1. GENERAL

1.1 Introduction

JUXTA R Series consist of relay I/O card and its storing nest.
Relay input card receives digital signal from the field and outputs isolated and amplified contact signal to DCS, etc. through relay. One card handles 2 points.
Relay output card receives status signal from DCS or FA sequencer through relay and outputs isolated and amplified contact signal to the field. Please read through this instruction manual for correct use of relay I/O card.

2. JUXTA R SERIES NEST

2.1 Type and Suffix Code

Table 2.1 Type and suffix code of Nest

Type	Suffix code		Option code	Note
RYH				Horizontal mount type (Apply JIS/EIA specs. standard rack mounting dimension)
Power spec.	-3			24V DC±10%
DCS connection		1		Yokogawa Elecrtric DCS (CENTUM, μXL, YEWMAC) Status Card ST2, ST3, ST4
		2		Yokogawa Elecrtric DCS (CENTUM, μXL, YEWMAC) Status Card ST5, ST6, ST7
Option code			/□□	

Table 2.2 Type and suffix code of Nest

Type	Suffix code		Option code	Note
RYV				Vertical mount type (Apply CENTUM-XL S/C nest mounting dimension)
Power spec.	-1 -2 -3			85～132V AC (with AC/DC power supply) 170～264V AC (with AC/DC power supply) 24V DC±10%
DCS connection		1		Yokogawa Electric DCS (CENTUM, μXL, YEWMAC) Status Card ST2, ST3, ST4, ST5, ST6, ST7
Option code			/□□	

2.2 Major Spec. of Nest

Storing quantity of Relay I/O Card	Relay input card 16 (maximum upto 32 points) Relay output card 16 (maximum upto 32 points) Available mixed storing of 8 relay input cards plus 8 relay output cards (maximum upto 32 points)
Signal	Direct connection by connector between nest and DCS or sequencer
Alarm output	When fuse break of Relay I/O card, non-voltage contact outputs from alarm terminal
Power supply for voltage contact output	Maximum voltage 125V AC or 125V DC External load drive current Maximum 10A at 32 points

2.3 External Dimension and Nomenclature

(1) RYH Type Nest (Horizontal Mounting Type)
RYH nest can be mounted on JIS/EIA spec. 19 inch standard rack or wall.

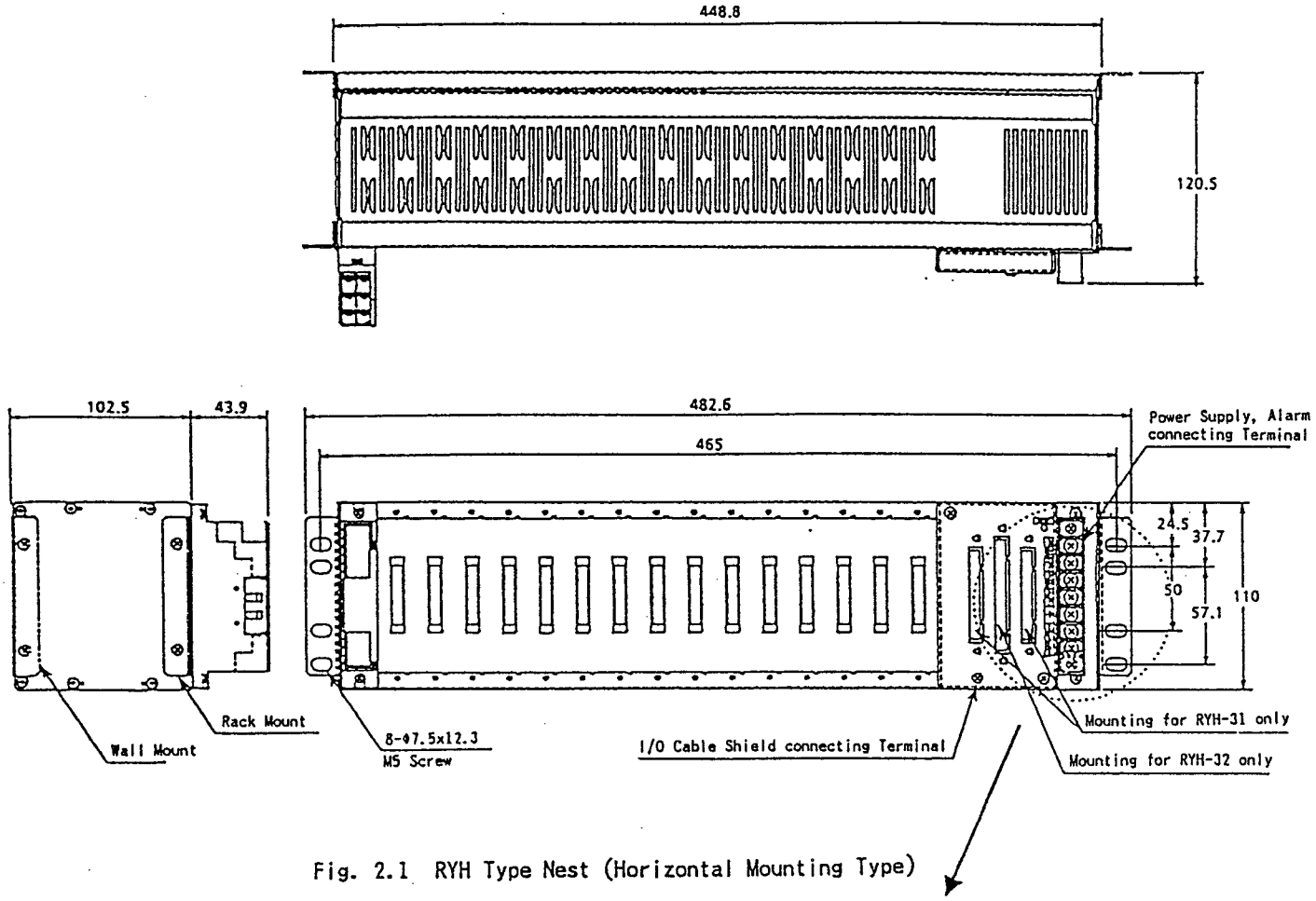
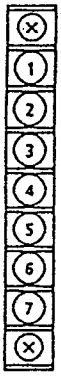


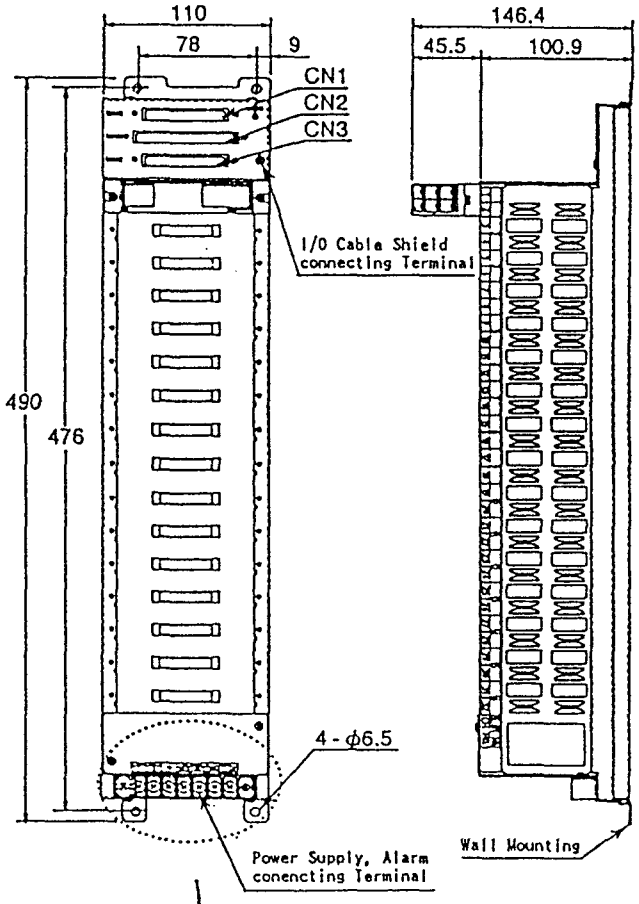
Fig. 2.1 RYH Type Nest (Horizontal Mounting Type)



Terminal No.	RYH-3□	
①	L(+)	Voltage contact output power supply Less than 125V AC/DC
②	N(-)	
③	AL1	Relay I/O card fuse break alarm
④	AL2	Non-voltage contact output 30V DC, 300mA MAX
⑤	⏚	Relay I/O card power supply 24V DC±10%, 2A
⑥	+	
⑦	-	

(2) RYV Type Nest (Vertical Mounting Type)
RYV vertical type nest can also be mounted on Yokogawa Electric CENTUM-XL Cubicle.

● DC Power Supply use



● AC Power Supply use

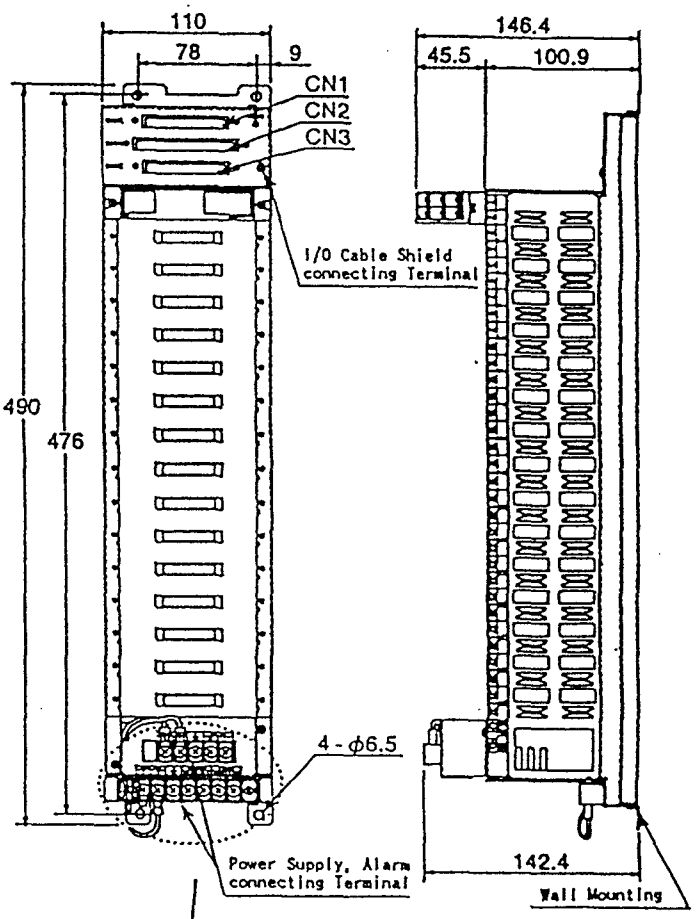
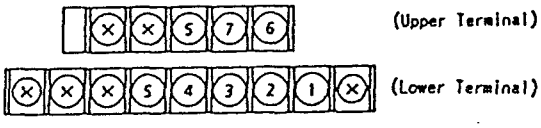


Fig. 2.2 RYV Type Nest (Vertical Mounting Type)

● DC Power Supply use

Terminal No.	RYV-31	
①	L(+)	Voltage contact output power supply Less than 125V AC/DC
②	N(-)	
③	AL1	Relay I/O card fuse break alarm
④	AL2	
⑤	⏚	Relay I/O card power supply 24V DC±10%, 2A
⑥	+	
⑦	-	

● AC Power Supply use



Terminal No.		RYV-11		RYV-21
Lower	Upper			
①		L(+)	Voltage contact output power supply Less than 125V AC/DC	
②		N(-)		
③		AL1	Relay I/O card fuse break alarm	
④		AL2		
⑤	⑤	⏚	100/110/115 /120V AC (85~132V AC)	200/220/230 /240V AC (170~264V AC)
	⑥	L		
	⑦	N		

2.4 Mounting Position of Relay I/O Card

Table 2.3 Example of Relay I/O Card Mounting

(1) RYH-31

Slot No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	DCS side Connector		
Channel No.	1 2	3 4	5 6	7 8	9 10	11 12	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	CN1		CN2
Storing Card	Input Card	→	→	→	→	→	→	→	Output Card	→	→	→	→	→	→	→	ST2 (CN1)		ST2 (CN2)
	Input Card	→	→	→	→	→	→	→	Input Card	→	→	→	→	→	→	→	ST3 (CN1)		ST3 (CN2)
	Output Card	→	→	→	→	→	→	→	Output Card	→	→	→	→	→	→	→	ST4 (CN1)		ST4 (CN2)

(2) RYH-32

Slot No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	DCS side Connector	
Channel No.	1 2	3 4	5 6	7 8	9 10	11 12	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	CN1	
Storing Card	Input Card	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	ST5 (CN1)	
	Input Card	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	ST6 (CN1) (CN2)	
	Output Card	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	ST5 (CN2) ST7 (CN1,2)	

Slot No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	FA500 side Connector	
Channel No.	1 2	3 4	5 6	7 8	9 10	11 12	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	CN2	
Storing Card	Input Card	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	XD64 -6N	
	Output Card	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	YD64 -1A	

Table 2.4 Example of Relay I/O Card Mounting

(3) RYV-□□

DCS side Connector				
	CN1	ST2 (CN1)	ST3 (CN1)	ST4 (CN1)
	CN2			
	CN3	ST2 (CN2)	ST3 (CN2)	ST4 (CN2)

Slot No.	Channel No.	Storing Card		
1	1	Input Card	Input Card	Output Card
	2			
2	3	↓	↓	↓
	4			
3	5	↓	↓	↓
	6			
4	7	↓	↓	↓
	8			
5	9	↓	↓	↓
	10			
6	11	↓	↓	↓
	12			
7	13	↓	↓	↓
	14			
8	15	↓	↓	↓
	16			
9	17	Output Card	Input Card	Output Card
	18			
10	19	↓	↓	↓
	20			
11	21	↓	↓	↓
	22			
12	23	↓	↓	↓
	24			
13	25	↓	↓	↓
	26			
14	27	↓	↓	↓
	28			
15	29	↑	↓	↓
	30			
16	31	↑	↓	↓
	32			

DCS side Connector				
	CN1			
	CN2	ST5 (CN1)	ST6 (CN1) (CN2)	ST5 (CN2) ST7 (CN1,2)
	CN3			

Slot No.	Channel No.	Storing Card		
1	1	Input Card	Input Card	Output Card
	2			
2	3	↓	↓	↓
	4			
3	5	↓	↓	↓
	6			
4	7	↓	↓	↓
	8			
5	9	↓	↓	↓
	10			
6	11	↓	↓	↓
	12			
7	13	↓	↓	↓
	14			
8	15	↓	↓	↓
	16			
9	17	↓	↓	↓
	18			
10	19	↓	↓	↓
	20			
11	21	↓	↓	↓
	22			
12	23	↓	↓	↓
	24			
13	25	↓	↓	↓
	26			
14	27	↓	↓	↓
	28			
15	29	↓	↓	↓
	30			
16	31	↓	↓	↓
	32			

FA500 side Connector			
	CN1		
	CN2	XD64 -6N	YD64 -1A
	CN3		

Slot No.	Channel No.	Storing Card	
1	1	Input Card	Output Card
	2		
2	3	↓	↓
	4		
3	5	↓	↓
	6		
4	7	↓	↓
	8		
5	9	↓	↓
	10		
6	11	↓	↓
	12		
7	13	↓	↓
	14		
8	15	↓	↓
	16		
9	17	↓	↓
	18		
10	19	↓	↓
	20		
11	21	↓	↓
	22		
12	23	↓	↓
	24		
13	25	↓	↓
	26		
14	27	↓	↓
	28		
15	29	↓	↓
	30		
16	31	↓	↓
	32		

2.5 Connection between Multi-Point Status I/O Card and Nest

(1) RYH-31

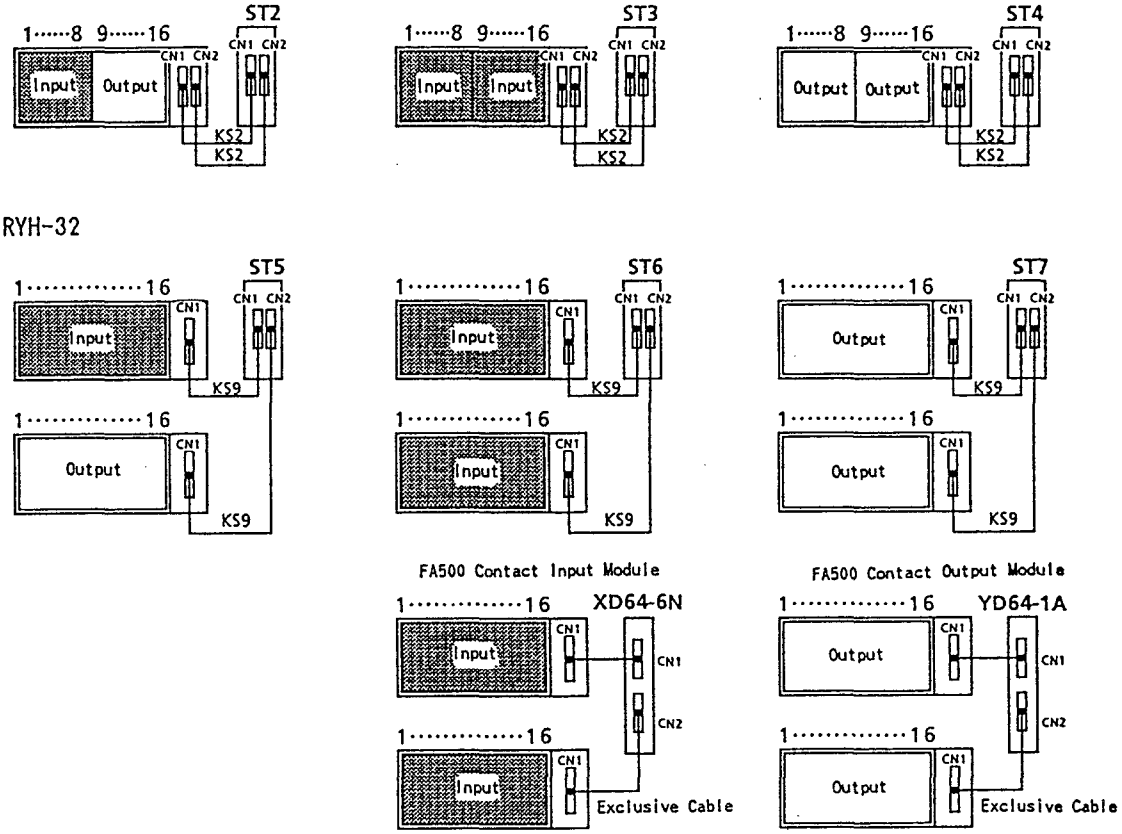


Fig. 2.3 Connection between Multi-Point Status I/O Card and Nest

(3) RYV-□□

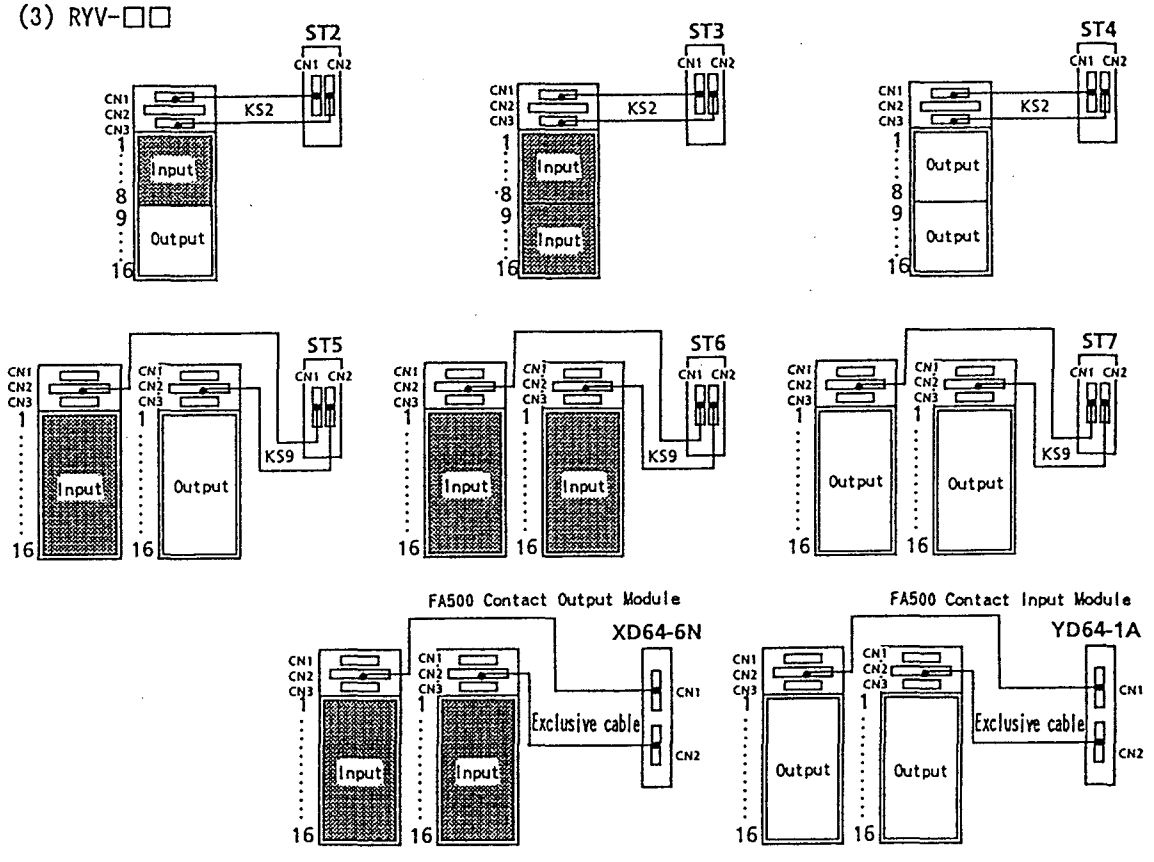


Fig. 2.4 Connection between Multi-Points Status I/O Card and Nest

3. RELAY I/O CARD

3.1 Type and Suffix Code

Table 3.1 Relay Input Card

Type	Suffix code		Option code	Note
RY1				Relay input card (2 channel use) Input signal : Non-voltage contact or open collector
Relay output type	-1			Output-1 : a contact (output thru connector) Output-2 : Transfer contact (re-transmit use)
Test switch		0		Without test switch
		1		With test switch
Option code			/□□	

Table 3.2 Relay Output Card

Type	Suffix code		Option code	Note
RY0				Relay output card (2 channel use) Input signal : Non-voltage contact or open collector
Relay output type	-1			Output-1 : a (*1) or b (*2) contact (non-voltage contact), change-over jumper Output-2 : Transfer contact
	-2			Output-1 : a contact (voltage contact, with fuse) Output-2 : Transfer contact
Test switch		0		Without test switch
		1		With test switch
Option code			/□□	

*1 a contact means contact to be CLOSE when relay is excited.
(OPEN when relay is not excited)
*2 b contact means contact to be OPEN when relay is excited.
(CLOSE when relay is not excited)

3.2 Major Spec. of RY1 Relay Input Card

Relay input card is space saving type card with 2 points per card. DC/DC converter is built in the power supply so as to protect noise from the field when mixed mounting with output card. Easy instrumentation because the power supply is electrically insulated.

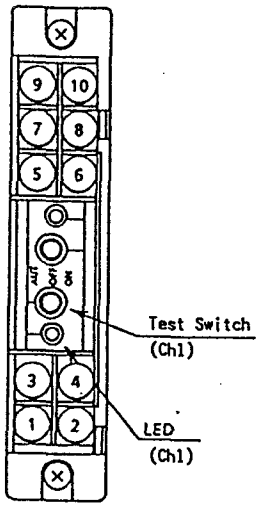
Test Switch Position		AUT	When input contact ON, output contact ON (CLOSE when a contact)
		OFF	Output contact OFF compulsorily (OPEN when a contact)
		ON	Output contact ON compulsorily (CLOSE when a contact)
LED Lamp		ON	When relay exciting (Output contact ON)
		OFF	When relay non-exciting (Output contact OFF)
Fuse Break Alarm			Alarm contact ON when break of relay circuit fuse (rating : 0.15A) or break of converter circuit fuse
RY1 relay input card contact rating	Output-1 for DCS	——	30V DC, 0.2A
	Output-2 for re-transmission	Load resistance	Maximum voltage to use : 250V AC or 125V DC 125V AC, 0.4A 30V DC, 1.0A
		Inductance	Maximum voltage to use : 250V AC or 125V DC 125V AC, 0.2A 30V DC, 0.5A
External contact rating			Non-voltage contact or open collector 24V DC more than 30mA

WARNING
When driving inductance load (various kinds of coils), erase noise to protect contact

3.3 Terminal Arrangement and Signal

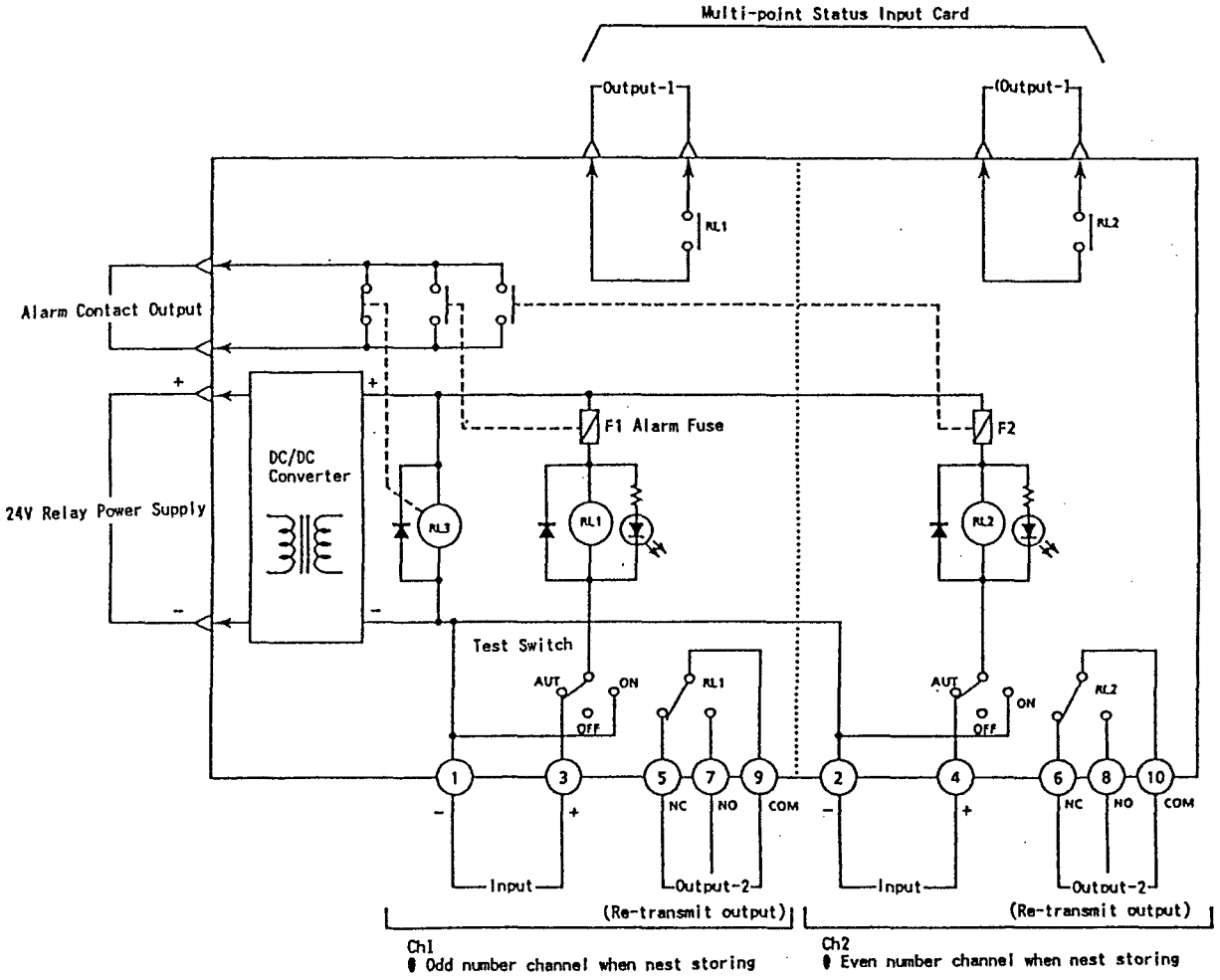
Terminal Arrangement

	Terminal No.	Signal
Ch1	1	Contact input (-) (Field side)
	3	Contact input (+) (Field side)
	5	b contact output
	7	a contact output
	9	Common
Ch2	2	Contact input (-) (Field side)
	4	Contact input (+) (Field side)
	6	b contact output
	8	a contact output
	10	Common



RY1 Relay Input Card

3.4 Block Diagram



3.5 Major Spec. of RYO Relay Output Card

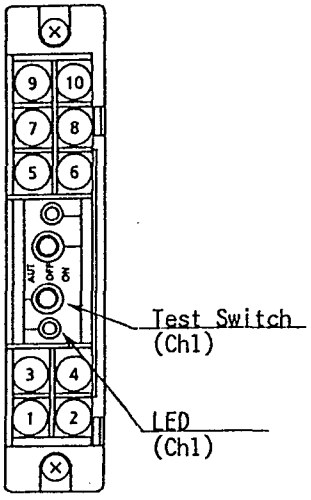
Relay output card has 2 points per card. Output-1 is classified by non-voltage contact output and voltage contact output. a contact output or b contact output can be changed by jumper in the card.
Output-2 is non-voltage contact output and has capacity of 3A.

Test Switch Position		AUT	When input contact ON, output contact ON (CLOSE when a contact)	
		OFF	Output contact OFF compulsorily (OPEN when a contact)	
		ON	Output contact ON compulsorily (CLOSE when a contact)	
LED Lamp		ON	When relay exciting (output contact ON)	
		OFF	When relay non-exciting (output contact OFF)	
Fuse break Alarm			Fuses (rating 1A) included in both phases when Output-1 is voltage contact output. Alarm contact is ON when fuse breaks	
RYO relay output card contact rating	Output-1	When non-voltage contact output	Resistance Load	Maximum voltage 250V AC or 125V DC 250V AC 3.0A 30V DC 3.0A 125V DC 0.3A
			Inductance Load	Maximum voltage 250V AC or 125V DC 250V AC 1.5A 30V DC 1.5A 125V DC 0.1A
		When voltage contact output	Inductance Load	Maximum voltage 125V AC or 125V DC 125V AC 0.6A 30V DC 0.6A 125V DC 0.1A
	Output-2 for re-transmit	——	Resistance Load	Maximum voltage 250V AC or 125V DC 250V AC 3.0A 30V DC 3.0A 125V DC 0.3A
			Inductance Load	Maximum voltage 250V AC or 125V DC 250V AC 1.5A 30V DC 1.5A 125V DC 0.1A

WARNING
When driving inductance load (various kinds of coil), erase noise to protect contact. (Refer 3.8 contact protection circuit)

3.6 Terminal Arrangement and Signal

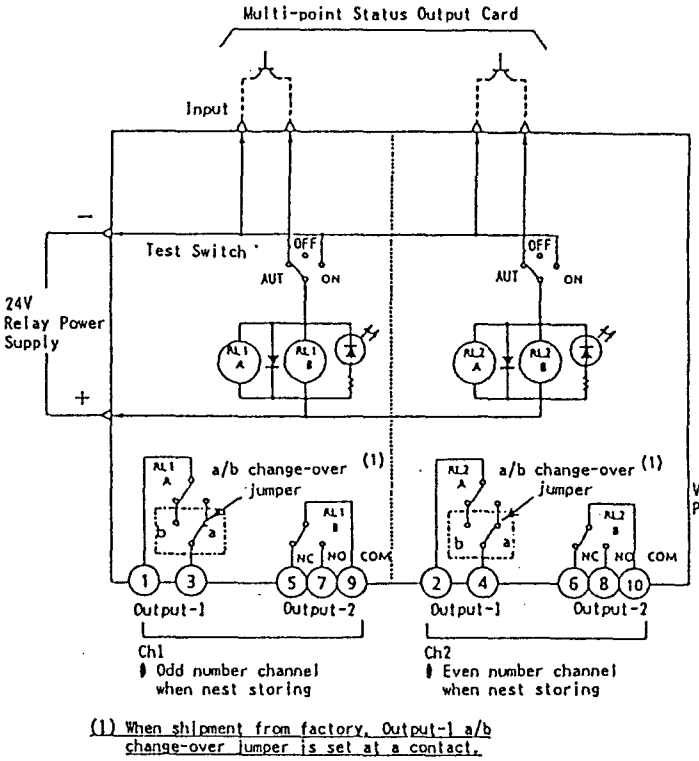
	Terminal No.	Signal RYO-1□	Signal RYO-2□
Ch1	1	Common (non-voltage)	a contact N(-) (voltage)
	3	a contact or b contact (non-voltage)	a contact L(+) (voltage)
	5	b contact output	
	7	a contact output	
	9	Common	
Ch2	2	Common (non-voltage)	a contact N(-) (voltage)
	4	a contact or b contact (non-voltage)	a contact L(+) (voltage)
	6	b contact output	
	8	a contact output	
	10	Common	



RYO Relay Output Card

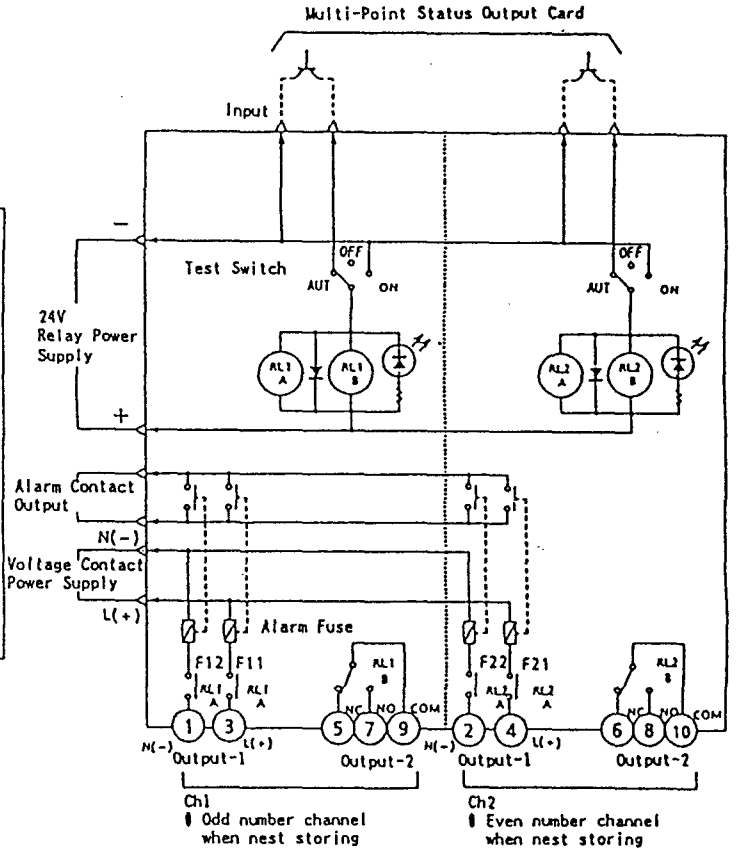
3.7 Relay Output Card Circuit

● RYO-1□
When (Output-1 : Non-Voltage Contact Output)



(1) When shipment from factory, Output-1 a/b change-over jumper is set at a contact.

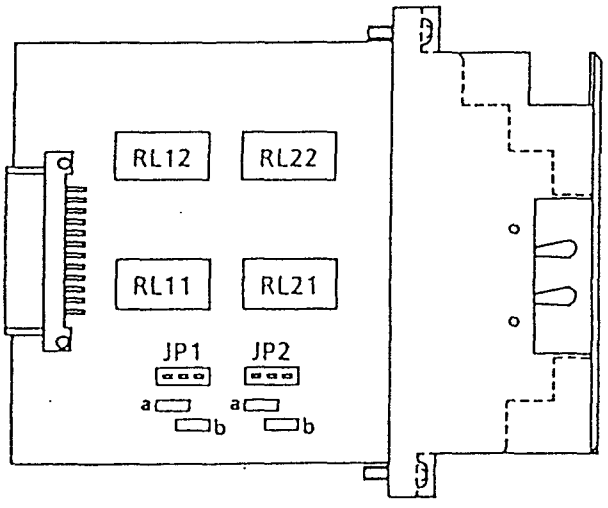
● RYO-2□
When (Output-1 : Voltage Contact Output)



3.8 Jumper Setting of Relay Output Card

For contact output of RYO-1□, a or b contact is selectable for Output-1 only.

WARNING
The card will be shipped from factory at status of a contact output. Set jumper socket in the card at a or b contact according to outer (field side) specifications.



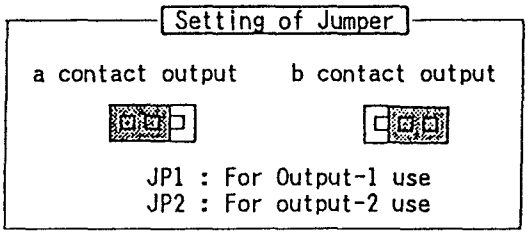
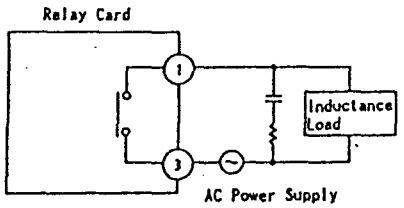
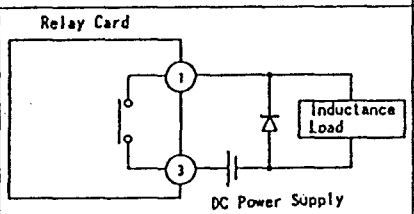
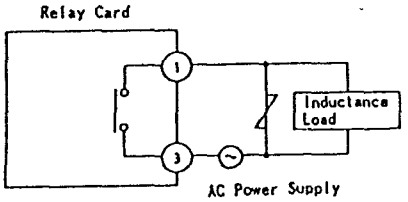


Fig. 3 Setting Method of Jumper

3.9 Contact Protection Circuit

When driving inductance load (various coils) through Relay I/O Cards, the following countermeasure should be taken to erase noise to protect contact.
Contact protection circuit is used to strengthen contact's life, to erase noise and to diminish carbide produce by arcing. However, its incorrect use may bring a reverse effect.
Beware of somewhat delay of returning time when use of contact protection circuit.
The following table shows typical example of contact protection circuit.

Method	Exmaple of circuit	Apply to AC	Apply to DC	Characteristics, etc.
CR Method		○	○	Returning time delays when load is relay solenoid. Effective method is to connect CR between loads when power voltage is 24~48V or connect CR between contacts when power voltage is 100~200V. as shown in Figure left. Recommended CR is C : 0.5~1μF against contact current 1A R : 0.5~1Ω against contact voltage 1V Withstand voltage of C is more than 2 times of using voltage, AC (no polarity)
Diode Method		X	○	Flow energy stored in coil to coil in form of current through parallel diode and let it comsume as Jule heat through resistance of inductance load. Returning time will be further delayed than CR method. Use diode having reverse withstand voltage of more than 10 times of circuit voltage.
Ballis-ter Method		○	○	This method is used so as not to apply too high voltage between contacts by utilizing characteristics of breakdown voltage of ballister. By this method, returning time also somewhat delays. Effective method is to connect ballister between loads when power voltage is 24~48V or connect ballister between contacts when power voltage is 100~200V.

4. STANDARD ACCESSORIES

4.1 Nest

(1) Nest Tag Number Label	(Refer Fig. 4.1)	1 sheet
(2) Nest Fitting Metal	(Refer Fig. 4.2)	1 pair
(3) Card Tag Number Label	(Refer Fig. 4.3)	16 sheets

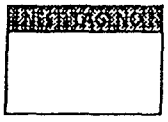


Fig. 4.1 Nest Tag Number Label

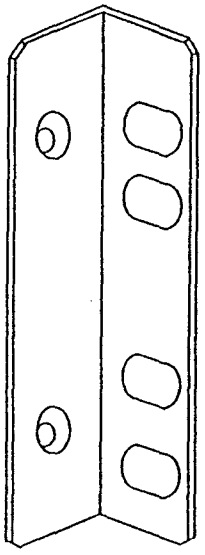


Fig. 4.2 Nest Fitting Metal

4.2 Card

(1) Relay I/O Card
Tag Number Label (Refer Fig. 4.3) 1 sheet/card

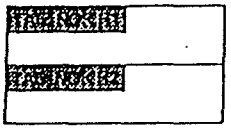


Fig. 4.3 Card Tag Number Label

5. FIELD SIDE WIRING AND POWER SUPPLY·GROUND WIRING

5.1 Field side wiring and power supply·ground wiring

Flexible twisted wire and good contact of durable round crimp-on terminal (JISC2805) are recommended to be used. (Refer Table 5.1, Fig.5.1)

Table 5.1

Nominal Cross-Sectional Area	Screw		ΦD1 Dia (mm)	A Terminal OD (mm)	L Terminal Length (mm)	ΦD2 Insulation Coverage (mm)	Suitable Crimp-on Terminal Example (Note)
0.75mm²	Card	M3.5	Over 3.7	Below 6.6	About 19	Below 3.2	AMP 34144 JST V1.25-M3
0.9mm² 1.25mm²	Nest	M4.0	Over 4.3	Below 8.7	About 21	Below 3.2	AMP 170781-1 JST V1.25-4
2.mm²	Nest	M4.0	Over 4.3	Below 8.7	About 21	Below 3.9	AMP 170781-1 JST V2-4

(Note) AMP : AMP Co.
JST : Japan Atchaku Tanshi Mfg. Co.

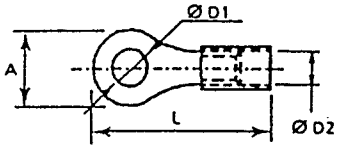


Fig. 5.1 Crimp-on Terminal

(1) Signal cable
Nominal cross-sectional area of conductor
0.75～2mm²
Example of suitable cable
Twisted vinyl code (VSF) (JIS C3307)

(2) Power cable
Nominal cross-sectional area of conductor
0.75～2mm²
Example of suitable cable
Twisted 600V vinyl code (IV) (JIS C3307)
Vinyl insulated code (KIV) (JISC3316)
for electric equipment use

(3) Ground cable
Nominal cross-sectional area of conductor
2mm²
Example of suitable cable
Twisted 600V vinyl code (IV) (JISC3307)
Vinyl insulated code (KIV) (JISC3316)
for electric equipment use

6. NEST SETTING

RYH nest is available horizontal mounting on JIS, EIA spec. 19 inch rack or wall. Each nest can set maximum 5 units in one side of cabinet in accordance with Item 6.2 setting condition. RYV nest can mount on Yokogawa Electric CENTUM-XL Cubicle.

6.1 Ambient Condition

(1) Ambient temperature and humidity
Ambient temperature and humidity during operation should be in the range as shown below :
0～50℃ 5～90%RH (no condensation)

(2) Vibration condition
Vibration of installation place should be less than 2mm/sec at 10～150Hz

(3) Air purification degree
Indoor dust is desirous to be less than 0.2mg/m³. Corrosive gas such as hydrogen sulfide, sulfurous acid, chlorine gas and dielectric dusts such as ferrous, carbonic dusts are desirous to be as little as possible.

(Note)
Permissible limit of hydrogen sulfide (H_2S) and sulfurous acid gas (SO_2) is as JEIDA*-29 (1979) CLASS SI.
JEIDA : Japan Electronic Industrial Development Association
JEIDA-29 (1979) CLASS SI
H_2S Less than 0.01ppm
SO_2 Less than 0.05ppm
(Ambient condition:
Tempeature : 25℃±5℃
Humidity : 40～80%RH)

6.2 Setting Condition

(1) Secure space at up and down of the nest for ventillation purpose.
- Apart the nest more than 100mm from floor board if it exists.
- Apart the nest more than 100mm from upper panel and provide air hole or air-cooling fan on upper panel.
- In case of rack mounting, apart the nest more than 60mm from building wall for ventilation purpose if the wall exists on back.

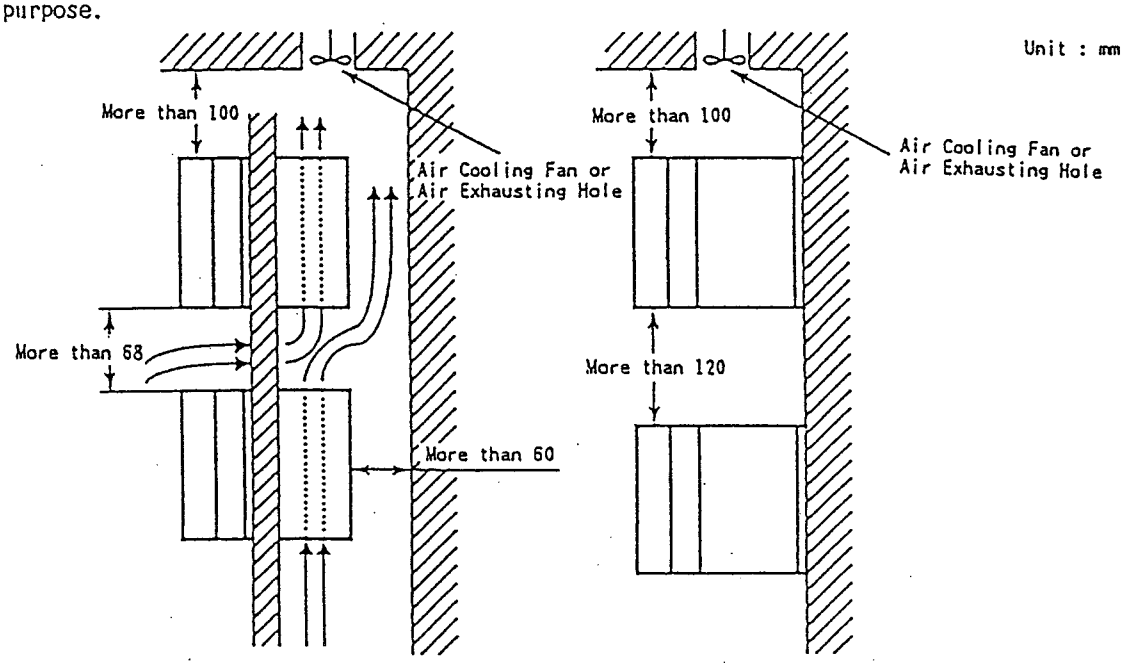
(2) Secure enough space in front and side of the nest for wiring and maintenance purpose.

(3) When storing the nest in cabinet, prevent it from temperature rise by making air-cooling.

(4) Do not place the nest on the flammable subjects.

(5) When nests are installed placing them up and down, make space as shown in Fig. 6.1. for ventillation purpose.

(6) Follow instruction of Yokogawa Electric Corporation when mounting RYV vertical nest on Yokogawa CENTUM-XL Cubicle.



(1) 19-inch Rack Mounting (2) Wall Mounting

Fig. 6.1 Nest Setting Method

6.3 Fixing method of nest fitting metal

For optional selection of 19-inch rack or wall mountings, nest fitting metal and screws are furnished. Also, screw holes are provided on the nest side board to fix nest fitting metal.

Either one of two fixing methods of nest fitting metal is selective as shown in Fig. 6.2.

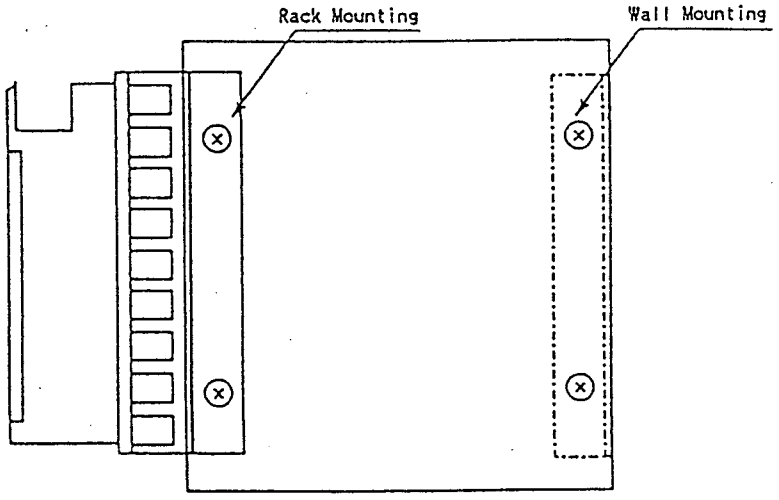


Fig. 6.2 Fixing Method of Nest Fitting Metal

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