

## Analog I/O Modules

Analog input modules provide an interface to the CPU for sensing variable real world levels of voltage and current signals. These signals are converted into digital values by the modules for use in programs. This enables the CPU to process variable signals such as pressure, speed and flow. For modules able to sense temperature, please refer to the temperature input modules section.

### Analog to Digital Converter Modules

Model Number	Q64AD	Q68ADV	Q68ADI					
Stocked Item	S	S	S					
Certification	UL • cUL • CE	UL • cUL • CE	UL • cUL • CE					
Number of Analog Input Points	4 points (4 channels)	8 points (8 channels)	8 points (8 channels)					
Analog Input	Voltage	-10 to 10VDC (input resistance value 1M $\Omega$ )						
	Current	0 to 20mAADC (input resistance value 250 $\Omega$ )	-	0 to 20mAADC (input resistance value 250 $\Omega$ )				
Digital Output	16-bit signed binary (Normal resolution mode: -4096 to 4095, high resolution mode: -12288 to 12287, -16384 to 16383)							
I/O Characteristics Max. Resolution	Analog Input Range		Normal Resolution Mode		High Resolution Mode			
			Digital Output Value	Max. Resolution	Digital Output Value	Max. Resolution		
	Voltage	0 to 10V	0 to 4000	2.5mV	0 to 16000	0.625mV		
		0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV		
		1 to 5V	0 to 4000	1.0mV	0 to 12000	0.333mV		
		-10 to 10	-4000 to 4000	2.5mV	-16000 to 16000	0.625mV		
	User Range Setting		-4000 to 4000	0.375mV	-12000 to 12000	0.333mV		
	Current	0 to 20mA	0 to 4000	5 $\mu$ A	0 to 12000	1.66 $\mu$ A		
		4 to 20mA	0 to 4000	4 $\mu$ A	0 to 12000	1.33 $\mu$ A		
		User Range Setting	-4000 to 4000	1.37 $\mu$ A	-12000 to 12000	1.33 $\mu$ A		
Accuracy (Accuracy of Digital Output Value Relative to Maximum Value) (*1)	Analog Input Range		Normal Resolution Mode		High Resolution Mode			
			Ambient Temperature 0 to 55 $^{\circ}$ C		Ambient Temperature 0 to 55 $^{\circ}$ C			
			With Temp. Drift Compensation	Without Temp. Drift Compensation	With Temp. Drift Compensation	Without Temp. Drift Compensation		
	Voltage	0 to 10V	$\pm$ 0.3% ( $\pm$ 12 digit)	$\pm$ 0.4% ( $\pm$ 16 digit)	$\pm$ 0.1% ( $\pm$ 48 digit)	$\pm$ 0.3% ( $\pm$ 48 digit)	$\pm$ 0.4% ( $\pm$ 64 digit)	$\pm$ 0.1% ( $\pm$ 16 digit)
		-10 to 10						
		0 to 5V						
		1 to 5V						
	User Range Setting							
	Current	0 to 20mA	$\pm$ 0.3% ( $\pm$ 36 digit)	$\pm$ 0.3% ( $\pm$ 48 digit)	$\pm$ 0.1% ( $\pm$ 12 digit)	$\pm$ 0.3% ( $\pm$ 36 digit)	$\pm$ 0.3% ( $\pm$ 48 digit)	$\pm$ 0.1% ( $\pm$ 12 digit)
		4 to 20mA						
User Range Setting								
Conversion Time	80 $\mu$ s/channel (When temperature drift compensation is provided, time is 160 $\mu$ s longer, regardless of the number of channels used)							
Absolute Max. Input	Voltage: $\pm$ 15V, current: $\pm$ 30mA							
Insulation System	Across I/O terminals and PLC power supply: Photocoupler insulation; Across channels: No insulation							
I/O Device Points Occupied	16 points (I/O allocation: 16 intelligent points)							
Connection Terminal	18-point terminal block							
Internal Current Consumption (5VDC) (A)	0.63	0.64	0.64					
Weight (kg)	0.18	0.19	0.19					
Base Unit Slots Occupied	1							

Note 1: "Digit" indicates a digital value.  $\pm$ 4 digit means that the digital value 1000 will vary between 996 and 1004.

## High Speed Analog Input Module

<b>Model Number</b>		<b>Q64ADH</b>																															
<b>Stocked Item</b>		S																															
<b>Certification</b>		UL • cUL • CE																															
<b>Number of Analog Inputs</b>		4 points (4 channels)																															
<b>Digital Output</b>		-20480 to 20479 (-32768 to 32767 when using the scaling function)																															
<b>Analog Input</b>	<b>Voltage</b>	10 to 10VDC (Input resistance 1MΩ)																															
	<b>Current</b>	0 to 20mADC (Input resistance 250Ω)																															
<b>I/O Characteristics Maximum Resolution (*1)</b>		<table border="1"> <thead> <tr> <th>Analog Input Range</th> <th>Digital Output Value</th> <th>Maximum Resolution</th> </tr> </thead> <tbody> <tr> <td rowspan="6">Voltage</td> <td>0 to 10V</td> <td>500μV</td> </tr> <tr> <td>0 to 5V</td> <td>250μV</td> </tr> <tr> <td>1 to 5V</td> <td>200μV</td> </tr> <tr> <td>-10 to 10V</td> <td>-20000 to 20000</td> <td>500μV</td> </tr> <tr> <td>1 to 5V (Extended mode)</td> <td>-5000 to 22500</td> <td>200μV</td> </tr> <tr> <td>User Range Setting</td> <td>-20000 to 20000</td> <td>219μV</td> </tr> <tr> <td rowspan="5">Current</td> <td>0 to 20 mA</td> <td>1000nA</td> </tr> <tr> <td>4 to 20 mA</td> <td>0 to 20000</td> <td>800nA</td> </tr> <tr> <td>4 to 20V (Extended Mode)</td> <td>-5000 to 22500</td> <td>800nA</td> </tr> <tr> <td>User Range Setting</td> <td>-20000 to 20000</td> <td>878nA</td> </tr> </tbody> </table>	Analog Input Range	Digital Output Value	Maximum Resolution	Voltage	0 to 10V	500μV	0 to 5V	250μV	1 to 5V	200μV	-10 to 10V	-20000 to 20000	500μV	1 to 5V (Extended mode)	-5000 to 22500	200μV	User Range Setting	-20000 to 20000	219μV	Current	0 to 20 mA	1000nA	4 to 20 mA	0 to 20000	800nA	4 to 20V (Extended Mode)	-5000 to 22500	800nA	User Range Setting	-20000 to 20000	878nA
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			User Range Setting	-20000 to 20000	878nA																												
<b>Accuracy (Accuracy Relative to Maximum Analog Output Value) (*2)</b>	<b>Ambient Temperature 25 ±5°C</b>		Within ±0.1% (±20 digit)																														
	<b>Ambient Temperature 0 to 55°C</b>	Within ±0.2% (±40 digit)																															
<b>Conversion Speed (*3, *4, *5)</b>		High speed: 20μs/channel; Medium speed: 80μs/channel; Low speed: 1ms/channel																															
<b>Absolute Maximum Input</b>		Voltage: ±15V, Current: 30mA (*6)																															
<b>Offset / Gain Setting Count (*7)</b>		Up to 50000 times																															
<b>Isolation Method</b>		Between I/O terminals and programmable controller power supply: photocoupler isolation; Between input channels: no isolation																															
<b>Dielectric Withstand Voltage</b>		Between I/O terminals and programmable controller power supply: 500VACrms for 1 minute																															
<b>Insulation Resistance</b>		Between I/O terminals and programmable controller power supply: 500VDC 10MΩ or higher																															
<b>Number of Occupied I/O Points</b>		16 points (I/O assignment: Intelligent 16 points)																															
<b>Connected Terminal</b>		18-point terminal block																															
<b>Applicable Wire Size</b>		0.3 to 0.75mm <sup>2</sup>																															
<b>Applicable Solderless Terminal</b>		R1.25-3 (solderless terminals with sleeve are not usable)																															
<b>Internal Current Consumption (5VDC)</b>		0.52A																															
<b>Weight (kg)</b>		0.18																															
<b>Base Unit Slots Occupied</b>		1 slot																															

**Notes:**

- For details on the I/O conversion characteristics, refer to the following. I/O conversion characteristic of A/D conversion in the User's Manual.
- Except when receiving noise influence.
- The default value is 20μs/channel.
- The logging function can be used only in the middle speed (80μs/channel) or low speed (1ms/channel).
- The flow amount integration function can be used only in the low speed (1ms/channel).
- This is a momentary current value which does not cause damage to internal resistors of the module. The maximum input current value for constant application is 24mA.
- If the number of offset/gain settings exceeds 50000 times, an error occurs.

## Isolated Analog Modules

For some applications, it is essential that there is channel-to-channel isolation between analog inputs or outputs. These modules provide galvanic isolation between each channel so there is no common connection from one channel to any other.

### 8 CH Analog Module (Isolated Analog)

<b>Model Number</b>		<b>Q68AD-G</b>																																																												
<b>Stocked Item</b>		S																																																												
<b>Certification</b>		UL • cUL • CE																																																												
<b>Number of Analog Inputs</b>		8 points (8 channels)																																																												
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<b>Accuracy (Accuracy Relative to Maximum Analog Output Value)</b>	<b>Reference Accuracy (*1)</b>		±0.1%; Normal resolution mode : ±4digit (*2); High resolution mode (0 to 10V, -10 to 10V): ±16digit (*2) High resolution mode (Other than the above ranges): ±12digit (*2)																																																											
	<b>Temp. Coefficient</b>	±71.4ppm/°C (0.00714%/°C) (*3)																																																												
<b>Conversion Speed</b>		10ms / channel																																																												
<b>I/O Device Points Occupied</b>		16 points																																																												
<b>Isolation Specifications</b>		<b>Isolated Part</b>	<b>Isolation Method</b>	<b>Dielectric Strength</b>	<b>Insulation Resistance</b>																																																									
		Between I/O Terminal and Programmable Controller Power Supply	Transformer Isolation	500VAC rms, 1min.	500VDC 10MΩ or more																																																									
		Between Analog Input Channels		1000VAC rms, 1min.																																																										
<b>Connector Type</b>		A6CON1 or A6CON4																																																												
<b>Internal Current Consumption (5VDC)</b>		0.46A																																																												
<b>Weight (kg)</b>		0.16																																																												
<b>Base Unit Slots Occupied</b>		1																																																												

#### Notes:

- Accuracy of offset/gain setting at ambient temperature.
- "digit" indicates a digital value.
- Accuracy per temperature change of 1°C Example: Accuracy when temperature changes from 25 to 30°C ±0.1% (reference accuracy) + 0.00714 %/°C (temperature coefficient) x 5°C (temperature change difference) = 0.1357%

## High Resolution Analog Module (Isolated Analog Input Channels)

<b>Model Number</b>		Q64AD-GH					
<b>Stocked Item</b>		S					
<b>Certification</b>		UL • cUL • CE					
<b>Number of Analog Input Points</b>		4 points (4 channels)					
<b>Analog Input</b>	<b>Voltage</b>	-10 to 10VDC (Input resistance 1MΩ)					
	<b>Current</b>	0 to 20 mADC (Input resistance 250Ω)					
<b>Digital Output</b>		16-bit signed binary (-32768 to 32768); 32-bit signed binary (-65536 to 65536)					
<b>I/O Characteristics Maximum Resolution</b>		<b>Input</b>	<b>Analog Input Range</b>	<b>Maximum Resolution</b>		<b>Digital Output Value (32-Bit)</b>	<b>Digital Output Value (16-Bit)</b>
		Voltage	0 to 10V	156.3μV	312.6μV	0 to 64000	0 to 32000
			0 to 5V	78.2μV	156.4μV		
			1 to 5V	62.5μV	125.0μV		
			Users Input Range (Uni-Polar)	47.4μV	94.8μV		
			-10 to 10V	156.3μV	312.6μV	-64000 to 64000	
		Users Input Range (Bi-Polar)	47.4μV	94.8μV	-32000 to 32000		
		Current	0 to 20 mA	312.5nA	625.0μV	0 to 64000	0 to 32000
			4 to 20 mA	250.0nA	500.0μV		
			Users Input Range (Uni-Polar)	151.6nA	303.2μV		
<b>Accuracy (Accuracy Relative to Full-Scale)</b>	<b>Reference Accuracy (*1)</b>	±0.05%; Digital output value( 32 bit): ±32 digit (*2); Digital output value (16 bit): ±16 digit (*2)					
	<b>Temp. Coefficient (*3)</b>	±71.4 ppm / °C (0.00714% / °C)					
<b>Conversion Speed</b>		10ms / 4 channels					
<b>Absolute Maximum Input</b>		Voltage: ± 15V; Current: ± 30mA					
<b>Withstanding Voltage Isolation Method</b>		Between I/O terminal and PLC power supply: Photocoupler insulation; Between analog input channels: transformer isolation					
<b>Dielectric Strength</b>		1780VAC ms / 3 cycles (elevation 2000m)					
<b>Isolation Voltage</b>		Between I/O terminal and PLC power supply: 500VDC 20MΩ more					
<b>I/O Device Points Occupied</b>		16 points					
<b>Connected Terminal</b>		18 points terminal block					
<b>Applicable Solderless Terminals</b>		R1.25-3 (A solderless terminals with sleeves cannot be used)					
<b>Internal Current Consumption (5VDC)</b>		0.89 A					
<b>Weight (kg)</b>		0.20					
<b>Base Unit Slots Occupied</b>		1					

**Notes:**

- Accuracy when consistent at some temperature within the ambient temperature (to 55°C).
- "Digit" indicates a digital output value.
- Accuracy per temperature change of 1°C. Example: Accuracy when temperature change from 25 to 30°C. 0.05% (reference accuracy + 0.00714% / °C (temperature coefficient) x 5 °C (temperature change difference) = 0.0857%

## Isolated Analog Input Module with Signal Conditioning Function

<b>Model Number</b>		<b>Q66AD-DG</b>				
<b>Stocked Item</b>		S				
<b>Certification</b>		UL • cUL • CE				
<b>Connecting Section with 2-Wire Transmitter</b>	<b>Input Specification</b>	<b>Number of Analog Input</b>	6 points (6 channels)			
		<b>Analog Input</b>	4 to 20 mA DC (Input resistance 250Ω)			
	<b>Supply Power Specification</b>	<b>Supply Voltage</b>	26 ±2VDC			
		<b>Maximum Supply Current</b>	24mA DC			
<b>Short-Circuit Protection</b>		Available; Limit current: 25 to 35mA				
<b>Check Terminals</b>		Available				
<b>Digital Output</b>		16-bit signed binary (normal resolution mode: -96 to 4095, high resolution mode: -288 to 12287)				
<b>I/O Characteristics Maximum Resolution</b>		<b>Analog Input Range</b>	<b>Normal Resolution Mode</b>		<b>High Resolution Mode</b>	
			<b>Digital Output Value</b>	<b>Max. Resolution</b>	<b>Digital Output Value</b>	<b>Max. Resolution</b>
		0 to 20mA	0 to 4000	5μA	0 to 12000	1.66μA
		4 to 20mA		4μA		1.33μA
		4 to 20mA (Expanded Mode)	-1000 to 4500	4μA	-3000 to 13500	1.33μA
	User Range Setting	0 to 4000	1.37μA	0 to 12000	1.33μA	
<b>Accuracy (Accuracy Relative to Full-Scale)</b>	<b>Reference Accuracy (*1)</b>	±0.1% (Normal resolution mode: ±4 digit; High resolution mode: ±12 digit) (*2)				
	<b>Temp. Coefficient (*3)</b>	±71.4 ppm / °C (0.00714% / °C)				
<b>Conversion Speed</b>		10ms / channel				
<b>Insulation</b>	<b>Isolated Part</b>	<b>Insulation Method</b>	<b>Dielectric Withstand Voltage</b>		<b>Isolation Voltage</b>	
	Between I/O Terminal and Programmable Controller Power Supply	Transformer Isolation	500VAC rms, 1min		500VDC 10MΩ or more	
	Between Analog Input Channels		1000VAC rms, 1min.			
	Between External Power Supply and Analog Input		500VAC rms, 1min			
<b>I/O Device Points Occupied</b>		16 points				
<b>Connected Terminal</b>		18 points terminal block				
<b>Connector Type</b>		A6CON4				
<b>Internal Current Consumption (5VDC)</b>		0.42 A				
<b>External Power Supply</b>		24VDC +20%, -15%; Ripple, spike within 500mVp-p; Inrush current: 5.0A, within 400μs; 0.36A				
<b>Weight (kg)</b>		0.22				
<b>Base Unit Slots Occupied</b>		1				

### Notes:

- Accuracy of offset/gain setting at ambient temperature.
- "digit" indicates a digital value.
- Accuracy per temperature change of 1°C. Example: Accuracy when temperature changes from 25 to 30°C 0.1% (reference accuracy) + 0.00714 % / °C (temperature coefficient) × 5°C (temperature change difference) = 0.1357%

## High Resolution Isolated Analog Input Module with Signal Conditioning Function

<b>Model Number</b>		Q62AD-DGH				
<b>Stocked Item</b>		S				
<b>Certification</b>		CE				
<b>Connecting Section With 2-Wire Transmitter</b>	<b>Input</b>	<b>Number of Analog Input</b>	2 points (2 channels)			
		<b>Analog Input</b>	4 to 20 mAADC (*1) (Input resistance 250Ω)			
	<b>Supply Power</b>	<b>Supply Voltage</b>	26 ±2VDC			
		<b>Maximum Supply Current</b>	24mAADC			
		<b>Short-Circuit Protection</b>	Available; Limit current: 25 to 35mA			
<b>Check Terminals</b>		Available				
<b>Digital Output</b>		16-bit signed binary (-768 to 32767); 32-bit signed binary (-1538 to 65535)				
<b>I/O Characteristics Maximum Resolution</b>		<b>Analog Input Range</b>	<b>Maximum Resolution</b>		<b>Digital Output Value (32-Bit)</b>	<b>Digital Output Value (16-Bit)</b>
			<b>32-Bit</b>	<b>16-Bit</b>		
		4 to 20mA	250.0nA	500.0nA	0 to 64000	0 to 32000
		User range Setting	151.6nA	303.2nA		
<b>Accuracy (Accuracy Relative to Full-Scale)</b>	<b>Reference Accuracy (*2)</b>	±0.05%; Digital output value( 32 bit): ±32 digit; Digital output value (16 bit): ±16 digit (*3)				
	<b>Temp. Coefficient (*4)</b>	±71.4 ppm / °C (0.00714% / °C)				
<b>Conversion Speed</b>		10ms / 2 channels				
<b>Insulation</b>	<b>Isolated Part</b>		<b>Insulation Method</b>	<b>Dielectric Strength</b>	<b>Isolation Voltage</b> 500 VDC 10MΩ or more	
	Between I/O Terminal and PLC Power Supply		Photocoupler Insulation	1780 VAC rms / 3 cycles (elevation 2000m)		
	Between Analog Input Channels		Transformer Isolation			
	Between External Power Supply and Analog Input		Transformer Isolation			
<b>I/O Device Points Occupied</b>		16 points				
<b>Connected Terminal</b>		18 points terminal block				
<b>Applicable Solderless Terminals</b>		R1.25-3 (A solderless terminals with sleeves cannot be used)				
<b>Internal Current Consumption (5VDC)</b>		0.33 A				
<b>External Power Supply</b>		24VDC +20%, -15%; Ripple, spike within 500mVp-p; Inrush current: 5.5A, within 200μs; 0.19A				
<b>Weight (kg)</b>		0.19				
<b>Base Unit Slots Occupied</b>		1				

**Notes:**

- User range setting is 2 to 24mA.
- Accuracy of offset/gain setting at ambient temperature. Q62AD-DGH needs to be powered on 30 minutes prior to operation for compliance to the specification (accuracy).
- "Digit" indicates a digital output value.
- Accuracy per temperature change of 1°C.  
Example: Accuracy when temperature change from 25 to 30°C. 0.05% (reference accuracy + 0.00714% / °C (temperature coefficient) x 5 °C (temperature change difference) = 0.0857%

## Combination Analog Module

<b>Model Number</b>	Q64AD2DA						
<b>Stocked Item</b>	S						
<b>Certification</b>	UL • cUL • CE						
<b>Number of Analog Input Points</b>	4 points (4 channels)						
<b>Analog Input</b>	<b>Voltage</b>	-10 to 10VDC (input resistance value 1MΩ)					
	<b>Current</b>	0 to 20mADC (input resistance value 250Ω)					
<b>Digital Output</b>	Normal resolution mode:-96 to 4095, -4096 to 4095, -1096 to 4595 High resolution mode:-384 to 16383, -288 to 12287, -16384 to 16383, -3288 to 13787						
<b>I/O Characteristics Maximum Resolution</b>	<b>Analog Input Range</b>		<b>Normal Resolution Mode</b>		<b>High Resolution Mode</b>		
	<b>Voltage</b>	<b>0 to 10V</b>	0 to 4000	<b>Digital Output Value</b>	<b>Max. Resolution</b>	<b>Digital Output Value</b>	<b>Max. Resolution</b>
		<b>0 to 5V</b>		2.5mV	0 to 16000	0.625mV	
		<b>1 to 5V</b>	1.25mV	0 to 12000	0.416mV		
		<b>-10 to 10V</b>	-4000 to 4000	1.0mV	0 to 12000	0.333mV	
		<b>1 to 5V (Extended Mode)</b>	-1000 to 4500	2.5mV	-16000 to 16000	0.625mV	
	<b>Current</b>	<b>0 to 20mA</b>	0 to 4000	5μA	0 to 12000	1.66μA	
		<b>4 to 20mA</b>		4μA		1.33μA	
		<b>4 to 20mA (Extended Mode)</b>	-1000 to 4500	4μA	-3000 to 13500	1.33μA	

<b>Accuracy (Accuracy of Digital Output Value Relative to Maximum Value) (*1)</b>	<b>Analog Input Range</b>		<b>Normal Resolution Mode</b>		<b>High Resolution Mode</b>		
	<b>Voltage</b>	<b>0 to 10V</b>	±0.4% (±16 digit)	<b>Ambient Temperature 0 to 55°C</b>	<b>Ambient Temperature 25 ±5°C</b>	<b>Ambient Temperature 0 to 55°C</b>	<b>Ambient Temperature 25 ±5°C</b>
		<b>-10 to 10</b>		±0.4% (±4 digit)	±0.1% (±4 digit)	±0.4% (±64 digit)	±0.1% (±16 digit)
		<b>0 to 5V</b>	±0.4% (±48 digit)			±0.1% (±12 digit)	
		<b>1 to 5V</b>					
		<b>1 to 5V (Extended Mode)</b>					
	<b>Current</b>	<b>0 to 20mA</b>	±0.4% (±60 μA)			±0.1% (±20 μA)	
		<b>4 to 20mA</b>					
		<b>4 to 20mA (Extended Mode)</b>					

<b>Conversion Time</b>	500 μs/channel	
<b>Absolute Maximum Input</b>	Voltage: ±15V, current: ±30mA (*2)	
<b>Number Of Analog Output Points</b>	2 points (2 channels)	
<b>Digital Input</b>	Normal resolution mode: -96 to 4095, -4096 to 4095; High resolution mode: -288 to 12287, -16384 to 16383	
<b>Analog Output</b>	<b>Voltage</b>	-10 to 10VDC (External load resistance: 1MΩ)
	<b>Current</b>	0 to 20mADC (External load resistance: 600Ω)

<b>I/O Characteristics Maximum Resolution</b>	<b>Analog Output Range</b>		<b>Normal Resolution Mode</b>		<b>High Resolution Mode</b>		
	<b>Voltage</b>	<b>0 to 5V</b>	0 to 4000	<b>Digital Input Value</b>	<b>Maximum Resolution</b>	<b>Digital Input Value</b>	<b>Maximum Resolution</b>
		<b>1 to 5V</b>		1.25 mV	0 to 12000	0.416 mV	
		<b>-10 to 10V</b>	-4000 to 4000	1.0 mV	0 to 12000	0.333 mV	
		<b>Current</b>	<b>0 to 20 mA</b>	0 to 4000	2.5 mV	-16000 to 16000	0.625 mV
			<b>4 to 20 mA</b>		5μA	0 to 12000	1.66μA
				4μA		1.33μA	

<b>Accuracy (Accuracy With Respect To Maximum Analog Output Value)</b>	<b>Analog Output Range</b>		<b>Ambient Temperature</b>		
	<b>Voltage</b>	<b>0 to 5V</b>	±0.3% (±30mV)	<b>0 to 55°C</b>	<b>25 ±5°C</b>
		<b>1 to 5V</b>		±0.3% (±60 μA)	±0.1% (±20 μA)
		<b>-10 to 10V</b>			
		<b>Current</b>	<b>0 to 20 mA</b>		
			<b>4 to 20 mA</b>		

<b>Conversion Speed</b>	500 μs/channel
<b>Absolute Maximum Output</b>	Voltage: 12V Current: 21mA
<b>Output Short Circuit Protection</b>	Available
<b>I/O Device Points Occupied</b>	16 points (I/O assignment: Intelligent 16 points)
<b>Connected Terminals</b>	18 points terminal block
<b>Applicable Solderless Terminal</b>	A/D conversion part, D/A conversion part: R1.25-3 (Solderless terminals with sleeves are unavailable.) External power supply 24VDC, FG terminal connection: Not available
<b>External Supply Power</b>	24VDC 15%; Ripple, spike 500mVp-P or less; Inrush current: 2.5A 150μs or less; Current consumption: 0.19A
<b>Internal Current Consumption (5VDC)</b>	0.17A
<b>Weight (kg)</b>	0.23
<b>Base Unit Slots Occupied</b>	1

### Notes:

- A1: The selection ranges and accuracies have the following relationships.

Ambient Temperature	Temperature Range		
	Pt100 and JPt100 : -20 to 120°C	Pt100 : -200 to 850°C	JPt100 : -180 to 600°C
0 to 55°C	±0.3°C	±2.125°C	±1.5°C
25 ±5°C	±0.096°C	±0.68°C	±0.48°C

The conversion speed is a period from when a temperature is input and converted into a corresponding digital value until the value is stored into the buffer memory. When two or more channels are used, the conversion speed is "40ms number of conversion enabled channels".

- For output in the case of disconnection detection, select any of "Value immediately before disconnection", "Up scale (maximum value of measured temperature range + 5% of measured temperature range)", "Down scale (minimum value of measured temperature range - 5% of measured temperature range)" or "Given value".

## Analog Output Modules

Analog output modules allow the CPU to convert digital program values to real world analog current or voltage signals. These can then be used to control actuators whose properties vary between set limits, such as valve openings, speed control, extension distance, etc.

Model Name		Q62DAN	Q64DAN	Q68DAVN	Q68DAIN			
Stocked Item		S	S	S	S			
Number Of Analog Output Points		2 points (2 channels)	4 points (4 channels)	8 points (8 channels)				
Digital Input		16-bit signed binary (normal resolution mode: -4096 to 4095, High resolution mode: -12288 to 12287, -16384 to 16383)						
Analog Output	Voltage	-10 to 10VDC (External load resistance value: 1KΩ to 1MΩ)			-			
	Current	0 to 20 mA DC (External load resistance value: 0Ω to 600Ω)	-		0 to 20 mA DC (External load resistance value: 0Ω to 600Ω)			
I/O Characteristics, Maximum Resolution		Analog Output Range		Normal Resolution Mode		High Resolution Mode		
				Digital Input Value	Max. Resolution	Digital Input Value	Max. Resolution	
		Voltage	0 to 5V	0 to 4000	1.25 mV	0 to 12000	0.416 mV	
			1 to 5V		1.0 mV		0.333 mV	
			-10 to 10V	-4000 to 4000	2.5 mV	-16000 to 16000	0.625 mV	
		User Range Setting	0.75 mV		-12000 to 12000	0.333 mV		
		Current	0 to 20 mA	0 to 4000	5μA	0 to 12000	1.66μA	
4 to 20 mA	4μA		1.33μA					
User Range Setting	-4000 to 4000		1.5μA	-12000 to 12000	0.83μA			
Accuracy (Accuracy With Respect To Maximum Analog Output Value)	Ambient Temp. 25 ±5°C	Within ± 0.1 % (Voltage: ±10 mV, Current: ± 20μA)						
	Ambient Temp. 0 to 55°C	Within ± 0.3 % (Voltage: ± 30 mV, Current: ± 60μA)						
Conversion Speed		80μs/channel						
Output Short Circuit Protection		Available						
I/O Device Points Occupied		16 points (I/O assignment: Intelligent 16 points)						
Connected Terminals		18-points terminal block						
Applicable Solderless Terminal		R1.25-3 (A solderless terminal with sleeve cannot be used)		FG terminal: R1.25-3, 1.25-YS3, RAV1.25-3, V1.25-YS3A; Other terminals than FG: R1.25-3 (A solderless terminal with sleeve cannot be used)				
External Supply Power		24VDC + 20 %, -15 %						
		Ripple, spike 500 mV P-P or less						
		Inrush current: 2.5 A, within 250μs	Inrush current: 2.5 A, within 260μs	Inrush current: 2.5 A, within 230μs	Inrush current: 2.5 A, within 230μs			
Internal Current Consumption (5VDC)		0.33 A	0.24 A	0.20 A	0.27 A			
Weight (kg)		0.19	0.20	0.20	0.20			
Base Unit Slots Occupied		1						



## D/A Converter Module

<b>Model Number</b>		<b>Q64DAH</b>																								
<b>Stocked Item</b>		-																								
<b>Number of Analog Output Points</b>		4 points (4 channels)																								
<b>Digital Input</b>	<b>Input</b>	-20480 to 20479																								
	<b>Using the Scaling Function</b>	-32768 to 32767																								
<b>Analog Output</b>	<b>Voltage</b>	-10 to 10VDC (external load resistance 1kΩ to 1MΩ)																								
	<b>Current</b>	0 to 20mADC (external load resistance 0Ω to 600Ω)																								
<b>I/O Characteristics, Maximum Resolution (*1)</b>		<table border="1"> <thead> <tr> <th colspan="2">Analog Output Range</th> <th>Digital Value</th> <th>Maximum Resolution</th> </tr> </thead> <tbody> <tr> <td rowspan="4"><b>Voltage</b></td> <td>0 to 5V</td> <td rowspan="2">0 to 20000</td> <td>250μV</td> </tr> <tr> <td>1 to 5V</td> <td>200μV</td> </tr> <tr> <td>-10 to 10V</td> <td rowspan="2">-20000 to 20000</td> <td>500μV</td> </tr> <tr> <td>User range setting</td> <td>333μV</td> </tr> <tr> <td rowspan="3"><b>Current</b></td> <td>0 to 20mA</td> <td rowspan="2">0 to 20000</td> <td>1000nA</td> </tr> <tr> <td>4 to 20mA</td> <td>800nA</td> </tr> <tr> <td>User range setting</td> <td>-20000 to 20000</td> <td>700nA</td> </tr> </tbody> </table>	Analog Output Range		Digital Value	Maximum Resolution	<b>Voltage</b>	0 to 5V	0 to 20000	250μV	1 to 5V	200μV	-10 to 10V	-20000 to 20000	500μV	User range setting	333μV	<b>Current</b>	0 to 20mA	0 to 20000	1000nA	4 to 20mA	800nA	User range setting	-20000 to 20000	700nA
		Analog Output Range		Digital Value	Maximum Resolution																					
		<b>Voltage</b>	0 to 5V	0 to 20000	250μV																					
			1 to 5V		200μV																					
			-10 to 10V	-20000 to 20000	500μV																					
			User range setting		333μV																					
		<b>Current</b>	0 to 20mA	0 to 20000	1000nA																					
			4 to 20mA		800nA																					
User range setting	-20000 to 20000		700nA																							
<b>Accuracy (Accuracy for the Maximum Value of Analog Output Value) (*2)</b>	<b>Ambient Temperature 25 ±5°C</b>	Within ±0.1% (voltage: ±10mV, current: ±20μA)																								
	<b>Ambient Temperature 0 to 55°C</b>	Within ±0.3% (voltage: ±30mV, current: ±60μA)																								
<b>Conversion Speed</b>	<b>Normal Output Mode</b>	20μs/channel																								
	<b>Wave Output Mode</b>	50μs/channel, 80μs/channel																								
<b>Number of Offset/Gain Settings</b>		Up to 50000 counts																								
<b>Output Short Protection</b>		Protected																								
<b>Insulation Method</b>		Between I/O terminals and programmable controller power supply: photocoupler isolation; Between output channels: no isolation; Between external power supply and analog output: transformer isolation																								
<b>Dielectric Withstand Voltage</b>		Between I/O terminals and programmable controller power supply: 500VAC rms for 1 minute; Between external power supply and analog output: 500VAC rms for 1 minute																								
<b>Insulation Resistance</b>		Between I/O terminals and programmable controller power supply: 500VDC 10MΩ or higher																								
<b>Number of Occupied I/O Points</b>		16 points (I/O assignment: 16 points for intelligent)																								
<b>Connected Terminal</b>		18-point terminal block																								
<b>Applicable Wire Size</b>		0.3 to 0.75mm <sup>2</sup>																								
<b>Applicable Solderless Terminal</b>		R1.25-3 (solderless terminals with sleeve are not usable)																								
<b>External Power Supply</b>	<b>24VDC +20%, -15%</b>	24VDC +20%, -15%																								
	<b>Ripple, Spike 500mVP-P or Lower</b>	Ripple, spike 500mVP-P or lower																								
	<b>Inrush Current: 4.3A, 1000μs or Shorter</b>	Inrush current: 4.3A, 1000μs or shorter																								
	<b>Current Consumption: 0.18A</b>	Current consumption: 0.18A																								
<b>Internal Current Consumption (5VDC)</b>		0.12A																								
<b>Weight (kg)</b>		0.19																								

### Notes:

- For details on the I/O conversion characteristics, refer to I/O conversion characteristic of D/A conversion in the User's Manual.
- Except when receiving noise influence. Warm up (power on) the module for 30 minutes to satisfy the accuracy shown in the table.

## Isolated Analog Output Modules with Output Monitor

<b>Model Number</b>		<b>Q62DA-FG</b>				
<b>Stocked Item</b>		S				
<b>Certification</b>		UL • cUL • CE				
<b>Number of Analog Outputs</b>		2 points (2 channels)				
<b>Digital Input</b>		16-bit signed binary (-12288 to 12287, -16384 to 16383)				
<b>Analog Output</b>	<b>Voltage</b>	-12 to 12VDC (External load resistance 1k to 1MΩ)				
	<b>Current</b>	0 to 20 mADC (External load resistance: 0 to 600Ω); 0 to 22 mADC				
<b>I/O Characteristics Maximum Resolution</b>						
			<b>Analog Output Range</b>	<b>Digital Input Value</b>	<b>Maximum Resolution</b>	
		Voltage	0 to 5V	0 to 12000	0.416mV	
			1 to 5V		0.333mV	
			-10 to 10V	-16000 to 16000	0.625mV	
			User Range Setting 2	-12000 to 12000	0.366mV	
			User Range Setting 3		0.183mV	
		Current	0 to 20 mA	0 to 12000	1.66μA	
			4 to 20 mA		1.33μA	
User Range Setting 1	-12000 to 12000		0.671μA			
<b>Accuracy (Accuracy Relative to Maximum Analog Output Value)</b>	<b>Reference Accuracy (*1)</b>	within ±0.1%; (Voltage: ±10mV, Current: ±20μA)				
	<b>Temp. Coefficient (*2)</b>	±80 ppm / °C (0.008% / °C)				
<b>Conversion Speed</b>		10ms / 2 channels				
<b>Output Monitor</b>	<b>Resolution</b>	12 bit				
	<b>Reference Accuracy (*1)</b>	±0.2%				
	<b>Temperature Coefficient (*2)</b>	±160ppm / °C (0.016% / °C)				
<b>Output Short-Circuit Protection</b>		Available				
<b>I/O Device Points Occupied</b>		16 points				
<b>Isolation Specifications</b>		<b>Isolated Part</b>		<b>Isolation Method</b>	<b>Dielectric Strength</b>	<b>Insulation Resistance</b> 500VDC 10MΩ or more
		Between I/O Terminal and Controller Power Supply		Photocoupler Isolation	1780VAC rms / 3 cycles (elevation 2000m)	
		Between Analog Output Channels		Transformer Isolation		
		Between External Power Supply and Analog Output		Transformer Isolation		
<b>Connected Terminal</b>		18 points terminal block				
<b>Applicable Solderless Terminals</b>		R1.25-3 (A solderless terminals with sleeves cannot be used)				
<b>Internal Current Consumption (5VDC)</b>		0.37A				
<b>External Power Supply</b>		24VDC +20%, -15%; Ripple, spike within 500mVp-p; Inrush current: 5.2A, within 300μs, 0.3A				
<b>Weight (kg)</b>		0.20				
<b>Base Unit Slots Occupied</b>		1				

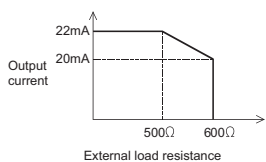
**Notes:**

- Accuracy of offset/gain setting at ambient temperature Q62AD-DGH needs to be powered on 30 minutes prior to operation for compliance to the specification (accuracy).
- Accuracy per temperature change of 1°C.  
Example: Accuracy when temperature change from 25 to 30°C. 0.1% (reference accuracy + 0.008% / °C (temperature coefficient) × 5 °C (temperature change difference) = 0.14%

<b>Model Number</b>		<b>Q66DA-G</b>					
<b>Stocked Item</b>		S					
<b>Certification</b>		UL • cUL • CE					
<b>Number of Analog Outputs</b>		6 points (6 channels)					
<b>Digital Input</b>		16-bit signed binary (normal resolution mode:-4096 to 4095; high resolution mode: -12288 to 12287, -16384 to 16383)					
<b>Analog Output</b>	<b>Voltage</b>	-12 to 12VDC (External load resistance 1k to 1MΩ)					
	<b>Current</b>	0 to 20 mADC (External load resistance: 0 to 600Ω); 0 to 22 mADC (*3)					
<b>I/O Characteristics Maximum Resolution</b>		<b>Input</b>	<b>Analog Input Range</b>	<b>Normal Resolution Mode</b>		<b>High Resolution Mode</b>	
				<b>Digital Input Value</b>	<b>Max. Resolution</b>	<b>Digital Input Value</b>	<b>Max. Resolution</b>
		Voltage	0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV
			1 to 5V		1.0mV		0.333mV
			-10 to 10V	-4000 to 4000	2.5mV	-16000 to 16000	0.625mV
			User Range Setting 2		.075mV		-12000 to 12000
		User Range Setting 3		0.375mV		0.210mV	
Current	0 to 20 mA	0 to 4000	5μA	0 to 12000	1.66μA		
	4 to 20 mA		4μA		1.33μA		
	User Range Setting 1	-4000 to 4000	1.5μA	-12000 to 12000	0.95μA		
<b>Accuracy (Accuracy Relative to Maximum Analog Output Value)</b>	<b>Reference Accuracy (*1)</b>	within ±0.1%; (Voltage: ±10mV, Current: ±20μA)					
	<b>Temp. Coefficient (*2)</b>	±80 ppm / °C (0.008% / °C)					
<b>Conversion Speed</b>		6ms / channels					
<b>Output Monitor</b>	<b>Resolution</b>	15-bit					
	<b>Reference Accuracy (*1)</b>	±0.1%					
	<b>Temperature Coefficient (*2)</b>	0.008% / °C					
<b>Output Short-Circuit Protection</b>		Available					
<b>I/O Device Points Occupied</b>		16 points					
<b>Isolation Specifications</b>		<b>Isolated Part</b>	<b>Isolation Method</b>	<b>Dielectric Strength</b>	<b>Insulation Resistance</b>		
		Between Output Terminal and Controller Power Supply	Transformer Isolation	500VAC rms, 1 min.	500VDC 10MΩ or more		
		Between Analog Output Channels		1000VAC rms, 1 min.			
		Between External Power Supply and Analog Output		500VAC rms, 1 min.			
<b>Connected Terminal</b>		40-pin connector					
<b>Applicable Solderless Terminals</b>		R1.25-3 (A solderless terminals with sleeves cannot be used)					
<b>Internal Current Consumption (5VDC)</b>		0.62A					
<b>External Power Supply</b>		24VDC, +20%, -15%; Ripple, spike within 500 mV p-p; Inrush current: 4.8A, within 400μs; 0.22A					
<b>Weight (kg)</b>		0.22					
<b>Base Unit Slots Occupied</b>		1					

**Notes:**

- Accuracy of offset/gain setting at ambient temperature Q66DA-G needs to be powered on 30 minutes prior to operation for compliance to the specification (accuracy).
- Accuracy per temperature change of 1 °C  
 Example: Accuracy when temperature changes from 25 to 30 °C  
 $0.1\% (\text{Reference accuracy}) + 0.008\% / \text{°C} (\text{temperature coefficient}) \times 5 \text{ °C} (\text{temperature change difference}) = 0.14\%$
- The following indicates the external load resistance when output current is 20mA or more.



## HART Interface Module

The Q Series HART® Interface I/O Modules provide total access to process data and device diagnostics from over 1000 HART enabled field devices. The system is designed to use the 4-20mA (or 0-20mA) control signal from traditional analog devices as well as the 4-20mA and digital process data from HART devices, allowing up to 5 (1 analog, 4 digital process variables) control points on a single 2-wire connection.

<b>Model Number</b>		<b>ME1AD8HAI-Q</b>		
<b>Stocked Item</b>		-		
<b>Number of Analog Input Points</b>		8 points (8 channels)		
<b>Analog Input</b>	<b>Current</b>	0 to 20 mA DC • 4 to 20 mA DC		
	<b>Absolute Maximum Input</b>	± 30 mA		
	<b>Input Resistance</b>	250Ω		
	<b>Short-Circuit Protection</b>	Available		
	<b>Primary Filter</b>	Hz (3 dB), HART signal is 1200 Hz with 1 mAP-P		
<b>Digital Output</b>		16-bit signed binary (-768 to 32767)		
<b>I/O Characteristics, Maximum Resolution</b>		<b>Analog Input Range</b>	<b>Digital Output Value</b>	<b>Maximum Resolution</b>
		0 to 20 mA	0 to 32000	625.0 nA
		4 to 20 mA		500.0 nA
<b>Accuracy (Relative to Digital Output Value) (*1)</b>		±0.15% (±48 digit) (*2)		
<b>Cycle Time</b>		80 ms (Independent to the number of used channels)		
<b>Insulation Method</b>	<b>Between the I/O Terminals and PLC Power Supply</b>	Photocoupler insulation		
	<b>Between Analog Input Channels</b>	Non-insulated		
<b>HART Modem</b>		FSK Physical Layer, multiplexed		
<b>HART Functions</b>		Protocol Revision 6 support • 4 Process variables support (PV, SV, TV, QV) • FDT/DTM support		
<b>Number of I/O Occupied Points</b>		32 points (I/O assignment: Intelligent 32 points)		
<b>External Wiring Connection System</b>		18-points terminal block		
<b>Applicable Wire Size</b>		Refer to the HART specification for more details. The external power supply voltage of the ME1AD8HAI-Q should be enough for correct operation of the analog transmitter. (*3, *4)		
<b>Applicable Solderless Terminals</b>		R1.25-3 (Solderless terminals with sleeves cannot be used)		
<b>External Supply Power</b>	<b>Voltage</b>	24VDC (+20%, -15%); ripple, spike within 500mVp-P		
	<b>Current (A)</b>	0.3		
	<b>Inrush Current</b>	5.5 A within 200 μs		
<b>Online Module Change</b>		Not supported		
<b>Internal Current Consumption (5VDC) (A)</b>		0.32		
<b>Weight (kg)</b>		0.19		
<b>Base Unit Slots Occupied</b>		1		

**Notes:**

- ME1AD8HAI-Q needs to be powered on 30 minutes prior to operation for compliance to the specification (accuracy).
- "digit" indicates a digital value.
- Use case: For distances up to 800 m, the wire size of 0.51 mm diameter with 115 nF/km cable capacitance and 36.7 nF/km cable resistance can be applied.
- Refer to the calculation example shown in User's Manual (External wiring).

## Load Cell Input Module

<b>Model Number</b>		<b>Q61LD</b>				
<b>Stocked Item</b>		S				
<b>Certification</b>		UL • cUL • CE				
<b>Number of Analog Inputs</b>		1 point (1 channel)				
<b>Digital Output</b>		32-bit signed binary; 0 to 10000				
<b>Analog Input Range (Load Cell Rated Output)</b>		0.0 to 1.0mV/V, 0.0 to 2.0mV/V, 0.0 to 3.0mV/V				
<b>I/O Characteristics Maximum Resolution</b>		<b>Analog Input Range</b>	<b>Digital Output Value</b>	<b>Maximum Weighing Capacity Output Value</b>	<b>Maximum Resolution</b>	
		<b>Load Cell Rated Output</b>	0 to 1.0mV/V	0 to 10000	-99999 to 99999	0.5μA
			0 to 2.0mV/V			1.0μA
0 to 3.0mV/V	1.5μA					
<b>Accuracy (Accuracy Relative to Maximum Analog Output Value)</b>		Nonlinearity: Within ±0.01%/FS (Ambient temperature 25°C); Zero drift: Within ±0.25μV/°C RTI; Gain drift: Within ±15 ppm/°C				
<b>Conversion Speed</b>		10ms				
<b>Accuracy (Accuracy Relative to Analog Input (Load Cell Rated Output) of a Module)</b>		Nonlinearity: Within ±0.01%/FS (Ambient temperature 25°C); Zero drift: Within ±0.25μV/°C RTI; Gain drift: Within ±15 ppm/°C				
<b>I/O Device Points Occupied</b>		16 points				
<b>Connected Terminal</b>		18 point terminal block				
<b>Applicable Solderless Terminals</b>		R1.25-3 (A solderless terminal cannot be used)				
<b>Internal Current Consumption (5VDC)</b>		0.48A				
<b>External Power Supply</b>		24VDC +20%, -15%; Ripple, spike within 500mVp-p; Inrush current: 5.2A, within 300μs, 0.3A				
<b>Weight (kg)</b>		0.17				
<b>Base Unit Slots Occupied</b>		1				