FA Goods

Output Terminal Module

FA-TH16YRA11/11S/20/20S/20SL/21/21S,FA-TH16YRAC20S,
FA-TH16YRAB20SL,FA-TH16YSR11S/20S/21S,
FA-TH16YTL11S/21S,FA-TH16YTH11S,FA-TH16YTR20S,
FA-TH16Y2TR20,FA-THE16YTH11S,FA-THE16YTR20S,
FA-FXTH16YRA11S/20/20SFA1-TH1E16Y2RA20S,
FA1-TH/TH1E16Y2RA20S1E,FA1-TH/TH1E16Y1SR20S1E,
FA1-TH/TH1E16Y1TR20S1E,FA1-TH/TH1E16Y2SC20S1E

User's Manual

Thank you for purchasing the FA Goods products.

Before using the products, please read this manual and the relevant manuals carefully to handle the products correctly.

MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

SAFETY PRECAUTIONS
(Read these precautions before using the FA Goods products.)

Before using the products, please read this manual and the relevant manuals carefully, and pay full attention to safety to handle the products correctly.

The precautions given in this manual are concerned with the FA Goods products only.

For the safety precautions of the programmable controller system, refer to the user's manual for the programmable controller used.

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 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
●Configure safety circuits externally to ensure that the entire system operates safely even when a fault occurs in the external power supply, the programmable controller, or the FA Goods products. Failure to do so may result in an accident due to an incorrect output or malfunction. 　(1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured externally. 　(2) Outputs may remain on or off due to a failure of a component such as a relay, transistor, and triac in an output terminal module. Configure an external circuit for monitoring output signals that could cause a serious accident. ●In an output circuit of an output terminal module, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse. ●Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.

[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 (3.94 inches) or more between them. Failure to do so may result in malfunction or failure due to noise. ●When using a terminal block conversion module for a high-speed counter module, do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 150mm (5.91 inches) or more between them. Failure to do so may result in malfunction or failure due to noise. ●Keep a distance of 100mm (3.94 inches) or more between a thermocouple or RTD (Resistance Temperature Detector) and the main circuit line or AC control lines. Also, keep the thermocouple or RTD away from a circuit that includes harmonics, such as a high-voltage circuit and a load circuit of an inverter. If not, the thermocouple or RTD is more likely to be affected by noise, surges, and induction. ●At power-on or power-off, a voltage may occur or a current may flow between output terminals for a moment. To use an analog signal converter or analog terminal block conversion module, start the control after analog outputs become stable. ●Do not place an analog signal converter or analog terminal block conversion module near a device that generates magnetic noise. ●When a device such as a lamp, heater, or solenoid valve is controlled through an output terminal module, a large current (approximately 10 times greater than normal) may flow when the output is turned from off to on. Therefore, use an output terminal module that has a sufficient current rating.

[Installation Precautions]

⚠ WARNING
●Shut off the external power supply (all phases) used in the system before installation. Failure to do so may result in electric shock or damage to the products.

[Installation Precautions]

⚠ CAUTION
●Use FA Goods products in an environment that meets the general specifications in this manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the products. ●Securely fix the products with a DIN rail or screws. Incorrect installation may cause malfunction, failure, or drop of the module. When using the products in an environment of frequent vibrations, fix the products with screws. ●Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or products, resulting in drop, short circuit, or malfunction. ●Attach DIN rail stoppers on the right and left sides of the spring clamp conversion module (FA1-TESV**) to fix the module securely. ●Shut off the external power supply (all phases) used in the system before mounting or removing the products. Failure to do so may result in damage to, malfunction of, or failure of the products. ●Do not directly touch any conductive parts and electronic components of the products. Failure to do so may cause malfunction or failure of the products. ●Install the products in the correct orientation if it is specified. Failure to do so may result in damage to or deterioration of the products. ●When drilling screw holes, be careful not to drop chips into the inside of the products or conductive parts. Such foreign matter can cause a fire, failure, or malfunction. ●When using replacement relays/triacs/transistors for a terminal module or signal conversion modules, use them in the correct combination. Incorrect combination may cause failure. ●Shut off the power supply before installing/removing a replacement relay/triac/transistor for a terminal module. Failure to do so may cause failure or malfunction. ●Securely install replacement relays/triacs/transistors on a terminal module and securely mount a signal conversion modules on an installation base. Failure to do so may cause damage to or drop of the products, or malfunction due to poor contact. Follow the correct procedure to install/remove them. Failure to do so may cause damage to or drop of the products, or malfunction due to poor contact. ●When relay/triac/transistor modules are installed on a terminal module or a signal conversion module is mounted on the installation base, hold the terminal module or installation base to transport them or install them to a panel. Holding the relay/triac/transistor or signal conversion module may cause drop or failure of the terminal module or installation base.

[Wiring Precautions]

⚠ WARNING
●Shut off the external power supply (all phases) used in the system before wiring. Failure to do so may result in electric shock or damage to the products. ●After wiring, attach the included terminal cover to the products before turning them on for operation. Failure to do so may result in electric shock.

[Wiring Precautions]

⚠ **CAUTION**

- Use applicable solderless terminals and tighten them within the specified torque range. Failure to do so may cause failure, damage, or malfunction.
- Check the rated voltage and terminal layout before wiring to the products, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
- 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 result in malfunction due to noise.
- When using a terminal block conversion module for a high-speed counter module, do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 150mm (5.91 inches) or more between them. Failure to do so may result in malfunction or failure due to noise.
- Keep a distance of 100mm (3.94 inches) or more between a thermocouple or RTD (Resistance Temperature Detector) and the main circuit line or AC control lines. Also, keep the thermocouple or RTD away from a circuit that includes harmonics, such as a high-voltage circuit and a load circuit of an inverter. If not, the thermocouple or RTD is more likely to be affected by noise, surges, and induction.
- Do not place an analog signal converter or analog terminal block conversion module near a device that generates magnetic noise.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the products or cables or malfunction due to poor contact.
- Tighten the terminal screws within the specified torque range. Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or products, resulting in drop, short circuit, or malfunction.
- Tighten the connector screws within the specified torque range. Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or products, resulting in drop, short circuit, fire, or malfunction.
- Securely connect connectors to the products. Failure to do so may cause malfunction.
- When disconnecting a cable from the products, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the products may result in malfunction or damage to the products or cable.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the products and external device.
- Prevent foreign matter such as dust or wire chips from entering the products. Such foreign matter can cause a fire, failure, or malfunction.
- The products must be installed in control panels. Connect the main power supply to the products in the control panel through a relay terminal block. Wiring and replacement of the products must be performed by qualified maintenance personnel with knowledge of protection against electric shock.
- When connecting the products with a programmable controller, check that the product configuration is correct. An incorrect configuration may cause failure or malfunction.
- Use the products with no force applied to their connectors. Applied force may cause failure or disconnection.
- Attach protective covers or signal conversion modules to unused connectors or empty slots of the products. Failure to do so may cause a fire, failure, or malfunction due to foreign matter.
- When using replacement relays/triacs/transistors for a terminal module or signal conversion modules, use them in the correct combination. Incorrect combination may cause failure of a programmable controller, terminal module, installation base, or external device.
- Securely install replacement relays/triacs/transistors on a terminal module and securely mount a signal conversion modules on an installation base. Failure to do so may cause damage to or drop of the products, or malfunction due to poor contact. Follow the correct procedure to install/remove them. Failure to do so may cause damage to or drop of the products, or malfunction due to poor contact.
- Individually ground the FG terminal of the products with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.

[Startup and Maintenance Precautions]

⚠ WARNING
●Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
●Shut off the external power supply (all phases) used in the system before cleaning the products or retightening the terminal screws, connector screws, or products fixing screws. Failure to do so may result in electric shock or cause failure or malfunction of the products. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or products, resulting in drop, short circuit, or malfunction.

[Startup and Maintenance Precautions]

⚠ CAUTION
●Do not disassemble or modify the products. Doing so may cause failure, malfunction, injury, or a fire.
●Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller and FA Goods products. Failure to do so may cause malfunction.
●Shut off the external power supply (all phases) used in the system before mounting or removing the products. Failure to do so may cause failure or malfunction of or damage to the products.
●After the first use of the products, do not connect/remove the products and cables more than 50 times (IEC 61131-2 compliant). Exceeding the limit may cause malfunction.
●Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
●Before handling the products, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause failure or malfunction of the products.

[Disposal Precautions]

⚠ CAUTION
●When disposing of the products, treat them as industrial waste.

[Transportation Precautions]

⚠ CAUTION
●Do not apply shock that exceeds the shock resistance described in the general specifications during transportation since the products are precision devices. Doing so may cause failure of the module.
●The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the products. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.

EMC and Low Voltage Directives

Compliance with the EMC Directive, which is one of the EU directives, has been mandatory for products sold within EU member states since 1996 as well as compliance with the Low Voltage Directive since 1997.
For products compliant to the EMC and Low Voltage Directives, their manufacturers are required to declare compliance and affix the CE marking.

(1) Sales representative in EU member states
   The sales representative in EU member states is:
   Company: MITSUBISHI ELECTRIC EUROPE B.V.
   Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

(2) Method of ensuring compliance
   To ensure that FA Goods products maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to "EMC and Low Voltage Directives Compliant Manual" (50D-FA9010-108).

REVISIONS

The manual number is given on the bottom left of the last page.

Print Date	*Manual Number	Revision
March, 2018	50D-FG0232	First edition
March, 2018	50D-FG0232-A	Added or modified parts Product addition: FA-FXTH16YRA11S/20/20S, CONTENTS, 3. PERFORMANCE SPECIFICATIONS, 4. CONNECTABLE MODULES AND CABLES, 5. EXTERNAL DIMENSIONS, 6. INSTALLATION ORIENTATION, 7. CONNECTING METHOD, 8. EXTERNAL CONNECTION EXAMPLE, 9. APPLICABLE SOLDERLESS TERMINALS
April, 2019	50D-FG0232-B	Added or modified parts Product addition: FA1-TH1E16Y2RA20S CONTENTS, 2. GENERAL SPECIFICATIONS, 3. PERFORMANCE SPECIFICATIONS, 4. CONNECTABLE MODULES AND CABLES, 5. EXTERNAL DIMENSIONS, 6. INSTALLATION ORIENTATION, 7. CONNECTING METHOD, 8. EXTERNAL CONNECTION EXAMPLE, 9. APPLICABLE SOLDERLESS TERMINALS
July, 2019	50D-FG0232-C	Added or modified parts Product addition: FA1-TH16Y2RA20S1E, FA1-TH1E16Y2RA20S1E, FA1-TH16Y1SR20S1E, FA1-TH1E16Y1SR20S1E, FA1-TH16Y1TR20S1E, FA1-TH1E16Y1TR20S1E, FA1-TH16Y2SC20S1E, FA1-TH1E16Y2SC20S1E CONTENTS, 2. GENERAL SPECIFICATIONS, 3. PERFORMANCE SPECIFICATIONS, 4. CONNECTABLE MODULES AND CABLES, 5. EXTERNAL DIMENSIONS, 6. INSTALLATION ORIENTATION, 7. CONNECTING METHOD, 8. EXTERNAL CONNECTION EXAMPLE, 9. APPLICABLE SOLDERLESS TERMINALS

CONTENTS

1. INTRODUCTION

This manual describes the specifications and handling of the terminal module used in combination with Mitsubishi Electric Corporation DC output modules.

2. GENERAL SPECIFICATIONS

2-1. FA-TH16Y***11/11S/20/20S/20SL/21/21S, FA-THE16Y**11S/20S

Item	Specifications			
Operating ambient temperature	0 to 55°C			
Storage ambient temperature	-25 to 75°C			
Operating ambient humidity	5 to 95%RH, non-condensing			
Storage ambient humidity	5 to 95%RH, non-condensing			
Vibration resistance	Applicable standard	JIS B 3502, IEC 61131-2		
		Frequency	Constant acceleration	Half amplitude	Sweep count
	Under intermittent vibration	5 to 8.4Hz	—	3.5mm	10 times each in X, Y, and Z directions
		8.4 to 150Hz	9.8m/s^2 (1G)	—	
	Under continuous vibration	5 to 8.4Hz	—	1.75mm	—
		8.4 to 150Hz	4.9m/s^2 (0.5G)	—	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147m/s2 (15G), 3 times each in X, Y, and Z bidirections)			
Operating atmosphere	No corrosive gases			
Operating altitude[1]	2000m or lower			
Installation location	Inside a control panel[4], Indoor use			
Overvoltage category[2]	II or less			
Pollution degree[3]	2 or less			

*1: Do not use or store the products under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction.
*2: This category indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
*3: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
*4: The enclosure is suitably designed for those specific environmental conditions, as applicable, and enclosure rate meets IP20 and minimum type 1 of UL 50.

2-2. FA-FXTH16Y**11S/20/20S, FA1-TH16Y1SR/1TR20S1E, FA1-TH1E16Y1SR/1TR20S1E

Item	Specifications			
Operating ambient temperature	-20 to 55°C			
Storage ambient temperature	-25 to 75°C			
Operating ambient humidity	5 to 95%RH, non-condensing			
Storage ambient humidity	5 to 95%RH, non-condensing			
Vibration resistance	Applicable standard	JIS B 3502, IEC 61131-2		
		Frequency	Constant acceleration	Half amplitude	Sweep count
	Under intermittent vibration	5 to 8.4Hz	—	3.5mm	10 times each in X, Y, and Z directions
		8.4 to 150Hz	9.8m/s^2 (1G)	—	
	Under continuous vibration	5 to 8.4Hz	—	1.75mm	—
		8.4 to 150Hz	4.9m/s^2 (0.5G)	—	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147m/s2 (15G), 3 times each in X, Y, and Z bidirections)			
Operating atmosphere	No corrosive gases			
Operating altitude[1]	2000m or lower			
Installation location	Inside a control panel[4], Indoor use			
Overvoltage category[2]	II or less			
Pollution degree[3]	2 or less			

*1: Do not use or store the products under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction.
*2: This category indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
*3: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
*4: The enclosure is suitably designed for those specific environmental conditions, as applicable, and enclosure rate meets IP20 and minimum type 1 of UL 50.

2-3. FA1-TH1E16Y2RA20S, FA1-TH16Y2RA20S1E, FA1-TH1E16Y2RA20S1E

Item	Specifications				
Operating ambient temperature	-20 to 55°C (Product specifications) -20 to 40°C (Specifications certified by UL)				
Storage ambient temperature	-25 to 75°C				
Operating ambient humidity	5 to 95%RH, non-condensing				
Storage ambient humidity	5 to 95%RH, non-condensing				
Vibration resistance	Applicable standard	JIS B 3502, IEC 61131-2			
		Frequency	Constant acceleration	Half amplitude	Sweep count
	Under intermittent vibration	5 to 8.4Hz	—	3.5mm	10 times each in X, Y, and Z directions
		8.4 to 150Hz	$9.8 m/s^2$ (1G)	—	
	Under continuous vibration	5 to 8.4Hz	—	1.75mm	—
		8.4 to 150Hz	$4.9 m/s^2$ (0.5G)	—	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 ($147 m/s2$ (15G), 3 times each in X, Y, and Z bidirections)				
Operating atmosphere	No corrosive gases				
Operating altitude[1]	2000m or lower				
Installation location	Inside a control panel[4], Indoor use				
Overvoltage category[2]	II or less				
Pollution degree[3]	2 or less				

*1: Do not use or store the products under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction.
*2: This category indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
*3: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
*4: The enclosure is suitably designed for those specific environmental conditions, as applicable, and enclosure rate meets IP20 and minimum type 1 of UL 50.

2-4. FA1-TH16Y2SC20S1E, FA1-TH1E16Y2SC20S1E

Item	Specifications				
Operating ambient temperature	-20 to 55°C *When use FA-NYP24WK4: -20 to 55°C (Product specifications), -20 to 40°C (Specifications certified by UL)				
Storage ambient temperature	-25 to 75°C				
Operating ambient humidity	5 to 95%RH, non-condensing				
Storage ambient humidity	5 to 95%RH, non-condensing				
Vibration resistance	Applicable standard	JIS B 3502, IEC 61131-2			
		Frequency	Constant acceleration	Half amplitude	Sweep count
	Under intermittent vibration	5 to 8.4Hz	—	3.5mm	10 times each in X, Y, and Z directions
		8.4 to 150Hz	$9.8 m/s^2$ (1G)	—	
	Under continuous vibration	5 to 8.4Hz	—	1.75mm	—
		8.4 to 150Hz	$4.9 m/s^2$ (0.5G)	—	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 ($147 m/s2$ (15G), 3 times each in X, Y, and Z bidirections)				
Operating atmosphere	No corrosive gases				
Operating altitude[1]	2000m or lower				
Installation location	Inside a control panel[4], Indoor use				
Overvoltage category[2]	II or less				
Pollution degree[3]	2 or less				

*1: Do not use or store the products under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction.
*2: This category indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
*3: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
*4: The enclosure is suitably designed for those specific environmental conditions, as applicable, and enclosure rate meets IP20 and minimum type 1 of UL 50.
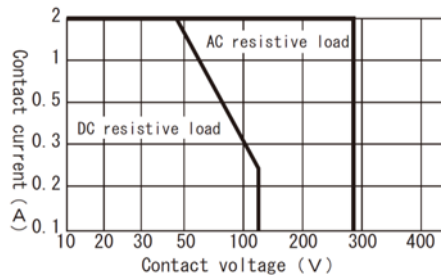
3. PERFORMANCE SPECIFICATIONS

3-1. FA-TH16YRA11, FA-TH16YRA11S

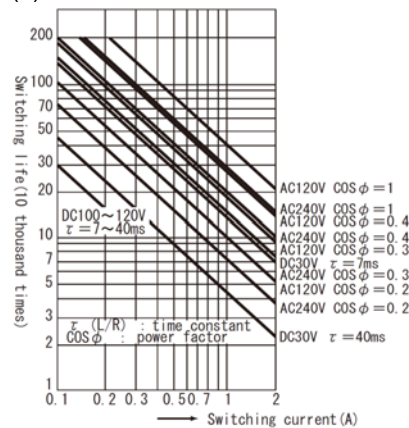| Model Item		FA-TH16YRA11	FA-TH16YRA11S
Number of points, output device numbers		16 points, Y0 to YF	
Insulation method		Relay	
Rated switching voltage/current[1]		Voltage: 24VDC, 200VAC (50/60Hz), Current: 2A/1 contact (resistive load, COSø=1), 8A/1 common	
Maximum number of points simultaneously ON		100%	
Minimum switching load		5VDC 1mA	
Maximum switching load		270VAC, 150VDC	
Maximum switching frequency		1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)	
Mechanical life		20000000 times or more	
Electrical life		100000 times or more at rated switching voltage and current	
		100000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)	
		100000 times or more at 200VAC 1A (COSø=0.35)	
		100000 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% (ripple ratio: within 5%, CLASS 2)	
Current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		Between inputs/outputs: 2500VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher	
Noise immunity		Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)	
Operation indication		LED on with power supply ON and input ON	
Socket		None (module replacement not possible)	Yes (relay module replaceable)
Module replacement count		—	50 times
Module mixing		—	Not possible
Terminal block	Terminal block screw	M3 screw, Number of terminals:20P, 7.62mm pitch, Spring-up screw with finger protection cover	
		Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in), UL standard conformity tightening torque: 59N·cm, 5.22 lbf·in	
	Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)	
Installation method	Screw	M4 × 0.7mm × 22mm or more	
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)	
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5AI (compliant with IEC 60715)	
Weight		Approx. 220g	Approx. 240g

*1: Evaluation for UL certification is conducted using a resistive load.

Relay Characteristics Data

(1) Maximum value of switching capacity

(2) Contact life curve

*2: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.
*3: 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.
*4: 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, 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.
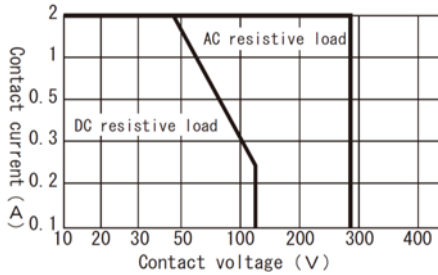
3-2. FA-TH16YRA20, FA-TH16YRA20S

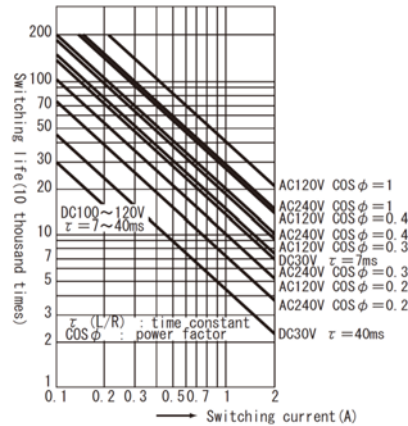| Model Item		FA-TH16YRA20	FA-TH16YRA20S
Number of points, output device numbers		16 points, Y0 to YF	
Insulation method		Relay	
Rated switching voltage/current[*1]		Voltage: 24VDC, 200VAC (50/60Hz), Current: 2A/1 contact (resistive load, COSø=1)	
Maximum number of points simultaneously ON		100%	
Minimum switching load		5VDC 1mA	
Maximum switching load		270VAC, 150VDC	
Maximum switching frequency		1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)	
Mechanical life		20000000 times or more	
Electrical life		100000 times or more at rated switching voltage and current	
		100000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)	
		100000 times or more at 200VAC 1A (COSø=0.35)	
		100000 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		All points independent	
External power supply		24VDC±10% (ripple ratio: within 5%, CLASS 2)	
Current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		Between inputs/outputs, between each output: 2500VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher	
Noise immunity		Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)	
Operation indication		LED on with power supply ON and input ON	
Socket		None (module replacement not possible)	Yes (relay module replaceable)
Module replacement count		—	50 times
Module mixing		—	Possible
Terminal block	Terminal block screw	M3 screw, Number of terminals:34P, 7.62mm pitch, Spring-up screw with finger protection cover	
		Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in), UL standard conformity tightening torque: 59N·cm, 5.22 lbf·in	
	Applicable wire	22 to 14 AWG: 0.3 to 2.0mm² (when solderless terminals are used)	
Installation method	Screw	M4 × 0.7mm × 22mm or more	
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)	
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)	
Weight		Approx. 280g	Approx. 300g

[*1]: Evaluation for UL certification is conducted using a resistive load.

Relay Characteristics Data

(1) Maximum value of switching capacity

(2) Contact life curve

[*2]: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.
[*3]: 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.
[*4]: 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, 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.
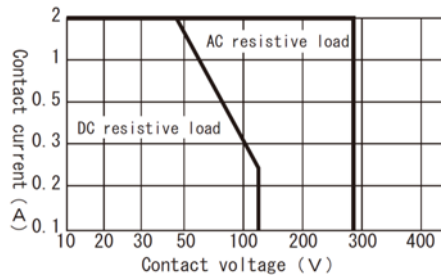
3-3. FA-TH16YRA20SL

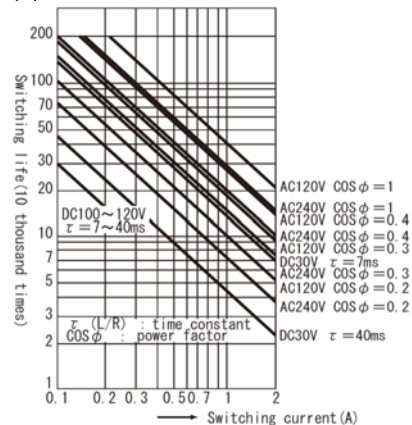| Item \ Model	FA-TH16YRA20SL		
Number of points, output device numbers	16 points, Y0 to YF		
Insulation method	Relay		
Rated switching voltage/current[*1]	Voltage: 24VDC, 200VAC (50/60Hz), Current: 2A/1 contact (resistive load, COSø=1)		
Maximum number of points simultaneously ON	100% (When UL standard conformity the max switching current is 1.5A)		
Minimum switching load	5VDC 1mA		
Maximum switching load	270VAC, 150VDC		
Maximum switching frequency	1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)		
Mechanical life	20000000 times or more		
Electrical life	100000 times or more at rated switching voltage and current		
	100000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)		
	100000 times or more at 200VAC 1A (COSø=0.35)		
	100000 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	All points independent		
External power supply	24VDC±10% (ripple ratio: within 5%, CLASS 2)		
Current consumption	Approx. 90mA at 24VDC (not including current consumption of programmable controller)		
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher		
Noise immunity	Simulator noise 1500Vp-p, noise width 1µs (based on noise simulator with noise frequency of 25 to 60Hz)		
Operation indication	LED on with power supply ON and input ON		
Socket	Yes (relay module replaceable)		
Module replacement count	50 times		
Module mixing	Possible		
Terminal block	Terminal block screw	M3.5 screw, Number of terminals:36P, 8mm pitch	
		Tightening torque range: 68 to 92N·cm(7 to 9kgf·cm, 6.1 to 8lbf·in), UL standard conformity tightening torque : 80N·cm, 7.08 lbf·in	
	Applicable wire	20 to 14 AWG: 0.5 to 2.0mm^2	
Installation method	Screw	M4 × 35mm or more	
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)	
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)	
Weight	Approx. 390g		

*1: Evaluation for UL certification is conducted using a resistive load.

Relay Characteristics Data

(1) Maximum value of switching capacity

(2) Contact life curve

*2: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.
*3: 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.
*4: 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, 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.
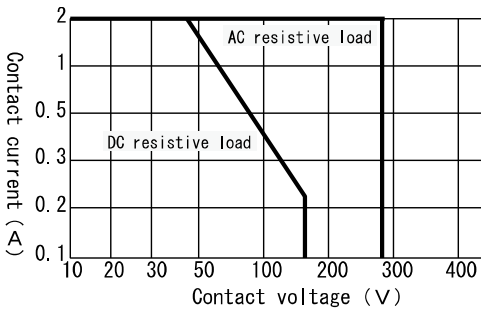
3-4. FA-TH16YRAB20SL

Item \ Model	FA-TH16YRAB20SL
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Relay
Rated switching voltage/current[*1]	Voltage: 24VDC, 200VAC (50/60Hz), Current: 2A/1 contact (resistive load, COSø=1)
Maximum number of points simultaneously ON	100%
Minimum switching load	5VDC 1mA
Maximum switching load	270VAC, 150VDC
Maximum switching frequency	1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)
Mechanical life	20000000 times or more
Electrical life	100000 times or more at rated switching voltage and current
	100000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)
	100000 times or more at 200VAC 1A (COSø=0.35)
	100000 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)
Response time — ON→OFF	12ms or less (excluding programmable controller response time)
Wiring method for common	All points independent
External power supply	24VDC±10% (ripple ratio: within 5%, CLASS 2)
Current consumption	Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (relay module replaceable)
Module replacement count	50 times
Module mixing	Possible
Terminal block — Terminal block screw	M3.5 screw, Number of terminals:36P, 8mm pitch Tightening torque range: 68 to 92N·cm(7 to 9kgf·cm, 6.1 to 8lbf·in), UL standard conformity tightening torque : 80N·cm, 7.08 lbf·in
Terminal block — Applicable wire	20 to 14 AWG: 0.5 to 2.0mm^2
Installation method — Screw	M4 × 35mm or more Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 390g

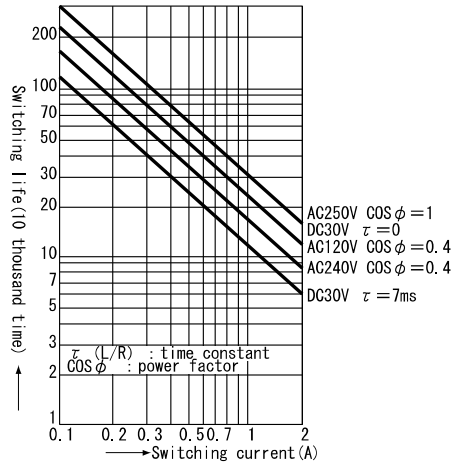*1: Evaluation for UL certification is conducted using a resistive load.

Relay Characteristics Data

(1) Maximum value of switching capacity

(2) Contact life curve

*2: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.

*3: 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.

*4: 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, 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.
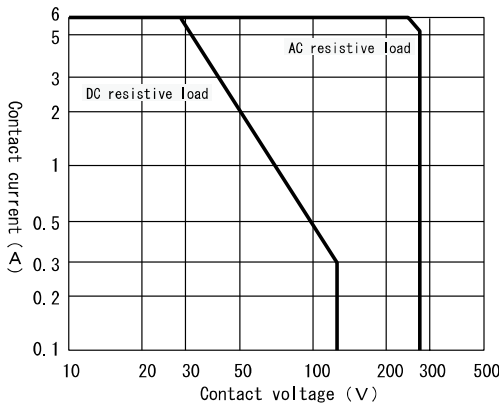
3-5. FA-TH16YRAC20S

Item \ Model	FA-TH16YRAC20S
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Relay
Rated switching voltage/current[*1]	Voltage: 24VDC, 200VAC (50/60Hz), Current: 6A/1 contact (resistive load, COSø=1)
Maximum number of points simultaneously ON	100%(When the max switching current is 4.5A)
Minimum switching load	5VDC 1mA
Maximum switching load	AC277V, DC125V
Maximum switching frequency	1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)
Mechanical life	10000000 times or more
Electrical life	Make contact 50000 times or more/ Break contact 30000 times or more at 250 VAC 6A (COSø=1), 30 VDC 6A (τ=0)
	Make contact 100000 times or more/ Break contact 60,000 times or more at 250 VAC 3A (COSø=1), 200VAC 2.2A (COSø=0.7), 250 VAC 1.8A (COSø=0.7)
	Make contact 100000 times or more/ Break contact 60000 times or more at 100 VAC 1.3A (COSø=0.4), 200VAC 1.1A (COSø=0.4), 250 VAC 0.9A (COSø=0.4)
	Make contact 100000 times or more/ Break contact 60000 times or more at 30 VDC 3A (τ=0), 24VDC 1.5A (τ=7ms) , 100VDC 0.2A (τ=7ms)
Response time — OFF→ON	10ms or less (excluding programmable controller response time)
Response time — ON→OFF	12ms or less (excluding programmable controller response time)
Wiring method for common	All points independent
External power supply	24VDC±10% (ripple ratio: within 5%, CLASS 2)
Current consumption	Approx. 220mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (relay module replaceable)
Module replacement count	50 times
Module mixing	—
Terminal block — Terminal block screw	M3 screw, Number of terminals:50P, 7.62mm pitch, Spring-up screw with finger protection cover
	Terminal screw tightening torque range: 58.8 to 88.2N·cm(6 to 9kgf·cm, 5.22 to 7.5lbf·in), UL standard conformity tightening torque : 59N·cm, 5.22 lbf·in)
Terminal block — Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more
	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 440g

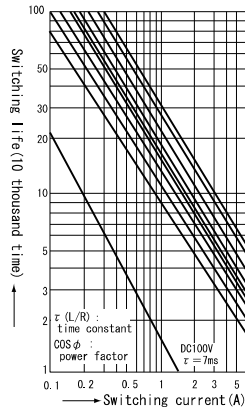*1: Evaluation for UL certification is conducted using a resistive load.

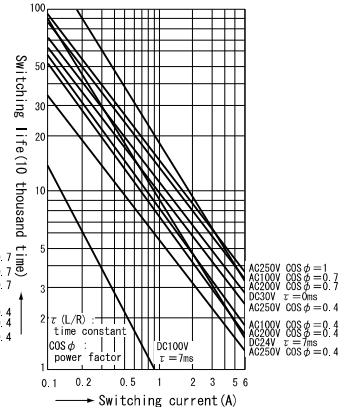## Relay Characteristics Data

(1) Maximum value of switching capacity

(2) Contact life curve

*2: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.
*3: 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.
*4: 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, 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.
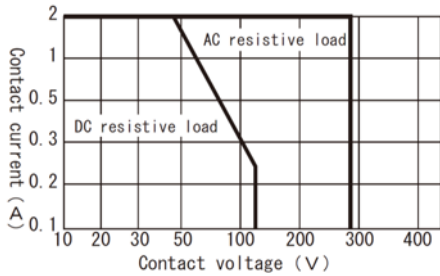 (c) Capacitive load
    When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.
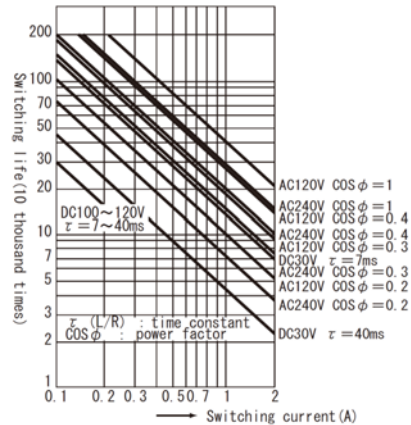
3-6. FA-TH16YRA21, FA-TH16YRA21S

Model Item	FA-TH16YRA21	FA-TH16YRA21S
Number of points, output device numbers	16 points, Y0 to YF	
Insulation method	Relay	
Rated switching voltage/current	Voltage: 24VDC, 200VAC (50/60Hz), Current: 2A/1 contact (resistive load, COSø=1), 8A/1 common	
Maximum number of points simultaneously ON	100%	
Minimum switching load	5VDC 1mA	
Maximum switching load	270VAC, 150VDC	
Maximum switching frequency	1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)	
Mechanical life	20000000 times or more	
Electrical life	100000 times or more at rated switching voltage and current	
	100000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)	
	100000 times or more at 200VAC 1A (COSø=0.35)	
	100000 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 (2-wire type)	
External power supply	24VDC ±10% (ripple ratio: within 5%)	
Current consumption	Approx. 90mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance	Between inputs/outputs: 2500VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher	
Noise immunity	Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)	
Operation indication	LED on with power supply ON and input ON	
Socket	None (module replacement not possible)	Yes (relay module replaceable)
Module replacement count	—	50 times
Module mixing	—	Not possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:28P, 7.62mm pitch, Spring-up screw with finger protection cover	
	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)	
Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)	
Installation method — Screw	M4 × 0.7mm × 22mm or more	
	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)	
DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)	
Weight	Approx. 260g	Approx. 280g

Relay Characteristics Data

(1) Maximum value of switching capacity

(2) Contact life curve

*1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.
*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.
*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, 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.
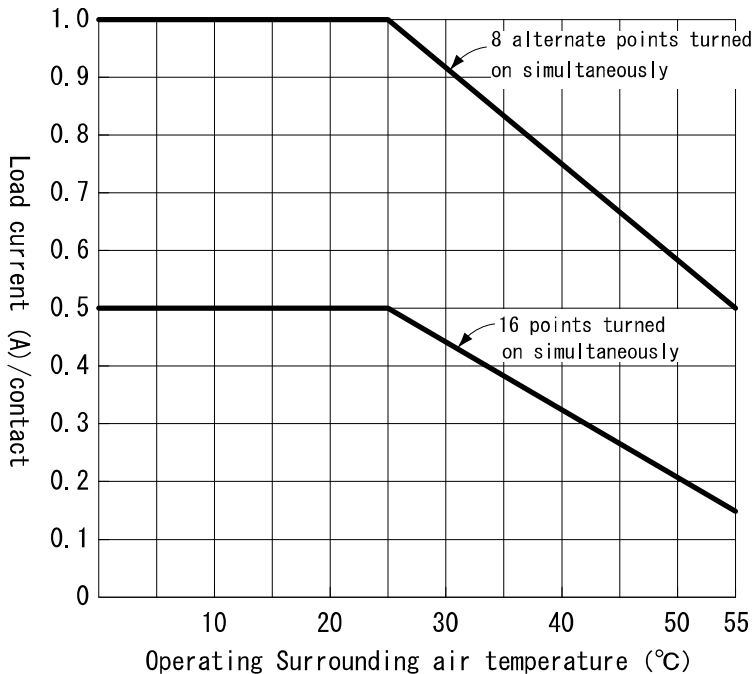   (c) Capacitive load
     When there is a capacitor, for example, in the load circuit, an inrush current 20 to 40 times greater than a steady current flows. Therefore, consideration should be given to contact welding in this case. Care must be also taken regarding the cable capacity when running a long wire.

3-7. FA-TH16YSR11S

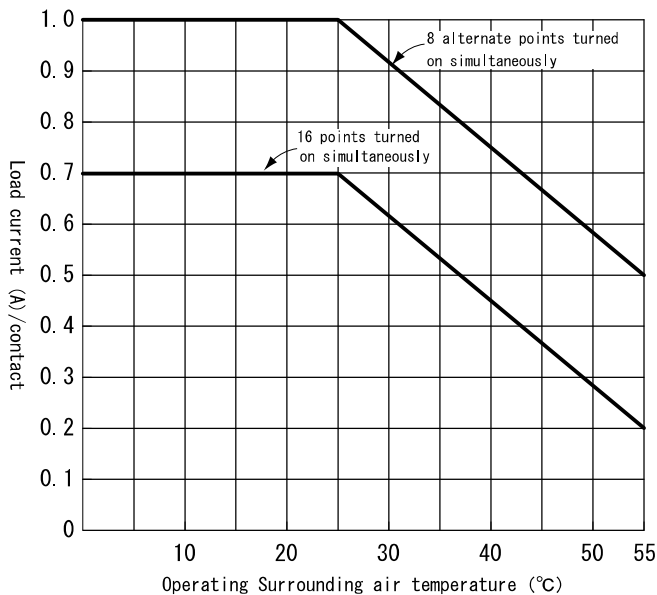| Item \ Model	FA-TH16YSR11S
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	30 to 240VAC (50/60Hz)
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	10mA
Maximum load current	1.0A/1 contact, 8A/common
Maximum inrush current	25A (60Hz, 1 cycle)
Leakage current at OFF	1.5mArms or lower (at 100VACrms 60Hz) 3.0mArms or lower (at 200VACrms 60Hz)
Maximum voltage drop at ON	2.5Vrms or lower
Response time OFF→ON	1ms or less
Response time ON→OFF	1ms + 1/2 cycle or less
Surge suppressor	Varistor, snubber circuit (built-in triac module)
Fuse	None
Wiring method for common	16 points/common (1-wire type)
External power supply	24VDC ±10% (ripple ratio: within 5%)
Current consumption	Approx. 180mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (triac module replaceable)
Module replacement count	50 times
Module mixing	Not possible
Terminal block Terminal block screw	M3 screw, Number of terminals:20P, 7.62mm pitch, Spring-up screw with finger protection cover
Terminal block Terminal block screw	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)
Terminal block Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method Screw	M4 × 0.7mm × 22mm or more
Installation method Screw	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 240g

Load Current Characteristics

8 alternate points turned on simultaneously

16 points turned on simultaneously

Load current (A)/contact

Operating Surrounding air temperature (℃)

3-8. FA-TH16YSR20S

Item \ Model	FA-TH16YSR20S
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	30 to 240VAC (50/60Hz)
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	10mA
Maximum load current	1.0A/1 contact
Maximum inrush current	25A (60Hz, 1 cycle)
Leakage current at OFF	1.5mArms or lower (at 100VACrms 60Hz) 3.0mArms or lower (at 200VACrms 60Hz)
Maximum voltage drop at ON	2.5Vrms or lower
Response time — OFF→ON	1ms or less
Response time — ON→OFF	1ms + 1/2 cycle or less
Surge suppressor	Varistor, snubber circuit (built-in triac module)
Fuse	None
Wiring method for common	All points independent
External power supply	24VDC ±10% (ripple ratio: within 5%)
Current consumption	Approx. 180mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (triac module replaceable)
Module replacement count	50 times
Module mixing	Possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:34P, 7.62mm pitch, Spring-up screw with finger protection cover Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)
Terminal block — Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 300g

Load Current Characteristics

17

3-9. FA-TH16YSR21S

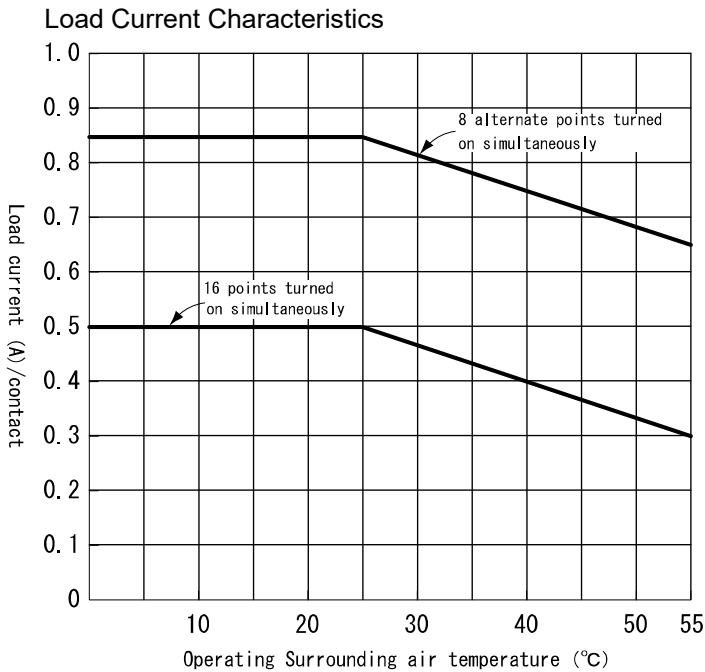| Item \ Model	FA-TH16YSR21S
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	30 to 240VAC (50/60Hz)
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	10mA
Maximum load current	1.0A/1 contact, 8A/common
Maximum inrush current	25A (60Hz, 1 cycle)
Leakage current at OFF	1.5mArms or lower (at 100VACrms 60Hz) 3.0mArms or lower (at 200VACrms 60Hz)
Maximum voltage drop at ON	2.5Vrms or lower
Response time — OFF→ON	1ms or less
Response time — ON→OFF	1ms + 1/2 cycle or less
Surge suppressor	Varistor, snubber circuit (built-in triac module)
Fuse	None
Wiring method for common	16 points/common (2-wire type)
External power supply	24VDC ±10% (ripple ratio: within 5%)
Current consumption	Approx. 180mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (triac module replaceable)
Module replacement count	50 times
Module mixing	Not possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:28P, 7.62mm pitch, Spring-up screw with finger protection cover Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)
Terminal block — Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 280g

Load Current Characteristics
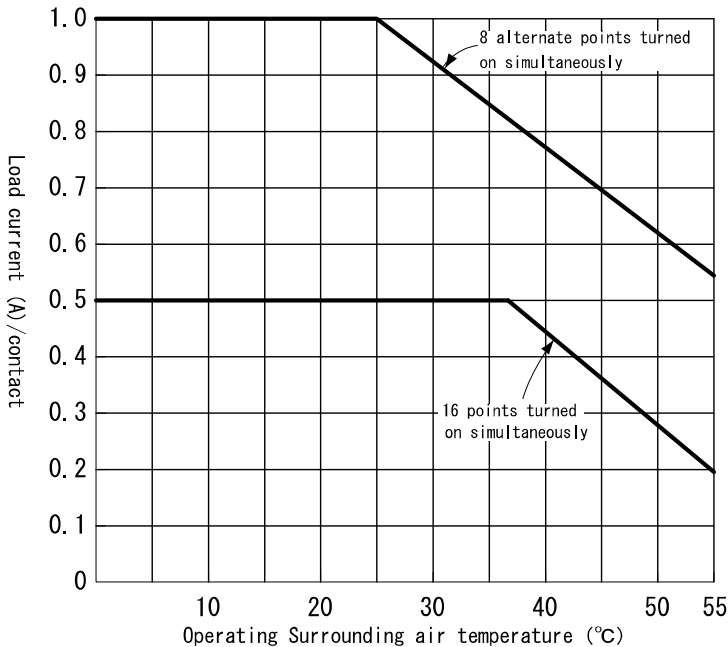
3-10. FA-TH16YTL11S

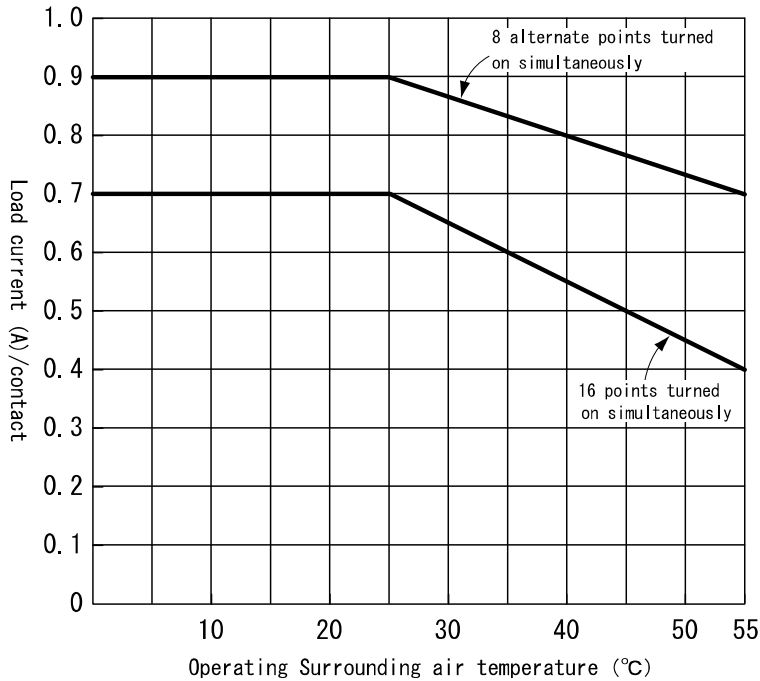| Item / Model	FA-TH16YTL11S
Terminal output type	Sink output
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	3 to 30VDC
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	1.0mA
Maximum load current	1.0A/1 contact, 8A/common
Maximum inrush current	3A 10ms
Leakage current at OFF	0.1mA or lower (at 30VDC)
Maximum voltage drop at ON	1.5V or lower
Response time OFF→ON	1ms or less
Response time ON→OFF	1ms or less
Surge suppressor	Zenor diode (built-in transistor module)
Fuse	None
Wiring method for common	16 points/common (1-wire type)
External power supply	24VDC ±10% (ripple ratio: within 5%)
Current consumption	Approx. 160mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (transistor module replaceable)
Module replacement count	50 times
Module mixing	Not possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:20P, 7.62mm pitch, Spring-up screw with finger protection cover
	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)
Terminal block — Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more
	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 230g

Load Current Characteristics

3-11. FA-TH16YTL21S

Item \ Model	FA-TH16YTL21S
Terminal output type	Sink output
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	3 to 30VDC
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	1.0mA
Maximum load current	1.0A/1 contact, 8A/common
Maximum inrush current	3A 10ms
Leakage current at OFF	0.1mA or lower (at 30VDC)
Maximum voltage drop at ON	1.5V or lower
Response time OFF→ON	1ms or less
Response time ON→OFF	1ms or less
Surge suppressor	Zenor diode (built-in transistor module)
Fuse	None
Wiring method for common	16 points/common (2-wire type)
External power supply	24VDC ±10% (ripple ratio: within 5%)
Current consumption	Approx. 160mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (transistor module replaceable)
Module replacement count	50 times
Module mixing	Not possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:28P, 7.62mm pitch, Spring-up screw with finger protection cover
Terminal block — Terminal block screw	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)
Terminal block — Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more
Installation method — Screw	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 260g

Load Current Characteristics
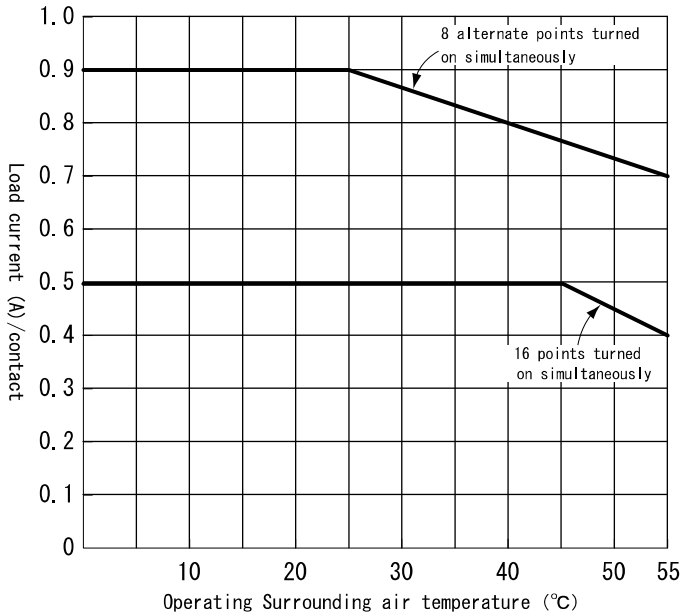
3-12. FA-TH16YTH11S

Item \ Model	FA-TH16YTH11S
Terminal output type	Source output
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	3 to 30VDC
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	1.0mA
Maximum load current	1.0A/1 contact, 8A/common
Maximum inrush current	3A 10ms
Leakage current at OFF	0.1mA or lower (at 30VDC)
Maximum voltage drop at ON	1.5V or lower
Response time OFF→ON	1ms or less
Response time ON→OFF	1ms or less
Surge suppressor	Zenor diode (built-in transistor module)
Fuse	None
Wiring method for common	16 points/common (1-wire type)
External power supply	24VDC ±10% (ripple ratio: within 5%)
Current consumption	Approx. 160mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (transistor module replaceable)
Module replacement count	50 times
Module mixing	Not possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:20P, 7.62mm pitch, Spring-up screw with finger protection cover
Terminal block — Terminal block screw	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)
Terminal block — Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more
Installation method — Screw	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 230g

Load Current Characteristics

8 alternate points turned on simultaneously

16 points turned on simultaneously

Load current (A)/contact

Operating Surrounding air temperature (℃)

3-13. FA-TH16YTR20S

Item \ Model	FA-TH16YTR20S
Terminal output type	Sink/Source output
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	3 to 30VDC
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	1.0mA
Maximum load current	1.0A/1 contact
Maximum inrush current	3A 10ms
Leakage current at OFF	0.1mA or lower (at 30VDC)
Maximum voltage drop at ON	1.5V or lower
Response time OFF→ON	1ms or less
Response time ON→OFF	1ms or less
Surge suppressor	Zenor diode (built-in transistor module)
Fuse	None
Wiring method for common	All points independent
External power supply	24VDC ±10% (ripple ratio: within 5%)
Current consumption	Approx. 160mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (transistor module replaceable)
Module replacement count	50 times
Module mixing	Possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:34P, 7.62mm pitch, Spring-up screw with finger protection cover
Terminal block — Terminal block screw	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)
Terminal block — Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more
Installation method — Screw	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 290g

Load Current Characteristics

3-14. FA-TH16Y2TR20

Item / Model	FA-TH16Y2TR20
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Load voltage range	24VDC(CLASS 2)
Rated load voltage	4.5 to 28.8VDC (CLASS 2)
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	1.0mA
Maximum load current [*1]	2.0A/1 contact
Maximum inrush current	8A 10ms or lower
Leakage current at OFF	0.1mA or lower
Maximum voltage drop at ON	0.3V (when load current 2A)

Response time	OFF → ON	3ms or less
	ON → OFF	10ms or less (resistive load)

Item		FA-TH16Y2TR20
Surge suppressor		Zener diode
Fuse		None
Wiring method for common		All points independent
External power supply		24VDC±10% (ripple ratio: within 5%, CLASS 2)
Current consumption		Approx. 210mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance		Between inputs/outputs, between each output: 560 Vrms AC / 3 cycles (altitude: 2,000m), 10MΩ or higher
Noise immunity		Simulator noise 500Vp-p, noise width 1µs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication		LED on with power supply ON and input ON
Terminal block	Terminal block screw	M3 screw, Number of terminals:36P, 7.62mm pitch, Spring-up screw with finger protection cover
		Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in), UL standard conformity tightening torque: 59N·cm, 5.22 lbf·in
	Applicable wire	22 to 14 AWG: 0.3 to 2.0mm² (when solderless terminals are used)
Installation method	Screw	M4 × 35mm or more
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight		Approx. 310g

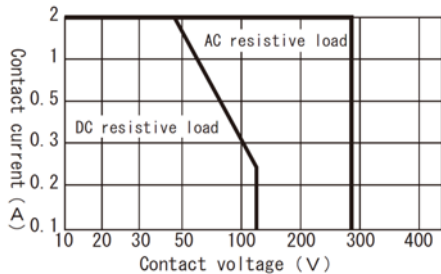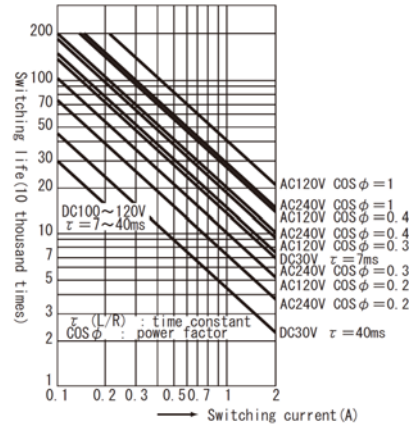* 1: Evaluation for UL certification is conducted using a resistive load.

Load Current Characteristics

Module direction (1)

Module direction (2)

Module direction (3)

Module direction (4)

Module direction (5)
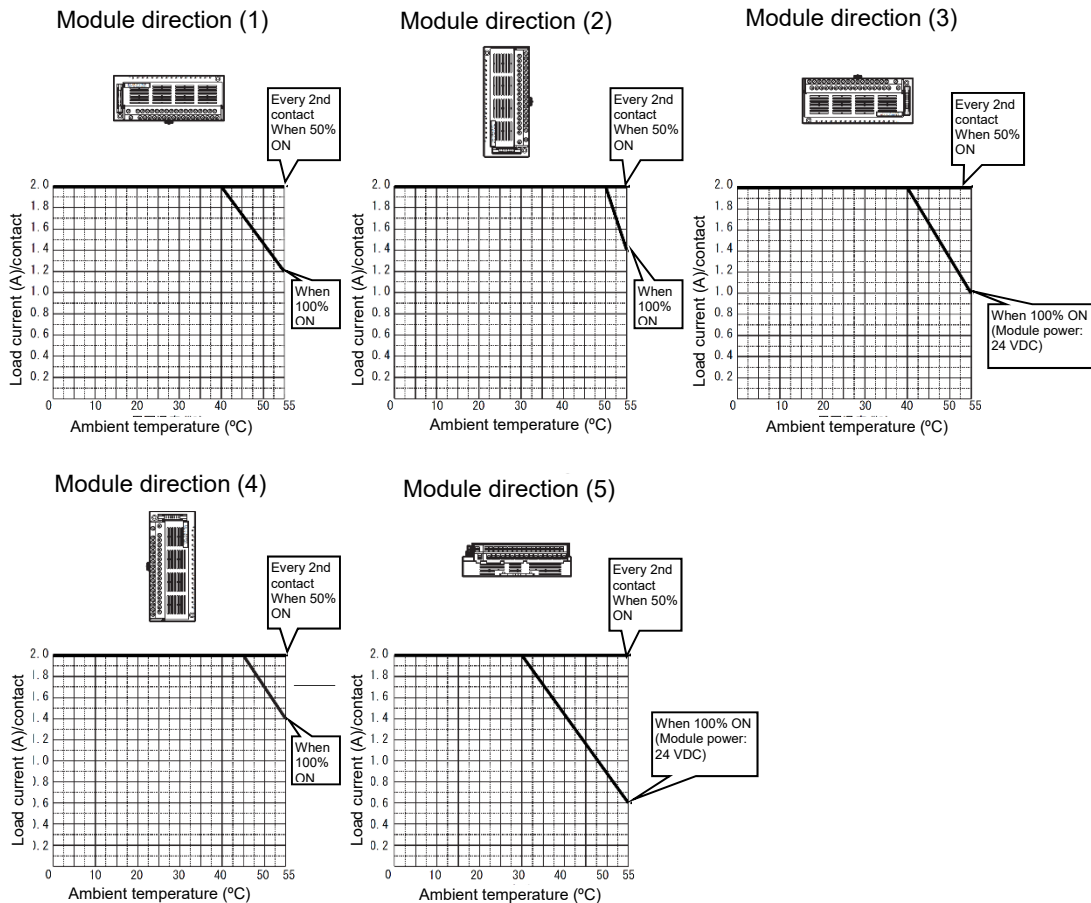
3-15. FA-THE16YTH11S

Model Item	FA-THE16YTH11S
Terminal output type	Source output
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	3 to 30VDC(CLASS 2)
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	1.0mA
Maximum load current *1	1.0A/1 contact, 8A/common
Maximum inrush current	3A 10ms
Leakage current at OFF	0.1mA or lower (at 30VDC)
Maximum voltage drop at ON	1.5V or lower
Response time OFF→ON	1ms or less
ON→OFF	1ms or less
Surge suppressor	Zenor diode (built-in transistor module)
Fuse	None
Wiring method for common	16 points/common (1-wire type)
External power supply	24VDC±10% (ripple ratio: within 5%, CLASS 2)
Current consumption	Approx. 160mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 500Vp-p, noise width 1µs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (transistor module replaceable)
Module replacement count	50 times
Module mixing	Not possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:20P, 7.62mm pitch, Spring-up screw with finger protection cover
	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in), UL standard conformity tightening torque: 59N·cm, 5.22 lbf·in
Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more
	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 230g

* 1: Evaluation for UL certification is conducted using a resistive load.

Load Current Characteristics
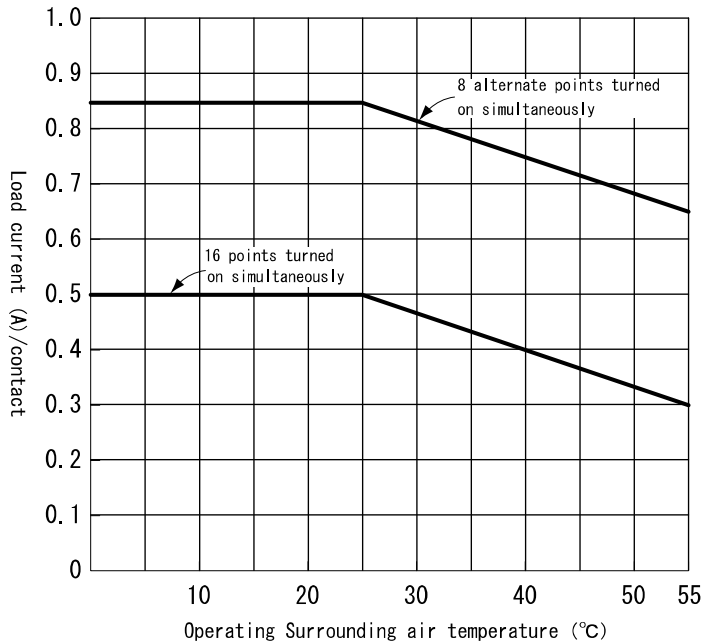
3-16. FA-THE16YTR20S

Item / Model	FA-THE16YTR20S
Terminal output type	Sink/Source output
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Photocoupler
Rated load voltage	3 to 30VDC(CLASS 2)
Maximum number of points simultaneously ON	Depends on the load current characteristics.
Minimum load current	1.0mA
Maximum load current [*1]	1.0A/1 contact
Maximum inrush current	3A 10ms
Leakage current at OFF	0.1mA or lower (at 30VDC)
Maximum voltage drop at ON	1.5V or lower
Response time OFF→ON	1ms or less
Response time ON→OFF	1ms or less
Surge suppressor	Zenor diode (built-in transistor module)
Fuse	None
Wiring method for common	All points independent
External power supply	24VDC±10% (ripple ratio: within 5%, CLASS 2)
Current consumption	Approx. 160mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 500Vp-p, noise width 1µs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (transistor module replaceable)
Module replacement count	50 times
Module mixing	Possible
Terminal block Terminal block screw	M3 screw, Number of terminals:34P, 7.62mm pitch, Spring-up screw with finger protection cover
Terminal block Terminal block screw	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in), UL standard conformity tightening torque:59N·cm, 5.22 lbf·in
Terminal block Applicable wire	22 to 14 AWG: 0.3 to 2.0mm² (when solderless terminals are used)
Installation method Screw	M4 × 0.7mm × 22mm or more
Installation method Screw	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 290g

* 1: Evaluation for UL certification is conducted using a resistive load.

Load Current Characteristics
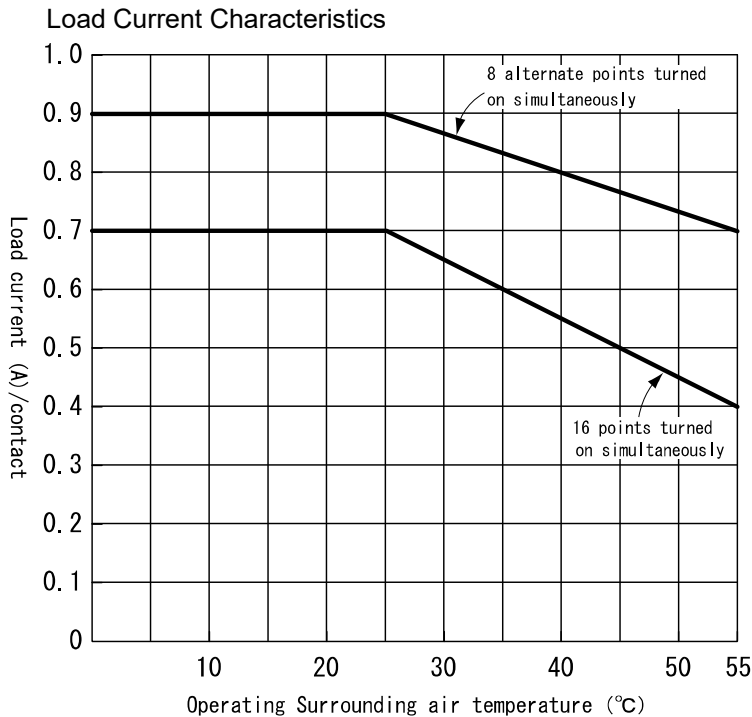
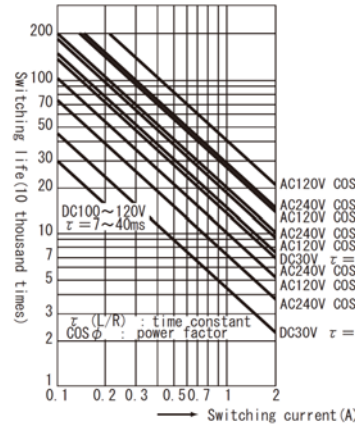## 3-17. FA-FXTH16YRA11S

Item \ Model	FA-FXTH16YRA11S
Number of points, output device numbers	16 points, first half: Y0 to Y7, latter half: Y0 to Y7
Insulation method	Relay
Rated switching voltage/current	Voltage: 24VDC, 200VAC (50/60Hz), Current: 2A/1 contact (resistive load, COSø=1), 8A/1 common
Maximum number of points simultaneously ON	100%
Minimum switching load	5VDC 1mA
Maximum switching load	270VAC, 150VDC
Maximum switching frequency	1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)
Mechanical life	20000000 times or more
Electrical life	100000 times or more at rated switching voltage and current
	100000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)
	100000 times or more at 200VAC 1A (COSø=0.35)
	100000 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)
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% (ripple ratio: within 5%)
Current consumption	Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs: 2500VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 1000Vp-p, noise width 1μs (based on noise simulator with noise frequency of 30 to 100Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (relay module replaceable)
Module replacement count	50 times
Module mixing	Not possible
Terminal block — Terminal block screw	M3 screw, Number of terminals:20P, 7.62mm pitch, Spring-up screw with finger protection cover
	Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)
Terminal block — Applicable wire	22 to 14 AWG: 0.3 to 2.0mm² (when solderless terminals are used)
Installation method — Screw	M4 × 0.7mm × 22mm or more
	Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 200g

Relay Characteristics Data

(1) Maximum value of switching capacity

(2) Contact life curve

*1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.

*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.

*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, 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.

3-18. FA-FXTH16YRA20, FA-FXTH16YRA20S

Model Item	FA-FXTH16YRA20	FA-FXTH16YRA20S
Number of points, output device numbers	16 points, first half: Y0 to Y7, latter half: Y0 to Y7	
Insulation method	Relay	
Rated switching voltage/current	Voltage: 24VDC, 200VAC (50/60Hz), Current: 2A/1 contact (resistive load, COSø=1)	
Maximum number of points simultaneously ON	100%	
Minimum switching load	5VDC 1mA	
Maximum switching load	270VAC, 150VDC	
Maximum switching frequency	1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)	
Mechanical life	20000000 times or more	
Electrical life	100000 times or more at rated switching voltage and current	
	100000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)	
	100000 times or more at 200VAC 1A (COSø=0.35)	
	100000 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	All points independent	
External power supply	24VDC±10% (ripple ratio: within 5%)	
Current consumption	Approx. 90mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher	
Noise immunity	Simulator noise 1000Vp-p, noise width 1µs (based on noise simulator with noise frequency of 30 to 100Hz)	
Operation indication	LED on with power supply ON and input ON	
Socket	None (module replacement not possible)	Yes (relay module replaceable)
Module replacement count	—	50 times
Module mixing	—	Possible
Terminal block	Terminal block screw	M3 screw, Number of terminals:34P, 7.62mm pitch, Spring-up screw with finger protection cover	
		Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in)	
	Applicable wire	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used)	
Installation method	Screw	M4 × 0.7mm × 22mm or more	
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)	
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)	
Weight	Approx. 230g	Approx. 250g

Relay Characteristics Data

(1) Maximum value of switching capacity

(2) Contact life curve

*1: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.
*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.
*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, 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.

3-19. FA1-TH1E16Y2RA20S

Item \ Model	FA1-TH1E16Y2RA20S
Number of points, output device numbers	16 points, Y0 to YF
Insulation method	Relay
Rated switching voltage/current	Voltage: 24 VDC, 100 to 240 VAC(+10%, -15%), 50/60Hz Current: 2A/1 contact (resistance load, COSø=1) *5
Maximum number of points simultaneously ON	100%
Minimum switching load	5VDC 1mA
Maximum switching load *1	270VAC, 150VDC
Maximum switching frequency	1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)
Mechanical life	20,000,000 times or more
Electrical life *2	100,000 times or more at rated switching voltage and current
	100,000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)
	100,000 times or more at 200VAC 1A (COSø=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)
Response time ON→OFF	12ms or less (excluding programmable controller response time)
Wiring method for common	All points independent
External power supply	24 VDC ±10% (ripple ratio: within 5%, SELV and LIM or Class 2)*6
Current consumption	Approx. 90mA at 24VDC (not including current consumption of programmable controller)
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500 VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher
Noise immunity	Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)
Operation indication	LED on with power supply ON and input ON
Socket	Yes (relay module replaceable)
Module replacement count	50 times
Module mixing	Possible
Terminal block Terminal block screw	M3 screw, Number of terminals:34P, 7.62mm pitch, Spring-up screw with finger protection cover Tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm, 5.22 to 7.5lbf·in), UL standard conformity tightening torque: 59N·cm, 5.22 lbf·in
Terminal block Applicable wire *3	22 to 14 AWG: 0.3 to 2.0mm^2 (when solderless terminals are used) *7
Installation method *4 Screw	M4 × 0.7mm × 22mm or more Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
Installation method *4 DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 300g

*1: Evaluation for UL certification is conducted 24 VDC, 240 VAC.
*2: Evaluation for UL certification is conducted 6000 times.
*3: Select wires depending on the current value used.
*4: Evaluation for UL certification is conducted a DIN rail installation.
*5: Evaluation for UL certification is conducted using a resistive load.
*6: The power supply must be powered from approved source that meets of SELV and Class 2 or limited energy according to UL 61010-2-201.
*7: Use copper wires having temperature rating of 75°C or more for the terminal block.

Relay Characteristics Data

(1) Maximum value of switching capacity
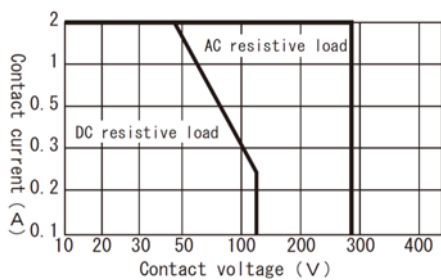
(2) Contact life curve
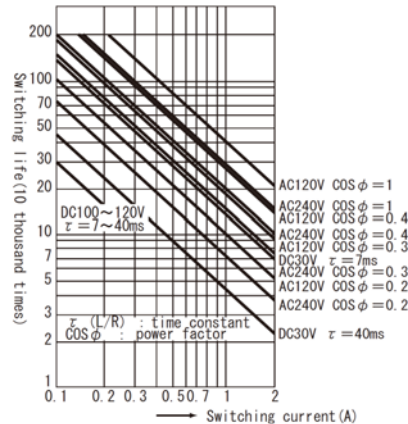
*8: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.
*9: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.
*10: 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, 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.

3-20. FA1-TH16Y2RA20S1E, FA1-TH1E16Y2RA20S1E

Item \ Model		FA1-TH16Y2RA20S1E	FA1-TH1E16Y2RA20S1E
Connected programmable controller		Sink-type 24VDC transistor output module	Source-type 24VDC transistor output module
Terminal module output type		Sink-type	Source-type
Number of points, output device numbers		16 points, Y0 to YF	
Insulation method		Relay	
Rated switching voltage/current *1		Voltage: 24VDC, 100 to 240VAC (50/60Hz), Current: 2A/1 contact (resistive load, COSø=1)	
Maximum number of points simultaneously ON		100%	
Minimum switching load		5VDC 1mA	
Maximum switching load *5 *8		270VAC, 150VDC	
Maximum switching frequency		1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)	
Mechanical life		20000000 times or more	
Electrical life *6		100000 times or more at rated switching voltage and current	
		100000 times or more at 200VAC 1.5A (COSø=0.7), 240VAC 1A (COSø=0.7)	
		100000 times or more at 200VAC 1A (COSø=0.35)	
		100000 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		All points independent	
External power supply		24VDC±10% (ripple ratio: within 5%, SELV and LIM or Class 2) *2	
Current consumption		Approx. 90mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance		Between inputs/outputs, between each output: 2500VAC 1minute, between contacts: 750VAC 1minute, 10MΩ or higher	
Noise immunity		Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)	
Operation indication		LED on with power supply ON and input ON	
Socket		Yes (relay module replaceable)	
Module replacement count		50 times	
Module mixing		Possible	
Terminal block	Number of points	52points	
	Applicable wire *3	0.2-1.5mm^2 (AWG24-16) *4 Use copper wire only	
	Wire strip length	8mm	
Installation method *7	Screw	M4 × 0.7mm × 22mm or more	
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)	
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)	
Weight		Approx. 220g	

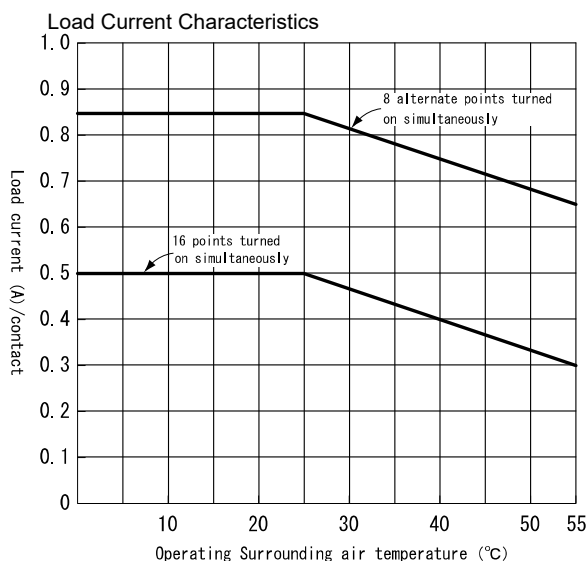*1: Evaluation for UL certification is conducted under resistance load conditions.
*2: The power supply must be powered from approved source that meets of SELV and Class 2 or limited energy according to UL 61010-2-201.
*3: Select wires depending on the current value used.
*4: Use copper wires having temperature rating of 75°C or more for the terminal block.
*5: Evaluation for UL certification is conducted 24 VDC, 240 VAC.
*6: Evaluation for UL certification is conducted 6000 times.
*7: Evaluation for UL certification is conducted a DIN rail installation.
*8: Do not combine an accessible circuit (such as SELV or PELV circuit) and AC power supplies in combination.

Relay Characteristics Data

(1) Maximum value of switching capacity
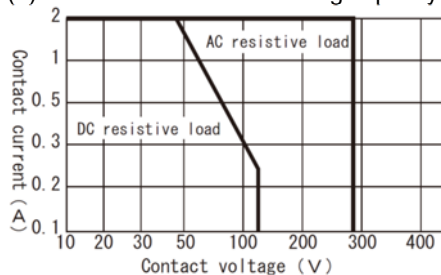
(2) Contact life curve
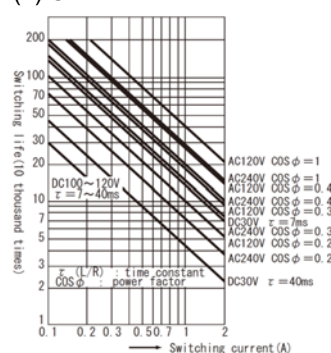
*9: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.
*10: The relay life curve shows the actual service life, not a guaranteed life. Consider the relay life with an adequate safety margin for the relay life curve.
*11: 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, 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.

3-21. FA1-TH16Y1SR20S1E, FA1-TH1E16Y1SR20S1E

Item \ Model	FA1-TH16Y1SR20S1E	FA1-TH1E16Y1SR20S1E
Connected programmable controller	Sink-type 24VDC transistor output module	Source-type 24VDC transistor output module
Terminal module output type	Sink-type	Source-type
Number of points, output device numbers	16 points, Y0 to YF	
Insulation method	Photocoupler	
Rated load voltage	30 to 240VAC (50/60Hz)	
Maximum number of points simultaneously ON	Depends on the load current characteristics.	
Minimum load current	10mA	
Maximum load current	1A/1 contact	
Maximum inrush current	25A (60Hz, 1 cycle)	
Leakage current at OFF	1.5mArms or lower (at 100VACrms 60Hz) 3.0mArms or lower (at 200VACrms 60Hz)	
Maximum voltage drop at ON	2.5Vrms or lower	
Response time — OFF→ON	1ms or less (excluding programmable controller response time)	
Response time — ON→OFF	1ms + 1/2 cycle or less (excluding programmable controller response time)	
Surge suppressor	Varistor, snubber circuit (built-in triac module)	
Fuse	None	
Wiring method for common	All points independent	
External power supply	24VDC±10% (ripple ratio: within 5%)	
Current consumption	Approx. 180mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, 10MΩ or higher	
Noise immunity	Simulator noise 1500Vp-p, noise width 1μs (based on noise simulator with noise frequency of 25 to 60Hz)	
Operation indication	LED on with power supply ON and input ON	
Socket	Yes (triac module replaceable)	
Module replacement count	50 times	
Module mixing	Possible	
Terminal block — Number of points	52points	
Terminal block — Applicable wire	0.2-1.5mm^2 (AWG24-16)	
Terminal block — Wire strip length	8mm	
Installation method — Screw	M4 × 0.7mm × 22mm or more Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)	
Installation method — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)	
Weight	Approx. 220g	

Load Current Characteristics
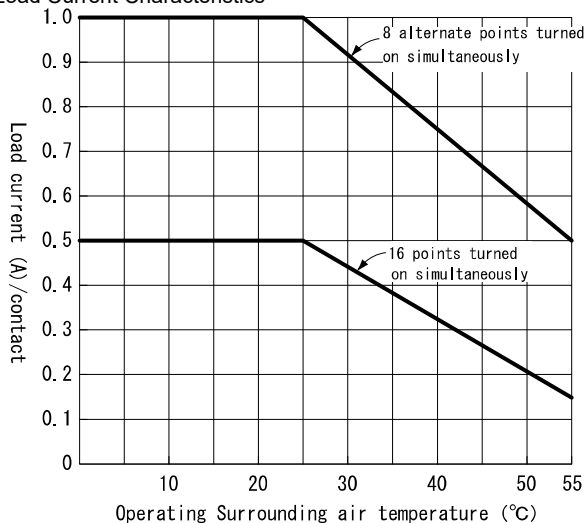
3-22. FA1-TH16Y1TR20S1E, FA1-TH1E16Y1TR20S1E

Item \ Model	FA1-TH16Y1TR20S1E	FA1-TH1E16Y1TR20S1E
Connected programmable controller	Sink-type 24VDC transistor output module	Source-type 24VDC transistor output module
Terminal module output type	Sink-type	Source-type
Number of points, output device numbers	16 points, Y0 to YF	
Insulation method	Photocoupler	
Rated load voltage [*1]	3 to 30VDC	
Maximum number of points simultaneously ON	Depends on the load current characteristics.	
Minimum load current	1.0mA	
Maximum load current	1A/1 contact [*6]	
Maximum inrush current	3A 10ms	
Leakage current at OFF	0.1mA or lower (at 30VDC)	
Maximum voltage drop at ON	1.5V or lower	
Response time	OFF→ON	1ms or less (excluding programmable controller response time)
	ON→OFF	1ms or less (excluding programmable controller response time)
Surge suppressor	Zenor diode (built-in transistor module)	
Fuse	None	
Wiring method for common	All points independent	
External power supply	24VDC±10% (ripple ratio: within 5%, SELV and LIM or Class 2) [*2]	
Current consumption	Approx. 160mA at 24VDC (not including current consumption of programmable controller)	
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, 10MΩ or higher	
Noise immunity	Simulator noise 1500Vp-p, noise width 1µs (based on noise simulator with noise frequency of 25 to 60Hz)	
Operation indication	LED on with power supply ON and input ON	
Socket	Yes (transistor module replaceable)	
Module replacement count	50 times	
Module mixing	Possible	
Terminal block	Number of points	52points
	Applicable wire [*3]	0.2-1.5mm^2 (AWG24-16) [*4] Use copper wire only
	Wire strip length	8mm
Installation method [*5]	Screw	M4 × 0.7mm × 22mm or more Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)
Weight	Approx. 220g	

*1: Evaluation for UL certification is conducted under resistance load conditions.
*2: The power supply must be powered from approved source that meets of SELV and Class 2 or limited energy according to UL 61010-2-201.
*3: Select wires depending on the current value used.
*4: Use copper wires having temperature rating of 75°C or more for the terminal block.
*5: Evaluation for UL certification is conducted a DIN rail installation.
*6: Evaluation for UL certification is conducted 0.3A/1 contact.

Load Current Characteristics

3-23. FA1-TH16Y2SC20S1E, FA1-TH1E16Y2SC20S1E

Item \ Model	FA1-TH16Y2SC20S1E	FA1-TH1E16Y2SC20S1E
Connected programmable controller	Sink-type 24VDC transistor output module	Source-type 24VDC transistor output module
Terminal module output type	Sink-type	Source-type
Number of points, output device numbers	16 points, Y0 to YF	
Rated load voltage/current [*1]	Voltage, Current: Depends on modules connected.	
Maximum number of points simultaneously ON	100%, however, changes depending on the load current characteristics when triac and transistor modules are connected.	
Wiring method for common	All points independent	
External power supply	24VDC±10% (ripple ratio: within 5%, SELV and LIM or Class 2) [*2]	
Current consumption	Approx. 10mA at 24VDC (not including current consumption of programmable controller and module)	
Withstand voltage, insulation resistance	Between inputs/outputs, between each output: 2500VAC 1minute, 10MΩ or higher	
Operation indication	LED on with power supply ON and input ON	
Connectable modules	NO contact relay: FA-NYP24WK4, NC contact relay: FA-NYBP24WK4[*5], triac: FA-SN24A01FS4[*5], transistor: FA-SN24D01HZS4	
Module replacement count	50 times	
Module mixing	Possible	
Terminal block — Number of points	52points	
Terminal block — Applicable wire [*3]	0.2-1.5mm^2 (AWG24-16) [*4] Use copper wire only	
Terminal block — Wire strip length	8mm	
Installation method [*6] — Screw	M4 × 0.7mm × 22mm or more / Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm, 7 to 10lbf·in)	
Installation method [*6] — DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715)	
Weight	Approx. 160g	

*1: Evaluation for UL certification is conducted under resistance load conditions.
*2: The power supply must be powered from approved source that meets of SELV and Class 2 or limited energy according to UL 61010-2-201.
*3: Select wires depending on the current value used.
*4: Use copper wires having temperature rating of 75°C or more for the terminal block.
*5: Not allowed to use when the output terminal module obtains UL certification.
*6: Evaluation for UL certification is conducted a DIN rail installation.

Connectable Module Specifications

Item \ Model	FA-NYP24WK4	FA-NYBP24WK4	FA-SN24A01FS4	FA-SN24D01HZS4
Output method	NO contact relay	NC contact relay	triac	transistor
Insulation method	Relay		Photocoupler	Photocoupler
Maximum number of points simultaneously ON	-		Depends on the load current characteristics.	Depends on the load current characteristics.
Rated load voltage	24VDC, 100 to 240VAC [*8][*10]		30 to 240VAC	3 to 30VDC (SELV and LIM or Class 2) [*2]
Maximum load current	2A/1 contact (resistive load, COSø=1)		1A	1A [*7]
Minimum load current	DC5V 1mA		10mA	1mA
Maximum inrush current	-		25A (60Hz, 1 cycle)	3A 10ms
Leakage current at OFF	-		1.5mArms or lower (at 100VACrms 60Hz) 3.0mArms or lower (at 200VACrms 60Hz)	0.1mA or lower (at 30VDC)
Maximum voltage drop at ON	-		2.5Vrms or lower	1.5V or lower
Maximum switching frequency	1800 times/hr (ON for 1 second or longer, OFF for 1 second or longer)		-	-
Mechanical life	20000000 times or more		-	-
Electrical life	100000 times or more at rated switching voltage and current [*9]		-	-
Response time — OFF→ON	10ms or less		1ms or less	1ms or less
Response time — ON→OFF	12ms or less		1ms + 1/2 cycle or less	1ms or less
Surge suppressor	-		Varistor, snubber circuit	Zenor diode
Current consumption	Approx. 5mA at 24VDC/ 1 point		Approx. 8mA at 24VDC/ 1 point	Approx. 10mA at 24VDC/ 1 point
Noise immunity	Simulator noise 1500Vp-p, noise width 1µs (based on noise simulator with noise frequency of 25 to 60Hz)			
Module color	Beige	Sky blue	Black	Red
Quantity in package	4			
Weight	Approx. 30g			

*7: Evaluation for UL certification is conducted 0.3A/1 contact.
*8: Do not combine an accessible circuit (such as SELV or PELV circuit) and AC power supplies in combination.
*9: Evaluation for UL certification is conducted 6000 times.
*10: Evaluation for UL certification is conducted 24 VDC, 240 VAC.

Relay Characteristics Data

FA-NYP24WK4 (NO contact relay)

(1) Maximum value of switching capacity

Contact current (A) vs Contact voltage (V)
AC resistive load
DC resistive load

(2) Contact life curve

Switching life (10 thousand times) vs Switching current (A)

DC100~120V τ=7~40ms
AC120V COSφ=1
AC240V COSφ=1
AC120V COSφ=0.4
AC240V COSφ=0.4
AC120V COSφ=0.3
DC30V τ=7ms
AC240V COSφ=0.3
AC120V COSφ=0.2
AC240V COSφ=0.2
DC30V τ=40ms
τ (L/R) : time constant
COSφ : power factor
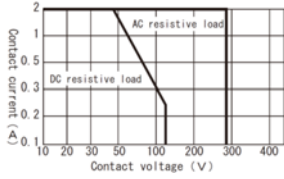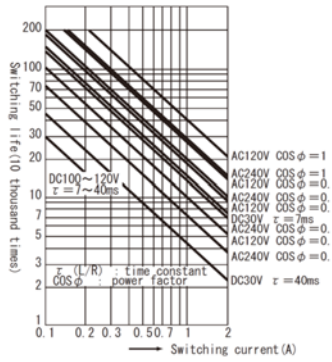
FA-NYBP24WK4 (NC contact relay)

(1) Maximum value of switching capacity

Contact current (A) vs Contact voltage (V)
AC resistive load
DC resistive load

(2) Contact life curve

Switching life (10 thousand time) vs Switching current (A)

AC250V COSφ=1
DC30V τ=0
AC120V COSφ=0.4
AC240V COSφ=0.4
DC30V τ=7ms
τ (L/R) : time constant
COSφ : power factor
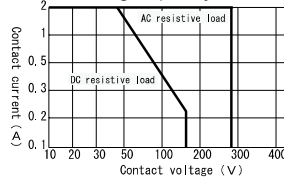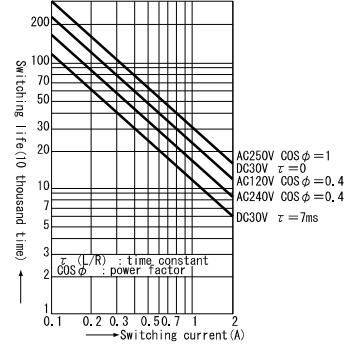
*11: When the module is used in applications with high switching frequency, the lifespan of the relay becomes a matter of concern. Adequately consider use conditions.

*12: 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.

*13: 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, 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.

Load Current Characteristics

FA-SN24A01FS4 (triac)

Load current (A)/contact vs Operating Surrounding air temperature (°C)
8 alternate points turned on simultaneously
16 points turned on simultaneously

FA-SN24D01HZS4 (transistor)

Load current (A)/contact vs Operating Surrounding air temperature (°C)
8 alternate points turned on simultaneously
16 points turned on simultaneously
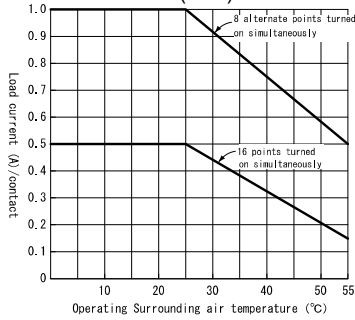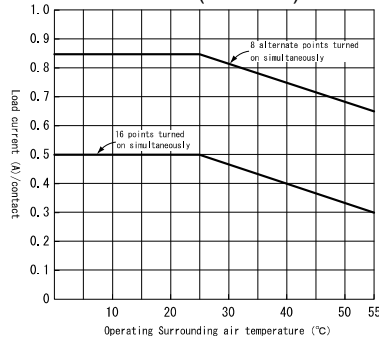
4. CONNECTABLE MODULES AND CABLES

4-1. FA-TH16Y**, FA-FXTH16Y**, FA1-TH16Y**

Module model for a programmable controller[1]			Cable model	Module model
MELSEC iQ-R series connector type	RY41NT2P RY42NT2P		FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	FA-TH16YRA11 FA-TH16YRA11S FA-TH16YRA20 FA-TH16YRA20S FA-TH16YRA20SL FA-TH16YRA21 FA-TH16YRA21S FA-TH16YRAB20SL FA-TH16YRAC20S FA-TH16YSR11S FA-TH16YSR20S FA-TH16YSR21S FA-TH16YTL11S FA-TH16YTL21S FA-TH16YTH11S FA-TH16YTR20S FA-TH16Y2TR20 FA1-TH16Y2RA20S1E FA1-TH16Y1SR20S1E FA1-TH16Y1TR20S1E FA1-TH16Y2SC20S1E
	RH42C4NT2P	Output side	FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	
MELSEC iQ-R series terminal block type	RY40NT5P		FA-CBL**M20 FA-CBL**YM20 FA-CBL**TMV20	
MELSEC-Q series terminal block type	QY40P		FA-CBL**M20 FA-CBL**YM20 FA-CBL**TMV20	
MELSEC-Q series connector type	QY41P QY42P		FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	
	QH42P QX41Y41P	Output side	FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	
MELSEC-L series connector type	LY41NT1P LY42NT1P		FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	
	LH42C4NT1P	Output side	FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	
CC-Link connector type	AJ65SBTCF1-32T AJ65BTC1-32T NZ2GFCF1-32T		FA-CBL**FM2H[2] FA-CBL**FM2LH[2]	
CC-Link/LT connector type	CL2Y16-TP1M1V		FA-CBL**MMH20	
MELSEC-F series MELSEC iQ-F series connector type	FX3GC-32MT/D FX3UC-16MT/D FX3UC-32MT/D FX3UC-32MT-LT FX3UC-32MT-LT2 FX3UC-64MT/D FX3UC-96MT/D FX5UC-32MT/D FX5UC-64MT/D FX5UC-96MT/D FX5-C32ET/D	Output side	FA-FXCBL**MMH20 FA2-CB1LT**MM1H20[3][4]	FA-FXTH16YRA11S FA-FXTH16YRA20 FA-FXTH16YRA20S FA1-TH16Y2RA20S1E FA1-TH16Y1SR20S1E FA1-TH16Y1TR20S1E FA1-TH16Y2SC20S1E
	FX2NC-16EYT FX2NC-32EYT FX5-C16EYT/D FX5-C32EYT/D			

*1: For use with 24VDC only.
*2: Use the same power supply for the Modules to be connected.
*3: When the operating ambient temperature is -20 to 55°C, use the FA2-CB1LT**MM1H20.
*4: For use below 0°C, check the Operating ambient temperature of programmable controller.

4-2. FA-THE16Y**, FA1-TH1E16Y**

Module model for a programmable controller[1]			Cable model	Module model
MELSEC iQ-R series connector type	RY41PT1P RY42PT1P		FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	FA-THE16YTH11S FA-THE16YTR20S FA1-TH1E16Y2RA20S FA1-TH1E16Y2RA20S1E FA1-TH1E16Y1SR20S1E FA1-TH1E16Y1TR20S1E FA1-TH1E16Y2SC20S1E
MELSEC iQ-R series terminal block type	RY40PT5P		FA-CBL**M20 FA-CBL**YM20 FA-CBL**TMV20	
MELSEC-Q series terminal block type	QY80		FA-CBL**M20 FA-CBL**YM20 FA-CBL**TMV20	
MELSEC-Q series connector type	QY81P		FA-CBL**DM2FY[2]	
	QY82P		FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	
MELSEC-L series connector type	LY41PT1P LY42PT1P		FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	
	LH42C4PT1P		FA-CBL**FM2V[2] FA-CBL**FM2LV[2]	
MELSEC iQ-F series connector type	FX5UC-32MT/DSS FX5UC-64MT/DSS FX5UC-96MT/DSS FX5-C32ET/DSS	Output side	FA2-CB1L**MM1H20E FA2-CB1LT**MM1H20E[3][4]	FA1-TH1E16Y2RA20S FA1-TH1E16Y2RA20S1E FA1-TH1E16Y1SR20S1E FA1-TH1E16Y1TR20S1E FA1-TH1E16Y2SC20S1E
	FX5-C16EYT/DSS FX5-C32EYT/DSS			

*1: For use with 24VDC only.
*2: Use the same power supply for the Modules to be connected.
*3: When the operating ambient temperature is -20 to 55°C, use the FA2-CB1LT**MM1H20.
*4: For use below 0°C, check the Operating ambient temperature of programmable controller.

5. EXTERNAL DIMENSIONS

5-1. FA-TH16Y**11/11S, FA-THE16YTH11S, FA-FXTH16YRA11S

[Unit:mm]
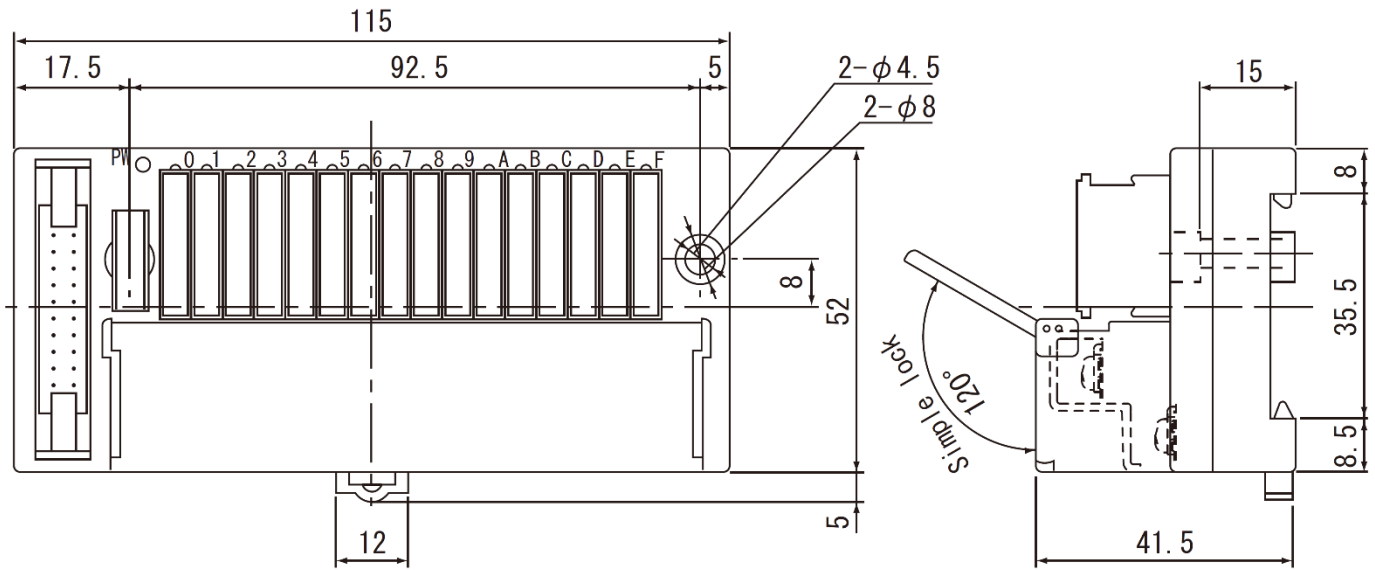
5-2. FA-TH16Y**20/20S, FA-THE16YTR20S, FA-FXTH16YRA20/20S

[Unit:mm]
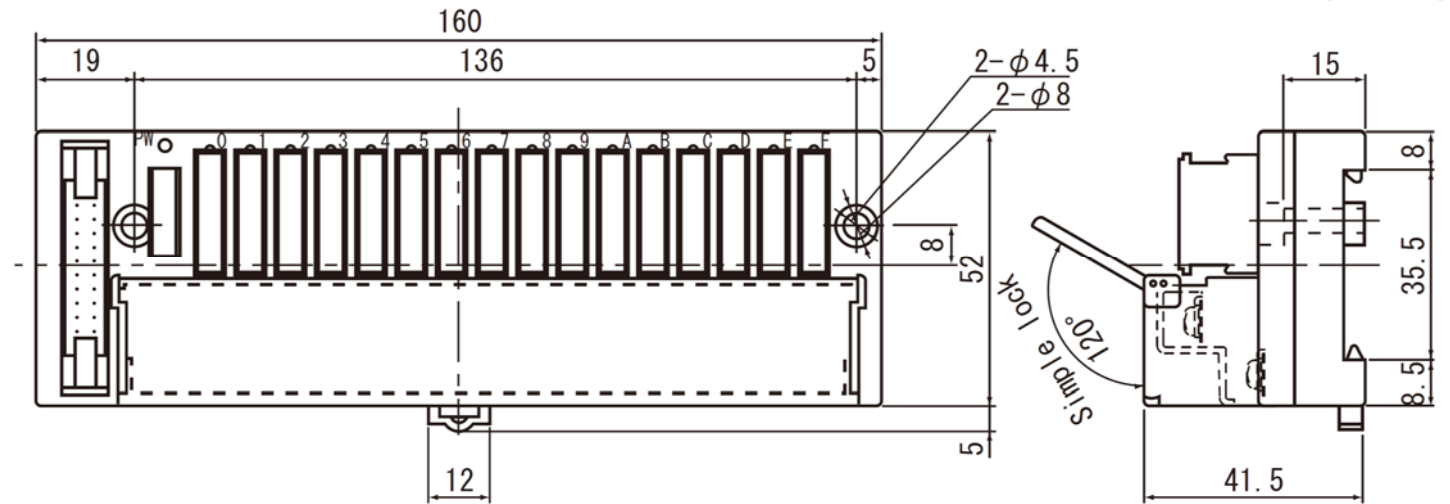
5-3. FA-TH16Y**20SL

[Unit:mm]
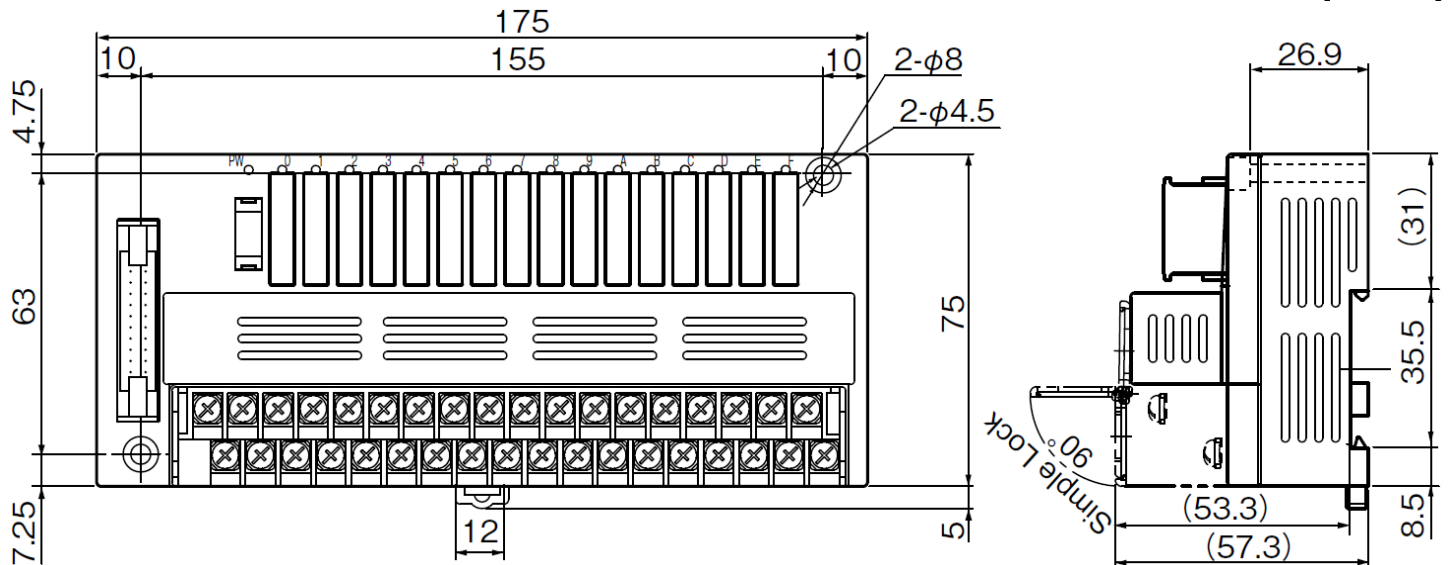
5-4. FA-TH16YRAC20S

[Unit:mm]
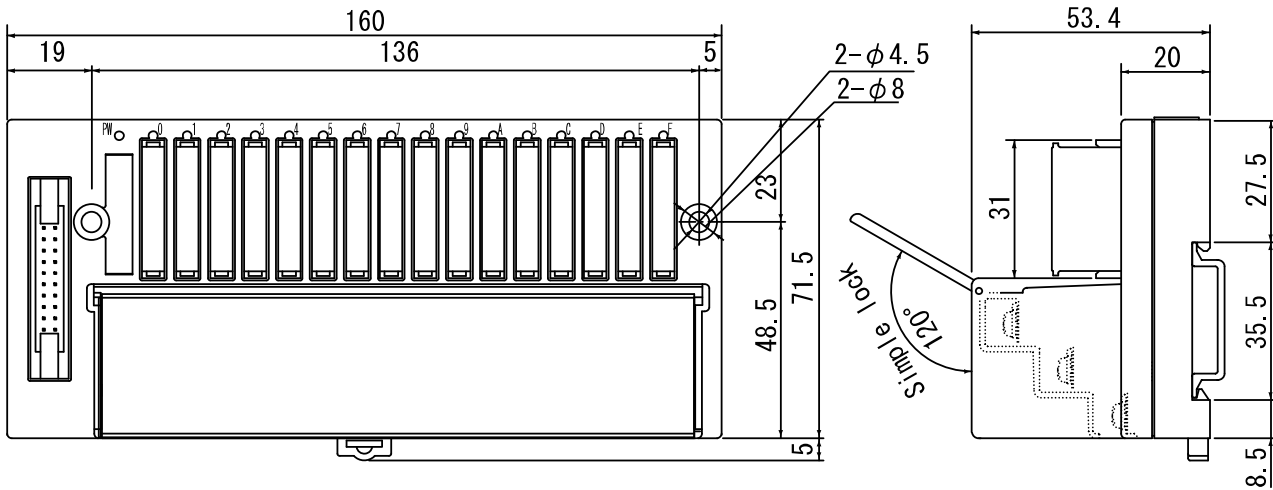
5-5. FA-TH16Y**21/21S

[Unit:mm]
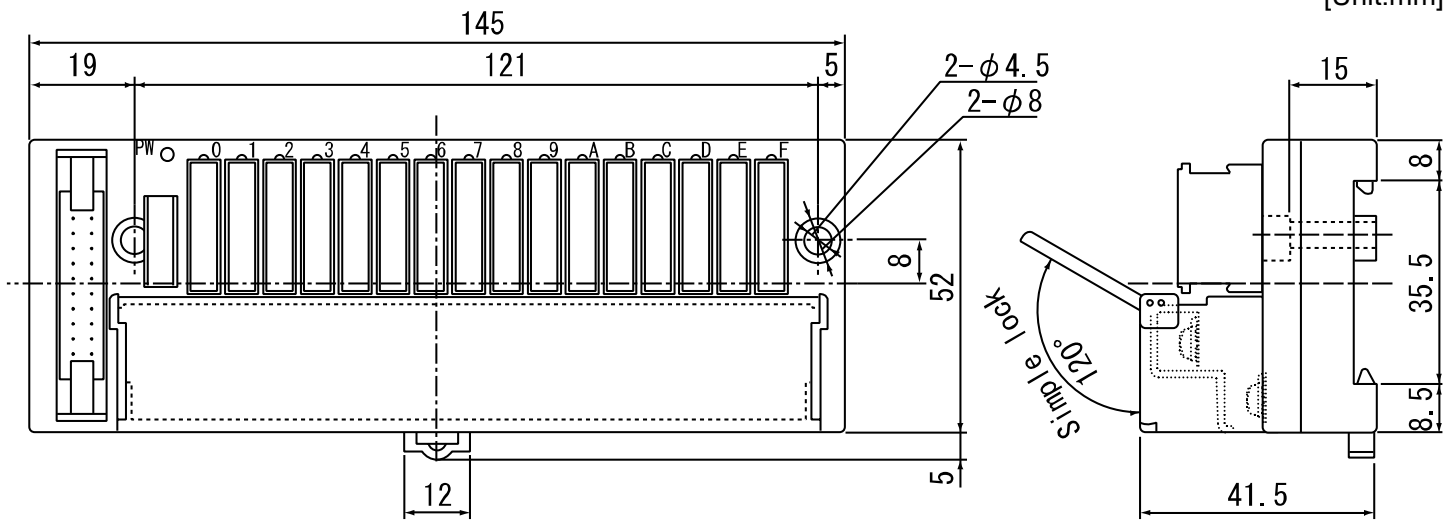
5-6. FA-TH16Y2TR20

[Unit:mm]

36
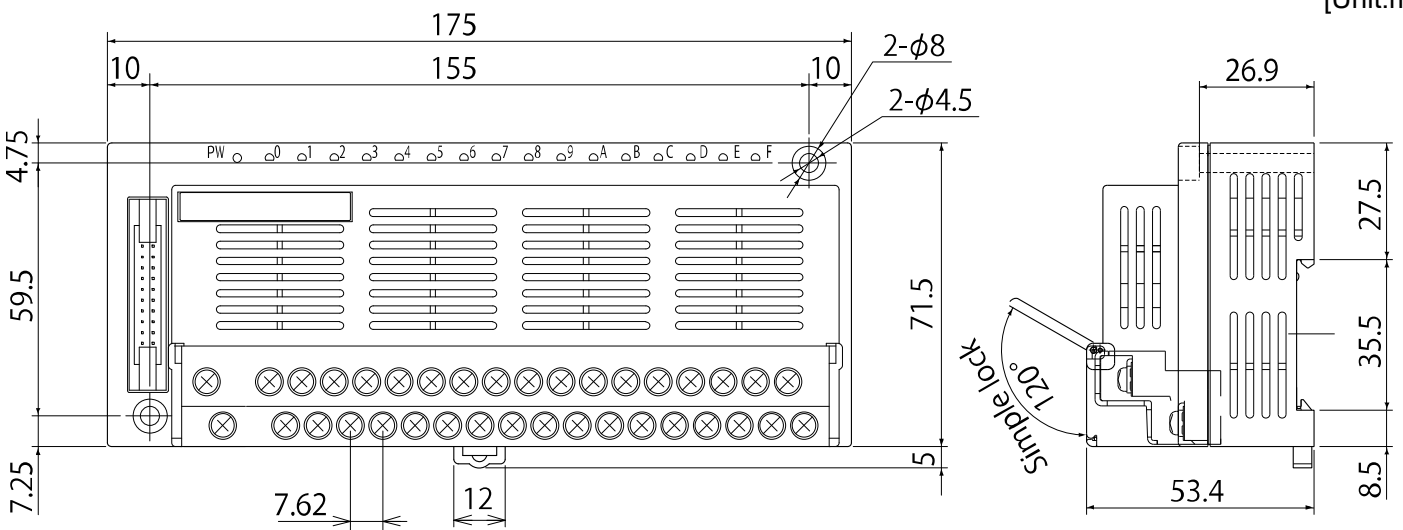
5-7. FA1-TH1E16Y2RA20S

[Unit:mm]
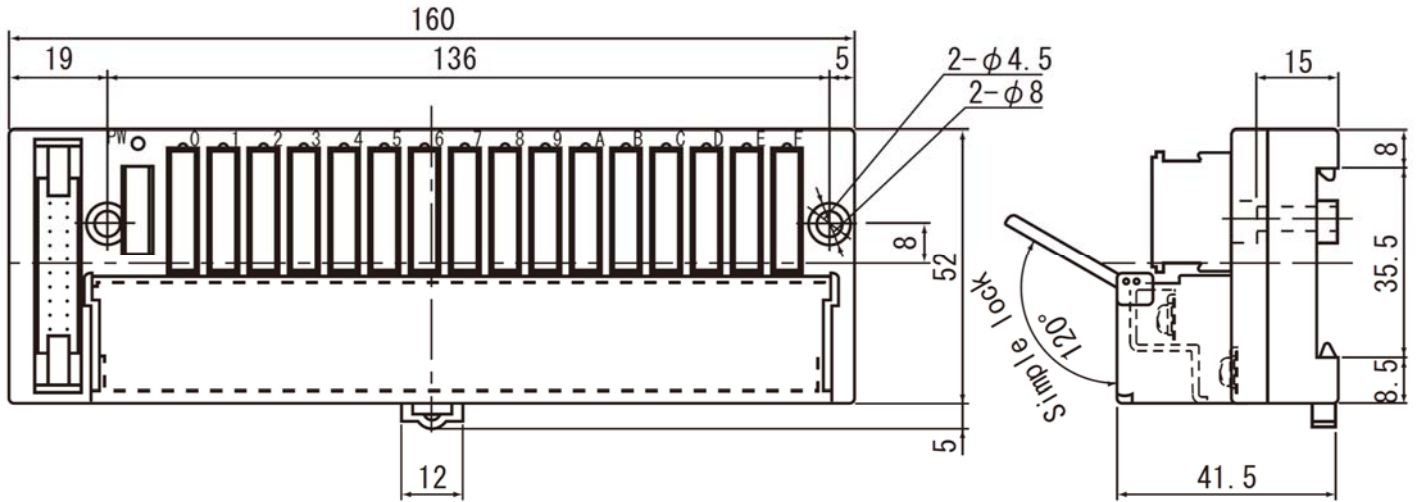
*1: A terminal block symbol sheet for the MELSEC iQ-R and MELSEC-Q series modules is attached to the module.
When connecting to the MELSEC iQ-F or MELSEC-F series module, obtain a terminal block symbol sheet for the MELSEC iQ-F or MELSEC-F series module from our MEEFAN website and replace the sheet as needed.
URL:http://www.mee.co.jp/sales/fa/meefan/parts/cad/fa_goods/cad_list.html

<Terminal block symbol paper>

MELSEC iQ-R and MELSEC-Q series (Hexadecimal) *2	Front Back
MELSEC iQ-F and MELSEC-F series (Octal) [Downloadable from our website]	Front Back

*2: This sheet is attached to the module.
*3: When using the MELSEC iQ-F or MELSEC-F series module, regard the LED indication numbers 8 to F as higher numbers 0 to 7.

5-8. FA1-TH16Y**20S1E, FA1-TH1E16Y**20S1E
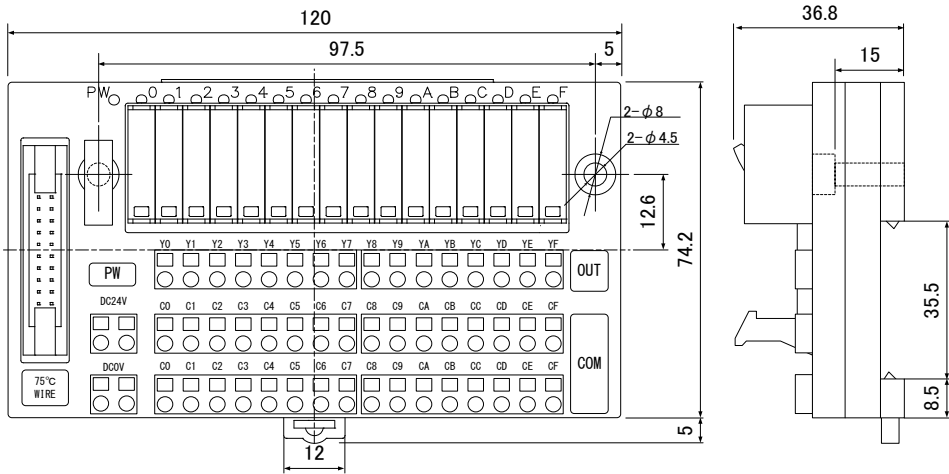
[Unit:mm]

6. INSTALLATION ORIENTATION

6-1. FA-TH16Y**11/11S/20/20S/21/21S, FA-THE16**11S/20S, FA-FXTH16YRA11S/20/20S, FA1-TH1E16Y2RA20S

Horizontal installation
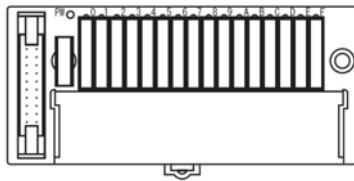
Vertical installation
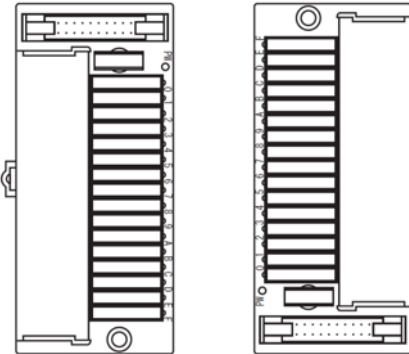
*1: Do not install the module in any direction other than the above.

6-2. FA-TH16Y2TR20, FA-TH16YRA20SL, FA-TH16YRAB20SL, FA1-TH/TH1E16Y**1E

Horizontal installation
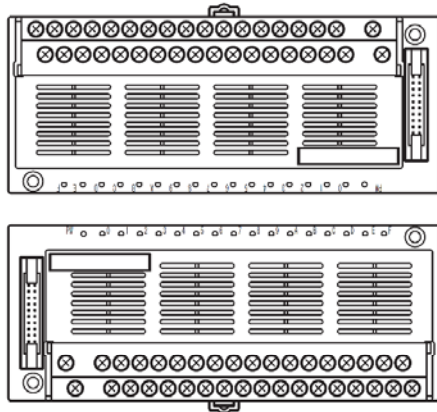
Vertical installation
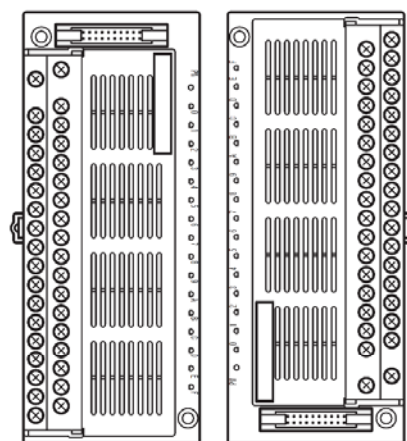
Upward installation
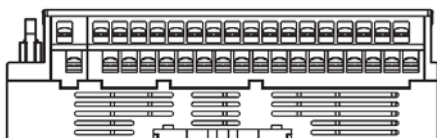
*1: Do not install the module in any direction other than the above.

7. CONNECTING METHOD

7-1. Connection example with a terminal block module of a programmable controller

   7-1-1. When a cable with a terminal block is used

Connect the terminal block securely to the programmable controller module using installation screws.

Programmable controller module QY40P, other

Cable
FA-CBL**TMV20

Insert the connector fully to fix it securely.

Load
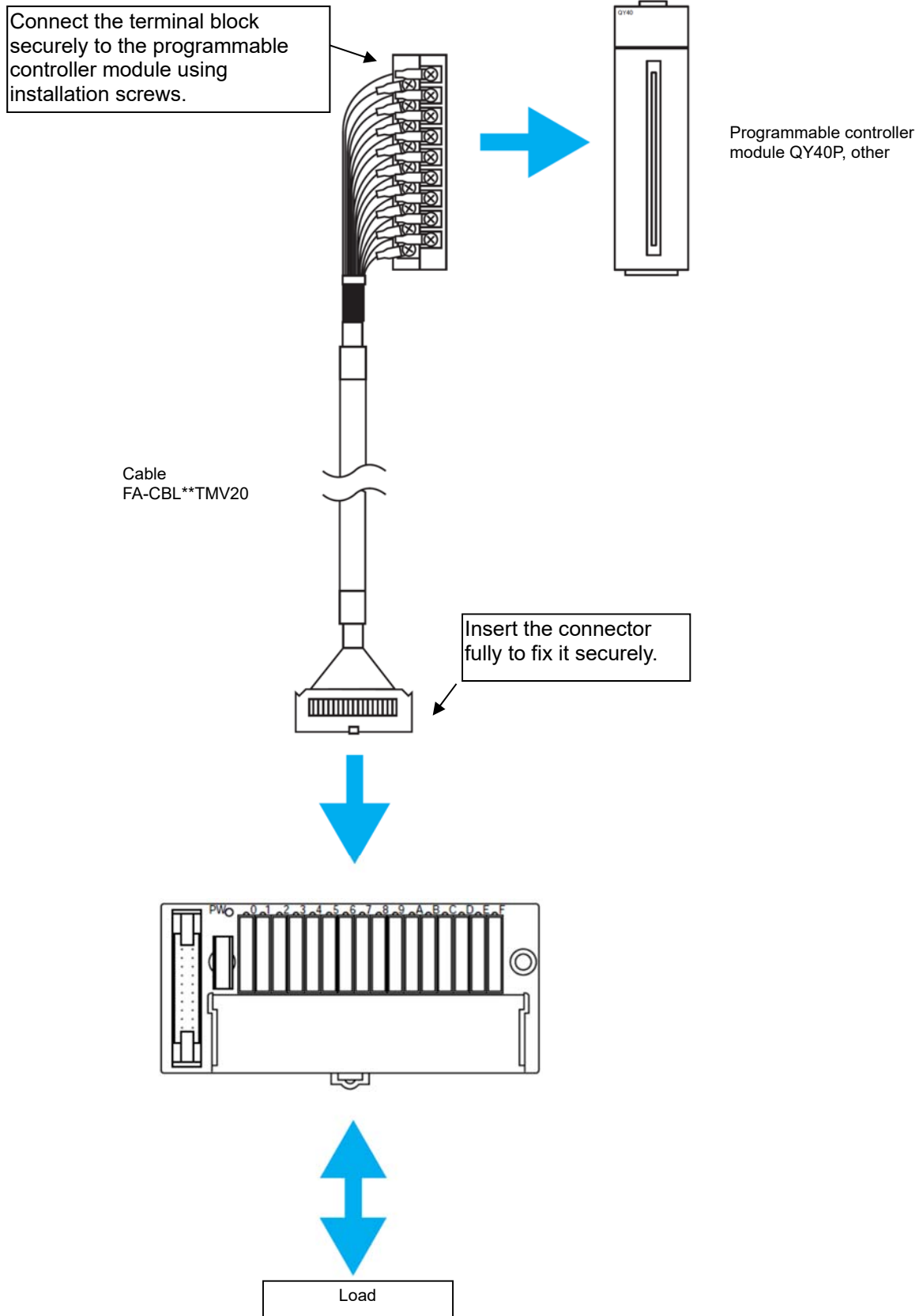
7-1-2. When a discrete cable is used

Wire the cable securely to the terminal block of the programmable controller module.

Programmable controller module QY40P, other

Cable
FA-CBL**M20
FA-CBL**YM20

Insert the connector fully to fix it securely.

Load
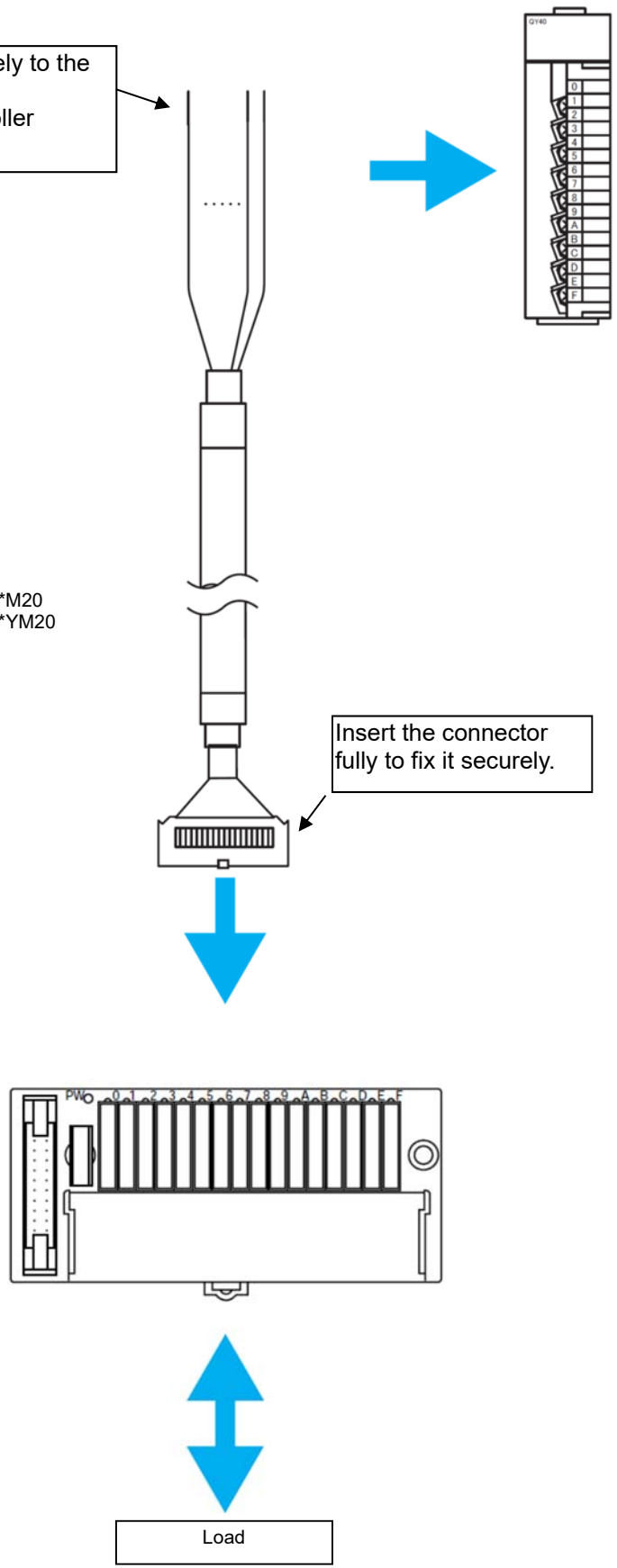
7-2. Connection example with a connector module of a programmable controller

7-2-1. When a cable with a 40P connector is used

Connect the connector securely to the programmable controller module using installation screws.

Programmable controller module QY41P, other

Cable
FA-CBL**FM2V
FA-CBL**FM2LV
FA-CBL**FM2H
FA-CBL**FM2LH

Insert the connector fully to fix it securely.

Insert the connector fully to fix it securely.

Load

Load
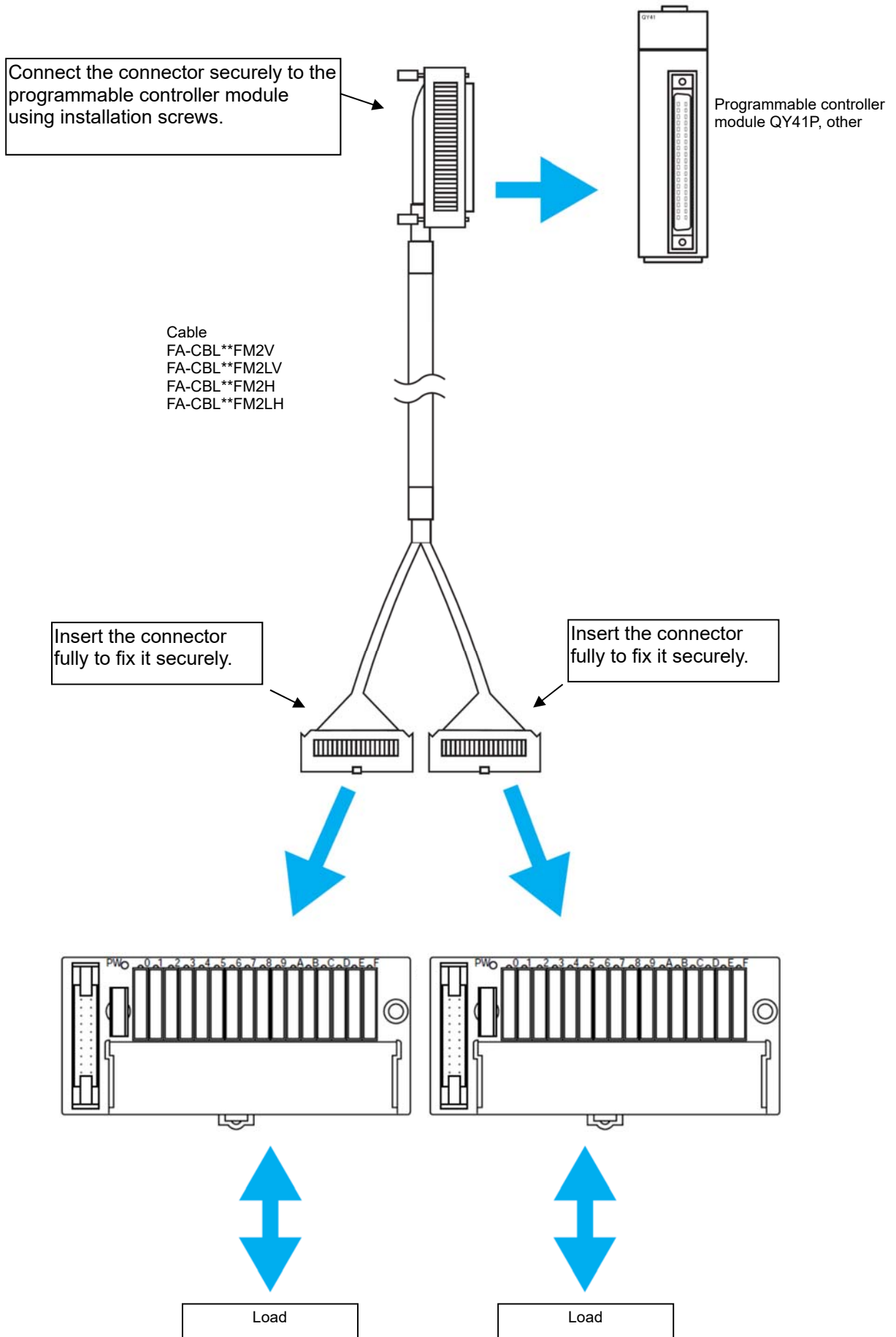
7-2-2. When a cable with a 37P connector is used

Connect the connector securely to the programmable controller module using installation screws.

Programmable controller module QY81P

Cable
FA-CBL**DM2FY

Insert the connector fully to fix it securely.

Insert the connector fully to fix it securely.

Load

Load
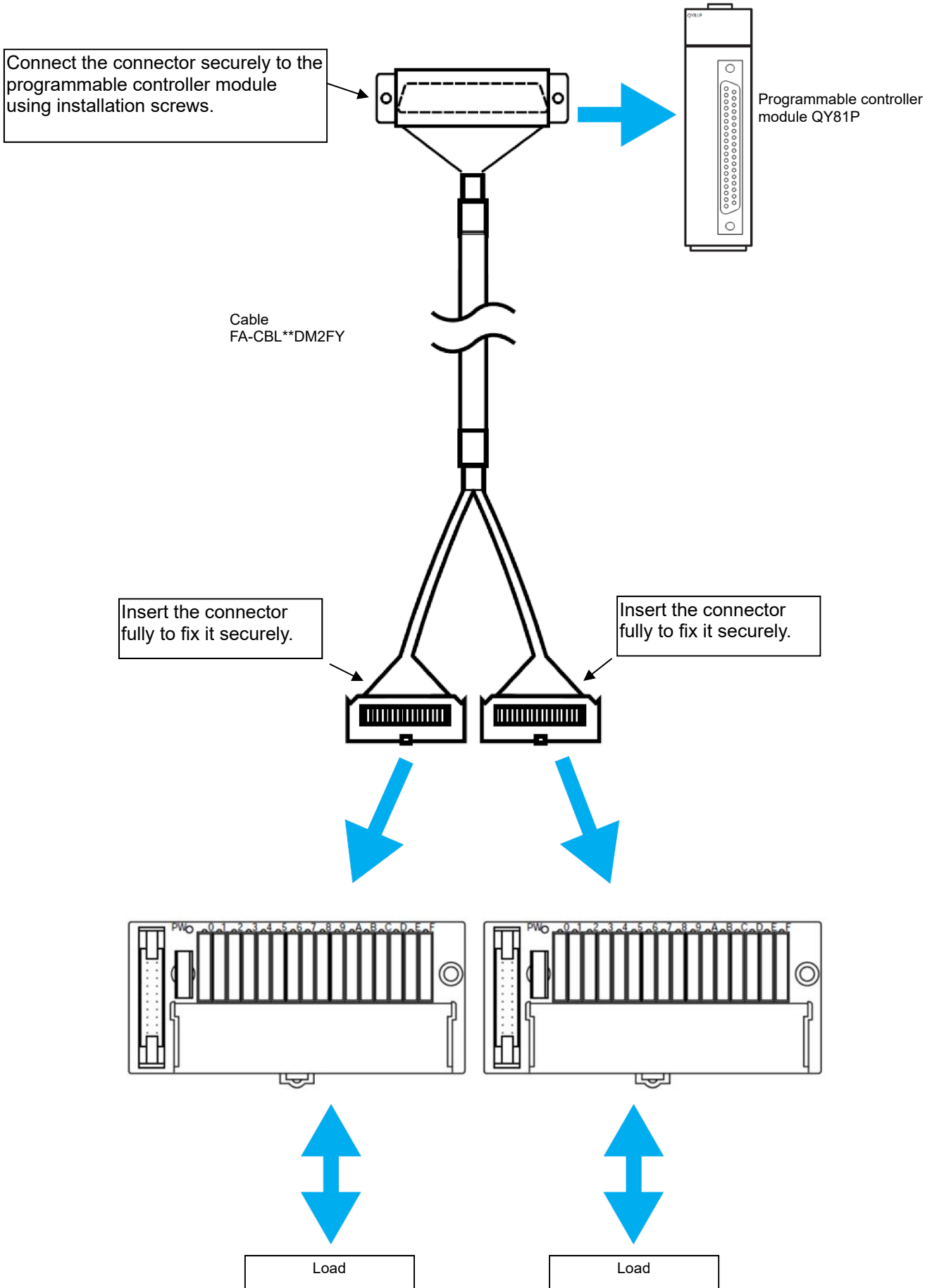
7-2-3. When a cable with a 20P connector is used

(1) When connecting the FA-CBL**MMH20 cable

CC-Link/LT remote I/O,
CL2Y16-TP1M1V

Cable
FA-CBL**MMH20

Insert the connector
fully to fix it securely.

Load
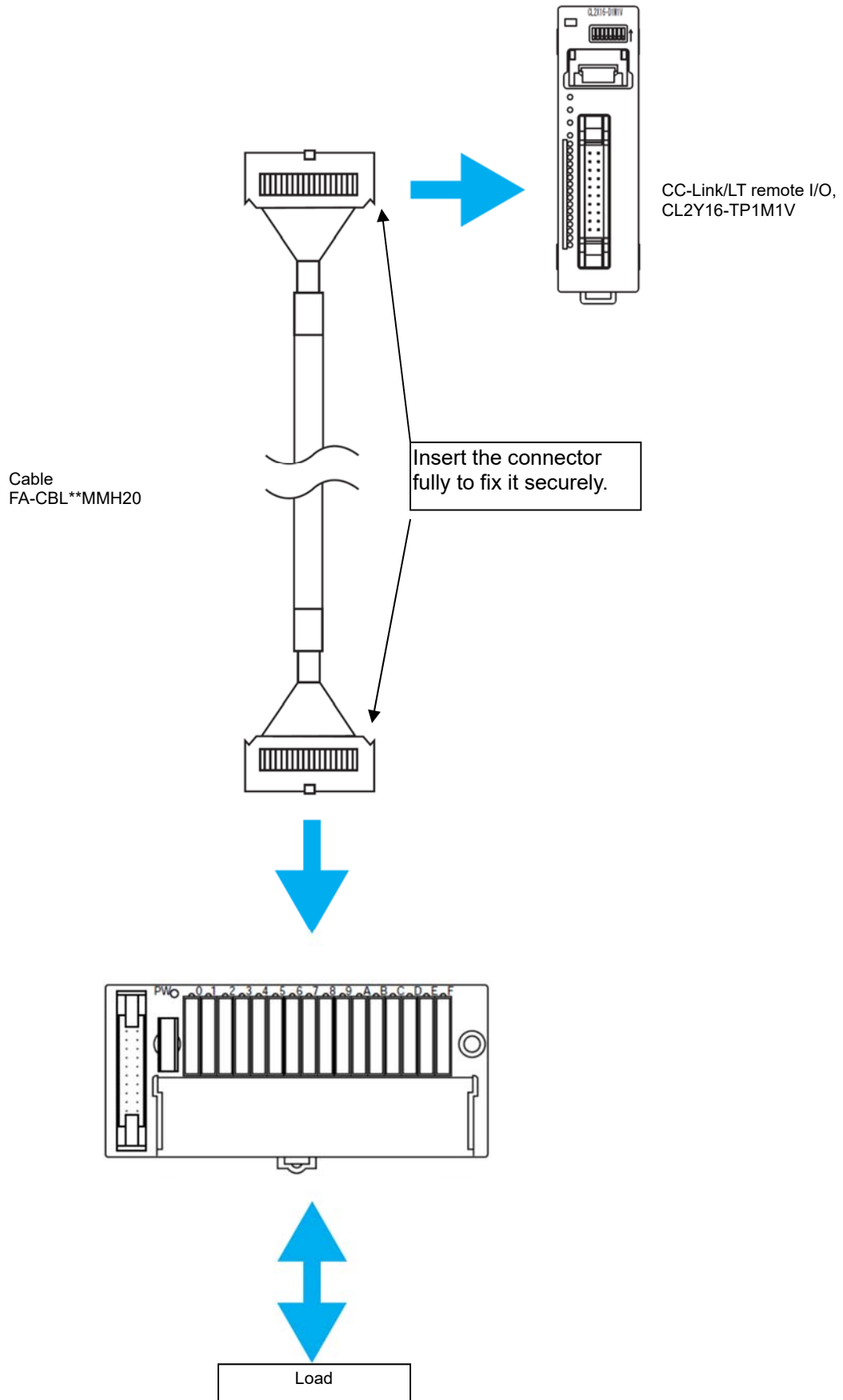
(2) When connecting the FA-FXCBL**MMH20, FA2-CB1L**MM1H20* cable

Programmable controller module FX5UC-32MT/D, other

Insert the connector fully to fix it securely.

Cable
FA-FXCBL**MMH20
FA2-CB1L**MM1H20E
FA2-CB1LT**MM1H20
FA2-CB1LT**MM1H20E

Load
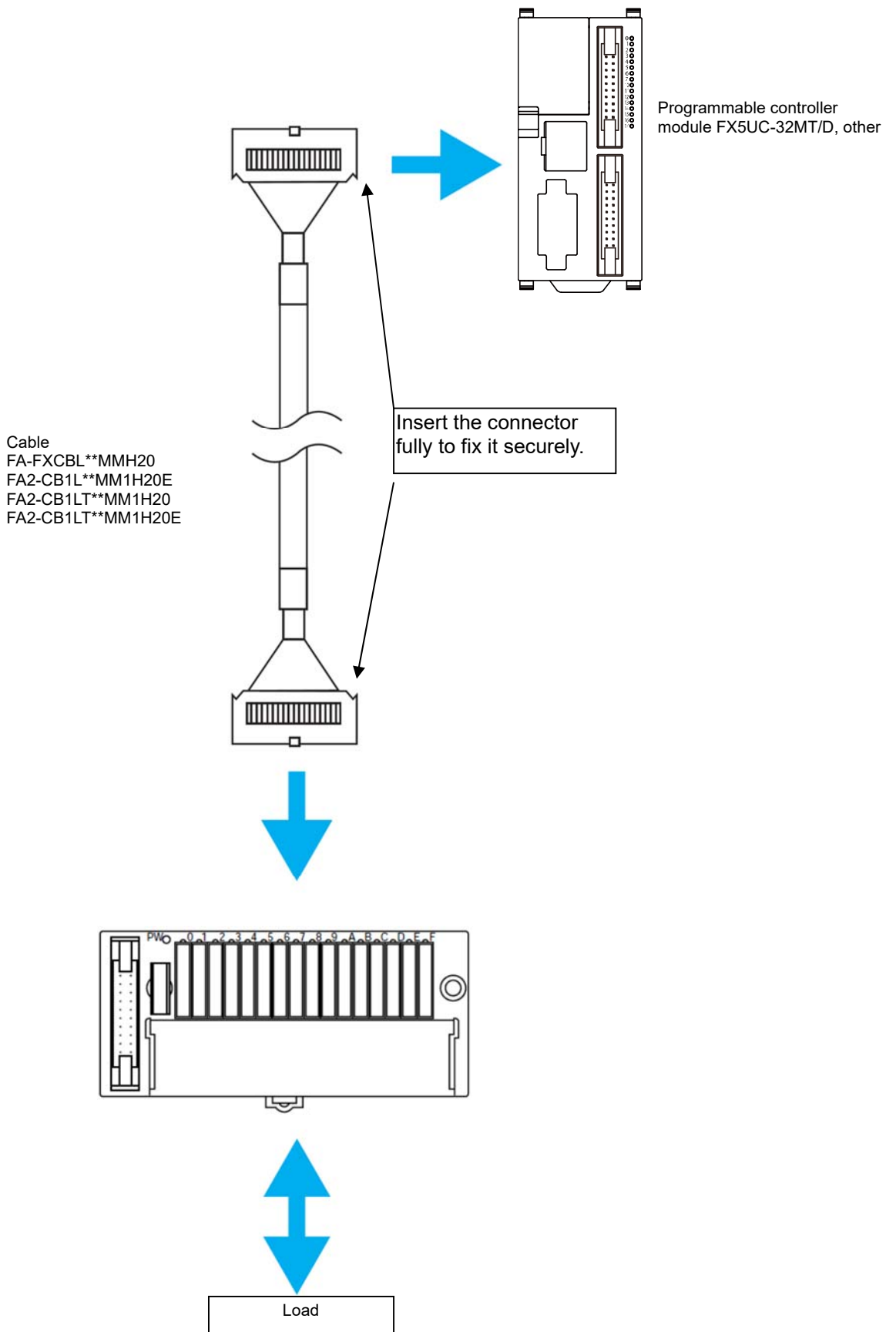
7-3. A common terminal can be shared by using short-circuit lines (FA1-TH16Y**S1E、FA1-TH1E16Y**S1E)

EXTERNAL CONNECTION EXAMPLE : FA1-TH16Y2RA20S1E common to Y0 to Y7, Y8 to YF is shared.

Share common terminal using FA1-SC1W006F-15
All points independent → 8 points/common (1-wire type) x2

2RA : 2A/1 contact , 8A/common
1SR : 1A/1 contact , 8A/common
1TR : 1A/1 contact , 8A/common
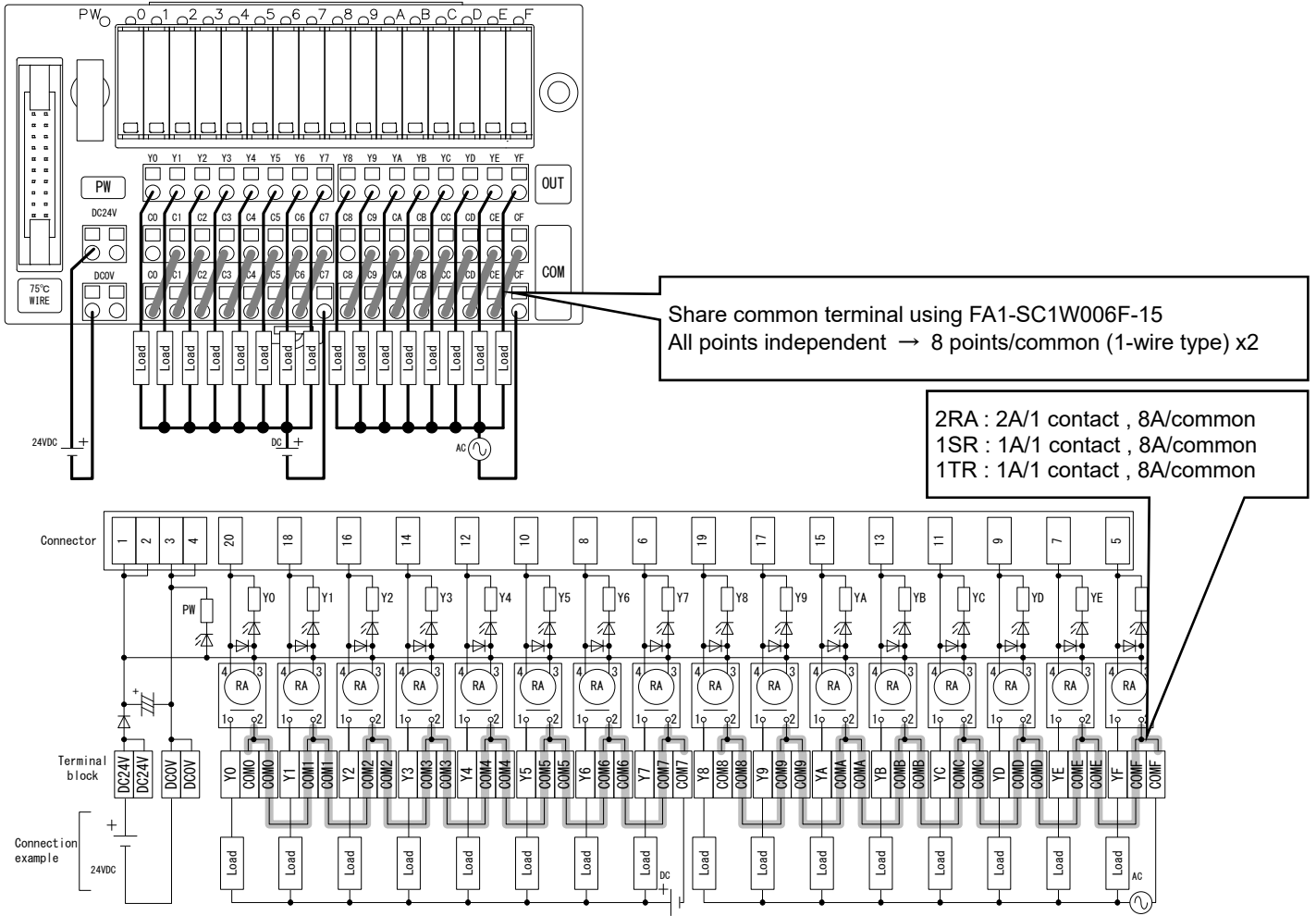
7-4. How to use the extraction tool (FA-TH16Y**S/SL, FA-THE16Y**S, FA-FXTH16Y**S, FA1-TH1E16Y**S, FA1-TH/TH1E**S1E)

■How to remove the extraction tool from the case

Remove the tool from the case using your fingers as shown below.
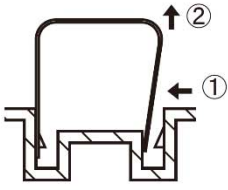
■How to install the extraction tool to the case

Install the tool to the case using your fingers as shown below.
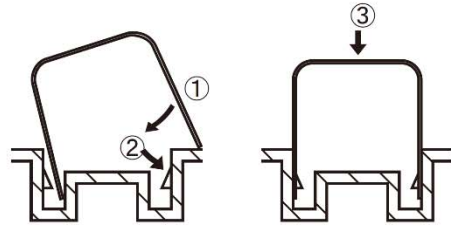
■How to remove the relay from the socket

Insert the tool into the relay and pull out using your fingers as shown below.
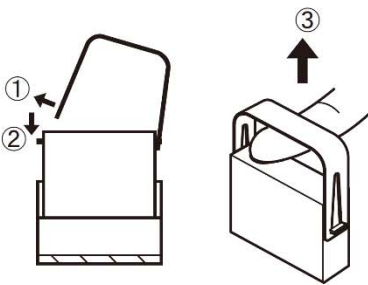
■How to insert the relay into the socket

Insert the tool into the relay, and then insert the relay into the socket.
After insertion, remove the tool from the relay.
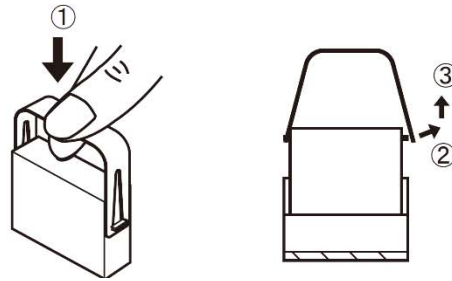
8. EXTERNAL CONNECTION EXAMPLE

8-1. FA-TH16YRA11, FA-TH16YRA11S
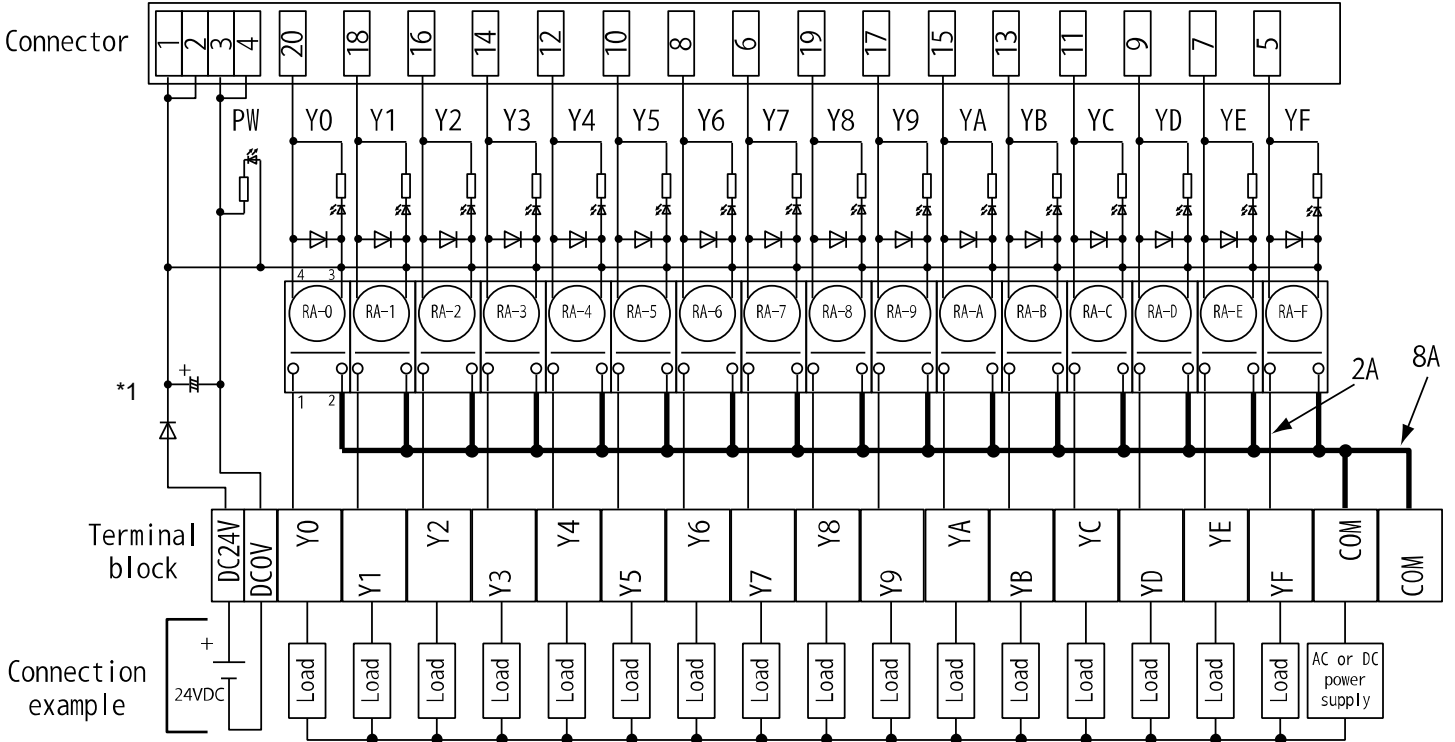
*1: A capacitor is not mounted on the FA-TH16YRA11.

8-2. FA-TH16YRA20, FA-TH16YRA20S
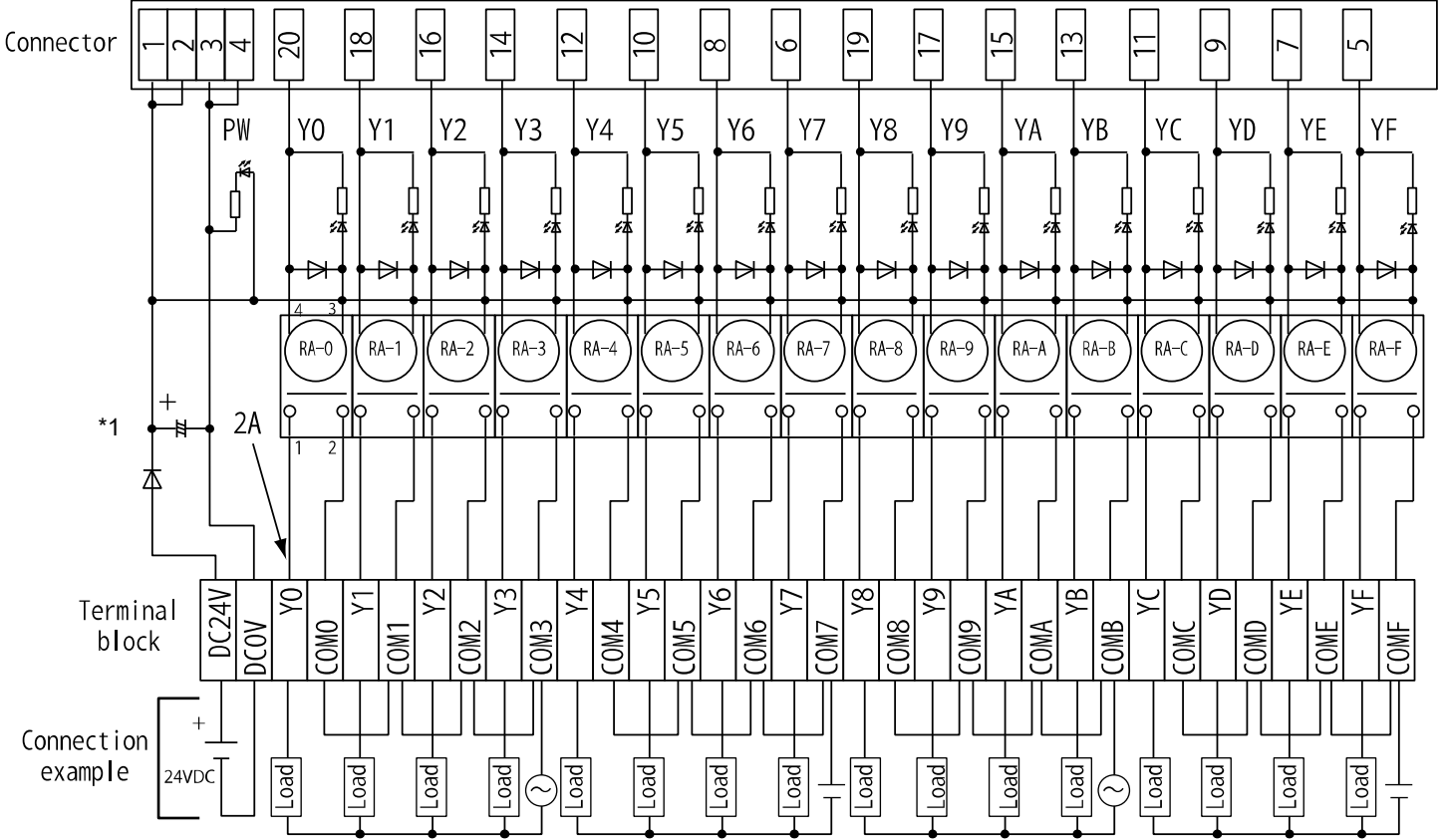
*1: A capacitor is not mounted on the FA-TH16YRA20.

8-3. FA-TH16YRA20SL
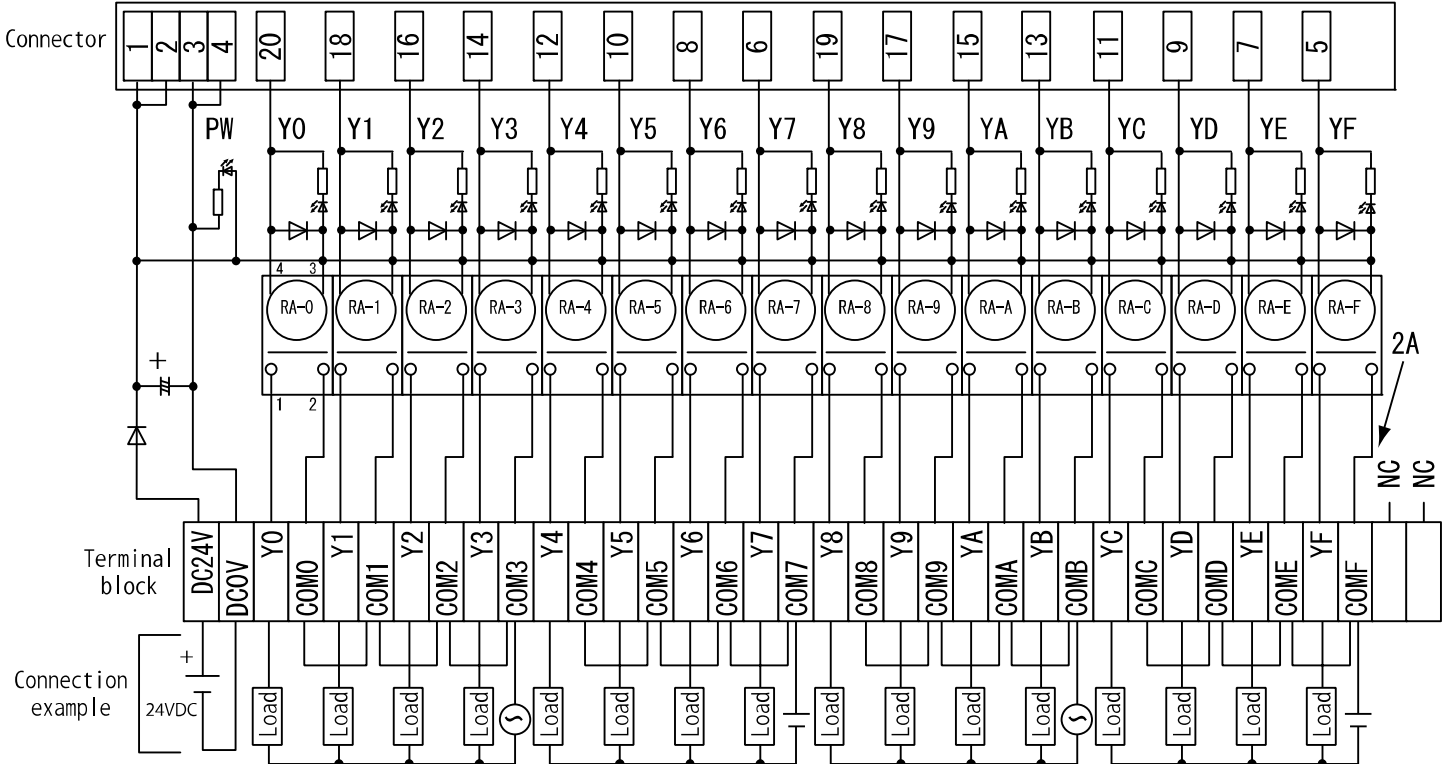
8-4. FA-TH16YRAB20SL
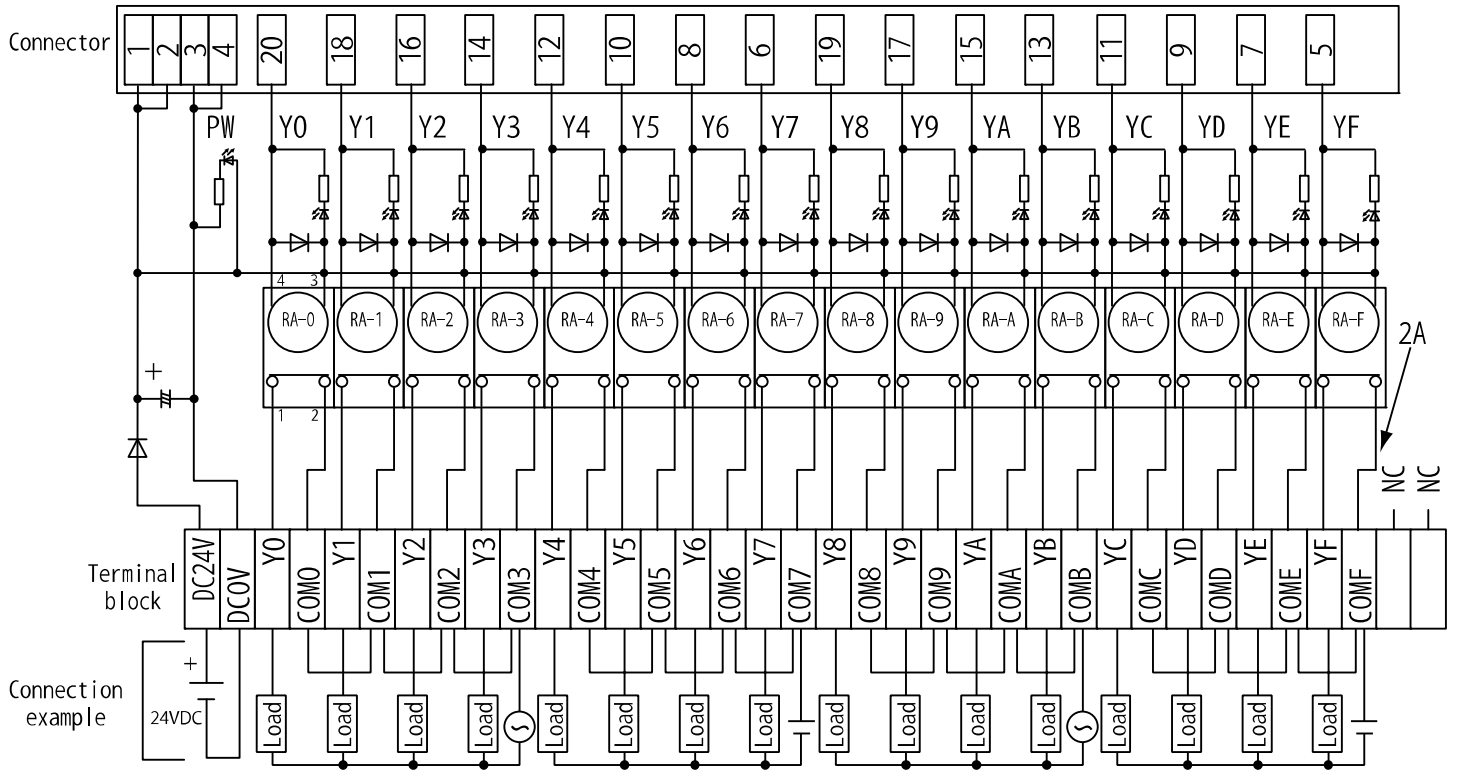
8-5. FA-TH16YRAC20S
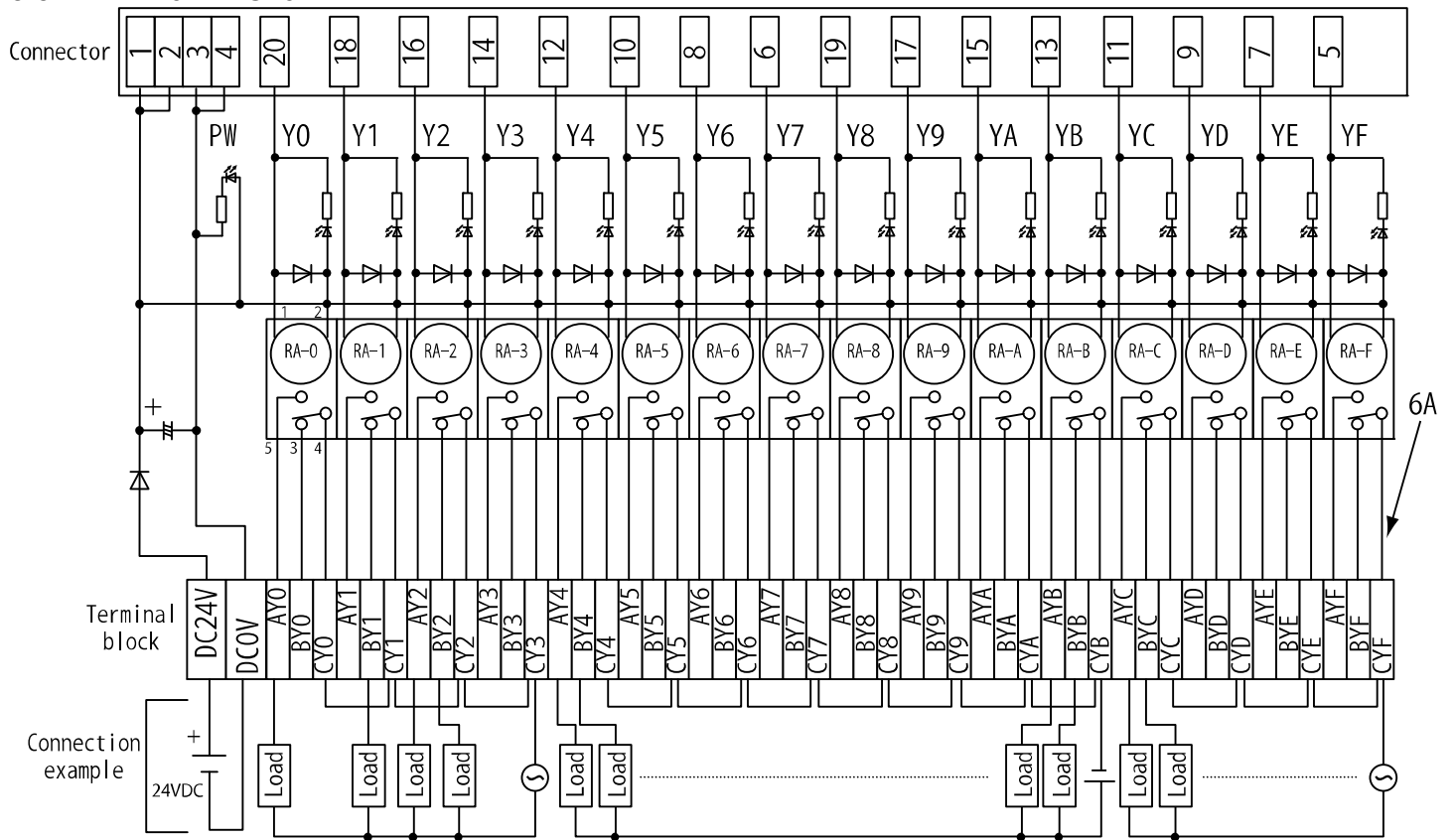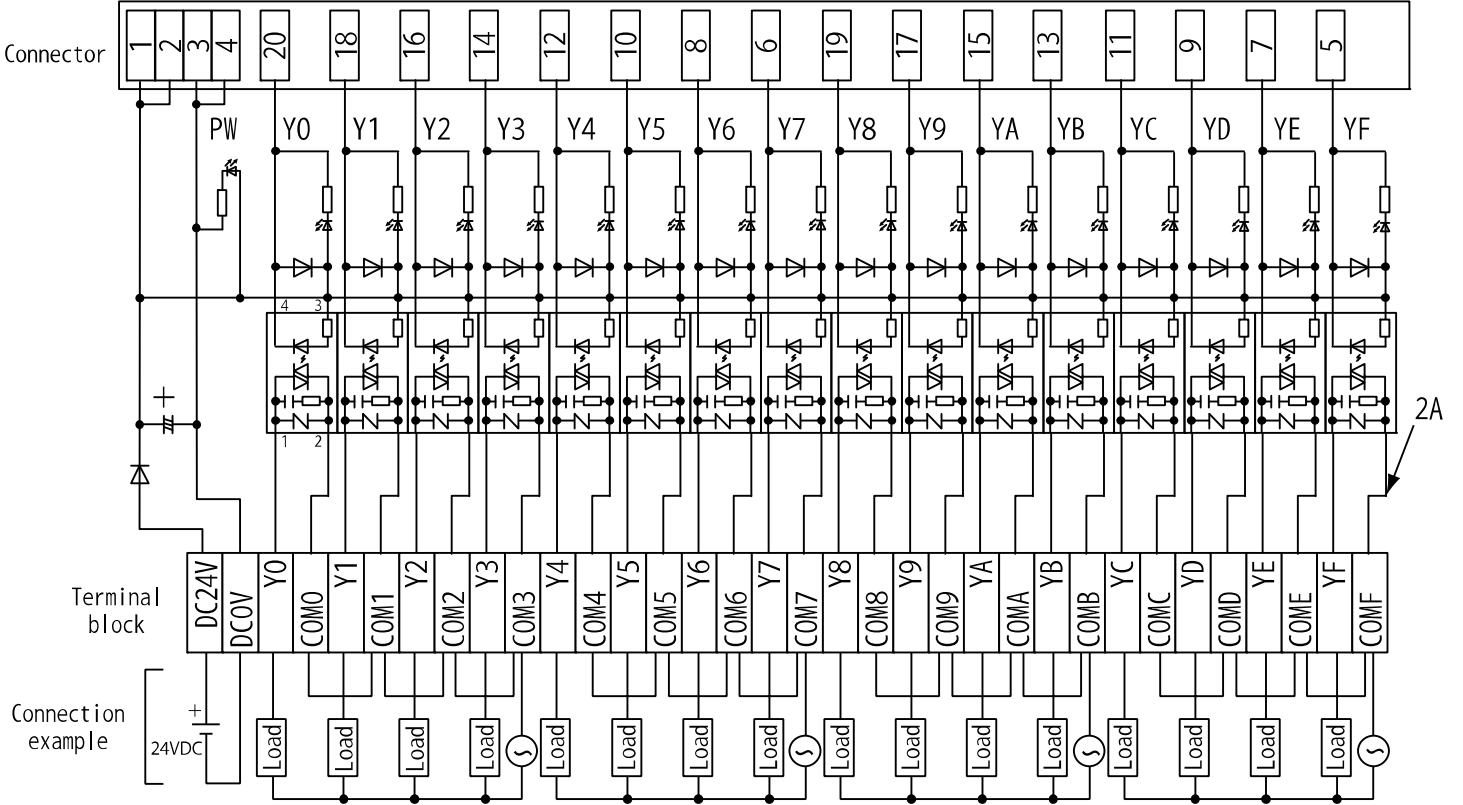
8-6. FA-TH16YRA21, FA-TH16YRA21S
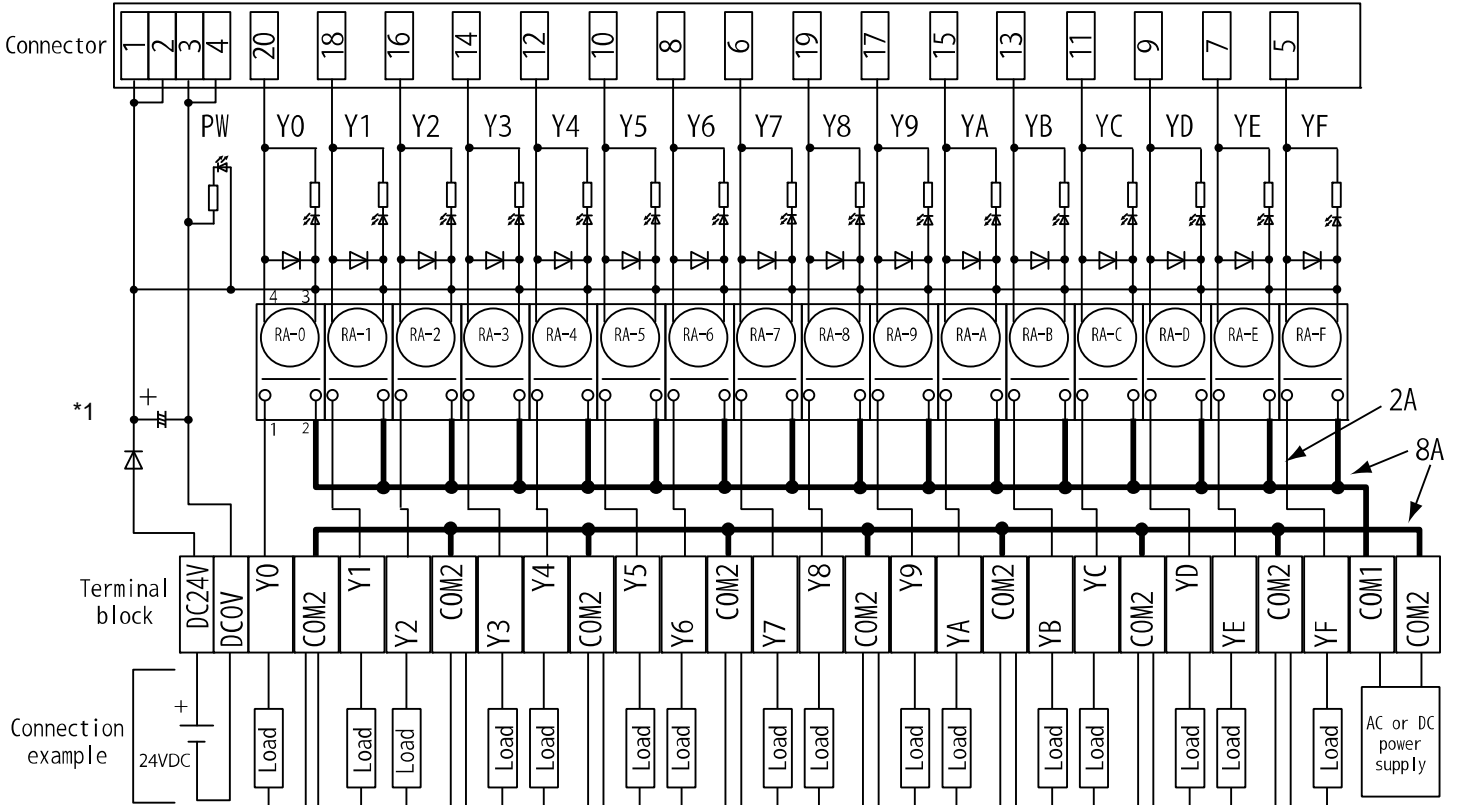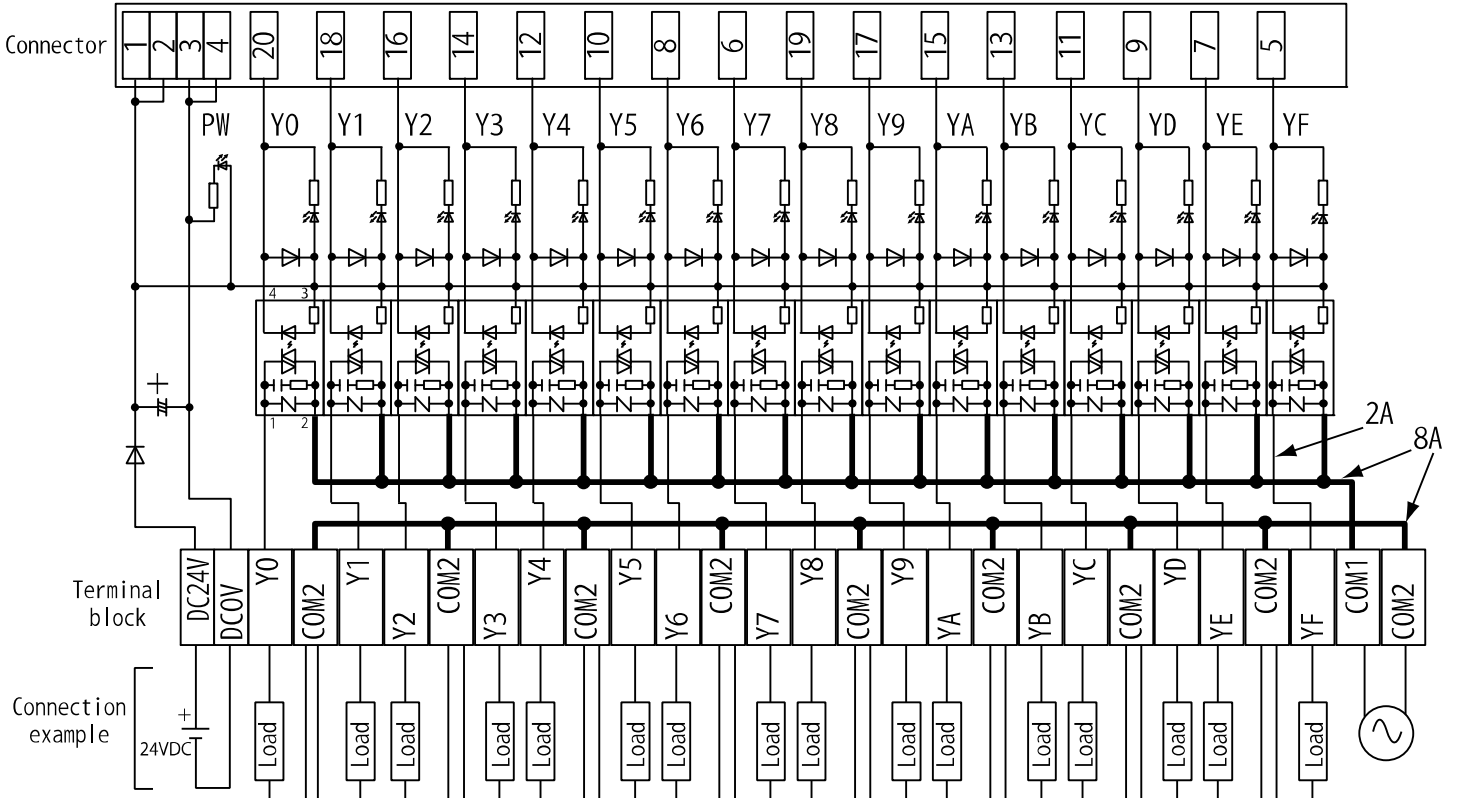

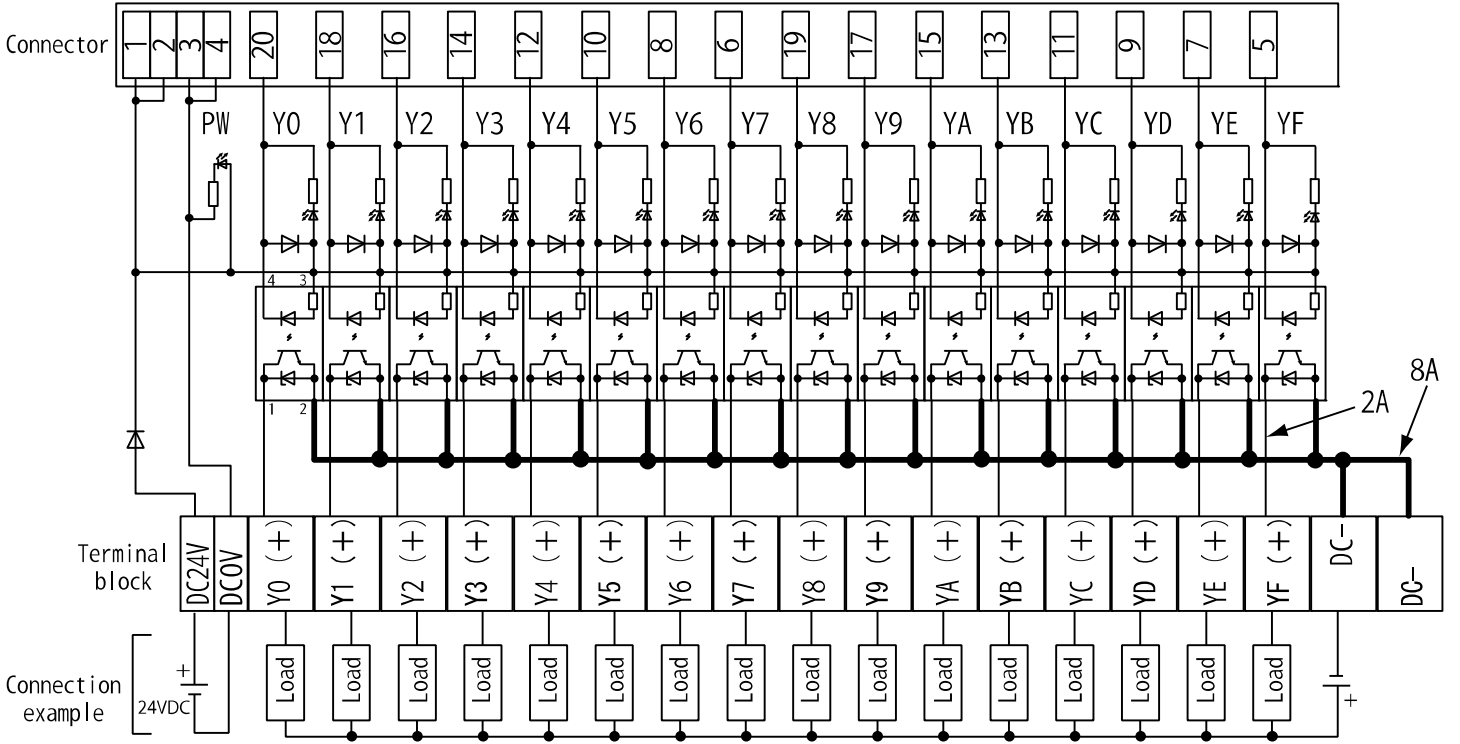*1: A capacitor is not mounted on the FA-TH16YRA21.
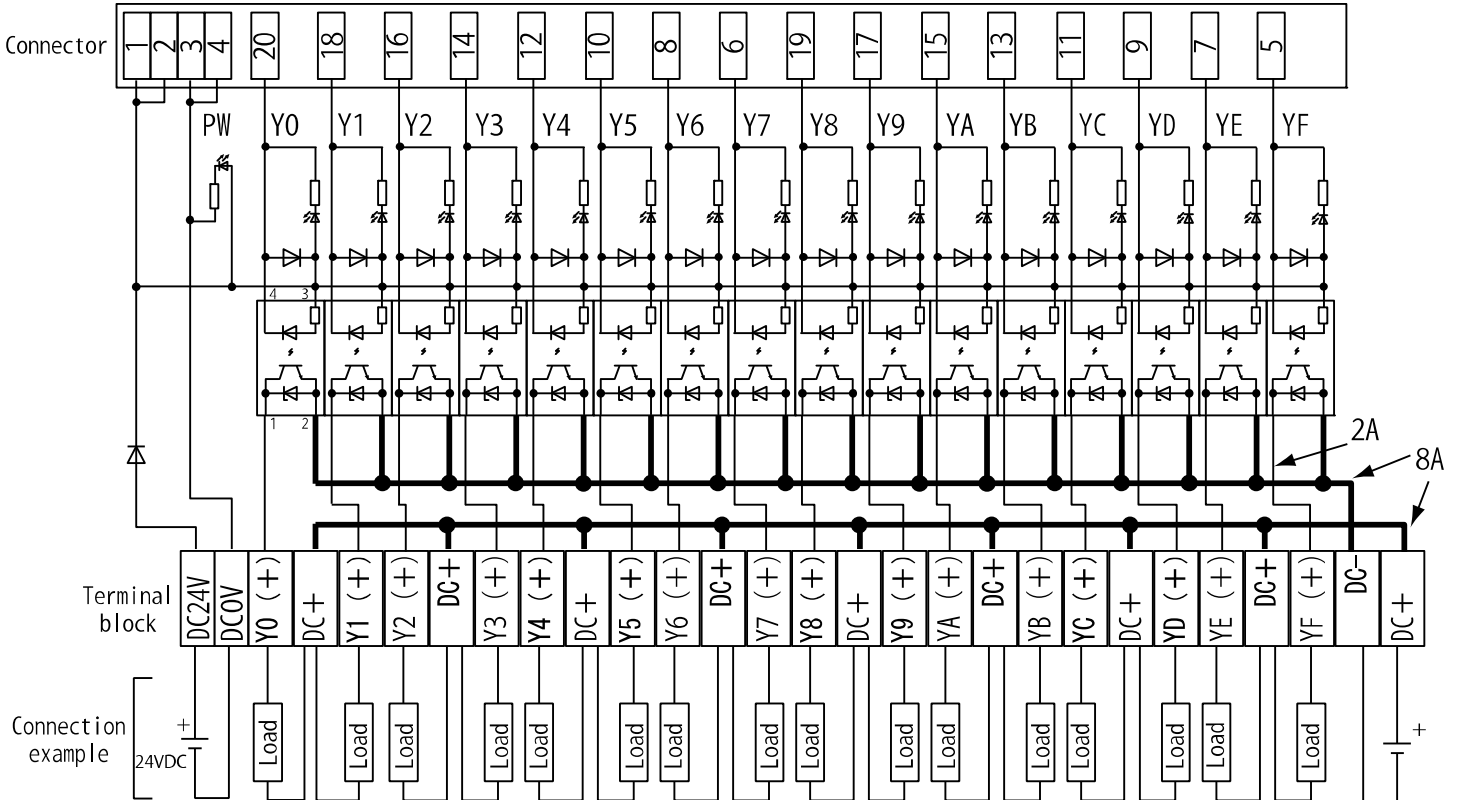
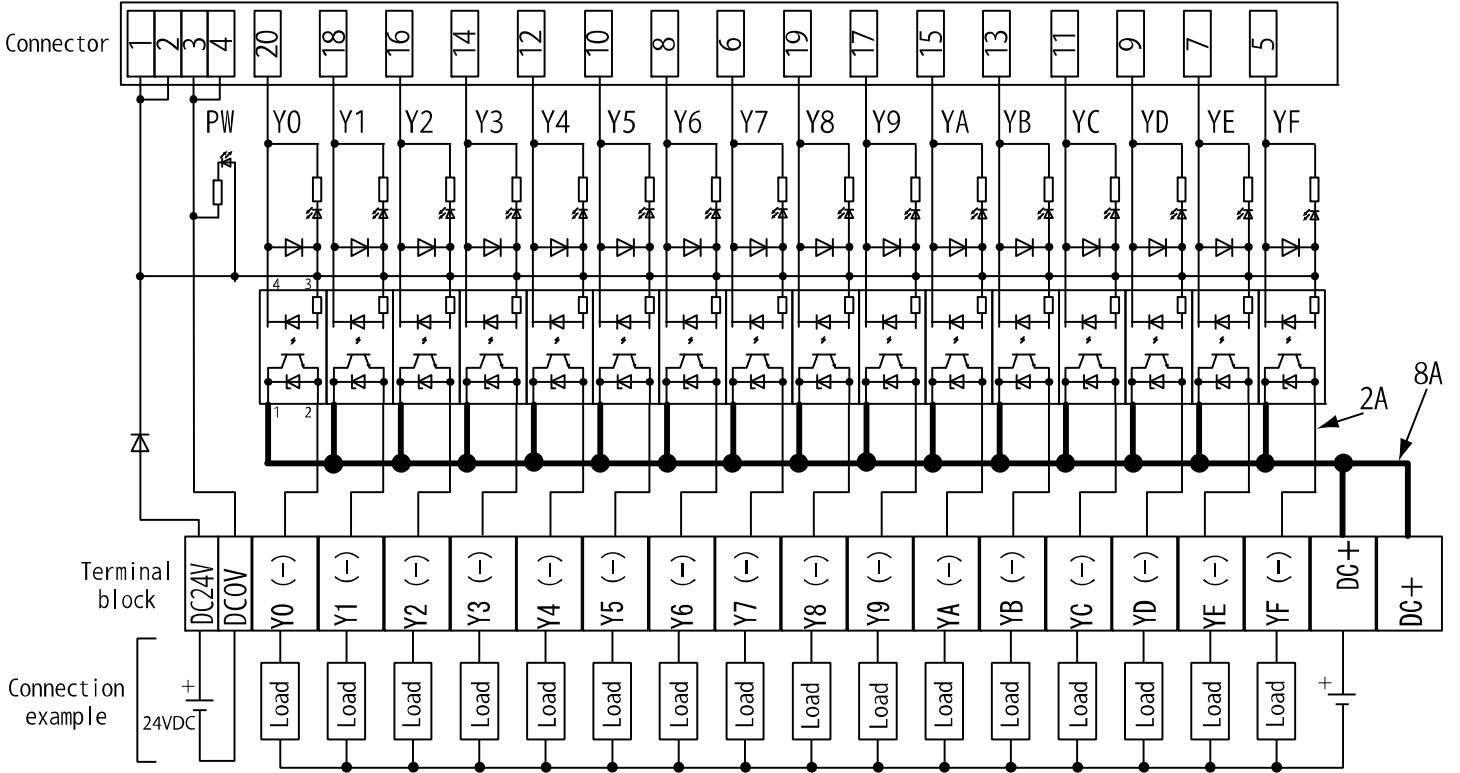## 8-7. FA-TH16YSR11S
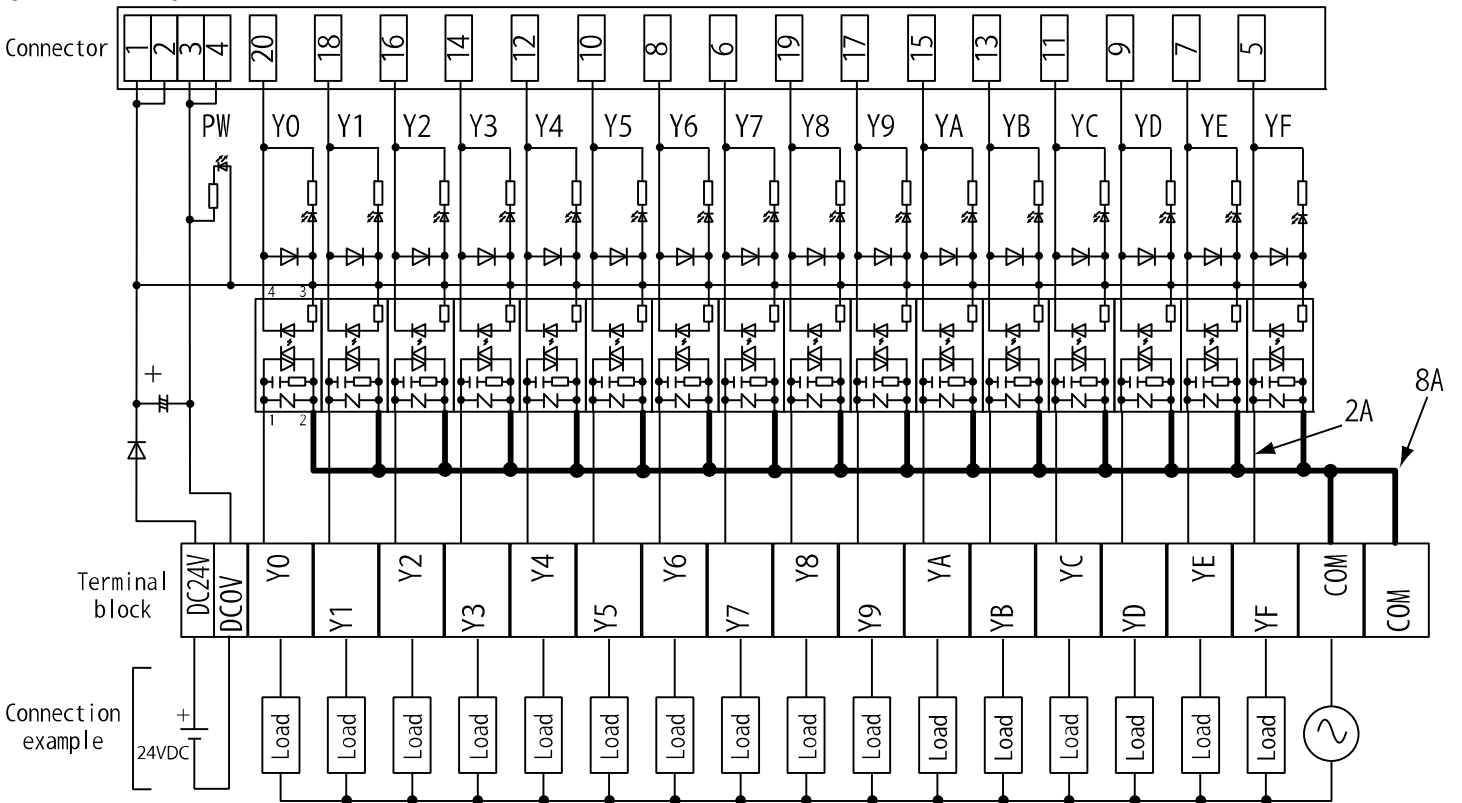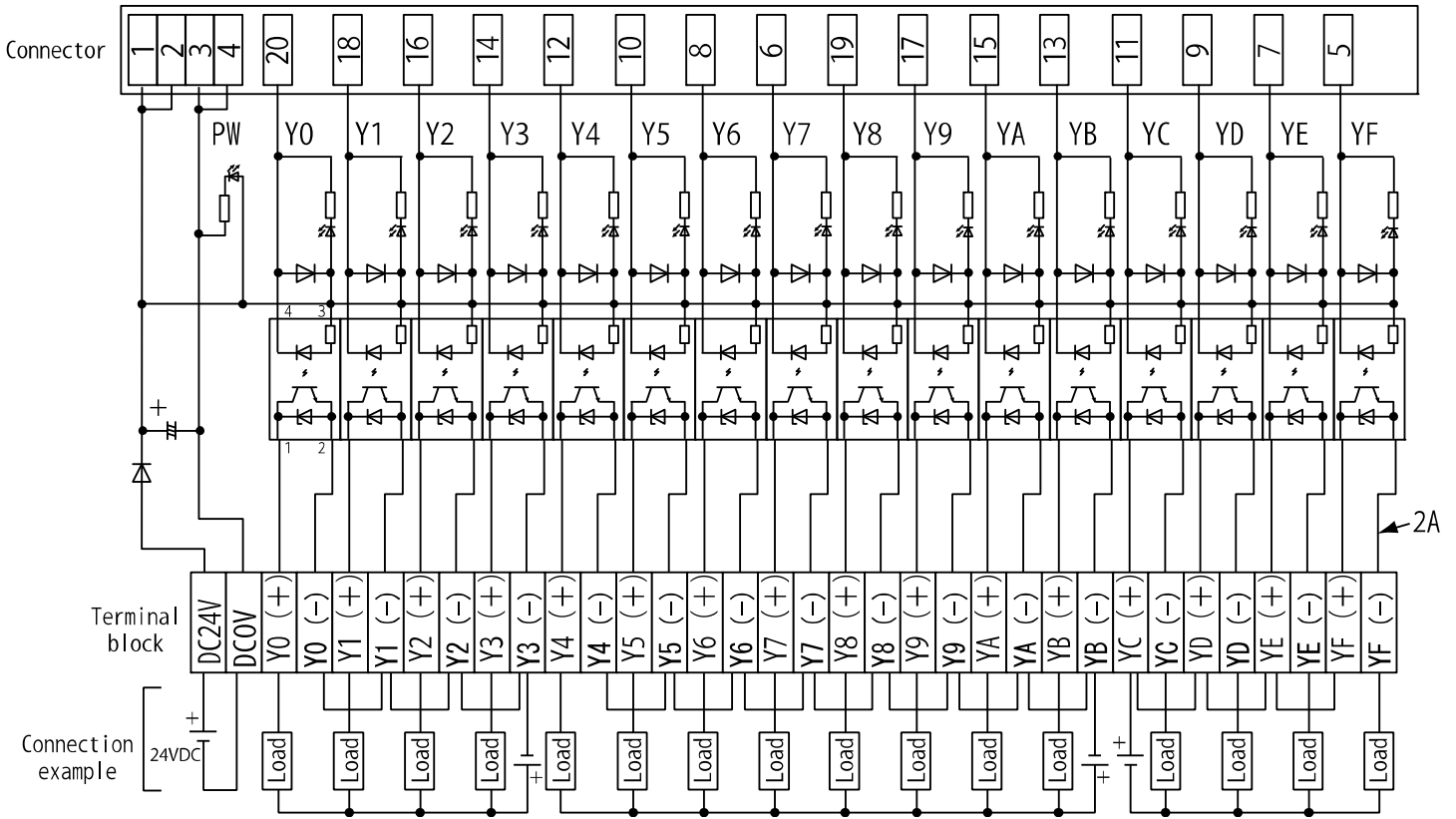
8-8. FA-TH16YSR20S

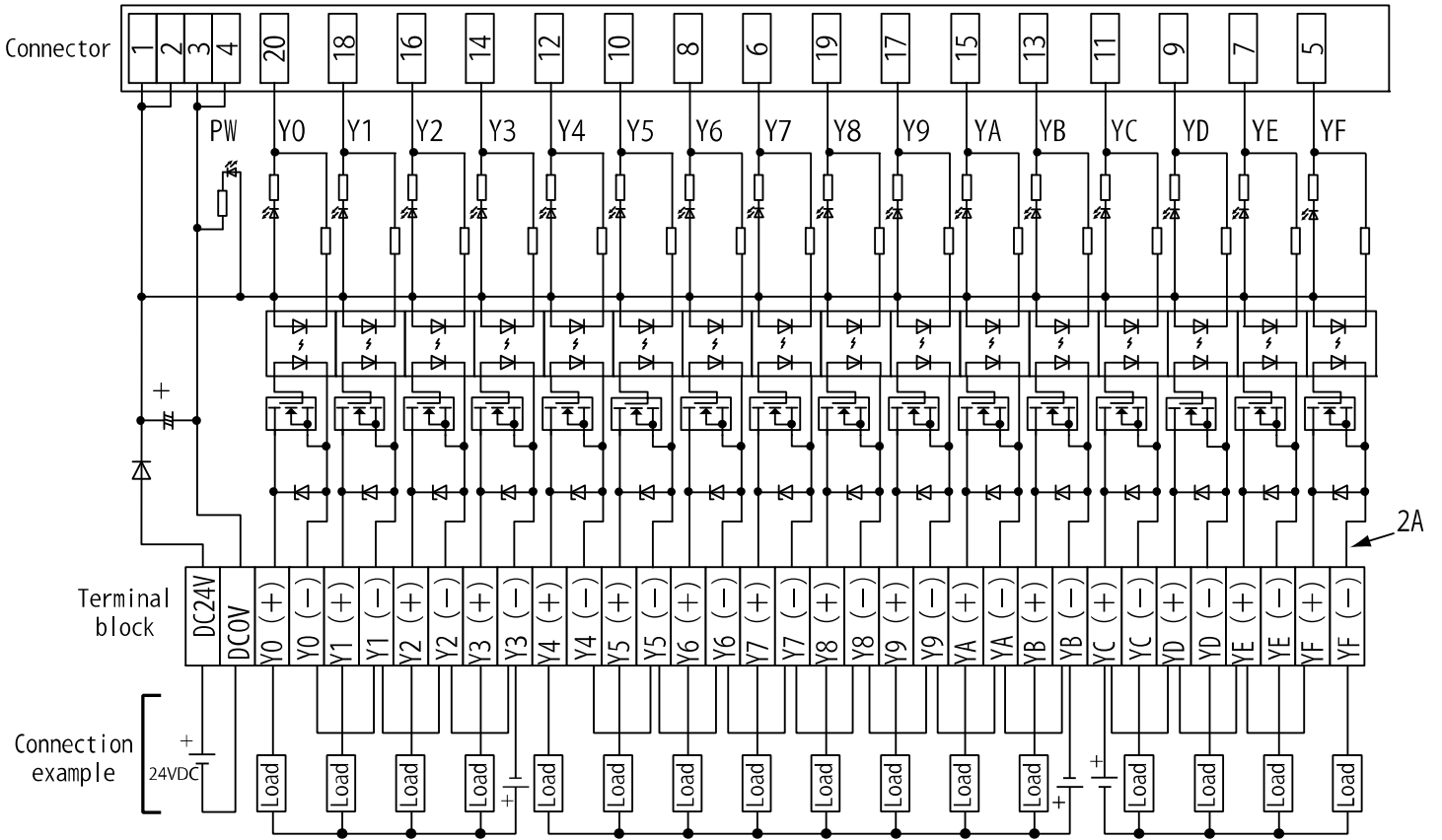## 8-9. FA-TH16YSR21S

8-10. FA-TH16YTL11S

8-11. FA-TH16YTL21S

51

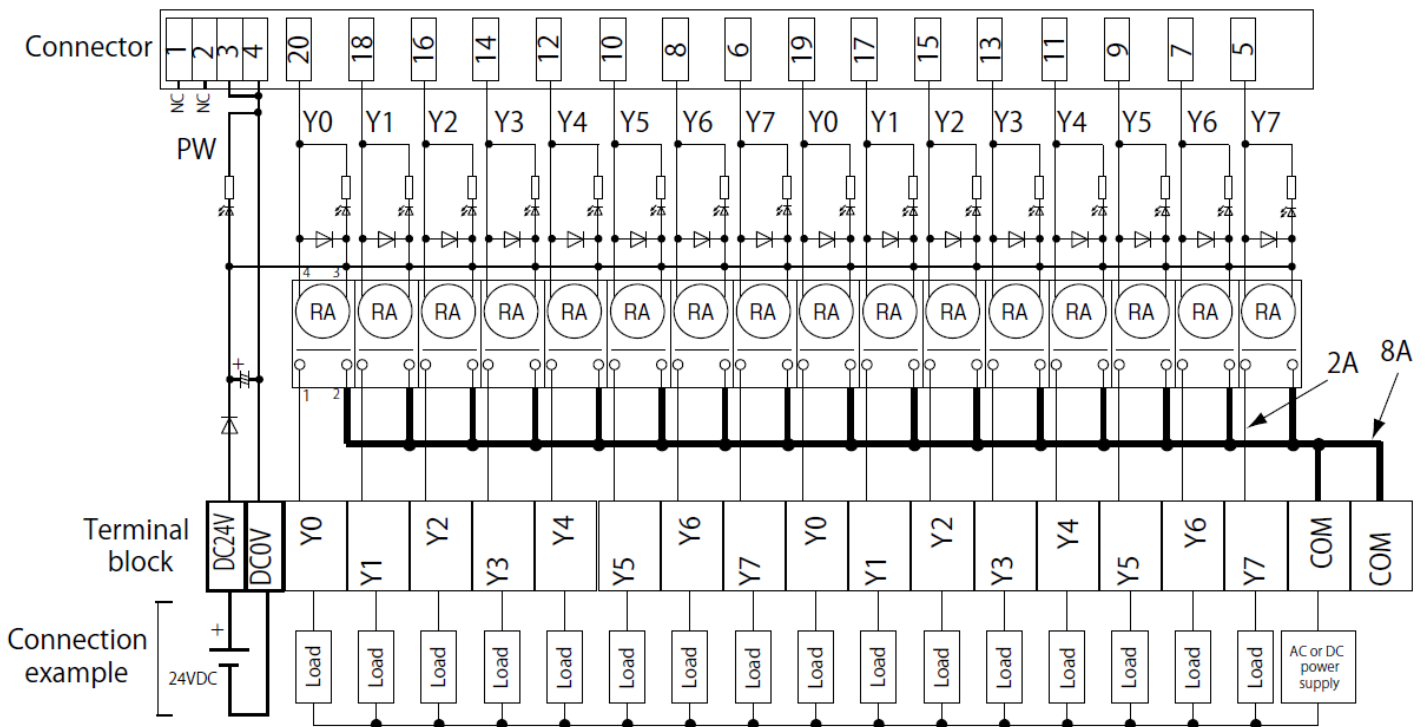## 8-12. FA-TH16YTH11S

8-13. FA-TH16YTR20S

8-14. FA-TH16Y2TR20

Connector: 1 2 3 4 | 20 18 16 14 12 10 8 6 19 17 15 13 11 9 7 5

PW | Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 YA YB YC YD YE YF

2A

Terminal block: DC24V DC0V | Y0(+) Y0(−) Y1(+) Y1(−) Y2(+) Y2(−) Y3(+) Y3(−) Y4(+) Y4(−) Y5(+) Y5(−) Y6(+) Y6(−) Y7(+) Y7(−) Y8(+) Y8(−) Y9(+) Y9(−) YA(+) YA(−) YB(+) YB(−) YC(+) YC(−) YD(+) YD(−) YE(+) YE(−) YF(+) YF(−)

Connection example: 24VDC | Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load

8-15. FA-THE16YTH11S

Connector: 1 2 3 4 | 20 18 16 14 12 10 8 6 19 17 15 13 11 9 7 5

PW | Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 YA YB YC YD YE YF

2A 8A

Terminal block: DC24V DC0V | Y0(−) Y1(−) Y2(−) Y3(−) Y4(−) Y5(−) Y6(−) Y7(−) Y8(−) Y9(−) YA(−) YB(−) YC(−) YD(−) YE(−) YF(−) DC+ DC+

Connection example: 24VDC | Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load

53

8-16. FA-THE16YTR20S

Connector

| 1 | 2 | 3 | 4 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 19 | 17 | 15 | 13 | 11 | 9 | 7 | 5 |

PW　Y0　Y1　Y2　Y3　Y4　Y5　Y6　Y7　Y8　Y9　YA　YB　YC　YD　YE　YF

2A

Terminal block

DC24V DC0V Y0(+) Y0(-) Y1(+) Y1(-) Y2(+) Y2(-) Y3(+) Y3(-) Y4(+) Y4(-) Y5(+) Y5(-) Y6(+) Y6(-) Y7(+) Y7(-) Y8(+) Y8(-) Y9(+) Y9(-) YA(+) YA(-) YB(+) YB(-) YC(+) YC(-) YD(+) YD(-) YE(+) YE(-) YF(+) YF(-)

Connection example

24VDC

Load

8-17. FA-FXTH16YRA11S

Connector

| 1 | 2 | 3 | 4 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 19 | 17 | 15 | 13 | 11 | 9 | 7 | 5 |

NC NC

PW

Y0　Y1　Y2　Y3　Y4　Y5　Y6　Y7　Y0　Y1　Y2　Y3　Y4　Y5　Y6　Y7

RA

2A　8A

Terminal block

DC24V DC0V Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 COM COM

Connection example
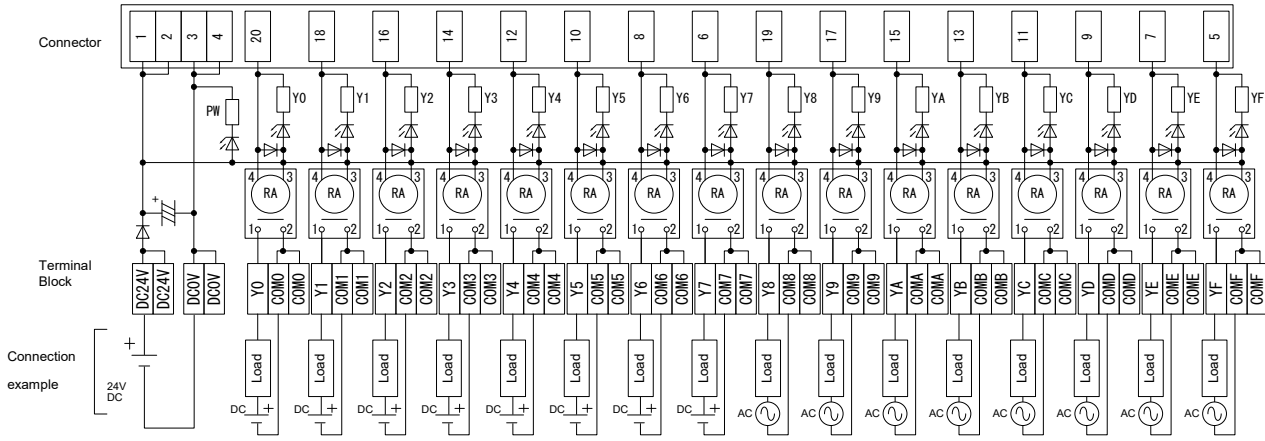
24VDC

Load

AC or DC power supply
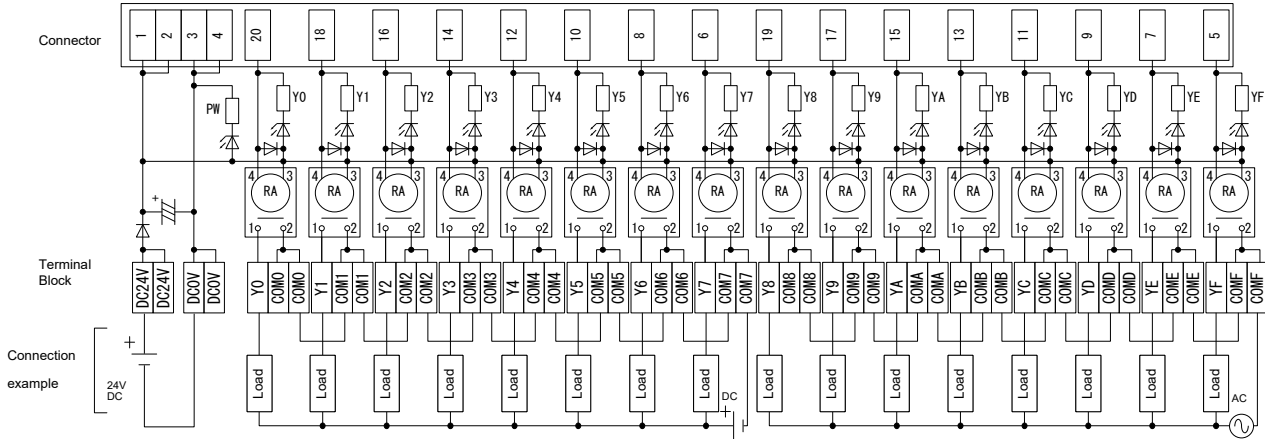
54

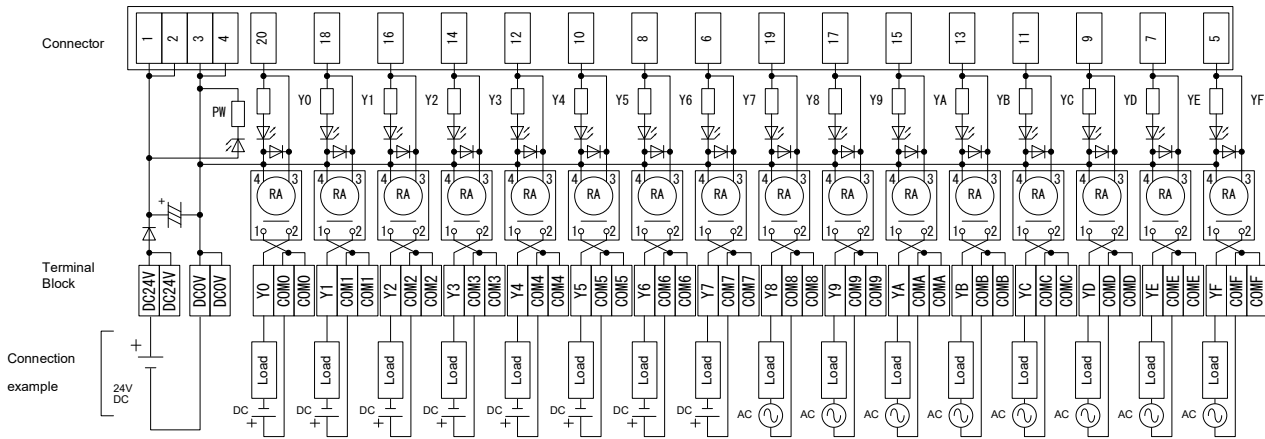## 8-18. FA-FXTH16YRA20, FA-FXTH16YRA20S

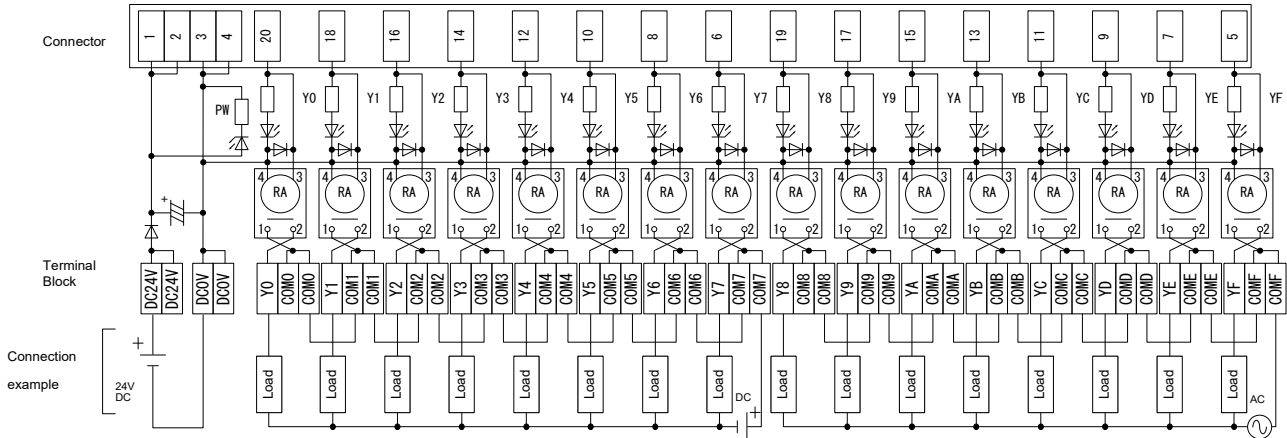

8-19. FA1-TH1E16Y2RA20S
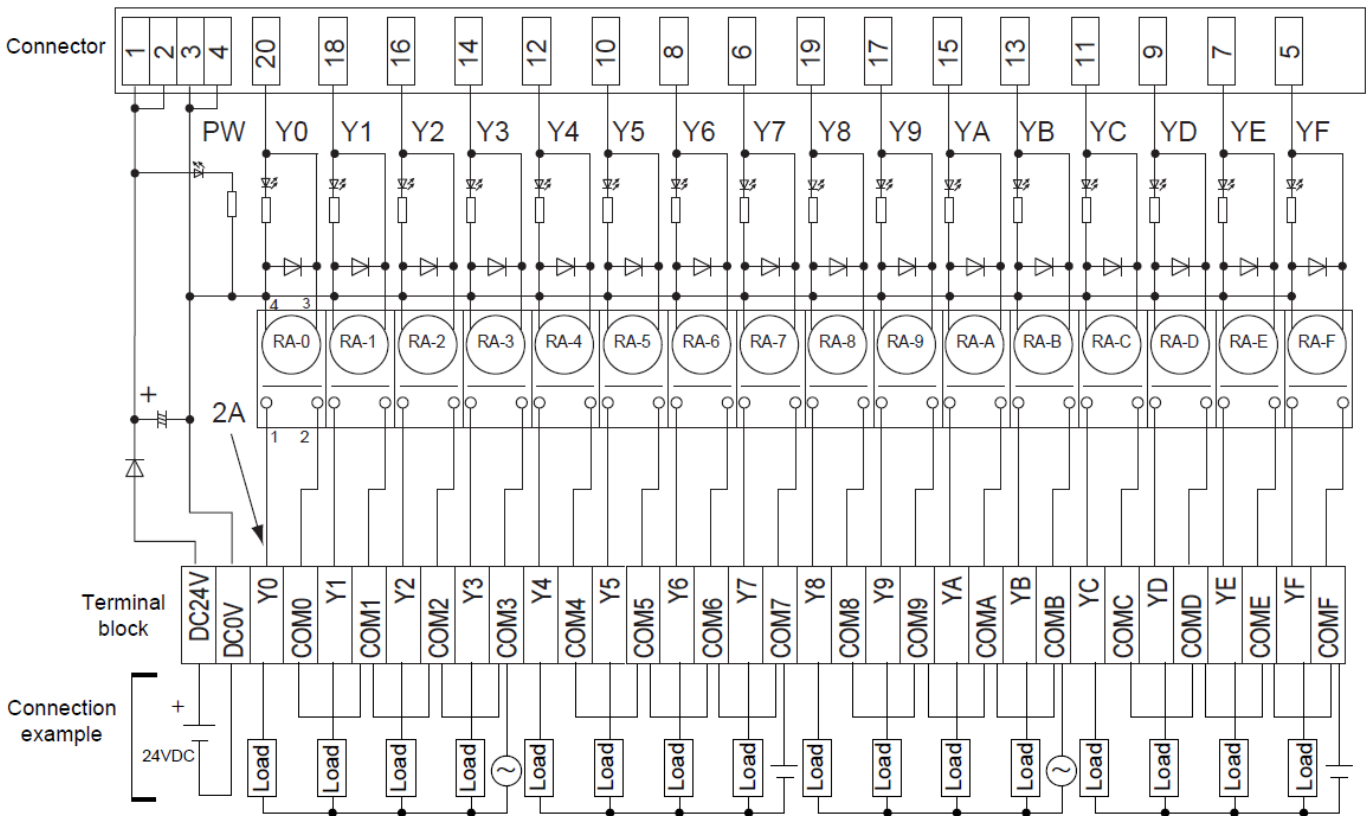
8-20. FA1-TH16Y2RA20S1E

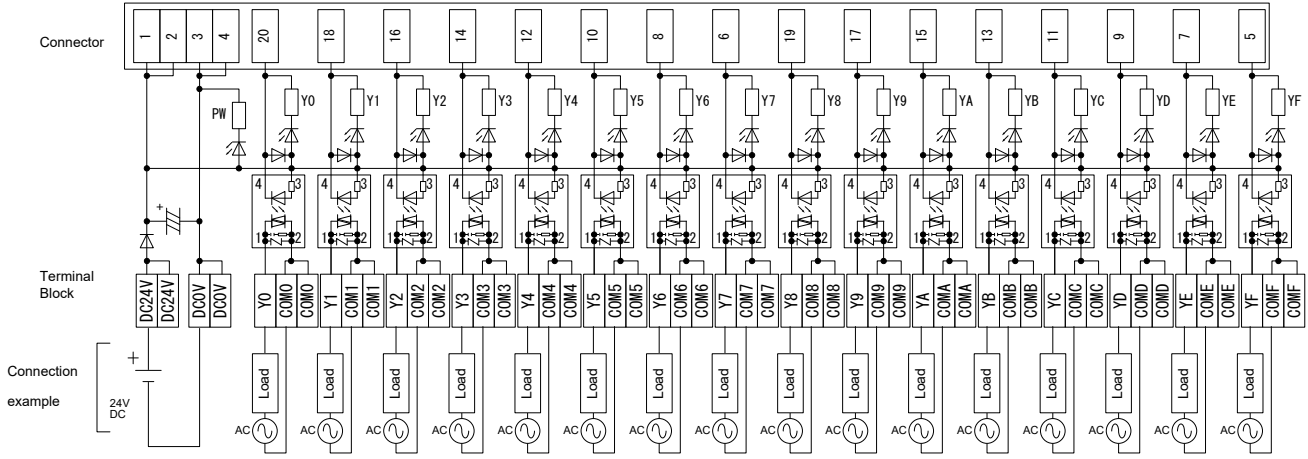Example: 8 points/common (1-wire type) x2

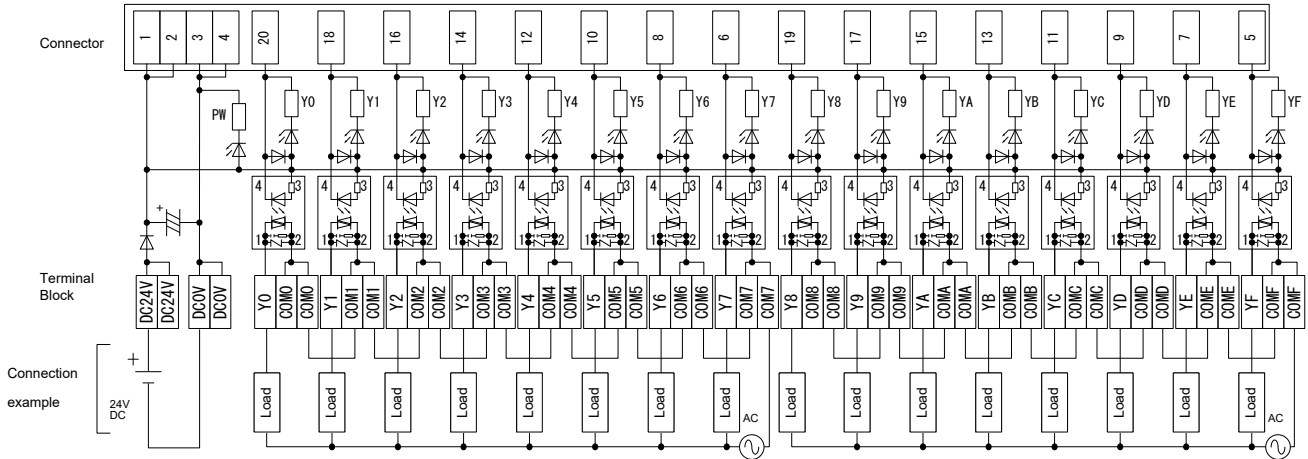## 8-21. FA1-TH1E16Y2RA20S1E
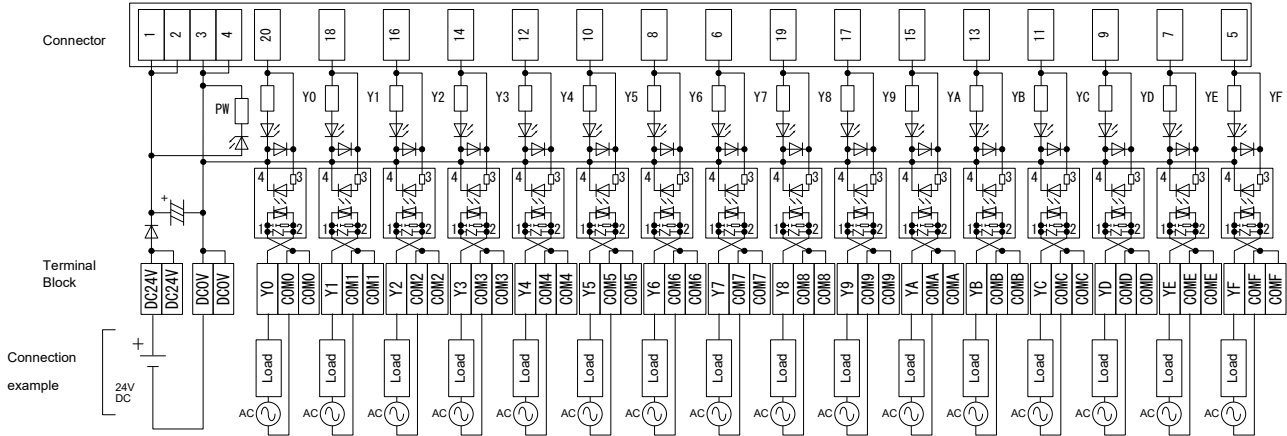
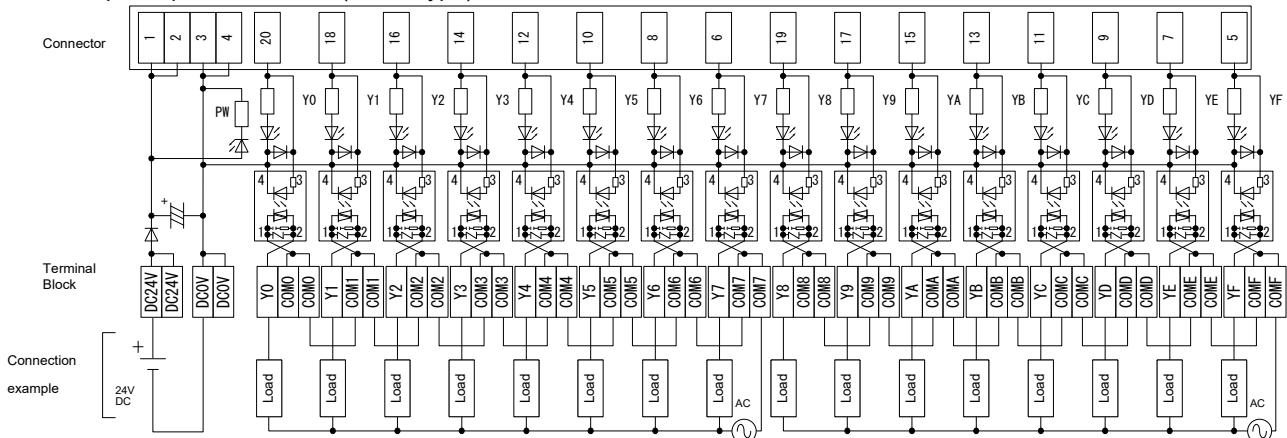Example: 8 points/common (1-wire type) x2

8-22. FA1-TH16Y1SR20S1E
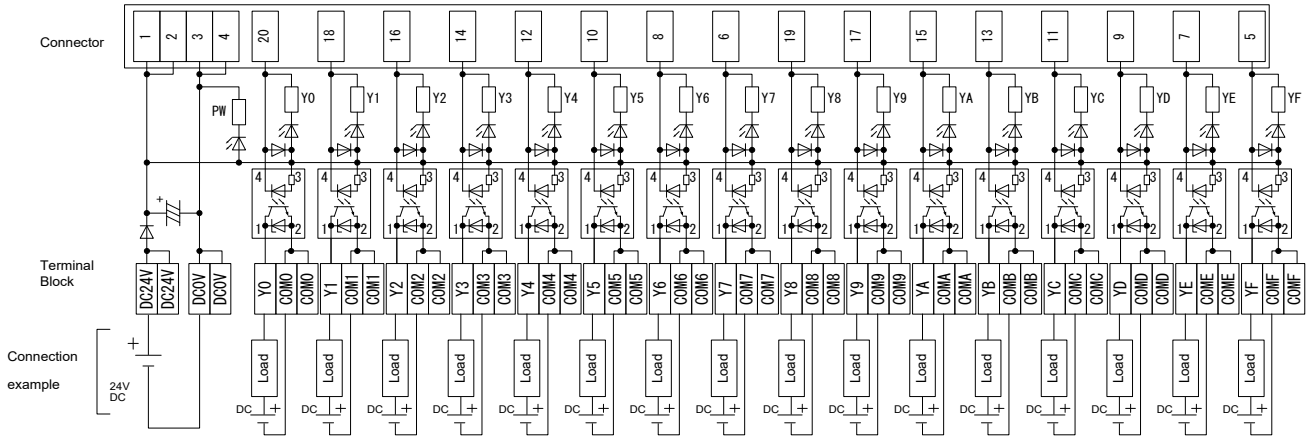

Example: 8 points/common (1-wire type) x2

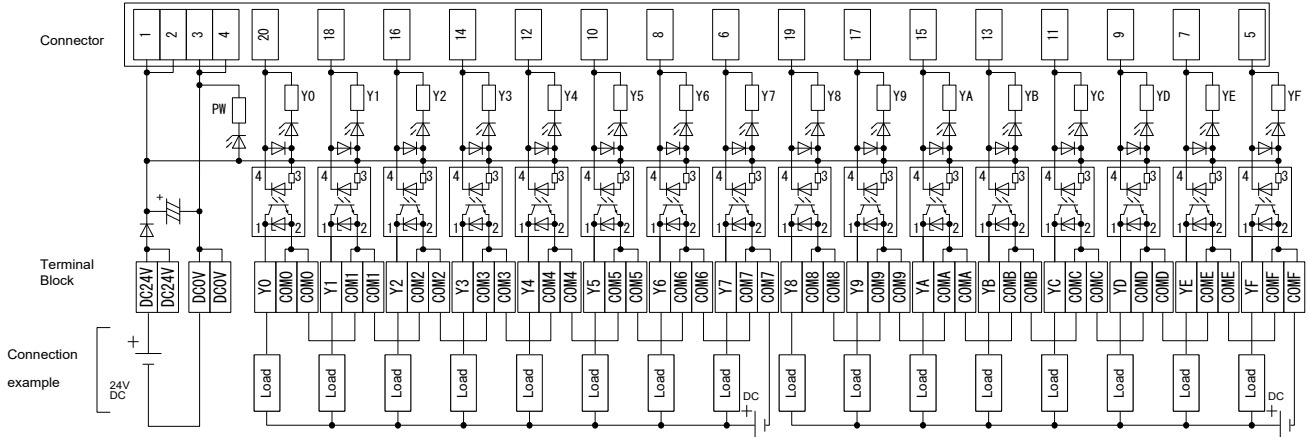## 8-23. FA1-TH1E16Y1SR20S1E

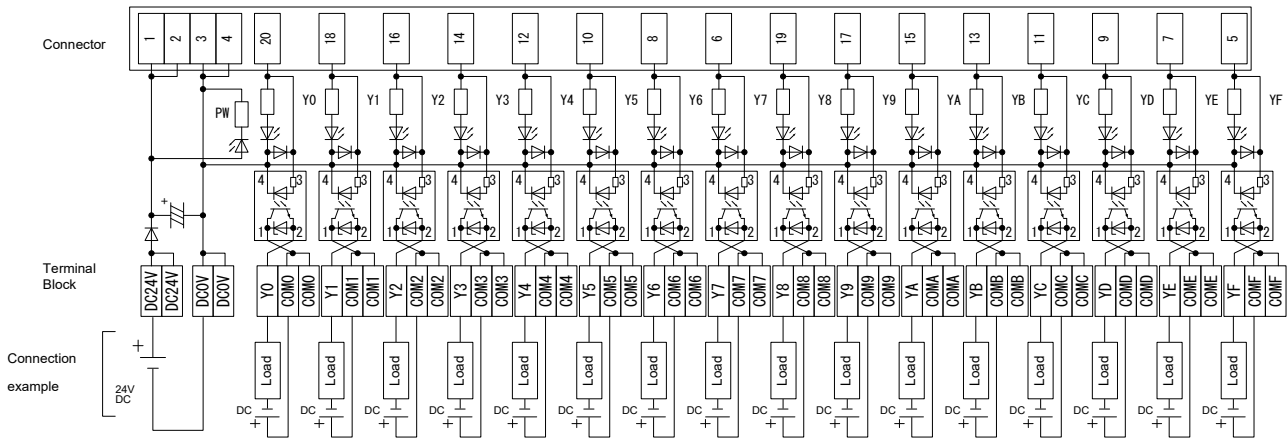Example: 8 points/common (1-wire type) x2
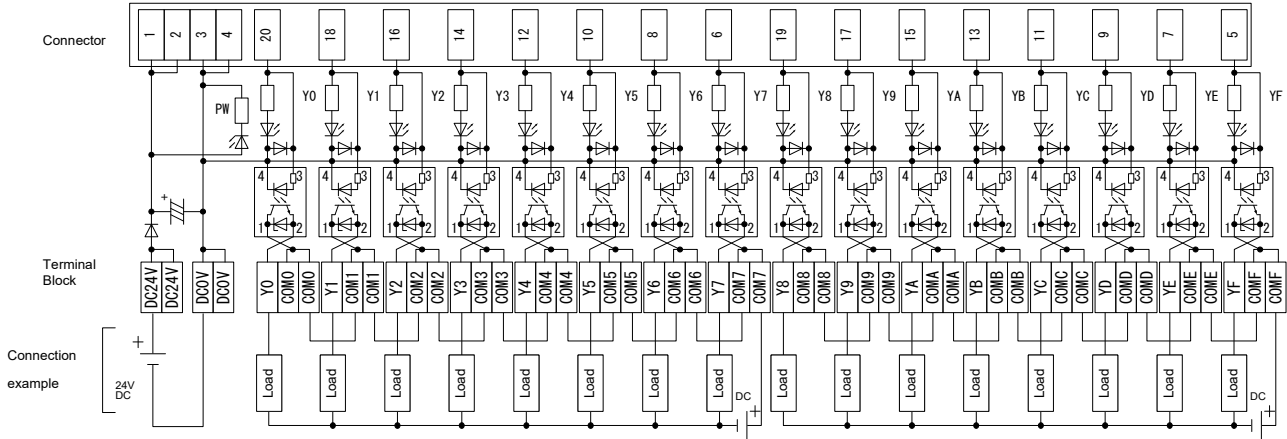
8-24. FA1-TH16Y1TR20S1E

Example: 8 points/common (1-wire type) x2
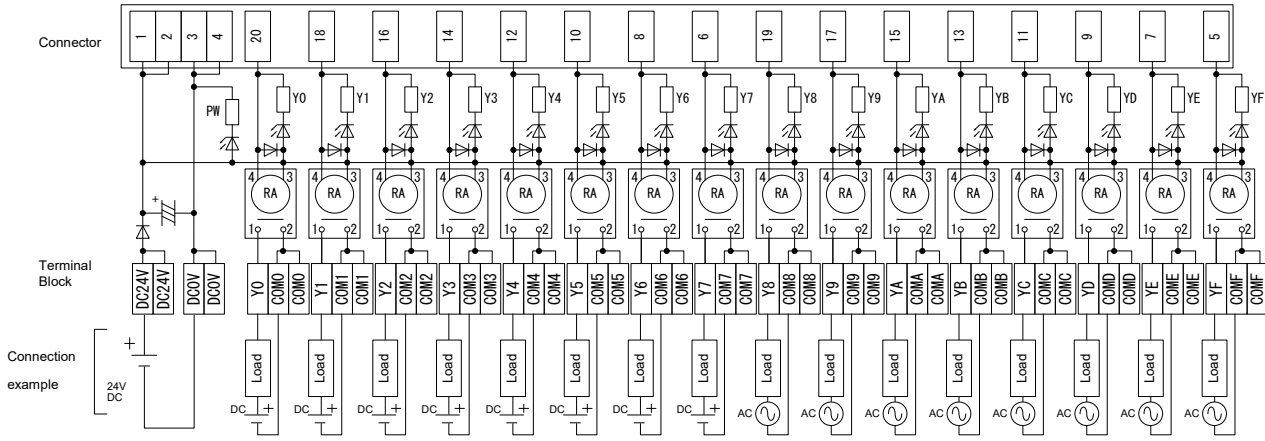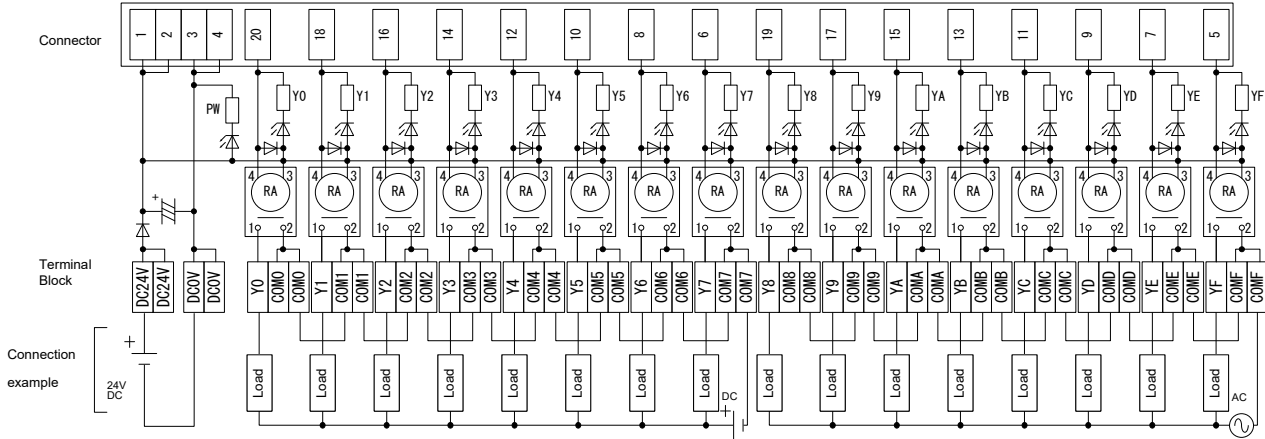

8-25. FA1-TH1E16Y1TR20S1E

Example: 8 points/common (1-wire type) x2

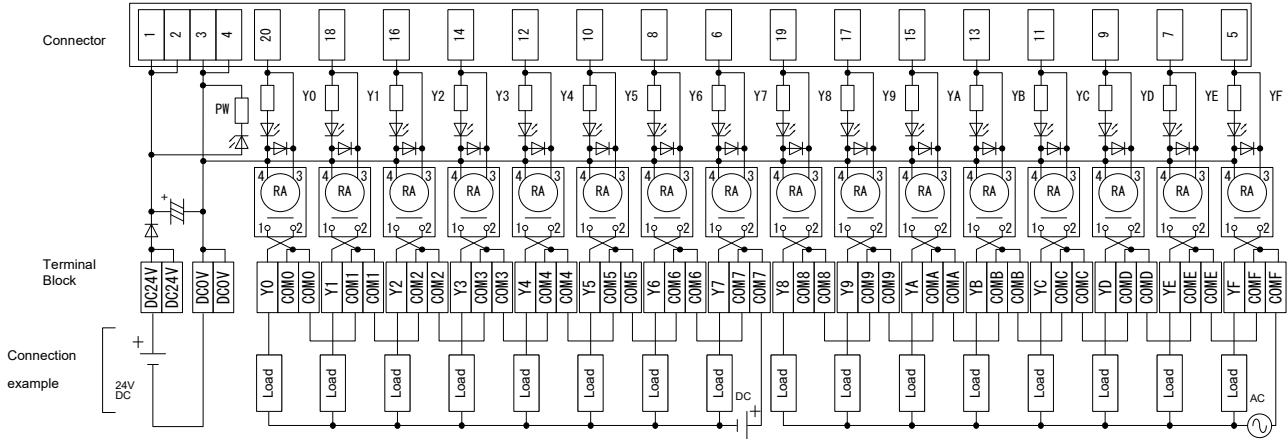## 8-26. FA1-TH16Y2SC20S1E * When FA-NYP24WK4 is connected (NO contact relay)

Connector

PW

Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 YA YB YC YD YE YF

RA RA RA RA RA RA RA RA RA RA RA RA RA RA RA RA

Terminal Block

DC24V DC24V DC0V DC0V Y0 COM0 COM0 Y1 COM1 COM1 Y2 COM2 COM2 Y3 COM3 COM3 Y4 COM4 COM4 Y5 COM5 COM5 Y6 COM6 COM6 Y7 COM7 COM7 Y8 COM8 COM8 Y9 COM9 COM9 YA COMA COMA YB COMB COMB YC COMC COMC YD COMD COMD YE COME COME YF COMF COMF

Connection example

24V DC

Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load

DC AC

Example: 8 points/common (1-wire type) x2

Connector

PW

Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 YA YB YC YD YE YF

RA RA RA RA RA RA RA RA RA RA RA RA RA RA RA RA

Terminal Block

DC24V DC24V DC0V DC0V Y0 COM0 COM0 Y1 COM1 COM1 Y2 COM2 COM2 Y3 COM3 COM3 Y4 COM4 COM4 Y5 COM5 COM5 Y6 COM6 COM6 Y7 COM7 COM7 Y8 COM8 COM8 Y9 COM9 COM9 YA COMA COMA YB COMB COMB YC COMC COMC YD COMD COMD YE COME COME YF COMF COMF

Connection example

24V DC

Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load

DC AC

8-27. FA1-TH1E16Y2SC20S1E * When FA-NYP24WK4 is connected (NO contact relay)

Connector

PW

Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 YA YB YC YD YE YF

RA RA RA RA RA RA RA RA RA RA RA RA RA RA RA RA

Terminal Block

DC24V DC24V DC0V DC0V Y0 COM0 COM0 Y1 COM1 COM1 Y2 COM2 COM2 Y3 COM3 COM3 Y4 COM4 COM4 Y5 COM5 COM5 Y6 COM6 COM6 Y7 COM7 COM7 Y8 COM8 COM8 Y9 COM9 COM9 YA COMA COMA YB COMB COMB YC COMC COMC YD COMD COMD YE COME COME YF COMF COMF

Connection example

24V DC

Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load

DC AC

Example: 8 points/common (1-wire type) x2

Connector

PW

Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 YA YB YC YD YE YF

RA RA RA RA RA RA RA RA RA RA RA RA RA RA RA RA

Terminal Block

DC24V DC24V DC0V DC0V Y0 COM0 COM0 Y1 COM1 COM1 Y2 COM2 COM2 Y3 COM3 COM3 Y4 COM4 COM4 Y5 COM5 COM5 Y6 COM6 COM6 Y7 COM7 COM7 Y8 COM8 COM8 Y9 COM9 COM9 YA COMA COMA YB COMB COMB YC COMC COMC YD COMD COMD YE COME COME YF COMF COMF

Connection example

24V DC

Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load Load

DC AC

9-1. FA-TH16Y**11/11S/20/20S/21/21S, FA-THE16Y**11S/20S, FA-FXTH16Y**11S/20/20S, FA1-TH1E16Y**20S

Type		Round		Y-shaped	
Manufacture	Applicable wire size	Non-insulated solderless terminal	Insulated solderless terminal	Non-insulated solderless terminal	Insulated solderless terminal
Nichifu Co., Ltd. NTM	0.3 to 1.25mm^2	R1.25-3N R1.25-3.5N	TG$_N^V$1.25-3N TG$_N^V$1.25-3.5N	1.25Y-3 1.25Y-3N 1.25Y-3L 1.25Y-3.5	TG$_N^V$1.25Y-3 TG$_N^V$1.25Y-3N TG$_N^V$1.25Y-3L TG$_N^V$1.25Y-3.5
	1.25 to 2.0mm^2	R2-3N	TG$_N^V$2-3N	2Y-3 2Y-3.5S	TG$_N^V$2Y-3 TG$_N^V$2Y-3.5S
Japan Solderless Terminal Mfg. Co., Ltd. JST	0.3 to 1.25mm^2	1.25-MS3	V1.25-MS3	1.25-B3A 1.25-C3A 1.25-N3A 1.25-C3.5A	V1.25-B3A V1.25-N3A
	1.25 to 2.0mm^2	2-MS3	V2-MS3	2-N3A 2-M3A	V2-N3A
Nippon Tanshi Co.,Ltd. NTK	0.3 to 1.25mm^2	R1.25-3ML R1.25-3.5SL	RAV1.25-3ML RAP1.25-3ML	VD1.25-3L VD1.25-3.5SS VD1.25-3.5S	VDAV1.25-3L VDAV1.25-3.5SS VDAV1.25-3.5S
	1.25 to 2.0mm^2	R2-3SL	RAV2-3SL RAP2-3SL	VD2-3S VD2-3.5SS VD2-3.5S	VDAV2-3.5SS VDAV2-3.5S

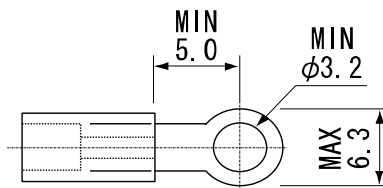● Solderless terminal dimensions   [Unit:mm]
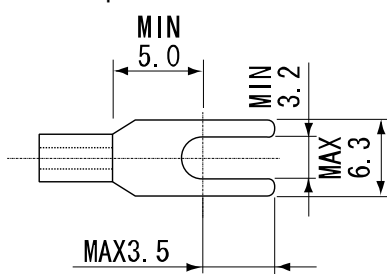
Round non-insulated solderless terminal
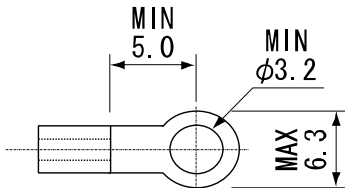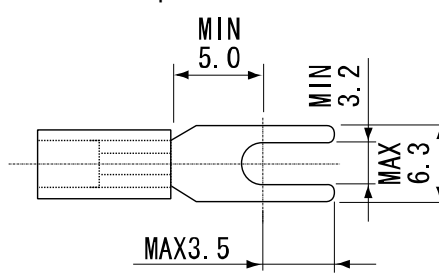

Round insulated solderless terminal

Y-shaped non-insulated solderless terminal

Y-shaped insulated solderless terminal

● Terminal block shape   [Unit:mm]

9-2. FA-TH16YRA20SL, FA-TH16YRAB20SL

Type		Round		Y-shaped	
Manufacture	Applicable wire size	Non-insulated solderless terminal	Insulated solderless terminal	Non-insulated solderless terminal	Insulated solderless terminal
Nichifu Co., Ltd. NTM	0.3 to 1.25mm²	R1.25-3.5	TG$_N^V$1.25-3.5	1.25Y-3.5	TG$_N^V$1.25Y-3.5
	1.25 to 2.0mm²	R2-3.5	TG$_N^V$2-3.5	2Y-3.5	TG$_N^V$2Y-3.5
Japan Solderless Terminal Mfg. Co., Ltd. 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 Co.,Ltd. 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]

Round non-insulated solderless terminal

Round insulated solderless terminal
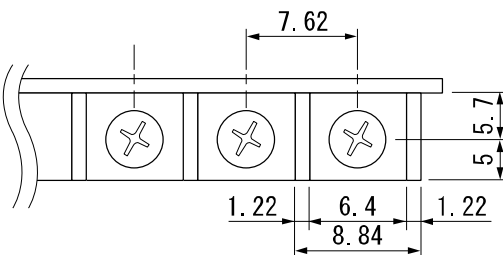

Y-shaped non-insulated solderless terminal

Y-shaped insulated solderless terminal

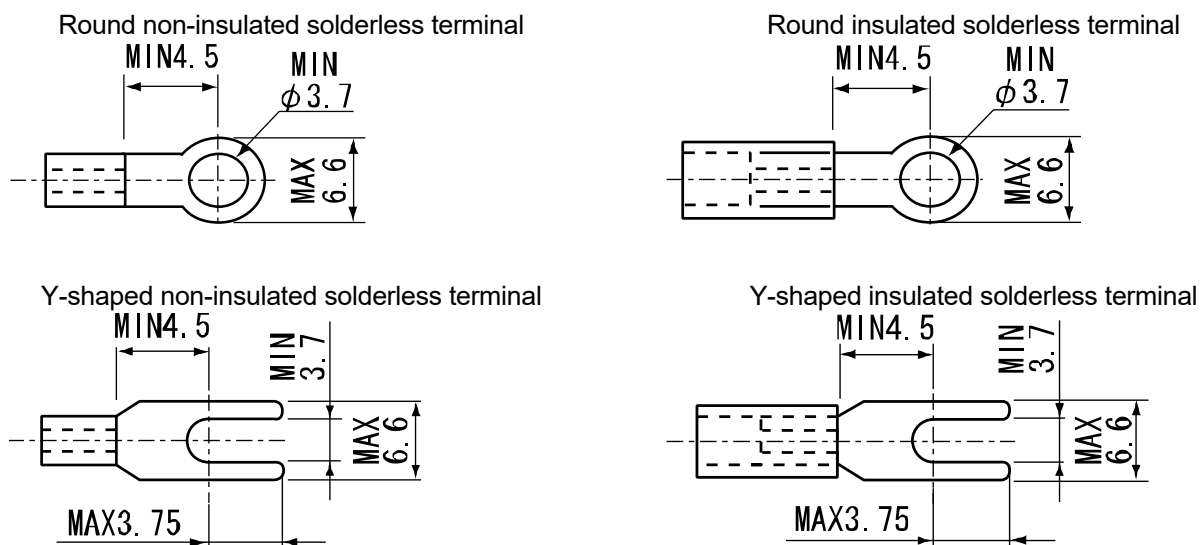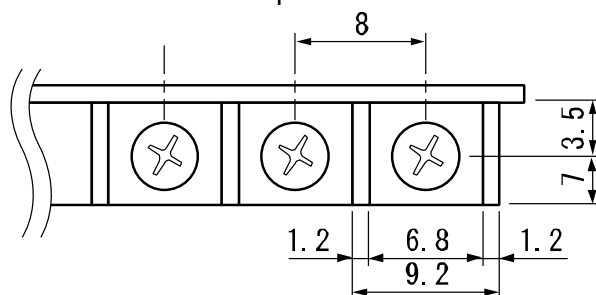● Terminal block shape   [Unit:mm]

9-3. FA1-TH16Y**, FA1-TH1E16Y**

Type		Applicable ferrule [1]	Crimp tool
Manufacturer	Applicable wire size (mm² / AWG)		
PHOENIX CONTACT	0.25 / 24	AI 0,25-8 YE	CRIMPFOX 6
	0.3,0.34 / 22	AI 0,34-8 TQ	
	0.5 / 20	AI 0,5-8 WH	
	0.75 / 18	AI 0.75-8 GY	
WAGO	0.08 to 0.34 / 28 to 22	216-302	206-220
	0.34 / 24 and 22	216-302	206-204
	0.5 / 22 and 20	216-201	
	0.75 / 20 and 20	216-202	

[1]: UL certification is obtained by solid/stranded wires.

10. PRECAUTIONS

(1) For wiring to the terminal block, refer to the manual of the programmable controller module to be connected, published by Mitsubishi Electric.

11. 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.

12. EXCLUSION FROM LIABILITY FOR OPPORTUNITY LOSS AND SECONDARY LOSS

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.

13. TRADEMARKS

MELSEC, MELSEC iQ-R, CC-Link, CC-Link IE, and CC-Link L/T are trademarks or registered trademarks of Mitsubishi Electric Corporation. Other company names and product names in the text are trademarks or registered trademarks of each company.

In some cases, trademark symbols such as '™' or '®' are not specified in this manual.

⚠ 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.