MEL-PT User Guide

Mitsubishi ELectric PowerTrain

Solution

Version 3.02

MEAU – Engineering Group

This book applies to the Mitsubishi Electric Corporation product components and to all subsequent releases and modifications until otherwise indicated in new editions. Make sure you are using the correct edition for the level of the product.

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Content

Document Management Information

Date	Version No.	Document Name	Revision	Revised By
September 22, 2011	Alpha	MELPT-ASM Screens	Alpha Release for Customer Feedback and Demonstration	MEAU Custom Solutions Center
April 30th, 2012	Beta	MELPT-ASM Screens	Beta Release for Customer Feedback and Demonstration	MEAU Custom Solutions Center
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August 1st, 2012	V1.02	MELPT-ASM Screens	Corrections v1.02 revisions	MEAU Custom Solutions Center
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February 7th, 2013	V1.20	MELPT-ASM Screens	Main Screen Trigger devices added to navigation buttons to prevent navigation from main screen when communication failure Moved Superimpose from GD101 & 102 to labels Added Status observation to return to main screen when communication lost Blink Removed from Prompt Indicators on Manual Screen Corrected Indicator Work Prompt Indicator on Manual 3 Screen HARDWARE Interlink Screen Renamed Hardware Interlock Software Interlink Screen Renamed Software Interlock Comment File 180, Comment #50 Changed Camera Screen Status Indicators added to show individual bypass, and inspection complete W400 Fault Help Button has trigger, lamp indicator updated to reflect W611 Speed Input error corrected Corrected Comment File #24 OMRON Program updated to support two antenna Corrected Window 610, Selection Indicator, added units to values HM I Tool Counter Screen is updated to reflect FB change	MEAU Custom Solutions Center
December 31st 2013	V2.00	MELPT-ASM Screens	Documents the changes for V2.00 Complete Redesign of document	MEAU Engineering Group

2/10/2016	V3.00	MELPT	Documents the project as-is for v3.00. Project and document redesigned	MEAU Engineering Group
3/9/2016	V3.01	MELPT	Memory mappings changed to accommodate more than 1 add-on package	MEAU Engineering Group
3/18/2016	V3.02	MELPT	Model Management Package Updates	MEAU Engineering Group

1 OVERVIEW

1.1 Product Overview

The MEL-PT project is a MELSOFT Navigator Workspace that includes a GOT Project and PLC Project, along with used system labels and structured data types. This workspace was designed to be used with Mitsubishi Ethernet enabled Q Series PLC and up to 4 total GT16 or GT27 Series HMI with 800x600 resolution.

The project is intended to provide the user an example program or starting point for the programming of an assembly operation or machining center in powertrain manufacturing.

Some concepts can be applied outside of powertrain manufacturing, and the MEL-PT project can be applied to meet your specific needs.

The open concept of MELPT allows additional screens, programming, or features to be added to meet the specific demands of the end user.

The programming contained within this product can be used to reduce the implementation time and effort, and institute a common look and feel to an installation.

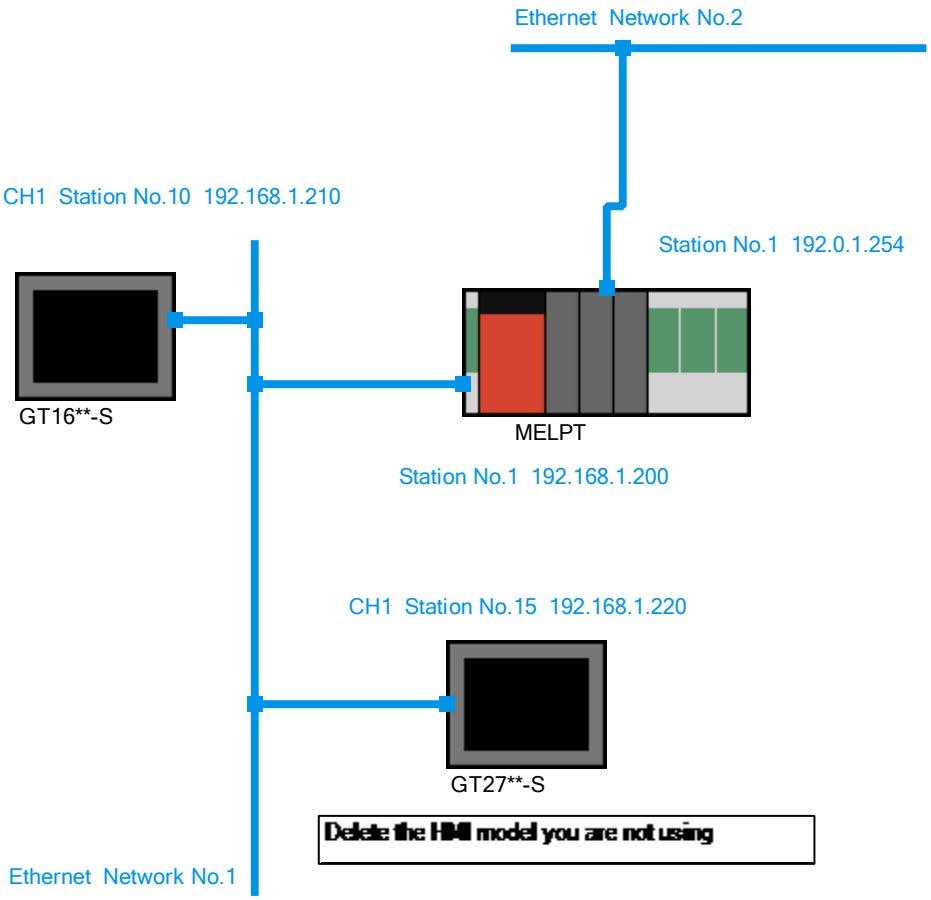


Figure 1: Front Port Network Layout

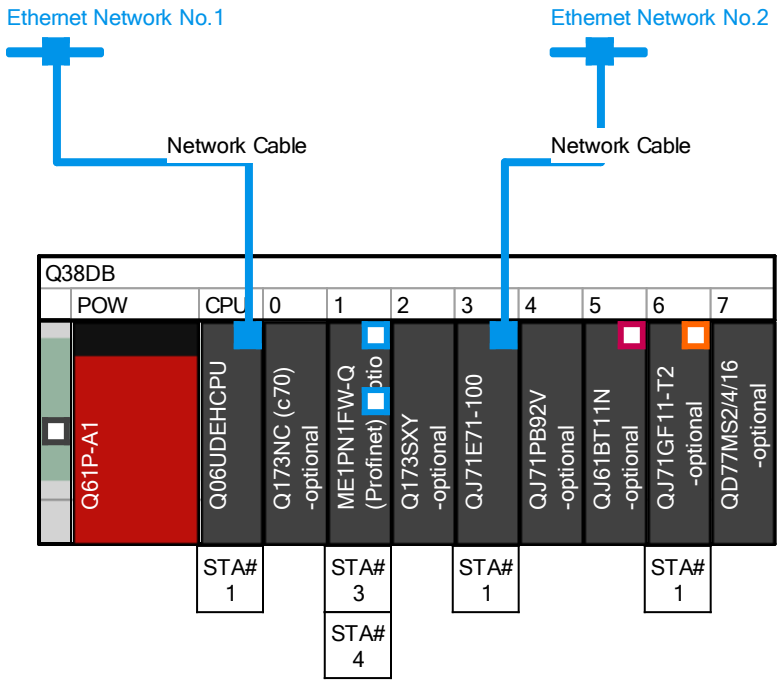


Figure 2: Q-Rack Layout

1.2 What is included in this document?

This document describes the MEL-PT template, from a functional standpoint.

Topics will include:

- Overall Concept
- HMI
  - Screen Objects
  - Alarming
  - Comment Files
  - Scripting
- PLC
  - Parameters
  - Programming
    - Function Blocks
    - Functions
    - Related Data Structures
- Additionally an application example may be detailed to help in understanding how to apply the given materials to an application

1.3 Basic Knowledge

To implement a MELPT system, the following IQ Works knowledge is required:

1.3.1. HMI

- Installation of GT Designer 3
- Installation of GOT BOOT and Project OS
- Setup and operation of Graphic Operator Terminals (GOT)
- Configuration of the HMI and connections between HMI and PLC
- Creation and Properties of Screen Objects
- Scripting
- Testing of HMI configurations

1.3.2. PLC

- Installation of GX Works 2
- Ability to handle project archives
- Working with FB programming
- Ability to connect to and monitor a PLC
- Ability to connect to a PLC for the reading and writing of parameters and program data
- Knowledge of the operation of GX Works 2 functions
- Use of structured data types
- Use of User Libraries
- Assignment of PLC registers to labels
- Automatic –assignment principles

1.3.3. System labels/Navigator

- Installation of MELSOFT Navigator
- Create and use labels
- Create, modify, and use Structured Data Types
- Registering and un-registering System Labels
- Changing hardware configurations

1.4 Hardware requirements

The MELPT_ASM Project is released for a Q06UDEH PLC, and GT16**-S or GT27**-SHMI. The QnU Processor must have a serial number with first 5 numbers greater than 11043. The HMI Project can be adapted to fit any GT16 series HMI. The Default project has a resolution of 800 pixels wide by 600 pixels high. It is highly recommended the HMI project utilizes the CF or SD memory of the GOT. Due to the initial project size it is recommended that the HMI project be loaded onto a CF card.

1.5 Software requirements

1.5.1. PLC

MELPT_ASM_PLC was created using GX Works 2 version 1.540N. The following GX Works 2 Options are selected from MELPT that differ from defaults:

- Project
  - Automatic Save
    - Save Project after writing to PLC is selected
- Program Editor
  - Structured Ladder Tool Hint
    - Class Selected
    - Device Comment Not Selected
    - Data Type Selected
    - Constant Value Selected

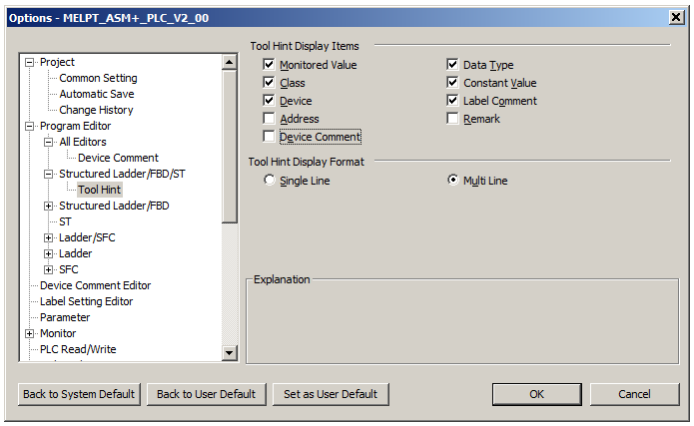


Figure 3 - GX Works 2 Options

- FB/FUN
  - Double Clicking Opens Body

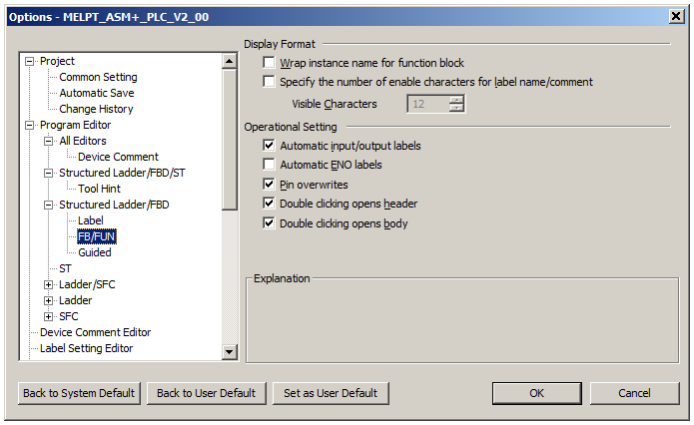


Figure 4 - GX Works 2 Options

- Label Setting Editor

- Display Last Blank Row Selected

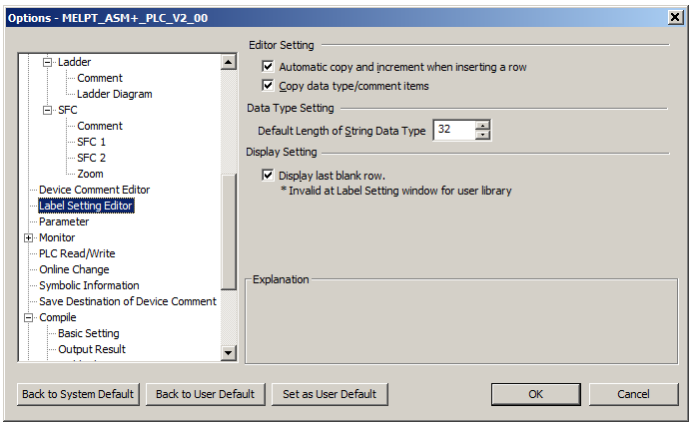


Figure 5 - GX Works 2 Options

- Monitor
  - Structured Ladder
    - Always Verify with PLC is Selected

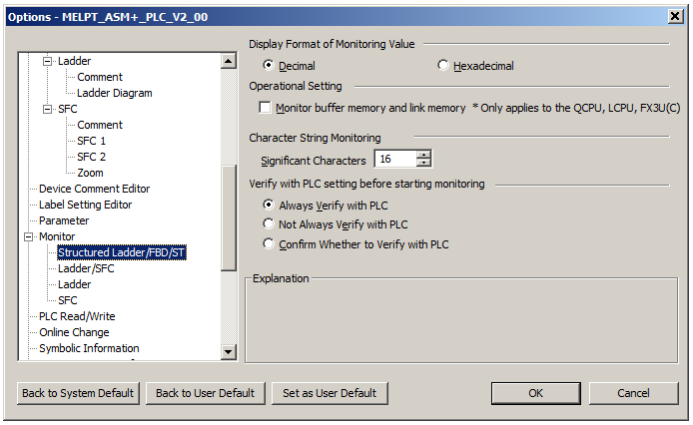


Figure 6 - GX Works 2 Options

- Symbolic Information
  - Save Destination Standard ROM

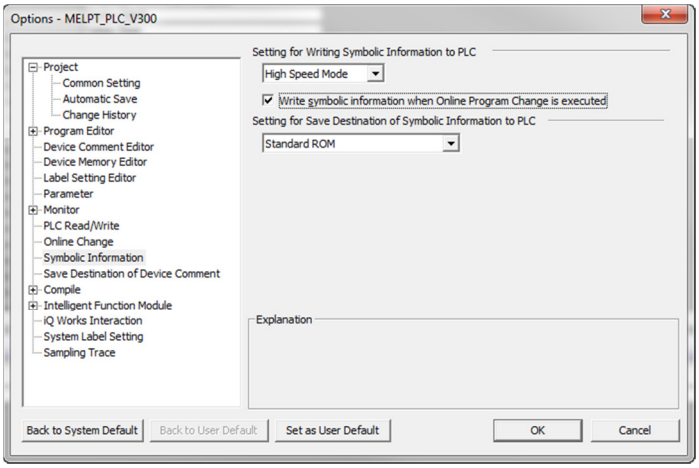


Figure 7 - GX Works 2 Options

1.5.2. HMI

MELPT_ASM_GOT was created using GT Designer 3 1.136s. When Installing the OS of each GOT there are options that should be installed to receive the full functionality of the MELPT template.

For Extended Function OS:

- Operator Authentication
  - allowing the creation of users with individual levels

For GOT16 only:

For Option OS:

- Object Script

For Standard Monitor OS:

- Standard Font: Japanese (Support Europe)
  - enabling the German language System Language to be displayed when German language is selected

For Machining Operations:

Extended Function OS:

CNC Data I/O

CNC Machining Program Edit

Option OS:

Ladder Monitor

CNC Monitor

For Model Management Operation GOT 1000:

Option OS: Recipe

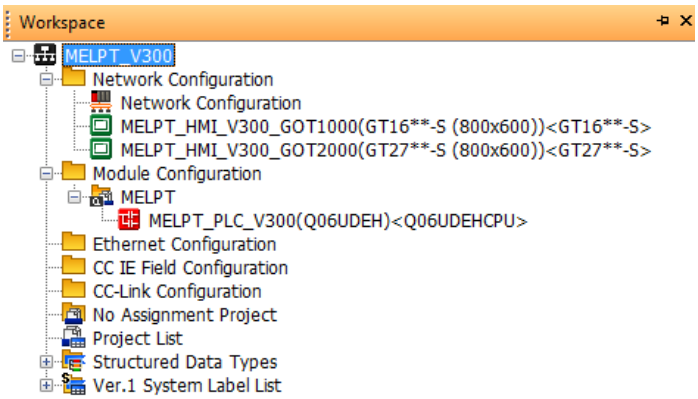
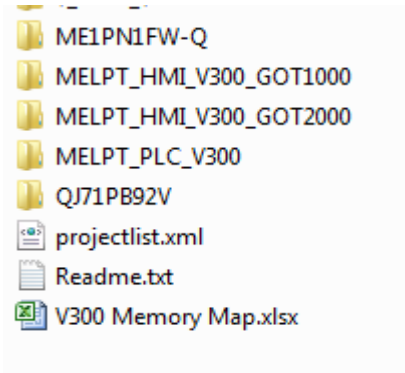
For Model Management Operation GOT 2000:

Extended Function: Recipe Operation

2 SYSTEM SETUP

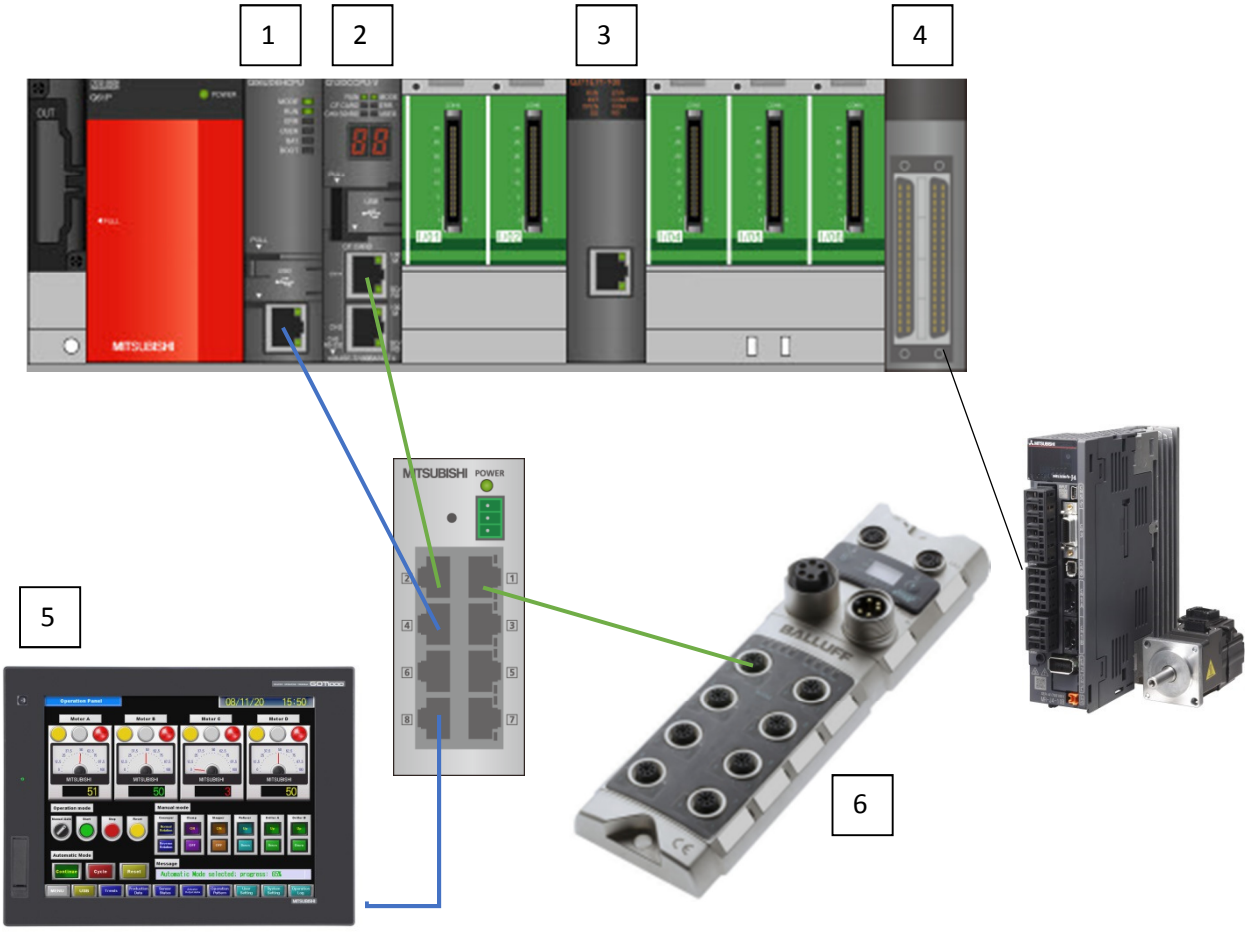
2.1 Unpacking the source project

MELPT is supplied as a MELSOFT Navigator compressed Workspace. The workspace must be unpacked with MELSOFT Navigator. The unpacked source project has the following structure:

	Network Configuration • GOT1000 HMI Project • GOT2000 HMI Project
	Q Module Configuration • PLC Project
	Registered Structured Data Types
	System Label Folders
	Extraction Location contains additional information
	ME1PN1FW-Q: Sample PN Configuration file Qj71PB92V: Sample DP Configuration File
	V300 Memory Map Excel Sheet documenting how memory is mapped out

2.3 Example of System Configuration

For Q series, here is a typical system setup for MELPT



No.	Module	Description
1	**Q series programmable controller with Ethernet interface**	Use the base unit, power supply module, and Q series Built-in Ethernet port CPU module. The cpu runs the MELPT program components selected
2	**Fieldbus Module**	Master Module for Distributed IO
3	**QJ71E71**	Dedicated FIS connection point
4	**Simple Motion Module**	Module used to command servo motion
5	**HMI**	Operator/Maintenance interface
6	**Field IO Block**	IO Block for the respective fieldbus

2.4 Programming Software Requirements

To properly open, configure, edit and save project data the required software with minimum

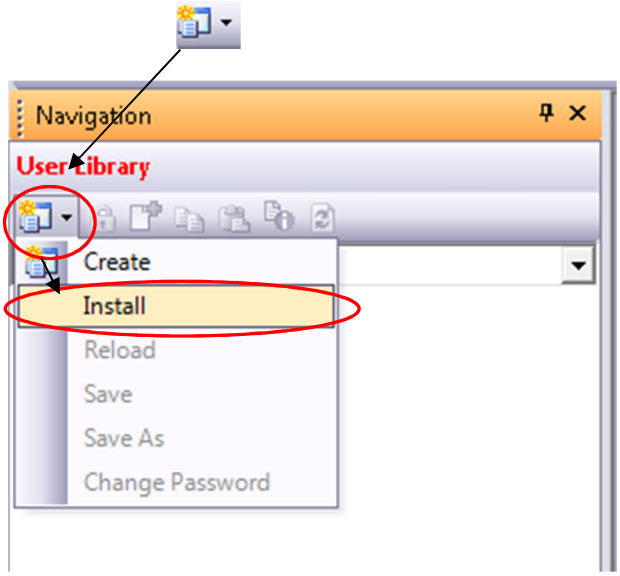
revision level is listed below:

Software Title	Version	Description
GX Works2	1.540N	PLC software needed for all PLC-related configurations and programming. Used in conjunction with MELSOFT Navigator.
Navigator	2.12N	Software that manages system labels and parameters
GT Designer	1.136S	HMI configuration software
PN Configurator	1.03	Used in Profinet Configurations
Configurator-DP	1.12	Used in Profibus Configurations

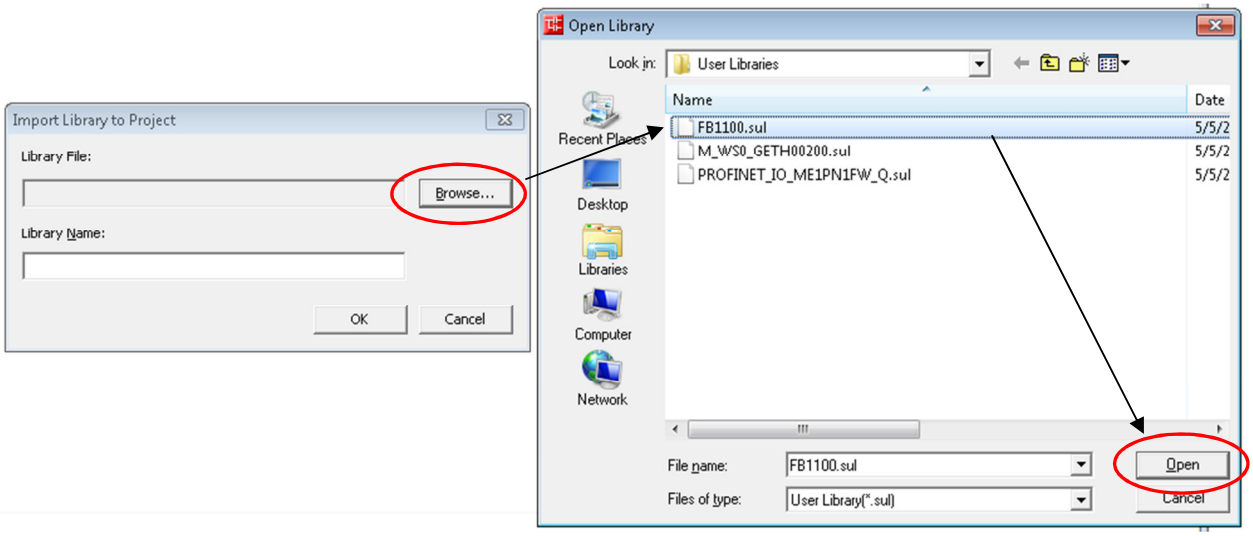
2.5 *Importing User Libraries*

This section explains how to import any User Library into GX Works2.

1) Click on the "User Library" tab on the GX Works 2 Navigation Pane.
2) Click the arrow part of this icon, to bring a drop-down menu. Select the "Install" option:

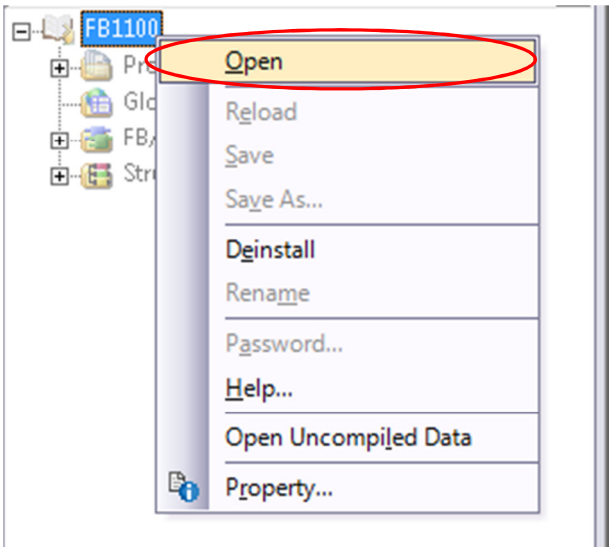


3) From the "Import Library to Project" window, click the Browse button, find the .sul library file, and click Open:



4) Click the “OK” button. Click “OK” again when prompted that the library has been installed.

The library elements will now show up as a directory tree in the Navigation Pane. Right click on the top folder and select “Open” to view/edit the library elements:



3 MELPT COMMON SETTINGS

This section will list settings in the project that are needed for certain functions to work

3.1 HMI Project

This section covers general information about how the HMI project is setup

Up to 4 HMI's can connect to the PLC and display unique data.

3.1.1. HMI Number

To be able to uniquely display information on HMI #1 from HMI #2 each HMI needs a separate number. Included in the MELPT project, are structures and scripting for 4 HMI. Using this HMI number, script #6 moves the data to the correct data location on the PLC. The HMI Number can be modified within the project under System->Script->Script Symbol.

Any number outside of 1-4 is treated as 1.

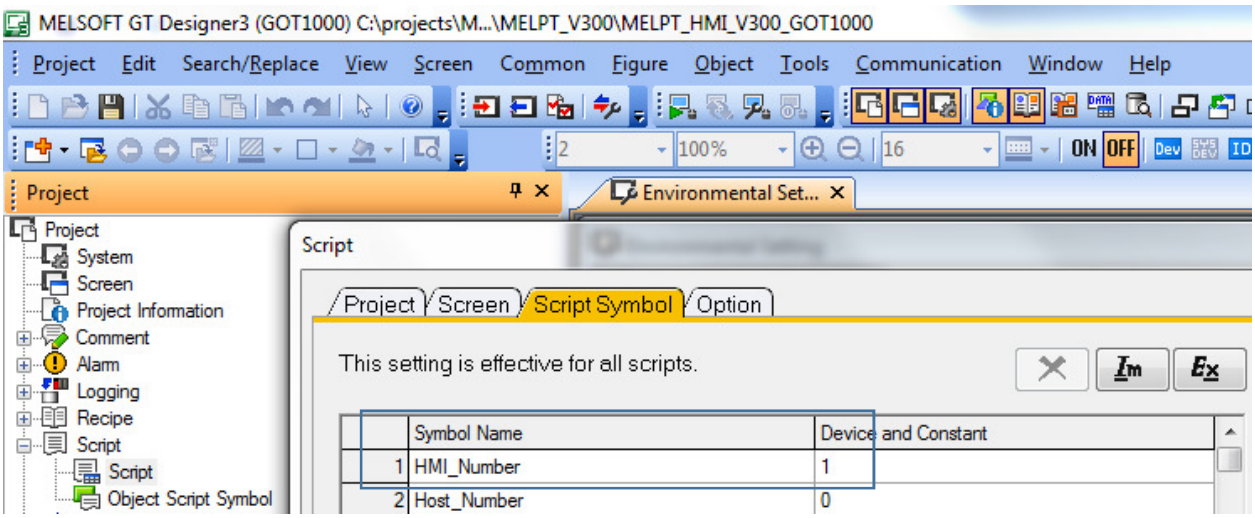
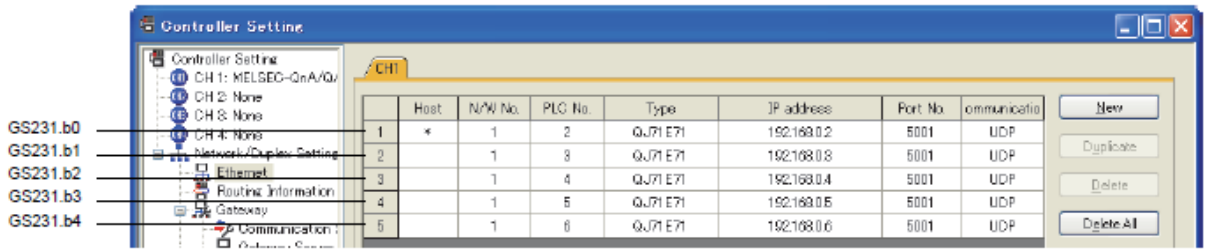


Figure 8 Script Symbols

3.1.2. Host Number

This number refers to the bit number to monitor within GS231



Device	Ethernet Setting No															
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
GS231	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Figure 9 - GS231 Information

This Boolean is placed in GB64000, When GB64000 is on. HMI returns to the main screen and does not allow navigation away from it. This scenario treats as if the PLC was disconnected from the HMI.

3.1.3. Environmental Settings

Project script Number #6 moves HMI_General labels to the GD registers listed, and back.

3.1.3.1. Screen-switching:

Many objects or scripts will refer to the following registers; by placing the **decimal** value into the appropriate register the HMI will display the associated screen.

An overlap window is moveable by the operator and up to 5 are available on screen at one time

A superimpose window is used interchangeable with the base screen up to 2 are available on screen at one time

- MELPT screen navigation uses Superimpose Window #2

The dialog window is placed in the foreground. While displayed other screens cannot be operated or updated.

Object	Register		Object	Register
Base Screen	GD64000		Superimpose Window 1	GD64060
			Superimpose Window 2	GD64070
Overlap Window 1	GD64010			
Overlap Window 1 X-position	GD64011		Dialog Window	GD64080

Object	Register		Object	Register
Overlap Window 1 Y-position	GD64012			
Overlap Window 2	GD64020		Overlap Window 4	GD64040
Overlap Window 2 X-position	GD64021		Overlap Window 4 X-position	GD64041
Overlap Window 2 Y-position	GD64022		Overlap Window 4 Y-position	GD64042
Overlap Window 3	GD64030		Overlap Window 5	GD64050
Overlap Window 3 X-position	GD64031		Overlap Window 5 X-position	GD64051
Overlap Window 3 Y-position	GD64032		Overlap Window 5 Y-position	GD64052

3.1.3.2. Language Screen:

The Language and System Language values are maintained by the PLC.

GD64100 = Language Switching Device

Decimal Value	Language
1	English
2	Italian
3	Chinese
4	Portuguese
5	Spanish
6	German
7	Polish
8	Spare
9	Spare
10	Spare

GD64101 = System Language Switching

GOT 1000			GOT 2000	
Decimal Value	Language		Decimal Value	Language
0	English		0	English
1	Japanese		1	Japanese
2	English		2	English
3	Chinese		3	Chinese
4	Chinese		4	Chinese
5	Korean		5	Korean
6	German		6	Not Set
7	English		7	Not Set

3.1.3.3. System Information:

The system signals such as base screen number are contained within this area.

System Scripts 1, 2, and 6 move this data back and forth to the PLC.

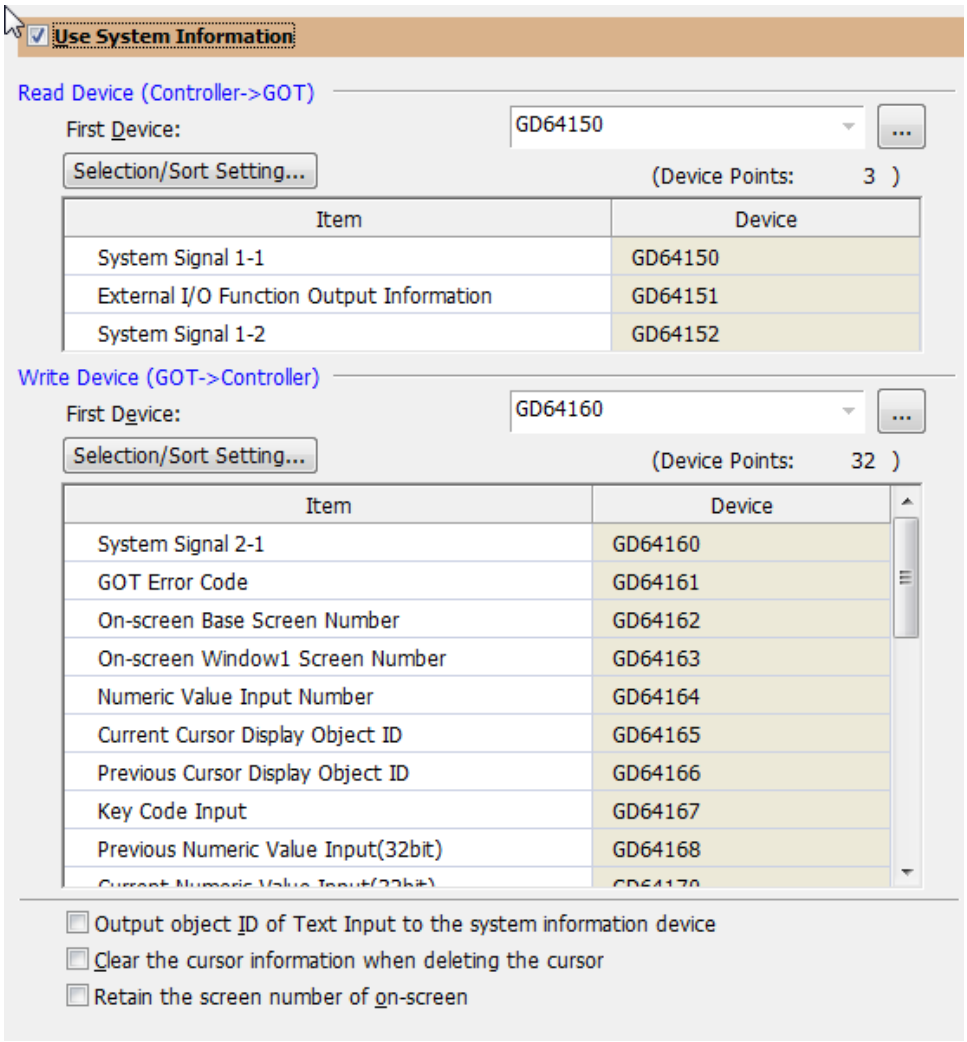


Figure 10 -System Information Screen

The following GOT 2000 Write Device information is not included:

GOT Error Code 2	Drive D Capacity
Drive F Capacity	Drive G Capacity

GD64162 is used by project script #2 to determine which bit to turn on within the HMI_ScreenActive structure.

There are four structures in the MELPT application one for each possible HMI. Script #6 then places the active bit in the proper HMI_ScreenActive_1, _2, _3, or 4 based on the HMI number that was specified

HMI_ScreenActive

3.1.3.4. Security Level:

The security level is assigned in the operator authentication of the HMI. When the user logs in to operator authentication this value is sent to the PLC. A FB on the PLC, MELPT_SYS_GOTSetup first determines which base screen the user is on from the HMI_ScreenActive structure for that HMI. If the screen is active then the Security level from operator authentication for that HMI is compared to preset values on the function block for various functions.

If the security level is equal to or greater than the pre-set level and the HMI has the appropriate HMIScreenActive bit TRUE, The PLC will set the HMI_General_X.SecurityOK to TRUE. The HMI will then place this bit into GB65101.

GB65101 is commonly used as a trigger and lamp device to allow editing features when the HMI_General_x.SecurityOK is TRUE.

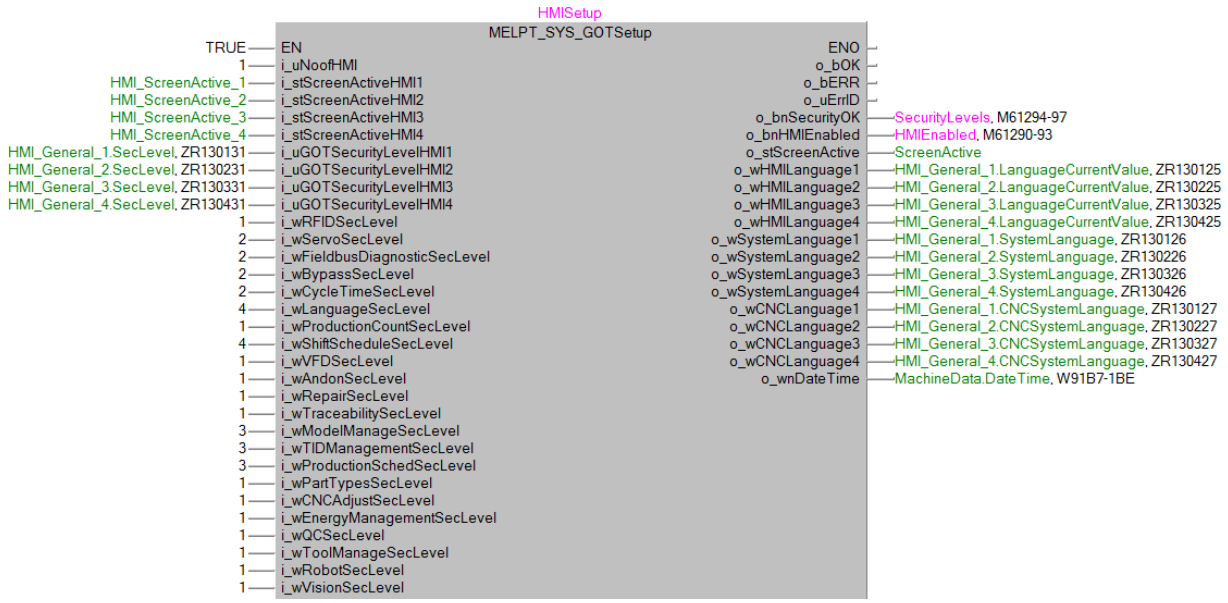


Figure 11 - MELPT_SYS_GOTSetup

Items on the HMI will have a different appearance depending on the value of GB65101

Item	GB65101==ON	GB65101==OFF
Push Button	ANTENNA –	ANTENNA +
Numeric Input	38.7	100
ASCII Input	TID 2	ABCDEFG

3.1.4. GOT Setup:

The System Language is defaulted to English

The Utility Call button is the Upper Left hand corner of the HMI by default.

The GOT time is synchronized to the PLC time at an interval of every 3 minutes.

Screen Saver Time is set to 20 minutes.

3.1.5. Comment Files

The HMI uses comment files to handle Language switching. Comment files 200 thru 250 are for OEM use.

There is up to 10 columns for Language Switching in a comment file.

There files are intended as below

Decimal Value	Language
1	English
2	Italian
3	Chinese
4	Portuguese
5	Spanish
6	German

Decimal Value	Language
7	Polish
8	Spare
9	Spare
10	Spare

Comment File List:

General Categories		
Comment File Number	Comment File Name	Comment File Description
3	Screen Names	A List of all screens, used for navigation buttons
10	Alarm	All User Alarms and warning
11	Corrective Action	Corrective Action for Alarms
12	Prompts	User Prompting
15	FCA EMEA Alarms	Alternative Alarm
20	CC-link IE	Errors and locations for fieldbus
21	Profinet	Errors and locations for fieldbus
22	CC-link	Errors and locations for fieldbus
23	Profibus	Errors and locations for fieldbus
24	Spare-Fieldbus	
25	Simple Motion	Module Errors for QD77 cards
26	QJ71E71	Module Errors for QJ71E71 card
27	DA_AD	Module Errors for DA and AD to cards

General Categories		
Comment File Number	Comment File Name	Comment File Description
28	Serial	Module Errors for Serial communication cards
29	Spare-Intelligent	
30	Balluff RFID	RFID Errors
31	Omron RFID	RFID Errors
32	Siemens RFID	RFID Errors
33	TURCK RFID	RFID Errors

Overview Screens F1 (100-109)		
Comment File Number	Comment File Name	Comment File Description
100	Main	Text Descriptions for the Main Screens
101	Machining	Machining related text
102	Startup	This is a manual type screen and the comment file follows a manual type format
103	Part Status	Part Status Screen Text
104	Device Screen	This is a manual type screen and the comment file follows a manual type format
105	Cycle Type	This is a manual type screen and the comment file follows a manual type format
106	Cycle Time	Cycle Time Screen Text

107	Gantry	Gantry Overview Screen text
108-109	Spare	

Manual Screens F2 (110-119)		
Comment File Number	Comment File Name	Comment File Description
110	Manual	This is a manual type screen and the comment file follows a manual type format
111-119	Spare	

Diagnostics Screens F3 (120-129)		
Comment File Number	Comment File Name	Comment File Description
120	Fieldbus Diagnostics	
121	Hardwire Interlocks	This comment file has a specific format
122	Software Interlocks	This comment file has a specific format
123	Ethernet	Ethernet Screen Text
124	Vision	Vision Screen Text
125	RFID	RFID Comment Text
126	Laser marking	Laser Mark Common Text
127	HW IO	This comment file has a specific format
128	Andon	This comment file is for ANDON test

129	FIS	This comment file is end user specific

Fault Screens F4 (130-139)		
Comment File Number	Comment File Name	Comment File Description
130	Fault Screen	
131	Data Block Check Screen	
132	FB Alarm Block	
133-139	Spare	

Production Screens F5 (140-149)		
Comment File Number	Comment File Name	Comment File Description
140	Part Counter	
141	Traceability	Text for Traceability Screens
142	Spare	
143	Master Data	
144	Spare	
145	Shift Schedule	Text for Shift Schedule
146	Production Schedule	Text for Production Schedule
147	Model Management	Text for Model Management screens
148	Parts Overview	
149	Spare	

Maintenance Screens F6 (150-159)		
Comment File Number	Comment File Name	Comment File Description
150	Maintenance Call	This is a manual type screen and the comment file follows a manual type format
151	Servo Setup	Servo Screen Text
152	Password	Password Screen Text
153	Spare	
154	VFD	VFD Screen Text
155	Language	Language Change Screen Text
156	Energy	Energy Screen Text
157-159	Spare	

Repair Screens F7 (160-169)		
Comment File Number	Comment File Name	Comment File Description
160	Repair	Repair Text
161	Spare	
162	Operator Code	Operator Code Screens Text
163	Pallet Repair	Pallet Repair Screen text
164	Reintroduce	Reintroduce Screen Text
165-169	Spare	

Quality Screens F7 (170-179)		
Comment File Number	Comment File Name	Comment File Description
170	Tool counter	Tool Counter Screen Text
171	Quality check	Quality Check Screen Text
172-179	Spare	

Misc. (180-199)		
Comment File Number	Comment File Name	Comment File Description
181	CNC Adjust	
182	PLC/CNC Status	
190	IO Input descriptions	
191	IO Output Descriptions	

3.1.6. User Alarming

Alarm Number	Name	File Save	File Save Name
1	Fault Nafta	Yes	A:\CPTALARMHST
2	Fault EMEA	Yes	A:\FPTALARMHST
3	Prompts	No	
10	Simple Motion	yes	A:\Servo
20	CC-link IE	Yes	A:\CCLinkIE
21	Profinet	Yes	A:\Profinet
22	CC-link	Yes	A:\CCLink
23	Profibus	YES	A:\QJ71PB92V

Alarm Number	Name	File Save	File Save Name
26	Ethernet	Yes	A:\QJ71E71
27	Digital to analog	YES	A:\DA
28	Analog to Digital	YES	A:\AD
29	Serial	YES	A:\Serial
30	RFID-Balluff	YES	A:\RFID
31	RFID-Omron	YES	A:\Omron

3.1.7. Project Scripting

Project Scripts run every HMI scan

Script Number	Description
1	Loads Station data to HMI Internal registers
2	Sets the screen Active Bit
3	Determines the Fieldbus Data to Display
4	Moves the Screen enabled data to Got internal registers, determines the text to display for F7
5	Moves Machine Data to Internal Registers
6	Moves HMI General and Screen Active Data to the PLC.
10	Moves Model Management Triggers to Internal Registers

3.1.8. Screen Scripts

These scripts are only run when the screen is displayed on the HMI

Screen and Screen Number	Script Number	Description
Startup (B-100)	100	Moves Associated Startup Screen Data to the Manual Screen Template
Part Status (B-110)	110	Moves The Part Status Data for the Page Selected on to the screen
Bypass (B-120)	120	Moves Associated Bypass Screen Data to the Manual Screen Template

Screen and Screen Number	Script Number	Description
Cycle Type (B-130)	130	Moves Associated Cycle Type Screen Data to the Manual Screen Template
Manual (B-200)	200	Moves Associated Manual Screen Data to the Manual Screen Template
Hardwire Interlocks (B-310)	310	Moves Hardwire Interlocks Screen Data to the IO Screen Template
Software Interlocks (B-320)	320	Moves Software Interlocks Screen Data to the IO Screen Template
Ethernet (B-330)	330	Preloads Window Numbers and X-Y coordinates for the overlap windows
Ethernet (B-330)	331	When the download to USB button is pressed the Qj71E71 Alarm file is saved on the USB stick (only executes when the button is pressed until the files are done copying)
RFID (B-350)	350	Moves the 1 Byte Write Data to an HMI register for editing
RFID (B-350)	351	When the download to USB button is pressed the Alarm file for the RFID system in use is saved on the USB stick (only executes when the button is pressed until the files are done copying)
PLC Status	360	Preloads Window Numbers and X-Y coordinates for the overlap windows
HW IO (B-380)	380	Moves HW IO Screen Data to the IO Screen Template
Model Maintenance (B-592)	592	Loads the correct superimpose window
Complexity Maintenance (B-593	593	Loads the correct superimpose window
Maintenance Call (B-600)	600	Moves Associated Maintenance Call Screen Data to the Manual Screen Template
Servo (B-610)	610	When the download to USB button is pressed the Alarm file for the SERVO system is saved on the USB stick (only executes when the button is pressed until the files are done copying)

Screen and Screen Number	Script Number	Description
VFD(B-640)	640	This Script is used to do floating point increment and decrements
Operator Login (B-700)	700	This script loads the correct window depending if the badge code reader is enabled or disabled.
Quality check (B-770)	770	This script calculates the offset for selecting a part type.
F7 Navigation (W-701)	701	This script determines what button to turn blue to signify currently on that screen.
CC-link IE Field Diagnostic	3011	When the download to USB button is pressed the Alarm file for the CC-Link IE field system is saved on the USB stick (only executes when the button is pressed until the files are done copying)
Profinet Diagnostic (W-3013)	3013	When the download to USB button is pressed the Alarm file for the Profinet system is saved on the USB stick (only executes when the button is pressed until the files are done copying)
CC-link Diagnostic (W-3015)	3015	When the download to USB button is pressed the Alarm file for the CC-Link system is saved on the USB stick (only executes when the button is pressed until the files are done copying)
Profibus diagnostic (w-3017)	3017	When the download to USB button is pressed the Alarm file for the Profibus system is saved on the USB stick (only executes when the button is pressed until the files are done copying)
Fault Summary (w-4100)	4100	When the download to USB button is pressed the Alarm file for the appropriate system is saved on the USB stick (only executes when the button is pressed until the files are done copying)
Fault text List (w-4200)	4200	This script calculates which comment file and numbers to display.

3.1.9. Status Observation

This category does not exist in GOT2000 projects it is combined with Trigger devices.

Screen	Condition	Action
Ethernet Screen (B-330)	GOTEthernet.NumberofQJ71E71>=1	Launch Qj71e71 #1 graphic number
Ethernet Screen (B-330)	GOTEthernet.NumberofQJ71E71>=2	Launch Qj71e71 #2 graphic number
Ethernet Screen (B-330)	GOTEthernet.NumberofQJ71E71>=3	Launch Qj71e71 #3 graphic number
Ethernet Screen (B-330)	GOTEthernet.NumberofQJ71E71>=4	Launch Qj71e71 #4 graphic number
TID Management (B-750)	GOTTIDManagement.EditingIndex!=0	Place Window 7503 in overlap 1; Window 7503 is password Input window
TID Management (B-750)	GOTTIDManagement.EditingIndex==0	Place 0 in overlap 1; Closes overlap window 1
Analog to Digital (W-3620)	AD.Enabled[1]==TRUE	Load Overlap Window 1 with Card 1 graphic
Analog to Digital (W-3620)	AD.Enabled[2] ==TRUE	Load Overlap Window 2 with Card 2 graphic
Analog to Digital (W-3620)	AD.Enabled[3] ==TRUE	Load Overlap Window 3 with Card 3 graphic
Analog to Digital (W-3620)	AD.Enabled[4] ==TRUE	Load Overlap Window 4 with Card 4 graphic
Digital to Analog (W-3630)	DA.Enabled[1]==TRUE	Load Overlap Window 1 with Card 1 graphic
Digital to Analog (W-3630)	DA.Enabled[2]==TRUE	Load Overlap Window 1 with Card 2 graphic
Digital to Analog (W-3630)	DA.Enabled[3]==TRUE	Load Overlap Window 1 with Card 3 graphic
Digital to Analog (W-3630)	DA.Enabled[4]==TRUE	Load Overlap Window 1 with Card 4 graphic

Screen	Condition	Action
Serial (W-3640)	Serial.Enabled[1]==TRUE	Load Overlap Window 1 with Card 1 graphic
Serial (W-3640)	Serial.Enabled[2]==TRUE	Load Overlap Window 1 with Card 2 graphic
Serial (W-3640)	Serial.Enabled[3]==TRUE	Load Overlap Window 1 with Card 3 graphic
Serial (W-3640)	Serial.Enabled[4]==TRUE	Load Overlap Window 1 with Card 4 graphic

3.1.10. Trigger Devices

IF GOT 2000 all settings within Status Observation are contained under the heading of Trigger Devices

3.1.11. Object Triggers

Object Triggers are commonly used on Switches and Entries to prevent activation of Booleans or the modification of data.

When the Trigger evaluation is FALSE on a switch, ASCII Input, or Numeric Input; Modification to the device controlled by the object is not allowed, and does not occur.

3.1.12. Switch-Display State

Off states of switches is black text on gray background.

On States, which can be key-press, bit, or word driven, are White Text on Blue background

When switches do not work, typically because trigger conditions are not satisfied is Dark Gray Text on Gray background.

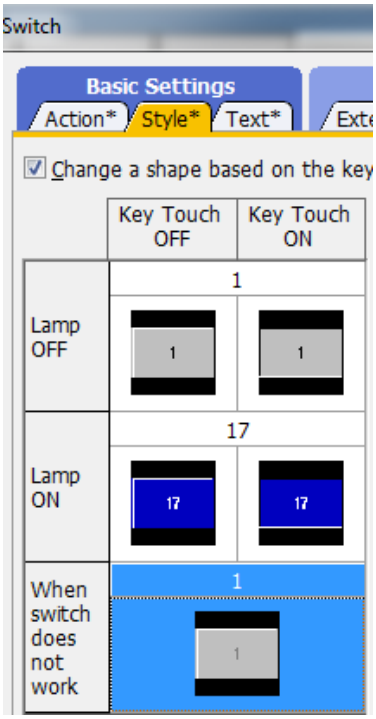


Figure 12-Switch States

3.1.13. Bit Lamp Display State

In the case of safety devices RED (224) is the OFF state.

For non-safe devices GRAY (182) is the OFF state

In the case of safety devices GREEN (28) is the ON State

For non-Safe devices the ON state is application specific.

3.1.14. Multi-State Indicator (Word Lamps) Display State

Yellow (252) is typically used when a change has been entered but not saved.

Teal (22) is used for selected

When needed a legend is included.

The following image is captured from the GT Designer #3 Function Manual regarding states. When multiple states for an indicator is true, the True State with the smallest number has priority

***2 state**

For details of states, refer to the following.

☞ (Fundamentals) 5.3.4 State setting

(1) When state are overlapped

When state are overlapped, the state with smaller No. has priority.

Example) Monitor device : D100
Data type : Signed BIN16

The operation priority for setting overlap state	State No.	Range	Lamp	Display text	Blink
High	1	M10 ON	Red	Stop	No
	2	60<=$V<=80	Yellow	Caution	No
↓	3	81<=$V	Red	Alarm	Low
Low	Normal case (State 0)	-	Blue	Normal operation	-

* $V is the monitor device value.

State 1	When M10 is ON, the lamp will be red and the displayed text will be Stop.	Stop
State 2	When the device value is between 60 and 80 (60<=$V<= 80), the lamp will be yellow and the displayed text will be "Caution"	Caution
State 3	When the monitor device value is 81 or more (81<=$V), the display (lamp color and displayed text) on the state 3 and the lamp color on the state 0 blink alternately. The text set on the state 0 is not displayed.	Alarm ↔ Blink every second.
Normal case (State 0)	When the condition is other than the state 1. 2, and 3, the lamp lights in blue and "Normal operation" is displayed.	Normal operation

Figure 13- Multistate Indicators

3.1.15. Numeric Input Display States

Numeric entries use a 3D rectangle shape to signify they are an Input and not just a display.

The shape color is GRAY (182) for when editing is not allowed.

The shape color is WHITE (255) for when editing is allowed.

The shape Color is Yellow (252) when the write check bit is true.

These states are usually ties with the Trigger device of the object.

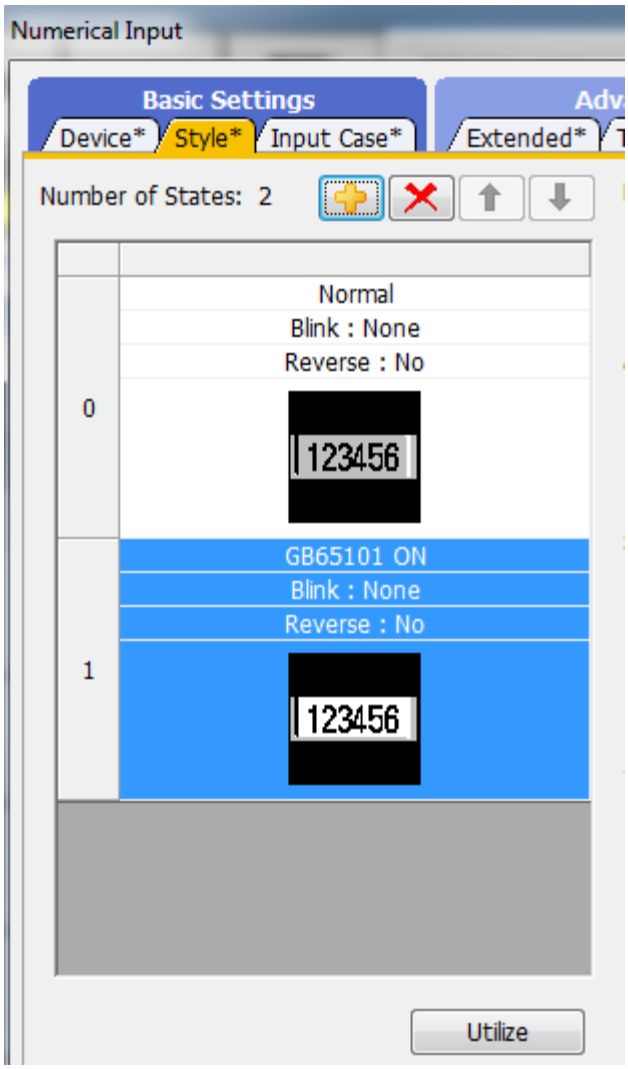


Figure 14-Numerical Input

Numeric Entries commonly will use a Write Check Boolean.

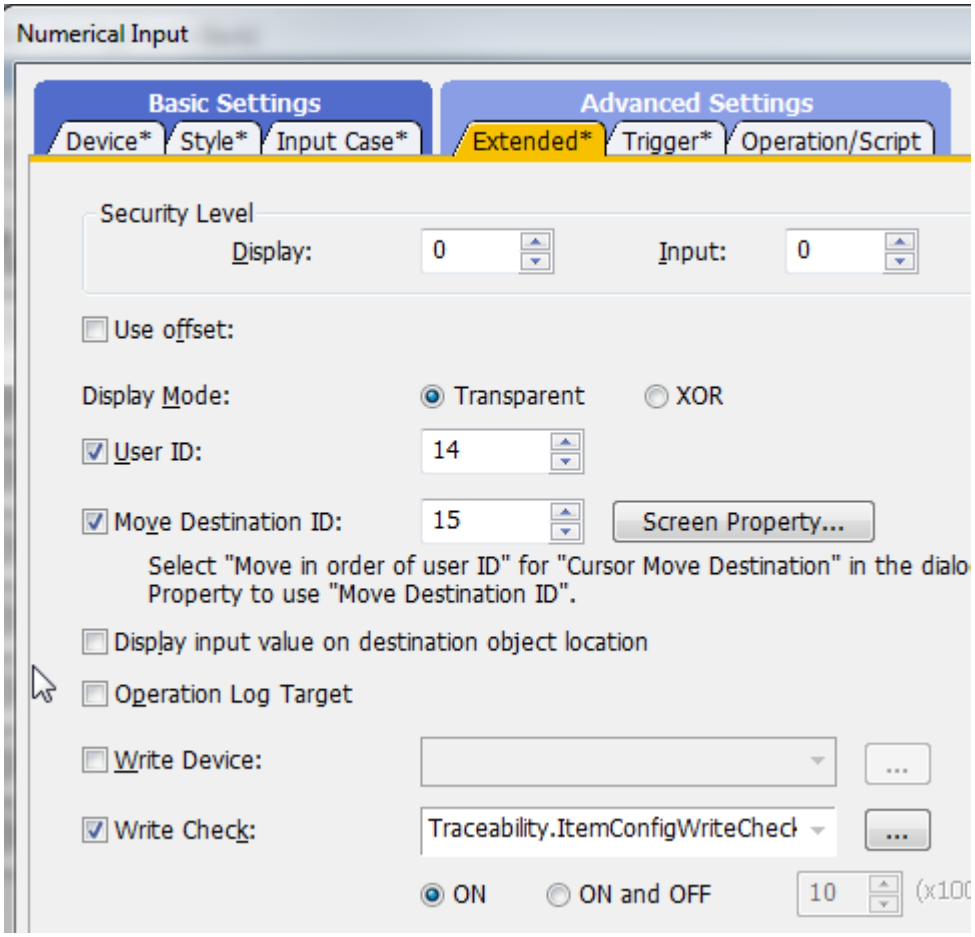
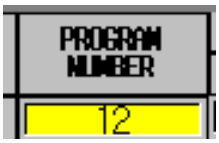


Figure 15- Write Check

This bit is used as a handshake with the PLC; it notifies the associated PLC code a change has been made. Resetting of the write check is commonly done by the associated PLC logic. This bit is used as a handshake with the PLC; it notifies the associate PLC code a change has been made. Resetting of the write check is commonly done by the associated PLC logic. In Many cases when a write check bit is used, a save changes or clear changes pushbutton will also be included. Save changes will write the edited HMI information to the PLC registers. Clear Changes will refresh HMI data with stored PLC data and reset the write check bit. In cases where a Save Changes push button is not included, PLC is logic is formatted to process changes from a write check bit immediately, and will refresh the HMI after the modification.

When the WriteCheck bit is set the object will display in a different color, commonly yellow is used:



3.1.16. ASCII Input Display states

ASCII entries are typically two objects layered. On top will be the ASCII input itself. On the back layer will be a word or bit lamp.

The ASCII Input will have a Trigger device to require proper credentials to edit a field.

ASCII Input objects will execute an object script when the enter button is pressed

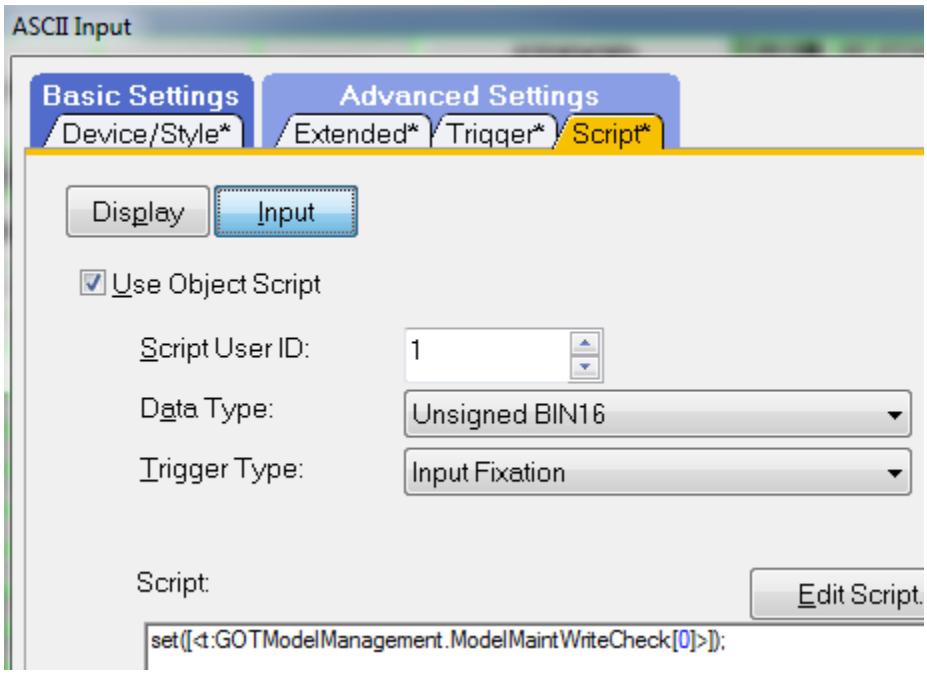


Figure 16-Example Input Fixation Write Check

The input fixation trigger is set when the enter key is pressed for the input. And will be set even when the value has not been changed.

This bit is used as a handshake with the PLC; it notifies the associate PLC code a change has been made. Resetting of the write check is commonly done by the associated PLC logic. In Many cases when a write check bit is used, a save changes or clear changes pushbutton will also be included. Save changes will write the edited HMI information to the PLC registers. Clear Changes will refresh HMI data with stored PLC data and reset the write check bit.

The lamp behind the ASCII Input will be default to gray (182), white (255) when user has permission to edit, and yellow (252) when write check bit is true.

3.1.17. GOT Registers used

3.1.18. Bits (GB)

PLC-> GOT
GOT Internal
GOT->PLC

GB	Usage Description
GB40	Always On
GB41	Always Off
GB42	Set By GOT When Screen Switch occurs

GOT System Data	
GB64000	Communication Lost to Host
GB64102	Language Change Signal
GB64111	Release as Reject build
GB64112	Release as Reject No Build
GB64113	Start/Stop
gb64150	Reset GOT Error
GB64200	Station Data-Home
GB64201	StationData-WorkCompleted
GB64202	Pallet Present
GB64203	RFIDinProgress
GB64204	RFIDReadComplete
GB64205	RFIDWriteComplete
GB64206	Part Present
GB64207	Blocked
GB64208	Starved
GB64209	In Cycle
GB64210	Faulted

GB64212	PalletPresent_Pre
GB64213	RFIDinProgress_Pre
GB64214	RFIDReadComplete_Pre
GB64215	RFIDWriteComplete_Pre

GB64216	Part Present_Pre

GOT System Data	
GB64300	ScreenEnabled.Main
GB64301	ScreenEnabled.Spare_01
GB64302	ScreenEnabled.Spare_02
GB64303	ScreenEnabled.Spare_03
GB64304	ScreenEnabled.Spare_04
GB64305	ScreenEnabled.Spare_05
GB64306	ScreenEnabled.Spare_06
GB64307	ScreenEnabled.Spare_07
GB64308	ScreenEnabled.Spare_08
GB64309	ScreenEnabled.Spare_09
GB64310	ScreenEnabled.Startup
GB64311	ScreenEnabled.PartStatus
GB64312	ScreenEnabled.Bypass
GB64313	ScreenEnabled.CycleType
GB64314	ScreenEnabled.CycleTime
GB64315	ScreenEnabled.Operation
GB64316	ScreenEnabled.Robot
GB64317	ScreenEnabled.Spare_17
GB64318	ScreenEnabled.Spare_18
GB64319	ScreenEnabled.Spare_19
GB64320	ScreenEnabled.Manual
GB64321	ScreenEnabled.Spare_21
GB64322	ScreenEnabled.Spare_22
GB64323	ScreenEnabled.Spare_23
GB64324	ScreenEnabled.Spare_24
GB64325	ScreenEnabled.Spare_25
GB64326	ScreenEnabled.Spare_26
GB64327	ScreenEnabled.Spare_27
GB64328	ScreenEnabled.Spare_28
GB64329	ScreenEnabled.Spare_29
GB64330	ScreenEnabled.FieldbusDiag
GB64331	ScreenEnabled.HWInterlock
GB64332	ScreenEnabled.SWInterlock
GB64333	ScreenEnabled.Ethernet
GB64334	ScreenEnabled.Vision

GB64335	ScreenEnabled.RFID
GB64336	ScreenEnabled.PLCStatus
GB64337	ScreenEnabled.LaserMark
GB64338	ScreenEnabled.HW_IO
GB64339	ScreenEnabled.ITData
GB64340	ScreenEnabled.FaultSummary
GB64341	ScreenEnabled.FaultHistory
GB64342	ScreenEnabled.Spare_42
GB64343	ScreenEnabled.Spare_43
GB64344	ScreenEnabled.Spare_44
GB64345	ScreenEnabled.Spare_45
GB64346	ScreenEnabled.Spare_46
GB64347	ScreenEnabled.Spare_47
GB64348	ScreenEnabled.Spare_48
GB64349	ScreenEnabled.Spare_49
GB64350	ScreenEnabled.PartCounter
GB64351	ScreenEnabled.LotTraceability
GB64352	ScreenEnabled.IndividualTraceability
GB64353	ScreenEnabled.MasterData
GB64354	ScreenEnabled.DressingData
GB64355	ScreenEnabled.PartsOverview
GB64356	ScreenEnabled.Spare_56
GB64357	ScreenEnabled.ShiftSchedule
GB64358	ScreenEnabled.ProdSchedule
GB64359	ScreenEnabled.ModelManagement
GB64360	ScreenEnabled.Maintenance
GB64361	ScreenEnabled.Servo
GB64362	ScreenEnabled.Password
GB64363	ScreenEnabled.ToolCounter
GB64364	ScreenEnabled.VFDConfig
GB64365	ScreenEnabled.CNC_Adjust
GB64366	ScreenEnabled.Language
GB64367	ScreenEnabled.Energy
GB64368	ScreenEnabled.System Monitor
GB64369	ScreenEnabled.IOL_Maint
GB64370	ScreenEnabled.RepairOverview
GB64371	ScreenEnabled.IndividualRepair
GB64372	ScreenEnabled.PalletRepair
GB64373	ScreenEnabled.PalletReintroduce
GB64374	ScreenEnabled.OperatorCode

GB64375	ScreenEnabled.TIDManagement
GB64376	ScreenEnabled.ToolManagement
GB64377	ScreenEnabled.QualityCheck
GB64378	ScreenEnabled.Spare_78
GB64379	ScreenEnabled.Spare_79
GB64380	ScreenEnabled.Information
GB64381	ScreenEnabled.Information
GB64382	ScreenEnabled.Information
GB64383	ScreenEnabled.Information
GB64384	ScreenEnabled.Information
GB64385	ScreenEnabled.StationManagement
GB64386	ScreenEnabled.ModelManagement
GB64387	ScreenEnabled.ComplexityManagement
GB64388	ScreenEnabled.ErrorProofing
GB64389	ScreenEnabled.Spare_89
GB64390	ScreenEnabled.CCLinkIEFieldDiag
GB64391	ScreenEnabled.ProfinetDiag
GB64392	ScreenEnabled.CCLinkDiag
GB64393	ScreenEnabled.ProfibusDiag
GB64394	ScreenEnabled.Spare_94
GB64395	ScreenEnabled.Spare_95

GOT System Data	
GB64400	ScreenActive.Main
GB64401	ScreenActive.Spare_01
GB64402	ScreenActive.Spare_02
GB64403	ScreenActive.Spare_03
GB64404	ScreenActive.Spare_04
GB64405	ScreenActive.Spare_05
GB64406	ScreenActive.Spare_06
GB64407	ScreenActive.Spare_07
GB64408	ScreenActive.Spare_08
GB64409	ScreenActive.Spare_09
GB64410	ScreenActive.Startup
GB64411	ScreenActive.PartStatus
GB64412	ScreenActive.Bypass
GB64413	ScreenActive.CycleType
GB64414	ScreenActive.CycleTime

GB64415	ScreenActive.Operation
GB64416	ScreenActive.Robot
GB64417	ScreenActive.Spare_17
GB64418	ScreenActive.Spare_18
GB64419	ScreenActive.Spare_19
GB64420	ScreenActive.Manual
GB64421	ScreenActive.Spare_21
GB64422	ScreenActive.Spare_22
GB64423	ScreenActive.Spare_23
GB64424	ScreenActive.Spare_24
GB64425	ScreenActive.Spare_25
GB64426	ScreenActive.Spare_26
GB64427	ScreenActive.Spare_27
GB64428	ScreenActive.Spare_28
GB64429	ScreenActive.Spare_29
GB64430	ScreenActive.FieldbusDiag
GB64431	ScreenActive.HWInterlock
GB64432	ScreenActive.SWInterlock
GB64433	ScreenActive.Ethernet
GB64434	ScreenActive.Vision
GB64435	ScreenActive.RFID
GB64436	ScreenActive.PLCStatus
GB64437	ScreenActive.LaserMark
GB64438	ScreenActive.HW_IO
GB64439	ScreenActive.ITData
GB64440	ScreenActive.FaultSummary
GB64441	ScreenActive.FaultHistory
GB64442	ScreenActive.Spare_42
GB64443	ScreenActive.Spare_43
GB64444	ScreenActive.Spare_44
GB64445	ScreenActive.Spare_45
GB64446	ScreenActive.Spare_46
GB64447	ScreenActive.Spare_47
GB64448	ScreenActive.Spare_48
GB64449	ScreenActive.Spare_49
GB64450	ScreenActive.PartCounter
GB64451	ScreenActive.LotTraceability
GB64452	ScreenActive.IndividualTraceability
GB64453	ScreenActive.MasterData
GB64454	ScreenActive.DressingData

GB64455	ScreenActive.PartsOverview
GB64456	ScreenActive.Spare_56
GB64457	ScreenActive.ShiftSchedule
GB64458	ScreenActive.ProdSchedule
GB64459	ScreenActive.ModelManagement
GB64460	ScreenActive.Maintenance
GB64461	ScreenActive.Servo
GB64462	ScreenActive.Password
GB64463	ScreenActive.ToolCounter
GB64464	ScreenActive.VFDConfig
GB64465	ScreenActive.CNC_Adjust
GB64466	ScreenActive.Language
GB64467	ScreenActive.Energy
GB64468	ScreenActive.System Monitor
GB64469	ScreenActive.IOL_Maint
GB64470	ScreenActive.RepairOverview
GB64471	ScreenActive.IndividualRepair
GB64472	ScreenActive.PalletRepair
GB64473	ScreenActive.PalletReintroduce
GB64474	ScreenActive.OperatorCode
GB64475	ScreenActive.TIDManagement
GB64476	ScreenActive.ToolManagement
GB64477	ScreenActive.QualityCheck
GB64478	ScreenActive.Spare_78
GB64479	ScreenActive.Spare_79
GB64480	ScreenActive.Information
GB64481	ScreenActive.Information
GB64482	ScreenActive.Information
GB64483	ScreenActive.Information
GB64484	ScreenActive.Information
GB64485	ScreenActive.StationManagement
GB64486	ScreenActive.ModelManagement
GB64487	ScreenActive.ComplexityManagement
GB64488	ScreenActive.ErrorProofing
GB64489	ScreenActive.Spare_89
GB64490	ScreenActive.CCLinkIEFieldDiag
GB64491	ScreenActive.ProfinetDiag
GB64492	ScreenActive.CCLinkDiag
GB64493	ScreenActive.ProfibusDiag
GB64494	ScreenActive.Spare_94

GB64495	ScreenActive.Spare_95

Generic Screen Use(reused per screen)	
GB64500-999	

Generic Screen Use(reused per screen)	
GB65000	Log Script Execute
GB65001	Convert
GB65002	Conversion in Progress
GB65003	Wait For Conversion Complete
GB65010	Script First Scan
GB65101	SecurityOK
GB65104	Display Station at Lower Limit
GB65105	Display Station at Higher Limit
gb65110	A Fieldbus Screen is available
GB65111	Diagnostic is chosen
GB65112	Diagnostic Script Mute
GB65120	Quality/Repair Button Enabled
GB65121	Quality/Repair Button Enabled
GB65122	Quality/Repair Button Enabled
GB65123	Quality/Repair Button Enabled
GB65124	Quality/Repair Button Enabled
GB65125	Quality/Repair Button Enabled
GB65131	On F1
GB65132	On F2
GB65133	On f3
GB65134	On f4
GB65135	On f5

GB65200	GOTModelManagement. RestoreFromMemoryCard
GB65201	GOTModelManagement. BackUpToMemoryCard

3.1.19. Words (GD)

PLC-> GOT
GOT Internal
GOT->PLC

GOT System Data		GOT System Data	
GD64000	Screen Switching Base Screen	GD64050	Screen Switching Overlap 5
GD64010	Screen Switching Overlap 1	GD64051	Screen Switching Overlap 5 x-position
GD64011	Screen Switching Overlap 1 x-position	GD64052	Screen Switching Overlap 5 y-position
GD64012	Screen Switching Overlap 1 y-position		
		GD64060	Superimpose #1
GD64020	Screen Switching Overlap 2	GD64070	Superimpose #2
GD64021	Screen Switching Overlap 2 x-position		
GD64022	Screen Switching Overlap 2 y-position	GD64080	Dialog Window
		GD64090	Previous Base Screen
GD64030	Screen Switching Overlap 3		
GD64031	Screen Switching Overlap 3 x-position	GD64100	Language Switch
GD64032	Screen Switching Overlap 3 y-position	GD64101	System Language Switch
		GD64102	Requested Language Number
GD64040	Screen Switching Overlap 4	GD64110-20	GOT Security
GD64041	Screen Switching Overlap 4 x-position	GD64150-52	GOT System Information Read
GD64042	Screen Switching Overlap 4 y-position	GD64160-99	GOT System Information Write

Station Data(Project Script #1)	
GD64200-4	Station Name
GD64205-12	Station Description
GD64215-19	Operator Name(script #4)
GD64221	Part Status
GD64225	Program Number
GD64226	Pick light Number
GD64228	Pallet Number
GD64230-9	Part Number
GD64240-9	Serial Number
GD64250-9	Part Description
GD64265-9	Signature

Machine Data(Project Script #5)	
GD64300	Overall
GD64301	Hydraulics
GD64302	Pneumatics
GD64303	Motor Overloads
GD64304	Lube
GD64305	Coolant
GD64306	Oil Mister
GD64307	Oil Cooler
GD64308	Mode
GD64309	Cycle Stop
GD64310	Operator In Attendance
GD64321	Pre-stop: Part Status
GD64325	Pre-stop: Program Number
GD64326	Pre-stop: Picklight Number
GD64328	Pre-stop: Pallet Number
GD64330-9	Pre-stop: Part Number
GD64340-9	Pre-stop: Serial Number
GD64350-9	Pre-stop Part Description
GD64365-9	Signature

Station Data(Project Script #1)	
GD64270-3	Operator Code
GD64275-6	Short Code
GD64280	Target Cycle Time
GD64282	Current cycle Time
GD64284	Last Cycle Time
GD64290	Tool hits Required 1
GD64291	Tool hits Required 2
GD64292	Tool hits Required 3
GD64293	Tool hits Required 4
GD64295	Tool Hits Accepted 1
GD64296	Tool Hits Accepted 2
GD64297	Tool Hits Accepted 3
GD64298	Tool Hits Accepted 4

Machine Data(Project Script #5)	
GD64370-3	Operator Code
GD64375-6	Short Code
GD64390	Pre-stop: Tool hits Required 1
GD64391	Pre-stop: Tool hits Required 2
GD64392	Pre-stop: Tool hits Required 3
GD64393	Pre-stop: Tool hits Required 4

SPARE	
GD64400-99	

Generic Screen Use(reused per screen)	
GD64500-999	

System Data	
GD65000	User Alarm ID (Script #4)
GD65001	Cycle Counter for alarm csv Conversion
GD65002	Alarm Copy Placeholder
GD65003	alarm Level Filter
GD65011	Fault Summary Superimpose Window
GD65012	Alarm Text Comment File
GD65013	Alarm Text Last Alarm
GD65020	Fault Text List Header
GD65050	User Alarm Display Alarm ID
GD65051	User Alarm Comment Group Number
GD65052	User Alarm Display Comment Number
GD65053	User Alarm Display Alarm Status
GD65054	User Alarm Display Occurred Date
GD65056	User Alarm Display Occurred Time
GD65060	User Alarm Display Restored Time
GD65062	User Alarm Display Checked Date
GD65064	User Alarm Display Checked time
GD65066	User Alarm Display Level
GD65067	User Alarm Display Group
GD65068	User Alarm Display Frequency
GD65069	User Alarm Display Cumulative Time
GD65071	User Alarm Display Down Time

System Data	
GD65080	Prompt Bar Level Display
GD65090	Alarm ID for conversion
gd65100	Comment Number for Header
GD65115	Fieldbus Number
GD65120	Repair/Quality Main Screen
GD65121	Repair f2
GD65122	Repair f3
GD65123	Repair f4
GD65124	Repair f5
GD65125	Repair f6
GD65130	Repair/Quality Superimpose 1 Screen
GD65131	Repair f2
GD65132	Repair f3
GD65133	Repair f4
GD65134	Repair f5
GD65135	Repair f6
GD65140	Repair/Quality Superimpose 2Screen
GD65141	Repair f2
GD65142	Repair f3
GD65143	Repair f4
GD65144	Repair f5
GD65145	Repair f6

System Data	
GD65200	Display Station
GD65201	HMI Number
GD65202	Superimpose Offset Window Main
GD65203	Indicator Placeholder
GD65298	Max Scan Monitor
GD65299	Screen of Max Scan
GD65300-399	Spare
GD65400-527	Fieldbus Indicators

3.2 PLC Project

3.2.1. PLC Parameters

The following PLC Parameters of the MELPT project differ from default:

- PLC System
  - Remote Reset is allowed
  - Service Process Time is fixed 10.0ms
- PLC File
  - File Registers use the following file ZR
    - 384K Points for non-model management station
    - 640K+ for model management station
- Device
- The device mapping has been modified to the image below:

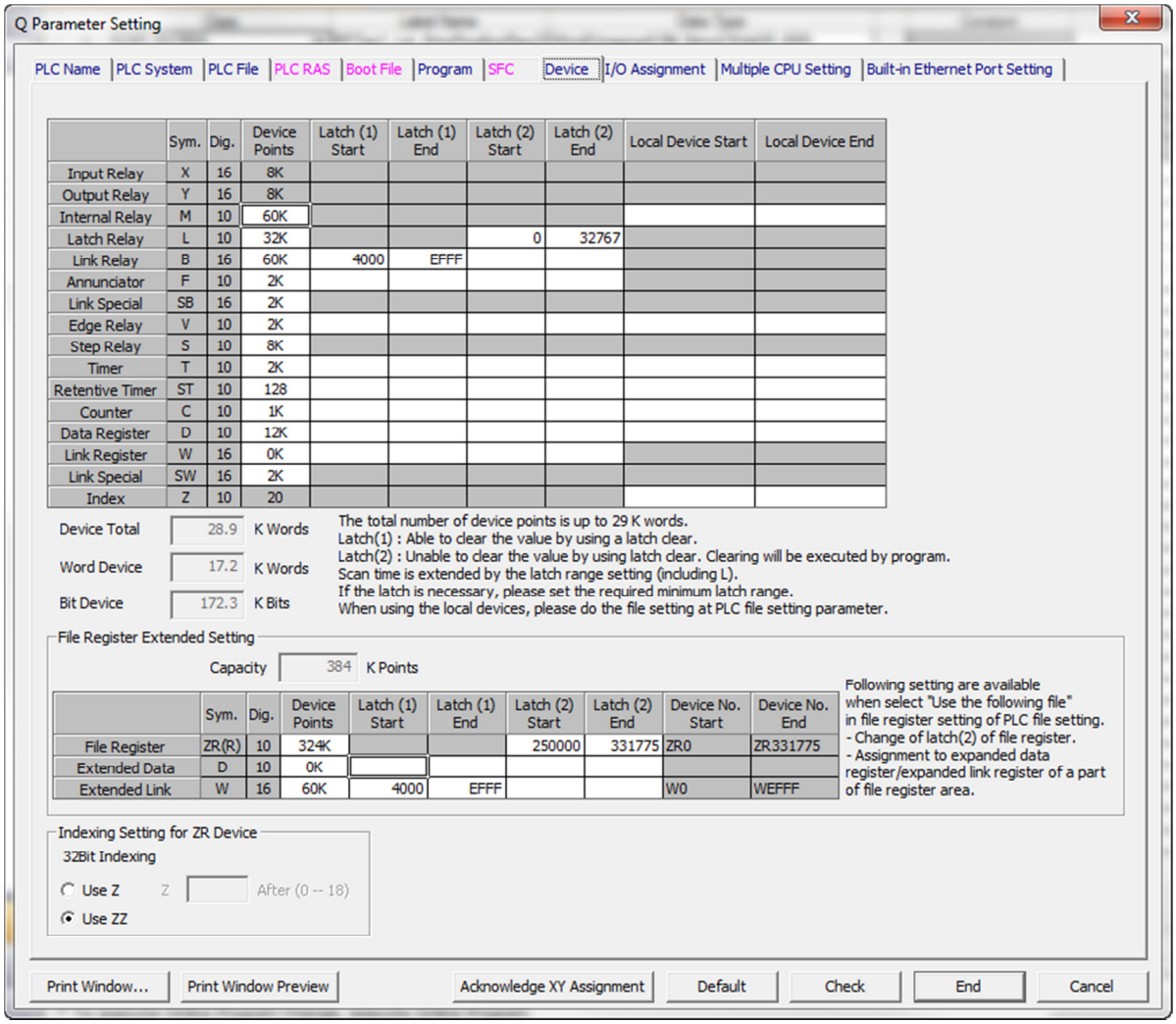


Figure 17-Device Mapping

Other changes are carried over from the Q-module settings from MELSOFT Navigator.

3.2.2. Global/System Labels

The following global label folders have been added to the project.

Folder Name	Memory Usage	Description
01_MELPT_APP	B8000-B8FFF; W8000-W8FFF; ZR100000-124999	Servo, RFID and Fieldbus Diagnostics
02_MELPT_SYS	B9000-9FFF; W9000-9FFF; ZR125000-129999	Part Counts, Station Data, Manual Screens
03_MELPT_GOT	BA000-BAFFF; WA000-WAFFF ZR130000-134999	HMI Overhead
04_MELPT_CNC	BB000-BBFFF; WB000-WBFFF; ZR135000-ZR139999	Used with CNC Packages
05_MELPT_QTM	BC000-BCFFF; WC000-WCFFF; ZR140000-144999	Tool Counters, TID, and Quality Management
06_MELPT_Enduser	BD000-BDFFF; WD000-WDFFF: ZR145000-ZR149999	End User Specific Requirements
07_MELPT_Enduser_MM	BE000-BEFFF; WE000-WEFFF	End User additional area.

3.2.3. Automatic Assignment Area

Word VAR	ZR150000-ZR249999 (100000)
Word VAR_Retain	ZR325000-331775 (6776)
Bit VAR	M30000-M61439 (31440)
Bit VAR_RETAIN	L16384-32767 (16384)
Pointer	2048-4095 (2048)
Timer	1024-2047 (1024)
Retentive Timer	64-127 (64)
Counter	512-1023 (512)

Device/Label Automatic-Assign Setting

Set a device range to automatically assign to labels.

Labels will be assigned from its way down the displayed device list when multiple devices are selected.

		Device	Digit	Assign Selection	Assignment Range Start	Assignment Range End	Total Points	PLC Parameter Device Setting Range
Word Device								
VAR Range		D	10	☐			100000	0 -- 12287
		W	16	☐				
		ZR	10	☑	150000	249999		0 -- 331775
VAR_RETAIN Range	Latch(2)	D Latch	10	☐			6776	
		W Latch	16	☐				
		ZR Latch	10	☑	325000	331775		250000 -- 331775
Bit Device								
VAR Range		M	10	☑	30000	61439	31440	0 -- 61439
		B	16	☐				0 -- EFFF
VAR_RETAIN Range	Latch(2)	L Latch	10	☑	16384	32767	16384	0 -- 32767
		B Latch	16	☐				
Pointer								
VAR Range		P	10	☑	2048	4095	2048	2048 -- 4095
Timer								
VAR Range		T	10	☑	1024	2047	1024	0 -- 2047
VAR_RETAIN Range	Latch(1)	T Latch	10	☐			0	
Retentive Timer								
VAR Range		ST	10	☑	64	127	64	0 -- 127
VAR_RETAIN Range	Latch(1)	ST Latch	10	☐			0	
Counter								
VAR Range		C	10	☑	512	1023	512	0 -- 1023
VAR_RETAIN Range	Latch(1)	C Latch	10	☐			0	

Latch(1) : Able to clear the value by using a latch clear.
Latch(2) : Unable to clear the value by using a latch clear. Please execute clearing in program.

(Caution)
1. Label-nonassigned devices, of the automatically assigned ones while compiling, will be allotted the device that displayed at the lowest of the selected ones. Ex):Device will be assigned to ZR when D and ZR are selected.
2. Changing the assignment target device may also change the processing speed since the arithmetic processing speed for R and ZR is difference from other devices.

OK Cancel

Figure 18 - Automatic Assignment Settings

Fieldbus Auto-Refresh Locations

W1000-1EFF Inputs

W2000-W2EFF Outputs

3.2.4. Additional Retained Memory

ZR250000-ZR274999	Part Counts 1-8
ZR275000-284999; L15000-L15399	Traceability Retention Area
ZR285000-324999; L16000-L16383	Add-on Package usage
ZR340000-ZR587999	Model Management Data (Model Management Station Q26

3.2.5. FB Label Naming Standard

Function block instances are always local labels.

Input, Output, and Input/Output labels use a label naming standard

i	_	b	n	Label Name
i = input o = output io = input/output	underscore	b=bit u=unsigned word ud=unsigned double w=signed word d=signed double e=Single Float s=string t=time format st=Structure(SDT)	Used when the variable is an array. Omitted when not an array	CamelCase (up to 29 characters)

4 TEMPLATE SCREEN

The template screen contains the following common components for all screens as shown in the following figure:

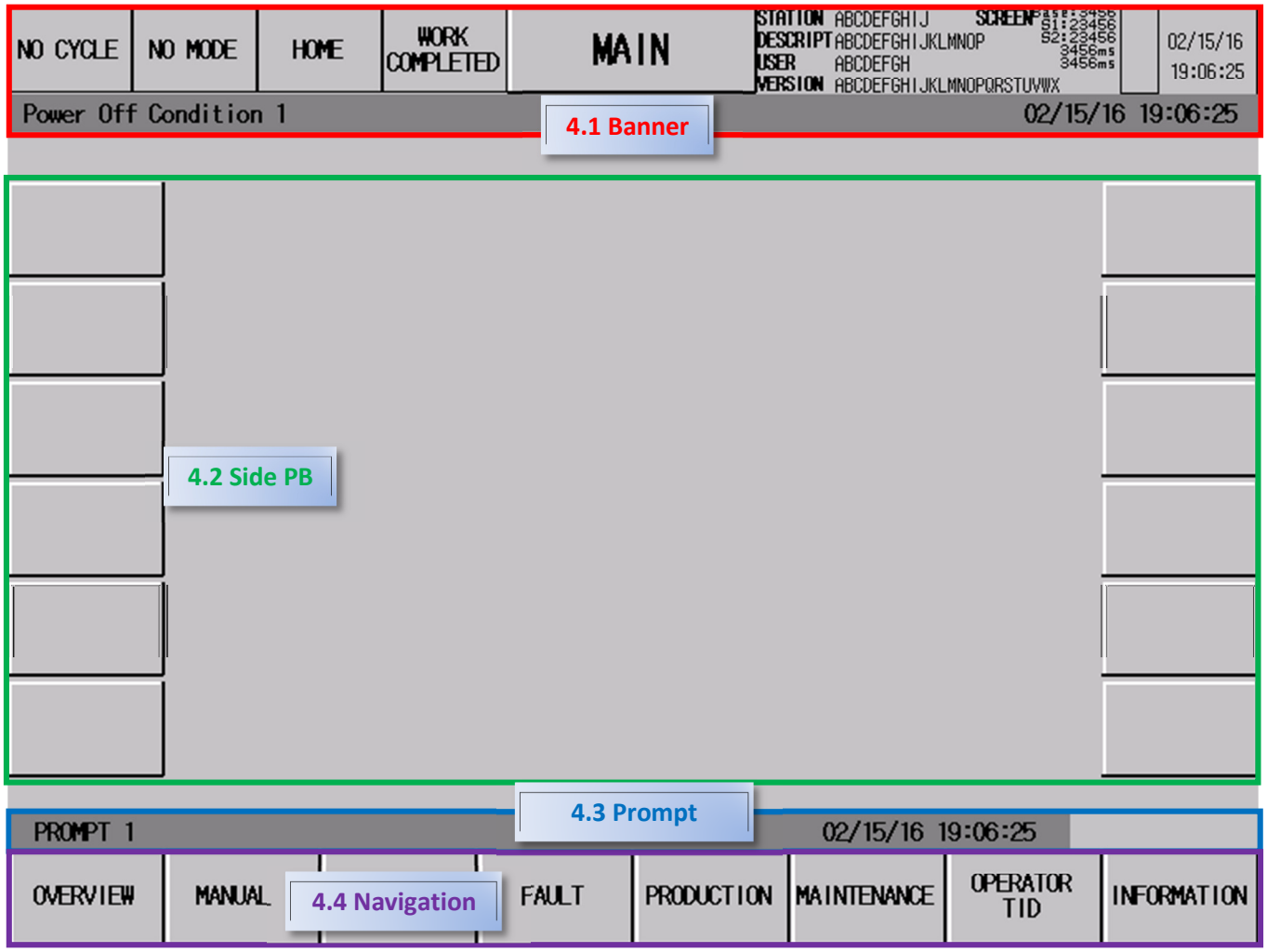


Figure 19- Basic Screen Template

4.1 Banner

The banner is an overlay screen placed on every base screen. The banner can be found as Window #1

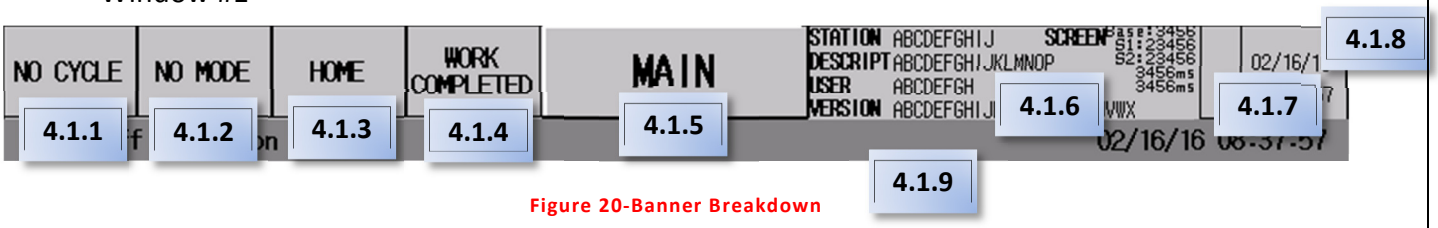


Figure 20-Banner Breakdown

4.1.1. Cycle Indicator

The Cycle indicator is a word lamp associated with the device: GD64360.

The source location on the PLC is: MachineData.MachineCycle, this value is placed into the GOT internal device by project script #5.

The Cycle Type Select Screen interfaces with the program MELPT_SYS_CycleType to load the preset values when a manual button is selected.

States	Value (Word Signed)	Comment Group	Comment Number	Lamp Color
NO CYCLE	0 or none of the below	100	1000	Gray
CONTINUOUS AUTO CYCLE	1	100	1001	Green
DRY CYCLE	2	100	1002	Yellow
SINGLE CYCLE	4	100	1003	Custom (232)
STEP CYCLE	8	100	1004	Blue
RUNOUT CYCLE	16	100	1005	White
HAND CYCLE	32	100	1006	Magenta

4.1.2. Mode Indicator

The Mode indicator is a word lamp associated with the device: GD64361.

The source location on the PLC is: MachineData.MachineMode, this value is placed into the GOT internal device by project script #5.

There is no associated MELPT logic included for mode selection

States	Value (Word Signed)	Comment Group	Comment Number	Lamp Color
NO MODE	0 or none of the below	100	1010	Gray
AUTO MODE	1	100	1011	Green
MANUAL MODE	2	100	1012	Blue
BYPASS	4	100	1013	Custom (232)
SETUP	8	100	1014	Dark White

4.1.3. Home Position Indicator

The Home Position indicator is a bit lamp associated with the device: GB64200.

The source location on the PLC is: StationData_X.HomePos,

- X is a variable between 1 and 8.
- The HMI can select the station it is viewing this value is stored in GD65200.
- GD65200 determines which Station Data to load.
    - When GD65200 =2, then StationData_2.HomePos is loaded into GB64200, by project script #1.

There is no associated MELPT logic included for populate StationData_X.HomePos

States	(Boolean)	Comment Group	Comment Number	Lamp Color
HOME	0	100	1020	Gray

States	(Boolean)	Comment Group	Comment Number	Lamp Color
HOME	1	100	1020	Green

4.1.4. Work Completed Indicator

The Work Completed indicator is a bit lamp associated with the device: GB64201.

The source location on the PLC is: StationData_X.CycleComplete,

- X is a variable between 1 and 8.
- The HMI can select the station it is viewing this value is stored in GD65200.
- GD65200 determines which Station Data to load.
  - When GD65200 =2, then StationData_2.CycleComplete is loaded into GB64201, by project script #1.

There is no associated MELPT logic included for populate StationData_X.CycleComplete

States	(Boolean)	Comment Group	Comment Number	Lamp Color
WORK COMPLETED	0	100	1021	Gray
WORK COMPLETED	1	100	1021	Blue

4.1.5. Screen Title/Navigation Switch

The Screen Title Switch will close all windows and navigate to the information page.

It is available when GB64000 is OFF, which means there is communication with the Host PLC

The text displayed by this switch is based off the internal variable GD65100. In most cases the value in GD65100 is equal to GD64162; GD64162 is set by the environmental setting System Information for on-screen base number. Script number four contains some scenarios where a value other than GD64162 is placed in GD65100.

States	(Boolean)	Comment Group	Comment Device	Text Color	Notes
MAIN	0	3	GD65100	Black	
MAIN	1	3	GD65100	Dark White	Switch does not function GB64000==ON

4.1.6. Information Area

There is a hidden button in this area that is a shortcut to the Operator authentication.

Figure 21-Banner Information Area

Description	Device	Reference
Station	ASCII Display: GD64200 (5 words)	Script #1: StationData_X.StationName[0]
Description	ASCII Display: GD64205 (8 words)	Script #1: StationData_X.StationDescription[0]
User	ASCII Display: GD64215 (4 words)	Script #4:GD64111 or GD64215 depends on if HMI_ScreenEnabled.OperatorCode is true
Version	ASCII Display: GD64370 (12 words)	Script #5: MachineData.VersionNumber[0]
Screen Base:	Numeric Input: GD64000	Environmental Settings Base Screen Switching Device
Screen s1:	Numeric Input: GD64060	Environmental Settings Superimpose 1 Screen Switching Device
Screen s2:	Numeric Input: GD64070	Environmental Settings Superimpose 2 Screen Switching Device
Time 1	GS8	Stores the time (ms) of a complete processing cycle set on the display screen as binary data. Data will be updated when all of the processing set on the display screen is complete. An error of 10 ms may be produced depending on the processing settings. Also, this does not apply to the objects that have not been processed by the security function. It is useful for load checking (debugging) of the monitor processing.
Time 2	GD65298	Object Script: if([w:GS8]>$$) {[w:GD65298]=[w:GS8];} Stores the greatest value of GS8.

4.1.7. Host PLC Status Indicator

Device GD65203 is assigned it is a placeholder

This indicator is to mimic PLC LED lights.

States	Flash	Device	Description	Lamp Color
		Normal		Gray
	Low	GB64000 = On	IP of in GOT Ethernet Settings Communication Err. Detected by project script #5	Dark White
	None	SD201.b2 = On	PLC Err LED On	Red
	Med	SD201.b3 = On	PLC Err. LED Flash	Red
	Low	SD201.b0 = Off	PLC Run LED Off	Custom 232
	None	SD201.b6 = On	PLC Bat. LED On	Yellow
	Med	SD201.b7 = On	PLC Bat. LED Flash	Yellow
	None	SD201.b0 = On	PLC Run LED ON	Green

4.1.8. Date and Time

Date and Time are displayed from the HMI. In the GOT setup the GOT synchronizes it's time with the host PLC every 3 minutes

Date is displayed in the mm/dd/yy format

Time is 24 hour format with seconds display

4.1.9. Alarm and Warning Notification

The advanced User Alarm Display on the top of the screen uses the advanced alarm specified in GD65000.

GD65000 is populated by script #4. Depending on the value within GD64363: MachineData.MachineType

Machine Type 0 or 1 uses Alarm File 1

Anything else uses Alarm File 2

MachineData.MachineType is populated by the initial scan program MELPT_SYS_INIT.

The level of the displayed alarm is output to GD65066, the word lamp GD65066 exists behind the alarm display.

States	Value (Unsigned Word)	Description	Lamp Color
	Normal		Dark White
	1	Alarm	Red
	2	Warning	Yellow
	3	Message	Green
	4	Dynamic Alarm	Blue

4.2 Side Push Button

Up to 8 Left Side Push buttons and 8 Right Side Push Buttons are available per screen, these pushbuttons are associated with a comment file for text, and will have unique actions based on the screen displayed

A typical screen has 6 Left Push Buttons, and 6 Right Pushbuttons. Depending on screen requirements, Left and Right Side Push buttons can be removed to provide more space to screen graphics.

The text for rows 1-16 is Black.

The text for rows 17-32 is White.

When relating to a comment file the first 8 comment entries (1-8) are dedicated to the OFF state of Left push buttons.

Comments 9-16 are the OFF state of Right hand PB.

Comments 17-24 are the ON state of Left Hand PB.

Comment 25-32 are the ON state of Right hand PB

When the switch does not work state follows the OFF state but has Dark White Coloring instead of Black

Comments for other devices on the screen start at comment #50.

Figure 22- Off State Comment Numbers

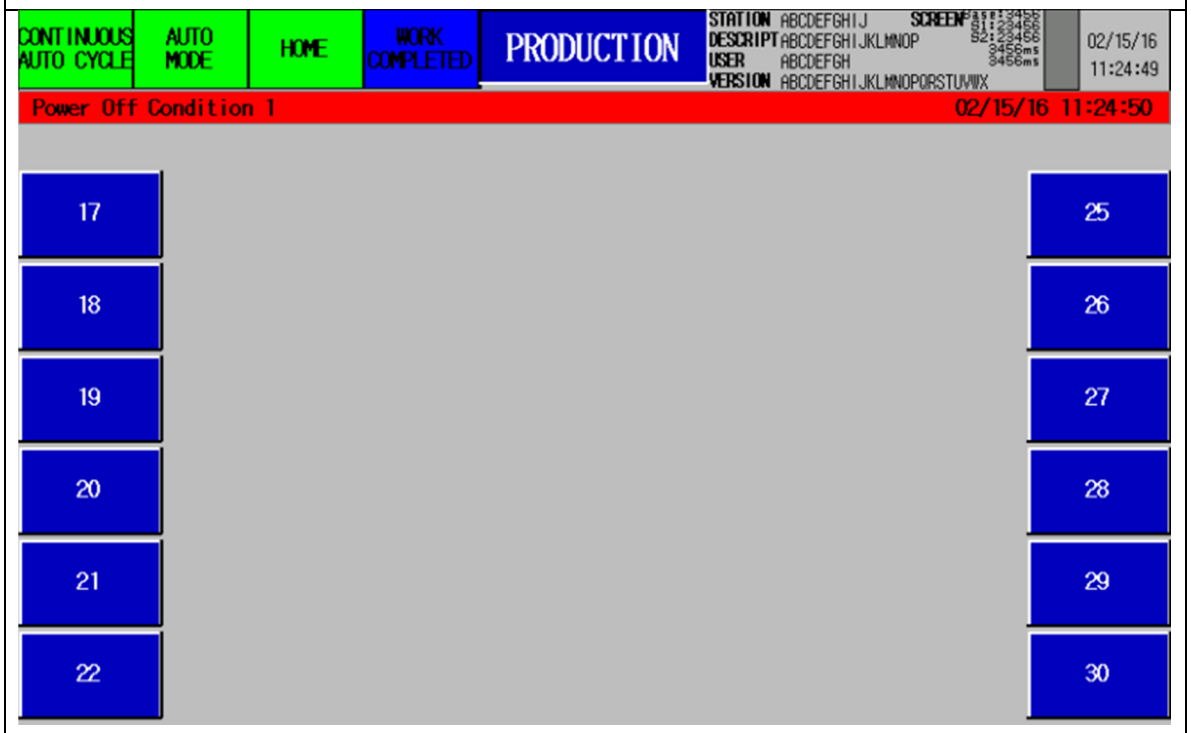


Figure 23-On State Comment Numbers

Figure 24-State that does not work

4.3 Prompts

This is an overlay window placed on to every base screen. It is W-2, and will display the highest ranking Prompt message.

This object is also an Advanced User Alarm Display Layered over a word Lamp.

The Alarm ID monitored is 3;

When a message is displayed the level is output to GD65080

The lap Device monitors GD65080, and will turn green when the value of GD65080 is non-zero.

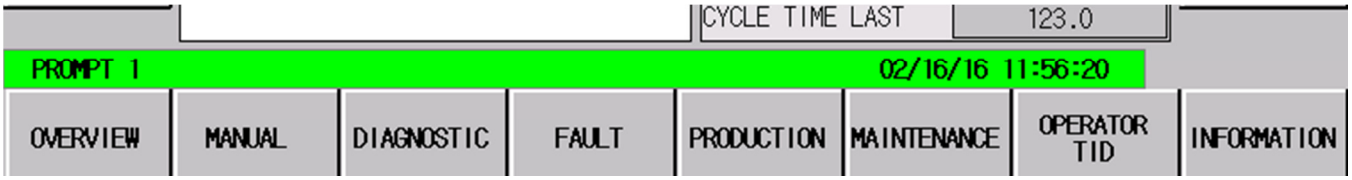


Figure 25- Prompt Bar

4.4 Navigation

The Navigation Pane allows for screen navigation, It is commonly a superimpose window. There are three levels of Navigation Window.

4.4.1. Level 1

This is the Navigation bar for the Main Screen is the only Level 1 Navigation bar in the project W-100

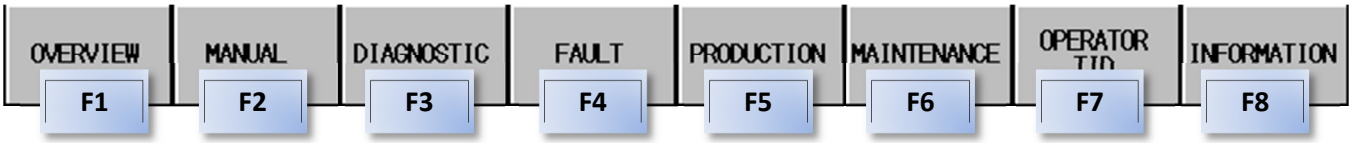


Figure 26-Level 1 Navigation

Category	Action
F1	Navigates to the Overview Level 2 Navigation
F2	Changes the Base Screen to Manual Operation Screen
F3	Navigates to the Diagnostic Level 2 Navigation
F4	Changes the Base Screen to Fault Summary Screen
F5	Navigates to the Production Level 2 Navigation
F6	Navigates to the Maintenance Level 2 Navigation
F7	This is a variable category, depending of the value in MachineData.MachineType, and the function blocks currently in the scan variable text and navigation will occur
F8	Changes the Base Screen to Information Screen

4.4.2. Level 2

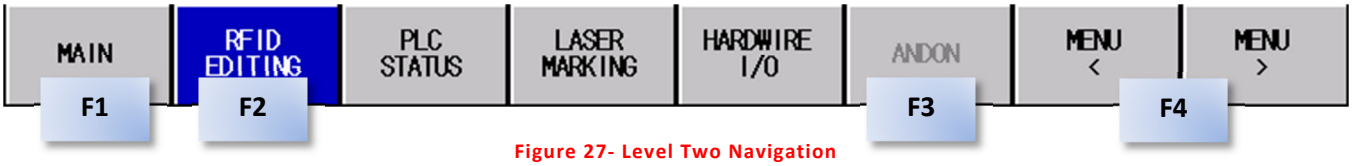


Figure 27- Level Two Navigation

Category	Action
F1	Always MAIN. Changes the base screen to 1, the navigation bar to Level 1
F2	When the base screen displayed matches that category display with blue background
F3	When a selection is unavailable, the associated programming is not in the scan. The text is "Grayed out" and navigation is unavailable

Category	Action
F4	Menu > & Menu< can be used to navigate to other level 2 menu's if available

This is the navigation bar displayed when choosing the base screen destination to navigate to.

Level 2 Windows are numbered between Windows 101-999

4.4.3. Level 3

This is the navigation bar displayed when there are multiple faceplates (superimpose windows) to the selected category. Level 3 Windows are numbered 1000-9999

Figure 28 - Layer 3 Navigation

Category	Action
F1	Always MAIN. Changes the base screen to 1, the navigation bar to Level 1
F2	Goes back to the level 2 navigation bar
F3	Used to change station number or page number of displayed info

5 MAIN SCREEN

Three base screens and two informational windows are included with the project

5.1 Base Screens

To implement the desired MAIN base screen should be moved to base screen 1

This is the screen to be displayed when the machine is first powered up

5.1.1. Station Layout Main Screen

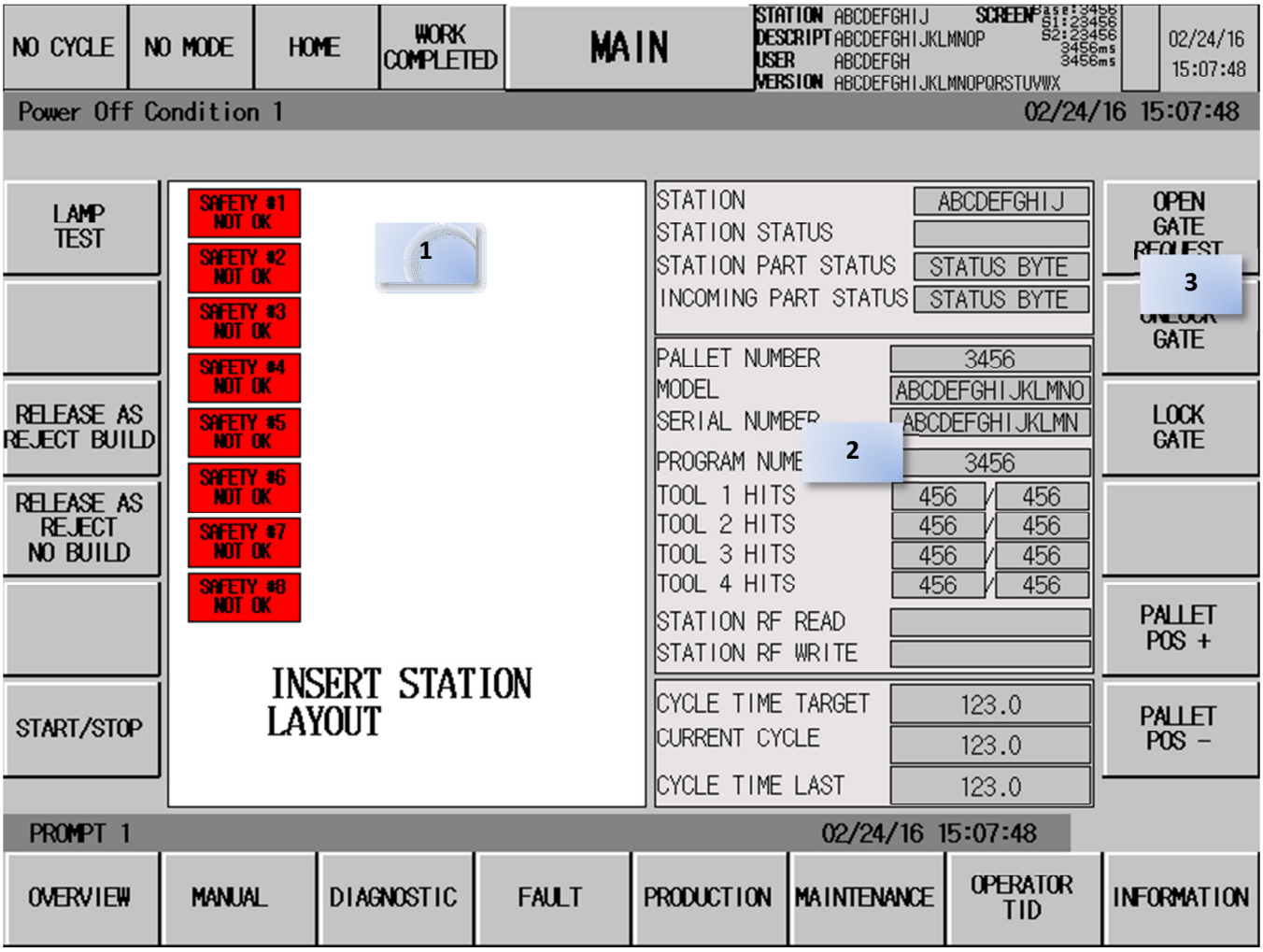


Figure 29-Main Layout Screen

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>1</td><td>Layout Window, Insert a Station Layout, arrange safety indicators

MachineData.SafetyInd[1..16]

<table>
<tr><th>State</th><th>Color</th></tr>
<tr><td>OFF</td><td>Safety X NOT OK</td></tr>
<tr><td>ON</td><td>Safety X OK</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>Informational window that displays pallet info for the selected station</td></tr>
<tr><td>3</td><td>Side push buttons

Pallet Position + and Pallet Position - ; Change the station information that is on the screen.</td></tr>
</table>

5.1.2. Main Screen-Assembly Informational Window

The information window is controlled by a project script. Project script #4 loads a hardcoded value that represents the information window into register GD65202. GD65202 is loaded into superimpose window #1 when on screen #1 by script #2. This should be commented out if the informational window is not wanted.

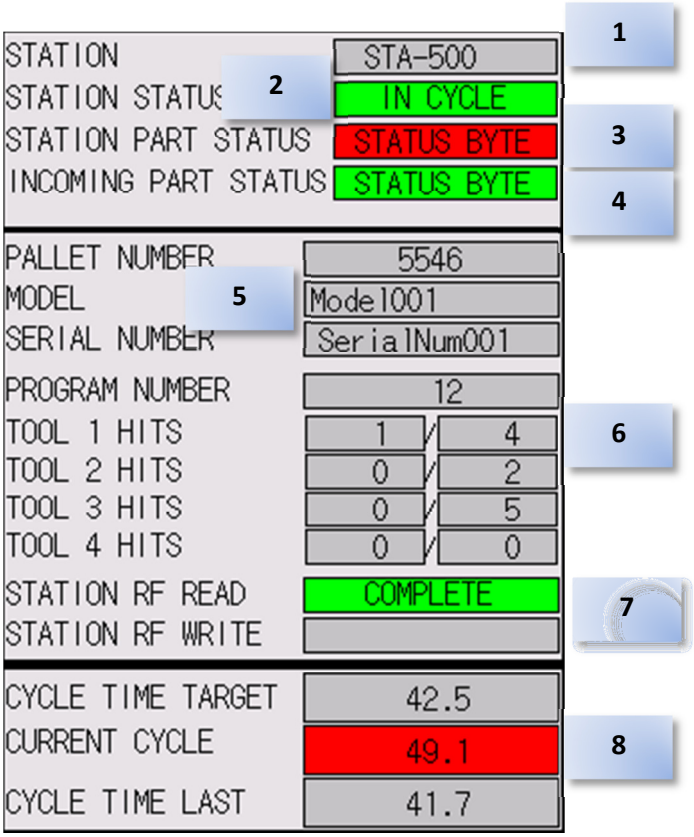


Figure 30-Assembly Informational Window

Item	Object	Device	Notes
1	Station Name ASCII Display	GD64200	Loaded by Script #1 Source: StationData_X.StationName
2	Station Status Word Lamp	GD64220	Loaded by script #1 GB64207 – Blocked GB64208 – Starved GB64209 – In Cycle GB64210 – Faulted

<table>
<tr><th>Item</th><th>Object</th><th>Device</th><th>Notes</th></tr>
<tr><td>3</td><td></td><td>GD64221</td><td>Part Status
Word Comment Display
Loaded by script #1
StationData_X.PartStatus
<table>
<tr><th>Value</th><th>Text</th></tr>
<tr><td>1</td><td>Accept</td></tr>
<tr><td>2</td><td>Reject Build</td></tr>
<tr><td>4</td><td>Reject No Build</td></tr>
</table></td></tr>
<tr><td>4</td><td></td><td>GD64321</td><td>Incoming Part Status
Word Comment Display
Loaded by script #1
StationData_X.PartStatus_Pre
<table>
<tr><th>Value</th><th>Text</th></tr>
<tr><td>1</td><td>Accept</td></tr>
<tr><td>2</td><td>Reject Build</td></tr>
<tr><td>4</td><td>Reject No Build</td></tr>
</table></td></tr>
<tr><td>5</td><td></td><td>GD64228
GD64230
GD64240</td><td>Loaded by Script #1:
Pallet Number: Numeric Display: StationData_X.PalletNumber
Model: ASCII Display: StationData_X.ModelNumber
Serial Number: ASCII Display: StationData_X.SerialNumber</td></tr>
</table>

Item	Object	Device	Notes
6		GD64225 GD64295/ GD64290 GD64296/ GD64291 GD64297/ GD64292 GD64298/ GD64293	Loaded By Project Script #1: Program Number: Numeric Display: StationData_X.ProgramNumber Tool Hits Accepted/Required: Numeric Display: StationData_X.ToolHitsAccepted_1/ StationData_X.ToolHitsRequired_1 StationData_X.ToolHitsAccepted_2/ StationData_X.ToolHitsRequired_2 StationData_X.ToolHitsAccepted_3/ StationData_X.ToolHitsRequired_3 StationData_X.ToolHitsAccepted_4/ StationData_X.ToolHitsRequired_4
7		GD64500	RFID Status: Loaded by Project Script #1:

Device	Description	State
GB64202	Pallet Present	OFF Display is just gray indicator
GB64204	Complete	RFID READ Complete ON
GB64203	In Progress	RFID Read in Progress ON
GB64204	Not Complete	RFID READ Complete ON
GB64205	Complete	RFID Write Complete ON
GB64205	Not Complete	RFID Write Complete OFF

Item	Object	Device	Notes
8			Cycle Times:
			Loaded by Project Script #1
		GD64280	Target Cycle Time: Numeric Display: CycleTime.Target[X]
			Backgrounds turn red when value is greater than target
		GD64282	Current Cycle: Numeric Display: CycleTime.CycleTimes[X,1]
		GD64284	Last Cycle Time: Numeric Display: CycleTime.cycleTimes[X,2]

5.1.3. Main Screen-Machining Information Window

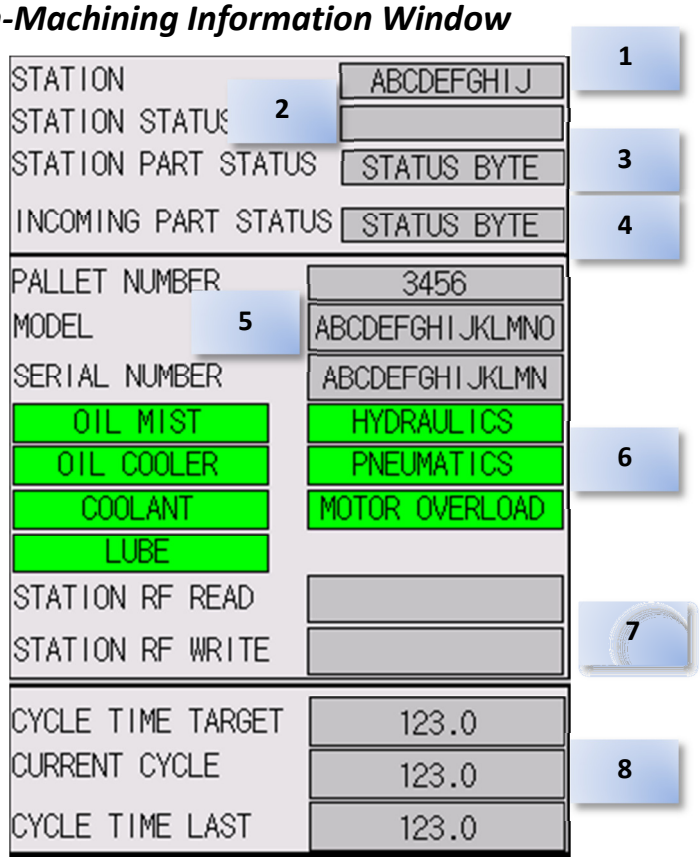


Figure 31-Machining Information Window

<table>
<tr><th>Item</th><th>Device</th><th>Notes</th></tr>
<tr><td>1</td><td>GD64200</td><td>Station Name

ASCII Display

Loaded by Script #51

Source: StationData_X.StationName</td></tr>
<tr><td>2</td><td>GD64220</td><td>Station Status

Word Lamp

Loaded by script #1

StationData_X.

<table><tr><td>GB64207</td><td>Blocked</td></tr><tr><td>GB64208</td><td>Starved</td></tr><tr><td>GB64209</td><td>In Cycle</td></tr><tr><td>GB64210</td><td>Faulted</td></tr></table></td></tr>
<tr><td>3</td><td>GD64221</td><td>Part Status

Word Comment Display

Loaded by script #1

StationData_X.PartStatus

<table><tr><td>Value</td><td>Text</td></tr><tr><td>1</td><td>Accept</td></tr><tr><td>2</td><td>Reject Build</td></tr><tr><td>4</td><td>Reject No Build</td></tr></table></td></tr>
</table>

<table>
<tr><th>Item</th><th>Device</th><th>Notes</th></tr>
<tr><td>4</td><td>GD64321</td><td>Incoming Part Status

Word Comment Display

Loaded by script #1

StationData_X.PartStatus_Pre

<table>
<tr><th>Value</th><th>Text</th></tr>
<tr><td>1</td><td>Accept</td></tr>
<tr><td>2</td><td>Reject Build</td></tr>
<tr><td>4</td><td>Reject No Build</td></tr>
</table></td></tr>
<tr><td>5</td><td>

GD64228

GD64230

GD64240</td><td>Loaded by Script #1:

Pallet Number: Numeric Display: StationData_X.PalletNumber

Model: ASCII Display: StationData_X.ModelNumber

Serial Number: ASCII Display: StationData_X.SerialNumber</td></tr>
</table>

<table>
<tr><th>Item</th><th>Device</th><th>Notes</th></tr>
<tr><td>6</td><td>GD64301
GD64302
GD64303
GD64304
GD64305
GD64306
GD64307</td><td>
<table>
<tr><th>Description</th><th>Member</th><th>Gray</th><th>Red</th><th>Green</th></tr>
<tr><td>Hydraulics</td><td>.Hydraulics</td><td>0=Not Installed</td><td>2=faulted</td><td>4=ok</td></tr>
<tr><td>Pneumatics</td><td>.Pneumatics</td><td>0=Not Installed</td><td>2=faulted</td><td>4=ok</td></tr>
<tr><td>Motor Overload</td><td>.Motor Overloads</td><td>0=Not Installed</td><td>2=faulted</td><td>4=ok</td></tr>
<tr><td>Lube</td><td>.Lube</td><td>0=Not Installed</td><td>2=faulted</td><td>4=ok</td></tr>
<tr><td>Coolant</td><td>.Coolant</td><td>0=Not Installed</td><td>2=faulted</td><td>4=ok</td></tr>
<tr><td>Oil Mist</td><td>.Oil Mister</td><td>0=Not Installed</td><td>2=faulted</td><td>4=ok</td></tr>
<tr><td>Oil Cooler</td><td>.Oil Cooler</td><td>0=Not Installed</td><td>2=faulted</td><td>4=ok</td></tr>
</table>
</td></tr>
<tr><td>7</td><td>GD64500</td><td>RFID Status:

Loaded by Project Script #1:
<table>
<tr><th>Device</th><th>Description</th><th>State</th></tr>
<tr><td>GB64202</td><td>Pallet Present</td><td>OFF

Display is just gray indicator</td></tr>
<tr><td>GB64204</td><td>Complete</td><td>RFID READ Complete ON</td></tr>
<tr><td>GB64203</td><td>In Progress</td><td>RFID Read in Progress ON</td></tr>
<tr><td>GB64204</td><td>Not Complete</td><td>RFID READ Complete ON</td></tr>
<tr><td>GB64205</td><td>Complete</td><td>RFID Write Complete ON</td></tr>
<tr><td>GB64205</td><td>Not Complete</td><td>RFID Write Complete OFF</td></tr>
</table>
</td></tr>
</table>

Item	Device	Notes
8		Cycle Times:
		Loaded by Project Script #1
	GD64280	Target Cycle Time: Numeric Display: CycleTime.Target[X]
		Backgrounds turn red when value is greater than target
	GD64282	Current Cycle: Numeric Display: CycleTime.CycleTimes[X,1]
	GD64284	Last Cycle Time: Numeric Display: CycleTime.cycleTimes[X,2]

5.1.4. Zone Main Screen

This screen shows sample objects that can be used to create a Zone Main Screen

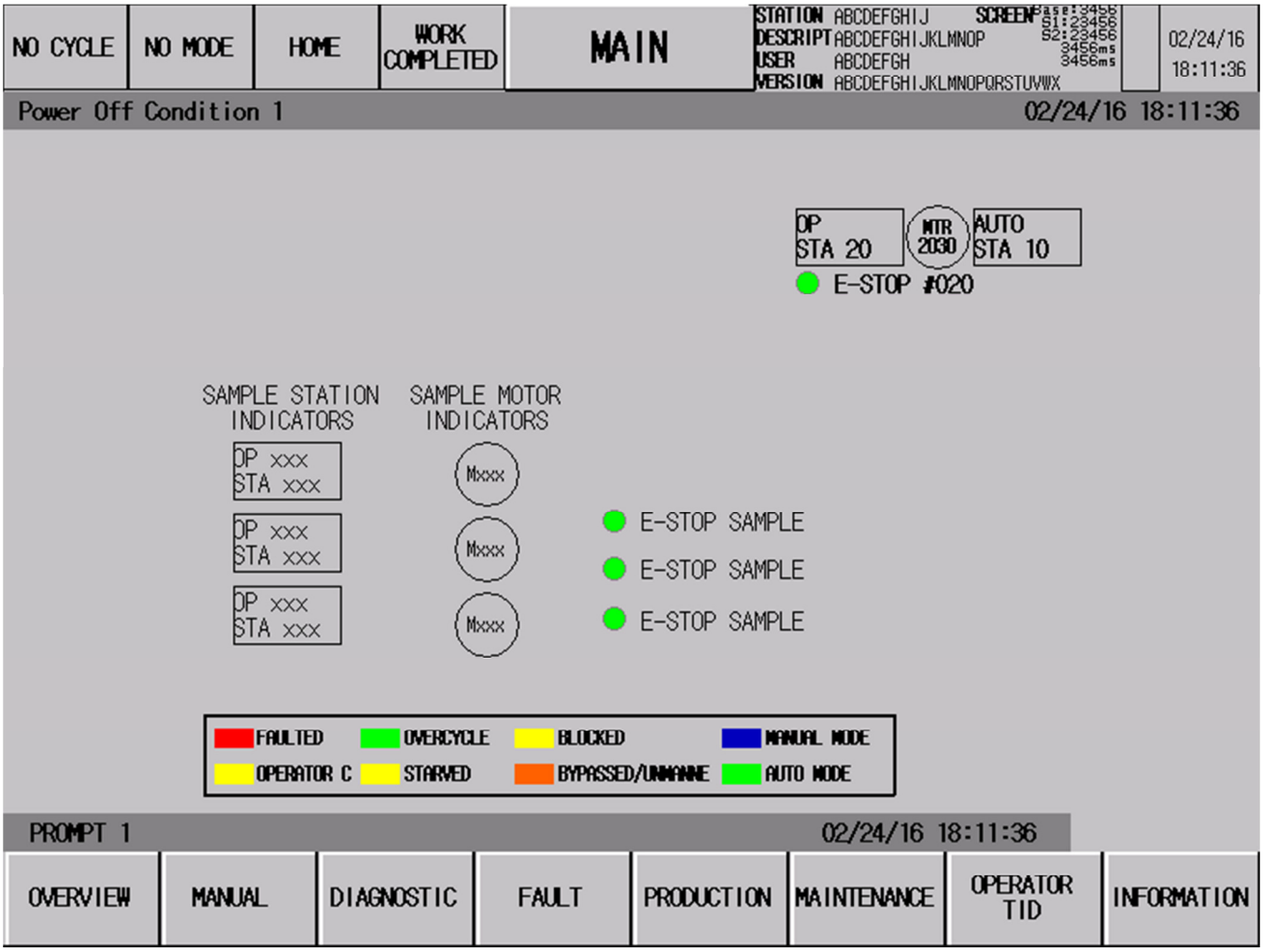


Figure 32- zone screen

States	Value (Word Signed)	State
	Normal	None
Flash	1	Faulted
Flash	2	Operator Call
Flash	3	Over Cycle
	4	Blocked
	5	Starved
	6	Bypassed
	7	Manual Mode
	8	Auto Mode

5.1.5. Team Leader Main Screen

This screen shows station status for up to 8 work stations.

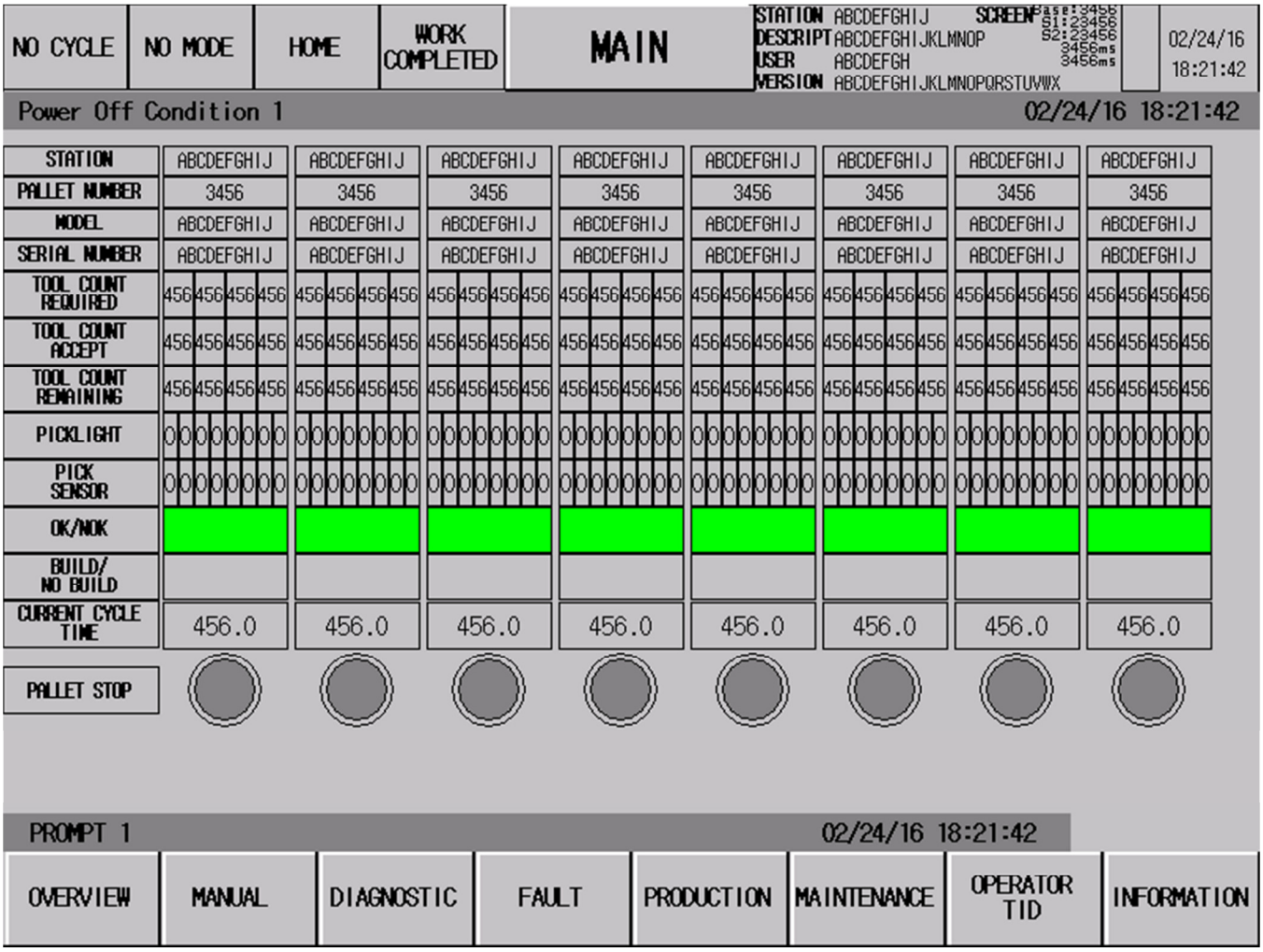


Figure 33-Team Leader Screen

Object	Device X= Station Number
Station ASCII Display	StationData_X.StationName
Pallet Number Numeric Display	StationData_X.PalletNumber

Object	Device X= Station Number
Model ASCII Display	StationData_X.ModelNumber
Serial Number ASCII Display	StationData_X.SerialNumber
Tool Count Required Numeric Display:	StationData_X.ToolHitsRequired_1 StationData_X.ToolHitsRequired_2 StationData_X.ToolHitsRequired_3 StationData_X.ToolHitsRequired_4
Tool Count Accept Numeric Display:	StationData_X.ToolHitsAccepted_1 StationData_X.ToolHitsAccepted_2 StationData_X.ToolHitsAccepted_3 StationData_X.ToolHitsAccepted_4
Tool Count Remaining Numeric Display:	StationData_X.ToolHitsRequired_1- StationData_X.ToolHitsAccepted_1 StationData_X.ToolHitsRequired_2- StationData_X.ToolHitsAccepted_2 StationData_X.ToolHitsRequired_3- StationData_X.ToolHitsAccepted_3 StationData_X.ToolHitsRequired_4- StationData_X.ToolHitsAccepted_4 This is math done by the HMI
Picklight Numeric Display:	StationData_X.PicklightNumber A Mask is applied to each bit
Pick Sensor Numeric Display:	StationData_X.PickSensor A Mask is applied to each bit

<table>
<tr><th>Object</th><th>Device

X= Station Number</th></tr>
<tr><td>OK/NOK

Bit Lamp:</td><td>StationData_X.ActiveFault

<table><tr><th>State</th><th>Color</th></tr><tr><td>False</td><td></td></tr><tr><td>True</td><td></td></tr></table></td></tr>
<tr><td>Build/No Build

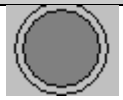
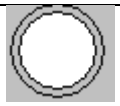
Word Lamp:</td><td>StationData_X.PartStatus

<table><tr><th>Value</th><th>Color</th></tr><tr><td>Other</td><td></td></tr><tr><td>4</td><td></td></tr></table></td></tr>
<tr><td>Current Cycle Time</td><td>Numeric Display:

CycleTime.CycleTimes[X,1]

Background turns red when CycleTime.CycleTimes[X,1]> CycleTime.Target[X]</td></tr>
<tr><td>Pallet Stop</td><td>Bit Lamp:

StationData_X.StopStart_PB

<table><tr><th>State</th><th>Color</th></tr><tr><td>Off</td><td>  </td></tr><tr><td>On</td><td>  </td></tr></table></td></tr>
</table>

The Station Data is used is a combination of Station logic, input sensors, or data read from the RFID Tag

SDT Usage

1. MELPT_SYS_StationData

System Label: StationData_x		
Member	Type	Usage

System Label: StationData_x		
Member	Type	Usage
StopStart_PB	Bit	From Main Screen
RejectBuild_PB	Bit	From Main Screen
RejectNoBuild_PB	Bit	From Main Screen
PalletPresent_Pre	Bit	Sensor Data from Pre-Stop
PartPresent_Pre	Bit	Sensor Data From Pre-stop
RFIDInProgress_Pre	Bit	RFID command but not complete
RFIDReadComp_Pre	Bit	RFID command but not complete
GantryHatch	Bit	Machining Center Data Populated by MELPT_CNC_Status
SafetyDoor	Bit	Machining Center Data Populated by MELPT_CNC_Status
ESTOP	Bit	Machining Center Data Populated by MELPT_CNC_Status
Blocked	Bit	Status determined on PLC
Starved	Bit	Status determined on PLC
InCycle	Bit	Status determined on PLC
ActiveFault	Bit	Status determined on PLC
HomePos	Bit	Status determined on PLC
CycleComplete	Bit	Status determined on PLC
PartCountIncremented	Bit	Signal Set by OEM logic for PLC use
PalletPresent	Bit	Sensor Data from In-Station
PartPresent	Bit	Sensor Data from In-Station
RFIDInProgress	Bit	RFID Read or Write in Progress
RFIDReadComp	Bit	RFID Read Complete

System Label: StationData_x		
Member	Type	Usage
RFIDWriteComp	Bit	RFID Write Complete
Overall	Word[Unsigned]	Machining Center Data Populated by MELPT_CNC_Status
Hydraulics	Word[Unsigned]	Machining Center Data Populated by MELPT_CNC_Status
Pnuematics	Word[Unsigned]	Machining Center Data Populated by MELPT_CNC_Status
MotorOverloads	Word[Unsigned]	Machining Center Data Populated by MELPT_CNC_Status
Lube	Word[Unsigned]	Machining Center Data Populated by MELPT_CNC_Status
Coolant	Word[Unsigned]	Machining Center Data Populated by MELPT_CNC_Status
OilMister	Word[Unsigned]	Machining Center Data Populated by MELPT_CNC_Status
OilCooler	Word[Unsigned]	Machining Center Data Populated by MELPT_CNC_Status
Mode	Word[Unsigned]	OEM to Populate
CycleStop	Word[Unsigned]	OEM to Populate
OperatorInAttendance	Word[Unsigned]	OEM to Populate
PickSensor	Word[Unsigned]	OEM to Populate
PalletNumber_Pre	Word[Unsigned]	Data from RF Tag Pre-Stop
ModelNumber_Pre	Word[Unsigned](0..7)	Data from RF Tag Pre-Stop
SerialNumber_Pre	Word[Unsigned](0..6)	Data from RF Tag Pre-Stop
PartDescription_Pre	Word[Unsigned](0..9)	Data from RF Tag Pre-Stop
TechnicalSignature_Pre	Word[Unsigned](0..4)	Data from RF Tag Pre-Stop

System Label: StationData_x		
Member	Type	Usage
ShortCode_Pre	Word[Unsigned](0..1)	Data from RF Tag Pre-Stop
PartStatus_Pre	Word[Unsigned]	Data from RF Tag Pre-Stop
ProgramNumber_Pre	Word[Unsigned]	Data from RF Tag Pre-Stop
PicklightNumber_Pre	Word[Unsigned]	Data from RF Tag Pre-Stop
ToolHitsRequired_1_Pre	Word[Unsigned]	Data from RF Tag Pre-Stop
ToolHitsRequired_2_Pre	Word[Unsigned]	Data from RF Tag Pre-Stop
ToolHitsRequired_3_Pre	Word[Unsigned]	Data from RF Tag Pre-Stop
ToolHitsRequired_4_Pre	Word[Unsigned]	Data from RF Tag Pre-Stop
PalletNumber	Word[Unsigned]	Data From RF Tag In-Sta
ModelNumber	Word[Unsigned](0..7)	Data From RF Tag In-Sta
SerialNumber	Word[Unsigned](0..6)	Data From RF Tag In-Sta
PartDescription	Word[Unsigned](0..9)	Data From RF Tag In-Sta
TechnicalSignature	Word[Unsigned](0..4)	Data From RF Tag In-Sta
OperatorCode	Word[Unsigned](0..3)	Data From RF Tag In-Sta
ShortCode	Word[Unsigned](0..1)	Data From RF Tag In-Sta
PartStatus	Word[Unsigned]	Data From RF Tag In-Sta
ProgramNumber	Word[Unsigned]	Data From RF Tag In-Sta
PicklightNumber	Word[Unsigned]	Data From RF Tag In-Sta
ToolHitsRequired_1	Word[Unsigned]	Data From RF Tag In-Sta
ToolHitsRequired_2	Word[Unsigned]	Data From RF Tag In-Sta
ToolHitsRequired_3	Word[Unsigned]	Data From RF Tag In-Sta
ToolHitsRequired_4	Word[Unsigned]	Data From RF Tag In-Sta

System Label: StationData_x		
Member	Type	Usage
ToolHitsAccepted_1	Word[Unsigned]	Tool Hit Counts Populated by OEM
ToolHitsAccepted_2	Word[Unsigned]	Tool Hit Counts Populated by OEM
ToolHitsAccepted_3	Word[Unsigned]	Tool Hit Counts Populated by OEM
ToolHitsAccepted_4	Word[Unsigned]	Tool Hit Counts Populated by OEM
StationName	Word[Unsigned](0..4)	Populated by PLC initial Program
StationDescription	Word[Unsigned](0..7)	Populated by PLC Initial Program

6 MANUAL OPERATION TYPE SCREENS

6.1 Function

Manual Operation Screens can be used to perform the following functions:

- Manual movement
- Select cycle type
- Set startup conditions
- Set devices in or out of bypass
- Perform maintenance calls.

Each function consists of the following components:

- Base Screen
- Navigation Window
- Comment File
- HMI Row Labels (6)
- HMI Page Labels
- One PLC instance, of one of the following function blocks:
  - MELPT_SYS_HMIScreenOperation16
  - MELPT_SYS_HMIScreenOperation32
  - MELPT_SYS_HMIScreenOperation64
- A Number of instances of the MELPT_SYS_RowFunction function block to meet the application requirements of the screen, but not to exceed the number of rows allowable for the screen. (16, 32, or 64).

The MELPT Project has been delivered with the following pre-configured labels and POU

Base Screen	Navigation Window	Comment File	Row Label X=Row Number	Page Label	Screen FB Number
Startup (B-100)	(W-1000)	102	GOTStartupRow_X	GOTStartupPageData	16
Bypass (B-120)	(W-1200)	104	GOTDeviceRow_X	GOTDevicePageData	32
Cycle Type (B-130)	(W-1300)	105	GOTCycleTypeRow_X	GOTCycleTypePageData	16
Manual (B-200)	(W-2000)	110	GOTManualRow_X	GOTManualPageData	64
Maintenance Call (B-600)	(W-6000)	150	GOTMaintCallRow_X	GOTMaintCallPageData	16

6.2 Screen Settings

6.2.1. Row Configuration

Elements 1 thru 9 can be hidden by the MELPT_SYS_HMIScreenOperation Default Row configuration

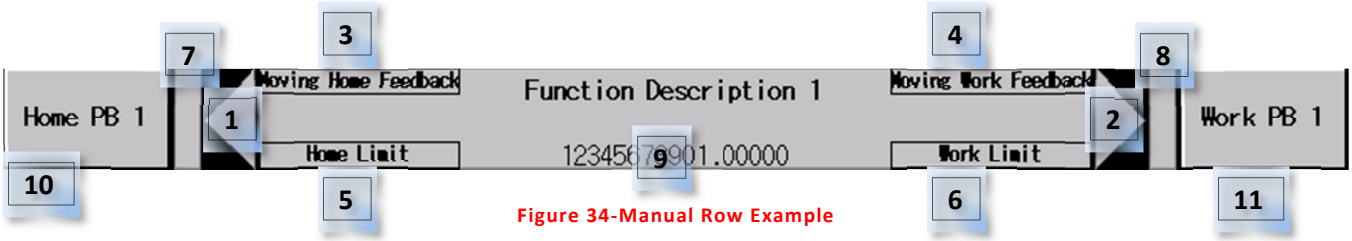


Figure 34-Manual Row Example

#	Description	Object	Off State	On state	Row Config Hide Bit
1	Execute Permission Left	Bit Parts Display: Part (300) GOTManualRow_X.EXEC_L			0
2	Execute Permission Right	Bit Parts Display: Part (301) GOTManualRow_X.EXEC_R			1
3	In-motion to home position	Bit Lamp: GOTManualRow_X.FEEDBACK_L	Moving Home Feedback	Moving Home Feedback	2
4	In-motion to work position	Bit Lamp: GOTManualRow_X.FEEDBACK_R	Moving Work Feedback	Moving Work Feedback	3
5	Home Limit Indicator	Bit Lamp: GOTManualRow_X.LIMIT_L	Home Limit	Home Limit	4
6	Work Limit Indicator	Bit Lamp: GOTManualRow_X.LIMIT_R	Work Limit	Work Limit	5

7	Left Button Pressed Indicator	Bit Parts Display: Part (302) GOTManualRow_X.PB_L			6
8	Right Button Pressed Indicator	Bit Parts Display: Part (302) GOTManualRow_X.PB_R			7
9	Position	Numeric Display: GOTManualRow_X.Position /GOTManualRow_X.PositionFactor	0.0000		8
10	Left Push Button	Bit Momentary: GOTManualRow_X.PB_L	Home PB 1	Home PB 2	N/A
11	Right Push Button	Bit Momentary: GOTManualRow_X.PB_R	Work PB 2	Work PB 2	N/A

6.2.2. Screen Script

Each Manual Function screen executes a screen script that handles the following.

- Places HMI Control GB registers into the proper HMI PB_L or PB_R Register

Register	Label
GB64616	GOTManualRow_1.PB_L
GB64617	GOTManualRow_1.PB_R
GB64626	GOTManualRow_2.PB_L
GB64627	GOTManualRow_2.PB_R
GB64636	GOTManualRow_3.PB_L
GB64637	GOTManualRow_3.PB_R
GB64646	GOTManualRow_4.PB_L
GB64647	GOTManualRow_4.PB_R

Register	Label
GB64656	GOTManualRow_5.PB_L
GB64657	GOTManualRow_5.PB_R
GB64666	GOTManualRow_6.PB_L
GB64667	GOTManualRow_6.PB_R

- Sets the comment file number
- Determines the text to display depending on the Current Page Number and the state of Symbolic/Absolute Addressing bit.

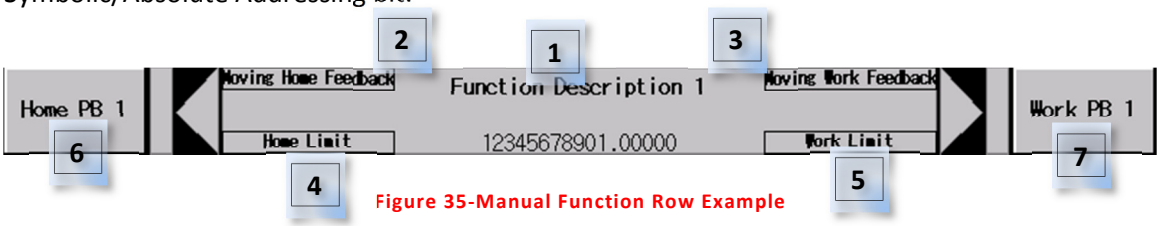


Figure 35-Manual Function Row Example

Item #	Description	Comment Device
1	Row #1 Function Description	GD64510
2	Row #1 Moving Home Feedback	GD64511
3	Row #1 Moving Work Feedback	GD64513
4	Row #1 Home Limit	GD64512
5	Row #1 Work Limit	GD64514
6	Row #1 Home PB	GD64515
7	Row #1 Work PB	GD64516
1-7	Row #2 Items	GD64520-GD64526

6.2.3. Absolute/Symbolic Addressing

Each navigation manual function window has a symbolic view PB.

Figure 36 - Navigation Window

This PB toggles the bit GB64503

Each Project Script evaluates this bit and adds a 1 to the comment number displayed if GB64503 is TRUE

This offset displays the absolute address, instead of the symbolic text

6.2.4. Manual Type Screen Comment File Format

A Manual screen can have 6 rows per screen, and up to 10 screens

Comments are organized as such

Figure 37-Manual Row

Comment Number	Description
10	Row 1 Function Description-Symbolic
11	Row 1 Function Description-Absolute
12	Moving Home Feedback-Symbolic
13	Moving Home Feedback-Absolute
14	Home Limit –Symbolic
15	Home Limit –Absolute
16	Moving work Feedback – Symbolic
17	Moving Work Feedback –Absolute
18	Work Limit -Symbolic
19	Work Limit –Absolute
20..29	Row 2

Comment Number	Description
1000	Home PB Text Row 1
1001	Home PB Text Row 2

Comment Number	Description
1100	Work PB Text Row 1
1101	Work PB Text Row 2

6.2.5. Page Control

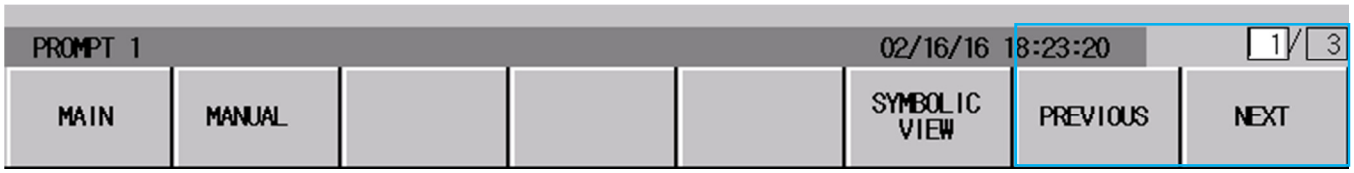


Figure 38-Manual Screen Page Controls

The Number of Pages is determined by the MELPT_SYS_HMIOperation function block and its inputs.

Last Row Number is divided by the number of rows per page to determine the total number of pages.

Example: MELPT_SYS_HMIOperation32 has 28 declared as LastRowNumber, and 3 RowsPerPage, LastPageNumber will be 10.

The current page displayed can be changed by entering the value in the Current Page numeric Input field.

The page can also be changed by pressing the previous button to decrement by 1 or the Next button to increment by 1. The value of the page is limited by the MELPT_SYS_HMIScreenOperation FB.

6.2.6. Object Hiding

There are multiple ways to hide objects of a HMI Manual function row

All features are setting a bit that an object script evaluates and determines to display the object or not.

6.2.6.1. MELPT_SYS_HMIScreenOperation

There is an input on the MELPT_SYS_HMIScreenOperation Function Block: i_uDefaultRowConfig

By setting the individual bits in the word screen elements can be removed from every row.

Per Screen									
	Hide Position	Hide Right Button Pressed	Hide Left Button Pressed	Hide Limit Right	Hide Limit Left	Hide Feedback Right	Hide Feedback Left	Hide Execute Right Arrow	Hide Execute Left Arrow
bit #	8	7	6	5	4	3	2	1	0
Decimal	256	128	64	32	16	8	4	2	1

6.2.6.2. MELPT_SYS_HMIScreenOperation

When the i_wRowsPerPage is set to less than six the overlay window will not be displayed.

Example RowsPerPage =4. Window 2005 and 2006 would not be displayed.

Window Number	Row Relation
2001	Manual Operation Row #1
2002	Manual Operation Row #2
2003	Manual Operation Row #3
2004	Manual Operation Row #4
2005	Manual Operation Row #5
2006	Manual Operation Row #6

A row number greater than the Last Row Number is automatically hidden by the HMI Operation function block

Example: Last row number is set to 10. Rows per page are 6. Row #5 and row #6 on the second screen will automatically be hidden.

6.2.6.3. MELPT_SYS_RowFunction

There is an input on the MELPT_SYS_HMIScreenOperation Function Block: i_uDisplayConfig

By setting the individual bits in the word screen elements can be removed from the individual row

Per Row				
	Hide All	Hide Position	Hide Right Side	Hide Left Side
bit #		2	1	0
Decimal	7	4	2	1

6.2.6.4. MELPT_SYS_RowFunction

If i_bEnabled is TRUE .Enabled ==1. When .Enabled does not equal 1 the row is hidden.

6.3 Manual Operations PLC Programs

There are five programs in the MELPT project that utilize the two function blocks needed for operating a manual motion from the HMI screen.

MELPT_SYS_Startup

Uses MELPT_SYS_HMIScreenOperation16

MELPT_SYS_Device

Uses MELPT_SYS_HMIScreenOperation32

MELPT_SYS_CycleType

Uses MELPT_SYS_HMIScreenOperation16

MELPT_SYS_ManualOp

Uses MELPT_SYS_HMIScreenOperation64

MELPT_SYS_MaintCall

Uses MELPT_SYS_HMIScreenOperation16

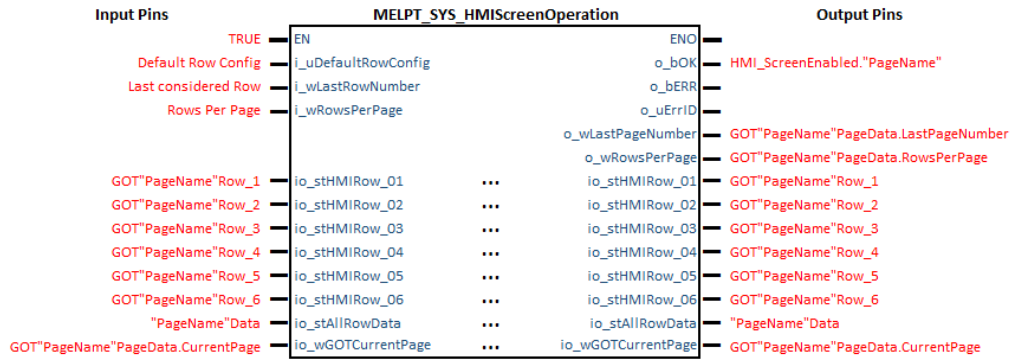
In these programs there is one instance of the HMI function block and 1 example instance of a row function block (MELPT_SYS_RowFunction).

It is the implementer's responsibility to provide the adequate programming for each row function.

6.3.1. MELPT_SYS_HMIScreenOperation

FB Name
MELPT_SYS_HMIScreenOperation (16, 32, 64)

Function Overview

Item	Description
Function overview	MELPT_SYS_HMIScreenOperation function blocks have three variants of identical programming. There are a 16 elements, 32 element, and 64 element version. This refers to the structure size that can be accepted on the pin io_stAllRowData. These function blocks interface with the HMI screen and pass the data to correct global structures based on the current page
Symbol	

Applicable Hardware

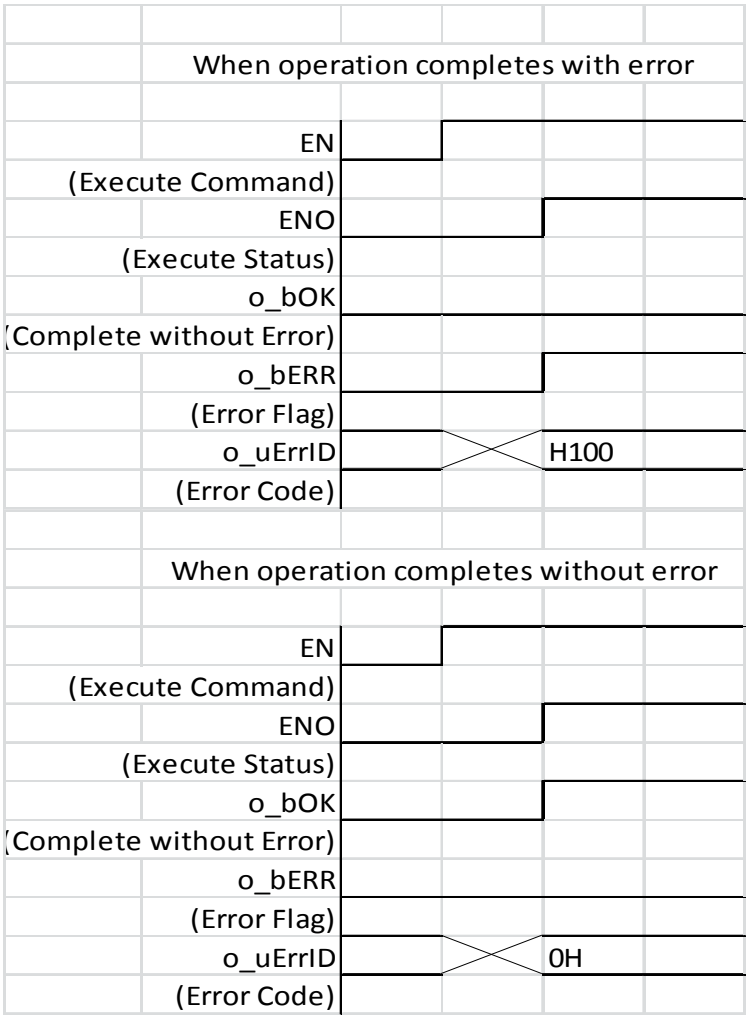
Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 1292 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td><table><tr><th>Type</th><th>Bits</th><th>Words</th></tr><tr><td>16</td><td>194</td><td>156</td></tr><tr><td>32</td><td>322</td><td>252</td></tr><tr><td>64</td><td>572</td><td>444</td></tr></table></td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the MELPT_SYS_GOTManRow SDT
This FB works in parallel with the MELPT_SYS_RowFunction FB</td></tr>
<tr><td>Function description</td><td>This function block manages indicators and buttons from the associated row type function blocks and places them into a global structure for the function. In addition this function block applies the display/not display properties to the HMI for a row function.</td></tr>
<tr><td>Restrictions and precautions</td><td>This FB uses Z16-Z19</td></tr>
</table>

Item	Description
Timing chart	

Labels

■ Input labels

User Input	Name	Var_Input name	Data Type	Setting range	Description
X	Default Row Config	i_uDefaultRowConfig	Word[Unsigned]	0 to 1FF	Masking word to tailor the display of elements for the whole screen

User Input	Name	Var_Input name	Data Type	Setting range	Description
X	Last Considered Row	i_wLastRowNumber	Word[Signed]	1 to 16,32, or 64	Hide row numbers greater than number input, used to calculate number of pages
X	Rows Per Page	i_wRowsPerPage	Word[Signed]	1 to 6	Used to calculate number of pages, used to scale how many rows to display per page

■ Input/Output labels

User Input	Symbol	Var_In_Out name	Data Type	Setting range	Description
	GOT"PageName"Row_1	io_stHMIRow_01	MELPT_SYS_GOTManRow		Row 1 Data
	GOT"PageName"Row_2	io_stHMIRow_02	MELPT_SYS_GOTManRow		Row 2 Data
	GOT"PageName"Row_3	io_stHMIRow_03	MELPT_SYS_GOTManRow		Row 3 Data
	GOT"PageName"Row_4	io_stHMIRow_04	MELPT_SYS_GOTManRow		Row 4 Data
	GOT"PageName"Row_5	io_stHMIRow_05	MELPT_SYS_GOTManRow		Row 5 Data
	GOT"PageName"Row_6	io_stHMIRow_06	MELPT_SYS_GOTManRow		Row 6 Data
	"PageName"Data	io_stAllRowData	MELPT_SYS_GOTManRow(1..16, 32, or 64)		All Row Data for the associated screen
	GOT"PageName"PageData.CurrentPage	io_wGOTCurrentPage	Word[Signed]		The currently displayed screen internally limited to 1 thru max page

■ Output labels

Name	Var_Output name	Data Type	Description
FB Executes normal	o_bOK	Bit	If On, indicates FB Normal
FB aborted execution	o_bERR	Bit	If On, FB Error Occurred
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
GOT"PageName"PageData.LastPageNumber	o_wLastPageNumber	Word[Signed]	Maximum Page Number
GOT"PageName"PageData.RowsPerPage	o_wRowsPerPage	Word[Signed]	Directly related to i_wRowsPerPage

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Last Row Number Greater than FB Max
H101 (257)	Rows Per Page >6
H102 (258)	Rows Per Page <1

FB Version Upgrade History

Version	Description
2.00A	Initial Release
2.10	Added IEC Compare
3.00	Three versions introduced, moved row functions outside of function block
3.01	Introduced temp variable to reduce indexing by compiler.

SDT Usage

1. MELPT_SYS_GOTManPage

System Label: GOT"PageName"PageData		
Member	Type	Usage
.CurrentPageNumber	Word[Signed]	Limited by FB to Last Page Number, controlled by the HMI
.LastPageNumber	Word[Signed]	Calculated by FB, used to mask rows, page control
.RowsPerPage	Word[Signed]	Number of Rows Per Page populated, used by HMI for script offsetting

2. MELPT_SYS_GOTManRow

System Label: GOT"PageName"Row'X'		
Member	Type	Usage
.EXEC_L	Bit	Moved from global structure to HMI structure
.EXEC_R	Bit	Moved from global structure to HMI structure
.FEEDBACK_L	Bit	Moved from global structure to HMI structure
.FEEDBACK_R	Bit	Moved from global structure to HMI structure
.LIMIT_L	Bit	Moved from global structure to HMI structure
.LIMIT_R	Bit	Moved from global structure to HMI structure
.PB_L	Bit	Moved from HMI Structure to global structure
.PB_R	Bit	Moved from HMI Structure to global structure
.Enabled	Word[Unsigned]	If value not equal to 1 the row is hidden
.DisplayConfig	Word[Unsigned]	Calculated and output to HMI
.PositionFactor	Double Word[Signed]	Moved from global structure to HMI structure
.Position	Double Word[Signed]	Moved from global structure to HMI structure

3. MELPT_SYS_GOTManRow

Global Label: "PageName"Data		
Member	Type	Usage
.EXEC_L	Bit	Copied to the HMI Structure
.EXEC_R	Bit	Copied to the HMI Structure

Global Label: ”PageName”Data		
Member	Type	Usage
.FEEDBACK_L	Bit	Copied to the HMI Structure
.FEEDBACK_R	Bit	Copied to the HMI Structure
.LIMIT_L	Bit	Copied to the HMI Structure
.LIMIT_R	Bit	Copied to the HMI Structure
.PB_L	Bit	Copied from the HMI Structure
.PB_R	Bit	Copied from the HMI Structure
.Enabled	Word[Unsigned]	If Not 1 display Config is set to mask all
.DisplayConfig	Word[Unsigned]	Read by this function block and combined with input values to be written to HMI structures
.PositionFactor	Double Word[Signed]	Copied from the HMI Structure
.Position	Double Word[Signed]	Copied from the HMI Structure

Application Example

There are three main decisions to be made when implementing a Manual Operation Screen.

Decision #1: How many manual operations are there?

This decision determines if you are using a 16, 32, or 64 operation function block. You could always use a 64 operation function block but if you only have 4 operations there, and declare a 64 operation block 60 instances of the SDT reside in memory but are unused.

Decision #2: How many manual operations per screen?

This is usually determined by the amount of data you want to show on the screen, if you need to display layout graphics, the amount of real estate on the screen could be reduced limiting the number of rows you want to display. If you are trying to adapt this project to a smaller display HMI you may also want to reduce the number of rows per screen to keep the HMI easier to operate.

Each row has its own overlay window, beginning with Window 2001; place the overlay windows as needed to meet your requirements.

Decision #3: What Screen elements do I want to display?

Choose the display mask to customize your screen

Some examples:

No Mask:

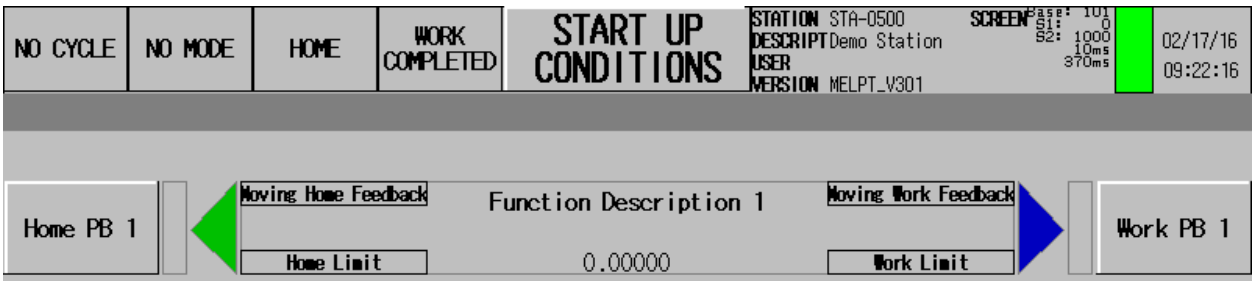


Figure 39-No Display Mask

Hide Position: set .b8 or decimal 256, hex H100

Figure 40-Mask Position

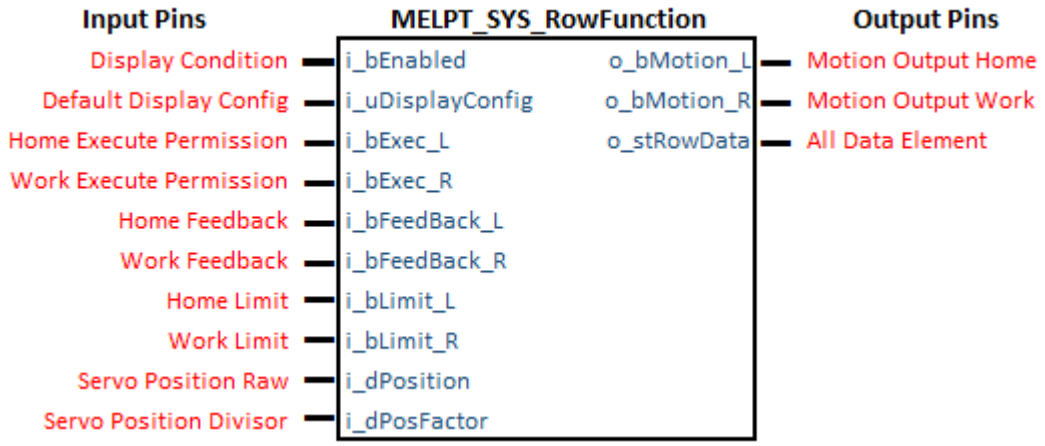
Hide Limits, Feedback, and Position: Set .b2, b3, .b4, .b5, and .b8, decimal 316, H13C

Bit Number	Decimal Value	Hex Value	Display
.b0	1	1	Hides the Left Arrow(execute permission home)
.b1	2	2	Hides the Right Arrow(execute permission work)
.b2	4	4	Hides the Left Feedback(in motion toward home)
.b3	8	8	Hides the Right Feedback(in motion toward work)
.b4	16	10	Hides the Left Limit(at home)
.b5	32	20	Hides the Right Limit(at work)
.b6	64	40	Hides the Left Button(Execute Home)
.b7	128	80	Hides the Right Button(Execute Work)
.b8	256	100	Hides the Position(Axis Position Value)

6.3.2. MELPT_SYS_RowFunction

FB Name
MELPT_SYS_RowFunction

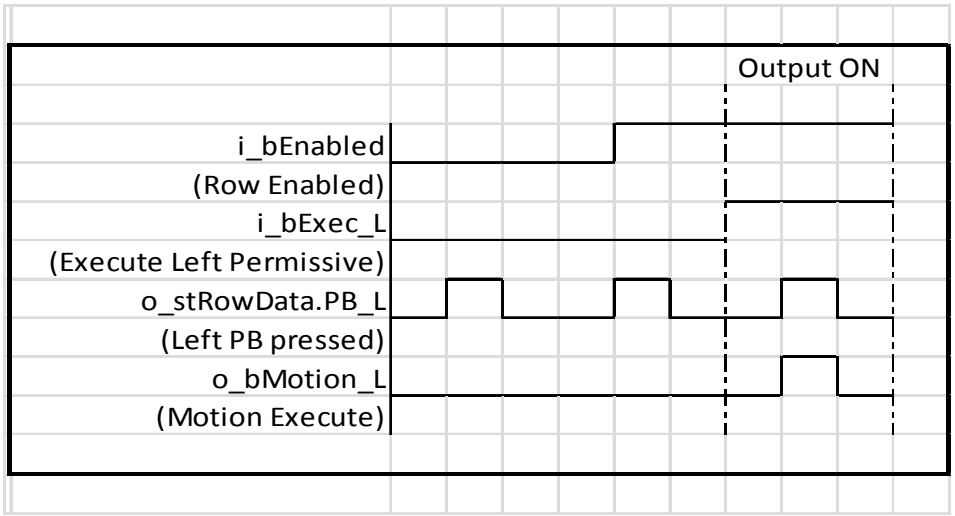
Function Overview

Item	Description
Function overview	This function block is used handle row input and output for a single manual operation. It is used in conjunction with the HMIScreenOperation FB to pass the data to the HMI and pass the HMI PB to the correct row function block. One instance is to be called per row function. If you have 32 row operations related to the manual screen you will need 32 instances of this fb, one for each manual operation.
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Item	Description
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 59 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	17 bits 11 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This FB requires the MELPT_SYS_GOTManRow SDT This FB works in conjunction with the MELPT_SYS_HMIScreenOperation FB's
Function description	This function block places input data into the ALLRow global structure. It uses the PB Data from the HMI structure to execute a motion. For a motion to be executed the appropriate EXEC bit must be true
Restrictions and precautions	
Timing chart	

Labels

■ Input labels

User Input	Name	Var_Input name	Data Type	Setting range	Description
X	Display Condition	i_bEnabled	Bit		This Row is to be displayed
X	Default Display Config	i_uDisplayConfig	Word[Unsigned]	0-7	Configuration of Display object
X	Home Execute Permission	i_bExec_L	Bit		Permission to move Left
X	Work Execute Permission	i_bExec_R	Bit		Permission to Move Right
X	Home Feedback	i_bFeedBack_L	Bit		Feedback that we are moving Left
X	Work Feedback	i_bFeedBack_R	Bit		Feedback that we are moving right
X	Home Limit	i_bLimit_L	Bit		On Left Limit
X	Work Limit	i_bLimit_R	Bit		On Right Limit
X	Servo Position Raw	i_dPosition	Double Word[Signed]		Position from Servo
X	Servo Position Divisor	i_dPosFactor	Double Word[Signed]		Divisor from Servo

■ Output labels

Name	Var_Output name	Data Type	Description
Motion Output Home	o_bMotion_L	Bit	Motion actuation toward Home
Motion Output Work	o_bMotion_R	Bit	Motion Actuation toward Work

Name	Var_Output name	Data Type	Description
All Data Element	o_stRowData	MELPT_SYS_GOTManRow	Grouping of Data for display

FB Version Upgrade History

Version	Description
2.00A	Initial Release
2.10	IEC commands
3.00	Rewritten to be used outside of the Screen Operation FB
3.01	Display Config Limit changed

SDT Usage

2. MELPT_SYS_GOTManRow

Global Label: ”PageName”Data		
Member	Type	Usage
.EXEC_L	Bit	Input pin i_bEXEC_L value is placed into the SDT by this FB
.EXEC_R	Bit	Input pin i_bEXEC_R value is placed into the SDT by this FB
.FEEDBACK_L	Bit	Input pin i_bFeedback_L value is placed into the SDT by this FB
.FEEDBACK_R	Bit	Input pin i_bFeedback_R value is placed into the SDT by this FB
.LIMIT_L	Bit	Input pin i_bLimit_L value is placed into the SDT by this FB
.LIMIT_R	Bit	Input pin i_bLimit_R value is placed into the SDT by this FB
.PB_L	Bit	The value from the SDT is used to determine if the o_bMotion_L is output

Global Label: ”PageName”Data		
Member	Type	Usage
.PB_R	Bit	The value from the SDT is used to determine if the o_bMotion_R is output
.Enabled	Word[Unsigned]	If i_bEnabled input pin is true this value ==1
.DisplayConfig	Word[Unsigned]	Contains the Display Config from the row function Limited from 0 to 7 by this FB
.PositionFactor	Double Word[Signed]	Value from i_dPosFactor is placed into this register
.Position	Double Word[Signed]	Value from i_dPosition is placed into this register

Application Example

This function block works in concert with the HMIScreenOperation block that interfaces the HMI to global row data.

One instance of this function block is to be called per row.

Masking Examples:

Hide Left Side: i_uDisplayConfig =1

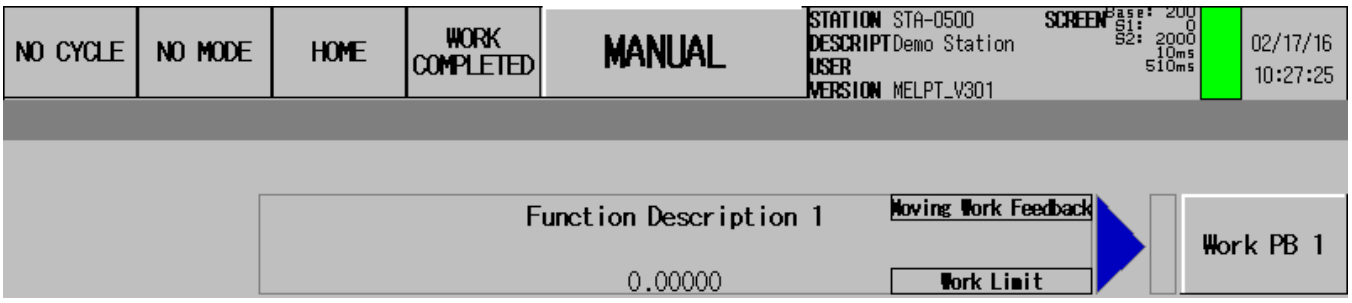


Figure 41 - Hide the Left Side

Hide Position and Left Side: i_uDisplayConfig =5

Figure 42-Hide Left Side and position

Decimal Value	Display
0	Display All
1	Hide Left Side
2	Hide Right Side
3	Hide Both Left and Right
4	Hide Position
5	Hide Position and Left
6	Hide Position and Right
7	Hide Position, Left, and Right

7 OVERVIEW

7.1 Overview-Startup Conditions

This screen is used to show the Start-Up conditions.

In practice all the steps necessary to turn the machine from off state to satisfy the pre-conditions for Automatic Continuous Cycle shall be listed.

- This screen is a manual operation screen and follows the formatting laid out in the Manual Operations Screen in section 6.
- Screen Script #101 sets the comment file to 102 and loads GOTStartupRowData and GOTStartupPage Data into the appropriate GD/GB registers.
- An instance of MELPT_SYSHMIScreenOperation16 has been added to the scan in program MELPT_SYS_Startup. The MELPT PLC project includes the global label StartupData with 16 instances of the MELPT_SYS_GOTManRow SDT.

Application Example

- This function block works in concert with the HMIScreenOperation block that interfaces the HMI to global row data.
- One instance of this function block is to be called per row.
- Below is an example of Startup Condition

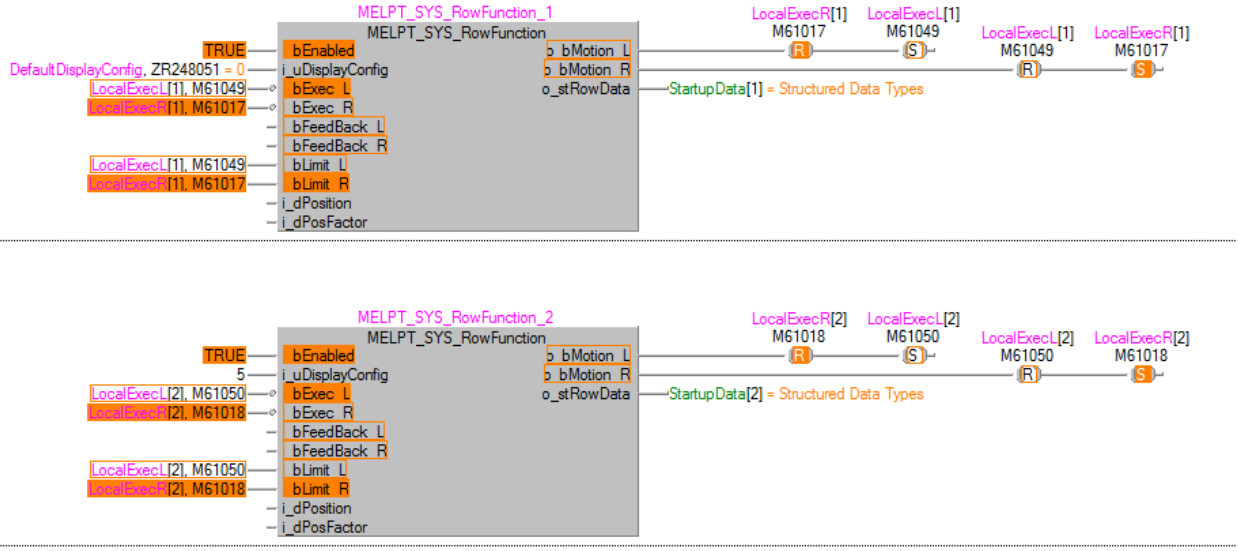


Figure 43-Startup Condition

Pressing the ON Button will turn on the device. Pressing the OFF button will turn off the device.

For the second row the display Config has been set so the device cannot be turned off once turned on.

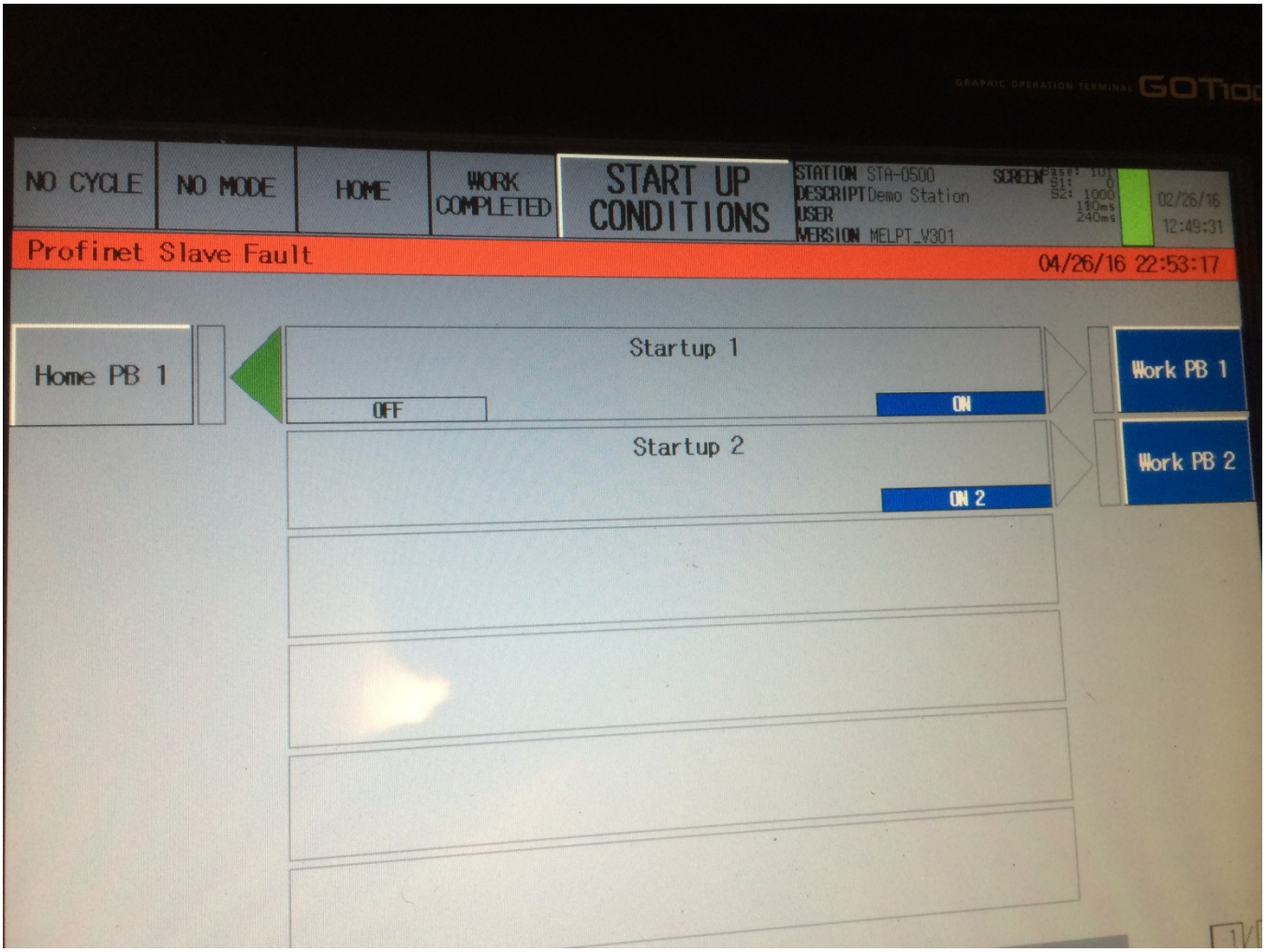


Figure 44-Startup Conditions Example

7.2 Overview-Part Status

7.2.1. HMI-Part Status Base Screen

- The Part Status screen gives the overview of up to 32 devices
- The screen is divided into two parts the work layout (1) area, and the detailed information (2) area.
- The Next and Previous buttons on the navigation bar allow for changing the page of devices displayed within the detailed information area
- Changing the page can also be accomplished by entering the page number.
- The work layout area is used to display the summary status of up to 32 devices.
- The OEM is required to arrange the device status indicators over the layout to match actual implementation
- Each Device has a 2 character identifier.
- Each device has a display Config to allow one or two parameters with or without limits to determine the status and be displayed.
- Screen Script #110 moves PLC register memory into HMI register memory
- It is recommended to remove the status indicators not necessary

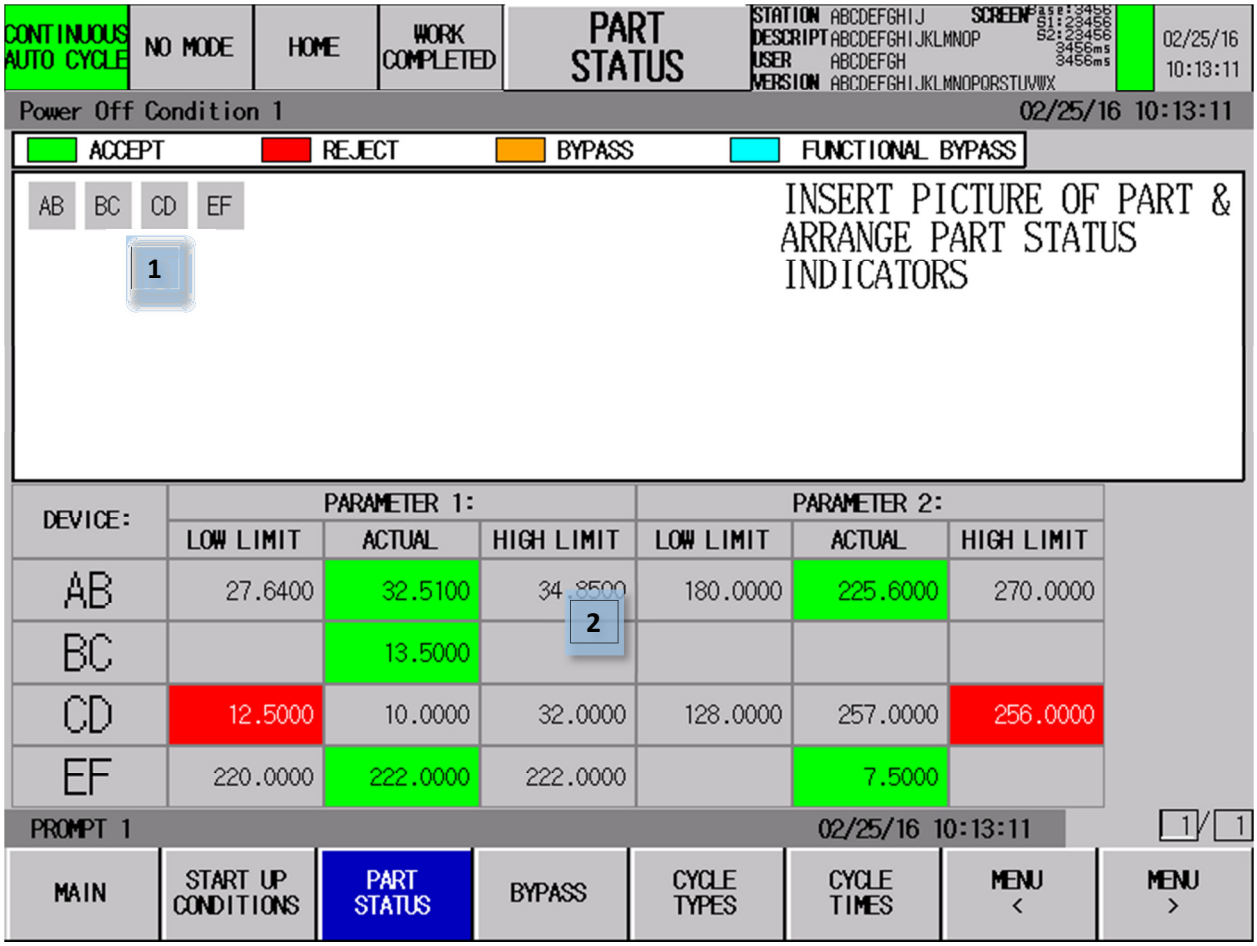


Figure 45- Part Status

1) Work Layout: Device Status Indicators

32 indicators are provided as ASCII displays. Each object contains its own script.

```
{
        Case 1:my.plate_color=28; break; //green
        Case 2:
        Case 4:
        Case 8:
        Case 10:
        Case 12:
        Case 16:
        Case 18:
        Case 20: my.plate_color=224;break;//red
        Case 32: my.plate_color=240;break;//orange
        Case 64: my.plate_color=31;break;//cyan
        Default: my.plate_color=182;//gray
}
```

This script changes the background indicator of the device.

Value(s)	Color	Description
1	Green	Accept
2,4,8,10,12,16,18,20	Red	Reject
32	Orange	Bypassed(from Bypass screen)
64	Cyan	Functional Bypassed (due to model type) OEM determination
Any not listed	Gray	No Determination

It is recommended that for devices not populated, the indicator be removed by the integrator.

2) Detailed Information

	A	B	C	D	E	F	G
	DEVICE:	PARAMETER 1:			PARAMETER 2:		
		LOW LIMIT	ACTUAL	HIGH LIMIT	LOW LIMIT	ACTUAL	HIGH LIMIT
1	AB	27.6400	32.5100	34.8500	180.0000	225.6000	270.0000
2	BC		13.5000				
3	CD	12.5000	10.0000	32.0000	128.0000	257.0000	256.0000
4	EF	220.0000	222.0000	222.0000		7.5000	

Figure 46-Detailed Information Window

Objects							
Identifier	A	B	C	D	E	F	G
	Device	**Parameter 1:**			**Parameter 2:**		
		Low Limit	**Actual**	**High Limit**	**Low Limit**	**Actual**	**High Limit**
1	ASCII Display GD64610 Status: GD64600	Numeric Display GD64710	Numeric Display GD64720	Numeric Display GD64730	Numeric Display GD64810	Numeric Display GD64820	Numeric Display GD64830
2	ASCII Display GD64611 Status: GD64601	Numeric Display GD64712	Numeric Display GD64722	Numeric Display GD64732	Numeric Display GD64812	Numeric Display GD64822	Numeric Display GD64832

Objects							
3	ASCII Display GD64612 Status: GD64602	Numeric Display GD64714	Numeric Display GD64724	Numeric Display GD64734	Numeric Display GD64814	Numeric Display GD64824	Numeric Display GD64834
4	ASCII Display GD64613 Status: GD64603	Numeric Display GD64716	Numeric Display GD64726	Numeric Display GD64736	Numeric Display GD64816	Numeric Display GD64826	Numeric Display GD64836

	A	B	C	D	E	F	G
	DEVICE:	PARAMETER 1:			PARAMETER 2:		
		LOW LIMIT	ACTUAL	HIGH LIMIT	LOW LIMIT	ACTUAL	HIGH LIMIT
1	AB	27.6400	32.5100	34.8500	180.0000	225.6000	270.0000
2	BC		13.5000				
3	CD	12.5000	10.0000	32.0000	128.0000	257.0000	256.0000
4	EF	220.0000	222.0000	222.0000		7.5000	

Example When the Current Page =1

Identifier	HMI Device	Associated Label
A1 A1	GD64610 GD64600	PartStatus.DeviceDesignator[1] PartStatus.status[1]
B1 B1	GD64710 GD64700	PartStatus.P1LowLimit[1] PartStatus.P1Divisor[1]

Identifier	HMI Device	Associated Label
C1 C1	GD64720 GD64700	PartStatus.P1Actual[1] PartStatus.P1Divisor[1]
D1 D1	GD64730 GD64700	PartStatus.P1HighLimit[1] PartStatus.P1Divisor[1]
E1 E1	GD64810 GD64800	PartStatus.P2LowLimit[1] PartStatus.P2Divisor[1]
F1 F1	GD64820 GD64800	PartStatus.P2Actual[1] PartStatus.P2Divisor[1]
G1 G1	GD64830 GD64800	PartStatus.P2HighLimit[1] PartStatus.P2Divisor[1]

- Items A1-A4 run an object script to color the background based off the status, the script is identical to the script for the work status indicators.
- The divisor is used to adjust the number of decimal places displayed

Status Definition

Bit Number	Decimal	Meaning
0	1	Accepted
1	2	Parameter 1 Actual greater Than Parameter 1 High Limit
2	4	Parameter 1 Actual Less than Parameter 1 Low Limit
3	8	Parameter 2 Actual greater Than Parameter High Limit
4	16	Parameter 2 Actual Less than Parameter Low Limit
5	32	Bypassed
6	64	Functionally Bypassed

Display Config

Bit Number	Decimal	Meaning
0	1	Hides Parameter 2 Limits Any Parameter 2 Actual <> 0 is accepted
1	2	Hides Parameter 2 Determination is made based off Parameter 1 only
2	4	Hides Parameter 1 Limits Parameter 1 Actual <> 0 is accepted
3	8	Hides All(Operates Like Functional Bypass)

	A	B	C	D	E	F	G
	DEVICE:	PARAMETER 1:			PARAMETER 2:		
		LOW LIMIT	ACTUAL	HIGH LIMIT	LOW LIMIT	ACTUAL	HIGH LIMIT
1	AB	27.6400	32.5100	34.8500	180.0000	225.6000	270.0000
2	BC		13.5000				
3	CD	12.5000	10.0000	32.0000	128.0000	257.0000	256.0000
4	EF	220.0000	222.0000	222.0000		7.5000	

Identifier	HMI Device	Display Case
	GD64620-23	Is Loaded with Display Config for row 1-4
	GD64600-03	is loaded with Status for Row 1-4
Row 1	GD64620=0	Compare Both Parameters
	GD64600=1	Actual for Parameter #1 is between lower and upper limit Actual for Parameter #2 is between lower and upper limit
Row 2	GD64621=7	Parameter 1 Actual only
	GD64601=1	Parameter 1 Value not equal to 0 is accepted
Row 3	GD64622=0	Compare Both Parameters
	GD64602=12	Parameter 1 is less than Lower Limit (=4) Parameter 2 is greater than Upper Limit (=8)
Row 4	GD64623=1	No Upper or Lower limits for Parameter 2, non-zero only required
	GD64603=1	Actual for Parameter #1 is between lower and upper limit Actual for Parameter #2 is non-zero

A screen script runs on the HMI to display specific part status data on the screen based off the current page

Page Number	Part status Displayed
1	Part Status[1] thru Part Status [4]
2	Part Status[5] thru Part Status [8]
3	Part Status[9] thru Part Status [12]
4	Part Status[13] thru Part Status [16]
5	Part Status[17] thru Part Status [20]
6	Part Status[21] thru Part Status [24]
7	Part Status[25] thru Part Status [28]
8	Part Status[29] thru Part Status [32]

7.2.2. PLC-MELPT_SYS_PartStatus Program

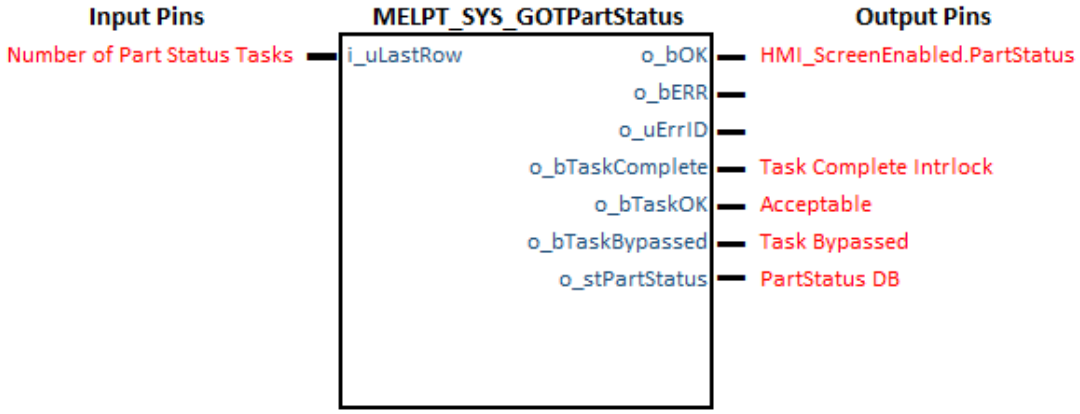
The PLC program provided consists of two function blocks: MELPT_SYS_PartStatusINT and MELPT_SYS_PartStatusDINT, configured in various ways to meet certain determinations.

Additionally a third block acts as a HMI interface MELPT_SYS_GOTPartStatus

7.2.3. MELPT_SYS_GOTPartStatus

FB Name
MELPT_SYS_GOTPartStatus

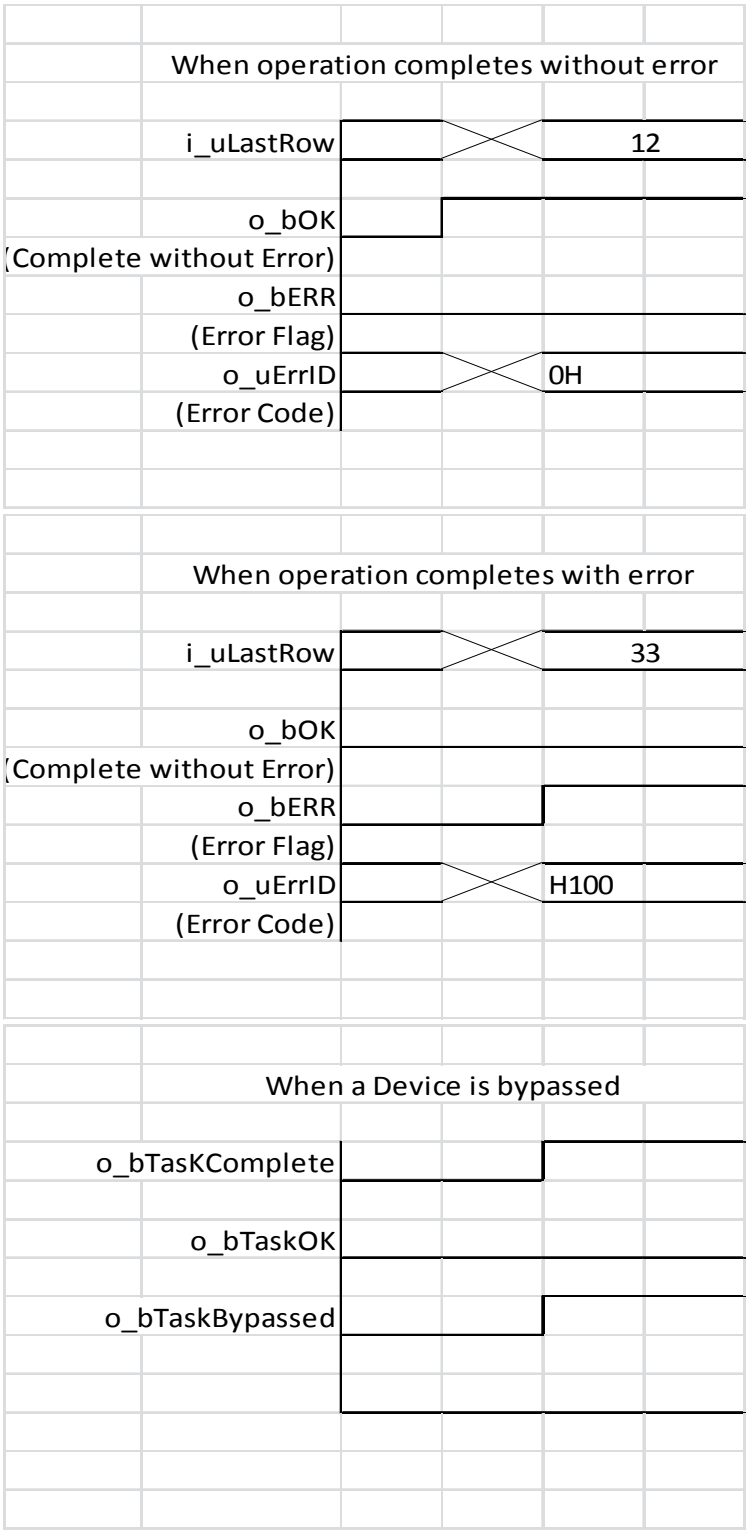
Function Overview

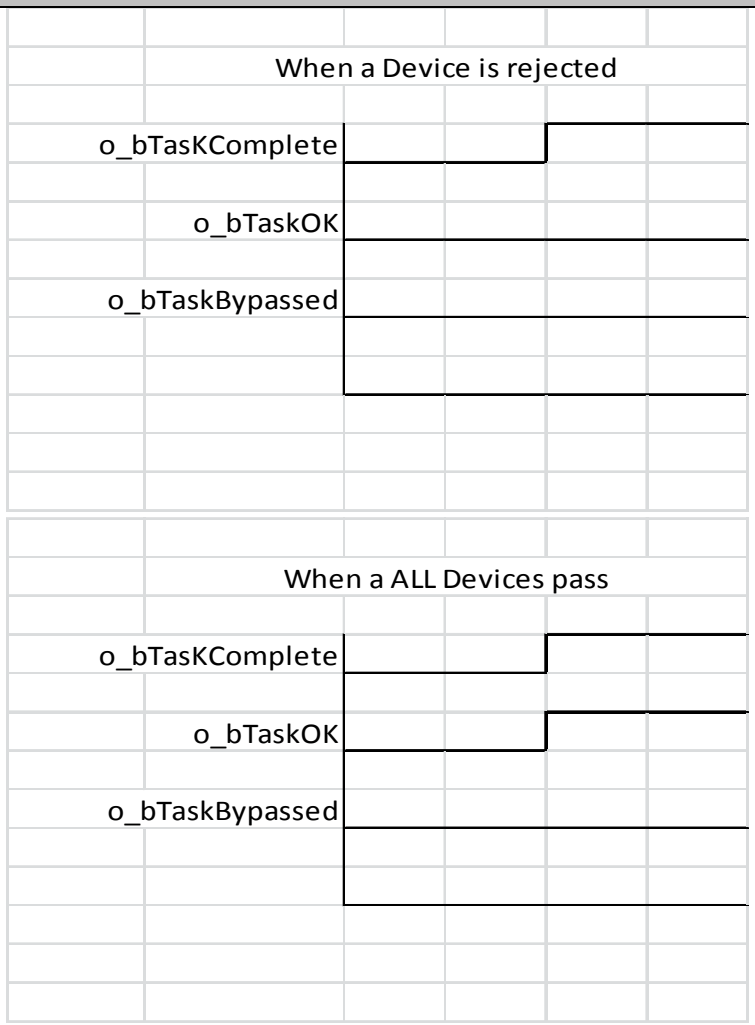
Item	Description
Function overview	This function block is used to determine the max pages, zero out and hide unused rows, and to determine task status
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Software</td><td><table><tr><th>Series</th><th>Version</th></tr><tr><td>GX Works 2</td><td>1.536</td></tr><tr><td>GT Designer 3</td><td>1.136</td></tr></table></td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 367 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>6 bits
551 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the MELPT_SYS_PartStatus SDT
This FB works in conjunction with the MELPT_SYS_PartStatusINT and MELPT_SYS_PartStatusDINT FB</td></tr>
<tr><td>Function description</td><td>This function blocks sets the display Config to 15 for all rows greater than the input i_uLastRow to 15, masking all elements. In addition it will loop through all devices 1 thru i_uLastRow and check the status, if the status is non zero for all items a Task Complete is returned. If any device is bypassed the task is bypassed.

If the task is complete, none of the devices are bypassed, and no status was between 2 and 31, o_bTaskOK is true</td></tr>
<tr><td>Restrictions and precautions</td><td>This FB uses Z16. Please do not use this register</td></tr>
</table>

Item	Description
Timing chart	

Item	Description
	

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Last Row Number Greater than 32

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Number of Part Status Tasks	i_uLastRow	Word[Unsigned]	0 to 32	Used in masking unused rows and to determine how many items to check

■ Output labels

Symbol Name	Var_Output name	Data Type	Description
Normal FB Complete	o_bOK	Bit	If On, indicates FB Normal
FB Execution Aborted	o_bERR	Bit	If On, FB Error Occurred
FB Err Code	o_uErrID	Word[Unsigned]	FB Error Code Output
Task Complete Interlock	o_bTaskComplete	Bit	All Status <> 0
Acceptable	o_bTaskOK	Bit	No Reject or Bypass Status
Task Bypassed	o_bTaskBypassed	Bit	Bypass Status Found
Part Status Data block	o_stPartStatus	MELPT_SYS_PartStatus	HMI Display SDT

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.12	Added Functional Bypass and Actual1_GT0, and Actual2_GT0 bits FB labels updated to BCN-89000-0823-D guideline
1.20	Added FB Status Outputs
1.26	One Parameter Status is now bit array, removed security ok;
2.00A	Adopted BCN-89000-0969; added active device, added cursor controls
3.00	Completely rewritten, Part Status determination removed to own FB

SDT Usage

1. MELPT_SYS_PartStatus

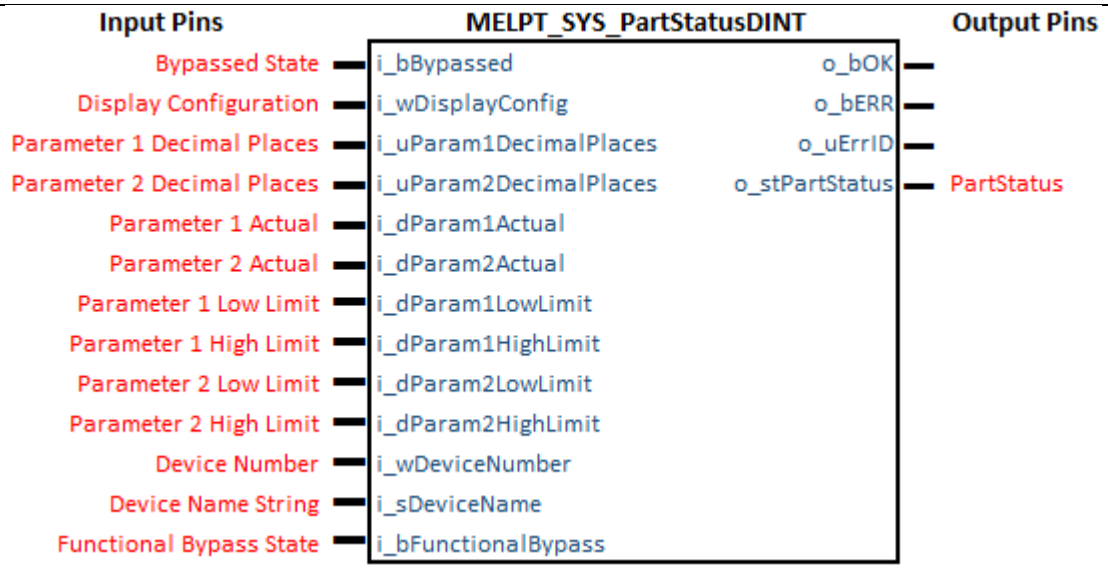
System Label: PartStatus

Member	Type	Usage
.MaxPage	Word[Unsigned]	Determined by this FB i_uLastRow divided by 4
.MaxDeviceNumber	Word[Signed]	The input i_uLastRowNumber is written here
.DisplayConfig	Word[Unsigned](1..32)	Set to 15 if element number greater than i_uLast Row
.Status	Word[Unsigned](1..32)	Set to 0 if element number greater than i_uLast Row
.P1Divisor	Word[Unsigned](1..32)	Set to 0 if element number greater than i_uLast Row
.P2Divisor	Word[Unsigned](1..32)	Set to 0 if element number greater than i_uLast Row
.P1Actual	Double Word[Signed](1..32)	Set to 0 if element number greater than i_uLast Row
.P1LowLimit	Double Word[Signed](1..32)	Set to 0 if element number greater than i_uLast Row
.P1HighLimit	Double Word[Signed](1..32)	Set to 0 if element number greater than i_uLast Row
.P2Actual	Double Word[Signed](1..32)	Set to 0 if element number greater than i_uLast Row
.P2LowLimit	Double Word[Signed](1..32)	Set to 0 if element number greater than i_uLast Row
.P2HighLimit	Double Word[Signed](1..32)	Set to 0 if element number greater than i_uLast Row
.DeviceDesignator	Word[Unsigned](1..32)	Set to 0 if element number greater than i_uLast Row

7.2.4. MELPT_SYS_PartStatusDINT

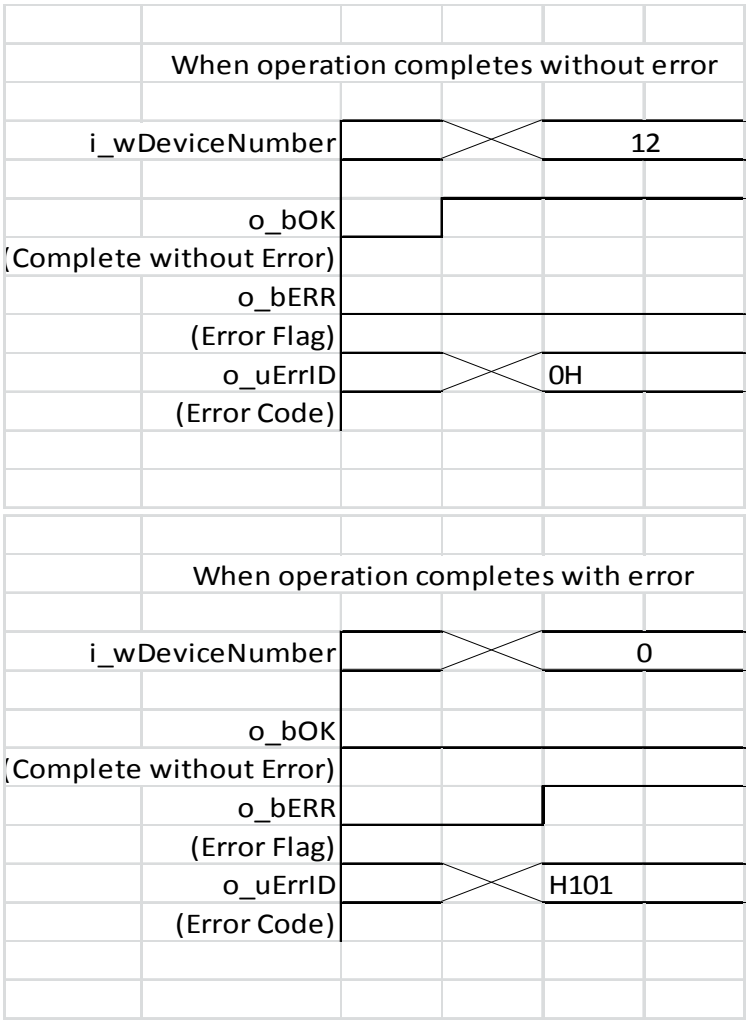
FB Name
MELPT_SYS_PartStatusDINT

Function Overview

Item	Description
Function overview	This function block uses inputs from external devices to determine the status of a device or task. This function blocks accepts the Actual and Limit Data in Double Word Signed Format -2147483648 to 2147483647
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Software</td><td><table><tr><th>Series</th><th>Version</th></tr><tr><td>GX Works 2</td><td>1.536</td></tr><tr><td>GT Designer 3</td><td>1.136</td></tr></table></td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 271 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>14 bits
592 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the MELPT_SYS_PartStatus SDT
This FB works in conjunction with the MELPT_SYS_GOTPartStatus FB</td></tr>
<tr><td>Function description</td><td>This function block moves the input divisors, actual and limit data to the Part Status Data Block
It also sets the display parameters and will make a status determination based off the display configuration</td></tr>
<tr><td>Restrictions and precautions</td><td>This FB uses Z16. Please do not use this register</td></tr>
</table>

Item	Description
Timing chart	

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Device Number Greater than 32
H101 (257)	Device Number less than 1

Labels

■ Input labels

User Input	Name	Var_Input name	Data Type	Setting range	Description	
X	Bypassed State	i_bBypassed	Bit		Used to set status 32 bypassed	
X	Display Configuration	i_wDisplayConfig	Word[Signed]	0 to 8	Value	Meaning
					1	Don't use Parameter 2 Limits
					2	Don't Use Parameter 2
					3	Same as 2
					4	Don't use Parameter 1 Limits
					5	4+1
					6	4+2
					7	Same as 6
					8	Set Functional Bypass
X	Parameter 1 Decimal Places	i_uParam1DecimalPlaces	Word[Unsigned]	0 to 4	Number of Decimal Places for Parameter 1 Values	
X	Parameter 2 Decimal Places	i_uParam2DecimalPlaces	Word[Unsigned]	0 to 4	Number of Decimal Places for Parameter 1 Values	
X	Parameter 1 Actual	i_dParam1Actual	Double Word[Signed]		Actual Value of Parameter 1	
X	Parameter 2 Actual	i_dParam2Actual	Double Word[Signed]		Actual Value of Parameter 2	
X	Parameter 1 Low Limit	i_dParam1LowLimit	Double Word[Signed]		Lower Limit of Parameter 1	
X	Parameter 1 High Limit	i_dParam1HighLimit	Double Word[Signed]		Upper Limit of Parameter 1	

User Input	Name	Var_Input name	Data Type	Setting range	Description
X	Parameter 2 Low Limit	i_dParam2LowLimit	Double Word[Signed]		Lower Limit of Parameter 2
X	Parameter 2 High Limit	i_dParam2HighLimit	Double Word[Signed]		Upper Limit of Parameter 2
X	Device Number	i_wDeviceNumber	Word[Signed]	1 to 32	Unique Device Number
X	Device Name String	i_sDeviceName	String		Unique Identifier for the screen
X	Functional Bypass State	I_bFunctionalBypass	Bit		Used to set status 64

■ Output labels

	Var_Output name	Data Type	Description
FB Executed Normally	o_bOK	Bit	If On, indicates FB Normal
FB Execution aborted	o_bERR	Bit	If On, FB Error Occurred
FB Error code	o_uErrID	Word[Unsigned]	FB Error Code Output
Part Status Data block	o_stPartStatus	MELPT_SYS_PartStatus	HMI Display SDT

FB Version Upgrade History

Version	Description
3.00	Initial Release
3.01	User input Check modified

SDT Usage

1. MELPT_SYS_PartStatus

System Label: Part Status		
Member	Type	Usage

System Label: Part Status		
Member	Type	Usage
.MaxDeviceNumber	Word[Signed]	Used as upper Limit for FB error check
.DisplayConfig	Word[Unsigned](i_wDeviceNumber)	I_wDisplayConfig is moved into this register, if i_wDisplayConfig >=8 15 is stored
.Status	Word[Unsigned](i_wDeviceNumber)	Determined by this FB
.P1Divisor	Word[Unsigned](i_wDeviceNumber)	I_uParam1DecimalPlaces is Limited to 0 to 4 and placed in this register
.P2Divisor	Word[Unsigned](i_wDeviceNumber)	I_uParam2DecimalPlaces is Limited to 0 to 4 and placed in this register
.P1Actual	Double Word[Signed](i_wDeviceNumber)	I_dPParam1Actual placed into this register If functional bypass TRUE or i_wDisplyConfig =15, then 0 is entered
.P1LowLimit	Double Word[Signed](i_wDeviceNumber)	I_dPParam1LowLimit placed into this register If functional bypass TRUE or i_wDisplyConfig >=4, then 0 is entered
.P1HighLimit	Double Word[Signed](i_wDeviceNumber)	I_dPParam1HighLimit placed into this register If functional bypass TRUE or i_wDisplyConfig >=4, then 0 is entered
.P2Actual	Double Word[Signed](i_wDeviceNumber)	I_dPParam2Actual placed into this register If functional bypass TRUE or i_wDisplyConfig >=2, then 0 is entered
.P2LowLimit	Double Word[Signed](i_wDeviceNumber)	I_dPParam2LowLimit placed into this register If functional bypass TRUE or i_wDisplyConfig >=1, then 0 is entered

System Label: Part Status		
Member	Type	Usage
.P2HighLimit	Double Word[Signed](i_wDeviceNumber)	I_dPAram2HighLimit placed into this register If functional bypass TRUE or i_wDisplyConfig >=1, then 0 is entered
.DeviceDesignator	Word[Unsigned](i_wDeviceNumber)	The first two characters of i_sDeviceName are moved

Notes

Status Definition

Bit Number	Decimal	Meaning
0	1	Accepted
1	2	Parameter 1 Actual greater Than Parameter 1 High Limit
2	4	Parameter 1 Actual Less than Parameter 1 Low Limit
3	8	Parameter 2 Actual greater Than Parameter High Limit
4	16	Parameter 2 Actual Less than Parameter Low Limit
5	32	Bypassed
6	64	Functionally Bypassed

Display Config

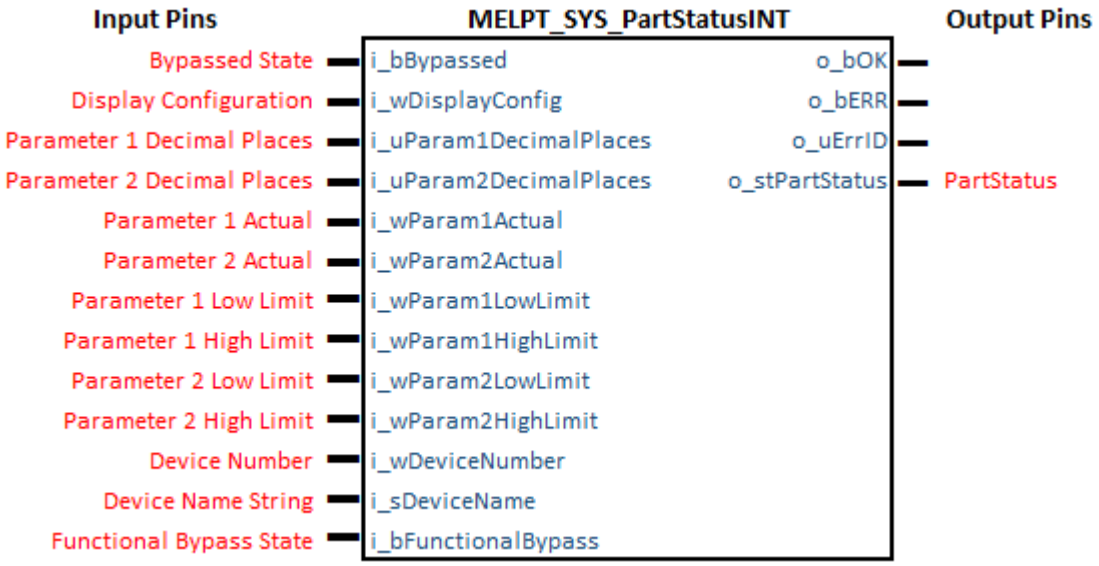
Bit Number	Decimal	Meaning
0	1	Hides Parameter 2 Limits Any Parameter 2 Actual <> 0 is accepted
1	2	Hides Parameter 2 Determination is made based off Parameter 1 only

Bit Number	Decimal	Meaning
2	4	Hides Parameter 1 Limits Parameter 1 Actual <> 0 is accepted
3	8	Hides All(Operates Like Functional Bypass)

7.2.5. MELPT_SYS_PartStatusINT

FB Name
MELPT_SYS_PartStatusINT

Function Overview

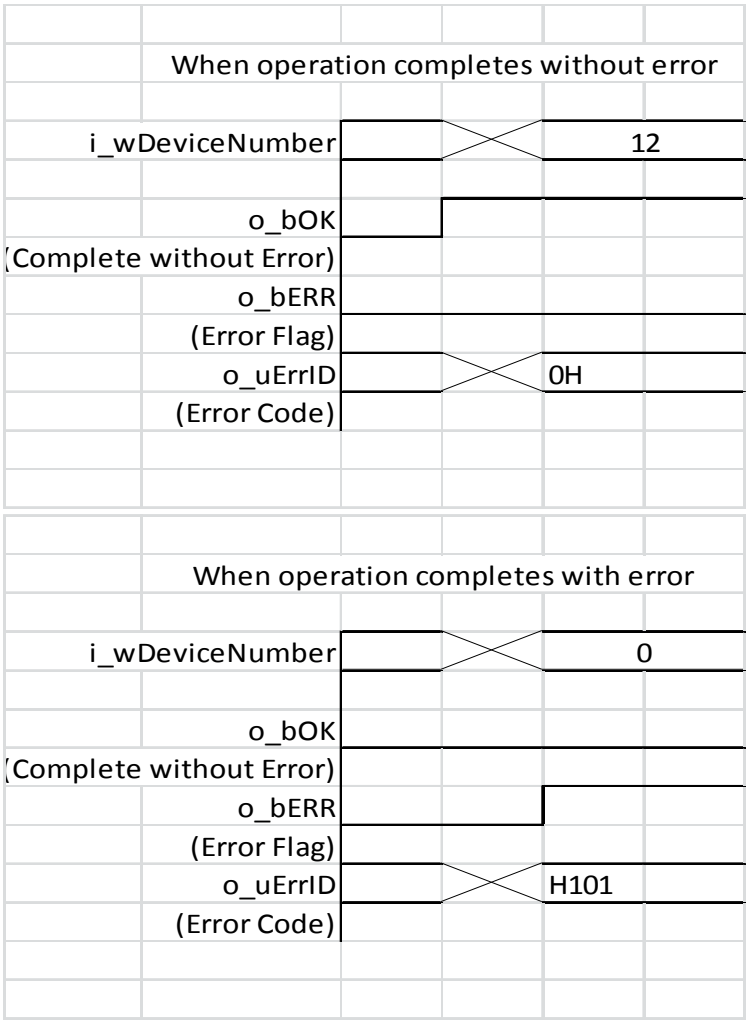
Item	Description
Function overview	This function block uses inputs from external devices to determine the status of a device or task. This function blocks accepts the Actual and Limit Data in Word Signed Format -32768 to 32767
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Software</td><td><table><tr><th>Series</th><th>Version</th></tr><tr><td>GX Works 2</td><td>1.536</td></tr><tr><td>GT Designer 3</td><td>1.136</td></tr></table></td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 310 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>14 bits
585 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the MELPT_SYS_PartStatus SDT
This FB works in conjunction with the MELPT_SYS_GOTPartStatus FB</td></tr>
<tr><td>Function description</td><td>This function block moves the input divisors, to the Part Status Data Block

It converts the actual and limits to Double Words and places them into the Part Status Data Block

It also sets the display parameters and will make a status determination based off the display configuration</td></tr>
<tr><td>Restrictions and precautions</td><td></td></tr>
</table>

Item	Description
Timing chart	

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Device Number Greater than 32
H101 (257)	Device Number less than 1

Labels

■ Input labels

User Input	Symbol	Var_Input name	Data Type	Setting range	Description	
X	Bypassed State	i_bBypassed	Bit		Used to set status 32 bypassed	
X	Display Configuration	i_wDisplayConfig	Word[Signed]	0 to 8	Value	Meaning
					1	Don't use Parameter 2 Limits
					2	Don't Use Parameter 2
					3	Same as 2
					4	Don't use Parameter 1 Limits
					5	4+1
					6	4+2
					7	Same as 6
					8	Set Functional Bypass
X	Parameter 1 Decimal Places	i_uParam1DecimalPlaces	Word[Unsigned]	0 to 4	Number of Decimal Places for Parameter 1 Values	
X	Parameter 2 Decimal Places	i_uParam2DecimalPlaces	Word[Unsigned]	0 to 4	Number of Decimal Places for Parameter 1 Values	
X	Parameter 1 Actual	i_wParam1Actual	Word[Signed]		Actual Value of Parameter 1	
X	Parameter 2 Actual	i_wParam2Actual	Word[Signed]		Actual Value of Parameter 2	

User Input	Symbol	Var_Input name	Data Type	Setting range	Description
X	Parameter 1 Low Limit	i_wParam1LowLimit	Word[Signed]		Lower Limit of Parameter 1
X	Parameter 1 High Limit	i_wParam1HighLimit	Word[Signed]		Upper Limit of Parameter 1
X	Parameter 2 Low Limit	i_wParam2LowLimit	Word[Signed]		Lower Limit of Parameter 2
X	Parameter 2 High Limit	i_wParam2HighLimit	Word[Signed]		Upper Limit of Parameter 2
X	Device Number	i_wDeviceNumber	Word[Signed]	1 to 32	Unique Device Number
X	Device Name String	i_sDeviceName	String		Unique Identifier for the screen
X	Functional Bypass State	I_bFunctionalBypass	Bit		Used to set status 64

■ Output labels

	Var_Output name	Data Type	Description
FB Executed Normally	o_bOK	Bit	If On, indicates FB Normal
FB Execution aborted	o_bERR	Bit	If On, FB Error Occurred
FB Error code	o_uErrID	Word[Unsigned]	FB Error Code Output
Part Status Data block	o_stPartStatus	MELPT_SYS_PartStatus	HMI Display SDT

FB Version Upgrade History

Version	Description
3.00	Initial Release
3.01	User input Check modified

SDT Usage

1. MELPT_SYS_PartStatus

System Label: PartStatus

Member	Type	Usage
.MaxDeviceNumber	Word[Signed]	Used as upper Limit of i_wDeviceNumber
.DisplayConfig	Word[Unsigned](i_wDeviceNumber)	I_wDisplayConfig is moved into this register, if i_wDisplayConfig >=8 15 is stored
.Status	Word[Unsigned](i_wDeviceNumber)	Determined by this FB
.P1Divisor	Word[Unsigned](i_wDeviceNumber)	I_uParam1DecimalPlaces is Limited to 0 to 4 and placed in this register
.P2Divisor	Word[Unsigned](i_wDeviceNumber)	I_uParam2DecimalPlaces is Limited to 0 to 4 and placed in this register
.P1Actual	Double Word[Signed](i_wDeviceNumber)	I_wPAram1Actual placed into this register If functional bypass TRUE or i_wDisplyConfig =15, then 0 is entered
.P1LowLimit	Double Word[Signed](i_wDeviceNumber)	I_wPAram1LowLimit placed into this register If functional bypass TRUE or i_wDisplyConfig >=4, then 0 is entered
.P1HighLimit	Double Word[Signed](i_wDeviceNumber)	I_wPAram1HighLimit placed into this register If functional bypass TRUE or i_wDisplyConfig >=4, then 0 is entered
.P2Actual	Double Word[Signed](i_wDeviceNumber)	I_wPAram2Actual placed into this register If functional bypass TRUE or i_wDisplyConfig >=2, then 0 is entered
.P2LowLimit	Double Word[Signed](i_wDeviceNumber)	I_wPAram2LowLimit placed into this register If functional bypass TRUE or i_wDisplyConfig >=1, then 0 is entered

System Label: PartStatus		
Member	Type	Usage
.P2HighLimit	Double Word[Signed](i_wDeviceNumber)	I_wPAram2HighLimit placed into this register If functional bypass TRUE or i_wDisplyConfig >=1, then 0 is entered
.DeviceDesignator	Word[Unsigned](i_wDeviceNumber)	The first two characters of i_sDeviceName are moved

Notes

Status Definition

Bit Number	Decimal	Meaning
0	1	Accepted
1	2	Parameter 1 Actual greater Than Parameter 1 High Limit
2	4	Parameter 1 Actual Less than Parameter 1 Low Limit
3	8	Parameter 2 Actual greater Than Parameter High Limit
4	16	Parameter 2 Actual Less than Parameter Low Limit
5	32	Bypassed
6	64	Functionally Bypassed

Display Config

Bit Number	Decimal	Meaning

Bit Number	Decimal	Meaning
0	1	Hides Parameter 2 Limits Any Parameter 2 Actual <> 0 is accepted
1	2	Hides Parameter 2 Determination is made based off Parameter 1 only
2	4	Hides Parameter 1 Limits Parameter 1 Actual <> 0 is accepted
3	8	Hides All(Operates Like Functional Bypass)

7.3 Overview-Bypass

This screen is used to show the Bypassed Devices, and with proper access remove a device from bypass

- Pressing the Bypass or Run buttons will change the state of the selected tool.
- The function of placing tools in or out of bypass is password protected.
- Screen Script #120 is used to place PLC registers into HMI memory
- Screen Script #120 sets the comment file to 104 and loads GOTDeviceRow and GOTDevicePage Data into the appropriate GD/GB registers.
- An instance of MELPT_SYSHMIScreenOperation32 has been added to the scan in program MELPT_SYS_Device. The MELPT PLC project includes the global label DeviceData with 32 instances of the MELPT_SYS_GOTManRow SDT.

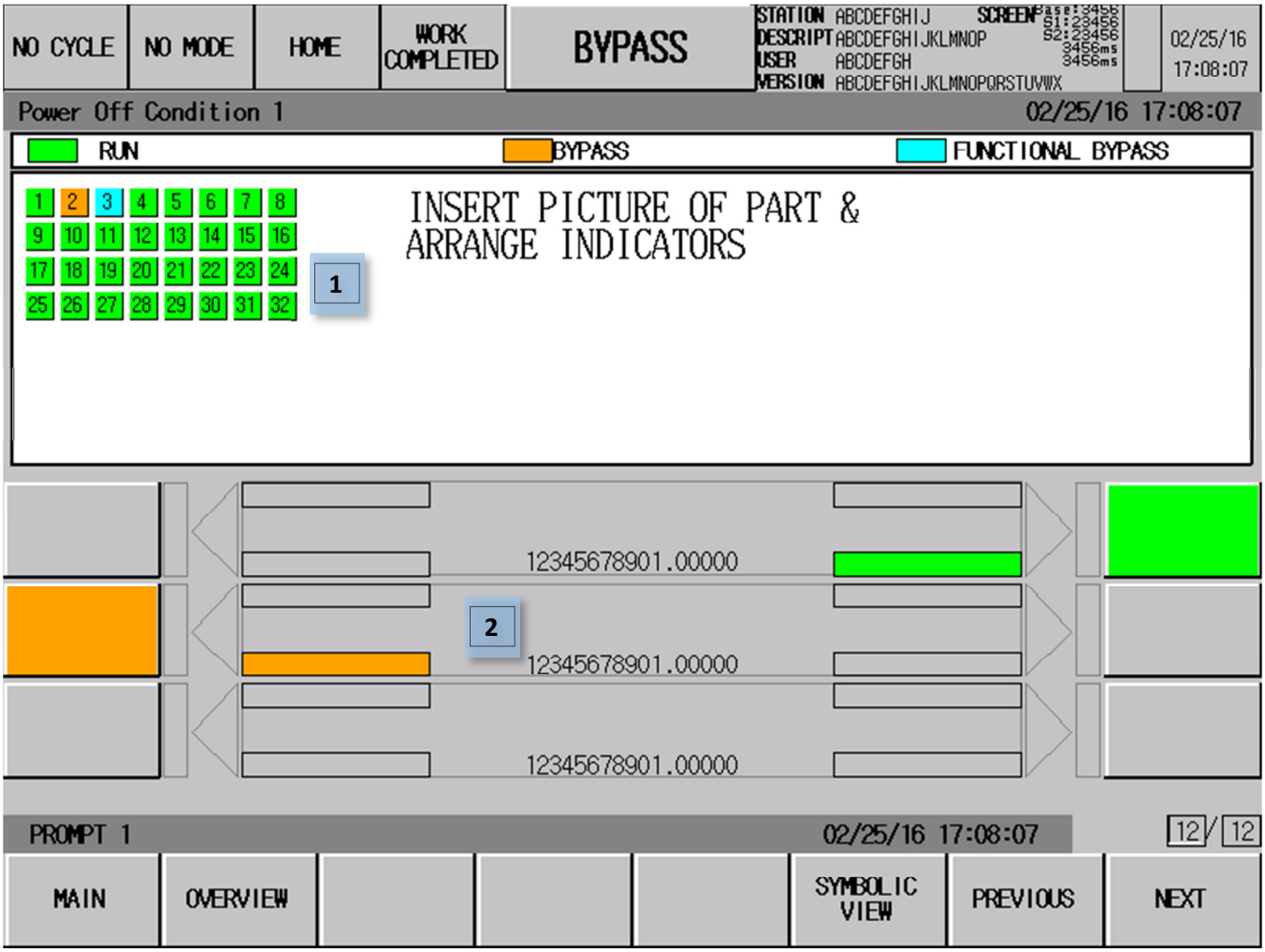


Figure 47-Bypass Screen

Item	Description

Item	Description
1	32 Status Indicators Normal — 1 Device Bypassed — 2 Functional Bypass (done via PLC) — 3 Additionally, each indicator has a display script that will hide the object when Bypass.DeviceActive[X] is true OEM to insert layout
2	Manual Operations, is not linked to window 2001-2006, since the color scheme is different control and display in this area is handled by the MELPT_SYS_Device Program and follows the format laid out in section 5

Application Example

- This function block works in concert with the HMIScreenOperation block that interfaces the HMI to global row data.
- One instance of this function block is to be called per row.
- Below is an example of a Manual Operation Row that is configured to bypass a device.

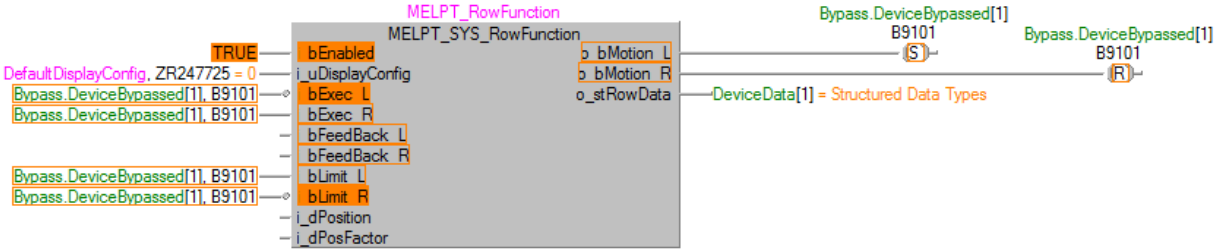


Figure 48-Bypass Screen Example

Pressing the opposite position when logged in will switch the device status

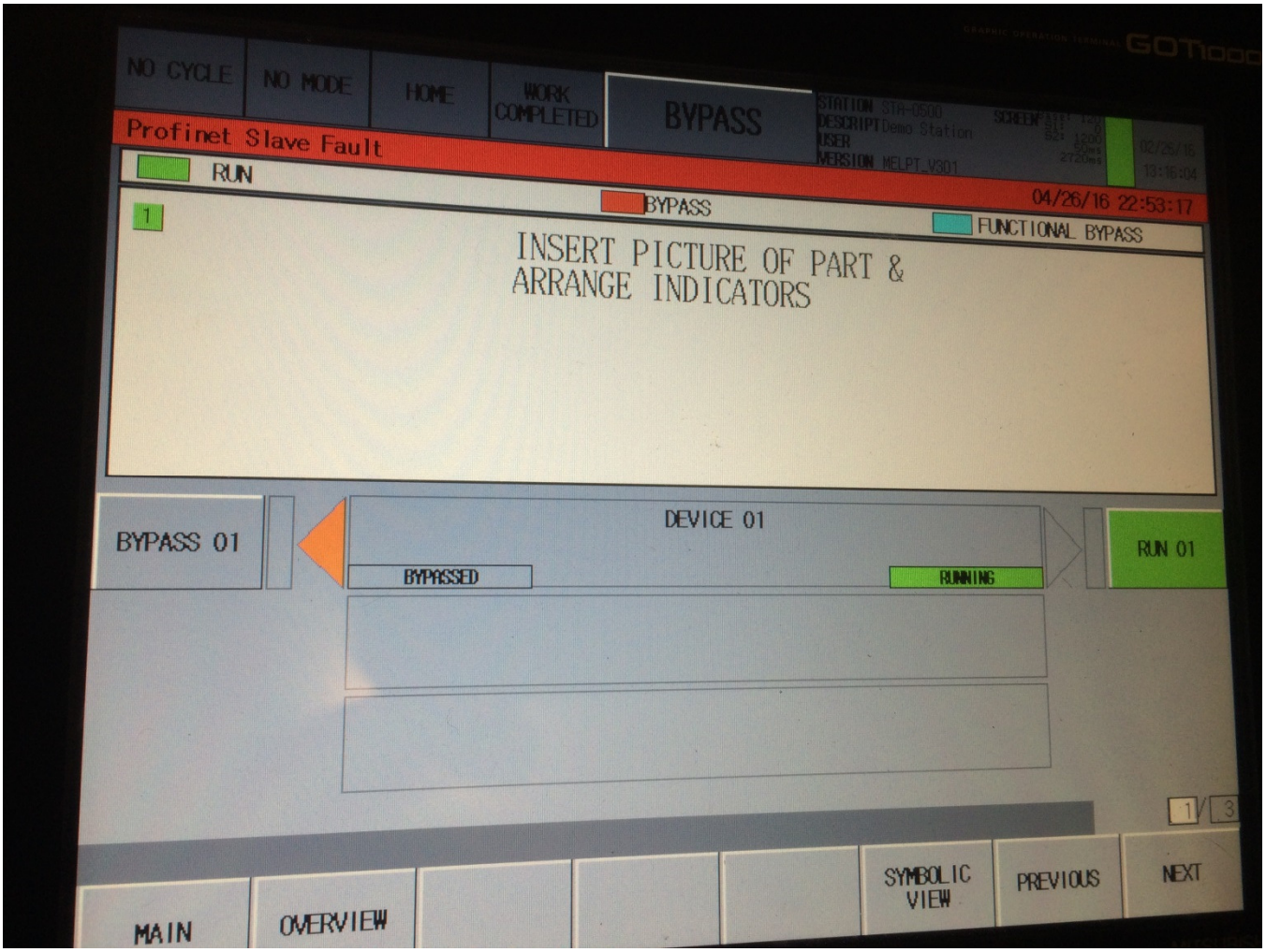


Figure 49-Bypass Screen Example

7.4 Overview-Cycle Type Selection

This screen is used for Cycle Type Selection.

- This screen is a manual operation screen and follows the formatting laid out in the Manual Operations Screen in section 6.
- Screen Script #130 sets the comment file to 105 and loads GOTCycleTypeRow and GOTCycleTypePage Data into the appropriate GD/GB registers.
- An instance of MELPT_SYSHMIScreenOperation16 has been added to the scan in program MELPT_SYS_CycleType. The MELPT PLC project includes the global label CycleTypeData with 16 instances of the MELPT_SYS_GOTManRow SDT.

Application Example

- This function block works in concert with the HMIScreenOperation block that interfaces the HMI to global row data.
- One instance of this function block is to be called per row.
- Below is an example of Cycle Type Selection

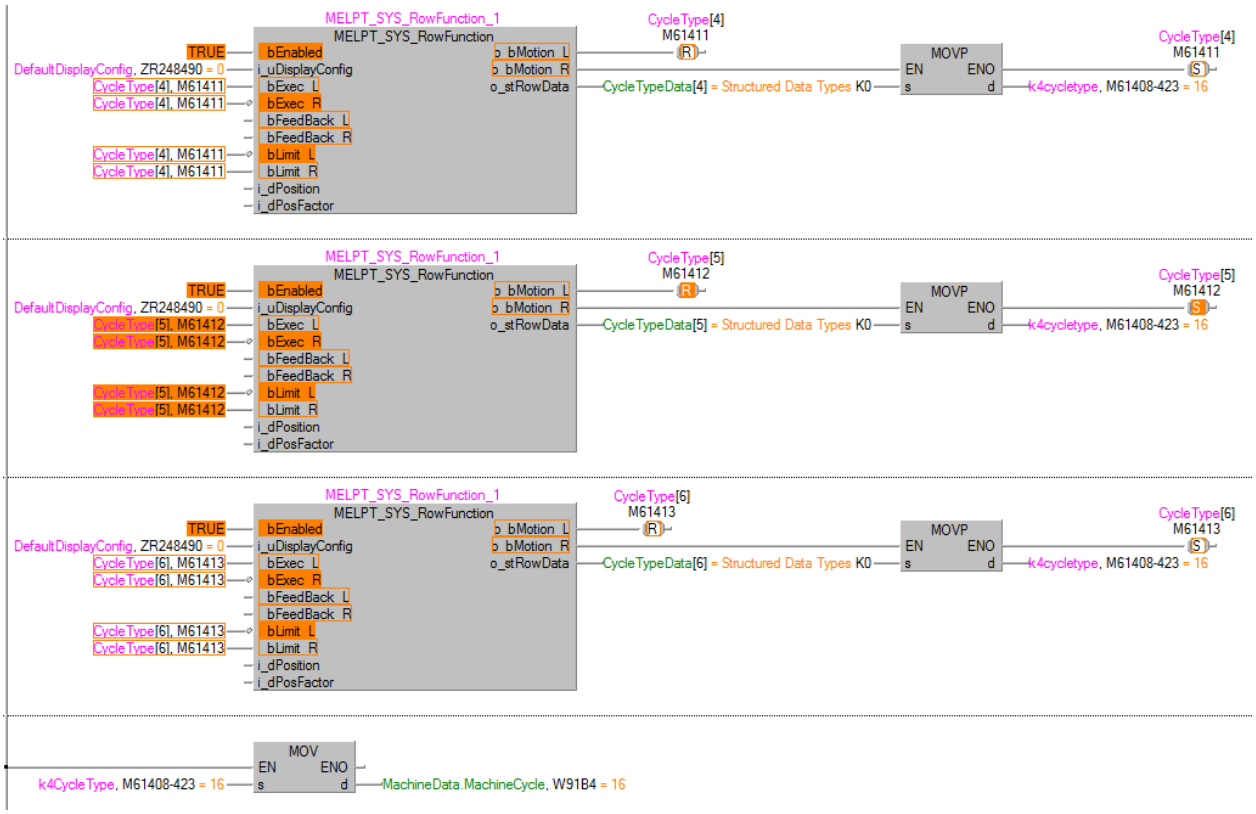


Figure 50-Cycle Type Selection Example

States	Value (Word Signed)	Comment Group	Comment Number	Lamp Color
NO CYCLE	0 or none of the below	100	1000	Gray
CONTINUOUS AUTO CYCLE	1	100	1001	Green
DRY CYCLE	2	100	1002	Yellow
SINGLE CYCLE	4	100	1003	Custom (232)
STEP CYCLE	8	100	1004	Blue
RUNOUT CYCLE	16	100	1005	White
HAND CYCLE	32	100	1006	Magenta

Pressing the ON position will switch the mode to the selected mode.

When a mode is already selected pressing the on button for another mode will reset the mode and then switch to the new selected mode.

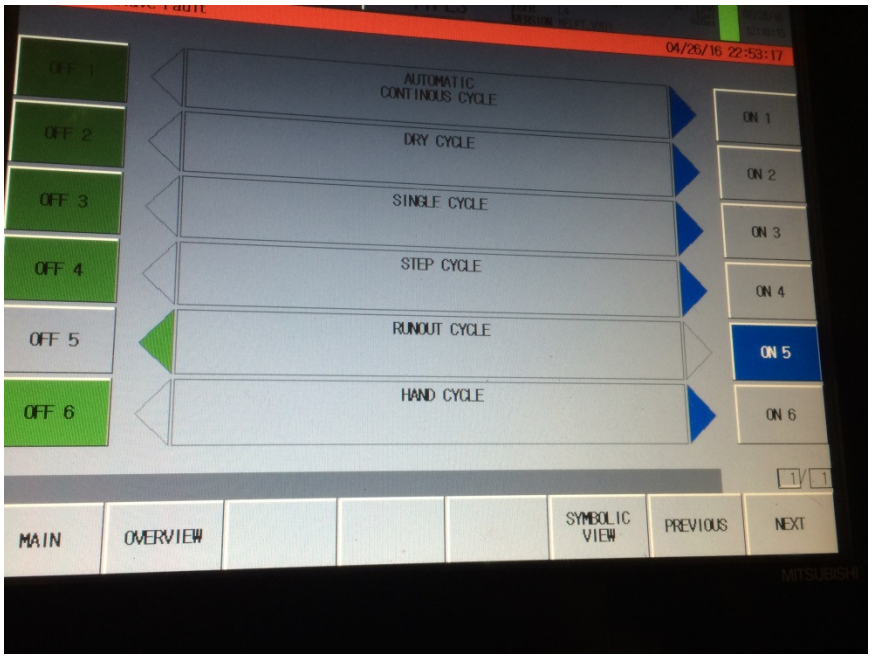


Figure 51-Cycle Type Selection

7.5 Overview-Cycle Time

7.5.1. HMI-Cycle Time Base Screen

The cycle time screen shows the cycle times for up to 8 controlled work stations. From this screen you can view the last 10 cycles. Modifying the target time for a work station is a password protected function

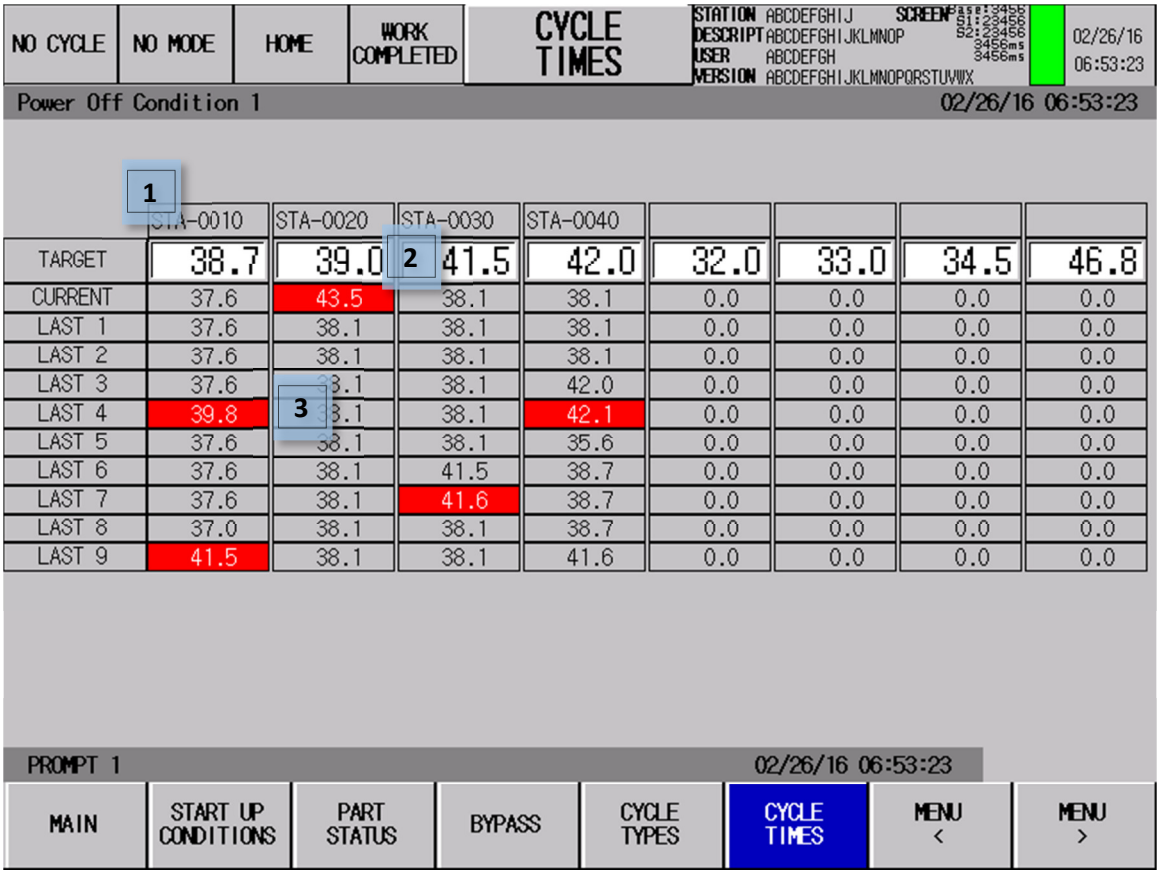


Figure 52-Cycle Time Screen

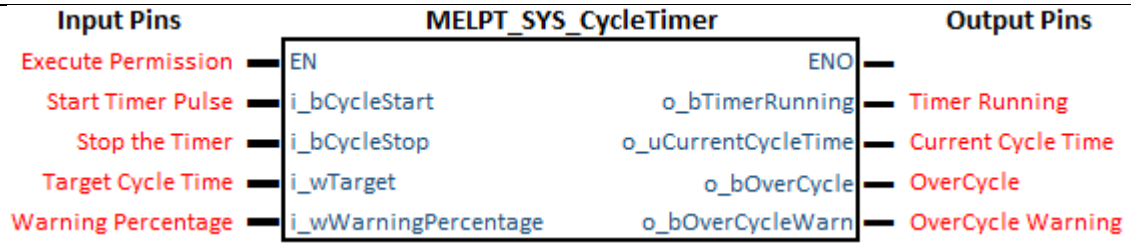
Item #	Description	Object X=Station Number	Details
1	Station Name	ASCII Display: StationData_X.StationName[0]	
2	Cycle Time Target	Numeric Input: CycleTime.Target[X]	Values Monitored are divided by 10, Values written are multiplied by 10

Item #	Description	Object X=Station Number	Details
3	Current and Last cycle Times	Numeric Display: CycleTime.CycleTimes[X,1-10]	Background turns red, when the time is greater than the Current target for that station.

7.5.2. PLC-MELPT_SYS_CycleTimes

This program is provided with the MELPT package it contains two instances of the MELPT_SYS_CycleTimer function block

FB Name
MELPT_SYS_CycleTimer

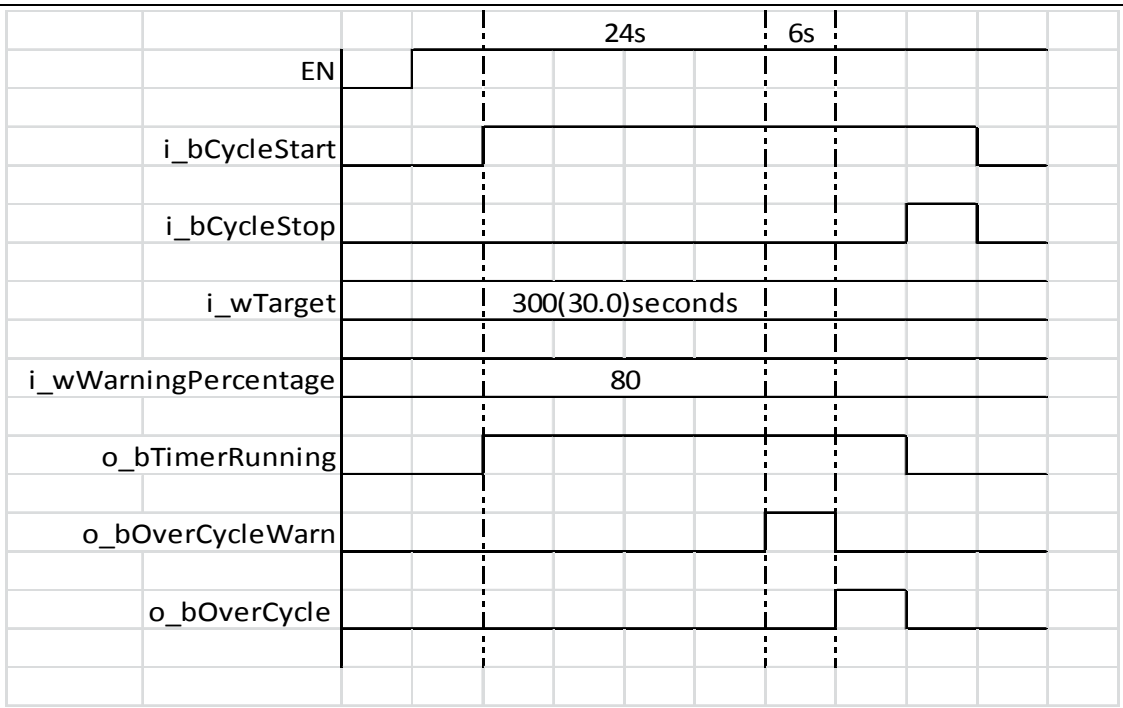
Function Overview	
Item	Description
Function overview	This function block calculates cycle time and tracks the previous 9 cycle times. Additionally outputs exist for over-cycle and over-cycle warning.
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 78 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	5 bits 20 words 1 Timer

Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	
Function description	The rising edge of i_bCycleStart starts the timer, this will set o_bTimerRunning To stop the timer i_bCycleStop must be triggered When the o_uCurrentCycleTime exceeds the i_wtarget, o_bOverCycle is TRUE When the o_uCurrentCycleTime exceeds the i_wtarget, multiplied by (i_wWarningPercentage/100) o_bOverCycleWarn is TRUE
Restrictions and precautions	
Timing chart	

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Start Timer Pulse	i_bCycleStart	Bit		Starts the Cycle Timer
X	Stop the Timer	i_bCycleStop	Bit		Stops the Cycle Timer
	Target Cycle Time	i_wTarget	Word[Signed]	1 to 30000	Target Cycle Time (100ms to 3000.0s)
X	Warning Percentage	i_wWarningPercentage	Word[Signed]		Warning Percentage

■ Output labels

Symbol Name	Var_Output name	Data Type	Description
Timer Running	o_bTimerRunning	Bit	Timer Enabled Latch
Current Cycle Time	o_uCurrentCycleTime	Word[Signed]	Current Value of Cycle Time
Over Cycle	o_bOverCycle	Bit	TRUE when o_uCurrentCycleTime > i_wTarget
Over Cycle Warning	o_bOverCycleWarn	Bit	TRUE when o_uCurrentCycleTime > i_wTarget*(i_wWarningPercentage/100)

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.02	Added Target Input and Over Cycle Output
1.10	Converted numerical data from Word to Float
1.12	Modified Screen Active Logic FB labels updated to BCN-89000-0823-D guideline
2.00A	Adopted BCN-89000-0969 guideline. Historical Array Dimension Change; Changes SDT; Remove Security OK; Added Timer running Output
2.10	Added reset
3.00	Removed reset, label name change, changed from real to word
3.01	Removed fb error

SDT Usage

1. MELPT_SYS_CycleTime

System Label: Cycle Time X=Station Number		
Member	Type	Usage
.Target	Word[Signed]	Used as an input, editable from HMI
.CycleTimes	Word[Signed](1..8,1..10)	Current Cycle Time == (X,1) Previous (x,2..10)

Application Example

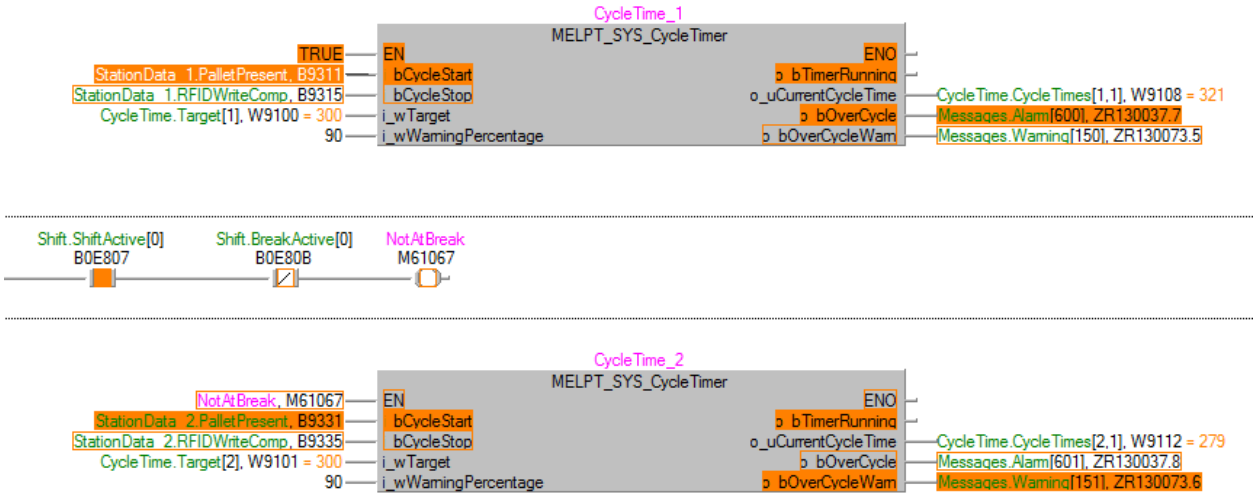


Figure 53-Cycle Time Example

One instance of this function block is required for each workstation to be monitored. The MELPT project has data predefined to support up to 8 work stations. With **i_bCycleStop FALSE**, and the transition of **i_bCycleStart** from **FALSE** to **TRUE**, o_uCurrentCycleTime and previous cycle times are shifted o_uCurrentCycleTime is reset and begins timing. The timer will continue to increment as long as **EN** is **TRUE** and **i_bCycleStop** is **FALSE**. To stop the timer, but retain the count, set **EN** to **FALSE**. To stop the timer, set **i_bCycleStop** to **TRUE** while **EN** is **TRUE**. Maximum value of **o_uCurrentCycleTime** is 3000.0s. **O_bOverCycle** is **TRUE** when **o_uCycleTimeValue** exceeds **i_wTarget**

In the above example the EN pin is attached to the AND product of Shift Active, and NOT Break Active. When i_bCycleStart becomes True the timer start running, and ceases running when i_bCycleStop becomes true. If the shift becomes inactive or the line goes to break in this example, the timer retains the elapsed time until EN conditions are true again, but the timer cannot be stopped when EN is false.

7.6 Overview-Gantry

This screen shows status for gantry stations. It works in conjunction with the MELPT_CNC_PartsOverview program which calls MELPT_CNC_Status FB.

StationData_1	M/C #1
StationData_2	M/C #2
StationData_3	M/C #3
StationData_4	M/C #4
StationData_5	M/C #5
StationData_6	M/C #6
StationData_7	Arm #1
StationData_8	Arm #2

7.6.1. HMI-Overview Gantry

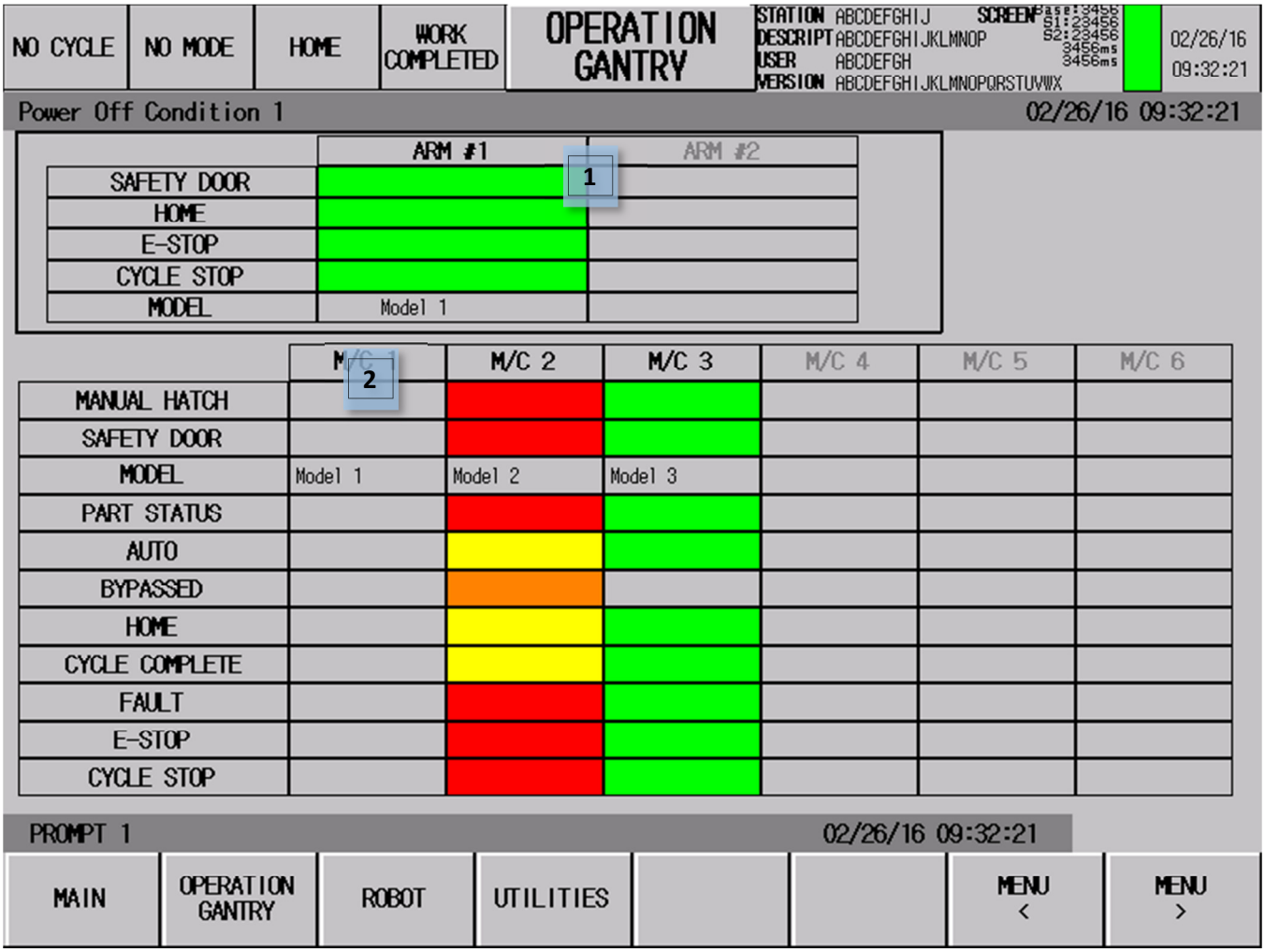


Figure 54- Gantry Overview Screen

Item #	Description	Object X=7 or 8 7= Gantry Arm #1 8=Gantry Arm #2		Details		
				Overall=0	Off	ON
1	Gantry Details	Safety Door	StationData_X.SafetyDoor			
		Home	StationData_X.HomePos			
		E-Stop	StationData_X.ESTOP			

Item #	Description	Object X=7 or 8 7= Gantry Arm #1 8=Gantry Arm #2		Details		
				Overall=0	Off	ON
		Cycle Stop	StationData_X.CycleStop		1	2
		Model	StationData_X.ModelNumber	ASCII Display When Overall=0: Not Displayed		

Item #	Description	Object	Device X = M/C 1-6	Details		
				Overall=0	Off	On
2	Manual Hatch	Bit:	StationData_X.GantryHatch			
	Safety Door	Bit:	StationData_X.SafetyDoor			
	Model	ASCII Display	StationData_X.ModelNumber	When Overall=0: Not Displayed		
	Part Status	Word	StationData_X.PartStatus		1	2
	Auto	Word:	StationData_X.Mode		1	2
	Bypassed	Word:	StationData_X.Mode		4	
	Home	Bit:	StationData_X.HomePos			
	Cycle Complete	Bit:	StationData_X.CycleComplete			
	Fault	Bit:	StationData_X.ActiveFault			
	E-Stop	Bit :	StationData_X.ESTOP			
	Cycle Stop	Word:	StationData_X.CycleStop		1	2

7.6.2. PLC-MELPT_CNC_PartsOverview

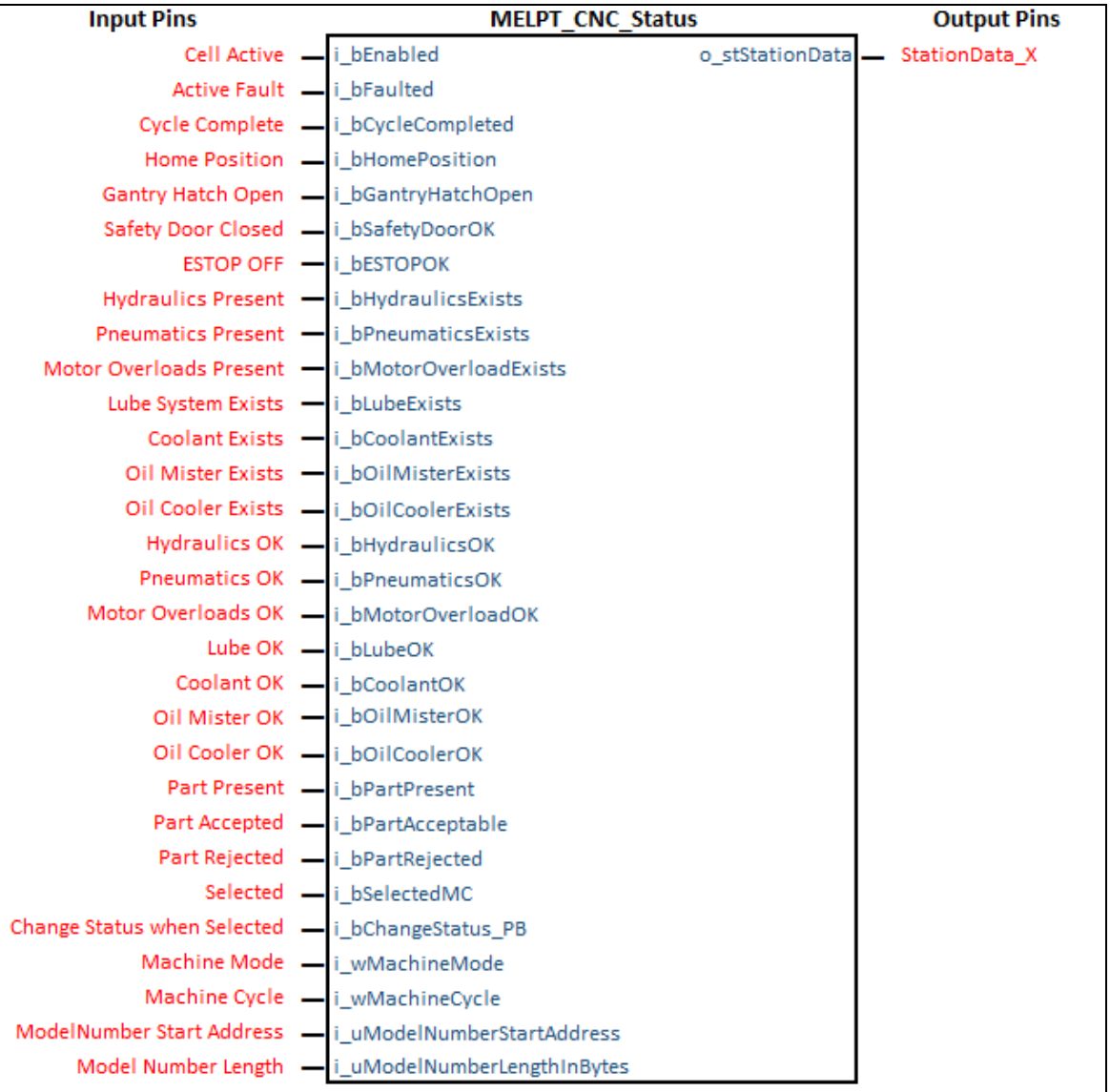
This program calls the function block MELPT_CNC_Status. This function block is used to populate Station Data.

It also populates data for Machining Informational Window. One instance of this function block should exist for each machining workstation this PLC controls.

FB Name
MELPT_CNC_Status

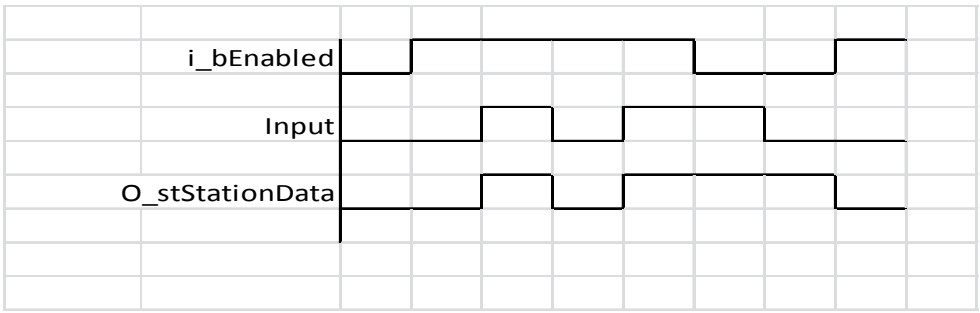
Function Overview	
Item	Description
Function overview	This function block sets CNC status words in the Station Data.

Symbol



Applicable Hardware

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	<table><tr><th>Series</th><th>Version</th></tr><tr><td>GX Works 2</td><td>1.536</td></tr><tr><td>GT Designer 3</td><td>1.136</td></tr></table>
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 242 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	50 bits 148 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This FB requires the MELPT_SYS_StationData SDT
Function description	This function block when enabled is true allow for movement of inputs into the Station Data input attached to the output pin
Restrictions and precautions	
Timing chart	

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Cell Active	i_bEnabled	Bit		Set overall to zero when false
X	Active Fault	i_bFaulted	Bit		Fault Indicator
X	Cycle Complete	i_bCycleCompleted	Bit		Cycle Complete
X	Home Position	i_bHomePosition	Bit		At home Position
X	Gantry Hatch Open	i_bGantryHatchOpen	Bit		Gantry Hatch Open
X	Safety Door Closed	i_bSafetyDoorOK	Bit		Safety Door OK
X	ESTOP OFF	i_bESTOPOK	Bit		ESTOP OK
X	Hydraulics Present	i_bHydraulicsExists	Bit		Hydraulics Exists
X	Pneumatics Present	i_bPneumaticsExists	Bit		PneumaticsExist
X	Motor Overloads Present	i_bMotorOverloadExists	Bit		MotorOverloadsExist
X	Lube System Exists	i_bLubeExists	Bit		LubeSystemExists
X	Coolant Exists	i_bCoolantExists	Bit		Coolant Exists
X	Oil Mister Exists	i_bOilMisterExists	Bit		Oil Mister Exists
X	Oil Cooler Exists	i_bOilCoolerExists	Bit		Oil Cooler Exists
X	Hydraulics OK	i_bHydraulicsOK	Bit		Hydraulics OK
X	Pneumatics OK	i_bPneumaticsOK	Bit		Pneumatics OK
X	Motor Overloads OK	i_bMotorOverloadOK	Bit		Motor Overloads OK
X	Lube OK	i_bLubeOK	Bit		Lube system OK
X	Coolant OK	i_bCoolantOK	Bit		Coolant System OK
X	Oil Mister OK	i_bOilMisterOK	Bit		Oil Mister OK

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Oil Cooler OK	i_bOilCoolerOK	Bit		Oil Cooler OK
X	Part Present	i_bPartPresent	Bit		Part Present
X	Part Accepted	i_bPartAcceptable	Bit		Part Accept
X	Part Rejected	i_bPartRejected	Bit		Part Reject
	Selected	i_bSelectedMC	Bit		Signal From Parts Overview HMI Screen that this FB is selected
	Change Status when Selected	i_bChangeStatus_PB	Bit		Change status HMI PB
	Machine Mode	i_wMachineMode	Word[Signed]		Mode of Machine
	Machine Cycle	i_wMachineCycle	Word[Signed]		Machine Cycle Type
X	Model Number Start Address	i_uModelNumberStartAddress	Word[Unsigned]		Model Number Starting Location
X	Model Number Length	i_uModelNumberLengthInBytes	Word[Unsigned]		Model Number Length

■ Output labels

Name	Var_Output name	Data Type	Description
StationData_X	o_stStationData	MELPT_SYS_StationData	Station Data information

FB Version Upgrade History

Version	Description
3.00	This function block was introduced
3.01	Coding edits to reduce number of steps

SDT Usage

1. MELPT_SYS_StationData

System Label: StationData_X		
Member	Type	Usage
.Overall	Word[Unsigned]	Set by this FB, 1 if enabled 2 if selected, 0 if not enabled
.Hydraulics	Word[Unsigned]	0 if does not exist, 2 if not OK, 4 if OK
.Pneumatics	Word[Unsigned]	0 if does not exist, 2 if not OK, 4 if OK
.MotorOverloads	Word[Unsigned]	0 if does not exist, 2 if not OK, 4 if OK
.Lube	Word[Unsigned]	0 if does not exist, 2 if not OK, 4 if OK
.Coolant	Word[Unsigned]	0 if does not exist, 2 if not OK, 4 if OK
.OilMister	Word[Unsigned]	0 if does not exist, 2 if not OK, 4 if OK
.OilCooler	Word[Unsigned]	0 if does not exist, 2 if not OK, 4 if OK
.ActiveFault	Bit	Enabled and i_bFaulted
.PartPresent	Bit	Enabled and i_bPartPresent
.GantryHatch	Bit	Enabled and i_bGantryHatchOpen
.SafetyDoor	Bit	Enabled and i_bSafetyDoorOK
.ESTOP	Bit	Enabled and i_bESTOPOK
.HomePos	Bit	Enabled and i_bHomePosition
.CycleComplete	Bit	Enabled and i_bCycleCompleted
.PartStatus	Word[Unsigned]	Determined by i_bPartPresent, part Acceptable or Part Reject; editable via HMI

System Label: StationData_X		
Member	Type	Usage
.ModelNumber	Word[Unsigned]	Copied from i_wModelNumberStartAddress for i_uModelNumberLengthBytes
.CycleStop	Word[Unsigned]	When i_wMachineCycle =0 Value =1 Otherwise 2
.Mode	Word[Unsigned]	When i_wMachineMode =4 it writes 4 otherwise unedited.

8 MANUAL OPERATION SCREEN

This screen is used for Manual Operations

- This screen is a manual operation screen and follows the formatting laid out in the Manual Operations Screen in section 6.
- Screen Script #200 sets the comment file to 110 and loads GOTManualRow and GOTManualPage Data into the appropriate GD/GB registers.
- An instance of MELPT_SYSHMIScreenOperation64 has been added to the scan in program MELPT_SYS_ManualOP. The MELPT PLC project includes the global label ManualData with 64 instances of the MELPT_SYS_GOTManRow SDT.

Application Example

- This function block works in concert with the HMIScreenOperation block that interfaces the HMI to global row data.
- One instance of this function block is to be called per row.
- Below is an example of a Manual Operation motion

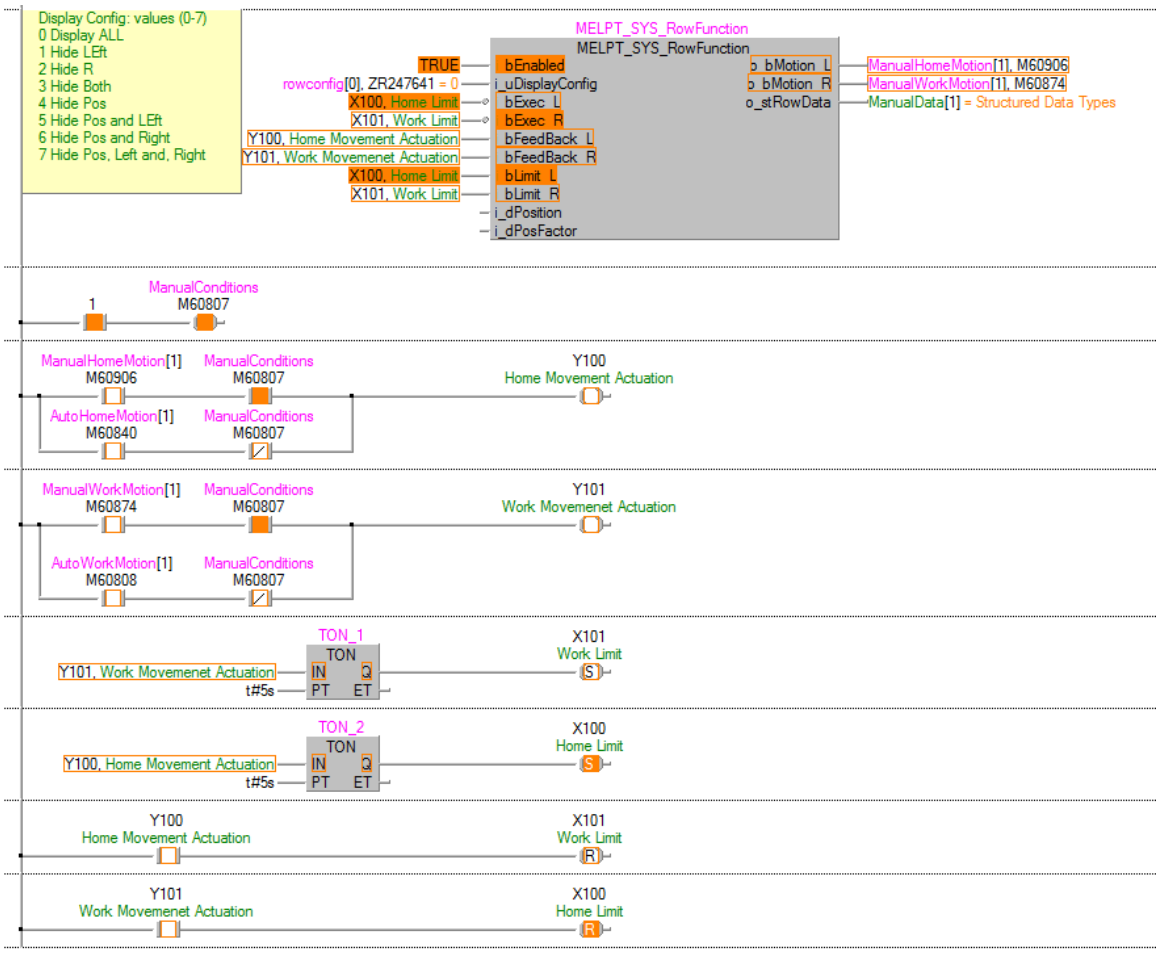


Figure 55-Manual Operation Example

With Manual Conditions TRUE HMI input is used to control the physical output.

Logic controls the inputs X100 and X101 since no physical device is actually wired in this example.

A Timer is used to simulate the motion to the opposing limit switch

For the output motion to be true, i_bEnabled must be true, the appropriate i_bExec must be true and the o_stRowData.PB must be true

Inputs	Description
X100	The limit Switch for home position
X101	The limit switch for work position

Outputs	Description
Y100	Motion to return a slide
Y101	Motion to advance a slide

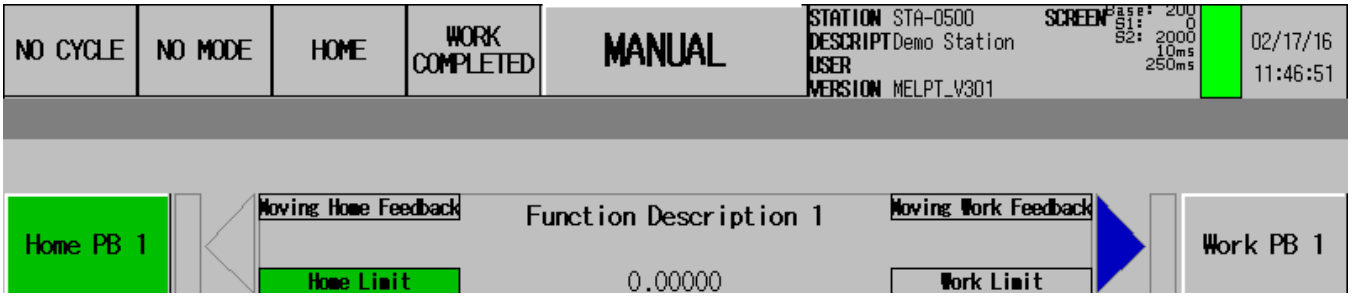


Figure 56-Manual at Home/Retracted

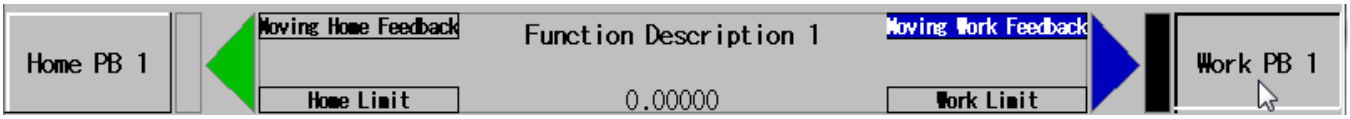


Figure 57-In Motion toward Work/Advanced

Figure 58-At Work/Advanced position

9 DIAGNOSTIC

9.1 Fieldbus Diagnostics

Fieldbus Diagnostics will determine fieldbus node health. The MELPT application can handle 4 different fieldbuses

- Profinet
- Profibus
- CC-link IE Field
- CC-link

The associated function block will determine node health and categorize the node number into one of the following categories

FieldbusDiag.Nodestatus (FieldbusDiag = Profinet, Profibus, CCLinkIE, or CCLink)

State	Decimal Value	Graphic
Not Configured	0	0 NOT CONFIGURED
Normal	1	0 OK
Maintenance	34	0 MAINTENANCE
Ok Was Maintained	33	0 OK, WAS MAINTAINED
Defective	68	0 DEFECTIVE
Ok Was Defective	65	0 OK, WAS DEFECTIVE
Disconnected	136	0 DISCONNECTED
Ok Was Disconnected	129	0 OK, WAS DISCONNECTED
Deactivated	272	0 DEACTIVATED
Ok Was Deactivated	257	0 OK, WAS DEACTIVATED

Each Fieldbus Diagnostic Screen can be broken into a layout and detailed diagnostic screen.

The layout is intended to give the operator a general view of machine operation, and where the fieldbus nodes are located.

The detailed diagnostic is intended to provide detailed information about one node.

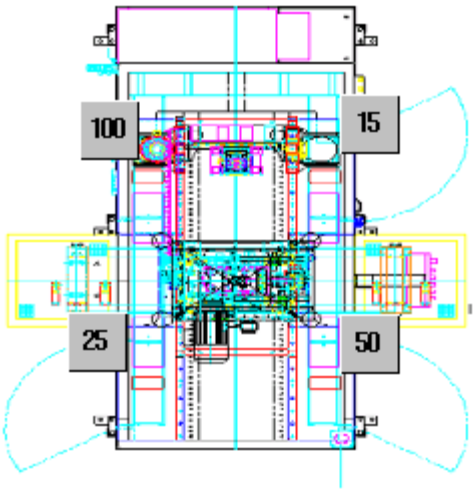


Figure 59-Fieldbus Layout

Project script #3 monitors the screen you are on and when you are on a specific fieldbus diagnostic screen the specific labels associated with the screen are loaded into the general HMI registers for display.

Each Indicator on the Overview screen is layered with a hidden multifunction switch.

The switch accomplishes 3 tasks

- Sets bit GB65111, when this bit is set the screen navigates to the appropriate detailed diagnostic screen
- Sets the node number
    - When on the detailed diagnostic screen the information displayed is for this node number
- Sets the particular fieldbus.update signal
    - This signal is used by the associated FB to know to retrieve information for the node selected

On each layout screen indicators and switches are provided for the maximum allowed nodes per fieldbus, it is recommended that not configured indicators be moved to another window inside the project for future use.

Navigation

The navigation bar has two options for each fieldbus

Layout

Figure 60-Navigation for Profinet Layout

Detailed Diagnostic

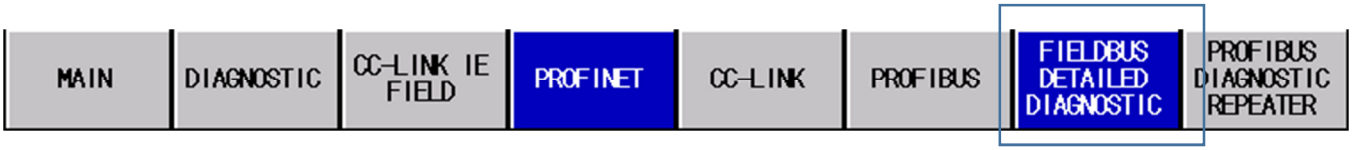


Figure 61-Navigation for Profinet Detailed Diagnostic

The fieldbus detailed diagnostic button is a toggle switch to switch between the layout and detailed diagnostic for the selected Fieldbus

9.1.1. HMI-Profinet Detailed Diagnostics

This screen provides detailed information for the selected node of the Profinet Fieldbus

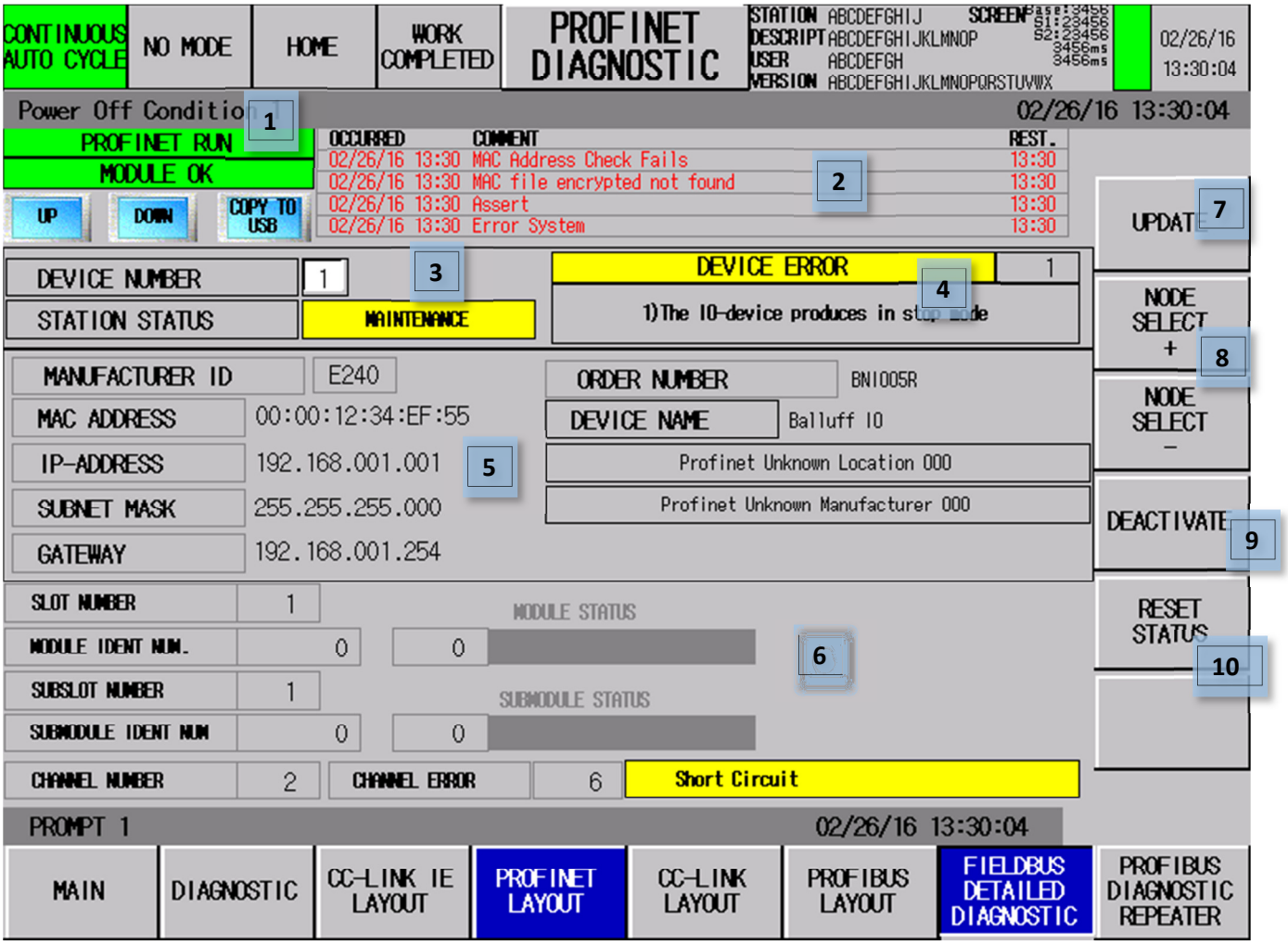


Figure 62-Profinet Detailed Diagnostics

Item #	Description	Object	Details
1	Host Status	Bit Lamp: ProfinetDiag.HostOK	Off: PROFINET NOT RUNNING On: PROFINET RUN
	Module Faulted Indicator	Bit Lamp: ProfinetDiag.FieldbusModuleFault	Off: MODULE OK On: MODULE ERROR
2	Alarm Area	User Alarm Display(21)	COPY to USB button Executes Screen script that will copy alarms to E:\backup\Profinet.CSV
3	Selected Node	Numeric Input ProfinetDiag.SelectedNode	Numeric Input limited by the first and last node number detected by FB; Sets ProfinetDiag.Update when a new value is entered

<table>
<tr><th>Item #</th><th>Description</th><th>Object</th><th>Details</th></tr>
<tr><td>3</td><td>Selected Status</td><td>Word Lamp:
ProfinetDiag.SelectedStatus</td><td>
<table>
<tr><th>State</th><th>Value</th><th>Graphic</th></tr>
<tr><td>Not Configured</td><td>0</td><td>NOT CONFIGURED</td></tr>
<tr><td>Ok</td><td>1</td><td>OK</td></tr>
<tr><td>Ok Was Maintained</td><td>33</td><td>OK, WAS MAINTAINED</td></tr>
<tr><td>Maintenance</td><td>34</td><td>MAINTENANCE</td></tr>
<tr><td>Ok Was Defective</td><td>65</td><td>OK, WAS DEFECTIVE</td></tr>
<tr><td>Defective</td><td>68</td><td>DEFECTIVE</td></tr>
<tr><td>Ok Was Disconnected</td><td>129</td><td>OK, WAS DISCONNECT</td></tr>
<tr><td>Disconnected</td><td>136</td><td>DISCONNECTED</td></tr>
<tr><td>Ok Was Deactivated</td><td>257</td><td>OK, WAS DEACTIVATE</td></tr>
<tr><td>Deactivated</td><td>272</td><td>DEACTIVATED</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Device Error Code</td><td>Word Comment Display:
Numeric Display:
ProfinetDiag.SelectedDeviceDiagnostic</td><td>Comment File #21
Device Error Text Turns yellow when not equal to zero
DEVICE ERROR</td></tr>
<tr><td>5</td><td>Device Details</td><td>Information retrieved from device via acyclic means when the Profinet.update is triggered</td><td>
<table>
<tr><td>Manufacturer ID</td><td>Retrieved by I&m0
ProfinetDiag.ManufacturerID</td></tr>
<tr><td>Mac Address</td><td>Response to index F841
ProfinetDiag.MacAddress[0..2]</td></tr>
<tr><td>IP Address</td><td>Response to index F841
ProfinetDiag.IPAddress[0..2]</td></tr>
</table>
</td></tr>
</table>

			Subnet Mask		Response to index F841 ProfinetDiag.SubnetMask[0..2]	
			Gateway		Response to index F841 ProfinetDiag.GatewayAddress[0..2]	
			Order Number		Retrieved by I&m0	
			Device Name		Response to index F841 ProfinetDiag.ChasisData[0..15]	
5	Location	Word Comment Display: ProfinetDiag.SelectedNode	Comment File #21 $$ + 10000			
	Manufacturer	Word Comment Display: ProfinetDiag.SelectedNode	Comment File #21 20000 + $$			
6	Channel Diagnostics	Information retrieved from device via acyclic means when the Profinet.update is triggered	Slot Number	Numeric Display	ProfinetDiag.Slot	
			Module Ident Number	Numeric Display	ProfinetDiag.SlotIDent	
			Module Status	ProfinetDiag.SlotStatus	0	No Module
					1	Wrong Module
					2	Right Module
					3	Substitute Module
			SubSlot Number	Numeric Display	ProfinetDiag.SubSlot	
			Submodule Ident Number	Numeric Display	ProfinetDiag.SubSlotIDent	
			Submodule Status	ProfinetDiag.SubSlotStatus	0	No submodule
					1	Wrong Submodule
					2	Locked by IO Controller
					4	Application Ready Pending
					7	Substitute

					Hex 8000-8007	Take Over Not Allowed
					Hex 8020-8040	Maintenance Required
					Hex 8040-8080	Maintenance Demanded
					Hex 8080-8100	Diagnosis Data
					Hex 8100-8110	Application ready Pending
					Hex 8110-8200	SUPERORDINATED LOCKED
					Hex 8000	OKAY
					Hex 9000-9880	Substitute
					Hex 9800-9A00	wrong
					Hex A000-FFFF	No submodule
			Channel Number	Numeric display	ProfinetDiag.ChannelNumber	
			Channel Error	ProfinetDiag.ChannelError	1	Short Circuit
					2	Under voltage
					3	Overvoltage

					4	Overload
					5	Over temperature
					6	Line Break
					7	Upper Limit Value Exceeded
					8	Lower Limit Value Exceeded
					9	Error
					16	Parametrization Fault
					17	Power Supply Fault
					18	Fuse Blown / Open
					19	Communication Error
					20	Ground Fault
					21	Reference Point Lost
					22	Process Event Lost
					23	Threshold Warning
					24	Output Disabled
					25	Safety Event
					26	External Fault
					27	Sensor has incorrect Configuration
					28	Manufacturer Specific
					29	Primary Variable out of limits
					30	Non-primary Variable out of limits

					31	The Channel Needs Parameters
					32	Reserved
					33	Sensor Supply Short Circuit
					34	Ground fault
7	Update Button	Bit Momentary Switch ProfinetDiag.Update	Refreshed all acyclic retrieved data and channel diagnostics.			
8	Node Select Buttons	Word Switch: ProfinetDiag.SelectedNode	Increment or decrements by 1 the Selected Node			
9	Deactivate /Activate PB	Bit Momentary Switch: ProfinetDiag.ActivateDeactivate_PB ProfinetDiag.ActiveNode_Ind	Toggles the Deactivated State of the Selected Node, this occurs while the system continues to run.			
10	Reset Status	Bit Momentary Switch: ProfinetDiag.ResetStatus	Places zero into ProfinetDiag.NodeStatus[SelectedNode]			

9.1.2. PLC-MELPT_APP_Profinet_Diag

This program calls the function block MELPT_APP_ProfinetDiag. This function block is used to monitor overall node health for the fieldbus and provide detailed diagnostics for the selected fieldbus node.

For this function block to operate properly the User library installed by GX Configurator –PN must be installed and updated with the correct PLC registers. To accomplish this in GX Configurator –PN you must set the project name and path. During the write process to the PLC , GX Configurator –PN will install the user library and update the labels with the devices listed in PLC Settings of GX Configurator_PN.

This function block refers to SDT's and devices provided in the user library to function properly.

In addition the User Library PN_accessory needs to be installed, this library contains function blocks for acyclic read and write requests.

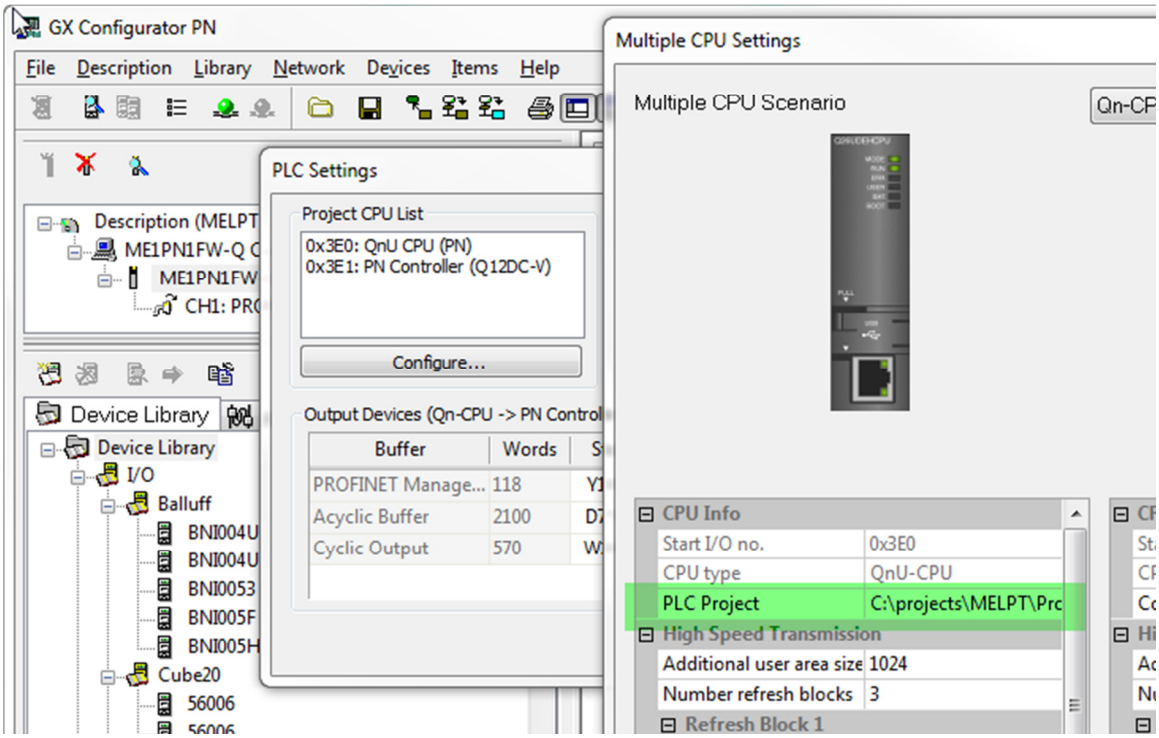
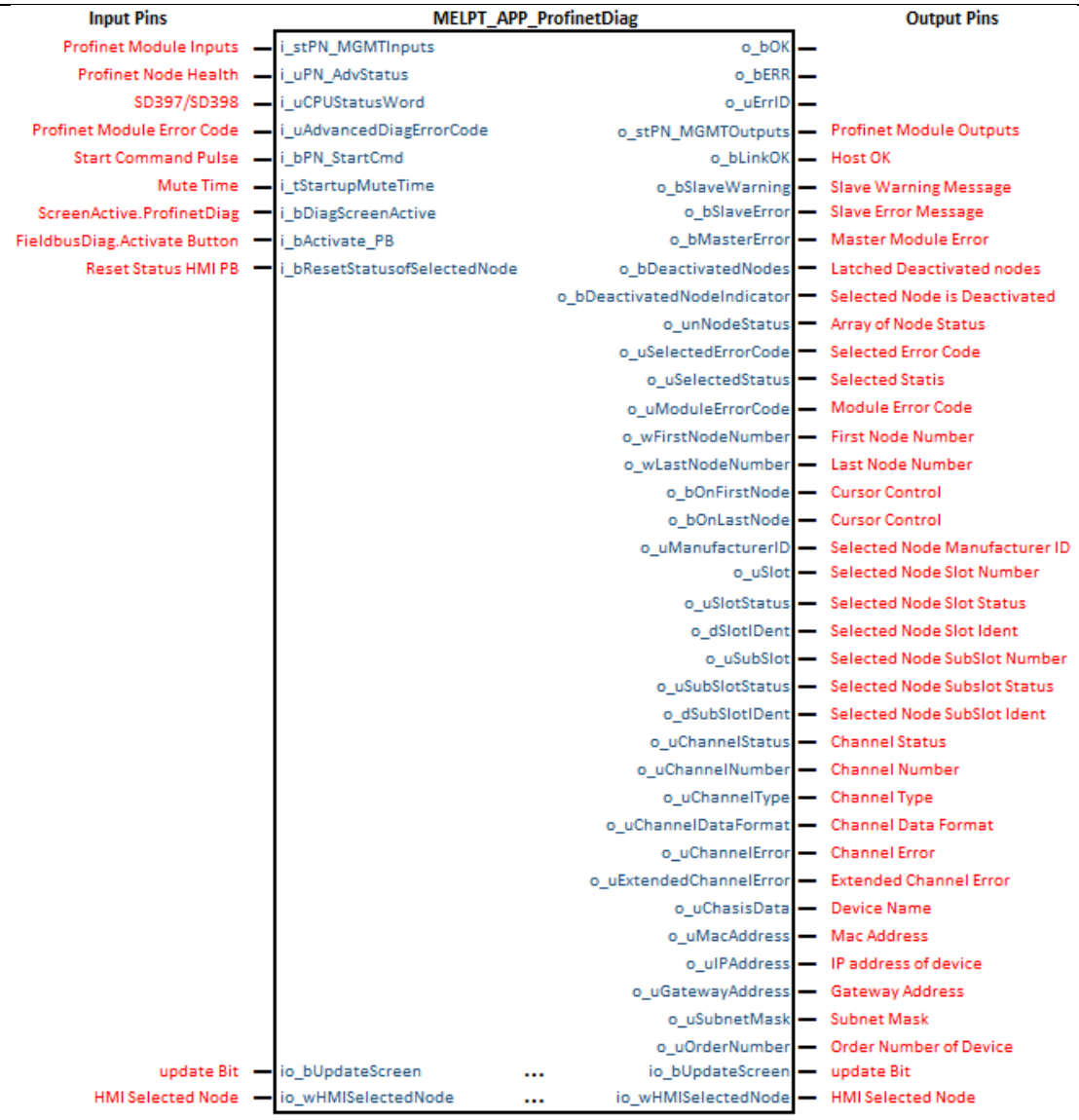


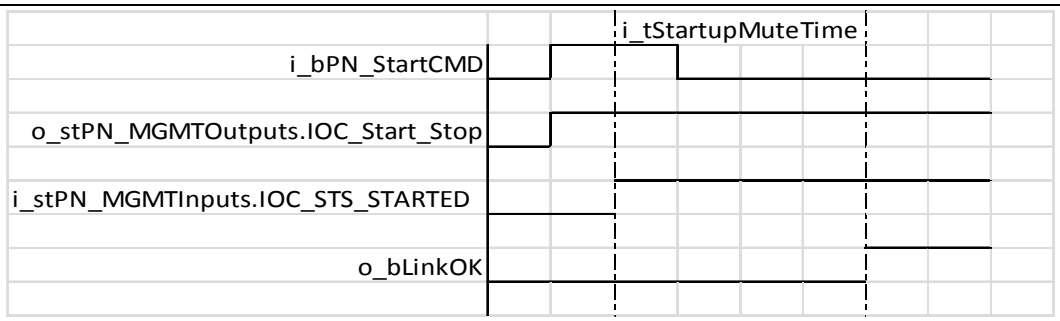
Figure 63-GX Configurator PN

FB Name

MELPT_APP_ProfinetDiag

Item	Description
Function overview	This function block monitors Profinet node health, starts the fieldbus, and allows a method to reserve/activate nodes
Symbol	

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model PLC</td><td>None</td></tr>
<tr><td>MELSEC-Q series C CPU</td><td>ME1PN1FW-Q</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
<tr><td>Configurator-PN</td><td>1.03</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 1132 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>1852 bits
1426 words
2 timer</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the following SDT from the Profinet Module library:
tPN_MGMT_INPUTS,
tPN_MGMT_OUTPUTS
and the following FB from the PN_accessory library
PN_Read_Rec
PN_AcyclicBufferCheck</td></tr>
</table>

Item	Description
Function description	This function block enabled the ProfiNet fieldbus, monitors node health, sets alarms for node issues, and interrogates an individual node for channel diagnostics
Restrictions and precautions	This function block uses Z16
Timing chart	

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Not a Profinet Module check i_uCPUStatusWord
H101 (257)	Module Error Code Present
H102 (258)	Configuration Error Detected

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Profinet Module Inputs	i_stPN_MGMTInputs	tPN_MGMT_INPUTS		Profinet Controller Management Input SDT

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Profinet Node Health	i_uPN_AdvStatus	Word[Unsigned](0..63)		Advanced Status of 128 nodes
X	SD397/SD398	i_uCPUStatusWord	Word[Unsigned]	SD397 or SD398	Data for MultiCPU Enter SD397 if CPU2 SD398 if CPU3
	Profinet Module Error Code	i_uAdvancedDiagErrorCode	Word[Unsigned]		Error Code from C-CPU
	Start Command Pulse	i_bPN_StartCmd	Bit		User Defined Start Profinet
X	Mute Time	i_tStartupMuteTime	Time	T#1ms – t#32s	Timer for not recovering status of slaves
	ScreenActive.ProfinetDiag	i_bDiagScreenActive	Bit		When Fieldbus Diagnostic Screen is Active
	FieldbusDiag.Activate Button	i_bActivate_PB	Bit		Activate Node
	Reset Status HMI PB	i_bResetStatusofSelectedNode	Bit		Reset Status

■ Input/Output labels

User Input	Name	Var_In_Out name	Data Type	Setting range	Description
	update Bit	io_bUpdateScreen	Bit		Refresh Diag Screen
	HMI Selected Node	io_wHMISelectedNode	Word[Signed]		HMI numeric Input of FDL address

■ Output labels

Name	Var_Output name	Data Type	Description

Name	Var_Output name	Data Type	Description
FB Execute normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execute abnormally	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
Profinet Module Outputs	o_stPN_MGMTOutputs	tPN_MGMT_OUTPUTS	outputs to ProfiNet control
Host OK	o_bLinkOK	Bit	Status of Data Link
Slave Warning Message	o_bSlaveWarning	Bit	A slave currently has diagnostic message
Slave Error Message	o_bSlaveError	Bit	A slave currently is disconnected
Master Module Error	o_bMasterError	Bit	A slave currently is disconnected
Latched Deactivated nodes	o_bDeactivatedNodes	Bit(0..127)	Temporary Reserved Nodes
Selected Node is Deactivated	o_bDeactivatedNodeIndicator	Bit	HMI Indicator the selected Node is Deactivated
Array of Node Status	o_unNodeStatus	Word[Unsigned](0..127)	Node Status Array
Selected Error Code	o_uSelectedErrorCode	Word[Unsigned]	Node Status Array
Selected Statis	o_uSelectedStatus	Word[Unsigned]	Selected node Status
Module Error Code	o_uModuleErrorCode	Word[Unsigned]	Profibus HMI Module Fault Code
First Node Number	o_wFirstNodeNumber	Word[Signed]	First Node Number
Last Node Number	o_wLastNodeNumber	Word[Signed]	Last Node Number on Machine

Name	Var_Output name	Data Type	Description
Cursor Control	o_bOnFirstNode	Bit	HMI Indicator for Node Selection Control
Cursor Control	o_bOnLastNode	Bit	HMI Indicator for Node Selection Control
Selected Node Manufacturer ID	o_uManufacturerID	Word[Unsigned]	Manufacturer ID from I&M0
Selected Node Slot Number	o_uSlot	Word[Unsigned]	Slot Number of
Selected Node Slot Status	o_uSlotStatus	Word[Unsigned]	Slot Status
Selected Node Slot Ident	o_dSlotIDent	Double Word[Unsigned]	Slot Ident Number
Selected Node SubSlot Number	o_uSubSlot	Word[Unsigned]	Subslot Number
Selected Node Subslot Status	o_uSubSlotStatus	Word[Unsigned]	Subslot Status
Selected Node SubSlot Ident	o_dSubSlotIDent	Double Word[Unsigned]	SubSlot Ident
Channel Status	o_uChannelStatus	Word[Unsigned]	Channel Status
Channel Number	o_uChannelNumber	Word[Unsigned]	Channel Number
Channel Type	o_uChannelType	Word[Unsigned]	Channel Type
Channel Data Format	o_uChannelDataFormat	Word[Unsigned]	ChannelDataFormat
Channel Error	o_uChannelError	Word[Unsigned]	Channel Error Code
Extended Channel Error	o_uExtendedChannelError	Word[Unsigned]	Extended Channel Error Code
Device Name	o_uChasisData	Word[Unsigned](0..15)	Chassis data

Name	Var_Output name	Data Type	Description
Mac Address	o_uMacAddress	Word[Unsigned](0..2)	MAC Address
IP address of device	o_uIPAddress	Word[Unsigned](0..1)	IP Address
Gateway Address	o_uGatewayAddress	Word[Unsigned](0..1)	Gateway Address
Subnet Mask	o_uSubnetMask	Word[Unsigned](0..1)	Subnet Mask
Order Number of Device	o_uOrderNumber	Word[Unsigned](0..9)	Order Number

FB Version Upgrade History

Version	Description
2.10	This function block was introduced
3.00	Modified Format to display channel diagnostics
3.01	Recode reduces memory usage

SDT Usage

1. tPN_MGMT_Ouptuts

Global Label: vPN_MGMT_Outputs		
Member	Type	Usage
.IOC_Start_Stop	Bit	Starts Profinet Communication, Set by this FB
ACYC_HSK_Y_Req1.Execute	Bit	Monitor to see if acyclic buffer in use
ACYC_HSK_Y_Req2.Execute	Bit	Monitor to see if acyclic buffer in use
.IOD_MGT_Mode	Bit(0..127)	Used to deactivate nodes
.IOD_CMD_HSK_Y	Bit(0..127)	Used to deactivate nodes
IOD_START_STOP_DEV	Bit(0..127)	

Global Label: vPN_MGMT_Outputs		
Member	Type	Usage
IOD_MGT_ALARM	Bit(0..127)	
IOD_CONSIST	Bit(0..127)	
IOD_INPUT_HSK_Y	Bit(0..127)	
IOD_OUTPUT_HSK_Y	Bit(0..127)	

2. tPN_MGMT_INPUTS

Global Label: vPN_MGMT_Inputs		
Member	Type	Usage
IOC_STS_CONFIG_OK	Bit	Needed to turn on ProfiNet
IOC_STS_CONFIG_DOWNLOADING	Bit	
IOC_STS_KEYFILE_ERROR	Bit	
IOC_STS_STARTED	Bit	Handshake from module that it started
IOC_STS_ERROR_DIAG_SET	Bit	
IOC_STS_PLC_WD_ERR	Bit	
IOD_CMD_HSK_X	Bit(0..127)	
IOD_INPUT_HSK_X	Bit(0..127)	
IOD_OUTPUT_HSK_X	Bit(0..127)	
ACYC_HSK_X_RES1_COMPLETED	Bit	Monitor to see if acyclic buffer in use
ACYC_HSK_X_RES2_COMPLETED	Bit	Monitor to see if acyclic buffer in use
ACYC_HSK_X_RES1_ACCEPTED	Bit	Monitor to see if acyclic buffer in use
ACYC_HSK_X_RES2_ACCEPTED	Bit	Monitor to see if acyclic buffer in use
IOD_ALARM_IND	Bit(0..127)	
IOD_CONN_STS	Bit(0..127)	Used to determine status
IOD_ERR_STS	Bit(0..127)	Used to determine status

3. MELPT_APP_FieldbusDiag

System Label: ProfinetDiag		
Member	Type	Usage
HostOK	Bit	Profinet Card Running, set by this FB
Update	Bit	Set by HMI, requires refresh of detailed diagnostic data
ActivateDeactivate_PB	Bit	HMI PB to change activated status
ActiveNode_Ind	Bit	HMI Indicator of activation status
ResetStatus	Bit	Reset Status PB From HMI. Seta Status to zero
OnFirstNode	Bit	Set by Function block to limit HMI PB from decrementing too low
OnLastNode	Bit	Set by Function block to limit HMI PB from incrementing too high
WriteCheck	Bit(0..7)	
DeactivatedNodes	Bit(0..127)	Stored Values of Deactivated nodes
IMSupported	Bit(0..15)	
LocalNetworkNumber	Word[Unsigned]	
LocalStationNumber	Word[Unsigned]	
FieldbusModuleCommentNumber	Word[Unsigned]	
FieldbusModuleFault	Word[Unsigned]	Profinet Module Error
FirstConfiguredNode	Word[Signed]	Node Number of first configured node
LastConfiguredNode	Word[Signed]	Node Number of Last configured node
SelectedNode	Word[Signed]	HMI Selected node, this is FB limited by First and Last Configured Node
SelectedStatus	Word[Unsigned]	Status of Selected Node

System Label: ProfinetDiag		
Member	Type	Usage
SelectedDeviceDiagnostic	Word[Unsigned]	
ManufacturerID	Word[Unsigned]	Retrieved during acyclic requests manufacturer code
DeviceID	Word[Unsigned]	
ChannelStatus	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics
ChannelNumber	Word[Unsigned]	Retrieved during acyclic requests channel number under error
ChannelType	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics channel type
ChannelDataFormat	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics data format
ChannelError	Word[Unsigned]	Retrieved during acyclic requests channel error
ExtendedChannelError	Word[Unsigned]	Retrieved during acyclic requests channel extended channel error
Slot	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics
SlotStatus	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics
SubSlot	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics
SubSlotStatus	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics
SlotIDent	Double Word[Unsigned]	Retrieved during acyclic requests channel diagnostics
SubSlotIDent	Double Word[Unsigned]	Retrieved during acyclic requests channel diagnostics
ChasisData	Word[Unsigned](0..15)	Retrieved during acyclic requests includes device name
MacAddress	Word[Unsigned](0..2)	Retrieved during acyclic requests

System Label: ProfinetDiag		
Member	Type	Usage
IPAddress	Word[Unsigned](0..1)	Retrieved during acyclic requests
SubnetMask	Word[Unsigned](0..1)	Retrieved during acyclic requests
GatewayAddress	Word[Unsigned](0..1)	Retrieved during acyclic requests
OrderNumber	Word[Unsigned](0..9)	Retrieved during acyclic requests
PlantID	Word[Unsigned](0..15)	
LocationName	Word[Unsigned](0..10)	
InstallationDate	Word[Unsigned](0..7)	
Description	Word[Unsigned](0..23)	
LinkTime	Word[Unsigned](0..2)	
NodeStatus	Word[Unsigned](0..127)	Status of all nodes determined by the FB

9.1.3. HMI-Profibus Detailed Diagnostics

This screen provides detailed information for the selected node of the Profibus Fieldbus

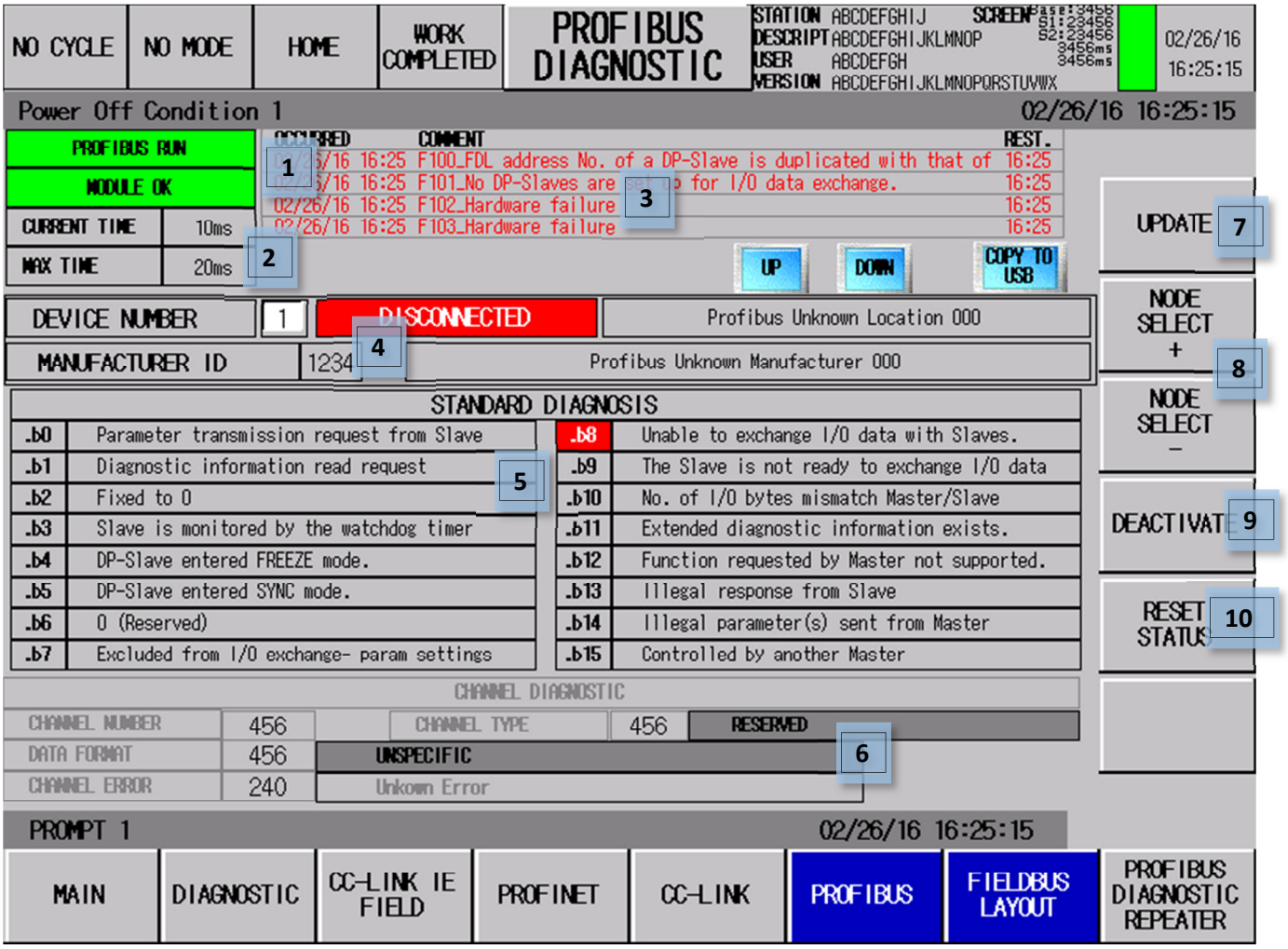


Figure 64-Profibus Diagnostics

Item #	Description	Object	Details
1	Host Status	Bit Lamp: ProfibusDiag.HostOK	Off: PROFIBUS NOT RUNNING On: PROFIBUS RUN

Item #	Description	Object	Details
	Module Faulted Indicator	Bit Lamp: ProfibusDiag.FieldbusModuleFault	Off: MODULE OK On: MODULE ERROR
2	Current Fieldbus Time	Numeric Display: ProfibusDiag.LinkTime[0]	Ms text added
2	Max Fieldbus Time	Numeric Display: ProfibusDiag.LinkTime[2]	Ms text added
3	Alarm Area	User Alarm Display(23)	COPY to USB button Executes Screen script that will copy alarms to E:\backup\Profibus.CSV
4	Selected Node	Numeric Input ProfibusDiag.SelectedNode	Numeric Input limited by the first and last node number detected by FB; Sets ProfibusDiag.Update when a new value is entered
4	Location	Word Comment Display: ProfibusDiag.SelectedNode	Comment File #23 $$ + 10000
4	Manufacturer	Word Comment Display: ProfibusDiag.SelectedNode	Comment File #23 20000 + $$

Item #	Description	Object	Details
4	Selected Status	Word Lamp: ProfinetDiag.SelectedStatus	

State	Value	Graphic
Not Configured	0	NOT CONFIGURED
Ok	1	OK
Ok Was Maintained	33	OK, WAS MAINTAINED
Maintenance	34	MAINTENANCE
Ok Was Defective	65	OK, WAS DEFECTIVE
Defective	68	DEFECTIVE
Ok Was Disconnected	129	OK, WAS DISCONNECT
Disconnected	136	DISCONNECTED
Ok Was Deactivated	257	OK, WAS DEACTIVATE
Deactivated	272	DEACTIVATED

<table>
<tr><th>Item #</th><th>Description</th><th>Object</th><th>Details</th></tr>
<tr><td>5</td><td>Standard Diagnostic</td><td>Word Comment Display:
Numeric Display:
ProfibusDiag.SelectedDeviceDiagnostic</td><td>Comment File #23
STANDARD DIAGNOSIS
<table>
<tr><td>.b0</td><td>Parameter transmission request from Slave</td></tr>
<tr><td>.b1</td><td>Diagnostic information read request</td></tr>
<tr><td>.b2</td><td>Fixed to 0</td></tr>
<tr><td>.b3</td><td>Slave is monitored by the watchdog timer</td></tr>
<tr><td>.b4</td><td>DP-Slave entered FREEZE mode.</td></tr>
<tr><td>.b5</td><td>DP-Slave entered SYNC mode.</td></tr>
<tr><td>.b6</td><td>0 (Reserved)</td></tr>
<tr><td>.b7</td><td>Excluded from I/O exchange- param settings</td></tr>
<tr><td>.b8</td><td>Unable to exchange I/O data with Slaves.</td></tr>
<tr><td>.b9</td><td>The Slave is not ready to exchange I/O data.</td></tr>
<tr><td>.b10</td><td>No. of I/O bytes mismatch Master/Slave</td></tr>
<tr><td>.b11</td><td>Extended diagnostic information exists.</td></tr>
<tr><td>.b12</td><td>Function requested by Master not supported.</td></tr>
<tr><td>.b13</td><td>Illegal response from Slave</td></tr>
<tr><td>.b14</td><td>Illegal parameter(s) sent from Master</td></tr>
<tr><td>.b15</td><td>Controlled by another Master</td></tr>
</table></td></tr>
<tr><td>6</td><td>Channel Diagnostics</td><td>Information retrieved from device via acyclic means when the</td><td>
<table>
<tr><td>Channel Number</td><td>Numeric Display</td><td colspan="2">ProfibusDiag.ChannelNumber</td></tr>
<tr><td>Channel</td><td>ProfibusDiag.C</td><td>0</td><td>Reserved</td></tr>
</table></td></tr>
</table>

Item #	Description	Object	Details			
		Profibus.update is triggered	Type	hannelType	64	Input
					128	Output
					192	Input/Output
			Data Format	ProfibusDiag.ChannelDataFormat	0	Unspecific
					32	BIT
					64	2 BIT
					96	4 Bit
					128	Byte
					144	Word
					192	2 Word
					224	Reserved
			Channel Error	ProfibusDiag.ChannelError	1	Short Circuit
					2	Undervoltage
					3	Overvoltage
					4	Overload
					5	Overtemperature
					6	Line Break
					7	Upper Limit Value Exceeded
					8	Lower Limit Value Exceeded
					9	Error
					16	Parametrization Fault

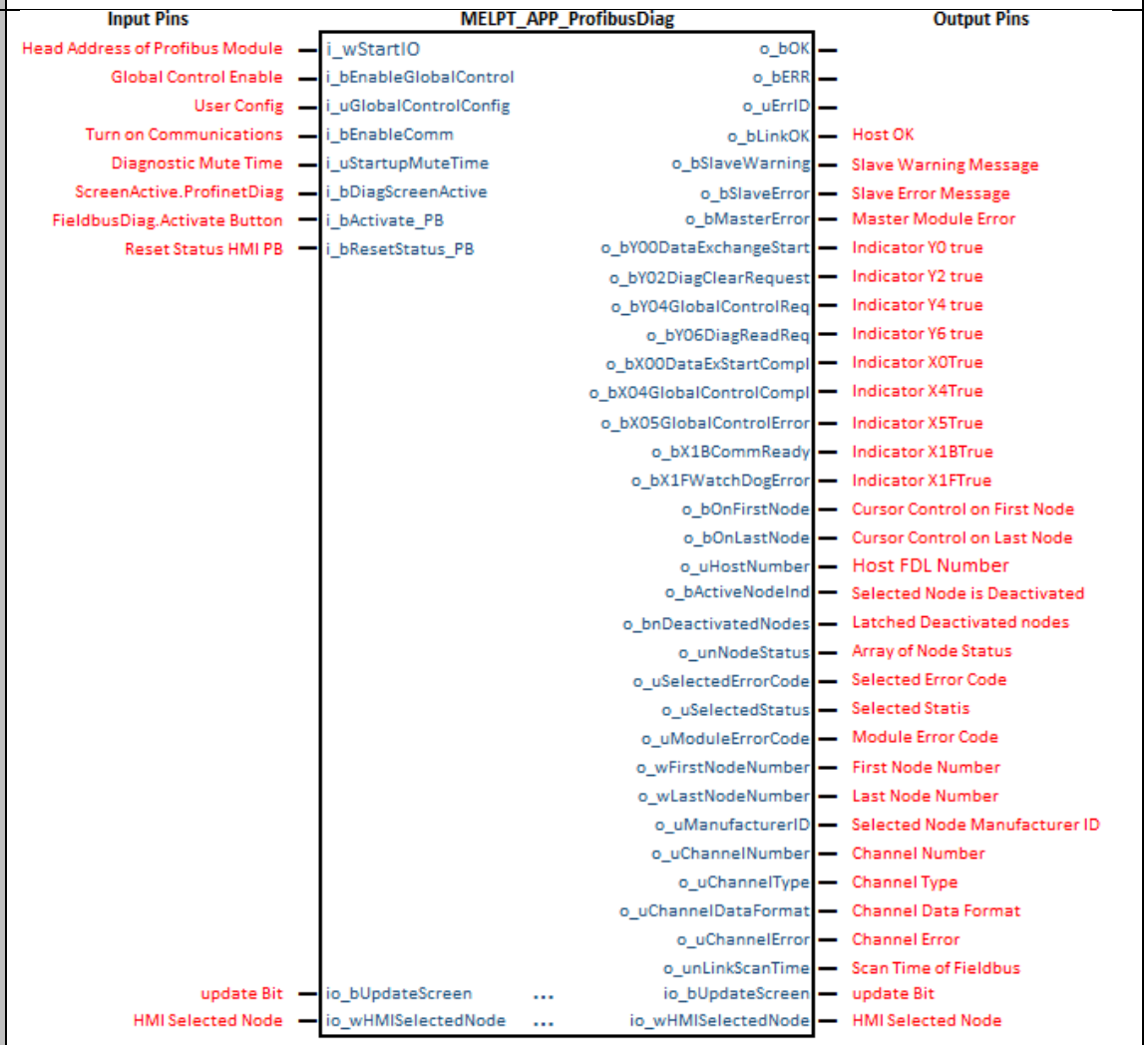
Item #	Description	Object	Details			
					17	Power Supply Fault
					18	Fuse Blown / Open
					19	Communication Error
					20	Ground Fault
					21	Reference Point Lost
					22	Process Event Lost
					23	Threshold Warning
					24	Output Disabled
					25	Safety Event
					26	External Fault
					27	Sensor has incorrect Configuration
					28	Manufacturer Specific
					29	Primary Variable out of limits

Item #	Description	Object	Details			
					30	Non-primary Variable out of limits
					31	The Channel Needs Parameters
					32	Reserved
					33	Sensor Supply Short Circuit
					34	Ground fault

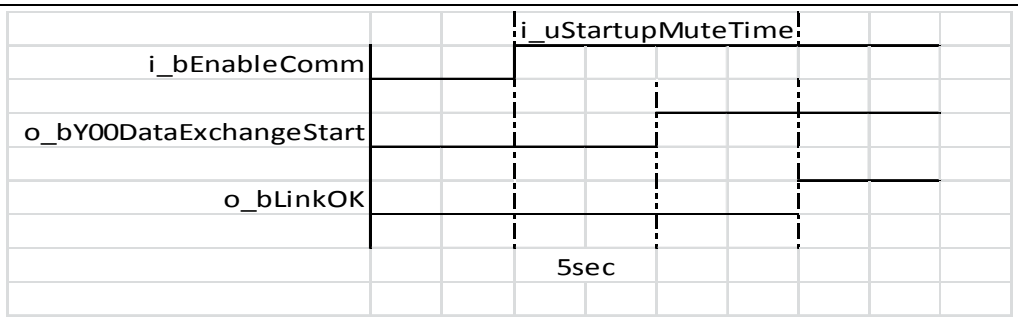
9.1.4. PLC-MELPT_APP_ProfibusDiag

This program calls the function block MELPT_APP_ProfibusDiag. This function block is used to monitor overall node health for the fieldbus and provide detailed diagnostics for the selected fieldbus node.

FB Name
MELPT_APP_ProfibusDiag

Item	Description
Function overview	This function block monitors Profibus node health, starts the fieldbus, and allows a method to reserve/activate nodes
Symbol	

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model</td><td>None</td></tr>
<tr><td>MELSEC-Q Series intelligent</td><td>QJ71PB92V</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
<tr><td>Configurator-DP</td><td>7.12</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 807 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>924 bits
730 words
5 timer</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the function MELPT_APP_IntModuleCheck</td></tr>
<tr><td>Function description</td><td>This function block enabled the Profibus fieldbus, monitors node health, sets alarms for node issues, interrogates an individual node for channel diagnostics, and manages reserved nodes</td></tr>
</table>

Item	Description
Restrictions and precautions	This function block uses Z9, z8, z7, z16, z18
Timing chart	

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Profibus Module not detected at i_wStartIO

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of Profibus Module	i_wStartIO	Word[Signed]	0 to 7E0	Head Address Profibus Module in HEX
X	Global Control Enable	i_bEnableGlobalControl	Bit		On Enables Global Control function
X	User Config	i_uGlobalControlConfig	Word[Unsigned]		Configuration for Un\G2081

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Turn on Communications	i_bEnableComm	Bit		Y0
X	Diagnostic Mute Time	i_uStartupMuteTime	Word[Unsigned]		Mute Timer for status
	ScreenActive.ProfinetDiag	i_bDiagScreenActive	Bit		On Profibus Diag Screen
	FieldbusDiag.Activate Button	i_bActivate_PB	Bit		Activate Node
	Reset Status HMI PB	i_bResetStatus_PB	Bit		Reset Status

■ Input/Output labels

User Input	Name	Var_In_Out name	Data Type	Setting range	Description
	update Bit	io_bUpdateScreen	Bit		Refresh Diag Screen
	HMI Selected Node	io_wHMISelectedNode	Word[Signed]		HMI numeric Input of FDL address

■ Output labels

Name	Var_Output name	Data Type	Description
FB Executes Normally	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execution Abnormal	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
Host OK	o_bLinkOK	Bit	Status of Data Link
Slave Warning Message	o_bSlaveWarning	Bit	A slave currently has diagnostic message
Slave Error Message	o_bSlaveError	Bit	A slave currently is disconnected

Name	Var_Output name	Data Type	Description
Master Module Error	o_bMasterError	Bit	Master has local Diag Info
Indicator Y0 true	o_bY00DataExchangeStart	Bit	y0
Indicator Y2 true	o_bY02DiagClearRequest	Bit	y2
Indicator Y4 true	o_bY04GlobalControlReq	Bit	y4
Indicator Y6 true	o_bY06DiagReadReq	Bit	y6
Indicator X0True	o_bX00DataExStartCompl	Bit	Profibus Network Card I/O X0
Indicator X4True	o_bX04GlobalControlCompl	Bit	Xn4
Indicator X5True	o_bX05GlobalControlError	Bit	Xn5
Indicator X1BTrue	o_bX1BCommReady	Bit	Communication Ready
Indicator X1FTrue	o_bX1FWatchDogError	Bit	Profibus Network Card I/O X1F
Cursor Control on First Node	o_bOnFirstNode	Bit	HMI on first Node for cursor control
Cursor Control on Last Node	o_bOnLastNode	Bit	HMI on Last node for cursor control
Host FDL Number	o_uHostNumber	Word[Unsigned]	FDL of Host Station
Selected Node is Deactivated	o_bActiveNodeInd	Bit	PB control
Latched Deactivated nodes	o_bnDeactivatedNodes	Bit(0..127)	Temporary Reserved Nodes
Array of Node Status	o_unNodeStatus	Word[Unsigned](0..127)	Profibus HMI Ind. Node With Diagnostic
Selected Error Code	o_uSelectedErrorCode	Word[Unsigned]	Node Status Array

Name	Var_Output name	Data Type	Description
Selected Statis	o_uSelectedStatus	Word[Unsigned]	Selected node Status
Module Error Code	o_uModuleErrorCode	Word[Unsigned]	Profibus HMI Module Fault Code
First Node Number	o_wFirstNodeNumber	Word[Signed]	First Node Number
Last Node Number	o_wLastNodeNumber	Word[Signed]	Last Node Number on Machine
Selected Node Manufacturer ID	o_uManufacturerID	Word[Unsigned]	Manufacturer ID
Channel Number	o_uChannelNumber	Word[Unsigned]	Channel number of selected Error
Channel Type	o_uChannelType	Word[Unsigned]	Channel Type of selected Error
Channel Data Format	o_uChannelDataFormat	Word[Unsigned]	channel Data format of Selected Error
Channel Error	o_uChannelError	Word[Unsigned]	Channel Error of Selected Error
Scan Time of Fieldbus	o_unLinkScanTime	Word[Unsigned](0..2)	Profibus Link Scan Time

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.02	Corrected addressing issue with FDL's
1.10	Replaced first scan bit with EN bit
1.12	Modified Screen Active; Designate Hex for Start_IO Modified FB variables to use the standard specified in BCN-89000-0823-D
1.13	Added global control function for sync
1.20	Added FB Status Output; Modified Logic for o_s_HMI_ProfiDiagFaultCode
2.00A	Adopted BCN-89000-0969 Implemented Intelligent Module Check, Added Superimpose Offset; Added Link Time Output
3.00	Rewrite, added channel diagnostics, reserved nodes, and link reboot logic

SDT Usage

1. MELPT_APP_FieldbusDiag

System Label: ProfibusDiag		
Member	Type	Usage

System Label: ProfibusDiag		
Member	Type	Usage
HostOK	Bit	Profibus Card OK
Update	Bit	Set by HMI, requires refresh of channel diagnostic
ActivateDeactivate_PB	Bit	HMI PB to change activated status
ActiveNode_Ind	Bit	HMI Indicator of activation status
ResetStatus	Bit	Reset Status PB From HMI. Seta Status to zero
OnFirstNode	Bit	Set by Function block to limit HMI PB from decrementing too low
OnLastNode	Bit	Set by Function block to limit HMI PB from incrementing too high
WriteCheck	Bit(0..7)	
DeactivatedNodes	Bit(0..127)	Stored Values of Deactivated nodes
IMSupported	Bit(0..15)	
LocalNetworkNumber	Word[Unsigned]	
LocalStationNumber	Word[Unsigned]	FDL of Master
FieldbusModuleCommentNumber	Word[Unsigned]	
FieldbusModuleFault	Word[Unsigned]	Profinet Module Error
FirstConfiguredNode	Word[Signed]	Node Number of first configured node
LastConfiguredNode	Word[Signed]	Node Number of Last configured node
SelectedNode	Word[Signed]	HMI Selected node, this is FB limited by First and Last Configured Node
SelectedStatus	Word[Unsigned]	Status of Selected Node
SelectedDeviceDiagnostic	Word[Unsigned]	Error Array for Selected Node

System Label: ProfibusDiag		
Member	Type	Usage
ManufacturerID	Word[Unsigned]	Retrieved during acyclic requests manufacturer code
DeviceID	Word[Unsigned]	
ChannelStatus	Word[Unsigned]	
ChannelNumber	Word[Unsigned]	Retrieved during acyclic requests channel number under error
ChannelType	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics channel type
ChannelDataFormat	Word[Unsigned]	Retrieved during acyclic requests channel diagnostics data format
ChannelError	Word[Unsigned]	Retrieved during acyclic requests channel error
ExtendedChannelError	Word[Unsigned]	
Slot	Word[Unsigned]	
SlotStatus	Word[Unsigned]	
SubSlot	Word[Unsigned]	
SubSlotStatus	Word[Unsigned]	
SlotIDent	Double Word[Unsigned]	
SubSlotIDent	Double Word[Unsigned]	
ChasisData	Word[Unsigned](0..15)	
MacAddress	Word[Unsigned](0..2)	
IPAddress	Word[Unsigned](0..1)	

System Label: ProfibusDiag		
Member	Type	Usage
SubnetMask	Word[Unsigned](0..1)	
GatewayAddress	Word[Unsigned](0..1)	
OrderNumber	Word[Unsigned](0..9)	
PlantID	Word[Unsigned](0..15)	
LocationName	Word[Unsigned](0..10)	
InstallationDate	Word[Unsigned](0..7)	
Description	Word[Unsigned](0..23)	
LinkTime	Word[Unsigned](0..2)	Profibus Minimum, maximum and current cycle time in milliseconds
NodeStatus	Word[Unsigned](0..127)	Status of all nodes determined by the FB

9.1.5. HMI-Profibus Diagnostic Repeater

This screen is an overlap window and can be displayed at time from the diagnostic navigation window

Figure 65-Fieldbus Diagnostic Navigation Window

This window shows the last 10 events captured by the Profibus diagnostic repeater

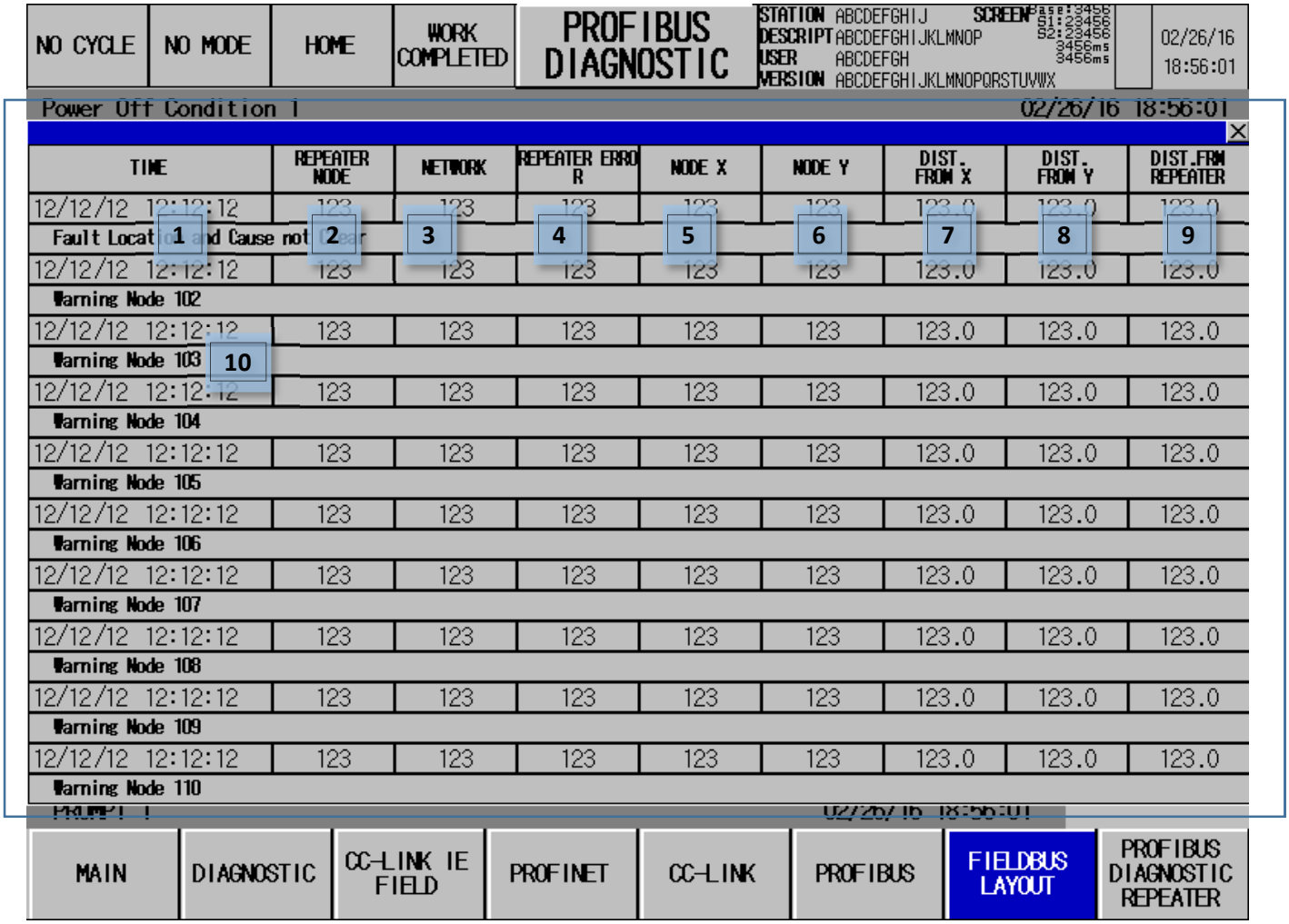


Figure 66-Diagnostic Repeater Window

Item #	Device X=row	Description

Item #	Device X=row	Description
1	Numeric Displays: ProfibusLineDiag.Historical[X,1-6]	Date Time of Event Occurrence
2	Numeric Displays: ProfibusLineDiag.Historical[X,7]	Repeater Node Number
3	Numeric Displays: ProfibusLineDiag.Historical[X,8]	Network Number
4	Numeric Displays: ProfibusLineDiag.Historical[X,9]	Repeater Error
5	Numeric Displays: ProfibusLineDiag.Historical[X,10]	Node X
6	Numeric Displays: ProfibusLineDiag.Historical[X,11]	Node Y
7	Numeric Displays: ProfibusLineDiag.Historical[X,12]	Distance from X
8	Numeric Displays: ProfibusLineDiag.Historical[X,13]	Distance From Y
9	Numeric Displays: ProfibusLineDiag.Historical[X,14]	Distance from Repeater
10	Word Comment Display: ProfibusLineDiag.Historical[X,15]	Error Event Comment File #23 $$+25100

Alarm Value	Comment
1	Fault Location and Cause not Clear

4	Further measuring circuits at the segment, the other diagnostic repeater is connected with its segment DP2
5	Further measuring circuits at the segment , the other diagnostic repeater is connected with its segment DP3
7	Error cause is not clear
8	Message fault rate is critical
9	Break in the signal line A
10	Short Circuit between signal line B to screen
12	Short Circuit between signal line A to screen
13	Break in the signal line B
15	Break in signal line A and/or B or no terminating resistor
16	Break in signal line A and/or B or an additional terminating resistor has been inserted
17	Segment de-activated automatically, because the line level constantly zero.
18	Segment de-activated automatically, because the line level constantly unsteady
21	More than 32 nodes are connected to the measuring segment
22	The distance of the node to the diagnostic repeater exceeds the permitted line length
23	The maximum permitted number of diagnostic repeaters connected in series is exceeded
24	The diagnostic repeater has recognized further faults

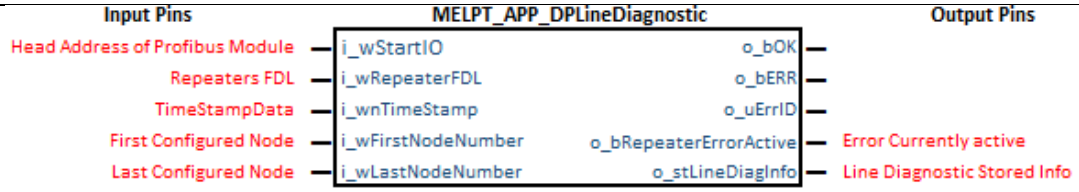
9.1.6. PLC-MELPT_APP_LineDiag

Using Siemens Step 7 or Com Profibus Software, a Time Domain Reflection can be executed by the Diagnostic repeater and stored in its memory. This procedure creates a table of nodes and the time it takes for a signal to return. As nodes are added or reduced this procedure needs to be executed again.

FB Name

MELPT_APP_DPLineDiagnostic

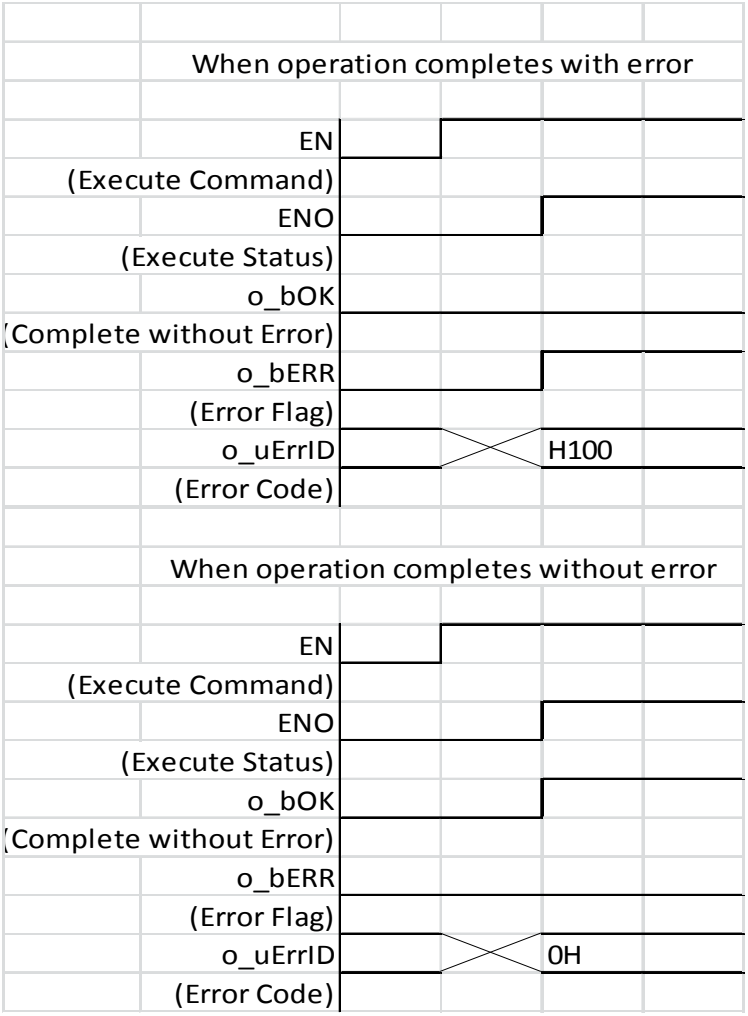
Function Overview

Item	Description
Function overview	This function block monitors the diagnostic message on the Profibus master module. If the message originator matches the FDL number of the repeater as put on the input pin the message is decoded and displayed on screen.
Symbol	
Applicable Hardware	
Applicable Software	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model PLC	None
Melsec-Q Series intelligent	QJ71PB92V	None
Siemens	Profibus Diagnostic Repeater	
GOT 1000 series	GT16(800*600) or Higher	None

Series	Version
GX Works 2	1.536
GT Designer 3	1.136
Configurator DP	7.12

Item	Description
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 301 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	55 bits 272 Words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This FB requires the MELPT_APP_DPLineDiag SDT
Function description	
Restrictions and precautions	This FB uses z9 and z16

Item	Description
Timing chart	

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Repeater FDL greater than Last Node Number
H101 (257)	Repeater FDL less than First Node Number

Labels

■ Input labels

User Input	Symbol	Var_Input name	Data Type	Setting range	Description
X	Head Address of Profibus Module	i_wStartIO	Word[Signed]	0 to 7e0	Head Address of Module in HEX
X	Repeaters FDL	i_wRepeaterFDL	Word[Signed]	1 to 125	FDL Address of Diagnostic Repeater
	TimeStampData	i_wnTimeStamp	Word[Signed](0..7)		The Time Stamp as formatted by HMI language function block
	First Configured Node	i_wFirstNodeNumber	Word[Signed]		First Node Number
	Last Configured Node	i_wLastNodeNumber	Word[Signed]		Last Node Number on Machine

■ Output labels

Name	Var_Output name	Data Type	Description
FB Executes Normally	o_bOK	Bit	True when Normal Execute
FB Execution Abnormal	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
Error Currently active	o_bRepeaterErrorActive	Bit	True when error currently exists
Line Diagnostic Stored Info	o_stLineDiagInfo	MELPT_APP_DPLineDiag	Output for the Line Diagnostic Screen

FB Version Upgrade History

Version	Description
1.01	Initial Release

Version	Description
1.02	Added Screen Active condition for clear Screen_PB
1.10	Added Buffer Screen Input
1.12	Modified Screen Active; Designate Hex for Start_IO Modified FB variables to use the standard specified in BCN-89000-0823-D
1.20	Added FB Status Outputs
2.00A	Adopted BCN-89000-0969 Added Intelligent Module Check, Modified Data Structures
3.00	Removed Intelligent module check, simplified programming by only storing last 10 errors
3.01	Corrected issue with Z registers

SDT Usage

1. MELPT_APP_DPLineDiag

System Label: ProfiLineDiag		
Member	Type	Usage
.ErrorActive	Bit	Used to indicate active error
.Historical	Word[Unsigned](1..10,1..15)	Stores Data for display on screen

9.1.7. HMI-CC-Link IE Field Detailed Diagnostics

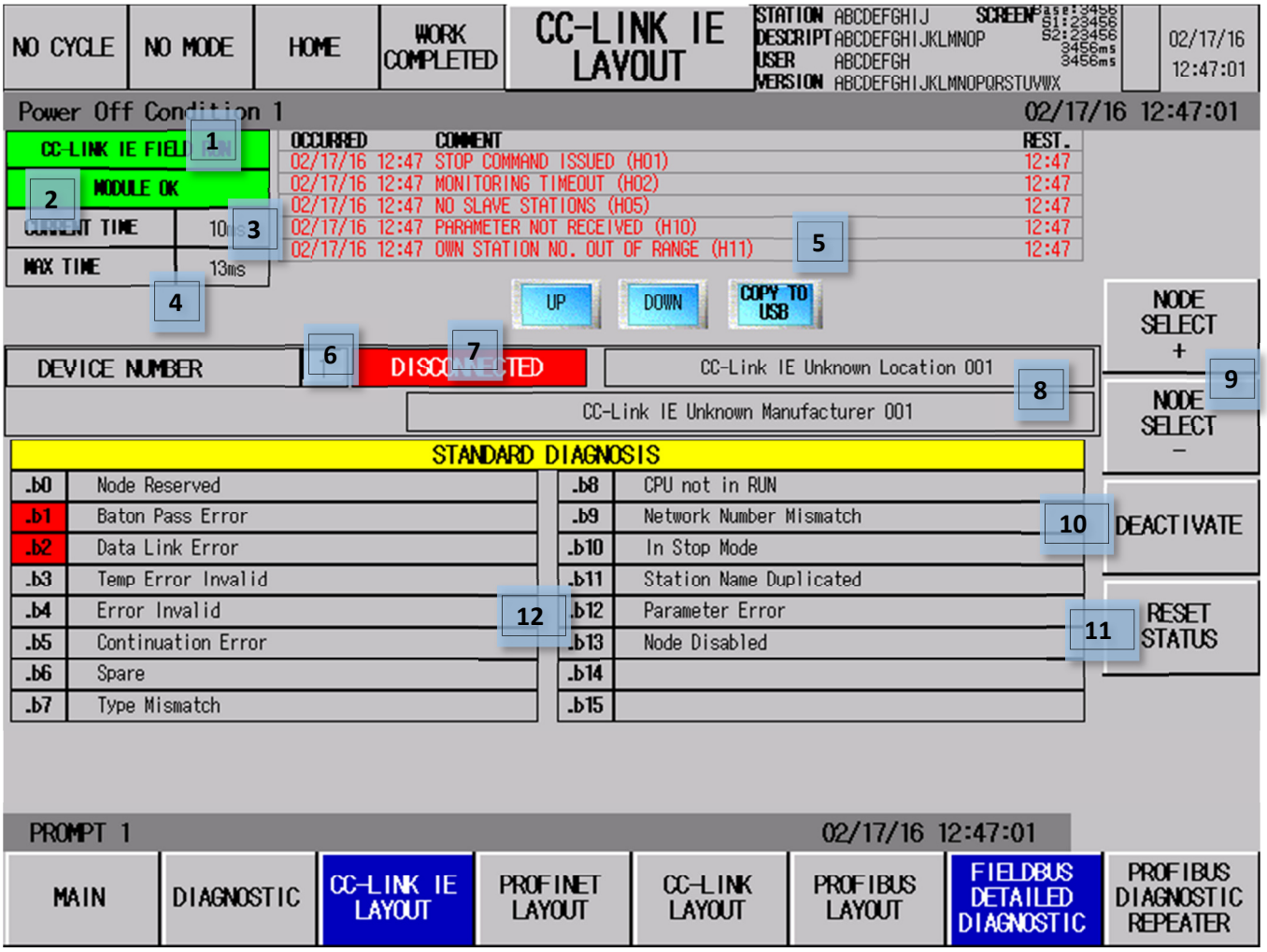


Figure 67-CC-link IE Field Detailed Diagnostics

Item #	Description	Object	Details
1	Host Status	Bit Lamp: CCLinkIEDiag.HostOK	Off: CC-LINK IE FIELD NOT RUNNING On: CC-LINK IE FIELD RUN

Item #	Description	Object	Details
2	Module Faulted Indicator	Bit Lamp: CCLinkIEDiag.FieldbusModuleFault	Off: MODULE OK On: MODULE ERROR
3	Current Fieldbus Time	Numeric Display: CCLinkIEDiag.LinkTime[1]	Ms text added
4	Max Fieldbus Time	Numeric Display: CCLinkIEDiag.LinkTime[0]	Ms text added
5	Alarm Area	User Alarm Display(20)	COPY to USB button Executes Screen script that will copy alarms to E:\backup\CCLinkIE.CSV
6	Selected Node	Numeric Input CCLinkIEDiag.SelectedNode	Numeric Input limited by the first and last node number detected by FB

<table>
<tr><th>Item #</th><th>Description</th><th>Object</th><th>Details</th></tr>
<tr><td>7</td><td>Selected Status</td><td>Word Lamp:
CCLinkIEDiag.SelectedStatus</td><td>
<table>
<tr><th>State</th><th>Value</th><th>Graphic</th></tr>
<tr><td>Not Configured</td><td>0</td><td>NOT CONFIGURED</td></tr>
<tr><td>Ok</td><td>1</td><td>OK</td></tr>
<tr><td>Ok Was Maintained</td><td>33</td><td>OK, WAS MAINTAINED</td></tr>
<tr><td>Maintenance</td><td>34</td><td>MAINTENANCE</td></tr>
<tr><td>Ok Was Defective</td><td>65</td><td>OK, WAS DEFECTIVE</td></tr>
<tr><td>Defective</td><td>68</td><td>DEFECTIVE</td></tr>
<tr><td>Ok Was Disconnected</td><td>129</td><td>OK, WAS DISCONNECT</td></tr>
<tr><td>Disconnected</td><td>136</td><td>DISCONNECTED</td></tr>
<tr><td>Ok Was Deactivated</td><td>257</td><td>OK, WAS DEACTIVATE</td></tr>
<tr><td>Deactivated</td><td>272</td><td>DEACTIVATED</td></tr>
</table>
</td></tr>
<tr><td>8</td><td>Location and manufacturer</td><td>Word Comment Display:
CCLinkIEDiag.SelectedNode</td><td>Comment File #20
Location = Label Value +10000
Manufacturer = Label Value + 20000</td></tr>
<tr><td>9</td><td>Node Select Buttons</td><td>Word Switch:
CCLinkIEDiag.SelectedNode</td><td>Increment or decrements by 1 the Selected Node</td></tr>
<tr><td>10</td><td>Deactivate /Activate PB</td><td>Bit Momentary Switch:
CCLinkIEDiag.ActivateDeactivate_PB
CCLinkIEDiag.ActiveNode_Ind</td><td>Toggles the Deactivated State of the Selected Node, for CC-link IE field this is a PLC maintained mask for faulting. It does not place the node into reserved mode</td></tr>
</table>

<table>
<tr><th>Item #</th><th>Description</th><th>Object</th><th>Details</th></tr>
<tr><td>11</td><td>Reset Status</td><td>Bit Momentary Switch:

CCLinkIEDiag.ResetStatus</td><td>Places zero into CCLinkIEDiag.NodeStatus[SelectedNode]</td></tr>
<tr><td>12</td><td>Standard

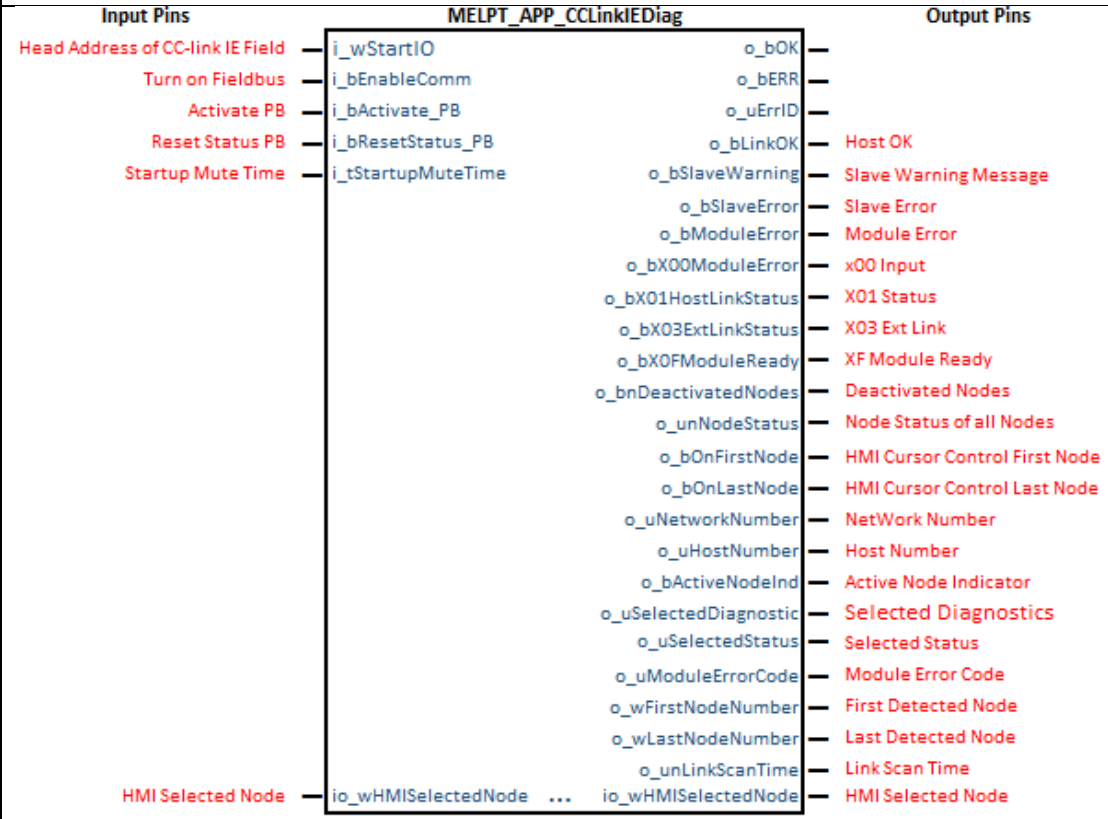
Diagnosis</td><td>Word Lamp:

CCLinkIEDiag.SelectedDeviceDiagnostic</td><td>Each Bit is evaluated by appropriate bit mask and text is provided for each bit
<table>
<tr><th>Bit Number</th><th>Meaning</th><th>Status</th></tr>
<tr><td>0</td><td>Reserved by Parameter</td><td>Deactivated</td></tr>
<tr><td>1</td><td>Baton Pass Error</td><td>Disconnected</td></tr>
<tr><td>2</td><td>Data Link Error</td><td>Disconnected</td></tr>
<tr><td>3</td><td>Temporary Error Invalid</td><td>Maintenance</td></tr>
<tr><td>4</td><td>Error Invalid</td><td>Maintenance</td></tr>
<tr><td>5</td><td>Continuation Error</td><td>Maintenance</td></tr>
<tr><td>6</td><td>Spare</td><td></td></tr>
<tr><td>7</td><td>Mismatch</td><td>Defective</td></tr>
<tr><td>8</td><td>CPU run off</td><td>Defective</td></tr>
<tr><td>9</td><td>Network Mismatch</td><td>Defective</td></tr>
<tr><td>10</td><td>Stop Error</td><td>Defective</td></tr>
<tr><td>11</td><td>Station Number Duplicated</td><td>Defective</td></tr>
<tr><td>12</td><td>Parameter Error</td><td>Defective</td></tr>
<tr><td>13</td><td>HMI Deactivated</td><td>Deactivated</td></tr>
</table></td></tr>
</table>

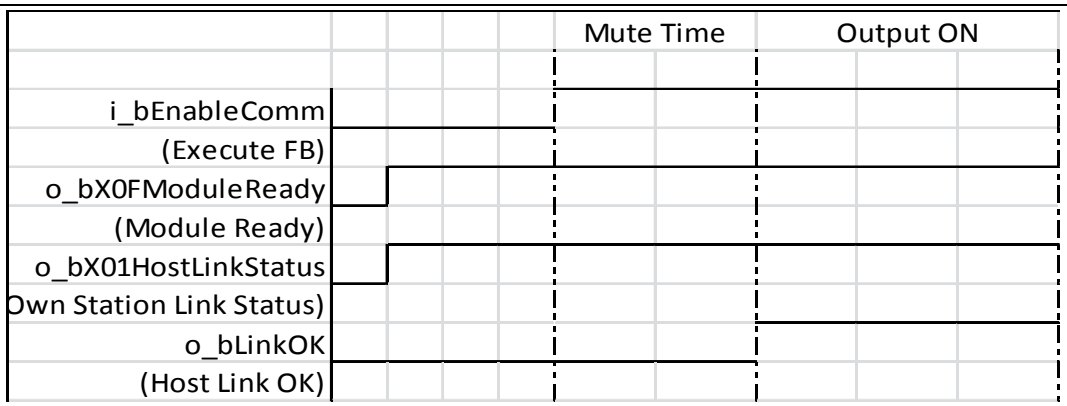
9.1.8. PLC-MELPT_APP_CCLinkIEDiag

This program calls the function block MELPT_APP_CCLinkIEDiag. This function block is used to monitor overall node health for the fieldbus and provide detailed diagnostics for the selected fieldbus node.

FB Name
MELPT_APP_CCLinkIEDiag

Item	Description
Function overview	This function block monitors CC-Link IE node health, starts the fieldbus, and allows a method to reserve/activate nodes
Symbol	

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model PLC</td><td>None</td></tr>
<tr><td>MELSEC-Q Series</td><td>QJ71GF11-T2</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 750 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>1690 bits
372 words
1 Timer</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the function MELPT_APP_IntModuleCheck</td></tr>
</table>

Item	Description
Function description	This function block retrieves buffer memory status for a QJ71GF11 residing at **i_wStartIO**. The following Status is considered With Diagnostic: Baton Pass Status Data Link Status Reserved Error Invalid Type Mismatch CPU Run Status Network Number Mismatch Stop Error Station Number Duplication Continuation errors Parameter Error The status is determined for each node. A Warning flag is set if any node exhibits maintenance behavior An Error flag is set if any node is disconnected or exhibits defective behavior Three outputs are designed to be interfaced with the alarming system O_bSlaveWarning O_bSlaveError O_bModuleError
Restrictions and precautions	Z9 thru Z7 are used in this function block. Do not use Z9 thru Z7 in an interrupt program. **I_wStartIO** must be entered in hexadecimal FB designed for one instance per fieldbus module, additional system labels necessary if using more than 1 CC-link IE Field module.
Timing chart	

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Profibus Module not detected at i_wStartIO

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of CC-link IE Field	i_wStartIO	Word[Signed]	0-7FF	Head Address of Module in HEX
X	Turn on Fieldbus	i_bEnableComm	Bit		Start Communicating
	Activate PB	i_bActivate_PB	Bit		Activate Node PB
	Reset Status PB	i_bResetStatus_PB	Bit		Reset Status PB
X	Startup Mute Time	i_tStartupMuteTime	Time		Time To delay before Host OK,

■ Input/Output labels

User Input	Name	Var_In_Out name	Data Type	Setting range	Description
	HMI Selected Node	io_wHMISelectedNode	Word[Signed]		HMI numeric Input of FDL address

■ Output labels

Name	Var_Output name	Data Type	Description
FB Executes Normally	o_bOK	Bit	TRUE when FB executed Normal
FB Execution Abnormal	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output

Name	Var_Output name	Data Type	Description
Host OK	o_bLinkOK	Bit	Status of Data Link
Slave Warning Message	o_bSlaveWarning	Bit	A slave currently has diagnostic message
Slave Error	o_bSlaveError	Bit	A slave currently is disconnected
Module Error	o_bModuleError	Bit	Master has local Diag Info
x00 Input	o_bX00ModuleError	Bit	CCLink I/O X0 Module Error
X01 Status	o_bX01HostLinkStatus	Bit	CCLink I/O X1 Host Status
X03 Ext Link	o_bX03ExtLinkStatus	Bit	CCLink I/O X3 External Link Status
XF Module Ready	o_bX0FModuleReady	Bit	CCLink I/O XF Module Ready
Deactivated Nodes	o_bnDeactivatedNodes	Bit(0..127)	Temporary Reserved Nodes
Node Status of all Nodes	o_unNodeStatus	Word[Unsigned](0..127)	Profibus HMI Ind. Node With Diagnostic
HMI Cursor Control First Node	o_bOnFirstNode	Bit	HMI is first selectable node
HMI Cursor Control Last Node	o_bOnLastNode	Bit	HMI is on Last selectable node
Network Number	o_uNetworkNumber	Word[Unsigned]	Network number of module
Host Number	o_uHostNumber	Word[Unsigned]	FDL of Host Station
Active Node Indicator	o_bActiveNodeInd	Bit	To tell HMI if node is active or deactivated
Selected Diagnostics	o_uSelectedDiagnostic	Word[Unsigned]	Node Status Array
Selected Status	o_uSelectedStatus	Word[Unsigned]	Selected node Status
Module Error Code	o_uModuleErrorCode	Word[Unsigned]	Profibus HMI Module Fault Code
First Detected Node	o_wFirstNodeNumber	Word[Signed]	First Node Number
Last Detected Node	o_wLastNodeNumber	Word[Signed]	Last Node Number on Machine
Link Scan Time	o_unLinkScanTime	Word[Unsigned](0..2)	Link Scan Time

FB Version Upgrade History

Version	Description
1.24	Initial Release
2.00A	Adopted BCN-89000-0969 added intelligent module check, changes made to screen display and use of Superimpose Offset; Issue with Detailed Diagnostic Output corrected
2.10	Outputs Changed to words
3.00	Redesign for common Diagnostic SDT template between all fieldbus
3.01	Removed update, reorder code, added i_bEnabled

SDT Usage

1. MELPT_APP_FieldbusDiag

System Label: CCLinkIEDiag		
Member	Type	Usage
HostOK	Bit	CC-link IE Card OK
Update	Bit	
ActivateDeactivate_PB	Bit	HMI PB to change activated status
ActiveNode_Ind	Bit	HMI Indicator of activation status
ResetStatus	Bit	Reset Status PB From HMI. Seta Status to zero
OnFirstNode	Bit	Set by Function block to limit HMI PB from decrementing too low
OnLastNode	Bit	Set by Function block to limit HMI PB from incrementing too high
WriteCheck	Bit(0..7)	
DeactivatedNodes	Bit(0..127)	Stored Values of Deactivated nodes
IMSupported	Bit(0..15)	
LocalNetworkNumber	Word[Unsigned]	Station Number of Card
LocalStationNumber	Word[Unsigned]	Network Number of Card

System Label: CCLinkIEDiag		
Member	Type	Usage
FieldbusModuleCommentNumber	Word[Unsigned]	
FieldbusModuleFault	Word[Unsigned]	Module Error
FirstConfiguredNode	Word[Signed]	Node Number of first configured node
LastConfiguredNode	Word[Signed]	Node Number of Last configured node
SelectedNode	Word[Signed]	HMI Selected node, this is FB limited by First and Last Configured Node
SelectedStatus	Word[Unsigned]	Status of Selected Node
SelectedDeviceDiagnostic	Word[Unsigned]	Error Array for selected node
ManufacturerID	Word[Unsigned]	
DeviceID	Word[Unsigned]	
ChannelStatus	Word[Unsigned]	
ChannelNumber	Word[Unsigned]	
ChannelType	Word[Unsigned]	
ChannelDataFormat	Word[Unsigned]	
ChannelError	Word[Unsigned]	
ExtendedChannelError	Word[Unsigned]	
Slot	Word[Unsigned]	
SlotStatus	Word[Unsigned]	
SubSlot	Word[Unsigned]	
SubSlotStatus	Word[Unsigned]	
SlotIDent	Double Word[Unsigned]	

System Label: CCLinkIEDiag		
Member	Type	Usage
SubSlotIDent	Double Word[Unsigned]	
ChasisData	Word[Unsigned](0..15)	
MacAddress	Word[Unsigned](0..2)	
IPAddress	Word[Unsigned](0..1)	
SubnetMask	Word[Unsigned](0..1)	
GatewayAddress	Word[Unsigned](0..1)	
OrderNumber	Word[Unsigned](0..9)	
PlantID	Word[Unsigned](0..15)	
LocationName	Word[Unsigned](0..10)	
InstallationDate	Word[Unsigned](0..7)	
Description	Word[Unsigned](0..23)	
LinkTime	Word[Unsigned](0..2)	CC-link IE Field Minimum, maximum and current cycle time in milliseconds
NodeStatus	Word[Unsigned](0..127)	Status of all nodes determined by the FB

9.1.9. HMI-CC-link Detailed Diagnostics

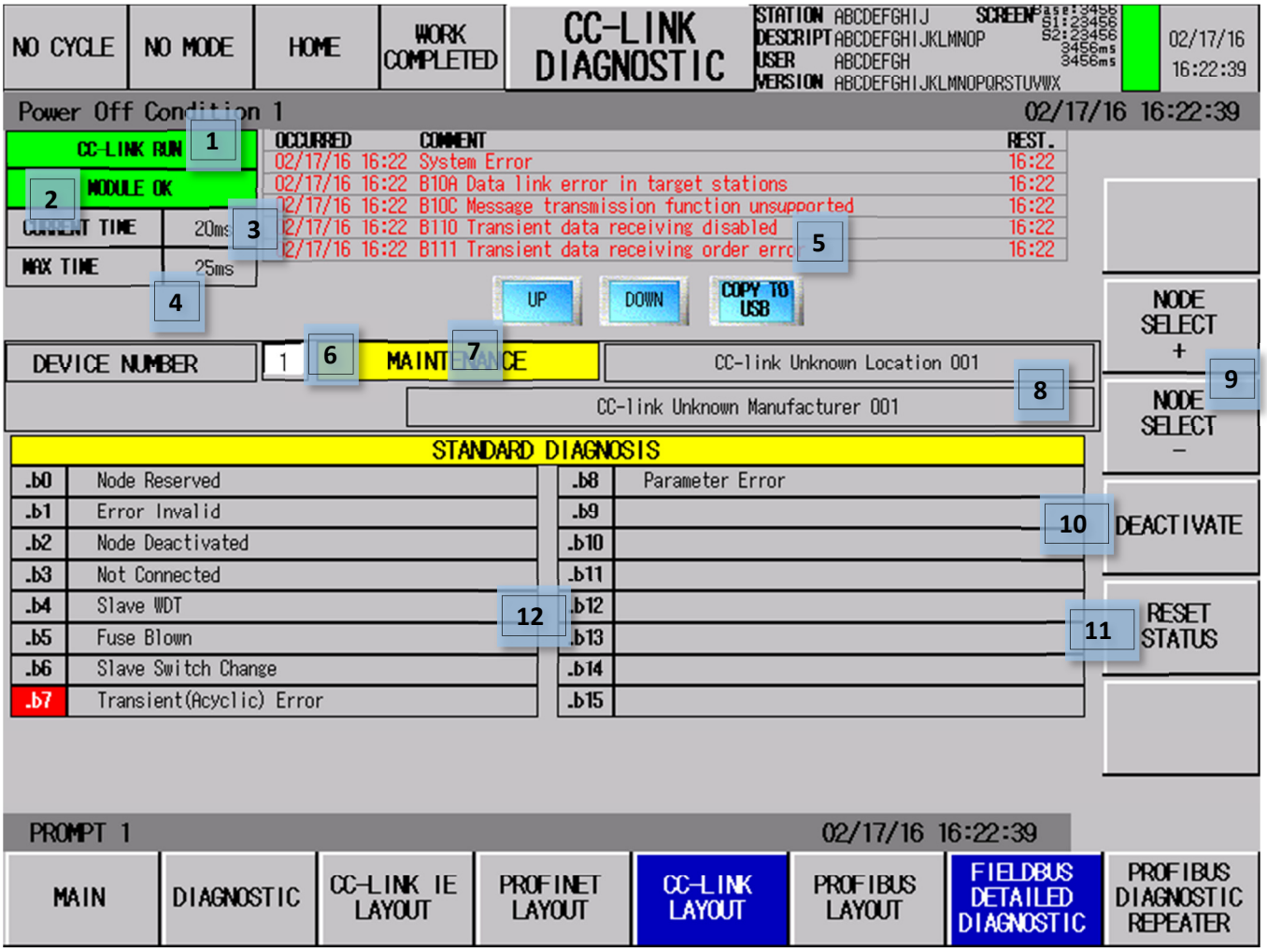


Figure 68-CC-link IE Field Detailed Diagnostics

Item #	Description	Object	Details
1	Host Status	Bit Lamp: CCLinkDiag.HostOK	Off: CC-LINK NOT RUNNING On: CC-LINK RUN

Item #	Description	Object	Details
2	Module Faulted Indicator	Bit Lamp: CCLinkDiag.FieldbusModuleFault	Off: MODULE OK On: MODULE ERROR
3	Current Fieldbus Time	Numeric Display: CCLinkDiag.LinkTime[1]	Ms text added
4	Max Fieldbus Time	Numeric Display: CCLinkDiag.LinkTime[0]	Ms text added
5	Alarm Area	User Alarm Display(22)	COPY to USB button Executes Screen script that will copy alarms to E:\backup\CCLink.CSV
6	Selected Node	Numeric Input: CCLinkDiag.SelectedNode	Numeric Input limited by the first and last node number detected by FB

Item #	Description	Object	Details
7	Selected Status	Word Lamp: CCLinkDiag.SelectedStatus	

State	Value	Graphic
Not Configured	0	NOT CONFIGURED
Ok	1	OK
Ok Was Maintained	33	OK, WAS MAINTAINED
Maintenance	34	MAINTENANCE
Ok Was Defective	65	OK, WAS DEFECTIVE
Defective	68	DEFECTIVE
Ok Was Disconnected	129	OK, WAS DISCONNECT
Disconnected	136	DISCONNECTED
Ok Was Deactivated	257	OK, WAS DEACTIVATE
Deactivated	272	DEACTIVATED

8	Location and manufacturer	Word Comment Display: CCLinkDiag.SelectedNode	Comment File #22 Location = Label Value +10000 Manufacturer = Label Value + 20000
9	Node Select Buttons	Word Switch: CCLinkDiag.SelectedNode	Increment or decrements by 1 the Selected Node
10	Deactivate /Activate PB	Bit Momentary Switch: CCLinkDiag.ActivateDeactivate_PB CCLinkDiag.ActiveNode_Ind	Toggles the Deactivated State of the Selected Node, for CC-link this mask is maintained as temporary error invalid.
11	Reset Status	Bit Momentary Switch: CCLinkDiag.ResetStatus	Places zero into CCLinkDiag.NodeStatus[SelectedNode]

<table>
<tr><th>Item #</th><th>Description</th><th>Object</th><th>Details</th></tr>
<tr><td>12</td><td>Standard

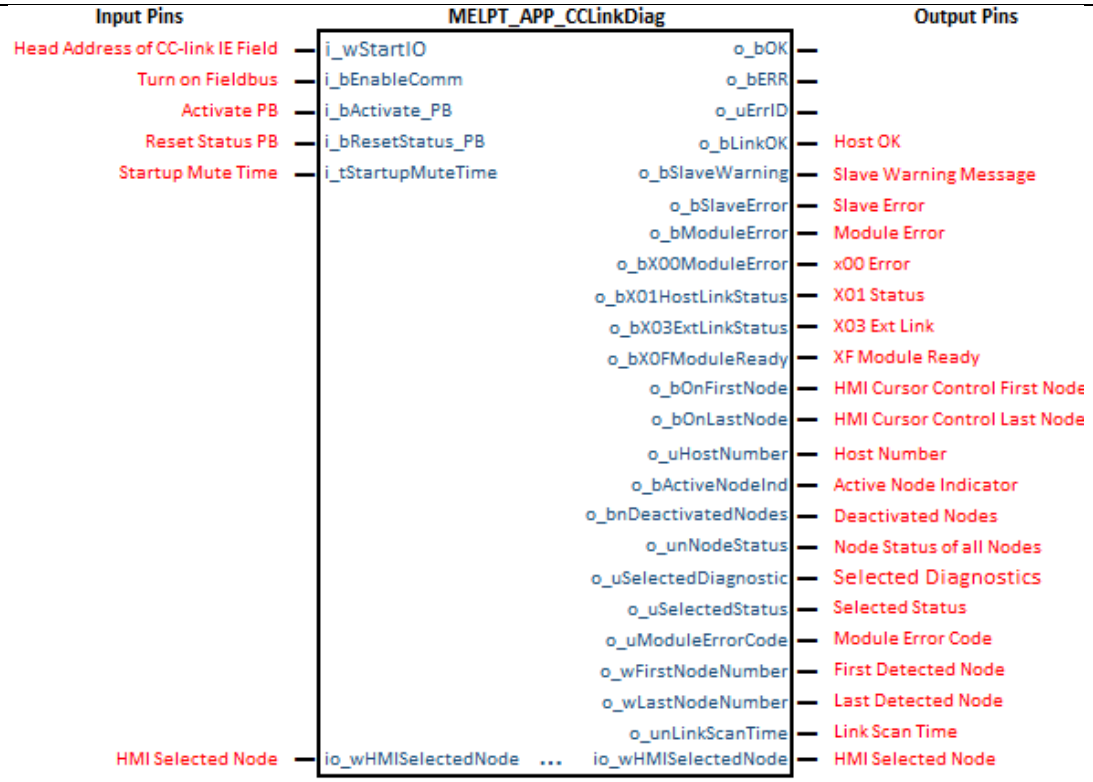
Diagnosis</td><td>Word Lamp:

CCLinkDiag.SelectedDeviceDiagnostic</td><td>Each Bit is evaluated by appropriate bit mask and text is provided for each bit
<table>
<tr><th>Bit Number</th><th>Meaning</th><th>Status</th></tr>
<tr><td>0</td><td>Node Reserved</td><td>Deactivated</td></tr>
<tr><td>1</td><td>Error Invalid</td><td>Maintenance</td></tr>
<tr><td>2</td><td>Node Deactivated</td><td>Deactivated</td></tr>
<tr><td>3</td><td>Not Connected</td><td>Disconnected</td></tr>
<tr><td>4</td><td>Slave WDT</td><td>Defective</td></tr>
<tr><td>5</td><td>Fuse Blown</td><td>Defective</td></tr>
<tr><td>6</td><td>Slave Switch Change</td><td>Defective</td></tr>
<tr><td>7</td><td>Acyclic Error</td><td>Maintenance</td></tr>
<tr><td>8</td><td>Parameter Error</td><td>Defective</td></tr>
</table></td></tr>
</table>

9.1.10. PLC-MELPT_APP_CCLinkDiag

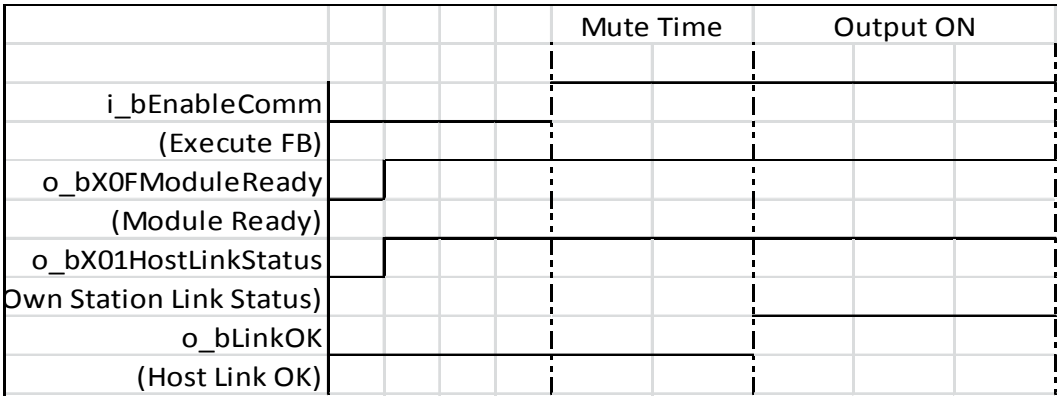
This program calls the function block MELPT_APP_CCLinkDiag. This function block is used to monitor overall node health for the fieldbus and provide detailed diagnostics for the selected fieldbus node.

FB Name
MELPT_APP_CCLinkDiag

Item	Description
Function overview	This function block monitors CC-Link node health, starts the fieldbus, and allows a method to reserve/activate nodes
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model PLC	None
MELSEC-Q Series	QJ71GF11-T2	None
GOT 1000 series	GT16(800*600) or Higher	None

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 997 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>736 bits
344 words
1 Timer</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the function MELPT_APP_IntModuleCheck</td></tr>
<tr><td>Function description</td><td>This function block retrieves buffer memory status for a QJ71GF11 residing at i_wStartIO.
The following Status is considered With Diagnostic:
Data Link Status
Reserved
Error Invalid
Temporary Error Invalid
Transient(Acyclic) Error
Slave WDT
Slave Fuse Blown
Slave Switch Change
Parameter Error
The status is determined for each node.
A Slave Warning flag is set if any node exhibits maintenance behavior
A Slave Error flag is set if any node is disconnected or exhibits defective behavior</td></tr>
</table>

Item	Description
Restrictions and precautions	Z9 thru Z7 are used in this function block. Do not use Z9 thru Z7 in an interrupt program. **I_wStartIO** must be entered in hexadecimal FB designed for one instance per fieldbus module, additional system labels necessary if using more than 1 fieldbus
Timing chart	

FB Error Code

Error Code	Description
0	No Error
H100 (256)	Profibus Module not detected at i_wStartIO

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of CC-link IE Field	i_wStartIO	Word[Signed]	0-7FF	Head Address of Module in HEX
X	Turn on Fieldbus	i_bEnableComm	Bit		Start Communicating
	Activate PB	i_bActivate_PB	Bit		Activate Node PB
	Reset Status PB	i_bResetStatus_PB	Bit		Reset Status PB

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Startup Mute Time	i_tStartupMuteTime	Time		Time To delay before Host OK,

■ Input/Output labels

User Input	Name	Var_In_Out name	Data Type	Setting range	Description
	HMI Selected Node	io_wHMISelectedNode	Word[Signed]		HMI numeric Input of FDL address

■ Output labels

Name	Var_Output name	Data Type	Description
FB Executes Normally	o_bOK	Bit	TRUE when FB executed Normal
FB Execution Abnormal	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
Host OK	o_bLinkOK	Bit	Status of Data Link
Slave Warning Message	o_bSlaveWarning	Bit	A slave currently has diagnostic message
Slave Error	o_bSlaveError	Bit	A slave currently is disconnected
Module Error	o_bModuleError	Bit	Master has local Diag Info
x00 Input	o_bX00ModuleError	Bit	CCLink I/O X0 Module Error
X01 Status	o_bX01HostLinkStatus	Bit	CCLink I/O X1 Host Status
X03 Ext Link	o_bX03ExtLinkStatus	Bit	CCLink I/O X3 External Link Status
XF Module Ready	o_bX0FModuleReady	Bit	CCLink I/O XF Module Ready
HMI Cursor Control First Node	o_bOnFirstNode	Bit	HMI is first selectable node

Name	Var_Output name	Data Type	Description
HMI Cursor Control Last Node	o_bOnLastNode	Bit	HMI is on Last selectable node
Host Number	o_uHostNumber	Word[Unsigned]	FDL of Host Station
Active Node Indicator	o_bActiveNodeInd	Bit	To tell HMI if node is active or deactivated
Deactivated Nodes	o_bnDeactivatedNodes	Bit(0..127)	Temporary Reserved Nodes
Node Status of all Nodes	o_unNodeStatus	Word[Unsigned](0..127)	Profibus HMI Ind. Node With Diagnostic
Selected Diagnostics	o_uSelectedDiagnostic	Word[Unsigned]	Node Status Array
Selected Status	o_uSelectedStatus	Word[Unsigned]	Selected node Status
Module Error Code	o_uModuleErrorCode	Word[Unsigned]	Profibus HMI Module Fault Code
First Detected Node	o_wFirstNodeNumber	Word[Signed]	First Node Number
Last Detected Node	o_wLastNodeNumber	Word[Signed]	Last Node Number on Machine
Link Scan Time	o_unLinkScanTime	Word[Unsigned](0..2)	Link Scan Time

FB Version Upgrade History	
Version	Description
1.10	Initial Release
1.12	Label Update
1.13	Fix errors
1.20	FB Status outputs added
2.00A	Adopted BCN-89000-0969 added intelligent module check, changes made to screen display and use of Superimpose Offset; Issue with Detailed Diagnostic Output corrected
2.10	Outputs Changed to words
3.00	Redesign for common Diagnostic SDT template between all fieldbus
3.01	Removed update, reorder code, added i_bEnabled

SDT Usage

1. MELPT_APP_FieldbusDiag

System Label: CCLinkDiag		
Member	Type	Usage
HostOK	Bit	CC-link IE Card OK
Update	Bit	
ActivateDeactivate_PB	Bit	HMI PB to change activated status
ActiveNode_Ind	Bit	HMI Indicator of activation status
ResetStatus	Bit	Reset Status PB From HMI. Seta Status to zero
OnFirstNode	Bit	Set by Function block to limit HMI PB from decrementing too low
OnLastNode	Bit	Set by Function block to limit HMI PB from incrementing too high
WriteCheck	Bit(0..7)	
DeactivatedNodes	Bit(0..127)	Stored Values of Deactivated nodes
IMSupported	Bit(0..15)	
LocalNetworkNumber	Word[Unsigned]	
LocalStationNumber	Word[Unsigned]	Network Number of Card
FieldbusModuleCommentNumber	Word[Unsigned]	
FieldbusModuleFault	Word[Unsigned]	Module Error
FirstConfiguredNode	Word[Signed]	Node Number of first configured node
LastConfiguredNode	Word[Signed]	Node Number of Last configured node
SelectedNode	Word[Signed]	HMI Selected node, this is FB limited by First and Last Configured Node
SelectedStatus	Word[Unsigned]	Status of Selected Node

System Label: CCLinkDiag		
Member	Type	Usage
SelectedDeviceDiagnostic	Word[Unsigned]	Error Array for selected node
ManufacturerID	Word[Unsigned]	
DeviceID	Word[Unsigned]	
ChannelStatus	Word[Unsigned]	
ChannelNumber	Word[Unsigned]	
ChannelType	Word[Unsigned]	
ChannelDataFormat	Word[Unsigned]	
ChannelError	Word[Unsigned]	
ExtendedChannelError	Word[Unsigned]	
Slot	Word[Unsigned]	
SlotStatus	Word[Unsigned]	
SubSlot	Word[Unsigned]	
SubSlotStatus	Word[Unsigned]	
SlotIDent	Double Word[Unsigned]	
SubSlotIDent	Double Word[Unsigned]	
ChasisData	Word[Unsigned](0..15)	
MacAddress	Word[Unsigned](0..2)	
IPAddress	Word[Unsigned](0..1)	
SubnetMask	Word[Unsigned](0..1)	
GatewayAddress	Word[Unsigned](0..1)	
OrderNumber	Word[Unsigned](0..9)	
PlantID	Word[Unsigned](0..15)	

System Label: CCLinkDiag		
Member	Type	Usage
LocationName	Word[Unsigned](0..10)	
InstallationDate	Word[Unsigned](0..7)	
Description	Word[Unsigned](0..23)	
LinkTime	Word[Unsigned](0..2)	CC-link Field Minimum, maximum and current cycle time in milliseconds
NodeStatus	Word[Unsigned](0..127)	Status of all nodes determined by the FB

9.2 Diagnostics- HMI I/O Screens

Three IO screens are provided, the format is similar, 256 words are provided for input and 256 words are provided for output.

These words and text lists are to be populated by the system integrator.

The word value is displayed and the bit status with bit comment is displayed for each word.

Side Push Buttons are provided to change the word that is displayed on screen. The side push buttons provided allow the operator to change the word displayed by 1, 16, or select the first and last page.

The difference between the screens, are the words being loaded, and the HMI comment file used to display the comments for words or bits.

The three screens:

1. Hardware Interlocks
    a. Base Screen 310
    b. Screen Script 310
    c. Comment File 121
    d. Utilizes labels: HInterlock_Input and HInterlock_Output
2. Software Interlocks
    a. Base Screen 320
    b. Screen Script 320
    c. Comment File 122
    d. Utilizes labels: SInterlock_Input and SInterlock_Output
3. Hardwired I/O
    a. Base Screen 380
    b. Screen Script 380
    c. Comment File 127
    d. Utilizes labels: HWIO_Input and HWIO_Output

There is logic included in MELPT_SYS_INIT, which initializes the 256 words in and out per page.

Additionally there is some sample logic in MELPT_SYS_GOT to move some devices into the display words

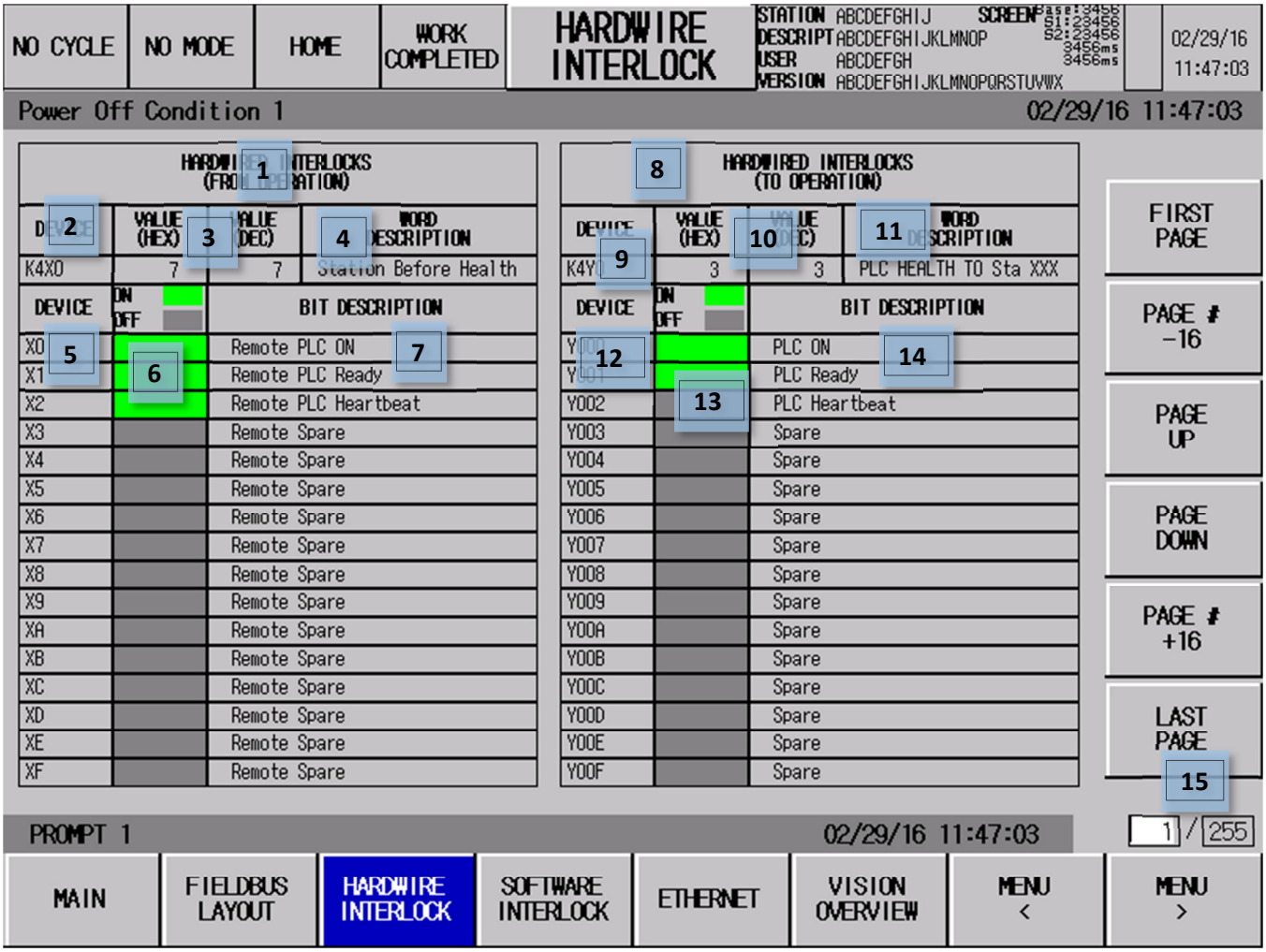


Figure 69-IO Screen Layout

Item Number	Device	Comment Number	Description
1	GD64505	(Current Page -1)+100	Word Comment Display: Overall description of what this input column is. example: interlocks from Station 010
2	GD64600	(Current Page -1)+1000	Word Comment Display: Current Displayed word device. Example K4X0, W0, D0

Item Number	Device	Comment Number	Description
3	HInterlock_Input[0]	Offset: (Current Page -1)	Numeric Display HEX and Decimal: Word Value of displayed input interlock
4	GD64700	(Current Page -1)+2000	Word Comment Display: Description of displayed input word. Example: PLC health interlocks, Current Style interlock
5	GD64601	((Current Page -1)*16)+10000	Device of individual bit displayed. Example X0, D0.0
6	HInterlock_Input[0]	Each bit is masked Offset: (Current Page -1)	Off: Gray ON: Green
7	GD64701	((Current Page -1)*16)+15000	Description of each input bit
8	GD64505	(Current Page -1)+500	Word Comment Display: Overall description of what this input column is. example: interlocks to Station 010
9	GD64800	(Current Page -1)+3000	Word Comment Display: Current Displayed word device. Example K4Y0, W2000, D1000
10	HInterlock_Output[0]	Offset: (Current Page -1)	Numeric Display HEX and Decimal: Word Value of displayed output interlock
11	GD64900	(Current Page -1)+4000	Word Comment Display: Description of displayed output word. Example: PLC health interlocks, Current Style interlock
12	GD64801	((Current Page -1)*16)+20000	Device of individual bit displayed. Example y0, D1000.0
13	HInterlock_Output[0]	Each bit is masked Offset: (Current Page -1)	Off: Gray ON: Green

Item Number	Device	Comment Number	Description
14	GD64901	((Current Page - 1)*16)+25000	Description of each output bit
15	GD64501 GD64502	Current Page Maximum Pages	The currently displayed word/page Page 1 displays element 0 Buttons allow for first, last, and page increment/decrement 1 or 16

9.2.1. IO Screen Comment File format

An IO screen shows 16 inputs and 16 outputs per page, there can be up to 255 pages

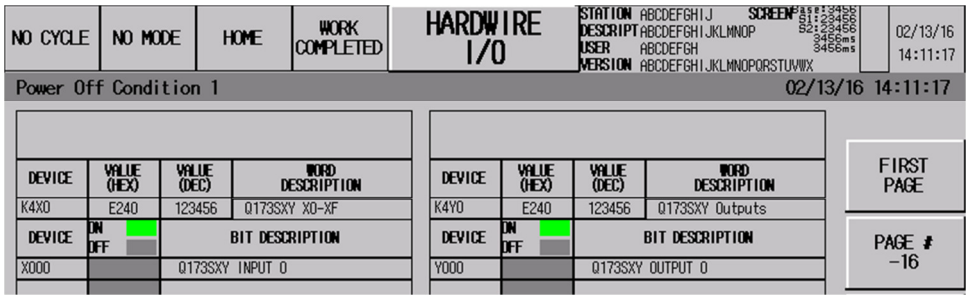


Figure 70 - IO Screen

Comment Number	Description
100	Word Description Inputs Page 1
101	Word Description Inputs Page 2
500	Word Description Outputs Page 1
501	Word Description Outputs Page 2
1000	Word Device Inputs Page 1
1001	Word Device Inputs Page 2
2000	Page Inputs description Page 1
2001	Page Inputs description Page 2

Comment Number	Description
3000	Word Device Outputs Page 1
3001	Word Device Outputs Page 2
4000	Page Outputs description Page 1
4001	Page Outputs description Page 2
10000-10015	Bit Device Inputs Page 1
100016-10031	Bit Device Inputs Page 2
15000-15015	Bit Device Description Outputs Page 1
15016-15031	Bit Device Description Outputs Page 2
20000-20015	Bit Device Outputs Page 1
20016-20031	Bit Device Outputs Page 2
25000-25015	Bit Device Description Outputs Page 1
25016-25031	Bit Device Description Outputs Page 2

9.3 Diagnostics-Ethernet

9.3.1. HMI-Ethernet Diagnostics

This screen and function block will display the IP address for the PLC and HMI. Additionally the IP address, head address, LED status, and error codes for up to 4 extension Ethernet modules can be displayed. The ability to reset the error on the module is also included. The individual module displays are controlled by a status observation that will launch the window when on this screen. If the overlap window is closed, the overlap window will be relaunched.

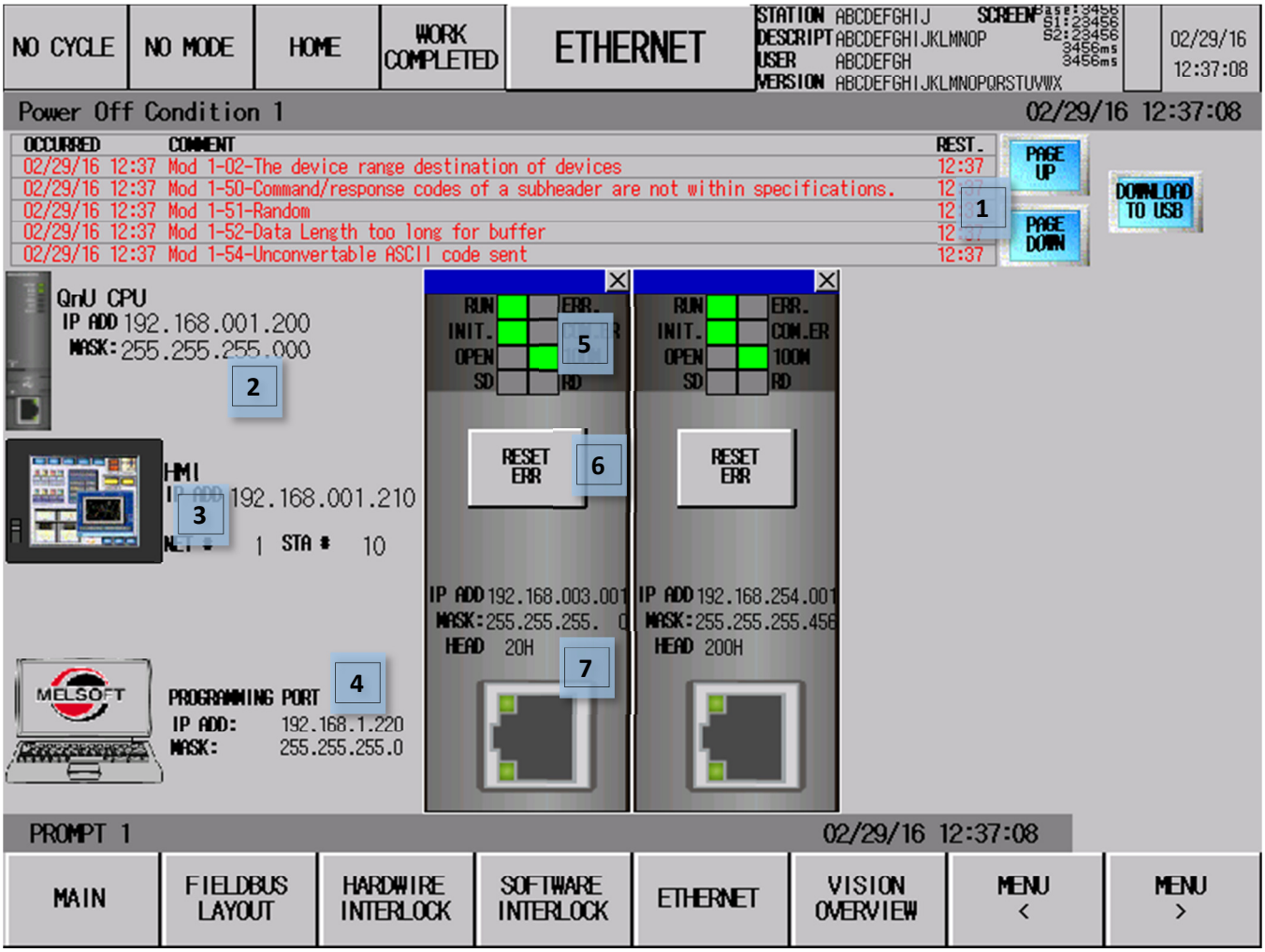


Figure 71-Ethernet Screen

Item Number	Device	Description
1	Advanced User Alarm 26	Screen Script included that will write alarms to QJ71E71.CSV, when download to USB button is pressed. The alarm text is stored in comment file #26
2	SD1260-SD1263	IP address and mask from PLC front port
3	GS198-199 GS376 GS377	IP Address of current HMI, Network Number of current HMI Station Number of Current HMI
4	Hardcoded Text	The programming port for this station. OEM to modify as needed
5	# = module number, ordered by Head address from 0 to 7E0	Status LED from an individual QJ71E71

Bit Lamp: GOTEthernet.LEDStatus[#,0]	Description	State	Color
	RUN	Off	
		ON	

Bit Lamp: GOTEthernet.LEDStatus[#,1]	Description	State	Color
	INIT	Off	
		ON	

Bit Lamp: GOTEthernet.LEDStatus[#,2]	Description	State	Color
	OPEN	Off	
		ON	

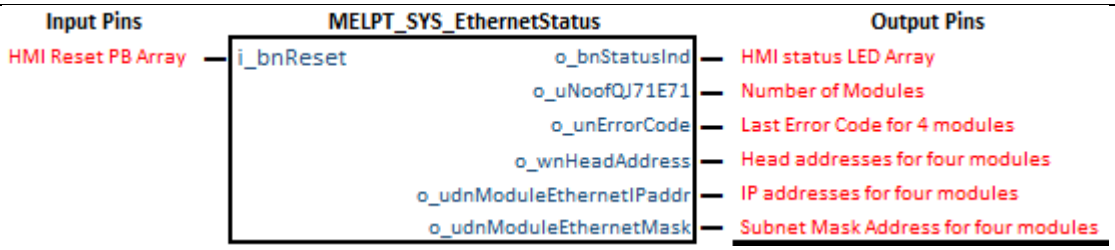
Bit Lamp: GOTEthernet.LEDStatus[#,3]	Description	State	Color
	SD	Off	
		ON	

Item Number	Device	Description
	Bit Lamp: GOTEthernet.LEDStatus[#,4]	Description: ERR State: Off Color: State: ON Color:
	Bit Lamp: GOTEthernet.LEDStatus[#,5]	Description: COM.ERR State: Off Color: State: ON Color:
	Bit Lamp: GOTEthernet.LEDStatus[#,6]	Description: 100M State: Off Color: State: ON Color:
	Bit Lamp: GOTEthernet.LEDStatus[#,7]	Description: RD State: Off Color: State: ON Color:
6	GOTEthernet.Reset_PB[#]	Reset the Error displayed, Reset comm error light
7	GOTEthernet.ModuleEthernetIPaddr[#] GOTEthernet.ModuleEthernetMask[#] GOTEthernet.ModuleHeadAddress[#]	Display the IP address of the module Displays the subnet mask of the module Displays the Head Address of the module

9.3.2. PLC Ethernet Diagnostics

The MELPT_SYS_Ethernet program is provided with the MELPT package it contains the only required instance of the MELPT_SYS_EthernetStatus Function block

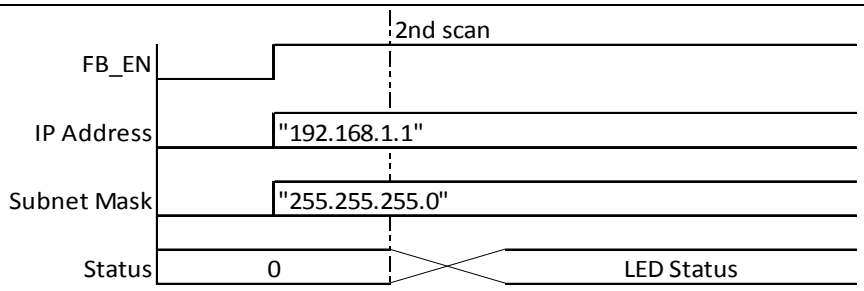
FB Name
MELPT_SYS_EthernetStatus

Function Overview	
Item	Description
Function overview	This function block receives status, IP address, and error codes for up to 4 QJ71E71 modules
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None
MELSEC-Q series	QJ71E71	None

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 485 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	70 bits 33 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	
Function description	This function block interrogates the PLC, to learn how many QJ71E71 modules, and where their head addresses are located. It then interrogates those head addresses for the IP address and subnet mask. Status is retrieved every scan. When the Reset PB is pressed, the Comm ERR OFF Request is set.
Restrictions and precautions	z9, z8 and z7 are used within this function block.
Timing chart	

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	HMI Reset PB Array	i_bnReset	Bit(1..4)		HMI PB to reset error code

■ Output labels

Symbol Name	Var_Output name	Data Type	Description

Symbol Name	Var_Output name	Data Type	Description
HMI status LED Array	o_bnStatusInd	Bit(1..4,0..7)	LED Array
Number of Modules	o_uNoofQJ71E71	Word[Unsigned]	No. of Qj71E71 detected
Last Error Code for 4 modules	o_unErrorCode	Word[Unsigned](1..4)	Last Error Code for each module
Head addresses for four modules	o_wnHeadAddress	Word[Signed](1..4)	Head Address for Each Module
IP addresses for four modules	o_udnModuleEthernetIPaddr	Double Word[Unsigned](1..4)	Qj71E71 IP Address
Subnet Mask Address for four modules	o_udnModuleEthernetMask	Double Word[Unsigned](1..4)	Qj71E71 Ethernet Mask

FB Version Upgrade History

Version	Description
1.10	Initial Release
1.12	FB labels updated to BCN-89000-0823-D guideline
1.20	Add FB Status outputs
2.00A	Adopted BCN-89000-0969 guideline; code rewritten to used G Mov and 2 dimensional array
2.10	Added MC/MCR option
3.00	Added Status indicators, reset and re-init
3.01	Removed Re-init logic

SDT Usage

1. MELPT_SYS_GOTEnet

System Label: GOTEthernet		
Member	Type	Usage
Reset_PB	Bit(1..4)	HMI Driver inputs to the FB
LEDStatus	Bit(1..4,0..7)	Outputs of the FB to the HMI

System Label: GOTEthernet		
Member	Type	Usage
NumberofQJ71E71	Word[Unsigned]	Determined and output by the FB
ModuleHeadAddress	Word[Signed](1..4)	Determined and output by the FB
LastErrorCode	Word[Unsigned](1..4)	Determined and output by the FB
ModuleEthernetIPaddr	Double Word[Unsigned](1..4)	Determined and output by the FB
ModuleEthernetMask	Double Word[Unsigned](1..4)	Determined and output by the FB

9.4 Diagnostics-Vision

This screen displays the camera status for up to 8 cameras, and the overall camera status for the station.

9.4.1. HMI_Vision

The HMI screens consist of a navigation window and two superimpose screens. One superimpose screen provides the status for up to 8 cameras, the second superimpose screen provides a history background of camera grades for the last 10 images for up to 8 cameras.

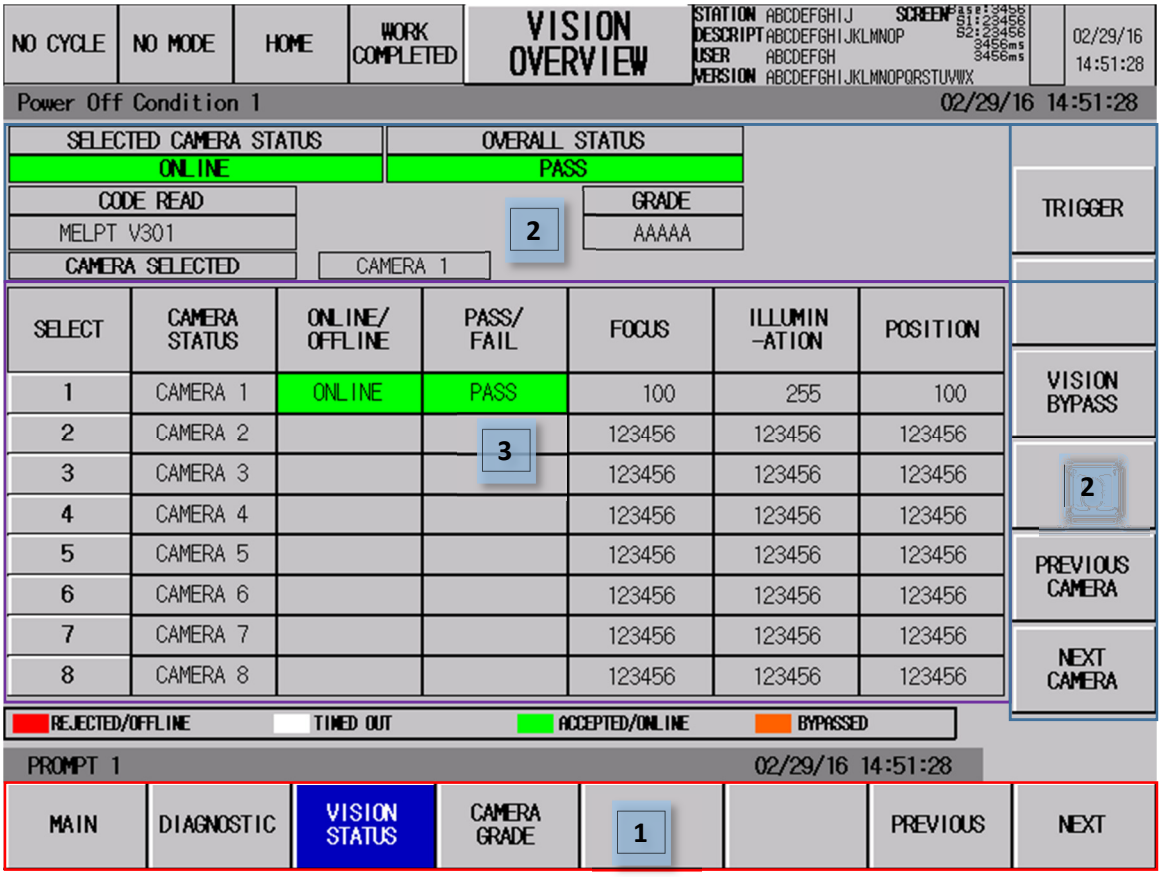


Figure 72 - Vision Overview

Item #	Window Number	Description
1	W-3400	Vision Navigation Bar (L3)
2	W-3401	Vision Header Information of Overall and selected information, included action buttons
3	W-3402	Camera Status Window

9.4.1.1. Vision Navigation Bar

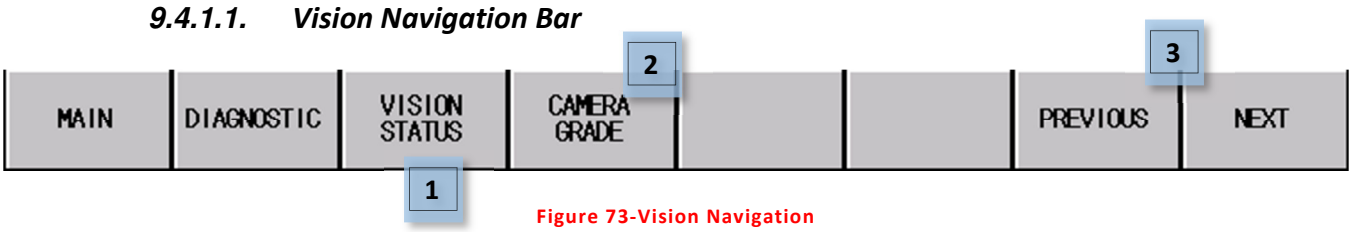


Figure 73-Vision Navigation

Item #	Description
1	Displays W-3402:Vision Status
2	Displays W:3403:Camera Grade History
3	Modifies the selected camera number

9.4.1.2. Vision Header Information and PB

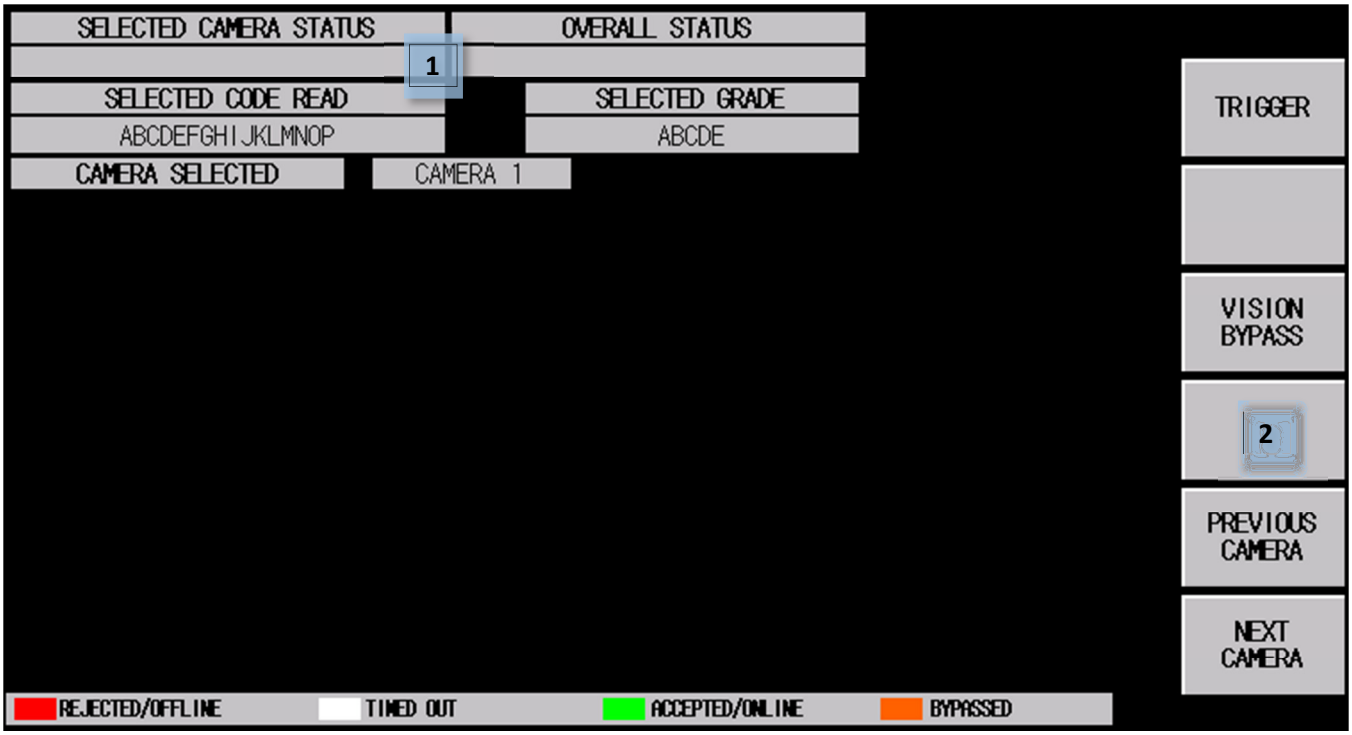


Figure 74-Vision PB and header

Item #	Object	Device	Description	
1	Word Lamp: Selected Camera Status	GOTVision.StationCameraStatus	Value	Indicator
			1	Online
			2	Offline
			4	Bypassed
			8	Timed Out
	Word Lamp: Overall Status	GOTVision.OverallCameraStatus	Value	Indicator
			1	Fail
			2	Pass
			4	Bypassed
	ASCII Display: Selected Code Read	GOTVision.CodeRead[0]	Selected Camera Code Read	
	ASCII Display: Selected Grade	GOTVision.Grade[0]	Selected Camera Grade	
	Word Comment Display: Camera Selected	GOTVision.CameraSelected	Selected Camera Number	
2	Momentary Push Button: Trigger	GOTVision.Trigger_PB GB65101 must be true		
	Screen Switch Button: Vision Bypass		Navigates to the Overview-Bypass screen	
	Word Set Push Button: Previous Camera	GOTVision.CameraSelected	Reduces camera Selected by 1	
	Word Set Pushbutton: Next Camera	GOTVision.CameraSelected	Increments Selected Camera by 1	

9.4.1.3. Camera Status Window

1 SELECT	2 CAMERA STATUS	3 ONLINE/ OFFLINE	4 PASS/ FAIL	5 FOCUS	6 ILLUMIN -ATION	7 POSITION
1	CAMERA 1			123456	123456	123456
2	CAMERA 2			123456	123456	123456
3	CAMERA 3			123456	123456	123456
4	CAMERA 4			123456	123456	123456
5	CAMERA 5			123456	123456	123456
6	CAMERA 6			123456	123456	123456
7	CAMERA 7			123456	123456	123456
8	CAMERA 8			123456	123456	123456

Figure 75- Vision status Window

<table>
<tr><th>Item #</th><th>Object</th><th>Device</th><th colspan="3">Description</th></tr>
<tr><td rowspan="4">1</td><td rowspan="4">Select

Word Set Switch:</td><td rowspan="4">GOTVision.CameraSelected

1-8</td><td colspan="2">State</td><td>Color</td></tr>
<tr><td colspan="2">Camera Not Selected</td><td></td></tr>
<tr><td colspan="2">Camera Selected</td><td></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="6">2</td><td rowspan="6">Camera Status

Word Lamp</td><td rowspan="6">GOTVision.NumberofCameras</td><td>Device</td><td>State</td><td>Color</td></tr>
<tr><td>GOTVision.NumberofCameras</td><td><X</td><td></td></tr>
<tr><td>GOTVision.Bypassed[X]</td><td>ON</td><td>Camera X</td></tr>
<tr><td>GOTVision.Timeout[X]</td><td>ON</td><td>Camera X</td></tr>
<tr><td>GOTVision.Online[X]</td><td>OFF</td><td>Camera X</td></tr>
<tr><td>GOTVision.Online[X]</td><td>ON</td><td>Camera X</td></tr>
</table>

<table>
<tr><td>3</td><td>Online/Offline
Word Lamp</td><td>GOTVision.NumberofCameras</td><td><table><tr><td>Device</td><td>State</td><td>Color</td></tr><tr><td>GOTVision.NumberofCameras</td><td><X</td><td></td></tr><tr><td>GOTVision.Online[X]</td><td>OFF</td><td>Offline</td></tr><tr><td>GOTVision.Online[X]</td><td>ON</td><td>Online</td></tr></table></td></tr>
<tr><td>4</td><td>Pass/Fail
Word Lamp</td><td>GOTVision.NumberofCameras</td><td><table><tr><td>Device</td><td>State</td><td>Color</td></tr><tr><td>GOTVision.NumberofCameras</td><td><X</td><td></td></tr><tr><td>GOTVision.PassFail[X]</td><td>ON</td><td>PASS</td></tr><tr><td>GOTVision.PassFail[X]</td><td>OFF</td><td>FAIL</td></tr></table></td></tr>
<tr><td>5</td><td>Focus
Numerical Display</td><td>GOTVision.Focus[1-8]</td><td>Trigger devices hides the value if the number of camera is less than X</td></tr>
<tr><td>6</td><td>Illumination
Numerical Display</td><td>GOTVision.Illumination[1-8]</td><td>Trigger devices hides the value if the number of camera is less than X</td></tr>
<tr><td>7</td><td>Position
Numerical Display</td><td>GOTVision.Position[1-8]</td><td>Trigger devices hides the value if the number of camera is less than X</td></tr>
</table>

9.4.1.4. Grade History

GRADE HISTORY						
PART	OVERALL 1	DECODING 2	CONTRAST 3	PRINT GROWTH 4	AXIAL NON-UNIF 5	UNUSED ECC 6
CURRENT	A	A	A	A	A	A
PREVIOUS	A	A	A	A	A	A
3	A	A	A	A	A	A
4	A	A	A	A	A	A
5	A	A	A	A	A	A
6	A	A	A	A	A	A
7	A	A	A	A	A	A
8	A	A	A	A	A	A
9	A	A	A	A	A	A
10	A	A	A	A	A	A

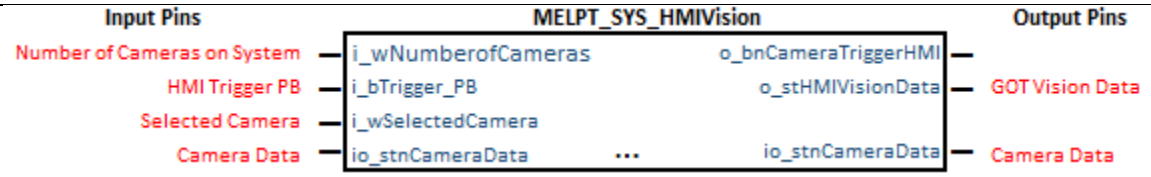
Figure 76-Grade History

Item #	Object	Device	Description
1	Overall ASCII Display	GOTVision.GradeHist[X,0]	X=History Number
2	Decoding ASCII Display	GOTVision.GradeHist[X,1]	X=History Number
3	Contrast ASCII Display	GOTVision.GradeHist[X,2]	X=History Number
4	Print Growth ASCII Display	GOTVision.GradeHist[X,3]	X=History Number
5	Axial NON-Uniformity ASCII Display	GOTVision.GradeHist[X,4]	X=History Number
6	Unused ECC ASCII Display	GOTVision.GradeHist[X,5]	X=History Number

9.4.2. PLC-MELPT_SYS_HMIVision

The MELPT_SYS_Vis program is provided with the MELPT package it contains the only required instance of the MELPT_SYS_HMIVision Function block

FB Name
MELPT_SYS_HMIVision

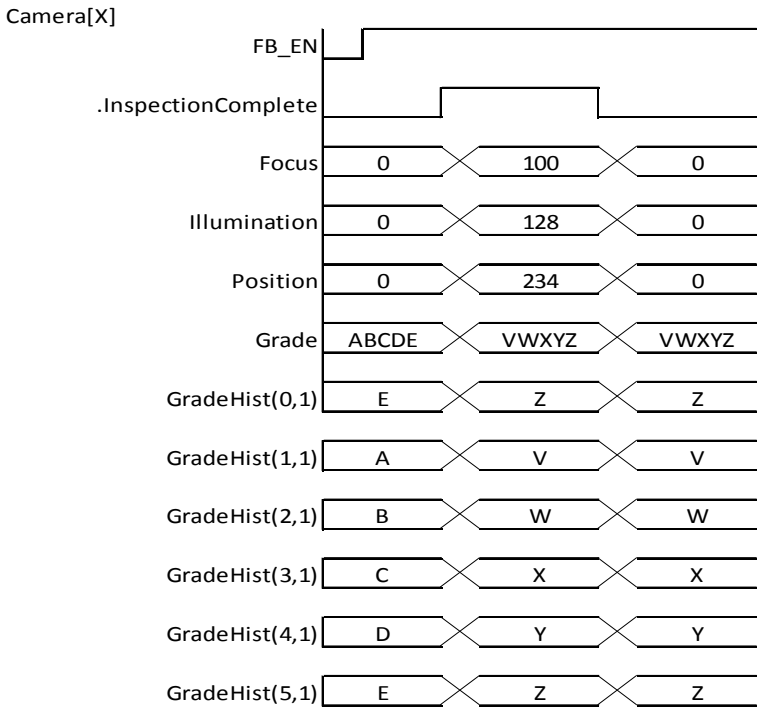
Function Overview	
Item	Description
Function overview	This function blocks parses grade data from the vision information for HMI display and allows the trigger of a camera from the HMI.
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 626 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	96 bits 775 words

Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the SDT MELPT_SYS_GOTVISION And MELPT_SYS_VISION
Function description	Data from the MELPT_Sys_Vision SDT is sorted and parsed and transferred to the MELPT_SYS_GOTVision SDT. Data from the camera needs to be populated by the OEM into the MELPT_Sys_Vision SDT array.
Restrictions and precautions	Index Z16 is used within this function block.
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Number of Cameras on System	i_wNumberOfCameras	Word[Signed]	1to 8	No. of Camera in System
	HMI Trigger PB	i_bTrigger_PB	Bit		Manual Trigger HMI PB
	Selected Camera	i_wSelectedCamera	Word[Signed]		Selected Camera number

- Input/Output Labels

User Input	Symbol	Var_In_Out name	Data Type	Setting range	Description
	Camera Data	io_stnCameraData	MELPT_Sys_Vision(1..8)		Data for 8 Cameras

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Got Trigger signal	o_bnCameraTriggerHMI	Bit(1..8)	Triggers Output for selected Camera
GOT Vision Data	o_stHMIVisionData	MELPT_SYS_GOTVision	Output for HMI

FB Version Upgrade History

Version	Description
1.10	Initial Release
1.12	Revised SDT, labels updated to BCN-89000-0823
1.13	SDT Name Change
1.20	Added FB Status Outputs; Historical Grade information moved to 2-dimensional array
2.00A	Adopted BCN-89000-0969, and implemented better User input checks; Removed Security OK Logic
3.00	Label Change, reduced program size
3.01	Introduce Temp Variable to reduce program size

SDT Usage

1. MELPT_Sys_Vision

Global Label: Camera		
Member	Type	Usage
.Online	Bit	Read by FB for HMI Display
.InspectionComplete	Bit	Read by FB for HMI Display
.InspectionPass	Bit	Read by FB for HMI Display
.Bypassed	Bit	Read by FB for HMI Display
.InspectionTimeout	Bit	Read by FB for HMI Display
.Focus	Word[Signed]	Read by FB for HMI Display
.Illumination	Word[Signed]	Read by FB for HMI Display
.Position	Word[Signed]	Read by FB for HMI Display
.CodeRead	Word[Unsigned](0..7)	Read by FB for HMI Display
.Grade	Word[Unsigned](0..2)	Read by FB for HMI Display
.GradeHist	Word[Unsigned](1..10,0..5)	When Inspection completes transitions to true, the grade is parsed into elements 1-5. Element 0 is the maximum value of those 5 and is considered the overall value

2. MELPT_SYS_GOTVISION

System Label: GOTVision		
Member	Type	Usage
Trigger_PB	Bit	HMI PB
onMaxCamera	Bit	HMI Cursor Control determine by FB
Online	Bit(1..8)	Online Status determined from MELPT_Sys_Vision

System Label: GOTVision		
Member	Type	Usage
InspectionComplete	Bit(1..8)	Inspection Complete Status determined from MELPT_Sys_Vision
PassFail	Bit(1..8)	Pass Status determined from MELPT_Sys_Vision
Bypassed	Bit(1..8)	Bypassed Status determined from MELPT_Sys_Vision
Timeout	Bit(1..8)	Inspection Timeout Status determined from MELPT_Sys_Vision
StationCameraStatus	Word[Signed]	Determined from online, inspection timeout, bypassed
OverallCameraStatus	Word[Signed]	Determined from, pass, complete, bypassed
NumberofCameras	Word[Signed]	Input of FB
CameraSelected	Word[Signed]	Chosen from HMI
Focus	Word[Signed](1..8)	Focus determined from MELPT_Sys_Vision
Illumination	Word[Signed](1..8)	Illumination determined from MELPT_Sys_Vision
Position	Word[Signed](1..8)	Position determined from MELPT_Sys_Vision
CodeRead	Word[Unsigned](0..7)	Code Read determined from MELPT_Sys_Vision
Grade	Word[Unsigned](0..2)	Grade determined from MELPT_Sys_Vision
GradeHist	Word[Unsigned](1..10,0..5)	The grade is parsed out by FB and restored in MELPT_Sys_Vision, then the selected camera grade history is moved to the HMI structure

9.5 Diagnostics-RFID

The RFID screen provides a manual interface to the RFID system installed

RFID systems are installed as a user library, the user library contains a program and function block for reading and writing to multiple antennas on a RFID controller.

The HMI Interface is a standard screen with HMI Interface function block. The program included in the user library already interfaces the HMI driven manual components with the standard RFID function block

Up to 16 antennas can be managed by the screen, function block and labels provided with MELPT

Writing to the RF tag is a password protected function

9.5.1. HMI-RFID Editing Screen

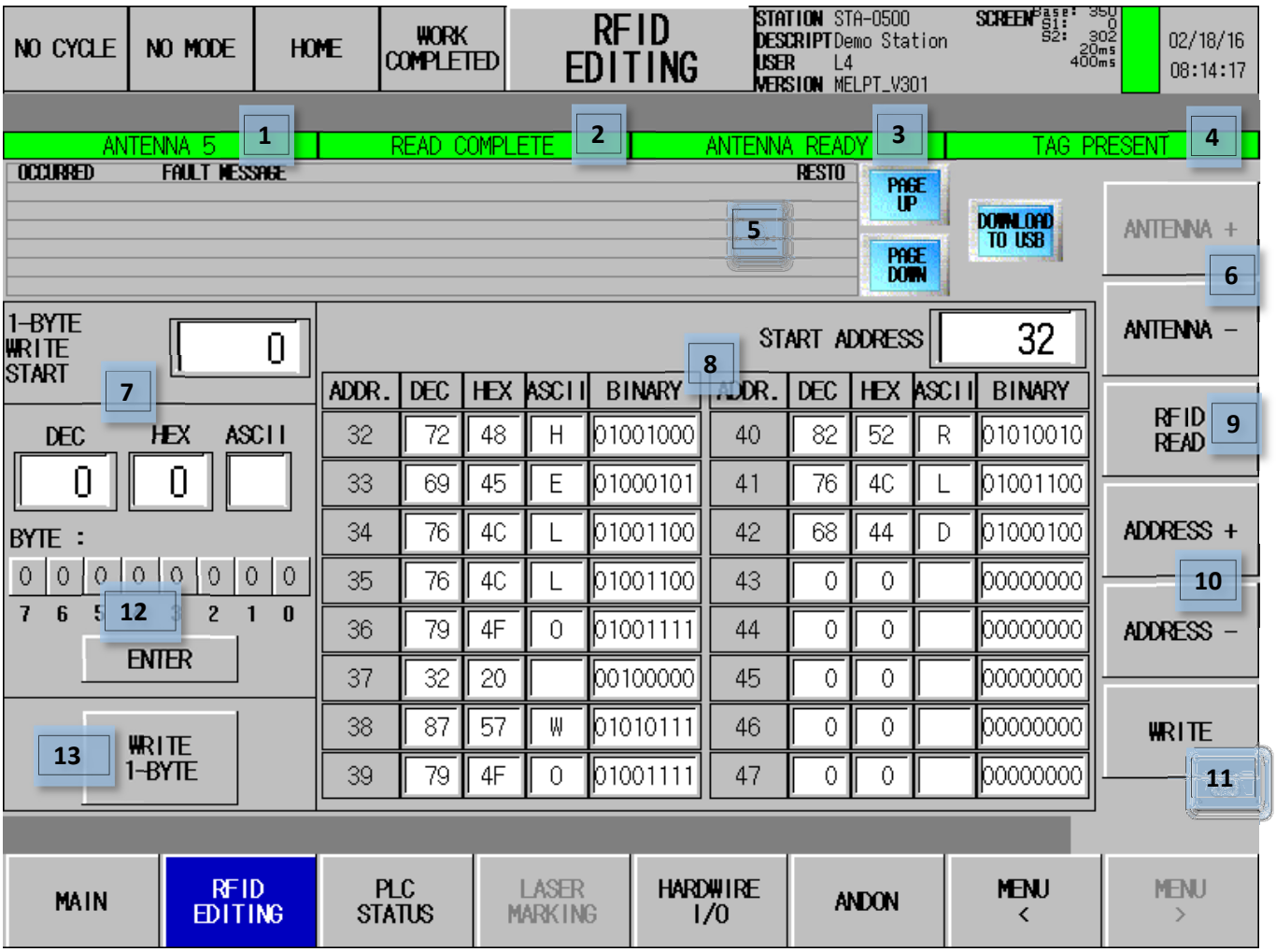


Figure-RFID Editing Screen

#	Description	Object	Details
1	Antenna Number	Word Comment Display: GOTRFID.SelectedAntennaNumber Comment Displayed is $$+50 Comment File:125	1-16
2	Operation Status Indicator	Word Comment Display: GOTRFID.SelectedStatus	Value / Graphic None / INVALID DATA 1 / FAULTED 2 / READ IN PROGRES 3 / READ COMPLETE 4 / WRITE IS PROGRE 5 / WRITE COMPLETE
3	Antenna Status	Bit Lamp: GOTRFID.CHReady	State / Graphic Off / ANTENNA NOT READY On / ANTENNA READY
4	Tag Present	Word Lamp: 31 == GOTRFID.RFIDErrorCommentNumber GOTRFID.TagPresent	State / Graphic None / TAG NOT PRESENT 31 == GOTRFID.RFIDErrorCommentNumber / [illegible] GOTRFID.TagPresent==0 / TAG NOT PRESENT GOTRFID.TagPresent==1 / TAG PRESENT

#	Description	Object	Details
5	RFID Alarming	Advanced User Alarm Display(GOTRFID.RFIDErrorCommentNumber)	COPY to USB button Executes Screen script that will copy alarms to E:\backup\Balluff.CSV Or E:\backup\OMRON.CSV Based off value contained within PLC logic needs to place a value in GOTRFID.RFIDErrorCommentNumber
6	Antenna Selection PB	Word Switch:	Numeric Input limited to the maximum number of antenna
7	One Byte Write Address And Data	Accessible when GB65101 and GOTRFID.WriteCondTrue are TRUE Address: Numeric Input GOTRFID.WriteStartAddress Limited to 0<=$W<=GOTRFID.TagSizeBytes	
8	16 Byte Start Address And Data	Numeric Input: GOTRFID.StartAddress Limited to 0<=$W<=GOTRFID.TagSizeBytes	
9	RFID Read PB	Bit Momentary: GOTRFID.ManualRead_PB	GOTRFID.ReadCondTrue must be TRUE

#	Description	Object	Details
10	Address Change PB	Word Switch: GOTRFID.StartAddress	Adds or Subtracts 16 to the Starting Address
11	RFID Write PB	Bit Momentary: GOTRFID.ManualWrite16_PB	GOTRFID.WriteCondTrue and GB65101 must be TRUE
12	Bit Enter	Byte: Bit Alternate GD64510.bit number Enter: Bit Set: GB64511	8 individual switched alternate the bits of a byte. Pressing the Enter Key executes a script that loads the value into GOTRFID.WriteData1Byte
13	Write 1-byte PB	Bit Momentary: GOTRFID.ManualWrite1_PB	

9.5.2. PLC-MELPT_APP_RFIDGOT

Two programs are provided with the MELPT application, MELPT_APP_RFIDGOT_1K and MELPT_APP_RFIDGOT_2K. Only one program is designed to be in the scan of the PLC at one time. The difference between the two programs is the amount of memory required to execute. The 1K program allows a user to support the continuous read and write of 1024 bytes. The 2K program allows a user to support the continuous read and write of 2048 bytes.

The choice of which structure to use may be dependent on the RFID system used.

Since the default structure of MELPT supports 16 antennas, the total memory requirements for the data structure are:

Both Structures:

175 bits

1K Structure:

16768 Words (32KB)

2K Structure:

33152 Words (64KB)

It is recommended to delete the data structure from the MELPT_APP global label directory that is not used.

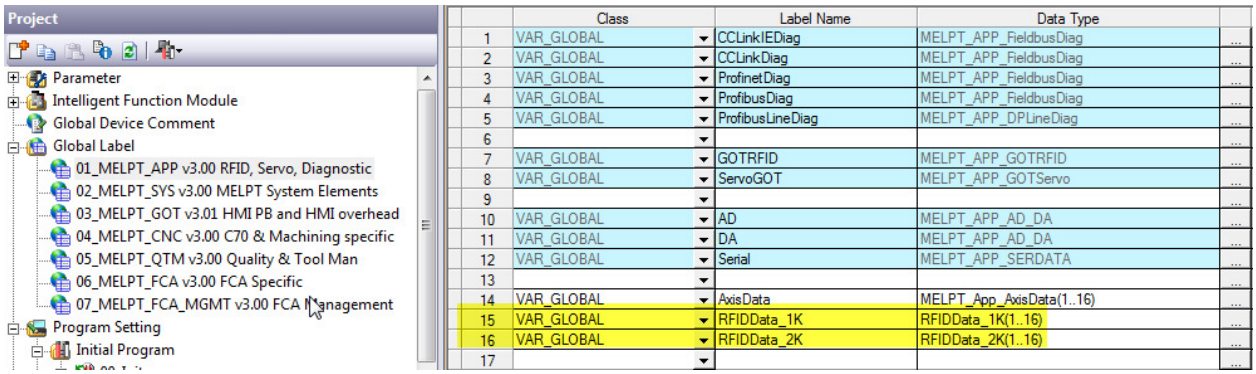
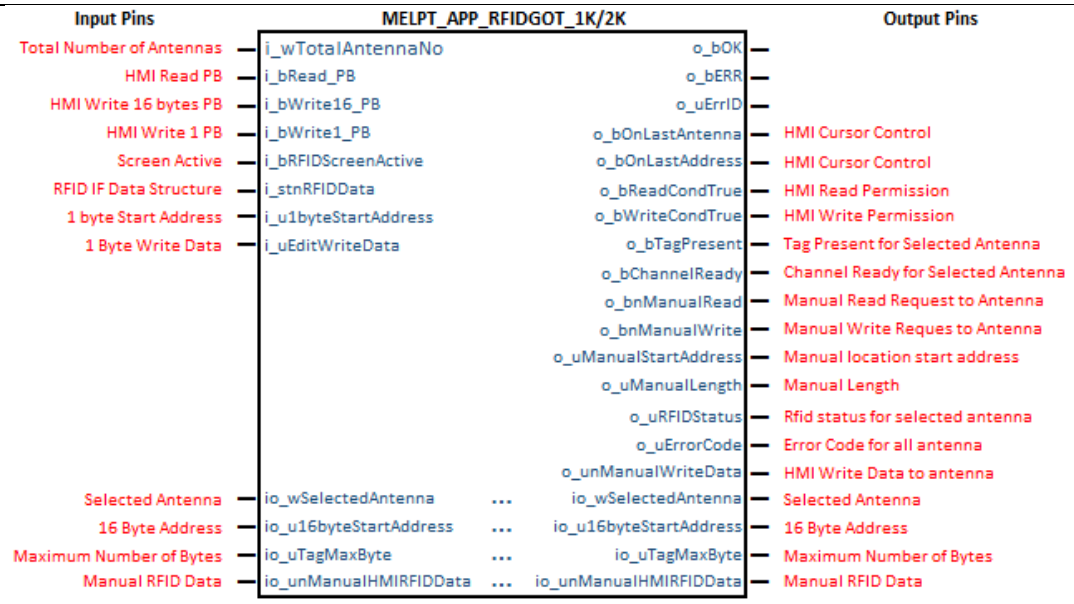


Figure 77-Global Label removal

This program calls the function block MELPT_APP_RFIDGOT_1K or 2K. Only one of these programs is designed to be in the scan at any one time and is intended to be used with the data structures needed by the RFID system in use

FB Name
MELPT_APP_RFIDGOT_1K/2K

Item	Description
Function overview	This function block interfaces GOT related RFID functions to the selected RFID IF FB. 1 instance per GOT screen, this function block can interface with up to 16 antenna data structures.
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model PLC	None
GOT 1000 series	GT16(800*600) or Higher	None

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 408 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>MELPT_APP_RFIDGOT_1K:

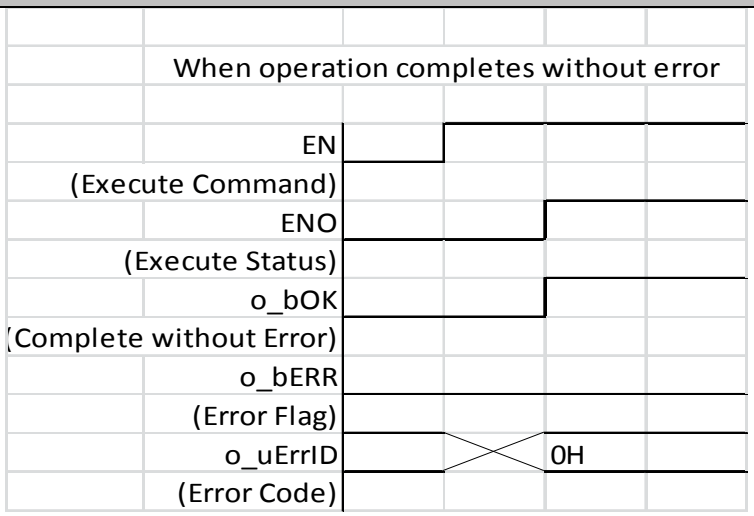
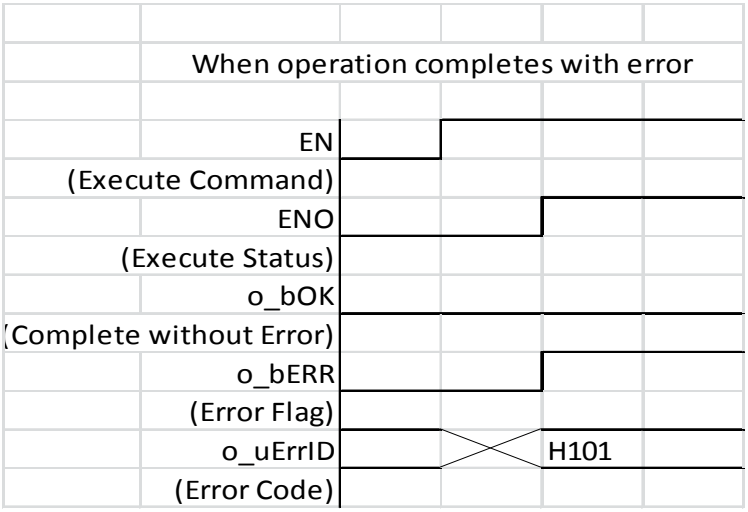
45 bits

16834 words

MELPT_APP_RFIDGOT_2K:

45 bits

33218 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the function MELPT_APP_IntModuleCheck</td></tr>
<tr><td>Function description</td><td>This function blocks separates status data from the antenna interrogated and places into HMI labels. It also moves HMI input data to the manual related members of the RFID data structure of the selected antenna.</td></tr>
<tr><td>Restrictions and precautions</td><td></td></tr>
</table>

Item	Description
Timing chart	 

FB Error Code

Error Code	Description
0	No Error.
H101(257)	Tag Max Byte is equal to zero
H102(258)	Total Antenna Number is greater than 16
H103(259)	Total Antenna number is less than or equal to zero

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Total Number of Antennas	i_wTotalAntennaNo	Word[Signed]	1 to 16	No. of Antennas used
	HMI Read PB	i_bRead_PB	Bit		HMI PB to read tag
	HMI Write 16 bytes PB	i_bWrite16_PB	Bit		HMI PB to write to tag 16 bytes
	HMI Write 1 PB	i_bWrite1_PB	Bit		HMI PB to write to tag 1 byte
	Screen Active	i_bRFIDScreenActive	Bit		Screen Active Bit
	RFID IF Data Structure	i_stnRFIDData	RFIDData_1K(1..16)		RFID Data for all antennas
	1 byte Start Address	i_u1byteStartAddress	Word[Unsigned]		1 Byte Write Start Address
	1 Byte Write Data	i_uEditWriteData	Word[Unsigned]		The data to be written to the tag for 1-byte write

■ Input/Output labels

User Input	Name	Var_In_Out name	Data Type	Setting range	Description
	Selected Antenna	io_wSelectedAntenna	Word[Signed]		Selected Antenna
	16 Byte Address	io_u16byteStartAddress	Word[Unsigned]		16 Byte Start Address
X	Maximum Number of Bytes	io_uTagMaxByte	Word[Unsigned]	0-32k	Tag Size in Bytes
	Manual RFID Data	io_unManualHMIRFIDData	Word[Unsigned](0..15)		16-byte write data or data read from tag

■ Output labels

Name	Var_Output name	Data Type	Description

Name	Var_Output name	Data Type	Description
FB Executed Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execution abnormal	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
HMI Cursor Control	o_bOnLastAntenna	Bit	HMI Indicator for PB Control
HMI Cursor Control	o_bOnLastAddress	Bit	HMI Indicator for PB Control
HMI Read Permission	o_bReadCondTrue	Bit	HMI Indicator for PB Control
HMI Write Permission	o_bWriteCondTrue	Bit	HMI Indicator for PB Control
Tag Present for Selected Antenna	o_bTagPresent	Bit	Tag present Ind. on HMI
Channel Ready for Selected Antenna	o_bChannelReady	Bit	Selected Antenna can accept new command
Manual Read Request to Antenna	o_bnManualRead	Bit(1..16)	Manual Read to RFID FB
Manual Write Request to Antenna	o_bnManualWrite	Bit(1..16)	Manual Write to RFID FB
Manual location start address	o_uManualStartAddress	Word[Unsigned]	Manual Start Address
Manual Length	o_uManualLength	Word[Unsigned]	Manual Operation Length
RFID status for selected antenna	o_uRFIDStatus	Word[Unsigned]	Status of RFID HMI Ind.
Error Code for all antenna	o_uErrorCode	Word[Unsigned](1..16)	Array of Error Codes to Display on HMI
HMI Write Data to antenna	o_unManualWriteData	Word[Unsigned](0..15)	1-byte Write Data

FB Version Upgrade History

Version	Description
1.10	Initial Release
1.12	Label Update
1.20	FB Status Outputs added
2.00A	Adopted BCN-89000-0969 added intelligent module check, changes made to screen display and use of Superimpose Offset; Issue with Detailed Diagnostic Output corrected
2.10	Start address changed to double word
3.00	Modified for version 3.00 structures, start address back to single word

SDT Usage

1. RFIDData_1K / RFIDData_2K

Global Label: RFIDData_1K/2K		
Member	Type	Usage
RFIDCHReady	Bit	Selected Antenna Data forwarded to HMI structure
ManualReadCondTrue	Bit	Selected Antenna Data forwarded to HMI structure
ManualWriteCondTrue	Bit	Selected Antenna Data forwarded to HMI structure
ReadComplete	Bit	Selected Antenna Data forwarded to HMI structure
WriteComplete	Bit	Selected Antenna Data forwarded to HMI structure
TagPresent	Bit	Selected Antenna Data forwarded to HMI structure
ManualOperation	Bit	
ReadPermission	Bit	Selected Antenna Data forwarded to HMI structure
ReadCmdAuto	Bit	
WritePermission	Bit	Selected Antenna Data forwarded to HMI structure
WriteCmdAuto	Bit	

Global Label: RFIDData_1K/2K		
Member	Type	Usage
Status	Word[Unsigned]	Selected Antenna Data forwarded to HMI structure
ErrorCode	Word[Unsigned]	All Data forwarded to HMI
AutoReadLength	Word[Unsigned]	
AutoWriteLength	Word[Unsigned]	
ManualLength	Word[Unsigned]	Modified by this FB and sent to individual RF function block
AutoReadStartAddress	Word[Unsigned]	
AutoWriteStartAddress	Word[Unsigned]	
ManualStartAddress	Word[Unsigned]	Modified by this FB and sent to individual RF function block
ManualData	Word[Unsigned](0..15)	Retrieved and populated by this function block
AutoReadData	Word[Unsigned](0..511 /1023)	
AutoWriteData	Word[Unsigned](0..511 /1023)	

2. MELPT_APP_GOTRFID

System Label: GOTRFID		
Member	Type	Usage
StationDataRequest_PB	Bit	
StationDataRequestPre_ PB	Bit	
ManualRead_PB	Bit	GOT Screen Manual Read
ManualWrite1_PB	Bit	GOT Screen Manual Write 1 byte
ManualWrite16_PB	Bit	GOT Screen Manual Write 16byte
OnLastAntenna	Bit	True when on Last Antenna

System Label: GOTRFID		
Member	Type	Usage
OnLastAddress	Bit	True When on Last Address
TagPresent	Bit	Tag Present Ind.
CHReady	Bit	Antenna Ready Indicator
ReadCondTrue	Bit	Read Cond True allow Manual Read Push Button
WriteCondTrue	Bit	Write Cond True FB will accept Manual Write PB if pressed
ManualReadRequest	Bit(1..16)	Manual Read Pulse for Each Antenna, this function block pulses the selected antenna bit
ManualWriteRequest	Bit(1..16)	Manual Write Pulse for Each Antenna, this function block pulses the selected antenna biut
SelectedAntennaNumber	Word[Signed]	Antenna Selection number hmi controlled
SelectedStatus	Word[Unsigned]	Antenna Status to HMI
TagSizeBytes	Word[Unsigned]	This is the last editable byte number of the tag, used for input checking
RFIDErrorCommentNumber	Word[Unsigned]	Populate as part of the RFID driver you are using:
ErrorCodes	Word[Unsigned](1..16)	Error Codes for RFID alarming
WriteData1Byte	Word[Unsigned]	1 Byte of Write Data
StartAddress	Word[Unsigned]	Manual Read and 16 Write Start Add.
WriteStartAddress	Word[Unsigned]	1 byte Write Start Address
HMIData	Word[Unsigned](0..15)	Manual Data I/O 16bytes of read/write data

9.5.3. PLC-RFID_Balluff_BIS-V

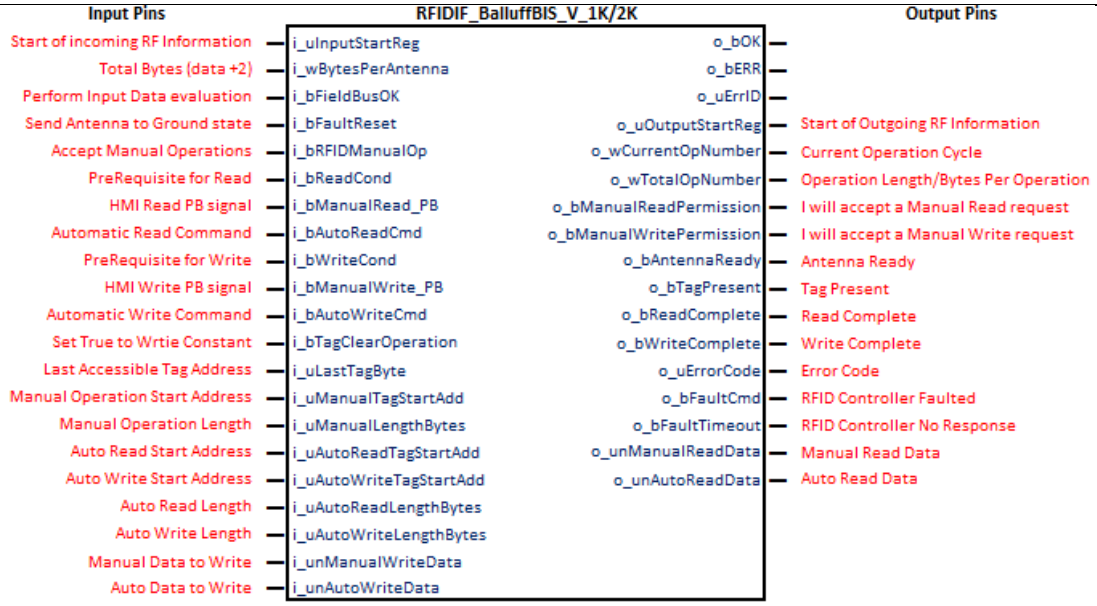
The RFID_Balluff User library contains two programs, two function blocks and two SDT.

If you are using the Balluff BIS_V RFID system, You will pull the program of your choice into the PLC scan.

This will match the size of the MELPT_APP_RFIDGOT program and FB you are scanning.

The only difference is the size of the AutoReadData and AutoWriteData members of the Structure and associated FB.

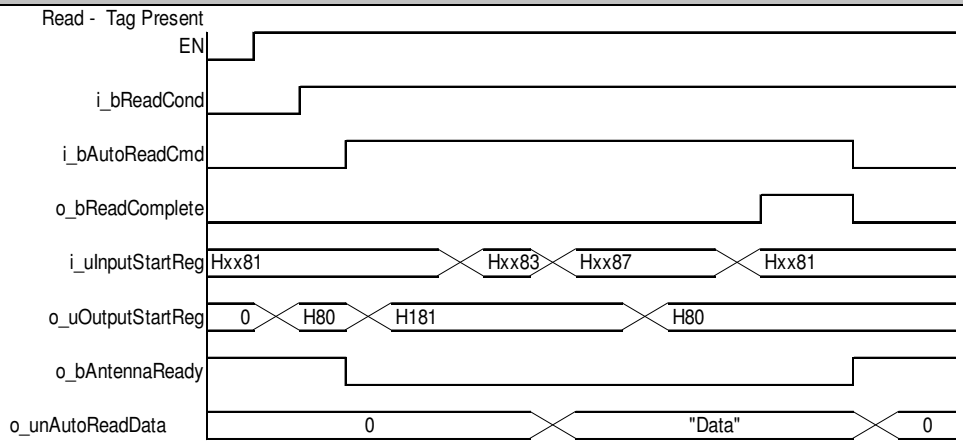
FB Name
RFIDIF_Balluff_1K

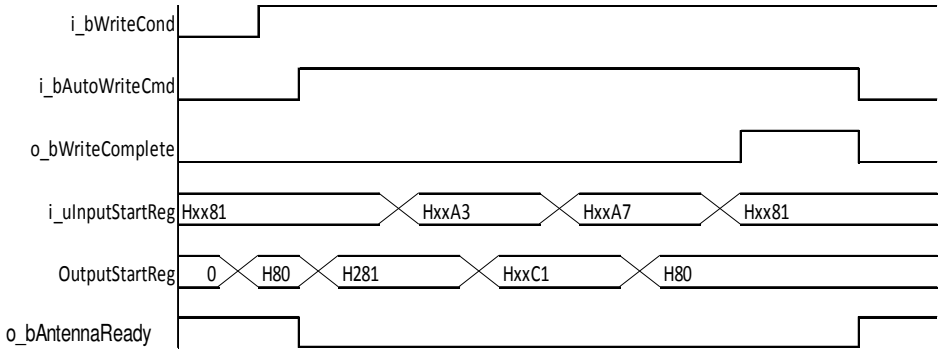
Item	Description
Function overview	This Function block handles manual and automatic RFID functions for 1 antenna of the BIS-V System. Commands supported are: Read, Write, and Write Constant Value.
Symbol	

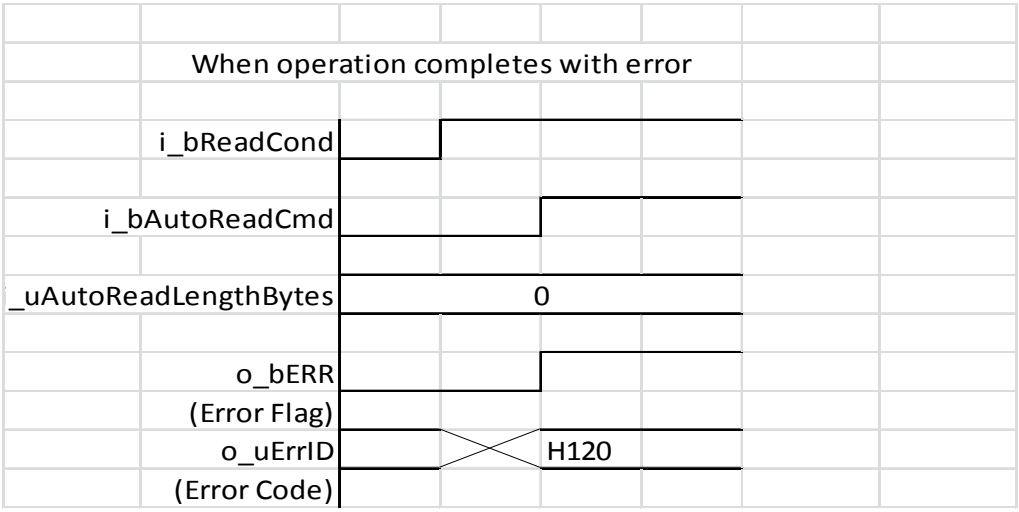
<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model PLC</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
<tr><td>Melsec Q Series</td><td>Applicable Fieldbus Module</td><td></td></tr>
<tr><td>Balluff BIS-V RF Controller</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
<tr><td>Fieldbus Configurator</td><td></td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 718 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>1K:
60 bits
3140 words
3 timers
2K:
6212 words
60 bits
3 timers</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
</table>

Item	Description
Execution type	Real-time Execution
Dependences	The RFID controller needs to have 2-byte headers enabled
Function description	This function blocks separates status data from the antenna interrogated and places into HMI labels. It also moves HMI input data to the manual related members of the RFID data structure of the selected antenna.
Restrictions and precautions	

Item	Description
Timing chart	







FB Error Code

Error Code	Description
0	No Error.
H100(256)	Bytes Per Antenna is less than 2
H101(257)	Bytes per antenna > 1024/2048
H110(272)	Manual Length = 0
H111(273)	Manual Length Greater than 16
H112(274)	Manual Operation Exceeds Tag Capacity
H120(288)	Auto Read Length = 0
H121(289)	Auto Read Length >1024/2048
H122(290)	Read Operation Exceeds Tag Capacity
H130(304)	Auto Write Length = 0
H131(305)	Auto Write Length >1024/2048
H132(306)	Write Operation Exceeds Tag Capacity
H140(320)	Fieldbus OK not true

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Start of incoming RF Information	i_uInputStartReg	Word[Unsigned]		Input from Fieldbus
X	Total Bytes (data +2)	i_wBytesPerAntenna	Word[Signed]	1 to 1024/2048	to fieldbus maximum

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Perform Input Data evaluation	i_bFieldBusOK	Bit		Fieldbus Ok signal
	Send Antenna to Ground state	i_bFaultReset	Bit		Fault Reset Signal
X	Accept Manual Operations	i_bRFIDManualOp	Bit		When True Manual Input Expected
X	Prerequisite for Read	i_bReadCond	Bit		Input Conditions for Read
	HMI Read PB signal	i_bManualRead_PB	Bit		HMI PB for Manual Read
X	Automatic Read Command	i_bAutoReadCmd	Bit		Automatic Read Begin
X	Prerequisite for Write	i_bWriteCond	Bit		Input Conditions for Write
	HMI Write PB signal	i_bManualWrite_PB	Bit		HMI PB for Manual Write
X	Automatic Write Command	i_bAutoWriteCmd	Bit		Automatic Write Begin
X	Set True to Write Constant	i_bTagClearOperation	Bit		If this is true the next write will be a tag clear operation
	Last Accessible Tag Address	i_uTagByteCapacity	Word[Unsigned]		Tag Size
	Manual Operation Start Address	i_uManualTagStartAdd	Word[Unsigned]	1 to i_uTagByte Capacity	Start Address of Manual Read/Write
	Manual Operation Length	i_uManualLengthBytes	Word[Unsigned]	1 to 16	Length of Manual Operation
X	Auto Read Start Address	i_uAutoReadTagStartAdd	Word[Unsigned]	1 to i_uTagByte Capacity	Automatic Read Starting Address

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Auto Write Start Address	i_uAutoWriteTagStartAdd	Word[Unsigned]	1 to i_uTagByteCapacity	Automatic Write Starting Address
X	Auto Read Length	i_uAutoReadLengthBytes	Word[Unsigned]	1 to 1024/2048	Automatic Read Length in Bytes
X	Auto Write Length	i_uAutoWriteLengthBytes	Word[Unsigned]	1 to 1024/2048	Automatic Write Length in Bytes
	Manual Data to Write	i_unManualWriteData	Word[Unsigned](0..15)		Data to Write to Tag with Manual Write
X	Auto Data to Write	i_unAutoWriteData	Word[Unsigned](0..511)/(0..1023)		Write Data for auto write

■ Output labels

User Output	Symbol Name	Var_Output name	Data Type	Description
	FB Executed Normally	o_bOK	Bit	When TRUE, indicates processing has completed normally
	FB Execution Aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred
	FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
X	Start of Outgoing RF Information	o_uOutputStartReg	Word[Unsigned]	Output to fieldbus
	Current Operation Cycle	o_wCurrentOpNumber	Word[Signed]	Current Operation Number
	Operation Length/Bytes Per Operation	o_wTotalOpNumber	Word[Signed]	Total Operations to Complete

User Output	Symbol Name	Var_Output name	Data Type	Description
	I will accept a Manual Read request	o_bManualReadPermission	Bit	HMI Indicator to allow Manual Read
	I will accept a Manual Write request	o_bManualWritePermission	Bit	HMI Indicator to allow Manual Write
	Antenna Ready	o_bAntennaReady	Bit	RFID Ready For new Command Signal
	Tag Present	o_bTagPresent	Bit	Tag Presence Signal
	Read Complete	o_bReadComplete	Bit	Read Complete signal
	Write Complete	o_bWriteComplete	Bit	Write Complete signal
	Error Code	o_uErrorCode	Word[Unsigned]	Error Code
	RFID Controller Faulted	o_bFaultCmd	Bit	On When Controller Error Bit TRUE
	RFID Controller No Response	o_bFaultTimeout	Bit	Command execution time > 20 seconds
	Manual Read Data	o_unManualReadData	Word[Unsigned](0..15)	Manual Read Data
X	Auto Read Data	o_unAutoReadData	Word[Unsigned](0..511)/(0..1023)	Read Data for auto read

FB Version Upgrade History	
Version	Description
1.01	Initial Release
1.02	Clear Manual Read memory on status Change
1.12	Changed the Manual Read Structure Modified FB variables to use the standard specified in BCN-89000-0823-D
1.13	Added Clear Tag Function

1.20	Added FB Status Outputs
2.00A	Adopted BCN-89000-0969; Corrected Issue with Tag Clear WTOB; Removed 5 Read Write Option, added ob_suRFIDReady; Move to flexible sized input and output
2.10	Continuous Read/write supported
3.00	Tag Clear is integrated into Write
3.01	Label Name Updates
3.02	Removed Fault Timer Input

SDT Usage

1. RFIDData_1K / RFIDData_2K

Global Label: RFIDData_1K/2K		
Member	Type	Usage
RFIDCHReady	Bit	Populated by this FB when a new command can be accepted
ManualReadCondTrue	Bit	Populated by this FB when Manual Operation and Read Permission are true
ManualWriteCondTrue	Bit	Populated by this FB when Manual Operation and Write Permission are true
ReadComplete	Bit	Populated by this FB when done and held true until input condition is released
WriteComplete	Bit	Populated by this FB when done and held true until input condition is released
TagPresent	Bit	Populated by this FB
ManualOperation	Bit	User Populated needed by this function block to know when to accept manual inputs
ReadPermission	Bit	User Populated needed by this function block to know when to accept A Read Command

Global Label: RFIDData_1K/2K		
Member	Type	Usage
ReadCmdAuto	Bit	User Populated to execute an automatic Read Command
WritePermission	Bit	User Populated needed by this function block to know when to accept A Write Command
WriteCmdAuto	Bit	User Populated to execute an automatic Write Command
Status	Word[Unsigned]	Determined outside of function block by associated program
ErrorCode	Word[Unsigned]	Error Code received from RF controller
AutoReadLength	Word[Unsigned]	Populated by User for length to read
AutoWriteLength	Word[Unsigned]	Populated by User for length to write
ManualLength	Word[Unsigned]	Provided by External GOT Function block
AutoReadStartAddress	Word[Unsigned]	Populated by User for start address of read
AutoWriteStartAddress	Word[Unsigned]	Populated by User for start address of write
ManualStartAddress	Word[Unsigned]	Populated by Got FB and used by this function block
ManualData	Word[Unsigned](0..15)	Manual Data Structure
AutoReadData	Word[Unsigned](0..511 /1023)	Populated by this function block. Data read from TAG, cleared when input condition is lowered
AutoWriteData	Word[Unsigned](0..511 /1023)	Populated by user Data to RF Tag

2. MELPT_APP_GOTRFID

System Label: GOTRFID		
Member	Type	Usage
StationDataRequest_PB	Bit	
StationDataRequestPre_PB	Bit	

System Label: GOTRFID		
Member	Type	Usage
ManualRead_PB	Bit	
ManualWrite1_PB	Bit	
ManualWrite16_PB	Bit	
OnLastAntenna	Bit	
OnLastAddress	Bit	
TagPresent	Bit	
CHReady	Bit	
ReadCondTrue	Bit	
WriteCondTrue	Bit	
ManualReadRequest	Bit(1..16)	Antenna Element used to Trigger Manual Read
ManualWriteRequest	Bit(1..16)	Antenna Element used to Trigger Manual Write
SelectedAntennaNumber	Word[Signed]	
SelectedStatus	Word[Unsigned]	
TagSizeBytes	Word[Unsigned]	Used as input check to prevent operation over the limits of the tag
RFIDErrorCommentNumber	Word[Unsigned]	
ErrorCodes	Word[Unsigned](1..16)	
WriteData1Byte	Word[Unsigned]	
StartAddress	Word[Unsigned]	
WriteStartAddress	Word[Unsigned]	

System Label: GOTRFID		
Member	Type	Usage
HMIData	Word[Unsigned](0..15)	

9.5.4. OMRON RFID V680

The RFID_Omron_v680 User library contains one program, the program and function block provided only support the 2K SDT structure.

MELPT_APP_RFIDGOT_2K program must be called when using the OMRON RFID system.

FB Name
RFIDIF_Omron

Item	Description
Function overview	This Function block handles manual and automatic RFID functions for 1 antenna of the EQ-V680D1 or D2 module. Commands supported are: Read, Write, and Write Constant Value.
Symbol	

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model PLC</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
<tr><td>Hardware</td><td>EQ-V680D1 or 2</td><td></td></tr>
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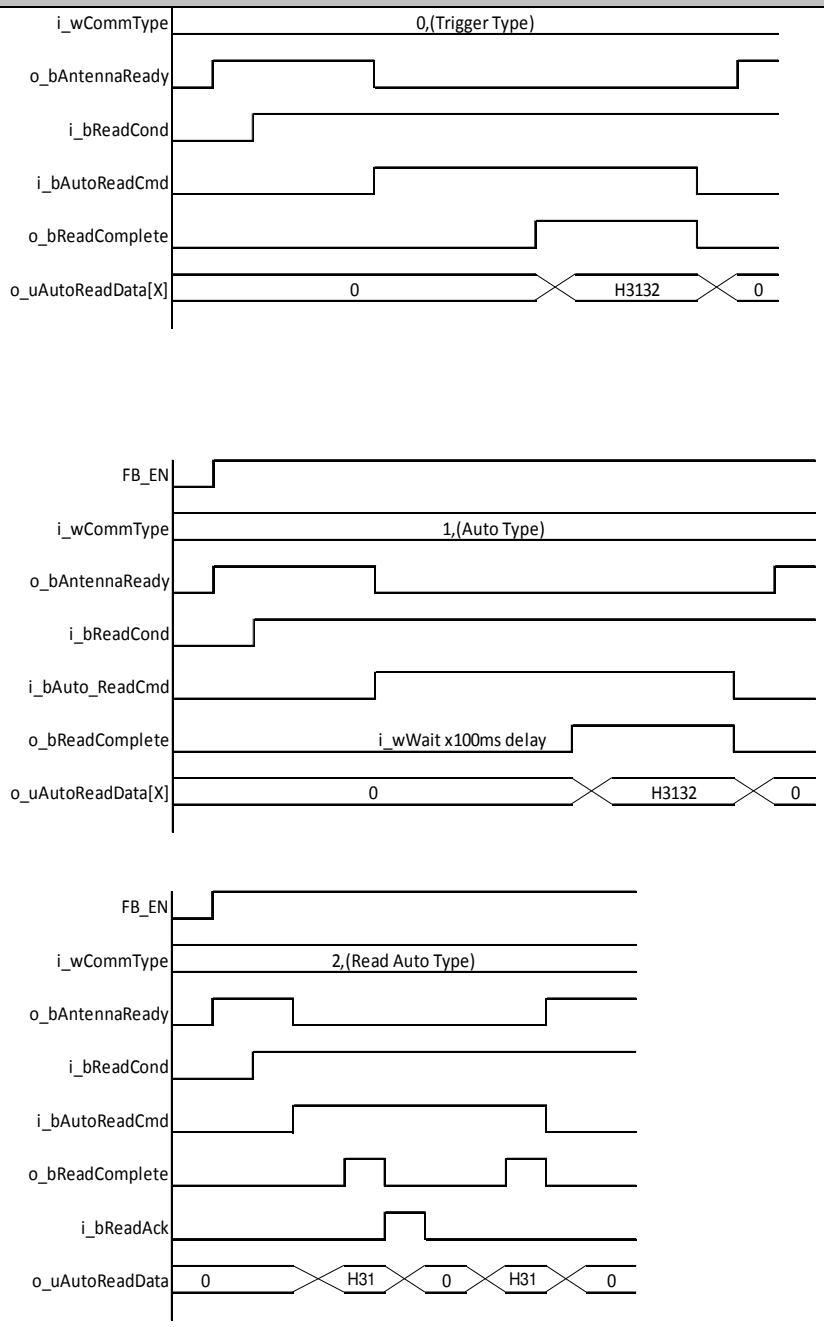
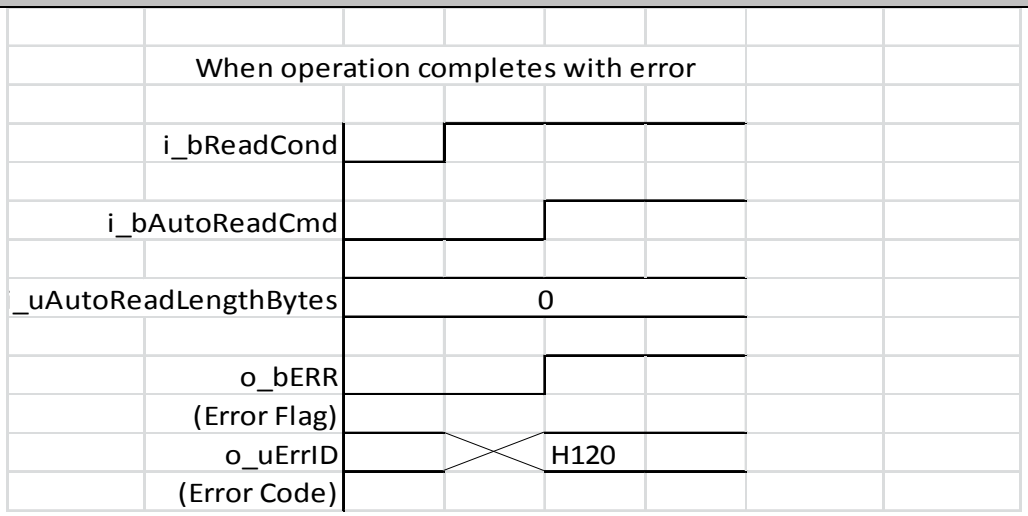
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 872 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>56 bits

62 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the function MELPT_APP_IntModuleCheck</td></tr>
</table>

Item	Description
Function description	two outputs are designed to be interfaced with the alarming system o_bReadError o_bWriteError Three inputs must be true when trying to execute a command i_bReadCond i_bWriteCond Set i_bTagClear when the Write operation is to be a tag clear operation
Restrictions and precautions	Z9-Z6 is used within this function block, do not use interrupt program that utilizes Z9-Z6 Please see the switch settings in manual to place module in high-speed mode r to disable/enable write verify mode I_wStartIO must be entered in hexadecimal The coding of this function block is intended for 1 instance per channel.

Item	Description
Timing chart	

Item	Description
	

FB Error Code

Error Code	Description
0	No Error.
H110(272)	Manual Length = 0
H111(273)	Manual Length Greater than 16
H112(274)	Manual Operation Exceeds Tag Capacity
H120(288)	Auto Read Length = 0
H121(289)	Auto Read Length >2048
H122(290)	Read Operation Exceeds Tag Capacity
H130(304)	Auto Write Length = 0
H131(305)	Auto Write Length >2048
H132(306)	Write Operation Exceeds Tag Capacity
H140	Module not Found
H150	Module Not Ready

Error Code	Description
H151-152	Invalid Comm Type

Labels

■ Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of Module	i_wStartIO	Word[Signed]	0 to 7E0	Head Address of module in HEX
X	Antenna 1 or 2	i_wCH	Word[Signed]	1 or 2	Antenna No. 1-2
X	Communication Type	i_wCommType	Word[Signed]	0 to 6	Value 0,1,3 Pg. 3-10 (G1)
X	Processing Number	i_wProcessingNo	Word[Signed]	0 or 1	0-1 (G2) sets little endian big endian
X	Wait Time	i_wWait	Word[Signed]		BCD (G10) x 100ms delay before error
X	Set Parameters Signal	i_bSetParameters	Bit	TRUE or FALSE	Set Parameters
X	Fault Reset	i_bFaultReset	Bit	TRUE or FALSE	Fault Reset
X	Accept Manual Operations	i_bRFIDManualOp	Bit	TRUE or FALSE	Set True when HMI driven
X	Prerequisite for Read	i_bReadCond	Bit	TRUE or FALSE	Preconditions to Read
	HMI Read PB signal	i_bManualRead_PB	Bit		HMI Driven Read Command
X	Automatic Read Command	i_bAutoReadCmd	Bit	TRUE or FALSE	Auto Mode Read Command
X	Move on to Next Read	i_bReadAck	Bit	TRUE or FALSE	Read Acknowledge

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Prerequisite for Write	i_bWriteCond	Bit	TRUE or FALSE	Preconditions to Write
	HMI Write PB signal	i_bManualWrite_PB	Bit		HMI Driven Write Command
X	Automatic Write Command	i_bAutoWriteCmd	Bit	TRUE or FALSE	Write Cmd
X	Move on To Next Write	i_bWriteAck	Bit	TRUE or FALSE	Write Ack
X	Tag Protect	i_bTagProtectCmd	Bit	TRUE or FALSE	Setting True will write tag protect address to 0 to 3
X	Tag Unprotect	i_bTagUnProtectCmd	Bit	TRUE or FALSE	Setting True will Write all zeros to 0 to 3 of tag
X	Write Operation is Tag Clear	i_bTagClear	Bit	TRUE or FALSE	Preconditions for Fill
	Manual Operation Start Address	i_uManualTagStartAdd	Word[Unsigned]		Starting Address for Manual Op
	Manual Operation Length	i_uManualLengthBytes	Word[Unsigned]		Length of Manual Op
X	Auto Read Start Address	i_uAutoReadTagStartAdd	Word[Unsigned]		Start Byte for Auto Read
X	Auto Write Start Address	i_uAutoWriteTagStartAdd	Word[Unsigned]		Start Byte for Auto Write
X	Auto Read Length	i_uAutoReadLengthBytes	Word[Unsigned]		1-2048
X	Auto Write Length	i_uAutoWriteLengthBytes	Word[Unsigned]	0 to FF	1-2048
	Manual Data to Write	i_uManualWriteData	Word[Unsigned]		Manual Write Array

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Auto Data to Write	i_uAutoWriteData	Word[Unsigned]		Data to be written
X	Tag Protection Starting Address	i_wTagProtectStartHexTagAddress	Word[Signed]		Start Hex Address
X	Tag Protection Ending Address	i_wTagProtectEndHexTagAddress	Word[Signed]		End Hex Address
	Last Accessible Tag Address	i_uTagByteCapacity	Word[Unsigned]		Last Tag Byte

■ Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normally	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execution Aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Signed]	FB Error Code Output
Communication complete input	o_bX2IDCommComplete	Bit	X2 ID Communication Complete Mode=5
I will accept a Manual Read request	o_bManualReadPermission	Bit	HMI Indicator for Manual Read
I will accept a Manual Write request	o_bManualWritePermission	Bit	HMI Indicator For Manual Write
Antenna Ready	o_bAntennaReady	Bit	Ready For Command
Read Error	o_bReadError	Bit	Read Error
Read Complete	o_bReadComplete	Bit	Successful Read
Write Error	o_bWriteError	Bit	Write Error

Symbol Name	Var_Output name	Data Type	Description
Write Complete	o_bWriteComplete	Bit	Successful Write
Manual Read Data	o_uManualData	Word[Unsigned]	Manual Read Data
Auto Read Data	o_uAutoReadData	Word[Unsigned]	Data Read during auto command
Error Code	o_uErrorCode	Word[Unsigned]	ErrorCode
	o_wModuleStatus	Word[Signed]	Status of the interface module
Provides Communication time in BCD	o_wProcessingResult	Word[Signed]	See 50CM-D180057-B(1110) Section 7.1
UID of Tag	o_wUID	Word[Signed]	UID of the tag

FB Version Upgrade History	
Version	Description
1.10	Initial Release
1.12	Replaced first Scan with EN FB labels updated to BCN-89000-0823-D guideline Move X & Y to fb internal variables
1.20	Added FB Status Outputs
1.26	Added Intelligent Module Check; Modified Input output for consistency; Added Tag Protect Function
2.00A	Adopted BCN-89000-0969
2.10	Removed Over Cycle add Status outputs
3.00	User input check changed, Error Code Outputs modified, removed write check
3.01	Combined Some Write and Fill Inputs

SDT Usage

1. RFIDData_2K

Global Label: RFIDData_2K		
Member	Type	Usage
RFIDCHReady	Bit	Populated by this FB when a new command can be accepted
ManualReadCondTrue	Bit	Populated by this FB when Manual Operation and Read Permission are true
ManualWriteCondTrue	Bit	Populated by this FB when Manual Operation and Write Permission are true
ReadComplete	Bit	Populated by this FB when done and held true until input condition is released
WriteComplete	Bit	Populated by this FB when done and held true until input condition is released
TagPresent	Bit	
ManualOperation	Bit	User Populated needed by this function block to know when to accept manual inputs
ReadPermission	Bit	User Populated needed by this function block to know when to accept A Read Command
ReadCmdAuto	Bit	User Populated to execute an automatic Read Command
WritePermission	Bit	User Populated needed by this function block to know when to accept A Write Command
WriteCmdAuto	Bit	User Populated to execute an automatic Write Command
Status	Word[Unsigned]	Determined outside of function block by associated program
ErrorCode	Word[Unsigned]	Error Code received from RF controller
AutoReadLength	Word[Unsigned]	Populated by User for length to read

Global Label: RFIDData_2K		
Member	Type	Usage
AutoWriteLength	Word[Unsigned]	Populated by User for length to write
ManualLength	Word[Unsigned]	Provided by External GOT Function block
AutoReadStartAddress	Word[Unsigned]	Populated by User for start address of read
AutoWriteStartAddress	Word[Unsigned]	Populated by User for start address of write
ManualStartAddress	Word[Unsigned]	Populated by Got FB and used by this function block
ManualData	Word[Unsigned](0..15)	Manual Data Structure
AutoReadData	Word[Unsigned](0..511 /1023)	Populated by this function block. Data read from TAG, cleared when input condition is lowered
AutoWriteData	Word[Unsigned](0..511 /1023)	Populated by user Data to RF Tag

2. MELPT_APP_GOTRFID

System Label: GOTRFID		
Member	Type	Usage
StationDataRequest_PB	Bit	
StationDataRequestPre_PB	Bit	
ManualRead_PB	Bit	
ManualWrite1_PB	Bit	
ManualWrite16_PB	Bit	
OnLastAntenna	Bit	
OnLastAddress	Bit	
TagPresent	Bit	
CHReady	Bit	
ReadCondTrue	Bit	

System Label: GOTRFID		
Member	Type	Usage
WriteCondTrue	Bit	
ManualReadRequest	Bit(1..16)	Antenna Element used to Trigger Manual Read
ManualWriteRequest	Bit(1..16)	Antenna Element used to Trigger Manual Write
SelectedAntennaNumber	Word[Signed]	
SelectedStatus	Word[Unsigned]	
TagSizeBytes	Word[Unsigned]	Used as input check to prevent operation over the limits of the tag
RFIDErrorCommentNumber	Word[Unsigned]	
ErrorCodes	Word[Unsigned](1..16)	
WriteData1Byte	Word[Unsigned]	
StartAddress	Word[Unsigned]	
WriteStartAddress	Word[Unsigned]	
HMIData	Word[Unsigned](0..15)	

9.6 Diagnostics-PLC Status

This screen provides System alarms, GOT scan time, and general PLC status additionally from this screen you can navigate to the diagnostic screens for analog to digital modules, digital to analog modules and serial communication modules

Associated HMI screens

Window Number	Window Type	Description
w-3600	Superimpose #2	Navigation Window
W-3610	Superimpose #1	PLC Diagnostics
W-3620	Superimpose #1	Analog to Digital
W-3630	Superimpose #1	Digital to Analog
W-3640	Superimpose #1	Serial
W-3621	Overlap #1	Analog to Digital Module #1
W-3622	Overlap #2	Analog to Digital Module #2
W-3623	Overlap #3	Analog to Digital Module #3
W-3624	Overlap #4	Analog to Digital Module #4
W-3631	Overlap #1	Digital to Analog Module #1
W-3632	Overlap #2	Digital to Analog Module #2
W-3633	Overlap #3	Digital to Analog Module #3
W-3634	Overlap #4	Digital to Analog Module #4
W-3641	Overlap #1	Serial Communication #1
W-3642	Overlap #2	Serial Communication #2
W-3643	Overlap #3	Serial Communication #3
W-3644	Overlap #4	Serial Communication #4

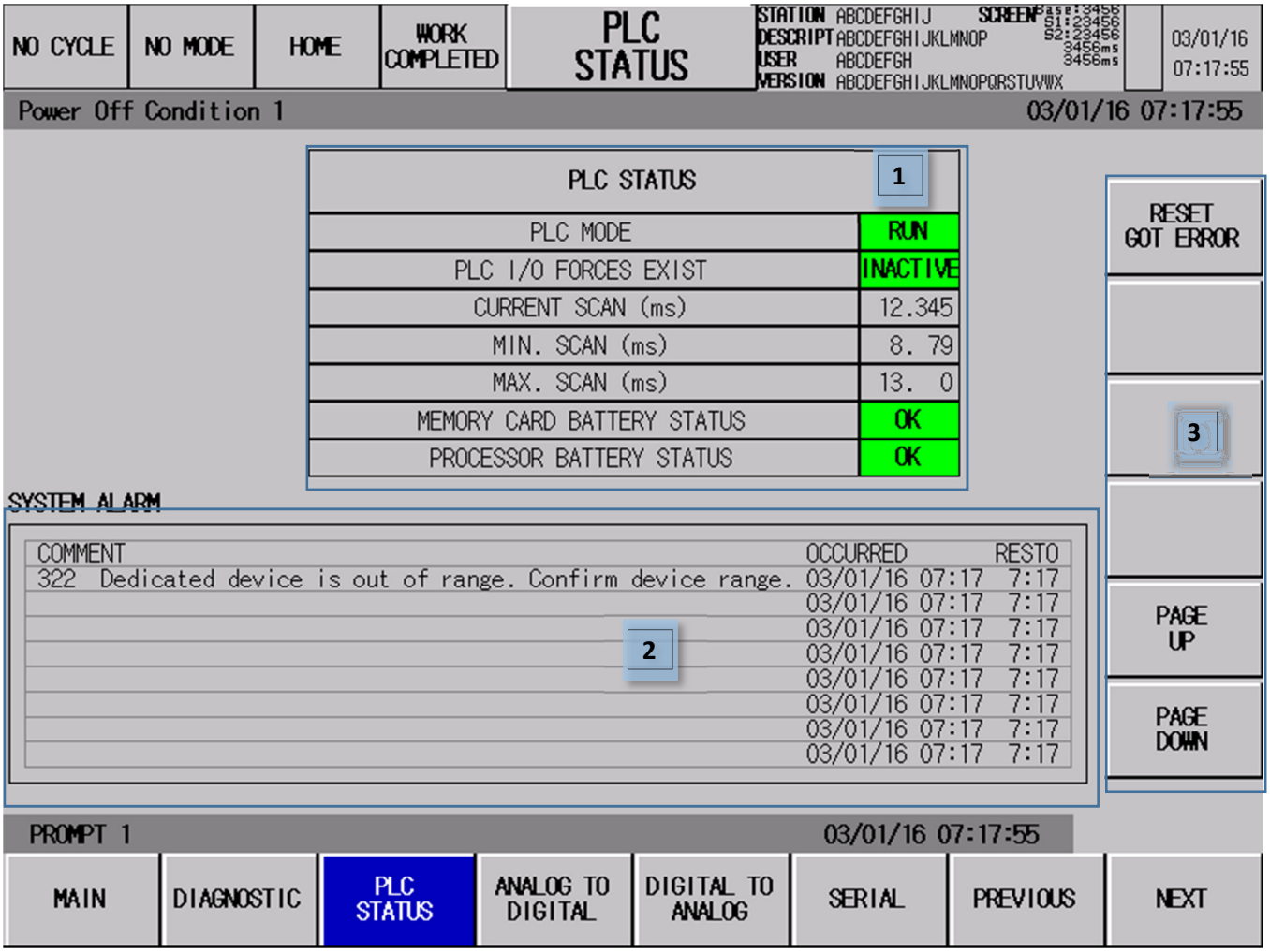


Figure 78-PLC Status

Item #	Object	Device	Description	
1	Word Lamp: PLC Mode	SD203	Value	
				RUN
			1	Faulted
			2	STOP
			3	STOP
	Bit Lamp: PLC I/O Forces Exist	SD840.b0	State	
			Off	INACTIVE

Item #	Object	Device	Description	
			ON	ACTIVE
	Numeric Display: Current Scan Time	SD520.SD521	SD520 :ms SD521: us	
	Numeric Display: Minimum scan time	SD524.SD525	SD524 :ms SD525: us	
	Numeric Display: Maximum scan time	SD526.SD527	SD526 :ms SD527: us	
	Word Lamp: Memory Card Battery Status	SD0	Value	
			!=1601	OK
			1601	NOT OK
	Bit Lamp: Processor Battery Status	SM52	State	
			Off	OK
			ON	NOT OK
2	System Alarm			
3	Reset GOT Error	GD64150.b13	Resets the GOT error	

9.6.1. HMI-Analog to Digital

The analog to digital screen will show status and alarms, for up to 4 analog to digital modules. The overlap windows provide the functionality of resetting an occurring error. A status observation exists that will launch the module overlap windows when they are enabled by the function block

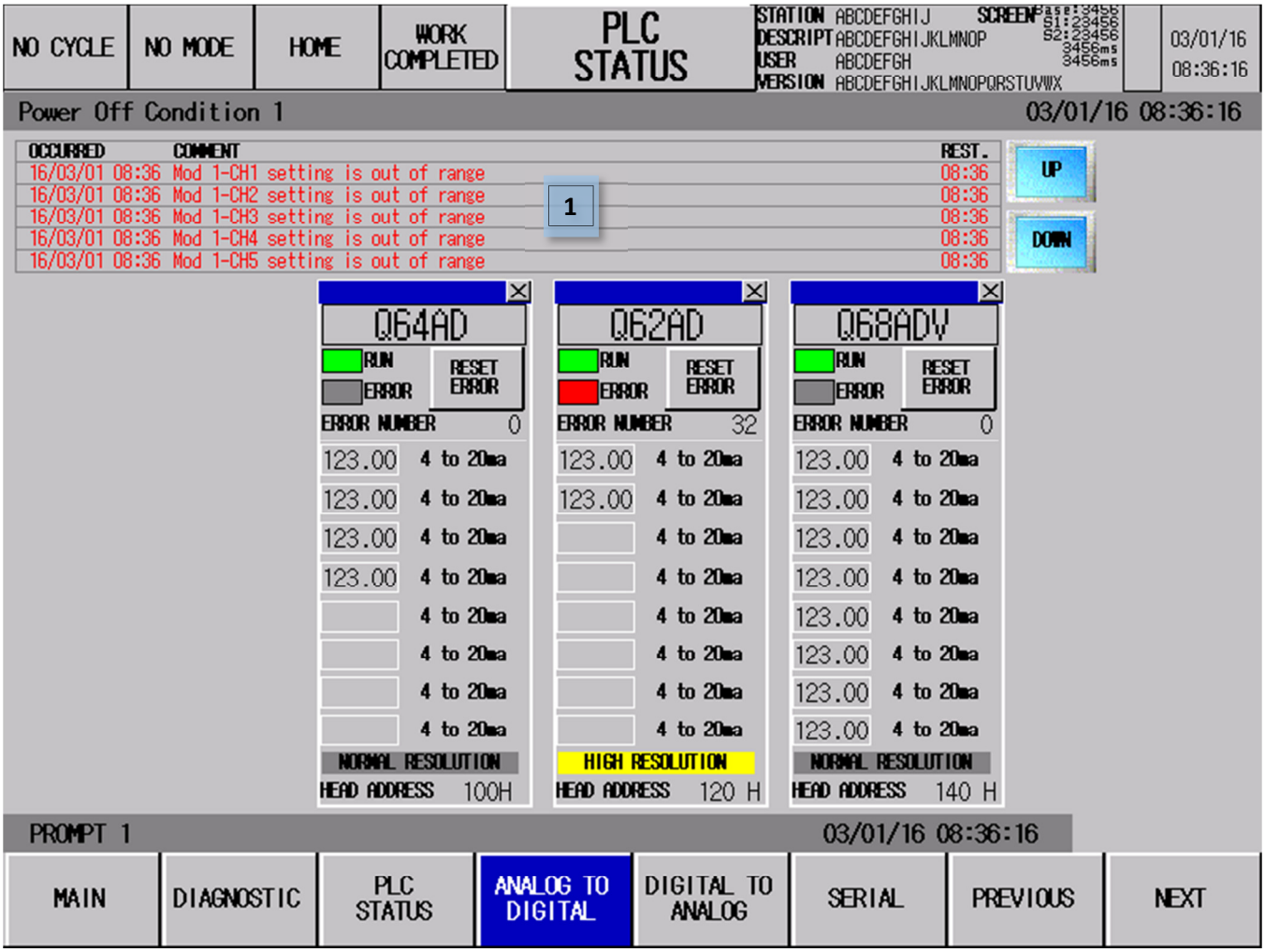


Figure 79-Analog to Digital Screen

1. The user alarm ID 28.

Figure 80-Analog to Digital Module

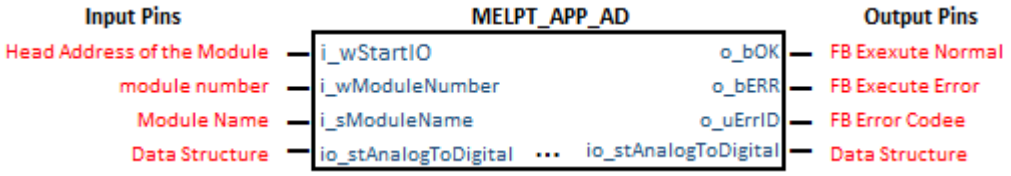
Item Number	Object X=Module Number	Device	Description	
1	ASCII Display	AD.Model[X,0]	Module Number	
2	Bit Lamp: Run	AD.Run[X]	OFF	
			ON	
	Bit Lamp:	AD.Err[X]	OFF	

Item Number	Object X=Module Number	Device	Description	
	Error		ON	
3	Bit Switch: Reset Error	AD.Reset_PB[X]	Resets Error	
4	Numeric Display: Error Number	AD.ErrNumber[X]	Error Number	
5	Numeric Display:	AD.HMISignal[X,1-8]	If set by the FB the display is masked	
6	Word Comment Display:	AD.ChannelSetting[X,1-8]	Value	Input Range
			0	4 to 20ma
			1	0 to 20ma
			2	1 to 5V
			3	0 to 5V
			4	-10 to 10V
			5	0 to 10V
			A	4 to 20ma(extended)
			B	1 to 5V (extended mode)
			F	User Range Setting
7	Bit Lamp: Resolution Mode	AD.ResolutionMode[X]	State	Display
			OFF	Normal Resolution
			ON	High Resolution
8	Numeric Display: Head Address	AD.HeadAddress[X]		

9.6.2. PLC-Analog to Digital

The MELPT_APP_AnalogToDigital program is provided with the MELPT package it contains one of four instances of the MELPT_APP_AD function block and retrieves the information from the modules

FB Name
MELPT_APP_AD

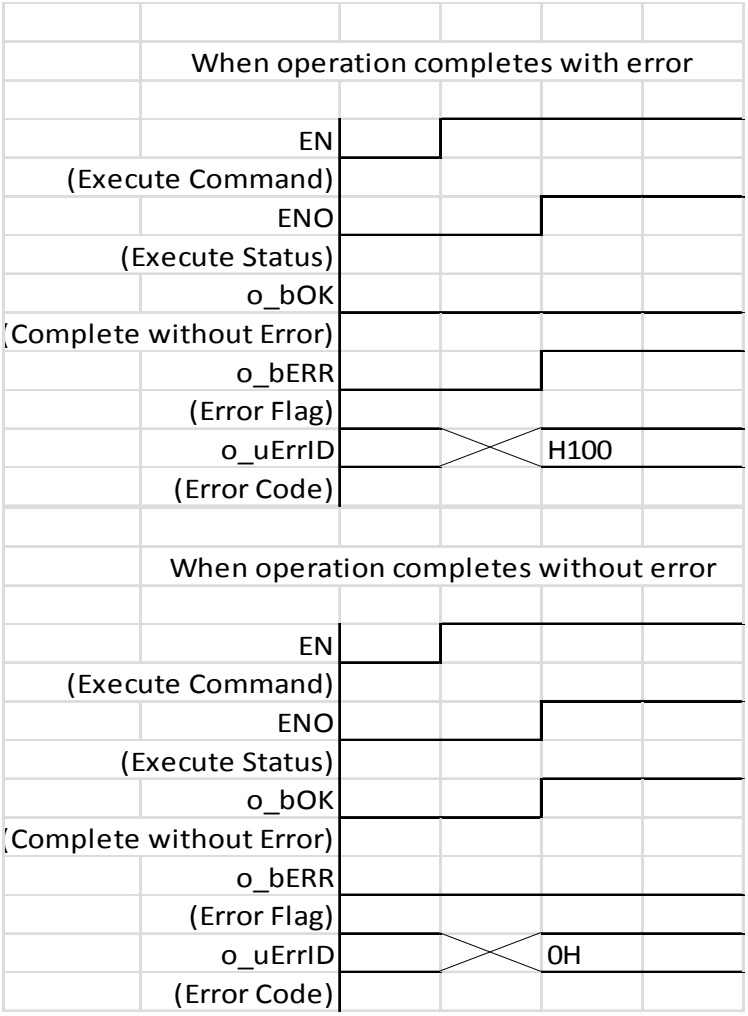
Function Overview	
Item	Description
Function overview	This function block retrieves configuration, error codes and values for an analog to digital module
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 329 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
MELSEC-Q series	Analog to digital module	None
GOT 1000 series	GT16(800*600) or Higher	None

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Device Memory Used	71 bits 194 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the SDT MELPT_APP_AD_DA This function block requires the function MELPT_APP_IntModuleCheck
Function description	
Restrictions and precautions	Index Z16,Z9, Z8,Z7 are used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101 (257)	Module not found at head address specified
H102 (258)	Module Number less than 1
H103 (259)	Module Number greater than 4

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of the Module	i_wStartIO	Word[Signed]	0 to 7E0	Head address of the module
X	module number	i_wModuleNumber	Word[Signed]	1 to 4	
X	Module Name	i_sModuleName	String(32)		Needs to match the module

- Input/Output Labels

User Input	Symbol	Var_In_Out name	Data Type	Setting range	Description
	Data Structure	io_stAnalogToDigital	MELPT_APP_AD_DA		Analog/Digital module Data structure

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execute Error	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Codes	o_uErrID	Word[Unsigned]	FB Error Code Output

FB Version Upgrade History

Version	Description
3.00	Initial Release

SDT Usage

1. MELPT_APP_AD_DA

System Label: AD		
Member	Type	Usage
Enabled	Bit(1..4)	Set by o_bOK of FB allows it to be displayed on screen
Reset_PB	Bit(1..4)	HMI control Reset_PB
Err	Bit(1..4)	Set by FB XF An Error has occurred on this module
Run	Bit(1..4)	Set by FB Module X0 Ready
ResolutionMode	Bit(1..4)	Set by FB from X7
NumChannels	Word[Signed](1..4)	Number of Channels on module set by FB
ErrNumber	Word[Signed](1..4)	Error Code retrieved
HeadAddress	Word[Signed](1..4)	From FB input
ChannelSetting	Word[Signed](1..4,1..8)	Retrieved from module and populated by FB
HMISignal	Word[Signed](1..4,1..8)	Retrieved from module and populated by FB
Model	Word[Unsigned](1..4,0..4)	Read from module and populated by FB

9.6.3. HMI-Digital to Analog

The digital to analog screen will show status and alarms, for up to 4 digital to analog modules. The overlap windows provide the functionality of resetting an occurring error. A status observation exists that will launch the module overlap windows when they are enabled by the function block

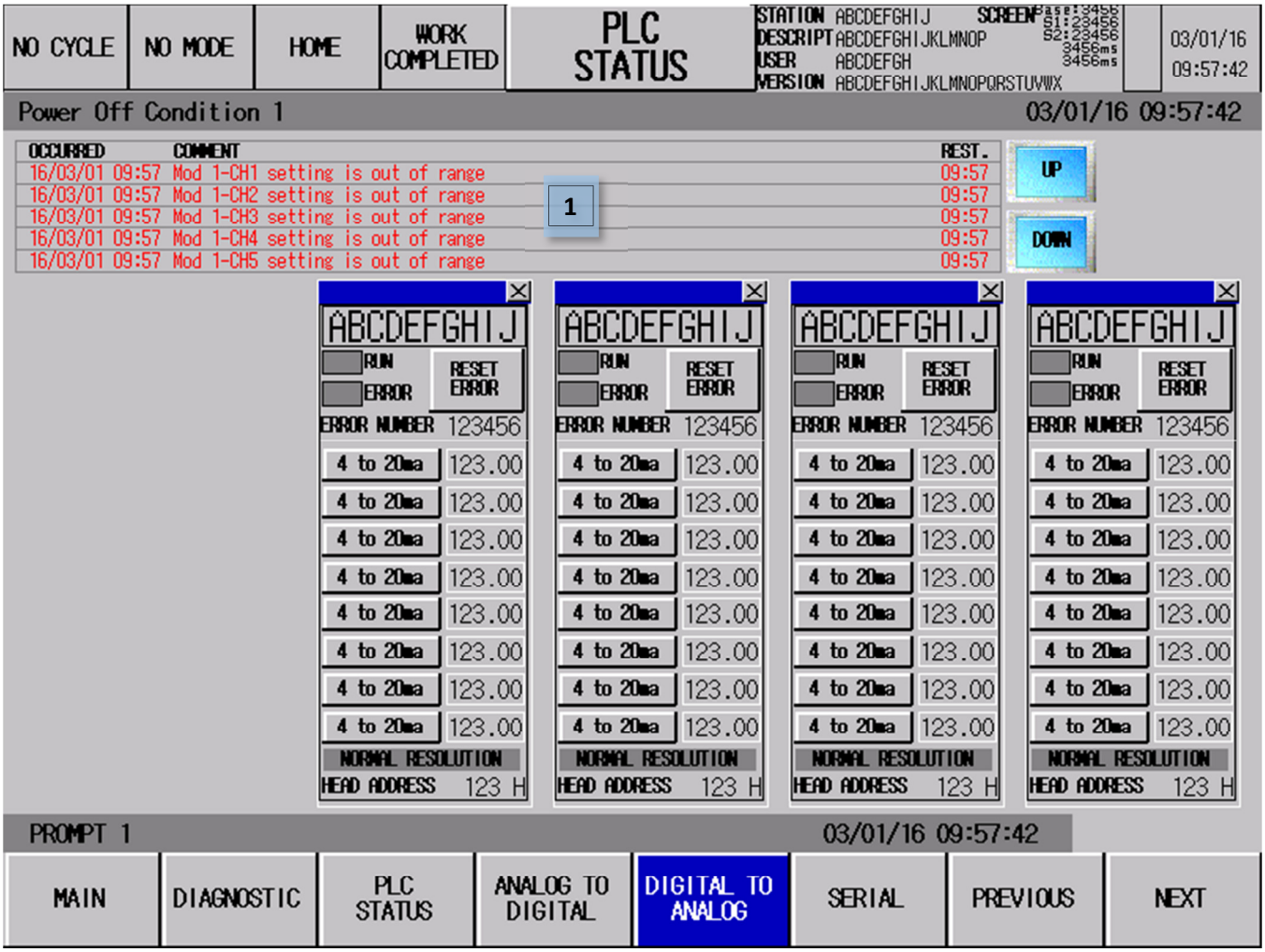


Figure 81-Digital to Analog

2. The user alarm ID 27.

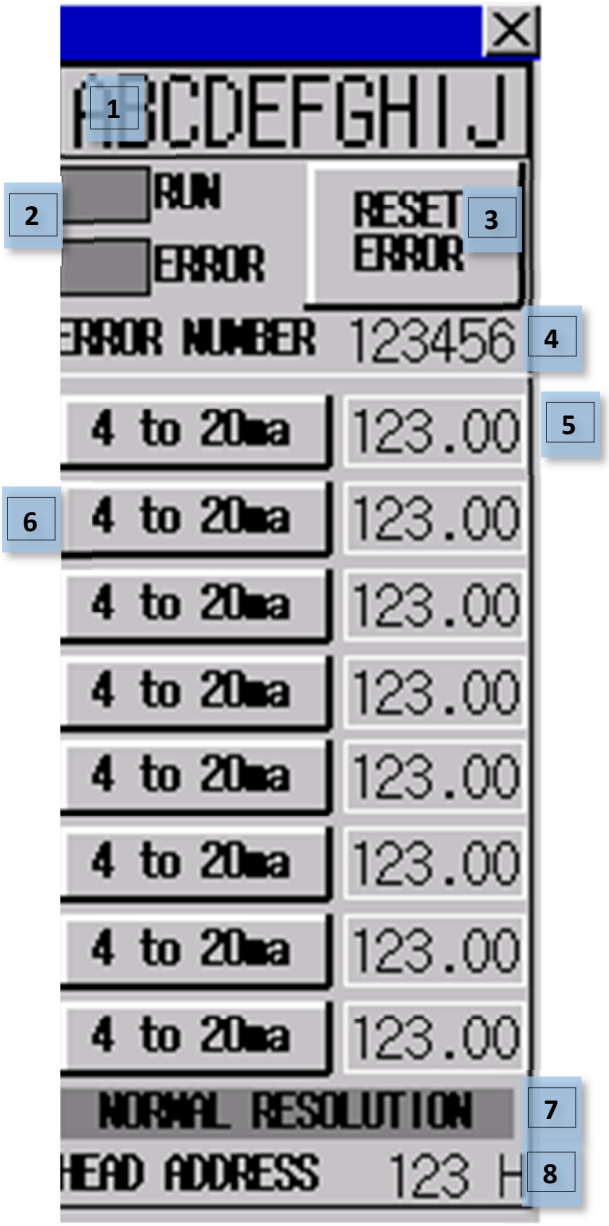


Figure 82-Analog to Digital Module

Item Number	Object X=Module Number	Device	Description	
1	ASCII Display	DA.Model[X,0]	Module Number	
2	Bit Lamp: Run	DA.Run[X]	OFF	
			ON	

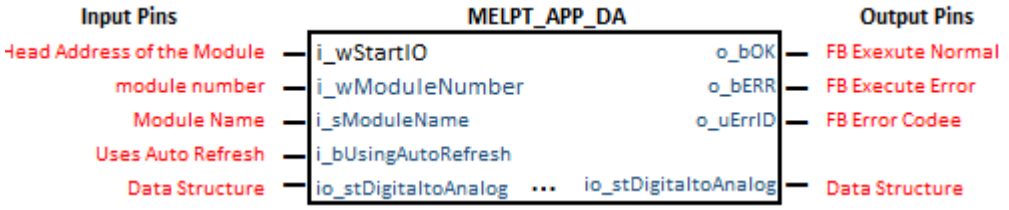
Item Number	Object X=Module Number	Device	Description	
	Bit Lamp: Error	DA.Err[X]	OFF	
			ON	
3	Bit Switch: Reset Error	DA.Reset_PB[X]	Resets Error	
4	Numeric Display: Error Number	DA.ErrNumber[X]	Error Number	
5	Numeric Display:	DA.HMISignal[X,1-8]	If set by the FB the display is masked	
6	Bit Switch	DA.ChannelSetting[X,1-8]	Value	Input Range
			0	4 to 20ma
			1	0 to 20ma
			2	1 to 5V
			3	0 to 5V
			4	-10 to 10V
			F	User Range Setting
6	Bit Switch	DA.OutputToggle_PB[X,1](disables or enables output)	Off	Gray
			ON	Blue
7	Bit Lamp: Resolution Mode	DA.ResolutionMode[X]	State	Display
			OFF	Normal Resolution
			ON	High Resolution
8	Numeric Display: Head Address	DA.HeadAddress[X]		

9.6.4. PLC-Digital to Analog

The MELPT_APP_DigitaltoAnalog program is provided with the MELPT package it contains one of four instances of the MELPT_APP_DA function block and retrieves the information from the modules

If the i_bUsingAutoRefresh value is not chosen, values from the io_St.DigitaltoAnalog.OutgoingSignal are sent to the buffer memory of the digital to Analog manual

FB Name
MELPT_APP_DA

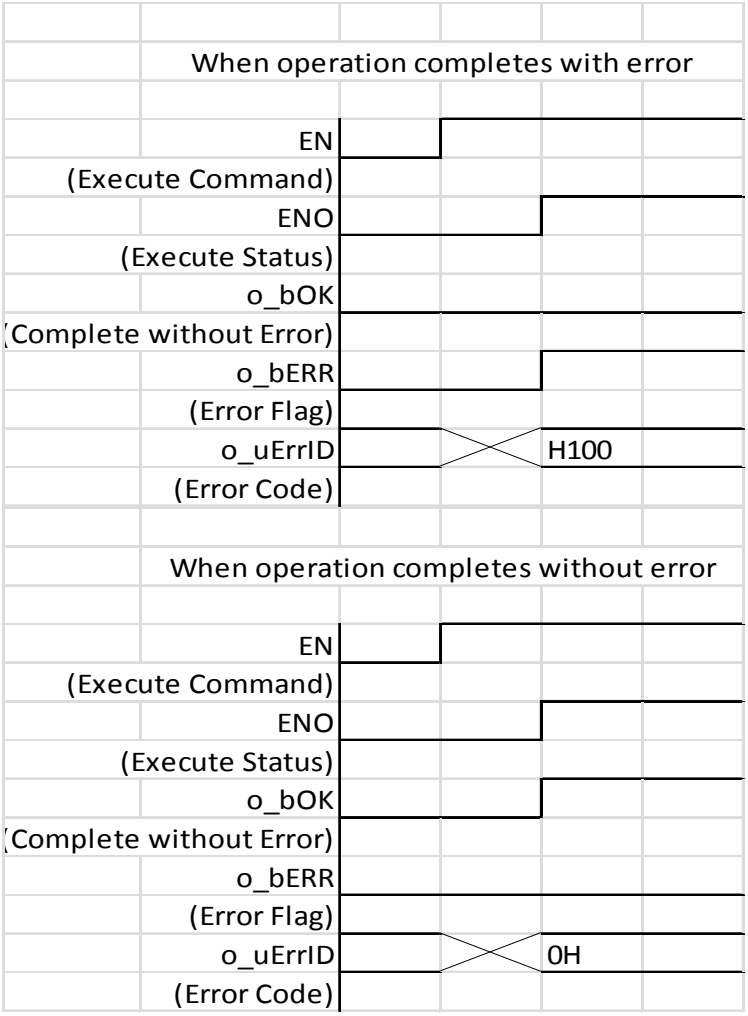
Function Overview	
Item	Description
Function overview	This function block retrieves configuration, error codes and values for a digital to analog module
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
MELSEC-Q series	Digital to Analog module	None
GOT 1000 series	GT16(800*600) or Higher	None

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Number of Ladder Steps	QnU: 420 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	72 bits 148 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the SDT MELPT_APP_AD_DA This function block requires the function MELPT_APP_IntModuleCheck
Function description	If i_bUsingautoRefresh is FALSE The data in the data structure for outgoing signal is placed in the buffer memory of the module
Restrictions and precautions	Index Z16,Z9, Z8,Z7 are used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101 (257)	Module not found at head address specified
H102 (258)	Module Number less than 1
H103 (259)	Module Number greater than 4

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of the Module	i_wStartIO	Word[Signed]	0 to 7E0	Station IO of the module
X	module number	i_wModuleNumber	Word[Signed]	1 to 4	Module Number 1 to 4
X	Module Name	i_sModuleName	String(32)		Module Name has to match what is physically installed
X	Uses Auto Refresh	i_bUsingAutoRefresh	Bit		Set true if using auto refresh

- Input/Output Labels

User Input	Symbol	Var_In_Out name	Data Type	Setting range	Description
	Data Structure	io_stDigitaltoAnalog	MELPT_APP_AD_DA		Analog/Digital module Data structure

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execute Error	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Codes	o_uErrID	Word[Unsigned]	FB Error Code Output

FB Version Upgrade History

Version	Description
3.00	Initial Release

SDT Usage

1. MELPT_APP_AD_DA

System Label: DA		
Member	Type	Usage
Enabled	Bit(1..4)	Set by o_bOK of FB allows it to be displayed on screen
Reset_PB	Bit(1..4)	HMI control Reset_PB
Err	Bit(1..4)	Set by FB XF An Error has occurred on this module
Run	Bit(1..4)	Set by FB Module X0 Ready
ResolutionMode	Bit(1..4)	Set by FB from X8
NumChannels	Word[Signed](1..4)	Number of Channels on module set by FB, determined by name
ErrNumber	Word[Signed](1..4)	Error Code retrieved
HeadAddress	Word[Signed](1..4)	From FB input
ChannelSetting	Word[Signed](1..4,1..8)	Retrieved from module and populated by FB
HMISignal	Word[Signed](1..4,1..8)	Retrieved from module and populated by FB
Model	Word[Unsigned](1..4,0..4)	Read from module and populated by FB
Outgoing Signal	Word[Signed](1..4,1..8)	Signals sent to Module when auto refresh is not set
OutputToggle_PB	Bit(1..4,1..8)	Used to enable the conversion
Conversion Enabled	Bit(1..4,1..8)	Indicator showing what is enabled.

9.6.5. HMI-Serial

The Serial screen will show status and alarms, for up to 4 Serial modules. The overlap windows provide the functionality of resetting an occurring error. A status observation exists that will launch the module overlap windows when they are enabled by the function block

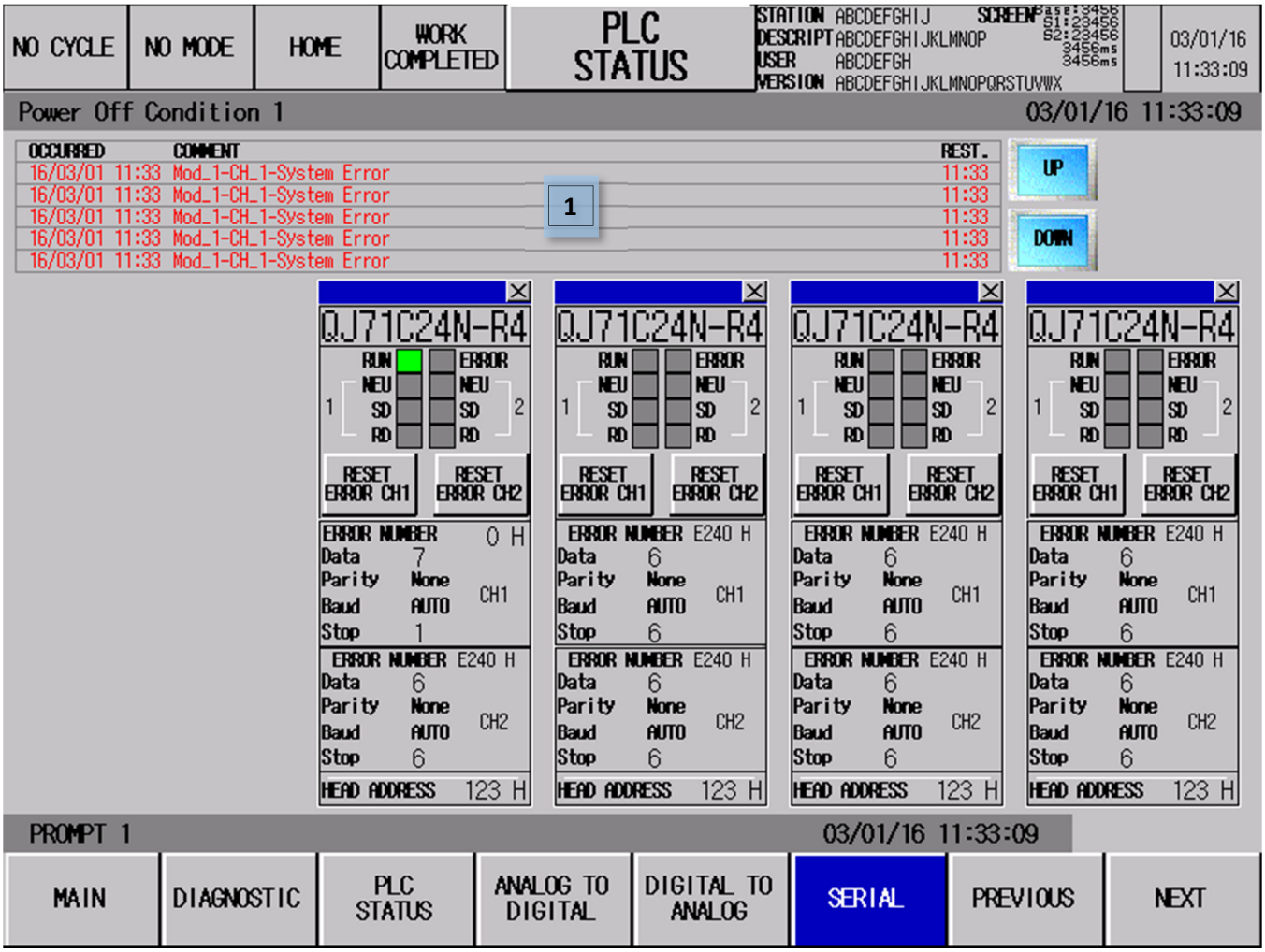


Figure 83-Serial Screen

3. The user alarm ID 29.

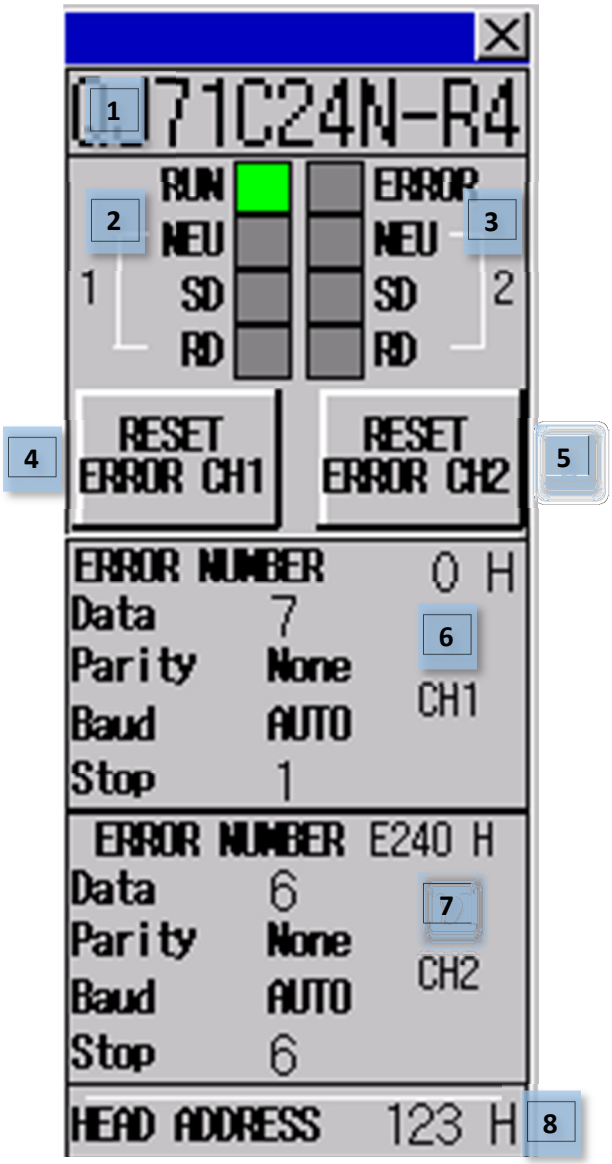


Figure 84-Analog to Digital Module

Item Number	Object X=Module Number	Device	Description	
1	ASCII Display	Serial. Model[X,0]	Module Number	
2	Bit Lamp: Run	Serial.LEDS[X,0]	OFF	
			ON	

Item Number	Object X=Module Number	Device	Description	
	Bit Lamp: CH 1 NEU	Serial.LEDS[X,1]	OFF	
			ON	
	Bit Lamp CH1 SD:	Serial.LEDS[X,2]	OFF	
			ON	
	Bit Lamp CH1 RD:	Serial.LEDS[X,3]	Off	
			ON	
3	Bit Lamp: Error	Serial.LEDS[X,4]	OFF	
			ON	
	Bit Lamp: CH 2 NEU	Serial.LEDS[X,5]	OFF	
			ON	
	Bit Lamp CH2 SD:	Serial.LEDS[X,6]	OFF	
			ON	
	Bit Lamp CH2 RD:	Serial.LEDS[X,7]	Off	
			ON	
4	Bit Switch: Reset Error Ch1	Serial. Reset_PB[X,1]	Resets Error CH1	
5	Bit Switch: Reset Error CH2	Serial. Reset_PB[X,2]	Resets Error CH2	
6	CH1 Data			
	Error Number Numeric Display	Serial. ErrNumber[X,1]		
	Data Numeric Display	Serial.CH1_Data[X]		
	Parity	Serial.CH1_Parity[X]	Value	Comment

Item Number	Object X=Module Number	Device	Description	
	Word Comment Display		0	N/A
			1	None
			2	Odd
			3	Even
	Baud Word Comment Display	Serial.CH1_Baud[X]	Value	Comment
			1	300
			2	600
			3	1200
			4	2400
			5	4800
			6	9600
			7	14400
			8	19200
			9	28800
			10	38400
			11	57600
			12	115200
			13	230400
			14	AUTO
	Stop Numeric Display	Serial.CH1_Stop[X]		
7	CH2 Data			

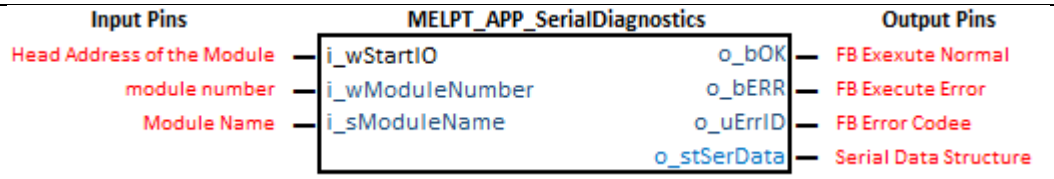
Item Number	Object X=Module Number	Device	Description	
	Error Number Numeric Display	Serial. ErrNumber[X,2]		
	Data Numeric Display	Serial.CH2_Data[X]		
	Parity Word Comment Display	Serial.CH2_Parity[X]	Value	Comment
			0	N/A
			1	None
			2	Odd
			3	Even
	Baud Word Comment Display	Serial.CH2_Baud[X]	Value	Comment
			1	300
			2	600
			3	1200
			4	2400
			5	4800
			6	9600
			7	14400
			8	19200
			9	28800
			10	38400
			11	57600
			12	115200
			13	230400

Item Number	Object X=Module Number	Device	Description	
			14	AUTO
	Stop Numeric Display	Serial.CH2_Stop[X]		
8	Numeric Display: Head Address	Serial. HeadAddress[X]		

9.6.6. PLC-Serial Diagnostics

The MELPT_APP_Diagnostics program is provided with the MELPT package it contains one of four instances of the MELPT_APP_SerialDiagnostics function block and retrieves the information from the modules

FB Name
MELPT_APP_SerialDiagnostics

Function Overview	
Item	Description
Function overview	This function block retrieves configuration, error codes and values for 1 serial module
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
MELSEC-Q series	Serial Module	None
GOT 1000 series	GT16(800*600) or Higher	None

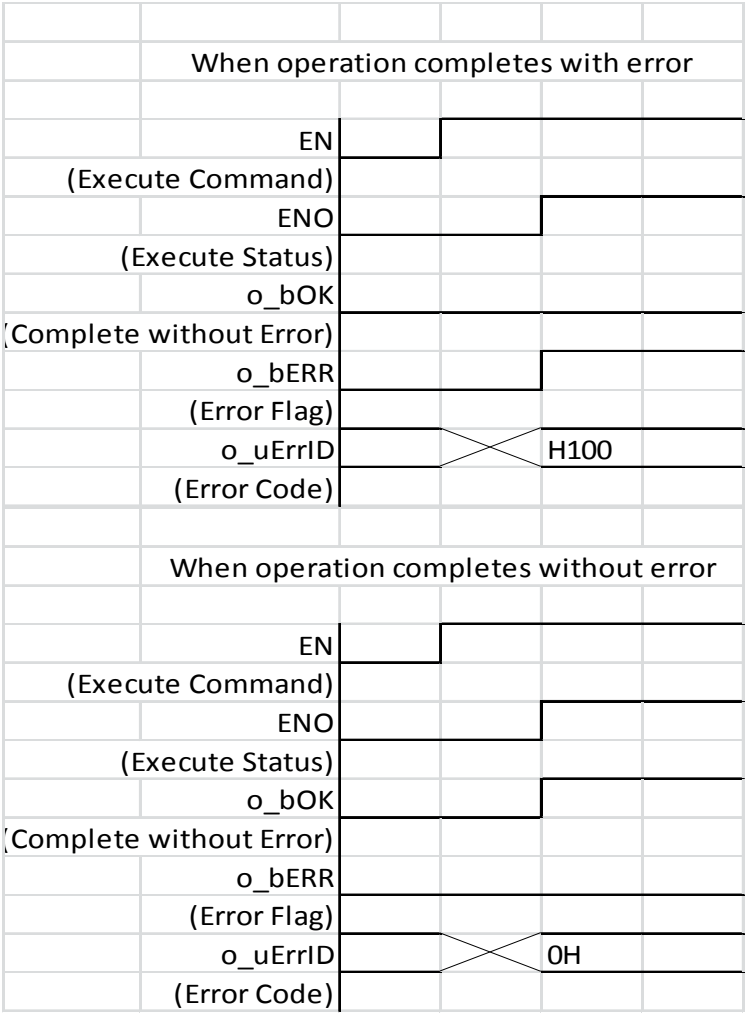
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 369 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	70 bits 132 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the SDT MELPT_APP_SERDATA This function block requires the function MELPT_APP_IntModuleCheck
Function description	
Restrictions and precautions	Index Z16,Z9, Z8,Z7 are used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101 (257)	Module not found at head address specified
H102 (258)	Module Number less than 1
H103 (259)	Module Number greater than 4

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of the Module	i_wStartIO	Word[Signed]	0 to 7E0	Head address of the module
X	module number	i_wModuleNumber	Word[Signed]	1 to 4	
X	Module Name	i_sModuleName	String(32)		Needs to match the module

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execute Error	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Codes	o_uErrID	Word[Unsigned]	FB Error Code Output
Serial Data Structure	O_stSerData	MELPT_APP_SERDATA	Serial Data Storage

FB Version Upgrade History

Version	Description
3.00	Initial Release

SDT Usage

1. MELPT_APP_SERData

System Label: Serial		
Member	Type	Usage
Enabled	Bit(1..4)	Set by OK signal of FB allows HMI to display module info
Reset_PB	Bit(1..4,1..2)	REST PB for each channel from HI

System Label: Serial		
Member	Type	Usage
LEDS	Bit(1..4,0..7)	Indicator displays set by FB for HMI
ErrNumber	Word[Signed](1..4,1..2)	Error Code of current error
HeadAddress	Word[Signed](1..4)	Set from input of the FB
CH1_Baud	Word[Signed](1..4)	Retrieved by FB
CH2_Baud	Word[Signed](1..4)	Retrieved by FB
CH1_Parity	Word[Signed](1..4)	Retrieved by FB
CH2_Parity	Word[Signed](1..4)	Retrieved by FB
CH1_Data	Word[Signed](1..4)	Retrieved by FB
CH2_Data	Word[Signed](1..4)	Retrieved by FB
CH1_Stop	Word[Signed](1..4)	Retrieved by FB
CH2_Stop	Word[Signed](1..4)	Retrieved by FB
Model	Word[Unsigned](1..4,0..6)	Retrieved by FB

9.7 Diagnostics – Factory Information Systems

The factory information Systems section of the MELPT project is end user specific. Included in this manual are programs and function blocks specific to FCA Nafta region

9.7.1. HMI-Andon Test

This screen allows an operator to view the Andon data structure for up to 8 machine id's (work stations) associated with this PLC. Test mode is password protected function. Test mode allows the operator to replace the machine determined Andon data with HMI driven data.

Test mode is disabled when no action has occurred during a preset time. Or when the HMI navigates away from the screen

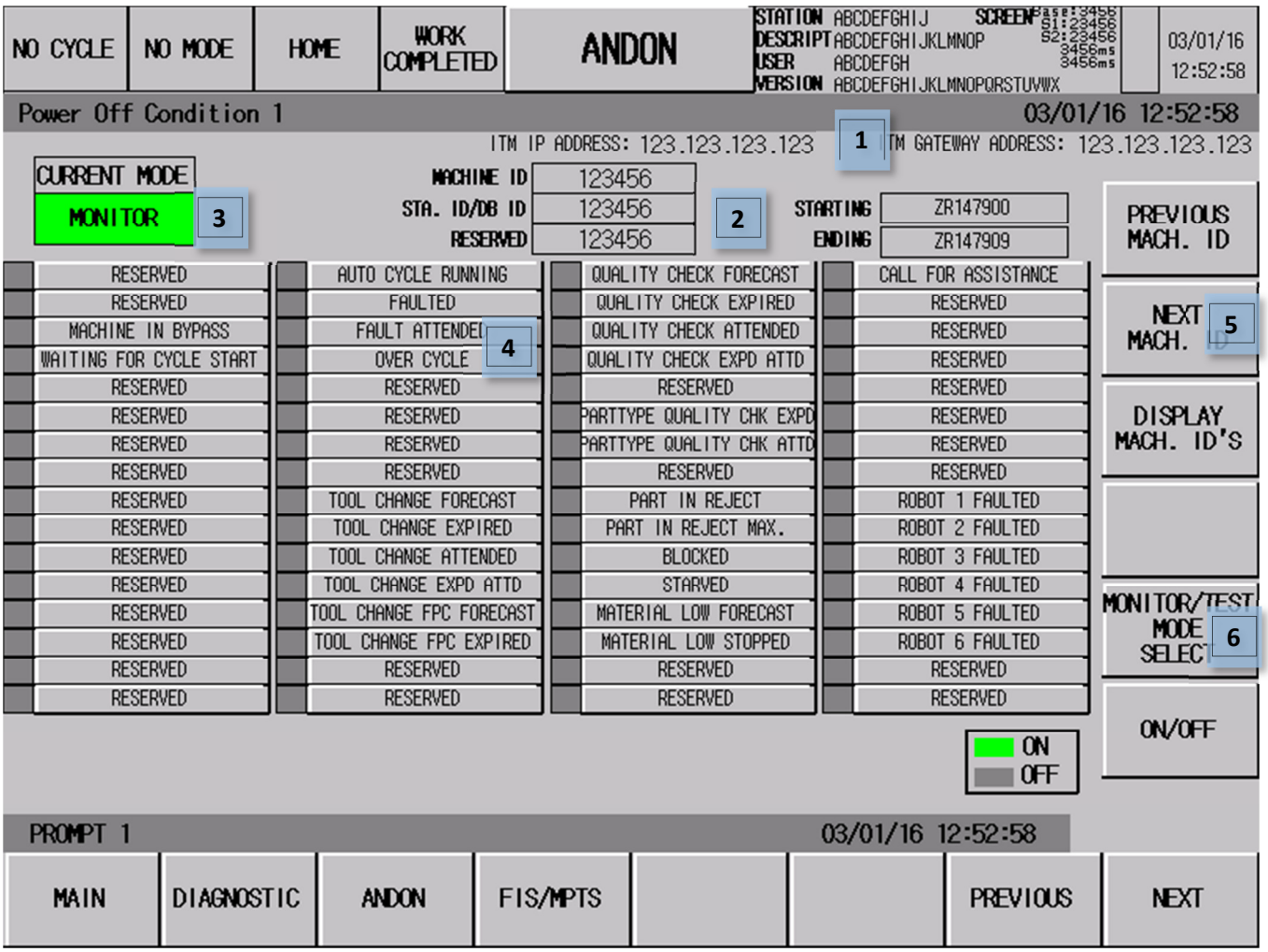


Figure 85-Andon Test Screen

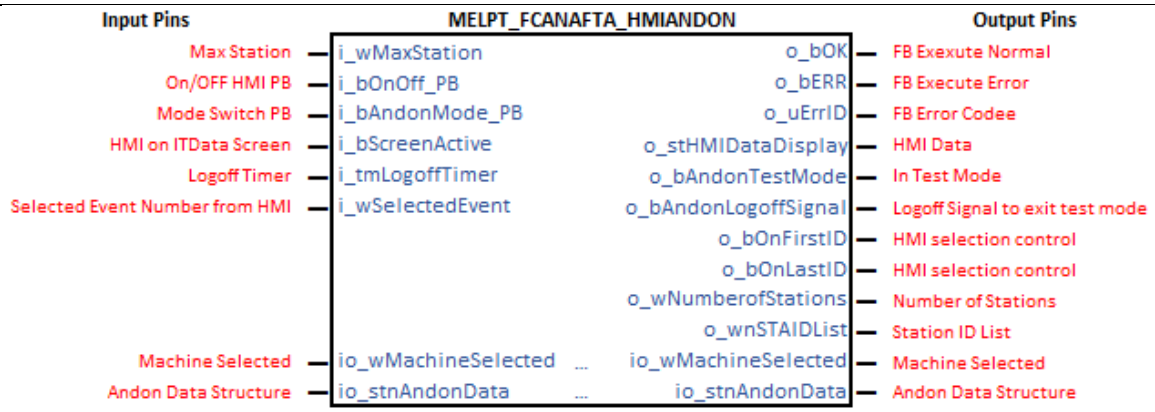
Item Number	Object	Device	Description	
1	ITM IP Address	ITMData.ITIP	Populated by MELPT_FCANAFTA_HMIFIS Function Block	
2	Numeric Display Machine ID	AndonDataDisplay.MachineID		
	Numeric Display Sta ID	AndonDataDisplay.Station_DB_ID		
	Numeric Display Reserved	AndonDataDisplay.Reserved		
	Numeric Display Starting	ITMData.AndonMachSelected	$$+200 comment file 128	
	Numeric Display Ending	ITMData.AndonMachSelected	$$+300 comment file 128	
3	Current Mode Bit Lamp	ITMData.AndonMode	State	Text
			Off	Monitor
			On	Test
4	Test area Word Lamp	AndonDataDisplay.EventSignal[0-3]	Each bit individually masked, if non zero background is green	
	Word Set Switch	ITMData.SelectedAndonEvent	Values 1 to 64, background is blue when selected comments are 101-164 of comment file 128	
5	Previous Machine ID	ITMData.AndonMachSelected -1	Allows operator change the data being viewed/manipulated	

Item Number	Object	Device	Description
	Next Machine ID	ITMData.AndonMachSelected +1	
	Display Machine ID List	Launches window that allows operator to select the ID from the list of available ID's	
6	Monitor/Test Mode Select	ITMData.ModeSelect_PB	Password Protected: Switches from PLC data to HMI data
	ON/OFF	ITMData.OnOff_PB	Password Protected: Flip-flops the selected bit

9.7.2. PLC-MELPT_FCANAFTA_HMIANDON

This program and function block are included in the FCA Nafta user library. This function block handles the interface with the HMI concerning ANDON test functionality.

FB Name
MELPT_FCANAFTA_HMIAndon

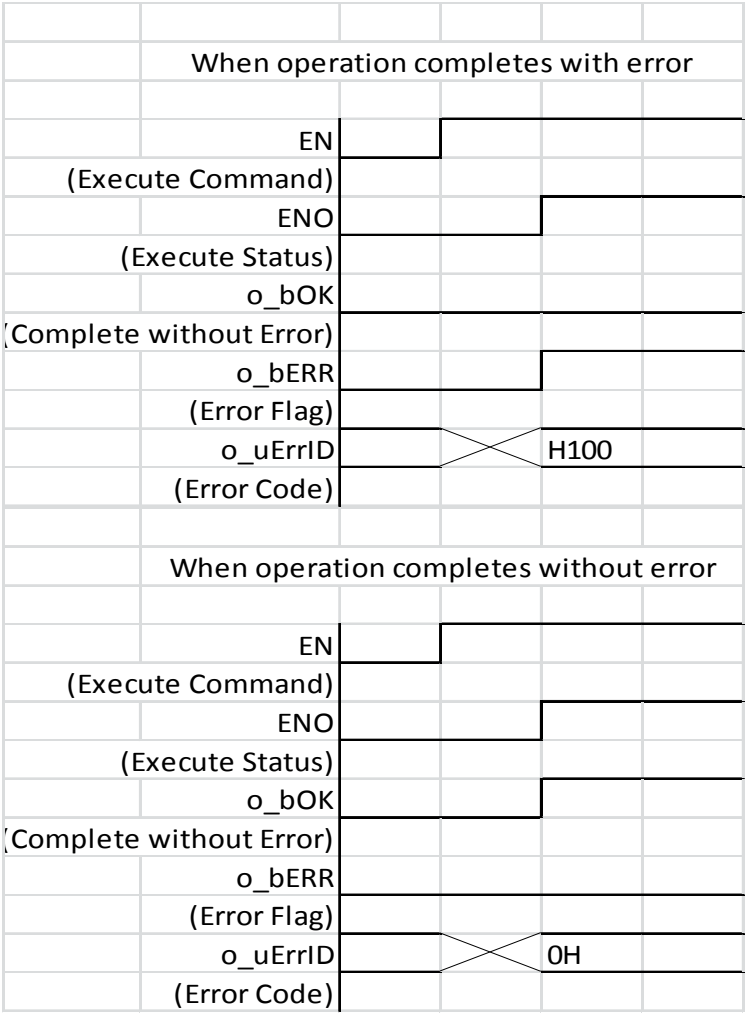
Function Overview	
Item	Description
Function overview	This function block interfaces with the hmi to allow the overwrite of HMI data over Andon data.
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Number of Ladder Steps	QnU: 202 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	73 bits 95 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the FCANAFTA_Andon SDT
Function description	
Restrictions and precautions	Index Z16 is used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101 (257)	I_wMaxStation less than 1
H102 (258)	I_wMaxStation greater than 8

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Max Station	i_wMaxStation	Word[Signed]	1 to 8	Maximum Station ID;s
	On/OFF HMI PB	i_bOnOff_PB	Bit		HMI PB To Toggle Event States when in test mode
	Mode Switch PB	i_bAndonMode_PB	Bit		HMI PB To Toggle between Monitor and Test Mode
	HMI on IT Data Screen	i_bScreenActive	Bit		HMI is on Andon Screen
X	Logoff Timer	i_tmLogoffTimer	Time	30s to 45min	Exit Screen Timer When left in Test Mode
	Selected Event Number from HMI	i_wSelectedEvent	Word[Signed]		Selected Event From HMI when in Test Mode 1-64

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Machine Selected	io_wMachineSelected	Word[Signed]	1	Andon Machine Selected
	Andon Data Structure	io_stnAndonData	FCANAFTA_Andon(1..8)		Andon Data from 8 Stations

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execute Error	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
HMI Data	o_stHMIDataDisplay	FCANAFTA_Andon	Data for display on screen
In Test Mode	o_bAndonTestMode	Bit	Ind. for Normal or Test Mode

Symbol Name	Var_Output name	Data Type	Description
Logoff Signal to exit test mode	o_bAndonLogoffSignal	Bit	Signal to Other FB to revert to Main Screen
HMI selection control	o_bOnFirstID	Bit	On First ID
HMI selection control	o_bOnLastID	Bit	On Last ID
Number of Stations	o_wNumberofStations	Word[Signed]	Number of Stations
Station ID List	o_wnSTAIDList	Word[Signed](1..8)	Andon Machine Id List

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.02	Added 5 minute timeout function, added support for 10 stations
1.12	Modify Screen Active Logic; Placed Input and Output into array; Machine ID list now generated in this function block; Auto-Logoff Timer is now a variable set Modified FB variables to use the standard specified in BCN-89000-0823-D
1.20	Added FB Status Outputs Corrected issue with active Screen in Test Mode
2.00A	Adopted BCN-89000-0969 Removed Int to Bit Array Instruction; Auto Logoff Feature modified to work with Multiple HMI
2.10	IEC Comparisons used
3.00	Rewritten, moved to FCANAFTA library
3.01	Spelling corrections in comments

SDT Usage

1. FCANAFTA_andon

System Label: AndonDataDisplay		
Member	Type	Usage
MachineID	Word[Signed]	Displayed on HMI, list is assembled

System Label: AndonDataDisplay		
Member	Type	Usage
Station_DB_ID	Word[Signed]	Displayed on HMI
Reserved	Word[Signed]	Displayed on HMI
EventSignal	Word[Signed](0..3)	Modified by the Function block when in test mode

2. MELPT_FCANAFTA_ITMData

System Label: ITMData		
Member	Type	Usage
ModeSelect_PB	Bit	Alternates Mode of Selected Andon Station
OnOff_PB	Bit	Alternates state of selected event
AndonMode	Bit	Test/Monitor Mode indicator for HMI
OnFirstAndonID	Bit	Set by FB to Limit HMI to navigation to selectable ID's
OnLastAndonID	Bit	Set by FB to Limit HMI to navigation to selectable ID's
OnFirstFISID	Bit	
OnLastFISID	Bit	
FISDBNumber	Word[Signed]	
SelectedAndonEvent	Word[Signed]	Event Number Selected by HMI during Test Mode
AndonMachSelected	Word[Signed]	Machine Selected from HMI, limited by FB
FISMachSelected	Word[Signed]	
NumberofID_Andon	Word[Signed]	Number of Stations
NumberofID_FIS	Word[Signed]	

System Label: ITMData		
Member	Type	Usage
AndonMachIDList	Word[Signed](1..8)	Compiled List of Machine ID's for selection on the HMI
FISMachIDList	Word[Signed](1..8)	Compiled List of Machine ID's for selection on the HMI
ITIP	Double Word[Unsigned]	
ITGateway	Double Word[Unsigned]	

9.7.3. HMI-FIS/MPTS

This screen allow the operator to look at selected FIS or MPTS data for up to 8 controlled work stations.

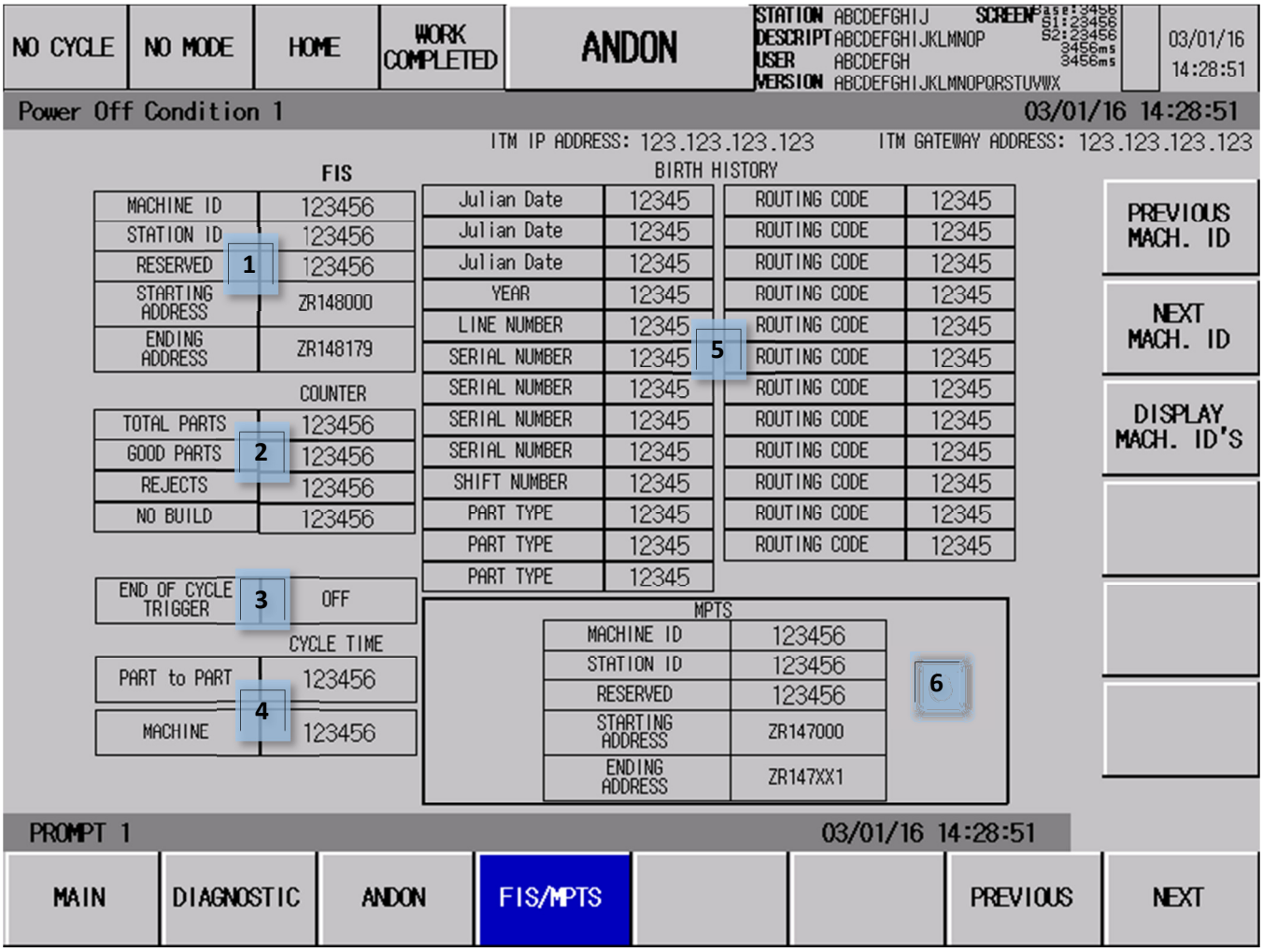


Figure 86-FIS/MPTS Screen

Item Number	Object	Device	Description
1	FIS Header		
	Machine ID Numeric Display	FISData230.MachID	

Item Number	Object	Device	Description
	Station ID Numeric Display	FISData230.StaID	
	Reserved Numeric Display	FISData230.SigTimeStamp	
	Starting Address Word Comment display	ITMData.FISMachSelected	Comment File 129: $$+200
	Ending Address Word Comment display	ITMData.FISMachSelected	Comment File 129: $$+300
2	Part Counts		
	Numeric Display: Total Parts	FISData230.Counts[0]	
	Numeric Display: Good Parts	FISData230.Counts[1]	
	Numeric Display: Rejects	FISData230.Counts[2]	
	Numeric Display: No Build	FISData230.Counts[3]	
3	Word Comment Display: End of Cycle Trigger	FISData230.Triggers[0]	
4	Cycle Times		

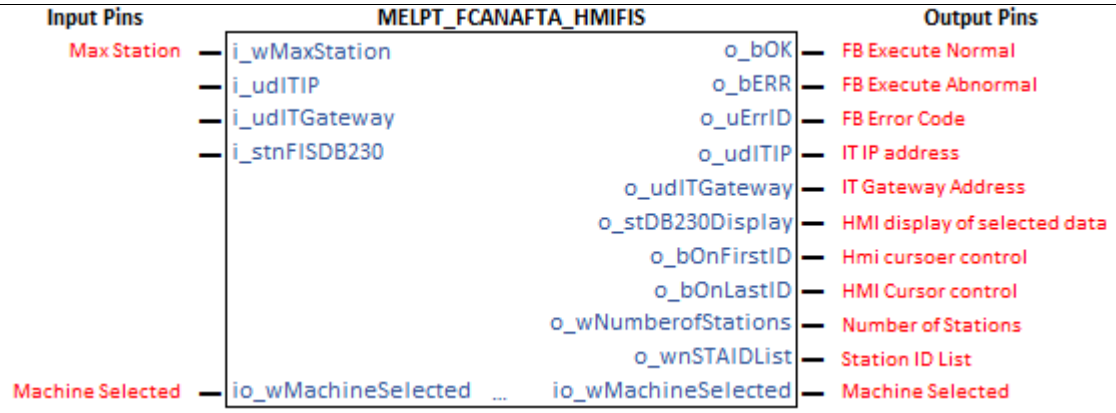
Item Number	Object	Device	Description
	Numeric Display Part to Part	FISData230.Timers[0]	
	Numeric Display Machine	FISData230.Timers[1]	
5	Birth History		
	Julian Date Numeric Display:	FISData230.Birth[0-2]	
	Year Numeric Display:	FISData230.Birth[3]	
	Line Number Numeric Display:	FISData230.Birth[4]	
	Serial Number Numeric Display:	FISData230.Birth[5-8]	
	Shift Number Numeric Display:	FISData230.Birth[9]	
	Part Type Numeric Display:	FISData230.Birth[10-12]	
	Routing Code Numeric Display:	FISData230.Birth[13-24]	
6	MPTS Header		
	Machine ID Numeric Display	AndonDataDisplay.MachineID	
	Station ID Numeric Display	AndonDataDisplay.Station_DB_ID	

Item Number	Object	Device	Description
	Reserved Numeric Display	AndonDataDisplay.Reserved	
	Starting Address Word Comment display	ITMData.FISMachSelected	Comment File 129: $$+1200
	Ending Address Word Comment display	ITMData.FISMachSelected	Comment File 129: $$+1300

9.7.4. PLC-MELPT_FCANAFTA_HMIFIS

This program and function block are included in the the FCANafta user library. This function block handles the interface with the HMI concerning FIS/MPTS.

FB Name
MELPT_FCANAFTA_HMIFIS

Function Overview	
Item	Description
Function overview	This function block interfaces with the hmi and displays DB230 for the selected workstation on screen
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

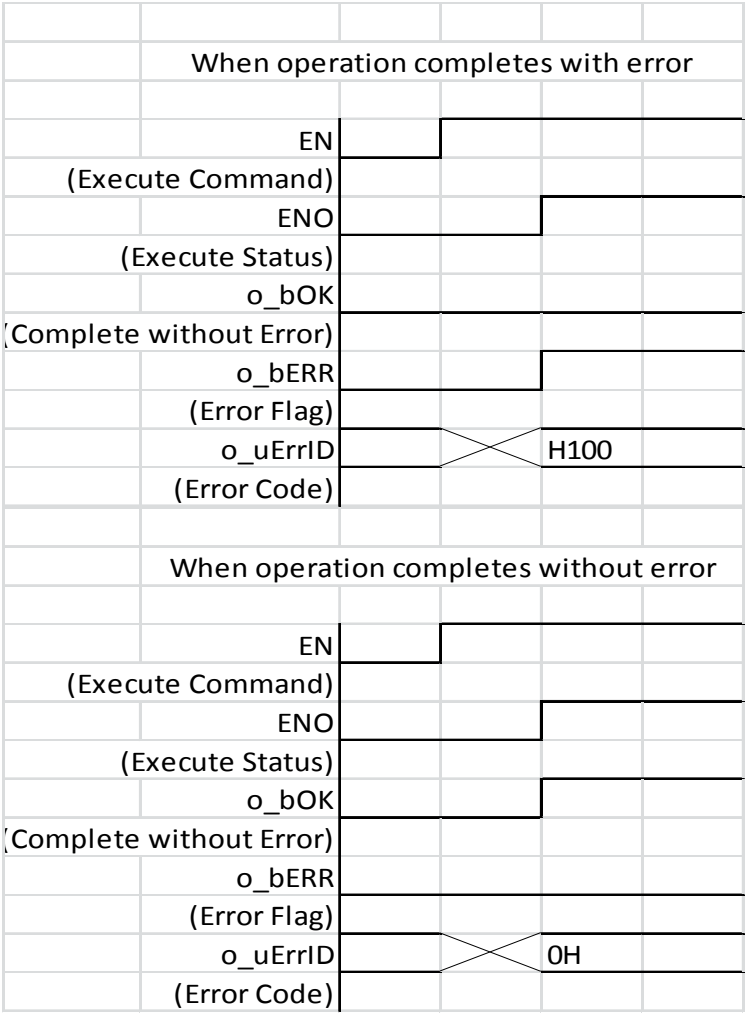
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD

Number of Ladder Steps	QnU: 187 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	4 bits 1640 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the FCANAFTA_FISDB230
Function description	This function block copies data from the selected structure to the HMI display structure
Restrictions and precautions	Index Z16 is used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101 (257)	I_wMaxStation less than 1
H102 (258)	I_wMaxStation greater than 8

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Max Station	i_wMaxStation	Word[Signed]	1 to 8	Maximum Station ID;s
X	IP address of IT Connection	i_udITIP	Double Word[Unsigned]		THE IP Address of the IT connection
X	Gateway of IT Connection	i_udITGateway	Double Word[Unsigned]		The Gateway of the IT connection
	Data Structure for 8 workstations	i_stnFISDB230	FCANAFTA_FISDB230(1..8)		DB230 Data

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Machine Selected	io_wMachineSelected	Word[Signed]		Machine Selected

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execute Abnormal	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
IT IP address	o_udITIP	Double Word[Unsigned]	IP Address for Display
IT Gateway Address	o_udITGateway	Double Word[Unsigned]	GateWay for Display
HMI display of selected data	o_stDB230Display	FCANAFTA_FISDB230	HMI Output of selected data
Hmi cursoer control	o_bOnFirstID	Bit	On First ID
HMI Cursor control	o_bOnLastID	Bit	On Last ID

Symbol Name	Var_Output name	Data Type	Description
Number of Stations	o_wNumberofStations	Word[Signed]	Number of Stations
Station ID List	o_wnSTAIDList	Word[Signed](1..8)	FIS Machine Id List

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.02	Added support for 10 stations, limit by new input
1.12	Removed Andon Modified FB variables to use the standard specified in BCN-89000-0823-D
1.20	Added FB Status Outputs
2.00A	Adopted BCN-89000-0969 Moved Data Structure Input to Input Output Corrected Issues with Looping, Improved User Input Check
2.10	IEC Comparisons used
3.00	Rewritten, moved to FCANAFTA library
3.01	Coding reduction

SDT Usage

3. FCANAFTA_FISDB230

System Label: FISData230		
Member	Type	Usage
MachID	Word[Unsigned]	All data moved to HMI structure for display
DBID	Word[Unsigned]	
StaID	Word[Unsigned]	
SigTimeStamp	Word[Unsigned]	
Counts	Word[Unsigned](0..19)	
Triggers	Word[Unsigned](0..1)	
Timers	Word[Unsigned](0..9)	

System Label: FISData230		
Member	Type	Usage
Status	Word[Unsigned](0..4)	
Birth	Word[Unsigned](0..24)	
ProcData	Word[Unsigned](0..11)	
Ident	Word[Unsigned](0..14)	
States	Word[Unsigned](0..2)	
Rejects	Word[Unsigned](0..1)	
Alarms	Word[Unsigned](0..9)	
Events	Word[Unsigned](0..71)	

4. MELPT_FCANAFTA_ITMData

System Label: ITMData		
Member	Type	Usage
ModeSelect_PB	Bit	
OnOff_PB	Bit	
AndonMode	Bit	
OnFirstAndonID	Bit	
OnLastAndonID	Bit	
OnFirstFISID	Bit	Set by FB to Limit HMI to navigation to selectable ID's
OnLastFISID	Bit	Set by FB to Limit HMI to navigation to selectable ID's
FISDBNumber	Word[Signed]	
SelectedAndonEvent	Word[Signed]	
AndonMachSelected	Word[Signed]	

System Label: ITMData		
Member	Type	Usage
FISMachSelected	Word[Signed]	Machine Selected from HMI, limited by FB
NumberofID_Andon	Word[Signed]	
NumberofID_FIS	Word[Signed]	Number of Stations
AndonMachIDList	Word[Signed](1..8)	
FISMachIDList	Word[Signed](1..8)	Compiled List of Machine ID's for selection on the HMI
ITIP	Double Word[Unsigned]	IP Address of IT System for display on HMI
ITGateway	Double Word[Unsigned]	GateWay Address of IT System for display on HMI

10 FAULTS

The faults categories consists of HMI screens Fault summary, fault history, fault help window, and fault text list. From the PLC all that is provided is a label structure.

SDT Usage

5. MELPT_SYS_FAULT

System Label: Messages		
Member	Type	Usage
Alarm	Bit(1..1024)	Alarm Messages
Warning	Bit(1..256)	Warning messages (displayed in yellow)
Prompt	Bit(1..256)	Shown in separate message header

10.1 Fault Summary

Two Screens are provided one for assembly systems and one for CNC machines that display alarm messages from the CNC controller

10.1.1. Assembly

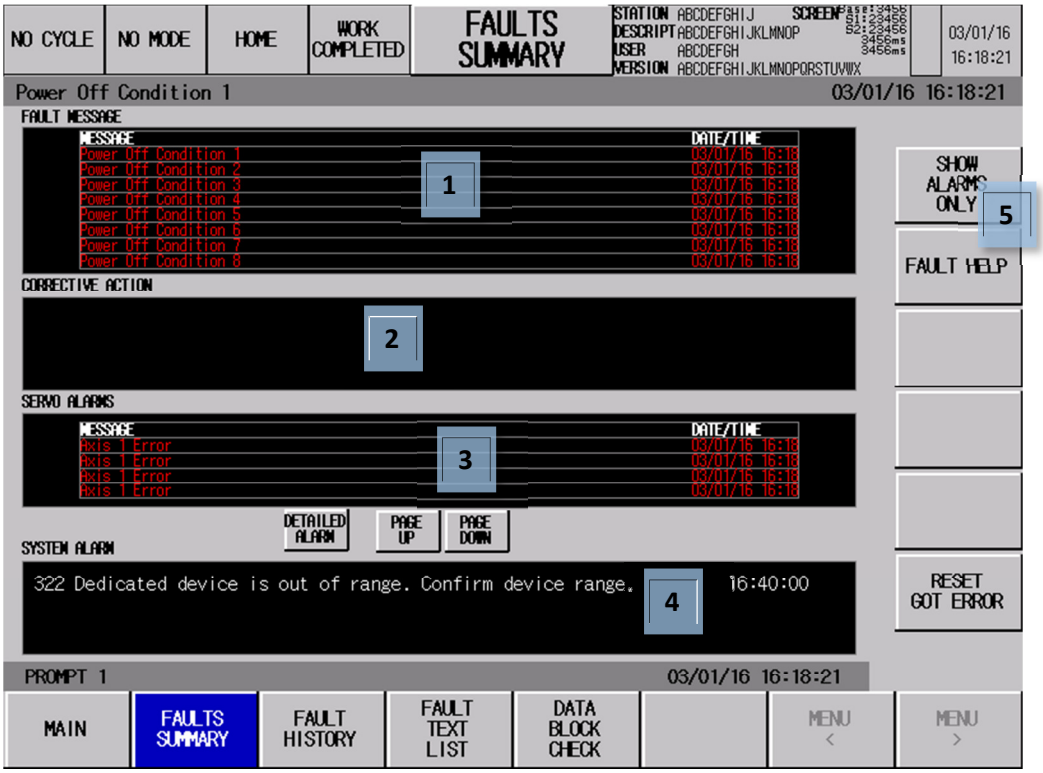


Figure 87- Fault Summary Assembly

Item Number	Object	Description
1	Advanced user Alarm Display Fault message	Displays the Alarm ID in GD65000, a project script sets this value is set based off MachineData.MachineType
2	Corrective Action Word Comment Display: GD65052	Comment File #11 GD65052, is populated by the Advanced User Alarm Display when the fault is selected
3	Servo Alarms Alarm ID:10	Detailed Alarms Key will launch comment window with more info on selected alarm
4	System Alarm Display	
5	Show Alarms Push Button	This button will filter out the warnings when selected

Item Number	Object	Description
	Fault Help Push Button	When an alarm is selected and the button is pressed the fault help window is launched

10.1.2. Machining

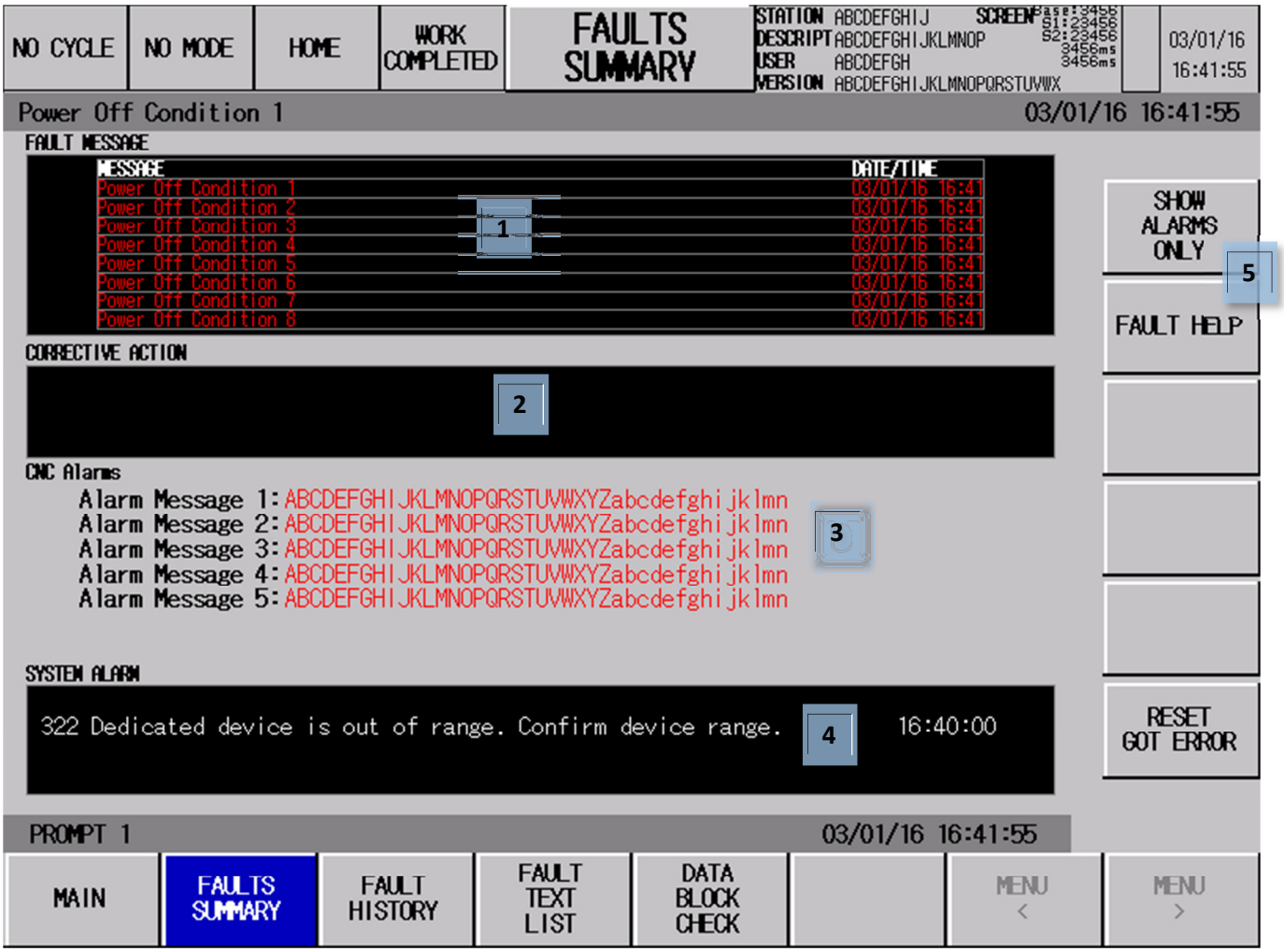


Figure 88-Faults Summary Machining

Item Number	Object	Description

Item Number	Object	Description
1	Advanced user Alarm Display Fault message	Displays the Alarm ID in GD65000, a project script sets this value is set based off MachineData.MachineType
2	Corrective Action Word Comment Display: GD65052	Comment File #11 GD65052, is populated by the Advanced User Alarm Display when the fault is selected
3	CNC Alarms	This alarm area is already monitoring Automatic Setting window 5 of the CNC CPU. "Acquisition of alarm message which is Occurring"
4	System Alarm Display	
5	Show Alarms Push Button	This button will filter out the warnings when selected
	Fault Help Push Button	When an alarm is selected and the button is pressed the fault help window is launched

10.2 Fault Help Window

This overlap window displays additional information on the selected alarm, when implemented properly an image is displayed.

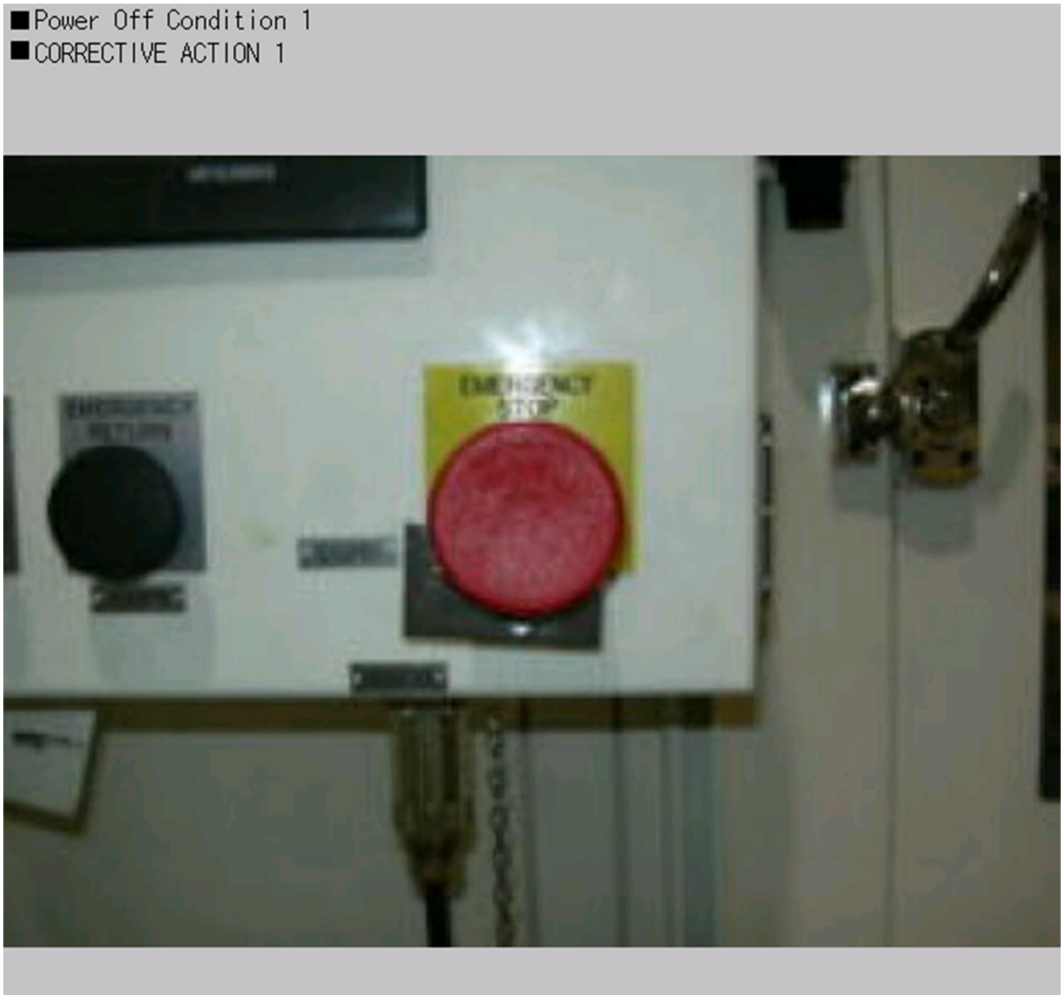


Figure 89-Fault Help Window

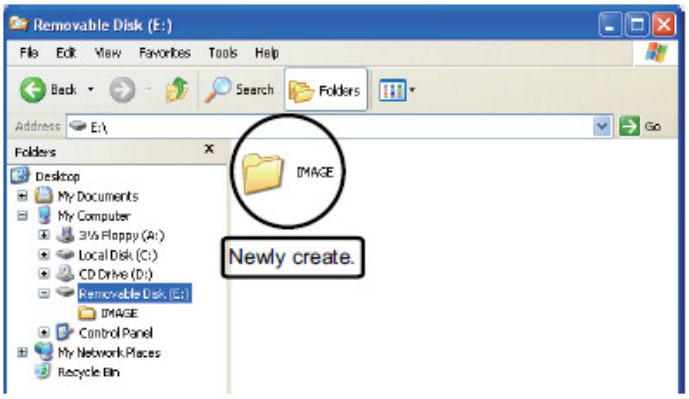
GS450.b8 is set automatically by a project script.

With this bit set images are loaded from the A:\ Memory Card

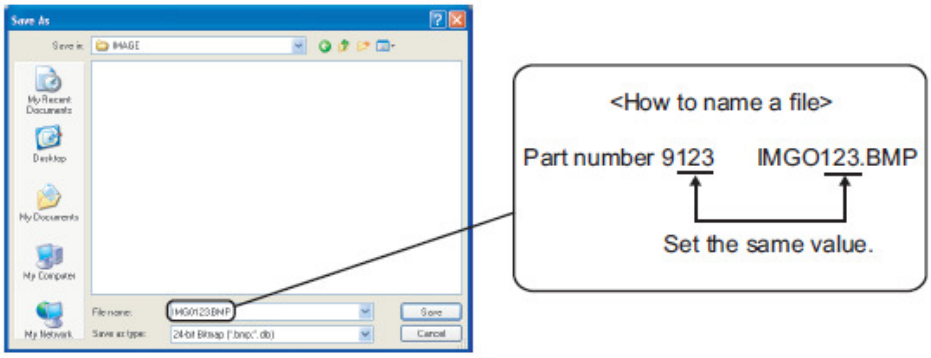
The part Number is 9000+ the comment number so for fault #1 the image needs to be IMG0001.BMP

■ Displaying BMP/JPEG files (project units)

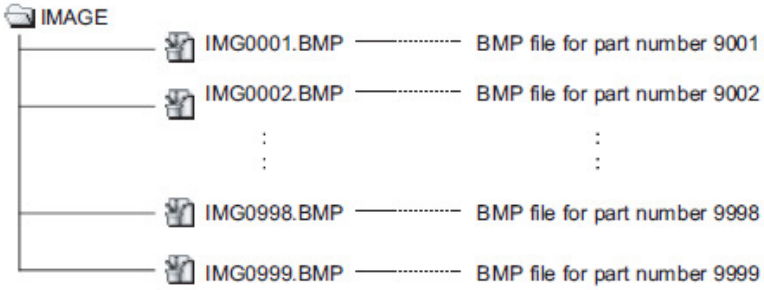
1. Create a folder named "IMAGE" to store BMP/JPEG file parts in the memory card.
   If storing BMP/JPEG file parts in other than "IMAGE" folder, the BMP/JPEG file parts will not be displayed in Parts Display/Parts Movement.



2. Store a BMP/JPEG file to be used as a part in the "IMAGE" folder in the memory card by naming the file with "IMG****. BMP" or "IMG****. JPG". (Assign "*****" with a number from 0001 to 0999.)
   The lower 3 digits of "*****" corresponds to those of part numbers.
   Example) Naming the BMP file to be displayed as a part of the part number 9123.



- Structure in the memory card (for BMP files)



10.3 *Fault History*

The fault history Screen allows the user to view a chronological history of alarms. Download the alarms to a CSV file on a USB stick. Or filter the warnings out.

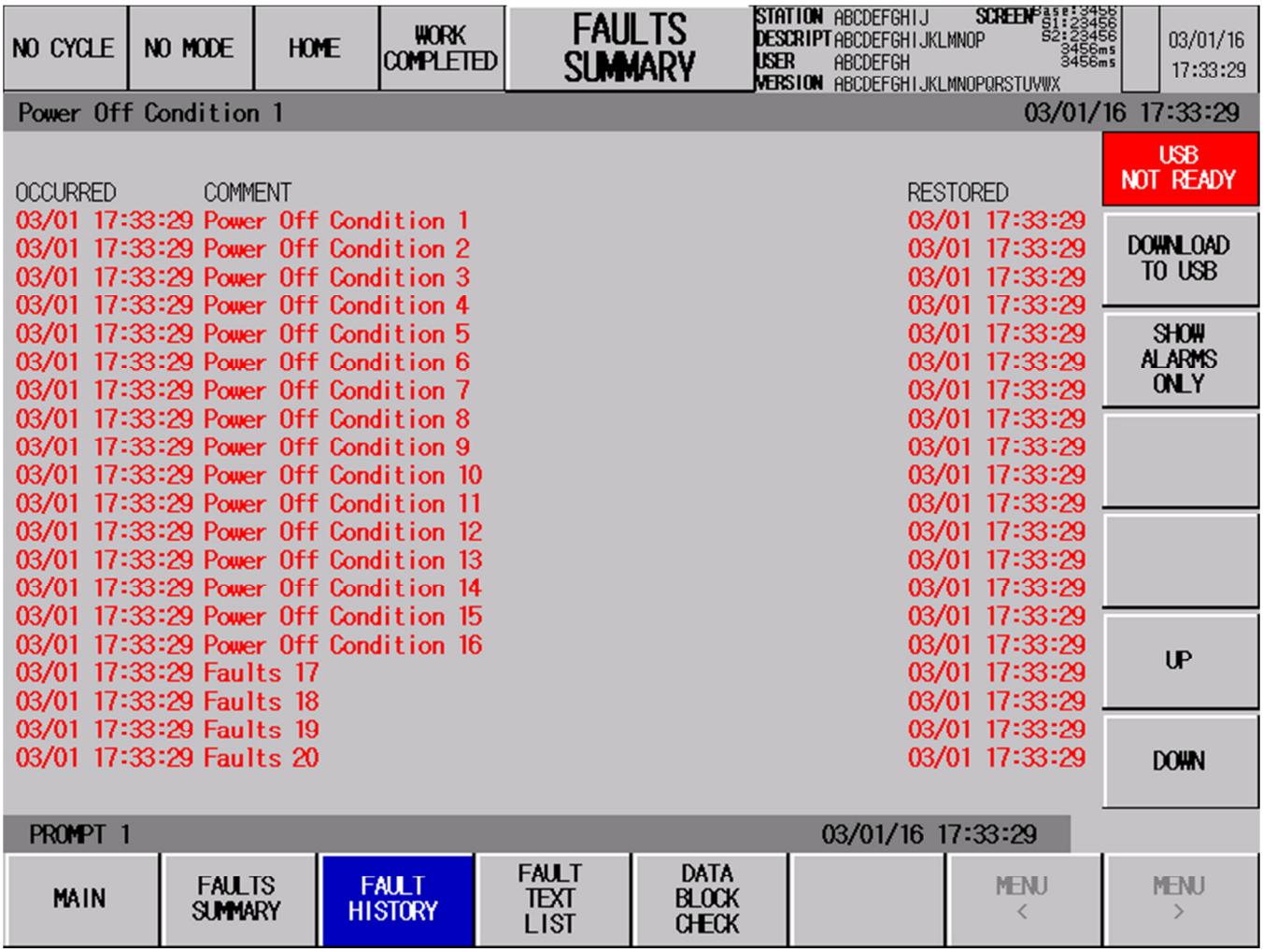


Figure 90-Fault History

The up/down buttons, moves the selection one row when an alarm has been selected on the screen.

When nothing is selected it operates as a page up and page down

When the E:\drive(front USB) is accessible the download to USB is accessible. This button uses a screen script to copy the converted alarm.csv file to the USB drive.

10.4 Fault Text List

The fault text list screen allows an operator to view the text list of all faults registered within the HMI

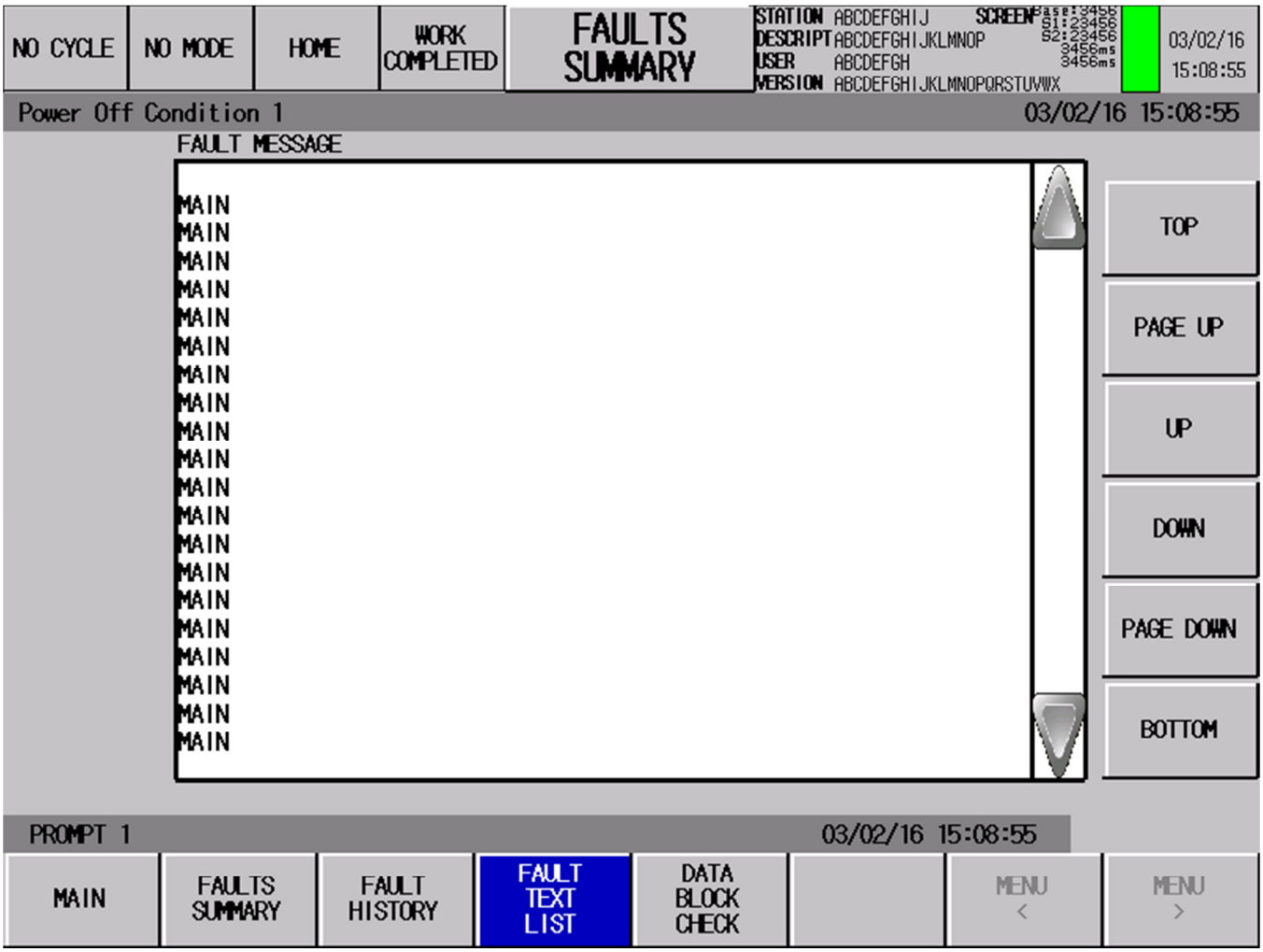


Figure 91-Fault Text List

GD65012 controls the comment file that is used to populate this screen, it is populated by script number 4.

The Screen number value placed into GD65012 is determined by the value residing in [<t:MachineData.MachineType>];

0 & 1 load comment file #10

2 loads comment file #15

GD65013 is also populated by script #4 and represents the last comment number

GD65013=1005 for Machine Type 0 &1, and 4980 for machine type 2

11 PRODUCTION

11.1 HMI-Part Counter

From the part counter screen the target count can be set. Selected part counts can be reset, and a manual shift reset, can be done.

The screen displays the parts known by the system, their current shift counts for good, bad and total. Previous shift counts, and machine life part for the selected station.

A subset of 8 counts are shown on the screen, multiple pages are available depending on the maximum part count. Page up/down control can be done with the arrow scroll keys.

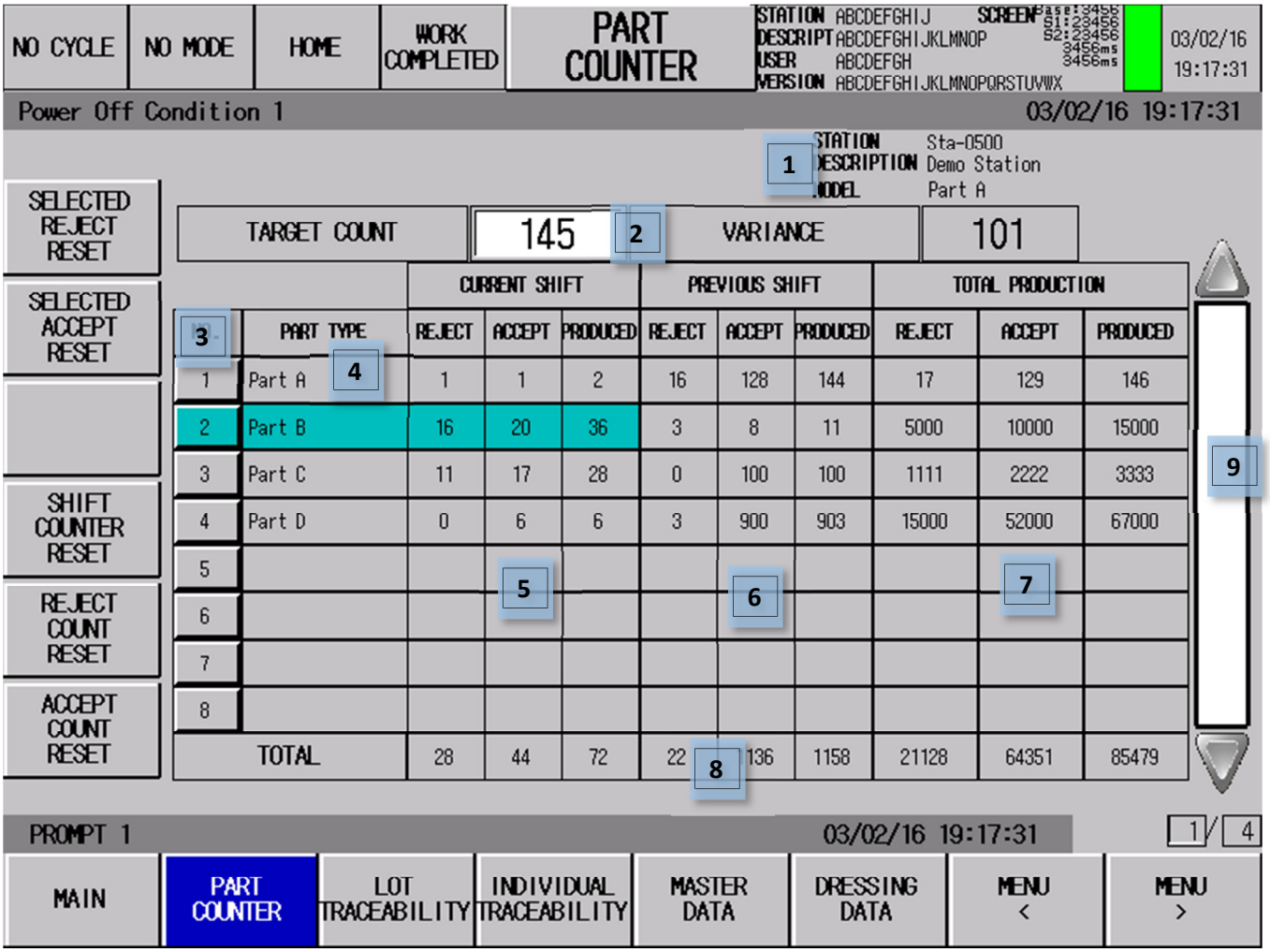


Figure 92-Part Count Screen

Item Number	Object	Device X=row number	Details

Item Number	Object	Device X=row number	Details
1	Station ASCII Display	GD64200	Information Loaded by project script from current station viewed
	Station Description ASCII Display	GD64205	Information Loaded by project script from current station viewed
	Model ASCII Display	GD64230	Current Model In Station loaded by project script
2	Target Count Numeric Input **Password Protected**	GOTPartCnt.Target	
	Variance Numeric Display	GOTPartCnt.Variance	This value is the target – the total number of good parts made this shift
3	Row Selection Button	GOTPartCnt.Selection Sets the selection = X if the row is not masked	There are two layered objects a numeric display showing part number index, and a word set pushbutton that sets the row number
	Index Numeric Display	GOTPartCnt.DisplayIndex+ (x-1), hides number if mask bit is on, displays teal if selection == X Displays yellow if it is the current index	
4	Part Type	GOTPartCnt.PartTypeHMI[X,0]	Displays the part types
5	Current Shift Data Numeric Displays	GOTPartCnt.CurBad[1-8] GOTPartCnt.CurGood[1-8] GOTPartCnt.CurProd[1-8]	Background turns Teal when Selection = X Production totals are the sum of good, bad, dry cycle, and no build. Dry cycle and no build are not displayed
6	Previous Shift Data Numeric Displays	GOTPartCnt.PreBad[1-8] GOTPartCnt.PreGood[1-8] GOTPartCnt.PReProd[1-8]	No operations occur on this data it is populated by shift counter reset
7	Total Production Numeric Displays	GOTPartCnt.TotalBad[1-8] GOTPartCnt.TotalGood[1-8] GOTPartCnt.TotalProd[1-8]	Double Words Production totals are the sum of good, bad, dry cycle, and no build. Dry cycle and no build are not displayed

Item Number	Object	Device X=row number	Details
8	Totals Numeric Displays	Current Shift GOTPartCnt.TotalCount[1,2,5] Previous Shift: GOTPartCnt.TotalCount[6,7,10] Total Production: GOTPartCnt.TotalCount[11,12,15]	The function block sums all counts for all part types, this screen displays these totals
9	Cursor Control	GOTPartCnt.CurrentPage -1 GOTPartCnt.CurrentPage +1	The up/down arrows will change the current page by one

11.2 PLC-ProdCounts

Two function blocks are used in the program and are needed to track and display production counts for a workstation.

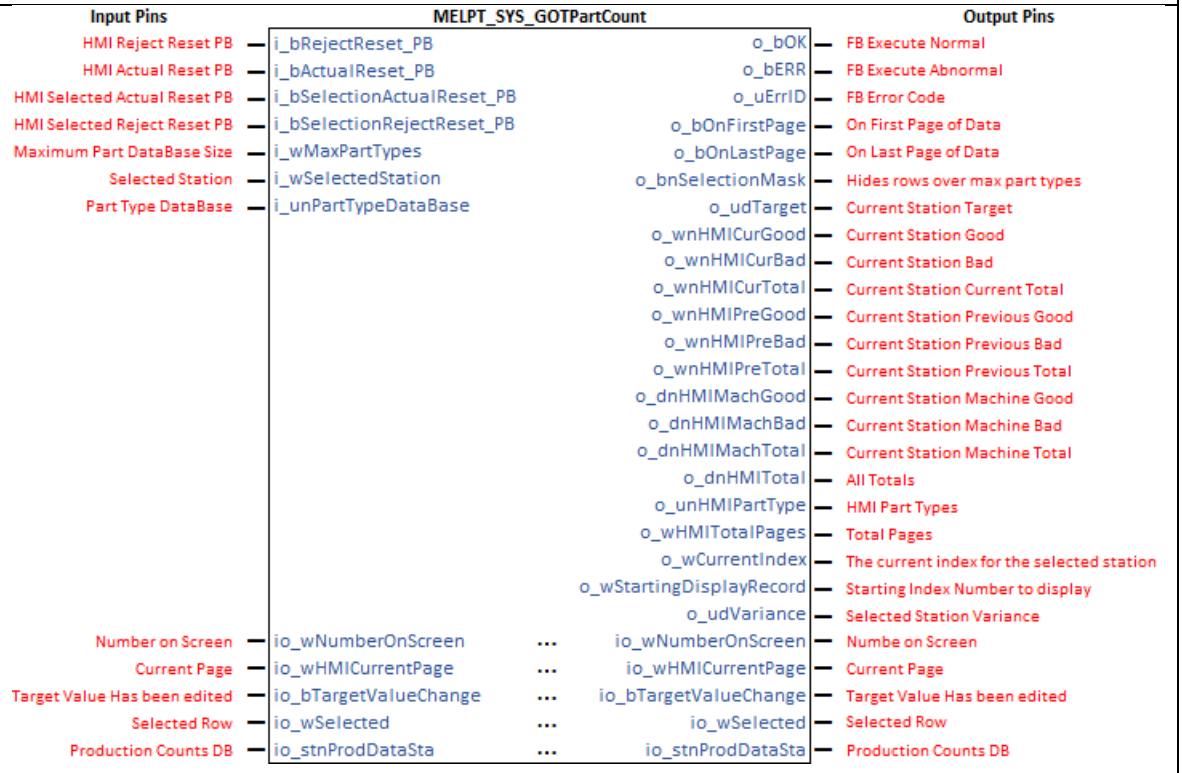
One instance of MELPT_SYS_GOTPartCount is required for HMI interface to 8 workstations of data

One instance of MELPT_SYS_ProdCounterDB is required per workstation managed by the PLC. This function block matches the current part type in station to one in the shared database, and adds the part number to the database if it does not exist. It also increments the current count of good, bad, no cycle, and no build parts for the workstation.

Current Shift Counts are reset to one when an individual count exceeds 32000. The total is limited to 32000.

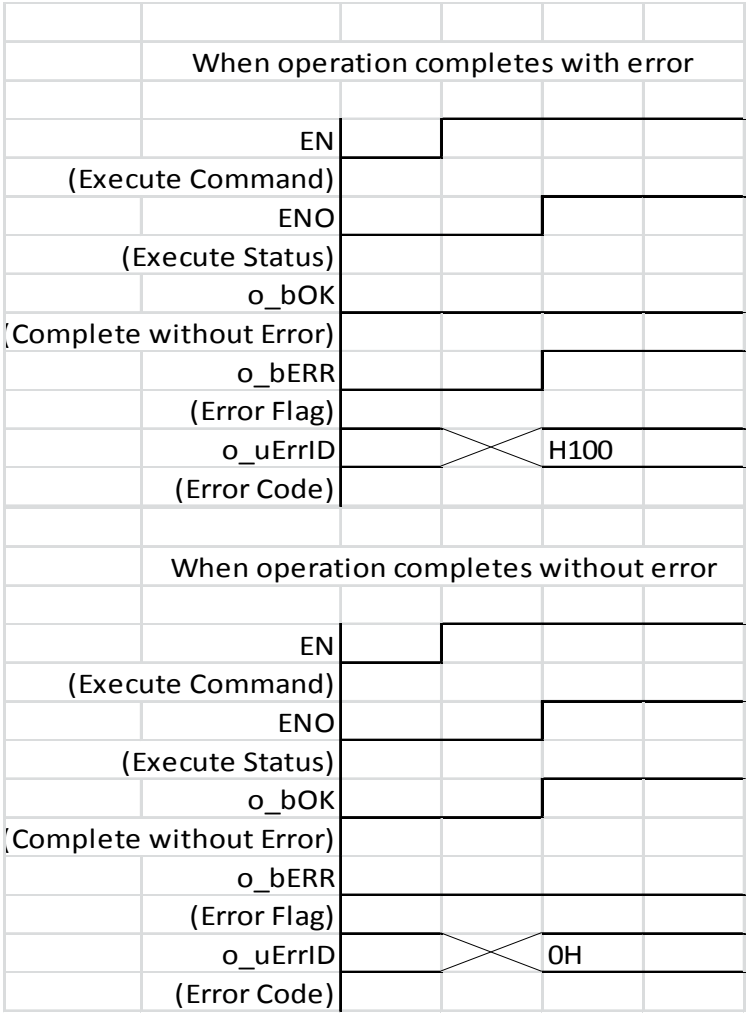
11.2.1. MELPT_SYS_GOTPartCount

FB Name
MELPT_SYS_GOTPartCount

Function Overview	
Item	Description
Function overview	This function block interfaces with the hmi to display production counts for the selected station, and with proper authentication allows for the reset of said counts.
Symbol	

<table>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 766 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>17 bits
38000 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This function block requires the MELPT_SYS_StationPartCounts SDT</td></tr>
<tr><td>Function description</td><td></td></tr>
<tr><td>Restrictions and precautions</td><td>Index Z16 thru z19 are used within this function block.</td></tr>
</table>

Timing chart



FB Error Code

Error Code	Description
0	No Error
H102 (258)	Selected Station greater than 8
H103 (259)	Selected Station less than 1
H104 (260)	Max Part Types greater than 200
H105 (261)	Max Part Types less than 1

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	HMI Reject Reset PB	i_bRejectReset_PB	Bit		HMI PB to reset all Current rejects
	HMI Actual Reset PB	i_bActualReset_PB	Bit		HMI PB to reset all Current actuals
	HMI Selected Actual Reset PB	i_bSelectionActualReset_PB	Bit		Resets Selected Part Type Current Actual
	HMI Selected Reject Reset PB	i_bSelectionRejectReset_PB	Bit		Resets Selected Part Type Current Reject
X	Maximum Part DataBase Size	i_wMaxPartTypes	Word[Signed]	1 to 200	Maximum Loops
	Selected Station	i_wSelectedStation	Word[Signed]	1 to 8	Selected Station 1-8
	Part Type DataBase	i_unPartTypeDataBase	Word[Unsigned](1..200,0..7)		Part Type Database

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Number on Screen	io_wNumberOnScreen	Word[Signed]		No. of records to be displayed on screen
	Current Page	io_wHMICurrentPage	Word[Signed]		Current Page for HMI
	Target Value Has been edited	io_bTargetValueChange	Bit		Wrtie Check Value

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Selected Row	io_wSelected	Word[Signed]		HMI Selected Indicator
	Production Counts DB	io_stnProdDataSta	MELPT_SYS_StationPartCounts(1..8)		DB Info

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	TRUE when FB executed
FB Execute Abnormal	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
On First Page of Data	o_bOnFirstPage	Bit	HMI Page Control
On Last Page of Data	o_bOnLastPage	Bit	True when HMI is on last page
Hides rows over max part types	o_bnSelectionMask	Bit(1..8)	Used to Prevent Selection of Unused Part Types
Current Station Target	o_udTarget	Double Word[Unsigned]	Target of Station
Current Station Good	o_wnHMICurGood	Word[Signed](1..8)	HMI Display Current Shift Good Part
Current Station Bad	o_wnHMICurBad	Word[Signed](1..8)	HMI Display Current Shift Bad Part
Current Station Current Total	o_wnHMICurTotal	Word[Signed](1..8)	HMI Display Current Shift Total Part
Current Station Previous Good	o_wnHMIPreGood	Word[Signed](1..8)	HMI Display Previous Shift Good Part
Current Station Previous Bad	o_wnHMIPreBad	Word[Signed](1..8)	HMI Display Previous Shift Bad Part
Current Station Previous Total	o_wnHMIPreTotal	Word[Signed](1..8)	HMI Display Previous Shift Total Part

Symbol Name	Var_Output name	Data Type	Description
Current Station Machine Good	o_dnHMIMachGood	Double Word[Signed](1..8)	HMI Display Total Good Part
Current Station Machine Bad	o_dnHMIMachBad	Double Word[Signed](1..8)	HMI Display Total Bad Part
Current Station Machine Total	o_dnHMIMachTotal	Double Word[Signed](1..8)	HMI Display Total Shift Total Part
All Totals	o_dnHMITotal	Double Word[Signed](1..15)	HMI Display Total Reject, Accept, Produced, for current previous and total
HMI Part Types	o_unHMIPartType	Word[Unsigned](1..8, 0..7)	HMI Display of Part Types
Total Pages	o_wHMITotalPages	Word[Signed]	Total Pages for HMI
The current index for the selected station	o_wCurrentIndex	Word[Signed]	Match Location
Starting Index Number to display	o_wStartingDisplayRecord	Word[Signed]	Starting Record Number for this page
Selected Station Variance	o_udVariance	Double Word[Unsigned]	Target - Current Shift Produced

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.10	Added selection and reset of current shift, added max part type input, changed calculations from Double to single word. Only totals are double word.
1.12	Modified for SDT changes FB labels updated to BCN-89000-0823-D guideline
1.20	Auto-Add Part Type Feature Added; Added FB Status Outputs
1.24	; Strings Converted to Word Arrays; Modified Screen Active and Security OK Logic
2.00A	Adopted BCN-89000-0969 Adjusted to 200 Part Types; added cursor controls
3.00	Separated HMI and count functionality to support 8 work stations

Version	Description
3.01	Changes to the structure

SDT Usage

1. MELPT_SYS_StationPartCounts

Global Label: ProdCounts		
Member	Type	Usage
Index	Word[Signed]	The Match Index
CurGood	Word[Signed](1..200)	Current Good Counts for 200 parts, can be reset by the HMI
CurBad	Word[Signed](1..200)	Current Bad Counts for 200 parts, can be reset by the HMI
CurDryCycle	Word[Signed](1..200)	
CurNoBuild	Word[Signed](1..200)	
CurTotal	Word[Signed](1..200)	A summation of Current Shift Good, Bad, Dry Cycle, and No build, for display on HMI
PreGood	Word[Signed](1..200)	Previous Shift Good Counts for 200 parts, for display on the HMI
PreBad	Word[Signed](1..200)	Previous Shift Bad Counts for 200 parts, for display on the HMI
PreDryCycle	Word[Signed](1..200)	
PreNoBuild	Word[Signed](1..200)	
PreTotal	Word[Signed](1..200)	A summation of Previous Shift Good, Bad, Dry Cycle, and No build, for display on HMI
MachGood	Double Word[Signed](1..200)	Machine history of Good Parts for 200 part Types for display on the HMI
MachBad	Double Word[Signed](1..200)	Machine history of Bad Parts for 200 part Types for display on the HMI

Global Label: ProdCounts		
Member	Type	Usage
MachDryCycle	Double Word[Signed](1..200)	
MachNoBuild	Double Word[Signed](1..200)	
MachTotal	Double Word[Signed](1..200)	Machine history of Bad Parts for 200 part Types for display on the HMI
Target	Double Word[Signed]	Target Input for the selected station
Variance	Double Word[Signed]	Copy the variance for the selected station
Totals	Double Word[Signed](1..15)	Copy the totals to the HMI structure for the selected station

2. MELPT_SYS_GOTPartCounter

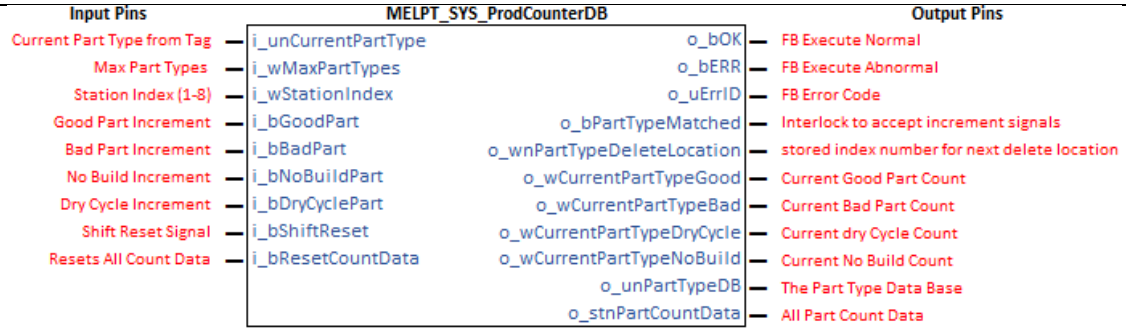
System Label: GOTPartCnt		
Member	Type	Usage
ShiftReset_PB	Bit	
RejectReset_PB	Bit	Resets Current Shift Rejects for Selected Station
ActualReset_PB	Bit	Resets Current Shift Accepted Part Count for Selected Sattion
SelectionActualReset_PB	Bit	Resets the selected part accepted count
SelectionRejectReset_PB	Bit	Resets the selected part reject count
OnFirstPage	Bit	FB set to limit hmi navigation to possible pages
OnLastPage	Bit	FB set to limit hmi navigation to possible pages
TargetValueChange	Bit	Signal from HMI that the Target value has been modified
DisplayMask	Bit(1..8)	Fb masking out impossible rows

System Label: GOTPartCnt		
Member	Type	Usage
PartIndex	Word[Signed]	The Part Index of the current Part for HMI display
DisplayIndex	Word[Signed]	The starting index for the 8 rows displayed
Selection	Word[Signed]	Hmi controlled Selected Row
NumberOnScreen	Word[Signed]	Number of rows on screen
CurrentPage	Word[Signed]	Current Page Number controlled by HMI limited by FB
TotalPages	Word[Signed]	Total Pages calculated by FB
Target	Double Word[Unsigned]	This stations Target Value
Variance	Double Word[Unsigned]	This stations variance
CurGood	Word[Signed](1..8)	Current Shift Good Counts for HMI display, FB populated, based off selected station and current page, and numberonScreen
CurBad	Word[Signed](1..8)	Current Shift Bad Counts for HMI display, FB populated, based off selected station and current page, and numberonScreen
CurProd	Word[Signed](1..8)	Current Shift Total Produced for HMI display, FB populated, based off selected station and current page, and numberonScreen
PreGood	Word[Signed](1..8)	Previous Shift Good Counts for HMI display, FB populated, based off selected station and current page, and numberonScreen
PreBad	Word[Signed](1..8)	Previous Shift Bad Counts for HMI display, FB populated, based off selected station and current page, and numberonScreen

System Label: GOTPartCnt		
Member	Type	Usage
PreProd	Word[Signed](1..8)	Previous Shift Total Produced for HMI display, FB populated, based off selected station and current page, and numberonScreen
TotalGood	Double Word[Signed](1..8)	Total Produced Good Counts for HMI display, FB populated, based off selected station and current page, and numberonScreen
TotalBad	Double Word[Signed](1..8)	Total Produced Shift Bad Counts for HMI display, FB populated, based off selected station and current page, and numberonScreen
TotalProd	Double Word[Signed](1..8)	Mach Life Total Produced for HMI display, FB populated, based off selected station and current page, and numberonScreen
TotalCount	Double Word[Signed](1..15)	Total Counts for selected station
PartTypeHMI	Word[Unsigned](1..8,0..7)	Part Types for display on HMI; FB populated, based off current page, and numberonScreen

11.2.2. MELPT_SYS_ProdCounterDB

FB Name
MELPT_SYS_ProdCounterDB

Function Overview	
Item	Description
Function overview	This function block is used to manage the parts database. One instance is required for each work station controlled by this plc. Once the part is matched inputs can be accepted to increment one of four counts: Good Bad No build Dry Cycle
Symbol	
Applicable Hardware	

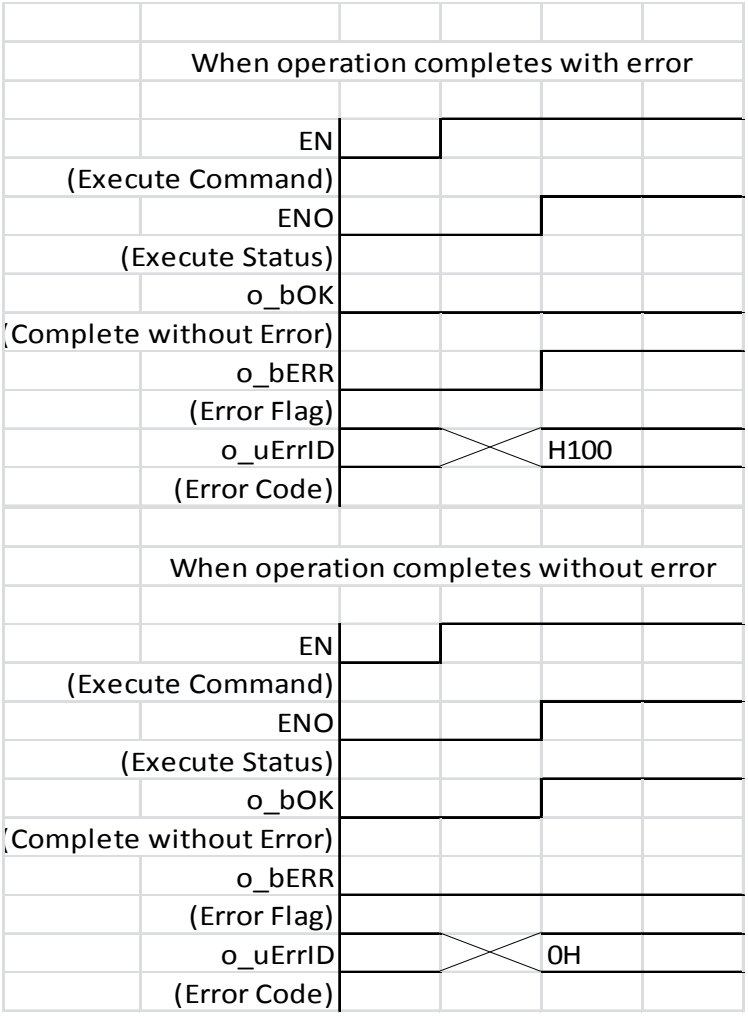
Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

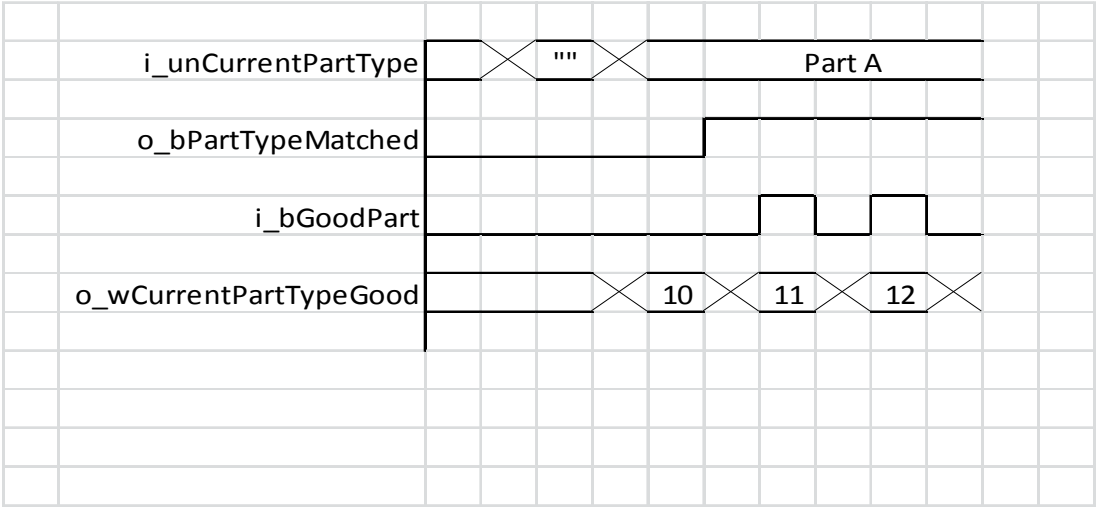
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 1578 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	14 bits 37947 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the MELPT_SYS_StationPartCounts SDT
Function description	When o_bPartTypeMatched is true, i_bGoodPart, i_bBadPart, i_bDryCyclePart, and i_b NoBuildPart will increment their related part count. While the Part is matched the current counts are output from this function block. If the current part type does not exist in the Part Type DB, the function block will add it at the first empty location. If no empty location exists, the location at o_wnPartTypeDeleteLocation will be cleared and the new part type will replace this position.
Restrictions and precautions	Index Z16 is used within this function block.

Timing chart





FB Error Code

Error Code	Description
0	No Error
H101 (257)	Max Part Types greater than 200
H102 (258)	Max Part Types less than 1
H103 (259)	Station Index greater than 8
H104 (260)	Station Index less than 1

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
		i_unCurrentPartType	Word[Unsigned](0..7)		The current part type
X		i_wMaxPartTypes	Word[Signed]	1 to 200	Declares when we need to delete a row
X		i_wStationIndex	Word[Signed]	1 to 8	Which index of counts to use
X		i_bGoodPart	Bit		increment Current Good Part Count for PartType
X		i_bBadPart	Bit		increment Current Bad Part Count for PartType
X		i_bNoBuildPart	Bit		No Build Increment Signal
X		i_bDryCyclePart	Bit		Dry Cycle Increment Signal
		i_bShiftReset	Bit		Moves Current Counts to Previous shift

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X		i_bResetCountData	Bit		Removal of all Part Type and Counts

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	TRUE when FB executed
FB Execute Abnormal	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
On First Page of Data	o_bPartTypeMatched	Bit	Part Type Matched
On Last Page of Data	o_wnPartTypeDeleteLocation	Word[Signed]	The Part Type Index to be deleted next
Hides rows over max part types	o_wCurrentPartTypeGood	Word[Signed]	Current Part Type Number Good
Current Station Target	o_wCurrentPartTypeBad	Word[Signed]	Current Part Type Number Bad
Current Station Good	o_wCurrentPartTypeDryCycle	Word[Signed]	Current Part Type Number DryCycle
Current Station Bad	o_wCurrentPartTypeNoBuild	Word[Signed]	Current Part Type No Build
Current Station Current Total	o_unPartTypeDB	Word[Unsigned](1..200,0..7)	DB Info
Current Station Previous Good	o_stnPartCountData	MELPT_SYS_StationPartCounts(1..8)	All The Part Counts

FB Version Upgrade History

Version	Description
3.00	Initial Release
3.01	Insert Data brought into this FB

SDT Usage

3. MELPT_SYS_StationPartCounts

System Label: ProdCounts		
Member	Type	Usage
Index	Word[Signed]	The Match Index populated by this FB
CurGood	Word[Signed](1..200)	Incremented by this FB
CurBad	Word[Signed](1..200)	Incremented by this FB
CurNoBuild	Word[Signed](1..200)	Incremented by this FB
CurDryCycle	Word[Signed](1..200)	Incremented by this FB
CurTotal	Word[Signed](1..200)	Summed by this FB
PreGood	Word[Signed](1..200)	Transferred from Current with Shift Reset
PreBad	Word[Signed](1..200)	Transferred from Current with Shift Reset
PreDryCycle	Word[Signed](1..200)	Transferred from Current with Shift Reset
PreNoBuild	Word[Signed](1..200)	Transferred from Current with Shift Reset
PreTotal	Word[Signed](1..200)	Transferred from Current with Shift Reset
MachGood	Double Word[Signed](1..200)	Incremented by this FB
MachBad	Double Word[Signed](1..200)	Incremented by this FB
MachTotal	Double Word[Signed](1..200)	Incremented by this FB
MachDryCycle	Double Word[Signed](1..200)	Incremented by this FB
MachNoBuild	Double Word[Signed](1..200)	Incremented by this FB
Variance	Double Word[Signed]	Calculated By This FB
Totals	Double Word[Signed](1..15)	Calculated By This FB

11.3 Production-LOT Traceability

The traceability functions are FCA specific screens and function blocks. The function block and programs can be found in the FCANAFTA user library, it can be classified into two categories:

Lot Traceability and Individual Traceability, this section covers Lot Traceability

Lot Traceability

- HMI
  - Lot Trace Bin Status
  - Lot Trace Item Status
  - Lot Trace Bin Config
  - Lot Trace Item Config
  - Scanner Type Selection
- PLC
  - MELPT_LotTraceability_GOT
  - MELPT_LotTrace_StationLogic
  - MELPT_LotTrace_HandScanner
  - MELPT_LotTrace_FixedScanner
  - MELPT_GroupSerperatorParse_FB
  - MELPT_ConvertChartoNumeral

11.3.1. HMI-Lot Traceability Bin Status

This screen displays the status of 8 bins Lot Bins for one station. Other stations can be navigated to from this screen.

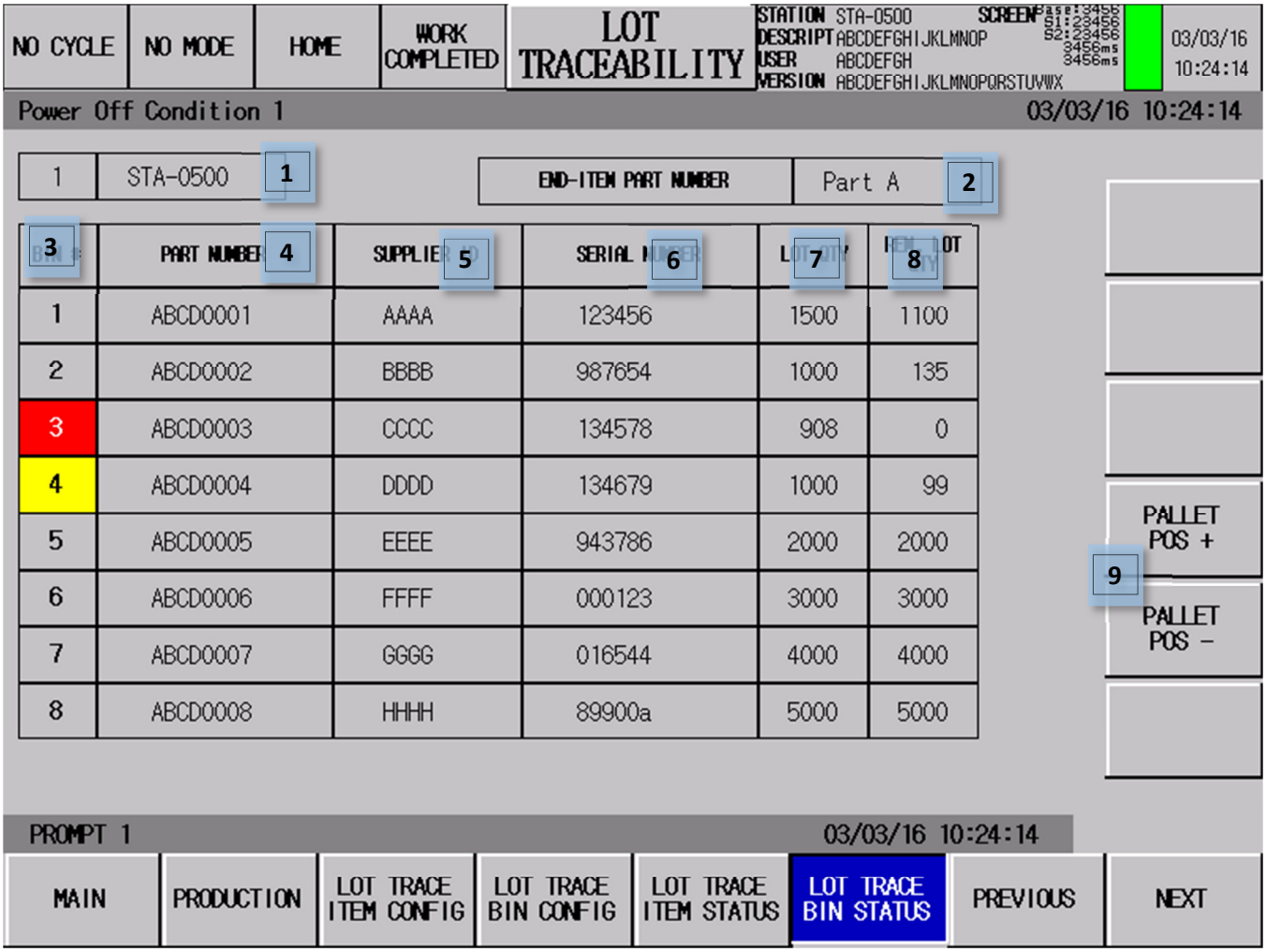


Figure 93- Lot Traceability Bin Status

Item Number	Object	Device X=row number	Details
1	Displayed Station Number Ascii Display:	Traceability.StationNumber[0]	
2	End-Item Part Number ASCII Display::	Traceability.EndItemPartNumber[0]	

Item Number	Object	Device X=row number	Details	
3	Bin Status Word Comment Display	Traceability.GOTBinIndex[X] Yellow= Remaining QTY within warning range RED= Remaining QTY Within alarm Range	Value	Display
			Normal	X
			1	X
			2	X
4	Part Number ASCII Display	Traceability.PartNumber[X,0]	Parsed from the barcode	
5	Supplier ID ASCII Display	Traceability.SupplierID[X,0]	Parsed from the barcode	
6	Serial Number ASCII Display	Traceability.SerialNumber[X,0]	Parsed from the barcode	
7	Lot QTY Numeric Display	Traceability.LotQuantity[X]	Parsed from the barcode	
8	Remaining Lot QTY Numeric Display	Traceability.RemainingLotQuantity[X]		
9	Change Station PB Word Set PB	Traceability.SelectStationNumber	Changes the station displayed on the screen	

11.3.2. HMI-Lot Traceability Item Status

This screen displays the read error proofing numbers and their locations on the RF TAG.

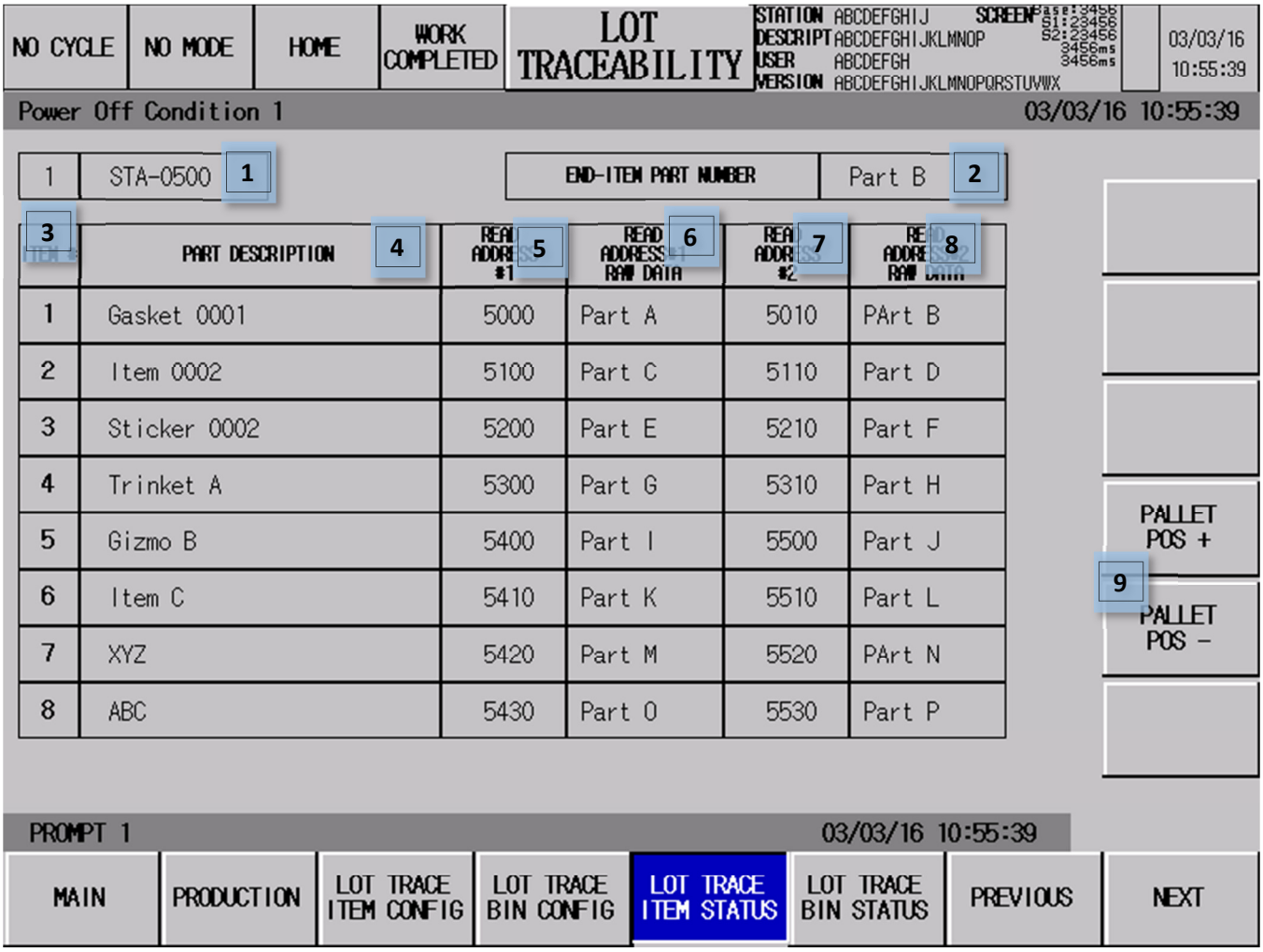


Figure 94- Lot Traceability Item Status Screen

Item Number	Object	Device X=row number	Details	
1	Displayed Station Number Ascii Display:	Traceability.StationNumber[0]		
2	End-Item Part Number ASCII Display::	Traceability.EndItemPartNumber[0]		
3	Item #	Traceability.GOTItemNumber[X]	Value	Display

Item Number	Object	Device X=row number	Details	
	Word Comment Display	RED= No Match Green = Match	Normal	X
			1	X
			2	X
4	Part Description ASCII Display	Traceability.PartDescription[X,0]	Stored ON PLC	
5	Read Address #1 Numeric Display	Traceability.ReadByteAddress1[X]	Stored ON PLC	
6	Read Address Raw Data #1 ASCII Display	Traceability.ReadAddressRawData1[X,0]	Parsed from the RF Tag	
7	Read Address #2 Numeric Display	Traceability.ReadByteAddress2[X]	Stored ON PLC	
8	Read Address Raw Data #2 ASCII Display	Traceability.ReadAddressRawData2[X,0]	Parsed from the RF Tag	
9	Change Station PB Word Set PB	Traceability.SelectStationNumber	Changes the station displayed on the screen	

11.3.3. HMI-Lot Traceability Bin Configuration

From this screen an authenticated user can change the Bin Setup for traceability.

Possible changes include the bit number for the Pick light and Pick sensor, the picklight sequence, the scanner type, or disable/enable the picklight.

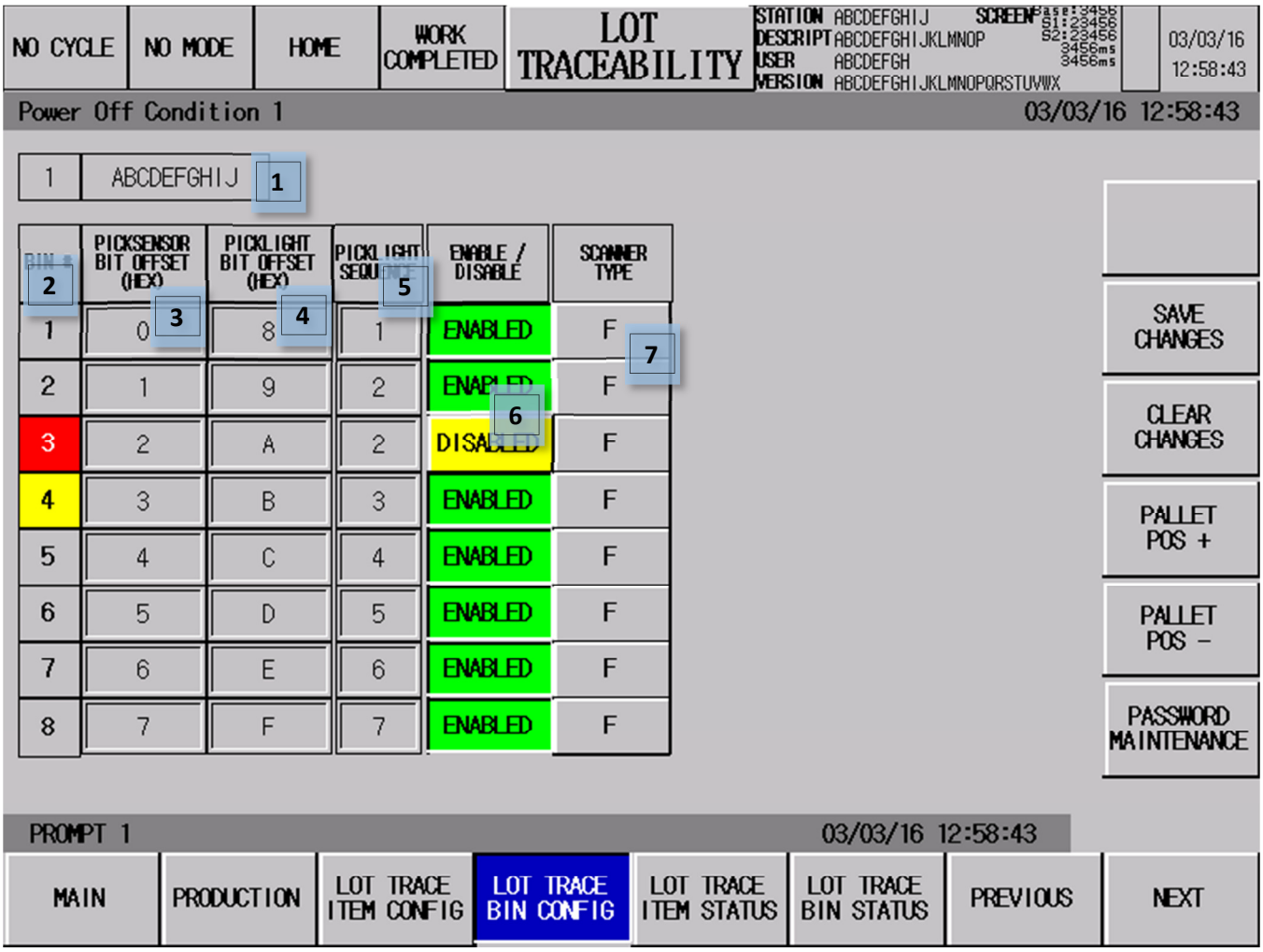


Figure 95-Lot Traceability Bin Configuration

Item Number	Object	Device X=row number	Details
1	Displayed Station Number Ascii Display:	Traceability.StationNumber[0]	

Item Number	Object	Device X=row number	Details	
2	Bin Status Word Comment Display	Traceability.GOTBinIndex[X] Yellow= Remaining QTY within warning range RED= Remaining QTY Within alarm Range	Value	Display
			Normal	X
			1	X
			2	X
3	Pick Sensor Bit Offset Numeric Input	Traceability.PickLightInputAddressBitOffset[X]	Limited to 0-15	
4	Pick Light Bit Offset Numeric Input	Traceability.PickLightOutputAddressBitOffset[X]	Limited to 0-15	
5	Pick Light Sequence Numeric Input	Traceability.PickLightSequence[X]	Limited to 0-8	
6	Enable/Disable: Bit Alternate Push Button	Traceability.EnablePickLight[X]		
7	Scanner Type Multifunction Switch	Traceability.ScannerTypeWriteCheck[X]	This button is yellow when bypassed Launches the scanner type selection window 1=**H**andheld, 2=**F**ixed 3=**S**pare 4=**B**ypassed	
9	Side Push buttons			
	Save Changes	Traceability.BinConfigSaveChanges	Moved changed data from hmi to the PLC for storage	
	Clear Changes	Traceability.BinConfigClearChanges	Overwrites HMI Data with PLC data	
	Pallet Pos +	Traceability.SelectStationNumber+1 Traceability.BinConfigClearChanges	Changes the station that is monitored	
	Pallet Pos -	Traceability.SelectStationNumber -1 Traceability.BinConfigClearChanges	Changes the station that is monitored	
	Password Maintenance	Navigates to the password screen		

11.3.4. HMI-Lot traceability Scanner Selection Window

This overlap window is launched from the Lot traceability configuration screen

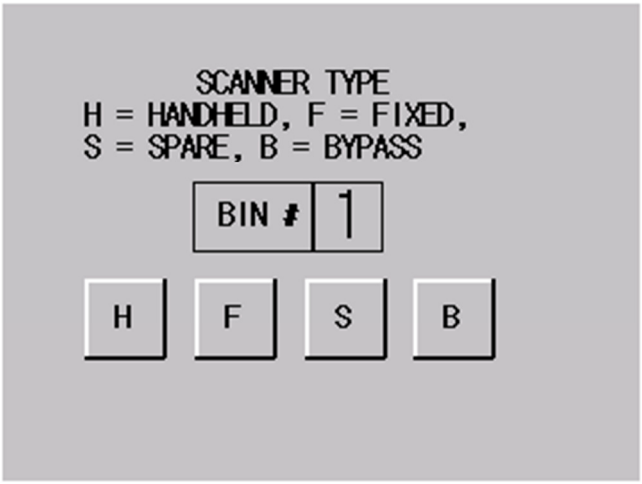


Figure 96-Scanner Selection Window

HandHeld = Type 1

Fixed = Type 2

Spare = Type 3

Bypass = Type 4

When one is selected, the row edited (write check) is set only when save changes is pressed afterwards is the new selection saved to the PLC.

11.3.5. HMI-Lot Traceability Item Config

This screen allows the user to set the read address locations for error proofing. Changes to Part Description, Parts/cycle, and enable/disable the Bin

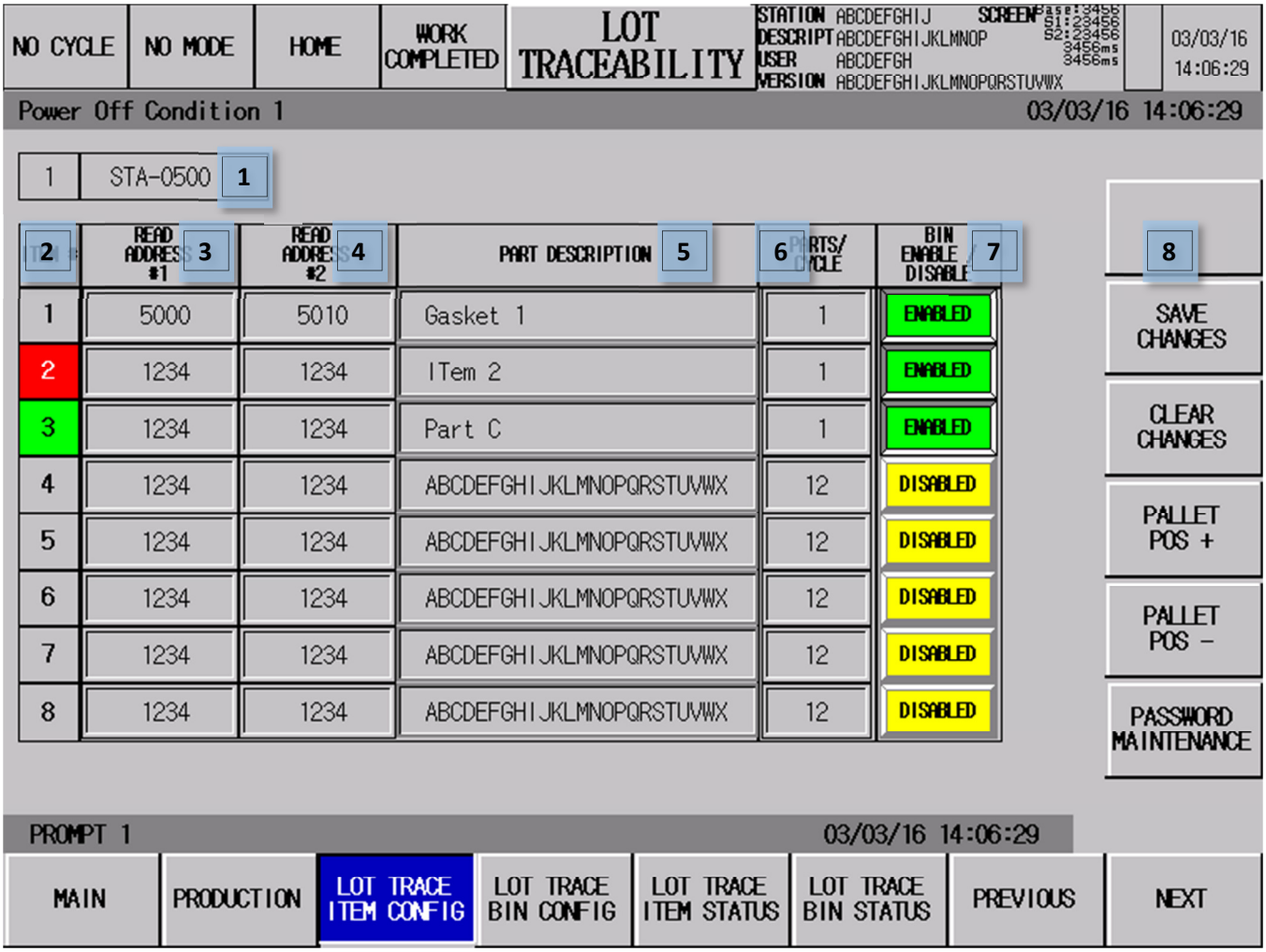


Figure 97-Lot Traceability Item Config

Item Number	Object	Device X=row number	Details	
1	Displayed Station Number Ascii Display:	Traceability.StationNumber[0]		
2	Item # Word Comment	Traceability.GOTItemNumber[X] RED= No Match	Value Normal	Display X

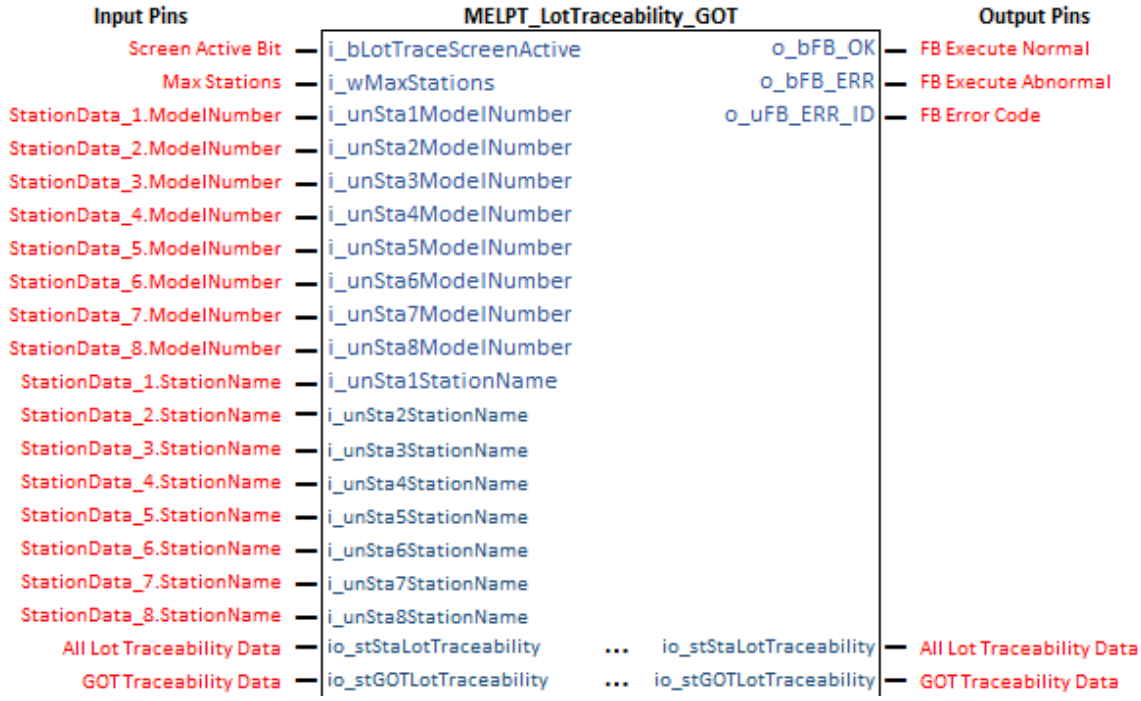
Item Number	Object	Device X=row number	Details	
	Display	Green = Match	1	X
			2	X
4	Read Address #1 Numeric Input	Traceability.ReadByteAddress1[X]	When the Row Edit bit is set the background is yellow	
5	Read Address #2 Numeric Input	Traceability.ReadByteAddress2[X]	When the Row Edit bit is set the background is yellow	
6	Part Description ASCII Input	Traceability.PartDescription[X,0]	When the Row Edit bit is set the background is yellow	
7	Parts/Cycle Numeric Input	Traceability.PartsUsedPerCycle[X]	When the Row Edit bit is set the background is yellow	
8	BIN Enable/Disable Bit Switch	Traceability.EnableBin[X]	When the Row Edit bit is set the background is yellow	
9	Side Push buttons			
	Save Changes	Traceability.BinConfigSaveChanges	Moved changed data from hmi to the PLC for storage	
	Clear Changes	Traceability.BinConfigClearChanges	Overwrites HMI Data with PLC data	
	Pallet Pos +	Traceability.SelectStationNumber+1 Traceability.BinConfigClearChanges	Changes the station that is monitored	
	Pallet Pos -	Traceability.SelectStationNumber -1 Traceability.BinConfigClearChanges	Changes the station that is monitored	
	Password Maintenance	Navigates to the password screen		

11.3.6. PLC-MELPT_LotTraceability_GOT

One instance is required to monitor 8 work stations worth of data.

This function block facilitates populating HMI data from the main PLC structures, and handles editing from the configuration screens

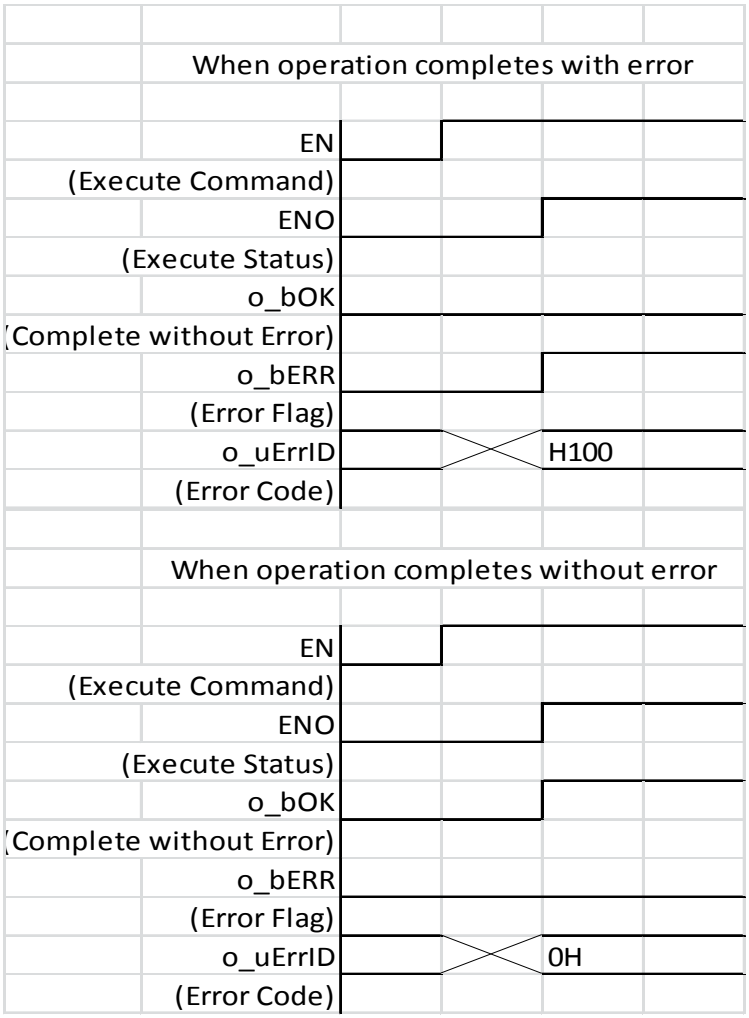
FB Name
MELPT_LOTTraceability_GOT

Function Overview	
Item	Description
Function overview	This function block transfers a subset of data from the traceability data block. Edits can be made from the hmi saved back to the traceability data block
Symbol	

Applicable Hardware			
	Series	Model	Serial Restriction
	MELSEC-Q series	Universal Model	None
	GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	<table><tr><th>Series</th><th>Version</th></tr><tr><td>GX Works 2</td><td>1.536</td></tr><tr><td>GT Designer 3</td><td>1.136</td></tr></table>
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 2647 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	339 bits 5349 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the MELPT_FCANAFTA_Traceability SDT And MELPT_FCANAFTA_LotTraceStaData SDT
Function description	
Restrictions and precautions	Index Z16-z19 is used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101 (257)	Maximum Stations Less than 0
H102 (258)	Maximum Station greater than 8

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Screen Active Bit	i_bLotTraceScreenActive	Bit		Lot Traceability Active
	Max Stations	i_wMaxStations	Word[Signed]		Max Number of Stations to display
	StationData_1.ModelNumber	i_unSta1ModelNumber	Word[Unsigned](0..7)		Station1 Model Number read from RF Tag
	StationData_2.ModelNumber	i_unSta2ModelNumber	Word[Unsigned](0..7)		Station2 Model Number read from RF Tag
	StationData_3.ModelNumber	i_unSta3ModelNumber	Word[Unsigned](0..7)		Station3 Model Number read from RF Tag
	StationData_4.ModelNumber	i_unSta4ModelNumber	Word[Unsigned](0..7)		Station4 Model Number read from RF Tag
	StationData_5.ModelNumber	i_unSta5ModelNumber	Word[Unsigned](0..7)		Station5 Model Number read from RF Tag
	StationData_6.ModelNumber	i_unSta6ModelNumber	Word[Unsigned](0..7)		Station6 Model Number read from RF Tag
	StationData_7.ModelNumber	i_unSta7ModelNumber	Word[Unsigned](0..7)		Station7 Model Number read from RF Tag
	StationData_8.ModelNumber	i_unSta8ModelNumber	Word[Unsigned](0..7)		Station8 Model Number read from RF Tag

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	StationData_1.StationName	i_unSta1StationName	Word[Unsigned](0..4)		Station1 Name input from Operartor
	StationData_2.StationName	i_unSta2StationName	Word[Unsigned](0..4)		Station2 Name input from Operartor
	StationData_3.StationName	i_unSta3StationName	Word[Unsigned](0..4)		Station3 Name input from Operartor
	StationData_4.StationName	i_unSta4StationName	Word[Unsigned](0..4)		Station4 Name input from Operartor
	StationData_5.StationName	i_unSta5StationName	Word[Unsigned](0..4)		Station5 Name input from Operartor
	StationData_6.StationName	i_unSta6StationName	Word[Unsigned](0..4)		Station6 Name input from Operartor
	StationData_7.StationName	i_unSta7StationName	Word[Unsigned](0..4)		Station7 Name input from Operartor
	StationData_8.StationName	i_unSta8StationName	Word[Unsigned](0..4)		Station8 Name input from Operartor

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	All Lot Traceability Data	io_stStaLotTraceability	MELPT_FCANAFTA_LotTraceStaData(1..8)		Data Storage for 8 stations
	GOT Traceability Data	io_stGOTLotTraceability	MELPT_FCANAFTA_Traceability		GOT Screens to SDT and Control to FB interface

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	TRUE when FB executed
FB Execute Abnormal	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output

FB Version Upgrade History

Version	Description
3.00	Rewritten
3.01	Coding improvements to reduce size

SDT Usage

1. MELPT_FCANAFTA_Traceability

System Label: Traceability		
Member	Type	Usage
EnableBin	Bit(1..8)	HMI PB to disable/enable pin
EnablePickLight	Bit(1..8)	HMI PB to disable/enable picklight
ScannerTypeWriteCheck	Bit(1..8)	Set by HMI when editing scanner type

System Label: Traceability		
Member	Type	Usage
ItemConfigWriteCheck	Bit(1..8)	Set My HMI when editing an item Config
BinConfigWriteCheck	Bit(1..8)	Set my HMI when editing a bin Config
ScannerSelectBit	Bit	Set by HMI In the middle of a scanner change
OnFirstStation	Bit	HMI station load control
OnLastStation	Bit	HMI station load control
ItemConfigSaveChanges	Bit	HMI PB Save Changes on Item Config Screen Write Edited Data to PLC Storage Location
ItemConfigClearChanges	Bit	HMI PB Clear Changes on Item Config Screen PLC data refreshes HMI Data
BinConfigSaveChanges	Bit	HMI PB Save Changes on Bin Config Screen Write Edited Data to PLC Storage Location
BinConfigClearChanges	Bit	HMI PB Clear Changes on Bin Config Screen PLC data refreshes HMI Data
ScannerSelectWord	Word[Signed]	Set By The HMI as the selection
StationNumber	Word[Unsigned](0..4)	Set by the FB and sent to the HMI
EndItemPartNumber	Word[Unsigned](0..4)	Set by the FB and sent to the HMI
GOTItemNumber	Word[Signed](1..8)	Sent to the HMI
GOTBinIndex	Word[Signed](1..8)	Sent to the HMI
ReadByteAddress1	Word[Unsigned](1..8)	Editable on the HMI of the Error Proofing location on the tag to read

System Label: Traceability		
Member	Type	Usage
ReadByteAddress2	Word[Unsigned](1..8)	Editable on the HMI of the Error Proofing location on the tag to read
PartDescription	Word[Unsigned](1..8,0..11)	Editable on the HMI
PartsUsedPerCycle	Double Word[Signed](1..8)	Editable on the HMI
LotQuantity	Double Word[Signed](1..8)	Displayed on the HMI
RemainingLotQuantity	Double Word[Signed](1..8)	Displayed on the HMI
SupplierID	Word[Unsigned](1..8,0..3)	Displayed on the HMI
SerialNumber	Word[Unsigned](1..8,0..4)	Displayed on the HMI
PartNumber	Word[Unsigned](1..8,0..4)	Displayed on the HMI
ReadAddressRawData1	Word[Unsigned](1..8,0..4)	Displayed on the HMI
ReadAddressRawData2	Word[Unsigned](1..8,0..4)	Displayed on the HMI
PickLightInputAddressBitOffset	Word[Unsigned](1..8)	Set by HMI
PickLightOutputAddressBitOffset	Word[Unsigned](1..8)	Set by HMI
PickLightSequence	Word[Signed](1..8)	Set by HMI

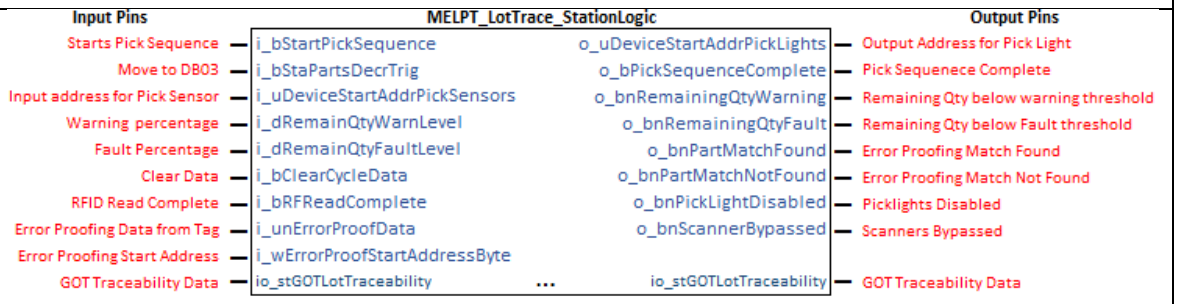
System Label: Traceability		
Member	Type	Usage
ScannerType	Word[Signed] (1..8)	Set by HMI
ScannerText	Word[Signed] (1..8)	SET by the FB This is the comment number to be displayed on the HMI for Scanner type
SelectStationNumber	Word[Signed]	Selected Station Number

11.3.7. PLC-MELPT-LotTrace_StationLogic

This function block handles the pick lights, and sequence for a workstation. Additionally it determines the warning and faults for the traceability.

One instance is required per set of 8 bins, or per work station

FB Name
MELPT_LOTTrace_StationLogic

Function Overview	
Item	Description
Function overview	This function block handles the pciklights, pick sensors and pick sequence for a set of 8 bins, as well as the error proofing of these bins, additionally outputs are provided by this function block on a per bin/item basis to notify of warnings and alarms
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD

Number of Ladder Steps	QnU: 1158 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	118 bits 1273 words 2 Timers
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the MELPT_FCANAFTA_LotTraceStaData SDT And MELPT_FCANAFTA_MPTS_LotTrace SDT
Function description	
Restrictions and precautions	Index Z16-z19 is used within this function block.
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Starts Pick Sequence	i_bStartPickSequence	Bit		Start of the Pick Sequence - Trigger
X	Move to DB03	i_bStaPartsDecrTrig	Bit		Trigger the decrement of parts/cycle from Lot Qty

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Input address for Pick Sensor	i_uDeviceStartAddrPickSensors	Word[Unsigned]		Device Start Address for Pick Sensor Inputs
X	Warning percentage	i_dRemainQtyWarnLevel	Double Word[Signed]	0 to 100	Remaining Quantity Warning Level in percentage
X	Fault Percentage	i_dRemainQtyFaultLevel	Double Word[Signed]	0 to 100	Remaining Quantity Fault Level in percentage
X	Clear Data	i_bClearCycleData	Bit		Clear Previous Cycle Data incl. RF Data
X	RFID Read Complete	i_bRFReadComplete	Bit		RF Tag Read Complete
X	Error Proofing Data from Tag	i_unErrorProofData	Word[Unsigned](0..600)		RF Tag Error Proof Data for 100 Error Proofs
X	Error Proofing Start Address	i_wErrorProofStartAddressByte	Word[Unsigned]		Tag address of data stored in i_unErrorProofData[0]

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Lot Traceability Data for one workstation	io_stStaLotTraceability	MELPT_FCANAFTA_LotTraceStaData		Data Storage for this station

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Output Address for Pick Light	o_uDeviceStartAddrPickLights	Word[Unsigned]	Device Start Address for Pick Lights Outputs

Symbol Name	Var_Output name	Data Type	Description
Pick Sequence Complete	o_bPickSequenceComplete	Bit	Pick Sequence Done
Remaining Quantity below warning threshold	o_bnRemainingQtyWarning	Bit(1..8)	Remaining Quantity Warning for Bins 1-8
Remaining Quantity below Fault threshold	o_bnRemainingQtyFault	Bit(1..8)	Remaining Quantity Fault for Bins 1-8
Error Proofing Match Found	o_bnPartMatchFound	Bit(1..8)	Error Proofing Part Match found in the Bins for Bins 1-8
Error Proofing Match Not Found	o_bnPartMatchNotFound	Bit(1..8)	Error Proofing Part Match NOT found in the for Bins 1-8
Picklight Disabled	o_bnPickLightDisabled	Bit(1..8)	Pick Lights Disabled Warning for Bins 1-8
Scanners Bypassed	o_bnScannerBypassed	Bit(1..8)	Scanner Bypassed Warning for Bins 1-8
Output Address for Pick Light	o_stMPTS_DB03_Data	MELPT_FCANAFTA_MPTS_LotTrace(1..8)	MPTS_DB03 Data

FB Version Upgrade History

Version	Description
3.00	Rewritten
3.01	Coding improvements to reduce size

SDT Usage

2. MELPT_FCANAFTA_LotTraceStaData

Global Label: LotTrace_StationData[X] X=StationNumber		
Member	Type	Usage

Global Label: LotTrace_StationData[X] X=StationNumber		
Member	Type	Usage
EnableBin	Bit(1..8)	Used to do Error Proofing
EnablePickLight	Bit(1..8)	Used to Pick Light Sequencing
QuantityWarning	Bit(1..8)	Set by this fb when at warning level
QuantityFault	Bit(1..8)	Set by this FB when at fault level
GOTItemNumber	Word[Signed](1..8)	Used to signify if error proofing match is found
GOTBinIndex	Word[Signed](1..8)	Used to Signify Warning or Fault Level
ReadByteAddress1	Word[Unsigned](1..8)	Used to know reading location of RFID error proofing for the Bin
ReadByteAddress2	Word[Unsigned](1..8)	Used to know reading location of RFID error proofing for the Bin
PartsUsedPerCycle	Double Word[Signed](1..8)	Used to know when to move in the pick sequence
LotQuantity	Double Word[Signed](1..8)	Used to determine fault and warning levels
RemainingLotQuantity	Double Word[Signed](1..8)	Compared to warning and fault percentage to set alarm
SupplierID	Word[Unsigned](1..8,0..3)	Moved to DB03
SerialNumber	Word[Unsigned](1..8,0..4)	Moved to DB03

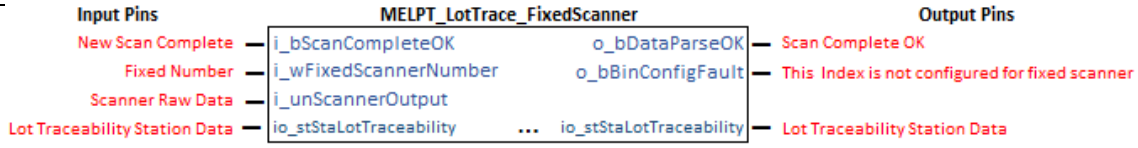
Global Label: LotTrace_StationData[X] X=StationNumber		
Member	Type	Usage
PartNumber	Word[Unsigned](1..8,0..4)	Moved to DB03
ReadAddressRawData1	Word[Unsigned](1..8,0..4)	Raw Data from RF Tag
ReadAddressRawData2	Word[Unsigned](1..8,0..4)	Raw Data from RF Tag
PickLightInputAddressBitOffset	Word[Unsigned](1..8)	Interrogate the pick sensor data for an individual point
PickLightOutputAddressBitOffset	Word[Unsigned](1..8)	Used to set the individual pick light on
PickLightSequence	Word[Signed](1..8)	Sequence numbers for picking
ScannerType	Word[Signed](1..8)	Scanner Type 1=Handheld 2=Fixed 3=Spare 4=Bypass
ScannerText	Word[Signed](1..8)	HMI comment Number for display on HMI

11.3.8. PLC-MELPT_LotTrace_FixedScanner

This function block takes raw data from a fixed scanner and will parse it to retrieve bin data and follow the FCA sequence for Lot Traceability

One instance is required per fixed scanner

FB Name
MELPT_LotTrace_FixedScanner

Function Overview	
Item	Description
Function overview	This function block handles the parsing of a fixed scanner string into part number, serial number, supplier ID, and lot quantity
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

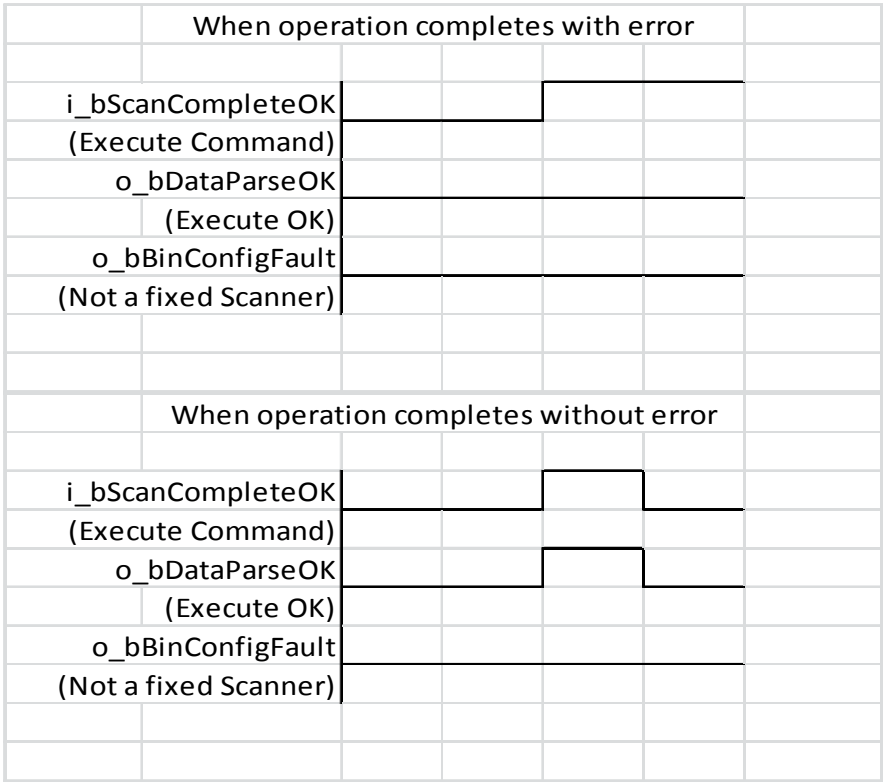
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 1064 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	8 bits 116 words
Compiling method	Macro type;
Execution type	Pulse
Dependences	This function block requires the MELPT_FCANAFTA_LotTraceStaData SDT And MELPT_GroupSeperatorParse_FB And MELPT_ConvertCharToNumeral function
Function description	
Restrictions and precautions	Index Z16-z19 is used within this function block.

Timing chart



Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	New Scan Complete	i_bScanCompleteOK	Bit		turn on to start parse
X	Fixed Number	i_wFixedScannerNumber	Word[Signed]	1-8	Number of the fixed scanner
X	Scanner Raw Data	i_unScannerOutput	Word[Unsigned](0..34)		Raw Data String

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Lot Traceability Data for one workstation	io_stStaLotTraceability	MELPT_FCANAFTA_LotTraceStaData		Data Storage for this station

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Scan Complete OK	o_bDataParseOK	Bit	Scanner Status Good
This Index is not configured for fixed scanner	o_bBinConfigFault	Bit	Bin Configuration Fault

FB Version Upgrade History

Version	Description
3.00	Rewritten
3.01	Coding improvements to reduce size

SDT Usage

3. MELPT_FCANAFTA_LotTraceStaData

Global Label: LotTrace_StationData[X] x=station Number		
Member	Type	Usage
EnableBin	Bit(1..8)	
EnablePickLight	Bit(1..8)	
QuantityWarning	Bit(1..8)	
QuantityFault	Bit(1..8)	
StationNumber	Word[Unsigned](0..4)	

Global Label: LotTrace_StationData[X] x=station Number		
Member	Type	Usage
EndItemPartNumber	Word[Unsigned](0..4)	
GOTItemNumber	Word[Signed](1..8)	
GOTBinIndex	Word[Signed](1..8)	
ReadByteAddress1	Word[Unsigned](1..8)	
ReadByteAddress2	Word[Unsigned](1..8)	
PartDescription	Word[Unsigned](1..8,0..11)	
PartsUsedPerCycle	Double Word[Signed](1..8)	
LotQuantity	Double Word[Signed](1..8)	Parse from the string and stored upon successful scan
RemainingLotQuantity	Double Word[Signed](1..8)	Set to Lot quantity as pulse upon successful scan
SupplierID	Word[Unsigned](1..8,0..3)	Parse from the string and stored upon successful scan
SerialNumber	Word[Unsigned](1..8,0..4)	Parse from the string and stored upon successful scan
PartNumber	Word[Unsigned](1..8,0..4)	Parse from the string and stored upon successful scan
ReadAddressRawData1	Word[Unsigned](1..8,0..4)	
ReadAddressRawData2	Word[Unsigned](1..8,0..4)	

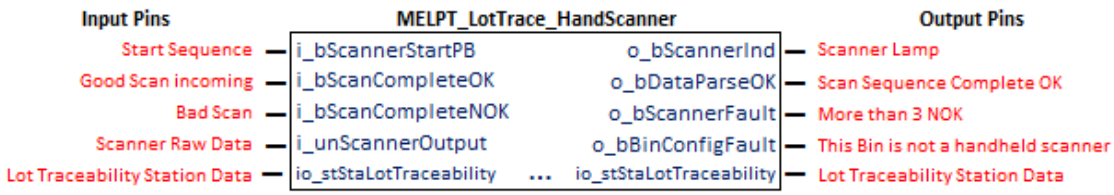
Global Label: LotTrace_StationData[X] x=station Number		
Member	Type	Usage
PickLightInputAddressBitOffset	Word[Unsigned](1..8)	
PickLightOutputAddressBitOffset	Word[Unsigned](1..8)	
PickLightSequence	Word[Signed](1..8)	
ScannerType	Word[Signed](1..8)	Type =2; For Fixed Scanner
Scanner Text	Word[Signed](1..8)	

11.3.9. PLC-MELPT_LotTrace_HandScanner

This function block takes raw data from a Hand scanner, it parses the bin label, then a separate label is scanned where the ship label is parsed.

One instance is required per hand scanner

FB Name
MELPT_LOTTrace_HandScanner

Function Overview	
Item	Description
Function overview	This function block handles the handheld sequence for lot traceability and data parsing
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

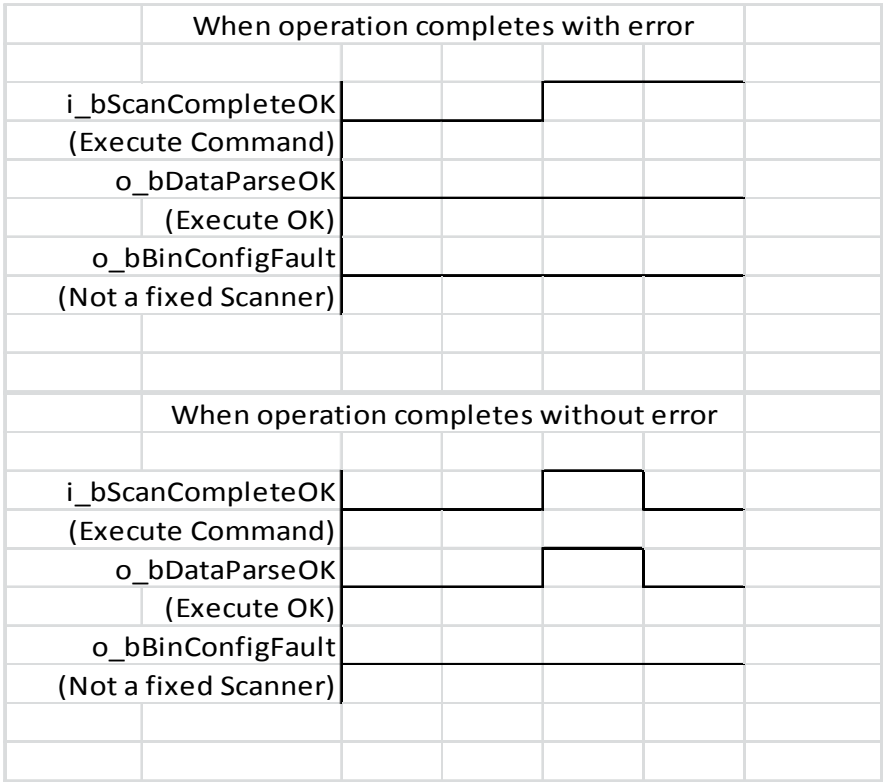
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 1436 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	10 bits 120 words 2 Timers
Compiling method	Macro type;
Execution type	Real Time Execution
Dependences	This function block requires the MELPT_FCANAFTA_LotTraceStaData SDT And MELPT_GroupSeperatorParse_FB And MELPT_ConvertCharToNumeral function
Function description	After Starting the sequence, scan the bin label, if the bin label number is not set to a handheld scanner, o_bBinConfigFault becomes True. After 30s of no activity the sequence will reset. If the bin label was set as a handheld scanner, the operator will scan the bin label. If the bin label parses correctly. Data is populated in the data structure and o_bDataParseOK is true for 5second before the sequence is reset. If the bin label cannot be parsed successfully, o_bDataParseOK will not be true
Restrictions and precautions	Index Z16-z19 is used within this function block.

Timing chart



Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Good Scan incoming	i_bScannerStartPB	Bit		turn on to start sequence
X	Bad Scan	i_bScanCompleteOK	Bit		Good Scan Data Incoming
X	Scanner Raw Data	i_bScanCompleteNOK	Bit		Bad Data
	Good Scan incoming	i_unScannerOutput	Word[Unsigned](0..34)		Incoming Data String

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Lot Traceability Data for one workstation	io_stStaLotTraceability	MELPT_FCANAFTA_LotTraceStaData		Data Storage for this station

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Scanner Lamp	o_bScannerInd	Bit	Scanner Status Indicator
Scan Sequence Complete OK	o_bDataParseOK	Bit	Scanner Status Good
More than 3 NOK	o_bScannerFault	Bit	Scanner Status Faulted
This Bin is not a handheld scanner	o_bBinConfigFault	Bit	Bin Configuration Fault

FB Version Upgrade History

Version	Description
3.00	Rewritten
3.01	Coding improvements to reduce size

SDT Usage

4. MELPT_FCANAFTA_LotTraceStaData

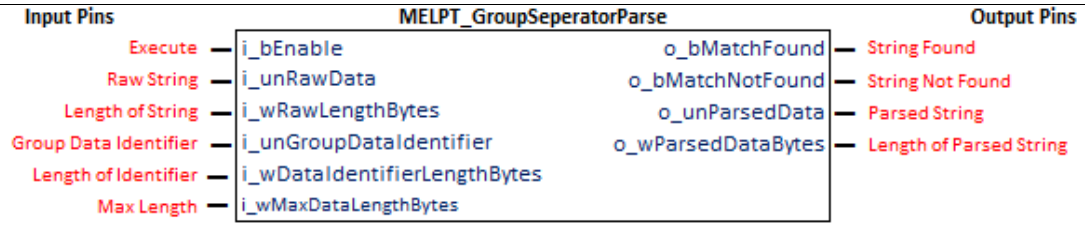
Global Label: LotTrace_StationData[X] x=station Number		
Member	Type	Usage
LotQuantity	Double Word[Signed](1..8)	Parse from the string and stored upon successful scan
ScannerType	Word[Signed](1..8)	Type =1; For Handheld Scanner

Global Label: LotTrace_StationData[X] x=station Number		
Member	Type	Usage
RemainingLotQuantity	Double Word[Signed](1..8)	Set to Lot quantity as pulse upon successful scan
SupplierID	Word[Unsigned](1..8,0..3)	Parse from the string and stored upon successful scan
SerialNumber	Word[Unsigned](1..8,0..4)	Parse from the string and stored upon successful scan
PartNumber	Word[Unsigned](1..8,0..4)	Parse from the string and stored upon successful scan

11.3.10. PLC-MELPT_GroupSeperatorParse_FB

This function block is called by both the handheld and fixed scanner function blocks. The function blocks searches a string for a group separator and identifier, and returns the string and length from the identifier to the end of string or next group separator

FB Name
MELPT_GroupSeperatorParse_FB

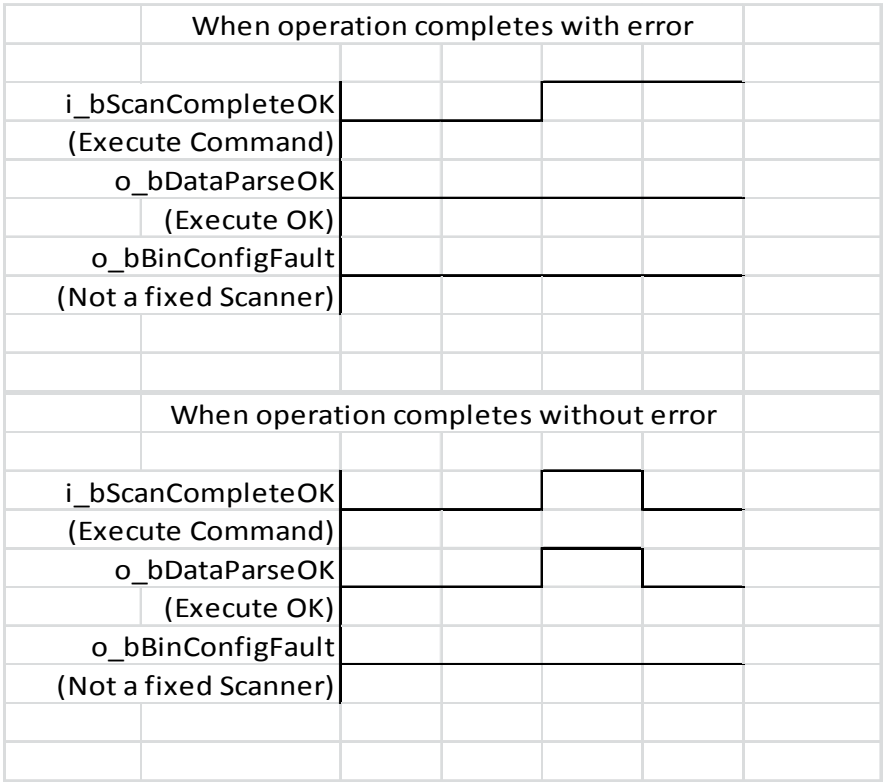
Function Overview	
Item	Description
Function overview	The function blocks searches a string for a group separator and identifier, and returns the string and length from the identifier to the end of string or next group separator
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 213 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	6 bits 190 words
Compiling method	Macro type;
Execution type	Real Time Execution
Dependences	
Function description	Provide a Group separator, when enabled the function block will search for the group separator and output the string following the group separator until another group separator is encountered. Or the end of string
Restrictions and precautions	Index Z16-z19 is used within this function block.
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Good Scan incoming	i_bScannerStartPB	Bit		turn on to start sequence
X	Bad Scan	i_bScanCompleteOK	Bit		Good Scan Data Incoming
X	Scanner Raw Data	i_bScanCompleteNOK	Bit		Bad Data
	Good Scan incoming	i_unScannerOutput	Word[Unsigned](0..34)		Incoming Data String

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Lot Traceability Data for one workstation	io_stStaLotTraceability	MELPT_FCANAFTA_LotTraceStaData		Data Storage for this station

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Scanner Lamp	o_bScannerInd	Bit	Scanner Status Indicator
Scan Sequence Complete OK	o_bDataParseOK	Bit	Scanner Status Good
More than 3 NOK	o_bScannerFault	Bit	Scanner Status Faulted
This Bin is not a handheld scanner	o_bBinConfigFault	Bit	Bin Configuration Fault

FB Version Upgrade History

Version	Description
2.10	Initial Release
3.00	Modified to handle group separator as a variable

SDT Usage

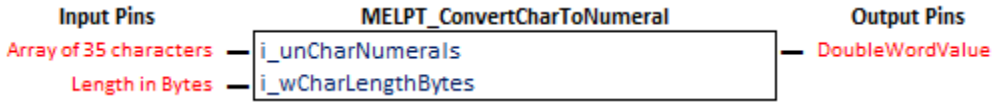
1. MELPT_FCANAFTA_LotTraceStaData

Global Label: LotTrace_StationData[X] x=station Number		
Member	Type	Usage
LotQuantity	Double Word[Signed](1..8)	Parse from the string and stored upon successful scan
ScannerType	Word[Signed](1..8)	Type =1; For Handheld Scanner
RemainingLotQuantity	Double Word[Signed](1..8)	Set to Lot quantity as pulse upon successful scan
SupplierID	Word[Unsigned](1..8,0..3)	Parse from the string and stored upon successful scan
SerialNumber	Word[Unsigned](1..8,0..4)	Parse from the string and stored upon successful scan
PartNumber	Word[Unsigned](1..8,0..4)	Parse from the string and stored upon successful scan

11.3.11. PLC-MELPT_ConvertCharToNumeral

This function will convert a string of numeric ascii characters up 10 characters long to double signed word

FUN Name
MELPT_ConvertCharToNumeral

Function Overview	
Item	Description
Function overview	This function will convert a string of numeric ascii characters up 10 characters long to double signed word
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 213 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	69 words
Compiling method	Sub-Routine Type

Execution type	Real Time Execution
Dependences	
Function description	
Restrictions and precautions	
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Array of 35 characters	i_unCharNumerals	Word[Unsigned](0..34)		Input Numeral value in ASCII Characters, 1 character per word
X	Length in Bytes	i_wCharLengthBytes	Word[Signed]		Input Numeral Character length in Bytes

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Output	MELPT_ConvertCharToNumeral	Double Word[Signed]	The output of the function

FB Version Upgrade History

Version	Description

Version	Description
3.00	Initial Release
3.01	Bug Fix

11.4 Production-Individual Traceability

The traceability functions are FCA specific screens and function blocks. The function block and programs can be found in the FCANAFTA user library, it can be classified into two categories:

Lot Traceability and Individual Traceability, this section covers Individual Traceability

Individual Traceability

- HMI
  - Individual Traceability Item Config
  - Individual Traceability Item Status
- PLC
  - MELPT_IndTraceability_GOT
  - MELPT_IndTrace_StationLogic
  - MELPT_IndTrace_HandScanner
  - MELPT_IndTrace_FixedScanner
  - MELPT_IndTraceData_Parsing_FB

11.4.1. HMI-Individual Traceability Item Status

This screen displays the status of 5 items

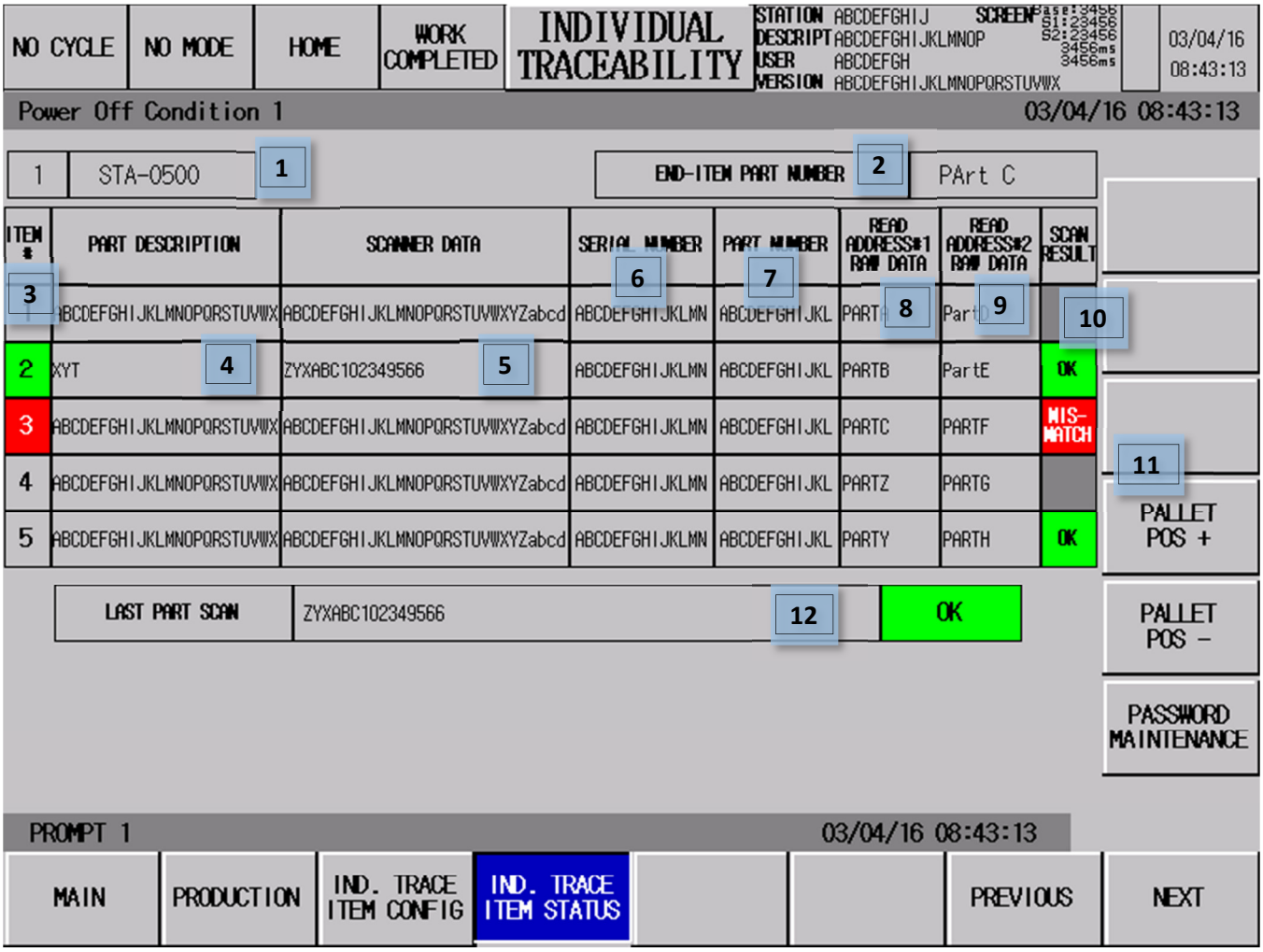


Figure 98-Individual Traceability

Item Number	Object	Device X=row number	Details	
1	Displayed Station Number Ascii Display:	Traceability.StationNumber[0]		
2	End-Item Part Number ASCII Display::	Traceability.EndItemPartNumber[0]		
3	Item Status	Traceability.GOTItemNumber[X]	Value	Display

Item Number	Object	Device X=row number	Details	
	Word Comment Display		Normal	X
			1	X
			2	X
4	Part Description ASCII Display	Traceability.PartDescription[X,0]	Parsed from the barcode	
5	Scanner Data ASCII Display	Traceability.ScannedData[X,0]	Parsed from the barcode	
6	Serial Number ASCII Input	Traceability.ParsedSerialNumber[X,0]		
7	Part Number ASCII Input	Traceability.ParsedPartNumber[X,0]		
8	Read Address #1 ASCII Display	Traceability.ReadAddressRawData1[X,0]		
9	Read Address #2 ASCII Display	Traceability.ReadAddressRawData2[X,0]		
10	Scan result Word Lamp	Traceability.ScannedDataResult[X]	Normal	
			1	OK
			2	Mis-Match
11	Push Buttons			
	Pallet Pos +	Traceability.SelectStationNumber +1		
	Pallet Pos -	Traceability.SelectStationNumber -1		
	Password Mainteneace	Navigates to the Password Screen		
12	Last Part Scan			
	ASCII Display	Traceability.LastScanned[0]		
	Word Lamp	Traceability.LastResult	Normal	
			1	OK
			2	Mis-Match

11.4.2. HMI-Individual Traceability Item Config

This screen allow the configuration of the individual traceability when proper security is applied

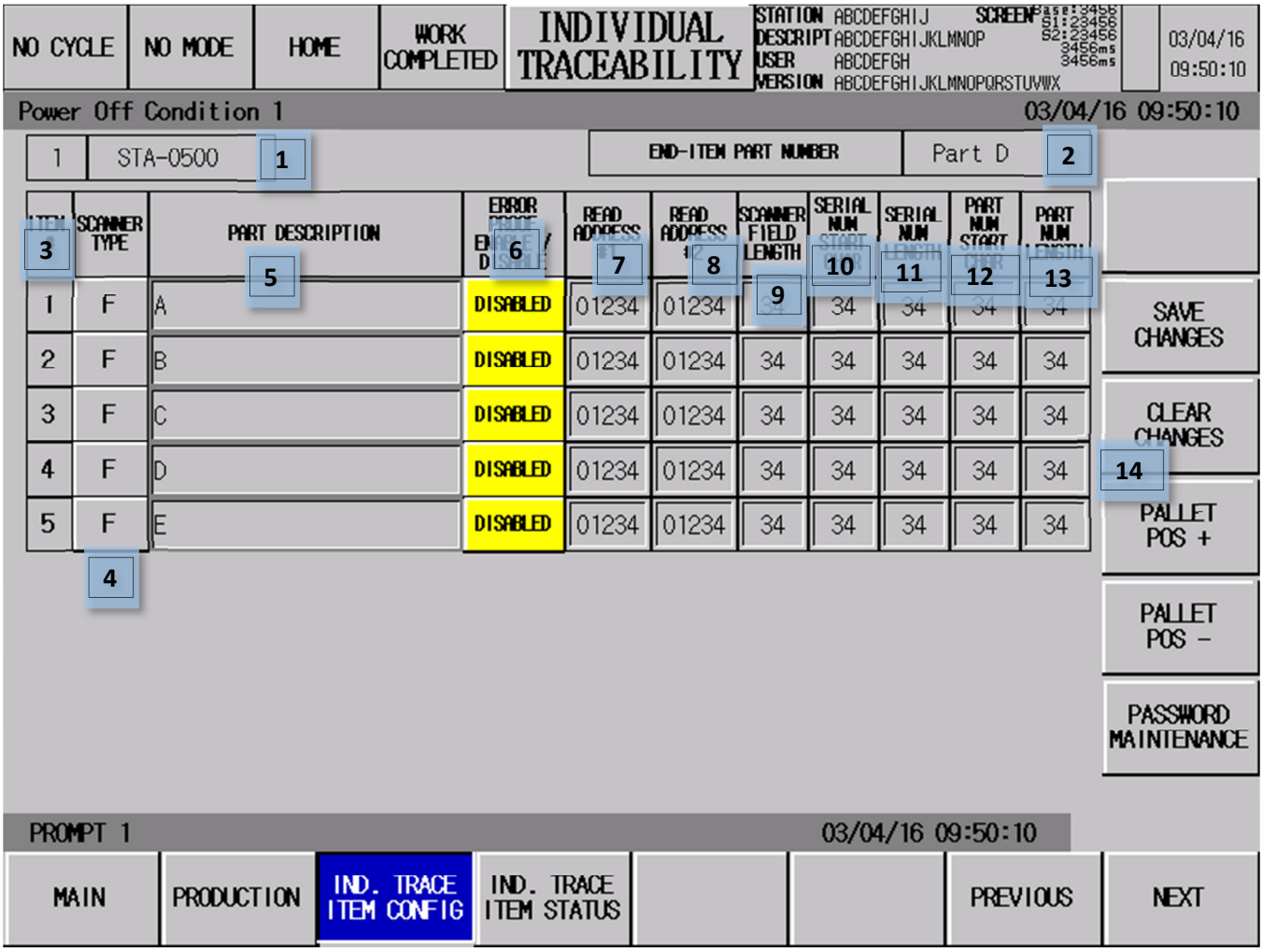


Figure 99-Individual Traceability Item Config Screen

Item Number	Object	Device X=row number	Details	
1	Displayed Station Number Ascii Display:	Traceability.StationNumber[0]		
2	End-Item Part Number ASCII Display::	Traceability.EndItemPartNumber[0]		
3	Item Status	Traceability.GOTItemNumber[X]	Value	Display

Item Number	Object	Device X=row number	Details	
	Word Comment Display		Normal	X
			1	X
			2	X
4	Scanner Type Multifunction Switch	Traceability.ScannerTypeWriteCheck[X]	This button is yellow when bypassed Launches the scanner type selection window 1=**H**andheld, 2=**F**ixed 3=**S**pare 4=**B**ypassed	
5	Part Description ASCII Input	Traceability.PartDescription[X,0]		
6	Enable/Disable: Bit Alternate Push Button	Traceability.EnableBin[X]	This bit enables or disables error proofing for this part	
7	Read Address #1 Numeric Input	Traceability.ReadAddressRawData1[X,0]	RFID Read Address #1 for this item	
8	Read Address #2 Numeric Input	Traceability.ReadAddressRawData2[X,0]	RFID Read Address #2 for this item	
9	Scanned Field Length Numeric Input	Traceability.ScannedFieldLength[X]	This is the length of the barcode string	
10	Serial Number Start Char Numeric Input	Traceability.SerialNumberStart[X]	This is the location of the serial number	

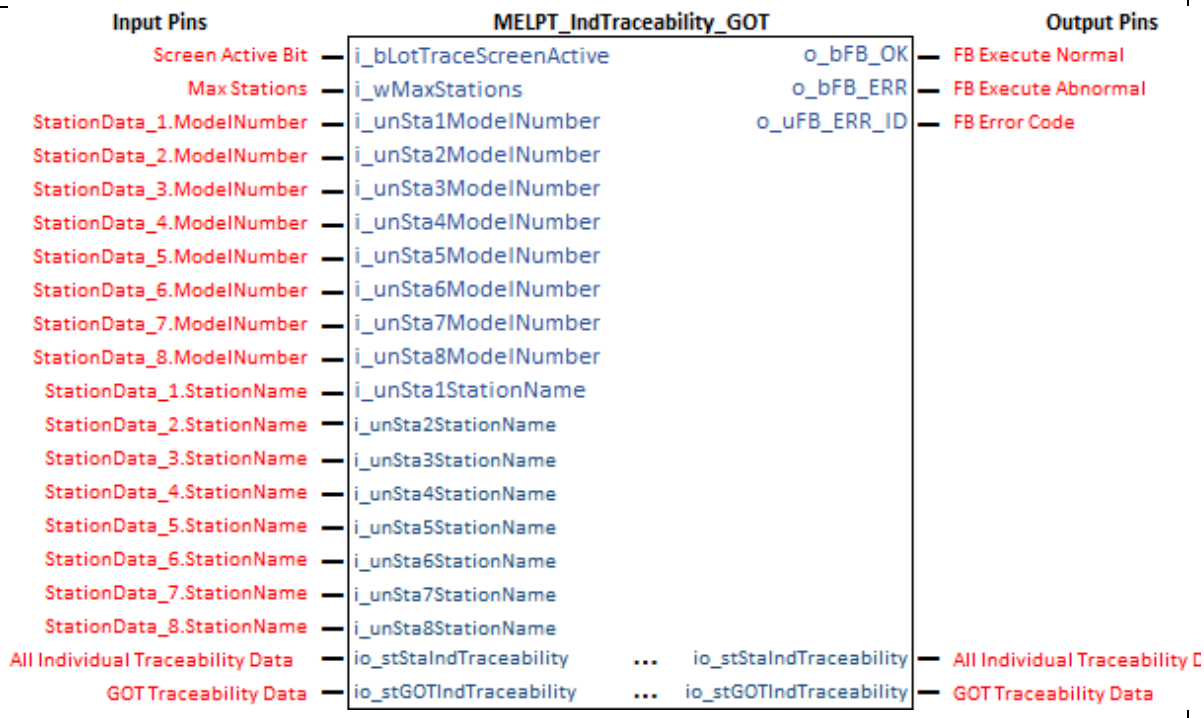
Item Number	Object	Device X=row number	Details
11	Serial Number Length Numeric Input	Traceability.SerialNumberLength[X]	This is the length of the serial number
12	Part Number Start Char Numeric Input	Traceability.PartNumberStart[X]	This is the location of the Part number
13	Part Number Length Numeric Input	Traceability.PartNumberLength[X]	This is the length of the serial number

11.4.3. PLC-MELPT_IndTraceability_GOT

One instance is required to monitor up to 8 work stations worth of data.

This function block facilitates populating HMI data from the main PLC structures, and handles editing from the configuration screens

FB Name
MELPT_IndTraceability_GOT

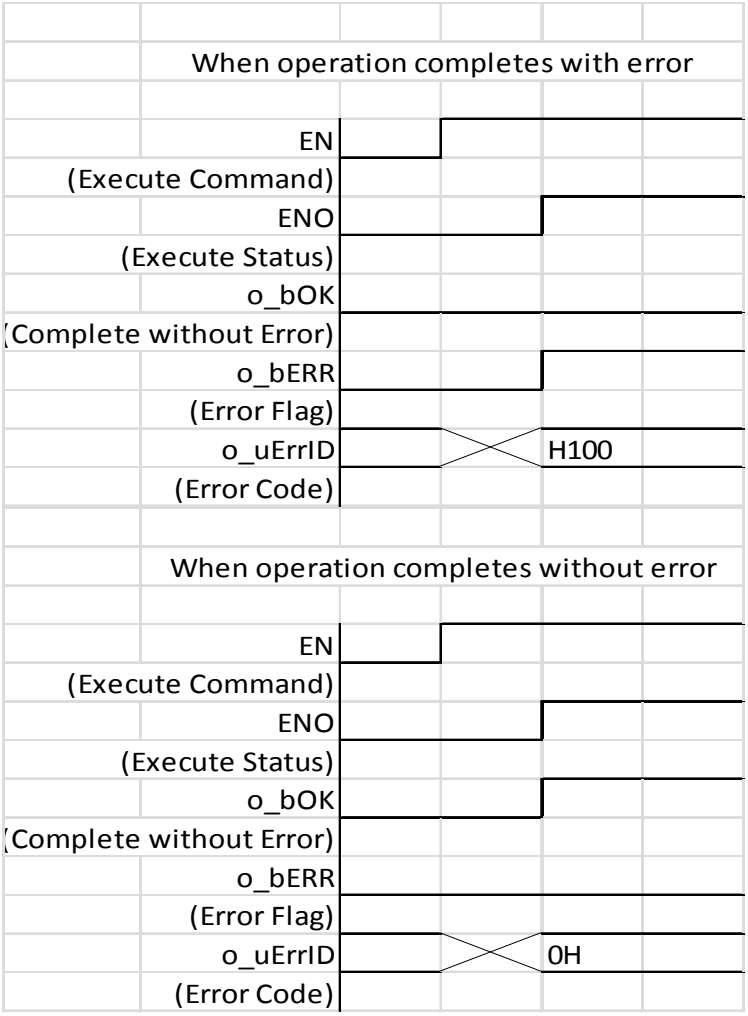
Function Overview	
Item	Description
Function overview	This function block transfers a subset of data from the traceability data block. Edits can be made from the hmi saved back to the traceability data block
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

<table>
<tr><td>Applicable Software</td><td><table><tr><th>Series</th><th>Version</th></tr><tr><td>GX Works 2</td><td>1.536</td></tr><tr><td>GT Designer 3</td><td>1.136</td></tr></table></td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 2273 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>339 bits
5349 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This function block requires the MELPT_FCANAFTA_Traceability SDT

And MELPT_FCANAFTA_IndTraceStaData SDT</td></tr>
<tr><td>Function description</td><td></td></tr>
<tr><td>Restrictions and precautions</td><td>Index Z16-z19 is used within this function block.</td></tr>
</table>

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101 (257)	Maximum Stations Less than 0
H102 (258)	Maximum Station greater than 8

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Screen Active Bit	i_bLotTraceScreenActive	Bit		Lot Traceability Active
	Max Stations	i_wMaxStations	Word[Signed]		Max Number of Stations to display
	StationData_1.ModelNumber	i_unSta1ModelNumber	Word[Unsigned](0..7)		Station1 Model Number read from RF Tag
	StationData_2.ModelNumber	i_unSta2ModelNumber	Word[Unsigned](0..7)		Station2 Model Number read from RF Tag
	StationData_3.ModelNumber	i_unSta3ModelNumber	Word[Unsigned](0..7)		Station3 Model Number read from RF Tag
	StationData_4.ModelNumber	i_unSta4ModelNumber	Word[Unsigned](0..7)		Station4 Model Number read from RF Tag
	StationData_5.ModelNumber	i_unSta5ModelNumber	Word[Unsigned](0..7)		Station5 Model Number read from RF Tag
	StationData_6.ModelNumber	i_unSta6ModelNumber	Word[Unsigned](0..7)		Station6 Model Number read from RF Tag
	StationData_7.ModelNumber	i_unSta7ModelNumber	Word[Unsigned](0..7)		Station7 Model Number read from RF Tag
	StationData_8.ModelNumber	i_unSta8ModelNumber	Word[Unsigned](0..7)		Station8 Model Number read from RF Tag

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	StationData_1.StationName	i_unSta1StationName	Word[Unsigned](0..4)		Station1 Name input from Operartor
	StationData_2.StationName	i_unSta2StationName	Word[Unsigned](0..4)		Station2 Name input from Operartor
	StationData_3.StationName	i_unSta3StationName	Word[Unsigned](0..4)		Station3 Name input from Operartor
	StationData_4.StationName	i_unSta4StationName	Word[Unsigned](0..4)		Station4 Name input from Operartor
	StationData_5.StationName	i_unSta5StationName	Word[Unsigned](0..4)		Station5 Name input from Operartor
	StationData_6.StationName	i_unSta6StationName	Word[Unsigned](0..4)		Station6 Name input from Operartor
	StationData_7.StationName	i_unSta7StationName	Word[Unsigned](0..4)		Station7 Name input from Operartor
	StationData_8.StationName	i_unSta8StationName	Word[Unsigned](0..4)		Station8 Name input from Operartor

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	All Individual Traceability Data	io_stStaIndTraceability	MELPT_FCANAFTA_IndTraceStaData(1..8)		Data Storage for 8 stations
	GOT Traceability Data	io_stGOTIndTraceability	MELPT_FCANAFTA_Traceability		GOT Screens to SDT and Control to FB interface

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	TRUE when FB executed
FB Execute Abnormal	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output

FB Version Upgrade History

Version	Description
3.00	Rewritten
3.01	Coding improvements to reduce size

SDT Usage

1. MELPT_FCANAFTA_Traceability

System Label: Traceability		
Member	Type	Usage
EnableBin	Bit(1..8)	HMI PB to disable/enable Error Proofing
ScannerTypeWriteCheck	Bit(1..8)	Set by HMI when editing scanner type
ItemConfigWriteCheck	Bit(1..8)	Set by HMI when editing an item config

System Label: Traceability		
Member	Type	Usage
ScannerSelectBit	Bit	Set by HMI In the middle of a scanner change
OnFirstStation	Bit	HMI station load control
OnLastStation	Bit	HMI station load control
ItemConfigSaveChanges	Bit	HMI PB Save Changes on Item Config Screen Write Edited Data to PLC Storage Location
ItemConfigClearChanges	Bit	HMI PB Clear Changes on Item Config Screen PLC data refreshes HMI Data
ScannerSelectWord	Word[Signed]	Set By The HMI as the selection of the scanner type for that row
StationNumber	Word[Unsigned](0..4)	Set by the FB and sent to the HMI
EndItemPartNumber	Word[Unsigned](0..4)	Set by the FB and sent to the HMI
GOTItemNumber	Word[Signed](1..8)	Sent to the HMI
ReadByteAddress1	Word[Unsigned](1..8)	Editable on the HMI of the Error Proofing location on the tag to read
ReadByteAddress2	Word[Unsigned](1..8)	Editable on the HMI of the Error Proofing location on the tag to read
PartDescription	Word[Unsigned](1..8,0..11)	Description of the part
SupplierID	Word[Unsigned](1..8,0..3)	Displayed on the HMI
SerialNumber	Word[Unsigned](1..8,0..4)	Displayed on the HMI
PartNumber	Word[Unsigned](1..8,0..4)	Displayed on the HMI

System Label: Traceability		
Member	Type	Usage
ReadAddressRawData1	Word[Unsigned](1..8,0..4)	Displayed on the HMI
ReadAddressRawData2	Word[Unsigned](1..8,0..4)	Displayed on the HMI
ScannerType	Word[Signed](1..8)	Set by HMI
ScannerText	Word[Signed](1..8)	SET by the FB This is the comment number to be displayed on the HMI for Scanner tYpe
SelectStationNumber	Word[Signed]	Selected Station Number
ScannedFieldLength	Word[Signed](1..5)	Entered from HMI this is the length of string
SerialNumberStart	Word[Unsigned](1..5)	Starting Location of the Serial number entered by HMI
SerialNumberLength	Word[Signed](1..5)	Length of Serial Number entered on HMI
PartNumberStart	Word[Unsigned](1..5)	Starting character of scanner text where the part number begins
PartNumberLength	Word[Signed](1..5)	Length of the Part Number
ScannedData	Word[Unsigned](1..5,0..29)	Display of Scanned Data
LastScanned	Word[Unsigned](0..29)	Last Scanned Data
ParsedPartNumber	Word[Unsigned](1..5,0..5)	Parsed Part Numbers

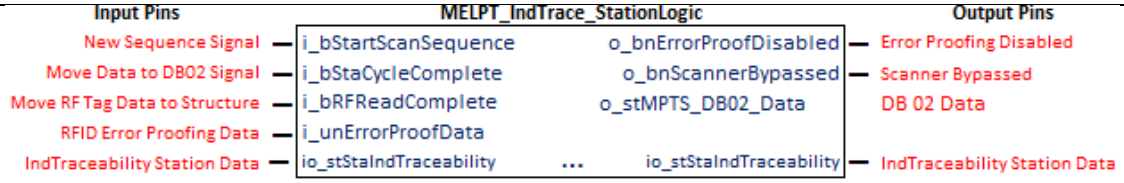
System Label: Traceability		
Member	Type	Usage
ParsedSerialNumber	Word[Unsigned](1..5,0..6)	Parsed Serial Numbers
LastResult	Word[Signed]	Last Scanned Result OK or MisMatch

11.4.4. PLC-MELPT-IndTrace_StationLogic

This function block handles the Individual Traceability Sequence and the moving of data to DB02

One instance is required per station

FB Name
MELPT_IndTrace_StationLogic

Function Overview	
Item	Description
Function overview	This function block handles moving data from the RFId Structure to the HMI, and the parsed serial number and part number to the DB02 structure
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 481 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	18 bits 1116 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the MELPT_FCANAFTA_MPTS_PartMarriage SDT And MELPT_FCANAFTA_MPTS_IndTrace SDT
Function description	
Restrictions and precautions	Index Z16-z19 is used within this function block.
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	New Sequence Signal	i_bStartScanSequence	Bit		Clears all Data
X	Move Data to DB02 Signal	i_bStaCycleComplete	Bit		Populate DB02
X	Move RF Tag Data to Structure	i_bRFReadComplete	Bit		Parses the RF Tag Data
X	RFID Error Proofing Data	i_unErrorProofData	Word[Unsigned](0..600)		

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Individual Traceability Data for one workstation	io_stStaIndTraceability	MELPT_FCANAFTA_IndTraceStaData		Data Storage for this station

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Error Proofing Disabled	o_bnErrorProofDisabled	Bit(1..5)	Error Proofing Disabled
Scanner Bypassed	o_bnScannerBypassed	Bit(1..5)	Scanner Bypassed Signal
DB 02 Data	o_stMPTS_DB02_Data	MELPT_FCANAFTA_MPTS_PartMarriage(1..5)	MPTS_DB02 Data

FB Version Upgrade History

Version	Description
3.00	Rewritten
3.01	Coding improvements to reduce size

SDT Usage

2. MELPT_FCANAFTA_IndTraceStaData

Global Label:IndTrace_StationData[X] X=Station Number		
Member	Type	Usage
EnableBin	Bit(1..5)	Used to enable disable error proofing
StationNumber	Word[Unsigned](0..4)	

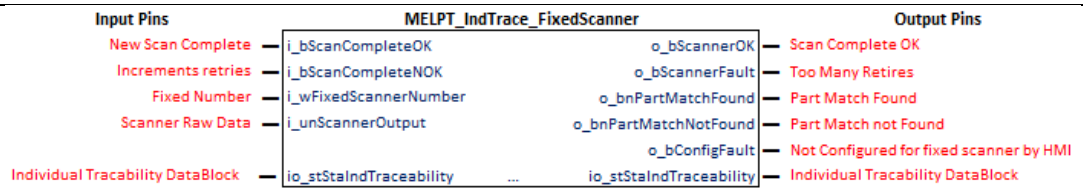
Global Label:IndTrace_StationData[X] X=Station Number		
Member	Type	Usage
EndItemPartNumber	Word[Unsigned](0..4)	
GOTItemNumber	Word[Signed](1..5)	
ReadByteAddress1	Word[Unsigned](1..5)	Used to parse data out of RFTag array
ReadByteAddress2	Word[Unsigned](1..5)	Used to parse data out of RFTag array
PartDescription	Word[Unsigned](1..5,0..11)	
ReadAddressRawData1	Word[Unsigned](1..5,0..4)	The parsed Data of the RFTag Array
ReadAddressRawData2	Word[Unsigned](1..5,0..4)	The parsed Data of the RFTag Array
ScannerType	Word[Signed](1..5)	
ScannedFieldLength	Word[Signed](1..5)	
SerialNumberStart	Word[Signed](1..5)	
SerialNumberLength	Word[Signed](1..5)	
PartNumberStart	Word[Signed](1..5)	

Global Label:IndTrace_StationData[X] X=Station Number		
Member	Type	Usage
PartNumberLength	Word[Signed](1..5)	
ScannedData	Word[Unsigned](1..5,0..29)	Cleared when i_bStartScanSequence is true
ParsedPartNumber	Word[Unsigned](1..5,0..5)	Cleared when i_bStartScanSequence is true
ParsedSerialNumber	Word[Unsigned](1..5,0..6)	Cleared when i_bStartScanSequence is true
ScannedDataResult	Word[Signed](1..5)	Cleared when i_bStartScanSequence is true
LastScanned	Word[Unsigned](0..29)	Cleared when i_bStartScanSequence is true
LastResult	Word[Signed]	Cleared when i_bStartScanSequence is true

11.4.5. PLC-MELPT_IndTrace_FixedScanner

This function block takes raw data from a Fixed scanner and will parse it to retrieve data and follow the FCA sequence for Individual traceability

FB Name
MELPT_IndTrace_FixedScanner

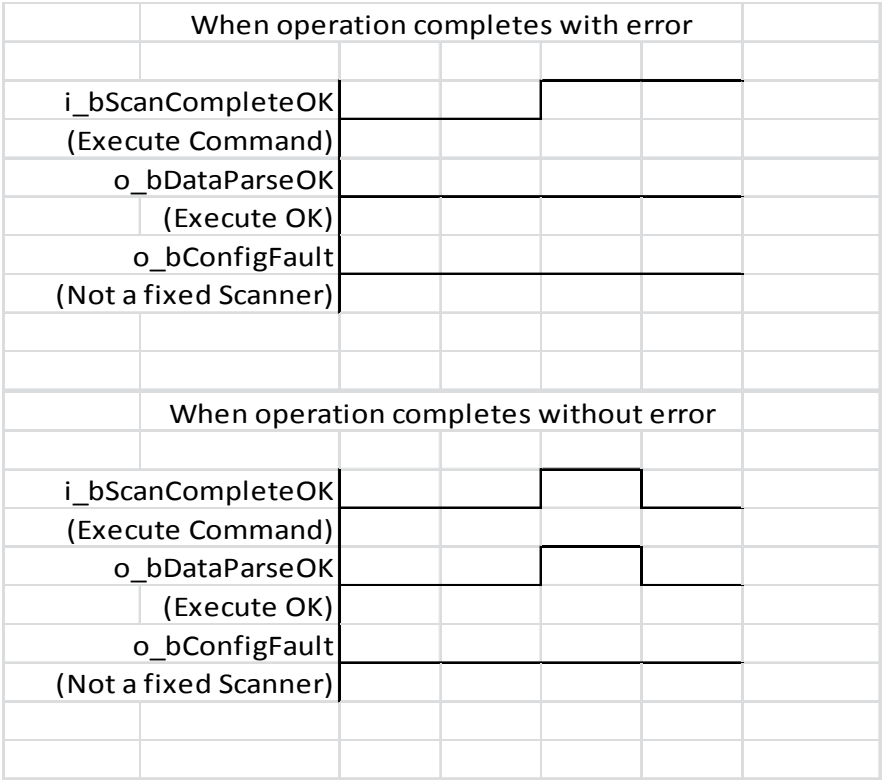
Function Overview	
Item	Description
Function overview	This function block handles the parsing of a fixed scanner string into part number, serial number and serial number, and comparing versus the Error proofing data
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 608 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	22 bits 53 words

Compiling method	Macro type;
Execution type	Real Time Execution
Dependences	This function block requires the MELPT_FCANAFTA_IndTraceStaData SDT And MELPT_IndTraceData_Parsing_FB
Function description	
Restrictions and precautions	Index Z16-z19 is used within this function block.
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	New Scan Complete	i_bScanCompleteOK	Bit		turn on to start parse
X	New Scan Bad	i_bScanCompleteNOK	Bit		Scan Complete Bad
X	Fixed Number	i_wFixedScannerNumber	Word[Signed]	1-5	Number of the fixed scanner
X	Scanner Raw Data	i_unScannerOutput	Word[Unsigned](0..29)		Raw Data String

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Ind Traceability Data for one workstation	io_stStaIndTraceability	MELPT_FCANAFTA_IndTraceStaData		Data Storage for this station

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Scan Complete OK	o_bScannerOK	Bit	Direct Link to i_bScanCompleteOK
Too Many Retires	o_bScannerFault	Bit	Direct Link to i_bScanCompleteNOK
Part Match Found	o_bnPartMatchFound	Bit(1..5)	Scanned Data Matches a Configuration
Part Match not Found	o_bnPartMatchNotFound	Bit(1..5)	Scanned Data does not match a configuration
Not Configured for fixed scanner by HMI	o_bConfigFault	Bit	The Configuration is not set to fixed for this number

FB Version Upgrade History

Version	Description
3.00	Rewritten
3.01	Coding improvements to reduce size

SDT Usage

3. MELPT_FCANAFTA_IndTraceStaData

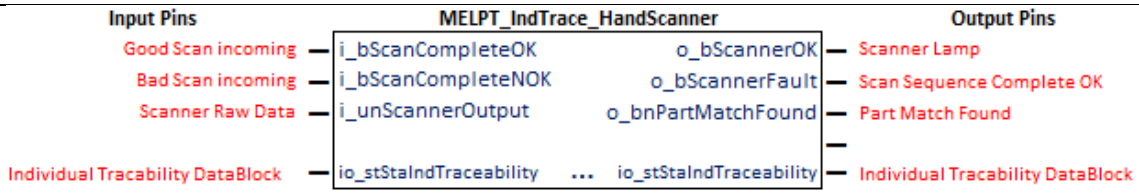
Global Label: IndTrace_StationData[X] x=station Number		
Member	Type	Usage
EnableBin	Bit(1..5)	When Enabled we search this data for a match
StationNumber	Word[Unsigned](0..4)	
EndItemPartNumber	Word[Unsigned](0..4)	
GOTItemNumber	Word[Signed](1..5)	
ReadByteAddress1	Word[Unsigned](1..5)	If non Zero and enable compare Error Proofing #1
ReadByteAddress2	Word[Unsigned](1..5)	If non Zero and enable compare Error Proofing #2
PartDescription	Word[Unsigned](1..5,0..11)	
ReadAddressRawData1	Word[Unsigned](1..5,0..4)	Raw Error Proofing Data for comparison
ReadAddressRawData2	Word[Unsigned](1..5,0..4)	Raw Error Proofing Data for comparison
ScannerType	Word[Signed](1..5)	Needs to be type 2 to use this FB
ScannerText	Word[Signed](1..5)	

Global Label: IndTrace_StationData[X] x=station Number		
Member	Type	Usage
ScannedFieldLength	Word[Signed](1..5)	Parameters for parsing the raw string
SerialNumberStart	Word[Signed](1..5)	Parameters for parsing the raw string
SerialNumberLength	Word[Signed](1..5)	Parameters for parsing the raw string
PartNumberStart	Word[Signed](1..5)	Parameters for parsing the raw string
PartNumberLength	Word[Signed](1..5)	Parameters for parsing the raw string
ScannedData	Word[Unsigned](1..5,0..29)	The raw scanner string
ParsedPartNumber	Word[Unsigned](1..5,0..5)	The Parsed Part Number from the Raw String
ParsedSerialNumber	Word[Unsigned](1..5,0..6)	The Parsed Serial Number from the Raw String
ScannedDataResult	Word[Signed](1..5)	1 is match 2 is mis-match
LastScanned	Word[Unsigned](0..29)	
LastResult	Word[Signed]	

11.4.6. PLC-MELPT_IndTrace_HandScanner

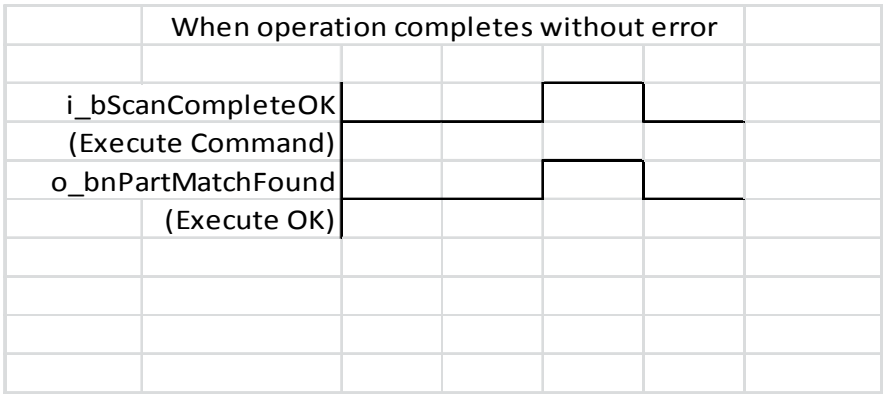
This function block takes raw data from a Hand scanner and parses it.

FB Name
MELPT_IndTrace_HandScanner

Function Overview	
Item	Description
Function overview	This function block handles the handheld sequence for individual traceability and data parsing and error proofing
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 530 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	12 bits 46 words

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Compiling method	Macro type;
Execution type	Real Time Execution
Dependences	This function block requires the MELPT_FCANAFTA_IndTraceStaData SDT And MELPT_IndTraceData_Parsing_FB
Function description	
Restrictions and precautions	Index Z16-z19 is used within this function block.
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Good Scan incoming	i_bScanCompleteOK	Bit		Scan Completed Good
X	Bad Scan incoming	i_bScanCompleteNOK	Bit		Scan Complete Bad

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Scanner Raw Data	i_unScannerOutput	Word[Unsigned](0..29)		Scanner Output in Words

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
Individual Traceability Data Block	Individual Traceability Data for one workstation	io_stStaIndTraceability	MELPT_FCANAFTA_IndTraceStaData		Data Storage for this station

- Output labels

Symbol Name	Var_Output name	Data Type	Description
Scanner Lamp	o_bScannerOK	Bit	Scanner Status Good
Scan Sequence Complete OK	o_bScannerFault	Bit	Scanner Status Faulted
Part Match Found	o_bnPartMatchFound	Bit(1..5)	Error Proofing Part Match found in the Bins for Bins 1-5

FB Version Upgrade History

Version	Description
3.00	Rewritten
3.01	Coding improvements to reduce size

SDT Usage

1. MELPT_FCANAFTA_IndTraceStaData

Global Label: IndTrace_StationData[X] x=station Number		
Member	Type	Usage
EnableBin	Bit(1..5)	When Enabled we search this data for a match
StationNumber	Word[Unsigned](0..4)	
EndItemPartNumber	Word[Unsigned](0..4)	
GOTItemNumber	Word[Signed](1..5)	
ReadByteAddress1	Word[Unsigned](1..5)	If non Zero and enable compare Error Proofing #1
ReadByteAddress2	Word[Unsigned](1..5)	If non Zero and enable compare Error Proofing #2
PartDescription	Word[Unsigned](1..5,0..11)	
ReadAddressRawData1	Word[Unsigned](1..5,0..4)	Raw Error Proofing Data for comparison
ReadAddressRawData2	Word[Unsigned](1..5,0..4)	Raw Error Proofing Data for comparison
ScannerType	Word[Signed](1..5)	Needs to be type 1 to use this FB
ScannerText	Word[Signed](1..5)	
ScannedFieldLength	Word[Signed](1..5)	Parameters for parsing the raw string
SerialNumberStart	Word[Signed](1..5)	Parameters for parsing the raw string
SerialNumberLength	Word[Signed](1..5)	Parameters for parsing the raw string

Global Label: IndTrace_StationData[X] x=station Number		
Member	Type	Usage
PartNumberStart	Word[Signed](1..5)	Parameters for parsing the raw string
PartNumberLength	Word[Signed](1..5)	Parameters for parsing the raw string
ScannedData	Word[Unsigned](1..5,0..29)	The raw scanner string
ParsedPartNumber	Word[Unsigned](1..5,0..5)	The Parsed Part Number from the Raw String
ParsedSerialNumber	Word[Unsigned](1..5,0..6)	The Parsed Serial Number from the Raw String
ScannedDataResult	Word[Signed](1..5)	Set to 1 when matched
LastScanned	Word[Unsigned](0..29)	The last Handheld scanner data received
LastResult	Word[Signed]	Set to 1 or 2 on scan depending on match

11.5 Production-Master Data

The Master Data screen shows Station Data read from the RF TAG. Push buttons exist to change the work station being interrogated and to re-read the tag

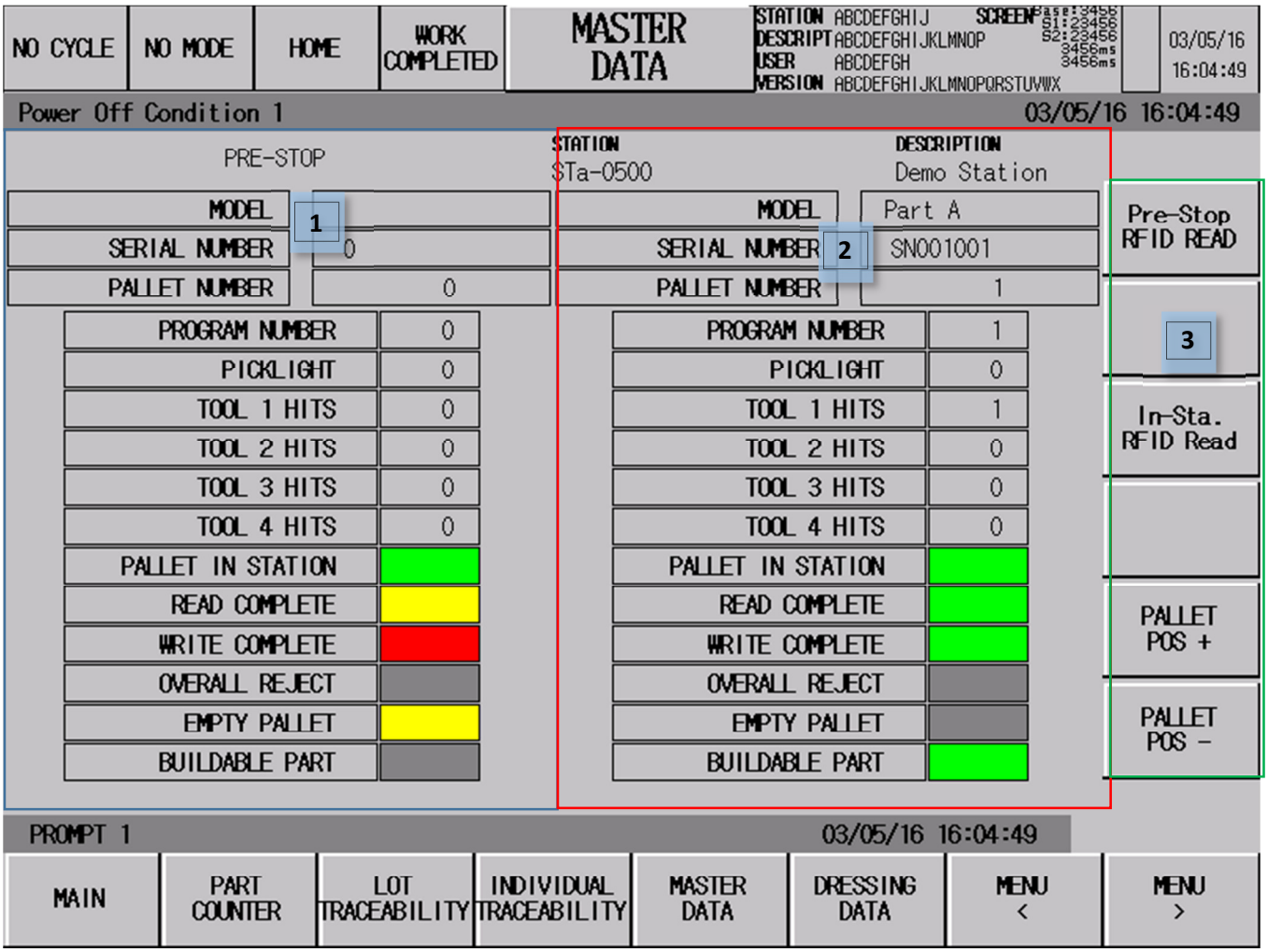


Figure 100-Master Data Screen

Item #	Object	Device X=StationNumber		Details
1	Pre-Stop Overlay Window	W-5301		
	Model Ascii Display	GD64330	StationData_X.ModelNumber_pre	Not Displayed unless pallet present

Item #	Object	Device X=StationNumber		Details	
	Serial Number Ascii Display	GD64340	StationData_X.SerialNumber_pre	Not Displayed unless pallet present	
	Pallet Number Numeric Display	GD64328	StationData_X.PalletNumber_Pre	Display Masked when pallet not present	
	Program Number Numeric Display	GD64325	StationData_X.ProgramNumber_Pre	Display Masked when pallet not present	
	PickLight Numeric Display	GD64326	StationData_X.PicklightNumber_Pre	Display Masked when pallet not present	
	Tool 1 Hits Numeric Display	GD64390	StationData_X.ToolHitsRequired_1_Pre	Display Masked when pallet not present	
	Tool 2 Hits Numeric Display	GD64390	StationData_X.ToolHitsRequired_2_Pre	Display Masked when pallet not present	
	Tool 3 Hits Numeric Display	GD64391	StationData_X.ToolHitsRequired_3_Pre	Display Masked when pallet not present	
	Tool 4 hits Numeric Display	GD64392	StationData_X.ToolHitsRequired_4_Pre	Display Masked when pallet not present	
	Pallet In Station Bit Lamp	GB64212	StationData_X.PalletPresent_Pre	State	Color
				Off	
				ON	
	Read Complete Word Lamp	GD64500	Placeholder	State	Color
				Normal	
		GB64212	StationData_X.PalletPresent_Pre(off)	Pallet Not Present	
		GB64214	StationData_X.RFIDReadComp_Pre(ON)	Read Complete	

Item #	Object	Device X=StationNumber		Details	
		GB64213	StationData_X.RFIDinProgress_Pre(ON)	Read in Progress	
		GB64214	StationData_X.RFIDReadComp_Pre(Off)	Read Complete OFF	
	Write Complete Word Lamp	GD64500	Placeholder		
		GB64212	StationData_X.PalletPresent_Pre(off)	Pallet Not Present	
	Overall Reject Word Lamp	GD64321	StationData_X.PartStatus_Pre	State	Color
				{Bit 2 or Bit 1} False	
				{Bit 2 or Bit 1} True	
	Empty Pallet Bit Lamp	GB64216	StationData_X.PartPresent_Pre	State	Color
				Off	
				ON	
	Buildable Pallet Word Lamp	GD64321	StationData_X.PartStatus_Pre	State	Color
				{Bit 0 or Bit 1} False	
				{Bit 0 or Bit 1} True	
2	In-Station Overlay Window	W-5300			
	Model Ascii Display	GD64230	StationData_X.ModelNumber	Not Displayed unless pallet present	
	Serial Number Ascii Display	GD64240	StationData_X.SerialNumber	Not Displayed unless pallet present	
	Pallet Number Numeric Display	GD64228	StationData_X.PalletNumber	Display Masked when pallet not present	
	Program Number Numeric Display	GD64225	StationData_X.ProgramNumber	Display Masked when pallet not present	

Item #	Object	Device X=StationNumber		Details	
	PickLight Numeric Display	GD64226	StationData_X.PicklightNumber	Display Masked when pallet not present	
	Tool 1 Hits Numeric Display	GD64290	StationData_X.ToolHitsRequired_1	Display Masked when pallet not present	
	Tool 2 Hits Numeric Display	GD64290	StationData_X.ToolHitsRequired_2	Display Masked when pallet not present	
	Tool 3 Hits Numeric Display	GD64291	StationData_X.ToolHitsRequired_3	Display Masked when pallet not present	
	Tool 4 hits Numeric Display	GD64292	StationData_X.ToolHitsRequired_4	Display Masked when pallet not present	
	Pallet In Station Bit Lamp	GB64202	StationData_X.PalletPresent	State	Color
				Off	
				ON	
	Read Complete Word Lamp	GD64500	Placeholder	State	Color
				Normal	
		GB64202	StationData_X.PalletPresent(off)	Pallet Not Present	
		GB64204	StationData_X.RFIDReadComp(ON)	Read Complete	
		GB64203	StationData_X.RFIDinProgress(ON)	Read in Progress	
		GB64204	StationData_X.RFIDReadComp(Off)	Read Complete OFF	
	Write Complete Word Lamp	GD64500	Placeholder		
		GB64202	StationData_X.PalletPresent(off)	Pallet Not Present	
		GB64205	StationData_X.RFIDWriteComp(on)	Write Complete ON	
		GB64205	StationData_X.RFIDWriteComp(off)	Write Complete off	

Item #	Object	Device X=StationNumber		Details	
	Overall Reject Word Lamp	GD64221	StationData_X.PartStatus	State	Color
				{Bit 2 or Bit 1} False	
				{Bit 2 or Bit 1} True	
	Empty Pallet Bit Lamp	GB64206	StationData_X.PartPresent	State	Color
				Off	
				ON	
	Buildable Pallet Word Lamp	GD64221	StationData_X.PartStatus	State	Color
				{Bit 0 or Bit 1} False	
				{Bit 0 or Bit 1} True	
3	Side Push Buttons				
	Pre-Stop RFID Read	Bit Momentary: GOTRFID.StationDataRequestPre_PB[0]		Device Is Offset by GD65200: Display Station(1-8)	
	In Stop RFID Read	Bit Momentary: GOTRFID.StationDataRequest_PB[0]		Device Is Offset by GD65200: Display Station(1-8)	
	Pallet Pos +	Increment Display Station			
	Pallet Pos -	Decrement Display Station			

11.6 Production- Part Overview

The Parts Overview Screen allows an operator to change the part Status of a part inside of the selected workstation.

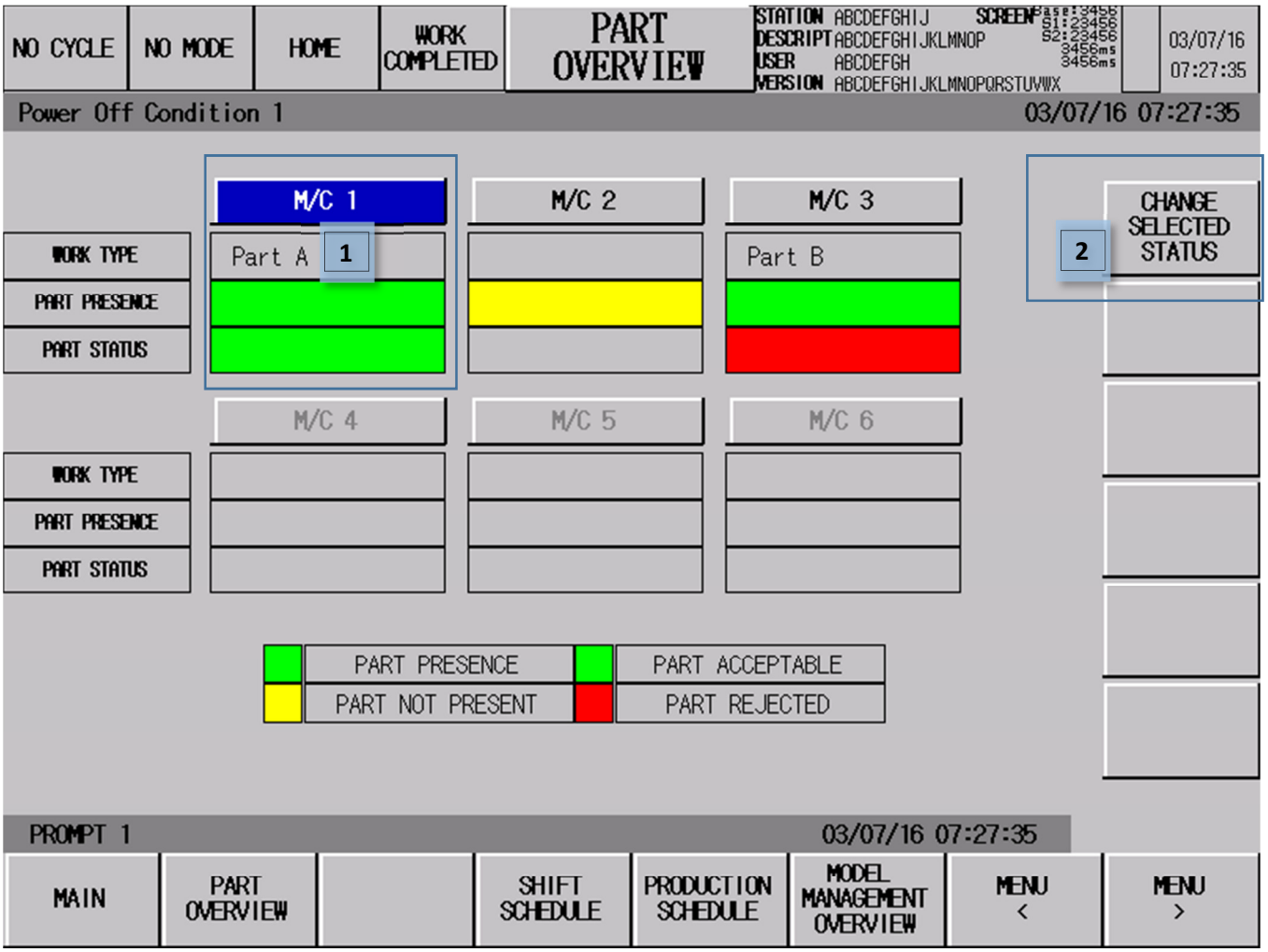


Figure 101- Part Overview Screen

Item #	Object	Device X=Station Number		Details	
1	M/C Select	Word Switch	GOTPartTypeData.MCSelection =X	When Selected Switch Turns Blue	
	Work Type	ASCII Display	StationData_X.ModelNumber		
	Part Presence	Word Lamp		State	Color
			StationData_X.Overall	Overall=0	
			StationData_X.PartPresent	OFF	

Item #	Object	Device X=Station Number		Details	
			StationData_X.PartPresent	ON	
	Part Status	Word Lamp	StationData_X.PartStatus	State	Color
			StationData_X.Overall	Overall=0	
			StationData_X.PartStatus	1 <= $V <= 7	
			StationData_X.PartStatus	8 <= $V	
2	Change Selected Status PB	GOTPartTypeData.TogglePartStatus_PB Password Protected		Changes the State of Part Status for the selected station Accepted-> No State No State -> Rejected Rejected -> accepted This assumes bit 3(dec 8) signifies reject and bit 0(dec 1) signifies accepted	

12 MAINTENANCE

12.1 Maintenance Call

This screen is used to allow an operator to make a call for help.

Pressing the Call/Cancel button, Sets the call, the acknowledge button acknowledges the call. Pressing the Call/Cancel Button again clears the acknowledgment.

- Screen Script #600 is used to place PLC registers into HMI memory
- Screen Script #600 sets the comment file to 150 and loads GOTMaintCallRow and GOTMaintCallPageData into the appropriate GD/GB registers.
- An instance of MELPT_SYSHMIScreenOperation16 has been added to the scan in program MELPT_SYS_MaintCall. The MELPT PLC project includes the global label MaintCallData with 16 instances of the MELPT_SYS_GOTManRow SDT.

Figure 102-Bypass Screen

Item	Object	Device X=Screen Row Number		Description	
1	Word Lamp	Device	Related Label	State	Color
		GD646X0	MaintCallRow_X.DisplayConfig	==7	None
		GB64614	GOTMaintCallRow_X.LIMIT_L	ON	
		GB64615	GOTMaintCallRow_X.LIMIT_R	ON	“BLINK”
2	Call/Cancel PB	GOTMaintCallRow_X.PB_R			
3	Acknowledge PB	GOTMaintCallRow_X.PB_L			

Application Example

- This function block works in concert with the HMIScreenOperation block that interfaces the HMI to global row data.
- One instance of this function block is to be called per row.
- Below is an example of Manual Operation Row configured to for maintenance call
- This screen does not use the default overlay window since the row lamps are custom color coded.

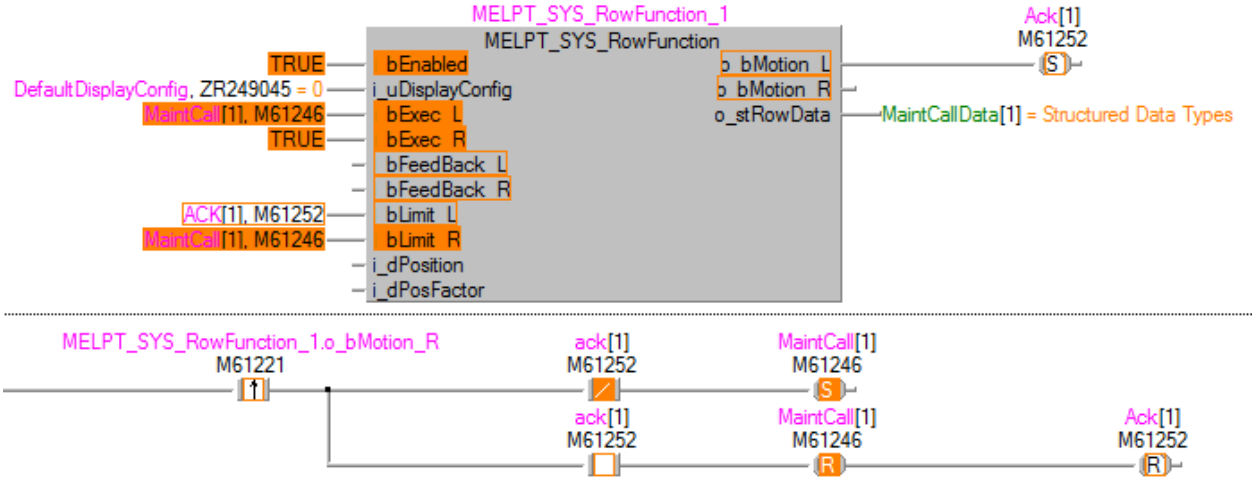


Figure 103-Maintenance Call Example

Pressing the Call Button sets o_bMotion_R to True.

The logic provided makes this so i_bExec_L is true and allows the left push-button(acknowledge)

Pressing the Acknowledge Push-button sets the left limit. Pressing the cancel button at this point cancels the acknowledge state.

12.2 Maintenance-Servo

The servo screen and related programming provide a HMI interface to JOG, teach, and home an individual axis that resides on one Simple motion module (QD77MS2, QD77MS4, QD77MS16).

This one screen provides an interface of up to 16 axis on simple one motion module.

Included functions/function blocks provide the following features:

- ALL Axis ON
- Error Reset
- MCode Reset
- JOG
- OPR
- Parameter Data retrieved and placed into a structure

Parameter Data	Parameter	Values
Unit Setting	Pr.1	0=mm 1=inch 2=degrees 3=pulses
Axis Speed Limit	Pr.8	
Jog Speed Limit	Pr.31	
OPR Method	Pr.43	0=Near Point dog Method 4=Count Method 1 5=Count Method 2 6=Data Set Method 7=Scale Origin signal detection method 8=Driver OPR method

- Monitor Data retrieved and placed into structure

Monitor Data	Item Number
Current Feed Value	Md.20
Axis Error Code	Md.23
Axis Warning Number	Md.24

Monitor Data	Item Number
M Code Value	Md.25
Axis Operation Status	Md.26
Current Speed	Md.27
Axis Feed Rate	Md.28
External Input Status	Md.30
Axis Status	Md.31
Actual Position	Md.101
Servo Status	Md.108

12.2.1. HMI: Servo Base Screen Display Elements

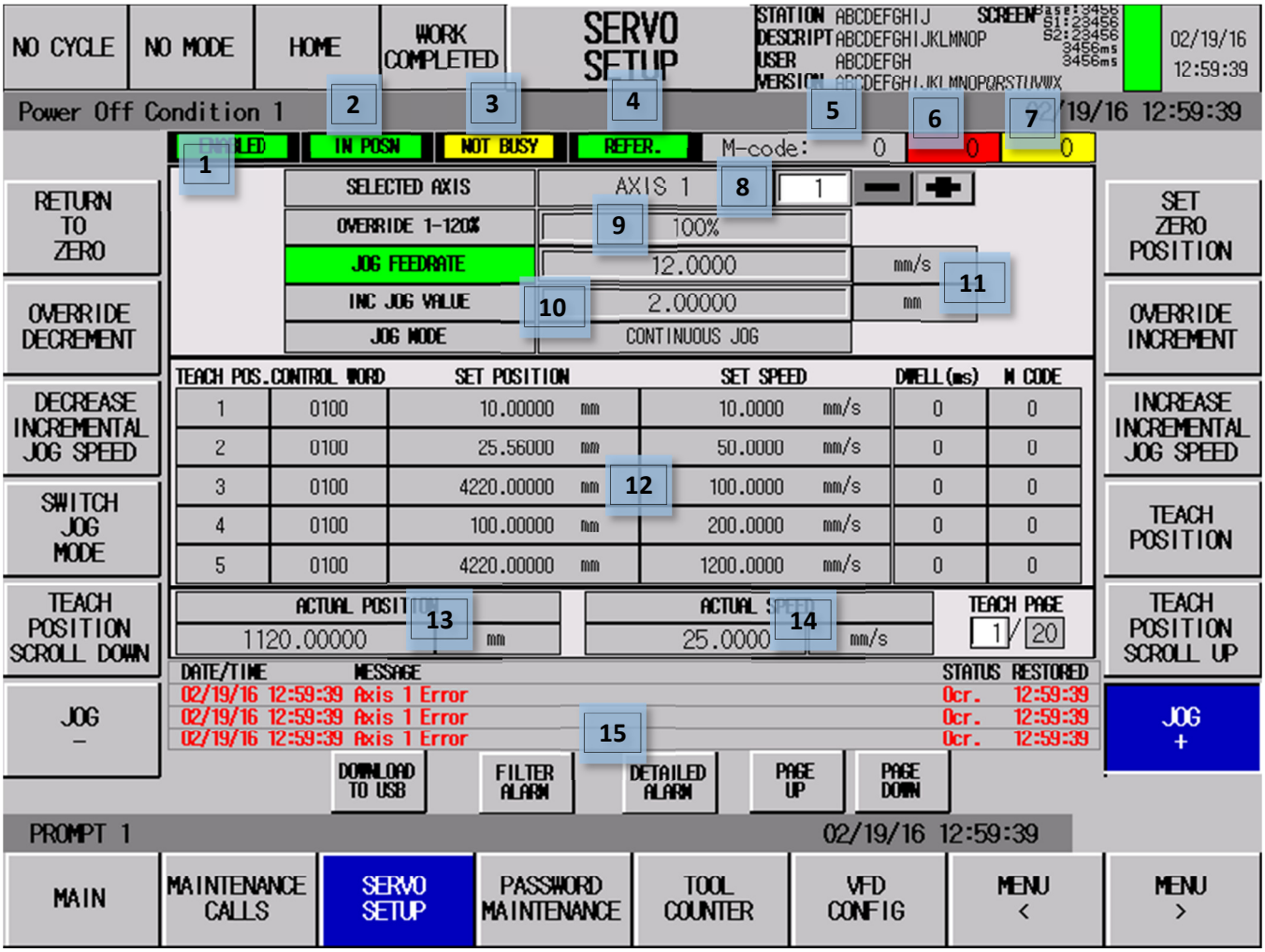


Figure pic-Servo Setup

All speeds are monitored after being divided by ServoGOT.SelectedSpeedFactor

All speeds are written after being multiplied by ServoGOT.SelectedSpeedFactor

All speeds are monitored after being divided by ServoGOT.SelectedPositionFactor

All speeds are written after being multiplied by ServoGOT.SelectedPositionFactor

Item #	Description	Object	Details	
1	Servo Enabled Indicator	Bit Lamp: ServoGOT.ServoOn	OFF	DISABLED
			ON	ENABLED

Item #	Description	Object	Details
2	Servo In Position	Bit Lamp: ServoGOT.InPos	OFF: NOT POSN ON: IN POSN
3	Servo Busy	BitLamp: ServoGOT.Busy	OFF: NOT BUSY ON: BUSY
4	Servo Referenced	Bit Lamp: ServoGOT.Referenced	OFF: NOT REFER. ON: REFER.
5	M-Code	Numeric Display: ServoGOT.SelectedMCode	Display Case: ServoGOT.MCodeON Turns background green
6	Error Code Display	Numeric Display: ServoGOT.SelectedErrorCode	Error code for selected axis
7	Warning Code Display	Numeric Display: ServoGOT.SelectedWarnCode	Warning Code for selected axis
8	Selected Axis	Numeric Input: ServoGOT.SelectedAxis Word Set Switches: ServoGOT.SelectedAxis	Word Set Switches increment or decrement axis number by 1
9	Override	Numeric Input: ServoGOT.HMIOverrideValue WriteCheck: ServoGOT.OverrideWriteCheck	This sets the axis override percentage

<table>
<tr><th>Item #</th><th>Description</th><th>Object</th><th>Details</th></tr>
<tr><td>10</td><td>Jog Feedrate</td><td>Bit Lamp:
ServoGOT.JogModeSelect_PB
ON=incremental JOG
OFF=continuous JOG
Numeric Input Continous:
ServoGOT.HMIFeedRate
Numeric Input Incrmental:
ServoGOT.IncJogDist</td><td>Incremental jog (move only incremental jog value) or continuous jog must be selected. When one is selected the other selection is grayed out, both values are modified by the Selected Axis Speed Factor</td></tr>
<tr><td>11</td><td>Distance units:

Speed Units:</td><td>Word Comment Display:
ServoGOT.SelectedUnitSetting +300
Word Comment Display:
ServoGOT.SelectedUnitSetting +305</td><td>Comment File 151</td></tr>
<tr><td>12</td><td>Teach Table</td><td><table>
<tr><th>Item</th><th>Label</th></tr>
<tr><td>Teach Pos</td><td>ServoGOT.TeachListIndex</td></tr>
<tr><td>Control Word</td><td>ServoGOT.TeachListControlWord[0..4]</td></tr>
<tr><td>Set Position</td><td>ServoGOT.TeachListPos[0..4]</td></tr>
<tr><td>Set Speed</td><td>ServoGOT.TeachListSpeed[0..4]</td></tr>
<tr><td>Dwell</td><td>ServoGOT.TeachListDwell[0..4]</td></tr>
<tr><td>M Code</td><td>ServoGOT.TeachListMCode[0.44]</td></tr>
</table>
Each row acts a switch and the selected row becomes the one pressed.
The selected row is colored teal
 
</td></tr>
<tr><td>13</td><td>Current position</td><td>ServoGOT.SelectedActualPos</td><td></td></tr>
</table>

Item #	Description	Object	Details
14	Current Speed	ServoGOT.SelectedActualSpeed	
15	Alarm Area	Advanced user Alarm Display (10)	Button provided to filter on current axis Button Provided to display details of alarm Button Provided to download Servo.csv to USB stick

12.2.2. HMI Servo Screen Side Push Buttons

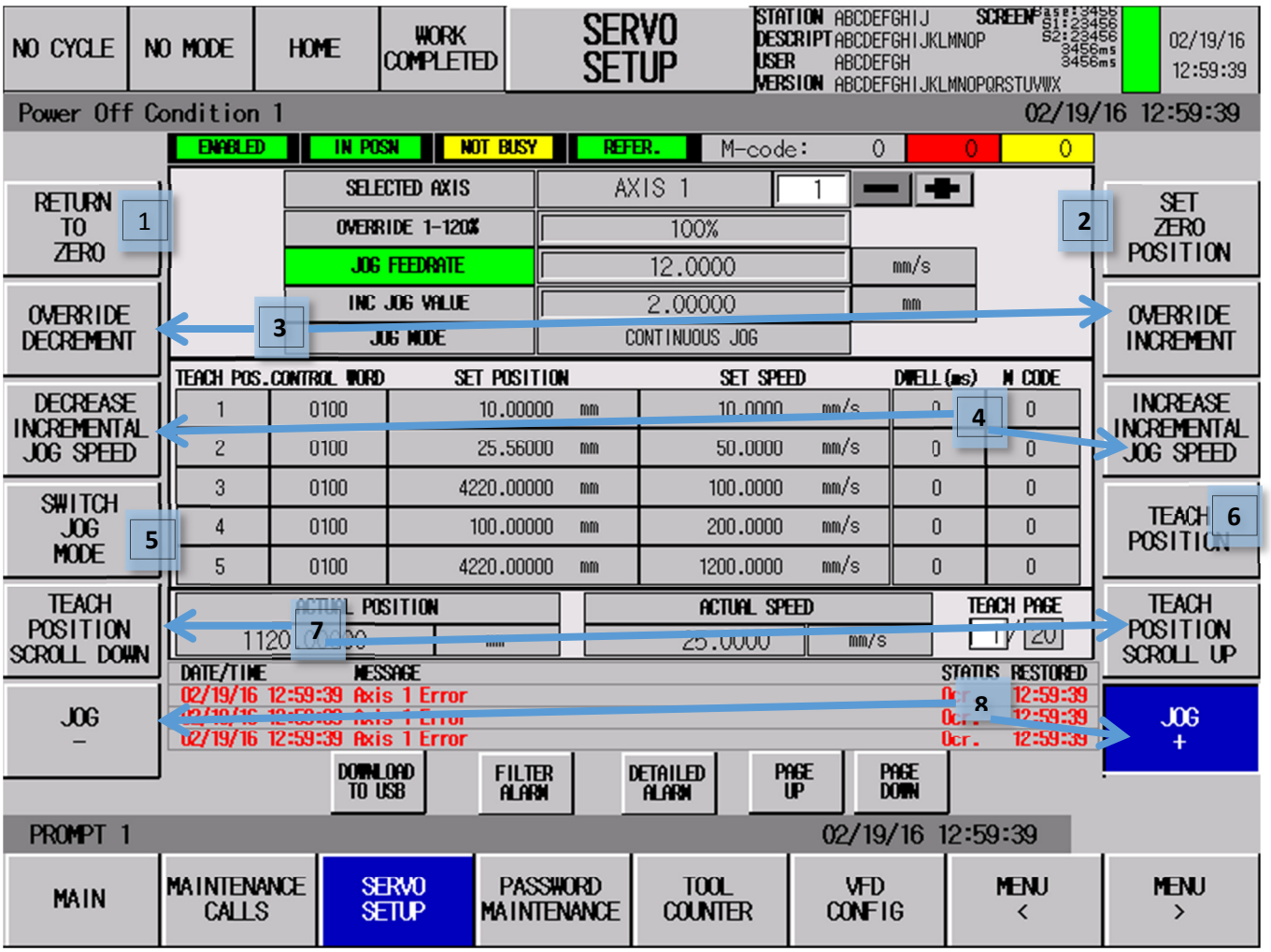


Figure 104-Servo Screen Side Push buttons

Item #	Text	Device	Prerequisites	Action
1	Return to zero	Bit Momentary: ServoGOT.ReturntoZero_PB	ServoGOT.HomingCondTrue ON and GB65101 ON	9002 OPR
2	Set zero Position	Bit Momentary: ServoGOT.SetZero_PB	ServoGOT.HomingCondTrue ON and GB65101 ON	9001 OPR
3	Override Increment/Decrement	Word Set: ServoGOT.HMIOverrideValue	GB65101 ON	Adds 1 or subtracts 1 from value, sets write check bit to notify PLC of change.
4	Increase/Decrease Incremental Jog Speed	Bit Momentary: ServoGOT.IncJogDist	ServoGOT.JogModeSelect_PB And GB65101 ON	Adds 1 or subtracts 1 from value
5	Switch Jog Mode	Bit Alternate ServoGOT.JogModeSelect_PB	GB65101 ON	
6	Teach Position	Launches the Teach Window for selected row		
7	Teach Position Down/Up	ServoGOT.TeachListPosSelected		Adds 1 or subtracts 1 from value
8	Jog +/-	ServoGOT.JogRev_PB ServoGOT.JogFwd_PB	ServoGOT.JogCondTrue ON And GB65101 ON	Jogs servo in the + or - direction

12.2.3. HMI Axis Teach Window

The HMI Teach window allows the user the modify elements of the position table.

It also provides the interface to save those changes to the flash rom.

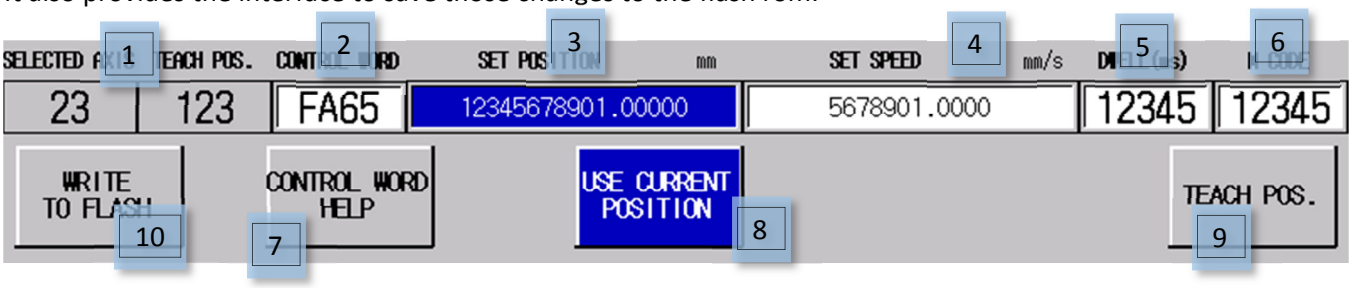


Figure 105-Servo Teach Window

Item #	Object	Description
1	Numeric Display: ServoGOT.SelectedAxis Numeric Display: ServoGOT.TeachListIndex+TeachListSelected	Displays the axis and table position under edit.
2	Numeric Input(HEX): ServoGOT.HMITeachControlWord	The Control Word is Da1 thru Da5
3	Numeric Input: ServoGOT.HMITeachPosition	The background will turn blue when “Use Current Position” is selected
4	Numeric Input ServoGOT.HMITeachSpeed	
5	Numeric Input: ServoGOT.HMITeachDwell	The dwell time in ms
6	Numeric Input: ServoGOT.HMITeachMCode:	The M Code
7	Launches a JPEG from the manual	

8	Bit Alternate: ServoGOT.UseCurrent_PB	Sets the Set Position to the current position of the axis
9	Bit Momentary: ServoGOT.Teach_PB	Will modify the Input in buffer memory for the simple motion module
10	Bit Momentary: ServoGOT.WriteToFlash_PB	After modifying the buffer memory, the Input will be lost at next power up. Writing to flash ROM will Disable the servo, but will write buffer memory to flash ROM.

12.2.4. SERVO-PLC

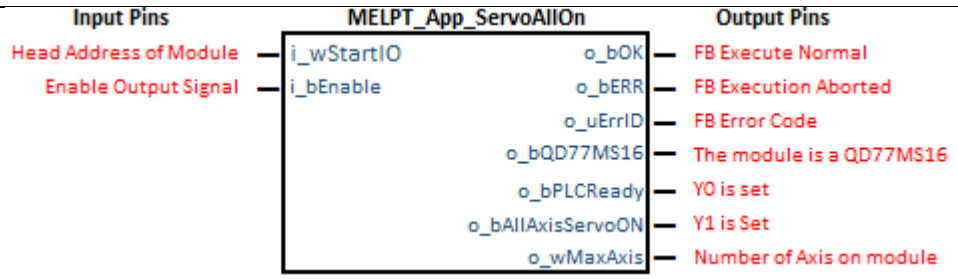
There are four function blocks and three functions included in with the QD77 portion of the PLC.

Name	Function or Function Block	Description
MELPT_APP_ServoAllOn	Function Block	Sets the y0 and y1 output for the module for all axis on
MELPT_APP_HMIServo	Function Block	Handles the HMI interface with an individual axis, controls Boolean outputs for when a servo override is less than 100, or a servo error or warning exists
MELPT_APP_QD77ErrorReset	Function	Used to reset an error on an axis
MELPT_APP_QD77MCodeReset	Function	Used to reset a M-Code on an axis
MELPT_APP_QD77Jog	Function	Used to Jog an axis
MELPT_APP_QD77OPR	Function Block	Used to execute an OPR(origin point return) function on an axis
MELPT_APP_QD77AxisMD	Function Block	Used to retrieve Selected Monitor Data for 1 axis.

12.2.5. PLC-MELPT_APP_ServoAllOn

This function block turns on the All Axis ON Interlock for the simple motion module

FB Name
MELPT_APP_ServoAllOn

Function Overview	
Item	Description
Function overview	This function block is designed to handle the PLC Ready output to the Motion Module
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
MELSEC-Q series	QD77MS2/4/16	None

Applicable Software	

Series	Version
GX Works 2	1.536

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 128 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	8 bits 6 words

Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This FB requires the function MELPT_APP_IntModuleCheck
Function description	One instance of this function block is required per module When **i_bEnable** is **TRUE** the PLC Ready Signal is sent to the module, the handshake back from the module is monitored and **o_bAllAxisServoON** is **TRUE** when the handshake is received
Restrictions and precautions	Z9 and Z8 Index registers are used in this function block. Do not use this Registers in an interrupt program
Timing chart	

FB Error Code

Error Code	Description
0	No Error.
H100(256)	Intelligent Module Check Failed

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of Module	i_wStartIO	Word[Signed]	H0 to H7E0	Head Address of the Q Motion Card
X	Enable Output Signal	i_bEnable	Bit	**TRUE** or **FALSE**	When True We want to turn all axis on

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	TRUE when FB executed Normal
FB Execution Aborted	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
The module is a QD77MS16	o_bQD77MS16	Bit	The module detected was a QD77MS16
Y0 is set	o_bPLCReady	Bit	y0 on
Y1 is Set	o_bAllAxisServoON	Bit	y1 on
Number of Axis on module	o_wMaxAxis	Word[Signed]	Maximum axis by type

FB Version Upgrade History

Version	Description
2.00A	Initial Release
2.01	MC/MCR turned on
3.00	added axis number output, label name change

Application Example

12.2.5.1. Application Example

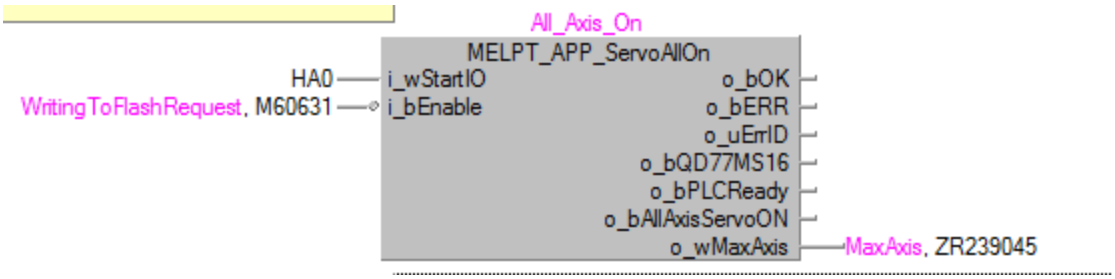


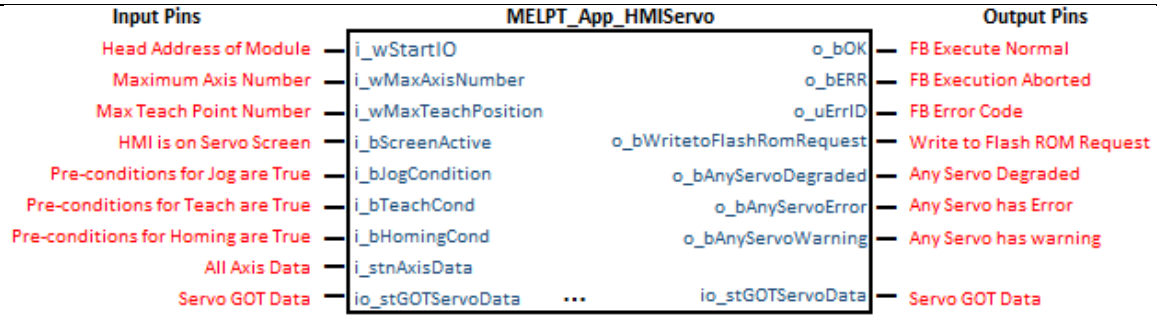
Figure 106-MELPT_Servo_all_Axis_on

One instance of this function block is required per motion module. When i_bEnable is **TRUE, o_bPLCReady** will go **TRUE**, the motion module is expected to return and input, and at that point **o_bAllAxisServoON** will become **TRUE**. In this example when WriteToFlashRequest but goes **TRUE** the i_bEnable signal is dropped and this allows *MELPT_APP_HMIServo* to complete a Buffer Memory to Flash Rom write operation.

12.2.6. PLC-MELPT_APP_HMIServo

This function block is used to interface HMI commands with the simple motion module, it will also display monitor data for the selected axis on the screen

FB Name
MELPT_APP_HMIServo

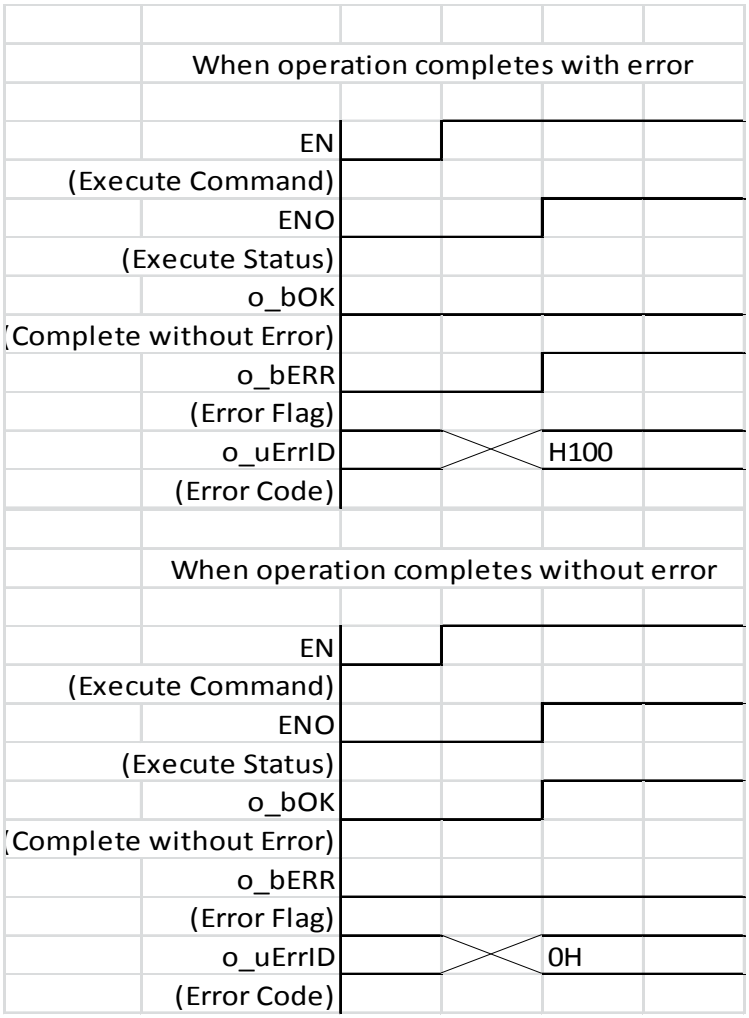
Function Overview	
Item	Description
Function overview	This function block serves to handle input from the HMI screen and pass it to the individual axis. This function block also will output information from the selected axis to the HMI.
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
MELSEC-Q series	QD77MS2/4/16	None
GOT 1000 series	GT16(800*600) or Higher	None

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Number of Ladder Steps	QnU: 1393 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	287 bits 530 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This FB requires the function MELPT_APP_IntModuleCheck
Function description	i_wAxisNumber limits the Axis Number selected. I_bJogCondition I_bTeachCond I_bHomingCond Can be used to control when HMI related functions are allowed to be used. Three outputs are designed to be interfaced with the alarming system O_bAnyServoDegraded O_bAnyServoError O_bAnyServoWarning
Restrictions and precautions	Only 100 teach positions can be accessed by buffer memory for the QD77MS16. **I_wMaxTeachPosition** is default 100 for this reason. The Override is limited to 120

Timing chart



FB Error Code

Error Code	Description
0	No Error
H100(256)	QD77 not detected
H101(257)	Axis Number too low
H102(258)	Axis Number too high
H103(259)	Max Teach Position too low
H104(260)	Max Teach Position too high

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Head Address of Module	i_wStartIO	Word[Signed]	H0 to H7E0	Head Address of the Q Motion Card
	Maximum Axis Number	i_wMaxAxisNumber	Word[Signed]	1 to 16	No. of axis to cycle through
X	Max Teach Point Number	i_wMaxTeachPosition	Word[Signed]	1 to 100	Maximum No. of teach positions
	HMI is on Servo Screen	i_bScreenActive	Bit		True when HMI on Servo Screen
X	Pre-conditions for Jog are True	i_bJogCondition	Bit		Conditions for Jog are OK
X	Pre-conditions for Teach are True	i_bTeachCond	Bit		Conditions for Teach are true
X	Pre-conditions for Homing are True	i_bHomingCond	Bit		Conditions for Homing are true
	All Axis Data	i_stnAxisData	MELPT_App_AXISDATA(1..16)		Monitor Data SDT

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Servo GOT Data	io_stGOTServoData	MELPT_APP_GOTServo		HMI Data Structure related to Servo

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execution Aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Signed]	FB Error Code Output
Write to Flash ROM Request	o_bWritetoFlashRomRequest	Bit	Signal that we want to FLASH the ROM
Any Servo Degraded	o_bAnyServoDegraded	Bit	Alarm Signal That an Axis is below 100%
Any Servo has Error	o_bAnyServoError	Bit	Alarm Signal that an Axis has an error
Any Servo has warning	o_bAnyServoWarning	Bit	Alarm Signal that an Axis has a Warning

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.12	Modified for incremental mode and teach mode modifications FB labels updated to BCN-89000-0823-D guideline
1.20	Added FB Status Outputs
1.26	improved user input checking; combined with GOT Disp FB; Changed Override Percentage
2.00A	Adopted BCN-89000-0969
3.00	Rewrite of FB

SDT Usage

1. MELPT_APP_GOTSERVO

System Label: ServoGOT		
Member	Type	Usage
TeachWriteCheck	Bit	HMI Set when a teach point has changed
OverrideWriteCheck	Bit	HMI Set when the Override has changed
OnFirstAxis	Bit	FB Set when on First Axis to prevent HMI from selecting invalid Axis
OnLastAxis	Bit	FB Set when on Last Axis to prevent HMI from selecting invalid Axis
OnFirstTeachPos	Bit	FB Set when on First Teach Position to prevent HMI from selecting invalid Teach Position
OnLastTeachPos	Bit	FB Set when on Last Teach Position to prevent HMI from selecting invalid Teach Position
OnGreatestOverride	Bit	FB Set when Override is 1 to prevent HMI from reducing further
OnLeastOverride	Bit	FB Set when Override is 120 to prevent HMI from increasing further
OnGreatestIncJogDist	Bit	FB set to prevent HMI from incrementing too much
JogModeSelect_PB	Bit	HMI PB switched between Continuous and incremental jog mode
UseCurrent_PB	Bit	HMI PB that will load current position into teach window
WriteToFlash_PB	Bit	HMI PB that will start a write to Flash Rom sequence
JogFwd_PB	Bit	HMI Jog axis forward
JogRev_PB	Bit	HMI PB Jog Axis Reverse
Teach_PB	Bit	Edit the Teach Point

System Label: ServoGOT		
Member	Type	Usage
SetZero_PB	Bit	HMI PB for OPR 9001
ReturntoZero_PB	Bit	HMI PB for OPR 9002
TeachCondTrue	Bit	PLC to HMI, to allow teaching
JogCondTrue	Bit	PLC to HMI, to allow Jogging
HomingCondTrue	Bit	PLC to HMI, to allow Homing
WriteToFlash_Ind	Bit	Notification to write to FlashROM or change will be lost during power cycle
InPos	Bit	In Position indicator
Busy	Bit	Busy Indicator
Referenced	Bit	Referenced Indicator
MCodeON	Bit	M Code ON indicator
ServoOn	Bit	Servo Enabled Indicator
HMITeachPosInhibit	Bit(0..4)	Disabled selecting a row for teach if it is not available
IncJogDist	Double Word[Signed]	Incremental Jog Distance
SelectedAxis	Word[Signed]	Selected Axis controlled by HMI, Limited by PLC
TeachListPosSelected	Word[Signed]	Teach List Position Selected
TeachListIndex	Word[Signed]	(TEach List Page-1)*5
TeachListMaxPage	Word[Signed]	Maximum Pages of Teach List
TeachListCurrentPage	Word[Signed]	Current Page of Teach List
SelectedErrorCode	Word[Unsigned]	Selected Axis Error Number
SelectedWarnCode	Word[Unsigned]	Selected Axis Warning Number
SelectedMCode	Word[Unsigned]	

System Label: ServoGOT		
Member	Type	Usage
SelectedUnitSetting	Word[Unsigned]	Selected Axis Units
SelectedJogSpeedLimit	Double Word[Signed]	Selected Axis Jog Limits Speed used by HMI to limit input
SelectedActualPos	Double Word[Signed]	Selected Axis Current Position
SelectedActualSpeed	Double Word[Signed]	Selected Axis Actual Speed
SelectedPositionFactor	Double Word[Signed]	Selected Axis Position Factor(used to get proper decimal places)
SelectedSpeedFactor	Double Word[Signed]	Selected Axis Speed Factor(Used to get proper decimal places)
HMIOverrideValue	Word[Unsigned]	HMI Override Value
HMITeachMCode	Word[Unsigned]	HMI Teach Window M Code
HMITeachControlWord	Word[Unsigned]	HMI Teach Window Control Word
HMITeachDwell	Word[Unsigned]	HMI Teach Window Dwell Value
HMIFeedRate	Double Word[Signed]	Selected Axis Speed
HMITeachPosition	Double Word[Signed]	HMI Teach Window (Input Number)
HMITeachSpeed	Double Word[Signed]	HMI Teach Window Speed
HMIAxisPosition	Double Word[Signed](1..16)	All Axis Position Output from FB
HMIPositionFactor	Double Word[Signed](1..16)	All Axis Position Factors output of FB

System Label: ServoGOT		
Member	Type	Usage
ErrorCode	Word[Unsigned](1..16)	All Axis Error Code for Alarming
WarnCode	Word[Unsigned](1..16)	All Axis Warning Code for Alarming
HMIAxisUnit	Word[Unsigned](1..16)	Unit Setting for all Axis
TeachListMCode	Word[Unsigned](0..4)	M Codes for Teach List Display
TeachListControlWord	Word[Unsigned](0..4)	Control Words for Teach List Display
TeachListDwell	Word[Unsigned](0..4)	Dwells for Teach List Display
TeachListPos	Double Word[Signed](0..4)	Positions for Teach List Display
TeachListSpeed	Double Word[Signed](0..4)	Speeds for Teach List Display

2. MELPT_App_AxisData

Global Label: Axis Data		
Member	Type	Usage
InPos	Bit	Transferred from Selected Axis Structure to HMI Structure
Busy	Bit	Transferred from Selected Axis Structure to HMI Structure
StopSignal	Bit	
PositionStart	Bit	
ErrDetect	Bit	Used to set Any Servo Error of FB
WarnDetect	Bit	Used to set and Servo Warning of FB

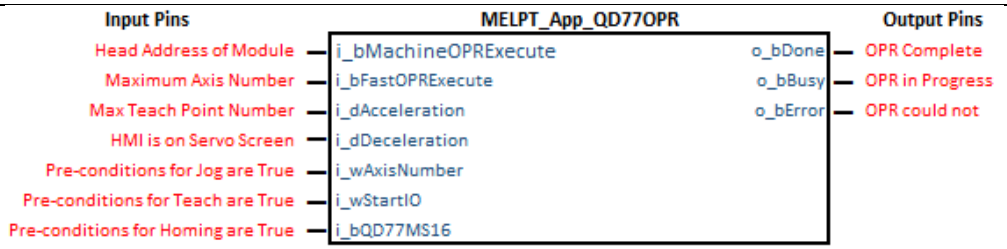
Global Label: Axis Data		
Member	Type	Usage
Referenced	Bit	Transferred from Selected Axis Structure to HMI Structure
McodeON	Bit	Transferred from Selected Axis Structure to HMI Structure
ServoON	Bit	Transferred from Selected Axis Structure to HMI Structure
ServoDegraded	Bit	Used to set and Servo Servo Degraded of Any Axis on FB
LowerLimit	Bit	
UpperLimit	Bit	
ExtStopSignal	Bit	
ExtCommandSignal	Bit	
ExtNearPointDog	Bit	
UnitSetting	Word[Unsigned]	Sent to HMI Structure
AxisSpeedLimit	Double Word[Signed]	
JogSpeedLimit	Double Word[Signed]	Used to Limit Incremental Jog Distance
OPRMethod	Word[Unsigned]	
CommandedPos	Double Word[Signed]	
ErrorCode	Word[Unsigned]	Sent to HMI Structure for alarming purposes
WarnCode	Word[Unsigned]	Sent to HMI Structure for alarming purposes
ActiveMCode	Word[Unsigned]	Sent To HMI Structure
OperationStatus	Word[Signed]	
CommandedSpeed	Double Word[Signed]	

Global Label: Axis Data		
Member	Type	Usage
ActualSpeed	Double Word[Signed]	Sent to HMI Structure
ExternalInputStatus	Word[Unsigned]	
AxisStatus	Word[Unsigned]	
ActualPos	Double Word[Signed]	Sent to HMI Structure
ServoStatus	Word[Unsigned](0..1)	

12.2.7. PLC-MELPT_APP_QD77OPR

This function block will make an OPR request for the selected axis

FB Name
MELPT_APP_QD77OPR

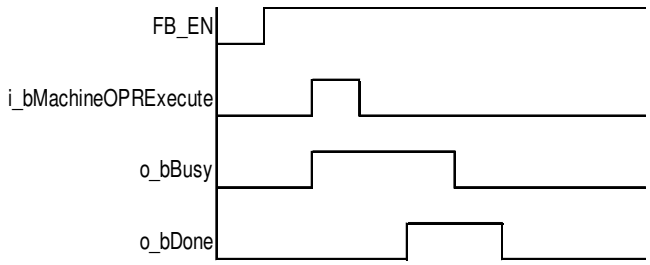
Function Overview	
Item	Description
Function overview	This function block executes a 9001 or 9002 OPR.
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
MELSEC-Q series	QD77MS2/4/16	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 220 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	32 bits 10 words 1 Timer
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	
Function description	This function block will execute a Fast or Machine OPR on the axis number at the StartIO specified
Restrictions and precautions	Z9 and Z8 Z7 Index registers are used in this function block. Do not use this Registers in an interrupt program The values attached to acceleration and deceleration are written to parameter 9 and parameter 10 of the axis when i_bMachineOPRExecute or i_bFastOPRExecute are triggered. This replaces the value for Acceleration 0 and deceleration 0
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Head Address of Module	i_bMachineOPRExecute	Bit		HMI PB Start Homing Routine

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Maximum Axis Number	i_bFastOPRExecute	Bit		HMI PB Start Fast OPR Routine
X	Max Teach Point Number	i_dAcceleration	Double Word[Signed]		
X	HMI is on Servo Screen	i_dDeceleration	Double Word[Signed]		
X	Pre-conditions for Jog are True	i_wAxisNumber	Word[Signed]	**1 to 16**	Axis Number
X	Pre-conditions for Teach are True	i_wStartIO	Word[Signed]	**0 to 7E0**	Head Address IO
	Pre-conditions for Homing are True	i_bQD77MS16	Bit		This module is a QD77MS16

- Output labels

Symbol Name	Var_Output name	Data Type	Description
OPR Complete	o_bDone	Bit	TRUE when FB executed Normal
OPR in Progress	o_bBusy	Bit	TRUE when user input check failed
OPR could not	o_bError	Bit	FB Error Code Output

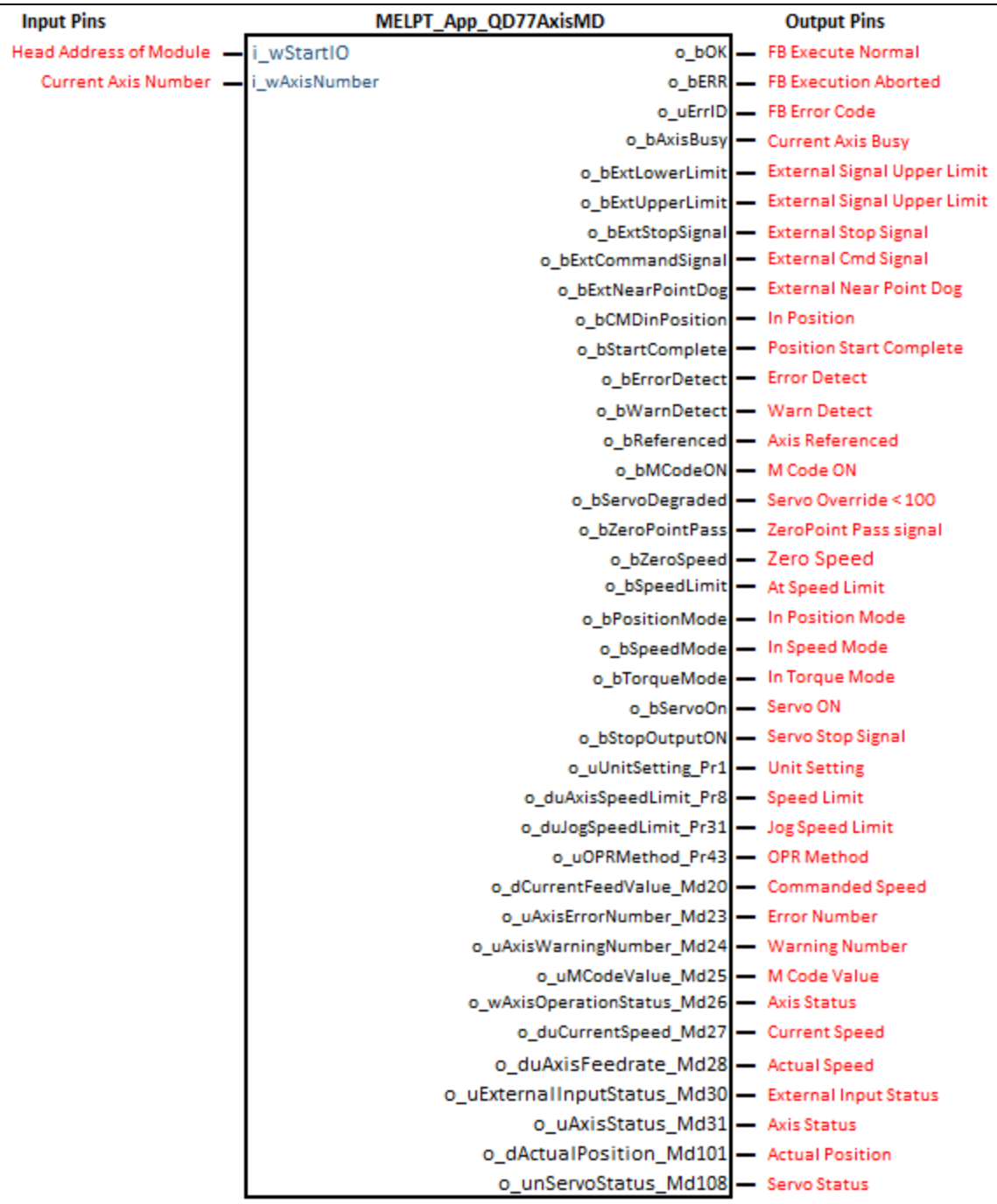
FB Version Upgrade History

Version	Description
3.00	Initial Release

12.2.8. PLC-MELPT_APP_QD77AxisMD

FB Name
MELPT_APP_QD77AxisMD

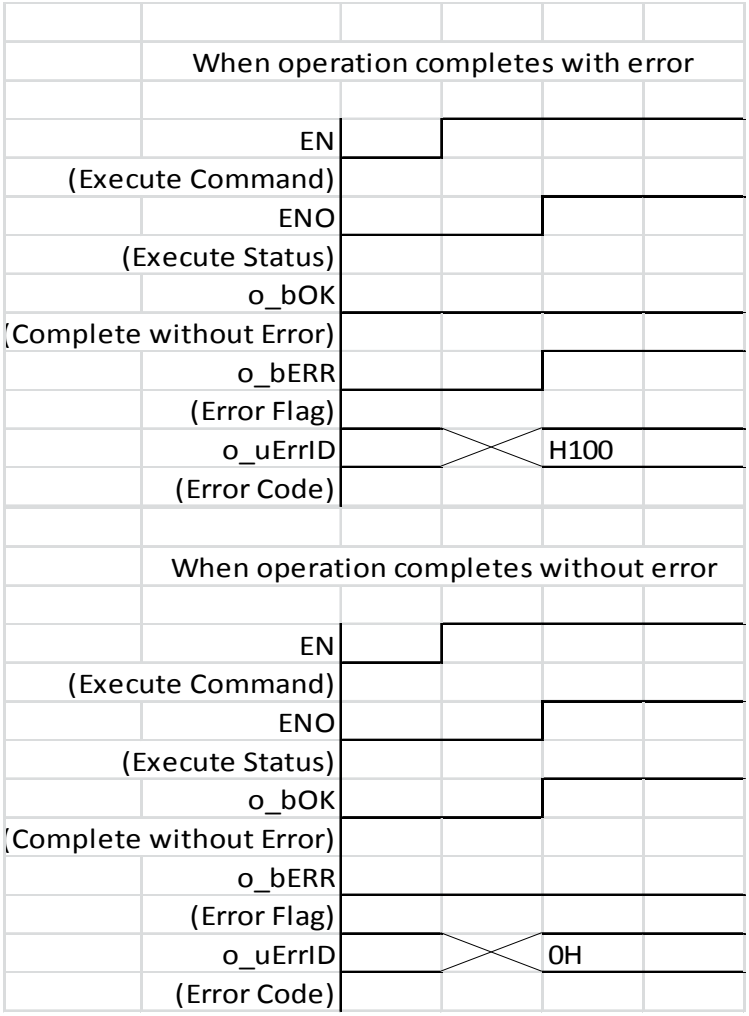
Function Overview	
Item	Description
Function overview	This function block retrieves selected monitor data and places into the axisdata structure for the axis at i_wAxisNumber at the StartIO location

Symbol	
	

Input Pins
MELPT_App_QD77AxisMD
Output Pins
Head Address of Module
i_wStartIO
Current Axis Number
i_wAxisNumber
o_bOK
FB Execute Normal
o_bERR
FB Execution Aborted
o_uErrID
FB Error Code
o_bAxisBusy
Current Axis Busy
o_bExtLowerLimit
External Signal Upper Limit
o_bExtUpperLimit
External Signal Upper Limit
o_bExtStopSignal
External Stop Signal
o_bExtCommandSignal
External Cmd Signal
o_bExtNearPointDog
External Near Point Dog
o_bCMDinPosition
In Position
o_bStartComplete
Position Start Complete
o_bErrorDetect
Error Detect
o_bWarnDetect
Warn Detect
o_bReferenced
Axis Referenced
o_bMCodeON
M Code ON
o_bServoDegraded
Servo Override < 100
o_bZeroPointPass
ZeroPoint Pass signal
o_bZeroSpeed
Zero Speed
o_bSpeedLimit
At Speed Limit
o_bPositionMode
In Position Mode
o_bSpeedMode
In Speed Mode
o_bTorqueMode
In Torque Mode
o_bServoOn
Servo ON
o_bStopOutputON
Servo Stop Signal
o_uUnitSetting_Pr1
Unit Setting
o_duAxisSpeedLimit_Pr8
Speed Limit
o_duJogSpeedLimit_Pr31
Jog Speed Limit
o_uOPRMethod_Pr43
OPR Method
o_dCurrentFeedValue_Md20
Commanded Speed
o_uAxisErrorNumber_Md23
Error Number
o_uAxisWarningNumber_Md24
Warning Number
o_uMCodeValue_Md25
M Code Value
o_wAxisOperationStatus_Md26
Axis Status
o_duCurrentSpeed_Md27
Current Speed
o_duAxisFeedrate_Md28
Actual Speed
o_uExternalInputStatus_Md30
External Input Status
o_uAxisStatus_Md31
Axis Status
o_dActualPosition_Md101
Actual Position
o_unServoStatus_Md108
Servo Status

<table>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model</td><td>None</td></tr>
<tr><td>MELSEC-Q series</td><td>QD77MS2/4/16</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Device Memory Used</td><td>287 bits
530 words</td></tr>
<tr><td>Compiling method</td><td>Sub-Routine Type</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the function MELPT_APP_IntModuleCheck</td></tr>
<tr><td>Function description</td><td>This function block retrieves selected monitor data for the defined axis of the module</td></tr>
<tr><td>Restrictions and precautions</td><td>Z9 and Z8 Z7 Index registers are used in this function block. Do not use this Registers in an interrupt program</td></tr>
</table>

Timing chart



FB Error Code

Error Code	Description
0	No Error
H100(256)	QD77 not detected
H101(257)	Axis Number too low
H102(258)	Axis Number too high

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X		i_wStartIO	Word[Signed]	0 to 7FF	Head Address of the Q Motion Card
X		I_wAxisNumber	Word[Signed]	1 to 16	Axis No. of the Q Motion Card that this block is for

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execution Aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Signed]	FB Error Code Output
Current Axis Busy	o_bAxisBusy	Bit	Servo Busy Signal
External Signal Upper Limit	o_bExtLowerLimit	Bit	Md.30 signal
External Signal Upper Limit	o_bExtUpperLimit	Bit	Md.30 signal
External Stop Signal	o_bExtStopSignal	Bit	Md.30 signal
External Cmd Signal	o_bExtCommandSignal	Bit	Md.30 signal
External Near Point Dog	o_bExtNearPointDog	Bit	Md.30 signal
In Position	o_bCMDinPosition	Bit	Servo In position Signal
Position Start Complete	o_bStartComplete	Bit	postion start handshake bit

Symbol Name	Var_Output name	Data Type	Description
Error Detect	o_bErrorDetect	Bit	Servo Err Detected
Warn Detect	o_bWarnDetect	Bit	Servo Warning Signal
Axis Referenced	o_bReferenced	Bit	Referenced Signal
M Code ON	o_bMCodeON	Bit	M Code Signal
Servo Override < 100	o_bServoDegraded	Bit	Override less than 100%
ZeroPoint Pass signal	o_bZeroPointPass	Bit	Md.108
Zero Speed	o_bZeroSpeed	Bit	Md.108
At Speed Limit	o_bSpeedLimit	Bit	Md.108
In Position Mode	o_bPositionMode	Bit	Md.108
In Speed Mode	o_bSpeedMode	Bit	Md.108
In Torque Mode	o_bTorqueMode	Bit	Md.108
Servo ON	o_bServoOn	Bit	Servo Enabled Signal
Servo Stop Signal	o_bStopOutputON	Bit	
Unit Setting	o_uUnitSetting_Pr1	Word[Unsigned]	Pr.1
Speed Limit	o_duAxisSpeedLimit_Pr8	Double Word[Signed]	Speed Limit read from Parameters
Jog Speed Limit	o_duJogSpeedLimit_Pr31	Double Word[Signed]	Jog Speed Limit
OPR Method	o_uOPRMethod_Pr43	Word[Unsigned]	OPR Method Selected
Commanded Speed	o_dCurrentFeedValue_Md20	Double Word[Signed]	Md.20
Error Number	o_uAxisErrorNumber_Md23	Word[Unsigned]	Md. 23

Symbol Name	Var_Output name	Data Type	Description
Warning Number	o_uAxisWarningNumber_Md24	Word[Unsigned]	Md. 24
M Code Value	o_uMCodeValue_Md25	Word[Unsigned]	Md.25
Axis Status	o_wAxisOperationStatus_Md26	Word[Signed]	Md. 26
Current Speed	o_duCurrentSpeed_Md27	Double Word[Signed]	Md. 27
Actual Speed	o_duAxisFeedrate_Md28	Double Word[Signed]	MD .28
External Input Status	o_uExternalInputStatus_Md30	Word[Unsigned]	Md. 30
Axis Status	o_uAxisStatus_Md31	Word[Unsigned]	Md.31
Actual Position	o_dActualPosition_Md101	Double Word[Signed]	Md. 101
Servo Status	o_unServoStatus_Md108	Word[Unsigned](0..1)	Md. 108

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.12	Modified for incremental mode and teach mode modifications FB labels updated to BCN-89000-0823-D guideline Include QD77Ms16 functionality
1.20	Added FB Status Outputs; Y0Z0 AND Y1Z0 replace internal variables
1.26	Condensed qd7716 code added Intelligent Module Check; Added Write to Flash Rom, Added Hard Stop homing Method
2.00A	Adopted Bcn-89000-0969, changed output from SDT to individual pins

Version	Description
3.00	Rewrite of FB, used to be called MELPT_Servo_GOTFunc_FB

SDT Usage

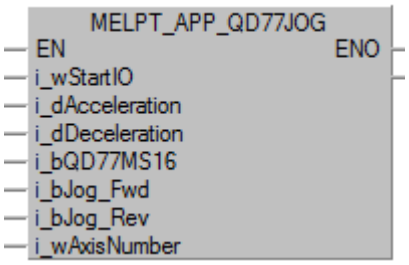
1. MELPT_App_AxisData

Global Label: Axis Data		
Member	Type	Usage
InPos	Bit	Determined by this FB
Busy	Bit	Determined by this FB
StopSignal	Bit	Determined by this FB
PositionStarted	Bit	Determined by this FB
ErrDetect	Bit	Determined by this FB
WarnDetect	Bit	Determined by this FB
Referenced	Bit	Determined by this FB
McodeON	Bit	Determined by this FB
ServoON	Bit	Determined by this FB
ServoDegraded	Bit	Determined by this FB
LowerLimit	Bit	Determined by this FB
UpperLimit	Bit	Determined by this FB
ExtStopSignal	Bit	Determined by this FB
ExtCommandSignal	Bit	Determined by this FB
ExtNearPointDog	Bit	Determined by this FB
UnitSetting	Word[Unsigned]	Determined by this FB
AxisSpeedLimit	Double Word[Signed]	Determined by this FB

Global Label: Axis Data		
Member	Type	Usage
JogSpeedLimit	Double Word[Signed]	Determined by this FB
OPRMethod	Word[Unsigned]	Determined by this FB
CommandedPos	Double Word[Signed]	Determined by this FB
ErrorCode	Word[Unsigned]	Determined by this FB
WarnCode	Word[Unsigned]	Determined by this FB
ActiveMCode	Word[Unsigned]	Determined by this FB
OperationStatus	Word[Signed]	Determined by this FB
CommandedSpeed	Double Word[Signed]	Determined by this FB
ActualSpeed	Double Word[Signed]	Determined by this FB
ExternalInputStatus	Word[Unsigned]	Determined by this FB
AxisStatus	Word[Unsigned]	Determined by this FB
ActualPos	Double Word[Signed]	Determined by this FB
ServoStatus	Word[Unsigned](0..1)	Determined by this FB

12.2.9. PLC-MELPT_APP_QD77Jog

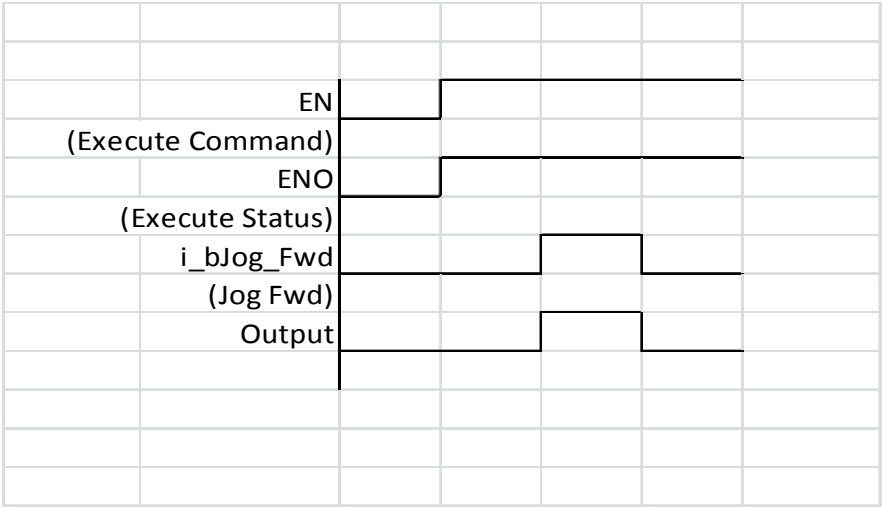
FUN Name
MELPT_APP_QD77JOG

Function Overview	
Item	Description
Function overview	This function will Jog or incrementally move the selected axis
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
MELSEC-Q series	QD77MS2/4/16	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	
Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 220 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	5 bits 10 words
Execution type	Real-time Execution
Dependences	This FB requires the function MELPT_APP_IntModuleCheck
Function description	Triggering i_bJog_Fwd or i_bJog_Rev, will jog the axis in the appropriate direction
Restrictions and precautions	There is no protection for invalid axis or i_wStartIO The values attached to acceleration and deceleration is written to parameter 9 and parameter 10 of the axis when i_bJog_Fwd or i_bJog_Rev are triggered. This replaces the value for Acceleration 0 and deceleration 0
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X		i_wStartIO	Word[Signed]	0-7E0	Head Address of the Q Motion Card
X		i_dAcceleration	Double Word[Signed]	1 to 8388608	Acceleration time (ms) to reach speed limit

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X		i_dDeceleration	Double Word[Signed]	1 to 8388608	Deceleration time form speed limit to zero Sp
X		i_bQD77MS16	Bit		Signal that module is QD77MS16
X		i_bJog_Fwd	Bit		True-Forward ; False - Reverse
X		i_bJog_Rev	Bit		True-Forward ; False - Reverse
X		i_wAxisNumber	Word[Signed]	1 to 16	Axis Number

- Output labels

The output is on when i_bJog_Fwd or i_bJog_Rev is true, but not both.

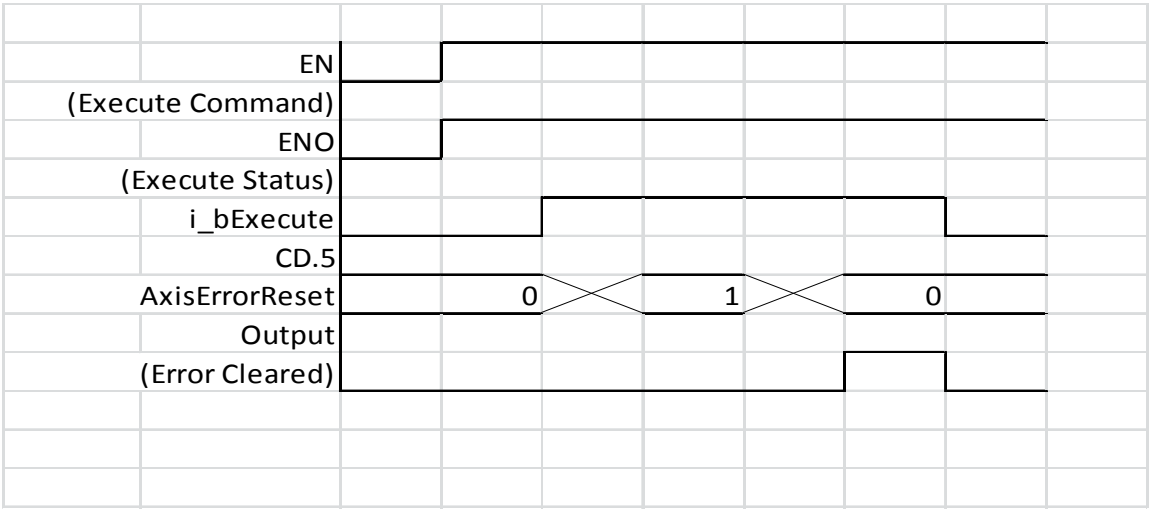
FUN Version Upgrade History

Version	Description
3.00	New Function

12.2.10. PLC-MELPT_APP_QD77ErrorReset

FUN Name
MELPT_APP_QD77ErrorReset

Function Overview	
Item	Description
Function overview	This function will reset the error for the selected axis
Symbol	
Applicable Hardware	Series: MELSEC-Q series; Model: Universal Model; Serial Restriction: None Series: MELSEC-Q series; Model: QD77MS2/4/16; Serial Restriction: None
Applicable Software	Series: GX Works 2; Version: 1.536
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 23 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	2 bits 4 words
Execution type	Real-time Execution

Dependences	
Function description	Triggering Execute places a 1 in error reset buffer memory for the module and axis number selected
Restrictions and precautions	There is no protection for invalid axis or i_wStartIO
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X		i_bExecute	Bit		Clear Error at rising edge
X		i_bQD77MS16	Bit		Signal that module is QD77MS16
X		i_wStartIO	Word[Signed]		Head Address of the Q Motion Card
X		i_wAxisNumber	Word[Signed]		Axis Number

- Output labels

This is true when CD.5 = 0 and i_bExecute is true

FUN Version Upgrade History

Version	Description
3.00	New Function

12.2.11. PLC-MELPT_APP_QD77MCodeReset

FUN Name
MELPT_APP_QD77MCodeReset

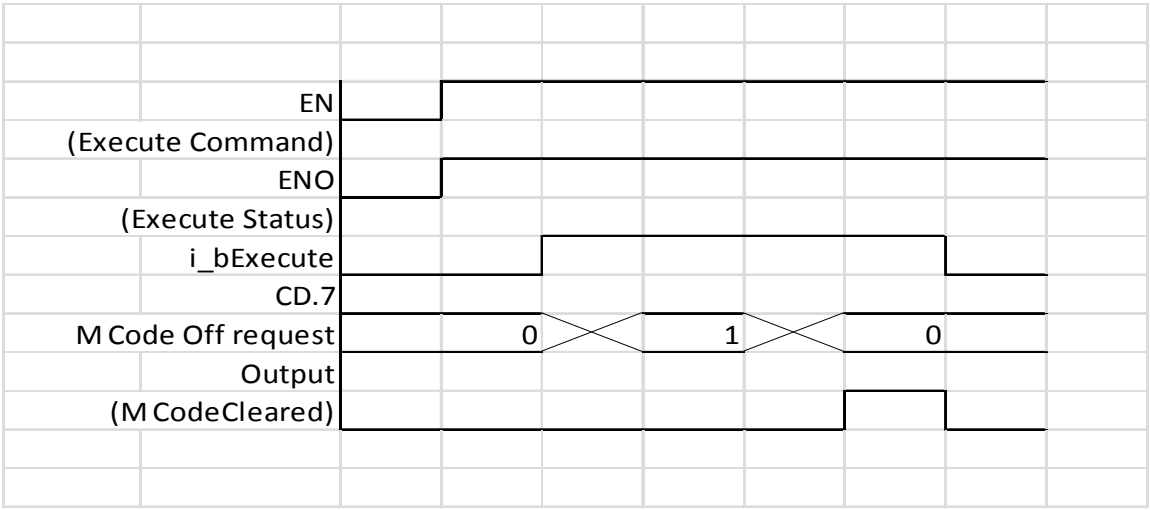
Function Overview	
Item	Description
Function overview	This function will reset the error for the selected axis
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
MELSEC-Q series	QD77MS2/4/16	None

Applicable Software	

Series	Version
GX Works 2	1.536

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 23 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	2 bits 4 words
Execution type	Real-time Execution

Dependences	
Function description	Triggering Execute places a 1 in error reset buffer memory for the module and axis number selected
Restrictions and precautions	There is no protection for invalid axis or i_wStartIO
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X		i_bExecute	Bit		Clear Error at rising edge
X		i_bQD77MS16	Bit		Signal that module is QD77MS16
X		i_wStartIO	Word[Signed]		Head Address of the Q Motion Card
X		i_wAxisNumber	Word[Signed]		Axis Number

- Output labels

This is true when CD.7 = 0 and i_bExecute is true

FUN Version Upgrade History

Version	Description
3.00	New Function

12.3 Password Maintenance

The Password Maintenance Screen provides an interface to operator authentication Operator Names and passwords are maintained locally on the HMI.

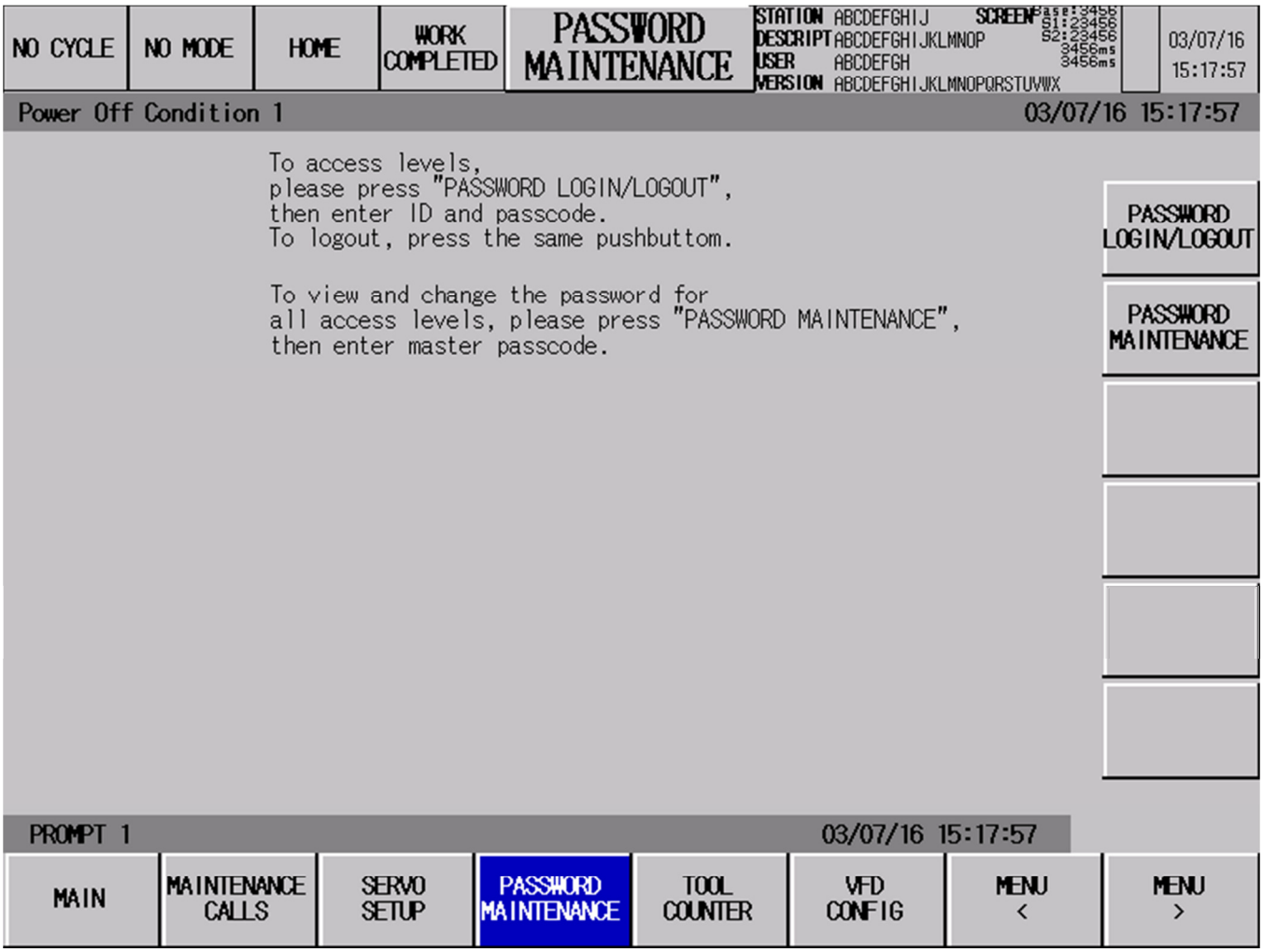


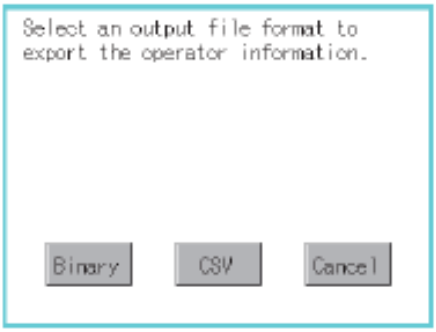
Figure 107-Password Maintenance Screen

Operator Authentication can be exported from one HMI to another HMI.

(f) Export operation

Export the operator information stored in the GOT to a CF card.

1. Touch the [Export] button.



2. The dialog box on the left is displayed.
   Touch the following buttons according to the output format for the file.
   - Binary file : [Binary] button
   - CSV file : [CSV] button

3. The dialog box shown left is displayed.

   Touch [OK] button, and then the Admin password authentication screen is displayed. Input the administrator password.

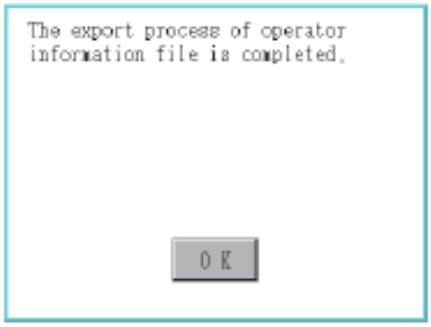
   Character types to be input can be changed with touching the following buttons.

   [A-Z]: Alphabet capital

   [a-z]: Alphabet small letter

   [0-9]: Numeric

   When the input is completed, touch the [Enter] key.

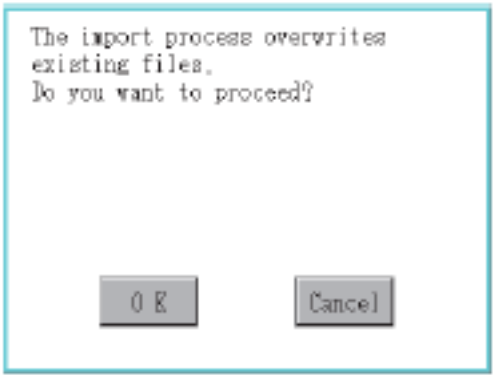


4. When the administrator password is correctly input, the dialog box shown left is displayed and the operator information stored in the GOT is exported to a CF card.
   (file name: AUTHINF.G1U)

(e) Import operation

Import the operator information that is already exported to a CF card to the GOT.

1. Touch the [Import] button.



2. The dialog box shown left is displayed.

   Touch [OK] button, and then the Admin password authentication screen is displayed. Input the administrator password.

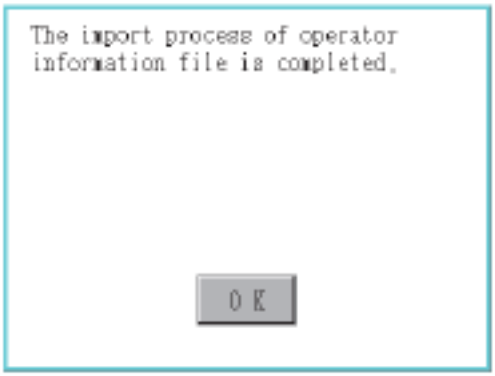
   Character types to be input can be changed with touching the following buttons.

   [A-Z]: Alphabet capital

   [a-z]: Alphabet small letter

   [0-9]: Numeric

   When the input is completed, touch the [Enter] key.



3. When the administrator password is correctly input, the dialog box shown left is displayed and the operator information stored in a CF card is imported to the GOT.

12.4 HMI-Tool Counters

There are two types of tool counter screens included in the MELPT package, automatic station and manual station.

Additionally the tool management function block has to be configured to support the screen type selected.

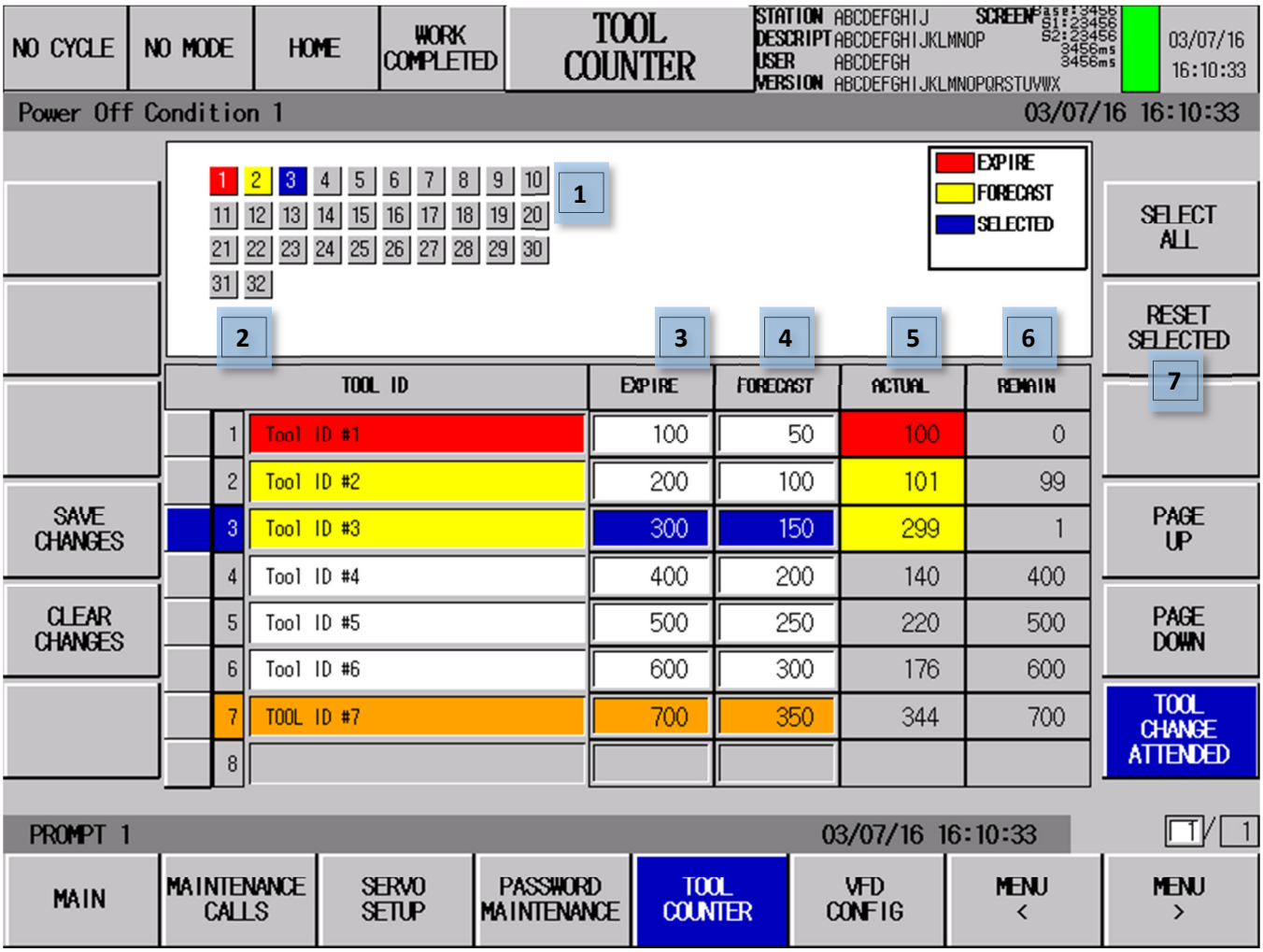


Figure 108 - Automatic Station Tool Counters

Item #	Object	Device X=Indicator Number		Details	
1	Status Indicators	Word Lamp	HMIToolCounter.AllStatus[1]	State	Indicator
				Normal	X
				32 <= $V	X
				$V == 16	X

Item #	Object	Device X=Indicator Number		Details	
				$V == 8	X “Flash”
				$V == 4	X
				$V == 2	X “FlasH”

Item #	Object	Device X=Row Number		Details	
2	Tool ID	Selection Push Button	HMIToolCounter.Select_PB[X]	Selects the Row	
			HMIToolCounter.Selected_Ind[X]	Indicates a selected row	
		Numeric Display	HMIToolCounter.CurrentPage X + (HMIToolCounter.NumberPerScreen * ($$ - 1))	Case	Display
				Normal	$V
				HMIToolCounter.WriteCheck[X]==ON	$V
				HMIToolCounter.Selected_Ind[X]==ON	$V
		ASCII Input	HMIToolCounter.ToolID[X,0]	State	Display
				Normal	
				HMIToolCounter.WriteCheck[X]==ON	
				HMIToolCounter.Status[X]==16	
				HMIToolCounter.Status[X]==8	Flash
		Word Lamp	HMIToolCounter.Status[X]	HMIToolCounter.Status[X]==4	
				HMIToolCounter.Status[X]==2	Flash
				HMIToolCounter.InhibitScreenEdits==ON	
				HMIToolCounter.DisplayMask[X] ==ON	
				GB65101==ON	

Item #	Object	Device X=Row Number		Details	
3	Expired	Numeric Input	HMIToolCounter.Expired[X]	State	Display
				Normal	####
				HMIToolCounter.DisplayMask[X]==ON	
				HMIToolCounter.InhibitScreenEdits==ON	####
				HMIToolCounter.WriteCheck[X]==ON	####
				HMIToolCounter.Selected_Ind[1]	####
				GB65101==ON	####
4	Forecast	Numeric Input	HMIToolCounter.Forecast[X]	State	Display
				Normal	####
				HMIToolCounter.DisplayMask[X]==ON	
				HMIToolCounter.InhibitScreenEdits==ON	####
				HMIToolCounter.WriteCheck[X]==ON	####
				HMIToolCounter.Selected_Ind[1]	####
				GB65101==ON	####
5	Actual	Numeric Display	HMIToolCounter.Actual[X]	State	Displa

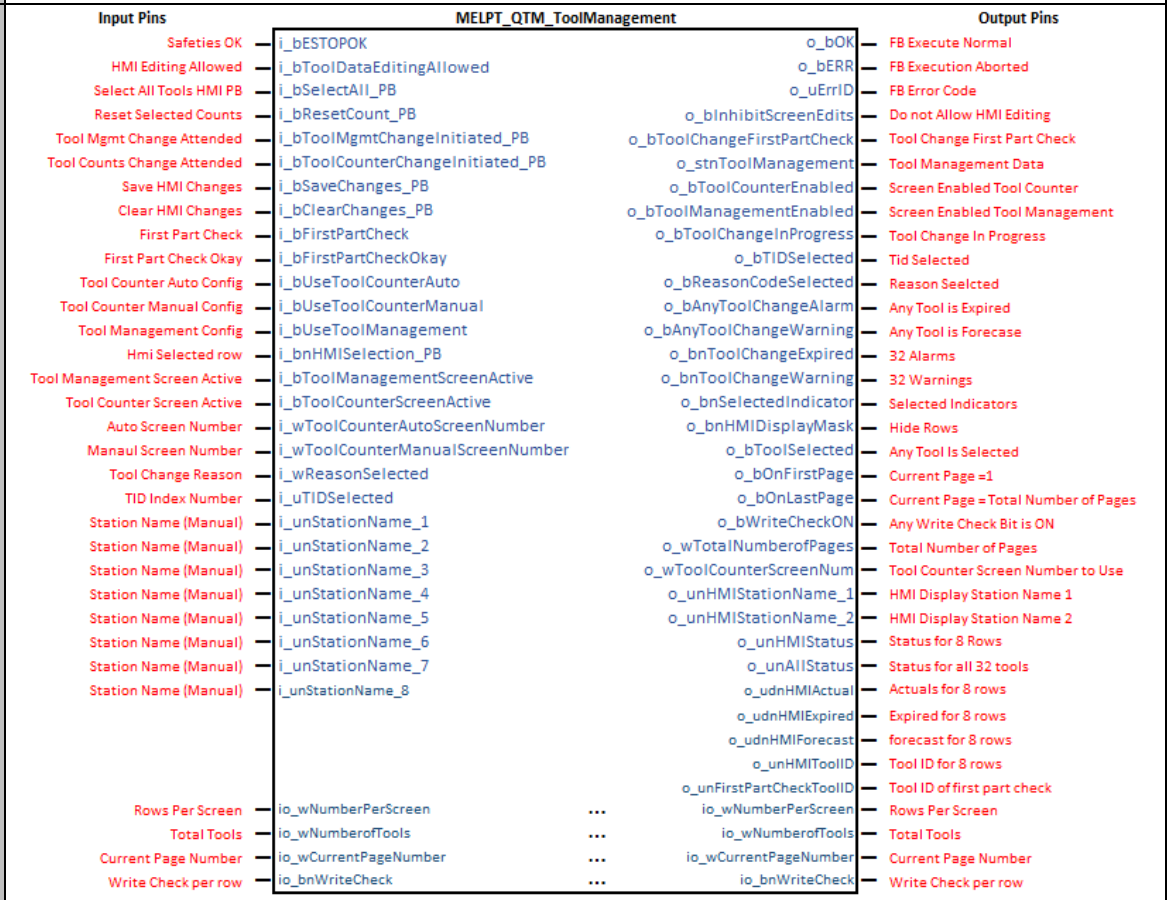
		Word Lamp	HMIToolCounter.Status[X]	<table><tr><td></td><td>y</td></tr><tr><td>Normal</td><td></td></tr><tr><td>HMIToolCounter.WriteCheck[X]==ON</td><td></td></tr><tr><td>HMIToolCounter.Status[X]==16</td><td></td></tr><tr><td>HMIToolCounter.Status[X]==8</td><td>Flash</td></tr><tr><td>HMIToolCounter.Status[X]==4</td><td></td></tr><tr><td>HMIToolCounter.Status[X]==2</td><td>Flash</td></tr></table>
6	Remain	Numeric Display	HMIToolCounter.Expired[X] $$- - HMIToolCounter.Actual[X]	HMIToolCounter.DisplayMask[X==ON] Gray Text on Gray Background
7	Select ALL PB	Bit Alternate	HMIToolCounter.SelectAll_PB	Selects All Tool Counters
	Reset Selected PB	Bit Momentary	HMIToolCounter.ResetSelected_PB	Resets the Actual Counts of Selected Tool Counters
	Page Up PB	Word Set	HMIToolCounter.CurrentPage-1	Decrement Current Page Number
	Page Down PB	Word Set	HMIToolCounter.CurrentPage+1	Increment Current Page Number
	Tool Change Attended	Bit Momentary	HMIToolCounter.ToolCounterChangeInitiated_PB	Required to be ON for any Tool Change Operation
		Bit Lamp:	HMIToolCounter.ToolChangeInProgress	
	Save Changes PB	Bit Momentary	HMIToolCounter.SaveChanges_PB	Modifications to TOOL ID, expired and forecast are not saved until save changes is pressed
	Clear Changes PB	Bit Momentary	HMIToolCounter.ClearChanges_PB	Pending modification to TOOL ID, expired and forecast, are reset when pressed

12.5 PLC-Tool Counters

The tool counter screen is managed by the program MELPT_QTM_ToolCounts

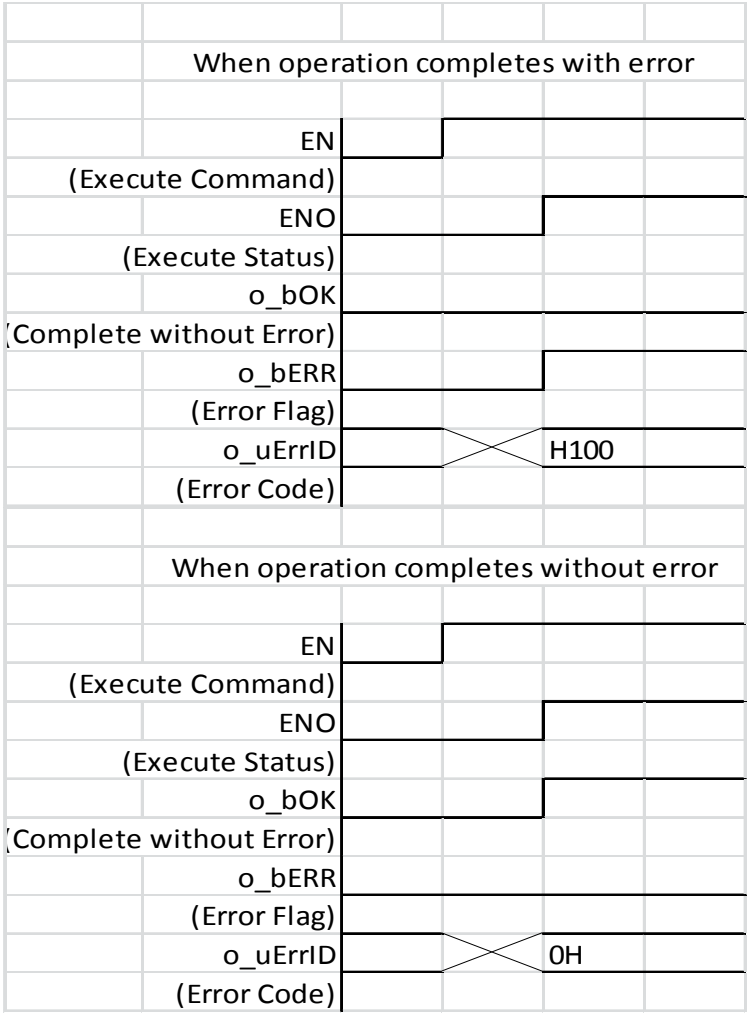
This program contains logic and the MELPT_QTM_ToolManagement Function block. This function block can be used to support automatic tool counters, Manual Workstation Tool Counters, and Tool Management

FB Name
MELPT_QTM_ToolManagement

Function Overview	
Item	Description
Function overview	This function block handles HMI interface to tool counters and tool management, which configuration is used depends on how the application is set up
Symbol	

<table>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 1402 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>167 bits
530 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the SDT MELPT_QTM_ToolManagementDB</td></tr>
<tr><td>Function description</td><td>This function block will compare the actual value to expired and forecast values and notify when the actual value exceeds these presets. It also provides an HMI interface to modify these values.</td></tr>
<tr><td>Restrictions and precautions</td><td>Z16 through z19 are used by this function block.</td></tr>
</table>

Timing chart



FB Error Code

Error Code	Description
0	No Error
H100(256)	Number Per Screen is less than 1
H101(257)	Number Per Screen is greater than 8
H102(258)	Neither Tool Management or either tool counter is selected
H103(259)	Both Auto Tool Counter and Manual Tool Counter is selected
H104(260)	Both Tool Counter and Tool Management Selected

Labels

- Input labels

Tool Management Only
Manual Tool Counters Only
Tool Counters Only

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Safeties OK	i_bESTOPOK	Bit		Keep True for Tool Counters
X	HMI Editing Allowed	i_bToolDataEditingAllowed	Bit		Used to allow HMI Editing
	Select All Tools HMI PB	i_bSelectAll_PB	Bit		HMI PB Selects all tools
	Reset Selected Counts	i_bResetCount_PB	Bit		HMI PB Resets Actual for Selected Tools
	Tool Mgmt Change Attended	i_bToolMgmtChangeInitiated_PB	Bit		HMI PB Tool Change Attended
	Tool Counts Change Attended	i_bToolCounterChangeInitiated_PB	Bit		HMI PB Tool Change Attended
	Save HMI Changes	i_bSaveChanges_PB	Bit		HMI Save Edits
	Clear HMI Changes	i_bClearChanges_PB	Bit		HMI Clear Edits
	First Part Check	i_bFirstPartCheck	Bit		First Part Che3ck PB

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	First Part Check Okay	i_bFirstPartCheckOkay	Bit		First Part Check OKay Signal
X	Tool Counter Auto Config	i_bUseToolCounterAuto	Bit		Set True for assemebly auto machine
X	Tool Counter Manual Config	i_bUseToolCounterManual	Bit		Set True for manual station
X	Tool Management Config	i_bUseToolManagement	Bit		Set true for Machining
	Hmi Selected row	i_bnHMISelection_PB	Bit(1..8)		Row Selected PB
	Tool Management Screen Active	i_bToolManagementScreenActive	Bit		Tool Management Screen Active
	Tool Counter Screen Active	i_bToolCounterScreenActive	Bit		Tool Counter Screen Active
	Auto Screen Number	i_wToolCounterAutoScreenNumber	Word[Signed]		Screen Number to send to HMI
	Manaul Screen Number	i_wToolCounterManualScreenNumber	Word[Signed]		Screen Number to send to HMI
	Tool Change Reason	i_wReasonSelected	Word[Signed]		Reason Code Index
	TID Index Number	i_uTIDSelected	Word[Unsigned]		TID Selected Index
	Station Name (Manual)	i_unStationName_1	Word[Unsigned](0..4)		Station Name for Display on Screen

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Station Name (Manual)	i_unStationName_2	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_3	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_4	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_5	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_6	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_7	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_8	Word[Unsigned](0..4)		Station Name for Display on Screen

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Rows Per Screen	io_wNumberPerScreen	Word[Signed]		Number per screen (8)
X	Total Tools	io_wNumberofTools	Word[Signed]	1 to 32	Total No. of tools
	Current Page Number	io_wCurrentPageNumber	Word[Signed]		Current Page Number
	Write Check per row	io_bnWriteCheck	Bit(1..8)		HMI Edit was made signal

- Output labels

Tool Management Only
Manual Tool Counters Only
Tool Counters Only

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execution Aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
Do not Allow HMI Editing	o_bInhibitScreenEdits	Bit	Disables Screen Editing
Tool Change First Part Check	o_bToolChangeFirstPart Check	Bit	First Part Check Latch
Tool Management Data	o_stnToolManagement	MELPT_QTM_ToolMa nagementDB(1..32)	TOOL Management Data
Screen Enabled Tool Counter	o_bToolCounterEnabled	Bit	Screen Enabled Bits for HMI navigation
Screen Enabled Tool Management	o_bToolManagementEn abled	Bit	Screen Enabled Bits for HMI navigation
Tool Change In Progress	o_bToolChangeInProgre ss	Bit	Tool Change In Progress (Andon)
Tid Selected	o_bTIDSelected	Bit	Tool Change In Progress (Andon)
Reason Selected	o_bReasonCodeSelecte d	Bit	Tool Change In Progress (Andon)
Any Tool is Expired	o_bAnyToolChangeAlar m	Bit	A Tool is expired
Any Tool is Forecast	o_bAnyToolChangeWar ning	Bit	A tool is Forecast

Symbol Name	Var_Output name	Data Type	Description
32 Alarms	o_bnToolChangeExpired	Bit(1..32)	individual status
32 Warnings	o_bnToolChangeWarning	Bit(1..32)	individual status
Selected Indicators	o_bnSelectedIndicator	Bit(1..8)	hmi selected indicator
Hide Rows	o_bnHMIDisplayMask	Bit(1..8)	hmi hide data
Any Tool Is Selected	o_bToolSelected	Bit	a Tool is selected
Current Page =1	o_bOnFirstPage	Bit	Page up/down Controls
Current Page = Total Number of Pages	o_bOnLastPage	Bit	Page up/down Controls
Any Write Check Bit is ON	o_bWriteCheckON	Bit	A Write Check is On
Total Number of Pages	o_wTotalNumberofPages	Word[Signed]	Number of Pages to scrool
Tool Counter Screen Number to Use	o_wToolCounterScreenNum	Word[Signed]	Navigation Info
HMI Display Station Name 1	o_unHMIStationName_1	Word[Unsigned](0..4)	Station Name on Screen
HMI Display Station Name 2	o_unHMIStationName_2	Word[Unsigned](0..4)	Station Name on Screen
Status for 8 Rows	o_unHMIStatus	Word[Unsigned](1..8)	Status for 8 rows
Status for all 32 tools	o_unAllStatus	Word[Unsigned](1..32)	Tool status for 32 Tools
Actuals for 8 rows	o_udnHMIActual	Double Word[Unsigned](1..8)	Actual for 8 rows
Expired for 8 rows	o_udnHMIExpired	Double Word[Unsigned](1..8)	Expired rating for 8 tools
forecast for 8 rows	o_udnHMIForecast	Double Word[Unsigned](1..8)	Forecast rating for 8 tools

Symbol Name	Var_Output name	Data Type	Description
Tool ID for 8 rows	o_unHMIToolID	Word[Unsigned](1..8, 0..15)	Tool ID for 8 tools
Tool ID of first part check	o_unFirstPartCheckToolID	Word[Unsigned]	Tool ID index

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.12	Modified for incremental mode and teach mode modifications FB labels updated to BCN-89000-0823-D guideline
1.20	Added FB Status Outputs
2.00	Rewrote to Bypass/Part status Model
2.10	Increment Actual Added
3.00	Removed Increment Function
3.01	Reduced Programming

SDT Usage

Tool Management Only
Manual Tool Counters Only
Tool Counters Only

1. MELPT_QTM_ToolManagementDB

Global Label: ToolManagementData		
Member	Type	Usage
ToolIdentifier	Word[Unsigned](0..15)	The Tool Identifier of the Tool
ExpiredValue	Double Word[Unsigned]	The Expired Value for this tool
ForecastValue	Double Word[Unsigned]	The Forecast Value for this Tool
ActualValue	Double Word[Unsigned]	The Actual Value for this tool
ToolChangeValue	Double Word[Unsigned]	The Actual Value at last tool change
ToolReasonCode	Word[Unsigned]	The Tool Reason Code Index
ToolChangeUserID	Word[Unsigned]	The Tool Change TID Index

2. MELPT_QTM_HMIToolCount

System Label: HMIToolCounter		
Member	Type	Usage
InhibitScreenEdits	Bit	If the FB input i_bToolDataEditingAllowed is False this bit is TRUE, this signal is used by the HMI to prevent Editing
SelectAll_PB	Bit	Selects all the tool counters

System Label: HMIToolCounter		
Member	Type	Usage
ResetSelected_PB	Bit	Resets the actual Value
ToolManagementChangeInitiated_PB	Bit	This is the Tool Change Initiated PB
ToolCounterChangeInitiated_PB	Bit	This is the Tool Change Initiated PB
FirstPartCheck_PB	Bit	
FirstPartCheck_Ind	Bit	
FirstPartCheckOK_PB	Bit	
AssistanceCall_PB	Bit	
SaveChanges_PB	Bit	If an edit was made this makes the change permanent
ClearChanges_PB	Bit	IF an Edit was made, this clears the edit
ToolChangeInProgress	Bit	Signal to HMI we are in the middle of a tool change
OnFirstPage	Bit	HMI page control to prevent hmi from setting current page below zero
OnLastPage	Bit	HMI page control to prevent hmi from setting current page above total pages
ToolSelected	Bit	Any Tool Has been Selected
AnyWriteCheckIndicator	Bit	Any HMI Input has been edited
WriteCheck	Bit(1..8)	Row Edited Bits
Select_PB	Bit(1..8)	Row Selection Bits
Selected_Ind	Bit(1..8)	Row Selected Indicators
DisplayMask	Bit(1..8)	Used to hide rows
NumberOfTools	Word[Signed]	Total Number of Tools, used to calculate number of pages and masking

System Label: HMIToolCounter		
Member	Type	Usage
NumberPerScreen	Word[Signed]	Number of Rows on Screen,
CurrentPage	Word[Signed]	Current Page used to load information on hmi
TotalPages	Word[Signed]	Total Number of Pages
ToolCounterScreenNumber	Word[Signed]	What HMI Screen Number to use
ManualStationName_1	Word[Unsigned](0..4)	Each Page of Manual Tool Counters shows two stations this is the first station name displayed
ManualStationName_2	Word[Unsigned](0..4)	Each Page of Manual Tool Counters shows two stations this is the second station name displayed
ToolID	Word[Unsigned](1..8,0..15)	Tool ID's for HMI display
Status	Word[Unsigned](1..8)	Tool Status for HMI display
AllStatus	Word[Unsigned](1..32)	All Status Array for indicator display
Expired	Double Word[Unsigned](1..8)	HMI Expired Values
Forecast	Double Word[Unsigned](1..8)	HMI Forecast Values
Actual	Double Word[Unsigned](1..8)	HMI Actual Values

Application Example

12.5.1. Automatic Tool Counters Application Example

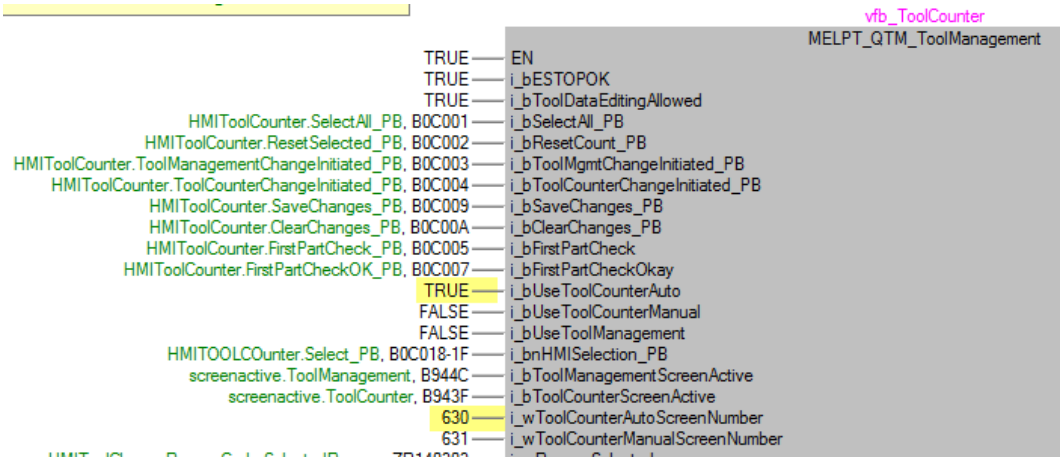


Figure 109-HMI Tool Counters AutomaTic

Configuring the function block in the above way will call the automatic tool counters screen

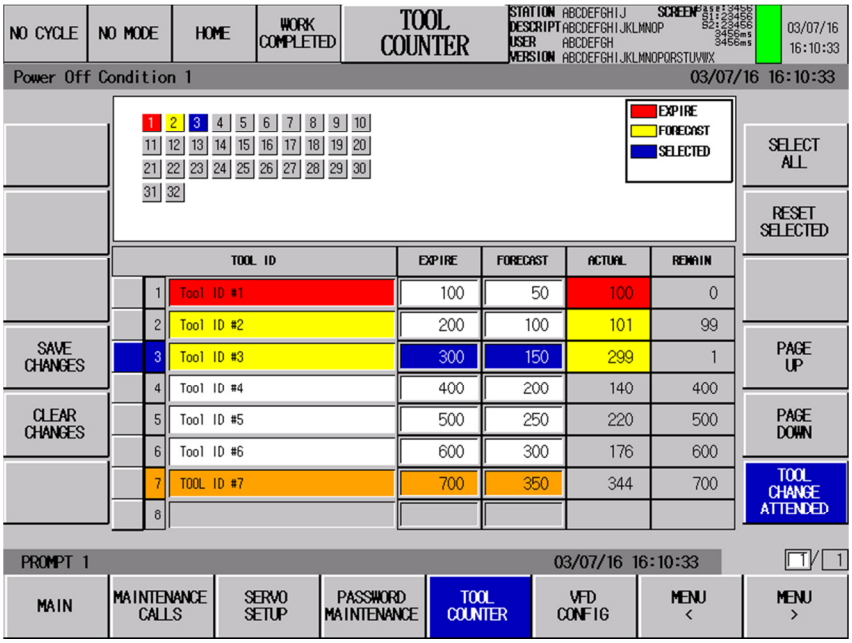


Figure 110-Automatic Tool Counters HMI

12.5.2. *Manual Tool Counters Application Example*

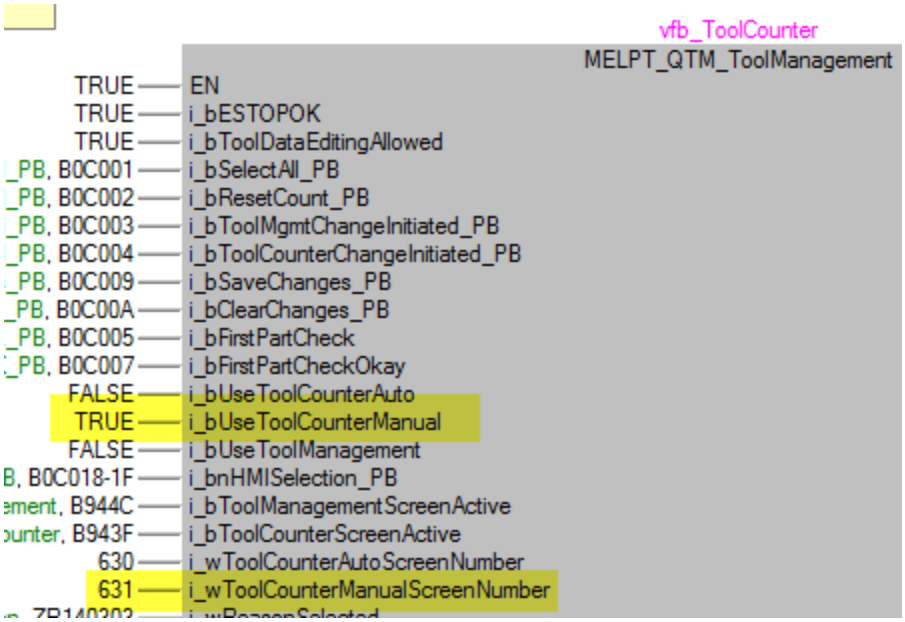


Figure 111-Manual FB configuration

Configuring the function block this way will call up the manual tool counter screen

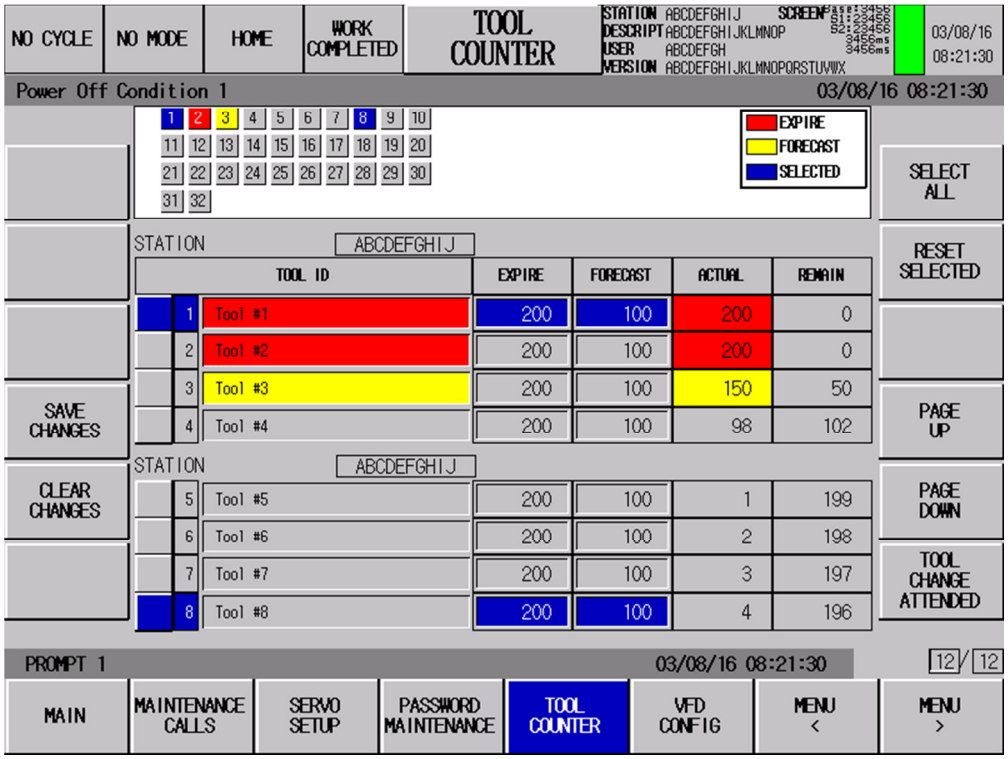
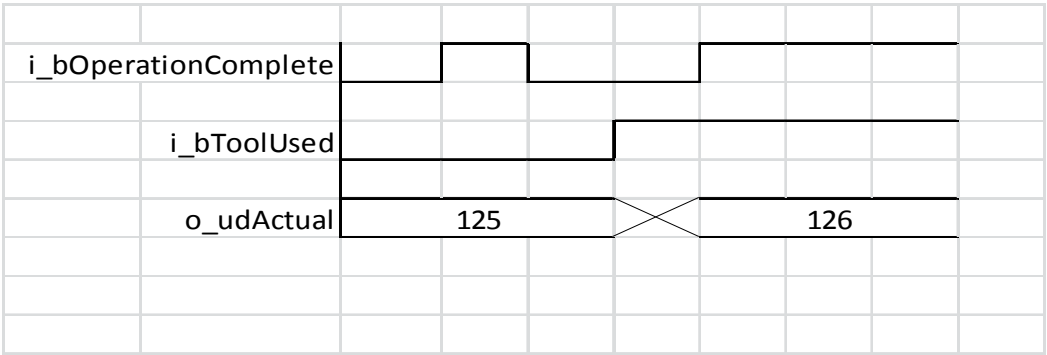


Figure 112-Manual Tool Counters Screen

12.5.3. PLC-MELPT_QTM_ToolCountActualInc

FUN Name
MELPT_QTM_ToolCountActualInc

Function Overview	
Item	Description
Function overview	This function block will increment the actual count
Symbol	
Applicable Hardware	Series: MELSEC-Q series; Model: Universal Model; Serial Restriction: None
Applicable Software	Series: GX Works 2; Version: 1.536
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 3 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	2 bits 2 words
Execution type	Pulsed Execution
Dependences	
Function description	Triggering i_bOperationComplete increments the actual by 1

Restrictions and precautions	
Timing chart	

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Cycle Complete	i_bOperationComplete	Bit		Signal To increment
X	Tool Used	i_bToolUsed	Bit		Signal That Tool was used

- Output labels

Symbol Name	Var_Output name	Data Type	Setting range	Description
Actual Value	o_udActual	Double Word[Unsigned]		Retained Actual Value

FUN Version Upgrade History

Version	Description
3.00	New Function Block

Version	Description
3.01	Removed Increment Ammount Input

12.6 VFD

The VFD Screen allows an authenticated used change the commanded frequency for the VFD and relates this to a cycle time. Changing speed can occur from the left hand buttons, Loading preset times will occur from the right hand side.

12.6.1. VFD-HMI

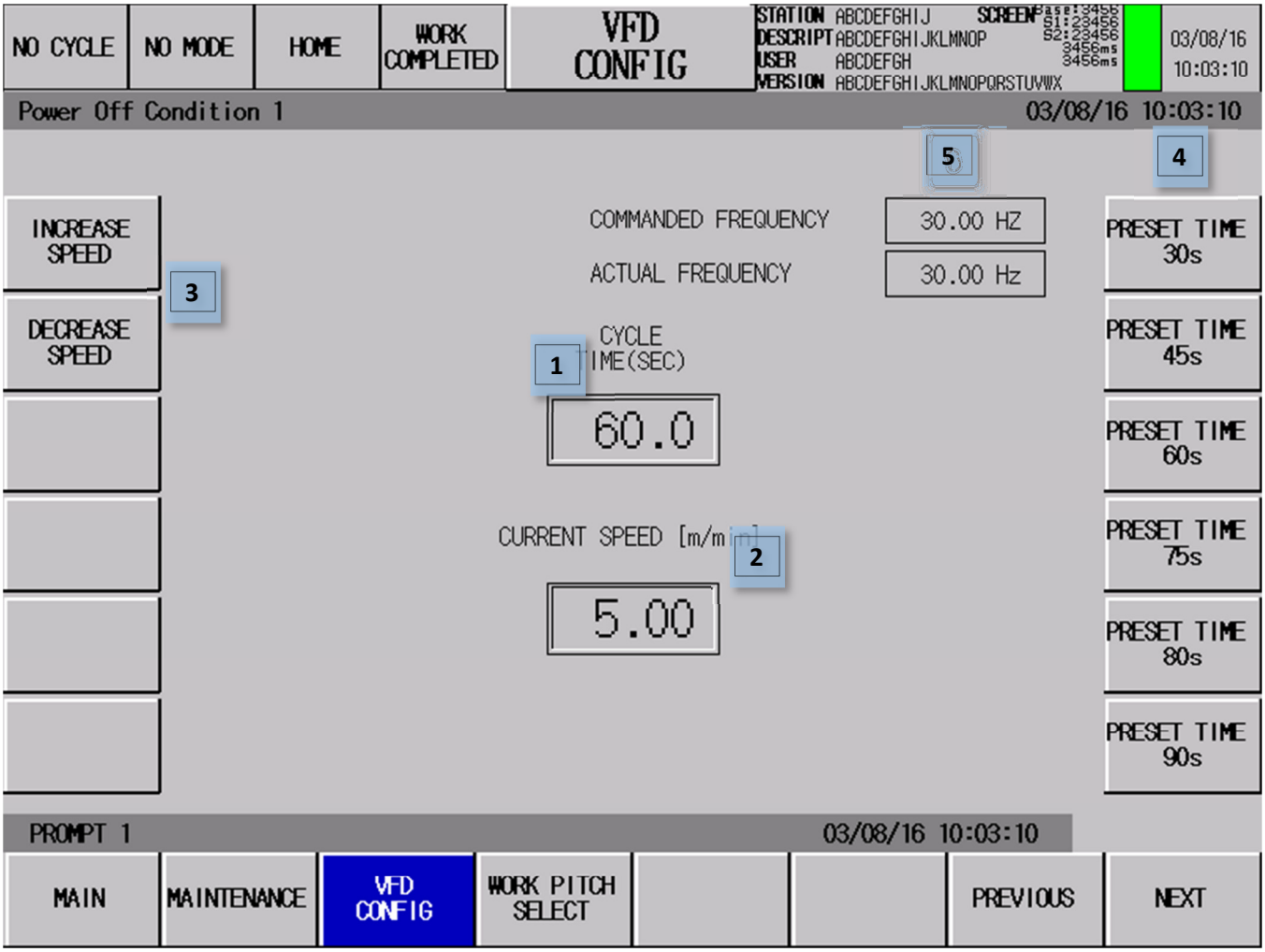


Figure 113-VFD Configuration Screen

Item #	Description	Object	Details
1	Cycle Time	Numeric Input	Allows Edit of the VFD Target Cycle Time
2	Current Speed	Numeric Input	Allows Edit of Commanded Frequency
3	Speed Increment PB	Bit Sets an internal register for Screen Script	Screen Script will increment or decrement Current Speed Value

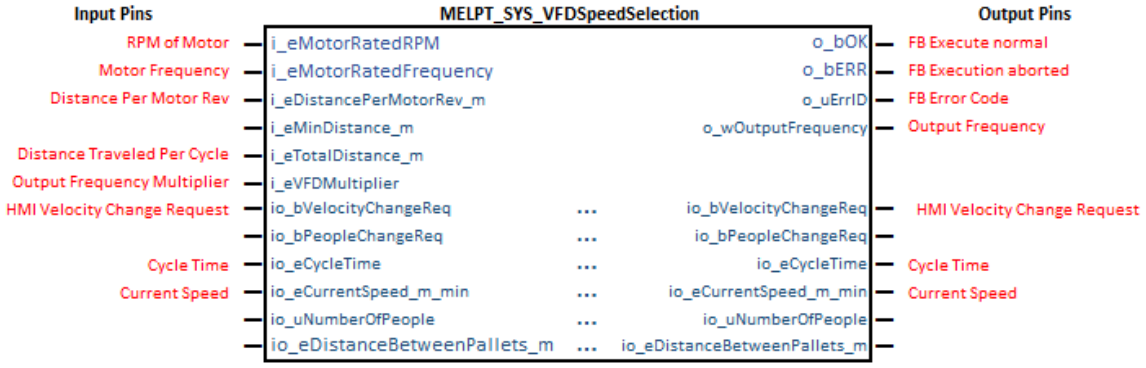
Item #	Description	Object	Details
4	Preset Cycle Times	WordSet PB	Will set the Cycle Time to 30s 45s 60s 75s 80s 90s
5	Commanded Frequency	Numeric Display:	Displays the commanded frequency

12.6.2. VFD-PLC

This function block works in conjunction with the VFD Speed Selection HMI Screen. This function block requires some user input for mechanical variables that are used to compute the output frequency and cycle time.

This function block turns on the All Axis ON Interlock for the simple motion module

FB Name
MELPT_SYS_VFDSpeedSelection

Function Overview	
Item	Description
Function overview	This function block is designed to handle the HMI Requests for changing target speed and cycle time for a VFD
Symbol	

Applicable Hardware

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 305 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	4 bits 27 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	
Function description	
Restrictions and precautions	
Timing chart	

FB Error Code

Error Code	Description
0	No Error.
H100(256)	Distance Per Rev not set
H101(257)	Total Distance less than min
H102(258)	Min Distance=0

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	RPM of Motor	i_eMotorRatedRPM	FLOAT (Single Precision)		Motor RPM
X	Motor Frequency	i_eMotorRatedFrequency	FLOAT (Single Precision)		Motor Freq
X	Distance Per Motor Rev	i_eDistancePerMotorRev_m	FLOAT (Single Precision)		Distance Traveled in Meters per one motor Rev
		i_eMinDistance_m	FLOAT (Single Precision)		Minimum distance between people
X	Distance Traveled Per Cycle	i_eTotalDistance_m	FLOAT (Single Precision)		Total Continous moving conveyor
X	Output Frequency Multiplier	i_eVFDMultiplier	FLOAT (Single Precision)		factor to multiply output

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	HMI Velocity Change Request	io_bVelocityChangeReq	Bit		HMI Signal Velocity Change Request
		io_bPeopleChangeReq	Bit		HMI Signal People Change Request
	Cycle Time	io_eCycleTime	FLOAT (Single Precision)		Cycle Time

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Current Speed	io_eCurrentSpeed_m_min	FLOAT (Single Precision)		Current Speed
		io_uNumberOfPeople	Word[Unsigned]		Number of PEople
		io_eDistanceBetweenPallets_m	FLOAT (Single Precision)		Distance Between PAllets

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	Completed without error
FB Execution Aborted	o_bERR	Bit	Completed With Error
FB Error Code	o_uErrID	Word[Unsigned]	Error Code
Output Frequency Calculation	o_wOutputFrequency	Word[Signed]	Clamped at 320 Hz 32000

FB Version Upgrade History

Version	Description
3.00	Major Rewrite
3.01	Corrected Error with Real to Int conversion that would fault PLC

SDT Usage

1. MELPT_SYS_VFD

System Label: VFD		
Member	Type	Usage
WriteCheck	Bit(1..4)	HMI Will Set This bit when the HMI commanded a Change

System Label: VFD		
Member	Type	Usage
People	Word[Unsigned]	
CommandedFrequency	Word[Signed]	The commanded frequency to be sent to VFD by integrator
FeedbackFrequency	Word[Signed]	Frequency Returned by VFD populated by integrator
CycleTime	FLOAT (Single Precision)	Cycle Time Display for HMI based off mechanical
Speed	FLOAT (Single Precision)	Speed Display for HMI based off mechanical
Distance	FLOAT (Single Precision)	

Application Example

12.6.3. VFD Application Example

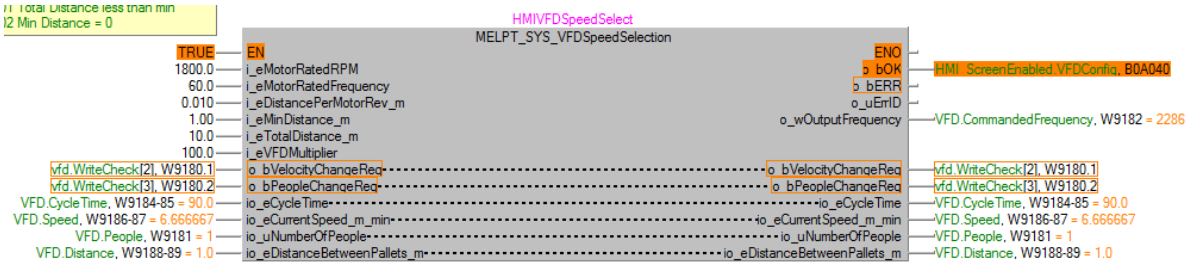


Figure 114-MELPT_SYS_VFDSpeedSelection

The integrator has provided the mechanical constants:

i_eMotorRatedRPM=1800RPM

i_eMotorRatedFrequency=60hz

i_eDistancePerMotorRev_m=.01m

i_eTotalDistance_m=10.0m

The HMI Operator has chosen a travel time of 90.0s, the total distance of 10.0m is divided by 1.5min and

calculates a speed of 6.67m/min

The Speed 6.67 is divided by the distance traveled in one motor rev(0.01) to calculate 667

667 is divided by the Motor RPM of 1800, to come up with the ratio .37055

.37055 is multiplied by the Rated Frequency(60Hz) and the multiplier(100) with the result of 22.23HZ

12.7 Maintenance-CNC Adjust HMI

The CNC screen can be used to manually control an axis on a C70 controller this screen works in conjunction with the MELPT_CNC_Adjust Function Block

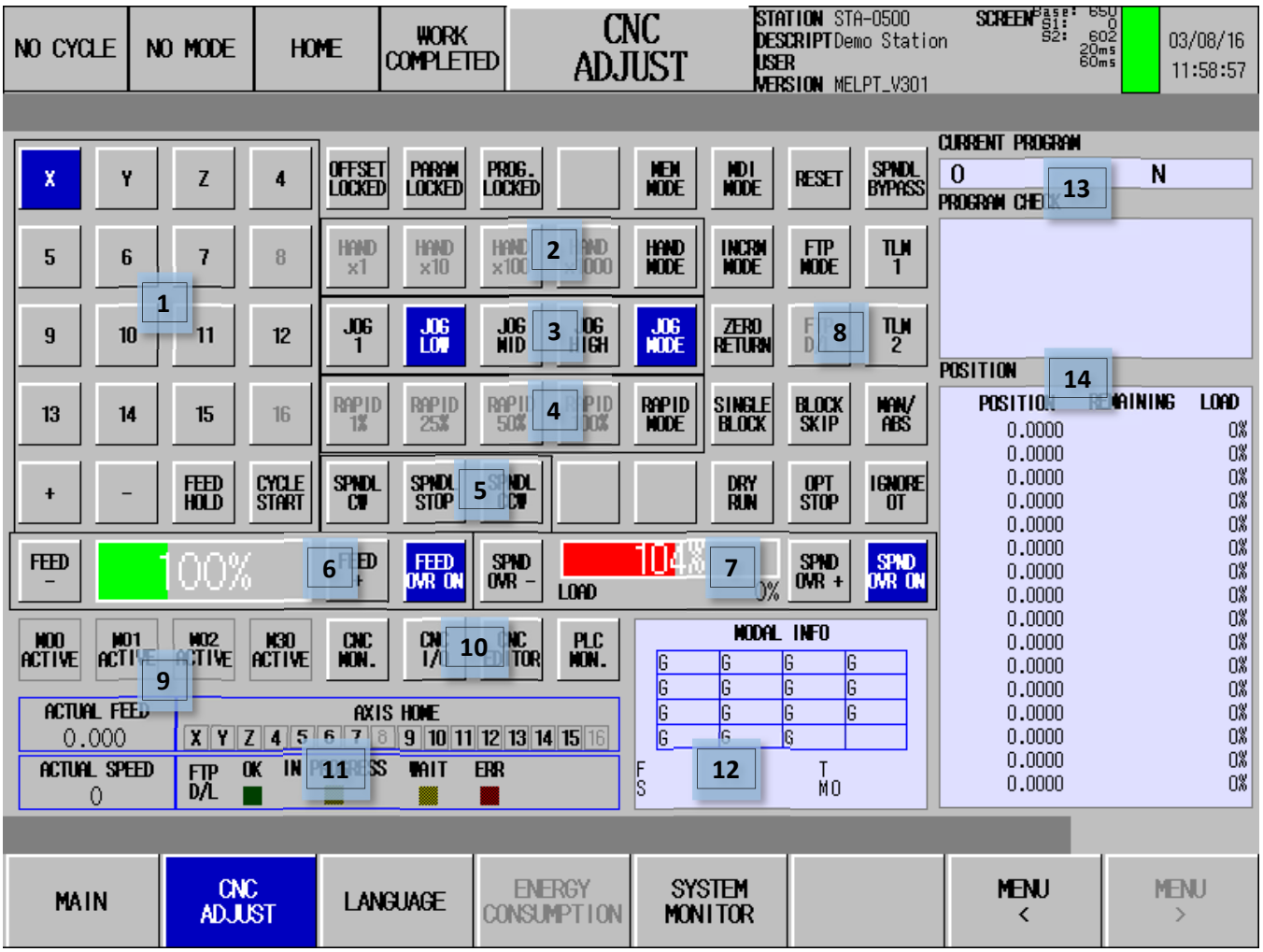


Figure 115-CNC Adjust Screen

Item #	Description	Object	Details
1	Axis Selection	Word Set Switch: GOTCNCAdjust.AxisSelected	Value set bitwise
	Jog FWD	GOTCNCAdjust.Fwd_PB	"+" Must be in Jog, Zero Return, or Increment Mode
	Jog Rev	GOTCNCAdjust.Rev_PB	"-"Must be in Jog, Zero Return, or Increment Mode

	Feed Hold	GOTCNCAdjust.FeedHold_PB	Toggles the State of (Feed Hold) Y711
	Cycle Start	GOTCNCAdjust.CycleStart_PB	When Pressed turns on (Cycle Start)Y710
2	Hand Mode	GOTCNCAdjust.ModeSelected	Sets the mode to “3” function block will output Y701 (Part System Cmd Handle Mode)
	Hand X1, Hand X100, Hand x1000	GOTCNCAdjust.HandleSelected	Will set the proper output bits to set magnification level
3	Jog Mode	GOTCNCAdjust.ModeSelected	Will Set Jog Mode to TRUE (Y700)
	Jog 1, Jog Low, Jog Mid, Jog High	GOTCNCAdjust.JogSpeedSelected	Sets the jog rate to the value on the input pin of the FB
4	Rapid Mode	GOTCNCAdjust.RapidModeToggle_PB	Toggles Y726(Rapid Traverse)
	Rapid 1%, Rapid 25, Rapid 50, Rapid 100	GOTCNCAdjust.RapidModeSelected	Sets the Rapid Traverse Override Code Y768, Y769
5	Spindle Control	Spindle ClockWise	GOTCNCAdjust.SpindleCW_PB
			Turns on Spindle Forward YD38
		Spindle Counter ClockWise	GOTCNCAdjust.SpindleCCW_PB
			Turns on Spindle Reverse YD39
		Spindle Stop	
6	FeedOverride	GOTCNCAdjust.CuttingFeedOvrToggle_PB	Toggles Y767 Feed Override Selection Method Enabled
		GOTCNCAdjust.CuttingFeedRateOverride	Sets Override Percentage to 1-300%

7	Spindle Override	GOTCNCAdjust.SpindleOvrToggle_PB	Toggles YD2F SpindleOverride Selection Method
		GOTCNCAdjust.SpindleOverride	Sets the percentage 1 to 200%
8	The other PB		
	Mem Mode	GOTCNCAdjust.ModeSelected =1	Sets Memory Mode Y708
	MDI Mode	GOTCNCAdjust.ModeSelected =2	Sets MDI Mode Y70B
	Reset	GOTCNCAdjust.Reset_PB	Used to Stop Download Request
	Spndl Bypass	GOTCNCAdjust.SpindleBypass_PB	Spindle Bypassed Toggled Y75F
	Incrm Mode	GOTCNCAdjust.ModeSelected=4	Sets Incremement mode Y702
	FTP Mode	GOTCNCAdjust.ModeSelected=7	Set FTP Mode y709
	TLM 1	GOTCNCAdjust.TLM1_PB	Toggles Tool Life Managerment #1 Y720
	Zero Return	GOTCNCAdjust.ModeSelected=6	Sets Zero Return Mode T704
	FTP D/L	GOTCNCAdjust.FTPDownLoad_PB	Sets Download Request Y350
	TLM 2	GOTCNCAdjust.TLM2_PB	Toggles Tool Life Managerment #1 Y721
	Single Block	GOTCNCAdjust.SingleBlock_PB	Sets the single Block Output Y712
	Block Skip	GOTCNCAdjust.BlockSkip_PB	Sets the Option Block Skip Y72D
	Man/ABS	GOTCNCAdjust.ManAbs_PB	Toggles Manual/Absolute Y728
	Dry Run	GOTCNCAdjust.DryRun_PB	Toggles Dry Run Y715
	OPT Stop	GOTCNCAdjust.OptionalStop_PB	Used in conjunction of x641 (M01 Ouptut) when outputing y712 (single block)

	Ignore OT	GOTCNCAdjust.IgnoreOT_PB	Pressing this button will ignore the overtravel for the selected axis.
9	M Code Independent Active	Bit Indicators	M00:X640 M01: X641 M02: X642 M30: X643
10	HMI Shortcuts	CNC Mon.	Launches Extended CNC Monitor
		CNC I/O	Launches Extended CNC Data Input/Output
		CNC Editor	Launches CNC Program Edit
		PLC Monitor	Launches Ladder Editor
11	Actual Feed	GOTCNCAdjust.FeedRateDisplay	
	Actual Speed	R1602	Spindle Rotation Speed
	Axis Home	GOTCNCAdjust.AxisHome[X]==OFF	X
		GOTCNCAdjust.AxisExists[X]	X
		GOTCNCAdjust.AxisHome[X]==ON	X
	FTP D/L	GOTCNCAdjust.FTPOK_Ind	Off
			ON
		In Progress(x350)	Off
			ON
		Wait (X066C)	Off
			ON
		Error (X352)	Off
			ON

12	O N	239-2 D7225 239-2 D7229	This is automatic retrieval GOT window #3: Modal information package acquisition
	Program Check	D5600	Got Window Response #1, A GOT Window Program included in MELPT calculates the offset for the GOT window and adjusts properly
13	Axis Name	1-4(R9080-R9087) 5-8(R9088-R9095) 9-12(R9096-R9103) 13-16(R9104-R9111)	PLC Read Window 6 PLC Read Window 7 PLC Read Window 8 PLC Read Window 9
	Position	1-4(R9112-R9119) 5-8(R9120-R9127) 9-12(R9128-R9135) 13-16(R9136-R9143)	PLC Read Window 10 PLC Read Window 11 PLC Read Window 12 PLC Read Window 13
	Remaining	239-2 D7014	Automatic Setting Window 2 2 Remaining distance package acquisition (all axes within the 1-part system)
	Load	1-4(R9168-R9175) 5-8(R9176-R9183) 9-12(R9184-R9191) 13-16(R9192-R9199)	PLC Read Window 17 PLC Read Window 18 PLC Read Window 19 PLC Read Window 20

12.8 Maintenance-CNC Adjust Programming

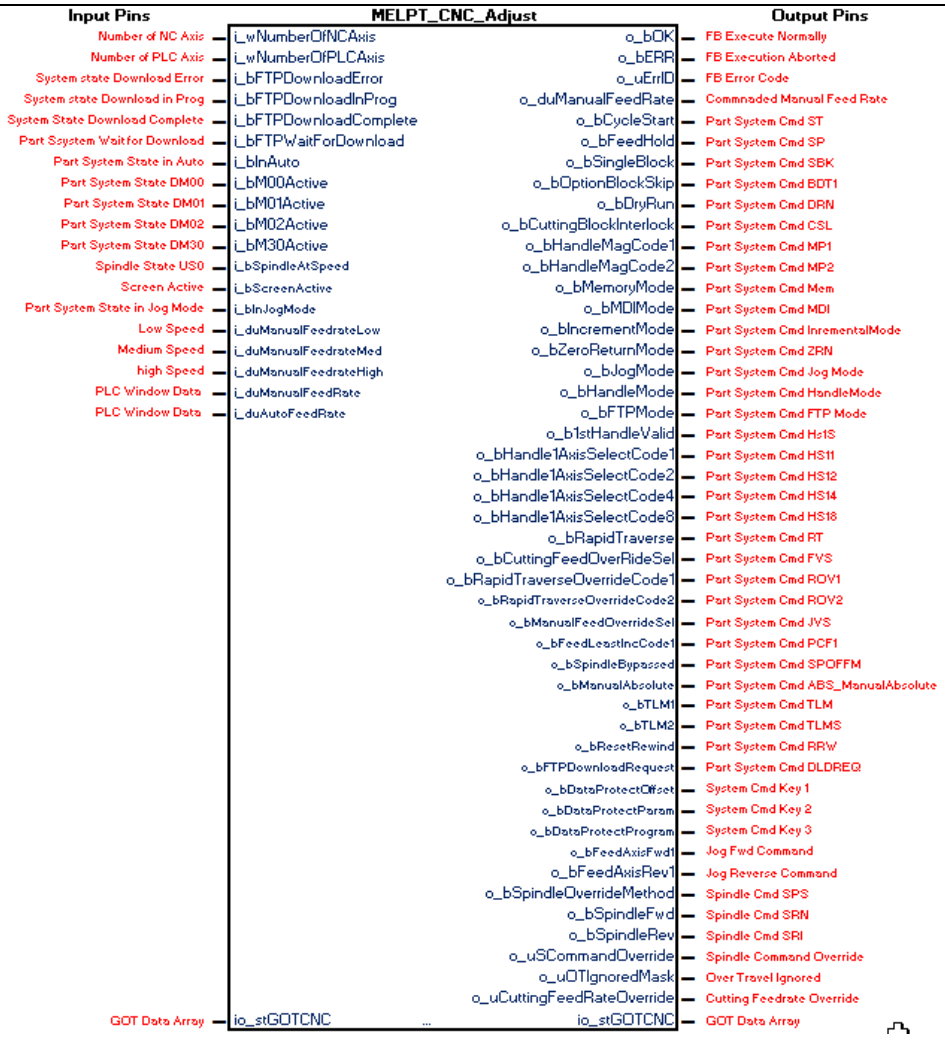
12.8.1. MELPT_CNC_Adjust

This function block is used to interface HMI commands with the C70 label structures to provides status and some manual interface

FB Name
MELPT_CNC_Adjustment

Function Overview	
Item	Description
Function overview	This function block serves to handle input from the HMI screen and pass it to the individual axis. This function block also will output information from the selected axis to the HMI.

Symbol



Applicable Hardware

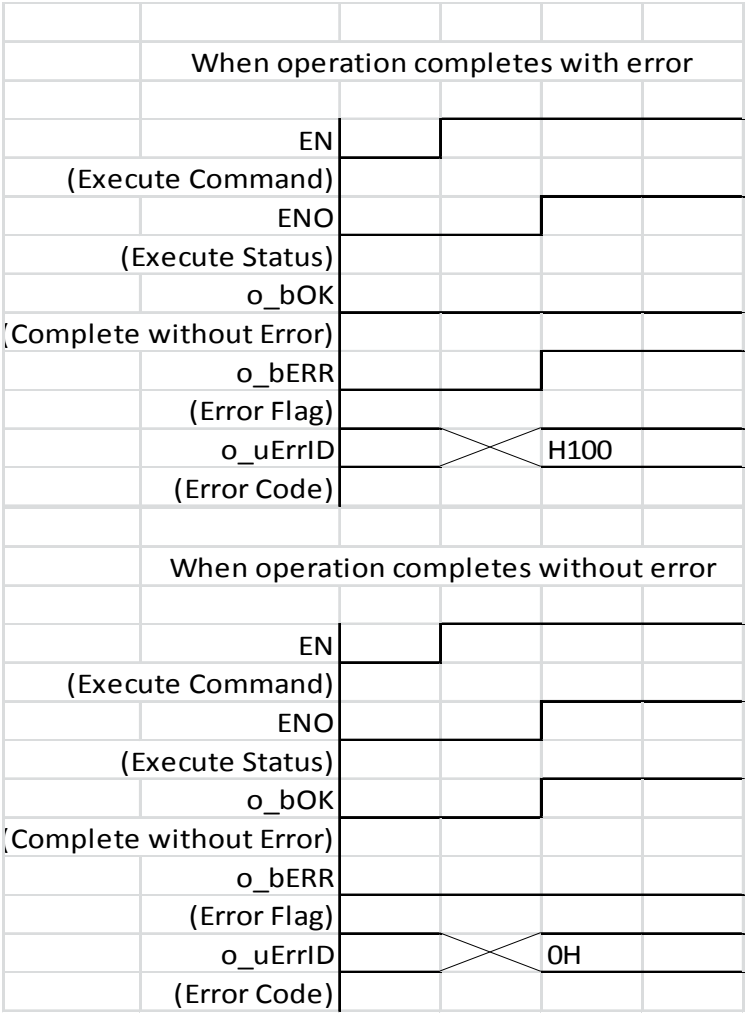
Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
Melsec-Q Series	Q173NCCCPU	
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 407 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	56 bits 21 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	
Function description	This function block is used to populate certain devices in the C70->PLC handshake.
Restrictions and precautions	

Timing chart



FB Error Code

Error Code	Description
0	No Error
H100(256)	Number of NC Axis exceeds 8
H101(257)	Number of PLC Axis exceeds 8

Labels

- Input labels

User Input	Var_Input name	Data Type	Setting range	Description
X	i_wNumberOfNCAxis	Word[Signed]	1 to 8	Number of NC Axis configured
X	i_wNumberOfPLCAxis	Word[Signed]	0 to 8	Number of PLC Axis Configured
	i_bFTPDownloadError	Bit		FTP Download Error
	i_bFTPDownloadInProg	Bit		System state Download in Prog
	i_bFTPDownloadComplete	Bit		System State Download Complete
	i_bFTPWaitForDownload	Bit		Part Ssystem Wait for Download
	i_bInAuto	Bit		Part System State in Auto
	i_bM00Active	Bit		Part System State DM00
	i_bM01Active	Bit		Part System State DM01
	i_bM02Active	Bit		Part System State DM02
	i_bM30Active	Bit		Part System State DM30
	i_bSpindleAtSpeed	Bit		Spindle State US0
	i_bScreenActive	Bit		Screen Active
	i_bInJogMode	Bit		Part System State in Jog Mode
X	i_duManualFeedrateLow	Double Word[Unsigned]		Low Speed
X	i_duManualFeedrateMed	Double Word[Unsigned]		Medium Speed
X	i_duManualFeedrateHigh	Double Word[Unsigned]		High Speed

User Input	Var_Input name	Data Type	Setting range	Description
	i_duManualFeedRate	Double Word[Unsigned]		Manual Feed Rate
	i_duAutoFeedRate	Double Word[Unsigned]		Automatic Feedrate

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	CNc Data GOT Structure	io_stGOTCNC	MELPT_CNC_GOTAdjust		HMI Data Structure related to CNC

- Output labels

Var_Output name	Data Type	Description
o_bOK	Bit	FB Execute Normally
o_bERR	Bit	FB Execution Aborted
o_uErrID	Word[Signed]	FB Error Code
o_duManualFeedRate	Double Word[Unsigned]	Commnaded Manual Feed Rate
o_bCycleStart	Bit	Part System Cmd ST
o_bFeedHold	Bit	Part System Cmd SP
o_bSingleBlock	Bit	Part System Cmd SBK
o_bOptionBlockSkip	Bit	Part System Cmd BDT1
o_bDryRun	Bit	Part System Cmd DRN
o_bCuttingBlockInterlock	Bit	Part System Cmd CSL
o_bHandleMagCode1	Bit	Part System Cmd MP1
o_bHandleMagCode2	Bit	Part System Cmd MP2

Var_Output name	Data Type	Description
o_bMemoryMode	Bit	Part System Cmd Mem
o_bMDIMode	Bit	Part System Cmd MDI
o_bIncrementMode	Bit	Part System Cmd InrementalMode
o_bZeroReturnMode	Bit	Part System Cmd ZRN
o_bJogMode	Bit	Part System Cmd Jog Mode
o_bHandleMode	Bit	Part System Cmd HandleMode
o_bFTPMode	Bit	Part System Cmd FTP Mode
o_b1stHandleValid	Bit	Part System Cmd Hs1S
o_bHandle1AxisSelectCode1	Bit	Part System Cmd HS11
o_bHandle1AxisSelectCode2	Bit	Part System Cmd HS12
o_bHandle1AxisSelectCode4	Bit	Part System Cmd HS14
o_bHandle1AxisSelectCode8	Bit	Part System Cmd HS18
o_bRapidTraverse	Bit	Part System Cmd RT
o_bCuttingFeedOverRideSel	Bit	Part System Cmd FVS
o_bRapidTraverseOverrideCode1	Bit	Part System Cmd ROV1
o_bRapidTraverseOverrideCode2	Bit	Part System Cmd ROV2
o_bManualFeedOverrideSel	Bit	Part System Cmd JVS
o_bFeedLeastIncCode1	Bit	Part System Cmd PCF1
o_bSpindleBypassed	Bit	Part System Cmd SPOFFM
o_bManualAbsolute	Bit	Part System Cmd ABS_ManualAbsolute
o_bTLM1	Bit	Part System Cmd TLM

Var_Output name	Data Type	Description
o_bTLM2	Bit	Part System Cmd TLMS
o_bResetRewind	Bit	Part System Cmd RRW
o_bFTPDownloadRequest	Bit	Part System Cmd DLDREQ
o_bDataProtectOffset	Bit	System Cmd Key 1
o_bDataProtectParam	Bit	System Cmd Key 2
o_bDataProtectProgram	Bit	System Cmd Key 3
o_bFeedAxisFwd	Bit	Jog Fwd Command
o_bFeedAxisRev	Bit	Jog Reverse Command
o_bSpindleOverrideMethod	Bit	Spindle Cmd SPS
o_bSpindleFwd	Bit	Spindle Cmd SRN
o_bSpindleRev	Bit	Spindle Cmd SRI
o_uSCommandOverride	Word[Unsigned]	Spindle Command Override
o_uOTIgnoredMask	Word[Unsigned]	Over Travel Ignored
o_uCuttingFeedRateOverride	Word[Unsigned]	Cutting Feedrate Override

FB Version Upgrade History

Version	Description
1.02	Initial Release
2.10	Revised
3.01	Revised

SDT Usage

1. MELPT_CNC_GotAdjust

System Label: GOTCNCAdjust		
Member	Type	Usage
Enabled	Bit	
SpindleBypass_PB	Bit	Toggles o_bSpindleBypassed
FTPDownLoad_PB	Bit	Sets Y350
Fwd_PB	Bit	Outputs signal to jog fwd
Rev_PB	Bit	Outputs signal to jog rev
Reset_PB	Bit	Used to stop process
TLM1_PB	Bit	Toggles Y720
TLM2_PB	Bit	Toggles Y721
OffsetUnlock_PB	Bit	Toggles Y318
ParamUnlock_PB	Bit	Toggles Y319
ProgramUnlock_PB	Bit	Toggles Y31A
ManAbs_PB	Bit	Toggles Y728
CycleStart_PB	Bit	Y710 Output
FeedHold_PB	Bit	Toggles Y711
IgnoreOT_PB	Bit	Toggles the bit for the selected axis in the Overtravel ignore mas
SingleBlock_PB	Bit	Toggles the Single Block Indicator
BlockSkip_PB	Bit	Toggles Y72D
DryRun_PB	Bit	Toggles Y715
OptionalStop_PB	Bit	Toggles the internal optional stop bit, if and M01 Active Y712 is output
SpindleCW_PB	Bit	When in jog mode will set the spindle in fwd direction until stopped

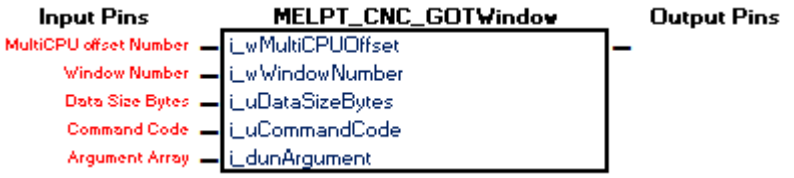
System Label: GOTCNCAdjust		
Member	Type	Usage
SpindleCCW_PB	Bit	When in jog mode will set the spindle in rev direction until stopped
SpindleStop_PB	Bit	Stops the motion of spindle
RapidModeToggle_PB	Bit	Toggles Y726
CuttingFeedOvrToggle_PB	Bit	Toggles the Cutting Rate OVerride
SpindleOvrToggle_PB	Bit	Toggles Yd2F
FeedPermit	Bit	True when in Jog, Zero Return or Increment Mode
FTPOK_Ind	Bit	HMI Indicator to note that FTP was OK
SingleBlock_Ind	Bit	HMI Indicator to note that in single block mode
OptionalStop_Ind	Bit	HMI Indicator to note optional stop
OTMask_Ind	Bit	Indicator that an over travel is ignored
AxisExists	Bit(1..16)	Used ot mask when Axis does not exist
AxisHome	Bit(1..16)	Axis at Home indicators
AxisSelected	Word[Unsigned]	Selected Axis
JogSpeedSelected	Word[Unsigned]	Selected Speed
HandleSelected	Word[Unsigned]	Handle Selected
RapidModeSelected	Word[Unsigned]	Rapid Mode Selected
ModeSelected	Word[Unsigned]	Mode
NumberOfNCAxis	Word[Unsigned]	Number of NC Axis
NumberOfPLCAxis	Word[Unsigned]	Number of PLC Axis
SpindleOverride	Word[Unsigned]	Spindle Override Value

System Label: GOTCNCAdjust		
Member	Type	Usage
CuttingFeedRateOverride	Word[Unsigned]	Cutting Feedrate Override Value
GOTWindowProgramOffset	Word[Unsigned]	What Got window is used for running program display
FeedRateDisplay	Double Word[Unsigned]	Feed Rate for HMI display

12.8.2. MELPT_CNC_GOT_Window

This function is used to interface commands with the C70 GOT Window

FB Name
MELPT_CNC_GOT_Window

Function Overview	
Item	Description
Function overview	This function provides command data to the C70 controller for GOT window display. The C70 processess the command data and will provide the result in local memory on the NC controller. The HMI can communicate with the C70 through the front Ethernet port of the C70 to retrieve the response data.
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
Melsec-Q Series	Q173NCCCPU	
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 74 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	70 words
Execution type	Real-time Execution
Dependences	
Function description	This function block is used to send commands to the C70 GOT Window data structure
Restrictions and precautions	

Window #	Response Area
1	239-2 D6880
2	239-2 D7008
3	239-2 D7136
4	239-2 D7264
5	239-2 D7392
6	239-2 D7520
7	239-2 D7648
8	239-2 D7776
9	239-2 D7904
10	239-2 D8032

Timing chart	

Labels

- Input labels

User Input	Var_Input name	Data Type	Setting range	Description
X	i_wMultiCPUOffset	Word[Signed]		Word offset of current PLC data to Multi-CPU
X	i_wWindowNumber	Word[Signed]		This is the GOT window number, this number dictates where the response is located on the CNC-CPU

User Input	Var_Input name	Data Type	Setting range	Description
X	i_uDataSizeBytes	Word[Unsigned]		
X	i_uCommandCode	Word[Unsigned]		
X	i_dunArgument	Double Word[Unsigned](1..30)		

FB Version Upgrade History

Version	Description
1.02	Initial Release
2.10	Revised
3.00	Revised

Labels

1. MELPT_CNC_GOTWindow

System Label: GOTWindow		
Member	Type	Usage
DataSizeBytes	Word[Unsigned]	Size of the message
Reserve_01	Word[Unsigned]	Always 0
CommandCode	Word[Unsigned]	Command Code see c70 PLC manual
Reserve_03	Word[Unsigned]	Always 0
CommandArgument	Double Word[Unsigned](1..30)	Command Arguments

Application Example

Program Provided in MELPT project sets the following parameters:

Window Number = 10

Command Code = HF01 ; Get Current Program

Data Size Bytes = 16

Command Argument 1 = 0; Part System 1

Command Argument 2 = 6; Number of Lines to Get

Command Argument 3 = 30; Number of characters per Line

Window #	Response Area
1	239-2 D6880
2	239-2 D7008
3	239-2 D7136
4	239-2 D7264
5	239-2 D7392
6	239-2 D7520
7	239-2 D7648
8	239-2 D7776
9	239-2 D7904
10	239-2 D8032

The HMI will display the program in the green highlighted area:

Figure 116-CNC Program display

An offset in the ascii display in the device is calculated on the plc for the window used*128 words

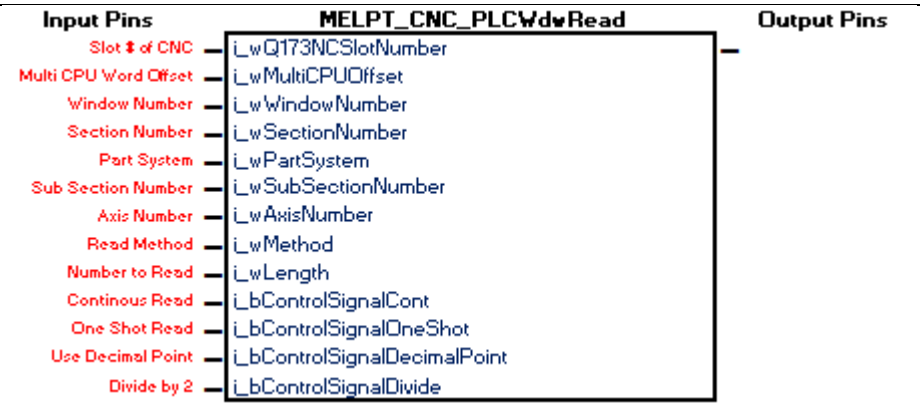
Since the Window used in the example is 10. (Window Number -1) =9 *128 words Offset =1152

D6800+1152=d8032

12.8.3. MELPT_CNC_PLCWdwRead

This function is used to interface commands with the C70 PLC Window for reading data from the C70

FB Name
MELPT_CNC_PLCWdwRead

Function Overview	
Item	Description
Function overview	This function provides command data to the C70 controller for PLC window Read Operation. The C70 processes the command data and will provide the result as 4 double words
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
Melsec-Q Series	Q173NCCCPU	
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 44 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	20 words 6 Bits
Execution type	Real-time Execution
Dependences	This function requires the MELPT_CNC_PLCReadWindow SDT
Function description	This function sets PLC Read Window Commands to the c70 controller

Restrictions and precautions

Window No.	Read control window	Read data window				Read result
		1	2	3	4	
1	G+2100-G+2107	G12310-G12311	G12312-G12313	G12314-G12315	G12316-G12317	G12270
	R8500-R8507	R9040-R9041	R9042-R9043	R9044-R9045	R9046-R9047	R9000
2	G+2108-G+2115	G12318-G12319	G12320-G12321	G12322-G12323	G12324-G12325	G12271
	R8508-R8515	R9048-R9049	R9050-R9051	R9052-R9053	R9054-R9055	R9001
3	G+2116-G+2123	G12326-G12327	G12328-G12329	G12330-G12331	G12332-G12333	G12272
	R8516-R8523	R9056-R9057	R9058-R9059	R9060-R9061	R9062-R9063	R9002
4	G+2124-G+2131	G12334-G12335	G12336-G12337	G12338-G12339	G12340-G12341	G12273
	R8524-R8531	R9064-R9065	R9066-R9067	R9068-R9069	R9070-R9071	R9003
5	G+2132-G+2139	G12342-G12343	G12344-G12345	G12346-G12347	G12348-G12349	G12274
	R8532-R8539	R9072-R9073	R9074-R9075	R9076-R9077	R9078-R9079	R9004
6	G+2140-G+2147	G12350-G12351	G12352-G12353	G12354-G12355	G12356-G12357	G12275
	R8540-R8547	R9080-R9081	R9082-R9083	R9084-R9085	R9086-R9087	R9005
7	G+2148-G+2155	G12358-G12359	G12360-G12361	G12362-G12363	G12364-G12365	G12276
	R8548-R8555	R9088-R9089	R9090-R9091	R9092-R9093	R9094-R9095	R9006
8	G+2156-G+2163	G12366-G12367	G12368-G12369	G12370-G12371	G12372-G12373	G12277
	R8556-R8563	R9096-R9097	R9098-R9099	R9100-R9101	R9102-R9103	R9007
9	G+2164-G+2171	G12374-G12375	G12376-G12377	G12378-G12379	G12380-G12381	G12278
	R8564-R8571	R9104-R9105	R9106-R9107	R9108-R9109	R9110-R9111	R9008
10	G+2172-G+2179	G12382-G12383	G12384-G12385	G12386-G12387	G12388-G12389	G12279
	R8572-R8579	R9112-R9113	R9114-R9115	R9116-R9117	R9118-R9119	R9009
11	G+2180-G+2187	G12390-G12391	G12392-G12393	G12394-G12395	G12396-G12397	G12280
	R8580-R8587	R9120-R9121	R9122-R9123	R9124-R9125	R9126-R9127	R9010
12	G+2188-G+2195	G12398-G12399	G12400-G12401	G12402-G12403	G12404-G12405	G12281
	R8588-R8595	R9128-R9129	R9130-R9131	R9132-R9133	R9134-R9135	R9011
13	G+2196-G+2203	G12406-G12407	G12408-G12409	G12410-G12411	G12412-G12413	G12282
	R8596-R8603	R9136-R9137	R9138-R9139	R9140-R9141	R9142-R9143	R9012
14	G+2204-G+2211	G12414-G12415	G12416-G12417	G12418-G12419	G12420-G12421	G12283
	R8604-R8611	R9144-R9145	R9146-R9147	R9148-R9149	R9150-R9151	R9013
15	G+2212-G+2219	G12422-G12423	G12424-G12425	G12426-G12427	G12428-G12429	G12284
	R8612-R8619	R9152-R9153	R9154-R9155	R9156-R9157	R9158-R9159	R9014
16	G+2220-G+2227	G12430-G12431	G12432-G12433	G12434-G12435	G12436-G12437	G12285
	R8620-R8627	R9160-R9161	R9162-R9163	R9164-R9165	R9166-R9167	R9015
17	G+2228-G+2235	G12438-G12439	G12440-G12441	G12442-G12443	G12444-G12445	G12286
	R8628-R8635	R9168-R9169	R9170-R9171	R9172-R9173	R9174-R9175	R9016
18	G+2236-G+2243	G12446-G12447	G12448-G12449	G12450-G12451	G12452-G12453	G12287
	R8636-R8643	R9176-R9177	R9178-R9179	R9180-R9181	R9182-R9183	R9017
19	G+2244-G+2251	G12454-G12455	G12456-G12457	G12458-G12459	G12460-G12461	G12288
	R8644-R8651	R9184-R9185	R9186-R9187	R9188-R9189	R9190-R9191	R9018
20	G+2252-G+2259	G12462-G12463	G12464-G12465	G12466-G12467	G12468-G12469	G12289
	R8652-R8659	R9192-R9193	R9194-R9195	R9196-R9197	R9198-R9199	R9019

Timing chart

Labels

- Input labels

User Input	Var_Input name	Data Type	Setting range	Description
X	i_wQ173NCSlotNumber	Word[Signed]	1-2	Which CPU Slot
X	i_wMultiCPUOffset	Word[Signed]		Word Offset for Writing Data to MultiCPU
X	i_wWindowNumber	Word[Signed]	1-20	PLC Window Number
X	i_wSectionNumber	Word[Signed]		Section Number from C70 PLC Interface Manual
X	i_wPartSystem	Word[Signed]	0-7 or 100	The Part SubSystem 100 = PLC Axis
X	i_wSubSectionNumber	Word[Signed]		Sub-Section Number from C70 PLC Interface Manual
X	i_wAxisNumber	Word[Signed]	1 to 8	The Axis Number
X	i_wMethod	Word[Signed]	0,1,2	0: Reads up to 4 consecutive data from the designated "data No.". 1: Reads up to 4 consecutive data from the designated "sub-section No.". 2: Reads up to 4 consecutive data from the designated "section sub-ID No.".
X	i_wLength	Word[Signed]	1-4	Designate the number of data to be read. Maximum number to be read is 4. If 5 or more is designated, the number of data is regarded as 4.
X	i_bControlSignalCont	Bit		Start Continous Read
X	i_bControlSignalOneShot	Bit		Start One Shot Read

User Input	Var_Input name	Data Type	Setting range	Description
X	i_bControlSignalDecimalPoint	Bit		Decimal Point is added ######## becomes ####.#### Always 4 decimal places
X	i_bControlSignalDivide	Bit		Divide the reading result into halves

FB Version Upgrade History

Version	Description
3.00	New Release
3.01	Added Input Comments

Labels

1. MELPT_CNC_PLCWdwRead

Global Label: PLCReadWindow		
Member	Type	Usage
Result	Word[Unsigned](1..20)	The return result from the operation, the result is placed into the array element of the window number. <Status> bit0: Read finished (this bit is turned ON when the read operation finished, regardless of whether the operation succeeded or not.) bit1 to 7: bit1 to 7: Error status 0x01: Normally finished 0x11: Read variable is empty 0x21: Read variable overflowed 0x41: Part system designation illegal 0x45: Section No. illegal 0x5D: Data type illegal 0xFF: No option

Global Label: PLCReadWindow		
Member	Type	Usage
DataWindow	Double Word[Unsigned](1..20,1..4)	The returned values of the window number

Application Example

Program Provided in MELPT project sets the following parameters:

Window Number = 17

We want to retrieve the following information Feed Axis Motor Load for axis 1-4 continuously

Section No =27

Sub-Section = 330

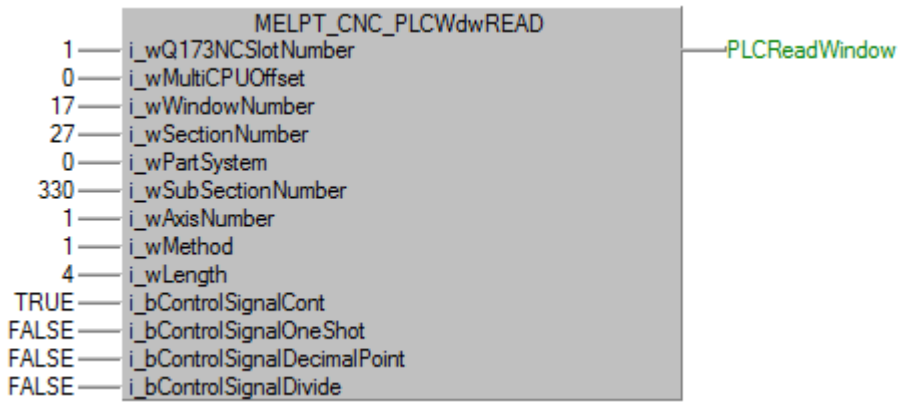
Part System = 1

Axis Number = 1

Method = 1

Length = 4

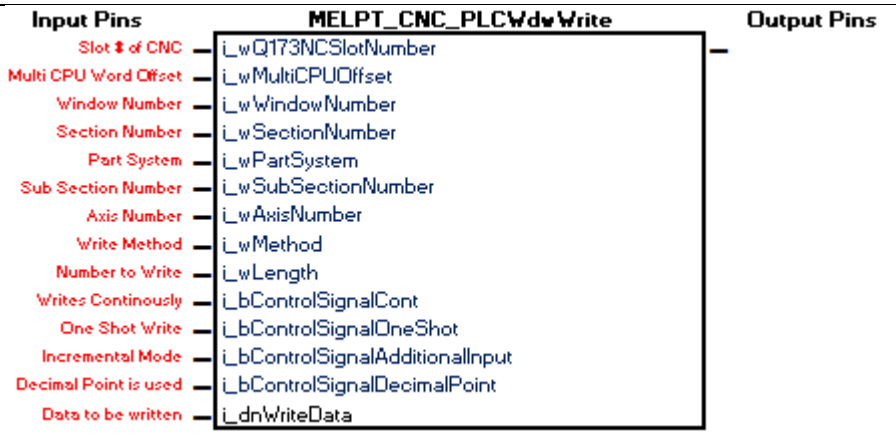
I_bControlSignalCont = TRUE



12.8.4. MELPT_CNC_PLCWdwWrite

This function is used to interface commands with the C70 PLC Window for writing data to the c70

FB Name
MELPT_CNC_PLCWdwWrite

Function Overview	
Item	Description
Function overview	This function provides command data to the C70 controller for PLC window Write Operation. The C70 processes the command data and will accept up to 4 double words worth of data
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
Melsec-Q Series	Q173NCCCPU	
GOT 1000 series	GT16(800*600) or Higher	None

Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 44 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	29 words 7 Bits
Execution type	Real-time Execution
Dependences	
Function description	This function sends PLC Write Window Commands and data to the c70 controller

Restrictions and precautions	**Write window interface**

Window No.	Write control window	Write data window ("write data")				Write result
		1	2	3	4	
1	G+2268-G+2275	G+2260-G+2261	G+2262-G+2263	G+2264-G+2265	G+2266-G+2267	G12290
	R8668-R8675	R8660-R8661	R8662-R8663	R8664-R8665	R8666-R8667	R9020
2	G+2284-G+2291	G+2276-G+2277	G+2278-G+2279	G+2280-G+2281	G+2282-G+2283	G12291
	R8684-R8691	R8676-R8677	R8678-R8679	R8680-R8681	R8682-R8683	R9021
3	G+2300-G+2307	G+2292-G+2293	G+2294-G+2295	G+2296-G+2297	G+2298-G+2299	G12292
	R8700-R8707	R8692-R8693	R8694-R8695	R8696-R8697	R8698-R8699	R9022
4	G+2316-G+2323	G+2308-G+2309	G+2310-G+2311	G+2312-G+2313	G+2314-G+2315	G12293
	R8716-R8723	R8708-R8709	R8710-R8711	R8712-R8713	R8714-R8715	R9023
5	G+2332-G+2339	G+2324-G+2325	G+2326-G+2327	G+2328-G+2329	G+2330-G+2331	G12294
	R8732-R8739	R8724-R8725	R8726-R8727	R8728-R8729	R8730-R8731	R9024
6	G+2348-G+2355	G+2340-G+2341	G+2342-G+2343	G+2344-G+2345	G+2346-G+2347	G12295
	R8748-R8755	R8740-R8741	R8742-R8743	R8744-R8745	R8746-R8747	R9025
7	G+2364-G+2371	G+2356-G+2357	G+2358-G+2359	G+2360-G+2361	G+2362-G+2363	G12296
	R8764-R8771	R8756-R8757	R8758-R8759	R8760-R8761	R8762-R8763	R9026
8	G+2380-G+2387	G+2372-G+2373	G+2374-G+2375	G+2376-G+2377	G+2378-G+2379	G12297
	R8780-R8787	R8772-R8773	R8774-R8775	R8776-R8777	R8778-R8779	R9027
9	G+2396-G+2403	G+2388-G+2389	G+2390-G+2391	G+2392-G+2393	G+2394-G+2395	G12298
	R8796-R8803	R8788-R8789	R8790-R8791	R8792-R8793	R8794-R8795	R9028
10	G+2412-G+2419	G+2404-G+2405	G+2406-G+2407	G+2408-G+2409	G+2410-G+2411	G12299
	R8812-R8819	R8804-R8805	R8806-R8807	R8808-R8809	R8810-R8811	R9029
11	G+2428-G+2435	G+2420-G+2421	G+2422-G+2423	G+2424-G+2425	G+2426-G+2427	G12300
	R8828-R8835	R8820-R8821	R8822-R8823	R8824-R8825	R8826-R8827	R9030
12	G+2444-G+2451	G+2436-G+2437	G+2438-G+2439	G+2440-G+2441	G+2442-G+2443	G12301
	R8844-R8851	R8836-R8837	R8838-R8839	R8840-R8841	R8842-R8843	R9031
13	G+2460-G+2467	G+2452-G+2453	G+2454-G+2455	G+2456-G+2457	G+2458-G+2459	G12302
	R8860-R8867	R8852-R8853	R8854-R8855	R8856-R8857	R8858-R8859	R9032
14	G+2476-G+2483	G+2468-G+2469	G+2470-G+2471	G+2472-G+2473	G+2474-G+2475	G12303
	R8876-R8883	R8868-R8869	R8870-R8871	R8872-R8873	R8874-R8875	R9033
15	G+2492-G+2499	G+2484-G+2485	G+2486-G+2487	G+2488-G+2489	G+2490-G+2491	G12304
	R8892-R8899	R8884-R8885	R8886-R8887	R8888-R8889	R8890-R8891	R9034
16	G+2508-G+2515	G+2500-G+2501	G+2502-G+2503	G+2504-G+2505	G+2506-G+2507	G12305
	R8908-R8915	R8900-R8901	R8902-R8903	R8904-R8905	R8906-R8907	R9035
17	G+2524-G+2531	G+2516-G+2517	G+2518-G+2519	G+2520-G+2521	G+2522-G+2523	G12306
	R8924-R8931	R8916-R8917	R8918-R8919	R8920-R8921	R8922-R8923	R9036
18	G+2540-G+2547	G+2532-G+2533	G+2534-G+2535	G+2536-G+2537	G+2538-G+2539	G12307
	R8940-R8947	R8932-R8933	R8934-R8935	R8936-R8937	R8938-R8939	R9037
19	G+2556-G+2563	G+2548-G+2549	G+2550-G+2551	G+2552-G+2553	G+2554-G+2555	G12308
	R8956-R8963	R8948-R8949	R8950-R8951	R8952-R8953	R8954-R8955	R9038
20	G+2572-G+2579	G+2564-G+2565	G+2566-G+2567	G+2568-G+2569	G+2570-G+2571	G12309
	R8972-R8979	R8964-R8965	R8966-R8967	R8968-R8969	R8970-R8971	R9039

Timing chart	

Labels

- Input labels

User Input	Var_Input name	Data Type	Setting range	Description
X	i_wQ173NCSlotNumber	Word[Signed]	1-2	Which CPU Slot
X	i_wMultiCPUOffset	Word[Signed]		Word Offset for Writing Data to MultiCPU
X	i_wWindowNumber	Word[Signed]	1-20	PLC Window Number
X	i_wSectionNumber	Word[Signed]		Section Number from C70 PLC Interface Manual
X	i_wPartSystem	Word[Signed]	0-7 or 100	The Part SubSystem 100 = PLC Axis
X	i_wSubSectionNumber	Word[Signed]		Sub-Section Number from C70 PLC Interface Manual
X	i_wAxisNumber	Word[Signed]	1 to 8	The Axis Number
X	i_wMethod	Word[Signed]	0,1,2	0: Writes up to 4 consecutive data from the designated "Data No.". 1: Writes up to 4 consecutive data from the designated "Sub-section No.". 2: Writes up to 4 consecutive data from the designated "Section sub-ID No.".
X	i_wLength	Word[Signed]	1-4	Designate the number of data to be Written. Maximum number to be Written is 4. If 5 or more is designated, the number of data is regarded as 4.
X	i_bControlSignalCont	Bit		Start Continuous Write
X	i_bControlSignalOneShot	Bit		Start One Shot Write

User Input	Var_Input name	Data Type	Setting range	Description
X	i_bControlSignalAdditionalInput	Bit		Sets incremental or absolute value
X	i_bControlSignalDecimalPoint	Bit		Decimal Point
X	i_dnWriteData	Double Word[Signed](1..4)		Data to be written

FB Version Upgrade History

Version	Description
3.00	New Release
3.01	Added Input Comments

Labels

1. MELPT_CNC_PLCWdwWrite

Global Label: PLCWriteWindow		
Member	Type	Usage
Result	Bit(0..15)	Status> bit0: Write finished (this bit is turned ON when the write operation finished, regardless of whether the operation succeeded or not.)) bit1 to 7: bit1 to 7: Error status 0x01: Normally finished 0x21: Write variable overflowed 0x41: Part system designation illegal 0x45: Section No. illegal 0x5D: Data type illegal 0x6D: Written in read-only data 0xFF: No option <Results>: Number of data written
DataWindow	Double Word[Signed](0..3)	Data to be written
ControlWindow	Word[Unsigned](1..8)	Command Data

Application Example

Program Provided in MELPT project sets the following parameters:

Window Number = 20

We want to write the axis name.

Section No =2

Sub-Section = 0

Part System = 0

Axis Number = 1

Method = 0

Length = 1

I_bControlSignalOneShot = TRUE

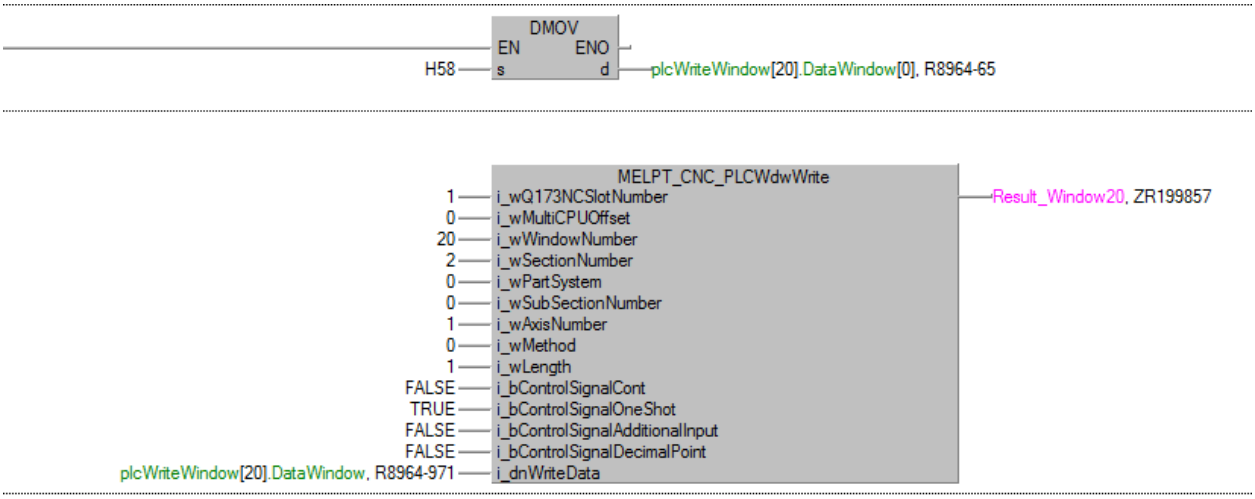


Figure 117-PLC Window Example

12.9 Language-HMI

The language Screen allows an authenticated user to change the HMI display language

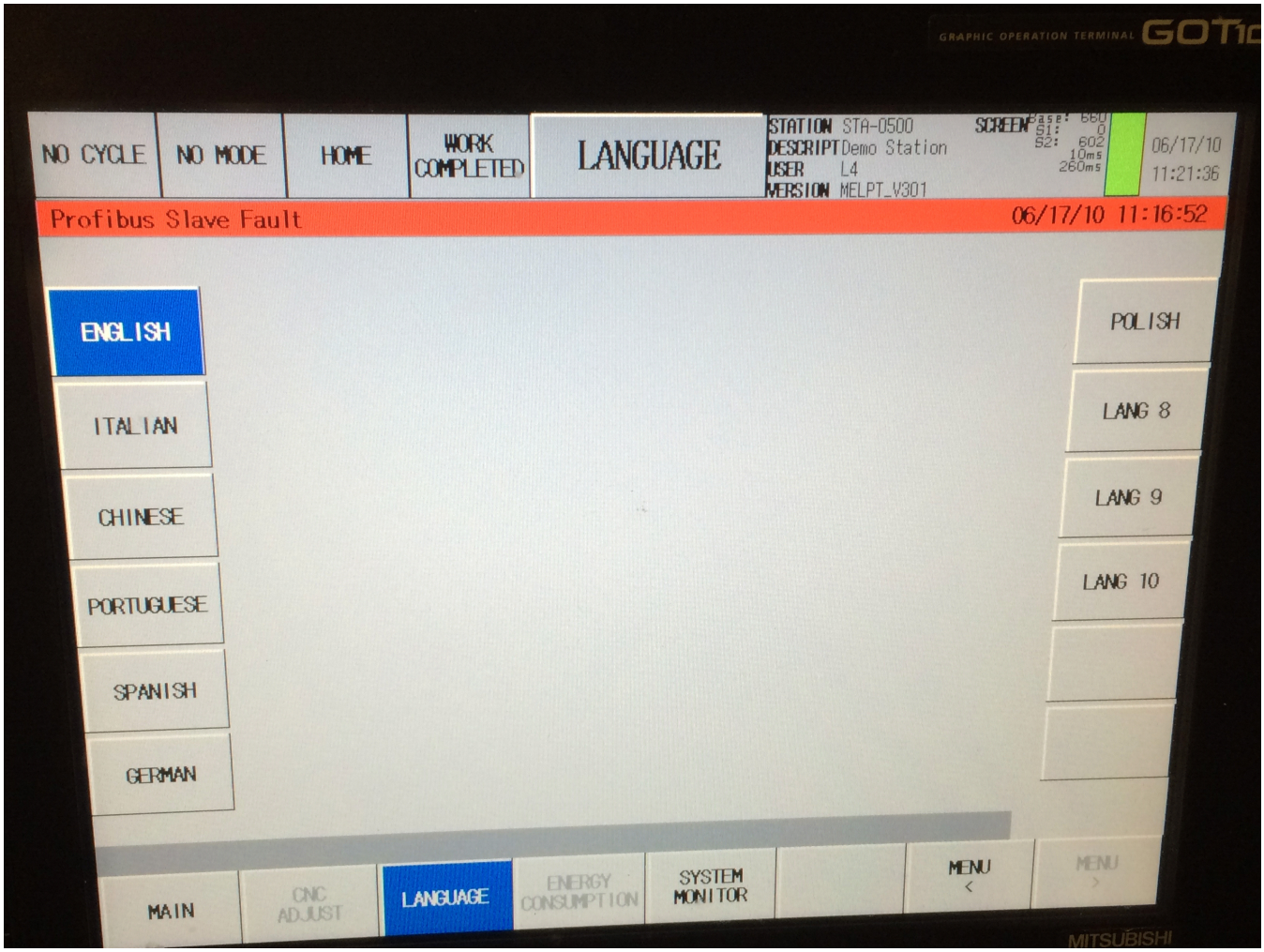


Figure 118- Hmi Screenfor Language Scripting

The language can only be changed with proper security.

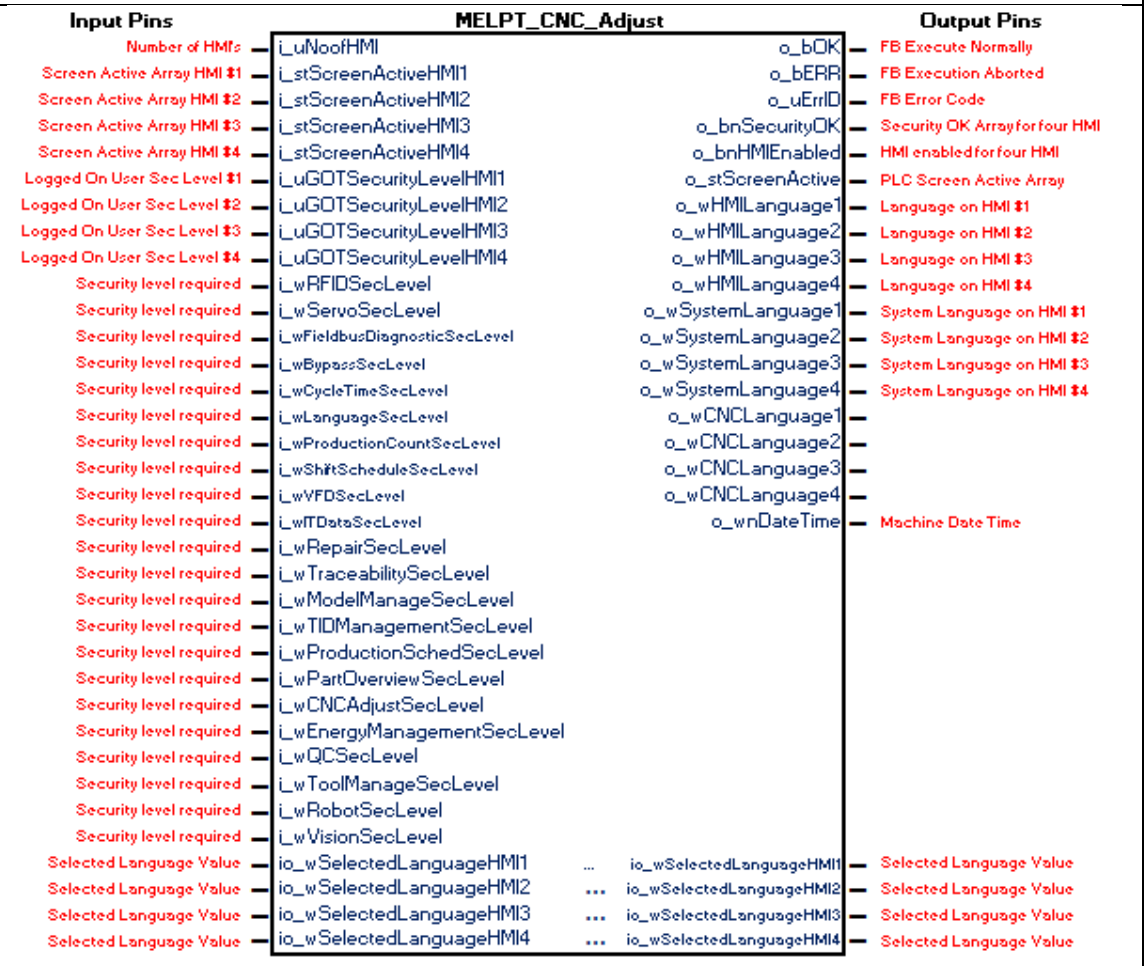
The push button sets a value 1 to 8 into an internal GOT register. The HMI will place this into the correct system label HMI_General_x.LanguageSelectedValue register in Project Script #6. The MELPT_SYS_GOTSetup function block retains this value. And will output it to the selected HMI_General_X.LangaugeCurrentValue which controls the display language. This value represents the column number of the HMI Comment Files.

Decimal Value	Language
1	English

Decimal Value	Language
2	Italian
3	Chinese
4	Portuguese
5	Spanish
6	German
7	Polish
8	Spare
9	Spare
10	Spare

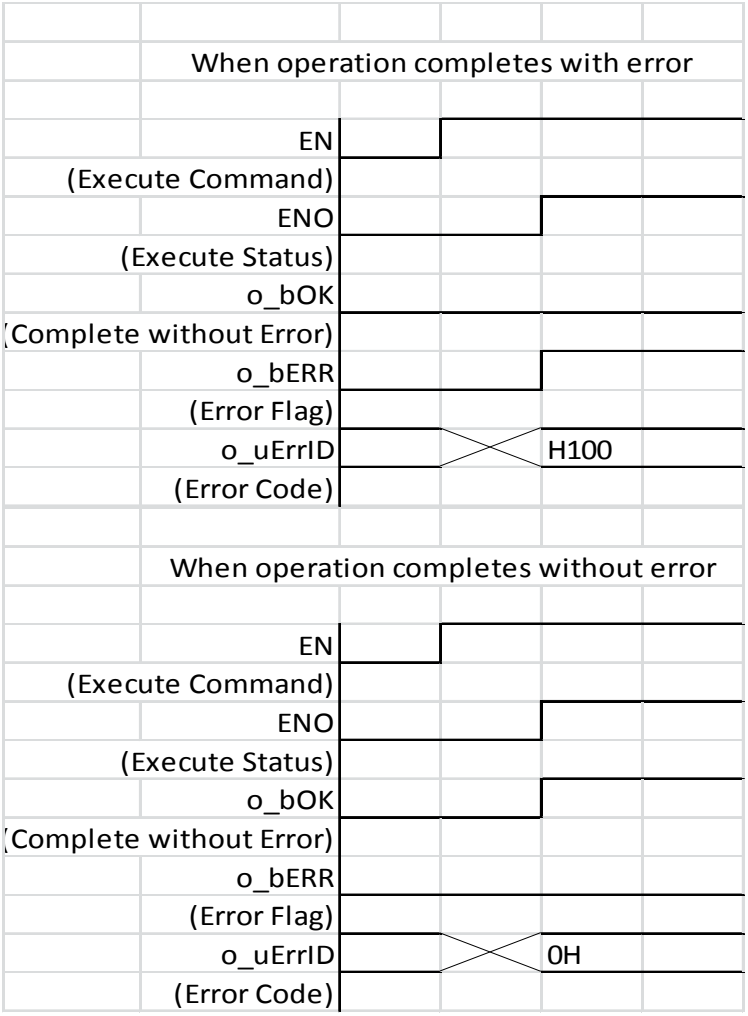
12.10 Maintenance –MELPT_SYS_GOTSetup

FB Name
MELPT_SYS_GOTSetup

Function Overview	
Item	Description
Function overview	This function block handles GOT language, GOT system language, populating the current date and time, determining what screen is active, and determines if the security level of the logged on user is adequate to enabling editing functions of the current HMI screen.
Symbol	

<table>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 1306 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>587 bits
59 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This function block requires the MELPT_SYS_ScreenList SDT</td></tr>
<tr><td>Function description</td><td></td></tr>
<tr><td>Restrictions and precautions</td><td>Z16 is used within this function block
There is no mechanism to move the CNC language to the C70 at this point.</td></tr>
</table>

Timing chart



FB Error Code

Error Code	Description
0	No Error
H100(256)	Number of HMI >4
H101(257)	Number of HMI = 0

Labels

- Input labels

User Input	Var_Input name	Data Type	Setting range	Description
X	i_uNoofHMI	Word[Unsigned]	1 to 4	Number of HMI's will full MELPT suite
	i_stScreenActiveHMI1	MELPT_SYS_ScreenList		Current Active Screen SDT from HMI #1
	i_stScreenActiveHMI2	MELPT_SYS_ScreenList		Current Active Screen SDT from HMI #2
	i_stScreenActiveHMI3	MELPT_SYS_ScreenList		Current Active Screen SDT from HMI #3
	i_stScreenActiveHMI4	MELPT_SYS_ScreenList		Current Active Screen SDT from HMI #4
	i_uGOTSecurityLevelHMI1	Word[Signed]		Logged on user security Level HMI #1
	i_uGOTSecurityLevelHMI2	Word[Signed]		Logged on user security Level HMI #1
	i_uGOTSecurityLevelHMI3	Word[Signed]		Logged on user security Level HMI #1
	i_uGOTSecurityLevelHMI4	Word[Signed]		Logged on user security Level HMI #1
X	i_wRFIDSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wServoSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wFieldbusDiagnosticSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen

User Input	Var_Input name	Data Type	Setting range	Description
X	i_wBypassSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wCycleTimeSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wLanguageSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wProductionCountSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wShiftScheduleSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wVFDSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wITDataSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wRepairSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wTraceabilitySecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wModelManageSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wTIDManagementSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wProductionSchedSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wPartOverviewSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen

User Input	Var_Input name	Data Type	Setting range	Description
X	i_wCNCAdjustSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wEnergyManagementSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wQCSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wToolManageSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wRobotSecLevel	Word[Signed]	1 to 15	Level Needed to Edit on this screen
X	i_wVisionSecLevel	Word[Unsigned]	1 to 15	Level Needed to Edit on this screen

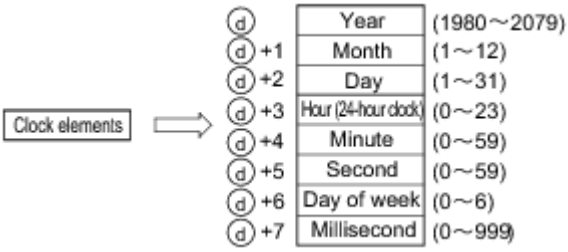
- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Selected Language Value	io_wSelectedLanguageHMI1	Word[Signed]	1 to 10	The language selected by the HMI
	Selected Language Value	io_wSelectedLanguageHMI2	Word[Signed]	1 to 10	The language selected by the HMI
	Selected Language Value	io_wSelectedLanguageHMI3	Word[Signed]	1 to 10	The language selected by the HMI
	Selected Language Value	io_wSelectedLanguageHMI4	Word[Signed]	1 to 10	The language selected by the HMI

- Output labels

Var_Output name	Data Type	Description
o_bOK	Bit	FB Execute Normally

Var_Output name	Data Type	Description
o_bOK	Bit	FB Execute Normally
o_bERR	Bit	FB Execution Aborted
o_uErrID	Word[Unsigned]	FB Error Code
o_bnSecurityOK	Bit(1..4)	Security OK Array for four HMI
o_bnHMIEnabled	Bit(1..4)	HMI enabled for four HMI
o_stScreenActive	MELPT_SYS_ScreenList	PLC Screen Active Array
o_wHMILanguage1	Word[Signed]	Language on HMI #1
o_wHMILanguage2	Word[Signed]	Language on HMI #2
o_wHMILanguage3	Word[Signed]	Language on HMI #3
o_wHMILanguage4	Word[Signed]	Language on HMI #4
o_wSystemLanguage1	Word[Signed]	System Language on HMI #1
o_wSystemLanguage2	Word[Signed]	System Language on HMI #2
o_wSystemLanguage3	Word[Signed]	System Language on HMI #3
o_wSystemLanguage4	Word[Signed]	System Language on HMI #4
o_wCNCLanguage1	Word[Signed]	Selected CNC Langauge
o_wCNCLanguage2	Word[Signed]	Selected CNC Langauge
o_wCNCLanguage3	Word[Signed]	Selected CNC Langauge
o_wCNCLanguage4	Word[Signed]	Selected CNC Langauge

Var_Output name	Data Type	Description
o_wnDateTime	Word[Signed](0..7)	Machine Date and Time 

FB Version Upgrade History

Version	Description
1.22	Initial Release
2.00	Active Screen Revised
2.01	Added MC/MCR
2.10	Screen Active into 5 SDT
3.00	Move to 4 SDT, remove TID
3.01	Replaced coding to be more efficient savings of 10Kb

SDT Usage

1. MELPT_SYS_ScreenList

Global Label: ScreenActive		
Member	Type	Usage When True a HMI is on this screen, up to 4 bits in this SDT can be on for the four HMI's
Main	Bit	
Spare_01	Bit	
Spare_02	Bit	
Spare_03	Bit	

Global Label: ScreenActive		
Member	Type	Usage When True a HMI is on this screen, up to 4 bits in this SDT can be on for the four HMI's
Spare_04	Bit	
Spare_05	Bit	
Spare_06	Bit	
Spare_07	Bit	
Spare_08	Bit	
Spare_09	Bit	
Startup	Bit	
PartStatus	Bit	
Bypass	Bit	
CycleType	Bit	
CycleTime	Bit	
Operation	Bit	
Robot	Bit	
Spare_17	Bit	
Spare_18	Bit	
Spare_19	Bit	
Manual	Bit	
Spare_21	Bit	
Spare_22	Bit	
Spare_23	Bit	
Spare_24	Bit	

Global Label: ScreenActive		
Member	Type	Usage When True a HMI is on this screen, up to 4 bits in this SDT can be on for the four HMI's
Spare_25	Bit	
Spare_26	Bit	
Spare_27	Bit	
Spare_28	Bit	
Spare_29	Bit	
FieldbusDiag	Bit	
HWInterlock	Bit	
SWInterlock	Bit	
Ethernet	Bit	
Vision	Bit	
RFID	Bit	
PLCStatus	Bit	
LaserMark	Bit	
HW_IO	Bit	
ITData	Bit	
FaultSummary	Bit	
FaultHistory	Bit	
Spare_42	Bit	
Spare_43	Bit	
Spare_44	Bit	
Spare_45	Bit	

Global Label: ScreenActive		
Member	Type	Usage When True a HMI is on this screen, up to 4 bits in this SDT can be on for the four HMI's
Spare_46	Bit	
Spare_47	Bit	
Spare_48	Bit	
Spare_49	Bit	
PartCounter	Bit	
LotTraceability	Bit	
IndividualTraceability	Bit	
MasterData	Bit	
DressingData	Bit	
PartsOverview	Bit	
Spare_56	Bit	
ShiftSchedule	Bit	
ProdSchedule	Bit	
ModelManagementOverview	Bit	
Maintenance	Bit	
Servo	Bit	
Password	Bit	
ToolCounter	Bit	
VFDConfig	Bit	
CNC_Adjust	Bit	

Global Label: ScreenActive		
Member	Type	Usage When True a HMI is on this screen, up to 4 bits in this SDT can be on for the four HMI's
Language	Bit	
Energy	Bit	
SystemMonitor	Bit	
IOL_Maint	Bit	
RepairOverview	Bit	
IndividualRepair	Bit	
PalletRepair	Bit	
PalletReintroduce	Bit	
OperatorCode	Bit	
TIDManagement	Bit	
ToolManagement	Bit	
QualityCheck	Bit	
Spare_78	Bit	
Spare_79	Bit	
Information	Bit	
Spare_81	Bit	
Spare_82	Bit	
Spare_83	Bit	
Spare_84	Bit	
StationManagement	Bit	
ModelManagement	Bit	

Global Label: ScreenActive		
Member	Type	Usage When True a HMI is on this screen, up to 4 bits in this SDT can be on for the four HMI's
PartNumberManagement	Bit	
ErrorProofing	Bit	
Spare_89	Bit	
CCLinkIEFieldDiag	Bit	
ProfinetDiag	Bit	
CCLinkDiag	Bit	
ProfibusDiag	Bit	
Spare_94	Bit	
Spare_95	Bit	

2. MELPT_SYS_GOTGeneral

Global Label: HMI_General_X x=HMI Number		
Member	Type	Usage
Enabled	Bit	
SecurityOK	Bit	Set by This FB
GOTID	Word[Unsigned]	
BaseScreenNumber	Word[Unsigned]	
WindowNumber	Word[Unsigned]	
Superimpose_1	Word[Unsigned]	
Superimpose_2	Word[Unsigned]	
BaseChangeNumber	Word[Unsigned]	

Global Label: HMI_General_X x=HMI Number		
Member	Type	Usage
OverlapChangeNumber1	Word[Unsigned]	
OverlapChangeNumber2	Word[Unsigned]	
OverlapChangeNumber3	Word[Unsigned]	
OverlapChangeNumber4	Word[Unsigned]	
OverlapChangeNumber5	Word[Unsigned]	
SuperimposeChangeNumber1	Word[Unsigned]	
SuperImposeChangeNumber2	Word[Unsigned]	
OverlapXY1	Word[Unsigned](0..1)	
OverlapXY2	Word[Unsigned](0..1)	
OverlapXY3	Word[Unsigned](0..1)	
OverlapXY4	Word[Unsigned](0..1)	
OverlapXY5	Word[Unsigned](0..1)	
DisplayStation	Word[Signed]	

Global Label: HMI_General_X x=HMI Number		
Member	Type	Usage
LanguageSelectedValue	Word[Signed]	HMI to PLC Requested Language
LanguageCurrentValue	Word[Signed]	PLC to HMI Display Language
SystemLanguage	Word[Signed]	HMI System Menu Language
CNCSystemLanguage	Word[Signed]	CNC System Language Value
ReadDevice	Word[Signed](0..2)	
SecLevel	Word[Signed]	Used to determine if security level is more than required
WriteDevice	Word[Signed](0..38)	
OperatorAuthName	Word[Unsigned](0..7)	

12.11 Energy Consumption

There are two screens provided in the MELPT package for Energy Consumption.

Total Energy Consumption, which shows a historical overview of energy usage and Instantaneous consumption, which display current usage. As of release 3.01 only screens and data structures are provided.

12.11.1. Total Energy Consumption

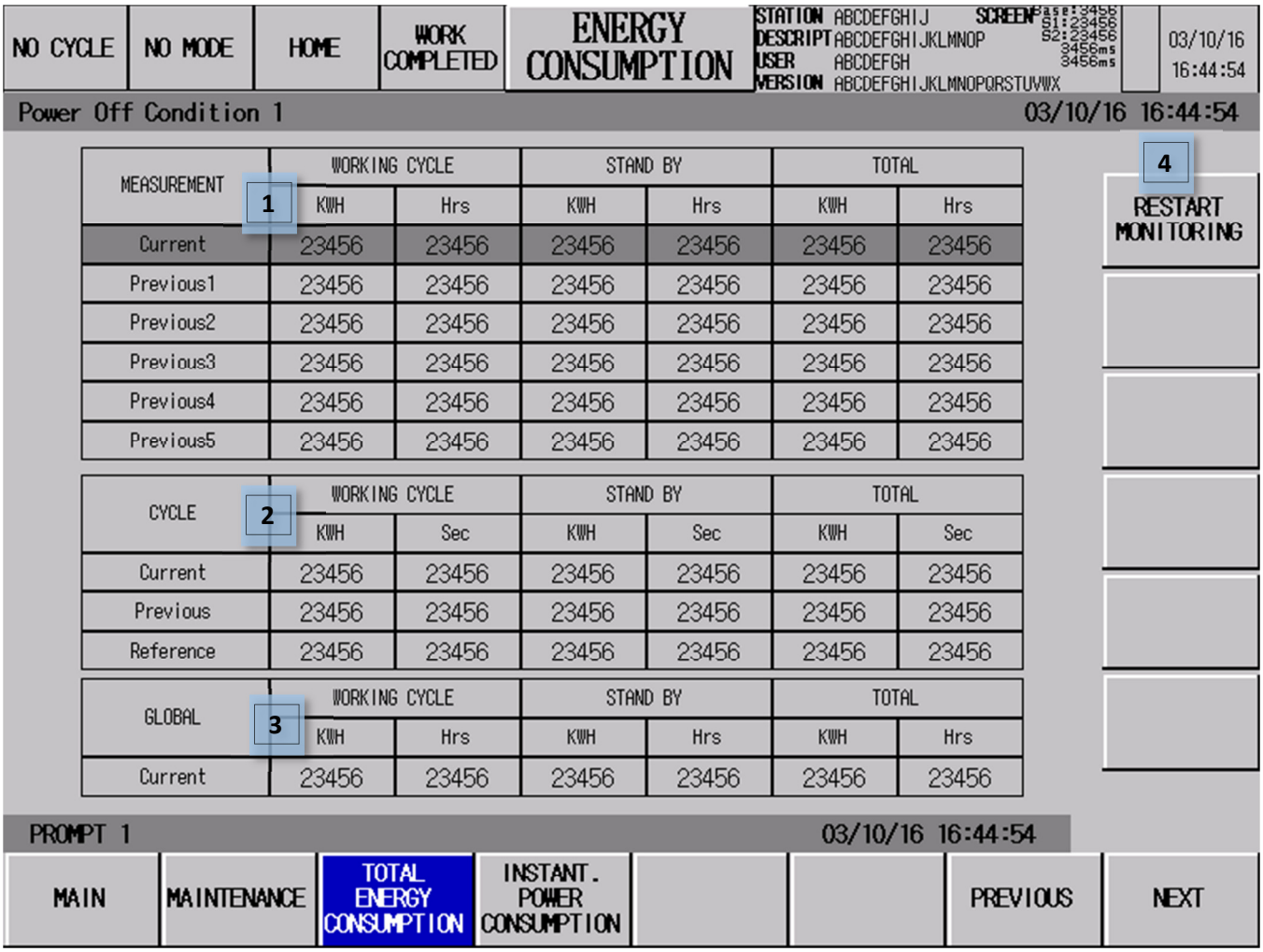


Figure 119-Energy Consumption HMI

Item #	Description	Object X=Input Number (row)		Details
1	Measurement Energy Consumption	Working Cycle Numeric Display	EnergyConsumption.MeasurementKWH[1,X]	
			EnergyConsumption.MeasurementHrs[1,X]	
		Stand By Numeric Display	**EnergyConsumption.MeasurementKWH[2,X]**	
			EnergyConsumption.MeasurementHrs[2,X]	
		Total Numeric Display	EnergyConsumption.MeasurementKWH[1,X]+ EnergyConsumption.MeasurementKWH[2,X]	
			EnergyConsumption.MeasurementHrs[1,X]+ EnergyConsumption.MeasurementHrs[2,X]	
2	Cycle Energy Consumption	Working Cycle Numeric Display	EnergyConsumption.CycleKWH[1,X]	
			EnergyConsumption.CycleSec[1,X]	
		Stand By Numeric Display	**EnergyConsumption.MeasurementKWH[2,X]**	
			EnergyConsumption. CycleSec [2,X]	
		Total Numeric Display	EnergyConsumption.MeasurementKWH[1,X]+ EnergyConsumption. MeasurementKWH [2,X]	
			EnergyConsumption. CycleSec [1,X]+ EnergyConsumption. CycleSec [2,X]	
3	Global Energy Consumption	Working Cycle Numeric Display	EnergyConsumption.GlobalKWH[1]	
			EnergyConsumption.GlobalHrs[1]	
		Stand By Numeric Display	EnergyConsumption.GlobalKWH[2]	
			EnergyConsumption.GlobalHrs[2]	
		Total Numeric Display	EnergyConsumption.GlobalKWH[1]+ EnergyConsumption.GlobalKWH[2]	
			EnergyConsumption.GlobalHrs[1]+ EnergyConsumption.GlobalHrs[2]	

Item #	Description	Object X=Input Number (row)	Details
4	Restart Monitoring Pushbutton	EnergyConsumption.Reset_PB	

SDT Usage

1. MELPT_SYS_Energy

Global Label: EnergyConsumption		
Member	Type	Usage
Reset_PB	Bit	HMI PB
MeasurementKWH	Word[Signed](1..2,1..6)	Measurement KWH Working Cycle =1, standby =2, current =1, previous values 2-6
MeasurementHrs	Word[Signed](1..2,1..6)	Measurement Hrs Working Cycle =1, standby =2, current =1, previous values 2-6
CycleKWH	Word[Signed](1..2,1..3)	Cycle KWH Working Cycle =1, standby =2, current =1, previous values=2 refernce =3
CycleSec	Word[Signed](1..2,1..3)	Cycle sec Working Cycle =1, standby =2, current =1, previous values=2 refernce =3
GlobalKWH	Double Word[Signed](1..2)	global KWH Working Cycle =1, standby =2,
GlobalHrs	Word[Signed](1..2)	Global hrs Working Cycle =1, standby =2,
AxisKWH	Double Word[Signed](1..16)	
SpindleKWH	Double Word[Signed]	

Global Label: EnergyConsumption		
Member	Type	Usage
TotalsKWH	Double Word[Signed](1..3)	

12.11.2. Instantaneous consumption

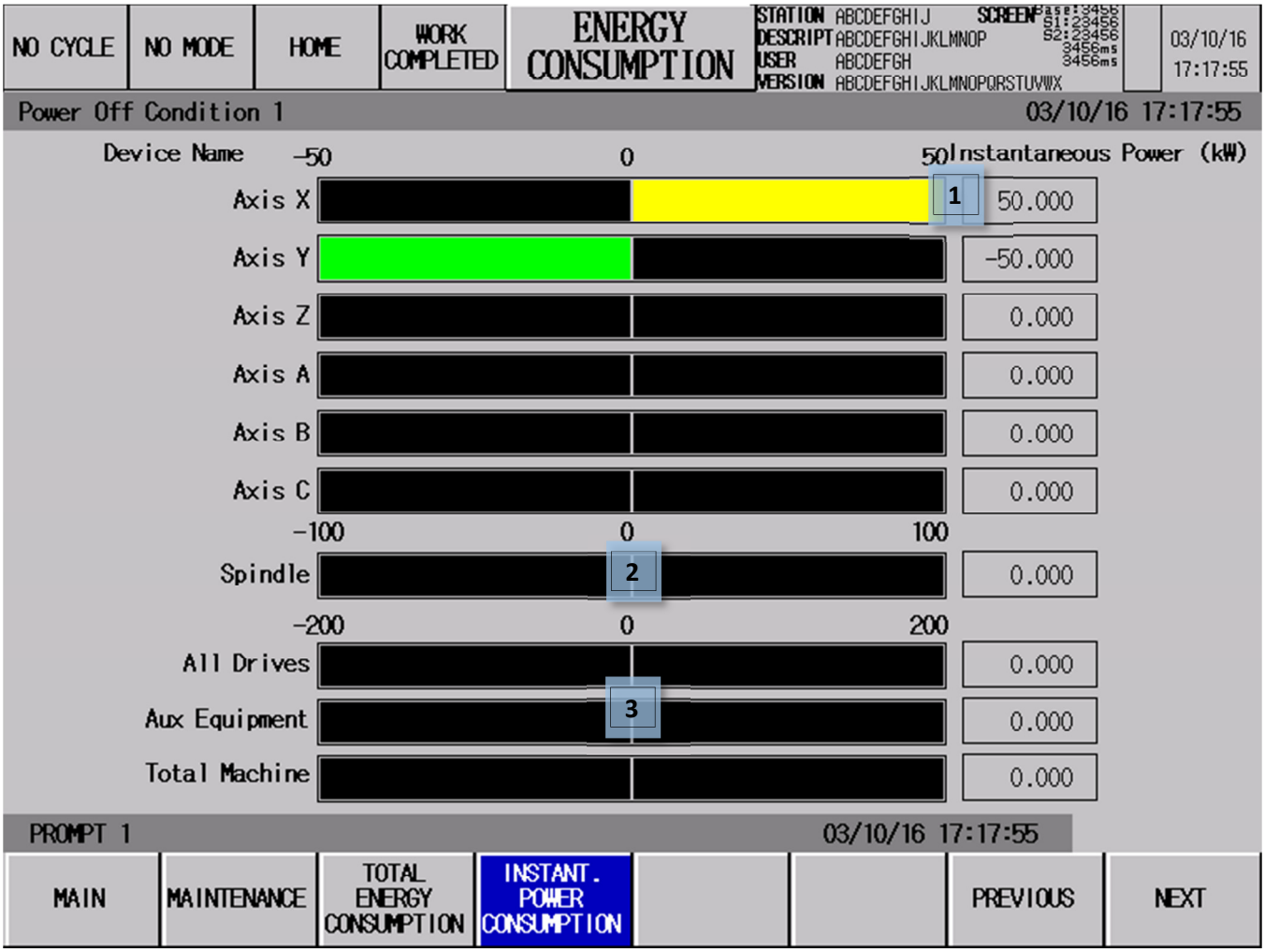


Figure 120-Instantaneous Power for Each Axis

Item #	Description	Object X=Input Number (row)		Details
1	Axis Energy Consumption	Axis Level Displays	-50<=$v<=0	EnergyConsumption.AxisKWH[1] -1 * ($$ / 1000)
			0 < $V	EnergyConsumption.AxisKWH[1] $$ / 1000
1	Axis Energy Consumption	Numeric Display	EnergyConsumption.AxisKWH[X]	

Item #	Description	Object X=Input Number (row)		Details
2	Spindle Energy Consumption	Spindle Level Displays	-100<=$v<=0	EnergyConsumption.SpindleKWH -1 * ($$ / 1000)
			0 < $V	EnergyConsumption.SpindleKWH $$ / 1000
2	Spindle Energy Consumption	Numeric Display	EnergyConsumption.SpindleKWH	
3	Summary Energy Consumption	Level Displays	-200<=$v<=0	EnergyConsumption.TotalsKWH[X] -1 * ($$ / 1000)
			0 < $V	EnergyConsumption.TotalsKWH[X] $$ / 1000
3				X =1 All Drives X=2 AuxEquipment X=3 Total Machine
3	Summary Energy Consumption	Numeric Display		EnergyConsumption.TotalsKWH[X]

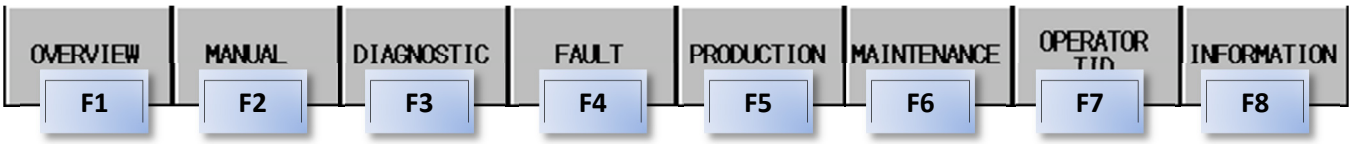
SDT Usage

1. MELPT_SYS_Energy

Global Label: EnergyConsumption		
Member	Type	Usage
Reset_PB	Bit	

Global Label: EnergyConsumption		
Member	Type	Usage
MeasurementKWH	Word[Signed](1..2,1..6)	
MeasurementHrs	Word[Signed](1..2,1..6)	
CycleKWH	Word[Signed](1..2,1..3)	
CycleSec	Word[Signed](1..2,1..3)	
GlobalKWH	Double Word[Signed](1..2)	
GlobalHrs	Word[Signed](1..2)	
AxisKWH	Double Word[Signed](1..16)	Instantaneous Power for up to 16 Axis
SpindleKWH	Double Word[Signed]	Instantaneous Power for the spindle
TotalsKWH	Double Word[Signed](1..3)	Summation of all power

13 REPAIR/QUALITY



The F7 Category, displays and navigates to a variable category.

Depending on the value placed into MachineData.MachineType and the function blocks placed in the scan the text and navigation is determined by Project script #4

MachineData.MachineType!=1;

Navigation and Text "Repair"

Repair: Level 2 Navigation:

Figure 121-Repair Level 2 Navigation

MachineData.MAchineType==1;

Figure 122-Machining Type F7

Depending on the function blocks in the scan navigation to certain screens will not be allowed.

Additionally the Level 1 navigation bar will display different text depending on the configurations

Machine Type	Tool Management	Quality Check	Image
0	N/A	N/A	
1	Off	Off	

Machine Type	Tool Management	Quality Check	Image
1	Off	On	
1	On	Off	
1	ON	ON	

TID Management will be covered in the Model Management Section

13.1 HMI-Operator TID

The operator TID screen uses a series of overlays to be used, this screen interfaces with the Client FB, which will parse the data and place it in a data structure. This data structure is intended to be transferred to the server fb for comparison to the data base, the results are written into the data structure and transferred back to the client.

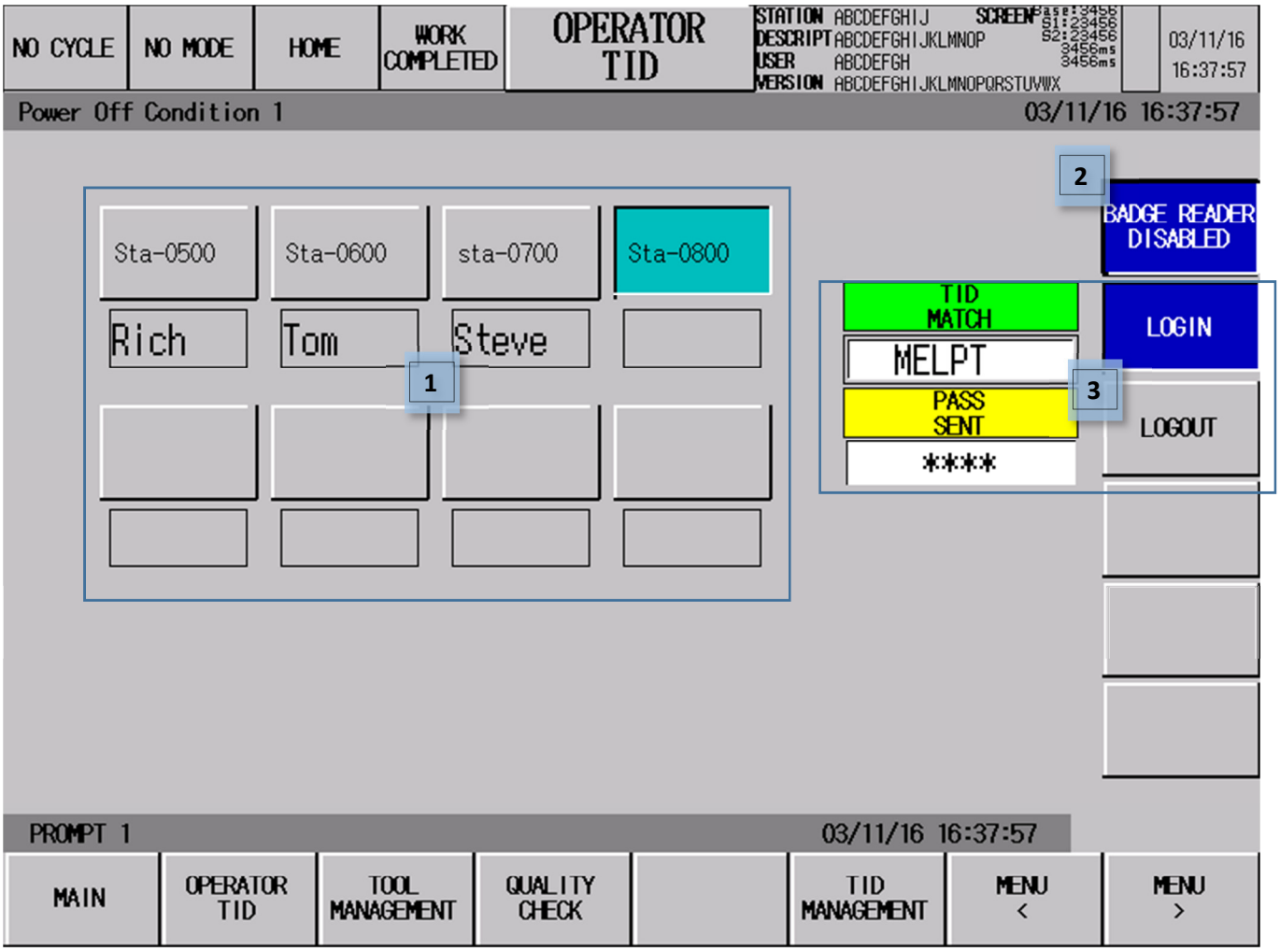
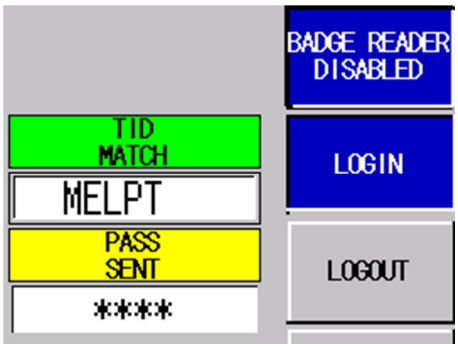
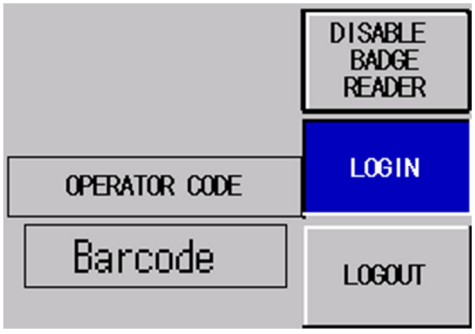


Figure 123-Operator TID Screen

Item #	Description	Object	Details X=Station Number
1	Station Select Window	Window 7002	If GOTTID.ValidStation[X] is true the text displays and the button is selectable

Item #	Description	Object	Details X=Station Number
	Station Name	AscII Display: StationData_X.StationName[0]	The Station Name set in PLC Logic.
	Operator Name	ASCII display: StationData_X.OperatorCode[0]	The Current Logged on Operator for that station
	Selection PB	Word Set Switch: GOTTID.StationNumberSelected	When Selected background turns Teal
2	Badge Reader Disabled	Hidden Pushbutton: Bit Momentary: GOTTID.BypassReader_PB	Toggles the use of a barcode reader or
		Bit Lamp: GOTTID.BadgeReaderDisabled[0]	Offset: GOTTID.StationNumberSelected When True background is blue
3	Login Window	GOTTID.BadgeReaderDisabled==TRUE	Window 7000  Login PB: GOTTID.Login_PB Logout PB: GOTTID.Logout_PB TID: GOTTID.TIDLogin[0]

Item #	Description	Object	Details X=Station Number		
			GOTTID.HMIStatus	Value	Indicator
				Normal	T-ID
				2	TID Sent
				3	TID Not Found
				4	TID Match
				8	TID MATCH
				16	TID Match
			Password	Editable when status >=4 and less than 32	
			Status Lamp GOTTID.HMIStatus	Value	Indicator
				Normal	Password
				8	PASS SENT
				16	Password Fail
				32	Password OK

Item #	Description	Object	Details X=Station Number	
		GOTTID.BadgeReaderDisabled==False	Window 7001  	
			Login PB	GOTTID.Login_PB
			Logout PB	GOTTID.Logout_PB
			Ascii Display	GOTTID.BadgeCode[0] This can interface with the Barcode Option of the HMI OS

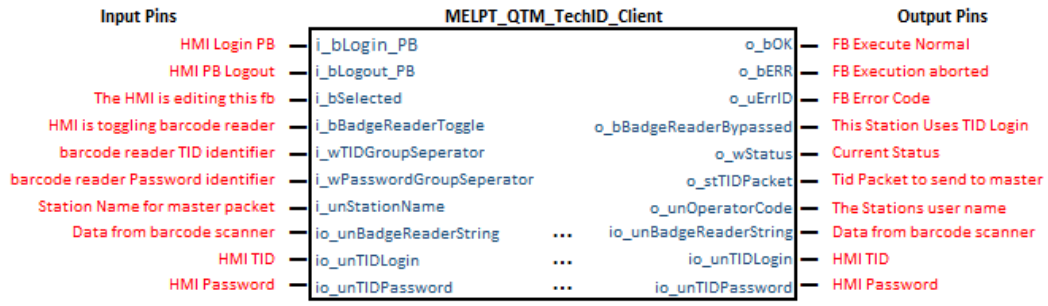
TID Status Meaning		
Value:	Set By:	Meaning:
0	Master	Master Logout Signal: End of Shift
0	Local	Local Logout PB Pressed
2	Local	TID Has been Entered, Master needs to search for match
4	Master	A TID Match has been found
8	Local	A Password has been sent to master
16	Master	The Password does not match
32	Master	The Password has matched

13.2 PLC-Operator TID

Two function blocks are required to validate a TID and Password. MELPT_TID_Server and MELPT_TID_Client, if the database of User ID's and passwords reside on the local PLC, both of the function blocks are required. IF the database of UserName and Passwords resides on a remote PLC. The Client Function block is required per station managed by the PLC. Only one instance of the server function block is required.

13.2.1. PLC-MELPT_QTM_TechID_Client

FUN Name
MELPT_QTM_TechIDClient

Function Overview	
Item	Description
Function overview	This function block handles the interface between the HMI and the data structure for tID
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

Applicable Software	

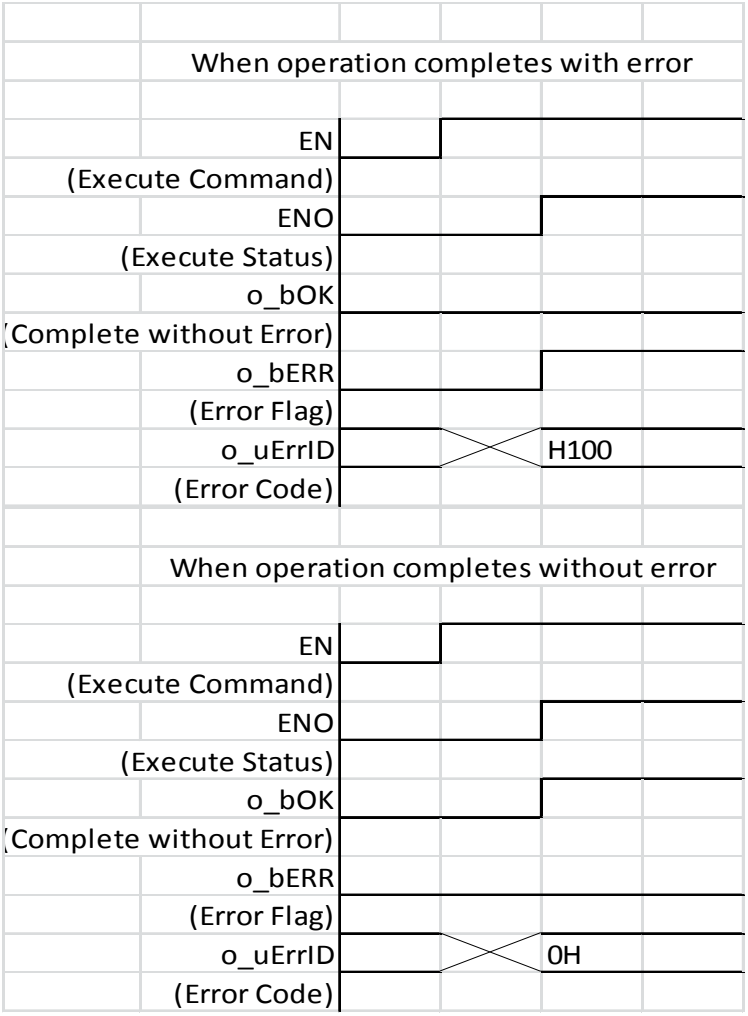
Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 253 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	11 bits 131 words
Execution type	Real TimeExecution
Dependences	This function block requires the SDT MELPT_QTM_TIDPacket This function block requires GroupSeperatorParse Function

Function description	Sequence:
	
	1. Select the station to login to by pressing HMI button,
	2. Enter TID:
	  o Server will respond with TID match
	3. Enter Password,
	4. Press Login PB
	  o Server will compare entered password to stored password, if Match
	
	Operator Logged IN

Restrictions and precautions	

Timing chart



FB Error Code

Error Code	Description
0	No Error.
H103(259)	Password Group Seperator =0 (ignored if badge reader is disabled)
H104(260)	TID Group Seperator =0 (ignored if badge reader is disabled)

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	HMI Login PB	i_bLogin_PB	Bit		HMI Login PB
X	HMI PB Logout	i_bLogout_PB	Bit		HMI Logout PB
	The HMI is editing this fb	i_bSelected	Bit		This is true when the logon sequence is under edit of the HMI
	HMI is toggling barcode reader	i_bBadgeReaderToggle	Bit		HMI PB changes usage from TID to barcode reader
X	barcode reader TID identifier	i_wTIDGroupSeperator	Word[Signed]		Identifier in barcode string TID follows
X	barcode reader Password identifier	i_wPasswordGroupSeperator	Word[Signed]		Identifier in barcode String Password follows
	Station Name for master packet	i_unStationName	Word[Unsigned](0..4)		Station Name for this FB

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Data from barcode scanner	io_unBadgeReaderString	Word[Unsigned](0..15)		BadgeReaderString

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	HMI TID	io_unTIDLogin	Word[Unsigned](0..3)		Operator Code
	HMI Password	io_unTIDPassword	Word[Unsigned](0..1)		Password

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	FB OK
FB Execution aborted	o_bERR	Bit	FB ERR
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code
This Station Uses TID Login	o_bBadgeReaderBypassed	Bit	Badge Reader Disabled Signal
Current Status	o_wStatus	Word[Signed]	Status
Tid Packet to send to master	o_stTIDPacket	MELPT_QTM_TID Packet	The derived packet to server to be transmitted by fieldbus
The Stations user name	o_unOperatorCode	Word[Unsigned](0..3)	Operator Code to station data

FB Version Upgrade History

Version	Description

Version	Description
1.10	Re-write Master/Slave
1.12	FB updated to BCN-89000-0823-D
1.20	FB Status Outputs added
2.00	Adopted BCN-89000-0969; Changes to Security removed access level
2.10	Rewrite
3.00	Rewrite for new structures, support 8 station
3.01	Remove two redundant outputs

13.3 TID Management

13.3.1. HMI-TID History

This screen displays information regarding the last 300 logins.

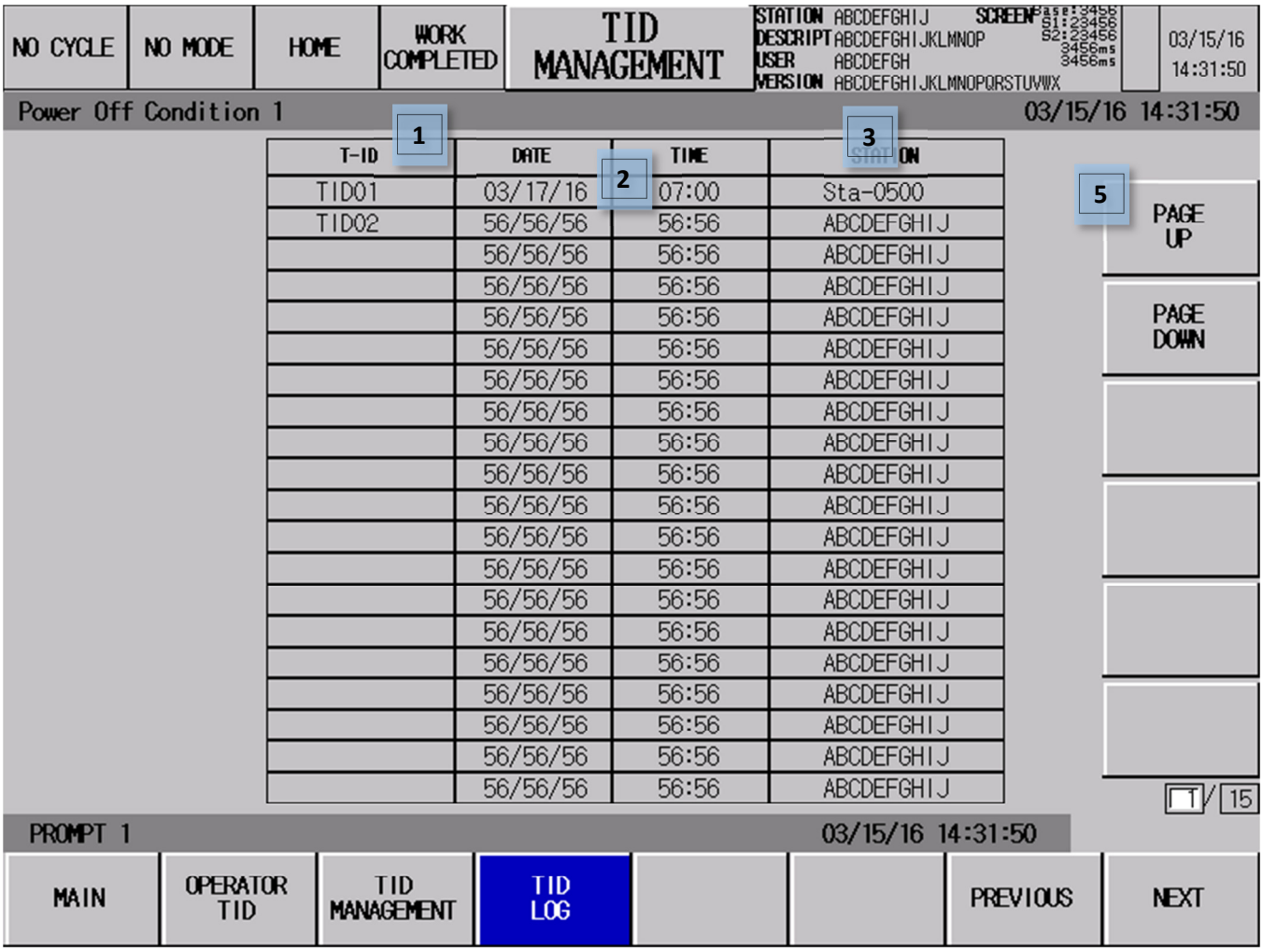


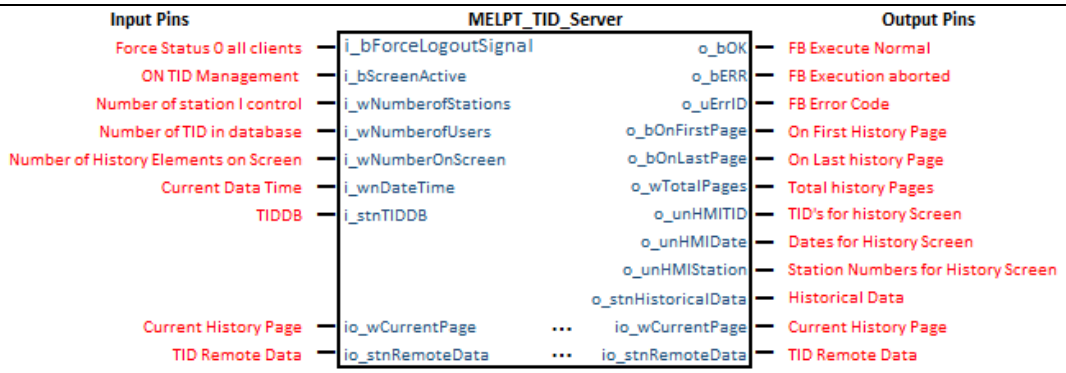
Figure 124-TID Management Log

Item #	Description	Object X=Row Number	Details X=Station Number
1	T-ID	ASCII Display: GOTTIDHistory.HMITID[1,0]	

Item #	Description	Object X=Row Number	Details X=Station Number
2	Date/Time	Numeric Display: GOTTIDHistory.HMITIDTimeStamp[X, 0..2]	Each Byte is Masked to show correct value Data is BCD packed **Number**SD210 **Name**Clock Data **Meaning**Clock Data (Year, Month) **Explanation** This register stores the following year (year, last two digits) and the month when data were restored in BCD code. b15 to b12 b11 to b8 b7 to b4 b3 to b0 +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+ (Example) July, 1993 | | | | 9307H +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+ <- Year -> <- Month ->
3	Station Name	ASCII Display: GOTTIDHistory.HMITIDStation[X,0]	
4	Page UP/Down	GOTTIDHistory.CurrentPage	Modifies the current page by 1

13.3.2. PLC-MELPT_QTM_TechID_Server

FUN Name
MELPT_QTM_TechIDServer

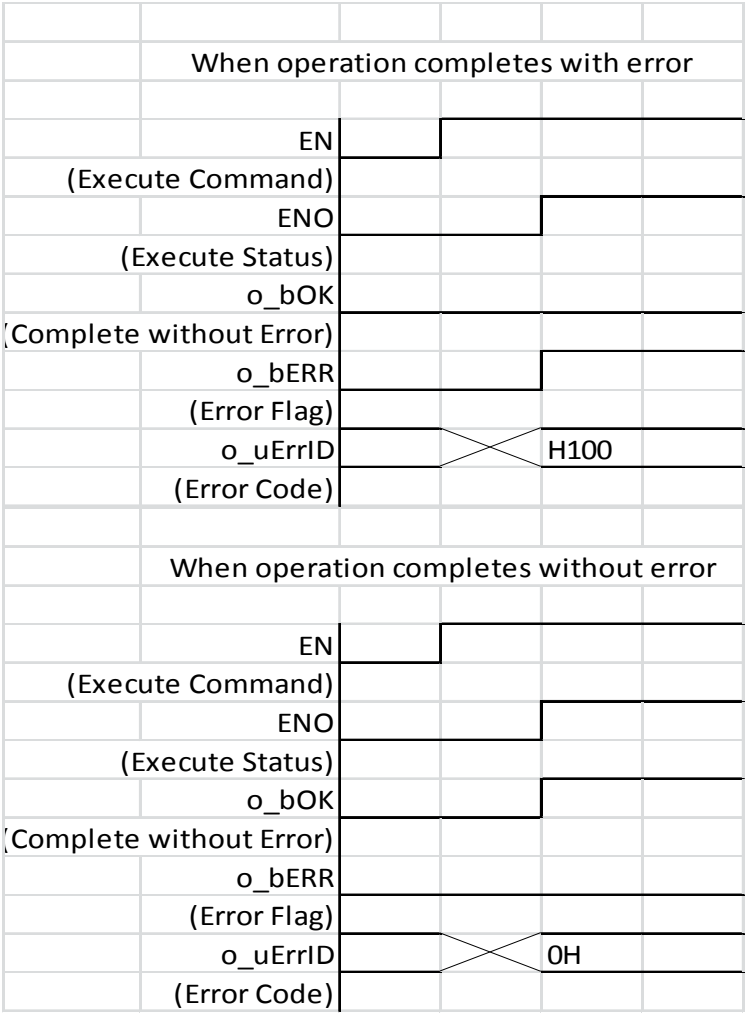
Function Overview	
Item	Description
Function overview	This function block searches the TID DB and handshakes with a client for authentication. IT loops through 300 instances of the the TID packet, and responds to the status. IT also handle entries into the historical data base and parsing of the historical data base for display by the HMI.
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Number of Ladder Steps	QnU: 253 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	7 bits 8353 words
Execution type	Real TimeExecution
Dependences	This function block requires the SDT MELPT_QTM_TechIDDB This function block requires the SDT MELPT_TID_Historical This function block requires the SDT MELPT_QTM_TIDPacket This function block requires TIDServer_FindIndex Function
Function description	
Restrictions and precautions	

Timing chart



FB Error Code

Error Code	Description
0	No Error.
H101(257)	NumberOnScreen Less than or equal to 0
H102(258)	NumberOnScreen greater than 20
H103(259)	NumberOfStations Less than or equal to 0

Error Code	Description
H104(260)	NumberOfStations greater than 300
H105(261)	Number of Users less than or equal to 0
H106(262)	Number of Users greater than 300

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
x	Force Status 0 all clients	i_bForceLogoutSignal	Bit		
	ON TID Management	i_bScreenActive	Bit		
X	Number of station I control	i_wNumberofStations	Word[Signed]		
X	Number of TID in database	i_wNumberofUsers	Word[Signed]		
X	Number of History Elements on Screen	i_wNumberOnScreen	Word[Signed]		
	Current Data Time	i_wnDateTime	Word[Signed](0..3)		
	TIDDB	i_stnTIDDB	MELPT_QTM_TechIDDB(1..300)		

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Current History Page	io_wCurrentPage	Word[Signed]		Current HMI Page
	TID Remote Data	io_stnRemoteData	MELPT_QTM_TIDPacket(1..300)		Data from All Clients

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	FB OK
FB Execution aborted	o_bERR	Bit	FB ERR
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code
On First History Page	o_bOnFirstPage	o_bOnFirstPage	When TRUE, indicates processing has completed normally
On Last history Page	o_bOnLastPage	o_bOnLastPage	When TRUE, indicates an Error has occurred
Total history Pages	o_wTotalPages	o_wTotalPages	FB Error Code Output
TID's for history Screen	o_unHMITID	o_unHMITID	HMI Cursor Control when on PAge 1
Dates for History Screen	o_unHMIDate	o_unHMIDate	HMI Cursor Control
Station Numbers for History Screen	o_unHMIStation	o_unHMIStation	Total Number / Number on Screen

Symbol Name	Var_Output name	Data Type	Description
Historical Data	o_stnHistoricalData	o_stnHistoricalData	HMI List of Historical TID

FB Version Upgrade History

Version	Description
1.10	Re-write Master/Slave
1.12	FB updated to BCN-89000-0823-D
1.20	FB Status Outputs added
2.00	Adopted BCN-89000-0969; Changes to Security removed access level
2.10	Rewrite
3.00	Rewrite for new structures, support 8 station
3.01	Comments updated

SDT Usage

1. MELPT_QTM_GOTTIDhistory

System Label: GOTTIDHistory		
Member	Type	Usage
OnFirstPage	Bit	FB Driven prevents HMI from decreasing Current Page Number going below 1
OnLastPage	Bit	FB Driven prevents HMI from modifying current page above Total Pages
CurrentPage	Word[Signed]	HMI Controlled, limited by FB
TotalPages	Word[Signed]	Calculated in FB as 300/ Number on Screen
HMITID	Word[Unsigned](1..20,0..3)	HMI Displayed TID's FB populated by current page
HMITIDTimeStamp	Word[Unsigned](1..20,0..2)	HMI Displayed Time Stamps FB populated by current page

System Label: GOTTIDHistory		
Member	Type	Usage
HMITIDStation	Word[Unsigned](1..20,0..4)	HMI displayed Stations FB populated by current page

2. MELPT_QTM_TIDPacket

Global Label: TIDRemoteData		
Member	Type	Usage
UserName	Word[Unsigned](0..3)	Populated by remote station TID entered
Password	Word[Unsigned](0..1)	Populated by remote station password entered
StationNumber	Word[Unsigned](0..4)	Populated by remote station: Station name
Status	Word[Signed]	TID Status Meaning

Value:	Set By:	Meaning:
0	Master	Master Logout Signal: End of Shift
0	Local	Local Logout PB Pressed
2	Local	TID Has been Entered, Master needs to search for match
4	Master	A TID Match has been found
8	Local	A Password has been sent to master
16	Master	The Password does not match
32	Master	The Password has matched

Index	Word[Signed]	Set by the Master of which record the tid matched from the data base.

3. MELPT_TID_Historical

Local Label: TIDhistorical		
Member	Type	Usage
TechID	Word[Unsigned](0..3)	Stored With successful authentication, the newest record is stored in element 1. TID
StationID	Word[Unsigned](0..4)	Stored With successful authentication, the newest record is stored in element 1. Station Name
LoginDateTime	Word[Unsigned](0..2)	Stored With successful authentication, the newest record is stored in element 1. PLC Date and Time at authentication

13.3.3. HMI TID Management

This screen allows for the editing of TID's and passwords. IT is accessibly from the PLC maintain the TID Database locally.

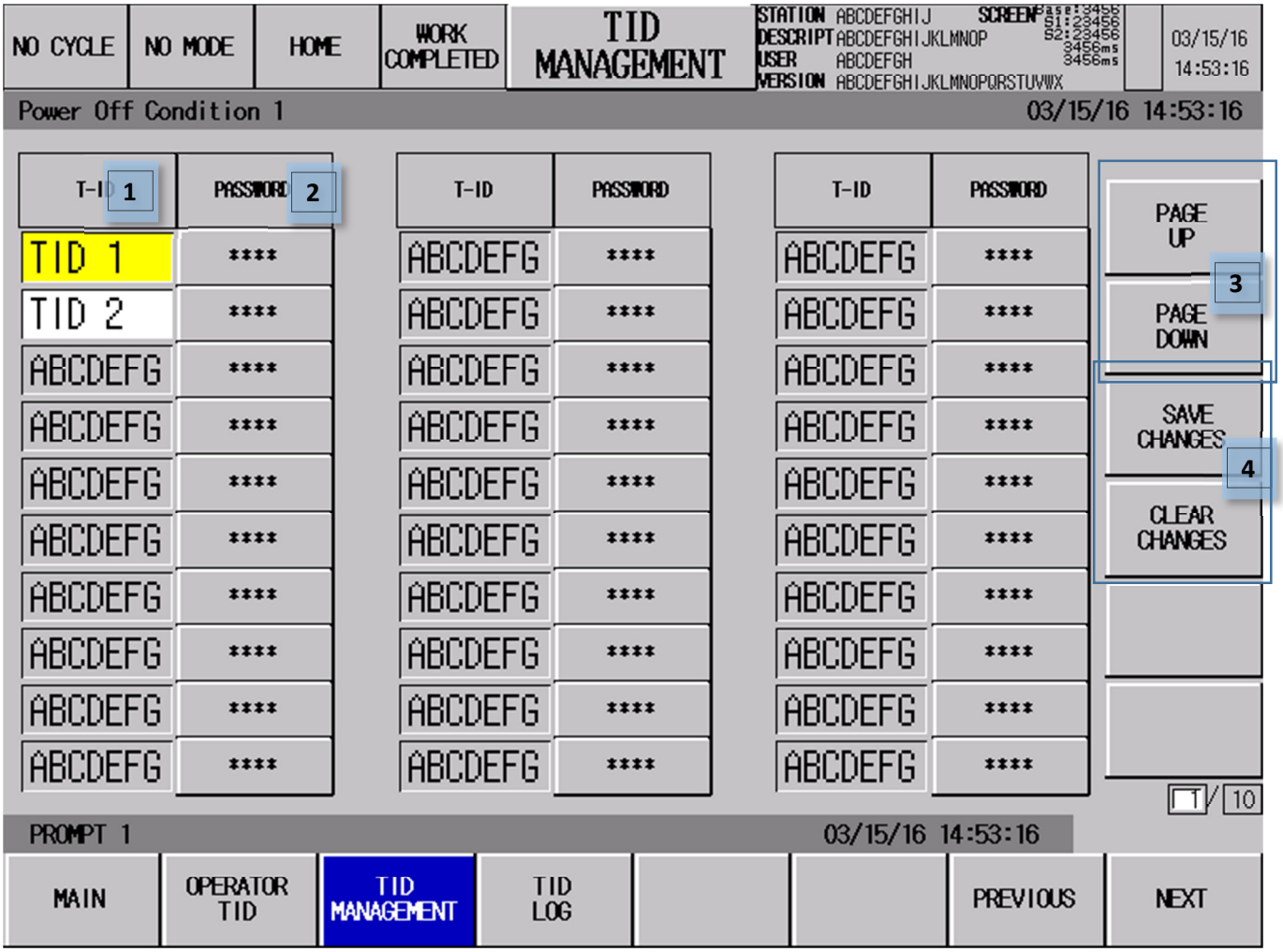


Figure 125-TID Management Screen

Item #	Description	Object X=Row Number	Details X=Station Number
1	T-ID	ASCII Input: GOTTIDManagement.TIDList[X,0]	Trigger: GB65101==ON Input Fixation Script: set([<t:GOTTIDManagement.WriteCheck[X]>]);
		Word Lamp: GOTTIDManagement.WriteCheck[X]==ON	Backgorund in Yellow

Item #	Description	Object X=Row Number	Details X=Station Number
		Word Lamp: GB65101 ==ON	BackGround is White
2	****	Word Set PB GOTTIDManagement.EditingIndex	This value is set to X When the value is non-zero a Screen Status Observation attached to base 750, launches the password change window into overlap 5
3	Page Up	GOTTIDManagement.CurrentPage	Subtracts 1 when GOTTIDManagement.OnFirstPage is OFF
	Page Down	GOTTIDManagement.CurrentPage	Adds 1 when GOTTIDManagement.OnLastPage is OFF
4	Save Changes	Momentary Push Button: GOTTIDManagement.SaveChanges_PB	Will Write HMI Editied Objects to the PLC storage Allowed When GB65101 is TRUE
	Clear Changes	Momentary Push Button: GOTTIDManagement.ClearChanges_PB	Will Clear HMI Edits, and reload the screen Allowed When GB65101 is TRUE

13.3.4. TID Change Password Window

Base Screen 750 has a status observation running this programming watches for the HMI editing index to be non zero, when it is the Password Change window is placed as an overlap window.

This window Allows you to change the password for the selected TID.

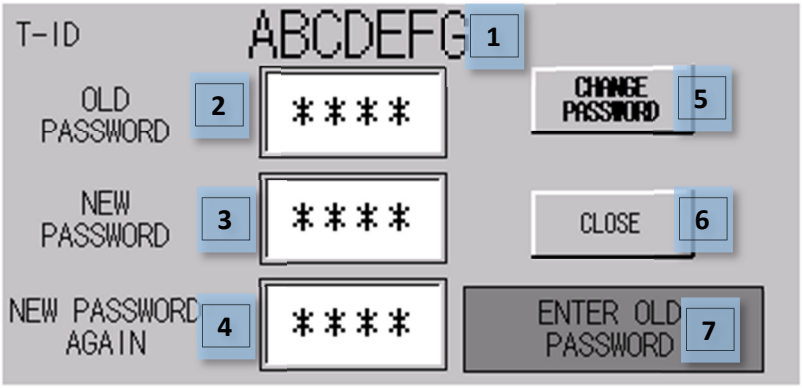


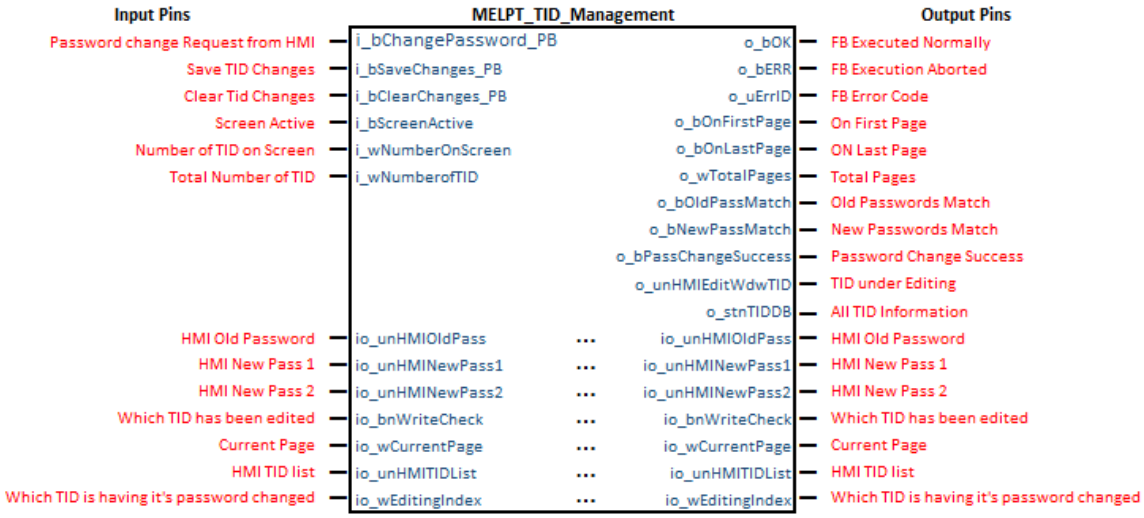
Figure 126-TID Password Change Window

Item #	Description	Object X=Row Number	Details X=Station Number
1	TID	ASCII Display: GOTTIDManagement.SelectedTID[0]	
2	OLD Password	ASCII Input: GOTTIDManagement.OldPass[0]	Trigger: GOTTIDManagement.OldPasswordsMatch==OFF
3	New Password	ASCII Input: GOTTIDManagement.NewPass1[0]	Trigger: GOTTIDManagement.OldPasswordsMatch==ON
4	New Password Again	ASCII Input: GOTTIDManagement.NewPass2[0]	Trigger: GOTTIDManagement.OldPasswordsMatch==ON
5	Change Password	Bit Momentary GOTTIDManagement.PasswordChange_PB	Trigger: GOTTIDManagement.NewPasswordsMatch==ON

Item #	Description	Object X=Row Number	Details X=Station Number	
6	Close Window	Word Set: GOTTIDManagement.EditingIndex	Sets the index to zero, the status observation will close the window	
7	Status Indicator	Word Lamp	Value	Display
		Normal	Normal	Enter Old Password
		GOTTIDManagement.PasswordChangeAccepted_LT	ON	OK
		GOTTIDManagement.NewPasswordsMatch	ON	Press Change Password
		GOTTIDManagement.OldPasswordsMatch	ON	Enter New Password

13.3.5. PLC-MELPT_TID_Management

FUN Name
MELPT_TID_Management

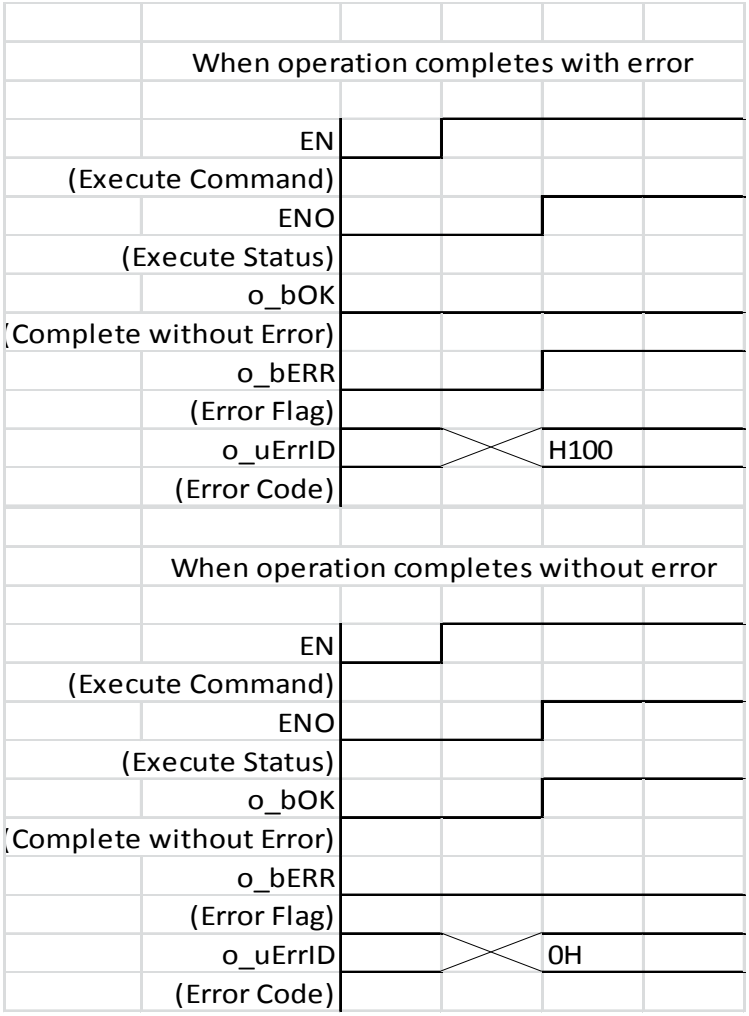
Function Overview	
Item	Description
Function overview	This function block allows HMI editing of the TID Database
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Number of Ladder Steps	QnU: 482 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	48 bits 1 Timer 1929 words
Execution type	Real TimeExecution
Dependences	This function block requires the MELPT_QTM_TechIDDB SDT
Function description	
Restrictions and precautions	This function block uses Z16-Z19

Timing chart



FB Error Code

Error Code	Description
0	No Error.
H101(257)	NumberOnScreen Less than or equal to 0
H102(258)	NumberOnScreen greater than 30
H103(259)	NumberOfTID less than 1

Error Code	Description
H104(260)	NumberOfTID greater than 300

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Password change Request from HMI	i_bChangePassword_PB	Bit		Change Password HMI PB
	Save TID Changes	i_bSaveChanges_PB	Bit		HMI PB Save TID Changes
	Clear Tid Changes	i_bClearChanges_PB	Bit		HMI PB Clear TID Changes
	Screen Active	i_bScreenActive	Bit		HMI Control When on Password Change Screen
	Number of TID on Screen	i_wNumberOnScreen	Word[Signed]	1 to 30	Number of Records on screen
	Total Number of TID	i_wNumberofTID	Word[Signed]	1 to 300	Number of TID to search through

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	HMI Old Password	io_unHMIOldPass	Word[Unsigned](0..1)		Password for edit window
	HMI New Pass 1	io_unHMINewPass1	Word[Unsigned](0..1)		New Password 1 Edit window

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	HMI New Pass 2	io_unHMINewPass2	Word[Unsigned](0..1)		New Password 2 Edit window
	Which TID has been edited	io_bnWriteCheck	Bit(1..30)		Indicator for which HMI EInput has been edited
	Current Page	io_wCurrentPage	Word[Signed]		Current Index of viewable
	HMI TID list	io_unHMITIDList	Word[Unsigned](1..30,0..3)		TID viewable on screen
	Which TID is having it's password changed	io_wEditingIndex	Word[Signed]		TID Under Edit

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed Normally	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execution Aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Signed]	FB Error Code Output
On First Page	o_bOnFirstPage	Bit	HMi Cursor Control
ON Last Page	o_bOnLastPage	Bit	HMi Cursor Control
Total Pages	o_wTotalPages	Word[Signed]	Total Pages
Old Passwords Match	o_bOldPassMatch	Bit	Indicator that old password matched DB

Symbol Name	Var_Output name	Data Type	Description
New Passwords Match	o_bNewPassMatch	Bit	Indicator NEw passwords Match
Password Change Success	o_bPassChangeSuccess	Bit	Password Change Complete signal
TID under Editing	o_unHMIEditWdwTID	Word[Unsigned](0..3)	TID for edit window
All TID Information	o_stnTIDDB	MELPT_QTM_TechIDDB(1..300)	ALl THE TID DATA

FB Version Upgrade History

Version	Description
1.10	Re-write Master/Slave
1.11	Page Index Corrected
1.20	FB Status Outputs added
2.00	Adopted BCN-89000-0969; Changes to ScreenActive
2.10	Rewrite for new spec
3.00	Display 30 on HMI
3.01	Comments updated

13.4 Repair

13.4.1. HMI-Repair Overview

The repair overview screen gives the operator an overview of status and what operations need to be repaired.

It is a gate way screen to completing the individual repairs by operation. There is no function blocks provided in the melpt project for repair overview or individual repair. This logic is to be provided by OEM on a per application basis.

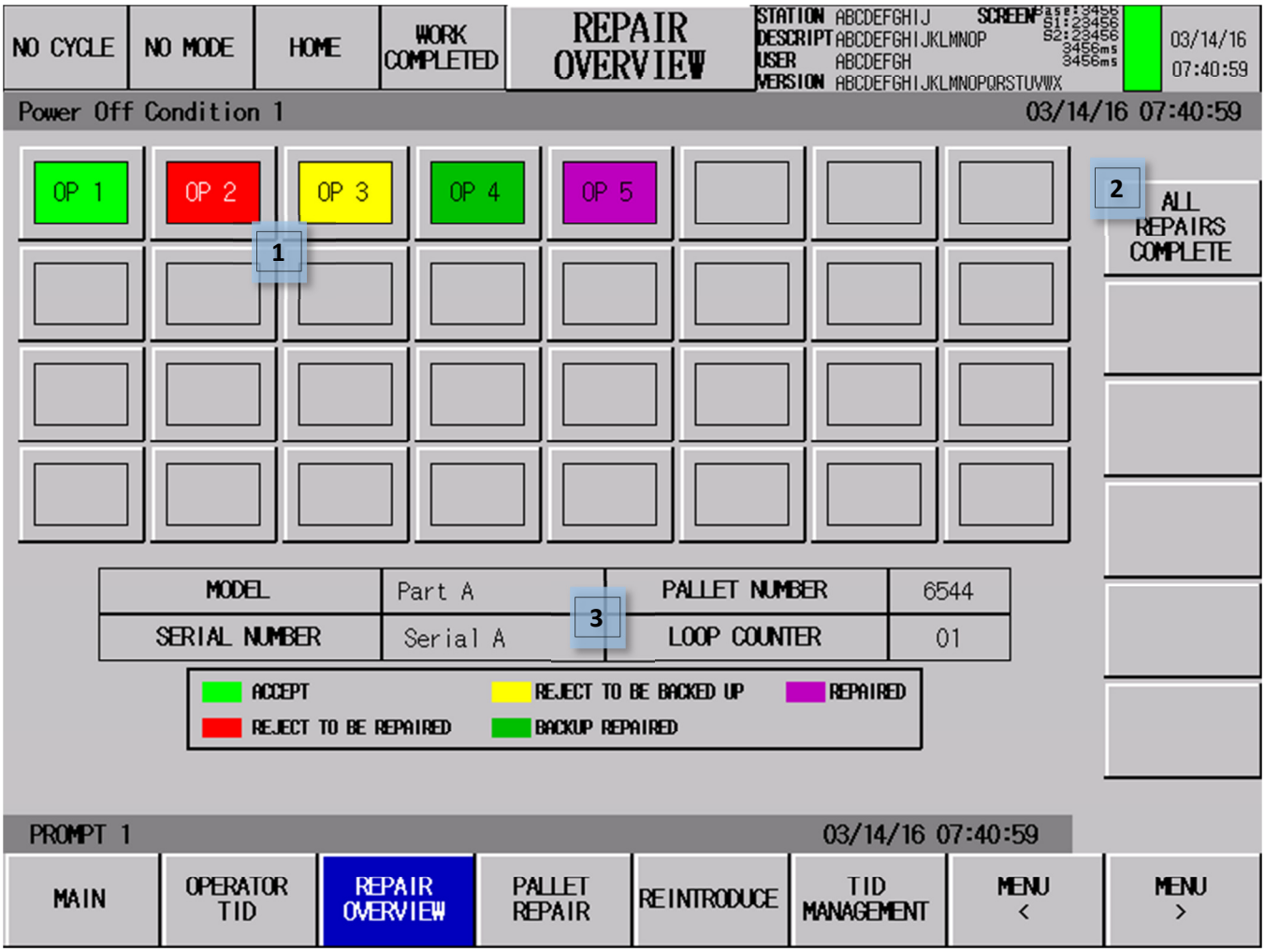


Figure 127-Repair Overview Screen

Item #	Description	Object X=Operation Number	Details

Item #	Description	Object X=Operation Number	Details
1	Repair Status Indicator	Repair.OverviewStationStatus[X]	<table><tr><td>Value</td><td>Graphic</td></tr><tr><td>Normal</td><td>OP X</td></tr><tr><td>Reapir.StationActive[X]==OFF</td><td></td></tr><tr><td>1=Accept</td><td>OP X</td></tr><tr><td>2=Reject</td><td>OP X</td></tr><tr><td>4=Reject to be backed up</td><td>OP X</td></tr><tr><td>8=backup repaired</td><td>OP X</td></tr><tr><td>16=repaired</td><td>OP X</td></tr></table>
	Repair Status Button	Repair.StationSelected +X	Screen Switching to Individual Repair.
2	All Repairs Completed Push Button	Repair.AllRepairsCompleted_PB	No Logic is tied to this button. Should release pallet
3	Current Pallet Information	Model	ASCII Display: Repair.PartType[0]
		Serial Number	ASCII Display: Repair.SerialNumber[0]
		Pallet Number	Numeric Display: Repair.PalletNumber
		Loop Counter	Numeric Display: Repair.LoopCounter

13.4.2. HMI-Individual Repair

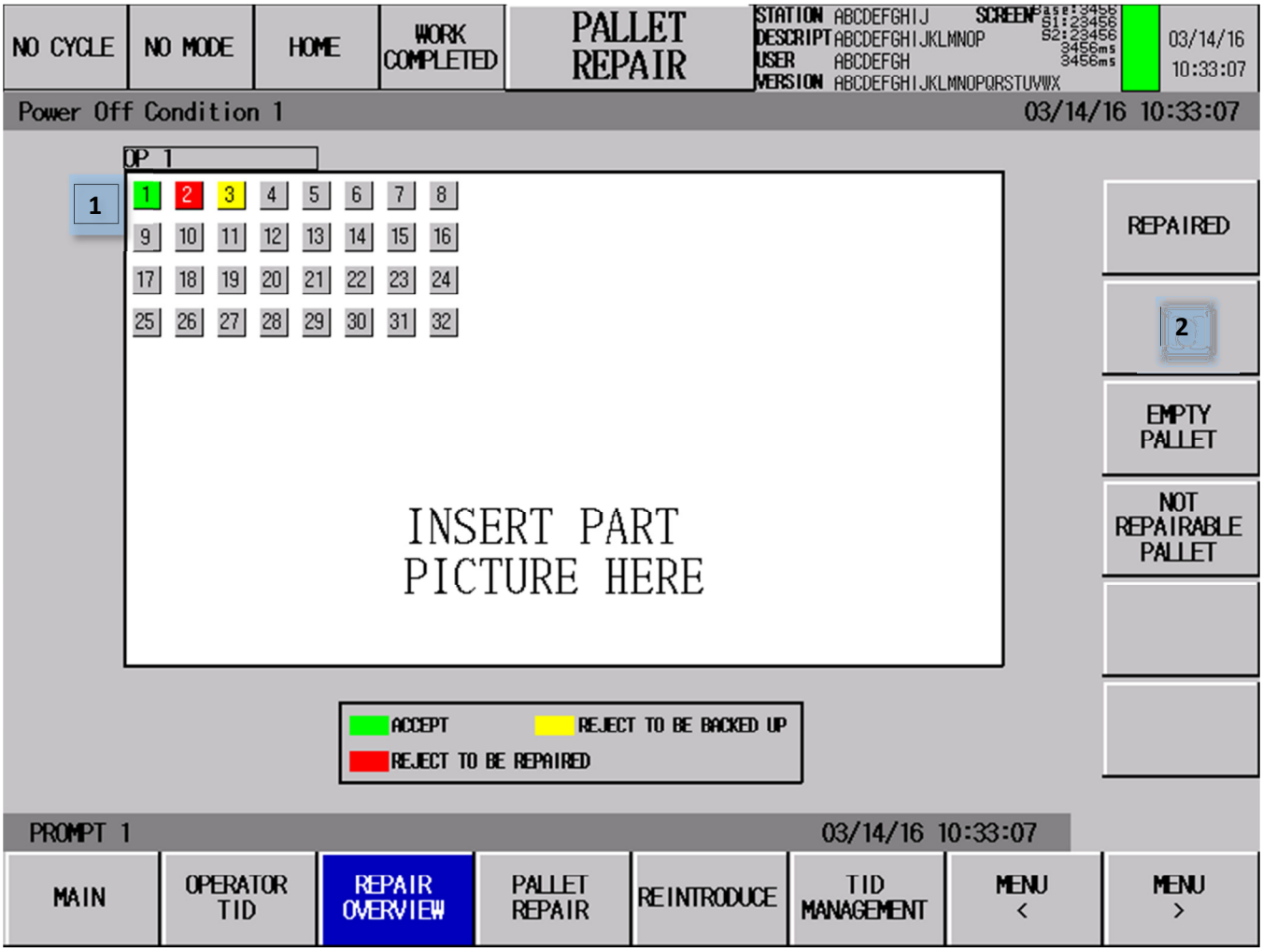


Figure 128-Individual Repair Screen

This screen shows the status of up to 32 operations for one station.

Item #	Description	Object X=Operation Number	Details

Item #	Description	Object X=Operation Number	Details
1	Individual Repair Status Indicator	Repair.IndividualStatus[X,1-32]	<table><tr><td>Value</td><td>Indicator</td></tr><tr><td>Normal</td><td>Normal</td></tr><tr><td>2=Accept</td><td>X</td></tr><tr><td>4=Reject to be Repaired</td><td>X</td></tr><tr><td>8=Reject to be backed up</td><td>X</td></tr></table>
2	Push Buttons		
	Repaired	Repair.Repaired_PB[X]	No Logic is tied to this button.
	Empty Pallet	Repair.EmptyPallet_PB[X]	No Logic is tied to this button.
	Not Repairable Pallet	Repair.NotRepairable_PB[X]	No Logic is tied to this button.

Window Number	Description
710	Individual Repair Navigation 1-4
711	Individual Repair Navigation 5-8
712	Individual Repair Navigation 9-12
713	Individual Repair Navigation 13-16
714	Individual Repair Navigation 17-20
715	Individual Repair Navigation 21-24
716	Individual Repair Navigation 25-28
717	Individual Repair Navigation 29-32

Window Number	Description

7111	Individual Repair OP #1
7112	Individual Repair OP #2
7113	Individual Repair OP #3
7114	Individual Repair OP #4
7115	Individual Repair OP #5
7116	Individual Repair OP #6
7117	Individual Repair OP #7
7118	Individual Repair OP #8
7119-7132	Reserved for Individual Repair OP #9-#32

13.4.3. HMI-Pallet Repair

The Pallet Repair Screen and MELPT_SYS_PalletRoute function block can be used to route a pallet.

Up to ten pallet numbers can be added to a list when the pallet enters a station the RFID tag will be read, the information on the tag includes the pallet number. This pallet number will be compared to the ten in the list. If a match is found the function block will output a match bit. If a match is not found a Notfound bit is output. An integrator can use this information to determine the path the pallet is to travel.

The HMI Screen allows addition of a Pallet Number to the list. IF the list is full an addition cannot be made.

When a match is found the index is highlighted in blue

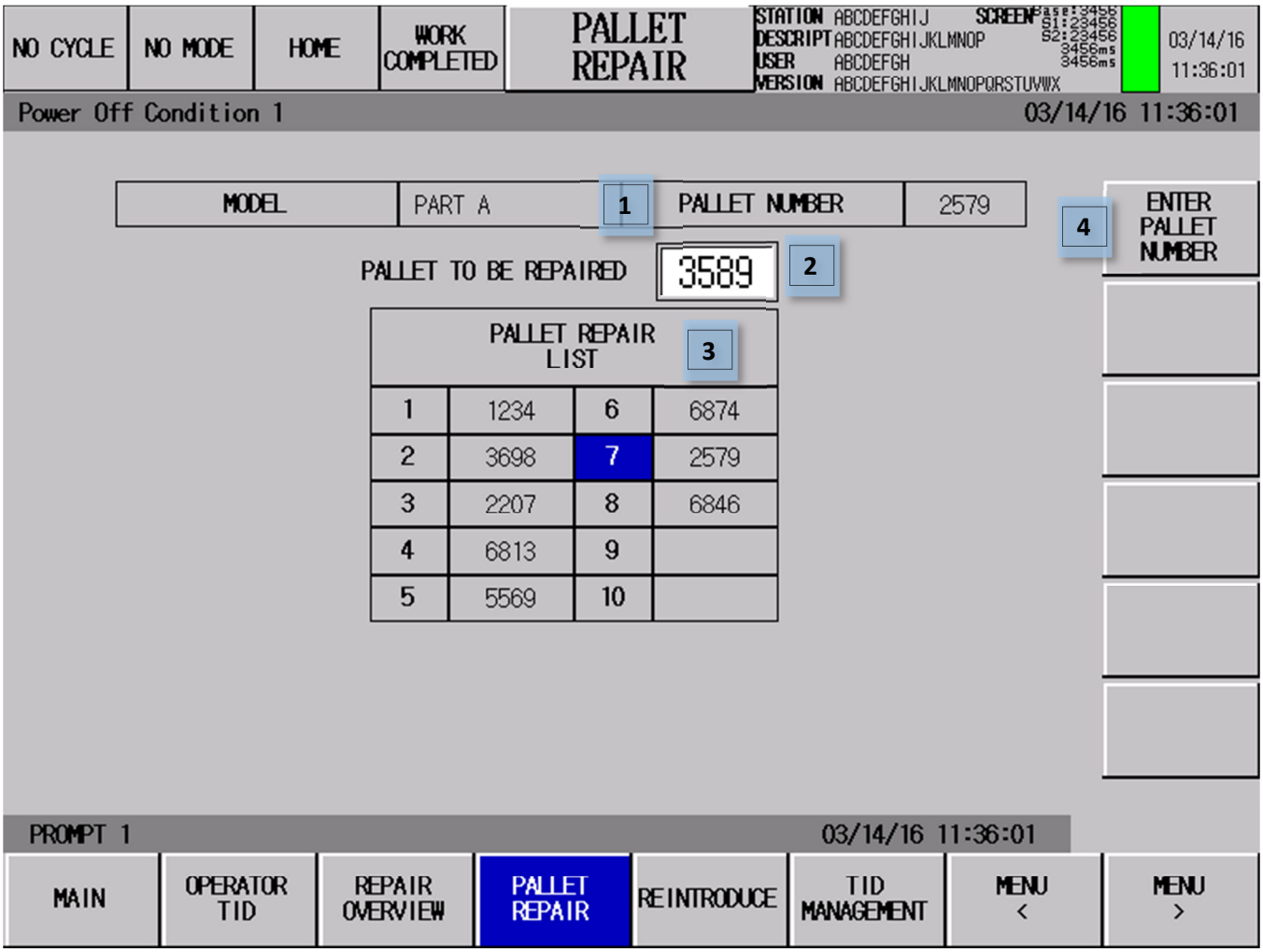
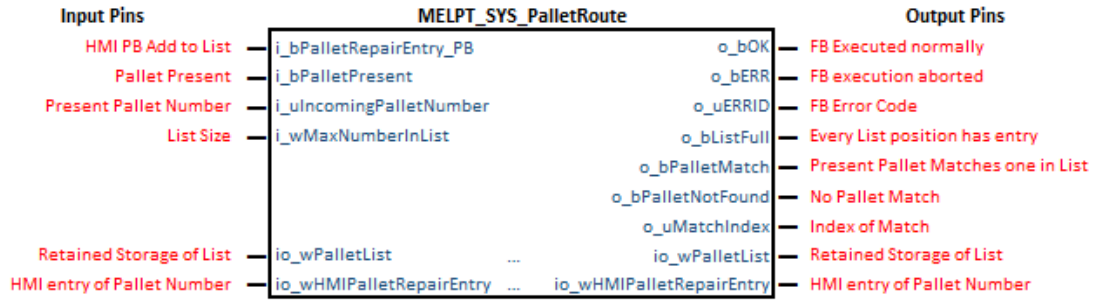


Figure 129-Pallet Repair

Item #	Description	Object X=Operation Number	Details
1	Model and Pallet Number	Ascii Display: Repair.PartType[0] Numeric Display: Repair.PalletNumber	Display of In station information
2	Pallet Number Input	Numeric Input: PalletRepair.HMIPalletToBeAdded	Trigger Action does not allow Input when GB65101 if FALSE or PalletRepair.FullList_Ind is TRUE
3	Pallet List	Index: Word Lamp: PalletRepair.MatchIndex	If the MatchIndex== the display number the background turns blue this signified the current pallet matched this index's pallet number
		Pallet List: Numeric Display PalletRepair.HMIRepairList[1]	IF no Input the display is gray text on gray background
4	Enter Pallet Number PB	PalletRepair.AddtoList_PB	Will add the value in Pallet to Added to the list.

13.4.4. PLC-MELPT_SYS_PalletRoute

FUN Name
MELPT_SYS_PalletRoute

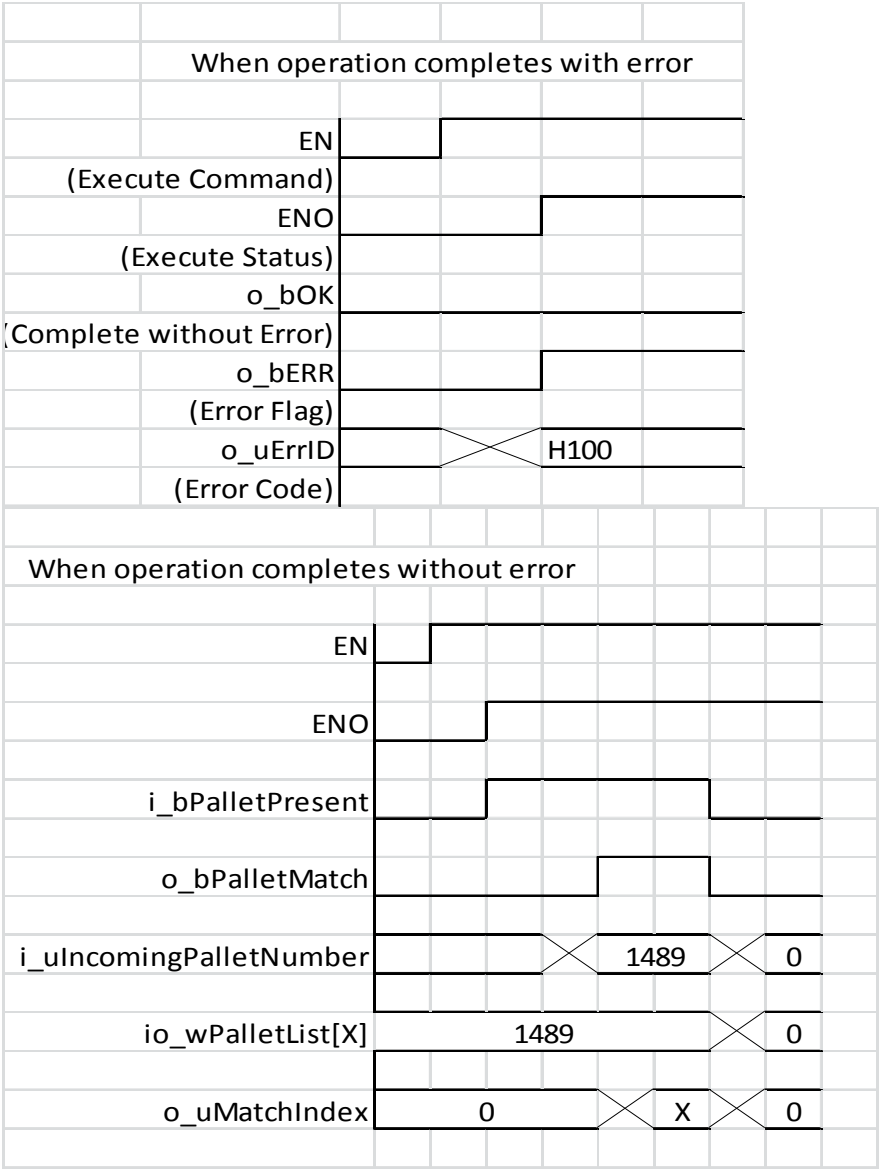
Function Overview	
Item	Description
Function overview	This function block handles maintenance of a pallet list, and the matching and removal of pallet numbers from the list.
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 268 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Device Memory Used	9 bits 17 words
Execution type	Real Time Execution
Dependences	
Function description	This function block when pallet is present will search the list of pallets and match the incoming pallet number to one in the list. If a match is found o_bPalletMatch is True. If a match is not found o_bPalletNotFound is TRUE. When a match is found, when the pallet leaves the station (pallet present transition to FALSE) the Input is removed from the list. Maintenance of the list is done by the FB every scan where if the list has a pallet number that is zero it is moved to the end of the list and nonzero entries are collected at the beginning of the list. If the list has 10 entries a separate signal is output, this signal is used by the HMI to limit additional entries from adding to the list.
Restrictions and precautions	This function block uses Z16

Timing chart



FB Error Code

Error Code	Description
0	No Error.
H100(256)	Number in List less than 1

Error Code	Description
H101(257)	Number in List greater than 10

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	HMI PB Add to List	i_bPalletRepairInput_PB	Bit		HMI PB to enter new value in List
X	Pallet Present	i_bPalletPresent	Bit		Pallet PResent
X	Present Pallet Number	i_uIncomingPalletNumber	Word[Unsigned]	0 to 9999	Current Pallet Number
X	List Size	i_wMaxNumberInList	Word[Signed]	1 to 10	Number of Entries in Pallet list

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Retained Storage of List	io_wPalletList	Word[Signed](1..10)		List of Retained Pallet Numbers
	HMI Input of Pallet Number	io_wHMIPalletRepairInput	Word[Signed]		Pallet Number to be added to list

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed normally	o_bOK	Bit	FB Execute Normally
FB execution aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred

Symbol Name	Var_Output name	Data Type	Description
FB Error Code	o_uERRID	Word[Unsigned]	FB Error Code Output
Every List position has Input	o_bListFull	Bit	No. of Pallets in Repair Loop
Present Pallet Matches one in List	o_bPalletMatch	Bit	Current Pallet Matched one in List
No Pallet Match	o_bPalletNotFound	Bit	Current Pallet did not match one in list
Index of Match	o_uMatchIndex	Word[Signed]	If MAtched Index =1 to 10

FB Version Upgrade History

Version	Description
1.00	Initial Release
1.12	Label Change
1.20	Added Status Outputs
2.00	Adopted BCN -89000-0969; Added LoopCounter; Increased to 32 positions; list retained by function block; removed SecurityOK
2.10	Added NumberofRepair Station input
3.00	seperated Pallet Repair FB from status logic
3.01	Name Changed to MELPT_SYS_PalletRoute

13.4.5. HMI-Pallet Reintroduce

The Pallet Reintroduce Screen allows an operator to add part number data to a tag

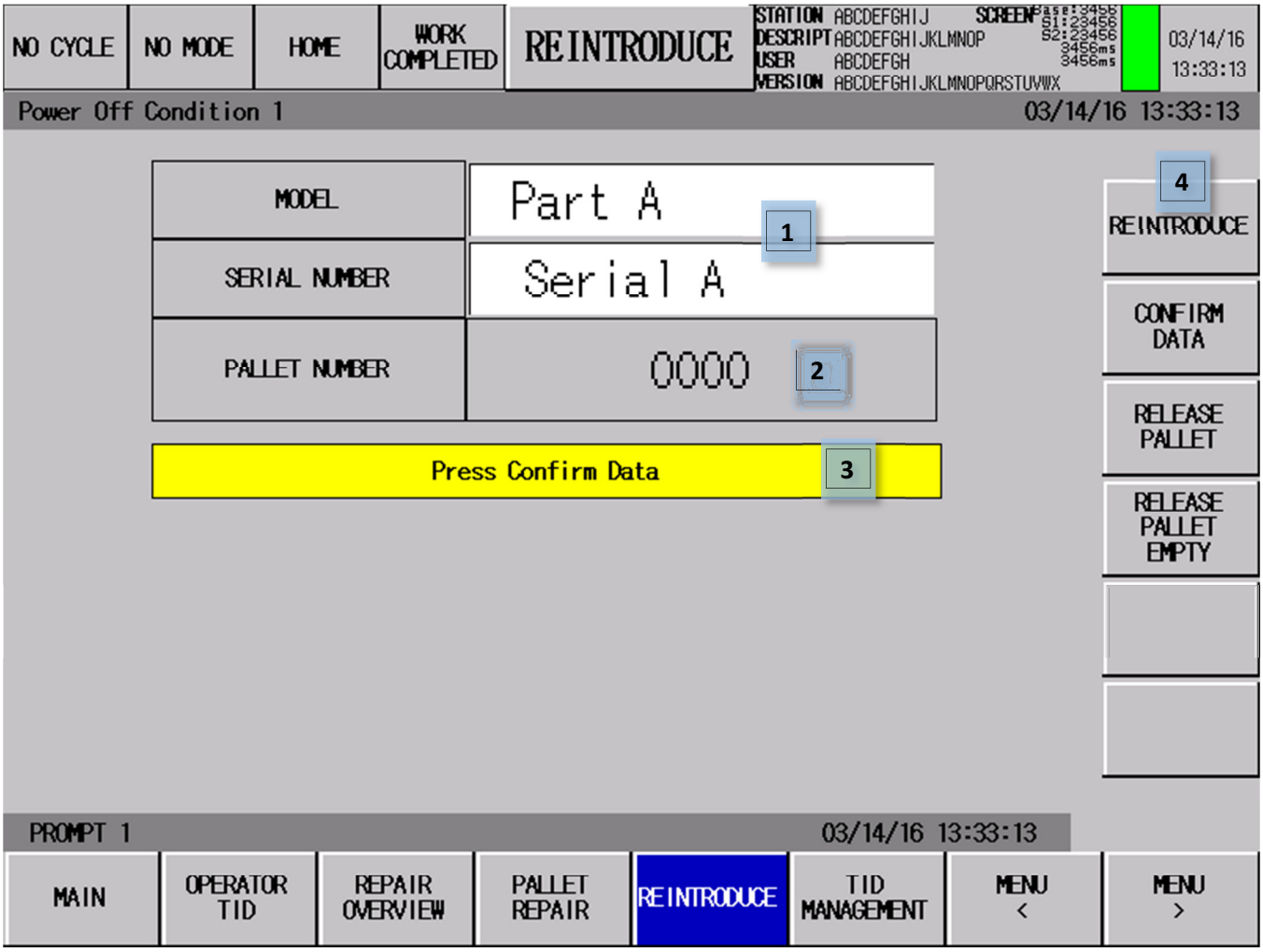


Figure 130-Pallet Reintroduce Screen

Process:

1. Press Reintroduce will Pallet in Station
    a. Pallet Number is retrieved
2. Using Barcode Scanner or HMI Input the Model and Serial Number
3. Press the Confirm Data button
    a. Station Logic will request Model Information from the Model Management station the data telegram will be transported to the requesting station. The local RF Controller will write all the data to the tag.

4. After Write Complete the pallet can be released

Item #	Description	Object	Details
1	Model	ASCII Input: Reintroduce.PartNumber[0]	Can come from barcode reader or HMI input, only allowed at certain point of sequence
	Serial Number	ASCII Input: Reintroduce.SerialNumber[0]	Can come from barcode reader or HMI input, only allowed at certain point of sequence
2	Pallet Number	Numeric Display:	Read from Current Pallet when Reintroduce Push Button is Pressed
3	Status Indicator	Word Lamp: Reintroduce.OkToRelInd	

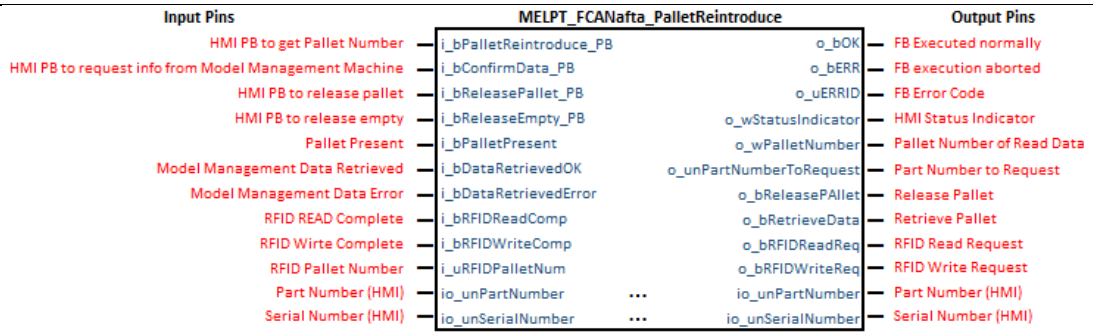
Value	Indicator
Normal	
1	Pallet Present
2	Pallet Number Request
4	Part Number Not Found
8	Add Serial and Part Number
16	Press Confirm Data
32	Data Check In Progress
64	Writing to RFID
128	Ready for Release

4	Push Buttons		
	Reintroduce	Bit Momentary: Reintroduce.Reintroduce_PB	Requests local RFID Controller to read pallet number

Item #	Description	Object	Details
	Confirm Data	Bit Momentary: Reintroduce.ConfirmData_PB	Sends request to Model Management Station for Model Information
	Release Pallet	Bit Momentary: Reintroduce.ReleasePallet_PB	Allows Pallet to leave Station
	Release Pallet Empty	Bit Momentary: Reintroduce.ReleasePalletEmpty_PB	Allows Empty Pallet to Leave

13.4.6. PLC-MELPT_FCANafta_PalletReintroduce

FB Name
MELPT_FCANafta_PalletReintroduce

Function Overview	
Item	Description
Function overview	This function block handle the HMI interface of the Pallet Reintroduce Screen and the sequence required.
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

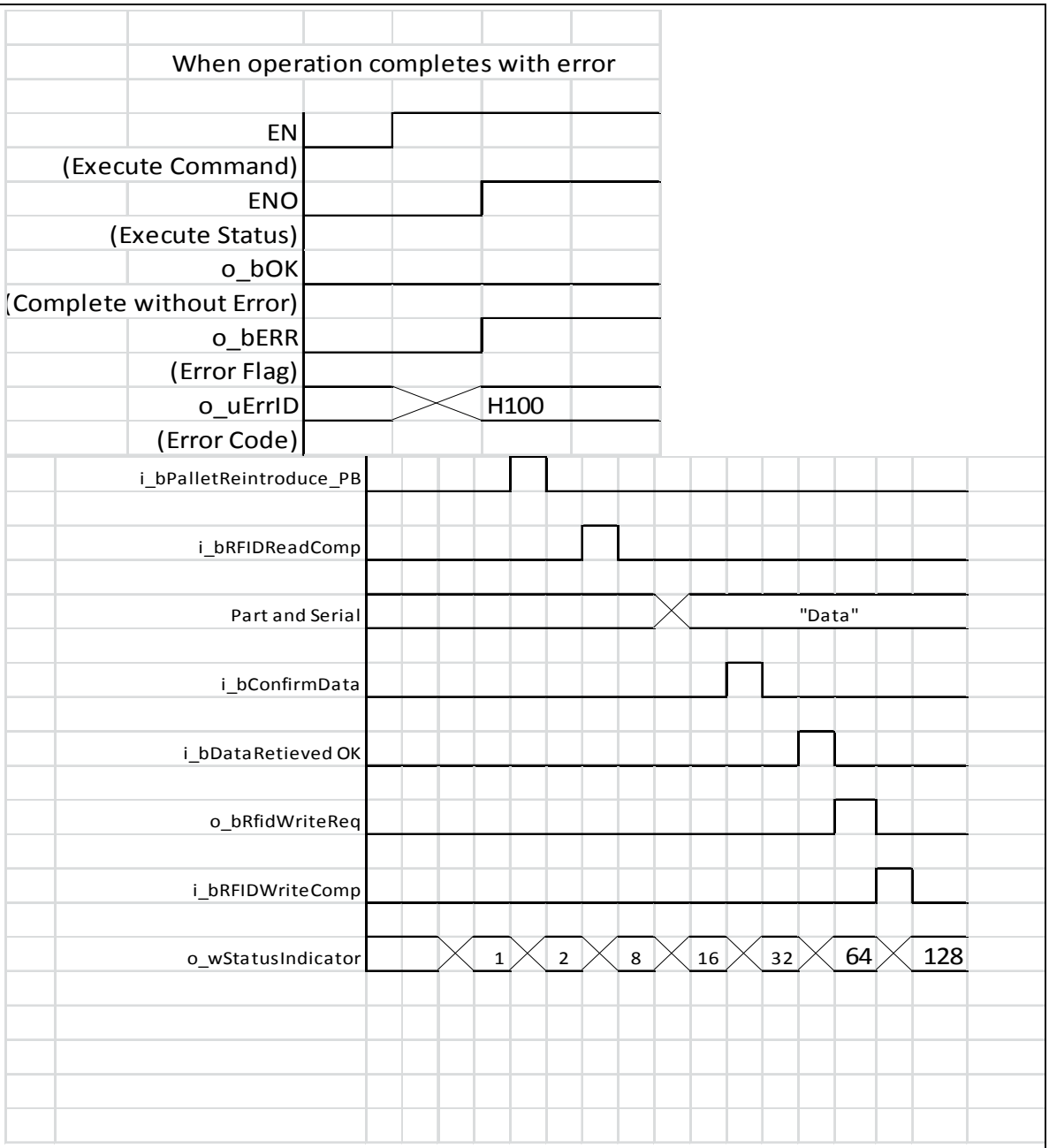
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 156 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	17 bits 59 words
Execution type	Real Time Execution
Dependences	
Function description	This function block handles HMI input and sequencing for the Pallet Reintroduce sequence
Restrictions and precautions	

Timing chart



Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	HMI PB to get Pallet Number	i_bPalletReintroduce_PB	Bit		Reintroduce PB on the Pallet Reintroduce screen
	HMI PB to request info from Model Management Machine	i_bConfirmData_PB	Bit		Confirm Data PB on the Pallet Reintroduce screen
	HMI PB to release pallet	i_bReleasePallet_PB	Bit		Release Pallet PB on the Pallet Reintroduce screen
	HMI PB to release empty	i_bReleaseEmpty_PB	Bit		Release Pallet Empty PB on the Pallet Reintroduce screen
X	Pallet Present	i_bPalletPresent	Bit		Pallet Present
X	Model Management Data Retrieved	i_bDataRetrievedOK	Bit		Data Retieve OK
X	Model Management Data Error	i_bDataRetrievedError	Bit		Date Retrieve Error
X	RFID READ Complete	i_bRFIDReadComp	Bit		RFId Read Comp-lete
X	RFID Wirte Complete	i_bRFIDWriteComp	Bit		RFID Write COmplete

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	RFID Pallet Number	i_uRFIDPalletNum	Word[Unsigned]	0 to 9999	Pallet No. read from the RFID tag

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
X	Part Number (HMI)	io_unPartNumber	Word[Unsigned](0..7)		Part Type display on the Pallet Reintroduce screen
X	Serial Number (HMI)	io_unSerialNumber	Word[Unsigned](0..6)		Serial No. display on the Pallet Reintroduce screen

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed normally	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB execution aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uERRID	Word[Signed]	FB Error Code Output
HMI Status Indicator	o_wStatusIndicator	Word[Signed]	Ok to Release Pallet Ind. on the Pallet Reintroduce screen
Pallet Number of Read Data	o_wPalletNumber	Word[Unsigned]	Pallet No. displayed on the Pallet Reintroduce screen
Part Number to Request	o_unPartNumberToRequest	Word[Unsigned](0..7)	Part Number to Request
Release Pallet	o_bReleasePAllet	Bit	Release Pallet
Retrieve Pallet	o_bRetrieveData	Bit	Retieve Data

Symbol Name	Var_Output name	Data Type	Description
RFID Read Request	o_bRFIDReadReq	Bit	RFID read request
RFID Write Request	o_bRFIDWriteReq	Bit	RFID write request

FB Version Upgrade History

Version	Description
1.00	Initial Release
1.12	Label Change
1.20	Added Status Outputs
2.00	Adopted BCN -89000-0969; Added LoopCounter; Increased to 32 positions; list retained by function block; removed SecurityOK
2.10	Part Type Length Change
3.00	Re-write
3.01	FB Comments added

13.5 Quality

The Quality Section is commonly present in machining type applications.

Three types of screens exists within the MELPT Project:

Quality Check Station

Remote Quality

Integrated Quality

The quality Check Station Screen is paired with the MELPT_QTM_QualityCheckStation Function Block

The Remote Quality and Integrated Quality screens are paired with the MELPTQTM_SingleMachineQC function Block.

The idea behind the quality check is to set limits to send evaluate a check part on overall produced "Quality Check"

And on Part Type Count:

Example: Send a check part every 50 parts produced, this is considered a "Quality Check Part"

Example: Send a Check Part after a tool Change: This is a "1st part check"

Example: Send a Check Part every 50 Part Type B produced, this is a "Part Type Check Part"

13.5.1. HMI-Quality Check Station

This screen is required when the PLC is a quality check station with multiple machining centers feeding the station.

The signals generated by the function block from the selected M/C and the HMI PB needs to be transferred to the selected M/C

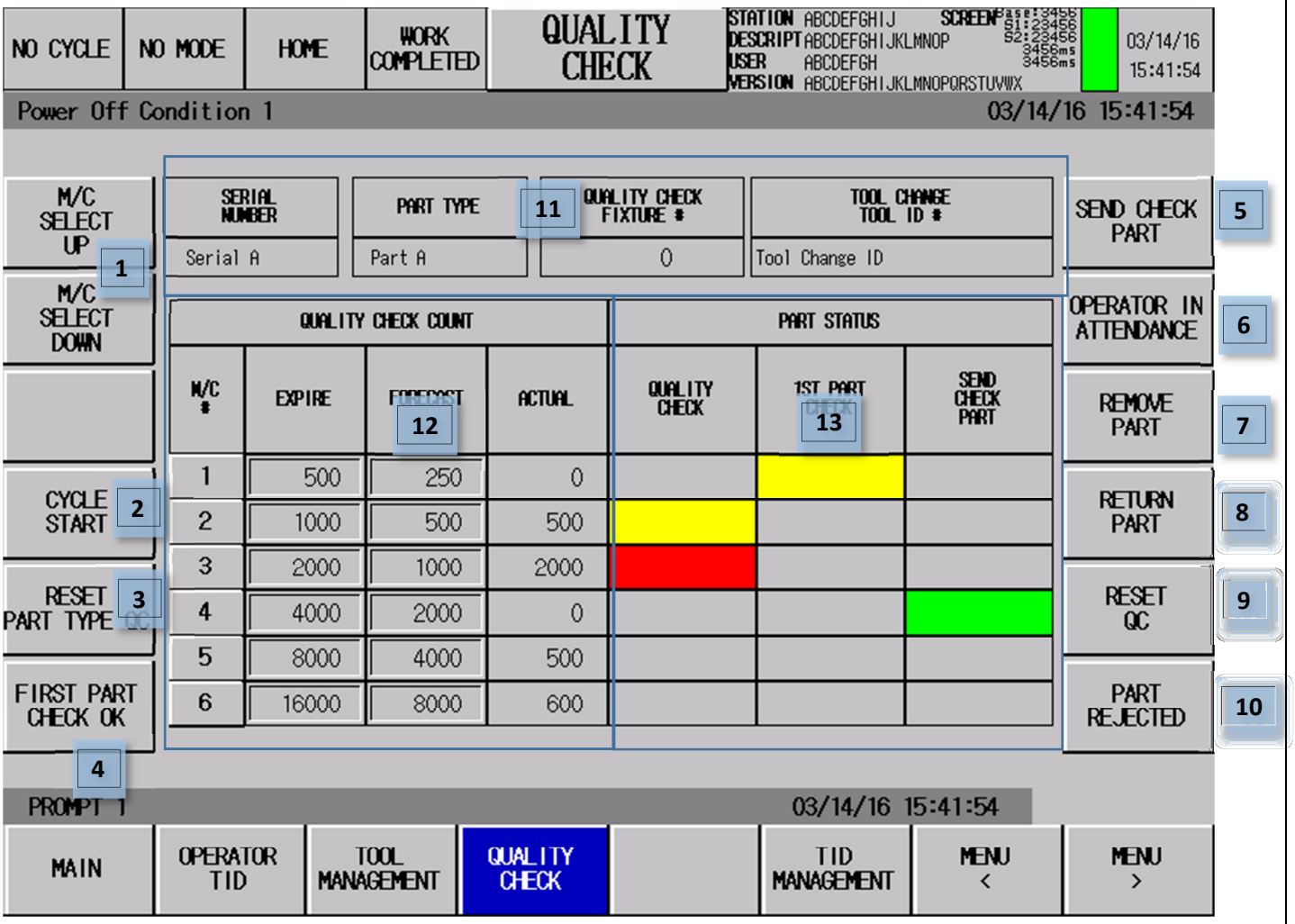


Figure 131-Quality Check Station

Item #	Description	Object X=M/C Number	Details
1	M/C Select PB	Word Switch: HMIQualityCheck.Selection	Subtracts or adds one to the selected Machining Center

Item #	Description	Object X=M/C Number	Details
2	Cycle Start	Bit Momentary Switch: HMIQualityCheck.CycleStart_PB	This will output the Cycle Start bit for the selected station
3	Reset Part Type	Bit Momentary Switch: HMIQualityCheck.ResetPartTypeQC_PB	This will output the Reset Part Type QC bit for the selected station
4	First Part Check OK	Bit Momentary Switch: HMIQualityCheck.FirstPartCheckOK_PB	This will output the First Part Check OK bit for the selected station
5	Send Check Part	Bit Momentary Switch: HMIQualityCheck.SendCheckPart_PB	This will output the Send Check Part bit for the selected station
6	Operator In Attendance	Bit Momentary Switch: HMIQualityCheck.OperatorInAttendance_PB	This will output the Operator In Attendance bit for the selected station
7	Remove Part	Bit Momentary Switch: HMIQualityCheck.RemovePart_PB	This will output the Remove Part bit for the selected station
8	Return Part	Bit Momentary Switch: HMIQualityCheck.ReturnPart_PB	This will output the Return Part bit for the selected station
9	Reset QC	Bit Momentary Switch: HMIQualityCheck.ResetQC_PB	This will output the Reset QC bit for the selected station
10	Part Rejected	Bit Momentary Switch: HMIQualityCheck.PartRejected_PB	This will output the Part Rejected bit for the selected station
11	Serial Number	ASCII Display: HMIQualityCheck.QCSerialNumber[0]	The Selected MC Information is displayed on Screen
	Part Type	ASCII Display: HMIQualityCheck.QCPartType[0]	The Selected MC Information is displayed on Screen

Item #	Description	Object X=M/C Number	Details	
	Quality Check Fixture	Numeric Display: HMIQualityCheck.QCFixtureNumber	The Selected MC Information is displayed on Screen	
	Tool Change Tool ID	ASCII Display: HMIQualityCheck.QCToolID[0]	The Selected MC Information is displayed on Screen	
12	M/C	Word Set Switch HMIQualityCheck.Selection	Highlighted in Blue when Selected = the displayed number	
	Expire	Numeric Input: HMIQualityCheck.QCExpire[X]	Only Editable when the function block allows screen Edit	
	Forecast	Numeric Input: HMIQualityCheck.QCForecast[X]	Only Editable when the function block allows screen Edit	
	Actual	HMIQualityCheck.QCActual[X]	Displays the actual QC count from each MC	
13	Quality Check	Word Lamp: HMIQualityCheck.QualityCheckStatus[X]	State	Display
			Normal	
			$V=1,2,4,8	
			$V=16,32	
	1st Part Check	Word Lamp: HMIQualityCheck.FirstPartCheckStatus[X]	State	Display
			Normal	
			$v=1	
	Send Check Part	Word Lamp: HMIQualityCheck.SendCheckPartStatus[X]	State	Display
			Normal	
			$v=1	
			$v=2	

13.5.2. PLC-MELPT_QTM_QualityCheckStation

This function block is used with the Quality Check Station HMI Screen, the transport of signals to and from the connected M/C is the responsibility of the integrator.

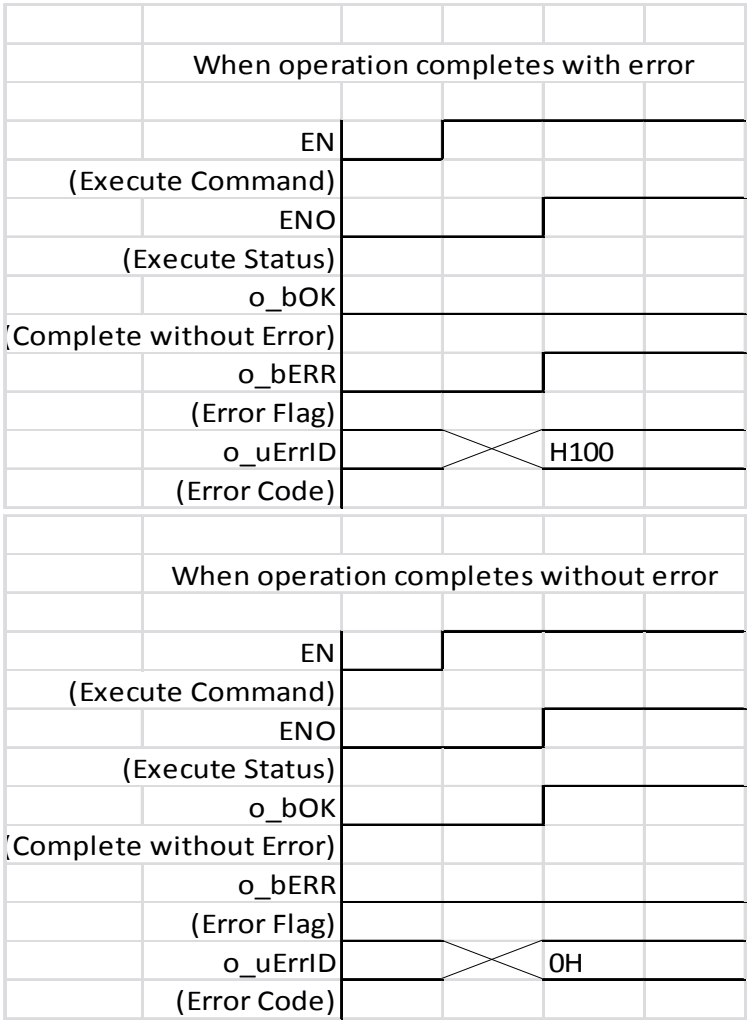
FB Name
MELPT_QTM_QualityCheckStation

Function Overview	
Item	Description
Function overview	This function block handles HMI interface to the Quality Check Station Data
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

<table>
<tr><td>Applicable Software</td><td><table><tr><th>Series</th><th>Version</th></tr><tr><td>GX Works 2</td><td>1.536</td></tr><tr><td>GT Designer 3</td><td>1.136</td></tr></table></td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 309 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>80 bits
382 words</td></tr>
<tr><td>Execution type</td><td>Real Time Execution</td></tr>
<tr><td>Dependences</td><td></td></tr>
<tr><td>Function description</td><td>This function block will place HMI signals in the selected MC element of multiple arrays. The transfer of these signals to and from the machining centers is the responsibility of the integrator.</td></tr>
<tr><td>Restrictions and precautions</td><td>This function block uses Z16</td></tr>
</table>

Timing chart



FB Error Code

Error Code	Description
0	No Error.
H100(256)	Number on Screen greater than 8

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Allow HMI Editing of forecast and actual	i_bDataEditingAllowed	Bit		HMI Allows Editing
	HMI PB Cycle Start	i_bCycleStart_PB	Bit		HMI PB Cycle Start
	HMI PB Part Rejected	i_bPartRejected_PB	Bit		HMI PB Part Rejected
	HMI PB Send Check Part	i_bSendCheckPart_PB	Bit		HMI PB Send Check PArt
	HMI PB Operator in Attendance	i_bOperatorInAttendance_PB	Bit		HMI PB Operator in Attendance
	HMI PB Reset Part Type QC	i_bResetPartTypeQC_PB	Bit		HMI PB Reset Part Type QC
	HMI PB Reset QC	i_bResetQC_PB	Bit		HMI PB Reset QC
	HMI PB First Part Check OK	i_bFirstPartCheckOK	Bit		HMI First Part Check OK
X	HMI Screen Number	i_wWindowNumber	Word[Signed]		HMI Window Number
X	Number of M/C	i_wNumberOnScreen	Word[Signed]	1 to 8	Number of M/C's
X	Array of 8 M/C Serial Numbers	i_unSerialNumber	Word[Unsigned](1..8,0..6)		Serial Numbers for 8 M/C

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Array of 8 M/C Model Numbers	i_unModelNumber	Word[Unsigned](1..8,0..7)		Model Numbers for 8 M/C
X	Array of 8 M/C Quality Check Fixtures	i_uQualityCheckFixture	Word[Unsigned](1..8)		Quality Check Fixture for 8 M/C
X	Array of 8 M/C Tool ID's	i_unToolID	Word[Unsigned](1..8,0..15)		Tool ID for 8 M/C

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Array of 8 First Part Check Status	io_unFirstPartCheckStatus	Word[Unsigned](1..8)		8 Machine Center First Part Check Status
	Array of 8 First Quality Check Status	io_unQualityCheckStatus	Word[Unsigned](1..8)		8 Machine Center Quality Check Status
	Array of 8 Send Check Part Status	io_unSendCheckPartStatus	Word[Unsigned](1..8)		8 Machine Center Send Check PArt Status
	Selected M/C	io_wSelection	Word[Signed]	1 to 8	Selected MAchine Center 1-8
	HMI Expireds	io_udHMIExpired	Double Word[Unsigned](1..8)		HMI Expired
	HMI Forecasts	io_udHMIForecast	Double Word[Unsigned](1..8)		HMI Forecast

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed Normally	o_bOK	Bit	TRUE when FB executed
FB Execution aborted	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
HMI Signal to disallow editing	o_bInhibitScreenEdits	Bit	HMI Signal to stop HMI Editing
Selected MC is currently Part Type QC Status	o_bSelectedPartTypeQC	Bit	Selected M/C is PArt Type QC Status
On First MC	o_bOnFirstSelection	Bit	HMI Cursor Control for Selected MC
On Last MC	o_bOnLastSelection	Bit	HMI Cursor Control for Selected MC
Hides unavailable MC	o_bnDisplayMasking	Bit(1..10)	MAsking M/C
The QC Type Window Number	o_wWindowNumber	Word[Signed]	HMI Window Number
Operaotr In Attendance to selected MC	o_bnOperatorInAttendance	Bit(1..8)	Selected M/C Operator in Attendance Signal
Send Check Part to Selected MC	o_bnSendCheckPart	Bit(1..8)	Selected M/C Send Check PartSignal
Cycle Start to Selected MC	o_bnCycleStart	Bit(1..8)	Selected M/C Cycle Start Signal
First Part Check to Selected MC	o_bnFirstPartCheckOK	Bit(1..8)	Selected M/C First PArt Check OK Signal
Reset Part Type to Selected MC	o_bnResetPartTypeQC	Bit(1..8)	Selected M/C Reset Part TYpe QC Signal

Symbol Name	Var_Output name	Data Type	Description
Reset QC to selcted MC	o_bnResetQC	Bit(1..8)	Selected M/C Reset QC Signal
Part Rejected to Selected MC	o_bnPartRejected	Bit(1..8)	Selected M/C PArt Rejected Signal
Serial Number for Selcted MC	o_unSerialNumber	Word[Unsigned](0..6)	HMI Display Serial Number
Model Number for Selcted MC	o_unModelNumber	Word[Unsigned](0..7)	HMI Display Model Number
Aulity Check Fixture for Selcted MC	o_uQualityCheckFixture	Word[Unsigned]	HMI Display Quality Check Fixture
Tool IF for Selected MC	o_unToolID	Word[Unsigned](0..15)	HMI Display Tool ID

FB Version Upgrade History

Version	Description
3.00	Functionality Split between 3 function blokcs
3.01	Added Screen Edit Inhibit

13.5.3. HMI-Remote Quality Check

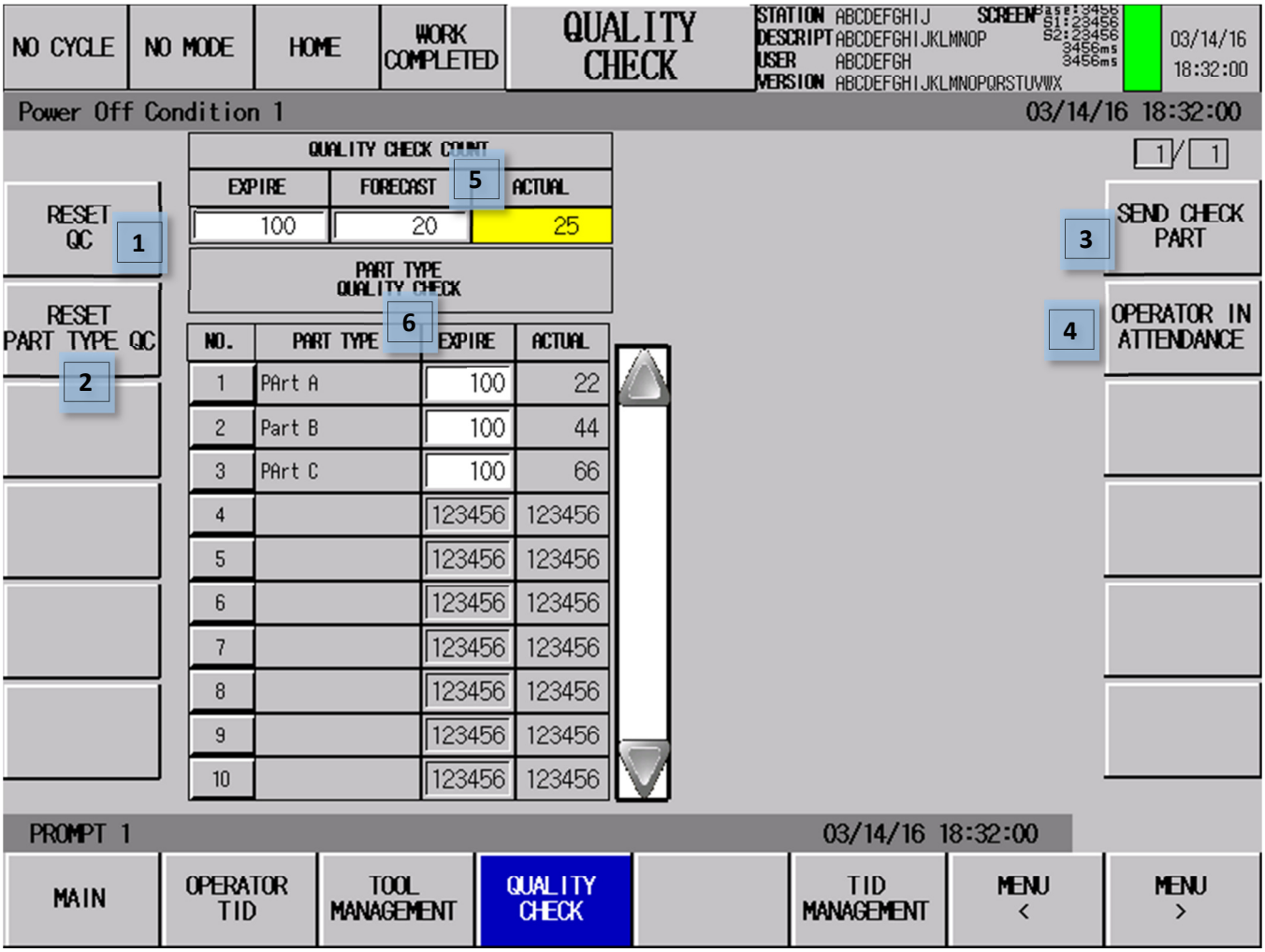


Figure 132-Remote Quality Check

Item #	Description	Object X=M/C Number	Details
1	Reset QC PB	Bit Momentary Switch: HMIQualityCheck.ResetQC_PB	Resets QC Actual
2	Reset Part Type QC PB	Bit Momentary Switch: HMIQualityCheck.ResetPartTypeQC_PB	Reset Actual for current part type
3	Send Check Part PB	Bit Momentary Switch: HMIQualityCheck.SendCheckPart_PB	Sets Check Part Status to 1

Item #	Description	Object X=M/C Number	Details
4	Operator In Attenadnce PB	Bit Momentary Switch: HMIQualityCheck.OperatorInAttendance_PB	Sets Operator in Attendance ouptut
5	Expired	Numeric Input: HMIQualityCheck.QCExpire[1]	Displays QC Expired Limit
	Forecast	Numeric Input: HMIQualityCheck.QCForecast[1]	Displays QC Forecast Limit
	Actual	Numeric Display: HMIQualityCheck.QCActual[1]	Displays Part Count Total Normal $V>Forecast $V>Expired
6	Part Type Quality Check		
	No	Numeric Display Layered with Word Switch HMIQualityCheck.CurrentPage 1 + (10 * ($$ - 1))	When Selection =$V background is Teal
	Part Type	ASCII Display HMIQualityCheck.PartTypeList[X,0]	
	Expired	Numeric Input HMIQualityCheck.HMIExpired[X]	
	ACtual	Numeric Display: HMIQualityCheck.HMIActual[X]	Turns Red When Greater than or equal to expired

13.5.4. HMI-Integrated Quality Check Station

A Station with integrated quality check station has the following screen:

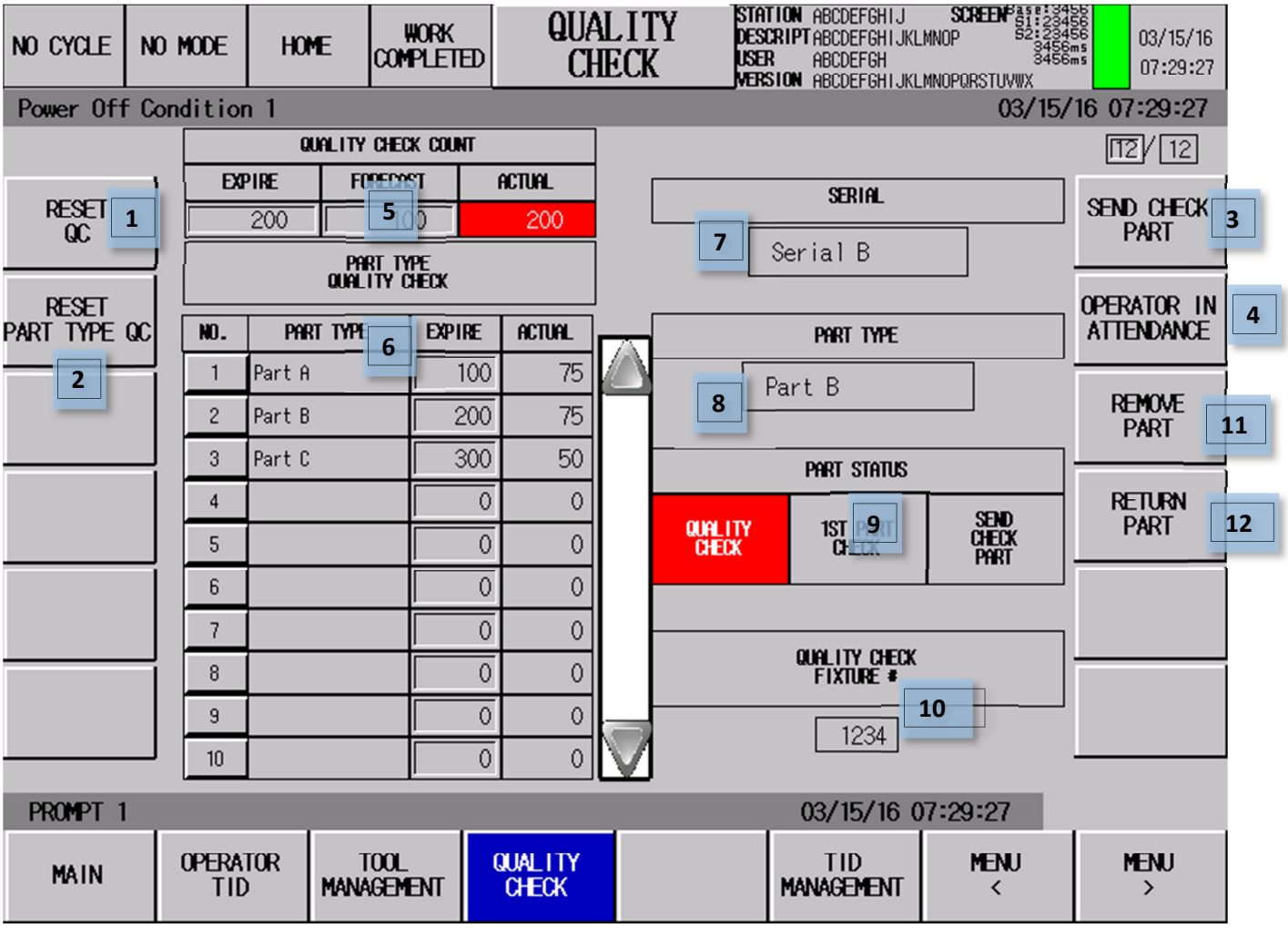


Figure 133-Integrated Quality Check

Item #	Description	Object X=M/C Number	Details
1	Reset QC PB	Bit Momentary Switch: HMIQualityCheck.ResetQC_PB	Resets QC Actual
2	Reset Part Type QC PB	Bit Momentary Switch: HMIQualityCheck.ResetPartTypeQC_PB	Reset Actual for current part type

Item #	Description	Object X=M/C Number	Details	
3	Send Check Part PB	Bit Momentary Switch: HMIQualityCheck.SendCheckPart_PB	Sets Check Part Status to 1	
4	Operator In Attenadnce PB	Bit Momentary Switch: HMIQualityCheck.OperatorInAttendance_PB	Sets Operator in Attendance ouptut	
5	Expired	Numeric Input: HMIQualityCheck.QCExpire[1]	Displays QC Expired Limit	
	Forecast	Numeric Input: HMIQualityCheck.QCForecast[1]	Displays QC Forecast Limit	
	Actual	Numeric Display: HMIQualityCheck.QCActual[1]	Displays Part Count Total	
			Normal	
			$V>Forecast	
			$V>Expired	
6	Part Type Quality Check			
	No	Numeric Display Layered with Word Switch HMIQualityCheck.CurrentPage 1 + (10 * ($$ - 1))	When Selection =$V background is Teal	
	Part Type	ASCII Display HMIQualityCheck.PartTypeList[X,0]		
	Expired	Numeric Input HMIQualityCheck.HMIExpired[X]		
	ACtual	Numeric Display: HMIQualityCheck.HMIActual[X]	Turns Red When Greater than or equal to expired	

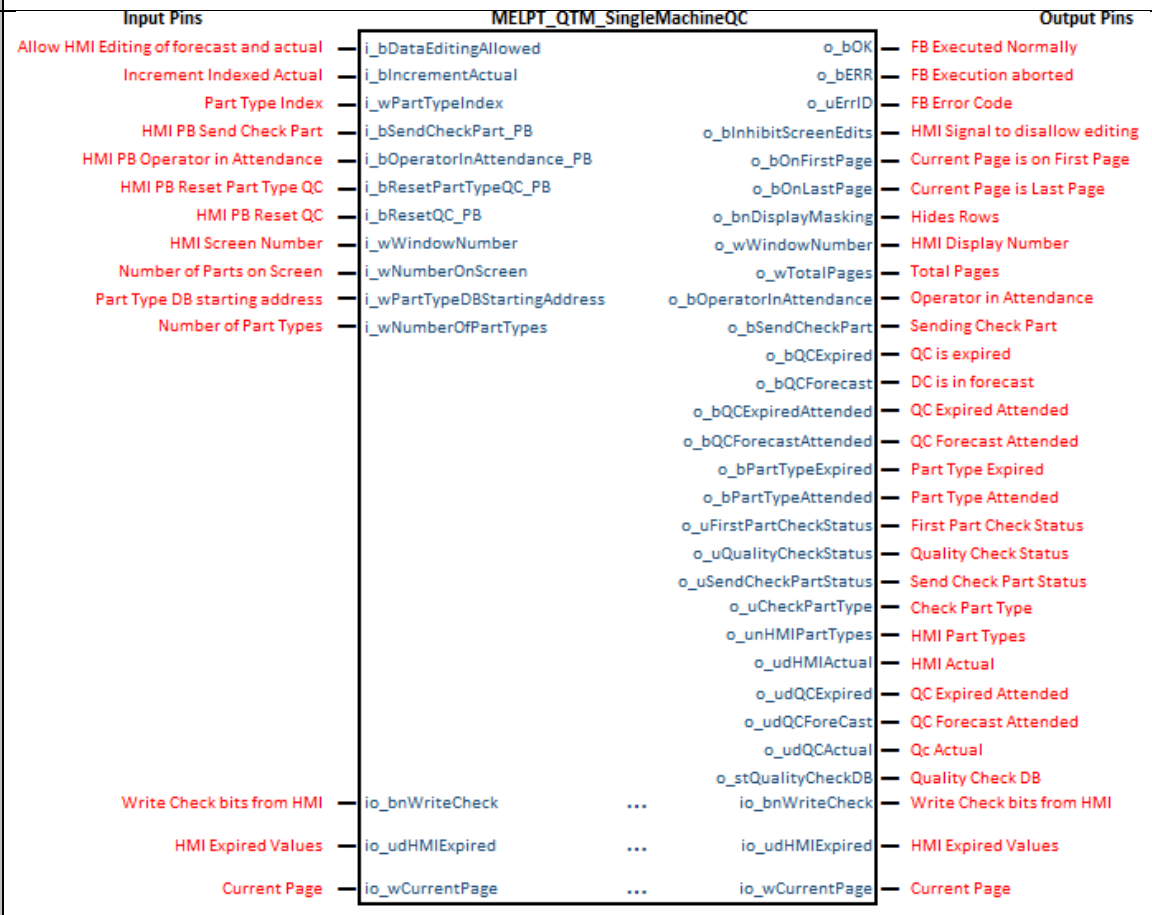
Item #	Description	Object X=M/C Number	Details	
7	Serial Number	Ascii DisplaY: HMIQualityCheck.QCSerialNumber[0]		
8	Part Type	ASCII Display: HMIQualityCheck.QCPartType[0]		
9	Part Status			
	Quality Check	Word Lamp: HMIQualityCheck.QualityCheckStatus[1]	Value	Indicator
			Normal	Quality Check
			1	Quality Check
			2	Quality Check
			4	Quality Check
			8	Quality Check
			16	Quality Check
			32	Quality Check
	1st Part Check	Word Comment Display: HMIQualityCheck.FirstPartCheckStatus[1]	Value	Indicator
			Normal	1st Part Check
			1	!st Part Check
	Send Check	Word Comment Display: HMIQualityCheck.SendCheckPartStatus[1]	Value	Indicator
			Normal	Send Check Part
			1	Send Check Pare
			2	Send Check Part

Item #	Description	Object X=M/C Number	Details
10	Quality Check Fixture	Numeric Display: HMIQualityCheck.QCFixtureNumber	
11	Remove Part	Bit Momentary: HMIQualityCheck.RemovePart_PB	
12	Return Part	Bit Momentary: HMIQualityCheck.ReturnPart_PB	

13.5.5. PLC-MELPT_QTM_SingleMachineQC

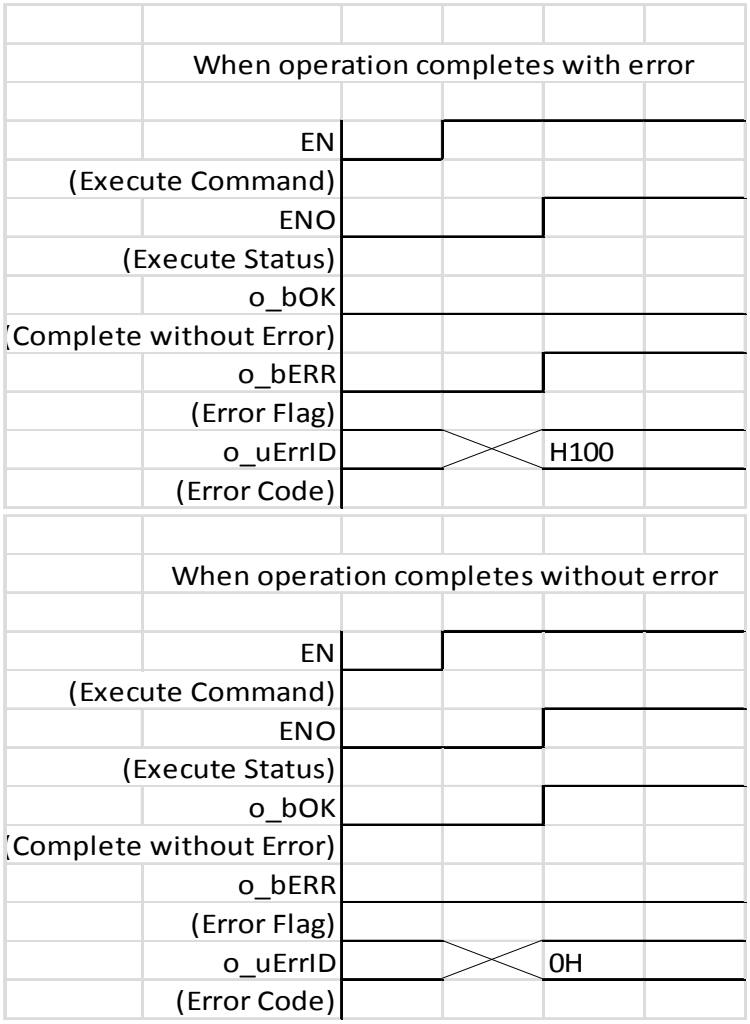
This function block is used with the Remote Quality Check Screen or Integrated Quality Check Screen

FUN Name
MELPT_QTM_SingleMachineQC

Function Overview	
Item	Description
Function overview	This function block handles HMI interface to the Quality Check Station Data for a single machine
Symbol	

<table>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model</td><td>None</td></tr>
<tr><td>GOT 1000 Series</td><td>800x600</td><td></td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 832 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>48 bits
586 words</td></tr>
<tr><td>Execution type</td><td>Real Time Execution</td></tr>
<tr><td>Dependences</td><td>This function block requires the SDT: MELPT_QTM_QualityCheckDB</td></tr>
<tr><td>Function description</td><td>This function block will signify of a QC or Part Type Quality Check Scenario, depending on configuration it can be used in either a remote or integrated quality check station way</td></tr>
<tr><td>Restrictions and precautions</td><td>This function block uses Z16-z19</td></tr>
</table>

Timing chart



FB Error Code

Error Code	Description
0	No Error.
H100(256)	Number on Screen greater than 10
H101(257)	Number On Screen less than 1
H102(258)	Part Type Index > Number of Part Types

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Allow HMI Editing of Expired	i_bDataEditingAllowed	Bit		HMI Allows Editing
	Increment Indexed Actual	i_bIncrementActual	Bit		Increment Actual Count
	Part Type Index	i_wPartTypeIndex	Word[Signed]	1 to 200	Part Type Index
	HMI PB Send Check Part	i_bSendCheckPart_PB	Bit		HMI PB Send Check PArt
	HMI PB Operator in Attendance	i_bOperatorInAttendance_PB	Bit		HMI PB Operator in Attendance
	HMI PB Reset Part Type QC	i_bResetPartTypeQC_PB	Bit		HMI PB Reset Part Type QC
	HMI PB Reset QC	i_bResetQC_PB	Bit		HMI PB Reset QC
X	HMI Screen Number	i_wWindowNumber	Word[Signed]		HMI Window Number
X	Number of Parts on Screen	i_wNumberOnScreen	Word[Signed]		Number of Part Types
X	Part Type DB starting address	i_wPartTypeDBStartingAddress	Word[Signed]		Startindg Address of PArt Types
X	Number of Part Types	i_wNumberOfPartTypes	Word[Signed]	1 to 200	Number of Part Types

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting Range	Description
	Write Check bits from HMI	io_bnWriteCheck	Bit(0..10)		Write Check bits
	HMI Expired Values	io_udHMIExpired	Double Word[Unsigned](1..10)		HMI Expired
	Current Page	io_wCurrentPage	Word[Signed]		Current Page

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed Normally	o_bOK	Bit	TRUE when FB executed
FB Execution aborted	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
HMI Signal to disallow editing	o_bInhibitScreenEdits	Bit	HMI Signal to stop HMI Editing
Current Page is on First Page	o_bOnFirstPage	Bit	Selected M/C is PArt Type QC Status
Current Page is Last Page	o_bOnLastPage	Bit	HMI Cursor Control for Selected MC
Hides Rows	o_bnDisplayMasking	Bit(1..10)	HMI Cursor Control for Selected MC
HMI Display Number	o_wWindowNumber	Word[Signed]	MAsking M/C
Total Pages	o_wTotalPages	Word[Signed]	HMI Window Number
Operator in Attendance	o_bOperatorInAttendance	Bit	Selected M/C Operator in Attendance Signal

Symbol Name	Var_Output name	Data Type	Description
Sending Check Part	o_bSendCheckPart	Bit	Selected M/C Send Check PartSignal
QC is expired	o_bQCExpired	Bit	Selected M/C Cycle Start Signal
DC is in forecast	o_bQCForecast	Bit	Selected M/C First PArt Check OK Signal
QC Expired Attended	o_bQCExpiredAttended	Bit	Selected M/C Reset Part TYpe QC Signal
QC Forecast Attended	o_bQCForecastAttended	Bit	Selected M/C Reset QC Signal
Part Type Expired	o_bPartTypeExpired	Bit	Selected M/C PArt Rejected Signal
Part Type Attended	o_bPartTypeAttended	Bit	HMI Display Serial Number
First Part Check Status	o_uFirstPartCheckStatus	Word[Unsigned]	HMI Display Model Number
Quality Check Status	o_uQualityCheckStatus	Word[Unsigned]	HMI Display Quality Check Fixture
Send Check Part Status	o_uSendCheckPartStatus	Word[Unsigned]	HMI Display Tool ID
Check Part Type	o_uCheckPartType	Word[Unsigned]	Check Part Type
HMI Part Types	o_unHMIPartTypes	Word[Unsigned](1..10,0..7)	HMI Part Type
HMI Actual	o_udHMIActual	Double Word[Unsigned](1..10)	HMI Actual
QC Expired Attended	o_udQCExpired	Double Word[Unsigned]	QC Expired
QC Forecast Attended	o_udQCForeCast	Double Word[Unsigned]	QC Forecast

Symbol Name	Var_Output name	Data Type	Description
Qc Actual	o_udQCActual	Double Word[Unsigned]	QC Actual
Quality Check DB	o_stQualityCheckDB	MELPT_QTM_QualityCheckDB	Quality Check DB SDT

FB Version Upgrade History

Version	Description
3.00	Functionality Split between 3 function blokcs
3.01	Comments Updated

SDT Usage

1. MELPT_QTM_HMIQC

System Label: HMIQualityCheck		
Member	Type	Usage
FirstPartCheckOK_PB	Bit	
CycleStart_PB	Bit	
PartRejected_PB	Bit	
SendCheckPart_PB	Bit	
OperatorInAttendance_PB	Bit	
RemovePart_PB	Bit	Available in the integrated version
ReturnPart_PB	Bit	Available in the integrated version
ResetPartTypeQC_PB	Bit	Resets the selected part type actual
ResetQC_PB	Bit	Resets the QC Actual Value

System Label: HMIQualityCheck		
Member	Type	Usage
OperatorInAttendance_LT	Bit	Operator in Attendance Indicator
SelectedPartTypeQC_LT	Bit	
InhibitEdits	Bit	HMI Editing Control
OnFirstPage	Bit	HMI Cursor Control to prevent Current Page to zero
OnLastPage	Bit	HMI Cursor Control to Prevent Page > MaxPage
DisplayMasking	Bit(1..10)	Hides non-existant part types
WriteCheck	Bit(0..10)	Set When Value Edited
CurrentPage	Word[Signed]	Current Page controlled by HMI
MaxPage	Word[Signed]	Max Page Calculated by FB
Selection	Word[Signed]	Quality Check Station for selected MC
Window	Word[Signed]	HMI Graphic to display
FirstPartCheckStatus	Word[Unsigned](1..8)	For Integrated or remote we only use one element
QualityCheckStatus	Word[Unsigned](1..8)	For Integrated or remote we only use one element
SendCheckPartStatus	Word[Unsigned](1..8)	For Integrated or remote we only use one element
QCExpire	Double Word[Unsigned](1..8)	For Integrated or remote we only use one element
QCActual	Double Word[Unsigned](1..8)	For Integrated or remote we only use one element

System Label: HMIQualityCheck		
Member	Type	Usage
QCForecast	Double Word[Unsigned](1..8)	For Integrated or remote we only use one element
HMIExpired	Double Word[Unsigned](1..10)	Expired Values on HMI
HMIActual	Double Word[Unsigned](1..10)	Actual Values on HMI
PartTypeList	Word[Unsigned](1..10,0..7)	HMI list of Part Types
QCSerialNumber	Word[Unsigned](0..6)	Serial Number of Current Part (Integrated)
QCFixtureNumber	Word[Unsigned]	Fixture Number of Current Part Type (Integrated)
QCPartType	Word[Unsigned](0..7)	Part Type (Integrated)
QCToolID	Word[Unsigned](0..15)	Tool ID Quality Check Station

2. MELPT_QTM_QTMData

Global Label: QTMData		
Member	Type	Usage
FirstPartCheck	Bit(1..8)	
ToolChangeForecastAttended	Bit(1..8)	
ToolChangeExpiredAttended	Bit(1..8)	

Global Label: QTMData		
Member	Type	Usage
ToolChangeExpired	Bit(1..8)	
ToolChangeForecast	Bit(1..8)	
ToolChangeFirstPartCheckForecast	Bit(1..8)	
ToolChangeFirstPartCheckExpired	Bit(1..8)	
QualityCheckForecastAttended	Bit(1..8)	Output of FB only one element
QualityCheckExpiredAttended	Bit(1..8)	Output of FB only one element
QualityCheckExpired	Bit(1..8)	Output of FB only one element
QualityCheckForecast	Bit(1..8)	Output of FB only one element
PartTypeQualityCheckAttended	Bit(1..8)	Output of FB only one element
PartTypeQualityCheckExpired	Bit(1..8)	Output of FB only one element
MCOperatorInAttendance	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine
MCSendCheckPart	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine
MCCycleStart	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine
MCFirstPartCheckOK	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine
MCResetPartTypeQC	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine

Global Label: QTMData		
Member	Type	Usage
MCResetQC	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine
MCRemovePart	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine
MCReturnPart	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine
MCPartRejected	Bit(1..8)	Set by Quality Check Station and used as input of Single Machine
TIDSelected	Word[Unsigned](1..8)	
MCQualityCheckStatus	Word[Unsigned](1..8)	1 Element is Output of Single Machine for display on Quality Check Station HMI
MCFirstPartCheckStatus	Word[Unsigned](1..8)	1 Element is Output of Single Machine for display on Quality Check Station HMI
MCSendCheckPartStatus	Word[Unsigned](1..8)	1 Element is Output of Single Machine for display on Quality Check Station HMI
MCExpired	Double Word[Unsigned](1..8)	1 Element is Output of Single Machine for display on Quality Check Station HMI
MCForecast	Double Word[Unsigned](1..8)	1 Element is Output of Single Machine for display on Quality Check Station HMI
MCActual	Double Word[Unsigned](1..8)	1 Element is Output of Single Machine for display on Quality Check Station HMI
MCSerialNumber	Word[Unsigned](1..8,0..6)	1 Element is Output of Single Machine for display on Quality Check Station HMI

Global Label: QTMData		
Member	Type	Usage
MCModelNumber	Word[Unsigned](1..8,0..7)	1 Element is Output of Single Machine for display on Quality Check Station HMI
MCQualityCheckFixture	Word[Unsigned](1..8)	1 Element is Output of Single Machine for display on Quality Check Station HMI
MCToolID	Word[Unsigned](1..8,0..15)	1 Element is Output of Single Machine for display on Quality Check Station HMI

3. MELPT_QTM_QualityCheckDB

Global Label: QualityCheckData		
Member	Type	Usage
QCForecast	Double Word[Unsigned]	Stores the QC Forecast
QCExpire	Double Word[Unsigned]	Stores the QCExpired
QCActual	Double Word[Unsigned]	Stores The QC Actual
QCPartTypeData	Double Word[Unsigned](1..32,0..2)	Stores the Part Type Expires, Forecast and Actual

13.5.1. Remote Quality Check Example

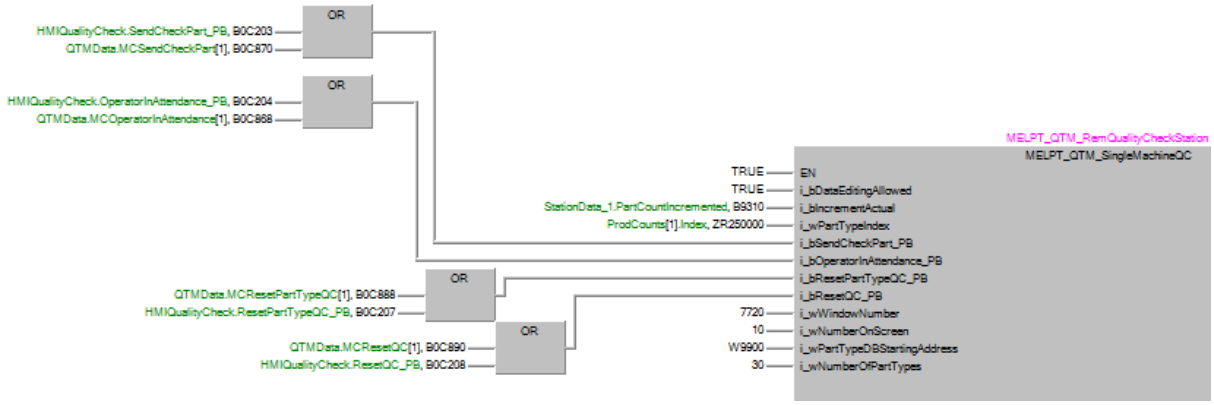


Figure 134-MELPT_QTM_SingleMachineQC

With this configuration inputs can be accepted from the HMI or from a remote location like a quality check station. The integrator is responsible for transporting the signals from the Quality Check Station to the remote and back via machine interlocking.

13.5.2. Tool Management

Tool Management uses the same function block as Tool Counters MELPT_QTM_ToolManagement

When configured in a certain way the function block follows a modified sequence that requires a reason code and TID for unscheduled Tool changes.

Tool Management Sequence:

1. Are tool Counter Actuals greater than or equal to Expired Limit?
   - Machine In Cycle Stop Mode
   - Press Initiate Tool Change to continue go to step 3
2. If no tool is expired the machine is allowed to run, but will notify when greater than forecast

3. Tool Change Initiated:

   - Select A Tool
   - If not expired or forecast, allow reset, place data in ITM DB go to 5
   - If Expired go to 4
4. Login to TID System
   - Select a Reason Code

- Reset Selected Tool Counter

5. Send First Part Check to Quality Check Station
6. Get Acceptance and Run.

13.5.2.1. HMI-Tool Management

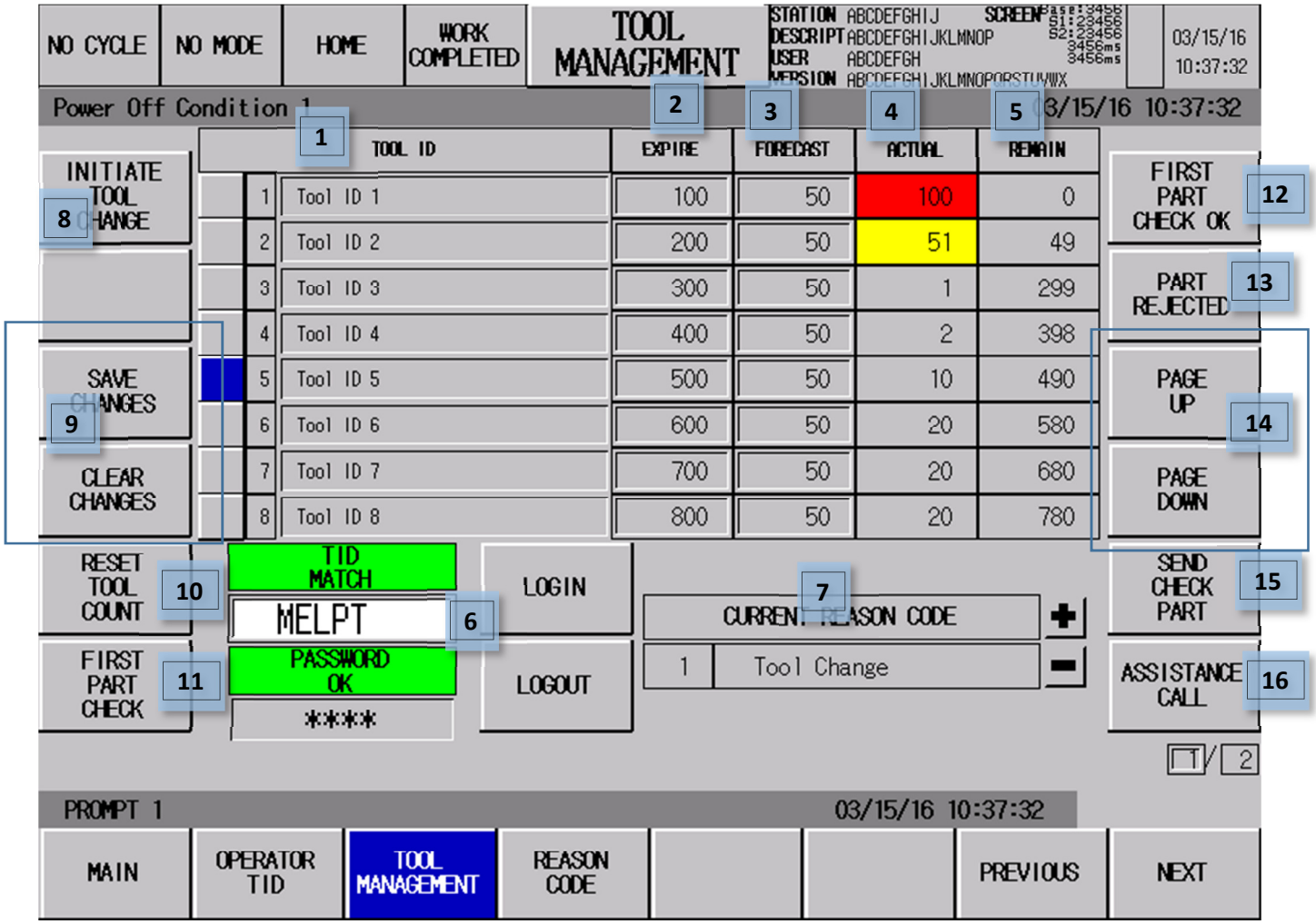


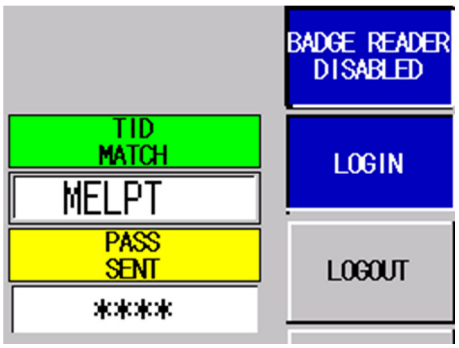
Figure 135-Tool Management Screen

Item #	Object	Device X=Row Number		Details	
1	Tool ID	Selection Push Button	HMIToolCounter.Select_PB[X]	Selects the Row	
			HMIToolCounter.Selected_Ind[X]	Indicates a selected row	
		Numeric Display	HMIToolCounter.CurrentPage X + (HMIToolCounter.NumberPerScreen	Case	Display
				Normal	$V
				HMIToolCounter.WriteCheck[X]==ON	$V

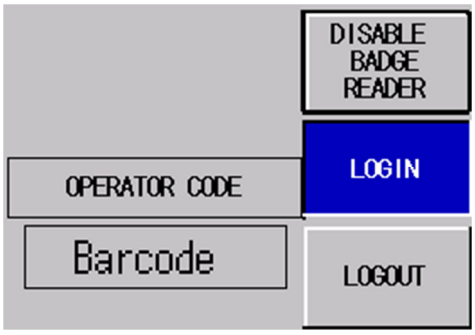
			* ($$ - 1))	HMIToolCounter.Selected_Ind[X]==ON	$V
		ASCII Input	HMIToolCounter.ToolID[X,0]	State	Display
				Normal	
				HMIToolCounter.WriteCheck[X]==ON	
				HMIToolCounter.Status[X]==16	
				HMIToolCounter.Status[X]==8	Flash
		Word Lamp	HMIToolCounter.Status[X]	HMIToolCounter.Status[X]==4	
				HMIToolCounter.Status[X]==2	Flash
				HMIToolCounter.InhibitScreenEdits==ON	
				HMIToolCounter.DisplayMask[X] ==ON	
				GB65101==ON	

Item #	Object	Device X=Row Number		Details	
2	Expired	Numeric Input	HMIToolCounter.Expired[X]	State	Display
				Normal	####
				HMIToolCounter.DisplayMask[X]==ON	
				HMIToolCounter.InhibitScreenEdits==ON	####
				HMIToolCounter.WriteCheck[X]==ON	####
				HMIToolCounter.Selected_Ind[1]	####
				GB65101==ON	####
3	Forecast	Numeric Input	HMIToolCounter.Forecast[X]	State	Display
				Normal	####
				HMIToolCounter.DisplayMask[X]==ON	
				HMIToolCounter.InhibitScreenEdits==ON	####
				HMIToolCounter.WriteCheck[X]==ON	####

				HMIToolCounter.Selected_Ind[1]	####
				GB65101==ON	####
4	Actual	Numeric Display	HMIToolCounter.Actual[X]	State	Display
				Normal	
		Word Lamp	HMIToolCounter.Status[X]	HMIToolCounter.WriteCheck[X]==ON	
				HMIToolCounter.Status[X]==16	
				HMIToolCounter.Status[X]==8	Flash
				HMIToolCounter.Status[X]==4	
				HMIToolCounter.Status[X]==2	Flash
5	Remain	Numeric Display	HMIToolCounter.Expired[X] $$- - HMIToolCounter.Actual[X]	HMIToolCounter.DisplayMask[X==ON] Gray Text on Gray Background	

Item #	Description	Object	Details X=Station Number	
6	Login Window	GOTTID.BadgeReaderDisabled==TRUE	Window 7000  	
			Login PB	GOTTID.Login_PB
			Logout PB	GOTTID.Logout_PB

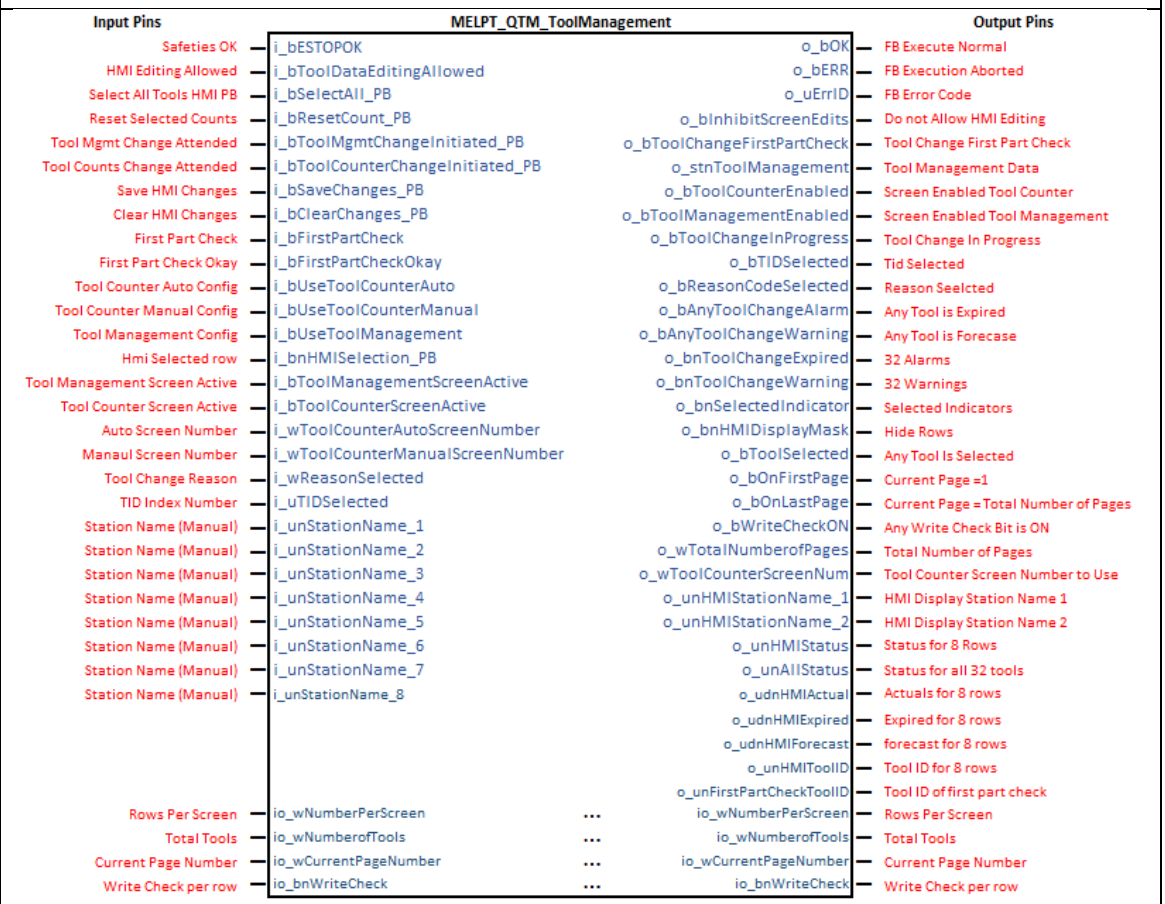
Item #	Description	Object	Details X=Station Number	
			TID	GOTTID.TIDLogin[0]
			GOTTID.HMIStatus	Value / Indicator Normal / T-ID 2 / TID Sent 3 / TID Not Found 4 / TID Match 8 / TID MATCH 16 / TID Match
			Password	Editable when status >=4 and less than 32
			Status Lamp GOTTID.HMIStatus	Value / Indicator Normal / Password 8 / PASS SENT 16 / Password Fail 32 / Password OK

Item #	Description	Object	Details X=Station Number
		GOTTID.BadgeReaderDisabled==False	Window 7001  Login PB: GOTTID.Login_PB Logout PB: GOTTID.Logout_PB Ascii Display: GOTTID.BadgeCode[0] This can interface with the Barcode Option of the HMI OS
7	Selected Reason Code	Numeric Display: HMIToolChangeReasonCode.Selected Reason	The index of the selected reason
		ASCII Display: HMIToolChangeReasonCode.Current Reason[1]	Text Description of tool change reason
		+ Push Button HMIToolChangeReasonCode.Selected Reason	Adds 1 to the selected reason
		- Push Button: HMIToolChangeReasonCode.Selected Reason	Subtracts one to the selected Reason

Item #	Text	Device X=Row Number	Details
8	Initiate Tool Change	Bit Momentary PB: HMIToolCounter.ToolManagementChangeInitiated_PB	
9	Save Changes	Bit Momentary PB: HMIToolCounter.SaveChanges_PB	Saves Edits when editing is allowed on HMI
	Clear Changes	Bit Momentary PB: HMIToolCounter.ClearChanges_PB	Reloads Screen, clearing write check bits
10	Reset Tool Count	Bit Momentary PB: HMIToolCounter.ResetSelected_PB	Reset Seelcted Tool Count Actual
11	First Part Check	Bit Momentary PB: HMIToolCounter.FirstPartCheck_PB	Sets First Part Check Sequence
12	First Part Check OK	Bit Momentary PB: HMIToolCounter.FirstPartCheckOK_PB	
13	Part Rejected	Bit Momentary PB: HMIQualityCheck.PartRejected_PB	
14	Page UP	Word Set PB: HMIToolCounter.CurrentPage	HMIToolCounter.CurrentPage -1
	Page Down	Word Set PB: HMIToolCounter.CurrentPage	HMIToolCounter.CurrentPage +1
15	Send Check Part	Bit Momentary PB: HMIQualityCheck.SendCheckPart_PB	
16	Assistance Call	Bit Momentary PB: HMIToolCounter.AssistanceCall_PB	

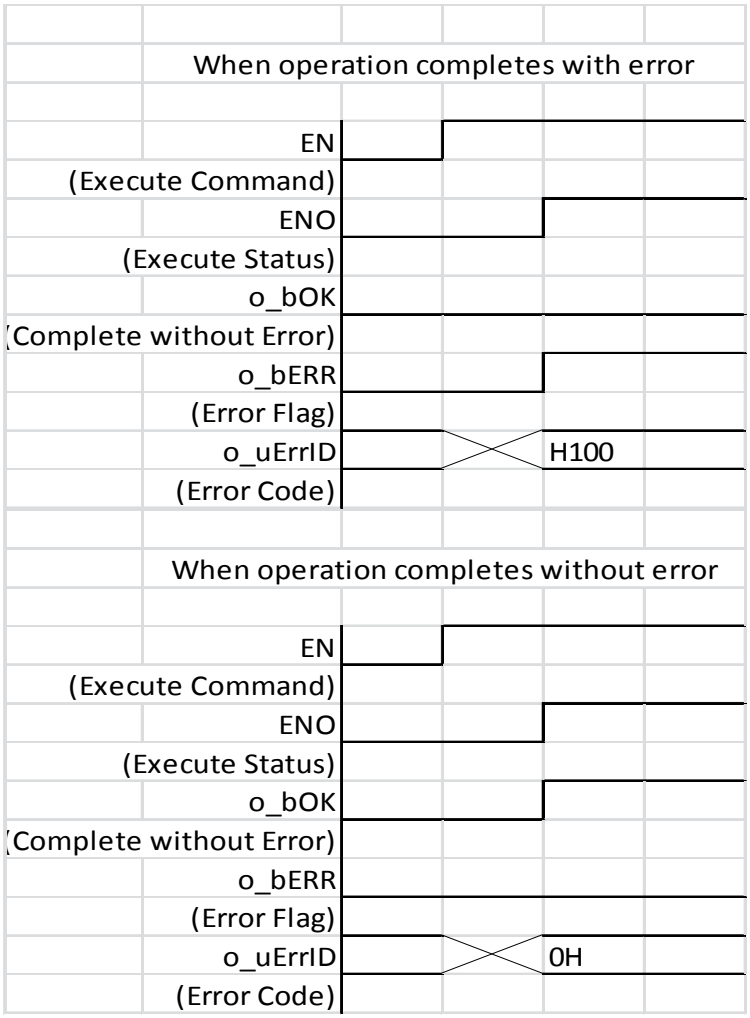
13.5.2.2. PLC-Tool Management

FB Name
MELPT_QTM_ToolManagement

Function Overview	
Item	Description
Function overview	This function block handles HMI interface to tool counters and tool management, which configuration is used depends on how the application is set up
Symbol	

<table>
<tr><td>Applicable Hardware</td><td>
<table>
<tr><th>Series</th><th>Model</th><th>Serial Restriction</th></tr>
<tr><td>MELSEC-Q series</td><td>Universal Model</td><td>None</td></tr>
<tr><td>GOT 1000 series</td><td>GT16(800*600) or Higher</td><td>None</td></tr>
</table>
</td></tr>
<tr><td>Applicable Software</td><td>
<table>
<tr><th>Series</th><th>Version</th></tr>
<tr><td>GX Works 2</td><td>1.536</td></tr>
<tr><td>GT Designer 3</td><td>1.136</td></tr>
</table>
</td></tr>
<tr><td>Programming language</td><td>Structured Ladder/FBD</td></tr>
<tr><td>Number of Ladder Steps</td><td>QnU: 1402 steps
*The number of steps of the FB program depends on the CPU Model that is used and input and output definition</td></tr>
<tr><td>Device Memory Used</td><td>167 bits
530 words</td></tr>
<tr><td>Compiling method</td><td>Macro type;</td></tr>
<tr><td>Execution type</td><td>Real-time Execution</td></tr>
<tr><td>Dependences</td><td>This FB requires the SDT MELPT_QTM_ToolManagementDB</td></tr>
<tr><td>Function description</td><td>This function block will compare the actual value to expired and forecast values and notify when the actual value exceeds these presets. It also provides an HMI interface to modify these values.</td></tr>
<tr><td>Restrictions and precautions</td><td>Z16 through z19 are used by this function block.</td></tr>
</table>

Timing chart



FB Error Code

Error Code	Description
0	No Error
H100(256)	Number Per Screen is less than 1
H101(257)	Number Per Screen is greater than 8
H102(258)	Neither Tool Management or either tool counter is selected
H103(259)	Both Auto Tool Counter and Manual Tool Counter is selected
H104(260)	Both Tool Counter and Tool Management Selected

Labels

- Input labels

Tool Management Only
Manual Tool Counters Only
Tool Counters Only

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Safeties OK	i_bESTOPOK	Bit		Keep True for Tool Counters
X	HMI Editing Allowed	i_bToolDataEditingAllowed	Bit		Used to allow HMI Editing
	Select All Tools HMI PB	i_bSelectAll_PB	Bit		HMI PB Selects all tools
	Reset Selected Counts	i_bResetCount_PB	Bit		HMI PB Resets Actual for Selected Tools
	Tool Mgmt Change Attended	i_bToolMgmtChangeInitiated_PB	Bit		HMI PB Tool Change Attended
	Tool Counts Change Attended	i_bToolCounterChangeInitiated_PB	Bit		HMI PB Tool Change Attended
	Save HMI Changes	i_bSaveChanges_PB	Bit		HMI Save Edits
	Clear HMI Changes	i_bClearChanges_PB	Bit		HMI Clear Edits
	First Part Check	i_bFirstPartCheck	Bit		First Part Che3ck PB

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	First Part Check Okay	i_bFirstPartCheckOkay	Bit		First Part Check OKay Signal
X	Tool Counter Auto Config	i_bUseToolCounterAuto	Bit		Set True for assemebly auto machine
X	Tool Counter Manual Config	i_bUseToolCounterManual	Bit		Set True for manual station
X	Tool Management Config	i_bUseToolManagement	Bit		Set true for Machining
	Hmi Selected row	i_bnHMISelection_PB	Bit(1..8)		Row Selected PB
	Tool Management Screen Active	i_bToolManagementScreenActive	Bit		Tool Management Screen Active
	Tool Counter Screen Active	i_bToolCounterScreenActive	Bit		Tool Counter Screen Active
	Auto Screen Number	i_wToolCounterAutoScreenNumber	Word[Signed]		Screen Number to send to HMI
	Manaul Screen Number	i_wToolCounterManualScreenNumber	Word[Signed]		Screen Number to send to HMI
	Tool Change Reason	i_wReasonSelected	Word[Signed]		Reason Code Index
	TID Index Number	i_uTIDSelected	Word[Unsigned]		TID Selected Index
	Station Name (Manual)	i_unStationName_1	Word[Unsigned](0..4)		Station Name for Display on Screen

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Station Name (Manual)	i_unStationName_2	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_3	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_4	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_5	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_6	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_7	Word[Unsigned](0..4)		Station Name for Display on Screen
	Station Name (Manual)	i_unStationName_8	Word[Unsigned](0..4)		Station Name for Display on Screen

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	Rows Per Screen	io_wNumberPerScreen	Word[Signed]		Number per screen (8)
X	Total Tools	io_wNumberofTools	Word[Signed]	1 to 32	Total No. of tools
	Current Page Number	io_wCurrentPageNumber	Word[Signed]		Current Page Number
	Write Check per row	io_bnWriteCheck	Bit(1..8)		HMI Edit was made signal

- Output labels

Tool Management Only
Manual Tool Counters Only
Tool Counters Only

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	When TRUE, indicates processing has completed normally
FB Execution Aborted	o_bERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
Do not Allow HMI Editing	o_bInhibitScreenEdits	Bit	Disables Screen Editing
Tool Change First Part Check	o_bToolChangeFirstPart Check	Bit	First Part Check Latch
Tool Management Data	o_stnToolManagement	MELPT_QTM_ToolMa nagementDB(1..32)	TOOL Management Data
Screen Enabled Tool Counter	o_bToolCounterEnabled	Bit	Screen Enabled Bits for HMI navigation
Screen Enabled Tool Management	o_bToolManagementEn abled	Bit	Screen Enabled Bits for HMI navigation
Tool Change In Progress	o_bToolChangeInProgre ss	Bit	Tool Change In Progress (Andon)
Tid Selected	o_bTIDSelected	Bit	Tool Change In Progress (Andon)
Reason Selected	o_bReasonCodeSelecte d	Bit	Tool Change In Progress (Andon)
Any Tool is Expired	o_bAnyToolChangeAlar m	Bit	A Tool is expired
Any Tool is Forecast	o_bAnyToolChangeWar ning	Bit	A tool is Forecast

Symbol Name	Var_Output name	Data Type	Description
32 Alarms	o_bnToolChangeExpired	Bit(1..32)	individual status
32 Warnings	o_bnToolChangeWarning	Bit(1..32)	individual status
Selected Indicators	o_bnSelectedIndicator	Bit(1..8)	hmi selected indicator
Hide Rows	o_bnHMIDisplayMask	Bit(1..8)	hmi hide data
Any Tool Is Selected	o_bToolSelected	Bit	a Tool is selected
Current Page =1	o_bOnFirstPage	Bit	Page up/down Controls
Current Page = Total Number of Pages	o_bOnLastPage	Bit	Page up/down Controls
Any Write Check Bit is ON	o_bWriteCheckON	Bit	A Write Check is On
Total Number of Pages	o_wTotalNumberofPages	Word[Signed]	Number of Pages to scrool
Tool Counter Screen Number to Use	o_wToolCounterScreenNum	Word[Signed]	Navigation Info
HMI Display Station Name 1	o_unHMIStationName_1	Word[Unsigned](0..4)	Station Name on Screen
HMI Display Station Name 2	o_unHMIStationName_2	Word[Unsigned](0..4)	Station Name on Screen
Status for 8 Rows	o_unHMIStatus	Word[Unsigned](1..8)	Status for 8 rows
Status for all 32 tools	o_unAllStatus	Word[Unsigned](1..32)	Tool status for 32 Tools
Actuals for 8 rows	o_udnHMIActual	Double Word[Unsigned](1..8)	Actual for 8 rows
Expired for 8 rows	o_udnHMIExpired	Double Word[Unsigned](1..8)	Expired rating for 8 tools
forecast for 8 rows	o_udnHMIForecast	Double Word[Unsigned](1..8)	Forecast rating for 8 tools

Symbol Name	Var_Output name	Data Type	Description
Tool ID for 8 rows	o_unHMIToolID	Word[Unsigned](1..8, 0..15)	Tool ID for 8 tools
Tool ID of first part check	o_unFirstPartCheckToolID	Word[Unsigned]	Tool ID index

FB Version Upgrade History

Version	Description
1.01	Initial Release
1.12	Modified for incremental mode and teach mode modifications FB labels updated to BCN-89000-0823-D guideline
1.20	Added FB Status Outputs
2.00	Rewrote to Bypass/Part status Model
2.10	Increment Actual Added
3.00	Removed Increment Function
3.01	Reduced Programming

SDT Usage

Tool Management Only
Manual Tool Counters Only
Tool Counters Only

3. MELPT_QTM_ToolManagementDB

Global Label: ToolManagementData		
Member	Type	Usage
ToolIdentifier	Word[Unsigned](0..15)	The Tool Identifier of the Tool
ExpiredValue	Double Word[Unsigned]	The Expired Value for this tool
ForecastValue	Double Word[Unsigned]	The Forecast Value for this Tool
ActualValue	Double Word[Unsigned]	The Actual Value for this tool
ToolChangeValue	Double Word[Unsigned]	The Actual Value at last tool change
ToolReasonCode	Word[Unsigned]	The Tool Reason Code Index
ToolChangeUserID	Word[Unsigned]	The Tool Change TID Index

4. MELPT_QTM_HMIToolCount

System Label: HMIToolCounter		
Member	Type	Usage
InhibitScreenEdits	Bit	If the FB input i_bToolDataEditingAllowed is False this bit is TRUE, this signal is used by the HMI to prevent Editing
SelectAll_PB	Bit	Selects all the tool counters

System Label: HMIToolCounter		
Member	Type	Usage
ResetSelected_PB	Bit	Resets the actual Value
ToolManagementChangeInitiated_PB	Bit	This is the Tool Change Initiated PB
ToolCounterChangeInitiated_PB	Bit	This is the Tool Change Initiated PB
FirstPartCheck_PB	Bit	
FirstPartCheck_Ind	Bit	
FirstPartCheckOK_PB	Bit	
AssistanceCall_PB	Bit	
SaveChanges_PB	Bit	If an edit was made this makes the change permanent
ClearChanges_PB	Bit	IF an Edit was made, this clears the edit
ToolChangeInProgress	Bit	Signal to HMI we are in the middle of a tool change
OnFirstPage	Bit	HMI page control to prevent hmi from setting current page below zero
OnLastPage	Bit	HMI page control to prevent hmi from setting current page above total pages
ToolSelected	Bit	Any Tool Has been Selected
AnyWriteCheckIndicator	Bit	Any HMI Input has been edited
WriteCheck	Bit(1..8)	Row Edited Bits
Select_PB	Bit(1..8)	Row Selection Bits
Selected_Ind	Bit(1..8)	Row Selected Indicators
DisplayMask	Bit(1..8)	Used to hide rows
NumberOfTools	Word[Signed]	Total Number of Tools, used to calculate number of pages and masking

System Label: HMIToolCounter		
Member	Type	Usage
NumberPerScreen	Word[Signed]	Number of Rows on Screen,
CurrentPage	Word[Signed]	Current Page used to load information on hmi
TotalPages	Word[Signed]	Total Number of Pages
ToolCounterScreenNumber	Word[Signed]	What HMI Screen Number to use
ManualStationName_1	Word[Unsigned](0..4)	Each Page of Manual Tool Counters shows two stations this is the first station name displayed
ManualStationName_2	Word[Unsigned](0..4)	Each Page of Manual Tool Counters shows two stations this is the second station name displayed
ToolID	Word[Unsigned](1..8,0..15)	Tool ID's for HMI display
Status	Word[Unsigned](1..8)	Tool Status for HMI display
AllStatus	Word[Unsigned](1..32)	All Status Array for indicator display
Expired	Double Word[Unsigned](1..8)	HMI Expired Values
Forecast	Double Word[Unsigned](1..8)	HMI Forecast Values
Actual	Double Word[Unsigned](1..8)	HMI Actual Values

Application Example

13.5.3. Tool Managaement Application Example

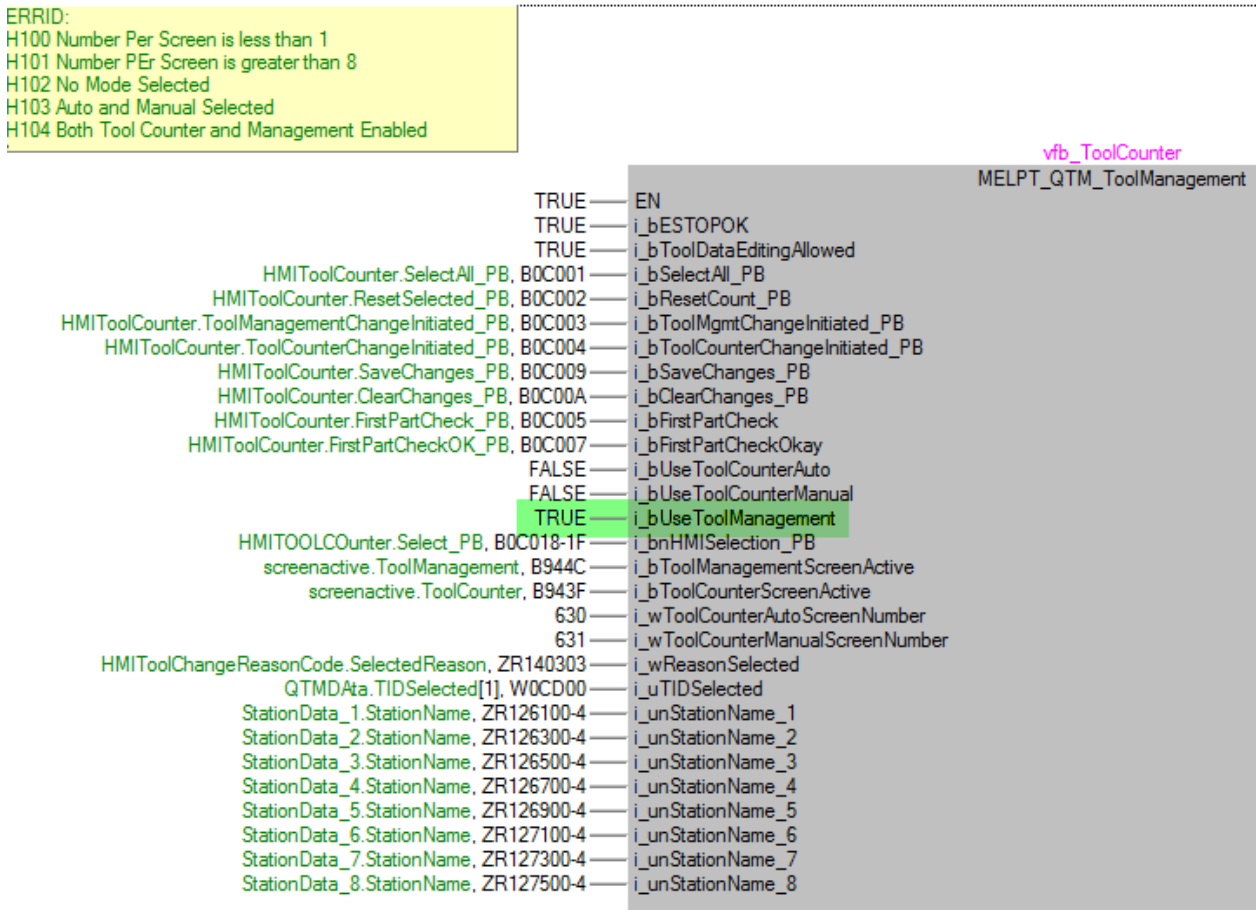


Figure 136-HMI Tool Management

Configuring the function block in the above way will enable the tool management screen and process

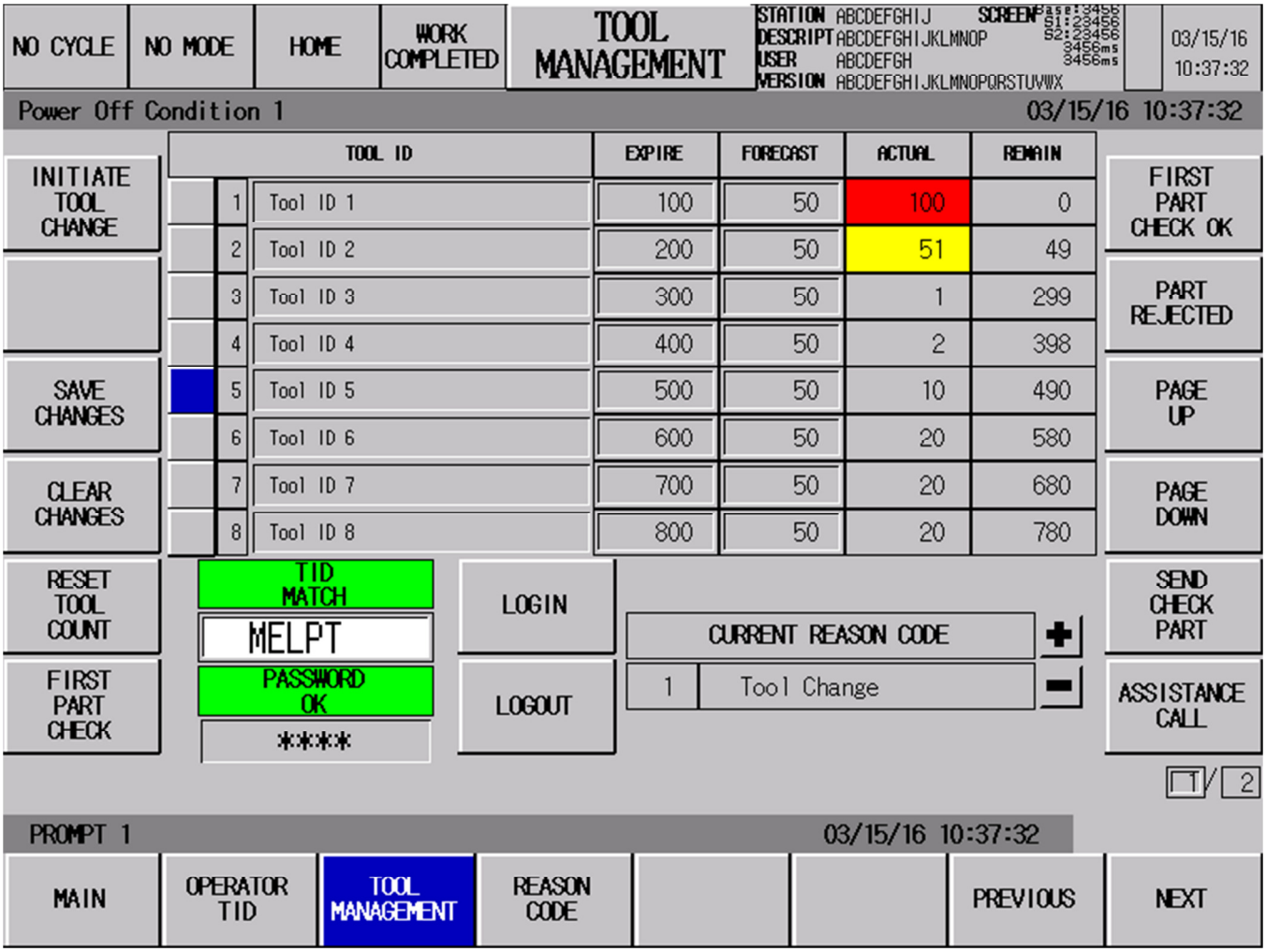


Figure 137-Tool Management Screen

13.5.4. HMI-Tool Change Reason Code

This screen allows for the selection, viewing, and if allowed, editing of the unscheduled reason codes.

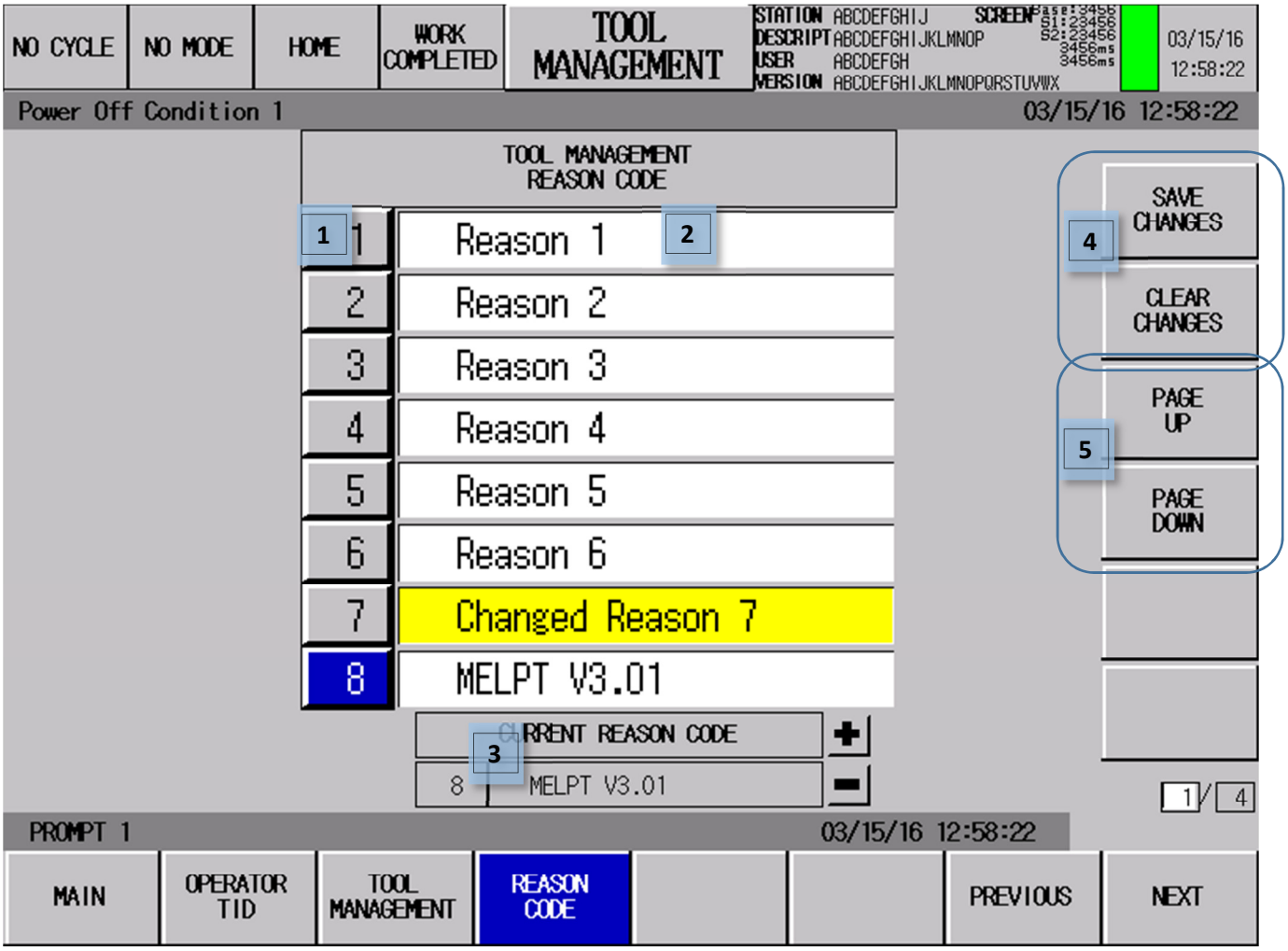
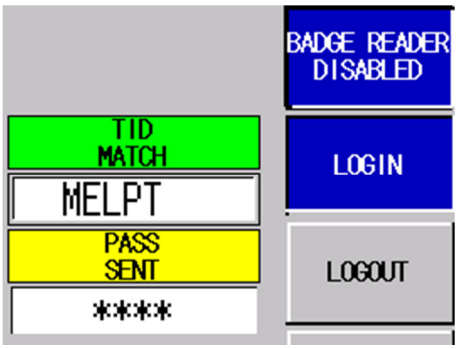
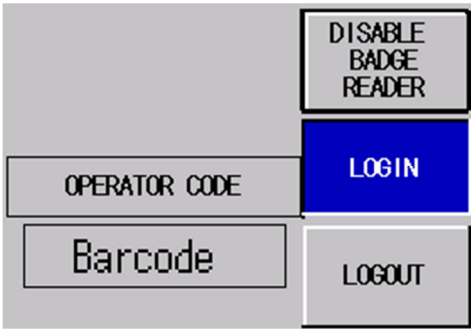


Figure 138-Reason Code Selection Screen

Item #	Object	Device X=Row Number	Details
1	Reason Selection button	Numeric Display Layered with Hidden Push Button Numeric Display: HMIToolChangeReasonCode.CurrentPage X + (HMIToolChangeReasonCode.NumberPerScreen * ($$ - 1)) PushButton: HMIToolChangeReasonCode.Selection_PB[X]	When HMIToolChangeReasonCode.SelectedReason== X + (HMIToolChangeReasonCode.NumberPerScreen * ($$ - 1)) The Numeric Display Background is BLUE
2	Tool Reason Code	ASCII Input: HMIToolChangeReasonCode.HMIReasonCodes[X,1]	If WriteCheck Bit is on background is Yellow
3	Login Window	GOTTID.BadgeReaderDisabled==TRUE	Window 7000  Login PB: GOTTID.Login_PB Logout PB: GOTTID.Logout_PB TID: GOTTID.TIDLogin[0]

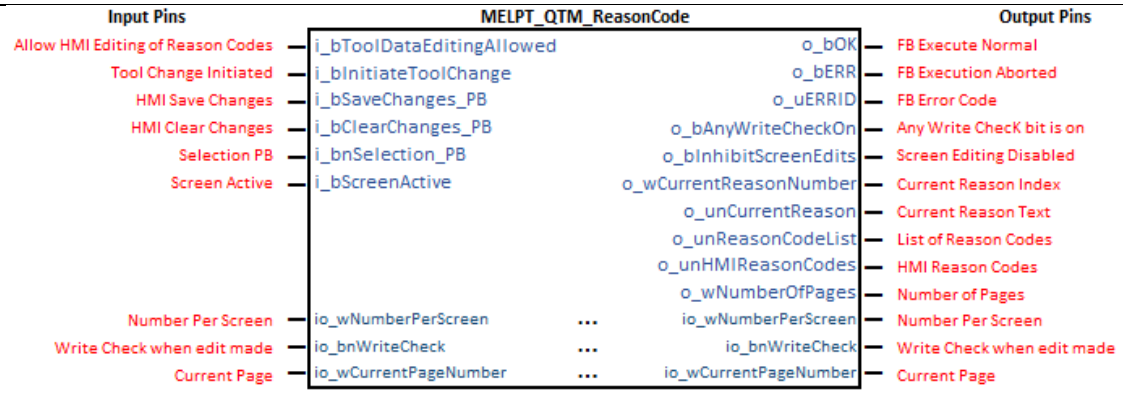
			GOTTID.HMIStatus	Value / Indicator Normal / T-ID 2 / TID Sent 3 / TID Not Found 4 / TID Match 8 / TID MATCH 16 / TID Match
			Password	Editable when status >=4 and less than 32
			Status Lamp GOTTID.HMIStatus	Value / Indicator Normal / Password 8 / PASS SENT 16 / Password Fail 32 / Password OK

		GOTTID.BadgeReaderDisabled==False	Window 7001  	
			Login PB	GOTTID.Login_PB
			Logout PB	GOTTID.Logout_PB
			Ascii Display	GOTTID.BadgeCode[0] This can interface with the Barcode Option of the HMI OS
4	Save Changes PB	Bit Momentary PB: HMIToolChangeReasonCode.SaveChanges_PB	Saves all edited fields to the PLC	
	Clear Changes PB	Bit Momentary PB: HMIToolChangeReasonCode.ClearChanges_PB	Resets all Write Check Bits Reloads the screen	
5	Page UP	Word Set PB: HMIToolChangeReasonCode.CurrentPage	Subtracts 1	
	Page Down	Word Set PB: HMIToolChangeReasonCode.CurrentPage	Adds 1	

13.5.5. PLC-Tool Change Reason Code

This function block is used to selected the unscheduled reason code and edit the list of reason codes

FB Name
MELPT_QTM_ReasonCode

Function Overview	
Item	Description
Function overview	This function block handles the HMI interface for the reason code selection and editing.
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

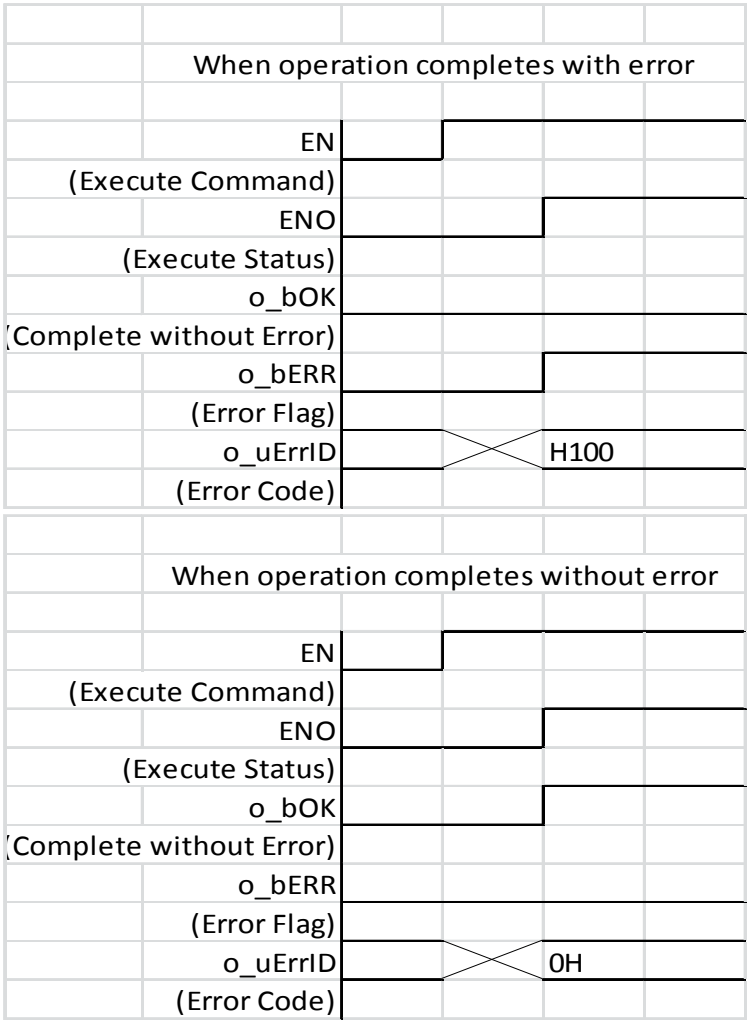
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD

Number of Ladder Steps	QnU: 310 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	25 bits 420 words
Execution type	Real Time Execution
Dependences	
Function description	This function block allows for the selection of an unscheduled reason code for tool management purposes. It also allows HMI interface for the editing of unscheduled reason Codes
Restrictions and precautions	This function block uses Z16-z19

Timing chart



FB Error Code

Error Code	Description
0	No Error.
H100(256)	Number Per Screen less than 1
H101(257)	Number on Screen greater than 8

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Allow HMI Editing of Reason Codes	i_bToolDataEditingAllowed	Bit		Signal to allow HMI Editing
	Tool Change Initiated	i_bInitiateToolChange	Bit		Zeros out the reason code
	HMI Save Changes	i_bSaveChanges_PB	Bit		Save HMI Edits
	HMI Clear Changes	i_bClearChanges_PB	Bit		Clear HMI Edits
	Selection PB	i_bnSelection_PB	Bit(1..8)		HMI Selection PB
	Screen Active	i_bScreenActive	Bit		Screen Active

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting Range	Description
	Number Per Screen	io_wNumberPerScreen	Word[Signed]	1 to 8	Number Per Screen
	Write Check when edit made	io_bnWriteCheck	Bit(1..8)		Write Check Signal
	Current Page	io_wCurrentPageNumber	Word[Signed]		Current Page Number

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bOK	Bit	TRUE when FB executed

Symbol Name	Var_Output name	Data Type	Description
FB Execution Aborted	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uERRID	Word[Unsigned]	FB Error Code Output
Any Write CheckK bit is on	o_bAnyWriteCheck On	Bit	A Write Check Button is On
Screen Editing Disabled	o_bInhibitScreenEdi ts	Bit	Signal To HMI to Enable HMI Editing
Current Reason Index	o_wCurrentReason Number	Word[Signed]	Current Reason Index
Current Reason Text	o_unCurrentReason	Word[Unsigned](1..10)	Current Reason Output
List of Reason Codes	o_unReasonCodeLis t	Word[Unsigned](1..32,1 ..10)	List of all reasons
HMI Reason Codes	o_unHMIReasonCod es	Word[Unsigned](1..8,1.. 10)	Reason Codes on Screen
Number of Pages	o_wNumberOfPages	Word[Signed]	Number of Pages

FB Version Upgrade History

Version	Description
3.00	Complete Rewrite

SDT Usage

1. MELPT_QTM_HMIToolChangeReason

System Label: HMIToolChangeReasonCode		
Member	Type	Usage

System Label: HMIToolChangeReasonCode		
Member	Type	Usage
EditInhibit	Bit	FB Driven Inhibits Editing on HMI
AnyWriteCheckOn	Bit	Fb Driven Allows for Save or Clear Changes
Selection_PB	Bit(1..8)	HMI Driven used to determine selected reason
WriteCheck	Bit(1..8)	HMI driven when a change is made
SaveChanges_PB	Bit	HMI PB that will write hmi values to the PLC
ClearChanges_PB	Bit	HMI PB that will overwrite HMI values with PLC stored values
CurrentPage	Word[Signed]	Current Page Number
TotalPages	Word[Signed]	Number of Reasons (32)/Number Per Screen
NumberPerScreen	Word[Signed]	User Input regards to rows on the screen
SelectedReason	Word[Signed]	Selected Reason Index
CurrentReason	Word[Unsigned](1..10)	Current Reason Text
HMIReasonCodes	Word[Unsigned](1..8,1..10)	8 rows of HMI reason Codes

14 MODEL MANAGEMENT

The model Management Library contains Labels, FB, and data structures in a separate library. The size of these data structures require a Q26 CPU or an extended memory cassette.

14.1 HMI-Shift Schedule

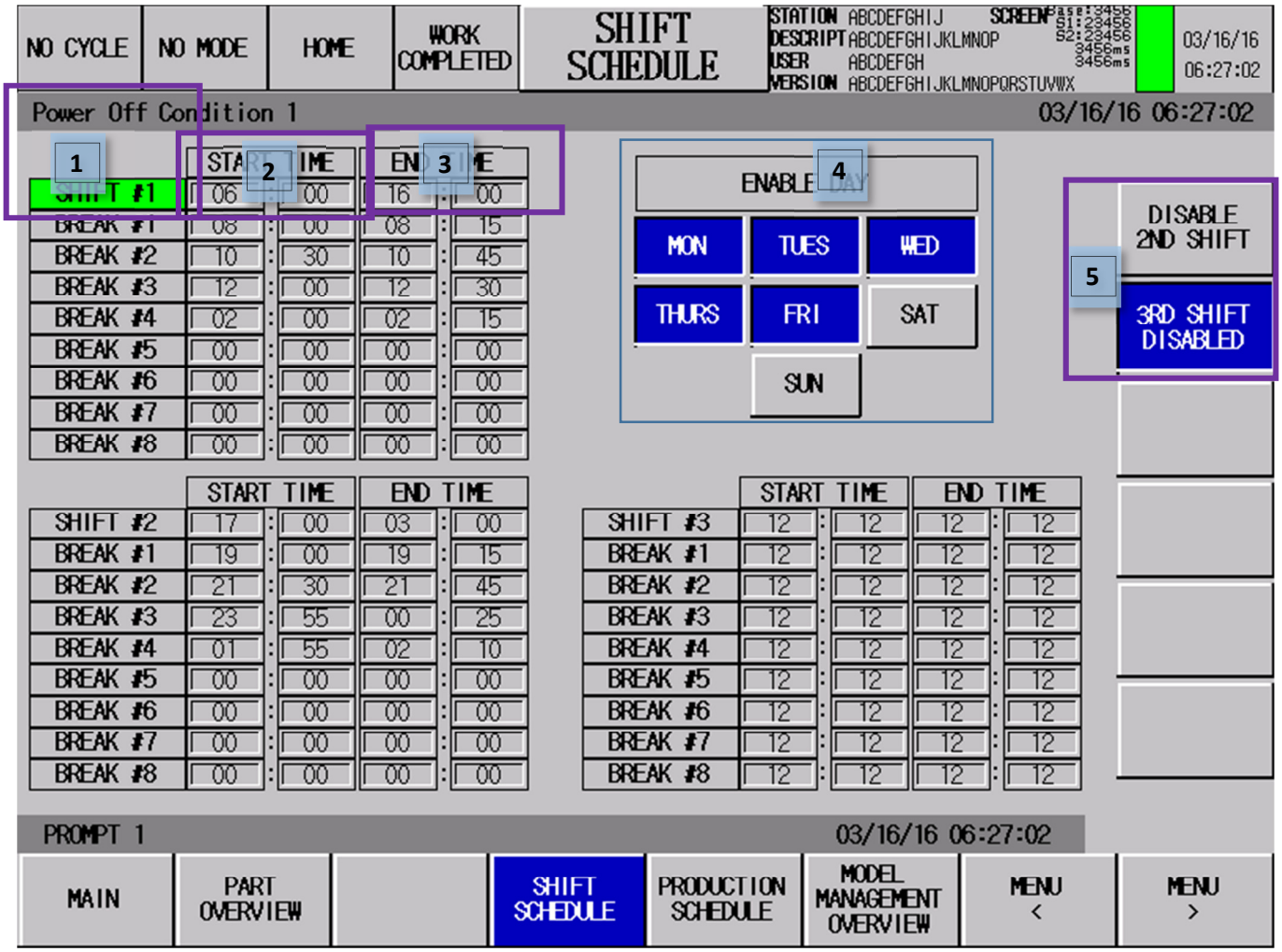
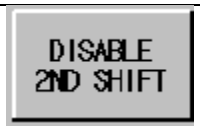


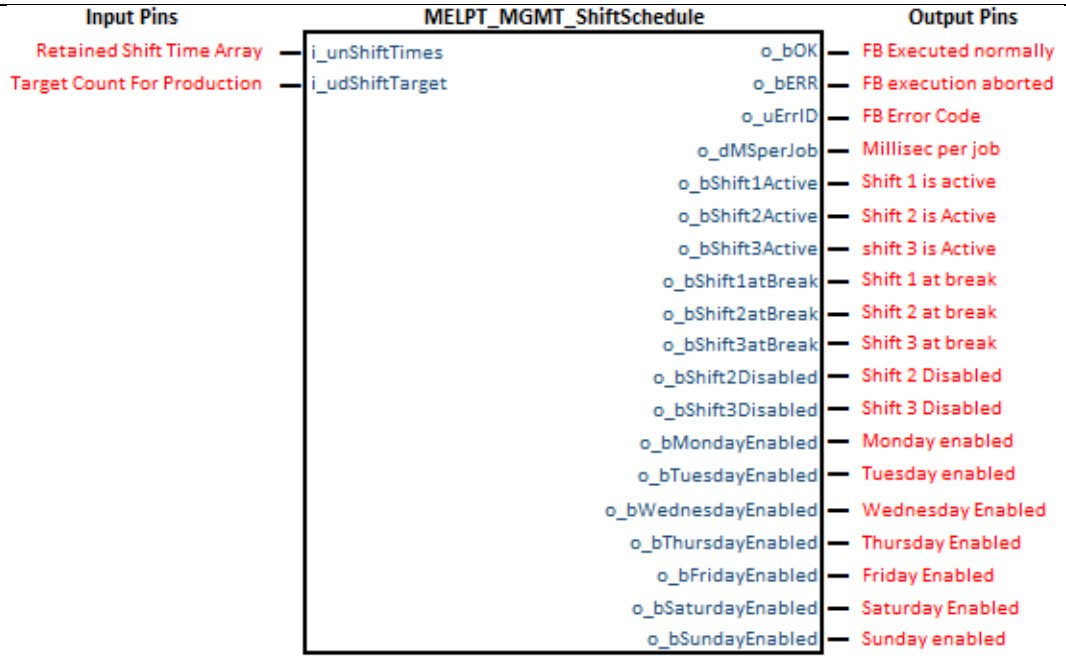
Figure 139-Shift Schedule Screen

Item #	Description	Object X=Shift Number	Details Y=BreakNumber	
1	Current Shift Indicator	Shift.ShiftActive[X]	Off	Shift X
			On	Shift X

Item #	Description	Object X=Shift Number	Details Y=BreakNumber	
2	Shift start Time	Numeric Display: Trigger:GB65101==ON	Shift.Schedule[X,0,1]=hours Shift.Schedule[X,0,2]=Min	
	Break start time	Numeric Display: Trigger:GB65101==ON	Shift.Schedule[X,Y,1]=hours Shift.Schedule[X,Y,2]=Min	
3	Shift End Time	Numeric Display: Trigger:GB65101==ON	Shift.Schedule[X,0,3]=hours Shift.Schedule[X,0,4]=Min	
	Break End time	Numeric Display: Trigger:GB65101==ON	Shift.Schedule[X,Y,3]=hours Shift.Schedule[X,Y,4]=Min	
4	Enable Day	Bit Alternate: Shift.DayEnabled Trigger:GB65101==ON	Off	
			On	
5	Enable/Disable Day	Bit Momentary: Shift.ShiftDisabled[X]	Off	
			On	

14.2 PLC-Shift Schedule

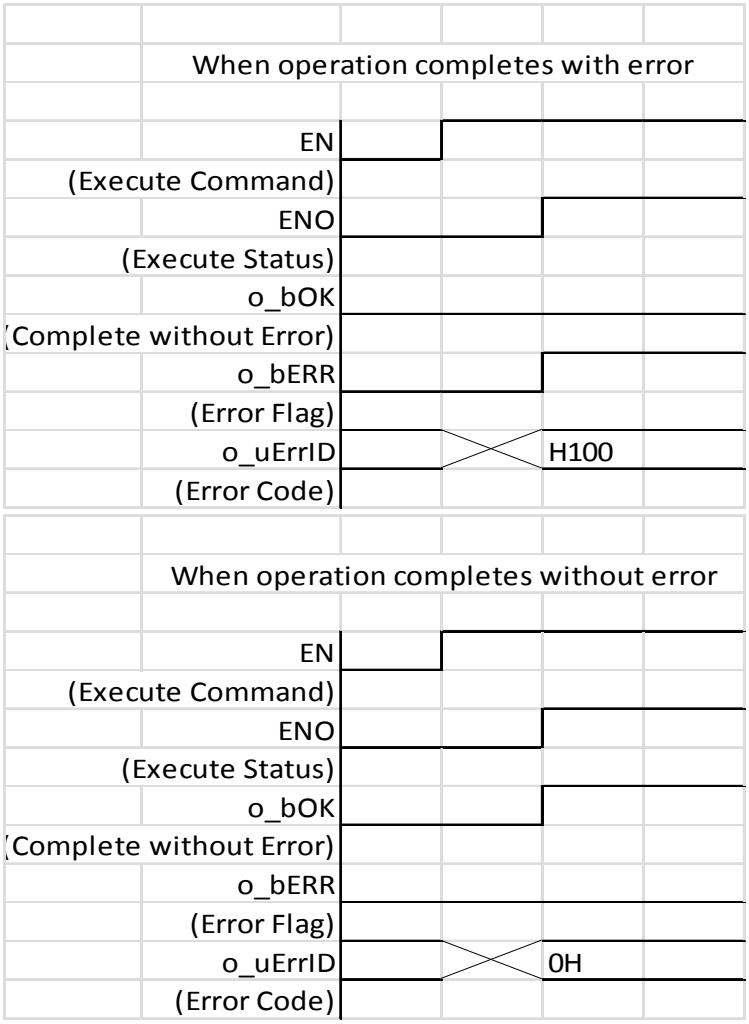
FB Name
MELPT_MGMT_ShiftSchedule

Function Overview	
Item	Description
Function overview	This function block used the PLC clock to determine current shift and when at break. Additionally the work time is calculated, the plan count is divided by the work time to determine the number of milliseconds per increment of the plan count
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

Applicable Software	<table><tr><th>Series</th><th>Version</th></tr><tr><td>GX Works 2</td><td>1.536</td></tr><tr><td>GT Designer 3</td><td>1.136</td></tr></table>
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 309 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	80 bits 382 words
Execution type	Real Time Execution
Dependences	
Function description	This function block will place HMI signals in the selected MC element of multiple arrays. The transfer of these signals to and from the machining centers is the responsibility of the integrator.
Restrictions and precautions	This function block uses Z16

Timing chart



FB Error Code

Error Code	Description
0	No Error.

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Allow HMI Editing of forecast and actual	i_bDataEditingAllowed	Bit		HMI Allows Editing
	HMI PB Cycle Start	i_bCycleStart_PB	Bit		HMI PB Cycle Start
	HMI PB Part Rejected	i_bPartRejected_PB	Bit		HMI PB Part Rejected
	HMI PB Send Check Part	i_bSendCheckPart_PB	Bit		HMI PB Send Check PArt
	HMI PB Operator in Attendance	i_bOperatorInAttendance_PB	Bit		HMI PB Operator in Attendance
	HMI PB Reset Part Type QC	i_bResetPartTypeQC_PB	Bit		HMI PB Reset Part Type QC
	HMI PB Reset QC	i_bResetQC_PB	Bit		HMI PB Reset QC
	HMI PB First Part Check OK	i_bFirstPartCheckOK	Bit		HMI First Part Check OK
X	HMI Screen Number	i_wWindowNumber	Word[Signed]		HMI Window Number
X	Number of M/C	i_wNumberOnScreen	Word[Signed]	1 to 8	Number of M/C's
X	Array of 8 M/C Serial Numbers	i_unSerialNumber	Word[Unsigned](1..8,0..6)		Serial Numbers for 8 M/C

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	Retained Shift Time Array	i_unShiftTimes	Word[Signed](1..3,0..8,1..4)		Array of schedule times for 1st Shift
	Target Count For Production	i_udShiftTarget	Double Word[Signed]		Taregt Value from Procuction Counter

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed normally	o_bOK	Bit	TRUE when FB executed
FB execution aborted	o_bERR	Bit	TRUE when user input check failed
FB Error Code	o_uErrID	Word[Unsigned]	FB Error Code Output
Millisec per job	o_dMSperJob	Double Word[Signed]	Ms per job X10
Shift 1 is active	o_bShift1Active	Bit	Indicator Active Shift
Shift 2 is Active	o_bShift2Active	Bit	Indicator Active Shift
shift 3 is Active	o_bShift3Active	Bit	Indicator Active Shift
Shift 1 at break	o_bShift1atBreak	Bit	Which Break is Active for Shift 1
Shift 2 at break	o_bShift2atBreak	Bit	Which Break is Active for Shift 2
Shift 3 at break	o_bShift3atBreak	Bit	Which Break is Active for Shift 3
Shift 2 Disabled	o_bShift2Disabled	Bit	For HMI 2nd Shift Disabled
Shift 3 Disabled	o_bShift3Disabled	Bit	For HMI 3rd Shift Disabled
Monday enabled	o_bMondayEnabled	Bit	Day enabled

Symbol Name	Var_Output name	Data Type	Description
Tuesday enabled	o_bTuesdayEnabled	Bit	Day enabled
Wednesday Enabled	o_bWednesdayEnabled	Bit	Day enabled
Thursday Enabled	o_bThursdayEnabled	Bit	Day enabled
Friday Enabled	o_bFridayEnabled	Bit	Day enabled
Saturday Enabled	o_bSaturdayEnabled	Bit	Day enabled
Sunday enabled	o_bSundayEnabled	Bit	Day enabled

FB Version Upgrade History

Version	Description
1.02	Increased breaks per shift to 8
1.10	Replaced First Scan with EN
1.12	FB labels updated to BCN-89000-0823-D
1.20	Add FB Status output variables Program memory usage decreased
2.00	Adopted BCN-89000-0969; Removed Security OK
2.01	Using Screen PB SDT
3.00	Reqrite
3.01	Data Type of Production Count

SDT Usage

1. MELPT_MGMT_ShiftSched

System Label: Shift		
Member	Type	Usage

System Label: Shift		
Member	Type	Usage
MondayEnabled	Bit	Set by HMI, Shift active determined by PLC clock if shift starts on Monday when enabled
TuesdayEnabled	Bit	Set by HMI, Shift active determined by PLC clock if shift starts on Tuesday when enabled
WednesdayEnabled	Bit	Set by HMI, Shift active determined by PLC clock if shift starts on Wednesday when enabled
ThursdayEnabled	Bit	Set by HMI, Shift active determined by PLC clock if shift starts on Thursday when enabled
FridayEnabled	Bit	Set by HMI, Shift active determined by PLC clock if shift starts on Friday when enabled
SaturdayEnabled	Bit	Set by HMI, Shift active determined by PLC clock if shift starts on saturday when enabled
SundayEnabled	Bit	Set by HMI, Shift active determined by PLC clock if shift starts on sunday when enabled
ShiftActive	Bit(0..3)	Bit 1-3 is relative to Shift Number, 0 is summary if any is on
BreakActive	Bit(0..3)	Bit 1-3 is relative to Shift Number, bit 0 is a summary bit if any bit is on
ShiftDisabled	Bit(1..3)	Set HMI bit number is relative to shift number
Schedule	Word[Signed](1..3,0..8,1..4)	Set by HMI

14.3 HMI-Production Schedule

The production schedule screen allows an authenticated user to set the part number sequence to be produced and the numbers to be produced. This information shares the model management data, and must run on the model management PLC/HMI.

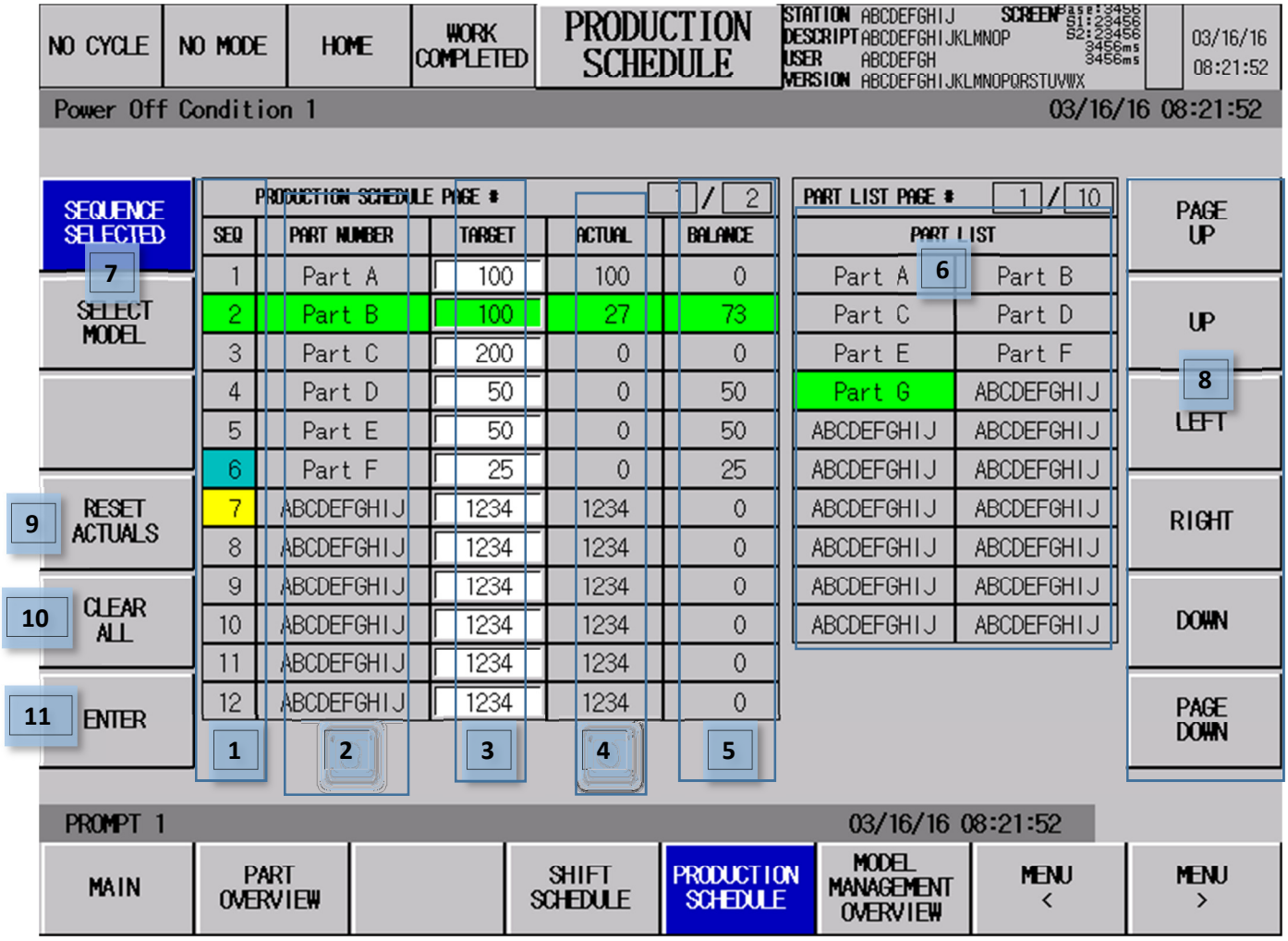


Figure 140-Production Schedule Screen

Item #	Description	Object	Details X=Input Number	
1	Sequence	Numeric Display: GOTProdSchedule.SeqListPage	X + (($$ - 1) * GOTProdSchedule.SeqListSize)	
			GOTProdSchedule.HMIStatus[X]	
			Value	Display

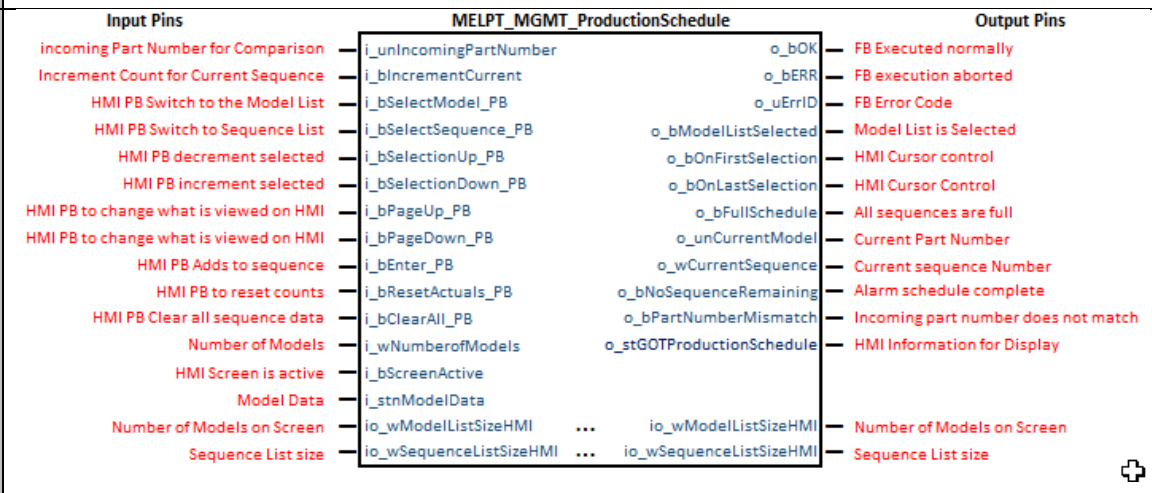
Item #	Description	Object	Details X=Input Number	
			Normal	Display
			1	X
			2	X
			4	X
			8	X
2	Part Number	ASCII display: GOTProdSchedule.SelectedModels[X,0]	GOTProdSchedule.InhibitEdit[X]	
			State	Display
			Off	
			On	
3	Target	Numeric Input: GOTProdSchedule.Targets[X]	Trigger: GB65101==ON and InhibitEdit[X] OFF GOTProdSchedule.WriteCheck[X]	
4	Actual	Numeric Display: GOTProdSchedule.Actuals[X]	GOTProdSchedule.InhibitEdit[X]	
			State	Display
			Off	
			On	
5	Balance	Numeric display: GOTProdSchedule.Balances[X]	GOTProdSchedule.InhibitEdit[X]	
			State	Display
			Off	
			On	
6	Part List	ASCII Display: GOTProdSchedule.ModelList[X,0]	GOTProdSchedule.ModelListPos==X	

Item #	Description	Object	Details X=Input Number
7	Select Sequence PB	Bit Momentary: GOTProdSchedule.SelectSeq_PB	Switches Cursor Control to Sequence
	Select Model PB	Bit Momentary: GOTProdSchedule.SelectModel_PB	Switches Cursor Control to the Part List
8	Page Up	Bit Momentary: GOTProdSchedule.SelectionPageUp_PB	When on the Model list decreases by 20 when on the sequence list decreases by 12
	UP	Bit Momentary: GOTProdSchedule.SelectionUp_PB	When on the model List decreases by 2 When on sequence list decreases by 1
	Left	Word Set: GOTProdSchedule.ModelListPos -1	Only available when on the model list decreases selected by 1
	Right	Word Set: GOTProdSchedule.ModelListPos +1	Only available when on the model list increases selected by 1
	Down	Bit Momentary: GOTProdSchedule.SelectionDown_PB	When on the model list increases by 2. When on the sequence list increases by 1
	Page Down	Bit Momentary: GOTProdSchedule.SelectionPageDown_PB	When on the Model List increases by 20 When on the Sequence List Increases by 12

Item #	Description	Object	Details X=Input Number
9	Reset Actuals	Bit Momentary: GOTProdSchedule.ResetActuals_PB Trigger: GB65101 ==ON	Sets all actual counts to zero
10	Clear ALL	Bit Momentary: GOTProdSchedule.ClearAll_PB Trigger: GB65101 ==ON	Clear the sequence List
11	Enter	Bit Momentary: GOTProdSchedule.Enter_PB	When the Model List is Selected: If the sequence is not full, adds the selected model to the next available location
			When the Sequence List is Selected, sets the current selection to the current model

14.4 PLC-Production Schedule

FB Name
MELPT_MGMT_ProductionSchedule

Function Overview	
Item	Description
Function overview	This function block interfaces with the HMI screen, to set the sequence of models to nbe produced, as the current number reaches the target the next sequence is started. When no sequences are left the o_bNoSequenceRemaining is set. The current running Sequence is output from the function block this data is used by Model Management System to get tag data to write to the PLC.
Symbol	
Applicable Hardware	

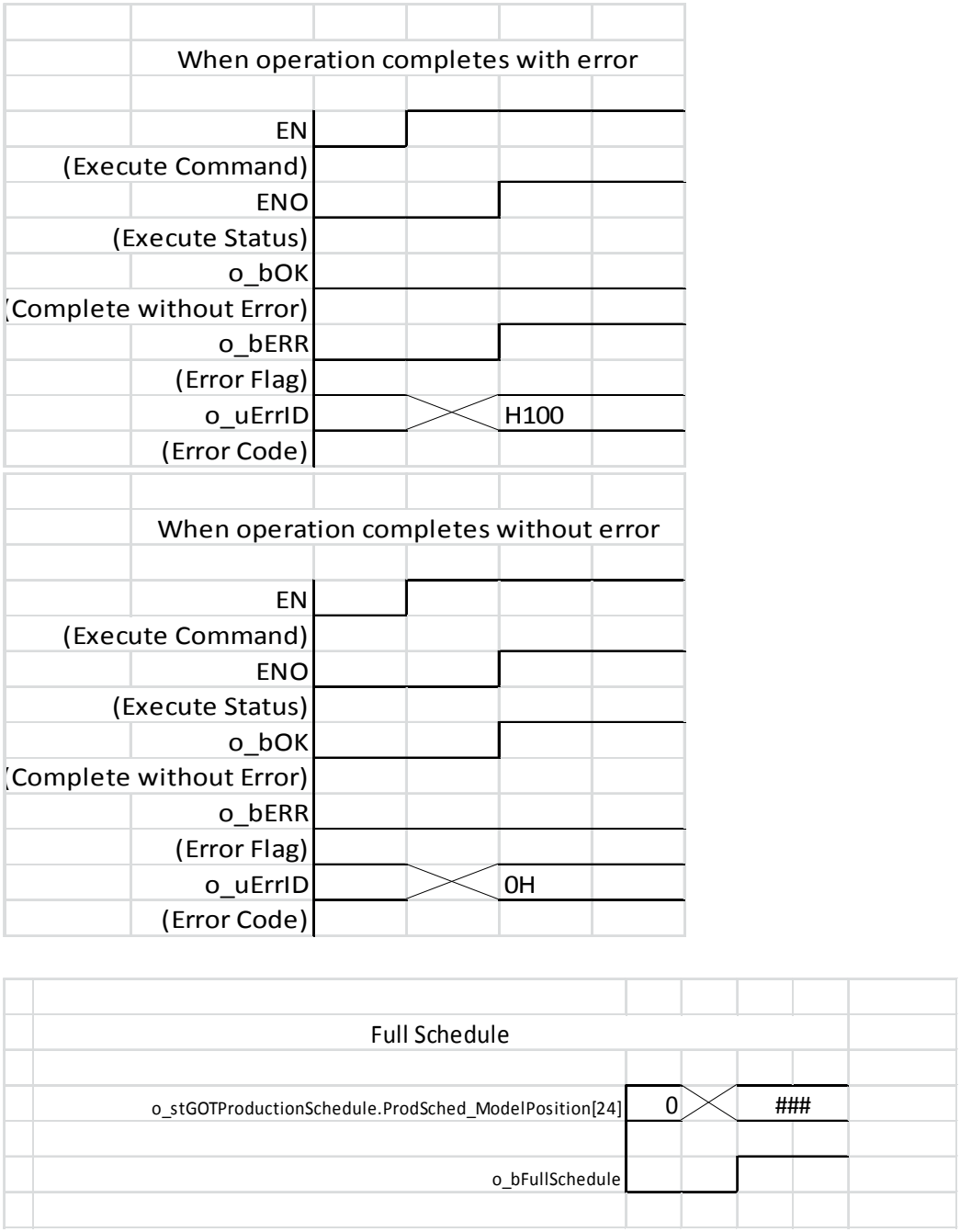
Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 Series	800x600	

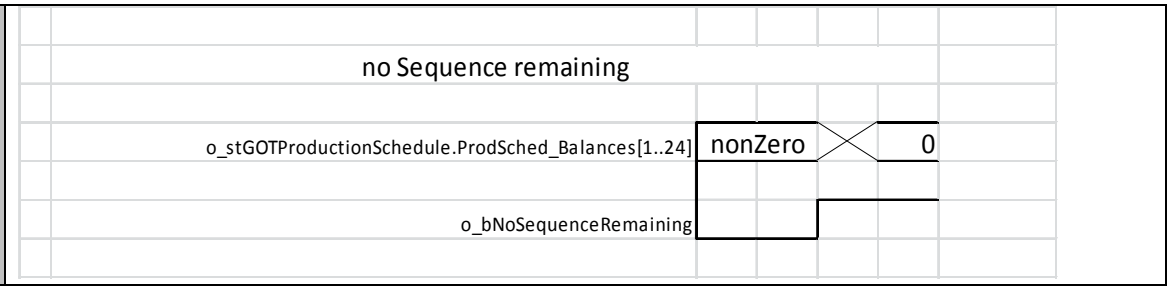
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 1016 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	55 bits 331 words
Execution type	Real Time Execution
Dependences	This function block requires the MELPT_MGMT_ModelManagement SDT This function block requires the MELPT_MGMT_GOTProdSched SDT
Function description	
Restrictions and precautions	This function block uses Z16

Timing chart





FB Error Code

Error Code	Description
0	No Error.
H101(257)	Model List Size Greater than max models
H102(258)	Model List Size Less than or equal to zero
H103(259)	Sequence List size greater than Max Sequences
H104(260)	Sequence List size Less than or equal to zero

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting Range	Description
x	incoming Part Number for Comparison	i_unIncomingPartNumber	Word[Unsigned](0..4)		Incoming Part Number for Mismatch Compare
x	Increment Count for Current Sequence	i_bIncrementCurrent	Bit		Increment current model signal
	HMI PB Switch to the Model List	i_bSelectModel_PB	Bit		HMI PB Select Model

User Input	Symbol Name	Var_Input name	Data Type	Setting Range	Description
	HMI PB Switch to Sequence List	i_bSelectSequence_PB	Bit		HMI PB Select Sequence
	HMI PB decrement selected	i_bSelectionUp_PB	Bit		HMI PB Selection UP
	HMI PB increment selected	i_bSelectionDown_PB	Bit		HMI PB Selection Down
	HMI PB to change what is viewed on HMI	i_bPageUp_PB	Bit		HMI PB Selection UP
	HMI PB to change what is viewed on HMI	i_bPageDown_PB	Bit		HMI PB Selection Down
	HMI PB Adds to sequence	i_bEnter_PB	Bit		HMI Enter PB
	HMI PB to reset counts	i_bResetActuals_PB	Bit		HMI PB Reset all actual values
	HMI PB Clear all sequence data	i_bClearAll_PB	Bit		HMI PB Clear Schedule
x	Number of Models	i_wNumberofModels	Word[Signed]	1 to 160	Total Number of Models
	HMI Screen is active	i_bScreenActive	Bit		Screen is on a HMI

User Input	Symbol Name	Var_Input name	Data Type	Setting Range	Description
	Model Data	i_stnModelData	MELPT_MGMT_ ModelManagem ent(1..160)		ModelManagement Database

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting Range	Description
X	Number Per Screen	io_wModelListSizeHMI	Word[Signed]	1 to 20	Model List Size for HMI
X	Write Check when edit made	io_wSequenceListSizeH MI	Word[Signed]	1 to 12	Seuence List size for HMI

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed normally	o_bOK	Bit	FB OK Signal
FB execution aborted	o_bERR	Bit	FB Err Signal
FB Error Code	o_uErrID	Word[Unsigned]	Err code for FB Err Signal
Model List is Selected	o_bModelListSelect ed	Bit	Model List has curcor control
HMI Cursor control	o_bOnFirstSelection	Bit	Cursor control limit
HMI Cursor Control	o_bOnLastSelection	Bit	Cursor control limit
All sequences are full	o_bFullSchedule	Bit	No editing allowed
Current Part Number	o_unCurrentModel	Word[Unsigned](0..4)	Current Model Output

Symbol Name	Var_Output name	Data Type	Description
Current sequence Number	o_wCurrentSequence	Word[Signed]	Current Sequence Number
Alarm schedule complete	o_bNoSequenceRemaining	Bit	No Sequences remaining fault
Incoming part number does not match	o_bPartNumberMismatch	Bit	Incoming part number does not match schedule fault
HMI Information for Display	o_stGOTProductionSchedule	MELPT_MGMT_GOTProdSched	GOT Prpoduction Schedule Data

FB Version Upgrade History

Version	Description
1.02	Added Current model Ouptu
1.20	FB labels updated to BCN-89000-0823-D
2.00	Adopted BCN-89000-0969
3.00	Adjust to new model Management Structure
3.01	Reduces Pin by referencing GOT structure

SDT Usage

1. MELPT_MGMT_GOTProdSched

System Label: GOTProdSchedule		
Member	Type	Usage
SelectSeq_PB	Bit	HI PB to Select Sequence
SelectModel_PB	Bit	HMI PB to Select Model List
SelectionUp_PB	Bit	HMI PB to Change Selected

System Label: GOTProdSchedule		
Member	Type	Usage
SelectionDown_PB	Bit	HMI PB to Change selected
SelectionPageUp_PB	Bit	HMI PB to Changes Viewed Data
SelectionPageDown_PB	Bit	HMI PB to Changes Viewed Data
Enter_PB	Bit	HMI PB enters model In sequence or changes the sequence to the selected model
ResetActuals_PB	Bit	HMI PB Reset the Actual Values
ClearAll_PB	Bit	HMI PB Clear the whole list
OnFirstSelection	Bit	HMI Indicator to prevent the HMI from loading an invalid page
OnLastSelection	Bit	HMI Indicator to prevent the HMI from loading an invalid page
ModelSelected_Ind	Bit	ON = Model List Selected
FullSequence	Bit	The Sequence Is Full, nothing can be added
InhibitEdit	Bit(1..12)	Prevents editing for the currently producing index
WriteCheck	Bit(1..12)	Signal to HMI that a target value has been edited
ModelListPos	Word[Signed]	Selected Model List Value
SeqListPos	Word[Signed]	Selected Sequence List Value
SeqListPage	Word[Signed]	Current sequence Page
SeqListMaxPage	Word[Signed]	Maximum page number of sequences
ModelListPage	Word[Signed]	Current Model Page
ModelListMaxPage	Word[Signed]	Maximum Model Page Number
SeqListSize	Word[Signed]	Size of the Sequence List

System Label: GOTProdSchedule		
Member	Type	Usage
ModelListSize	Word[Signed]	Size of the Model List
Targets	Word[Signed](1..12)	HMI Input/display of Target values
Actuals	Word[Signed](1..12)	HMI Actuals
Balances	Word[Signed](1..12)	HMI Balances (Target-Actual)
HMIStatus	Word[Signed](1..12)	Status Indicator
ProdSched_Targets	Word[Signed](1..24)	Stored Target Values for all possible sequences
ProdSched_Actuals	Word[Signed](1..24)	Stored Actual Values for all possible sequences
ProdSched_Balances	Word[Signed](1..24)	Stored Balanaces Values for all possible sequences
ProdSched_ModelPosition	Word[Signed](1..24)	Stored model Index for all possible sequences
CurrentPartNumber	Word[Unsigned](0..4)	Current Model Number
SelectedModels	Word[Unsigned](1..12,0..4)	Models In the List
ModelList	Word[Unsigned](1..20,0..4)	Models for selection

2. MELPT_MGMT_modelManagement

global Label: ModelMaint		
Member	Type	Usage
PartNumber	Word[Unsigned](0..4)	This information is displayed on-screen for the model list and the part type in the sequence list.
CODEPNumber	Word[Unsigned](0..5)	

global Label: ModelMaint		
Member	Type	Usage
CodeType	Word[Unsigned](0..1)	
ToolCount	Double Word[Unsigned]/Bit String[32-bit](1..300)	
ProgNum	Word[Unsigned](1..300)	
ErrorProofing	Word[Unsigned](1..100,0..4)	
IncomingModelNumber	Word[Unsigned](0..4)	
CODEPBool	Word[Unsigned]	

14.5 HMI-Model Management Overview

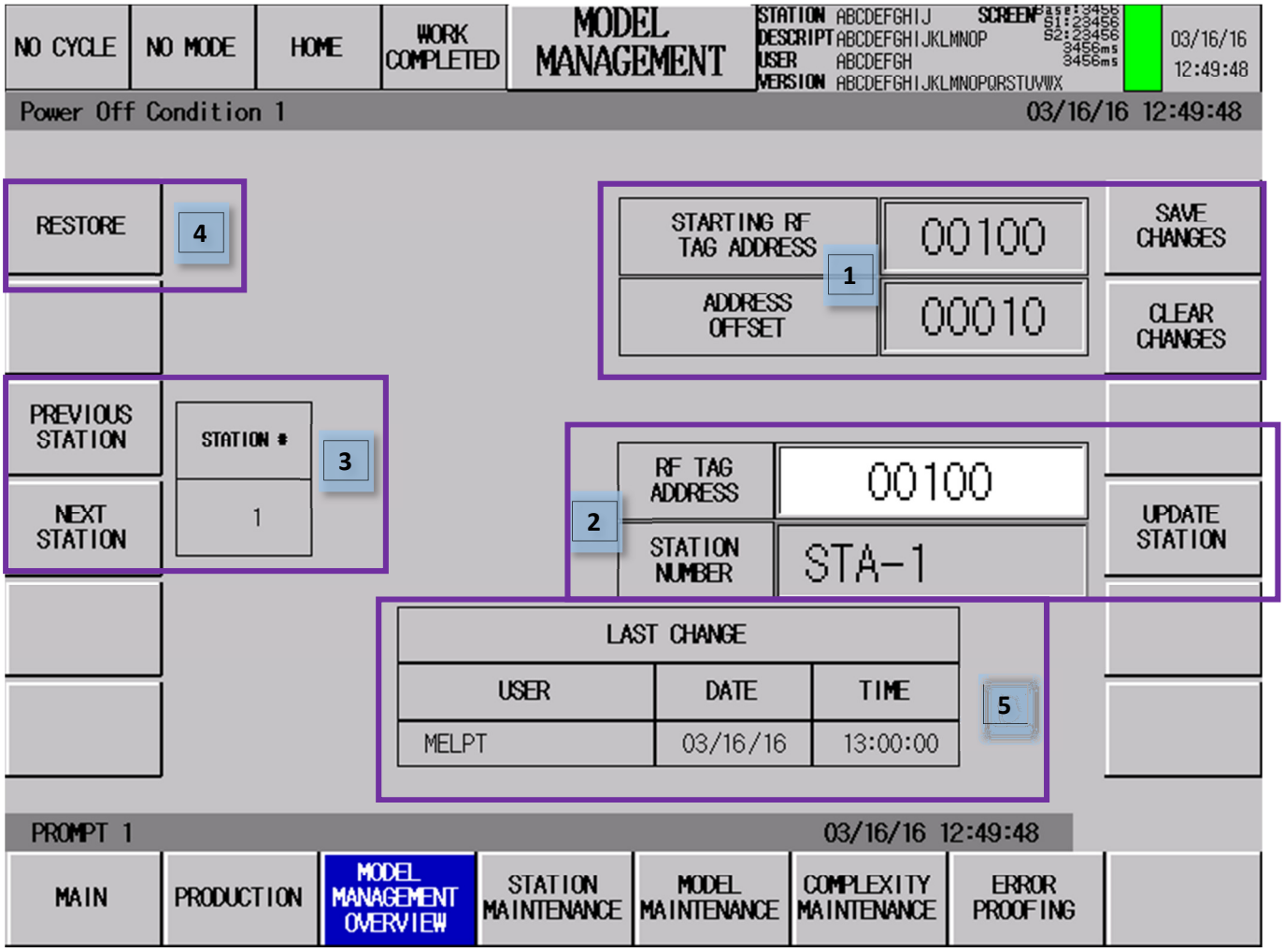


Figure 141-Model management Overview

Item #	Description	Object	Details
1	RF Tag Config		
	Starting RF Tag address	Numeric Input:	GOTModelManagement.StartingRFAddressInput Trigger device: GB65101==ON The starting RF byte address for station data This value adjusts items on the station Maintenance screen

Item #	Description	Object	Details
	Address Offset	Numeric Input:	GOTModelManagement.RFAddressOffset Trigger Device: GB65101==ON The offset in bytes between station data This value adjusts items on the station Maintenance screen
	Save changes	Bit Momentary:	GOTModelManagement.RFAddressInputSaveChanges Trigger Device: GB65101==ON Changes the RFID Station Starting address and offset in bytes
	Clear Changes	Bit Momentary:	GOTModelManagement.RFAddressInputClearChanges
2	Station Selection		
	RF Tag Address	Numeric Input	GOTModelManagement.RFAddressInput
	Station Number	ASCII Input	GOTModelManagement.StaNumberInput[0]
	Update Station	Bit Momentary switch:	GOTModelManagement.StaNumberUpdate Will Set The current station to the one at the RF-Address specified for editing
3	Station Selection		
	Previous station	Word Set Switch	GOTModelManagement.SelectedStationNumber -1 Trigger : GOTModelManagement.OnFirstStation =OFF Changes the Selected station by 1
	Next station	Word Set Switch	GOTModelManagement.SelectedStationNumber +1 Trigger : GOTModelManagement.OnLastStation =OFF Changes the Selected station by 1
4	Restore	Launches the Restore Window (W-5901)	
5	Last change Info		
	User	ASCII display:	GOTModelManagement.ChangeOperator[0]

Item #	Description	Object	Details
	Date	Numeric display:	GOTModelManagement.ChangeTime[1..3]
	Time	Numeric Display:	GOTModelManagement.ChangeTime[4..6]

14.6 HMI-Restore Window

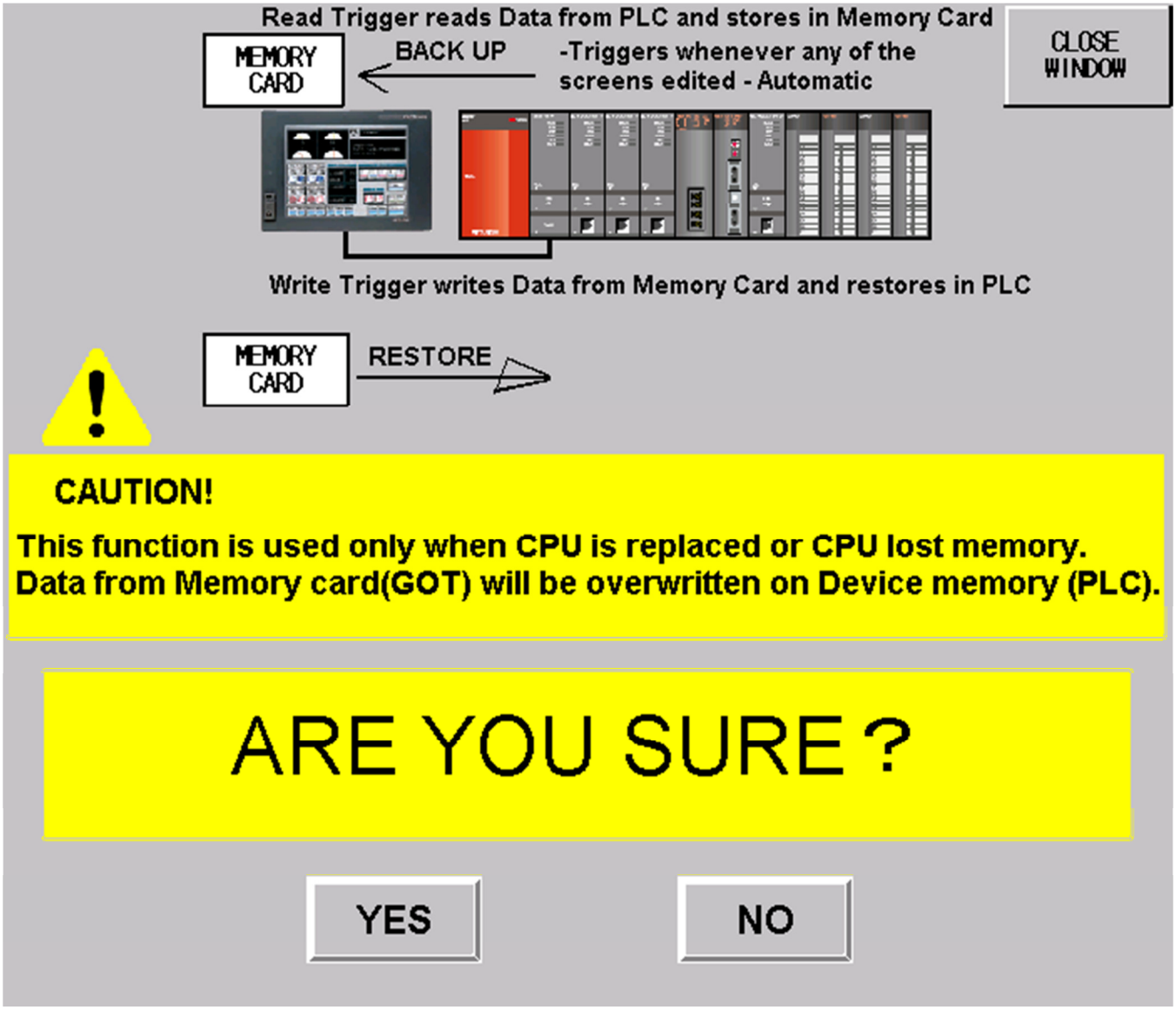


Figure 142-HMI Restore Window

From this window the HMI backup can be restored to the PLC, by pressing the yes button

14.7 HMI-Station Management

This screen allows an authenticated user to apply a station number to an RF Tag Address

When the number of stations is less than the number that can be displayed on screen the object is masked. This is gray test on gray background.

If a write check bit is true, navigation is not allowed before either a save changes or clear changes is applied. A dialog window will be launched on screen stating the scenario when navigation is attempted away before saving changes

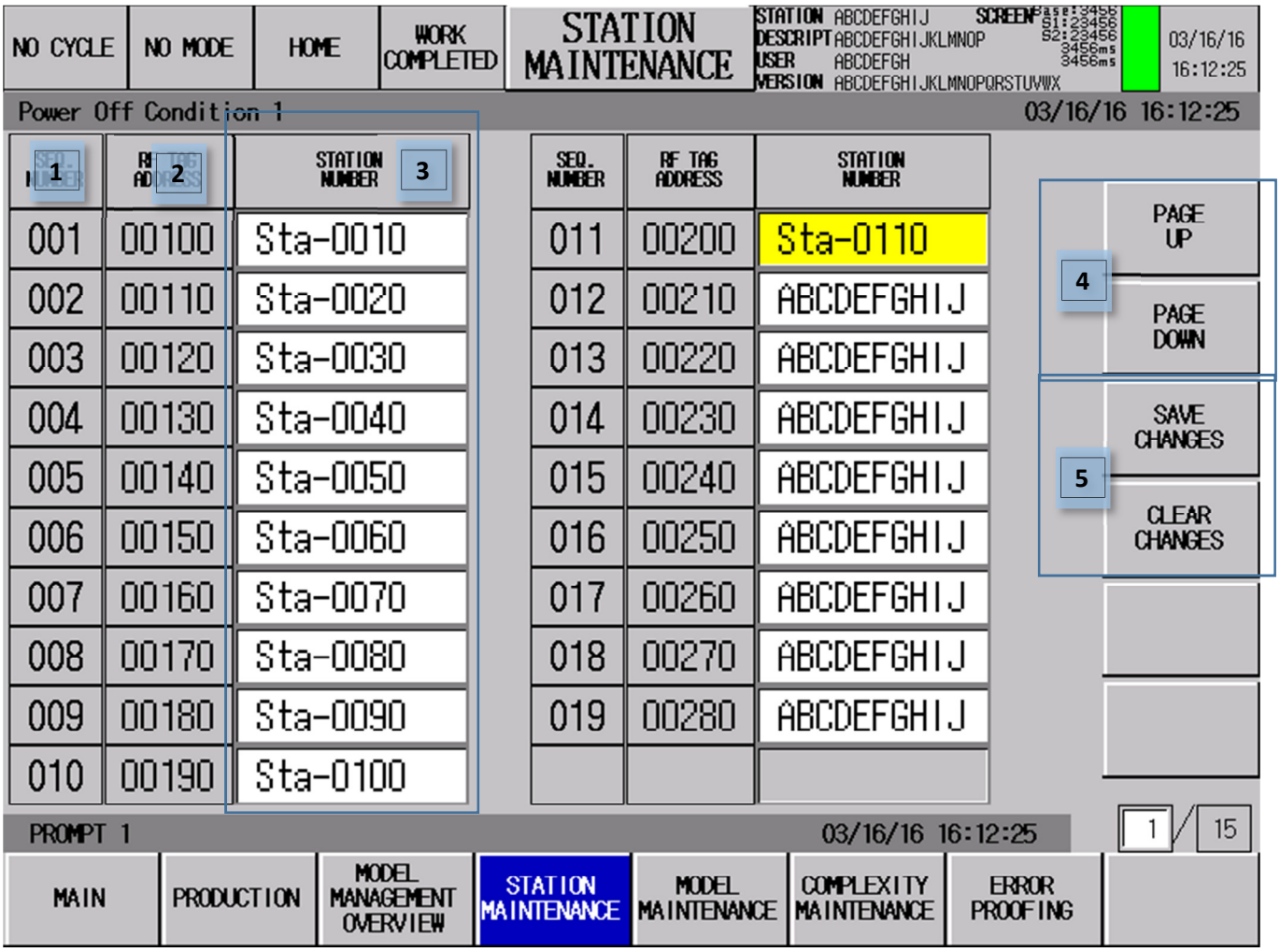


Figure 143-station Maintenance Screen

Item #	Description	Object	Details X=Entry Number
1	Sequence number	Numeric display	GOTModelManagement.StationMaintCurrentPage X + (($$ - 1) * GOTModelManagement.NumberOfRowsOnScreen)
2	RFID Address	Numeric Display	GOTModelManagement.RFTagAddress[X]
3	Station Name	ASCII Entry	GOTModelManagement.StaNumber[X,0] Trigger device= GB65101==ON && GOTModelManagement.StationMaintDisplayMask[X]==OFF HMI entry Sets the GOTModelManagement.StationMaintWriteCheck[X] bit TRUE
4	Page Control PB	Bit Momentary Push Buttons	Increment or decrements GOTModelManagement.StationMaintCurrentPage. If no Write check bits are on
5	Save Changes	Bit Momentary Push Buttons	GOTModelManagement.StationMaintSaveChanges Writes values with a True Write check to the PLC
	Clear changes	Bit Momentary Push Buttons	GOTModelManagement.StationMaintClearChanges Clears all Write checks, Reloads the HMI data from the PLC data.

14.8 HMI-Model Management

This screen runs a screen script which loads a different window depending on if this is a machining or assembly application.

If a write check bit is true, navigation is not allowed before either a save changes or clear changes is applied. A dialog window will be launched on screen stating the scenario when navigation is attempted away before saving changes

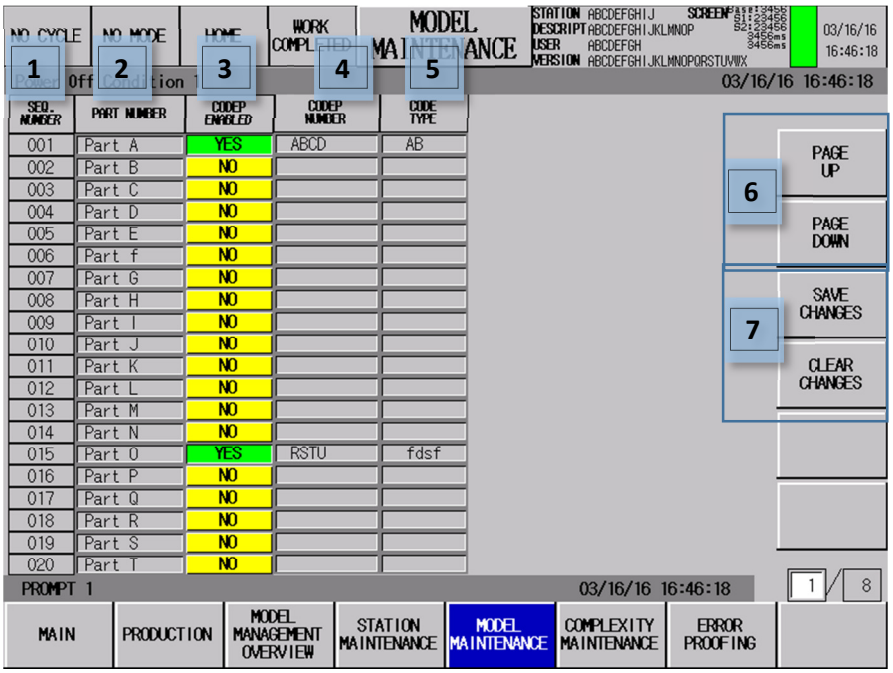


Figure 144-Assembly Model Maintenance

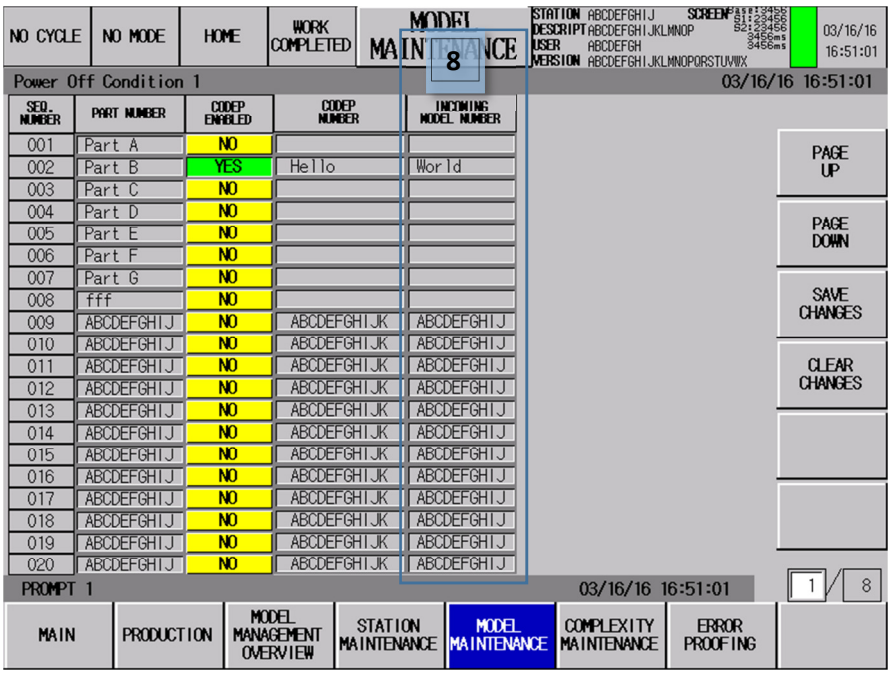


Figure 145-Machining Model Maintenance

Item #	Description Object	Device	Details X=Entry Number
1	Seq Number Numeric Display	GOTModelManagement. ModelMaintCurrentPage	X + (($$ - 1) * GOTModelManagement.NumberOfRowsOnScreen)
2	Part Number ASCII Input	GOTModelManagement. PartNumber[X,0]	Trigger: GB65101 ==ON Script: Input Fixation: set([<t:GOTModelManagement.ModelMaintWriteCheck[X]>]);
3	Codep Enabled Word Set Switch	GOTModelManagement. CODEPBool[X]==1	Sets: :GOTModelManagement.ModelMaintWriteCheck[X] OFF: NO ON: YES
4	Codep Number	GOTModelManagement.	Trigger: GB65101 ==ON

Item #	Description Object	Device	Details X=Entry Number
	ASCII Input	CODEPNumber[X,0]	Script: Input Fixation: set([<t:GOTModelManagement.ModelMaintWriteCheck[X]>]);
5	Codep Type ASCII Input	GOTModelManagement.CodeType[0,0]	Trigger: GB65101 ==ON Script: Input Fixation: set([<t:GOTModelManagement.ModelMaintWriteCheck[X]>]);
6	Page Up Word Set Switch	GOTModelManagement.ModelMaintCurrentPage	Subtracts 1 Trigger: GOTModelManagement.ModelMaintOnFirstPage =OFF and GOTModelManagement.ModelManageWriteCheckOn==OFF
	Page Down Word Set Switch	GOTModelManagement.ModelMaintCurrentPage	Adds 1 Trigger: GOTModelManagement.ModelMaintOnFirstPage =OFF and GOTModelManagement.ModelManageWriteCheckOn==OFF
7	Save Changes Bit Momentary Switch	GOTModelManagement.ModelMaintSaveChanges	Writes Values with Write Check Bit to the PLC.
	Clear Changes Bit Momentary Switch	GOTModelManagement.ModelMaintClearChanges	Clears the Write Check Bits and Reloads the Screen with PLC Data.

Item #	Description Object	Device	Details X=Entry Number
8	Incoming Model Number ASCII Input	GOTModelManagement.IncomingModelNumber[X,0]	Trigger: GB65101 ==ON Script: Input Fixation: set([<t:GOTModelManagement.ModelMaintWriteCheck[X]>]);

14.9 HMI-Complexity Management

This screen is used to associate a program number and tool hits to a part number PER Station.

In a machining application the tool counts are not shown

If a write check bit is true, navigation is not allowed before either a save changes or clear changes is applied. A dialog window will be launched on screen stating the scenario when navigation is attempted away before saving changes

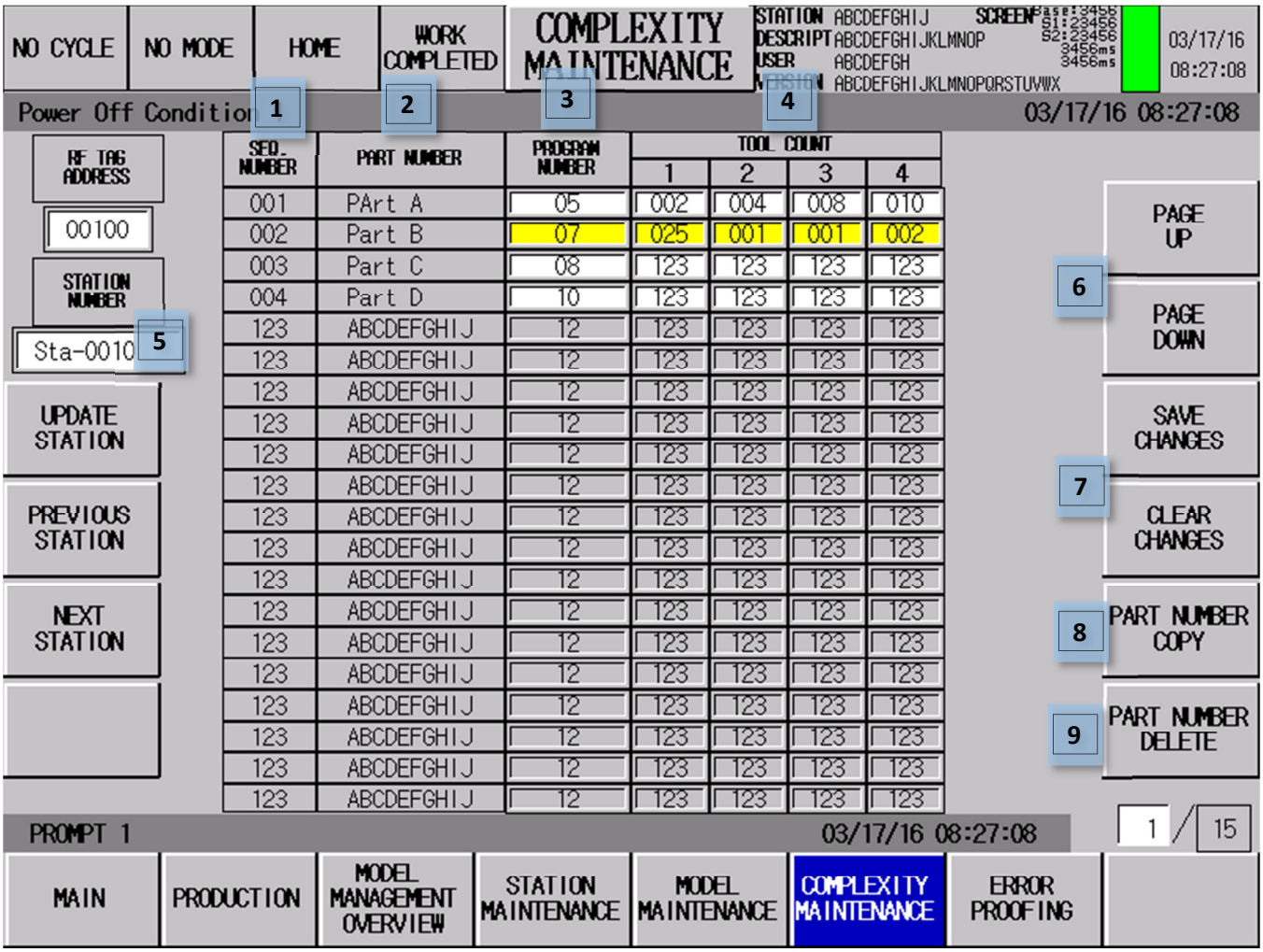


Figure 146-Complexity Maintenance

<table>
<tr><th>Item #</th><th>Description
Object</th><th>Device</th><th>Details
X=Entry Number</th></tr>
<tr><td>1</td><td>Seq Number
Numeric Display</td><td>GOTModelManagement.
ModelMaintCurrentPage</td><td>X + (($$ - 1) *
GOTModelManagement.NumberOfRowsOnScreen)</td></tr>
<tr><td>2</td><td>Part Number
ASCII Display</td><td>GOTModelManagement.
PartNumber[X,0]</td><td></td></tr>
<tr><td>3</td><td>Program Number
Numeric Entry</td><td>GOTModelManagement.
ProgramNumber[X]</td><td>Trigger: GB65101==ON
Sets Write Check:
GOTModelManagement.PartNumberMaintWriteCheck[X]</td></tr>
<tr><td>4</td><td>Tool Hits
Numeric Input:</td><td>GOTModelManagement.
ToolCount[X]</td><td>Each count is byte in double word
<table>
<tr><th colspan="4">Tool Count</th></tr>
<tr><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>.b24-.b31</td><td>.b16-.b23</td><td>.b8-.b15</td><td>.b0-.b7</td></tr>
</table>
This window is not shown in machining environment</td></tr>
<tr><td rowspan="5">5</td><td colspan="3">Station Selection</td></tr>
<tr><td>RF Tag Address</td><td>Numeric Input</td><td>GOTModelManagement.RFAddressInput</td></tr>
<tr><td>Station Number</td><td>ASCII Input</td><td>GOTModelManagement.StaNumberInput[0]</td></tr>
<tr><td>Update Station</td><td>Bit Momentary switch:</td><td>GOTModelManagement.StaNumberUpdate
Will Set The current station to the one at the RF-Address specified for editing</td></tr>
<tr><td colspan="3">Station Selection</td></tr>
</table>

Item #	Description Object	Device	Details X=Entry Number
	Previous station	Word Set Switch	GOTModelManagement.SelectedStationNumber -1 Trigger : GOTModelManagement.OnFirstStation =OFF Changes the Selected station by 1
	Next station	Word Set Switch	GOTModelManagement.SelectedStationNumber +1 Trigger : GOTModelManagement.OnLastStation =OFF Changes the Selected station by 1
6	Page Up Word Set Switch	GOTModelManagement.PartNumberMaintCurrentPage	Subtracts 1 Trigger: GOTModelManagement.PartNumberMaintOnFirstPage =OFF and GOTModelManagement.ModelManageWriteCheckOn==OFF
	Page Down Word Set Switch	GOTModelManagement.PartNumberMaintCurrentPage	Adds 1 Trigger: GOTModelManagement.PartNumberMaintOnFirstPage =OFF and GOTModelManagement.ModelManageWriteCheckOn==OFF
7	Save Changes Bit Momentary Switch	GOTModelManagement.PartNumberMaintSaveChanges	Writes Values with Write Check Bit to the PLC.
	Clear Changes Bit Momentary Switch	GOTModelManagement.PartNumberMaintClearChanges	Clears the Write Check Bits and Reloads the Screen with PLC Data.

Item #	Description Object	Device	Details X=Entry Number
8	Part Number Copy	Launches the Part Number Copy Window (W5935 or 5936) 5935=Assembly 5936=Machining	
9	Part Number Delete	Launches the Part Number Copy Window (W5937 or 5938) 5937=Assembly 5938=Machining	

14.10 HMI-Part Number Copy Window

This window is used to copy data for one part number to another part number across all stations under control of model management. This includes the error proofing strings applied to the original part number.

Error Proofing strings will need to be adjusted as needed.

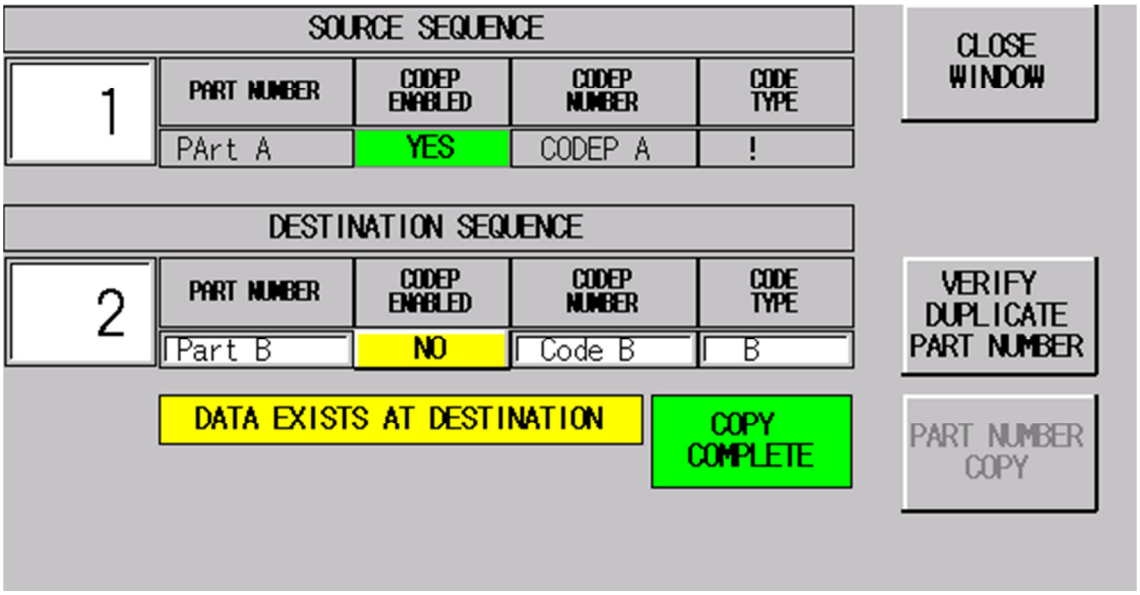


Figure 147-Assembly Part Number Copy

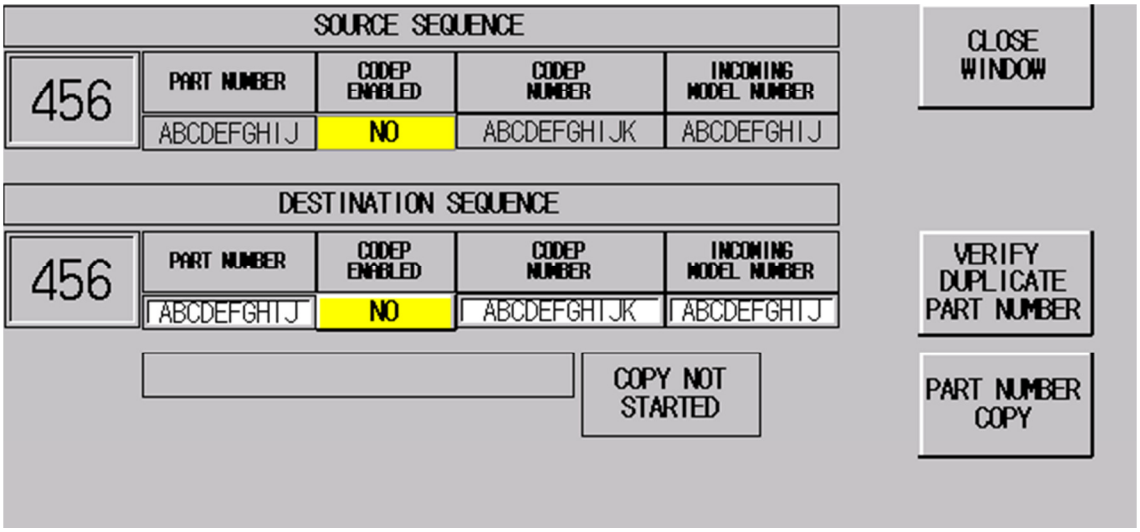


Figure 148-Machining PArt Number OCpy

Sequence:

1) Select Source Sequence Number by using numeric entry on window
    - Source Part Number is Displayed
2) Select Destination
    - Destination Data is displayed
        - If Exists Indicator displays Data Exists at Destination
3) Verify Duplicate Part Number
    - This sequence check to make sure the part number is not duplicated by this operation the part number of the destination needs to be unique from the source.
4) If Verification is successful, PART Number Copy Button becomes available.
5) Press the Part Number Copy Button
6) This button will copy the part data including program number and tool hits across all stations and error proofing information to the new part number.
7) The indicator will display Copy Complete

14.11 HMI-Part Number Delete Window

This window allows an authenticated user to delete a part number from the system.

Sequence:

1) Select Source Sequence Number by using numeric entry on window
   - Source Part Number is Displayed
2) Press Part Number Delete Push Button

Indicator will display delete complete when done.

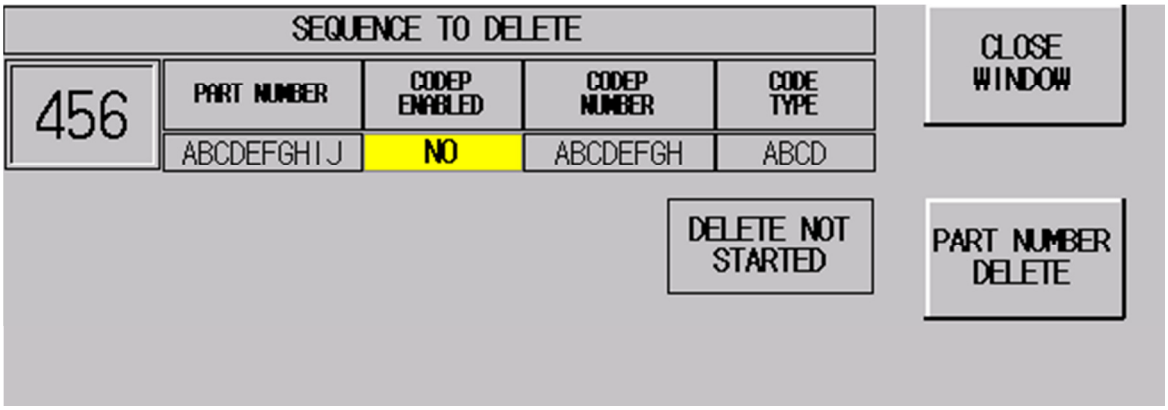


Figure 149-Assembly Part Number Delete

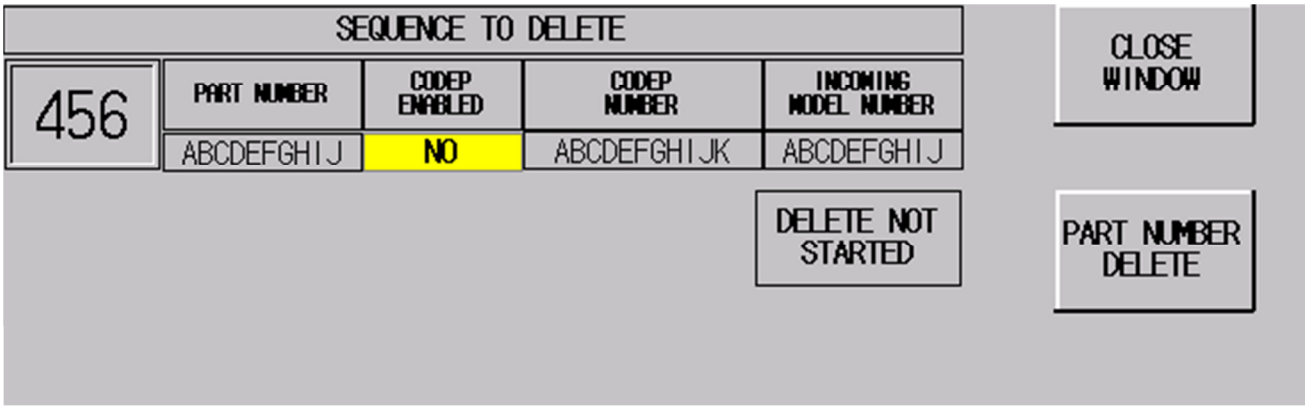


Figure 150- Machining PArt Number Delete

14.12 HMI-Error Proofing

This screen allows an authenticated user to change the 100 possible error proofing strings per part number

If a write check bit is true, navigation is not allowed before either a save changes or clear changes is applied. A dialog window will be launched on screen stating the scenario when navigation is attempted away before saving changes

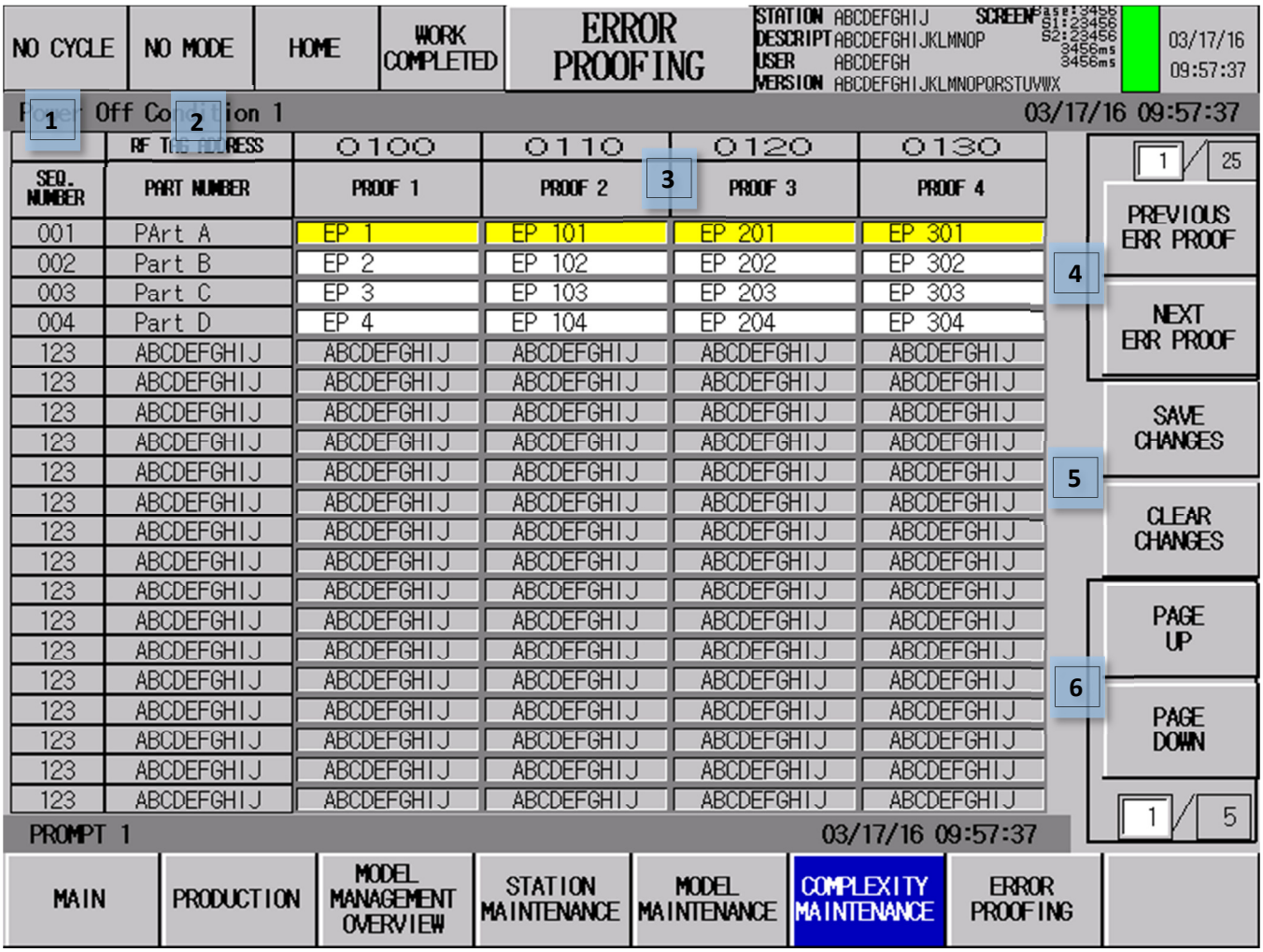


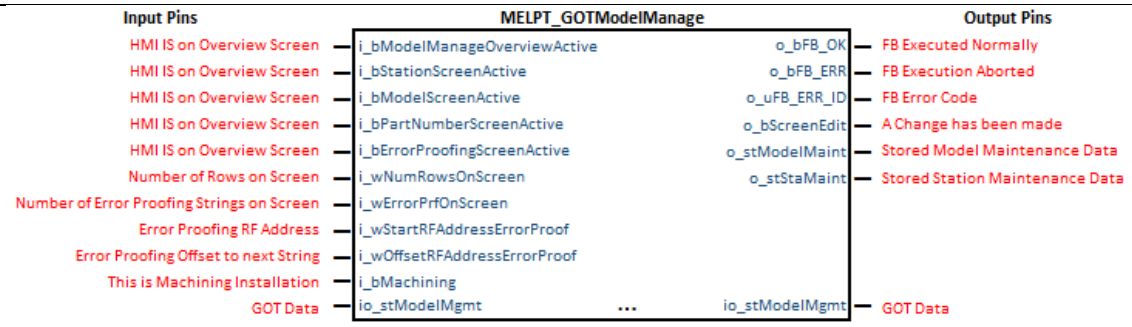
Figure 151-Error Proofing Screen

Item #	Description Object	Device	Details X=Entry Number
1	Seq Number Numeric Display	GOTModelManagement. ModelMaintCurrentPage	X + (($$ - 1) * GOTModelManagement.NumberOfRowsOnScreen)
2	Part Number ASCII Display	GOTModelManagement. PartNumber[X,0]	
3	RF Tag Address	Numeric Display:	V = ((0 * [<t:GOTModelManagement.ErrorProofRFTagOffset>]) + ((($$ - 1) * [<t:GOTModelManagement.NumberOfErrorProofOnScreen>] * [<t:GOTModelManagement.ErrorProofRFTagOffset>]) + [<t:GOTModelManagement.ErrorProofRFTagStartAddress>]));
	Proof Number	Word Comment Display:	GOTModelManagement.ErrorProofStringIndex 10X + (($$ - 1) * 4)
	Proof1	GOTModelManagement. ErrProof[x,1,0]	Trigger: Gb65101 Input Fixation Script"" set([<t:GOTModelManagement.ErrorProofWriteCheck[X]>]);
	Proof 2	GOTModelManagement. ErrProof[x,2,0]	Trigger: Gb65101 Input Fixation Script"" set([<t:GOTModelManagement.ErrorProofWriteCheck[X]>]);
	Proof 3	GOTModelManagement. ErrProof[x,3,0]	Trigger: Gb65101 Input Fixation Script"" set([<t:GOTModelManagement.ErrorProofWriteCheck[X]>]);

Item #	Description Object	Device	Details X=Entry Number
	Proof 4	GOTModelManagement. ErrProof[x,4,0]	Trigger: Gb65101 Input Fixation Script”” set([<t:GOTModelManagement.ErrorProofWriteCheck[X]>]);
4	Previous Error Proof	Word Set Switch	GOTModelManagement.ErrorProofStringIndex-1
4	Next Error Proof	Word Set Switch	GOTModelManagement.ErrorProofStringIndex+1
5	Save Changes	Bit Momentary	GOTModelManagement.ErrorProofSaveChanges Writes Data With Write Check Bit True to PLC,
5	Clear Changes	Bit Momentary	GOTModelManagement.ErrorProofClearChanges Clears Write Check Bits, Reloads HMI Data
6	Page Up	Word Set Switch	GOTModelManagement.ErrorProofCurrentPage-1
6	Page Down	Word Set Switch	GOTModelManagement.ErrorProofCurrentPage+1

14.13 PLC-Model Management

FB Name
MELPT_GOTModelManage

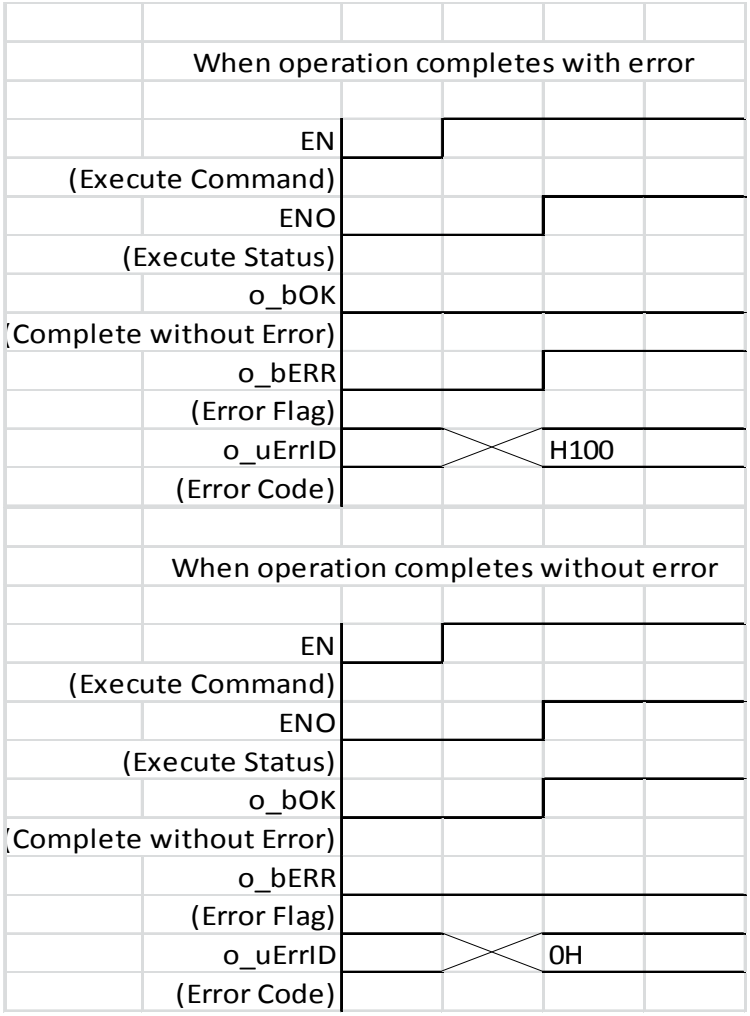
Function Overview	
Item	Description
Function overview	This function block interfaces with the hmi to allow modification of the model management data which includes 300 stations, 160 parts, and 100 error proofing strings per part.
Symbol	
Applicable Hardware	
Applicable Software	
Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 4187 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Device Memory Used	182 bits 182011 words 5 bits
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the following SDT reside on the PLC MELPT_MGMT_ModelManagement MELPT_MGMT_StationManagement MELPT_MGMT_GOTModelMgmt
Function description	This function block displays Model management information on the HMI. With proper authentication the user can modify the PLC information. When Data is Changes o_bScreenEdit is true for one scan. Additional PLC uses this signal to place the Operator name and Time Stamp on the HMI
Restrictions and precautions	Index Z16 thru z19 are used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101(257)	Number of Rows on Screen Less than or equal to 0
H102(258)	Number of Rows on Screen Greater than 20
H103(259)	Number of ErrorProofs on Screen Less than or equal to 0
H104(260)	Number of ErrorProofs on Screen Greater than 4
H105(261)	Starting RF Tag Address for ErrorProof Less than or equal to 0

Error Code	Description
H106(262)	Starting RF Tag Address for ErrorProof Greater than 32000
H107(263)	Offset RF Tag Address for ErrorProof Less than or equal to 0
H108(264)	Offset RF Tag Address ErrorProof Greater than 20

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
	HMI IS on Overview Screen	i_bModelManageOverviewActive	Bit		HMI on Model Management Overview Screen
	HMI IS on Overview Screen	i_bStationScreenActive	Bit		HMI on Station Maint Management Screen
	HMI IS on Overview Screen	i_bModelScreenActive	Bit		HMI on Model Maint Management Screen
	HMI IS on Overview Screen	i_bPartNumberScreenActive	Bit		HMI on Part Number Maint Management Screen
X	HMI IS on Overview Screen	i_bErrorProofingScreenActive	Bit		HMI on Error Proofing Maint Management Screen
X	Number of Rows on Screen	i_wNumRowsOnScreen	Word[Signed]	1 to 20	Number of Rows to display on screen

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Number of Error Proofing Strings on Screen	i_wErrorPrfOnScreen	Word[Signed]	1 to 4	Numberof ErrorProof to display on screen
X	Error Proofing RF Address	i_wStartRFAddressErrorProof	Word[Signed]		Starting RF Tag Address for ErrorProof
X	Error Proofing Offset to next String	i_wOffsetRFAddressErrorProof	Word[Signed]		Offset RF Tag Address for ErrorProof
X	This is Machining Installation	i_bMachining	Bit		Michining=TRUE / Assembly=FALSE

- Input/Output Labels

User Input	Symbol Name	Var_In_out name	Data Type	Setting range	Description
	GOT Data	io_stModelMgmt	MELPT_MGMT_GOTModelMgmt		GOT Screens to SDT and Control to FB interface

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Execute Normal	o_bFB_OK	Bit	When TRUE, indicates processing has completed normally
FB Execute Abnormal	o_bFB_ERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uFB_ERR_ID	Word[Unsigned]	FB Error Code Output
On First Page of Data	o_bScreenEdit	Bit	Any Maint Management Screen edit

Symbol Name	Var_Output name	Data Type	Description
On Last Page of Data	o_stModelMaint	MELPT_MGMT_ModelManagement(1..160)	Model Maintenance SDT update
Hides rows over max part types	o_stStaMaint	MELPT_MGMT_StationManagement(1..300)	Station Maintenance SDT update

FB Version Upgrade History

Version	Description
3.00	Re-write to V10.0 spec
3.02	Moved Model Change Output to internal variable

SDT Usage

1. MELPT_MGMT_ModelManagement

Global Label: ModelMAint		
Member	Type	Usage
PartNumber	Word[Unsigned](0..4)	Stored and retrieved by HMI
CODEPNumber	Word[Unsigned](0..5)	Stored and retrieved by HMI
CodeType	Word[Unsigned](0..1)	Stored and retrieved by HMI
ToolCount	Double Word[Unsigned]/Bit String[32-bit](1..300)	Stored and retrieved by HMI
ProgNum	Word[Unsigned](1..300)	Stored and retrieved by HMI
ErrorProofing	Word[Unsigned](1..100,0..4)	Stored and retrieved by HMI
IncomingModelNumber	Word[Unsigned](0..4)	Stored and retrieved by HMI for machining

Global Label: ModelMAint		
Member	Type	Usage
CODEPBool	Word[Unsigned]	Boolean Stored as word for retention

2. MELPT_MGMT_StationManagement

Global Label: StationMaint		
Member	Type	Usage
StationNumber	Word[Unsigned](0..4)	Stored Station Number
RFTagAddress	Word[Signed]	Calculated by FB from Starting address input by HMI

3. MELPT_MGMT_GOTModelMgmt

System Label: GOTModelManagement		
Member	Type	Usage
CopyPermission	Bit	
DeletePermission	Bit	
CopyOverwrite	Bit	
PartNumberCopy	Bit	
PartNumberDelete	Bit	
OnFirstStation	Bit	Set By PLC to prevent HMI from navigating less than station 1
OnLastStation	Bit	Set By PLC to prevent HMI from navigating greater than max station
StationMaintOnFirstPage	Bit	Set By PLC to prevent HMI from navigating less than station 1
StationMaintOnLastPage	Bit	Set By PLC to prevent HMI from navigating greater than max station
ModelMaintOnFirstPage	Bit	Set By PLC to prevent HMI from navigating less than model 1

System Label: GOTModelManagement		
Member	Type	Usage
ModelMaintOnLastPage	Bit	Set By PLC to prevent HMI from navigating greater than max model
PartNumberMaintOnFirstPage	Bit	Set By PLC to prevent HMI from navigating less than Part Number 1
PartNumberMaintOnLastPage	Bit	Set By PLC to prevent HMI from navigating greater than max Part Number
ErrorProofOnFirstPage	Bit	Set By PLC to prevent HMI from navigating less than Error Proofing Part Number1
ErrorProofOnLastPage	Bit	Set By PLC to prevent HMI from navigating greater than max Part Number
ErrorProofOnFirstString	Bit	Set By PLC to prevent HMI from navigating less than Error Proofing String #1
ErrorProofOnLastString	Bit	Set By PLC to prevent HMI from navigating past Error Proofing String 100
StationMaintSaveChanges	Bit	HMI PB Save Changes From Station Maintenance
StationMaintClearChanges	Bit	HMI PB Clears Changes From Station Maintenance
ModelMaintSaveChanges	Bit	HMI PB Save Changes From Model Maintenance
ModelMaintClearChanges	Bit	HMI PB Clears Changes From Model Maintenance
PartNumberMaintSaveChanges	Bit	HMI PB Save Changes From Complexity Maintenance Screen
PartNumberMaintClearChanges	Bit	HMI PB Clears Changes From Complexity Maintenance Screen

System Label: GOTModelManagement		
Member	Type	Usage
ErrorProofSaveChanges	Bit	HMI PB Save Changes From Error Proofing Screen
ErrorProofClearChanges	Bit	HMI PB Clears Changes From Error Proofing Screen
RFAddressInputWriteCheck	Bit	Set By HMI when Station under Edit RF Address is being changed
StaNumberInputWriteCheck	Bit	Set By HMI when Station under Edit Station Number is being changed
BackUpToMemoryCard	Bit	
RestoreFromMemoryCard	Bit	HMI PB
Machining	Bit	Set By FB When Maching Installation
StationMaintWriteCheckOn	Bit	Set by FB when any Station Maintenance Write Check TRUE
ModelMaintWriteCheckOn	Bit	Set by FB when any Model Maintenance Write Check TRUE
PartNumberMaintWriteCheckOn	Bit	Set by FB when any Complexity Maintenance Write Check TRUE
ErrorProofWriteCheckOn	Bit	Set by FB when any Error PRoofing Write Check TRUE
ModelManageWriteCheckOn	Bit	Set By FB when any Write Check oN
RFAddressInputInvalid	Bit	
StaNumberInputInvalid	Bit	
StaNumberUpdate	Bit	

System Label: GOTModelManagement		
Member	Type	Usage
RFAddrStaNumInvalid	Bit	
RFAddressInputSaveChanges	Bit	
RFAddressInputClearChanges	Bit	
StartOffsetRFAddressWriteCheck	Bit	
CopySourceWriteCheck	Bit	
CopyDestWriteCheck	Bit	
VerifyDuplicatePartNumber	Bit	
DuplicatePartNumberExists	Bit	
StationMaintWriteCheck	Bit(0..19)	
ModelMaintWriteCheck	Bit(0..19)	
PartNumberMaintWriteCheck	Bit(0..19)	
ErrorProofWriteCheck	Bit(0..19)	
StationMaintDisplayMask	Bit(0..19)	
RFAddressInput	Word[Unsigned]	
StaNumberInput	Word[Unsigned](0..4)	
StartingRFAddressInput	Word[Unsigned]	
RFAddressOffset	Word[Unsigned]	

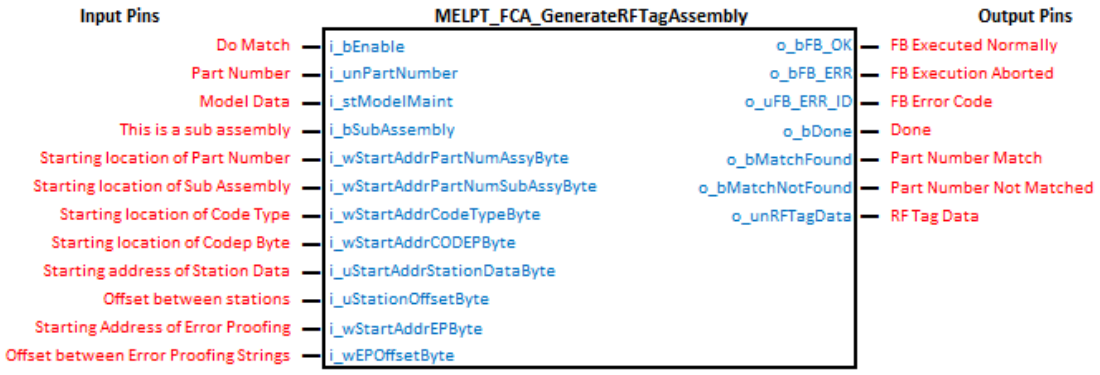
System Label: GOTModelManagement		
Member	Type	Usage
RFStoredOffsetBytes	Word[Unsigned]	
StationMaintCurrentPage	Word[Signed]	
StationMaintTotalPages	Word[Signed]	
ModelMaintCurrentPage	Word[Signed]	
ModelMaintTotalPages	Word[Signed]	
PartNumberMaintCurrentPage	Word[Signed]	
PartNumberMaintTotalPages	Word[Signed]	
ErrorProofCurrentPage	Word[Signed]	
ErrorProofTotalPages	Word[Signed]	
ErrorProofStringIndex	Word[Signed]	
ErrorProofMaxStrings	Word[Signed]	
SelectedStationNumber	Word[Signed]	
CopySource	Word[Signed]	
CopyDestination	Word[Signed]	
CopyStatus	Word[Signed]	HMI Indicator Set By FB
DeleteStatus	Word[Signed]	HMI Indicator Set By FB
NumberOfRowsOnScreen	Word[Signed]	Set By FB for index calculation
HMINumber	Word[Signed]	Set BY HMI when Change is Made
ErrorProofRFTagStartAddress	Word[Signed]	Set by FB Input Pins

System Label: GOTModelManagement		
Member	Type	Usage
ErrorProofRFTagOffset	Word[Signed]	Set by FB Input Pins
NumberOfErrorProofOnScreen	Word[Signed]	
ChangeOperator	Word[Unsigned](0..7)	HMI Display Set By PLC When Change Made
ChangeTime	Word[Signed](1..6)	HMI Display Set by PLC When Change Made
RFTagAddress	Word[Unsigned](0..19)	Set By FB for index calculation
StaNumber	Word[Unsigned](0..19,0..4)	HMI Display of Station Numbers
PartNumber	Word[Unsigned](0..19,0..4)	HMI Display of Part Numbers
CODEPBool	Word[Unsigned](0..19)	HMI Display of Codep Bools
CODEPNumber	Word[Unsigned](0..19,0..5)	HMI Display of Codep Numbers
CodeType	Word[Unsigned](0..19,0..1)	HMI Display of Code Types
ErrProof	Word[Unsigned](0..19,1..4,0..4)	HMI Display of Error Proofs
IncomingModelNumber	Word[Unsigned](0..19,0..4)	
ProgramNumber	Word[Unsigned](0..19)	
ToolCount	Double Word[Unsigned]/Bit String[32-bit](0..19)	
PartNumberCopySource	Word[Unsigned](0..4)	
CODEPBoolCopySource	Word[Unsigned]	
CODEPNumberCopySource	Word[Unsigned](0..5)	
CodeTypeCopySource	Word[Unsigned](0..1)	

System Label: GOTModelManagement		
Member	Type	Usage
IncomingModelNumber CopySource	Word[Unsigned](0..4)	
PartNumberCopyDest	Word[Unsigned](0..4)	
CODEPBoolCopyDest	Word[Unsigned]	
CODEPNumberCopyDest	Word[Unsigned](0..5)	CODEP Number Copy Destination
CodeTypeCopyDest	Word[Unsigned](0..1)	Copy Window Code Type Destination
IncomingModelNumber CopyDest	Word[Unsigned](0..4)	Copy Destination Window Incoming Model Number Destination

14.14 PLC-RF Tag Assembly

FB Name
MELPT_FCA_GenerateRFTagAssembly

Function Overview	
Item	Description
Function overview	This function blocks creates a tag structure for use by an RFID Function block. A Part Number is provided as an input, the part number will be matched and the tag structure created based off the inputs to the function block
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

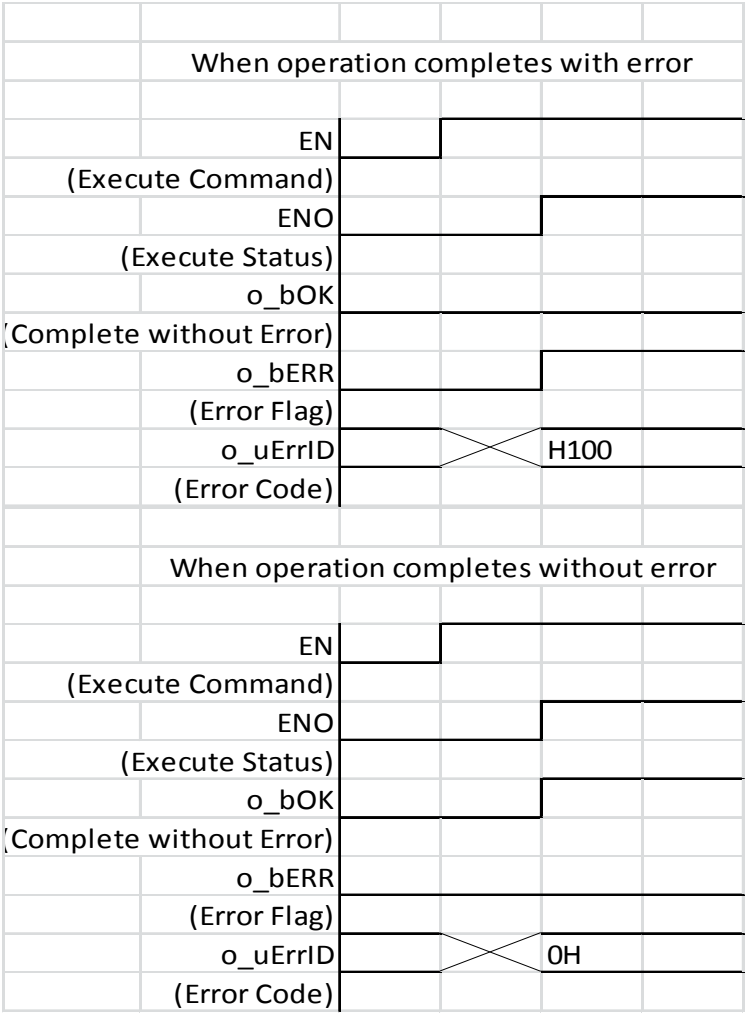
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD

Number of Ladder Steps	QnU: 558 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition
Device Memory Used	182 bits 185290 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the following SDT reside on the PLC MELPT_MGMT_ModelManagement
Function description	
Restrictions and precautions	Index Z16 thru z19 are used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101(257)	Starting RF Tag Address for Part Number Assembly Less than 0
H102(258)	Starting RF Tag Address for Part Number Assembly Greater than 100
H103(259)	Starting RF Tag Address for Part Number Sub Assembly Less than 0
H104(260)	Starting RF Tag Address for Part Number SubAssembly Greater than 100
H105(261)	Starting RF Tag Address for Code Type Less than 0

Error Code	Description
H106(262)	Starting RF Tag Address for Code Type Greater than 100
H107(263)	Starting RF Tag Address for CODEP Number Less than 0
H108(264)	Starting RF Tag Address for CODEP Number Greater than 100
H113(275)	Starting RF Tag Address for ErrorProof Less than or equal to 0
H114(276)	Starting RF Tag Address for ErrorProof Greater than 32000

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Do Match	i_bEnable	Bit		Start populating Assembly RF Tag SDT Data
X	Part Number	i_unPartNumber	Word[Unsigned](0..4)		Production Schedule current Part Number
	Model Data	i_stModelMaint	MELPT_MGMT_ModelManagement(1..160)		Model Maintenance SDT Data
X	This is a sub assembly	i_bSubAssembly	Bit		Sub Assembly = TRUE, Final Assembly = FALSE
X	Starting location of Part Number	i_wStartAddrPartNumAssyByte	Word[Signed]		Start Address on RF Tag for Part Number Assembly
X	Starting location of Sub Assembly	i_wStartAddrPartNumSubAssyByte	Word[Signed]	1 to 20	Start Address on RF Tag for Part Number SubAssembly

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Starting location of Code Type	i_wStartAddrCodeTypeByte	Word[Signed]	1 to 4	Start Address on RF Tag for Code Type
X	Starting location of Codep Byte	i_wStartAddrCODEPByte	Word[Signed]		Start Address on RF Tag for CODEP
X	Starting address of Station Data	i_uStartAddrStationDataByte	Word[Unsigned]		Start Address on RF Tag for Program Number
X	Offset between stations	i_uStationOffsetByte	Word[Unsigned]		Offset between station data entry

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed Normally	o_bFB_OK	Bit	When TRUE, indicates processing has completed normally
FB Execution Aborted	o_bFB_ERR	Bit	When TRUE, indicates an Error has occurred
FB Error Code	o_uFB_ERR_ID	Word[Unsigned]	FB Error Code Output
Done	o_bDone	Bit	Completion of Populating Assembly RF Data to SDT
Part Number Match	o_bMatchFound	Bit	Production Schedule current Part Number Match Found
Part Number Not Matched	o_bMatchNotFound	Bit	Production Schedule current Part Number Match NOT Found
RF Tag Data	o_uRFTagData	Word[Unsigned]	Assembly RF Tag SDT Data

FB Version Upgrade History

Version	Description
3.00	New Function Block
3.02	Words to Bytes

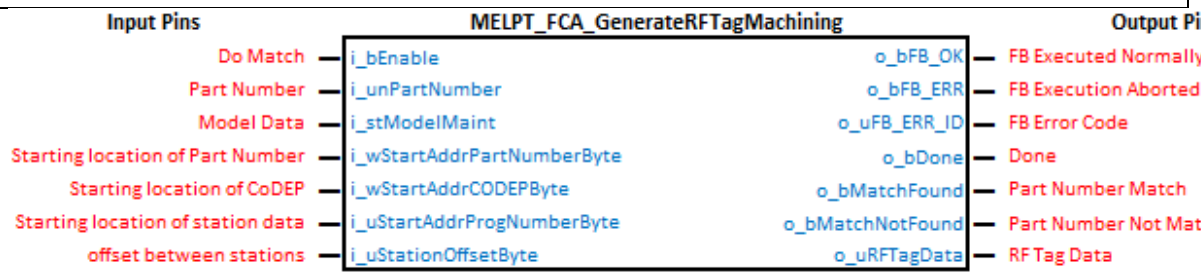
SDT Usage

1. MELPT_MGMT_ModelManagement

Global Label: ModelMAint		
Member	Type	Usage
PartNumber	Word[Unsigned](0..4)	Comparison
CODEPNumber	Word[Unsigned](0..5)	Written to Tag Structure
CodeType	Word[Unsigned](0..1)	Written to Tag Structure
ToolCount	Double Word[Unsigned]/Bit String[32-bit](1..300)	Written to Tag Structure
ProgNum	Word[Unsigned](1..300)	Written to Tag Structure
ErrorProofing	Word[Unsigned](1..100,0..4)	Written to Tag Structure
IncomingModelNumber	Word[Unsigned](0..4)	Written to Tag Structure
CODEPBool	Word[Unsigned]	

14.15 PLC-RF Tag Machining

FB Name
MELPT_FCA_GenerateRFTagMachining

Function Overview	
Item	Description
Function overview	This function blocks creates a tag structure for use by an RFID Function block. A Part Number is provided as an input, the part number will be matched and the tag structure created based off the inputs to the function block
Symbol	
Applicable Hardware	

Series	Model	Serial Restriction
MELSEC-Q series	Universal Model	None
GOT 1000 series	GT16(800*600) or Higher	None

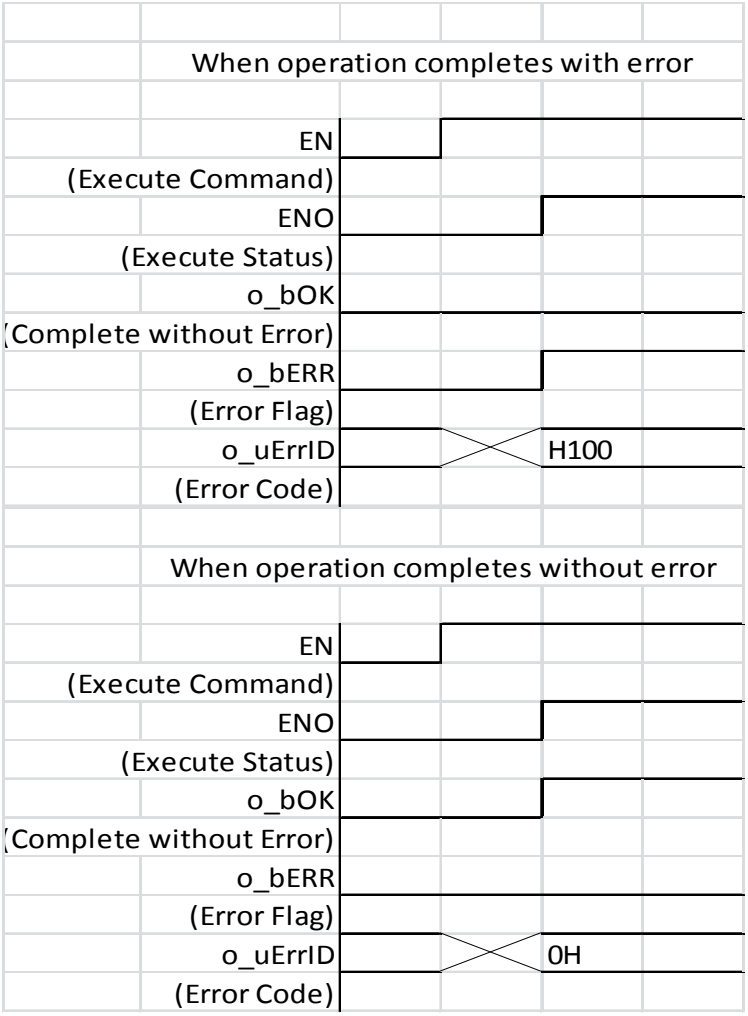
Applicable Software	

Series	Version
GX Works 2	1.536
GT Designer 3	1.136

Programming language	Structured Ladder/FBD
Number of Ladder Steps	QnU: 259 steps *The number of steps of the FB program depends on the CPU Model that is used and input and output definition

Device Memory Used	11 bits 180557 words
Compiling method	Macro type;
Execution type	Real-time Execution
Dependences	This function block requires the following SDT reside on the PLC MELPT_MGMT_ModelManagement
Function description	
Restrictions and precautions	Index Z16 thru z19 are used within this function block.

Timing chart



FB Error Code

Error Code	Description
0	No Error
H101(257)	Starting RF Tag Address for Part Number Less than 0
H102(258)	Starting RF Tag Address for Part Number Greater than 100
H103(259)	Starting RF Tag Address for CODEP Number Less than 0
H104(260)	Starting RF Tag Address for CODEP Number Greater than 100

Labels

- Input labels

User Input	Symbol Name	Var_Input name	Data Type	Setting range	Description
X	Do Match	i_bEnable	Bit		Start populating Assembly RF Tag SDT Data
X	Part Number	i_unPartNumber	Word[Unsigned](0..4)		Production Schedule current Part Number
	Model Data	i_stModelMaint	MELPT_MGMT_ModelManagement(1..160)		Model Maintenance SDT Data
X	Starting location of Part Number	i_wStartAddrPartNumberByte	Word[Signed]	1 to 100	Start Address on RF Tag for Part Number Machining
X	Starting location of CoDEP	i_wStartAddrCODEPByte	Word[Signed]	1 to 100	Start Address on RF Tag for CODEP
X	Starting location of station data	i_uStartAddrProgNumberByte	Word[Unsigned]		Start Address on RF Tag for Program Number
X	offset between stations	i_uStationOffsetByte	Word[Unsigned]		Start Address on RF Tag for Tool Count

- Output labels

Symbol Name	Var_Output name	Data Type	Description
FB Executed Normally	o_bFB_OK	Bit	When TRUE, indicates processing has completed normally
FB Execution Aborted	o_bFB_ERR	Bit	When TRUE, indicates an Error has occurred

Symbol Name	Var_Output name	Data Type	Description
FB Error Code	o_uFB_ERR_ID	Word[Unsigned]	FB Error Code Output
Done	o_bDone	Bit	Completion of Populating Assembly RF Data to SDT
Part Number Match	o_bMatchFound	Bit	Production Schedule current Part Number Match Found
Part Number Not Matched	o_bMatchNotFound	Bit	Production Schedule current Part Number Match NOT Found
RF Tag Data	o_uRFTagData	Word[Unsigned]	Assembly RF Tag SDT Data

FB Version Upgrade History

Version	Description
3.00	New Function Block
3.02	Words to Bytes

SDT Usage

1. MELPT_MGMT_ModelManagement

Global Label: ModelMAint		
Member	Type	Usage
PartNumber	Word[Unsigned](0..4)	Comparison
CODEPNumber	Word[Unsigned](0..5)	Written to Tag Structure
CodeType	Word[Unsigned](0..1)	
ToolCount	Double Word[Unsigned]/Bit String[32-bit](1..300)	
ProgNum	Word[Unsigned](1..300)	Written to Tag Structure

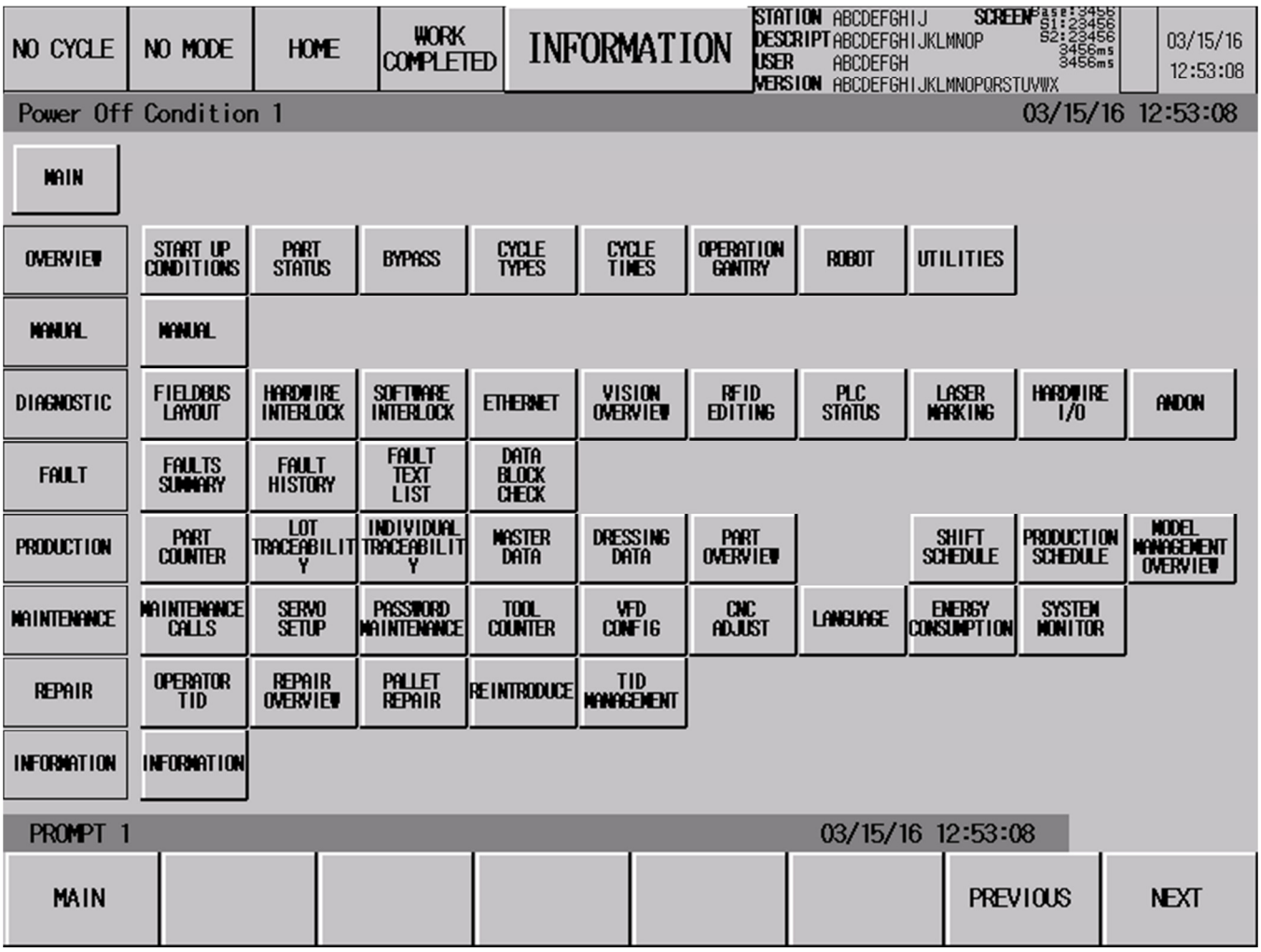
Global Label: ModelMAint		
Member	Type	Usage
ErrorProofing	Word[Unsigned](1..100,0..4)	Written to Tag Structure
IncomingModelNumber	Word[Unsigned](0..4)	
CODEPBool	Word[Unsigned]	

15 INFORMATION

Figure 152-Navigation to the Information Screen

Figure 153-Level 1 Navigation to information screen

The navigation screen provides an index of the available screen destinations.



16 APPENDIX 1-VERSION 3.0 -> 3.02 CHANGES

V301

IP Schema modified so Profinet can co-exist with PLC on same subnet.

Profinet Controller 192.168.1.254

Profinet Node Address Range 192.168.1.0-.127

PLC 192.168.1.200

HMI (GOT 1000) 192.168.1.210

HMI (GOT 2000) 192.168.1.220

PLC:

1. MELPT_SYS_GOTGENERAL SDT Modified
    a. Member Write Device Increased to 39 words to accommodate GOT 2000
2. Traceability debug bits removed.
3. ZR Memory Map modified.
    a. Retentive memory starts at zr250,000
    b. Part Counters moved to ZR250000-274999
4. New IP Address
5. PLC Version Changed to MELPT_V301
6. Modify Manual Operation function blocks to reduce memory usage
7. Limit Row Config to 0-7
8. Corrected Issue with Real to Int conversion in VFD Speed Select FB
9. Added EN/ENO pins to QD77 function blocks, updated label name definitions
10. Modified CClinkIEDiag FB
11. Modified CCLinkDiag FB
12. Added 2nd cycle timer example
13. Changed MELPT_SYS_PartStatus SDT
14. Improved MELPT_CNC_PartsOverview
15. Improved Manual Operation Sample Programs
16. Added Bypassed devices to warning annunciation
17. Store Line Diagnostics in retained memory
18. Removed reinit logic from Ethernet FB
19. Reduced the coding of MELPT_SYS_GOTSETUP
20. Modified Digital to analog, added enabled indicator
21. Production Counter function Block combined with DB function block
22. Updated Lot Traceability FB for reduced programming

23. Revised ChartoNumeral FB to make it work correctly
24. Revise GroupSeperatorParse function
25. Added function block to clear SDT of bits
26. Remove FB for individual traceability parsing
27. Add Bits for Master Data Read/Write
28. Modified MELPT_CNC_Adjust FB
29. Corrected CC-link IE Field Diag FB
30. Added CC-link IE IO init FB
31. Added CNC PLC Window Write example
32. TID Client FB and HMI Sdt modified
33. Remapped Devices for MELPT_FCA Labels
34. Stored TID into local TID History.
35. Revised MELPT_MGMT_GotProdSchedule SDT
36. Revised MELPT_MGMT_ProdSchedule FB
37. Revised Model Management function blocks

HMI:

1. Graphics cleanup, and shapes, colors, sizes made to be more common
    a. Traceability deviated from common HMI conventions.
2. Comment File 190 removed
3. Comment File 191 removed
4. Basic Comment utilized
5. Alarm #30 Save File Name Changed to Balluff
6. Alarm #31 Save File Name changed to OMRON
7. Screen Script #351 modified to copy the appropriate RFID Error.csv
8. Modified Comment #20 and #22
9. Modified Screen 3011 and 3015 to new comment locations
10. Added new alarms to alarm 20 and 22.
11. Added Download to USB button and script to screen 3011 and 3015.
12. Script #1 modified to move 39 words.
13. Navigation Screens Corrected
14. HMI Fault Help Graphic modified to 640x480 and reintroduced as overlap window
15. Traceability navigation
16. Manual Screen row description text device incorrect.
17. Startup Conditions moved to Base Screen 101
18. Corrected Fieldbus Diagnostic Indicators
19. Removed .update control from CC-link and CC-link IE Diagnostic Screens
20. RFID Screen Numeric Input objects removed object scripting.
21. Added Detail Display to Servo Alarm #10

22. Added filter and detail display capability to Screen 610
23. Updated download to USB script for screen 610
24. Added Overcycle warnings to HMI Warning 150-157
25. Added Robot Faults 200-204
26. Modified Screen Base 120, Added Security to PB text on Green background changed to black
27. Added more Faults
28. Changed Fieldbus Navigation text
29. Corrected Line Diagnostic Comment (offset)
30. Base 310 Header Comment Updated
31. Base 320 Header Comment Updated
32. Script page end delimited modified Base 310 and Bas e 320
33. Added camera switching controls from previous/next buttons on camera navigation window
34. Modified DtoA graphics.
35. Modified pushbuttons on Andon Test Screen
36. Changed comment file for alarms to match actual size of sdt
37. Change Alarm #1 to match size of SDT's
38. Add value to GD65013 in script #1
39. Production counter screen adjusted for new totals locations and use of double words
40. Updated Traceability screens
41. Added 16 bits for rereading master data
42. Added Pre-Stop dressing Data to HMI Script for Station Selection, Added EMEA pre-stop Master Data window
43. Operator Code Window references different locations.
44. Added Project Script 10 for modelmanagement.