

*GE Fanuc Automation Europe*

*Computer Numerical Controls*



*I/O Unit - Model A  
Connection*

*Maintenance Manual*

*B-63813EN/03*





## **DEFINITION OF WARNING, CAUTION, AND NOTE**

---

This manual includes safety precautions for protecting the user and preventing damage to the machine. Precautions are classified into Warning and Caution according to their bearing on safety. Also, supplementary information is described as a Note. Read the Warning, Caution, and Note thoroughly before attempting to use the machine.

### **WARNING**

Applied when there is a danger of the user being injured or when there is a damage of both the user being injured and the equipment being damaged if the approved procedure is not observed.

### **CAUTION**

Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

### **NOTE**

The Note is used to indicate supplementary information other than Warning and Caution.

- Read this manual carefully, and store it in a safe place.



# PREFACE

---

This manual describe the following products:

## Applicable models

<b>Name of products</b>	<b>Abbreviation</b>
FANUC I/O Unit-MODEL A	I/O Unit-A
FANUC I/O Unit-MODEL B	I/O Unit-B

## Applicable CNCs

<b>Name of products</b>	<b>Abbreviation</b>
FANUC Power Mate-MODEL A	Power Mate-A
FANUC Power Mate-MODEL B	Power Mate-B
FANUC Power Mate-MODEL C	Power Mate-C
FANUC Series 0(MODEL C)	Series 0-C
FANUC Series 15	Series 15
FANUC Series 16	Series 16
FANUC Series 18	Series 18
FANUC SYSTEM F-MODEL D Mate	F-D Mate



## PREFACE

## I CONNECTIONS

1. FANUC I/O LINK.....	3
1.1 CONFIGURATION.....	4
1.2 ALLOCATION OF I/O POINTS.....	5
2. I/O UNIT CONFIGURATION.....	8
3. INSTALLATION.....	9
3.1 ENVIRONMENTAL CONDITIONS.....	9
3.2 DESIGNING CONDITION FOR A CABINET.....	10
3.3 OUTER DIMENSION OF I/O Unit.....	11
3.4 MOUNTING AND DISMOUNTING MODULES.....	13
4. CONNECTION.....	14
4.1 GENERAL CONNECTION DIAGRAM.....	14
4.2 CONNECTING INPUT POWER SOURCE.....	15
4.3 GROUNDING.....	16
4.4 REQUIRED CURRENT.....	17
4.5 INTERFACE MODULE (AIF01A, AIF01B).....	18
4.6 INTERFACE MODULE (AIF02C) CONNECTION.....	21
4.6.1 Overview.....	21
4.6.2 Connection.....	22
4.6.3 Setting with the DIP switch.....	24
4.7 CONNECTING WITH I/O MODULES.....	25
5. DIGITAL INPUT / OUTPUT MODULES.....	27
5.1 LIST OF MODULES.....	27
5.2 CORRESPONDENCE BETWEEN I/O SIGNALS AND ADDRESSES IN A MODULE.....	29
5.3 SPECIFICATION FOR EACH MODULE.....	30
6. ANALOG INPUT MODULE (AAD04A).....	61
6.1 SPECIFICATIONS FOR ANALOG INPUT MODULE.....	61
6.2 CORRESPONDENCE BETWEEN INPUT SIGNALS AND ADDRESSES IN A MODULE.....	62
6.3 CONNECTING WITH ANALOG INPUT MODULE.....	64
7. ANALOG OUTPUT MODULE.....	65
7.1 12-BIT ANALOG OUTPUT MODULE (ADA02A).....	65
7.1.1 Specification.....	65
7.1.2 Correspondence between Output Signals and Addresses in a Module.....	66
7.1.3 Connection to Analog Output Module.....	67
7.2 FOURTEEN-BIT ANALOG OUTPUT MODULE (ADA02B).....	68
7.2.1 Specification.....	68
7.2.2 Correspondence between Output Signals and Addresses in the Module.....	68
7.2.3 Connection between the Analog Output Module and Load.....	69

<b>8. HIGH SPEED COUNTER MODULE</b> .....	<b>70</b>
8.1 OUTLINE OF HIGH SPEED COUNTER MODULE.....	70
8.2 SPECIFICATIONS OF HIGH SPEED COUNTER MODULE.....	72
8.2.1 Pulse counter.....	72
8.2.2 Comparison function.....	72
8.2.3 Pulse Interface.....	74
8.2.4 External contact input.....	76
8.2.5 External contact output.....	76
8.2.6 Marker processing.....	76
8.2.7 LED Indicators.....	77
8.3 PMC INTERFACE.....	79
8.3.1 Mode A.....	79
8.3.2 Mode B.....	81
8.3.3 Details of PMC interface signals.....	83
8.4 TOTAL CONNECTION OF HIGH SPEED COUNTER MODULE.....	86
8.4.1 Connection diagram.....	86
8.4.2 Connector signal list.....	87
8.5 CONNECTION WITH PULSE GENERATOR.....	88
8.5.1 Use of phase A and B pulses.....	88
8.5.2 Use of positive/negative pulses.....	89
8.6 CONNECTION WITH POWER MAGNETICS CABINET.....	90
8.7 I/O SIGNALS CONVENTIONS.....	91
8.7.1 Solid state relay output signals (OUT0 to OUT7).....	91
8.7.2 DC input signals (ME and CSP).....	92
8.8 SUPPLEMENT.....	93
8.8.1 Configuration of mode A.....	93
8.8.2 Counter presetting and counting.....	94
8.8.3 Setting data.....	95
8.8.4 Reading data.....	97
8.8.5 Miscellaneous information.....	98
<b>9. TEMPERATURE INPUT MODULE</b> .....	<b>99</b>
9.1 OVERVIEW.....	99
9.2 TEMPERATURE INPUT MODULE SPECIFICATION.....	100
9.3 PMC INTERFACE.....	101
9.3.1 PMC I/O area.....	101
9.3.2 Measurement mode.....	102
9.3.3 Details of output signals (PMC → temperature module).....	102
9.3.4 Details of input signals (temperature module → PMC).....	104
9.4 COMPLETE CONNECTION OF TEMPERATURE INPUT MODULE.....	107
9.4.1 Temperature input module connection diagram.....	107
9.4.2 Connector signal lists.....	108
9.4.3 Terminal board unit connection diagram.....	109
9.5 TIMING CHARTS.....	110
9.6 MEASUREMENT EXAMPLES.....	111
9.7 TERMINAL BOARD UNIT DIMENSIONS.....	118
<b>10. OPTICAL I/O LINK ADAPTER</b> .....	<b>119</b>
10.1 EXTERNAL DIMENSION OF OPTICAL I/O LINK.....	120
10.2 WEIGHT OF OPTICAL I/O LINK.....	120
10.3 CONNECTION OF OPTICAL I/O LINK.....	121
10.4 POWER SOURCE OF OPTICAL I/O LINK ADAPTER.....	121
10.5 INSTALLATION CONDITIONS OF OPTICAL I/O LINK ADAPTER.....	122
10.6 OPTICAL FIBER CABLE.....	122
10.6.1 External view of optical fiber cable.....	122
10.6.2 Notice of optical fiber cable handling.....	123
10.6.3 Optical fiber cable clamping method.....	124
10.6.4 Relay using an optical fiber adapter.....	125



10.6.5	Maximum transmission distance by optical fiber cable .....	125
<b>11.</b>	<b>I/O LINK DUMMY UNIT .....</b>	<b>126</b>
11.1	OVERVIEW .....	126
11.2	EXTERNAL DIMENSIONS .....	126
11.3	LED INDICATORS .....	127
11.4	WEIGHT .....	127
11.5	POWER REQUIREMENTS .....	127
11.6	INSTALLATION CONDITIONS .....	127
11.7	CONNECTION DIAGRAMS .....	128
11.7.1	When not connecting FANUC I/O Link dummy units in series .....	128
11.7.2	Connecting FANUC I/O Link dummy units in series .....	129
11.7.3	Grounding .....	129
11.7.4	K3X cable .....	130
<b>12.</b>	<b>SAFETY FOR USING AC .....</b>	<b>131</b>
12.1	INSTALLATION ENVIRONMENT .....	132
12.1.1	Installation Category (Overvoltage Category) .....	132
12.1.2	Pollution Degree .....	132
 <b>II MAINTENANCE</b>		
<b>1.</b>	<b>OVERVIEW .....</b>	<b>135</b>
1.1	SYSTEM CONFIGURATION .....	135
1.2	I/O UNIT-A CONFIGURATION .....	136
1.3	BLOCK DIAGRAM .....	137
1.4	LIST OF UNITS .....	138
<b>2.</b>	<b>INDICATION .....</b>	<b>140</b>
2.1	INTERFACE MODULE (AIF01A) LEDS .....	140
2.2	INTERFACE MODULE (AIF01B) LEDS .....	144
2.3	INTERFACE MODULE (AIF02C) LED INDICATORS .....	146
2.3.1	PWR indicator .....	146
2.3.2	LNK indicators .....	146
2.3.3	ER indicators .....	146
2.3.4	LED indicators .....	146
2.3.5	M/S indicator .....	147
2.3.6	No. Indicators .....	148
2.4	LED INDICATORS ON THE INPUT/OUTPUT MODULES (HAVING 16 OR FEWER INPUT/OUTPUT POINTS) .....	148
<b>3.</b>	<b>FUSES .....</b>	<b>149</b>
<b>4.</b>	<b>REMOVING PC BOARDS .....</b>	<b>150</b>
4.1	HOW TO REMOVE TERMINAL BOARD-TYPE I/O MODULE PC BOARDS .....	150
4.2	HOW TO REMOVE INTERFACE AND CONNECTOR-TYPE I/O MODULE PC BOARDS .....	152



# I. CONNECTIONS



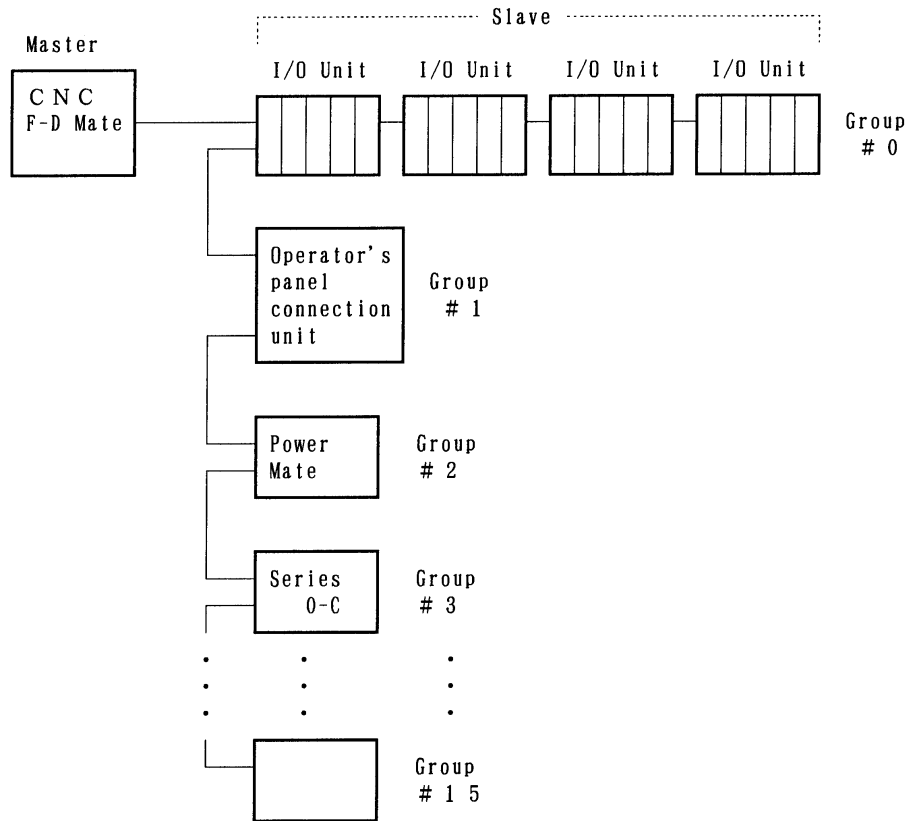
# 1

## FANUC I/O Link

---

I/O Link is a serial interface with a purpose to transfer I/O signals (bit data) between CNC, cell controller, the I/O Unit-A, the Power Mate-A, etc. at high speed.

# 1.1 CONFIGURATION

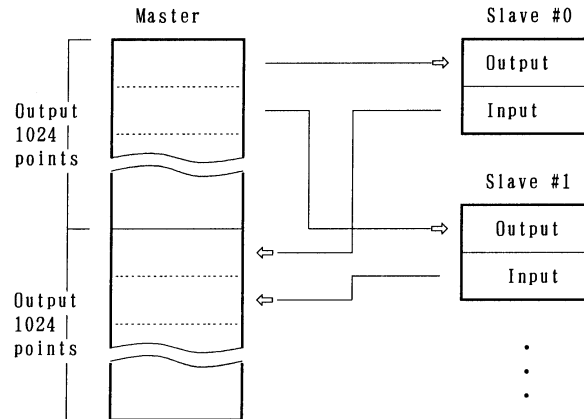


- 1) The FANUC I/O Link is made up of one master and a number of slaves.  
 Master : Series 0-C, Series 15/16/18/20/21, Series 15i/16i/18i/20i/21i, Power Mate-D/H, Power Mate i-D/H, F-D Mate  
 Slave : I/O Unit-A, Power Mate operator's panel connection unit, Series 0-C
  
- 2) Up to 16 groups of slaves can be connected with a single I/O Link. Number of slaves per one group is as follows.  
 I/O Unit-A : Up to 4 units (i.e.4 bases) but when Master is CNC and Pwer Mate up to 2 units.  
 Power Mate : 1  
 Operator's panel connection unit : 1  
 Series 0-C, : 1
  
- 3) Any slave can be connected with any group. However, different types of slaves can not be connected with a single group.

# 1.2 ALLOCATION OF I/O POINTS

I/O Link has 1024 input points and 1024 output points as viewed from the master.

I/O data is periodically transferred between the master and slaves by allotting these I/O points to each slave.



Each slave occupies specified number of I/O points. Sum of I/O points occupied by all slaves in an I/O Link is restricted as follows:

- Number of input points    1024
- Number of output points    1024

Number of actual I/O points may differ from that of the occupied ones. How to determine the number of I/O points to be allotted to each slave and restrictions for allocation are shown in the followings.

(For the allocation method for I/O points, refer to the PMC PROGRAMMING MANUAL.)

Number of actual and occupied I/O points are shown in Table 1.2.

**Table 1.2**

Kind of slave	Actual I/O points		Occupied I/O point		Remarks	
	Input points	Output points	Input points	Output points		
I/O Unit-A	Each input module points	Each output module points	Refer 3 of next page			
Operator's panel connection unit	A	96	64	128	64	
	B	64	32			
Power Mate		32	32	32	32	Either I/O point can be allocated.
		64	64	64	64	
Series 0-C		32	32	32	32	Either I/O point can be allocated.
		64	64	64	64	

- 1) Sum the numbers of the occupied I/O points in Table 1 for all slaves connected with a single I/O Link. The sum must satisfy the following restriction :

Number of input points 1024 (per one I/O Link)

Number of output points 1024 (per one I/O Link)

- 2) Number of the occupied I/O points per one group must satisfy the following restriction :

Number of input points 256 (per one group)

Number of output points 256 (per one group)

- 3) Determine the number of I/O points for the I/O Unit-A using the following.

[Output points]

Sum of the actual output points in a group		Occupied output points
0 to 32	⇒	32 points
40 to 64	⇒	64 points
72 to 128	⇒	128 points
136 to 256	⇒	256 points

**NOTE**

Count AOA05E as 8 points AOA12F as 16 points.

[Input points]

Sum of the actual output points in a group		Occupied output points
0 to 32	⇒	32 points
40 to 64	⇒	64 points
72 to 128	⇒	128 points
136 to 256	⇒	256 points

However, as result of the calculation above, when the number of input points is not larger than that of the output points in a single group, the number of input points is assumed to be equal to that of the output points.

Example 1 : When the following modules are used in the group No. 0.

AOD32C 3      AID32A 5

AOA12F 2      AIA16G 3

[Output points]

$$32 \times 3 + 16 \times 2 = 128 \Rightarrow 128 \text{ points}$$

[Input points]

$$32 \times 5 + 16 \times 3 = 208 \Rightarrow 256 \text{ points}$$

Example 2: When the following modules are used in the group No.2

AOD16C 7      AID16C 4

AOA05E 9      AIA16G 3

[Output points]

$$16 \times 7 + 8 \times 9 = 184 \Rightarrow 256 \text{ points}$$

[Input points]

$$16 \times 4 + 16 \times 3 = 112 \Rightarrow 128 \text{ points}$$

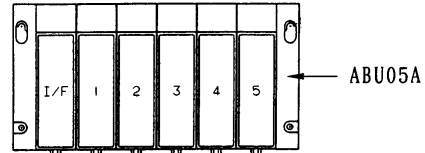


In this case, as the number of input points is not larger than that of the output points, the number of input points is assumed to be equal to that of the output points, in other words, 256 points.

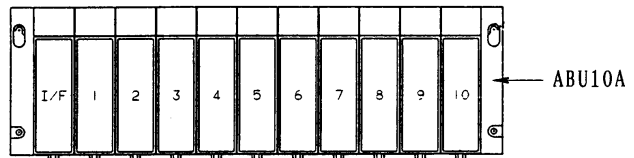
# 2

## I/O UNIT CONFIGURATION

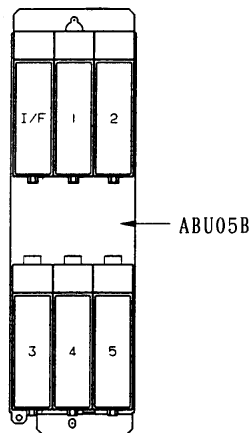
5-slot horizontal base unit (ABU05A)



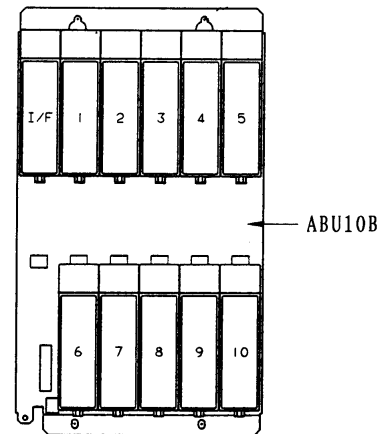
10-slot horizontal base unit (ABU10A)



5-slot vertical base unit (ABU05B)



10-slot vertical base unit (ABU10B)



**NOTE**  
 I/F :Interface module (AIF01A, AIF01B, or AIF02C)  
 1 to 10: I/O modules

# 3

## INSTALLATION

---

### 3.1 ENVIRONMENTAL CONDITIONS

---

Install the cabinet containing the I/O Unit-A where the following conditions are satisfied.

- 1) Surrounding temperature  
During operation: 0 to 45  
During preservation and transportation: -20 to 60
- 2) Temperature changing rate: Max. 1.1 /min
- 3) Humidity  
Normal condition: 75% or less (relative humidity)  
Short period (one month or shorter): Max.95%
- 4) Vibration  
During operation: 0.5G or less
- 5) Atmosphere  
When the unit is used in areas with high density of dust, cutting fluid or organic solvent, the user should consult FANUC.

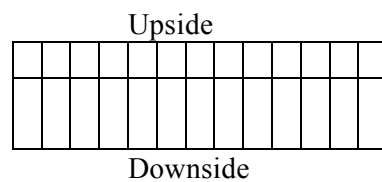
## 3.2 DESIGNING CONDITION FOR A CABINET

---

When designing a cabinet to contain the I/O Unit-A, take the same care as taken for the cabinet containing the CNC control unit and other units. For details, refer to the CNC CONNECTING MANUAL.

In addition, when mounting the I/O unit, conform to the followings in view of maintenance, environmental durability, noise resistance and the like.

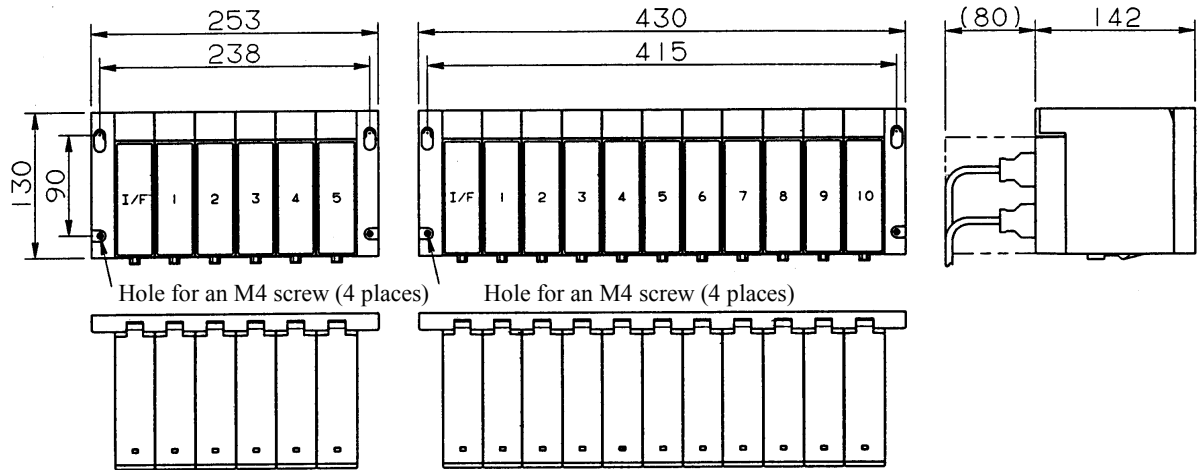
- 1) In order to ventilate inside the module well, mount the I/O unit in the direction shown in the figure below.



- 2) Mount the I/O unit vertically apart from other units by 100 mm or more taking ventilation and wiring into consideration.
- 3) Do not put equipments which generate a large amount of heat under the I/O unit.
- 4) Low-level signals are transferred through the signal cables K1X and K2X. (For these cables, see the general connection diagram.) Lay out these cables apart from the wires for AC power source and the I/O wires of the I/O module by 100 mm or more.
- 5) Make sure that there is no protruding portion such as a screw on the mounting surface of the I/O unit.
- 6) Heat values of I/O unit are listed in Table 3.3

### 3.3 OUTER DIMENSION OF I/O Unit

Horizontal base units (ABU05A and ABU10A)



Vertical base units (ABU05B and ABU10B)

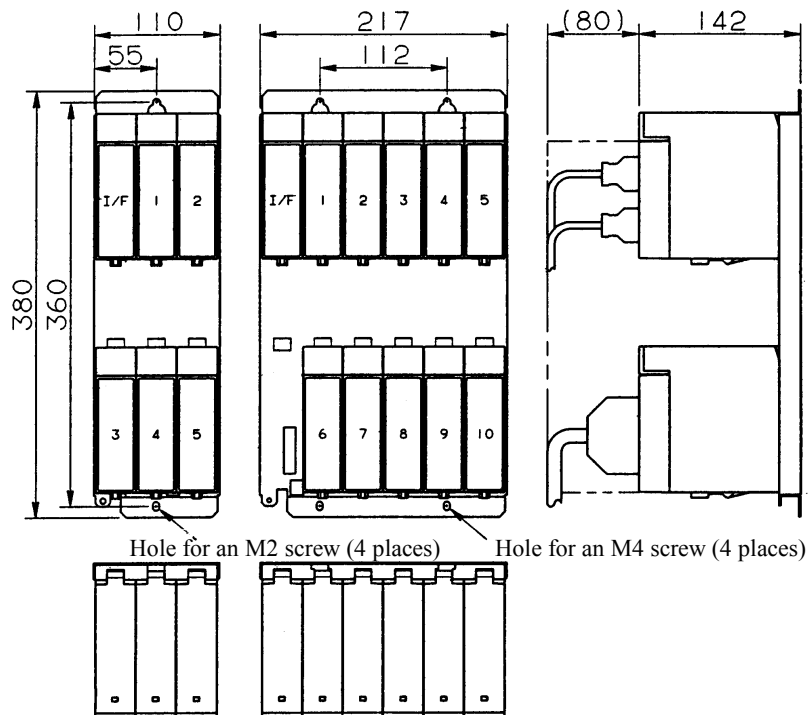


Table 3.3 Heat value of each module

	Module name	Basic heat value (W)	Heat value per 1 I/O point (W)
	AIF01A	1.2	-
	AIF01B	1.2	-
*1	AID32A1	1.2	0.23
*2	AID32B1	1.2	0.23
	AID32H1	1.2	0.23
	AID16C	0.1	0.21
	AID16K	0.1	0.21
	AID16D	0.1	0.21
	AID16L	0.1	0.21
*3	AID32E1	0.1	0.23
	AID32E2	0.1	0.23
*4	AID32F1	0.1	0.23
	AID32F2	0.1	0.23
	AIA16G	0.1	0.21
*5	AOD32A1	0.3	-
	AOD08C	0.1	$0.04+0.4 \times IL^2$
	AOD08D	0.1	$0.04+0.6 \times IL^2$
	AOD16C	0.1	$0.04+1.4 \times IL^2$
	AOD16D	0.1	$0.04+1.4 \times IL^2$
*6	AOD32C1	0.1	$0.01+0.8 \times IL^2$
	AOD32C2	0.1	$0.01+0.8 \times IL^2$
*7	AOD32D1	0.1	$0.01+0.8 \times IL^2$
	AOD32D2	0.1	$0.01+0.8 \times IL^2$
	AOA05E	0.1	$0.13+1.5 \times IL$
	AOA08E	0.1	$0.13+1.5 \times IL$
	AOA12F	0.1	$0.11+1.5 \times IL$
	AOR08G	0.1	$0.3+0.1 \times IL^2$
	AOR16G	0.1	$0.3+0.1 \times IL^2$
	AOR16H2	0.1	$0.3+0.1 \times IL^2$
	AAD04A	3.1	-
	ADA02A	3.1	-
	ADA02B	3.1	-
	ACT01A	4.1	-
	ATI04A	4.0	-
	ATI04B	4.0	-

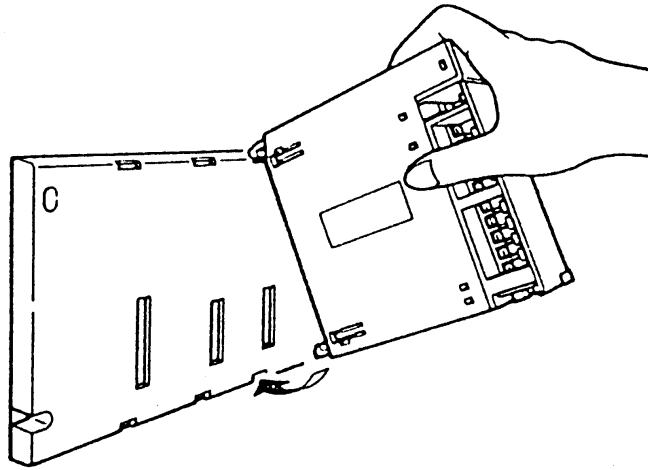
- Total 'Heat value per 1 I/O point' for simultaneous ON points plus 'Basic heat value' is the heat value of the module.
- IL : Load current of output
- A□ D32□ 1 of " \*1 to \*7" is the same module as former A□ D32□  
(Example : AID32E1 is equal to former AID32E.)

## 3.4 MOUNTING AND DISMOUNTING MODULES

Interface modules and various types of I/O modules can be mounted to and dismantled from the base unit easily as shown below.

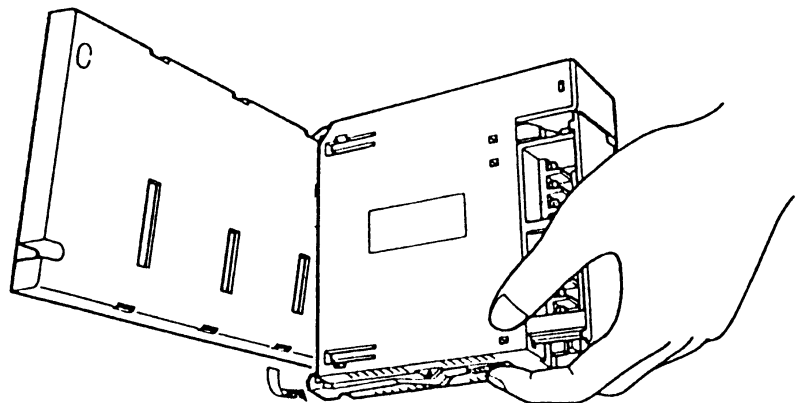
### Mounting

Hang the hook at the top of the module on the groove in the upper side of the base unit, and make the connector of the module engage with that of the base unit. Push the module in the lower groove of the base unit till the stopper in the lower side of the module stops.



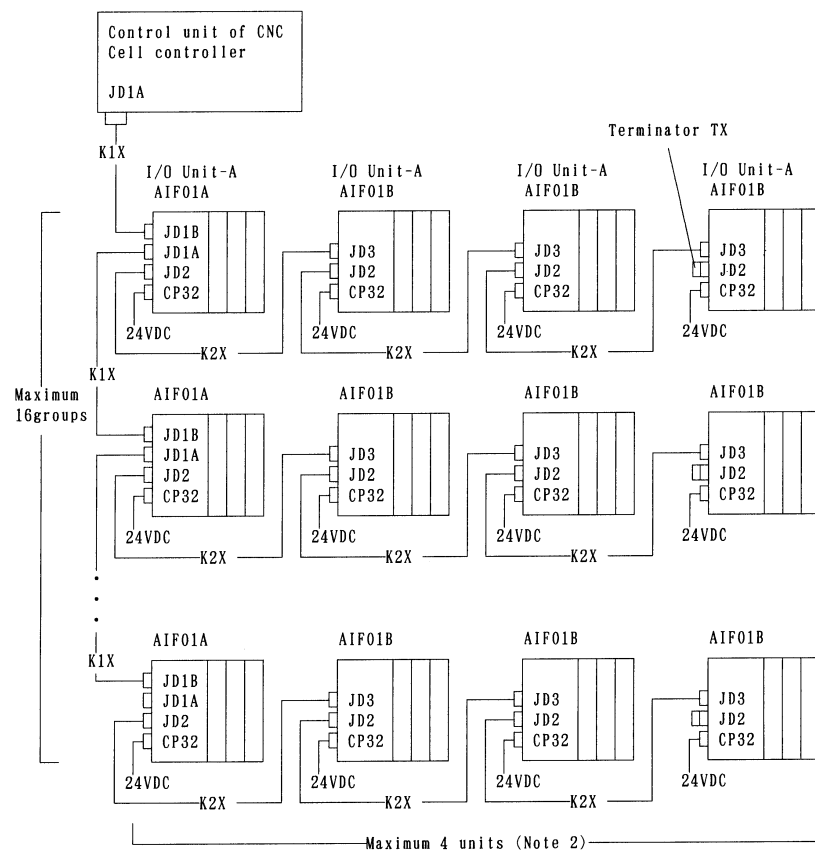
### Dismounting

Release the stopper by pushing the lever at the bottom of the module, and then push the module upwards.



# 4 CONNECTION

## 4.1 GENERAL CONNECTION DIAGRAM



### NOTE

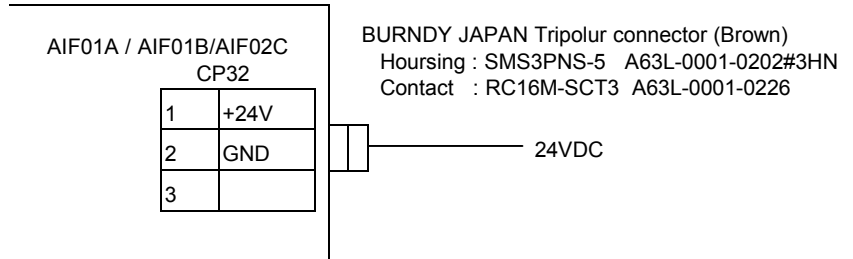
- 1 Number of I/O Units and connecting method are restricted depending on the allocation of the I/O points. Refer to the section 1.2, "Allocation of I/O points."
- 2 The number of I/O units per group is limited to 2 when the master equipment is the CNC.
- 3 Cable K1X can be an optical fiber cable by using the optical I/O link adapter. See chapter 10.
- 4 Terminator TX is required for connector JD2 of the AIF01B that is the last unit to be connected in the group. The terminator is not required when the AIF01B is not used.



## 4.2 CONNECTING INPUT POWER SOURCE

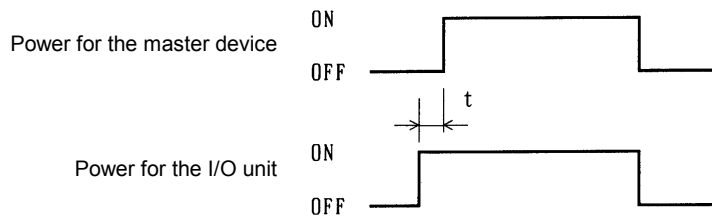
Connect the following power source with the connector CP32 of the interface module (AIF01A, AIF01B, or AIF02C).

- Voltage: 24VDC  $\pm$  10%
- Current: Determine from Table 4.4



### NOTE

Turn ON the power for the I/O unit just when or before the power for the CNC or the cell controller is turned ON. When the CNC or cell controller power is turned OFF, make sure to turn the power to the I/O unit OFF as well. If the power is not turned on and off according to the above procedure, an error occurs in the CNC or the controller, or the I/O unit is not normally connected to the power.

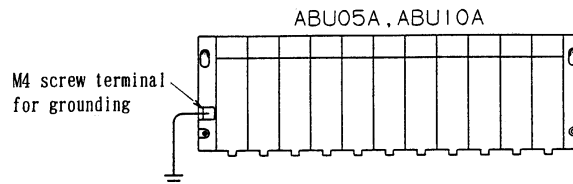


$t \geq 500$  ms (Turn ON of the power for I/O unit can be late 500 ms or less.)

# 4.3 GROUNDING

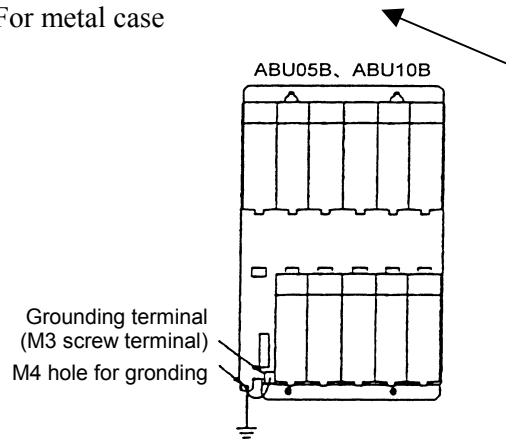
Connect the grounding terminal of the base unit (ABU05A, ABU05B, ABU10A, or ABU10B) to ground.

- (1) Horizontal type base unit



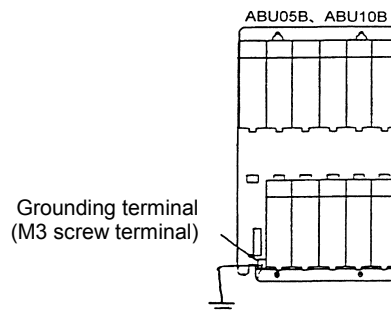
Use a wire of 2 mm<sup>2</sup> or more for grounding.

- (2) Vertical type base unit
  - (a) For metal case



**NOTE**  
Connect the grounding terminal to the grounding hole portion.

- (b) For plastic case



- (2) When the cable K1X ( See overall connection figure in section 4.1) runs between different cabinets, make sure to connect the cabinets with a wire more than 5.5 mm<sup>2</sup>.

## 4.4 REQUIRED CURRENT

Table 4.4 Required current of each module

Module name	Required current (mA) of+24V	
	A	B
AIF01A	50	
AIF01B	50	
AIF0K	50	
AID32A1	$20+0.5 \times n$	$3.0+7.5 \times n$
AID32B1	$20+0.5 \times n$	$3.0+7.5 \times n$
AID32H1	$20+0.5 \times n$	$3.0+7.5 \times n$
AID16C	5	
AID16K	5	
AID16D	5	
AID16L	5	
AID32E1	5	
AID32E2	5	
AID32F1	5	
AID32F2	5	
AIA16G	$5+1.5 \times n$	
AOD32A1	14	
AOD08C	$5+2 \times n$	
AOD08D	$5+2 \times n$	
AOD16C	$5+2 \times n$	
AOD16D	$5+2 \times n$	
AOD32C1	$5+0.5 \times n$	
AOD32C2	$5+0.5 \times n$	
AOD32D1	$5+0.5 \times n$	
AOD32D2	$5+0.5 \times n$	
AOA05E	$5+5.5 \times n$	
AOA08E	$5+5.5 \times n$	
AOA12F	$5+4.5 \times n$	
AOR08G	5	$10 \times n$
AOR16G	5	$10 \times n$
AOR16H2	5	$10 \times n$
AAD04A	5	130
ADA02A	6	120
ADA04B	5	130
ACT01A	$170+0.3 \times \alpha$	
ATI04A	62.5	100
ATI04B	62.5	100

n: Number of the input and output points (for each module) which turn ON simultaneously

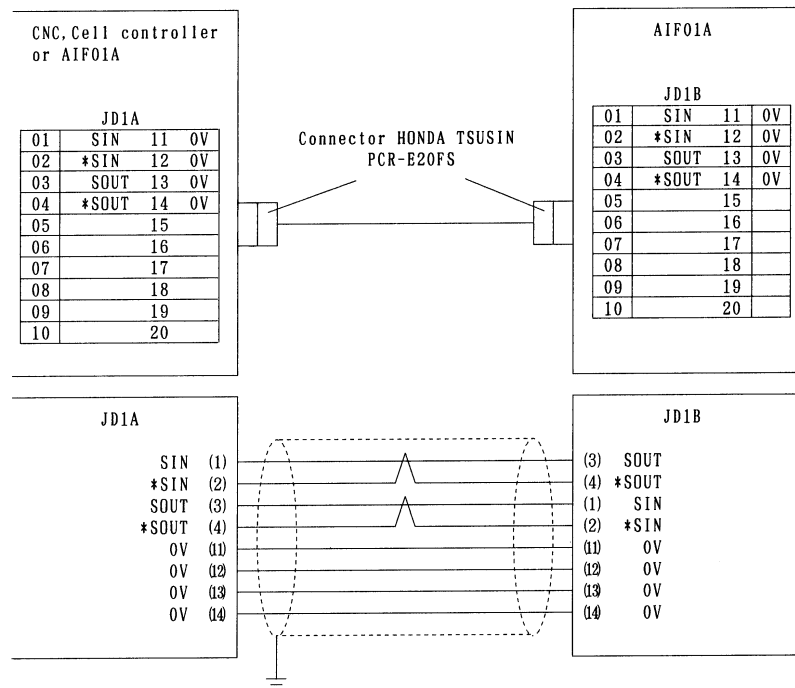
$\alpha$ : +5-V current (mA) output to the outside

- Add the sums of the columns A and B for the modules to be used. The sum is the required current.(Unit:mA)
- For each base unit, keep the sum of column A and the sum of column B to within 500 mA and 1,500 mA, respectively.

## 4.5 INTERFACE MODULE (AIF01A, AIF01B)

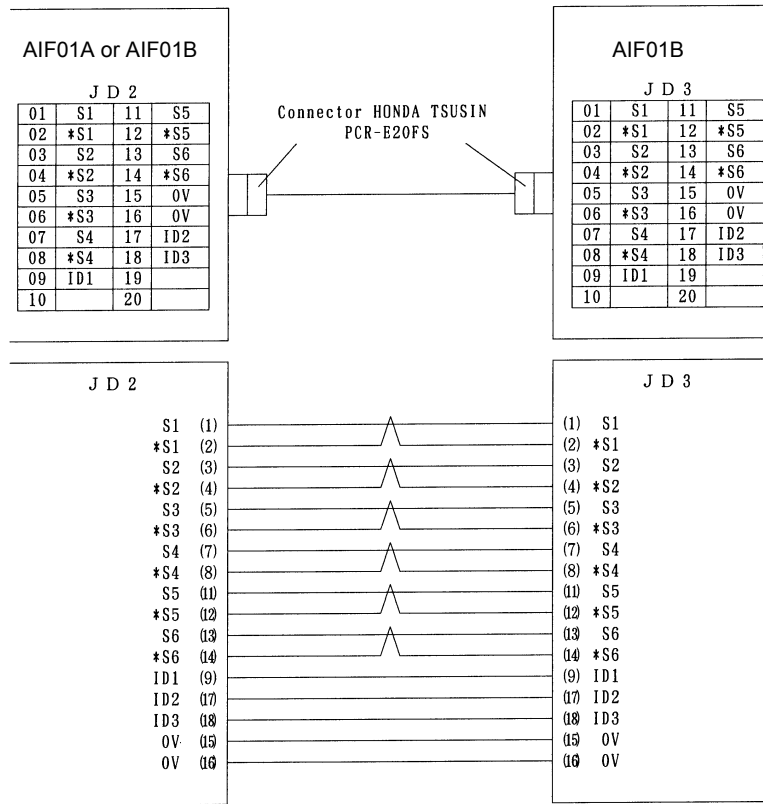
Details of the cables K1X, K2X and the terminator shown in the general connection diagram are as follows.

### 1) Cable K1X



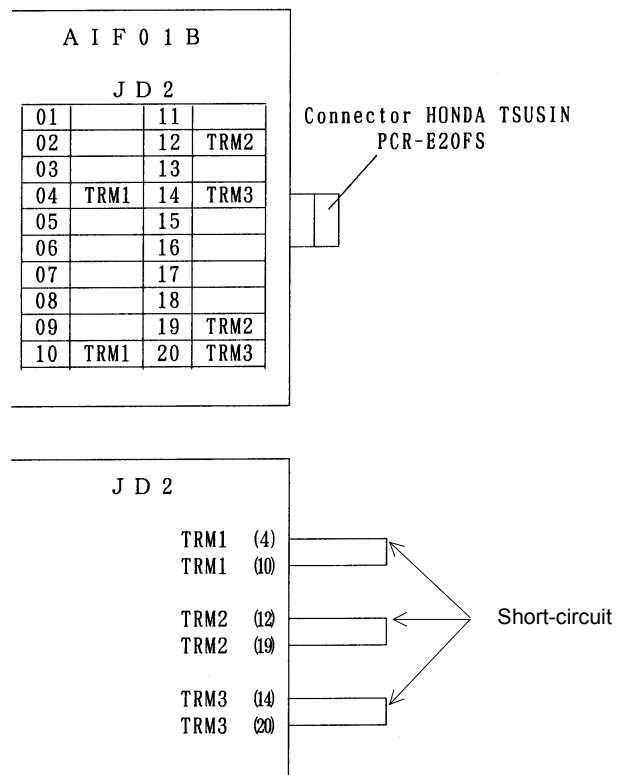
- a) Make sure to use twisted pair wires for signal SIN and \*SIN, and signals SOUT and \*SOUT.
  - i) Reconnected cable material: A66L-0001-0284#10P (twisted pair/shielded)
  - ii) Shielding wires should be connected with the grounding plate of the cabinet at the JD1A side using a cable clamp. (Refer to the CONNECTING MANUAL for the CNC and the cell controller.)
  - iii) Maximum cable length: 10 m
  - iv) Make sure not to connect to the connector spare pins.
  - v) In the following cases, make sure to use an optical I/O link adapter and an optical fiber cable. (See chapter 10)
    - When the cable is more than 10 meters long.
    - When the cable runs between different cabinets and there is no appropriate ground wire between the cabinets.
    - When there is concern that the cable is influenced by strong noise.
  - vi) When an optical I/O link adapter is used: Cable to be used between the interface module (AIF01A) and the optical I/O link adapter is dissimilar to this cable. (See chapter 10.)

2) Cable K2X



- Connect the signals with a same name.
- Make sure to use twisted pair wires for the following signals:  
S1 and \* S1, S2 and \*S2, S3 and \*S3  
S4 and \* S4, S5 and \*S5, S6 and \*S6
- Do not connect the pins No.10, No.19 and No.20 as they are used internally.
- Recommended cable material: A66L - 0001 - 0284#10P (twisted pair/shielded)
- Maximum cable length: 2m

## 3) Terminator TX



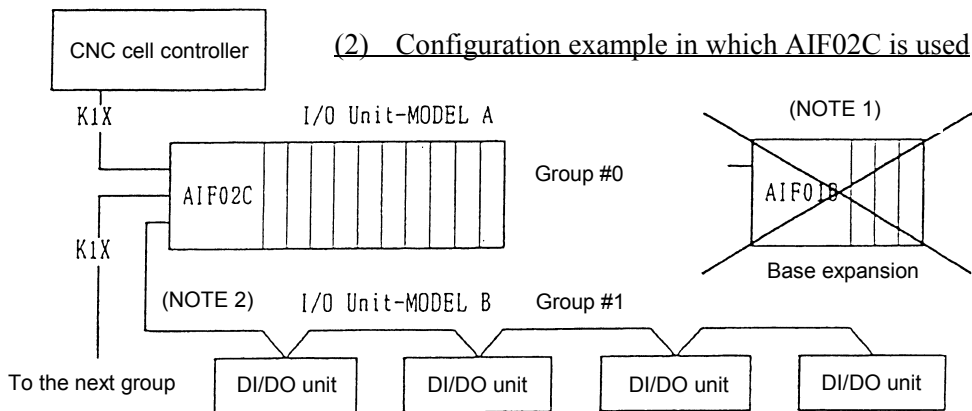
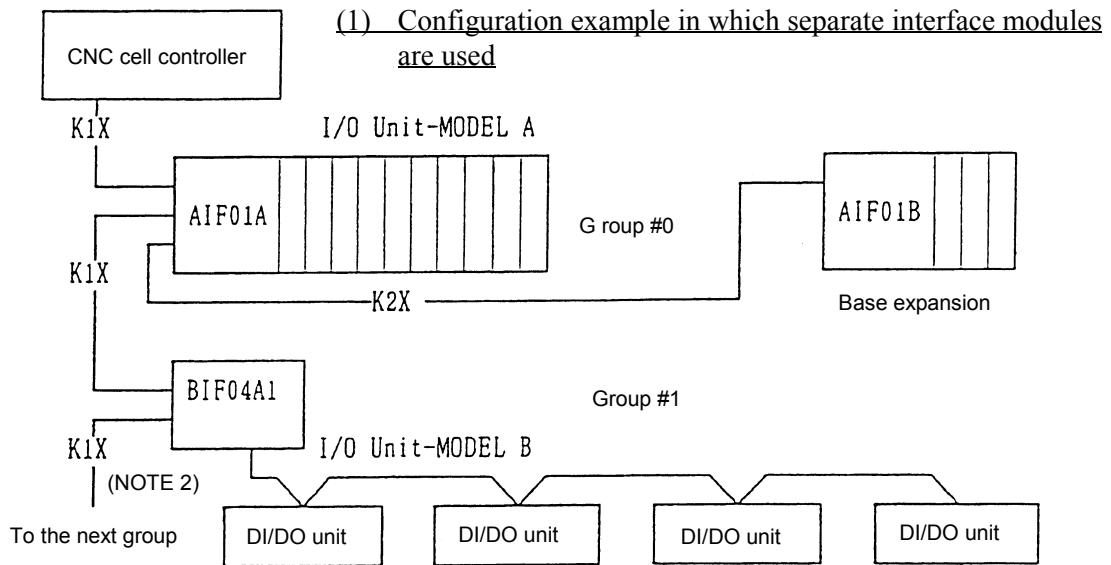
- Terminate the connector JD2 of the last AIF01B in a single group with the terminator. The connector need not be terminated when the AIF01B is not used.
- Short-circuit the TRM1s, the TRM2s and the TRM 3s one another respectively in a manner that a TRM1 is with another TRM1 and so on.

## 4.6 INTERFACE MODULE (AIF02C) CONNECTION

### 4.6.1 Overview

One interface module (AIF02C) can control communication with both I/O Unit-A and Unit-B, when it is connected to the FANUC I/O Link.

The following examples show a configuration in which two conventional separate interface modules, I/O Unit-A and I/O Unit-B, are used and a configuration in which the AIF02C is used.



In this way, using the AIF02C eliminates the necessity for the interface unit (BIF04A1) for I/O Unit-B, which has conventionally been used separately; this configuration is suitable for a small I/O Unit-B system. Note the following points.

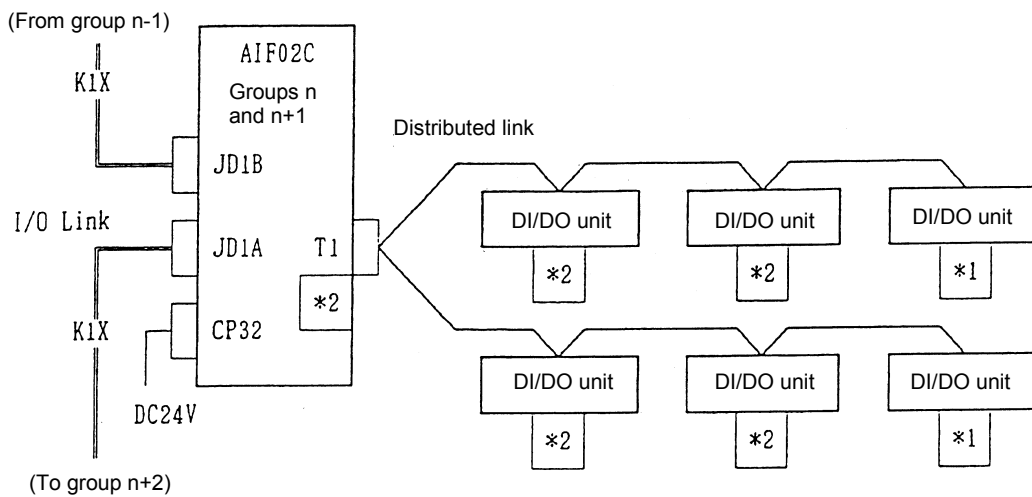
**NOTES**

- 1 The AIF02C cannot be used for base expansion.
- 2 The BIF04A1 can branch to a maximum of eight communication lines.  
The AIF02C can branch only to a maximum of two distributed link cables.

### 4.6.2 Connection

(1) Connection diagram

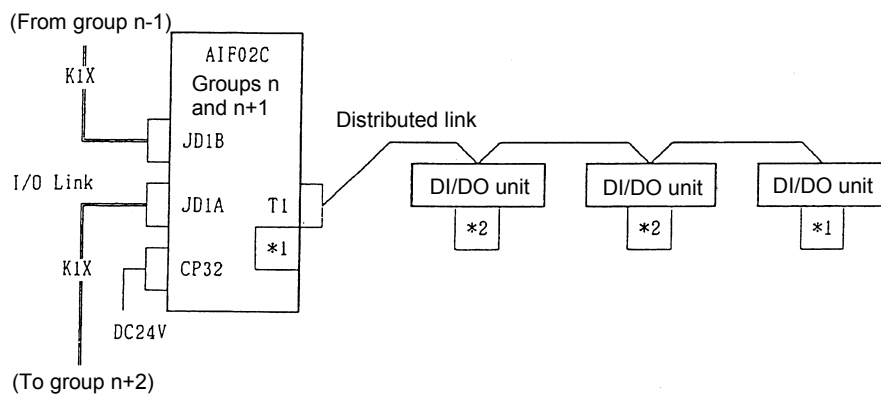
[a] Configuration with two distributed link cables (note the setting of the terminating resistor.)



**CAUTIONS**

- 1 Set the terminating resistor DIP switch to ON
- 2 Set the terminating resistor DIP switch to OFF.

[b] Connection with one Distributed Link cable (note the setting





**CAUTIONS**

- 1 Set the terminating resistor DIP switch to ON.
- 2 Set the terminating resistor DIP switch to OFF.

## (2) Connection with the I/O link

The AIF02C occupies two groups on the I/O link.

When groups #n and #n+1 are used, for example, the smaller-numbered group, #n, is assigned to the I/O Unit-A, and the larger-numbered group, #n+1, is assigned to the I/O Unit-B.

## [a] Connection of the I/O link cable

Connect the I/O link cable from the previous group to JD1B. Connect JD1A to the I/O link cable leading to the next group. Use the K1X I/O link signal cable, the same I/O link signal cable type as that for the AIF01A.

## [b] Number of occupied I/O points on the I/O link

The nominal number of occupied I/O points may differ from the actual number of I/O points. For the details of the number of I/O points occupied by the I/O Unit-B, refer to Section 4.2.1, "Number of points occupied on the interface unit I/O link," of the FANUC I/O Unit-B MODEL Connection Manual (B-62163E).

## (3) Connection with the distributed link (I/O Unit-B)

## [a] Number of distributed communication lines (I/O Unit-B)

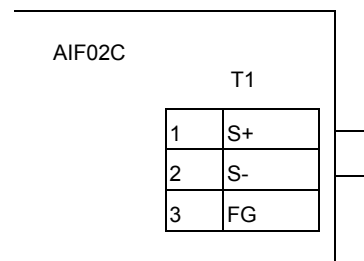
"T1" can connect to two communication lines (twisted-pair wires).

So, it is possible to branch to up to two lines.

To branch to more lines, you should use the I/O Unit-B interface unit (BIF04A1), which enables branching to up to eight communication lines.

## [b] Terminal board "T1," used for connection with the distributed link cable

The distributed link cable is connected to "T1."



- ① Use twisted-pair wires as the distributed link cable.
- ② The distributed link cable is polarity-sensitive. Match the signal polarity of the AIF02C with that of the basic unit.
- ③ The terminal board has M3 screws with a terminal cover.

Refer to Section 4.3, "Connecting a Distributed Link," and Section 4.5.2, "Connecting the communications cable," of the FANUC I/O Unit-MODEL B Connection Manual (B-62163E) for details.

### 4.6.3 Setting with the DIP switch

In the AIF02C, distributed link settings can be made with the DIP switch on the back of the module.

The settings and corresponding signals are shown below.

1		} Unused
2		
3		
4	EDSP	
5	Q	
6	H	
7	URDY	
8	R	

- (1) EDSP (error display method selection)  
Normally, set EDSP to the ON position.
- (2) Q and H (communication speed setting)  
Normally, set both Q and H to the OFF positions.
- (3) URDY (setting of the power on/off information for the unit)  
Normally, set URDY to the OFF position.
- (4) R (terminating resistor setting)  
The ON position means that a terminating resistor must be installed. The OFF position means that no terminating resistor need be installed.

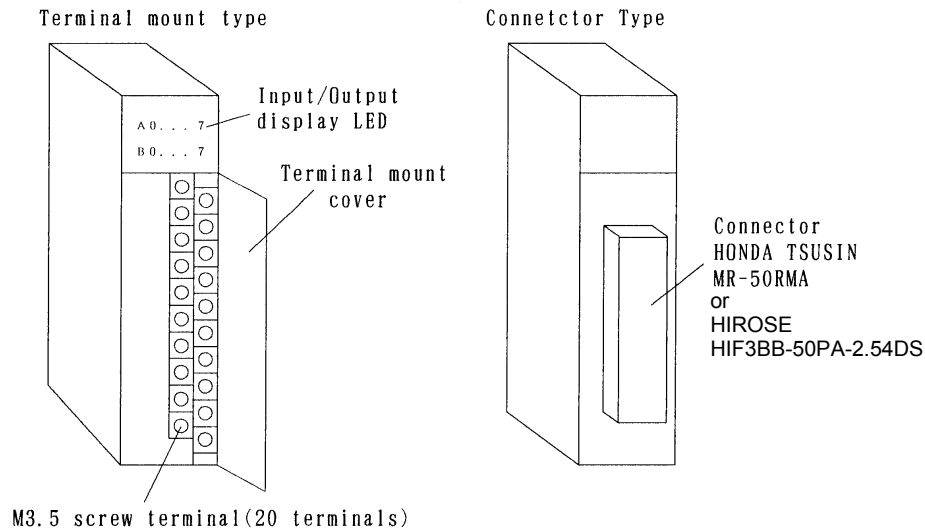
When only one communication cable is connected to the AIF02C, terminate it and the basic unit at the end of the communication cable with a resistor.

When two communication cables are connected to the AIF02C, terminate the basic unit connected to the end of each communication cable with a resistor. Do not connect a terminating resistor to the AIF02C. (Refer to Section 4.6.2, "Connection.")

Refer to Section 5.1.1, "DIP switch setting," of the FANUC I/O Unit-MODEL B Connection Manual (B-62163E).

## 4.7 CONNECTING WITH I/O MODULES

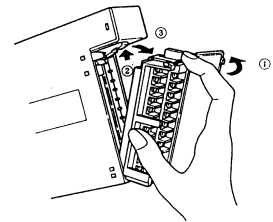
From the point of view of an external connecting method, there are two types of I/O modules such as one with a terminal block and one with a connector.



- 1) Connect with each module following the connection diagrams of sections 4.2 and 5.3.
- 2) The terminal block is a removable type.

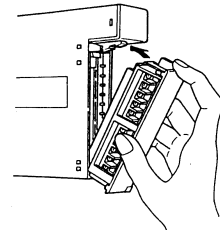
### [Dismounting the terminal block]

- ① Open the cover of the terminal block.
- ② Push up the latch at the top of the terminal block.
- ③ Drag out the tab at the top of the terminal block and pull it out. The terminal block will be removed from the module.



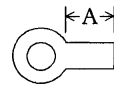
### [Mounting the terminal block]

- ① Insert the protruding portion at the bottom of the terminal block in the groove of the module side.
- ② Push the terminal block using the engaging point of the protruding portion and the groove as an axis and mount it in the module firmly.
- ③ Open the cover of the terminal block and check to make sure the latch at the top of the terminal block is firmly set.



## 3) Cautionary points when wiring terminal block type

- Wiring material : AWG22 to 18 (0.3 to 0.75 mm<sup>2</sup>)  
A wire as this as possible is recommended.
- Crimp style terminal : M3.5  
Crimp style terminal with no insulation sleeve and a short distance "A", as illustrated in the drawing below, is recommended.



DAIDO TANSHI 1.25-S3.5  
NICHIFU TANSHI 1.25-3.5S etc.

- Mark tube : Use a short mark tube as possible and cover crimped part with the mark tube.

# 5

## DIGITAL INPUT/OUTPUT MODULES

### 5.1 LIST OF MODULES

#### Digital input modules

Input type	module name	Rated voltage	Rated current	Polarity	Response time	Points	External connection	LED display
Non-insulation type DC input	AID32A1	24VDC	7.5 mA	Both	Maximum 20 ms	32	Connector A	not provided
	AID32B1	24VDC	7.5 mA	Both	Maximum 2 ms	32	Connector A	not provided
	AID32H1	24VDC	7.5 mA	Both	Maximum 2 ms Maximum 20 ms	8 24	Connector A	not provided
Insulation type DC input	AID16C	24VDC	7.5 mA	NEG	Maximum 20 ms	16	Terminal block	provided
	AID16K	24VDC	7.5 mA	NEG	Maximum 2 ms	16	Terminal block	provided
	AID16D	24VDC	7.5 mA	POS	Maximum 20 ms	16	Terminal block	provided
	AID16L	24VDC	7.5 mA	POS	Maximum 2 ms	16	Terminal block	provided
	AID32E1	24VDC	7.5 mA	Both	Maximum 20 ms	32	Connector A	not provided
	AID32E2	24VDC	7.5 mA	Both	Maximum 20 ms	32	Connector B	not provided
	AID32F1	24VDC	7.5 mA	Both	Maximum 2 ms	32	Connector A	not provided
	AID32F2	24VDC	7.5 mA	Both	Maximum 2 ms	32	Connector B	not provided
AC input	AIA16G	100 to 120VAC	10.5 mA (120VAC)		ON Max 35ms OFF Max 45ms	16	Terminal block	provided

#### NOTE

##### 1 Polarity

Negative : 0 V common (current source type) Regard to be ON when input is at Low level.

Positive : 24 V common (current sink type) Regard to be ON when input is High level.

##### 2 Connector A : HONDA MR Connector

Connector B : Flat Cable Connector

##### 3 For the details of the specifications for each module, refer to the section 5.3.

Digital output modules

Output type	Module name	Rated voltage	Maximum current	Polarity	Points	Points/ common	External connection	LED display	Fuse
Non-insulation type DC output	AOD32A1	5 to 24VDC	0.3A	NEG	32	8	Connector A	not provided	not provided
Insulation type DC output	AOD08C	12 to 24VDC	2A	NEG	8	8	Terminal block	provided	provided
	AOD08D		2A	POS	8	8	Terminal block	provided	provided
	AOD16C		0.5A	NEG	16	8	Terminal block	provided	not provided
	AOD16D		0.5A	POS	16	8	Terminal block	provided	not provided
	AOD32C1		0.3A	NEG	32	8	Connector A	not provided	not provided
	AOD32C2		0.3A	NEG	32	8	Connector B	not provided	not provided
	AOD32D1		0.3A	POS	32	8	Connector A	not provided	not provided
	AOD32D2		0.3A	POS	32	8	Connector B	not provided	not provided
AC output	AOA05E	100 to 240VAC	2A	-	5	1	Terminal block	provided	provided
	AOA08E		1A	-	8	4	Terminal block	provided	provided
	AOA12F	100 to 120VAC	0.5A	-	12	6	Terminal block	provided	provided
RELAY output	AOR08G	Maximum 250VAC/ 30VDC	4A	-	8	1	Terminal block	provided	not provided
	AOR16G		2A	-	16	4	Terminal block	provided	not provided
	AOR16H2	30VDC	2A	-	16	4	Connector B	provided	not provided

**NOTE**

## 1 Polarity

Negative : 0 V common (current sink type) Output is at Low level when ON.

Positive : 24 V common (current source type) Output is at High level when ON.

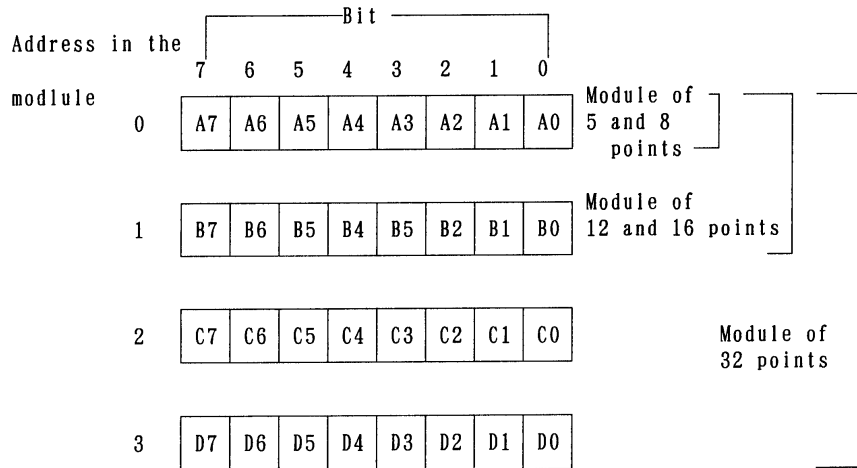
## 2 Connector A : HONDA MR Connector

Connector B : Flat Cable Connector

## 3 For the details of the specifications for each module, refer to the section 5.3.

## 4 The maximum current of the DC output module includes the permissible rush current.

## 5.2 CORRESPONDENCE BETWEEN I/O SIGNALS AND ADDRESSES IN A MODULE



Addresses in a module are addresses defined for each module. They are relative addresses in a module with the beginning address in the module as 0. Real addresses viewed from the sequence program of the PMC are set by the programmer.

For input modules, an input signal becomes "1" when the contact point connected with the input is turned ON. On the other hand, for output modules, an output contact point (or transistor) is turned ON when the output signal is "1."

## 5.3 SPECIFICATION FOR EACH MODULE

---

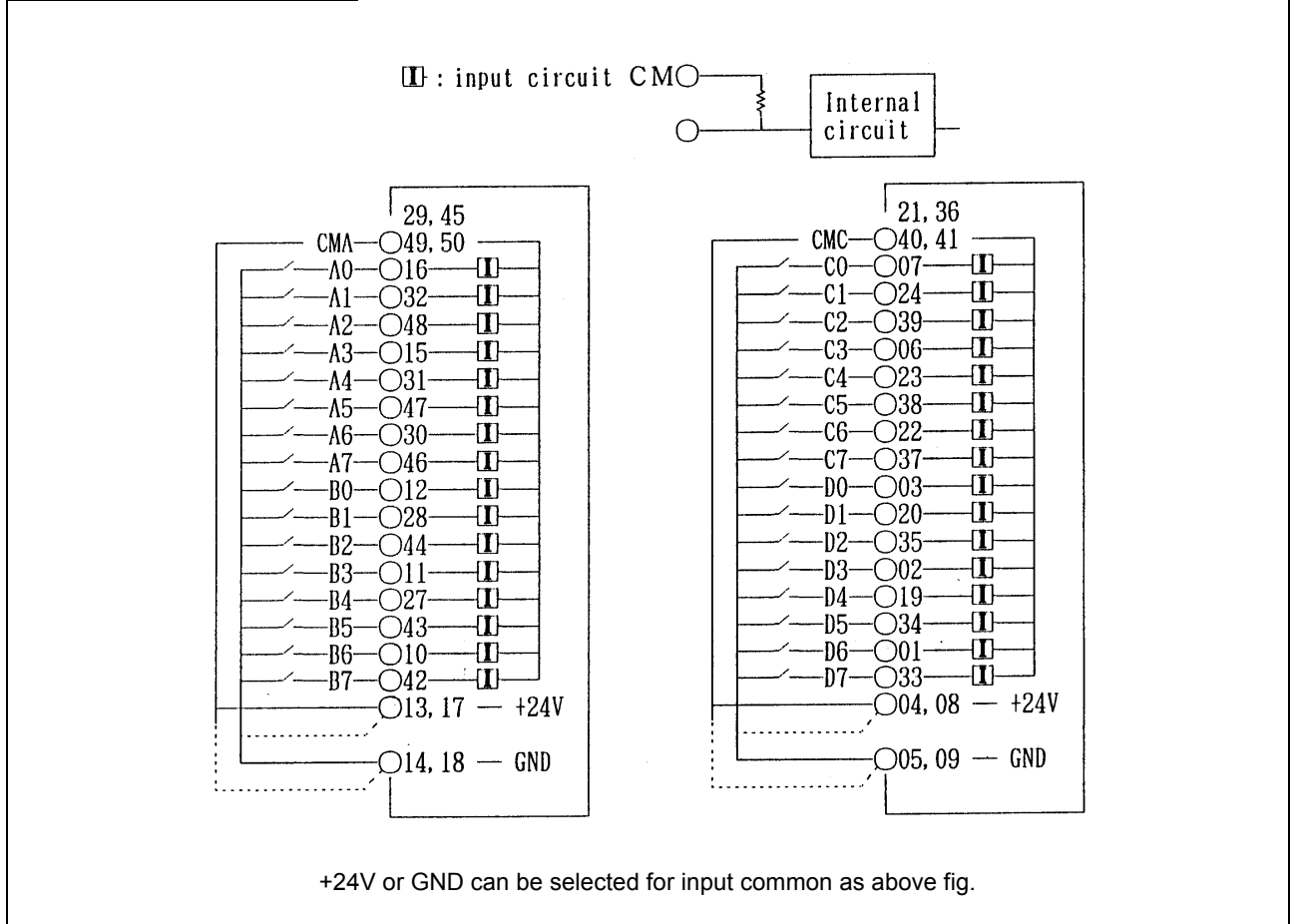
Specifications for each I/O module are shown in the following pages.

- (1) Input module AID32A1
- (2) Input module AID32B1
- (3) Input module AID32H1
- (4) Input module AID16C
- (5) Input module AID16K
- (6) Input module AID16D
- (7) Input module AID16L
- (8) Input module AID32E1
- (9) Input module AID32E2
- (10) Input module AID32F1
- (11) Input module AID32F2
- (12) Input module AIA16G
- (13) Output module AOD32A1
- (14) Output module AOD08C
- (15) Output module AOD08D
- (16) Output module AOD16C
- (17) Output module AOD16D
- (18) Output module AOD32C1
- (19) Output module AOD32C2
- (20) Output module AOD32D1
- (21) Output module AOD32D2
- (22) Output module AOA05E
- (23) Output module AOA08E
- (24) Output module AOA12F
- (25) Output module AOR08G
- (26) Output module AOR16G
- (27) Output module AOR16H2



(1) Input module AID32A1 (Non-insulation type)

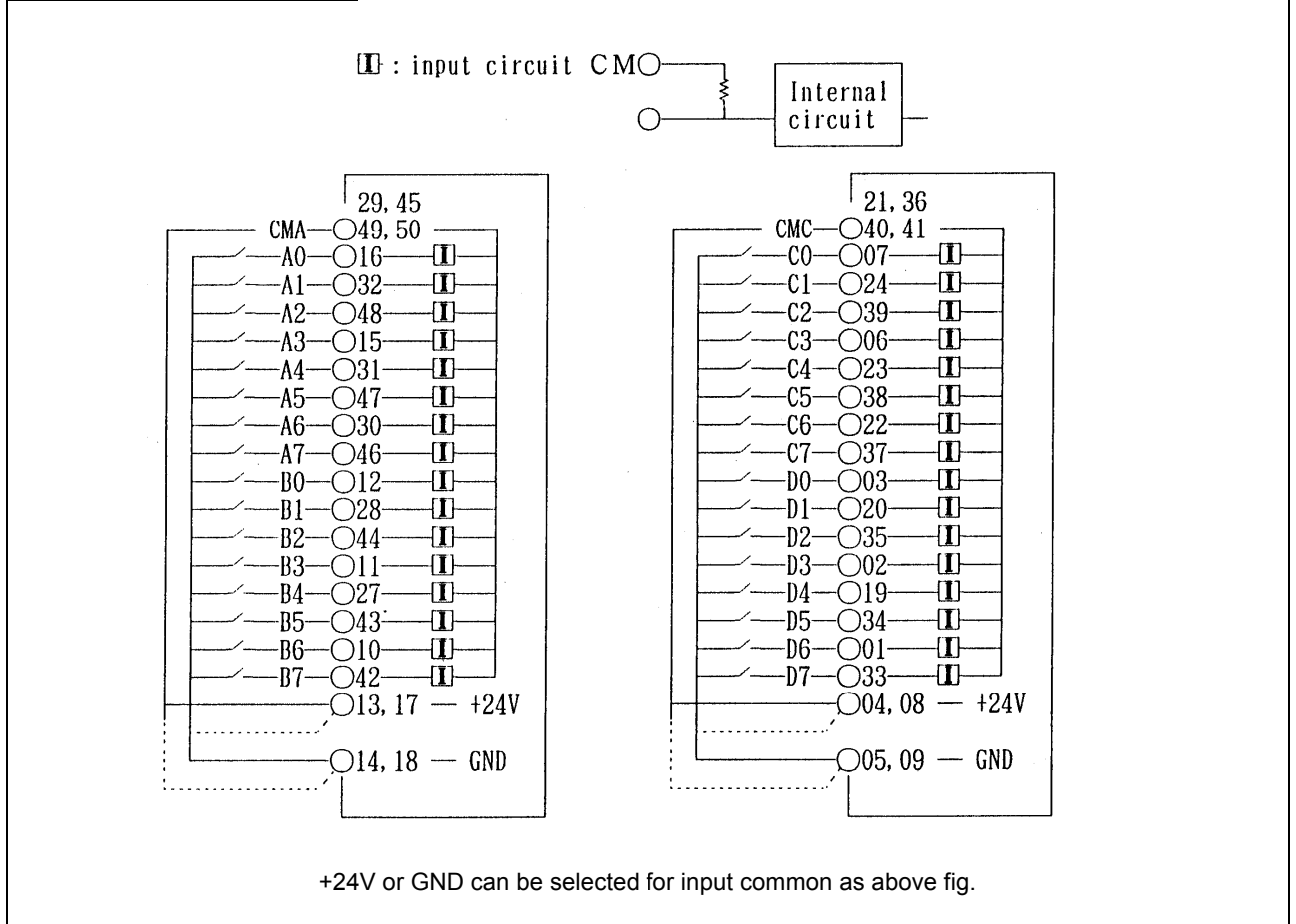
Item		Specifications	
Points/module		32 points	
Points/common		16 points/common	
Sink/source current		Both directions	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 18VDC, min. 6mA	
OFF voltage, current		Max. 6VDC, max. 1.5mA	
Response time	OFF ON	Max.20ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.20ms	
Input display		Not provided	
External connection		Connector (HONDA TSUSIN MR-50RMA)	
Terminal connection and circuitry			



**NOTE**  
 1 Make sure to connect all common (CMA, CMC) pins.  
 2 This module outputs +24 V on pins 13, 17, 04, and 08.

(2) Input module AID32B1 (Non-insulation type)

Item		Specifications	
Points/module		32 points	
Points/common		16 points/common	
Sink/source current		Both directions	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 18VDC, min. 6mA	
OFF voltage, current		Max. 6VDC, max. 1.5mA	
Response time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Input display		Not provided	
External connection		Connector (HONDA TSUSIN MR-50RMA)	
Terminal connection and circuitry			



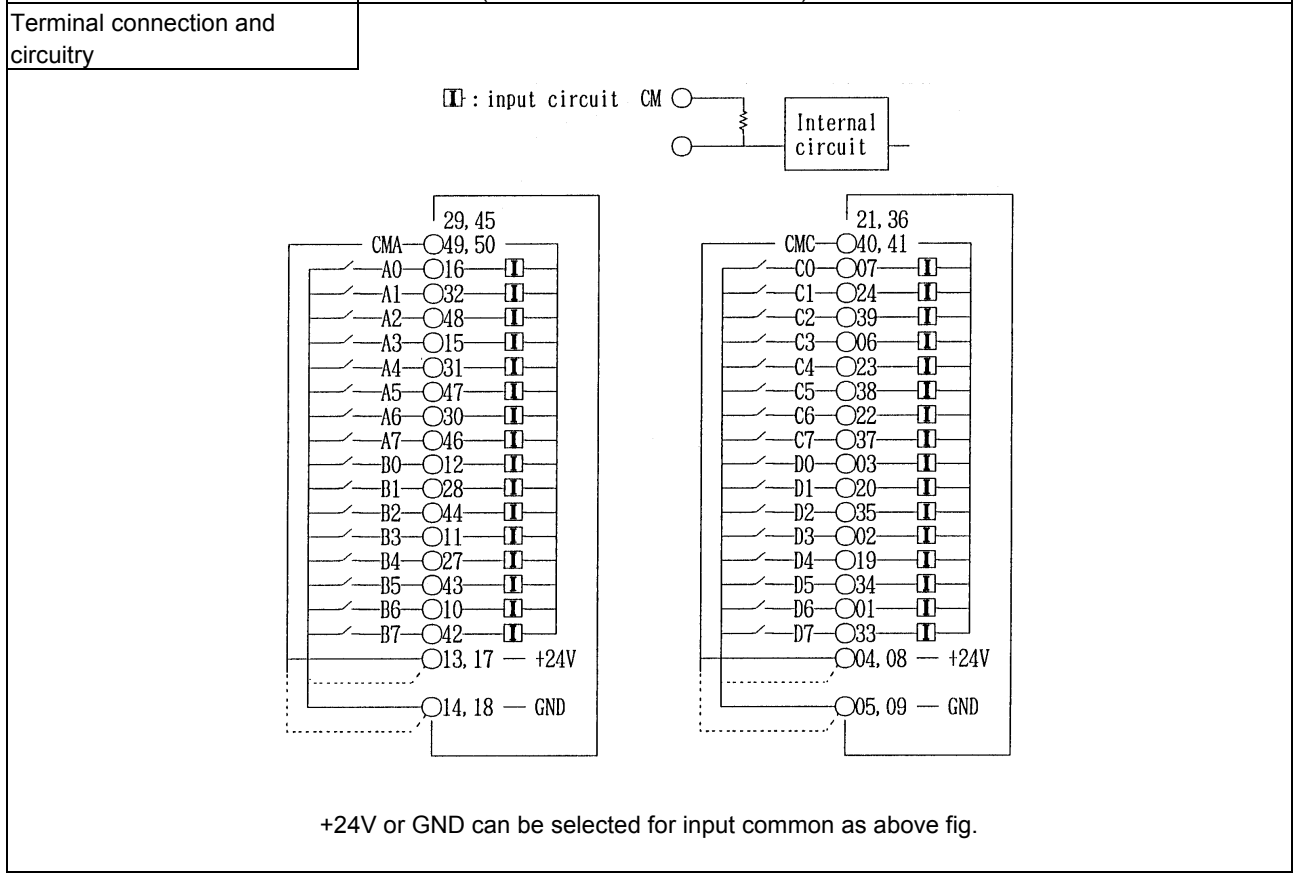
**NOTE**

1 Make sure to connect all common (CMA, CMC) pins.

2 This module outputs +24 V on pins 13, 17, 04, and 08.

(3) Input module AID32H1

Item		Specifications	
Points/module		32 points	
Points/common		16 points/common	
Sink/source current		Both directions	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 18VDC, min. 6mA	
OFF voltage, current		Max. 6VDC, max. 1.5mA	
Response time	OFF ON	Max.2ms (A0 to A7) Max.20ms (B0 to D7)	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms (A0 to A7) Max.20ms (B0 to D7)	
Input display		Not provided	
External connection		Connector (HONDA TSUSIN MR-50RMA)	

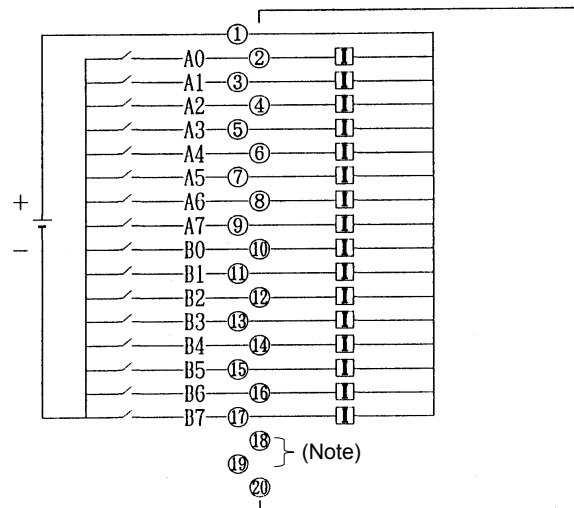



**NOTE**  
 1 Make sure to connect all common (CMA, CMC) pins.  
 2 This module outputs +24 V on pins 13, 17, 04, and 08.

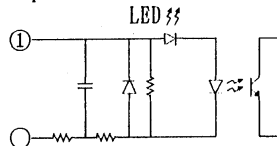
(4) Input module AID16C

Item		Specifications	
Points/module		16 points	
Points/common		16 points/common	
Sink/source current		Source current type	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 15VDC, min. 4mA	
OFF voltage, current		Max. 5VDC, max. 1.5mA	
Response time	OFF ON	Max.20ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.20ms	
Input display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	

Terminal connection and circuitry



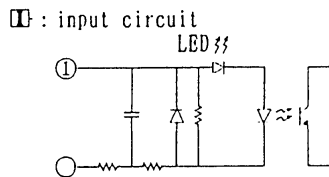
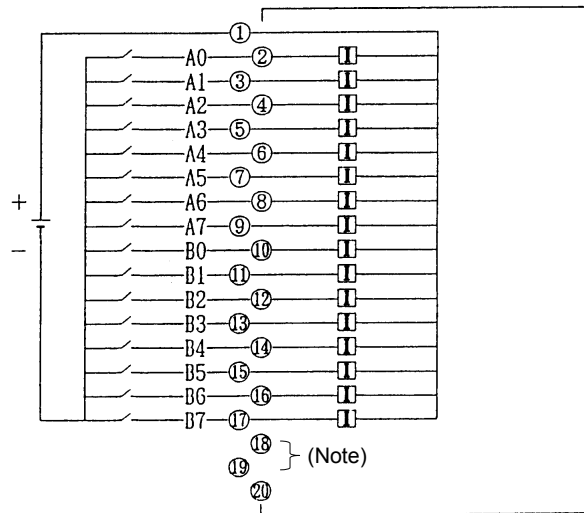
 : input circuit



**NOTE**  
 Pins 18 and 19 are for factory use only.  
 Do not connect any wire to them

(5) Input module AID16K

Item		Specifications	
Points/module		16 points	
Points/common		16 points/common	
Sink/source current		Source current type	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 15VDC, min. 4mA	
OFF voltage, current		Max. 5VDC, max. 1.5mA	
Response time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Input display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Terminal connection and circuitry			

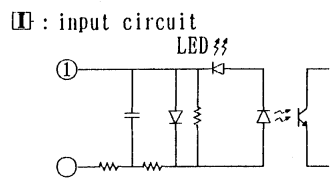
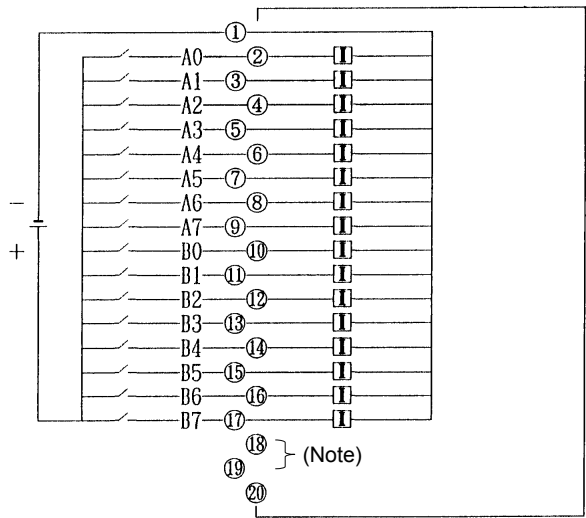


**NOTE**  
 Pins 18 and 19 are for factory use only.  
 Do not connect any wire to them

(6) Input module AID16D

Item		Specifications	
Points/module		32 points	
Points/common		16 points/common	
Sink/source current		Sink current type	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 15VDC, min. 4mA	
OFF voltage, current		Max. 5VDC, max. 1.5mA	
Response time	OFF ON	Max.20ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.20ms	
Input display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	

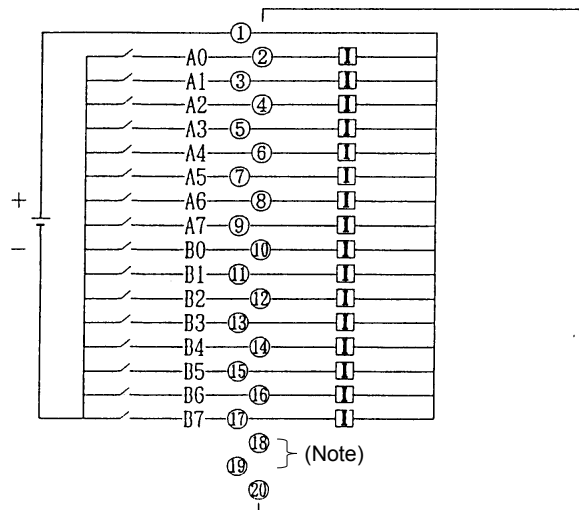
Terminal connection and circuitry



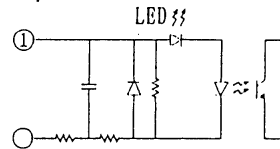
**NOTE**  
 Pins 18 and 19 are for factory use only.  
 Do not connect any wire to them

(7) Input module AID16L

Item		Specifications	
Points/module		16 points	
Points/common		16 points/common	
Sink/source current		Source current type	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 15VDC, min. 4mA	
OFF voltage, current		Max. 5VDC, max. 1.5mA	
Response time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Input display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Terminal connection and circuitry			



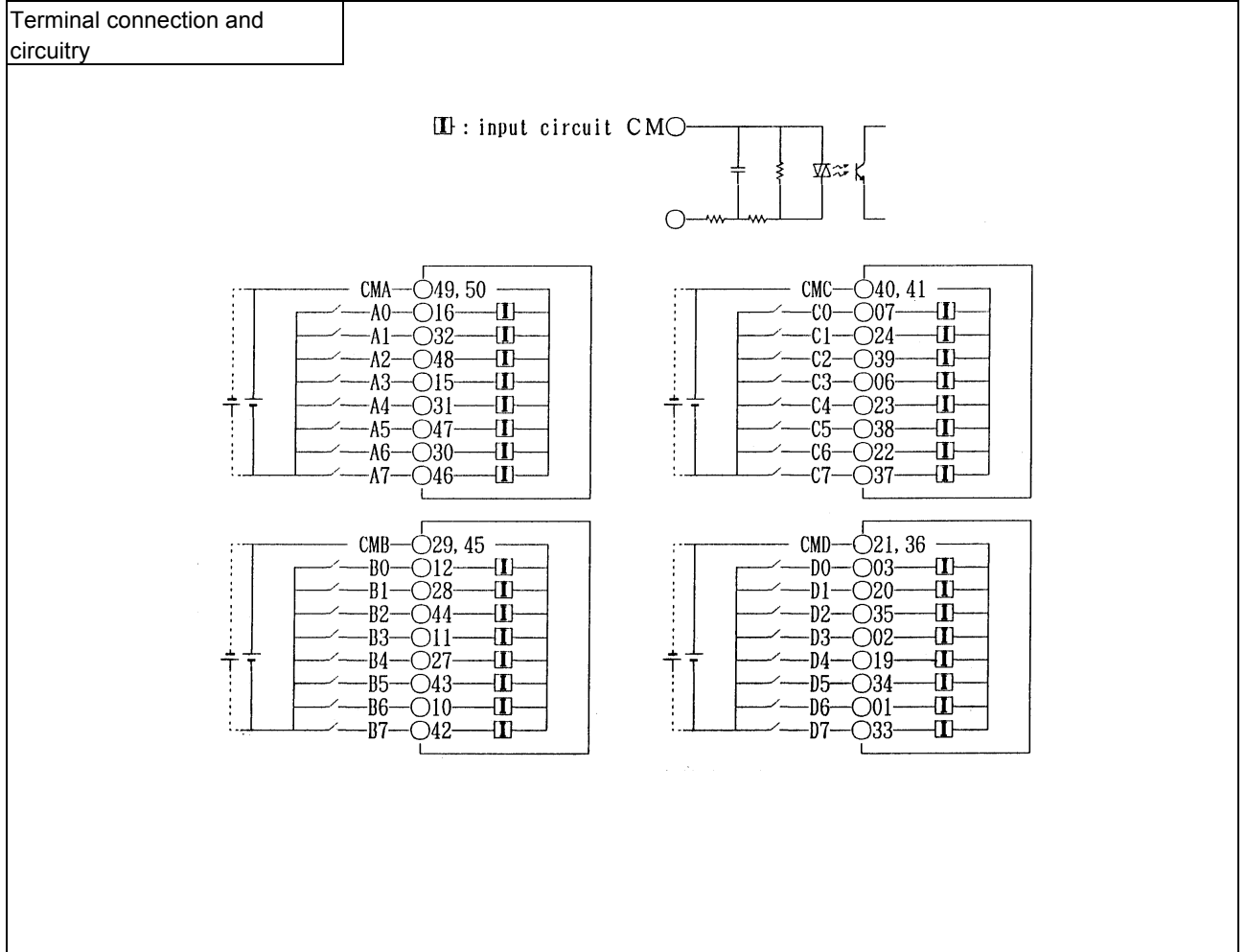
□ : input circuit



**NOTE**  
 Pins 18 and 19 are for factory use only.  
 Do not connect any wire to them

(8) Input module AID32E1

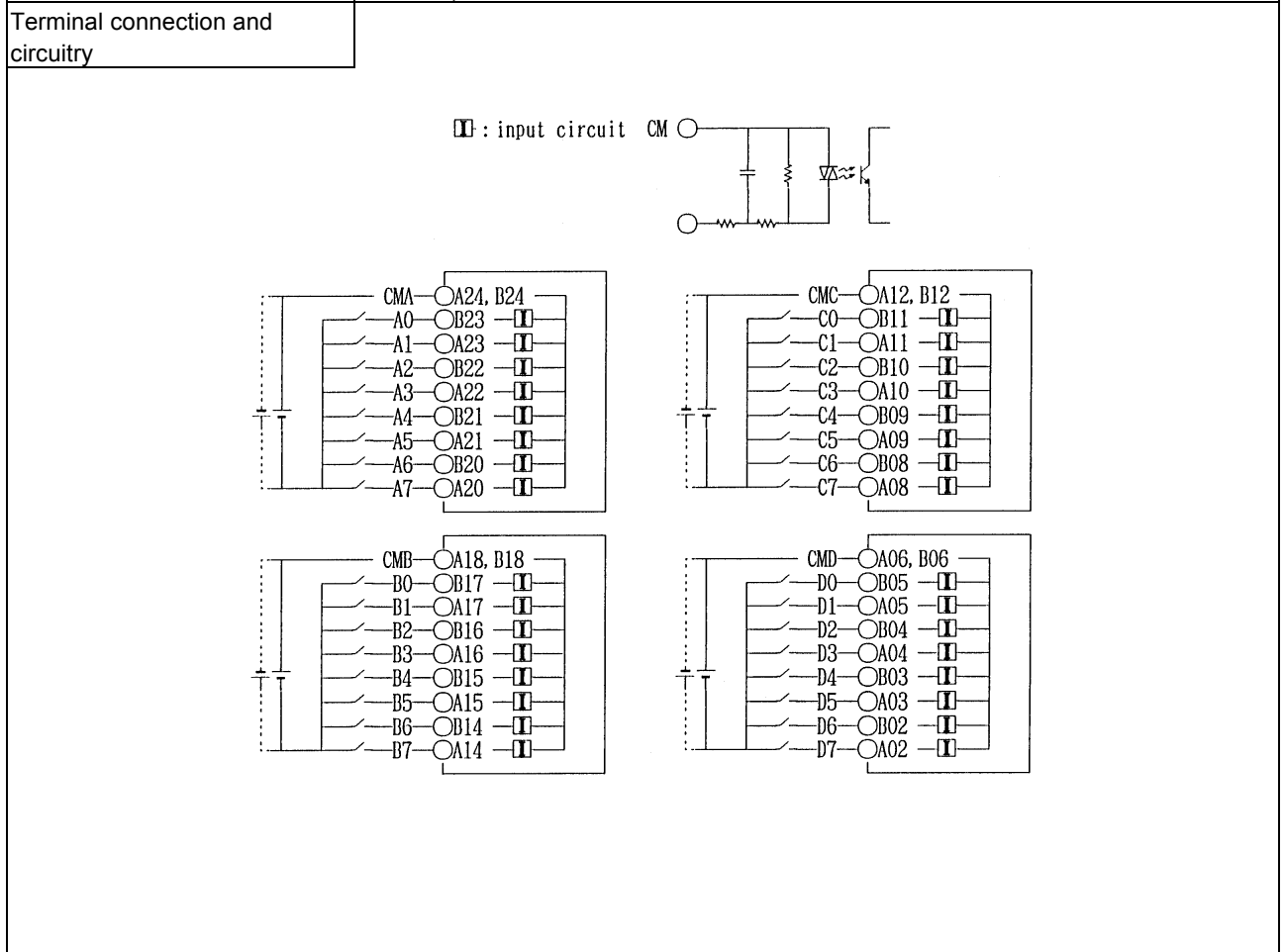
Item		Specifications	
Points/module		32 points	
Points/common		8 points/common	
Sink/source current		Both directions	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 15VDC, min. 4.5mA	
OFF voltage, current		Max. 6VDC, max. 2mA	
Response time	OFF ON	Max.20ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.20ms	
Input display		Not provided	
External connection		Connector (HONDA TSUSIN MR-50RMA)	





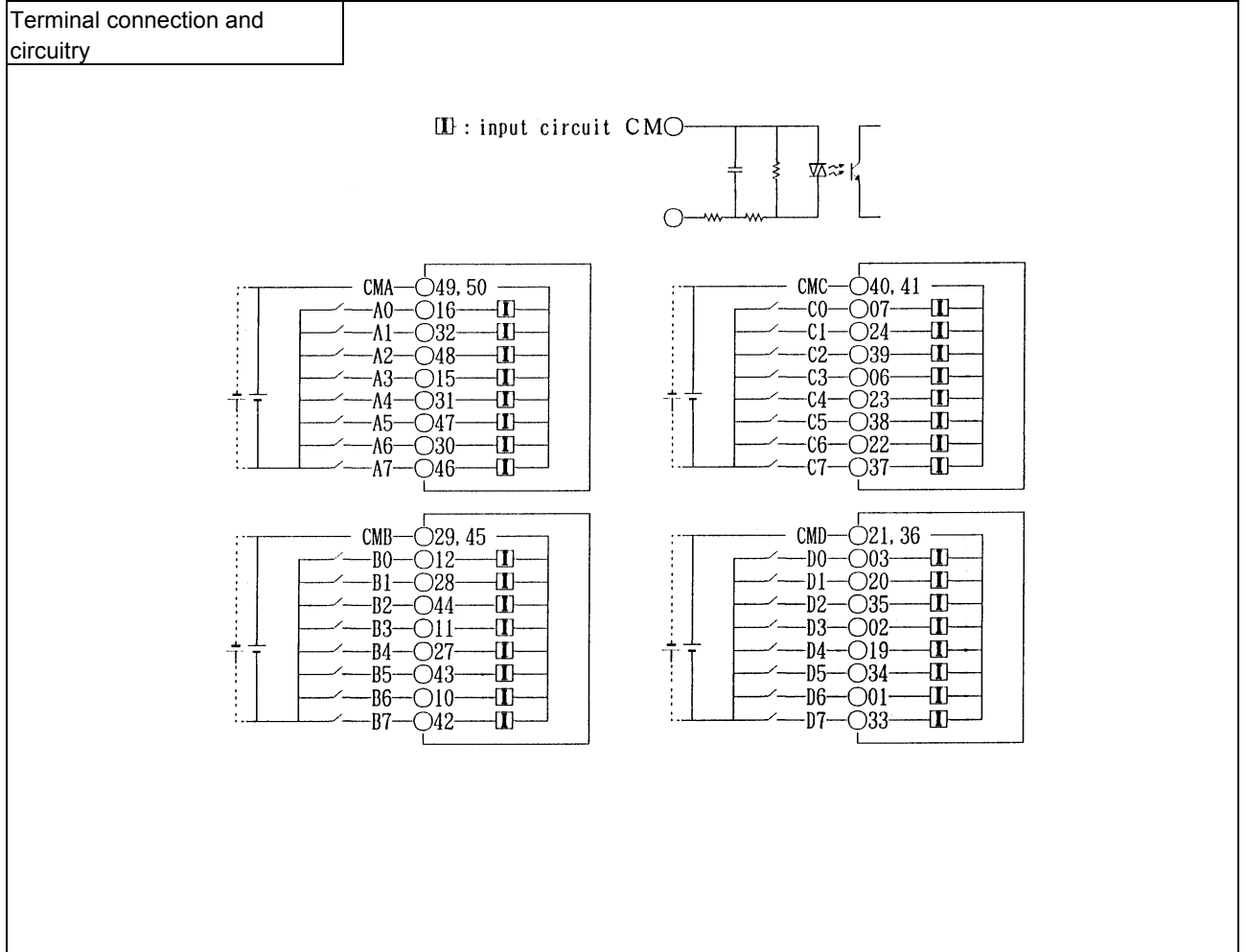
(9) Input module AID32E2

Item		Specifications	
Points/module		32 points	
Points/common		8 points/common	
Sink/source current		Both directions	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 15VDC, min. 4.5mA	
OFF voltage, current		Max. 6VDC, max. 2mA	
Response time	OFF ON	Max.20ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.20ms	
Input display		Not provided	
External connection		Connector (HIROSE ELECTRIC HIF3BB-50PA-2.54DS in accordance with MIL standard)	



(10) Input module AID32F1

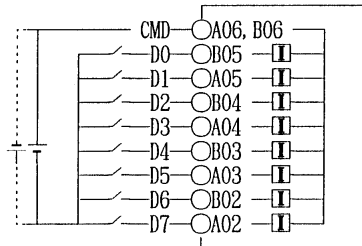
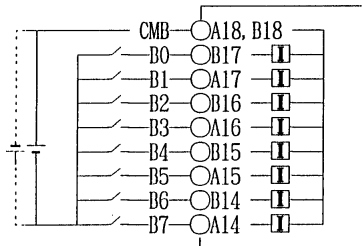
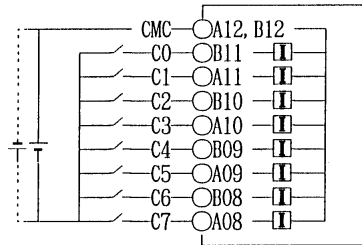
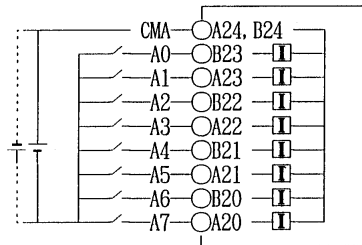
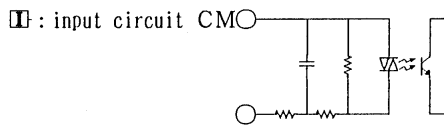
Item		Specifications	
Points/module		32 points	
Points/common		8 points/common	
Sink/source current		Both directions	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 15VDC, min. 4.5mA	
OFF voltage, current		Max. 6VDC, max. 2mA	
Response time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Input display		Not provided	
External connection		Connector (HONDA TSUSIN MR-50RMA)	



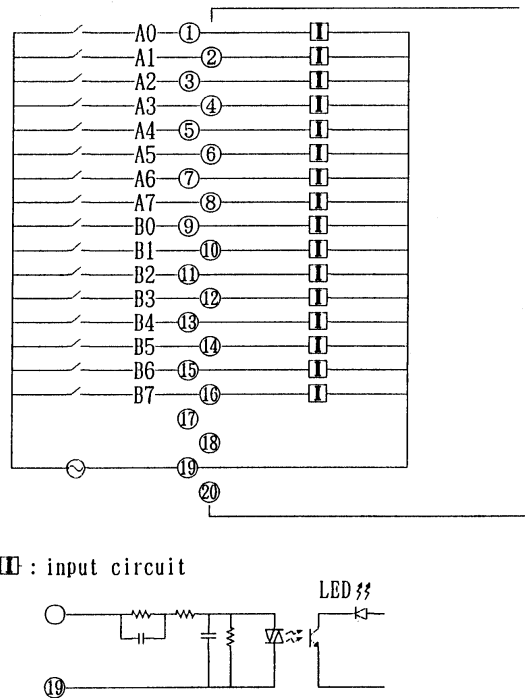
(11) Input module AID32F2

Item		Specifications	
Points/module		32 points	
Points/common		8 points/common	
Sink/source current		Both directions	
Input voltage		24VDC +10%, -20%	
Input current		7.5mA (average)	
ON voltage, current		Min. 15VDC, min. 4.5mA	
OFF voltage, current		Max. 6VDC, max. 2mA	
Response time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Input display		Not provided	
External connection		Connector (HIROSE ELECTRIC HIF3BB-50PA-2.54DS in accordance with MIL standard)	

Terminal connection and circuitry

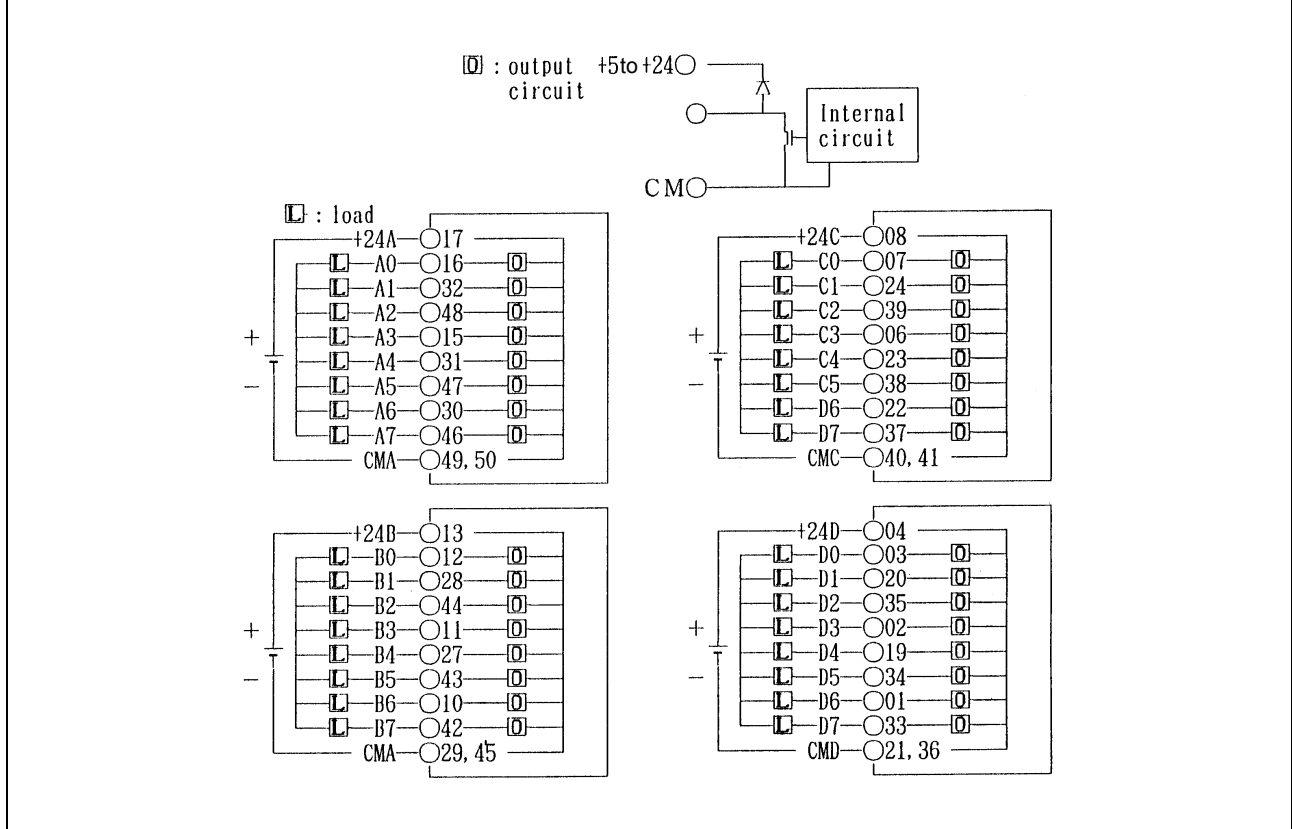


(12) Input module AIA16G

Item		Specifications	
Points/module		16 points	
Points/common		16 points/common	
Sink/source current		100 to 115VAC ±15%	
Input voltage		132Vrms, 50/60 Hz	
Input current		10.55mArms (120VAC, 50Hz)	
ON voltage, current		Min. 74Vrms, min. 6mArms	
OFF voltage, current		Max. 20Vrms, max. 2.2mArms	
Response time	OFF ON	Max.35ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.45ms	
Input display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Common		16 points/common	
Terminal connection and circuitry		 <p>The diagram shows a terminal block with 20 terminals. Terminals 1 through 16 are labeled A0 through B7, each with a switch symbol. Terminals 17, 18, 19, and 20 are unlabeled. Terminal 19 is connected to a common ground symbol. Below the terminal block is a schematic of the input circuit, showing a resistor, a capacitor, a diode, and an LED connected to terminal 19.</p>	

(13) Output module AOD32A1 (Non-insulation type)

Item		Specifications	
Points/module		32 points	
Points/common		8 points/common	
Sink/source current		Sink current type	
Rated load voltage		5 to 24VDC +20%, -15%	
Maximum load current		0.3A (however 2A/common)	
Maximum voltage drop when ON		0.24V (load current $\times$ 0.8 $\Omega$ )	
Maximum leak current when OFF		0.1mA	
Response time	OFF ON	Max.1ms	
	ON OFF	Max.1ms	
Input display		Not provided	
External connection		Connector (HONDA TSUSIN MR-50RMA)	
Terminal connection and circuitry			



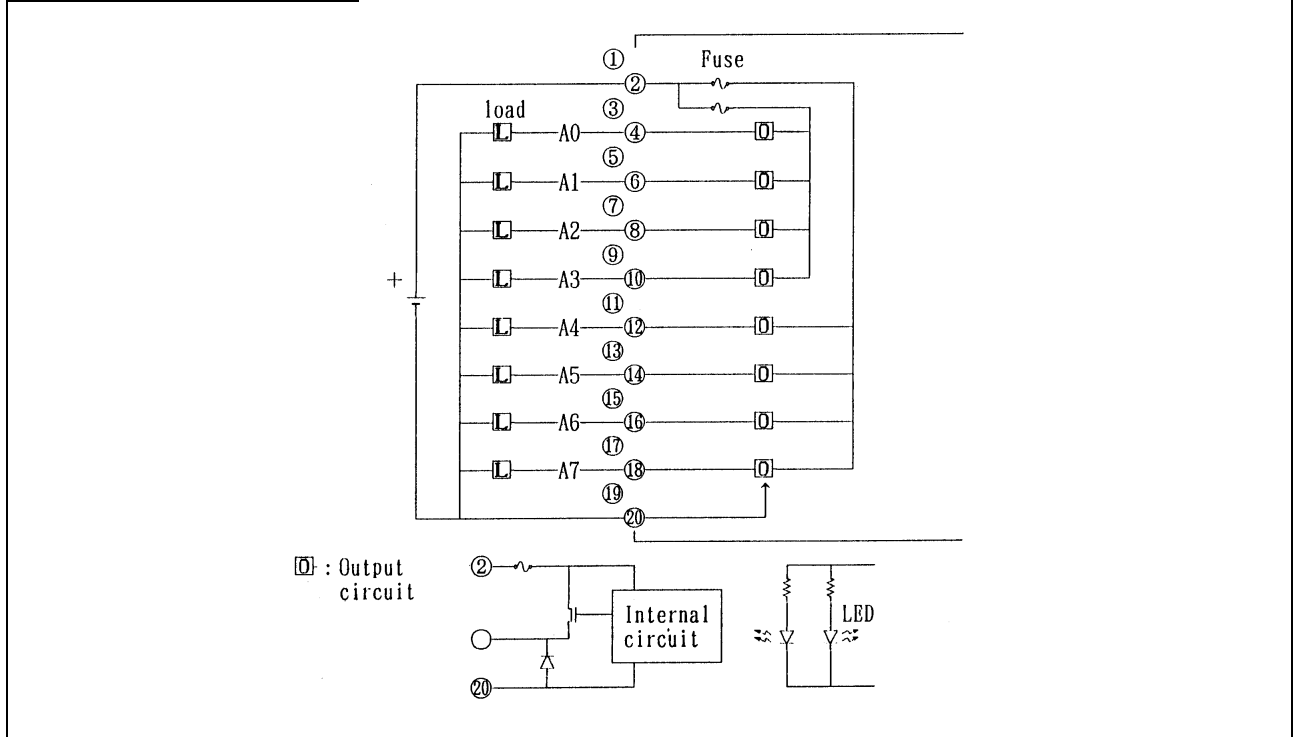
**NOTE**  
For the common (CMA, CMB, CMC, CMD) , make sure to use both of them.

(14) Output module AOD08C

Item		Specifications	
Points/module		8 points	
Points/common		8 points/common	
Sink/source current		Sink current type	
Rated load voltage		12 to 24VDC +20%, -15%	
Maximum load current		2A (however 4A/fuse)	
Maximum voltage drop when ON		0.8V (load current $\times$ 0.4 $\Omega$ )	
Maximum leak current when OFF		0.1mA	
Response time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Input display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Fuse		5A, 1 piece for each output A0-A3 and A4-A7.	
Terminal connection and circuitry		<p>The diagram illustrates the internal circuitry of the AOD08C output module. It features 20 terminals numbered 1 through 20. Terminals 1 and 2 are connected to a power supply (+ and -). Terminals 3 through 10 are connected to input LEDs labeled A0 through A3. Terminals 11 through 18 are connected to input LEDs labeled A4 through A7. Terminals 19 and 20 are connected to a common output circuit. A fuse is connected between terminals 19 and 20. The output circuit is connected to an LED display. A legend indicates that the symbol for a square with a dot represents the output circuit.</p>	

(15) Output module AOD08D

Item		Specifications	
Points/module		8 points	
Points/common		8 points/common	
Sink/source current		Source current type	
Rated load voltage		12 to 24VDC +20%, -15%	
Maximum load current		2A (however 4A/fuse)	
Limit of load		Refer to load derating curve (Fig. 5.3(a))	
Maximum voltage drop when ON		1.2V (load current $\times$ 0.6 $\Omega$ )	
Maximum leak current when OFF		0.1mA	
Response Time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Output display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Fuse		5A, 1 piece for each output A0-A3 and A4-A7.	
Terminal connection and circuitry			



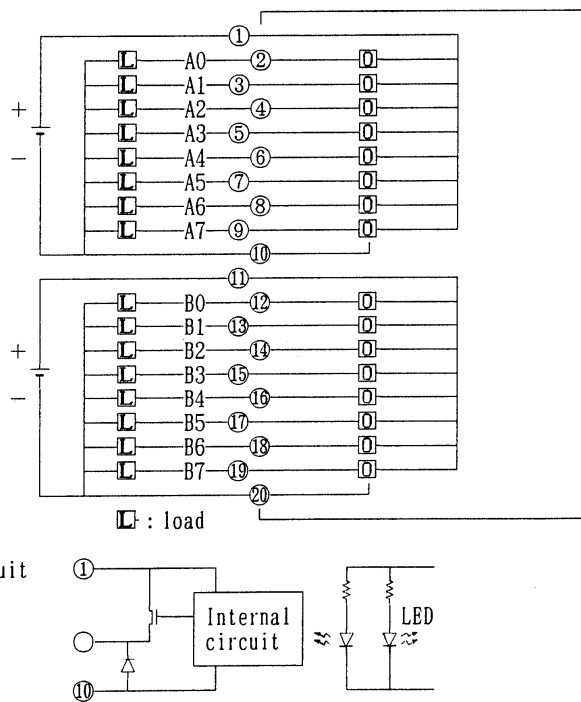
(16) Output module AOD16C

Item		Specifications	
Points/module		16 points	
Points/common		8 points/common	
Sink/source current		Sink current type	
Rated load voltage		12 to 24VDC +20%, -15%	
Maximum load current		0.5A (however 2A/common)	
Maximum voltage drop when ON		0.7V (load current ×1.4Ω)	
Maximum leak current when OFF		0.1Ma	
Response time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Output display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Terminal connection and circuitry		<p>□ : load</p> <p>○ : Output circuit</p>	



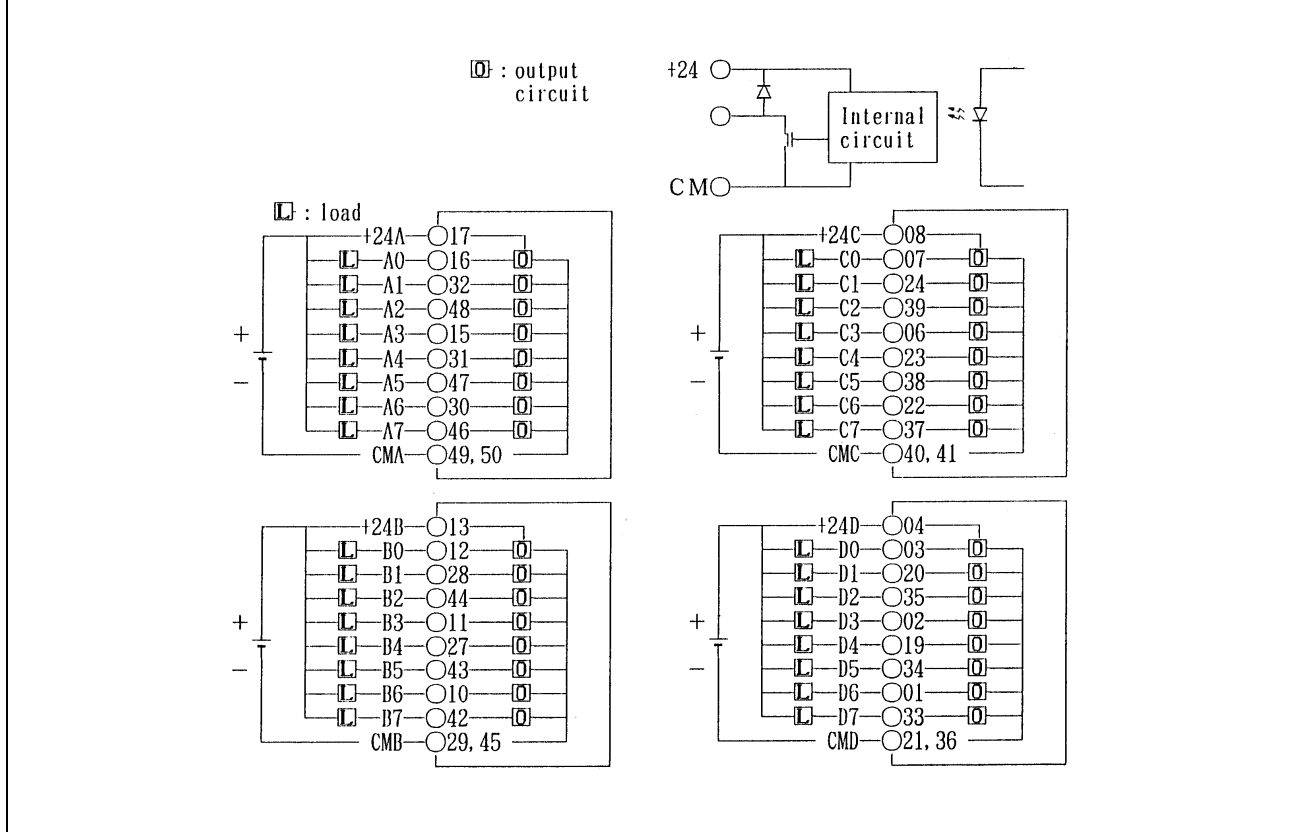
(17) Output module AOD16D

Item		Specifications	
Points/module		16 points	
Points/common		8 points/common	
Sink/source current		Source current type	
Rated load voltage		12 to 24VDC +20%, -15%	
Maximum load current		0.5A (however 2A/common)	
Maximum voltage drop when ON		0.7V (load current $\times$ 1.4 $\Omega$ )	
Maximum leak current when OFF		0.1mA	
Response time	OFF ON	Max.2ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.2ms	
Output display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Terminal connection and circuitry			



(18) Output module AOD32C1

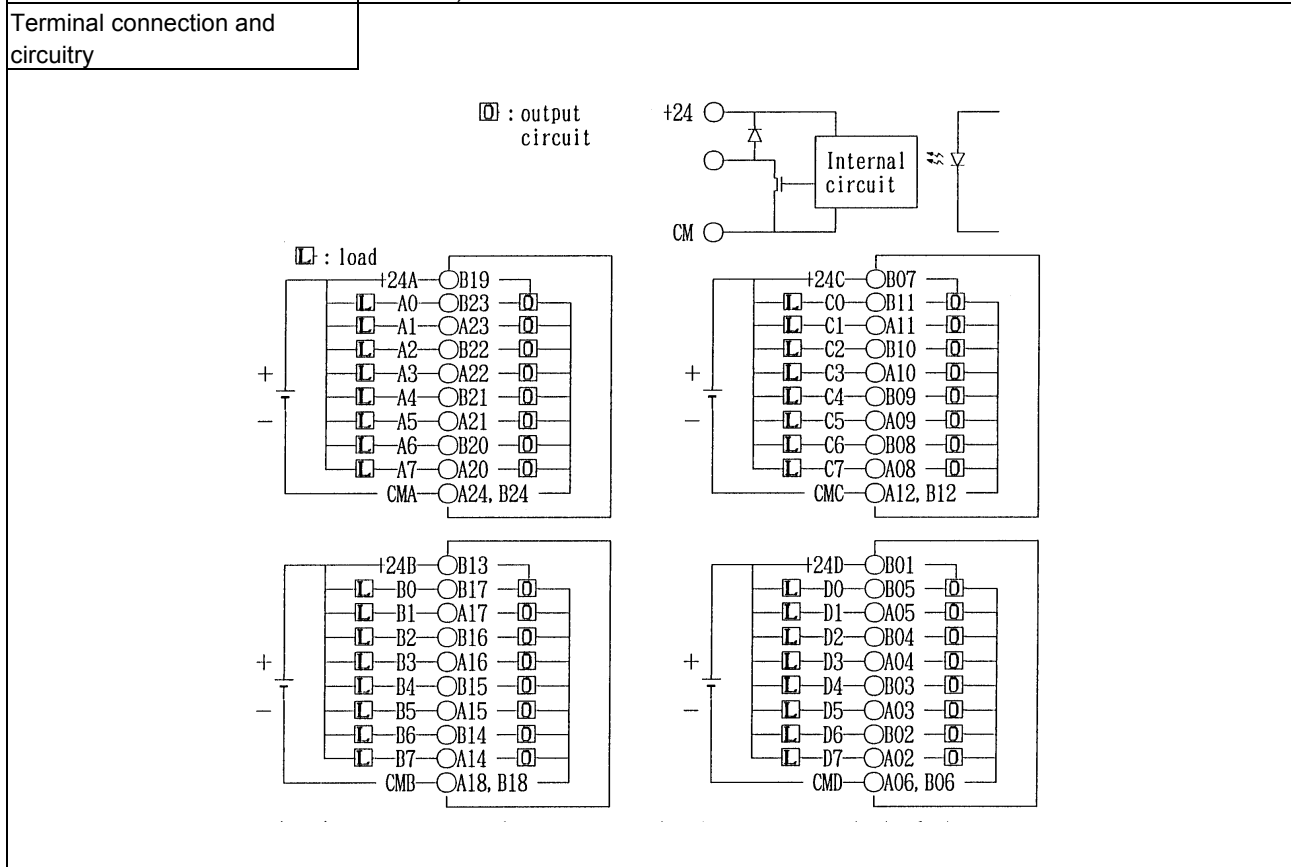
Item		Specifications
Points/module		32 points
Points/common		8 points/common
Sink/source current		Sink current type
Rated load voltage		12 to 24VDC +20%, -15%
Maximum load current		0.3A (however 2A/common)
Maximum voltage drop when ON		0.24V (load current $\times 0.8\Omega$ )
Maximum leak current when OFF		0.1mA
Response time	OFF ON	Max.2ms
	ON OFF	Max.2ms
Output display		Not provided
External connection		Connector (HONDA TSUSIN MR-50RMA)
Terminal connection and circuitry		



**NOTE**  
 For the common (CMA, CMB, CMC, CMD) , make sure to use both of them.

(19) Output module AOD32C2

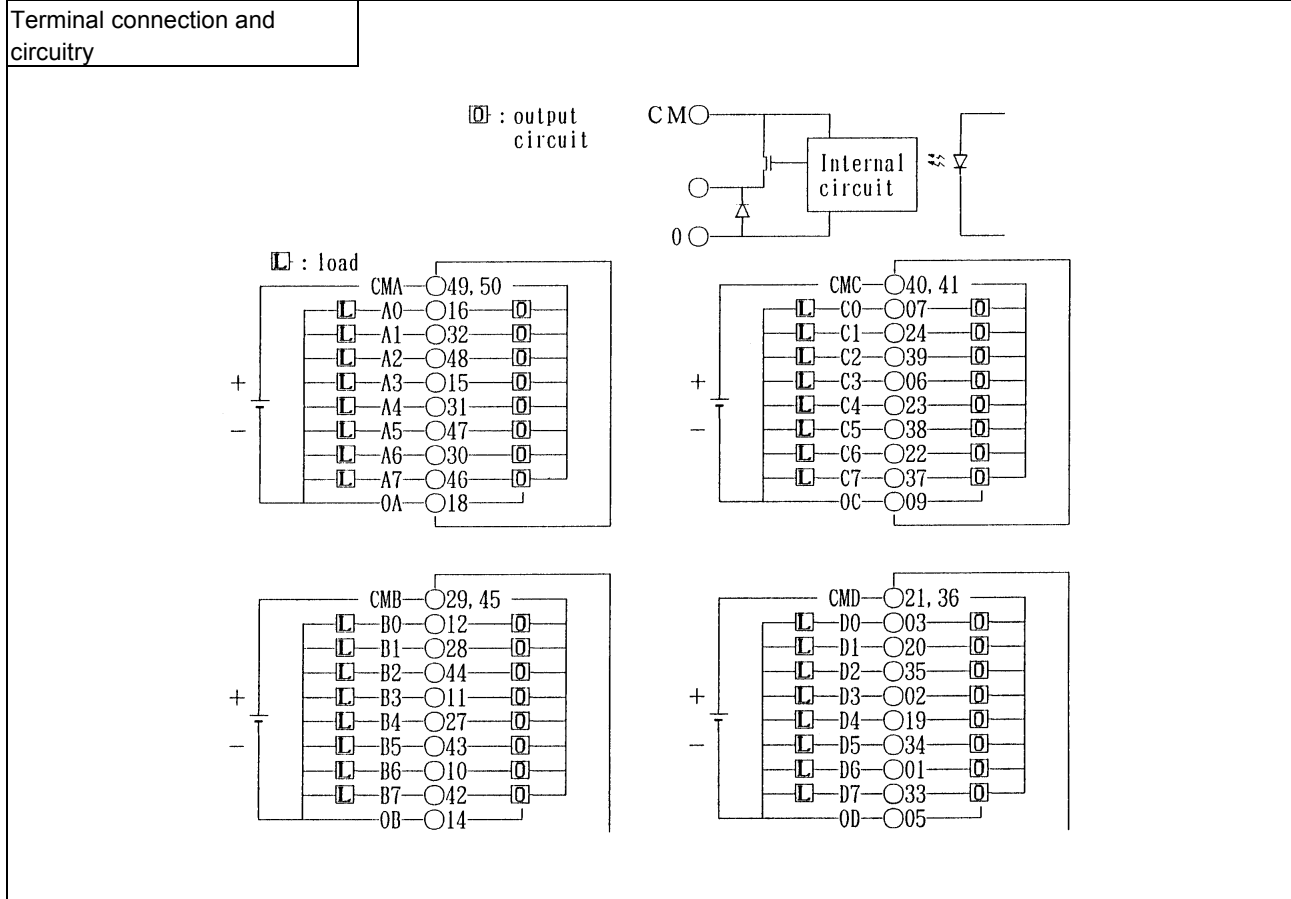
Item		Specifications
Points/module		32 points
Points/common		8 points/common
Sink/source current		Sink current type
Rated load voltage		12 to 24VDC +20%, -15%
Maximum load current		0.3A (however 2A/common)
Maximum voltage drop when ON		0.24V (load current $\times$ 0.8 $\Omega$ )
Maximum leak current when OFF		0.1mA
Response time	OFF ON	Max.2ms
	ON OFF	Max.2ms
Output display		Not provided
External connection		Connector (HIROSE ELECTRIC HIF3BB-50PA-2.54DS in accordance with MIL standard)



**NOTE**  
For the common (CMA, CMB, CMC, CMD), make sure to use both of them.

(20) Output module AOD32D1

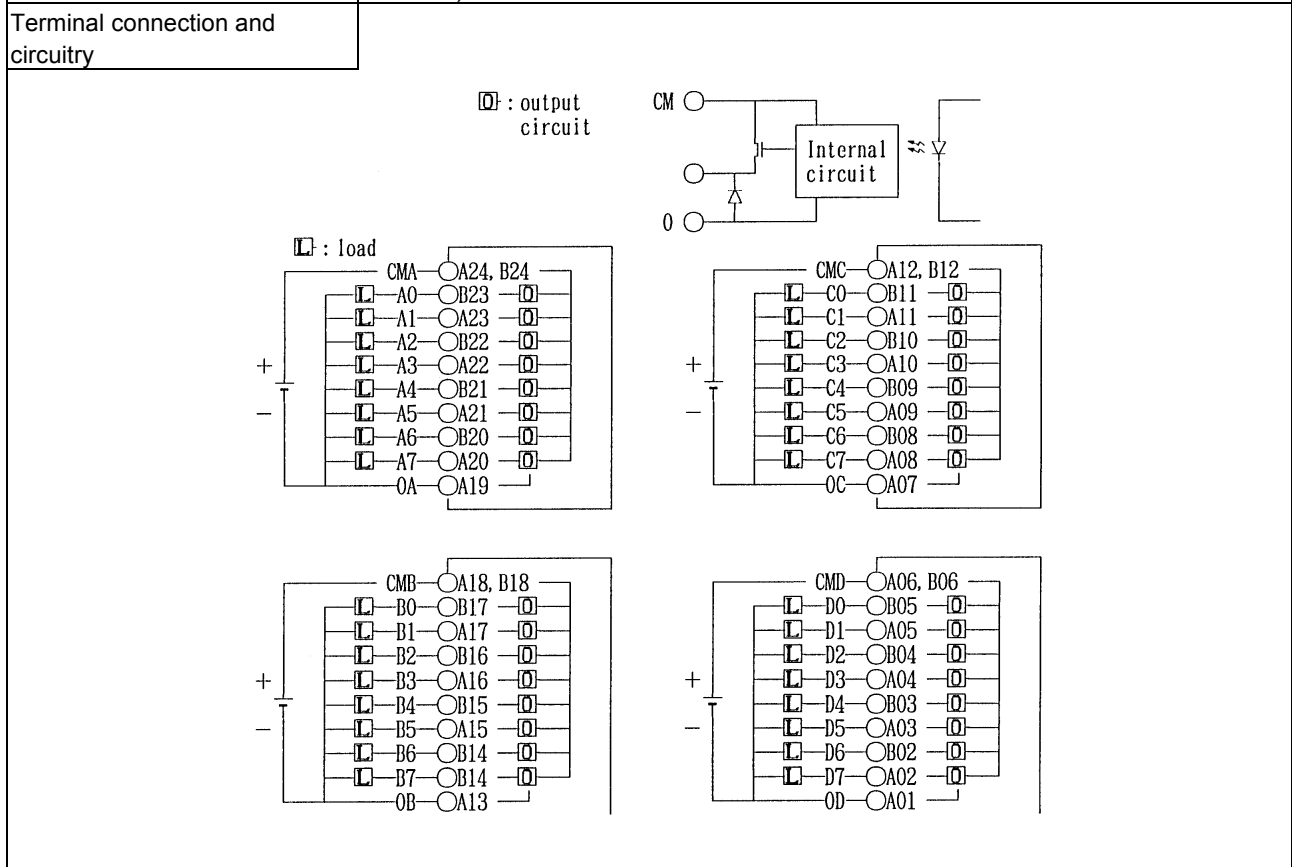
Item		Specifications
Points/module		32 points
Points/common		8 points/common
Sink/source current		Source current type
Rated load voltage		12 to 24VDC +20%, -15%
Maximum load current		0.3A (however 2A/common)
Maximum voltage drop when ON		0.24V (load current $\times 0.8\Omega$ )
Maximum leak current when OFF		0.1mA
Response Time	OFF ON	Max.2ms
	ON OFF	Max.2ms
Output display		Not provided
External connection		Connector (HONDA TSUSIN MR-50RMA)



**NOTE**  
For the common (CMA, CMB, CMC, CMD), make sure to use both of them.

(21) Output module AOD32D2

Item		Specifications
Points/module		32 points
Points/common		8 points/common
Sink/source current		Source current type
Rated load voltage		12 to 24VDC +20%, -15%
Maximum load current		0.3A (however 2A/common)
Maximum voltage drop when ON		0.24V (load current $\times 0.8\Omega$ )
Maximum leak current when OFF		0.1mA
Response time	OFF ON	Max.2ms
	ON OFF	Max.2ms
Output display		Not provided
External connection		Connector (HIROSE ELECTRIC HIF3BB-50PA-2.54DS in accordance with MIL standard)

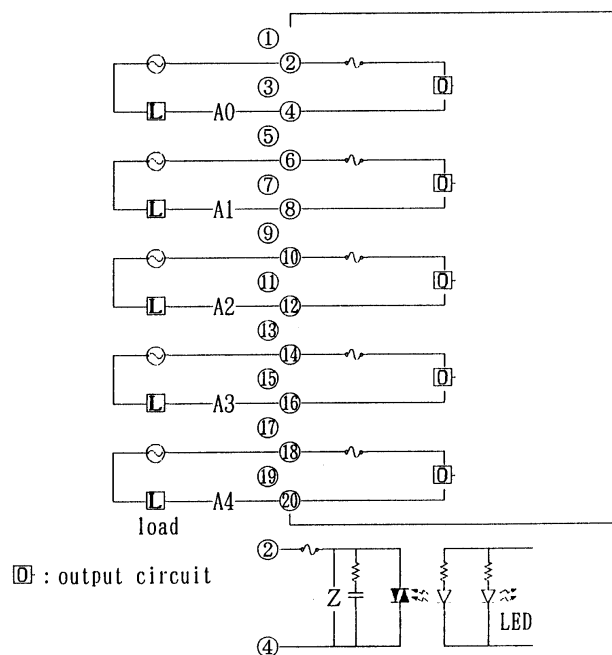


**NOTE**  
For the common (CMA, CMB, CMC, CMD), make sure to use both of them.

(22) Output module AOA05E

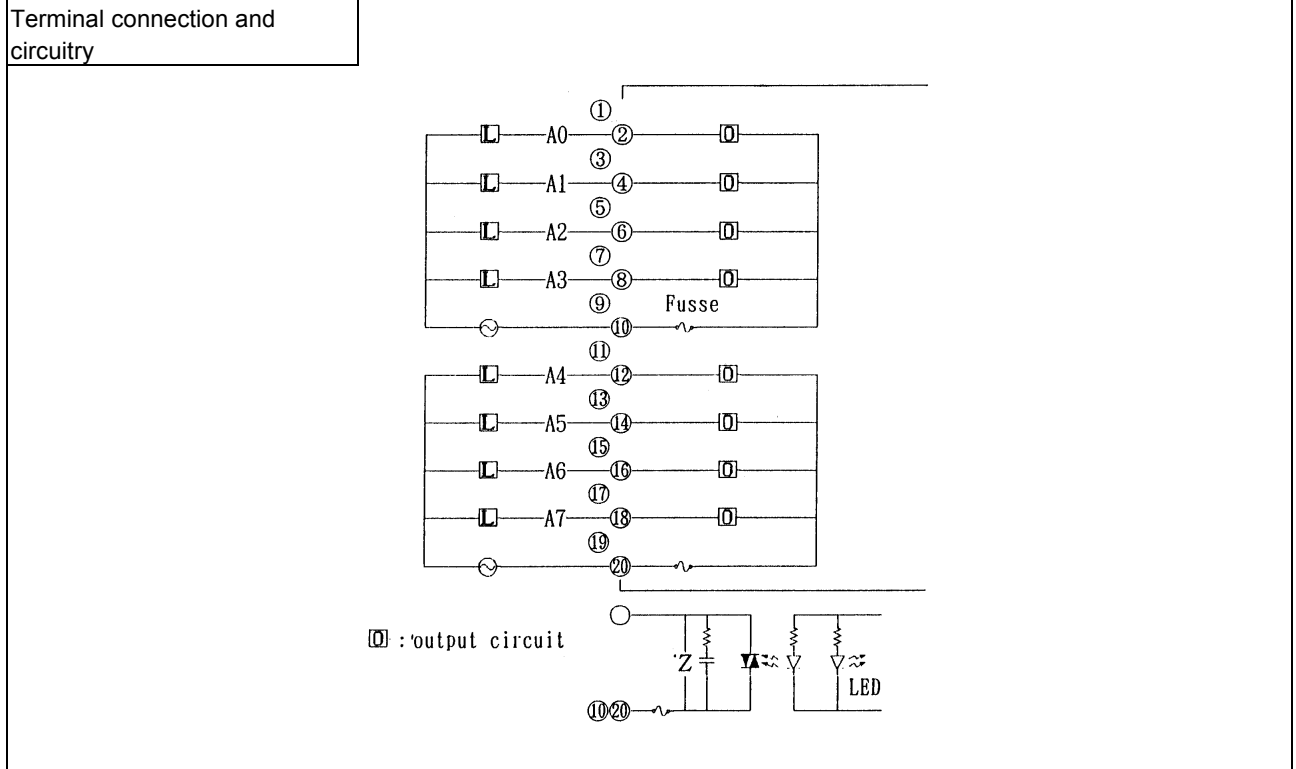
Item		Specifications	
Points/module		5 points	
Points/common		1 points/common	
Rated load voltage		100 to 230VAC ±15%, 47 to 63Hz	
Maximum load current		2A/point (however 5A/module)	
Maximum rush current		25A ( 1 period)	
Limit of load		Refer to load derating curve (Fig. 5.3 (b))	
Maximum voltage drop when ON		1.5Vrms	
Maximum leak current when OFF		3.0mA (115VAC), 6.0mA (230VAC)	
Response time	OFF ON	Max.1ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Half of the load frequency or less	
Output display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Fuse		3.2A, 1 piece for each output A0 to A4	

Terminal connection and circuitry



(23) Output module AOA08E

Item		Specifications	
Points/module		8 points	
Points/common		4 points/common	
Rated load voltage		100 to 230VAC ±15%, 47 to 63Hz	
Maximum load current		1A/point ( however 2A/common)	
Maximum in rush current		10A ( 1 period)	
Maximum voltage drop when ON		1.5Vrms	
Maximum leak current when OFF		3.0mA (115VAC), 6.0mA (230VAC)	
Response time	OFF ON	Max.1ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Half of the load frequency or less	
Output display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Fuse		3.2A, 1 piece for each output A0 to A3 and A4 to A7	



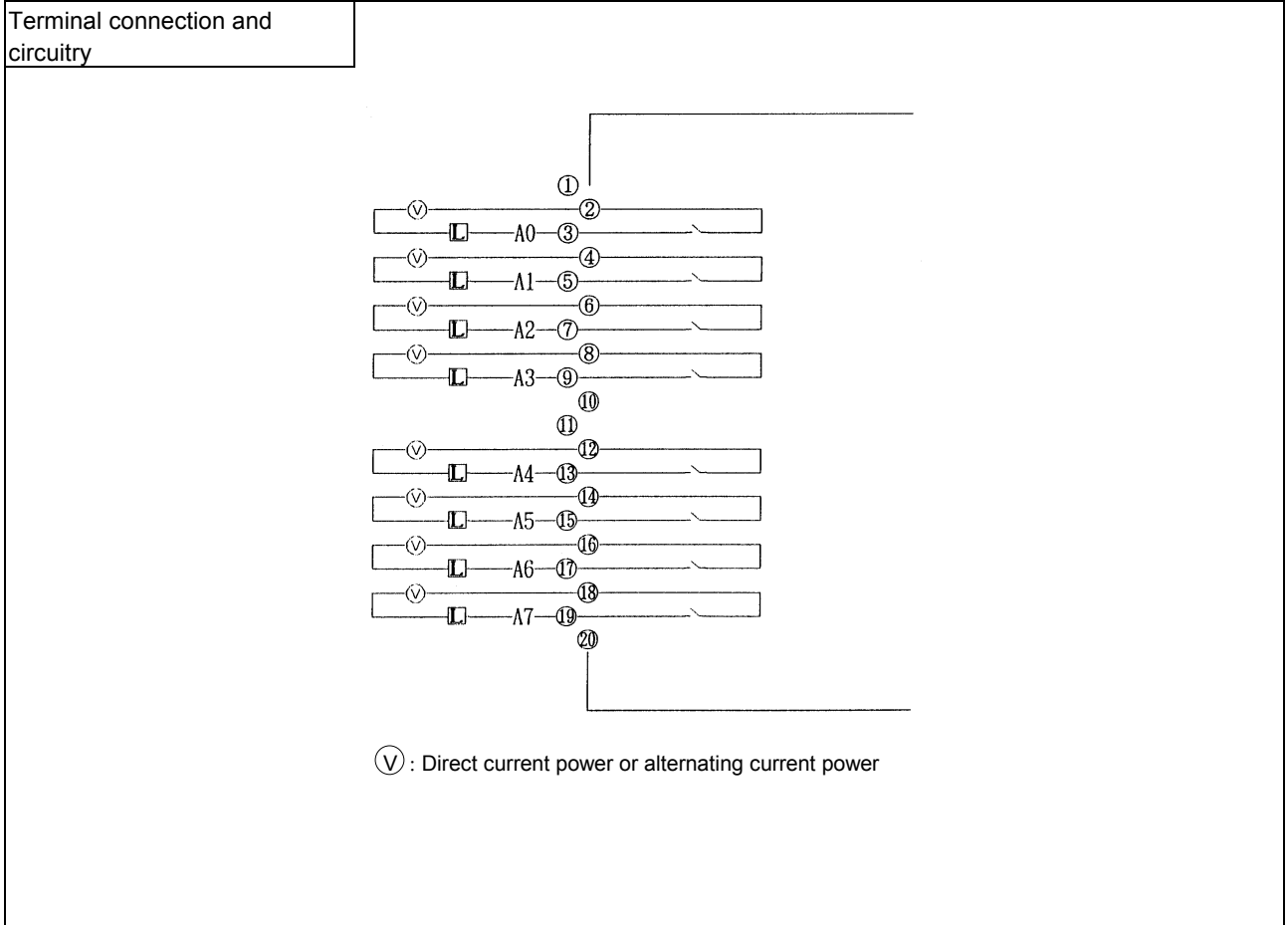
(24) Output module AOA12F

Item		Specifications	
Points/module		12 points	
Points/common		6 points/common	
Rated load voltage		100 to 115VAC ±15%, 47 to 63Hz	
Maximum load current		0.5A/point ( however, 2A/common)	
Maximum in rush current		5A ( 1 period)	
Limit of load		Refer to load derating curve (Fig. 5.3 (c))	
Maximum voltage drop when ON		1.5Vrms	
Maximum leak current when OFF		1.5mA (115VAC)	
Response time	OFF ON	Max.1ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Half of the load frequency or less	
Output display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Fuse		3.2A, 1 piece for each output A0 to A5 and B0 to B5	
Terminal connection and circuitry		<p>load</p> <p>A0 ①, A1 ②, A2 ③, A3 ④, A4 ⑤, A5 ⑥</p> <p>⑦, ⑧ fuse, ⑨, ⑩</p> <p>B0 ⑪, B1 ⑫, B2 ⑬, B3 ⑭, B4 ⑮, B5 ⑯</p> <p>⑰, ⑱, ⑳</p> <p>⑨/⑱ : output circuit</p> <p>Z, LED</p>	



(25) Output module AOR08G

Item		Specifications	
Points/module		8 points	
Points/common		1 points/common	
Maximum load		30VDC/250VAC, 4A (resistance load)	
Minimum load		5VDC, 10mA	
Limit of load		Refer to load derating curve (Fig. 5.3 (d))	
Maximum voltage drop when ON		1.5Vrms	
Maximum leak current when OFF		1.5mA (115VAC)	
Response time	OFF ON	Max.15ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.15ms	
Output display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Fuse		3.2A, 1 piece for each output A0 to A5 and B0 to B5	
Relay life	Mechanical	Min. 20,000,000 times	
	Electrical	Min. 100,000 times (resistance load)	



(26) Output module AOR16G

Item		Specifications	
Points/module		16 points	
Points/common		4 points/common	
Maximum load		30VDC/250VAC, 2A (resistance load)	
Minimum load		5VDC, 10mA	
Maximum current		4A/common	
Limit of load		Refer to load derating curve (Fig. 5.3 (e))	
Response time	OFF ON	Max.15ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.15ms	
Output display		LED display	
External connection		Terminal block connector (20 terminals, M3.5 screw terminal)	
Relay life	Mechanical	Min. 20,000,000 times	
	Electrical	Min. 100,000 times (resistance load)	
Terminal connection and circuitry		<p>Ⓟ: Direct current power or alternating current power</p>	

(27) Output module AOR16H2

Item		Specifications	
Points/module		16 points	
Points/common		4 points/common	
Maximum load		30VDC, 2A (resistance load)	
Minimum load		5VDC, 10mA	
Maximum current		4A/common	
Limit of load		Refer to load derating curve (Fig. 5.3 (e))	
Response time	OFF ON	Max.15ms	This is the value from input to output in the module. The actual value is determined by adding it to the scanning time depending on each system.
	ON OFF	Max.15ms	
Output display		LED display	
External connection		Connector (HIROSE ELECTRIC HIF3BB-50PA-2.54DS in accordance with MIL standard)	
Relay life	Mechanical	Min. 20,000,000 times	
	Electrical	Min. 100,000 times (resistance load)	
Terminal connection and circuitry		<p style="text-align: center;">† : Direct current power</p>	

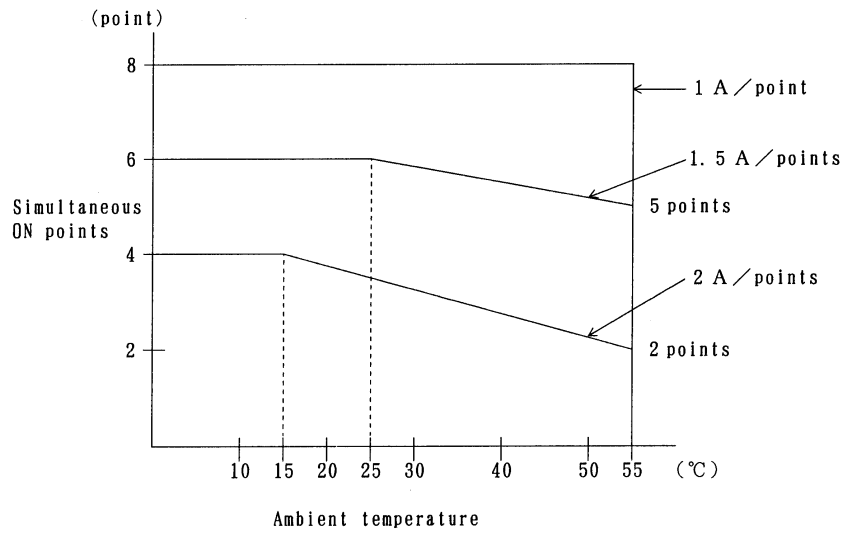


Fig.5.3 (a) AOD08D Load reduction curve

**NOTE**  
 Ambient temperature means the temperature surrounding the I/O unit and not that surrounding the cabinet containing the I/O unit.

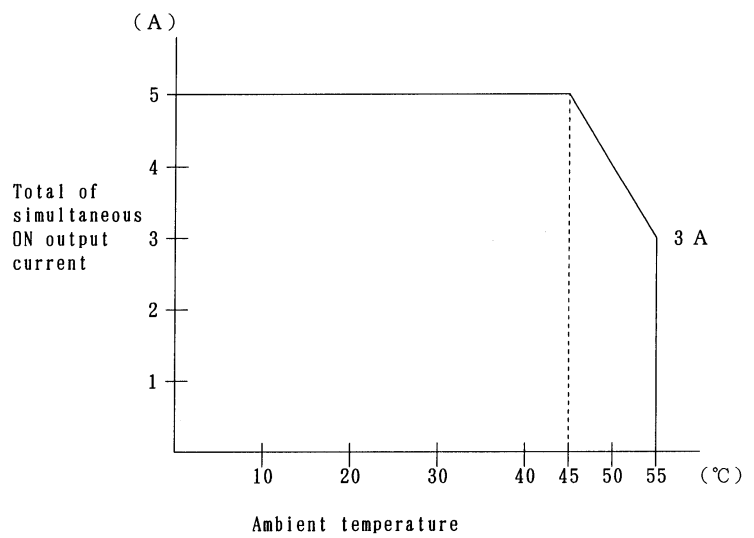


Fig.5.3 (b) AOA05E Load reduction curve

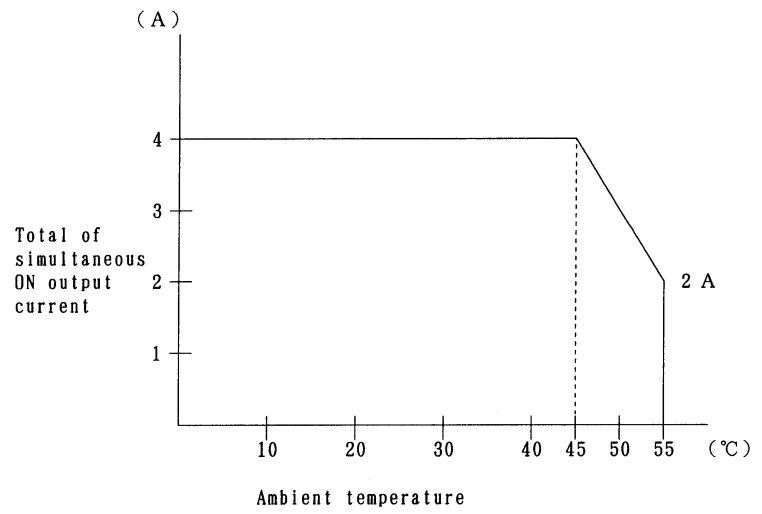


Fig.5.3 (c) AOA12F Load reduction curve

**NOTE**  
Ambient temperature means the temperature surrounding the I/O unit and not that surrounding the cabinet containing the I/O unit.

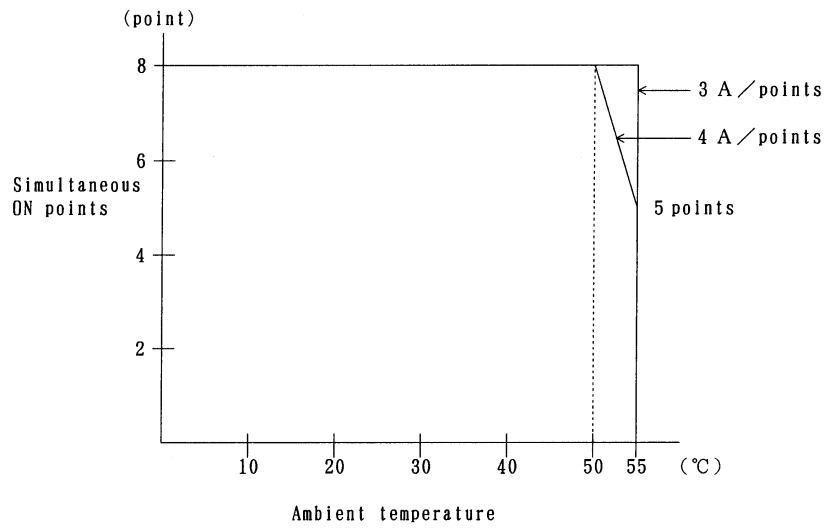


Fig.5.3 (d) AOR08G Load reduction curve

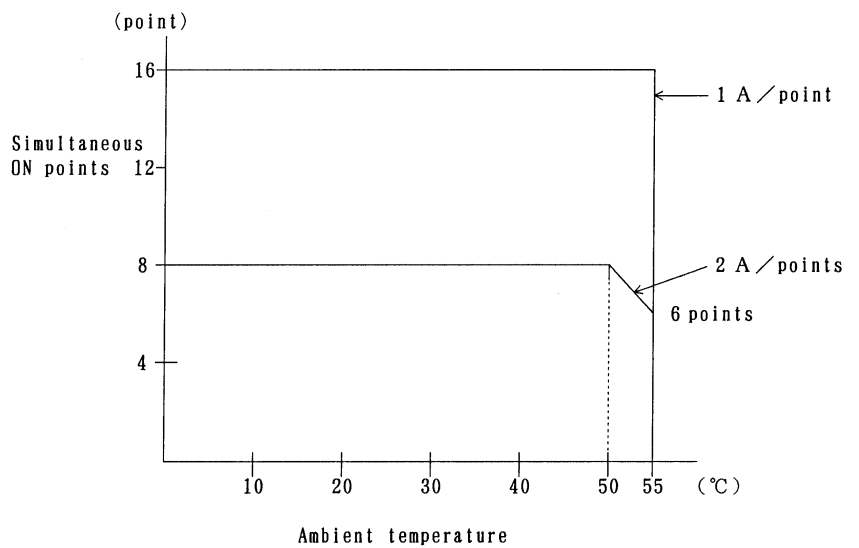


Fig.5.3 (e) AOR16G, AOR16H2 Load reduction curve

**NOTE**  
 Ambient temperature means the temperature surrounding the I/O unit and not that surrounding the cabinet containing the I/O unit.