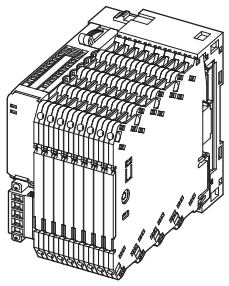
Remote I/O R6 Series

R6 SERIES GENERAL SPECIFICATIONS

Functions & Features
- Free combination of analog and discrete I/O
- Direct sensor inputs
- Space-saving
- Low power consumption

Typical Applications
- Remote I/O for DCS and PLC
- Personal computer I/O



ORDERING INFORMATION

•NETWORK MODULES: R6-[1]
Specify a code from below for [1].
(e.g. R6-NC1)

•BASE: R6[1]-[2]
Specify a code from below for each [1] and [2].
(e.g. R6D-BS8B)

•I/O MODULES: R6[1]-[2]
Specify a code from below for each [1] and [2].
(e.g R6D-SV2)

•POWER SUPPLY MODULES: R6[1]-PF1-R
Specify a code from below for [1].
(e.g. R6D-PF1-R)

•POWER SUPPLY MODULE: R6-PSM
(e.g. R6-PSM)
Note: R6x-PF and R6-PSM cannot be used at the same time.

NETWORK MODULES: R6-[1]

Refer to the data sheet for the respective models.

[1] I/O TYPE

NC1: CC-Link (Ver.1.10) (CE not available)
NC3: CC-Link (Ver.2.00, 64-point analog) (CE not available)
ND1: DeviceNet
NE1: Ethernet (Modbus/TCP, 32-point analog)
NE2: Ethernet (Modbus/TCP, 64-point analog)
NM1: Modbus (32-point analog)
NM2: Modbus (64-point analog)
NF1: T-Link (Fuji Electric) (CE not available)
(Select the Base model: R6x-BS8B)
(Select Power Supply Module model: R6x-PF1)
NP1: PROFIBUS-DP (62-point analog)

BASE: R6[1]-[2]

[1] TERMINAL STYLE

D: Euro terminal
N: Screw terminal
S: Tension clamp

[2] FUNCTION

BS8A: 8 I/O slots + Network Module (18 mm wide)
BS8B: 8 I/O slots + Network Module (36.5 mm wide)
(Selectable only for using with R6-NF1 or R6-PSM)
BS8P: 8 I/O slots for extension

I/O MODULES: R6[1]-[2]

[1] TERMINAL STYLE

D: Euro terminal
N: Screw terminal
S: Tension clamp

[2] FUNCTION

• I/O
SV2: DC voltage input, 2 points
SS2: DC current input, 2 points
TS2: Thermocouple input, 2 points
TS2A: Thermocouple input, 2 points, high-accuracy
(CE not available)
RS2: RTD input, 2 points
DS1: 4 – 20 mA input with 2-wire transmitter excitation
YV2: DC voltage output, 2 points
YS2: DC current output, 4 – 20 mA, 2 points
DA4: Discrete input, 4 points
DC4A: NPN transistor output, 4 points
DC4B: PNP transistor output, 4 points
• Blank Filler
DM: Blank filler module
(Housing only; No electrical circuits)

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POWER SUPPLY MODULES: R6[1]-PF1-R

[1] TERMINAL STYLE

D: Euro terminal
N: Screw terminal
S: Tension clamp

FUNCTION

PF1: Power supply

POWER INPUT

R: 24 V DC

POWER SUPPLY MODULE: R6-PSM

FUNCTION

PSM: Power supply module
(Select the Base model: R6x-BS8B)
(Not selectable with the T-Link module model: R6-NF1)

POWER INPUT

• AC power
100 - 240 AC (Operational voltage range: 90 - 264 V AC, 47 - 66 Hz)

FUNCTIONS & FEATURES

The R6 Series Remote I/O is composed of the power supply module, I/O modules, the network module and the base.

■ POWER SUPPLY MODULE
Converts 24 V DC power inputs for use in the network module and I/O modules.

■ I/O MODULES
Performs A/D conversion of field analog inputs; D/A conversion of data received through the internal bus into analog/discrete outputs.

■ NETWORK MODULE
Converts data between the open network fieldbus (Modbus, etc.) and the internal communication bus, functioning as a gateway between two buses.

■ BASE
Backplane with an internal communications bus and a power supply bus.
Basic 8-slot base (model: R6x-BS8A, R6x-BS8B) can be added with up to three (3) extension bases (model: R6x-BS8P) so that at the maximum of thirty-one (31) I/O modules can be mounted.

■ DATA CONVERSION
Depends upon the type of I/O and ranges.
Temperature input (T/C or RTD) is converted into signed binary data which equals 10 times its engineering unit value (°C). e.g. 25.5°C is converted to 255. With °F temperature unit, the integer section of raw data is directly converted into the data. For example, 135.4°F is converted into 135. Minus temperature is converted into negative value, represented in 2's complements.
Analog (voltage/current) input is represented with 16-bit binary data. Basically, 0 to 100 % of the selected range is converted into 0 to 10000 (binary) or 0000 to 2710 (hexadecimal).
-15 to 0 % is represented in 2's complements.
Analog (voltage/current) output is represented with 16-bit binary data. Basically, 0 to 100 % of the selected range is converted into 0 to 10000 (binary) or 0000 to 2710 (hexadecimal).
-15 to 0 % is represented in 2's complements.
Refer to the data sheet for the respective network modules for more information.

■ SCALING & ZERO & SPAN ADJUSTMENTS
The PC Configurator Software (model: R6CON) is available to scale temperature and field I/O range into 0 – 100 %.

■ HOT INSERTION/REMOVAL OF I/O MODULES
Each I/O and network module has an independent CPU. Data is renewed by serial communications between modules.
Removing or replacing I/O modules does not affect other modules on the same backplane. It is possible to replace them without removing the power supply.

RELATED PRODUCTS

• PC configurator software (model: R6CON)
Downloadable at M-System's web site.
A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.
• Network module (model: R6-Nx)

GENERAL SPECIFICATIONS

Power input:
•R6x-PF
Operational voltage range 24 V DC ± 10 % ripple 10 % p-p max.
Approx. 1 A with the maximum I/O extension
•R6-PSM
Operational voltage range 90 - 264 V AC 47 - 66 Hz
Approx. 25 VA at 100 V AC
Approx. 30 VA at 200 V AC
Approx. 35 VA at 264 V AC
Operating temperature: -10 to +55°C (14 to 131°F)
Operating humidity: 30 to 90 %RH (non-condensing)

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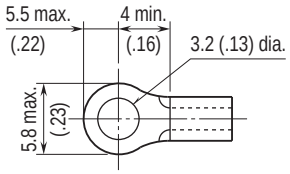
Atmosphere: No corrosive gas or heavy dust
Mounting: DIN rail or surface
Connection
Network (R6-NEx): RJ-45 connector
Network (R6-NP1): 9-pin D-sub connector
9-pin D-Sub
Other network modules: Euro type connector terminal block
I/O & power input (R6x-PF)
· **Euro terminal style**: Euro terminal (torque 0.3 N·m)
Applicable wire size 0.2 to 2.5 mm^2
· **Screw terminal style**: M3 screw terminal (torque 0.5 N·m)
Screwdriver stem diameter ≤ 6 mm (0.24")
Recommended solderless terminal Max. 5.8 mm (0.23") wide; Ones with insulation sleeve do not fit.
Applicable wire size 0.2 to 2.5 mm^2
· **Tension clamp style**: Tension clamp
Applicable wire size 0.2 to 2.5 mm^2, stripped length 8 mm
Power supply (R6-PSM)
Connector type euro terminal block
Applicable wire size 0.2 to 2.5 mm^2
Housing material: Flame-resistant resin (black)
Internal communication bus: Transmission cycle approx. 50 msec.

■ **Current Consumption & Weight**
R6x-SV2: 20 mA 60 g (2.1 oz)
R6x-SS2: 20 mA 60 g (2.1 oz)
R6x-TS2: 20 mA 60 g (2.1 oz)
R6x-TS2A: 20 mA 70 g (2.5 oz)
R6x-RS2: 20 mA 60 g (2.1 oz)
R6x-DS1: 55 mA 60 g (2.1 oz)
R6x-YV2: 25 mA 60 g (2.1 oz)
R6x-YS2: 45 mA 60 g (2.1 oz)
R6x-DA4: 10 mA 60 g (2.1 oz)
R6x-DC4A: 20 mA 60 g (2.1 oz)
R6x-DC4B: 20 mA 60 g (2.1 oz)
R6-NC1: 110 mA 100 g (3.5 oz)
R6-NC3: 110 mA 100 g (3.5 oz)
R6-ND1: 40 mA 100 g (3.5 oz)
R6-NE1: 75 mA 100 g (3.5 oz)
R6-NE2: 75 mA 100 g (3.5 oz)
R6-NM1: 50 mA 100 g (3.5 oz)
R6-NM2: 50 mA 100 g (3.5 oz)
R6-NF1: 100 mA 150 g (5.3 oz)
R6-NP1: 100 mA 100 g (3.5 oz)

■ **Weight**
R6x-BS8A: 80 g (2.8 oz)
R6x-BS8B: 95 g (3.4 oz)
R6x-BS8P: 50 g (1.8 oz)
R6x-DM: 60 g (2.1 oz)
R6x-PF: 60 g (2.1 oz)
R6-PSM: 120 g (4.2 oz)

■ **Recommended solderless terminal (unit: mm(inch))**



STANDARDS & APPROVALS

CE conformity:
EMC Directive (2004/108/EC)
EMI EN 61000-6-4: 2007
EMS EN 61000-6-2: 2005
Low Voltage Directive (2006/95/EC)
R6x-PF
EN 61010-1: 2001
Measurement Category II
Pollution Degree 2
RUN output to internal bus or power supply: Reinforced insulation (250 V)
R6-PSM
EN 61010-1: 2001
Measurement Category II (RUN contact output)
Installation Category II (power input)
Pollution Degree 2
Internal power or RUN contact output to power input to FG: Reinforced insulation (300 V)
Internal power to RUN contact output: Basic insulation (300 V)

BASIC CONFIGURATIONS

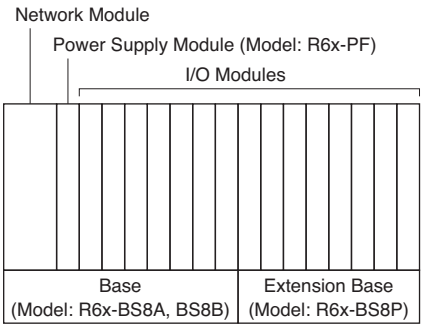
■ EXTENSION BASE

Up to three (3) extension bases can be added to the basic one, so that at the maximum of thirty-one (31) I/O modules can be mounted. Certain network modules allow only less number of I/O modules to be mounted. Refer to the data sheet for the respective network modules for more information.

The terminal style of the extension bases must be the same as that for the basic one.

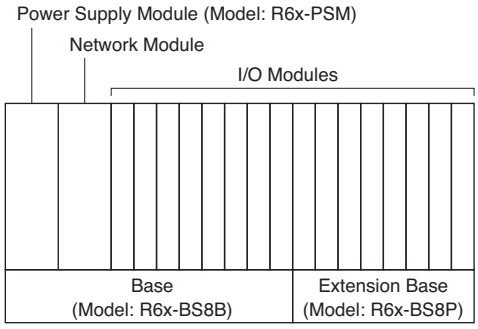
■ With R6x-PF

The power supply module could be mounted at any slots, however, installing them at either end is generally recommended.



■ With R6x-PSM

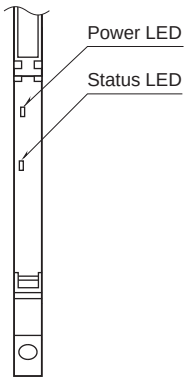
Mount the R6-PSM on the slot of the left end of R6x-BS8B.



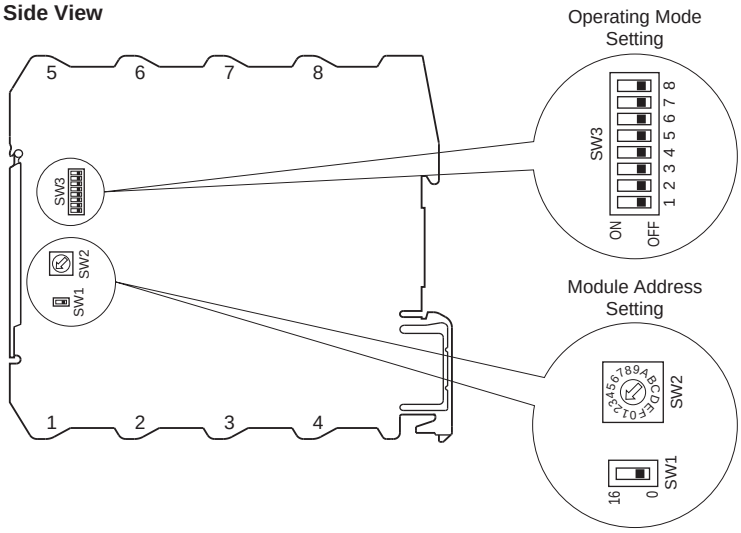
EXTERNAL VIEW

■ ANALOG I/O MODULE

• Front View (cover opened)

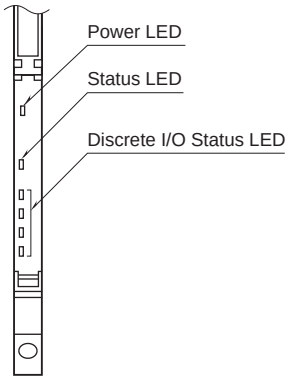


• Side View

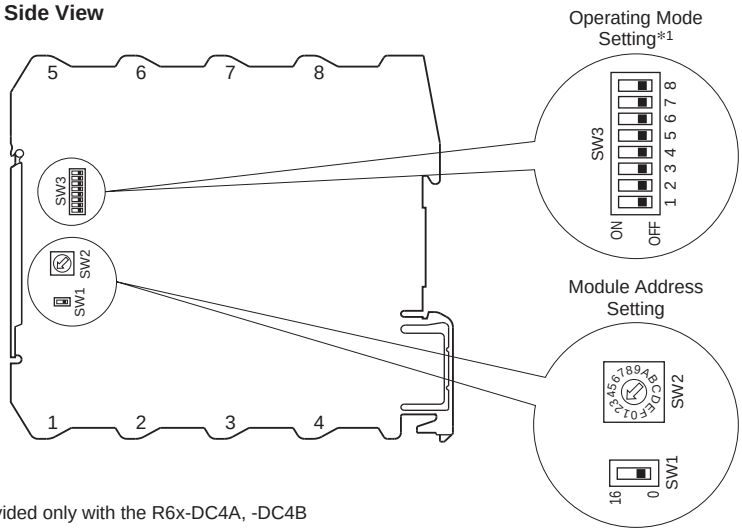


■ DISCRETE I/O MODULE

• Front View (cover opened)



• Side View



*1. Provided only with the R6x-DC4A, -DC4B

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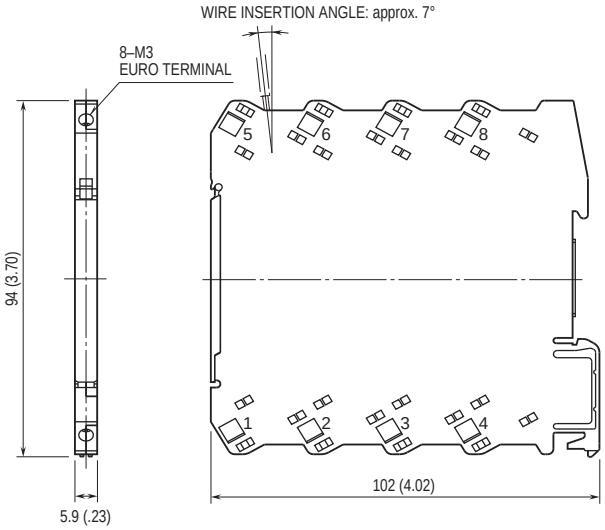
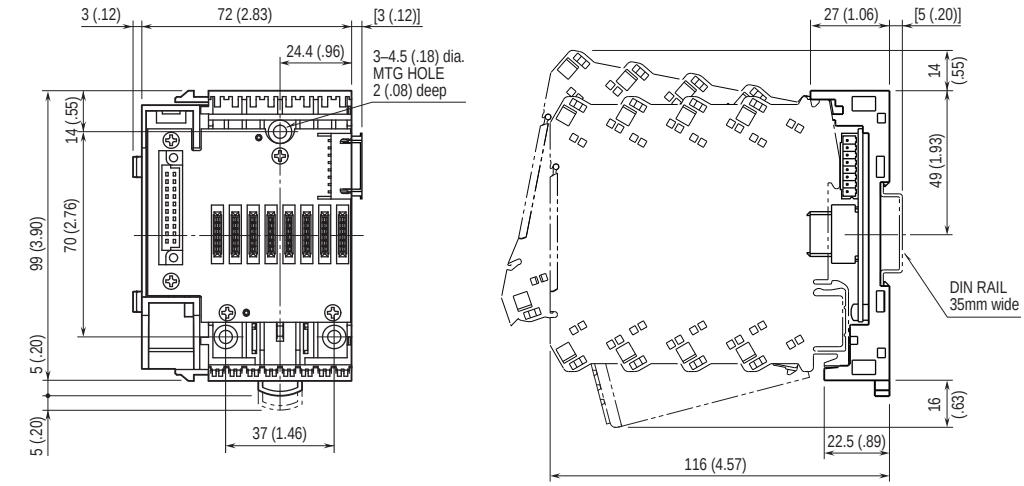
DIMENSIONS unit: mm (inch)

■ R6D: I/O, POWER SUPPLY & BLANK FILLER MODULE

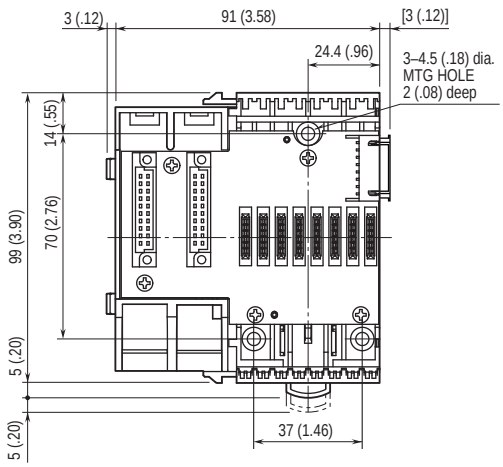


■ R6D: BASE

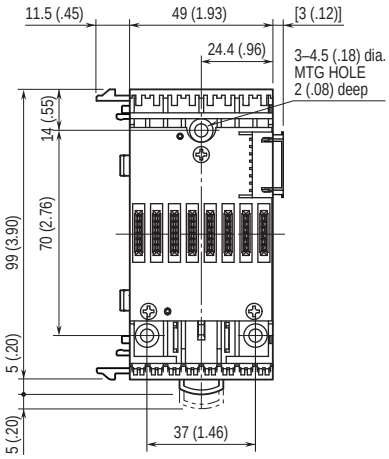
• **R6D-BS8A**



• **R6D-BS8B**



• **R6D-BS8P**



■ R6N: I/O, POWER SUPPLY & BLANK FILLER MODULE

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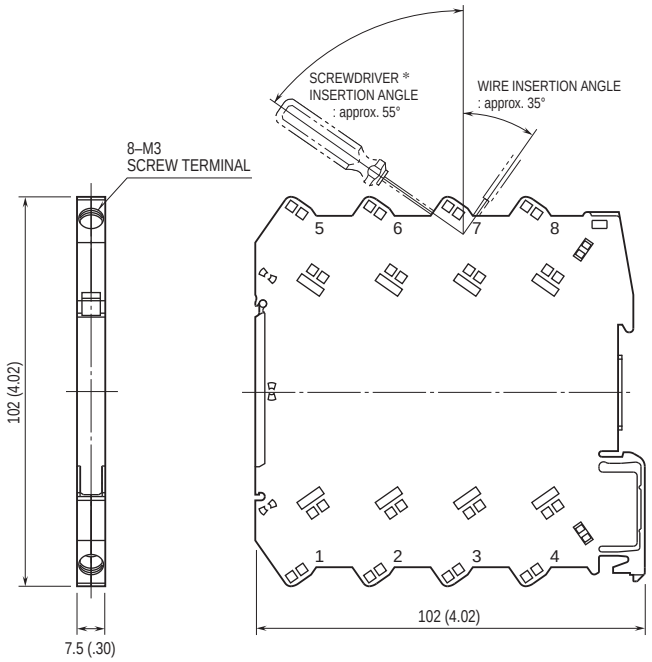
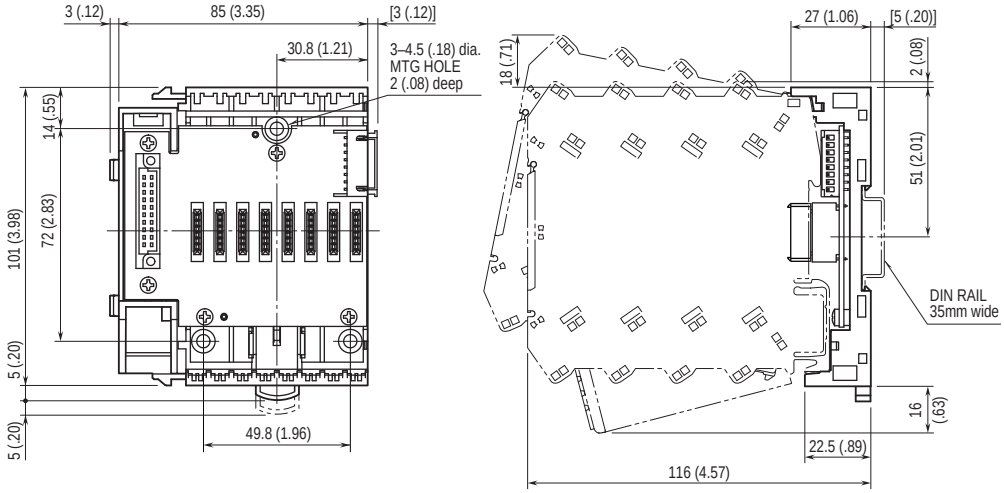


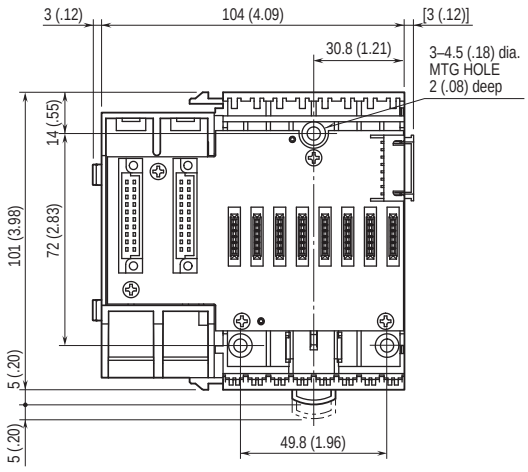
*Screwdriver stem diameter: 6 mm (.24") or less

■ R6N: BASE

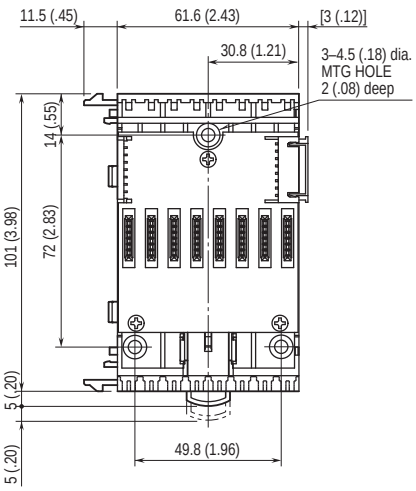
• R6N-BS8A



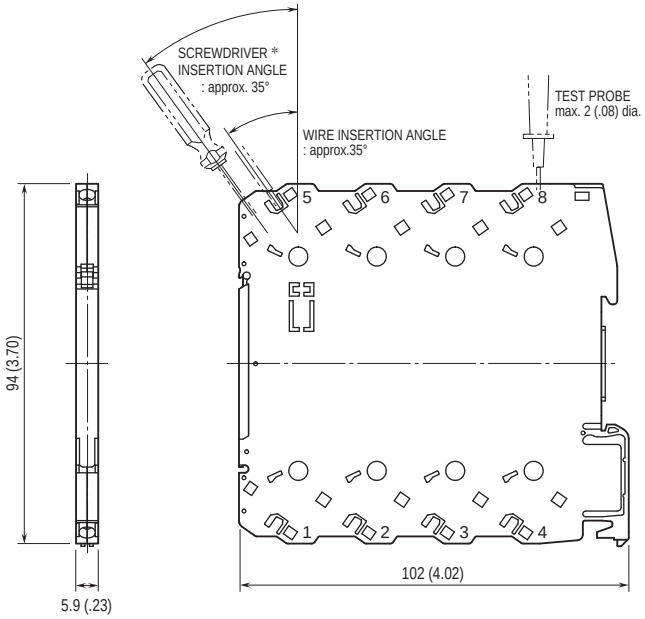
• R6N-BS8B



• R6N-BS8P



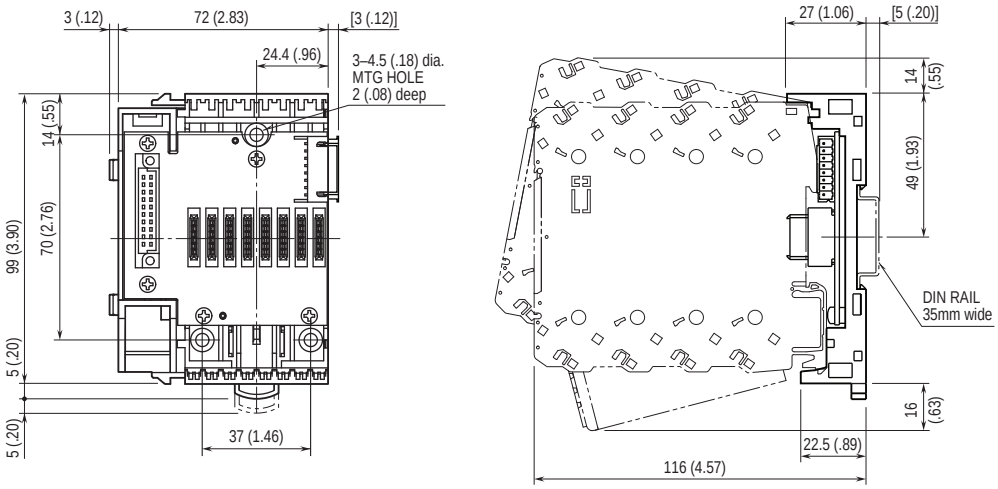
■ R6S: I/O, POWER SUPPLY & BLANK FILLER MODULE



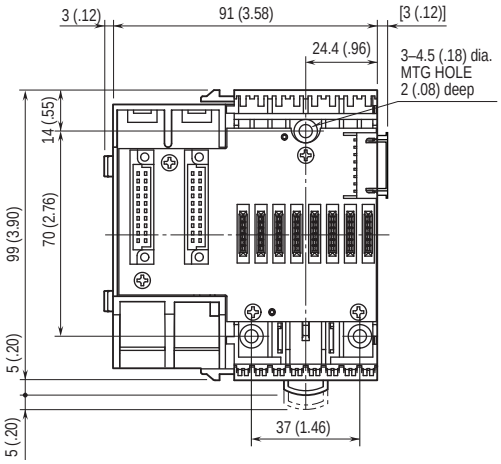
*Use a minus screwdriver: tip width 3.8 mm max., tip thickness 0.5 to 0.6 mm

■ R6S: BASE

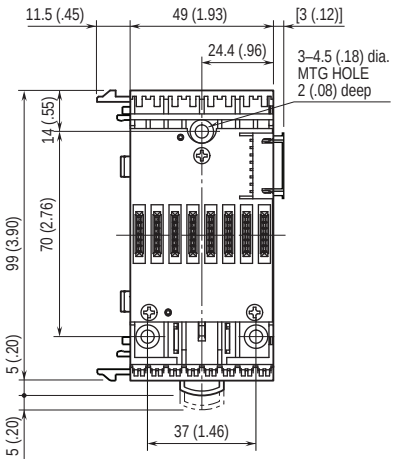
• **R6S-BS8A**



• **R6S-BS8B**



• **R6S-BS8P**



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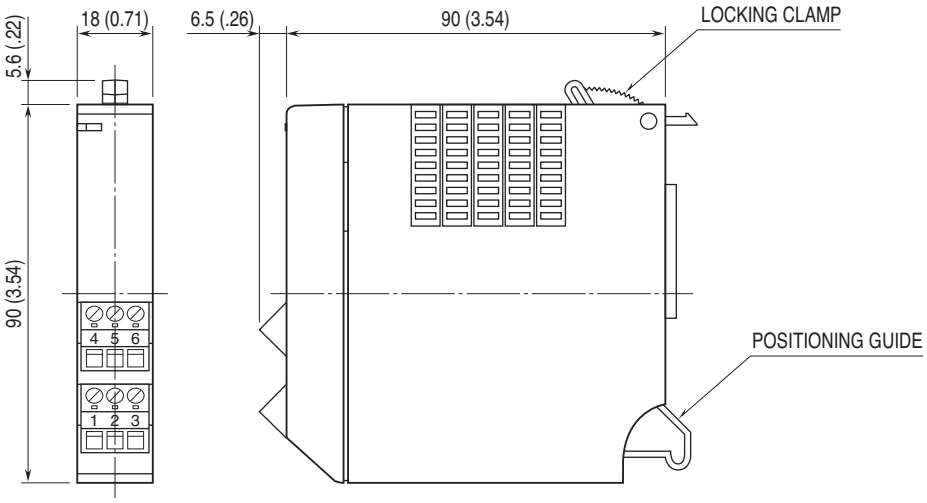
■ **R6-PSM**



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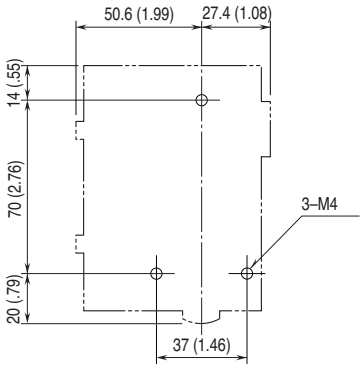
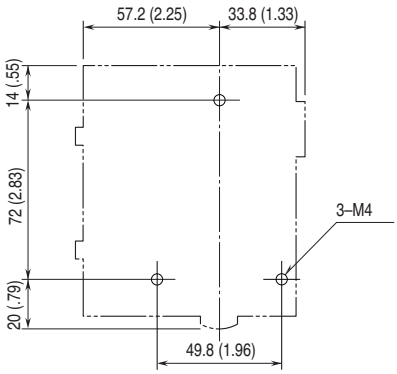
MOUNTING REQUIREMENTS unit: mm (inch)

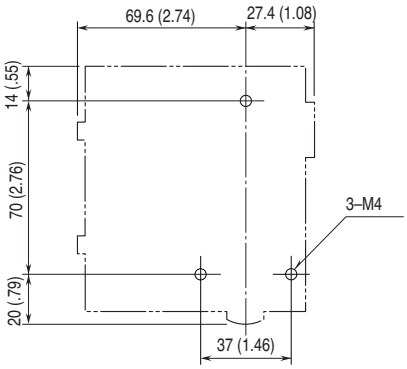
• R6D/R6S-BS8A



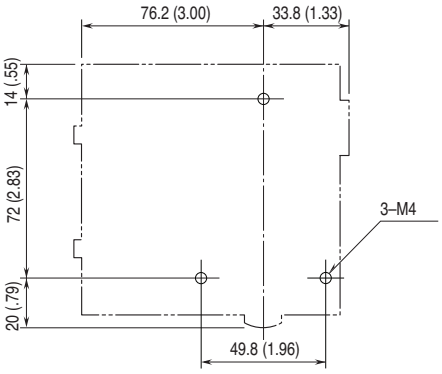
• R6N-BS8A



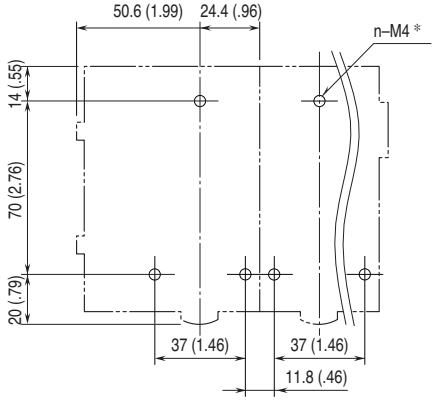
• R6D/R6S-BS8B



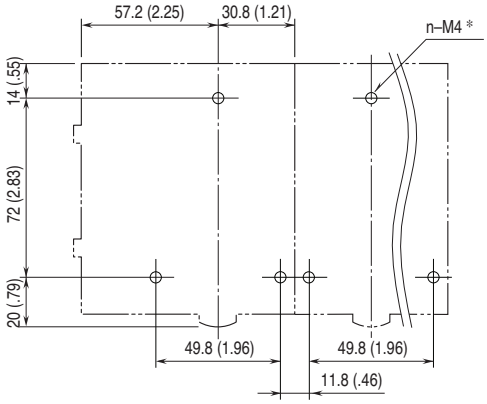
• R6N-BS8B



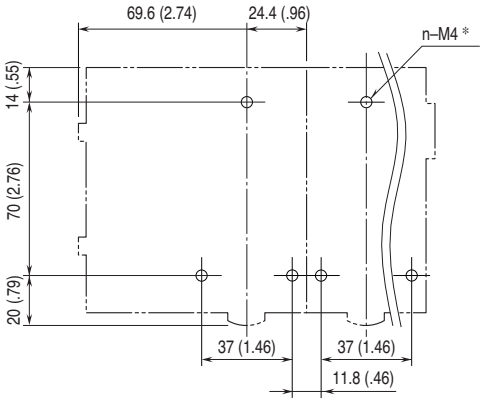
• R6D/R6S-BS8A+BS8P



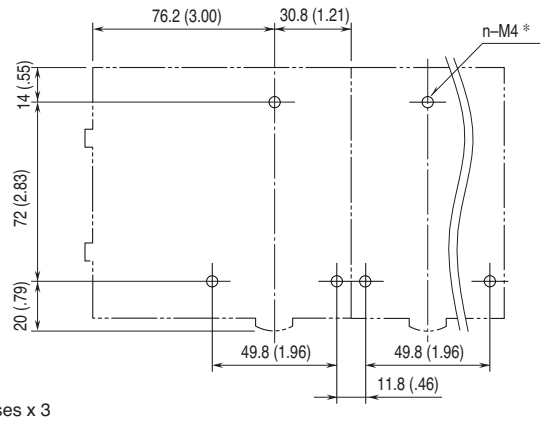
• R6N-BS8A+BS8P



• R6D/R6S-BS8B+BS8P



• R6N-BS8B+BS8P



*Number of bases x 3

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INSTALLATION BASE

MODEL: R6D-BS R6N-BS R6S-BS

GENERAL SPECIFICATIONS

Construction: DIN rail or surface mounting

Capacity:

•R6x-BS8A: I/O / power supply module, 8 slots + network (18 mm wide) module

•R6x-BS8B: I/O / power supply module, 8 slots + network (36.5 mm wide) module

•R6x-BS8P: I/O / power supply module, 8 slots

PERFORMANCE

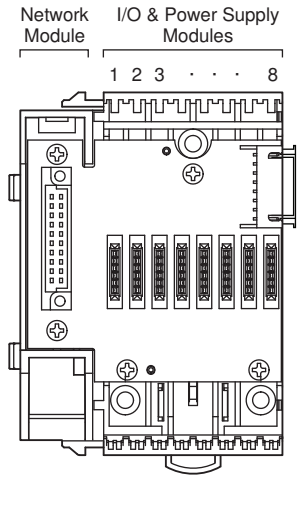
Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 2000 V AC @ 1 minute (internal power or field signal to ground)

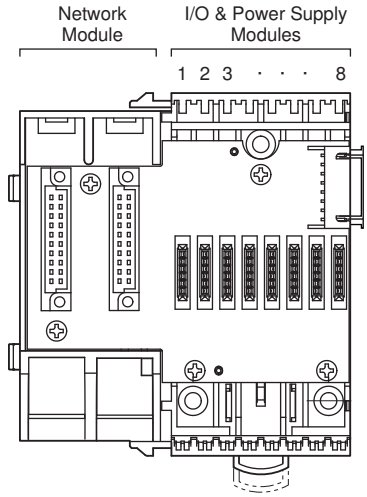
EXTERNAL VIEW

Mount I/O and power supply modules, starting from the left end.

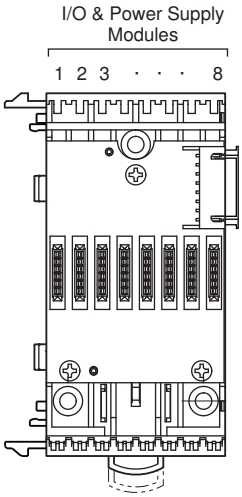
The power supply module could be mounted at any slots, however, installing them at either end is generally recommended.



R6x-BS8A



R6x-BS8B



R6x-BS8D

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POWER SUPPLY MODULE

MODEL: R6D-PF R6N-PF R6S-PF

GENERAL SPECIFICATIONS

Isolation: RUN contact output to internal bus or power
Power LED: Green light turns on when the power is supplied.
RUN indicator: Orange LED turns on in normal communication with the host PLC.
RUN contact: Terminals (2 – 3) turns ON and (4 – 3) OFF in normal communication with the host PLC;
Terminals (2 – 3) turns OFF and (4 – 3) ON in abnormal communication.

■ **RUN CONTACT OUTPUT**

Rated load: 250 V AC @ 0.5 A (cos ø = 1)
30 V DC @ 0.5 A (resistive load)
Maximum switching voltage: 250 V AC or 30 V DC
Maximum switching power: 250 VA or 150 W
Minimum load: 1 V DC @ 1 mA
Mechanical life: 2×10^7 cycles (rate 300 cycles/min.) When driving an inductive load, external contact protection and noise quenching recommended.

INSTALLATION

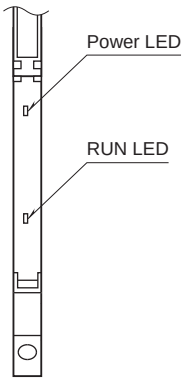
Power input

•**DC**: Operational voltage range 24 V DC ±10 % ripple 10 % p-p max. Approx. 1 A with the maximum I/O extension

PERFORMANCE

Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 2000 V AC @ 1 minute (RUN contact output to internal bus or power to ground)

EXTERNAL VIEW



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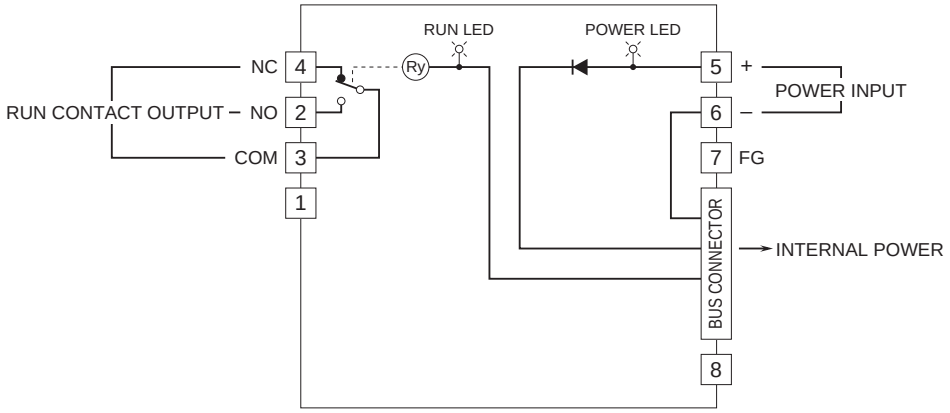
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



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POWER SUPPLY MODULE

MODEL: R6-PSM

GENERAL SPECIFICATIONS

Isolation: RUN contact to internal power to power supply to FG

Power indicator: Bi-color (green/amber) LED; Green turns ON when the power is supplied. Amber turns ON in normal communication.

RUN contact: ON in normal communication with the host PLC; OFF in communication error.

■ **RUN CONTACT OUTPUT**

Rated load: 250 V AC @ 0.5 A (cos ø = 1)
30 V DC @ 0.5 A (resistive load)

Maximum switching voltage: 250 V AC or 30 V DC

Maximum switching power: 250 VA or 150 W

Minimum load: 5 V DC @ 10 mA

Mechanical life: 2 × 10^7 cycles (rate 300 cycles/min.) When driving an inductive load, external contact protection and noise quenching recommended.

INSTALLATION

Power input

•**AC**: Operational voltage range 90 – 264 V, 47 – 66 Hz
Approx. 25 VA at 100 V
Approx. 30 VA at 200 V
Approx. 35 VA at 264 V

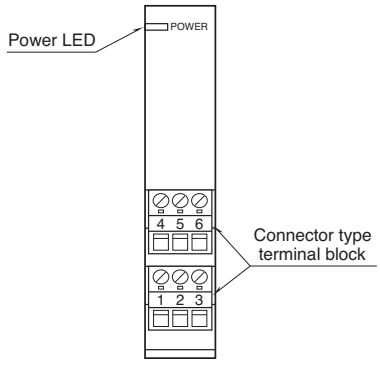
PERFORMANCE

Output (internal power):
24 V ±1 V DC, 400 mA (continuance)
Arrange in order that the total current consumed by the I/O modules or Network modules is within this capacity.

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 2000 V AC @ 1 minute (RUN contact to internal power to power input to FG)

EXTERNAL VIEW



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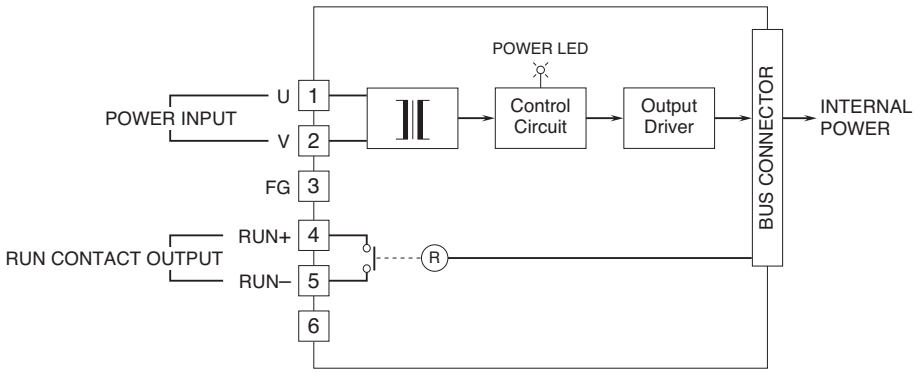
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



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DC VOLTAGE INPUT MODULE

(2 points)

MODEL: R6D-SV2 R6N-SV2 R6S-SV2

GENERAL SPECIFICATIONS

Isolation: Input 1 to input 2 to internal bus or power
Zero adjustments: PC programming
Span adjustments: PC programming
Input range: Selectable with the side DIP SW or PC programming
Cold Junction Compensation: CJC sensor incorporated
Converted data range: 0 – 10000 of the input range
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.

INPUT SPECIFICATIONS

■ **Narrow Span**: -1 – +1 V, 0 – 1 V, -0.5 – +0.5 V DC
Input resistance: 100 kΩ min.
■ **Wide Span**: -10 – +10 V, -5 – +5 V,
0 – 10 V, 0 – 5 V, 1 – 5 V DC
Input resistance: 1 MΩ min.

PERFORMANCE

Conversion rate (PC programmable. Factory set to 80 msec.)/conversion accuracy:
10 msec./±0.8 %
20 msec./±0.4 %
40 msec./±0.2 %
80 msec./±0.1 %
Data allocation: 2
Temp. coefficient: ±0.01 %/°C (±0.006 %/°F)
Response time: Conversion rate × 2 + 50 msec. or less
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (input 1 to input 2 to internal bus or power to ground)

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

■ INPUT RANGE

INPUT RANGE	INPUT 1 SW3			INPUT 2 SW3		
	1	2	3	4	5	6
-10 – +10V DC (*)						
-5 – +5V DC	■			■		
-1 – +1V DC		■			■	
0 – 10V DC	■	■		■	■	
0 – 5V DC			■			■
1 – 5V DC	■		■	■		■
0 – 1V DC		■	■		■	■
-0.5 – +0.5V DC	■	■	■	■	■	■

■ CONFIGURATION MODE

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

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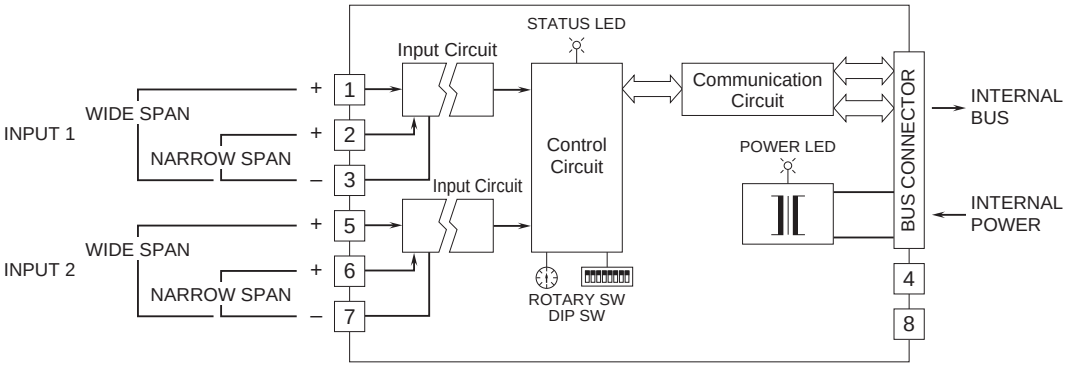
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



DC CURRENT INPUT MODULE

(2 points)

MODEL: R6D-SS2 R6N-SS2 R6S-SS2

GENERAL SPECIFICATIONS

Isolation: Input 1 to input 2 to internal bus or power
Zero adjustments: PC programming
Span adjustments: PC programming
Input range: Selectable with the side DIP SW or PC programming
Converted data range: 0 – 10000 of the input range
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.

INPUT SPECIFICATIONS

■ **Narrow Span**: 1500 Ω input resistor incorporated
Input range: -1 – +1 mA, 0 – 1 mA DC
■ **Wide Span**: 24.9 Ω input resistor incorporated
Input range: -40 – +40 mA, -20 – +20 mA,
0 – 40 mA, 0 – 20 mA, 4 – 20 mA DC

PERFORMANCE

Conversion rate (PC programmable. Factory set to 80 msec.)/conversion accuracy:
10 msec./±0.8 %
20 msec./±0.4 %
40 msec./±0.2 %
80 msec./±0.1 %
Data allocation: 2
Temp. coefficient: ±0.01 %/°C (±0.006 %/°F)
Response time: Conversion rate × 2 + 50 msec. or less
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (input 1 to input 2 to internal bus or power to ground)

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

■ INPUT RANGE

INPUT RANGE	INPUT 1 SW3			INPUT 2 SW3		
	1	2	3	4	5	6
-40 – +40mA DC						
-20 – +20mA DC	■			■		
-1 – +1mA DC		■			■	
0 – 40mA DC	■	■		■	■	
0 – 20mA DC			■			■
4 – 20mA DC (*)	■		■	■		■
0 – 1mA DC		■	■		■	■

■ CONFIGURATION MODE

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

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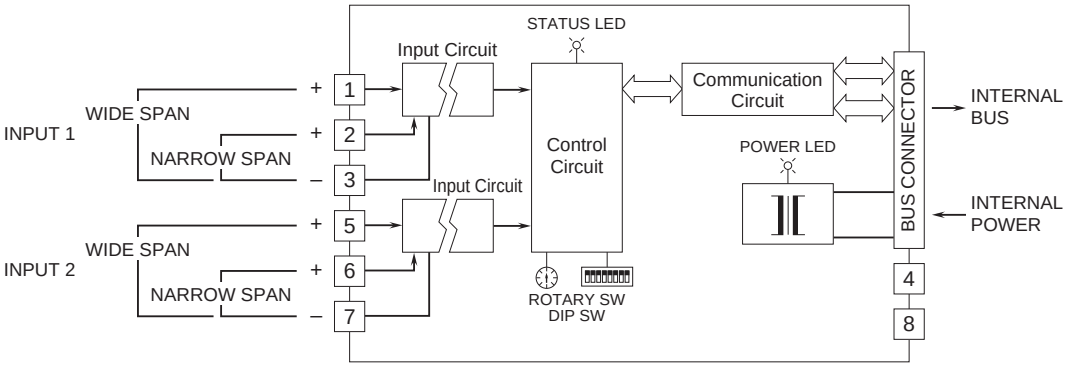

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THERMOCOUPLE INPUT MODULE

(2 points)

MODEL: R6D-TS2 R6N-TS2 R6S-TS2

GENERAL SPECIFICATIONS

Isolation: Input 1 to input 2 to internal bus or power
Zero adjustments: PC programming
Span adjustments: PC programming
Input type: Selectable with the side DIP SW or PC programming
Cold Junction Compensation: CJC sensor incorporated
Converted data range:
•Engineering unit value (°C, K) × 10 (integer)
•Engineering unit value (°F)
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.

INPUT SPECIFICATIONS

Thermocouple: K, E, J, T, B, R, S, C, N, U, L, P, PR
Input resistance: 30 kΩ min.
Burnout sensing: ≤ 0.1 μA

T/C	BURNOUT INDICATION (°C)		CONFORMANCE RANGE (°C)
	Downscale	Upscale	
K (CA)	-272	+1472	-150 to +1370
E (CRC)	-272	+1100	-170 to +1000
J (IC)	-260	+1300	-180 to +1200
T (CC)	-272	+ 500	-170 to + 400
B (RH)	24	1920	400 to 1760
R	-100	+1860	200 to 1760
S	-100	+1860	0 to 1760
C (WRe 5-26)	-52	+2416	0 to 2315
N	-272	+1400	-130 to +1300
U	-252	+ 700	-200 to +600
L	-252	+1000	-200 to +900
P (Platinel II)	-52	+1496	0 to 1395
(PR)	-52	+1860	0 to 1760

T/C	BURNOUT INDICATION (°F)		CONFORMANCE RANGE (°F)
	Downscale	Upscale	
K (CA)	-458	+2682	-238 to +2498
E (CRC)	-458	+2012	-274 to +1832
J (IC)	-436	+2372	-292 to +2192
T (CC)	-458	+932	-274 to +752
B (RH)	75	3488	752 to 3200
R	-148	+3380	392 to 3200
S	-148	+3380	32 to 3200
C (WRe 5-26)	-62	+4381	32 to 4199
N	-458	+2552	-202 to +2372
U	-422	+1292	-328 to +1112
L	-422	+1832	-328 to +1652
P (Platinel II)	-62	+2725	32 to 2543
(PR)	-62	+3380	32 to 3200

PERFORMANCE

Conversion accuracy: ±1°C (±1.8°F) except ±2°C (±3.6°F) for B, R, S, C, PR
Conversion rate: 250 msec. / 500 msec.(PC programmable. Factory set to 500 msec.)
Data allocation: 2
Cold junction compensation error:
±3°C at 25 ±10°C
±5.4°F at 77 ±18°F
Temp. coefficient: ±0.01 %/°C (±0.006 %/°F)
Response time: Conversion rate × 2 + 50 msec. or less
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (input 1 to input 2 to internal bus or power to ground)

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

■ THERMOCOUPLE TYPE

T/C	INPUT 1 SW3			INPUT 2 SW3		
	1	2	3	4	5	6
K (CA) (*)						
E (CRC)	■			■		
J (IC)		■			■	
T (CC)	■	■		■	■	
B (RH)			■			■
R	■		■	■		■
S		■	■		■	■
C (WRe 5-26)	■	■	■	■	■	■

Use PC Configurator Software (model: R6CON) to set N, U, L, P (Platinel II) and PR thermocouples.

■ BURN OUT

BURN OUT	SW3-7
Upscale (*)	
Downscale	■

■ CONFIGURATION MODE

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

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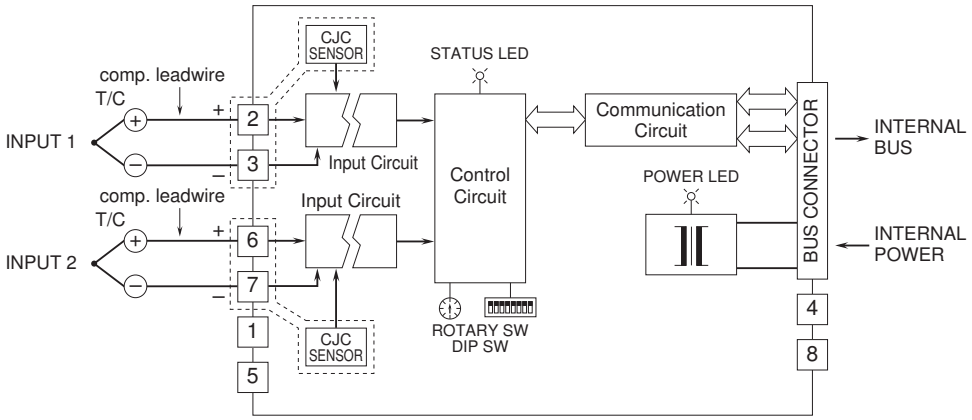
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



THERMOCOUPLE INPUT MODULE

(high-accuracy, 2 points)

MODEL: R6D-TS2A R6N-TS2A R6S-TS2A

GENERAL SPECIFICATIONS

Isolation: Input 1 to input 2 to internal bus or power
Zero adjustments: PC programming
Span adjustments: PC programming
Input type: Selectable with the side DIP SW or PC programming
Cold junction compensation: CJC sensor attached to the input terminals
Converted data range:
•Engineering unit value (°C, K) × 10 (integer)
•Engineering unit value (°F)
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.

INPUT SPECIFICATIONS

Thermocouple: K, E, J, T, B, R, S, C, N, U, L, P, PR
Input resistance: 30 kΩ min.
Burnout sensing: ≤ 0.1 μA

T/C	BURNOUT INDICATION (°C)		CONFORMANCE RANGE (°C)
	Downscale	Upscale	
K (CA)	-272	+1472	-150 to +1370
E (CRC)	-272	+1100	-170 to +1000
J (IC)	-260	+1300	-180 to +1200
T (CC)	-272	+ 500	-170 to + 400
B (RH)	24	1920	400 to 1760
R	-100	+1860	200 to 1760
S	-100	+1860	0 to 1760
C (WRe 5-26)	-52	+2416	0 to 2315
N	-272	+1400	-130 to +1300
U	-252	+ 700	-200 to +600
L	-252	+1000	-200 to +900
P (Platinel II)	-52	+1496	0 to 1395
(PR)	-52	+1860	0 to 1760

T/C	BURNOUT INDICATION (°F)		CONFORMANCE RANGE (°F)
	Downscale	Upscale	
K (CA)	-458	+2682	-238 to +2498
E (CRC)	-458	+2012	-274 to +1832
J (IC)	-436	+2372	-292 to +2192
T (CC)	-458	+932	-274 to +752
B (RH)	75	3488	752 to 3200
R	-148	+3380	392 to 3200
S	-148	+3380	32 to 3200
C (WRe 5-26)	-62	+4381	32 to 4199
N	-458	+2552	-202 to +2372
U	-422	+1292	-328 to +1112
L	-422	+1832	-328 to +1652
P (Platinel II)	-62	+2725	32 to 2543
(PR)	-62	+3380	32 to 3200

PERFORMANCE

Conversion accuracy: ±0.5°C (±0.9°F) except ±1°C (±1.8°F) for B, R, S, C, PR
Conversion rate: 250 msec. / 500 msec.(PC programmable. Factory set to 500 msec.)
Data allocation: 2
Cold junction compensation error:
±1°C max. at 25 ±10°C
±1.8°F max. at 77 ±18°F
Temp. coefficient: ±0.01 %/°C (±0.006 %/°F)
Response time: Conversion rate × 2 + 50 msec. or less
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (input 1 to input 2 to internal bus or power to ground)

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

■ THERMOCOUPLE TYPE

T/C	INPUT 1 SW3			INPUT 2 SW3		
	1	2	3	4	5	6
K (CA) (*)						
E (CRC)	■			■		
J (IC)		■			■	
T (CC)	■	■		■	■	
B (RH)			■			■
R	■		■	■		■
S		■	■		■	■
C (WRe 5-26)	■	■	■	■	■	■

Use PC Configurator Software (model: R6CON) to set N, U, L, P (Platinel II) and PR thermocouples.

■ BURN OUT

BURN OUT	SW3-7
Upscale (*)	
Downscale	■

■ CONFIGURATION MODE

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

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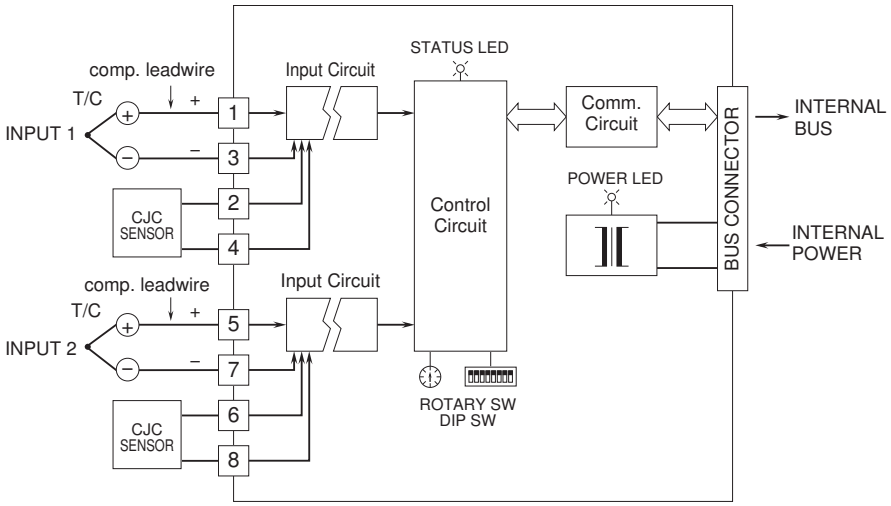
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



RTD INPUT MODULE
(2 points)

MODEL: R6D-RS2 R6N-RS2 R6S-RS2

GENERAL SPECIFICATIONS
Isolation: Input 1 to input 2 to internal bus or power
Zero adjustments: PC programming
Span adjustments: PC programming
Input type: Selectable with the side DIP SW or PC programming
Converted data range:
•Engineering unit value (°C, K) × 10 (integer)
•Engineering unit value (°F)
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.

INPUT SPECIFICATIONS
Input resistance: ≥ 1 MΩ
Maximum leadwire resistance: 100 Ω per wire
Sensing current: ≤ 1 mA

RTD	BURNOUT INDICATION (°C)		CONFORMANCE
	Downscale	Upscale	RANGE (°C)
Pt 100 (JIS '97/IEC)	-240	+900	-200 to +850
Pt 100 (JIS '89)	-240	+900	-200 to +660
JPt 100 (JIS '89)	-236	+560	-200 to +510
Pt 50 Ω (JIS '81)	-236	+700	-200 to +649
Ni 100	-100	+252	-80 to +250
Cu 10 (25°C)	-212	+312	-50 to +250
Cu 50	-100	+200	-50 to +150

RTD	BURNOUT INDICATION (°F)		CONFORMANCE
	Downscale	Upscale	RANGE (°F)
Pt 100 (JIS '97/IEC)	-400	+1652	-328 to +1562
Pt 100 (JIS '89)	-400	+1652	-328 to +1220
JPt 100 (JIS '89)	-393	+1040	-328 to +950
Pt 50 Ω (JIS '81)	-393	+1292	-328 to +1200
Ni 100	-148	+486	-112 to +482
Cu 10 (25°C)	-350	+594	-58 to +482
Cu 50	-148	+392	-58 to +302

PERFORMANCE
Conversion accuracy: ±1°C (±1.8°F) except ±3°C (±5.4°F) for Cu 10 @ 25°C
Conversion rate: 250 msec. / 500 msec.(PC programmable. Factory set to 500 msec.)
Data allocation: 2
Temp. coefficient: ±0.01 %/°C (±0.006 %/°F)
Response time: Conversion rate × 2 + 50 msec. or less
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (input 1 to input 2 to internal bus or power to ground)

OPERATING MODE SETTING
(*) Factory setting
■ = ON, Blank = OFF

■ RTD TYPE

RTD	INPUT 1 SW3			INPUT 2 SW3		
	1	2	3	4	5	6
Pt 100 (JIS '97/IEC) (*)						
Pt 100 (JIS '89)	■			■		
JPt 100 (JIS '89)		■			■	
Pt 50 (JIS '81)	■	■		■	■	
Ni 100			■			■
Cu 10 @25°C	■		■	■		■
Cu 50		■	■		■	■

■ BURN OUT

BURN OUT	SW3-7
Upscale (*)	
Downscale	■

■ CONFIGURATION MODE

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

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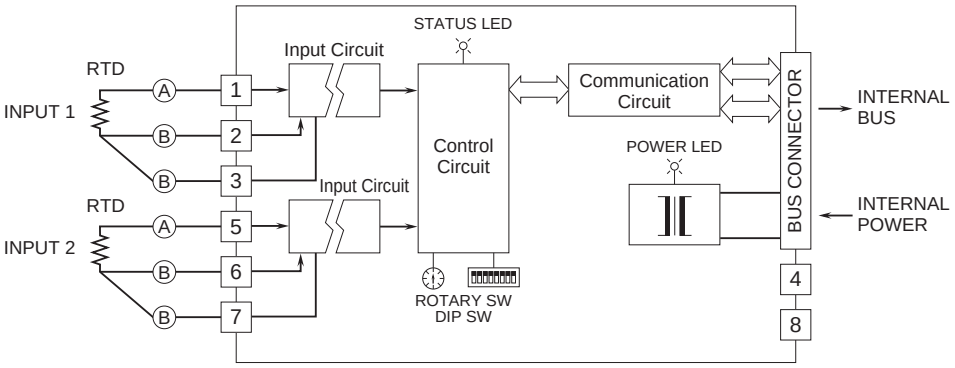

4 – 20 mA INPUT MODULE

MODEL: R6D-DS1 R6N-DS1 R6S-DS1

■ **CONFIGURATION MODE**

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

GENERAL SPECIFICATIONS

Isolation: Input to internal bus or power
Zero adjustments: PC programming
Span adjustments: PC programming
Converted data range: 0 – 10000
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.

SUPPLY OUTPUT

(across the terminals 3 – 4)
Output voltage: 24 – 28 V DC with no load
19 V DC min. at 20 mA
Current rating: ≤ 22 mA DC
Permissible leadwire resistance:
R L ≤ ((19 - min. XMTR Operational Voltage) V ÷ 0.02 A) Ω
• **Shortcircuit Protection**
Current limited: 45 mA max.
Protected time duration: No limit

INPUT SPECIFICATIONS

■ **DC Current**: 4 – 20 mA DC
Input resistance: 250 Ω resistor incorporated

PERFORMANCE

Conversion rate (PC programmable. Factory set to 80 msec.)/conversion accuracy:
10 msec./±0.8 %
20 msec./±0.4 %
40 msec./±0.2 %
80 msec./±0.1 %
Data allocation: 1
Temp. coefficient: ±0.01 %/°C (±0.006 %/°F)
Response time: Conversion rate × 2 + 50 msec. or less
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute
(input to internal bus or power to ground)

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

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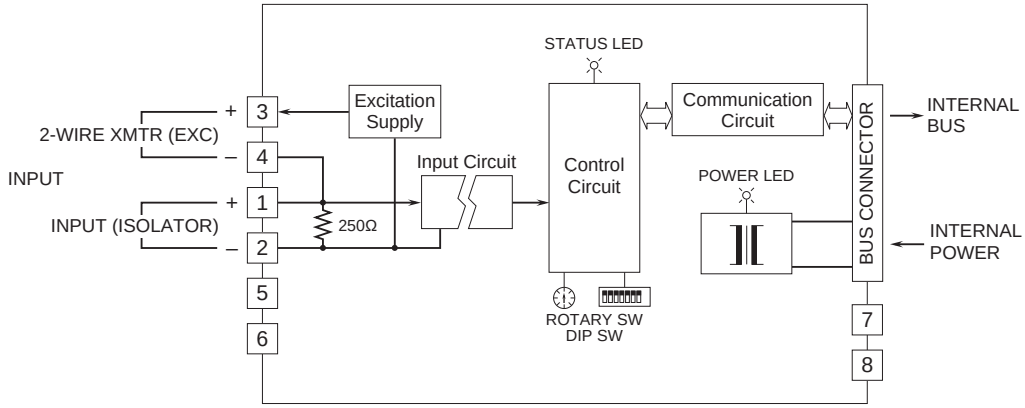
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



DC VOLTAGE OUTPUT MODULE

(2 points)

MODEL: R6D-YV2 R6N-YV2 R6S-YV2

GENERAL SPECIFICATIONS

Isolation: Output 1 to output 2 to internal bus or power
Zero adjustments: PC programming
Span adjustments: PC programming
Output range: Selectable with the side DIP SW or PC programming
Converted data range: 0 – 10000 of the oputput range
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.

OUTPUT SPECIFICATIONS

Overrange output: -11.5 – +11.5 V DC or -15 to +115 %
■ **Narrow Span**: -1 – +1 V, 0 – 1 V, -0.5 – +0.5 V DC
Load resistance: 10 kΩ min.
■ **Wide Span**: -10 – +10 V, -5 – +5 V,
0 – 10 V, 0 – 5 V, 1 – 5 V DC
Load resistance: 10 kΩ min.

PERFORMANCE

Conversion accuracy: ±0.1 %
Data allocation: 2
Temp. coefficient: ±0.01 %/°C (±0.006 %/°F)
Response time: ≤ 0.25 sec. (0 – 90 %)
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (output 1 to output 2 to internal bus or power to ground)

FUNCTIONS

■ OUTPUT HOLD

The output function in case of a loss of communication is selectable with the side DIP SW: Reset the output (to -15 % or -11.5 V), Hold the output (last normally received data) or Fix the output at a specific value (PC programming).
The output is held at -11.5 V or -15 % of the output range until normal data is received at the startup.

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

■ **OUTPUT RANGE**

OUTPUT RANGE	OUTPUT 1 SW3			OUTPUT 2 SW3		
	1	2	3	4	5	6
-10 – +10V DC (*)						
-5 – +5V DC	■			■		
-1 – +1V DC		■			■	
0 – 10V DC	■	■		■	■	
0 – 5V DC			■			■
1 – 5V DC	■		■	■		■
0 – 1V DC		■	■		■	■
-0.5 – +0.5V DC	■	■	■	■	■	■

■ **OUTPUT FUNCTION AT A LOSS OF COMMUNICATION**

OUTPUT FUNCTION	SW3-7
Hold the last normally received data (*)	
Reset to -15% or -11.5V of the output range	■

■ **CONFIGURATION MODE**

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

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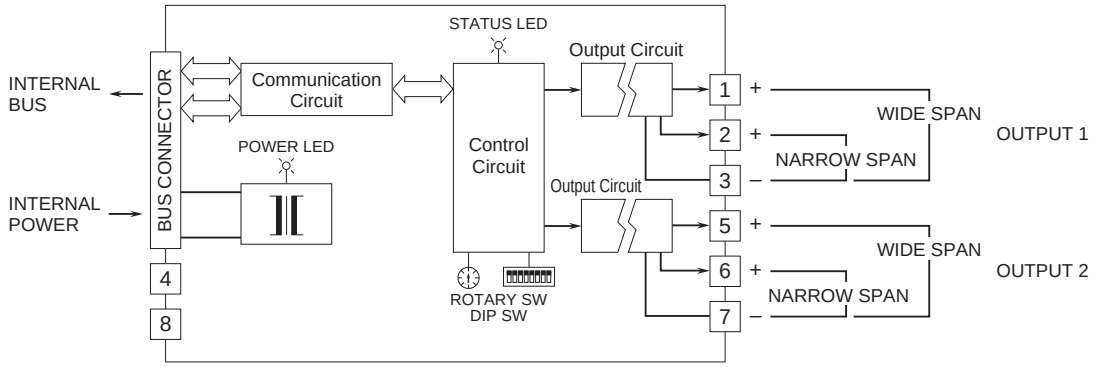
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



DC CURRENT OUTPUT MODULE

(2 points)

MODEL: R6D-YS2 R6N-YS2 R6S-YS2

■ CONFIGURATION MODE

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

GENERAL SPECIFICATIONS

Isolation: Output 1 to output 2 to internal bus or power
Zero adjustments: PC programming
Span adjustments: PC programming
Converted data range: 0 – 10000 of the oputput range
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.

OUTPUT SPECIFICATIONS

Overrange output: -15 to +115 %
Output range: 4 – 20 mA DC
Load resistance: 550 Ω max.

PERFORMANCE

Conversion accuracy: ±0.1 %
Data allocation: 2
Temp. coefficient: ±0.01 %/°C (±0.006 %/°F)
Response time: ≤ 0.25 sec. (0 – 90 %)
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (output 1 to output 2 to internal bus or power to ground)

FUNCTIONS

■ OUTPUT HOLD

The output function in case of a loss of communication is selectable with the side DIP SW: Reset the output (to -15 %), Hold the output (last normally received data) or Fix the output at a specific value (PC programming).
The output is held at -15 % of the output range until normal data is received at the startup.

■ OUTPUT WIRE BREAKDOWN DETECTION

In the case of wire breakdown, output error is detected. Then, the status indicator LED blinks (0.5 seconds per cycle) and the flag of error is set on the PLC etc.
Note: Wire breakdown detection is applicable with Firmware Version 2.00 or later.

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

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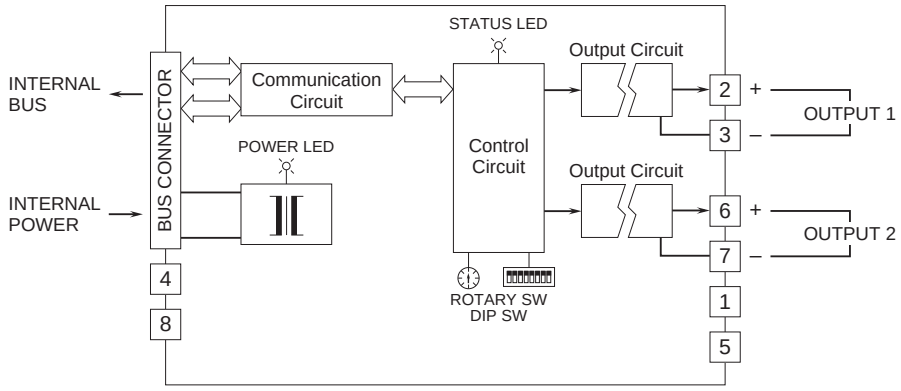
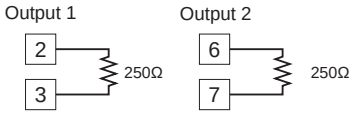


■ UNUSED OUTPUT TERMINALS

Install the attached resistor between the unused output terminals as indicated below.



When the unused output terminals are open, the status indicator LED blinks and the flag of error is set on the PLC etc.

Note: Output wire breakdown detection is applicable with Firmware Version 2.00 or later.

DISCRETE INPUT MODULE, 4 points

MODEL: R6D-DA4 R6N-DA4 R6S-DA4

GENERAL SPECIFICATIONS

Isolation: Input to internal bus or power
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.
Discrete input status indicators: Red LED;
Refer to the instruction manual for details.

INPUT

Common: Positive or negative common (NPN/PNP) per 2 points
Number of I/O: Input, 4 points
Rated input voltage: 24 V DC ±10 %; ripple 5 %p-p max.
ON voltage / current: ≥ 15 V DC (input – COM) / ≥ 3.5 mA
OFF voltage / current: ≤ 5 V DC (input – COM) / ≤ 1 mA
Input current: ≤ 5.5 mA per point at 24 V DC
Input resistance: Approx. 4.4 kΩ
ON delay: ≤ 2.0 msec.
OFF delay: ≤ 2.0 msec.

PERFORMANCE

Data allocation: 1
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute
(input to internal bus or power to ground)

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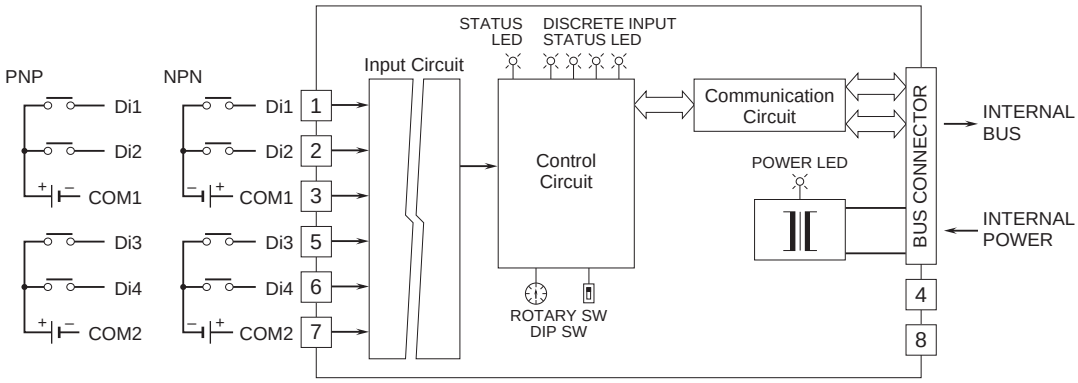
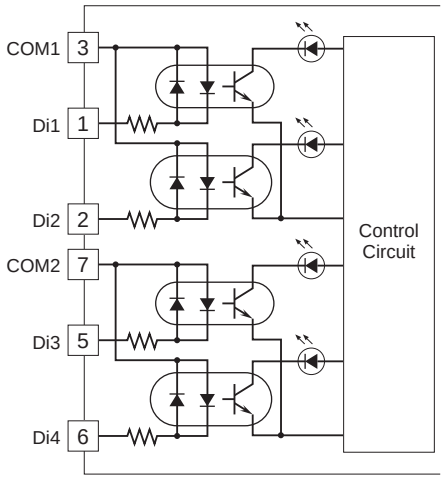


■ **Input Circuit**



NPN TRANSISTOR OUTPUT MODULE, 4 points

MODEL: R6D-DC4A R6N-DC4A R6S-DC4A

GENERAL SPECIFICATIONS

Isolation: Output to internal bus or power
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.
Discrete output status indicators: Red LED;
Refer to the instruction manual for details.

OUTPUT

Common: Negative common (NPN) per 4 points
Number of I/O: Output, 4 points
Maximum outputs applicable at once: No limit (at 24 V DC)
Rated load voltage: 24 V DC ±10 %
Rated output current: 0.25 A per point, 2.0 A per common
Residual voltage: ≤ 1.2 V
Leakage current: ≤ 0.1 mA
ON delay: ≤ 0.5 msec.
OFF delay: ≤ 1.5 msec.

PERFORMANCE

Data allocation: 1
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500V AC @1 minute
(output to internal bus or power to ground)

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

■ OUTPUT FUNCTION AT A LOSS OF COMMUNICATION

OUTPUT FUNCTION	SW3-7
Hold the last normally received data (*)	
Fix at OFF	■

■ CONFIGURATION MODE

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

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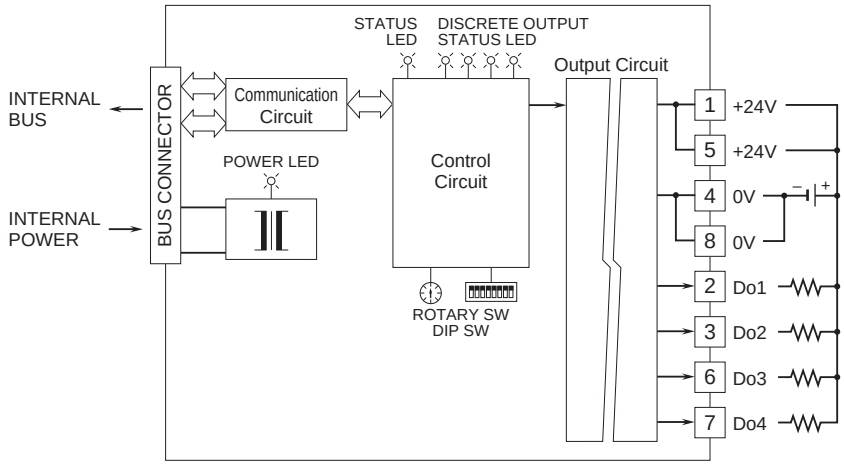
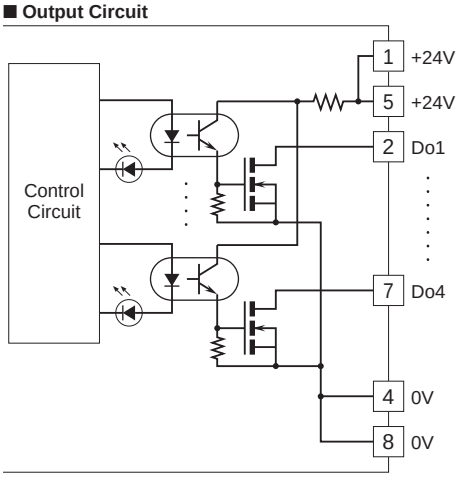


■ Output Circuit



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PNP TRANSISTOR OUTPUT MODULE, 4 points

MODEL: R6D-DC4B R6N-DC4B R6S-DC4B

GENERAL SPECIFICATIONS

Isolation: Output to internal bus or power
Power indicator: Green LED; Refer to the istruction manual for details.
Status indicator: Bi-color (red/green) LED;
Refer to the instruction manual for details.
Discrete output status indicators: Red LED;
Refer to the instruction manual for details.

OUTPUT

Common: Positive common (PNP) per 4 points
Number of I/O: Output, 4 points
Maximum outputs applicable at once: No limit (at 24 V DC)
Rated load voltage: 24 V DC ±10 %
Rated output current: 0.25 A per point, 2.0 A per common
Residual voltage: ≤ 1.2 V
Leakage current: ≤ 0.1 mA
ON delay: ≤ 0.5 msec.
OFF delay: ≤ 1.5 msec.

PERFORMANCE

Data allocation: 1
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500V AC @1 minute
(output to internal bus or power to ground)

OPERATING MODE SETTING

(*) Factory setting
■ = ON, Blank = OFF

■ OUTPUT FUNCTION AT A LOSS OF COMMUNICATION

OUTPUT FUNCTION	SW3-7
Hold the last normally received data (*)	
Fix at OFF	■

■ CONFIGURATION MODE

CONFIGURATION MODE	SW3-8
DIP SW (*)	
PC	■

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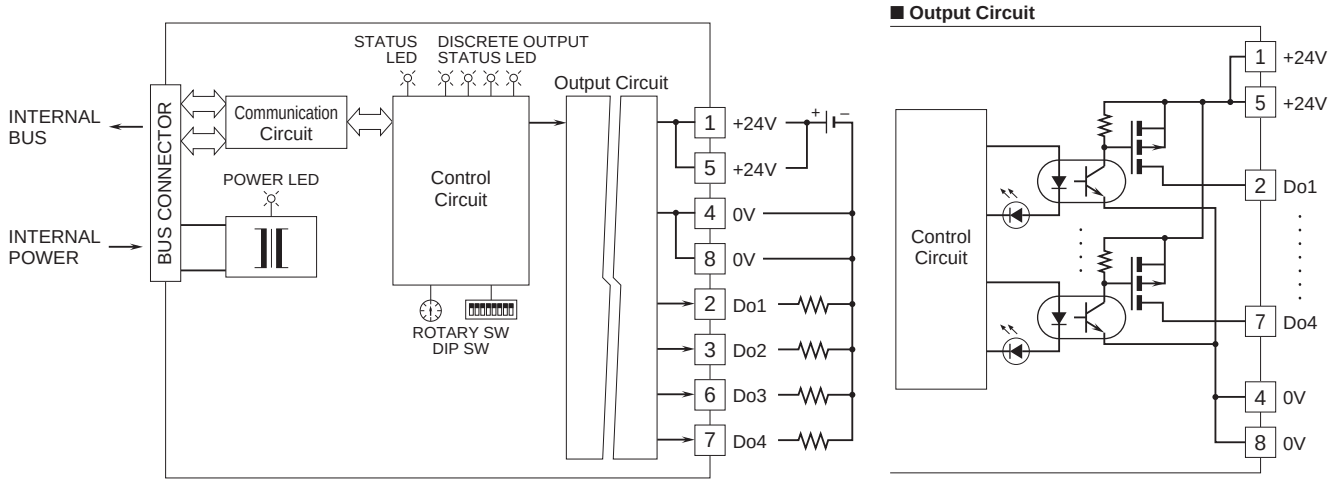

Specifications are subject to change without notice.

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