MITSUBISHI

A8GT-50KBF

External I/O Interface Module

User's Manual

(Hardware)

Thank you for choosing the MELSEC-GOT Series.

To ensure correct use of this equipment, please read this manual carefully before operating it.

MODEL	A8GT-50KBF-U
MODEL CODE	1DM053
IB(NA)-68908-C(0406)MEE	

MITSUBISHI Graphic Operation Terminal

● SAFETY PRECAUTIONS ●

(Always read before starting use)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in the manual. Also pay careful attention to safety and handle the module properly.
These precautions apply only to the installation of Mitsubishi equipment and the wiring with the external device. Refer to the user's manual of the CPU module to be used for a description of the PLC system safety precautions.
These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".

⚠DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.
⚠CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by **⚠CAUTION** may also be linked to serious results.
In any case, it is important to follow the directions for usage.
Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

⚠DANGER

- Some faults of the GOT, this unit or connection cables may keep the outputs on or off.
  An external monitoring circuit should therefore be provided to check for output signals which may lead to a serious accident.
  Otherwise, mis-output or misoperation can cause an accident.

[INSTALLATION PRECAUTIONS]

⚠DANGER

- When installing and removing this module from the GOT main module be sure to shut off the power at all external switches. If all the switches are not turned off, the module could be damaged or malfunction.
- When connecting the bus connection cable to this module be sure to turn off the switch to all external power switches to the GOT and PC CPU. If all the switches are not turned off, it may cause malfunction.

⚠CAUTION

- Use this module in an environment that is within the general specifications written in the GOT User's Manual. If the power supply is used in an environment that is outside of the general specifications then electric shock, fire, malfunction, or product damage or degradation could occur.
- For a correct installation, insert the bus connection cable to this module, A7GT-BUS2S, bus connector conversion module, and base unit connector until you hear it click.
  A bad connection could cause erroneous input or output.
- When installing this module in the GOT main module, install it in the GOT installation area and be sure it is fastened with a module fastening screw that is tightened within the specified torque range.
  If the module fixing screws are loosen, it may cause malfunction, damage or falling of the module.
  If the module fixing screws are too tight, the GOT main module or the screws could break.

[Wiring Instructions]

⚠DANGER

- Before starting wiring, always switch off all phases of the power supply externally.

⚠CAUTION

- During wiring, care should be taken so that foreign matter such as shield and wire offcuts do not enter this unit.
  Otherwise, a fire, fault or misoperation can occur.

[STARTING AND MAINTENANCE PRECAUTIONS]

⚠DANGER
● Do not change the switch setting while power is on. ● Switch all phases of the GOT external power supply off before cleaning. Not doing so could result in electric shock.

⚠CAUTION
● Never disassemble or modify the module. This may cause breakdowns, malfunctioning, injury, and/or fire. ● Do not directly touch the conducted area and electric parts of this module. It may cause damage and malfunctioning of the module. ● This module is made of resinous materials, and should be protected from strong shock or impact. It may cause breakdown. ● When disconnecting the communication or power cable from the module, do not hold and pull the cable part. When disconnecting the cable having a connector, hold the connector plugged in the module. Before disconnecting the cable having no connector, loosen the screws in the module. If the cable connected to the module is pulled, the module or cable may be damaged or a malfunction may occur due to a cable connection fault. ● Before handling the unit, touch a grounded metal or similar object to discharge the static electricity from the human body. Failure to do so may cause the unit to fail or mulfunction.

[DISPOSAL PRECAUTIONS]

⚠CAUTION
● When disposing of this product, treat it as industrial waste.

Revisions

* The manual number is noted at the lower left of the back cover.

Print Date	*Manual Number	Revision
Jun., 1997	IB(NA)-68908-A	First printing
May, 2001	IB(NA)-68908-B	Partial correction Chapter 1, Chapter 3, Chapter 4, Chapter 5, Chapter 7
Jun., 2004	IB(NA)-68908-C	Partial correction SAFETY PRECAUTION, Manuals MODEL CODE change Changed from 13JL17 to 1DM053

CONTENTS

Manuals

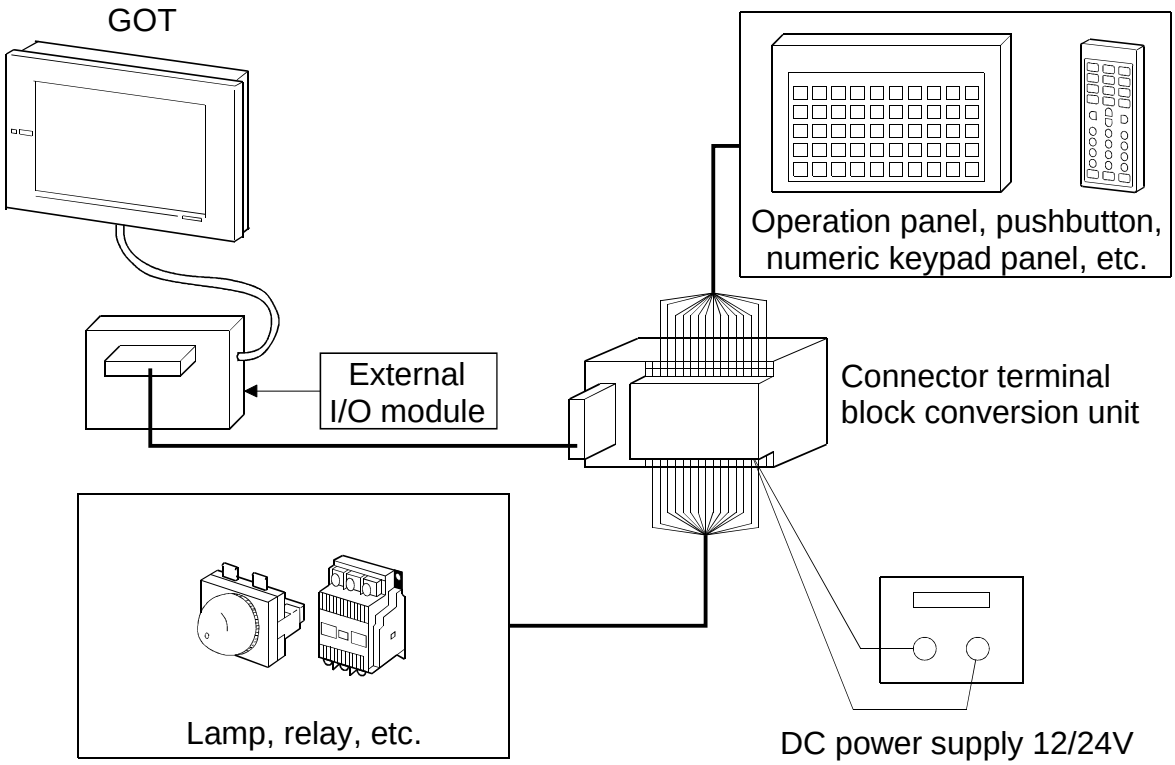
The following manuals are relevant to this product.
Refer to the following list and order the required manuals.

Relevant Manuals

Manual name	Manual No. (Model code)
A8GT-TK type Numeric Keypad Panel User's Manual (Found in the packing of the A8GT-TK)	IB-66832 (1DM094)
GOT-A900 Series User's Manual (GT Works Version5/GT Designer Version5 compatible connection Sysytem Manual) (Available as option)	SH-080119 (1DM189)
SW3NIW-A8GOTP Graphic Settings Software Package Operating Manual (Monitor Screen Creation Manual) (Found in the packing of the software package)	IB-66793 (1DM176)

1. Overview

This user's manual gives the specifications, system configurations, parts identifi-cation, installation procedure and outline dimensions of the A8GT-50KBF type external I/O unit (referred to as the external I/O unit).
The external I/O unit is fitted to the A956WGOT/A95*GOT/A85*GOT (referred to as the GOT) to receive up to 8/64 points of inputs and provide up to 16 points of outputs.



2. Components Including in the Package

After opening the container, check that the following products are present.

Description	Quantity
External I/O unit	1
External connector (soldered type)	1

3. Specifications

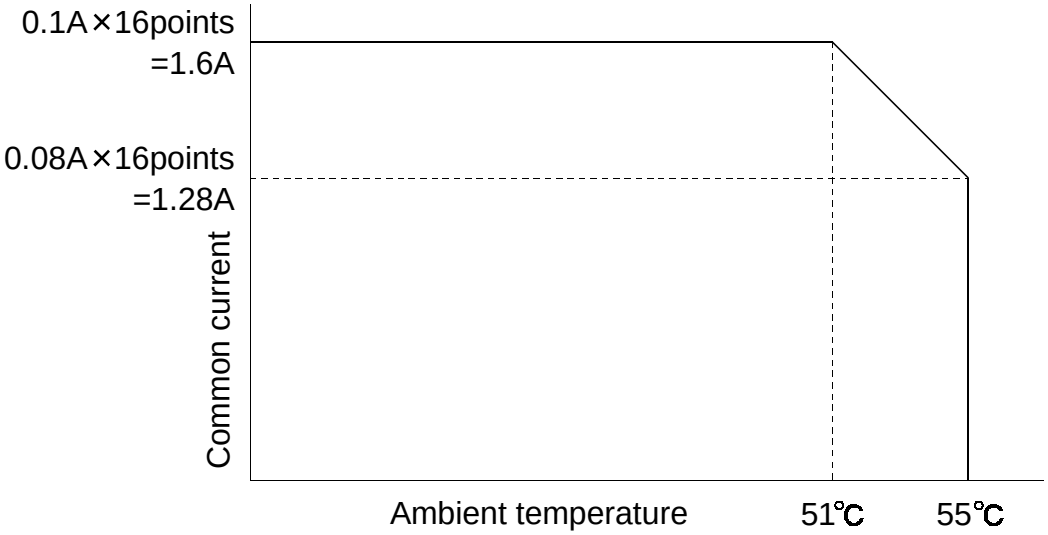
Input Specifications			
Input system		Dynamic scan	
Number of input points		8/64 points	
Isolation system		Photocoupler isolation	
Rated input voltage		12VDC	24DVC
Rated input current		Approx. 4mA	Approx. 9mA
Operating voltage range		10.2 to 26.4VDC (ripple percentage within 5%)	
Max. number of simultaneous input points		100% simultaneous ON (at 26.4VDC)	
ON voltage/ON current		8VDC or more/2mA or more	
OFF voltage/OFF current		4VDC or less/1mA or less	
Input resistance		Approx. 2.4KΩ	
Response time *1	ON to OFF	Approx. 0.4ms or less (24VDC)	
	OFF to ON	Approx. 0.4ms or less (24VDC)	
Dynamic scan cycle		13.3ms	

Output Specifications		
Output system		Direct
Number of output points		16 points
Isolation system		Photocoupler isolation
Rated load voltage		12/24DVC
Max. load current*4		0.1A/1 point
Operating load voltage range		10.2 to 26.4VDC (ripple percentage within 5%)
Max. inrush current		0.4A
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		2.5VDC (0.1A)
Response time*1	ON to OFF	2ms or less
	OFF to ON	2ms or less (resistive load)
Surge suppressor		Clamp diode

I/O Specifications		
External connection system		40-pin connector
Applicable wire size		0.3mm2
Operation indicator		None
External supply power	Voltage*3	12/24VDC (10.2 to 26.4V, ripple percentage 5% or less)
	Current	1.65A for external output 0.05A for internal consumption only
Fuse rating*2		2.0A fuse, unreplaceable
Internal current consumption		0.1A
Weight		250g(0.55lb)
Accessory		1 piece of external wiring connector (soldered type)

*1: Time in the I/O section.

*2: The maximum load current varies with the number of simultaneous ON points. Refer to the following information:
Relationships between output load current (common current), number of simultaneous ON points and ambient temperature

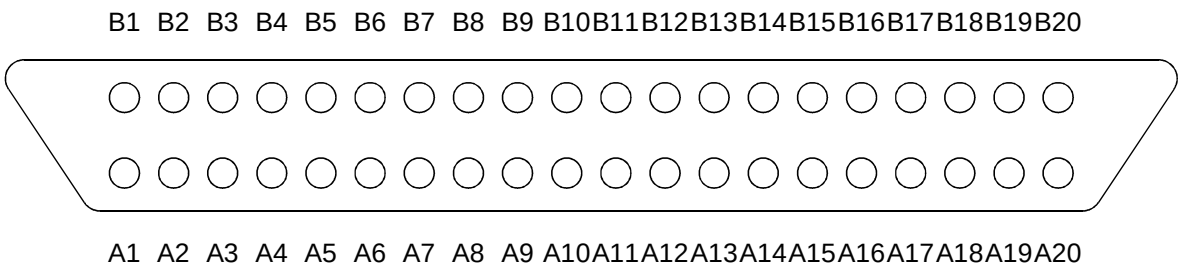


*3: A fuse-blown error will also be displayed when the external supply power switches off.

*4: The fuse in the output unit is provided to prevent the external wiring from burning out if the outputs of the unit are shorted.
Therefore, it may not protect the output elements.
The fuse may not be blown if the output elements are damaged in the fault mode other than a short circuit.

External Connector Pin-Outs

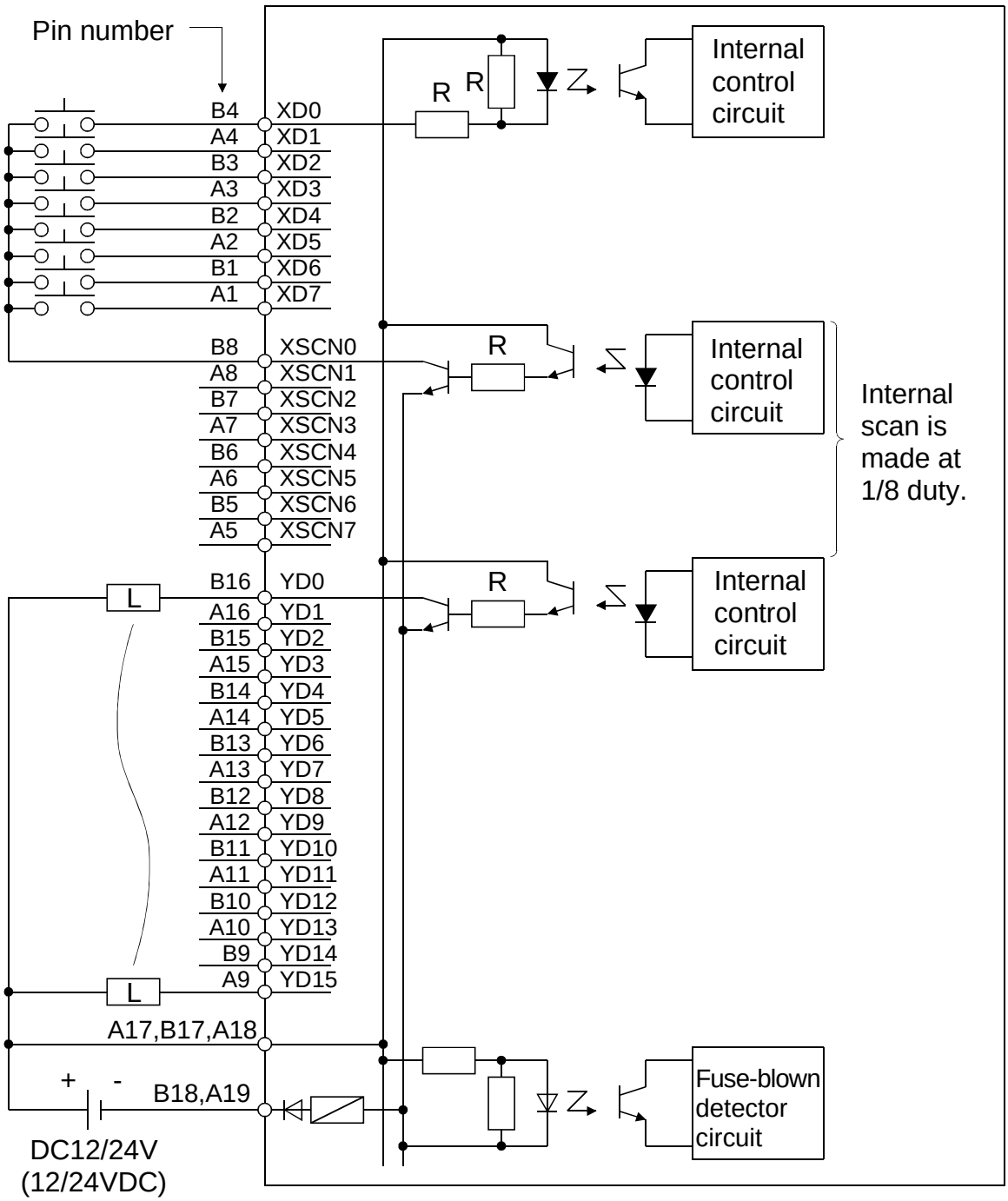
View from the unit front Connector used: Fujitsu's FCN-365P040-AU



Pin Numbers and Signal Names of External Connector

Pin Number	Signal Name	Pin Number	Signal Name
A1	XD7	B1	XD6
A2	XD5	B2	XD4
A3	XD3	B3	XD2
A4	XD1	B4	XD0
A5	XSCN7	B5	XSCN8
A6	XSCN5	B6	XSCN4
A7	XSCN3	B7	XSCN2
A8	XSCN1	B8	XSCN0
A9	YD15	B9	YD14
A10	YD13	B10	YD12
A11	YD11	B11	YD10
A12	YD9	B12	YD8
A13	YD7	B13	YD6
A14	YD5	B14	YD4
A15	YD3	B15	YD2
A16	YD1	B16	YD0
A17	DC12/24V	B17	DC12/24V
A18	DC12/24V	B18	0V
A19	0V	B19	
A20		B20	FG

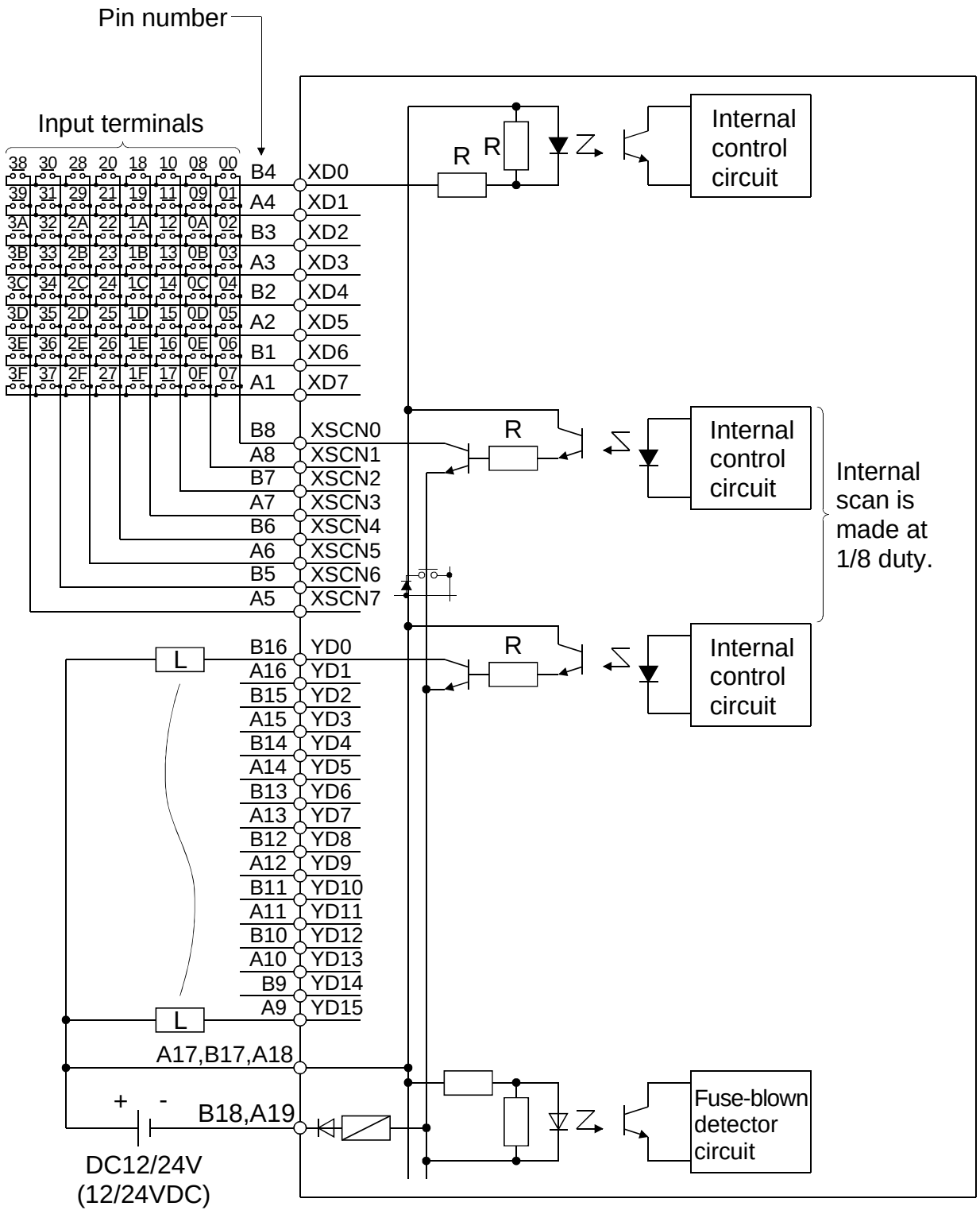
External Connection Diagram (1) (8-point inputs, 16-point outputs)



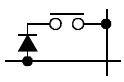
*1: A fuse-blown error will also be displayed when the external supply power switches off.

*2: The fuse in the output unit is provided to prevent the external wiring from burning out if the outputs of the unit are shorted.
Therefore, it may not protect the output elements.
The fuse may not be blown if the output elements are damaged in the fault mode other than a short circuit.

External Connection Diagram (2) (64-point inputs, 16-point outputs)



*1: When there is a probability that two or more switches are pressed simultaneously, each switch must be provided with a diode. (Refer to the right figure.)



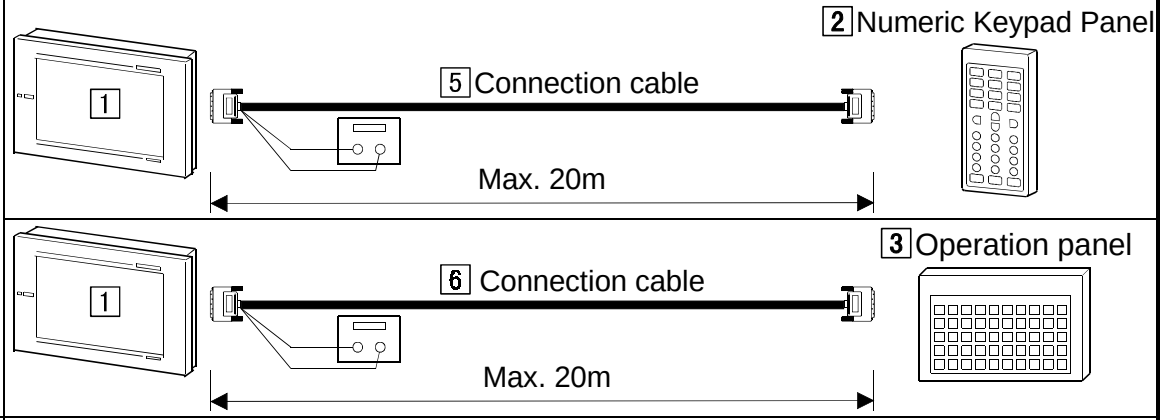
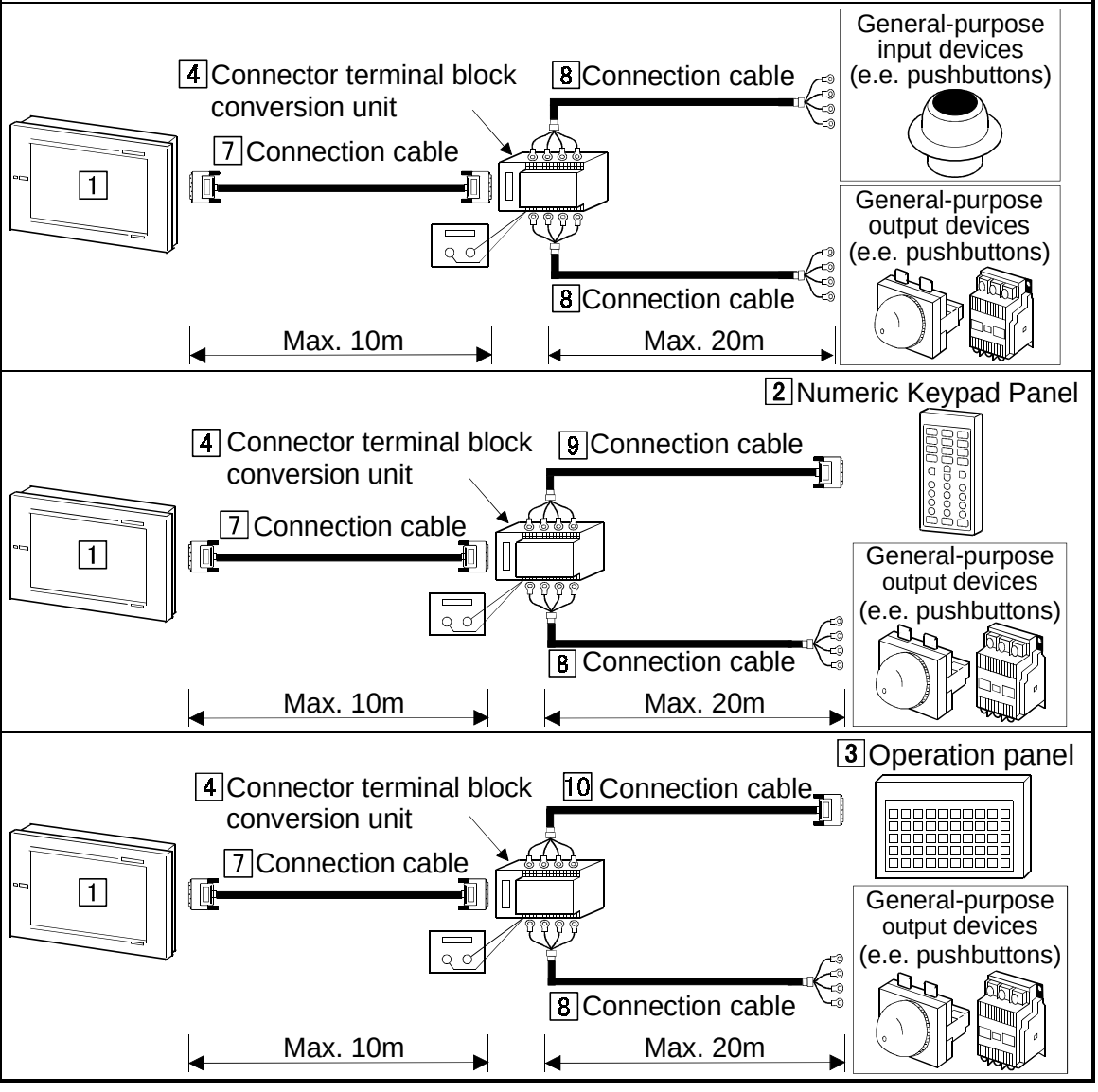
*2: A fuse-blown error will also be displayed when the external supply power switches off.

*3: The fuse in the output unit is provided to prevent the external wiring from burning out if the outputs of the unit are shorted.
Therefore, it may not protect the output elements.
The fuse may not be blown if the output elements are damaged in the fault mode other than a short circuit.

4. System Configuration

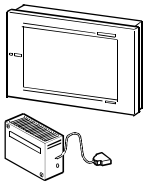
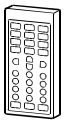
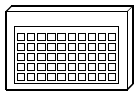
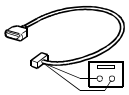
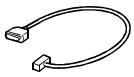
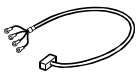
(1) System configurations and connection conditions

The following system configuration assumes connection of a printer. The numbers (1 to 10) given in the system configurations denote the numbers (1 to 10) in "(2) System equipment". Refer to these numbers when you want to confirm the types and applications.

Connection Conditions	System Configuration
For input only	
For I/O	

(2) System equipment

The following table indicates the system equipment needed for connection of external I/O equipment.

Image	No.	Applocation	Type	
			GOT unit	External I/O interface unit
	1	External I/O equipment-connected GOT	A956WGOT, A95*GOT, A85*GOT	A8GT-50KBF
	2	Ten-key panel	A8GT-TK	
	3	Operation panel*1	FP5-MD41-A (Kanaden Corp. make), FP5-MD41-B (Kanaden Corp. make)	
	4	Connector terminal block conversion unit*2	A6TBY36-E, A6TBY54-E	
	5	Connection cable between [GOT] and [ten-key panel]*2*3	A8GT-C05TK(0.5m)	
	6	Connection cable between [GOT] and [operation panel]*1*2*5	Connection cable (Kanaden Corp. make)	
	7	Connection cable between [GOT] and [connector terminal block conversion unit]*2*5	A8GT-C30TB(3m)	
	8	Connection cable between [connector terminal block conversion unit] and [general-purpose I/O equipment]	(Refer to Section 5.1 and fabricate on user side.)	
	9	Connection cable between [connector terminal block conversion unit] and [ten-key panel]	(Refer to A8GT-TK Numeric Keypad Panel User's Manual and fabricate on user side.)	
	10	Connection cable between [connector terminal block conversion unit] and [operation panel]*5	Connection cable (Kanaden Corp. make)	

*1: The operation panel and cable for input only may also be fabricated on user side.
Refer to Section 5.2 for details of the fabricating method.

*2: 12/24VDC power must be supplied for external I/O units.

*3: The connection cable may also be fabricated on user side.
Refer to the A8GT-TK Type Numeric Keypad Panel User's Manual for details of the fabricating method.

*4: The connection cable may also be fabricated on user side. Refer to Section 5.2 for details of the fabricating method.

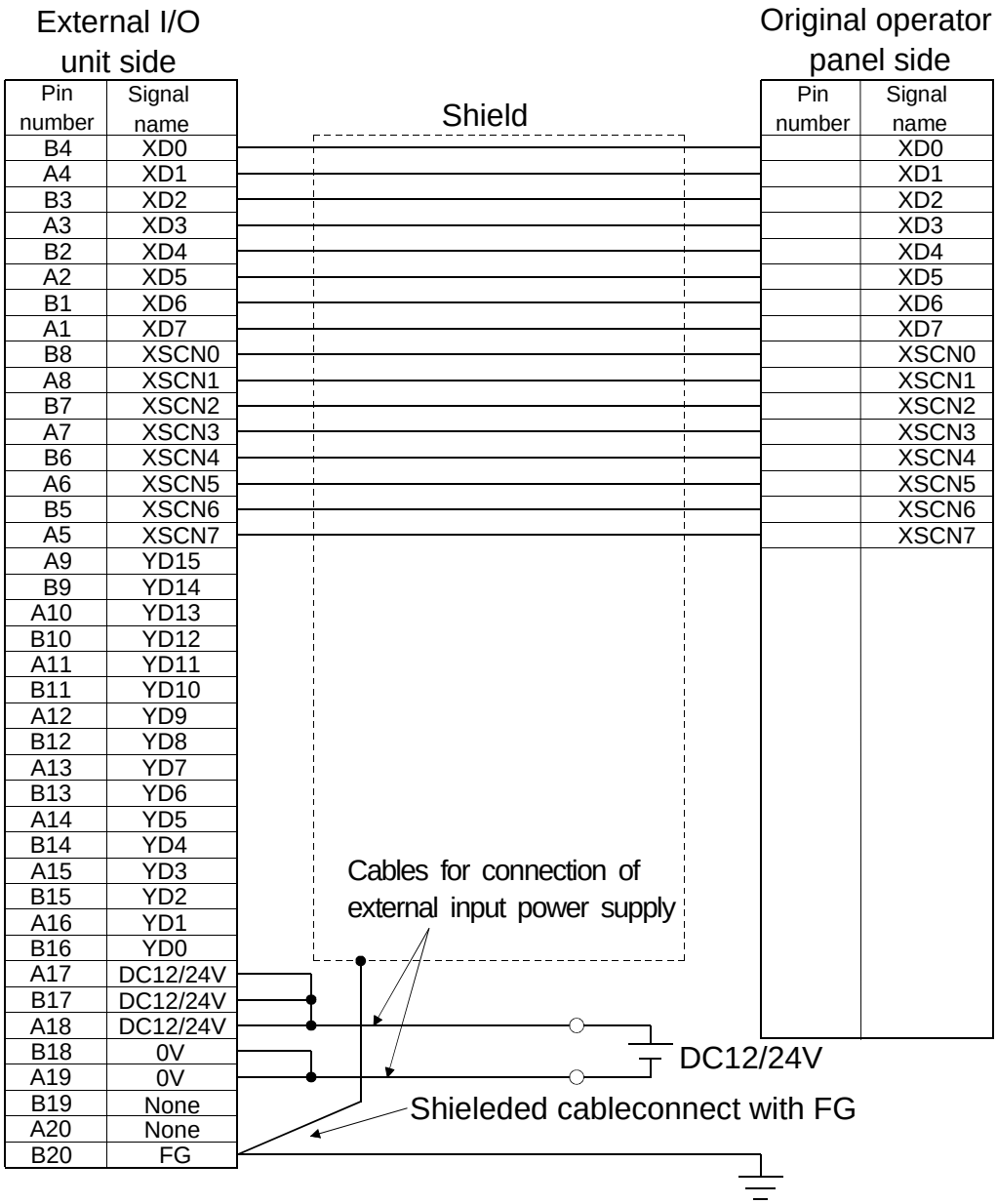
*5: The operation panel and cables for I/O may also be fabricated on user side.
Refer to Section 5.1 for details of the fabricating method.

5. User-fabricated Connection Cables

The following is the way of fabricating the connection cable which can be fabricated by the user:

5.1 Connection cable

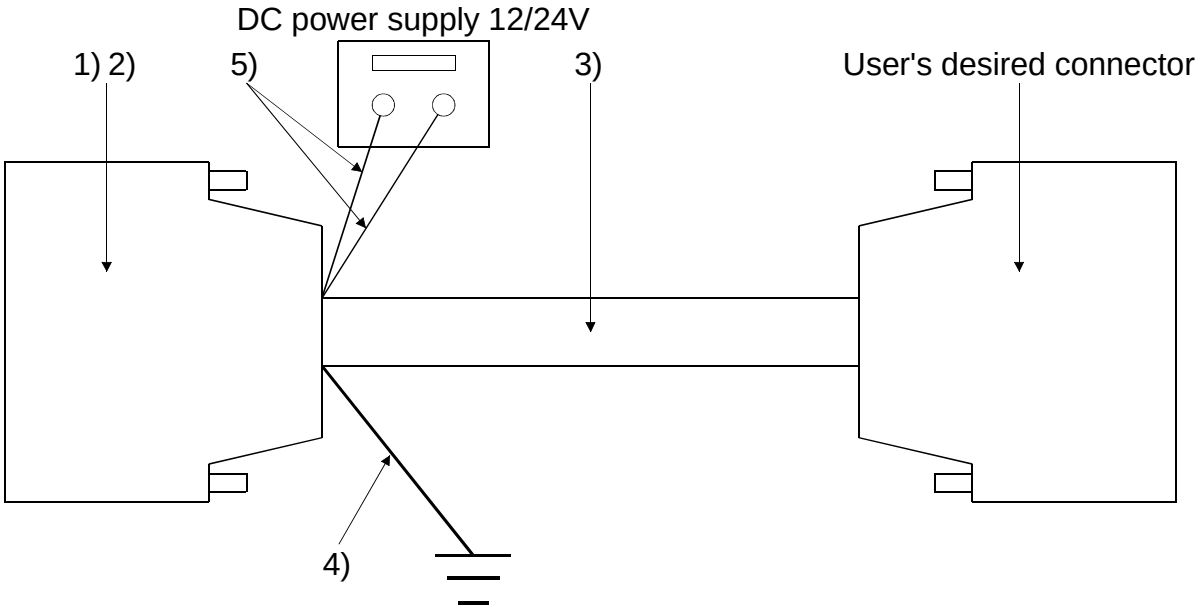
(1) Cable for connection between external I/O unit and original operator panel
Fabricate the connection cable in accordance with the following wiring diagram, parts diagram and assembly drawing: (Maximum cable length: 20m (16.4feet))
(a) Connection diagram



(b) Parts list

Number	Name	Type	Maker
1) 2)	Connector (with cover)	A6CON1	Mitsubishi Electric
1)	Connector	FCN-361JO40-AU	Fujitsu
2)	Connector cover	FCN-360CO40-B	
3)	Pair shielded cable	UL 2464 AWG26 or equivalent	———
4)	FG wire	UL 1015 AWG14 or equivalent	
5)	Wires for connection of external input power	UL 1007 AWG24 or equivalent	

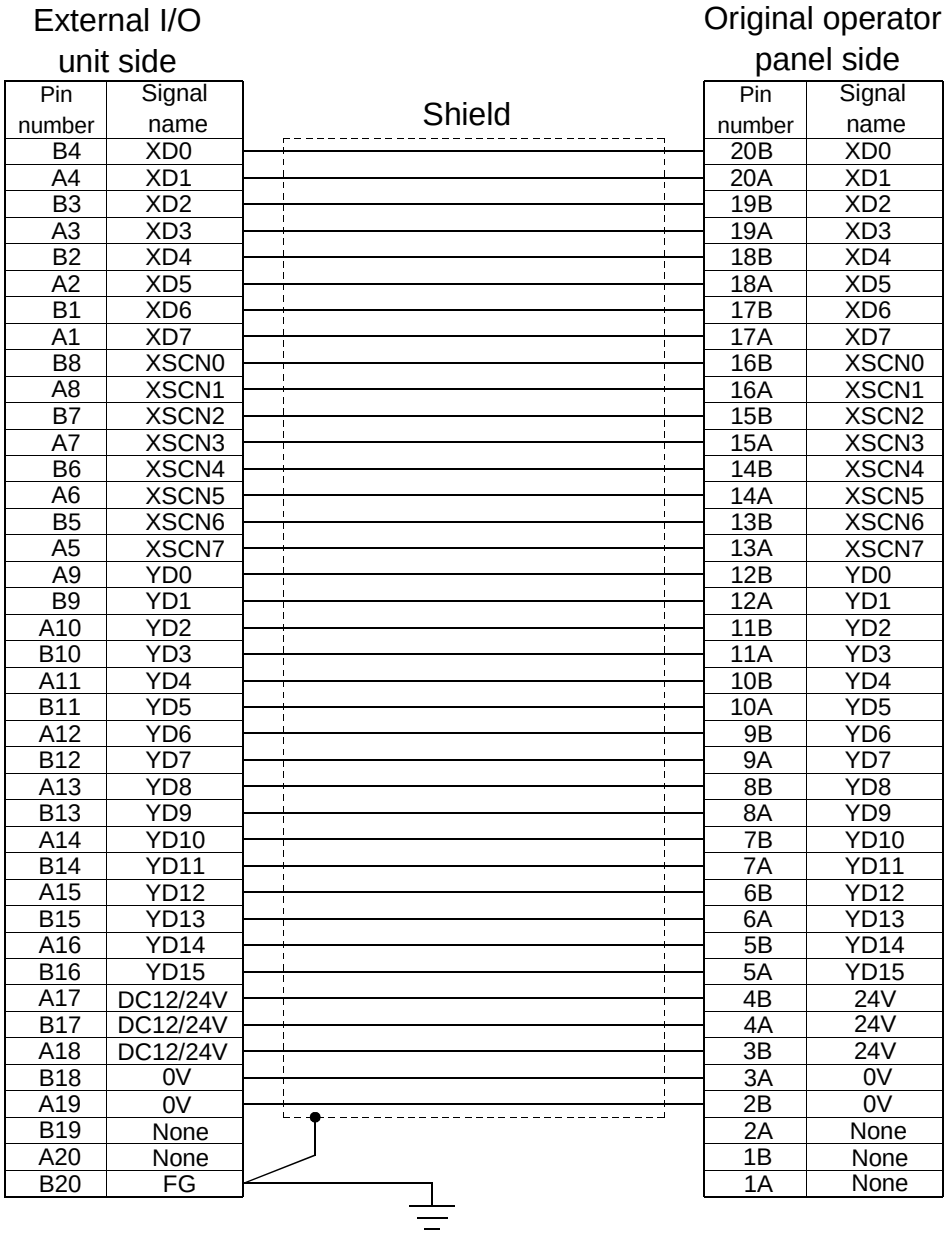
(c) Assembly



POINT

- The cable fabricated should be within 3m in length .
- Connect the FG cable to the nearest ground
- The grounding wire (green wire, approx. 1m) coming out of the connector of the user-fabricated connection cable must be connected to the control box or the like.
- Grounding should be independent where possible.
- Use class D grounding (class 3 grounding) method (grounding resistance is 100 Ω max.).
- The grounding point should be as near as possible to the external I/O module to minimize the grounding cable length.
- Adjust the grounding cable length according to the grounding position and install a terminal or the like for grounding.
- When grounding, always connect the FG cable for connection with the GOT 's power supply terminal block and the FG wire of the user-fabricated connection cable separately.

(2) Cable for connection between external I/O unit and terminal block conversion unit.
Fabricate the connection cable in accordance with the following wiring diagram, parts diagram and assembly drawing: (Maximum cable length: 10m (32.79feet)).
(a) Connection diagram



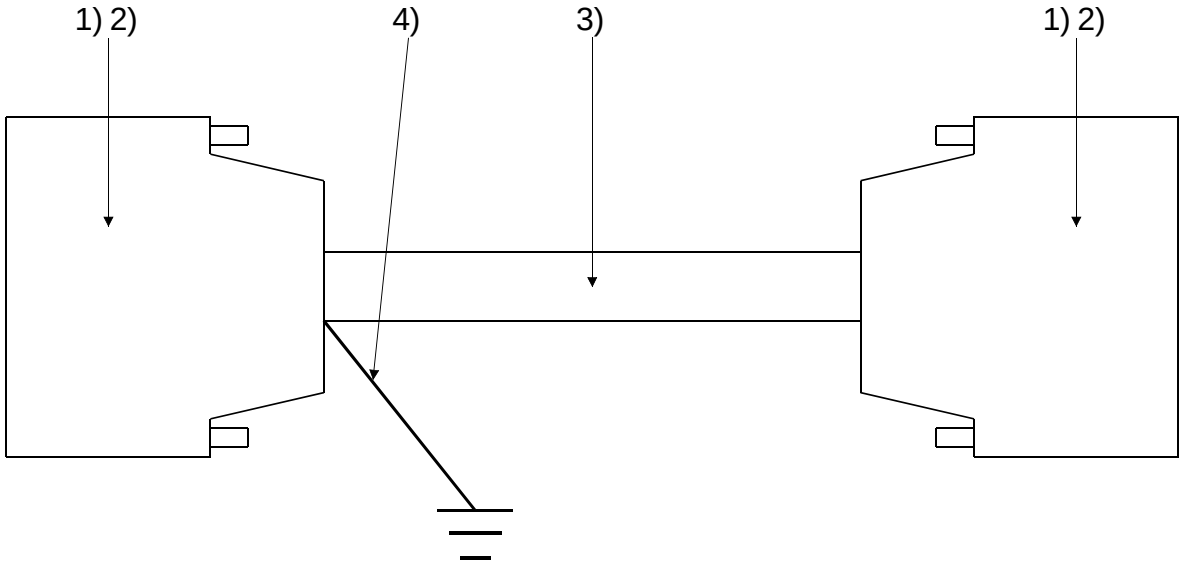
Pin number	Signal name
B4	XD0
A4	XD1
B3	XD2
A3	XD3
B2	XD4
A2	XD5
B1	XD6
A1	XD7
B8	XSCN0
A8	XSCN1
B7	XSCN2
A7	XSCN3
B6	XSCN4
A6	XSCN5
B5	XSCN6
A5	XSCN7
A9	YD0
B9	YD1
A10	YD2
B10	YD3
A11	YD4
B11	YD5
A12	YD6
B12	YD7
A13	YD8
B13	YD9
A14	YD10
B14	YD11
A15	YD12
B15	YD13
A16	YD14
B16	YD15
A17	DC12/24V
B17	DC12/24V
A18	DC12/24V
B18	0V
A19	0V
B19	None
A20	None
B20	FG

Pin number	Signal name
20B	XD0
20A	XD1
19B	XD2
19A	XD3
18B	XD4
18A	XD5
17B	XD6
17A	XD7
16B	XSCN0
16A	XSCN1
15B	XSCN2
15A	XSCN3
14B	XSCN4
14A	XSCN5
13B	XSCN6
13A	XSCN7
12B	YD0
12A	YD1
11B	YD2
11A	YD3
10B	YD4
10A	YD5
9B	YD6
9A	YD7
8B	YD8
8A	YD9
7B	YD10
7A	YD11
6B	YD12
6A	YD13
5B	YD14
5A	YD15
4B	24V
4A	24V
3B	24V
3A	0V
2B	0V
2A	None
1B	None
1A	None

(b) Parts list

Number	Name	Type	Maker
1) 2)	Connector (with cover)	A6CON1	Mitsubishi Electric
1)	Connector	FCN-361JO40-AU	Fujitsu
2)	Connector cover	FCN-360CO40-B	
3)	Pair shielded cable	UL 2464 AWG26 or equivalent	———
4)	FG wire	UL 1015 AWG14 or equivalent	

(c) Assembly



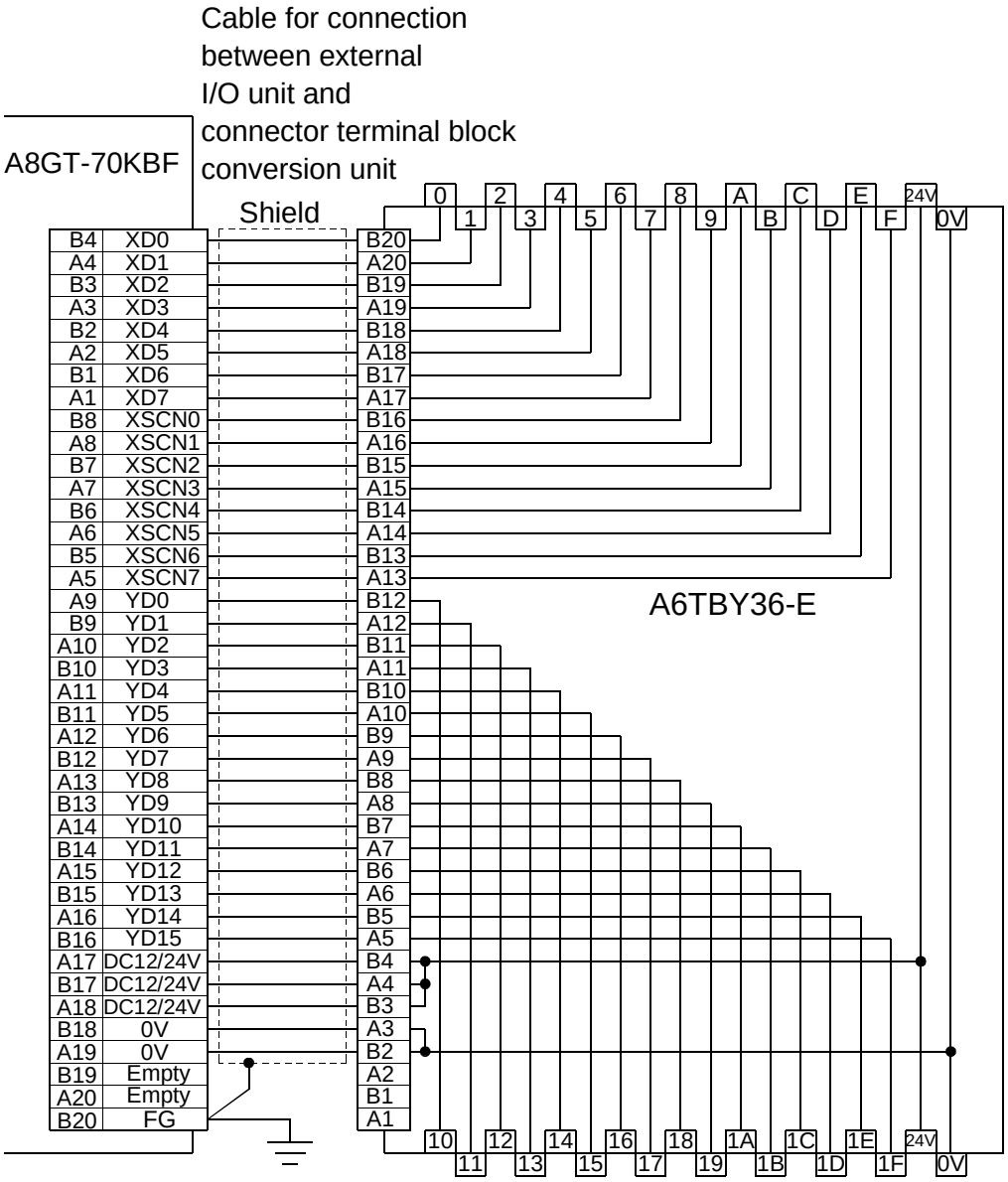
POINT

- The cable fabricated should be within 3m in length .
- Connect the FG cable to the nearest ground
- The grounding wire (green wire, approx. 1m) coming out of the connector of the user-fabricated connection cable must be connected to the control box or the like.
- Grounding should be independent where possible.
- Use class D grounding (class 3 grounding) method (grounding resistance is 100 Ω max.).
- The grounding point should be as near as possible to the external I/O module to minimize the grounding cable length.
- Adjust the grounding cable length according to the grounding position and install a terminal or the like for grounding.
- When grounding, always connect the FG cable for connection with the GOT 's power supply terminal block and the FG wire of the user-fabricated connection cable separately.

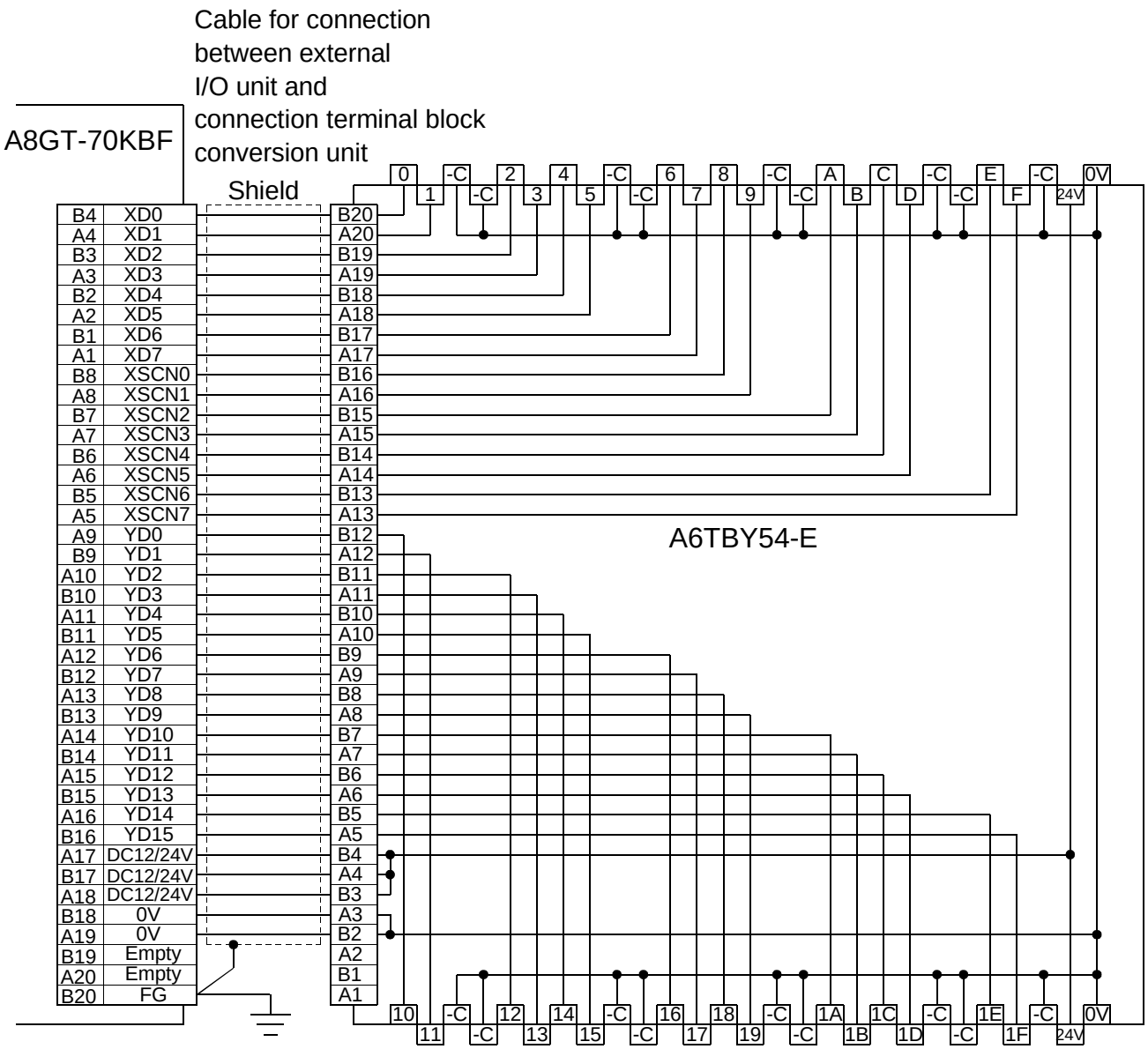
5.2 Wring diagrams

(1) Wiring diagram for use between external I/O unit and connector terminal block conversion unit

(a) For use of the connector terminal block conversion unit (A6TBY36-E)

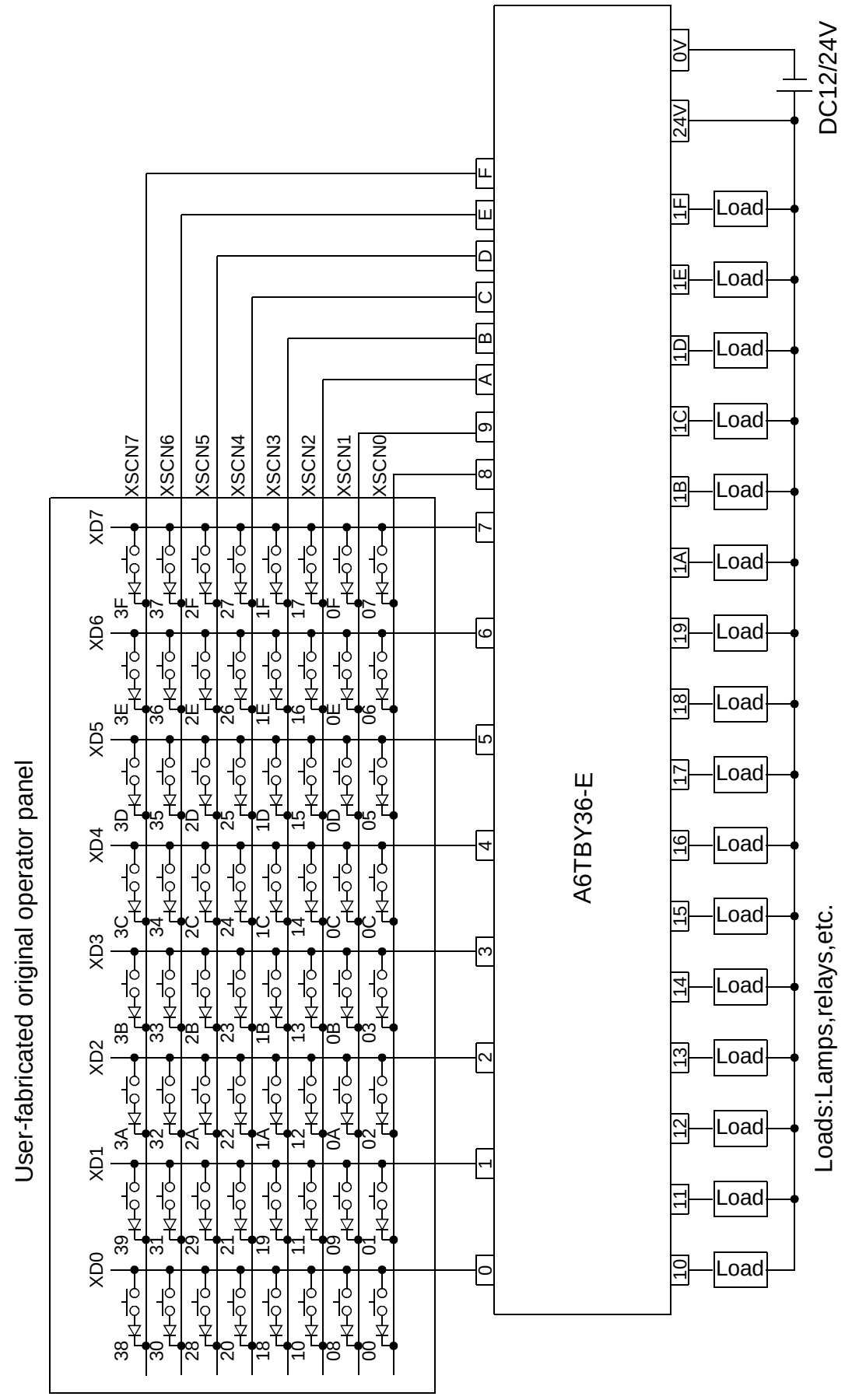


(b) For use of the connection terminal block conversion unit (A6TBY54-E)

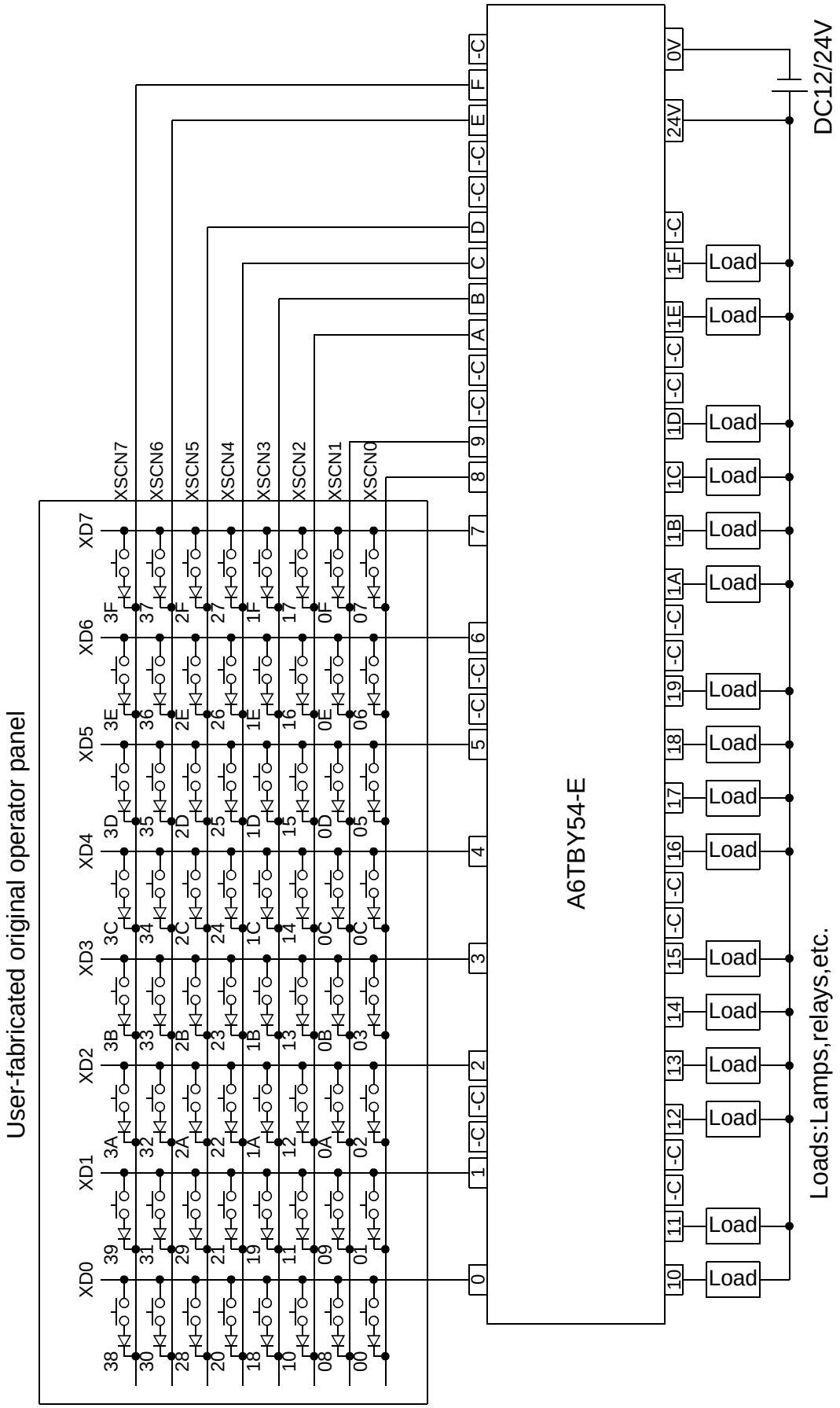


(2) Connection of external inputs and external outputs to the connector terminal block conversion unit.

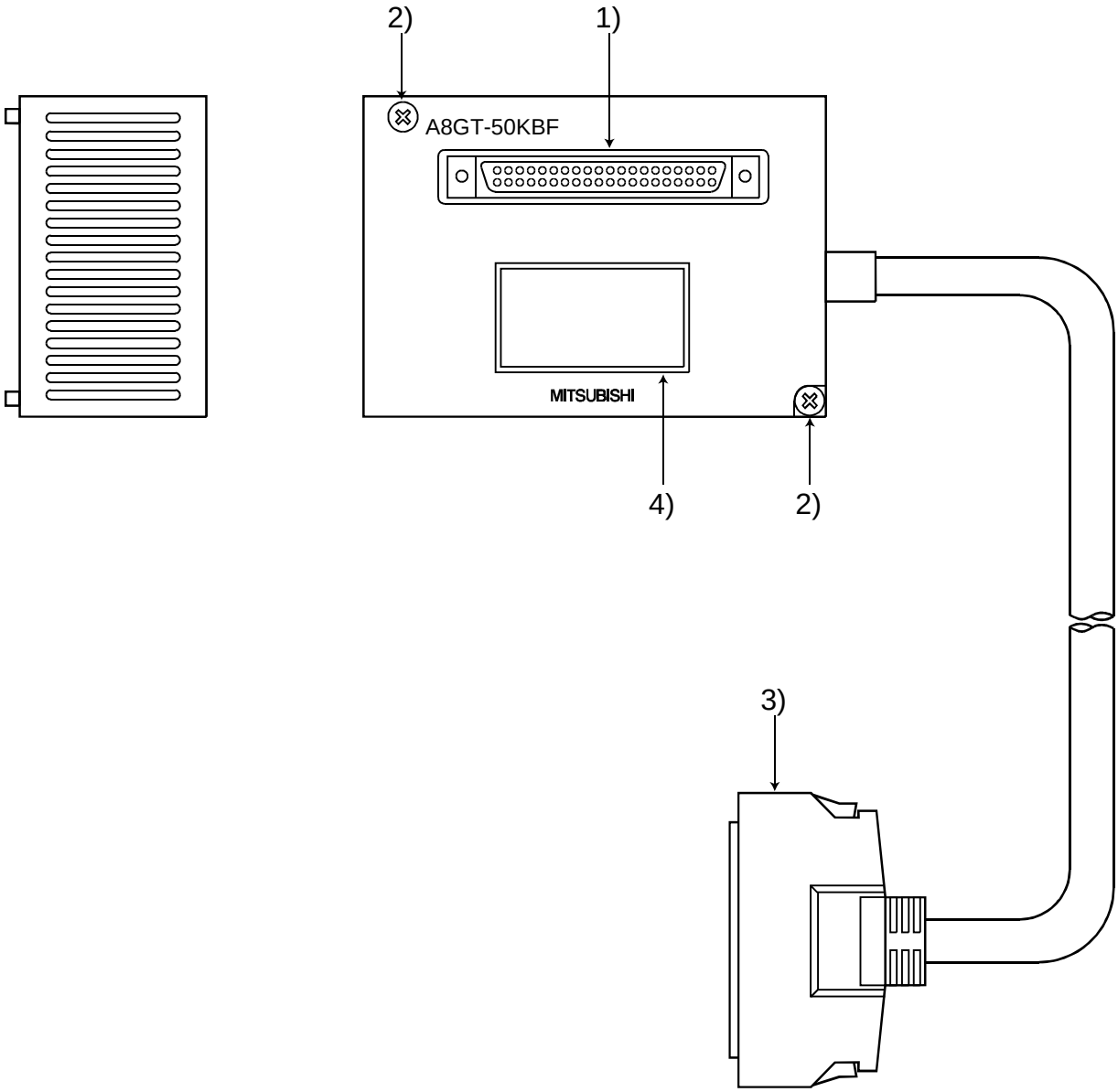
(a) For use of the connector terminal block conversion unit (A6TBY36-E)



(b) For use of the terminal block conversion unit (A6TBY54-E)



6. Pates Identification



No.	Name	Description
1)	I/O cable connection interface	Interface for connection of the I/O cable
2)	Unit fixing screws	Screws used to fix the unit to the GOT
3)	Connector	Connector used to plug the unit to the GOT.
4)	Rating plate	————

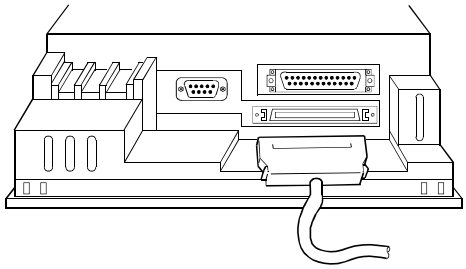
7. Installation Procedure

Install the unit to the GOT in the following procedure:

(1) Thread External I/O unit mounting screw holes in the control box or the like. (2-ϕ3.5 mounting holes)
The External I/O unit's GOT connection cable is 50cm long.
Install the External I/O unit within this distance so that the GOT-end connector of the cable may be fitted into the GOT's connector.
When mounting the External I/O unit on the back of control box door, exercise care to avoid screw holes passing through the control box surface.

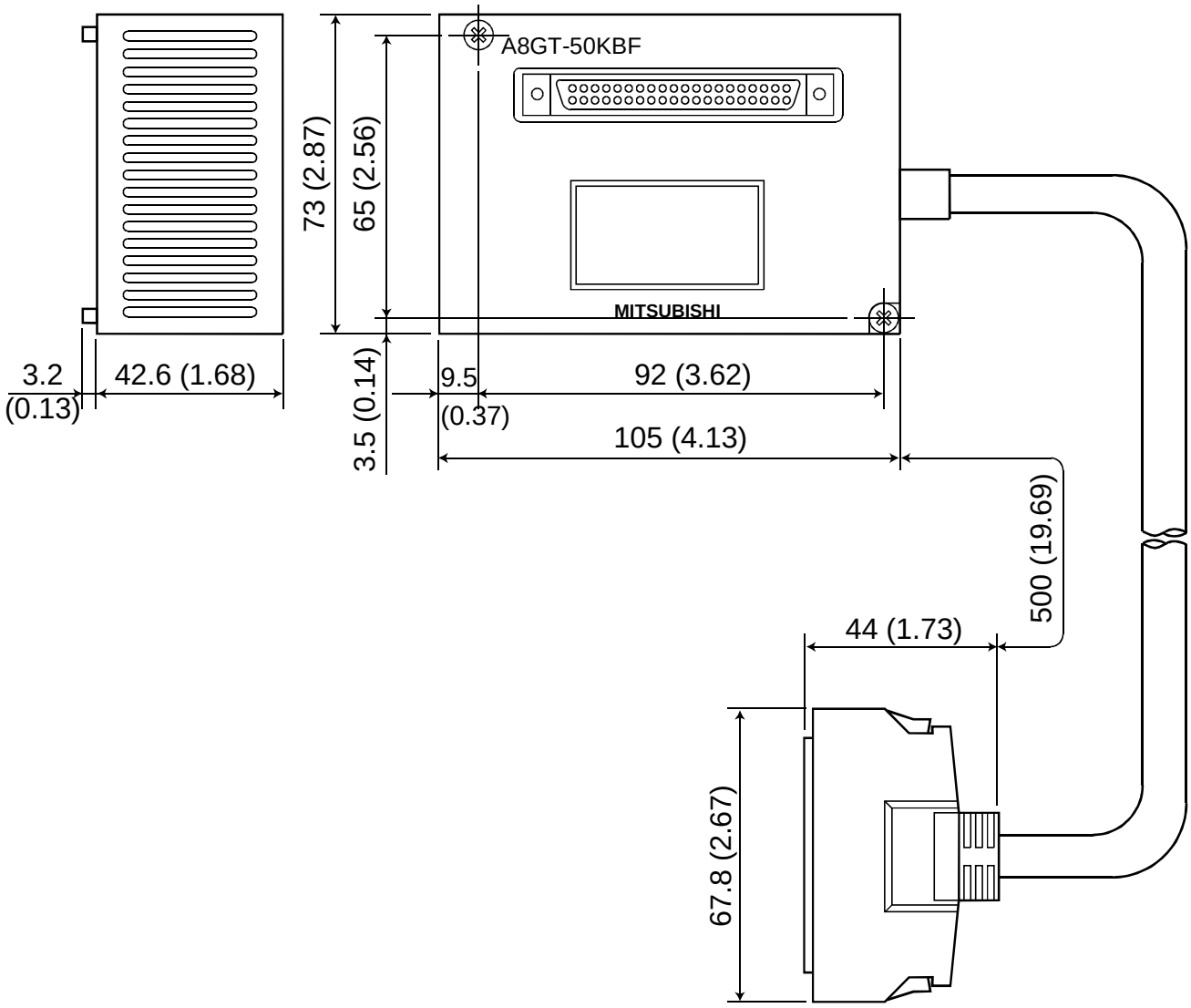
(2) Tighten the mounting screws to the specified torque range 39 to 59N·cm.

(3) Plug the GOT side connector of the External I/O unit to the option unit of the GOT.



To remove the unit, reverse the installation procedure.

8. Outline Dimension Drawing



Unit: mm (inch)

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠For safe use

- 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.
- 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.

Country/Region	Sales office/Tel
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061 Tel : +1-847-478-2100
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. AV. Paulista 1471, Conj. 308, Sao Paulo City, Sao Paulo State, Brazil Tel : +55-11-283-2423
Germany	Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY Tel : +49-2102-486-0
U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Herts., AL10 8XB,UK Tel : +44-1707-276100
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo-Ingr.2 Via Paracelso 12, 20041 Agrate B., Milano, Italy Tel : +39-039-6053344
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80 08190 - Sant Cugat del Valles, Barcelona, Spain Tel : +34-93-565-3131
France	Mitsubishi Electric Europe B.V. French Branch 25 Boulevard des Bouvets, F-92741 Nanterre Cedex, France TEL: +33-1-5568-5568
South Africa	Circuit Breaker Industries LTD. Tripswitch Drive, Elandsfontein Gauteng, South Africa Tel : +27-11-928-2000

Country/Region	Sales office/Tel
Hong Kong	Ryoden Automation Ltd. 10th Floor, Manulife Tower, 169 Electric Road, North Point, HongKong Tel : +852-2887-8870
China	Ryoden Automation Shanghai Ltd. 3F Block5 Building Automation Instrumentation Plaza 103 Cao Bao Rd. Shanghai 200233 China Tel : +86-21-6475-3228
Taiwan	Setsuyo Enterprise Co., Ltd. 6F., No.105 Wu-Kung 3rd.RD, Wu-Ku Hsiang, Taipei Hsine, Taiwan Tel : +886-2-2299-2499
Korea	HAN NEUNG TECHNO CO.,LTD. 1F Dong Seo Game Channel Bldg., 660-11, Deungchon-dong Kangsec-ku, Seoul, Korea Tel : +82-2-3660-9552
Singapore	Mitsubishi Electric Asia Pte, Ltd. 307 ALEXANDRA ROAD #05-01/02, MITSUBISHI ELECTRIC BUILDING SINGAPORE 159943 Tel : +65-6473-2308
Thailand	F. A. Tech Co.,Ltd. 898/28,29,30 S.V.City Building,Office Tower 2,Floor 17-18 Rama 3 Road, Bangkpongpang, Yannawa, Bangkok 10120 Tel : +66-2-682-6522
Indonesia	P.T. Autoteknindo SUMBER MAKMUR Jl. Muara Karang Selatan Block A Utara No.1 Kav. No.11 Kawasan Industri/ Pergudangan Jakarta - Utara 14440 Tel : +62-21-663-0833
India	Messung Systems Put,Ltd. Electronic Sadan NO:111 Unit No15, M.I.D.C BHOSARI,PUNE-411026 Tel : +91-20-712-2807
Australia	Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, PostalBag, No 2, Rydalmere, N.S.W 2116, Australia Tel : +61-2-9684-7777

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : 1-8-12, OFFICE TOWER Z 14F HARUMI CHUO-KU 104-6212, JAPAN
NAGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.
Printed in Japan on recycled paper.