

General Specifications

Field Connection Specifications (for FIO)



GS 33K50H10-50E

[Release 5]

■ GENERAL

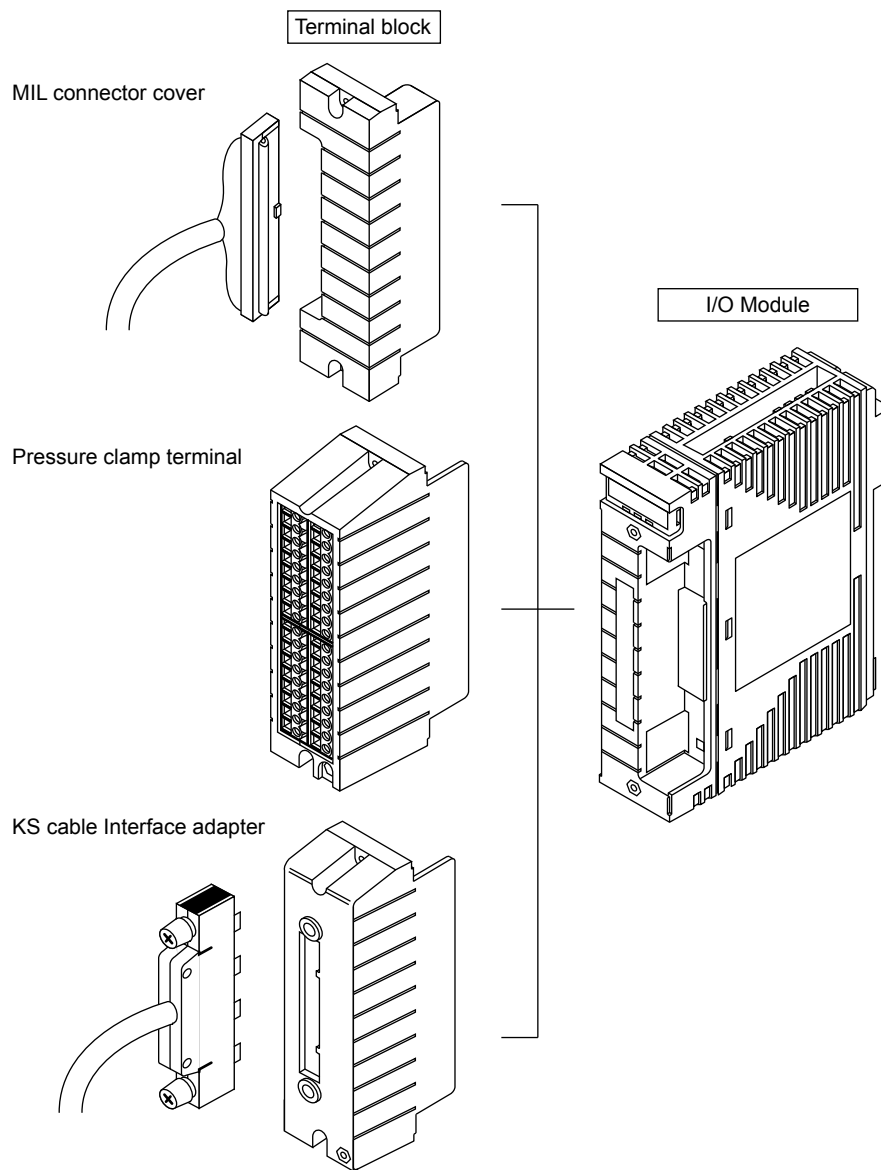
This GS describes the connection between the I/O Modules for FIO and field devices.

■ SIGNAL CONNECTIONS

● Variation of Signal Connections

The I/O Modules can be connected to field devices by terminal connection or with a terminal block via a KS cable interface adapter. A customer-furnished MIL cable can also be used to connect to the I/O Module.

The following explains the terminal blocks as well as the signal wiring that can be paired with the I/O Modules.



F02E.ai

● Configuration of I/O Module Connection

A pressure clamp terminal block is provided for the terminal connection with field devices. To expand terminals via terminal boards, connect a KS cable adapter to an I/O Module. When using a customer-furnished MIL connector cable, can directly connect to an I/O Module.

A dedicated terminal block is provided for a dual-redundant configuration.

Table Combinations of I/O Modules and Terminal Blocks (Part 1)

Model name	Module name	Form of connection				
		Pressure clamp terminal		Terminal board connection		
		Single	Dual-redundant	Adapter	Cable	Terminal board
—	Analog I/O Modules					
AAI141	Analog Input Module (4 to 20 mA, 16-Channel, Non-Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
AAV141	Analog Input Module (1 to 5 V, 16-Channel, Non-Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
					KS2	MUB, TE16, MHC
AAV142	Analog Input Module (-10 to 10 V, 16-Channel, Non-Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
AAB141	Analog Input Module (1 to 5 V/4 to 20 mA, 16-Channel, Non-Isolated)	—	—	ATK4A	KS2	MHC
AAI841	Analog I/O Module (4 to 20 mA Input, 4 to 20 mA Output, 8-Channel Input/8-Channel Output, Non-Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
AAB841	Analog I/O Module (1 to 5 V Input, 4 to 20 mA Output, 8-Channel Input/8-Channel Output, Non-Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
				ATM4A	KS1	MCM, MHM
				ATV4A	KS2	MUB, TE16, MHC
AAB842	Analog I/O Module (1 to 5 V/4 to 20 mA Input, 4 to 20 mA Output, 8-Channel Input/8-Channel Output, Non-Isolated)	—	—	ATM4A	KS1	MHM
				ATV4A	KS2	MHC
AAV542	Analog Output Module (-10 to 10 V, 16-Channel, Non-Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
					KS2	MUB, TE16, MHC
AAI143	Analog Input Module (4 to 20 mA, 16-Channel, Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
AAI543	Analog Output Module (4 to 20 mA, 16-Channel, Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
AAV144	Analog Input Module (-10 to 10 V, 16-Channel, Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
AAV544	Analog Output Module (-10 to 10 V, 16-Channel, Isolated)	ATA4S	ATA4D	ATK4A	KS1	AEA4D
AAT141	Thermocouple/mV Input Module (*2) (Thermocouple: JIS R, J, K, E, T, B, S, N/mV: -100 to 150 mV, 16-Channel, Isolated)	ATT4S	ATT4D	—	—	—
AAR181	RTD Input Module (RTD: JIS Pt100 Ω, 12-Channel, Isolated)	ATR8S	ATR8D	—	—	—
AAI135	Analog Input Module (4 to 20 mA, 8-Channel, Isolated Channels)	ATI3S	ATI3D	ATK4A	KS1	AEA4D(*3)
				ATI3A	KS1	AEA3D(*4)
AAI835	Analog I/O Module (4 to 20 mA, 4-Channel Input/4-Channel Output, Isolated Channels)	ATI3S	ATI3D	ATK4A	KS1	AEA4D(*3)
				ATB3A	KS1	AEA3D(*4)
AAT145	Thermocouple/mV Input Module (Thermocouple: JIS R, J, K, E, T, B, S, N/mV: -100 to 150 mV, 16-Channel, Isolated Channels)	—	—	— (*1)	KS1	AET4D, MTC, TETC (*5)
AAR145	RTD/POT Input Module (RTD: JIS Pt100 Ω/POT: 0 to 10 kΩ, 16-Channel, Isolated Channels)	—	—	— (*1)	KS8	MRT, TERT
					AKB335	AER4D
AAP135	Pulse Input Module (8-Channel, Pulse Count, 0 to 10 kHz, Isolated Channels)	ATI3S	ATI3D	ATK4A	KS1	AEA4D(*3)
				ATI3A	KS1	AEA3D(*4)
AAP149	Pulse Input Module for compatible PM1 (16-Channel, Pulse Count, 0 to 6 kHz, Non-Isolated)	—	—	— (*1)	KS2	MHC
AAP849	Pulse Input/Analog Output Module for compatible PAC (Pulse Count, 4 to 20 mA, 8-Channel Input/8-Channel Output, Non-Isolated)	—	—	— (*1)	KS1	MHM, MCM

Note: One dual-redundant terminal block is used to connect two adjacent I/O Modules.

Note: A cable connector cover (ACCC01) is provided for the connection via a MIL connector.

*1: A cable can be connected directly to the I/O module without using an adapter.

*2: When a MIL connector cable is connected, this can be used only as the mV Input Module.

*3: For the combination of AAI135/AAI835/AAP135; ATK4A; AEA4D, either 2-Wire Transmitter 2-Wire Input (transmitter power supply type) or 4-Wire Transmitter 2-Wire Input (without transmitter power supply) can be selected for each input channel.

*4: For the combination of AAI135/AAP135; ATI3A; AEA3D and the combination of AAI835; ATB3A; AEA3D, all input channels are 2-Wire Transmitter 2-Wire Input (transmitter power supply type).

*5: When AAT145 module is connected to MTC terminal board or TETC terminal board, the module is 15-Channel.

● Cable Termination Process when Pressure Clamp Terminals Are Used

Without a Sleeve

Cable Thickness (mm ²)	Peel-off Length (mm)	Remark
0.5 to 2 (AWG20 to 14)	11	Pressure clamp terminals other than below
1.25 to 2 (AWG16 to 14)	13	When connecting with ATC4S or ATC5S

With a Sleeve

Except for ATC4S, ATC5S

Cable thickness (mm ²)	When using a sleeve with insulating cover				When using a sleeve (without insulating cover)		
	Peel-off length (mm)	Sleeve dimensions		Weidmuller model No.	Peel-off length (mm)	Sleeve dimensions	
		Total length (mm)	Contact section length (mm)			Total length (mm)	Weidmuller model No.
0.5	11	16	10	H0.5/16	11	10	H0.5/10
0.75	11	16	10	H0.75/16	11	10	H0.75/10
1.0	11	16	10	H1/16	11	10	H1/10
1.25 to 1.5	11	16	10	H1.5/16	11	10	H1.5/10

For ATC4S, ATC5S

Cable thickness (mm ²)	When using a sleeve with insulating cover				When using a sleeve (without insulating cover)		
	Peel-off length (mm)	Sleeve dimensions		Weidmuller model No.	Peel-off length (mm)	Sleeve dimensions	
		Total length (mm)	Contact section length (mm)			Total length (mm)	Weidmuller model No.
1.25 to 1.5	13	18	12	H1.5/18D	13	12	H1.5/12

■ TERMINAL BLOCK AND CONNECTOR CONNECTION SPECIFICATIONS

Please refer to the specifications shown below to connect signal cables with a proper terminal since some Analog I/O modules require to select a proper terminal dependent on the devices to be connected.

Models	Cable Connection Prs	Input Type		
AAI141 AAI143 AAI841 (*1)	IN□A	2-wire transmitter input +	Current input -	—
	IN□B	2-wire transmitter input - (setting pin: 2-wire input)	Current input + (setting pin: 4-wire input)	
AAI135 AAI835	IN□A	2-wire transmitter input +	—	—
	IN□B	2-wire transmitter input -	Current input +	
	IN□C	—	Current input -	
AAR181 (*2)	IN□A	RTD input A	—	—
	IN□B	RTD input B		
	IN□C	RTD input B		
AAR145 (*3)	IN□A	RTD input A	POT input, 100 %	—
	IN□B	RTD input B	POT input, 0 %	
	IN□C	RTD input B	POT input, variable	
AAP135	IN□A	2-wire power supply (power)	—	3-wire power supply power supply
	IN□B	2-wire power supply (signal)	2-wire (voltage, contact) +	3-wire power supply +
	IN□C	—	2-wire (voltage, contact) -	3-wire power supply -

□ is channel number.

*1: When power of models AAI141, AAI143, AAI841, AAI135 and AAI835 is off or abnormal, current input loop is in the open state.

Do not use current signals with other receiving devices. When in use, also use an external receiver resistance, in the voltage mode (Shunt resistant module part no.: A1080RZ 250 ohm).

*2: Wiring resistance for the signal cables of IN□A and IN□C must be identical.

*3: Wiring resistance for the signal cables of IN□A and IN□B must be identical.

For AAB841

Signal name	Terminal No.		Signal name
IN1+	A1	B1	IN1-
IN2+	A2	B2	IN2-
IN3+	A3	B3	IN3-
IN4+	A4	B4	IN4-
IN5+	A5	B5	IN5-
IN6+	A6	B6	IN6-
IN7+	A7	B7	IN7-
IN8+	A8	B8	IN8-
OUT1+	A9	B9	OUT1-
OUT2+	A10	B10	OUT2-
OUT3+	A11	B11	OUT3-
OUT4+	A12	B12	OUT4-
OUT5+	A13	B13	OUT5-
OUT6+	A14	B14	OUT6-
OUT7+	A15	B15	OUT7-
OUT8+	A16	B16	OUT8-
N.C.	A17	B17	N.C.
N.C.	A18	B18	N.C.

F05E.ai

For AAR181

Signal name	Terminal No.		Signal name
IN1A	A1	B1	IN1C
IN1B	A2	B2	IN2B
IN2A	A3	B3	IN2C
IN3A	A4	B4	IN3C
IN3B	A5	B5	IN4B
IN4A	A6	B6	IN4C
IN5A	A7	B7	IN5C
IN5B	A8	B8	IN6B
IN6A	A9	B9	IN6C
IN7A	A10	B10	IN7C
IN7B	A11	B11	IN8B
IN8A	A12	B12	IN8C
IN9A	A13	B13	IN9C
IN9B	A14	B14	IN10B
IN10A	A15	B15	IN10C
IN11A	A16	B16	IN11C
IN11B	A17	B17	IN12B
IN12A	A18	B18	IN12C

F07E.ai

For AAT141

Signal name	Terminal No.		Signal name
IN1+	A1	B1	IN1-
IN2+	A2	B2	IN2-
IN3+	A3	B3	IN3-
IN4+	A4	B4	IN4-
IN5+	A5	B5	IN5-
IN6+	A6	B6	IN6-
IN7+	A7	B7	IN7-
IN8+	A8	B8	IN8-
IN9+	A9	B9	IN9-
IN10+	A10	B10	IN10-
IN11+	A11	B11	IN11-
IN12+	A12	B12	IN12-
IN13+	A13	B13	IN13-
IN14+	A14	B14	IN14-
IN15+	A15	B15	IN15-
IN16+	A16	B16	IN16-
N.C.	A17	B17	N.C.
N.C.	A18	B18	N.C.

F06E.ai

For AAI135 and AAP135

Signal name	Terminal No.		Signal name
IN1A	A1	B1	N.C.
IN1B	A2	B2	IN1C
IN2A	A3	B3	N.C.
IN2B	A4	B4	IN2C
IN3A	A5	B5	N.C.
IN3B	A6	B6	IN3C
IN4A	A7	B7	N.C.
IN4B	A8	B8	IN4C
IN5A	A9	B9	N.C.
IN5B	A10	B10	IN5C
IN6A	A11	B11	N.C.
IN6B	A12	B12	IN6C
IN7A	A13	B13	N.C.
IN7B	A14	B14	IN7C
IN8A	A15	B15	N.C.
IN8B	A16	B16	IN8C
N.C.	A17	B17	N.C.
N.C.	A18	B18	N.C.

F09E.ai

For AAI841 (MIL 40-pin)

Signal name	Pin No.		Signal name
IN1A	40	39	IN1B
IN2A	38	37	IN2B
IN3A	36	35	IN3B
IN4A	34	33	IN4B
IN5A	32	31	IN5B
IN6A	30	29	IN6B
IN7A	28	27	IN7B
IN8A	26	25	IN8B
OUT1+	24	23	OUT1-
OUT2+	22	21	OUT2-
OUT3+	20	19	OUT3-
OUT4+	18	17	OUT4-
OUT5+	16	15	OUT5-
OUT6+	14	13	OUT6-
OUT7+	12	11	OUT7-
OUT8+	10	9	OUT8-
N.C.	8	7	N.C.
N.C.	6	5	N.C.
N.C.	4	3	N.C.
CBSE(*1)	2	1	CBSE(*1)

F13E.ai

*1: Short-circuit on CBSE terminals of the external terminal board so that disconnected MIL cable can be detected.

For AAT141 (MIL 40-pin)

Signal name	Pin No.		Signal name
IN1+	40	39	IN1-
IN2+	38	37	IN2-
IN3+	36	35	IN3-
IN4+	34	33	IN4-
IN5+	32	31	IN5-
IN6+	30	29	IN6-
IN7+	28	27	IN7-
IN8+	26	25	IN8-
IN9+	24	23	IN9-
IN10+	22	21	IN10-
IN11+	20	19	IN11-
IN12+	18	17	IN12-
IN13+	16	15	IN13-
IN14+	14	13	IN14-
IN15+	12	11	IN15-
IN16+	10	9	IN16-
Reserved	8	7	Reserved
Reserved	6	5	Reserved
Reserved	4	3	Reserved
CBSE(*1)	2	1	CBSE(*1)

F25E.ai

Note: When a MIL connector cable is connected, the mV Input Module only can be used.

*1: Short-circuit on CBSE terminals of the external terminal board so that disconnected MIL cable can be detected.

For AAB841 (MIL 40-pin)

Signal name	Pin No.		Signal name
IN1+	40	39	IN1-
IN2+	38	37	IN2-
IN3+	36	35	IN3-
IN4+	34	33	IN4-
IN5+	32	31	IN5-
IN6+	30	29	IN6-
IN7+	28	27	IN7-
IN8+	26	25	IN8-
OUT1+	24	23	OUT1-
OUT2+	22	21	OUT2-
OUT3+	20	19	OUT3-
OUT4+	18	17	OUT4-
OUT5+	16	15	OUT5-
OUT6+	14	13	OUT6-
OUT7+	12	11	OUT7-
OUT8+	10	9	OUT8-
N.C.	8	7	N.C.
N.C.	6	5	N.C.
N.C.	4	3	N.C.
CBSE(*1)	2	1	CBSE(*1)

F24E.ai

*1: Short-circuit on CBSE terminals of the external terminal board so that disconnected MIL cable can be detected.

For AAR181 (MIL 40-pin)

Signal name	Pin No.		Signal name
IN1A	40	39	IN1C
IN1B	38	37	IN2B
IN2A	36	35	IN2C
IN3A	34	33	IN3C
IN3B	32	31	IN4B
IN4A	30	29	IN4C
IN5A	28	27	IN5C
IN5B	26	25	IN6B
IN6A	24	23	IN6C
IN7A	22	21	IN7C
IN7B	20	19	IN8B
IN8A	18	17	IN8C
IN9A	16	15	IN9C
IN9B	14	13	IN10B
IN10A	12	11	IN10C
IN11A	10	9	IN11C
IN11B	8	7	IN12B
IN12A	6	5	IN12C
N.C.	4	3	N.C.
CBSE(*1)	2	1	CBSE(*1)

F26E.ai

*1: Short-circuit on CBSE terminals of the external terminal board so that disconnected MIL cable can be detected.