MELSEC A Series

Programmable Logic Controller

User's Manual

I/O module type Building block

01 02 1999
IB(NA)66140
Version E

● 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 PC 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.

[System Design Precautions]

⚠ DANGER

- Safety circuits should be installed external to the programmable controller to ensure that the system as a whole will continue to operate safely in the event of an external power supply malfunction or a programmable controller failure.
  Erroneous outputs and operation could result in an accident.
  1) The following circuitry should be installed outside the programmable controller:
     Interlock circuitry for the emergency stop circuit protective circuit, and for reciprocal operations such as forward/reverse, etc., and interlock circuitry for upper/lower positioning limits, etc., to prevent machine damage.
  2) When the programmable controller detects an abnormal condition, processing is stopped and all outputs are switched OFF. This happens in the following cases:
     - When the power supply module's over-current or over-voltage protection device is activated.
     - When an error (watchdog timer error, etc.) is detected at the PC CPU by the self-diagnosis function.

     Some errors, such as input/output control errors, cannot be detected by the PC CPU, and there may be cases when all outputs are turned ON when such errors occur. In order to ensure that the machine operates safely in such cases, a failsafe circuit or mechanism should be provided outside the programmable controller. Refer to the CPU module user's manual for an example of such a failsafe circuit.
  3) Outputs may become stuck at ON or OFF due to an output module relay or transistor failure. An external circuit should therefore be provided to monitor output signals whose incorrect operation could cause serious accidents.

- A circuit should be installed which permits the external power supply to be switched ON only after the programmable controller power has been switched ON. Accidents caused by erroneous outputs and motion could result if the external power supply is switched ON first.

- When a data link communication error occurs, the status shown below will be established at the faulty station. In order to ensure that the system operates safely at such times, an interlock circuit should be provided in the sequence program (using the communication status information).
  Erroneous outputs and operation could result in an accident.
  1) The data link data which existed prior to the error will be held.
  2) All outputs will be switched OFF at MELSECNET (II, /B, /10) remote I/O stations.
  3) At the MELSECNET/MINI-S3 remote I/O stations, all outputs will be switched OFF or output statuses will be held, depending on the E.C. mode setting.

  For details on procedures for checking faulty stations, and for operation statues when such errors occur, refer to the appropriate data link manual.

- 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 (AG62).
  When the extension base A52B, A55B, 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.

[System Design Precautions]

⚠ CAUTION

- Do not bundle control lines or communication wires together with main circuit or power lines, or lay them close to these lines.
  As a guide, separate the lines by a distance of at least 100 mm, otherwise malfunctions may occur due to noise.
- When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than 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.

[Cautions on Mounting]

⚠ CAUTION

- Use the PC in an environment that conforms to the general specifications in the manual.
  Using the PC in environments outside the ranges stated in the general specifications will cause electric shock, fire, malfunction, or damage to/deterioration of the product.
- Make sure that the module fixing projection on the base of the module is properly engaged in the module fixing hole in the base unit before mounting the module.
  Failure to mount the module properly will result in malfunction or failure, or in the module falling.
- Extension cables should be securely connected to base unit and module connectors. Check for loose connection after installation.
  A poor connection could result in contact problems and erroneous inputs/outputs.
- Plug the memory cassette properly by pressing on the connector for installation. Check for loose connection after installation.
  A poor connection could result in erroneous operation.
- Plug the memory firmly into the memory socket. Check for loose connection after installation.
  A poor connection could result in erroneous operation.

[Cautions on Wiring]

DANGER

- Switch off the external power supply before staring installation and wiring work.
  Failure to do so could result in electrical shocks and equipment damage.
- After installation and wiring is completed, be sure to attach the terminal cover before switching the power ON and starting operation.
  Failure to do so could result in electrical shocks.

CAUTION

- Be sure to ground the FG and LG terminals, carrying out at least class 3 grounding work with a ground exclusive to the PC.
  Otherwise there will be a danger of electric shock and malfunctions.
- Carry out wiring to the PC correctly, checking the rated voltage and terminal arrangement of the product.
  Using a power supply that does not conform to the rated voltage, or carrying out wiring incorrectly, will cause fire or failure.
- Outputs from multiple power supply modules should not be connected in parallel. Failure to do so could cause the power supply module to overheat, resulting in a fire or module failure.
- Tighten the terminal screws to the stipulated torque.
  Loose screws will cause short circuits, fire, or malfunctions.
- Make sure that no foreign matter such as chips or wiring offcuts gets inside the module.
  It will cause fire, failure or malfunction.
- Connectors for external connections should be crimped, pressure welded, or soldered in the correct manner using the correct tools.
  For details regarding crimping and pressure welding tools, refer to the input/output module user's manual.
  A poor connection could cause shorts, fire, and erroneous operation.

[Cautions on Startup and Maintenance]

DANGER

- Do not touch terminals while the power is ON.
  This will cause malfunctions.
- Make sure that the battery is connected properly. Do not attempt to charge or disassemble the battery, do not heat the battery or place it in a flame, and do not short or solder the battery.
  Incorrect handling of the battery can cause battery heat generation and ruptures which could result in fire or injury.
- Switch the power off before cleaning or re-tightening terminal screws.
  Carrying out this work while the power is ON will cause failure or malfunction of the module.

CAUTION

- In order to ensure safe operation, read the manual carefully to acquaint yourself with procedures for program changes, forced outputs, RUN, STOP, and PAUSE operations, etc., while operation is in progress.
  Incorrect operation could result in machine failure and injury.
- Do not disassemble or modify any module.
  This will cause failure, malfunction, injuries, or fire.
- Switch the power OFF before mounting or removing the module.
  Mounting or removing it with the power ON can cause failure or malfunction of the module.
- When replacing fuses, be sure to use the prescribed fuse. A fuse of the wrong capacity could cause a fire.

[Cautions on Disposal]

CAUTION

- Dispose of this product 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

INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-A Series of General Purpose 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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1.1 GENERAL SPECIFICATIONS

Table 1.1 General specification

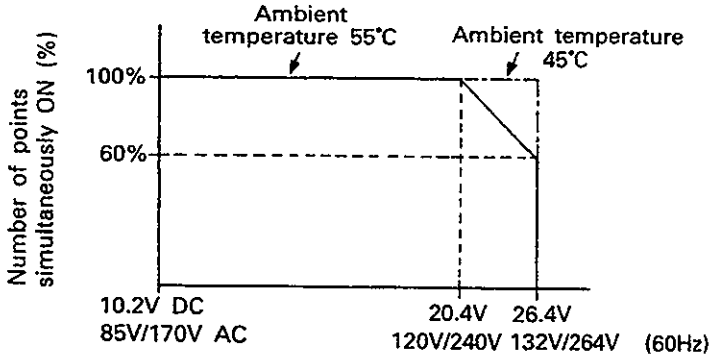
Item	Specifications					
Ambient operating temperature	0 to 50 °C					
Ambient storage temperature	-20 to 75 °C					
Ambient operating humidity	10 to 90 % RH, No-condensing					
Ambient storage humidity	10 to 90 % RH, No-condensing					
Vibration resistance	Conforming to JIS B 6501, IEC 1131-2		Frequency	Acceleration	Amplitude	No. of sweeps
		Under intermittent vibration	10 to 57Hz	———	0.075mm (0.003in.)	10 times each in X, Y, Z directions (for 80min.)
			57 to 150Hz	9.8m/s²{1 G}	———	
		Under continuous vibration	10 to 57Hz	———	00.35mm (0.001in.)	
			57 to 150Hz	4.9m/s²{1 G}	———	
Shock resistance	Conforming to JIS B 3501, IEC 1131-2 (147 m/s²{15G}, 3 times in each of 3 directions X Y Z)					
Operating ambience	No corrosive gases					
Operating elevation	2000m (6562ft.) max.					
Installation location	Control panel					
Over voltage category *1	II max.					
Pollution level *2	2 max.					

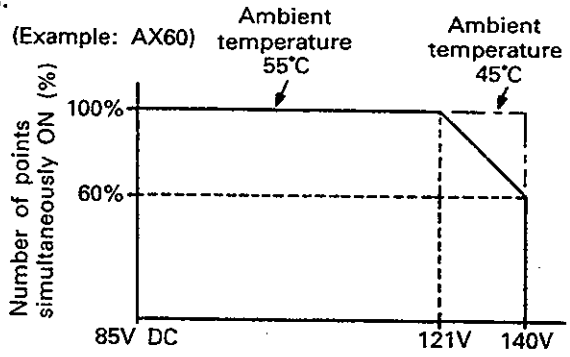
*1: *This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage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

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.



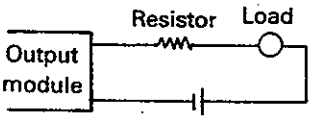


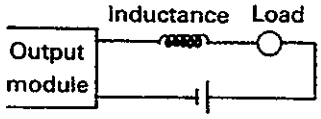
(2) Triac output modules should be used instead of relay contact output modules when:
- The outputs are being switched very frequently.
- A large inductive load is being switched.
- An inductive load with a low power factor is being switched.

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.





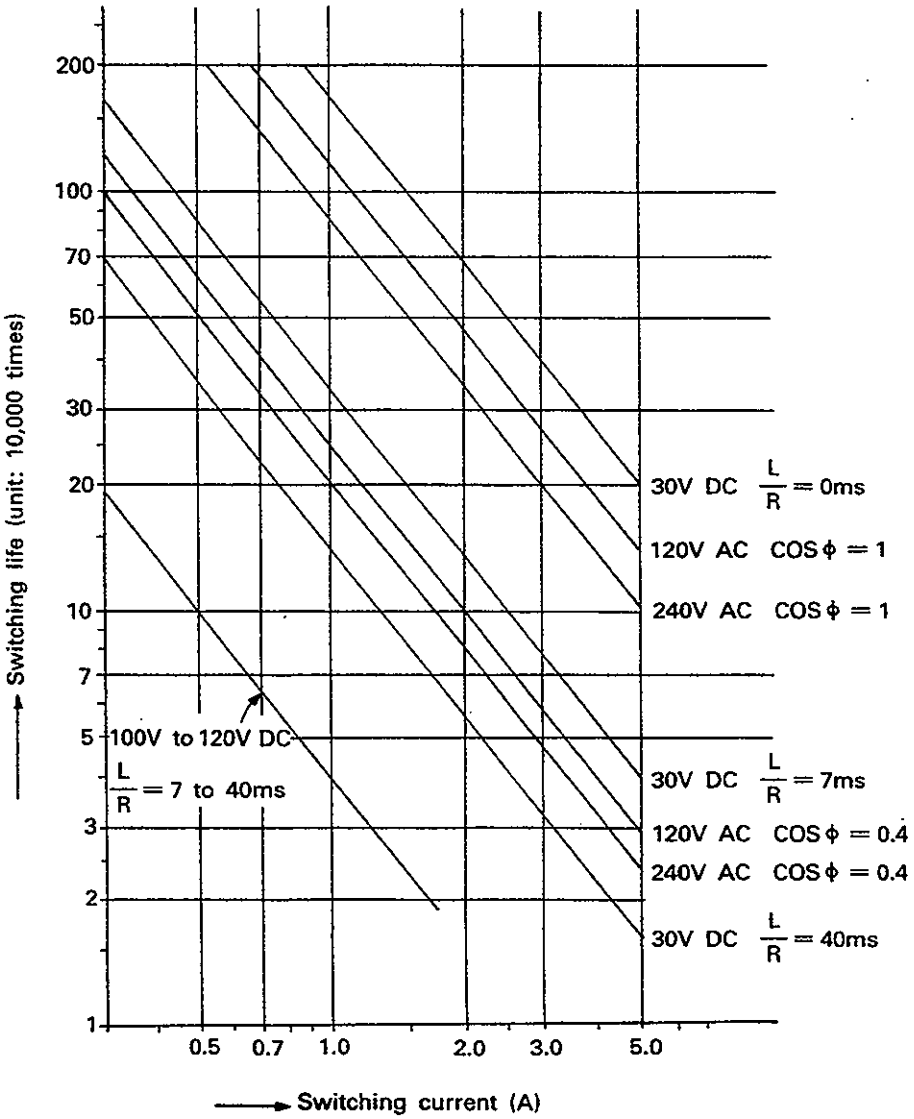
(5) The maximum number of output points which may be switched on at one time depends on the current capacity of the common terminal which, in turn, depends on the ambient temperature.
Note that if certain output modules are installed next to a power supply module the current capacity of the common terminal 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) The relay life for relay output modules (AY10, AY10A, AY11, AY13) is shown below.
Relay output modules should be selected with reference to these characteristics and to the frequency of operation.

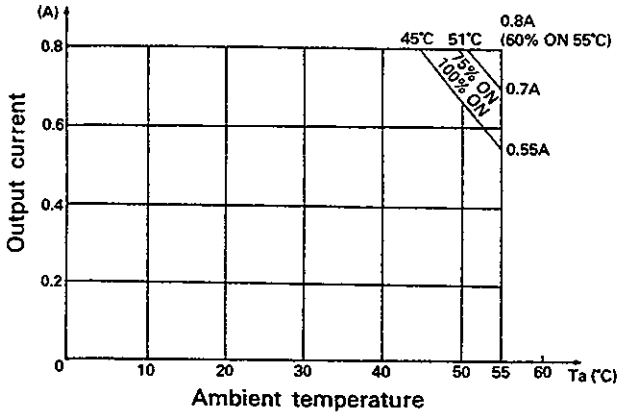


(8) When using a pressure displacement type connector jack (flat cable (pitch: 1.27 mm)) for an AX42 input unit or AY42 output unit, the following type connector jack should be prepared by the user. Consult your nearest Mitsubishi representative about the connector jack.

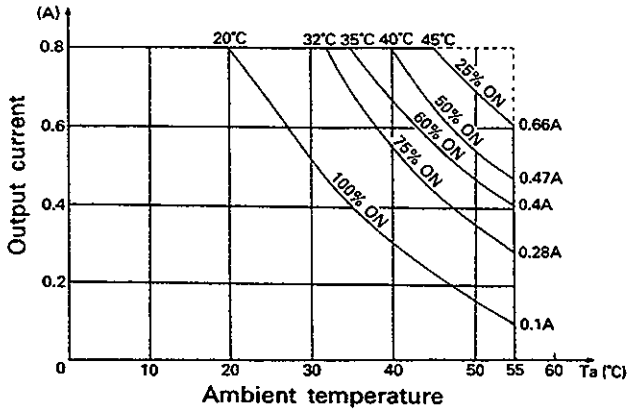
Type: FCN-367J040-AU/F (close end type, gold plated)

Connect cables referring to Sections 2.7 and 3.15 for pin arrangement and flat cable arrangement.

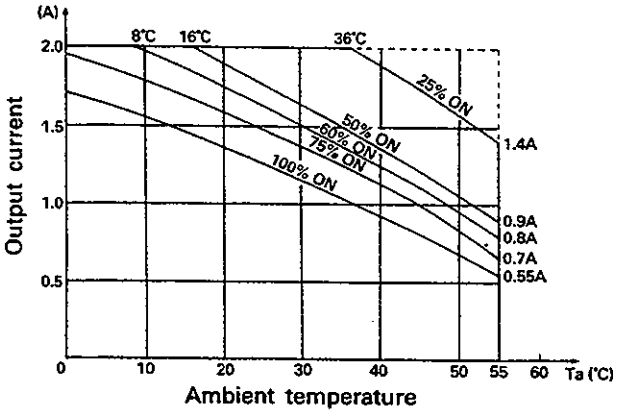
(9) The maximum number of output points which may be simultaneously on in the AY80EP, AY81EP or AY60EP output units varies with output current and ambient temperature as follows.



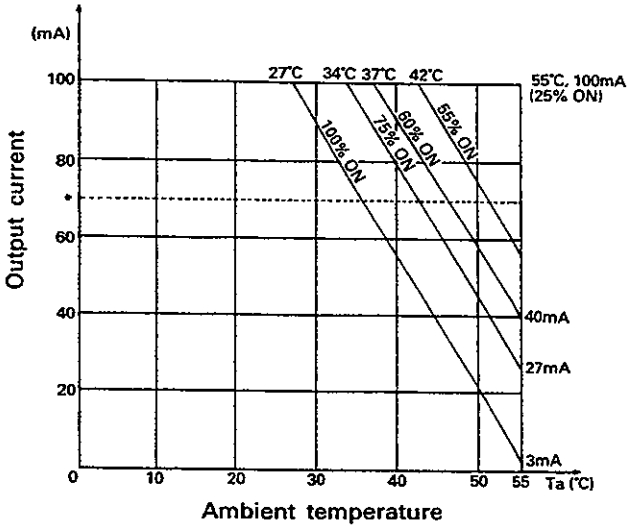
AY80EP



AY81EP



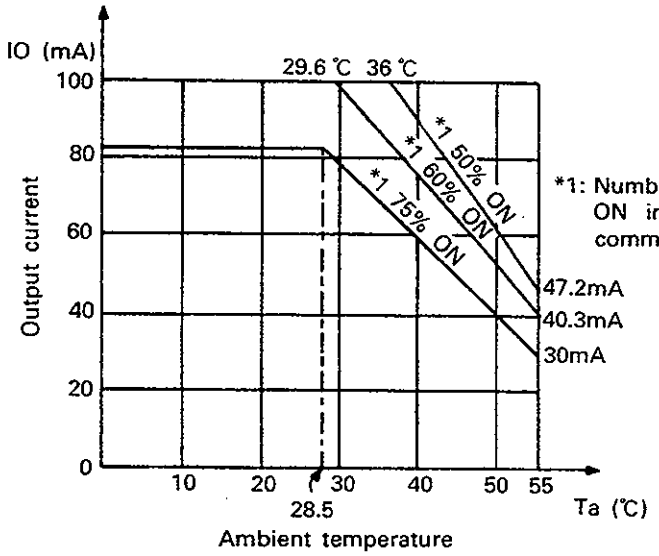
AY60EP



AY82EP

*70mA/point if all of Yn8 × m to Yn8 × m + 7 (n = 0, 1, 2, m = 0, 1) are on.

(10) 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.

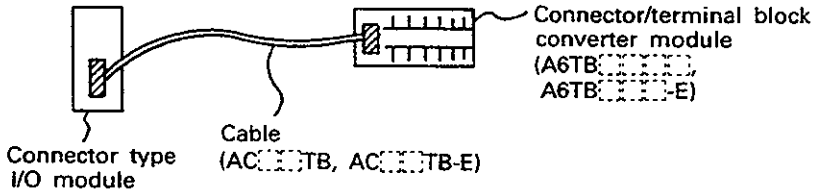


*1: Number of points simultaneously ON indicates the number per common (32 points).

REMARKS

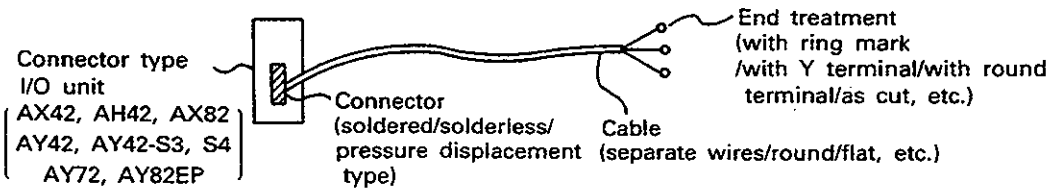
Consult your nearest supplier with the following I/O module related parts and cable.

(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.

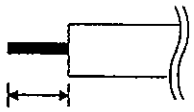
(2) I/O cable (connectable)
Wiring becomes easy by using I/O cable with connector which can be connected to 40-pin or 37-pin D subconnector of I/O unit.
(Consult your nearest Mitsubishi representative with I/O cable with connector.)



(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.

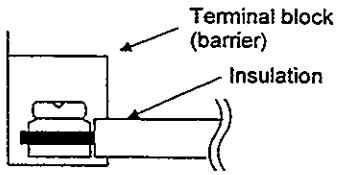
(a) Bare the end of insulated wires to expose about 6 to 8 mm of naked wire.

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.



Bared length: 6 to 8 mm (0.24 to 0.31 in.)

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.

2. INPUT MODULE SPECIFICATIONS

Quick Reference Summary

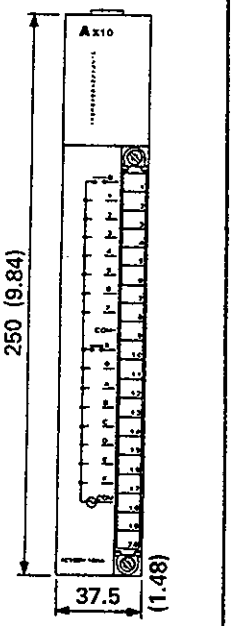
type	Number of inputs	Input voltage	Features
AX10	16	100-120V AC	
AX11	32	100-120V AC	
AX11EU	32	100-120V AC	
AX20	16	200-240V AC	
AX21	32	200-240V AC	
AX21EU	32	200-240V AC	
AX31	32	12/24V DC, 12/24V AC	
AX40	16	12/24V DC	Sink inputs
AX41	32	12/24V DC	Sink inputs
AX41-S1	32	12/24V DC	Sink inputs, fast response time
AX42	64	12/24V DC	Sink inputs
AX42-S1	64	12/24V DC	Sink inputs, fast response time
AX50	16	48V DC	Sink inputs
AX50-S1	16	48V DC	Sink/source selectable
AX60	16	100/110/125V DC	Sink inputs
AX60-S1	16	100/110/125V DC	Sink/source selectable
AX70	16	5/12/24V DC	Sink/source selectable
AX71	32	5/12/24V DC	Sink/source selectable
AX80	16	12/24V DC	Source inputs
AX80E	16	12/24V DC	Source inputs, 8 points selectable as fast response
AX81	32	12/24V DC	Source inputs
AX81-S1	32	12/24V DC	Source inputs, low on/off response threshold
AX81-S2	32	48/60V DC	Source inputs
AX82	64	12/24V DC	Source inputs

2.1 Type AX10 Input Module

AC Input

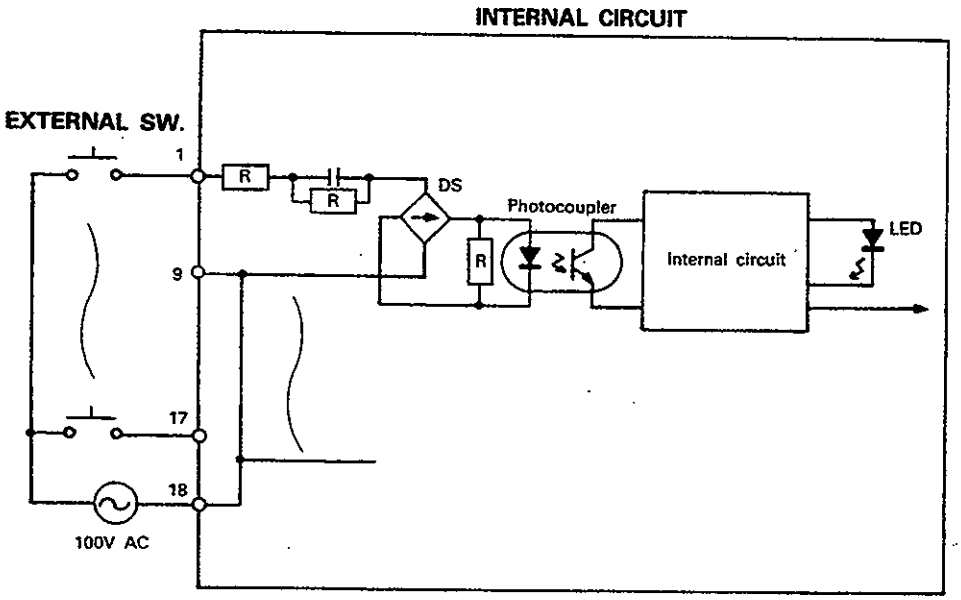
Specifications \ Type		AX10
Input points		16 points
Insulation system		Photocoupler
Rated input voltage		100—120V AC 50/60Hz
Rated input current		10mA (100V AC 60Hz)
Operating voltage range		85 to 132V AC (50/60Hz ± 5%)
Max. simultaneously ON		100% (16 points)
Inrush current		Max. 300mA, within 0.3ms (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)
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

Front View mm(inch)



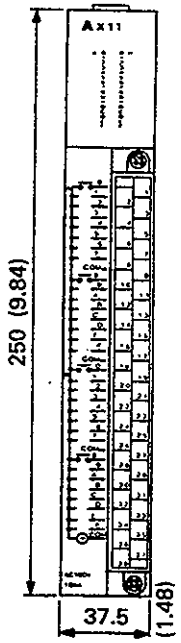
Weight: 0.39kg (0.86lbs)

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	Not used
TB20	Not used

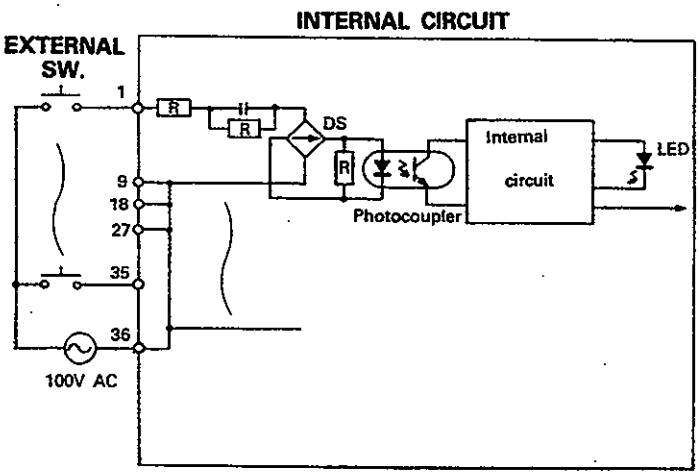


2.2 Type AX11 Input Module

AC Input

Specifications \ Type		AX11	Front View mm(inch)
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		100—120V AC 50/60Hz	
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)	
Indication		1 LED per point	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	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	Not used
TB18	Power supply common	TB38	Not used
TB19	X10		
TB20	X11		

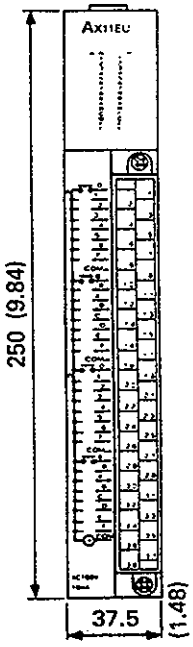


2.2.1 Type AX11EU Input Module

AC Input

Specifications \ Type		AX11EU
Input points		32 points
Insulation system		Photocoupler
Rated input voltage		100—120V AC 50/60Hz
Rated input current		10mA (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		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)		150mA (TYP. all points ON)
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)
Indication		1 LED per point
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 (8kgf·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

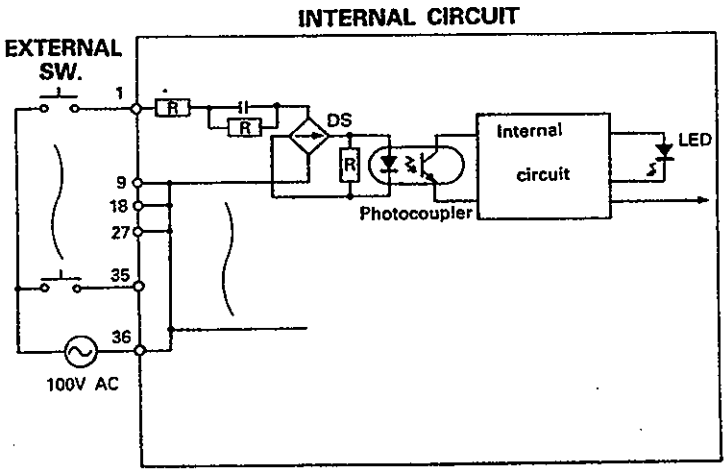
Front View mm(inch)



Weight: 0.50kg (1.10lbs)

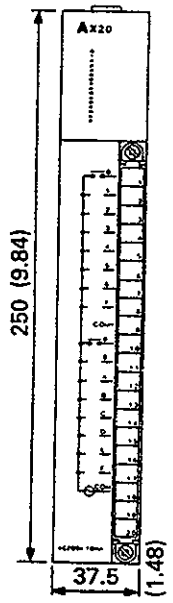
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common
TB8	X07	TB28	X18
TB9	Power supply common	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common
TB17	X0F	TB37	Not used
TB18	Power supply common	TB38	Not used
TB19	X10		
TB20	X11		

INTERNAL CIRCUIT



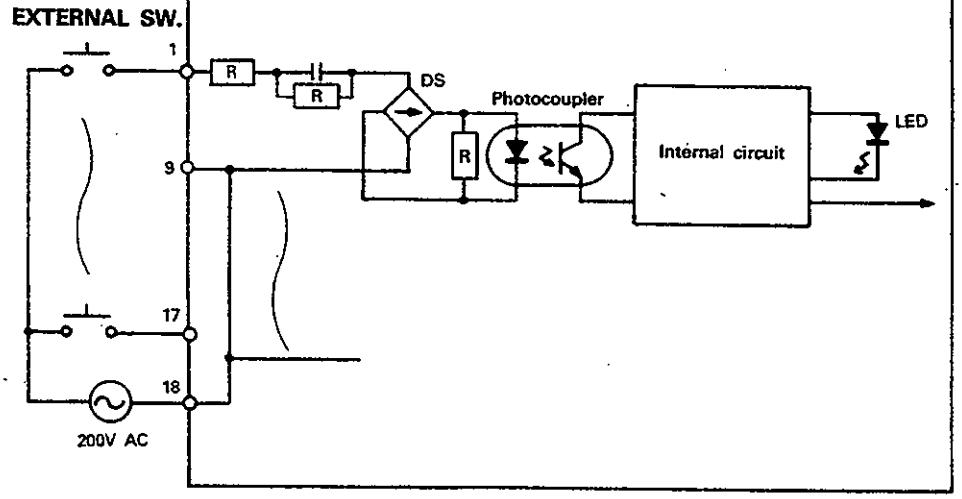
2.3 Type AX20 Input Module

AC Input

Specifications \ Type		AX20	Front View mm(inch)
Input points		16 points	
Insulation system		Photocoupler	
Rated input voltage		200—240V AC 50/60Hz	
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)	
Indication		1 LED per point	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	Weight: 0.38kg (0.84lbs)

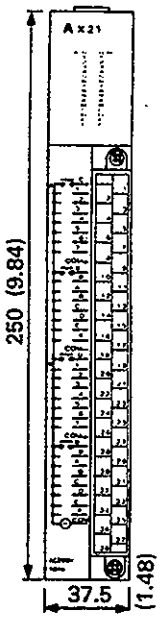
Terminal No.	Signal No.
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	Power supply common
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	Power supply common
TB19	Not used
TB20	Not used

INTERNAL CIRCUIT



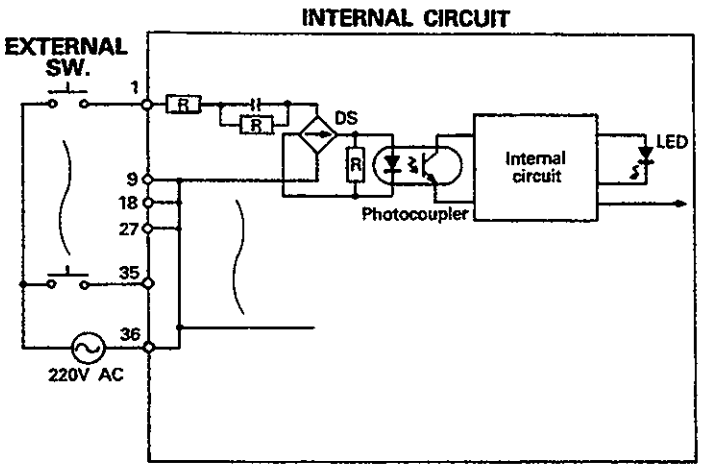
2.4 Type AX21 Input Module

AC Input

Specifications \ Type		AX21	Front View mm(inch)
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		200—240V AC 50/60Hz	
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)	
Indication		1 LED per point	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	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	Not used
TB18	Power supply common	TB38	Not used
TB19	X10		
TB20	X11		

INTERNAL CIRCUIT

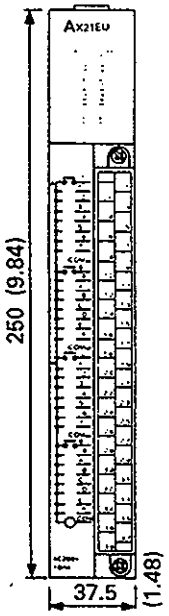


2.4.1 Type AX21EU Input Module

AC Input

Specifications \ Type		AX21EU
Input points		32 points
Insulation system		Photocoupler
Rated input voltage		200—240V AC 50/60Hz
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)
Indication		1 LED per point
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 (8kgf·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

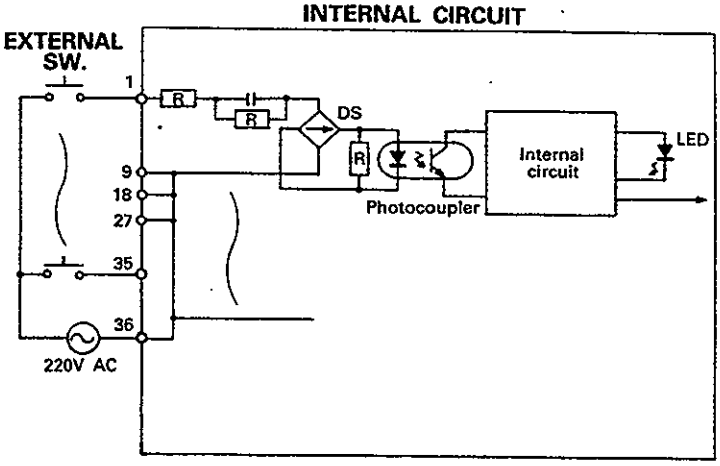
Front View mm(inch)



Weight 0.50kg (1.10lbs)

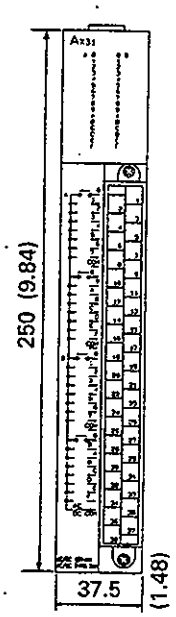
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	X00	TB21	X12
TB2	X01	TB22	X13
TB3	X02	TB23	X14
TB4	X03	TB24	X15
TB5	X04	TB25	X16
TB6	X05	TB26	X17
TB7	X06	TB27	Power supply common
TB8	X07	TB28	X18
TB9	Power supply common	TB29	X19
TB10	X08	TB30	X1A
TB11	X09	TB31	X1B
TB12	X0A	TB32	X1C
TB13	X0B	TB33	X1D
TB14	X0C	TB34	X1E
TB15	X0D	TB35	X1F
TB16	X0E	TB36	Power supply common
TB17	X0F	TB37	Not used
TB18	Power supply common	TB38	Not used
TB19	X10		
TB20	X11		

INTERNAL CIRCUIT



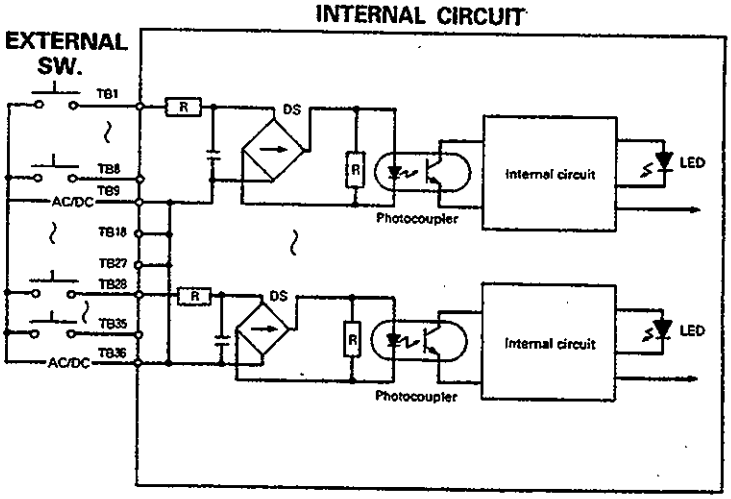
2.5 Type AX31C 12/24V DC/AC Input Module

AC Input

Specifications \ Type		AX31C		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 (26.4V AC)		
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	30ms or less (12/24V DC)	35ms or less (12/24V AC, 60Hz)	
	ON → OFF	30ms or less (12/24V DC)	30ms 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)		
Indication		1 LED per point		
Connection method		38-point removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))		
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A		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	Not used
TB18	Power supply common	TB38	Not used
TB19	X10		
TB20	X11		

INTERNAL CIRCUIT

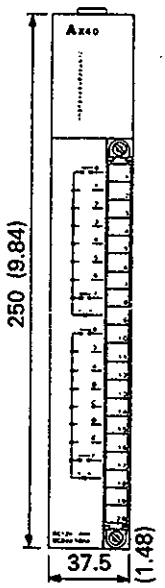


2.6 Type AX40 Input Module (Sink Loading)

DC Input

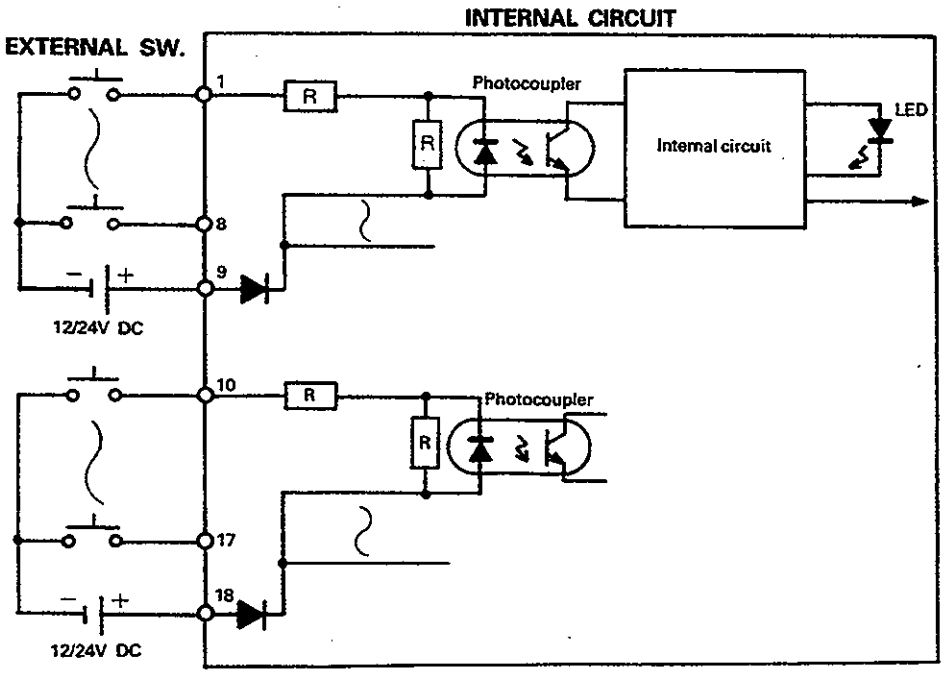
Specifications \ Type		AX40	
Input points		16 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		4mA	10mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		100% (8 points/common)	
ON voltage/ON current		9.5V DC or 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)	
Indication		1 LED per point	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg-cm (0.505lb-ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

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	12/24V DC
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	12/24V DC
TB19	Not used
TB20	Not used

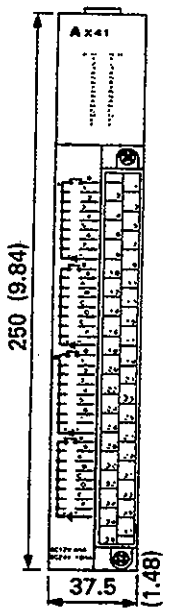


2.7 Type AX41 Input Module (Sink Loading)

DC Input

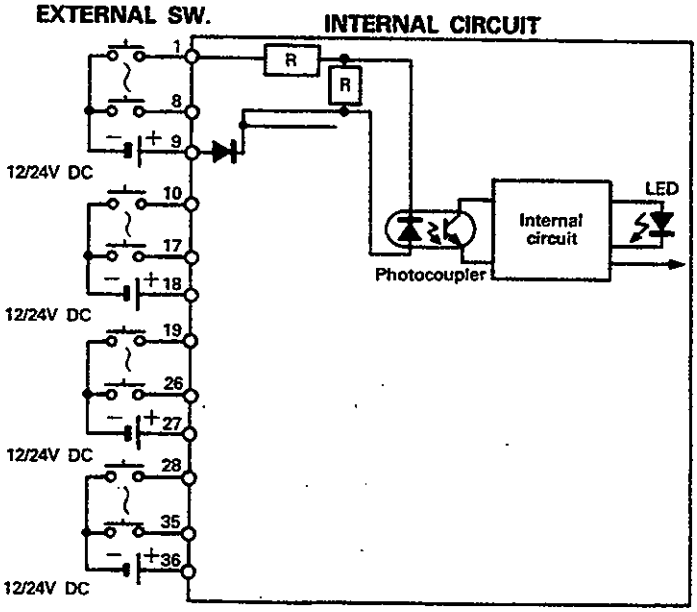
Specifications \ Type		AX41	
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		4mA	10mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		60% (5 points/common)	
ON voltage/ON current		9.5V DC or 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)	
Indication		1 LED per point	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

Front View mm(inch)



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	Not used
TB18	12/24V DC	TB38	Not used
TB19	X10		
TB20	X11		

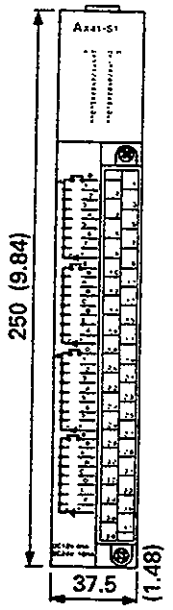


2.8 Type AX41-S1 Input Module (Sink Loading)

DC Input

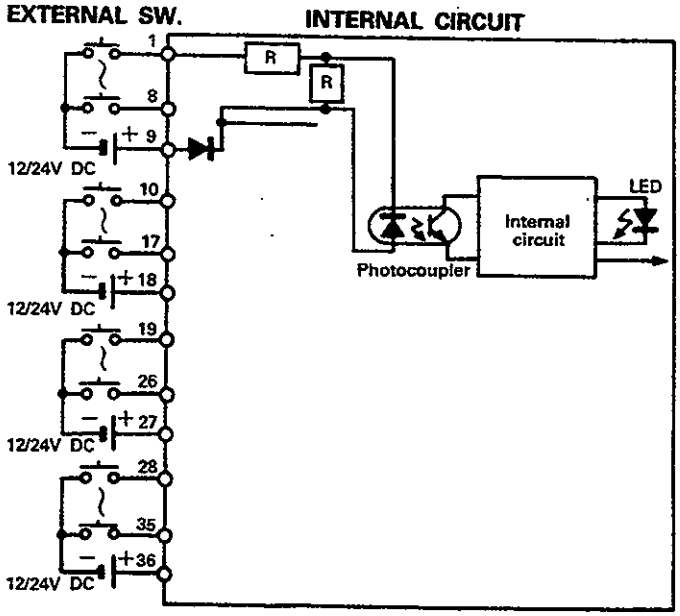
Specifications \ Type		AX41-S1	
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		4mA	10mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		60% (5 points/common)	
ON voltage/ON current		9.5V DC 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)	
Indication		1 LED per point	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb-ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

Front View mm(inch)



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	Not used
TB18	12/24V DC	TB38	Not used
TB19	X10		
TB20	X11		

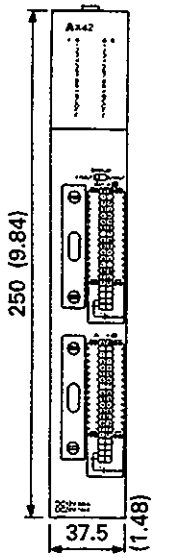


2.9 Type AX42 Input Module (Sink Loading)

DC Input

Specifications \ Type		AX42	
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)	
Indication		1 LED per two points (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	

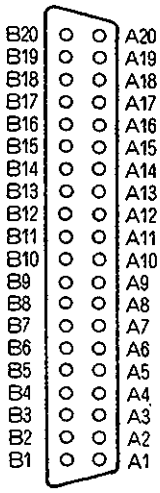
Front View mm(inch)



Weight 0.51kg (1.1lbs)

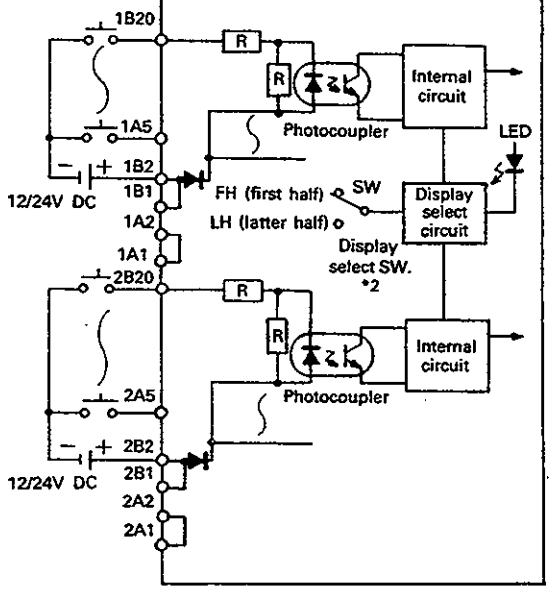
Terminal No.	Signal No. (FH)	Terminal No.	Signal No. (LH)
1B20	X00	2B20	X20
1B19	X01	2B19	X21
1B18	X02	2B18	X22
1B17	X03	2B17	X23
1B16	X04	2B16	X24
1B15	X05	2B15	X25
1B14	X06	2B14	X26
1B13	X07	2B13	X27
1B12	X08	2B12	X28
1B11	X09	2B11	X29
1B10	X0A	2B10	X2A
1B9	X0B	2B9	X2B
1B8	X0C	2B8	X2C
1B7	X0D	2B7	X2D
1B6	X0E	2B6	X2E
1B5	X0F	2B5	X2F
1B4	Not used	2B4	Not used
1B3	Not used	2B3	Not used
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	Not used	2A4	Not used
1A3	Not used	2A3	Not used
1A2	Not used	2A2	Not used
1A1	Not used	2A1	Not used

Pinouts



Front view

EXTERNAL SW. INTERNAL CIRCUIT



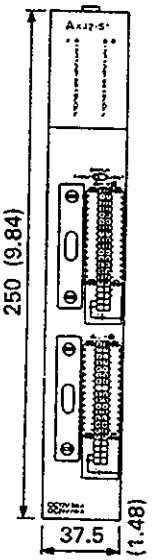
*1: 40% (13 inputs/common) when the input module is used next to the power supply module.
*2: The statuses of the first 32 inputs (X00 to X1F) are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 inputs (X20 to X3F) are indicated when LH is selected.
*3: The A 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. When a pressure displacement type connector is necessary, user should prepare it referring to Section 1 (8). (Type: FCN-361J040-AU (connector), FCN-360C040-B (cover))

2.10 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)	
Indication		1 LED per two points (switch selection of block of 32 points)	
Connection method		Two external wiring connectors	
Applicable wire size		0.3mm² (23 AWG)	
Accessory		Two external wiring connectors	

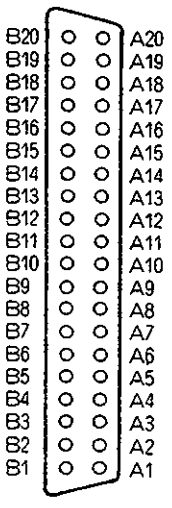
Front View mm(inch)



Weight 0.51kg (1.1lbs)

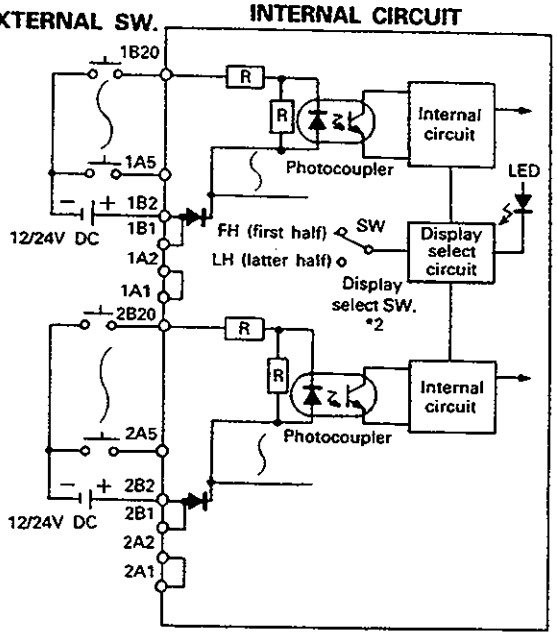
Terminal No.	Signal No. (FH)	Terminal No.	Signal No. (LH)
1B20	X00	2B20	X20
1B19	X01	2B19	X21
1B18	X02	2B18	X22
1B17	X03	2B17	X23
1B16	X04	2B16	X24
1B15	X05	2B15	X25
1B14	X06	2B14	X26
1B13	X07	2B13	X27
1B12	X08	2B12	X28
1B11	X09	2B11	X29
1B10	X0A	2B10	X2A
1B9	X0B	2B9	X2B
1B8	X0C	2B8	X2C
1B7	X0D	2B7	X2D
1B6	X0E	2B6	X2E
1B5	X0F	2B5	X2F
1B4	Not used	2B4	Not used
1B3	Not used	2B3	Not used
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	Not used	2A4	Not used
1A3	Not used	2A3	Not used
1A2	Not used	2A2	Not used
1A1	Not used	2A1	Not used

Pinouts



Front view

EXTERNAL SW. INTERNAL CIRCUIT



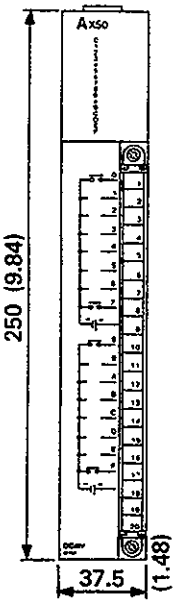
*1: 40% (13 inputs/common) when the input module is used next to the power supply module.
*2: The statuses of the first 32 inputs (X00 to X1F) are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 inputs (X20 to X3F) are indicated when LH is selected.
*3: Pin numbers 1[ ] indicate the upper connector pins and 2[ ] the lower connector pins.

2.11 Type AX50 Input Module (Sink Loading)

DC Input

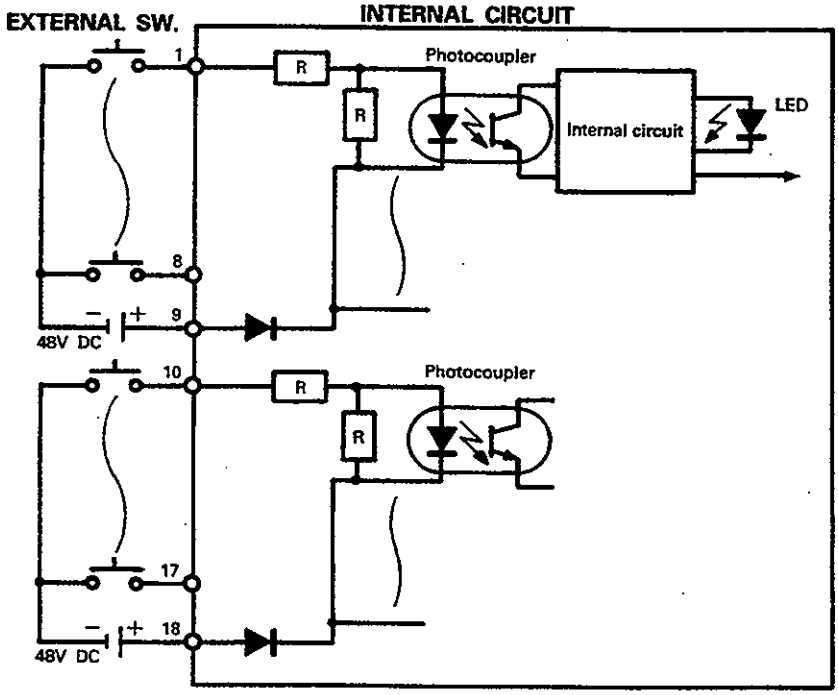
Specifications \ Type		AX50
Input points		16 points
Insulation system		Photocoupler
Rated input voltage		48V DC
Rated input current		4mA
Operating voltage range		38.4 to 57.6V DC (ripple ratio: within 5%)
Max. simultaneously ON		100% (8 points/common)
ON voltage/ON current		34V DC or higher/3mA or higher
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)
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

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	Not used
TB20	Not used

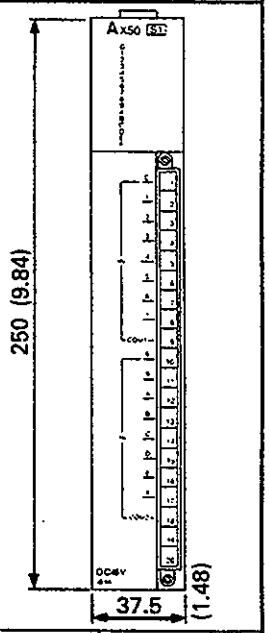


2.12 Type AX50-S1 Input Module (Sink/Source)

DC Input

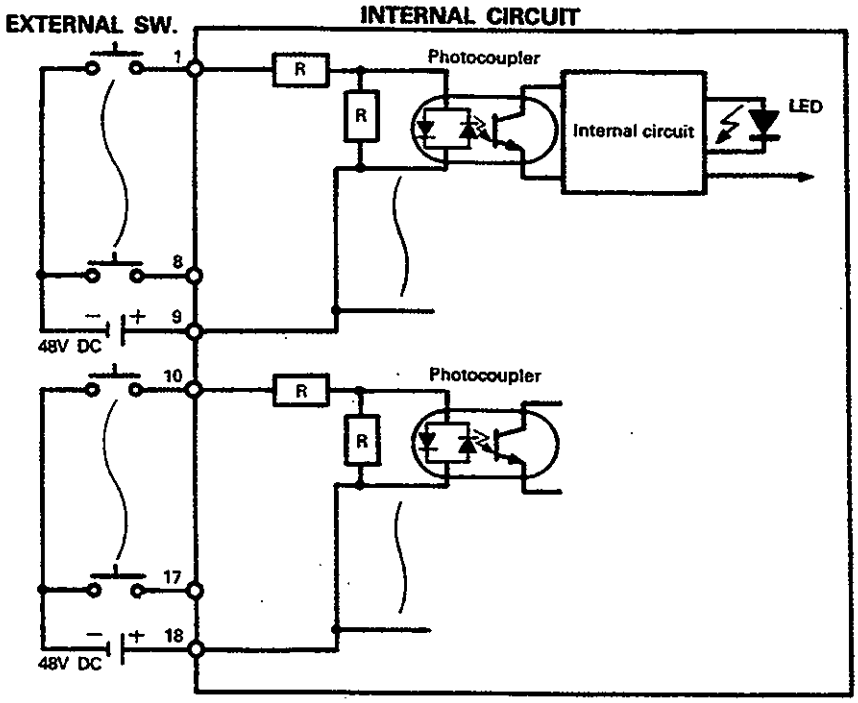
Specifications \ Type		AX50-S1
Input points		16 points
Insulation system		Photocoupler
Rated input voltage		48V DC
Rated input current		4mA
Operating voltage range		38.4 to 57.6V DC (ripple ratio: within 5%)
Max. simultaneously ON		100% (8 points/common)
ON voltage/ON current		34V DC or higher/3mA or 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)
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

Front View mm(inch)



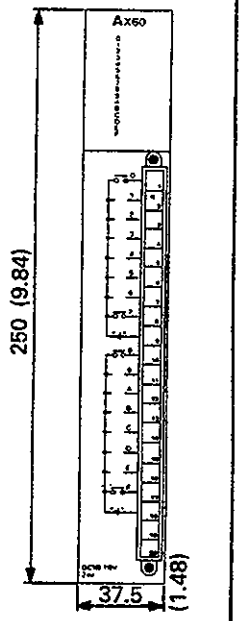
Weight	0.37kg (0.81lbs)

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	Not used
TB20	Not used

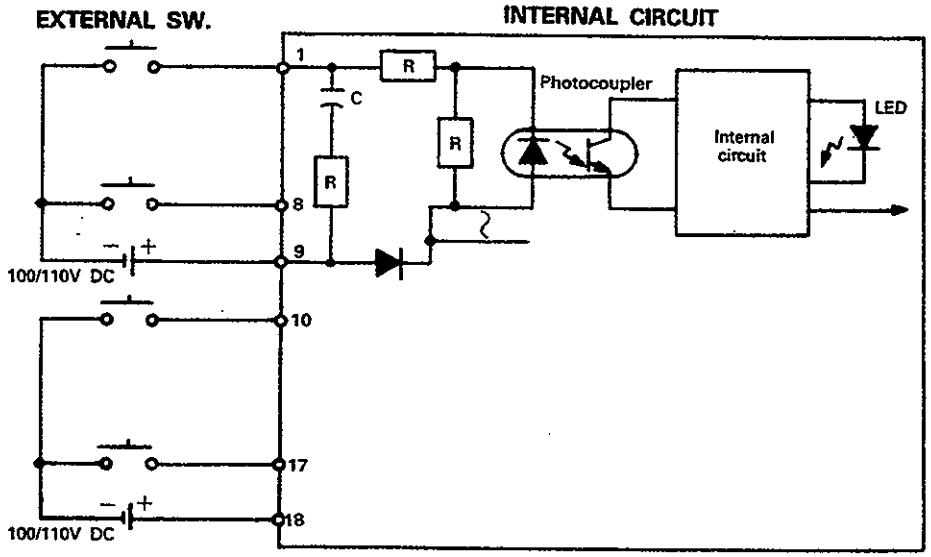


2.13 Type AX60 Input Module (Sink Loading)

DC Input

Specifications \ Type		AX60	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		100% (8 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	
Indication		1 LED per point	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb-ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	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	Not used
TB20	Not used

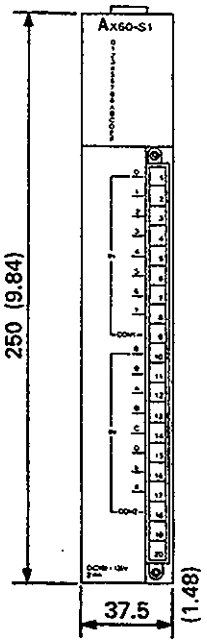


2.14 Type AX60-S1 Input Module (Sink/Source Loading)

DC Input

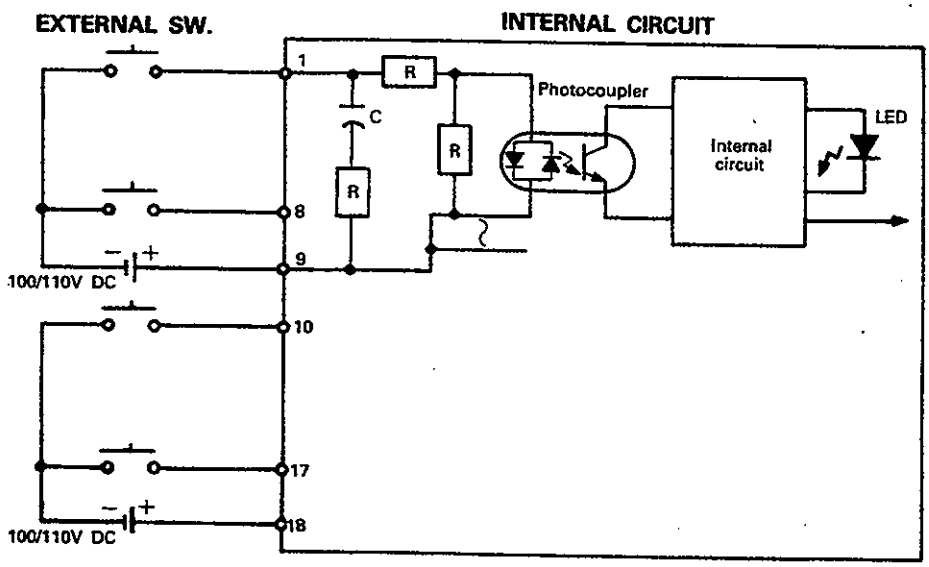
Specifications \ Type		AX60-S1
Input points		16 points
Insulation system		Photocoupler
Rated input voltage		100/110/125V DC
Rated input current		2mA
Max. inrush current		65mA (121V DC), 75mA (140V DC)
Operating voltage range		85 to 140V DC (ripple ratio: within 5%)
Max. simultaneously ON		100% (8 points/common)
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
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

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	COM1
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	COM2
TB19	Not used
TB20	Not used

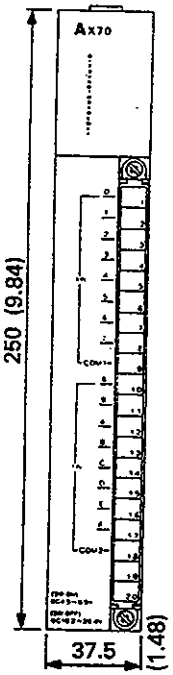


2.15 Type AX70 Input Module (Sink/Source)

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)		
Indication		1 LED per point		
Connection method		20-points removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))		
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A		

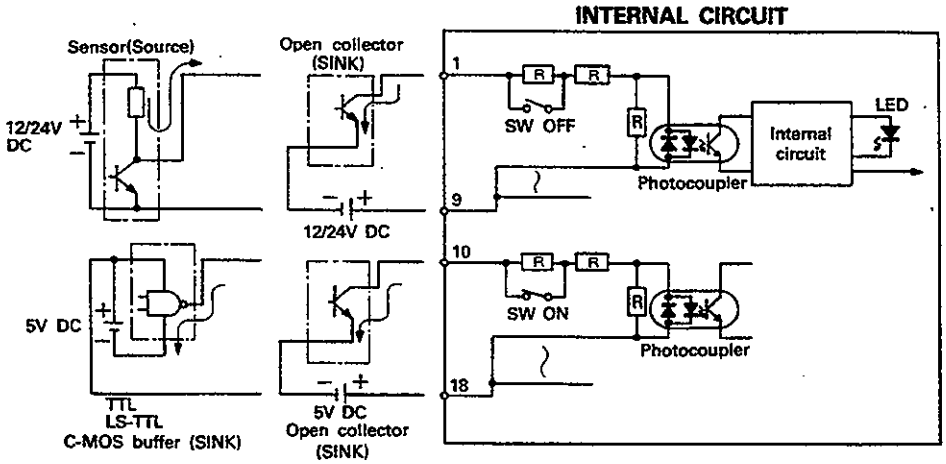
Front View mm(inch)



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	Not used
TB20	Not used

INTERNAL CIRCUIT



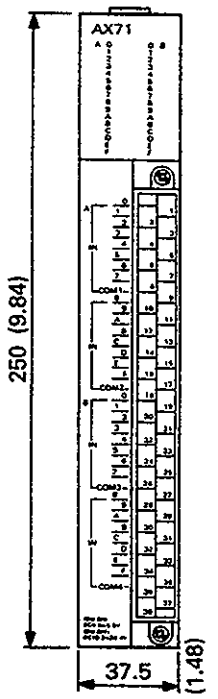
**1: Can be used with any combination by common of 8 points.*
**2: When using a CMOS source loading, only 5 VDC-rated CMOS (above) is available. (Example: HCMOS)*

2.16 Type AX71 Input Module (Sink/Source)

Input for Sensor

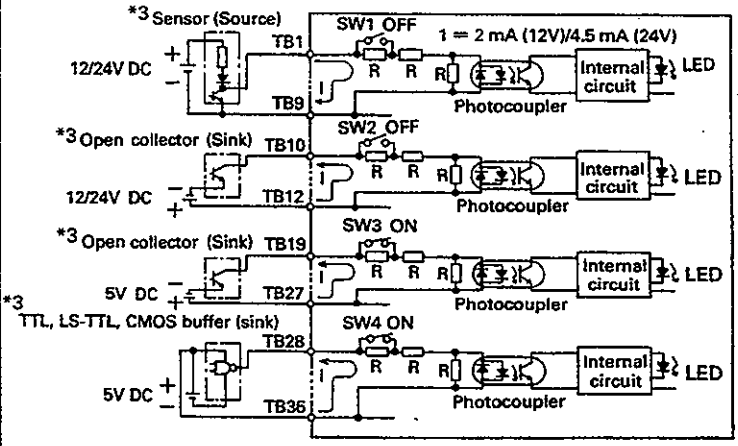
Specifications \ Type		AX71		
Input points		32 points		
Insulation system		Photocoupler		
Input voltage		5V DC	12V DC	24V DC
Input current	TYP.	3.5mA	2mA	4.5mA
	MAX.	5.5mA	3mA	6mA
Operating voltage range		4.5 to 5.5V DC (SW. ON), 10.2 to 26.4V DC (SW. OFF)		
Max. simultaneously ON		100% (8 points/common)		
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)		
Indication		1 LED per point		
Connection method		38-points removable terminal block (M3 × 6mm metric screws)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg-cm (0.505lb-ft))		
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A		

Front View mm(inch)



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	Not used
TB18	Power supply common 2	TB38	Not used
TB19	X10		
TB20	X11		



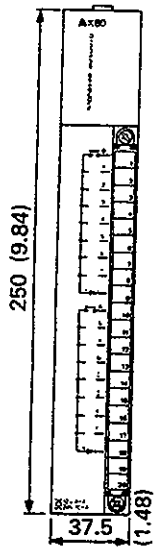
*1: Each batch of 8 input points (as divided by commons) is independent
*2: The AX71 is a high-speed response input module. Shielded wires should therefore be used and must be kept away from the other output wires.
*3: Can be used with any combination by common of 8 points.
*4: When using a CMOS source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

2.17 Type AX80 Input Module (Source Loading)

DC Source Input

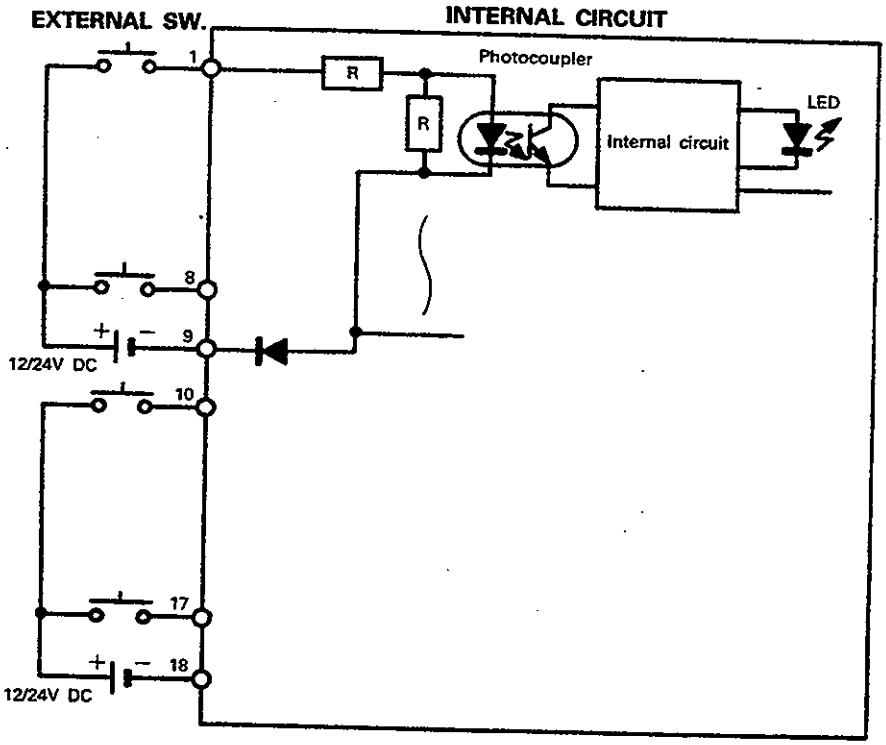
Specifications \ Type		AX80	
Input points		16 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		4mA	10mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		100% (8 points/common)	
ON voltage/ON current		9.5V DC or 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)	
Indication		1 LED per point	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

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	0V
TB10	X08
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	0V
TB19	Not used
TB20	Not used

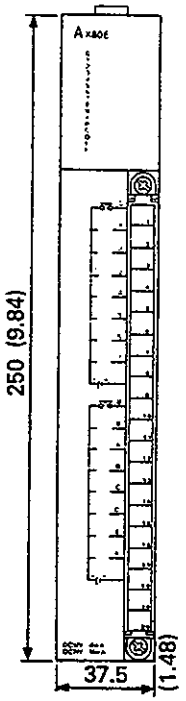


2.18 Type AX80E Input Module (Source Loading)

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)	
Indication		1 LED per point	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

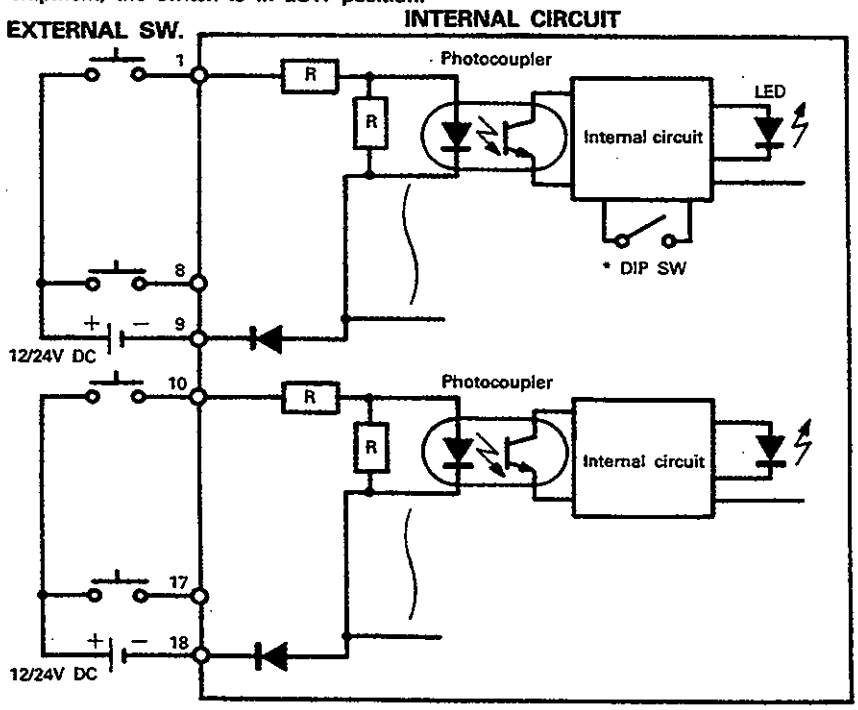
Front View mm(inch)



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	Not used
TB20	Not used

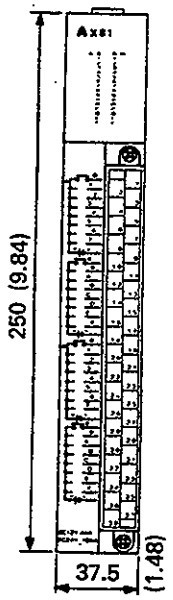


2.19 Type AX81 Input Module (Source Loading)

DC Source Input

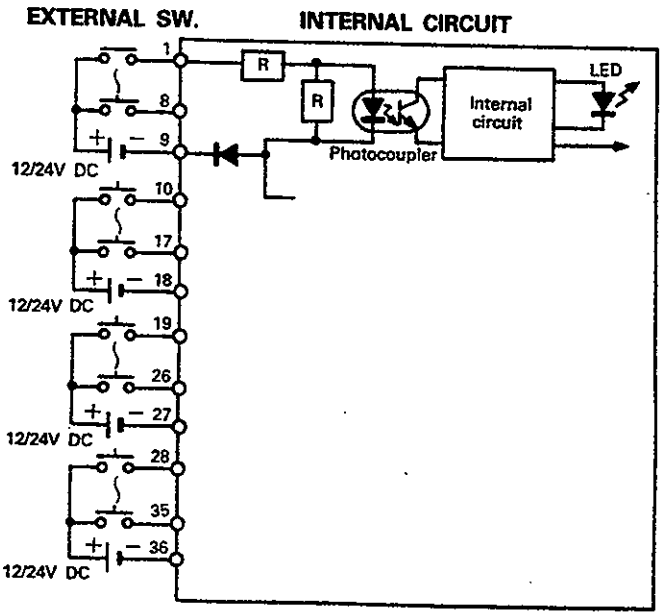
Specifications \ Type		AX81	
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		4mA	10mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		60% (5 points/common)	
ON voltage/ON current		9.5V DC or 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)	
Indication		1 LED per point	
Connection method		38-points removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

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	Not used
TB18	0V	TB38	Not used
TB19	X10		
TB20	X11		

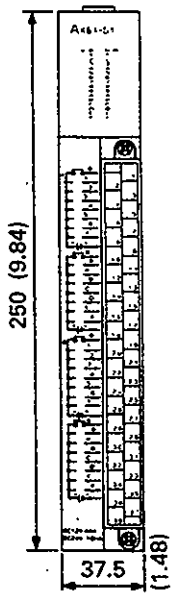


2.20 Type AX81-S1 Input Module (Sink/Source Loading)

DC Source Input

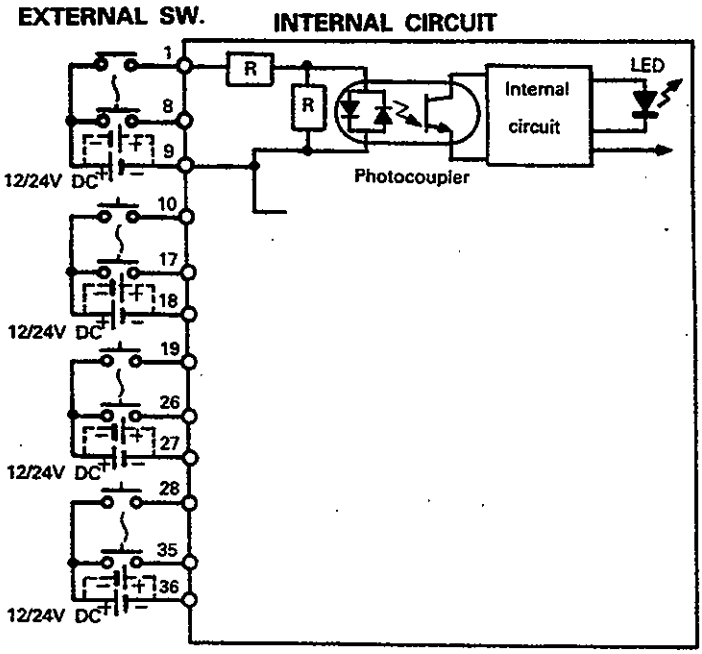
Specifications \ Type		AX81-S1	
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		2.5mA	5mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio: within 5%)	
Max. simultaneously ON		32 points	
ON voltage/ON current		5.6V DC or higher/1.1mA 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)	
Indication		1 LED per point	
Connection method		38-points removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

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	P/S common
TB8	X07	TB28	X18
TB9	P/S 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	P/S common
TB17	X0F	TB37	Not used
TB18	P/S common	TB38	Not used
TB19	X10		
TB20	X11		

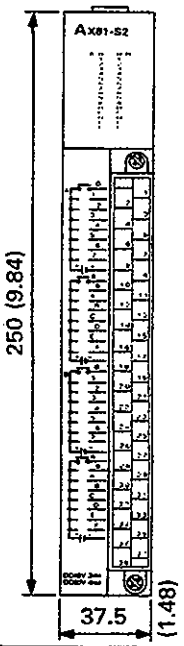


2.21 Type AX81-S2 Input Module (Source Loading)

DC Source Input

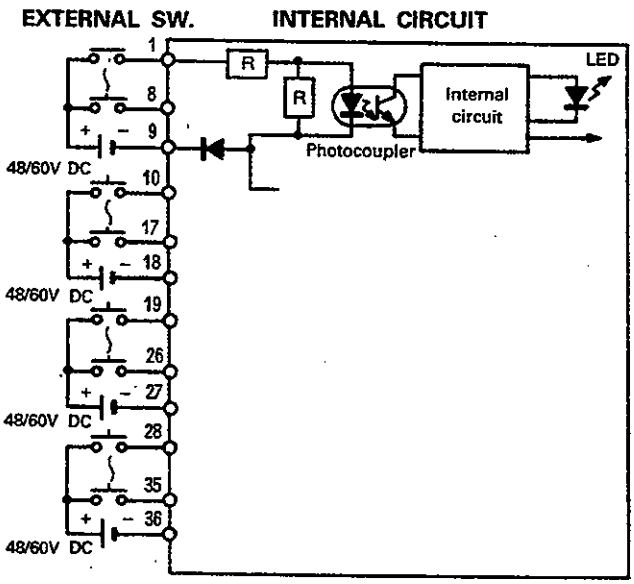
Specifications \ Type		AX81-S2	
Input points		32 points	
Insulation system		Photocoupler	
Rated input voltage		48V DC	60V DC
Rated input current		3mA	4mA
Operating voltage range		41 to 66V DC (ripple ratio: within 5%)	
Max. simultaneously ON		60% (5 points/common) simultaneous ON	
ON voltage/ON current		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)	
Indication		1 LED per point	
Connection method		38-points removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

Front View mm(inch)



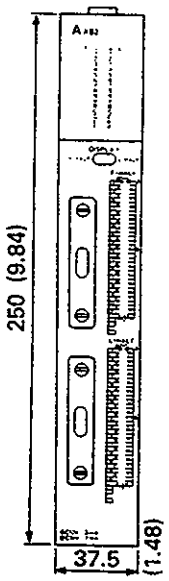
Weight: 0.45kg (1lbs)

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	Not used
TB18	0V	TB38	Not used
TB19	X10		
TB20	X11		

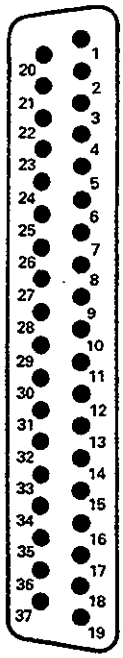


2.22 Type AX82 Input Module (Source Loading)

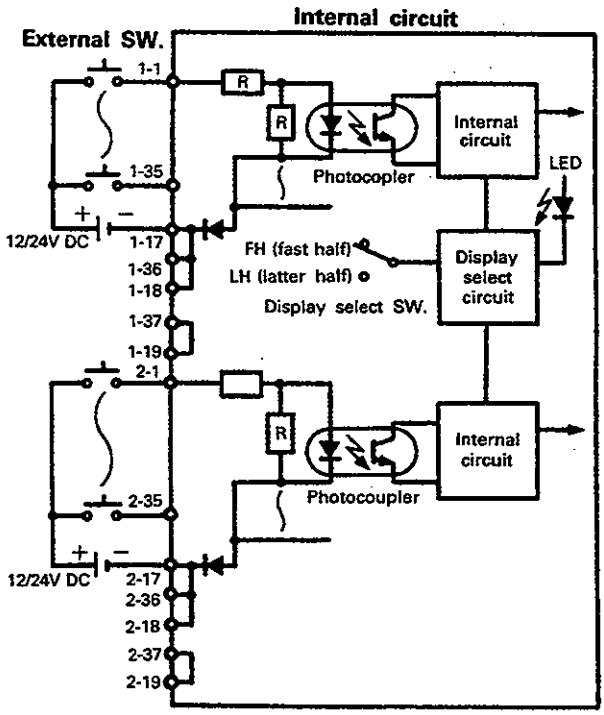
DC Input (Source)

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)		
Indication		1 LED per two points (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	X36
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	Not used	2-37	Not used
1-19	Not used	2-19	Not used



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)

3. OUTPUT MODULE SPECIFICATIONS

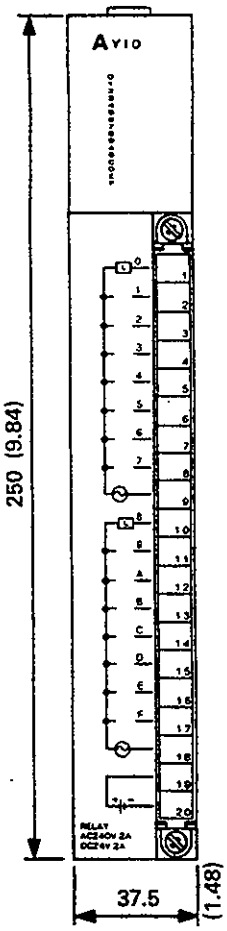
Quick Reference Summary

type	Output Device	Number of output points	Sink	Source	Fuse	Noise suppression/ Snubber	
AY10	Relay	16	—	—	—	—	
AY10A	Relay	16	Isolated outputs				
AY11	Relay	16	Plug-in relays			●	
AY11A	Relay	16	Isolated outputs			●	
AY11AEU	Relay	16	Isolated outputs			●	
AY11E	Relay	16	—	—	●	●	
AY11EEU	Relay	16	—	—	●	●	
AY13	Relay	32	—	—	—	—	
AY13EU	Relay	32	—	—	—	—	
AY13E	Relay	32	—	—	●	—	
AY15EU	Relay	32	—	—	—	—	
AY20EU	Triac	16	—	—	●	●	
AY22	Triac	16	—	—	●	●	
AY23	Triac	32	—	—	●	●	
AY40	Transistor	16	●	—	—	●	
AY40A	Transistor	16	●	—	—	●	
AY40P	Transistor	16	●	—	—	●	
AY41	Transistor	32	●	—	—	●	
AY41P	Transistor	32	●	—	—	●	
AY42	Transistor	64	●	—	—	●	
AY42-S1	Transistor	64	●	—	—	●	
AY42-S3	Transistor	64	●	—	—	●	
AY42-S4	Transistor	64	●	—	—	●	
AY50	Transistor	16	●	—	●	●	
AY51	Transistor	32	●	—	—	●	
AY51-S1	Transistor	32	●	—	—	●	
AY60	Transistor	16	●	—	●	●	
AY60S	Transistor	16	●	—	●	●	
AY60E	Transistor	16	—	●	●	●	
AY60EP	Transistor	16	—	●	—	●	Electronic circuit protection
AY70	TTL, CMOS	16	●	—	—	—	
AY71	TTL, CMOS	32	●	—	—	—	
AY72	TTL, CMOS	64	●	—	—	●	
AY80	Transistor	16	—	●	●	●	Electronic circuit protection
AY80EP	Transistor	16	—	●	—	●	
AY81	Transistor	32	—	●	—	●	Electronic circuit protection
AY81EP	Transistor	32	—	●	—	●	
AY82EP	Transistor	64	—	●	—	●	

key ● : Provided
— : Not provided

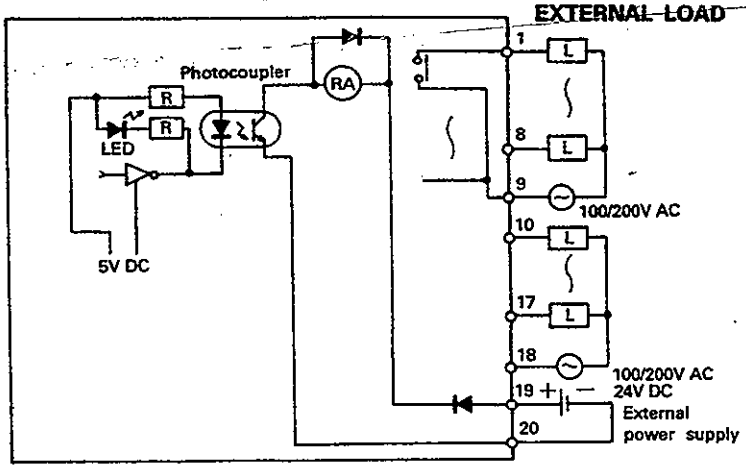
3.1 Type AY10 Output Module

Relay Contact Output			
Specifications \ Type		AY10	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 ≦ 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 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	
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)	
Indication		1 LED per point	
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: 7kg·cm (0.505lb-ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	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

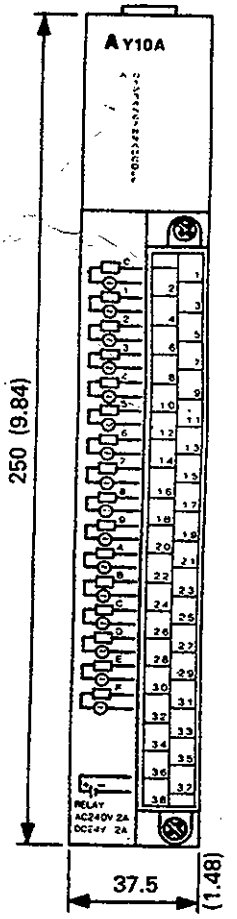
INTERNAL CIRCUIT



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

Relay Contact Output		
Specifications \ Type		AY10A
Output points		16 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistance load)/point 240V AC 2A (cosϕ=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 (COSϕ=0.7) 200 thousand times or more
		200V AC 1A, 240V AC 0.5A (COSϕ=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)
Indication		1 LED per point
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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

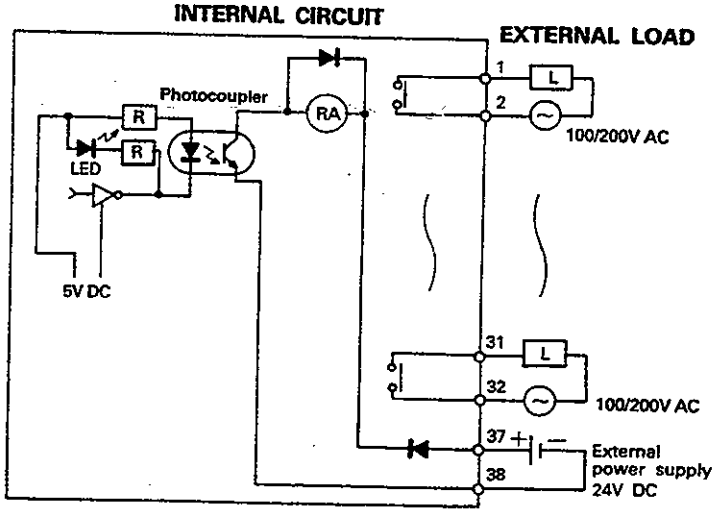
Front View mm(inch)



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	Not used
TB14		TB34	Not used
TB15	Y07	TB35	Not used
TB16		TB36	Not used
TB17	Y08	TB37	24V DC
TB18		TB38	0V
TB19	Y09		
TB20			

INTERNAL CIRCUIT

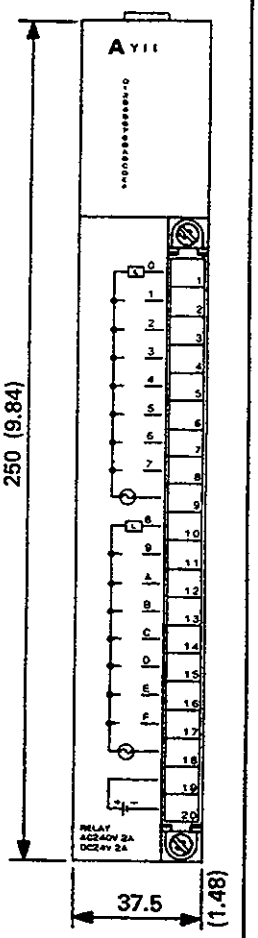


3.3 Type AY11 Output Module

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 ($\cos\phi$=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 ($\cos\phi$=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		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)
Indication		1 LED per point
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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

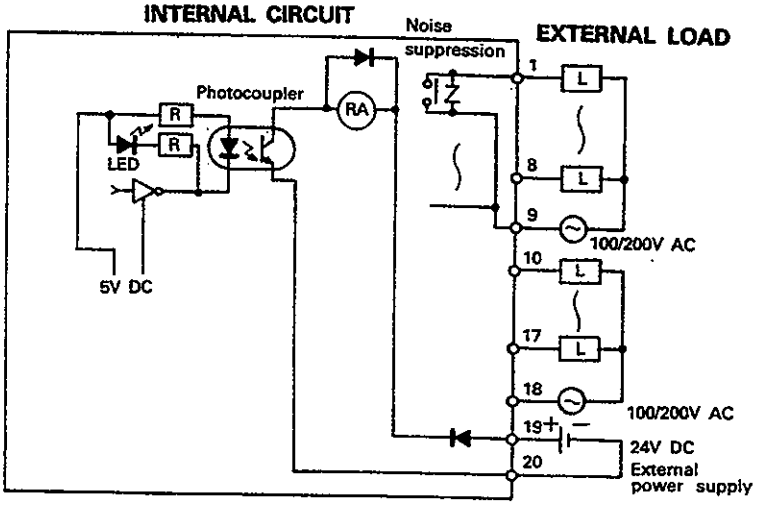
Front View mm(inch)



Weight	0.5kg (1.1lbs)

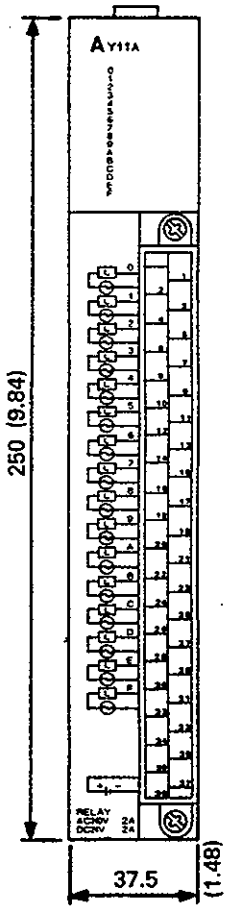
Terminal No.	Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	Common 1
TB10	Y08
TB11	Y09
TB12	Y0A
TB13	Y0B
TB14	Y0C
TB15	Y0D
TB16	Y0E
TB17	Y0F
TB18	Common 2
TB19	24V DC
TB20	0V

INTERNAL CIRCUIT

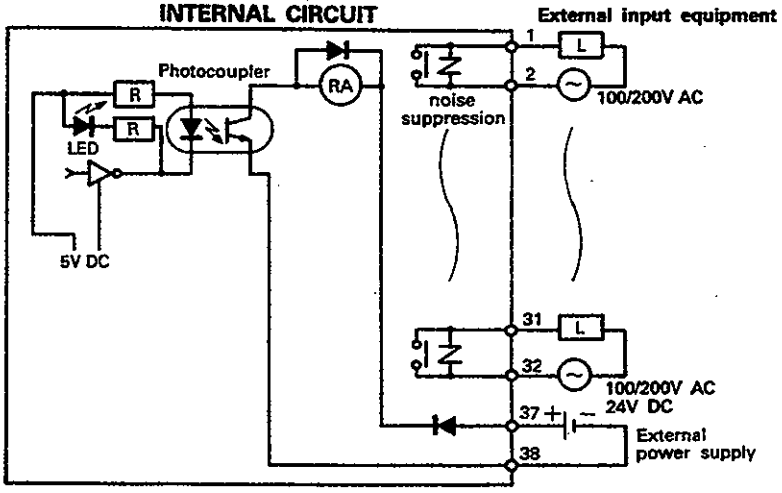


3.4 Type AY11A Output Module (Relay Contact Output (all points independent))

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 ($\cos\phi$=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 ($\cos\phi$=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		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)	
Indication		1 LED per point	
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: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	Weight: 0.47kg (1.03lbs)

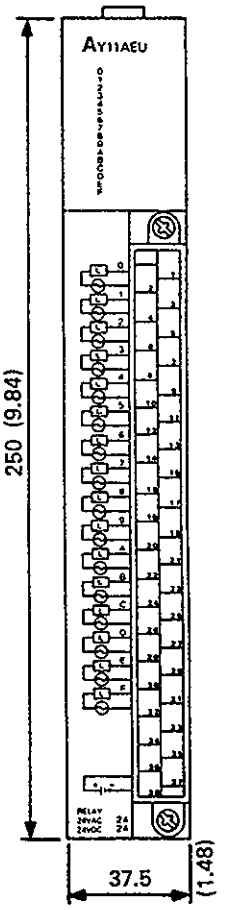


Terminal No.	Output Signal No.	Terminal No.	Output Signal No.
TB1	Y00	TB21	Y0A
TB2		TB22	
TB3	Y01	TB23	Y0B
TB4		TB24	
TB5	Y02	TB25	Y0C
TB6		TB26	
TB7	Y03	TB27	Y0D
TB8		TB28	
TB9	Y04	TB29	Y0E
TB10		TB30	
TB11	Y05	TB31	Y0F
TB12		TB32	
TB13	Y06	TB33	Not used
TB14		TB34	Not used
TB15	Y07	TB35	Not used
TB16		TB36	Not used
TB17	Y08	TB37	24V DC
TB18		TB38	0V
TB19	Y09		
TB20			



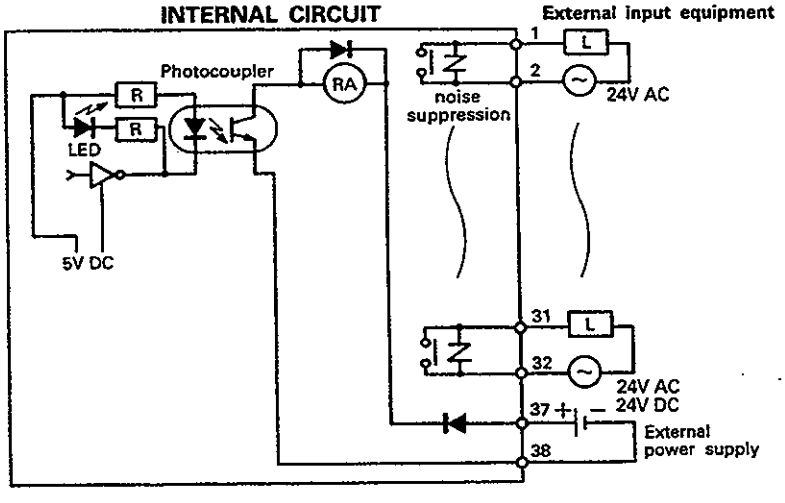
3.4.1 Type AY11AEU Output Module (Relay Contact Output (all points independent))

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)	
Indication		1 LED per point	
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: 7kgf·cm (0.505lb·ft))	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	
Noise durability		AC type noise voltage 1500Vp-p, DC type noise voltage 500Vp-p, Noise width 1µs, Noise frequency 25 to 60Hz (noise simulator condition)	
Withstanding voltage		1500V AC for 1 minute between all AC external terminals together and ground 500V AC for 1 minute between all DC external terminals together and ground	
Insulation resistance		10MΩ or higher, measured with a 500V DC insulation resistance tester	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	Not used
TB14		TB34	Not used
TB15	Y07	TB35	Not used
TB16		TB36	Not used
TB17	Y08	TB37	24V DC
TB18		TB38	0V
TB19	Y09		
TB20			

INTERNAL CIRCUIT

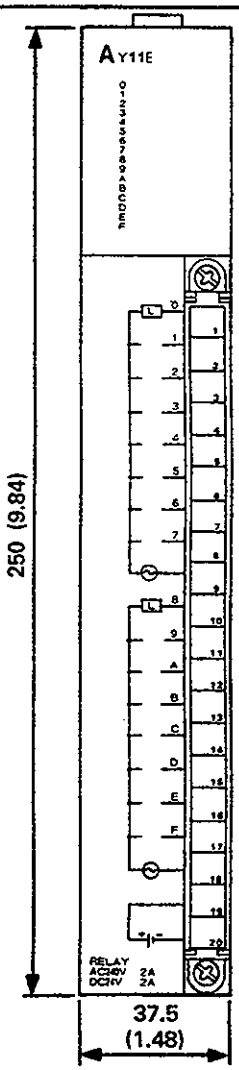


3.5 Type AY11E Output Module

Relay Contact Output

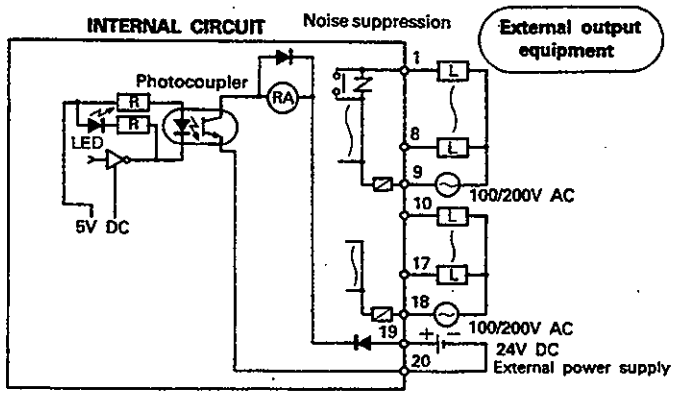
Specifications \ Type		AY11E
Output points		16 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistive load)/point, 240V AC 2A ($\cos\phi$=1)/point, (but ≦ 8A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		250V AC, 125V DC
Leakage current at OFF		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 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		Varistor (387 to 473V)
Fuse		8A MF51NM8
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)
Indication		1 LED per point
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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

Front View mm(inch)



Weight: 0.47kg (1.03lbs)

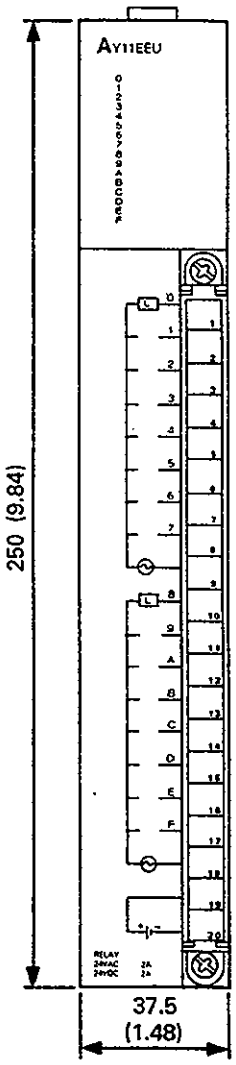
Terminal No.	Output Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	COM 1
TB10	Y08
TB11	Y09
TB12	Y0A
TB13	Y0B
TB14	Y0C
TB15	Y0D
TB16	Y0E
TB17	Y0F
TB18	COM 2
TB19	24V DC
TB20	0V



3.5.1 Type AY11EEU Output Module

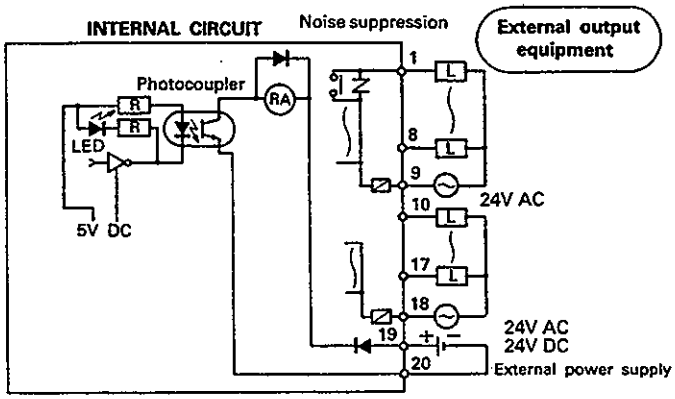
Relay Contact Output		
Specifications \ Type		AY11EEU
Output points		16 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistive load)/point 24V AC 2A (cosø=1)/point, (but ≦ 8A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		49.9V AC, 74.9V DC
Leakage 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
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)
Indication		1 LED per point
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: 7kgf·cm (0.505lb·ft))
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3
Noise durability		AC type noise voltage 1500Vp-p, DC type noise voltage 500Vp-p, Noise width 1μs, Noise frequency 25 to 60Hz (noise simulator condition)
Withstanding voltage		1500V AC for 1 minute between all AC external terminals together and ground 500V AC for 1 minute between all DC external terminals together and ground
Insulation resistance		10MΩ or higher, measured with a 500V DC insulation resistance tester

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

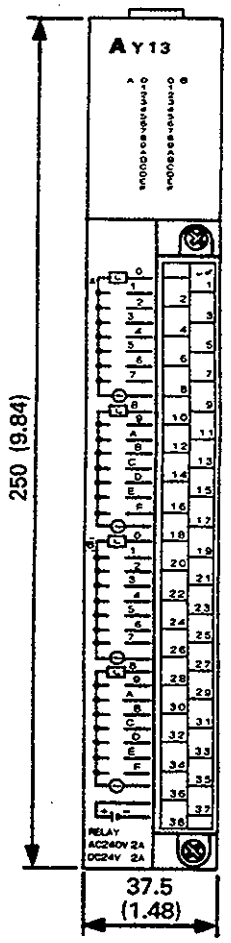


3.6 Type AY13 Output Module

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)
Indication		1 LED per point
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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

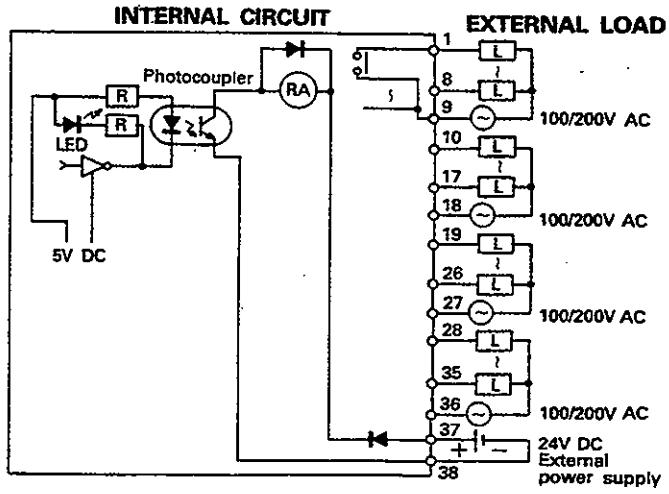
Front View mm(inch)



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		

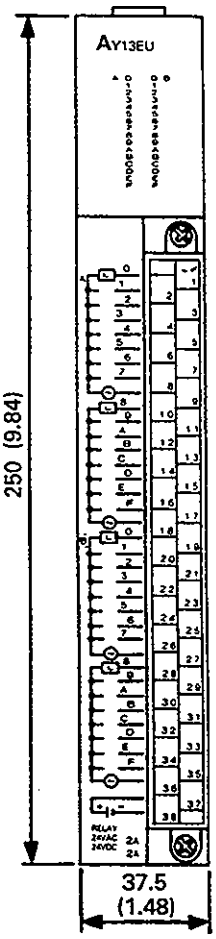
INTERNAL CIRCUIT **EXTERNAL LOAD**



3.6.1 Type AY13EU Output Module

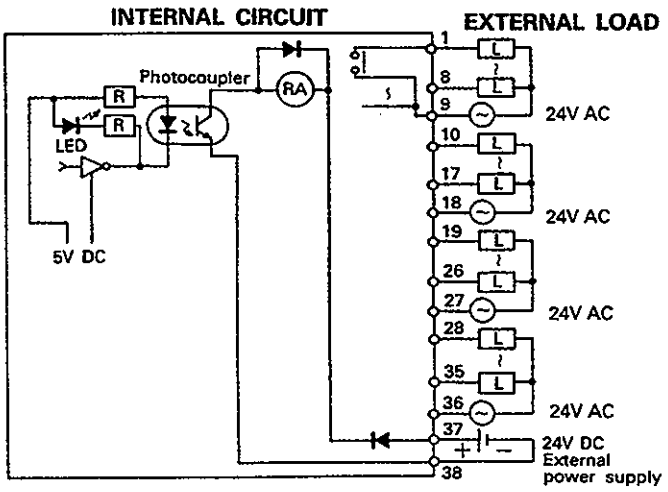
Relay Contact Output		
Specifications \ Type		AY13EU
Output points		32 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistance load)/point 24V AC 2A (cosø=1)/point, (but ≦ 5A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		49.9V AC, 74.9V DC
Response 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)
Indication		1 LED per point
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: 7kgf·cm (0.505lb·ft))
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3
Noise durability		AC type noise voltage 1500Vp-p, DC type noise voltage 500Vp-p, Noise width 1μs, Noise frequency 25 to 60Hz (noise simulator condition)
Withstanding voltage		1500V AC for 1 minute between all AC external terminals together and ground 500V AC for 1 minute between all DC external terminals together and ground
Insulation resistance		10MΩ or higher, measured with a 500V DC insulation resistance tester

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		

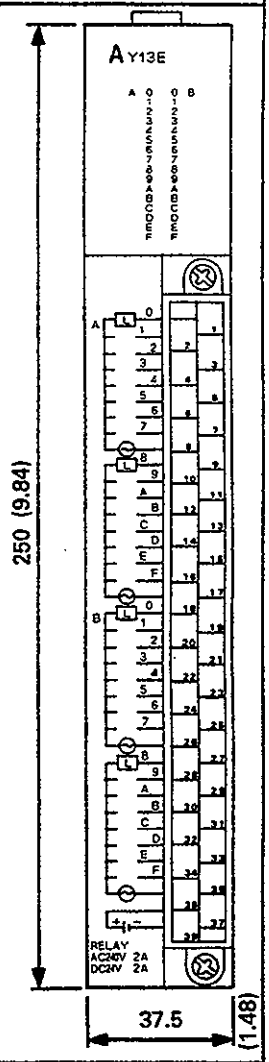


3.7 Type AY13E Output Module

Relay Contact Output

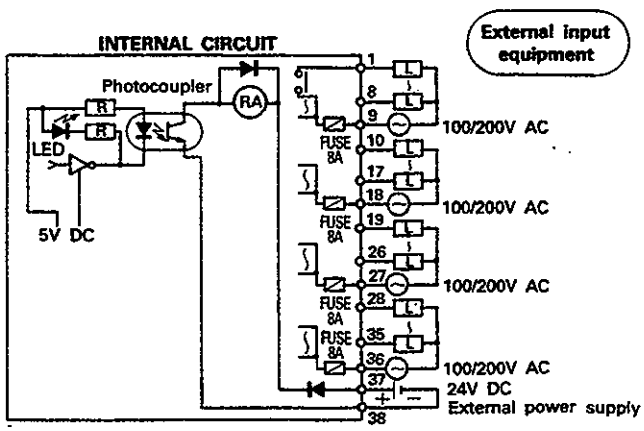
Specifications \ Type		AY13E
Output points		32 points
Insulation system		Photocoupler
Rated switching voltage, current		24V DC 2A (resistance load): point, 5A/common 240V AC 2A (cos ϕ =1): point, (but ≦ 5A per common)
Min. switching load		5V DC 1mA
Max. switching voltage		250V AC, 125V DC
Response time	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 ϕ =0.7) 200 thousand times or more
		200V AC 1A, 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		Not provided
Fuse		8A MF51NM8
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)
Indication		1 LED per point
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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

Front View mm(inch)



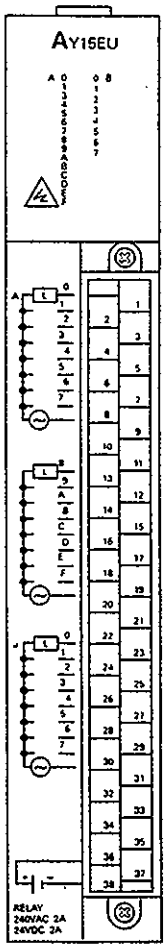
Weight: 0.60kg (1.32lbs)

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		

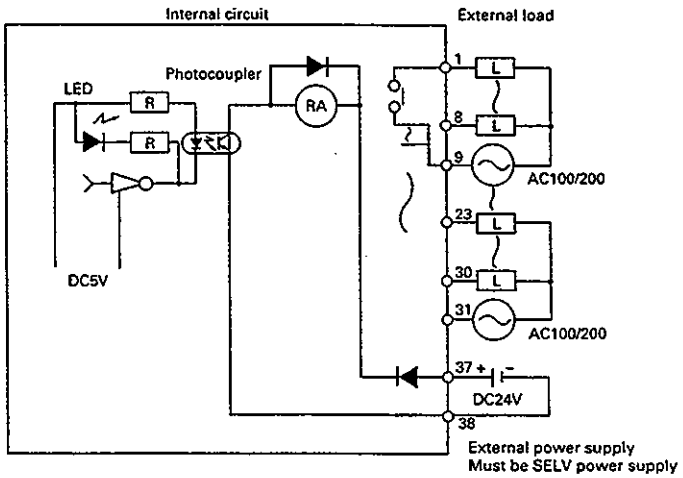


3.7.1 Type AY15EU Output Module

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 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)	
Operating indicator		ON state is indicated (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 (8kg·cm))	
Applicable solderless terminal		R1.25-3, R2-3 RAV1.25-3, RAV2-3	
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)

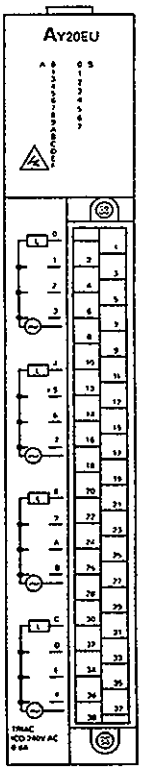


Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Vacant
TB2	Y01	TB22	Vacant
TB3	Y02	TB23	Y10
TB4	Y03	TB24	Y11
TB5	Y04	TB25	Y12
TB6	Y05	TB26	Y13
TB7	Y06	TB27	Y14
TB8	Y07	TB28	Y15
TB9	Common 1	TB29	Y16
TB10	Vacant	TB30	Y17
TB11	Vacant	TB31	Common 3
TB12	Y08	TB32	Vacant
TB13	Y09	TB33	Vacant
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		

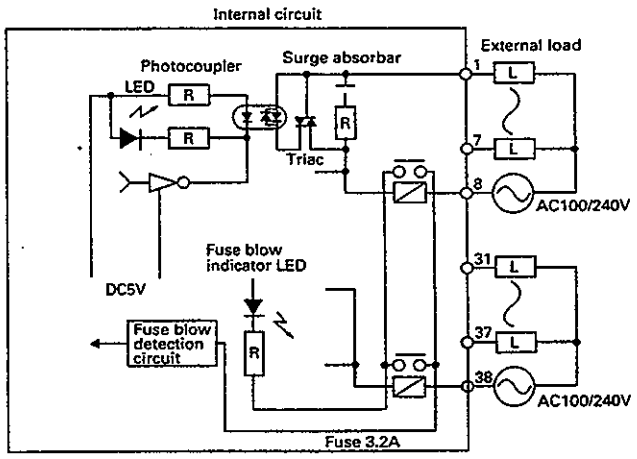


3.7.2 Type AY20EU Output Module

Relay Contact 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 arranqement		4 points/common (common terminal : TB8, TB18, TB28, TB38)	
Operating indicator		ON state is indicated (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(8kgf·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		

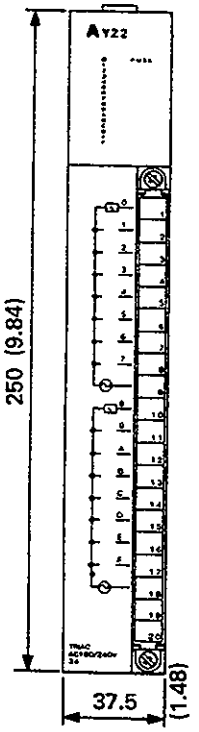


3.8 Type AY22 Output Module

Triac Output

Specifications \ Type		AY22
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 (0.022μF+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)
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

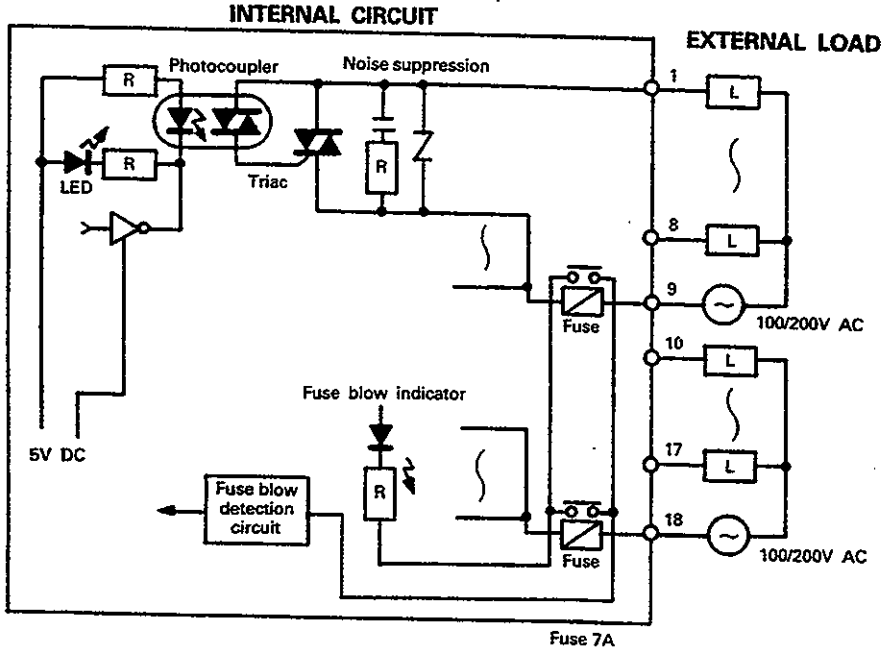
Front View mm(inch)



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	Not used
TB20	Not used

INTERNAL CIRCUIT

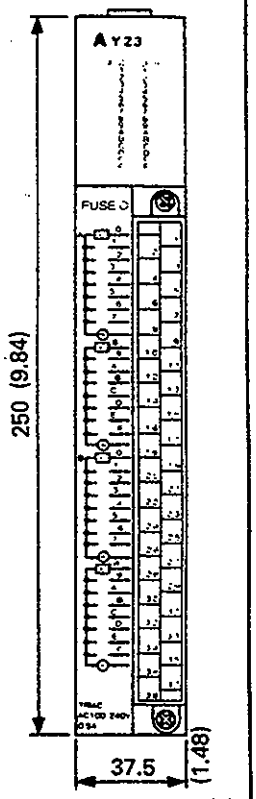


3.9 Type AY23 Output Module

Triac Output

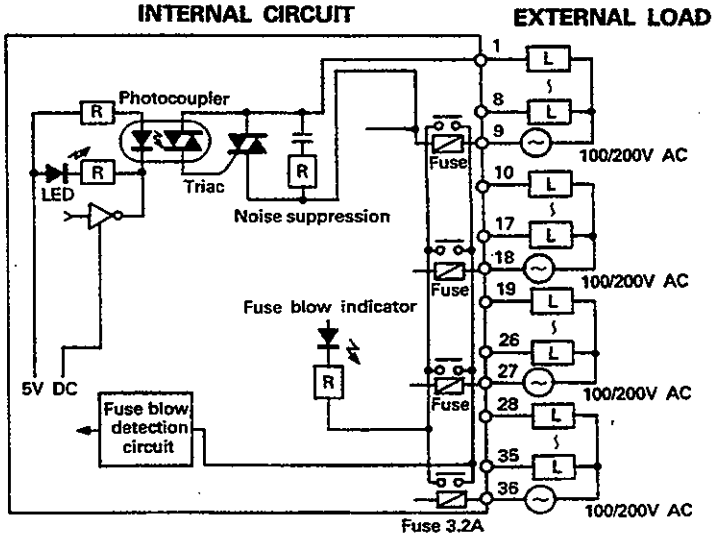
Specifications \ Type		AY23
Output points		32 points
Insulation system		Photocoupler
Rated load voltage		100—240V AC 40 to 70Hz
Max. load voltage		264V AC
Max. load current		0.6A/points, 2.4A/common *(1.05A/common)
Min. load voltage, current		24V AC 100mA, 100V AC 10mA, 240V AC 10mA
Max. inrush current		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)
Indication		1 LED per point
Connection method		38 point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A V1.25-3, V1.25-YS3A, V2-S3, VS-YS3A

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	Not used
TB18	Common 2	TB38	Not used
TB19	Y10		
TB20	Y11		



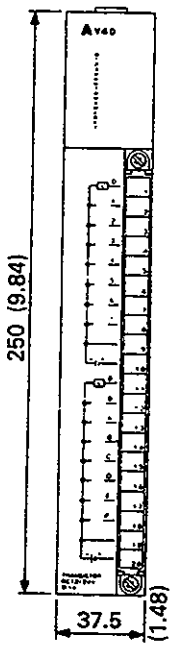
**: 1.05A/common when the output module is used in the next slot to the power supply module.*

3.10 Type AY40 Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY40
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)
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

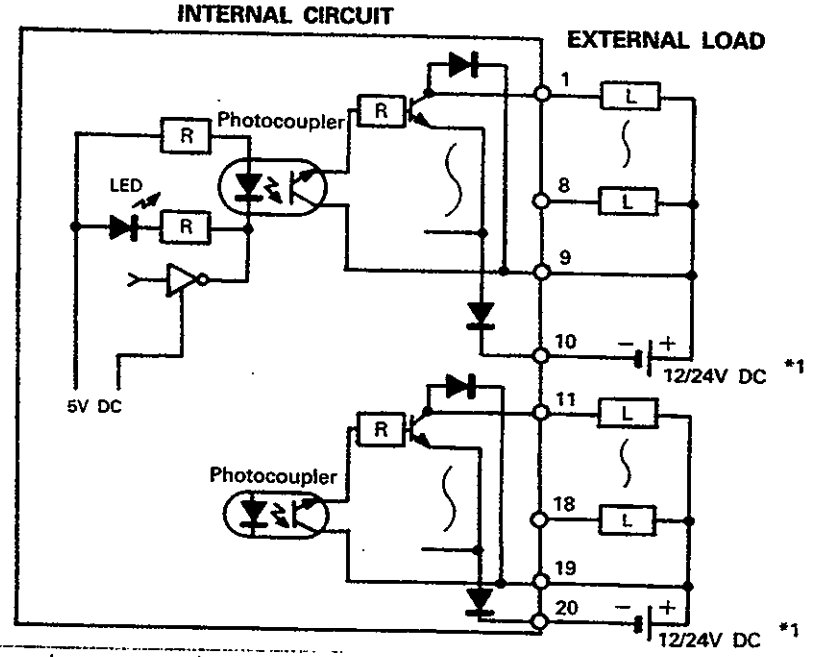
Front View mm(inch)



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



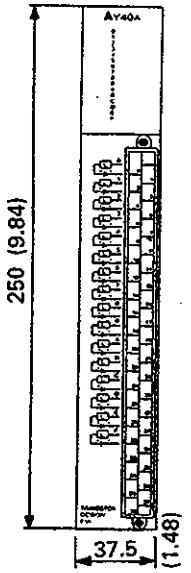
*1: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid.
The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.
*2: The peak voltage including serge becomes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

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

Transistor Output

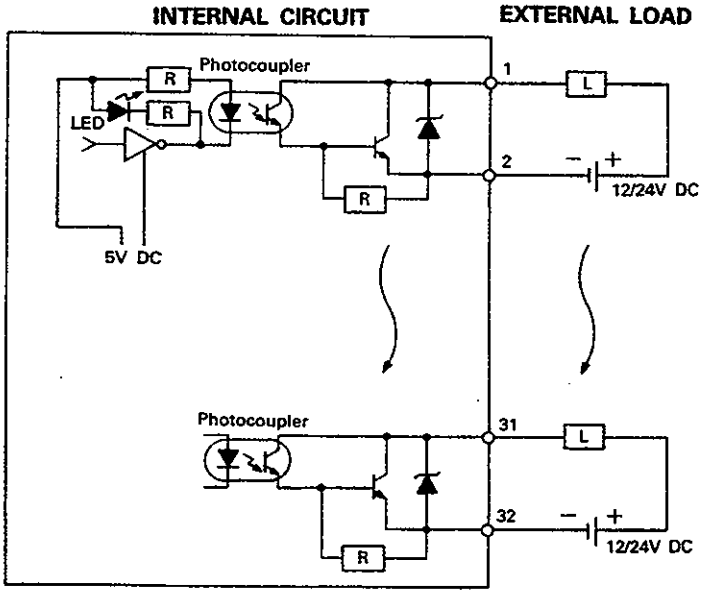
Specifications \ Type		AY40A
Output points		16 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 30V DC (Max. applied voltage)
Max. load current		0.3A/point
Max. inrush current		1A, 100ms or lower
Leakage current (OFF)		0.1mA or lower
Max. voltage 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)
Indication		1 LED per point
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

Front View mm(inch)



Weight: 0.42kg (0.92lbs)

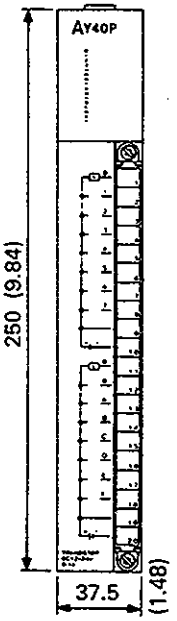
Terminal No.	Signal No.	Terminal No.	Signal No.
TB1	Y00	TB21	Y0A
TB2		TB22	
TB3	Y01	TB23	Y0B
TB4		TB24	
TB5	Y02	TB25	Y0C
TB6		TB26	
TB7	Y03	TB27	Y0D
TB8		TB28	
TB9	Y04	TB29	Y0E
TB10		TB30	
TB11	Y05	TB31	Y0F
TB12		TB32	
TB13	Y06	TB33	
TB14		TB34	
TB15	Y07	TB35	
TB16		TB36	
TB17	Y08	TB37	Not used
TB18		TB38	Not used
TB19	Y09		
TB20			



3.12 Type AY40P Transistor Output Module (Sink Loading)

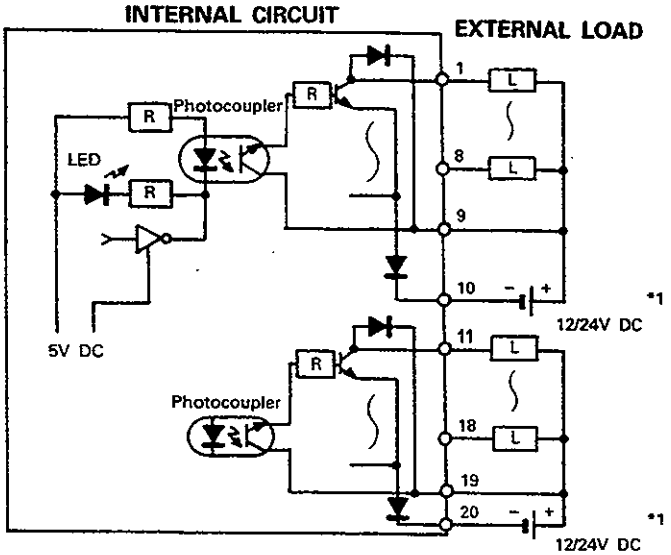
Specifications \ Type		AY40P
Output points		16 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.8 to 26.4V DC
Max. load current		0.1A/point, 0.8A/common
Max. inrush current		0.38A, 5msec or less
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (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)
Indication		1 LED per point
Protect		Provided (thermal and short-circuit protects) Thermal protect is detected in 1 common unit. When thermal protect occurs at one point of a common, all output points of corresponding common are turned OFF.
Protect detection indication		None (signal is not output to a PC CPU.)
Protect reset		Automatic reset (reset by canceling thermal protect)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A,

Front View mm(inch)



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



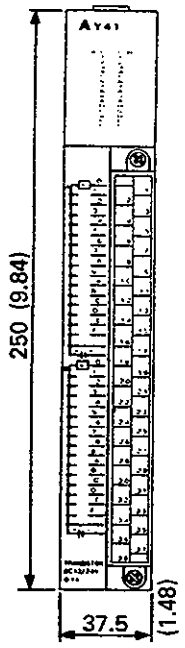
*1: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid. (See Section 7.2, example 5.)
The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.
*2: When 3 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)
Indication		1 LED per point
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg-cm (0.505lb-ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

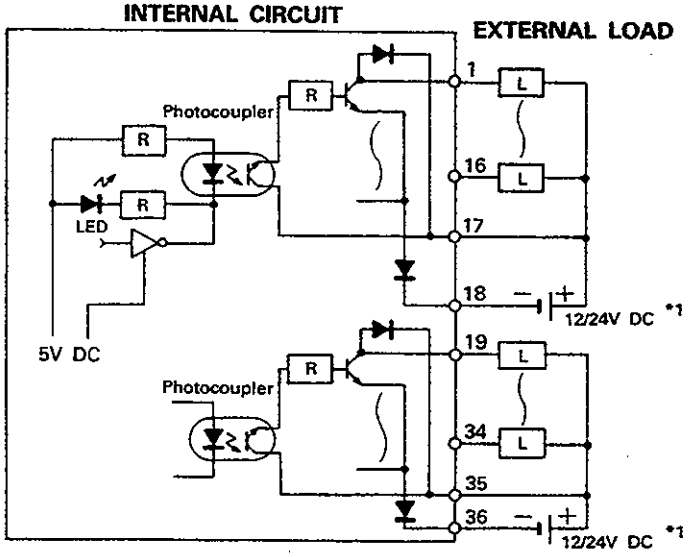
Front View mm(inch)



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	Not used
TB18	0V	TB38	Not used
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT **EXTERNAL LOAD**

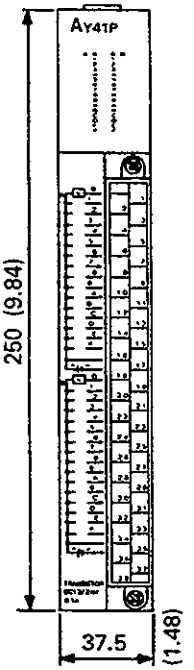


*1: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid.
The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.
*2: The peak voltage including serge becomes 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)
Indication		1 LED per point
Protect		Provided (thermal and short-circuit protects) Thermal protect is detected in 8 point units separately in the first half and letter half of one common. When thermal protect occurs at one point of 8 points in the first or latter half of one common, corresponding 8 point outputs of such first or latter half are turned OFF.
Protect detection indication		None (signal is not output to a PC CPU.)
Protect reset		Automatic reset (reset by canceling thermal protect)
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm 2 (tightening torque: 7kg·cm (0.05lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

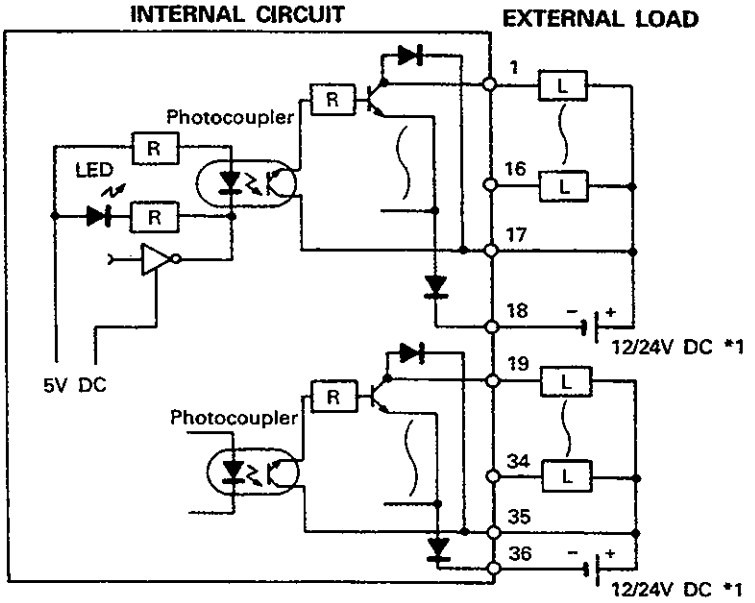
Front View mm(inch)



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	Not used
TB18	0V	TB38	Not used
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT / EXTERNAL LOAD



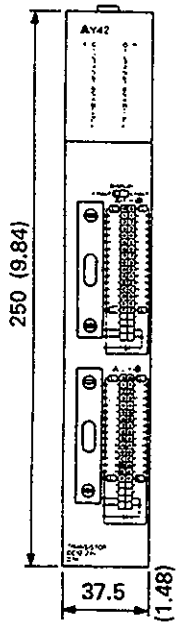
*1: The load power and external power supply sources must be the same otherwise the surge suppression (clamp diode) becomes invalid. (See Section 7.2, example 5.) The clamping diode absorbs serge through the wiring route.
L load is recommended to add surge absorber to individual both ends.
*2: When 3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

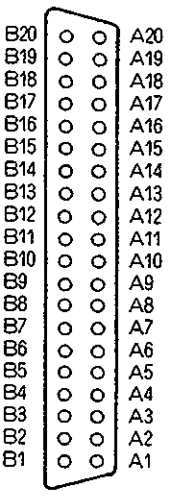
Specifications \ Type		AY42
Output points		64 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Max. load current		0.1A/point, 2A/common*(1.6A/common)
Operating load voltage range		10.2 to 40V DC
Max. inrush current		0.4A
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (ON)		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)
Indication		1 LED per two points (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)

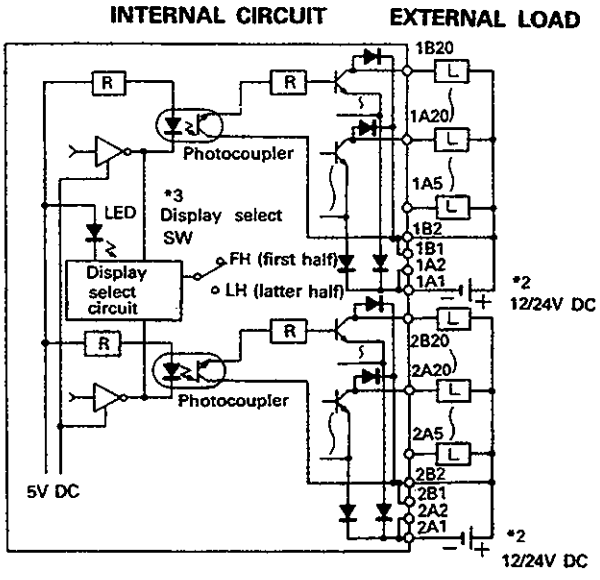


Weight: 0.5kg (1.1lbs)

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	Not used	2B4	Not used
1B3	Not used	2B3	Not used
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	Not used	2A4	Not used
1A3	Not used	2A3	Not used
1A2	0V	2A2	0V
1A1	0V	2A1	0V



Front view



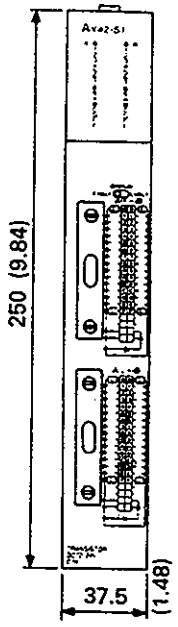
*1: When assigining pin numbers to outputs, use the above table. Note that the silkscreen printing on the front of the module refers A and B numbers to the LED indicators and not to the pin assignmet numbers.
*2: The load power and external power supply sources must be the same otherwise the surge suppression (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.
When a pressure displacement type connector is necessary, user should prepare it referring to Section 1 (8).
(Type:FCN-361J040-AU (connector), FCN-360C040-B (cover))
*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

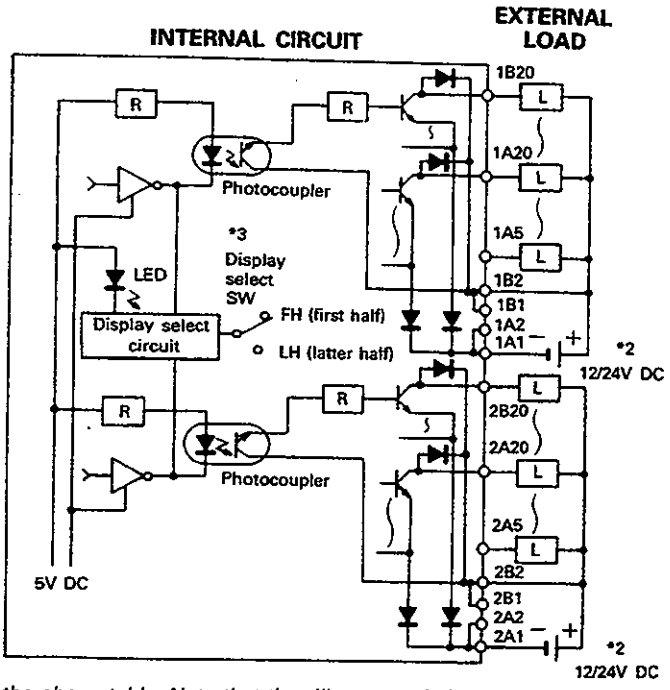
Specifications \ Type		AY42-S1
Output points		64 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Max. load current		0.1A/point, 2A/common (1.6A/common) *4
Operating load voltage range		10.2 to 40V DC
Max. inrush current		0.4A
Leakage current (OFF)		0.1mA or lower
Max. voltage drop (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)
Indication		1 LED per two points (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	Not used	2B4	Not used
1B3	Not used	2B3	Not used
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	Not used	2A4	Not used
1A3	Not used	2A3	Not used
1A2	0V	2A2	0V
1A1	0V	2A1	0V



*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.

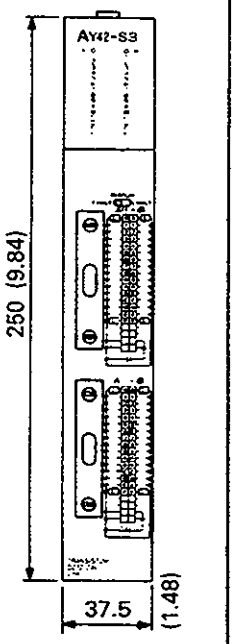
*3: The statuses of the first 32 outputs (Y00 to Y1F) are indicated by the LEDs when the toggle switch is set to FH (for first half). The second 32 outputs (Y20 to Y3F) are indicated when LH is selected.

*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.

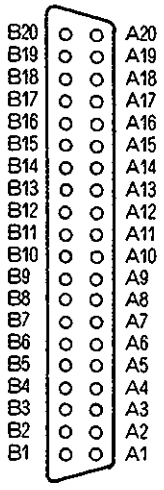
*5: The peak voltage including serge becomes 40V including a reverse-resisting pressure of the clamping diode.

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

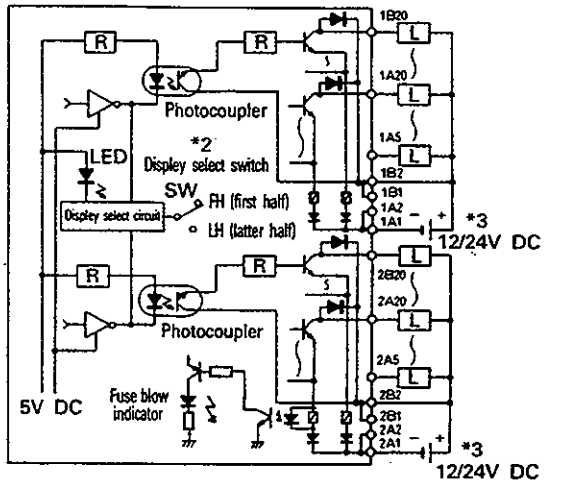
Transistor Output

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)	
Indication		1 LED per point (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	Not used	2B4	Not used
1B3	Not used	2B3	Not used
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	Not used	2A4	Not used
1A3	Not used	2A3	Not used
1A2	0V	2A2	0V
1A1	0V	2A1	0V

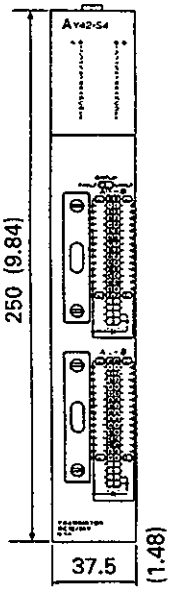


Front view

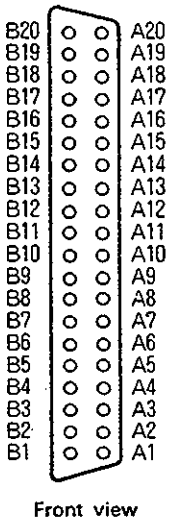


*1: Max. load current varies according to number of points which may be simultaneously turned ON. See Section 1 (10)
*2: The statuses of the first 32 outputs (Y00 to Y1F) are indicated by the LEDs when the toggle switch is set to FH (for first half).
The second 32 outputs (Y20 to Y3F) are indicated when 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.
When a pressure displacement type connector is necessary, user should prepare it referring to Section 1 (8)
(Type: FCN-361J040-AU (connector), FCN-360C040-B (cover))
*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.

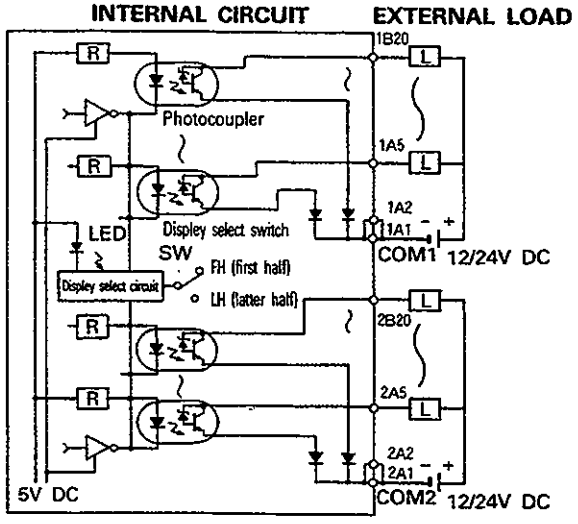
3.18 Type AY42-S4 Transistor Output Module (Sink Loading)

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)	
Indication		1 LED per point (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	
Applicable solderless terminal		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	Not used	2B4	Not used
1B3	Not used	2B3	Not used
1B2	Not used	2B2	Not used
1B1	Not used	2B1	Not used
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	Not used	2A4	Not used
1A3	Not used	2A3	Not used
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.

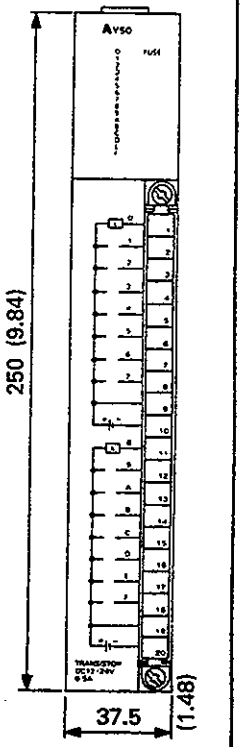
*4: AY42-S3 is provided with two soldered type connector jacks.
When a pressure displacement type connector is necessary, user should prepare it referring to Section 1 (8) (Type: FCN-361J040-AU (connector), FCN-360C040-B (cover))

3.19 Type AY50 Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY50
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		LED on unit front. Signal to PC CPU
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-S, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-S, V1.25-YS3A, V2-S3, V2-YS3A

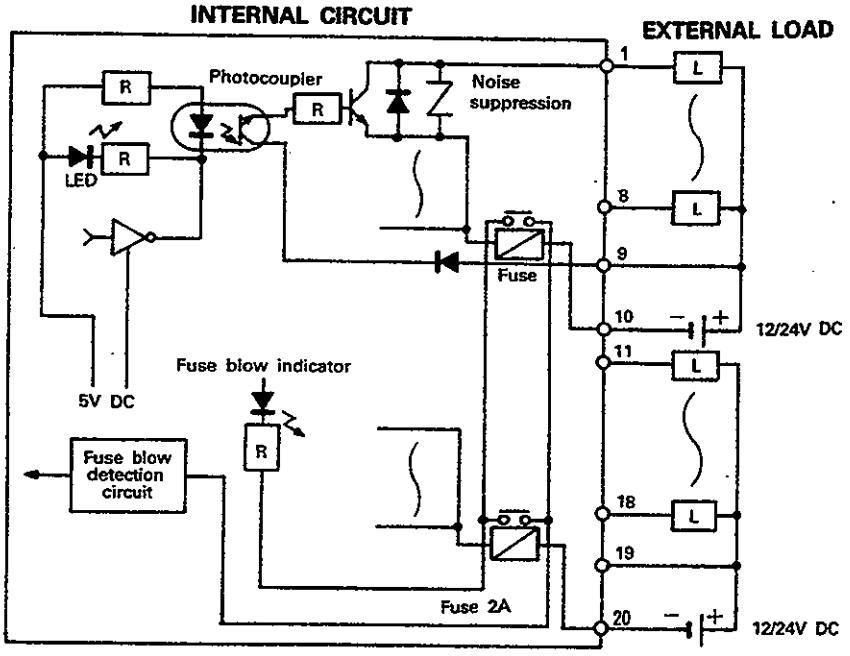
Front View mm(inch)



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

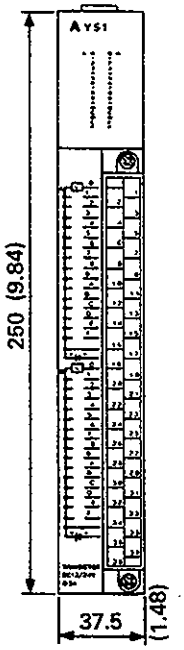


3.20 Type AY51 Output Module (Sink Loading)

Transistor Output

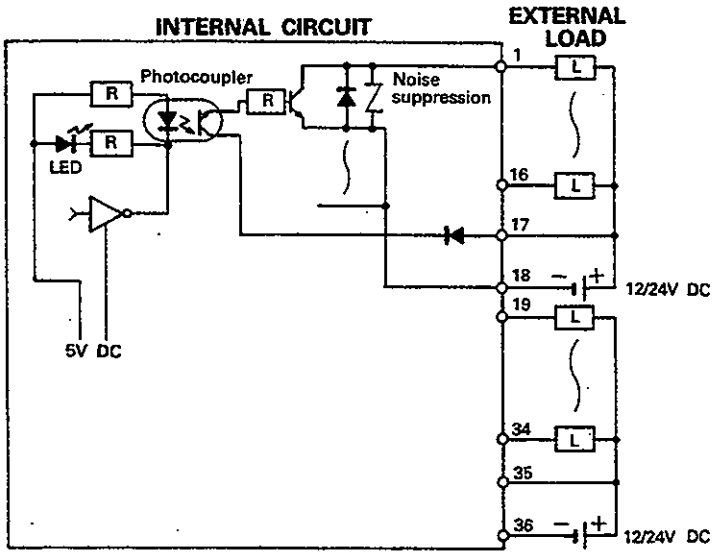
Specifications \ Type		AY51
Output points		32 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 30V DC
Max. load current		0.5A/point, 4A/common *(3.3A/common)
Max. inrush current		4A 10ms or shorter
Leakage current (OFF)		0.1mA or lower
Max. voltage 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)
Indication		1 LED per point
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

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	Not used
TB18	0V	TB38	Not used
TB19	Y10		
TB20	Y11		



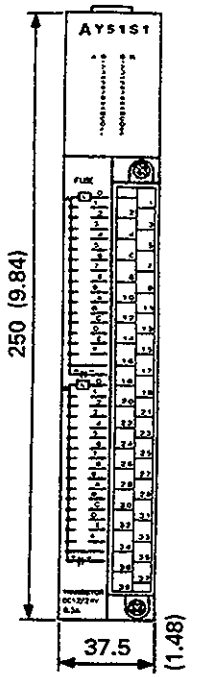
**: 3.3A/common when the output module is used next to the power supply module.*

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 PC CPU.)
Common terminal arrangement		16 points/common (common terminal: TB18, TB36), 8 points/fuse common
Indication		1 LED per point
Connection method		38-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm (tightening torque: 7kg·cm (0.05lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

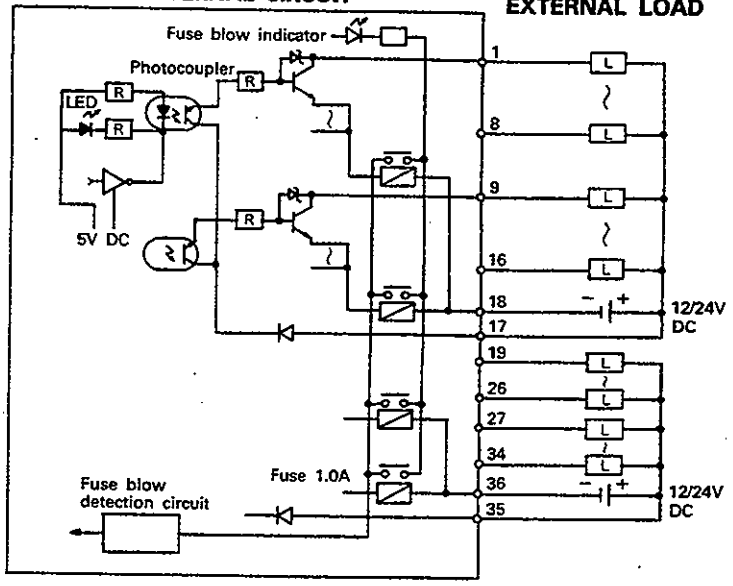
Front View mm(inch)



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	Not used
TB18	0V	TB38	Not used
TB19	Y10		
TB20	Y11		

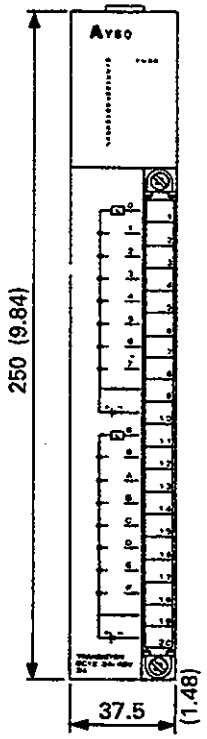
INTERNAL CIRCUIT **EXTERNAL LOAD**



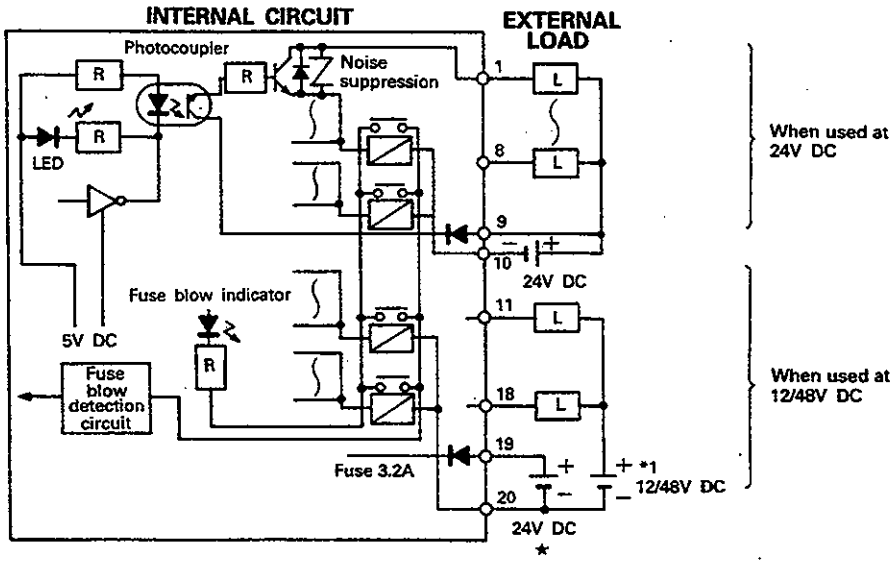
3.22 Type AY60 Output Module (Sink Loading)

Transistor Output

Specifications \ Type		AY60	Front View mm(inch)
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) *(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		LED on unit front. Signal to PC CPU	
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)	
Indication		1 LED per point	
Connection method		20-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	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.

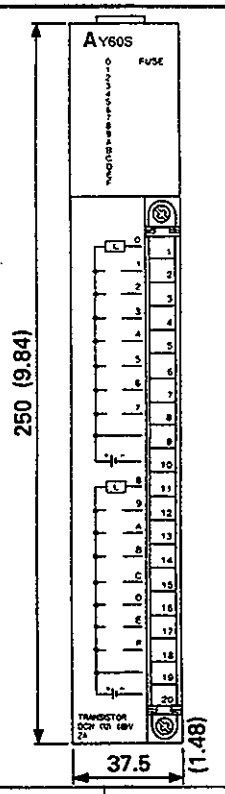
*: 3A/common when the output module is used next to the power supply module.

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
Max. load current		2A/points, 6.4A/common (5A/fuse)*2 (5A/common)
Operating load voltage range		21.6 to 52.8V DC (10.2 to 52.8V DC)*1
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)
Noise suppression		Varistor (90 to 110V)
Fuse rating		5A fast blow fuse (2 fuse per common) type MP-50
Indication		1 LED per point
Fuse blow indicator		LED on unit front. Signal to PC CPU
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)
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

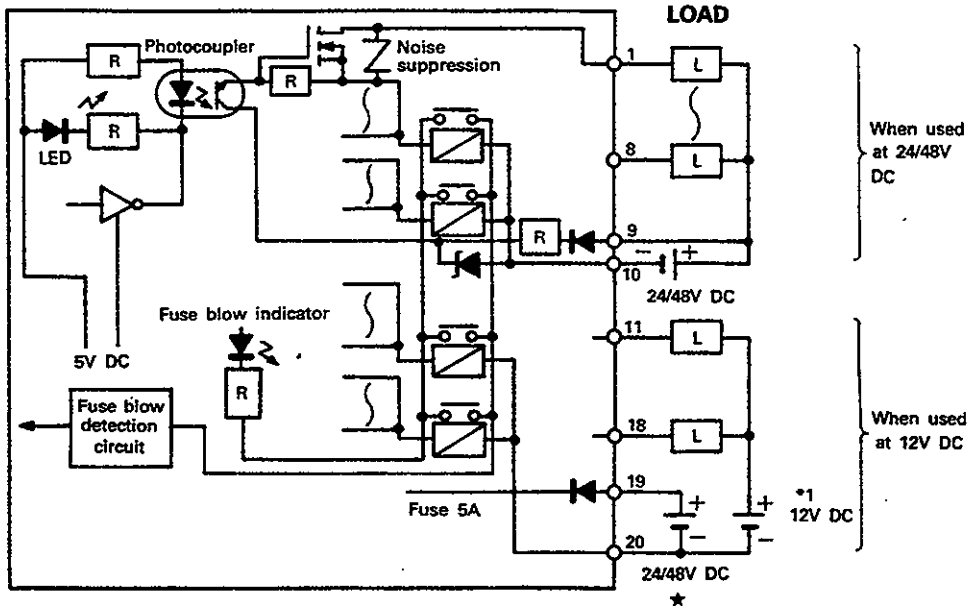
Front View mm(inch)



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.

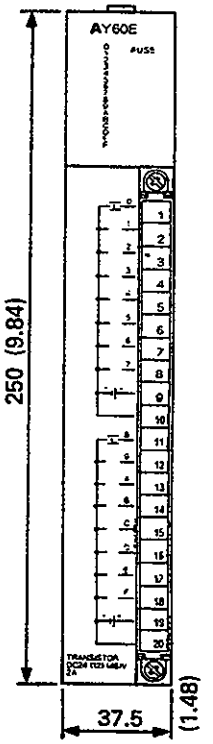
*2: 5A/common when the output module is next to the power supply module.

3.24 Type AY60E Output Module (Source Loading)

Transistor Output

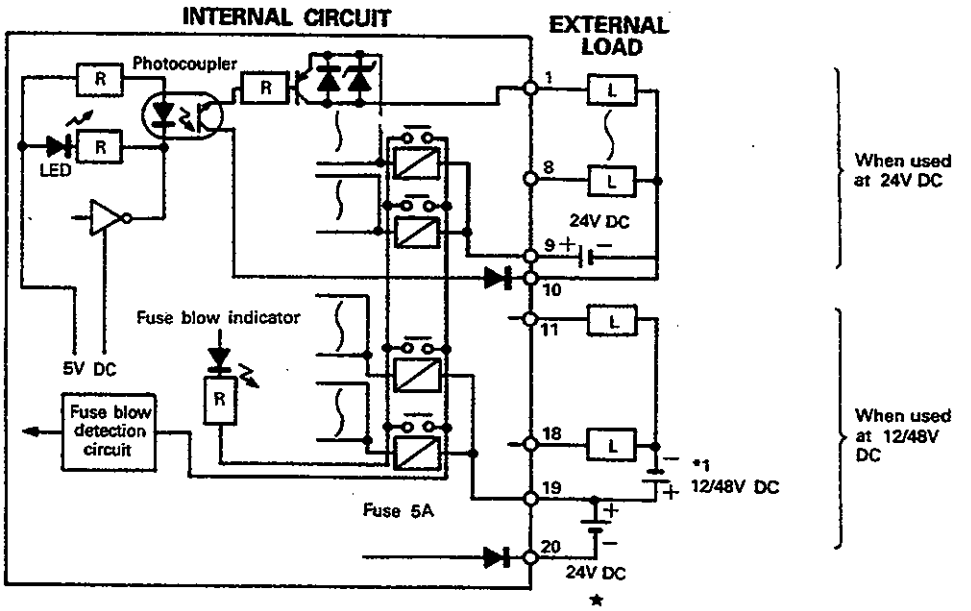
Specifications \ Type		AY60E
Output points		16 points
Insulation system		Photocoupler
Rated load voltage		24V DC/(12/48V)*1
Operating load voltage range		21.6 to 26.4V DC (10.2 to 56V DC)*1
Max. load current		12/24V DC 2A/point, 48V DC 0.8A/point *(3A/common)
Max. inrush current		4A 100ms or shorter, 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		Diode for absorbing noise
Fuse rating		5A fast blow fuse (1 fuse per common) type
Fuse blow indicator		LED on unit front. Signal to PC CPU
Common terminal arrangement		8 points/common (common terminal: TB10, TB20)
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

Front View mm(inch)



Weight	0.63kg (1.38lbs)

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.

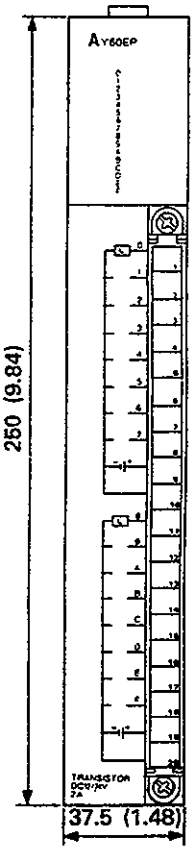
*: 3A/common when the output module is used next to the power supply module.

3.25 Type AY60EP Output Module (Source Loading, Circuit protection provided)

Transistor Output

Specifications \ Type		AY60EP
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		2A/point, 0.8A/point (60% ON, 55°C)
Max. inrush current		No limit (short protect)
Leakage current (OFF)		1.0mA or lower
Max. voltage drop (ON)		1.6V (TYP.) 2.0A, 2.0V (MAX) 2.0A
Response time	OFF → ON	0.5ms or less
	ON → OFF	1.5ms or less (resistive load)
External power supply requirement	Voltage	12/24V DC(10.2 to 26.4V DC)
	Current	110mA (TYP. 24V DC/common)
Noise suppression		Diode for absorbing noise
Protect		Provided (thermal and short-circuit protects) Thermal protect is detected in 2 points unit. When thermal protect 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 thermal protect occurs at an odd device number and output is turned OFF, output of the previous even device number is turned OFF simultaneously.
Protect reset		Automatic reset (reset by canceling thermal protect)
Common terminal arrangement		8 points/common (common terminal: TB9, TB19)
Indication		1 LED per point
Protect detection indication		Provided (LED is turned ON when thermal protect of short-circuit protect occurs. Fuse blow signal is output to a PC CPU).
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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A,

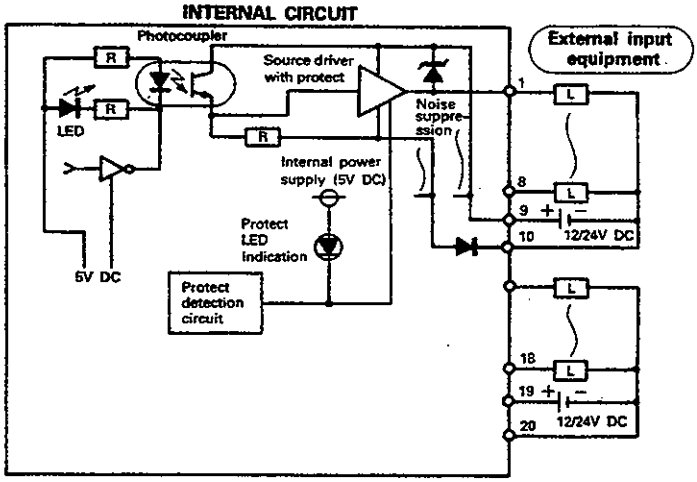
Front View mm(inch)



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: 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.

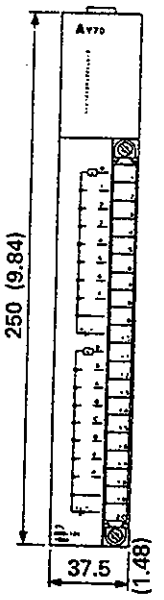
*2: When an external load remains short-circuited for a longtime, internal circuit may be broken. It is recommended to detect an occurrence state of short-circuit protect by using a sequence program and turn OFF the output of corresponding device number after a short-circuit protect occurs. (Time limit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

3.26 Type AY70 Output Module (Sink Loading)

TTL, CMOS Output

Specifications \ Type		AY70
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)
Indication		1 LED per point
Connection method		20-point removable terminal block (M3 × 6mm metric screws)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

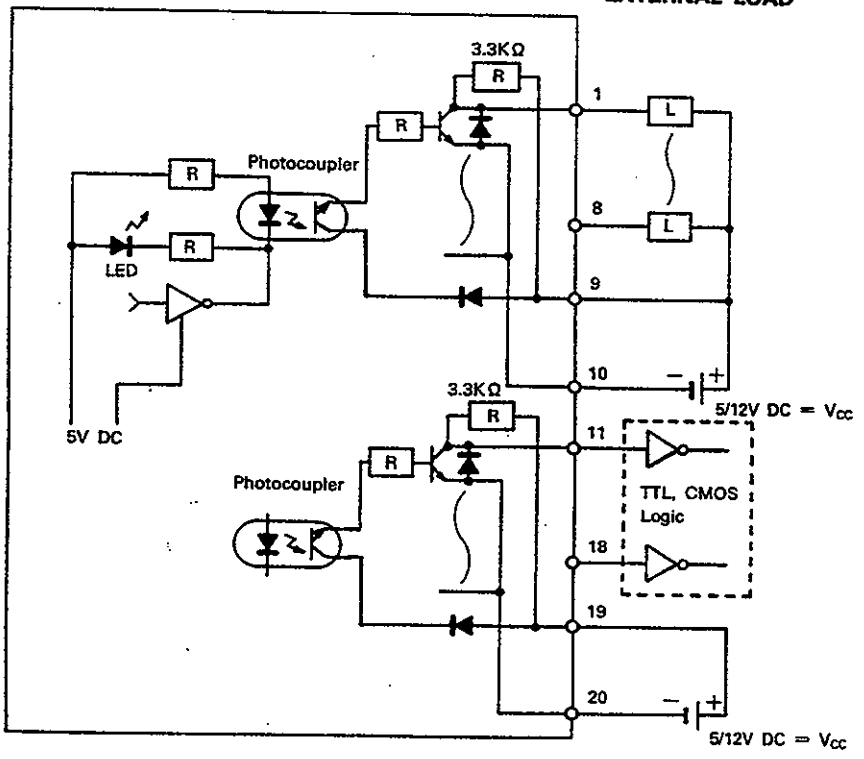
Front View mm(inch)



Weight: 0.36kg (0.80lbs)

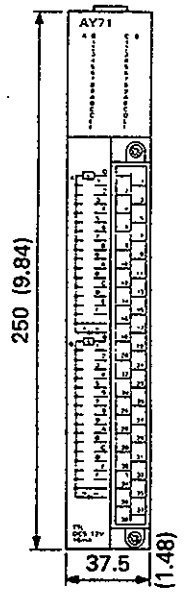
Terminal No.	Signal No.
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	5/12V DC
TB10	0V
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	Y0B
TB15	Y0C
TB16	Y0D
TB17	Y0E
TB18	Y0F
TB19	5/12V DC
TB20	0V

INTERNAL CIRCUIT **EXTERNAL LOAD**



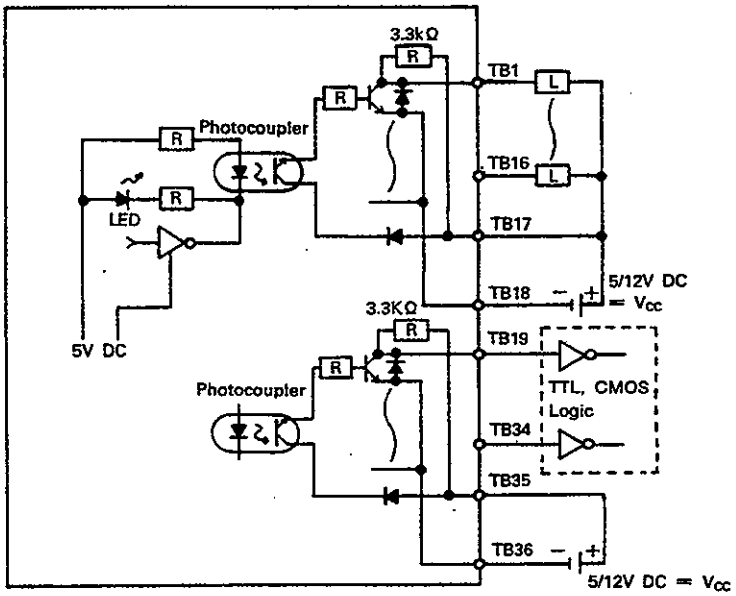
3.27 Type AY71 Output Module (Sink Loading)

TTL, CMOS Output

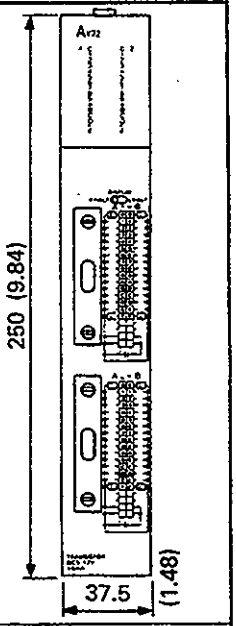
Specifications \ Type		AY71	Front View mm(inch)
Output points		32 points	
Insulation system		Photocoupler	
Rated load voltage		5/12V DC	
Operating load voltage range		4.5 to 15V DC	
Max. load current		16mA/point, 256mA/common (sink load)	
Max. inrush current		50mA 10ms	
Leakage current (OFF)		VOH: 3.5V (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)	
Indication		1 LED per point	
Connection method		38-point removable terminal block (M3 × 6mm metric screws)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (0.505lb·ft))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	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	Not used
TB18	0V	TB38	Not used
TB19	Y10		
TB20	Y11		

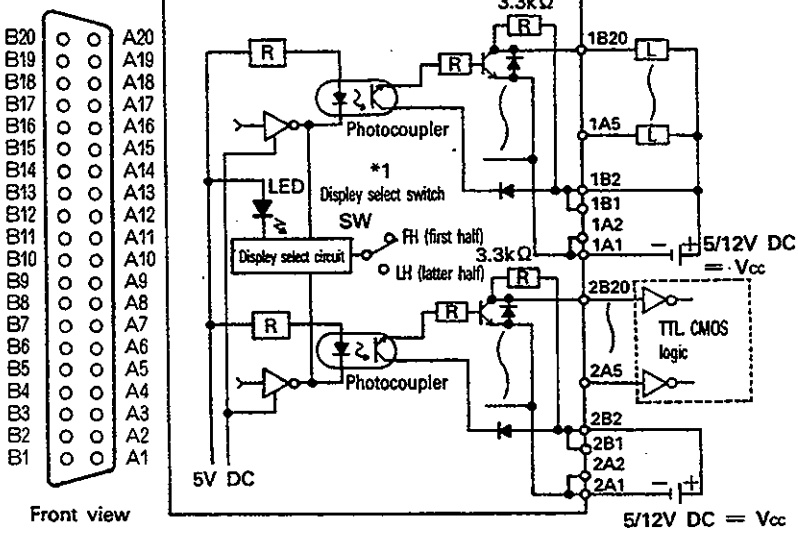
INTERNAL CIRCUIT **EXTERNAL LOAD**



3.28 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)	
Indication		1 LED per point	
Connection method		Two 40-pin connectors (soldered)	
Applicable wire size		0.3 mm²	
Applicable solderless terminal		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	Not used	2B4	Not used
1B3	Not used	2B3	Not used
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	Not used	2A4	Not used
1A3	Not used	2A3	Not used
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.*

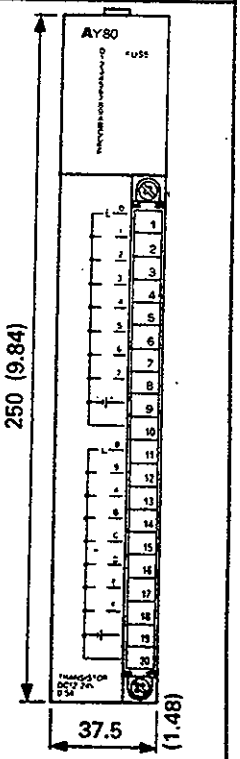
**4: AY72 is provided with two soldered type connector jacks. When a pressure displacement type connector is necessary, user should prepare it referring to Section 1 (8) (Type: FCN-361J040-AU (connector), FCN-360C040-B (cover))*

3.29 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)
Indication		1 LED per point
Fuse blow indicator		LED on unit front. Signal to PC 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: 7kg·cm (0.505lb-ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

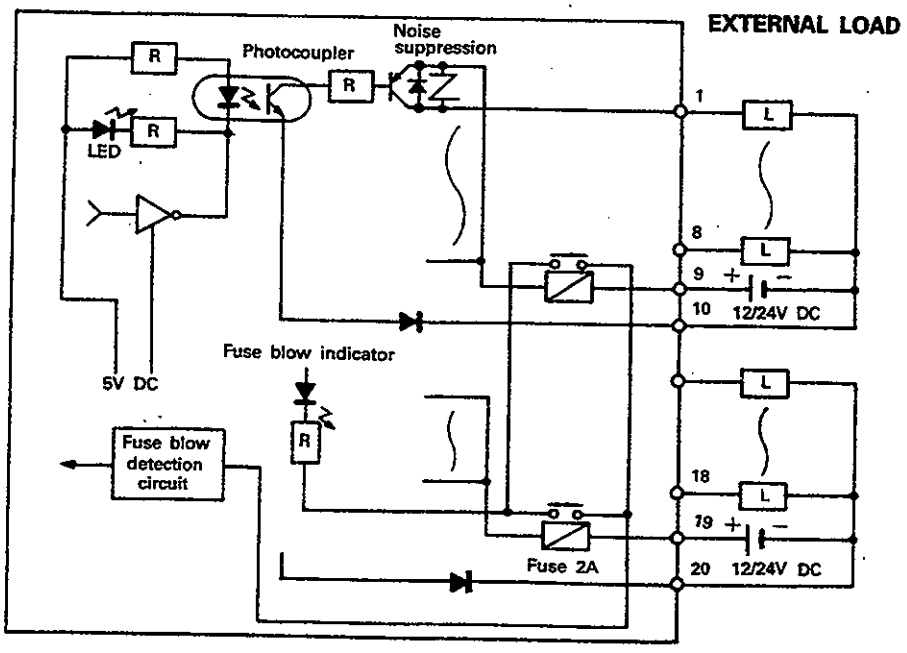
Front View mm(inch)



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

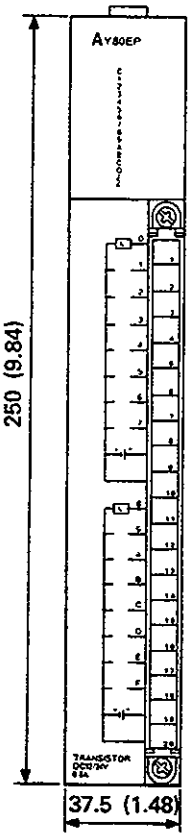


3.30 Type AY80EP Output Module (Source Loading, Circuit protection provided)

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)
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	100mA (TYP. 24V DC per common)
Noise suppression		Diode for absorbing noise
Protect		Provided (thermal and short-circuit protects) Thermal protect is detected in 2 points unit. When thermal protect 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 thermal protect occurs at an odd device number and output is turned OFF, output of the previous even device number is turned OFF simultaneously.
Protect reset		Automatic reset (reset by canceling thermal protect)
Common terminal arrangement		8 points/common (common terminal: TB9, TB19)
Indication		1 LED per point
Protect detection indication		Provided (LED is turned ON when thermal protect of short-circuit protect occurs. Fuse blow signal is output to a PC CPU).
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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A,

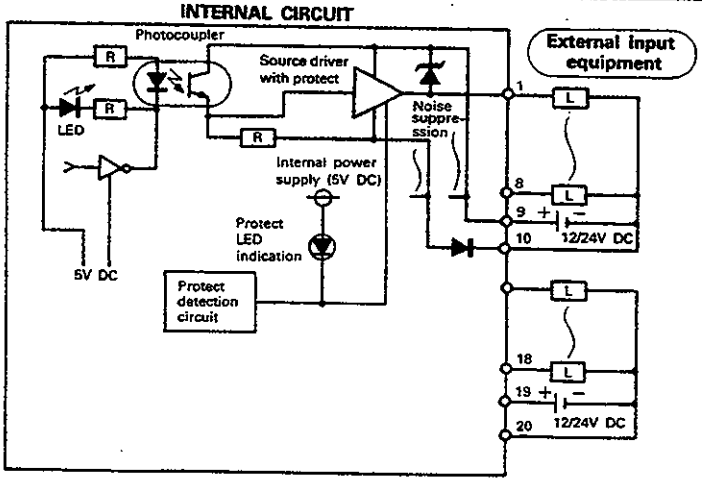
Front View mm(inch)



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



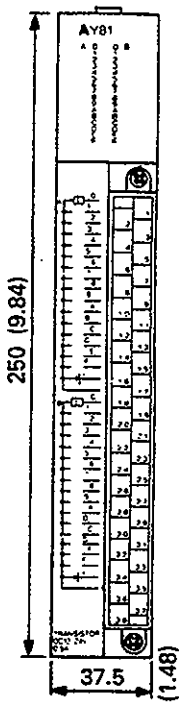
*1: Total length of cables connected to the external power supply and load should be 40 m or less. If it exceeds 40 m, output devices in the module may not be protected when output is short-circuited.

*2: 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 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
Indication		1 LED per point
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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A

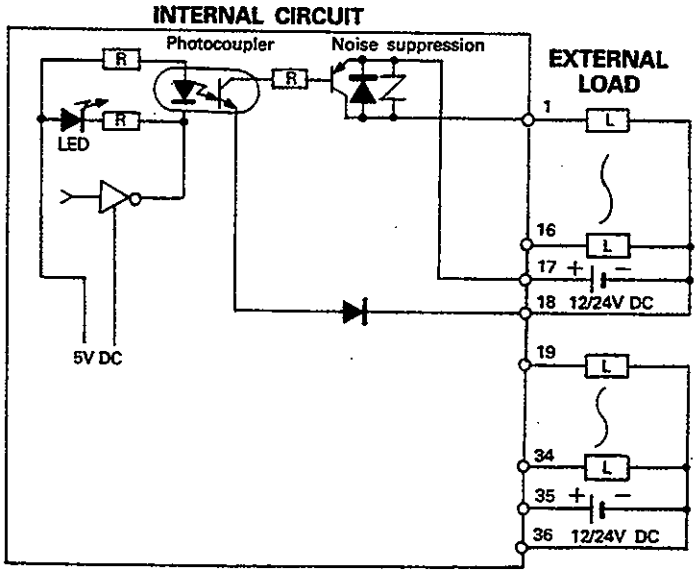
Front View mm(inch)



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	Not used
TB18	0V	TB38	Not used
TB19	Y10		
TB20	Y11		

INTERNAL CIRCUIT



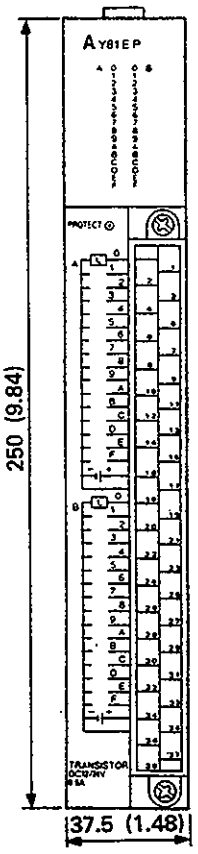
**: 3A/common when the output module is used next to the power supply module.*

3.32 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
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
Protect		Provided (thermal and short-circuit protects) Thermal protect is detected in 2 points unit. When thermal protect 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 thermal protect occurs at an odd device number and output is turned OFF, output of the previous even device number is turned OFF simultaneously.
Protect reset		Automatic reset (reset by canceling thermal protect)
Common terminal arrangement		16 points/common (common terminal: TB9, TB19)
Indication		1 LED per point
Protect detection indication		Provided (LED is turned ON when thermal protect of short-circuit protect occurs. Fuse blow signal is output to a PC CPU).
Internal current consumption (5V DC)		230mA (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: 7kg·cm (0.505lb·ft))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A,

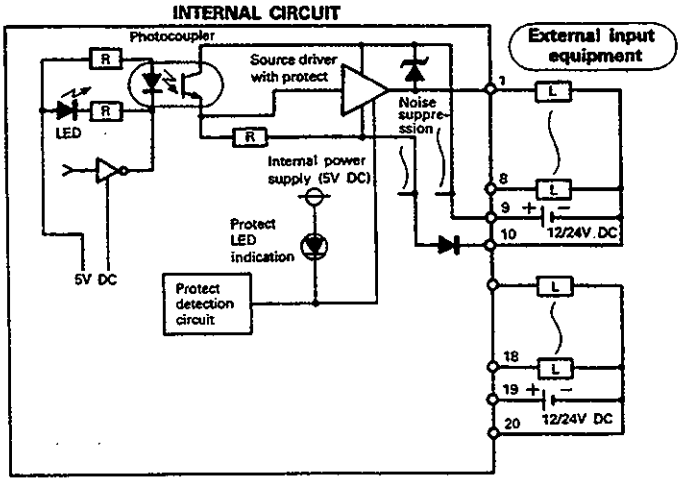
Front View mm(inch)



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	Not used
TB19	Y10	TB38	Not used

INTERNAL CIRCUIT



*1: 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.

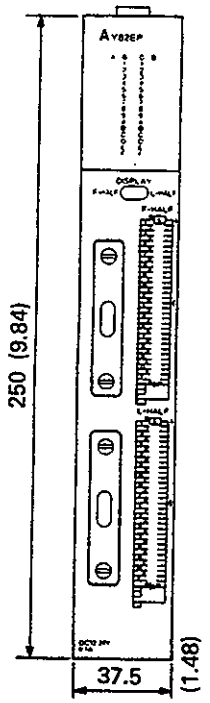
*2: When an external load remains short-circuited for a longtime, internal circuit may be broken.
It is recommended to detect an occurrence state of short-circuit protect by using a sequence program and turn OFF the output of corresponding device number after a short-circuit protect occurs.
(Time limit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

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

Transistor Output

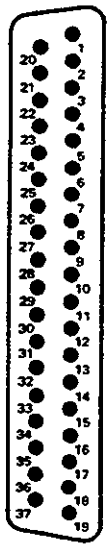
Specifications \ Type		AY82EP
Output points		64 points
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 26.4V DC
Max. load current		0.1A/point, 0.04A/point (60% ON, 55° C)
Max. inrush current		No limit (short protect)
Leakage current (OFF)		0.1mA or 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
External power supply requirement	Voltage	12/24V DC (10.2 to 26.4V DC)
	Current	Diode for absorbing noise
Protect		Provided (thermal and short-circuit protect) Thermal protect is detected in 1 point unit. When thermal protect occurs at an 1 point of 1 common, output of all points for corresponded common terminal is turned OFF.
Protect reset		Automatic veset (veset by canceling thermal protect)
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
Protect detection indication		None
Internal current consumption (5V DC)		290mA (TYP. all points ON)
External connection system		Two 40-pin D sub-connectors (soldered)
Applicable wire size		0.3mm²
Accessory		Two external wiring D sub-connectors

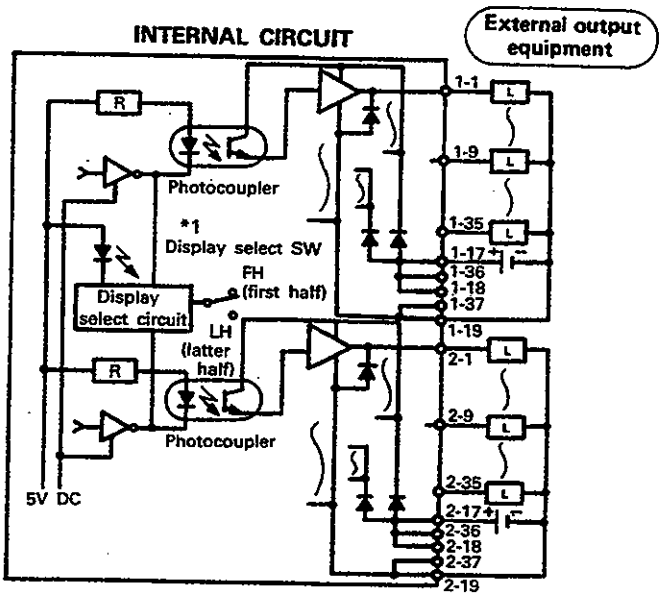
Front View mm(inch)



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





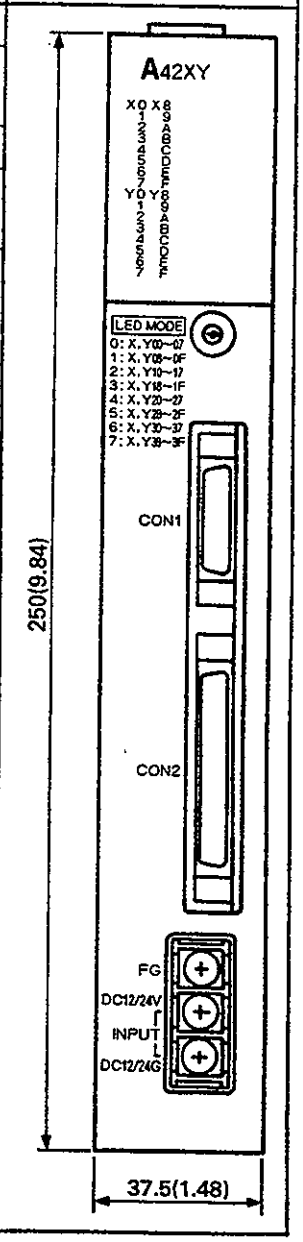
*1: The statuses of the first 32 outputs (Y00 to Y1F) are indicated by the LEDs when the toggle switch is set to FH (for fist half). The second 32 outputs (Y20 to Y3F) are indicated when LH is selected.
*2: Pin numbers 1□□ indicate the upper connector pins and 2□□ the lower connector pins.
*3: AY82EP 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

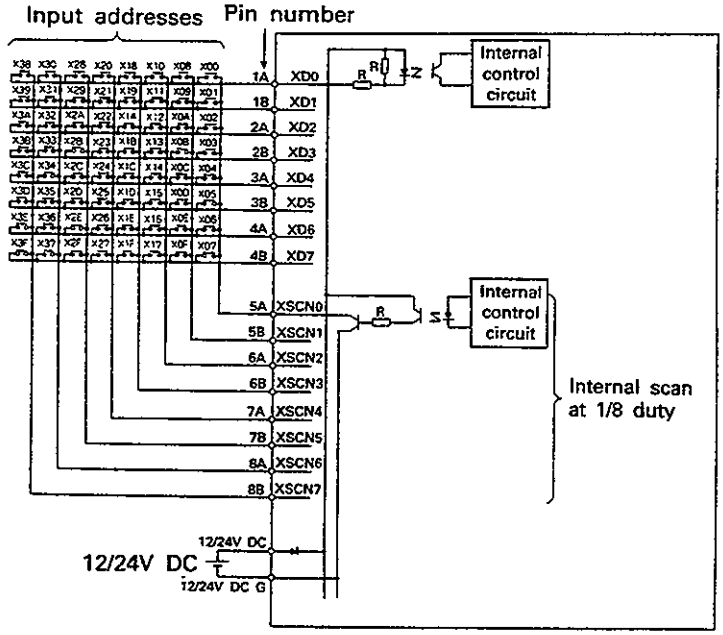
Input Specifications			Output Specifications			Front Panel
Number of inputs		64	Number of outputs		64	
Number of I/O occupied		64*1				
Insulation method		Photocoupler	Insulation method		Photocoupier	
Input method		Dynamic scan of 8 inputs × 8	Output method		Dynamic scan of 8 outputs × 8	
ON voltage/current		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.	
Indication		1 LED per 8 inputs. Batch of 8 inputs selected by rotary switch.	Indication		1 LED per 8 outputs. 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)

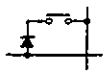
REMARKS

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

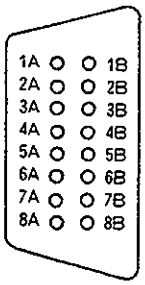
Input Connection Diagram



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

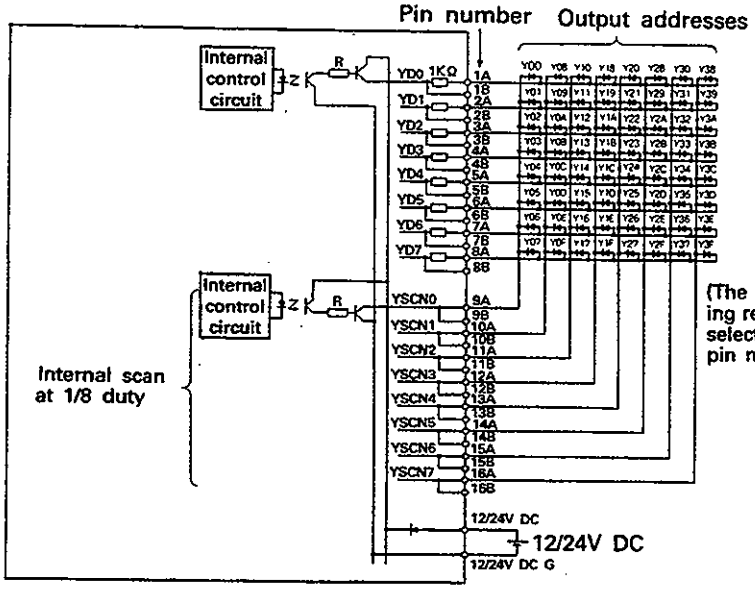


Pinouts

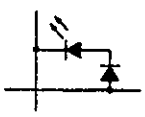


(Front view)

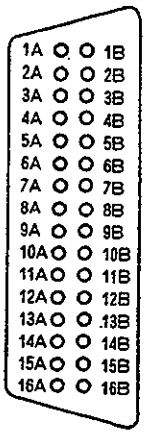
Output Connection Diagram



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.)



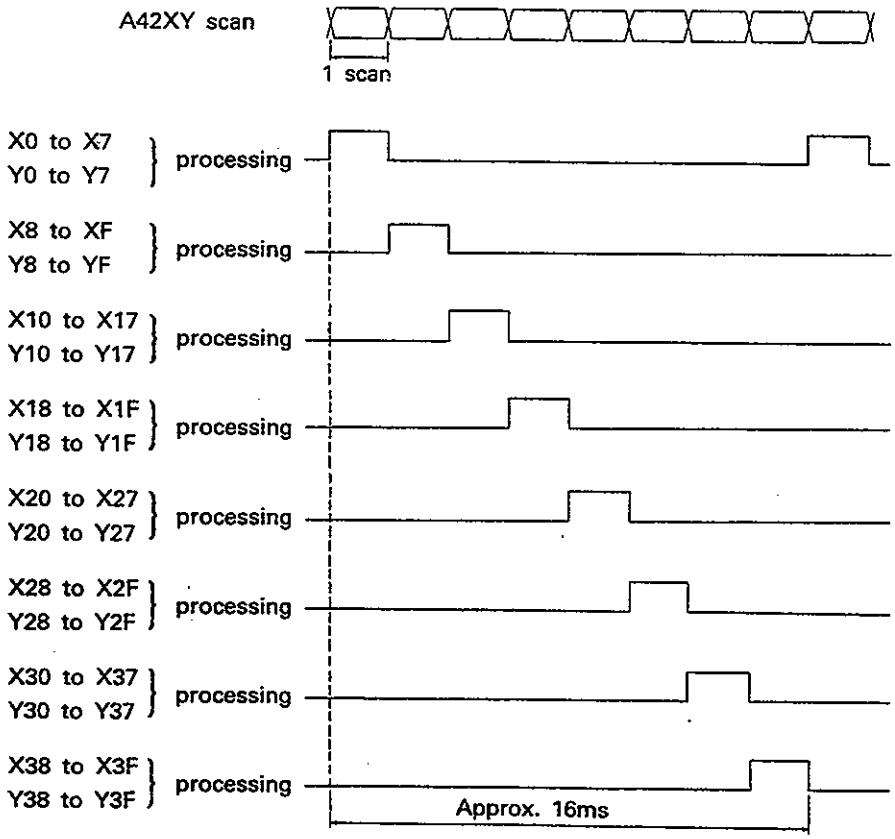
Pinouts



(Front view)

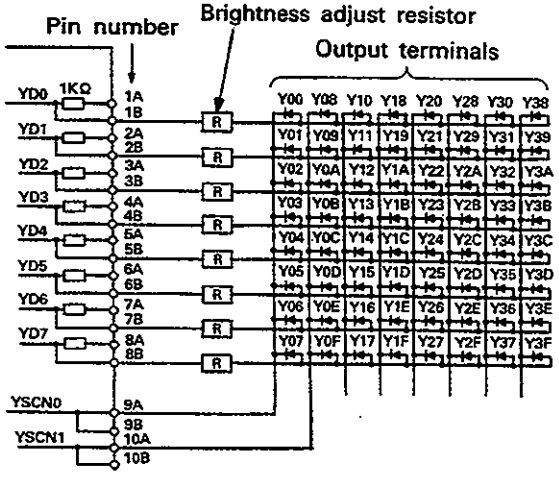
4.1.2 Dynamic scanning

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

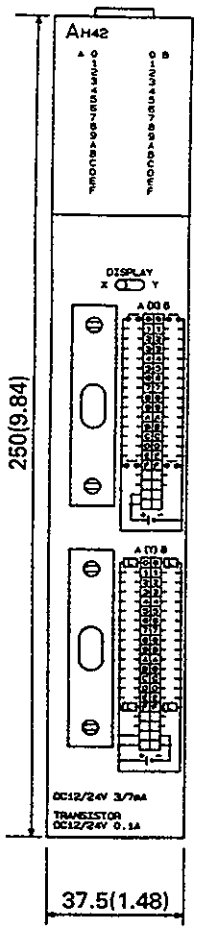
The AH42 is a sink loading type I/O module which controls 32 DC input points and 32 transistor output points.

Input Specifications			
Number of inputs		32	
Insulation system		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		Approx. 3mA	Approx. 7mA
Operating voltage range		10.2 to 26.4V DC (ripple ratio within 5%)	
ON voltage/current		9.5V DC or higher/3mA or higher	
OFF voltage/current		6V DC or lower/1.5mA or lower	
Input resistance		Approx. 3.3 kΩ	
Input method		Sink loading	
Response time	OFF→ON	10 msec or less (24V DC)	
	ON→OFF	10 msec or less (24V DC)	
Common terminal arrangement		32 points/common (1B1, 1B2)	
Max. simultaneous ON		60% simultaneous ON	

Output Specifications		
Number of outputs		32
Insulation system		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 40V DC
Max. load current		0.1A/point, 1 A/common
Max. inrush current		0.4A, 10msec or less
Leakage current (OFF)		0.1mA or lower
Max. voltage drop during ON		2.5V DC (0.1 A), 1.75V DC (5mA), 1.7V DC (1mA)
Output method		Sink loading
Response time	OFF→ON	2 msec or less
	ON→OFF	2 msec or less (resistive load)
External power supply	Voltage	12/24V DC (10.2 to 40V DC)
	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	1 LED per point (switch selection of block of 32 points)
Connection method	Two 40-pin connectors
Applicable wire size	0.3mm²
Accessory	Two 40-pin connectors (soldered)
Weight	0.7kg
External dimensions	See Appendix 1.1.1 (3) 40-pin connector.

Front Panel



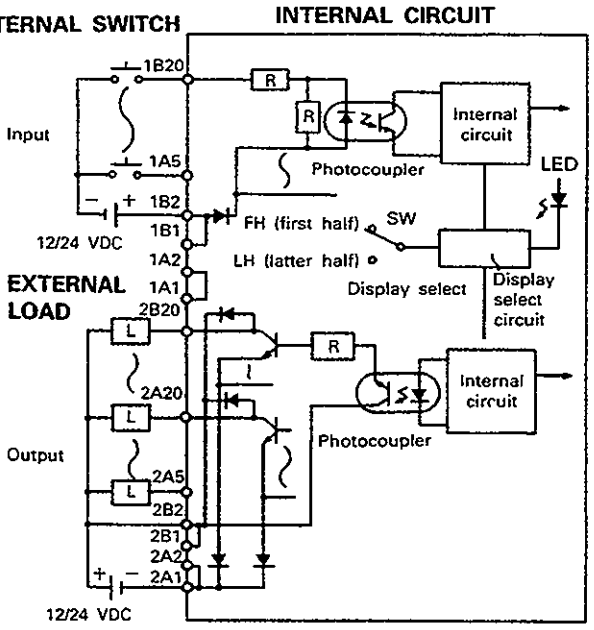
*1: The number of occupied I/O points is 64: first 32 points are allocated as inputs and latter 32 points are allocated as outputs.

*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	Not used	1A4	Not used
1B3	Not used	1A3	Not used
1B2	12/24V DC	1A2	Not used
1B1	12/24V DC	1A1	Not used



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	Not used	2A4	Not used
2B3	Not used	2A3	Not used
2B2	12/24V DC	2A2	0V
2B1	12/24V DC	2A1	0V

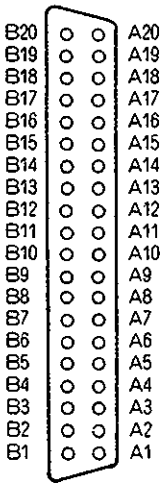
*1: LED indication is selected by using the select switch on the front of the module.
When the switch is set to X, 32 input points are indicated.
When the switch is set to Y, 32 output points are indicated.
X: inputs (X00 to X1F) are indicated.
Y: outputs (Y20 to Y3F) are indicated.

*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.
(Type: FCN-361J040-AU (connector)
FCN-360C040-B (cover))
When a pressure displacement type connector is necessary, user should prepare it referring to Section 1 (8).

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

	Type	Details	Applicable Models
Connector/terminal block converter unit	A6TBXY36	For sink type input modules and sink type output modules (standard type)	AX42, AY42(S3/S4), AH42, AJ35TC1-32D
	A6TBX54	For sink type input modules and sink type output modules (2-wire type)	
	A6TBX70	For sink type input modules (3-wire type)	AX42, AH42, AJ65BTC1-32D
	A6TBX36-E	For source type input modules (standard type)	AX82
	A6TBY36-E	For source type output modules (standard type)	AY82EP
	A6TBX54-E	For source type input modules (2-wire type)	AX82
	A6TBY54-E	For source type output modules (2-wire type)	AY82EP
	A6TBX70-E	For source type input modules (3-wire type)	AX82
Cable	AC05TB	0.5 m (19.69 in.), for sink modules	A6TBXY36 ATBXY54 A6TBX70
	AC10TB	1 m (39.37 in.), for sink modules	
	AC20TB	2 m (78.74 in.), for sink modules	
	AC30TB	3 m (118.11 in.), for sink modules	
	AC50TB	5 m (196.85 in.), for sink modules	
	AC80TB	8 m (314.96 in.), for sink modules (common current not exceeding 0.5 A)	
	AC100TB	10 m (393.7 in.), for sink modules (common current not exceeding 0.5 A)	A6TBX36-E A6TBY36-E A6TBX54-E A6TBY54-E A6TBX70-E
	AC05TB-E	0.5 m (19.69 in.), for source modules	
	AC10TB-E	1 m (39.37 in.), for source modules	
	AC20TB-E	2 m (78.74 in.), for source modules	
	AC30TB-E	3 m (118.11 in.), for source modules	
	AC50TB-E	5 m (196.85 in.), for source modules .	

INPORTANT

(1) The A1SX81 is a sink/spurce combination type, but nevertheless it should be used only with A6TBX36-E, A6TBX54, or A6TB70-E. A6TBXY36, A6TBXY54, and A6TBX70 cannot be used with it.

(2) 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.

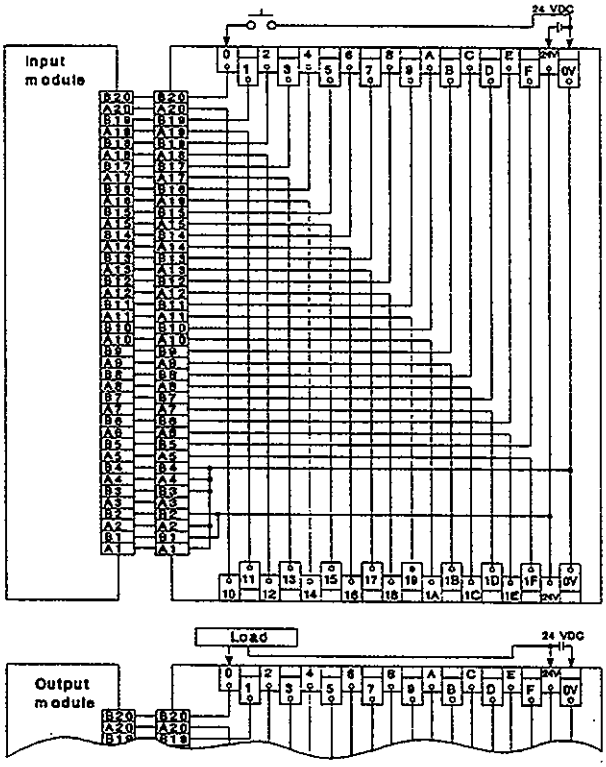
(3) Tighten the module terminal screws to the following torque.
Feeder connecting terminal screw (M3.5 screw) .. tightening torque .. 78.4N·cm (8kgf·cm)

5.2 Connector/Terminal Block Convertor Module Connection Diagrams

5.2.1 A6TBXY36

(a) When connecting an input module

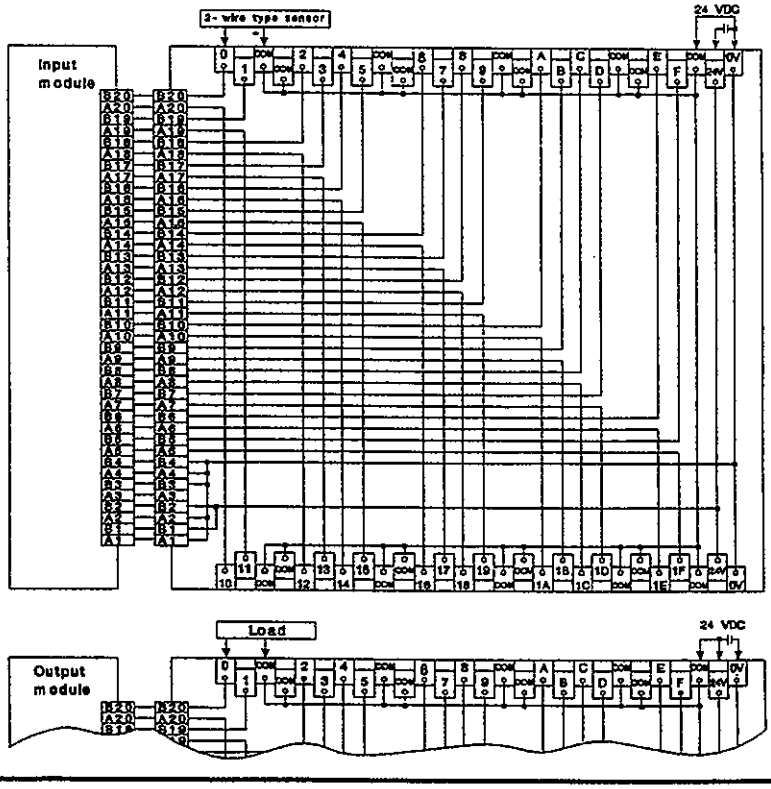
(b) When connecting an output module



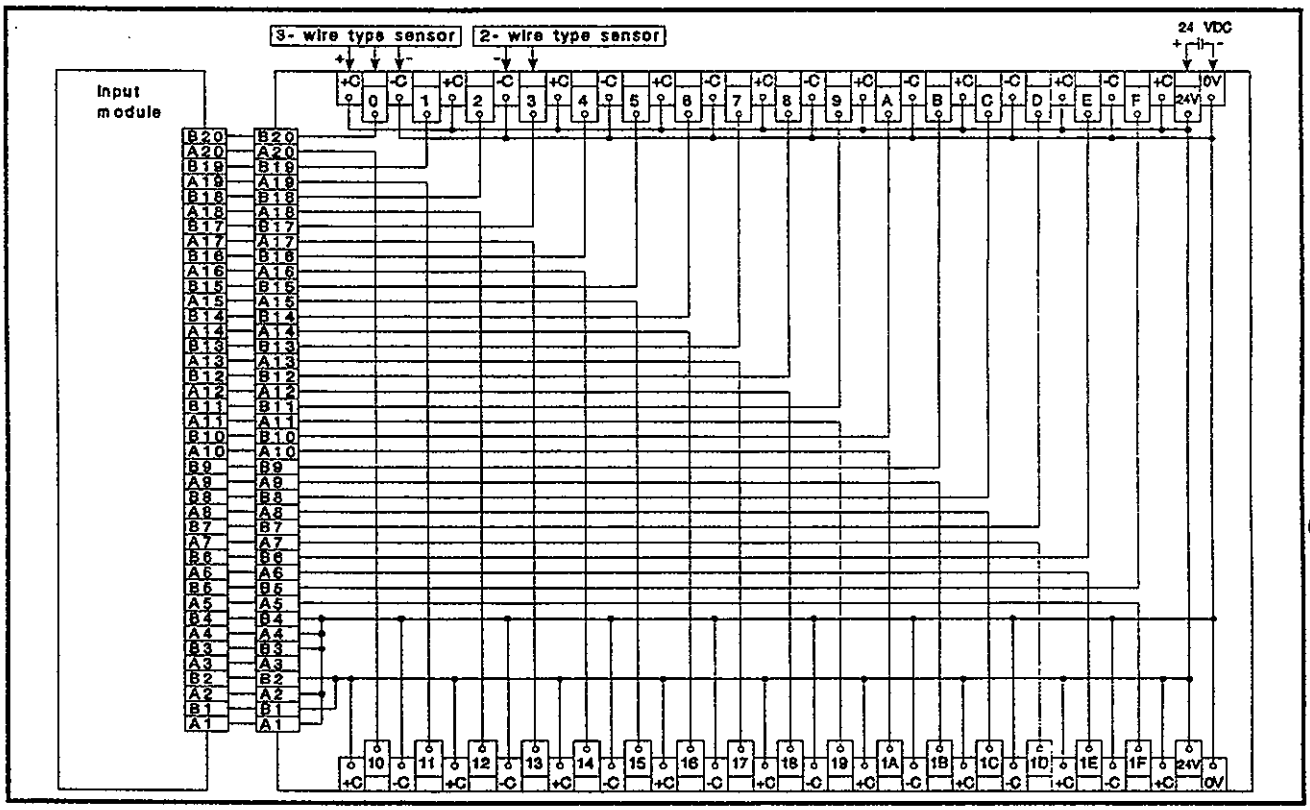
5.2.2 A6TBXY54

(a) When connecting an input module

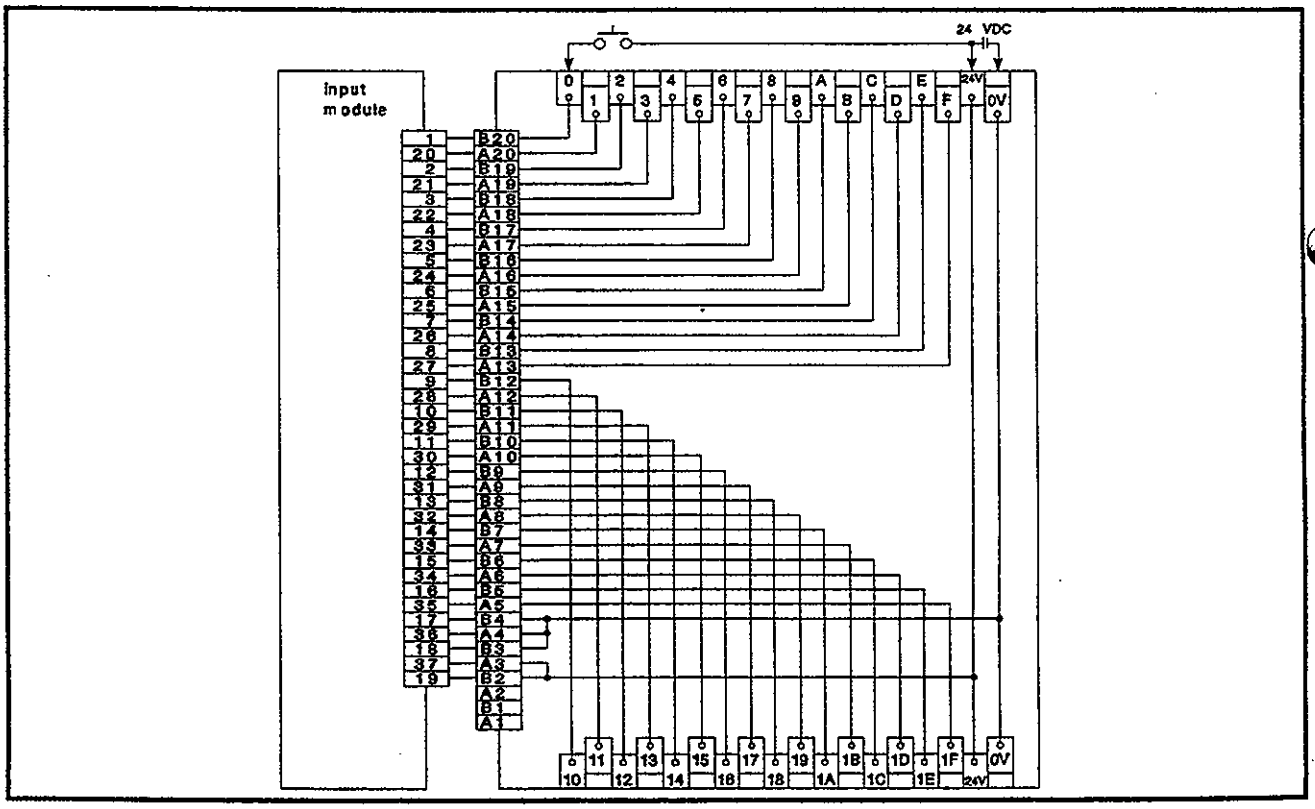
(b) When connecting an output module



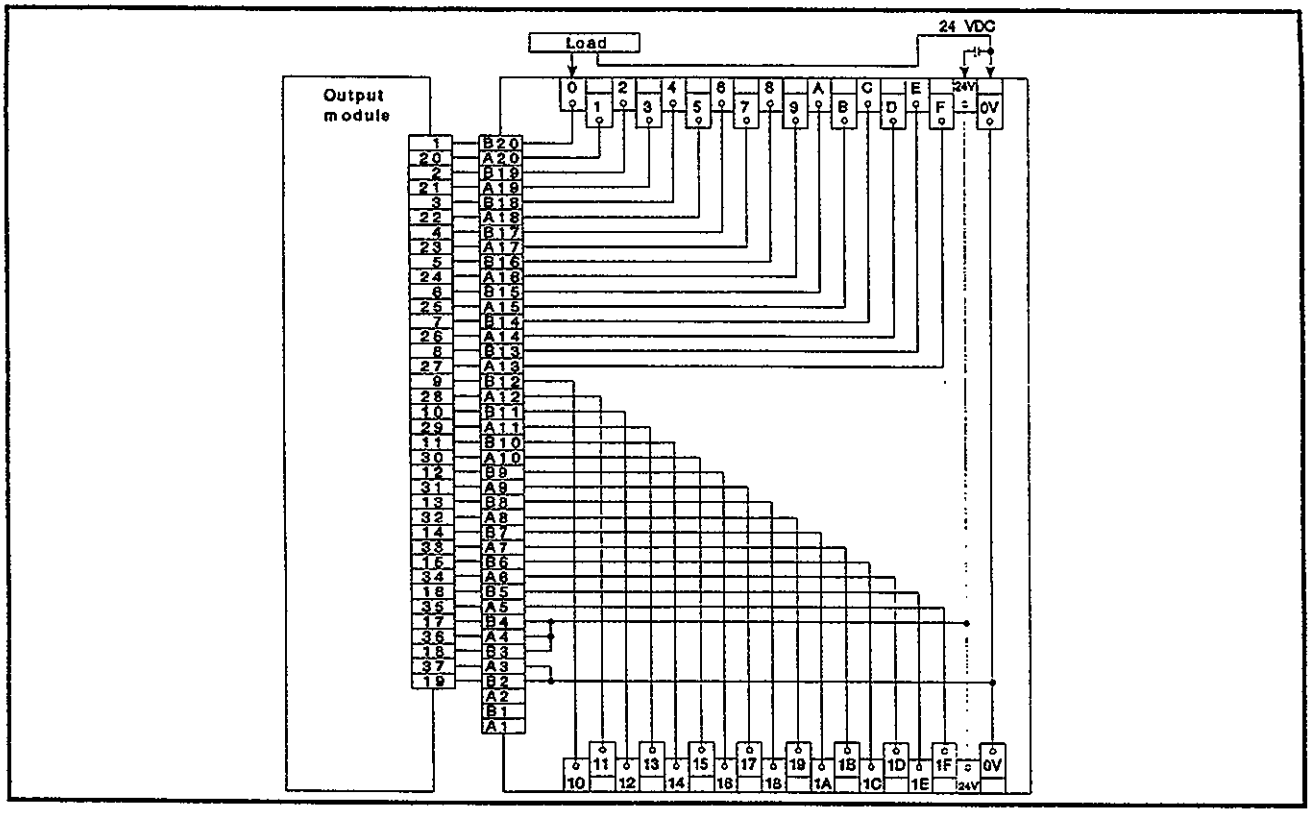
5.2.3 A6TBX70



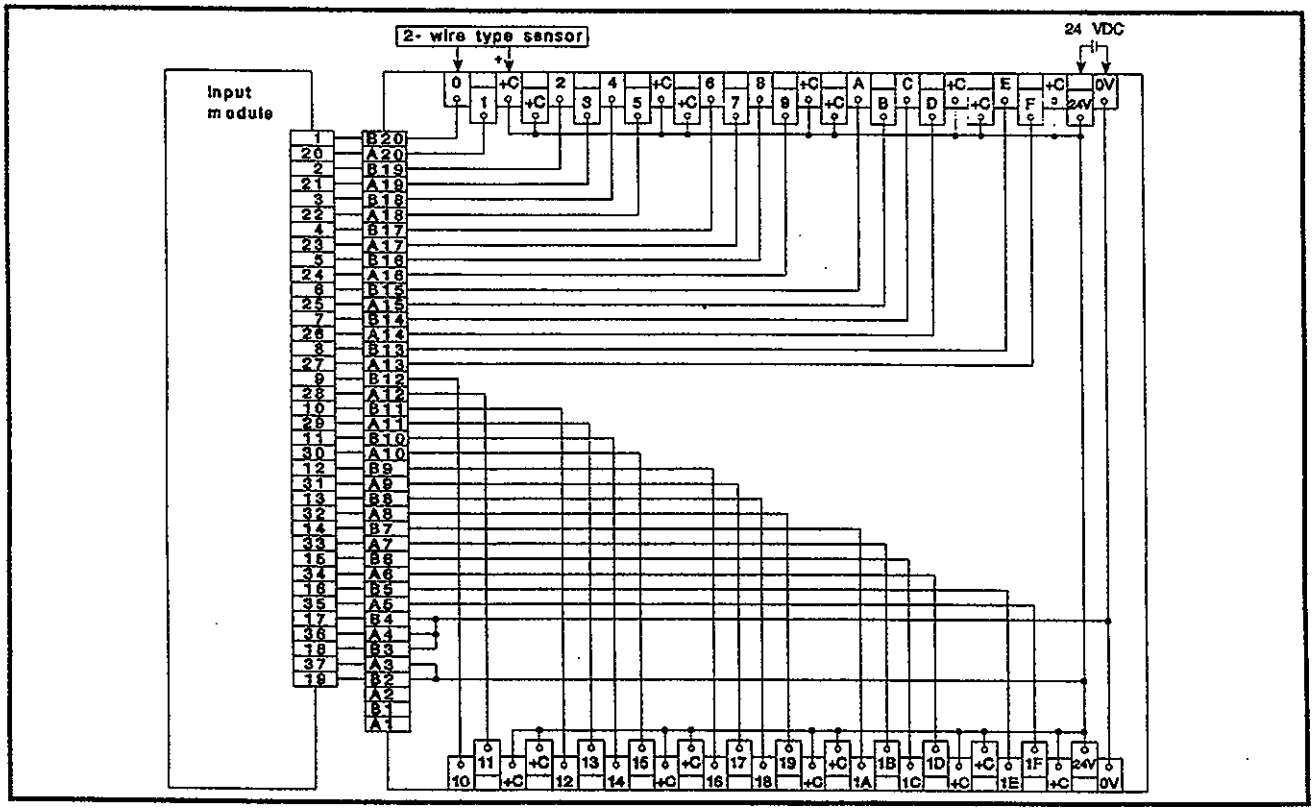
5.2.4 A6TBX36-E



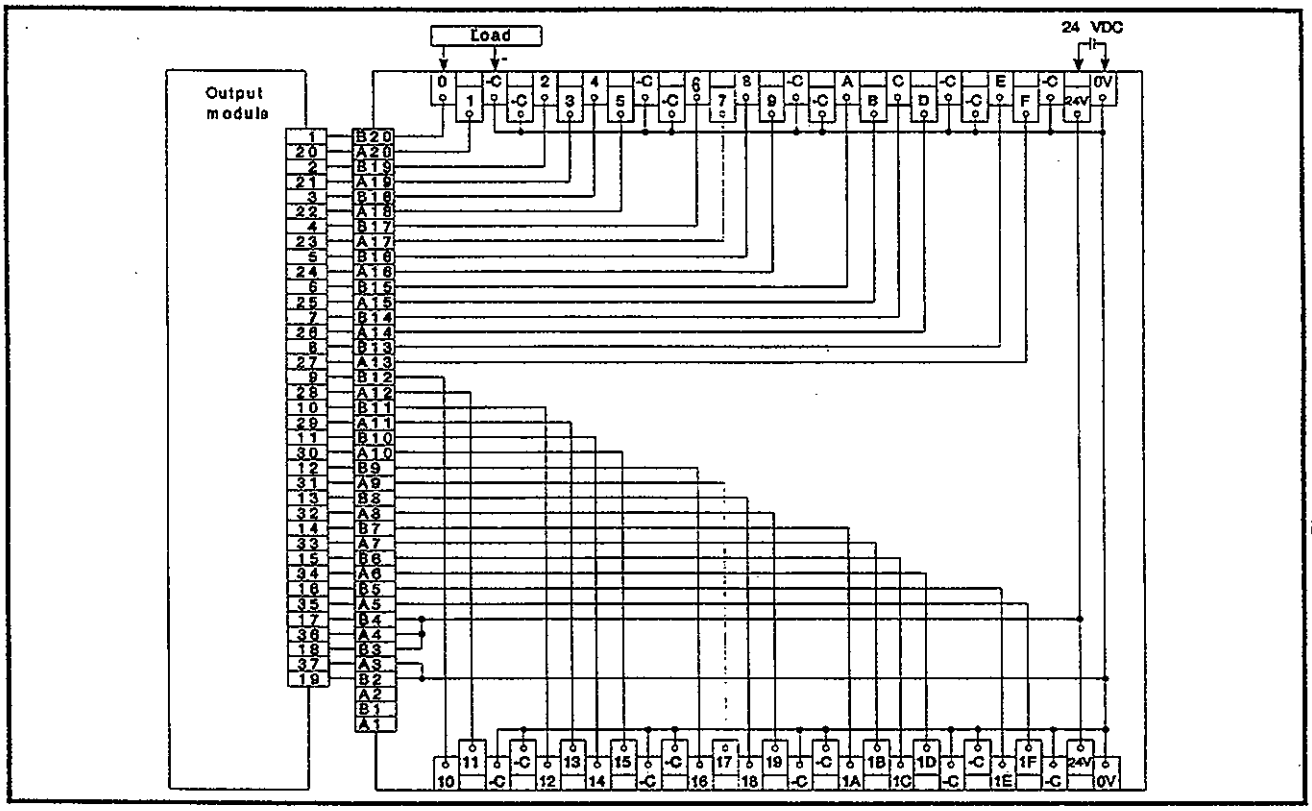
5.2.5 A6TBY36-E



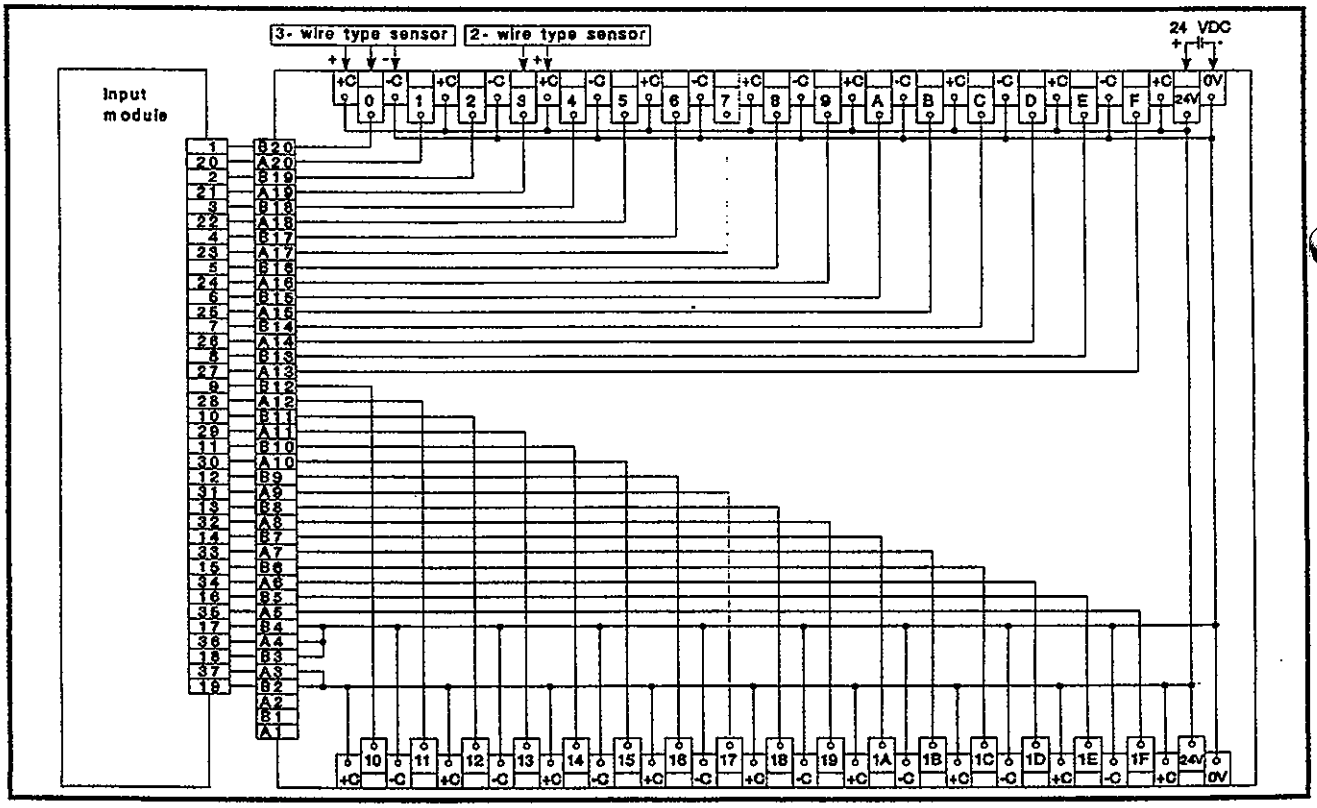
5.2.6 A6TBX54-E



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

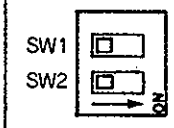
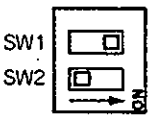
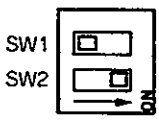
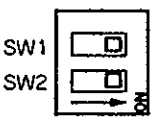
The AG60 blank cover is used to protect base unit vacant slots against dust etc.
The AG62 dummy module is used to reserve a specified number of I/O points at any base unit slot.

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	Vacant 16 points	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				

6.2 Simulation Switch (A6SW16, A6SW32) Specifications

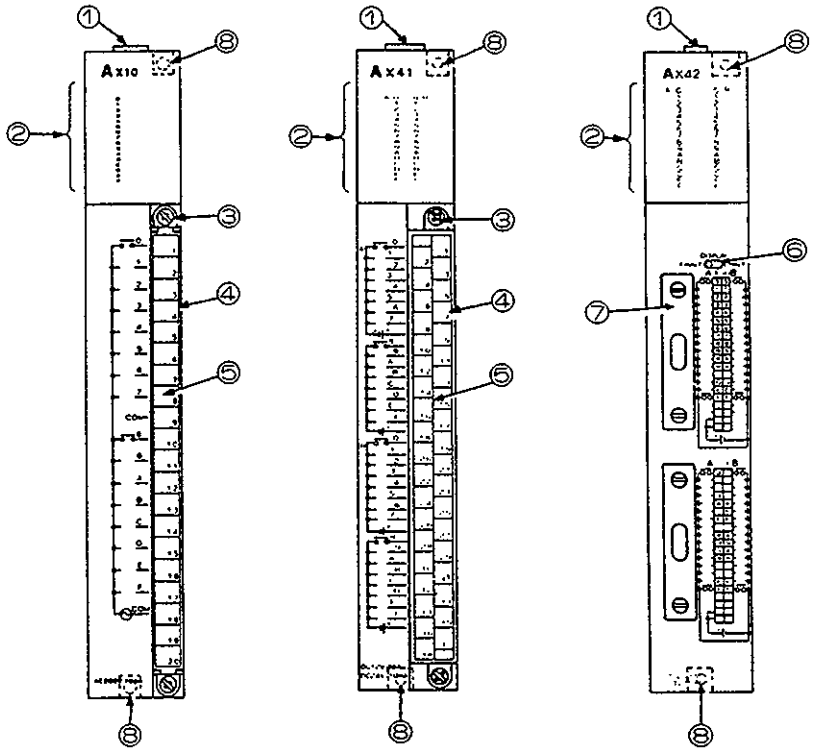
The simulation switches are banks of switches permanently fixed to a terminal block assembly. To use the simulation switches, remove the input modules terminal block and replace it with the appropriate simulation switch.
The simulation switches are used to test programs by simulating input conditions.

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	400g·f maximum	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

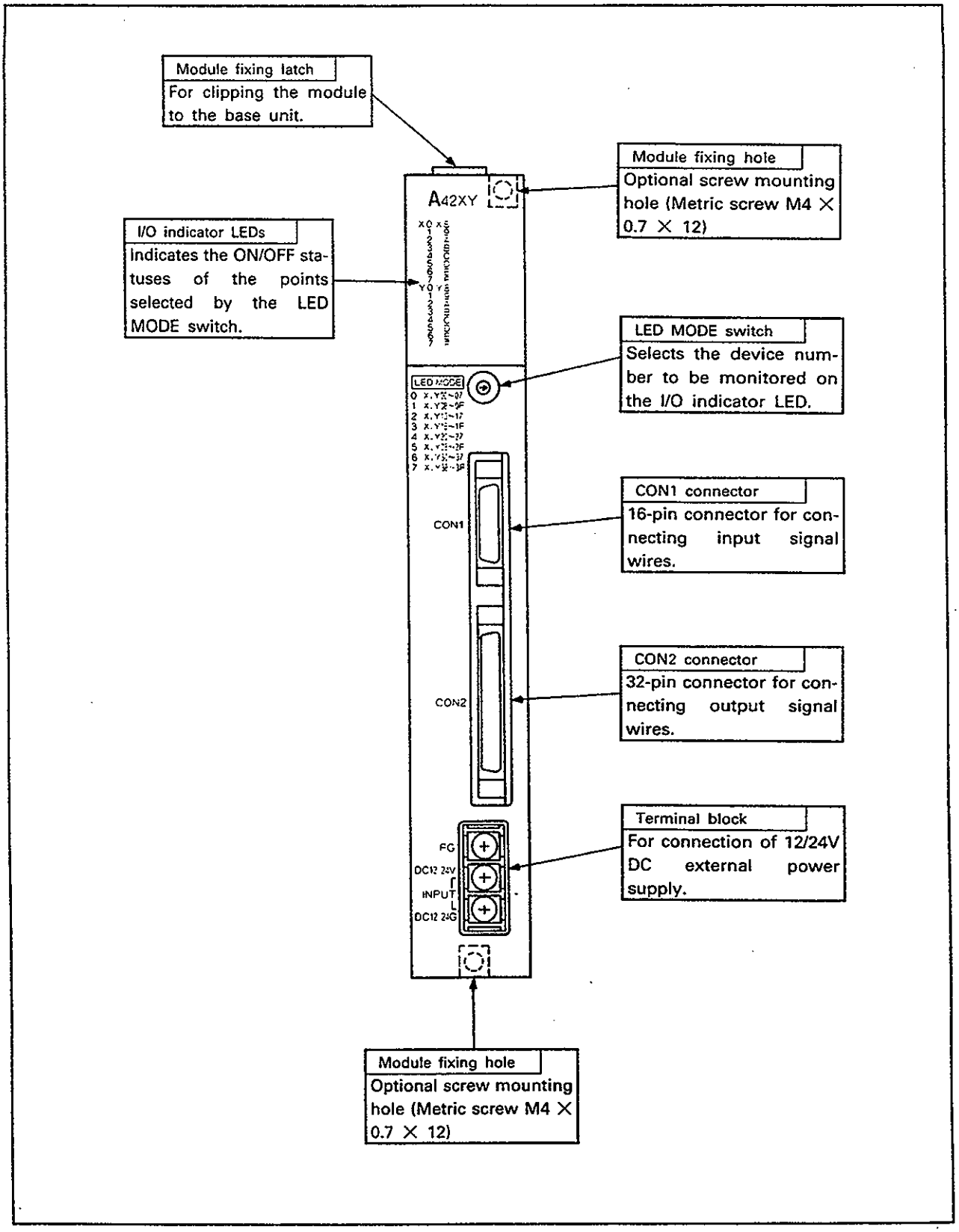
7. NOMENCLATURE

7.1 I/O Module Nomenclature

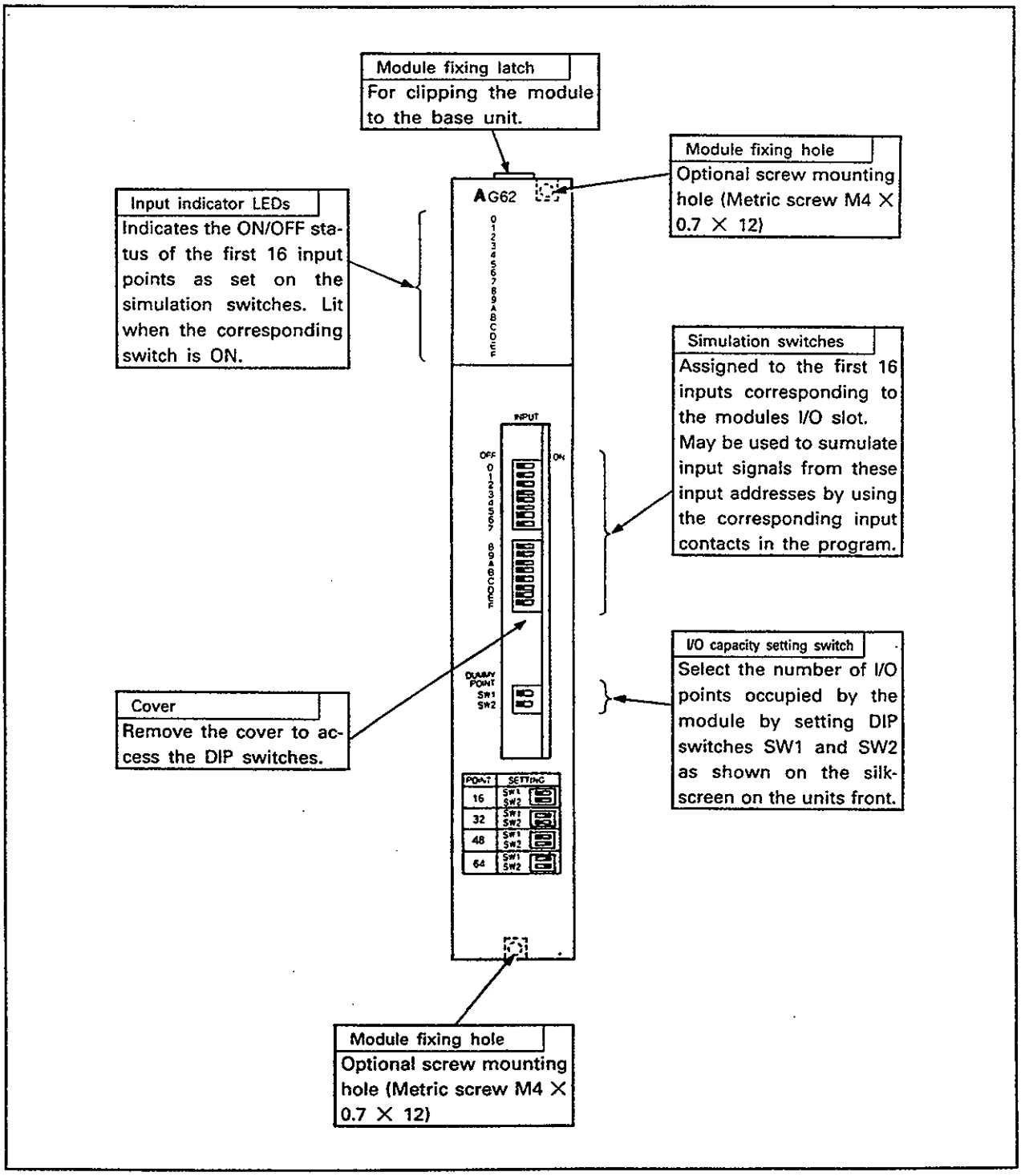


1) Module fixing latch ····· Clips the module to the base unit.
2) I/O indicator LEDs ····· Lit to indicate that the corresponding I/O point is on.
3) Terminal block fixing screw (M4 metric thread) ··· Fixes the terminal block (20- or 38-point) to the module.
4) Terminal block ····· Used to connect the 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 ····· Used to connect the power and I/O signal wiring.
8) Mounting hole ····· Optional screw mounting hole (for M4 metric screw)

7.2 A42XY Nomenclature



7.3 Dummy Module Nomenclature

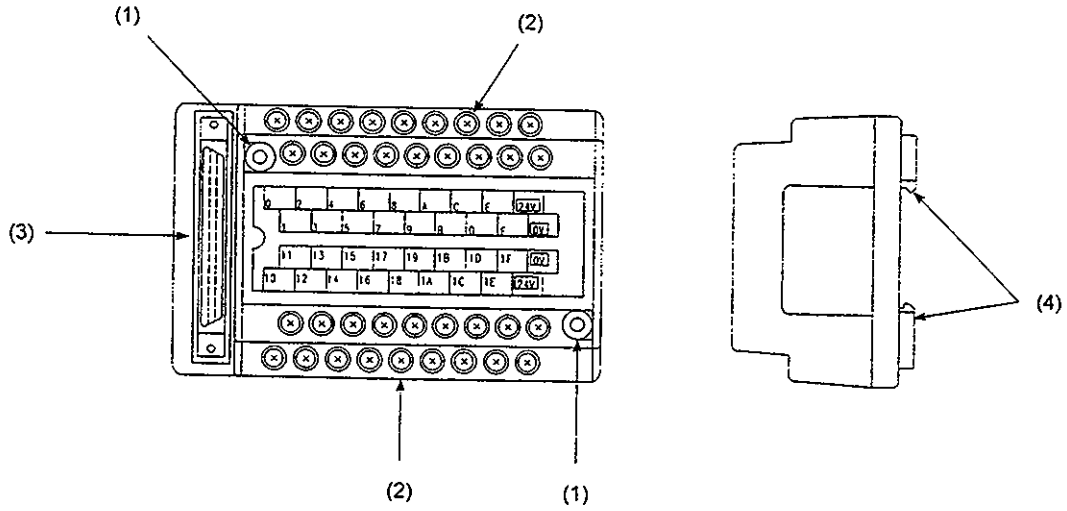


REMARKS

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

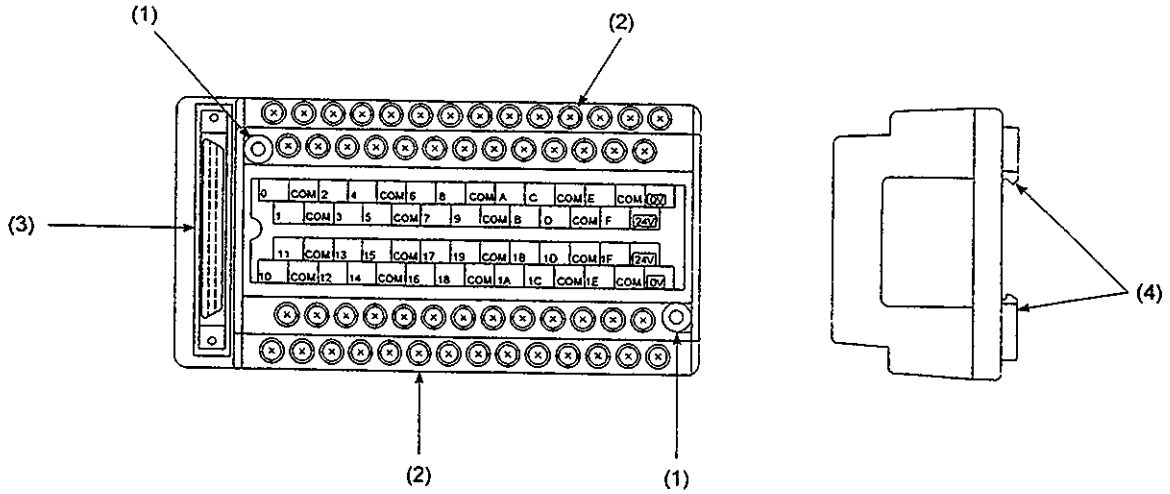
7.4 Connector/Terminal Block Convertor Modules

(1) A6TB□36□



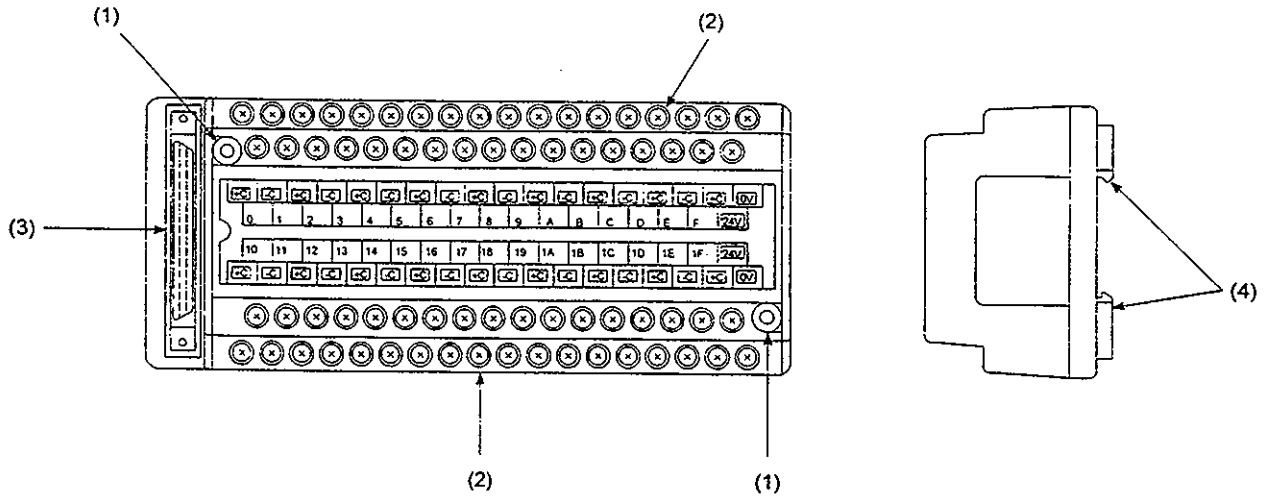
No.	Name	Description
(1)	Panel mounting hole	Panel mounting hole (for M4 screws)
(2)	Terminal block	Terminal block that connects power supply and signal wires (M3.5 screws)
(3)	40-pin connector	40-pin connector for a 32-point module; connects power supply and input signal wires
(4)	Module fixing hooks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

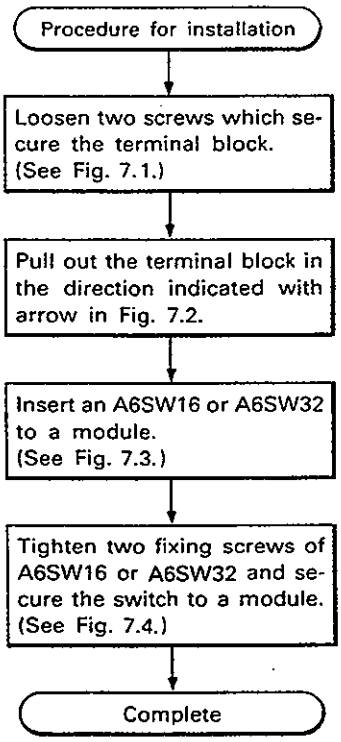


No.	Name	Description
(1)	Panel mounting hole	Panel mounting hole (for M4 screws)
(2)	Terminal block	Terminal block that connects power supply and signal wires (M3.5 screws)
(3)	40-pin connector	40-pin connector for a 32-point module; connects power supply and input signal wires
(4)	Module fixing hooks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

7.5 Installing/Removing the Simulation Switch

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

7.5.1 Installation



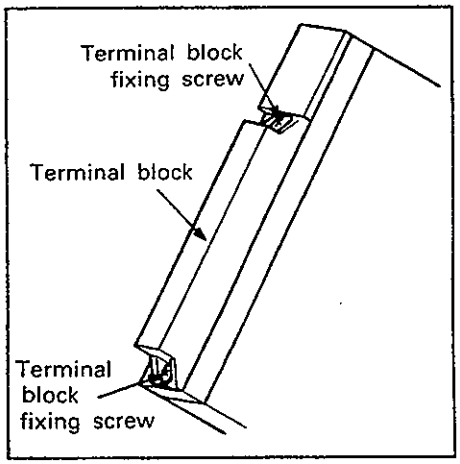


Fig. 7.1

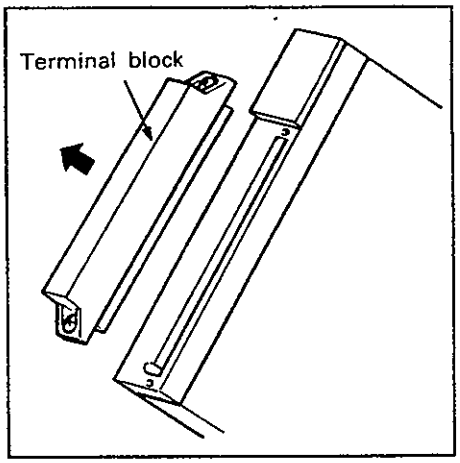


Fig. 7.2

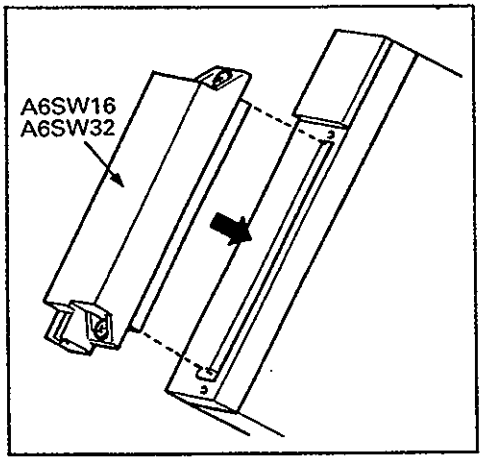


Fig. 7.3

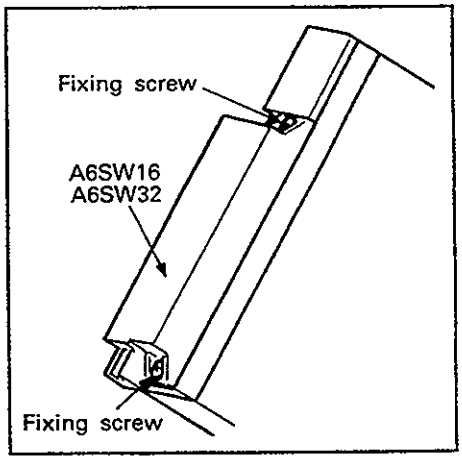


Fig. 7.4

7.5.2 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

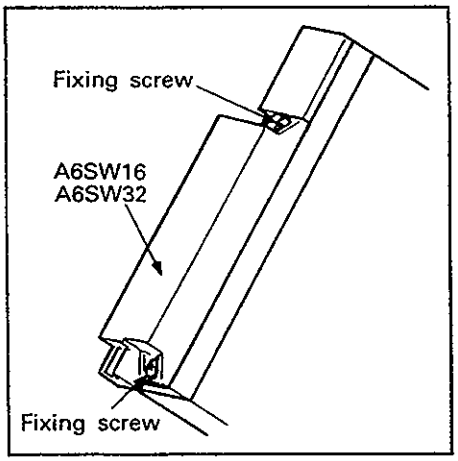


Fig. 7.5

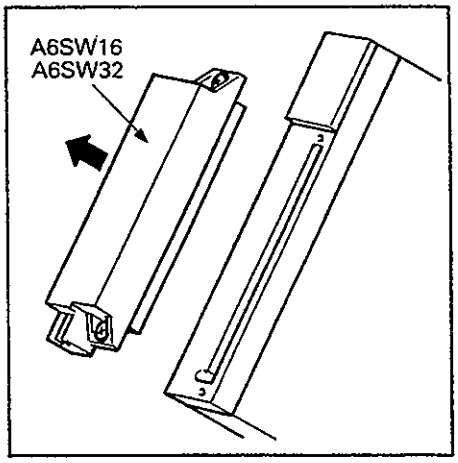


Fig. 7.6

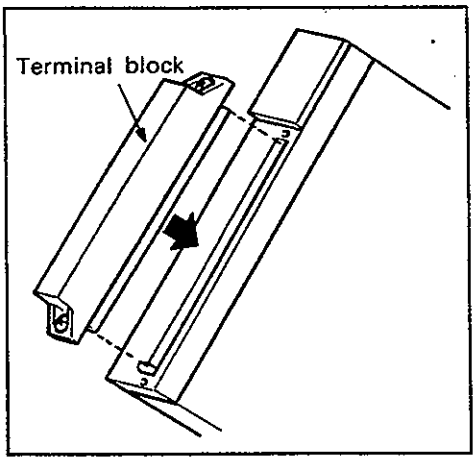


Fig. 7.7

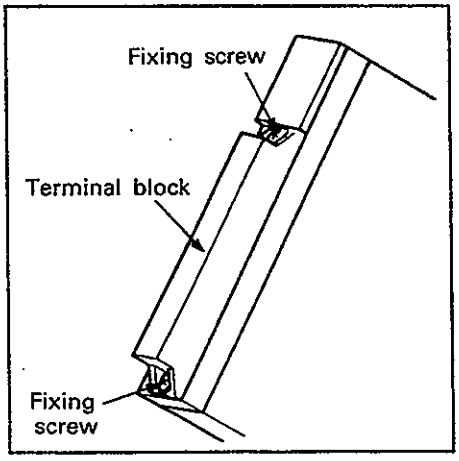


Fig. 7.8

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)

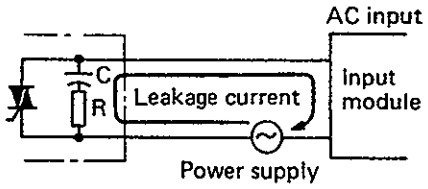
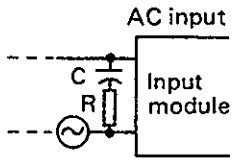
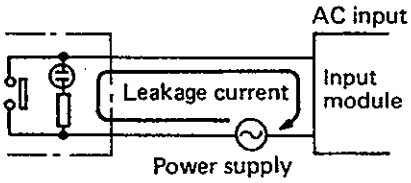
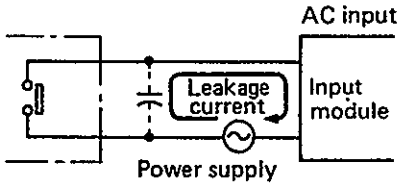
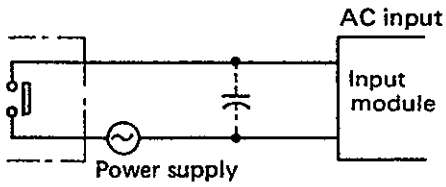
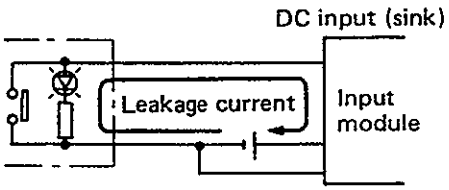
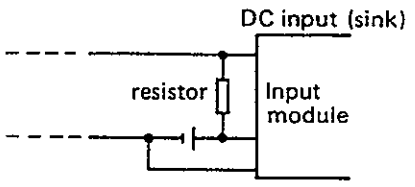
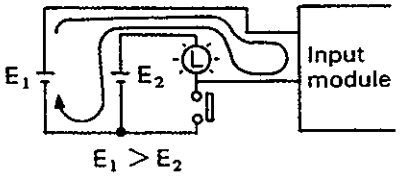
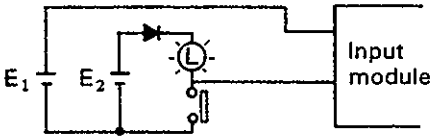
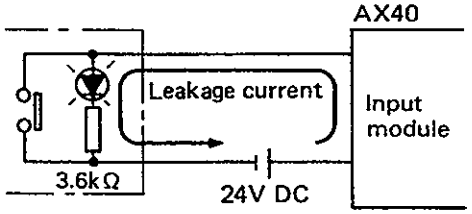
	Condition	Cause	Corrective Action
Example 1	AC input signal does not turn off. (Input LED may remain on or flicker)	● Input device leakage current. 	● Connect a CR network across input to drop the voltage below the input modules OFF threshold.  Use C = 0.1 to 0.47 μF and R = 47 to 120Ω (1/2W)
Example 2	AC input signal does not turn off. (Input LED may remain on or flicker)	● 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. (Input LED may remain on or flicker)	● 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. (Input LED may remain on or flicker)	• 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. (Input LED may remain on or flicker)	• Current flow due to the use of two power supplies. 	• Use single power supply. • Use diode as shown below: 

Example:

Calculation for Example 4

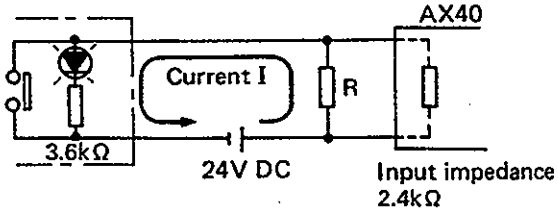


Consider a contact switch with LED indicator connected to an AX40 module, giving a 4mA leakage current.

- 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:

  $(24 - 6[V]) \div 3.6[k\Omega] = 5mA$

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

- Hence, for resistor, R

  $6[V] \div R > 5 - 2.5[mA]$
  $6[V] \div 2.5[mA] > R$
  $2.4[k\Omega] > R$

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

W = (applied voltage)²/R (or W = (maximum current)² × R)

Resistor R terminal voltage is:

$$\frac{2.4 \times 2}{2.4 + 2}(k\Omega) : \frac{2.4 \times 2}{2.4 + 2} + 3.6(k\Omega) = X : 24(V)$$

$X = 5.58(V)$

Therefore, the power capacity W of resistor R is

$W = (5.58[V])^2/2[k\Omega] = 0.015[W]$

- Use a safety factor of 3 to 5. Resistor should therefore be rated at 0.5 to 1W.

  A 3kΩ, 0.5 to 1W resistor should therefore be connected across the relevant input terminal and its COM.

8.2 Output Wiring Troubleshooting

Table 8.2 Output Wiring Troubleshooting (Continue)

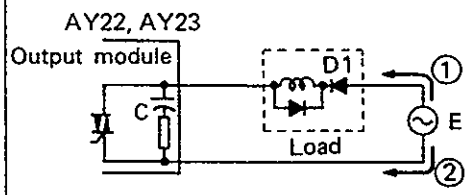
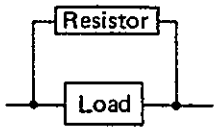
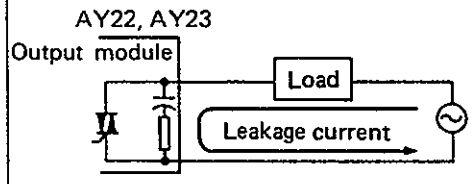
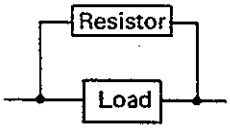
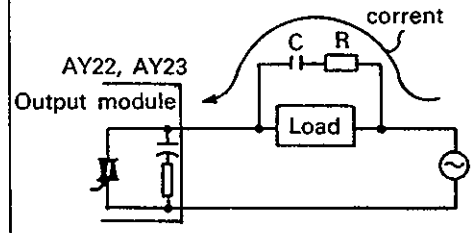
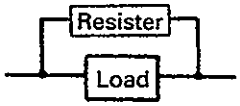
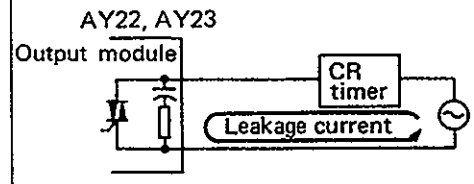
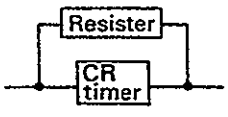
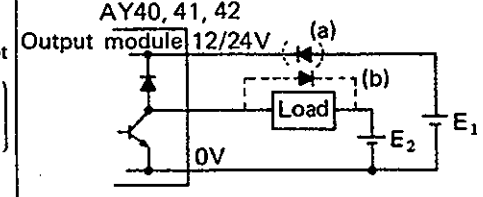
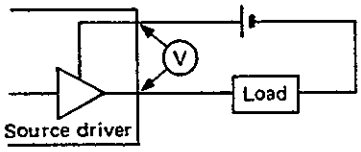
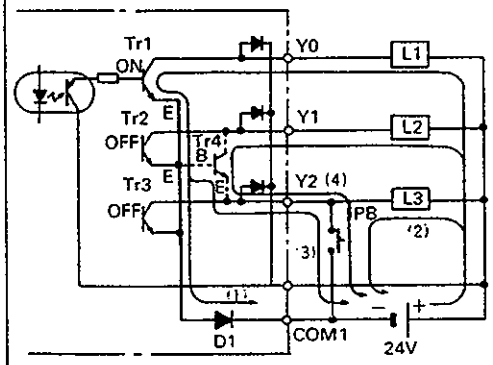
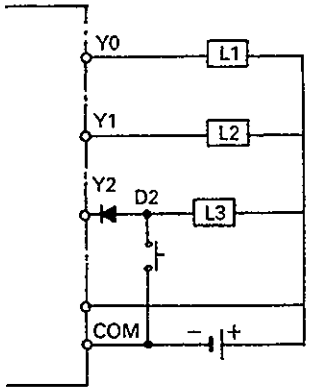
	Condition	Cause	Corrective Action
Example 1	AC voltage applied to output load when output in off.	● Half wave rectification by load (typical of some solenoids).  ● Current flow in direction ① causes capacitor, C, to charge. Current flow in direction ② applies capacitor voltage plus E across D1 (Voltage = 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)

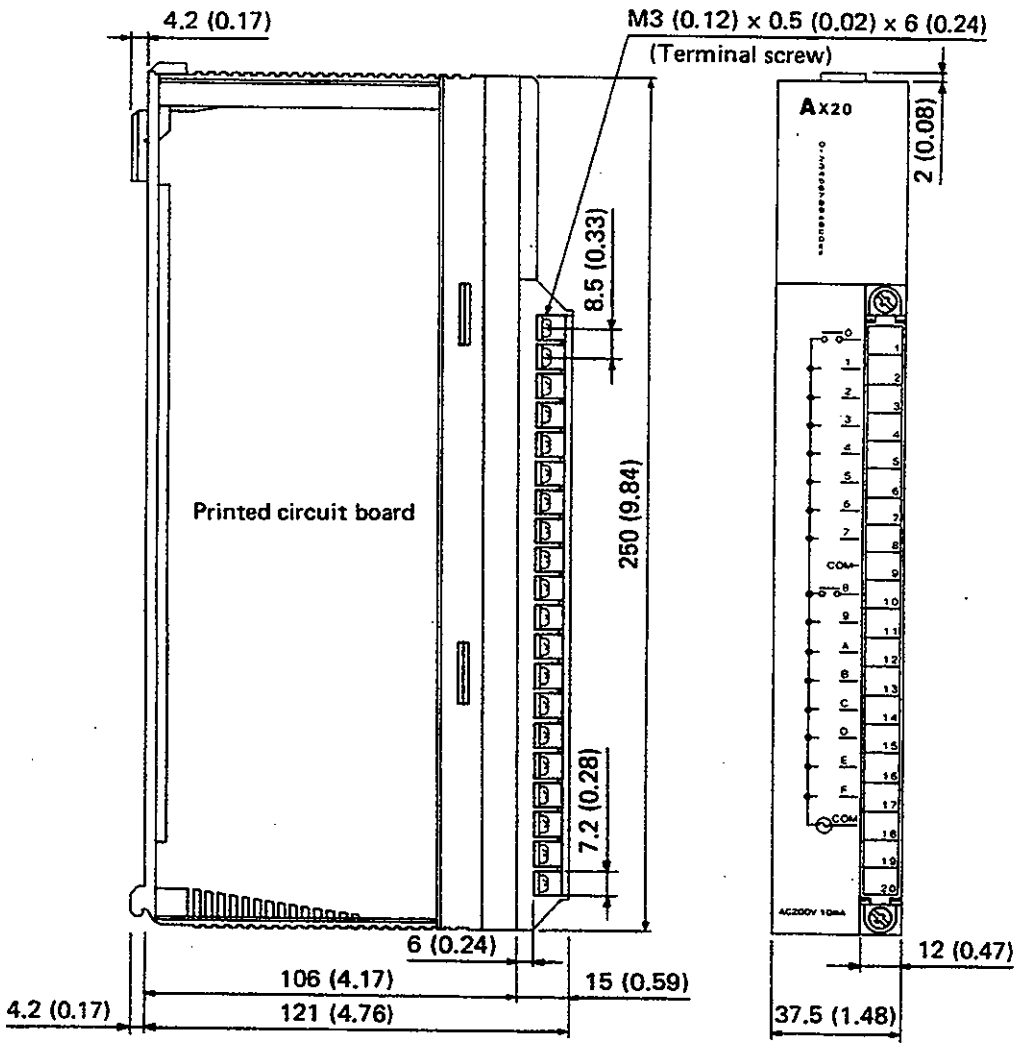
	Condition	Cause	Corrective Action
Example 6	Load does not operate normally (due to external shorting, etc.) AY60EP, AY80EP, AY81EP, AY82EP,	External load malfunction or incorrect connection.	• Check the external load. • Check voltage across the following terminals with output (Y) on. • If output voltage > 3V, check external load and wiring for short circuits. 
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.

APPENDIX

APPENDIX 1 DIMENSIONS

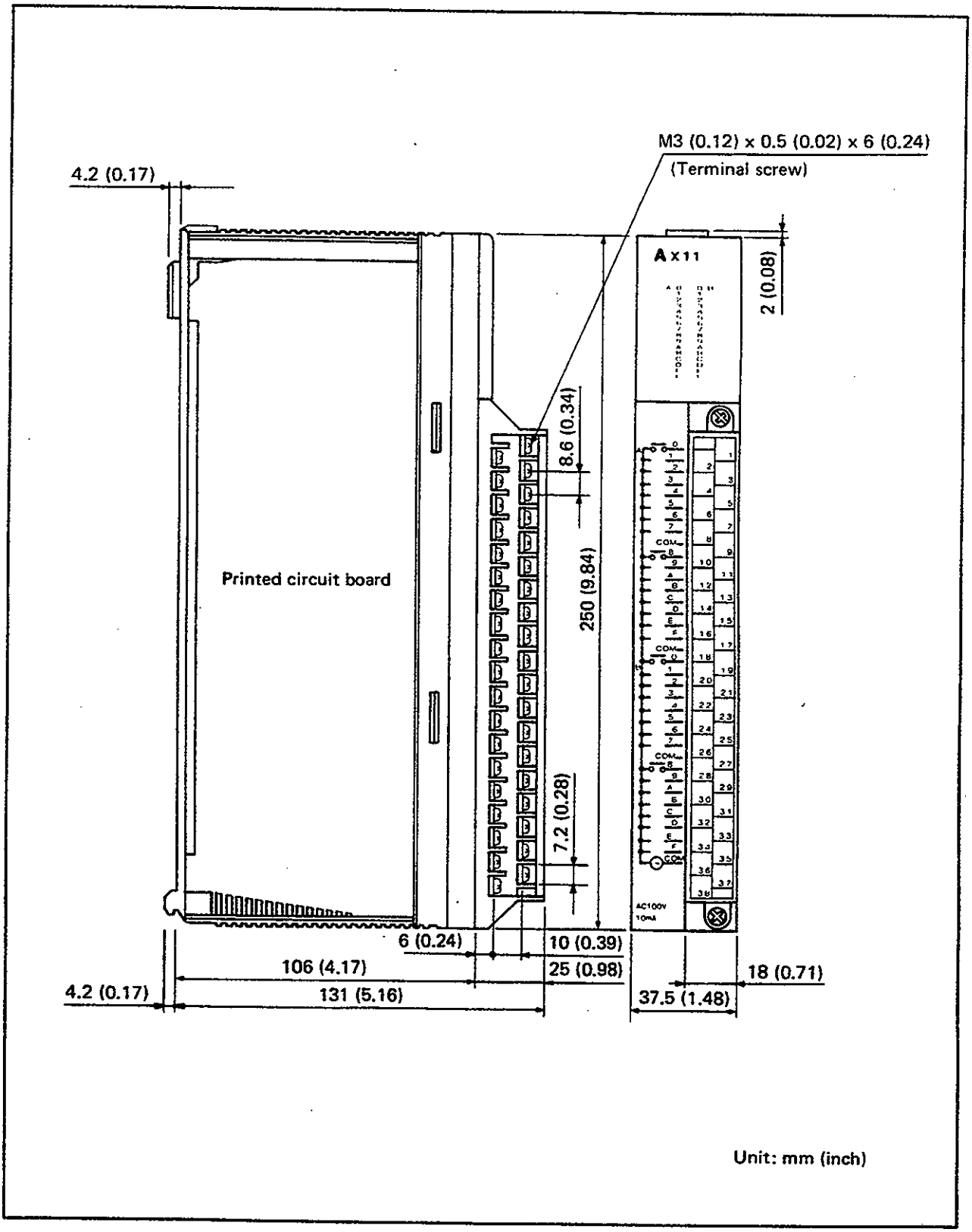
1.1 I/O Module

(1) 20 way type

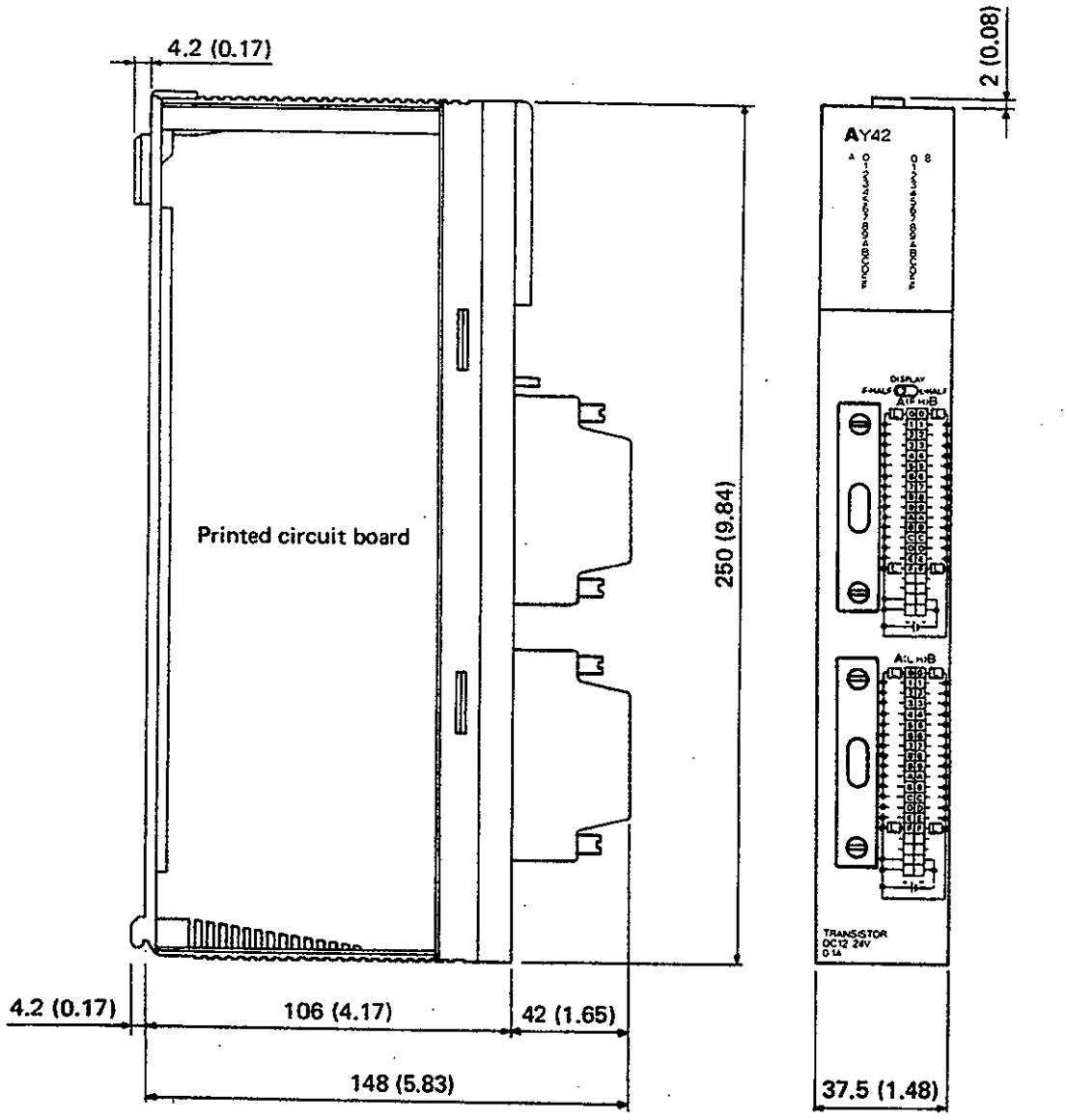


Unit: mm (inch)

(2) 38 way type

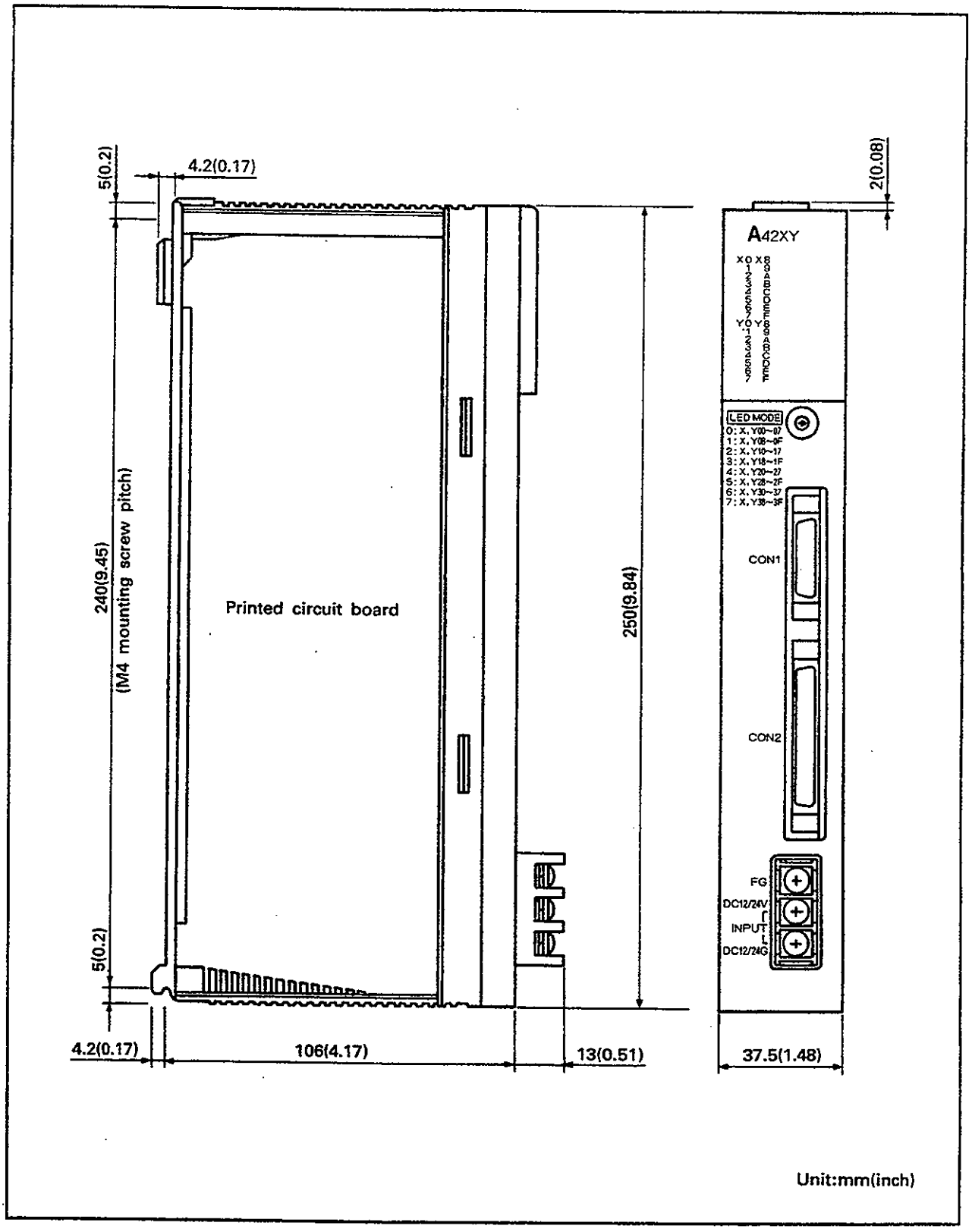

M3 (0.12) x 0.5 (0.02) x 6 (0.24)
(Terminal screw)
4.2 (0.17)
A X11
2 (0.08)
8.6 (0.34)
Printed circuit board
250 (9.84)
7.2 (0.28)
6 (0.24)
10 (0.39)
106 (4.17)
25 (0.98)
18 (0.71)
4.2 (0.17)
131 (5.16)
37.5 (1.48)
Unit: mm (inch)

(3) 40 way type

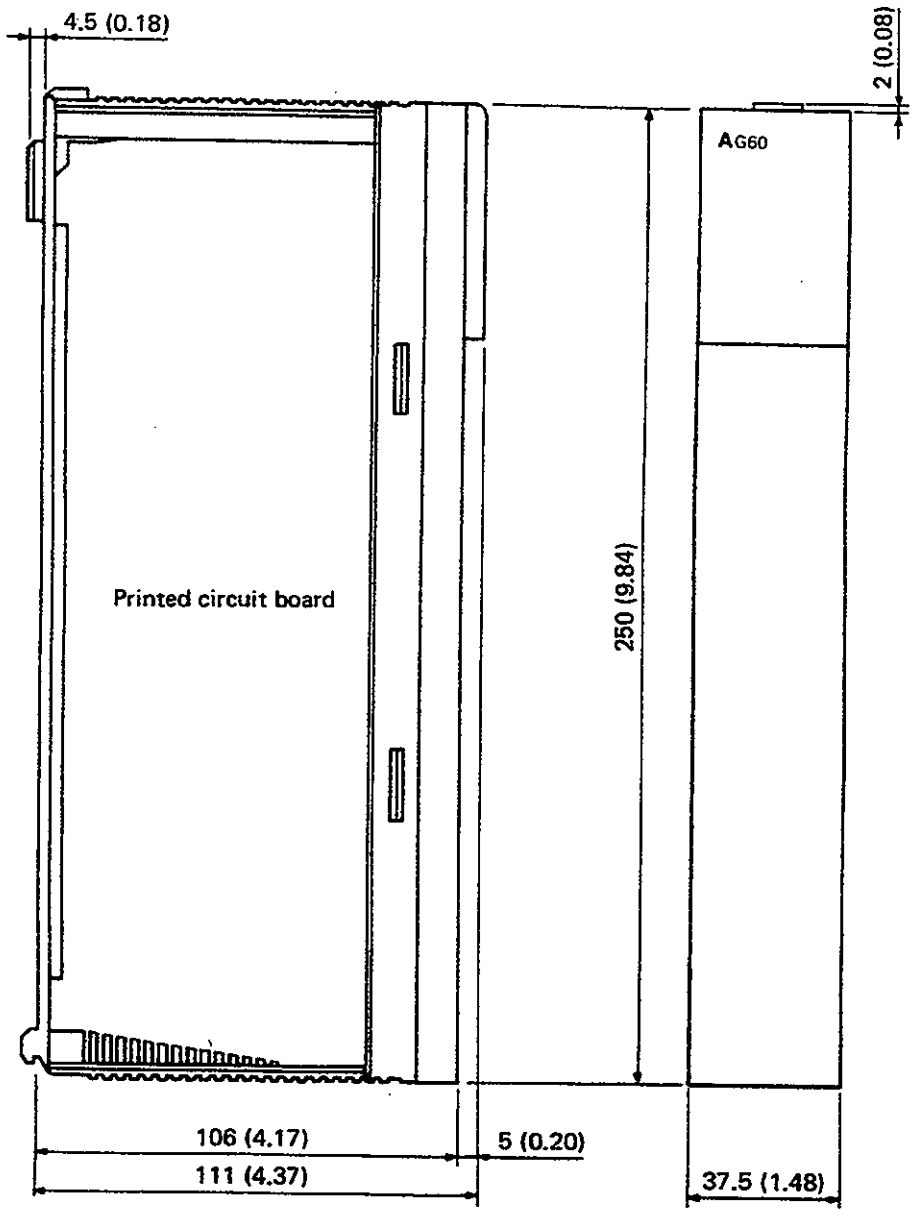


Unit: mm (inch)

1.2 Dynamic I/O Module (A42XY)

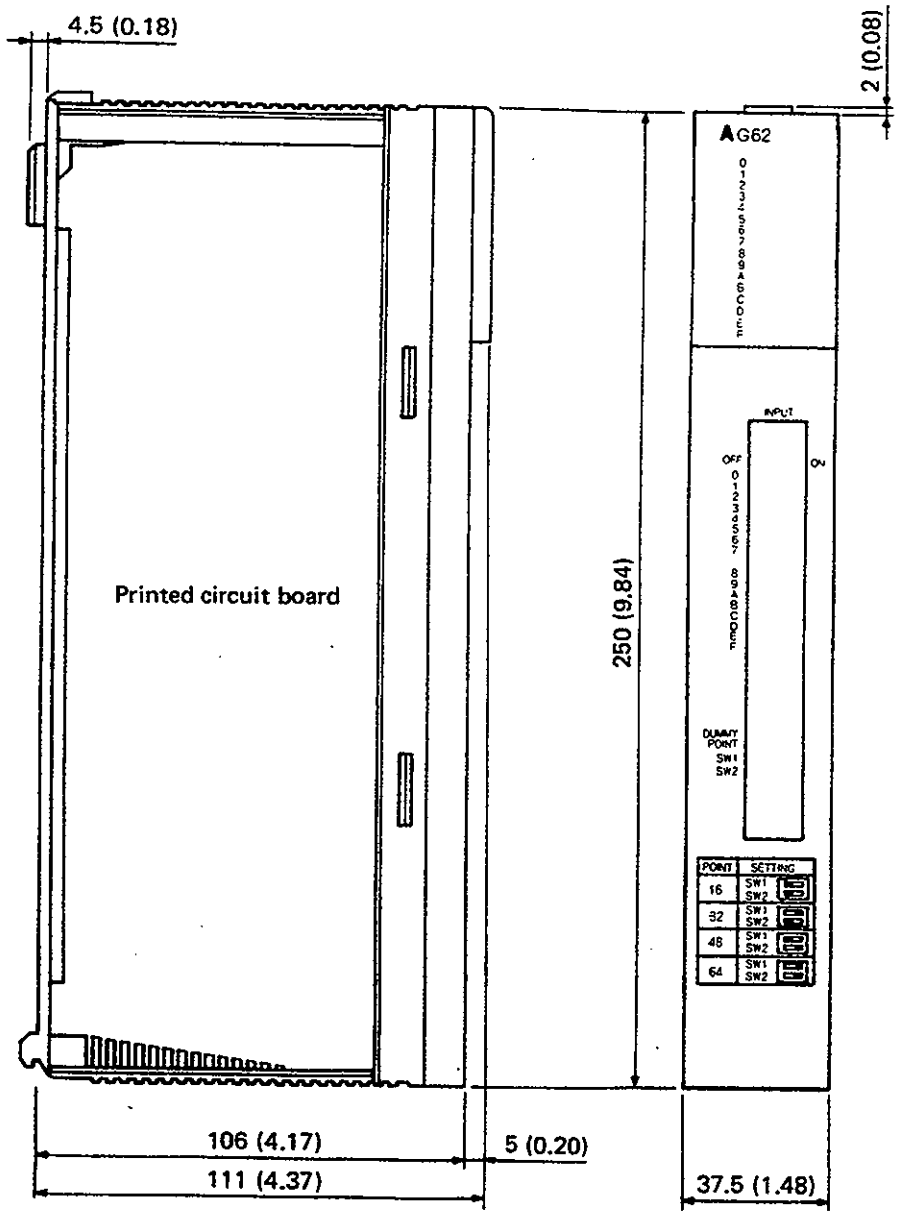


1.3 Blank Cover (AG60)



Unit: mm (inch)

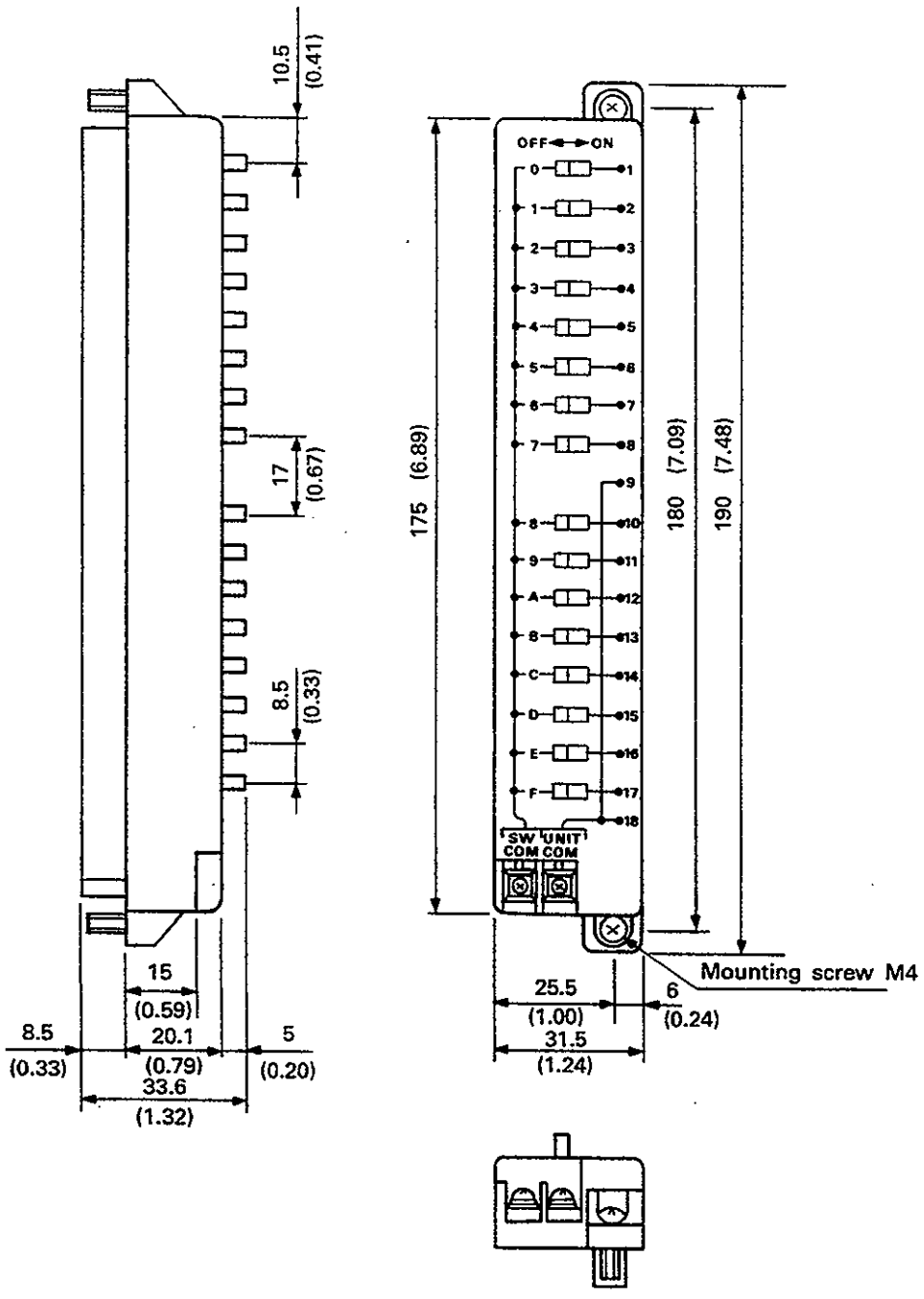
1.4 Dummy Module (AG62)



Unit: mm (inch)

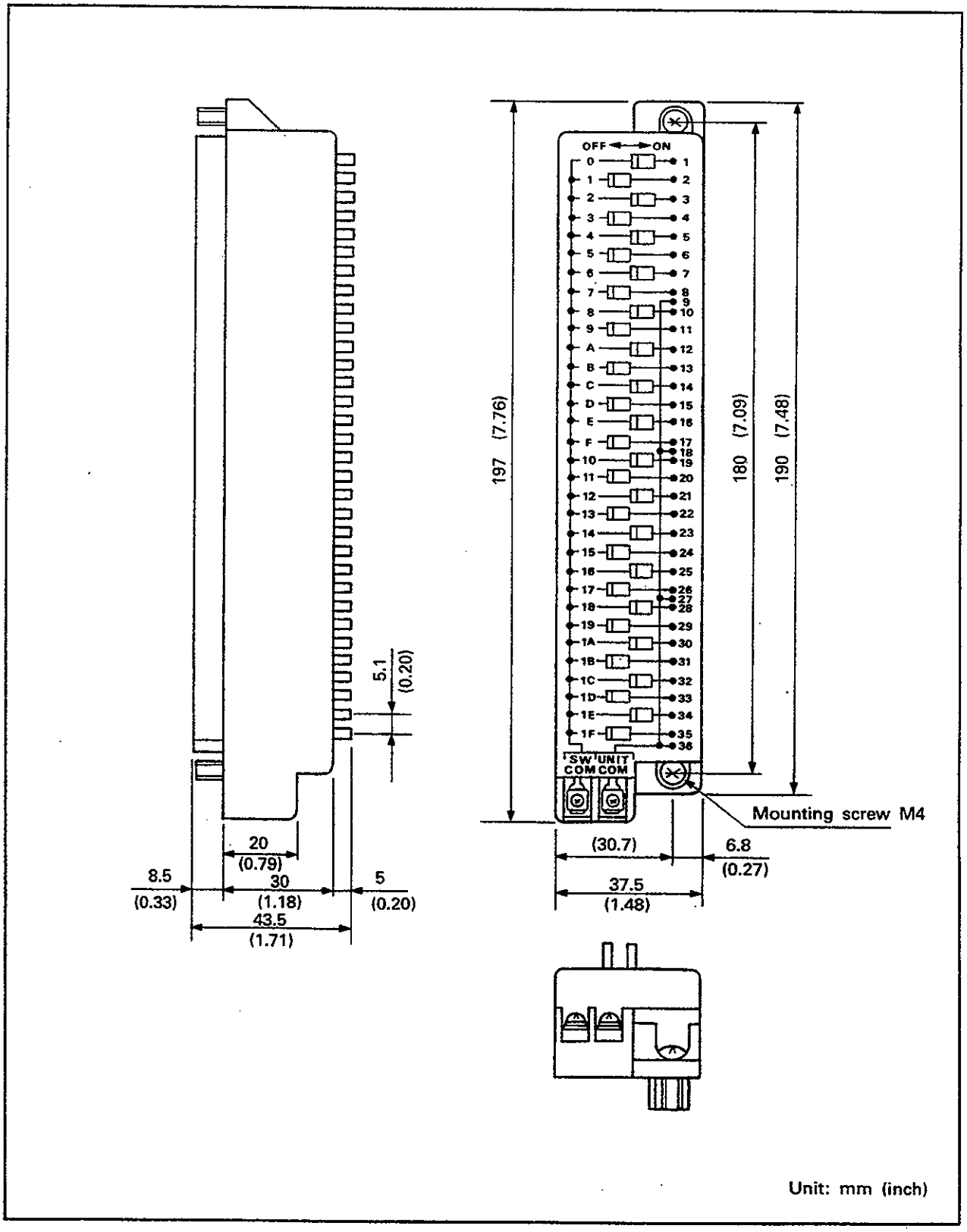
1.5 Simulation Switch

(1) A6SW16



Unit: mm (inch)

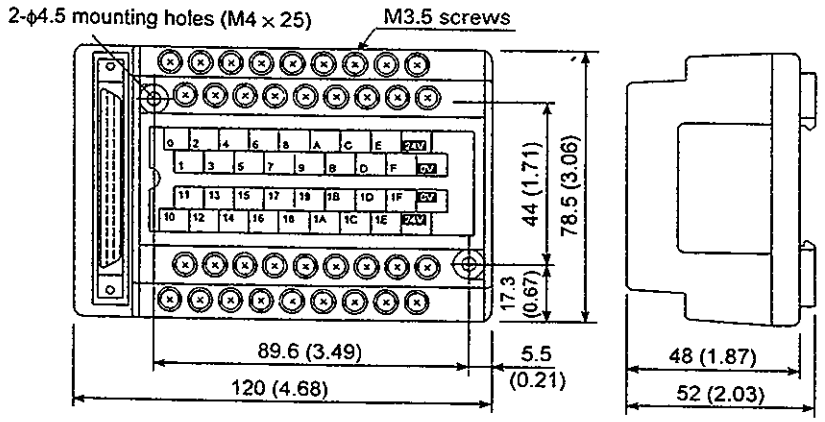
(2)A6SW32



Unit: mm (inch)

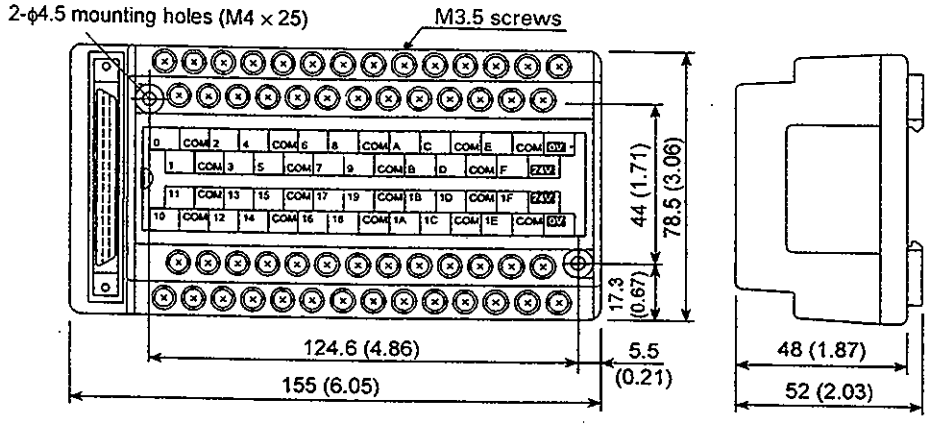
1.6 Connector/Terminal Block Convertor Modules

(1) A6TB□36□ type connector/terminal block convertor module



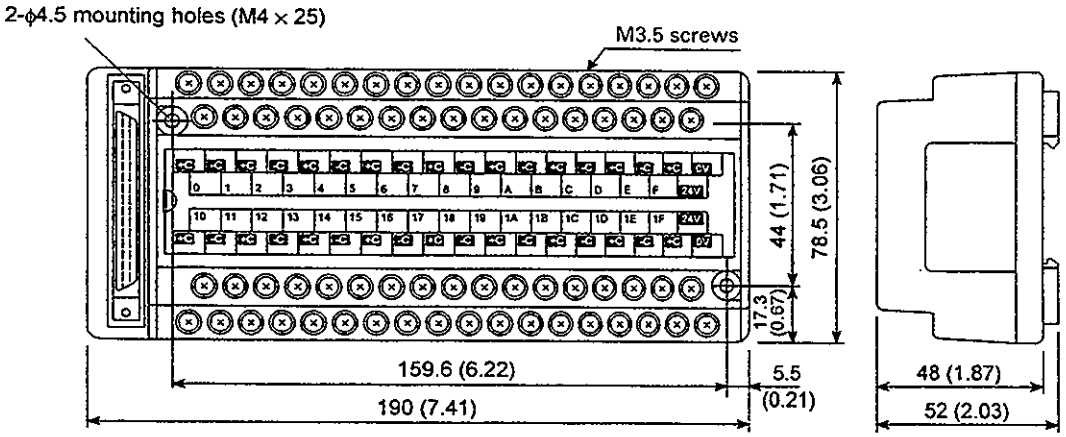
Unit: mm (inch)

(2) A6TB□54□ type connector/terminal block convertor module



Unit: mm (inch)

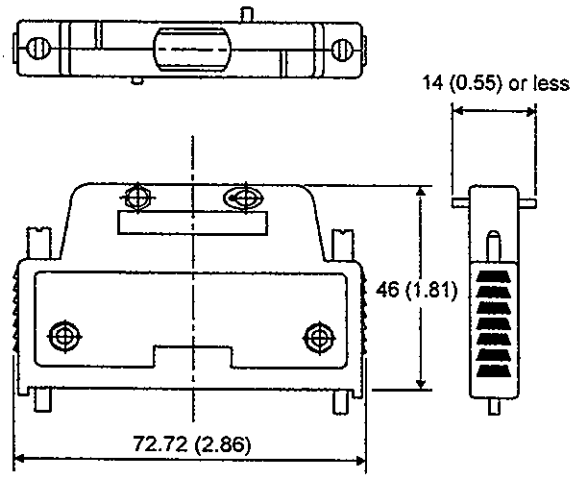
(3) A6TBX70[ ] type connector/terminal block convertor module



Unit: mm (inch)

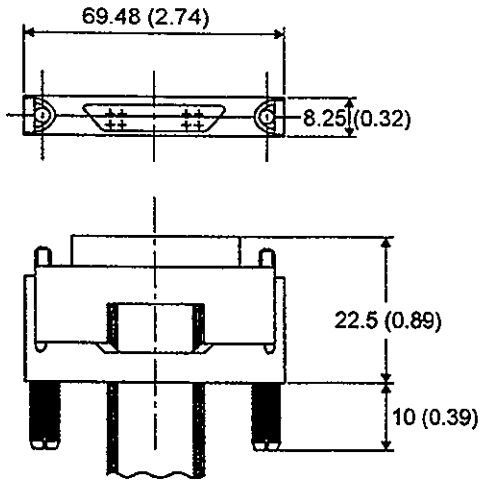
1.7 40-Pin Connectors

(1) A6CON1 soldering-type 40-pin connector, A6CON2 crimp-contact-type 40-pin connector



Unit: mm (inch)

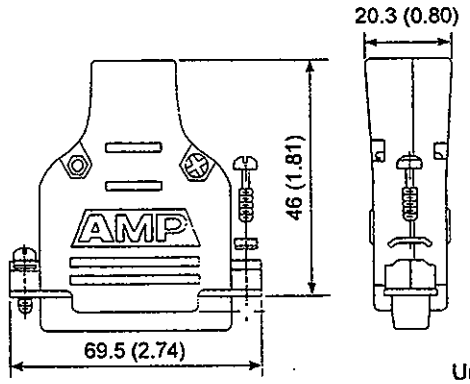
(2) A6CON3 pressure-displacement-type 40-pin connector



Unit: mm (inch)

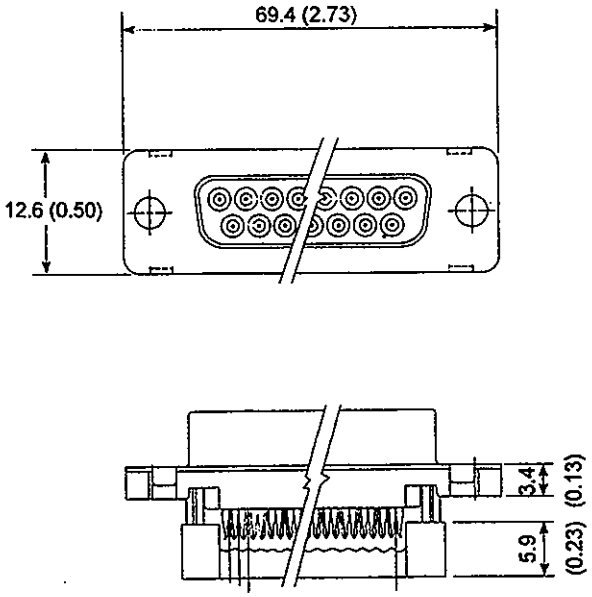
1.8 Pin D Sub-Connectors

(1) A6CON1E soldering type 37-pin D sub-connector
A6CON2E crimp-contact-type 37-pin D sub-connector



Unit: mm (inch)

(2) A6CON3E pressure-displacement-type 37-pin D sub-connector



Unit: mm (inch)

I/O module type Building block
User's Manual

MODEL	A-I/O-USERS-E
MODEL CODE	13J643
IB(NA)66140-E(9902)MEE	

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