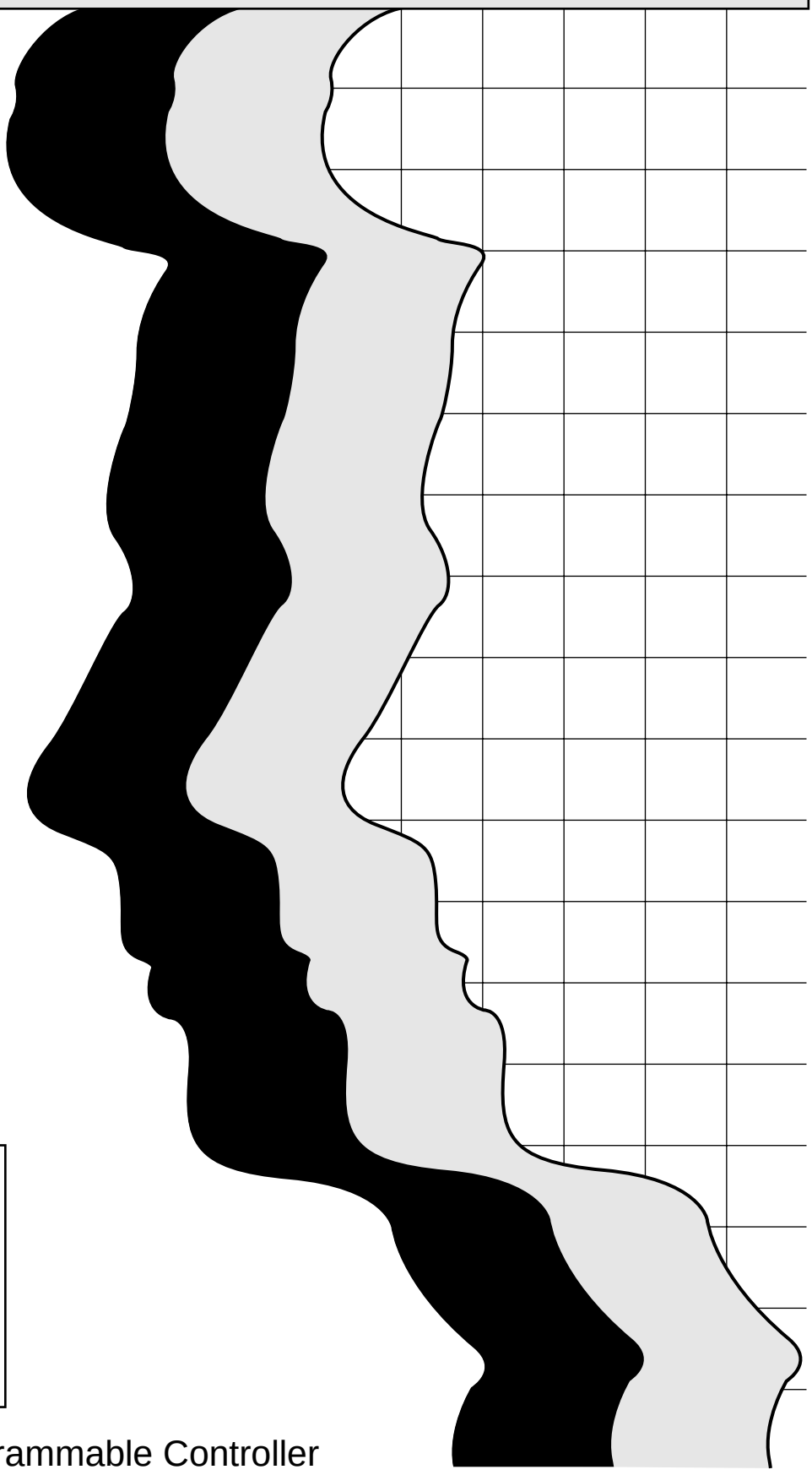
MITSUBISHI

I/O Module Type Building Block

User's Manual



A

MELSEC

Mitsubishi Programmable Controller

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a descriprion of the PLC system safty precautions.

These ● **SAFETY PRECAUTIONS** ● classifiy the safty 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 circumestances, procedures indicated by **CAUTION** may also be linked to serious results.

In many 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

- Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module. Otherwise, trouble could result from erroneous output or erroneous operation.
  (1) Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits positioning upper and lower limits switches and interlocking forward/reverse operations.
  (2) When the PLC detects the following problems, it will stop calculation and turn off all output.
    - The power supply module has and over current protection equipment and over voltage protection equipment.
    - The PLC CPUs self diagnostic functions, such as the watchdog timer error, detect problems. In addition, all output will be turned on when there are problems that the PLC CPU cannot detect, such as in the I/O controller. Build a fail safe circuit exterior to the PC that will make sure the equipment operates safely at such times. Refer to the CPU module user's manual for example fail safe circuits.

    Refer to this user's manual for example fail safe circuits.
  (3) Output could be left on or off when there is trouble in the output module relay or transistor. So build an external monitoring circuit that will monitor any single output that could cause serious trouble.

- When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuse.

- Build a circuit that turns on the external power supply when the PLC main mosule power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.

- When configuring a system, do not leave any slots vacant on the base.
  Should there be any vacant slots, always use a blank cover (AG60) or dummy module (A1SG62). When the extension base A52B, A55B or A58B is used, attach the dustproof cover supplied with the product to the module installed in slot 0. If the cover is not attached, the module's internal parts may be dispersed when a short-circuit test is performed or overcurrent/overvoltage is accidentally applied to the external I/O area.

CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100mm (3.94inch) or more from each other. Not doing so could result in noise that would cause erroneous operation.

- When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than that present in normal circumstances) may flow when the output is turned OFF → ON. Take measures such as replacing the module with one having sufficient rated current.

[INSTALLATION PRECAUTIONSDANGER]

⚠ CAUTION

- Use the PLC in an environment that meets to the general specifications contained in this manual. Using the PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Install so that the pegs on the bottom of the module fit securely into the base unit peg holes and use the specified torque to tighten the module's fixing screws. Not installing the module correctly could result in erroneous operation, damage, or pieces of the product falling. Tightening the screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunctions.
- Do not directly touch the module's conductive parts or electronic components. Doing so could cause erroneous operation or damage of the module.

[WIRING PRECAUTIONS]

⚠ DANGER

- Completely turn off the externally supplied power used in the system when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.
- When turning on the power supply or operating the module after installation or wiring work, be sure that the module's terminal covers are correctly attached.
  Not attaching the terminal cover could result in electric shock.

⚠ CAUTION

- Be sure to ground the FG terminals and LG terminals to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.
- When wiring in the PLC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.
- Tighten the terminal screws to with the specified torque. If the terminal screws are loosen, it could result in short circuits, fire or erroneous operation.
  Tightening the terminal screws too far may cause damages to the screws and /or the module, resulting in fallout, short circuits, or malfunctions.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module.Such debris could cause fires, damage, or erroneous operation.
- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. Imperfect connections could result in short circuit, fires, or erroneous operation.

[STARTUP AND MAINTENANCE PRECAUTIONS]

DANGER

- Do not touch the terminals while the power is ON.
  Doing so could cause shock.
- Switch off all phases of the externally supplied power used in the system when cleaning the module or retightening the terminal or module mounting screws.
  Not doing so could result in electric shock.

CAUTION

- Do not disassemble or modify the modules. Doing so could cause trouble, erroneous operation, injury, or fire.
- Use any radio communication device such as a cellular phone or a PHS phone more than 25cm (9.85 inch) away in all direction of the PLC.
  Not doing so can cause a malfunction.
- Switch off all phases of the externally supplied power used in the system when mounting or removing the module.
  Not doing so could result in failure or malfunction of the module.
- Do not drop or give an impact to the battery installed in the module.
  Otherwise the battery will be broken, possibly causing internal leakage of electrolyte.
  Do not use but dispose of the battery if it has fallen or an impact is given to it.
- Always make sure to touch the grounded metal to discharge the electricity charged in the electricity charged in the body, etc., before touching the module.
  Failure to do say cause a failure or malfunctions of the module.

[DISPOSAL PRECAUTIONS]

CAUTION

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

REVISIONS

※The manual number is given on the bottom left of the back cover.

Print Date	*Manual Number	Revision
Jun., 1988	IB (NA) 66140-A	First edition
Sep., 1989	IB (NA) 66140-B	Correction CONTENTS, Page 2-12, 2-14, 3-19, 4-2 Addition Page 4-1, 4-3 "Instructions for Strategic Materials" added
May, 1993	IB (NA) 66140-C	Addition of modules AX31, AX81-S2, AY40P, AY41P, AY51-S1, AY42-S3, AY42-S4, AY72, AH42 Correction CONTENTS, Section 1, 2, 2.3, 2.9, 2.12, 2.13, 2.14, 2.15, 2.16, 2.22, 3, 3.1, 3.3, 3.4, 3.7, 3.9, 3.15, 3.22, 3.23, 3.24, 3.25, 3.26, 3.27, 3.30, 3.32, 3.33, 4.1.1, 5.1, 7, App. 1, Index Addition Section 2.5, 2.21, 3.12, 3.14, 3.17, 3.18, 3.21, 3.28, 4.2, 6.4
Nov., 1998	IB (NA) 66140-D	Addition of modules AX11EU, AX21EU, AY11AEU, AY11EEU, AY13EU, AY15EU, AY20EU Correction CONTENTS
Feb., 1999	IB (NA) 66140-E	Correction SAFETY PRECAUTIONS, CONTENTS
May, 2003	IB (NA) 66140-F	Correction Section 1.2
Jan., 2005	IB (NA) 66140-G	Correction Thorough review
Jul., 2005	IB (NA) 66140-H	Review of entire content Addition App. 1.7
Mar., 2006	IB (NA) 66140- I	Correction SAFETY PRECAUTIONS, Section 4.1.3, 6.1
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Japanese Manual Version IB - 68036-AG

INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-A Series of Programmable Controllers.
Please read this manual carefully so that the equipment is used to its optimum.
A copy of this manual should be forwarded to the end User.

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Manuals :

The following table list the manuals relevant to this product.
Please order it as necessary.

Related manuals

Manual Name	Manual No.
A1N/A2N(S1)/A3NCPU User's Manual This manual describes the performance, functions, handling, etc., of the A1NCPU, A2NCPU(S1), and A3NCPU, and the specifications and handling for the memory cassette, power supply module, and base unit. (sold separately)	IB-66543 (13JE83)
A2A/A3ACPU User's Manual This manual describes the performance, functions, handling, etc., of the A2ACPU(S1) and A3ACPU, and the specifications and handling of the memory cassette, power supply module, and base unit. (sold separately)	(IB-66544) (13JE84)
A2U(S1)/A3U/A4UCPU User's Manual This manual describes the performance, functions, handling, and so forth of A2UCPU(S1), A3UCPU, A4UCPU, and the specifications and handling of the memory cassette, power supply module, and base unit. (sold separately)	(IB-66436) (13JE25)
Q2ACPU(S1)/Q3ACPU/Q4ACPU User's Manual Discusses QnACPU performance, functions, and operation, and contains the specifications for the power supply, memory card, and base unit. (sold separately)	IB-66608 (13J821)

1.1 GENERAL SPECIFICATIONS

Table 1.1 General specification

Item	Specifications					
Operating ambient temperature	0 to 55°C					
Storage ambient temperature	-20 to 75°C					
Operating ambient humidity	10 to 90%RH, non-condensing					
Storage ambient humidity	10 to 90%RH, non-condensing					
Vibration resistance	Conforming to JIS B 3502, IEC 61131-2		Frequency	Acceleration	Amplitude	Sweep count
		Under intermittent vibration	10 to 57Hz	———	0.075mm (0.003inch)	10 times each in X, Y, Z directions (for 80 min.)
			57 to 150Hz	9.8m/s^2	———	
		Under continuous vibration	10 to 57Hz	———	0.035mm (0.001inch)	
			57 to 150Hz	4.9m/s^2	———	
Shock resistance	Conforming to JIS B 3502, IEC 61131-2 (147 m/s^2, 3 times in each of 3 directions X, Y, Z)					
Operating ambience	No corrosive gases					
Operating altitude	2000m (6562ft.) max.					
Installation location	Inside control panel					
Overvoltage category *1	II max.					
Pollution level *2	2 max.					
Dielectric voltage	1500VAC across external AC terminal batch and earth:1 min. 500VAC across external DC terminal batch and earth:1 min.					
Withstanding noise	By noise simulator of noise voltage(AC type:1500 Vp-p, DC type:500 Vp-p), 1μs noise width and 25 to 60Hz noise frequency					
Insulation resistance	500VDC across external AC voltage batch and earth:5MΩ or more with a insulation resistance tester					

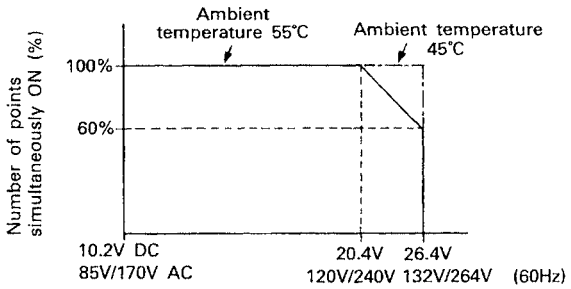
*1 : This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
Category II applies to equipment for which electrical power is supplied from fixed facilities.
The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

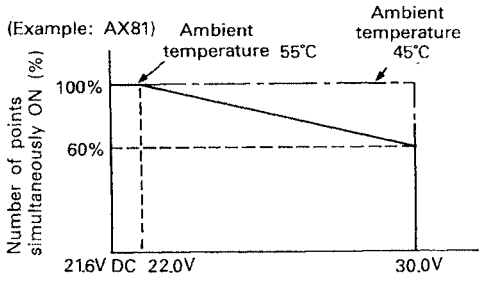
*2 : This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

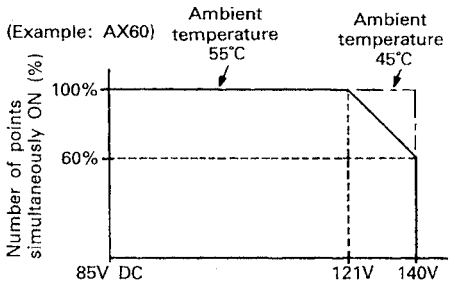
*3 : Do not use or store the PLC under pressure higher than the atmospheric pressure of altitude 0m. Doing so can cause a malfunction.
When using the PLC under pressure, please contact your sales representative.

1.2 NOTES ON SELECTING THE I/O MODULES

(1) The maximum number of input points which may be switched ON at any one time ("Max. Simultaneously ON" in the following tables) for a 32 or 64 way module depends on the input voltage and ambient temperature as shown in the following diagrams.





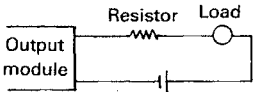


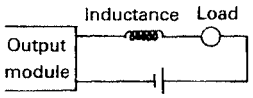
(2) Triac output modules should be used instead of relay contact output modules when:
- The outputs are being switched very frequently.
- A large inductive load is being switched.
- An inductive load with a low power factor is being switched.

The life of a relay switching any of the above conditions will be substantially reduced.

(3) The ON time and OFF time for any inductive load switched by an output module must be more than one second.

(4) Beware of rush currents when an AY40, AY41 or AY42 output module is used to switch a load incorperating a DC/DC converter (e.g. a timer or counter).
Either connect a resistive or inductive load in series with the load or use an AY50 or AY51 output module.





(5) The maximum number of output points which may be switched on at one time depends on the current capacity of the common terminal which, in turn, depends on the ambient temperature.
Note that if certain output modules are installed next to a power supply module the current capacity of the common terminal must be de-rated. The de-rated current capacity is given in parentheses in the specification tables.

(6) Output modules fitted with on-board fuses will be protected by the fuses providing the following criteria are met:

Item \ Load Voltage	12/24V DC Load	48V DC Load	100/200V AC Load
Wiring length	3m (118.11inch) minimum	3m (118.11inch) minimum	3m (118.11inch) minimum
Cable size	2mm² (14 AWG) maximum	2mm² (14 AWG) maximum	2mm² (14 AWG) maximum
Short-circuit current	20A maximum	9A maximum	——
Transformer capacity	——	——	2kVA maximum

Where these criteria are not met and fuse protection is required an external "fast-blow" fuse should be provided. The following external fast-blow fuses are recommended.

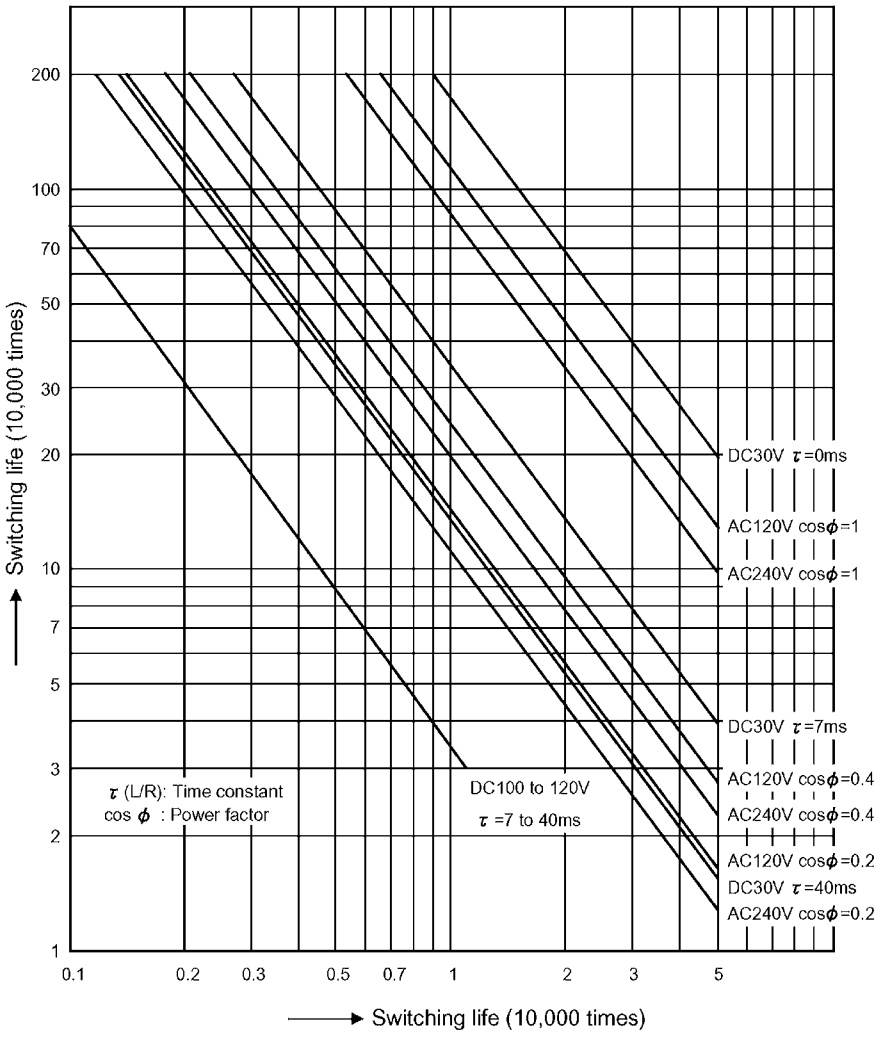
AC : HP fuse

DC : MP fuse

(7) **Following chart shows the relay life of relay output module based on actual use.**

Although the values on the chart are based on the relay characteristics, it is advisable to select a relay considering the description in (2).

(a) In the case of AY10, AY10A, AY11, AY11A, AY11E, AY13 or AY13E model



POINT

(1) When using the module for the application in which the relay contact is frequently switched, the relay life span should be considered. Therefore, it is recommended to use a triac output module.

(2) The relay life curve shows the value based on actual use, which is not guaranteed. Therefore, make sure to allow for a margin of error.

The relay life span differs according to the specifications as follows:

Rated switching voltage, current load	200 thousand operations
200V AC 1.5A, 240V AC 1A (COS ϕ =0.7)	200 thousand operations
200V AC 0.75A, 240V AC 0.5A (COS ϕ =0.35)	200 thousand operations
24V DC 1A, 100V DC 0.1A (L/R=7ms)	200 thousand operations

(3) Relay life is substantially affected by the load type and inrush current characteristics.

The inrush current may cause the contact welding. Therefore, consideration should be given to it as well as constant current.

(a) Inductive load

When the inductive load such as electromagnetic contactor or solenoid is shut off, high counter-electromotive force is generated between the contacting materials to produce an arc discharge. Consideration should be made especially when the power factor is low, as it may decrease the life period.

In addition, make sure to consider the contact melting, as the inrush current equivalent to 5 to 15 times of constant current flows when the module is powered on.

(b) Lamp load

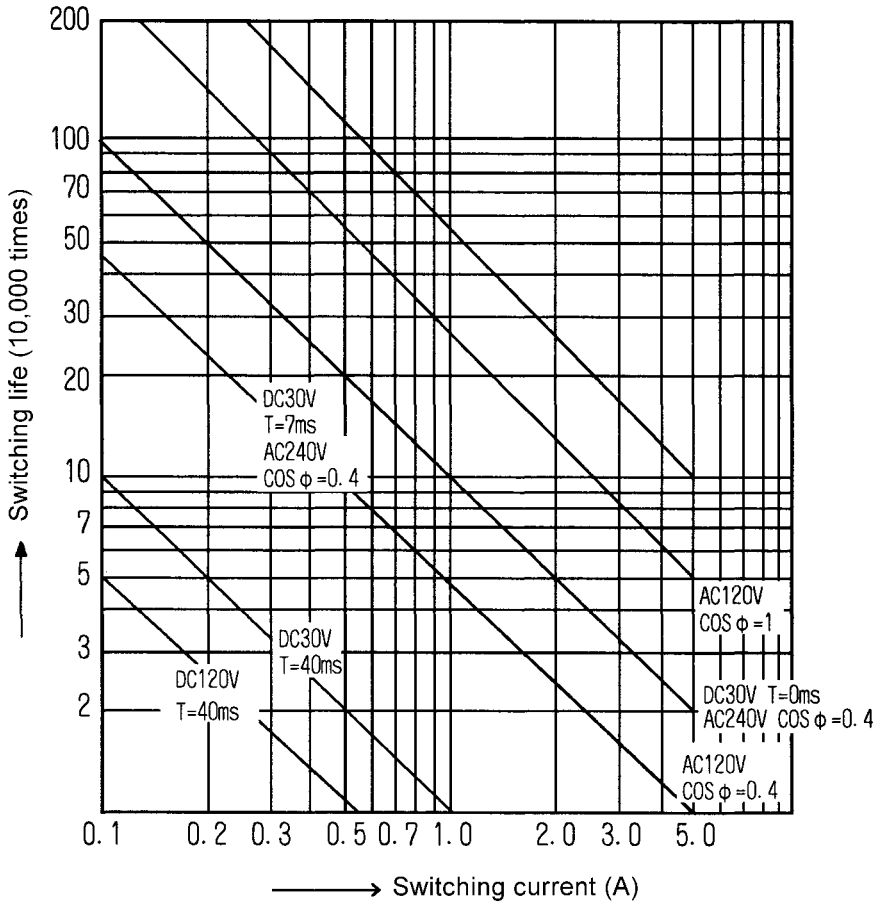
Make sure to consider the contact melting, as the inrush current equivalent to 10 to 15 times of constant current flows in the lamp circuit.

(c) Capacitive load

Make sure to consider the contact melting when a device such as condenser is used in a load circuit, as the inrush current equivalent to 20 to 40 times of constant current may flow in the circuit.

Also, pay full attention to the wire capacity if long length of wire is routed.

(b) In the case of AY15EU model



POINT

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(2) The relay life curve shows the value based on actual use, which is not guaranteed. Therefore, make sure to allow for a margin of error.

The relay life span differs according to the specifications as follows:

Rated switching voltage, current load	100 thousand operations
200V AC 2A, 240V AC 1.8A (COS ϕ =0.7)	200 thousand operations
200V AC 1.1A, 240V AC 0.9A (COS ϕ =0.35)	200 thousand operations
24V DC 1.1A, 100V DC 0.1A (L/R=7ms)	200 thousand operations

(3) Relay life is substantially affected by the load type and inrush current characteristics.

The inrush current may cause the contact welding. Therefore, consideration should be given to it as well as constant current.

(a) Inductive load

When the inductive load such as electromagnetic contactor or solenoid is shut off, high counter-electromotive force is generated between the contacting materials to produce an arc discharge. Consideration should be made especially when the power factor is low, as it may decrease the life period.

In addition, make sure to consider the contact melting, as the inrush current equivalent to 5 to 15 times of constant current flows when the module is powered on.

(b) Lamp load

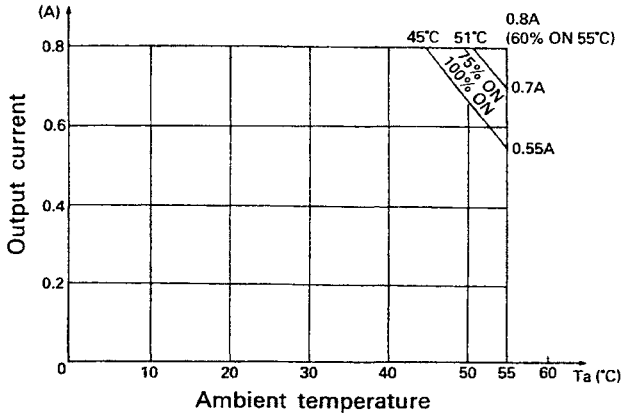
Make sure to consider the contact melting, as the inrush current equivalent to 10 to 15 times of constant current flows in the lamp circuit.

(c) Capacitive load

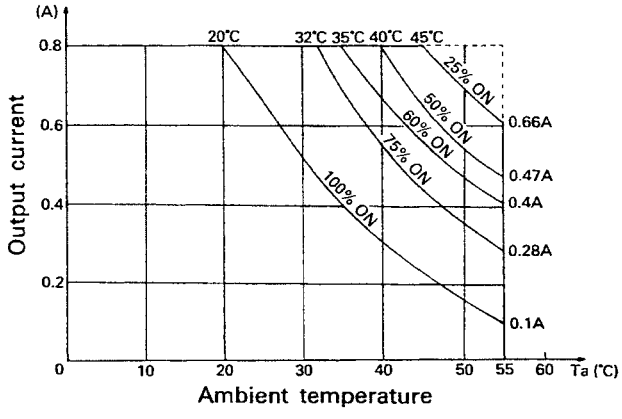
Make sure to consider the contact melting when a device such as condenser is used in a load circuit, as the inrush current equivalent to 20 to 40 times of constant current may flow in the circuit.

Also, pay full attention to the wire capacity if long length of wire is routed.

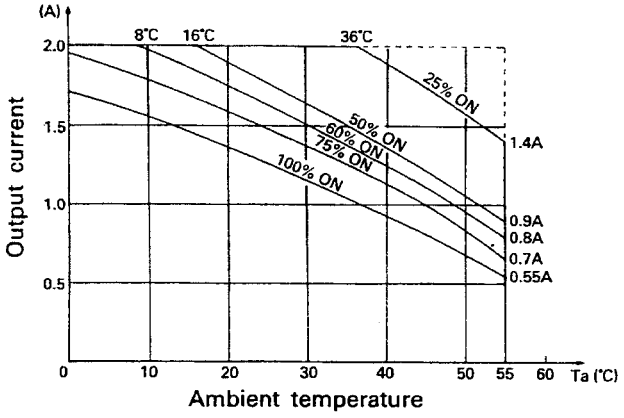
(8) The maximum number of output points which may be simultaneously on in the AY80EP, AY81EP or AY60EP output units varies with output current and ambient temperature as follows.



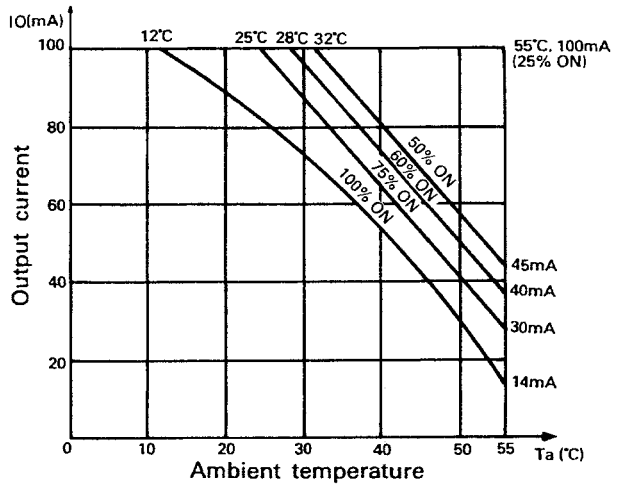
AY80EP



AY81EP

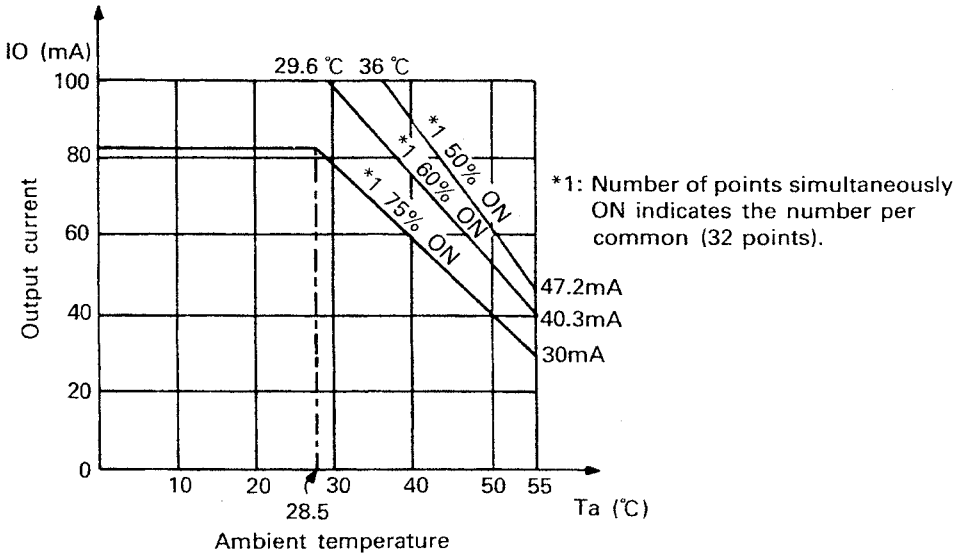


AY60EP



AY82EP

(9) The maximum number of output points which may be simultaneously on in the AY42-S3 (with fuse) varies with output current and ambient temperature as follows.



(10) The input module AX42, AX42-S1 and output module AY42, AY42-S1, etc., are included with soldering type 40-pin connectors. Pressure-displacement type and crimp-contact type 40-pin connectors are also applicable to the modules. The tool for pressure-displacement and crimp-contact must be prepared by the user.

(a) Soldering type 40-pin connector

Model name ····· A6CON1 (straight type)
A6CON4 (straight/bidirectional type)

(b) Pressure-displacement type 40-pin connector

Model name ····· A6CON2 (straight type)

Crimp-contact tool ····· FUJITSU COMPONENT LIMITED
FCN-363-T005/H

Applicable wire size ····· AWG#24 to 28

(c) Pressure-displacement type 40-pin connector

Model name ····· A6CON3 (flat cable type)

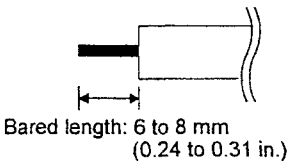
Pressure-displacement tool ····· FUJITSU COMPONENT LIMITED
FCN-367T-T012/H (locator plate)
FCN-707T-T001/H (cable cutter)
FCN-707T-T101/H (hand press)

Applicable wire size ····· AWG#28 (twisted)
AWG#30 (single wire)

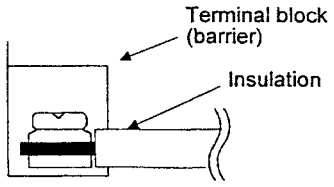
(11) When using AX□EU, AY□EU, etc., if the wires are connected to the terminal block without using solderless terminals, observe the following points.

(a) Bare the end of insulated wires to expose about 6 to 8 mm of naked wire.

When making connections, ensure that bared wire dose project from the terminal block. If it dose, it may close the gap to a distance shorter than that required for insulation between the terminals.



Treatment of end of wire



Connection to the terminal block
(viewed from side)

(b) If twisted wire is used, make sure that is dose not unravel.

(12) Precaution when connecting the uninterruptive power supply

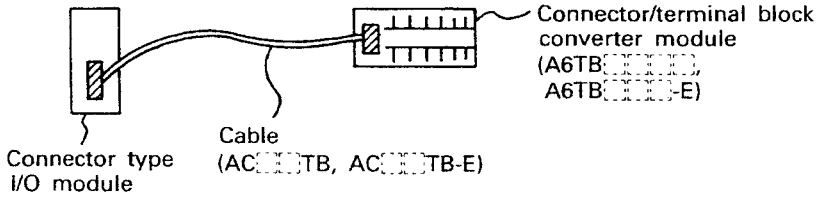
As for UPS, use the online power system or online interactive system with a voltage distortion rate of 5% or less.
Do not use any UPS of the commercial online power system.

REMARK

Consult your nearest supplier with the following I/O module related parts and cable.

(1) Connector/terminal block converter module and cable

I/O wiring can be installed using a terminal block by connecting a connector type I/O unit to a connector/terminal block converter module via a cable.

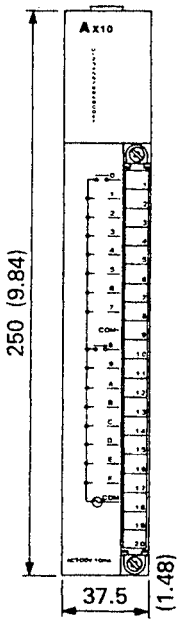


[Supplier]
Consult your nearest Mitsubishi representative.

2. INPUT MODULE SPECIFICATIONS

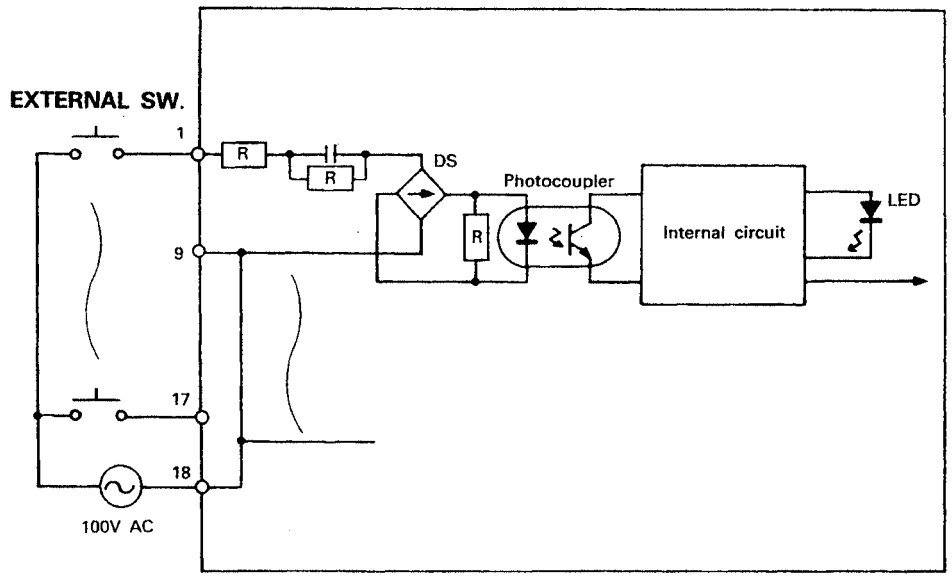
2.1 Type AX10 Input Module

AC Input

Specifications \ Type		AX10	Front View mm(inch)
Input points		16 points	
Insulation system		Photocoupler	
Rated input voltage		100—120V AC 50/60Hz	
Input voltage distortion		With in 5% (Refer to section 1.2 (13))	
Rated input current		10mA (100V AC 60Hz)	
Operating voltage range		85 to 132V AC (50/60Hz ± 5%)	
Max. simultaneously ON		100% (16 points)	
Inrush current		Max. 300mA, within 0.3ms (132V AC)	
ON voltage/ON current		80V AC or higher/6mA or higher	
OFF voltage/OFF current		40V AC or lower/4mA or lower	
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)	
Response time	OFF → ON	15ms or less	
	ON → OFF	25ms or less	
Internal current consumption (5V DC)		55mA (TYP. all points ON)	
Common terminal arrangement		16 points/common (common terminal: TB9, TB18)	
Operation indicator		ON indication (LED)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.39kg (0.86lbs)

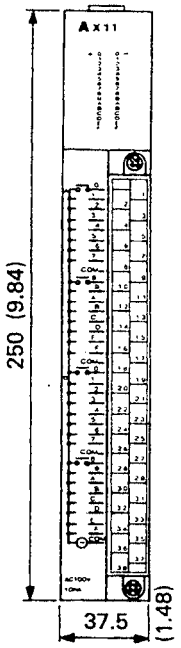
Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	Power supply common
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	Power supply common
TB19	Vacant
TB20	Vacant

INTERNAL CIRCUIT

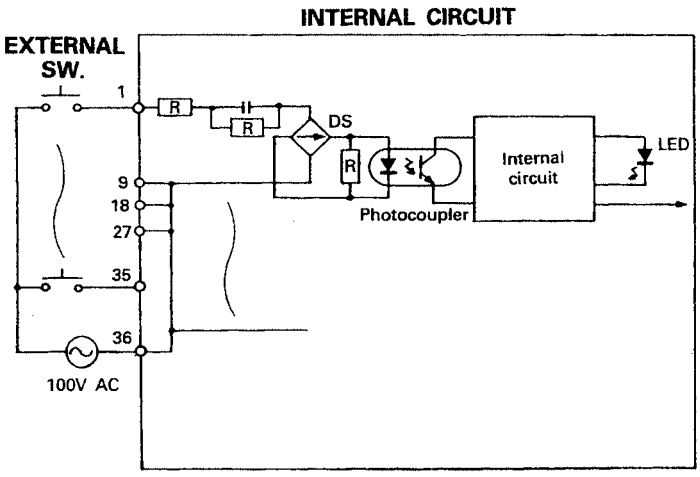


2.2 Type AX11 Input Module

AC Input

Specifications \ Type		AX11	Front View mm(inch)
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		100—120V AC 50/60Hz	
Input voltage distortion		With in 5% (Refer to section 1.2 (13))	
Rated input current		10mA (100V AC 60Hz)	
Operating voltage range		85 to 132V AC (50/60Hz ± 5%)	
Max. simultaneously ON		60% (20 points)	
Inrush current		Max. 300mA, within 0.3ms (132V AC)	
ON voltage/ON current		80V AC or higher/6mA or higher	
OFF voltage/OFF current		40V AC or lower/4mA or lower	
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)	
Response time	OFF → ON	15ms or less	
	ON → OFF	25ms or less	
Internal current consumption (5V DC)		110mA (TYP. all points ON)	
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)	
Operation indicator		ON indication (LED)	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.49kg (1.078lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common
TB8	X07	TB28	X18
TB9	Power supply common	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common
TB17	X0F	TB37	Vacant
TB18	Power supply common	TB38	Vacant
TB19	X10		
TB20	X11		

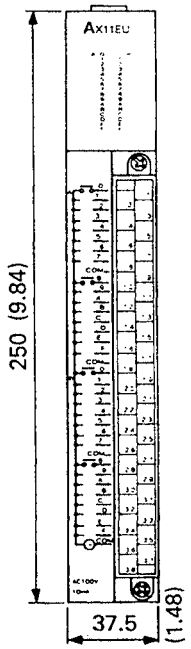


2.2.1 Type AX11EU Input Module

AC Input

Specifications \ Type		AX11EU
Input points		32 points
Insulation system		Photocoupler
Rated input voltage		100—120V AC 50/60Hz
Input voltage distortion		With in 5% (Refer to section 1.2 (13))
Rated input current		12mA (100V AC 60Hz)
Operating voltage range		85 to 132V AC (50/60Hz ± 5%)
Max. simulataneously ON		60% (20 points)
Inrush current		Max. 300mA, within 0.3ms (132V AC)
ON voltage/ON current		79V AC or higher/6mA or higher
OFF voltage/OFF current		40V AC or lower/4mA or lower
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)
Response time	OFF — ON	15ms or less (100V AC, 60Hz)
	ON — OFF	25ms or less (100V AC, 60Hz)
Internal current consumption (5V DC)		150mA (TYP. all points ON)
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)
Operation indicator		ON indication (LED)
Connection method		38-point removable terminal block (M3.5 X 6mm metric screws)
Applicable wire size		0.75 to 2mm² (AWG14 to AWG19) (Applicable tightening torque 78.4N·cm)
Applicable solderless terminal		RAV1.25-3.5, RAV2-3.5
Withstand Voltage		1780V AC rms/3 cycle (2,000m)
Insulator resistor		10MΩ or more using a insulation resistance tester
Noise immunity		IEC801-4; 1kV

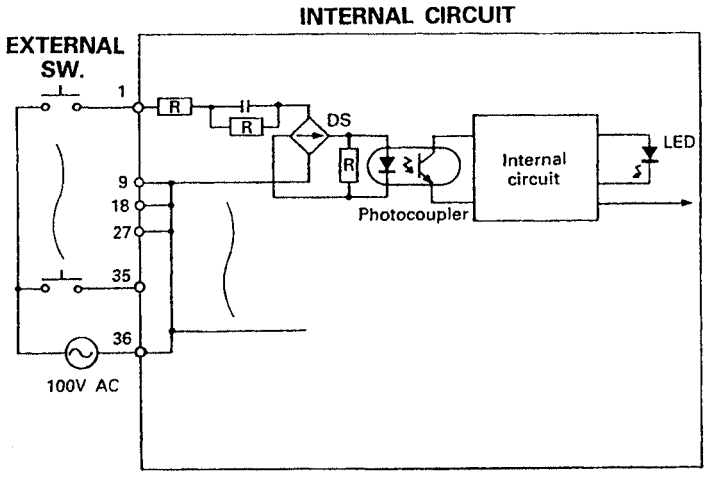
Front View mm(inch)



Weight 0.50kg (1.10lbs)

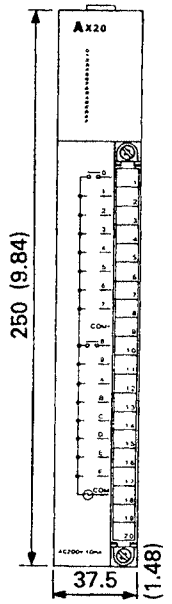
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common
TB8	X07	TB28	X18
TB9	Power supply common	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common
TB17	X0F	TB37	Vacant
TB18	Power supply common	TB38	Vacant
TB19	X10		
TB20	X11		

INTERNAL CIRCUIT



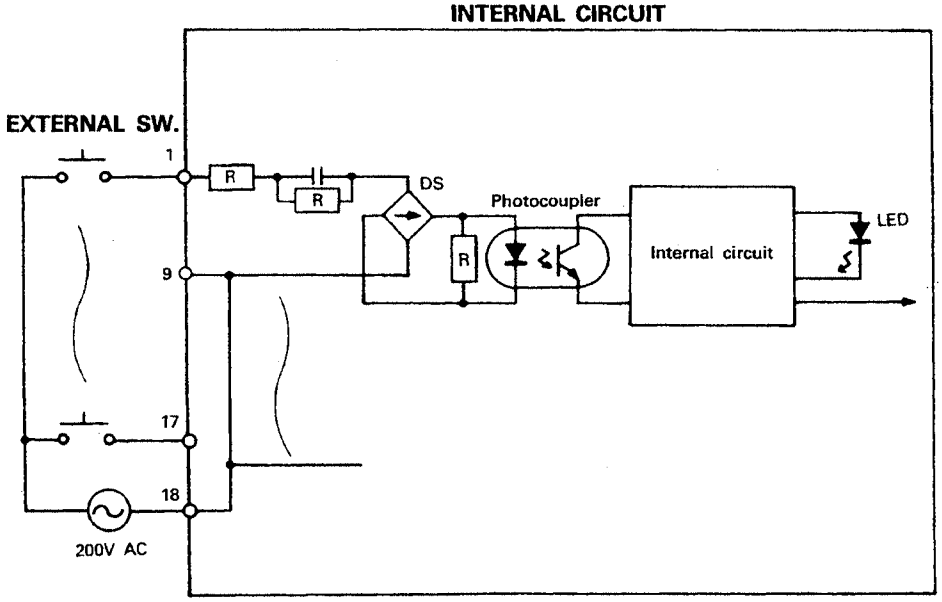
2.3 Type AX20 Input Module

AC Input

Specifications \ Type		AX20	Front View mm(inch)
Input points		16 points	
Insulation system		Photocoupler	
Rated input voltage		200—240V AC 50/60Hz	
Input voltage distortion		With in 5% (Refer to section 1.2 (13))	
Rated input current		10mA (200V AC 60Hz)	
Operating voltage range		170 to 264V AC (50/60Hz ± 5%)	
Max. simultaneously ON		100% (16 points)	
Inrush current		Max. 600mA, within 0.12ms (264V AC)	
ON voltage/ON current		160V AC or higher/5.5mA or higher	
OFF voltage/OFF current		70V AC or lower/3.5mA or lower	
Input impedance		Approx. 22kΩ (60Hz), approx. 24kΩ (50Hz)	
Response time	OFF → ON	15ms or less	
	ON → OFF	25ms or less	
Internal current consumption (5V DC)		55mA (TYP. all points ON)	
Common terminal arrangement		16 points/common (common terminal: TB9, TB18)	
Operation indicator		ON indication (LED)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.38kg (0.84lbs)

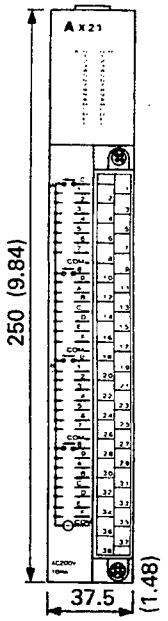
Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	Power supply common
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	Power supply common
TB19	Vacant
TB20	Vacant

INTERNAL CIRCUIT



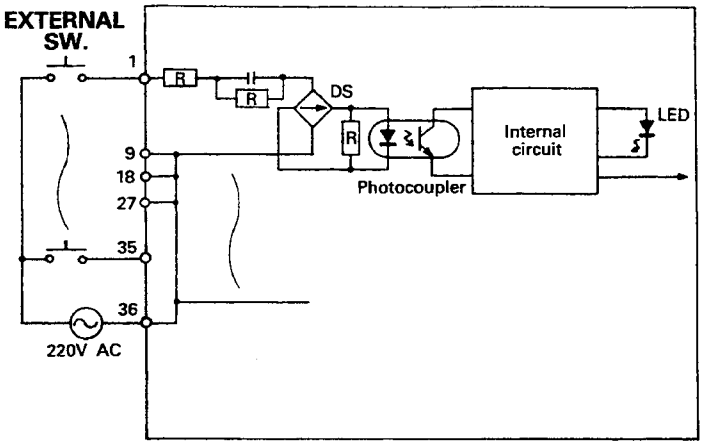
2.4 Type AX21 Input Module

AC Input

Specifications \ Type		AX21	Front View mm(inch)
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		200—240V AC 50/60Hz	
Input voltage distortion		With in 5% (Refer to section 1.2 (13))	
Rated input current		10mA (220V AC 60Hz)	
Operating voltage range		170 to 264V AC (50/60Hz ± 5%)	
Max. simultaneously ON		60% (20 points)	
Inrush current		Max. 600mA, within 0.12ms (264V AC)	
ON voltage/ON current		160V AC or higher/5.5mA or higher	
OFF voltage/OFF current		70V AC or lower/3.5mA or lower	
Input impedance		Approx. 22kΩ (60Hz), approx. 24kΩ (50Hz)	
Response time	OFF → ON	15ms or less	
	ON → OFF	25ms or less	
Internal current consumption (5V DC)		110mA (TYP. all points ON)	
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)	
Operation indicator		ON indication (LED)	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.5kg (1.1lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common
TB8	X07	TB28	X18
TB9	Power supply common	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common
TB17	X0F	TB37	Vacant
TB18	Power supply common	TB38	Vacant
TB19	X10		
TB20	X11		

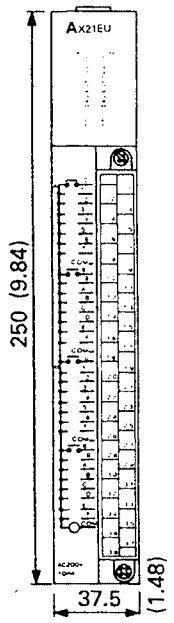
INTERNAL CIRCUIT



2.4.1 Type AX21EU Input Module

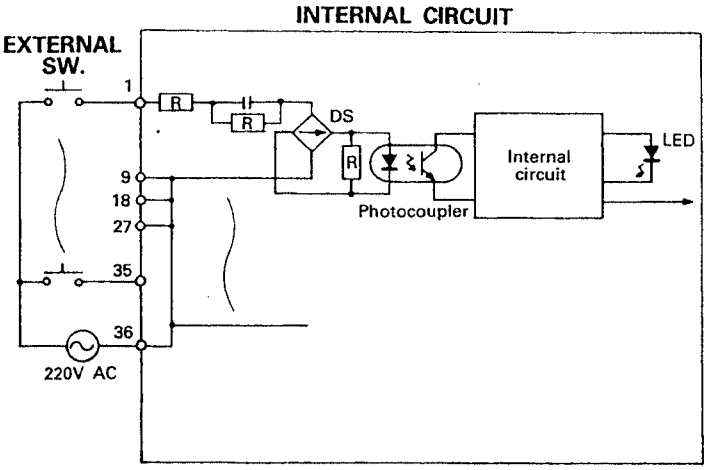
AC Input

Specifications \ Type		AX21EU	Front View mm(inch)
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		200—240V AC 50/60Hz	
Input voltage distortion		With in 5% (Refer to section 1.2 (13))	
Rated input current		10mA (220V AC 60Hz)	
Operating voltage range		170 to 264V AC (50/60Hz ± 5%)	
Max. simultaneously ON		60% (20 points)	
Inrush current		Max. 600mA, within 0.12ms (264V AC)	
ON voltage/ON current		160V AC or higher/5.5mA or higher	
OFF voltage/OFF current		70V AC or lower/3.5mA or lower	
Input impedance		Approx. 22kΩ (60Hz), approx. 24kΩ (50Hz)	
Response time	OFF → ON	15ms or less	
	ON → OFF	25ms or less	
Internal current consumption (5V DC)		150mA (TYP. all points ON)	
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)	
Operation indicator		ON indication (LED)	
Connection method		38-point removable terminal block (M3.5 X 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (AWG14 to AWG19) (Applicable tightening torque 78.4N·cm)	
Applicable solderless terminal		RAV1.25-3.5, RAV2-3.5	
Withstand Voltage		2830V AC rms/3 cycle (2,000m)	
Insulator resistor		10MΩ or more using a insulation resistance tester	
Noise immunity		IEC801-4; 1kV	Weight: 0.50kg (1.10lbs)



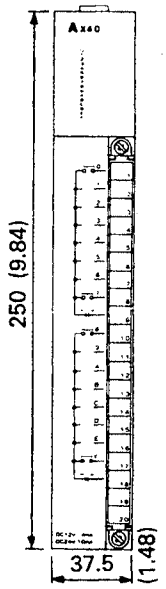
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common
TB8	X07	TB28	X18
TB9	Power supply common	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common
TB17	X0F	TB37	Vacant
TB18	Power supply common	TB38	Vacant
TB19	X10		
TB20	X11		

INTERNAL CIRCUIT

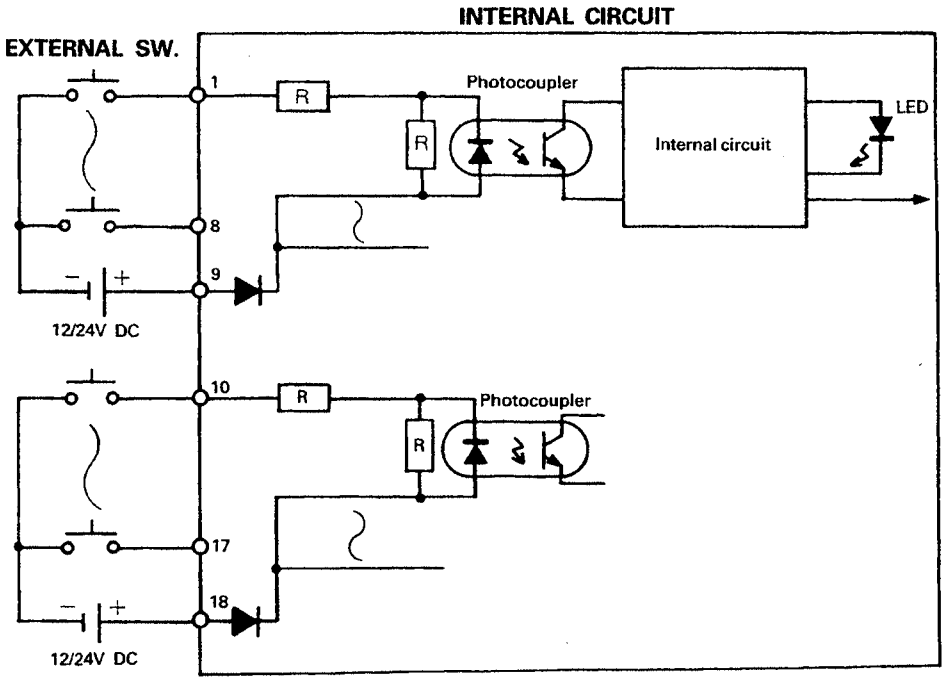


2.5 Type AX40 Input Module (Sink Loading)

DC Input

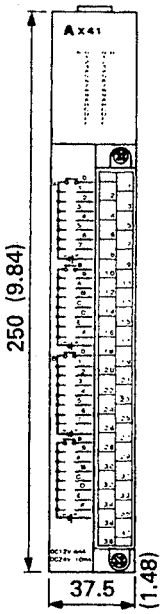
Specifications \ Type		AX40		Front View mm(inch)
Input points		16 points		
Insulation system		Photocoupler		
Rated input voltage		12V DC	24V DC	
Rated input current		4mA	10mA	
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)		
Max. simultaneously ON		100% (8 points/common)		
ON voltage/ON current		9.5V DC or higher/3mA or higher		
OFF voltage/OFF current		6V DC or lower/1.5mA or lower		
Input resistance		Approx. 2.4kΩ		
Response time	OFF → ON	10ms or less		
	ON → OFF	10ms or less		
Internal current consumption (5V DC)		55mA (TYP. all points ON)		
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)		
Operation indicator		ON indication (LED)		
Connection method		20-point removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)		
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight	0.36kg (0.8lbs)

Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	12/24V DC
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	12/24V DC
TB19	Vacant
TB20	Vacant

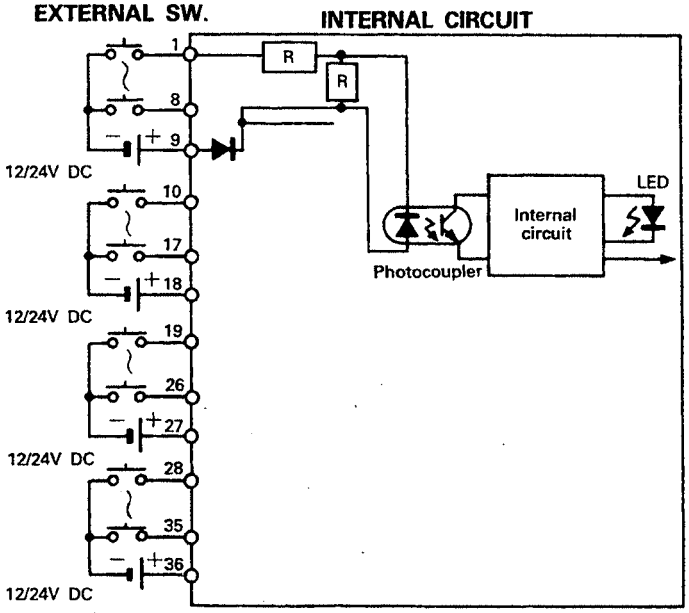


2.6 Type AX41 Input Module (Sink Loading)

DC Input

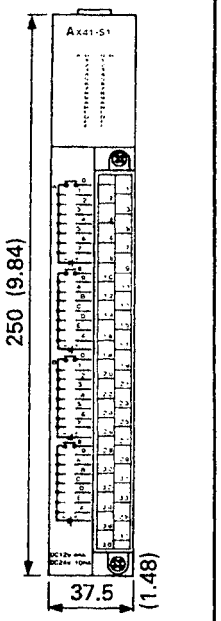
Specifications \ Type		AX41		Front View mm(inch)
Input points		32 points		
Insulation system		Photocoupler		
Rated input voltage		12V DC	24V DC	
Rated input current		4mA	10mA	
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)		
Max. simultaneously ON		60% (5 points/common)		
ON voltage/ON current		9.5V DC or higher/3mA or higher		
OFF voltage/OFF current		6V DC or lower/1.5mA or lower		
Input resistance		Approx. 2.4kΩ		
Response time	OFF → ON	10ms or less		
	ON → OFF	10ms or less		
Internal current consumption (5V DC)		110mA (TYP. all points ON)		
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)		
Operation indicator		ON indication (LED)		
Connection method		38-point removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)		
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3		Weight 0.44kg (0.97lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	12/24V DC
TB8	X07	TB28	X18
TB9	12/24V DC	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	12/24V DC
TB17	X0F	TB37	Vacant
TB18	12/24V DC	TB38	Vacant
TB19	X10		
TB20	X11		

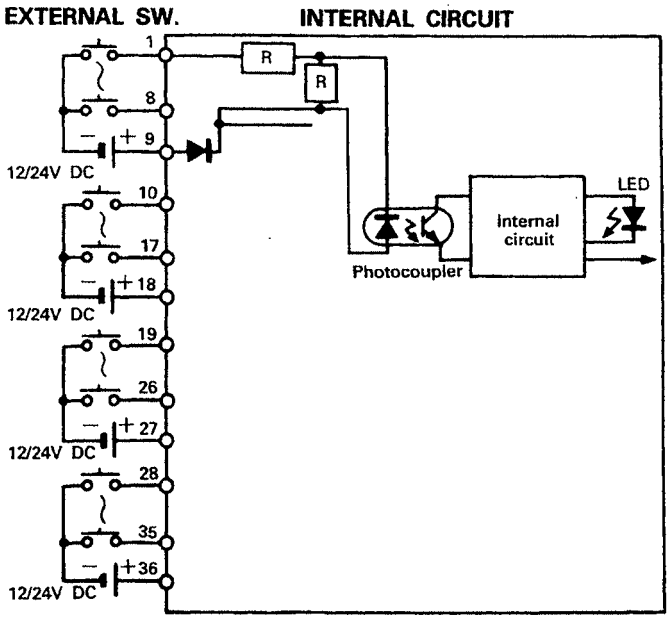


2.7 Type AX41-S1 Input Module (Sink Loading)

DC Input

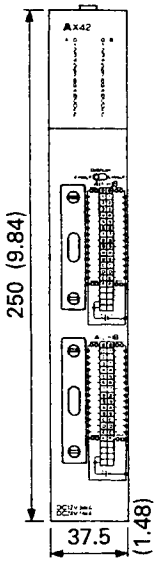
Specifications \ Type		AX41-S1		Front View mm(inch)
Input points		32 points		
Insulation system		Photocoupler		
Rated input voltage		12V DC	24V DC	
Rated input current		4mA	10mA	
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)		
Max. simultaneously ON		60% (5 points/common)		
ON voltage/ON current		9.5V DC or higher/3mA or higher		
OFF voltage/OFF current		6V DC or lower/1.5mA or lower		
Input resistance		Approx. 2.4kΩ		
Response time	OFF → ON	0.1ms or less		
	ON → OFF	0.2ms or less		
Internal current consumption (5V DC)		110mA (TYP. all points ON)		
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)		
Operation indicator		ON indication (LED)		
Connection method		38-point removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)		
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3		Weight: 0.44kg (0.97lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	12/24V DC
TB8	X07	TB28	X18
TB9	12/24V DC	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	12/24V DC
TB17	X0F	TB37	Vacant
TB18	12/24V DC	TB38	Vacant
TB19	X10		
TB20	X11		



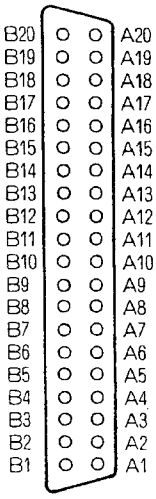
2.8 Type AX42 Input Module (Sink Loading)

DC Input

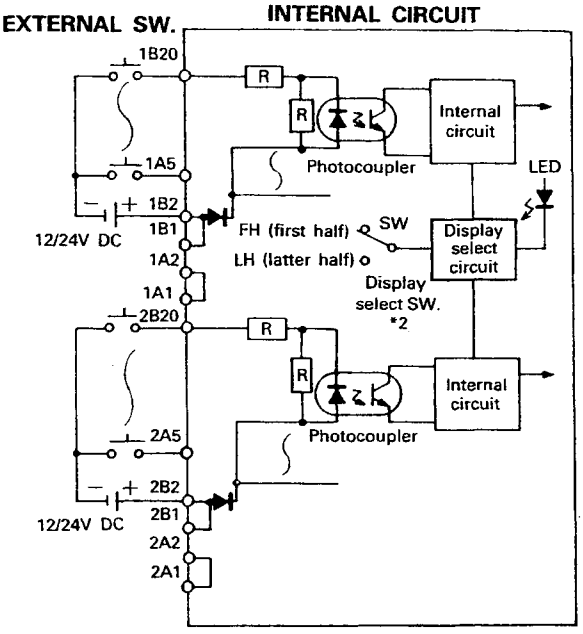
Specifications \ Type		AX42		Front View mm(inch)
Input points		64 points		
Insulation system		Photocoupler		
Rated input voltage		12V DC	24V DC	
Rated input current		3mA	7mA	
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)		
Max. simultaneously ON		*1 60% (20 points/common)		
ON voltage/ON current		9.5V DC or higher/3mA or higher		
OFF voltage OFF current		6V DC or lower/1.5mA or lower		
Input resistance		Approx. 3.4kΩ		
Response time	OFF → ON	10ms or less		
	ON → OFF	10ms or less		
Internal current consumption (5V DC)		120mA (TYP. all points ON)		
Common terminal arrangement		32 points/common (common terminal: 1B1, 1B2, 2B1, 2B2)		
Operation indicator		ON indication (LED) (switch selection of block of 32 points)		
Connection method		Two 40-pin connectors (with solder)		
Applicable wire size		0.3mm² (23 AWG)		
Accessory		Two external wiring connectors	Weight	0.51kg (1.1lbs)

Terminal No.	Signal No. (FH)	Terminal No.	Signal No. (LH)
1B20	X00	2B20	X20
1B19	X01	2B19	X21
1B18	X02	2B18	X22
1B17	X03	2B17	X23
1B16	X04	2B16	X24
1B15	X05	2B15	X25
1B14	X06	2B14	X26
1B13	X07	2B13	X27
1B12	X08	2B12	X28
1B11	X09	2B11	X29
1B10	X0A	2B10	X2A
1B9	X0B	2B9	X2B
1B8	X0C	2B8	X2C
1B7	X0D	2B7	X2D
1B6	X0E	2B6	X2E
1B5	X0F	2B5	X2F
1B4	Vacant	2B4	Vacant
1B3	Vacant	2B3	Vacant
1B2	12/24V DC	2B2	12/24V DC
1B1	12/24V DC	2B1	12/24V DC
1A20	X10	2A20	X30
1A19	X11	2A19	X31
1A18	X12	2A18	X32
1A17	X13	2A17	X33
1A16	X14	2A16	X34
1A15	X15	2A15	X35
1A14	X16	2A14	X36
1A13	X17	2A13	X37
1A12	X18	2A12	X38
1A11	X19	2A11	X39
1A10	X1A	2A10	X3A
1A9	X1B	2A9	X3B
1A8	X1C	2A8	X3C
1A7	X1D	2A7	X3D
1A6	X1E	2A6	X3E
1A5	X1F	2A5	X3F
1A4	Vacant	2A4	Vacant
1A3	Vacant	2A3	Vacant
1A2	Vacant	2A2	Vacant
1A1	Vacant	2A1	Vacant

Pinouts



Front view



*1: 40% (13 inputs/common) when the input module is used next to the power supply module.

*2: The statuses of the first 32 inputs (X00 to X1F) are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 inputs (X20 to X3F) are indicated when LH is selected.

*3: The A and B pin numbers are reverse of those of silk screen printing on the unit. The A numbers of the pin arrangement chart become the B numbers on the module.

*4: Pin numbers 1□□ indicate the upper connector pins and 2□□ the lower connector pins.

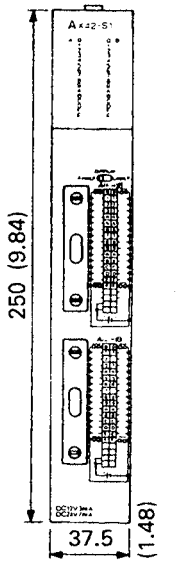
*5: AX42 is provided with two soldered type connector jacks (A6CON1). For applicable connectors, refer to section 1.2 (11).

2.9 Type AX42-S1 Input Module (Sink Loading)

DC Input

Specifications \ Type		AX42-S1	
Input points		64 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		3mA	7mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		*1 60% (20 points/common)	
ON voltage/ON current		9.5V DC or higher/3mA or higher	
OFF voltage/OFF current		6V DC or lower/1.5mA or lower	
Input resistance		Approx. 3.4kΩ	
Response time	OFF → ON	0.5ms or less	
	ON → OFF	0.5ms or less	
Internal current consumption (5V DC)		120mA (TYP. all points ON)	
Common terminal arrangement		32 points/common (common terminal: 1B1, 1B2, 2B1, 2B2)	
Operation indicator		ON indication (LED) (switch selection of block of 32 points)	
Connection method		Two 40-pin connectors (with solder)	
Applicable wire size		0.3mm² (23 AWG)	
Accessory		Two external wiring connectors	

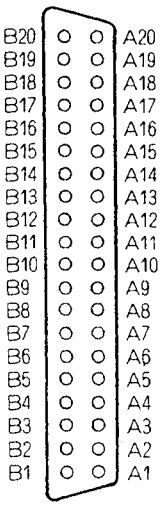
Front View mm(inch)



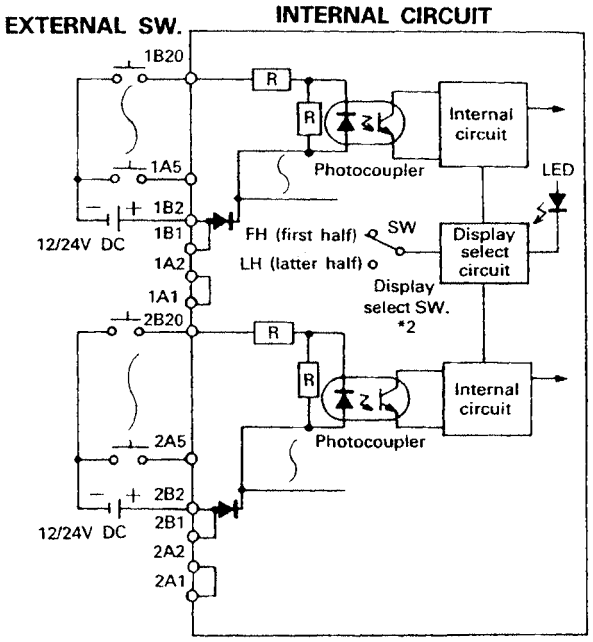
Weight: 0.51kg (1.1lbs)

Terminal No.	Signal No. (FH)	Terminal No.	Signal No. (LH)
1B20	X00	2B20	X20
1B19	X01	2B19	X21
1B18	X02	2B18	X22
1B17	X03	2B17	X23
1B16	X04	2B16	X24
1B15	X05	2B15	X25
1B14	X06	2B14	X26
1B13	X07	2B13	X27
1B12	X08	2B12	X28
1B11	X09	2B11	X29
1B10	X0A	2B10	X2A
1B9	X0B	2B9	X2B
1B8	X0C	2B8	X2C
1B7	X0D	2B7	X2D
1B6	X0E	2B6	X2E
1B5	X0F	2B5	X2F
1B4	Vacant	2B4	Vacant
1B3	Vacant	2B3	Vacant
1B2	12/24V DC	2B2	12/24V DC
1B1	12/24V DC	2B1	12/24V DC
1A20	X10	2A20	X30
1A19	X11	2A19	X31
1A18	X12	2A18	X32
1A17	X13	2A17	X33
1A16	X14	2A16	X34
1A15	X15	2A15	X35
1A14	X16	2A14	X36
1A13	X17	2A13	X37
1A12	X18	2A12	X38
1A11	X19	2A11	X39
1A10	X1A	2A10	X3A
1A9	X1B	2A9	X3B
1A8	X1C	2A8	X3C
1A7	X1D	2A7	X3D
1A6	X1E	2A6	X3E
1A5	X1F	2A5	X3F
1A4	Vacant	2A4	Vacant
1A3	Vacant	2A3	Vacant
1A2	Vacant	2A2	Vacant
1A1	Vacant	2A1	Vacant

Pinouts



Front view



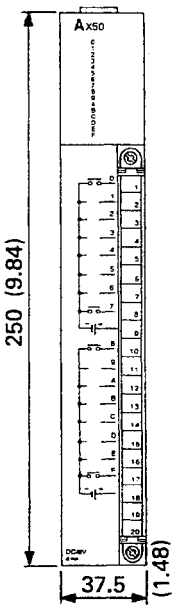
*1: 40% (13 inputs/common) when the input module is used next to the power supply module.
*2: The statuses of the first 32 inputs (X00 to X1F) are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 inputs (X20 to X3F) are indicated when LH is selected.
*3: The A and B pin numbers are reverse of those of silk screen printing on the unit. The A numbers of the pin arrangement chart become the B numbers on the module.
*4: Pin numbers 1□□ indicate the upper connector pins and 2□□ the lower connector pins.
*5: AX42-S1 is provided with two soldered type connector jacks. (A6CON1). For applicable connectors, refer to section 1.2 (11).

2.10 Type AX50 Input Module (Sink Loading)

DC Input

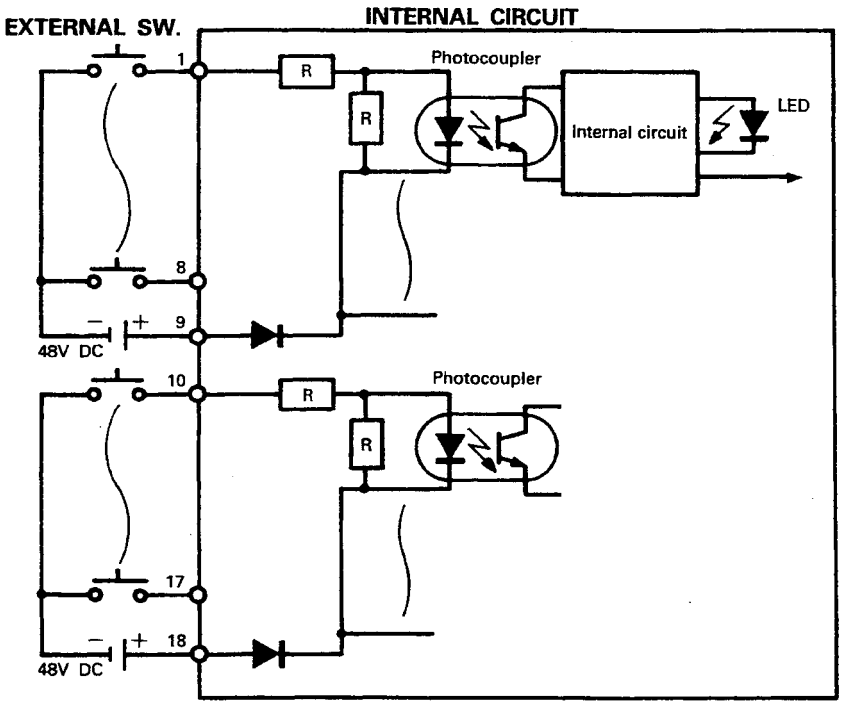
Specifications \ Type		AX50
Input points		16 points
Insulation system		Photocoupler
Rated input voltage		48V DC
Rated input current		4mA
Operating voltage range		38.4 to 57.6V DC (ripple ratio: within 5%)
Max. simultaneously ON		100% (8 points/common)
ON voltage/ON current		34V DC or higher/3mA or higher
OFF voltage/OFF current		10V DC or lower/1mA or lower
Input resistance		Approx. 11kΩ
Response time	OFF → ON	10ms or less
	ON → OFF	10ms or less
Internal current consumption (5V DC)		55mA (TYP. all points ON)
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)
Operation indicator		ON indication (LED)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

Front View mm(inch)



Weight	0.37kg (0.81lbs)

Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	48V DC
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	48V DC
TB19	Vacant
TB20	Vacant

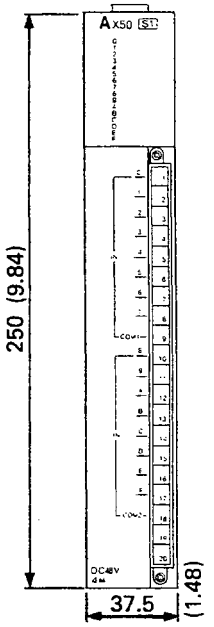


2.11 Type AX50-S1 Input Module (Sink/Source)

DC Input

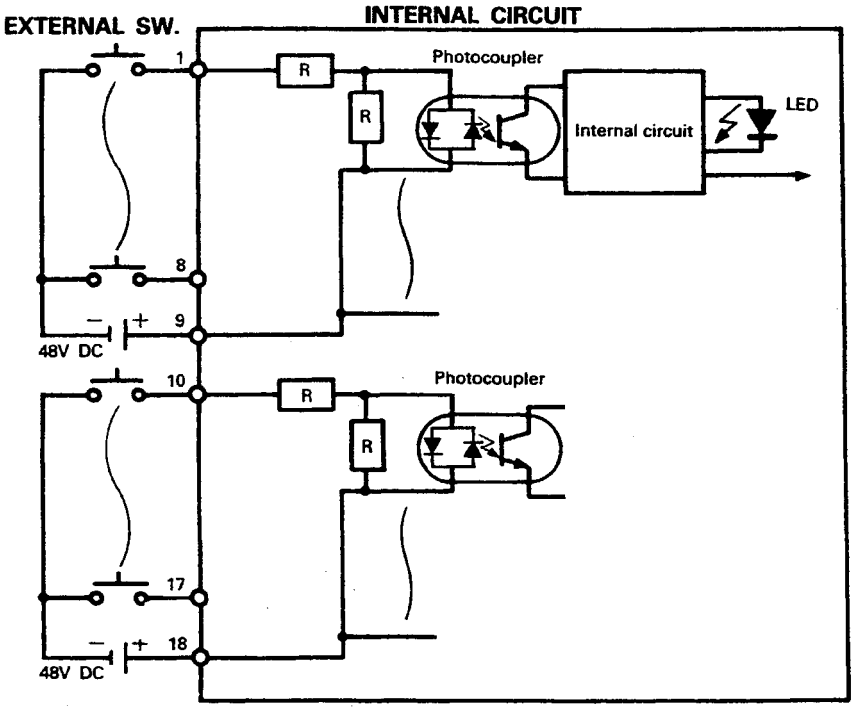
Specifications \ Type		AX50-S1
Input points		16 points
Insulation system		Photocoupler
Rated input voltage		48V DC
Rated input current		4mA
Operating voltage range		38.4 to 57.6V DC (ripple ratio: within 5%)
Max. simultaneously ON		100% (8 points/common)
ON voltage/ON current		34V DC or higher/3mA or higher
OFF voltage/OFF current		10V DC or lower/1mA or lower
Input resistance		Approx. 11kΩ
Response time	OFF → ON	10ms or less
	ON → OFF	10ms or less
Internal current consumption (5V DC)		55mA (TYP. all points ON)
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)
Operation indicator		ON indication (LED)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

Front View mm(inch)



Weight	0.37kg (0.81lbs)

Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	COM1
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	COM2
TB19	Vacant
TB20	Vacant

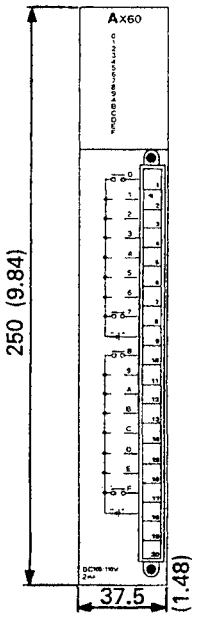


2.12 Type AX60 Input Module (Sink Loading)

DC Input

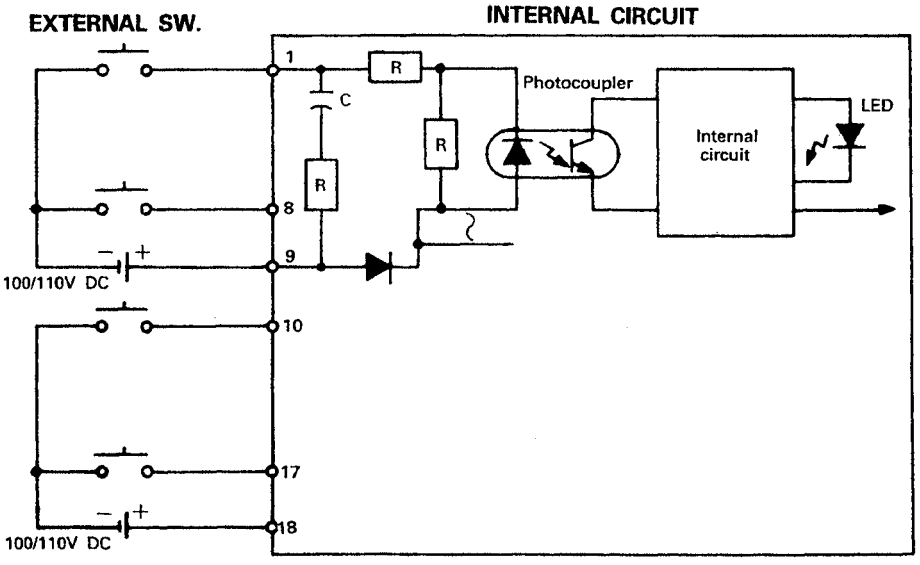
Specifications \ Type		AX60
Input points		16 points
Insulation system		Photocoupler
Rated input voltage		100/110/125V DC
Rated input current		2mA
Max. inrush current		65mA (121V DC), 75mA (140V DC)
Operating voltage range		85 to 140V DC (ripple ratio: within 5%)
Max. simultaneously ON		60% (5 points/common)
ON voltage/ON current		80V DC or higher/1.4mA or higher
OFF voltage/OFF current		20V DC or lower/0.5mA or lower
Input resistance		Approx. 50kΩ
Response time	OFF → ON	10ms or less
	ON → OFF	20ms or less
Internal current consumption (5V DC)		55mA (TYP. all points ON)
Common terminal arrangement		8 points/common
Operation indicator		ON indication (LED)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

Front View mm(inch)



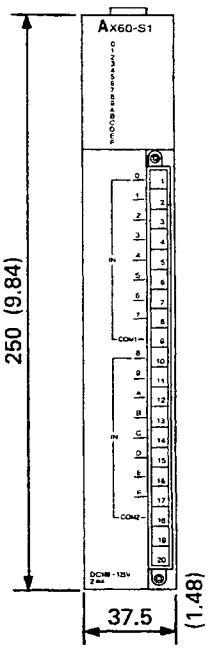
Weight	0.4kg (0.88lbs)

Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	100/110V DC
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	100/110V DC
TB19	Vacant
TB20	Vacant

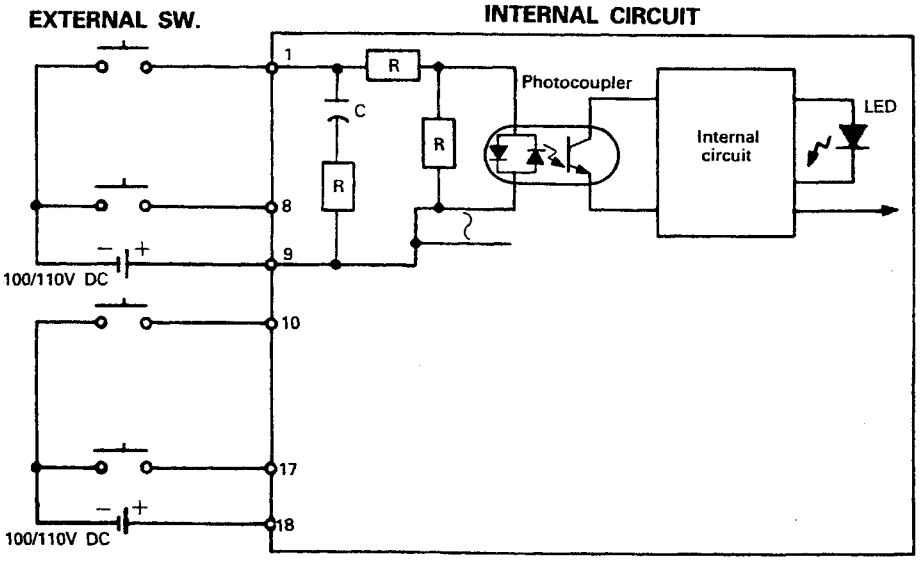


2.13 Type AX60-S1 Input Module (Sink/Source Loading)

DC Input

Specifications \ Type		AX60-S1	Front View mm(inch)
Input points		16 points	
Insulation system		Photocoupler	
Rated input voltage		100/110/125V DC	
Rated input current		2mA	
Max. inrush current		65mA (121V DC), 75mA (140V DC)	
Operating voltage range		85 to 140V DC (ripple ratio: within 5%)	
Max. simultaneously ON		60% (5 points/common)	
ON voltage/ON current		80V DC or higher/1.4mA or higher	
OFF voltage/OFF current		20V DC or lower/0.5mA or lower	
Input resistance		Approx. 50kΩ	
Response time	OFF → ON	10ms or less	
	ON → OFF	20ms or less	
Internal current consumption (5V DC)		55mA (TYP. all points ON)	
Common terminal arrangement		8 points/common	
Operation indicator		ON indication (LED)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.4kg (0.88lbs)

Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	COM1
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	COM2
TB19	Vacant
TB20	Vacant

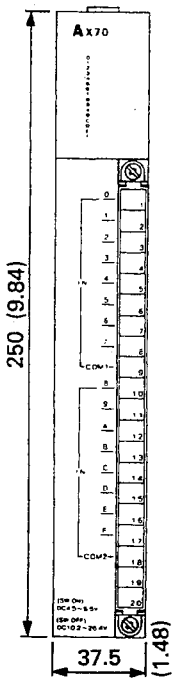


2.14 Type AX70 Input Module (Sink/Source)

Input for Sensor

Specifications \ Type		AX70		
Input points		16 points		
Insulation system		Photocoupler		
Input voltage		5V DC	12V DC	24V DC
Input current	TYP.	3.5mA	2mA	4.5mA
	MAX.	5.5mA	3mA	6mA
Operating voltage range		4.5 to 5.5V DC (SW. ON), 10.2 to 26.4V DC (SW. OFF)		
Max. simultaneously ON		100% (8 points/common)		
ON voltage/ON current		3.5V DC or higher/1.0mA or higher (Switch → ON), 5V DC or higher/1.0mA or higher (Switch → OFF).		
OFF voltage/OFF current		1.1V DC or lower/0.2mA or lower (Switch → ON), 2V DC or lower/0.2mA or lower (Switch → OFF).		
Input impedance		Approx. 1.4kΩ (Switch → ON), approx. 5.5kΩ (Switch → OFF).		
Response time	OFF → ON	1.5ms or less		
	ON → OFF	3ms or less		
Internal current consumption (5V DC)		55mA (TYP. all points ON)		
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)		
Operation indicator		ON indication (LED)		
Connection method		20-points removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)		
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3		

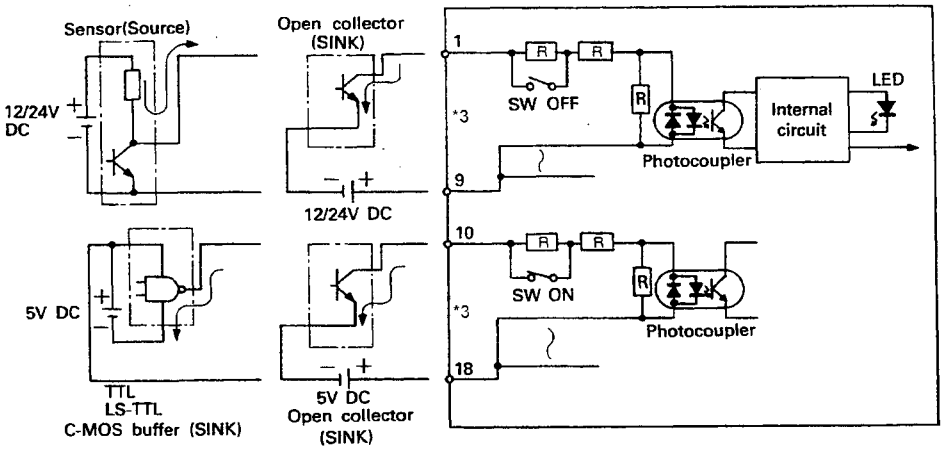
Front View mm(inch)



Weight	0.36kg (0.8lbs)

Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	Power supply common 1
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	Power supply common 2
TB19	Vacant
TB20	Vacant

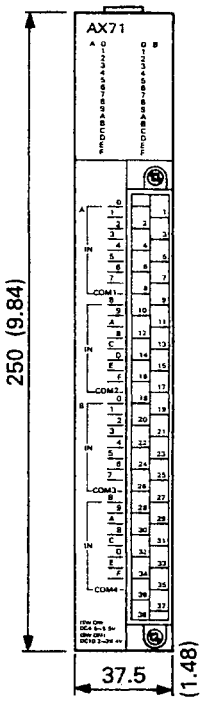
INTERNAL CIRCUIT



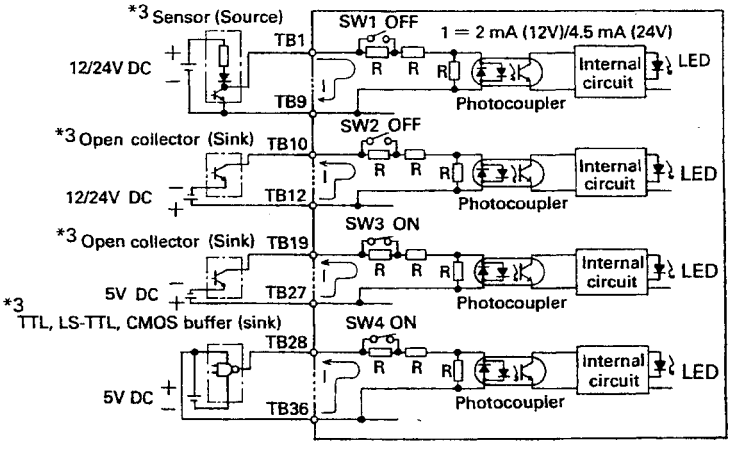
**1: Can be used with any combination by common of 8 points.*
**2: When using a CMOS source loading, only 5 VDC-rated CMOS (above) is available. (Example: HCMOS)*
**3: Refer to section 7.2.1 for setting of internal switch (SW).*

2.15 Type AX71 Input Module (Sink/Source)

Input for Sensor

Specifications \ Type		AX71			Front View mm(inch)	
Input points		32 points				
Insulation system		Photocoupler				
Input voltage		5V DC	12V DC	24V DC		
Input current	TYP.	3.5mA	2mA	4.5mA		
	MAX.	5.5mA	3mA	6mA		
Operating voltage range		4.5 to 5.5V DC (SW. ON), 10.2 to 26.4V DC (SW. OFF)				
Max. simultaneously ON		100% (8 points/common)				
ON voltage/ON current		3.5V DC or higher/1.0mA or higher (Switch → ON), 5V DC or higher/1.0mA or higher (Switch → OFF).				
OFF voltage/OFF current		1.1V DC or lower/0.2mA or lower (Switch → ON), 2V DC or lower/0.2mA or lower (Switch → OFF).				
Input impedance		Approx. 1.4kΩ (Switch → ON), approx. 5.5kΩ (Switch → OFF).				
Response time	OFF → ON	1.5ms or less				
	ON → OFF	3ms or less				
Internal current consumption (5V DC)		110mA (TYP. all points ON)				
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)				
Operation indicator		ON indication (LED)				
Connection method		38-points removable terminal block (M3 × 6mm metric screws)				
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)				
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3			Weight	0.45kg (0.99lbs)

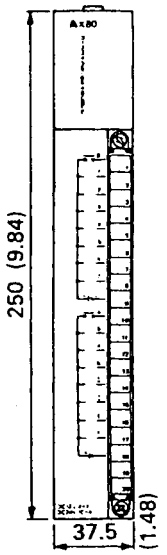
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common 3
TB8	X07	TB28	X18
TB9	Power supply common 1	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common 4
TB17	X0F	TB37	Vacant
TB18	Power supply common 2	TB38	Vacant
TB19	X10		
TB20	X11		



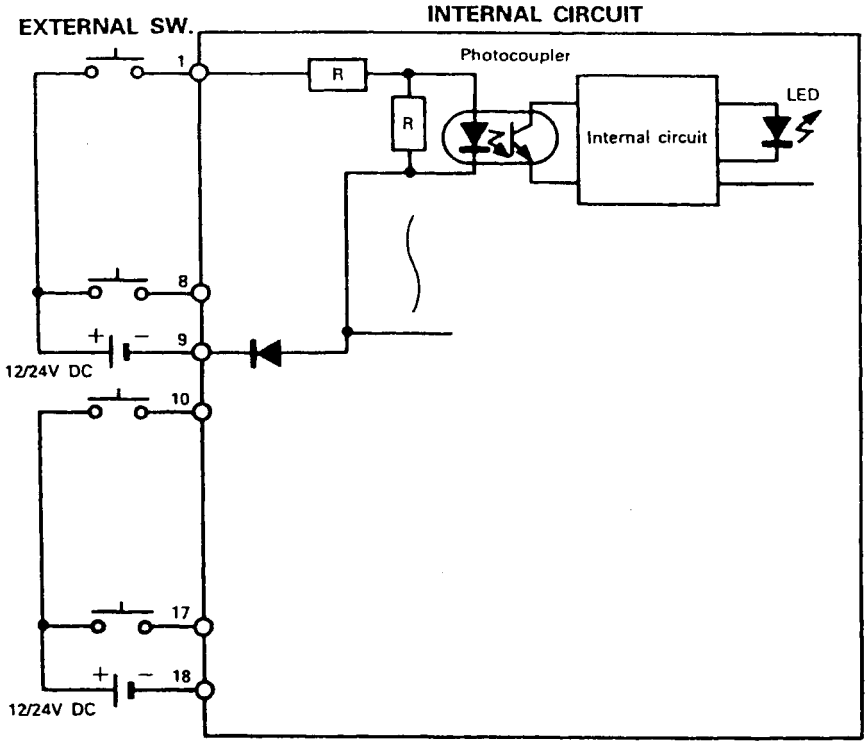
*1: Each batch of 8 input points (as divided by commons) is independent
*2: The AX71 is a high-speed response input module. Shielded wires should therefore be used and must be kept away from the other output wires.
*3: Can be used with any combination by common of 8 points.
*4: When using a CMOS source loading, only 5 VDC-rated CMOS (above) is available. (Example: HCMOS)
*5: Refer to section 7.2.1 for setting of internal switch (SW).

2.16 Type AX80 Input Module (Source Loading)

DC Source Input

Specifications \ Type		AX80		Front View mm(inch)
Input points		16 points		
Insulation system		Photocoupler		
Rated input voltage		12V DC	24V DC	
Rated input current		4mA	10mA	
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)		
Max. simultaneously ON		100% (8 points/common)		
ON voltage/ON current		9.5V DC or higher/3mA or higher		
OFF voltage/OFF current		6V DC or lower/1.5mA or lower		
Input resistance		Approx. 2.4kΩ		
Response time	OFF → ON	10ms or less		
	ON → OFF	10ms or less		
Internal current consumption (5V DC)		55mA (TYP. all points ON)		
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)		
Operation indicator		ON indication (LED)		
Connection method		20-point removable terminal block (M3 X 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)		
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3		Weight 0.36kg (0.8lbs)

Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	0V
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	0V
TB19	Vacant
TB20	Vacant

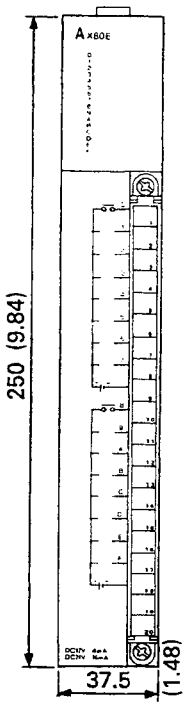


2.17 Type AX80E Input Module (Source Loading)

DC Input (Source)

Specifications \ Type		AX80E	
Input points		16 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		4mA	10mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		100% (8 points/common)	
ON voltage/ON current		9.5V DC or higher/2.6mA or higher	
OFF voltage/OFF current		6V DC or lower/1.0mA or lower	
Inrush current		Approx. 2.4kΩ	
Response time	OFF → ON	5.5ms (TYP) or less	
	ON → OFF	6.0ms (TYP) or less	
Response time high speed mode upper 8 points only	OFF → ON	0.5ms or less	
	ON → OFF	1.0ms or less	
Internal current consumption (5V DC)		55mA (TYP. all points ON)	
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)	
Operation indicator		ON indication (LED)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	

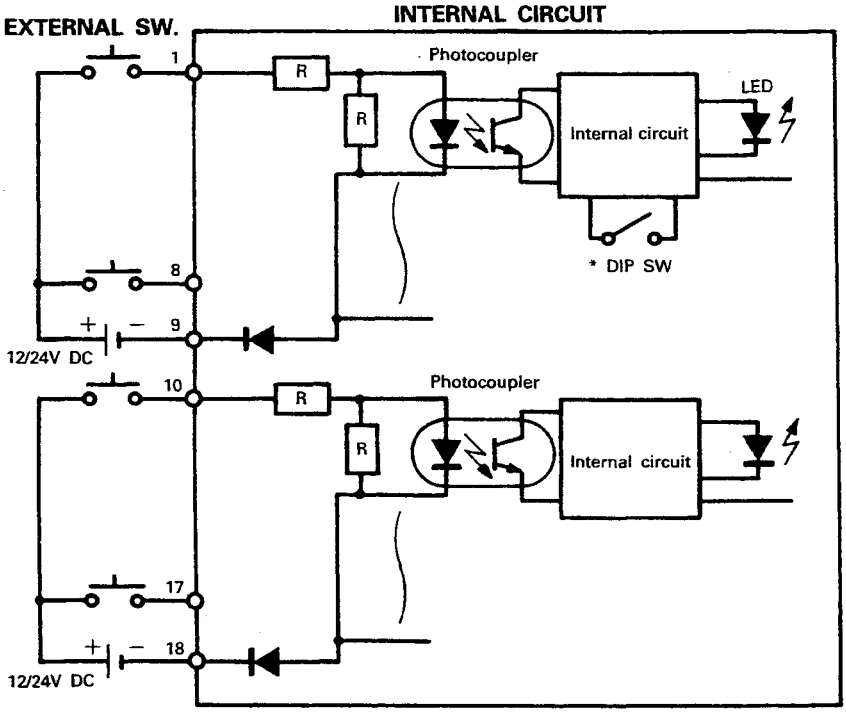
Front View mm(inch)



Weight	0.36kg (0.79lbs)

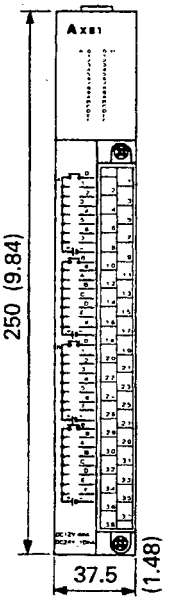
* For the first 8 points, high or low speed can be selected using DIP switches. At shipment, the switch is in LOW position.

Terminal No.	Input Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	0V
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	0V
TB19	Vacant
TB20	Vacant



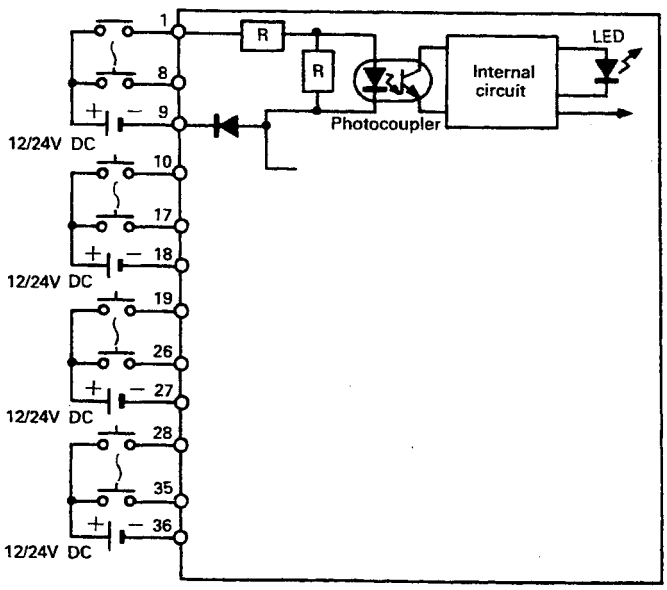
2.18 Type AX81 Input Module (Source Loading)

DC Source Input

Specifications \ Type		AX81		Front View mm(inch)
Input points		32 points		
Insulation system		Photocoupler		
Rated input voltage		12V DC	24V DC	
Rated input current		4mA	10mA	
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)		
Max. simultaneously ON		60% (5 points/common)		
ON voltage/ON current		9.5V DC or higher/3mA or higher		
OFF voltage/OFF current		6V DC or lower/1.5mA or lower		
Input resistance		Approx. 2.4kΩ		
Response time	OFF → ON	10ms or less		
	ON → OFF	10ms or less		
Internal current consumption (5V DC)		110mA (TYP. all points ON)		
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)		
Operation indicator		ON indication (LED)		
Connection method		38-points removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)		
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight	0.45kg (1lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	0V
TB8	X07	TB28	X18
TB9	0V	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	0V
TB17	X0F	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	X10		
TB20	X11		

EXTERNAL SW. **INTERNAL CIRCUIT**

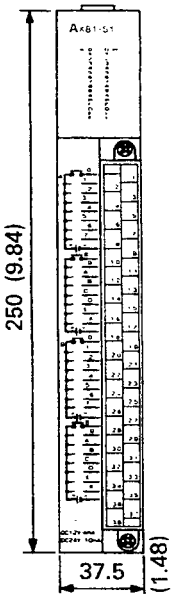


2.19 Type AX81-S1 Input Module (Sink/Source Loading)

DC Source Input

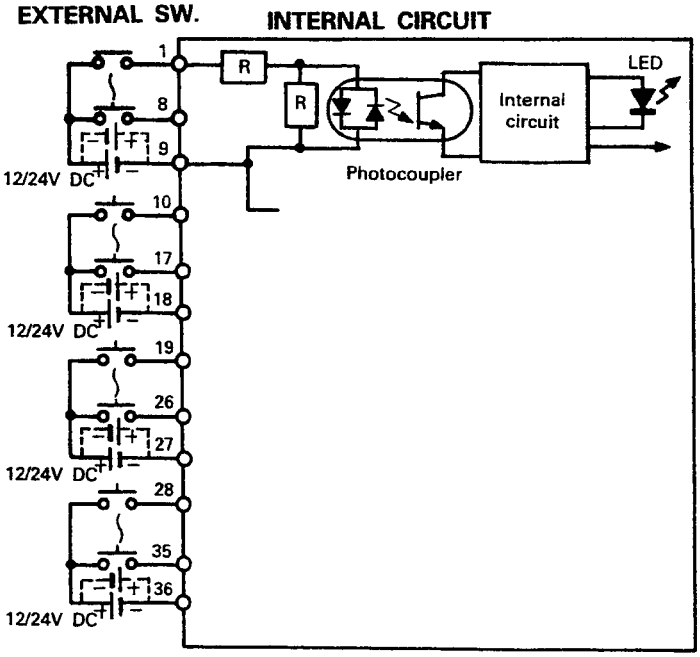
Specifications \ Type		AX81-S1	
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		2.5mA	5mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		60% (5 points/common)	
ON voltage/ON current		5.6V DC or higher/1.1mA or higher	
OFF voltage/OFF current		2.4V DC or lower/0.39mA or lower	
Input resistance		Approx. 4.8kΩ	
Response time	OFF → ON	10ms or less	
	ON → OFF	10ms or less	
Internal current consumption (5V DC)		105mA (TYP. all points ON)	
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)	
Operation indicator		ON indication (LED)	
Connection method		38-points removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	

Front View mm(inch)



Weight: 0.45kg (1lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	0V
TB8	X07	TB28	X18
TB9	0V	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	P/S common
TB17	X0F	TB37	Vacant
TB18	P/S common	TB38	Vacant
TB19	X10		
TB20	X11		

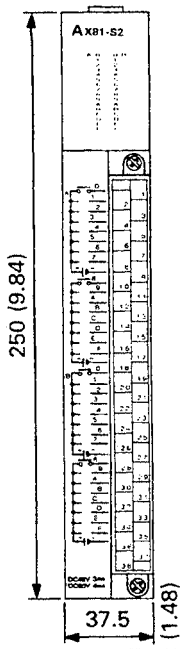


2.20 Type AX81-S2 Input Module (Source Loading)

DC Source Input

Specifications \ Type		AX81-S2	
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		48V DC	60V DC
Rated input current		3mA	4mA
Operating voltage range		41 to 66V DC (ripple ratio: within 5%)	
Max. simultaneously ON		60% (5 points/common) simultaneous ON	
ON voltage/ON current		31V DC or higher/1.7mA or higher	
OFF voltage/OFF current		10V DC or lower/0.5mA or lower	
Input inpedance		Approx. 18kΩ	
Response time	OFF → ON	20ms or less (60V DC)	
	ON → OFF	20ms or less (60V DC)	
Internal current consumption (5V DC)		110mA (TYP. all points ON)	
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)	
Operation indicator		ON indication (LED)	
Connection method		38-points removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	

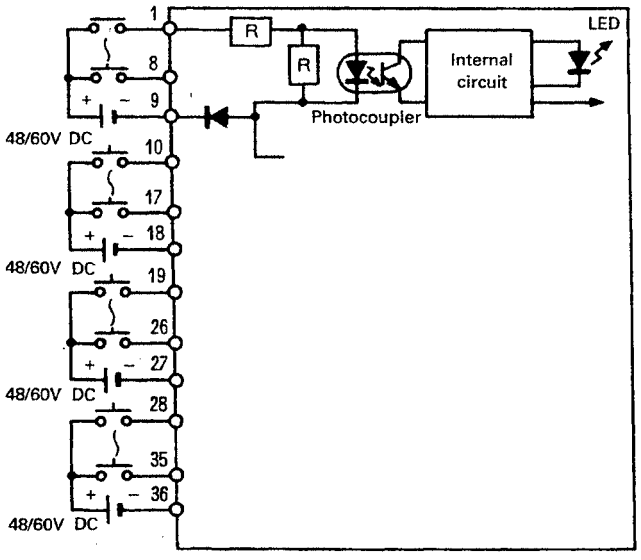
Front View mm(inch)



Weight 0.45kg (1lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	0V
TB8	X07	TB28	X18
TB9	0V	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	0V
TB17	X0F	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	X10		
TB20	X11		

EXTERNAL SW. INTERNAL CIRCUIT

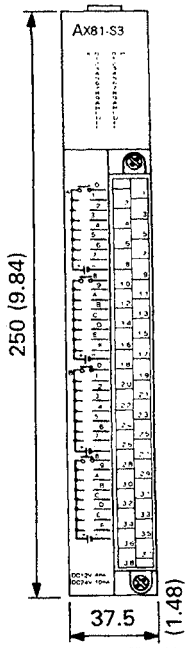


2.21 Type AX81-S3 Input Module (Source Loading)

DC Source Input

Specifications \ Type		AX81-S3	
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		4mA	10mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		60% (5 points/common) simultaneous ON	
ON voltage/ON current		9.5V DC or higher/3mA or higher	
OFF voltage/OFF current		6V DC or lower/1.5mA or lower	
Input inpedance		Approx. 2.4 kΩ	
Response time	OFF → ON	0.1 ms or less	
	ON → OFF	0.2ms or less	
Internal current consumption (5V DC)		110mA (TYP. all points ON)	
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)	
Operation indicator		ON indication (LED)	
Connection method		38-points removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	

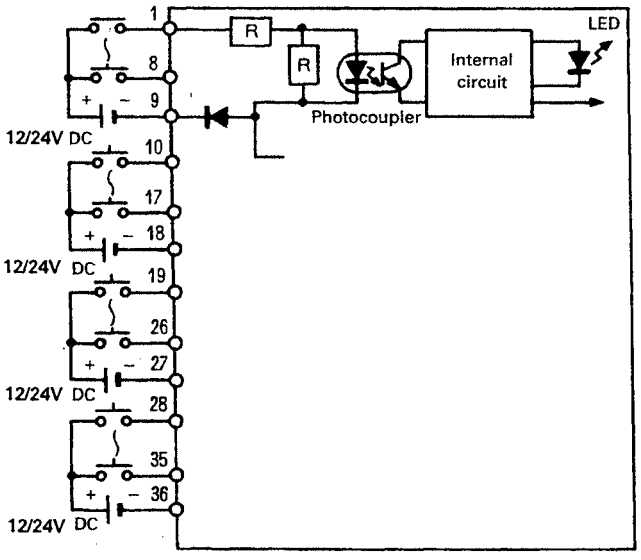
Front View mm(inch)



Weight 0.45kg (1lbs)

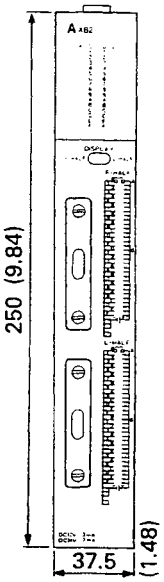
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	0V
TB8	X07	TB28	X18
TB9	0V	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	0V
TB17	X0F	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	X10		
TB20	X11		

EXTERNAL SW. INTERNAL CIRCUIT

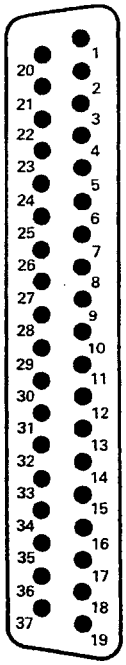


2.22 Type AX82 Input Module (Source Loading)

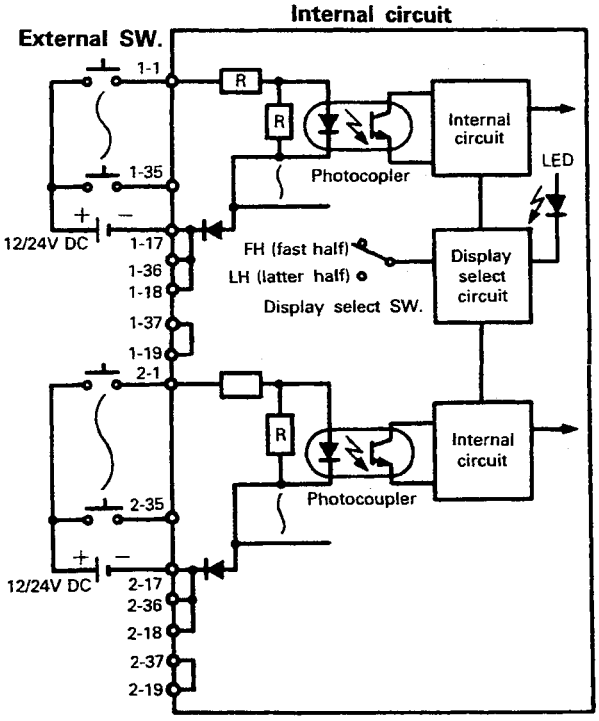
DC Input (Source)

Specifications \ Type		AX82		Front View mm(inch)
Input points		64 points		
Insulation system		Photocoupler		
Rated input voltage		12V DC	24V DC	
Rated input current		3mA	7mA	
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)		
Max. simultaneously ON		40 points (26 points if module is located next to power supply)		
ON voltage/ON current		9.5V DC or higher/2.6mA or higher		
OFF voltage/OFF current		6V DC or lower/1.0mA or lower		
Inrush current		Approx. 3.4kΩ		
Response time	OFF → ON	10ms or less		
	ON → OFF	10ms or less		
Internal current consumption (5V DC)		120mA (TYP. all points ON)		
Common terminal arrangement		32 points/common (common terminal: 1-17, 1-18, 1-36, 2-17, 2-18, 2-36)		
Operation indicator		ON indication (LED) (switch selection of block of 32 points)		
Connection method		Two 37-pin D sub-connectors (soldered)		
Applicable wire size		0.3mm² (23 AWG)		
Accessory		Two external wiring D sub-connectors	Weight	0.60kg (1.32lbs)

Terminal No.	Input Signal No.	Terminal No.	Input Signal No.
1-1	X00	2-1	X20
1-20	X01	2-20	X21
1-2	X02	2-2	X22
1-21	X03	2-21	X23
1-3	X04	2-3	X24
1-22	X05	2-22	X25
1-4	X06	2-4	X26
1-23	X07	2-23	X27
1-5	X08	2-5	X28
1-24	X09	2-24	X29
1-6	X0A	2-6	X2A
1-25	X0B	2-25	X2B
1-7	X0C	2-7	X2C
1-26	X0D	2-26	X2D
1-8	X0E	2-8	X2E
1-27	X0F	2-27	X2F
1-17	0V	2-17	0V
1-36	0V	2-36	0V
1-18	0V	2-18	0V
1-9	X10	2-9	X30
1-28	X11	2-28	X31
1-10	X12	2-10	X32
1-29	X13	2-29	X33
1-11	X14	2-11	X34
1-30	X15	2-30	X35
1-12	X16	2-12	X16
1-31	X17	2-31	X37
1-13	X18	2-13	X38
1-32	X19	2-32	X39
1-14	X1A	2-14	X3A
1-33	X1B	2-33	X3B
1-15	X1C	2-15	X3C
1-34	X1D	2-34	X3D
1-16	X1E	2-16	X3E
1-35	X1F	2-35	X3F
1-37	Vacant	2-37	Vacant
1-19	Vacant	2-19	Vacant



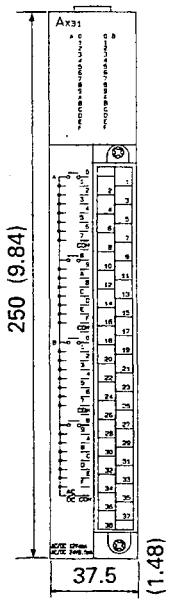
Front view



*1: The statuses of the first 32 inputs (X00 to X1F) are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 inputs (X20 to X3F) are indicated when LH is selected.
*2: Pin numbers 1□ indicate the upper connector pins and 2□ the lower connector pins.
*3: AX82 is provided with two soldered type connector jacks.
(Type: DC-37S-N (connector), DC-C8-J13-B1-1 (junction shell) cable protection tube)

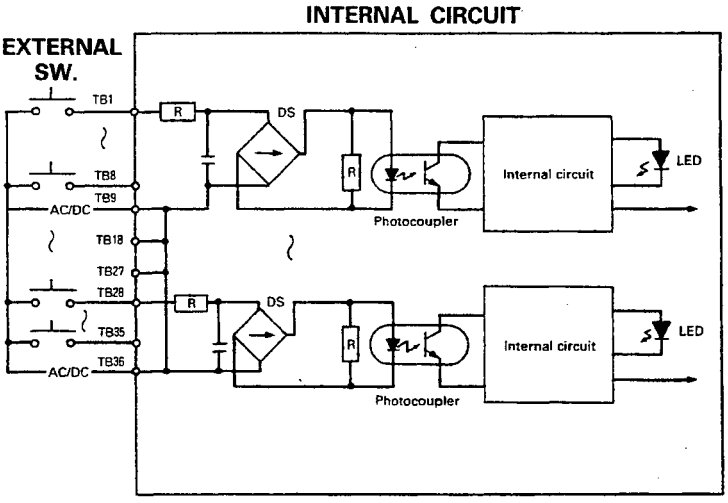
2.23 Type AX31 12/24V DC/AC Input Module

AC Input

Specifications \ Type		AX31		Front View mm(inch)
Input points		32 points		
Insulation system		Photocoupler		
Rated input voltage		12/24V DC	12/14V AC (50/60Hz)	
Rated input current		4mA (12V AC/DC), 8.5mA (24V AC/DC)		
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	10.2 to 26.4V AC (50/60Hz +−5%)	
Max. simultaneously ON		100% simultaneously ON		
ON voltage/ON current		7V DC/AC or higher/2mA or higher		
OFF voltage/OFF current		2.5V DC/AC or lower/0.7mA or lower		
Input impedance		Approx. 2.7kΩ		
Response time	OFF → ON	20ms or less (12/24V DC)	25ms or less (12/24V AC, 60Hz)	
	ON → OFF	20ms or less (12/24V DC)	20ms or less (12/24V AC, 60Hz)	
Internal current consumption (5V DC)		110mA (TYP. all points ON)		
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)		
Operation indicator		ON indication (LED)		
Connection method		38-point removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)		
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3		Weight: 0.49kg (1.078lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common
TB8	X07	TB28	X18
TB9	Power supply common	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common
TB17	X0F	TB37	Vacant
TB18	Power supply common	TB38	Vacant
TB19	X10		
TB20	X11		

INTERNAL CIRCUIT

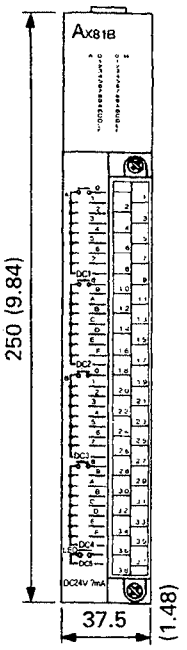


2.24 Type AX81B 24VDC Input Module with Wire Breaking Detection Function (Sink/Source)

DC Source Input

Specifications \ Type		AX81-S3		
Input points		32 points (64 points occupied)		
Insulation system		Photocoupler		
Rated input voltage		24VDC		
Rated input current		7mA (when external switch is ON)	1.5mA (when external switch is OFF)	
Operating voltage range		21.6 to 30.0VDC (ripple ratio: within 5%)		
Max. simultaneously ON		60% (5 points/common) simultaneous ON		
ON voltage/ON current		21.0VDC or higher/5.4mA or higher (normal input)	1.0VDC or lower/0.2mA or lower (disconnection detected)	
OFF voltage/OFF current		7.0VDC or lower/1.9mA or lower (normal input)	6.0VDC pr higher/1.3mA or higher (disconnection detected)	
Input resistance		Approx.3.6K Ω (normal input)	Approx.4.3K Ω (normal input)	
External resistance		0.1K Ω or lower (ON)	11.4 to 12.7K Ω (OFF)	150K Ω or higher (disconnection detected)
Parallel resistance to external switch		12K Ω (allowable variance: ±5%, 1/4W or higher)		
Response time Hi-speed mode (first 8 digits only)	OFF→ON	10ms or less		
	ON→OFF	10ms or less		
Internal current consumption (5V)		125mA(TYP. All points ON)		
Common terminal arrangement		8 points/common (common terminal:TB9,TB18,TB27,TB36)		
Operation indicator		ON indication		
Connection method		38 points terminal block connector (M3×6 screw)		
Applicable wire size		0.75 to 2mm² (applicable mounting torque 68.6N・cm)		
Applicable solder less terminal		R1.25 to 3, R2 to 3, RAV1.25 to 3, RAV2 to 3		
Weight		0.45Kg		

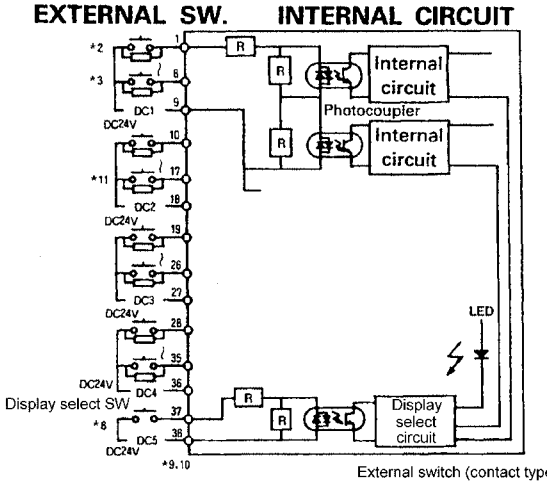
Front View mm(inch)

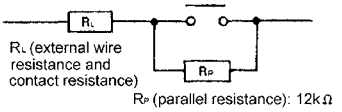


Weight	0.45kg (1lbs)

Terminal No.	Normal input signal name	Wire breaking detection signal name	Terminal No.	Normal input signal name	Wire breaking detection signal name
TB1	X00	X20	TB21	X12	X32
TB2	X01	X21	TB22	X13	X33
TB3	X02	X22	TB23	X14	X34
TB4	X03	X23	TB24	X15	X35
TB5	X04	X24	TB25	X16	X36
TB6	X05	X25	TB26	X17	X37
TB7	X06	X26	TB27	DC3	
TB8	X07	X27	TB28	X18	X38
TB9	DC1		TB29	X19	X39
TB10	X08	X28	TB30	X1A	X3A
TB11	X09	X29	TB31	X1B	X3B
TB12	X0A	X2A	TB32	X1C	X3C
TB13	X0B	X2B	TB33	X1D	X3D
TB14	X0C	X2C	TB34	X1E	X3E
TB15	X0D	X2D	TB35	X1F	X3F
TB16	X0E	X2E	TB36	DC4	
TB17	X0F	X2F	TB37	LED	
TB18	DC2		TB38	DC5	
TB19	X10	X30			
TB20	X11	X31			

EXTERNAL SW. INTERNAL CIRCUIT





External switch (contact type)
R_{SON} (switch ON resistance)

R_L (external wire resistance and contact resistance)

R_P (parallel resistance): 12kΩ

・Signal detection status according to external resistance value

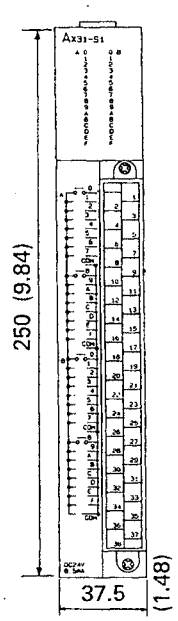
External resistance [kΩ]		Normal signal X00 to 1F	Wire breaking detected X20 to 3F
External switch ON $(R_L+R_{SON})<0.1$		ON	OFF
External switch OFF $11.4\leqq(R_L+R_P)\leqq12.7$		OFF	OFF
Wire breaking	$(R_L+R_{SON})>150$	OFF	ON
	$(R_L+R_P)>150$		

*4 to 7

*1: When allocating parameter's "I/O assignment" by peripheral device, set it as 64-point input module.
*2: Use a contact type for the external switch.
Connect resistance of 12K Ω (allowable variance: ±5%, rated power: 1/4W or higher, maximum used voltage: 100V or higher) to the external device in parallel.
*3: The total rate of resistance (ON resistance of external switch, external wire resistance and contact resistance) must be 1K Ω or less as 1 point.
*4: Disconnection detection turns on when the external resistance is 150K Ω or higher.
It means "disconnection status".
*5: If external resistance is rated other than the values of the above 2 to 4, the operation cannot be guaranteed. (Normal signals and disconnection detection both may turn off)
*6: X00 to 1F (first half) are indicated as normal input signals, the signals turn on when the external switch is ON.
*7: The signals turn on for X20 to 3F (last half) when disconnection is detected. (LED ON)
The disconnection detection of X20 applies to the input signal of X00.(the disconnection detection signals apply to the normal input signals)
*8: LED is displayed switching each operation of a normal signal and disconnection detection by display switch.
1) Normal signal is displayed when the display switch is OFF.
2) Disconnection detection is displayed when the display switch is ON.
Do not connect the parallel resistance to the display switch. (if connected, normal input signals may not be displayed.)
*9: It recommends using a different power supply between that for display switch (5DC) and input (1 to 4DC). (If the same power supply is used, disconnection detection may not be detected depending on a point where disconnection occurs.)
*10: It does not detect a disconnection of the display switch circuit.
*11: Do not connect multiple inputs/loads and etc.to one external switch.

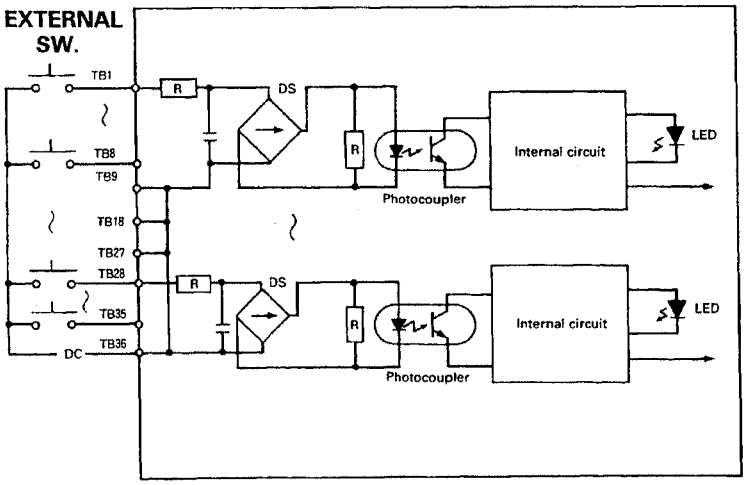
2.25 Type AX31-S1 Input Module (Sink/Source Loading)

AC Input

Specifications \ Type		DC Source Input AX31-S1	Front View mm(inch)
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		24V DC	
Rated input current		8.5mA	
Operating voltage range		19.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		100% simultaneously ON	
ON voltage/ON current		16V DC or higher/5mA or higher	
OFF voltage/OFF current		8V DC or lower/2mA or lower	
Input impedance		Approx. 2.7kΩ	
Response time	OFF → ON	10ms or less	
	ON → OFF	10ms or less	
Internal current consumption (5V DC)		110mA (TYP. all points ON)	
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)	
Operation indicator		ON indication (LED)	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	
Weight		0.49Kg	

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common
TB8	X07	TB28	X18
TB9	Power supply common	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common
TB17	X0F	TB37	Vacant
TB18	Power supply common	TB38	Vacant
TB19	X10		
TB20	X11		

INTERNAL CIRCUIT



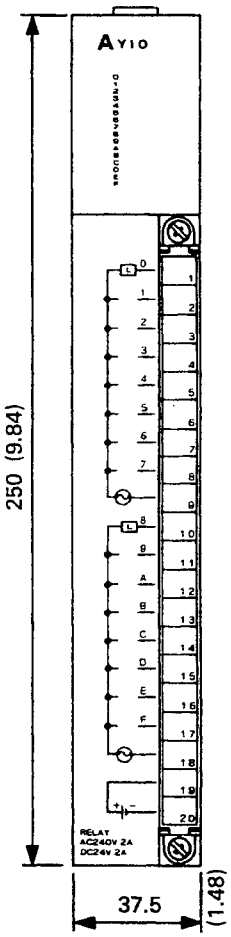
3. OUTPUT MODULE SPECIFICATIONS

3.1 Type AY10 Output Module

Relay Contact Output

Specifications \ Type		AY10
Output points		16 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistance load)/point 240V AC 2A ($\cos\phi$ =1)/point, (but ≦ 8A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		264V AC, 125V DC
Response time	OFF → ON	10ms or less
	ON → OFF	12ms or less
Life	Mechanical	20 million times or more
	Electrical	At rated switching voltage/current load 200 thousand times or more
		200V AC 1.5A, 240V AC 1A ($\cos\phi$ =0.7) 200 thousand times or more
		200V AC 0.75A, 240V AC 0.5A ($\cos\phi$ =0.35) 200 thousand times or more
		24V DC 1A, 100V DC 0.1A (L/R=7ms) 200 thousand times or more
Max. switching frequency		3600 times/hour
Surge killer		Not provided
Internal current consumption (5V DC)		115mA (TYP. all points ON)
Relay socket		Not provided
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)
Operation indicator		ON indication (LED)
External power supply requirement	Voltage	24V DC ± 10% Ripple voltage 4Vp-p or less
	Current	150mA (24V DC TYP. all points ON)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

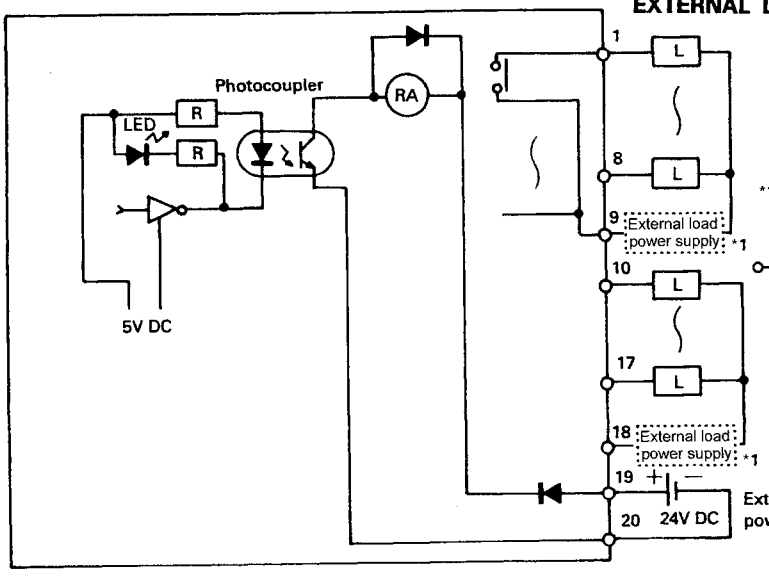
Front View mm(inch)



Weight: 0.44kg (0.97lbs)

Terminal No.	Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	Common 1
TB10	Y08
TB11	Y09
TB12	Y0A
TB13	Y0B
TB14	Y0C
TB15	Y0D
TB16	Y0E
TB17	Y0F
TB18	Common 2
TB19	24V DC
TB20	0V

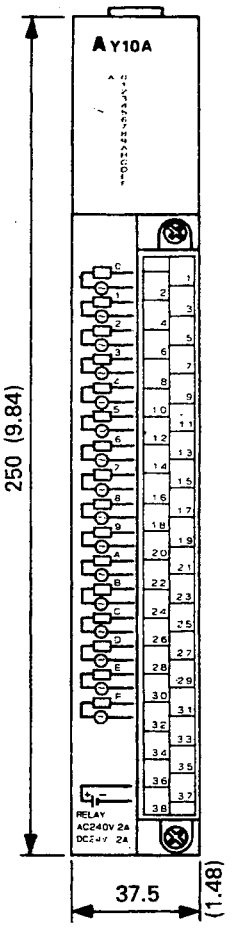
INTERNAL CIRCUIT



EXTERNAL LOAD

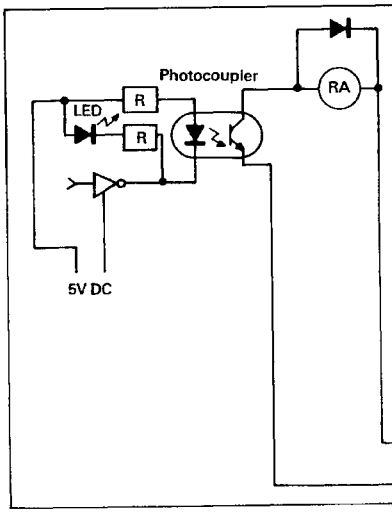
3.2 Type AY10A Output Module (Relay Contact Output (all points independent))

Relay Contact Output			
Specifications \ Type		AY10A	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated switching voltage, current		24V DC 2A (resistance load)/point 240V AC 2A ($\cos\phi$=1)/point, (but ≦ 16A total)	
Min. switching load		5V DC 1mA	
Max. switching voltage		264V AC, 125V DC	
Response time	OFF → ON	10ms or less	
	ON → OFF	12ms or less	
Life	Mechanical	20 million times or more	
	Electrical	At rated switching voltage/current load 200 thousand times or more	
		200V AC 1.5A, 240V AC 1A ($\cos\phi$=0.7) 200 thousand times or more	
		200V AC 0.75A, 240V AC 0.5A ($\cos\phi$=0.35) 200 thousand times or more	
		24V DC 1A, 100V DC 0.1A (L/R=7ms) 200 thousand times or more	
Max. switching frequency		3600 times/hour	
Surge killer		Not provided	
Internal current consumption (5V DC)		115mA (TYP. all points ON)	
Relay socket		Not provided	
Common terminal arrangement		Not provided (all points independent)	
Operation indicator		ON indication (LED)	
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less	
	Current	150mA (24V DC TYP. all points ON)	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.5kg (1.1lbs)

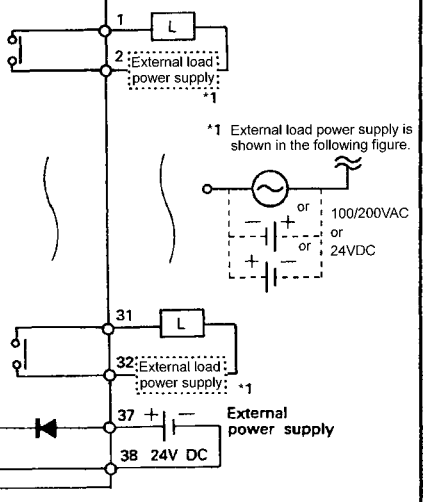


Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Y0A
TB2		TB22	
TB3	Y01	TB23	Y0B
TB4		TB24	
TB5	Y02	TB25	Y0C
TB6		TB26	
TB7	Y03	TB27	Y0D
TB8		TB28	
TB9	Y04	TB29	Y0E
TB10		TB30	
TB11	Y05	TB31	Y0F
TB12		TB32	
TB13	Y06	TB33	Vacant
TB14		TB34	Vacant
TB15	Y07	TB35	Vacant
TB16		TB36	Vacant
TB17	Y08	TB37	24V DC
TB18		TB38	0V
TB19	Y09		
TB20			

INTERNAL CIRCUIT



EXTERNAL LOAD

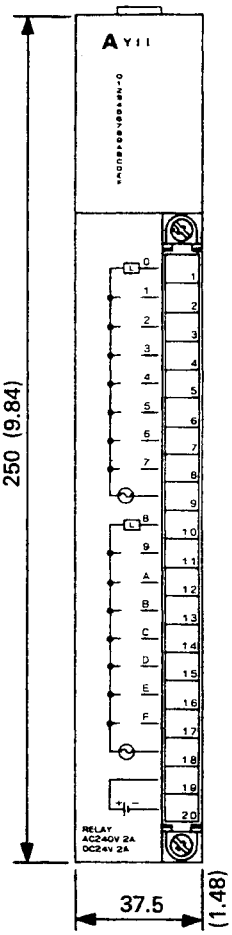


3.3 Type AY11 Output Module

Relay Contact Output

Specifications \ Type		AY11
Output points		16 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistance load)/point 240V AC 2A (cos ϕ =1)/point, (but ≦ 8A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		264V AC, 125V DC
Leakage current at OFF circuit		0.1mA (200V AC, 60Hz)
Response time	OFF → ON	10ms or less
	ON → OFF	12ms or less
Life	Mechanical	20 million times or more
	Electrical	At rated switching voltage/current load 200 thousand times or more
		200V AC 1.5A, 240V AC 1A (COS ϕ =0.7) 200 thousand times or more
		200V AC 0.75A, 240V AC 0.5A (COS ϕ =0.35) 200 thousand times or more
		24V DC 1A, 100V DC 0.1A (L/R=7ms) 200 thousand times or more
Max. switching frequency		3600 times/hour
Noise suppression		Varistor (387 to 473V)
Internal current consumption (5V DC)		115mA (TYP. all points ON)
Relay socket		Provided
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)
Operation indicator		ON indication (LED)
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less
	Current	150mA (24V DC TYP. all points ON)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

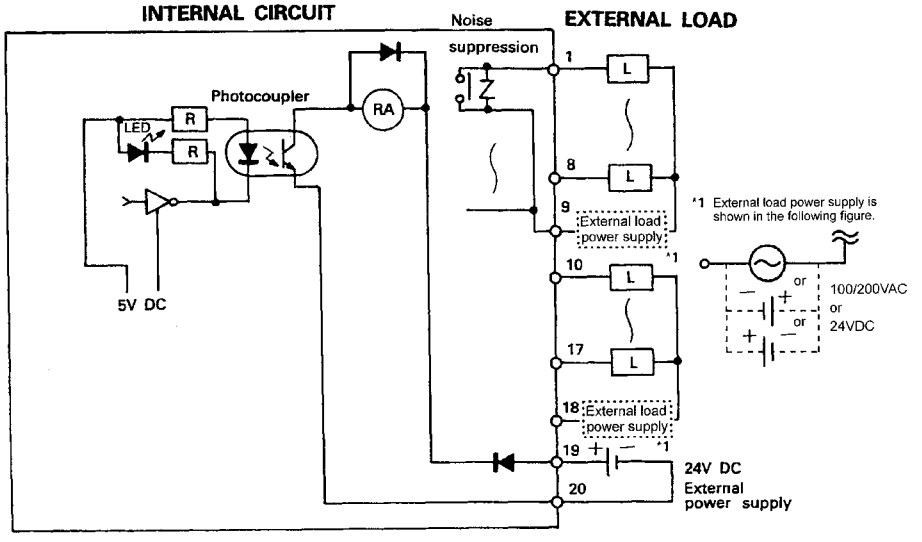
Front View mm(inch)



Weight	0.5kg (1.1lbs)

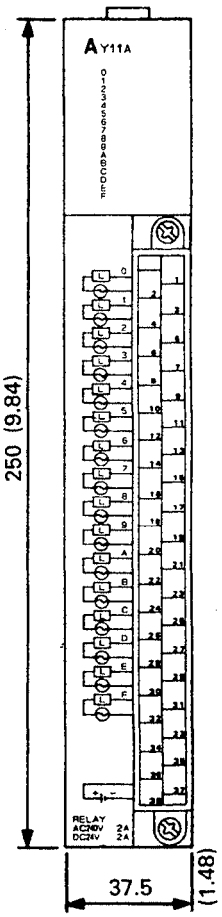
Terminal No.	Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	Common 1
TB10	Y08
TB11	Y09
TB12	Y0A
TB13	Y0B
TB14	Y0C
TB15	Y0D
TB16	Y0E
TB17	Y0F
TB18	Common 2
TB19	24V DC
TB20	0V

INTERNAL CIRCUIT **EXTERNAL LOAD**

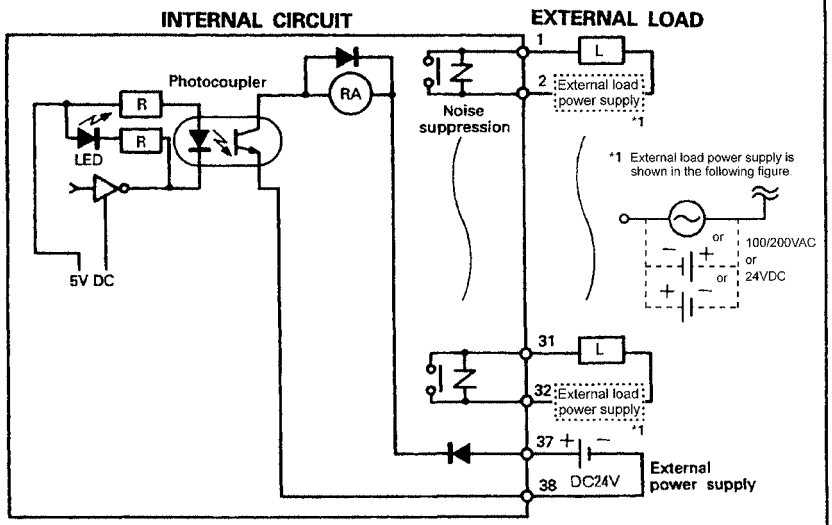


3.4 Type AY11A Output Module (Relay Contact Output (all points independent))

Relay Contact Output			
Specifications \ Type		AY11A	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated switching voltage, current		24V DC 2A (resistive load)/point 240V AC 2A (cos ϕ =1)/point, (but ≦ 16A total)	
Min. switching load		5V DC 1mA	
Max. switching voltage		264V AC, 125V DC	
Leakage current at OFF circuit		0.1mA (200V AC, 60Hz)	
Response time	OFF → ON	10ms or less	
	ON → OFF	12ms or less	
Life	Mechanical	20 million times or more	
	Electrical	At rated switching voltage/ current load 200 thousand times or more	
		200V AC 1.5A, 240V AC 1A (COS ϕ =0.7) 200 thousand times or more	
		200V AC 0.75A, 240V AC 0.5A (COS ϕ =0.35) 200 thousand times or more	
		24V DC 1A, 100V DC 0.1A (L/R=7ms) 200 thousand times or more	
Max. switching frequency		3600 times/hour	
Noise suppression		Varistor (387 to 473V)	
Internal current consumption (5V DC)		115mA (TYP. all points ON)	
Relay socket		Not provided	
Common terminal arrangement		Not provided (all points independent)	
Operation indicator		ON indication (LED)	
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less	
	Current	150mA (24V DC TYP. all points ON)	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.47kg (1.03lbs)

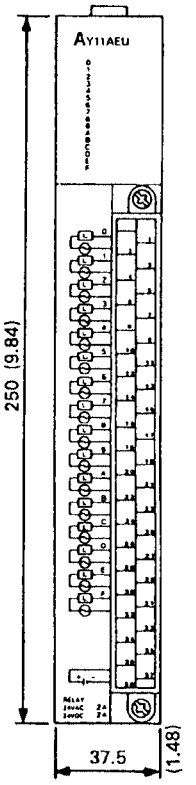


Terminal No.	Output Signal No.	Terminal No.	Output Signal No.
TB1	Y00	TB21	Y0A
TB2		TB22	
TB3	Y01	TB23	Y0B
TB4		TB24	
TB5	Y02	TB25	Y0C
TB6		TB26	
TB7	Y03	TB27	Y0D
TB8		TB28	
TB9	Y04	TB29	Y0E
TB10		TB30	
TB11	Y05	TB31	Y0F
TB12		TB32	
TB13	Y06	TB33	Vacant
TB14		TB34	Vacant
TB15	Y07	TB35	Vacant
TB16		TB36	Vacant
TB17	Y08	TB37	24V DC
TB18		TB38	0V
TB19	Y09		
TB20			



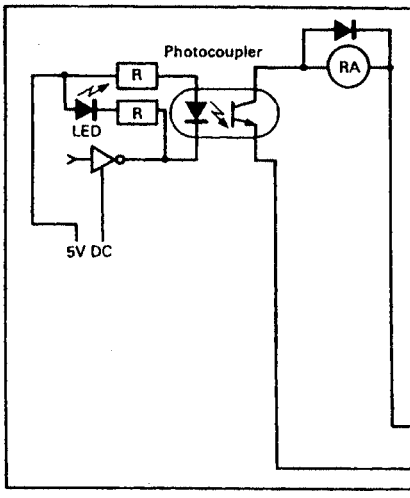
3.4.1 Type AY11AEU Output Module (Relay Contact Output (all points independent))

Relay Contact Output			
Specifications \ Type		AY11AEU	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated switching voltage, current		24V DC 2A (resistive load)/point 24V AC 2A (cosø=1)/point, (but ≦ 16A total)	
Min. switching load		5V DC 1mA	
Max. switching voltage		49.9V AC, 74.9V DC	
Leakage current at OFF circuit		0.1mA (49.9V AC, 60Hz)	
Response time	OFF – ON	10ms or less	
	ON – OFF	12ms or less	
Life	Mechanical	20 million times or more	
	Electrical	At rated switching voltage/current load 200 thousand times or more	
		24V AC 1.5A, (COSø=0.7) 200 thousand times or more	
		24V AC 0.75A, (COSø=0.35) 200 thousand times or more	
		24V DC 1A, 48V DC 0.1A (L/R=7ms) 200 thousand times or more	
Max. switching frequency		3600 times/hour	
Noise suppression		Varistor (387 to 473V)	
Internal current consumption (5V DC)		115mA (TYP. all points ON)	
Relay socket		Not provided	
Common terminal arrangement		Not provided (all points independent)	
Operation indicator		ON indication (LED)	
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less	
	Current	150mA (24V DC TYP. all points ON)	
Connection method		38-point removable terminal block (M3 X 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.47kg (1.03lbs)

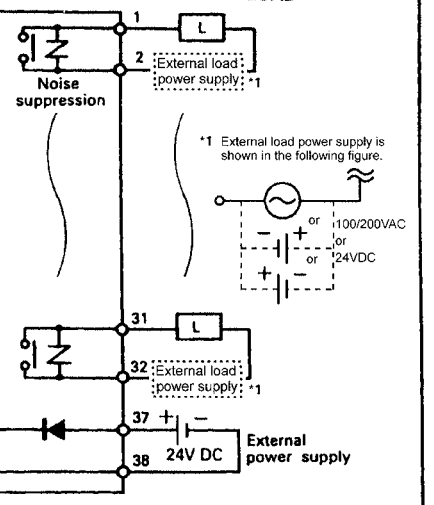


Terminal No.	Output Signal No.	Terminal No.	Output Signal No.
TB1	Y00	TB21	Y0A
TB2		TB22	
TB3	Y01	TB23	Y0B
TB4		TB24	
TB5	Y02	TB25	Y0C
TB6		TB26	
TB7	Y03	TB27	Y0D
TB8		TB28	
TB9	Y04	TB29	Y0E
TB10		TB30	
TB11	Y05	TB31	Y0F
TB12		TB32	
TB13	Y06	TB33	Vacant
TB14		TB34	Vacant
TB15	Y07	TB35	Vacant
TB16		TB36	Vacant
TB17	Y08	TB37	24V DC
TB18		TB38	0V
TB19	Y09		
TB20			

INTERNAL CIRCUIT



EXTERNAL LOAD

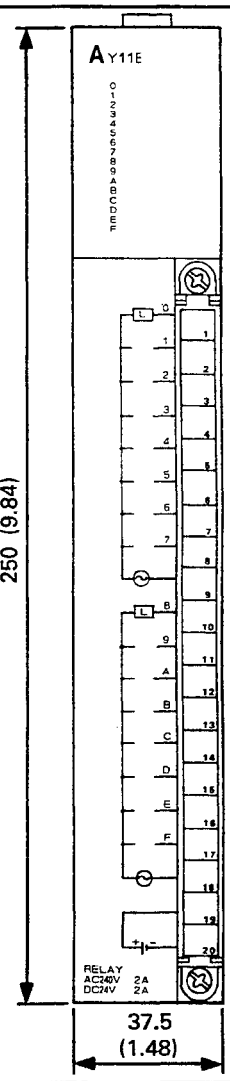


3.5 Type AY11E Output Module

Relay Contact Output

Specifications \ Type		AY11E
Output points		16 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistive load)/point, 240V AC 2A ($\cos\phi$=1)/point, (but ≦ 8A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		250V AC, 125V DC
Leakage current at OFF		0.1mA (200V AC, 60Hz)
Response time	OFF → ON	10ms or less
	ON → OFF	12ms or less
Life	Mechanical	20 million times or more
	Electrical	At rated switching voltage/current load 200 thousand times or more
		200V AC 1.5A, 240V AC 1A ($\cos\phi$=0.7) 200 thousand times or more
		200V AC 0.75A, 240V AC 0.5A ($\cos\phi$=0.35) 200 thousand times or more
		24V DC 1A, 100V DC 0.1A (L/R=7ms) 200 thousand times or more
Max. switching frequency		3600 times/hour
Noise suppression		Varistor (387 to 473V)
Fuse		8A MF51NM8 or FGMA250V8A
Fuse blow indication		Not provided
Internal current consumption (5V DC)		115mA (TYP. all points ON)
Relay socket		Not provided
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)
Operation indicator		ON indication (LED)
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less
	Current	150mA (24V DC all points ON)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

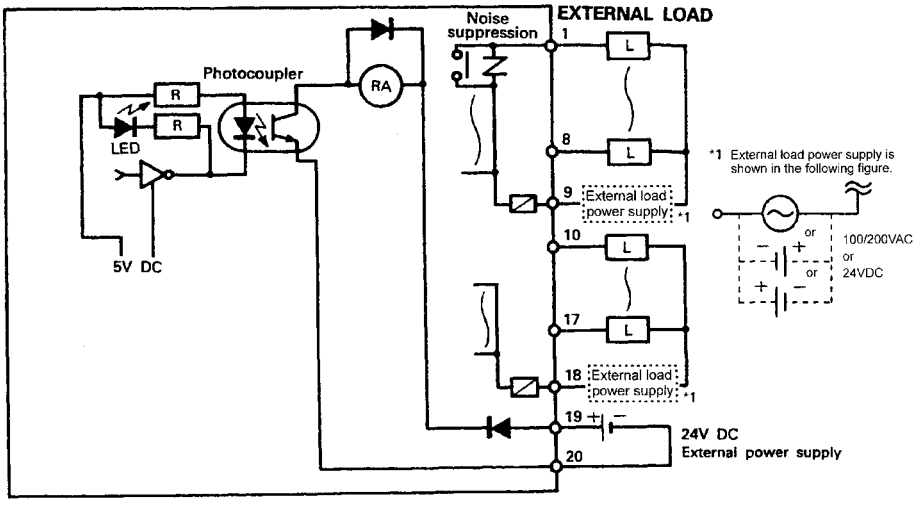
Front View mm(inch)



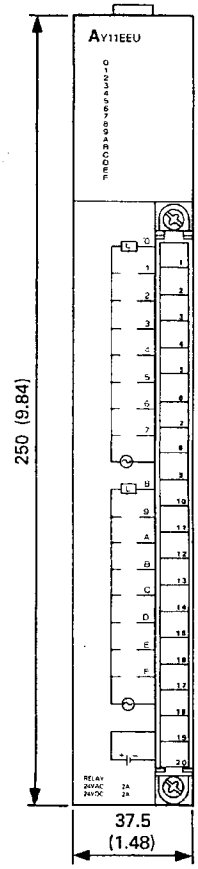
Weight: 0.47kg (1.03lbs)

Terminal No.	Output Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	COM 1
TB10	Y08
TB11	Y09
TB12	Y0A
TB13	Y0B
TB14	Y0C
TB15	Y0D
TB16	Y0E
TB17	Y0F
TB18	COM 2
TB19	24V DC
TB20	0V

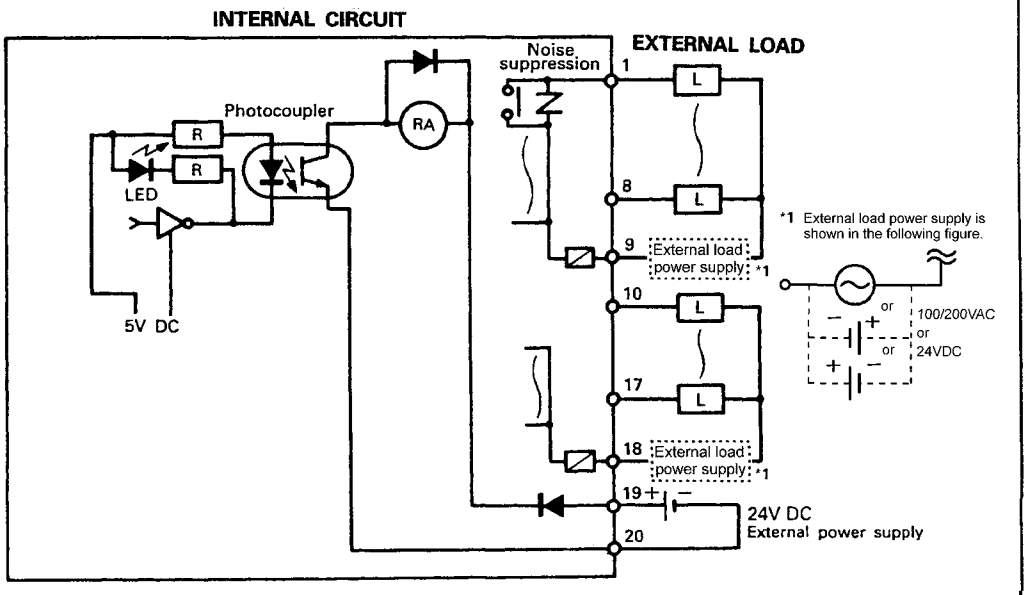
INTERNAL CIRCUIT



3.5.1 Type AY11EEU Output Module

Relay Contact Output			
Specifications \ Type		AY11EEU	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated switching voltage, current		24V DC 2A (resistive load)/point 24V AC 2A (cosø=1)/point, (but ≦ 8A per common)	
Min. switching load		5V DC 1mA	
Max. switching voltage		49.9V AC, 74.9V DC	
Leakage current at OFF		0.1mA (49.9 AC, 60Hz)	
Response time	OFF → ON	10ms or less	
	ON → OFF	12ms or less	
Life	Mechanical	20 million times or more	
	Electrical	At rated switching voltage/current load 200 thousand times or more	
		24V AC 1.5A, (COSø=0.7) 200 thousand times or more	
		24V AC 0.75A, (COSø=0.35) 200 thousand times or more	
		24V DC 1A, 48V DC 0.1A (L/R=7ms) 200 thousand times or more	
Max. switching frequency		3600 times/hour	
Noise suppression		Varistor (387 to 473V)	
Fuse		8A MF51NM8 or FGMA250V8A	
Fuse blow indication		Not provided	
Internal current consumption (5V DC)		115mA (TYP. all points ON)	
Relay socket		Not provided	
Common terminal arrangement		8 points/common (common terminal: TB9,TB18)	
Operation indicator		ON indication (LED)	
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less	
	Current	150mA (24V DC all points ON)	
Connection method		20-point removable terminal block (M3 X 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.47kg (1.03lbs)

Terminal No.	Output Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	COM 1
TB10	Y08
TB11	Y09
TB12	Y0A
TB13	Y0B
TB14	Y0C
TB15	Y0D
TB16	Y0E
TB17	Y0F
TB18	COM 2
TB19	24V DC
TB20	0V

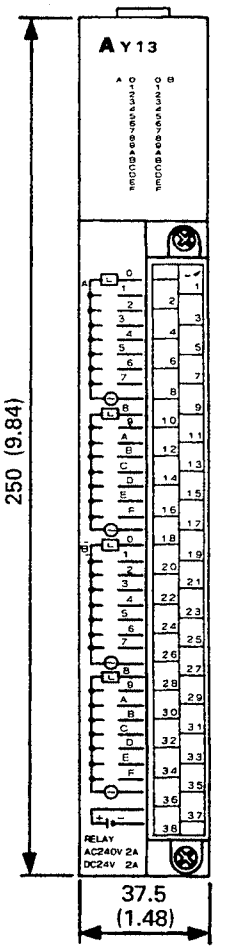


3.6 Type AY13 Output Module

Relay Contact Output

Specifications \ Type		AY13
Output points		32 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistance load)/point 240V AC 2A ($\cos\phi$=1)/point, (but ≦ 5A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		264V AC, 125V DC
Response time	OFF → ON	10ms or less
	ON → OFF	12ms or less
Life	Mechanical	20 million times or more
	Electrical	At rated switching voltage/current load 200 thousand times or more
		200V AC 1.5A, 240V AC 1A ($\cos\phi$=0.7) 200 thousand times or more
		200V AC 1A, 240V AC 0.5A ($\cos\phi$=0.35) 200 thousand times or more
		24V DC 1A, 100V DC 0.1A (L/R=7ms) 200 thousand times or more
Max. switching frequency		3600 times/hour
Noise suppression		Not provided
Internal current consumption (5V DC)		230mA (TYP. all points ON)
Relay socket		Not provided
Common terminal arrangement		8 points/common (common terminal: TB9, TB18 TB27, TB36)
Operation indicator		ON indication (LED)
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less
	Current	290mA (24V DC TYP. all points ON)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

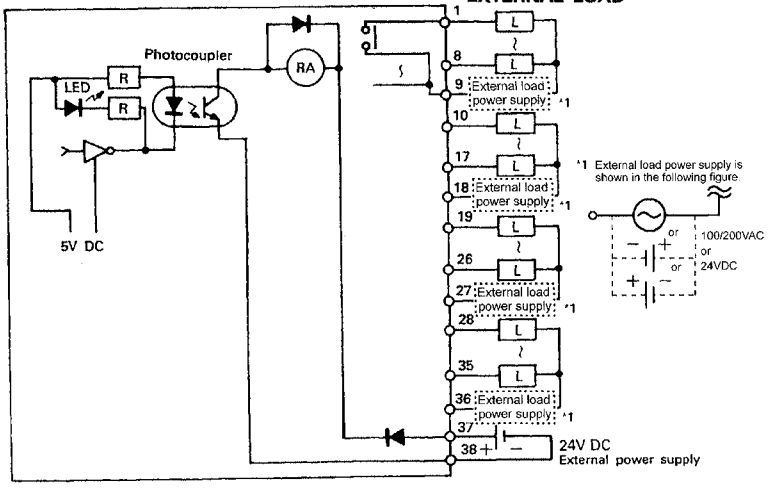
Front View mm(inch)



Weight	0.59kg (1.3lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Common 3
TB8	Y07	TB28	Y18
TB9	Common 1	TB29	Y19
TB10	Y08	TB30	Y1A
TB11	Y09	TB31	Y1B
TB12	Y0A	TB32	Y1C
TB13	Y0B	TB33	Y1D
TB14	Y0C	TB34	Y1E
TB15	Y0D	TB35	Y1F
TB16	Y0E	TB36	Common 4
TB17	Y0F	TB37	24V DC
TB18	Common 2	TB38	0V
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT

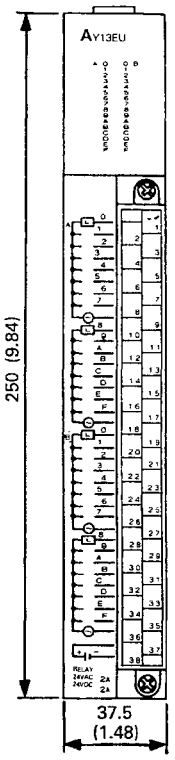


EXTERNAL LOAD

3.6.1 Type AY13EU Output Module

Relay Contact Output		
Specifications \ Type		AY13EU
Output points		32 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistance load)/point 24V AC 2A (cosø=1)/point, (but ≦ 5A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		49.9V AC, 74.9V DC
Response time	OFF → ON	10ms or less
	ON → OFF	12ms or less
Life	Mechanical	20 million times or more
	Electrical	At rated switching voltage/current load 200 thousand times or more
		24V AC 1.5A, (COSø=0.7) 200 thousand times or more
		24V AC 0.75A, (COSø=0.35) 200 thousand times or more
		24V DC 1A, 48V DC 0.1A (L/R=7ms) 200 thousand times or more
Max. switching frequency		3600 times/hour
Noise suppression		Not provided
Internal current consumption (5V DC)		230mA (TYP. all points ON)
Relay socket		Not provided
Common terminal arrangement		8 points/common (common terminal: TB9, TB18 TB27, TB36)
Operation indicator		ON indication (LED)
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less
	Current	290mA (24V DC TYP. all points ON)
Connection method		38-point removable terminal block (M3 X 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

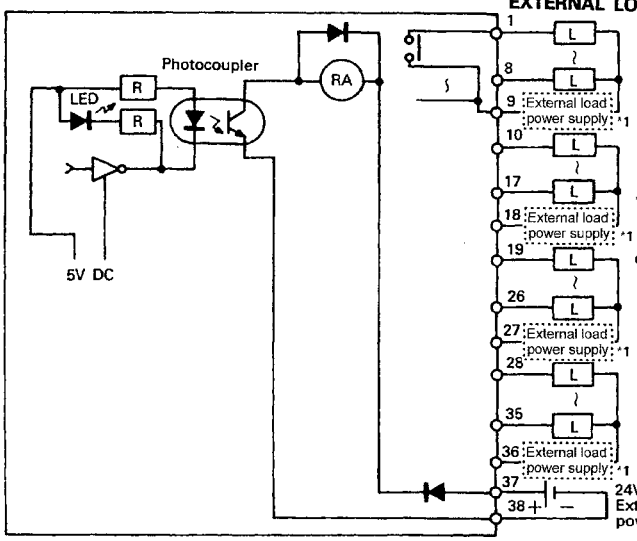
Front View mm(inch)

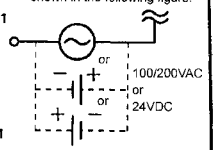


Weight	0.59kg (1.30lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Common 3
TB8	Y07	TB28	Y18
TB9	Common 1	TB29	Y19
TB10	Y08	TB30	Y1A
TB11	Y09	TB31	Y1B
TB12	Y0A	TB32	Y1C
TB13	Y0B	TB33	Y1D
TB14	Y0C	TB34	Y1E
TB15	Y0D	TB35	Y1F
TB16	Y0E	TB36	Common 4
TB17	Y0F	TB37	24V DC
TB18	Common 2	TB38	0V
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT



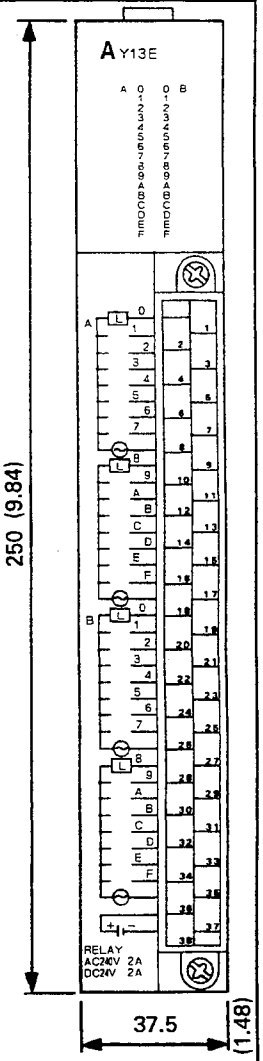


3.7 Type AY13E Output Module

Relay Contact Output

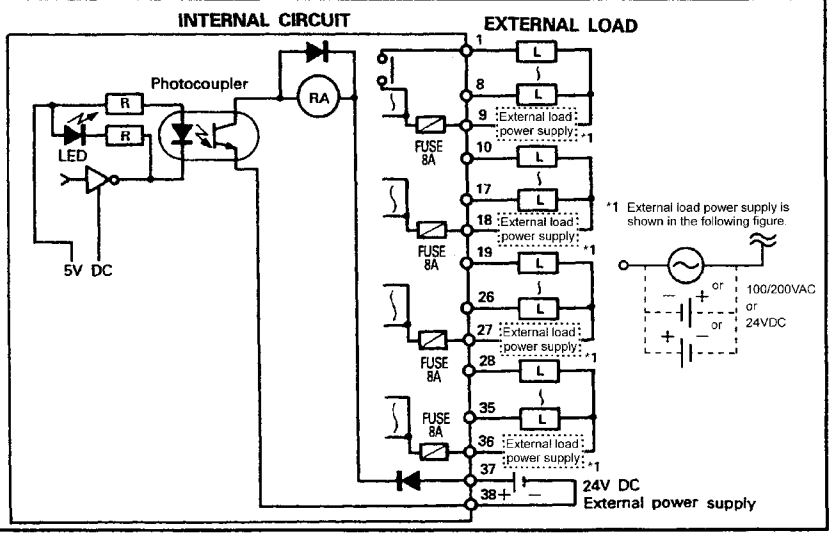
Specifications \ Type		AY13E
Output points		32 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistance load): point, 5A/common 240V AC 2A ($\cos\phi=1$): point, (but ≦ 5A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		250V AC, 125V DC
Response time	OFF → ON	10ms or less
	ON → OFF	12ms or less
Life	Mechanical	20 million times or more
	Electrical	At rated switching voltage/current load 200 thousand times or more
		200V AC 1.5A, 240V AC 1A ($\cos\phi=0.7$) 200 thousand times or more
		200V AC 1A, 240V AC 0.5A ($\cos\phi=0.35$) 200 thousand times or more
		24V DC 1A, 100V DC 0.1A (L/R=7ms) 200 thousand times or more
Max. switching frequency		3600 times/hour
Noise suppression		Not provided
Fuse		8A MF51NM8 or FGMA250V8A
Fuse blow indication		Not provided
Internal current consumption (5V DC)		230mA (TYP. all points ON)
Relay socket		Not provided
Common terminal arrangement		8 points/common (common terminal: TB9, TB18 TB27, TB36)
Operation indicator		ON indication (LED)
External power supply requirement	Voltage	24V DC ±10% Ripple voltage 4Vp-p or less
	Current	290mA (24V DC all points ON)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

Front View mm(inch)



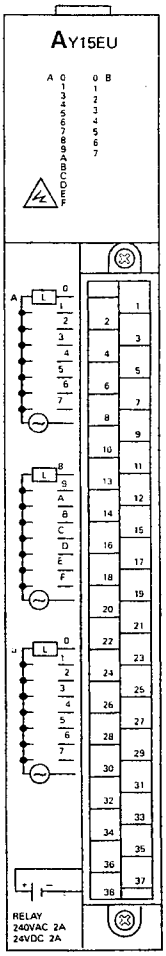
Weight	0.60kg (1.32lbs)

Terminal No.	Output Signal No.	Terminal No.	Output Signal No.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	COM 3
TB8	Y07	TB28	Y18
TB9	COM 1	TB29	Y29
TB10	Y08	TB30	Y1A
TB11	Y09	TB31	Y1B
TB12	Y0A	TB32	Y1C
TB13	Y0B	TB33	Y1D
TB14	Y0C	TB34	Y1E
TB15	Y0D	TB35	Y1F
TB16	Y0E	TB36	COM 4
TB17	Y0F	TB37	24V DC
TB18	COM 2	TB38	0V
TB19	Y10		
TB20	Y11		



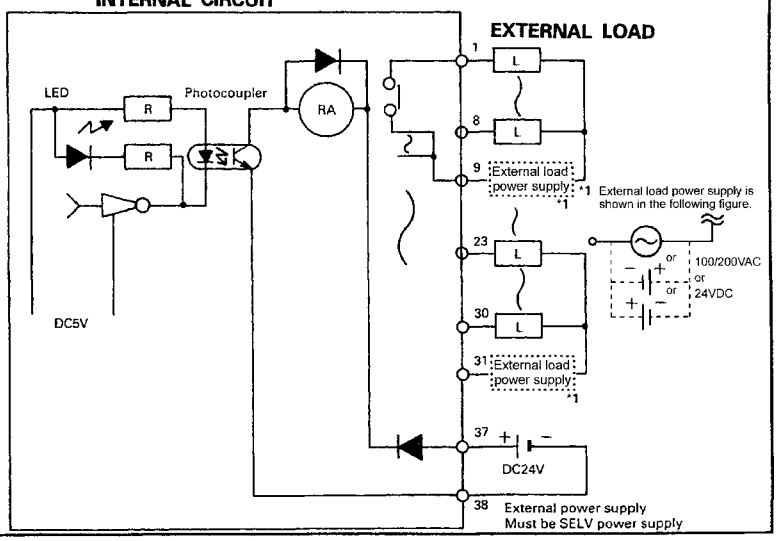
3.7.1 Type AY15EU Output Module

Relay Contact Output			
Specifications \ Type		AY15EU	Front View mm(inch)
Output points		24 points (number of occupied I/O points : 32 points)	
Insulation method		Photocoupler	
Rated switching voltage, current		24V DC 2A (resistance load)/point 240V AC 2A (cosø=1)/point, (but ≦ 8A per common)	
Min. switching load		5V DC 10mA	
Max. switching voltage		264V AC, 125V DC	
Response time	OFF → ON	10ms or less	
	ON → OFF	12ms or less	
Life	Mechanical	20 million times or more	
	Electrical	At rated switching voltage/current load 10 thousand times or more	
		200V AC 2A, 240V AC 1.8A (COSø=0.7) 200 thousand times or more	
		200V AC 1.1A, 240V AC 0.9A (COSø=0.35) 200 thousand times or more	
		24V DC 1.1A, 100V DC 0.1A (L/R=7ms) 200 thousand times or more	
Max. switching frequency		3600 times/hour	
Surge absorber		Not provided	
Internal current consumption (5V DC)		150mA (TYP. all points ON)	
Fuse		Not provided	
Common terminal arrangement		8 points/common (common terminal: TB9, TB20, TB31)	
Operation indicator		ON indication (LED)	
Connection method		38-point removable terminal block (M3.5 X 6mm screws)	
Applicable wire size		0.75 to 2mm² (AWG14 to AWG19) (Applicable tightening torque: 78.4N·cm)	
Applicable solderless terminal		RAV1.25-3.5, RAV2-3.5	
Withstand voltage		(AC external batch relay-drive power supply. 5V internal circuit) 2830V AC rms/3 cycle (2,000m)	
		(Relay-drive power supply, 5V internal circuit) 500V AC rms/3 cycle (2,000m)	
Insulation resistance		10MΩ or more using a insulation resistance tester	
Noise immunity		IEC801-4 : 1kV	
External power supply (24V DC, 0V)	Voltage	24V DC ± 10% Ripple voltage 4Vp-p or less	Must be SELV power supply
	Current	220mA (240V DC all points ON)	
			Weight 0.50kg (1.10lbs)



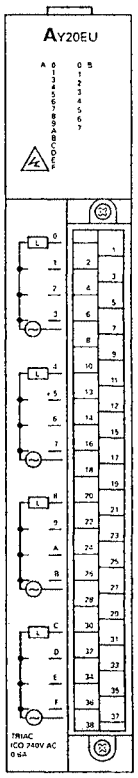
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Vacant
TB2	Y01	TB22	Vacant
TB3	Y02	TB23	Y10
TB4	Y03	TB24	Y11
TB5	Y04	TB25	Y12
TB6	Y05	TB26	Y13
TB7	Y06	TB27	Y14
TB8	Y07	TB28	Y15
TB9	Common 1	TB29	Y16
TB10	Vacant	TB30	Y17
TB11	Vacant	TB31	Common 3
TB12	Y08	TB32	Vacant
TB13	Y09	TB33	Vacant
TB14	Y0A	TB34	Vacant
TB15	Y0B	TB35	Vacant
TB16	Y0C	TB36	Vacant
TB17	Y0D	TB37	DC24V
TB18	Y0E	TB38	0V
TB19	Y0F		
TB20	Common 2		

INTERNAL CIRCUIT



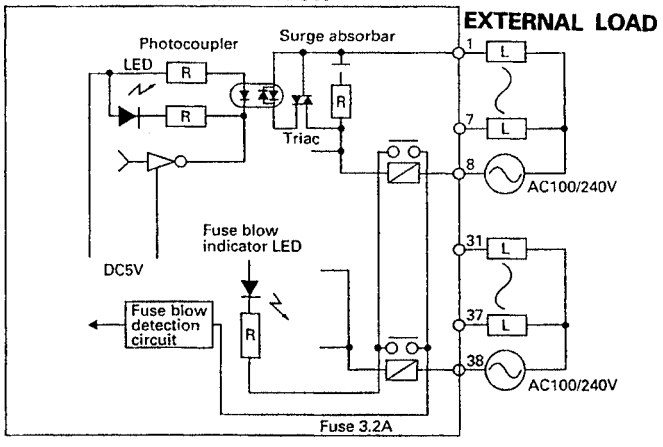
3.7.2 Type AY20EU Output Module

Triac Output

Specifications \ Type		AY20EU	Front View mm(inch)
Output points		16 points	
Insulation method		Photocoupler	
Rated load voltage		100 to 240V AC 40 to 70Hz	
Max. load voltage		264V AC	
Max. load current		0.6A/point, 1.9A/common	
Min. load voltage/current		24V AC/15mA, 120V AC/15mA, 240V AC/15mA	
Max. allowed rush current		30A 10ms or less, 15A 100ms or less	
Leakage current at OFF circuit		1.5mA (240V AC 60Hz)	
Max. voltage drop at ON circuit		1.5V AC or less (15mA to 0.6A)	
Response time	OFF → ON	1ms or less	
	ON → OFF	0.5 CYCLE + 1ms or less	
Surge absorber		CR absorber (0.1μF + 47Ω)	
Fuse rating		Fuse 3.2A (1 common) GP-32	
Common terminal arrangement		4 points/common (common terminal : TB8, TB18, TB28, TB38)	
Operation indicator		ON indication (LED)	
Fuse blow indication		LED on unit front. Signal to PC CPU	
Connection method		38-point removable terminal block (M3.5 X 6mm screws)	
Applicable wire size		0.75 to 2mm² (AWG14 to AWG19) (Applicable tightening torque 78.4N·cm)	
Applicable solderless terminal		RAV1.25-3.5, RAV2-3.5	
Accessories		Fuse GP-32 : 1	
Withstanding voltage		2830V AC rms/3 cycle (2,000m)	
Insulation resistance		10MΩ or more using a insulation resistance tester	
Noise durability		IEC801-4 : 1kV	
Internal current consumption (5V DC)		400mA (TYP. all points ON)	Weight: 0.65kg (1.43lbs)

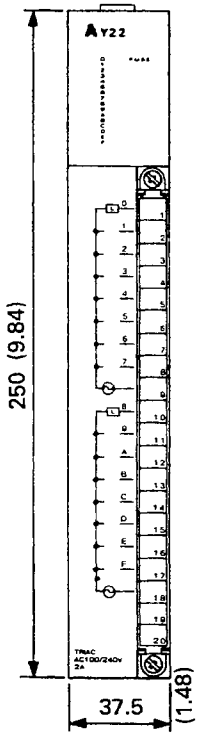
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Y08
TB2	Vacant	TB22	Vacant
TB3	Y01	TB23	Y09
TB4	Vacant	TB24	Vacant
TB5	Y02	TB25	Y0A
TB6	Vacant	TB26	Vacant
TB7	Y03	TB27	Y0B
TB8	Common 1	TB28	Common 3
TB9	Vacant	TB29	Vacant
TB10	Vacant	TB30	Vacant
TB11	Y04	TB31	Y0C
TB12	Vacant	TB32	Vacant
TB13	Y05	TB33	Y0D
TB14	Vacant	TB34	Vacant
TB15	Y06	TB35	Y0E
TB16	Vacant	TB36	Vacant
TB17	Y07	TB37	Y0F
TB18	Common 2	TB38	Common 4
TB19	Vacant		
TB20	Vacant		

INTERNAL CIRCUIT



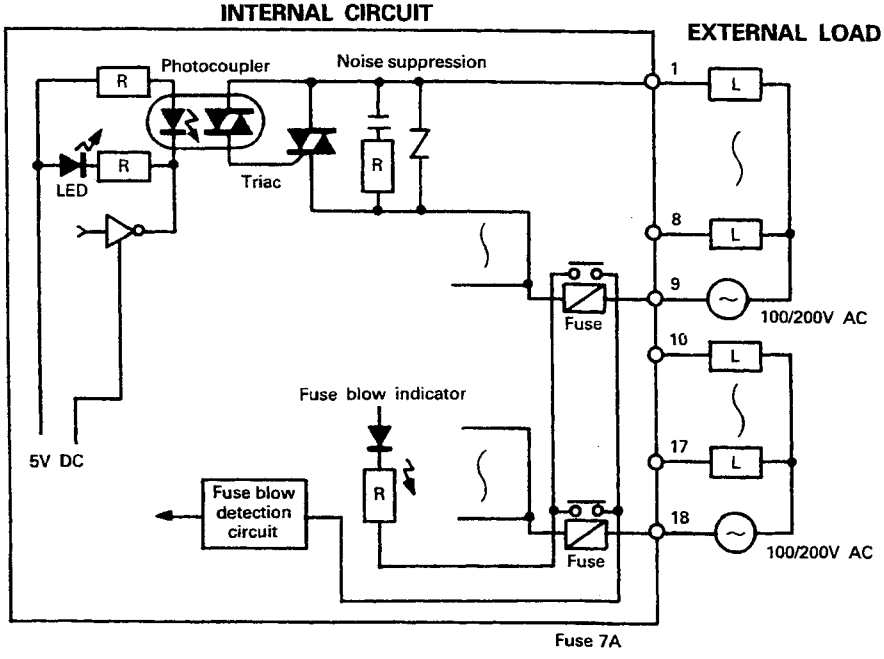
3.8 Type AY22 Output Module

Triac Output

Specifications \ Type		AY22	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated load voltage		100—240V AC 50/60Hz ±5%	
Max. load voltage		264V AC	
Max. load current		2A/point, 3.3A/common	
Min. load voltage, current		24V AC 100mA, 100V AC 10mA, 240V AC 20mA	
Max. inrush current		40A—10ms or shorter, 15A—100ms or shorter	
Leakage current (OFF)		1.5mA (120V AC 60Hz), 3mA (240V AC 60Hz)	
Max. voltage drop (ON)		1.5V or lower (1 to 2A), 1.8V or lower (0.2 to 1A), 5V or lower (0.2A or lower)	
Response time	OFF → ON	1ms or less	
	ON → OFF	0.5 cycles + 1ms or less	
Internal current consumption (5V DC)		305mA (TYP. all points ON)	
Noise suppression		CR absorber (0.022 μF+47Ω), Varistor (387 to 473V)	
Fuse rating		7A fast blow fuse (1 fuse per common) type HP-70K	
Fuse blow indicator		LED on unit front. Signal to PC CPU	
Common terminal arrangement		8 points/common (common terminal: TB9, TB18)	
Operation indicator		ON indication (LED)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.71kg (1.56lbs)

Terminal No.	Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	Common 1
TB10	Y08
TB11	Y09
TB12	Y0A
TB13	Y0B
TB14	Y0C
TB15	Y0D
TB16	Y0E
TB17	Y0F
TB18	Common 2
TB19	Vacant
TB20	Vacant

INTERNAL CIRCUIT

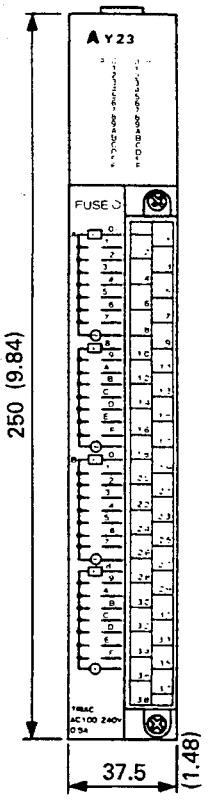


3.9 Type AY23 Output Module

Triac Output

Specifications \ Type		AY23
Output points		32 points
Insulation system		Photocoupler
Rated load voltage		100—240V AC 40 to 70Hz
Max. load voltage		264V AC
Max. load current		0.6A/points, 2.4A/common *(1.05A/common)
Min. load voltage, current		24V AC 100mA, 100V AC 10mA, 240V AC 10mA
Max. inrush current		20A—10ms or shorter, 8A—100ms or shorter
Leakage current (OFF)		1.5mA (120V AC 60Hz), 3mA (240V AC 60Hz)
Max. voltage drop (ON)		1.5V or lower (0.1 to 0.6A), 1.8V or lower (0.05 to 0.1A) 2.0V or lower (0.01 to 0.5A)
Response time	OFF → ON	1ms
	ON → OFF	0.5 cycles + 1ms or less
Internal current consumption (5V DC)		590mA (TYP. all points ON)
Noise suppression		CR absorber (0.022μF + 47Ω)
Fuse rating		3.2A fast blow fuse (1 fuse per common) type HP-32
Fuse blow indicator		LED on unit front. Signal to PC CPU
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)
Operation indicator		ON indication (LED)
Connection method		38 point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

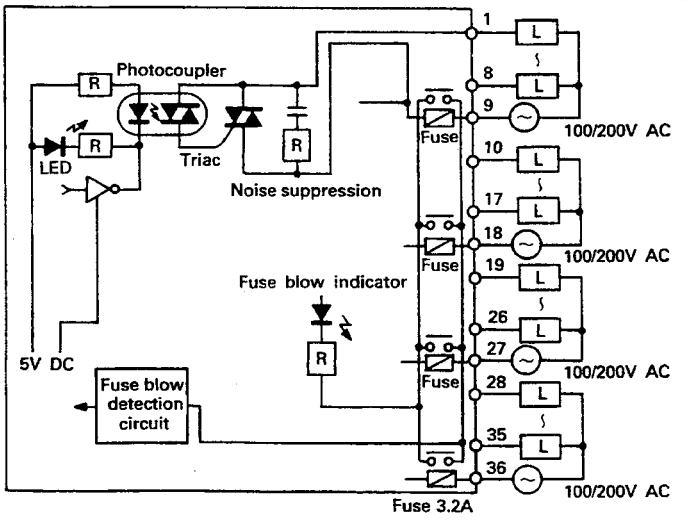
Front View mm(inch)



Weight	0.55kg (1.21lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Common 3
TB8	Y07	TB28	Y18
TB9	Common 1	TB29	Y19
TB10	Y08	TB30	Y1A
TB11	Y09	TB31	Y1B
TB12	Y0A	TB32	Y1C
TB13	Y0B	TB33	Y1D
TB14	Y0C	TB34	Y1E
TB15	Y0D	TB35	Y1F
TB16	Y0E	TB36	Common 4
TB17	Y0F	TB37	Vacant
TB18	Common 2	TB38	Vacant
TB19	Y10		
TB20	Y11		

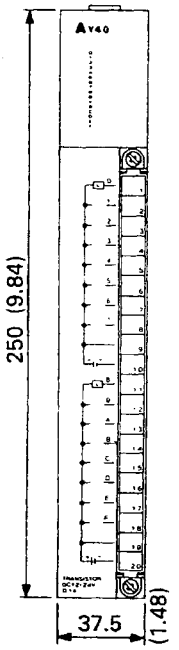
INTERNAL CIRCUIT **EXTERNAL LOAD**



**: 1.05A/common when the output module is used in the next slot to the power supply module.*

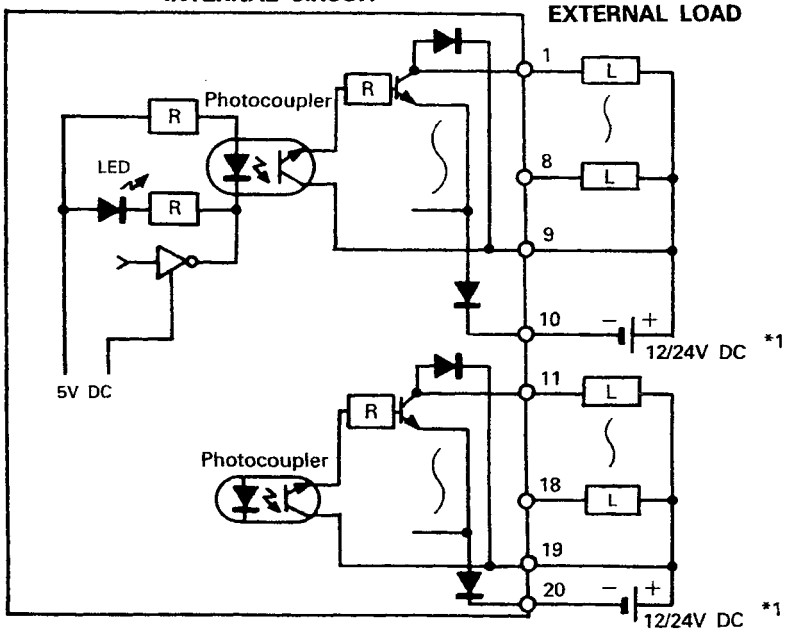
3.10 Type AY40 Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY40	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 40V DC	
Max. load current		0.1A/points, 0.8A/common	
Max. inrush current		0.4A	
Leakage current (OFF)		0.1mA or lower	
Max. voltage drop (ON)		2.5V (0.1A), 1.75V (5mA), 1.7V (1mA)	
Response time	OFF → ON	2ms or less	
	ON → OFF	2ms or less (resistive load)	
Internal current consumption (5V DC)		115mA (TYP. all points ON)	
External power supply requirement	Voltage	12/24V DC (10.2 to 40V DC)	
	Current	8mA (24V DC TYP. per common)	
Noise suppression		Clamp diode *2	
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)	
Operation indicator		ON indication (LED)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.36kg (0.80lbs)

Terminal No.	Signal NO.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	12/24V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	12/24V DC
TB20	0V

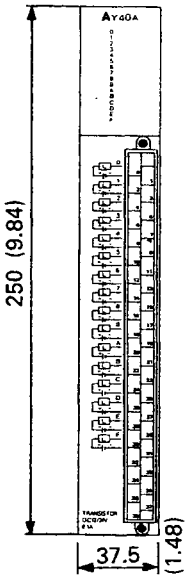
INTERNAL CIRCUIT **EXTERNAL LOAD**



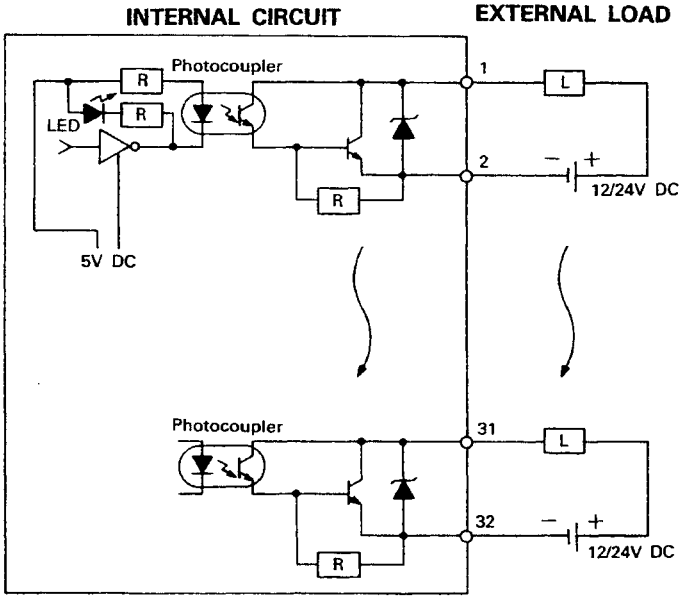
*1: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid.
The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.
*2: The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.

3.11 Type AY40A Output Module (Sink Loading, all points independent)

Transistor Output

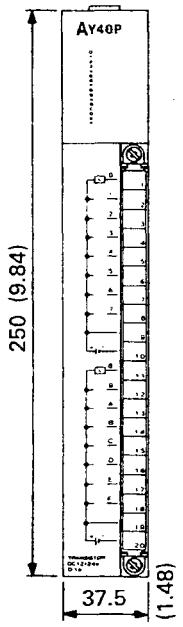
Specifications \ Type		AY40A	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 30V DC (Max. applied voltage)	
Max. load current		0.3A/point	
Max. inrush current		1A, 100ms or lower	
Leakage current (OFF)		0.1mA or lower	
Max. voltage drop (ON)		1.5V (50mA to 0.3A), 1.0V (50mA or lower)	
Response time	OFF → ON	2msec or less	
	ON → OFF	2msec or less (resistive load)	
Internal current consumption (5V DC)		190mA (TYP. all points ON)	
Noise suppression		Diode for absorbing noise	
Common terminal arrangement		Not provided (all points independent)	
Operation indicator		ON indication (LED)	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.42kg (0.92lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Y0A
TB2		TB22	
TB3	Y01	TB23	Y0B
TB4		TB24	
TB5	Y02	TB25	Y0C
TB6		TB26	
TB7	Y03	TB27	Y0D
TB8		TB28	
TB9	Y04	TB29	Y0E
TB10		TB30	
TB11	Y05	TB31	Y0F
TB12		TB32	
TB13	Y06	TB33	Vacant
TB14		TB34	Vacant
TB15	Y07	TB35	Vacant
TB16		TB36	Vacant
TB17	Y08	TB37	Vacant
TB18		TB38	Vacant
TB19	Y09		
TB20			

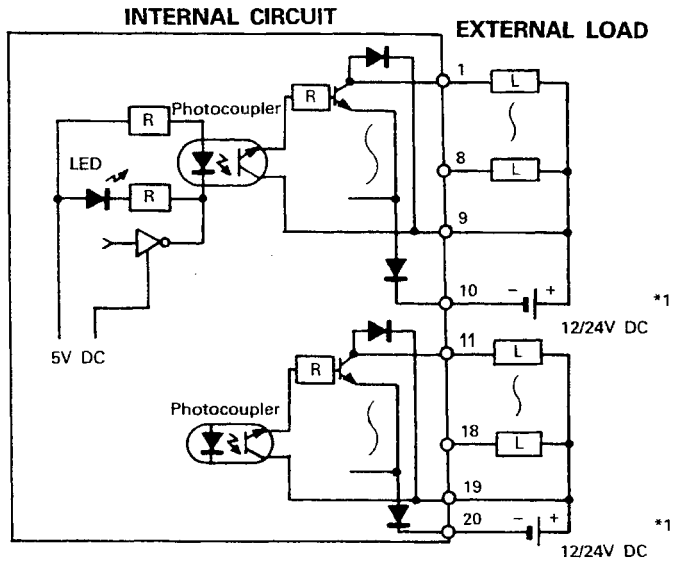


3.12 Type AY40P Transistor Output Module (Sink Loading)

Specifications \ Type		AY40P	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.8 to 26.4V DC	
Max. load current		0.1A/point, 0.8A/common	
Max. inrush current		0.38A, 5msec or less	
Leakage current (OFF)		0.1mA or lower	
Max. voltage drop (ON)		DC2.5V(0.1A), DC1.75V(5mA), DC1.7V(1mA)	
Response time	OFF → ON	2msec or less	
	ON → OFF	2 msec or less (resistive load)	
Internal current consumption (5V DC)		115mA (TYP. all points ON)	
External power supply requirement	Voltage	12/24V DC(10.8 to 26.4V DC)	
	Current	15mA (24V DC per common)	
Noise suppression		Clamp Diode *4	
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)	
Operation indicator		ON indication (LED)	
Protection func.		Provided (Overheat protection func. and short-circuit Protection func.) Overheat protection func. is detected in 1 common unit. When Overheat protection func. occurs at one point of a common, all output points of corresponding common are turned OFF.	
Protection func. detection indication		None (signal is not output to a PLC CPU.)	
Protection func. reset		Automatic reset (reset by canceling Overheat protection func.)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.36Kg (0.80lbs)



Terminal No.	Output Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	12/24V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	12/24V DC
TB20	0V



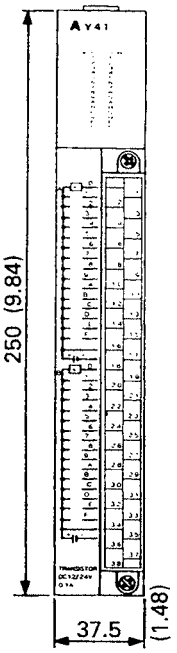
*1: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid. (See Section 7.2, example 5.)
The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.
*2: When 3 points or more of common 8 points are short-circuited simultaneously, internal circuit may be broken.
*3: When an external load remains short-circuited for a long time (time limit for short circuit is about 4 hours), internal circuit may be broken.
When short-circuit protect occurs (output of 8 points are turned OFF), restore an external load as soon as possible.
*4: The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.

3.13 Type AY41 Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY41
Output points		32 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 40V DC
Max. load current		0.1A/points, 1.6A/common
Max. inrush current		0.4A
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		2.5V (0.1A), 1.75V (5mA), 1.7V (1mA)
Response time	OFF → ON	2ms or less
	ON → OFF	2ms or less (resistive load)
Internal current consumption (5V DC)		230mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC (10.2 to 40V DC)
	Current	20mA (24V DC TYP. per common)
Noise suppression		Clamp Diode *2
Common terminal arrangement		16 points/common (common terminal: TB18, TB36)
Operation indicator		ON indication (LED)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

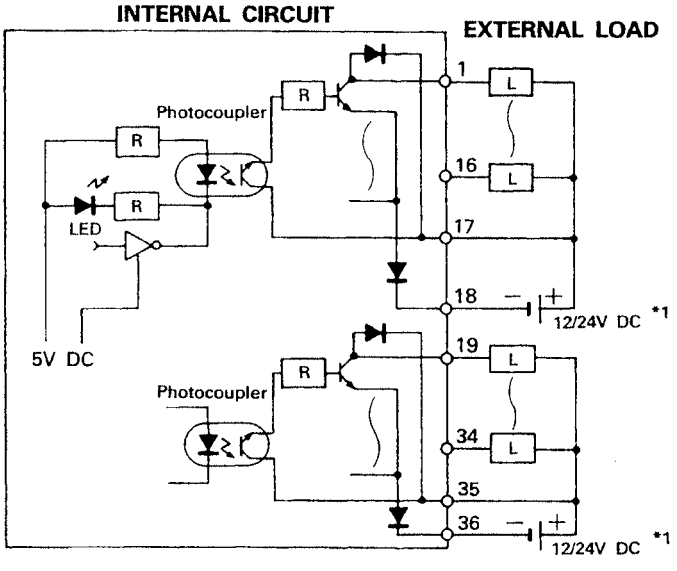
Front View mm(inch)



Weight	0.44kg (0.97lbs)

Terminal No.	Signal NO.	Terminal No.	Signal NO.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Y18
TB8	Y07	TB28	Y19
TB9	Y08	TB29	Y1A
TB10	Y09	TB30	Y1B
TB11	Y0A	TB31	Y1C
TB12	Y0B	TB32	Y1D
TB13	Y0C	TB33	Y1E
TB14	Y0D	TB34	Y1F
TB15	Y0E	TB35	12/24V DC
TB16	Y0F	TB36	0V
TB17	12/24V DC	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT **EXTERNAL LOAD**



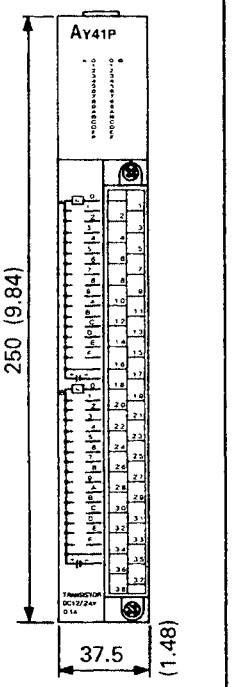
*1: *The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid.*
The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.

*2: *The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.*

3.14 Type AY41P Transistor Output Module (Sink Loading)

Specifications \ Type		AY41P
Output points		32 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.8 to 26.4V DC
Max. load current		0.1A/point, 1.0A/common
Max. inrush current		0.38A, 5msec or less
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		2.5V DC(0.1A), 1.75V DC(5mA), 1.7V DC(1mA)
Response time	OFF → ON	2msec or less
	ON → OFF	2msec or less (resistive load)
Internal current consumption (5V DC)		230mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC (10.8 to 26.4V DC)
	Current	30mA (24V DC TYP. per common)
Noise suppression		Clamp Diode *4
Common terminal arrangement		16 points/common (common terminal: TB18, TB36)
Operation indicator		ON indication (LED)
Protection func.		Provided (Overheat protection func. and short-circuit protection func.) Overheat protection func. is detected in 8 point units separately in the first half and letter half of one common. When Overheat protection func. occurs at one point of 8 points in the first or letter half of one common, corresponding 8 points outputs of such first or letter half are turned OFF.
Protection func. detection indication		None (signal is not output to a PLC CPU.)
Protection func. reset		Automatic reset (reset by canceling Overheat protection func.)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm 2 (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

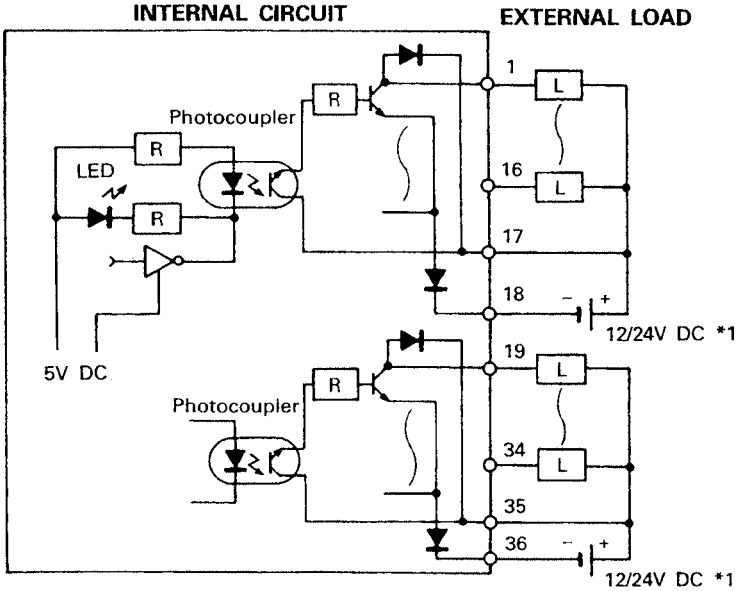
Front View mm(inch)



Weight: 0.44kg (0.97lbs)

Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Y18
TB8	Y07	TB28	Y19
TB9	Y08	TB29	Y1A
TB10	Y09	TB30	Y1B
TB11	Y0A	TB31	Y1C
TB12	Y0B	TB32	Y1D
TB13	Y0C	TB33	Y1E
TB14	Y0D	TB34	Y1F
TB15	Y0E	TB35	12/24V DC
TB16	Y0F	TB36	0V
TB17	12/24V DC	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT



*1: *The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid. (See Section 7.2, example 5.) The clamping diode absorbs serge through the wiring route. L load is recommended to add surge absorber to individual both ends.*

*2: *When 3 points or more of common 8 points in the first or latter half are short-circuited simultaneously, internal circuit may be broken.*

*3: *When an external load remains short-circuited for a long time (time limit for short circuit is about 4 hours), internal circuit may be broken. When short-circuit protect occurs (output of 8 points are turned OFF), restore an external load as soon as possible.*

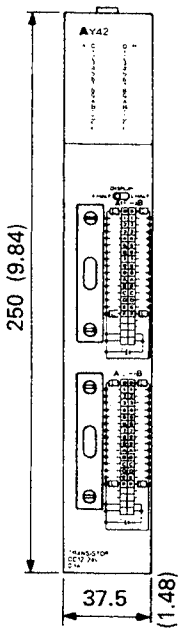
*4: *The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.*

3.15 Type AY42 Output Module (Sink Loading)

Transistor Output

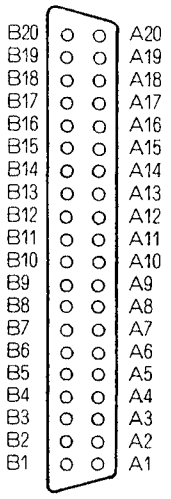
Specifications \ Type		AY42
Output points		64 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Max. load current		0.1A/point, 2A/common*(1.6A/common)
Operating load voltage range		10.2 to 40V DC
Max. inrush current		0.4A
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		2.5V (0.1A), 1.75V (5mA), 1.7V (1mA)
Response time	OFF → ON	2ms or less
	ON → OFF	2ms or less (resistive load)
Noise suppression		Clamp Diode *7
Common terminal arrangement		32 points/common (common terminal: 1A1, 1A2, 2A1, 2A2)
Operation indicator		ON indication (LED) (switch selection of block of 32 points
Internal current consumption (5V DC)		340mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC (10.2 to 40V DC)
	Current	40mA (24V DC TYP. per common)
Connection method		Two 40-pin connectors (solder)
Applicable wire size		0.3mm² (23 AWG)
Accessory		Two external wiring connectors

Front View mm(inch)

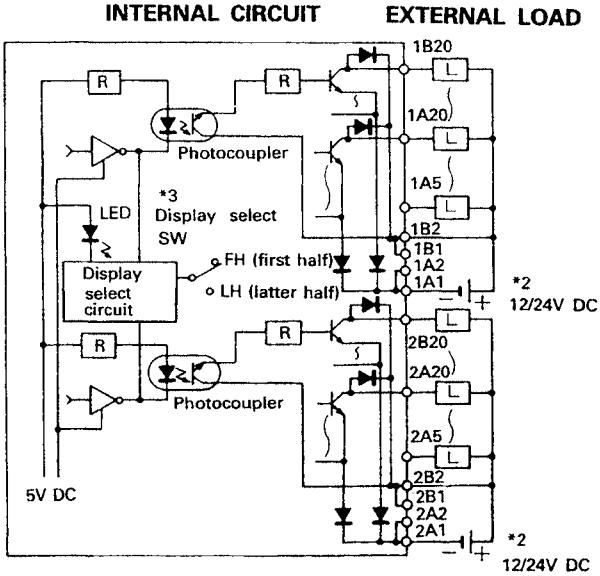


Weight: 0.5kg (1.1lbs)

Pin No.	Signal No. (FH)	Pin No.	Signal No. (LH)
1B20	Y00	2B20	Y20
1B19	Y01	2B19	Y21
1B18	Y02	2B18	Y22
1B17	Y03	2B17	Y23
1B16	Y04	2B16	Y24
1B15	Y05	2B15	Y25
1B14	Y06	2B14	Y26
1B13	Y07	2B13	Y27
1B12	Y08	2B12	Y28
1B11	Y09	2B11	Y29
1B10	Y0A	2B10	Y2A
1B9	Y0B	2B9	Y2B
1B8	Y0C	2B8	Y2C
1B7	Y0D	2B7	Y2D
1B6	Y0E	2B6	Y2E
1B5	Y0F	2B5	Y2F
1B4	Vacant	2B4	Vacant
1B3	Vacant	2B3	Vacant
1B2	12/24V DC	2B2	12/24V DC
1B1	12/24V DC	2B1	12/24V DC
1A20	Y10	2A20	Y30
1A19	Y11	2A19	Y31
1A18	Y12	2A18	Y32
1A17	Y13	2A17	Y33
1A16	Y14	2A16	Y34
1A15	Y15	2A15	Y35
1A14	Y16	2A14	Y36
1A13	Y17	2A13	Y37
1A12	Y18	2A12	Y38
1A11	Y19	2A11	Y39
1A10	Y1A	2A10	Y3A
1A9	Y1B	2A9	Y3B
1A8	Y1C	2A8	Y3C
1A7	Y1D	2A7	Y3D
1A6	Y1E	2A6	Y3E
1A5	Y1F	2A5	Y3F
1A4	Vacant	2A4	Vacant
1A3	Vacant	2A3	Vacant
1A2	0V	2A2	0V
1A1	0V	2A1	0V



Front view



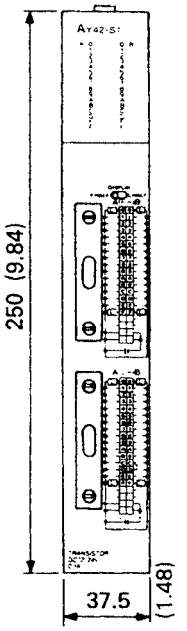
*1: When assigining pin numbers to outputs, use the above table. Note that the silkscreen printing on the front of the module refers A and B numbers to the LED indicators and not to the pin assignmet numbers.
*2: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid. The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.
*3: The statuses of the first 32 outputs (Y00 to Y1F) are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 outputs (Y20 to Y3F) are indicated when LH is selected.
*4: 1.6A/common when the output module is used next to the power supply module.
*5: Pin numbers 1[ ] indicate the upper connector pins and 2[ ] the lower connector pins
*6: AY42 is provided with two soldered type connector jacks (A6CON1).
For applicable connectors, refer to section 1.2 (11).
*7: The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.

3.16 Type AY42-S1 Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY42-S1
Output points		64 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Max. load current		0.1A/point, 2A/common (1.6A/common) *4
Operating load voltage range		10.2 to 40V DC
Max. inrush current		0.4A
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		2.5V (0.1A), 1.75V (5mA), 1.7V (1mA)
Response time	OFF → ON	0.1ms or less
	ON → OFF	0.3ms or less (resistive load less than 2.4kΩ)
Noise suppression		Clamp Diode *5
Common terminal arrangement		32 points/common (common terminal: 1A1, 1A2, 2A1, 2A2)
Operation indicator		ON indication (LED) (switch selection of block of 32 points
Internal current consumption (5V DC)		290mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC (10.2 to 40V DC)
	Current	40mA (24V DC TYP. per common)
Connection method		Two 40-pin connectors (solder)
Applicable wire size		0.3mm² (23 AWG)
Accessory		Two external wiring connectors

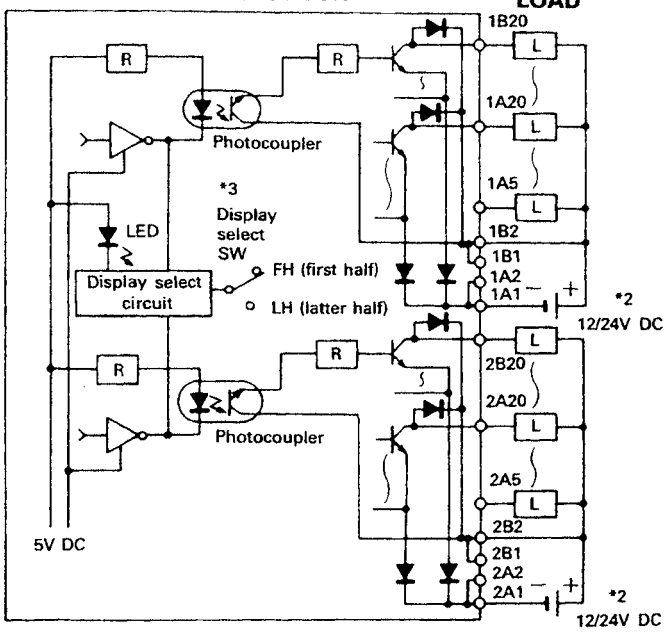
Front View mm(inch)



Weight: 0.5kg (1.1lbs)

Pin No.	Signal No. (FH)	Pin No.	Signal No. (LH)
1B20	Y00	2B20	Y20
1B19	Y01	2B19	Y21
1B18	Y02	2B18	Y22
1B17	Y03	2B17	Y23
1B16	Y04	2B16	Y24
1B15	Y05	2B15	Y25
1B14	Y06	2B14	Y26
1B13	Y07	2B13	Y27
1B12	Y08	2B12	Y28
1B11	Y09	2B11	Y29
1B10	Y0A	2B10	Y2A
1B9	Y0B	2B9	Y2B
1B8	Y0C	2B8	Y2C
1B7	Y0D	2B7	Y2D
1B6	Y0E	2B6	Y2E
1B5	Y0F	2B5	Y2F
1B4	Vacant	2B4	Vacant
1B3	Vacant	2B3	Vacant
1B2	12/24V DC	2B2	12/24V DC
1B1	12/24V DC	2B1	12/24V DC
1A20	Y10	2A20	Y30
1A19	Y11	2A19	Y31
1A18	Y12	2A18	Y32
1A17	Y13	2A17	Y33
1A16	Y14	2A16	Y34
1A15	Y15	2A15	Y35
1A14	Y16	2A14	Y36
1A13	Y17	2A13	Y37
1A12	Y18	2A12	Y38
1A11	Y19	2A11	Y39
1A10	Y1A	2A10	Y3A
1A9	Y1B	2A9	Y3B
1A8	Y1C	2A8	Y3C
1A7	Y1D	2A7	Y3D
1A6	Y1E	2A6	Y3E
1A5	Y1F	2A5	Y3F
1A4	Vacant	2A4	Vacant
1A3	Vacant	2A3	Vacant
1A2	0V	2A2	0V
1A1	0V	2A1	0V

INTERNAL CIRCUIT **EXTERNAL LOAD**



*1: When assigining pin numbers to outputs, use the above table. Note that the silkscreen printing on the front of the module refers A and B numbers to the LED indicators and not to the pin assignmet numbers.

*2: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid. The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.

*3: The statuses of the first 32 outputs (Y00 to Y1F) are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 outputs (Y20 to Y3F) are indicated when LH is selected.

*4: When this unit is used for a slot next to the power supply unit, the maximum load current value is as indicated in the parentheses.

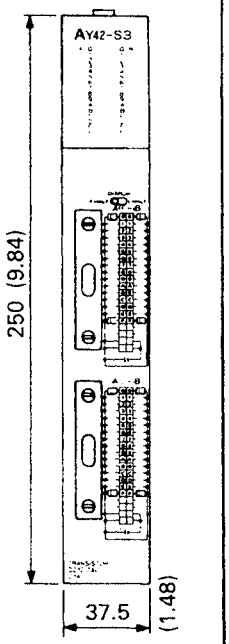
*5: The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.

*6: Pin numbers 1[][][] indicate the upper connector pins and 2[][][] the lower connector pins.

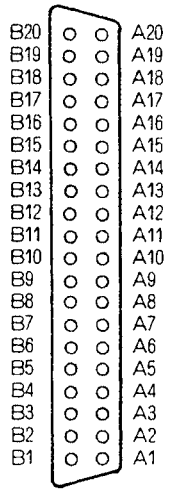
*7: AY42-S1 is provided with two soldered type connector jacks (A6CON1).
For applicable connectors, refer to section 1.2 (11).

3.17 Type AY42-S3 Transistor Output Module (Sink Loading)

Transistor Output

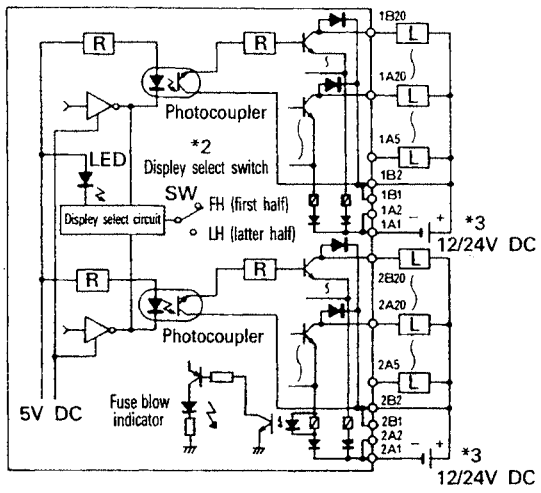
Specifications \ Type		AY42-S3	Front View mm(inch)
Output points		64 points	
Insulation system		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 40V DC	
Max. load current		0.1A/point, 2A/common *1	
Max. inrush current		0.4A/point, 3.5A/fuse	
Leakage current (OFF)		0.1mA or lower	
Max. voltage drop (ON)		2.5V DC(0.1A), 1.75V DC(5mA), 1.7V DC(1mA)	
Response time	OFF → ON	2msec or less	
	ON → OFF	2msec or less (resistive load)	
Internal current consumption (5V DC)		290mA (TYP. all points ON)	
External power supply requirement	Voltage	12/24V DC (10.2 to 40V DC)	
	Current	40mA (24V DC TYP. per common)	
Noise suppression		Clamp Diode *8	
Fuse rating		1.6A normal fuse (2 fuse per common) *7	
Fuse blow indicator		Provided	
Common terminal arrangement		32 points/common (common terminal: TB1A1, 1A2, 2A1, 2A2)	
Operation indicator		ON indication (LED) (switch selection of block of 32 points)	
Connection method		Two 40-pin connectors (soldered)	
Applicable wire size		0.3 mm2	
Accessory		Two external wiring connectors	Weight 0.50kg (1.1lbs)

Pin No.	Signal No. (FH)	Pin No.	Signal No. (LH)
1B20	Y00	2B20	Y20
1B19	Y01	2B21	Y21
1B18	Y02	2B18	Y22
1B17	Y03	2B16	Y23
1B16	Y04	2B16	Y24
1B15	Y05	2B15	Y25
1B14	Y06	2B14	Y26
1B13	Y07	2B13	Y27
1B12	Y08	2B12	Y28
1B11	Y09	2B11	Y29
1B10	Y0A	2B10	Y2A
1B9	Y0B	2B9	Y2B
1B8	Y0C	2B8	Y2C
1B7	Y0D	2B7	Y2D
1B6	Y0E	2B6	Y2E
1B5	Y0F	2B5	Y2F
1B4	Vacant	2B4	Vacant
1B3	Vacant	2B3	Vacant
1B2	12/24V DC	2B2	12/24V DC
1B1	12/24V DC	2B1	12/24V DC
1A20	Y10	2A20	Y30
1A19	Y11	2A19	Y31
1A18	Y12	2A18	Y32
1A17	Y13	2A17	Y33
1A16	Y14	2A16	Y34
1A15	Y15	2A15	Y35
1A14	Y16	2A14	Y36
1A13	Y17	2A13	Y37
1A12	Y18	2A12	Y38
1A11	Y19	2A11	Y39
1A10	Y1A	2A10	Y3A
1A9	Y1B	2A9	Y3B
1A8	Y1C	2A8	Y3C
1A7	Y1D	2A7	Y3D
1A6	Y1E	2A6	Y3E
1A5	Y1F	2A5	Y3F
1A4	Vacant	2A4	Vacant
1A3	Vacant	2A3	Vacant
1A2	0V	2A2	0V
1A1	0V	2A1	0V



Front view

INTERNAL CIRCUIT **EXTERNAL LOAD**



*1: Max. load current varies according to number of points which may be simultaneously turned ON. See Section 1 (10)

*2: The statuses of the first 32 outputs (Y00 to Y1F) are indicated by the LEDs when the toggle switch is set to FH (for first half).
The second 32 outputs (Y20 to Y3F) are indicated when LH is selected.

*3: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid. (See Section 7.2, example 5.)
The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.

*4: The A and B pin numbers are reverse of those of silk screen printing on the unit.
The A number of the pin arrangement chart become the B numbers on the module.

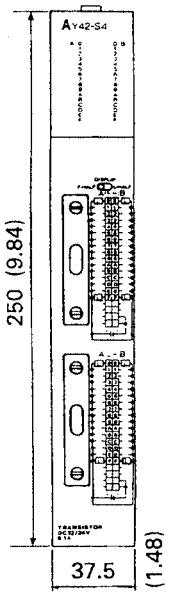
*5: Pin numbers 1[][] indicate the upper connector pins and 2[][] the lower connector pins.

*6: AY42-S3 is provided with two soldered type connector jacks (A6CON1).
For applicable connectors, refer to section 1.2 (11).

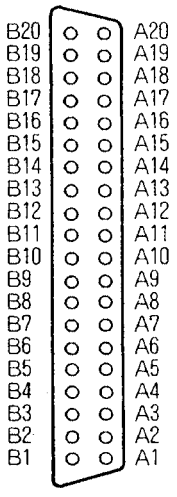
*7: Built-in fuse is installed directry on the module for protecting external wiring.
When a fuse is blown, replace the module.

*8: The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.

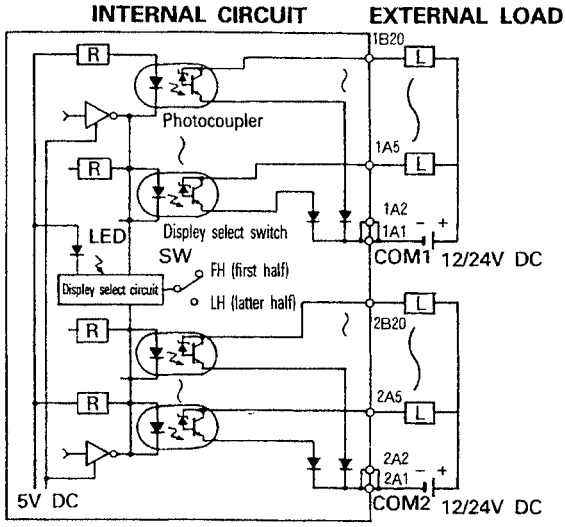
3.18 Type AY42-S4 Transistor Output Module (Sink Loading)

Specifications \ Type		AY42-S4	Front View mm(inch)
Output points		64 points	
Insulation system		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 30V DC	
Max. load current		0.1A/point, 1.92A/common	
Max. inrush current		0.4A, 10msec or less	
Max. simultaneous ON		60% or less simultaneous ON	
Leakage current (OFF)		0.1mA or lower	
Max. voltage drop (ON)		2.5V DC(MAX), 0.1A, 1.0V DC(TYP) 0.1A	
Response time	OFF → ON	2msec or less	
	ON → OFF	2msec or less (resistive load)	
Noise suppression		Photocoupler built-in zener diode	
Common terminal arrangement		32 points/common (common terminal: 1A1, 1A2, 2A1, 2A2)	
Operation indicator		ON indication (LED) (switch selection of block of 32 points)	
Internal current consumption (5V DC)		500mA (TYP.60% or less simultaneous ON)	
Connection method		Two 40-pin connectors (soldered)	
Applicable wire size		0.3mm²	
Accessory		Two external wiring connectors	Weight 0.44kg (0.97lbs)

Pin No.	Signal No. (FH)	Pin No.	Signal No. (LH)
1B20	Y00	2B20	Y20
1B19	Y01	2B21	Y21
1B18	Y02	2B18	Y22
1B17	Y03	2B16	Y23
1B16	Y04	2B16	Y24
1B15	Y05	2B15	Y25
1B14	Y06	2B14	Y26
1B13	Y07	2B13	Y27
1B12	Y08	2B12	Y28
1B11	Y09	2B11	Y29
1B10	Y0A	2B10	Y2A
1B9	Y0B	2B9	Y2B
1B8	Y0C	2B8	Y2C
1B7	Y0D	2B7	Y2D
1B6	Y0E	2B6	Y2E
1B5	Y0F	2B5	Y2F
1B4	Vacant	2B4	Vacant
1B3	Vacant	2B3	Vacant
1B2	Vacant	2B2	Vacant
1B1	Vacant	2B1	Vacant
1A20	Y10	2A20	Y30
1A19	Y11	2A19	Y31
1A18	Y12	2A18	Y32
1A17	Y13	2A17	Y33
1A16	Y14	2A16	Y34
1A15	Y15	2A15	Y35
1A14	Y16	2A14	Y36
1A13	Y17	2A13	Y37
1A12	Y18	2A12	Y38
1A11	Y19	2A11	Y39
1A10	Y1A	2A10	Y3A
1A9	Y1B	2A9	Y3B
1A8	Y1C	2A8	Y3C
1A7	Y1D	2A7	Y3D
1A6	Y1E	2A6	Y3E
1A5	Y1F	2A5	Y3F
1A4	Vacant	2A4	Vacant
1A3	Vacant	2A3	Vacant
1A2	COM1	2A2	COM2
1A1	COM1	2A1	COM2



Front view



*1: The statuses of the first 32 outputs (Y00 to Y1F)are indicated by the LEDs when the toggle switch is set to FH (for first half).
The second 32 output (Y20 to Y3F) are indicated when LH is selected.

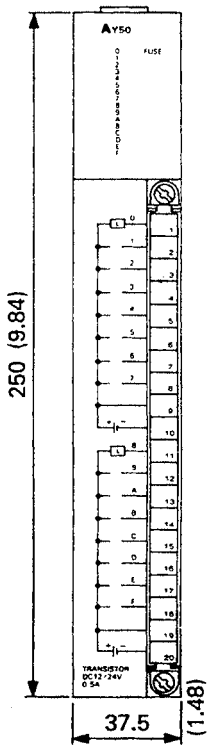
*2: The A and B pin numbers are reverse of those of silk screen printing on the unit.
The A number of the pin arrangement chart become the B numbers on the module.

*3: Pin numbers 1[][][] indicate the upper connector pins and 2[][][] the lower connector pins.

*4: AY42-S3 is provided with two soldered type connector jacks (A6CON1).
For applicable connectors, refer to section 1.2 (11).

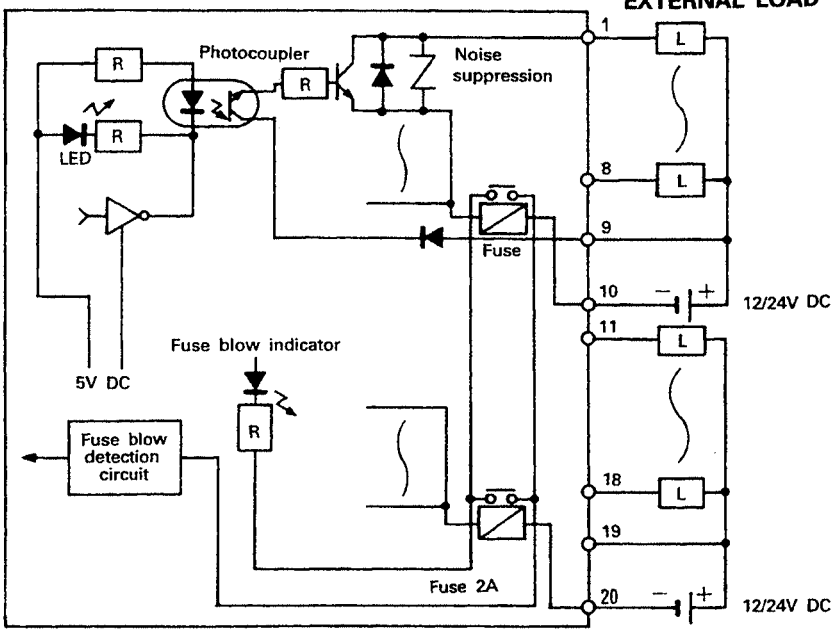
3.19 Type AY50 Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY50	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 30V DC	
Max. load current		0.5A/points, 2A/common	
Max. inrush current		7A 10ms or shorter, 3.5A 100ms or shorter	
Leakage current (OFF)		0.1mA or lower	
Max. voltage drop (ON)		0.9V (TYP.) 0.5A, 1.5V (MAX.) 0.5A	
Response time	OFF → ON	2ms or less	
	ON → OFF	2ms or less (resistive load)	
Internal current consumption (5V DC)		115mA (TYP. all points ON)	
External power supply requirement	Voltage	12/24V DC (10.2 to 30V DC)	
	Current	65mA (TYP. 24V DC per common)	
Noise suppression		Varistor (52 to 62V)	
Fuse rating		2A fast blow fuse (1 fuse common) type	
Fuse blow indicator		Provided (LED on unit front. Signal to PC CPU)	
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)	
Operation indicator		ON indication (LED)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight 0.42kg (0.92lbs)

Terminal No.	Signal NO.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	12/24V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	12/24V DC
TB20	0V

INTERNAL CIRCUIT

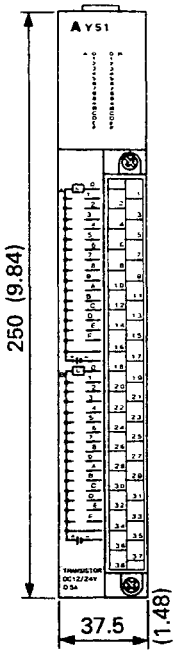


3.20 Type AY51 Output Module (Sink Loading)

Transistor Output

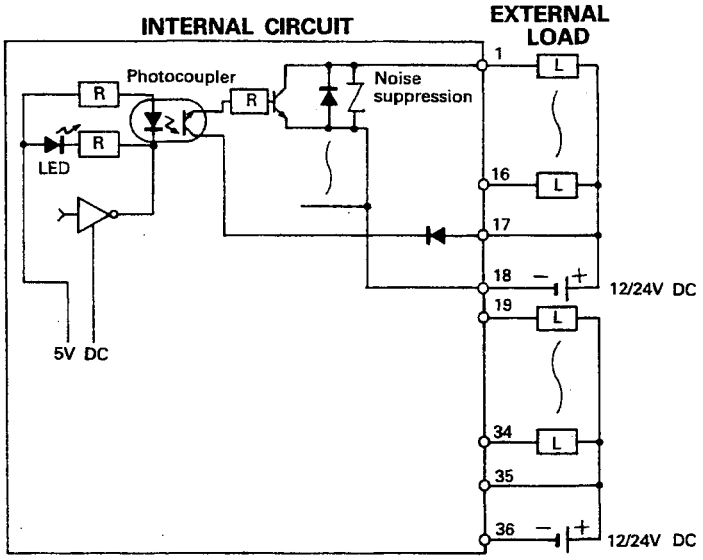
Specifications \ Type		AY51
Output points		32 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 30V DC
Max. load current		0.5A/point, 4A/common *(3.3A/common)
Max. inrush current		4A 10ms or shorter
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		0.9V (TYP) 0.5A, 1.5V (MAX.) 0.5A
Response time	OFF → ON	2ms or less
	ON → OFF	2ms or less (resistive load)
Internal current consumption (5V DC)		230mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC (10.2 to 30V DC)
	Current	50mA (24V DC TYP. per common)
Noise suppression		Varistor (52 to 62V)
Common terminal arrangement		16 points/common (common terminal: TB18, TB36)
Operation indicator		ON indication (LED)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

Front View mm(inch)



Weight	0.53kg (1.17lbs)

Terminal No.	Signal NO.	Terminal No.	Signal NO.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Y18
TB8	Y07	TB28	Y19
TB9	Y08	TB29	Y1A
TB10	Y09	TB30	Y1B
TB11	Y0A	TB31	Y1C
TB12	Y0B	TB32	Y1D
TB13	Y0C	TB33	Y1E
TB14	Y0D	TB34	Y1F
TB15	Y0E	TB35	12/24V DC
TB16	Y0F	TB36	0V
TB17	12/24V DC	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	Y10		
TB20	Y11		



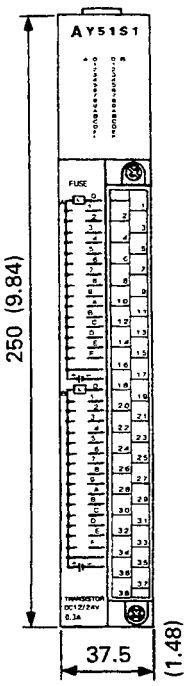
**: 3.3A/common when the output module is used next to the power supply module.*

3.21 Type AY51-S1 Transistor Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY51-S1
Output points		32 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 30V DC
Max. load current		0.3A/points, 2A/common (1A/fuse common)
Max. inrush current		3A/point, 10msec or less
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		1V DC(TYP) 0.3A, 1.5V DC(MAX) 0.3A
Response time	OFF → ON	2msec or less
	ON → OFF	2msec or less (resistive load)
Internal current consumption (5V DC)		310mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC (10.2 to 30V DC)
	Current	100mA (24V DC TYP. per common)
Noise suppression		Transistor built-in zener diode
Fuse rating		1A fast blow fuse (2fuses per common in 8 point units) MP-10
Fuse blow indicator		Provided (LED is turned ON when fuse is blown. Signal is output to a PLC CPU.)
Common terminal arrangement		16 points/common (common terminal: TB18, TB36), 8 points/fuse common
Operation indicator		ON indication (LED)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

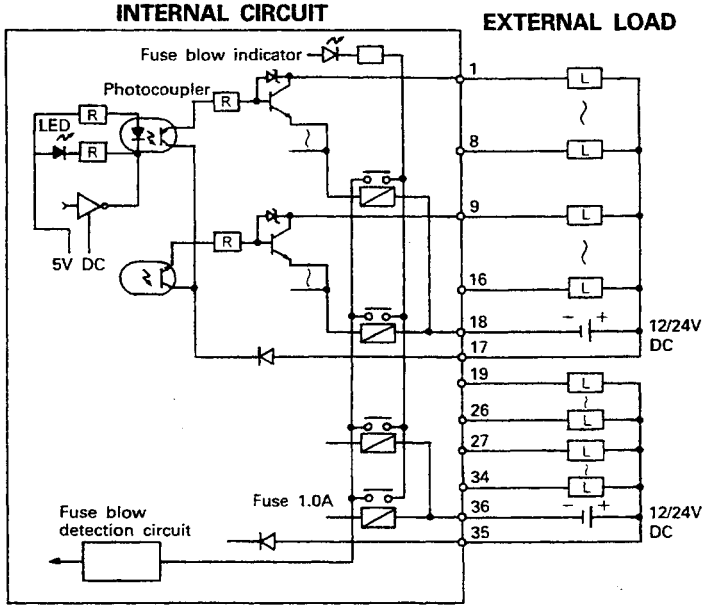
Front View mm(inch)



Weight	0.55kg (1.21lbs)

Terminal No.	Signal NO.	Terminal No.	Signal NO.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Y18
TB8	Y07	TB28	Y19
TB9	Y08	TB29	Y1A
TB10	Y09	TB30	Y1B
TB11	Y0A	TB31	Y1C
TB12	Y0B	TB32	Y1D
TB13	Y0C	TB33	Y1E
TB14	Y0D	TB34	Y1F
TB15	Y0E	TB35	12/24V DC
TB16	Y0F	TB36	0V
TB17	12/24V DC	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT **EXTERNAL LOAD**

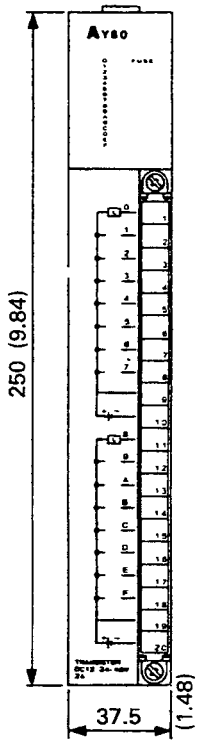


3.22 Type AY60 Output Module (Sink Loading)

Transistor Output

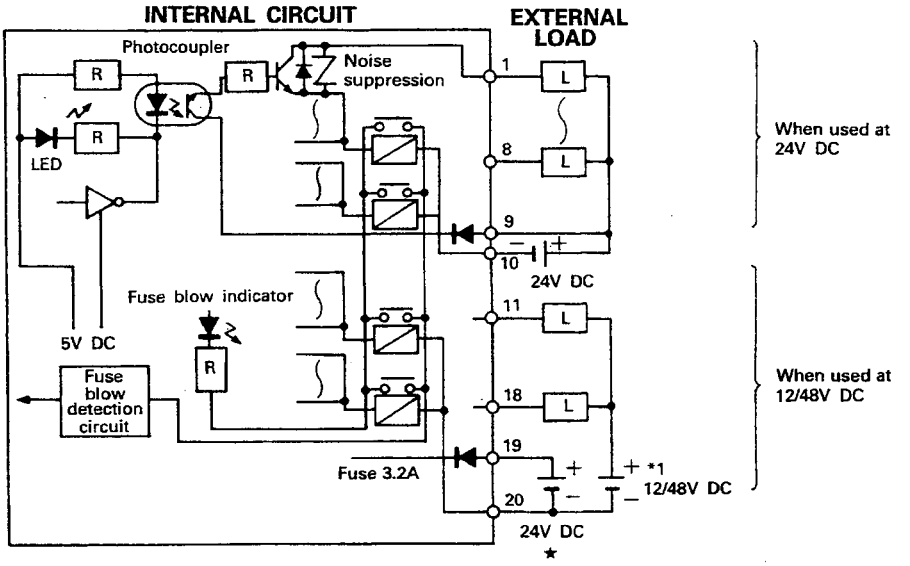
Specifications \ Type		AY60
Output points		16 points
Insulation system		Photocoupler
Rated load voltage		24V DC/(12/48V)*1
Operating load voltage range		21.6 to 26.4V DC (10.2 to 56V DC)*1
Max. load current		2A/points, 5A/common (3A/fuse) *2 (3A/common)
Max. inrush current		4A 100ms or shorter, 8A 10ms or shorter
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		1.5V (2A)
Response time	OFF → ON	2ms or less
	ON → OFF	2ms or less (resistive load)
Internal current consumption (5V DC)		115mA (TYP. all points ON)
External power supply requirement	Voltage	24V DC (21.6 to 26.4V DC)
	Current	65mA (24V DC TYP. per common)
Noise suppression		Varistor (108 to 132V)
Fuse rating		3.2A fast blow fuse (2 fuse per common) type MP-32
Fuse blow indicator		Provided (LED on unit front. Signal to PLC CPU)
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)
Operation indicator		ON indication (LED)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

Front View mm(inch)



Weight: 0.64kg (1.41lbs)

Terminal No.	Signal NO.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	24V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	24V DC
TB20	0V



*1: *24V DC power (marked ★) is required separately as the external supply power when 12/48V DC power is used as the load power. In this case, note that the negative poles are at the same potential as shown.*

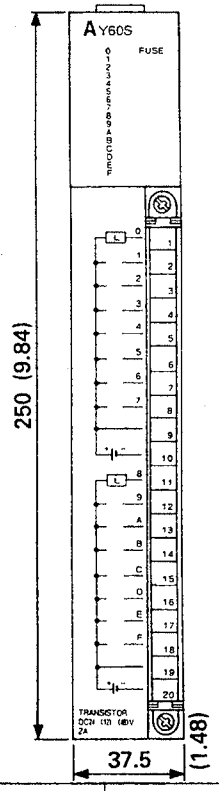
*2: *3A/common when the output module is used next to the power supply module.*

3.23 Type AY60S Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY60S
Output points		16 points
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)
Insulation system		Photocoupler
Rated load voltage		24/48V DC/(12V DC)*1
Operating load voltage range		21.6 to 52.8V DC (10.2 to 52.8V DC)*1
Max. load current		2A/points, 6.4A/common (5A/fuse)*2 (5A/common)
Max. inrush current		4A 100ms or shorter, 8A 10ms or shorter
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		1V (2A)
Response time	OFF → ON	1ms or less
	ON → OFF	3ms or less (resistive load)
Internal current consumption (5V DC)		75mA (TYP. all points ON)
External power supply requirement	Voltage	24/48V DC (21.6 to 52.8V DC)
	Current	3mA (TYP. 24V DC per common)
Noise suppression		Varistor (90 to 110V)
Fuse rating		5A fast blow fuse (2 fuse per common) type MP-50
Operation indicator		ON indication (LED)
Fuse blow indicator		LED on unit front. Signal to PLC CPU
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

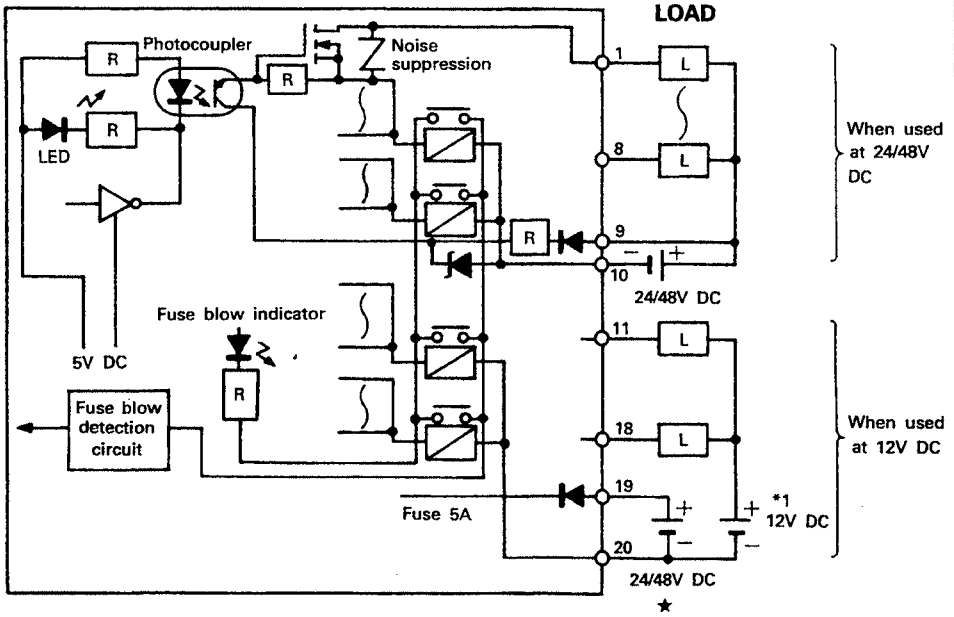
Front View mm(inch)



Weight	0.66kg (1.45lbs)

Terminal No.	Signal NO.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	24V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	24V DC
TB20	0V

INTERNAL CIRCUIT **EXTERNAL LOAD**

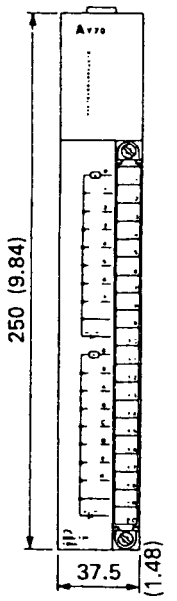


*1: When this unit is used at 12V DC load power source, another 24/48V DC power source, is required. In this case, caution should be exercised because the negative (—) side is at the same potential.

*2: 5A/common when the output module is next to the power supply module.

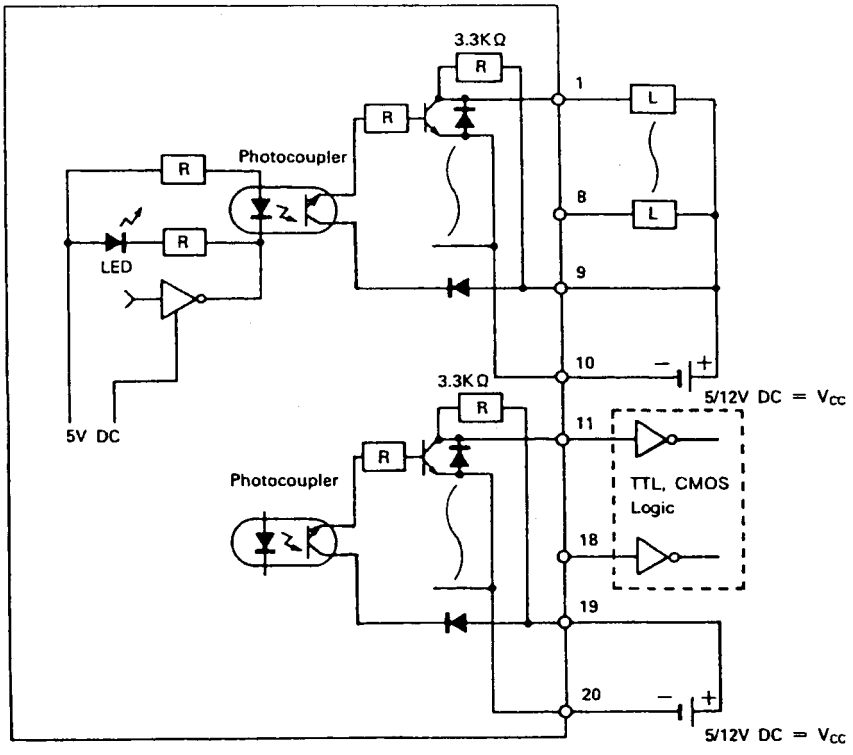
3.24 Type AY70 Output Module (For TTL, CMOS: Sink Loading)

TTL, CMOS Output

Specifications \ Type		AY70	Front View mm(inch)
Output points		16 points	
Insulation system		Photocoupler	
Rated load voltage		5/12V DC	
Operating load voltage range		4.5 to 15V DC	
Max. load current		16mA/point, 128mA/common	
Max. inrush current		50mA 10ms	
Leakage current (OFF)		VOH: 3.5V (V_{CC} = 5V, IOH = 0.4mA)	
Max. voltage drop at ON		VOL: 0.2V (IOL = 16mA)	
Response time	OFF → ON	1ms or less	
	ON → OFF	1ms or less	
Internal current consumption (5V DC)		100mA (TYP. all points ON)	
External power supply requirement	Voltage	5/12V DC (4.5 to 15V DC)	
	Current	55mA (12V DC TYP. per common)	
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)	
Operation indicator		ON indication (LED)	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.36kg (0.80lbs)

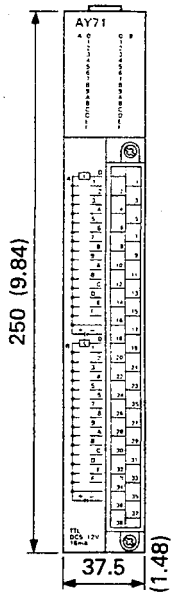
Terminal No.	Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	5/12V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	5/12V DC
TB20	0V

INTERNAL CIRCUIT EXTERNAL LOAD

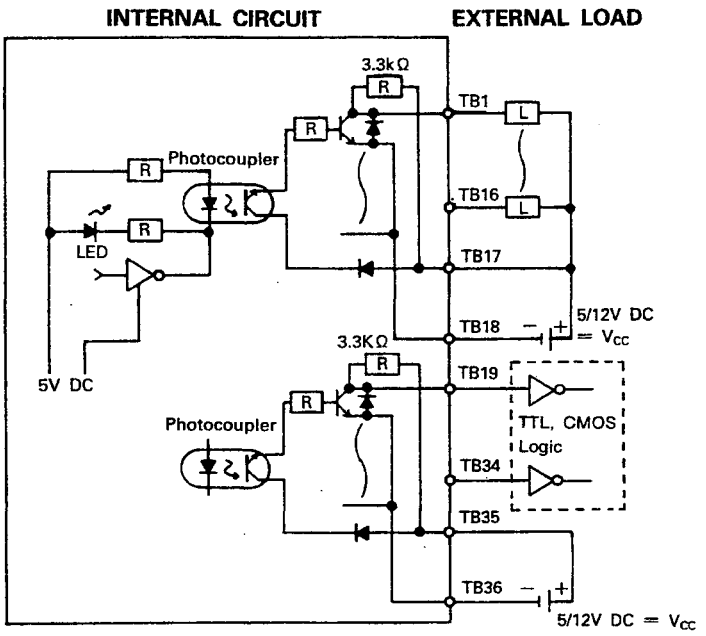


3.25 Type AY71 Output Module (For TTL, CMOS: Sink Loading)

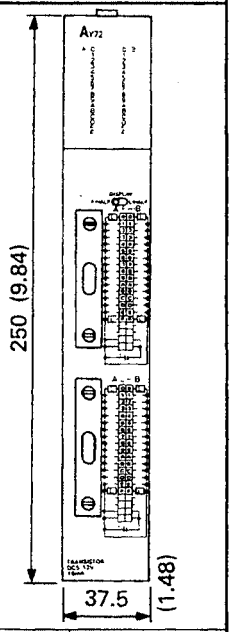
TTL, CMOS Output

Specifications \ Type		AY71	Front View mm(inch)
Output points		32 points	
Insulation system		Photocoupler	
Rated load voltage		5/12V DC	
Operating load voltage range		4.5 to 15V DC	
Max. load current		16mA/point, 256mA/common (sink load)	
Max. inrush current		50mA 10ms	
Leakage current (OFF)		VOH: 3.5V (V_{CC} = 5V, IOH = 0.4mA)	
Max. voltage drop (ON)		VOL: 0.2V DC (IOL = 16mA)	
Response time	OFF → ON	1ms or less	
	ON → OFF	1ms or less	
Internal current consumption (5V DC)		200mA (TYP. all points ON)	
External power supply requirement	Voltage	5/12V DC (4.5 to 15V DC)	
	Current	100mA (12V DC TYP. per common)	
Common terminal arrangement		16 points/common (common terminal: TB18, TB36)	
Operation indicator		ON indication (LED)	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	Weight: 0.44kg (0.97lbs)

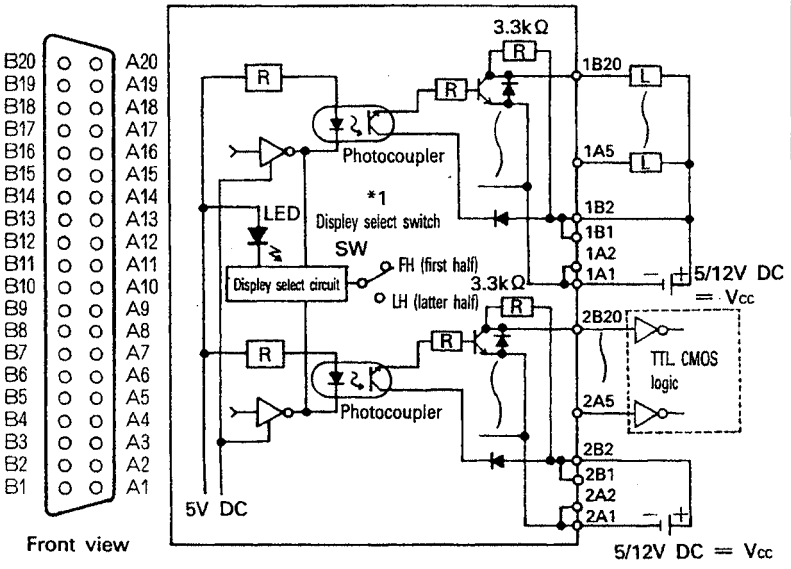
Terminal No.	Signal NO.	Terminal No.	Signal NO.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Y18
TB8	Y07	TB28	Y19
TB9	Y08	TB29	Y1A
TB10	Y09	TB30	Y1B
TB11	Y0A	TB31	Y1C
TB12	Y0B	TB32	Y1D
TB13	Y0C	TB33	Y1E
TB14	Y0D	TB34	Y1F
TB15	Y0E	TB35	5/12V DC
TB16	Y0F	TB36	0V
TB17	5/12V DC	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	Y10		
TB20	Y11		



3.26 Type AY72 Transistor Output Module (For TTL, CMOS: Sink Loading)

Specifications \ Type		AY72	Front View mm(inch)
Output points		64 points	
Insulation system		Photocoupler	
Rated load voltage		5/12V DC	
Operating load voltage range		4.5 to 15V DC	
Max. load current		16mA/point, 512mA/common(sink loading)	
Max. inrush current		50mA, 10msec	
Leakage current (OFF)		V_{OH}: 3.5V DC (V_{CC} = 5V DC, I_{OH} = 0.4mA)	
Max. voltage drop (ON)		V_{OL}: 0.2V DC (I_{OL} = 16mA)	
Response time	OFF → ON	1msec or less	
	ON → OFF	1msec or less	
Internal current consumption (5V DC)		300mA (TYP. all points ON)	
External power supply requirement	Voltage	5/12V DC (4.5 to 15V DC)	
	Current	300mA (12V DC TYP. 1-common ON)	
Common terminal arrangement		32 points/common (common terminal: 1A1, 1A2, 2A1, 2A2)	
Operation indicator		ON indication (LED)	
Connection method		Two 40-pin connectors (soldered)	
Applicable wire size		0.3 mm²	
Accessory		Two external wiring connectors	Weight: 0.47kg (1.03lbs)

Pin No.	Signal No. (FH)	Pin No.	Signal No. (LH)
1B20	Y00	2B20	Y20
1B19	Y01	2B21	Y21
1B18	Y02	2B18	Y22
1B17	Y03	2B16	Y23
1B16	Y04	2B16	Y24
1B15	Y05	2B15	Y25
1B14	Y06	2B14	Y26
1B13	Y07	2B13	Y27
1B12	Y08	2B12	Y28
1B11	Y09	2B11	Y29
1B10	Y0A	2B10	Y2A
1B9	Y0B	2B9	Y2B
1B8	Y0C	2B8	Y2C
1B7	Y0D	2B7	Y2D
1B6	Y0E	2B6	Y2E
1B5	Y0F	2B5	Y2F
1B4	Vacant	2B4	Vacant
1B3	Vacant	2B3	Vacant
1B2	5/12V DC	2B2	5/12V DC
1B1	5/12V DC	2B1	5/12V DC
1A20	Y10	2A20	Y30
1A19	Y11	2A19	Y31
1A18	Y12	2A18	Y32
1A17	Y13	2A17	Y33
1A16	Y14	2A16	Y34
1A15	Y15	2A15	Y35
1A14	Y16	2A14	Y36
1A13	Y17	2A13	Y37
1A12	Y18	2A12	Y38
1A11	Y19	2A11	Y39
1A10	Y1A	2A10	Y3A
1A9	Y1B	2A9	Y3B
1A8	Y1C	2A8	Y3C
1A7	Y1D	2A7	Y3D
1A6	Y1E	2A6	Y3E
1A5	Y1F	2A5	Y3F
1A4	Vacant	2A4	Vacant
1A3	Vacant	2A3	Vacant
1A2	0V	2A2	0V
1A1	0V	2A1	0V



*1: The statuses of the first 32 outputs (Y00 to Y1F)are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 output (Y20 to Y3F) are indicated when LH is selected.

*2: The A and B pin numbers are reverse of those of silk screen printing on the unit. The A number of the pin arrangement chart become the B numbers on the module.

*3: Pin numbers 1[][] indicate the upper connector pins and 2[][] the lower connector pins.

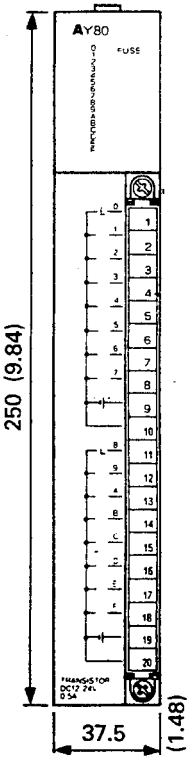
*4: AY72 is provided with two soldered type connector jacks (A6CON1). For applicable connectors, refer to section 1.2 (11).

3.27 Type AY80 Output Module (Source Loading)

Transistor Source Output

Specifications \ Type		AY80
Output points		16 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Max. load current		0.5A/points, 2A/common
Operating load voltage range		10.2 to 30V DC
Max. inrush current		7A 10ms or shorter, 3.5A 100ms or shorter
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		1.5V (MAX.) 0.5A
Response time	OFF → ON	2ms or less
	ON → OFF	2ms or less (resistive load)
Noise suppression		Varistor (52 to 62V)
Fuse rating		2A fast blow fuse (1 fuse per common) type
Common terminal arrangement		8 points/common (common terminal: TB9, TB19)
Operation indicator		ON indication (LED)
Fuse blow indicator		Provided (LED on unit front. Signal to PLC CPU)
Internal current consumption (5V DC)		115mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC (10.2 to 40V DC)
	Current	60mA (24V DC TYP. per common)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

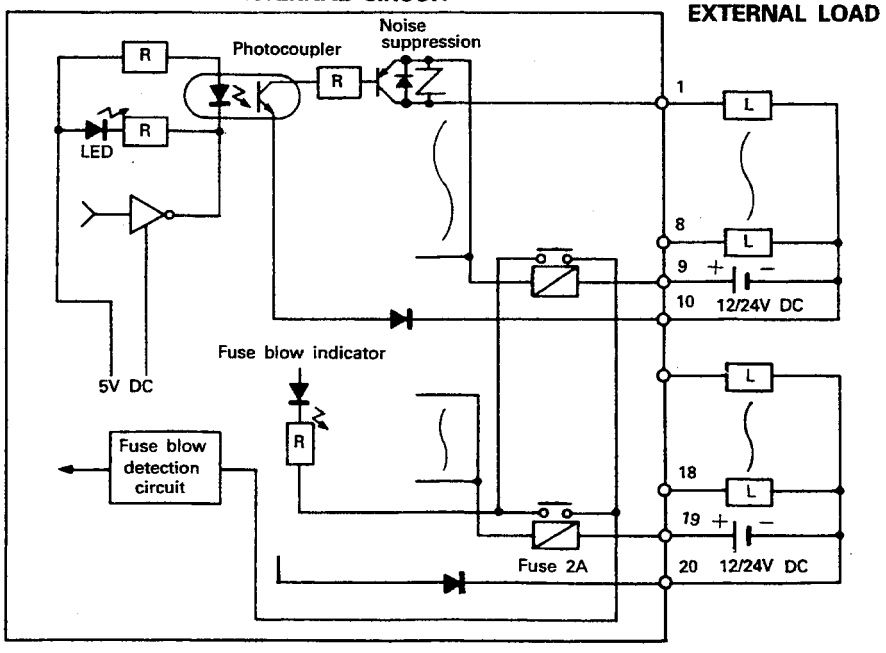
Front View mm(inch)



Weight	0.42kg (0.92lbs)

Terminal No.	Signal NO.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	12/24V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	12/24V DC
TB20	0V

INTERNAL CIRCUIT **EXTERNAL LOAD**

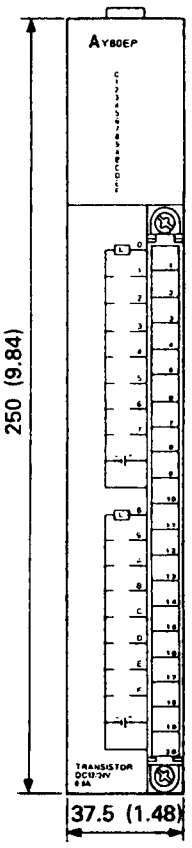


3.28 Type AY80EP Output Module (Source Loading, Circuit protection provided)

Transistor Output

Specifications \ Type		AY80EP
Output points		16 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 26.4V DC
Max. load current		0.8A/point, 0.8A/point (60% ON, 55°C) *1
Max. inrush current		No limit (short protect)
Leakage current (OFF)		1.0mA or lower
Max. voltage drop (ON)		1V (TYP.) 0.8A, 1.5V (MAX) 0.8A
Response time	OFF → ON	0.5ms or less
	ON → OFF	1.5ms or less
External power supply requirement	Voltage	12/24V DC (10.2 to 26.4V DC)
	Current	110mA (TYP. 24V DC per common)
Noise suppression		Diode for absorbing noise
Common terminal arrangement		8 points/common (common terminal: TB9, TB19)
Operation indicator		Provided (LED on unit front)
Protection func.		Provided (Overheat protection func. and short-circuit protection func.) Overheat protection func. is detected in 2 points unit. When Overheat protection func. occurs at an even device number of each terminal and output is turned OFF, output of the following odd device number is turned OFF simultaneously. When Overheat protection func. occurs at an odd device number and output is turned OFF, output of the previous even device number is turned OFF simultaneously.
Protection func. detection indication		Provided (LED is turned ON when Overheat protection func. or short-circuit protection func. occurs. Fuse blow signal is output to a PLC CPU.)
Protection func. reset		Automatic reset (reset by canceling Overheat protection func.)
Internal current consumption (5V DC)		115mA (TYP. all points ON)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

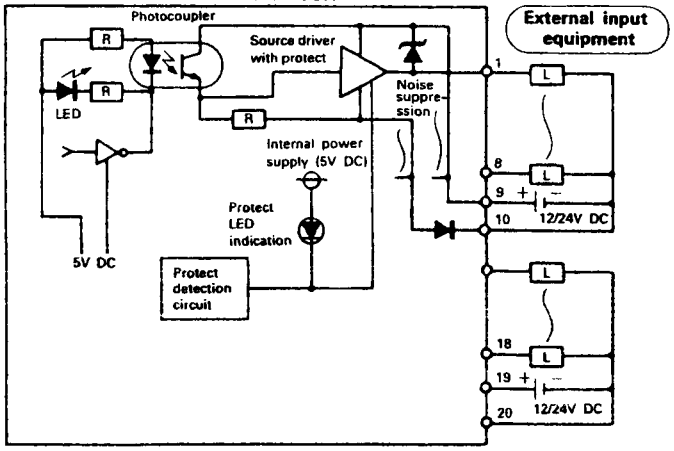
Front View mm(inch)



Weight: 0.55kg (1.21lbs)

Terminal No.	Output Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	12/24V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	12/24V DC
TB20	0V

INTERNAL CIRCUIT



*1: *Refer to section 1.2(9) for output current value per common.*

*2: *Total length of cables connected to the external power supply and load should be 40 m or less. If it exceeds 40 m, output devices in the module may not be protected when output is short-circuited.*

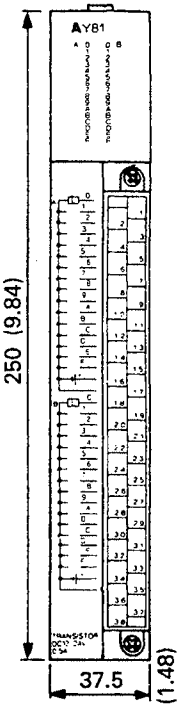
*3: *When an external load remains short-circuited for a longtime, internal circuit may be broken. It is recommended to detect an occurrence state of short-circuit protect by using a sequence program and turn OFF the output of corresponding device number after a short-circuit protect occurs. (Time limit for short-circuit is about 48 hours.)*

3.29 Type AY81 Output Module (Source Loading)

Transistor Source Output

Specifications \ Type		AY81
Output points		32 points
Common terminal arrangement		16 points/common
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Max. load current		0.5A/point, 4A/common *(3A/common)
Operating load voltage range		10.2 to 30V DC
Max. inrush current		4A 10ms or shorter
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		1.5V (MAX.) 0.5A
Response time	OFF → ON	2ms or less
	ON → OFF	2ms or less (resistive load)
Noise suppression		Varistor (52 to 62V)
Fuse rating		Not provided
Operation indicator		ON indication (LED)
Internal current consumption (5V DC)		230mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC (10.2 to 30V DC)
	Current	50mA (24V DC TYP. per common)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

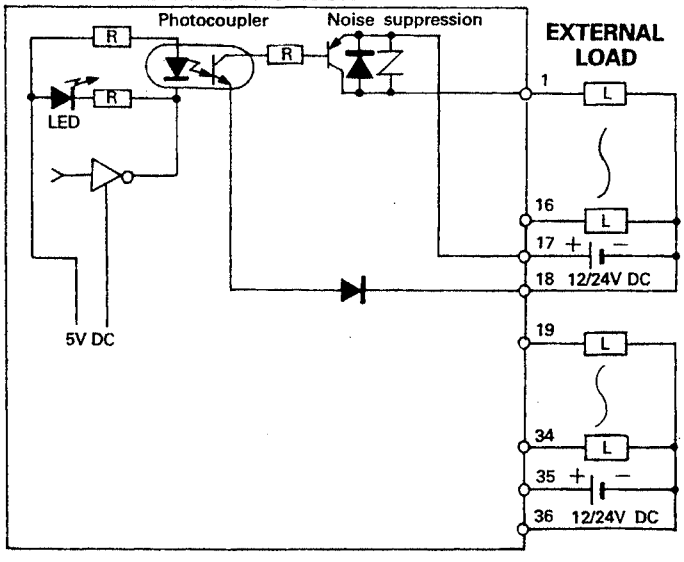
Front View mm(inch)



Weight: 0.53kg (1.17lbs)

Terminal No.	Signal NO.	Terminal No.	Signal NO.
TB1	Y00	TB21	Y12
TB2	Y01	TB22	Y13
TB3	Y02	TB23	Y14
TB4	Y03	TB24	Y15
TB5	Y04	TB25	Y16
TB6	Y05	TB26	Y17
TB7	Y06	TB27	Y18
TB8	Y07	TB28	Y19
TB9	Y08	TB29	Y1A
TB10	Y09	TB30	Y1B
TB11	Y0A	TB31	Y1C
TB12	Y0B	TB32	Y1D
TB13	Y0C	TB33	Y1E
TB14	Y0D	TB34	Y1F
TB15	Y0E	TB35	12/24V DC
TB16	Y0F	TB36	0V
TB17	12/24V DC	TB37	Vacant
TB18	0V	TB38	Vacant
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT



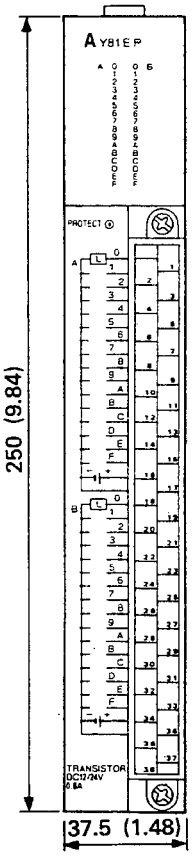
**: 3A/common when the output module is used next to the power supply module.*

3.30 Type AY81EP Output Module (Source Loading, Circuit protection provided)

Transistor Output

Specifications \ Type		AY81EP
Output points		32 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 26.4V DC
Max. load current		0.8A/point, 0.4A/point (60% ON, 55°C)
Max. inrush current		No limit (short protect)
Leakage current (OFF)		1.0mA or lower
Max. voltage drop (ON)		1.1V (TYP.) 0.8A, 1.5V (MAX) 0.8A
Response time	OFF → ON	0.5ms or less
	ON → OFF	1.5ms or less
Internal current consumption (5V DC)		230mA (TYP. all points ON)
External power supply requirement	Voltage	12/24V DC(10.2 to 26.4V DC)
	Current	220mA (TYP. 24V DC per common)
Noise suppression		Diode for absorbing noise
Common terminal arrangement		16 points/common (common terminal: TB9, TB19)
Operation indicator		Provided (LED on unit front)
Protection func.		Provided (Overheat protection func. and short-circuit protection func.) Overheat protection func. is detected in 2 points unit. When Overheat protection func. occurs at an even device number of each terminal and output is turned OFF, output of the following odd device number is turned OFF simultaneously. When Overheat protection func. occurs at an odd device number and output is turned OFF, output of the previous even device number is turned OFF simultaneously.
Protection func. reset		Automatic reset (reset by canceling Overheat protection func.)
Protection func. detection indication		Provided (LED is turned ON when Overheat protection func. or short-circuit protection func. occurs. Fuse blow signal is output to a PLC CPU.)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 68.6 N·cm)
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3

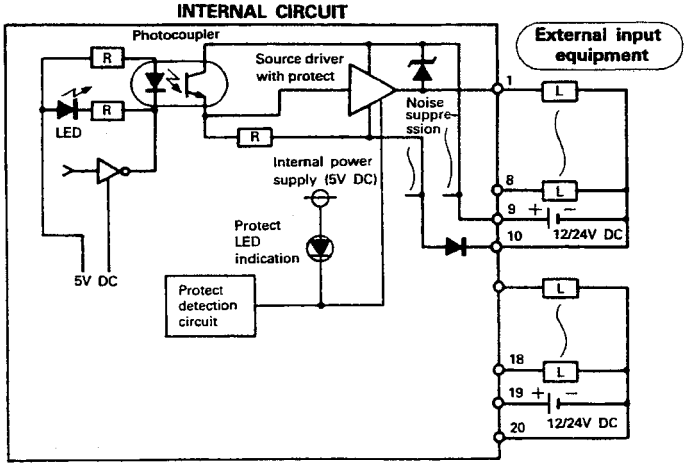
Front View mm(inch)



Weight	0.72kg (1.58lbs)

Terminal No.	Output Signal No.	Terminal No.	Output Signal No.
TB1	Y00	TB20	Y11
TB2	Y01	TB21	Y12
TB3	Y02	TB22	Y13
TB4	Y03	TB23	Y14
TB5	Y04	TB24	Y15
TB6	Y05	TB25	Y16
TB7	Y06	TB26	Y17
TB8	Y07	TB27	Y28
TB9	Y08	TB28	Y19
TB10	Y09	TB29	Y1A
TB11	Y0A	TB30	Y1B
TB12	Y0B	TB31	Y1C
TB13	Y0C	TB32	Y1D
TB14	Y0D	TB33	Y1E
TB15	Y0E	TB34	Y1F
TB16	Y0F	TB35	12/24V DC
TB17	12/24V DC	TB36	0V
TB18	0V	TB37	Vacant
TB19	Y10	TB38	Vacant

INTERNAL CIRCUIT



*1: *Refer to section 1.2(9) for output current value per common.*

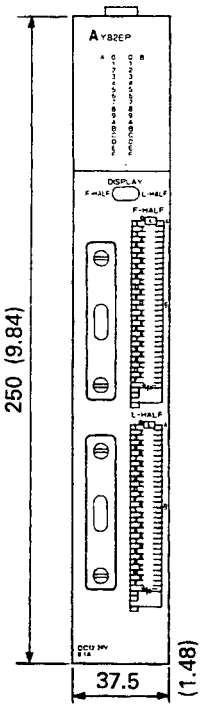
*2: *Total length of cables connected to the external power supply and load should be 40 m or less. If it exceeds 40 m, output devices in the module may not be protected when output is short-circuited.*

*3: *When an external load remains short-circuited for a longtime, internal circuit may be broken. It is recommended to detect an occurrence state of short-circuit protect by using a sequence program and turn OFF the output of corresponding device number after a short-circuit protect occurs. (Time limit for short-circuit is about 48 hours.)*

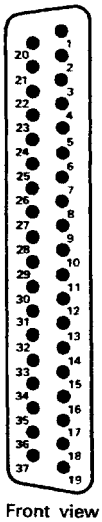
3.31 Type AY82EP Output Module (Source Loading, Circuit protection provided)

Transistor Output	Provided (Overheat protection func. and Overload protection func.)

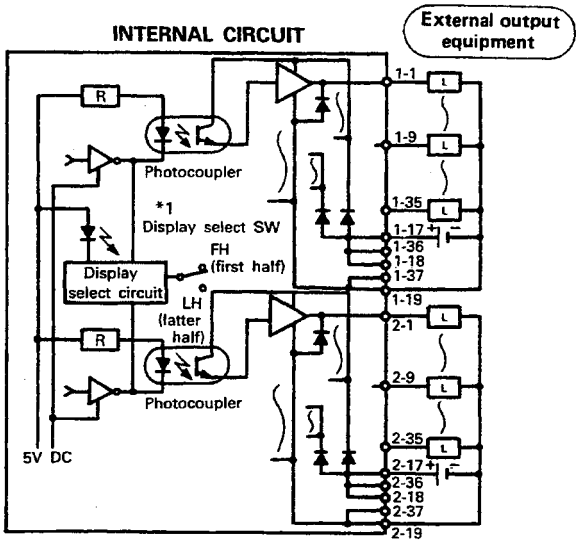
Specifications \ Type		AY82EP	Front View mm(inch)
Output points		64 points	
Insulation system		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 26.4V DC	
Max. load current		0.1A/point, 0.04A/point (60% ON, 55° C)	
Max. inrush current		No limit (short protect)	
Leakage current (OFF)		0.1mA or lower	
Max. voltage drop (ON)		3.5V (0.1A) 2.5V (0.1A TYP.)	
Response time	OFF → ON	0.5ms or shorter	
	ON → OFF	1.5ms or shorter	
Internal current consumption (5V DC)		290mA (TYP. all points ON)	
External power supply requirement	Voltage	12/24V DC (10.2 to 26.4V DC)	
	Current	Diode for absorbing noise	
Noise suppression		Diode for absorbing noise	
Common method		32points/common (common terminal:1-17, 1-18, 1-38, 1-36, 2-17, 2-18, 2-361)	
Operation indicator		Available (LED turns on when output is ON)	
Protection func.		Provided (Overheat protection func. and short-circuit protection func.) Overheat protection func. is detected in 1 point unit. When Overheat protection func. occurs at an 1 point of 1 common, output of all points for corresponded common terminal is turned OFF.	
Protection func. detection indication		None (there is no signal output to the PLC CPU)	
Protection func. reset		Automatic veset (veset by canceling Overheat protection func.)	
Common wiring system		32 points/common (common terminal : 1-17, 1-18, 1-36, 2-17, 2-18, 2-36)	
Operation indicator		Changeover display of 32 points by ON display (LED) SW	
External connection system		Two 37-pin D sub-connectors (soldered)	
Applicable wire size		0.3mm²	
Accessory		Two external wiring D sub-connectors	Weight: 0.58kg (1.27lbs)



Terminal No.	Output Signal No.	Terminal No.	Output Signal No.
1-1	Y00	2-1	Y20
1-20	Y01	2-20	Y21
1-2	Y02	2-2	Y22
1-21	Y03	2-21	Y23
1-3	Y04	2-3	Y24
1-22	Y05	2-22	Y25
1-4	Y06	2-4	Y26
1-23	Y07	2-23	Y27
1-5	Y08	2-5	Y28
1-24	Y09	2-24	Y29
1-6	Y0A	2-6	Y2A
1-25	Y0B	2-25	Y2B
1-7	Y0C	2-7	Y2C
1-26	Y0D	2-26	Y2D
1-8	Y0E	2-8	Y2E
1-27	Y0F	2-27	Y2F
1-17	12/24V DC	2-17	12/24V DC
1-36	12/24V DC	2-36	12/24V DC
1-18	12/24V DC	2-18	12/24V DC
1-9	Y10	2-9	Y30
1-28	Y11	2-28	Y31
1-10	Y12	2-10	Y32
1-29	Y13	2-29	Y33
1-11	Y14	2-11	Y34
1-30	Y15	2-30	Y35
1-12	Y16	2-12	Y36
1-31	Y17	2-31	Y37
1-13	Y18	2-13	Y38
1-32	Y19	2-32	Y39
1-14	Y1A	2-14	Y3A
1-33	Y1B	2-33	Y3B
1-15	Y1C	2-15	Y3C
1-34	Y1D	2-34	Y3D
1-16	Y1E	2-16	Y3E
1-35	Y1F	2-35	Y3F
1-37	0V	2-37	0V
1-19	0V	2-19	0V



Front view



*1: *Refer to section 1.2(9) for output current value per common.*

*2: *The statuses of the first 32 outputs (Y00 to Y1F) are indicated by the LEDs when the toggle switch is set to FH (for fist half). The second 32 outputs (Y20 to Y3F) are indicated when LH is selected.*

*3: *Pin numbers 1[ ] indicate the upper connector pins and 2[ ] the lower connector pins.*

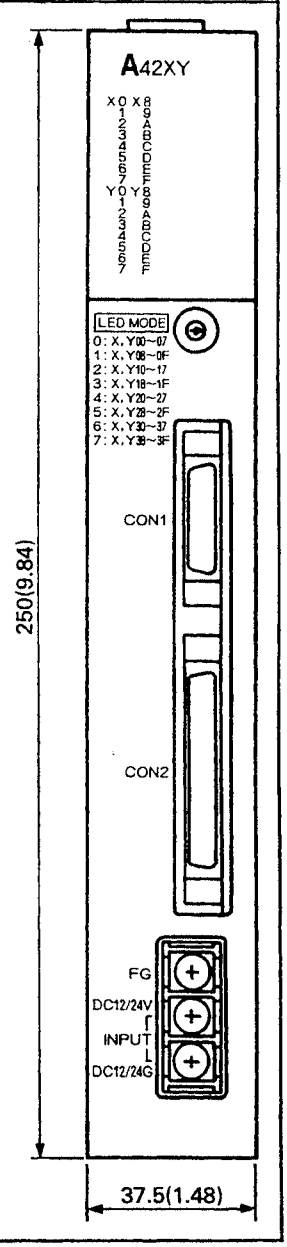
*4: *AY82EP is provided with two soldered type connector jacks. (Type: DC-37S-N (connector), DC-C8-J13-B1-1 (junction shell) cable protection tube)*

4. I/O COMPOSITE MODULE SPECIFICATIONS

4.1 A42XY Dynamic I/O Module

The A42XY allows processing of up to 64 inputs and 64 outputs via a single module. The module uses "dynamic scanning" to update its I/O and is primarily designed as a keyboard interface.

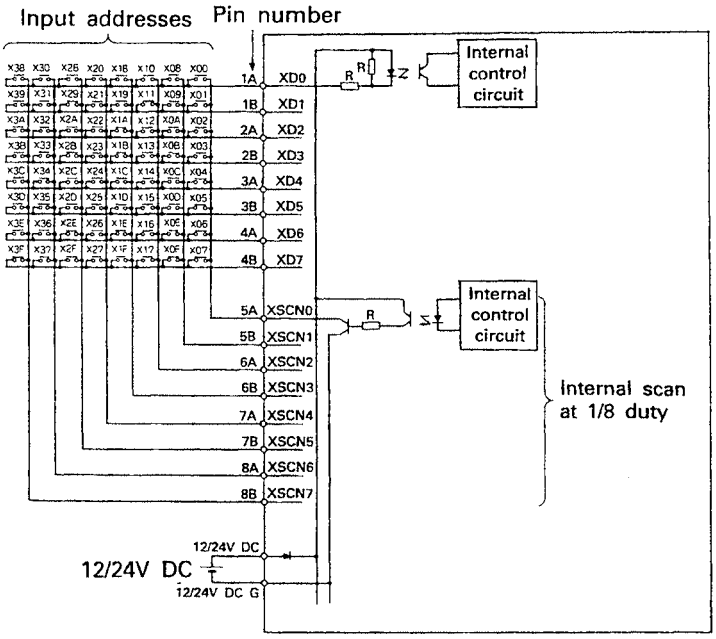
4.1.1 Specifications

Input Specifications			Output Specifications			Front Panel
Number of inputs		64	Number of outputs		64	
Number of I/O occupied		64*1*2				
Insulation method		Photocoupler	Insulation method		Photocoupler	
Input method		Dynamic scan of 8 inputs × 8	Output method		Dynamic scan of 8 outputs × 8	
ON voltage/current		7V DC minimum	Max. output current		50mA per point (built in limiting resistor (1K Ω) not used)	
OFF voltage/current		3V DC maximum	Max. voltage drop during ON		1.5V on the source side (built in limiting resistor not used)1V on the sink side	
Input resistance		Approx. 2.4kΩ				
Response time		16ms max.	Response time		16ms max.	
Operation indicator		ON indication (LED). Batch of 8 inputs selected by rotary switch.	Operation indicator		ON indication (LED). Batch of 8 outputs selected by rotary switch.	
Max. simultaneously ON		60%	Max. simultaneously ON		60% when built-in 1kΩ limiting resistor	
External connection		16-pin connector	External connection		32-pin connector	
External power supply	Voltage	12/24V DC (10.2 to 26.4V, ripple ratio within 5%)	External power supply	Voltage	12/24V DC (10.2 to 26.4V, ripple ratio within 5%)	
	Current	55mA typical		Current	180mA typical	
Internal current consumption (5V DC)		110mA typical				
Applicable wire size		0.3mm² (23 AWG)				
Applicable connector (Fujitsu)		FCN-361J016-AU FCN-360C016-B (cover)	Applicable connector (Fujitsu)		FCN-361J032-AU FCN-360C032-B (cover)	
Weight kg(lb)		0.6(1.32)				

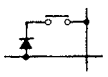
*1: Only 64 I/O are occupied since each I/O address is allowed an input and an output. (for example, both X0 and Y0 may be used)

*2: When making "I/O assignment" using a peripheral, specify the A42XY as a 64-point output module.

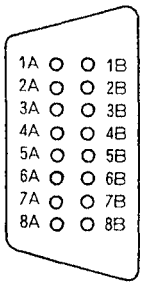
Input Connection Diagram



Note: Diodes must be used if more than one key can be pressed at once. (See the figure on the right.)

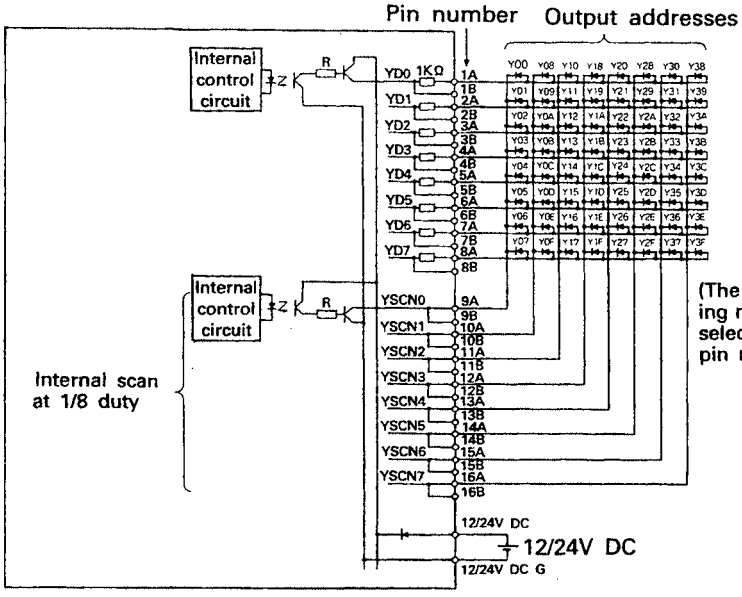


Pinouts

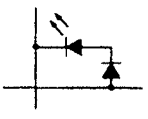


(Front view)

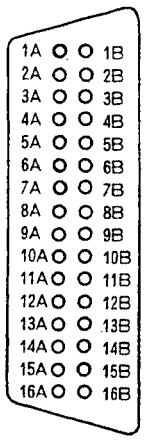
Output Connection Diagram



Note: The supply voltage (12/24V DC) is applied in the reverse direction to the LED. Each LED should be used with protection diodes in series if the reverse withstand voltage of the LED is insufficient. (See the figure on the right.)



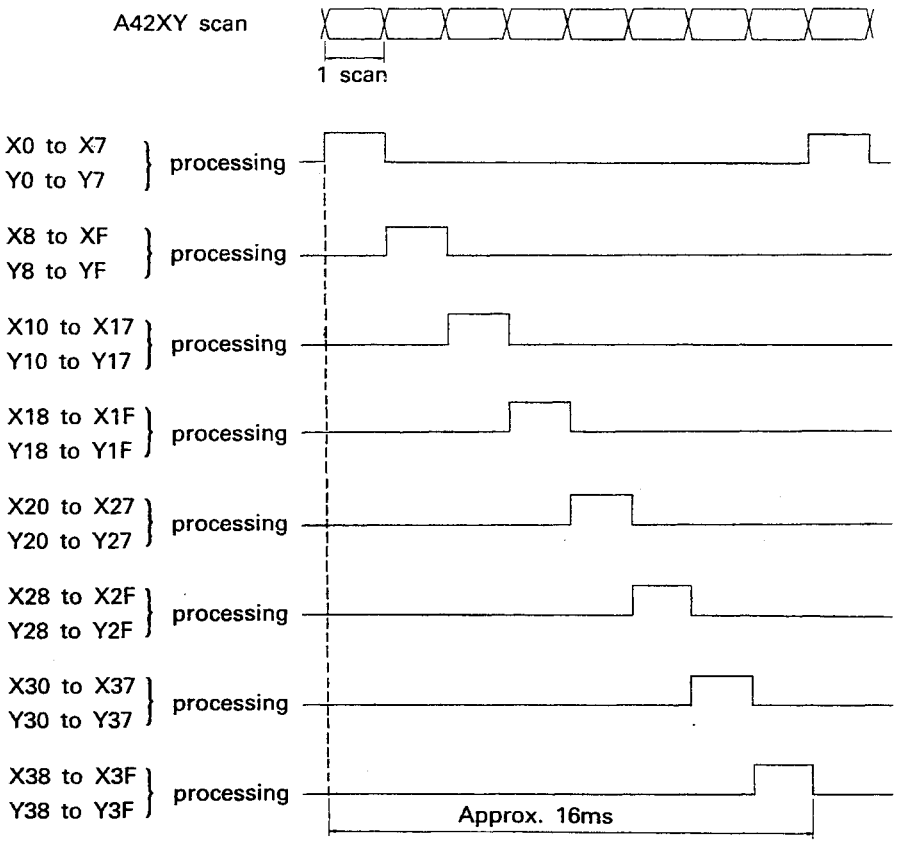
Pinouts



(Front view)

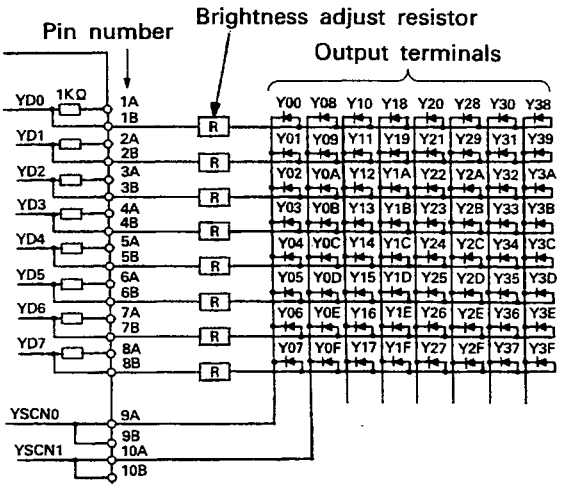
4.1.2 Dynamic scanning

In dynamic scanning mode, all input and output points are processed in a number of scans. All inputs and outputs are divided into groups of eight, and one group is processed each scan as shown below.



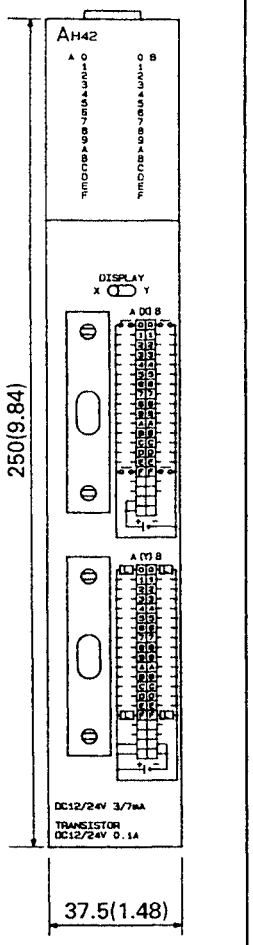
4.1.3 LED brightness adjustment

If the external LEDs are not bright enough, adjust current values by connecting resistors to pins 1B to 8B as shown below.



4.2 AH42 I/O Module Specifications

The AH42 is a sink loading type I/O module which controls 32 DC input points and 32 transistor output points.

Input Specifications				Output Specifications			Front Panel
Number of inputs		32		Number of outputs		32	
Insulation system		Photocoupler		Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC	Rated load voltage		12/24V DC	
Rated input current		Approx. 3mA	Approx. 7mA	Operating load voltage range		10.2 to 40V DC	
Operating voltage range		10.2 to 26.4V DC (ripple ratio within 5%)		Max. load current		0.1A/point, 1 A/common	
ON voltage/current		9.5V DC or higher/3mA or higher		Max. inrush current		0.4A, 10msec or less	
OFF voltage/current		6V DC or lower/1.5mA or lower		Leakage current (OFF)		0.1mA or lower	
Input resistance		Approx. 3.3 kΩ		Max. voltage drop during ON		2.5V DC (0.1 A), 1.75V DC (5mA), 1.7V DC (1mA)	
Input method		Sink loading		Output method		Sink loading	
Response time	OFF→ON	10 msec or less (24V DC)		Response time	OFF→ON	2 msec or less	
	ON→OFF	10 msec or less (24V DC)			ON→OFF	2 msec or less (resistive load)	
Common terminal arrangement		32 points/common (1B1, 1B2)		External power supply	Voltage	12/24V DC (10.2 to 40V DC)	
Max. simultaneous ON		60% simultaneous ON			Current	40mA (24V DC TYP)	
				Noise suppression		Clamp Diode *3	
				Common terminal arrangement		32 points/common (2A1, 2A2)	
Number of I/O occupied points, I/O allocation		*1 64 points..... first half: 32 points input/latter half: 32 points output *2 64-point output module					
Internal current consumption (5V DC)		245mA (TYP. all points ON)					
Indication		ON indication (LED) (switch selection of block of 32 points)					
Connection method		Two 40-pin connectors					
Applicable wire size		0.3mm^2					
Accessory		Two 40-pin connectors (soldered)					
Weight		0.7kg					
External dimensions		See Appendix 1.1.1 (3) 40-pin connector.					

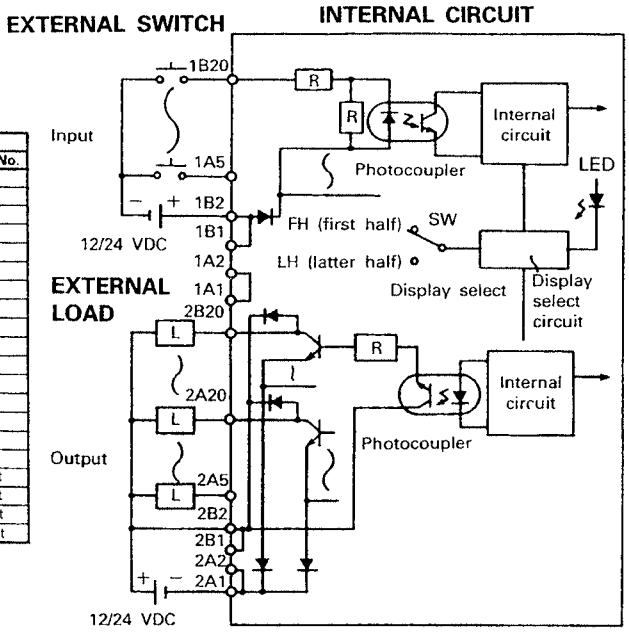
*1: The number of occupied I/O points is 64: first 32 points are allocated as inputs and latter 32 points are allocated as outputs.

*2: When making "I/O allocation" using a peripheral, specify AH42 as a 64-point output module.

*3: The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.

External connection

Input			
Pin No.	Signal No.	Pin No.	Signal No.
1B20	X00	1A20	X10
1B19	X01	1A19	X11
1B18	X02	1A18	X12
1B17	X03	1A17	X13
1B16	X04	1A16	X14
1B15	X05	1A15	X15
1B14	X06	1A14	X16
1B13	X07	1A13	X17
1B12	X08	1A12	X18
1B11	X09	1A11	X19
1B10	X0A	1A10	X1A
1B9	X0B	1A9	X1B
1B8	X0C	1A8	X1C
1B7	X0D	1A7	X1D
1B6	X0E	1A6	X1E
1B5	X0F	1A5	X1F
1B4	Vacant	1A4	Vacant
1B3	Vacant	1A3	Vacant
1B2	12/24V DC	1A2	Vacant
1B1	12/24V DC	1A1	Vacant



Input			
Pin No.	Signal No.	Pin No.	Signal No.
2B20	Y20	2A20	Y30
2B19	Y21	2A19	Y31
2B18	Y22	2A18	Y32
2B17	Y23	2A17	Y33
2B16	Y24	2A16	Y34
2B15	Y25	2A15	Y35
2B14	Y26	2A14	Y36
2B13	Y27	2A13	Y37
2B12	Y28	2A12	Y38
2B11	Y29	2A11	Y39
2B10	Y2A	2A10	Y3A
2B9	Y2B	2A9	Y3B
2B8	Y2C	2A8	Y3C
2B7	Y2D	2A7	Y3D
2B6	Y2E	2A6	Y3E
2B5	Y2F	2A5	Y3F
2B4	Vacant	2A4	Vacant
2B3	Vacant	2A3	Vacant
2B2	12/24V DC	2A2	0V
2B1	12/24V DC	2A1	0V

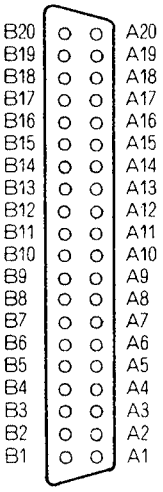
*1: LED indication is selected by using the select switch on the front of the module.
When the switch is set to X, 32 input points are indicated.
When the switch is set to Y, 32 output points are indicated.
X: inputs (X00 to X1F) are indicated.
Y: outputs (Y20 to Y3F) are indicated.

*2: The load power and external power supply source of transistor output must be the same. If not the same, load is sometimes not turned OFF. (See Section 7.2, example 5.)

*3: The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.

*4: AH42 is provided with two soldered type connector jacks (A6CON1).
For applicable connector, refer to section 1.2 (11).

Pin arrangement



Front view

5. SPECIFICATIONS OF CONNECTOR/TERMINAL BLOCK CONVERTOR MODULES

5.1 Specifications of Connector/Terminal Block Convertor Modules

Table 5.1 Connector/Teriminal Block Convertor Module Specifications

1) Connector/Terminal Block Convertor Module

Type	Details	Weight	Applicable Wire Size	Applicable Crimping Terminal	Applicable Models
A6TBXY36	For positive common type input modules and sink type output modules (standard type)	0.4kg	0.75 to 2mm²	1.25-3.5 (JIS) 1.25-YS3A (J.S.T.) Spade tongue V1.25-M3 (J.S.T.) Insulated V1.25-YS3A (J.S.T.) Spade tongue 2-3.5 (JIS) 2-YS3A (J.S.T.) Spade tongue V2-S3 (J.S.T.) Insulated V2-YS3A (J.S.T.) Spade tongue	Q series: QX41, QX41-S1, QX42, QX42-S1, QY41P, QY42P, QH42P AnS series: A1SX41, A1SX41-S1, A1SX41-S2, A1SX42, A1SX42-S1, A1SX42-S2, A1SX82-S1 A1SY41, A1SY42, A1SY42P, A1SY82, A1SH42, A1SH42-S1 A series: AX42, AX42-S1, AY42, AY42-S1, AY42-S3, AY42-S4, AH42 CC-Link: AJ65SBTCF1-32D, AJ65SBTCF1-32T, AJ65SBTC1-32D AJ65SBTC1-32T MELSECNET-MINI: AJ35TC1-32D, AJ35TC1-32T
A6TBXY54	For positive common type input modules and sink type output modules (2-wire type)	0.5kg			
A6TBX70	For positive common type input modules (3-wire type)	0.6kg			Q series: QX41, QX41-S1, QX42, QX42-S1, QH42P AnS series: A1SX41, A1SX41-S1, A1SX41-S2, A1SX42, A1SX42-S1, A1SX42-S2, A1SX82-S1, A1SH42, A1SH42-S1 A series: AX42, AX42-S1, AH42 CC-Link: AJ65SBTCF1-32D, AJ65BTC1-32D MELSECNET-MINI: AJ35TC1-32D
A6TBX36-E	For negative common type input modules (standard type)	0.4kg			Q series: QX81 AnS series: A1SX81, A1SX81-S2 A series: AX82
A6TBX54-E	For negative common type input modules (2-wire type)	0.5kg			
A6TBX70-E	For negative common type input modules (3-wire type)	0.6kg			
A6TBY36-E	For source type output modules (standard type)	0.4kg			Q series: QY81P AnS series: A1SY81 A series: AY82EP
A6TBY54-E	For source type output modules (2-wire type)	0.5kg			

INPORTANT

(1) The number of connectable I/O points is 32 for all connector/terminal block convertor modules.
Two connector/terminal block convertor modules and two cables for connector/terminal block convertor modules are required for 64-point I/O modules.

(2) Though the A1SX81(S2) is used either as a sink or source type, use the A6TBX36-E, A6TBX54-E or A6TBX70-E.
The A6TBXY36, A6TBXY54 or A6TBX70 cannot be used.

(3) Though the A1SX82-S1 is used either as a sink or source type, the A6TBXY36/XY54/X70 may be used only when the A1SX82-S1 is used as a sink type.
When it is used as a source type, the A6TBXY36/XY54/X70 cannot be used.

(4) Though the A1SY82 is a source type output module, use theA6TBXY36 or A6TBXY54. The A6TBXY36-E or A6TBXY54-E cannot be used.

(5) In the A series, the plus common input module is separately labeled as a sink type input module, and the minus common input module is separately labeled as a source type input module.

(6) When using the A6TBXY70 as a mixed input/output module, use at the input side.

(7) Tighten the module terminal screws to the following torque.
Supply line connecting terminal screw (M3.5 screw): Tightening torque 78.4N•cm

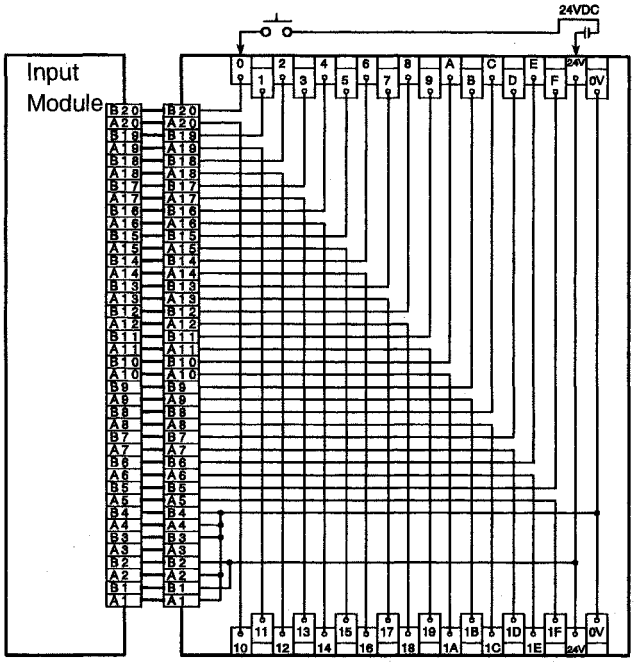
2) Cable

Type	Details	Weight	Applicable Models
AC05TB	0.5 m (19.69 in.), for sink modules	0.17kg	A6TBXY36 A6TBXY54 A6TBX70
AC10TB	1 m (39.37 in.), for sink modules	0.23kg	
AC20TB	2 m (78.74 in.), for sink modules	0.37kg	
AC30TB	3 m (118.11 in.), for sink modules	0.51kg	
AC50TB	5 m (196.85 in.), for sink modules	0.76kg	
AC80TB	8 m (314.96 in.), for sink modules (common current not exceeding 0.5 A)	1.2kg	
AC100TB	10 m (393.7 in.), for sink modules (common current not exceeding 0.5 A)	1.5kg	
AC05TB-E	0.5 m (19.69 in.), for source modules	0.17kg	A6TBX36-E A6TBY36-E A6TBX54-E A6TBY54-E A6TBX70-E
AC10TB-E	1 m (39.37 in.), for source modules	0.23kg	
AC20TB-E	2 m (78.74 in.), for source modules	0.37kg	
AC30TB-E	3 m (118.11 in.), for source modules	0.51kg	
AC50TB-E	5 m (196.85 in.), for source modules	0.76kg	

5.2 Connector/Terminal Block Convertor Module Connection Diagrams

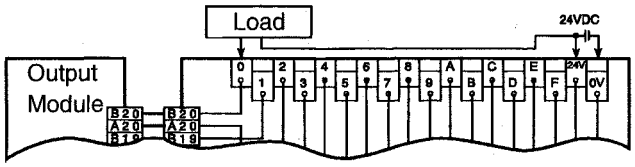
5.2.1 A6TBXY36

(1) When connecting an input module

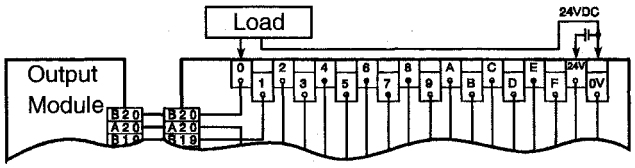


(2) When connecting an output module

(a) Sink Type

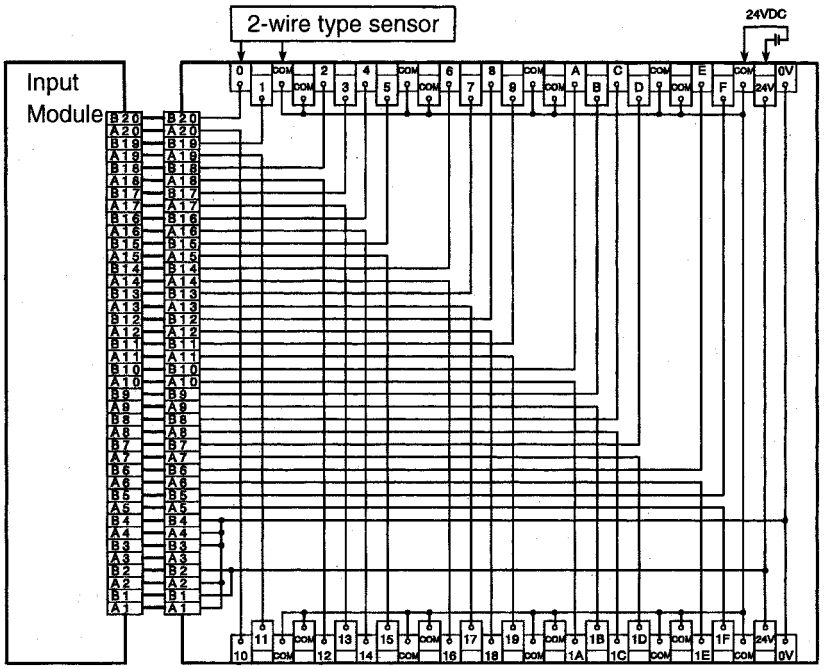


(b) Source Type



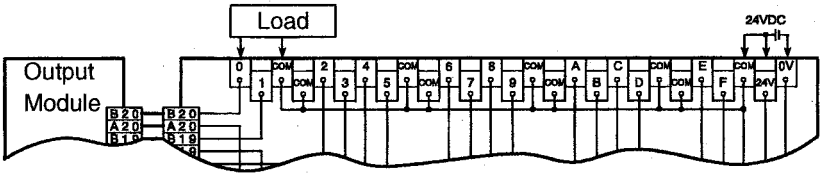
5.2.2 A6TBXY54

(1) When connecting an input module

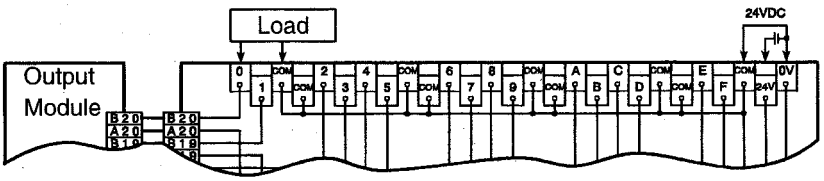


(2) When connecting an output module

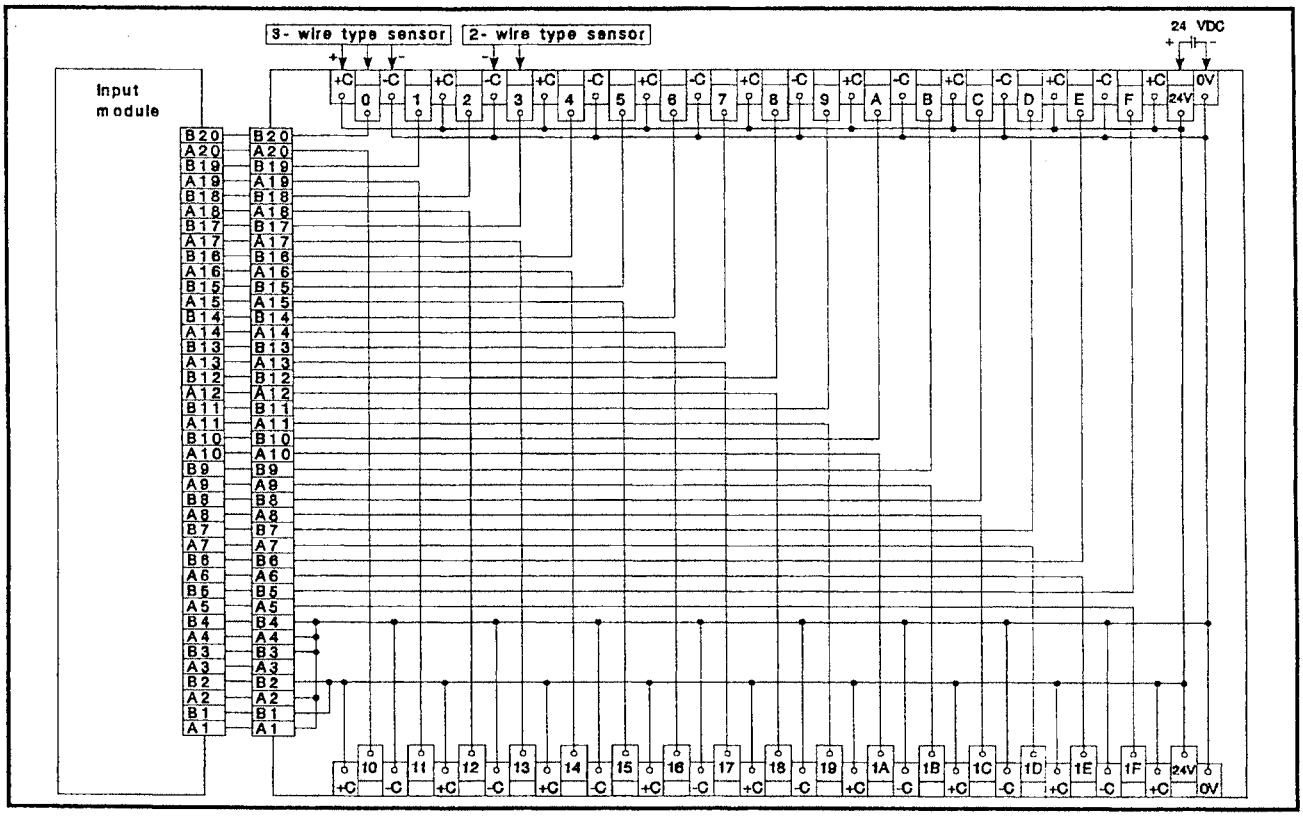
(a) Sink Type



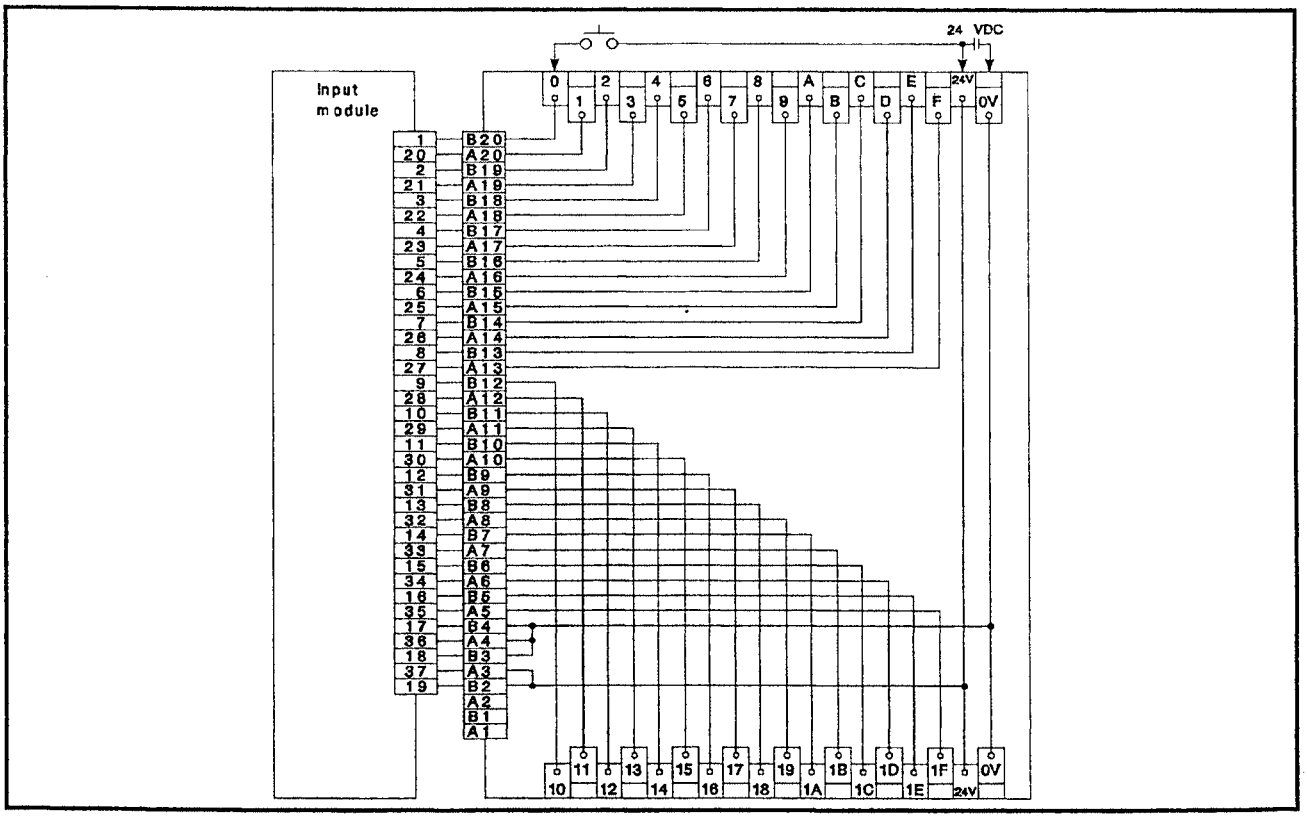
(b) Source Type



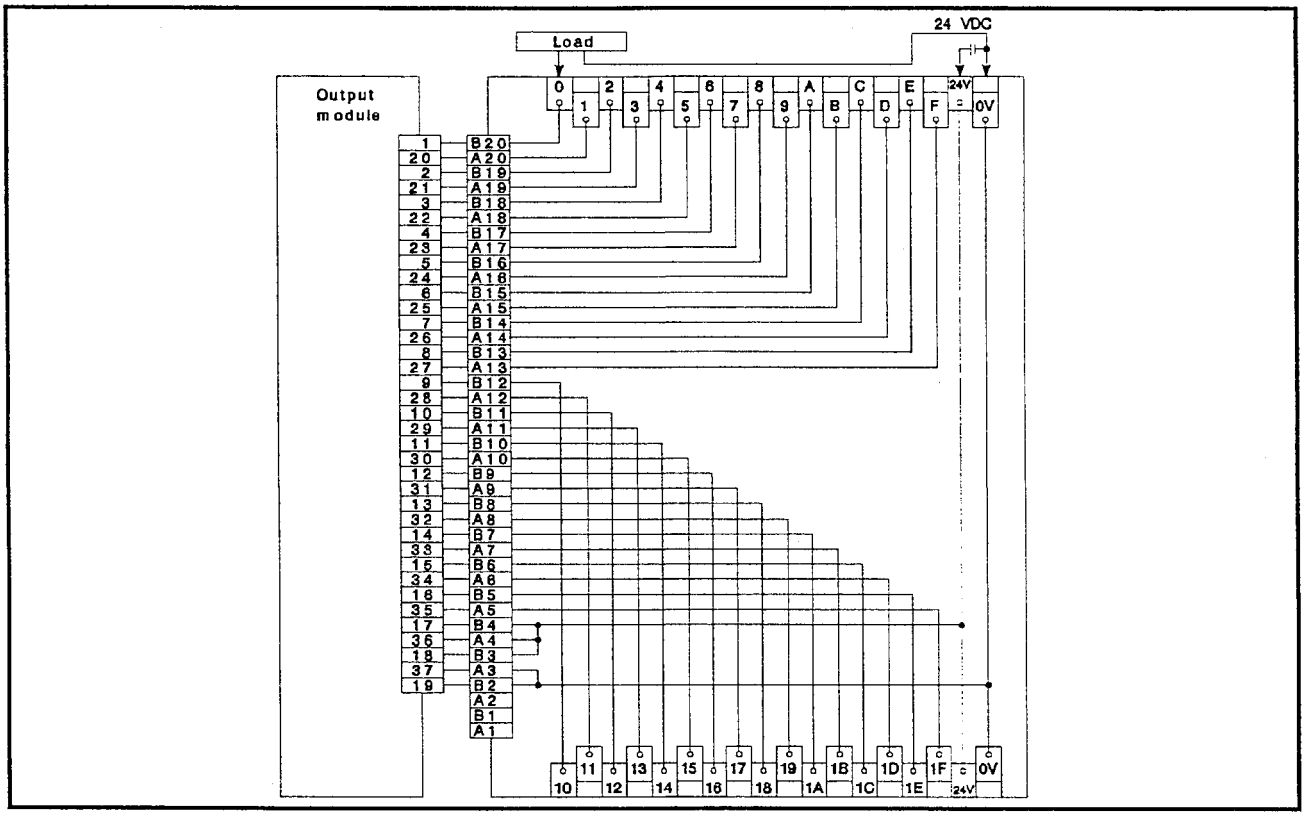
5.2.3 A6TBX70



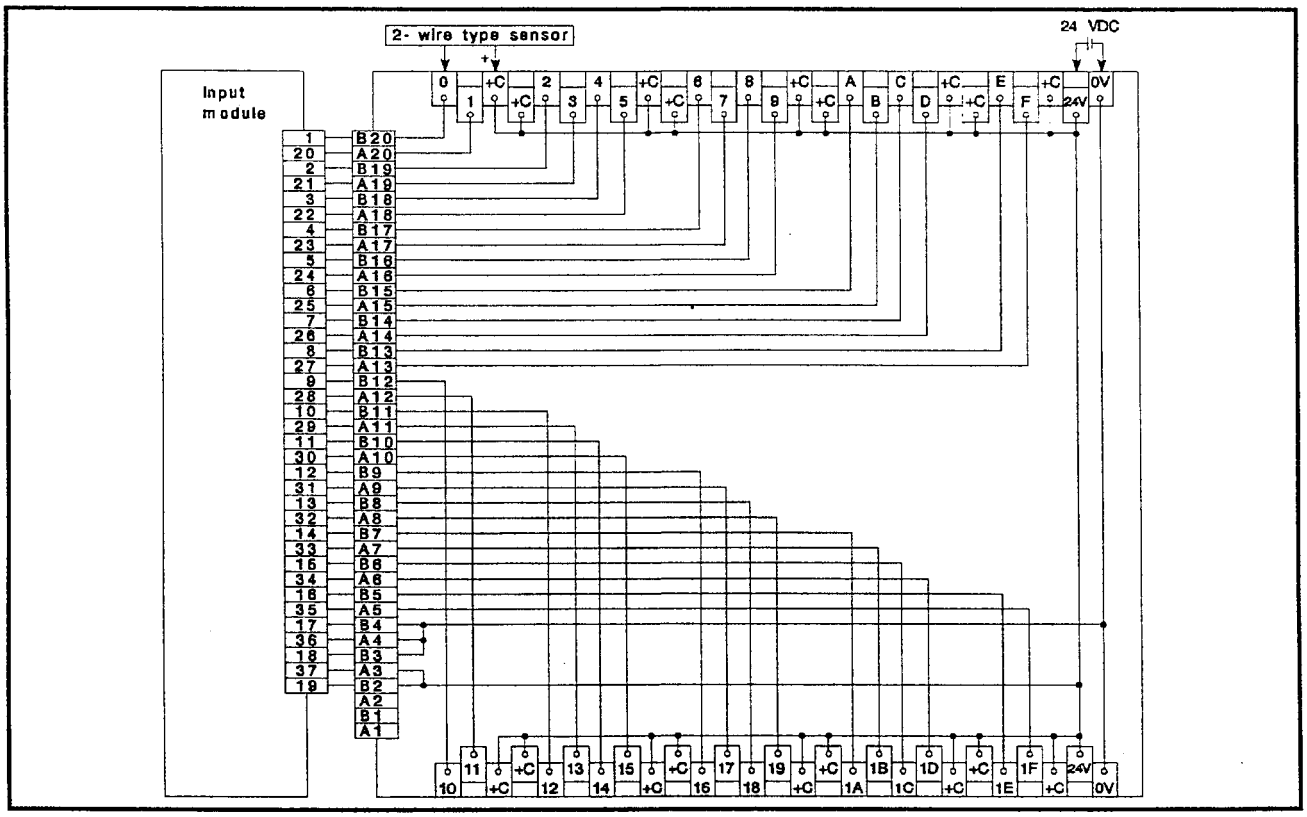
5.2.4 A6TBX36-E



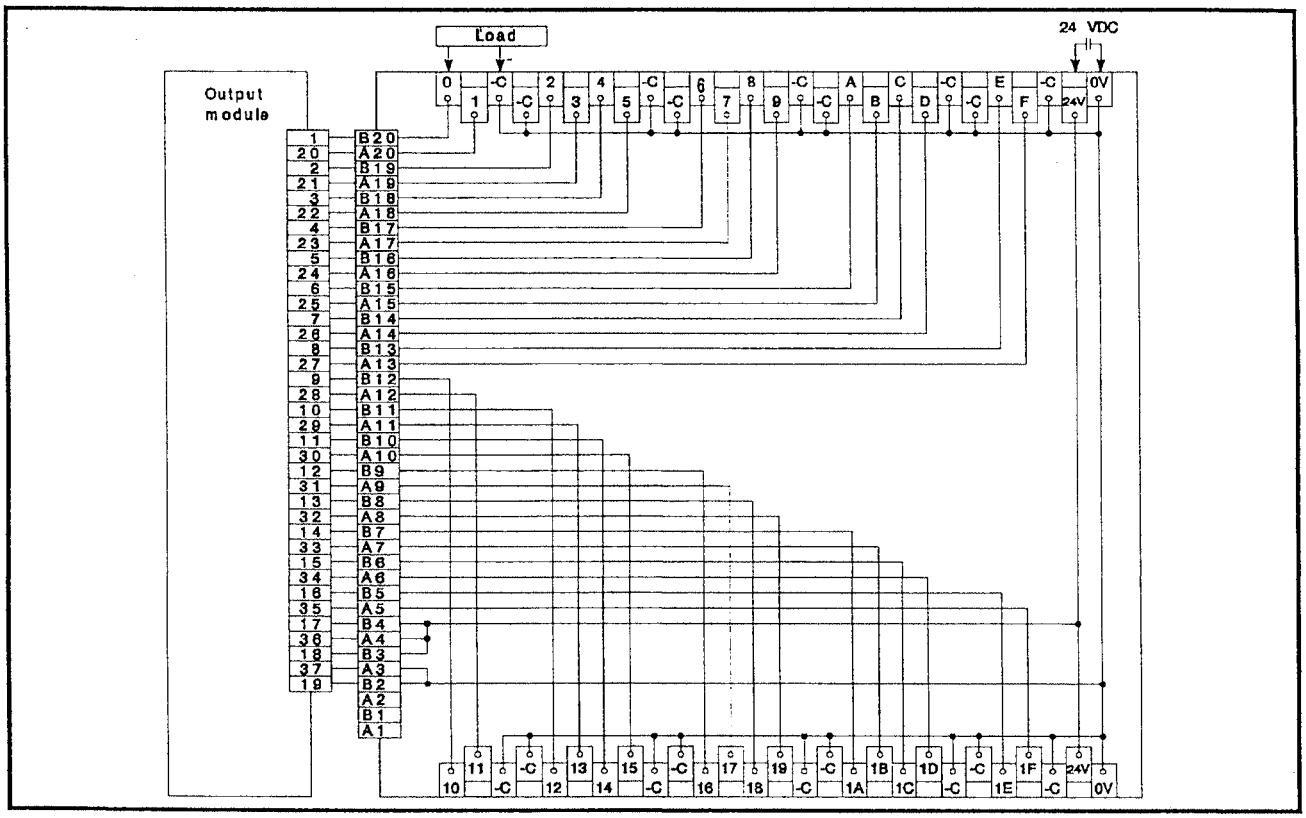
5.2.5 A6TBY36-E



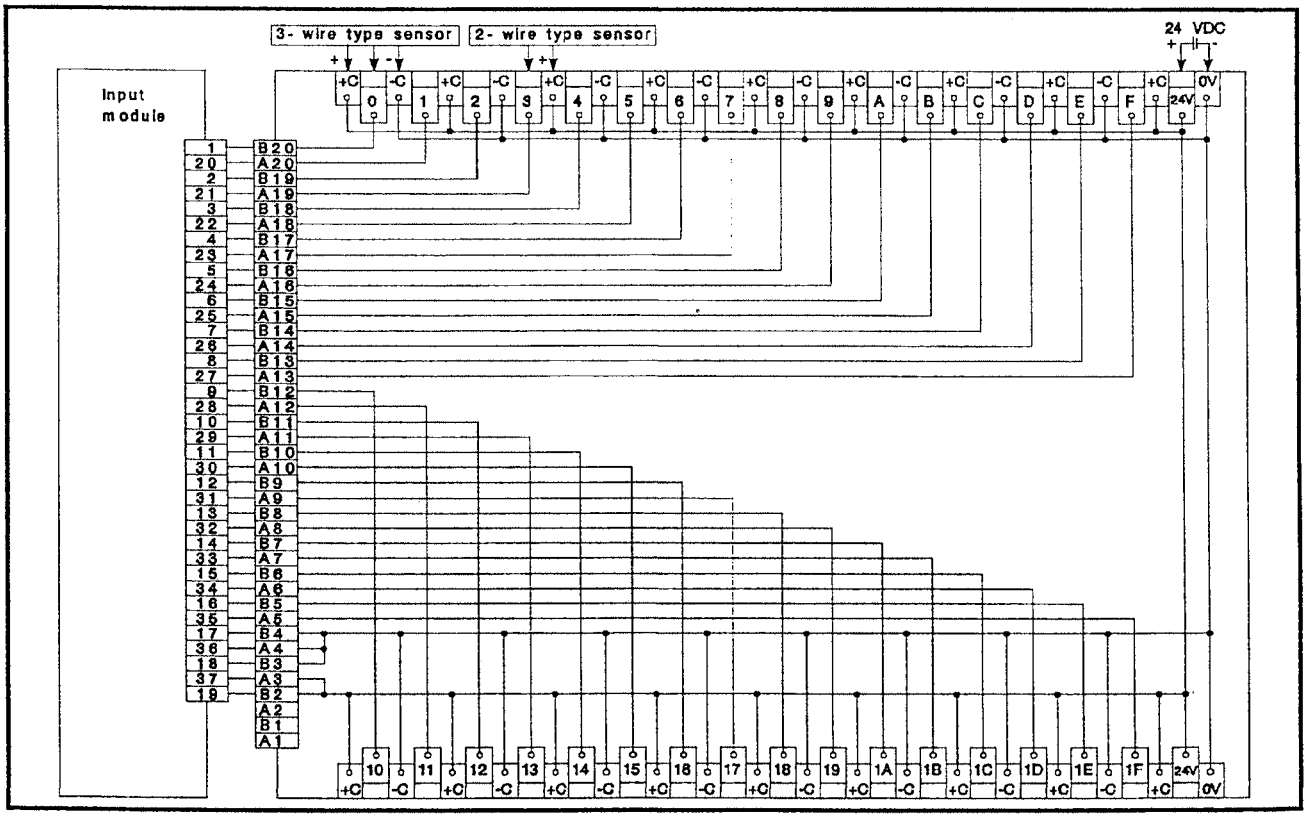
5.2.6 A6TBX54-E



5.2.7 A6TBY54-E



5.2.8 A6TBX70-E



6. BLANK COVER, DUMMY MODULE, SIMULATION SWITCH SPECIFICATIONS

6.1 Blank Cover (AG60), Dummy Module (AG62) Specifications

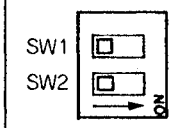
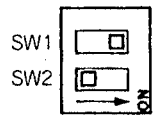
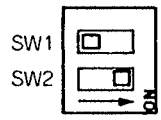
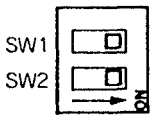
The AG60 blank cover is used to protect base unit vacant slots against dust etc.
The AG62 dummy module is used to reserve a specified number of I/O points at any base unit slot.

Item \ Type	AG60	AG62
Number of I/O occupied	16	Max. 64 (May be switched between 16, 32, 48 and 64 using the select switch on the front panel.)
I/O allocation	———	Designate the number of setting points for [ ] by using the select switch.
Application	Used to protect any vacant slot from dust.	Used to reserve I/O (16, 32, 48 or 64 points) for future use.
Other function	———	The first 16 inputs can be simulated using the DIP switches. (See Section 6.3)
Internal current consumption (5 VDC)	———	70 mA
Size mm(inch)	250(9.84) × 37.5(1.48) × 121(4.76)	250(9.84) × 3.75(0.15) × 121(4.76)
Weight kg(lbs)	0.17(0.37)	0.3(0.66)

Table 3.12 Dummy Module, Blank Cover Specifications

6.2 Setting the AG62's I/O Points Occupied

Use the occupied I/O point setting switches (DIP switches) on the module front. The number of I/O points occupied is factory-set to 64 points.

Number of I/O points occupied	16points	32points	48points	64points
Switch setting				

6.3 Simulation Switch (A6SW16, A6SW32) Specifications

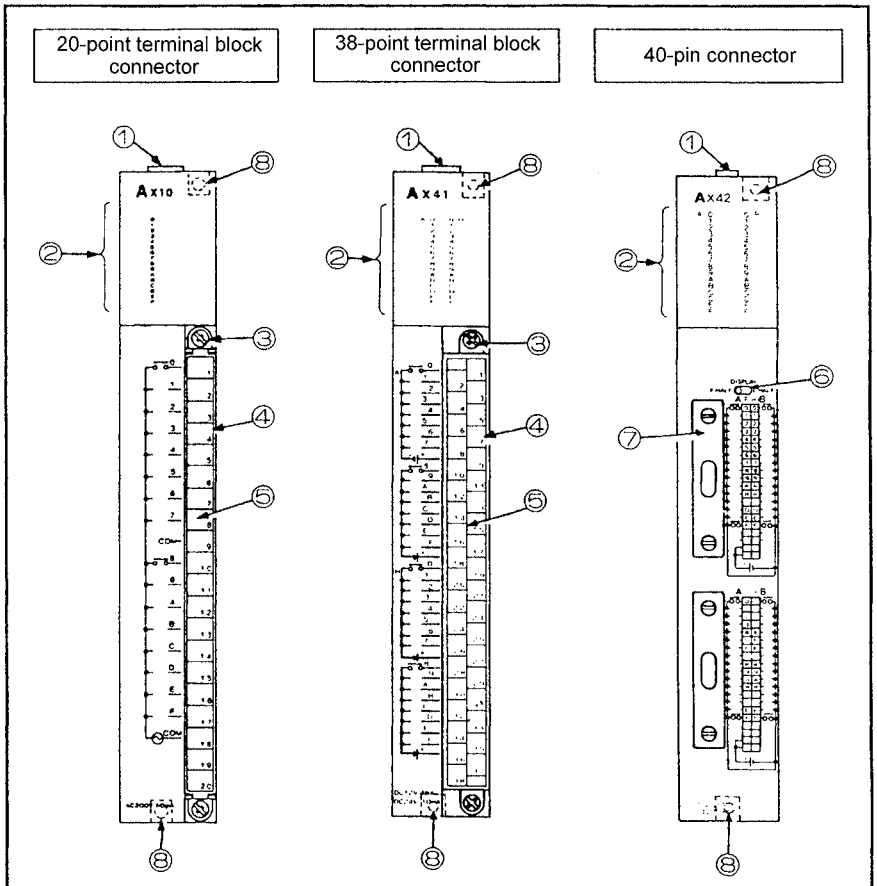
The simulation switches are banks of switches permanently fixed to a terminal block assembly. To use the simulation switches, remove the input modules terminal block and replace it with the appropriate simulation switch.
The simulation switches are used to test programs by simulating input conditions.

Item \ Type	A6SW16	A6SW32
Number of switches	16	32
Rated voltage, current	250V AC, 10mA	250V AC, 10mA
Minimum voltage, current	5V DC, 1mA	5V DC, 1mA
Switching life	More than 10,000 times	
Lever operating force	3.9N (400g·f) maximum	3.9N (400g·f) maximum
Size mm(inch)	190(7.48) × 31.5(1.24) × 33.6(1.32)	197(7.76) × 37.5(1.48) × 43.5(1.71)
Weight kg(lbs)	0.11(0.24)	0.2(0.44)

Table 3.13 Simulation Switch Specifications

7. NOMENCLATURE

7.1 I/O Module Nomenclature

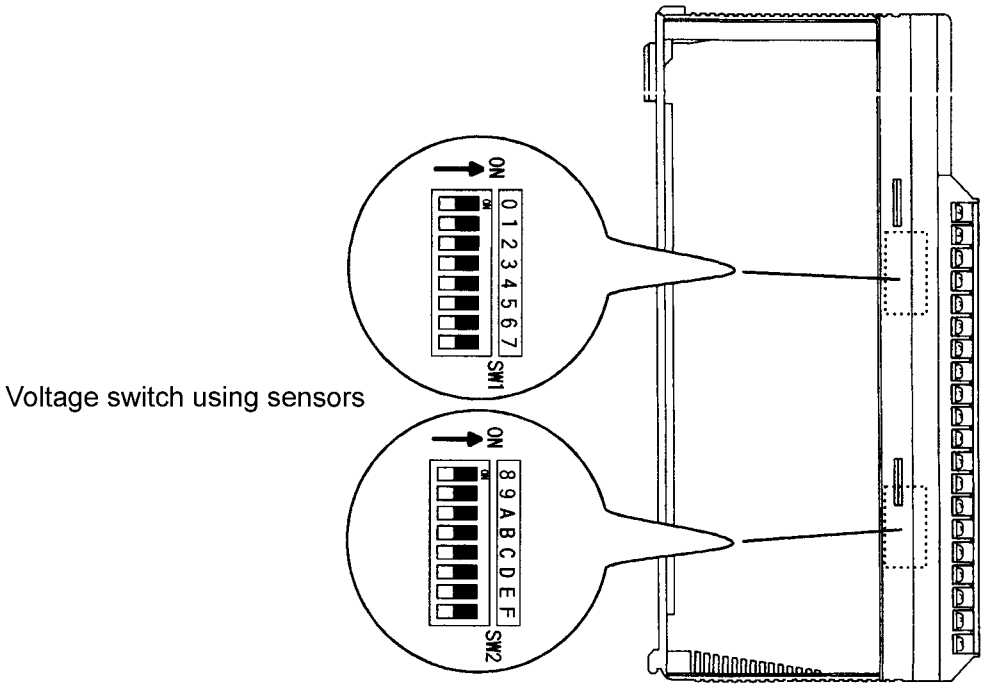


1) Module fixing latch····· Clips the module to the base unit.
2) I/O indicator LEDs····· Lit to indicate that the corresponding I/O point is on.
3) Terminal block fixing screw (M4 metric thread)··· Fixes the terminal block (20- or 38-point) to the module.
4) Terminal block····· Used to connect the power and I/O signal wiring.
5) Terminal screw (M3 × 0.5 × 6 metric screws)
6) Display select switch ····· Selects indication of the first or second 32 I/O point statuses on a 64 way module.
7) I/O connector····· A 40-pin connector for 64-point moudule connects the power supply or I/O signal cable
8) Mounting hole····· The module can be fixed onto the base unit using screws in addition to module fixing hook.
The fixing screw hole (for M4 screw)

7.2 The Part Names of AX70 and 71 Input Modules

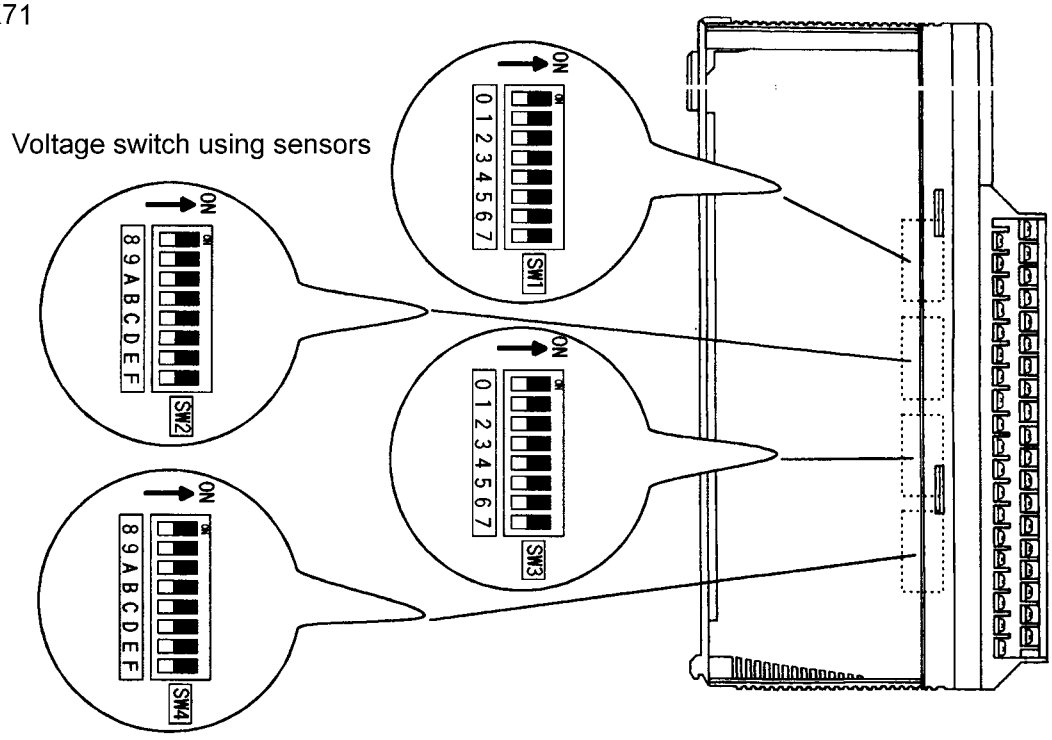
The part names of AX70 and 71 input modules for sensors are described.
In this section, the names of AX70 and 71 input modules for sensors from side are explained.
Refer to section 7.1 regarding the part names not explained in this section.

(1) AX70



*Setting of the voltage switch using sensors is explained in section 7.2.1.

(2) AX71



7.2.1 Setting of the voltage switch using sensors

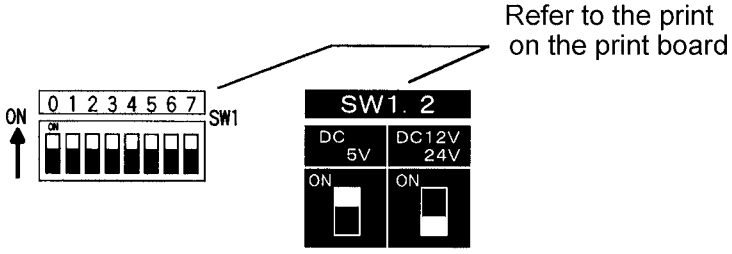
The voltage switch using sensors sets an appropriate voltage from 5VDC, 12/24VDC for AX70 and 71 input modules for sensors according to the conditions of use.
The dipswitch on its side makes setting.
Setting is made referring the compatible table between the print on the print board of the module's side and the following terminal Nos.
(All the 12/24VDC are set to OFF by factory default.)

Table 7.2.1 Response table for terminal No. and switch No.

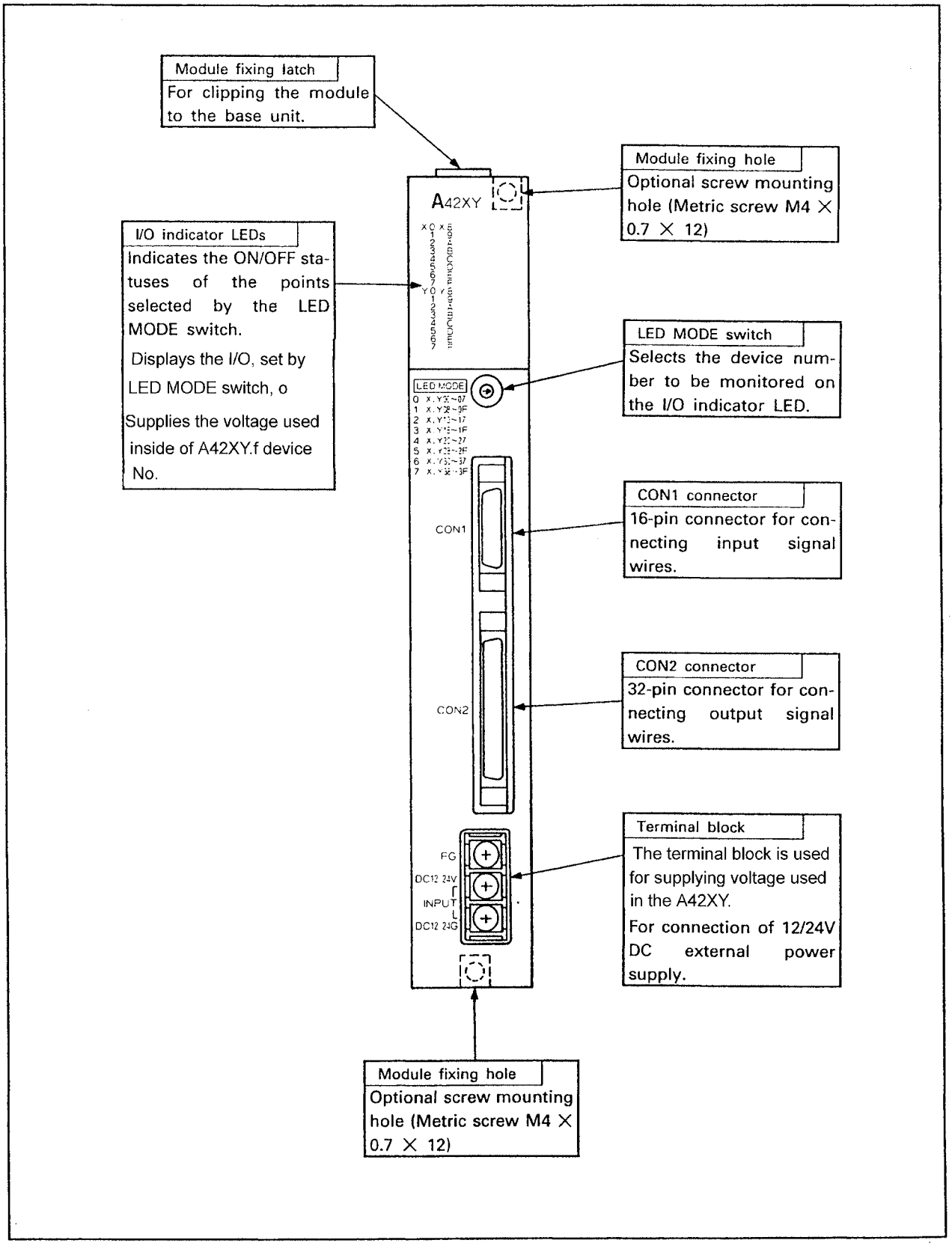
Terminal No.	Signal name	Voltage switch using sensors*1		Voltage using sensors*1	
		AX70	AX71	12/24V	5V
TB1	X00	SW1-0		OFF	ON
TB2	X01	SW1-1			
TB3	X02	SW1-2			
TB4	X03	SW1-3			
TB5	X04	SW1-4			
TB6	X05	SW1-5			
TB7	X06	SW1-6			
TB8	X07	SW1-7		OFF	ON
TB10	X08	SW2-8			
TB11	X09	SW2-9			
TB12	X0A	SW2-A			
TB13	X0B	SW2-B			
TB14	X0C	SW2-C			
TB15	X0D	SW2-D			
TB16	X0E	SW2-E			
TB17	X0F	SW2-F			
TB19	X10	-	SW3-0	OFF	ON
TB20	X11	-	SW3-1		
TB21	X12	-	SW3-2		
TB22	X13	-	SW3-3		
TB23	X14	-	SW3-4		
TB24	X15	-	SW3-5		
TB25	X16	-	SW3-6		
TB26	X17	-	SW3-7		
TB28	X18	-	SW3-8	OFF	ON
TB29	X19	-	SW3-9		
TB30	X1A	-	SW3-A		
TB31	X1B	-	SW3-B		
TB32	X1C	-	SW3-C		
TB33	X1D	-	SW3-D		
TB34	X1F	-	SW3-E		
TB35	X1F	-	SW3-F		

*1 Refer to the print on the print board for setting.

The setting when the sensors power voltage of 5VDC is used by 1 common (TB1 to TB8 of 8points) to AX70 input module for sensors is as follows.

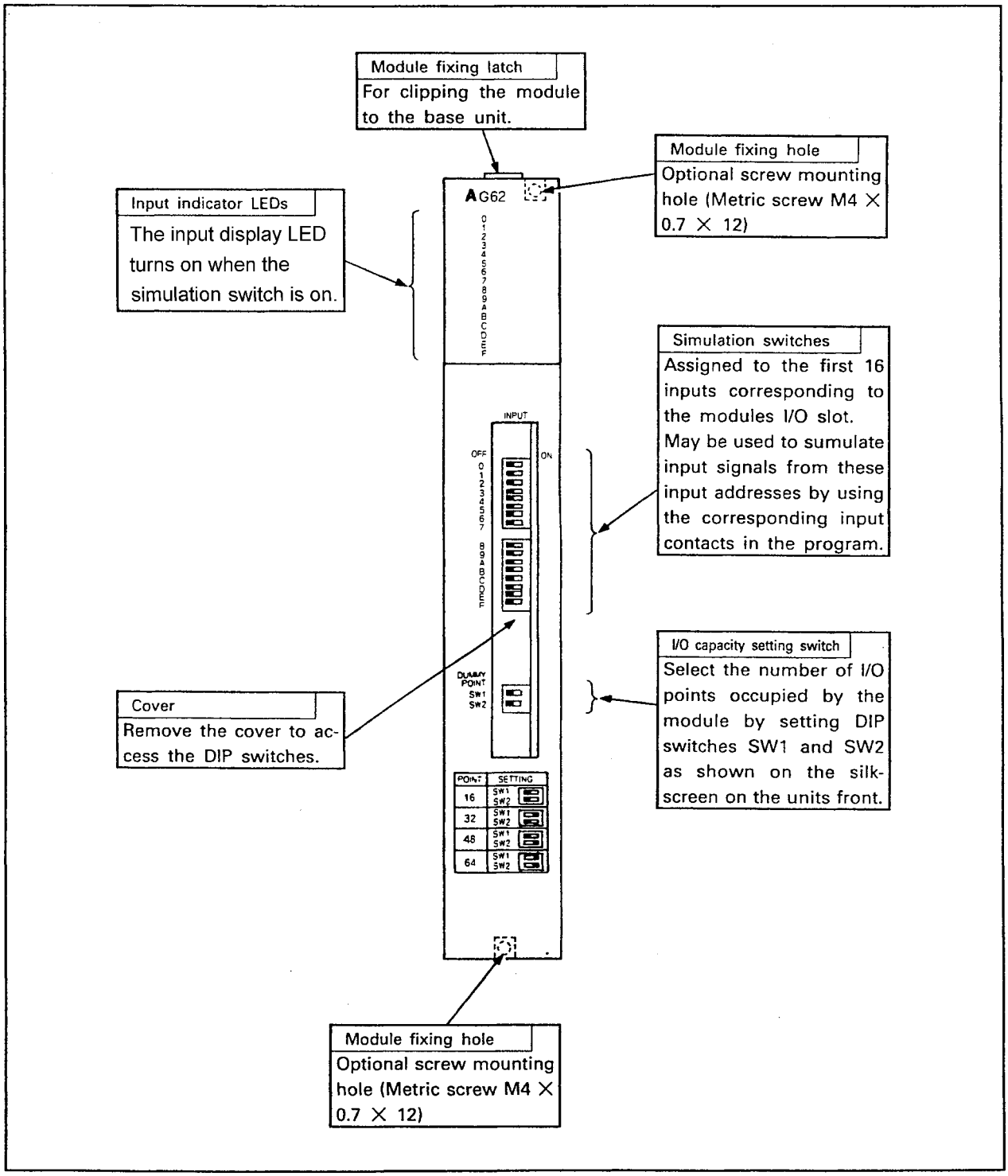


7.3 A42XY Nomenclature



7.4 Dummy Module Nomenclature

The part names of the dummy module, used for reserving empty occupied points' device using empty part on A series sequence system, are described.

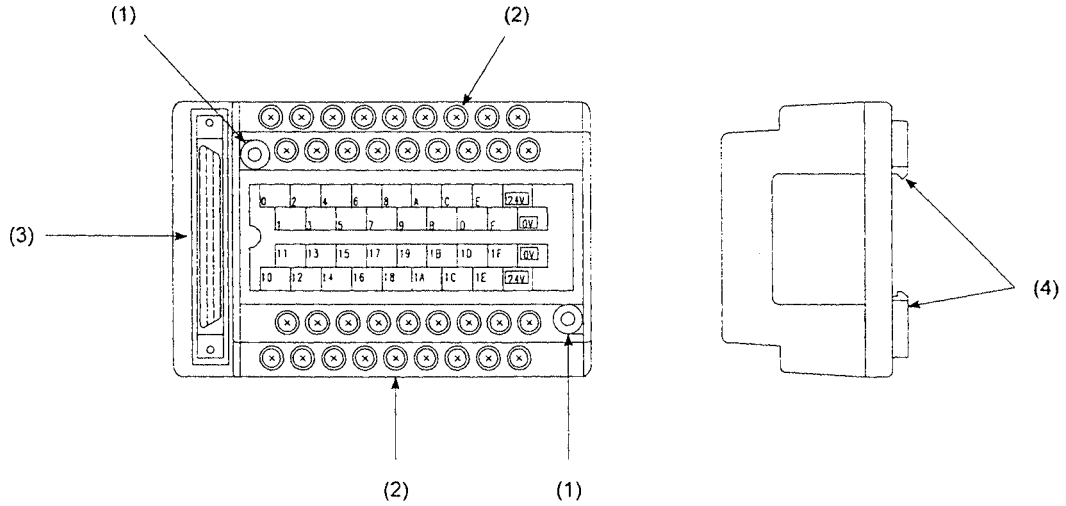


REMARKS

It is necessary to set areas marked ☐ after loading the module to the base unit and before starting operation.

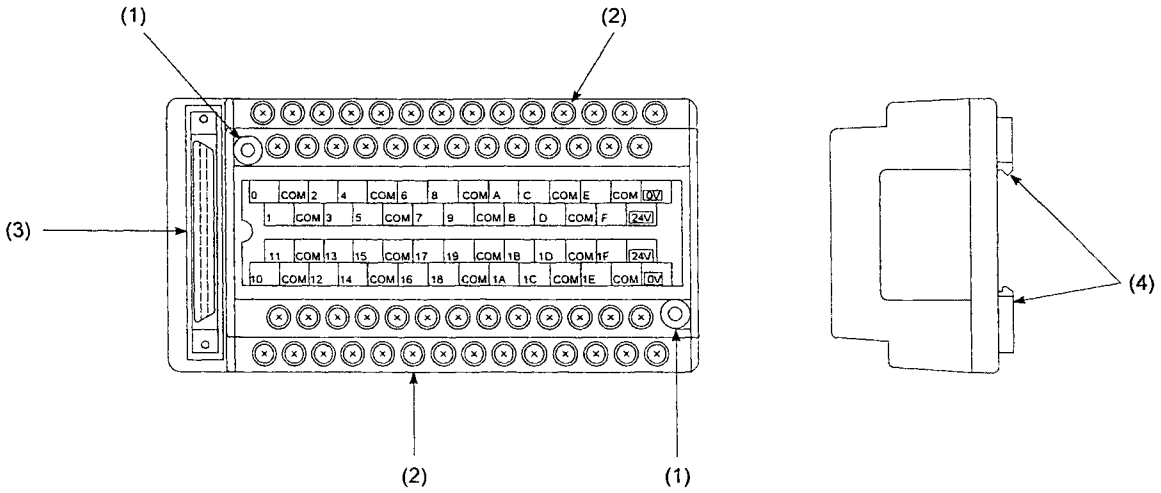
7.5 Connector/Terminal Block Convertor Modules

(1) A6TB□36□



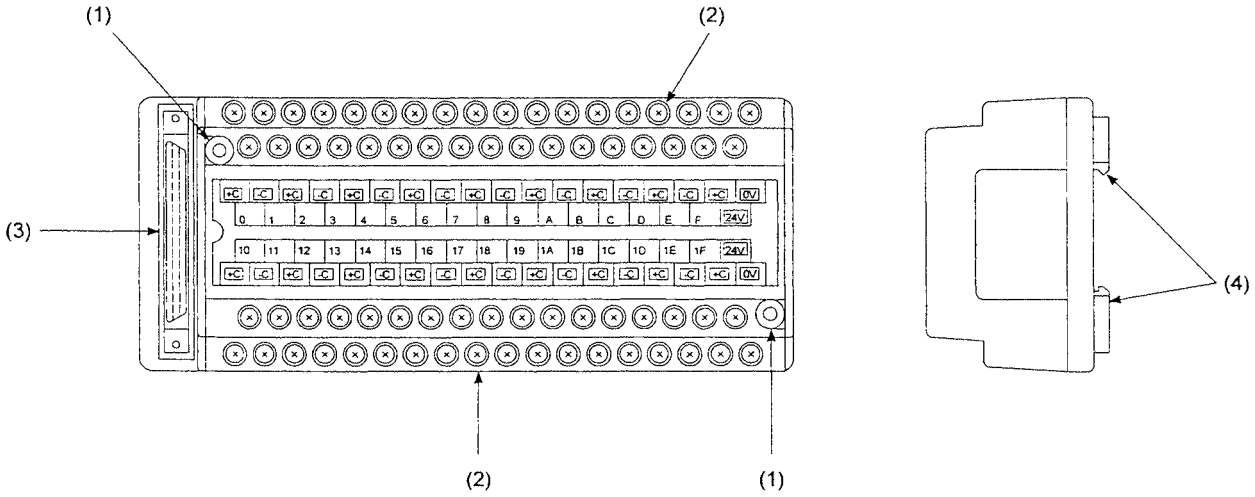
No.	Name	Description
(1)	Panel mounting hole	Panel mounting hole (for M4 screws)
(2)	Terminal block	Terminal block that connects power supply and signal wires (M3.5 screws)
(3)	40-pin connector	40-pin connector for a 32-point module; connects power supply and input signal wires
(4)	Module fixing hooks	Hooks for mounting on a DIN rail

(2) A6TB□54□



No.	Name	Description
(1)	Panel mounting hole	Panel mounting hole (for M4 screws)
(2)	Terminal block	Terminal block that connects power supply and signal wires (M3.5 screws)
(3)	40-pin connector	40-pin connector for a 32-point module; connects power supply and input signal wires
(4)	Module fixing hooks	Hooks for mounting on a DIN rail

(3) A6TBX70

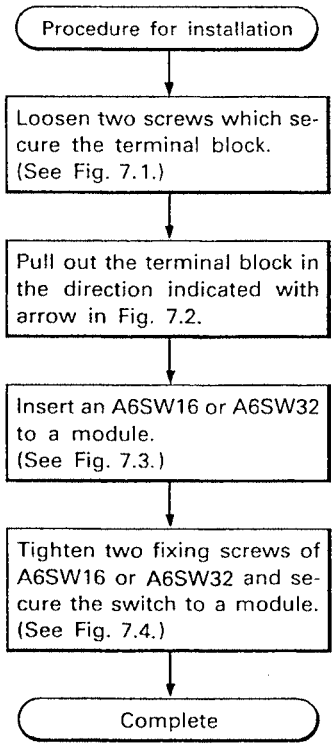


No.	Name	Description
(1)	Panel mounting hole	Panel mounting hole (for M4 screws)
(2)	Terminal block	Terminal block that connects power supply and signal wires (M3.5 screws)
(3)	40-pin connector	40-pin connector for a 32-point module; connects power supply and input signal wires
(4)	Module fixing hooks	Hooks for mounting on a DIN rail

7.6 Installing/Removing the Simulation Switch

This section explains how to install and remove the simulation switch (A6SW16/A6SW32) to and from an input module.

7.6.1 Installation



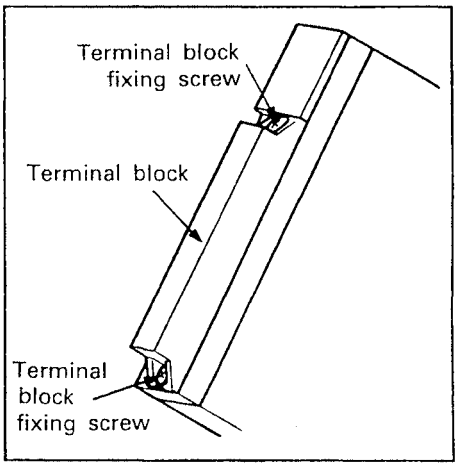


Fig. 7.1

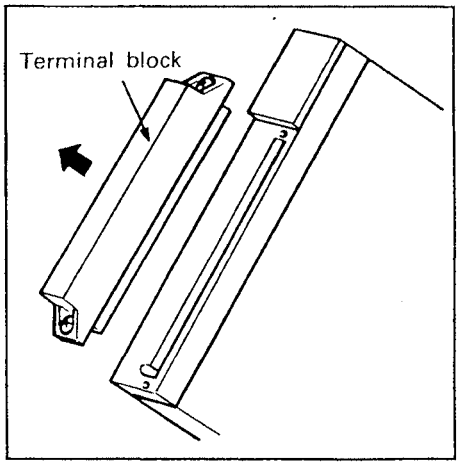


Fig. 7.2

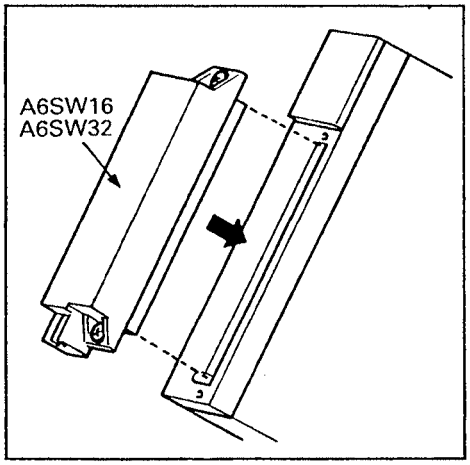


Fig. 7.3

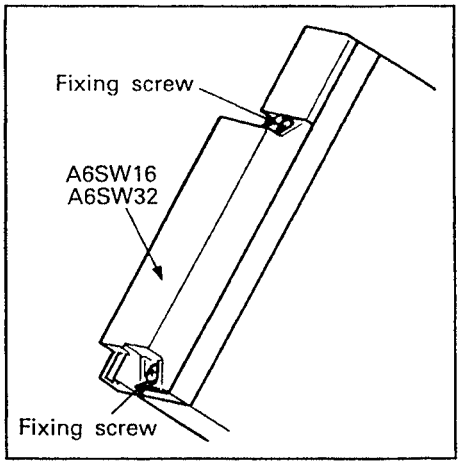


Fig. 7.4

7.6.2 Removal

Procedure for removal

↓

Loosen two screws which secure an A6SW16 or A6SW32. (See Fig. 7.5.)

↓

Pull out an A6SW16 or A6SW32 in the direction indicated by the arrow in Fig. 7.6.

↓

Insert a terminal block which has been installed to a module at the time of shipment. (See Fig. 7.7.)

↓

Tighten two fixing screws and secure the terminal block to a module. (See Fig. 7.8.)

↓

Complete

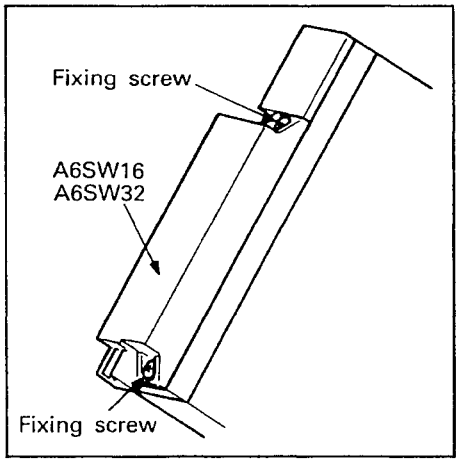


Fig. 7.5

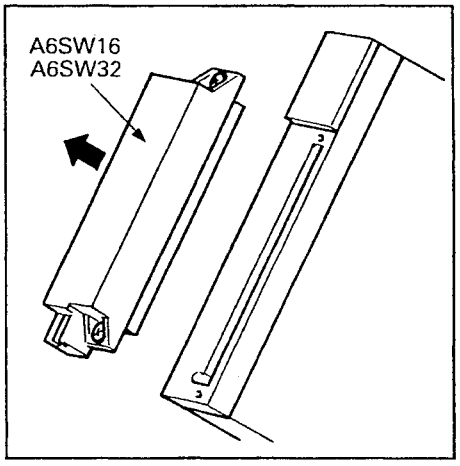


Fig. 7.6

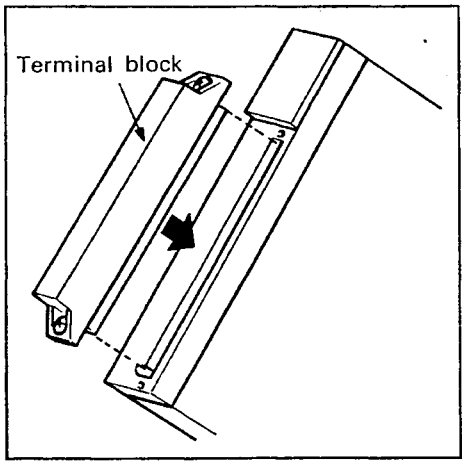


Fig. 7.7

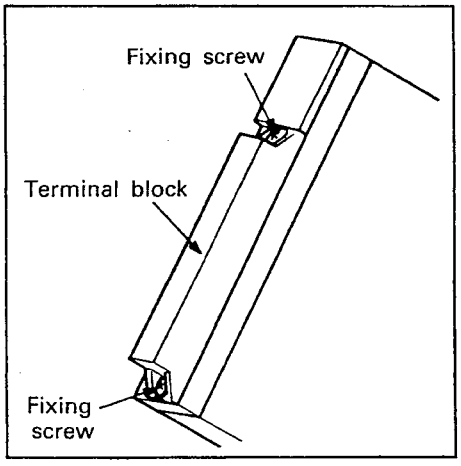


Fig. 7.8

8. I/O CONNECTION TROUBLESHOOTING

8.1 Input Wiring Troubleshooting

This section describes possible problems with the input circuit and corrective actions.

Table 8.1 Input Wiring Troubleshooting (Continue)

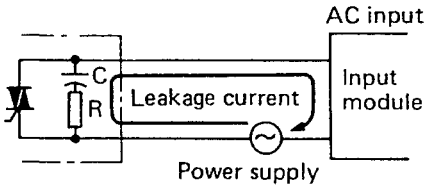
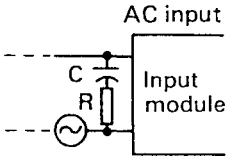
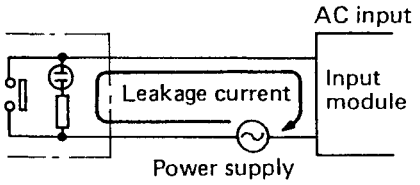
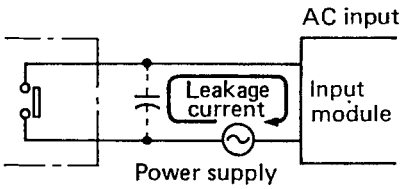
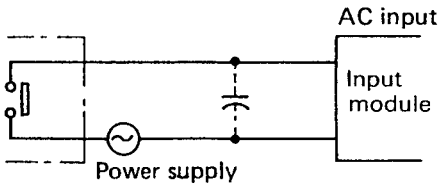
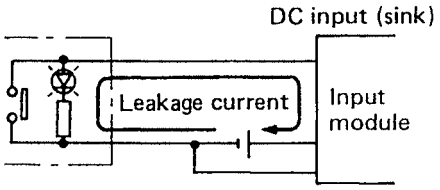
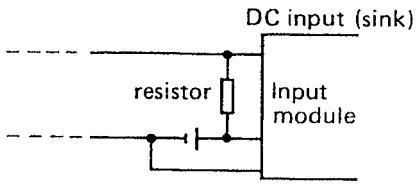
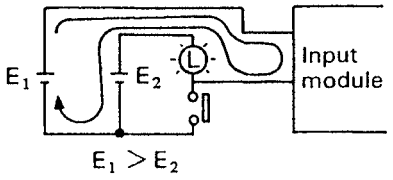
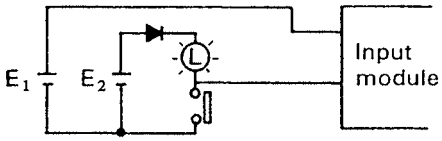
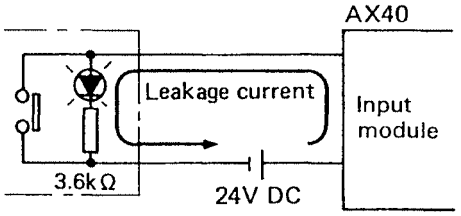
	Condition	Cause	Corrective Action
Example 1	AC input signal does not turn off.	● Input device leakage current. (e.g. drive by non contact switch) 	● Connect a CR network across input to drop the voltage below the input modules OFF threshold.  Use C = 0.1 to 0.47 μF and R = 47 to 120Ω (1/2W)
Example 2	AC input signal does not turn off.	● Leakage current due to contact switch with neon indicator. 	● As example 1, or. ● Construct independent indicator circuit.
Example 3	AC input signal does not turn off.	● Leakage current due to line capacity of wiring cable. (Line capacity of twisted pair wire is approx. 100 PF/m.) 	● As Example 1. ● Note that moving the power supply to the input device end of the cable will prevent leakage current from being generated. 

Table 8.1 Input Wiring Troubleshooting (Continued)

	Condition	Cause	Corrective Action
Example 4	DC input signal does not turn off.	• Leakage current due to contact switch with LED indicator. 	• Connect a resistor across the input and COM to drop the voltage below the input modules OFF threshold.  * Sample resistor value calculation given on next page.
Example 5	DC input signal does not turn off.	• Current flow due to the use of two power supplies. 	• Use single power supply. • Use diode as shown below: 

Example:

Calculation for Example 4

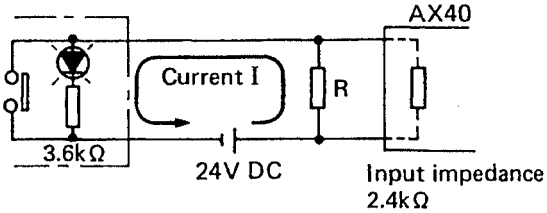


Consider a contact switch with LED indicator connected to an AX40 module, giving a 4mA leakage current.

- The voltage V_{TB} across terminal and common is obtained by the following expression:

  $V_{TB} = 4\ [mA] \times 2.4\ [K\Omega] = 9.6\ [V]$ (The voltage drop across the LED may be ignored.)

  The OFF threshold voltage is 6V so that the input will remain energized when the contact switch is open. Use resistor R as shown below:



- Calculate the resistor value, R, as shown below:
  For an input voltage < 6V, current I must be:

  (24 — 6[V]) ÷ 3.6[kΩ] = 5mA

  Resistor R must be selected to give a current I > 5mA.

- Hence, for resistor, R

  6[V] ÷ R > 5 — 2.5[mA]
  6[V] ÷ 2.5[mA] > R
  2.4[kΩ] > R

For R = 2kΩ, the power capacity must be:

The resistance power capacity[w] when switch is on.

W=(Applied voltage)^2/R
W=(26.4[V])^2/2[KΩ]=0.348[W]

- The resistance power capacity [W] is selected by 3 to 5 times larger than actual power consumption, so that it will be 1.0 to 1.7[W]. From the above reason,2[KΩ] 1 to 2 [W] register should therefore be connected across the relevant input terminal and its COM.

8.2 Output Wiring Troubleshooting

Table 8.2 Output Wiring Troubleshooting (Continue)

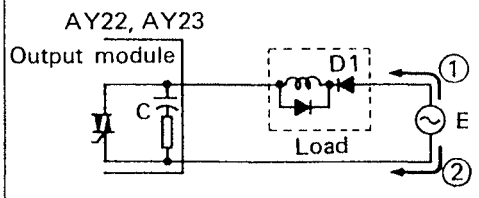
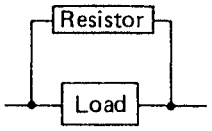
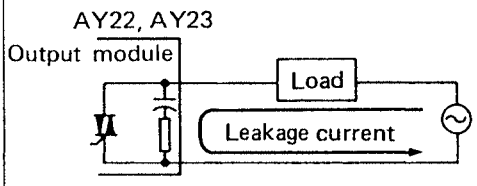
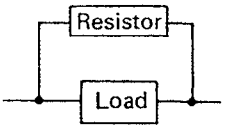
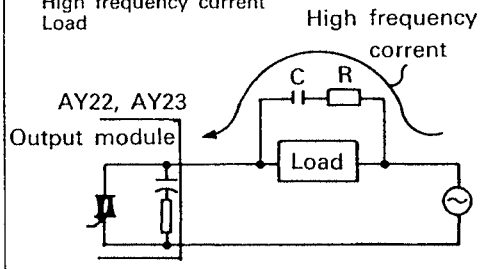
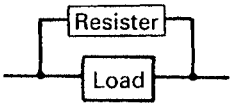
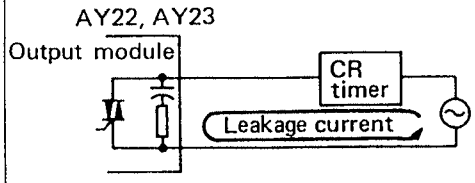
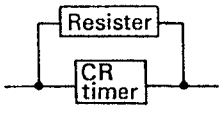
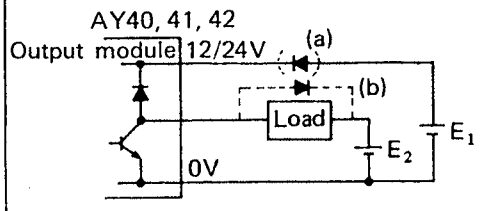
	Condition	Cause	Corrective Action
Example 1	AC voltage applied to output load when output in off.	● Half wave rectification by load (typical of some solenoids).  ● Current flow in direction ① causes capacitor, C, to charge. Current flow in direction ② applies capacitor voltage plus E across D1 (Voltage = 2.2E (approx)).	● Connect a resistor of several ten kΩ to several hundred kΩ across the load. Note: This solution may lead to damage to the diode. Suitable output loads should be substituted for the existing solenoids. 
Example 2	AC load does not turn off. (triac output)	● Leakage current due to built-in noise suppression. 	● Connect a R network across the load. Where long cable runs between output module and load are used, there may be a leakage current due to the line capacity. 
Example 3	Load turns OFF with a delay (triac output)	● Leakage current due to load noise suppressor. Output module High frequency current Load 	● Remove noise suppressor from both sides of the load and connect a resistor. { When wiring distance from output card to load is long, there may be a leakage current due to the line capacity. } Recommended resistance At 100 VAC: 5 to 10 KΩ, 5 to 3 W At 200 VAC: 10 to 20 KΩ, 15 to 10 W 
Example 4	AC load is C-R type timer, time constant fluctuates. (triac output)		● Connect a resistor to both ends of CR timer. { When wiring distance from output card to load is long, there may be a leakage current due to the line capacity. }  R values will depend on the load.
Example 5	DC load does not turn off. (Transister output with clamp diode)	● Current flow due to the use of two power supplies.  ● When $E_1 < E_2$, current flows.	● Use single power supply. ● Use diode (a) as shown on the left. When a relay (or similar load) is used, a free wheel diode should be connected across the load (see diode (b) on the left).

Table 8.2 Output Wiring Troubleshooting (Continued)

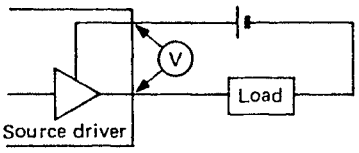
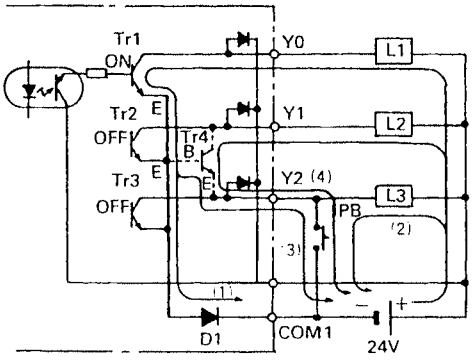
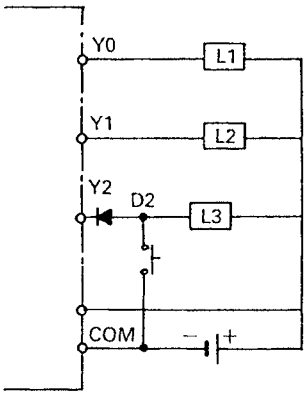
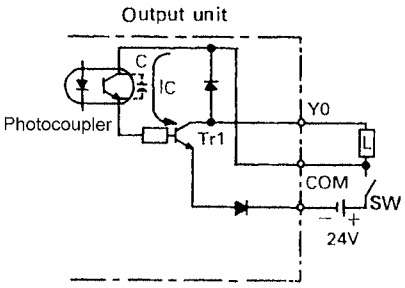
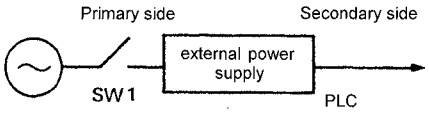
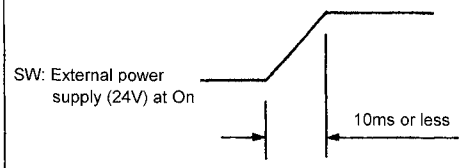
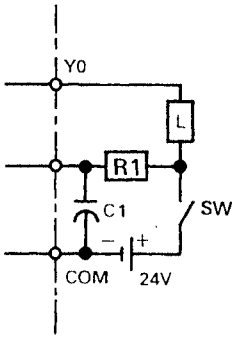
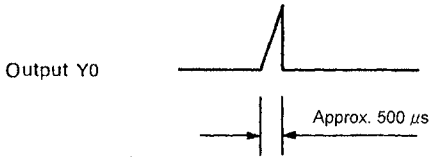
	Condition	Cause	Corrective Action
Example 6	Load does not operate normally (due to external shorting, etc.) AY60EP, AY80EP, AY81EP, AY82EP,	External load malfunction or incorrect connection.	• Check the external load. • Check voltage across the following terminals with output (Y) on. • If the voltage output is 3V or higher, external load could be shorted. Check the external load or wiring. 
Example 7	When an external switch is connected parallel between output and common, the voltage between Y1 and COM1 does not increase to a load voltage (24 V) and drops to 0 to 24 V though output (Y1) to which an external switch is not connected is turned OFF. Output voltage drops occur usually when load L2 is a light load such as LED lamp, photocoupler, etc. (when a load current is a few mA). AY40 AY41 AY42	Incorrect output due to parasitic transistor (Tr4).  Y2 is used to turn ON load L3 from either PC or PB. When PB is turned ON, Y0 is turned ON, and Y1 is turned OFF by PC. (1) L1 ((1) current) and L3 ((2) current) are turned ON. (2) Diode D1 is connected between emitters Tr1 to 4 (E) and COM1, and electrical potential difference occurs at COM1. (3) Transistors AY40 to 42 have parasitic transistors (Tr4). (4) Electrical potential difference above (2) is supplied between Tr4 base (B) and emitter (E), and (3) base current flows. (Tr4 is turned ON.) (5) Collector current (4) flows due to (4), and the voltage of Y1 drops to 0 to 24 V.	 Add diode D2 of IF=1A to output (Y2) to which an external switch is connected as shown in the figure above. (This prevents (3), (4) current (in the left figure) from flowing.) However, voltage drop increases 0.6 to 1 V when Y2 is turned ON. Confirm the operating voltage of L3.

Table 8.2 Output Wiring Troubleshooting (Continued)

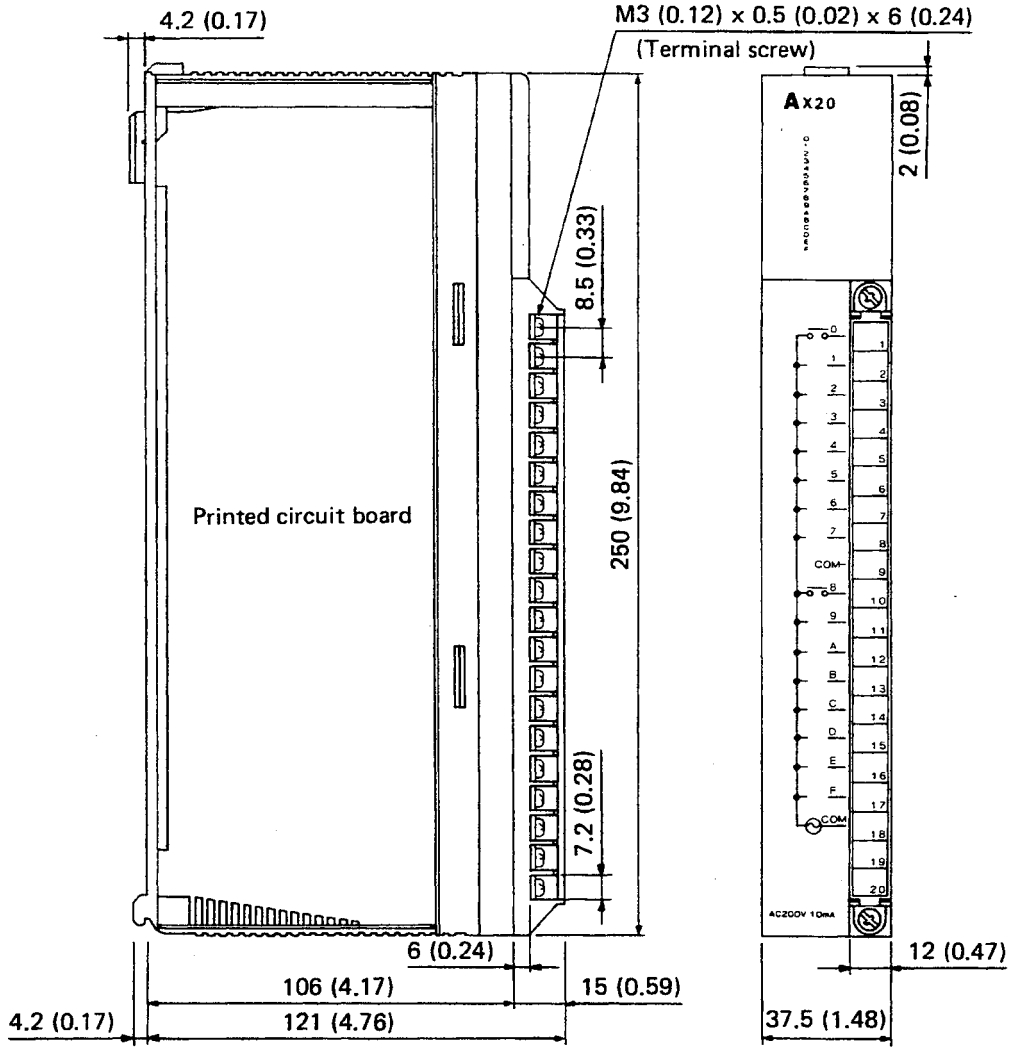
	Condition	Cause	Corrective Action
Example 8	When the external power supply turns on, the load turns on for a moment. (Transistor output)	Erroneous output due to the stray capacitance (C) between collector and emitter of hotocoupler. { There is no erroneous output at normal road. An erroneous output may occur at high sensitivity load (such as solid state relay).	(1) When the external power supply turns ON/OFF, check that the external power supply rising edge must be 10ms or more, and switch the SW1 to the primary side of external power supply.
			
		(1) If the external power supply is turned on precipitously, Ic current flows due to the stray capacitance (C) between collector and emitter of hotocoupler (2) Ic current flows to the next stage of transistor Tr1 base and Y0 output turns on by 500 μs.	(2) When switching to the secondary side of the external power supply is required, the external power supply rising edge connected a condenser must be slow, and measured 10ms or more.
			
			R1:N·+o- Ω Power capacity ≧ (external power supply current*1)^2 × resistance value × (3 to 5)*2 C1:several hundred μF 50mV *1 Refer to consumption current of the external power supply for modules used in this manual. *2 Select the power capacity of resistance to be 3 to 5 times lager than the actual power consumption. (Example) R1=40 Ω, C1=300 μF Use the below expression to calculated a time constant C1 × R1=300 × 10^{-5} × 40 =12 × 10^{-3}s =12ms

APPENDIX

APPENDIX 1 DIMENSIONS

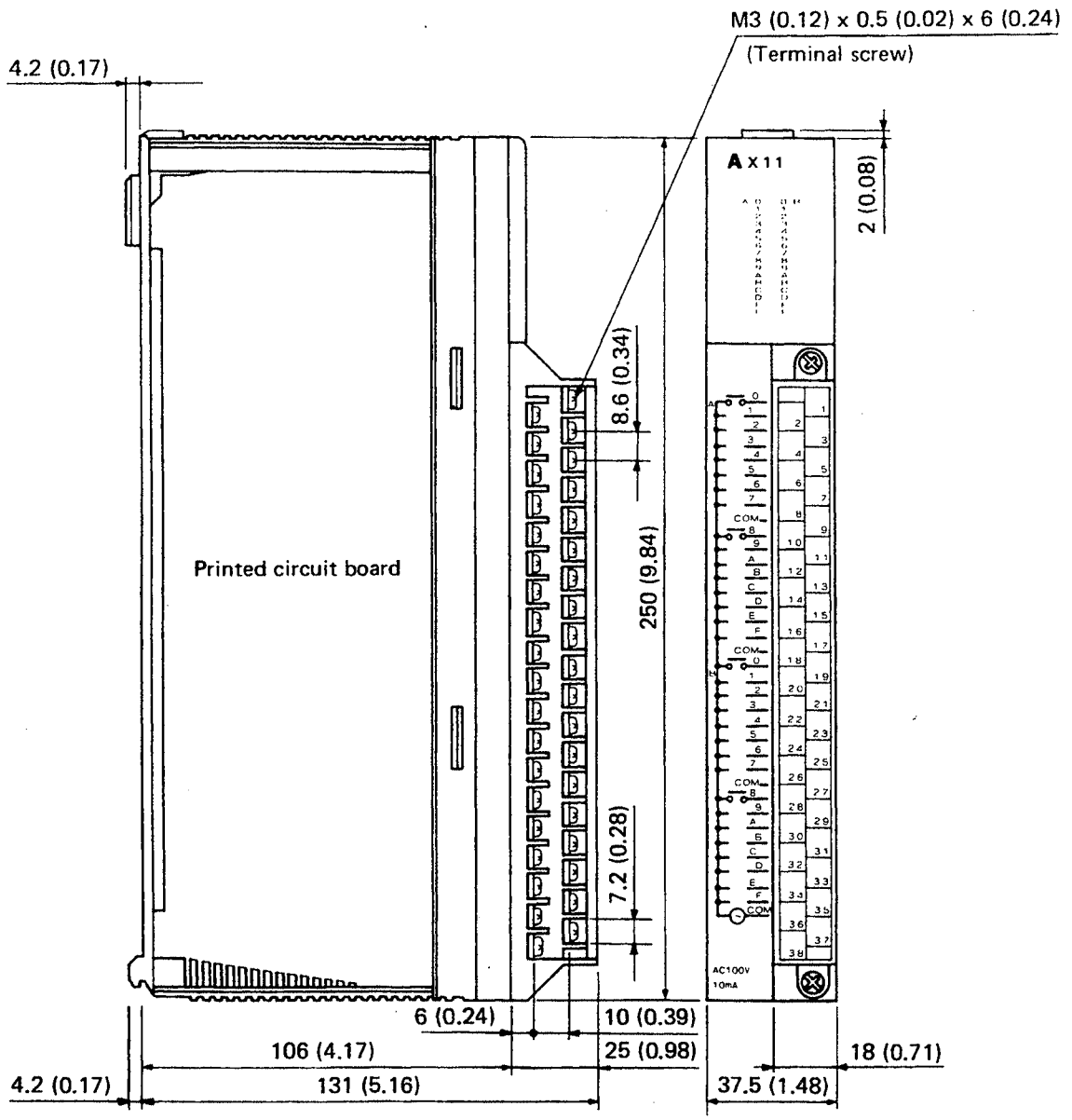
1.1 I/O Module

(1) 20-point terminal block connector



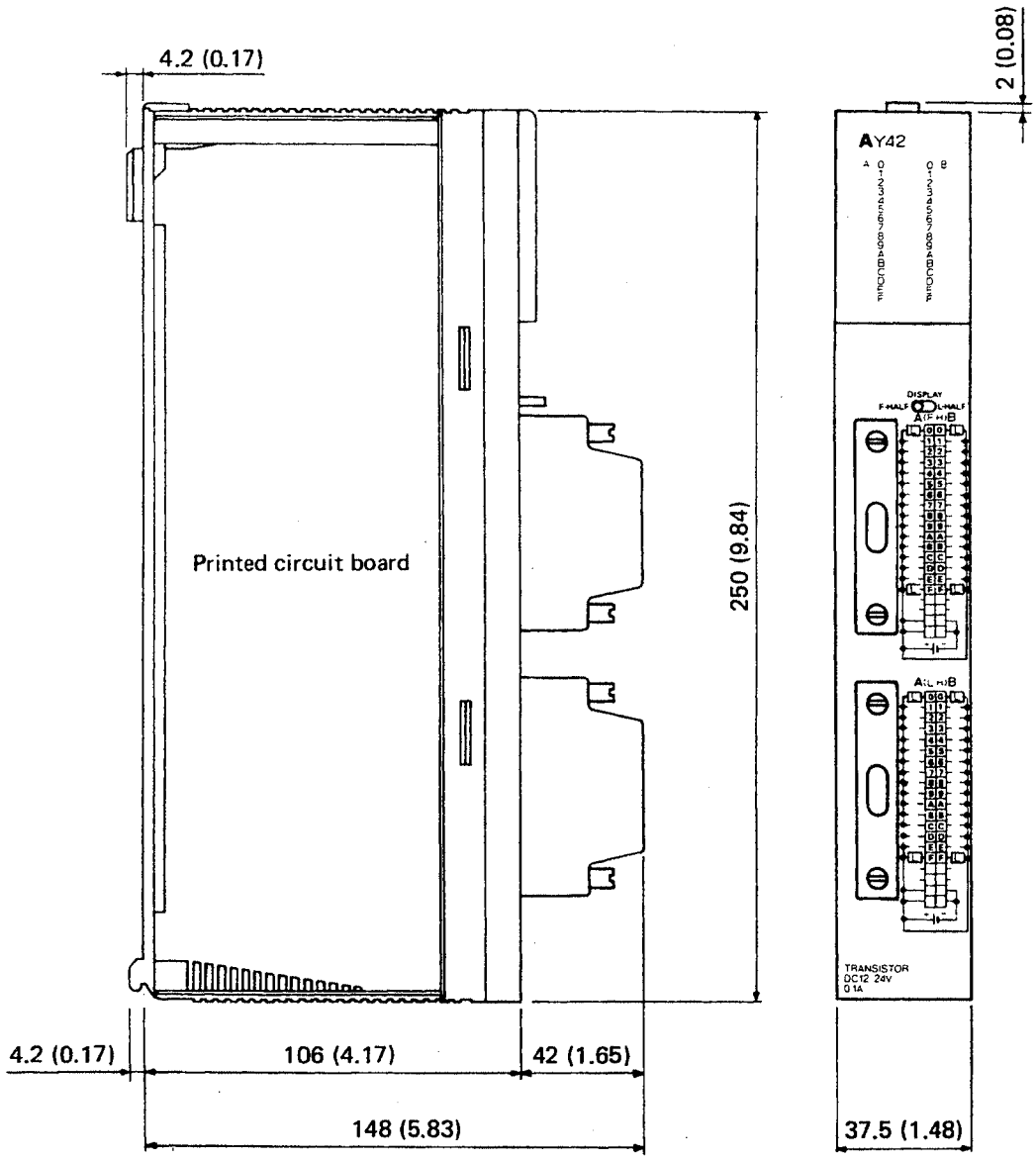
Unit: mm (inch)

(2) 38-point terminal block connector



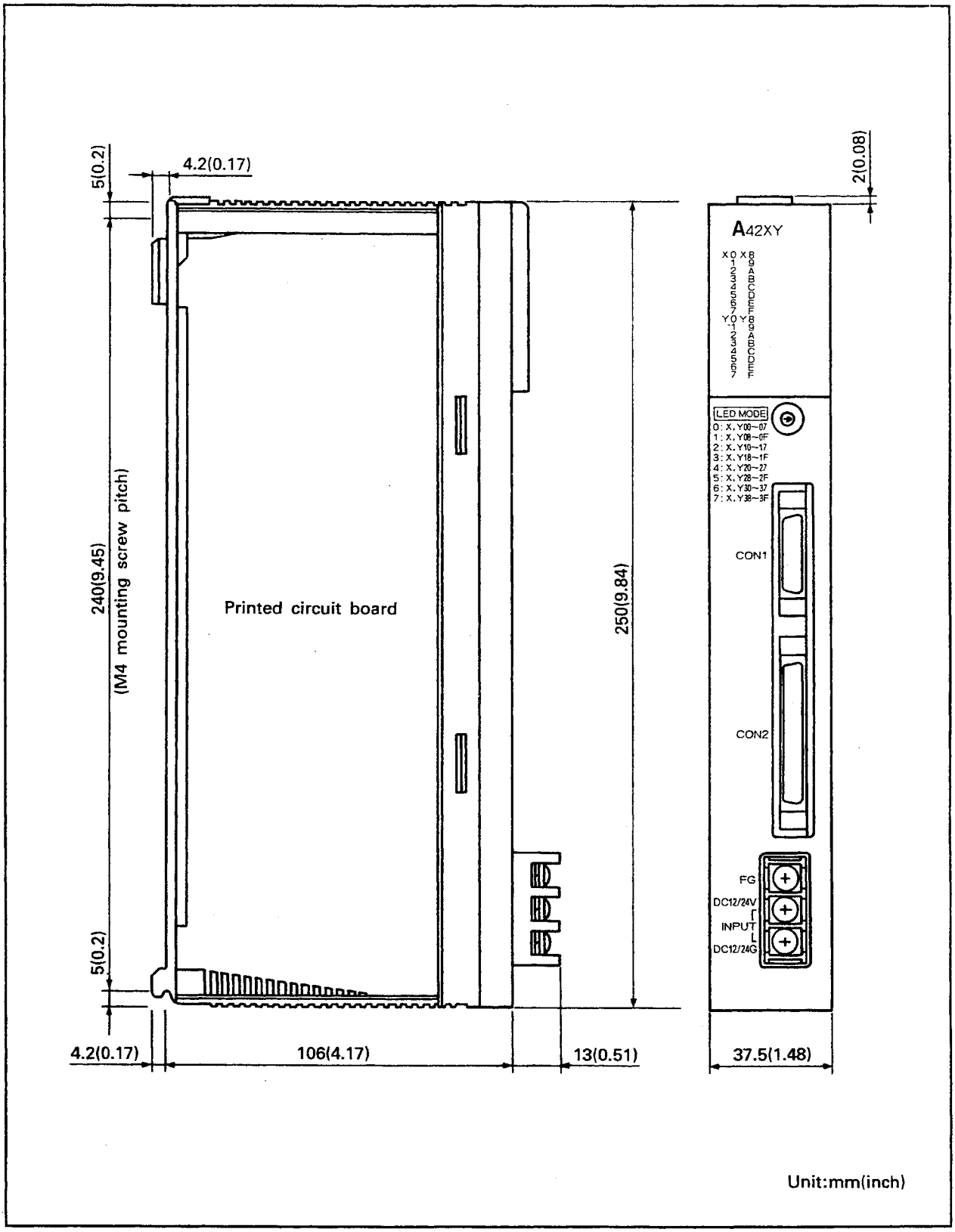
Unit: mm (inch)

(3) 40-pin connector

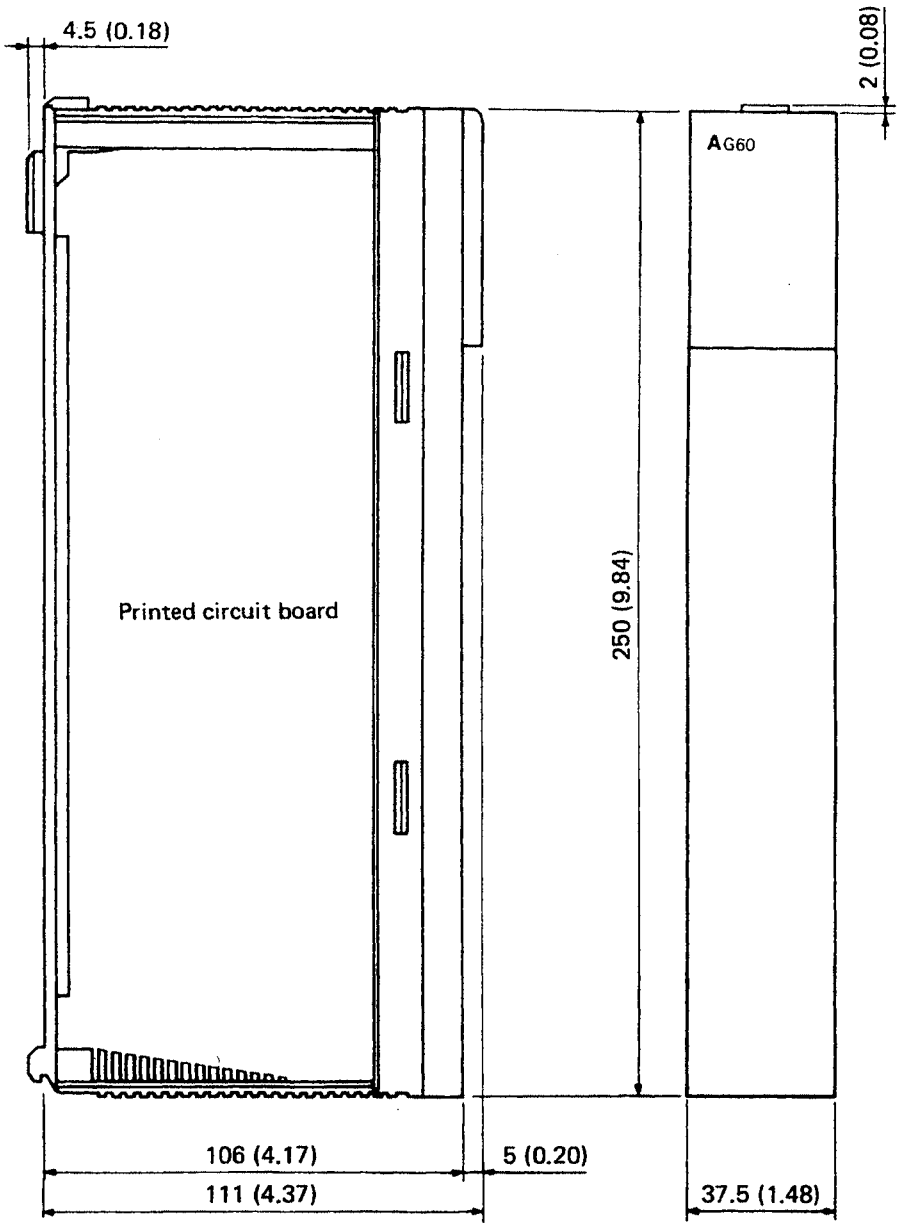


Unit: mm (inch)

1.2 Dynamic I/O Module (A42XY)

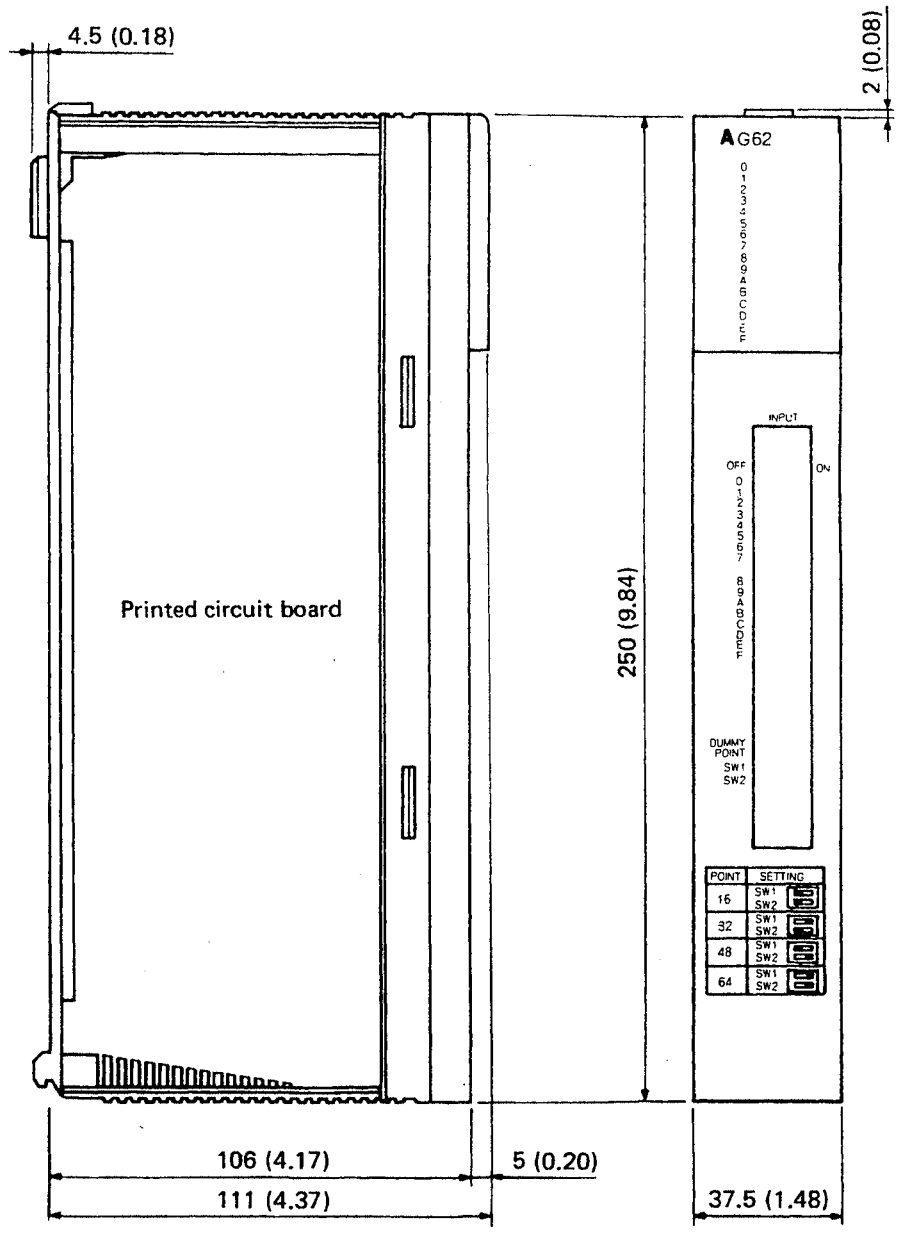


1.3 Blank Cover (AG60)



Unit: mm (inch)

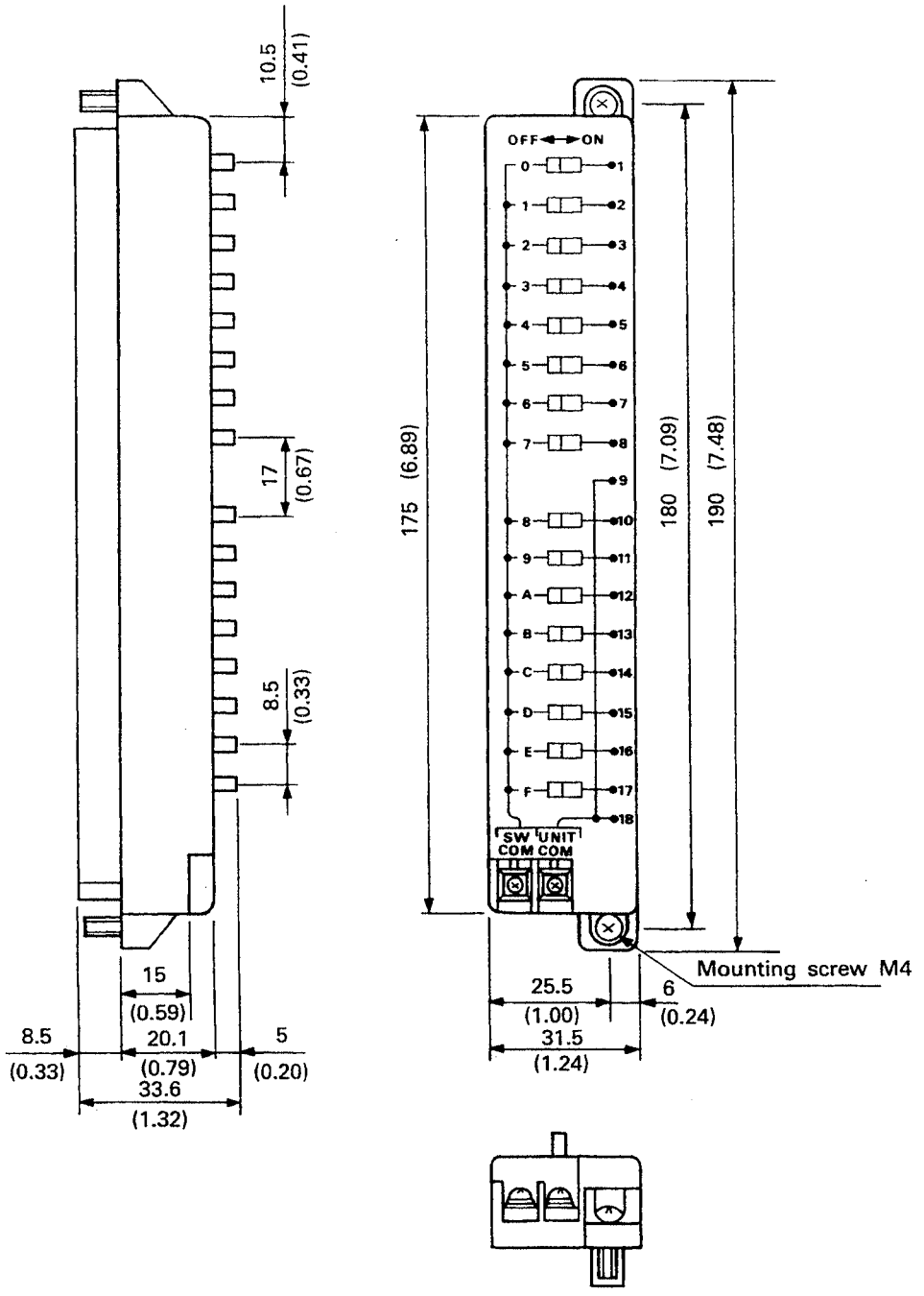
1.4 Dummy Module (AG62)



Unit: mm (inch)

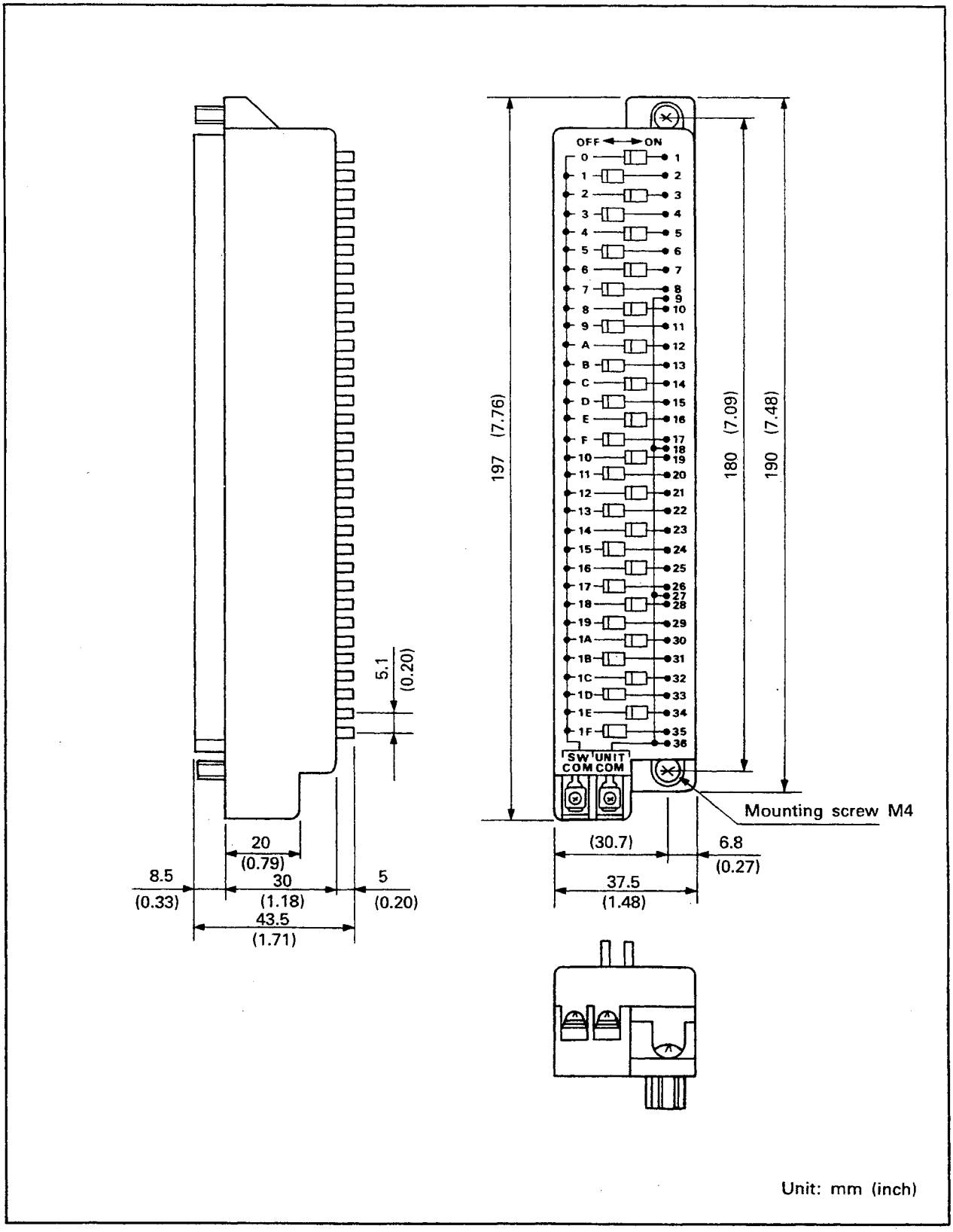
1.5 Simulation Switch

(1) A6SW16



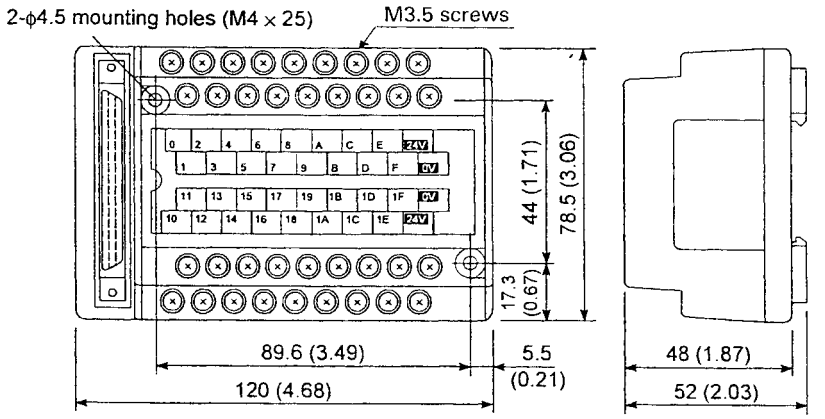
Unit: mm (inch)

(2)A6SW32


OFF ON
0 1
1 2
2 3
3 4
4 5
5 6
6 7
7 8
9 10
8 11
9 12
A 13
B 14
C 15
D 16
E 17
F 18
10 19
11 20
12 21
13 22
14 23
15 24
16 25
17 26
27 28
18 29
19 30
1A 31
1B 32
1C 33
1D 34
1E 35
1F 36
SW UNIT
COM COM
197 (7.76)
180 (7.09)
190 (7.48)
Mounting screw M4
(30.7)
6.8
(0.27)
37.5
(1.48)
5.1
(0.20)
20
(0.79)
8.5
(0.33)
30
(1.18)
5
(0.20)
43.5
(1.71)
Unit: mm (inch)

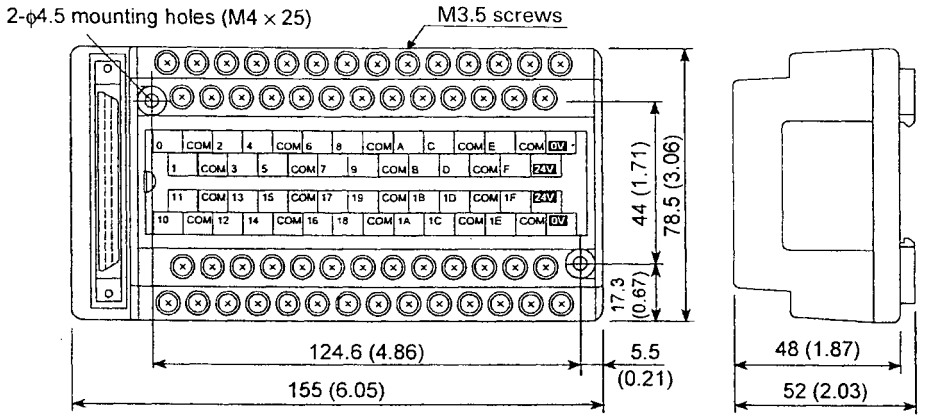
1.6 Connector/Terminal Block Convertor Modules

1.6.1 A6TB⬚ 36⬚ type connector/terminal block convertor module



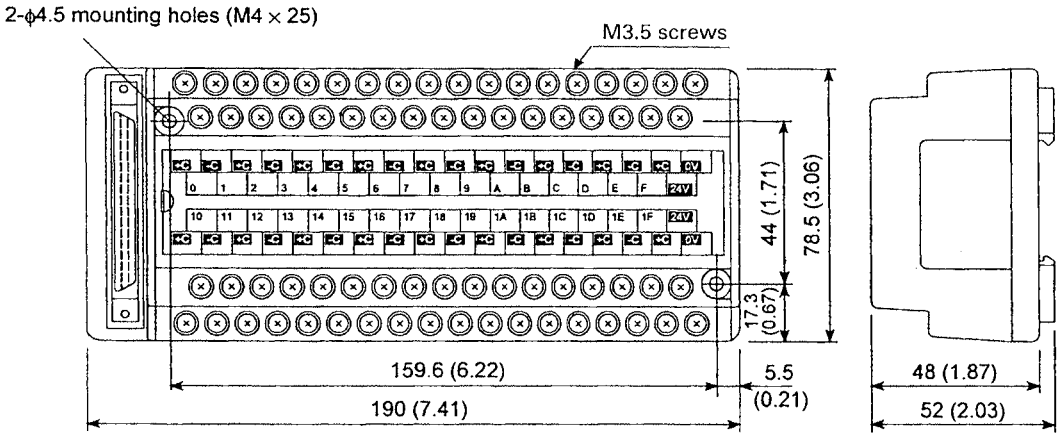
Unit: mm (inch)

1.6.2 A6TB⬚ 54⬚ type connector/terminal block convertor module



Unit: mm (inch)

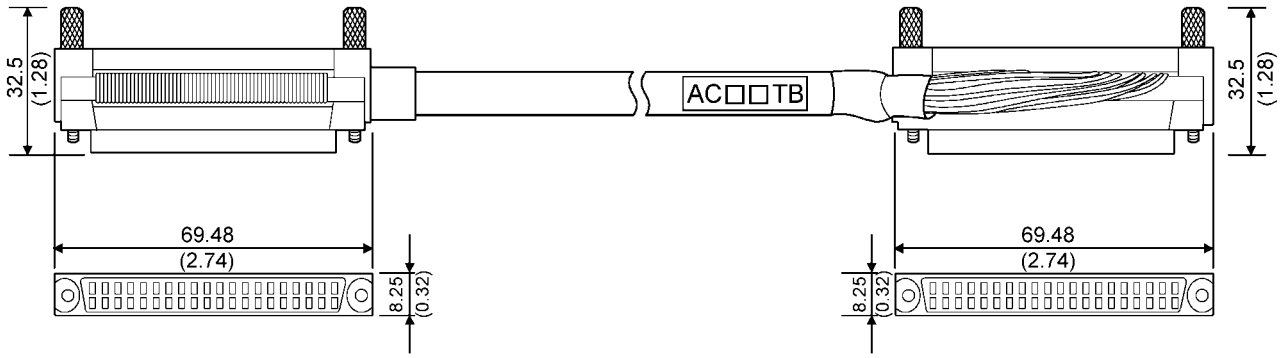
1.6.3 A6TBX70[ ] type connector/terminal block convertor module



Unit: mm (inch)

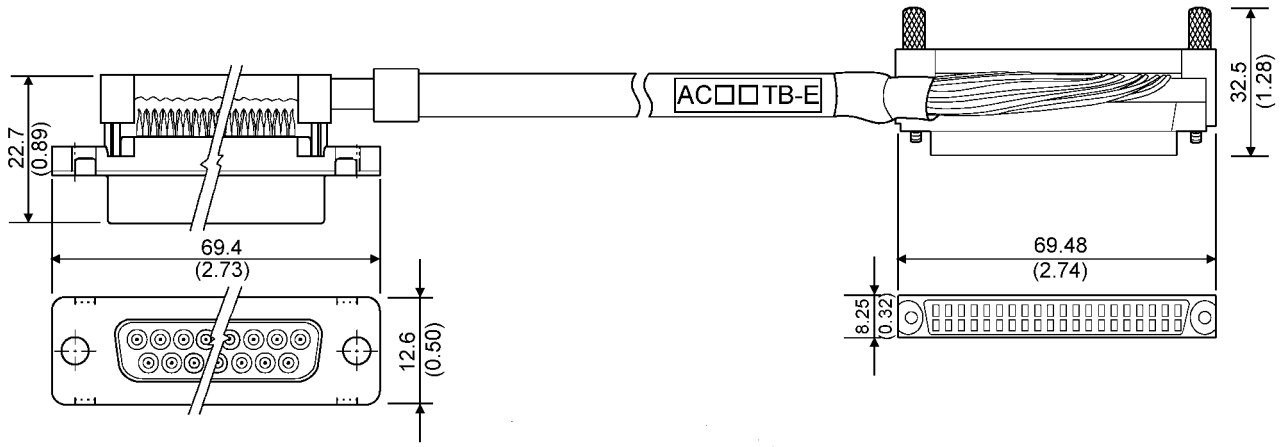
1.7 Connector/Terminal Block Convertor Modules Cable.

(1) AC □□ TB connector/ terminal block converter module cable.



Unit: mm (inch)

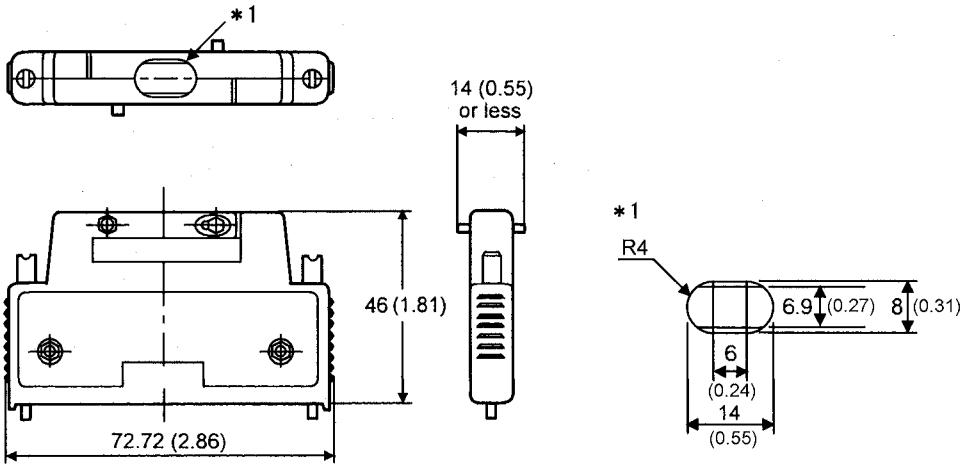
(2) AC □□ TB-E connector/ terminal block converter module cable.



Unit: mm (inch)

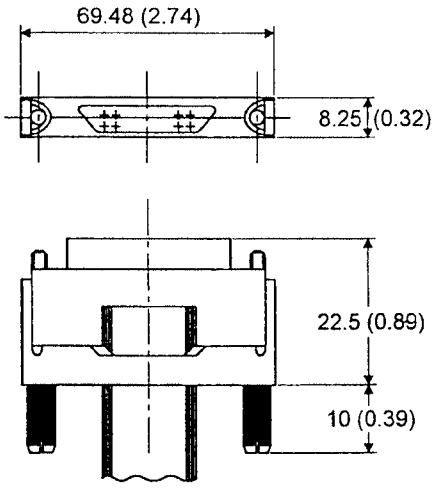
1.8 40-Pin Connectors

1.8.1 A6CON1 soldering-type 40-pin connector (straight out type), A6CON2 crimp-contact-type 40-pin connector (straight out type).



Unit: mm (inch)

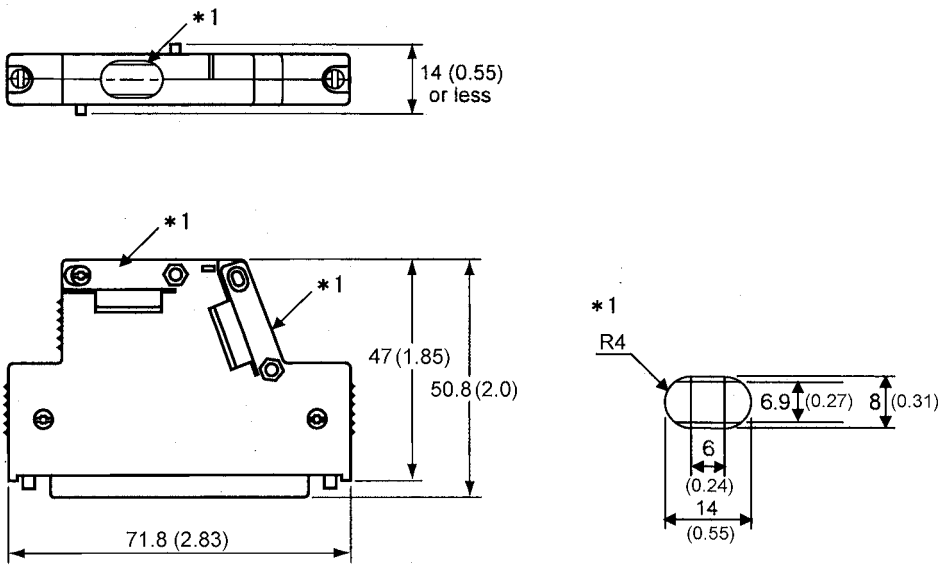
1.8.2 A6CON3 pressure-displacement-type 40-pin connector (flat cable type).



*Sequence of the flat cable is in order of A1→B1→A2.....

Unit: mm (inch)

1.8.3 A6CON4 soldering type 40-pin connector (straight/diagonal out type)

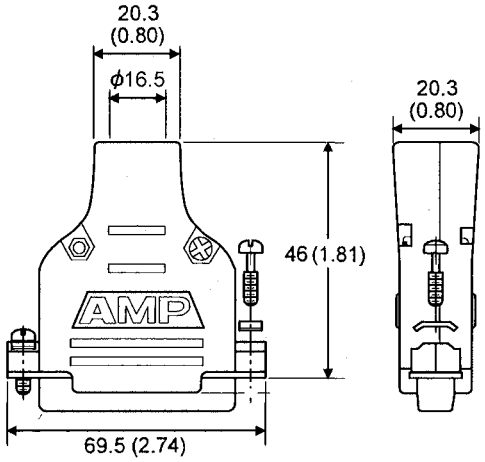


Unit: mm (inch)

If the cable diameter is thinner than the clamp portion, wind tape, etc. to secure the cable so that it will not come off the cable clamp portion.
If the cable is made of slippery material, it is recommended to take anti-slip measures by winding rubber-based tape, etc.

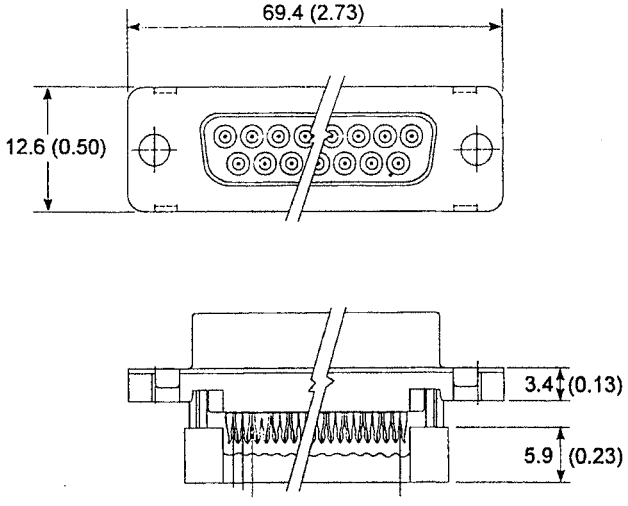
1.9 Pin D Sub-Connectors

1.9.1 A6CON1E soldering type 37-pin D sub-connector (straight out type)
A6CON2E crimp-contact-type 37-pin D sub-connector (straight out type)



Unit: mm (inch)

1.9.2 A6CON3E pressure-displacement-type 37-pin D sub-connector (flat cable type)



Unit: mm (inch)

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

(1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
(2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable controller applications.
In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.
However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

I/O Module Type Building Block

User's Manual

MODEL	A-I/O-USERS-E
MODEL CODE	13J643
IB(NA)-66140-K(0707)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN