MITSUBISHI ELECTRIC ENGINEERING

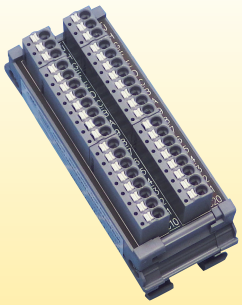
FA Goods

October 2017 Edition

FA Goods General Catalog
Devices for wire saving and process time reduction

For MELSEC iQ-R Series Programmable Controller,
MELSEC-Q/L Series Programmable Controllers,
MELSEC iQ-F / MELSEC-F FX Series Programmable Controllers,
and CC-Link IE Field Network / CC-Link Modules

Conversion Module for DC I/O



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Terminal Module for DC I/O

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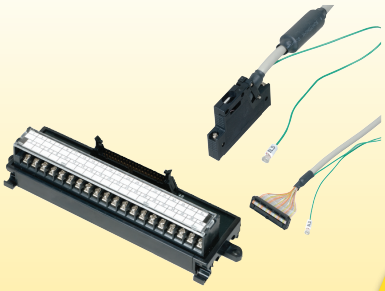
Conversion Module for Analog I/O



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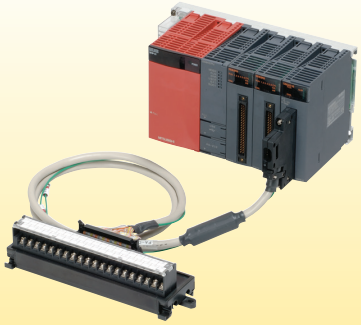
Conversion Module for High-Speed Counter



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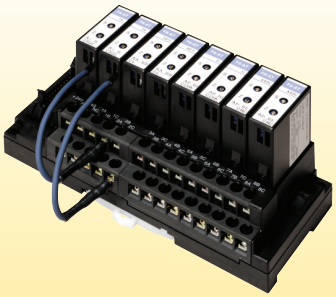
Analog Signal Converter



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For MELSEC iQ-F / MELSEC-F FX
Series Programmable Controllers

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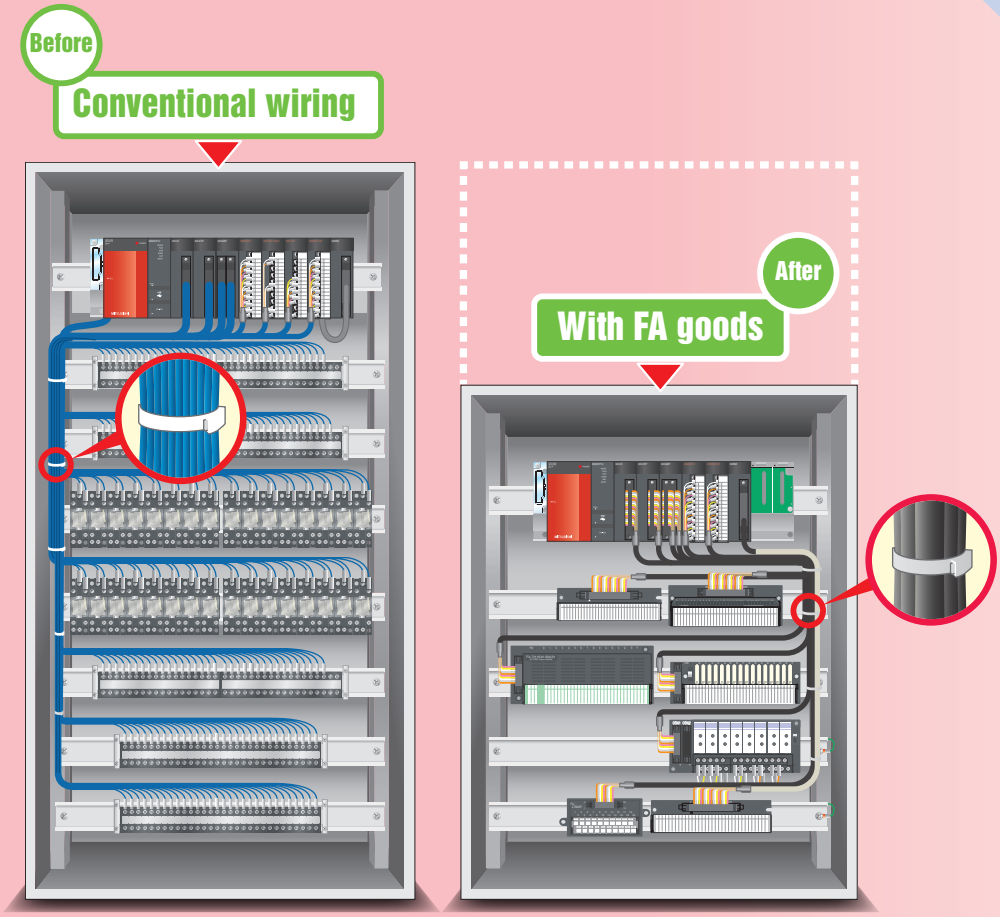
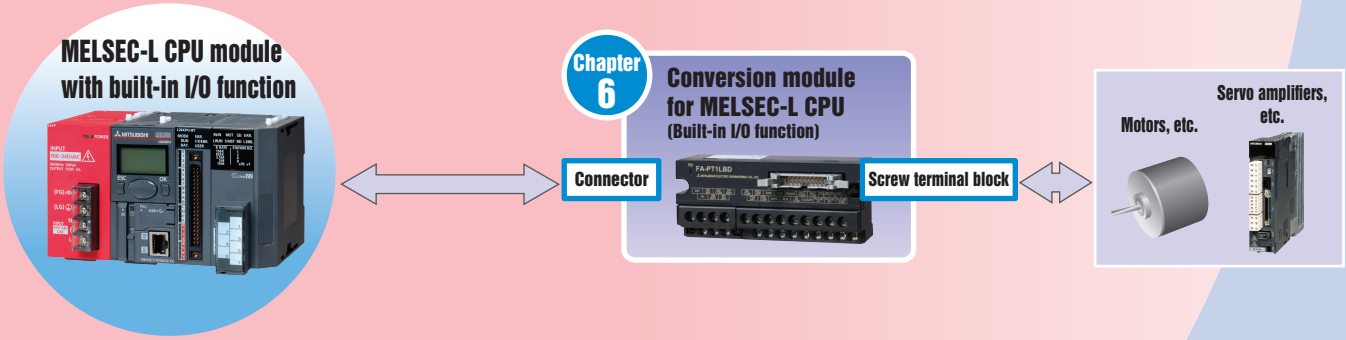
MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

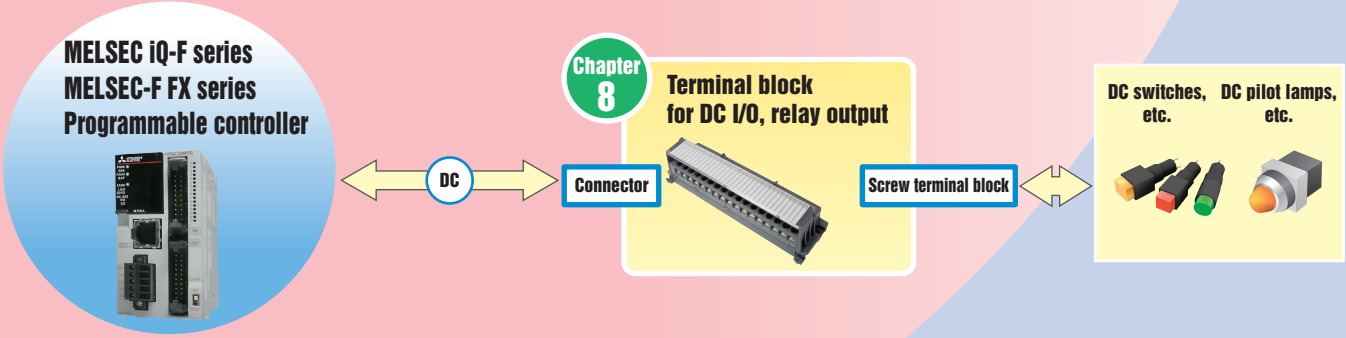
FA goods are highly reliable wire-saving devices that are used in the wiring work of Mitsubishi general-purpose programmable controllers!!

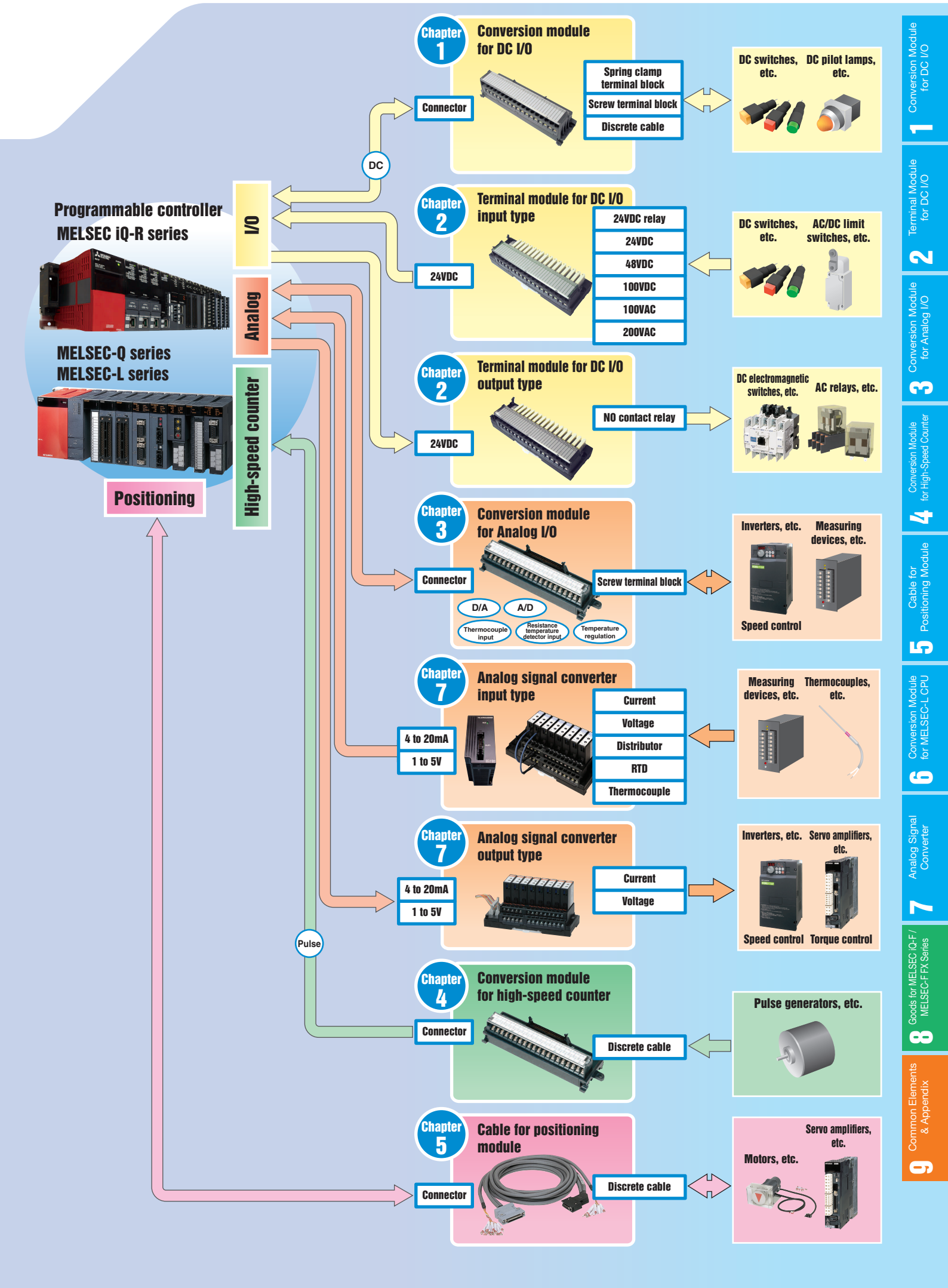


The above illustration is an image of the introduction of FA goods.

- FA goods reduce the process time required for the wiring work for the inside and outside of the panel of programmable controllers, reduce wiring errors, and ensure high reliability in safety.
- As an interface between programmable controllers and external I/O devices, FA goods further enhance the extensibility of programmable controllers.






Programmable controller
MELSEC iQ-R series
MELSEC-Q series
MELSEC-L series
Positioning
I/O
Analog
High-speed counter
DC
Pulse
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Spring clamp terminal block
Screw terminal block
Discrete cable
DC switches, etc.
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24VDC
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Analog signal converter input type
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Thermocouples, etc.
Chapter 7
Analog signal converter output type
4 to 20mA
1 to 5V
Current
Voltage
Inverters, etc.
Servo amplifiers, etc.
Speed control
Torque control
Chapter 4
Conversion module for high-speed counter
Connector
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Conversion Modules (DC Dedicated)

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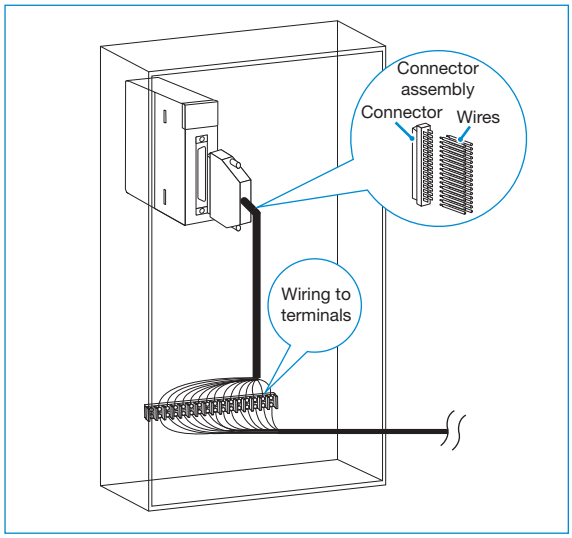
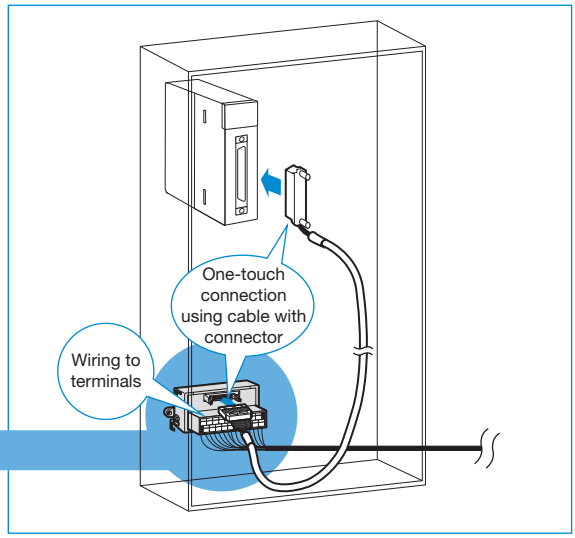
1. Conversion Module for DC I/O

Overview

Using a DC I/O conversion module as a relay terminal block of the control panel allows you to significantly reduce the process time required for wiring work to connector-type I/O modules of the programmable controller.
There are two types of conversion modules: MELSEC dedicated conversion modules and a general-purpose conversion module connectable to programmable controllers manufactured by other companies.

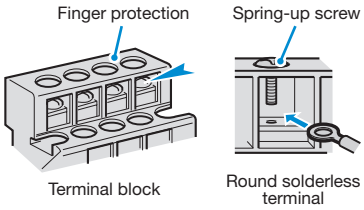




Types of Conversions

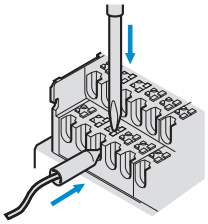
• Screw terminal block type

A screw terminal block (with spring-up, fall-prevention screws) is used for the wiring of the connector type I/O module of programmable controller.
The FA goods spring-up, fall-prevention screws facilitate wiring by using round solderless terminals without falling off of the screws even if the screws are loosened.



• Spring clamp terminal block type

A spring clamp terminal block is used for the wiring of the connector type I/O module of programmable controller.
The spring clamp terminal block is resistant to vibrations with high reliability because a tension is always applied to the terminal area.
Just push down the buttons on the terminal block to insert/extract the wires.



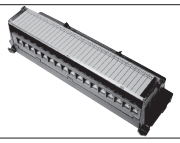
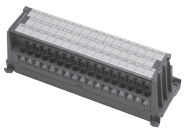
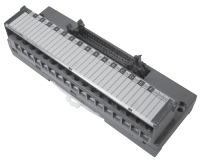
• Discrete cable type

A discrete cable is used for the wiring of the connector type I/O module of programmable controller, a discrete cable is used.
The cable has an unprocessed end because the cable is directly connected to a device (load, relay terminal, etc.).

Model List 1

Screw Terminal Block

For connectable I/O modules and cables, see the Selection Chart.

Product	Shape	Model	Device number (Note 1)	Remarks	Page
MELSEC-dedicated 16-point 1-wire type module		**FA-TB16XY**	For X0 to XF/Y0 to YF	• Used for the MELSEC connector type I/O module • Ideal for combined use with terminal modules • Common to input/output (target I/O is selected using the applicable cable)	1-13
MELSEC-dedicated 32-point 1-wire type module		**FA-TB32XY**	For X0 to X1F/Y0 to Y1F	• Used for the MELSEC connector type I/O module • Common to input/output (target I/O is selected using the applicable cable)	1-13
		FA-TBS32XY	For X0 to X1F/Y0 to Y1F	• Small-size conversion module for the MELSEC connector type I/O module • Common to input/output (target I/O is selected using the applicable cable)	1-14
		FA-TB1L32XY	For X0 to X1F/Y0 to Y1F	• M3.5 screw terminal block, 1-level type • Connecting to the MELSEC terminal block or connector I/O and converting connectors into M3.5 fall-prevention screws • Common to input/output (target I/O is selected using the applicable cable)	1-14
MELSEC-dedicated 32-point 1-wire type module with LED display		**FA-TB32XYL** (Sink type) **FA-TB32XYH** (Source type)	For X0 to X1F/Y0 to Y1F	• Used for the MELSEC connector type I/O module • Common to input/output (target I/O is selected using the applicable cable) • Allows verification of the I/O status by the LED display of the conversion module • FA-TB32XYL.....Positive common input / sink output compatible • FA-TB32XYH.....Negative common input / source output compatible	1-15
MELSEC-dedicated 32-point 2-wire type module		**FA-TB32XYP3** **FA-TB32XYN3**	For X0 to X1F/Y0 to Y1F	• Connecting to the MELSEC terminal block or connector I/O and converting connectors into M3 spring-up screws • Common to input/output (target I/O is selected using the applicable cable) • Designed as a 2-wire type; does not require a common terminal during load connection. • FA-TB32XYP3……Negative common input / sink output compatible • FA-TB32XYN3……Positive common input / source output compatible • Shares one common terminal between two X/Y points	1-16
MELSEC-dedicated 16-point 3-wire distributed type module		**FA-TB16XY1**	For X0 to XF/Y0 to YF	• 16-point distributed-type module used for the MELSEC connector type I/O module • Common to input/output (target I/O is selected using the applicable cable) • Connects distributed modules to each other using FA-CBL**MMH • Allows modules to be separately arranged in units of 16 points • Designed as a 3-wire type; does not require a common terminal during load connection, etc. • Shares one common terminal between two X/Y points	1-17
		FA-TB16XY2	For X10 to X1F/Y10 to Y1F		
General-purpose small-size 40-point module		**FA-TBS40P**	–	• General-purpose small-size terminal block for 40-point signal • Applicable to the programmable controller I/Os of other companies • Uses a general-purpose cable for connection with the programmable controllers of other companies	1-18
Connector covers (for MIL 40P connector)		**FA-CAP40MIL10**	–	• Option for the FA-TB16XY1/FA-TB16XY2 distributed type module • Covers for preventing the contamination of unused connectors by foreign matter • Includes 10 covers	1-18

Note 1: X* and Y* indicate the MELSEC I/O input and output device numbers.

Spring Clamp Terminal Block

For connectable I/O modules and cables, see the Selection Chart.

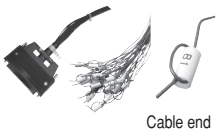
Product	Shape	Model	Device number (Note 1)	Remarks	Page
MELSEC-dedicated 32-point 1-wire type module		**FA1-TESV32XY**	For X0 to X1F/Y0 to Y1F	• Small-size type • This 32-point spring clamp terminal block type conversion module is used with a 40-core cable for 32 points of the MELSEC connector-type I/O module. • External line cables can be connected to a spring clamp terminal block by pressing and releasing the unlock button using a small-sized tool. When ferrule terminals are provided, push-in connection is possible.	1-19
38-point common terminal block module		**FA1-TESV38COM**	–	• Small-size type • Used as a common terminal block for the two lines (negative and positive, 19 points each) of the spring clamp terminal. • External line cables can be connected to a spring clamp terminal block by pressing and releasing the unlock button using a small-sized tool. When ferrule terminals are provided, push-in connection is possible.	1-19

Note 1: X* and Y* indicate the MELSEC I/O input and output device numbers.

Model List 2

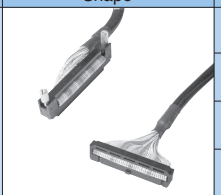
Discrete Cable

For connectable I/O modules and cables, see the Selection Chart.

Product	Shape	Model		Remarks	Page
40-core discrete cable for programmable controller I/O modules of other companies (FCN 40P connector on one side, Cable: 0.2mm²)	 Cable end	FA-BCBL10FFBL	1m	• For wiring, cut a cable if necessary for adjustment according to the connection destination. (Programmable controller side: FCN 40P connector, the other side: discrete cable)	1-21
		FA-BCBL20FFBL	2m		
		FA-BCBL30FFBL	3m		

Module-to-Module Cable

For connectable I/O modules and cables, see the Selection Chart.

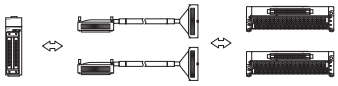
Product	Shape	Model		Remarks	Page
Vertical round 40-core cable for MELSEC-dedicated I/O module		FA-CBL10FMV	1m	• This cable is used for connecting a MELSEC-Q series FCN 40P connector-type I/O module and a MELSEC-dedicated 32-point conversion module. • The 40-core cable is vertically comes out from the MELSEC-Q series FCN 40P connector-type I/O module. • The cable cannot be used with general-purpose 40P conversion modules.	1-21
		FA-CBL20FMV	2m		
		FA-CBL30FMV	3m		
		FA-CBL50FMV	5m		
Vertical branch cable for MELSEC-dedicated I/O module		FA-CBL10FM2V	1m	• This cable comes out out from the MELSEC-Q series FCN 40P connector-type I/O module with a round 40-core cable, branching into two MIL 20P connectors on the other cable end, each connecting to a MELSEC-dedicated 16-point conversion module. • The 40-core cable is vertically comes out from the MELSEC-Q series FCN 40P connector-type I/O module. • The cable cannot be used with general-purpose 20P conversion modules.	1-22
		FA-CBL20FM2V	2m		
		FA-CBL30FM2V	3m		
		FA-CBL50FM2V	5m		
Vertical round 40-core cable (FCN connector type) for MELSEC-dedicated negative common type input module		FA-CBL10FMVE	1m	• This cable is used to connect a MELSEC-Q series FCN 40P connector-type negative common input module and a MELSEC-dedicated 32-point conversion module. • The 40-core cable is vertically comes out from the MELSEC-Q series FCN 40P connector-type I/O module. • The cable cannot be used with general-purpose 40P conversion modules.	1-22
		FA-CBL20FMVE	2m		
		FA-CBL30FMVE	3m		
Horizontal round 40-core cable (D-Sub connector type) for MELSEC-dedicated negative common type input module		FA-CBL10DMFX	1m	• This cable is used to connect a MELSEC-Q series D-Sub 37P connector-type negative common input module and a MELSEC dedicated 32-point conversion module. • The cable cannot be used with general-purpose 40P conversion modules.	1-23
		FA-CBL20DMFX	2m		
		FA-CBL50DMFX	5m		
Horizontal round 40-core cable (D-Sub connector type) for MELSEC-dedicated source output module		FA-CBL10DMFY	1m	• This cable is used to connect a MELSEC-Q series D-Sub 37P connector source-type output module and a MELSEC dedicated 32-point conversion module. • The cable cannot be used with general-purpose 40P conversion modules.	1-23
		FA-CBL20DMFY	2m		
		FA-CBL50DMFY	5m		
Connection cable for MELSEC terminal block I/O (with MELSEC-Q terminal block)		FA-CBL10TMV20	1m	• This cable is used to connect a MELSEC terminal block I/O and a conversion module. • The cable is provided with MELSEC-Q series terminal block.	1-24
		FA-CBL20TMV20	2m		
		FA-CBL30TMV20	3m		
Horizontal round 40-core cable for connection between distributed-type conversion modules (MELSEC-dedicated) or for connection between various controllers and a general-purpose 40P conversion module (general-purpose)		FA-CBL10MMH	1m	• This cable is used to connect distributed-type conversion modules. • The cable is used to connect the MIL 40P connector of various controllers and a general-purpose 40P conversion module.	1-24
		FA-CBL20MMH	2m		
		FA-CBL50MMH	5m		
Horizontal round 40-core cable for Mitsubishi Electric CC-Link remote I/O module		FA-CBL10FMH	1m	• This cable is used to connect a Mitsubishi Electric CC-Link remote I/O module that uses an FCN 40P connector and a MELSEC-dedicated 32-point conversion module.	1-25
		FA-CBL20FMH	2m		
		FA-CBL30FMH	3m		
Horizontal branch cable for Mitsubishi Electric CC-Link remote I/O module		FA-CBL10FM2H	1m	• This cable leads out from the Mitsubishi Electric CC-Link FCN 40P connector-type remote I/O module with a round 40-core cable , branching into two MIL 20P connectors on the other cable end, each connecting to a MELSEC-dedicated 16-point conversion module.	1-25
		FA-CBL20FM2H	2m		
		FA-CBL30FM2H	3m		
Dedicated vertical round 40-core cable for connection between Mitsubishi Electric I/O module and general-purpose 40P connector terminal block conversion module		FA-CBL10FMV-M	1m	• This cable is used to connect a Mitsubishi Electric programmable controller FCN 40P connector-type I/O module and a general-purpose 40P conversion module. • The cable cannot be connected to a MELSEC-dedicated 32-point conversion module.	1-26
		FA-CBL20FMV-M	2m		
		FA-CBL30FMV-M	3m		

MELSEC iQ-R Series Selection Chart 1

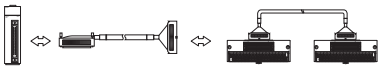
Programmable Controller ↔ Conversion Module

- Connection example: Screw terminal block type I/O module ↔ Conversion module
  RX40C7 + FA-CBL10YM20 + FA-TB16XY

- Connection example: Connector type I/O module ↔ Conversion module
  RX42C4 + FA-CBL10FMV×2 + FA-TB32XY×2



- Connection example: Connector type I/O module ↔ Distributed-type conversion module
  RY41NT2P + FA-CBL10FMV + FA-TB16XY1 + FA-CBL10MMH + FA-TB16XY2



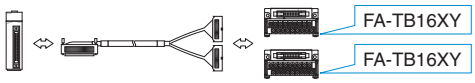
Input/ Output	Programmable controller module model		Module type			Module model		Connection cable	
Input	RX40C7	Positive common dedicated	Screw terminal block		1-wire type	FA-TB16XY	1-13	FA-CBL**TMV20	1-24
		Negative common dedicated	Screw terminal block		1-wire type	FA-TB16XY	1-13	FA-CBL**TMV20	1-24
	RX41C4 RX42C4	Positive common dedicated	Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1)	1-17	FA-CBL**FMV	1-21
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
						FA-TB1L32XY	1-14		
				LED	1-wire type	FA-TB32XYL (Note 2)	1-15		
					2-wire type	FA-TB32XYN3	1-16		
			Spring clamp terminal block		1-wire type	FA1-TESV32XY	1-19		
		Negative common dedicated	Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1)	1-17	FA-CBL**FMVE	1-22
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
						FA-TB1L32XY	1-14		
				LED	1-wire type	FA-TB32XYH (Note 2)	1-15		
					2-wire type	FA-TB32XYP3	1-16		
			Spring clamp terminal block		1-wire type	FA1-TESV32XY	1-19		
		Common	Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21
Output	RY40NT5P (Note 3)		Screw terminal block		1-wire type	FA-TB16XY	1-13	FA-CBL**TMV20	1-24
	RY40PT5P (Note 3)		Screw terminal block		1-wire type	FA-TB16XY	1-13		
	RY41NT2P RY42NT2P		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1)	1-17		
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14	FA-CBL**TMV20	1-24
						FA-TB1L32XY	1-14	FA-CBL**FMV	1-21
				LED	1-wire type	FA-TB32XYL (Note 2)	1-15		
					2-wire type	FA-TB32XYP3	1-16		
			Spring clamp terminal block		1-wire type	FA1-TESV32XY	1-19		
			Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21
	RY41PT1P RY42PT1P		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1)	1-17		
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
						FA-TB1L32XY	1-14	FA-CBL**FMV	1-21
				LED	1-wire type	FA-TB32XYH (Note 2)	1-15		
					2-wire type	FA-TB32XYN3	1-16		
			Spring clamp terminal block		1-wire type	FA1-TESV32XY	1-19		
			Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21

Note 1: A distributed type terminal block is used with modules combined together. When purchasing, check the details of each module. For a module-to-module cable, use FA-CBL**MMH. Use the same power supply for the modules.
Note 2: For use with 24VDC only.
Note 3: Use with a common current of 2A or less. When using with a common current exceeding 2A, use an AC/DC I/O conversion module.

MELSEC iQ-R Series Selection Chart 2

Programmable Controller ↔ Conversion Module + Conversion Module

- Connection example: Connector type I/O module ↔ Screw terminal block conversion
  RX41C4 + FA-CBL10FM2V + FA-TB16XY + FA-TB16XY



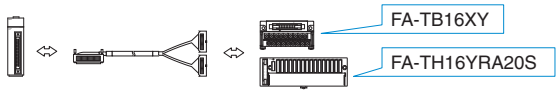
Input/ Output	Programmable controller module model		Module type		Module model 1		Module model 2		Connection cable	
Input	RX41C4 RX42C4	Positive common dedicated	Screw terminal block	1-wire type	**FA-TB16XY**	1-13	**FA-TB16XY**	1-13	**FA-CBL**FM2V** (Note 1)	1-22
Output	RY41NT2P RY42NT2P		Screw terminal block	1-wire type	**FA-TB16XY**	1-13	**FA-TB16XY**	1-13	**FA-CBL**FM2V** (Note 1)	1-22
	RY41PT1P RY42PT1P		Screw terminal block	1-wire type	**FA-TB16XY**	1-13	**FA-TB16XY**	1-13	**FA-CBL**FM2V** (Note 1)	1-22

Note 1: For two connected modules, use the same power supply.

MELSEC iQ-R Series Selection Chart 3

Programmable Controller ↔ Conversion Module + Terminal Module

- Connection example: Connector type I/O module
  ↔ Conversion module + Terminal module
  RY41NT2P + FA-CBL10FM2V + FA-TB16XY + FA-TH16YRA20S



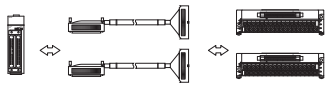
Input/ Output	Programmable controller module model		Module type		Module model 1		Module model 2		Connection cable	
Input	RX41C4 RX42C4	Positive common dedicated	Screw terminal block	1-wire type	**FA-TB16XY**	1-13	**FA-TH16XRA20S** **FA-TH16X24D31** **FA-TH16X24D31L** **FA-TH16X48D31L** **FA-TH16X100D31L** **FA-TH16X100A31** **FA-TH16X100A31L** **FA-TH16X200A31** **FA-TH16X200A31L**	2-17 2-18 2-19 2-20 2-21 2-22 2-23 2-24 2-25	**FA-CBL**FM2V** (Note 1)	1-22
Output	RY41NT2P (Note 2) RY42NT2P (Note 2)		Screw terminal block	1-wire type	**FA-TB16XY**	1-13	**FA-TH16YRA11** **FA-TH16YRA20** **FA-TH16YRA11S** **FA-TH16YRA20S** **FA-TH16YRA20SL**	2-26 2-27 2-28 2-29 2-30	**FA-CBL**FM2V** (Note 1)	1-22

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

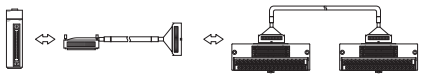
MELSEC-Q Series Selection Chart 1

Programmable Controller ↔ Conversion Module

- Connection example: Connector type I/O module ↔ Conversion module
  QX42 + FA-CBL10FMV × 2 + FA-TB32XY × 2



- Connection example: Connector type I/O module ↔ Distributed-type conversion module
  QX41 + FA-CBL10FMV + FA-TB16XY1 + FA-CBL10MMH + FA-TB16XY2



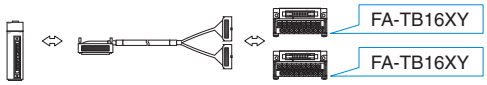
Input/ Output	Programmable controller module model		Conversion module type			Conversion module model		Connection cable	
Input	QX41 QX41-S1 QX41-S2 QX42 QX42-S1		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**FMV	1-21
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
				LED	1-wire type	FA-TB32XYL	(Note 2) 1-15		
			Spring clamp terminal block			FA1-TESV32XY	1-19		
			Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21
	QX71 (Notes 3 and 4) QX72 (Notes 3 and 4)	Positive common dedicated	Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**FMV	1-21
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
			Spring clamp terminal block			FA1-TESV32XY	1-19	FA-CBL**FMV	1-21
		Negative common dedicated	Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**FMVE	1-22
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
			Spring clamp terminal block			FA1-TESV32XY	1-19		
		Common	Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21
	QX81 QX81-S2		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**DMFX	1-23
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
				LED	1-wire type	FA-TB32XYH	(Note 2) 1-14		
			Spring clamp terminal block			FA1-TESV32XY	1-19		
	QX82 QX82-S1		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**FMVE	1-22
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
				LED	1-wire type	FA-TB32XYH	(Note 1) 1-15		
			Spring clamp terminal block			FA1-TESV32XY	1-19		
			Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21
Output	QY41P (Note 4) QY42P (Note 4) QY71 (Notes 3 and 4)		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**FMV	1-21
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
				LED	1-wire type	FA-TB32XYL	(Note 2) 1-15		
			Spring clamp terminal block			FA1-TESV32XY	1-19		
			Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21
	QY81P (Note 4)		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**DMFY	1-23
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
				LED	1-wire type	FA-TB32XYH	(Note 2) 1-15		
			Spring clamp terminal block			FA1-TESV32XY	1-19		
	QY82P (Note 4)		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**FMV	1-21
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
				LED	1-wire type	FA-TB32XYH	(Note 2) 1-15		
			Spring clamp terminal block			FA1-TESV32XY	1-19		
			Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21
Combined	QH42P QX41Y41P (Note 4)		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2	(Note 1) 1-17	FA-CBL**FMV	1-21
					1-wire type	FA-TB32XY	1-13		
						FA-TBS32XY	1-14		
				LED	1-wire type	FA-TB32XYL	(Note 2) 1-15		
			Spring clamp terminal block			FA1-TESV32XY	1-19		
			Screw terminal block			FA-TBS40P	1-18	FA-CBL**FMV-M	1-26
			Discrete cable					FA-BCBL**FFBL	1-21

Note 1: For a module-to-module cable, use FA-CBL**MMH. Use the same power supply for the modules.
Note 2: For use with 24VDC only.
Note 3: When used with 5VDC, connect the 5VDC to a 24VDC terminal.
Note 4: When used with 12VDC, connect the 12VDC to a 24VDC terminal.

MELSEC-Q Series Selection Chart 2

Programmable Controller ↔ Conversion Module + Conversion Module

- Connection example: Connector type I/O module ↔ Screw terminal block conversion
  QY41P + FA-CBL10FM2V + FA-TB16XY + FA-TB16XY



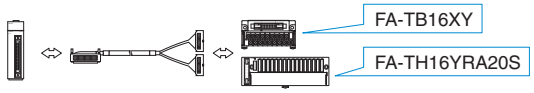
Input/ Output	Programmable controller module model	Conversion module type		Conversion module model 1	Conversion module model 2	Connection cable
Input	QX41 QX41-S1 QX41-S2 QX42 QX42-S1 QX71 (Notes 2, 3, and 4) QX72 (Notes 2, 3, and 4)	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 1-22
Output	QY41P (Note 3) QY42P (Note 3) QY71 (Notes 2 and 3)	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 1-22
	QY82P (Note 3)	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 1-22
Combined	QH42P QX41Y41P (Note 3)	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 1-22

Note 1: For two connected modules, use the same power supply.
Note 2: When used with 5VDC, connect the 5VDC to a 24VDC terminal.
Note 3: When used with 12VDC, connect the 12VDC to a 24VDC terminal.
Note 4: Applicable with a positive common.

MELSEC-Q Series Selection Chart 3

Programmable Controller ↔ Conversion Module + Terminal Module

- Connection example: Connector type I/O module ↔ Conversion module + Terminal module
  QY41P + FA-CBL10FM2V + FA-TB16XY + FA-TH16YRA20S



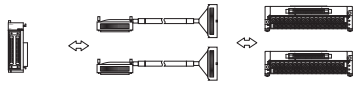
Input/ Output	Programmable controller module model		Conversion module type		Conversion module model 1	Conversion module model 2	Connection cable
Input	QX41 QX41-S1 QX41-S2 QX42 QX42-S1		Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TH16XRA20S 2-17	FA-CBL**FM2V (Note 1) 1-22
Output	QY41P (Note 2) QY42P (Note 2)		Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TH16YRA11S 2-28 FA-TH16YRA20S 2-29	FA-CBL**FM2V (Note 1) 1-22
Combined	QH42P (Note 2) QX41Y41P	Input side	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TH16XRA20S 2-17	FA-CBL**FM2V (Note 1) 1-22
		Output side	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TH16YRA11S 2-28 FA-TH16YRA20S 2-29	FA-CBL**FM2V (Note 1) 1-22

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

MELSEC-L Series Selection Chart 1

Programmable Controller ↔ Conversion Module

- Connection example: Connector type I/O module ↔ Conversion module
  LX42C4 + FA-CBL10FMV × 2 + FA-TB32XY × 2



- Connection example: Connector type I/O module ↔ Distributed-type conversion module
  LY41NT1P + FA-CBL10FMV + FA-TB16XY1 + FA-CBL10MMH + FA-TB16XY2

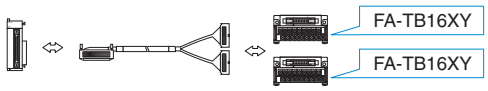
Input/ Output	Programmable controller module model		Conversion module type			Conversion module model	Connection cable
Input	LX41C4 LX42C4	Positive common dedicated	Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1) 1-17	FA-CBL**FMV 1-21
					1-wire type	FA-TB32XY 1-13 FA-TBS32XY 1-14	
				LED	1-wire type	FA-TB32XYL (Note 2) 1-15	
			Spring clamp terminal block			FA1-TESV32XY 1-19	
		Negative common dedicated	Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1) 1-17	FA-CBL**FMVE 1-22
					1-wire type	FA-TB32XY 1-13 FA-TBS32XY 1-14	
				LED	1-wire type	FA-TB32XYH (Note 2) 1-15	
			Spring clamp terminal block			FA1-TESV32XY 1-19	
		Common	Screw terminal block			FA-TBS40P 1-18	FA-CBL**FMV-M 1-26
			Discrete cable				FA-BCBL**FFBL 1-21
Output	LY41NT1P LY42NT1P		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1) 1-17	FA-CBL**FMV 1-21
					1-wire type	FA-TB32XY 1-13 FA-TBS32XY 1-14	
				LED	1-wire type	FA-TB32XYL (Note 2) 1-15	
			Spring clamp terminal block			FA1-TESV32XY 1-19	
			Screw terminal block			FA-TBS40P 1-18	FA-CBL**FMV-M 1-26
			Discrete cable				FA-BCBL**FFBL 1-21
	LY41PT1P LY42PT1P		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1) 1-17	FA-CBL**FMV 1-21
					1-wire type	FA-TB32XY 1-13 FA-TBS32XY 1-14	
				LED	1-wire type	FA-TB32XYH (Note 2) 1-15	
			Spring clamp terminal block			FA1-TESV32XY 1-19	
			Screw terminal block			FA-TBS40P 1-18	FA-CBL**FMV-M 1-26
			Discrete cable				FA-BCBL**FFBL 1-21

Note 1: For a module-to-module cable, use FA-CBL**MMH. Use the same power supply for the modules.
Note 2: For use with 24VDC only.

MELSEC-L Series Selection Chart 2

Programmable Controller ↔ Conversion Module + Conversion Module

- Connection example: Connector type I/O module ↔ Screw terminal block
  LX41C4 + FA-CBL10FM2V + FA-TB16XY + FA-TB16XY



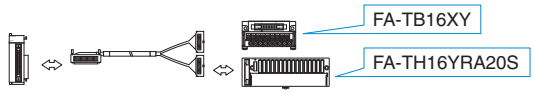
Input/ Output	Programmable controller module model		Conversion module type		Conversion module model 1	Conversion module model 2	Connection cable
Input	LX41C4 LX42C4	Positive common dedicated	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 1-22
Output	LY41NT1P LY42NT1P		Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 1-22
	LY41PT1P LY42PT1P		Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 1-22

Note 1: For two connected modules, use the same power supply.

MELSEC-L Series Selection Chart 3

Programmable Controller ↔ Conversion Module + Terminal Module

- Connection example: Connector type I/O module ↔ Conversion module + Terminal module
  LY41NT1P + FA-CBL10FM2V + FA-TB16XY + FA-TH16YRA20S



Input/ Output	Programmable controller module model		Conversion module type		Conversion module model	Terminal module model	Connection cable
Input	LX41C4 LX42C4	Positive common dedicated	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TH16XRA20S 2-17	FA-CBL**FM2V (Note 1) 1-22
Output	LY41NT1P (Note 2) LY42NT1P (Note 2)		Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TH16YRA11S 2-28 FA-TH16YRA20S 2-29	FA-CBL**FM2V (Note 1) 1-22

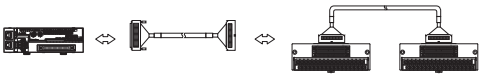
Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

Mitsubishi Electric CC-Link IE Field Network Remote I/O Selection Chart 1

Remote I/O ↔ Conversion Module

- Connection example: Remote I/O ↔ Conversion module
  NZ2GFCF1-32D + FA-CBL10FMH + FA-TB32XY

- Connection example: Remote I/O ↔ Distributed-type conversion module
  NZ2GFCF1-32T + FA-CBL10FMH + FA-TB16XY1
  + FA-CBLMMH + FA-TB16XY2



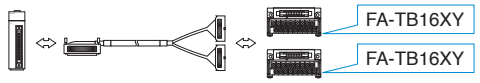
Input/ Output	Programmable controller module model		Module type			Module model	Connection cable
Input	NZ2GFCF1-32D	Positive common dedicated	Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1) 1-17	FA-CBL**FMH 1-25
					1-wire type	FA-TB32XY 1-13 FA-TBS32XY 1-14 FA-TB1L32XY 1-14	
				LED	1-wire type	FA-TB32XYL (Note 2) 1-15	
					2-wire type	FA-TB32XYN3 1-16	
			Spring clamp terminal block		1-wire type	FA1-TESV32XY 1-19	
		Common	Discrete cable				FA-BCBL**FFBL 1-21
Output	NZ2GFCF1-32T (Note 3)		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1) 1-17	FA-CBL**FMH 1-25
					1-wire type	FA-TB32XY 1-13 FA-TBS32XY 1-14 FA-TB1L32XY 1-14	
				LED	1-wire type	FA-TB32XYL (Note 2) 1-15	
					2-wire type	FA-TB32XYP3 1-16	
			Spring clamp terminal block		1-wire type	FA1-TESV32XY 1-19	
			Discrete cable				FA-BCBL**FFBL 1-21
Combined	NZ2GFCF1-32DT		Screw terminal block			FA-TBS40P 1-18	
			Discrete cable				FA-BCBL**FFBL 1-21

Note 1: A distributed type terminal block is used with modules combined together. When purchasing, check the details of each module. For a module-to-module cable, use FA-CBL**MMH. Use the same power supply for the modules.
Note 2: For use with 24VDC only.
Note 3: When used with 12VDC, connect the 12VDC to a 24VDC terminal.

Mitsubishi Electric CC-Link IE Field Network Remote I/O Selection Chart 2 , 3

Remote I/O ↔ Conversion Module + Conversion Module

- Connection example: Connector type I/O module ↔ Screw terminal block conversion
  RX41C4 + FA-CBL10FM2V + FA-TB16XY + FA-TB16XY

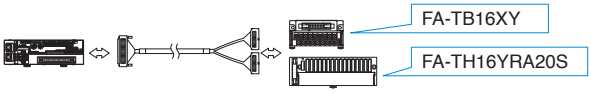


Input/ Output	Programmable controller module model		Module type		Module model 1	Module model 2	Connection cable
Input	NZ2GFCF1-32D	Positive common dedicated	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2H (Note 2) 1-25
Output	NZ2GFCF1-32T (Note 1)		Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2H (Note 2) 1-25

Note 1: When used with 12VDC, connect the 12VDC to a 24VDC terminal.
Note 2: For two connected modules, use the same power supply.

Remote I/O ↔ Terminal Module + Conversion Module

- Connection example: Remote I/O ↔ Terminal module + Conversion module
  NZ2GFCF1-32T + FA-CBL10FM2H + FA-TB16XY + FA-TH16YRA20S



Input/ Output	Programmable controller module model		Module type			Module model 1	Module model 2	Connection cable
Input	NZ2GFCF1-32D	Positive common dedicated	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TH16XRA20S 2-13	FA-CBL**FM2H (Note 2) 1-25
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	FA-TH16X24D31 2-14 FA-TH16X24D31L 2-15	
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20	FA-TH16X48D31L 2-16	
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21	FA-TH16X100D31L 2-17	
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	FA-TH16X100A31 2-18 FA-TH16X100A31L 2-19	
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	FA-TH16X200A31 2-20 FA-TH16X200A31L 2-21	
Output	NZ2GFCF1-32T (Note 1)		NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TH16YRA11 2-22	FA-CBL**FM2H (Note 2) 1-25
					Independent	FA-TH16YRA20 2-27	FA-TH16YRA20 2-23	
				With socket	1-wire type	FA-TH16YRA11S 2-28	FA-TH16YRA11S 2-24	
					Independent	FA-TH16YRA20S 2-29	FA-TH16YRA20S 2-25	

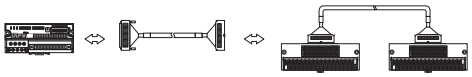
Note 1: For use with 24VDC only.
Note 2: For two connected modules, use the same power supply.

Mitsubishi Electric CC-Link Remote I/O Selection Chart 1

Remote I/O ↔ Conversion Module

- Connection example: Remote I/O module ↔ Conversion module
  AJ65SBTCF1-32D + FA-CBL10FMH + FA-TB32XY

- Connection example: Remote I/O module ↔ Distributed-type conversion module
  AJ65SBTCF1-32T + FA-CBL10FMH + FA-TB16XY1 + FA-CBL10MMH + FA-TB16XY2



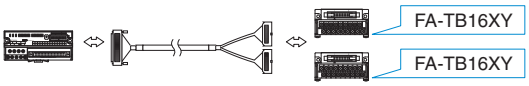
Input/ Output	Programmable controller module model		Conversion module type			Conversion module model	Connection cable
Input	AJ65SBTCF1-32D AJ65BTC1-32D	Positive common dedicated	Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1) 1-17	FA-CBL**FMH 1-25
					1-wire type	FA-TB32XY 1-13 FA-TBS32XY 1-14	
				LED	1-wire type	FA-TB32XYL (Note 2) 1-15	
			Spring clamp terminal block			FA1-TESV32XY 1-19	
Output	AJ65SBTCF1-32T (Note 3) AJ65BTC1-32T (Note 3)		Screw terminal block	Distributed 16-point	3-wire type	FA-TB16XY1, 2 (Note 1) 1-17	FA-CBL**FMH 1-25
					1-wire type	FA-TB32XY 1-13 FA-TBS32XY 1-14	
				LED	1-wire type	FA-TB32XYL (Note 2) 1-15	
			Spring clamp terminal block			FA1-TESV32XY 1-19	

Note 1: For a module-to-module cable, use FA-CBL**MMH. Use the same power supply for the modules.
Note 2: For use with 24VDC only.
Note 3: When used with 12VDC, connect the 12VDC to a 24VDC terminal.

Mitsubishi Electric CC-Link Remote I/O Selection Chart 2

Remote I/O ↔ Conversion Module + Conversion Module

- Connection example: Remote I/O module ↔ Screw terminal block
  AJ65SBTCF1-32T + FA-CBL10FM2H + FA-TB16XY + FA-TB16XY



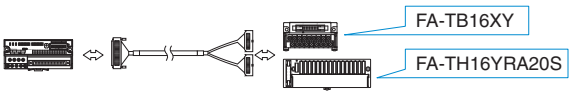
Input/ Output	Programmable controller module model		Conversion module type		Conversion module model 1	Conversion module model 2	Connection cable
Input	AJ65SBTCF1-32D AJ65BTC1-32D	Positive common dedicated	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2H (Note 1) 1-25
Output	AJ65SBTCF1-32T (Note 2) AJ65BTC1-32T (Note 2)		Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TB16XY 1-13	FA-CBL**FM2H (Note 1) 1-25

Note 1: For two connected modules, use the same power supply.
Note 2: When used with 12VDC, connect the 12VDC to a 24VDC terminal.

Mitsubishi Electric CC-Link Remote I/O Selection Chart 3

Remote I/O ↔ Conversion Module + Terminal Module

- Connection example: Remote I/O module ↔ Conversion module + Terminal module
  AJ65SBTCF1-32T + FA-CBL10FM2H + FA-TB16XY + FA-TH16YRA20S

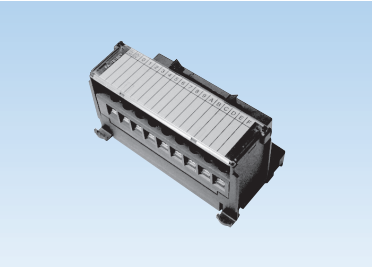


Input/ Output	Programmable controller module model		Conversion module type		Conversion module model	Terminal module model	Connection cable
Input	AJ65SBTCF1-32D AJ65BTC1-32D	Positive common dedicated	Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TH16XRA20S 2-17	FA-CBL**FM2H (Note 1) 1-25
Output	AJ65SBTCF1-32T (Note 2) AJ65BTC1-32T (Note 2)		Screw terminal block	1-wire type	FA-TB16XY 1-13	FA-TH16YRA11S 2-28 FA-TH16YRA20S 2-29	FA-CBL**FM2H (Note 1) 1-25

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

MELSEC-dedicated 16-point 1-wire type

FA-TB16XY



Features

- This module is a MELSEC-dedicated 16-point connector terminal block type conversion module. The module branches the 32 points of a MELSEC connector-type I/O module into 16-point units using a branch cable, allowing separate use from other 16-point modules.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The Mitsubishi programmable controller input and output signal (0-F) numbers are indicated on the marking strip, making wiring easy.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

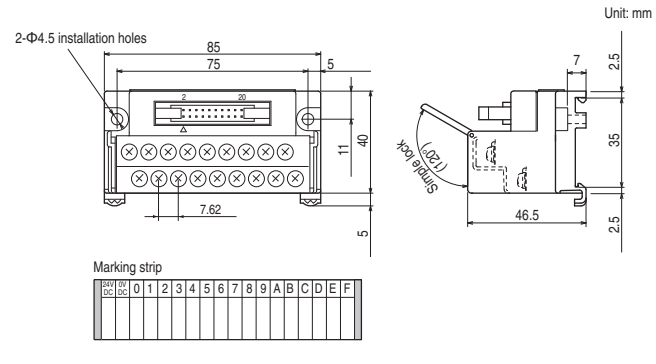
Applicable Standards

UL | cUL

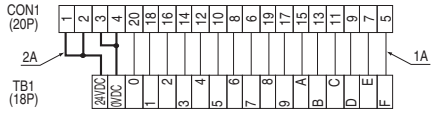
Specifications

Item		Specifications
Model		FA-TB16XY
No. of I/O points I/O device numbers		16 points, X0 to XF or Y0 to YF
Rated voltage		24VDC
Maximum operating voltage, current		28.8VDC, 1A (each signal terminal), 2A (each power supply terminal)
Wiring method for common		16 points / 1 (24V) common point + 1 (0V) common point
Terminal block	Terminal screw	M3 screws, number of terminals: 18P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.3 to 2mm^2 (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 12mm or more, tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		500VAC for 1 minute, 10MΩ or more (between all DC external terminals↔ground, between charged areas)
Weight		Approx. 130g
Precautions		•X and Y of the input/output device signal is X when the connected I/O module is an input module, and Y when the connected I/O module is an output module. The number is determined by the slot where the I/O module is inserted. •Failure to push in the module connector until it is locked may cause poor contact.

External Dimension

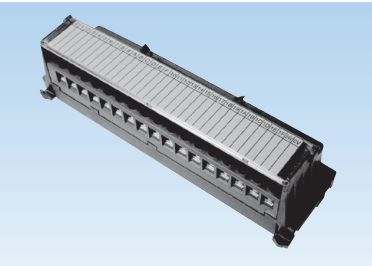


Wiring Diagram



MELSEC-dedicated 32-point 1-wire type

FA-TB32XY



Features

- This 32-point terminal block type conversion module is used with a 40-core cable for 32 points of the MELSEC connector-type I/O module.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The Mitsubishi programmable controller input and output signal (0-1F) numbers are indicated on the marking strip, making wiring easy.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

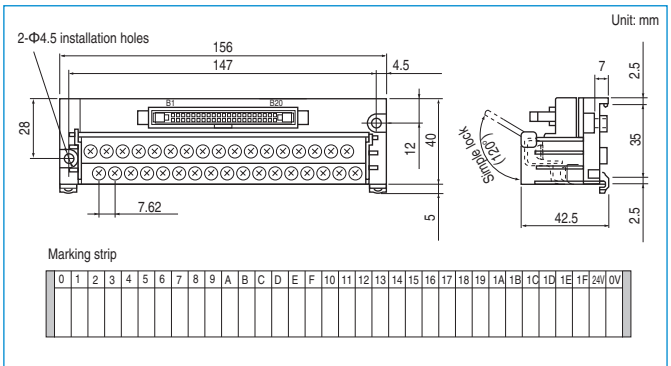
Applicable Standards

UL | cUL

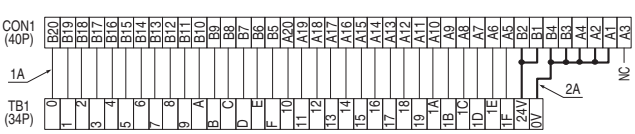
Specifications

Item		Specifications
Model		FA-TB32XY
No. of I/O points I/O device numbers		32 points, X0 to X1F or Y0 to Y1F
Rated voltage		24VDC
Maximum operating voltage, current		28.8VDC, 1A (each signal terminal), 2A (each power supply terminal)
Wiring method for common		32 points / 1 (24V) common point + 1 (0V) common point
Terminal block	Terminal screw	M3 screws, number of terminals: 34P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.3 to 2mm^2 (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 12mm or more, tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		500VAC for 1 minute, 10MΩ or more (between all DC external terminals↔ground, between charged areas)
Weight		Approx. 160g
Precautions		•X and Y of the input/output device signal is X when the connected I/O module is an input module, and Y when the connected I/O module is an output module. The number is determined by the slot where the I/O module is inserted. •Failure to push in the module connector until it is locked may cause poor contact.

External Dimension



Wiring Diagram



MELSEC-dedicated 32-point 1-wire small-size type

FA-TBS32XY

Features

- This 32-point terminal block type conversion module is used with a 40-core cable for 32 points of the MELSEC connector-type I/O module.
- The terminal block is a small-size type that employs M3 7-mm pitch screws.
- The module prevents screws from falling by employing a screw fall-prevention mechanism, and offers easy installation of round solderless terminals by employing a screw holding mechanism.
- The terminal screws include a black screw every five terminals, making verification of terminal locations easy.
- The frames of the terminal block marking strip include a bold line every four upper/lower level points, making verification of terminal number locations easy.
- The terminal numbers are the same as the MELSEC signal numbers, preventing wiring errors.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1 | M3 7-mm Applicable Solderless Terminal 9-2

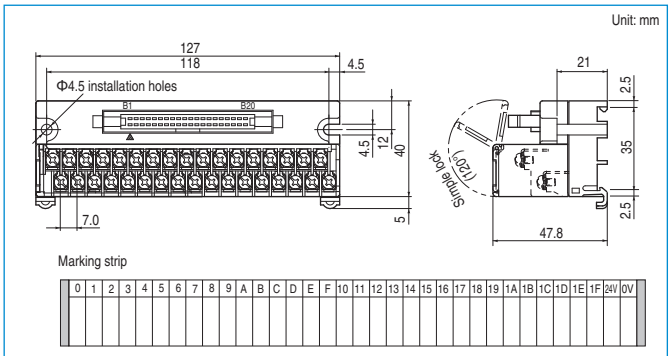
Applicable Standards

UL | cUL

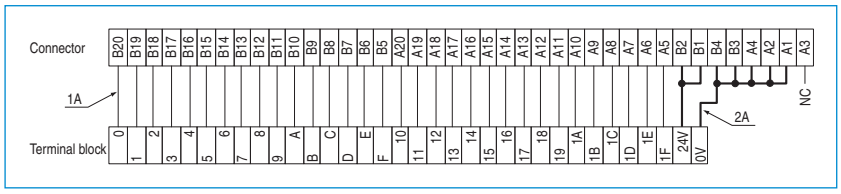
Specifications

Item		Specifications
Model		FA-TBS32XY
No. of I/O points I/O device numbers		32 points, X0 to X1F or Y0 to Y1F
Rated voltage		24VDC
Maximum operating voltage, current		28.8VDC, 1A (each signal terminal), 2A (each power supply terminal)
Wiring method for common		32 points / 1 (24V) common point + 1 (0V) common point
Terminal block	Terminal screw	M3 screws, number of terminals: 34P, 7-mm pitch, with screw holding and fall-prevention mechanism
	Applicable wire, tightening torque	0.3 to 1.25mm² (with solderless terminal use), 43 to 58N·cm
Module installation	Screw installation	M4 × 0.7mm × 25mm or more, tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		500VAC for 1 minute, 10MΩ or more (between all DC external terminals↔ground, between charged areas)
Weight		Approx. 150g
Precautions		•X and Y of the input/output device signal is X when the connected I/O module is an input module, and Y when the connected I/O module is an output module. The number is determined by the slot where the I/O module is inserted. •Failure to push in the module connector until it is locked may cause poor contact.

External Dimension

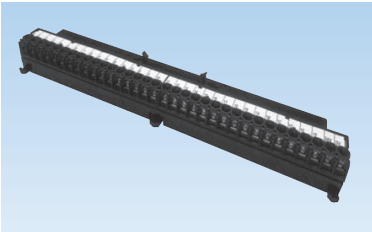


Wiring Diagram



MELSEC-dedicated 32-point 1-wire 1-level type

FA-TB1L32XY



Features

- This 32-point terminal block type conversion module is used with a 40-core cable for 32 points of the MELSEC connector-type I/O module.
- The terminal block is 1-level type which facilitates screw tightening at wiring, and wiring check and retightening at maintenance.
- Using M3.5 terminal screws, the module supports thick wires (with a wire diameter of 1.25 to 2mm²) used for wiring outside the panel.
- The module prevents screws from falling by employing a screw fall-prevention mechanism.
- Round and Y-type solderless terminals can be used.
- The Mitsubishi programmable controller input and output signal (0-1F) numbers are indicated on the marking strip, making wiring easy.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1 | M3.5 8-mm Applicable Solderless Terminal 9-2

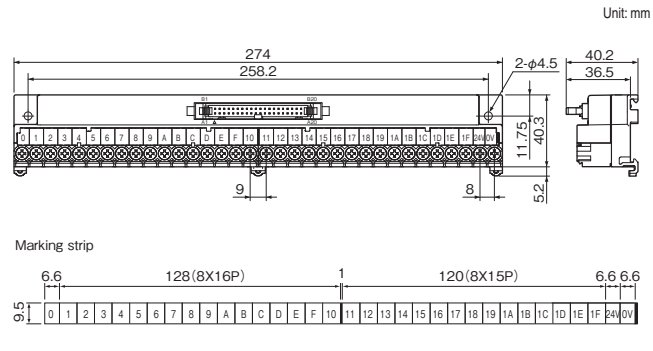
Applicable Standards

UL | cUL

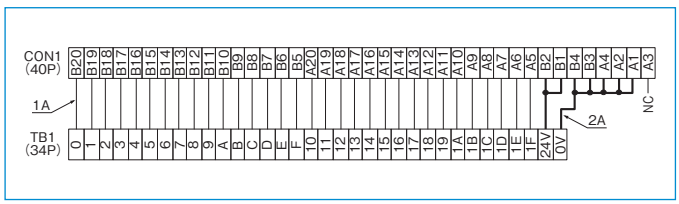
Specifications

Item		Specifications
Model		FA-TB1L32XY
Number of points I/O device numbers		32 points, X0 to X1F or Y0 to Y1F
Rated voltage		24VDC
Maximum operating voltage, current		28.8VDC, 1A (each signal terminal), 2A (each power supply terminal)
Wiring method for common		32 points/1 (24V) common point + 1 (0V) common point
Terminal block	Terminal screw	M3.5 screws, number of terminals: 34P, 8-mm pitch, with screw holding and fall-prevention mechanism, applicable driver: JIS B4633 H-type No.2
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal used), 70 to 110N·cm
Module installation	Screw installation	M4 × 0.7mm × 12mm or more, tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		500VAC for 1 minute, 10MΩ or more (between all DC external terminals↔ground, between charged areas)
Weight		Approx. 230g
Precautions		1. X or Y of the input/output device number is X when the connected I/O module is an input module,and Y when the connected I/O module is an output module. The number is determined by the slot where the I/O module is inserted. 2. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

External Dimension

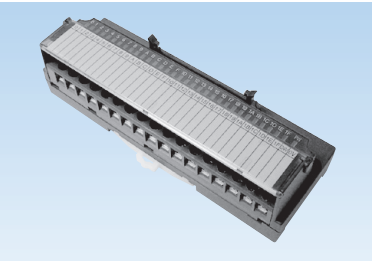


Wiring Diagram



MELSEC-dedicated 32-point 1-wire type with display

FA-TB32XYL, FA-TB32XYH



Features

- This 32-point terminal block type conversion module is used with a 40-core cable for 32 points of the MELSEC connector-type I/O module.
- This module displays the operating status of the power supply and signals. FA-TB32XYL can be used for positive common input and sink output and FA-TB32XYH can be used for negative input and source output.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The Mitsubishi programmable controller input and output signal (0-1F) numbers are indicated on marking strip, making wiring easy.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

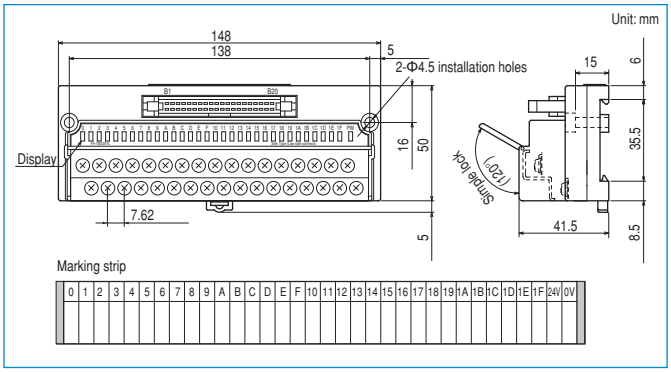
Applicable Standards

UL cUL

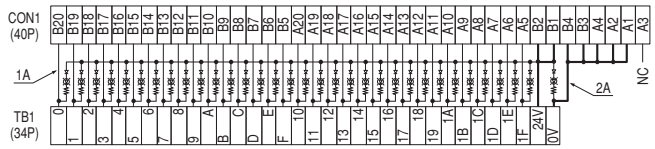
Specifications

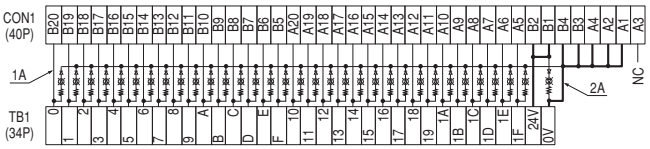
Item		Specifications
Model		FA-TB32XYL, FA-TB32XYH
No. of I/O points I/O device numbers		32 points, X0 to X1F or Y0 to Y1F (with power supply and signal 0 to 1F display; display current consumption: 4mA/point at 24VDC)
Rated voltage		24VDC
Maximum operating voltage, current		19.2 to 28.8VDC, 1A (each signal terminal), 2A (each power supply terminal)
Wiring method for common		32 points / 1 (24V) common point + 1 (0V) common point
Terminal block	Terminal screw	M3 screws, number of terminals: 34P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.3 to 2mm^2 (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 20mm or more, tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		500VAC for 1 minute, 10MΩ or more (between all DC external terminals↔ground, between charged areas)
Weight		Approx. 200g
Precautions		•X and Y of the input/output device signal is X when the connected I/O module is an input module, and Y when the connected I/O module is an output module. The number is determined by the slot where the I/O module is inserted. •Failure to push in the module connector until it is locked may cause poor contact.

External Dimension



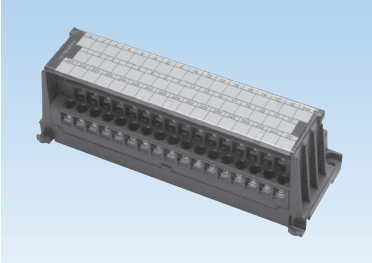
Wiring Diagram





MELSEC-dedicated 32-point 2-wire type

FA-TB32XYP3, FA-TB32XYN3



Features

- This 32-point terminal block type conversion module is used with a 40-core cable for 32 points of the MELSEC connector-type I/O module.
- The module has one common terminal per two signal terminals, making an external common terminal block unnecessary.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The Mitsubishi programmable controller input and output signal (0-1F) numbers are indicated on the marking strip, making wiring easy.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

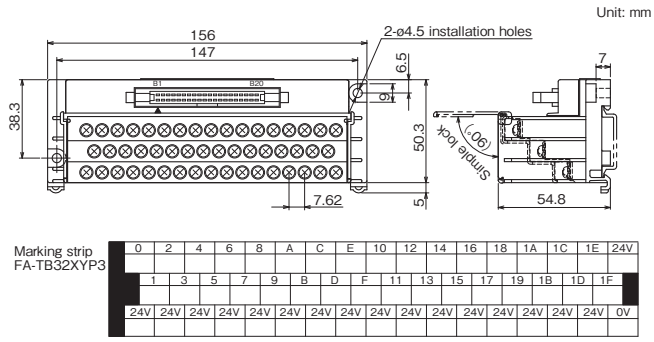
Applicable Standards

UL | cUL

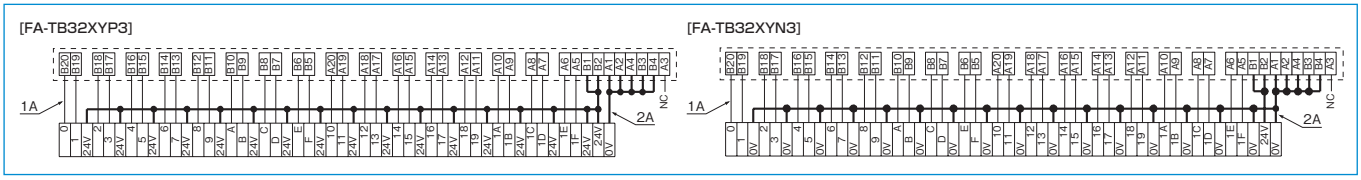
Specifications

Item	Specifications	
Model	FA-TB32XYP3	FA-TB32XYN3
No. of I/O points I/O device numbers	32 points, X0 to X1F or Y0 to Y1F	
Rated voltage	24VDC	
Maximum operating voltage, current	28.8VDC, 1A (each signal terminal), 2A (each power supply terminal)	
Wiring method for common	32 points / 16 common (24VDC)	32 points / 16 common (0V)
Terminal block	Terminal screw	M3 screws, number of terminals: 50P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 12mm or more, tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC 60715 compliant)
Withstand voltage, insulation resistance	500VAC for 1 minute, 10MΩ or more (between all DC external terminals ↔ ground, between charged areas)	
Weight	Approx. 280g	
Precautions	·X and Y of the input/output device signal is X when the connected I/O module is an input module, and Y when the connected I/O module is an output module. The number is determined by the slot where the I/O module is inserted. ·Failure to push in the module connector until it is locked may cause poor contact.	

External Dimension



Wiring Diagram



MELSEC-dedicated distributed 16-point 3-wire type

FA-TB16XY1, FA-TB16XY2

Features

- This conversion module, with a cable, is used to distribute 32 points of the MELSEC connector-type I/O module into 16-point modules.
- The module has a 24V or 0V common terminal per two signal points, making wiring with other distributed type modules possible.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The Mitsubishi programmable controller input and output signal (0 to F, 10 to 1F) numbers are indicated on the marking strip, making wiring easy.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

Related Products

Connector Covers 1-18

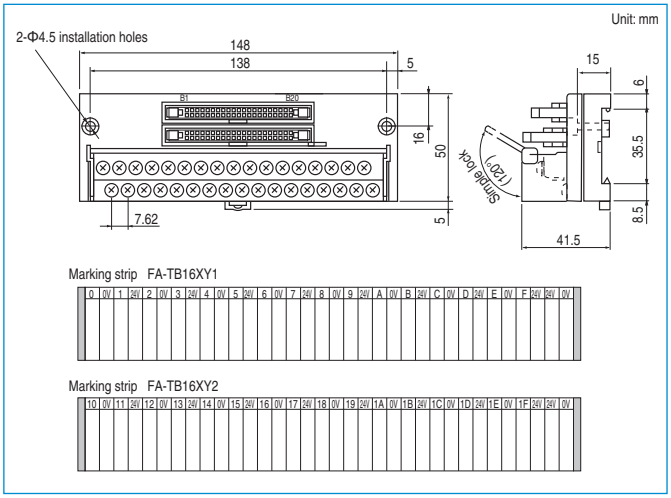
Applicable Standards

UL cUL

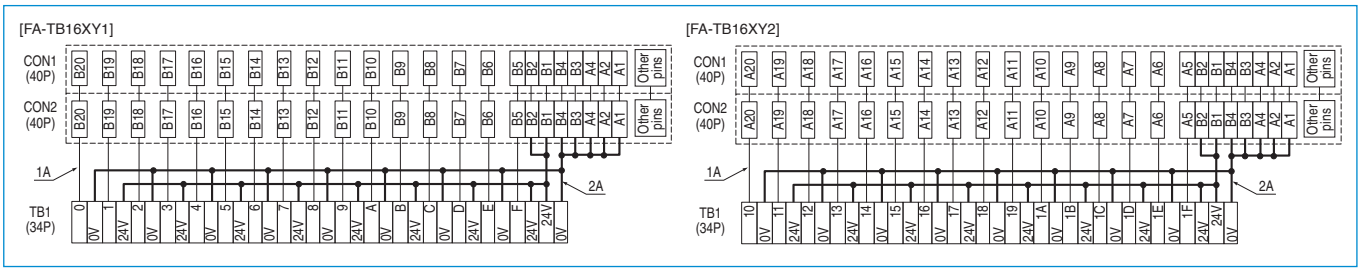
Specifications

Item		Specifications	
Model		FA-TB16XY1	FA-TB16XY2
No. of I/O points I/O device numbers		16 points, X0 to XF or Y0 to YF	16 points, X10 to 1XF or Y10 to Y1F
Rated voltage		24VDC	
Maximum operating voltage, current		28.8VDC, 1A (each signal terminal), 2A (each power supply terminal)	
wiring method for common		16 points / 8 (24V) common points + 8 (0V) common points	
Terminal block	Terminal screw	M3 screws, number of terminals: 34P, 7.62-mm pitch, spring-up screw with finger protection cover	
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm	
Module installation	Screw installation	M4 × 0.7mm × 20mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Withstand voltage, insulation resistance		500VAC for 1 minute, 10MΩ or more (between all DC external terminals↔ground, between charged areas)	
Weight		Approx. 180g	
Precautions		•X and Y of the input/output device signal is X when the connected I/O module is an input module, and Y when the connected I/O module is an output module. The number is determined by the slot where the I/O module is inserted. •Failure to push in the module connector until it is locked may cause poor contact.	

External Dimension

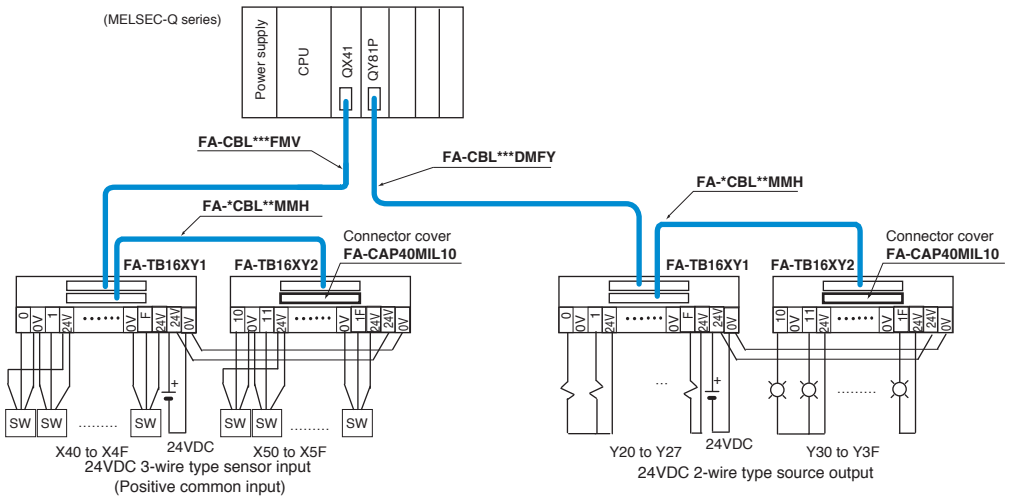


Wiring Diagram



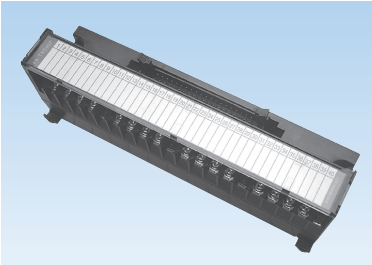
Example of use

Distributed type Connector ↔ Screw terminal block conversion module



General-purpose 40-point small-size type

FA-TBS40P



Features

- This 40P screw terminal block (regular screws) type conversion module is used to convert signals from a general-purpose connector-type module of MELSEC programmable controller.
- The module is a small-size type that employs M3 7-mm pitch screws in the terminal block.
- One signal point is connected to one terminal point; the module is applicable as a 40-point general-purpose connector / terminal block conversion module.
- The module prevents screws from falling by employing a screw fall-prevention mechanism, and offers easy installation of round solderless terminals by employing a screw holding mechanism.
- The terminal screws include a black screw every five terminals, making verification of terminal locations easy.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1 | M3 7-mm Applicable Solderless Terminal 9-2

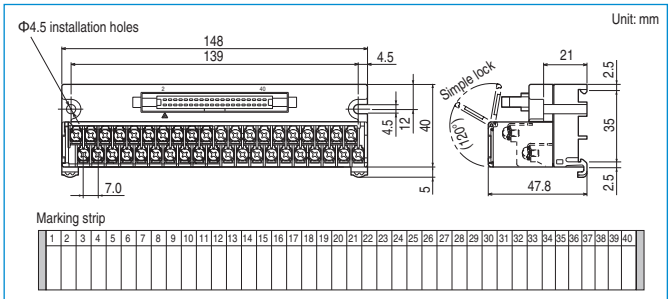
Applicable Standards

UL | cUL

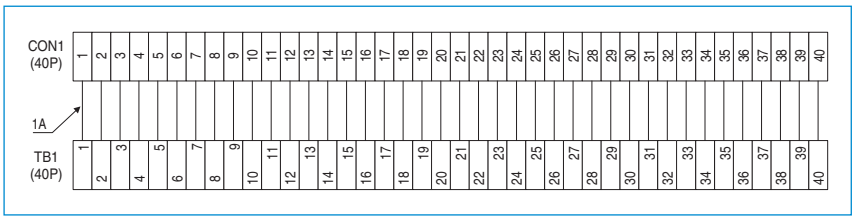
Specifications

Item		Specifications
Model		FA-TBS40P
No. of points		40 points, general-purpose
Maximum operating voltage, current		48VDC, 1A/point
wiring method for common		—
Terminal block	Terminal screw	M3 screws, number of terminals: 40P, 7-mm pitch, with screw holding and fall prevention mechanisms
	Applicable wire, tightening torque	0.3 to 1.25mm², 43 to 58N·cm
Module installation	Screw installation	M4 × 0.7mm × 25mm or more, tightening torque: 78.8 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		500VAC for 1 minute, 10MΩ or more (between all DC external terminals↔ground)
Weight		Approx. 190g
Precautions		Failure to push in the module connector until it is locked may cause poor contact.

External Dimension

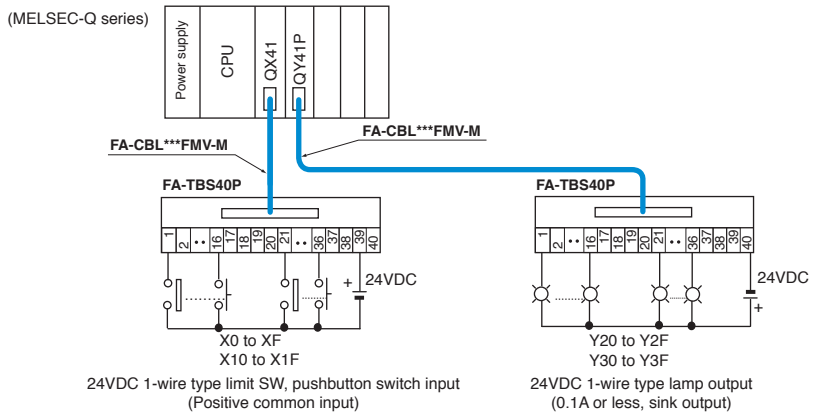


Wiring Diagram



Example of use

General-purpose connector-type I/O module ↔ Screw terminal block conversion module



24VDC 1-wire type limit SW, pushbutton switch input (Positive common input)

24VDC 1-wire type lamp output (0.1A or less, sink output)

MIL40P connector covers

FA-CAP40MIL10

Features

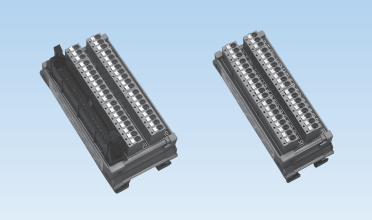
- When distributed-type modules are distributed using cables, the last module connector is open, resulting in the possibility of dust contamination. The connector cover is used to prevent contamination by such dust and the like.

Specifications

Item	Specifications
Model	FA-CA40MIL10 (protective cover for preventing contamination of an unused connector by foreign matter; includes 10 covers)
Applicable module	FA-TB16XY1, FA-TB16XY2
Weight	Approx. 30g

MELSEC-dedicated 32-point 1-wire type, common terminal block

FA1-TESV32XY, FA1-TESV38COM



Features

- This 32-point spring clamp terminal block type conversion module is used with a 40-core cable for 32 points of the MELSEC connector-type I/O module.
- By employing the vertical-installation design, the module is narrow, having a width of 42mm, and helps contributing to the downsizing of a system.
- Because screws do not become loose due to vibration, tightening work is not required at periodic inspection.
- Provided with a common terminal block, the module can be easily connected to a device such as a 3-wire sensor by being placed next to a 32-point connector↔spring terminal block conversion module.
- By using ferrule terminals, push-in connections are available.

Related Materials

General Specifications 9-1

Applicable Standards

UL cUL

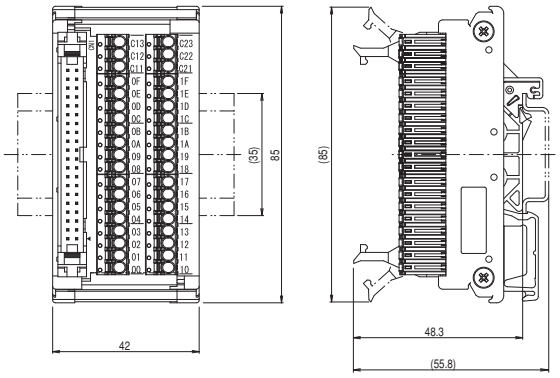
Specifications

Item	Specifications	
Model	FA1-TESV32XY	FA1-TESV38COM
Rated voltage	24VDC	
Maximum operating voltage	30VDC	
Maximum operating current (Note 2)	Signal: 1A, Common: 2A	Common: 6A (Note 3)
Wiring method for common	32 points / 3 (24V) common points + 3 (0V) common points	19 common points + 19 common points
Terminal block: Number of terminals	Terminal: 38 points	
Terminal block: Applicable wire (Note 4)	0.2 to 1.5mm² (AWG24-16), Sheath: Φ2.8mm or less	
Terminal block: Wire strip length	8 to 9mm (Maximum wire sheath outside diameter: Φ2.8mm or less)	
Module installation	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Withstand voltage, insulation resistance	500VAC for 1 minute, 10MΩ or more (measured with 500VDC insulation resistance tester)	
Weight	Approx. 70g	Approx. 60g
Precautions	Note 1: When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact. Note 2: Evaluation for UL certification is conducted using a resistance load as a condition. Note 3: When UL compliance is required, use the module based on a maximum rating of 100VA or lower. Note 4: Evaluation for UL certification is conducted with copper wires.	

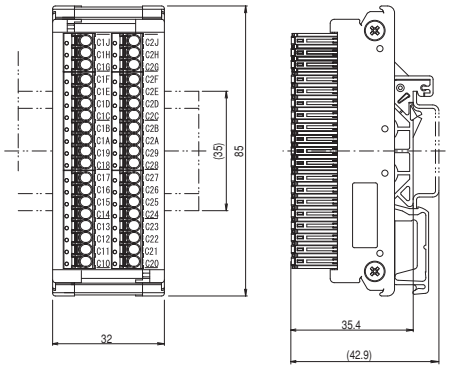
External Dimension

Unit: mm

- FA1-TESV32XY

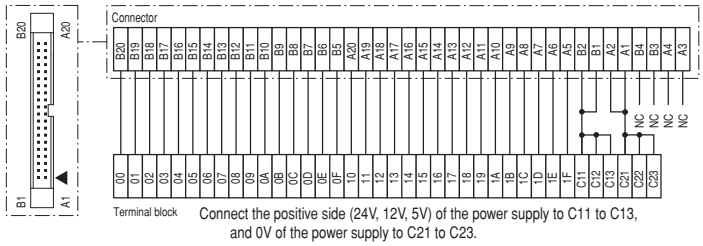


- FA1-TESV38COM



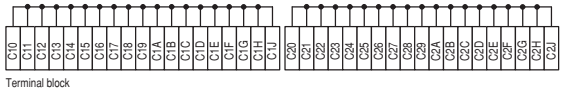
Wiring Diagram

- FA1-TESV32XY

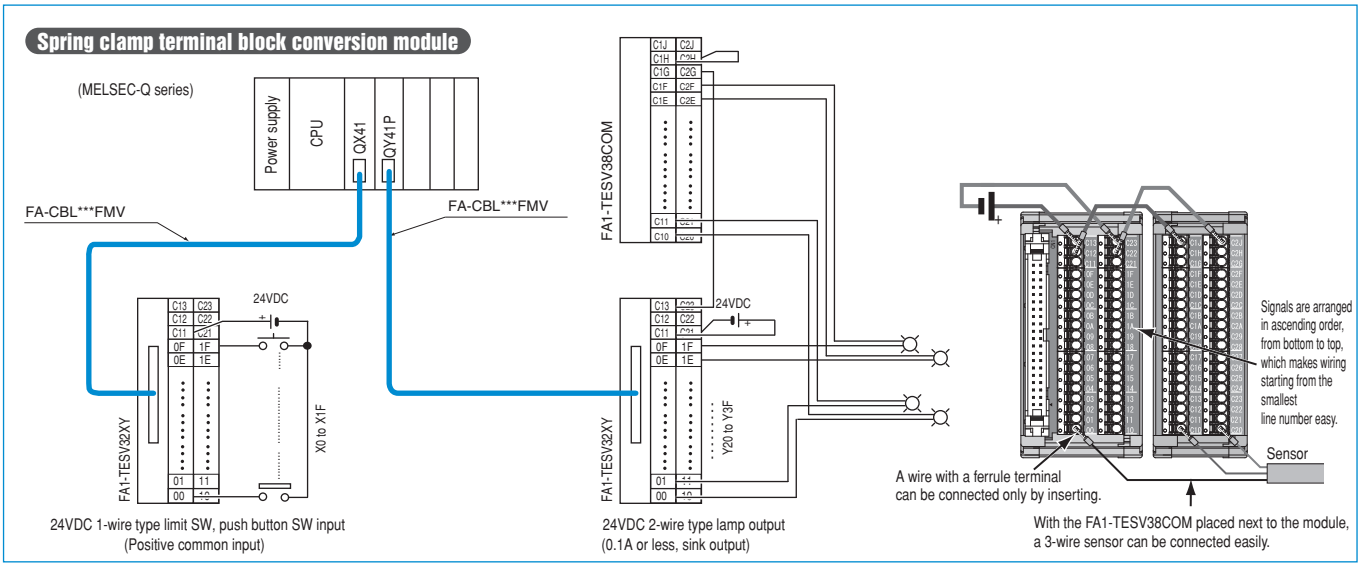


Connect the positive side (24V, 12V, 5V) of the power supply to C11 to C13, and 0V of the power supply to C21 to C23.

- FA1-TESV38COM

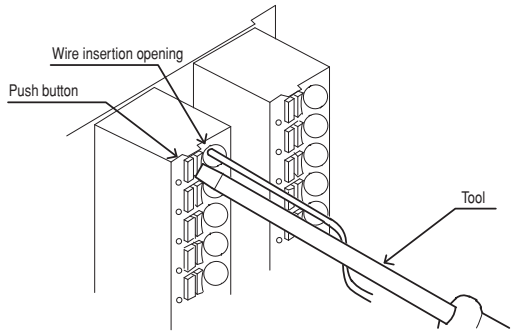


Example of use

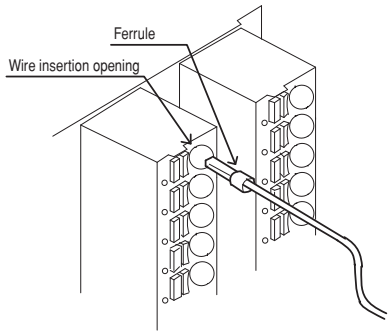


How to connect / remove a wire

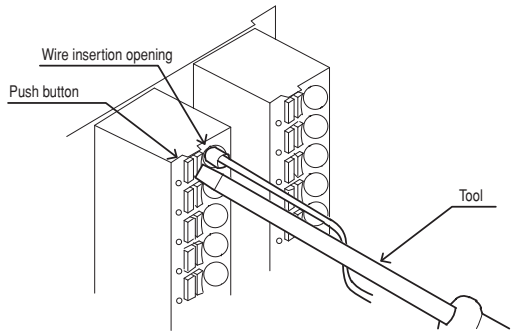
- How to connect a stranded wire
  1) Strip off 8 to 9mm of the sheath of the wire.
  2) Twist the strands. Note: Ensure that the strands are not excessively twisted, loose, or bent.
  3) Using a tool, push the push button forward sufficiently.
  4) While holding down the push button, insert the stranded wire into the wire insertion opening.
  5) After removing the tool, pull the stranded wire lightly and check that it is held firmly in place.



- How to connect a wire with a ferrule terminal
  1) Insert the wire as-is into the wire insertion opening.
  2) Pull the wire lightly and check that it is held firmly in place.



- Removal procedure (Common to a stranded wire and wire with a ferrule terminal)
  1) Using a tool, push the push button forward sufficiently.
  2) While holding down the push button, remove the wire from the wire insertion opening.



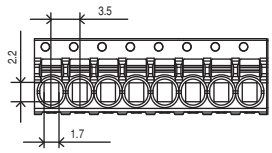
Recommended tool for operating a push button		
Manufacturer	WAGO Co. of JAPAN Ltd.	
Model	210-119SB (Mini type)	210-719 (Insulated shaft type)
Blade tip size	2.5 × 0.4mm	

Applicable solderless terminal (Ferrule terminal)

- Recommended ferrule terminal

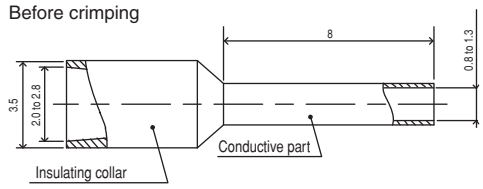
Manufacturer	Model	Applicable wire size	Crimping tool
WAGO Co. of JAPAN Ltd.	216-302	0.08 to 0.34mm²/AWG28 to 22	206-220
		0.34mm²/AWG24, 22	206-204
	216-201	0.5mm²/AWG22, 20	
	216-202	0.75mm²/AWG20, 18	

- Terminal block shape

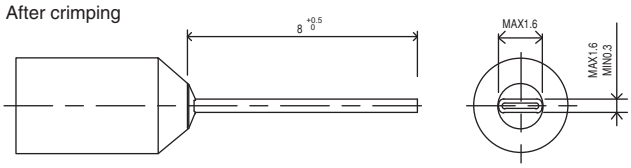


- Ferrule terminal dimensions

Before crimping



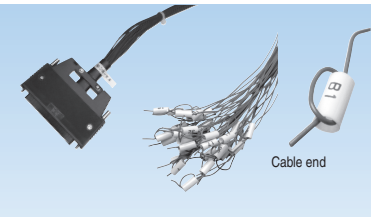
After crimping



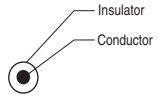
Note: Ensure that the cross-sectional area of the conductive part after crimping is not less than 0.48mm².

Discrete cable (40 strands) (FCN 40P type)

FA-BCBL**FFBL



Specifications

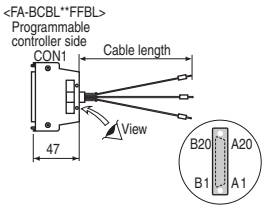
Item	Specifications
Model	FA-BCBL**FFBL
Programmable controller-side connector	FCN-363J040: Fujitsu Component
Used solderless terminal	–
Mark tube	Yes (Marks: A1 to A20, B1 to B20)
Used cable	Blue wire with 40 strands (semi-rigid vinyl cable)
Conductor configuration	11/0.16 wires/mm (AWG#24)
Insulator outer diameter, color	1.14mm, blue
Cable outer diameter	–
Rated current	48VDC/3A
Conductor resistance (20°C)	0.0929Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 1061 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-BCBL10FFBL	1m	Approx. 220g
FA-BCBL20FFBL	2m	Approx. 440g
FA-BCBL30FFBL	3m	Approx. 660g

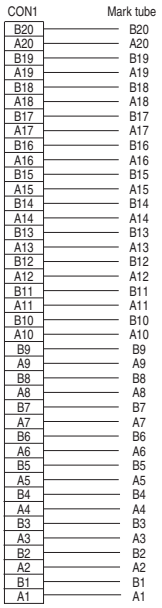
Features

- This is a cable with 40 blue strands, each of which is connected in such a way as to come out of a connection point of the FCN 40P connector type I/O module of the programmable controllers of other companies.
- For the discrete cable side, pin number mark tubes are provided and three types are available: The non-processed type, Y-shaped solderless terminal type, and round solderless terminal type.

External Dimension



Wiring Diagram



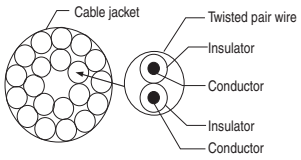
Related Materials

General Specifications 9-1

For MELSEC positive common input/sink output (for FCN 40P ↔ MIL 40P)

FA-CBL**FMV

Specifications

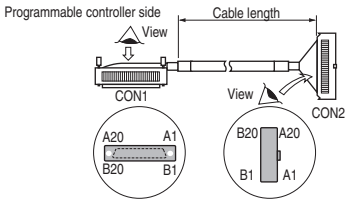
Item	Specifications
Programmable controller-side connector	FCN367J040-AU/MW: Fujitsu Component
Conversion module-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20°C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10FMV	1m	Approx. 160g
FA-CBL20FMV	2m	Approx. 270g
FA-CBL30FMV	3m	Approx. 390g
FA-CBL50FMV	5m	Approx. 590g

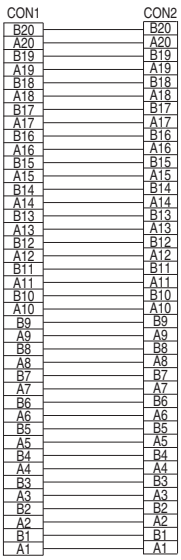
Features

- This cable is used to connect a MELSEC-Q series FCN 40P connector-type I/O module and a MELSEC-dedicated 32-point conversion module.
- This round 40-core cable connects the FCN 40P (vertical) connector of the MELSEC-Q series connector-type I/O module and the MIL 40P connector of the other module. The cable vertically comes out from the FCN 40P connector.
- The cable comes out vertically from the FCN 40P connector to prevent poor contact, cutting, etc. due to the tension applied to the upper end of the core wire.
- This cable cannot be used with general-purpose 40P conversion modules.

External Dimension



Wiring Diagram



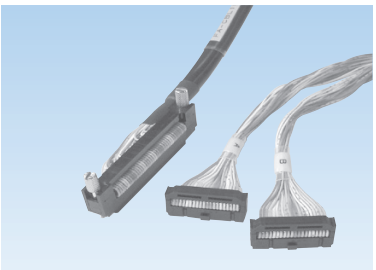
Note 1: Connectable to source output module QY82P

Related Materials

General Specifications 9-1

For MELSEC positive common input / sink output (FCN 40P ↔ MIL 20P × 2, MIL 20P side branching type)

FA-CBL**FM2V



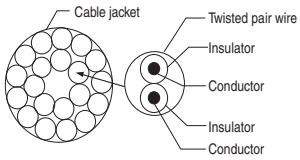
Features

- This round 40-core cable comes out from the MELSEC-Q series FCN 40P connector-type I/O module and branches at the other end of the cable into two MIL 20P connectors, each connecting to a MELSEC-dedicated 16-point conversion module.
- The cable comes out vertically from the FCN 40P connector to prevent poor contact, cutting, etc. due to the tension applied to the upper end of the core wire.
- The cable cannot be used with general-purpose 20P conversion modules.

Related Materials

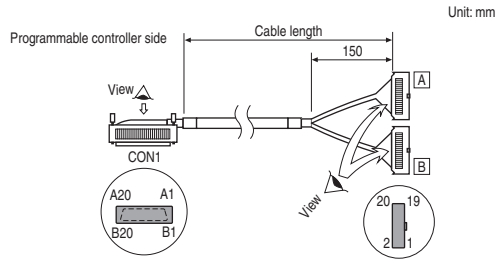
General Specifications 9-1

Specifications

Item	Specifications
Programmable controller-side connector	FCN367J040-AU/MW: Fujitsu Component
Conversion module-side connector	D7920-B500FL, D3448-7920: Sumitomo 3M × 2
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

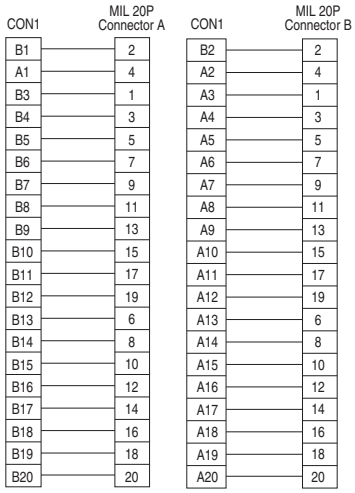
Model	Cable length	Weight
FA-CBL10FM2V	1m	Approx. 160g
FA-CBL20FM2V	2m	Approx. 270g
FA-CBL30FM2V	3m	Approx. 380g
FA-CBL50FM2V	5m	Approx. 600g

External Dimension



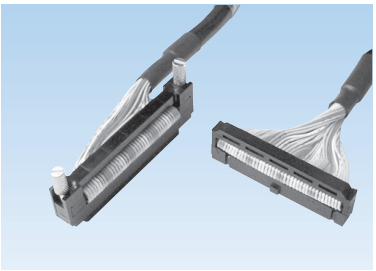
Note 1: A of the 20P connector corresponds to inputs X0 to XF / outputs Y0 to YF, and B of the 20P connector corresponds to inputs X10 to X1F / outputs Y10 to Y1F.

Wiring Diagram



For MELSEC negative common input (for FCN 40P ↔ MIL 40P)

FA-CBL**FMVE



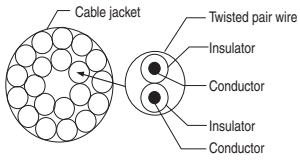
Features

- This cable is used to connect a MELSEC-Q series FCN 40P connector-type negative common input module and a MELSEC-dedicated 32-point conversion module.
- The cable comes out vertically from the FCN 40P connector to prevent poor contact, cutting, etc. due to the tension applied to the upper end of the core wire.
- This cable cannot be used with general-purpose 40P conversion modules.

Related Materials

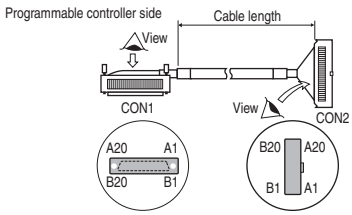
General Specifications 9-1

Specifications

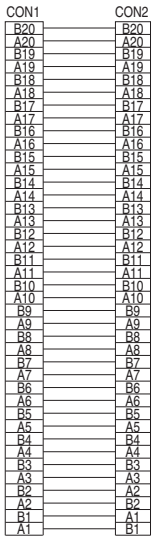
Item	Specifications
Programmable controller-side connector	FCN367J040-AU/MW: Fujitsu Component
Converter module-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10FMVE	1m	Approx. 140g
FA-CBL20FMVE	2m	Approx. 270g
FA-CBL30FMVE	3m	Approx. 400g

External Dimension



Wiring Diagram



For MELSEC negative common input (D-Sub 37P ↔ MIL 40P)

FA-CBL**DMFX

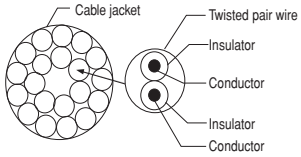
Features

- This cable is used to connect a MELSEC-Q series D-sub 37P connector-type negative common input module and a MELSEC-dedicated 32-point conversion module.
- The cable cannot be used with general-purpose 40P conversion modules.

Related Materials

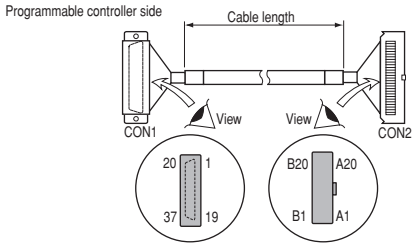
General Specifications 9-1

Specifications

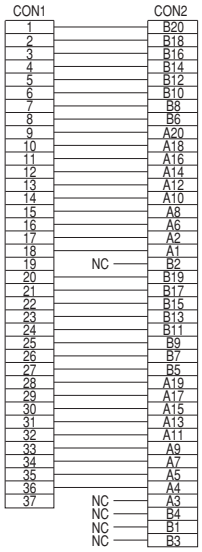
Item	Specifications
Programmable controller-side connector	1658612-1, 747275-1: Tyco Electronics AMP
Conversion module-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10DMFX	1m	Approx. 160g
FA-CBL20DMFX	2m	Approx. 270g
FA-CBL50DMFX	5m	Approx. 610g

External Dimension



Wiring Diagram



For MELSEC source output (D-Sub 37P ↔ MIL 40P)

FA-CBL**DMFY

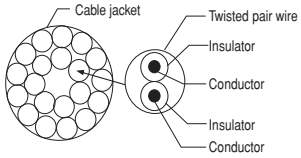
Features

- This cable is used to connect a MELSEC-Q series D-sub 37P connector source-type output module and a MELSEC-dedicated 32-point conversion module.
- This cable cannot be used with general-purpose 40P conversion modules.

Related Materials

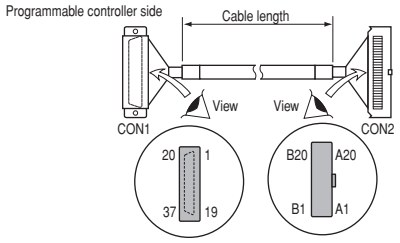
General Specifications 9-1

Specifications

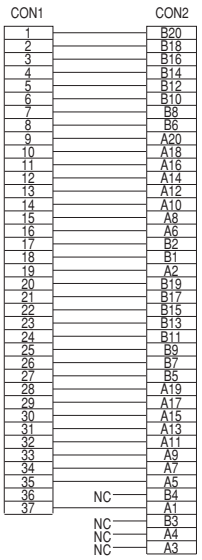
Item	Specifications
Programmable controller-side connector	1658612-1, 747275-1: Tyco Electronics AMP
Conversion module-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10DMFY	1m	Approx. 160g
FA-CBL20DMFY	2m	Approx. 270g
FA-CBL50DMFY	5m	Approx. 610g

External Dimension

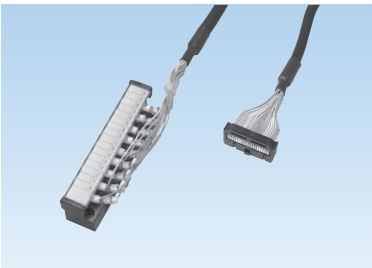


Wiring Diagram



For MELSEC terminal block I/O (MELSEC-Q terminal block ↔ MIL 20P)

FA-CBL**TMV20



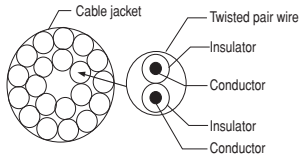
Features

■This cable is used to connect a terminal block of a MELSEC DC I/O module and a terminal module.

Related Materials

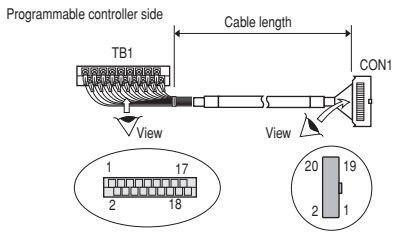
General Specifications 9-1

Specifications

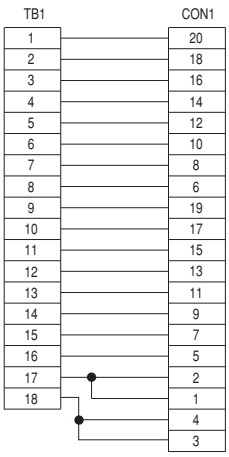
Item	Specifications
Programmable controller-side connector	MELSEC-Q terminal block
Conversion module-side connector	D7920-B500FL, D3448-7920: Sumitomo 3M
Used cable	Round 20-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	8.1mm (standard), black
Rated current	1A
Conductor resistance (20°C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	100MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10TMV20	1m	Approx. 170g
FA-CBL20TMV20	2m	Approx. 260g
FA-CBL30TMV20	3m	Approx. 360g

External Dimension

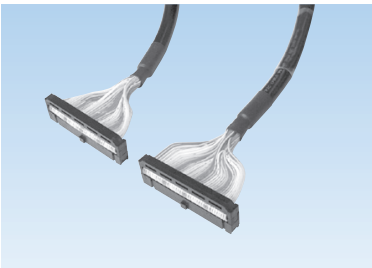


Wiring Diagram



For distributed module connection, general-purpose use (MIL 40P ↔ MIL 40P)

FA-CBL**MMH



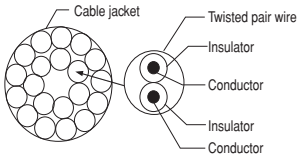
Features

■This round 40-core cable with two MIL 40P connectors connects between the distributed-type conversion modules.

Related Materials

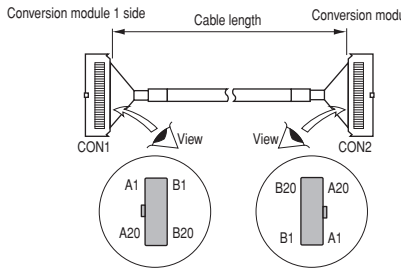
General Specifications 9-1

Specifications

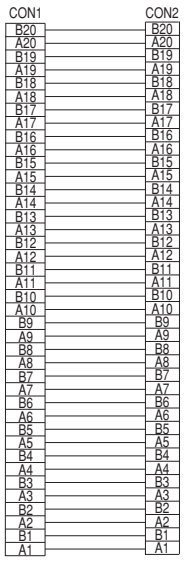
Item	Specifications
Programmable controller-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M
Conversion module-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20°C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10MMH	1m	Approx. 140g
FA-CBL20MMH	2m	Approx. 260g
FA-CBL50MMH	5m	Approx. 590g

External Dimension

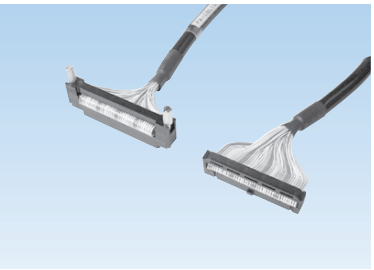


Wiring Diagram



For Mitsubishi Electric CC-Link remote I/O positive common input / sink output (FCN 40P ↔ MIL 40P)

FA-CBL**FMH



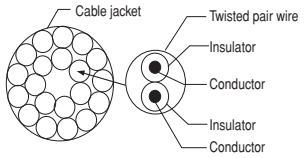
Features

■ This cable is used to connect a Mitsubishi Electric CC-Link remote I/O module that uses an FCN 40P connector and a MELSEC-dedicated 32-point conversion module.

Related Materials

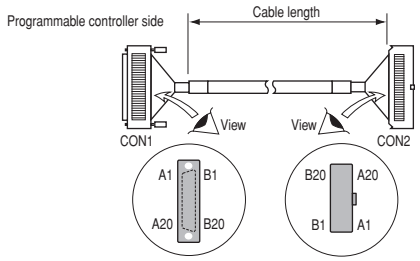
General Specifications 9-1

Specifications

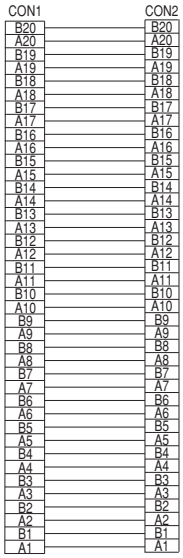
Item	Specifications
Programmable controller-side connector	FCN367J040-AU/MW: Fujitsu Component
Conversion module-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10FMH	1m	Approx. 160g
FA-CBL20FMH	2m	Approx. 280g
FA-CBL30FMH	3m	Approx. 380g

External Dimension



Wiring Diagram



For Mitsubishi Electric CC-Link remote I/O positive common input / sink output (FCN 40P ↔ MIL 20P × 2, MIL 20P-side branching type)

FA-CBL**FM2H

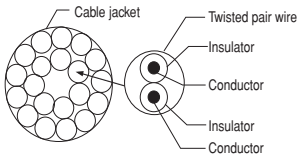
Features

■ This round 40-core cable comes out from the Mitsubishi Electric CC-Link FCN 40P connector-type I/O module and branches at the other end of the cable into two MIL 20P connectors, each connecting to a MELSEC-dedicated 16-point conversion module.

Related Materials

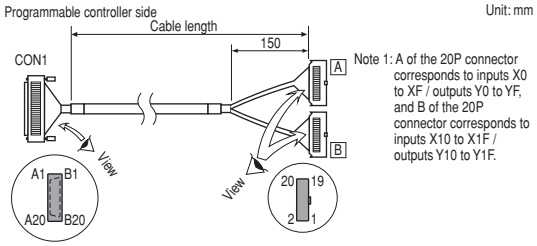
General Specifications 9-1

Specifications

Item	Specifications
Programmable controller-side connector	FCN367J040-AU/MW: Fujitsu Component
Conversion module-side connector	D7920-B500FL, D3448-7920: Sumitomo 3M × 2
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

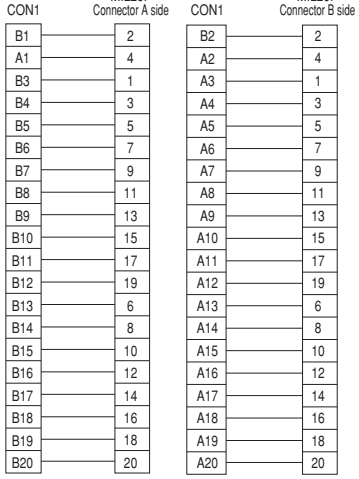
Model	Cable length	Weight
FA-CBL10FM2H	1m	Approx. 150g
FA-CBL20FM2H	2m	Approx. 270g
FA-CBL30FM2H	3m	Approx. 380g

External Dimension



Note 1: A of the 20P connector corresponds to inputs X0 to XF / outputs Y0 to YF, and B of the 20P connector corresponds to inputs X10 to X1F / outputs Y10 to Y1F.

Wiring Diagram



For general-purpose type Mitsubishi Electric programmable controllers (FCN 40P ↔ MIL 40P)

FA-CBL**FMV-M

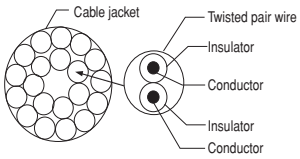
Features

- This cable is used to connect a Mitsubishi Electric programmable controller FCN 40P connector-type I/O module and a general-purpose 40P conversion module.
- The cable comes out vertically from the FCN 40P connector to prevent poor contact, cutting, etc. due to the tension applied to the upper end of the core wire.
- The cable cannot be used to connect MELSEC-dedicated 32-point conversion modules.

Related Materials

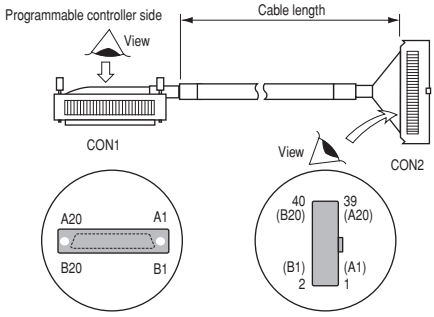
General Specifications 9-1

Specifications

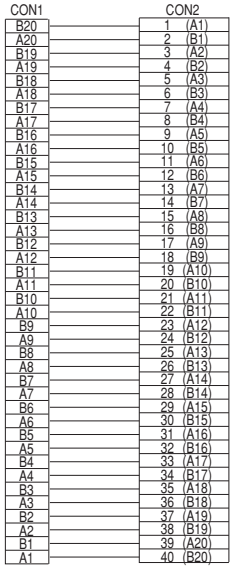
Item	Specifications
Programmable controller-side connector	FCN367J040-AU/MW: Fujitsu Component
Conversion module-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10FMV-M	1m	Approx. 160g
FA-CBL20FMV-M	2m	Approx. 270g
FA-CBL30FMV-M	3m	Approx. 380g

External Dimension



Wiring Diagram



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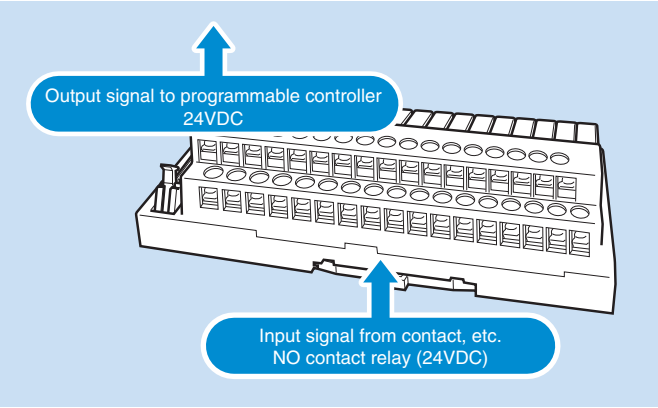
2. Terminal Module for DC I/O

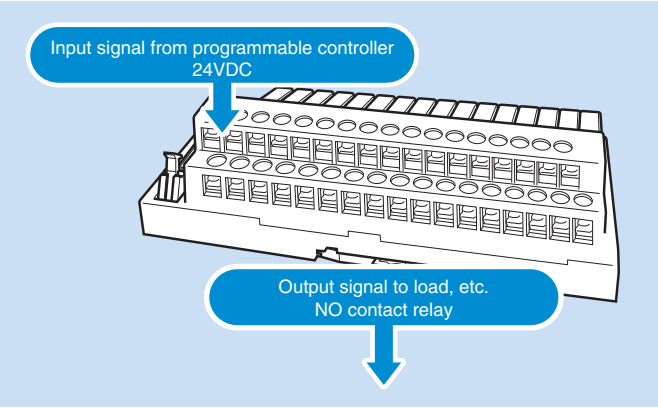
Overview

Terminal modules are used for isolation and conversion between MELSEC I/O module I/O signals and external I/O signals.
Only the 24VDC signals are used on the programmable controller side, and therefore different external signals can be also used.

●Input type



●Output type



Model List 1

Input Type Terminal Module

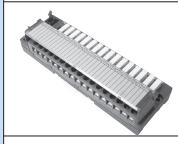
For connectable I/O modules and cables, see the Selection Chart.

Product	Shape	Model	Remarks								Page
			No. of points	Programmable controller connected module	Module isolation method	Conversion module type	Module socket	Module replacement	Input circuit method	+ terminal screw	
24VDC relay isolation type NO contact input module		FA-TH16XRA20S	16	+ common input module	Relay isolation	NO contact relay	Yes	Possible	16-point independent type (Common to + common / - common)	M3	2-17
24VDC photocoupler isolation type input module		FA-TH16X24D31	16	+common input module	Photocoupler isolation	–	–	–	16 points/common 2-wire type (Common to + common / - common)	M3	2-18
		FA-TH16X24D31L	16	+common input module	Photocoupler isolation	–	–	–	16 points/common 2-wire type (Common to + common / - common)	M3.5	2-19
48VDC photocoupler isolation type input module		FA-TH16X48D31L	16	+common input module	Photocoupler isolation	–	–	–	16 points/common 2-wire type (Common to + common / - common)	M3.5	2-20
100VDC photocoupler isolation type input module		FA-TH16X100D31L	16	+common input module	Photocoupler isolation	–	–	–	16 points/common 2-wire type (Common to + common / - common)	M3.5	2-21
100VAC photocoupler isolation type input module		FA-TH16X100A31	16	+common input module	Photocoupler isolation	–	–	–	16 points/common 2-wire type	M3	2-22
		FA-TH16X100A31L	16	+common input module	Photocoupler isolation	–	–	–	16 points/common 2-wire type	M3.5	2-23
200VAC photocoupler isolation type input module		FA-TH16X200A31	16	+common input module	Photocoupler isolation	–	–	–	16 points/common 2-wire type	M3	2-24
		FA-TH16X200A31L	16	+common input module	Photocoupler isolation	–	–	–	16 points/common 2-wire type	M3.5	2-25

Model List 2

Output Type Terminal Module

For connectable I/O modules and cables, see the Selection Chart.

Product	Shape	Model	Remarks								Page
			No. of points	Programmable controller connected module	Module isolation method	Conversion module type	Module socket	Module replacement	Output circuit method	+ terminal screw	
Relay isolation type NO contact output module		FA-TH16YRA11	16	Sink output module	Relay isolation	NO contact relay module	No	Not possible	16 points/common 1-wire type	M3	2-26
		FA-TH16YRA20	16	Sink output module	Relay isolation	NO contact relay module	No	Not possible	16-point independent type	M3	2-27
		FA-TH16YRA11S	16	Sink output module	Relay isolation	NO contact relay	Yes	Possible	16 points/common 1-wire type	M3	2-28
		FA-TH16YRA20S	16	Sink output module	Relay isolation	NO contact relay	Yes	Possible	16-point independent type	M3	2-29
		FA-TH16YRA20SL	16	Sink output module	Relay isolation	NO contact relay module	Yes	Possible	16-point independent type	M3.5	2-30

DC I/O Conversion Modules That Can Be Used Together

For connectable I/O modules and cables, see the Selection Chart.

Product	Shape	Model	Remarks		Page
MELSEC-dedicated + screw terminal block 16-point 1-wire type module		FA-TB16XY	For X0 to XF / Y0 to YF Note: X* and Y* indicate MELSEC I/O input/output device numbers.	This module is a MELSEC-dedicated 16-point connector terminal block conversion module. The module branches the 32 points of the MELSEC connector-type I/O module into 16-point units using a branch cable, allowing separate use from other 16-point modules.	1-13

Module-to-Module Cable

For connectable I/O modules and cables, see the Selection Chart.

Product	Shape	Model	Remarks		Page
Connection cable for MELSEC terminal block I/O (with MELSEC-Q terminal block)		FA-CBL10TMV20	1m	• Used for connecting a MELSEC terminal block I/O and a terminal module. • Provided with MELSEC-Q series terminal block	2-32
		FA-CBL20TMV20	2m		
		FA-CBL30TMV20	3m		
Vertical branch cable for MELSEC-dedicated I/O module		FA-CBL10FM2V	1m	• This cable comes out out from the MELSEC-Q series FCN 40P connector-type I/O module with a round 40-core cable, branching into two MIL 20P connectors on the other cable end, each connecting to a MELSEC-dedicated 16-point conversion module. • The 40-core cable is vertically comes out from the MELSEC-Q series FCN 40P connector-type I/O module. • The cable cannot be used with general-purpose 20P conversion modules.	2-31
		FA-CBL20FM2V	2m		
		FA-CBL30FM2V	3m		
		FA-CBL50FM2V	5m		
Horizontal branch cable for Mitsubishi Electric CC-Link remote I/O module		FA-CBL10FM2H	1m	This cable leads out from the Mitsubishi Electric CC-Link FCN 40P connector-type remote I/O module with a round 40-core cable , branching into two MIL 20P connectors on the other cable end, each connecting to a MELSEC-dedicated 16-point conversion module.	2-31
		FA-CBL20FM2H	2m		
		FA-CBL30FM2H	3m		

Options

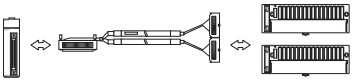
Product	Shape	Model	Remarks	Page
Replacement relay		FA-NYP24WK4	Normally open (NO) contact relay (quantity: 4, color: beige)	2-32

MELSEC iQ-R Series Selection Chart 1

Programmable Controller ↔ Terminal Module

- Connection example: Terminal block type I/O module ↔ Terminal module
  RX40C7 + FA-CBL10YM20 + FA-TH16XRA20S

- Connection example: Connector type I/O module ↔ Terminal module
  RY41NT2P + FA-CBL10FM2LV + FA-TH16YRA20S x 2



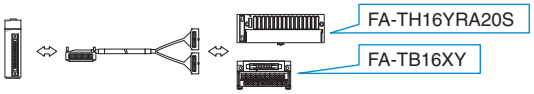
Input/ Output	Programmable controller module model		Module type			Module model 1	Module model 2	Connection cable
Input	RX40C7	Positive common dedicated	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17		FA-CBL**TMV20 2-32
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19		
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20		
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21		
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23		
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25		
	RX41C4 RX42C4	Positive common dedicated	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TH16XRA20S 2-17	FA-CBL**FM2V (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20	FA-TH16X48D31L 2-20	
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21	FA-TH16X100D31L 2-21	
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	
Output	RY41NT2P (Note 2) RY42NT2P (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TH16YRA11 2-26	FA-CBL**FM2V (Note 1) 2-31
					Independent	FA-TH16YRA20 2-27	FA-TH16YRA20 2-27	
					1-wire type	FA-TH16YRA11S 2-28	FA-TH16YRA11S 2-28	
					Independent	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30	

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

MELSEC iQ-R Series Selection Chart 2

Programmable Controller ↔ Terminal Module + Conversion Module

- Connection example: Connector type I/O module ↔ Terminal module + Conversion module
  RY41NT2P + FA-CBL10FM2V + FA-TH16YRA20S + FA-TB16XY



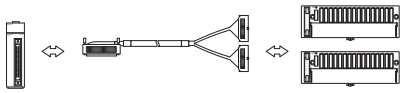
Input/ Output	Programmable controller module model		Module type			Module model 1	Conversion module model	Connection cable
Input	RX41C4 RX42C4	Positive common dedicated	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19		
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20		
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21		
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23		
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25		
Output	RY41NT2P (Note 2) RY42NT2P (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 2-31
					Independent	FA-TH16YRA20 2-27		
				With socket	1-wire type	FA-TH16YRA11S 2-28		
					Independent	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30		
	RY41PT1P (Note 2) RY42PT1P (Note 2)		Transistor 1.0A (Source)	With socket	1-wire type		FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 2-31

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

MELSEC-Q Series Selection Chart 1

Programmable Controller ↔ Terminal Module

- Connection example: Connector type I/O module ↔ Terminal module
  QY41P + FA-CBL10FM2V + FA-TH16YRA20S × 2



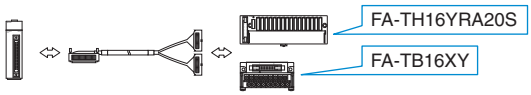
Input/ Output	Programmable controller module model		Module type			Module model 1	Module model 2	Connection cable
Input	QX40 QX40-S1		24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17		FA-CBL**TMV20 2-32
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19		
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20		
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21		
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23		
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25		
	QX41 QX41-S1 QX41-S2 QX42 QX42-S1		24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TH16XRA20S 2-17	FA-CBL**FM2V (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20	FA-TH16X48D31L 2-20	
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21	FA-TH16X100D31L 2-21	
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	
Output	QY40P (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11 2-26		FA-CBL**TMV20 2-32
					Independent	FA-TH16YRA20 2-27		
				With socket	1-wire type	FA-TH16YRA11S 2-28		
					Independent	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30		
			Transistor 1.0A	With socket	Independent	FA-TH16YTR20S 2-31		
	QY41P (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TH16YRA11 2-26	FA-CBL**FM2V (Note 1) 2-31
					Independent	FA-TH16YRA20 2-27	FA-TH16YRA20 2-27	
				With socket	1-wire type	FA-TH16YRA11S 2-28	FA-TH16YRA11S 2-28	
					Independent	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30	
Combined	QH42P (Note 2) QX41Y41P (Note 2)	Input side	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TH16XRA20S 2-17	FA-CBL**FM2V (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20	FA-TH16X48D31L 2-20	
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21	FA-TH16X100D31L 2-21	
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	
		Output side	NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TH16YRA11 2-26	FA-CBL**FM2V (Note 1) 2-31
					Independent	FA-TH16YRA20 2-27	FA-TH16YRA20 2-27	
				With socket	1-wire type	FA-TH16YRA11S 2-28	FA-TH16YRA11S 2-28	
					Independent	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30	

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

MELSEC-Q Series Selection Chart 2

Programmable Controller ↔ Terminal Module + Conversion Module

- Connection example: Connector type I/O module ↔ Terminal module + DC I/O conversion module
  QY41P + FA-CBL10FM2V + FA-TH16YRA20S + FA-TB16XY



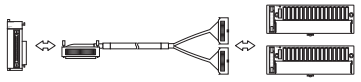
Input/ Output	Programmable controller module model		Module type			Module model 1	Conversion module model	Connection cable
Input	QX41 QX41-S1 QX41-S2 QX42 QX42-S1		24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19		
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20		
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21		
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23		
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25		
Output	QY41P (Note 2) QY42P (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 2-31
					Independent	FA-TH16YRA20 2-23		
				With socket	1-wire type	FA-TH16YRA11S 2-24		
					Independent	FA-TH16YRA20S 2-25 FA-TH16YRA20SL 2-26		
Combined	QH42P (Note 2) QX41Y41P (Note 2)	Input side	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19		
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20		
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21		
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23		
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25		
		Output side	NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TB16XY 1-13	FA-CBL**FM2V (Note 1) 2-31
				With socket	Independent	FA-TH16YRA20 2-27		
					1-wire type	FA-TH16YRA11S 2-28		
					Independent	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30		

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

MELSEC-L Series Selection Chart 1

Programmable Controller ↔ Terminal Module

- Connection example: Connector type I/O module ↔ Terminal module
  LY41NT1P + FA-CBL10FM2V + FA-TH16YRA20S × 2



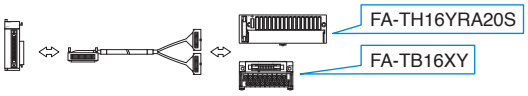
Input/ Output	Programmable controller module model		Module type			Module model 1		Module model 2		Connection cable
Input	LX41C4 LX42C4	Positive common dedicated	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S	2-17	FA-TH16XRA20S	2-17	FA-CBL**FM2V (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31	2-18	FA-TH16X24D31	2-18	
						FA-TH16X24D31L	2-19	FA-TH16X24D31L	2-19	
			48VDC 5mA		2-wire type	FA-TH16X48D31L	2-20	FA-TH16X48D31L	2-20	
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L	2-21	FA-TH16X100D31L	2-21	
			100VAC 8mA		2-wire type	FA-TH16X100A31	2-22	FA-TH16X100A31	2-22	
						FA-TH16X100A31L	2-23	FA-TH16X100A31L	2-23	
			200VAC 7.5mA		2-wire type	FA-TH16X200A31	2-24	FA-TH16X200A31	2-24	
						FA-TH16X200A31L	2-25	FA-TH16X200A31L	2-25	
Output	LY41NT1P (Note 2) LY42NT1P (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11	2-26	FA-TH16YRA11	2-26	FA-CBL**FM2V (Note 1) 2-31
					Independent	FA-TH16YRA20	2-27	FA-TH16YRA20	2-27	
				With socket	1-wire type	FA-TH16YRA11S	2-28	FA-TH16YRA11S	2-28	
					Independent	FA-TH16YRA20S	2-29	FA-TH16YRA20S	2-29	
						FA-TH16YRA20SL	2-30	FA-TH16YRA20SL	2-30	

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

MELSEC-L Series Selection Chart 2

Programmable Controller ↔ Terminal Module + Conversion Module

- Connection example: Terminal module ↔ DC I/O conversion module
  LY41NTP + FA-CBL10FM2V + FA-TH16YRA20S + FA-TB16XY



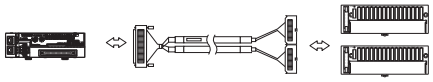
Input/ Output	Programmable controller module model		Module type			Module model 1		Conversion module model		Connection cable
Input	LX41C4 LX42C4	Positive common dedicated	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S	2-17	FA-TB16XY	1-13	FA-CBL**FM2V (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31	2-18			
						FA-TH16X24D31L	2-19			
			48VDC 5mA		2-wire type	FA-TH16X48D31L	2-20			
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L	2-21			
			100VAC 8mA		2-wire type	FA-TH16X100A31	2-22			
						FA-TH16X100A31L	2-23			
			200VAC 7.5mA		2-wire type	FA-TH16X200A31	2-24			
						FA-TH16X200A31L	2-25			
Output	LY41NT1P (Note 2) LY42NT1P (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11	2-26	FA-TB16XY	1-13	FA-CBL**FM2V (Note 1) 2-31
					Independent	FA-TH16YRA20	2-27			
				With socket	1-wire type	FA-TH16YRA11S	2-28			
					Independent	FA-TH16YRA20S	2-29			
						FA-TH16YRA20SL	2-30			

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.
Note 3: The module width is long. Use FA-CBL**FM2LV.

Mitsubishi Electric CC-Link IE Field Network Remote I/O Selection Chart 1

Remote I/O ↔ Terminal Module

- Connection example: Remote I/O module ↔ Terminal module
  NZ2GFCF1-32T + FA-CBL10FM2LH + FA-TH16YRA20S × 2



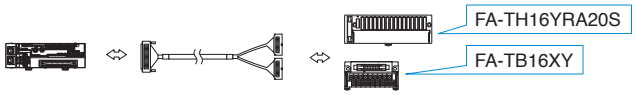
Input/ Output	Programmable controller module model		Module type			Module model 1	Module model 2	Connection cable
Input	NZ2GFCF1-32D	Positive common dedicated	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TH16XRA20S 2-17	FA-CBL**FM2H (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19	
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20	FA-TH16X48D31L 2-20	
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21	FA-TH16X100D31L 2-21	
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23	
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25	
Output	NZ2GFCF1-32T (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TH16YRA11 2-26	FA-CBL**FM2H (Note 1) 2-31
					Independent	FA-TH16YRA20 2-27	FA-TH16YRA20 2-27	
				With socket	1-wire type	FA-TH16YRA11S 2-28	FA-TH16YRA11S 2-28	
					Independent	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30	

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

Mitsubishi Electric CC-Link IE Field Network Remote I/O Selection Chart 2

Remote I/O ↔ Terminal Module + Conversion Module

- Connection example: Remote I/O module ↔ Terminal module + Conversion module
  NZ2GFCF1-32T + FA-CBL10FM2H + FA-TH16YRA20S + FA-TB16XY



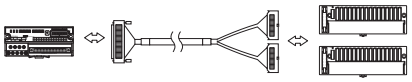
Input/ Output	Programmable controller module model		Module type			Module model 1	Conversion module model	Connection cable
Input	AJ65SBTCF1-32D AJ65BTC1-32D	Positive common dedicated	24VDC NO contact relay	With socket	Independent	FA-TH16XRA20S 2-17	FA-TB16XY 1-13	FA-CBL**FM2H (Note 1) 2-31
			24VDC 10mA		2-wire type	FA-TH16X24D31 2-18 FA-TH16X24D31L 2-19		
			48VDC 5mA		2-wire type	FA-TH16X48D31L 2-20		
			100VDC 2.5mA		2-wire type	FA-TH16X100D31L 2-21		
			100VAC 8mA		2-wire type	FA-TH16X100A31 2-22 FA-TH16X100A31L 2-23		
			200VAC 7.5mA		2-wire type	FA-TH16X200A31 2-24 FA-TH16X200A31L 2-25		
Output	AJ65SBTCF1-32T (Note 2) AJ65BTC1-32T (Note 2)		NO contact relay		1-wire type	FA-TH16YRA11 2-26	FA-TB16XY 1-13	FA-CBL**FM2H (Note 1) 2-31
					Independent	FA-TH16YRA20 2-27		
				With socket	1-wire type	FA-TH16YRA11S 2-28		
					Independent	FA-TH16YRA20S 2-29 FA-TH16YRA20SL 2-30		

Note 1: For two connected modules, use the same power supply.
Note 2: For use with 24VDC only.

Mitsubishi Electric CC-Link Remote I/O Selection Chart 1

Remote I/O ↔ Terminal Module

- Connection example: Remote I/O module ↔ Terminal module
  AJ65SBTCF1-32T + FA-CBL10FM2H + FA-TH16YRA20S × 2



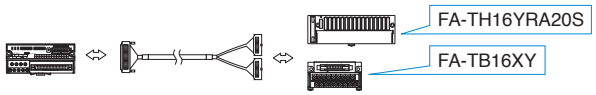
Input/ Output	Programmable controller module model		Conversion module type			Conversion module model 1	Conversion module model 2	Connection cable
Input	AJ65SBTCF1-32D AJ65BTC1-32D	Positive common dedicated	24VDC NO contact relay	With socket	Independent	**FA-TH16XRA20S** 2-17	**FA-TH16XRA20S** 2-17	**FA-CBL**FM2H** (Note 1) 2-31
Output	AJ65SBTCF1-32T AJ65BTC1-32T	(Note 2) (Note 2)	NO contact relay	With socket	1-wire type	**FA-TH16YRA11S** 2-28	**FA-TH16YRA11S** 2-28	**FA-CBL**FM2H** (Note 1) 2-31
					Independent	**FA-TH16YRA20S** 2-29	**FA-TH16YRA20S** 2-29	

Note 1: Use the same power supply for two connected modules.
Note 2: For use with 24VDC only.

Mitsubishi Electric CC-Link Remote I/O Selection Chart 2

Remote I/O ↔ Terminal Module + Conversion Module

- Connection example: Remote I/O module ↔ Terminal module + DC I/O conversion module
  AJ65SBTCF1-32T + FA-CBL10FM2H + FA-TH16YRA20S + FA-TB16XY



Input/ Output	Programmable controller module model		Conversion module type			Conversion module model 1	Conversion module model 2	Connection cable
Input	AJ65SBTCF1-32D AJ65BTC1-32D	Positive common dedicated	24VDC NO contact relay	With socket	Independent	**FA-TH16XRA20S** 2-17	**FA-TB16XY** 1-13	**FA-CBL**FM2H** (Note 1) 2-31
Output	AJ65SBTCF1-32T AJ65BTC1-32T	(Note 2) (Note 2)	NO contact relay	With socket	1-wire type	**FA-TH16YRA11S** 2-28	**FA-TB16XY** 1-13	**FA-CBL**FM2H** (Note 1) 2-31
					Independent	**FA-TH16YRA20S** 2-29		

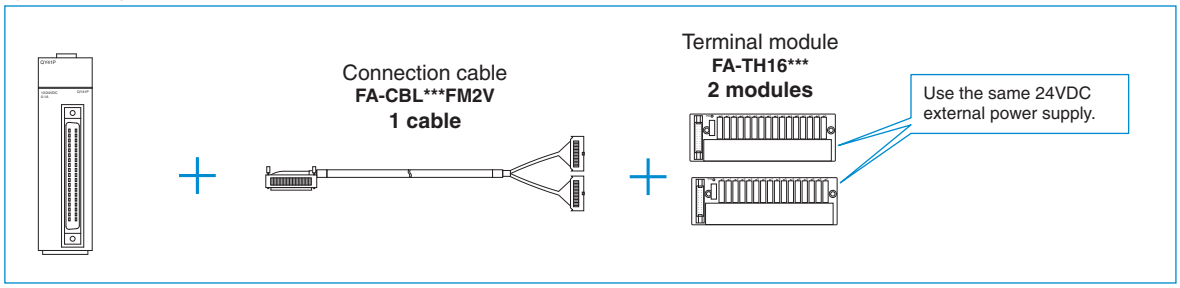
Note 1: Use the same power supply for two connected modules.
Note 2: For use with 24VDC only.

Terminal Module Selection Tips

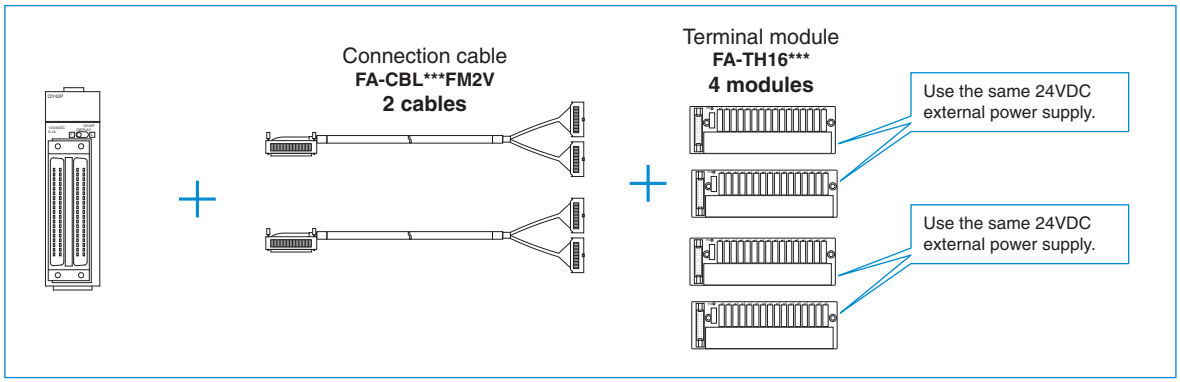
Number of cable(s) and modules used based on the number of I/O points

- The terminal module is a 16-point module. The number of modules used varies according to the number of MELSEC I/O module points used.

1) With a 32-point I/O module



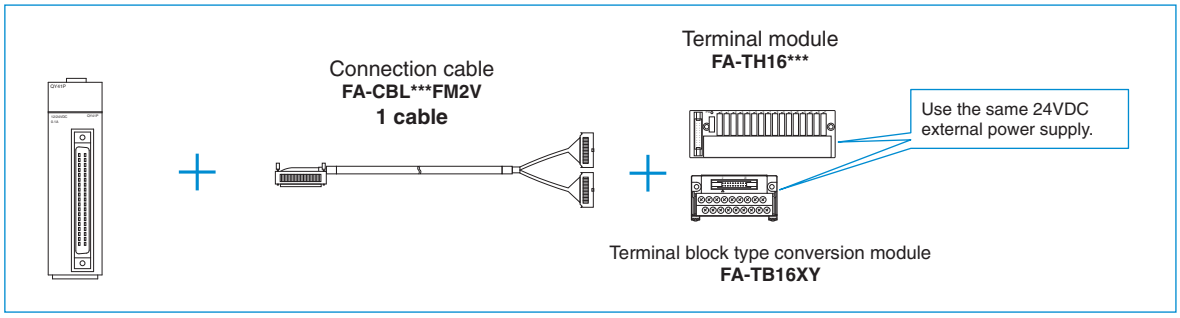
2) With a 64-point I/O module



Using a terminal module and a DC I/O conversion module together

- The terminal module is a 16-point module, allowing you to use the module together with a 16-point DC I/O conversion module.

1) When a terminal module and a terminal block type conversion module are used together in a 32-point I/O module



Precautions when using a 24VDC NO contact relay input module

1) Relay switching frequency

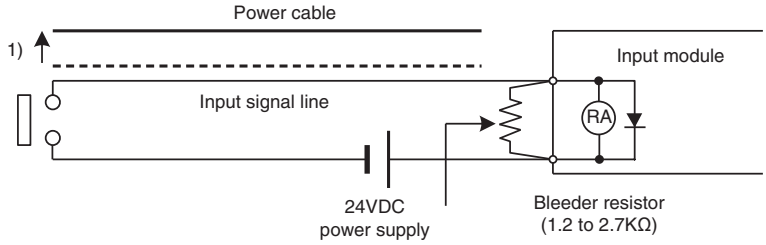
Use the module with a maximum input signal switching frequency of one-second or longer ON, and one-second or longer OFF.

2) Input line surge / induced voltage

Do not install the 24VDC input signal line together with the main circuit lines, power cables, or the like, or wire the 24VDC input signal line close to such wiring. As a general rule, keep a distance of 100mm or more between them.
Failure to do so may cause the input signal to turn ON when set to OFF, or not turn OFF when switched from ON to OFF due to the induced voltage from the main circuit or power cables.
Such wiring may also cause a high surge voltage to occur during ON ↔ OFF of the main circuit, power cables, etc., thereby damaging the diode inserted in parallel with the module relay.

Countermeasures

1) Arrange the input signal line far away from the main circuit, power cables, etc. (Do not make the input signal lines, main circuit, power cable, etc., the same cable or install the cables together.)
2) Insert a bleeder resistor in parallel with the input signal to lower the input impedance of the input signal.



・For the bleeder resistor, select a resistance value by starting from the large value and gradually decreasing it to find the value at which malfunction does not occur.

Precautions when using a relay output module

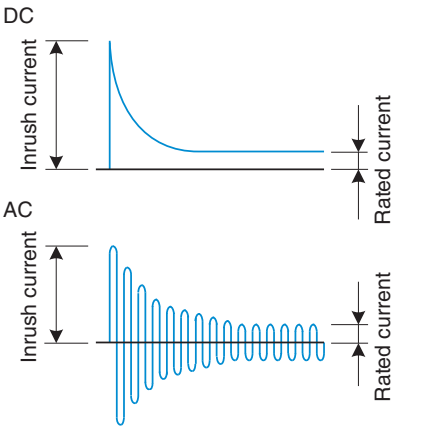
1) Relay switching frequency

Use the module with a maximum output signal switching frequency of one-second or longer ON, and one-second or longer OFF.

2) Relay contact locking

When the relay turns on while using any of the loads shown in the following table such as a timer or counter using a switching control AD/DC or DC/DC power supply and incandescent lamp, an inrush current may flow and cause contact welding, or a locking phenomenon may occur in the contact due to transition (where the contact remains ON and do not return to OFF).

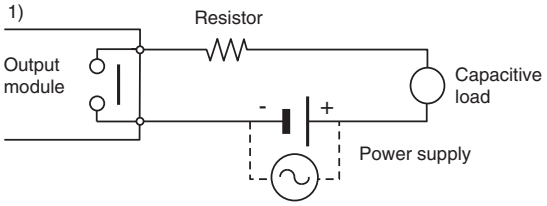
Load type	Inrush current / Rated current	Inrush current waveform
Resistance	1×	DC
Light bulb	Approx. 10× to 15×	
Capacitor (Note 1)	Approx. 20× to 50×	
Solenoid	Approx. 10× to 20×	
Electromagnetic contactor	Approx. 3× to 10×	AC
Fluorescent lamp	Approx. 5× to 15× (Note 2)	
Motor	Approx. 5× to 15×	
Transformer	Approx. 5× to 15×	
Mercury lamp	Approx. 3× (Note 2)	

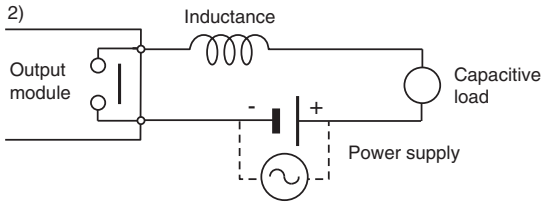


Note 1: The capacitor load includes the stray capacitance from capacitors and wiring, and the capacitive load of timers, counters, etc. (in which a switching control AC/DC or DC/DC power supply is used).
Note 2: With a discharge lamp such as a mercury lamp and fluorescent lamp, especially when it is of a high power factor type and its power supply impedance is low, a current 20 to 40 times greater may flow.

Countermeasures

1) Insert a resistor in series with the load.
2) Insert inductance in series with the load.



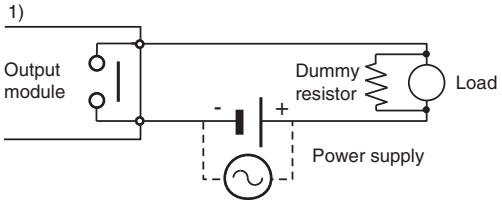


3) Switching of slight current load

When a slight current load (5VDC or less or 1mA or less) is switched by an output relay, the load may not turn ON even if the relay turns ON due to poor contact of the relay contact.

Countermeasures

1) Insert a dummy resistor in parallel with the load.



・Increase the load current at relay ON to prevent poor contact.

4) Service life of relay contact

With an output relay, when the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend using a transistor module or triac module.

The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.

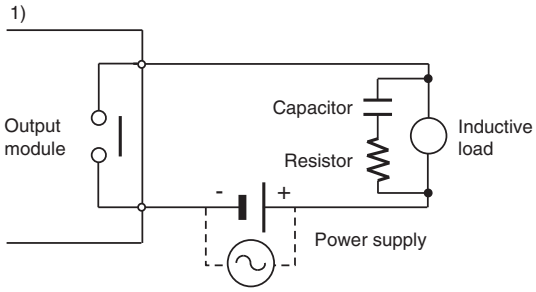
When an inductive load such as an electromagnetic contactor and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. If the switching current is high, the power factor is low, or a load whose time constant is high is connected, the life becomes short. Consideration is required in such a case.

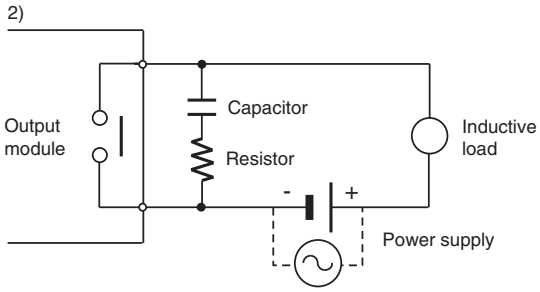
For inductive loads, we recommend using a protection circuit based on the surge absorbing circuit in the figure below.

Countermeasures

1) Insert a capacitor + resistor in parallel with the load (applicable to AC and DC loads).
2) Insert a capacitor + resistor in parallel with the contact (AC load: Note 1; applicable to DC loads).

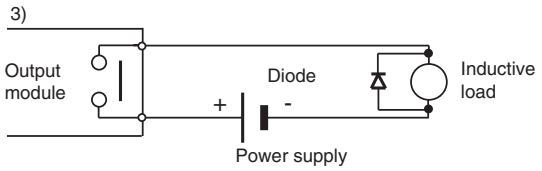
Note 1: For use with AC voltage, check that the load impedance is adequately smaller than the C and R impedance. (When the contact is OFF, a leakage current flows through C and R, causing the phenomenon of the load turning ON or the once turned-ON load not turning OFF.)





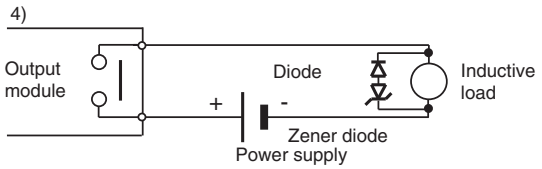
・The capacitor has the effect of suppressing an electrical discharge at contact OFF, and the resistor has the effect of limiting a current at contact ON.
・The guidelines for element selection are as described below. Note, however, that the values differ according to variances in load properties and characteristics. Check the values via experiments.
Capacitor: 0.5 to 1 (μF) for a contact current of 1A, Resistor: 0.5 to 1 (Ω) for a contact voltage of 1V
・Use a capacitor whose withstand voltage is 200 to 300V in general. For an AC circuit, use an AC capacitor without polarity.
・If the load is a relay or solenoid, the recovery time is delayed. Caution is required.

Countermeasures 3) Insert a diode in parallel with the load (applicable to DC loads).



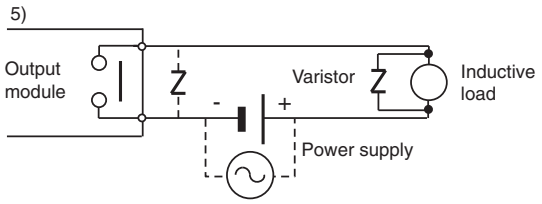
·When the contact turns OFF, the parallel diode causes the energy stored in the inductive load to flow to the load in the form of current, so that the energy is consumed by the resistance of the load as Joule heat.
·Use a diode whose reverse breakdown voltage is 10 times or more greater than the power supply voltage and whose forward current is equal to or greater than the load current.
·In this method, the recovery time delays more compared to the capacitor + resistor method.

Countermeasures 4) Insert a diode + Zener diode in parallel with the load (applicable to DC loads).



·This method is effective if used in cases in which the parallel diode in 3) results in excessive delay in the recovery time.
·Use a Zener diode whose Zener voltage is equal to or greater than the power supply voltage.

Countermeasures 5) Insert a varistor in parallel with the load or in parallel with the contact (applicable to AC or DC loads).

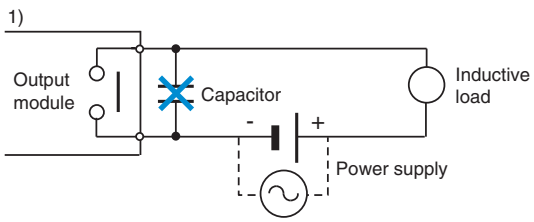


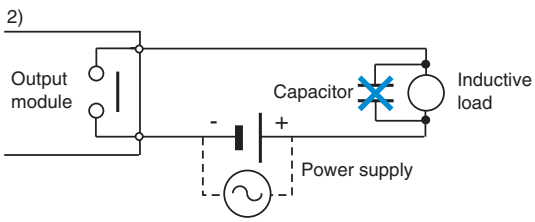
·Use the constant voltage characteristics of a varistor to ensure that a high voltage is not applied to the contact.
·Connection between the loads is effective when the power supply voltage is 24 to 48V, and connection between the contacts is effective when the power supply voltage is 100 to 200V.
·Select a varistor cut voltage Vc within the conditions described below. Note that the effect lessens when Vc is too high.
With a DC power supply: Vc > Power supply voltage × 1.5, With an AC power supply: Vc > Power supply voltage × $\sqrt{2}$ × 1.5
·If the load is a relay or solenoid, the recovery time is delayed to a certain extent.

5) Precautions

1) Avoid protection circuits that connect a capacitor in parallel with a contact.
Connecting a capacitor in parallel with a contact is extremely effective in arc extinction at the time of disconnection. However, because electric charge is stored when the contact is OFF and a short-circuit current of the capacitor flows when the contact turns ON, contact welding is likely to occur easily.

2) Avoid protection circuits that connect a capacitor in parallel with an inductive load.
Connecting a capacitor in parallel with an inductive load is extremely effective in arc extinction at the time of disconnection. However, because the charged current from the capacitor flows when the contact turns ON, contact welding is likely to occur easily.

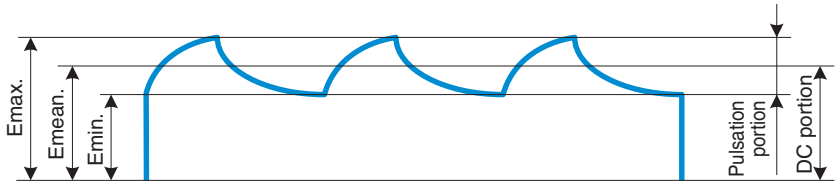




3) Install a protection circuit near the load or relay contact (module).
When the protection circuit is installed far away from the load or relay contact, the effect of the protection circuit cannot be adequately exhibited. As a rough distance, install the circuit within 50cm.

Precautions on DC power supply used for terminal module

1) For the DC power supply used for a terminal module, use a power supply with a ripple rate of 5% or less.



$$\text{Ripple rate \%} = \frac{\text{Emax.} - \text{Emin.}}{\text{Emean.}} \times 100\%$$

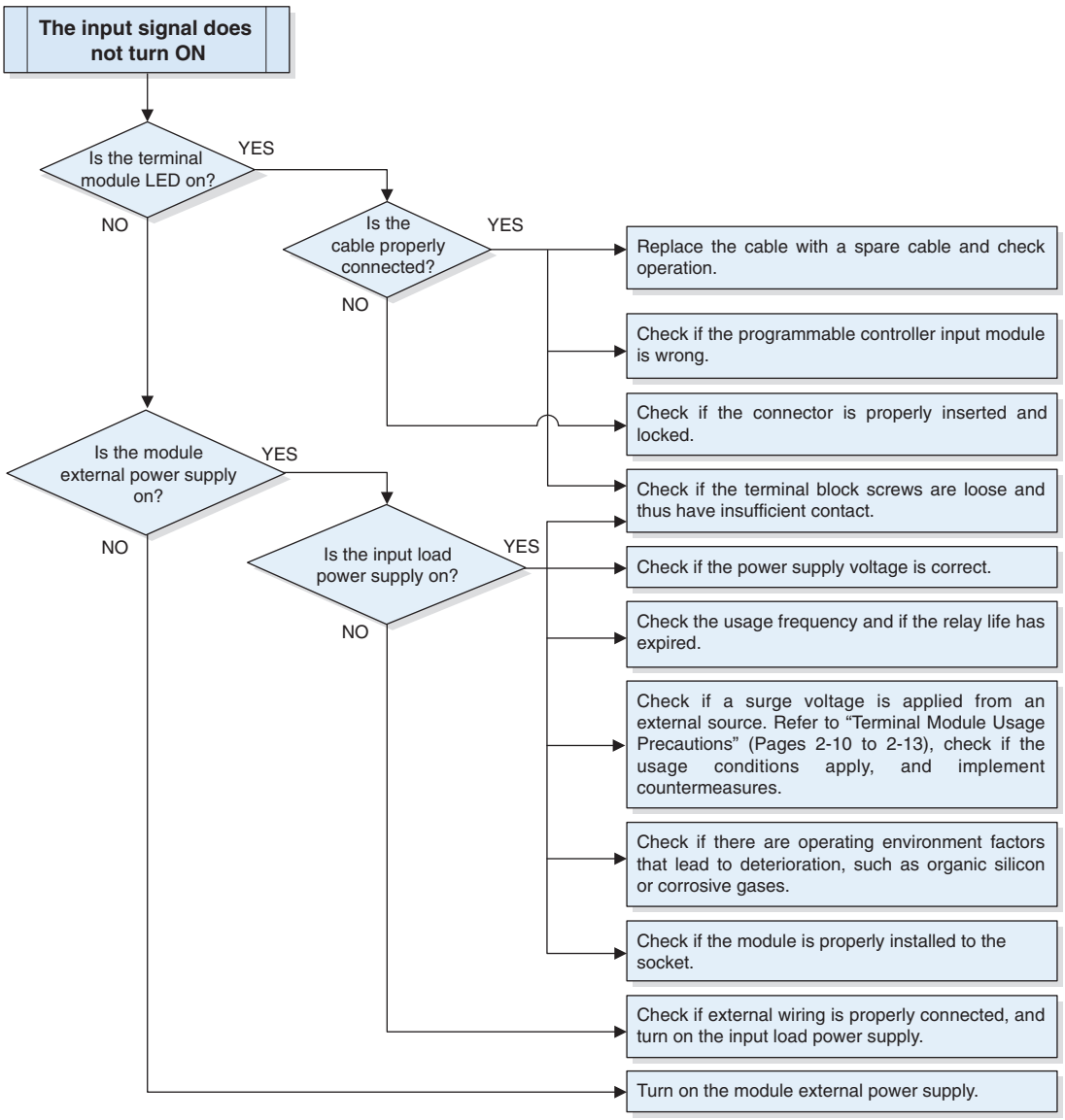
Emax. = Maximum value of pulsation portion
Emean. = Mean value of pulsation portion
Emin. = Minimum value of pulsation portion

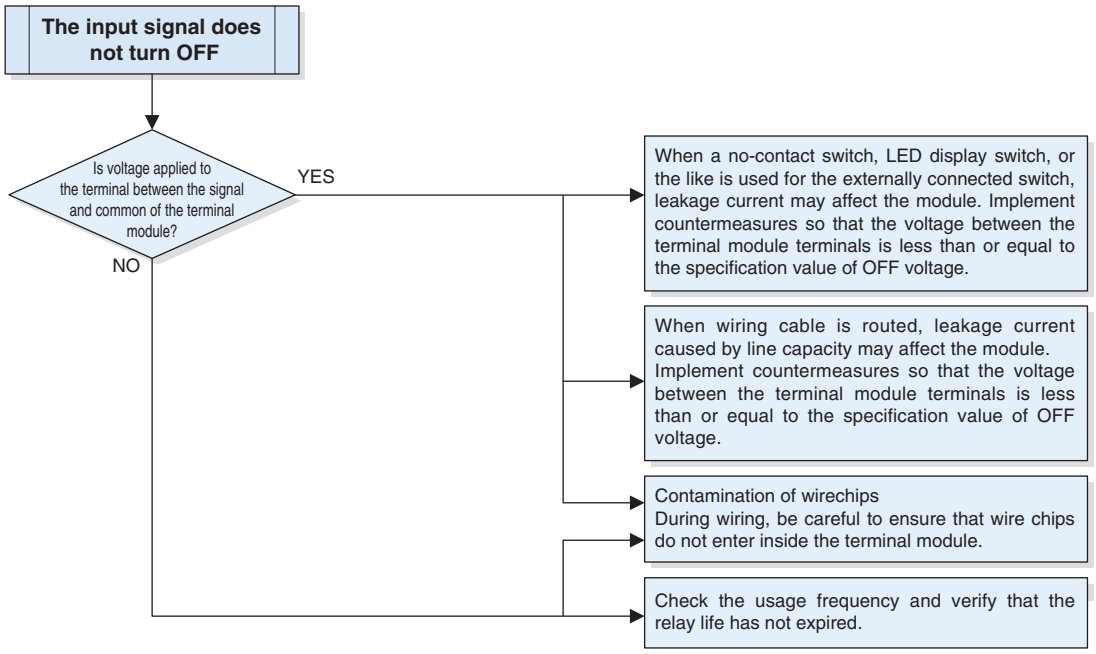
Precautions regarding AC power supply for terminal module

1) For an AC power supply used for a terminal module, use a power supply with a waveform distortion rate of 5% or less.

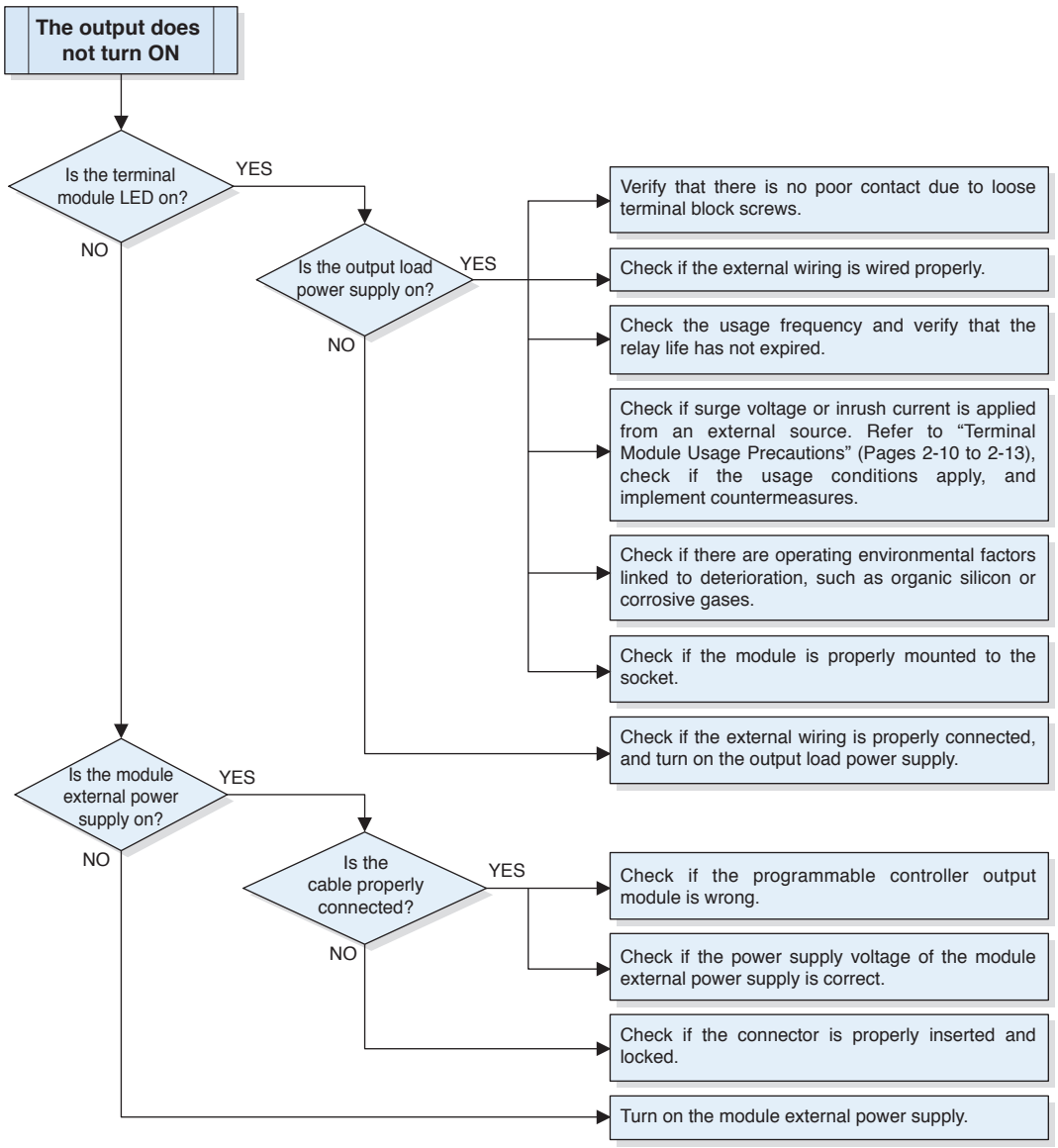
Troubleshooting

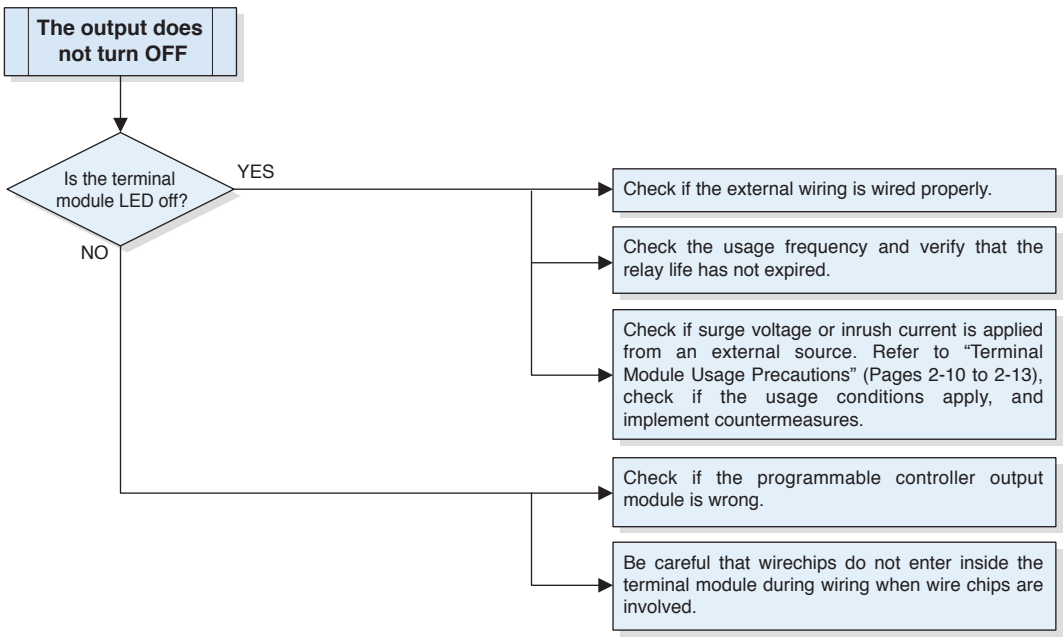
[Input type terminal module]





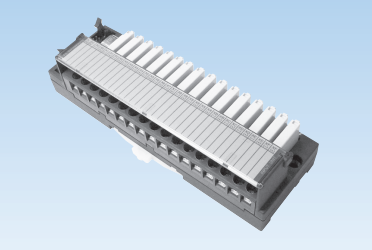
[Output type terminal module]





M3-screw 16-point 24VDC NO contact relay input (independent common; with sockets)

FA-TH16XRA20S



Features

■Due to its independent common features, the points can be used separately, such as 4 points/common.
■The module is provided with sockets, allowing single relay replacement.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

Related Products

Replacement Relay 2-32

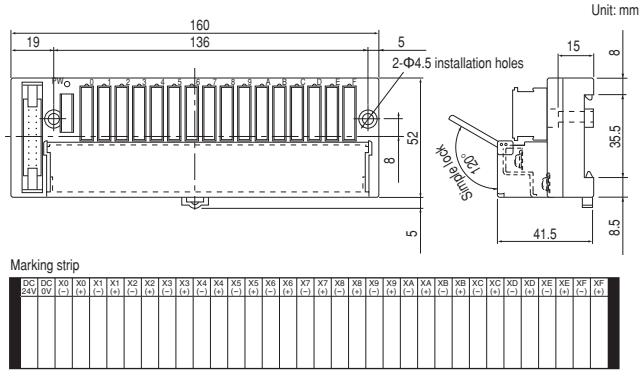
Applicable Standards

UL | cUL | CE

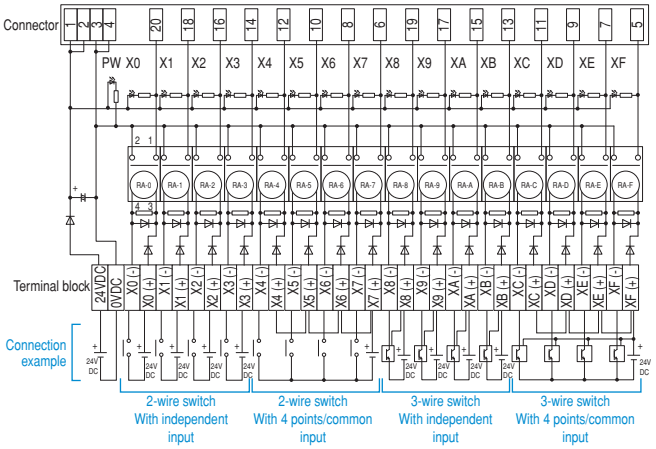
Specifications

Item		Specifications
Connected programmable controller		Positive common 24VDC input module
No. of points		16 points
Isolation method		Relay
Rated input voltage, current		Voltage: 24VDC, Current: Approx. 10mA (24VDC)
Operating voltage range		21.6 to 26.4VDC [24VDC ±10% (within a ripple of 5%)]
Maximum number of points simultaneously ON		100% (3-way installation)
ON voltage / ON current		19.2VDC or more / 8.1mA or more
OFF voltage / OFF current		2.4VDC or less / 1.0mA or less
Input impedance		Approx. 2.2kΩ
Response time	OFF→ON	10ms or less (excluding programmable controller response time)
	ON→OFF	12ms or less (excluding programmable controller response time)
Minimum switching load		24VDC 1mA or more
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF)
Mechanical life		20 million times or more
Electrical life		100,000 times or more at 24VDC, 100mA power conduction (contact side)
Wiring method for common		16-point independent common
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 10mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between each input, between external power supply and input ...2500VAC for 1 minute, 10MΩ or more
Noise resistance		Simulator noise 500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)
Operation display		LED on with power supply ON and input ON
Socket		Yes (relay replaceable)
No. of times module is replaced		50 times
Terminal block	Terminal screw	M3 spring-up screw, number of terminals: 34P, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 22mm or more, tightening torque range: 78 to 118N·cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Accessories		Relay extraction tool (mounted to relay)
Weight		Approx. 300g
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

External Dimension

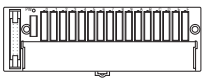


Wiring Diagram

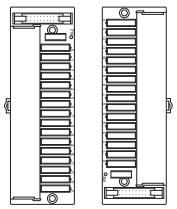


Module Installation Direction

Horizontal installation



Vertical installation

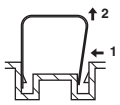


Note: Do not install the module in any direction other than the above.

How to Use the Extraction Tool

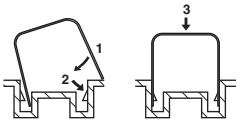
■Removing the extraction tool

Operate and remove the tool using your fingers.



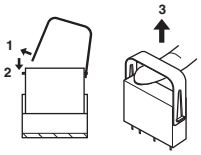
■Installing the extraction tool

Operate and install the tool using your fingers.



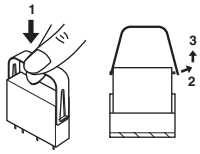
■Removing the relay from the socket

Insert the tool into the relay and pull using your fingers.



■Inserting the relay into the socket

Insert the tool, and then insert the relay into the socket.
After insertion, remove the tool from the relay.



*Insert the relay after first verifying that the relay feet are not bent.

M3-screw 16-point 24VDC photocoupler input (2-wire type, 16 points/common)

FA-TH16X24D31

Features

■Because the input current is 10mA, this module is designed to be immune to incorrect inputs caused by leakage current.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

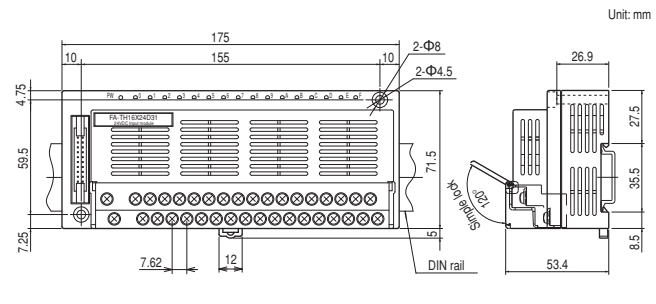
Applicable Standards

UL cUL CE

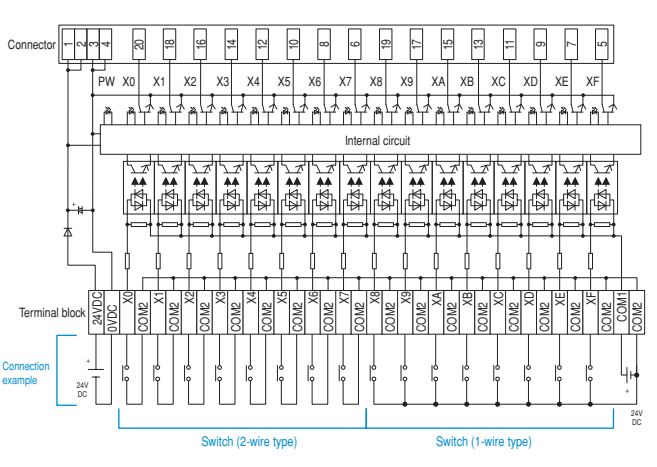
Specifications

Item		Specifications	
Connected programmable controller		Positive common 24VDC input module	
No. of points		16 points	
Isolation method		Photocoupler	
Rated input voltage, current		Voltage: 24VDC, Current: Approx. 10mA (24VDC)	
Operating voltage range		21.6 to 26.4VDC (24VDC ±10% [within a ripple of 5%])	
Maximum number of points simultaneously ON		100% (5-way installation)	
ON voltage / ON current		19VDC or more / 7.9mA or more	
OFF voltage / OFF current		8VDC or less / 3.3mA or less	
Input impedance		Approx. 2.2kΩ	
Response time	OFF→ON	10ms or less (excluding programmable controller response time)	
	ON→OFF	10ms or less (excluding programmable controller response time)	
Wiring method for common		16 points/common (2-wire type, WET type)	
External power supply		24VDC ±10% (within a ripple rate of 5%)	
Module current consumption		Approx. 27mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		560VACrms / 3 cycles (altitude: 2000m), 10MΩ or more	
Noise resistance		Simulator noise 500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)	
Operation display		LED on with power supply ON and input ON	
Terminal block	Terminal screw	M3 spring-up screw, number of terminals: 36P, 7.62-mm pitch	
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm	
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Weight		Approx. 310g	
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks.	

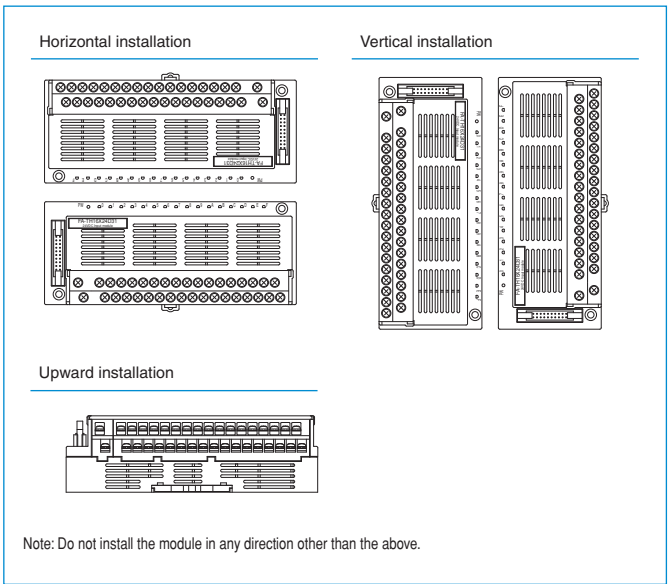
External Dimension



Wiring Diagram



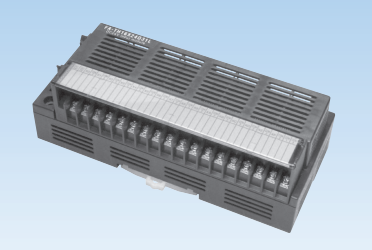
Module Installation Direction



Note: Do not install the module in any direction other than the above.

M3.5-screw 16-point 24VDC photocoupler input (2-wire type, 16 points/common)

FA-TH16X24D31L



Features

■Because the input current is 10mA, this module is designed to be immune to incorrect inputs caused by leakage current.
■Using M3.5 terminal screws, the module supports thick wires (with a wire diameter of 1.25 to 2mm²) used for wiring outside the panel.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3.5 8-mm Applicable Solderless Terminal 9-2

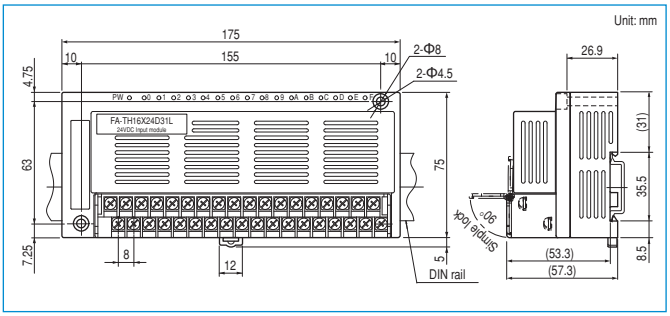
Applicable Standards

UL | cUL | CE

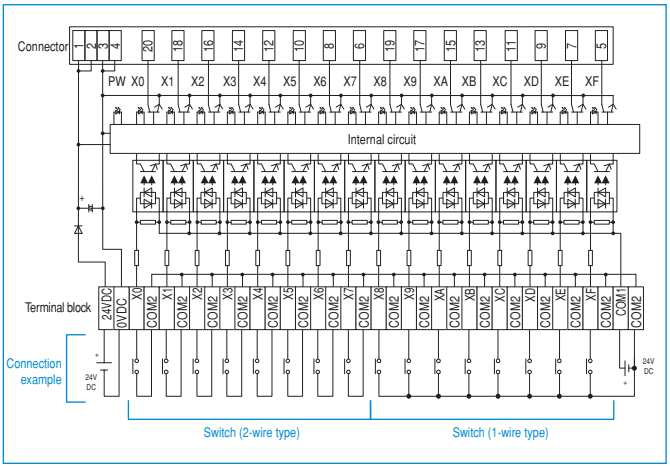
Specifications

Item		Specifications	
Connected programmable controller		Positive common 24VDC input module	
No. of points		16 points	
Isolation method		Photocoupler	
Rated input voltage, current		Voltage: 24VDC, Current: Approx. 10mA (24VDC)	
Operating voltage range		21.6 to 26.4VDC (24VDC ±10% [within a ripple of 5%])	
Maximum number of points simultaneously ON		100% (5-way installation)	
ON voltage / ON current		19VDC or more / 7.9mA or more	
OFF voltage / OFF current		8VDC or less / 3.3mA or less	
Input impedance		Approx. 2.2kΩ	
Response time	OFF→ON	10ms or less (excluding programmable controller response time)	
	ON→OFF	10ms or less (excluding programmable controller response time)	
Wiring method for common		16 points/common (2-wire type, WET type)	
External power supply		24VDC ±10% (within a ripple rate of 5%)	
Module current consumption		Approx. 27mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		560VACrms / 3 cycles (altitude: 2000m), 10MΩ or more	
Noise resistance		Simulator noise 500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)	
Operation display		LED on with power supply ON and input ON	
Terminal block	Terminal screw	M3.5 screw, number of terminals: 36P, 8.0-mm pitch	
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 68 to 92N·cm	
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Weight		Approx. 310g	
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.	

External Dimension

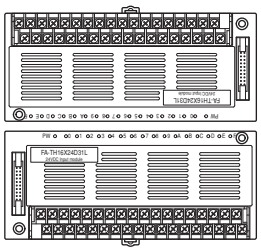


Wiring Diagram

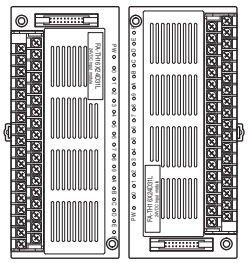


Module Installation Direction

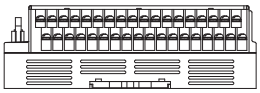
Horizontal installation



Vertical installation



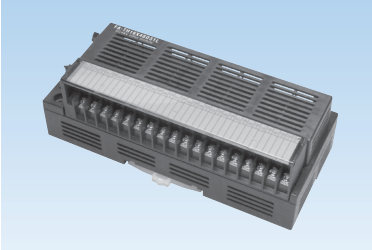
Upward installation



Note: Do not install the module in any direction other than the above.

M3.5-screw 16-point 48VDC photocoupler input (2-wire type, 16 points/common)

FA-TH16X48D31L



Features

- With a MELSEC 24VDC input module, 48VDC inputs can be made.
- When a 64-point input module is used, 48VDC inputs for a maximum of 64 points can be made per one slot.
- Using M3.5 terminal screws, the module supports thick wires (with a wire diameter of 1.25 to 2mm²) used for wiring outside the panel.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3.5 8-mm Applicable Solderless Terminal 9-2

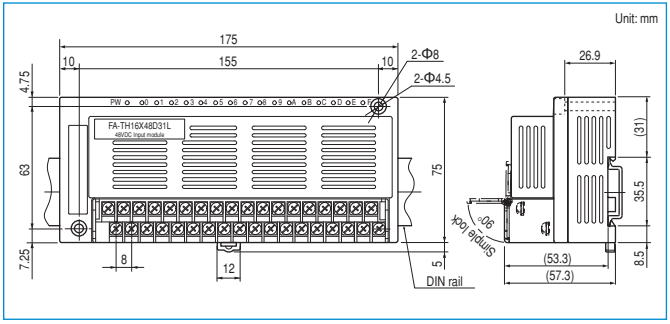
Applicable Standards

UL cUL CE

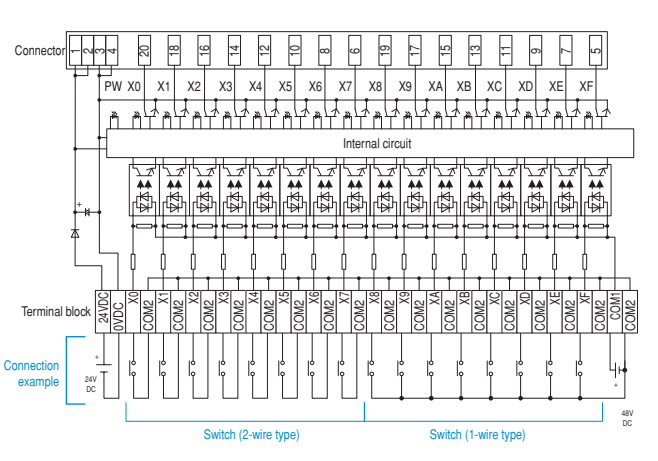
Specifications

Item		Specifications	
Connected programmable controller		Positive common 24VDC input module	
No. of points		16 points	
Isolation method		Photocoupler	
Rated input voltage, current		Voltage: 48VDC, Current: Approx. 5mA (48VDC)	
Operating voltage range		43.2 to 52.8VDC (48VDC ±10% [within a ripple of 5%])	
Maximum number of points simultaneously ON		Depending on the installation direction (Refer to the derating chart.)	
ON voltage / ON current		34VDC or more / 4.0mA or more	
OFF voltage / OFF current		10VDC or less / 1.0mA or less	
Input impedance		Approx. 8.5kΩ	
Response time	OFF→ON	10ms or less (excluding programmable controller response time)	
	ON→OFF	10ms or less (excluding programmable controller response time)	
Wiring method for common		16 points/common (2-wire type, WET type)	
External power supply		24VDC ±10% (within a ripple rate of 5%)	
Module current consumption		Approx. 27mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		560VACrms / 3 cycles (altitude: 2000m), 10MΩ or more	
Noise resistance		Simulator noise 500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)	
Operation display		LED on with power supply ON and input ON	
Terminal block	Terminal screw	M3.5 screw, number of terminals: 36P, 8.0-mm pitch	
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 68 to 92N·cm	
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Weight		Approx. 310g	
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.	

External Dimension

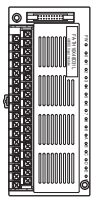


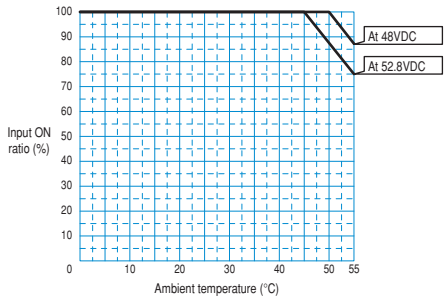
Wiring Diagram

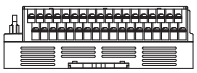


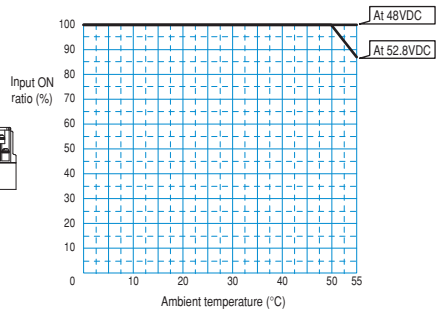
Derating Chart

- In any of the following installation directions, restrictions occur on the number of points simultaneously ON.





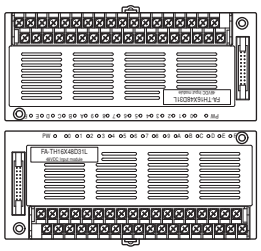




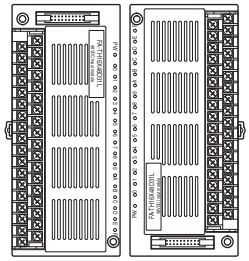
- Derating does not occur in any installation direction other than the above.

Module Installation Direction

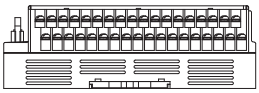
Horizontal installation



Vertical installation



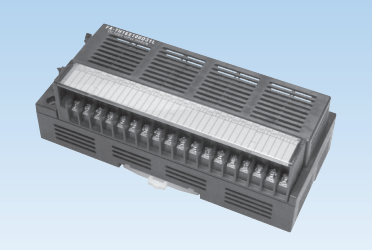
Upward installation



Note: Do not install the module in any direction other than the above.

M3.5-screw 16-point 100VDC photocoupler input (2-wire type, 16 points/common)

FA-TH16X100D31L



Features

- With a MELSEC 24VDC input module, 100VDC inputs can be made.
- When a 64-point input module is used, 100VDC inputs for a maximum of 64 points can be made per one slot.
- Using M3.5 terminal screws, the module supports thick wires (with a wire diameter of 1.25 to 2mm²) used for wiring outside the panel.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3.5 8-mm Applicable Solderless Terminal 9-2

Applicable Standards

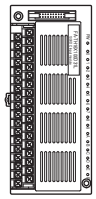
UL | cUL | CE

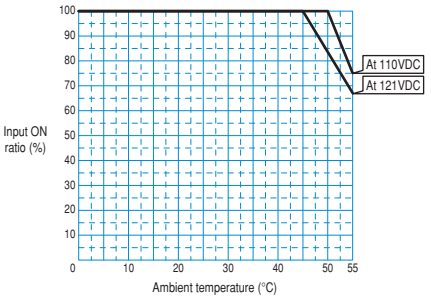
Specifications

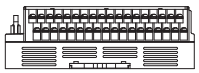
Item		Specifications	
Connected programmable controller		Positive common 24VDC input module	
No. of points		16 points	
Isolation method		Photocoupler	
Rated input voltage, current		Voltage: 100/110VDC, Current: Approx. 2.5mA (100VDC)	
Operating voltage range		90 to 121VDC (100/110VDC ±10% [within a ripple of 5%])	
Maximum number of points simultaneously ON		Depending on the installation direction (Refer to the derating chart.)	
ON voltage / ON current		80VDC or more / 2.2mA or more	
OFF voltage / OFF current		20VDC or less / 0.5mA or less	
Input impedance		Approx. 37kΩ	
Response time	OFF→ON	10ms or less (excluding programmable controller response time)	
	ON→OFF	10ms or less (excluding programmable controller response time)	
Wiring method for common		16 points/common (2-wire type, WET type)	
External power supply		24VDC ±10% (within a ripple rate of 5%)	
Module current consumption		Approx. 27mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulationresistance		1780VACrms / 3 cycles (altitude: 2000m), 10MΩ or more	
Noise resistance		Simulator noise 500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)	
Operation display		LED on with power supply ON and input ON	
Terminal block		Terminal screw	M3.5 screw, number of terminals: 36P, 8.0-mm pitch
		Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 68 to 92N·cm
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Weight		Approx. 320g	
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.	

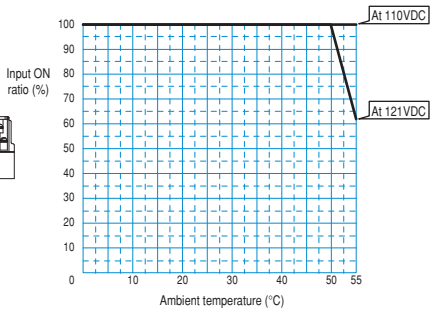
Derating Chart

■In any of the following installation directions, restrictions occur on the number of points simultaneously ON.



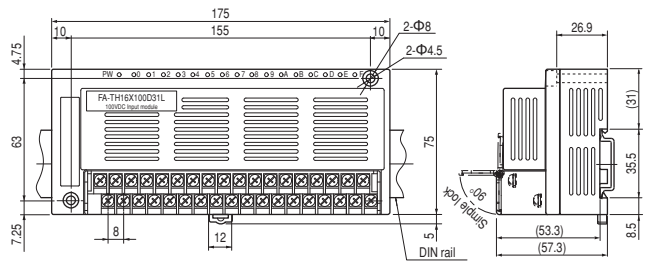




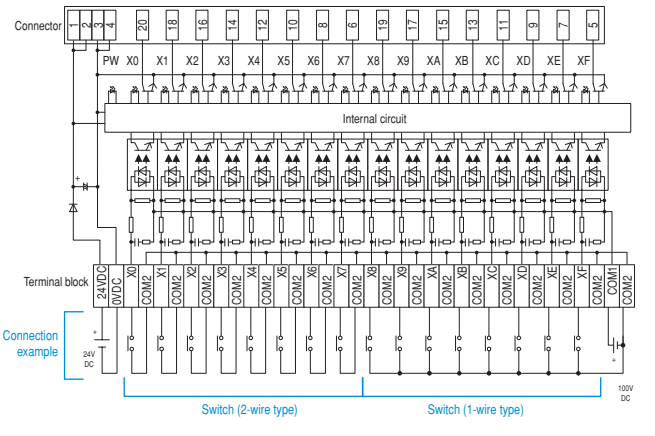


■Derating does not occur in any installation direction other than the above.

External Dimension

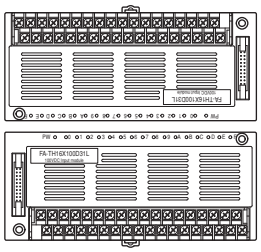


Wiring Diagram

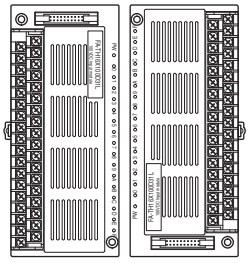


Module Installation Direction

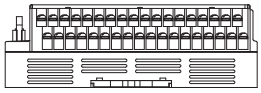
Horizontal installation



Vertical installation



Upward installation



Note: Do not install the module in any direction other than the above.

M3-screw 16-point 100VAC photocoupler input (2-wire type, 16 points/common)

FA-TH16X100A31

Features

- With a MELSEC 24VDC input module, 100VAC inputs can be made.
- When a 64-point input module is used, 100VAC inputs for a maximum of 64 points can be made per one slot.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

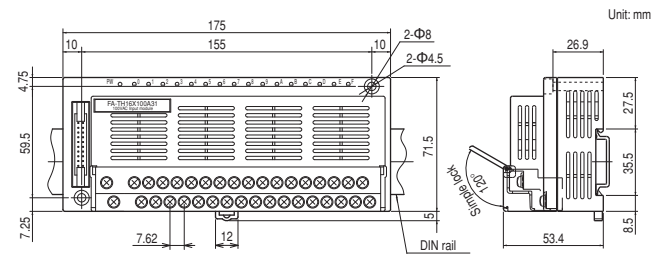
Applicable Standards

UL | cUL | CE

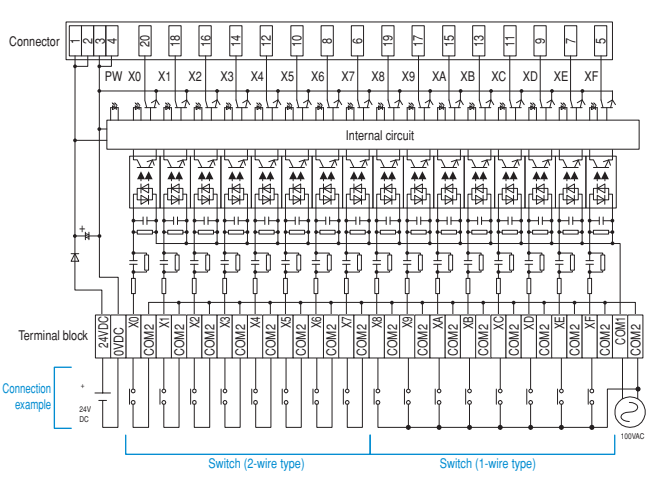
Specifications

Item		Specifications	
Connected programmable controller		Positive common 24VDC input module	
No. of points		16 points	
Isolation method		Photocoupler	
Rated input voltage, current		Voltage: 100 to 110VAC (50/60Hz) Current: Approx. 8mA (100VAC, 60Hz). Approx. 7mA (100VAC, 50Hz)	
Operating voltage range		85 to 132VAC (50/60Hz ±3Hz [within a distortion rate of 5%])	
Maximum number of points simultaneously ON		100% (5-way installation)	
ON voltage / ON current		80VAC or more / 5mA or more (50Hz, 60Hz)	
OFF voltage / OFF current		30VAC or less / 1.7mA or less (50Hz, 60Hz)	
Inrush current		Maximum 200mA 1ms or less (132VAC)	
Input impedance		Approx. 12kΩ (60Hz), Approx. 15kΩ (50Hz)	
Response time	OFF→ON	15ms or less (100VAC, 60Hz) (excluding programmable controller response time)	
	ON→OFF	35ms or less (100VAC, 60Hz) (excluding programmable controller response time)	
Wiring method for common		16 points/common (2-wire type, WET type)	
External power supply		24VDC ±10% (within a ripple rate of 5%)	
Module current consumption		Approx. 25mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		1780VACrms / 3 cycles (altitude: 2000m), 10MΩ or more	
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)	
Operation display		LED on with power supply ON and input ON	
Terminal block		Terminal screw	M3 spring-up screw, number of terminals: 36P, 7.62-mm pitch
		Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Weight		Approx. 310g	
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.	

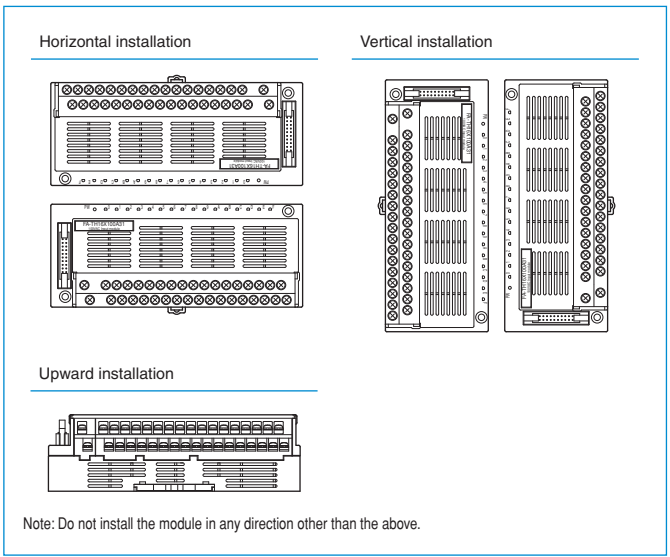
External Dimension



Wiring Diagram



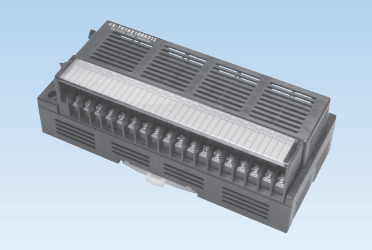
Module Installation Direction



Note: Do not install the module in any direction other than the above.

M3.5-screw 16-point 100VAC photocoupler input (2-wire type, 16 points/common)

FA-TH16X100A31L



Features

- With a MELSEC 24VDC input module, 100VAC inputs can be made.
- When a 64-point input module is used, 100VAC inputs for a maximum of 64 points can be made per one slot.
- Using M3.5 terminal screws, the module supports thick wires (with a wire diameter of 1.25 to 2mm²) used for wiring outside the panel.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3.5 8-mm Applicable Solderless Terminal 9-2

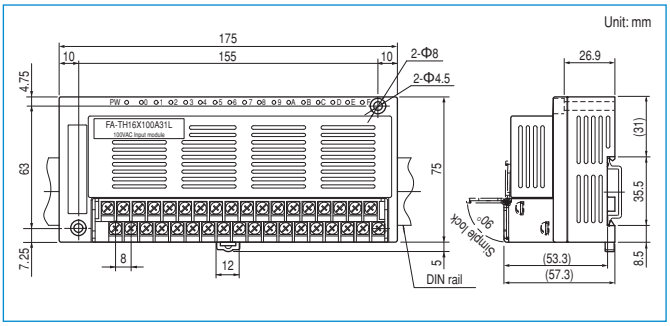
Applicable Standards

UL | cUL | CE

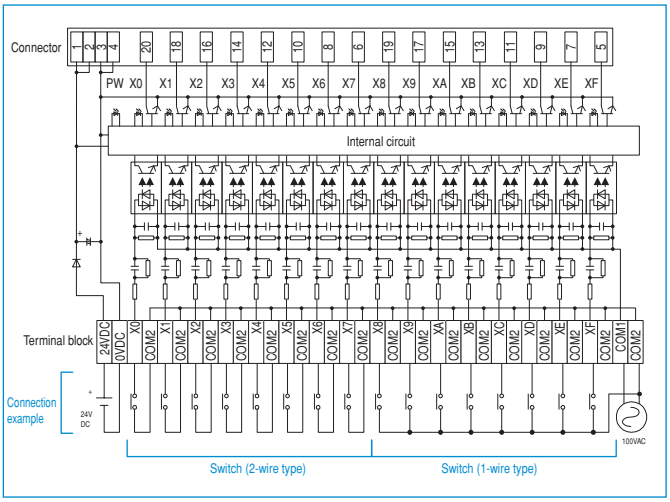
Specifications

Item		Specifications	
Connected programmable controller		Positive common 24VDC input module	
No. of points		16 points	
Isolation method		Photocoupler	
Rated input voltage, current		Voltage: 100 to 110VAC (50/60Hz) Current: Approx. 8mA (100VAC, 60Hz). Approx. 7mA (100VAC, 50Hz)	
Operating voltage range		85 to 132VAC (50/60Hz ±3Hz [within a distortion rate of 5%])	
Maximum number of points simultaneously ON		100% (5-way installation)	
ON voltage / ON current		80VAC or more / 5mA or more (50Hz, 60Hz)	
OFF voltage / OFF current		30VAC or less / 1.7mA or less (50Hz, 60Hz)	
Inrush current		Maximum 200mA 1ms or less (132VAC)	
Input impedance		Approx. 12kΩ(60Hz), Approx. 15kΩ (50Hz)	
Response time	OFF→ON	15ms or less (100VAC, 60Hz) (excluding programmable controller response time)	
	ON→OFF	35ms or less (100VAC, 60Hz) (excluding programmable controller response time)	
Wiring method for common		16 points/common (2-wire type, WET type)	
External power supply		24VDC ±10% (within a ripple rate of 5%)	
Module current consumption		Approx. 25mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		1780VACrms / 3 cycles (altitude: 2000m), 10MΩ or more	
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)	
Operation display		LED on with power supply ON and input ON	
Terminal block	Terminal screw	M3.5 screw, number of terminals: 36P, 8.0-mm pitch	
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 68 to 92N·cm	
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Weight		Approx. 320g	
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.	

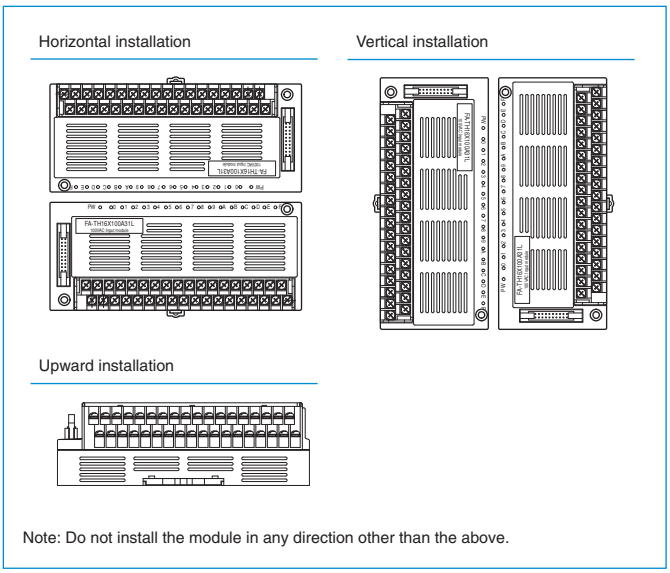
External Dimension



Wiring Diagram



Module Installation Direction



Note: Do not install the module in any direction other than the above.

M3-screw 16-point 200VAC photocoupler input (2-wire type, 16 points/common)

FA-TH16X200A31

Features

- With a MELSEC 24VDC input module, 200VAC inputs can be made.
- When a 64-point input module is used, 200VAC inputs for a maximum of 64 points can be made per one slot.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

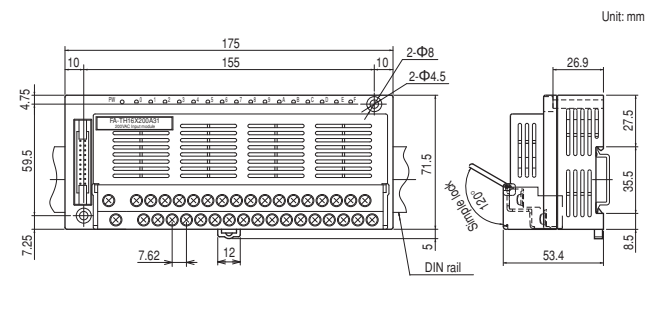
Applicable Standards

UL | cUL | CE

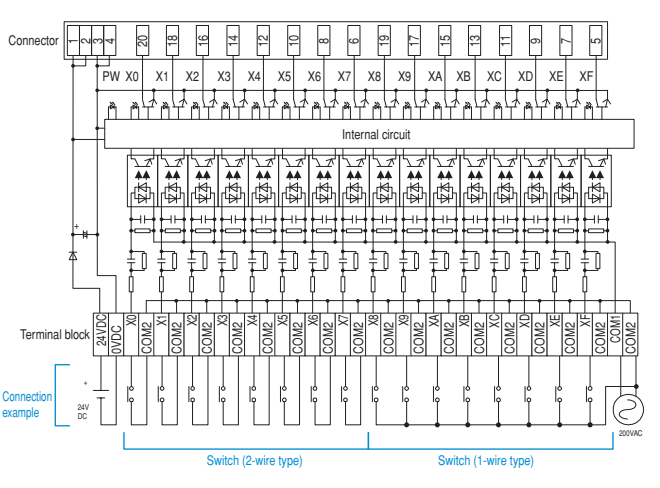
Specifications

Item		Specifications
Connected programmable controller		Positive common 24VDC input module
No. of points		16 points
Isolation method		Photocoupler
Rated input voltage, current		Voltage: 200 to 220VAC (50/60Hz) Current: Approx. 7.5mA (200VAC, 60Hz). Approx. 6mA (200VAC, 50Hz)
Operating voltage range		170 to 264VAC (50/60Hz ±3Hz [within a distortion rate of 5%])
Maximum number of points simultaneously ON		100% (5-way installation)
ON voltage / ON current		160VAC or more / 4.8mA or more (50Hz, 60Hz)
OFF voltage / OFF current		60VAC or less / 2.3mA or less (50Hz, 60Hz)
Inrush current		Maximum 500mA 1ms or less (264VAC)
Input impedance		Approx. 27kΩ (60Hz), Approx. 32kΩ (50Hz)
Response time	OFF→ON	15ms or less (200VAC, 60Hz) (excluding programmable controller response time)
	ON→OFF	35ms or less (200VAC, 60Hz) (excluding programmable controller response time)
Wiring method for common		16 points/common (2-wire type, WET type)
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 25mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		2830VACrms / 3 cycles (altitude: 2000m), 10MΩ or more
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)
Operation display		LED on with power supply ON and input ON
Terminal block	Terminal screw	M3 spring-up screw, number of terminals: 36P, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Weight		Approx. 320g
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

External Dimension

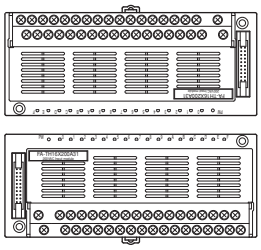


Wiring Diagram

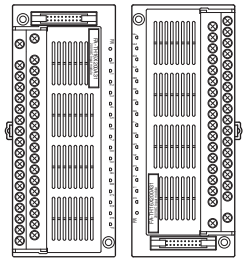


Module Installation Direction

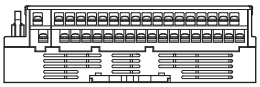
Horizontal installation



Vertical installation



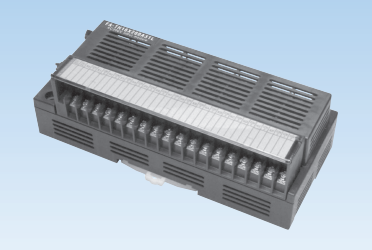
Upward installation



Note: Do not install the module in any direction other than the above.

M3.5-screw 16-point 200VAC photocoupler input (2-wire type, 16 points/common)

FA-TH16X200A31L



Features

- With a MELSEC 24VDC input module, 200VAC inputs can be made.
- When a 64-point input module is used, 200VAC inputs for a maximum of 64 points can be made per one slot.
- Using M3.5 terminal screws, the module supports thick wires (with a wire diameter of 1.25 to 2mm²) used for wiring outside the panel.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10
General Specifications 9-1 | M3.5 8-mm Applicable Solderless Terminal 9-2

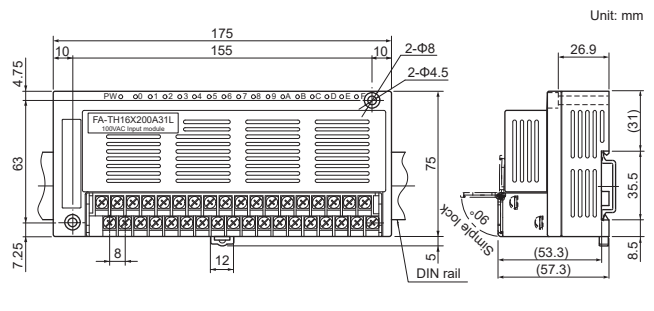
Applicable Standards

UL | cUL | CE

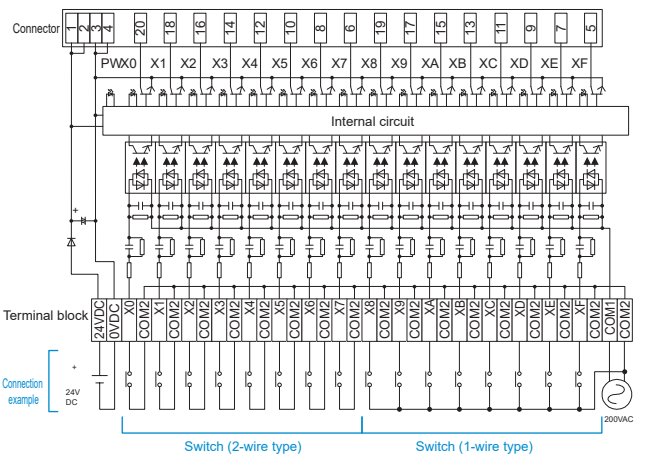
Specifications

Item		Specifications	
Connected programmable controller		Positive common 24VDC input module	
No. of points		16 points	
Isolation method		Photocoupler	
Rated input voltage, current		Voltage: 200 to 220VAC (50/60Hz) Current: Approx. 7.5mA (200VAC, 60Hz). Approx. 6mA (200VAC, 50Hz)	
Operating voltagerange		170 to 264VAC (50/60Hz ±3Hz [within a distortion rate of 5%])	
Maximum number of points simultaneously ON		100% (5-way installation)	
ON voltage / ON current		160VAC or more / 4.8mA or more (50Hz, 60Hz)	
OFF voltage / OFF current		60VAC or less / 2.3mA or less (50Hz, 60Hz)	
Inrush current		Maximum 500mA 1ms or less (264VAC)	
Input impedance		Approx. 27kΩ (60Hz), Approx. 32kΩ (50Hz)	
Response time	OFF→ON	15ms or less (200VAC, 60Hz) (excluding programmable controller response time)	
	ON→OFF	35ms or less (200VAC, 60Hz) (excluding programmable controller response time)	
Wiring method for common		16 points/common (2-wire type, WET type)	
External power supply		24VDC ±10% (within a ripple rate of 5%)	
Module current consumption		Approx. 25mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		2830VACrms / 3 cycles (altitude: 2000m), 10MΩ or more	
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)	
Operation display		LED on with power supply ON and input ON	
Terminal block	Terminal screw	M3.5 screw, number of terminals: 36P, 8.0-mm pitch	
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 68 to 92N·cm	
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Weight		Approx. 330g	
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.	

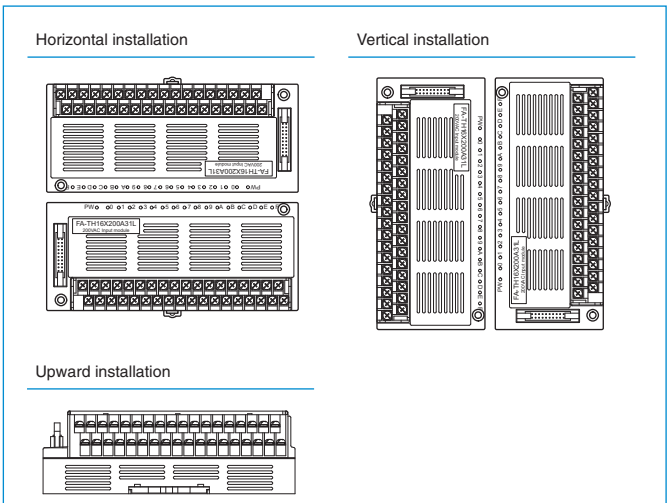
External Dimension



Wiring Diagram



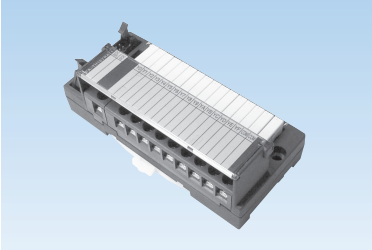
Module Installation Direction



Note: Do not install the module in any direction other than the above.

M3-screw 16-point NO contact relay output (1-wire type, 16 points/common)

FA-TH16YRA11



Features

■This module converts the input from the MELSEC sink-type transistor output module to NO contact relay output.
■When a 64-point output module is used, output conversion for a maximum of 64 points can be made per one slot.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10 to 2-12
General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

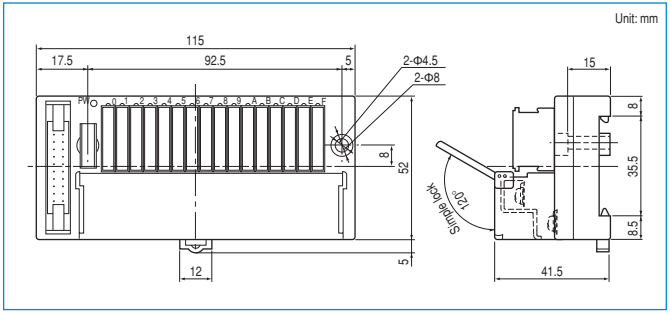
Applicable Standards

UL cUL CE

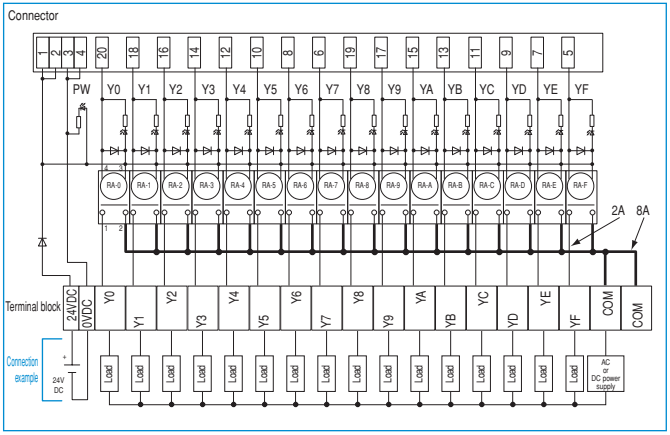
Specifications

Item		Specifications	
Connected programmable controller		Sink-type 24VDC transistor output module	
No. of points		16 points	
Isolation method		Relay	
Rated switching voltage, current		Voltage: 24VDC, 200VAC, Current: 2A/point (resistance load, COSΦ=1), 8A/common	
Maximum number of points simultaneously ON		100%	
Minimum switching load		5VDC 1mA	
Maximum switching load		270VAC, 150VDC	
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF)	
Mechanical life		20 million times or more	
Electrical life		100,000 times or more at rated switching voltage/current	
		100,000 times or more at 200VAC 1.5A (COSΦ=0.7), 240VAC 1A (COSΦ=0.7)	
		100,000 times or more at 200VAC 1A (COSΦ=0.35)	
		100,000 times or more at 24VDC 1A (L/R=7ms), 100VDC 0.1A (L/R=7ms)	
Response time	OFF→ON	10ms or less (excluding programmable controller response time)	
	ON→OFF	12ms or less (excluding programmable controller response time)	
Wiring method for common		16 points/common (1-wire type)	
External power supply		24VDC ±10% (within a ripple rate of 5%)	
Module current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		Between input-output: 2500VAC for 1 minute, between contacts: 750VA for 1 minute, 10MΩ or more	
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)	
Operation display		LED on with power supply ON and input ON	
Socket		No (module irreplaceable)	
No. of times module is replaced		–	
Terminal block	Terminal screw	M3 spring-up screw, number of terminals: 20P, 7.62-mm pitch	
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm	
Module installation	Screw installation	M4 x 0.7mm x 22mm or more, Tightening torque: 78 to 118N·cm	
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Accessories		–	
Weight		Approx. 220g	
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.	

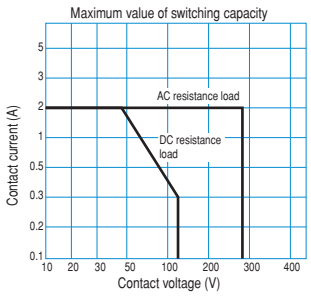
External Dimension

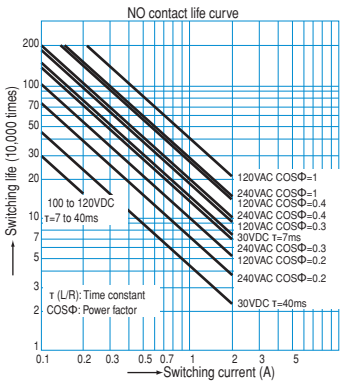


Wiring Diagram



Relay Characteristics Data

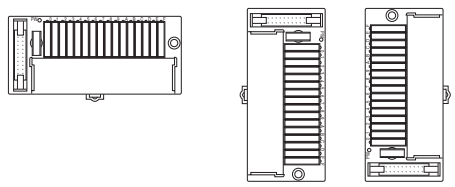




Note 1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend using a triac output terminal.
Note 2: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.
Note 3: The relay life varies significantly according to load type and its inrush current characteristics. In particular, an inrush current may cause contact welding, and thus must be taken into consideration as well as a steady current.
a) Inductive load
When an inductive load such as an electromagnetic switch and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. In particular, if the power factor is low, the life shortens. This must be taken into account. Additionally, at power activation, too, an inrush current 5 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.
b) Lamp load
For a lamp circuit inrush current, an inrush current 10 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.
c) Capacitive load
When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.

Module Installation Direction

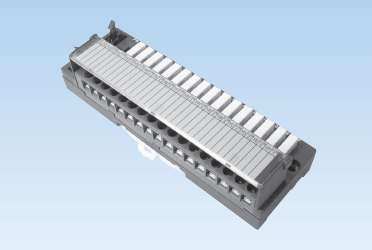
Horizontal installation | Vertical installation



Note: Do not install the module in any direction other than the above.

M3-screw 16-point NO contact relay output (independent common)

FA-TH16YRA20



Features

- This module converts the input from the MELSEC sink-type transistor output module to NO contact relay output.
- When a 64-point output module is used, output conversion for a maximum of 64 points can be made per one slot.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10 to 2-12
General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

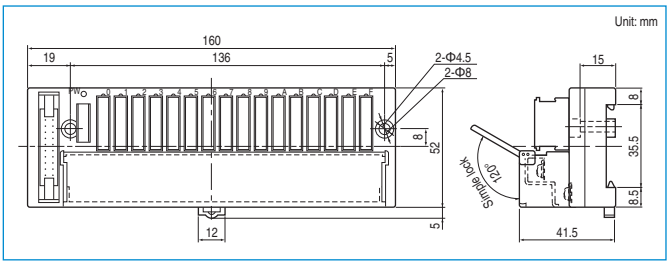
Applicable Standards

UL cUL CE

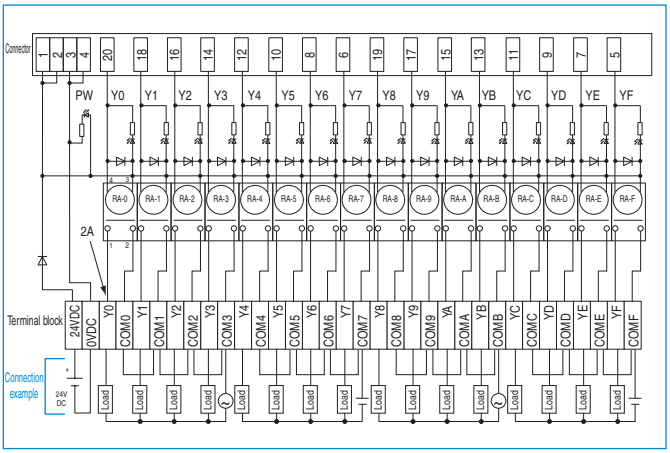
Specifications

Item		Specifications
Connected programmable controller		Sink-type 24VDC transistor output module
No. of points		16 points
Isolation method		Relay
Rated switching voltage, current		Voltage: 24VDC, 200VAC, Current: 2A/point (resistance load, COSΦ=1)
Maximum number of points simultaneously ON		100%
Minimum switching load		5VDC 1mA
Maximum switching load		270VAC, 150VDC
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF)
Mechanical life		20 million times or more
Electrical life		100,000 times or more at rated switching voltage/current
		100,000 times or more at 200VAC 1.5A (COSΦ=0.7), 240VAC 1A (COSΦ=0.7)
		100,000 times or more at 200VAC 1A (COSΦ=0.35)
		100,000 times or more at 24VDC 1A (L/R=7ms), 100VDC 0.1A (L/R=7ms)
Response time	OFF→ON	10ms or less (excluding programmable controller response time)
	ON→OFF	12ms or less (excluding programmable controller response time)
Wiring method for common		16-point independent common
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between input-output, between outputs: 2500VAC for 1 minute, between contacts: 750VAC for 1 minute, 10MΩ or more
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)
Operation display		LED on with power supply ON and input ON
Socket		No (module irreplaceable)
No. of times module is replaced		–
Terminal block	Terminal screw	M3 spring-up screw, number of terminals: 34P, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm x 22mm or more, tightening torque: 78 to 118N·cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Accessories		–
Weight		Approx. 280g
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

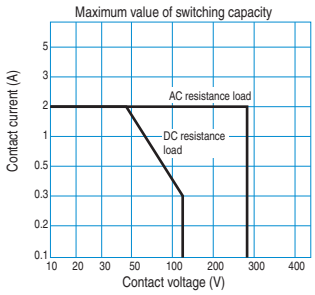
External Dimension

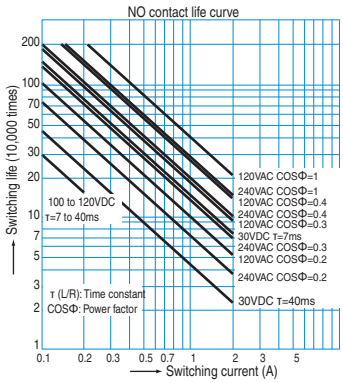


Wiring Diagram



Relay Characteristics Data





Note 1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend using a triac output terminal.

Note 2: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.

Note 3: The relay life varies significantly according to load type and its inrush current characteristics. In particular, an inrush current may cause contact welding, and thus must be taken into consideration as well as a steady current.

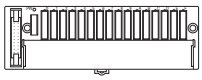
a) Inductive load
When an inductive load such as an electromagnetic switch and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. In particular, if the power factor is low, the life shortens. This must be taken into account. Additionally, at power activation, too, an inrush current 5 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

b) Lamp load
For a lamp circuit inrush current, an inrush current 10 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

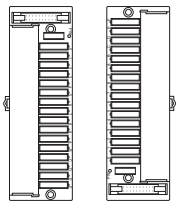
c) Capacitive load
When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.

Module Installation Direction

Horizontal installation



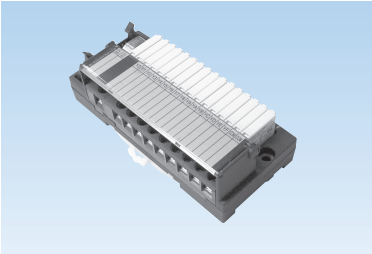
Vertical installation



Note: Do not install the module in any direction other than the above.

M3-screw 16-point NO contact relay output (independent common; with sockets)

FA-TH16YRA11S



Features

- This module converts the input from the MELSEC sink-type transistor output module to NO contact relay output.
- When a 64-point output module is used, output conversion for a maximum of 64 points can be made per one slot.
- Relays are replaceable on a per point basis (easy maintenance).

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10 to 2-12
General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

Related Products

Replacement Relay 2-32

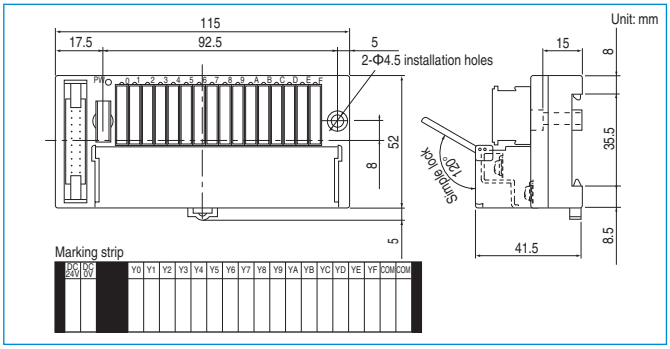
Applicable Standards

UL | cUL | CE

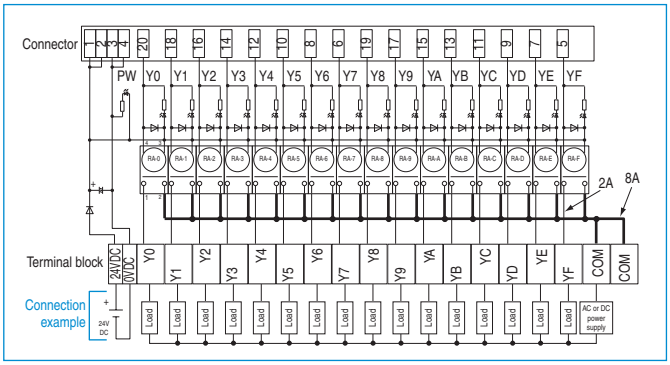
Specifications

Item		Specifications
Connected programmable controller		Sink-type 24VDC transistor output module
No. of points		16 points
Isolation method		Relay
Rated switching voltage, current		Voltage: 24VDC, 200VAC, Current: 2A/point (resistance load, COSΦ=1), 8A/common
Maximum number of points simultaneously ON		100%
Minimum switching load		5VDC 1mA
Maximum switching load		2700VAC, 150VDC
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF)
Mechanical life		20 million times or more
Electrical life		100,000 times or more at rated switching voltage/current
		100,000 times or more at 200VAC 1.5A (COSΦ=0.7), 240VAC 1A (COSΦ=0.7)
		100,000 times or more at 200VAC 1A (COSΦ=0.35)
		100,000 times or more at 24VDC 1A (L/R=7ms), 100VDC 0.1A (L/R=7ms)
Response time	OFF→ON	10ms or less (excluding programmable controller response time)
	ON→OFF	12ms or less (excluding programmable controller response time)
Wiring method for common		16 points/common (1-wire type)
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between input-output: 2500VAC for 1 minute, between contacts: 750VA for 1 minute, 10MΩ or more
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)
Operation display		LED on with power supply ON and input ON
Socket		Yes (relay replaceable)
No. of times module is replaced		50 times
Terminal block	Terminal screw	M3 spring-up screw, number of terminals: 20P, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 22mm or more, tightening torque range: 78 to 118N·cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Accessories		Relay extraction tool (mounted to relay)
Weight		Approx. 240g
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

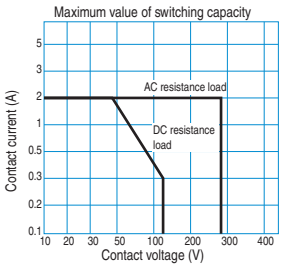
External Dimension

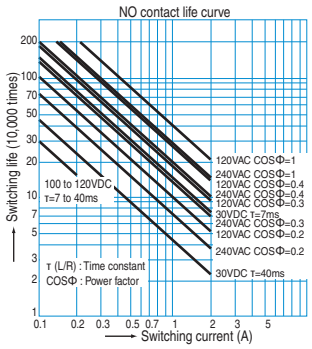


Wiring Diagram



Relay Characteristics Data





Note 1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend adequately considering usage conditions.

Note 2: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.

Note 3: The relay life varies significantly according to load type and its inrush current characteristics. In particular, an inrush current may cause contact welding, and thus must be taken into consideration as well as a steady current.

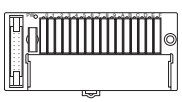
a) Inductive load
When an inductive load such as an electromagnetic switch and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. In particular, if the power factor is low, the life shortens. This must be taken into account. Additionally, at power activation, too, an inrush current 5 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

b) Lamp load
For a lamp circuit inrush current, an inrush current 10 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

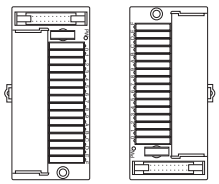
c) Capacitive load
When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.

Module Installation Direction

Horizontal installation



Vertical installation

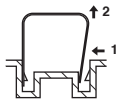


Note: Do not install the module in any direction other than the above.

How to Use the Extraction Tool

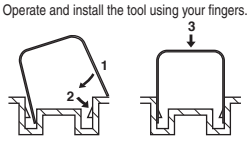
Removing the extraction tool

Operate and remove the tool using your fingers.



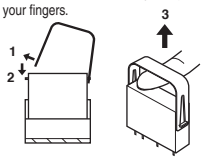
Installing the extraction tool

Operate and install the tool using your fingers.



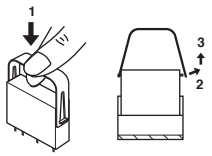
Removing the relay from the socket

Insert the tool into the relay and pull out the relay with the tool using your fingers.



Inserting the relay into the socket

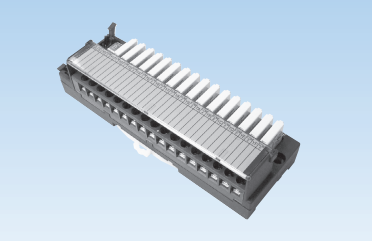
Insert the tool, and then insert the relay into the socket. After insertion, remove the tool from the relay.



Check that legs of relay are not bent before inserting the relay.

M3-screw 16-point NO contact relay output (independent common; with sockets)

FA-TH16YRA20S



Features

- This module converts the input from the MELSEC sink-type transistor output module to NO contact relay output.
- When a 64-point output module is used, output conversion for a maximum of 64 points can be made per one slot.
- Relays are replaceable on a per point basis (easy maintenance).

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10 to 2-12 | General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

Related Products

Replacement Relay 2-32

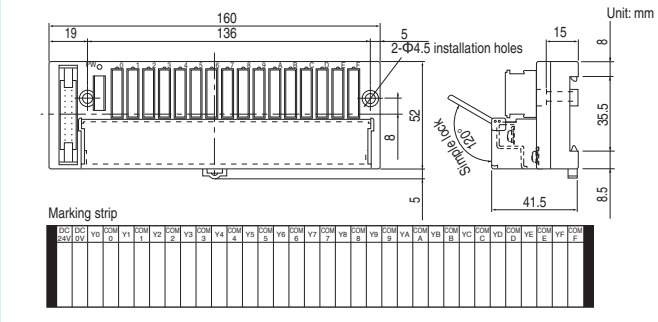
Applicable Standards

UL | cUL | CE

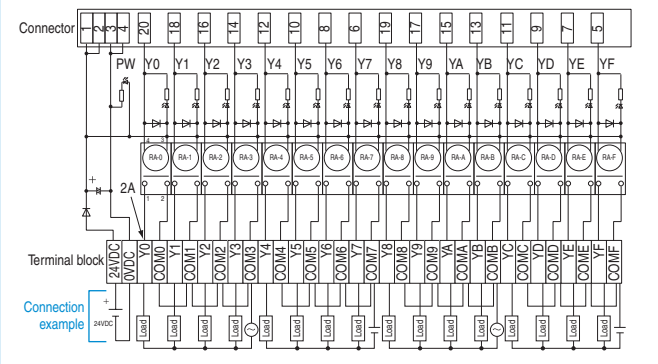
Specifications

Item		Specifications
Connected programmable controller		Sink-type 24VDC transistor output module
No. of points		16 points
Isolation method		Relay
Rated switching voltage, current		Voltage: 24VDC, 200VAC, Current: 2A/point (resistance load, COSΦ=1)
Maximum number of points simultaneously ON		100%
Minimum switching load		5VDC 1mA
Maximum switching load		270VAC, 150VDC
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF)
Mechanical life		20 million times or more
Electrical life		100,000 times or more at rated switching voltage/current
		100,000 times or more at 200VAC 1.5A (COSΦ=0.7), 240VAC 1A (COSΦ=0.7)
		100,000 times or more at 200VAC 1A (COSΦ=0.35)
		100,000 times or more at 24VAC 1A (L/R=7ms), 100VAC 0.1A (L/R=7ms)
Response time	OFF→ON	10ms or less (excluding programmable controller response time)
	ON→OFF	12ms or less (excluding programmable controller response time)
Wiring method for common		16 points independent common
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between input-output, between each output: 2500VAC for 1 minute, Between contacts: 750VAC for 1 minute, 10MΩ or more
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)
Operation display		LED on with power supply ON and input ON
Socket		Yes (relay replaceable)
No. of times module is replaced		50 times
Terminal block	Terminal screw	M3 spring-up screw, number of terminals: 34P, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 22mm or more, tightening torque range: 78 to 118N·cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Accessories		Approx. 300g
Weight		Relay extraction tool (mounted to relay)
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

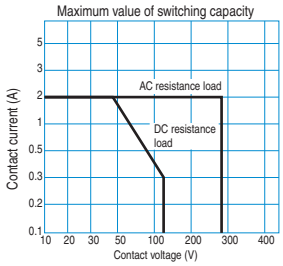
External Dimension

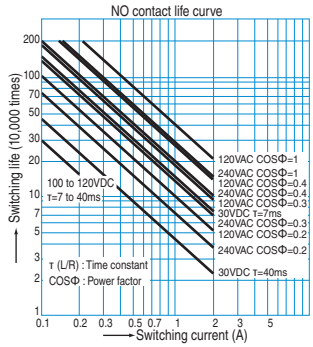


Wiring Diagram



Relay Characteristics Data





Note 1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend adequately considering usage conditions.

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a) Inductive load
When an inductive load such as an electromagnetic switch and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. In particular, if the power factor is low, the life shortens. This must be taken into account. Additionally, at power activation, too, an inrush current 5 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

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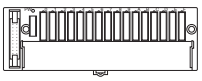
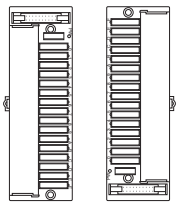
c) Capacitive load
When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.

Module Installation Direction

Horizontal installation



Vertical installation

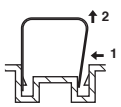


Note: Do not install the module in any direction other than the above.

How to Use the Extraction Tool

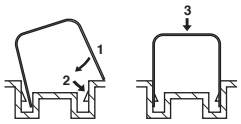
Removing the extraction tool

Operate and remove the tool using your fingers.



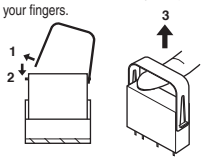
Installing the extraction tool

Operate and install the tool using your fingers.



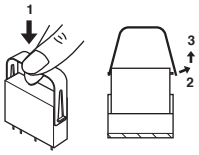
Removing the relay from the socket

Insert the tool into the relay and pull out the relay with the tool using your fingers.



Inserting the relay into the socket

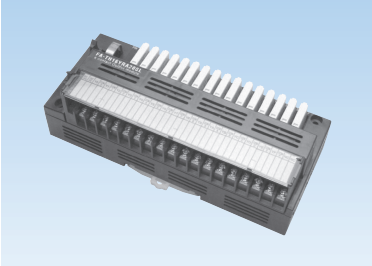
Insert the tool, and then insert the relay into the socket. After insertion, remove the tool from the relay.



Check that legs of relay are not bent before inserting the relay.

M3.5-screw 16-point NO contact relay output (independent common; with sockets)

FA-TH16YRA20SL



Features

- This module converts the input from the MELSEC sink-type transistor output module to NO contact relay output.
- When a 64-point output module is used, output conversion for a maximum of 64 points can be made per one slot.
- Since sockets are equipped, relay modules can be replaced on a per-module basis. (Easy maintenance)
- Using M3.5 terminal screws, the module supports thick wires (with a wire diameter of 1.25 to 2mm²) used for wiring outside the panel.

Related Materials

Selection Tips 2-9 | Usage Precautions 2-10 to 2-12
General Specifications 9-1 | M3.5 8-mm Applicable Solderless Terminal 9-2

Related Products

Replacement Relay 2-28

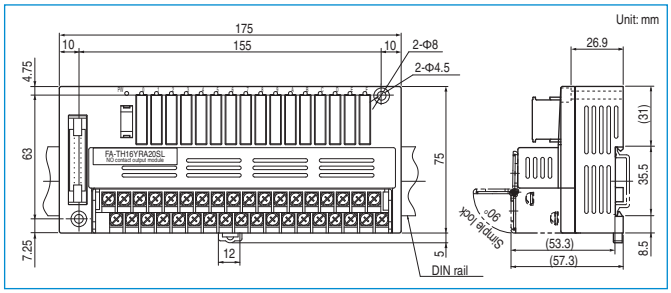
Applicable Standards

UL | cUL | CE

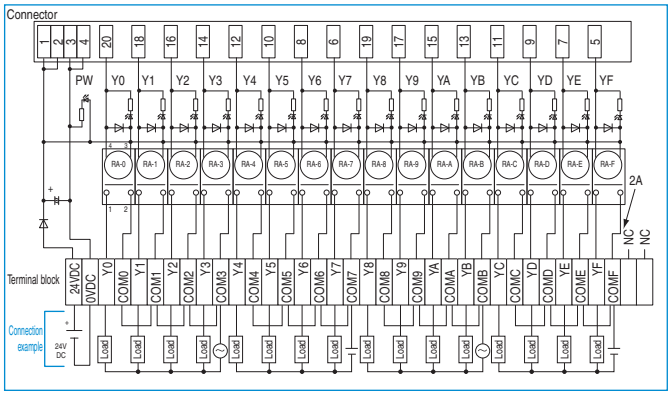
Specifications

Item		Specifications
Connected programmable controller		Sink-type 24VDC transistor output module
No. of points		16 points
Isolation method		Relay
Rated switching voltage, current		Voltage: 24VDC, 200VAC, Current: 2A/point (resistance load, COSΦ=1)
Maximum number of points simultaneously ON		100%
Minimum switching load		5VDC 1mA
Maximum switching load		270VAC, 150VDC
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF)
Mechanical life		20 million times or more
Electrical life		100,000 times or more at rated switching voltage/current
		100,000 times or more at 200VAC 1.5A (COSΦ=0.7), 240VAC 1A (COSΦ=0.7)
		100,000 times or more at 200VAC 1A (COSΦ=0.35)
		100,000 times or more at 24VDC 1A (L/R=7ms), 100VDC 0.1A (L/R=7ms)
Response time	OFF→ON	10ms or less (excluding programmable controller response time)
	ON→OFF	12ms or less (excluding programmable controller response time)
Wiring method for common		16-point independent common
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between input-output, between outputs: 2500VAC for 1 minute, between contacts: 750VAC for 1 minute, 10MΩ or more
Noise resistance		Simulator noise 1500Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 25 to 60Hz)
Operation display		LED on with power supply ON and input ON
Socket		Yes (relay module replaceable)
No. of times module is replaced		50 times
Terminal block	Terminal screw	M3.5 screw, number of terminals: 36P, 8.0-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal use), 68 to 92N·cm
Module installation	Screw installation	M4 × 35mm or more, tightening torque: 78 to 118N·cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Accessories		Module extraction tool
Weight		Approx. 390g
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

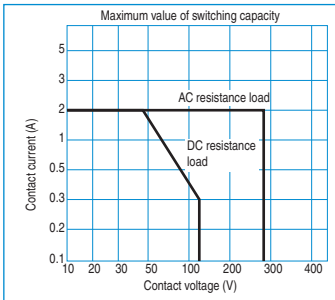
External Dimension

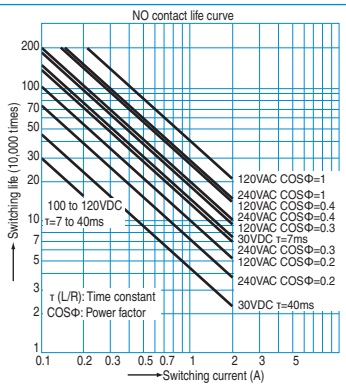


Wiring Diagram



Relay Characteristics Data





Note 1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend using a triac output terminal.

Note 2: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.

Note 3: The relay life varies significantly according to load type and its inrush current characteristics. In particular, an inrush current may cause contact welding, and thus must be taken into consideration as well as a steady current.

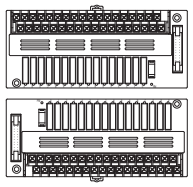
a) Inductive load
When an inductive load such as an electromagnetic switch and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. In particular, if the power factor is low, the life shortens. This must be taken into account. Additionally, at power activation, too, an inrush current 5 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

b) Lamp load
For a lamp circuit inrush current, an inrush current 10 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

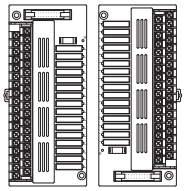
c) Capacitive load
When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.

Module Installation Direction

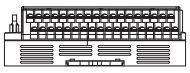
Horizontal installation



Vertical installation



Upward installation

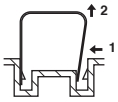


Note: Do not install the module in any direction other than the above.

How to Use the Extraction Tool

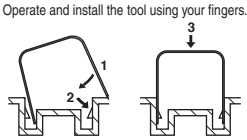
Removing the extraction tool

Operate and remove the tool using your fingers.



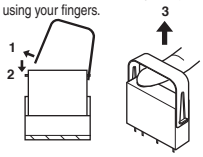
Installing the extraction tool

Operate and install the tool using your fingers.



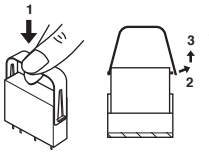
Removing the relay from the socket

Insert the tool into the relay and pull out the relay with the tool using your fingers.



Inserting the relay into the socket

Insert the tool, and then insert the relay into the socket. After insertion, remove the tool from the relay.



*Check that legs of relay are not bent before inserting the relay.

For MELSEC positive common input / sink output (FCN 40P ↔ MIL 20P × 2, MIL 20P side branching type)

FA-CBL**FM2V

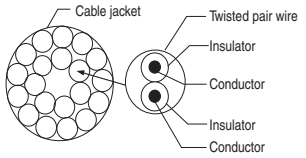
Features

- This cable is used to connect a MELSEC series FCN 40P connector-type I/O module and terminal modules.
- Combined use with a DC I/O conversion module is also possible.

Related Materials

General Specifications 9-1

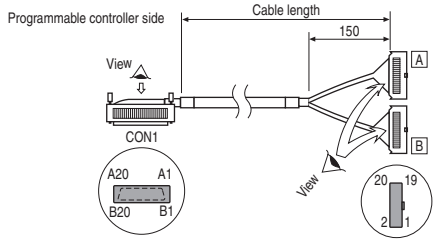
Specifications

Item	Specifications
Programmable controller-side connector	FCN367J040-AU/MW: Fujitsu Component
Module-side connector	D7920-B500FL, D3448-7920: Sumitomo 3M × 2
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10FM2V	1m	Approx. 160g
FA-CBL20FM2V	2m	Approx. 270g
FA-CBL30FM2V	3m	Approx. 380g
FA-CBL50FM2V	5m	Approx. 600g

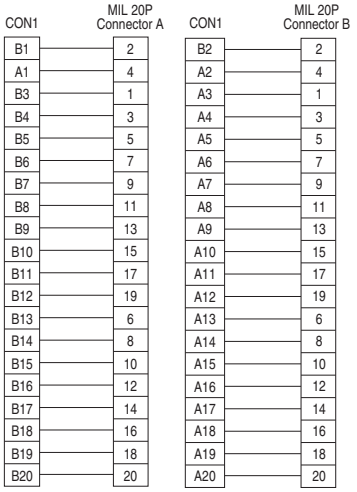
External Dimension

Unit: mm



Note 1: A of the 20P connector corresponds to inputs X0 to XF / outputs Y0 to YF, and B of the 20P connector corresponds to inputs X10 to X1F / outputs Y10 to Y1F.

Wiring Diagram



FA-CBL**FM2H

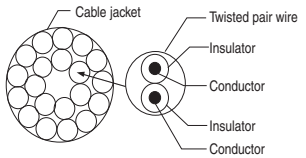
Features

- This cable is used to connect a Mitsubishi Electric CC-Link FCN 40P connector-type remote I/O module and terminal modules.
- Combined use with a DC I/O conversion module is also possible.

Related Materials

General Specifications 9-1

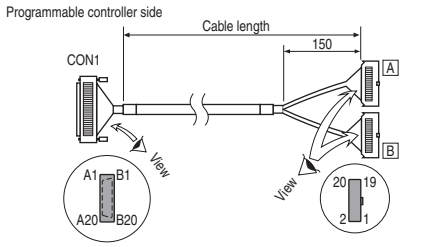
Specifications

Item	Specifications
Programmable controller-side connector	FCN367J040-AU/MW: Fujitsu Component
Module-side connector	D7920-B500FL, D3448-7920: Sumitomo 3M × 2
Used cable	Round 40-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20˚C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10FM2H	1m	Approx. 150g
FA-CBL20FM2H	2m	Approx. 270g
FA-CBL30FM2H	3m	Approx. 380g

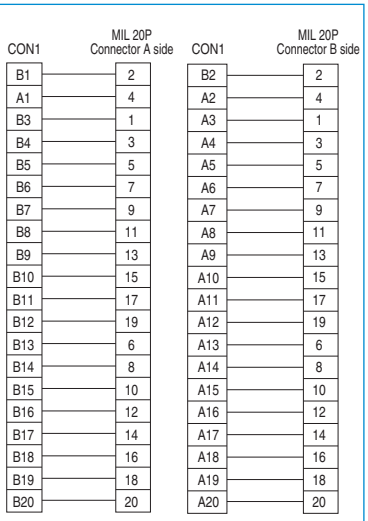
External Dimension

Unit: mm



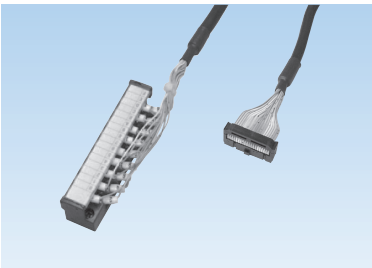
Note 1: A of the 20P connector corresponds to inputs X0 to XF / outputs Y0 to YF, and B of the 20P connector corresponds to inputs X10 to X1F / outputs Y10 to Y1F.

Wiring Diagram



For MELSEC terminal block I/O (MELSEC-Q terminal block ↔ MIL 20P)

FA-CBL**TMV20



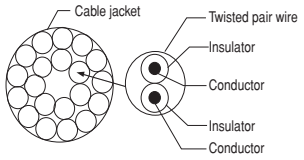
Features

■This cable is used to connect a terminal block of a MELSEC DC I/O module and a terminal module.

Related Materials

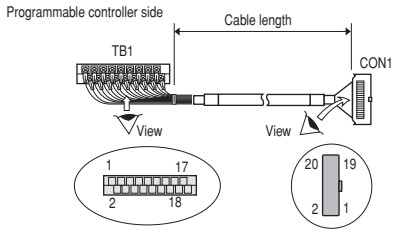
General Specifications 9-1

Specifications

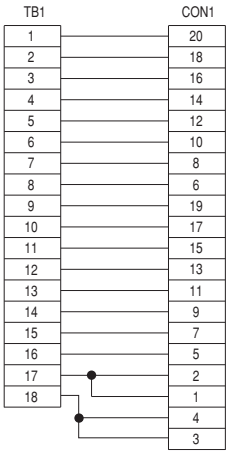
Item	Specifications
Programmable controller-side connector	MELSEC-Q terminal block
Conversion module-side connector	D7920-B500FL, D3448-7920: Sumitomo 3M
Used cable	Round 20-core cable (black)
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	8.1mm (standard), black
Rated current	1A
Conductor resistance (20°C)	0.232Ω/m or less
Dielectric withstand voltage	500VAC for 1 minute
Insulation resistance	100MΩ-km or more
UL standard (cable area)	UL STYLE NO 2464 80°C 300V
Structure diagram	

Model	Cable length	Weight
FA-CBL10TMV20	1m	Approx. 170g
FA-CBL20TMV20	2m	Approx. 260g
FA-CBL30TMV20	3m	Approx. 360g

External Dimension

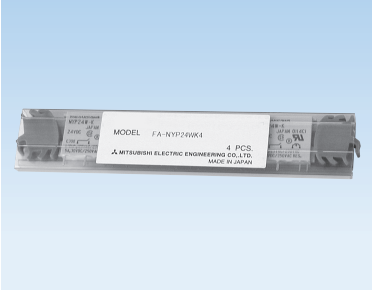


Wiring Diagram



Replacement relay

FA-NYP24WK4



Features

■This relay is used for socket-type terminal module maintenance.

Specifications

Item	Specifications
Model	**FA-NYP24WK4**
Module type	NO contact relay
Module color	Beige
Quantity in package	4
Weight	Approx. 30g

3. Conversion Module for Analog I/O

Contents

Overview

Terminal Block Type Conversion Module for Isolated Analog Module ··· 3-1
Terminal Block Type Conversion Module for Isolated RTD (Resistance Temperature Detector) Input Module etc. ····· 3-1

Model List

Conversion Module and Cable for Isolated Analog Module ····· 3-2
Conversion Module and Cable for Isolated Thermocouple Input Module ··· 3-2
Conversion Module and Cable for Isolated RTD Input Module ··· 3-2

Selection Chart

Conversion Module and Cable for Isolated Analog Module ····· 3-3
Conversion Module and Cable for Isolated Thermocouple Input Module ··· 3-3
Conversion Module and Cable for Isolated RTD Input Module ·· 3-3

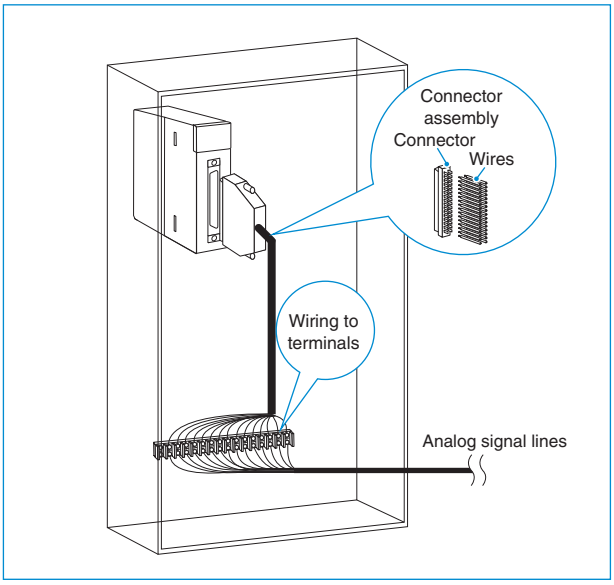
Individual Specifications

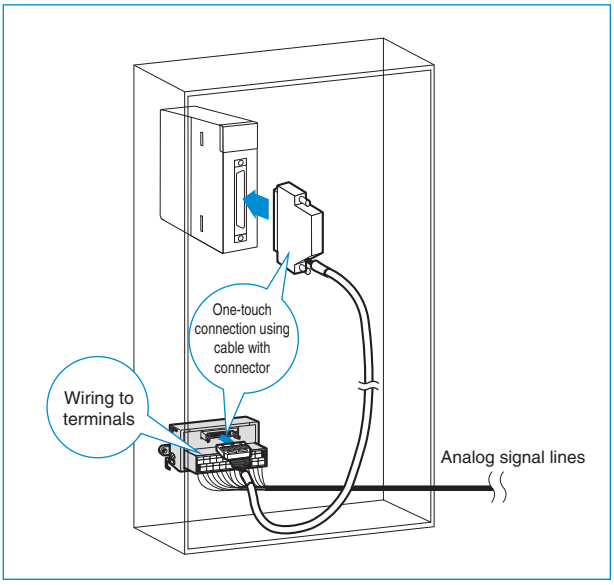
Conversion Module and Cable for Isolated Analog Module ····· 3-5
Conversion Module and Cable for Isolated Thermocouple Input Module ··· 3-6
Conversion Module and Cable for Isolated RTD Input Module ··· 3-7

3. Conversion Module for Analog I/O

Terminal block type conversion module for isolated analog module

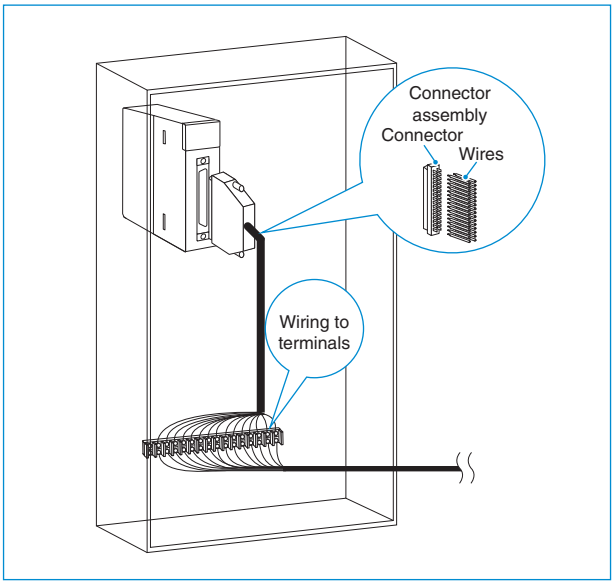
This conversion module is used as a relay terminal block for a MELSEC iQ-R / MELSEC-Q series isolated analog module or the like (connector type). Since the programmable controller module is a connector type, conversion to a terminal block makes it possible to reduce the wiring work.

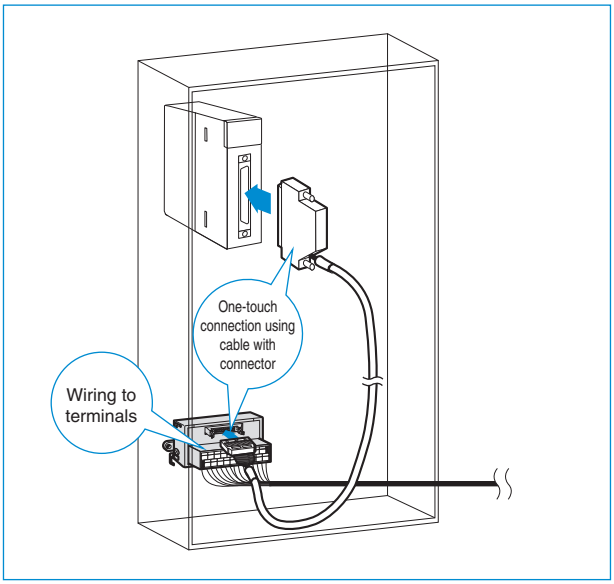




Terminal block type conversion module for isolated RTD (resistance temperature detector) input module etc.

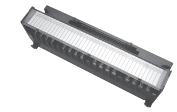
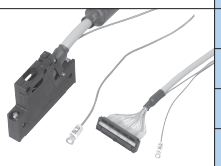
This conversion module is used as relay terminal blocks for thermocouple, compensating lead wire, and RTD (resistance temperature detector) connection.
Installing the module away from heating elements, fans, and the like inside the control panel makes it possible to measure the temperature without any impact from heat.
The dedicated connection cable can be used in place of a compensating lead wire.



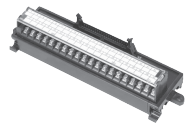
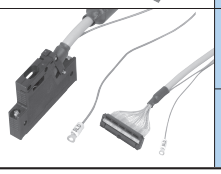


Model List

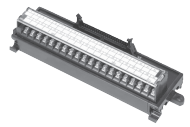
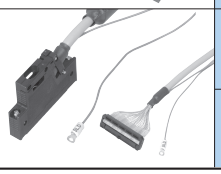
• Conversion module and cable for isolated analog module

Product	Shape	Model	Remarks		Page
Small-size terminal block conversion module for MELSEC iQ-R / MELSEC-Q series isolated analog module		FA1-TBS40ADGN	Terminal block conversion module for R60AD8/16-G and Q68AD-G, small-size type		3-5
		FA1-TBS40ADDG	Terminal block conversion module for Q66AD-DG, small-size type		
		FA1-TBS40DAG	Terminal block conversion module for R60DA8/16-G and Q66DA-G, small-size type		
Connection cable for MELSEC iQ-R series isolated analog module		FA1-CBL05R60DA8G	Used for connecting R60DA8/16-G or Q66DA-G and a terminal block conversion module		3-6
		FA1-CBL10R60DA8G			
		FA1-CBL20R60DA8G			
		FA1-CBL30R60DA8G			
Connection cable for MELSEC-Q series isolated analog module		FA-CBL10Q68ADGN	1m	Used for connecting MELSEC-Q series Q68AD-G and FA1-TBS40ADGN	3-6
		FA-CBL20Q68ADGN	2m		
		FA-CBL30Q68ADGN	3m		
		FA-CBL10Q66ADDG	1m	Used for connecting MELSEC-Q series Q66AD-DG and FA1-TBS40ADDG	
		FA-CBL20Q66ADDG	2m		
		FA-CBL30Q66ADDG	3m		
		FA-CBL10Q66DAG	1m	Used for connecting MELSEC-Q series Q66DA-G and FA1-TBS40DAG	
		FA-CBL20Q66DAG	2m		
		FA-CBL30Q66DAG	3m		

• Conversion module and cable for isolated thermocouple input module

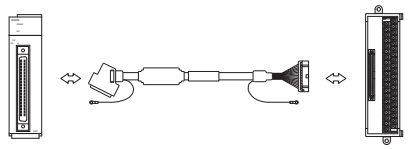
Product	Shape	Model	Remarks		Page
Terminal block type conversion module for isolated thermocouple input module		FA-LTB40TDG	MELSEC-Q series Q68TD-G-H01/H02 terminal block conversion module (without cold junction compensation resistor)		3-7
Connection cable for isolated thermocouple input module		FA-CBL20Q68TDG	2m	Used for connecting MELSEC-Q series Q68TD-G-H01/H02 and FA-LTB40TDG	3-7
		FA-CBL30Q68TDG	3m		

• Conversion module and cable for isolated RTD input module

Product	Shape	Model	Remarks		Page
Terminal block type conversion module for MELSEC-Q series Q68RD3-G		FA-LTB40RD3G	MELSEC-Q series Q68RD3-G terminal block conversion		3-8
Connection cable for MELSEC-Q series Q68RD3-G		FA-CBL20Q68RD3G	2m	Used for connecting MELSEC-Q series Q68RD3-G and FA-LTB40RD3G	3-8
		FA-CBL30Q68RD3G	3m		

Selection Chart 1

- Connection example: Q68AD-G ↔ Conversion module Q68AD-G ＋ FA-CBL10Q68ADGN ＋ FA1-TBS40ADGN

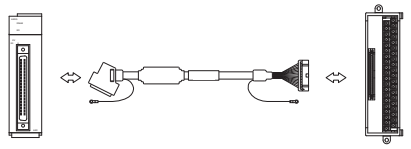


Product type	Programmable controller module model	Module type	Module model		Connection cable	
Channel isolated analog-digital converter module	R60AD8-G R60AD16-G Q68AD-G	Conversion module	**FA1-TBS40ADGN**	3-5	**FA-CBL**Q68ADGN**	3-6
	Q66AD-DG	Conversion module	**FA1-TBS40ADDG**	3-5	**FA-CBL**Q66ADDG**	3-6
Channel isolated digital-analog converter module	Q66DA-G	Conversion module	**FA1-TBS40DAG**	3-5	**FA-CBL**Q66DAG**	3-6
	R60DA8-G R60DA16-G	Conversion module	**FA1-TBS40DAG** (Note 1)	3-5	**FA1-CBL**R60DA8G**	3-6

Note 1: When using R60DA8-G or R60DA16-G, replace the marking strip attached to the terminal block with the one provided in the package before use.

Selection Chart 2

- Connection example: Q68TD-G-H01 ↔ Conversion module Q68TD-G-H01 ＋ FA-CBL10Q68TDG ＋ FA-LTB40TDG

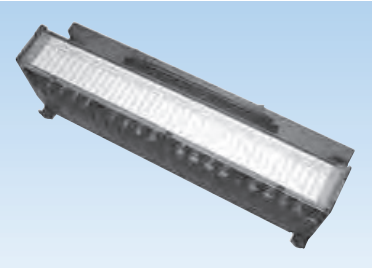


Product type	Programmable controller module model	Module type	Module model		Connection cable	
Thermocouple input module	Q68TD-G-H01 Q68TD-G-H02 R60TD8-G	Conversion module	**FA-LTB40TDG**	3-7	**FA-CBL**Q68TDG**	3-7
RTD input module	Q68RD3-G R60RD8-G	Conversion module	**FA-LTB40RD3G**	3-8	**FA-CBL**Q68RD3G**	3-8

Individual Specifications

Terminal block conversion module Small-size type

FA1-TBS40ADGN/ADDG/DAG



Features

- The module prevents screws from falling by employing a screw fall-prevention mechanism, and offers easy installation of round solderless terminals by employing a screw holding mechanism.
- The terminal screws include a black screw every five terminals, making verification of terminal locations easy.
- The module can be installed using a DIN rail or screws.

Related Materials

General Specifications 9-1
M3 7-mm Applicable Solderless Terminal 9-2

Applicable Standards

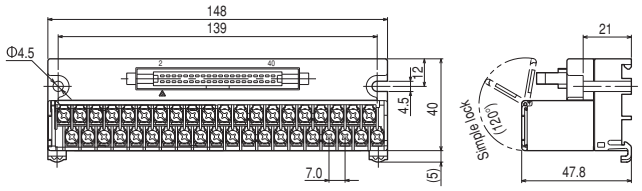
UL cUL

Specifications

Item	Specifications		
Model	FA1-TBS40ADGN	FA1-TBS40ADDG	FA1-TBS40DAG
Connected module	Q68AD-G, R60AD8/16-G	Q66AD-DG	Q66DA-G, R60DA8/16-G (Note 1)
Terminal block	Terminal screw	M3 screws, number of terminals: 40P, 7-mm pitch, with screw holding and fall-prevention mechanism	
	Applicable wire, tightening torque	0.3 to 1.25mm² (with solderless terminal used), 43 to 58N·cm	
Module installation	Screw installation	M4 × 0.7mm × 25mm or more, tightening torque: 78 to 118N·cm	
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)	
Withstand voltage, insulation resistance	Between CHs: 1000VAC for 1 minute, 10MΩ or more, Other: 500VAC for 1 minute, 10MΩ or more		
Weight	Approx. 190g	Approx. 190g	Approx. 190g
Precautions	1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact. Note 1: When connecting R60DA8/16-G, replace the marking strip with the one provided in the package before use.		

External Dimension

Unit: mm

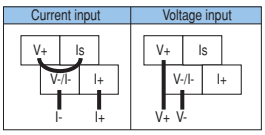


External Connection

◎For wiring to the terminal block, see the manual of the analog module to be connected, published by Mitsubishi Electric.

For the external wiring method when using a dedicated cable (FA-CBL*Q68ADGN), connect the terminals as described below.

Current input … Connect the V+ and Is terminals.
Voltage input … Do not connect wiring to the Is and I+ terminals.
Note) Is terminal: A dedicated terminal that connects with the V+ terminal when using current input.



[FA1-TBS40ADGN]

	1		3		5		7		9		11		13		15		17		19		21		23		25		27		29		31		33		35		37		39		ADGN
	CH1 V+		CH1 Is		CH2 V+		CH2 Is				CH3 V+		CH3 Is		CH4 V+		CH4 Is				CH5 V+		CH5 Is		CH6 V+		CH6 Is				CH7 V+		CH7 Is		CH8 V+		CH8 Is				
		2		4		6		8		10		12		14		16		18		20		22		24		26		28		30		32		34		36		38		40	
		CH1 V-/I-		CH1 I+		CH2 V-/I-		CH2 I+				CH3 V-/I-		CH3 I+		CH4 V-/I-		CH4 I+				CH5 V-/I-		CH5 I+		CH6 V-/I-		CH6 I+				CH7 V-/I-		CH7 I+		CH8 V-/I-		CH8 I+		

[FA1-TBS40ADDG]

	1		3		5		7		9		11		13		15		17		19		21		23		25		27		29		31		33		35		37		39		ADDG
	CH1 P		I - /CHK-				CH2 P		I - /CHK-				CH3 P		I - /CHK-				CH4 P		I - /CHK-				CH5 P		I - /CHK-				CH6 P		I - /CHK-						24VDC	
		2		4		6		8		10		12		14		16		18		20		22		24		26		28		30		32		34		36		38		40	
		I + /CHK+						I + /CHK+						I + /CHK+						I + /CHK+						I + /CHK+						I + /CHK+								DC24G	

[FA1-TBS40DAG (with Q66DA-G connected)]

	1		3		5		7		9		11		13		15		17		19		21		23		25		27		29		31		33		35		37		39		DAG
	CH1 V+		CH1 I+				CH2 V+		CH2 I+				CH3 V+		CH3 I+				CH4 V+		CH4 I+				CH5 V+		CH5 I+				CH6 V+		CH6 I+						24VDC	
Q		2		4		6		8		10		12		14		16		18		20		22		24		26		28		30		32		34		36		38		40	
		COM1						COM2						COM3						COM4						COM5						COM6								DC24G	

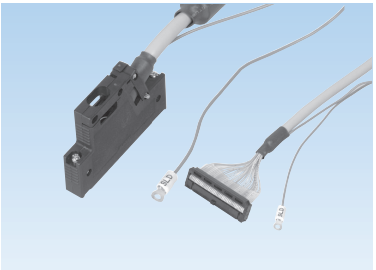
[FA1-TBS40DAG (with R60DA8-G or R60DA16-G connected)]

	1		3		5		7		9		11		13		15		17		19		21		23		25		27		29		31		33		35		37		39		DAG
	CH1 V+/I+				CH2 V+/I+				CH3 V+/I+				CH4 V+/I+						CH5 V+/I+				CH6 V+/I+				CH7 V+/I+				CH8 V+/I+								24VDC	
IQR		2		4		6		8		10		12		14		16		18		20		22		24		26		28		30		32		34		36		38		40	
		CH1 V-/I-				CH2 V-/I-				CH3 V-/I-				CH4 V-/I-						CH5 V-/I-				CH6 V-/I-				CH7 V-/I-				CH8 V-/I-								DC24G	

◎Ground the shielded wire in the same manner as the programmable controller module.
When grounding is not performed and the extra wire is rolled up, the wire may act as an antenna, possibly introducing noise. Caution is required.

Connection cable

FA-CBL*Q68ADGN, FA-CBL*Q66ADDG/DAG, FA1-CBL*R60DA8G



Features

■ This cable is a shielded twisted pair cable, and is provided with a solderless terminal for shield grounding.

Related Materials

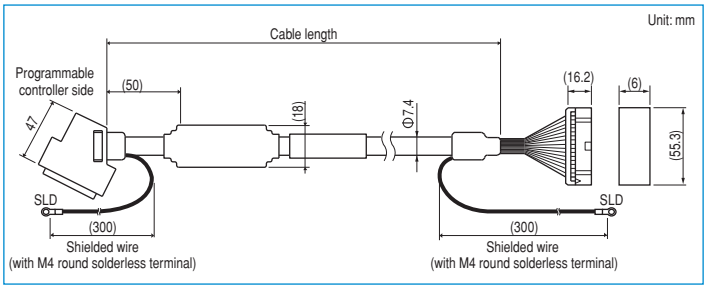
General Specifications 9-1

Specifications

Item	Specifications			
Model	FA-CBL**Q68ADGN	FA-CBL**Q66ADDG	FA-CBL**Q66DAG	FA1-CBL*R60DA8G
Connected module	Between Q68AD-G, R60AD8/16-G and terminal block converter module	Between Q66AD-DG and terminal block converter module	Between Q66DA-G and terminal block converter module	Between R60DA8-G, R60DA16-G and terminal block converter module
Used solderless terminal	M4 round solderless terminal			

Model		FA-CBL**Q68ADGN	FA-CBL**Q66ADDG	FA-CBL**Q66DAG	FA1-CBL*R60DA8G
**	Cable length	Weight	Weight	Weight	Weight
10	1.0m	Approx. 200g	Approx. 200g	Approx. 200g	Approx. 200g
20	2.0m	Approx. 300g	Approx. 300g	Approx. 300g	Approx. 300g
30	3.0m	Approx. 400g	Approx. 400g	Approx. 400g	Approx. 400g

External Dimension



Precautions

- **FA-LTB40ADGN, FA-CBL**Q68ADGN**
  Replacing a conventional FA-LTB40ADG or FA-CBL**Q68ADG (production discontinued) product without an N at the end of the model name

  ◎Use in combination with the conventional product is not permitted.
  (Example: Combining FA-LTB40ADGN + FA-CBL**Q68ADG…Not available)
  ◎The external wiring method differs from that of conventional products. At the time of replacement, verify the wiring of FA-LTB40ADGN.

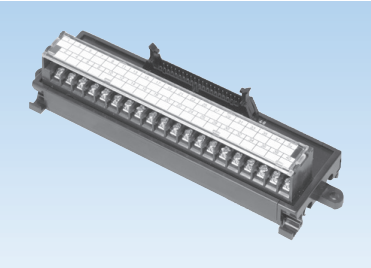
- **FA-LTB40DAG, FA-CBL**Q66DAG**
  When using a conversion module or cable, errors may occur in the Q66DA-G conversion characteristics due to the impact of a drop in voltage caused by wiring resistance. Be sure to take voltage drops caused by wiring resistance into adequate consideration.

  ◎Target: Q66DA-G, Conditions: Voltage output and when the load resistance is 50kΩ or less

  ◎Wiring resistance reference value ... Cable resistance value: 226Ω/km (20°C)
  Conversion module + Cable (3m) resistance value: 0.867Ω or less

Terminal block type conversion module

FA-LTB40TDG



Features

■With this conversion module connected, programmable controller accuracy specifications are satisfied.
■The module is capable of measurement without impact from heat when installed away from heating elements inside the control panel.

Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

Applicable Standards

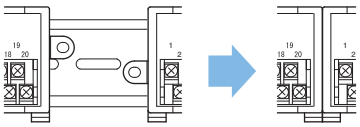
UL cUL

Specifications

Item		Specifications
Connected module		Q68TD-G-H01, Q68TD-G-H02
Cold junction compensation resistance		None (uses the resistor provided with the programmable controller)
Terminal block	Terminal screw	M3 regular screw, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm^2 (with solderless terminal use), 50 to 75N·cm
Module installation	Screw installation	M4 × 0.7mm × 8mm or more, tightening torque range: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		Between CHs: 1000VAC for 1 minute, 10MΩ or more, Other: 500VAC for 1 minute, 10MΩ or more
Weight		Approx. 240g
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

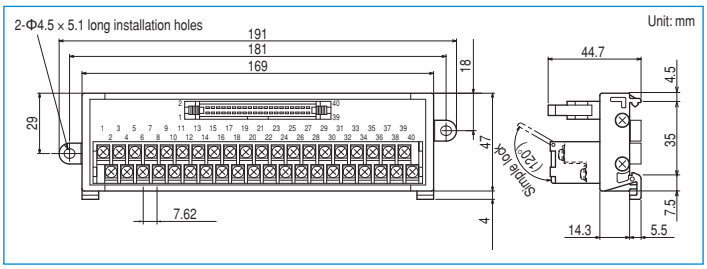
Module Installation Tips

When installing models that have screw installation holes on both module sides adjacent to each other on a DIN rail, the models can be installed close together as shown below.



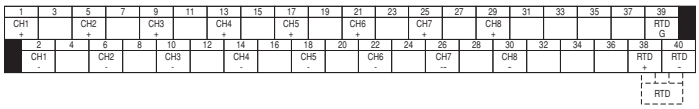
Applicable model
・FA-LTB**

External Dimension



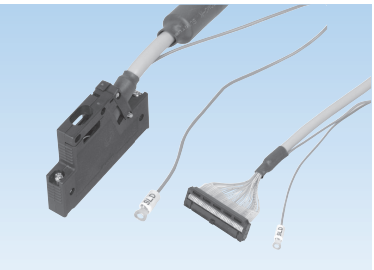
External Connection

◎Install the module in a location that has a uniform ambient temperature.
◎Connect the thermocouple or compensating lead wire directly to the terminal block.
◎Ground the shielded wire in the same manner as the programmable controller module. When grounding is not performed and the extra wire is rolled up, the wire may act as an antenna, possibly introducing noise. Caution is required.
◎For the cold junction compensation resistor (RTD), connect the Q68TD-G-H01/H02 accessory between terminal numbers 38 and 40 as shown below. Terminal numbers 39 (RTD G) and 40 (RDT-) are connected inside the conversion module, and therefore do not require external wiring.



Connection cable

FA-CBL*Q68TDG



Features

■This cable is used in place of the compensating lead wire between the conversion module and programmable controller module.
■The cable is a shielded instrumentation cable, and provides a solderless terminal for shield grounding.

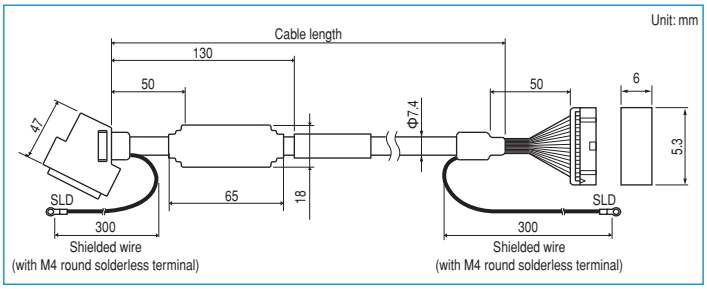
Related Materials

General Specifications 9-1

Specifications

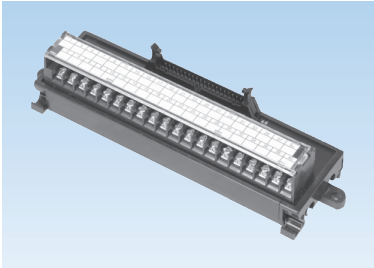
Item	Specifications	
Model	FA-CBL20Q68TDG	FA-CBL30Q68TDG
Connected module	Between Q68TD-G-H01/H02 and FA-LTB40TDG	
Cable length	2m	3m
Used solderless terminal	M4 round solderless terminal	
Weight	Approx. 300g	Approx. 400g

External Dimension



Terminal block conversion module

FA-LTB40RD3G



Features

■With this conversion module connected, programmable controller accuracy specifications are satisfied.

Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

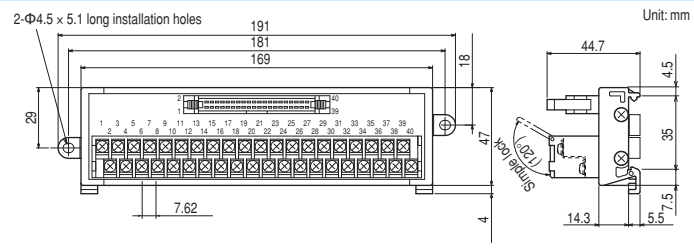
Applicable Standards

UL | cUL

Specifications

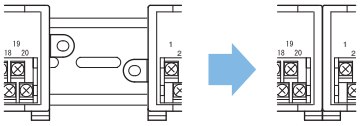
Item		Specifications
Connected module		Q68RD3-G
Terminal block	Terminal screw	M3 regular screw, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm^2 (with solderless terminal use), 50 to 75N·cm
Module installation	Screw installation	M4 × 0.7mm × 8mm or more, tightening torque range: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		Between CHs: 1000VAC for 1 minute, 10MΩ or more, Other: 500VAC for 1 minute, 10MΩ or more
Weight		Approx. 240g
Precautions		1. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact.

External Dimension



Module Installation Tips

When installing models that have screw installation holes on both module sides adjacent to each other on a DIN rail, the models can be installed close together as shown below.



Applicable model
・FA-LTB**

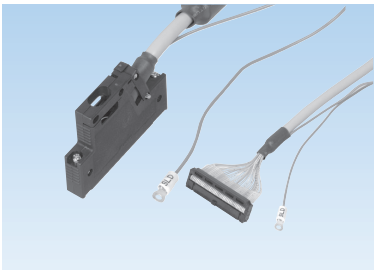
External Connection

◎Ground the shielded wire in the same manner as the programmable controller module. When grounding is not performed and the extra wire is rolled up, the wire may act as an antenna, possibly introducing noise. Caution is required.
◎For wiring to the terminal block, see the manual of the connected RTD input module published by Mitsubishi Electric.

1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39		
CH1 A1	CH1 b1		CH2 B2		CH3 A3	CH3 b3		CH4 B4		CH5 A5	CH5 b5		CH6 B6		CH7 A7	CH7 b7		CH8 B8			
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
	CH1 B1		CH2 A2	CH2 b2		CH3 B3		CH4 A4	CH4 b4		CH5 B5		CH6 A6	CH6 b6		CH7 B7		CH8 A8	CH8 b8		

Connection cable

FA-CBL*Q68RD3G



Features

■This cable is a shielded twisted pair cable, and provides a solderless terminal for shield grounding.

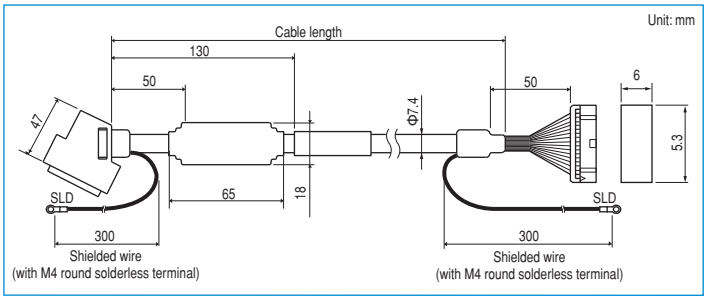
Related Materials

General Specifications 9-1

Specifications

Item	Specifications	
Model	FA-CBL20Q68RD3G	FA-CBL30Q68RD3G
Connected module	Between Q68RD3-G and FA-LTB40RD3G	
Cable length	2m	3m
Used solderless terminal	M4 round solderless terminal	
Weight	Approx. 300g	Approx. 400g

External Dimension



4. Conversion Module for High-Speed Counter

Contents

Overview

Conversion Module for High-Speed Counter 4-1

Selection Chart

Conversion Module for High-Speed Counter 4-1

Model List

Conversion Module for High-Speed Counter 4-1

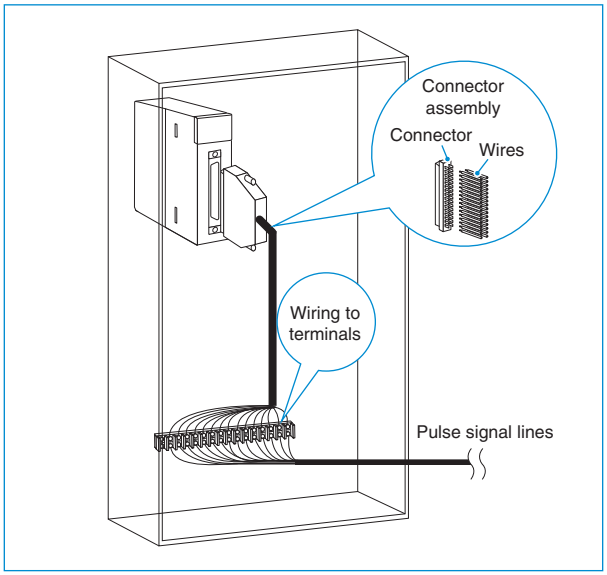
Individual Specifications

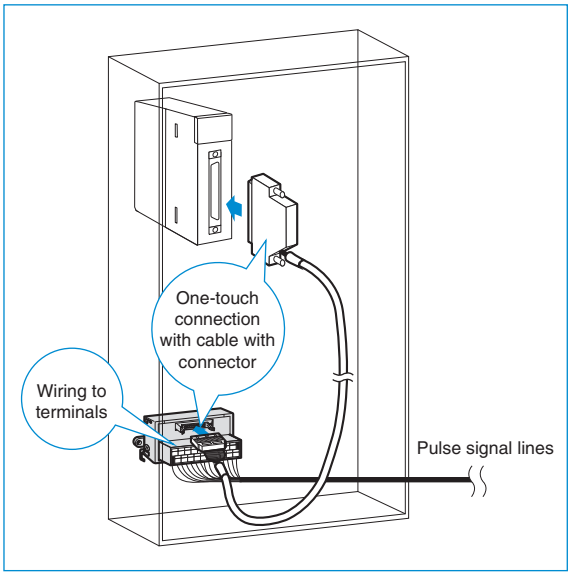
Conversion Module for High-Speed Counter 4-2

4. Conversion Module for High-Speed Counter

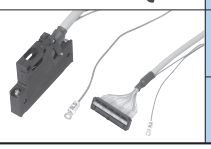
Overview

The high-speed counter conversion module is used as a relay terminal block for signal connection from a pulse generating device.





Model List

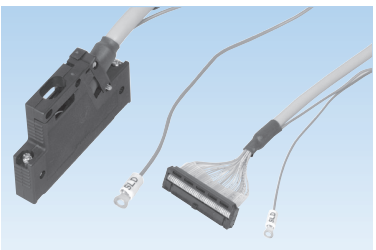
Product	Shape	Model	Remarks		Page
Terminal block type conversion module for MELSEC-Q series high-speed counter module (screw terminal block)		**FA-TBS40P**	This module is used to convert the input from the MELSEC iQ-R / MELSEC-Q/L series high-speed counter module using a screw terminal block.		1-18
Connection cable for MELSEC-Q series high-speed counter module		**FA-SCBL10FMV-M**	1m	• A connection cable between MELSEC iQ-R / MELSEC-Q/L series high-speed counter module ↔ Conversion module • Used conversion module: FA-TBS40P • Shielded cable (with FG wire on both ends)	4-2
		FA-SCBL20FMV-M	2m		

Selection Chart

Product type	Programmable controller module model	Module type	Module model	Connection cable
High-speed counter module	RD62P2 RD62D2 RD62P2E QD62 QD62E QD62D LD62 LD62D	Conversion module	**FA-TBS40P** 1-18	**FA-SCBL**FMV-M** 4-2

Connection cable (For MELSEC-Q Series High-Speed Counter Module)

FA-SCBL**FMV-M



Features

- This cable offers a one-touch connectable connector, making it possible to reduce the wiring process time.
- The cable is a shielded cable with superior noise resistance.

Related Materials

General Specifications 9-1

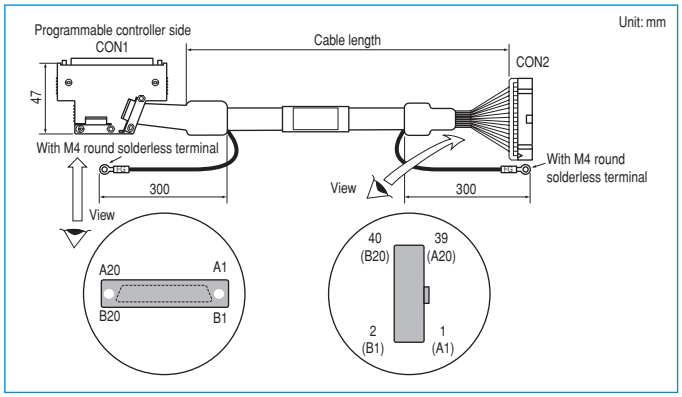
Related Products

Conversion Module 1-18

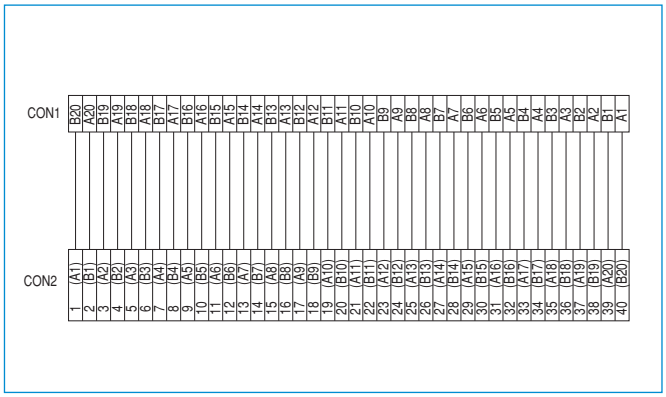
Specifications

Item	Specifications	
Model	FA-SCBL10FMV-M	FA-SCBL20FMV-M
Programmable controller-side connector	1473381-1: Tyco Electronics AMP	
Conversion module-side connector	D7940-7500SC, D3448-7940: Sumitomo 3M	
Cable	Round 40-core cable, Cable color: Blue-gray	
Conductor configuration	AWG28 (0.08mm^2)	
Cable length	1m	2m
Used solderless terminal	M4 (Daido Solderless Terminal Mfg. : RAV1.25-S4)	
Weight	Approx. 160g	Approx. 260g

External Dimension



Wiring Diagram



External Connection

The names of signals input to the terminals of the connected, conversion module (FA-TBS40P) are as follows.

◎For wiring to the terminal block, see the manual of the connected high-speed counter module published by Mitsubishi Electric.

・QD62
・QD62E

Terminal number	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
Signal name	CH1 ΦA (12V)	CH1 ABCOM	CH1 ΦB (12V)	CH1 PRST (24V)	CH1 PRST (5V)	CH1 FUNC (24V)	CH1 FUNC (5V)	CH2 ΦA (12V)	CH2 ABCOM	CH2 ΦB (12V)	CH2 PRST (24V)	CH2 PRST (5V)	CH2 FUNC (24V)	CH2 FUNC (5V)	CH1 EQU2	CH2 EQU2	NC	NC	12/24V	12/24V
Terminal number	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Signal name	CH1 ΦA (24V)	CH1 ΦA (5V)	CH1 ΦB (24V)	CH1 ΦB (5V)	CH1 PRST (12V)	CH1 CTRLCOM	CH1 FUNC (12V)	CH2 ΦA (24V)	CH2 ΦA (5V)	CH2 ΦB (24V)	CH2 ΦB (5V)	CH2 PRST (12V)	CH2 CTRLCOM	CH2 FUNC (12V)	CH1 EQU1	CH2 EQU1	NC	NC	0V	0V

・QD62D

Terminal number	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
Signal name	CH1 ΦA	CH1 ΦB	CH1 PRST (12V)	CH1 PRSTCOM	CH1 FUNC (12V)	CH1 FUNCCOM	CH2 ΦA	CH2 ΦB	CH2 PRST (12V)	CH2 PRSTCOM	CH2 FUNC (12V)	CH2 FUNCCOM	NC	NC	CH1 EQU2	CH2 EQU2	NC	NC	12/24V	12/24V
Terminal number	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Signal name	CH1 ΦA	CH1 ΦB	CH1 PRST (24V)	CH1 PRST (5V)	CH1 FUNC (24V)	CH1 FUNC (5V)	CH2 ΦA	CH2 ΦB	CH2 PRST (24V)	CH2 PRST (5V)	CH2 FUNC (24V)	CH2 FUNC (5V)	NC	NC	CH1 EQU1	CH2 EQU1	NC	NC	0V	0V

◎Ground the shielded wire in the same manner as the programmable controller module.
When grounding is not performed and the extra wire is rolled up, the wire may act as an antenna, possibly introducing noise. Caution is required.

5. Cable for Positioning Module

Contents

Overview

Servo Amplifier Connection Cable for Positioning Module ····· 5-1

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Servo Amplifier Connection Cable for Positioning Module ····· 5-1

Model List

Servo Amplifier Connection Cable for Positioning Module ····· 5-1

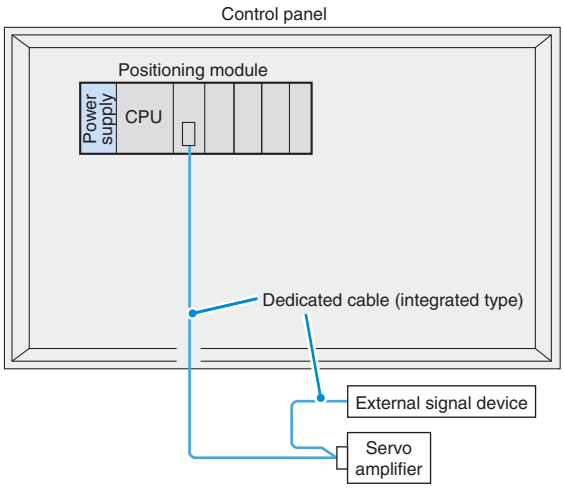
Individual Specifications

Servo Amplifier Connection Cable for Positioning Module ····· 5-2

5. Cable for Positioning Module

Servo amplifier connection cable for positioning module (for MELSEC-Q series)

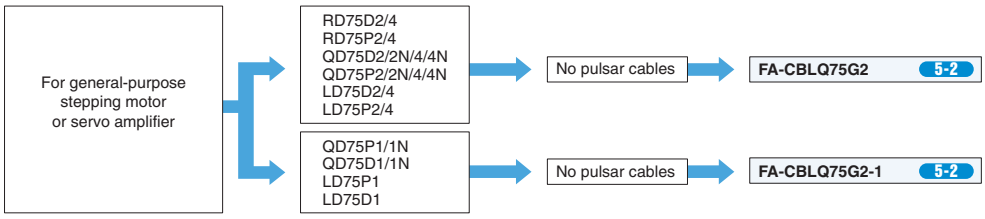
This cable is used to connect a positioning module and servo amplifier.
The cable has a branch cable with a solderless terminal for external signal connection, making wiring work easy.



Model List

Product	Shape	Model	Connectable modules	Remarks		Page
Discrete cable for general-purpose stepping motor or servo amplifier		**FA-CBLQ75G2**	RD75D2/4 RD75P2/4 QD75D2/2N/4/4N QD75P2/2N/4/4N LD75D2/4 LD75P2/4	Other side of QD75 series: Discrete cable type. Applicable to stepping motors manufactured by Oriental Motor other general-purpose servo amplifiers, and the like.	Cable length: 2m, Compatible with the 2-axis product	5-2
		FA-CBLQ75G2-1	QD75P1/1N QD75D1/1N LD75P1 LD75D1		Cable length: 2m, Compatible with the 1-axis product	

Selection Chart



Number of cables used according to the positioning module model

Model	No. of axes	Cable model	No. of cables
QD75D1, QD75D1N, QD75P1, QD75P1N, LD75D1, LD75P1	1	**FA-CBLQ75G2-1**	1
RD75D2, RD75P2, QD75D2, QD75D2N, QD75P2, QD75P2N, LD75D2, LD75P2	2	**FA-CBLQ75G2**	1
RD75D4, RD75P4, QD75D4, QD75D4N, QD75P4, QD75P4N, LD75D4, LD75P4	4	**FA-CBLQ75G2**	2

QD75 positioning cable (discrete cable type for general-purpose stepping motor or servo amplifier)

FA-CBLQ75G2/G2-1

Specifications

Item	Specifications	
Model	**FA-CBLQ75G2**	**FA-CBLQ75G2-1**
Connected module	QD75D2/2N/4/4N, QD75P2/2N/4/4N, LD75D2/4, LD75P2/4	QD75D1/1N, QD75P1/1N, LD75D1, LD75P1
Compatible number of axes	2	1
Manual pulsar cable	None	
Cable	For securing area, length: 2m, permissible bending radius: 120mm	
Used solderless terminal	V1.25-M3 (M3.5 screw round isolated solderless terminal) manufactured by J.S.T. Mfg.	
Discrete cable conductor configuration	Nominal cross-sectional area: 0.18mm^2 (AWG25), Material: Annealed tinned copper wire	
Applicable solderless terminal	V1.25-M3 (M3.5 screw round isolated solderless terminal) manufactured by J.S.T. Mfg.	
Weight	Approx. 840g	Approx. 520g

Features

- This cable has the discrete end(s), enabling wiring in accordance with the connected device.
- The cable is provided with noise countermeasures based on a shielding process.

Related Materials

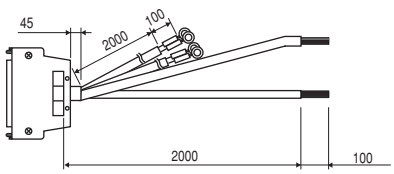
General Specifications 9-1

External Dimension

Unit: mm

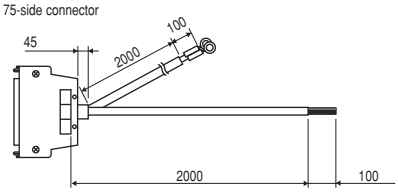
[FA-CBLQ75G2]

75-side connector



[FA-CBLQ75G2-1]

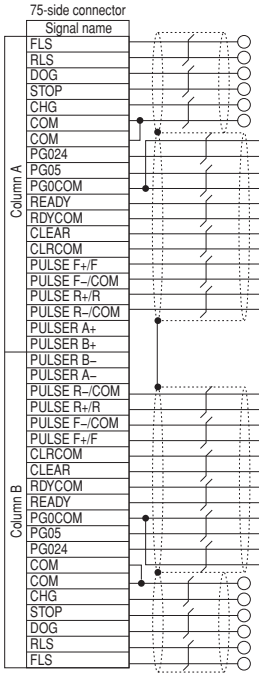
75-side connector



Wiring Diagram

[FA-CBLQ75G2]

75-side connector

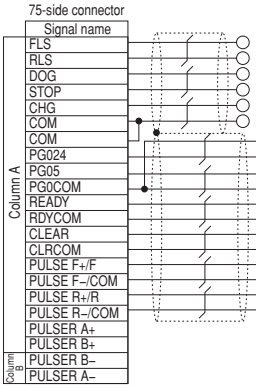


Signal name	Cable color	Dots	Color
PG0COM	Orange	1	Red
PG024	Orange	1	Black
PG05	Light gray	1	Red
PG0COM	Light gray	1	Black
READY	White	1	Red
RDYCOM	White	1	Black
CLEAR	Yellow	1	Red
CLRCOM	Yellow	1	Black
PULSE F+/F	Pink	1	Red
PULSE F–/COM	Pink	1	Black
PULSE R+/R	Orange	2	Red
PULSE R–/COM	Orange	2	Black

Signal name	Cable color	Dots	Color
PULSE R–/COM	Orange	1	Red
PULSE R+/R	Orange	1	Black
PULSE F–/COM	Light gray	1	Red
PULSE F+/F	Light gray	1	Black
CLRCOM	White	1	Red
CLEAR	White	1	Black
RDYCOM	Yellow	1	Red
READY	Yellow	1	Black
PG0COM	Pink	1	Red
PG05	Pink	1	Black
PG024	Orange	2	Red
PG0COM	Orange	2	Black

[FA-CBLQ75G2-1]

75-side connector

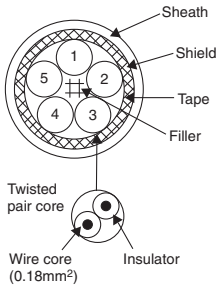


Signal name	Cable color	Dots	Color
PG0COM	Orange	1	Red
PG024	Orange	1	Black
PG05	Light gray	1	Red
PG0COM	Light gray	1	Black
READY	White	1	Red
RDYCOM	White	1	Black
CLEAR	Yellow	1	Red
CLRCOM	Yellow	1	Black
PULSE F+/F	Pink	1	Red
PULSE F–/COM	Pink	1	Black
PULSE R+/R	Orange	2	Red
PULSE R–/COM	Orange	2	Black

Note: The discrete cable end is not terminated. Be sure to terminate the wiring in accordance with the connected device.

Cable Structural Drawing

Example: 5-pair (10-core)



Wire core identification

No.		Insulator	Dots	
Core	Pair	Color		Color
1	1	Orange	– (one short point)	Red
2			–	Black
3	2	Light gray	–	Red
4			–	Black
5	3	White	–	Red
6			–	Black
7	4	Yellow	–	Red
8			–	Black
9	5	Pink	–	Red
10			–	Black

6. Conversion Module for MELSEC-L CPU

Contents

Conversion Module Connection Cable for MELSEC-L CPU Module with Built-in I/O Function

Overview 6-1
Model List 6-1
Selection Chart 6-1
Individual Specifications 6-2

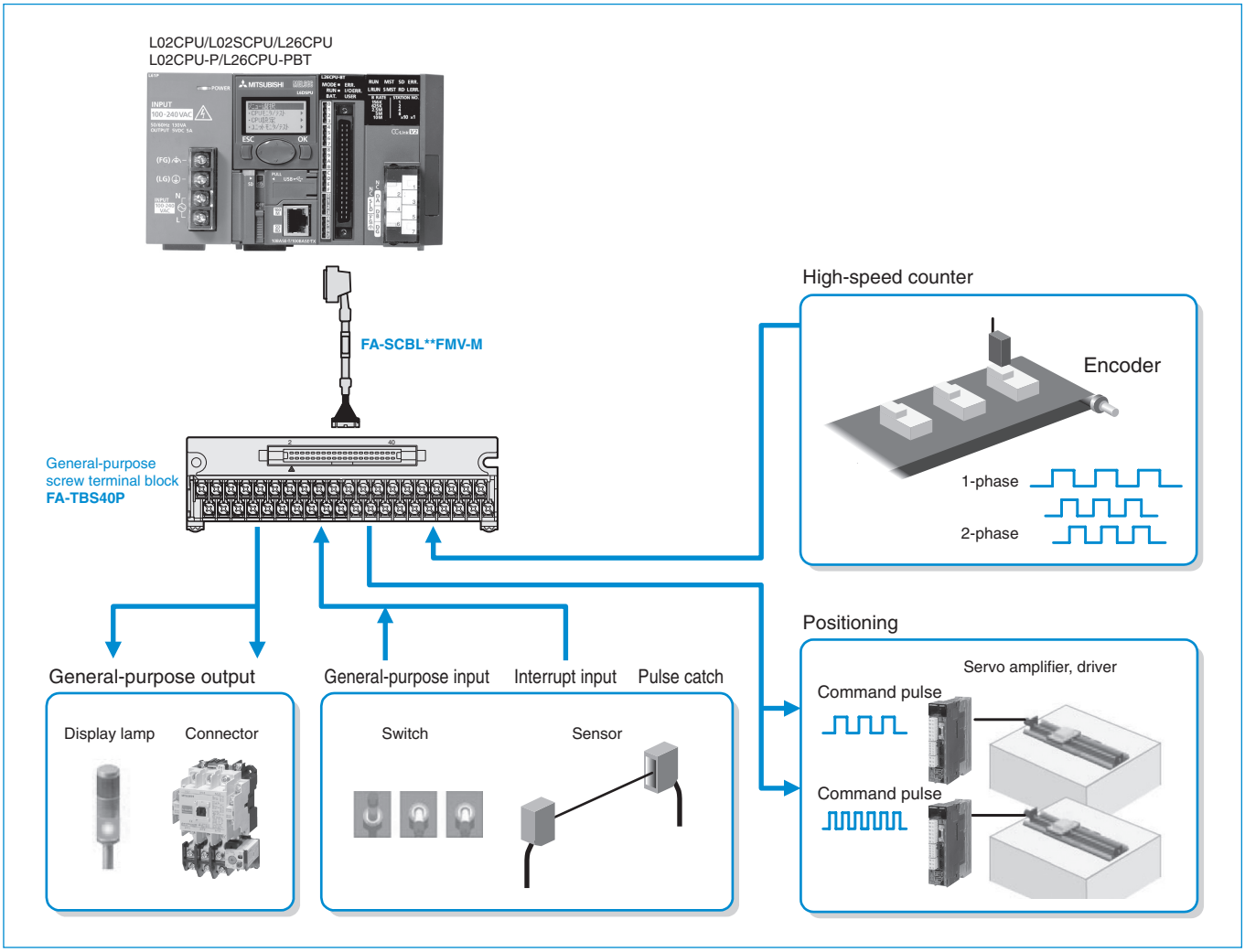
Built-in I/O Function (Positioning) Signal Conversion Module

Overview 6-3
Model List 6-3
Selection Chart 6-3
Individual Specifications 6-4, 5

6. Conversion Module for MELSEC-L CPU

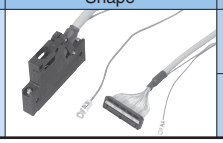
Overview

■The following cable is used to connect between the connector of the CPU module with built-in I/O function (I/O, high-speed counter, pulse catch, positioning, interrupt input) and a FA goods conversion module.



Model List

Module-to-module cable

Product	Shape	Model		Remarks	Page
For CPU module (built-in I/O function)		FA-SCBL10FMV-M	1m	• This cable is used to connect between the connector of the CPU module with built-in I/O function (positioning function, high-speed counter function, pulse catch function, interrupt input function, general-purpose input/output function) and FA-TBS40P.	6-2
		FA-SCBL20FMV-M	2m		

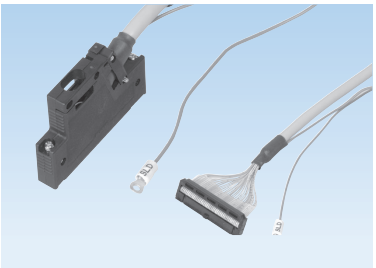
Selection Chart

Programmable controller module model	Conversion module model	Connection cable
L02CPU L02CPU-SET L02CPU-P L02CPU-P-SET L02SCPU L06CPU L06CPU-SET L06CPU-P L06CPU-P-SET L26CPU L26CPU-SET L26CPU-BT L26CPU-BT-SET L26CPU-PBT L26CPU-PBT-SET	FA-TBS40P 1-18	FA-SCBL**FMV-M 6-2

Individual Specifications

Conversion module connection cable for MELSEC-L CPU module with built-in I/O function

FA-SCBL**FMV-M



Features

■This cable connects between the connector of the MELSEC-L series CPU module with built-in I/O function and a general-purpose 40-point conversion module.

Related Materials

General Specifications 9-1

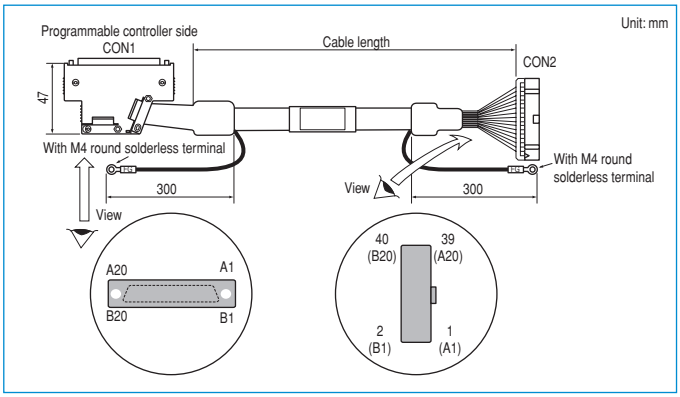
Related Products

Conversion Module 1-18

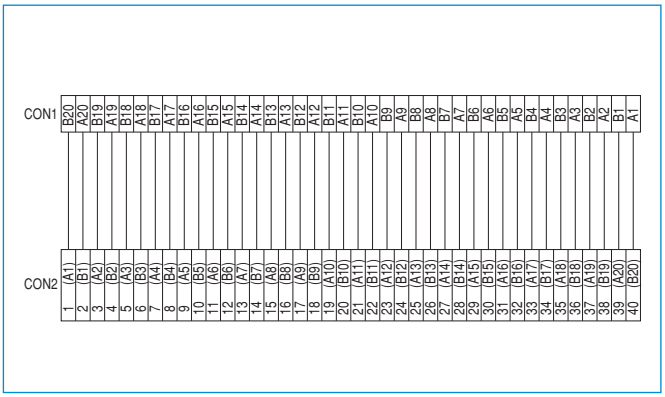
Specifications

Item	Specifications	
Model	FA-SCBL10FMV-M	FA-SCBL20FMV-M
Programmable controller side connector	1473381-1: Tyco Electronics AMP	
Conversion module side connector	D7940-7500SC, D3448-7940: Sumitomo 3M	
Cable	Round 40-core cable, Cable color: Blue-gray	
Conductor configuration	AWG28 (0.08mm²)	
Cable length	1m	2m
Used solderless terminal	M4 (Daido Solderless Terminal Mfg.: RAV1.25-S4)	
Weight	Approx. 160g	Approx. 260g

External Dimension



Wiring Diagram



External Connection

The names of signals input to the terminals of the connected conversion module (FA-TBS40P) are as follows.

◎For wiring to the terminal block, see the manual of the connected MELSEC-L CPU module published by Mitsubishi Electric.

Programmable controller connector pin number	B20	B19	B18	B17	B16	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Terminal number	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
Signal name	IN0 24V	IN0 DIFF	IN0 COM	IN1 24V	IN1 DIFF	IN1 COM	IN4 24V	IN4 DIFF	IN4 COM	IN COM	IN6	IN8	INA	INC	INE	OUT0	OUT2	OUT4	OUT6	OUT COM

Programmable controller connector pin number	A20	A19	A18	A17	A16	A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1
Terminal number	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Signal name	IN2 24V	IN2 DIFF	IN2 COM	IN3 24V	IN3 DIFF	IN3 COM	IN5 24V	IN5 DIFF	IN5 COM	IN COM	IN7	IN9	INB	IND	INF	OUT1	OUT3	OUT5	OUT7	OUT COM

◎Ground the shielded wire in the same manner as the programmable controller module.
When grounding is not performed and the extra wire is rolled up, the wire may act as an antenna, possibly introducing noise. Caution is required.

Connection example 1: With high-speed counter function

Terminal number	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
Signal name	PULSE A1 24V	PULSE A1 DIFF	PULSE A1 COM	PULSE B1 24V	PULSE B1 DIFF	PULSE B1 COM	PULSE Z1 24V	PULSE Z1 DIFF	PULSE Z1 COM	IN COM	FUNC1	LATCH1	NC	NC	NC	CH1 EQU1	CH1 EQU2	NC	NC	OUT COM

Terminal number	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Signal name	PULSE A2 24V	PULSE A2 DIFF	PULSE A2 COM	PULSE B2 24V	PULSE B2 DIFF	PULSE B2 COM	PULSE Z2 24V	PULSE Z2 DIFF	PULSE Z2 COM	IN COM	FUNC2	LATCH2	NC	NC	NC	CH2 EQU1	CH2 EQU2	NC	NC	OUT COM

Connection example 2: With positioning function

Terminal number	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
Signal name	NC	NC	NC	NC	NC	NC	PG01 24V	PG01 DIFF	PG01 COM	IN COM	CHG 1	READY 1	DOG 1	FLS 1	RLS 1	NC	CLEAR1	PULSE F1	PULSE R1	OUT COM

Terminal number	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Signal name	NC	NC	NC	NC	NC	NC	PG02 24V	PG02 DIFF	PG02 COM	IN COM	CHG 2	READY 2	DOG 2	FLS 2	RLS 2	NC	CLEAR2	PULSE F2	PULSE R2	OUT COM

Connection example 3: With 24VDC I/O, high-speed counter, and positioning function combination

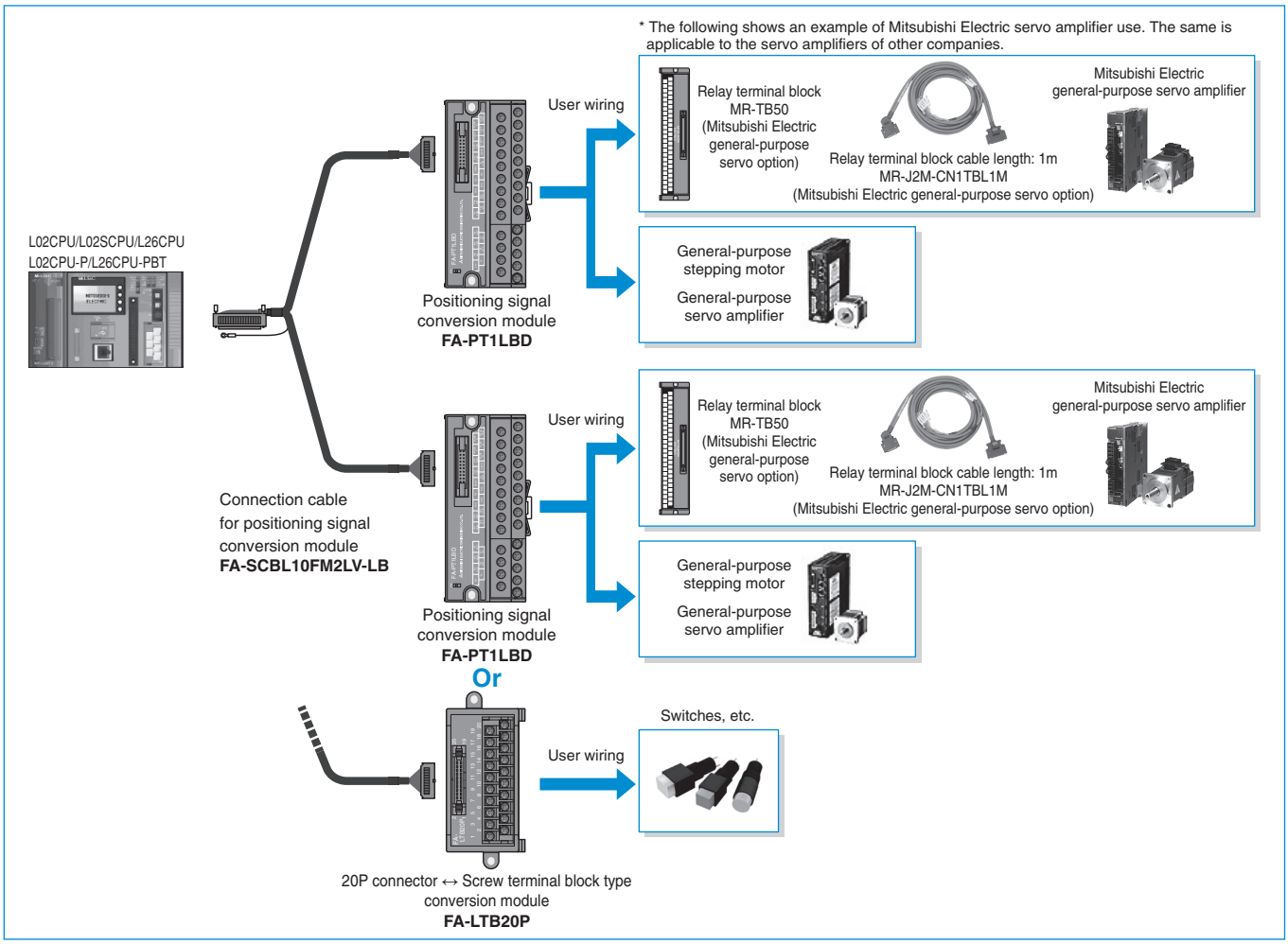
Terminal number	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
Signal name	PULSE A1 24V	PULSE A1 DIFF	PULSE A1 COM	PULSE B1 24V	PULSE B1 DIFF	PULSE B1 COM	PULSE Z1 24V	PULSE Z1 DIFF	PULSE Z1 COM	IN COM	FUNC1	LATCH1	XA	XC	XE	CH1 EQU1	CH1 EQU2	Y4	Y6	OUT COM

Terminal number	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Signal name	X2	NC	X2 COM	X3	NC	X3 COM	PG02 24V	PG02 DIFF	PG02 COM	IN COM	CHG 2	READY 2	DOG 2	FLS 2	RLS 2	Y1	CLEAR2	PULSE F2	PULSE R2	OUT COM

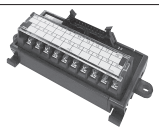
*Do not perform wiring to any signal name indicated as NC.

Overview

■This module is used to convert the pulse output of the CPU module with built-in I/O function (positioning) from the open collector output to the differential driver output.



Model List

Product	Shape	Model	Remarks	Page
Positioning signal conversion module		**FA-PT1LBD**	●For CPU module with built-in I/O function ●Applicable to both sink output and source output types	6-4
Connection cable for positioning signal conversion module		**FA-SCBL10FM2LV-LB**	●Cable length: 1m	6-5
20-point terminal block type conversion module		**FA-LTB20P**	●Allows you to combine the positioning (differential driver output) module and the general-purpose I/O terminal module in accordance with the system.	6-5

Selection Chart

Programmable controller module model	Conversion module model	Connection cable
L02CPU L02CPU-SET L02CPU-P L02CPU-P-SET L02SCPU L06CPU L06CPU-SET L06CPU-P L06CPU-P-SET L26CPU L26CPU-SET L26CPU-BT L26CPU-BT-SET L26CPU-PBT L26CPU-PBT-SET	**FA-PT1LBD** 6-4	**FA-SCBL10FM2LV-LB** 6-5

Individual Specifications

Positioning signal conversion module

FA-PT1LBD

Features

- This module converts the output to the differential driver output, improving exogenous noise resistance.
- The module converts the output to the differential driver output, offering a drive module wiring length of 10m, improving module installation freedom.

Related Materials

General Specifications 9-1

Applicable Standards

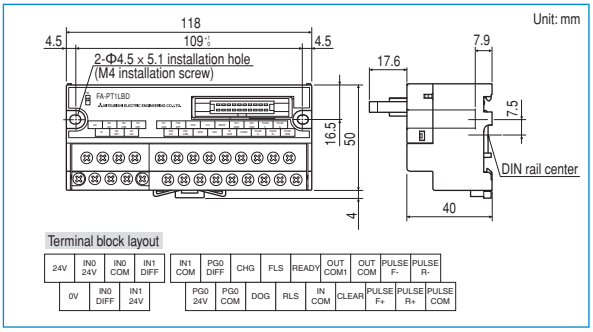
UL cUL CE

Specifications

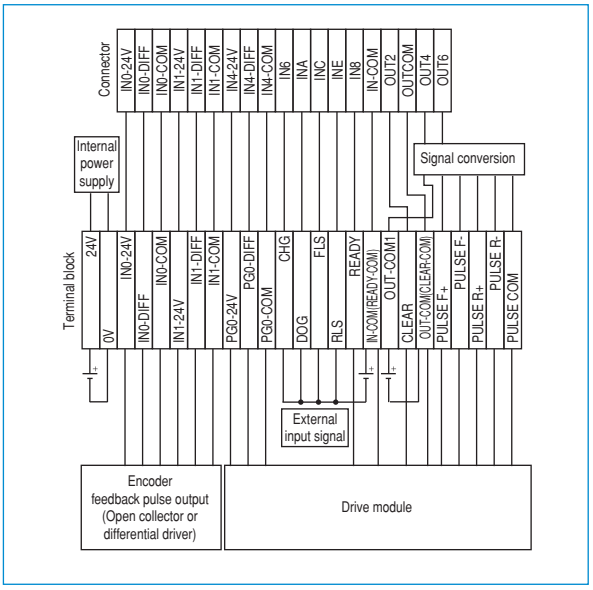
Item		Specifications
Number of converted axes		1
PULSE F/R output specifications	Output	AM26C31 equivalent differential driver
	Maximum number of output pulses	200kpps
	Pulse width	2.0μs or more; 2.0μs or more; 2.0μs or more
	Maximum connection distance with drive module	10m
Command pulse signal power supply		24V±10%, 50mA or less
PG0, CHG, DOG, FLS, RLS input specifications		According to the MELSEC-L series CPU with built-in I/O function (positioning function)
Ready input specifications		
Clear output specifications		
Module power supply		24VDC ±10% (within 5% ripple rate)
Module current consumption		At 24VDC, approx. 40mA *Not including current consumption of programmable controller
Terminal block	Terminal screw	M3 screw, number of terminals: 25P, 7.62-mm pitch, spring enhanced screw with finger protection cover
	Applicable wire, tightening torque	0.5 to 1.25mm^2, 58.8 to 88.2N·cm
Withstand voltage, insulation resistance		Between power supply and signal: 500VAC for 1 minute, 10MΩ or more
Module installation	Screw installation	M4 × 0.7mm × 16mm or more, tightening torque: 78 to 108Ncm
	DIN rail installation	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compatible)
Weight		Approx. 170g

Note: For wiring to the terminal, see the manual of the connected MELSEC-L CPU module published by Mitsubishi Electric.

External Dimension



Wiring Diagram



Positioning signal conversion module connection cables

FA-SCBL10FM2LV-LB

Features

- This cable offers a one-touch connectable connector, making it possible to reduce wiring process time.
- The cable used is a shielded cable with superior noise resistance.

Related Materials

General Specifications 9-1

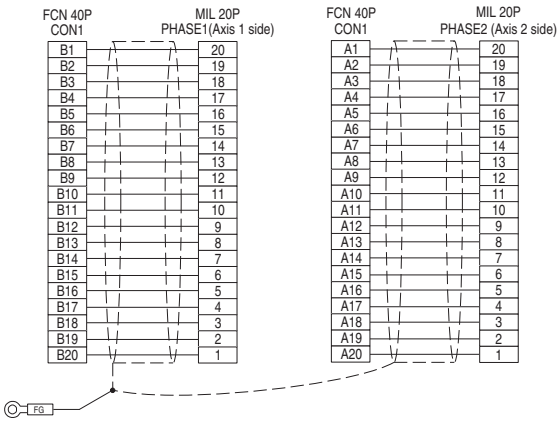
Related Products

Conversion Module 6-5

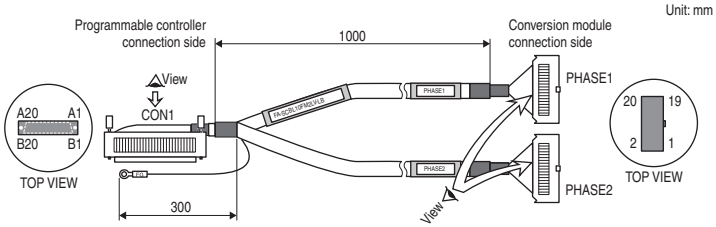
Specifications

Item	Specifications
Programmable controller side connector	FCN367J040-AU/MW: Fujitsu Component
Conversion module side connector	D7920-B500FL, D3448-7920 × 20: Sumitomo 3M
Cable	Round 20-core cable × 2, Cable color: Gray
Conductor configuration	AWG28 (0.08mm^2)
Cable length	1m
Used solderless terminal	M4 (Daido Solderless Terminal Mfg.: RAV1.25-S4)
Weight	Approx. 150g

Wiring Diagram

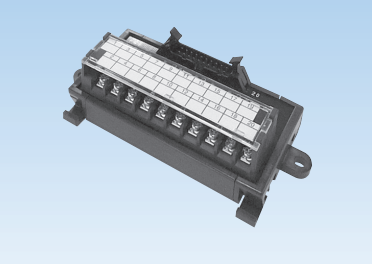


External Dimension



General-purpose 20-point terminal block type conversion module

FA-LTB20P



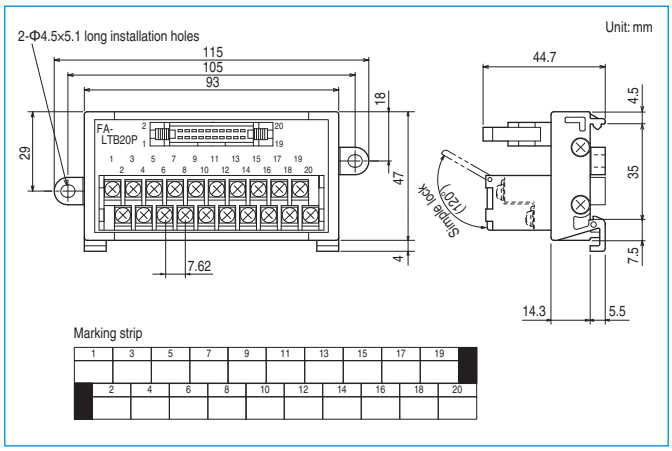
Features

- This module makes it possible to combine positioning (differential driver output) and general-purpose input/output terminal blocks in accordance with your system.
- When the same modules are installed in a row on a DIN rail, there is no need to provide space below adjacent modules for screw mount insertion.
- The printed-circuit board is an inexpensive open type that can be viewed from the outside. The module can be installed on a DIN rail or with screws.

Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

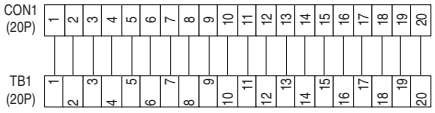
External Dimension



Specifications

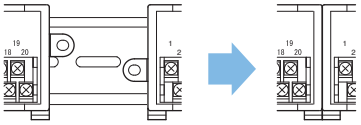
Item		Specifications
Model		**FA-LTB20P**
No. of points		20 points, general-purpose
Maximum operating voltage, current		48VDC, 1A/point
Wiring method for common		–
Terminal block	Terminal screw	M3 screws, number of terminals: 20P, 7.62-mm pitch, regular screw
	Applicable wire, tightening torque	0.3 to 2mm^2 (with solderless terminal use), 50 to 75N·cm
Module installation	Screw installation	M4 × 0.7mm × 10mm or more, tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage, insulation resistance		500VAC for 1 minute, 10MΩ or more (between all DC external terminals ↔ ground, between charged areas)
Weight		Approx. 115g
Precautions		Failure to push in the module connector until it is locked may cause poor contact.

External Dimension



Module Installation Tips

When installing models that have screw installation holes on both module sides adjacent to each other on a DIN rail, the models can be installed close together as shown below.



Applicable models
•FA-LTB**

Contents

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Output Type 7-6

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Input Type Conversion Adapter 7-8
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Output Type Module ..... 7-18 to 21
Output Type Module-to-Module Cable 7-23, 24
Input/output Type Module 7-25, 26

7. Analog Signal Converter

Input Type Analog Signal Converter

The input type analog signal converter is composed of the following modules, installation base unit, and adapter.

●Modules

Convert analog input signals to output signals in the range 1 to 5V to a programmable controller. (Isolation between the input and output provided)
The following types of analog input signals are supported.

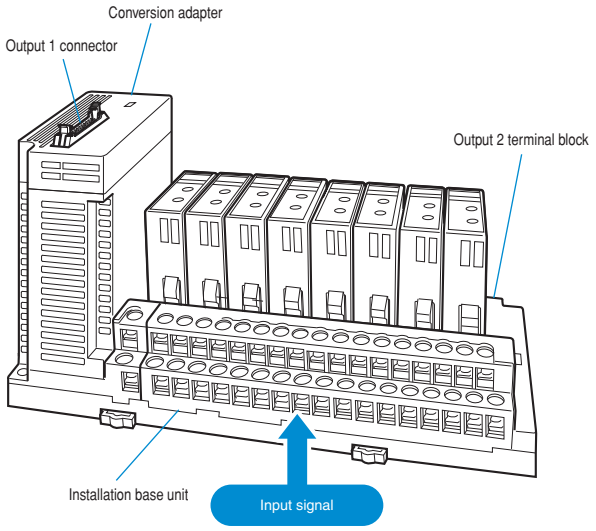
(1) Voltage input ····· 0 to 5V, 1 to 5V, -10 to +10V
(2) Current input ····· 4 to 20mA
(3) Distributor ····· 4 to 20mA
(4) Resistance temperature detector input
····· Pt100 -200 to +650°C, 0 to +100°C, 0 to +200°C, JPt100 -200 to +600°C
(5) Thermocouple temperature input
····· type B thermocouple +600 to +1700°C, type R thermocouple 0 to +1600°C, type S thermocouple 0 to +1600°C,
type K thermocouple -200 to +1200°C, 0 to +400°C, 0 to +600°C, 0 to +800°C
type E thermocouple -200 to +900°C, type J thermocouple -40 to +750°C,
type T thermocouple -200 to +350°C, type N thermocouple -200 to +1250°C
(6) Signal pass-through ··· Signal pass-through (not isolated), current to voltage conversion (not isolated)
(7) Dummy ····· For empty slot dust protection

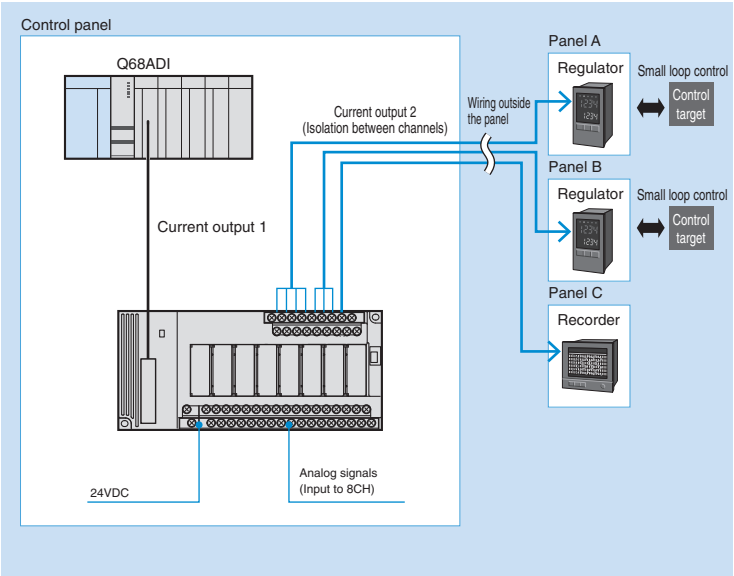
●Installation base unit

For module installation (8 slots), **Terminal block:** Input side, **Connector:** Output side (Programmable controller side)

Since channels are isolated from one another, a different analog signal can be input through each channel.

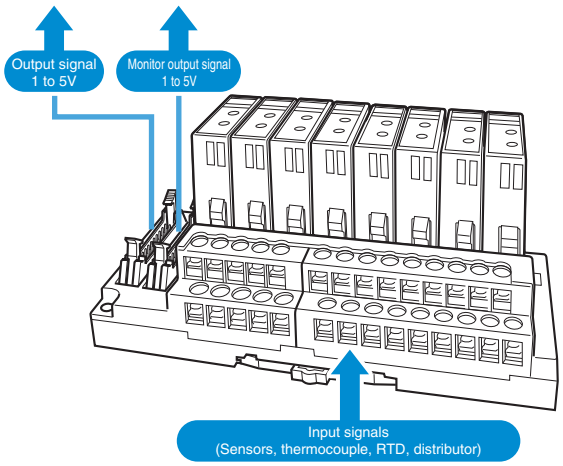
●Installation base unit (with connector for adapter) + conversion adapter (1 input - 2 current outputs)
This converter outputs voltage (1 to 5VDC) signals isolated and converted by modules as two current (4 to 20mADC) outputs into a programmable controller and external terminals.
Besides a programmable controller, devices outside the panel can be connected.





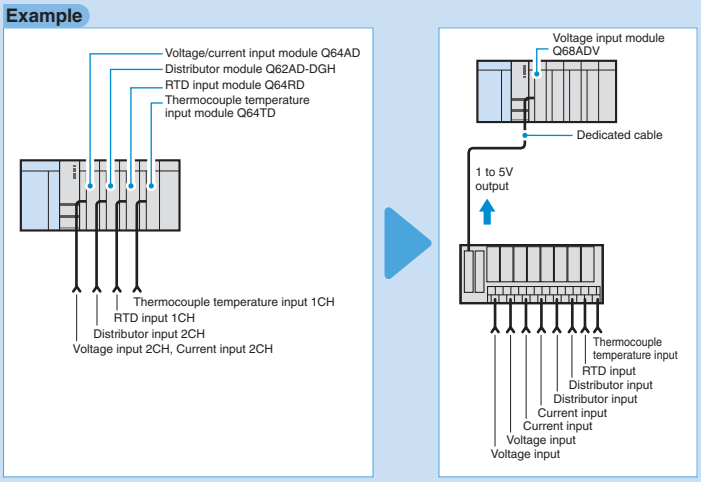
●Installation base unit (Input only)
This converter outputs voltage (1 to 5V) signals isolated and converted by modules to a programmable controller. Suitable for use inside the panel.

For module installation (8 slots)
Terminal block: Input side,
Connector: Output side (Programmable controller side)
Since channels are isolated from one another, a different analog signal can be input into each channel.



The configuration of a programmable controller system can be minimized when inputting multiple analog signals.

Example



Output Type Analog Signal Converter

The output type analog signal converter is composed of the following modules and installation base unit.

●Modules

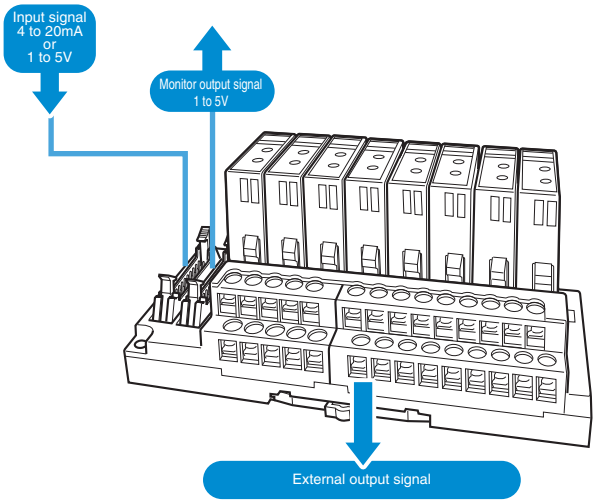
Convert analog input signals from a programmable controller into voltage/current output signals. (Isolation between the input and output provided)
The following types are available.

(1) Current input → Voltage output ····· 4 to 20mA → 0 to 5V, 1 to 5V, 0 to 10V, -10 to +10V
(2) Current input → Current output ····· 4 to 20mA → 0 to 20mA, 4 to 20mA
(3) Voltage input → Voltage output ····· 1 to 5V → 0 to 5V, 1 to 5V, 0 to 10V, -10 to +10V
(4) Voltage input → Current output ····· 1 to 5V → 0 to 20mA, 4 to 20mA
(5) Signal pass-through ····· Signal pass-through (not isolated), current to voltage conversion (not isolated)
(6) Dummy ····· For empty slot dust protection

● Installation base unit (output only)

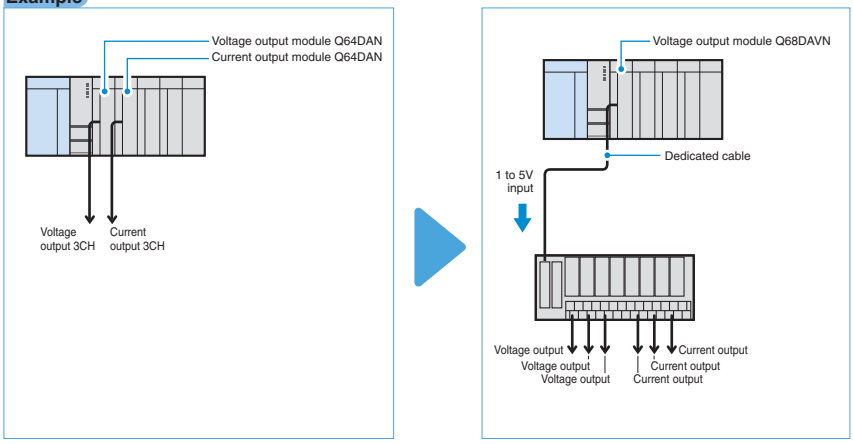
For module installation (8 slots), **Terminal block:** Output side, **Connector:** Input side (Programmable controller side)

Since channels are isolated another, a different analog signal can be output through each channel.
Voltage or current signals from a programmable controller are output as voltage or current signals isolated on a per-channel basis.



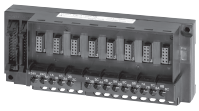
The configuration of a programmable controller system can be minimized when outputting multiple analog signals.

Example



Model List

•Input Type

Product	Shape	Model	Remarks			Page
Installation base unit (Input only) (With connector for adapter)		FA-ATKB8XTB	Used with a conversion adapter combined 8 slots (for 8 signal conversion modules) Output 18P terminal block (depending on the adapter output) External power supply: 24VDC			7-7
Conversion adapter (1 input - 2 current outputs supported)		FA-ATKAA8XM	Used with FA-ATKB8XTB combined Output 20P MIL connector (for output to programmable controller) Module 1 to 5V signal → Output to programmable controller: 8 non-isolated channels, 4 to 20mA Module 1 to 5V signal → Output to terminal block on base side: 8 isolated channels, 4 to 20mA			7-8
Installation base unit (Input only)		FA-ATB8XTB	8 slots (for 8 signal conversion modules) Output: 20P MIL connector × 2 (for output to programmable controller and output to monitor) External power supply: 24VDC			7-9
Signal conversion module (Input only)		FA-ATSVM1XV05	Voltage input	0 to 5V	Output to programmable controller...1 to 5VDC	7-10
		FA-ATSVM1XV15		1 to 5V		
		FA-ATSVM1XV1010		-10 to 10V		
		FA-ATSVM1XA420	Current input	4 to 20mA	Output to programmable controller...1 to 5VDC	7-11
		FA-ATSVM1XD	Distributor	4 to 20mA	Output to programmable controller...1 to 5VDC	7-12
		FA-ATSVM1XRPT	RTD input	Pt100 -200 to +650°C	Output to programmable controller...1 to 5VDC	7-13
		FA-ATSVM1XRPT0010		Pt100 0 to +100°C		
		FA-ATSVM1XRPT0020		Pt100 0 to +200°C		
		FA-ATSVM1XRJPT		JPt100 -200 to +600°C		
		FA-ATSVM1XTB	Thermocouple temperature input	type B thermocouple +600 to +1700°C	Output to programmable controller...1 to 5VDC	7-14
		FA-ATSVM1XTR		type R thermocouple 0 to +1600°C		
		FA-ATSVM1XTS		type S thermocouple 0 to +1600°C		
		FA-ATSVM1XTK		type K thermocouple -200 to +1200°C		
		FA-ATSVM1XTK0040		type K thermocouple 0 to +400°C		
		FA-ATSVM1XTK0060		type K thermocouple 0 to +600°C		
		FA-ATSVM1XTK0080		type K thermocouple 0 to +800°C		
		FA-ATSVM1XTE		type E thermocouple -200 to +900°C		
		FA-ATSVM1XTJ		type J thermocouple -40 to +750°C		
		FA-ATSVM1XTT		type T thermocouple -200 to +350°C		
		FA-ATSVM1XTN		type N thermocouple -200 to +1250°C		
Pass-through module (Input/output)		FA-ATFTMXY	• Signals that do not need to be isolated are passed through. • Current-to-voltage conversion (non-isolation) is possible by short-circuiting an external terminal.			7-25
Dummy module (Input/output)		FA-ATNDM5	5	• This module is a dummy module to be mounted to an empty slot of an installation base unit. • Product model: FA-ATNDM • Model for manufacturing arrangement: FA-ATNDM5 (with 5 FA-ATNDMs)		7-26
Connection cable with connector		FA-CBL10ATQ8XVA	1m	• This cable is used for connector connection between an installation base unit or conversion adapter and a programmable controller module. • For connection to a programmable controller, with a connector conversion adapter (FA-Q6TCA) installed, connection is made through one-touch operation. • Connected to a relay module, this cable is also used for connecting to a general purpose device via the relay module.		7-15
		FA-CBL20ATQ8XVA	2m			
		FA-CBL30ATQ8XVA	3m			
Connection cable with terminal block		FA-CBL10ATQ8XVT	1m	• This cable is used for connecting an installation base unit or conversion adapter and a programmable controller module. • This cable is provided with a MELSEC-Q series terminal block.		7-16
		FA-CBL20ATQ8XVT	2m			
		FA-CBL30ATQ8XVT	3m			
Connection cable with discrete cable on one side		FA-CBL10ATF	1m	• This cable is used for connecting an installation base unit or conversion adapter and an analog input module such as a programmable controller. • Terminal processing has not been done on the programmable controller side.		7-16
		FA-CBL20ATF	2m			
		FA-CBL30ATF	3m			

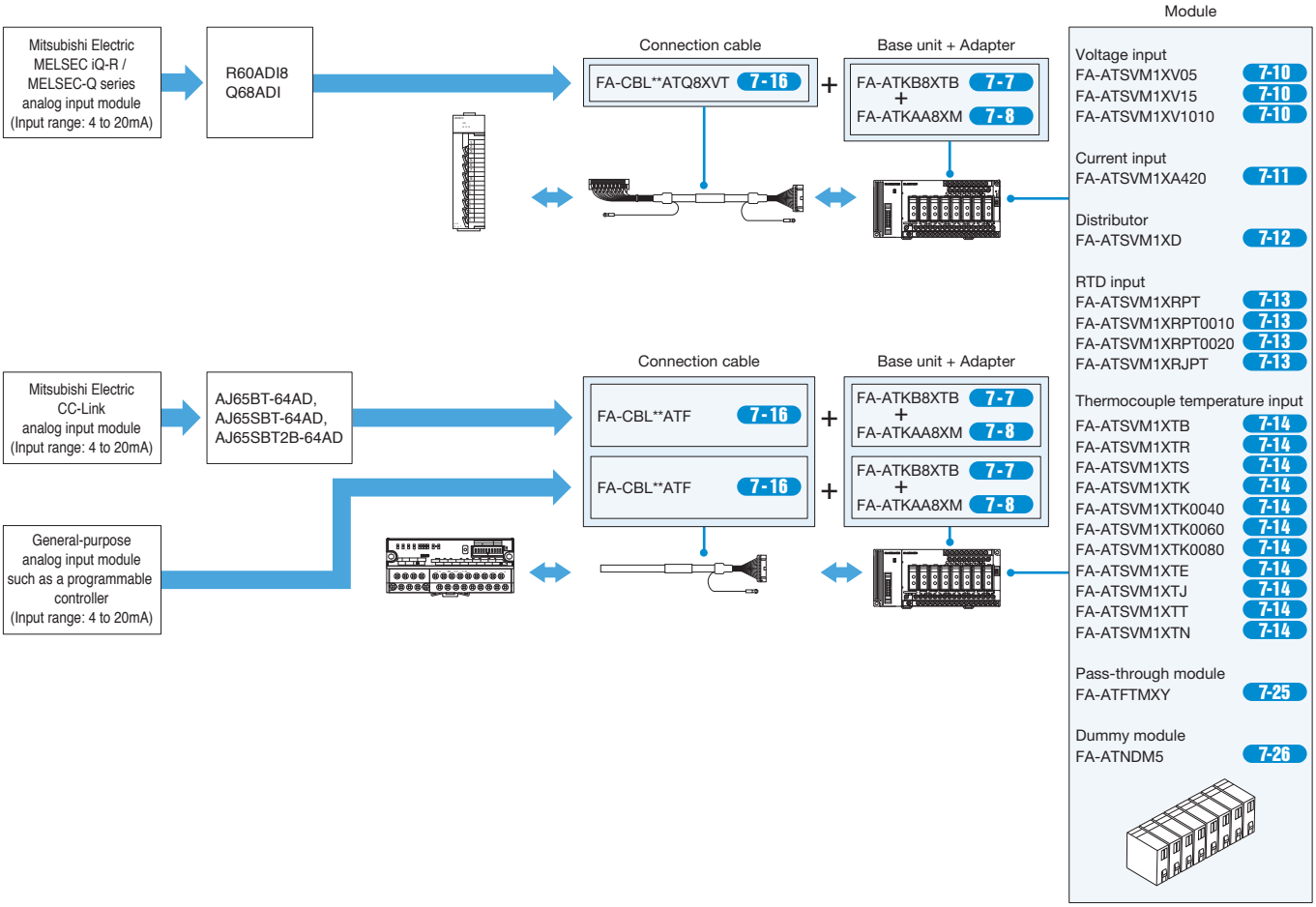
Model List

•Output Type

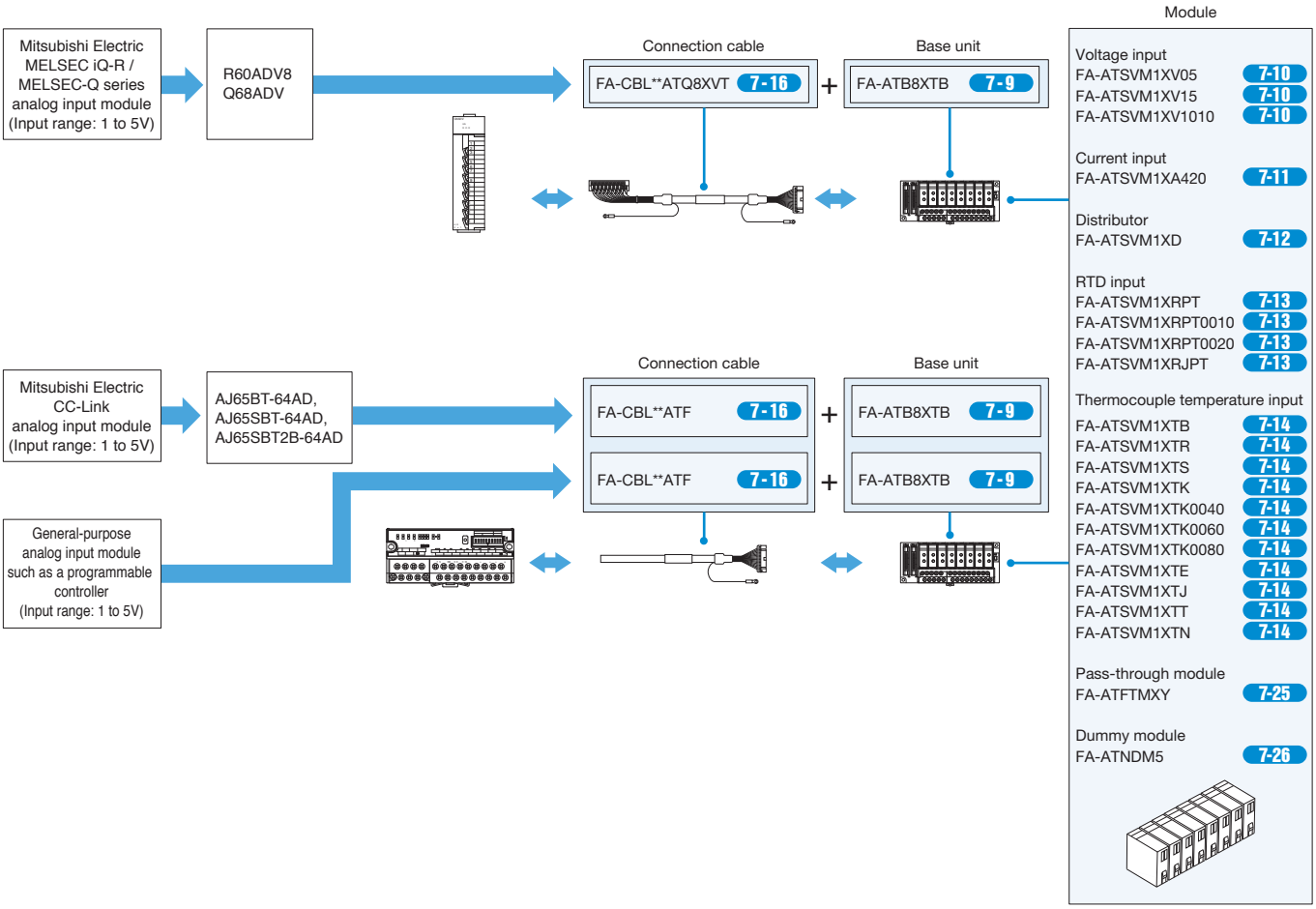
Product	Shape	Model	Remarks			Page
Installation base unit (Output only)		FA-ATB8YTB	This base unit supplies power to all the mounted output type signal conversion modules. Number of output type signal conversion modules that can be mounted: 8 Output terminal : M3 spring-up terminal Input : 20P MIL connector × 2 (parallel connection) External power supply : 24VDC			7-17
Signal conversion module (Output only)		FA-ATSAM1YV05	Voltage output	0 to 5V	Input from programmable controller...4 to 20mA	7-18
		FA-ATSAM1YV15		1 to 5V		
		FA-ATSAM1YV010		0 to 10V		
		FA-ATSAM1YV1010		-10 to 10V		
		FA-ATSAM1YA020	Current output	0 to 20mA	Input from programmable controller...4 to 20mA	7-19
		FA-ATSAM1YA420		4 to 20mA		
		FA-ATSVM1YV05	Voltage output	0 to 5V	Input from programmable controller...1 to 5V	7-20
		FA-ATSVM1YV15		1 to 5V		
		FA-ATSVM1YV010		0 to 10V		
		FA-ATSVM1YV1010		-10 to 10V		
		FA-ATSVM1YA020	Current output	0 to 20mA	Input from programmable controller...1 to 5V	7-21
		FA-ATSVM1YA420		4 to 20mA		
Pass-through module (Input/output)		FA-ATFTMXY	• Signals that do not need to be isolated are passed through. • Current-to-voltage conversion (non-isolation) is possible by short-circuiting an external terminal.			7-25
Dummy module (Input/output)		FA-ATNDM5	5	• This module is a dummy module to be mounted to an empty slot of an installation base unit. • Product model: FA-ATNDM • Model for manufacturing arrangement: FA-ATNDM5 (with 5 FA-ATNDMs)		7-26
Connection cable with connector		FA-CBL10ATQ8YA	1m	• This cable is used for connector connection between an installation base unit and a programmable controller module. • For connection to a programmable controller, with a connector conversion adapter (FA-Q6TCA) installed, connection is made through one-touch operation.		7-23
		FA-CBL20ATQ8YA	2m			
		FA-CBL30ATQ8YA	3m			
Connection cable with terminal block		FA-CBL10ATQ8YT	1m	• This cable is used for connecting an installation base unit and a programmable controller module. • This cable is provided with a MELSEC-Q series terminal block.		7-23
		FA-CBL20ATQ8YT	2m			
		FA-CBL30ATQ8YT	3m			
Connection cable with discrete cable on one side		FA-CBL10ATYF	1m	• This cable is used for connecting general-purpose analog output modules such as programmable controllers. • Terminal processing has not been done on the programmable controller side.		7-24
		FA-CBL20ATYF	2m			
		FA-CBL30ATYF	3m			

Selection Chart

•Input type (conversion adapter mount type)

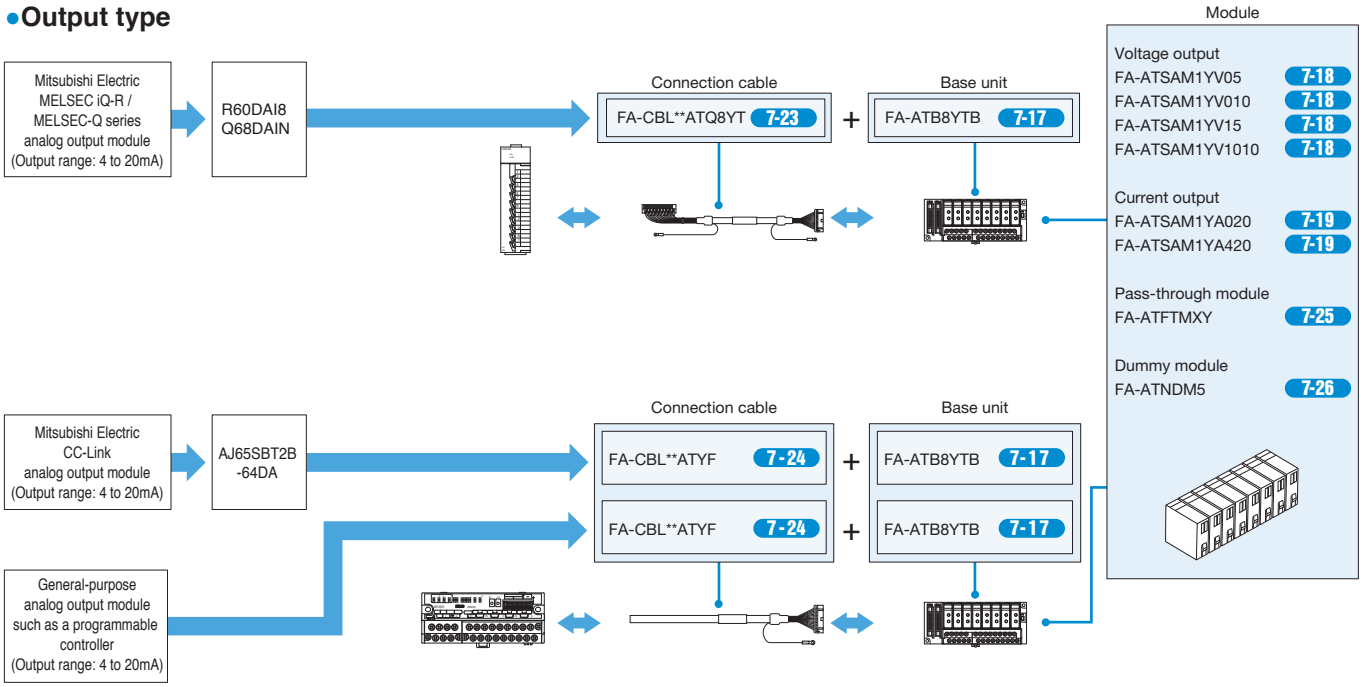


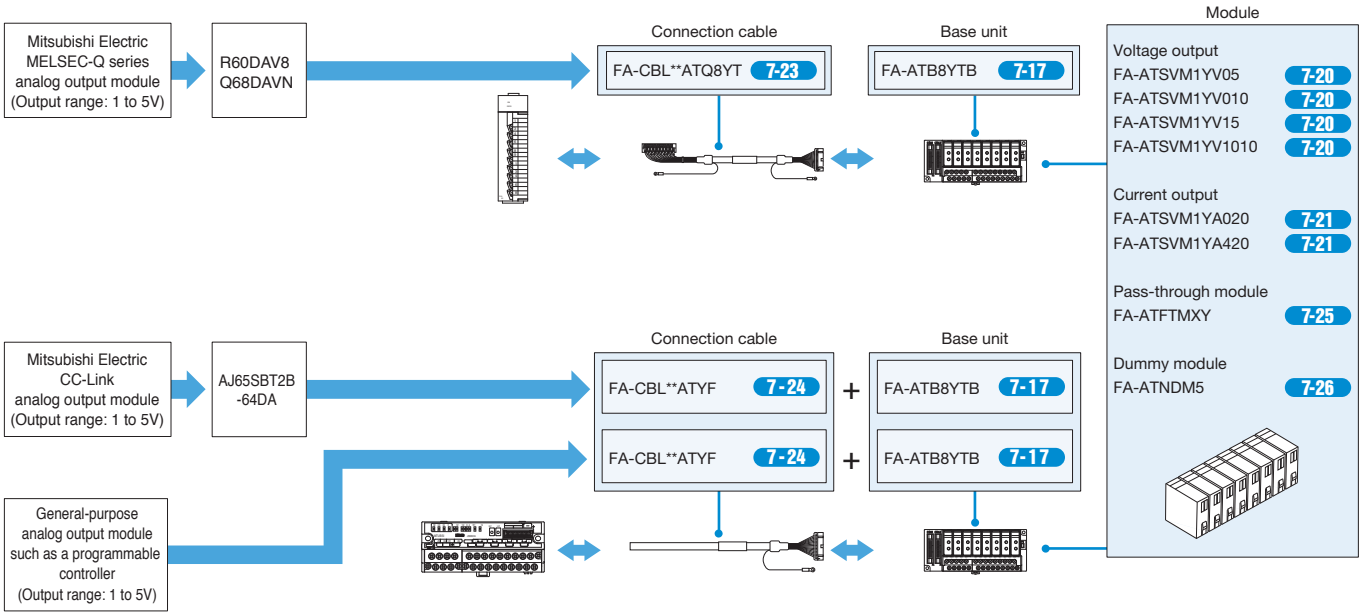
•Input type



Selection Chart

•Output type

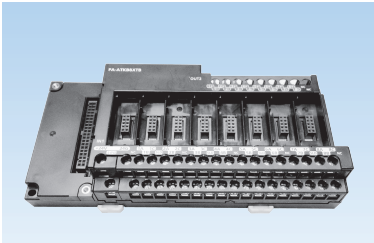




Individual Specifications

[Input type] Module installation base unit (with connector for adapter)

FA-ATKB8XTB



Features

- Thick wires such as compensating cables can be directly connected.
- Since isolation between channels is provided, various types of input modules can be connected together.
- This unit is used with a conversion adapter combined.

Related Materials

General Specifications 9-1
M3 7.62-mm Applicable Solderless Terminal 9-2

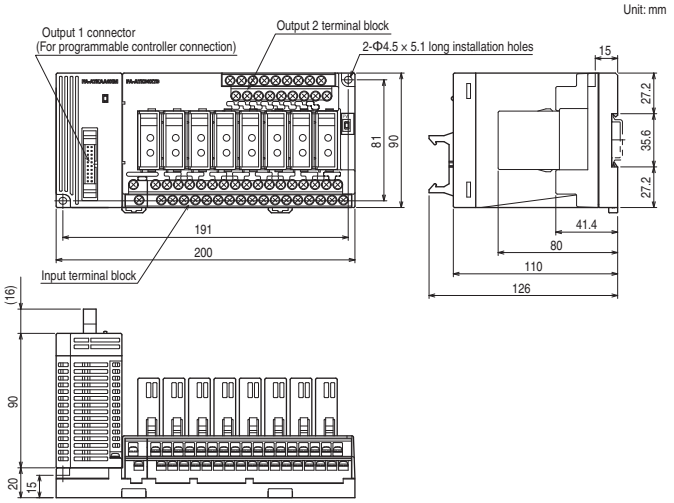
Related Products

Conversion Adapter 7-8
Module 7-10 to 7-14
Pass-Through Module 7-25
Dummy Module 7-26

Specifications

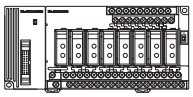
Item	Specifications	
No. of slots	8	
Terminal block	Terminal screw	M3 spring-up screws, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm^2 (with solderless terminal used), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 20mm or more Tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
External power supply	24VDC ±10%	
Current consumption (24VDC)	6mA or less (Not including current consumption of conversion adapter, and module)	
Withstand voltage, insulation resistance	Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more	
Weight	Approx. 370g	
Precautions	1. Mount a dummy module into an unused slot to allow no empty slot. 2. Even when cables are connected, the size in the height direction falls within the specified external dimensions. 3. Input type modules (line color: purple) only can be mounted. If an output type module is mistakenly mounted, failure or malfunction may occur. 4. Mount each module according to the signals of an external device. If a module is incorrectly mounted, failure or malfunction may occur.	

External Dimension

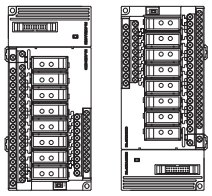


Unit Installation Direction

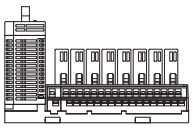
Horizontal installation



Vertical installation



Upward installation



Restrictions

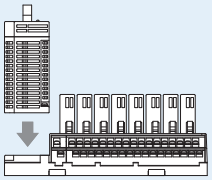
For vertical installation or upward installation, when using three or more FA-ATSVM1XD modules, set the ambient temperature to 50°C or lower.

Note: Do not install the unit in any direction other than the above.

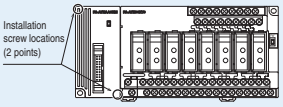
How to mount or remove an adapter

(1) How to mount an adapter to the base unit

1) Place the adapter perpendicularly on the base unit.



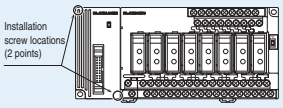
2) Fix the adapter to the base unit with installation screws.



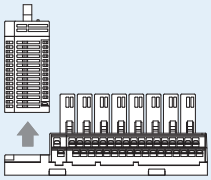
■Be sure to tighten up the installation screws. Otherwise, the adapter may be detached and damaged.

(2) How to remove an adapter from the base unit

1) Remove the screws connecting the adapter to the base unit.



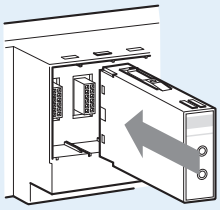
2) Pull out the adapter perpendicularly from the base unit.



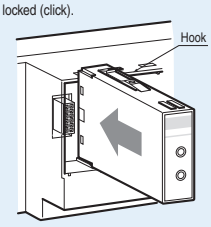
How to mount or remove a module

(1) How to mount a module to the base unit

1) Align the module with the slot of the base unit.

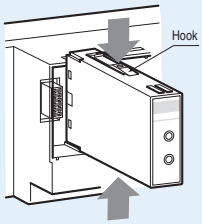


2) Insert the module until its hooks are locked (click).

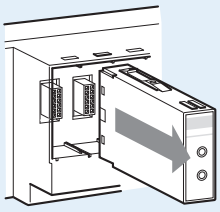


(2) How to remove a module from the base unit

1) Push the hook on the top and the hook on the bottom together.



2) While holding down the hooks, pull out the module.



[Input type] Conversion adapter (1 input-2 current outputs supported)

FA-ATKAA8XM

Features

■This adapter is used with a module installation base unit (FA-ATKB8XTB) combined.
■Reliability is improved because output 1 (programmable controller side) and output 2 (recorder connected side) are isolated from one another.

Related Materials

General Specifications 9-1

Related Products

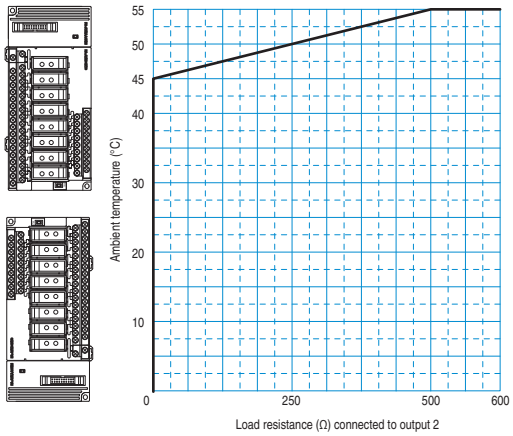
Module Installation Base Unit 7-7

Specifications

Item		Specifications
Model		FA-ATKAA8XM
Number of points		8 points (8 channels)
Input signal		1 to 5V (Module output)
Accuracy (Note 1) (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)
	Temperature characteristics	±0.015%/°C or less
Output 1 (OUT1) (Programmable controller side)	Interface	20-pin MIL connector
	Output signal	4 to 20mA
	Output allowable load resistance	250 to 350Ω
	Method for isolation between input and output	No
	Isolation between output channels	No
Output 2 (OUT2)	Interface	Through FA-ATKB8XTB OUT2 (M3 spring-up screws, 7.62-mm pitch)
	Output signal	4 to 20mA
	Output allowable load resistance	600Ω or less * Restrictions on the operating temperature range exist.
	Method for isolation between input and output	Transformer isolation
	Isolation between output channels	Yes
Response time (Note 2)		10ms or less
Power supply		24VDC ±10% (Supplied from the base unit)
Current consumption (24VDC)		310mA or less
Withstand voltage, insulation resistance		Between each input, all outputs for output 1, each channel for output 2, and power supply: 750VAC for 1 minute, 10MΩ or more
Base unit installation screw tightening torque range		36 to 48N·cm
Weight		Approx. 200g
Precautions		Note 1: The above shows the specifications for an adapter alone; the accuracy of modules to be installed should be added. Note 2: Time from when a startup pulse is input until the output level reaches 90% 1. To connect a cable to a unit, push the cable connector in until the connector is locked. Failure to do so may cause poor contact. 2. A pass-through module (FA-ATFTMXY) can be used for voltage input only. 3. When connecting the product with a programmable controller, first verify that the product configuration is correct. Connection based on a wrong configuration may cause failure or malfunction.

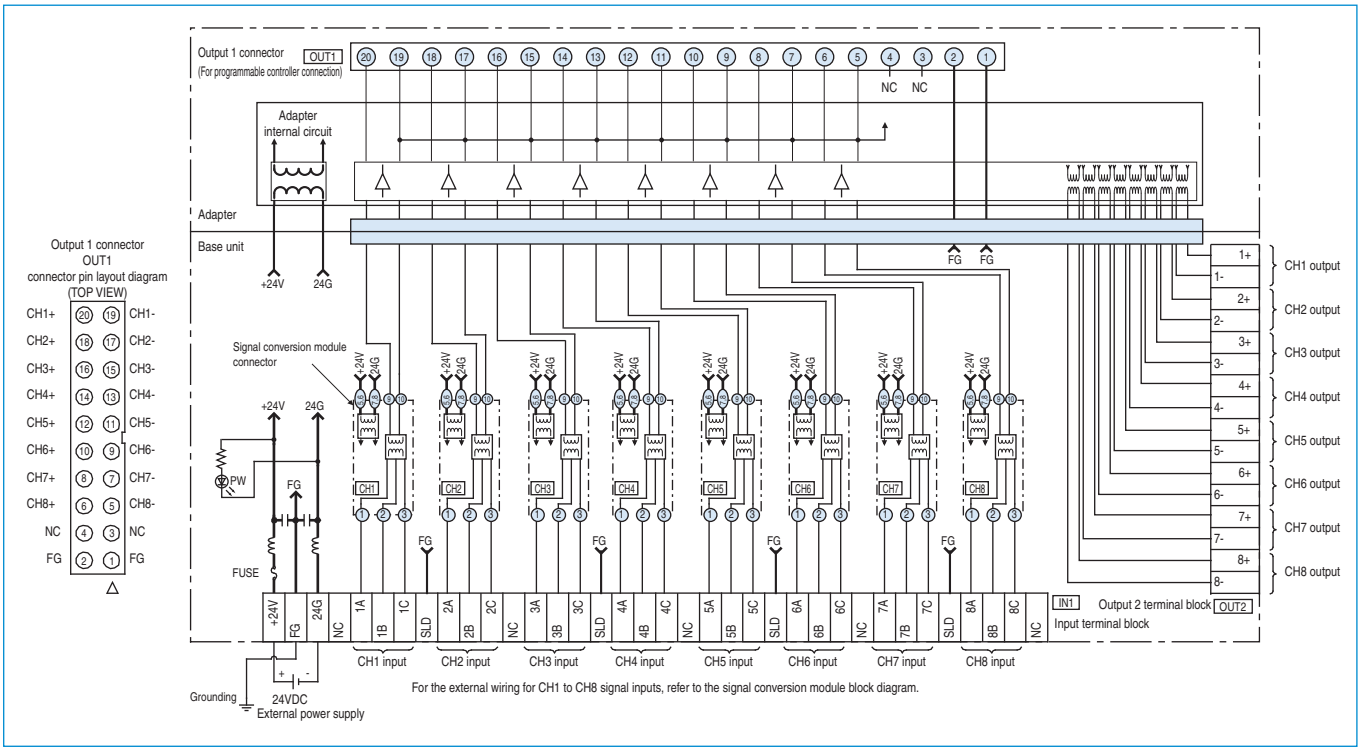
Restrictions on Operating Temperature Range

■In any of the following installation directions, due to the load resistance connected to output 2, restrictions occur on the operating temperature range.



■Restrictions on the operating temperature range do not occur in any installation direction other than the above.

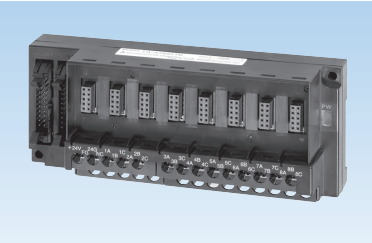
Block Diagram



For the external wiring for CH1 to CH8 signal inputs, refer to the signal conversion module block diagram.

[Input type] Module installation base unit

FA-ATB8XTB



Features

- Thick wires such as compensating cables can be directly connected.
- Since isolation between channels is provided, various types of input modules can be connected together.

Related Materials

General Specifications 9-1
M3 7.62-mm Applicable Solderless Terminal 9-2

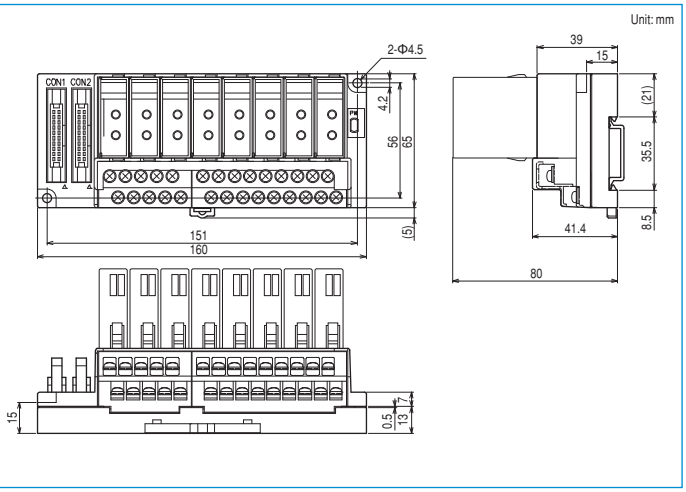
Related Products

Module 7-10 to 7-14
Pass-Through Module 7-25
Dummy Module 7-26

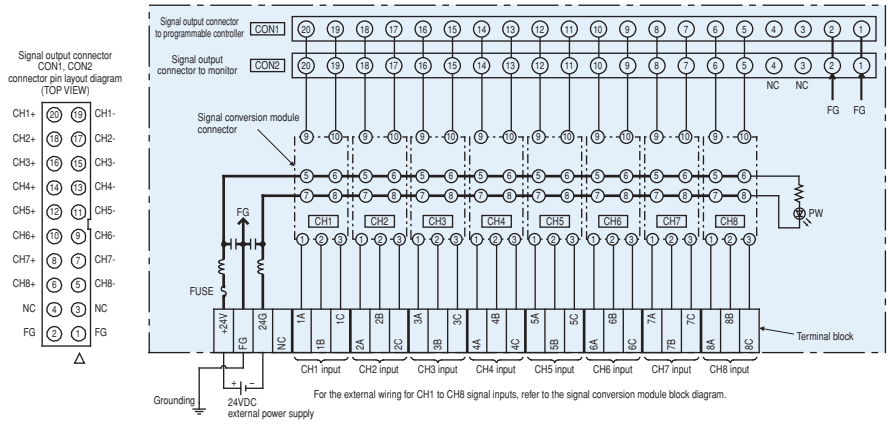
Specifications

Item		Specifications
No. of slots		8
Terminal block	Terminal screw	M3 spring-up screws, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal used), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 × 0.7mm × 20mm or more Tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
External power supply		24VDC±10%
Current consumption (24VDC)		6mA or less (Not including current consumption of module)
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more
Weight		Approx. 320g
Precautions		1. Mount a dummy module into an unused slot to allow no empty slot. 2. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact. 3. When connecting the product with a programmable controller, first verify that the product configuration is correct. Connection based on a wrong configuration may cause failure or malfunction. 4. Input type modules (line color: purple) only can be mounted. If an output type module is mistakenly mounted, failure or malfunction may occur. 5. Mount each module according to the signals of an external device. If a module is incorrectly mounted, failure or malfunction may occur.

External Dimension



Block Diagram

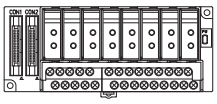


Precautions

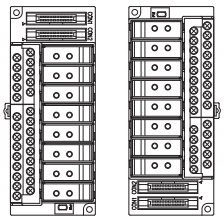
- For a device connected to a monitor output, use a device with sufficiently large input resistance.
  (Input resistance of 1MΩ or more is recommended.)
  The voltage of a monitor output signal is 1 to 5V.
- Since the terminal block of a base unit does not have a shield for input signal lines, ground them in the control panel.

Unit Installation Direction

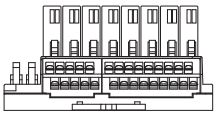
Horizontal installation



Vertical installation



Upward installation



Restrictions

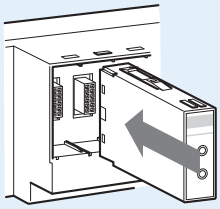
For vertical installation or upward installation, when using three or more FA-ATSVM1XD modules, set the ambient temperature to 50°C or lower.

Note: Do not install the unit in any direction other than the above.

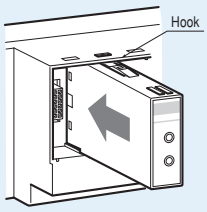
How to mount or remove a module

(1) How to mount a module to the base unit

1) Align the module with the slot of the base unit.

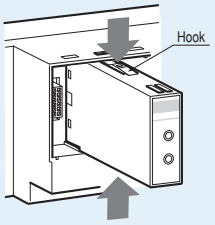


2) Insert the module until its hooks are locked (click).

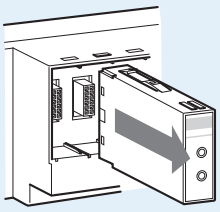


(2) How to remove a module from the base unit

1) Push the hook on the top and the hook on the bottom together.

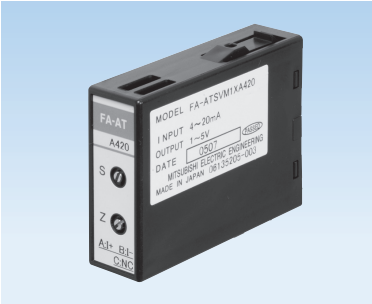


2) While holding down the hooks, pull out the module.



[Input type] Voltage to voltage signal conversion module

FA-ATSVM1XV05/V15/V1010



Features

- This module converts a voltage input into a voltage output. (Isolation between the input and output provided)
- The module can be mounted/removed to/from a base unit easily.

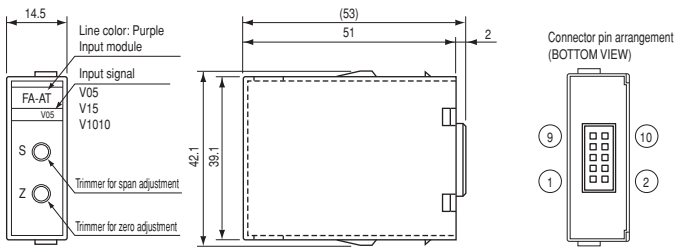
Related Materials

General Specifications 9-1

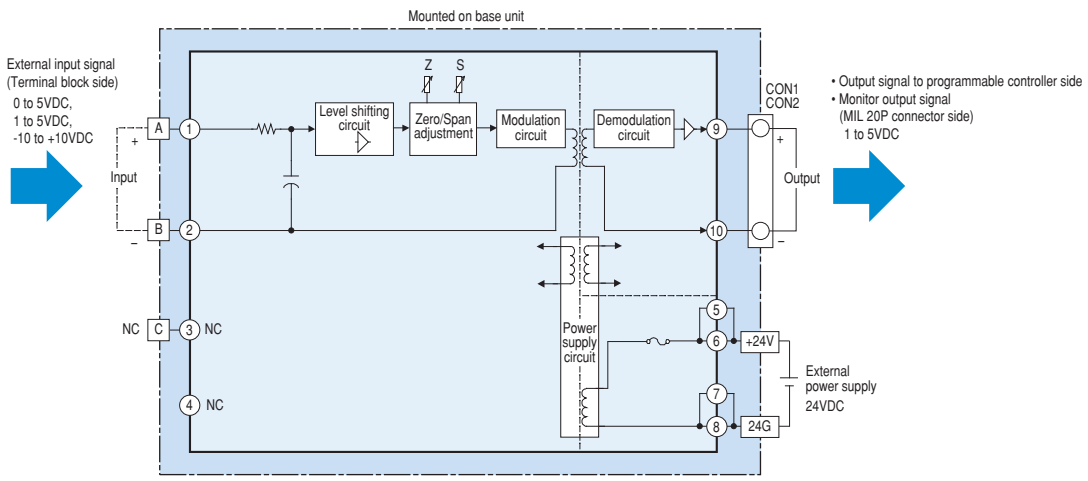
Specifications

Item		Specifications		
Model		FA-ATSVM1XV05	FA-ATSVM1XV15	FA-ATSVM1XV1010
Number of points		1 point (1 channel)		
Input	Input signal	0 to 5V	1 to 5V	-10 to +10V
	Input resistance	1MΩ or more		
	Disconnection detection function	No		
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)		
	Temperature characteristics	±0.015%/°C or less		
Output (Programmable controller side)	Output signal	1 to 5V		
	Output allowable load resistance	10kΩ or more		
Response time (Note 1)		15ms or less		
Zero/Span adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%		
Power supply		24VDC ±10% (Supplied from the base unit)		
Current consumption (24VDC)		20mA or less		
Isolation method		Transformer isolation		
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more		
Weight		Approx. 30g	Approx. 30g	Approx. 30g
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90%		

External Dimension

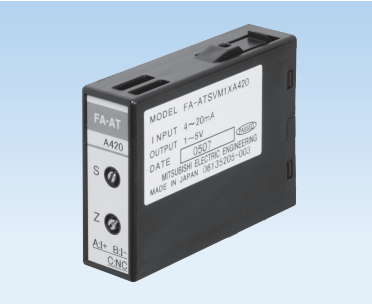


Block Diagram



[Input type] Current to voltage signal conversion module

FA-ATSVM1XA420



Features

- This module converts a current input into a voltage output. (Isolation between the input and output provided)
- The module can be mounted/removed to/from a base unit easily.

Related Materials

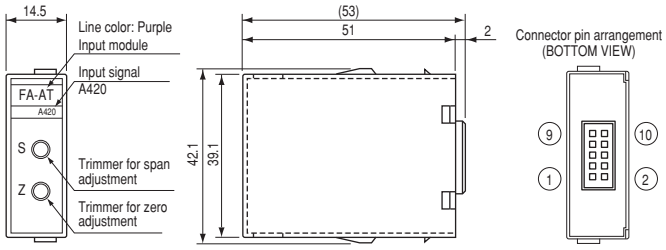
General Specifications 9-1

Specifications

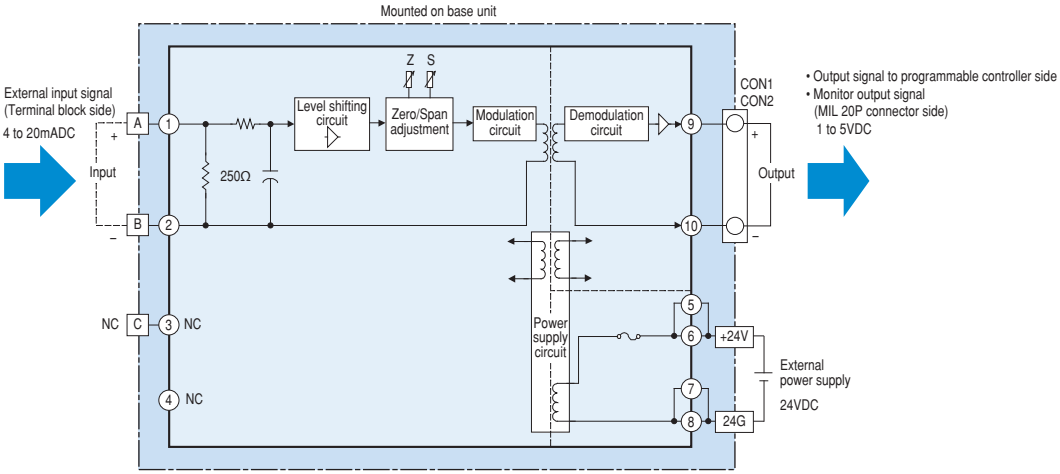
Item		Specifications
Model		**FA-ATSVM1XA420**
Number of points		1 point (1 channel)
Input	Input signal	4 to 20mA
	Input resistance	250Ω
	Disconnection detection function	No
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)
	Temperature characteristics	±0.015%/°C or less
Output (Programmable controller side)	Output signal	1 to 5V
	Output allowable load resistance	10kΩ or more
Response time (Note 1)		15ms or less
Zero/Span adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%
Power supply		24VDC ±10% (Supplied from the base unit)
Current consumption (24VDC)		20mA or less
Isolation method		Transformer isolation
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more
Weight		Approx. 30g
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90%

External Dimension

Unit: mm

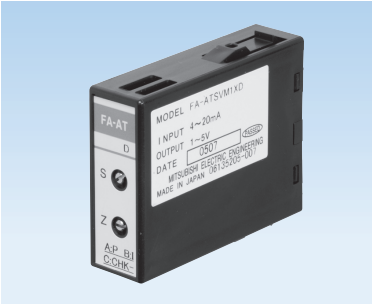


Block Diagram



[Input type] 2-wire transmitter to voltage signal conversion module (distributor)

FA-ATSVM1XD



Features

- This module converts an input from a 2-wire transmitter into a voltage output. (Isolation between the input and output provided)
- No external power supply is required because the module is provided with power supply for a 2-wire transmitter.
- The module can be mounted/removed to/from a base unit easily.

Related Materials

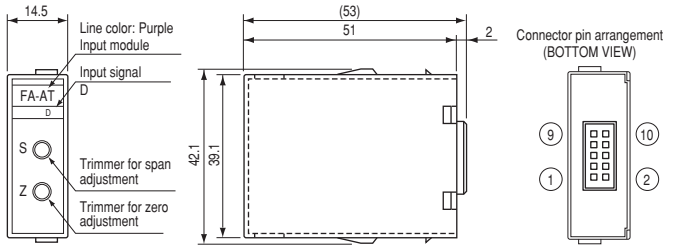
General Specifications 9-1

Specifications

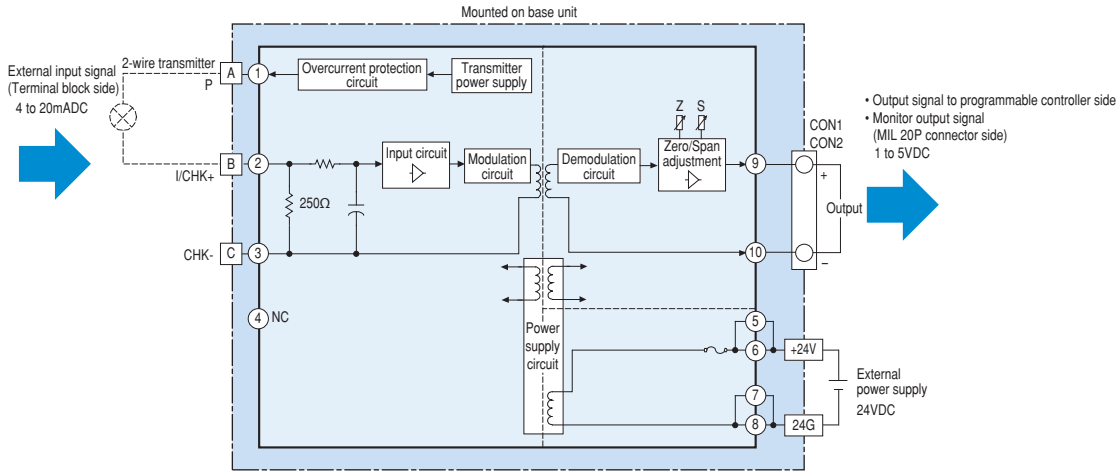
Item		Specifications
Number of points		1 point (1 channel)
Input	Input signal	2-wire type transmitter (4 to 20mA)
	Input resistance	250Ω
	Disconnection detection function	No
Power supply for transmitter	Supply voltage	26VDC ±2V
	Maximum supply current	24mA
	Short-circuit protection	Yes (Limiting current: 25 to 35mA)
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)
	Temperature characteristics	±0.015%/°C or less
Output (Programmable controller side)	Output signal	1 to 5V
	Output allowable load resistance	10kΩ or more
Response time (Note 1)		15ms or less
Zero/Span adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%
Power supply		24VDC ±10% (Supplied from the base unit)
Current consumption (24VDC)		68mA or less
Isolation method		Transformer isolation
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more
Weight		Approx. 30g
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90% 1. When three or more sets of this type of module are used for a base unit, there are restrictions on their installation directions.

External Dimension

Unit: mm



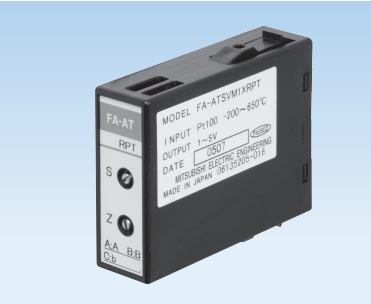
Block Diagram



Note: For use by inputting a current (4 to 20mADC), connect the positive side to the I/CHK+ terminal and the negative side to the CHK- terminal.

[Input type] Resistance temperature detector to voltage signal conversion module

FA-ATSVM1XRPT/RPT0010/RPT0020/RJPT



Features

- This module converts a resistance temperature detector input into a voltage output. (Isolation between the input and output provided)
- The module can be mounted/removed to/from a base unit easily.

Related Materials

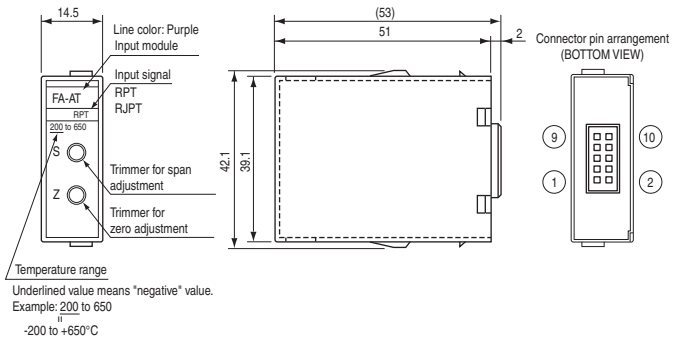
General Specifications 9-1

Specifications

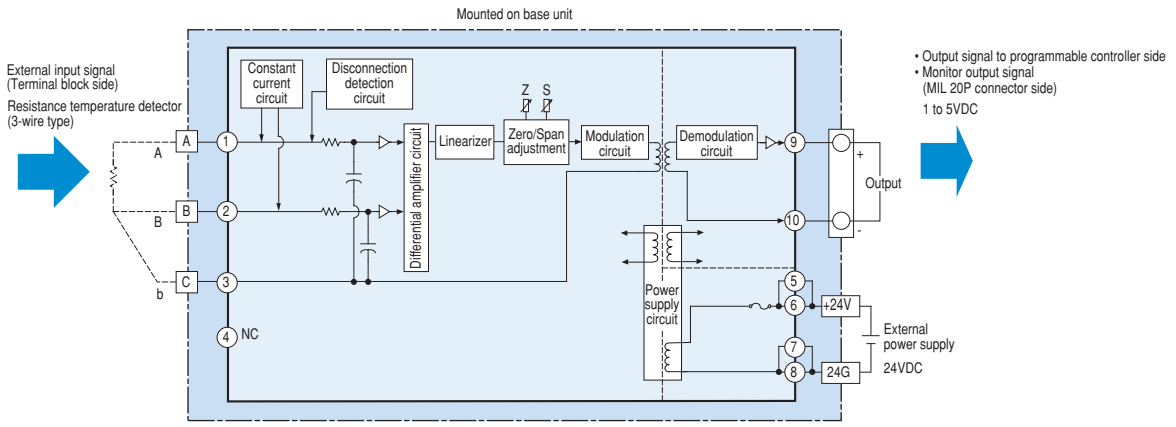
Item		Specifications			
Model		FA-ATSVM1XRPT	FA-ATSVM1XRPT0010	FA-ATSVM1XRPT0020	FA-ATSVM1XRJPT
Number of points		1 point (1 channel)			
Input	Input signal	Pt100 (-200 to +650°C)	Pt100 (0 to +100°C)	Pt100 (0 to +200°C)	JPt100 (-200 to +600°C)
	Disconnection detection function	Yes (Output exceeding the upper limit)			
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)			
	Linearization tolerance	±0.1% or less			
	Temperature characteristics	±0.010%/°C or less			
Output (Programmable controller side)	Output signal	1 to 5V			
	Output allowable load resistance	10kΩ or more			
Response time (Note 1)		100ms or less			
Zero/Span adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%			
Power supply		24VDC±10% (Supplied from the base unit)			
Current consumption (24VDC)		25mA or less			
Isolation method		Transformer isolation			
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more			
Weight		Approx. 40g			
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90% 1. The input range (temperature range) is fixed as the value specified in the table.			

External Dimension

Unit: mm

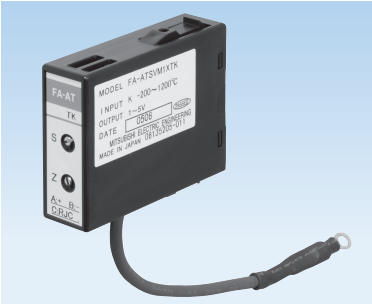


Block Diagram



[Input type] Thermocouple temperature to voltage signal conversion module

FA-ATSVM1XTB/TS/TE/TT/TR/TK/TK0040/TK0060/TK0080/TJ/TN



Features

- This module converts a thermocouple input into a voltage output. (Isolation between the input and output provided)
- The module can be mounted/removed to/from a base unit easily.

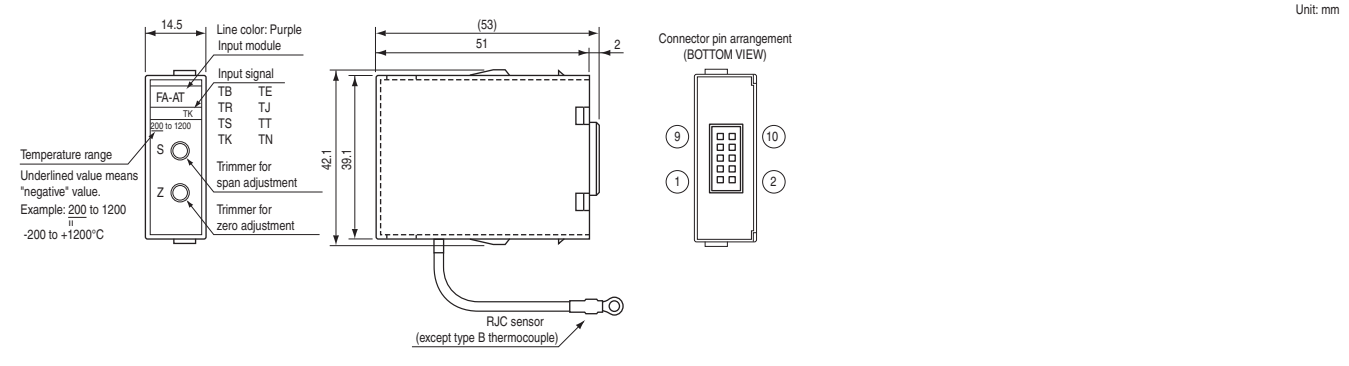
Related Materials

General Specifications 9-1

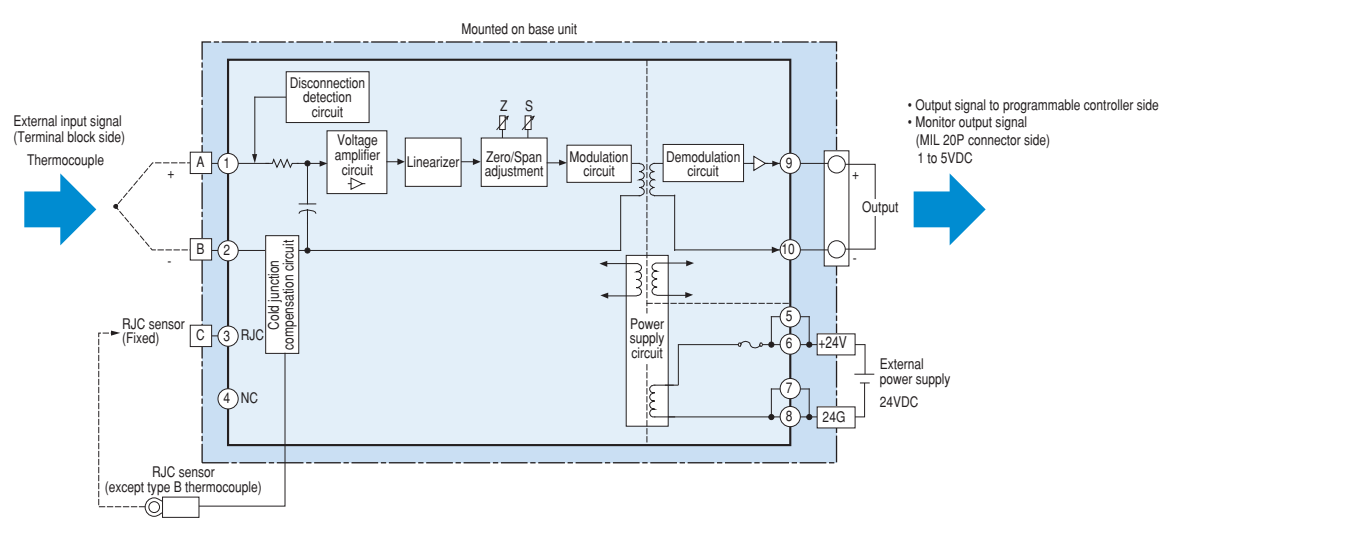
Specifications

Item		Specifications										
Model		FA-ATSVM1XTB	FA-ATSVM1XTS	FA-ATSVM1XTE	FA-ATSVM1XTT	FA-ATSVM1XTR	FA-ATSVM1XTK	FA-ATSVM1XTK0040	FA-ATSVM1XTK0060	FA-ATSVM1XTK0080	FA-ATSVM1XTJ	FA-ATSVM1XTN
Number of points		1 point (1 channel)										
Input	Input signal	type B thermocouple (+600 to +1700°C)	type S thermocouple (0 to +1600°C)	type E thermocouple (-200 to +900°C)	type T thermocouple (-200 to +350°C)	type R thermocouple (0 to +1600°C)	type K thermocouple (-200 to +1200°C)	type K thermocouple (0 to +400°C)	type K thermocouple (0 to +600°C)	type K thermocouple (0 to +800°C)	type J thermocouple (-40 to +750°C)	type N thermocouple (-200 to +1250°C)
	Input resistance	1MΩ or more										
	Disconnection detection function	Yes (Output exceeding the upper limit)										
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)										
	Linearization tolerance	±0.1% or less										
	Temperature characteristics	±0.015%/°C or less										
	Cold junction compensation accuracy	±0.5°C or less (25°C±5°C), ±1°C or less (0 to 55°C)										
Output (Programmable controller side)	Output signal	1 to 5V										
	Output allowable load resistance	10kΩ or more										
Response time (Note 1)		100ms or less										
Zero/Span adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%										
Power supply		24VDC±10% (Supplied from the base unit)										
Current consumption (24VDC)		24mA or less										
Isolation method		Transformer isolation										
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more										
Weight		Approx. 40g										
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90% 1. The input range (temperature range) is fixed as the value specified in the table.										

External Dimension



Block Diagram



[Input type] Connection cable with connector

FA-CBL*ATQ8XVA

Features

- This cable is a connector type and can be connected/removed through one-touch operation.
- The cable is a shielded cable, and is provided with a solderless terminal for shield grounding.

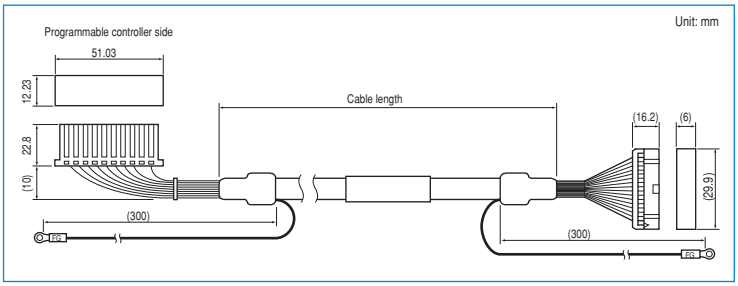
Related Materials

General Specifications 9-1

Specifications

Item	Specifications		
Model	FA-CBL10ATQ8XVA	FA-CBL20ATQ8XVA	FA-CBL30ATQ8XVA
Connected programmable controller	Q68ADV (with FA-Q6TCA attached)		
Connected module	FA-ATB8XTB, FA-ATKAA8XM (Connector color: black)		
Cable length	1.0m	2.0m	3.0m
Conductor resistance (20°C)	232Ω/km		
Used cable	Conductor material: Tin-plated soft copper stranded wire, Sheath material: Heat resistant vinyl mixture (black), Outer diameter: 8.1mm		
Used solderless terminal	M4 round solderless terminal		
Weight	Approx. 140g	Approx. 240g	Approx. 350g

External Dimension



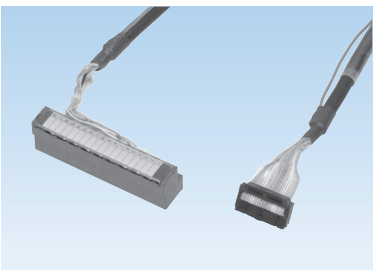
External connections of the relay module terminal block connected to the FA-CTB20P relay module

1 CH1 +	3 CH2 +	5 CH3 +	7 CH4 +	9 CH5 +		11 CH6 +	13 CH7 +	15 CH8 +	17 NC	19 NC	
	2 CH1 -	4 CH2 -	6 CH3 -	8 CH4 -	10 CH5 -		12 CH6 -	14 CH7 -	16 CH8 -	18 NC	20 FG

*The FG terminal is connected to the cable shield. Once the FG terminal of a cable is grounded, grounding using a terminal block conversion module is not required.

[Input type] Connection cable with MELSEC-Q series terminal block

FA-CBL*ATQ8XVT



Features

■Wiring is easy because this cable is provided with a terminal block.
■The cable is a shielded cable, and is provided with a solderless terminal for shield grounding.

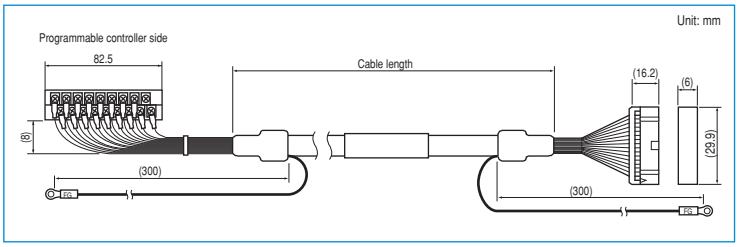
Related Materials

General Specifications 9-1

Specifications

Item	Specifications		
Model	FA-CBL10ATQ8XVT	FA-CBL20ATQ8XVT	FA-CBL30ATQ8XVT
Connected programmable controller	Q68ADV		
Connected module	FA-ATB8XTB, FA-ATKAA8XM (Connector color: black)		
Cable length	1.0m	2.0m	3.0m
Conductor resistance (20°C)	232Ω/km		
Used cable	Conductor material: Tin-plated soft copper stranded wire, Sheath material: Heat resistant vinyl mixture (black), Outer diameter: 8.1mm		
Used solderless terminal	M4 round solderless terminal		
Weight	Approx. 190g	Approx. 300g	Approx. 390g

External Dimension



[Input type] Connection cable with discrete cable on one side

FA-CBL*ATF

Features

■ Since terminal processing has not been done on one side, this cable can be used as a general-purpose cable.
■ The cable is a shielded cable, and is provided with a solderless terminal for shield grounding.

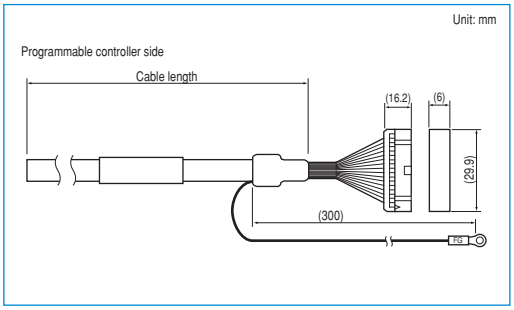
Related Materials

General Specifications 9-1

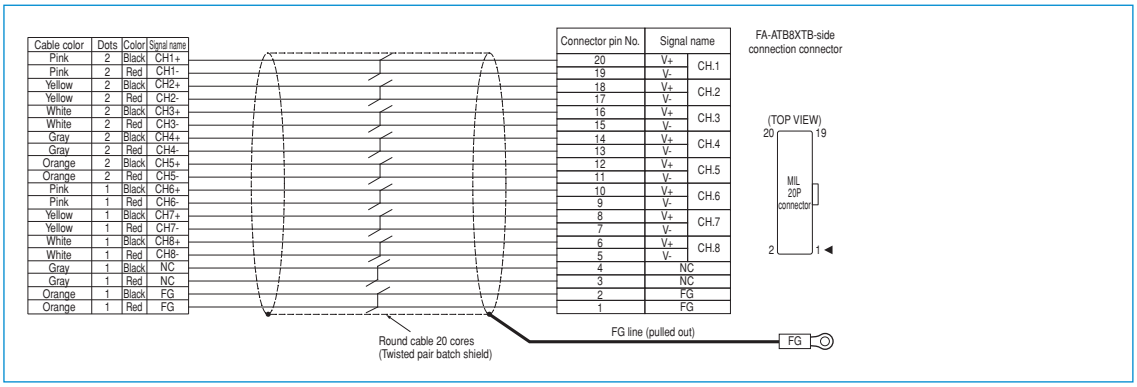
Specifications

Item	Specifications		
Model	FA-CBL10ATF	FA-CBL20ATF	FA-CBL30ATF
Connected programmable controller	Terminal block type module for the programmable controllers of other companies		
Connected module	FA-ATB8XTB, FA-ATKAA8XM (Connector color: black)		
Cable length	1.0m	2.0m	3.0m
No. of wire cores	20 cores		
Conductor	Material: Tin-plated soft copper stranded wire, Cross-sectional area: 0.08mm² (AWG28)		
Conductor resistance (20°C)	232Ω/km		
Sheath	Material: Heat resistant vinyl mixture (black), Outer diameter: 8.1mm		
Used solderless terminal	M4 round solderless terminal		
Weight	Approx. 130g	Approx. 220g	Approx. 330g

External Dimension

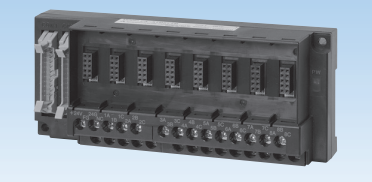


Wiring Diagram



[Output type] Module installation base unit

FA-ATB8YTB



Features

- Thick wires such as compensating cables can be directly connected.
- Since isolation between channels is provided, various types of input modules can be connected together.

Related Materials

- General Specifications 9-1
- M3 7.62-mm Applicable Solderless Terminal 9-2

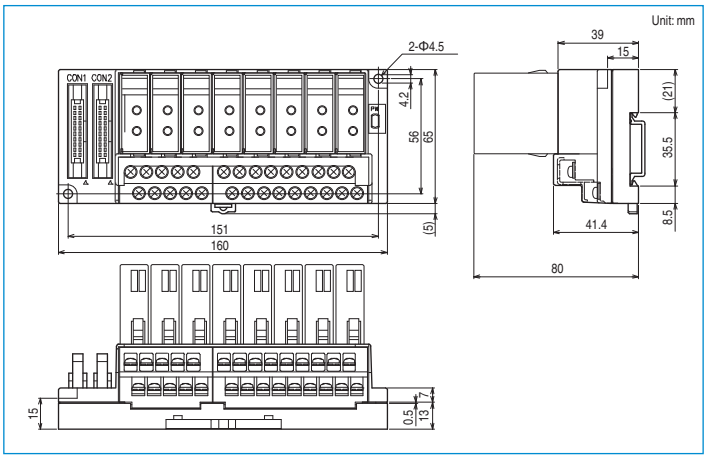
Related Products

- Pass-Through Module 7-25
- Dummy Module 7-26
- Module 7-18 to 7-21

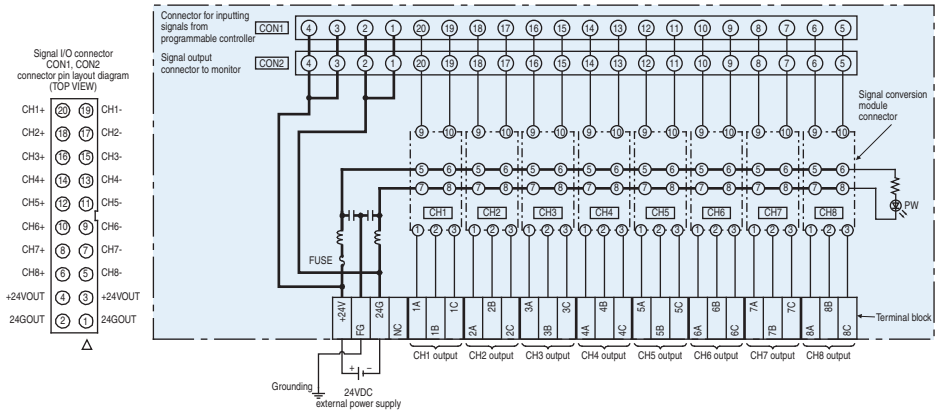
Specifications

Item		Specifications
No. of slots		8
Terminal block	Terminal screw	M3 spring-up screws, 7.62-mm pitch
	Applicable wire, tightening torque	0.3 to 2mm² (with solderless terminal used), 58.8 to 88.2N·cm
Module installation	Screw installation	M4 x 0.7mm × 20mm or more Tightening torque: 78 to 118N·cm
	DIN rail	Applicable DIN rails: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
External power supply		24VDC ±10%
Current consumption (24VDC)		6mA or less (Not including current consumption of module, programmable controller, and monitoring device)
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more
Weight		Approx. 320g
Precautions		1. Mount a dummy module into an unused slot to allow no empty slot. 2. When connecting cables to the module, be sure to push in the cable connector until the connector locks. Failure to do so may cause poor contact. 3. When the programmable controller's output is between 4 and 20mA and an FA-ATFTMXY signal pass-through module is used, the voltage value corresponding to the input resistance of the connected device is detected as a monitor output. The current value can be found by dividing the detected voltage by the input resistance. 4. When connecting the product with a programmable controller, first verify that the product configuration is correct. Connection based on a wrong configuration may cause failure or malfunction. 5. Output type modules (line color: orange) only can be mounted. If an input type module is mistakenly mounted, failure or malfunction may occur. 6. Mount each module according to the signals of an external device. If a module is incorrectly mounted, failure or malfunction may occur.

External Dimension

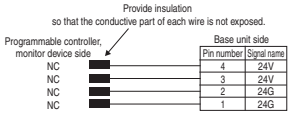


Block Diagram



Precautions

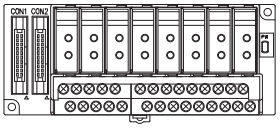
- An external power supply is connected to CON1 and CON2 each. If a power supply is not used, apply short-circuit protection.
- Power supply terminal
  24V: Pins 3 and 4, 24G: Pins 1 and 2
- Short-circuit protection
  1) Set the programmable controller, monitoring device side of cables as NC.
  2) Insulate the wire end of the NC pin.
- Example of power supply terminal processing for a connection cable when not using power supply



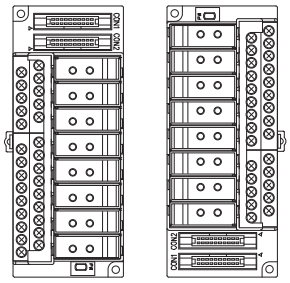
- For a device connected to a monitor output, use a device with sufficiently large input resistance. (Input resistance of 1MΩ or more is recommended.)

Unit Installation Direction

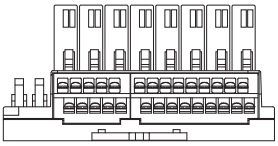
Horizontal installation



Vertical installation



Upward installation

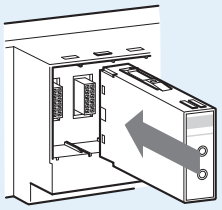


Note: Do not install the unit in any direction other than the above.

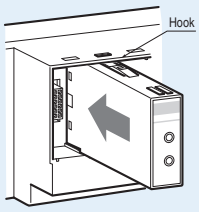
How to mount or remove a module

(1) How to mount a module to the base unit

1) Align the module with the slot of the base unit.

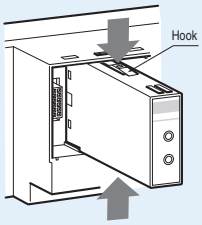


2) Insert the module until its hooks are locked (click).

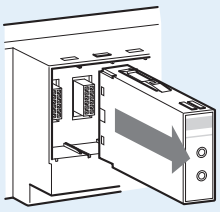


(2) How to remove a module from the base unit

1) Push the hook on the top and the hook on the bottom together.

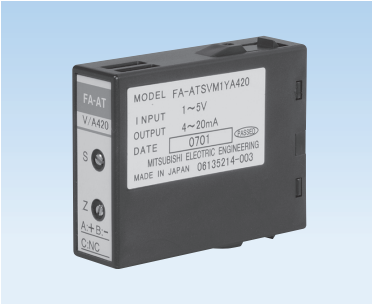


2) While holding down the hooks, pull out the module.



[Output type] Current to voltage signal conversion module

FA-ATSAM1YV05/V15/V010/V1010



Features

- This module converts a current input into a voltage output. (Isolation between the input and output provided)
- The module can be mounted/removed to/from a base unit easily.

Related Materials

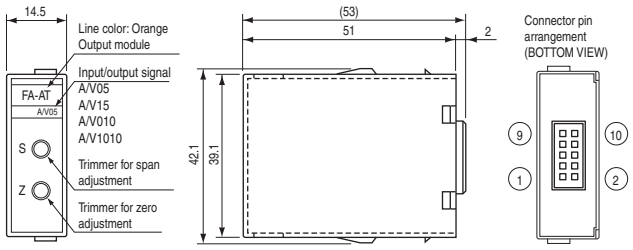
General Specifications 9-1

Specifications

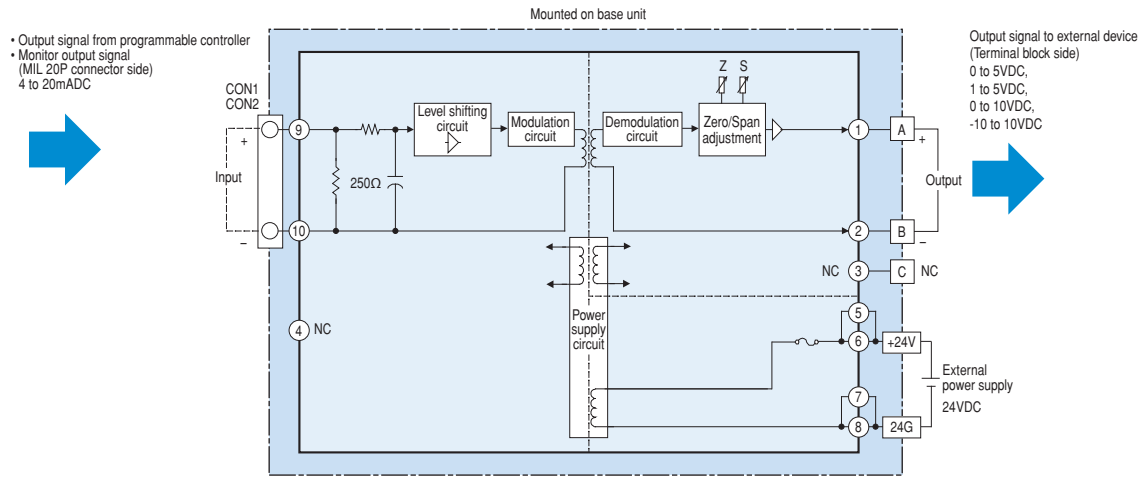
Item		Specifications			
Model		FA-ATSAM1YV05	FA-ATSAM1YV15	FA-ATSAM1YV010	FA-ATSAM1YV1010
Number of points		1 point (1 channel)			
Input (Programmable controller side)	Input range	4 to 20mA			
	Input resistance	250Ω			
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)			
	Temperature characteristics	±0.015%/°C or less			
Output	Output signal	0 to 5V	1 to 5V	0 to 10V	-10 to +10V
	Output allowable load resistance	2.5kΩ or more			
	Disconnection detection function	No			
Response time (Note 1)		15ms or less			
Zero/Span adjustments		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%			
Power supply		24VDC ±10% (Supplied from the base unit)			
Current consumption (24VDC)		45mA or less			
Isolation method		Transformer isolation			
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more			
Weight		Approx. 40g	Approx. 40g	Approx. 40g	Approx. 40g
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90%			

External Dimension

Unit: mm



Block Diagram



[Output type] Current to current signal conversion module

FA-ATSAM1YA020/A420

Features

- This module outputs a current input after changing its range. (Isolation between the input and output provided)
- The module can be mounted/removed to/from a base unit easily.

Related Materials

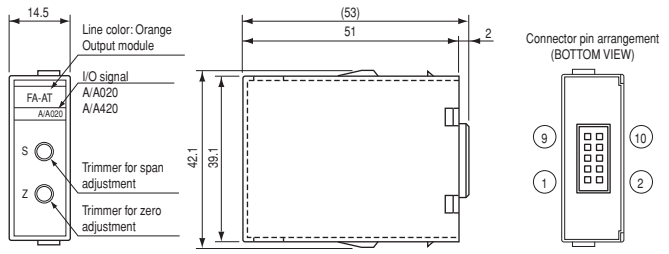
General Specifications 9-1

Specifications

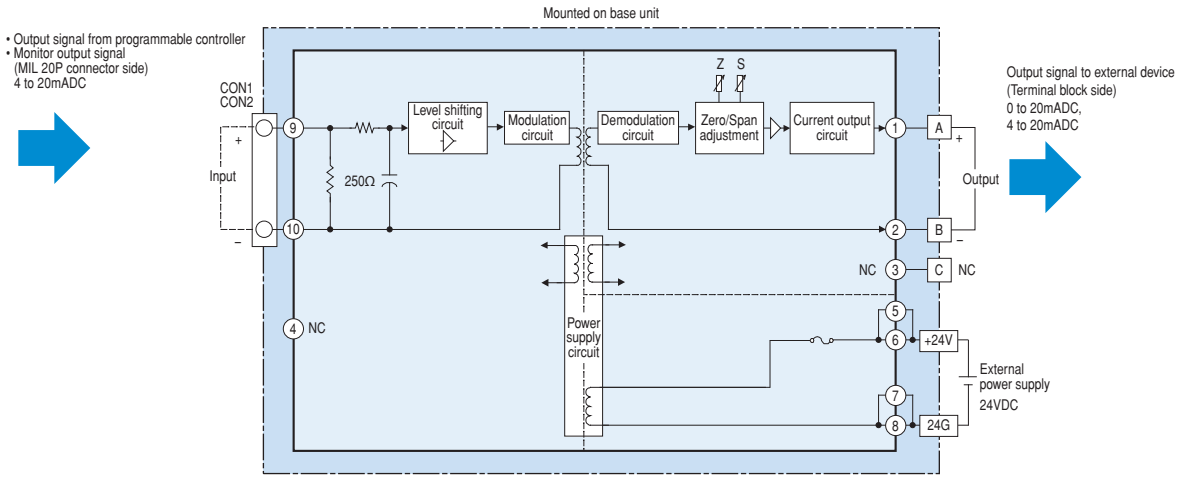
Item		Specifications	
Model		FA-ATSAM1YA020	FA-ATSAM1YA420
Number of points		1 point (1 channel)	
Input (Programmable controller side)	Input range	4 to 20mA	
	Input resistance	250Ω	
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)	
	Temperature characteristics	±0.015%/°C or less	
Output	Output signal	0 to 20mA	4 to 20mA
	Output allowable load resistance	600Ω or less	
	Disconnection detection function	No	
Response time (Note 1)		15ms or less	
Zero/Span adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%	
Power supply		24VDC ±10% (Supplied from the base unit)	
Current consumption (24VDC)		45mA or less	
Isolation method		Transformer isolation	
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more	
Weight		Approx. 40g	Approx. 40g
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90%	

External Dimension

Unit: mm



Block Diagram



[Output type] Voltage to voltage signal conversion module

FA-ATSVM1YV05/V15/V010/V1010

Features

- This module outputs a voltage input after changing its range. (Isolation between the input and output provided)
- The module can be mounted/removed to/from a base unit easily.

Related Materials

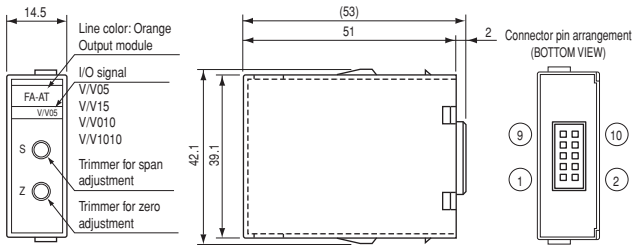
General Specifications 9-1

Specifications

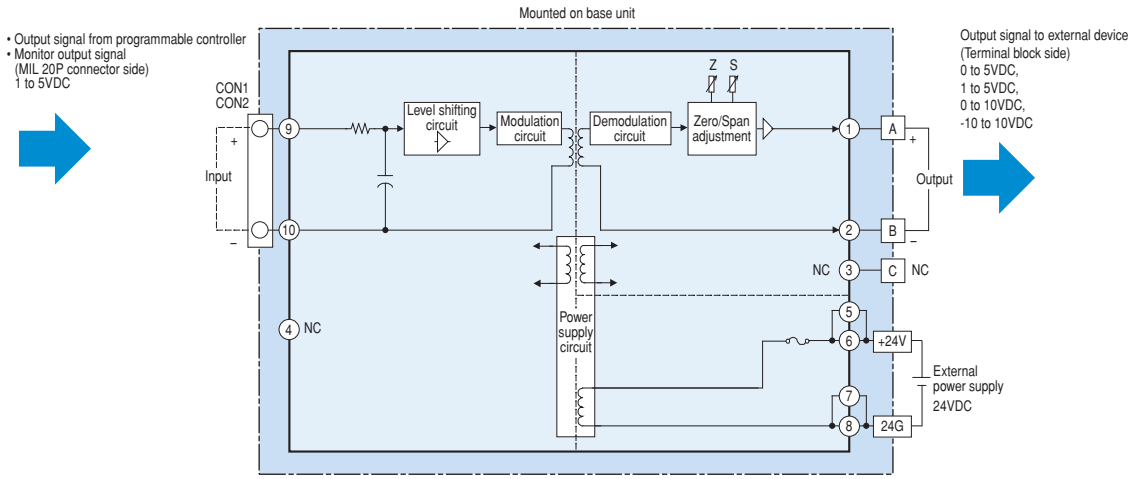
Item		Specifications			
Model		FA-ATSVM1YV05	FA-ATSVM1YV15	FA-ATSVM1YV010	FA-ATSVM1YV1010
Number of points		1 point (1 channel)			
Input (Programmable controller side)	Input range	1 to 5V			
	Input resistance	1MΩ or more			
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)			
	Temperature characteristics	±0.015%/°C or less			
Output	Output signal	0 to 5V	1 to 5V	0 to 10V	-10 to +10V
	Output allowable load resistance	2.5kΩ or more			
	Disconnection detection function	No			
Response time (Note 1)		15ms or less			
Zero/Span adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%			
Power supply		24VDC ±10% (Supplied from the base unit)			
Current consumption (24VDC)		45mA or less			
Isolation method		Transformer isolation			
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more			
Weight		Approx. 40g	Approx. 40g	Approx. 40g	Approx. 40g
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90%			

External Dimension

Unit: mm



Block Diagram



[Output type] Voltage to current signal conversion module

FA-ATSVM1YA020/A420

Features

- This module converts a voltage input into a current output. (Isolation between the input and output provided)
- The module can be mounted/removed to/from a base unit easily.

Related Materials

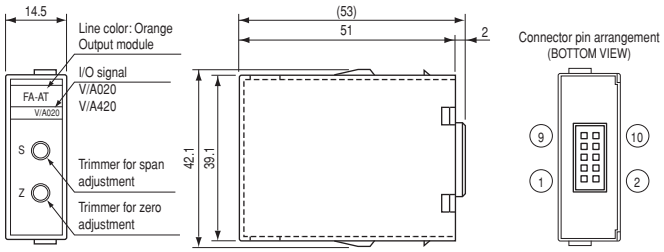
General Specifications 9-1

Specifications

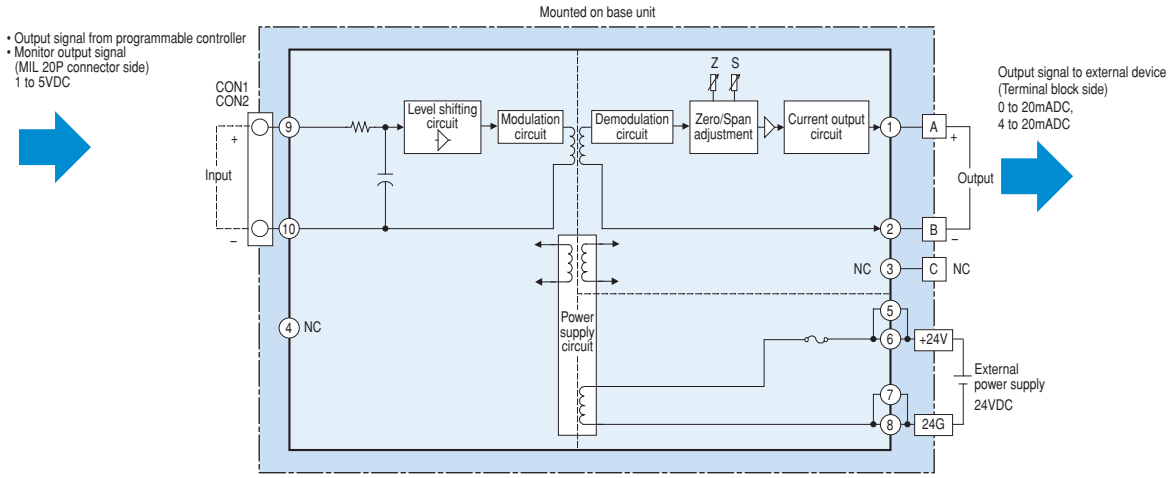
Item		Specifications	
Model		FA-ATSVM1YA020	FA-ATSVM1YA420
Number of points		1 point (1 channel)	
Input (Programmable controller side)	Input range	1 to 5V	
	Input resistance	1MΩ or more	
Accuracy (Percentage of full scale)	Reference accuracy	±0.1% or less (Ambient temperature: 25°C±5°C)	
	Temperature characteristics	±0.015%/°C or less	
Output	Output signal	0 to 20mA	4 to 20mA
	Output allowable load resistance	600Ω or less	
	Disconnection detection function	No	
Response time (Note 1)		15ms or less	
Zero/Span adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%	
Power supply		24VDC ±10% (Supplied from the base unit)	
Current consumption (24VDC)		45mA or less	
Isolation method		Transformer isolation	
Withstand voltage, insulation resistance		Between each input, output, and power supply: 750VAC for 1 minute, 10MΩ or more	
Weight		Approx. 40g	Approx. 40g
Precautions		Note 1: Time from when a startup pulse is input until the output level reaches 90%	

External Dimension

Unit: mm

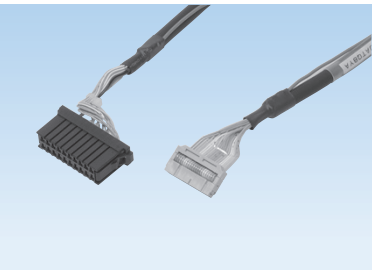


Block Diagram



[Output type] Connection cable with connector

FA-CBL*ATQ8YA



Features

- This cable is a connector type and can be connected/removed through one-touch operation.
- The cable is a shielded cable, and is provided with a solderless terminal for shield grounding.

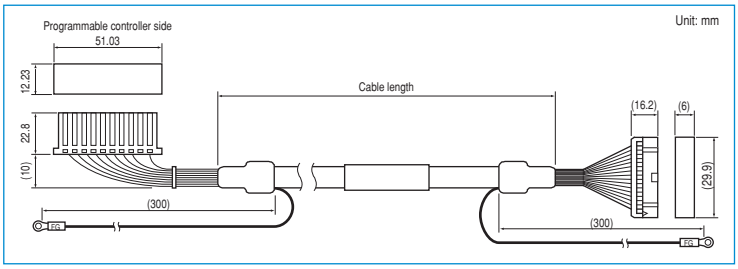
Related Materials

General Specifications 9-1

Specifications

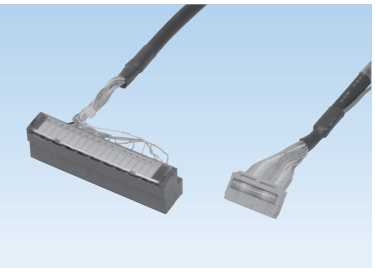
Item	Specifications		
Model	FA-CBL10ATQ8YA	FA-CBL20ATQ8YA	FA-CBL30ATQ8YA
Connected programmable controller	Q68DAIN, Q68DAVN (with FA-Q6TCA attached)		
Connected module	FA-ATB8YTB (Connector color: light gray)		
Cable length	1.0m	2.0m	3.0m
Conductor resistance (20°C)	232Ω/km		
Used cable	Conductor material: Tin-plated soft copper stranded wire, Sheath material: Heat resistant vinyl mixture (black), Outer diameter: 8.1mm		
Used solderless terminal	M4 round solderless terminal		
Weight	Approx. 140g	Approx. 240g	Approx. 350g

External Dimension



[Output type] Connection cable with MELSEC-Q series terminal block

FA-CBL*ATQ8YT



Features

- Wiring is easy because this cable is provided with a terminal block.
- The cable is a shielded cable, and is provided with a solderless terminal for shield grounding.

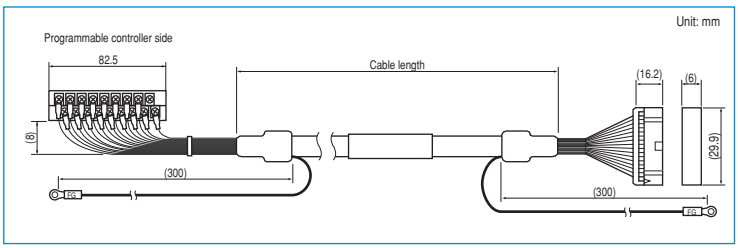
Related Materials

General Specifications 9-1

Specifications

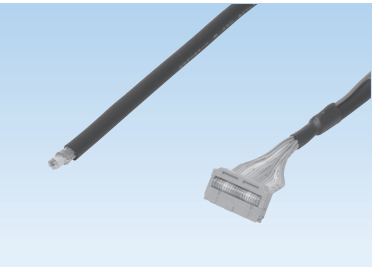
Item	Specifications		
Model	FA-CBL10ATQ8YT	FA-CBL20ATQ8YT	FA-CBL30ATQ8YT
Connected programmable controller	Q68DAIN, Q68DAVN		
Connected module	FA-ATB8YTB (Connector color: light gray)		
Cable length	1.0m	2.0m	3.0m
Conductor resistance (20°C)	232Ω/km		
Used cable	Conductor material: Tin-plated soft copper stranded wire, Sheath material: Heat resistant vinyl mixture (black), Outer diameter: 8.1mm		
Used solderless terminal	M4 round solderless terminal		
Weight	Approx. 190g	Approx. 300g	Approx. 390g

External Dimension



[Output type] Connection cable with discrete cable on one side

FA-CBL*ATYF



Features

■ Since terminal processing has not been done on one side, this cable can be used as a general-purpose cable.
■ The cable is a shielded cable, and is provided with a solderless terminal for shield grounding.

Related Materials

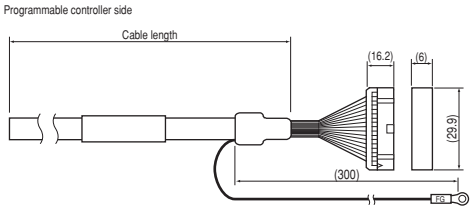
General Specifications 9-1

Specifications

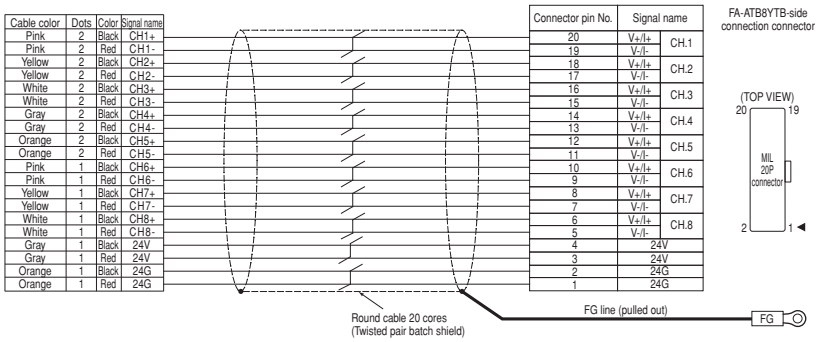
Item	Specifications		
Model	FA-CBL10ATYF	FA-CBL20ATYF	FA-CBL30ATYF
Connected programmable controller	Terminal block type module for the programmable controllers of other companies		
Connected module	FA-ATB8YTB (Connector color: light gray)		
Cable length	1.0m	2.0m	3.0m
No. of wire cores	20 cores		
Conductor	Material: Tin-plated soft copper stranded wire, Cross-sectional area: 0.08mm² (AWG28)		
Conductor resistance (20°C)	232Ω/km		
Sheath	Material: Heat resistant vinyl mixture (black), Outer diameter: 8.1mm		
Used solderless terminal	M4 round solderless terminal		
Weight	Approx. 130g	Approx. 220g	Approx. 330g

External Dimension

Unit: mm



Wiring Diagram



Cable color	Dots	Color	Signal name
Pink	2	Black	CH1+
Pink	2	Red	CH1-
Yellow	2	Black	CH2+
Yellow	2	Red	CH2-
White	2	Black	CH3+
White	2	Red	CH3-
Gray	2	Black	CH4+
Gray	2	Red	CH4-
Orange	2	Black	CH5+
Orange	2	Red	CH5-
Pink	1	Black	CH6+
Pink	1	Red	CH6-
Yellow	1	Black	CH7+
Yellow	1	Red	CH7-
White	1	Black	CH8+
White	1	Red	CH8-
Gray	1	Black	24V
Gray	1	Red	24V
Orange	1	Black	24G
Orange	1	Red	24G

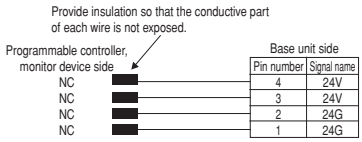
Connector pin No.	Signal name	
20	V+/I+	CH.1
19	V-/I-	
18	V+/I+	CH.2
17	V-/I-	
16	V+/I+	CH.3
15	V-/I-	
14	V+/I+	CH.4
13	V-/I-	
12	V+/I+	CH.5
11	V-/I-	
10	V+/I+	CH.6
9	V-/I-	
8	V+/I+	CH.7
7	V-/I-	
6	V+/I+	CH.8
5	V-/I-	
4	24V	
3	24V	
2	24G	
1	24G	

FA-ATB8YTB-side connection connector

Precautions

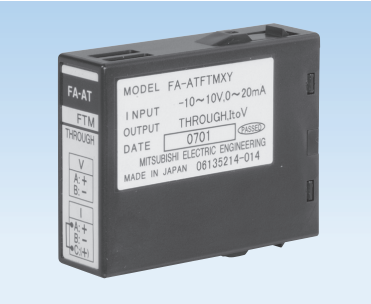
● If a power supply is not used, apply short-circuit protection.
• Short-circuit protection
Provide insulation to prevent a short-circuit on the discrete cable side of a cable.

• Example of power supply terminal processing for a connection cable when not using power supply



[Input/output type] Signal pass-through module

FA-ATFTMXY



Features

- This module passes through the signals that do not need to be isolated.
- The module also can convert a current input to a voltage output.

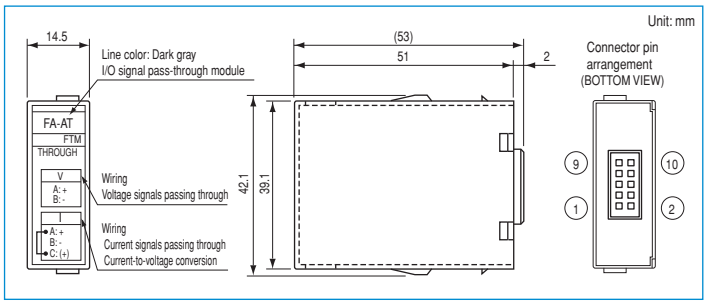
Related Materials

General Specifications 9-1

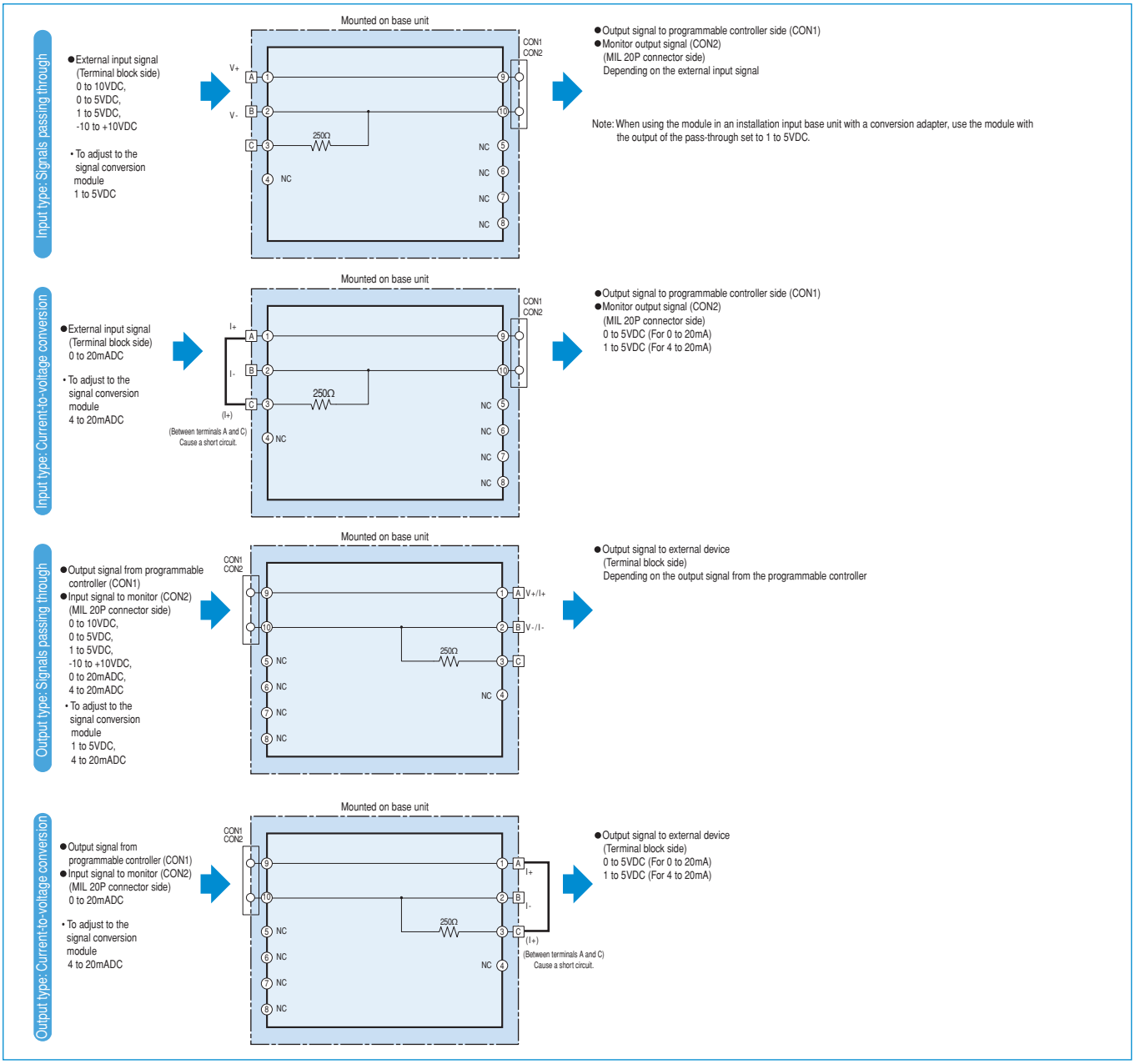
Specifications

Item		Specifications	
Number of points		1 point (1 channel)	
Conversion type		When passing through signals	When converting current to voltage (Note 1)
Input	Input resistance	-	250Ω
	Resistor accuracy	-	±0.1% or less
	Resistor temperature characteristics	-	±0.0025%/°C or less
Allowable I/O signals		Voltage: 10V or less, Current: 20mA or less	
Weight		Approx. 30g	
Precautions		Note 1: For current-to-voltage conversion, a short-circuit must be caused between terminals A and C of the base unit terminal block. Note 2: When FA-ATKAA8XM is used, only currents can be used. (Voltage conversion cannot be used.)	

External Dimension



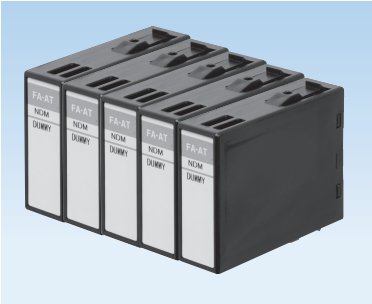
Block Diagram



Model Selection 7-5 7-6

[Input/output type] Dummy module

FA-ATNDM5



Features

- The module is used for dust protection of an empty slot in a base.
- The module can be mounted/removed to/from a base unit easily.

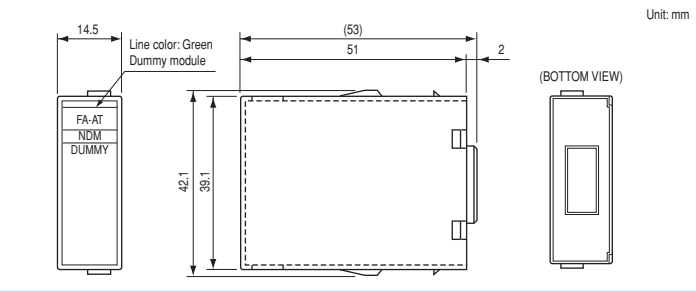
Related Materials

General Specifications 9-1

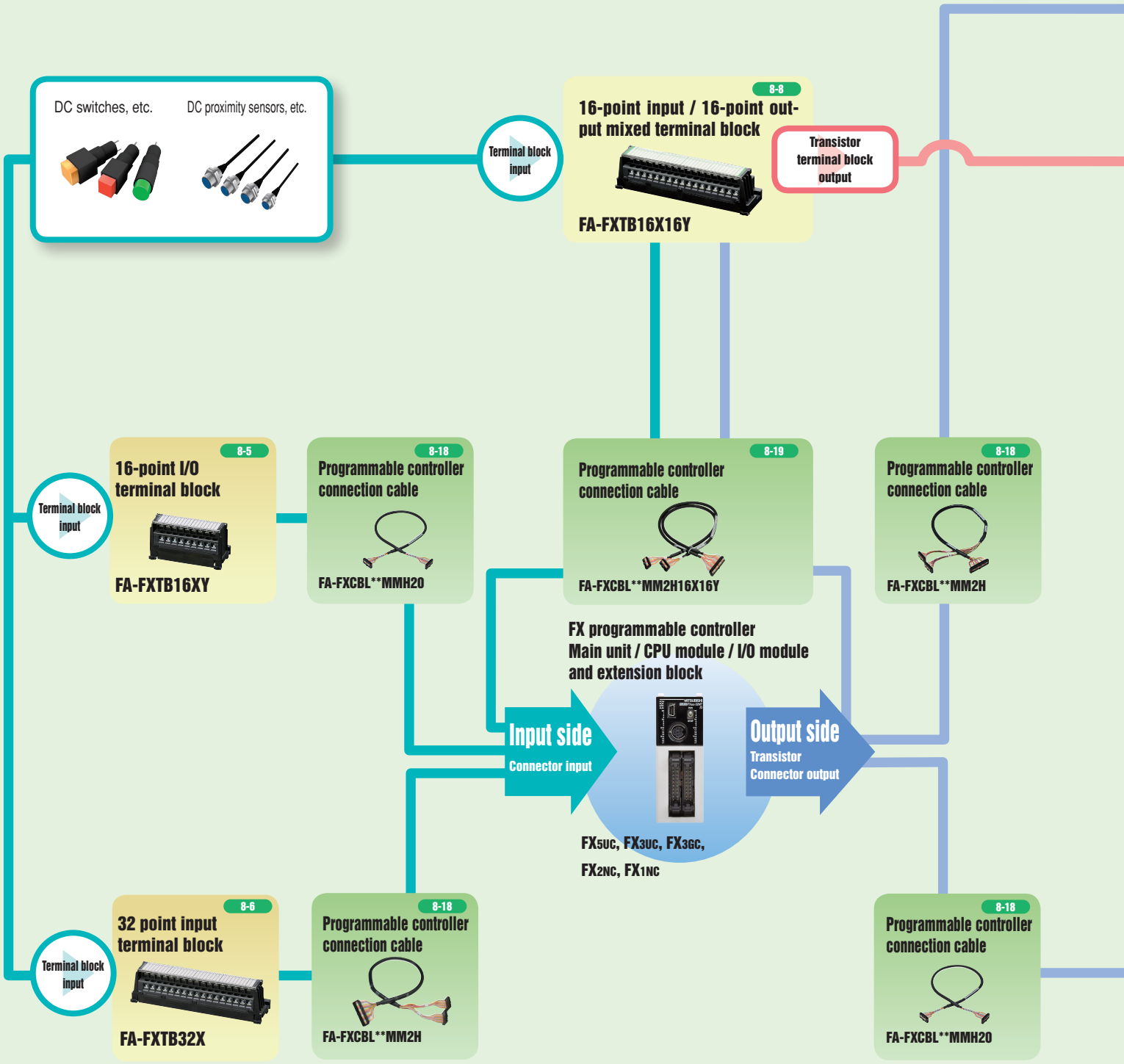
Specifications

Item	Specifications
Number of points	1 point (1 channel)
Quantity in package	5
Weight	Approx. 100g

External Dimension



Terminal blocks specialized for Mitsubishi Electric micro programmable controller FX series connector-type modules



- Terminal blocks reduce the process time required for the wiring work for the inside and outside of the panel of programmable controllers, reduce wiring errors, and ensure high reliability in safety.
- As an interface between programmable controllers and external I/O devices, terminal blocks further enhance the extensibility of programmable controllers.

8-7

32-point output terminal block

FA-FXTB32Y

Transistor terminal block output

8-5

16-point I/O terminal block

FA-FXTB16XY

Transistor terminal block output

Want to connect DC load, and switching frequency is high

Transistor output (5 to 30VDC) DC load no-contact output

Control panel / operation panel (DC load)

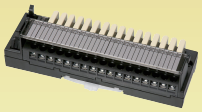
DC solenoid valves, etc.

DC lamps, etc.

DC relay

8-11

16-point relay output socket-type terminal block

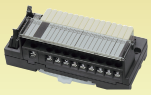


FA-FXTH16YRA20S

NO contact relay terminal block output

8-9

16-point relay output socket-type terminal block

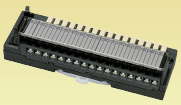


FA-FXTH16YRA11S

NO contact relay terminal block output

8-13

16-point relay output terminal block



FA-FXTH16YRA20

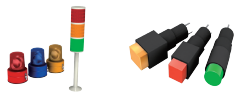
NO contact relay terminal block output

Want to connect a load with low switching frequency

Relay output (24VDC/200VAC) DC/AC load contact output

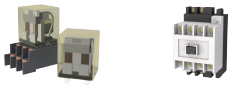
Control panel / operation panel (DC/AC load)

Lamps, etc.



Solenoid valves, etc.

Relay, electromagnetic contactors, etc.



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Connection Cable Individual Specifications

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8. Goods for MELSEC iQ-F / MELSEC-F FX Series

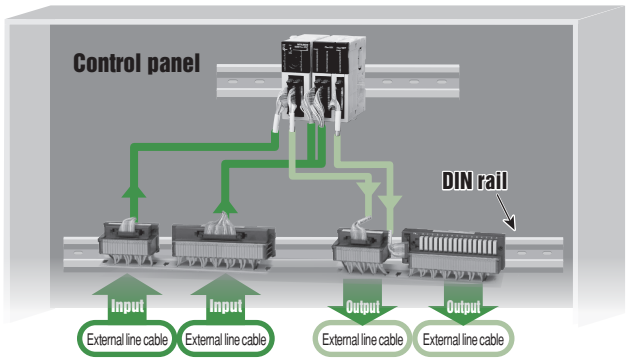
Overview

Connection of a connector-type programmable controller main unit / CPU module / I/O module or extension block can be converted into terminal-block-based connection.

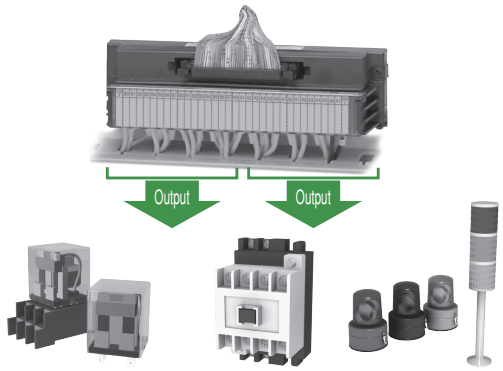
The user can have benefits of both the ease of use offered by connector-based connection and the general versatility of terminal-block-based connection.

- An external line cable can be connected directly. (By using an applicable solderless terminal, a cable of up to 2mm^2 can be connected.)
- Even when renewing a programmable controller, renewal work is easy because external line cables can be made short by using a terminal block.
- Direct installation using a DIN rail or screws is possible.
- Even for a connector-type programmable controller, an output can be branched easily.
- A load of maximum 2A/point can be connected to a relay module in a relay output terminal block.
- Even if a built-in terminal block relay fails, the user can replace relay modules on a per-module basis. (Use a socket-type terminal block.)
- The adoption of spring-up screw type M3 terminal screws makes wiring easy. A round solderless terminal can be connected easily without removing installation screws.
- A dedicated connection cable that can be directly connected to a programmable controller is available. (Cable length: 0.6/1/1.5/2m)

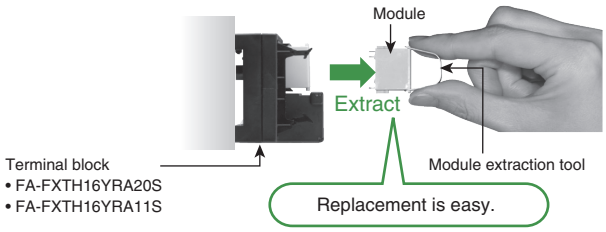
External connection is easy



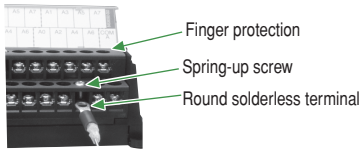
Branching an output is easy



Output module replacement is easy

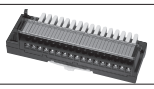


Spring-up screw method makes wiring easy



Model List

Terminal block

Product	Shape	Model	Remarks	Page
16-point I/O terminal block		FA-FXTB16XY	●When connected to the input connector of a programmable controller, this module converts the connector input signals (24VDC inputs) of the programmable controller into 16-point terminal block inputs. ●When connected to the output connector of a programmable controller, this module converts the connector output signals (transistor outputs) of the programmable controller into 16-point terminal block outputs.	8-5
32-point input terminal block		FA-FXTB32X	●This module converts connector input signals (24VDC inputs) of a programmable controller into 32-point terminal block inputs.	8-6
32-point output terminal block		FA-FXTB32Y	●This module converts connector output signals (transistor outputs) of a programmable controller into 32-point terminal block outputs.	8-7
16-point input / 16-point output mixed terminal block		FA-FXTB16X16Y	●This module converts 16-point connector input signals (24VDC inputs) and 16-point connector output signals (transistor outputs) of a programmable controller into 32-point terminal block inputs and outputs.	8-8
16-point relay output socket-type terminal block		FA-FXTH16YRA11S	●This module converts connector output signals (transistor outputs) of a programmable controller into 16-point socket-type relay output terminal block (2A/point) outputs. Accessory: Module extraction tool × 1	8-9
16-point relay output socket-type terminal block		FA-FXTH16YRA20S	●This module converts connector output signals (transistor outputs) of a programmable controller into 16-point socket-type relay output terminal block (2A/point) outputs. Accessory: Module extraction tool × 1	8-11
16-point relay output terminal block		FA-FXTH16YRA20	●This module converts connector output signals (transistor outputs) of a programmable controller into 16-point relay output terminal block (2A/point) outputs.	8-13

Programmable Controller Connection Cable

Product	Shape	Model		Remarks	Applicable terminal block	Page
16-point I/O terminal block programmable controller connection cable		FA-FXCBL06MMH20	0.6m	●Horizontal round cable [Programmable controller side] 20-pin MIL connector attached [Terminal block side] 20-pin MIL connector attached	FA-FXTB16XY FA-FXTH16YRA11S FA-FXTH16YRA20 FA-FXTH16YRA20S	8-18
		FA-FXCBL10MMH20	1.0m			
		FA-FXCBL15MMH20	1.5m			
		FA-FXCBL20MMH20	2.0m			
32-point I/O terminal block programmable controller connection cable		FA-FXCBL06MM2H	0.6m	●Horizontal round cable [Programmable controller side] Two 20-pin MIL connectors attached [Terminal block side] 40-pin MIL connector attached	FA-FXTB32X FA-FXTB32Y	
		FA-FXCBL10MM2H	1.0m			
		FA-FXCBL15MM2H	1.5m			
		FA-FXCBL20MM2H	2.0m			
16-point input / 16-point output mixed terminal block programmable controller connection cable		FA-FXCBL06MM2H16X16Y	0.6m	●Horizontal round cable [Programmable controller side] Two 20-pin MIL connectors attached [Terminal block side] 40-pin MIL connector attached	FA-FXTB16X16Y	8-19
		FA-FXCBL10MM2H16X16Y	1.0m			
		FA-FXCBL15MM2H16X16Y	1.5m			
		FA-FXCBL20MM2H16X16Y	2.0m			

Option

Replacement module [For details on the replacement module specifications, refer to Page 2-28.]

Product	Shape	Model	Quantity in package
NO contact relay module		FA-NYP24WK4	4

Correspondence Table

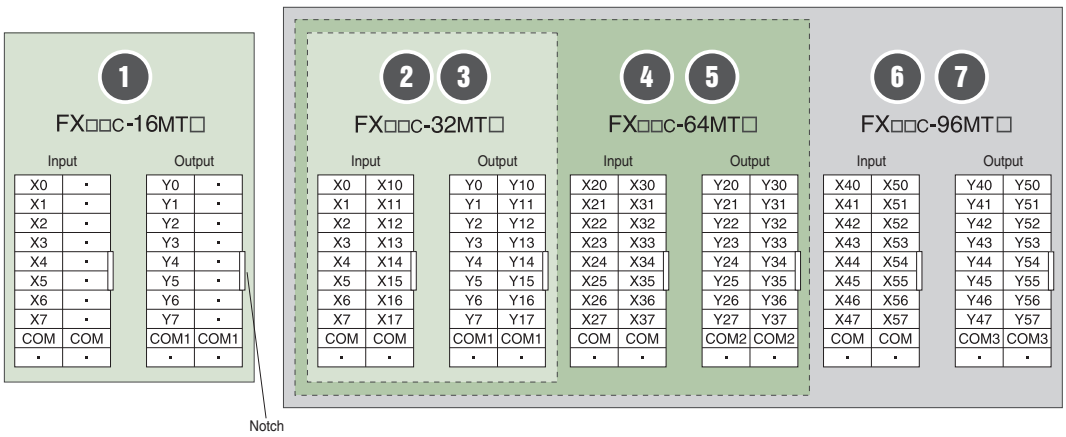
Connection to the main unit and CPU module of an FX programmable controller is possible in the following combinations.

Before using the product, check the connection target product, combination method, and required numbers of terminal blocks and connection cables.

Main unit / CPU module	Connector diagram (Details are provided below.)	1		2		3		4		5		6		7	
	Model	FX3UC-16MT/D FX1NC-16MT		FX5UC-32MT/D FX3UC-32MT/D FX3UC-32MT-LT(-LT2) FX3GC-32MT/D FX1NC-32MT		FX5UC-32MT/DSS		FX3UC-64MT/D FX5UC-64MT/D		FX5UC-64MT/DSS		FX3UC-96MT/D FX5UC-96MT/D		FX5UC-96MT/DSS	
Terminal block (cable)	Number of I/O point	16 points		32 points		32 points		64 points		64 points		96 points		96 points	
		Input 8 points	Output 8 points	Input 16 points	Output 16 points	Input 16 points	Output 16 points	Input 32 points	Output 32 points	Input 32 points	Output 32 points	Input 48 points	Output 48 points	Input 48 points	Output 48 points
FA-FXTB16XY		○	○	○	○	○	○	○	○	○	○	○	○	○	○
(Connection cable)		1	1	1	1	1	1	1	1	1	1	1	1	1	1
FA-FXTB32X								○		○		○		○	
(Connection cable)								2		2		2		2	
FA-FXTB32Y									○		○		○		○
(Connection cable)									2		2		2		2
FA-FXTB16X16Y		○		○		○		○		○		○		○	
(Connection cable)		4		4		4		4		4		4		4	
FA-FXTH16YRA11S			○		○				○				○		
(Connection cable)			1		1				1				1		
FA-FXTH16YRA20			○		○				○				○		
(Connection cable)			1		1				1				1		
FA-FXTH16YRA20S			○		○				○				○		
(Connection cable)			1		1				1				1		

○: Connectable

Main unit / CPU module connector diagram details



For the connection cable 1, select one from the following.

Connection cable 1

FA-FXCBL06MMH20(0.6m)
FA-FXCBL10MMH20(1.0m)
FA-FXCBL15MMH20(1.5m)
FA-FXCBL20MMH20(2.0m)

For the connection cable 2, select one from the following.

Connection cable 2

FA-FXCBL06MM2H(0.6m)
FA-FXCBL10MM2H(1.0m)
FA-FXCBL15MM2H(1.5m)
FA-FXCBL20MM2H(2.0m)

For the connection cable 4, select one from the following.

Connection cable 4

FA-FXCBL06MM2H16X16Y(0.6m)
FA-FXCBL10MM2H16X16Y(1.0m)
FA-FXCBL15MM2H16X16Y(1.5m)
FA-FXCBL20MM2H16X16Y(2.0m)

Correspondence Table

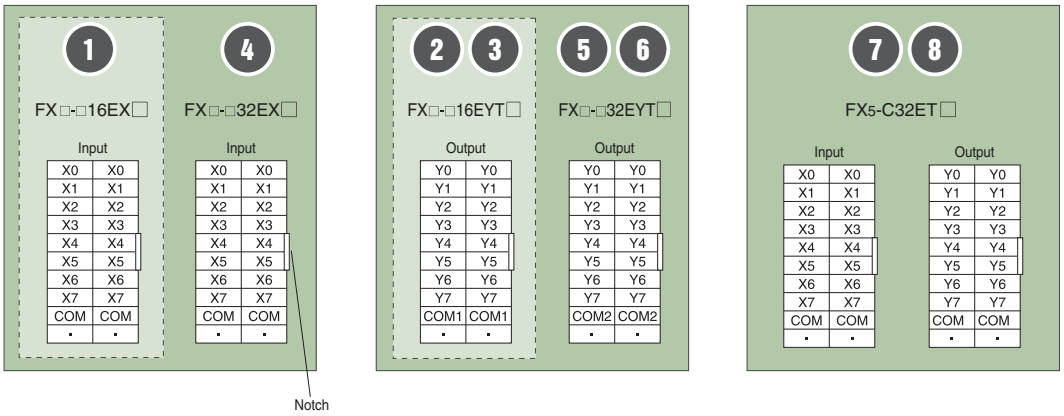
Connection to the I/O module and extension block of an FX programmable controller is possible in the following combinations.

Before using the product, check the connection target product, combination method, and required numbers of terminal blocks and connection cables.

I/O module, extension block / Terminal block (cable)	Connector diagram (Details are provided below.)	1	2	3	4	5	6	7		8	
	Model	FX5-C16EX/D FX5-C16EX/DS FX2NC-16EX	FX5-C16EYT/D FX2NC-16EYT	FX5-C16EYT/DSS	FX5-C32EX/D FX5-C32EX/DS FX2NC-32EX	FX5-C32EYT/D FX2NC-32EYT	FX5-C32EYT/DSS	FX5-C32ET/D		FX5-C32ET/DSS	
	Number of I/O point	16 points	16 points	16 points	32 points	32 points	32 points	32 points		32 points	
		Input 16 points	Output 16 points	Output 16 points	Input 32 points	Output 32 points	Output 32 points	Input 16 points	Output 16 points	Input 16 points	Output 16 points
FA-FXTB16XY		○	○	○	○	○	○	○	○	○	○
(Connection cable)		1	1	1	1	1	1	1	1	1	1
FA-FXTB32X					○						
(Connection cable)					2						
FA-FXTB32Y						○	○				
(Connection cable)						2	2				
FA-FXTB16X16Y								○		○	
(Connection cable)								4		4	
FA-FXTH16YRA11S			○			○			○		
(Connection cable)			1			1			1		
FA-FXTH16YRA20			○			○			○		
(Connection cable)			1			1			1		
FA-FXTH16YRA20S			○			○			○		
(Connection cable)			1			1			1		

○ : Connectable

I/O module, extension block connector diagram details



For the connection cable 1, select one from the following.

Connection cable 1

FA-FXCBL06MMH20 (0.6m)
FA-FXCBL10MMH20 (1.0m)
FA-FXCBL15MMH20 (1.5m)
FA-FXCBL20MMH20 (2.0m)

For the connection cable 2, select one from the following.

Connection cable 2

FA-FXCBL06MM2H (0.6m)
FA-FXCBL10MM2H (1.0m)
FA-FXCBL15MM2H (1.5m)
FA-FXCBL20MM2H (2.0m)

For the connection cable 4, select one from the following.

Connection cable 4

FA-FXCBL06MM2H16X16Y (0.6m)
FA-FXCBL10MM2H16X16Y (1.0m)
FA-FXCBL15MM2H16X16Y (1.5m)
FA-FXCBL20MM2H16X16Y (2.0m)

16-point I/O terminal block (16 points/2 common)

FA-FXTB16XY

Features

- This module converts Mitsubishi Electric micro programmable controller FX series connector-type input signals (24VDC inputs) into 16-point terminal block inputs. (When connected to the input connector of a programmable controller)
- This module converts Mitsubishi Electric micro programmable controller FX series connector-type output signals (transistor outputs) into 16-point terminal block outputs.
  (When connected to the output connector of a programmable controller)
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The module can be installed using a DIN rail or screws.

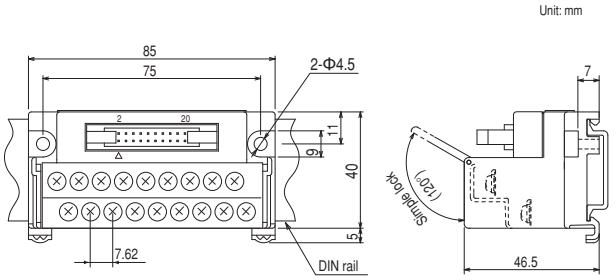
Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

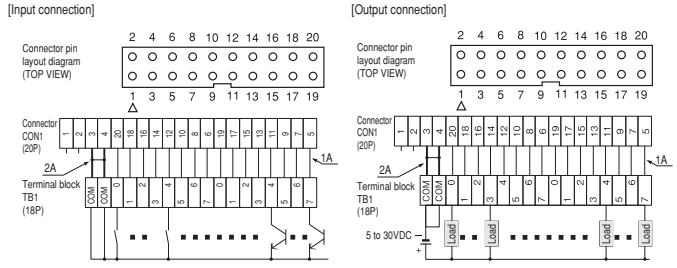
Specifications

Item		Specifications
No. of I/O points I/O device		16 points (16 points for input X or 16 points for output Y)
Maximum operating voltage, current		48VDC, 1A (each signal terminal), 2A (common terminal)
Common method		16 points/2 common
Terminal block	Terminal screw	M3 screw, number of terminals: 18P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.5 to 1.25mm² (with solderless terminal use), 58.8 to 88.3N•cm
Module installation	Screw installation	M4 × 0.7mm × 12mm or more, tightening torque: 78 to 118N•cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage		500VAC for 1 minute (between all DC external terminals ↔ ground)
Insulation resistance (Initial stage)		100MΩ or more (measured with 500VDC insulation resistance tester) (between all DC external terminals ↔ ground)
Weight		Approx. 130g

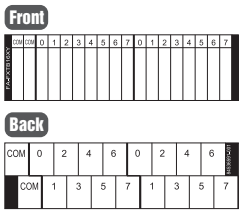
External Dimension



Wiring Diagram



Terminal board

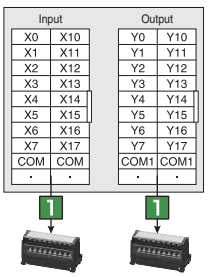


Connection to FX Programmable Controller Main Unit / CPU Module / I/O Module and Extension Block

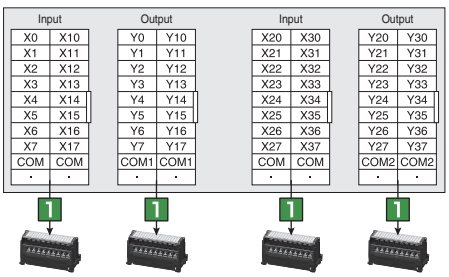
The following is an example of connection to an FX programmable controller main unit / CPU module / I/O module and extension block. For details on the applicable connections, refer to P8-3, 4.

- Configuration example of connection to FX programmable controller main unit / CPU module

FX3UC-32M, FX3GC-32M, FX5UC-32M, FX1NC-32M



FX3UC-64M, FX5UC-64M



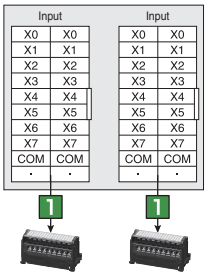
For the connection cable 1, select one from the following.

Connection cable 1

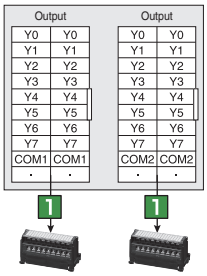
FA-FXCBL06MMH20 (0.6m)
FA-FXCBL10MMH20 (1.0m)
FA-FXCBL15MMH20 (1.5m)
FA-FXCBL20MMH20 (2.0m)

- Configuration example of connection to FX programmable controller I/O module and extension block

FX2NC-32EX



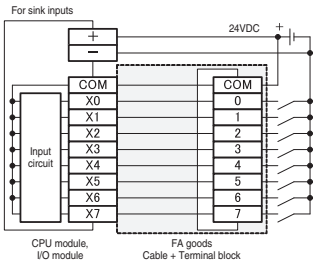
FX2NC-32EYT

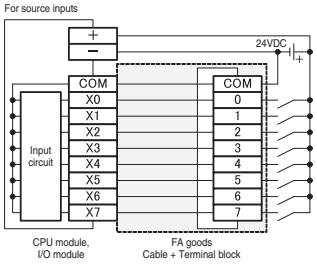


Precautions when connecting an module common to sink and source inputs

For sink/source common inputs, as the wiring shown in the manual issued by Mitsubishi Electric, commons need to be connected to the module power supply.

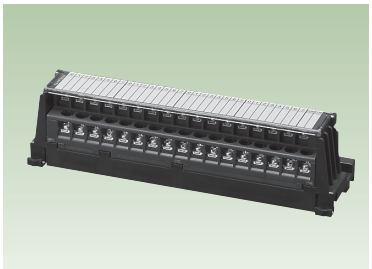
Applicable modules: FX5UC-32MT/DSS, FX5-C32EX/DS, FX5-C32ET/DSS





32-point input terminal block (32 points/2 common)

FA-FXTB32X



Features

- This module converts Mitsubishi Electric micro programmable controller FX series connector-type input signals (24VDC inputs) into 32-point terminal block inputs.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The module can be installed using a DIN rail or screws.

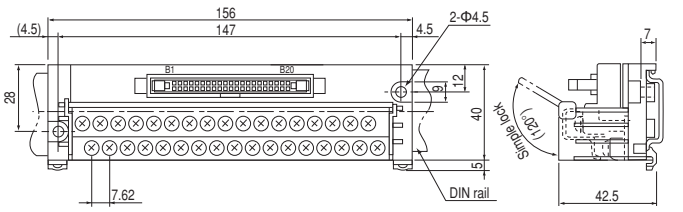
Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

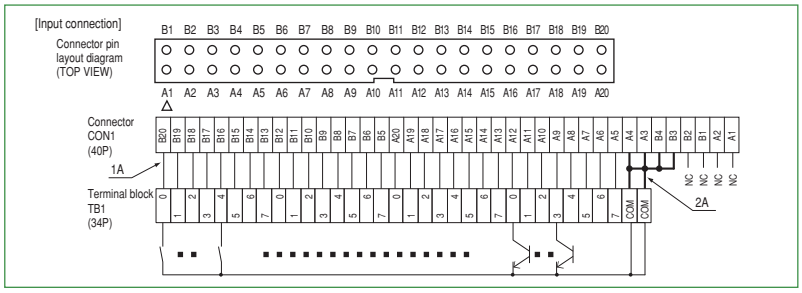
Specifications

Item		Specifications
No. of I/O points I/O device		32 points (input X)
Maximum operating voltage, current		48VDC, 1A (each signal terminal), 2A (common terminal)
Common method		32 points/2 common
Terminal block	Terminal screw	M3 screws, number of terminals: 34P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.5 to 1.25mm² (with solderless terminal use), 58.8 to 88.3N•cm
Module installation	Screw installation	M4 × 0.7mm × 12mm or more, tightening torque: 78 to 118N•cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage		500VAC for 1 minute (between all DC external terminals ↔ ground)
Insulation resistance (Initial stage)		100MΩ or more (measured with 500VDC insulation resistance tester) (between all DC external terminals ↔ ground)
Weight		Approx. 160g

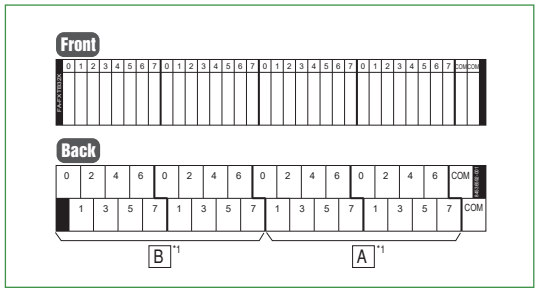
External Dimension



Wiring Diagram



Terminal board



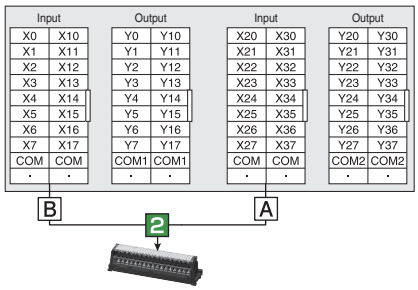
*1: Shows the attached connector identification (side A or B).

Connection to FX Programmable Controller Main Unit / CPU Module / I/O Module and Extension Block

The following is an example of connection to an FX programmable controller main unit / CPU module / I/O module and extension block. For details on the applicable connections, refer to P8-3, 4.

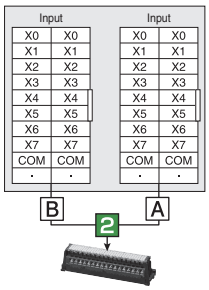
- Configuration example of connection to FX programmable controller main unit / CPU module

FX3UC-64M, FX5UC-64M



- Configuration example of connection to FX programmable controller I/O module and extension block

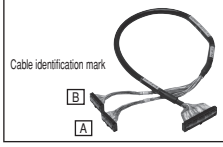
FX2NC-32EX



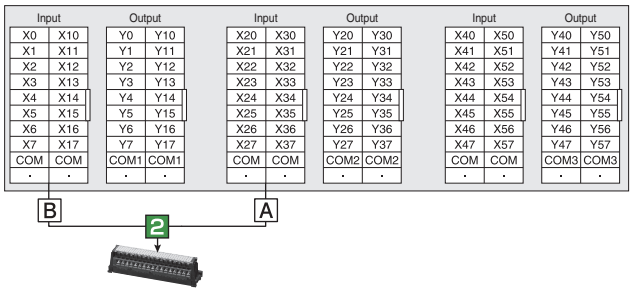
For the connection cable 2, select one from the following.

Connection cable 2

FA-FXCBL06MM2H (0.6m)
FA-FXCBL10MM2H (1.0m)
FA-FXCBL15MM2H (1.5m)
FA-FXCBL20MM2H (2.0m)



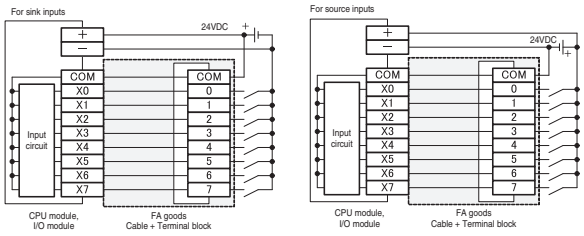
(Connection example) FX3UC-96M, FX5UC-96M



Precautions when connecting an module common to sink and source inputs

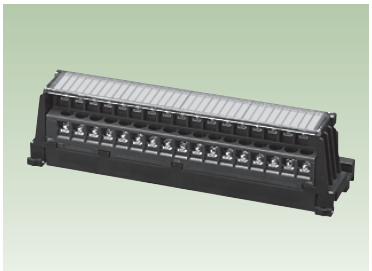
For sink/source common inputs, as the wiring shown in the manual issued by Mitsubishi Electric, commons need to be connected to the module power supply.

Applicable modules: FX5UC-32MT/DSS, FX5-C32EX/DS, FX5-C32ET/DSS



32-point output terminal block (32 points/2 common (16 points/common))

FA-FXTB32Y



Features

- This module converts Mitsubishi Electric micro programmable controller FX series connector-type output signals (transistor outputs) into 32-point terminal block outputs.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The module can be installed using a DIN rail or screws.

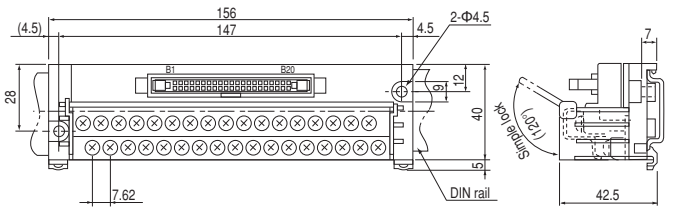
Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

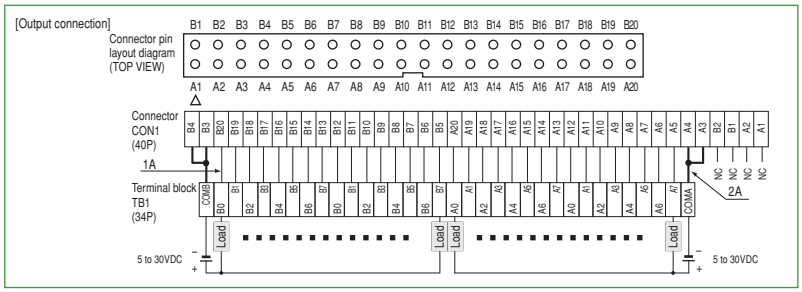
Specifications

Item		Specifications
No. of I/O points I/O device		32 points (output Y)
Maximum operating voltage, current		48VDC, 1A (each signal terminal), 2A (common terminal)
Common method		32 points/2 common (16 output points/common)
Terminal block	Terminal screw	M3 screw, number of terminals: 34P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.5 to 1.25mm² (with solderless terminal use), 58.8 to 88.3N•cm
Module installation	Screw installation	M4 × 0.7mm × 12mm or more, tightening torque: 78 to 118N•cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage		500VAC for 1 minute (between all DC external terminals ↔ ground)
Insulation resistance (Initial stage)		100MΩ or more (measured with 500VDC insulation resistance tester) (between all DC external terminals ↔ ground)
Weight		Approx. 160g

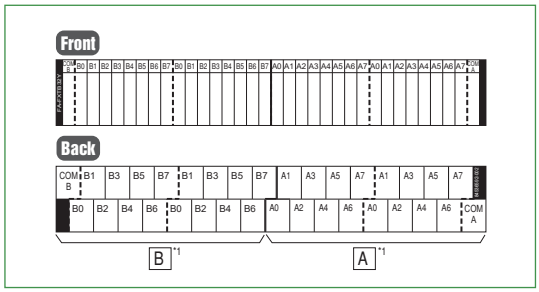
External Dimension



Wiring Diagram



Terminal board



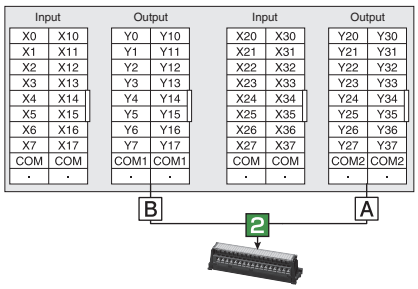
*1: Shows the attached connector identification (side A or B).

Connection to FX Programmable Controller Main Unit / CPU Module / I/O Module and Extension Block

The following is an example of connection to an FX programmable controller main unit / CPU module / I/O module and extension block. For details on the applicable connections, refer to P8-3, 4.

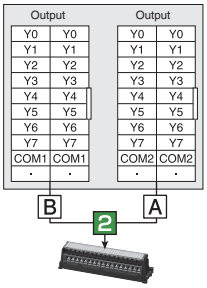
- Configuration example of connection to FX programmable controller main unit / CPU module

FX3UC-64M, FX5UC-64M



- Configuration example of connection to FX programmable controller I/O module and extension block

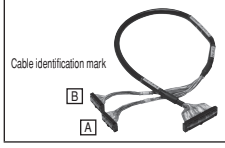
FX2NC-32EYT



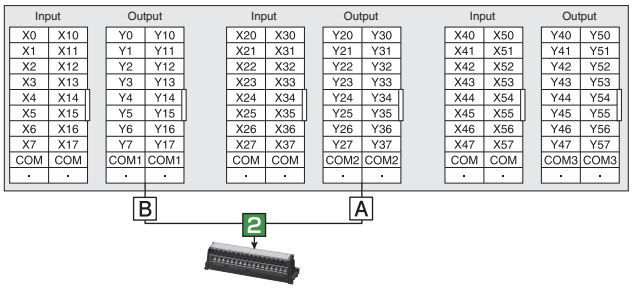
For the connection cable 2, select one from the following.

Connection cable 2

- FA-FXCBL06MM2H (0.6m)
- FA-FXCBL10MM2H (1.0m)
- FA-FXCBL15MM2H (1.5m)
- FA-FXCBL20MM2H (2.0m)

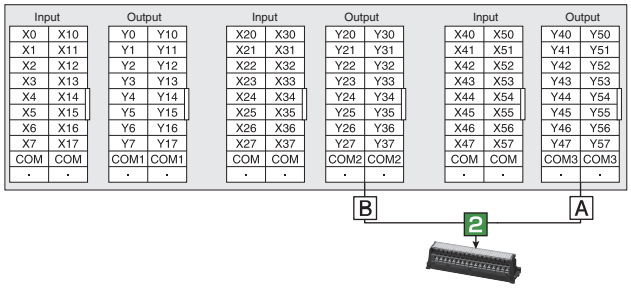


(Connection example 1)



FX3UC-96M, FX5UC-96M

(Connection example 2)



16-point input / 16-point output mixed terminal block (32 points/2 common (16 points/common))

FA-FXTB16X16Y

Features

- This module converts Mitsubishi Electric micro programmable controller FX series connector-type 16-point input signals (24VDC inputs) and 16-point output signals (transistor outputs) into 32-point terminal block inputs and outputs.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The module can be installed using a DIN rail or screws.

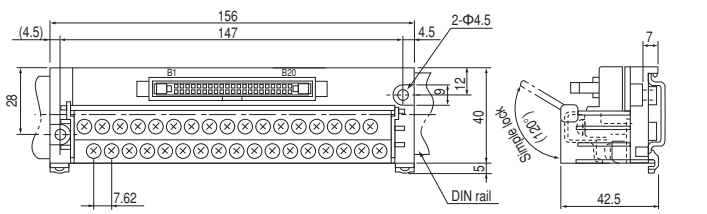
Related Materials

General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

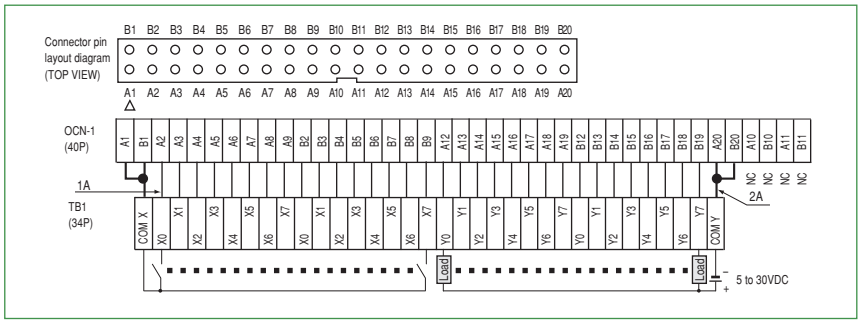
Specifications

Item		Specifications
No. of I/O points I/O device		32 points (16 points for input X, 16 points for output Y)
Maximum operating voltage, current		48VDC, 1A (each signal terminal), 2A (common terminal)
Common method		32 points/2 common (16 points/common)
Terminal block	Terminal screw	M3 screws, number of terminals: 34P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.5 to 1.25mm² (with solderless terminal use), 58.8 to 88.3N•cm
Module installation	Screw installation	M4 × 0.7mm × 12mm or more, tightening torque: 78 to 118N•cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage		500VAC for 1 minute (between all DC external terminals ↔ ground)
Insulation resistance		100MΩ or more (measured with 500VDC insulation resistance tester) (between all DC external terminals ↔ ground)
Weight		Approx. 160g

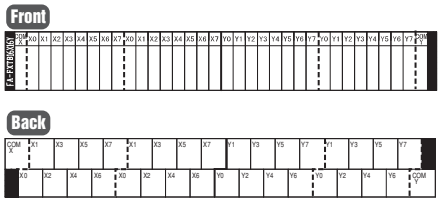
External Dimension



Wiring Diagram



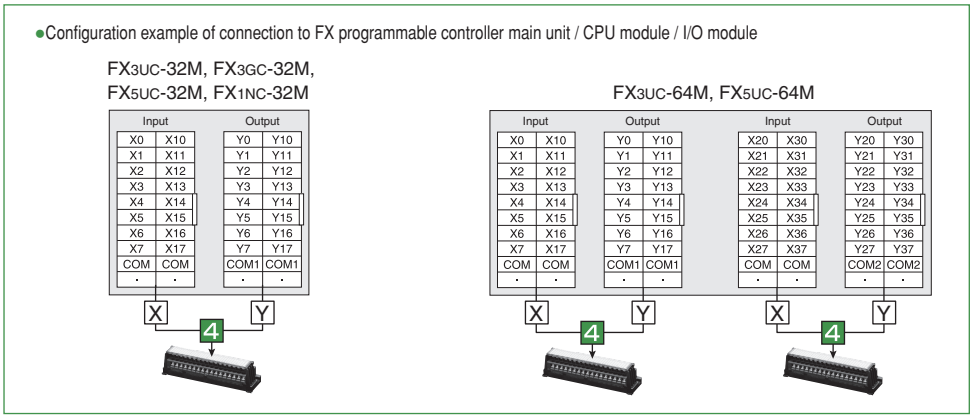
Terminal board



Connection to FX Programmable Controller Main Unit / CPU Module / I/O Module

The following is an example of connection to an FX programmable controller main unit / CPU module / I/O module. For details on the applicable connections, refer to P8-3, 4.

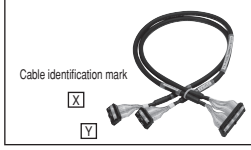
●Configuration example of connection to FX programmable controller main unit / CPU module / I/O module



For the connection cable 4, select one from the following.

Connection cable 4

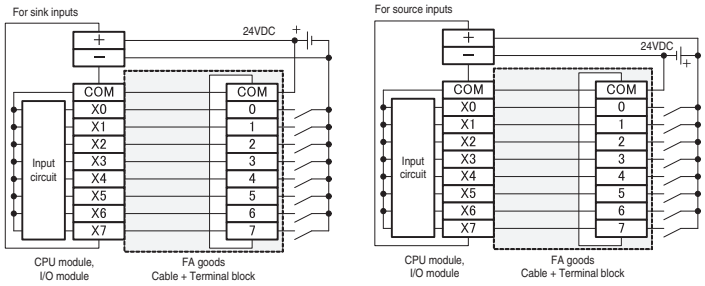
- FA-FXCBL06MM2H16X16Y (0.6m)
- FA-FXCBL10MM2H16X16Y (1.0m)
- FA-FXCBL15MM2H16X16Y (1.5m)
- FA-FXCBL20MM2H16X16Y (2.0m)



Precautions when connecting an module common to sink and source inputs

For sink/source common inputs, as the wiring shown in the manual issued by Mitsubishi Electric, commons need to be connected to the module power supply.

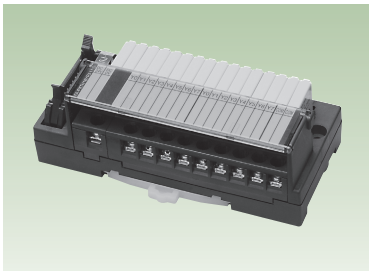
Applicable modules: FX5UC-32MT/DSS, FX5-C32EX/DS, FX5-C32ET/DSS



Model List 8-2 | Correspondence Table 8-3 8-4 | Individual Specifications 8-5 to 8-14

16-point relay output socket-type terminal block (16 points/common)

FA-FXTH16YRA11S



Features

- This module converts Mitsubishi Electric micro programmable controller FX series connector-type output signals (transistor outputs) into 16-point NO contact relay output terminal block (2A/point) outputs.
- Since sockets are equipped, relay modules can be replaced on a per-module basis. (Easy maintenance)
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The module can be installed using a DIN rail or screws.

Related Materials

Usage Precautions 8-15 to 8-17 | General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

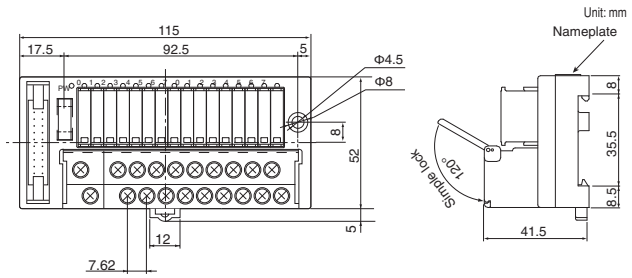
Related Products

Replacement Relay 2-28

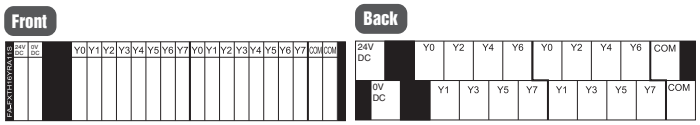
Specifications

Item		Specifications
No. of I/O points I/O device		16 points (output Y)
Isolation method		NO contact relay isolation
Rated switching voltage, current		Voltage: 24VDC, 200VAC, Current: 2A/point (resistance load, COSΦ=1), 8A/common
Maximum number of points simultaneously ON		100%
Minimum switching load		5VDC 1mA
Maximum switching load		270VAC, 150VDC
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF) For details, refer to the life curve. (A relay is a consumable and needs to be replaced.)
Mechanical life		20 million times or more
Electrical life		100,000 times or more at rated switching voltage/current
		100,000 times or more at 200VAC 1.5A (COSΦ=0.7), 240VAC 1A (COSΦ=0.7)
		100,000 times or more at 200VAC 1A (COSΦ=0.35), 100VDC 0.5A
		100,000 times or more at 24VDC 1A (L/R=7ms), 100VDC 0.1A (L/R=7ms)
Response time	OFF→ON	10ms or less (excluding programmable controller response time)
	ON→OFF	12ms or less (excluding programmable controller response time)
Common method		16 points/common
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between input-output, between each output: 2500VAC for 1 minute, between contacts: 750VAC for 1 minute, 100MΩ (Initial)
Noise resistance		Simulator noise 1000Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 30 to 100Hz)
Operation display		LED on with power supply ON and input ON
Socket		Yes (relay module replaceable)
No. of times module is replaced		50 times
Usable module		NO contact relay module
Terminal block	Terminal screw	M3 screws, number of terminals: 20P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.5 to 1.25mm² (with solderless terminal use), 58.8 to 88.3N•cm
Module installation	Screw installation	M4 × 0.7mm × 22mm or more, tightening torque: 78 to 118N•cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Accessories		Module extraction tool
Weight		Approx. 200g

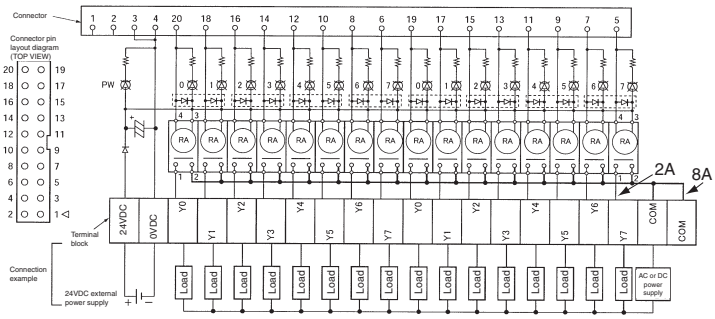
External Dimension



Terminal board



Wiring Diagram



A socket for socket-type modules is omitted.

Relay Characteristics Data

Note 1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend adequately considering usage conditions.

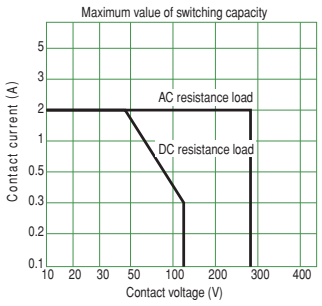
Note 2: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.

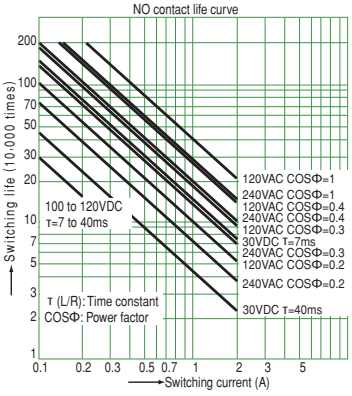
Note 3: The relay life varies significantly according to load type and its inrush current characteristics. In particular, an inrush current may cause contact welding, and thus must be taken into consideration as well as a steady current.

a) Inductive load
When an inductive load such as an electromagnetic switch and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. In particular, if the power factor is low, the life shortens. This must be taken into account. Additionally, at power activation, too, an inrush current 5 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

b) Lamp load
For a lamp circuit inrush current, an inrush current 10 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

c) Capacitive load
When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.



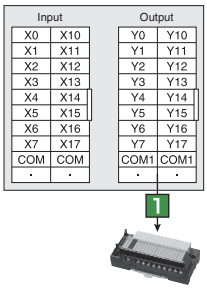


Connection to FX Programmable Controller Main Unit / CPU Module / I/O Module and Extension Block

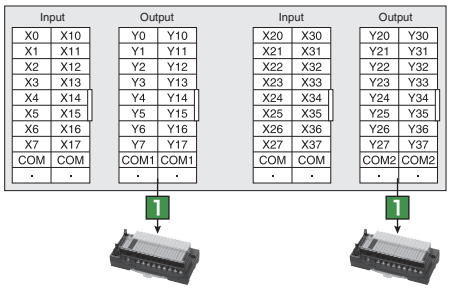
The following is an example of connection to an FX programmable controller main unit / CPU module / I/O module and extension block. For details on the applicable connections, refer to P8-3, 4.

●Configuration example of connection to FX programmable controller main unit / CPU module

FX3UC-32M, FX3GC-32M, FX5UC-32MT/D, FX1NC-32M



FX3UC-64M, FX5UC-64MT/D



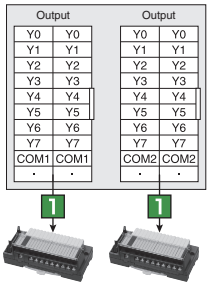
For the connection cable **1**, select one from the following.

Connection cable 1

FA-FXCBL06MMH20 (0.6m)
FA-FXCBL10MMH20 (1.0m)
FA-FXCBL15MMH20 (1.5m)
FA-FXCBL20MMH20 (2.0m)

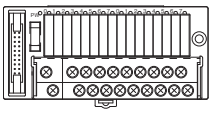
●Configuration example of connection to FX programmable controller I/O module and extension block

FX2NC-32EYT

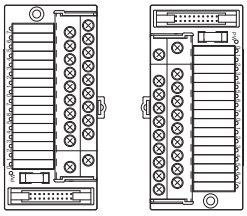


Installation Direction

Horizontal installation



Vertical installation

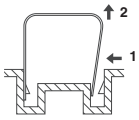


Note: Do not install the module in any direction other than the above.

How to Use the Extraction Tool

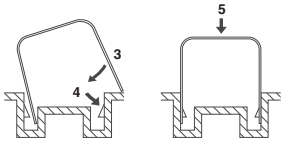
■Removing the extraction tool

Operate and remove the tool using your fingers.



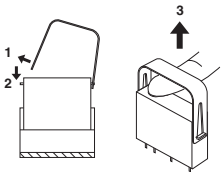
■Installing the extraction tool

Operate and install the tool using your fingers.

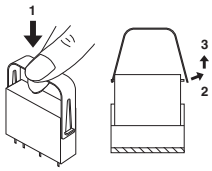


■Removing the relay from the socket

Insert the tool into the relay and pull out the relay with the tool using your fingers.



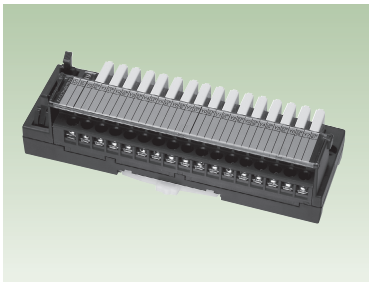
■Inserting the relay into the socket



* Check that legs of relay are not bent before inserting the relay.

16-point relay output socket-type terminal block (16-point independent common)

FA-FXTH16YRA20S



Features

- This module converts Mitsubishi Electric micro programmable controller FX series connector-type output signals (transistor outputs) into 16-point NO contact relay output terminal block (2A/point) outputs.
- Since sockets are equipped, relay modules can be replaced on a per-module basis. (Easy maintenance)
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The module can be installed using a DIN rail or screws.

Related Materials

Usage Precautions 8-15 to 8-17 | General Specifications 9-1
M3 7.62-mm Applicable Solderless Terminal 9-2

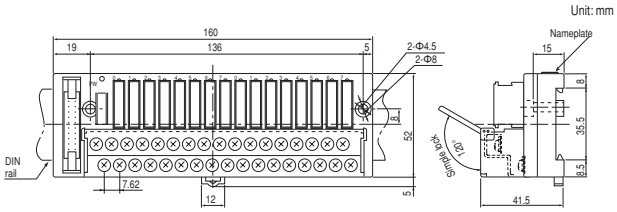
Related Products

Replacement Relay 2-28

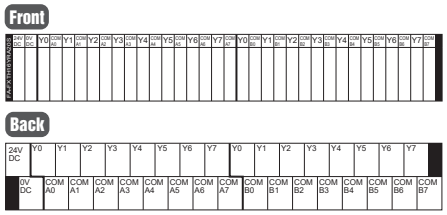
Specifications

Item		Specifications
No. of I/O points I/O device		16 points (output Y)
Isolation method		NO contact relay isolation
Rated switching voltage, current		Voltage: 24VDC, 200VAC, Current: 2A/point (resistance load, COSΦ=1)
Maximum number of points simultaneously ON		100%
Minimum switching load		5VDC 1mA
Maximum switching load		270VAC, 150VDC
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF) For details, refer to the life curve. (A relay is a consumable and needs to be replaced.)
Mechanical life		20 million times or more
Electrical life		100,000 times or more at rated switching voltage/current
		100,000 times or more at 200VAC 1.5A (COSΦ=0.7), 240VAC 1A (COSΦ=0.7)
		100,000 times or more at 200VAC 1A (COSΦ=0.35), 100VDC 0.5A
		100,000 times or more at 24VDC 1A (L/R=7ms), 100VDC 0.1A (L/R=7ms)
Response time	OFF→ON	10ms or less (excluding programmable controller response time)
	ON→OFF	12ms or less (excluding programmable controller response time)
Common method		16-point independent common
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between input-output, between each output: 2500VAC for 1 minute, between contacts: 750VAC for 1 minute, 100MΩ (Initial)
Noise resistance		Simulator noise 1000Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 30 to 100Hz)
Operation display		LED on with power supply ON and input ON
Socket		Yes (relay module replaceable)
No. of times module is replaced		50 times
Terminal block	Terminal screw	M3 screw, number of terminals: 34P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.5 to 1.25mm² (with solderless terminal use), 58.8 to 88.3N•cm
Module installation	Screw installation	M4 × 0.7mm × 22mm or more, tightening torque: 78 to 118N•cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Accessories		Module extraction tool
Weight		Approx. 250g

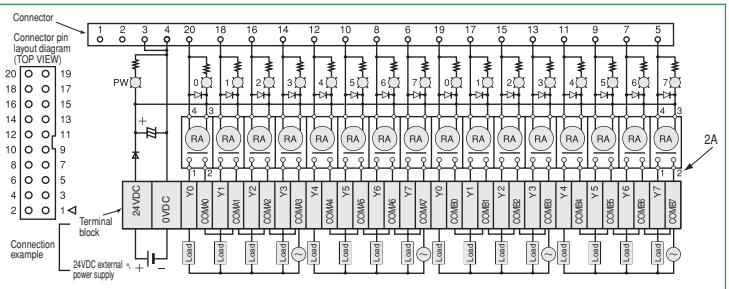
External Dimension



Terminal board



Wiring Diagram



A socket for socket-type modules is omitted.

* 1A when different modules are mixed together and when a triac or transistor module is used.
Check the specifications for triac (FA-TH16YSR20S) and transistor (FA-TH16YTR20S) modules.

Relay Characteristics Data

Note 1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend adequately considering usage conditions.

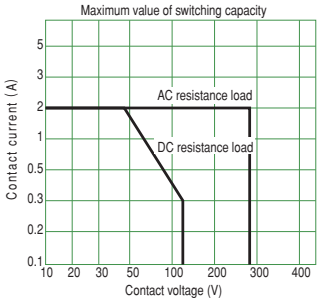
Note 2: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.

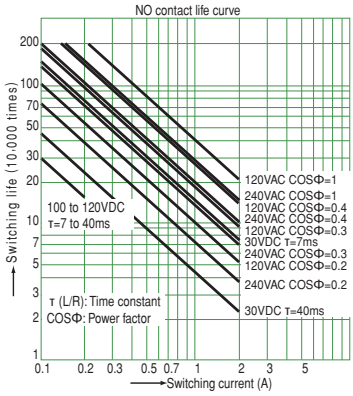
Note 3: The relay life varies significantly according to load type and its inrush current characteristics. In particular, an inrush current may cause contact welding, and thus must be taken into consideration as well as a steady current.

a) Inductive load
When an inductive load such as an electromagnetic switch and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. In particular, if the power factor is low, the life shortens. This must be taken into account. Additionally, at power activation, too, an inrush current 5 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

b) Lamp load
For a lamp circuit inrush current, an inrush current 10 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

c) Capacitive load
When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.



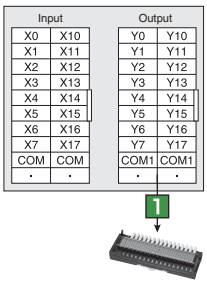


Connection to FX Programmable Controller Main Unit / CPU Module / I/O Module and Extension Block

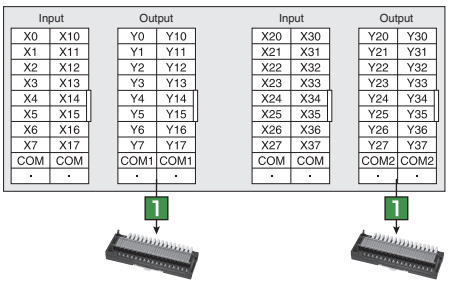
The following is an example of connection to an FX programmable controller main unit / CPU module / I/O module and extension block. For details on the applicable connections, refer to P8-3, 4.

●Configuration example of connection to FX programmable controller main unit / CPU module

FX3UC-32M, FX3GC-32M, FX5UC-32MT/D, FX1NC-32M



FX3UC-64M, FX5UC-64MT/D

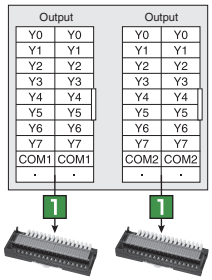


For the connection cable 1, select one from the following.

Connection cable 1
FA-FXCBL06MMH20 (0.6m)
FA-FXCBL10MMH20 (1.0m)
FA-FXCBL15MMH20 (1.5m)
FA-FXCBL20MMH20 (2.0m)

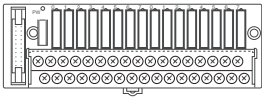
●Configuration example of connection to FX programmable controller I/O module and extension block

FX2NC-32EYT

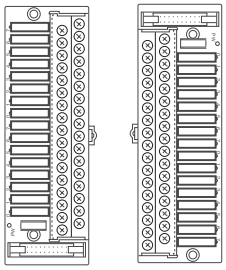


Installation Direction

Horizontal installation



Vertical installation

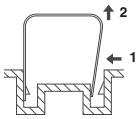


Note: Do not install the module in any direction other than the above.

How to Use the Extraction Tool

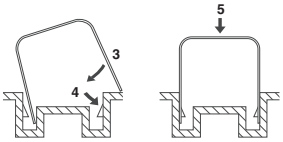
■Removing the extraction tool

Operate and remove the tool using your fingers.



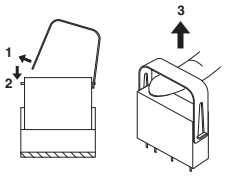
■Installing the extraction tool

Operate and install the tool using your fingers.



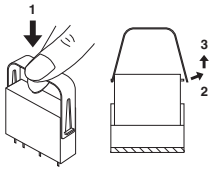
■Removing the relay from the socket

Insert the tool into the relay and pull out the relay with the tool using your fingers.



■Inserting the relay into the socket

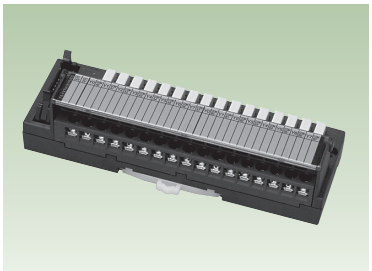
Insert the tool, and then insert the relay into the socket. After insertion, remove the tool from the relay.



* Check that legs of relay are not bent before inserting the relay.

16-point relay output terminal block (16-point independent common)

FA-FXTH16YRA20



Features

- This module converts Mitsubishi Electric micro programmable controller FX series connector-type output signals (transistor outputs) into 16-point NO contact relay output terminal block (2A/point) outputs.
- The + screw of the terminal is a spring-up screw, making round solderless terminal installation easy.
- The module can be installed using a DIN rail or screws.

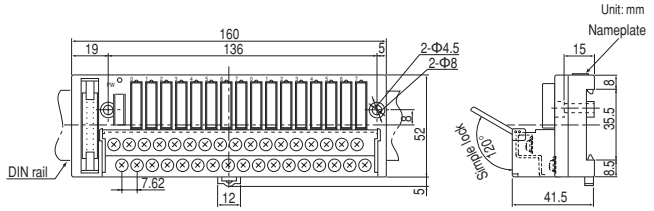
Related Materials

Usage Precautions 8-15 to 8-17 | General Specifications 9-1 | M3 7.62-mm Applicable Solderless Terminal 9-2

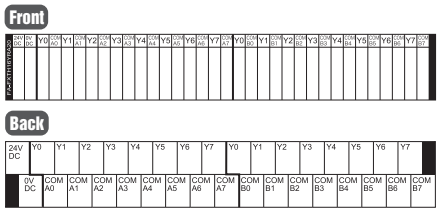
Specifications

Item		Specifications
No. of I/O points I/O device		16 points (output Y)
Isolation method		NO contact relay isolation
Rated switching voltage, current		Voltage: 24VDC, 200VAC, Current: 2A/point (resistance load, COSΦ=1)
Maximum number of points simultaneously ON		100%
Minimum switching load		5VDC 1mA
Maximum switching load		270VAC, 150VDC
Maximum switching frequency		3600 times/hour (1s or longer ON, 1s or longer OFF) For details, refer to the life curve. (A relay is a consumable and needs to be replaced.)
Mechanical life		20 million times or more
Electrical life		100,000 times or more at rated switching voltage/current
		100,000 times or more at 200VAC 1.5A (COSΦ=0.7), 240VAC 1A (COSΦ=0.7)
		100,000 times or more at 200VAC 1A (COSΦ=0.35), 100VDC 0.5A
		100,000 times or more at 24VDC 1A (L/R=7ms), 100VDC 0.1A (L/R=7ms)
Response time	OFF→ON	10ms or less (excluding programmable controller response time)
	ON→OFF	12ms or less (excluding programmable controller response time)
Common method		16-point independent common
External power supply		24VDC ±10% (within a ripple rate of 5%)
Module current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between input-output, between outputs: 2500VAC for 1 minute, between contacts: 750VAC for 1 minute, 100MΩ (Initial)
Noise resistance		Simulator noise 1000Vp-p, noise width 1μs (based on a noise simulator with a noise frequency of 30 to 100Hz)
Operation display		LED on with power supply ON and input ON
Socket		No (module irreplaceable)
Terminal block	Terminal screw	M3 screw, number of terminals: 34P, 7.62-mm pitch, spring-up screw with finger protection cover
	Applicable wire, tightening torque	0.5 to 1.25mm² (with solderless terminal use), 58.8 to 88.3N•cm
Module installation	Screw installation	M4 × 0.7mm × 22mm or more, tightening torque: 78 to 118N•cm
	DIN rail	TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Accessories		-
Weight		Approx. 230g

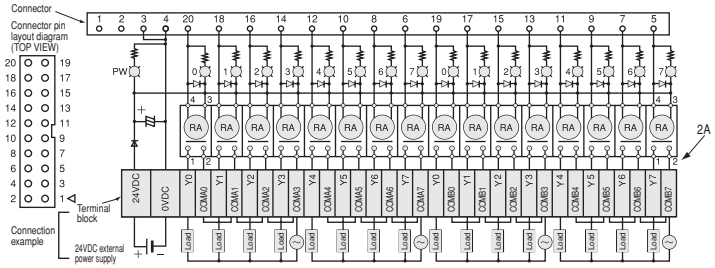
External Dimension



Terminal board



Wiring Diagram



Relay Characteristics Data

Note 1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. We therefore recommend adequately considering usage conditions.

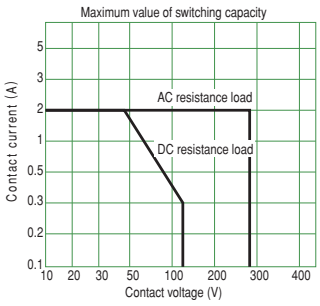
Note 2: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.

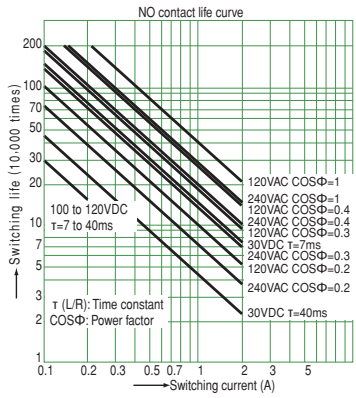
Note 3: The relay life varies significantly according to load type and its inrush current characteristics. In particular, an inrush current may cause contact welding, and thus must be taken into consideration as well as a steady current.

a) Inductive load
When an inductive load such as an electromagnetic switch and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. In particular, if the power factor is low, the life shortens. This must be taken into account. Additionally, at power activation, too, an inrush current 5 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

b) Lamp load
For a lamp circuit inrush current, an inrush current 10 to 15 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case.

c) Capacitive load
When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.



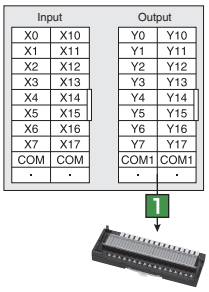


Connection to FX Programmable Controller Main Unit / CPU Module / I/O Module and Extension Block

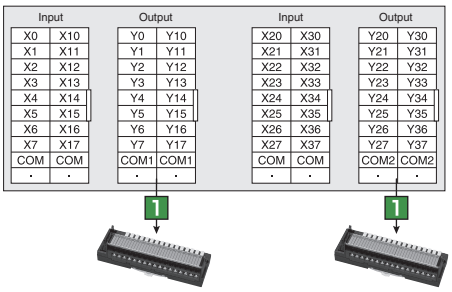
The following is an example of connection to an FX programmable controller main unit / CPU module / I/O module and extension block. For details on the applicable connections, refer to P8-3, 4.

●Configuration example of connection to FX programmable controller main unit / CPU module

FX3UC-32M, FX3GC-32M, FX5UC-32MT/D, FX1NC-32M



FX3UC-64M, FX5UC-64MT/D

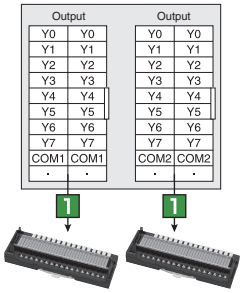


For the connection cable 1, select one from the following.

Connection cable 1
FA-FXCBL06MMH20 (0.6m)
FA-FXCBL10MMH20 (1.0m)
FA-FXCBL15MMH20 (1.5m)
FA-FXCBL20MMH20 (2.0m)

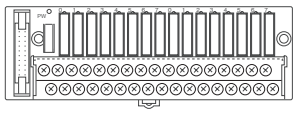
●Configuration example of connection to FX programmable controller I/O module and extension block

FX2NC-32EYT

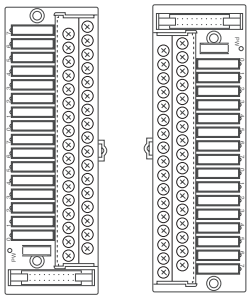


Installation Direction

Horizontal installation



Vertical installation



Note: Do not install the module in any direction other than the above.

Precautions when using a relay output terminal block

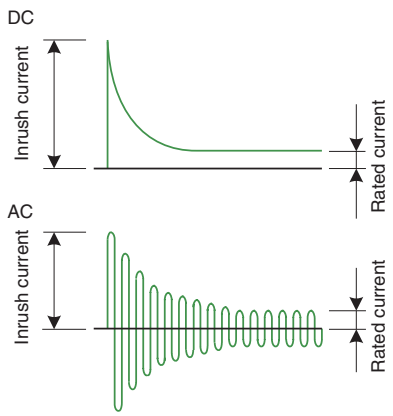
[FA-FXTH16YRA11S, FA-FXTH16YRA20, FA-FXTH16YRA20S]

(1) Relay switching frequency

Use the module with a maximum output signal switching frequency of one-second or longer ON, and one-second or longer OFF.

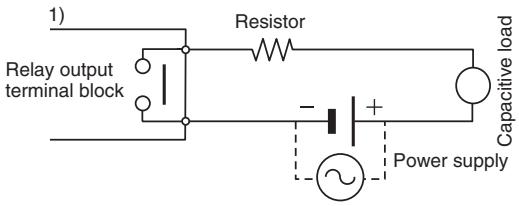
(2) Relay contact locking

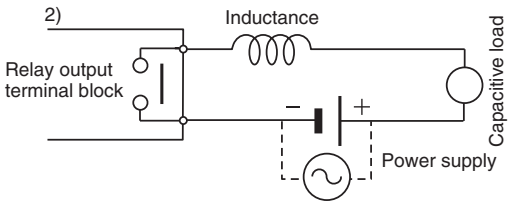
When the relay turns on while using any of the loads shown in the following table such as a timer or counter using a switching control AD/DC or DC/DC power supply and incandescent lamp, an inrush current may flow and cause contact welding, or a locking phenomenon may occur in the contact due to transition (where the contact remains ON and do not return to OFF).

Load type	Inrush current / Rated current	Inrush current waveform
Resistance	1×	
Incandescent lamp	Approx. 10× to 15×	
Capacitor*1	Approx. 20× to 50×	
Solenoid	Approx. 10× to 20×	
Electromagnetic contactor	Approx. 3× to 10×	
Fluorescent lamp	Approx. 5× to 15×*2	
Motor	Approx. 5× to 15×	
Transformer	Approx. 5× to 15×	
Mercury lamp	Approx. 3×*2	

* 1: The capacitor load includes the stray capacitance from capacitors and wiring, and the capacitive load of timers, counters, etc. (in which a switching control AC/DC or DC/DC power supply is used).
* 2: With a discharge lamp such as a mercury lamp and fluorescent lamp, especially when it is of a high power factor type and its power supply impedance is low, a current 20 to 40 times greater may flow.

Countermeasures
1) Insert a resistor in series with the load.
2) Insert inductance in series with the load.

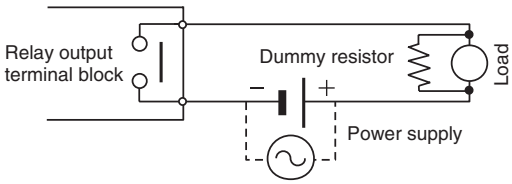




(3) Switching of slight current load

When a slight current load (5VDC or less or 1mA or less) is switched by an output relay, the load may not turn ON even if the relay turns ON due to poor contact of the relay contact.

Countermeasures 1) Insert a dummy resistor in parallel with the load.



• Increase the load current at relay ON to prevent poor contact.

(4) Service life of relay contact

The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.

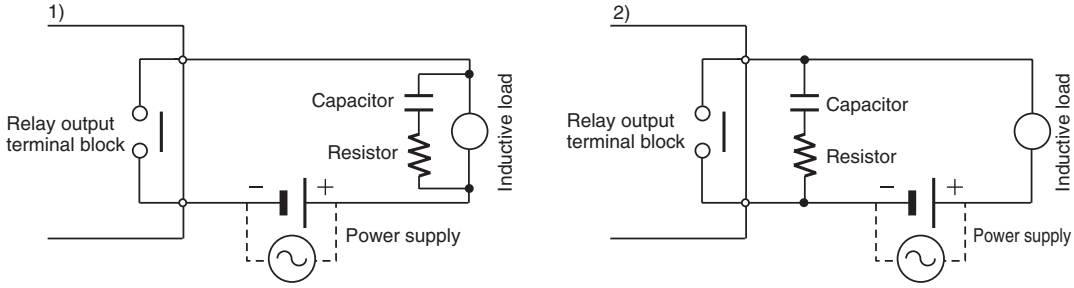
When an inductive load such as an electromagnetic contactor and solenoid is disconnected, a high counter-electromotive force occurs between contacts, generating an arc discharge. If the switching current is high, the power factor is low, or a load whose time constant is high is connected, the life becomes short. Consideration is required in such a case.

For inductive loads, we recommend using a protection circuit based on the surge absorbing circuit in the figure below.

Countermeasures

1) Insert a capacitor + resistor in parallel with the load (applicable to AC and DC loads).
2) Insert a capacitor + resistor in parallel with the contact (AC load: Note 1; applicable to DC loads).

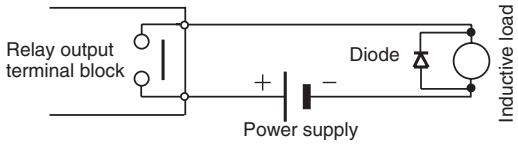
Note 1: For use with AC voltage, check that the load impedance is adequately smaller than the C and R impedance.
(When the contact is OFF, a leakage current flows through C and R, causing the phenomenon of the load turning ON or the once turned-ON load not turning OFF.)



- The capacitor has the effect of suppressing an electrical discharge at contact OFF, and the resistor has the effect of limiting a current at contact ON.
- The guidelines for element selection are as described below. Note, however, that the values differ according to variations in load properties and characteristics. Check the values via experiments.
  Capacitor: 0.5 to 1 (μF) for a contact current of 1A, Resistor: 0.5 to 1 (Ω) for a contact voltage of 1V
- Use a capacitor whose withstand voltage is 200 to 300V in general. For an AC circuit, use an AC capacitor without polarity.
- If the load is a relay or solenoid, the recovery time is delayed. Caution is required.

Countermeasures

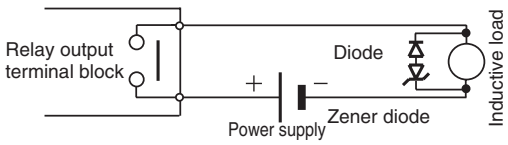
3) Insert a diode in parallel with the load (applicable to DC loads).



- When the contact turns OFF, the parallel diode causes the energy stored in the inductive load to flow to the load in the form of current, so that the energy is consumed by the resistance of the load as Joule heat.
- Use a diode whose reverse breakdown voltage is 10 times or more greater than the power supply voltage and whose forward current is equal to or greater than the load current.
- In this method, the recovery time delays more compared to the capacitor + resistor method.

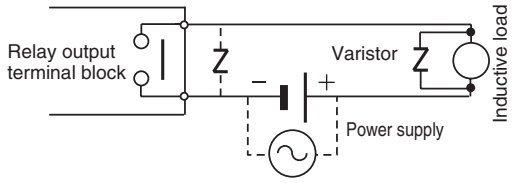
Countermeasures

4) Insert a diode + Zener diode in parallel with the load (applicable to DC loads).



- This method is effective if used in cases in which the parallel diode in 3) results in excessive delay in the recovery time.
- Use a Zener diode whose Zener voltage is equal to or greater than the power supply voltage.

Countermeasures 5) Insert a varistor in parallel with the load or in parallel with the contact (applicable to AC or DC loads).

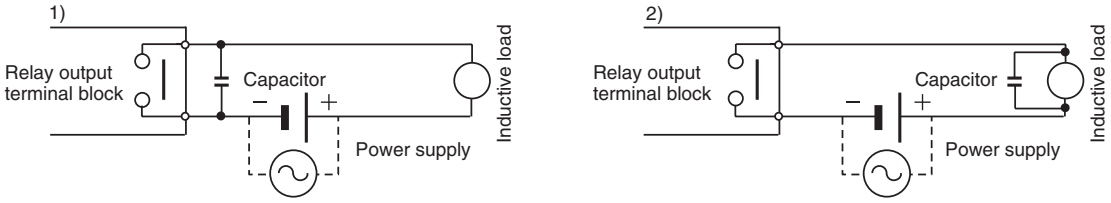


- Use the constant voltage characteristics of a varistor to ensure that a high voltage is not applied to the contact.
- Connection between the loads is effective when the power supply voltage is 24V, and connection between the contacts is effective when the power supply voltage is 100 to 200V.
- Select a varistor cut voltage Vc within the conditions described below. Note that the effect lessens when Vc is too high.
  With a DC power supply: Vc > Power supply voltage × 1.5; With an AC power supply: Vc > Power supply voltage × √2 × 1.5
- If the load is a relay or solenoid, the recovery time is delayed to a certain extent.

(5) Precautions

1) Avoid protection circuits that connect a capacitor in parallel with a contact.
Connecting a capacitor in parallel with a contact is extremely effective in arc extinction at the time of disconnection. However, because electric charge is stored when the contact is OFF and a short-circuit current of the capacitor flows when the contact turns ON, contact welding is likely to occur easily.

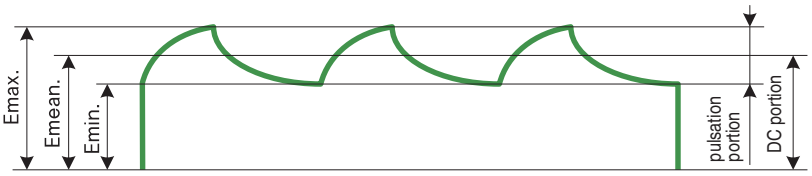
2) Avoid protection circuits that connect a capacitor in parallel with an inductive load.
Connecting a capacitor in parallel with an inductive load is extremely effective in arc extinction at the time of disconnection. However, because the charged current from the capacitor flows when the contact turns ON, contact welding is likely to occur easily.



3) Install a protection circuit near the load or relay contact (relay output terminal block).
When a protection circuit is installed far away from the load or relay contact, the effect of the protection circuit cannot be adequately exhibited. As a rough distance, install the circuit within 50cm.

(6) Precautions on DC power supply used for a relay output terminal block

For the DC power supply used for a relay output terminal block, use a power supply with a ripple rate of 5% or less.



$$\text{Ripple rate \%} = \frac{\text{Emax.} - \text{Emin.}}{\text{Emean.}} \times 100\%$$

Emax. = Maximum value of pulsation portion
Emean. = Mean value of pulsation portion
Emin. = Minimum value of pulsation portion

16-point I/O terminal block programmable controller connection cable

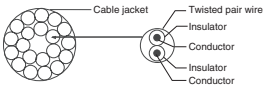
FA-FXCBL**MMH20

Features

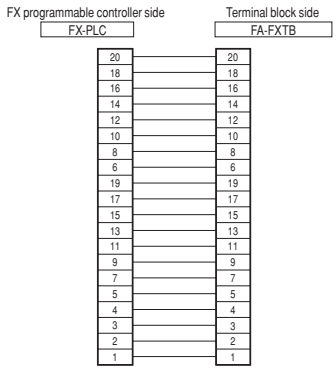
■ This cable is used for connecting a 16-point terminal block to a Mitsubishi Electric micro programmable controller FX series connector-type main unit / CPU module / I/O module, extension block.

Specifications

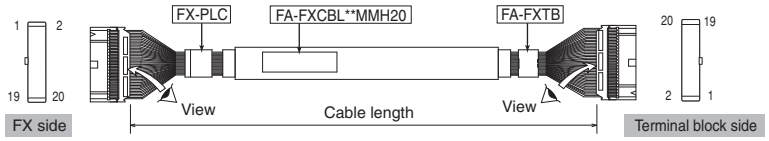
Model	Cable length	Programmable controller-side connector	Terminal block side connector
FA-FXCBL06MMH20	0.6m	MIL 20P connector FRC5-A020-3T0S-FA (DDK Ltd.)	MIL 20P connector D7920-B500FL, D3448-7920 (Sumitomo 3M)
FA-FXCBL10MMH20	1.0m		
FA-FXCBL15MMH20	1.5m		
FA-FXCBL20MMH20	2.0m		

Item	Specifications
Cable type	Round 20-core cable
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	8.1mm (standard), black
Rated current	1A
Conductor resistance (20°C)	0.232Ω/m or less
Withstand voltage	500VAC for one minute
Insulation resistance	100MΩ-km or more
UL standard (cable area)	UL STYLE No.2464 80°C 300V
Structure diagram	

Wiring Diagram



Connector External View



32-point I/O terminal block programmable controller connection cable

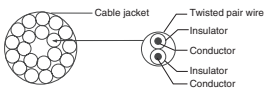
FA-FXCBL**MM2H

Features

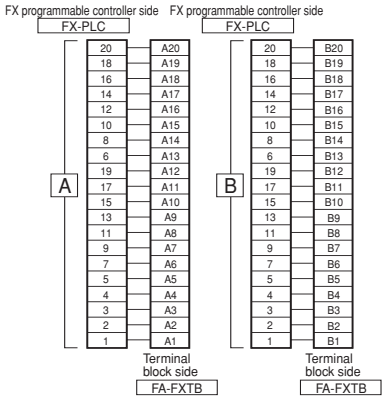
■ This cable is used for connecting a 32-point terminal block to a Mitsubishi Electric micro programmable controller FX series connector-type main unit / CPU module / I/O module, extension block.

Specifications

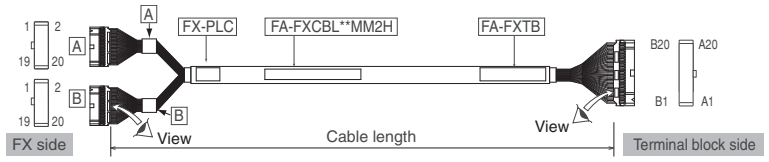
Model	Cable length	Programmable controller-side connector	Terminal block side connector
FA-FXCBL06MM2H	0.6m	MIL 20P connector FRC5-A020-3T0S-FA (DDK Ltd.) ×2	MIL 40P connector D7940-7500SC, D3448-7940 (Sumitomo 3M)
FA-FXCBL10MM2H	1.0m		
FA-FXCBL15MM2H	1.5m		
FA-FXCBL20MM2H	2.0m		

Item	Specifications
Cable type	Round 40-core cable
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	9.5mm (standard), black
Rated current	1A
Conductor resistance (20°C)	0.232Ω/m or less
Withstand voltage	500VAC for one minute
Insulation resistance	5MΩ-km or more
UL standard (cable area)	UL STYLE No.2464 80°C 300V
Structure diagram	

Wiring Diagram



Connector External View



16-point input / 16-point output mixed terminal block programmable controller connection cable

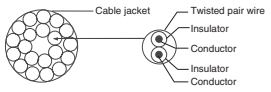
FA-FXCBL**MM2H16X16Y

Features

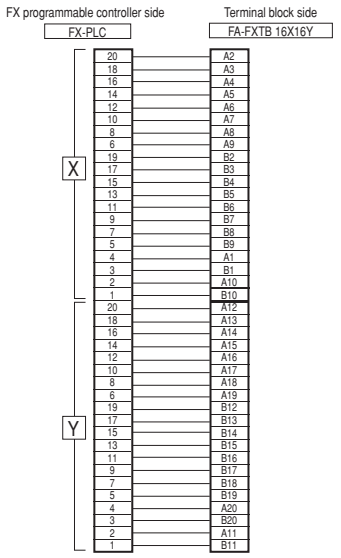
■ This cable is used for connecting a 16-point input / 16-point output mixed terminal block FA-FXTB16X16Y to a Mitsubishi Electric micro programmable controller FX series connector-type main unit / CPU module / I/O module.

Specifications

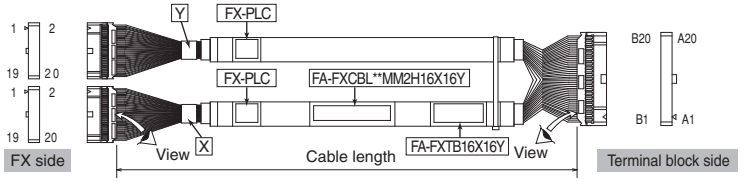
Model	Cable length	Programmable controller-side connector	Terminal block side connector
FA-FXCBL06MM2H16X16Y	0.6m	MIL 20P connector FRC5-A020-3T0S-FA (DDK Ltd.) ×2	MIL 40P connector D7940-7500SC, D3448-7940 (Sumitomo 3M)
FA-FXCBL10MM2H16X16Y	1.0m		
FA-FXCBL15MM2H16X16Y	1.5m		
FA-FXCBL20MM2H16X16Y	2.0m		

Item	Specifications
Cable type	Round 20-core cable × 2
Conductor configuration	7/0.127 wires/mm (AWG#28)
Insulator outer diameter	0.88mm
Cable outer diameter, color	8.1mm (standard), black
Rated current	1A
Conductor resistance (20°C)	0.232Ω/m or less
Withstand voltage	500VAC for one minute
Insulation resistance	100MΩ·km or more
UL standard (cable area)	UL STYLE No.2464 80°C 300V
Structure diagram	

Wiring Diagram



Connector External View



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9. Common Elements & Appendix

General Specifications

The following describes the general specifications.

MELSEC iQ-R series / MELSEC-Q/L series system

Item			Specifications
Operating ambient temperature			0 to 55°C
Storage ambient temperature			-25 to 75°C
Operating ambient humidity			5 to 95%RH (no condensation)
Storage ambient humidity			5 to 95%RH (no condensation)
Vibration resistance	With intermittent vibration	5 to 8.4Hz	Half amplitude: 3.5mm
		8.4 to 150Hz	Acceleration: 9.8m/s²
		Number of sweeps	10 times in each direction X, Y, and Z
	With continual vibration	5 to 8.4Hz	Half amplitude: 1.75mm
		8.4 to 150Hz	Acceleration: 4.9m/s²
		Number of sweeps	—
	Applicable standards		IEC61131-2
Shock resistance			147m/s², 3 times in each direction X, Y, and Z
		Applicable standards	IEC61131-2
Operating atmosphere			Free of corrosive gases
Operating altitude *1			2000m or less
Installation location			Inside control panel
Overvoltage category *2			II or less
Pollution degree *3			2 or less

*1: Do not store or use the module under a pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction.
*2: This indicates the section of power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within the premises.
*3: This index indicates the degree to which conductive material is generated in the environment where the device is used.

MELSEC iQ-F / MELSEC-F FX series system

Item			Specifications
Operating ambient temperature			0 to 55°C
Storage ambient temperature			-25 to 75°C
Operating ambient humidity			5 to 95%RH (no condensation)
Storage ambient humidity			5 to 95%RH (no condensation)
Vibration resistance	Installed on DIN rail	5 to 8.4Hz	Half amplitude: 1.75mm
		8.4 to 150Hz	Acceleration: 4.9m/s²
	Direct installing	5 to 8.4Hz	Half amplitude: 3.5mm
		8.4 to 150Hz	Acceleration: 9.8m/s²
	Number of sweeps		10 times in each direction X, Y, and Z
Shock resistance			147m/s², Action time: 11ms, 3 times by half-sine pulse in each direction X, Y, and Z
Operating atmosphere			Free from corrosive or flammable gas and excessive conductive dust
Operating altitude *1			2000m or less
Installation location			Inside control panel
Overvoltage category *2			II or less
Pollution degree *3			2 or less

*1: Do not store or use the module under a pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction.
*2: This indicates the section of power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within the premises.
*3: This index indicates the degree to which conductive material is generated in the environment where the device is used.

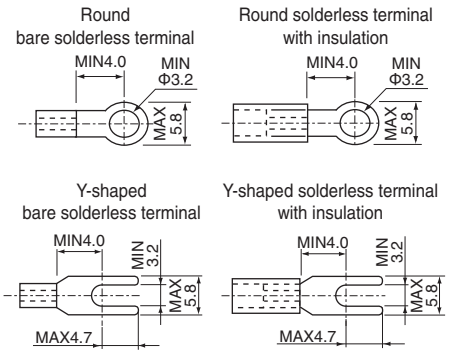
M3 Screw 7-mm pitch applicable solderless terminal

•Recommended solderless terminals

Type		Round-shaped		Y-shaped	
Manufacturer	Applicable wire size	Bare solderless terminal	Solderless terminal with insulation	Bare solderless terminal	Solderless terminal with insulation
Nichifu NTM	0.3 to 1.25mm²	R1.25-3N R1.25-3.5N	TMEV1.25-3 TMEV1.25-3N TMEV1.25-3.5N TG$^{V}_{N}$1.25-3N TG$^{V}_{N}$1.25-3.5N	1.25Y-3 1.25Y-3N 1.25Y-3.5	TMEV1.25Y-3 TMEV1.25Y-3K TMEV1.25Y-3.5 TMEV1.25Y-3.5K TG$^{V}_{N}$1.25Y-3 TG$^{V}_{N}$1.25Y-3N TG$^{V}_{N}$1.25Y-3.5
J.S.T. Mfg. JST	0.3 to 1.25mm²	1.25-MS3	V1.25-MS3	1.25-B3A 1.25-C3A 1.25-C3.5A	V1.25-B3A
Nippon Tanshi NTK	0.3 to 1.25mm²	R1.25-3ML R1.25-3.5SL	RAV1.25-3ML RAP1.25-3ML	VD1.25-3L VD1.25-3.5SS	VDAV1.25-3L VDAV1.25-3.5SS

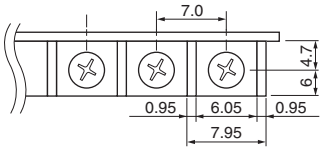
•Solderless terminal dimensions

Unit: mm



•Terminal block dimensions

Unit: mm



M3 Screw 7.62-mm pitch applicable solderless terminal

•Recommended solderless terminals

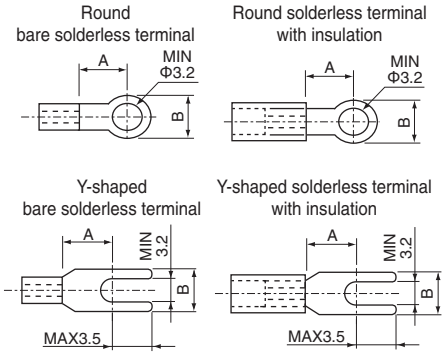
The M3 screw terminal block used with FA goods has an applicable wire size of 0.5 to 1.25mm², but is connectable to 0.3 to 2mm² wires with use of a solderless terminal.

Type		Round-shaped		Y-shaped	
Manufacturer	Applicable wire size	Bare solderless terminal	Solderless terminal with insulation	Bare solderless terminal	Solderless terminal with insulation
Nichifu NTM	0.3 to 1.25mm²	R1.25-3N R1.25-3.5N	TG$^{V}_{N}$1.25-3N TG$^{V}_{N}$1.25-3.5N	1.25Y-3 1.25Y-3N 1.25Y-3L (Note 1) 1.25Y-3.5	TG$^{V}_{N}$1.25Y-3 TG$^{V}_{N}$1.25Y-3N TG$^{V}_{N}$1.25Y-3L (Note 1) TG$^{V}_{N}$1.25Y-3.5
	1.25 to 2.0mm²	R2-3N	TG$^{V}_{N}$2-3N	2Y-3 2Y-3.5S	TG$^{V}_{N}$2Y-3 TG$^{V}_{N}$2Y-3.5S
J.S.T. Mfg. JST	0.3 to 1.25mm²	1.25-MS3	V1.25-MS3	1.25-B3A 1.25-C3A 1.25-N3A (Note 1) 1.25-C3.5A	V1.25-B3A V1.25-N3A (Note 1)
	1.25 to 2.0mm²	2-MS3	V2-MS3	2-N3A 2-M3A (Note 1)	V2-N3A
Nippon Tanshi NTK	0.3 to 1.25mm²	R1.25-3ML R1.25-3.5SL	RAV1.25-3ML RAP1.25-3ML	VD1.25-3L VD1.25-3.5SS VD1.25-3.5S (Note 1)	VDAV1.25-3L VDAV1.25-3.5SS VDAV1.25-3.5S (Note 1)
	1.25 to 2.0mm²	R2-3SL	RAV2-3SL RAP2-3SL	VD2-3S VD2-3.5SS VD2-3.5S (Note 1)	VDAV2-3.5SS VDAV2-3.5S (Note 1)

Note 1: This solderless terminal is recommended for spring-up screws only. Do not apply the terminal to regular screws.

•Solderless terminal dimensions

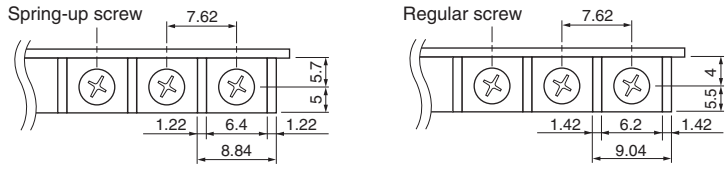
Unit: mm



Solderless terminal dimensions		
	A	B
Spring-up screw	MIN 5.0	MAX 6.3
Regular screw	MIN 5.5	MAX 6.1

•Terminal block dimensions

Unit: mm



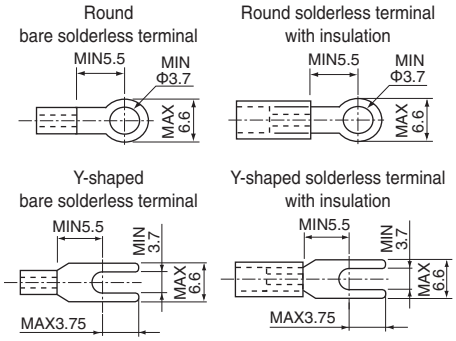
M3.5 Screw 8-mm pitch applicable solderless terminal

•Recommended solderless terminals

Type		Round-shaped		Y-shaped	
Manufacturer	Applicable wire size	Bare solderless terminal	Solderless terminal with insulation	Bare solderless terminal	Solderless terminal with insulation
Nichifu NTM	0.3 to 1.25mm²	R1.25-3.5	TG$^{V}_{N}$1.25-3.5	1.25Y-3.5	TG$^{V}_{N}$1.25Y-3.5
	1.25 to 2.0mm²	R2-3.5	TG$^{V}_{N}$2-3.5	2Y-3.5	TG$^{V}_{N}$2Y-3.5
J.S.T. Mfg. JST	0.3 to 1.25mm²	R1.25-3.5	V1.25-M3	1.25-YS3A	V1.25-YS3A
	1.25 to 2.0mm²	R2-3.5	V2-M3	2-YS3A	V2-YS3A
Nippon Tanshi NTK	0.3 to 1.25mm²	R1.25-3.5	RAV1.25-3.5	VD1.25-3.5S	VDAV1.25-3.5S
	1.25 to 2.0mm²	R2-3.5	RAV2-3.5	VD2-3.5S	VDAV2-3.5S

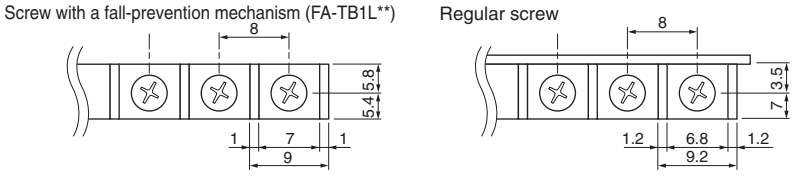
•Solderless terminal dimensions

Unit: mm



•Terminal block dimensions

Unit: mm

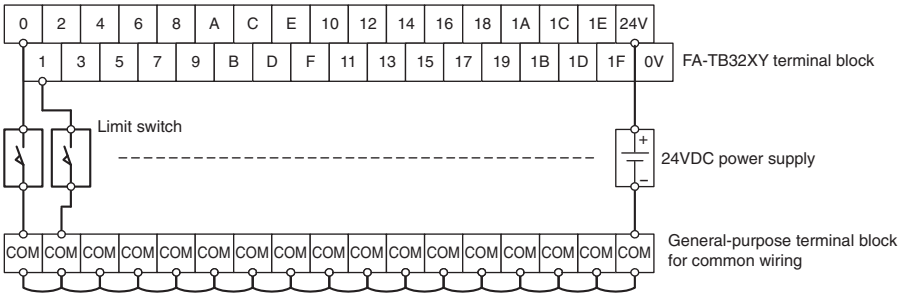


Explanation of Connection Method

1-wire to 3-wire types

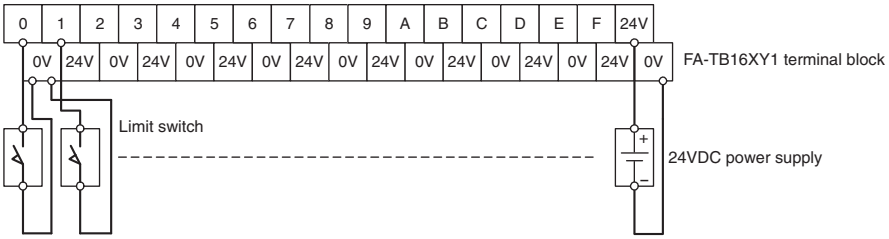
1) When connecting input using a 1-wire type

A 1-wire type indicates that only one wire from a limit switch, etc., can be connected to the conversion module.
Separate common terminals are required.



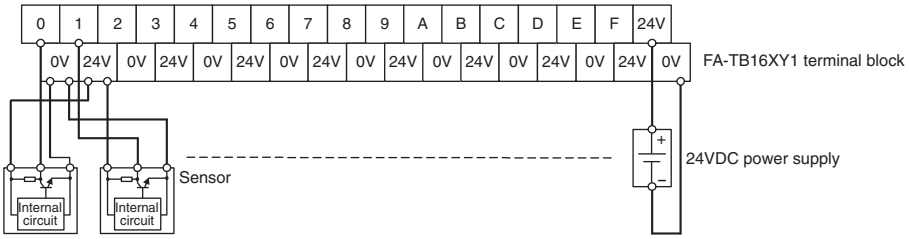
2) When connecting input using a 2-wire type

A 2-wire type indicates one or two wires from a limit switch, etc., can be connected to the conversion module.



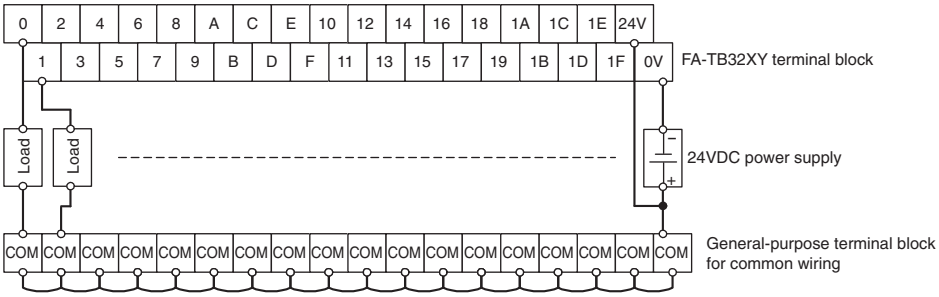
3) When connecting input using a 3-wire type

A 3-wire type indicates that up to three wires from sensors, etc., can be connected to the conversion module.



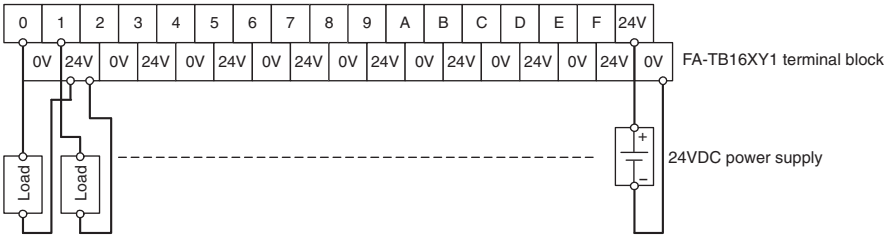
4) When connecting output using a 1-wire type

A 1-wire type indicates that only one wire from a load can be connected to the conversion module.



5) When connecting output using a 2-wire type

A 2-wire type indicates that one or two wires from a load, etc., can be connected to the conversion module.



Model: Alphabetical Index

No	Model	Product name	Page
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Warranty

Please confirm the following product warranty details prior to product use.

Gratis Warranty Terms and Gratis Warranty Range

If any fault or defect (hereinafter referred to as “Failure”) attributable to Mitsubishi Electric Engineering should occur within the gratis warranty period, Mitsubishi Electric Engineering shall replace the product free of charge via the distributor from whom you made your purchase.

■Gratis Warranty Period

The gratis warranty period of this product shall be one (1) year from the date of purchase or delivery to the designated place.

■Gratis Warranty Range

(1) The gratis warranty range shall be limited to normal use based on the usage conditions, methods and environment, etc., defined by the terms and precautions, etc., given in the instruction manual, user’s manual, and caution labels on the product.

(2) In the following cases, a repair fee shall be applied even if within the gratis warranty period.

1) Failure resulting from inappropriate storage or handling, carelessness or negligence by the user, or Failure caused by the user’s hardware or software design.
2) Failure caused by unapproved modifications, etc., to the product by the user.
3) Failure that could have been avoided if, when the Mitsubishi Electric Engineering product was assembled into the user’s device, safeguards defined by legal regulations applicable to the user’s device or functions or structures considered standard by the industry had been provided.
4) Failure recognized as preventable if the consumed products specified in instruction manuals, etc., were normally maintained or replaced.
5) Replacement of consumable parts (relays, etc.).
6) Failure caused by external factors beyond anyone’s control such as fires or abnormal voltage, and Failure caused by Force Majeure such as earthquakes, lightning, or wind and water damage.
7) Failure caused by reasons unpredictable by scientific technology standards at the time of shipment from Mitsubishi Electric Engineering.
8) Any other failure not attributable to Mitsubishi Electric Engineering or found by the user to not be attributable to Mitsubishi Electric Engineering.

Announcement of discontinuation of production

Discontinuation of production shall be announced to distributors six (6) months prior to product discontinuation.

Exclusion of opportunity loss and secondary loss from warranty liability

Regardless of the gratis warranty period, Mitsubishi Electric Engineering shall not be liable for compensation for damages arising from causes not attributable to Mitsubishi Electric Engineering, opportunity losses or lost profits incurred by the user due to Failures of Mitsubishi Electric Engineering products, damages or secondary damages arising from special circumstances, whether foreseen or unforeseen by Mitsubishi Electric Engineering, compensation for accidents, compensation for damages to products other than Mitsubishi Electric Engineering products, or compensation for replacement work, readjustment of onsite machinery and equipment, startup test runs or other duties carried out by the user.

Changes in product specifications

The specifications given in the catalogs, manuals, and technical documents are subject to change without notice.

Product application

This product shall be used in applications that will not lead to a major accident even in the unlikely event any failure or defect should occur in the product in which the product is incorporated, and shall be systematically provided with external backup and fail-safe functions that operate in the event of any failure or defect.

Safety Precaution

Before using this product, please read this catalog as well as the technical materials, etc., of related devices carefully and pay full attention to safety to ensure that the product is used correctly.
In this manual, the safety precautions are classified into two levels: "⚠ **WARNING**" and "⚠ **CAUTION**".

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury and/or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ **CAUTION**" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.

[Design Precautions]

⚠ WARNING

- Provide safety circuits external to the product to ensure that the entire system operates safely even when a fault occurs in the external power supply, the programmable controller, or this product. Failure to do so may result in an accident due to an incorrect output or malfunction.
  1) Configure external safety circuits, such as an emergency stop circuit, protection circuit, and protective interlock circuit for forward/reverse operation or upper/lower limit positioning designed to prevent machinery damage.
  2) Outputs may remain on or off due to a failure of an output relay, transistor, triac, or the like. Provide an external circuit for monitoring output signals that could cause a serious accident.
- If overcurrent more than the rating or overcurrent due to a short circuit flows in an output module for a long time, it may cause smoke or a fire. To prevent this, provide an external safety circuit, such as a fuse.

[Design Precautions]

⚠ CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may cause malfunctions due to noise.

[Installation Precautions]

⚠ WARNING

- Be sure to shut off the external power supply in all phases before installation. Failure to do so may result in electric shock.

[Installation Precautions]

⚠ CAUTION

- Use this product in an environment that meets the specifications and general specifications given in this catalog. Operation in any other environment may cause electric shock, fire, malfunction, product damage, and/or deterioration.
- Securely fix the module with a DIN rail or screws. Be sure to secure the cables in a duct or by a clamp. Failure to do so may cause falling, damage, or poor contact. When securing the module, tighten the screws within the specified torque range. Undertightening can cause screws to fall out, a short circuit, or malfunction. Overtightening can damage the screw and/or product, causing screws to fall out, a short circuit, or malfunction.
- Do not directly touch any conductive part of the module. Doing so may cause product malfunction or failure.
- If the product has a designated installation direction, install the product in accordance with that designation. Installing the product in a direction other than the designated direction may cause product damage or deterioration.
- When drilling screw holes, be careful that the cutting debris does not enter the product interior or conductive parts. Failure to do so may cause fire, failure, and/or malfunction.
- When detaching or attaching a replacement relay, be sure to first disconnect the power supply. Failure to do so may cause failure and/or malfunction.
- Securely fit the replacement relay to the module. Improper mounting may cause damage, falling, and/or malfunction due to poor contact. Additionally, detach and attach the module following the proper procedures. Failure to do so may cause damage, falling, and/or malfunction due to poor contact.

[Wiring Precautions]

⚠ WARNING

- Be sure to shut off the external power supply used in the system in all phases before wiring. Failure to do so may cause electric shock or product damage.
- When energizing and operating the product after wiring, be sure to first install the provided terminal cover to the product. Failure to do so may cause electric shock.

[Wiring Precautions]

⚠ CAUTION

- Use applicable solderless terminals and tighten the terminals based on the specified torque.
- Properly wire the product upon verification of the rated voltage and terminal layout of the product. Connecting the power supply after inputting a voltage different from the rated voltage or executing mistaken wiring may cause fire, failure, and/or malfunction.
- When connecting the product with a programmable controller, first verify that the product configuration is correct. Connection based on a wrong configuration may cause failure or malfunction.
- Securely mount the module and cable connectors to the mounting area. Failure to do so may cause malfunction.
- Use the product with the connectors of the products not subjected to additional force. Failure to do so may cause failure or disconnection.
- Securely mount the connection cables and peripheral device cables to the predetermined connectors. Failure to do so may cause malfunction caused by poor contact.
- Use the product with the connectors of the peripheral device cables not subjected to additional force. Failure to do so may cause disconnection or failure.
- When disconnecting a cable, do not pull the cable line. Disconnect a cable that has a connector by holding the connector of the connected part in your hand. Disconnect a cable without a connector by first loosening the screws, etc., of the part connected to the module. Pulling the cable in a connected state may cause module and/or cable damage, or malfunction due to poor contact.
- Mount a protective cover or module on unused connectors and sockets of the module. Failure to do so may cause entry of foreign matter, which may cause fire, failure, and/or malfunction.
- Be careful that wire chips do not enter the product interior or conductive parts. Failure to do so may cause fire, failure, and/or malfunction.

[Startup and Maintenance Precautions]

⚠ WARNING

- Do not touch terminals while power is supplied to the product. Doing so may cause electric shock and/or malfunction.
- Be sure to shut off the external power supply used in the system in all phases before cleaning or further tightening terminal or module screws. Failure to do so may cause electric shock and/or malfunction.
  Tighten the screws within the specified torque range. Undertightening can cause screws to fall out, short circuits, or malfunction. Overtightening can damage the screw and/or product, causing screws to fall out, a shortcircuit, or malfunction.

[Startup and Maintenance Precautions]

⚠ CAUTION

- Be sure to shut off the external power supply used in the system in all phases before detaching or attaching the product. Failure to do so may cause product failure and/or malfunction. Be sure to use the online attachable/detachable (hot-pluggable) RS232 ↔ RS422 communication converter using the QCPU-side connector (mini DIN6P).
- Attach and detach modules, cables, etc., no more than 50 times after the start of product use. Exceeding 50 times (IEC61131-2 compliant) may cause malfunction.
- Use wireless communication devices, such as mobile phones, PHSs, etc., at least 25cm away from the area surrounding the product and programmable controller. Failure to do so may cause malfunction.
- Before touching the product, be sure to touch a grounded metal or the like to discharge the static electricity charged from the human body. Failure to do so can cause product failure or malfunction.
- Do not disassemble or modify the product. Doing so may cause failure, malfunction, and/or fire.

[Disposal Precautions]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

[Disposal Precautions]

⚠ CAUTION

- This product is a precision instrument. During transportation, avoid impacts larger than the range specified in the general specifications. Failure to do so may cause failures in the product.

Related Catalog

The following catalogs are provided, describing the detailed information of related products.

■Programmable Controller Upgrade Tool General Catalog (NAC095E·134)

The upgrade tool is a handy tool for upgrading your current series to the MELSEC-Q series.

◎Simplifies replacement with MELSEC-Q
- •MELSEC-A (large-size) → MELSEC-Q replacement
- •SYSMAC C → MELSEC-Q replacement

◎Significantly reduces the input, output, analog, and high-speed counter module wiring time

◎Allows reuse of sequence programs
(Applicable only for the SYSMAC C → MELSEC-Q replacement)

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⚠ For safe operations

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric Engineering.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Stores

⚠ Before using this product, ensure the safety in case of failure. We shall not bear any responsibility for consequential damages caused by failure of the product.

The information is intended for the Japanese market.

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