Instruction Manual

JUXTA D SERIES
Signal Conditioners

IM JD100-01E

YOKOGAWA
Yokogawa Electric Corporation

IM JD100-01E
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CONTENTS

1. SUMMARY

1.1 INTRODUCTION

Please read thorough this Manual for correct handling of JUXTA D Series Signal Conditioners. Please keep this manual carefully after use.
The signal conditioner has been thoroughly inspected at factory before shipment. When you receive it, visually inspect it for damage.

① Model number and specification check

Check to see storing nest, type number and specifications of Signal Conditioners are as ordered.

② Contents of Instruction Manual

This manual explains cautions for handling, external wiring and safety use of Signal Conditioners for DCS (dispersion type control system).

1.2 SAFETY USE

The following caution for safety should be taken for handling of D Series Signal Condtioners and its nests. We are not responsible for damages incurred by use contrary to caution.

CAUTION

- The following items should be confirmed when turning power on. Use of instruments and its nests by ignoring the specifications may cause overheating or burning.
  (a) Voltage of power supply and input signal value be applied to the instruments and its nests should meet with required specifications.
  (b) External wiring to terminals should be connected correctly.
- Do not use the instruments and its nests in such dangerous places where exist inflammable and explosive gas or steam.

⚠ Connect input signal cables of PT Transmitter (DG1), CT Transmitter (DB1) and Tachometer Transmitter (DD1) to its front terminals ① and ②. If cables are connected by mistake to I/O terminals of storing nest field side, nest may sometimes be burned by overheating.

1.3 LINE UP

This manual explains the following Signal Conditioners and its nests.

1.3.1 Signal Conditioner's Storing Nest

Table 1.1 Type of storing nest

Type	Note
DCE	Nest for Input/output (E·P/E mixed mounting type)
DCP	Nest for Input/Output (E·P/E·E/P mixed mounting type)
DME	Nest for control input/output (E·P/E mixed mounting type)
DMP	Nest for control input/output (E·P/E·E/P mixed mounting type)

1.3.2 Signal Conditioner

Table 1.2 Type of signal conditioner and card

Type	Description
DH1	Isolator
DH2	Isolator (built-in micro-computer)
DH5	Square Root Extractor (built-in micro-computer)
DM1	mV Transmitter (built-in micro-computer)
DC0	Output Isolator
DA0	Output Isolator
DH0	Output Isolator
DT5	TC Transmitter (built-in micro-computer)
DR5	RTD Transmitter (built-in micro-computer)
DS1	Potentiometer Transmitter (built-in micro-computer)
DP3	Pulse/Analog Transmitter (built-in micro-computer)
DQ0	Analog/Pulse Transmitter (built-in micro-computer)
DA1	Distributor
DA5	Distributor (with $\sqrt{}$ extractor, built-in micro-computer)
DA9	Distributor (non-isolated)
DA2	Distributor (with communication function)
DG1	PT Transmitter
DB1	CT Transmitter
DD1	Tachometer Transmitter
DF1	P/E Transmitter
DF0	E/P Transmitter
DP1	Pulse Repeater
DX1	Input/Output Thru Card
DXT	Extension Card (connect to Handy Terminal)
DSC	Communication Interface Card (BRAIN Communication Protocol)
DSC2	Communication Interface Card (DSC2 Upper Communication protocol)

1.4 NOTICE

JUXTA D Series are the products to use in connection with DCS made by the various manufacturers.
This manual explains mainly the use with YOKOGWA DCS (CENTUM-XL, μXL) as an example.
The following is the related products of YOKOGAWA DCS used in this manual.

Table 1.3 List of YOKOGAWA products in this manual

Type	Description
VM1	Multi-points analog input card
VM2	Multi-points analog input/output card
VM4	Multi-points analog output card
PM1	Multi-points pulse train input card
MAC2	Multi-points control analog input/output card
PAC	Multi-points control pulse train input/analog output card
BC1	Brain signal conditioner communication card
MFCU	Field control unit
MFMU	Field monitoring unit
ENGS	Engineering station
MOPS	Operator station
MOPL	Operator station
KS1	Signal cable
KS2	Signal cable
TE16	Terminal block
SPBD	Portable manipulator

2. JUXTA-D SERIES NEST

2.1 TYPE AND STANDARD SPECIFICATION CODE

Table 2.1 Nest type and standard specification code

Type	Standard Spec.	Style	Note [Connecting I/O card]
DCE			Nest for I/O (E & P/E mixed mounting type) [VM1/VM2/VM4/PM1]
DCP			Nest for I/O (E, P/E & E/P mixed mounting type) [VM1/VM2/VM4/PM1]
DME			Nest for Control I/O (E & P/E mixted mounting type) [MAC2/PAC]
DMP			Nest for Control I/O (E, P/E & E/P mixed mounting type) [MAC2/PAC]
Power Source	-3		24V DC
Communication Function	0		No
	1		Yes (with DSC card, option)
	2		Yes (with DSC2 card, option)
Style Code		*A	Style A

Note : VM1 : Multi-points analog input card
VM2 : Multi-points analog input/output card
VM4 : Multi-points analog output card
PM1 : Multi-points pulse train input card
MAC2 : Multi-points control analog input/output card
PAC : Multi-points control pulse train/analog output card

2.2 DCE INPUT/OUTPUT NEST (E & P/E Mixed Mounting Type)

DCE nest is JIS and EIA specifications 19-inch rack or wall mounting type.
It can be set in general instrument panel.
It can mount sixteen (16) signal conditioners and one (1) DSC or DSC2 communication interface card.
Power supply to DCE nest is 24V DC±10%. It can be connected with Yokogawa VM1, VM2, VM4 (multi-points analog input/output card) and PM1 (multi-points pulse train input card).
Special cable (KS2) is used to connect with input/output cards.
(Connection refer to Article 6, Wiring and Piping).

2.3 DCP INPUT/OUTPUT NEST (E, P/E & E/P Mixed Mounting Type)

DCP nest is available for mixed mounting of E , P/E & E/P signal conditioners and is JIS and EIA specifications 19-inch rack or wall mounting type. It can be set in general instrument panel.
It can mount sixteen (16) signal conditioners including E/P signal conditioner and one (1) DSC2 or DSC communication card.
Power supply to DCP nest is 24V DC±10%. Supply air pressure is 1.4kgf/cm^2±10%.
It can be connected with VM1, VM2, VM4 and PM1 analog input/output cards.
Special cable (KS2) is used to connect with input/output cards.
(Connection refer to Article 6, Wiring and Piping).

2.4 DME CONTROL INPUT/OUTPUT NEST (E & P/E Mixed Mounting Type)

DME nest can mount maximum sixteen (16) signal conditioners (8 for input, and 8 for output) for Yokogawa MAC2 and PAC control input/output cards and one (1) DSC2 or DSC interface card. DME nest is JIS and EIA specifications 19-inch rack or wall mounting type. Power supply is 24V DC±10%.
To protect duplication of MAC2 and PAC cards, 2 connectors to connect with the system are furnished. It also furnishes connectors for SPBD (Style E) portable manipulator for maintenance of output type signal conditioner or backup of operational output at the time of its replacement.
Special cable (KS1) is used to connect with control input/output cards.
(Connection refer to Article 6, Wiring and Piping).

2.5 DMP CONTROL INPUT/OUTPUT NEST (E, P/E & E/P Mixed Mounting Type)

DMP nest can mount maximum sixteen (16) signal conditioners (8 for input, and 8 for output) for Yokogawa MAC2 and PAC control input/output cards and one (1) DSC2 or DSC interface card.
DMP nest is available for mixed mounting of E, P/E, E/P signal conditioners and is JIS and EIA specifications 19-inch rack or wall mounting type.
Power supply is 24V DC±10% and supply air pressure is 140kPa±10% (or 1.4kgf/cm^2±10%).
To protect duplication of MAC2 and PAC cards, 2 connectors to connect with the system are furnished. It also furnishes connector for SPBD (Style E) portable manipulator for maintenance of output type signal conditioner or backup of operational output at the time of its replacement. Special cable (KS1) is used to connect with control input/output cards.
(Connection refer to Article 6, Wiring and Piping).

2.6 EXTERNAL DIMENSION AND NAME OF EACH SECTION

External dimension and name of each section of storing nest are as shown in Fig. 2.1～2.4.

Unit : mm

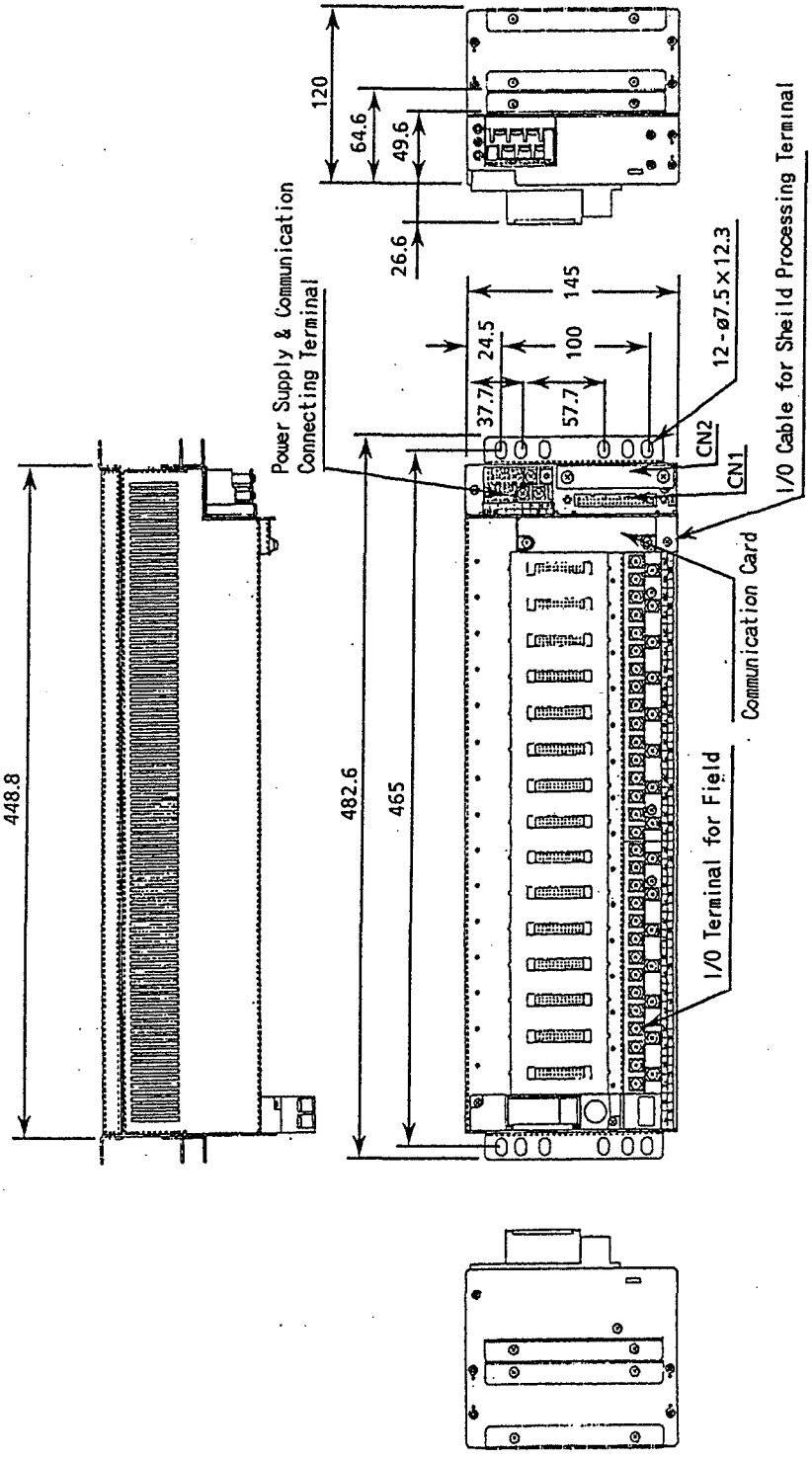


Fig. 2.1 DCE Nest for Input/Output (E & P/E Mixed Mounting Type)

Unit : mm

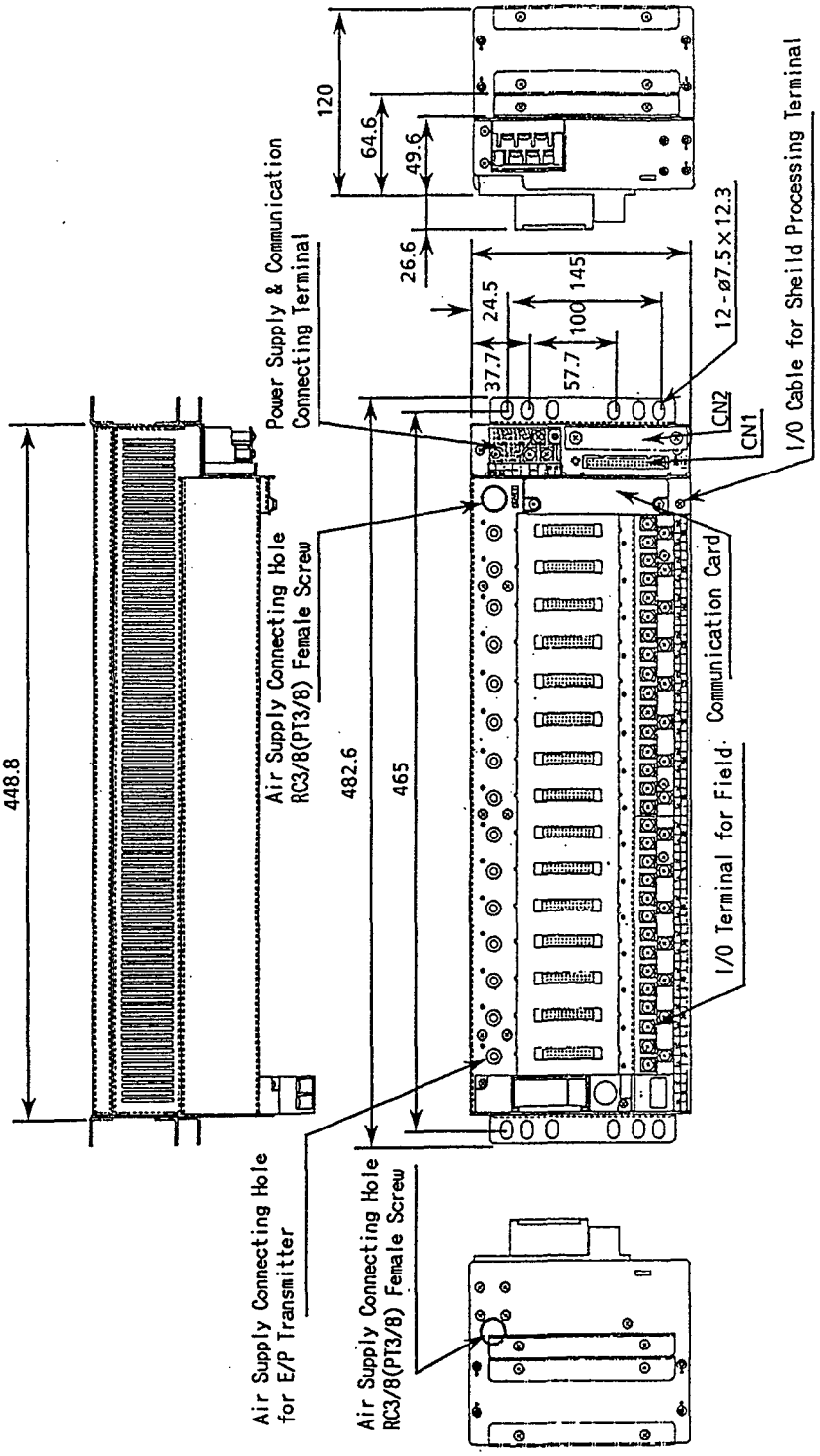


Fig. 2.2 DCP Nest for Input/Output (E, P/E & E/P Mixed Mounting Type)

Unit : mm

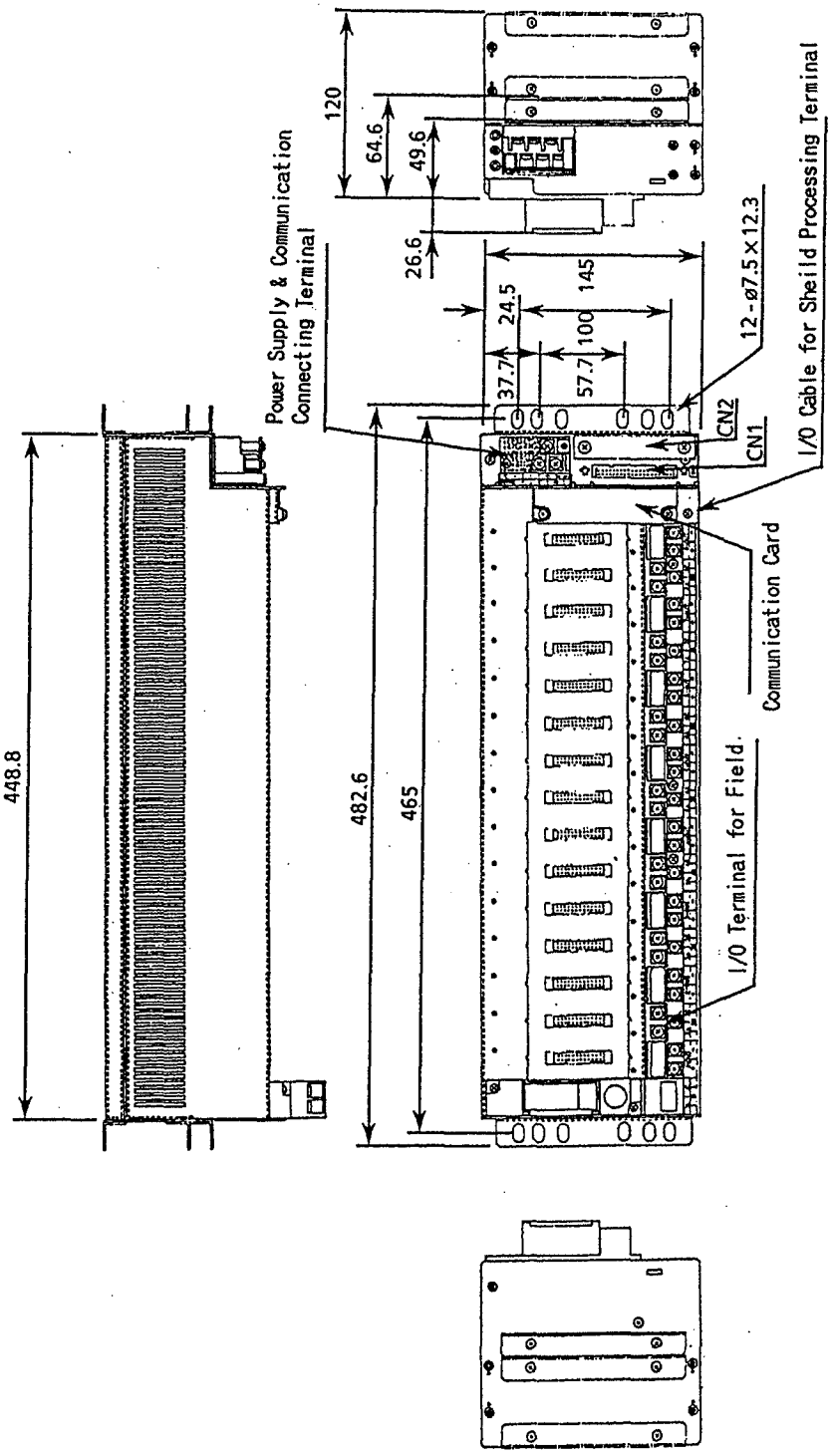


Fig. 2.3 DME Nest for Control Input/Output (E & P/E, Mixed Mounting Type)

Unit : mm

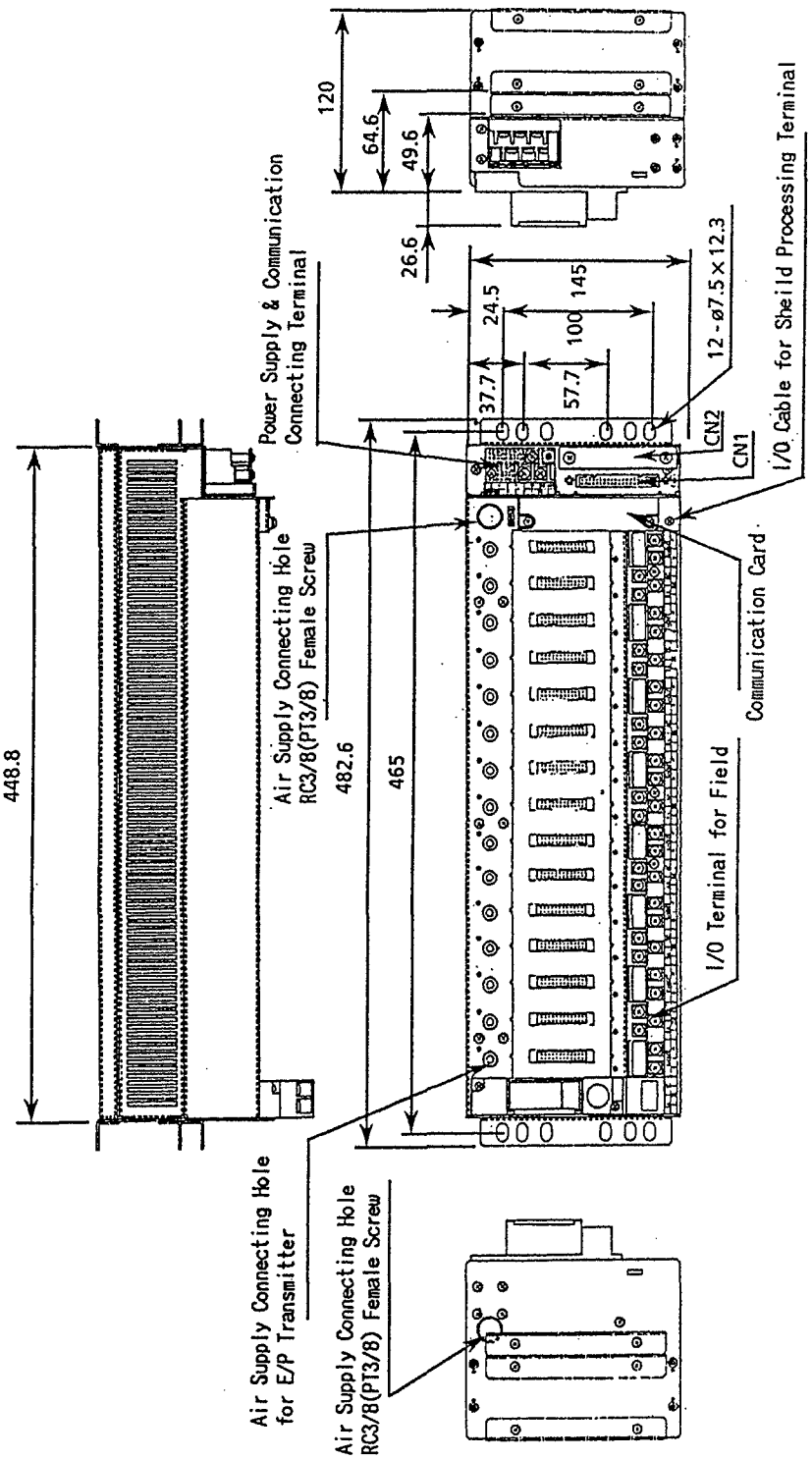


Fig. 2.4 DMP Nest for Control Input/Output (E, P/E & E/P Mixed Mounting Type)

2.7 MOUNTING PLACE OF SIGNAL CONDITIONER

I/O card to connect with DCS system differs according to type of nest. Also, type of signal conditioner available to mount and its mounting place differ according to type of I/O card.
Table 2.2 shows I/O card available to connect with nest.
Table 2.3～2.8 show signal conditioner available to mount and its mounting place. Slot numbers shown in the table are as orderly 1,2,.....,16 from the left of the nest.

Table 2.2 I/O Card available to mount on the nest

Nest Type	I/O Card	Signal conditioner available to mount and its place
DCE DCP	VM1	Refer Table 2.3
	VM2	Refer Table 2.4
	VM4	Refer Table 2.5
	PM1	Refer Table 2.6
DME DMP	MAC2	Refer Table 2.7
	PAC	Refer Table 2.8

Table 2.3 DCE, DCP Nest ←→ VMI Card
Signal conditioner available to mount and its place

VM1 : Multi-points analog input card

Type	Slot No. / Signal Conditioner	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note
DH1	Isolator	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DH2	Isolator	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DH5	Square Root Extractor	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DM1	mV Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DC0	Output Isolator																	
DA0	Output Isolator																	
DH0	Output Isolator																	
DT5	TC Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DR5	RTD Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DS1	Potentiometer Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DP3	Pulse/Analog Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DQ0	Analog/Pulse Transmitter																	
DA1	Distributor	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DA5	Distributor	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DA9	Distributor	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DA2	Distributor	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DG1	PT Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DB1	CT Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DD1	Tachometer Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DF1	P/E Transmitter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
DF0	E/P Transmitter																	
DP1	Pulse Repeater																	
DX1	Input/Output Thru Card	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	

O Available to mount

Table 2.4 DCE, DCP Nest ←→ VM2 Card
Signal conditioner available to mount and its place

VM2 : Multi-points analog input/output card

Type	Slot No. / Signal Conditioner	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note
DH1	Isolator	O	O	O	O	O	O	O	O									
DH2	Isolator	O	O	O	O	O	O	O	O									
DH5	Square Root Extractor	O	O	O	O	O	O	O	O									
DM1	mV Transmitter	O	O	O	O	O	O	O	O									
DC0	Output Isolator																	
DA0	Output Isolator									O	O	O	O	O	O	O	O	
DH0	Output Isolator									O	O	O	O	O	O	O	O	
DT5	TC Transmitter	O	O	O	O	O	O	O	O									
DR5	RTD Transmitter	O	O	O	O	O	O	O	O									
DS1	Potentiometer Transmitter	O	O	O	O	O	O	O	O									
DP3	Pulse/Analog Transmitter	O	O	O	O	O	O	O	O									
DQ0	Analog/Pulse Transmitter									O	O	O	O	O	O	O	O	
DA1	Distributor	O	O	O	O	O	O	O	O									
DA5	Distributor	O	O	O	O	O	O	O	O									
DA9	Distributor	O	O	O	O	O	O	O	O									
DA2	Distributor	O	O	O	O	O	O	O	O									
DG1	PT Transmitter	O	O	O	O	O	O	O	O									
DB1	CT Transmitter	O	O	O	O	O	O	O	O									
DD1	Tachometer Transmitter	O	O	O	O	O	O	O	O									
DF1	P/E Transmitter	O	O	O	O	O	O	O	O									
DF0	E/P Transmitter									O	O	O	O	O	O	O	O	*
DP1	Pulse Repeater																	
DX1	Input/Output Thru Card	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	

O Available to mount
* Available to mount DCP only

Table 2.5 DCE, DCP Nest ←→ VM4 Card
Signal conditioner available to mount and its place

VM4 : Multi-points analog output card

Type	Slot No. / Signal Conditioner	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note
DH1	Isolator																	
DH2	Isolator																	
DH5	Square Root Extractor																	
DM1	mV Transmitter																	
DC0	Output Isolator																	
DA0	Output Isolator	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
DH0	Output Isolator	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
DT5	TC Transmitter																	
DR5	RTD Transmitter																	
DS1	Potentiometer Transmitter																	
DP3	Pulse/Analog Transmitter																	
DQ0	Analog/Pulse Transmitter	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
DA1	Distributor																	
DA5	Distributor																	
DA9	Distributor																	
DA2	Distributor																	
DG1	PT Transmitter																	
DB1	CT Transmitter																	
DD1	Tachometer Transmitter																	
DF1	P/E Transmitter																	
DF0	E/P Transmitter	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	*
DP1	Pulse Repeater																	
DX1	Input/Output Thru Card	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

○ Available to mount
* Available to mount DCP only

Table 2.6 DCE, DCP Nest ←→ PM1 Card
Signal conditioner available to mount and its place

PM1 : Multi-points pulse train input card

Type	Slot No. / Signal Conditioner	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note
DH1	Isolator																	
DH2	Isolator																	
DH5	Square Root Extractor																	
DM1	mV Transmitter																	
DC0	Output Isolator																	
DA0	Output Isolator																	
DH0	Output Isolator																	
DT5	TC Transmitter																	
DR5	RTD Transmitter																	
DS1	Potentiometer Transmitter																	
DP3	Pulse/Analog Transmitter																	
DQ0	Analog/Pulse Transmitter																	
DA1	Distributor																	
DA5	Distributor																	
DA9	Distributor																	
DA2	Distributor																	
DG1	PT Transmitter																	
DB1	CT Transmitter																	
DD1	Tachometer Transmitter																	
DF1	P/E Transmitter																	
DF0	E/P Transmitter																	
DP1	Pulse Repeater	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
DX1	Input/Output Thru Card	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

○ Available to mount

Table 2.7 DME, DMP Nest ←→ MAC2 Card
Signal conditioner available to mount and its place

MAC2 : Multi-points control analog input/output card

Type	Slot No. / Signal Conditioner	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note
DH1	Isolator	O		O		O		O		O		O		O		O		
DH2	Isolator	O		O		O		O		O		O		O		O		
DH5	Square Root Extractor	O		O		O		O		O		O		O		O		
DM1	mV Transmitter	O		O		O		O		O		O		O		O		
DC0	Output Isolator		O		O		O		O		O		O		O		O	
DA0	Output Isolator																	
DH0	Output Isolator																	
DT5	TC Transmitter	O		O		O		O		O		O		O		O		
DR5	RTD Transmitter	O		O		O		O		O		O		O		O		
DS1	Potentiometer Transmitter	O		O		O		O		O		O		O		O		
DP3	Pulse/Analog Transmitter	O		O		O		O		O		O		O		O		
DQ0	Analog/Pulse Transmitter		O		O		O		O		O		O		O		O	
DA1	Distributor	O		O		O		O		O		O		O		O		
DA5	Distributor	O		O		O		O		O		O		O		O		
DA9	Distributor	O		O		O		O		O		O		O		O		
DA2	Distributor	O		O		O		O		O		O		O		O		
DG1	PT Transmitter	O		O		O		O		O		O		O		O		
DB1	CT Transmitter	O		O		O		O		O		O		O		O		
DD1	Tachometer Transmitter	O		O		O		O		O		O		O		O		
DF1	P/E Transmitter	O		O		O		O		O		O		O		O		
DF0	E/P Transmitter		O		O		O		O		O		O		O		O	(Note 1)
DP1	Pulse Repeater																	
DX1	Input/Output Thru Card	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	(Note 2)

O Available to mount
Note 1 Available to mount DMP only
Note 2 250Ω built-in type cannot be used as output card (even numbered slot)

Table 2.8 DME, DMP Nest ←→ PAC Card
Signal conditioner available to mount and its place

PAC : Multi-points pulse train input/analog output card

Type	Slot No. / Signal Conditioner	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note
DH1	Isolator																	
DH2	Isolator																	
DH5	Square Root Extractor																	
DM1	mV Transmitter																	
DC0	Output Isolator		○		○		○		○		○		○		○		○	
DA0	Output Isolator																	
DH0	Output Isolator																	
DT5	TC Transmitter																	
DR5	RTD Transmitter																	
DS1	Potentiometer Transmitter																	
DP3	Pulse/Analog Transmitter																	
DQ0	Analog/Pulse Transmitter		○		○		○		○		○		○		○		○	
DA1	Distributor																	
DA5	Distributor																	
DA9	Distributor																	
DA2	Distributor																	
DG1	PT Transmitter																	
DB1	CT Transmitter																	
DD1	Tachometer Transmitter																	
DF1	P/E Transmitter																	
DF0	E/P Transmitter		○		○		○		○		○		○		○		○	(Note 1)
DP1	Pulse Repeater	○		○		○		○		○		○		○		○		
DX1	Input/Output Thru Card	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	(Note 2)

○ Available to mount
Note 1 Available to mount DMP only
Note 2 250Ω built-in type cannot be used as output card (even numbered slot)

2.8 STANDARD ACCESSORIES

Standard accessories of the nests are as follows :

①	Nest tag number label (See Fig. 2.5)	: 1
	Signal conditioner tag number label	: 16
②	Nest metal fitting (See Fig. 2.6)	: 2
③	Mounting screw (M3 flat small screw)	: 4

Refer Article 5.3 for setting method of nest metal fittings.

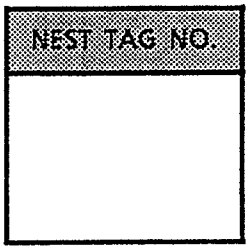


Fig. 2.5 Nest Tag Number Label

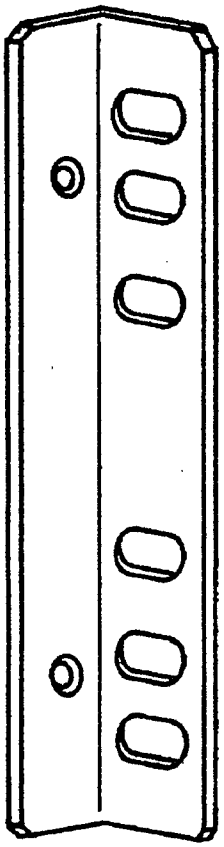


Fig. 2.6 Nest Metal Fittings

3. JUXTA-D SERIES SIGNAL CONDITIONERS

3.1 TYPE AND STANDARD SPECIFICATION CODE

Isolator

DH1-□6□*A

Type

Input Signal

A:4～20mA DC	1:0～10mV DC
B:2～10mA DC	2:0～100mV DC
C:1～5mA DC	3:0～1V DC
D:0～20mA DC	4:0～10V DC
E:0～16mA DC	5:0～5V DC
F:0～10mA DC	6:1～5V DC
G:0～1mA DC	7:-10～+10V DC
Z:(Custom) Current Signal (150mA or less)	0:(Custom) Voltage Signal (±30V or less)

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC	1:0～10mV DC
B:2～10mA DC	2:0～100mV DC
C:1～5mA DC	3:0～1V DC
D:0～20mA DC	4:0～10V DC
E:0～16mA DC	5:0～5V DC
F:0～10mA DC	6:1～5V DC
G:0～1mA DC	7:-10～+10V DC
Z:(Custom) Current Signal (24mA or less)	0:(Custom) Voltage Signal (±10V or less)

Isolator(with μP)

DH2-□6□*A

Type

Input Signal

A:0～50mA DC	1:-10～+10V DC
B:0～10mA DC	2:-1～+1V DC
Z:(Custom) Current Signal (50mA or less)	0:(Custom) Voltage Signal (±30V or less)

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC	1:0～10mV DC
B:2～10mA DC	2:0～100mV DC
C:1～5mA DC	3:0～1V DC
D:0～20mA DC	4:0～10V DC
E:0～16mA DC	5:0～5V DC
F:0～10mA DC	6:1～5V DC
G:0～1mA DC	7:-10～+10V DC
Z:(Custom) Current Signal (24mA or less)	0:(Custom) Voltage Signal (±10V or less)

Square Root Extractor (with μP)

DH5-66□*A

Type

Input Signal

6:1～5V DC

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC
B:2～10mA DC
C:1～5mA DC
D:0～20mA DC
E:0～16mA DC
F:0～10mA DC
G:0～1mA DC
Z:(Custom) Current Signal (24mA or less)

1:0～10mV DC
2:0～100mV DC
3:0～1V DC
4:0～10V DC
5:0～5V DC
6:1～5V DC
7:-10～+10V DC
0:(Custom) Voltage Signal (±10V or less)

mV Transmitter (with μP)

DM1-16□*A/B□

Type

Input Signal

Input Signal Range

1 : DC Potential Difference Signal
-100～+150mV DC
(when span is 3mV or more)

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC
B:2～10mA DC
C:1～5mA DC
D:0～20mA DC
E:0～16mA DC
F:0～10mA DC
G:0～1mA DC
Z:(Custom) Current Signal (24mA or less)

1:0～10mV DC
2:0～100mV DC
3:0～1V DC
4:0～10V DC
5:0～5V DC
6:1～5V DC
7:-10～+10V DC
0:(Custom) Voltage Signal (±10V or less)

Burnout

U:UP
D:DOWN
N:OFF

Output Isolator

DC0-A□N*A

Type

Input Signal

A:4～20mA DC

Output Signal

A:4～20mA DC
H:10～50mA DC

Output Isolator

DA0-6□N*A

Type

Input Signal

6:1～5V DC

Output Signal

A:4～20mA DC
H:10～50mA DC
Z:(Custom)
(when 100% is 50mA or less and zero elevation is within 25% of span)

Output Isolator

DH0-6□N*A

Type

Input Signal

6:1～5V DC

Output Signal

1:0～10mV DC
2:0～100mV DC
3:0～1V DC
4:0～10V DC
5:0～5V DC
6:1～5V DC
0: (CUSTOM) Voltage Signal
Span 10mV or more in the range of 0～10V DC

TC Transmitter (with μP)

DT5-□6□*A/B□

Type

Input Signal

Thermocouple
1:K(CA)
2:T(CC)
3:E(CRC)
4:J(IC)
5:R
6:S
7:B(RH)
8:N
0: Others

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC
B:2～10mA DC
C:1～5mA DC
D:0～20mA DC
E:0～16mA DC
F:0～10mA DC
G:0～1mA DC
Z:(Custom) Current Signal (24mA or less)

1:0～10mV DC
2:0～100mV DC
3:0～1V DC
4:0～10V DC
5:0～5V DC
6:1～5V DC
7:-10～+10V DC
0:(Custom) Voltage Signal (±10V or less)

Burnout

U:UP
D:DOWN
N:OFF

RTD Transmitter (with μP)

DR5-□6□*A/B□

Type

Input Signal

JIS specifications resistance bulb
1:Pt100
2:JPt100
0: Other resistanace bulb

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC
B:2～10mA DC
C:1～5mA DC
D:0～20mA DC
E:0～16mA DC
F:0～10mA DC
G:0～1mA DC
Z:(Custom) Current Signal (24mA or less)

1:0～10mV DC
2:0～100mV DC
3:0～1V DC
4:0～10V DC
5:0～5V DC
6:1～5V DC
7:-10～+10V DC
0:(Custom) Voltage Signal (±10V or less)

Burnout

U:UP
D:DOWN
N:OFF

POT Transmitter (with μP)

DS1-□6□*A/B□

Type

Input Signal

1:Full resistance (100～2kΩ)
0:(Custom)
Full resistance value of 2KΩ～30KΩ

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC
B:2～10mA DC
C:1～5mA DC
D:0～20mA DC
E:0～16mA DC
F:0～10mA DC
G:0～1mA DC
Z:(Custom) Current Signal (24mA or less)

1:0～10mV DC
2:0～100mV DC
3:0～1V DC
4:0～10V DC
5:0～5V DC
6:1～5V DC
7:-10～+10V DC
0:(Custom) Voltage Signal (±10V or less)

Burnout

U:UP
D:DOWN
N:OFF

Pulse Transmitter(with μP)

DP3-□6□*A

Type

Input Signal

1: Transmitter Power Supply (w/12VDC±10%, 30mA)

2: Transmitter Power Supply (w/24VDC±10%, 30mA)

Ch1 Output Signal

6: 1 ~ 5V DC

Ch2 Output Signal

A: 4 ~ 20mA DC	1: 0 ~ 10mV DC
B: 2 ~ 10mA DC	2: 0 ~ 100mV DC
C: 1 ~ 5mA DC	3: 0 ~ 1V DC
D: 0 ~ 20mA DC	4: 0 ~ 10V DC
E: 0 ~ 16mA DC	5: 0 ~ 5V DC
F: 0 ~ 10mA DC	6: 1 ~ 5V DC
G: 0 ~ 1mA DC	7: -10 ~ +10V DC
Z: (Custom) Current Signal (24mA or less)	0: (Custom) Voltage Signal (±10V or less)

Analog/Pulse Transmitter(with μP)

DQ0-□1N*A

Type

Input Signal

A: 4 ~ 20mA DC

6: 1 ~ 5V DC

Output Signal

1: Open Collector

Distributor

DA1-A 6□*A

Type

Input Signal

A: 4 ~ 20mA DC

Transmitter Power Supply (w/25~28V DC, 30mA)

Ch1 Output Signal

6: 1 ~ 5V DC

Ch2 Output Signal

A: 4 ~ 20mA DC	1: 0 ~ 10mV DC
B: 2 ~ 10mA DC	2: 0 ~ 100mV DC
C: 1 ~ 5mA DC	3: 0 ~ 1V DC
D: 0 ~ 20mA DC	4: 0 ~ 10V DC
E: 0 ~ 16mA DC	5: 0 ~ 5V DC
F: 0 ~ 10mA DC	6: 1 ~ 5V DC
G: 0 ~ 1mA DC	7: -10 ~ +10V DC
Z: (Custom) Current Signal (24mA or less)	0: (Custom) Voltage Signal (±10V or less)

Distributor(with μP) (with Square Root Extractor)

DA5-A 6□*A

Type

Input Signal

A: 4 ~ 20mA DC

Transmitter Power Supply (w/25~28V DC, 30mA)

Ch1 Output Signal

6: 1 ~ 5V DC

Ch2 Output Signal

A: 4 ~ 20mA DC	1: 0 ~ 10mV DC
B: 2 ~ 10mA DC	2: 0 ~ 100mV DC
C: 1 ~ 5mA DC	3: 0 ~ 1V DC
D: 0 ~ 20mA DC	4: 0 ~ 10V DC
E: 0 ~ 16mA DC	5: 0 ~ 5V DC
F: 0 ~ 10mA DC	6: 1 ~ 5V DC
G: 0 ~ 1mA DC	7: -10 ~ +10V DC
Z: (Custom) Current Signal (24mA or less)	0: (Custom) Voltage Signal (±10V or less)

Distributor (Non Isolated)

DA9-A 6N*A

Type

Input Signal

A:4～20mA DC
Transmitter Power Supply
(w/25～28V DC, 30mA)

Output Signal

6:1～5V DC

Distributor (with Communication Function)

DA2-A 66*A

Type

Input Signal

A:4～20mA DC
Transmitter Power Supply
(w/25～28V DC, 30mA)

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

6:1～5V DC

PT Transmitter (R.M.S.)

DG1-□6□*A

Type

Input Signal

1:0～110V AC
2:0～150V AC
0:(Custom) AC Voltage Signal
(100% input voltage 30～300V AC)

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC
B:2～10mA DC
C:1～5mA DC
D:0～20mA DC
E:0～16mA DC
F:0～10mA DC
G:0～1mA DC
Z:(Custom) Current Signal (24mA or less)

1:0～10mV DC
2:0～100mV DC
3:0～1V DC
4:0～10V DC
5:0～5V DC
6:1～5V DC
7:-10～+10V DC
0:(Custom) Voltage Signal (±10V or less)

CT Transmitter

DB1-□6□*A

Type

Input Signal

A:0～1A AC
B:0～5A AC
Z:(Custom) AC Current Signal
(N=5/I I : 100% input;
N should be integral)

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC
B:2～10mA DC
C:1～5mA DC
D:0～20mA DC
E:0～16mA DC
F:0～10mA DC
G:0～1mA DC
Z:(Custom) Current Signal (24mA or less)

1:0～10mV DC
2:0～100mV DC
3:0～1V DC
4:0～10V DC
5:0～5V DC
6:1～5V DC
7:-10～+10V DC
0:(Custom) Voltage Signal (±10V or less)

Tachometer Transmitter

DD1-16□*A

Type

Input Signal

1: AC Voltage Signal

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC	1:0～10mV DC
B:2～10mA DC	2:0～100mV DC
C:1～5mA DC	3:0～1V DC
D:0～20mA DC	4:0～10V DC
E:0～16mA DC	5:0～5V DC
F:0～10mA DC	6:1～5V DC
G:0～1mA DC	7:-10～+10V DC
Z:(Custom) Current Signal (24mA or less)	0:(Custom) Voltage Signal (±10V or less)

Pulse Repeater

DP1-□11*A

Type

Input Signal

1:Transmitter Power Supply (w/12VDC±10%, 30mA)

2:Transmitter Power Supply (w/24VDC±10%, 30mA)

Ch1 Output Signal

1:オープンコレクタ

Ch2 Output Signal

1:オープンコレクタ

P/E Transducer

DF1-16□*A

Type

Input Signal

1:0.2～1.0kgf/cm²

Ch1 Output Signal

6:1～5V DC

Ch2 Output Signal

A:4～20mA DC	1:0～10mV DC
B:2～10mA DC	2:0～100mV DC
C:1～5mA DC	3:0～1V DC
D:0～20mA DC	4:0～10V DC
E:0～16mA DC	5:0～5V DC
F:0～10mA DC	6:1～5V DC
G:0～1mA DC	7:-10～+10V DC
Z:(Custom) Current Signal (24mA or less)	0:(Custom) Voltage Signal (±10V or less)

E/P Transducer

DF0-□1N*A

Type

Input Signal

6:1～5V DC

A:4～20mA DC

Output Signal

1:0.2～1.0kgf/cm²

Input/Output Thru Card

DX1-□1N*A

- Type
- Input Signal Type
  - Input Resistor (250Ω)
  - 1: No
  - 2: Yes
- Output Signal Type
  - 1: Direct Connection of I/O Signal

Extension Card

DXT*A

- Type

Communication Interface Card (Brain Communication Protocol)

DSC*A

- Type

Communication Interface Card (DSC2 Upper System Comm. Protocol) (Brain Communication Protocol)

DSC2

- Type

3.2 EXTERNAL DIMENSION AND NOMENCLATURE

Fig.3.1~Fig.3.3 shows external dimension of signal conditioner.
Fig.3.4~Fig.3.5 shows nomenclature and terminal arrangement of signal conditioner.

Unit : mm

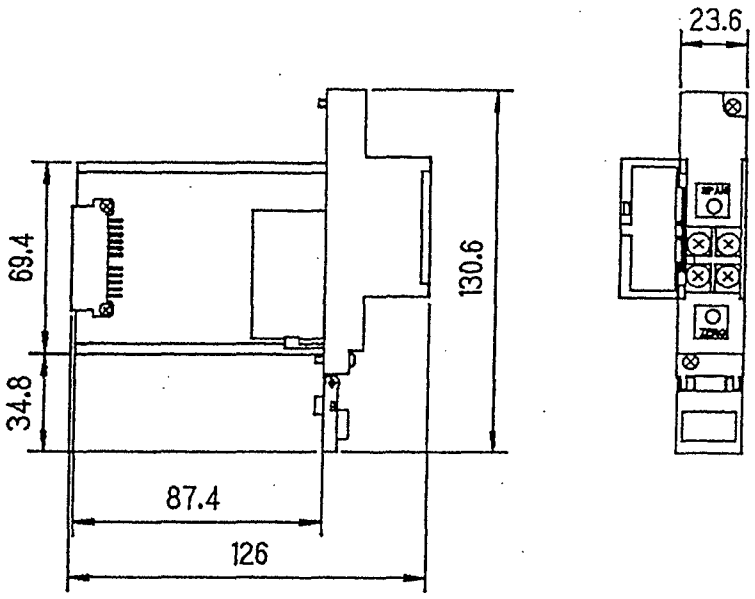


Fig. 3.1 External Dimension of Signal Conditioners other than DF1, DFO

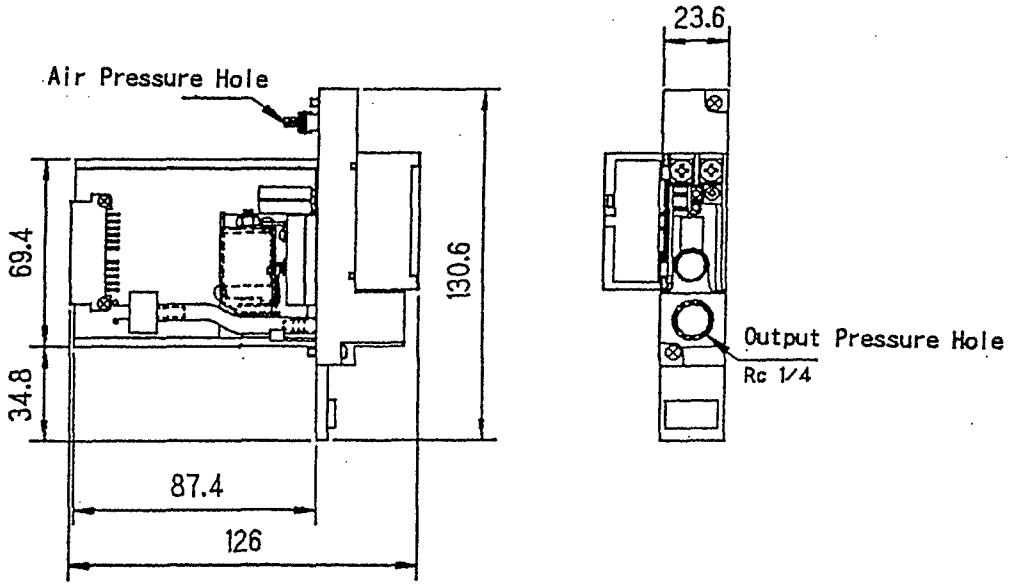


Fig. 3.2 External Dimension of DFO E/P Transmitter

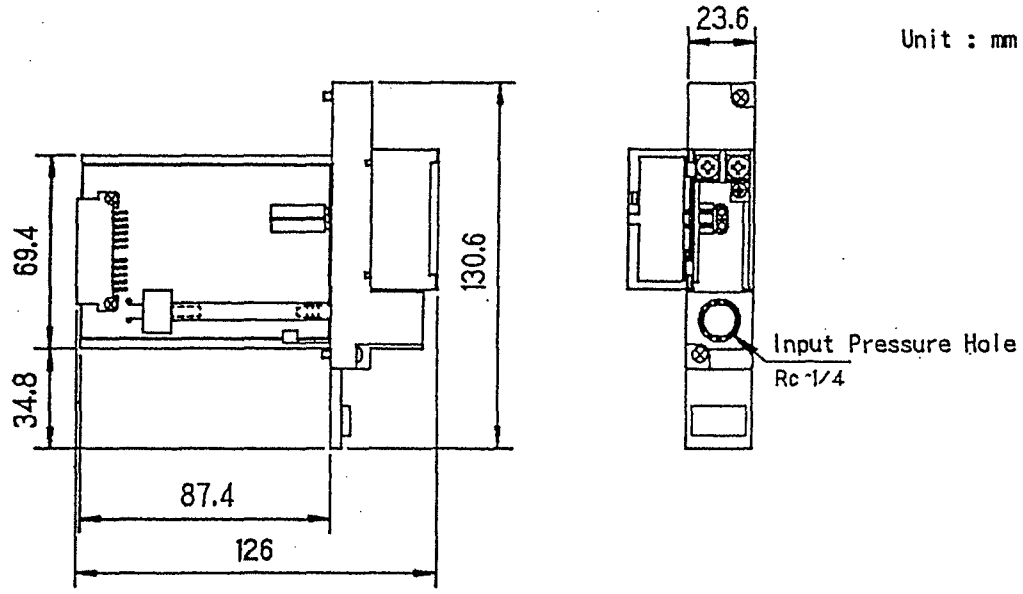
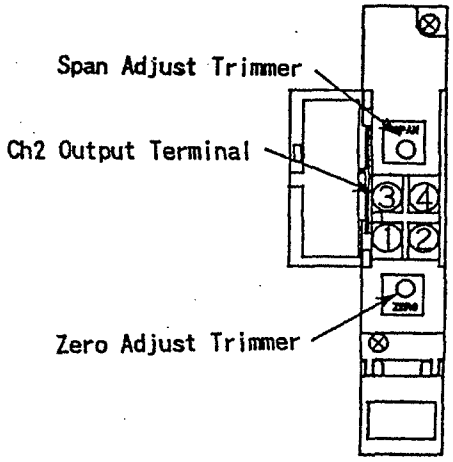


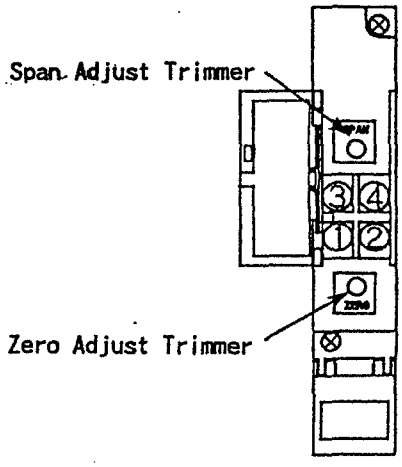
Fig. 3.3 External Dimension of DF1 P/E Transmitter



Terminal Arrangement

Terminal	Signal	Connection
①		M4 x 0.7 Screw
②		
③	+ (OUT 2)	
④	− (OUT 2)	

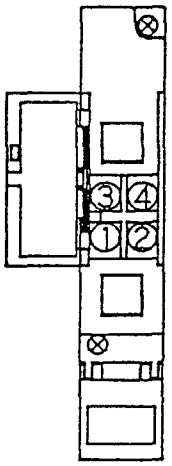
Fig. 3.4 Nomenclature and Terminal Arrangement of DH1, DA1, DA2



Terminal Arrangement

Terminal	Signal	Connection
①		M4 x 0.7 Screw
②		
③		
④		

Fig. 3.5 Nomenclature and Terminal Arrangement of DAO, DHO

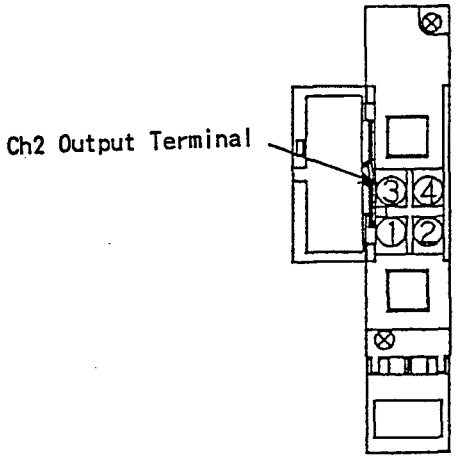


Terminal Arrangement

Terminal	Signal	Connection
①		M4 x 0.7 Screw
②		
③		
④		

Ch2 output to front terminals is not available

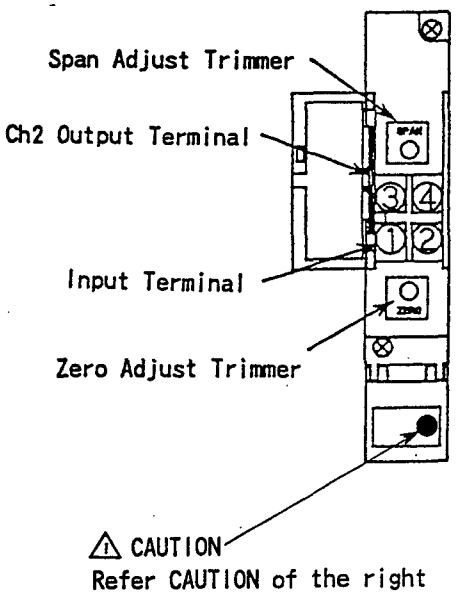
Fig. 3.6 Nomenclature and Terminal Arrangement of DC0, DQ0, DA9, DX1



Terminal Arrangement

Terminal	Signal	Connection
①		M4 x 0.7 Screw
②		
③	+(OUT 2)	
④	−(OUT 2)	

Fig. 3.7 Nomenclature and Terminal Arrangement of DH2, DH5, DM1, DT5, DR5, DS1, DP3, DA5, DP1



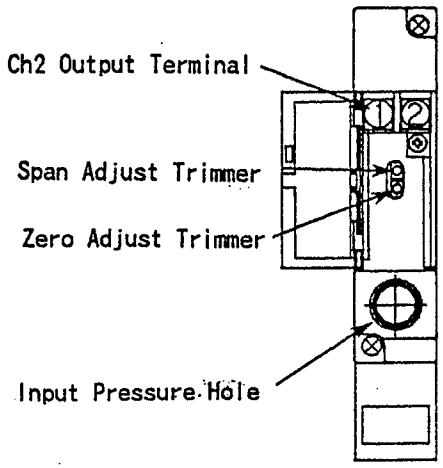
Terminal Arrangement

Terminal	Signal	Connection
①	+(IN)	M4 x 0.7 Screw
②	−(IN)	
③	+(OUT2)	
④	−(OUT2)	

⚠ CAUTION

Connect input signal cable of PT Transmitter (DG1), CT Transmitter (DB1), Tacho-Generator Transmitter (DD1) to its front terminals ① and ②.
Nests (DCP, DCE, DMP, DME) may be burned by over-heating when incorrect connection to field side I/O terminals of nest.

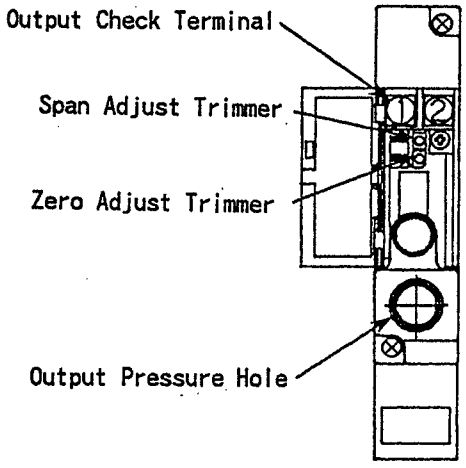
Fig. 3.8 Nomenclature and Terminal Arrangement of DG1, DB1, DD1



Terminal Arrangement

Terminal	Signal	Connection
①	+(OUT 2)	M4 x 0.7
②	−(OUT-2)	Screw
◎	INPUT 20～100kPa (or 0.2～1.0kgf/cm²)	Rc1/4 (PT1/4)

Fig. 3.9 Nomenclature and Terminal Arrangement for DF1



Terminal Arrangement

Terminal	Signal	Connection
①	+OUTPUT CHECK	M4 x 0.7
②	−OUTPUT CHECK	Screw
◎	OUTPUT 20～100kPa (or 0.2～1.0kgf/cm²)	Rc1/4 (PT1/4)

1～5V DC (accuracy ±1%) voltage signal proportional to 20～100kPa (or 0.2～1.0kgf/cm²) is output between output check terminals ①·②

Fig. 3.10 Nomenclature and Termnial Arrangement for DFO

3.3 STANDARD ACCESSORIES

Tag number labels are furnished with signal conditioners as standard accessories:

Tag Number Label 4

In addition to tag number labels,

Range Label (White portion of main label) 4

are furnished with micro-computer built-in signal conditioners such as DH2, DH5, DM1, DT5, DR5, DS1, DP3, DQ0 and DA5.

See Fig.11～13 for place and content of the labels.

(Note) Fuses are not included in standard accessories.

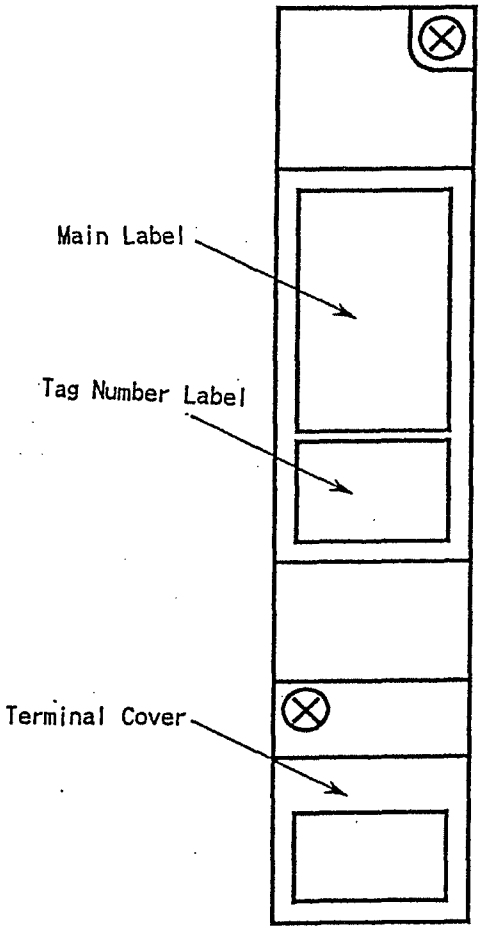


Fig. 3.11 Place of Label

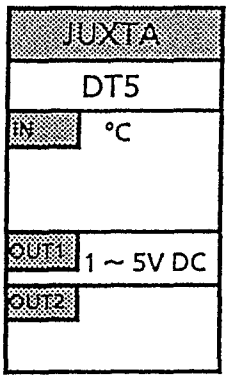


Fig. 3.12 Main Label

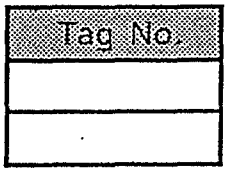


Fig. 3.13 Tag Number Label

4. CHECK AND SETTING OF SPECIFICATIONS

4.1 BURNOUT AND RANGE CHANGE

Burnout (upscale or downscale) and ranges are set before shipment according to ordering information. When you receive it, check to see whether the settings are correct by main label attached to the signal conditioner.

4.2 CARD AND SIGNAL CONDITIONERS EQUIPPED SETTING FACTORS

A part of specifications of

DSC Communication Interface Card
DP1 Pulse Repeater
DP3 Analog/Pulse Transmitter

is set by switch or short-circuit socket.
See Table 4.1 for its setting factor and setting method.
Refer Article 4.4~4.6 for details.

Table 4.1 Setting factor and setting method of DSC, DP1, DP3

Card & signal conditioners equipped setting factors	Setting Factors	Setting Method
DSC Communication Interface Card	Nest address	Set by rotary switch
DP1 Pulse Repeater	Current pulse load resistance Filter	Set by short-circuit socket
DP3 Pulse/Analog Transmitter	Transmittewr power supply voltage	Set by short-circuit socket
	Current pulse load resistance Filter	Set by DIP switch

See caution to static electricity mentioned in next article 4.3 when performing the above settings.

4.3 CAUTION TO STATIC ELECTRICITY

Integrated circuits are used for cards of signal conditioners.
Special attention to protect from the damage by static electricity should be done in case the cards are used for the purpose of maintenance and setting change. Pay attention to the following points :

(1) Put the signal conditioner into conductive bag or charge protection bag when store or carry it singly. (Signal conditioner be shipped from the factory as single order, conductive bag or charge protection bag are used).
(2) In case to insert or pull out the signal conditioner from the nest, use wrist strap with ground conductor by 1MΩ resistor. Wrist strap should be connected to ground terminal near to the ground conductor or unpainted portion (grounded) of the rack.

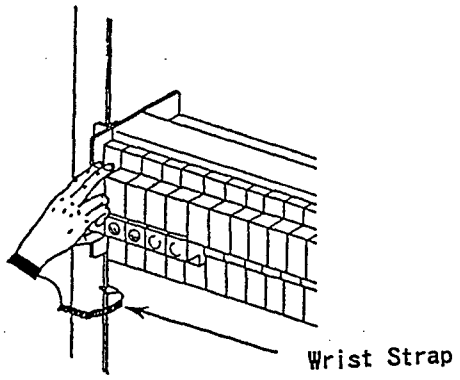


Fig. 4.1

(3) In case to use the signal conditioner on the work bench, etc., place it on the conductive sheet grounded by 1MΩ resistor. Worker should wear wrist strap as mentioned in (2). Apart chargeable plastic goods, etc. from the work bench.

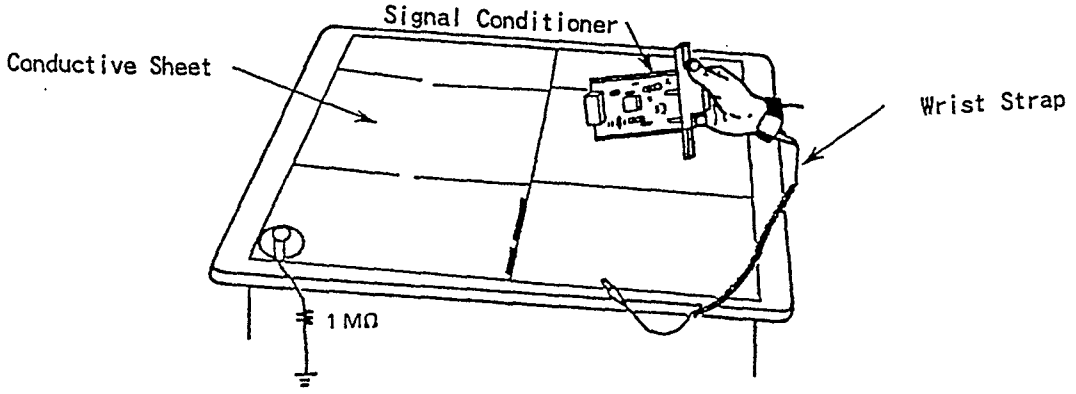


Fig. 4.2

(4) Do not touch by hands direct to faces of card's parts and pattern, connector or pin, etc. without using the wrist strap and conductive sheet.

4.4 SETTING OF DSC COMMUNICATION INTERFACE CARD

DSC Communication Interface Card has rotary switch in its front to set nest address. Nest address can be set at 0, 1, 2, 3, ...9, A, B, C, D, E, F by 16 progressive numbers.
Nest address is set at zero when shipment from factory.

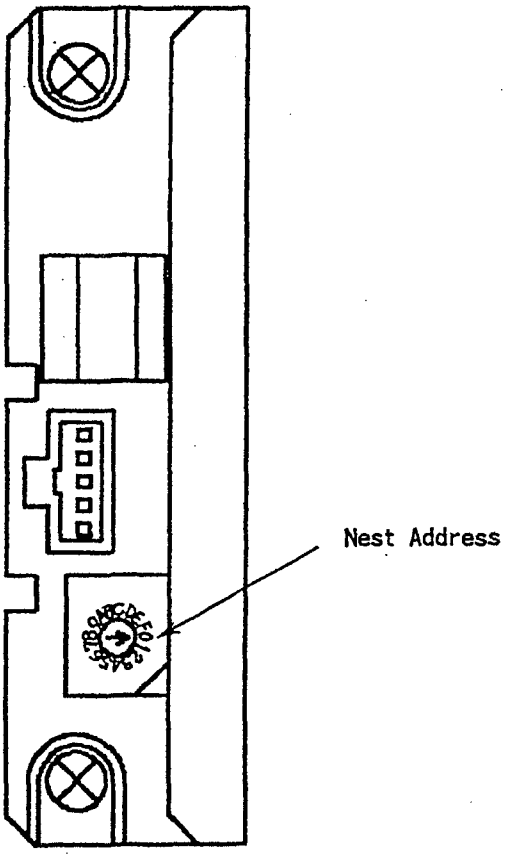


Fig. 4.3 Drawing showing front face of DSC Communication Interface Card

4.5 SETTING OF DP1 PULSE SIGNAL REPEATER

DP1 Pulse Signal Repeater receives voltage pulse, current pulse or contact pulse from the field and converts them into isolated transistor contact pulse.
Load resistance selectable by switch is built in DP1 enabling it to receive current pulse generated by flow meter.
Since requirement or non-requirement of input filter can be selected by switch, DP1 can also be used to receive signals having abundant chatterings such as relay contact, etc.
Four (4) connection methods according to types of pulse generators shall be explained below :

① **Connection to 3-wire power supply type generator**
Fig. 4.6(1) shows example of connection.
This method is to supply power to generator and converts the output signal into voltage level pulse by output amplifier after amplifying and shaping the output signal of generator.

② **Connection to 2-wire power supply type generator**
Fig. 4.6(2) shows example of connection.
This method is to supply power to generator and receives output signal of generator as current pulse signal. This current signal is converted into voltage level signal by current pulse load resistance (200Ω, 510Ω, 1KΩ selectable).

③ **Connection to contact pulse generator**
Fig. 4.6(3) shows example of connection.
Input signal can receive either relay contact and open collector.

④ **Connection to voltage pulse generator**
Fig. 4.6(4) shows example of connection.

4.5.1 Setting of Current Pulse Load Resistance

DP1 Signal Repeater is required to set current pulse load resistance according to the generators be connected.
Table 4.2 shows correspondence between setting pin and current pulse load resistance. The setting method is to insert short-circuit socket and make short-circuit two (2) setting pins. (See Fig. 4.4, 4.5)
Use tweezer when setting and take out the short-circuit socket so as do not bend the pins.
When shipment from factory, short-circuit sockets are inserted into off side as shown in Fig.4.4.

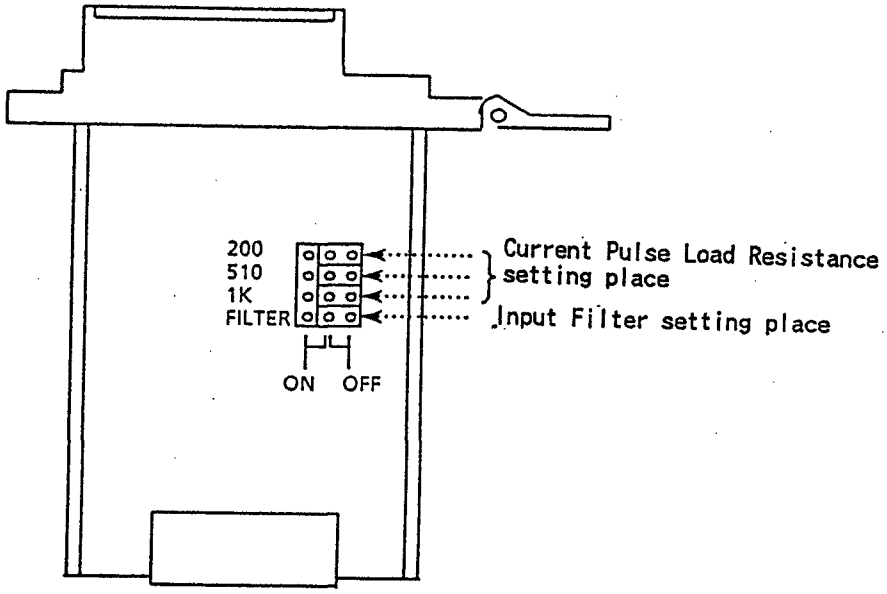


Fig. 4.4 DP1 - Current Pulse Load Resistance·Input Filter ON/OFF Setting Pin

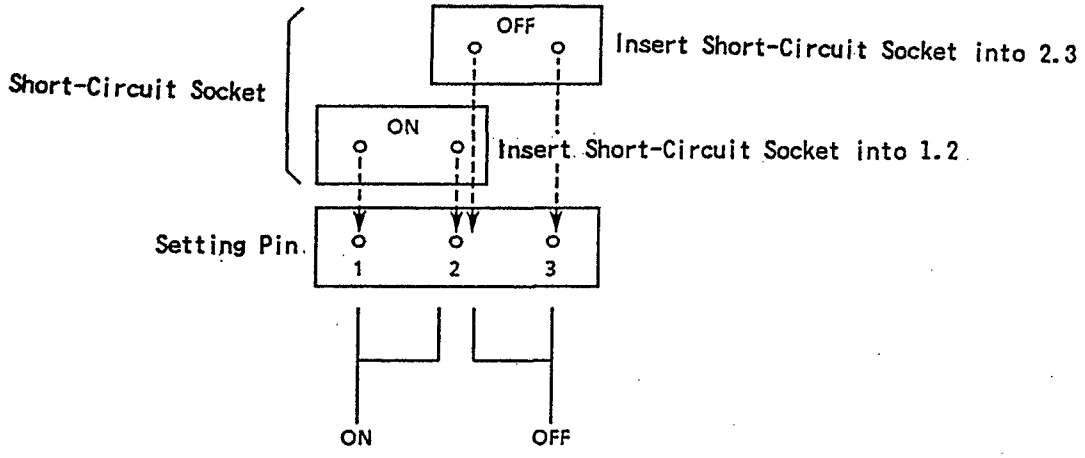


Fig. 4.5 DP1 - Relation between ON/OFF Setting Pin place and Short-Circuit Socket place

Table 4.2 Relation between Pin Setting and Current Pulse Load Resistance Value

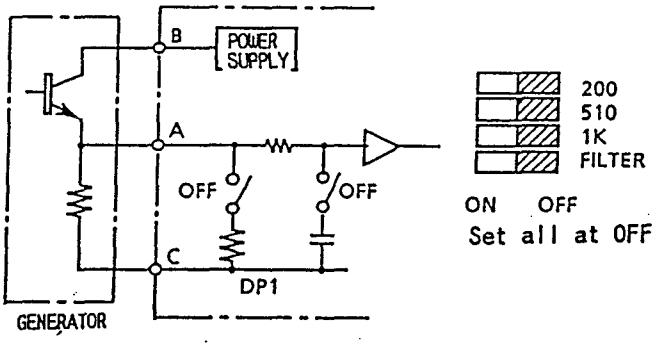
Setting Pin			Current Pulse Load Resistance Value
200	510	1k	
OFF	OFF	ON	1kΩ
OFF	ON	OFF	510Ω
OFF	ON	ON	338Ω
ON	OFF	OFF	200Ω
ON	OFF	ON	167Ω
ON	ON	OFF	147Ω
ON	ON	ON	126Ω

4.5.2 Setting of Input Filter

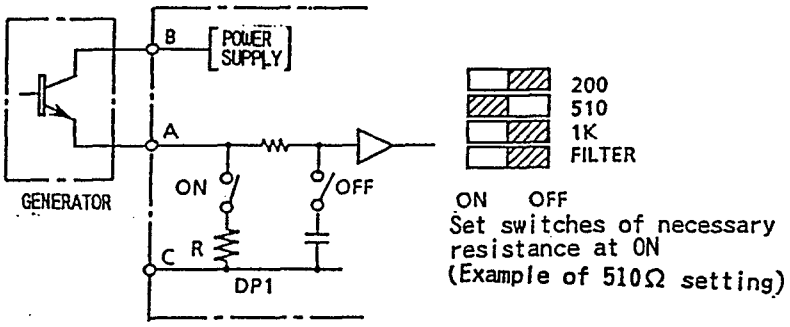
ON/Off switch of input filter is located at the bottom of setting pin. (See Fig. 4.4)

If pulse input has chattering noises at dry contact (mechanical relay, etc.) of below 10Hz, make it "ON" to eliminate the noises.

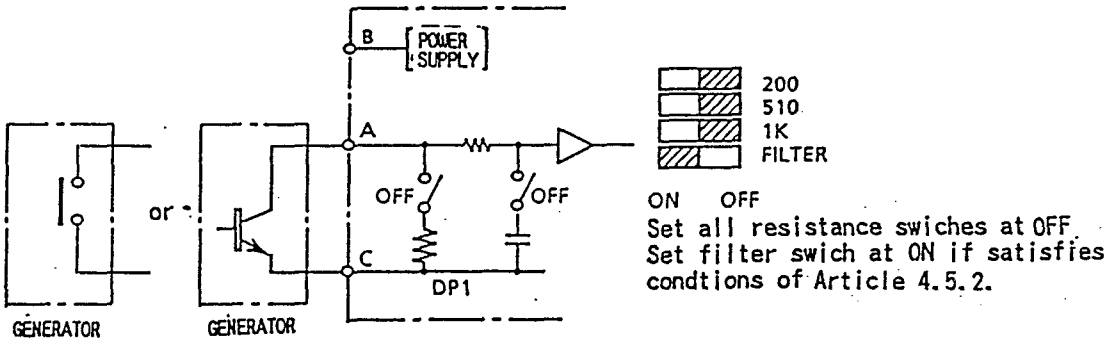
Setting method is same as the setting of current pulse load resistance of Article 4.5.1.



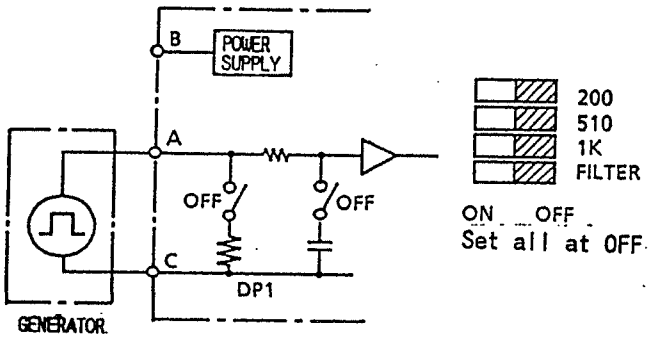
(1) Connection to 3-wire power supply type generator



(2) Connection to 2-wire powqer supply type generator



(3) Connection to contact pulse generator



(4) Connection to Voltage Pulse Generator

Fig. 4.6 Connection method between DP1 and Generator

4.6 SETTING OF DP3 PULSE/ANALOG TRANSMITTER

DP3 inputs pulse signal from the field and converts it into isolated DC voltage or current signals.
Input signals include voltage pulse, current pulse, non-voltage contact and open collector signals. (selectable by switch)
Transmitter's power supply of either 12V DC or 24V DC can be selected by setting pin.
Four (4) connection methods according to type of generators are available as the same manner of DP1.

4.6.1 Setting of Transmitter's Power Supply Voltage

Can be select either 12V DC or 24V DC by short-circuit socket.
Setting method is to insert short-circuit socket and make short-circuit two setting pins. (See Fig. 4.7 and 4.8)
Use tweezer, etc. when take out the short-circuit socket so as do not bend the pins.
Setting is made as per ordering information when shipment from factory.

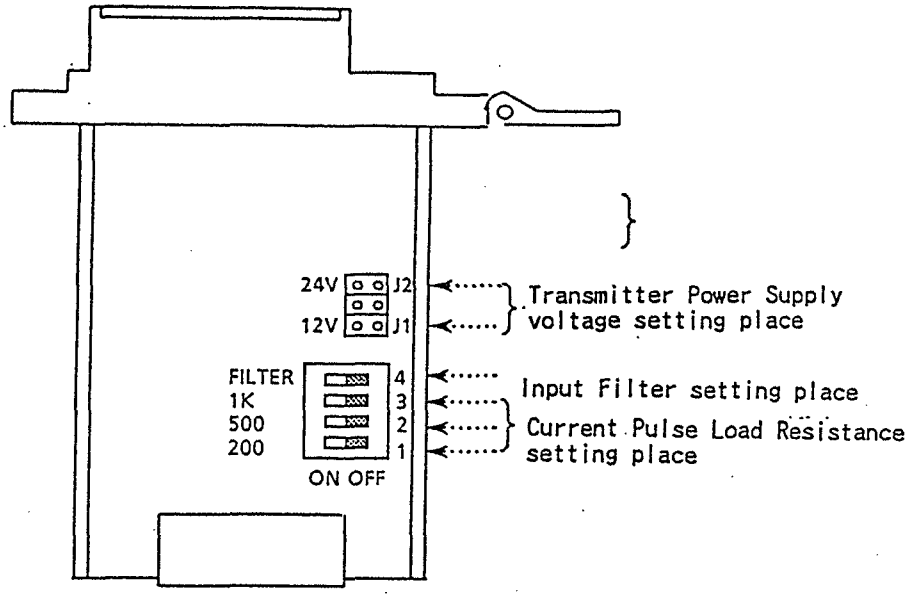
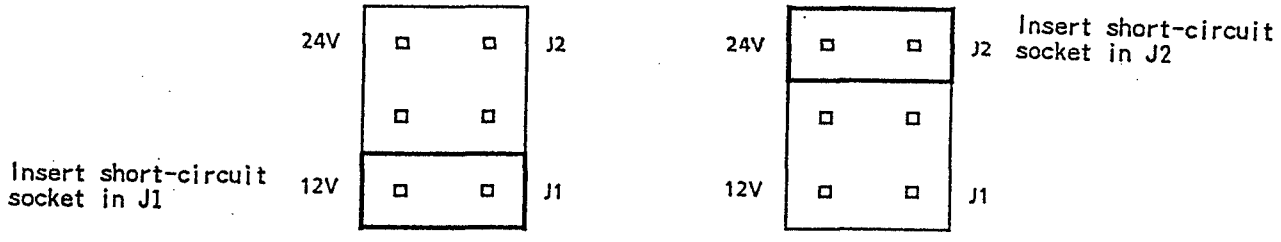


Fig. 4.7 DP3 Transmitter power supply voltage·current pulse load resistance·input filter on/off setting pin and setting switch



(1) Setting of 12V Tranmsmitter power supply

(2) Setting of 24V transmitter power supply

Fig. 4.8 Tranmsmitter power supply voltage setting

4.6.2 Setting of current pulse load resistance

DP3 Analog/Pulse Transmitter is required to set current pulse load resistance according to generators be connected.

Table 4.3 shows correspondence bewteen setting switch and current pulse load resistance.

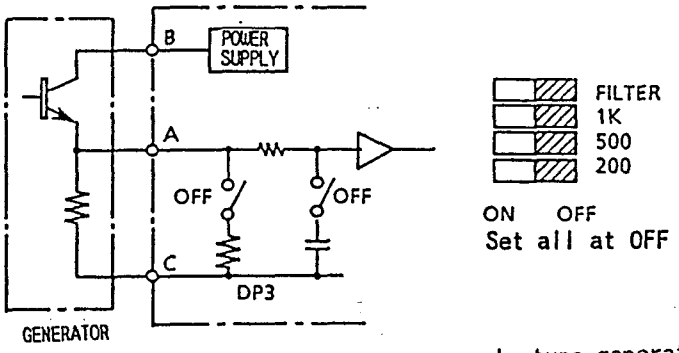
As shown in Fig.4.7, 1st bit~3rd bit are set at OFF when shipment from factory.

Table 4.3 Relation between switch setting and current pulse load resistance

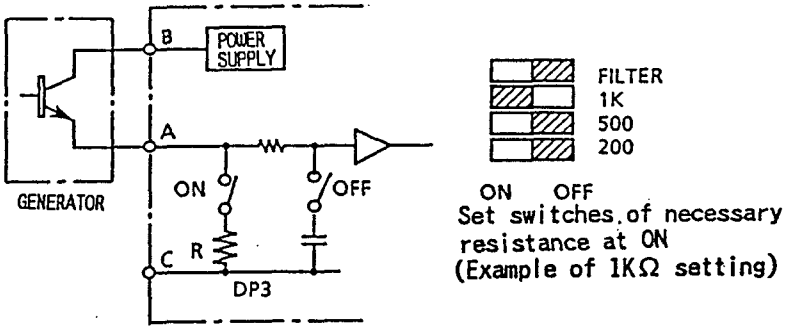
Setting switch			Current pulse load resistance value
1st bit	2nd bit	3rd bit	
ON	OFF	OFF	200Ω
OFF	ON	OFF or ON (No relation with status of relay)	500Ω
OFF	OFF	ON	1KΩ
OFF	ON	OFF or ON (No relation with status of relay)	143Ω
ON	OFF	ON	167Ω

4.6.3 Setting of Filter

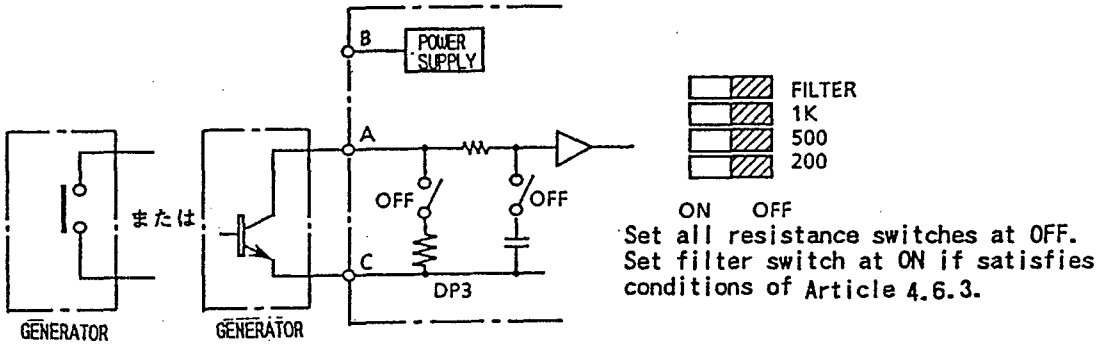
ON/OFF switch of input filter (4th bit) is located at the top of setting switch (See Fig. 4.9).
If pulse input has chattering noises at dry contact point (mechanical relay, etc.) of below 10Hz, make it ON to eliminate the noises.
As shown in Fig. 4.7, the 4th bit is set at OFF when shipment from factory.



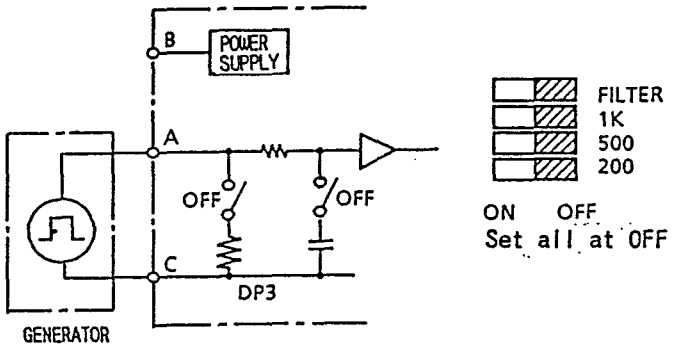
(1) Connection to 3-wire power supply type generator



(2) Connection to 2-wire power supply type generator



(3) Connection to contact pulse generator



(4) Connection to voltage pulse generator

Fig. 4.9 Connection methods between DP3 and generator

5. NEST SETTING

DCE, DCP, DME, DMP nests can be mounted on 19-inch rack of JIS, EIA specifications or direct on the wall. Maximum 5 nests can be mounted on one side at setting conditions mentioned in Article 5.2.

5.1 ENVIRONMENTAL CONDITIONS

(1) Ambient temperature and humiduty
The following ambient temperature and humidity ranges are applied during operation of the units.
0～50℃ 5～90%RH (no condensation)

(2) Vibration condition
Vibration of setting place is desirous below 2mm/sec at 10～150Hz.

(3) Air purity
Indoor dust is desirous below 0.2mg/m³. Corrosive gas such as hydrogen sulfide, sulfurous acid gas, chlorinic substance and conductive dusts such as ferric and carbonic substances are smaller the better.
(Note) Permissible limit of hydrogen sulfide (H_2S) and sulfurous acid gas (SO_2) are :
JEIDA* - 29 (1979) CLASS S1 would be the aim.
JEIDA : Japan Engineering & Industrial Development Association
JEIDA - 29 (1979) CLASS S1
H_2S below 0.01 ppm
SO_2 below 0.05 ppm (Ambient conditions : Temperature 25℃±5℃ Humidity 40～80%RH)

5.2 SETTING CONDITIONS

(1) Secure spaces at up and down for heat protection.
- Apart 100mm or more from floorboard.
- Apart 100mm or more from top of the panel. Make air exhaust hole or set air cool fan at upper of the panel.
- Apart 60mm or more from back wall for air ventilation in case of rack mounting.

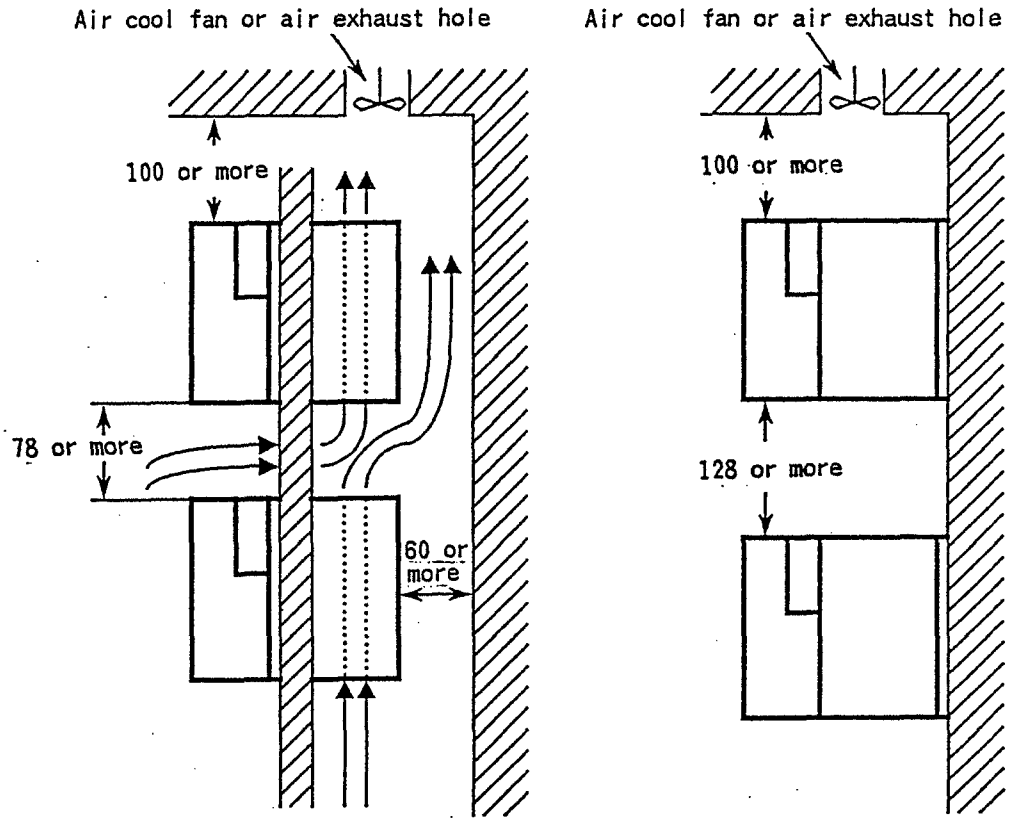
(2) Sufficient spaces are required for front and side of the nest since they are wiring, piping and maintenance area.

(3) When store the nest in the cabinet, make compulsory air cool to prevent raise of temperature.

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

(5) When setting the nests by placing up and down direction, take intervals as shown in Fig. 5.1.

Unit : mm



(1) 19-inch rack mounting

(2) Wall mounting

Fig. 5.1 Net setting methods

5.3 SETTING OF NEST METAL FITTINGS

Nest metal fittings and screws are furnished to make optional selection of 19-inch rack mounting or wall mounting. Screw holes are provided on the side board of the nest so as to fix the metal fittings.

2 setting methods of metal fittings are as shown in Fig. 5.2.

① Setting on 19-inch rack
② Setting on the wall

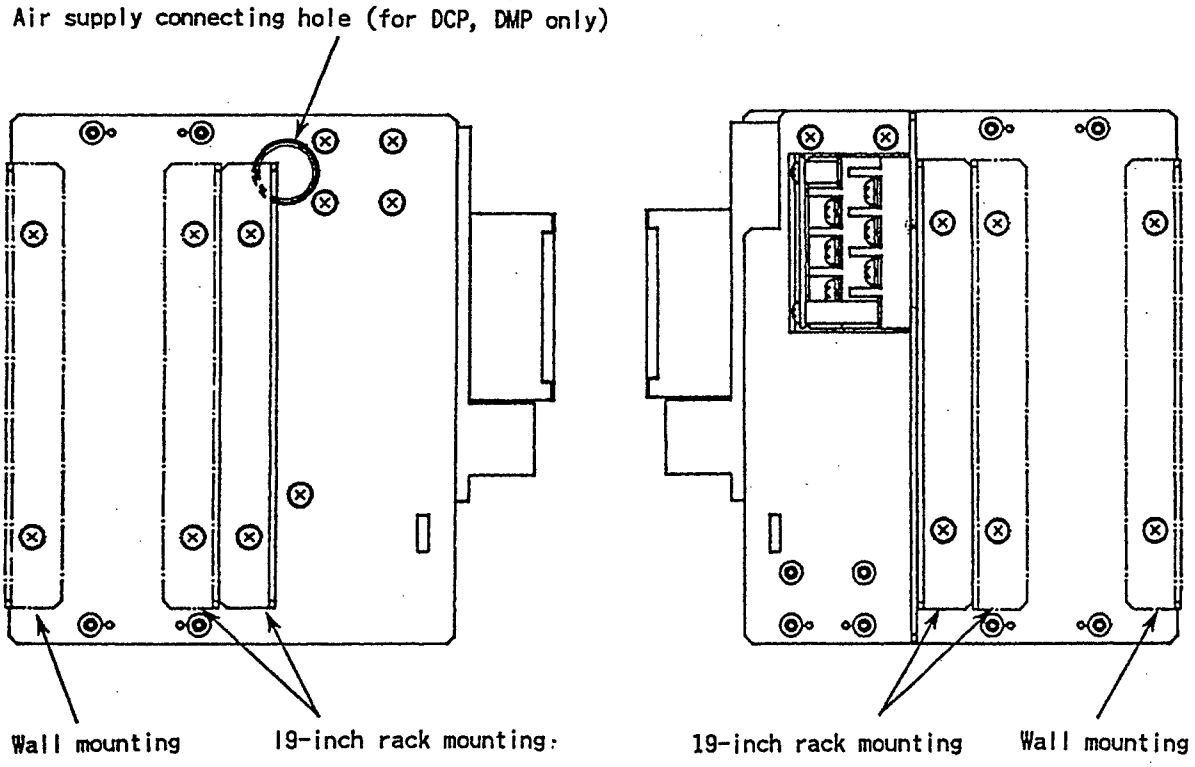


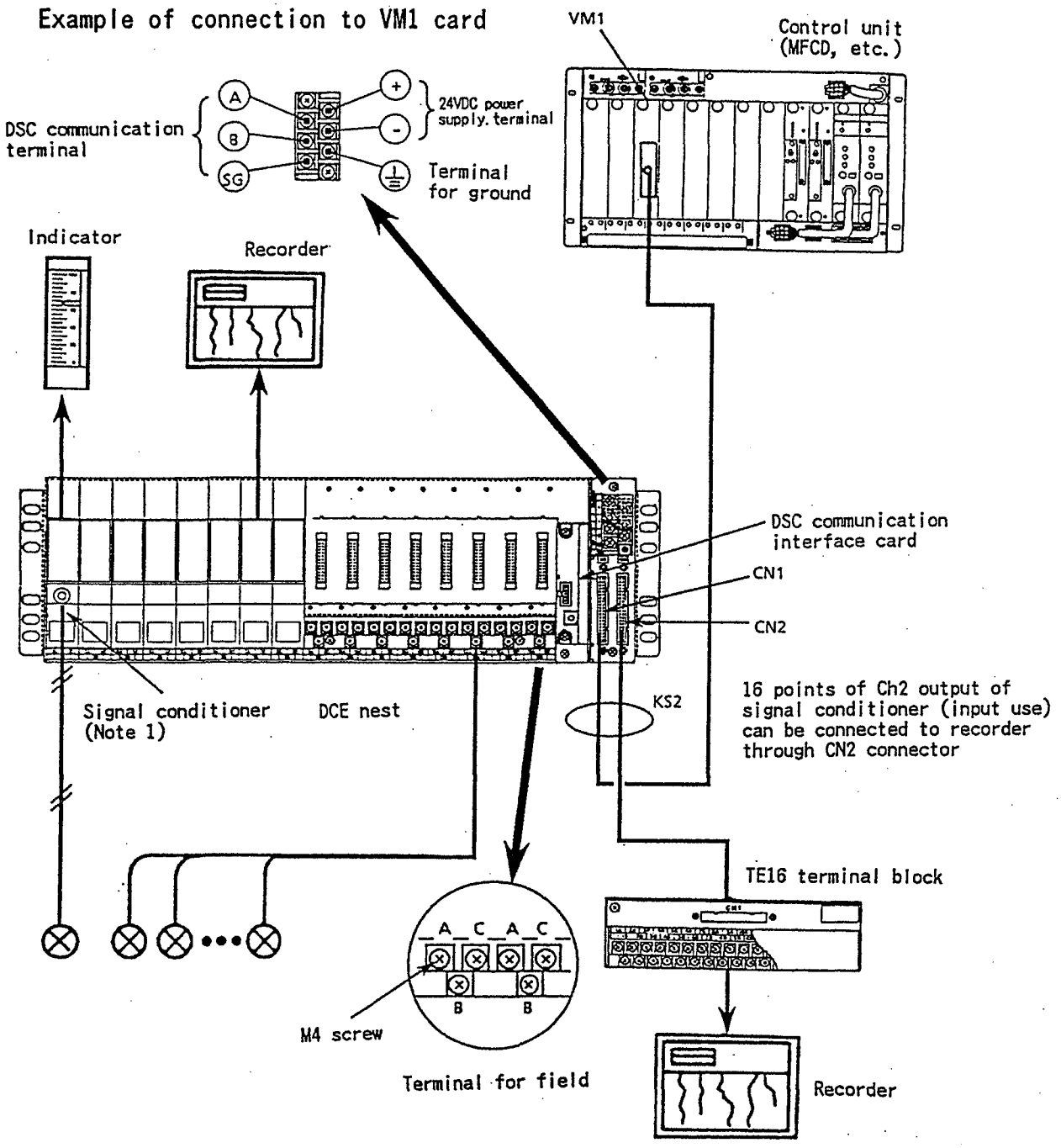
Fig. 5.2 Setting methods of nest metal fittings

6. WIRING AND PIPING

6.1 NOMENCLATURE AND CONNECTION

(1) DCE Nest

Example of connection to VM1 card

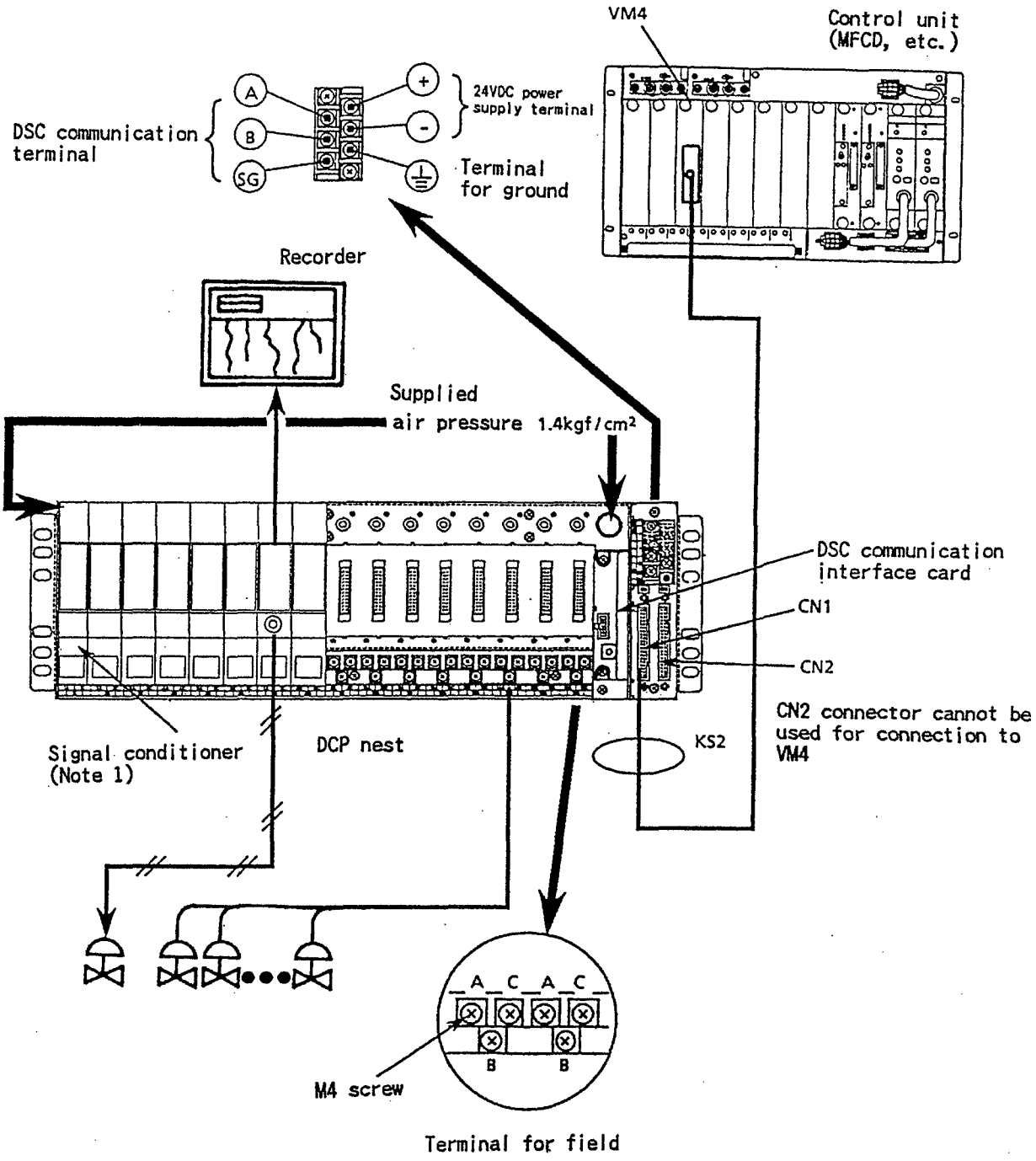


(Note 1)
Connection to VM1 multi-input card : All 16 slots are for input use
Connection to VM2 multi-input/output card : Left side 8 slots are for input use
Right side 8 slots are for output use
Connection to VM4 multi-output card : All 16 slots are for output use
Connection to PM1 multi-pulse train input card : All 16 slots are for DP1

Fig. 6.1 Connection Chart of DCE Nest

(2) DCP Nest

Example of connection to VM4 card



(Note 1)

Connection to VM1 multi-input card : All 16 slots are for input use

Connection to VM2 multi-input/output card : Left side 8 slots are for input use
Right side 8 slots are for output use

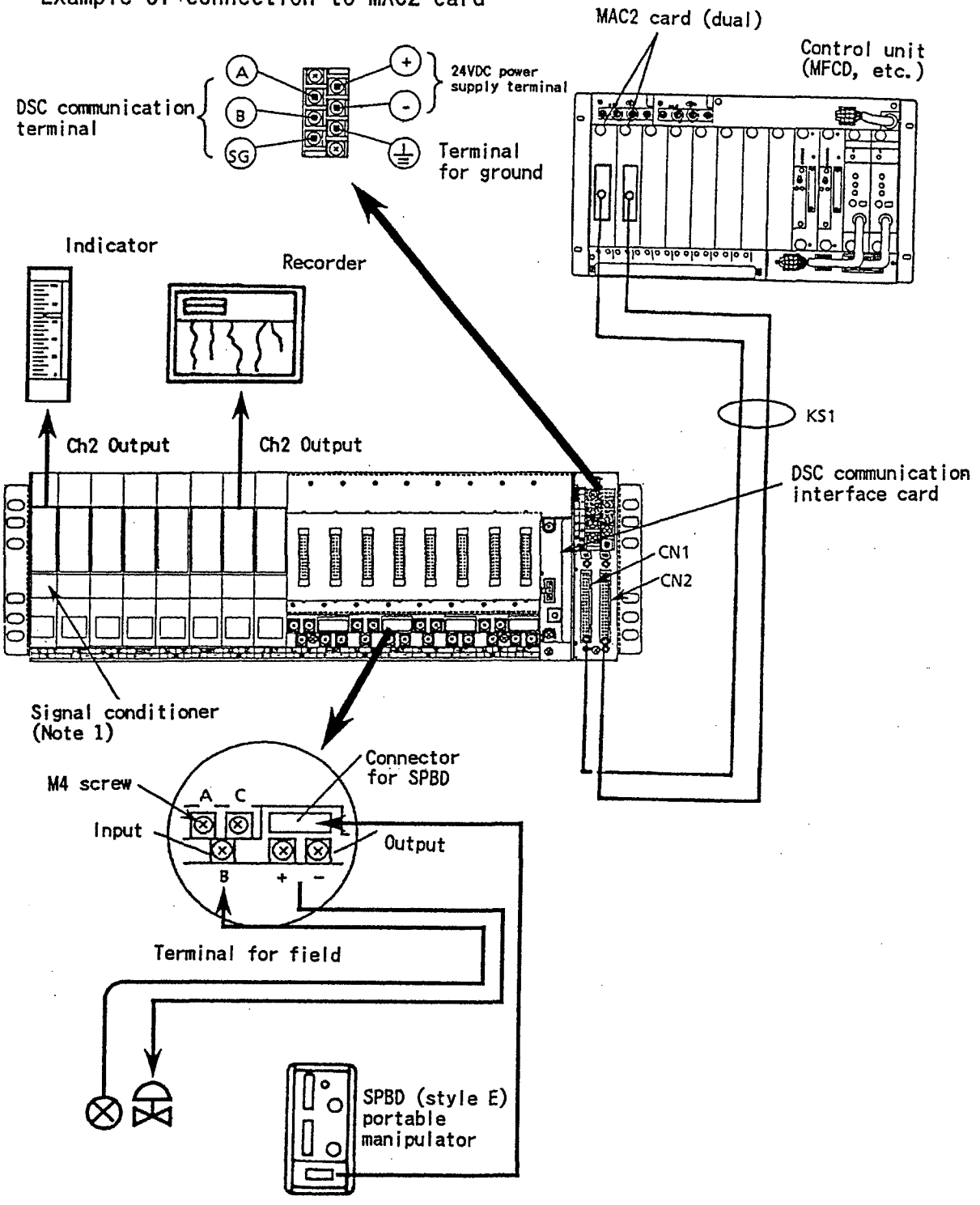
Connection to VM4 multi-output card : All 16 slots are for output use

Connection to PM1 multi-pulse train input card : All 16 slots are for DP1

Fig. 6.2 Connection Chart of DCP Nest

(3) DME Nest

Example of connection to MAC2 card



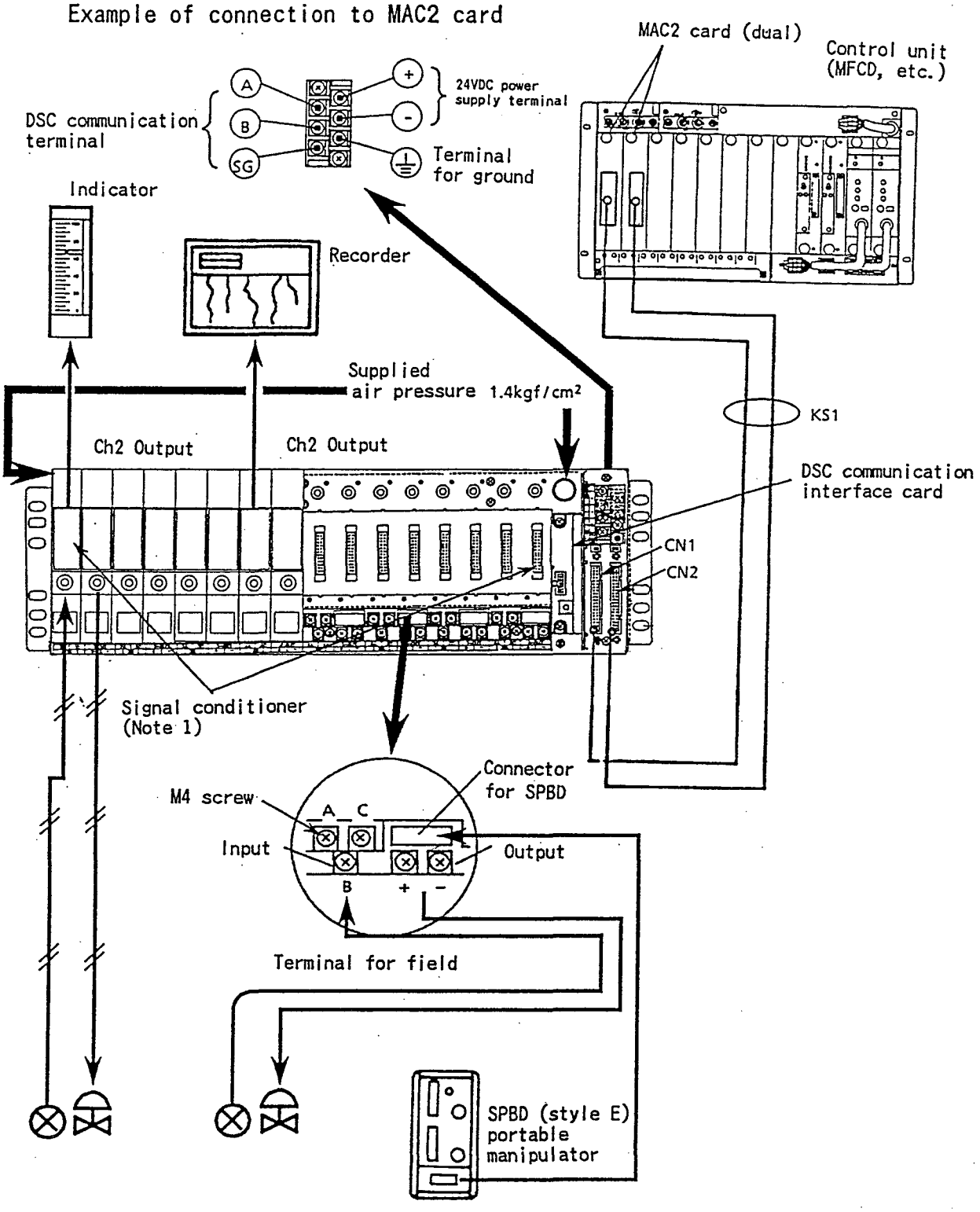
(Note 1)

Connection to MAC2 multi-control card : Insert signal conditioner (input use) into odd numbered slots and insert signal conditioner (output use) into even numbered slots orderly from the left.
Connection to PAC multi-control card : Insert DPI signal conditioner into odd numbered slots and insert signal conditioner (output use) into even numbered slots orderly from the left.

Fig. 6.3 Connection Chart of DME Nest

(4) DMP Nest

Example of connection to MAC2 card



(Note 1)
Connection to MAC2 multi-control card : Insert signal conditioner (input use) into odd numbered slots and insert signal conditioner (output use) into even numbered slots orderly from the left.

Fig. 6.4 Connection Chart of DMP Nest

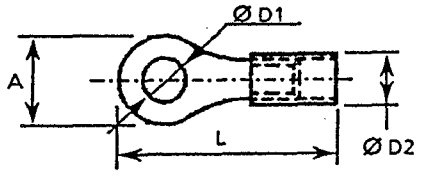
6.2 FIELD SIDE WIRING AND POWER SUPPLY·GROUND WIRING

6.2.1 Field side wiring and power supply·ground wiring

Flexible twisted wires and durable round crimp-on terminals (JISC2805) are recommended to be used (See Table 6.1, Fig. 6.5)

Table 6.1 Suitable Crimp-on Terminal

Nominal cross-sectional area	Screw (mm)	ΦDI Hole Φ (mm)	A Terminal OD (mm)	L Terminal Length (mm)	ΦD2 Insulation coverage(mm)	Example of suitable crimp-on terminal (Note)
0.75mm² 0.75mm² 0.75mm²	4	4.3 or more	8.7 or less	Abt. 21	3.2 or less	AMP 170781-1 JST V1.25-4
2mm²	4	4.3 or more	8.7 or less	Abt. 21	3.9 or less	AMP 170782-1 JST V2-4



(Note)
AMP : Nippon AMP (KK)
JST : Nippon Atsuchaku Tanshi (KK)

Fig. 6.5 Crimp-on Terminal

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

(2) Power supply wiring cable
Nominal cross-sectional area of conductor : 0.75~2mm²
Example of suitable cable : 600V vinyl code (IV) (JIS C3307)
Vinyl insulated cable for electronic instrument use (KIV) (JIS C3316)

(3) Ground wiring cable
Nominal cross-sectional area of conductor : 2mm²
Example of suitable cable : 600V vinyl code (IV) (JIS C3307)
Vinyl insulated cable for electronic instrument use (KIV) (JIS C3316)

(4) Cable for communication use
Use special communication twisted pair cable with shield (max. 50m) (YOKOGAWA Type KBC) between signal conmditioner's storing nest and BRAIN/signal conditioner card (BC1 card) of field control unit.
Connect shield at both ends.

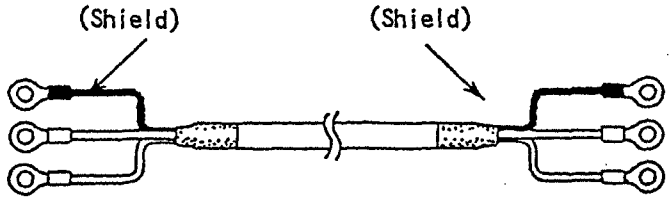


Fig. 6.6 KBC Cable

6.3 WIRING AND PIPING OF FIELD SIDE I/O TERMINAL, SIGNAL CONDITIONER'S FRONT TERMINAL AND WIRING OF SYSTEM SIDE CABLE

Fig.6.1~6.4 show field side I/O terminals arrangement.
Field side input/output terminals are M4 screws.
Special cable is used to connect between signal conditioner's storing nest and I/O cards.

Table 6.2 shows relationship between field side I/O terminals of DCP I/O nest and signal conditioner's front terminal and I/O signal at this terminal.
Table 6.2 also applies to DCE I/O nest except only it cannot store DF0.
In Table 6.2, for example, in case of DM1, apply +signal to nest field side input terminal A and apply -signal to terminal C. B shows no wiring.

Table 6.2 Wiring & piping of field side I/O terminal of DCP (DCE) nest, signal conditioner's front terminal

Signal Conditioner Nest	Field Side I/O Terminal Symbol			Transmitter Front Terminal Symbol				
	A	B	C	1	2	3	4	AIR
DM1, DT5	+		-			+	-	
						For Ch2 Output Signal		
DR5	Wiring resistance of A and B should be equal					+	-	
						For Ch2 Output Signal		
DS1	100% 0%					+	-	
	Wiring resistance of A & C should be made equal					For Ch2 Output Signal		
DP1 DP3 2-Wire Type (Voltage Contact)	+		-					
DP1 DP3 Internal Power Supply 2-Wire Type	Signal	Power Supply				+	-	
						For Ch2 Output Signal		
DP1 DP3 3-Wire Type	+	Power Supply	-					
DH1, DH2, DH5	+		-			+	-	
						For Ch2 Output Signal		
DA1, DA2, DA5, DA9	+ Can also be used when combining with BARD - / For 2-Wire Transmitter when power supply not needed - +					+	-	
						For Ch2 Output Signal (Except DA9)		
DH0, DA0, DQ0	+		-					
DX1	+		-					
DG1 ⚠ CAUTION (See below)				V ± L N		+	-	
						For Ch2 Output Signal		
DB1 ⚠ CAUTION (See below)				A ±		+	-	
						For Ch2 Output Signal		
DD1 ⚠ CAUTION (See below)				V ±		+	-	
						For Ch2 Output Signal		
DF1				+ -				IN
				For Ch2 Output Signal				
DF0				+ -				OUT
				For Output Signal Check				

⚠ CAUTION

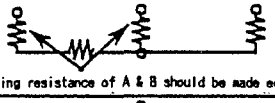
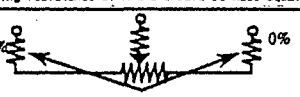
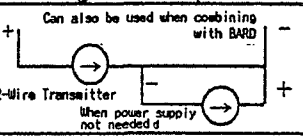
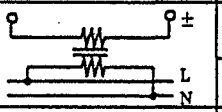
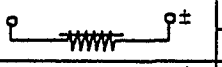
Connect input signal cable of DG1, DB1, DD1 to transmitter's front terminals ① and ②. Nest (DCP, DCE) may be burned by overheating when incorrect connection to field side I/O terminals of nest.

I/O Screw terminal : M4 x 0.7
I/O signal piping : Rc1/4(PT1/4) female screw
Supply side piping : Rc3/8(PT3/8) female screw

Note :
In case of DC current, Ch2 output is only available through either nest's CN2 connector or front terminal of transmitter.

Table 6.3 shows relationship between field side I/O terminals of DMP I/O nest and signal conditioner's front terminal and its I/O signal.
Table 6.3 also applied to DME I/O nest except only it cannot store DF0.
In Table 6.3, for example, in case of DM1, apply +signal to nest field side input terminal A and -signal to terminal C. B shows no wiring.

Table 6.3 Wiring & piping of field side I/O terminalof DCP (DCE) nest· signal conditioner's front terminal

Signal Conditioner Nest	Field Side Output Terminal Symbol			Transmitter Front Terminal Symbol				
	A	B	C	1	2	3	4	AIR
DM1, DT5	+		-			+	-	
						For Ch2 Output Signal		
DR5	 Wiring resistance of A & B should be made equal					+	-	
						For Ch2 Output Signal		
DS1	 100% 0% Wiring resistance of A & C should be made equal					+	-	
						For Ch2 Output Signal		
DP1 DP3 2-Wire Type (Voltage Contact)	+		-					
DP1 DP3 Internal Power Supply 2-Wire Type	Signal	Power Supply				+	-	
						For Ch2 Output Signal		
DP1 DP3 Internal Power Supply 3-Wire Type	+	Power Supply	-					
DH1, DH2, DH5	+		-			+	-	
						For Ch2 Output Signal		
DA1, DA2, DA5, DA9	 Can also be used when combining with BARD For 2-Wire Transmitter When power supply not needed					+	-	
						For Ch2 Output Signal (Except DA9)		
DG1 ⚠ CAUTION (See below)				 V ± L N		+	-	
						For Ch2 Output Signal		
DB1 ⚠ CAUTION (See below)				 A ±		+	-	
						For Ch2 Output Signal		
DD1 ⚠ CAUTION (See below)				 V ±		+	-	
						For Ch2 Output Signal		
DF1				+	-			 IN
				For Ch2 Output Signal				
DF0				+	-			 OUT
				For Output Signal Check				

Signal Conditioner Nest	Field Side Output Terminal Symbol		Transmitter Front Terminal Symbol				
	OUT+	OUT-	1	2	3	4	AIR
DC0	+	-					
DX1 (Note 1)	+	-					

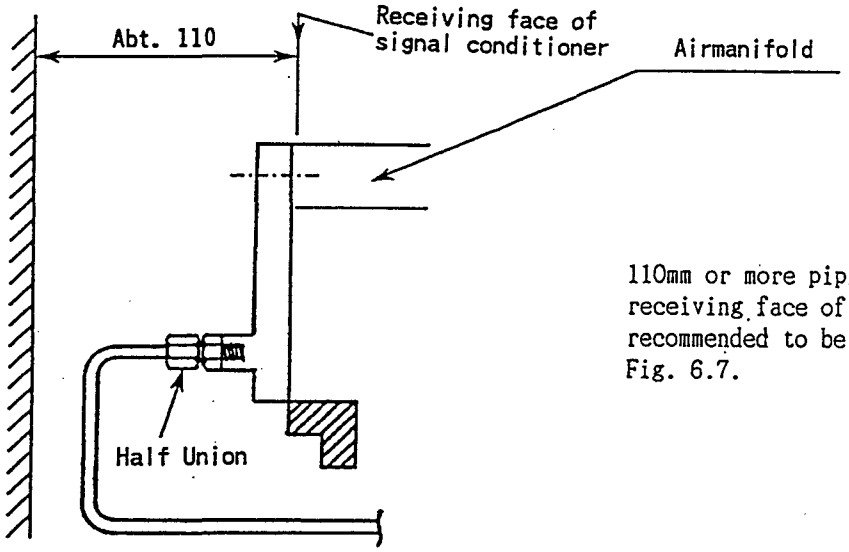
(Note 1) 250Ω installed type cannot be used as output card (even numbered slot).
(Note 2) In case of DC current output, Ch2 output is only available through either nest's CN2 connector or front terminal of transmitter.

⚠ CAUTION
Connect input signal cable of DG1, DB1, DD1 to transmitter's front terminals ① and ②. Nest (DMP, DME) may be burned by overheating when incorrect connection to field side I/O terminals of nest.

I/O Screw terminal : M4 x 0.7
I/O signal piping : Rc1/4(PT1/4) female screw
Supply side piping : Rc3/8(PT3/8) female screw

6.4 AIR PIPING

6.4.1 Space of Piping



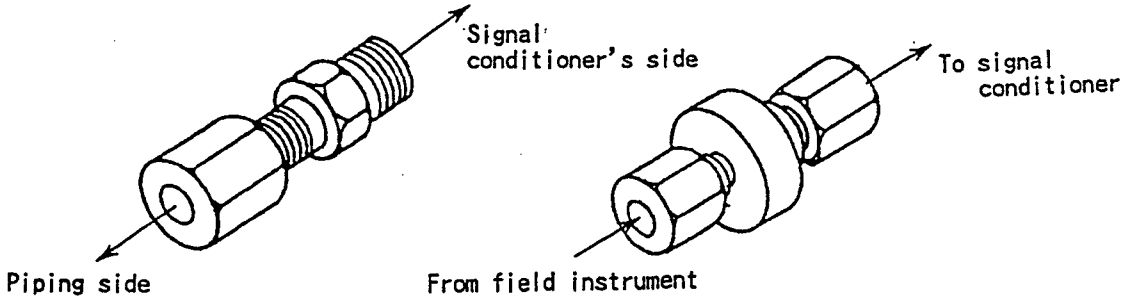
110mm or more piping space from the nest's receiving face of signal conditioner is recommended to be secured as shown in Fig. 6.7.

Fig. 6.7 Space of piping

6.4.2 Materials of Piping

The following parts are recommended for signal air piping in the instrumentation board. As for materials of piping, nylon pipes (black) are recommended to be used.

Application / Class	1st Recommend Nylon pipe	2nd recommend Hard-drawn copper pipe
Half union (φ6 x Rc1/4)	MH-1062	MH-1062
Back head union (φ6 x φ6)	ME-4060	MVS-6060
Pipe materials (φ6 x 4)	AX-1206 (black)	C1220T-1/2H(JIS)



6.4.3. Air Supply Piping Method

The following method is recommendable for air supply piping in the instrumentation board.

① Pipe length
Pipe length from air header to air supply connection hole of the nest should be within 5m.

② Pipe diamter (ID)
Use pipe of ID 8,9 or 10mm.

③ Number of air supply connection hole
Make additional air supply connection hole if maximum air consumption of overall DCP or DMP exceeds 480Nl/min.

a. If maximum air consumption is less than 480Nl/min (corresponding to air consumption of 8 E/P tramsmitters)
Add one air supply connection hole

b. If maximum air consumption exceeds 480Nl/min (corresponding to air consumption of 8 E/P transmitters)
Add two air supply connection holes

However, the above conditions of ① and ② should be satisfied.

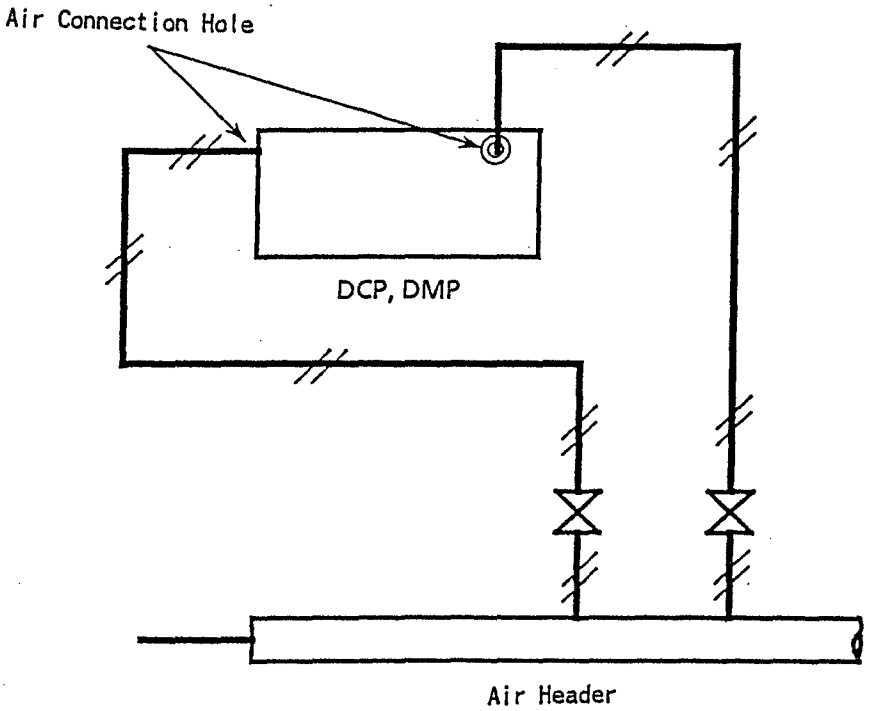


Fig. 6.8 Air Supply Piping

6.5 AIR SUPPLY SYSTEM

After-cooler, filter, air dryer should be set following after the compressor so as not to intrude water, oil, and other dirts into E/P transmitter since E/P transmitter requires clean and dried air.
The following shows example of air supply system and the notice for its setting.

(1) Example of Air Supply System

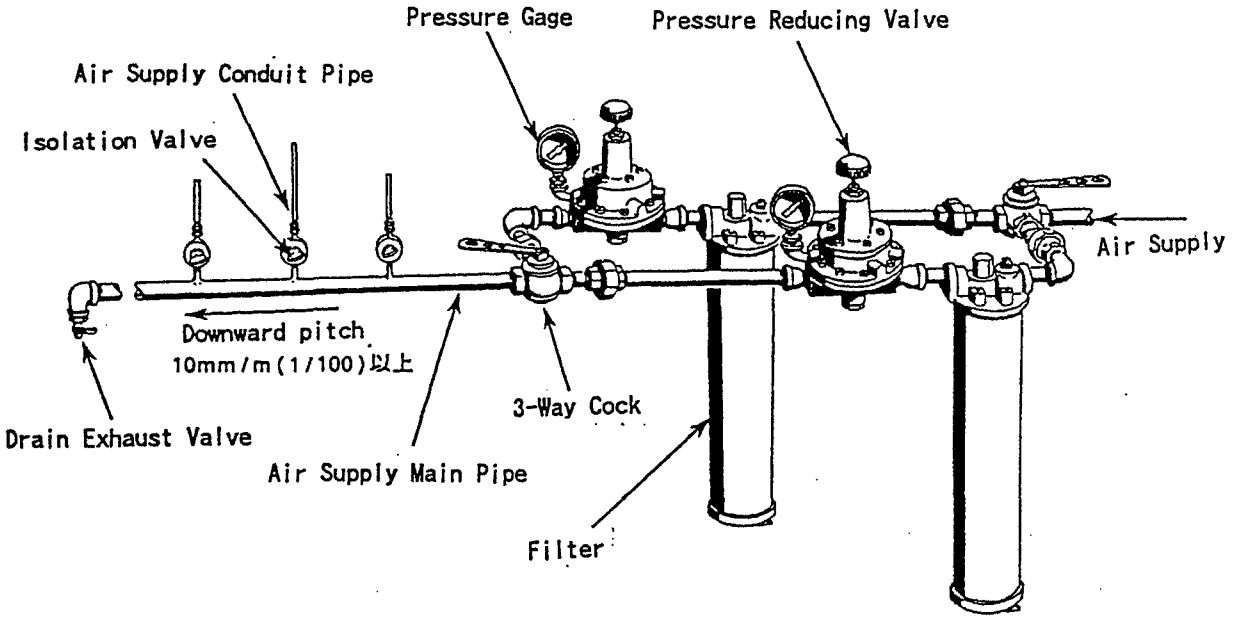


Fig. 6.9 Example of Air Supply System

As shown in Fig. 6.9, two (2) pressure reducing valves are recommendable to use in parallel in case of plenty of applicable instruments.
Parallel disposition will serve to keep operation in case either one of the valves is clogged. As shown in Fig. 6.9, use of 3-way cock can separate either one of the air supply systems when it requires maintenance.
Usually, both air pressure systems can be operated in parallel. In order to supply clean and dried air to the instruments, water drain, filter and pipe inclination (1/100 or more) shall be set.

(2) Composition

- Air supply
  Clean and dired air is required. Take out water, oil and other dirts by after-cooler, filter, air dryer, etc.
- Air supply main pipe (air header)
  Make inclination of at least 10mm/m (1/100) on main pipe supplying air to series of instruments so that moisture and oil can be take out from the pipe.

- Air supply conduit pipe
  Conduit pipe should be take out from the upper of the main pipe so as to prevent the moisture. Even in an unavoidable case, take out the conduit pipe from main pipe section. Not take out it from the bottom by all means.
  Isolation value is recommended to be set on the air supply conduit pipe so as to take out the respective instruments separately.
- Filter
  Filter will serve to take out moisture, oil and other dirts which can not be eliminated by the main air supply system. Usually, open the bottom cock and drain the moistutre, oil, etc. once or more per day.

The above method and device is only the example. There are other methods and devices. Use suitable methods and devices so as to supply clean and dried air to the instruments.

6.6 AIR LEAKAGE CHECK

When air leakage check be made by using check liquid after air piping of input pressure hole of P/E transmitter and output pressure hole of E/P transmitter as well as air supply hole of DCP, DMP nests have been completed, utmost care shall be done not to flow the check liquid into transmitter.
The following air leakage check liquids are recommended to be used.

(1) Monju Detection Liquid	Manufactured by : Monju Shokai (KK) Sold by : Daisho Bussan (KK)
(2) Liquid Leak Detector, "Snoop"	Manuafactured by : Nupro Company Sold by : Sugimoto Shoji (KK)
(3) Gupoflex Leak Detector	Sold by : Yokogawa Shoji (KK)

7. CALIBRATION

7.1 CHECK POINTS BEFORE POWER SUPPLY "ON"

- Power supply rating 24V DC±10%
- Supply air pressure rating 140kPa±10% (or 1.4kgf/cm^2±10%)
- Signal wiring
- Mounting, ambient temperature, humidity, dust and vibration

Apply power supply after checking the above.
5 minutes need to meet its specified accuracy.

7.2 CALIBRATION

In this article, calibration and checking methods of input/output signals of signal conditioners are explained. Range, etc. are written in non-volatile memory in micro-computer built-in signal conditioners when shipment from factory. Accordingly, in this article, only accuracy check will be done.
(CAUTION)

- For safety sake, don't touch by hand printed circuit board of the instrument during power-on so as to prevent incorrect operation.
- When inserting or pulling out the signal conditioner during power-on, pay attention to the static electricity. (See Article 4.3)
- Warm up the instrument for about 5 minutes before calibration.

7.2.1 Calibration Equipment

(1) Calibration Equipment

The following equipments are needed for calibration of signal conditioners. Number of equipment required depends on type of signal conditioner. Table 7.1 shows contrast of calibration equipment vs. signal conditioner. Arrange necessary number of calibration equipment according to type of signal conditioner.

Table 7.1 Calibration Equipment

Calibration Equipment	DM1	DT5	DR5	DS1	DH1	DH2	DH5	DA1	DA2	DA5	DA9	DX1
Digital Voltmeter	0	0	0	0	0	0	0	0	0	0	0	0
DC current/voltage generator	0	0			0	0	0	0	0	0	0	0
6 Dial variable resistor			0	0								

Table 7.2 Calibration Equipment

Calibration Equipment	DH0	DA0	DC0	DP1	DP3	DQ0	DG1	DB1	DD1	DF1	DF0
Digital voltmeter	0	0	0		0		0	0	0	0	
DC current/voltage generator	0	0	0			0					0
Standard resistor		0	0			0					
Pulse generator				0	0						
Pulse counter				0		0					
AC voltage/current generator							0	0	0		
Digital pressure gage											0
Standard pressure generator										0	
DC power supply						0					

(Note)
Use following instruments or equivalents corresponding to the above equipment.

Digital voltmeter	YOKOGAWA 2501A High Precision Voltmeter
DC current/voltage generator	YOKOGAWA 2552 DC Standard Voltage Generator and Current Unit [For DT5, use 2553 in combination with 2578-25 (semiconductor temperature sensor)]
6 dial variable resistor	YOKOGAWA 2793-01 6 Dial Variable Resistor
Standard resistor	YOKOGAWA 2792 Standard Resistor
Pulse generator	HP 3312A Function Generator
Pulse counter	HP 5334B Universal Counter
AC voltage/current generator	YOKOGAWA 2558 AC Standard Voltage/Current Generator
Digital pressure gage	YOKOGAWA 2661 High Precision Digital Pressure Gage
Standard pressure generator	YOKOGAWA 2656 Standard Pressure Generator
DC power supply	5V DC

(2) DXT Extension Card

DXT extension card is the intermediate board to make calibration and check of signal conditioner.
It equipped with connector for input/output terminal, power suppply terminal and handy terminal.
Calibration of signal conditioner itself can be made by connecting signal conditioner to DXT without using its storing nest.
Loop check and calibration on mounting status can be made by inserting DXT into signal conditioner's storing nest.

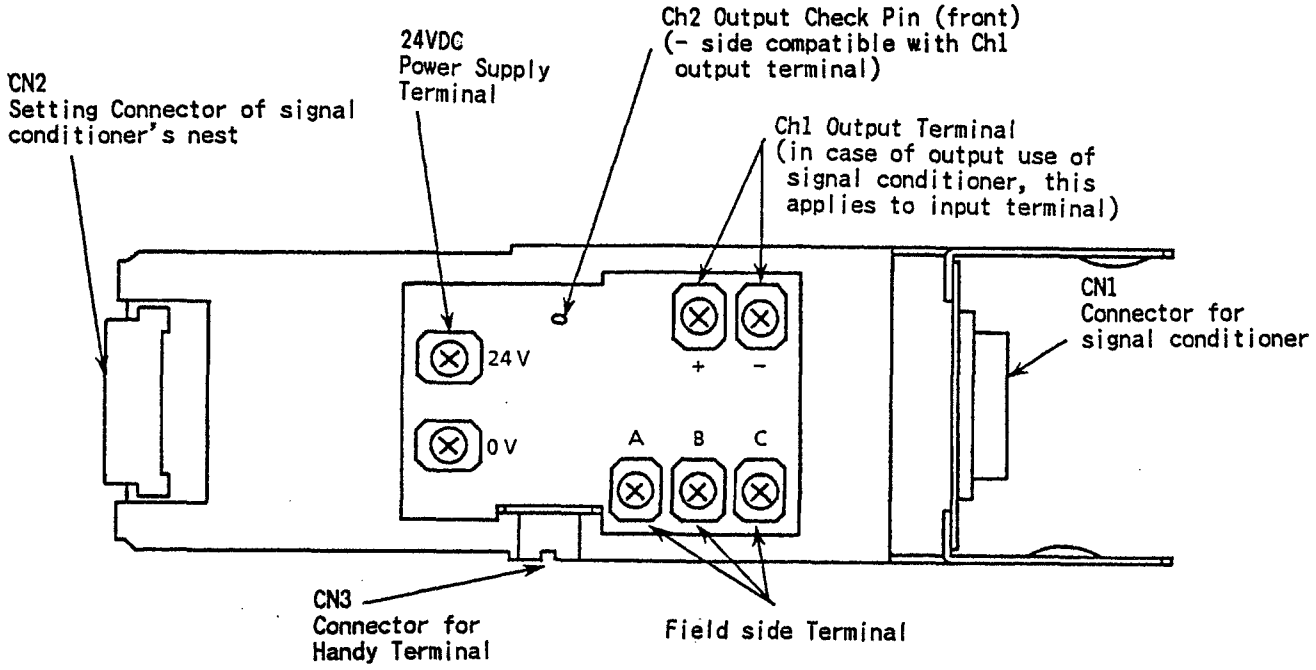


Fig. 7.1 DXT Extension Card

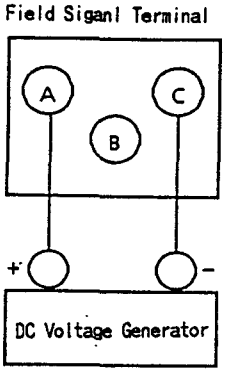
7.2.2 DSC2, DSC Interface Cards

These cards are used inserting into exclusive use slot (right side of No.16 slot) of DCE, DCP, DME, DMP signal conditioners' nests. Communication data of signal conditioners having data communication function and data of BRAIN series transmitters can be relayed to upper system through these cards.
For access from supper system, circuit will be connected by judgement of whether the address is made by itself or not and to which slot out of 16 slots the access be made according to the address data in the communication frame. For this purpose, the card has rotary switch (16 progressive numbers) possible to set nest address.
In case to connect with μXL, the nest address setting shall be made orderly 1,2,3,.....9,A,B,C since one BC1 card (I/O card to be inserted in YOKOGAWA MFCU, MFCD, MFMU) can be connected up to 12 units x 2 ports of signal conditioner's storing nest. Also, the cards have 5PIN connector for Handy Terminal on its front face and can communicate with signal conditioner in optional slot out of 16 slots or BRAIN Series transmitters.

7.2.3 Connection to Calibration Equipment

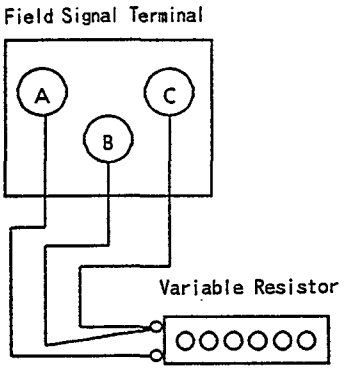
Connect signal conditioner or DXT card field side signal terminal to calibration equipment as shown in Fig. 7.2, 7.3.

(1) DM1, DT5, DH1, DH1, DH5 (No input resistance)



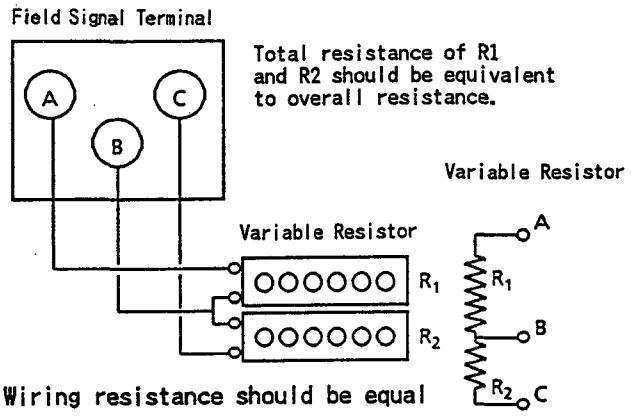
As for DT5, RJC semiconductor sensor for reverse compensation should be heat contacted to temperature sensor on DT5 terminal cover. Set DT5 semiconductor sensor on nest's screw terminal when DT5 is inserted in the nest. When DT5 is extracted by extension card, DT5 temperature sensor should be set on semiconductor sensor.

(2) DR5



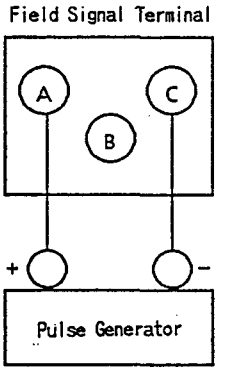
(Note) Wiring resistance should be equal

(3) DS1

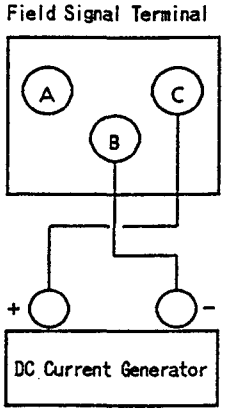


Wiring resistance should be equal

(4) DP1, DP3

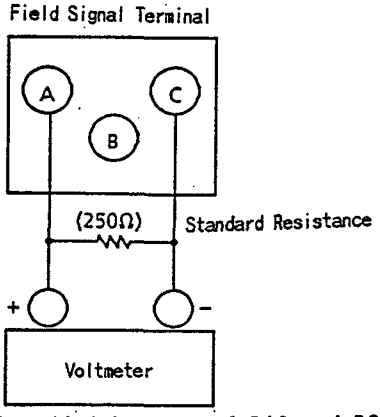


(5) DA1, DA2, DA5, DA9



(Note)
When use of internal power supply of DA□ : A(+), C(-)
The left Fig. shows combination with 2-wire transmitter using external power supply.

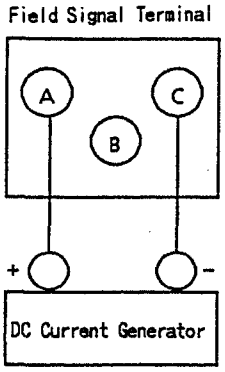
(6) DH0, DA0, DC0



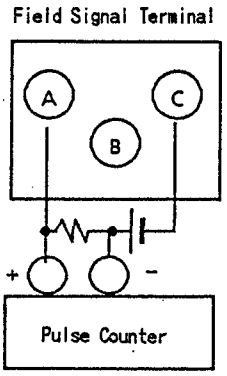
(Resistor is added in case of DA0 and DC0)

Fig. 7.2 Connection to Calibration Equipment

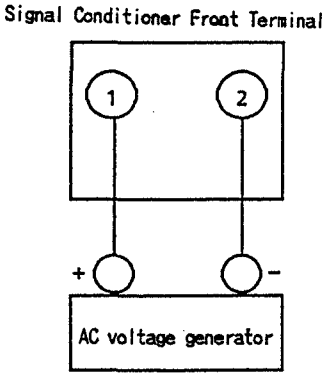
(7) DX1 (with input resistance)



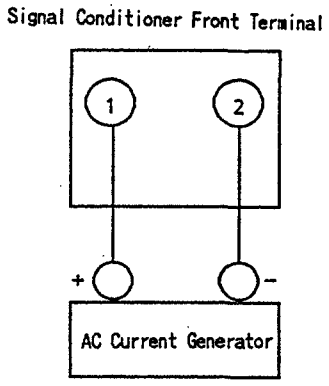
(8) DQ0



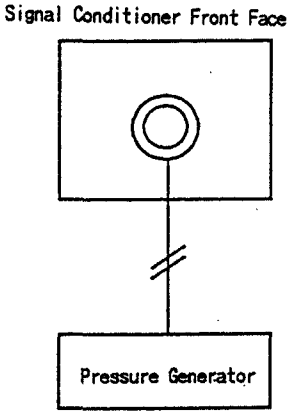
(9) DG1, DD1



(10) DB1



(11) DF1



(12) DF0

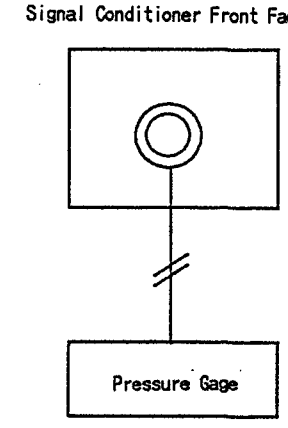


Fig. 7.3 Connection to Calibration Equipment

7.2.4 Calibration of DM1, DT5, DR5, DS1

Apply input signal per every 25% of span to signal conditioner through voltage generator or variable resistor according to the measuring range.
In case of DT5, apply mV corresponding temperature to between terminals A(+) and C(-) by referring the list of thermo-electromotive force.
Accuracy check of DT5 is made by contact of semiconductor sensor section to DT5 temperature sensor section (part of terminal cover) after combining "2553 standard voltage/current generator" with "2578-25 reference junction compensation semiconductor sensor" making RJC reverse compensation.
Check to see through indicated value on control system CRT screen or output terminal of DXT card that Ch1 outputs are 1V, 2V, 3V, 4V, 5V respectively and are within accuracy rating range.
(No adjustment trimmer. Carry out only check)
Also, check the difference between Ch2 and Ch1 outputs is within ±0.2% of span.

7.2.5 Calibartion of DA1, DA2, DA5, DH1, DH2, DH5

Apply input signal of 0, 25, 50, 75, 100% of span (in case of DA5, DH5 : 0, 6.25, 25, 56.25 100% of span) to signal conditioner through voltage/current generator.
Check to see through indicated value on control system CRT screen or output terminal of DXT card that Ch1 outputs of signal conditioner are 1V, 2V, 3V, 4V, 5V of span and are within accuracy rating range. Also, check that the difference between Ch2 and Ch1 outputs is within ±0.2% of span.
In case of DA1, DA2, DH1, if Ch1 output does not satisfy the accuracy, adjust it by zero·span adjustment trimmer. (Ch2 output will also interlock).
(No adjustment trimmer on DA5, DH2, DH5. Carry out only check)

7.2.6 Calibration of DA9, DX1

Apply input signal of 0, 25, 50, 75, 100% to signal conditioner through voltage/current generator.
Check to see through inducated value on control system CRT or output terminal of DXT card that Ch1 outputs of signal conditioner are 0, 25, 50, 75, 100% of span and are within accuracy rating range.
(No adjustment trimmer on DA9, DX1. Carry out only check)

7.2.7 Calibration of DP1, DP3

Apply optional frequency square wave pulse of below 6KHZ to DP1 through pulse generator and check its value through control system CRT screen or DXT terminal card.
Apply frequency square wave pulse of 0, 25, 50, 75, 100% of span to P3 through pulse generator.
Check to see through indicated value on control system CRT screen or output terminal of DXT card that Ch1 outputs of signal conditioner are 1V, 2V, 3V, 4V, 5V of span and are within accuracy rating range. Also, check that the difference between Ch2 and Ch1 outputs is within ±0.2% of span.
(No adjustment trimmer on DP1, DP3. Carry out only check)

7.2.8 Calibration of DC0, DA0, DH0

Apply data for 0, 25, 50, 75, 100% of span through control system CRT screen or terminal of DXT card.
Check to see that the output is 0, 25, 50, 75, 100% of span respectively and are within accuracy rating range.
(Note) When outputs of 0%, 100% from CRT, data will be below 0% or over 100%.
At the time of calibration, check the output corresponding to the input of 1% or 99%, for example.
If Ch1 output does not satisfy the accuracy rating, adjust it by zero·span adjustment trimmer.
(No adjustment trimmer on DC0. Carry out only check)

7.2.9 Calibration of DQO

Apply data for 0, 25, 50, 75, 100% of span through control system CRT screen or terminal of DXT card. Check to see that the output frequencies are 0, 25, 50, 75, 100% of span respectively and are within accuracy rating range.

(Note) When outputs of 0%, 100% from CRT screen, data will be below 0% or over 100%.
At the time of calibration, check the output corresponding to the input of 1% or 99%, for example.

(No adjustment trimmer on DQO. Carry out only check)

7.2.10 Calibration of DG1, DD1, DB1

Apply input signal of 0, 25, 50, 75, 100% of span to signal conditioner through AC voltage/current generator.

Check to see through inducated value on control system CRT screen or output terminal of DXT card that Ch1 outputs of signal conditioner are 0, 25, 50, 75, 100% of span and are within accuracy rating range.

Also, check that the difference between Ch2 and Ch1 outputs is within ±0.2% of span.

If Ch1 output does not satisfy the accuracy rating, adjust it by zero·span adjustment trimmer. (Ch2 output will also interlock)

7.2.11 Cablibration of DF1

Apply air pressure signal corresponding 0, 25, 50, 75, 100% of input signal to signal conditioner through pressure generator.

Check to see through inducated value on control system CRT screen or output terminal of DXT card that Ch1 outputs of signal conditioner are 0, 25, 50, 75, 100% of span and are within accuracy rating range.

Also, check that the difference between Ch2 and Ch1 outputs is within ±0.2% of span.

If Ch1 output does not satisfy the accuracy rating, adjust it by zero·span adjustment trimmer. (Ch2 output will also interlock)

7.2.12 Calibration of DFQ

Apply data for 0, 25, 50, 75, 100% of span through control system CRT screen or terminal of DXT card. Check to see that the air pressure outputs are 0.2, 0.4, 0.6, 0.8, 1.0 kgf/cm^2 respectively and are within accuracy rating range.

(Note) When outputs of 0%, 100% from CRT screen, data will be below 0% or over 100%.
At the time of calibration, check the output corresponding to the input of 1% or 99%, for example.

If output does not satisfy the accuracy rating, adjust it by zero·span adjustment trimmer.

CAUTION
Calibration should be done after warm-up the equipmewnt for more than 5 minutes. When measuring output, make tube length between transmitter and pneumatic pressure measuring instrument for more than 10m. If apply input signal leaving the blind plug on pipe hole, hunting would be caused by non-loading status.

7.3 PARAMETER CHANGE

7.3.1 Applicable Signal Conditioners

Signal conditioners are set as per designated specifications when shipment from factory. Micro-computer built-in signal conditioners can change its measuring parameters such as measuring range, input types, etc. by using Handy Terminal, sensor parameter setting functions of Engineering Station (ENGS) and Operator Station (MOPS/MOPL). When range is changed, calibrate it according to Article 7.2. Also, renew the label and write the revised range on the label.
Revised contents of measuring parameter can be confirmed by access from ENGS, MOPS/MOPL.
The following signal conditioners are available to setup measuring parameter.

DH2	Isolator (See Note 1)
DH5	Square Root Extractor
DM1	mV Transmitter
DT5	TC Transmitter
DR5	RTD Transmitter
DS1	Potentiometer Transmitter
DP3	Pulse/Analog Transmitter
DQ0	Analog/Pulse Transmitter (See Note 1)
DA5	Distributor (with $\sqrt{}$ Extractor)
DA2	Distributor (Connectable to YOKOGAWA BRAIN Series Transmitter & UNIΔ/COM Transmitter) (See Note 2)

(Note 1) DH2 and DQ0 : Partameter change can only be done by handy terminal. Parameter change cannot be done by sensor parameter setting functions of Engineering Station (ENGS) and Operator Station (MOPS/MOPL).

(Note 2) DA2 does not setup the measuring parameter of DA2 itself but sets measuring parameter of BRAIN Series Transmitter & UNIΔ/COM Transmitter. BRAIN Series Transmitters are consisting of BRAIN UNIΔ, BRAIN ADMAG, BRAIN YEWFLO. UNIΔ/COM Transmitter means UNIΔ Series Transmitter + communication function (Option).

7.3.2 Connection method to Handy Terminal

Insert signal conditioner into its storing nest through DXT Extension Card.
DXT Extension Card has connector for Handy Terminal and connect it to cable with 5 pins connector of Handy Terminal.
DSC Interface Card also has connector through which measuring parameters of the above mentioned transmitters, UNIΔ/COM and BRAIN Series Transmitters can be set. (See Article 8.2)

7.3.3 Parameter Setting

Refer Article 8 Handy Terminal for parameter setting.
Following functions of Handy Terminal can not be applied to signal conditioners.

(1) Calling for diagnostic menu (DIAG key)
(2) Reading for overall data (UPLD key)
(3) Setting for overall data (DNLD key)

7.3.4 Setting Function of Sensor Parameter (CENTUM-XL)

This function performs display and data setup for transmitters with communication function (BRAIN Series), UNIΔ/COM and signal conditioners connected to field control station from ENGS (Engineering Station).
This function realizes function of Handy Terminal at Engineering Station.

(1) Data display

Various data of transmitters and signal conditioners (both with communication function) are read and displayed through screens on CRT. There are 2 screens, 1st screen displays main data out of various data and 2nd screen displays all the data. Refer Article 8.11 List of Parameters for details of data available to set.
Since both 1st and 2nd screens display the data at the time of reading, its renewal will not be done periodically.

(2) Data setting

Various data of transmitters and signal conditioners (both with communication function) are setup. General data are setup through 2nd screen. Refer Article 8.11 List of Parameters for details of data avaiable to set.
An imaginary JHT window input is provided for adjustment and change of setting items which can be performed through both 1st and 2nd screens.

7.3.5 Sensor Parameter Communication Package (μXL)

This package performs dispaly and setting of data for transmitters with communication function (BRAIN Series), UNIΔ/COM and signal conditioners connected to field control unit (MFCU) or field monitoring unit (MFMU) from Operator Station (MOPS/MOPL).
This pacakge realizes function of Handy Terminal at Operator Station.

(1) Data display

Various data of transmitters and signal conditioners (both with communication function) are read and displayed through screens on CRT. There are 2 screens, 1st screen displays main data out of various data and 2nd screen displays all the data. Refer Article 8.11 List of Parameters for details of data available to set.
Since both 1st and 2nd screens display the data at the time of reading, its renewal will not be done periodically.

(2) Data setting

Various data of transmitters and signal conditioners (both with communication function) are setup. General data are setup through 2nd screen. Refer Article 8.11 List of Parameters for details of data avaiable to set.
An imaginary JHT window input is provided for adjustment and change of setting items which can be performed through both 1st and 2nd screens.

8. JHT HANDY TERMINAL

8.1 USAGE AND CHARACTERISTICS

8.1.1 Usage

JHT Handy Terminal is a portable terminal to connect with signal conditioner and through mutual communication, it performs

- Setting/change/display of parameter necessary for operation of signal conditioner such as tag number, range, burnout, etc.
- Monitor of input/output value and self-diagnostic result.
- Adjustment of zero point and span.

8.1.2 Characteristics

(1) On-Line monitoring is available.
Not affect input/output signals of signal conditioner during communication

(2) High operational performance
Easy operational procedures since adoption of tree structured menu system

(3) Abundant diagnostic and protective functions
- Diagnostic function to show incorrect contents
- Set value protection by switch (with key)
- Alarm function for dry battery voltage drop
- Automatic power-off function

8.2 CONNECTION TO NESTS

Fig. 8.1 shows connection to DCE, DCP, DME, DMP nests.
Connection is made by methods of either direct connection to signal conditioner or through communication interface card (DSC card).
The former is the connection of extension card (DXT) to JHT through its cable with 5 pin connector.
The later is direct connection of DSC card connector to JHT through its cable with 5 pin connector. In this case, designate slot number to which the card be communicated.
Designation method of slot number is shown in Parameter List and Instruction Manual of Handy Terminal (JHT200 : IM JF81-02E, JHT-100 : IMJF81-01E)
The slot numbers are arranged orderly 1,2,3,.....16 from the left.

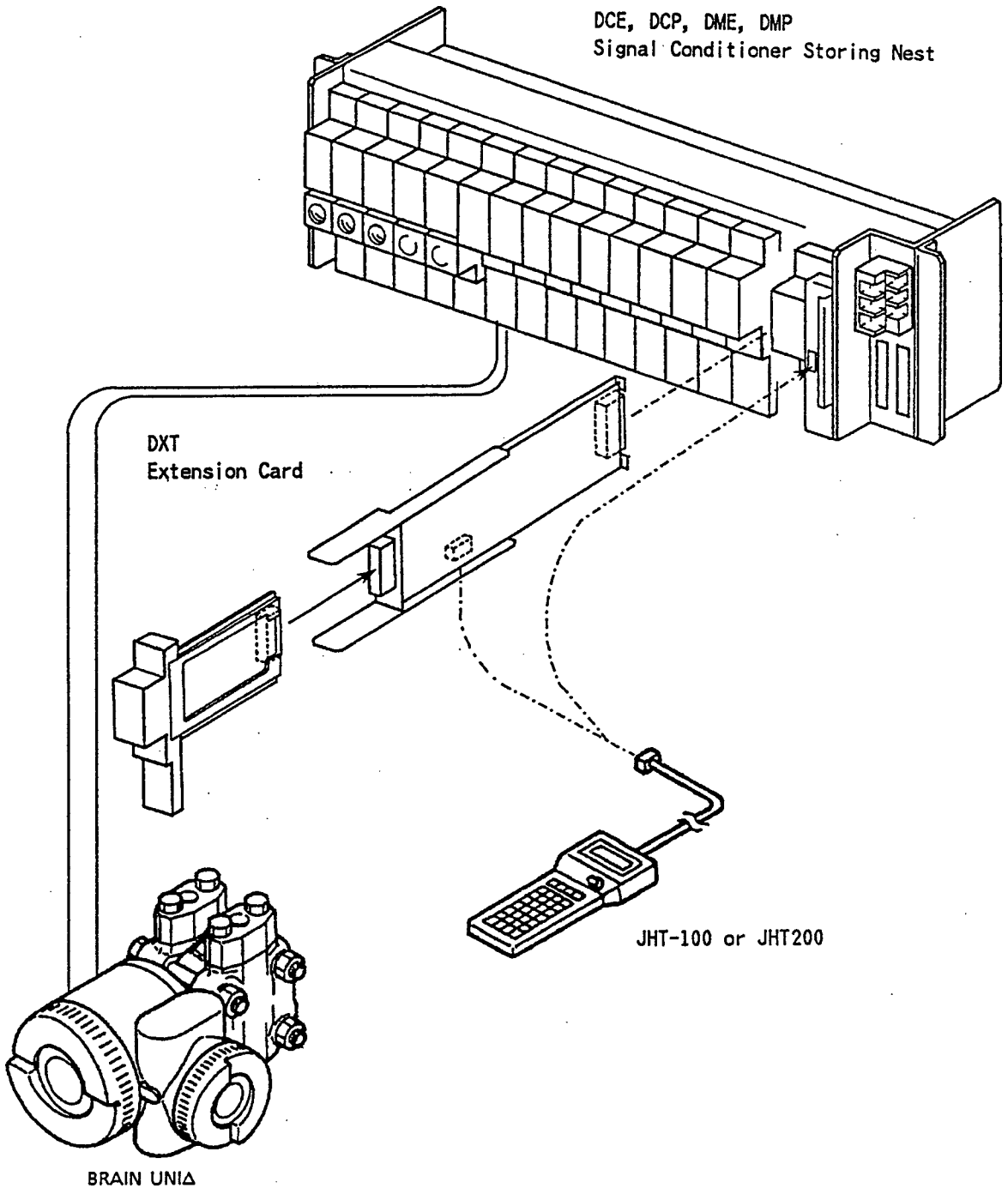


Fig.8.1 Connection to Handy Terminal

8.3 SETTING AND INPUT/OUTPUT ADJUSTMENT

Refer Parameter List and Instruction Manual of Handy Terminal (JHT200 : IMJF81-02E, JHT-100 : JF81-01E) for setting change and input/output ajustment.

8.3.1 LOW CUT (B07)

This function performs setting of transition point from proportioning to square root extraction which is only the function for DA5, DH5, DP3, DQ0.

(1) Low input cut point of DA5 amd DH5 is variable between lower limit of 0.3% and upper limit of 100%. If not specified in order sheet, it will be set at 0.6%. Hysteresis width is fixed at 0.2%.
(2) Low input cut point of DP3 is variable between lower limit of 0.01Hz and upper limit of 100%. If not specified in order sheet, it will be set at 0.01Hz.
(3) Low input cut point of DQ0 is variable between lower limit of 0.0001Hz and upper limit of 100%. If not specified in order sheet, it will be set at 0.0001Hz.

8.3.2 Input Zero Adjustment (C04 whereas C06 applies to DSI only, DP3 has not this function)

This function allows adjustment for input A/D conversion section. Accuracy can be maintained for range changeat customer site and sensor device error can be absorbed.

8.3.3 Input Span Adjustment (C05 whereas C07 applies to DSI only, DP3 has not this function)

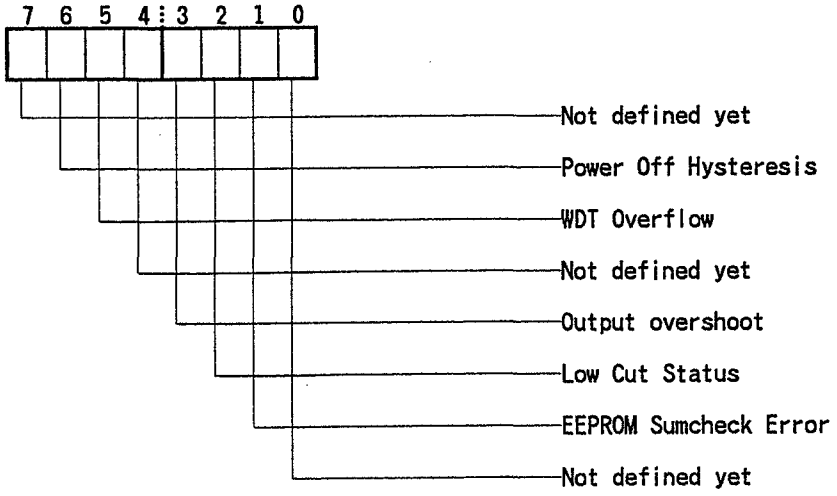
This fuctioin is used for adjustment of input A/D converter. Gain adjustment can be done by SPAN ADJ.

8.4 OTHER DISPLAY AND SETTING ITEMS

8.4.1 STASTUS (A03)

When "ERROR" is displayed by SELF CHECK (03), contents of ERROR will be displayed at this STATUS in hexadecial.

Allotment of STATUS bit



8.5 TABLE OF PARAMETER

The Table below shows the parameters of signal conditioners.

Number	Item	Symbol Display	Data Display by individual Signal Conditioner				
			DM1	DT5	DR5	DS1	DA5/DH5
01	Model	MODEL	DM1•A	DT5•A	DR5•A	DS1•A	DA5/DH5•A
02	Tag No.	TAG NO.	Alphabet/Numeric 16 characters				
03	Self Check	SELF CHK	GOOD or ERROR				
A00	Display Item	DISPLAY					
A01	Input Value	INPUT	□□□.□□mV	□□□□.□ deg C	□□□.□ deg C	□□□□□.□ OHM	□□□.□ %
A02	Output Value	OUTPUT	□□□.□%				
A03	Status	STATUS	FF (16 Progress 2 Lines)				
A04	Rev No.	REV NO.	n.000 (n : Rev No.)				
B00	Setting Item	SET					
B01	Tag No.1	TAG NO1	Alphabet/Numeric 8 characters (First Half 8 characters of Tag No.)				
B02	Tag No.2	TAG NO2	Alphabet/Numeric 8 characters (Later Half 8 characters of Tag No.)				
B03	Comment 1	COMMENT1	Alphabet/Numeric 8 characters (First Half 8 characters of Comment)				
B04	Comment 2	COMMENT2	Alphabet/Numeric 8 characters (Later Half 8 characters of Comment)				
B05	ER5 Input Type	INP TYPE			PT/JPT•1		
B06	ET5 Input Type	INP TYPE		B/E/J/K/T/R/S/N			
B07	Low Cut	LOW CUT					0.3~100.0 %
B08	ES1 Full Resistance	RESIST				□□□□□.□ OHM	
B09	Temperature Unit	UNIT		deg C/deg F/K	deg C/deg F/K		
B10	Zero Point	ZERO	□□□.□□mV	□□□□.□deg C	□□□.□deg C	□□□□□.□ OHM	
B11	Span *2	SPAN	□□□.□□mV	□□□□.□deg C	□□□.□deg C	□□□□□.□ OHM•4	
B12	Burnout	BURN OUT	OFF/UP/DOWN	OFF/UP/DOWN	OFF/UP/DOWN	OFF/UP/DOWN	
C00	Adjustment Item	ADJUST					
C01	% Output Correction	OUT 0 %	±10.00	±10.00	±10.00	±10.00	±10.00
C02	100% Output Correction	OUT 100 %	±10.00	±10.00	±10.00	±10.00	±10.00
C03	Burnout Correction	WIRING R	EXECUTE/RESET (BURNOUT CORRECT *3)	EXECUTE/RESET (BURNOUT CORRECT *3)			
C04	Input Zero Adjustment	ZERO ADJ	□□□.□□□mV RST/INC/DEC	□□□.□□□mV RST/INC/DEC	□□□.□□□ OHM RST/INC/DEC		□□□.□□□ % RST/INC/DEC
C05	Input Span Adjustment	SPAN ADJ	□□□.□□□mV RST/INC/DEC	□□□.□□□mV RST/INC/DEC	□□□.□□□ OHM RST/INC/DEC		□□□.□□□ % RST/INC/DEC
C06	Input Zero Adjustment	ZERO ADJ				□□□.□□□ OHM	
C07	Input Span Adjustment	SPAN ADJ				□□□.□□□ OHM	

*1 : Pt100=JIS '89. Pt100 (IEC, DIN Pt100 equivalent), JPT=JIS '89. JPt-100 (Old JIS Pt100).
*2 : Data possible to measure should be within the scope mentioned in standard specifications.
*3 : Burnout correction means the function to correct the error by burnout current arising when external conductor resistance value is great (Use when combining with BARD type safety holder).
*4 : Possible upto 30KΩ. However, standard specification is 100~2000Ω.

Number	Item	Symbol Display	Data Display by individual Signal Conditioner		
			DH2	DP3	DQ0
01	Model	MODEL	DH2•A	DP3•A	DQ0•A
02	Tag No.	TAG NO.	Alphabet/Numeric 16 characters		
03	Self Check	SELF CHK	GOOD or ERROR		
A00	Display Item	DISPLAY			
A01	Input Value	INPUT	□□□.□V	□.□□□□□Hz	□□□.□%
A02	Output Value	OUTPUT	□□□.□%	□□□.□%	□.□□□□□Hz
A03	Status	STATUS	FF (16 Progress 2 Lines)		
A04	Rev No.	REV NO.	n.000 (n : Rev No.)		
B00	Setting Items	SET			
B01	Tag No.1	TAG NO1	Alphabet/Numeric 8 characters (First Half 8 characters of Tag No.)		
B02	Tag No.2	TAG NO2	Alphabet/Numeric 8 characters (Later Half 8 characters of Tag No.)		
B03	Comment 1	COMMENT1	Alphabet/Numeric 8 characters (First Half 8 characters of Comment)		
B04	Comment 2	COMMENT2	Alphabet/Numeric 8 characters (Later Half 8 characters of Comment)		
B07	Low Cut	LOW CUT		□.□□□□□Hz	□.□□□□□Hz
B10	Zero Point	ZERO	□□□.□V	□.□□□□□Hz	□.□□□V
B11	Span ※1	SPAN	□□□.□V	□.□□□□□Hz	□.□□□V
B15	Output Range 0 Point	OUTZERO		□.□□□V	□.□□□□□Hz
B16	Output Range Span	OUTSPAN		□.□□□V	□.□□□□□Hz
B17	Pulse Width	P.W.TYPE			50% / ON / OFF
B18	Pulse Width Fixed Time	P.W.TIME			□□□.□msec
C00	Adjustment Item	ADJUST			
C01	% Output Correction	OUT 0%	±10.00	±10.00	
C02	100% Output Correction	OUT 100%	±10.00	±10.00	
C04	Input Zero Adjustment	ZERO ADJ	□□□.□□□V RST/INC/DEC		□□□.□□□% RST/INC/DEC
C05	Input Span Adjustment	SPAN ADJ	□□□.□□□V RST/INC/DEC		□□□.□□□% RST/INC/DEC

※1 : Possible measuring data is within the scope mentioned in standard specifications.

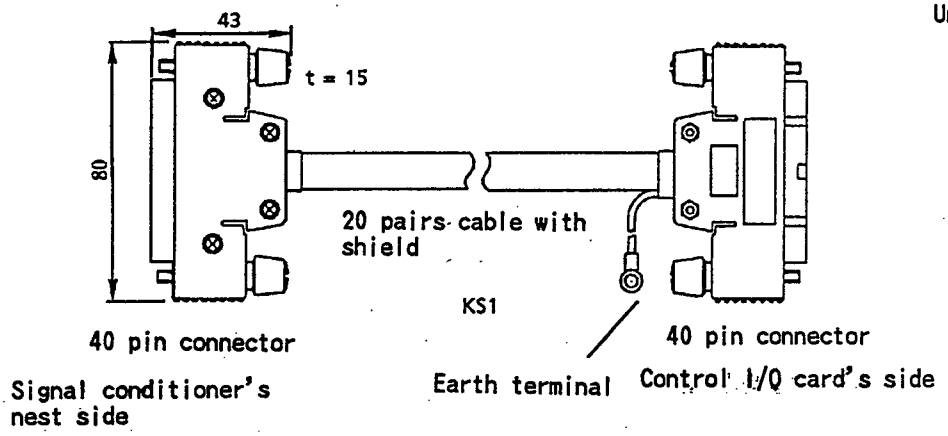
(ATTACHED SHEET)

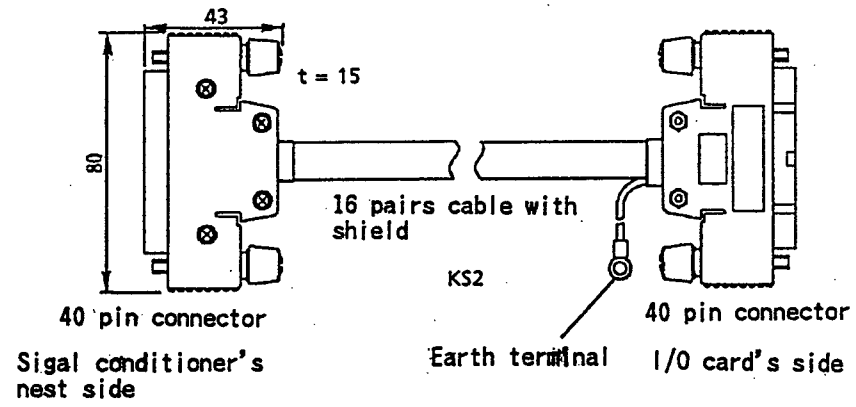
Special Cable

The following cables are used exclusively for DCE, DCP, DME, DMP nests.

KS1 Signal Cable	(DME↔Control I/O Card)
	(DMP↔Control I/O Card)
KS2 Signal Cable	(DCE↔I/O Card, TE16 Terminal Block)
	(DCP↔I/O Card, TE16 Terminal Block)

Unit : mm





Special Cable

Subject to change without notice for grade up quality and performance.

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