FA Goods

Programmable Controller Analog Terminal Block Conversion Module FA1-TBS40ADGN, FA1-TBS40ADDG, FA1-TBS40DAG

User's Manual

Thank you for purchasing FA Goods product.

Before using, please read this User's Manual and the relevant manuals carefully to ensure correct use.

MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

● SAFETY PRECAUTIONS ●

(Always read these precautions prior to use.)

Before using this product, please read this User's Manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions presented in this manual are concerned with this product only. For programmable controller system safety precautions, refer to the User's Manual of the programmable controller to be 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 external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller, this product. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Configure external safety circuits, such as an emergency stop circuit, protection circuit, and protective interlock circuit for forward/reverse operation or upper/lower limit positioning.
- 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 due to noise.

[Installation Precautions]

⚠ WARNING

- Shut off the external power supply (all phases) before installation. Failure to do so may result in electric shock.

[Installation Precautions]

⚠ CAUTION

- Use the programmable controller in an environment that meets the general specifications in this User's Manual.
  Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- Securely fix the module with a DIN rail or mounting screws. Incorrect mounting may cause malfunction, failure or drop of the module. When using this product in an environment of frequent vibrations, fix the module with a screw.
- Tighten the screw within the specified torque range.
  Undertightening can cause drop of the screw, short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Shut off the external power supply for the system in all phases before mounting or removing the module. Failure to do so may result in damage to, malfunction, or failure of the product.
- Do not directly touch any conductive parts and electronic components of this product. Doing so can cause malfunction or failure of the product.

[Wiring Precautions]

⚠ WARNING

- Shut off the external power supply for the system in all phases before installation and wiring.
- After wiring, attach the included terminal cover to the module before turning it 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. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and terminal layout before wiring to the module, 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 (3.94 inches) or more between them. Failure to do so may result in malfunction due to noise.
- Place the cables in a duct or clamp them. If not, dangling cables may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor connection.
- Tighten the terminal screw within the specified torque range.
  Undertightening can cause short circuit, fire, or malfunction.
  Overtightening can damage the screw and/or module, 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 module, resulting in drop, short circuit, fire, or malfunction.
- Install the connector to the module securely. Failure to do so may cause malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For a cable with connector, hold the connector by hand and pull it out. For a cable connected to a terminal block, loosen the terminal block screws first before removing the cable. Failure to do so may result in malfunction and damage to the module or cable.
- Before connecting the cables, check the type of interface to be connected. Connecting or erroneous wiring to the wrong interface may cause failure to the module and external devices.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- This product must be installed to control panels. Connect the main power supply to this product in the control panel through a relay terminal block. Wiring and replacement of a this product must be performed by qualified service personnel who is familiar with protection against electric shock.
- When connecting programmable controller, check that the product configuration are correct. The modules may be failure or malfunction if the configuration is incorrect.
- Use it with power doesn't join the connector of this product. Failure or disconnection may cause 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 for the system in all phases before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock or cause the module to fail or malfunction. Undertightening can cause drop of the screw, short circuit or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

[Startup and Maintenance Precautions]

⚠ CAUTION

- Do not disassemble or modify the modules. 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 (9.85 inches) away in all directions from the programmable controller, this product. Failure to do so may cause malfunction.
- Shut off the external power supply for the system in all phases before mounting or removing the module. Failure to do so may cause the module to fail or malfunction or damage.
- After the first use of the product, do not mount/remove the module, and the cable more than 50 times (IEC 61131-2 compliant) respectively. Exceeding the limit of 50 times 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 module, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

[Transportation Precautions]

⚠ CAUTION

- The shock that exceeds the range of the general specification during transportation must avoid this product for the precision instrument. Doing so results in the risk of failure.

1. INTRODUCTION

This User's Manual describes the specifications and so on between connectors and the programmable controller analog terminal block conversion modules used in combination with Mitsubishi Electric Corporation Channel Isolated Analog Modules.

2. GENERAL SPECIFICATIONS

<table>
<tr><td>Item</td><td colspan="5">Specifications</td></tr>
<tr><td>Operating Surrounding air temperature</td><td colspan="5">0 to 55°C</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="5">-25 to 75°C</td></tr>
<tr><td>Operating ambient humidity</td><td colspan="5">5 to 95% RH, no condensation</td></tr>
<tr><td>Storage ambient humidity</td><td colspan="5">5 to 95% RH, no condensation</td></tr>
<tr><td rowspan="6">Vibration resistance</td><td>Compliant standards</td><td colspan="4">JIS B 3502, IEC61131-2</td></tr>
<tr><td></td><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>Sweep count</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>5 to 8.4Hz</td><td>—</td><td>3.5mm</td><td rowspan="2">10 times each in X, Y, and Z axis directions</td></tr>
<tr><td>8.4 to 150Hz</td><td>9.8m/s^2 (1G)</td><td>—</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>5 to 8.4Hz</td><td>—</td><td>1.75mm</td><td rowspan="2">—</td></tr>
<tr><td>8.4 to 150Hz</td><td>4.9m/s^2 (0.5G)</td><td>—</td></tr>
<tr><td>Shock resistance</td><td colspan="5">Conforms to JIS B 3502 and IEC61131-2 (147m/s^2 (15G), 3 times each in X, Y, and Z axis directions)</td></tr>
<tr><td>Operating atmosphere</td><td colspan="5">There should be no corrosive gases.</td></tr>
<tr><td>Operating altitude (* 1)</td><td colspan="5">2,000m or lower</td></tr>
<tr><td>Installation location</td><td colspan="5">Inside control panel</td></tr>
<tr><td>Overvoltage category (* 2)</td><td colspan="5">II or lower</td></tr>
<tr><td>Pollution level (* 3)</td><td colspan="5">2 or lower</td></tr>
</table>

* 1: Do not use or store in a pressurized environment greater than the atmospheric pressure at an altitude of 0m.
* 2: Indicates how an assumption has been made on the point at which the devices are connected from the public power grid to the machinery and equipment inside the facilities.
* 3: This is a guideline indicating the extent to which conducting substances are found in the environment in which the devices are used.

3. PERFORMANCE SPECIFICATIONS

Item \ Model name		FA1-TBS40ADGN	FA1-TBS40ADDG	FA1-TBS40DAG
Connectable module		Q68AD-G, R60AD8-G, R60AD16-G	Q66AD-DG	Q66DA-G, R60DA8-G, R60DA16-G
Terminal block	Terminal block Screws	M3 screw, 7mm pitch, with screw retention/drop prevention mechanism		
		Terminal screw tightening torque range: 43 to 58N·cm (4.4 to 5.9kgf•cm, 3.81 to 5.13lbf·in, UL standard conformity tightening torque: 50N·cm, 4.43lbf·in)		
	Applicable wire	AWG22 to 16: 0.3 to 1.25mm^2(with solderless terminal use)		
Module mounting	Mounting screws	M4 × 0.7mm × 25mm or greater		
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm)		
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)		
Dielectric withstand voltage		Between CHs: 1000VAC for 1 minute, Other: 500VAC for 1 minute		
Insulation resistance (initial)		10MΩ or more by 500VDC insulation resistance tester		
Accessory		-	-	Marking strip for R60DA8-G/R60DA16-G(*4)
Weight		About 190g		

* 4: When connecting the R60DA8-G or R60DA16-G, replace the module's making strip with the provided marking strip.

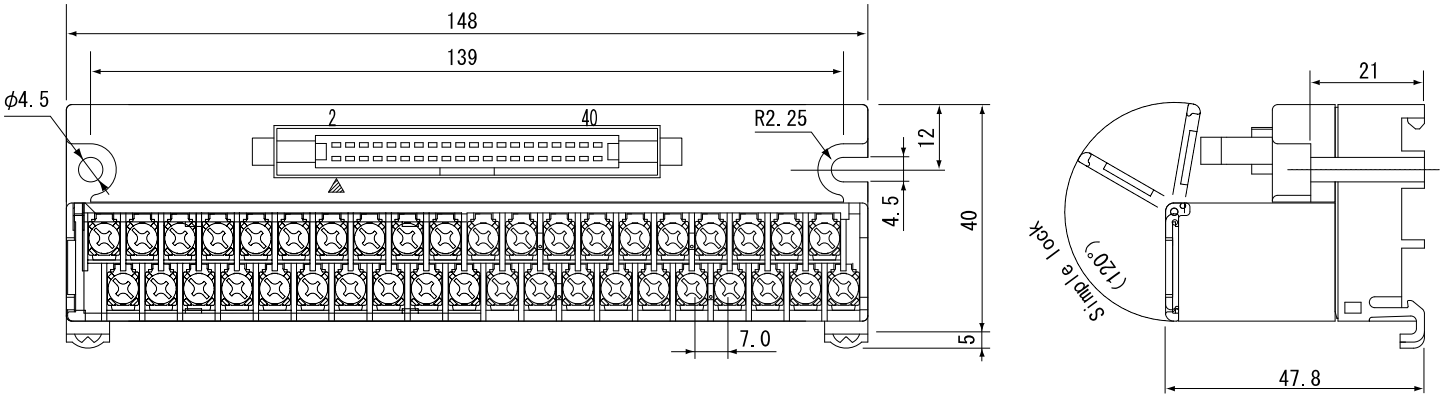
4. CONNECTED TARGET MODEL / PLC MODULE, CONNECTION CABLE

PLC Module Model		Connection Cable Model	Module Model
Channel Isolated Analog Input Module	Q68AD-G	FA-CBL**Q68ADGN	FA1-TBS40ADGN
	R60AD8-G R60AD16-G		
	Q66AD-DG	FA-CBL**Q66ADDG	FA1-TBS40ADDG
Channel Isolated Analog Output Module	Q66DA-G	FA-CBL**Q66DAG	FA1-TBS40DAG
	R60DA8-G R60DA16-G	FA1-CBL**R60DA8G	FA1-TBS40DAG

5. EXTERNAL DIMENSIONS

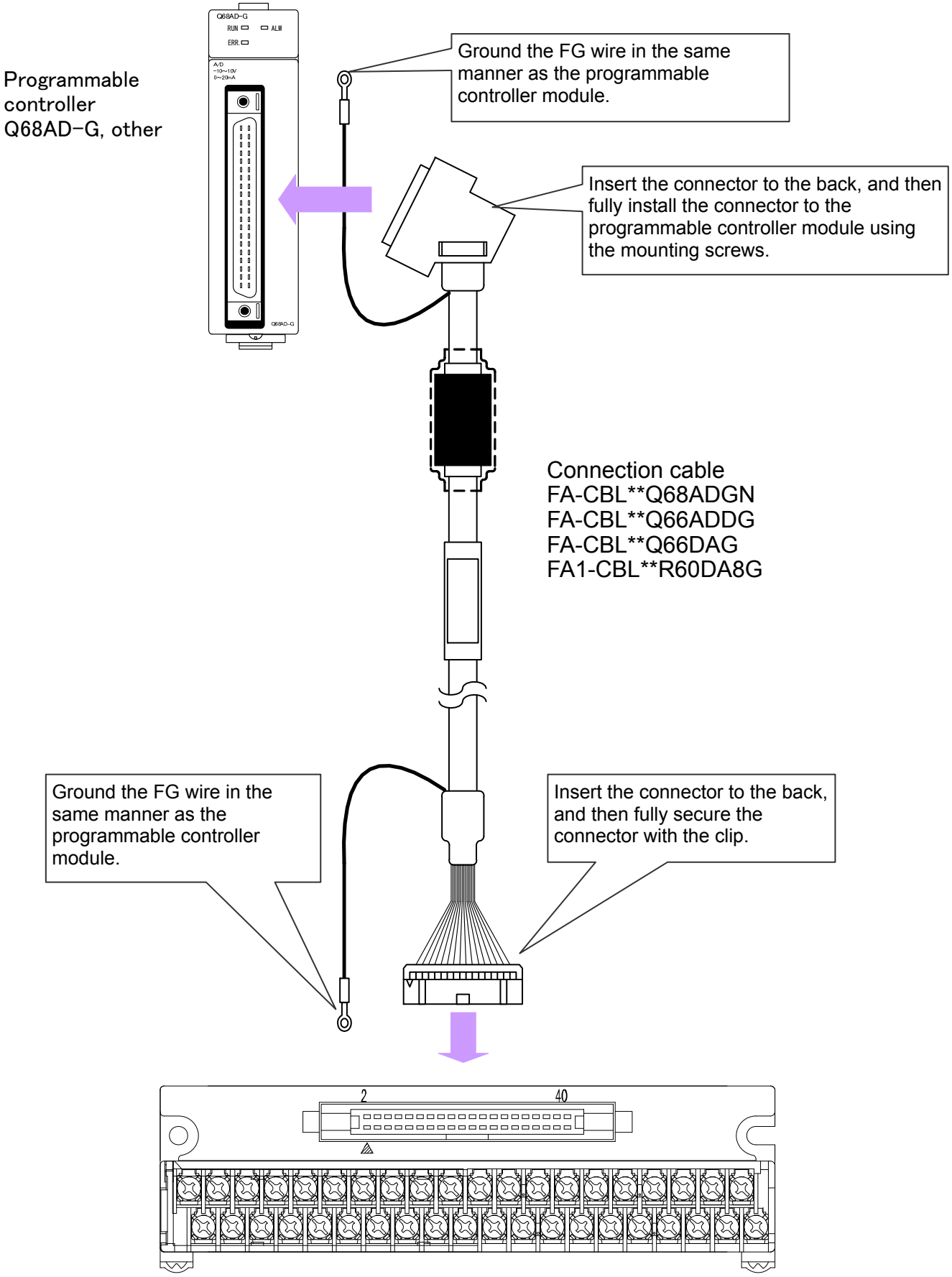
5-1. programmable controller analog terminal block conversion module (FA1-TBS40ADGN/ADDG/DAG)

[Unit: mm]



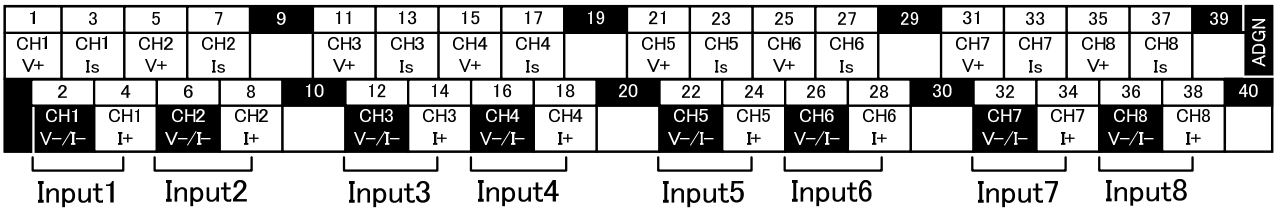
6. INSTALLATION METHOD

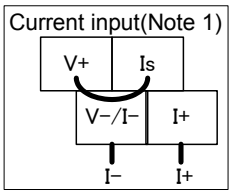
6-1. Connection example with PLC connector module

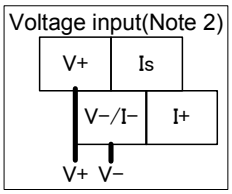


7. EXTERNAL CONNECTION EXAMPLE

7-1. FA1-TBS40ADGN

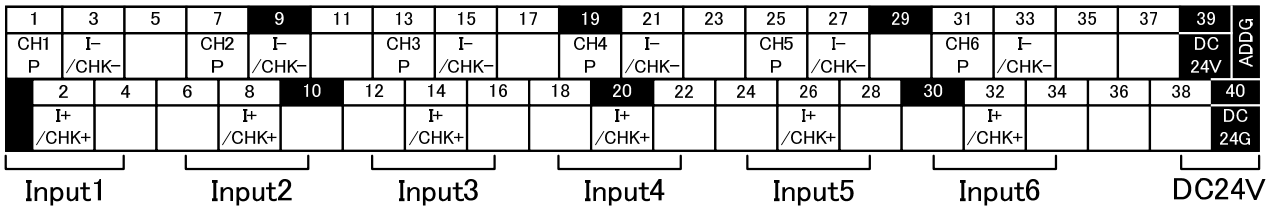


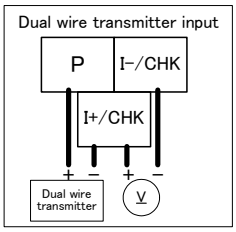


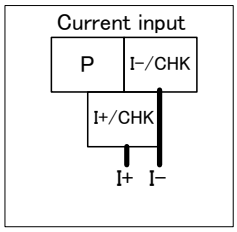


Note 1: For current input, connect the (V+) and (Is) terminals.
Note 2: For voltage input, set the (Is) and (I+) terminals as NC, and do not connect external wiring.

7-2. FA1-TBS40ADDG

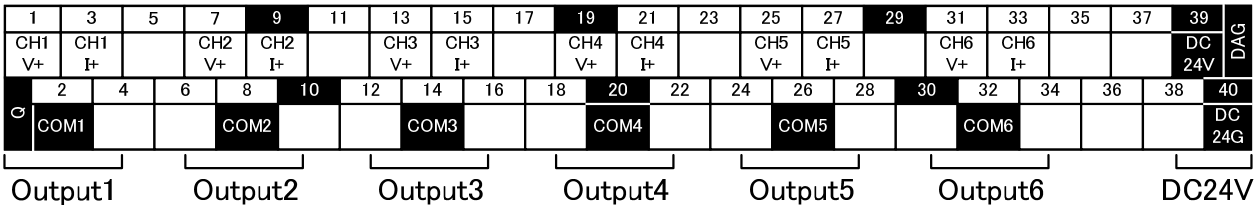


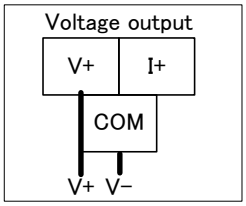


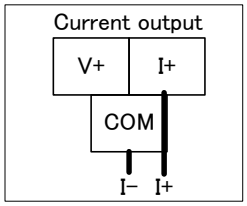


7-3.FA1-TBS40DAG

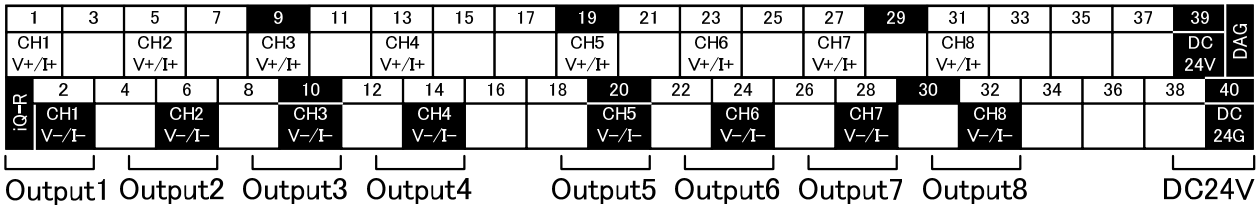
<With Q66DA-G connection>

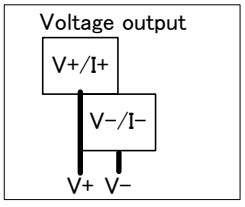


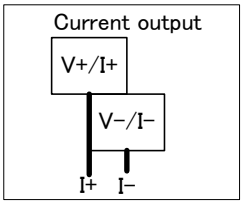




<With R60DA8-G, R60DA16-G connection> (Note1)







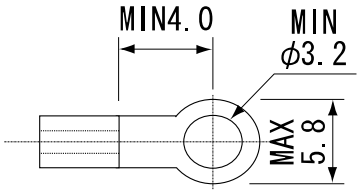
Note1: When connecting the R60DA8-G or R60DA16-G, replace the module's making strip with the provided marking strip.

8. APPLICABLE CRIMPING TERMINALS

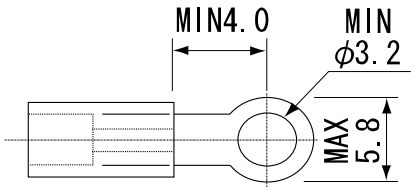
Type		Round		Y	
Marker	Applicable wire size	Bare crimping terminal	Insulated crimping terminal	Bare crimping terminal	Insulated crimping terminal
Nichifu, Co., Ltd. NTM	0.3～1.25mm^2	R1.25-3N R1.25-3.5N	TMEV1.25-3 TMEV1.25-3N TMEV1.25-3.5N TG $^{V}_{N}$1.25-3N TG $^{V}_{N}$1.25-3.5N	1.25Y-3 1.25Y-3N 1.25Y-3.5	TMEV1.25Y-3 TMEV1.25Y-3K TMEV1.25Y-3.5 TMEV1.25Y-3.5K TG $^{V}_{N}$1.25Y-3 TG $^{V}_{N}$1.25Y-3N TG $^{V}_{N}$1.25Y-3.5
Japan Solderless Terminal Co., Ltd JST	0.3～1.25mm^2	1.25-MS3	V1.25-MS3	1.25-B3A 1.25-C3A 1.25-C3.5A	V1.25-B3A
Nippon Tanshi Co., Ltd NTK	0.3～1.25mm^2	R1.25-3ML R1.25-3.5SL	RAV1.25-3ML RAP1.25-3ML	VD1.25-3L VD1.25-3.5SS	VDAV1.25-3L VDAV1.25-3.5SS

● Size of crimping terminal [Unit:mm]

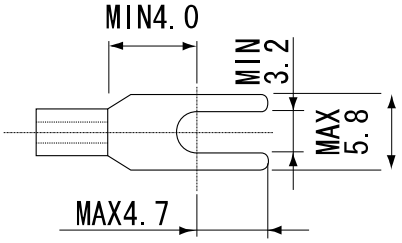
Round bare crimping terminal



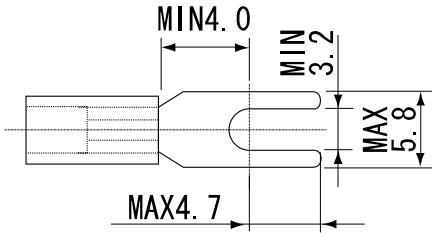
Round insulated crimping terminal



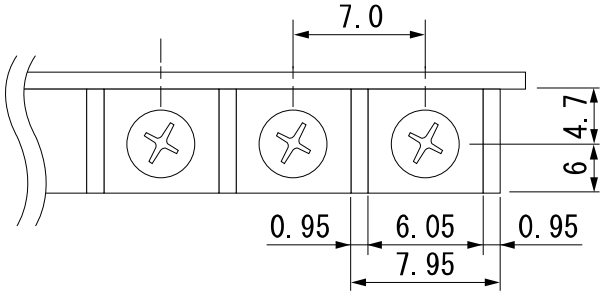
Y bare crimping terminal



Y insulated crimping terminal



● Terminal trapezoid [Unit:mm]



9. PRECAUTIONS

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

(2) Ground the FG wire provided with the cable in the same manner as the programmable controller module. Note that rolling up extra wire without grounding the wire may cause the wire to function as an antenna, resulting in the risk of noise.

⚠ FOR YOUR SAFETY

- This product has been manufactured as a general-purpose product for general industry applications, etc. The product is not intended for use in devices or systems used under conditions in which human life could be greatly affected.
- When considering application of this product to special applications, such as nuclear power, electrical power, aerospace, medical, or manned transport devices or systems, contact our sales service desk.
- Although this product was manufactured under a strict quality management system, the product shall be systematically provided with backup and fail-safe functions when applied to equipment that may lead to a major accident or damage in the unlikely event any failure or defect should occur in the product.

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⚠ During product use, be sure to ensure safety in the unlikely event failure occurs. Mitsubishi Electric Engineering assumes no responsibility whatsoever for any secondary damage caused by the failure of this product.

50D-FG0047

Information such as specifications is subject to change without notice.

Developed April 2015