FA Goods

Positioning Module Terminal Block Conversion Module

FA-LTBQ75M

User's Manual

Thank you for purchasing the FA Goods product.

Before using the product, 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 handle the product properly with full attention to safety.

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 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.

Always follow the precautions of both levels because they are important for personal and system safety.

[Design Precautions]

⚠ WARNING

- Configure safety circuits external to the product to ensure that the entire system operates safely even when a fault occurs in the external power supply or the 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 to turn on the programmable controller 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 bundle 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 a malfunction due to noise.

[Installation Precautions]

⚠ WARNING

- Be sure to shut off the external power supply for the system in all phases before installation. Failure to do so may result in an electric shock.

[Installation Precautions]

⚠ CAUTION

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

[Wiring Precautions]

⚠ WARNING

- Be sure to shut off the external power supply for the system in all phases before installation and wiring. Failure to do so may cause an electric shock, or damage the product.
- After wiring, attach the included terminal cover to the module before turning it on for operation. Failure to do so may cause an 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, and then wire the product 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 be inadvertently pulled, resulting in damage to the product or cables, or a malfunction due to poor connection.
- Tighten the terminal screws within the specified torque range.
  Undertightening can cause a short circuit, fire, or malfunction.
  Overtightening can damage screws and/or the product, causing the product to drop, short circuit, or malfunction.
- Tighten the connector screws within the specified torque range. Undertightening can cause a short circuit, fire, or malfunction. Overtightening can damage screws and/or the product, causing the product to drop, short circuit, or malfunction.
- Connect the connector to the product securely. Failure to do so may cause a malfunction.
- When disconnecting a cable from the product, do not pull the cable itself. For a cable with connector, hold the connector and pull it out. For a cable connected to a terminal block, loosen the terminal block screws before removing the cable. Failure to do so may result in a malfunction or damage to the product or cable.
- Before connecting the cables, check the type of interface to be connected. Connecting the cables to a wrong interface or erroneous wiring may cause the product or external devices to fail.
- Prevent foreign matter such as dust or wire chips from entering the product. Such foreign matter can cause a fire, failure, or malfunction.
- The product must be installed inside the control panel. Connect the main power supply to the product inside the control panel through a relay terminal block. Only qualified service personnel with knowledge of protection against electric shock should replace and wire the product.
- When connecting the product to the programmable controller, check that the product configuration is correct. The modules may be failure or malfunction if the configuration is incorrect.
- Use the product with no pressure applied to its connector. Failure to do so may cause a breakdown or disconnection.

[Startup and Maintenance Precautions]

⚠ WARNING

- Do not touch any terminal while power is on. Doing so can cause an electric shock or malfunction.
- Be sure to shut off the external power supply for the system in all phases before cleaning the product or retightening the terminal screws, the mounting screws of the connector, or the fixing screws of the product. Failure to do so may result in an electric shock, or cause the product to fail or malfunction. Undertightening can cause the product to drop, short circuit, or malfunction. Overtightening can damage the screw and/or product, causing the product to 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 this product, treat it as industrial waste.

[Transportation Precautions]

⚠ CAUTION

- Avoid the shock that exceeds the shock resistance described in the general specifications during transportation, as the product is a precision device. Failure to do so can cause the product to fail.
- If halogen-based materials (fluorine, chlorine, bromine, iodine, etc.) infiltrate into our products, the products will be damaged. Halogen-based materials are often included in fumigant, which is used to sterilize or disinfest wooden packages. Prevent residual fumigant components from being infiltrated into our products, or use an alternative sterilization or disinfection method (heat disinfection, etc.). Additionally, use the wooden package made of woods sterilized and protected against insects as a measurement.

REVISIONS

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

Print Date	*Manual Number	Revision
September 2011	50D-FA9010-029	First edition
March 2014	50D-FA9010-029-A	■Added or modified parts 4. CONNECTED TARGET MODEL / PLC MODULE, CONNECTION CABLE, 6. INSTALLATION METHOD, 7. EXTERNAL CONNECTION EXAMPLE, 9. Gratis Warranty Terms and Gratis Warranty Range, 10. Exclusion of Opportunity Loss and Secondary Loss from Warranty Liability
June 2015	50D-FA9010-029-B	■Added or modified parts SAFETY PRECAUTIONS, REVISIONS, 1. INTRODUCTION, 2. GENERAL SPECIFICATIONS, 3. PERFORMANCE SPECIFICATIONS, 9. PRECAUTIONS ■Modified English sentences SAFETY PRECAUTIONS, 2. GENERAL SPECIFICATIONS, 3. PERFORMANCE SPECIFICATIONS, 6. INSTALLATION METHOD, 8. APPLICABLE SOLDERLESS TERMINALS 10. COVERAGE OF WARRANTY, 11. EXCLUSION FROM LIABILITY FOR OPPORTUNITY LOSS AND SECONDARY LOSS, FOR YOUR SAFETY

Japanese manual number: 50D-FA9010-014

1. INTRODUCTION

This User's Manual describes the specifications and others of the terminal block conversion modules used in combination with Mitsubishi Electric Corporation positioning modules.

2. GENERAL SPECIFICATIONS

<table>
<tr><td>Item</td><td colspan="5">Specifications</td></tr>
<tr><td>Operating ambient 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>Conforming 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 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">Compliant with JIS B 3502 and IEC61131-2 (147m/s^2 (15G), 3 times each in X, Y, and Z directions)</td></tr>
<tr><td>Operating atmosphere</td><td colspan="5">No corrosive gas</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 the 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 the module under the atmospheric pressure greater than that at an altitude of 0m.
* 2: Indicates the section of the power supply to which the equipment is assumed to be connected, between the public power grid and the machinery within the premises.
* 3: This is a guideline indicating the degree of the generation of conducting substances in the environment in which a device is used.

3. PERFORMANCE SPECIFICATIONS

Item \ Model name		FA-LTBQ75M
Number of supported axes		2 axes (2 units used for 4 axes)
Input signals	Rated voltage	24 VDC (CLASS 2)
	Rated current	5mA
	Used voltage range	4.5 to 26.4 VDC (CLASS 2)
Terminal block	Terminal screw	M3 screws, 7.62 mm pitch
	Applicable wire, Tightening torque	Applicable wire: 0.5 to 1.25mm^2 Terminal screw tightening torque range: 50 to 75N·cm (5.2 to 7.6kgf·cm)
Module mounting	Mounting screws	M4 × 0.7mm × 8mm or greater
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (IEC60715 compliant)
Withstand voltage		500 VAC for 1 minute (between all DC external terminals and earth)
Weight		About 140g

4. CONNECTED TARGET MODEL / PLC MODULE, CONNECTION CABLE

PLC Module Model		Cable Model between PLC Module	Module Model	Connected Devices
MELSEC-Q Series connector type	QD75M1 QD75M2 QD75M4 QD75MH1 QD75MH2 QD75MH4 QD77MS2(Note 1),(Note 2) QD77MS4(Note 1),(Note 2) QD77MS16(Note 1),(Note 2)	FA-CBL**Q7	FA-LTBQ75M	External devices Connection signals For terminal block conversion

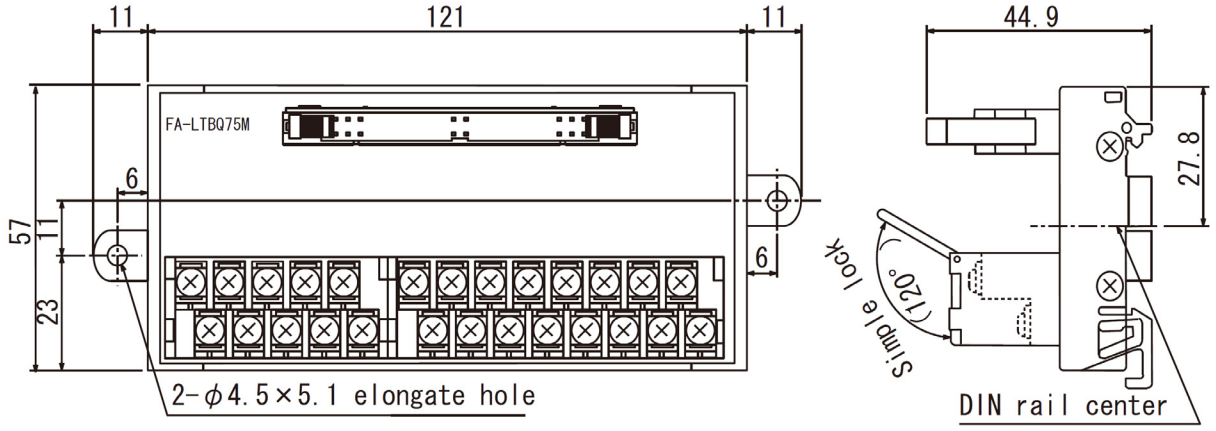
Note 1: The following signals to connecting differential output type of manual pulse generator/Incremental synchronous encoder will not use.
QD77MS** : HAH、HAL、HBH、HBL

Note 2: Units shall use to be replaced with signal names as the following.

No	FA-LTBQ75M Terminal names	QD77MS** Signal names
1	PULSER A+	5V
2	PULSER B+	5V
3	PULSER A-	HA
4	PULSER B-	HB
5	P5	5V
6	1.CHG	DI1
7	2.CHG	DI2

5. EXTERNAL DIMENSIONS

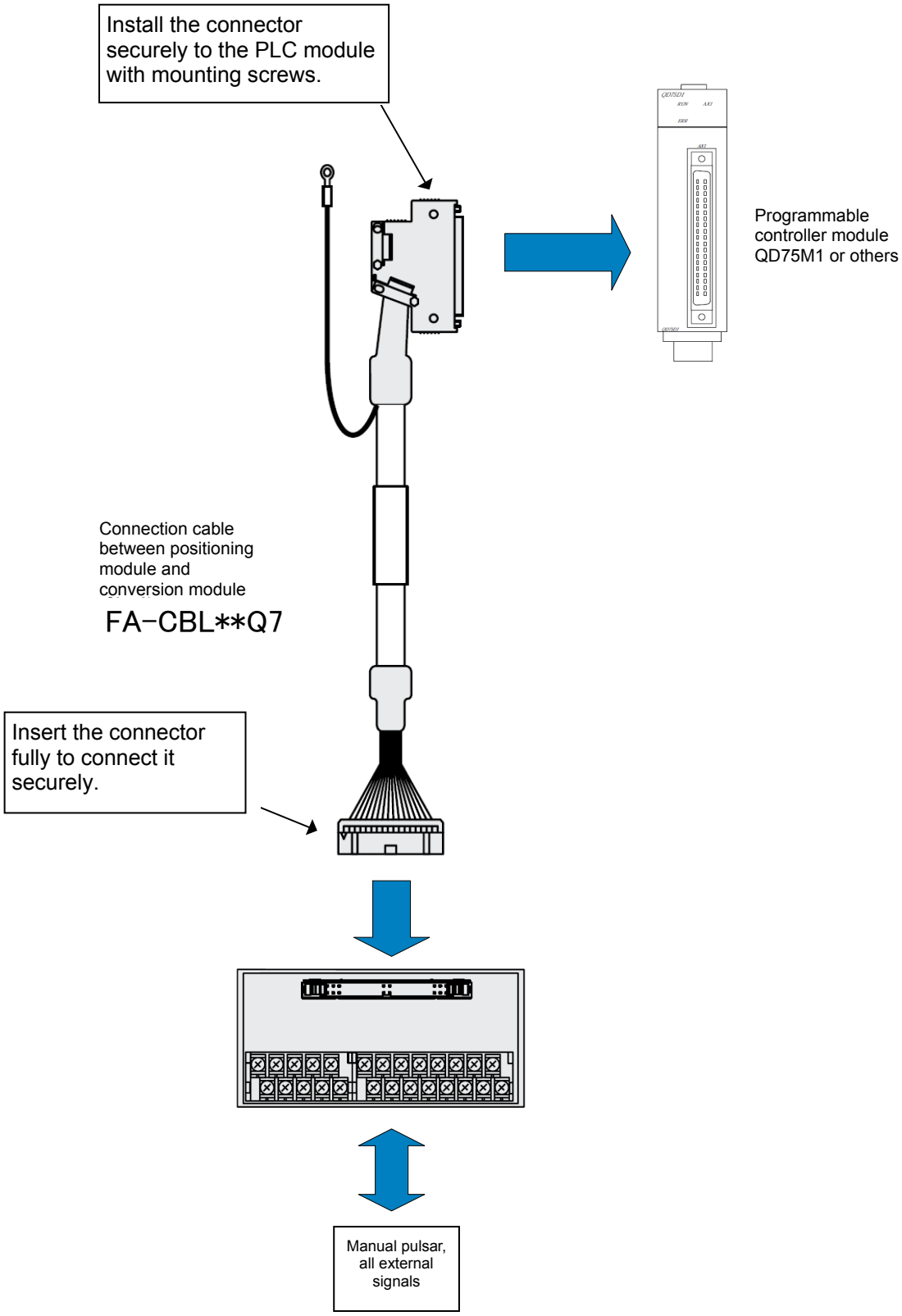
[Unit: mm]



6. INSTALLATION METHOD

Connection example of PLC positioning module and servo amplifier

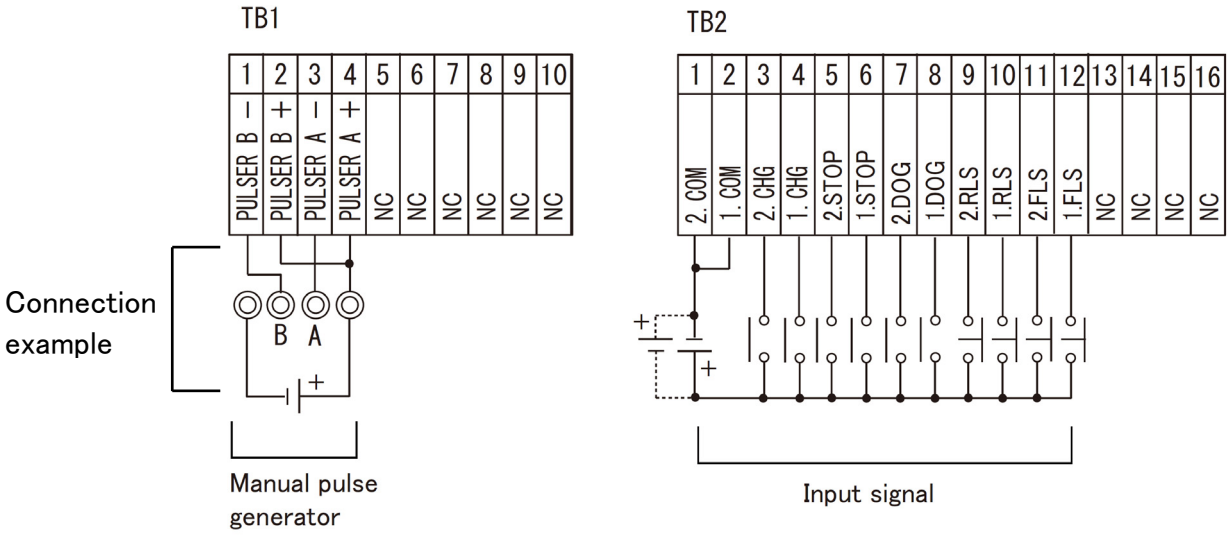
When connected to Mitsubishi Electric Corporation MR-J4 Series



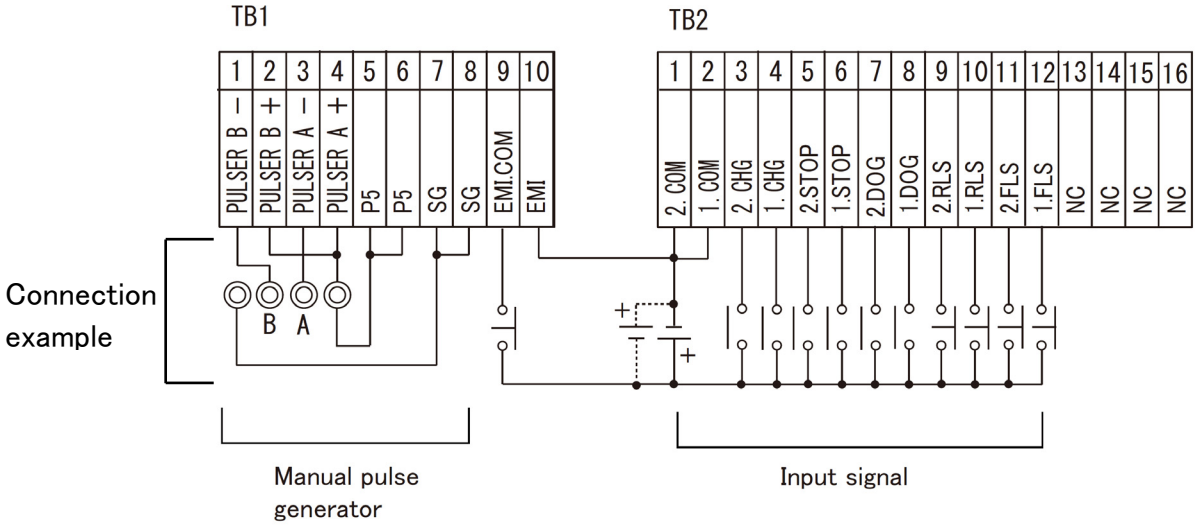
7. EXTERNAL CONNECTION EXAMPLE

Note: The Manual pulse generator please use HR-HDP01 manufactured by Mitsubishi Corporation.

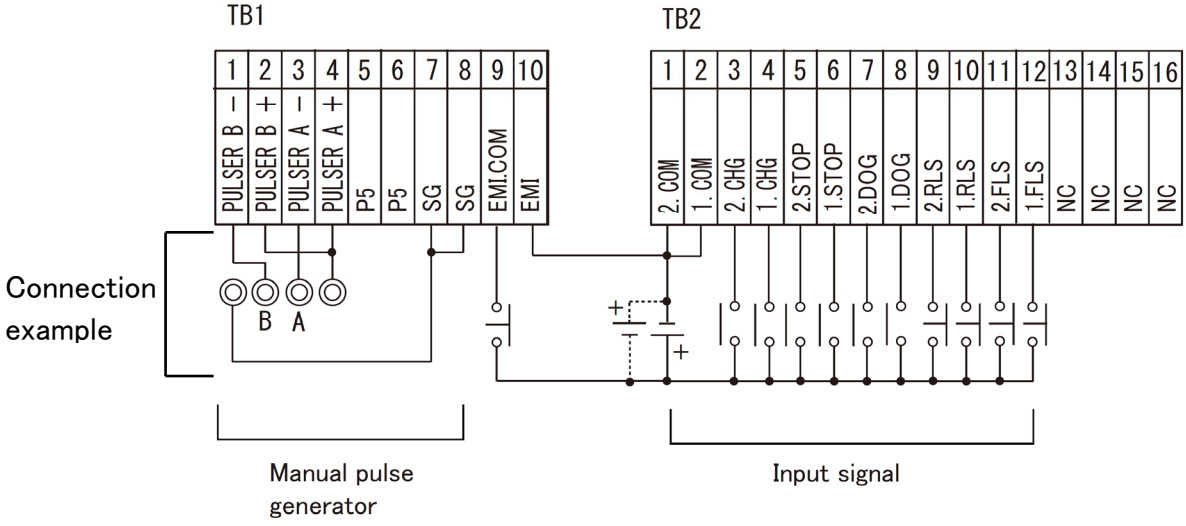
(1) When the QD75M connection.



(2) When the QD75MH connection.



(3) When the QD77MS connection.

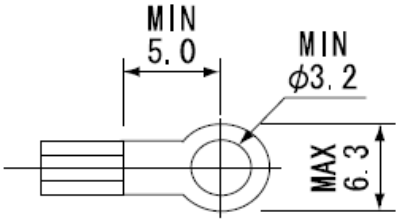


8. APPLICABLE SOLDERLESS TERMINALS

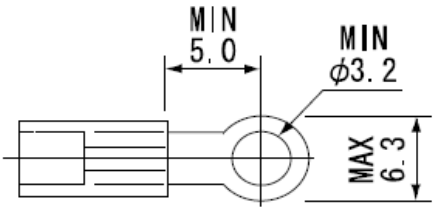
Type		Round		Y	
Manufacturer	Applicable wire size	Non-insulated solderless terminal	Insulated solderless terminal	Non-insulated solderless terminal	Insulated solderless terminal
Nichifu, Co., Ltd. NTM	0.3～1.25mm^2	R1.25-3N R1.25-3.5N	TGV$_N$1.25-3N TGV$_N$1.25-3.5N	1.25Y-3 1.25Y-3N 1.25Y-3L 1.25Y-3.5	TGV$_N$1.25Y-3 TGV$_N$1.25Y-3N TGV$_N$1.25Y-3L TGV$_N$1.25Y-3.5
	1.25～2.0mm^2	R2-3N	TGV$_N$2-3N	2Y-3 2Y-3.5S	TGV$_N$2Y-3 TGV$_N$2Y-3.5S
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-N3A 1.25-C3.5A	V1.25-B3A V1.25-N3A
	1.25～2.0mm^2	2-MS3	V2-MS3	2-N3A 2-M3A	V2-N3A
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 VD1.25-3.5S	VDAV1.25-3L VDAV1.25-3.5SS VDAV1.25-3.5S
	1.25～2.0mm^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]

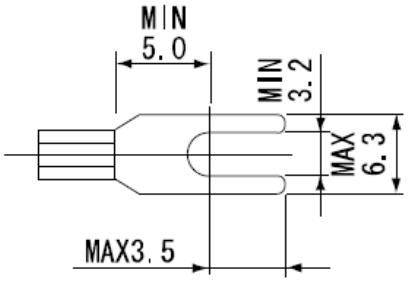
Round non-insulated solderless terminal



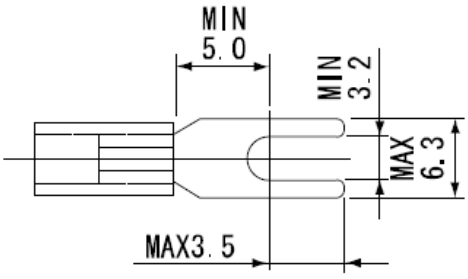
Round insulated solderless terminal



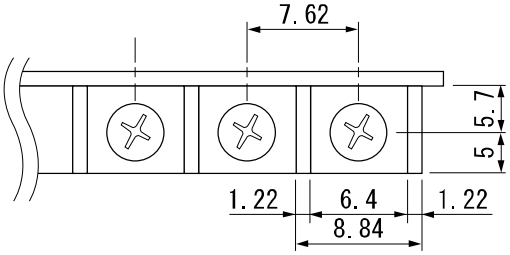
Y non-insulated solderless terminal



Y insulated solderless terminal



● Terminal block shape [Unit: mm]



9. PRECAUTIONS

(1) For wiring to the terminal block, refer to the manual of the connected programmable controller module, 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 the bunched-up extra wire without grounding may act as an antenna, possibly introducing noise.

10. COVERAGE OF WARRANTY

If any fault or defect (hereinafter referred to as “failure”) attributable to us occurs within the terms of the product warranty, we shall replace the product free of charge via your local sales office.

●Terms of warranty
The terms of the product warranty shall be one (1) year from the date of purchase or the delivered day to the designated place.

●Scope of warranty
(1) The scope of warranty shall be limited to normal use based on the usage conditions, methods and environment, the specifications, or safety precautions of the product, etc., defined in the instruction manuals.
(2) The following conditions are not covered with the warranty and subject to charge the product replacement, even if the valid warranty period remains.
1) Failure resulting from inappropriate storage or handling, carelessness or negligence by customer, or failure caused by customer's hardware or software design.
2) Failure caused by unapproved modifications, etc., to the product by customer.
3) Failure that could have been avoided if, when our product was assembled into customer's device, safeguards defined by legal regulations applicable to customer'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 shipment from our factory.
8) Any other failure not attributable to us or which customer identifies not attributable to us.

11. EXCLUSION FROM LIABILITY FOR OPPORTUNITY LOSS AND SECONDARY LOSS

Regardless of the warranty period, we shall have no liability for compensation for any damage caused by reasons not attributable to MEE, any opportunity loss or lost profit caused by a failure of our products, any damage or secondary damage caused by special circumstances whether or not foreseeable, any accident, any damage of other manufacturers products, or any customer's work such as products replacement, readjustment or launch of local machinery equipment, etc.

⚠ FOR YOUR SAFETY

- This product has been manufactured as a general-purpose product for general industry applications, etc. The product is not designed or manufactured to be used in equipment or systems in situations that can affect or endanger human life.
- When considering this product for operation in special applications such as machinery or systems used in passenger transportation, atomic power, electric power, aerospace, or medical applications, please contact your nearest Mitsubishi sales representative.
- Although this product was manufactured under conditions of strict quality control, the product shall be systematically provided with backup and fail-safe functions when it is used in facilities where breakdowns of the product are likely to cause a serious accident or damage.

MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

1-13-5 Kudankita, Chiyoda-ku, Tokyo, Japan 102-8404

Our website URL: http://www.mee.co.jp/

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Specifications subject to change without notice.

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