Guideline for choosing
Process Controller / Temperature Controller

YUDIAN AI-8 Series
Single Channel / Multi-channel Controller

 https://www.yudian.com.hk

AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller

AI	□	□	□	□	□	□	□	□	□	Description
Model	888									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.1-class accuracy, 10-year warranty
	868									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.15-class accuracy, 8-year warranty
	858									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.2-class accuracy, 5-year warranty
	838									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.25-class accuracy, 3-year warranty
	828									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.3-class accuracy, 2-year warranty
	826									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.3-class accuracy, 2-year warranty
Dimensions (Width × Height)		A/A1								Panel dimensions: 96×96mm
		A2/A21								Panel dimensions: 96x96mm, with light bar
		A5/A51								Panel dimensions: 96×96mm, dual five-digit display with light bar (suitable for instruments with accuracy ≥ 0.2 class)
		A9/A91								Panel dimensions: 96×96mm, two rows of five-digit display plus a third row of four-digit display (suitable for instruments with accuracy ≥ 0.2 class)
		B/B1								Panel dimensions: 160×80mm
		C3/C31								Panel dimensions: 80×160mm, three rows of four-digit display
		D								Panel dimensions: 72×72mm (without ALM, MIO)
		D61								Panel dimensions: 48x48mm, 12 terminal connections (without ALM, MIO)
		E/E1								Panel dimensions: 48×96mm
		E2/E21								Panel dimensions: 48×96mm, with light bar
		E3/E31								Panel dimensions: 48×96mm, three rows of four-digit display
		E5/E51								DIN rail mounting, width 45mm, no built-in display, external E85 display
		E9/E91								Panel dimensions: 48×96mm, two rows of five-digit display plus a third row of four-digit display (suitable for instruments with accuracy ≥ 0.2 class)
		F/F1								Panel dimensions: 96×48mm
Auxiliary Input (MIO)			I2/I5							Digital input module for Et event input, can be configured for run start/stop, switch setpoint/PID parameters, toggle direct/reverse action, toggle manual/automatic control, run/stop (I2 is single-channel, I5 is dual-channel)
			I4/I44							0-20mA/4-20mA current input module, capable of providing 24V power supply (I44 is used for versions V9.2 and above)
			I9							CT measurement module, used for heater break alarm
			V*							V24, V12, V10 modules are 24VDC, 12VDC, 10VDC power supply modules, respectively
Main Output (OUTP)				L1						Domestic large-size single-channel relay output module, capacity 250VAC/2A
				L3						Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
				G						Solid-state relay driver voltage output module (DC12V/30mA)
				W1/W2						SCR solid-state switch output module (W1 is normally open, W2 is normally closed)
				X3/X5						Optically isolated linear current output module (X3 uses the instrument's power supply, X5 has its own isolated power supply)
				K1/K3						SCR zero-crossing trigger output module (K1 supports single channel, K3 supports three channels, with K3 occupying the MIO port)
				K50/K60						SCR phase-shift trigger output module (K50 for 220V voltage, K60 for 380V voltage)
				K51						SCR phase-shift trigger output module (inductive load, suitable for 220VAC)
Alarm Interface (ALM)					L21					Domestic small-size single-channel relay output module, capacity 250VAC/1A
					L3					Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
					G					Solid-state relay driver voltage output module (DC12V/30mA)
					W1/W2					SCR solid-state switch output module (W1 is normally open, W2 is normally closed)
Auxiliary Interface (AUX)						L1				Domestic large-size single-channel relay output module, capacity 250VAC/2A
						L21				Domestic small-size single-channel relay output module, capacity 250VAC/1A
						L3				Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
						G				Solid-state relay driver voltage output module (DC12V/30mA)
						X3/X5				Optically isolated linear current output module (X3 uses the instrument's power supply, X5 has its own isolated power supply)
						R				232 communication interface, utilizing the internal 12V power supply of the instrument
Communication (COMM)							I2 / I5			Digital input module for Et event input, can be configured for run start/stop, switch setpoint/PID parameters, toggle direct/reverse action, toggle manual/automatic control, run/stop (single-channel)
							S/S4			Optically isolated RS485 communication interface (S uses the instrument power supply, S4 has its own isolated power supply)
							S2			Optically isolated RS485 communication interface (suitable for D-type instruments)
							X3/X5			Optically isolated linear current output module (X3 uses the instrument's power supply, X5 has its own isolated power supply)
Power Supply										Default 100-240VAC power supply
								-24VDC		24VDC power supply
Input Signals									-IN**	Designated signal input, ** represents the input type code (refer to the input type table on page P03)
									-INRT	Various RTD inputs, default setting: PT100 input
									-INTC	Various thermocouple inputs, default setting: K-type input
									-INAL	Universal input, with no predefined input specifications, allowing customers to configure freely

AI	□	□	□	□	□	□	□	□	□	Description
Model	888									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.1-class accuracy, 10-year warranty
	868									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.15-class accuracy, 8-year warranty
	858									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.2-class accuracy, 5-year warranty
	838									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.25-class accuracy, 3-year warranty
	828									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.3-class accuracy, 2-year warranty
	826									AI-8 Series Single-Loop High-Performance AI Controller/Temperature Controller, 0.3-class accuracy, 2-year warranty
Dimensions (Width × Height)		D71								DIN rail mounting, width 22.5 mm, with built-in display, power supply and communication via bus
Auxiliary Input (MIO)			I2/I22/I5							Digital input module for Et event input, can be configured for run start/stop, switch setpoint/PID parameters, toggle direct/reverse action, toggle manual/automatic control, run/stop (I2 is single-channel, I22 / I5 is dual-channel)
			I9							CT measurement module, used for heater break alarm
			V*							The V12 and V10 modules are 12VDC and 10VDC power supply modules, respectively
Main Output (OUTP)				L1						Domestic large-size single-channel relay output module, capacity 250VAC/2A
				L3						Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
				G						Solid-state relay driver voltage output module (DC12V/30mA)
				W1/W2						SCR solid-state switch output module (W1 is normally open, W2 is normally closed)
				X3						Optically isolated linear current output module (X3 uses the instrument's power supply, X5 has its own isolated power supply)
				K1						SCR zero-crossing trigger output module (K1 supports single channel, K3 supports three channels, with K3 occupying the MIO port)
				K50/K60						SCR phase-shift trigger output module (K50 for 220V voltage, K60 for 380V voltage)
				K51						SCR phase-shift trigger output module (inductive load, suitable for 220VAC)
Alarm Interface (ALM)					L21					Domestic small-size single-channel relay output module, capacity 250VAC/1A
					L3					Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
					G					Solid-state relay driver voltage output module (DC12V/30mA)
					W1/W2					SCR solid-state switch output module (W1 is normally open, W2 is normally closed)
Auxiliary Interface (AUX)						L1				Domestic large-size single-channel relay output module, capacity 250VAC/2A
						L21				Domestic small-size single-channel relay output module, capacity 250VAC/1A
						L3				Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
						G				Solid-state relay driver voltage output module (DC12V/30mA)
						X3				Optically isolated linear current output module (X3 uses the instrument's power supply, X5 has its own isolated power supply)
Communication (COMM)							S2			Integrated S2 module, optically isolated RS485 communication interface
Power Supply								-24VDC		Default 24VDC power supply
								-220VAC		Customized 100-240VAC power supply
Input Signals									-IN**	Designated signal input, ** represents the input type code (refer to the input type table on page P03)
									-INRT	Various RTD inputs, default setting: PT100 input
									-INTC	Various thermocouple inputs, default setting: K-type input
									-INAL	Universal input, with no predefined input specifications, allowing customers to configure freely

Selection Considerations:

- The AI-8 series offers various dimension options. However, when selecting D-series panel-mounted or DIN rail-mounted instruments, the number of installable modules may be less than the standard quantity due to size or terminal limitations. This may result in certain functions being unavailable. Please carefully read the relevant product manuals or contact our technical support team before finalizing your selection.
- A suffix of "1" in the dimension code indicates the selection of soldered modules, where all internal modules of the instrument are soldered. If the dimension suffix does not include "1", it indicates the selection of plug-in modules. For such instruments, as products are upgraded, some modules with single functions that are less likely to damage or are rarely used may be replaced with smaller, more resource-efficient soldered modules. However, the main output modules like OUTP and AUX, which are commonly used, will retain the plug-in module configuration.
- The D panel does not have an MIO port. The COMM and ALM ports share the same output channel. If an RS485 communication module is installed, the instrument will not have an ALM port. If an alarm function is required, an alarm output module can be added to the AUX port.
- The D61 panel does not have MIO and ALM ports, and it features 3 soldered modules (OUTP, AUX, COMM).
- The D7/D71 panels use pluggable bus terminals for power and communication wiring. The D7 has OUTP and AUX as plug-in modules, and COMM as a soldered module, while the D71 consists entirely of soldered modules. The number of modules is consistent with that of the panel-mounted large instruments, and it is fully compatible with the functionality of full-size instruments.
- D-series panel-mounted or DIN rail-mounted instruments cannot select modules that require 24V power, such as I4, X5, S1, S4, V24.
- Regarding auxiliary input (MIO): The Yudian instruments already support direct inputs for various thermocouples, RTDs, etc. For other inputs, specialized input modules can be selected, such as the I4 module for two-wire transmitters I7 module for 0-5A AC and more.
- Regarding voltage output modules V*: The Yudian instruments can provide power supply modules (24VDC, 12VDC, 10VDC, etc.) to power external devices. These can be installed in any module socket, but it is generally recommended to install them in the MIO, AUX, and COMM positions in sequence, depending on module availability.
- A5/A51/A9/A91/E9/E91 five-digit display instruments are designed for instruments with accuracy of 0.2 class or above. Instruments with accuracy of 0.3 class or 0.25 class are not available in these models.

Selection Example:

AI-858	A	I4	G	L21	S	IN15
①	②	③	④	⑤	⑥	⑦

① The host model of the instrument is AI-858, a high-performance multifunctional temperature controller with 0.2 accuracy class and 5 years of warranty.

② The instrument dimensions: A, with a panel dimension of 96×96mm and 20 terminal connections.

③ The auxiliary input (MIO) is I4, a 4-20mA current input module with 24V power supply.

④ The instrument's main output (OUTP) is a solid-state relay voltage-driven module, 12VDC/30mA.

⑤ The auxiliary alarm port (AUX) is equipped with the L21 module, indicating that the instrument has 1 alarm output function (both normally open and normally closed).

⑥ The instrument has a communication module installed in the COMM port, indicating that the instrument supports RS485 communication functionality.

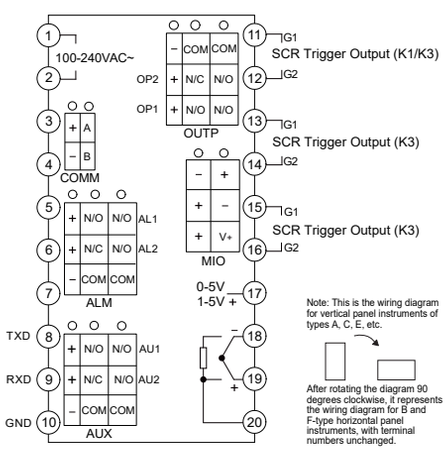
⑦ The input signal is designated as 4-20mA (input type code 15)

Wiring Diagram

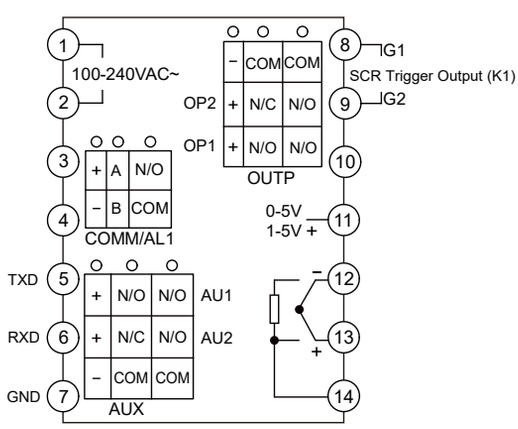
Note: Due to technical upgrades or special orders, if the instrument's included wiring diagram differs from the one in this selection manual, please refer to the included wiring diagram.

AI-8x8 /826

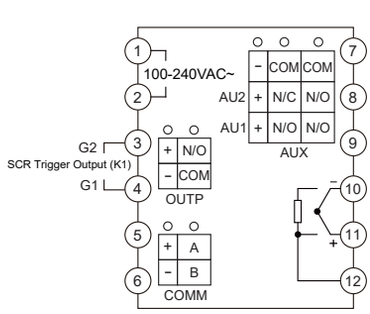
(A2.A21.A5.A51.A9.A91.B.B1.C3.C31.E.E1.E2.E21.E3.E31.E5.E51.E9.E91.F.F1)



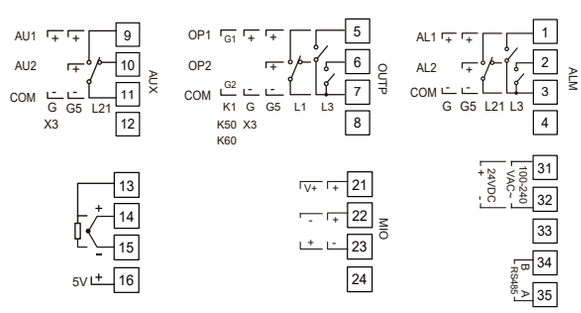
AI-8x8 /826 (D)



AI-8x8 /826 (D61)



AI-8x8 /826 (D71)



AI-8 Cascade High-Performance Multifunction Temperature Controller/Regulator

AI	□	□	□	□	□	□	□	□	□	□	Description
Model	899										Cascade high-performance temperature controller/regulator, 0.05/0.1-class accuracy, 10-year warranty
	889										Cascade high-performance temperature controller/regulator, 0.1-class accuracy, 10-year warranty
	869										Cascade high-performance temperature controller/regulator, 0.15-class accuracy, 5-year warranty
	859										Cascade high-performance temperature controller/regulator, 0.2-class accuracy, 5-year warranty
Dimensions (Width × Height)		A									Panel dimensions: 96×96mm
		B									Panel dimensions: 160×80mm
		C3									Panel dimensions: 80×160mm, three rows of four-digit display
		E									Panel dimensions: 48×96mm
		E5									DIN rail mounting, width 45mm, no built-in display, external E85 display
		F									Panel dimensions: 96×48mm
Auxiliary Input (MIO)				I2/I5							Digital input module for Et event input, can be configured for run start/stop, switch setpoint/PID parameters, toggle direct/reverse action, toggle manual/automatic control, run/stop (I2 is single-channel, I5 is dual-channel)
				V*							V24, V12, V10 modules are 24VDC, 12VDC, 10VDC power supply modules, respectively
Main Output (OUTP)					L1						Domestic large-size single-channel relay output module, capacity 250VAC/2A
					L3						Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
					G						Solid-state relay driver voltage output module (DC12V/30mA)
					W1/W2						SCR solid-state switch output module (W1 is normally open, W2 is normally closed)
					X3/X5						Optically isolated linear current output module (X3 uses the instrument's power supply, X5 has its own isolated power supply)
					K1/K3						SCR zero-crossing trigger output module (K1 supports single channel, K3 supports three channels, with K3 occupying the MIO port)
					K50/k60						SCR phase-shift trigger output module (K50 for 220V voltage, K60 for 380V voltage)
Alarm Interface (ALM)						L21					Domestic small-size single-channel relay output module, capacity 250VAC/1A
						L3					Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
						G					Solid-state relay driver voltage output module (DC12V/30mA)
						W1/W2					SCR solid-state switch output module (W1 is normally open, W2 is normally closed)
Auxiliary Interface (AUX)							L1				Domestic large-size single-channel relay output module, capacity 250VAC/2A
							L21				Domestic small-size single-channel relay output module, capacity 250VAC/1A
							L3				Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
							G				Solid-state relay driver voltage output module (DC12V/30mA)
							X3/X5				Optically isolated linear current output module (X3 uses the instrument's power supply, X5 has its own isolated power supply)
Communication (COMM)								I2 / I5			Digital input module for Et event input, can be configured for run start/stop, switch setpoint/PID parameters, toggle direct/reverse action, toggle manual/automatic control, run/stop (single-channel)
								S/S4			Optically isolated RS485 communication interface (S uses the instrument power supply, S4 has its own isolated power supply)
								X3/X5			Optically isolated linear current output module (X3 uses the instrument's power supply, X5 has its own isolated power supply)
Power Supply											Default 100-240VAC power supply
									-24VDC		24VDC power supply
Input Signals										-IN**	Designated signal input, ** represents the input type code (refer to the input type table on page P03)
										-INRT	Various RTD inputs, default setting: PT100 input
										-INTC	Various thermocouple inputs, default setting: K-type input
										-INAL	Universal input, with no predefined input specifications, allowing customers to configure freely

AI	□	□	□	□	□	□	□	□	□	Description
Model	899									Cascade high-performance temperature controller/regulator, 0.05/0.1-class accuracy, 10-year warranty
	889									Cascade high-performance temperature controller/regulator, 0.1-class accuracy, 10-year warranty
	869									Cascade high-performance temperature controller/regulator, 0.15-class accuracy, 5-year warranty
	859									Cascade high-performance temperature controller/regulator, 0.2-class accuracy, 5-year warranty
Dimensions (Width × Height)		D71								DIN rail mounting, width 22.5 mm, with built-in display, power supply and communication via bus
Input (M1)			J1							2-channel thermocouple input module
			J2							2-channel RTD input module
Main Output (OUTP)				L1						Domestic large-size single-channel relay output module, capacity 250VAC/2A
				L3						Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
				G						Solid-state relay driver voltage output module (DC12V/30mA)
				W1/W2						SCR solid-state switch output module (W1 is normally open, W2 is normally closed)
				X3						Optically isolated linear current output module (X3 utilizes the instrument's power supply)
				K1/K3						SCR zero-crossing trigger output module (K1 supports single channel, K3 supports three channels, with K3 occupying the MIO port)
				K50/k60						SCR phase-shift trigger output module (K50 for 220V voltage, K60 for 380V voltage)
Alarm Interface (ALM)					L21					Domestic small-size single-channel relay output module, capacity 250VAC/1A
					L3					Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
					G					Solid-state relay driver voltage output module (DC12V/30mA)
					W1/W2					SCR solid-state switch output module (W1 is normally open, W2 is normally closed)
Auxiliary Interface (AUX)						L1				Domestic large-size single-channel relay output module, capacity 250VAC/2A
						L21				Domestic small-size single-channel relay output module, capacity 250VAC/1A
						L3				Dual-channel relay output module, with two sets of normally open contacts, capacity 250VAC/2A
						G				Solid-state relay driver voltage output module (DC12V/30mA)
						X3				Optically isolated linear current output module (X3 utilizes the instrument's power supply)
Communication (COMM)							S2			Integrated S2 module, optically isolated RS485 communication interface
Power Supply								-24VDC		Default 24VDC power supply
								-220VAC		Customized 100-240VAC power supply
Input Signals									-IN**	Designated signal input, ** represents the input type code (refer to the input type table on page P03)
									-INRT	Various RTD inputs, default setting: PT100 input
									-INTC	Various thermocouple inputs, default setting: K-type input
									-INAL	Universal input, with no predefined input specifications, allowing customers to configure freely

Selection Example: AI-859 (①) D71 (②) J1 (③) G (④) L21 (⑤) S (⑥) - 24VDC (⑦) -IN00 (⑧)

① The host model of the instrument is AI-859, a cascade high-performance multifunction temperature controller/regulator, with 0.2-class accuracy and 5-year warranty.

② The instrument dimensions: D71, DIN rail mounting, width 22.5mm, with built-in display.

③ The instrument's input (M1) is J1, featuring two channels of thermocouple input, with no auxiliary input (MIO).

④ The instrument's main output (OUTP) is a solid-state relay voltage-driven module, 12VDC/30mA.

⑤ The auxiliary alarm port (AUX) is equipped with the L21 module, indicating that the instrument has 1 alarm output function (both normally open and normally closed).

⑥ The instrument has a communication module installed in the COMM port, indicating that the instrument supports RS485 communication functionality.

⑦ The instrument is powered by a 24VDC power supply

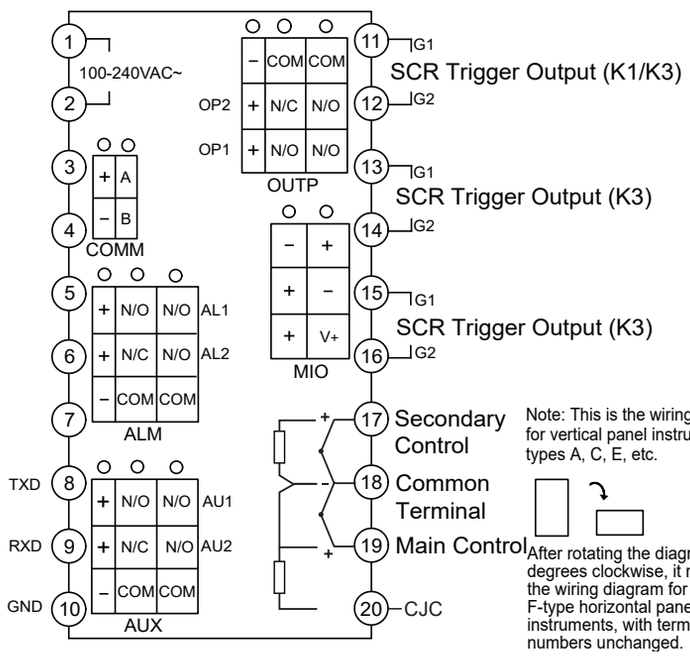
⑧ The input signal is specified as a K-type thermocouple (input type code 0)

Wiring Diagram

Note: Due to technical upgrades or special orders, if the instrument's included wiring diagram differs from the one in this selection manual, please refer to the included wiring diagram.

AI-8x9 (V9.2 and above)

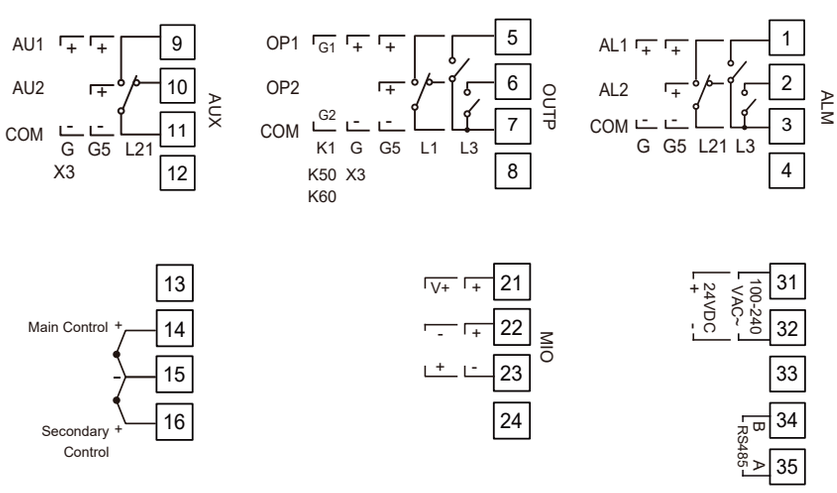
(A2.A21.A5.A51.A9.A91.B.B1.C3.C31.E2.E21.E3.E31.E5.E51.E9.E91.F.F1)



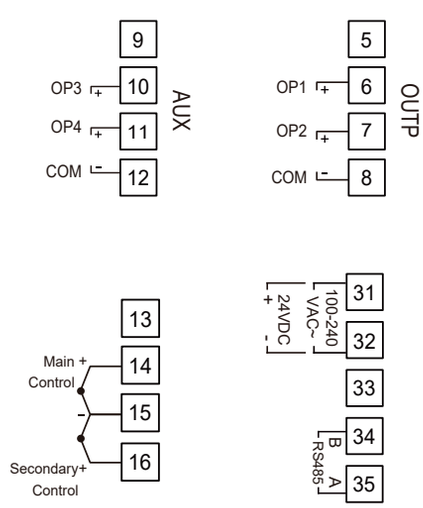
Note: This is the wiring diagram for vertical panel instruments of types A, C, E, etc.

After rotating the diagram 90 degrees clockwise, it represents the wiring diagram for B and F-type horizontal panel instruments, with terminal numbers unchanged.

AI-8x9 (D71)



AI-8x9 (D7 Four-Channel Solid-State)



AI-8 Series Multi-Loop High-Performance Measurement and Control Instrument

AI	□	□	□	□	□	□	□	□	Description
Model	8688								8-channel high-performance measurement and control instrument, with 0.15 accuracy class, 8-channel thermocouple input, 6 -year free warranty
	8288								8-channel high-performance measurement and control instrument, with 0.3 accuracy class, 8 -channel thermocouple input, 2 -year free warranty
	8188								8-channel controller, 8-channel thermocouple inputs, isolated input type, industry-customized model. Please consult the sales representative for details
Dimensions (Width × Height)		D71							DIN rail mounting, with buttons and dual 4-digit display, power and communication using bus terminals, width 22.5mm.
		D72							Rail mounting dimensions, single-row 2-digit display panel, capable of displaying the instrument's communication address.
Input (M1)			J1						8-channel thermocouple input
Main Output 1 (OUTP)				G3					Three-channel energy-saving non-isolated SSR drive voltage output module (5V/30mA)
				G6					Three-channel isolated solid-state relay drive voltage output module (12V/30mA, non-energy-saving type)
				G61					Three-channel isolated NPN output, can be externally connected to 5~24VDC to drive SSR or intermediate relay, maximum external voltage 28VDC, maximum drive current per channel 100mA
				G62					Three-channel isolated PNP output, can be externally connected to 5~24VDC to drive SSR or intermediate relay, maximum external voltage 28VDC, maximum drive current per channel 100mA
Main Output 2 (AUX)					G3				Three-channel energy-saving non-isolated SSR drive voltage output module (5V/30mA)
					G6				Three-channel isolated solid-state relay drive voltage output module (12V/30mA, non-energy-saving type)
					G61				Three-channel isolated NPN output, can be externally connected to 5~24VDC to drive SSR or intermediate relay, maximum external voltage 28VDC, maximum drive current per channel 100mA
					G62				Three-channel isolated PNP output, can be externally connected to 5~24VDC to drive SSR or intermediate relay, maximum external voltage 28VDC, maximum drive current per channel 100mA
Main Output 3 and Communication Expansion (ALM/YULINK)						G3			Three-channel energy-saving non-isolated SSR drive voltage output module (5V/30mA)
						G6			Three-channel isolated solid-state relay drive voltage output module (12V/30mA, non-energy-saving type)
						G61			Three-channel isolated NPN output, can be externally connected to 5~24VDC to drive SSR or intermediate relay, maximum external voltage 28VDC, maximum drive current per channel 100mA
						G62			Three-channel isolated PNP output, can be externally connected to 5~24VDC to drive SSR or intermediate relay, maximum external voltage 28VDC, maximum drive current per channel 100mA
						S5			Optical isolated RS422 communication expansion interface module
Power Supply								-24VDC	Default 24VDC power supply
								-220VAC	Customized 100-240VAC power supply

Selection considerations: The communication converter used in conjunction with the instrument must be RTU-ModbusTCP, which differs from the conventional AI-TCP series communication converter.

Wiring Diagram

Note: Due to technical upgrades or special orders, if the instrument's included wiring diagram differs from the one in this selection manual, please refer to the included wiring diagram.

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