

## Pulse I/O and Counter Modules

Although Q Series I/O modules are designed to offer very fast responses to input signals, some applications need a shorter response than these modules can offer. In these cases, use the QI60 interrupt module. This offers response times as rapid as 50 microseconds for very fast event capture. For more sophisticated applications, the QD60P8-G offers isolated input capability together with averaging, scaling and sampling functions.

<b>Model Number</b>	<b>QI60</b>						
<b>Stocked Item</b>	S						
<b>Certification</b>	UL • cUL • CE						
<b>Number of Input Points</b>	16 points						
<b>Rated Input Voltage</b>	24VDC (+20/-15%, ripple ratio within 5%)						
<b>Rated Input Current</b>	Approx. 6mA						
<b>ON Voltage/ON Current</b>	19V or higher/3mA or higher						
<b>OFF Voltage/OFF Current</b>	11V or lower/1.7mA or lower						
<b>Response Time (ms)</b>	<b>Set Value (*1)</b>		0.1	0.2	0.4	0.6	1
		<b>Typ</b>	0.05	0.15	0.30	0.55	1.05
	<b>ON – OFF</b>	<b>Max</b>	0.10	0.20	0.40	0.60	1.20
		<b>Typ</b>	0.15	0.20	0.35	0.60	1.10
<b>OFF – ON</b>	<b>Max</b>	0.20	0.30	0.50	0.70	1.30	
	<b>Typ</b>						
<b>Common Terminal Arrangement</b>	16 points/common (common terminal: TB17)						
<b>I/O Device Points Occupied</b>	16 points						
<b>External Connections</b>	18-point terminal block (M3 x 6 screws)						
<b>Applicable Crimping Terminal</b>	R1.25-3 (sleeved crimping terminals cannot be used)						
<b>5VDC Internal Current Consumption</b>	60 mA (TYP. all points ON)						
<b>Weight (kg)</b>	0.20						
<b>Base Unit Slots Occupied</b>	1						

**Note 1:** Set via software.



## Isolated Interrupt Module

<b>Model Number</b>	<b>QD60P8-G</b>							
<b>Stocked Item</b>	S							
<b>Certification</b>	CE							
<b>Counting Speed Switch Settings</b>	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps
<b>Number of Channels</b>	8 channels							
<b>Count Input Signal</b>	1-phase input							
<b>Signal Level</b>	5VDC / 12 to 24VDC							
<b>Counting Speed (Max.)</b>	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps
<b>Count Range</b>	Sampling pulse number: 16-bits binary values (0 to 32767); Accumulating count value: 32-bits binary values (0 to 99999999) Input pulse value: 32-bits binary values (0 to 2147483647)							
<b>Count Type</b>	Linear counter method, Ring counter method							
<b>Counter (*1)</b>								
<b>Minimum Count Pulse Width (Duty Ratio 50%)</b>	16.7 μs	16.7 μs	0.5 ms	0.5 ms	5 ms	5 ms	10 ms	10 ms
<b>Connected Terminal</b>	18 points terminal block							
<b>I/O Device Points Occupied</b>	32 points							
<b>Applicable Solderless Terminals</b>	R1.25-3 (A solderless terminals with sleeves cannot be used)							
<b>Internal Current Consumption (5VDC)</b>	0.58A							
<b>Weight (kg)</b>	0.17							
<b>Base Unit Slots Occupied</b>	1							

**Note 1:** Counting speed is affected by pulse rise and fall time. Note that if a pulse that has a large rise and/or fall time is counted, a miscount may occur.

## High Speed Counter Modules

These modules provide a capability for the CPUs to sense high frequency pulse trains as would be found in motion control and similar applications. Typically these modules would be linked to encoders to provide a closed loop of position sensing on a motion axis.

<b>Model Number</b>		<b>QD62-H01</b>	<b>QD62-H02</b>
<b>Stocked Item</b>		-	-
<b>Certification</b>		UL • cUL • CE	
<b>Number of Occupied I/O point</b>		16 I/O points	
<b>Number of Channels</b>		2 channels	
<b>Count Input Signal</b>	<b>Phase</b>	1-phase input, 2-phase input	
	<b>ON / OFF Characteristics</b>	5/12/24VDC, 2 to 5mA	
<b>Counter</b>	<b>Counting Speed (Max) (*1)</b>	1-phase input 50kPPS; 2-phase input 50kPPS	1-phase input 10kPPS; 2-phase input 7kPPS
	<b>Counting Range</b>	32-bit signed binary (-2147483648 to 2147483647)	
	<b>Type</b>	UP/DOWN Preset counter + Ring counter function	
	<b>Minimum Count Pulse Width (Duty Ratio 50%)</b>	 (1-phase input)	 (1-phase input)
<b>External Input</b>	<b>Rated Input Voltage</b>	5/12/24VDC, 2 to 5mA	
	<b>ON / OFF Characteristics</b>		
<b>Comparison Output</b>	<b>Comparison Range</b>	32-bit signed binary	
	<b>Comparison System</b>	Setting value < Count value Setting value = Count value Setting value > Count value	
	<b>Number of Points</b>	2 points/channel	
	<b>Output Rating</b>	Transistor (sink type)	
	<b>External Supply Power</b>	12/24VDC 0.5A/point; 2A/common	
<b>I/O Device Points Occupied</b>		16 points (I/O assignment: Intelligent 16 points)	
<b>5VDC Internal Current Consumption (A)</b>		0.30	
<b>Weight (kg)</b>		0.11	
<b>Base Unit Slots Occupied</b>		1	

**Note 1:** Counting speed is affected by pulse rise and fall time. Possible counting speeds are shown in the following table. Note that a miscount may occur if the D62-H01 counts a pulse larger than  $t=50\mu s$ . In this case, use the QD62-H02.

<b>Model Number</b>		<b>QD62</b>	<b>QD62E</b>	<b>QD62D</b>	<b>QD63P6</b>
<b>Stocked Item</b>		S	S	S	-
<b>Certification</b>		UL • cUL • CE			
<b>Compatible Encoder Types (*2) (*3)</b>		Open collector type/CMOS	Open collector type/CMOS	Line driver type	Open collector type/CMOS
<b>Counting Speed Switch Setting</b>		200k (100k to 200kPPS) 100k (10k to 100kPPS) 10k (10kPPS max.)		500k (200k to 500kPPS) 200k (100k to 200kPPS) 100k (10k to 100kPPS) 10k (10kPPS max.)	200k (100k to 200kPPS) 100k (10k to 100kPPS) 10k (10kPPS max.)
<b>Number of Channels</b>		2 channels			6 channels
<b>Count Input Signal</b>	<b>Phase</b>	1 phase input, 2 phase input			
	<b>Rated Input Voltage</b>	5/12/24VDC (positive or negative common)		EIA Standard RS-422-A	6.4 to 11.5 mA at 5VDC
	<b>ON / OFF Characteristics</b>	5/12/24V; 2 to 5mA		Differential line driver level (*1)	
	<b>Counting Range</b>	32-bit designated binary (-2147483648 to 2147483647)			
<b>External Input</b>	<b>Type</b>	UP/DOWN preset counter + ring counter functions			
	<b>Rated Input Voltage</b>	5/12/24VDC (positive or negative common)		5/12/24V (*2)	5V
<b>Comparison Output</b>	<b>ON / OFF Characteristics</b>	5/12/24V; 2 to 5mA		6.4 to 11.5mA	
	<b>Comparison Range</b>	32-bit designated binary (-2147483648 to 2147483647)			
	<b>Comparison System</b>	Set value < count value, set value = count value, set value > count value			
	<b>Number of Points</b>	2 points/channel			Internal I/O
	<b>Output Rating</b>	Transistor (Sink) 12/24VDC 0.5A/point 2A/common	Transistor (Source) 12/24VDC 0.1A/point 0.4A/common	Transistor (Sink) 12/24VDC 0.5A/point 2A/common	-
<b>External Supply Power</b>		Voltage range: 10.2 to 30V, current consumption: 8mA (typ @24VDC)			
<b>I/O Device Points Occupied</b>		16 points (I/O assignment: 16 intelligent points)			32 points (I/O assignment: 32 intelligent points)
<b>5VDC Internal Current Consumption (A)</b>		0.30	0.33	0.38	0.59
<b>Weight (kg)</b>		0.11		0.12	0.15
<b>Base Unit Slots Occupied</b>		1			

**Notes:**

1. Japan Texas Instruments product model Am26LS31 or equivalent.
2. Insure encoder output voltages are compatible with the module's input specifications.
3. TLL output type encoders cannot be used with the QD62, QD62E, and QD62D.

## High Speed Counter Modules

### QD62-H01

Counting Speed Switch Setting	1 Phase Input	2-Phase Input
t=5µs or less	50PPS	
t=50µs	5kPPS	
t=500µs	-	

### QD62-H02

Counting Speed Switch Setting	1 Phase Input	2-Phase Input
t=5µs or less	10kPPS	7kPPS
t=50µs	-	
t=500µs	500PPS	250PPS

### QD62

Counting Speed Switch Setting	200kPPS	100kPPS	10kPPS
Rise/Fall time	Both Phases 1 and 2		
t=1.25µs or less	200kPPS	100kPPS	10kPPS
t=2.5µs or less	100kPPS	100kPPS	10kPPS
t=25µs or less	-	10kPPS	10kPPS
t=500µs	-	-	500PPS

### QD62E

Counting Speed Switch Setting	200kPPS	100kPPS	10kPPS
Rise/Fall time	Both Phases 1 and 2		
t=1.25µs or less	200kPPS	100kPPS	10kPPS
t=2.5µs or less	100kPPS	100kPPS	10kPPS
t=25µs or less	-	10kPPS	10kPPS
t=500µs	-	-	500PPS

### QD62D

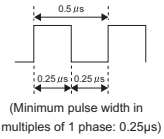
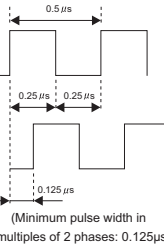
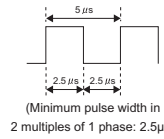
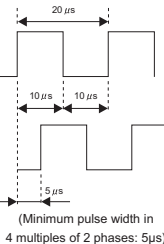
Counting Speed Switch Setting	500kPPS	200kPPS	100kPPS	10kPPS
Rise/Fall time	Both Phases 1 and 2			
t=0.5µs or less	500kPPS	200kPPS	100kPPS	10kPPS
t=1.25µs or less	200kPPS	200kPPS	100kPPS	10kPPS
t=2.5µs or less	-	100kPPS	100kPPS	10kPPS
t=25µs or less	-	-	10kPPS	10kPPS
t=500µs	-	-	-	500PPS

**Note:** Inputting a waveform with a long rise/fall time may cause a false input. Use a waveform within the permissible rise/fall time.

### QD63P6

Counting Speed Switch Setting	200kPPS	100kPPS	10kPPS
Rise/Fall time	Both Phases 1 and 2		
t=1.25µs or less	200kPPS	100kPPS	10kPPS
t=2.5µs or less	100kPPS	100kPPS	10kPPS
t=25µs or less	-	10kPPS	10kPPS
t=500µs	-	-	500PPS

## Multi-Function Counter/Timer Module

<b>Model Number</b>		<b>QD65PD2</b>	
<b>Stocked Item</b>		<b>S</b>	
<b>Certification</b>		UL • cUL • CE	
<b>Number of Occupied I/O Points</b>		32 points (I/O assignment: Intelligent, 32 points)	
<b>Number of Channels</b>		2 channels	
<b>Counting Speed Switch Setting (*1)</b>	<b>1 Multiple</b>	10kpps/100kpps/200kpps/500kpps/ 1Mpps/2Mpps	
	<b>2 Multiples</b>	10kpps/100kpps/200kpps/500kpps/ 1Mpps/2Mpps/4Mpps	
	<b>4 Multiples</b>	10kpps/100kpps/200kpps/500kpps/ 1Mpps/2Mpps/ 4Mpps/8Mpps	
<b>Count Input Signal</b>		1-phase input (1 multiple/2 multiples), 2-phase input (1 multiple/2 multiples/4 multiples), CW/CCW	
<b>Signal Level (αA, αB)</b>		EIA Standards RS-422-A, differential line driver level (AM26LS31 [manufactured by Texas Instruments] or equivalent)	
<b>Counting Speed (Max) (*2, *3)</b>		8Mpps (4 multiples of 2 phases)	
<b>Counting Range</b>		32-bit signed binary (-2147483648 to 2147483647)	
<b>Format</b>		Count, subtraction count; Linear counter format, ring counter format; Preset/replace function, latch counter function	
<b>Counter</b>	<b>Minimum Count Pulse Width (Duty Ratio 50%)</b>	1-phase input (1 multiple/2 multiples), CW/CCW	
			
		2-phase input (1 multiple/2 multiples/4 multiples)	
			
		1-phase input (1 multiple/2 multiples), CW/CCW	
			
		2-phase input (1 multiple/2 multiples/4 multiples)	
			
<b>Comparison Output</b>	<b>Comparison Range</b>	32-bit signed binary	
	<b>Comparison System</b>	Setting value < Count value; Setting value = Count value; Setting value > Count value	
	<b>In-Range Output</b>	Setting value (lower limit value) ≤ Count value ≤ Setting value (upper limit value)	
	<b>Not-In-Range Output</b>	Count value < Setting value (lower limit value), Setting value (upper limit value) < Count value	
	<b>Interrupt</b>	Equipped with a coincidence detection interrupt function	
<b>External Input</b>	<b>Phase Z</b>	EIA Standards RS-422-A, differential line driver level (AM26LS31 [manufactured by Texas Instruments] or equivalent): 2 points	5/12/24VDC, 7 to 10mA: 2 points
	<b>Function</b>	5/12/24VDC, 7 to 10mA: 2 points	
	<b>Latch Counter</b>	5/12/24VDC, 7 to 10mA: 2 points	
<b>External Output</b>	<b>General Input</b>	24 VDC, High Speed: 7 to 10mA, 2 points, Low Speed: 3mA, 4 points	
	<b>Coincidence Output (High Speed)</b>	Transistor (sink type) output: 2 points 12/24VDC 0.1A/point, 0.8A/common	
	<b>Coincidence output (Low Speed)</b>	Transistor (sink type) output: 6 points 12/24VDC 0.1A/point, 0.8A/common	
<b>Pulse Measurement</b>	<b>General Output</b>	Transistor (sink type) output: 8 points 12/24VDC 0.1A/point, 0.8A/common	
	<b>Measurement Item</b>	Pulse width (ON width/OFF width)	
	<b>Measurement Resolution</b>	100ns	
<b>Cam Switch</b>	<b>Measurement Points</b>	2 points/channel	
	<b>Number of Output Points</b>	8 points (max. 16 steps/point)	
	<b>Control Cycle</b>	1ms	
<b>PWM Output Frequency Range</b>	<b>Difference Between Each Output Duration in a Channel</b>	100μs or less	
	<b>Coincidence Output (High Speed)</b>	DC and up to 200kHz	
	<b>Coincidence Output (Low Speed)</b>	DC and up to 2kHz	
<b>Duty Ratio</b>	Any ratio (Can be set by 0.1μs)		
<b>5VDC Internal Current Consumption (A)</b>		0.23	
<b>Applicable Wire Size</b>		0.3mm <sup>2</sup> (22 AWG) (A6CON1 and A6CON4), 0.088mm <sup>2</sup> to 0.24mm <sup>2</sup> (24 to 28 AWG) (A6CON2)	
<b>Applicable Connector for External Wiring (Sold Separately)</b>		A6CON1, A6CON2, A6CON4	
<b>External Dimensions (H x W x D) mm</b>		98 x 27.4 x 90	
<b>Weight (kg)</b>		0.15	
<b>Base Unit Slots Occupied</b>		1	

### Notes:

- Counting speed switch setting can be done using the switch setting.
- Note that the count may be done incorrectly by inputting pulses whose phase difference is small between the phase A pulse and phase B pulse. To check the input waveform of the phase A pulse and phase B pulse, or to check phase difference between the phase A pulse and phase B pulse, refer to User's Manual
- The counting speed is affected by the pulse rise/fall time. The number of pulses that can be counted depending on the counting speed is listed below. Note that the count may be done incorrectly by counting pulses with long rise/fall time.