



for a greener tomorrow



**mitsubishi  
electric**

*Changes for the Better*

FACTORY AUTOMATION

# ELECTRONIC MULTI-MEASURING INSTRUMENT ME96SS



**SS** Ver.B  
*Super-S Series*

# ME96 Super-S Series Ver.B Features

## Variety of Complementary Features

### Password Function

With the password function, the following items can be protected from an accidental execution.

No.	Password-protected item	No.	Password-protected item
1	Shift to the setting mode	5	Adjust the time limit of rolling demand
2	Reset the max./min. values	6	Reset the peak value of rolling demand
3	Reset the value of active energy, reactive energy and apparent energy	7	Reset the value of operating time
4	Reset the value of periodic active energy		

### Special Primary Voltage/Current and Special Secondary Voltage are settable

#### (1) Special primary current

1A-30kA



#### (2) Special primary voltage

60V-750kV



#### (3) Special secondary voltage

Three phase 4-wire system

{63.5V, 100V, 110V, 115V, 120V}

Three phase 3-wire, Single phase 2-wire system

{100V, 110V, 220V}



### Periodic Monitoring Function

Power consumption can be measured in three individual intervals (e.g., peak, off-peak and shoulder, etc.).

The time segments can be switched according to the setting via communication or the digital input (DI).  
(The time segments cannot be switched manually (button operation).)



Power consumption (period 1)



Power consumption (period 2)



Power consumption (period 3)

### Rolling Demand Function

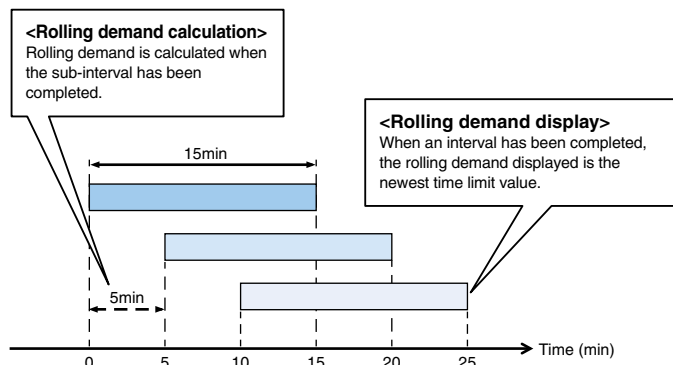
Rolling demand is the estimated power consumption in a specified period (interval).

For the block interval demand, select the duration (interval) of the block to be used for demand calculation.

#### ① Rolling block

Use rolling block to set the interval and sub-intervals from 1-60min (1min intervals). Rolling demand is calculated and updated at the end of each sub-interval. However, Present and predictive values are always calculated.

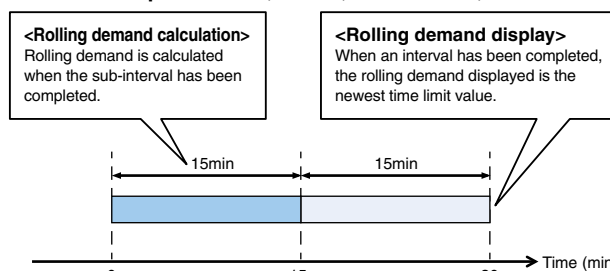
<Example: Interval, 15min; Sub-interval, 5min>



#### ② Fixed block

Use fixed block to set the interval from 1-60min (1min intervals). Rolling demand is calculated and updated at the end of each interval. However, Present and predictive values are always calculated.  
(For fixed block, use the same time limits both of interval and sub-interval).

<Example: Interval, 15min; Sub-interval, 15min>



## ME96SSRB-MB

Model name			ME96SSRB-MB		
Phase wire system			3-phase 4-wire, 3-phase 3-wire (3CT, 2CT), 1-phase 3-wire, 1-phase 2-wire (common use)		
Rating	Current		5 A AC, 1 A AC (common use)		
	Voltage		3-phase 4-wire: max 277/480 V AC 3-phase 3-wire: (DELTA) max 220 V AC, (STAR) max 440 V AC 1-phase 3-wire: max 220/440 V AC 1-phase 2-wire: (DELTA) max 220 V AC, (STAR) max 440 V AC		
	Frequency		50/60 Hz (common use)		
Item			Measurement items		Class
Measuring element	Current (A)		A1, A2, A3, AN, A <sub>AVG</sub>		±0.2%
	Current demand (DA)		DA1, DA2, DA3, DAN, DA <sub>AVG</sub>		
	Voltage (V)		V12, V23, V31, V <sub>AVG</sub> (L-L), V1N, V2N, V3N, V <sub>AVG</sub> (L-N)		
	Active power (W)		W1, W2, W3, ΣW		±0.5%
	Reactive power (var)		var1, var2,var3, Σvar		
	Apparent power (VA)		VA1, VA2, VA3, ΣVA		
	Power factor (PF)		PF1, PF2, PF3, ΣPF		±0.1%
	Frequency (Hz)		Hz		
	Active energy (Wh)		Imported, Exported		
	Reactive energy (varh)		Imported lag, Imported lead, Exported lag, Exported lead		Class 0.5S (IEC62053-22)
	Apparent energy (VAh)		Imported + Exported		Class 1S (IEC62053-24)
	Harmonic current (HI)		Total, 1 <sup>st</sup> to 19 <sup>th</sup> (Odd degree only)		±1.0%
	Harmonic voltage (HV)		Total, 1 <sup>st</sup> to 19 <sup>th</sup> (Odd degree only)		
	Rolling demand active power (DW)		Rolling block, Fixing block (Select either of them according to the settings.)		
	Rolling demand reactive power (Dvar)		Rolling block, Fixing block (Select either of them according to the settings.)		±1.0%
	Rolling demand apparent power (DVA)		Rolling block, Fixing block (Select either of them according to the settings.)		
	Periodic active energy (Wh)		Periodic active energy 1, Periodic active energy 2, Periodic active energy 3		
	Operating time (h)		Operating time 1, Operating time 2		Class 0.5S
	Current unbalance rate (Aunb)		Aunb		(Reference)
Voltage unbalance rate (Vunb)		Vunb		(Reference)	
CO <sub>2</sub> equivalent		kg		(Reference)	
Item			Specifications		
Analog output response time			1 second or less (Hz: 2 seconds or less, HI, HV: 5 seconds or less)		
Measuring Method	Instantaneous Value		A, V: RMS value calculation; W, var, VA, Wh, varh, VAh: Digital multiplication; PF: Power ratio calculation; Hz: Zero-cross; HI, HV: FFT		
	Demand Value		DA: Thermal type calculation, DW, Dvar, DVA: Rolling demand calculation		
Display	Display type		LCD with LED backlight		
	Number of display digits or segments	Digital section	First to third line indication: 4 digits, Fourth line indication: 6 digits		
			A, DA, V, W, var, VA, PF, DW, Dvar, DVA: 4 digits; Hz: 3 digits; Wh, varh, VAh: 9 digits (6-digit or 12-digit is also available.); Harmonic distortion ratio/content rate: 4 digits; Harmonic RMS value: 4 digits; Operating time: 6 digits; Contact input/output: I/O		
Display update time interval		0.5 s, 1 s (selectable)			
Communication			MODBUS RTU communication		
Built-in logging	Logging mode		Automatic overwrite update		
	Logging data type	Measuring data <sup>*1</sup>	Measuring data and time data are logged at the interval set at the data logging period. (15 min, 30 min, 60 min)		
		Alarm log	Time data at alarm generating/cancellation and at waiting for alarm cancellation		
		The recorded time of the Max/Min value	Max/Min value data and time data		
	Number of logging items	Measuring data	Integrated value data: 5 items, Data other than integrated value: 15 items, Total: A maximum of 20 items		
		Alarm log	The number of the set alarms		
		The recorded time of the Max/Min value	The total is 19 items: Current Max/Min (AVG), Line voltage Max/Min (AVG), Phase voltage Max/Min (AVG), Total active power Max/Min (AVG), Total power factor Max/Min (AVG), Frequency Max/Min (AVG), Total reactive power Max/Min, Total apparent power Max/Min, Total harmonic current RMS Max value, Harmonic line voltage distortion ratio Max total, Harmonic phase voltage distortion ratio Max total		
	Internal memory logging period	Measuring data	30 days (Logging period: 15 minutes), 60 days (Logging period: 30 minutes), 120 days (Logging period: 60 minutes),		
		Alarm log	100 records		
		The recorded time of the Max/Min value	1 record for every Max/Min value factor		
	System log data		100 records		
	Saving logging data		Use of nonvolatile memory		
	How to acquire logging data		Acquire the logging data via MODBUS <sup>®</sup> RTU Communication		
Clock accuracy		1 minute difference/Month (typical)			
Connectable Optional Plug-in Module			ME-4210-SS96B, ME-0040C-SS96, ME-0052-SS96, ME-0000MT-SS96, ME-0000BU-SS96		
Analog output		Output specifications (Load)	4 mA to 20 mA DC (0 to 600 Ω)		
Pulse/Alarm output	Switch type		Semiconductor relay/No-voltage a-contact		
	Contact capacity		35 V DC, 0.1 A		
	Pulse width		0.125 s, 0.5 s, 1.0 s		
Contact input (DI)	Contact capacity		24 V DC (19 V to 30 V DC), 7 mA or less		
	Signal width		30 ms or more		
Contact output (DO)		Switch type	Semiconductor relay/No-voltage a-contact		
Power interruption backup		Use of nonvolatile memory (Items: settings, MAX/MIN value, active energy, reactive energy, apparent energy, periodic active energy, rolling demand, operating time)			
		Built-in logging		Use of nonvolatile memory (Logging data, System log data)	
VA Consumption		Voltage circuit	Each phase: 0.1 VA (at 110 V AC), 0.2 VA (at 220 V AC), 0.4 VA (at 440 V AC)		
		Current circuit	Each phase: 0.1 VA		
		Auxiliary power circuit	13 VA (at 110 V AC), 14 VA (at 220 V AC), 9 W (at 100 V DC)		
Auxiliary power		100 V to 240 V AC (±15%), 100 V to 240 V DC (-30% +15%)			
Weight		0.5 kg			
Dimensions		96 (H) × 96 (W) × 90 (D) mm			
Mounting method		Embedded			
Operating temperature/humidity		-5°C to +55°C (Daily average temperature: 35°C or less), 0% to 85% RH, Non condensing			
Storage temperature/ humidity		-25°C to +75°C (Daily average temperature: 35°C or less), 0% to 85% RH, Non condensing			

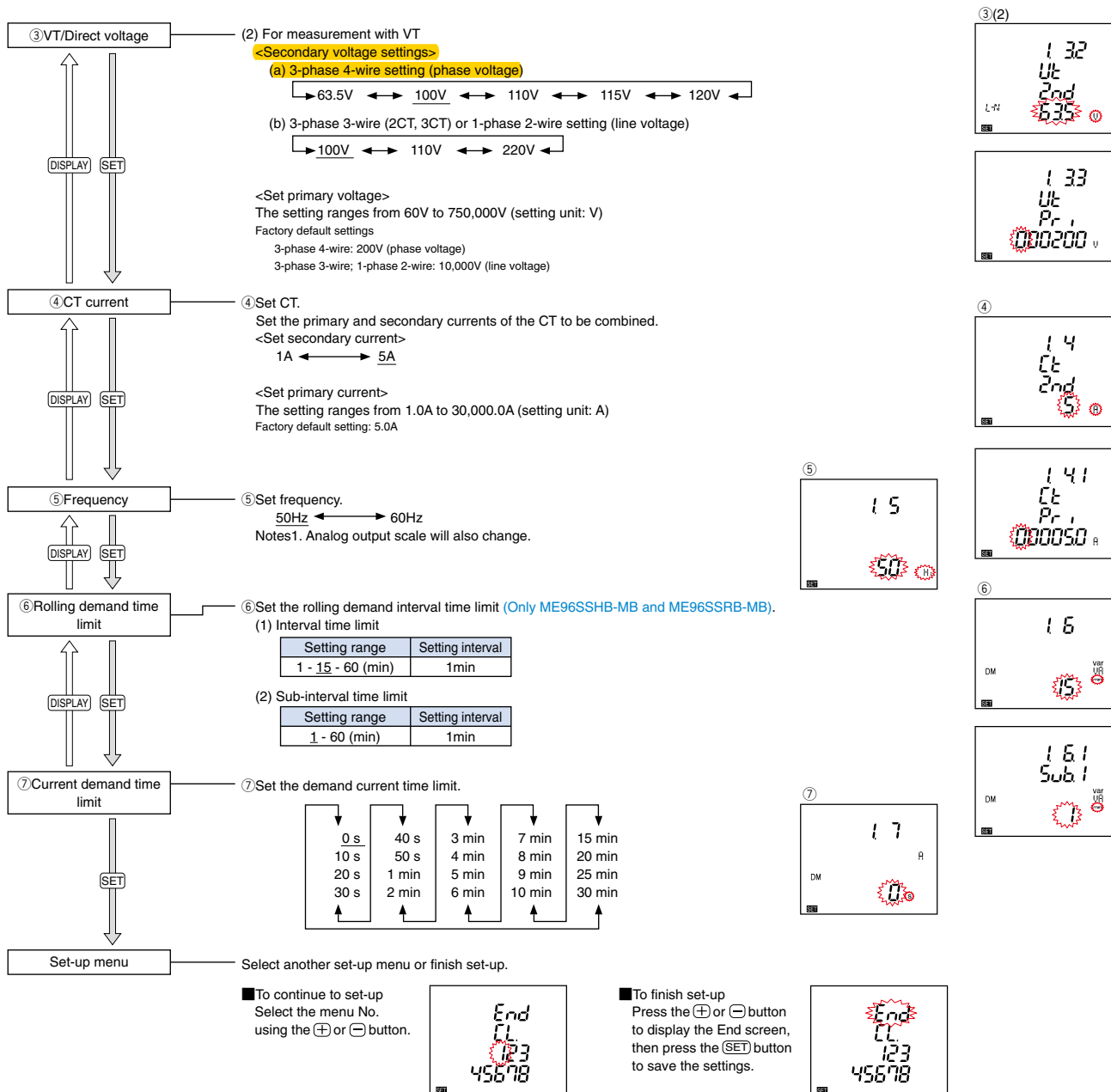
Note 1. The class value represents the ratio to the rated value (100%).

Note 2. For measurement where the harmonic distortion ratio (content rate) is 100% or more, the class can exceed ±1.0%.

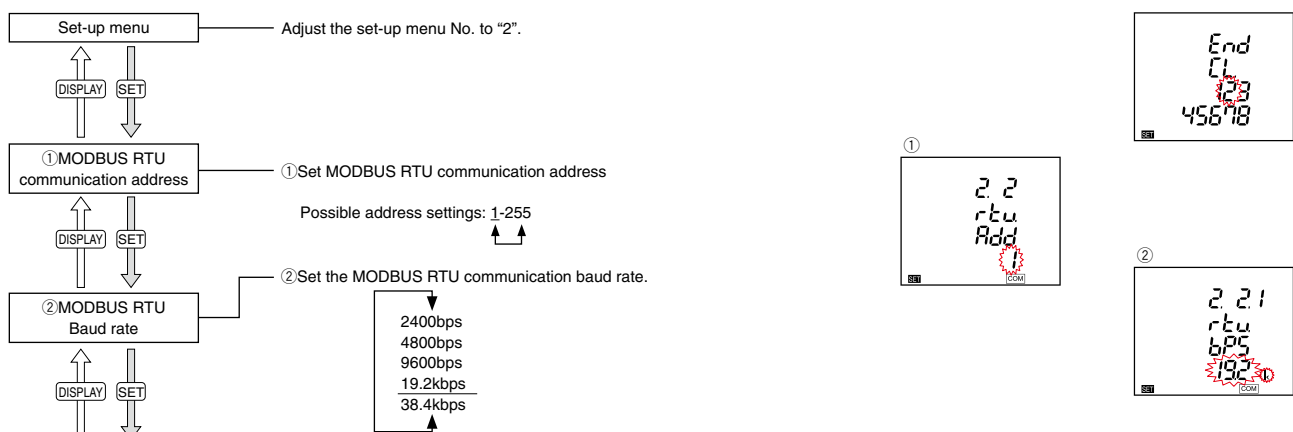
Note 3. Harmonic current cannot be measured without voltage input.

Note 4. Using the conventional ME-4210-SS96 (Optional Plug-in Module), the CE marking and UL standards safety certification requirements cannot be met.

\*1: Integrated values (Wh, varh, and VAh) are measured values of ME96SS. They are not differential values by logging period.



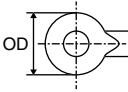
## Set-up menu 2: MODBUS RTU Communication settings (When ME-0040C-SS96 and ME-0000MT-SS96 are not installed)



## Wiring

### 1 Applicable Cable Size

The table on the right describes the applicable wire size.

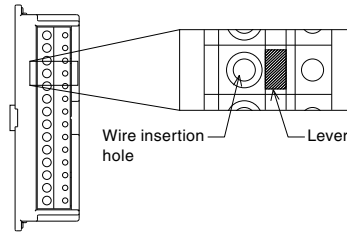
Part	Screw type	Wire specifications	Tightening torque
Product main body (auxiliary power supply, voltage input, current input and MODBUS RTU communication terminals)	M3	<ul style="list-style-type: none"> <li>Use of crimp-style terminals: AWG26 to 14 (2 wires can be connected.)</li> <li>Applicable crimp-style terminal: OD of 6 mm or less, for screw M3</li> </ul> 	0.6 to 0.8 N·m
Optional unit terminal (ME-0052-SS96, ME-0040C-SS96, ME-4210-SS96B)	Screwless	<ul style="list-style-type: none"> <li>Single wire and stranded wire: AWG24 to 14 (Rod terminal can be used together with stranded wire.)</li> <li>Wire stripping length: 10 to 11 mm</li> <li>*1: To conform to UL Standard, use in accordance with the following requirements. <ul style="list-style-type: none"> <li>Single wire and stranded wire: AWG24 to 18</li> <li>Use of a bar terminal is not allowed.</li> </ul> </li> <li>*2: When using a bar terminal for inserting two wires, select a terminal whose insertion part into the terminal block is 12 to 13 mm long.</li> </ul>	—

### 2 Wiring

#### Optional Plug-in Module Terminal

- Remove the wire casing at the end of the wire and solder to the rod terminal.
- With the lever pushed in, insert the wire and then release the lever to connect.

#### Optional Plug-in Module Terminal



### 3 Confirmations

After wiring, make sure the following:

- ☐ All wiring is connected
- ☐ There is no misitake in wiring

### Note

#### Protective sheet

There is a protective sheet covering the LCD screen to prevent scratching during panel installation. Please remove the sheet before using the meter. When removing the sheet, the LCD may turn on due to the static electricity generated. This is not abnormal; the LCD will turn off after a short time.

#### Installation position

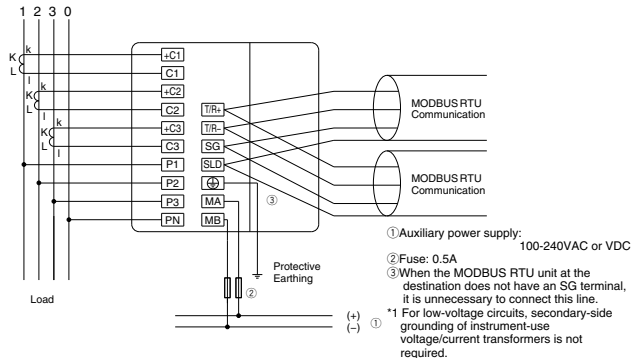
If installing the unit at the panel edge, choose an installation position where there is sufficient space for wiring work.

#### Optional unit

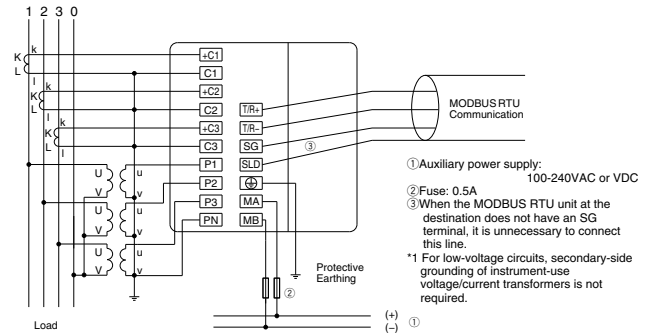
Turn the auxiliary power supply off before attaching the optional unit. If attached with the power on, the main unit will not recognize the optional unit. To remedy this, turn off/restart the auxiliary power supply or execute the "instrument restart" operation.

## Wiring Diagrams

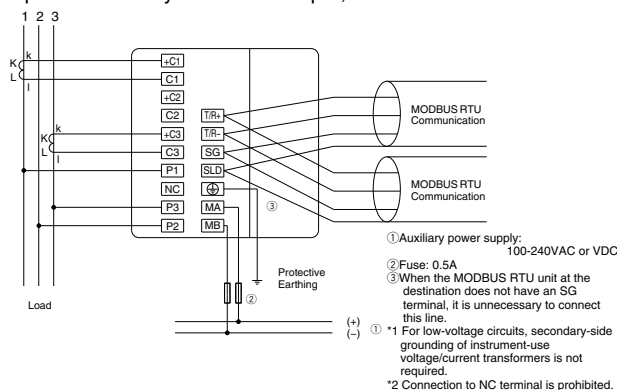
### Three phase 4-wire system: Direct input



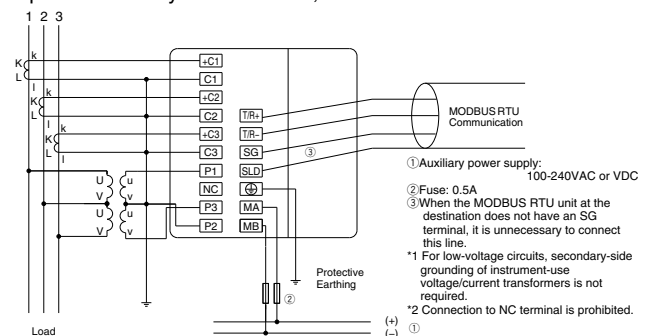
### Three phase 4-wire system: With VT



### Three phase 3-wire system: Direct input, 2CT



### Three phase 3-wire system: With VT, 3CT



## Wiring Diagrams (Continued)

### Note

- Pulse output, alarm output, and contact input/output cables must not be in close proximity or bundled with power cables or high-voltage cables. When laid parallel, separate by the distance shown in the following table.

Condition	Distance
Power lines of 600V or less	300mm or more
Other power lines	600mm or more
- Analog output cables must not be in close proximity or bundled with other power cables or input cables (e.g., VT, CT, auxiliary power supply). In addition, to prevent noise, surge and induction, use shielded cables or twisted-pair cables. Make sure that cables are as short as possible.
- There is no insulation between the MODBUS RTU communication portion and the optional module ME-4210-SS96B, ME-0040C-SS96 or ME-0000MT-SS96.
- Use only designated cables when connecting the CC-Link (see communication specifications). CC-Link dedicated cables cannot be used at the same time as CC-Link dedicated high-performance cables. Normal data transmission cannot be guaranteed if used at the same time.  
The terminal resistance value varies depending on the type of dedicated cable.
- For cables connecting the CC-Link, connect shielded cables to "SLD" and ground "FG" cables. "SLD" and "FG" cables are connected inside the unit.
- CC-Link transmission lines are small signal circuits: separate from strong electrical circuits by a distance of 10cm or more, or 30cm or more if laid in parallel over a long distance.  
Ground the terminal before use.
- For CC-Link transmission, always use dedicated lines and comply with conditions for total wiring distance, distance between stations and terminal resistance values according to the communication speed. Not doing so may prevent normal communication (see the CC-Link Master Unit Operations Manual for information on dedicated lines and wiring conditions).
- The terminal resistance supplied with the CC-Link Master Unit must always be used for the units at both ends of the CC-Link transmission line. If the meter is at the end of the CC-Link transmission line, connect it between the DA and DB terminals.
- Communication errors may occur under the influence of high-frequency noise from other devices in the installation environment during high-speed communication (100 Mbps) via 100BASE-TX connection of MODBUS TCP.  
Measures to be taken when the network system is configured to avoid the influence of high-frequency noise are shown below.
  - Wiring connection
    - When laying a twisted pair cable, do not bundle the cable together with any main circuit line or power line or lay it close to such a line.
    - Keep the twisted pair cables in the duct.
  - Communication method
    - Increase the number of communication retries as needed.
    - Replace the hub to be used for connection with that for 10 Mbps, and communicate at a data transmission speed of 10 Mbps.
- Do not connect any terminal or RJ45 connector in the live state.
- Do not insert or remove the SD memory card in the live state.

### Rated voltage for each phase/wire system

Phase/Wire	Connection	Rated voltage	Figure
Three phase 4-wire	Star	Max. 277VAC (L-N)/480VAC(L-L)	Figure 1
Three phase 3-wire	Delta	Max. 220VAC (L-L)	Figure 2
	Star	Max. 440VAC (L-L)	Figure 3
Single phase 3-wire	-	Max. 220VAC (L-N)/440VAC(L-L)	Figure 4
Single phase 2-wire*	Delta	Max. 220VAC (L-L)	Figure 5
	Star	Max. 440VAC (L-L)	Figure 6

\* The circuit derived from the three-phase 3-wire delta connection and the single-phase 2-wire transformer circuit have the maximum rating of 220 VAC.  
The circuits derived from the three-phase 4-wire and three-phase 3-wire star connections and single-phase 3-wire connection have the maximum rating of 440 VAC.

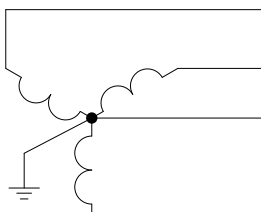


Fig. 1. Three phase 4-wire (star)

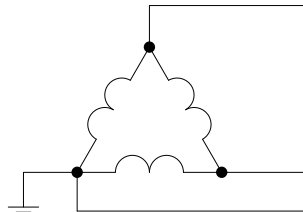


Fig. 2. Three phase 3-wire (delta)

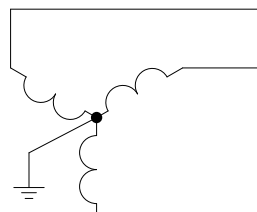


Fig. 3. Three phase 3-wire (star)

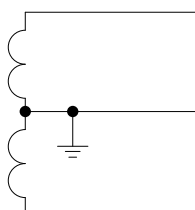


Fig. 4. Single phase 3-wire

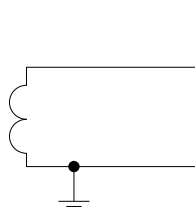


Fig. 5. Single phase 2-wire (delta)

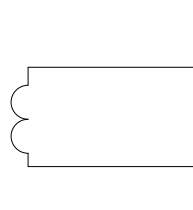


Fig. 6. Single phase 2-wire (star)