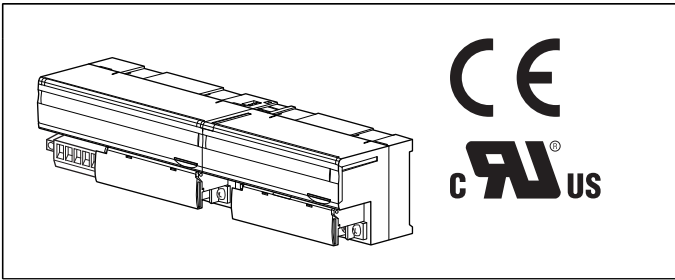


Remote I/O R7 Series

DeviceNet I/O MODULE



ORDERING INFORMATION

- Basic module: R7D-[1][2]
Specify a code from below for each of [1] and [2].
(e.g. R7D-SV4/Q)
- Specify the specification for option code /Q
(e.g. /C01)
- Extension module: R7D-[1][2]
Specify a code from below for each of [1] and [2].
(e.g. R7D-EC16A/Q)
- Specify the specification for option code /Q
(e.g. /C01)

BASIC MODULE: R7D-[1][2]

[1] I/O TYPE

- DA16:** Discrete input, 16 points
(Option /UL Not selectable)
- DC16A:** NPN transistor output, 16 points
(Option /UL Not selectable)
- DC16B:** PNP transistor output, 16 points
(Option /UL Not selectable)
- DC8C:** Relay contact output, 8 points
(Option /UL Not selectable)
(Not usable with 'extension' modules)
- RR8:** Remote control relay control, 8 points
(CE not available. Option /UL Not selectable)
- SV4:** DC voltage/current input (10 V/20 mA), 4 points
- TS4:** Thermocouple input, 4 points
- RS4:** RTD input, 4 points
(Option /UL Not selectable)
- MS4:** Potentiometer input, 4 points
(Option /UL Not selectable)
- CT4E:** AC current input, 4 points, clamp-on current sensor CLSE use (Option /UL Not selectable)
- PA8:** Totalized pulse input, 8 points,
(Option /UL not selectable)
- YV2:** DC voltage output, 2 points

- YV2A:** DC voltage output, external power supply, 2 points
(Option /UL Not selectable)
- YS2:** DC current output, 2 points
- YS2A:** DC current output, external power supply, 2 points
(Option /UL Not selectable)

[2] OPTIONS (multiple selections)

Standards & Approvals

- blank:** CE marking
- /UL:** UL approval, CE marking

Other Options

- blank:** none
- /Q:** Option other than the above (specify the specification)
(UL not available)

EXTENSION MODULE: R7D-[1][2]

[1] I/O TYPE

- EA8:** Discrete input, 8 points
(Option /UL Not selectable)
- EA16:** Discrete input, 16 points
(Option /UL Not selectable)
- EC8A:** NPN transistor output, 8 points
(Option /UL Not selectable)
- EC16A:** NPN transistor output, 16 points
(Option /UL Not selectable)
- EC8B:** PNP transistor output, 8 points
(Option /UL Not selectable)
- EC16B:** PNP transistor output, 16 points
(Option /UL Not selectable)

[2] OPTIONS

Other Options

- blank:** none
- /Q:** Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)

- /C01:** Silicone coating
- /C02:** Polyurethane coating
- /C03:** Rubber coating

FUNCTIONS & FEATURES

The R7D interfaces analog and discrete I/O signals with a PLC or PC via DeviceNet.

A 'basic' module can be attached with an 'extension' module.

(R7D-DC8C can not be attached with an 'extension' module.)

By combining two modules, single station can handle mixed

analog and discrete signals, 32-point discrete inputs, 32-point discrete outputs, 16-point discrete I/Os and other combinations of signals.

Input sensor type (thermocouple, RTD) and range can be selected with the front DIP switches for all channels. In order to set different selections for individual channels, zero/span adjustments, scaling and temperature unit, use the PC Configurator Software (model: R7CON)

RELATED PRODUCTS

- PC configurator software (model: R7CON)
- EDS file

The EDS files for basic modules and configurator software are 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.

- Clamp-on current sensor (model: CLSE)

For R7D-CT4E, the clamp-on current sensors must be ordered separately. Required number depends upon the channel number.

GENERAL SPECIFICATIONS

• Common Specifications

Network power supply voltage: 11 – 25 V DC

(supplied through the network terminal)

Insulation resistance: $\geq 100 \text{ M}\Omega$ with 500 V DC

Dielectric strength: 1500 V AC @1 minute
(between isolated circuits)

Operating temperature: -10 to +55°C (14 to 131°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Atmosphere: No corrosive gas or heavy dust

Storage temperature: -20 to +65°C (-4 to +149°F)

Mounting: DIN rail (35 mm wide)

Connection

DeviceNet: Euro type connector terminal

Applicable wire size: 0.2 to 2.5 mm², stripped length 7 mm

I/O: M3 separable screw terminals (torque 0.5 N·m)

Screw terminal material: Nickel-plated steel

Solderless terminal: Refer to the drawing at the end of the section.

Recommended manufacturer: Japan Solderless Terminal MFG.Co.Ltd, Nichifu Co.,Ltd

Applicable wire size: 0.25 to 1.65 mm² (AWG22 to 16)

Housing material: Flame-resistant resin (gray)

■ Current Consumption at 24 V DC; at 11 V DC; Weight

R7D-DA16: Approx. 40 mA; 75 mA; 200 g (7.1 oz)

R7D-DC16A: Approx. 50 mA; 90 mA; 200 g (7.1 oz)

R7D-DC16B: Approx. 50 mA; 90 mA; 200 g (7.1 oz)

R7D-DC8C: Approx. 50 mA (60 mA); 90 mA; 200 g (7.1 oz)

R7D-RR8: Approx. 50 mA; 90 mA; 180 g (6.3 oz)

R7D-SV4: Approx. 60 mA; 110 mA; 200 g (7.1 oz)

R7D-TS4: Approx. 60 mA; 110 mA; 200 g (7.1 oz)

R7D-RS4: Approx. 60 mA; 110 mA; 200 g (7.1 oz)

R7D-MS4: Approx. 60 mA; 110 mA; 200 g (7.1 oz)

R7D-CT4E: Approx. 80 mA; 170 mA; 200 g (7.1 oz)

R7D-PA8: Approx. 40 mA; 70 mA; 200 g (7.1 oz)

R7D-YV2: Approx. 70 mA; 130 mA; 150 g (5.3 oz)

R7D-YV2A: Approx. 35 mA (40 mA); 60 mA; 150 g (5.3 oz)

R7D-YS2: Approx. 100 mA; 200 mA; 150 g (5.3 oz)

R7D-YS2A: Approx. 35 mA (70 mA); 55 mA; 150 g (5.3 oz)

R7D-EA8: Approx. 10 mA; 10 mA; 90 g (3.2 oz)

R7D-EA16: Approx. 20 mA; 20 mA; 150 g (5.3 oz)

R7D-EC8A: Approx. 10 mA; 20 mA; 90 g (3.2 oz)

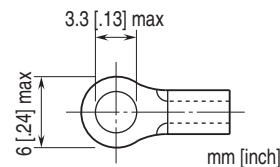
R7D-EC16A: Approx. 30 mA; 60 mA; 150 g (5.3 oz)

R7D-EC8B: Approx. 10 mA; 20 mA; 90 g (3.2 oz)

R7D-EC16B: Approx. 30 mA; 60 mA; 150 g (5.3 oz)

The consumed current of supply power for the output is shown in ().

■ Recommended solderless terminal



DeviceNet COMMUNICATION

Network cable: Approved for DeviceNet

Baud rate setting: 125 kbps (default), 250 kbps, 500 kbps, auto-tracking (rotary switch)

(Refer to the instruction manual.)

Status indicator LEDs: MS, NS

(Refer to the instruction manual for details.)

Node address setting: 1 - 63 (rotary switch, default:00)

(Refer to the instruction manual.)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

Low Voltage Directive

(R7D-DC8C only. Refer to the instruction manual for the detailed information.)

EN 61010-1, EN 61010-2-201

Measurement Category II (output)

Pollution Degree 2

Output to communication: Basic insulation (150 V)

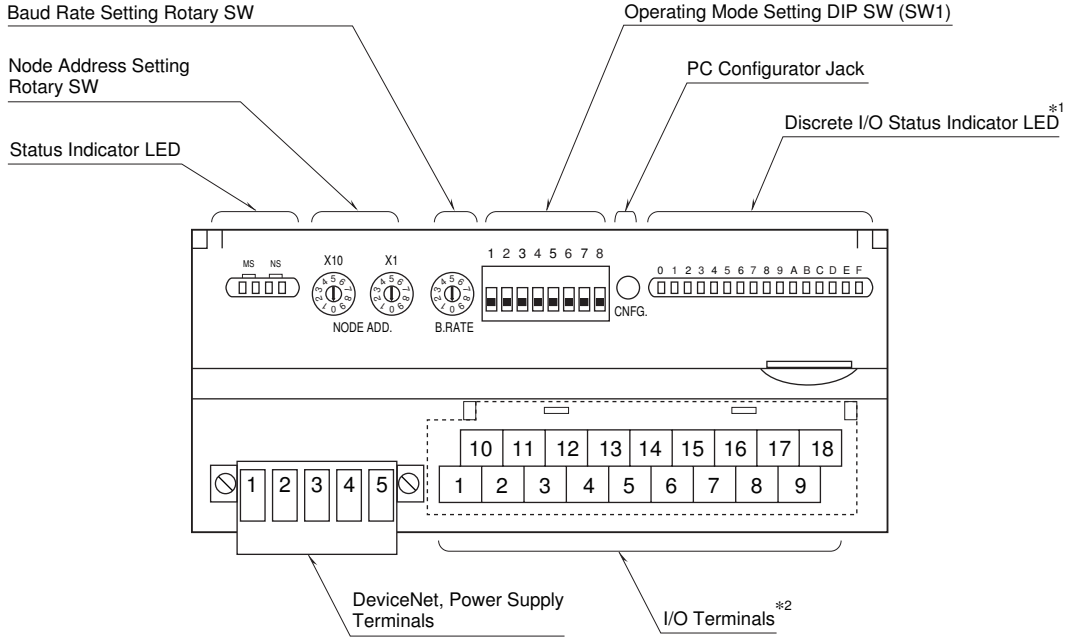
RoHS Directive

Approval:

UL/C-UL nonincendive Class I, Division 2,
 Groups A, B, C, and D
 (ANSI/ISA-12.12.01, CAN/CSA-C22.2 No.213)
 UL/C-UL general safety requirements
 (UL 61010-1, CAN/CSA-C22.2 No.61010-1)

EXTERNAL VIEW

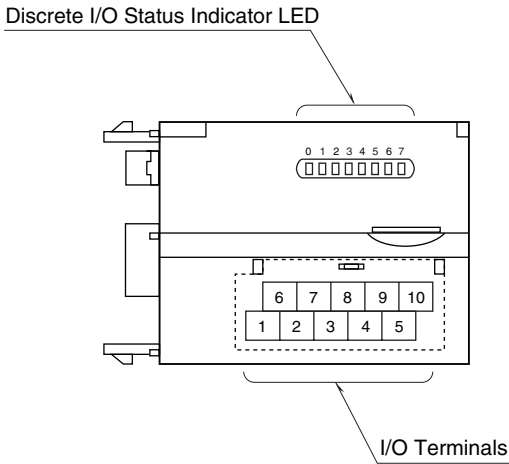
■ BASIC MODULE



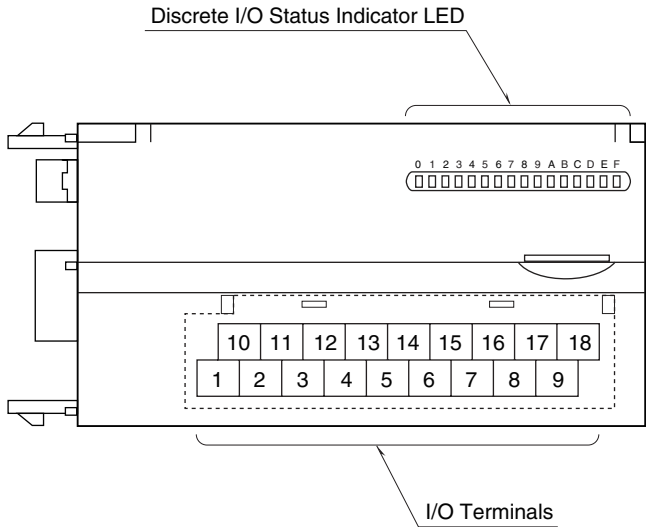
*1. Not available with analog I/O modules.
 *2. 10 screw terminals for analog output modules.

■ EXTENSION MODULE

• DISCRETE, 8 POINTS

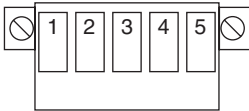


• DISCRETE, 16 POINTS



CONNECTION DIAGRAMS

■ DeviceNet TERMINAL ASSIGNMENT



NO.	ID	FUNCTION, NOTES
1	V+	Network power supply +
2	CAN_H	Network data High
3	Drain	Shield
4	CAN_L	Network data Low
5	V-	Network power supply -

DATA CONVERSION

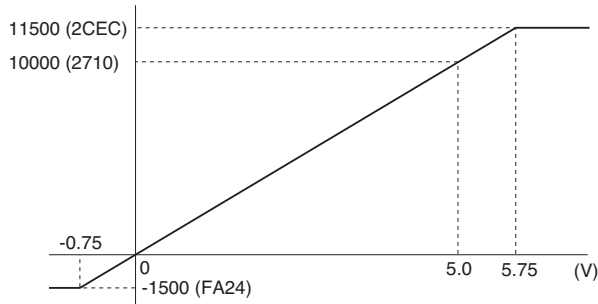
■ 0 – 100% DATA CONVERSION

Analog input data is converted into digital representations of 0 – 100% proportional to each scaled range. The converted % values are multiplied by 100 and expressed in 16 bits.

Overrange input is possible from -15 to +115% of the nominal range. When the signal exceeds the limit, the data is fixed at -15% or +115% respectively. Negative value is represented in 2's complements.

• Input Range 0 – 5 V DC

Input Value	Input %	Converted Data, Decimal	Converted Data, Hex
≤ -0.75 V	-15%	-1500	FA24
0 V	0%	0	0
5 V	100%	10000	2710
≥ 5.75 V	115%	11500	2CEC



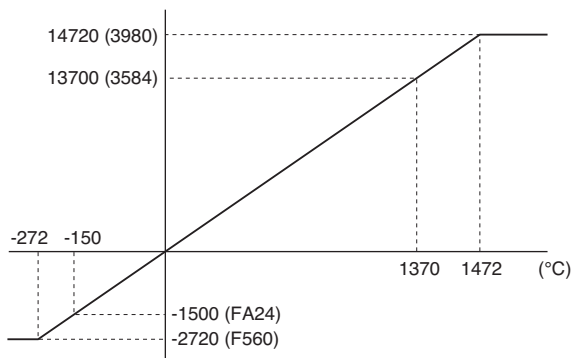
Analog output is converted in the reverse order of the input data. The output range 0 – 5 V DC is expressed as 10000 at 5.0 V (100%) and 0 at 0 V (0%).

■ ENGINEERING UNIT CONVERSION

Engineering unit value °C or K is multiplied by 10 and expressed in 16 bits. °F data is represented in engineering unit value, without multiplication. Engineering unit value A is multiplied by 100 or 1000, expressed in 16 bits. Negative value is represented in 2's complements.

• Input TYPE K Thermocouple

Input Value	Converted Data, Decimal	Converted Data, Hex
≤ -272°C	-2720	F560
-150°C	-1500	FA24
1370°C	13700	3584
≥ 1472°C	14720	3980



■ COUNT VALUE

The count value is 32-bit data. It is divided in 2 words of 16 bits represented with 2 addresses. The lower address is allocated in the lower word (LSB) and the upper address in the upper word (MSB). The count value is 0 - 4 294 967 295. The maximum count value available is 1 000 - 4 294 967 295. In case of overflow, the value is reset to 0 or 1 (configurable) from which the count will restart. The preset of the count value is also available. Use the R7CON or commands for the configuration.

DATA ALLOCATION

'Begin' address is determined by the R7D's node address and the master setting.

• **Example 1. R7D-SV4, without Status**

Output Data		Input Data
Begin +0	R7D-SV4 CH0	None
+1	CH1	
+2	CH2	
+3	CH3	

• **Example 2. R7D-TS4 + R7D-EC16x, with Status**

Output Data		Input Data
Begin +0	R7D-TS4 CH0	R7D-EC16x
+1	CH1	
+2	CH2	
+3	CH3	
+4	Status	

• **Example 3. R7D-RS4 + R7D-EA16, with Status**

Output Data		Input Data
Begin +0	R7D-RS4 CH0	None
+1	CH1	
+2	CH2	
+3	CH3	
+4	R7D-EA16	
+5	Status	

• **Example 4. R7D-YV2 + R7D-EA16, without Status**

Output Data		Input Data
Begin +0	R7D-EA16	R7D-YV2 CH0

• **Example 5. R7D-YS2 + R7D-EC16x, with Status**

Output Data		Input Data	
Begin +0	Status	R7D-YS2 CH0	
			+1 CH1
			+2 R7D-EC16x

• **Example 6. R7D-DA16 + R7D-EC16x, without Status**

Output Data		Input Data
Begin +0	R7D-DA16	R7D-EC16x

• **Example 7. R7D-DA16 + R7D-EA16, with Status**

Output Data		Input Data
Begin +0	R7D-DA16	None
+1	R7D-EA16	
+2	Status	

• Example 8. R7D-DC16x + R7D-EC16x, with Status

Output Data

Begin +0	Status
----------	--------

Input Data

Begin +0	R7D-DC16x
+1	R7D-EC16x

• Example 9. R7D-DC8C

Output Data
None

Input Data

Begin +0	
----------	--

• Example 10. R7D-RR8 + R7D-EA16, with Status

Output Data

Begin +0	R7D-RR8
+1	R7D-EA16
+2	Status

Input Data

Begin +0	R7D-RR8
----------	---------

• Example 11. R7D-RR8 + R7D-EC16x, with Status

Output Data

Begin +0	R7D-RR8
+1	Status

Input Data

Begin +0	R7D-RR8
+1	R7D-EC16x

■ R7D-PA8

The table below shows data allocation of R7D-PA8. Parameter preset and other settings are available with command setting of R7D-PA8. Set the commands according to the procedure explained next.

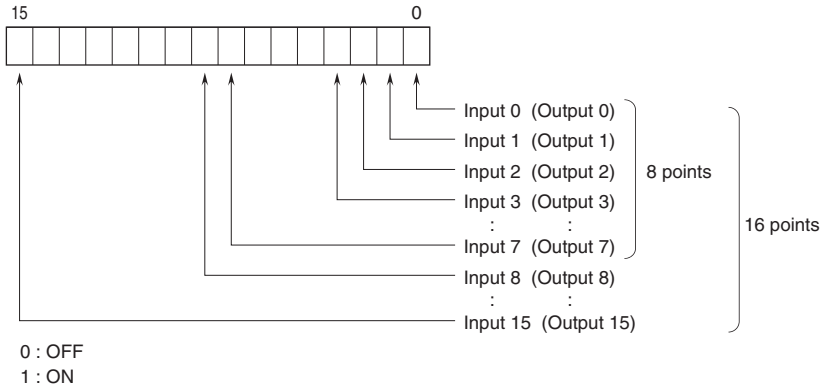
Parameter of each channel is two-word integer not signed. Make sure that data is written or read in a two-word unit. When overflowing, the value to which response can be set is "0" or "1". The maximum range available is 1000 to 4294967295. (Factory setting: 9999999)

Parameters may be preset to a value between the overflow response value and the maximum value.

OUTPUT DATA			INPUT DATA		
	15	0		15	0
Begin +0	Data to write (upper)	CH0	Begin + 0	Data to read (upper)	CH0
+1	Data to write (lower)	CH0	+1	Data to read (lower)	CH0
+2	Data to write (upper)	CH1	+2	Data to read (upper)	CH1
+3	Data to write (lower)	CH1	+3	Data to read (lower)	CH1
+4	Data to write (upper)	CH2	+4	Data to read (upper)	CH2
+5	Data to write (lower)	CH2	+5	Data to read (lower)	CH2
+6	Data to write (upper)	CH3	+6	Data to read (upper)	CH3
+7	Data to write (lower)	CH3	+7	Data to read (lower)	CH3
+8	Data to write (upper)	CH4	+8	Data to read (upper)	CH4
+9	Data to write (lower)	CH4	+9	Data to read (lower)	CH4
+10	Data to write (upper)	CH5	+10	Data to read (upper)	CH5
+11	Data to write (lower)	CH5	+11	Data to read (lower)	CH5
+12	Data to write (upper)	CH6	+12	Data to read (upper)	CH6
+13	Data to write (lower)	CH6	+13	Data to read (lower)	CH6
+14	Data to write (upper)	CH7	+14	Data to read (upper)	CH7
+15	Data to write (lower)	CH7	+15	Data to read (lower)	CH7
+16	Command setting		+16	Command setting	
	• Command address			• Command address	
	CH0: Bit 0, 1			CH0: Bit 0, 1	
	CH1: Bit 2, 3			CH1: Bit 2, 3	
	CH2: Bit 4, 5			CH2: Bit 4, 5	
	CH3: Bit 6, 7			CH3: Bit 6, 7	
	CH4: Bit 8, 9			CH4: Bit 8, 9	
	CH5: Bit 10, 11			CH5: Bit 10, 11	
	CH6: Bit 12, 13			CH6: Bit 12, 13	
	CH7: Bit 14, 15			CH7: Bit 14, 15	
	• Command			• Command	
	00: Read data			00: Read data	
	01: Preset			01: Preset	
	10: Overflow response value			10: Overflow response value	
	11: Maximum value			11: Maximum value	
+17	Extension discrete output data		+17	Extension discrete input data	
+18	–		+18	Status	

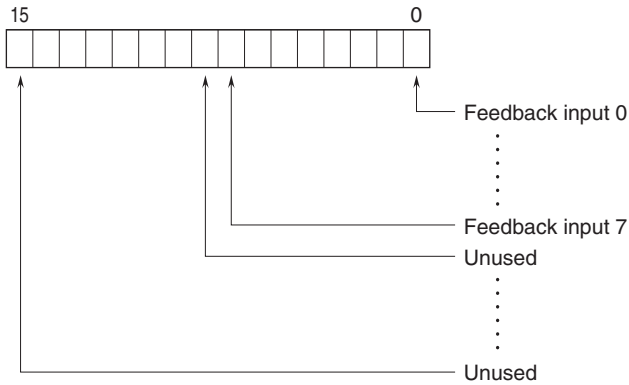
I/O DATA DESCRIPTIONS

■ DISCRETE I/O

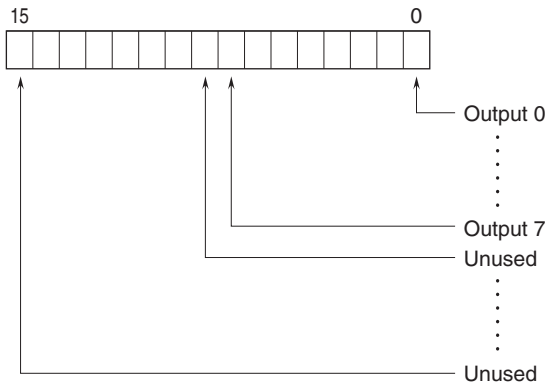


■ R7D-RR8

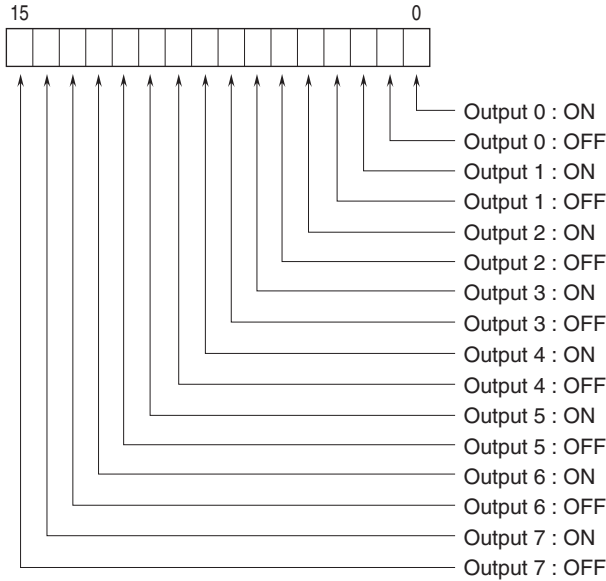
• Output Data



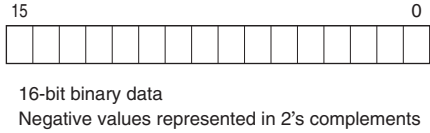
• Input Data (output data length: 8 bit)



• Input Data (output data length: 16 bit)

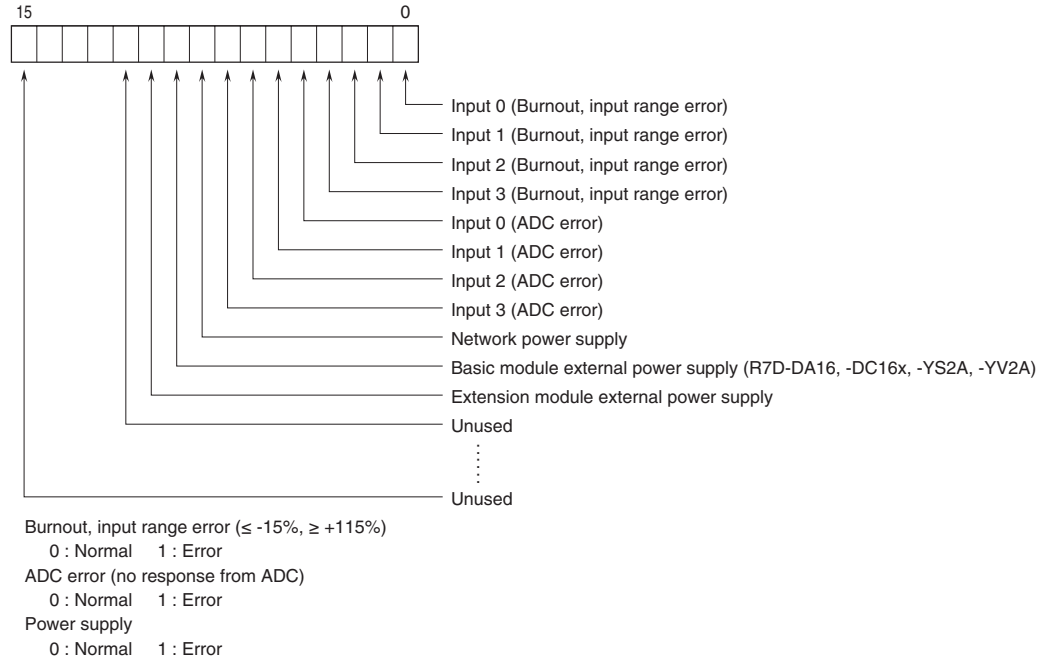


■ ANALOG I/O



■ STATUS

- Bit 0 to 7: Analog input modules (models: R7D-SV4, R7D-TS4, R7D-RS4, R7D-MS4, R7D-CT4E) can show input status of each channel.
Analog output modules (models: R7D-YS2, R7D-YS2A, R7D-YV2, R7D-YV2A), discrete I/O modules (models: R7D-DA16, R7D-DCx) and remote control relay control module (model: R7D-RR8) shows '0' at the same address.
- Bit 8 to 10: Shows the power supply status.



Note: No status in R7D-DC8C

TRANSMISSION DATA DESCRIPTIONS

■ BASIC MODULE

Transmitted data (word) depends upon the modules types.

MODEL	OUTPUT DATA* ¹	INPUT DATA* ²
	(R7D to Master)	(Master to R7D)
R7D-DA16	1	0
R7D-DCx	0	1
R7D-RR8	1	1
R7D-SV4	4	0
R7D-TS4	4	0
R7D-RS4	4	0
R7D-MS4	4	0
R7D-CT4E	4	0
R7D-PA8	17	17
R7D-YV2x	0	2
R7D-YS2x	0	2

■ EXTENSION MODULE

Transmitted data (word) for the extension module is added.

MODEL	OUTPUT DATA* ¹	INPUT DATA* ²
	(R7D to Master)	(Master to R7D)
R7D-EAx	1	0
R7D-ECx	0	1

*1. Output Data means those sent to the master.

*2. Input Data means those received from the master.

■ STATUS

Status signal can be included in the transmission data when the setting is enabled using the PC Configurator software (model: R7CON).^{*3} For details, refer to “STATUS in I/O DATA DESCRIPTIONS”.

STATUS	OUTPUT DATA* ¹	INPUT DATA* ²
	(R7D to Master)	(Master to R7D)
Enabled	1	0
Disabled	0	0

*3. The setting is not available as there is no status signal in R7D-DC8C.

EXTENSION MODULE

A ‘basic’ module can be attached with one ‘extension’ module. The extension module is powered from the basic module. By combining two modules, single station can handle mixed analog and discrete signals, 32-point discrete inputs, 32-point discrete outputs, 16-point discrete I/Os and other combinations of signals.

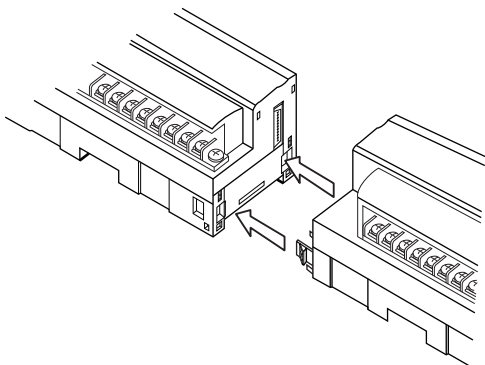
Note: Relay contact 8 points output module and relay c contact 4 points output module can not be attached with an ‘Extension’ module.

■ OUTPUT AT THE LOSS OF COMMUNICATION

The extension module is set to ‘Hold Output’ by factory default setting. The PC Configurator software is used to change the setting to ‘Reset Output.’

■ CONNECTING THE EXTENSION MODULE

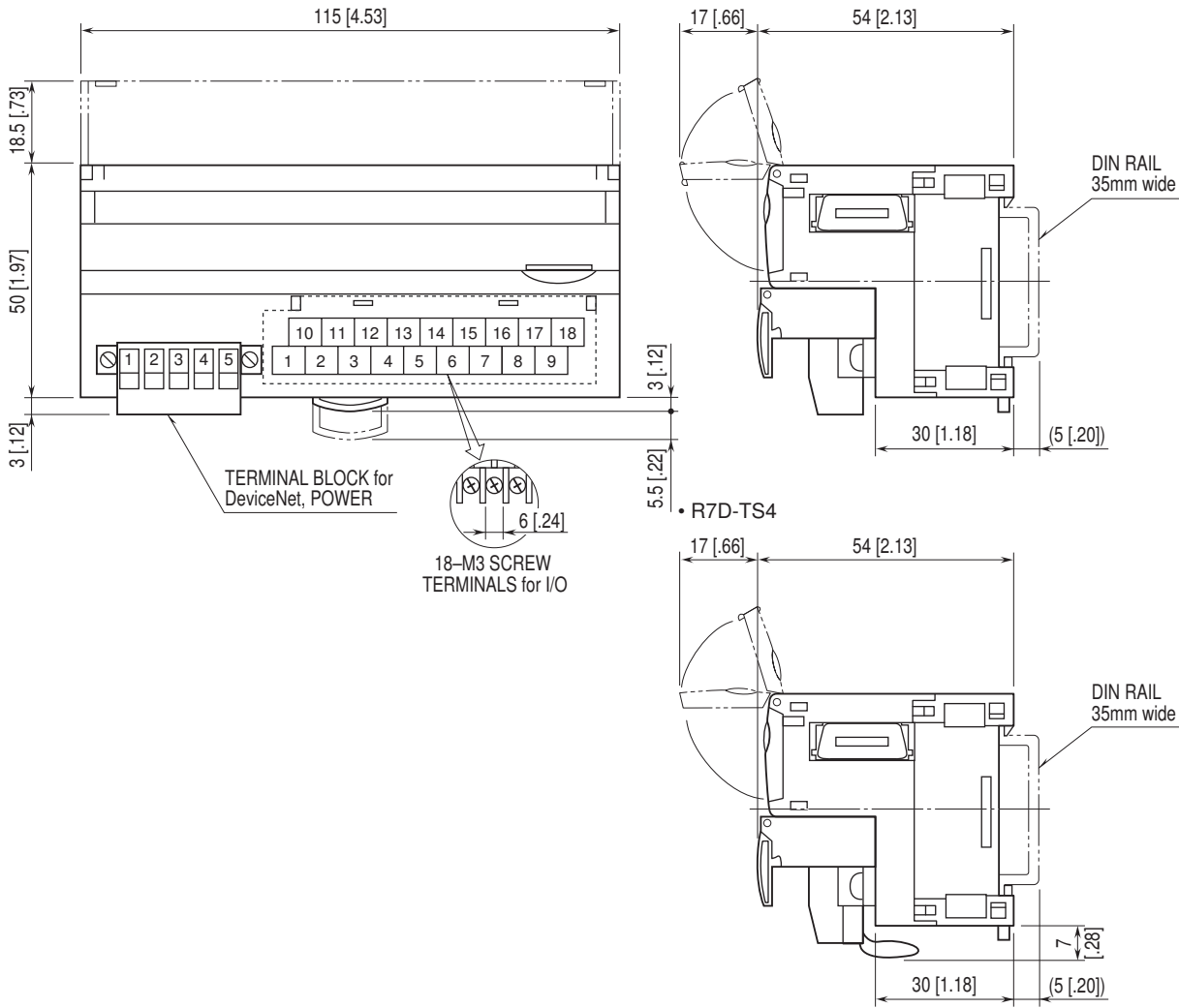
- 1) Remove the extension connector cover located at the side of the basic module.
- 2) Connect the extension module.



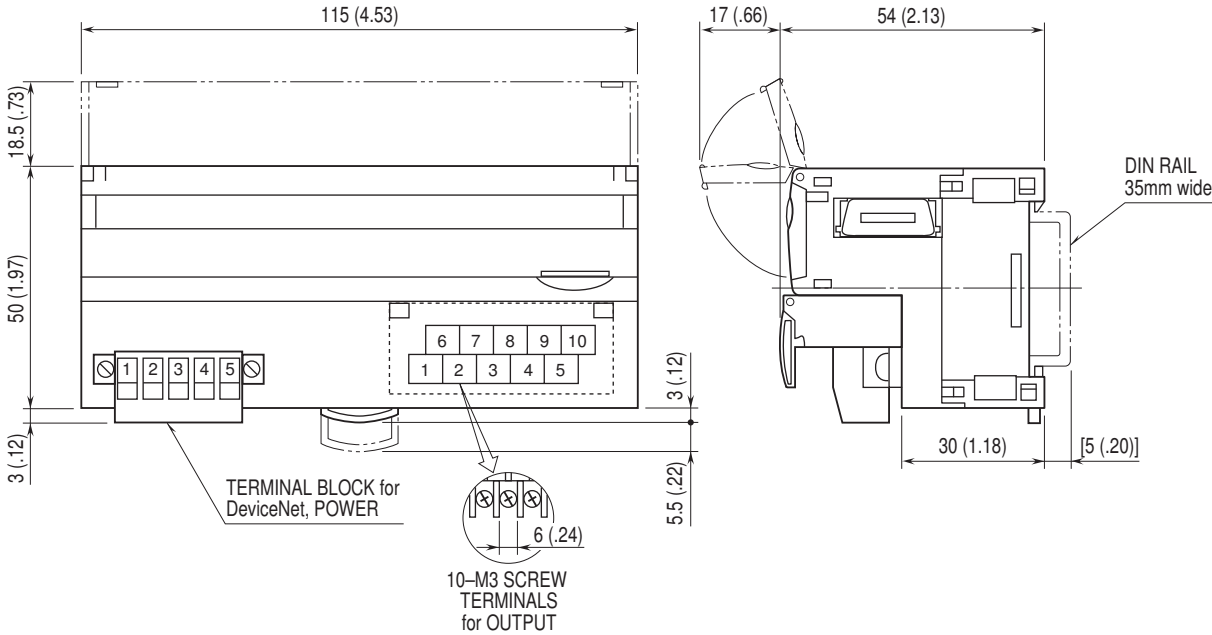
- 3) Mount the combined module on a DIN rail.

EXTERNAL DIMENSIONS unit: mm [inch]

■ **BASIC MODULE**

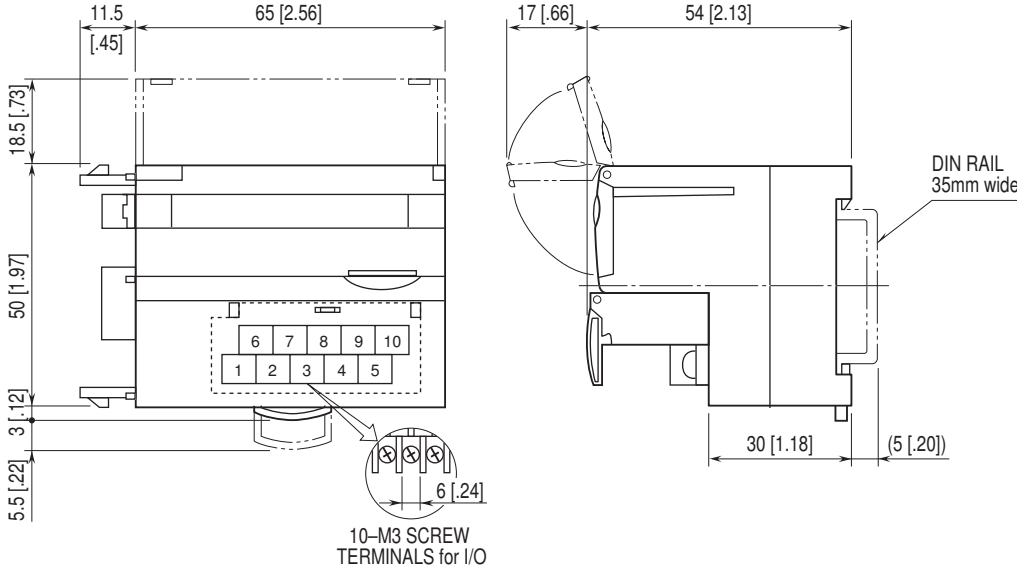


■ **ANALOG OUTPUT**

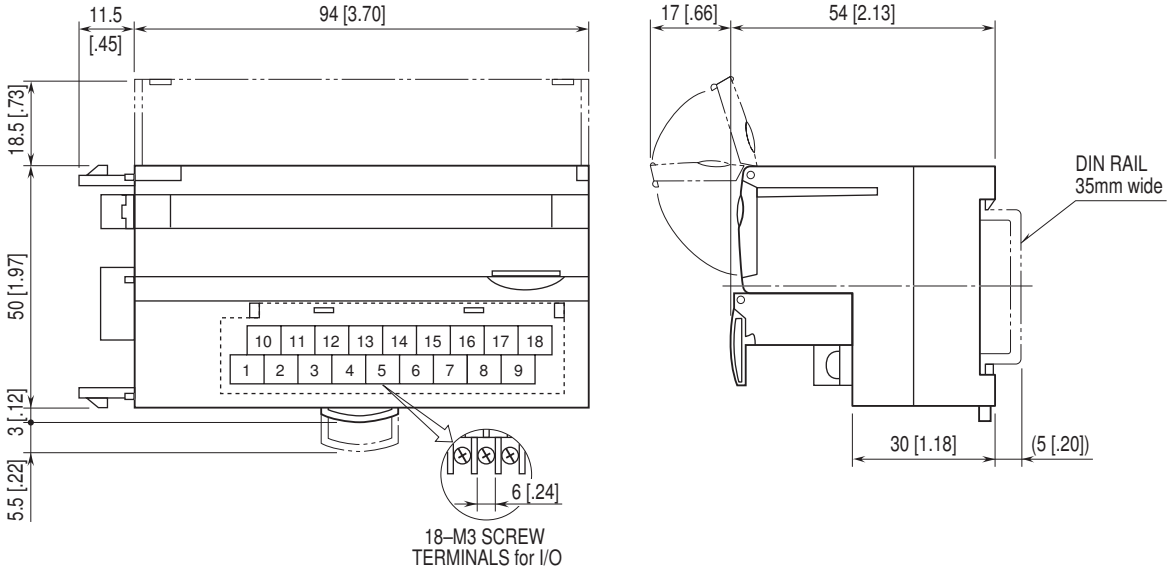


■ EXTENSION MODULES

● R7D-EA8, EC8A, EC8B



● R7D-EA16, EC16A, EC16B



DISCRETE INPUT MODULE, 16 points

MODEL: R7D-DA16

SPECIFICATIONS

- Common:** Positive or negative common (NPN/PNP) per 16 points
- Number of I/O:** Input, 16 points
- Maximum inputs applicable at once:** No limit (at 24 V DC)
- Input status indicator:** LED turns ON with contact ON
- Isolation:** Input to DeviceNet
- Rated input voltage:** 24 V DC $\pm 10\%$; ripple 5 %p-p max.
- ON voltage/current:** ≥ 15 V DC (input-COM1) / ≥ 3.5 mA
- OFF voltage/current:** ≤ 5 V DC (input-COM1) / ≤ 1 mA
- Input current:** ≤ 5.5 mA per point at 24 V DC
- Input resistance:** Approx. 4.4 k Ω
- ON delay:** ≤ 2.0 msec.
- OFF delay:** ≤ 2.0 msec.

OPERATING MODE SETTING

(*) Factory setting
 Caution ! - SW1-3 through 1-8 are unused. Be sure to turn off unused ones.

• Extension (SW1-1, 1-2)

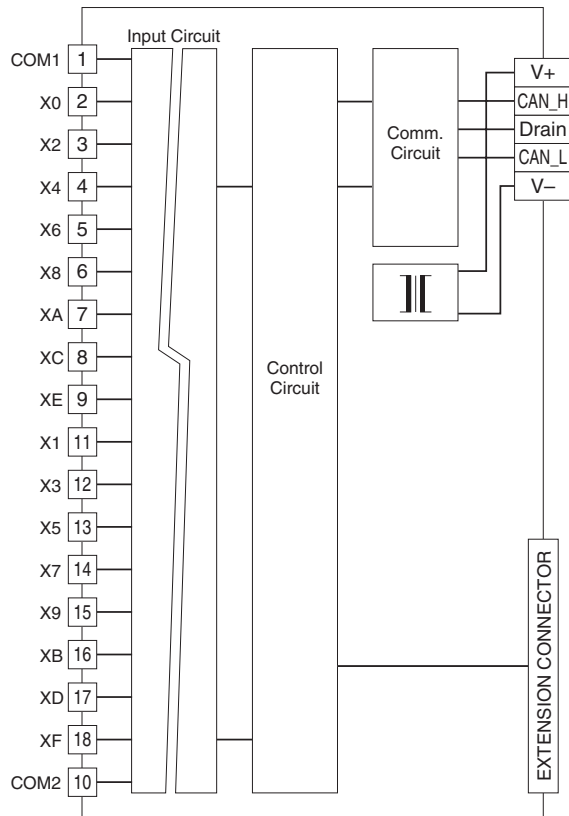
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

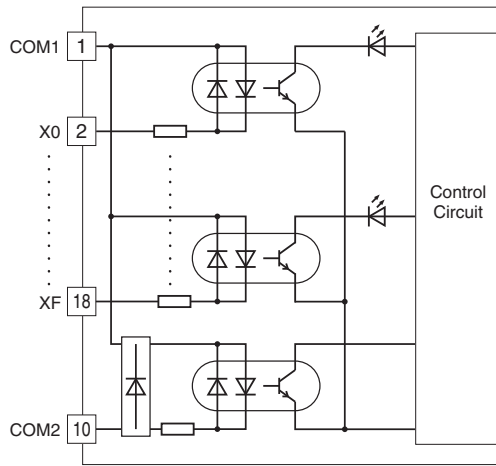
10	11	12	13	14	15	16	17	18
COM2	X1	X3	X5	X7	X9	XB	XD	XF
1	2	3	4	5	6	7	8	9
COM1	X0	X2	X4	X6	X8	XA	XC	XE

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	COM1	Common 1	10	COM2	Common 2
2	X0	Input 0	11	X1	Input 1
3	X2	Input 2	12	X3	Input 3
4	X4	Input 4	13	X5	Input 5
5	X6	Input 6	14	X7	Input 7
6	X8	Input 8	15	X9	Input 9
7	XA	Input 10	16	XB	Input 11
8	XC	Input 12	17	XD	Input 13
9	XE	Input 14	18	XF	Input 15

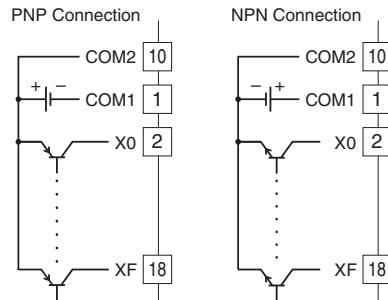
CIRCUIT DIAGRAM



■ Input Circuit



■ Input Connection Examples



NPN TRANSISTOR OUTPUT MODULE, 16 points

MODEL: R7D-DC16A

SPECIFICATIONS

- Common:** Negative common (NPN) per 16 points
 - Number of I/O:** Output, 16 points
 - Maximum outputs applicable at once:** No limit (at 24 V DC)
 - Output status indicator:** LED turns ON with contact ON
 - Isolation:** Output to DeviceNet
 - Rated load voltage:** 24 V DC $\pm 10\%$
 - 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.
- (When driving an inductive load, connect a diode in parallel with the load.)

OPERATING MODE SETTING

(*) Factory setting

Caution ! - SW1-3, 1-5 through 1-8 are unused. Be sure to turn off unused ones.

• Output at the Loss of Communication (SW1-4)

SW1-4	Output at the loss of communication
OFF	Reset the output (turned off)
ON	Hold the output (*) (maintains the last data received normally)

• Extension (SW1-1, 1-2)

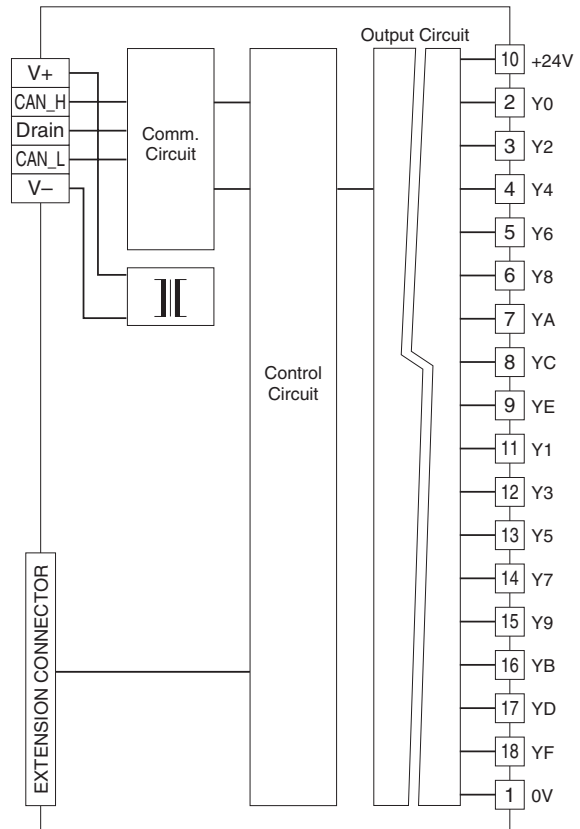
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

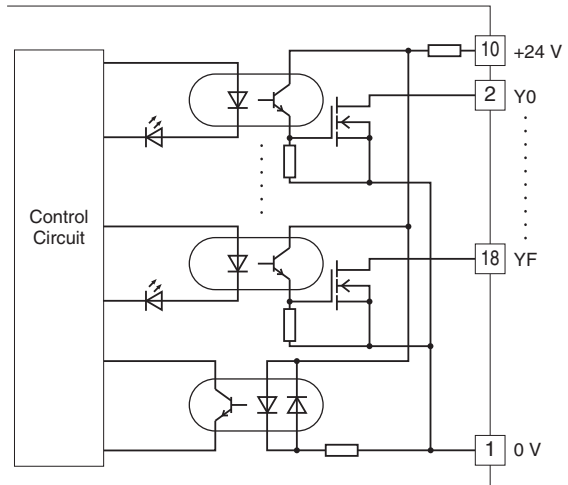
10	11	12	13	14	15	16	17	18
+24V	Y1	Y3	Y5	Y7	Y9	YB	YD	YF
1	2	3	4	5	6	7	8	9
0V	Y0	Y2	Y4	Y6	Y8	YA	YC	YE

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0 V	0 V (common)	10	+24 V	24 V DC
2	Y0	Output 0	11	Y1	Output 1
3	Y2	Output 2	12	Y3	Output 3
4	Y4	Output 4	13	Y5	Output 5
5	Y6	Output 6	14	Y7	Output 7
6	Y8	Output 8	15	Y9	Output 9
7	YA	Output 10	16	YB	Output 11
8	YC	Output 12	17	YD	Output 13
9	YE	Output 14	18	YF	Output 15

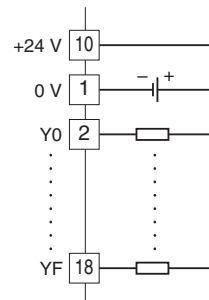
CIRCUIT DIAGRAM



■ Output Circuit



■ Output Connection Example



PNP TRANSISTOR OUTPUT MODULE, 16 points

MODEL: R7D-DC16B

SPECIFICATIONS

- Common:** Positive common (PNP) per 16 points
 - Number of I/O:** Output, 16 points
 - Maximum outputs applicable at once:** No limit (at 24 V DC)
 - Output status indicator:** LED turns ON with contact ON
 - Isolation:** Output to DeviceNet
 - Rated load voltage:** 24 V DC $\pm 10\%$
 - 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.
- (When driving an inductive load, connect a diode in parallel with the load.)

OPERATING MODE SETTING

(*) Factory setting
 Caution ! - SW1-3, 1-5 through 1-8 are unused. Be sure to turn off unused ones.

• Output at the Loss of Communication (SW1-4)

SW1-4	Output at the loss of communication
OFF	Reset the output (turned off)
ON	Hold the output (*) (maintains the last data received normally)

• Extension (SW1-1, 1-2)

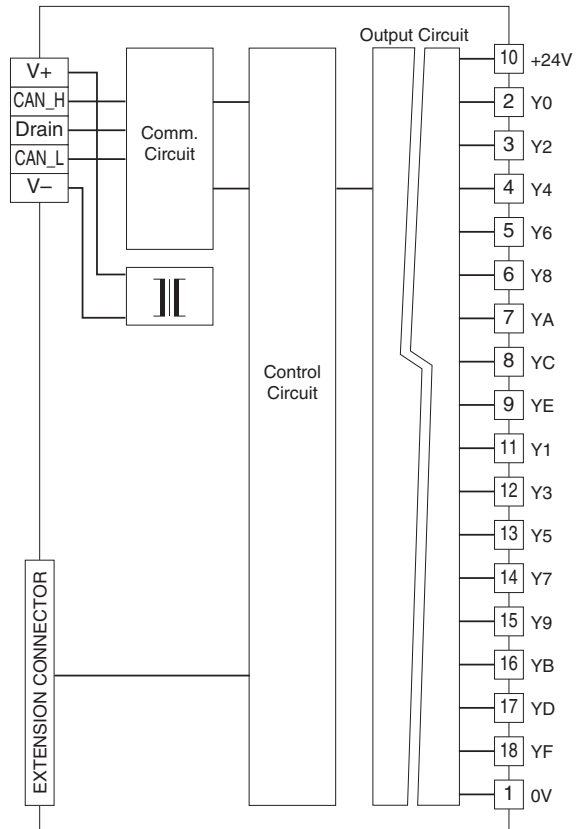
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

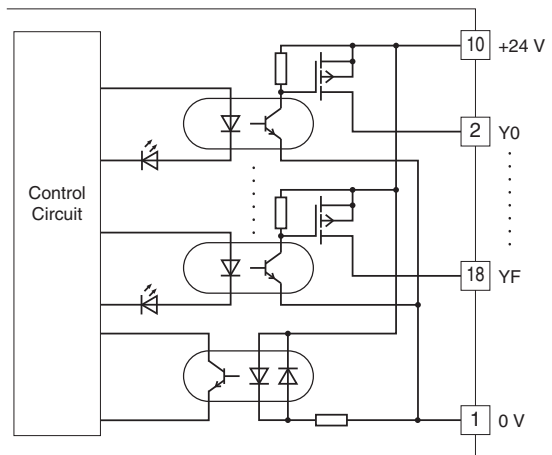
10	11	12	13	14	15	16	17	18
+24V	Y1	Y3	Y5	Y7	Y9	YB	YD	YF
1	2	3	4	5	6	7	8	9
0V	Y0	Y2	Y4	Y6	Y8	YA	YC	YE

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0 V	0 V	10	+24 V	24 V DC (common)
2	Y0	Output 0	11	Y1	Output 1
3	Y2	Output 2	12	Y3	Output 3
4	Y4	Output 4	13	Y5	Output 5
5	Y6	Output 6	14	Y7	Output 7
6	Y8	Output 8	15	Y9	Output 9
7	YA	Output 10	16	YB	Output 11
8	YC	Output 12	17	YD	Output 13
9	YE	Output 14	18	YF	Output 15

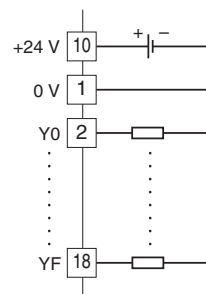
CIRCUIT DIAGRAM



■ Output Circuit



■ Output Connection Example



RELAY CONTACT OUTPUT MODULE, 8 points

MODEL: R7D-DC8C

SPECIFICATIONS

- Common:** 1 common per 4 points (4 terminals)
- Maximum current load:** 2.0 A per point
- Common current:** Max. 8 A (4 terminals)
- Number of I/O:** Relay contact output, 8 points
- Maximum outputs applicable at once:** No limit (at 24 V DC)
- Output status indicator:** LED turns ON with contact ON
- Isolation:** Output to DeviceNet
- Relay driving power:** 24 V DC $\pm 10\%$, ≥ 60 mA
- Rated load:** 250 V AC @ 2 A ($\cos \phi = 1$)
30 V DC @ 2 A (resistive load)
- (When it is used as a product relevant to EU directive, it should be used under the Installation Category I, 125 V AC or less.)
- Maximum switching voltage:** 250 V AC or 30 V DC
- Maximum switching power:** 500 VA or 60 W
- Minimum load:** 24 V DC @ 5 mA
- Mechanical life:** 2×10^7 cycles (rate 300/min.)
- When driving an inductive load, external contact protection and noise quenching are recommended.
- ON delay:** ≤ 10 msec.
- OFF delay:** ≤ 10 msec.

OPERATING MODE SETTING

(*) Factory setting
 Caution ! - SW1-1 through 1-3, 1-5 through 1-8 are unused.
 Be sure to turn off the unused ones.

• **Output at the Loss of Communication (SW1-4)**

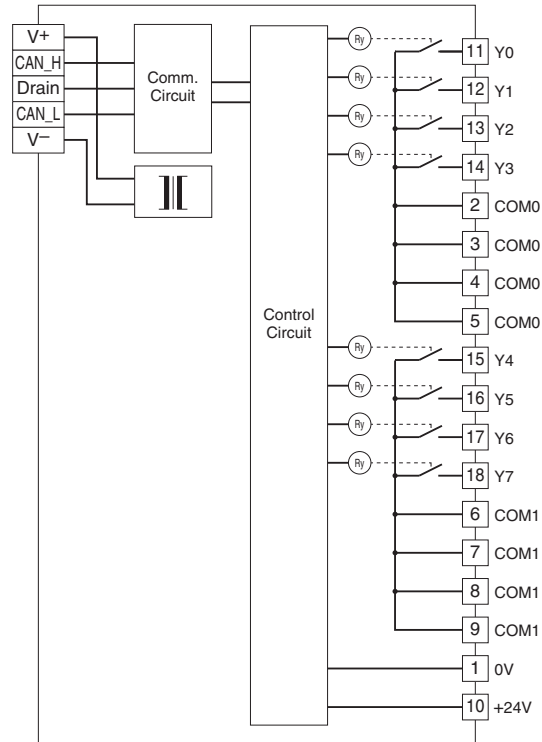
SW1-4	Output at the loss of communication
OFF	Reset the output (turned off)
ON	Hold the output (*) (maintains the last data received normally)

TERMINAL ASSIGNMENTS

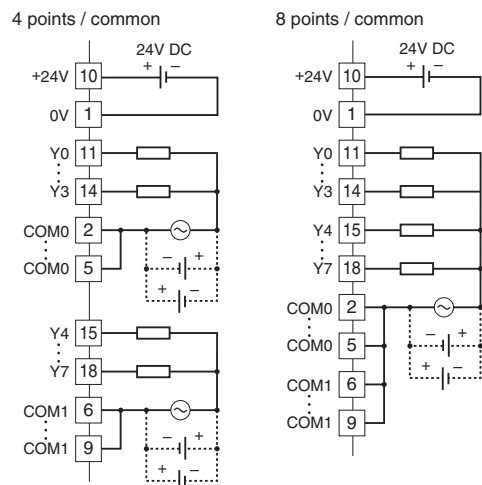
10	11	12	13	14	15	16	17	18
+24 V	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
1	2	3	4	5	6	7	8	9
0 V	COM0	COM0	COM0	COM0	COM1	COM1	COM1	COM1

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0 V	0 V	10	+24 V	24 V DC
2	COM0	Common 0	11	Y0	Output 0
3	COM0	Common 0	12	Y1	Output 1
4	COM0	Common 0	13	Y2	Output 2
5	COM0	Common 0	14	Y3	Output 3
6	COM1	Common 1	15	Y4	Output 4
7	COM1	Common 1	16	Y5	Output 5
8	COM1	Common 1	17	Y6	Output 6
9	COM1	Common 1	18	Y7	Output 7

CIRCUIT DIAGRAM



Output Connection Example



REMOTE CONTROL RELAY CONTROL MODULE, 8 points

MODEL: R7D-RR8

RECOMMENDED PRODUCTS (OPERATION CHECKED)

Remote control relay:

BR-12D, BR-22D (Mitsubishi Electric)

WR6165 (Panasonic)

Remote control transformer:

BRT-10B, BRT-20B (Mitsubishi Electric)

WR2301 (Panasonic)

SPECIFICATIONS

Common: 1 common per 8 points (8 terminals)

Number of I/O: Output, 8 points

Maximum outputs applicable at once: No limit

I/O status indicator: Feedback input status turns on with the input supplied.

Output status LED turns on with the output ON.

Isolation: Output to DeviceNet

Rated load voltage: 24 V AC $\pm 10\%$ (supplied by the remote control transformer)

Load voltage frequency: 50 / 60 Hz

OPERATING MODE SETTING

(*) Factory setting

Note: SW1-4 through SW1-8 are unused. Be sure to turn off unused ones.

• Extension (SW1-1, 1-2)

SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

• Output data length (SW1-3)

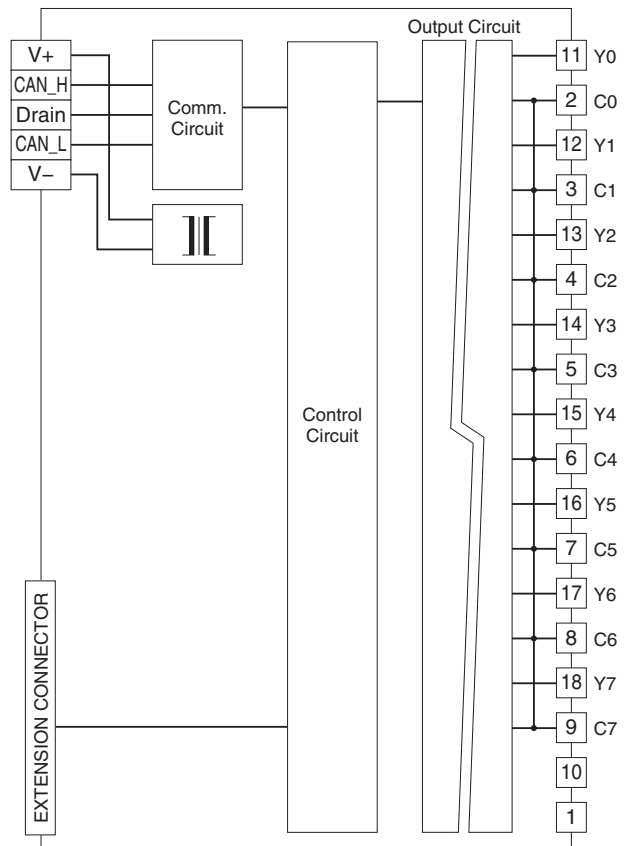
SW1-3	Output data length
OFF	16 bits (*)
ON	8 bits

TERMINAL ASSIGNMENTS

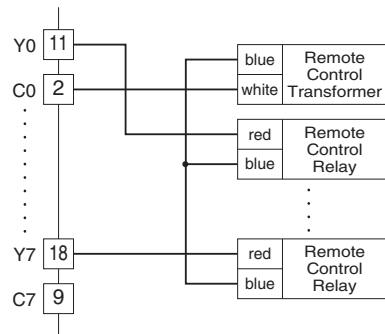
10	11	12	13	14	15	16	17	18
NC	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
1	2	3	4	5	6	7	8	9
NC	C0	C1	C2	C3	C4	C5	C6	C7

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	NC	No connection
2	C0	Common 0	11	Y0	Output 0
3	C1	Common 1	12	Y1	Output 1
4	C2	Common 2	13	Y2	Output 2
5	C3	Common 3	14	Y3	Output 3
6	C4	Common 4	15	Y4	Output 4
7	C5	Common 5	16	Y5	Output 5
8	C6	Common 6	17	Y6	Output 6
9	C7	Common 7	18	Y7	Output 7

CIRCUIT DIAGRAM



■ Output Connection Example



DC VOLTAGE/CURRENT INPUT MODULE, 4 points

MODEL: R7D-SV4

SPECIFICATIONS

Isolation: Input 0 to input 1 to input 2 to input 3 to DeviceNet

Converted data range: 0 - 10000 of the input range

• **Input range**

Wide span voltage: -10 - +10 V DC, -5 - +5 V DC, 0 - 10 V DC, 0 - 5 V DC, 1 - 5 V DC

Narrow span voltage: -1 - +1 V DC, 0 - 1 V DC, -0.5 - +0.5 V DC

Current range: -20 - +20 mA DC, 0 - 20 mA DC, 4 - 20 mA DC

• **Input resistance**

Wide span voltage: $\geq 1 \text{ M}\Omega$

Narrow span voltage: $\geq 100 \text{ k}\Omega$

Current range: 70Ω

Conversion rate / conversion accuracy:

10 msec./ $\pm 0.8 \%$, 20 msec./ $\pm 0.4 \%$, 40 msec./ $\pm 0.2 \%$,

80 msec./ $\pm 0.1 \%$

Response time: Conversion rate $\times 2 + 50 \text{ msec.}$ (0 - 90 %)

Temperature coefficient: $\pm 0.015 \%/^{\circ}\text{C}$ ($\pm 0.008 \%/^{\circ}\text{F}$)

OPERATING MODE SETTING

(*) Factory setting

• **Input Range (SW1-5, 1-6, 1-7, 1-8)**

SW1-5	SW1-6	SW1-7	SW1-8	Input range
OFF	OFF	OFF	OFF	-10 - +10 V DC (*)
ON	OFF	OFF	OFF	-5 - +5 V DC
OFF	ON	OFF	OFF	-1 - +1 V DC
ON	ON	OFF	OFF	0 - 10 V DC
OFF	OFF	ON	OFF	0 - 5 V DC
ON	OFF	ON	OFF	1 - 5 V DC
OFF	ON	ON	OFF	0 - 1V DC
ON	ON	ON	OFF	-0.5 - +0.5 V DC
ON	OFF	OFF	ON	-20 - +20 mA DC
OFF	ON	OFF	ON	4 - 20 mA DC
ON	ON	OFF	ON	0 - 20 mA DC
ON	ON	ON	ON	PC Configurator setting

• **Conversion Rate / Accuracy (SW1-3, 1-4)**

SW1-3	SW1-4	Conversion rate / Accuracy
OFF	OFF	80 msec. / $\pm 0.1 \%$ (*)
ON	OFF	40 msec. / $\pm 0.2 \%$
OFF	ON	20 msec. / $\pm 0.4 \%$
ON	ON	10 msec. / $\pm 0.8 \%$

• **Extension (SW1-1, 1-2)**

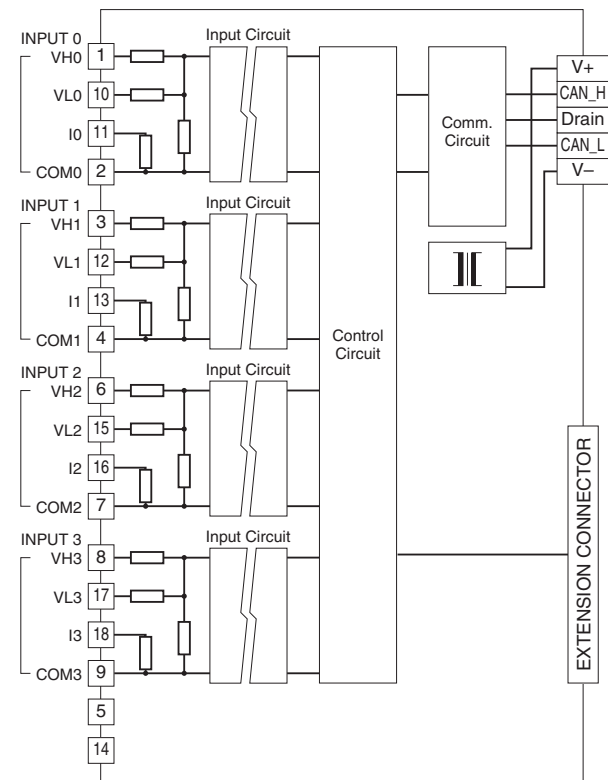
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

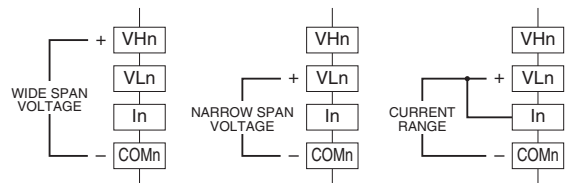
10	11	12	13	14	15	16	17	18
VL0	I0	VL1	I1	NC	VL2	I2	VL3	I3
1	2	3	4	5	6	7	8	9
VH0	COM0	VH1	COM1	NC	VH2	COM2	VH3	COM3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	VH0	Wide span volt. 0	10	VL0	Narrow span volt. 0
2	COM0	Common 0	11	I0	Current range 0
3	VH1	Wide span volt. 1	12	VL1	Narrow span volt. 1
4	COM1	Common 1	13	I1	Current range 1
5	NC	No connection	14	NC	No connection
6	VH2	Wide span volt. 2	15	VL2	Narrow span volt. 2
7	COM2	Common 2	16	I2	Current range 2
8	VH3	Wide span volt. 3	17	VL3	Narrow span volt. 3
9	COM3	Common 3	18	I3	Current range 3

CIRCUIT DIAGRAM



■ **Input Connection Examples**



Be sure to close across VLn and In terminals for a current input.

THERMOCOUPLE INPUT MODULE, 4 points

MODEL: R7D-TS4

SPECIFICATIONS

Isolation: Input 0 to input 1 to input 2 to input 3 to DeviceNet

Converted data range: Engineering unit value (°C, K) × 10 (integer); No multiplication for °F

Linearization: Standard

Thermocouple: K, E, J, T, B, R, S, C, N, U, L, P, PR

Cold junction compensation: CJC sensor attached to the input terminals

Input resistance: ≥ 30 kΩ

Burnout sensing: ≤ 0.1 μA

Conversion accuracy: ±1°C (±1.8°F);

±2.0°C (±3.6°F) for B, R, S, C, PR

Conversion rate: 250 msec. or 500 msec.

Response time: Conversion rate × 2 + 50 msec. (0 - 90 %)

Temperature coefficient: ±0.015 %/°C (±0.008 %/°F) of max. span

CJC error: ±1.0°C at 25°C ±10°C

(±1.8°F at 77°F ±18°F)

±1.5°C (±2.7°F) for R, S, PR

T/C	BURNOUT INDICATION (°C)		CONFORMANCE RANGE (°C)
	Downscale	Upscale	
K (CA)	-272	+1472	-150 to +1370
E (CRC)	-272	+1120	-170 to +1000
J (IC)	-260	+1300	-180 to +1200
T (CC)	-272	+ 500	-170 to + 400
B (RH)	24	1920	1000 to 1760
R	-100	+1860	380 to 1760
S	-100	+1860	400 to 1760
C (WRe 5-26)	-52	+2416	100 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	300 to 1760

T/C	BURNOUT INDICATION (°F)		CONFORMANCE RANGE (°F)
	Downscale	Upscale	
K (CA)	-458	+2682	-238 to +2498
E (CRC)	-458	+2048	-274 to +1832
J (IC)	-436	+2372	-292 to +2192
T (CC)	-458	+932	-274 to +752
B (RH)	75	3488	1832 to 3200
R	-148	+3380	716 to 3200
S	-148	+3380	752 to 3200
C (WRe 5-26)	-62	+4381	212 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	572 to 3200

OPERATING MODE SETTING

(*) Factory setting

• Thermocouple Type (SW1-5, 1-6, 1-7, 1-8)

SW1-5	SW1-6	SW1-7	SW1-8	Thermocouple type
OFF	OFF	OFF	OFF	K (CA) (*)
ON	OFF	OFF	OFF	E (CRC)
OFF	ON	OFF	OFF	J (IC)
ON	ON	OFF	OFF	T (CC)
OFF	OFF	ON	OFF	B (RH)
ON	OFF	ON	OFF	R
OFF	ON	ON	OFF	S
ON	ON	ON	OFF	C (WRe 5-26)
OFF	OFF	OFF	ON	N
ON	OFF	OFF	ON	U
OFF	ON	OFF	ON	L
ON	ON	OFF	ON	P (Platinel II)
OFF	OFF	ON	ON	(PR)
ON	ON	ON	ON	PC Configurator setting

• Conversion Rate (SW1-3)

SW1-3	Conversion rate
OFF	250 msec. (*)
ON	500 msec.

• Burnout (SW1-4)

SW1-4	Burnout
OFF	Upscale (*)
ON	Downscale

• Extension (SW1-1, 1-2)

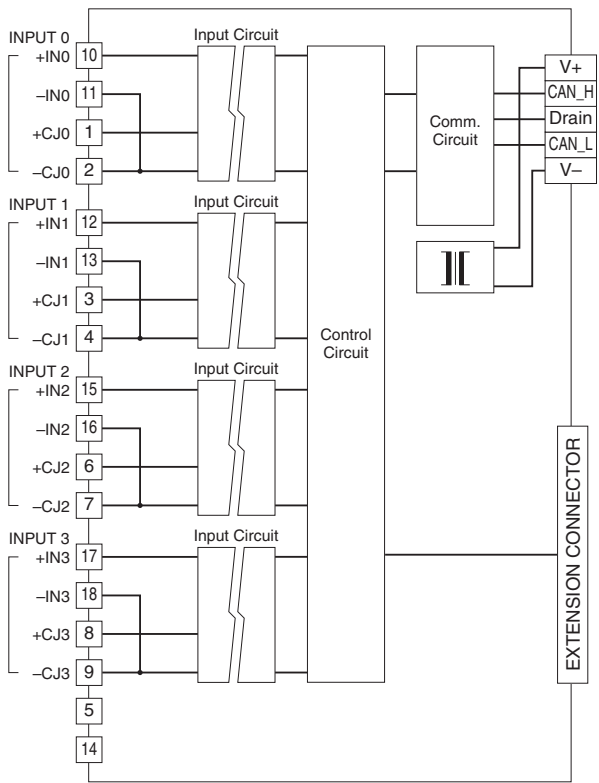
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

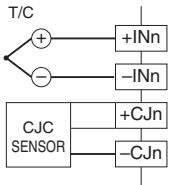
10	11	12	13	14	15	16	17	18
+IN0	-IN0	+IN1	-IN1	NC	+IN2	-IN2	+IN3	-IN3
1	2	3	4	5	6	7	8	9
+CJ0	-CJ0	+CJ1	-CJ1	NC	+CJ2	-CJ2	+CJ3	-CJ3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	+CJ0	CJC + 0	10	+IN0	T/C + 0
2	-CJ0	CJC - 0	11	-IN0	T/C - 0
3	+CJ1	CJC + 1	12	+IN1	T/C + 1
4	-CJ1	CJC - 1	13	-IN1	T/C - 1
5	NC	No connection	14	NC	No connection
6	+CJ2	CJC + 2	15	+IN2	T/C + 2
7	-CJ2	CJC - 2	16	-IN2	T/C - 2
8	+CJ3	CJC + 3	17	+IN3	T/C + 3
9	-CJ3	CJC - 3	18	-IN3	T/C - 3

CIRCUIT DIAGRAM



■ Input Connection Example



RTD INPUT MODULE, 4 points

MODEL: R7D-RS4

SPECIFICATIONS

Isolation: Input 0 to input 1 to input 2 to input 3 to DeviceNet

Converted data range: Engineering unit value (°C, K) × 10 (integer); No multiplication for °F

Linearization: Standard

RTD: Pt 100 (JIS '97, IEC), Pt 100 (JIS '89), JPt 100 (JIS '89), Pt 50 Ω (JIS '81), Ni 100, Cu 10, Cu 50

Sensing current: ≤ 1 mA

Input resistance: ≥ 1 MΩ

Maximum leadwire resistance: 100 Ω per wire

Conversion accuracy: ±1°C (±1.8°F); ±3°C (±5.4°F) for Cu 10

Conversion rate: 250 msec. or 500 msec.

Response time: Conversion rate × 2 + 50 msec. (0 - 90 %)

Temperature coefficient: ±0.015 %/°C (±0.008 %/°F) of max. span

RTD	BURNOUT INDICATION (°C)		CONFORMANCE RANGE (°C)
	Downscale	Upscale	
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 RANGE (°F)
	Downscale	Upscale	
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

OPERATING MODE SETTING

(*) Factory setting

• RTD Type (SW1-5, 1-6, 1-7, 1-8)

SW1-5	SW1-6	SW1-7	SW1-8	RTD Type
OFF	OFF	OFF	OFF	Pt 100 (JIS '97, IEC) (*)
ON	OFF	OFF	OFF	Pt 100 (JIS '89)
OFF	ON	OFF	OFF	JPt 100 (JIS '89)
ON	ON	OFF	OFF	Pt 50 Ω (JIS '81)
OFF	OFF	ON	OFF	Ni 100
ON	OFF	ON	OFF	Cu 10 @ 25°C
OFF	OFF	OFF	ON	Cu 50
ON	ON	ON	ON	PC Configurator setting

• Conversion Rate (SW1-3)

SW1-3	Conversion rate
OFF	250 msec. (*)
ON	500 msec.

• Burnout (SW1-4)

SW1-4	Burnout
OFF	Upscale (*)
ON	Downscale

• Extension (SW1-1, 1-2)

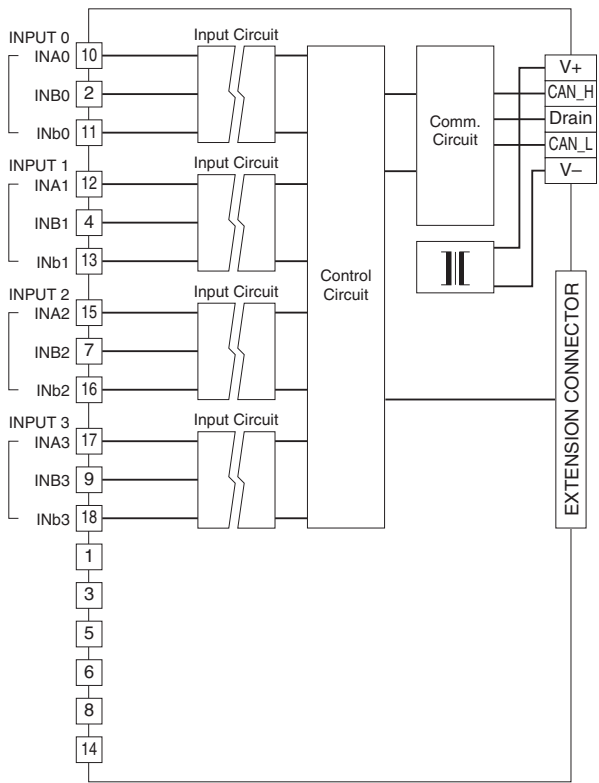
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

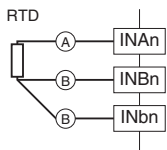
10	11	12	13	14	15	16	17	18
INA0	INb0	INA1	INb1	NC	INA2	INb2	INA3	INb3
1	2	3	4	5	6	7	8	9
NC	INB0	NC	INB1	NC	NC	INB2	NC	INB3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	INA0	RTD 0-A
2	INB0	RTD 0-B	11	INb0	RTD 0-b
3	NC	No connection	12	INA1	RTD 1-A
4	INB1	RTD 1-B	13	INb1	RTD 1-b
5	NC	No connection	14	NC	No connection
6	NC	No connection	15	INA2	RTD 2-A
7	INB2	RTD 2-B	16	INb2	RTD 2-b
8	NC	No connection	17	INA3	RTD 3-A
9	INB3	RTD 3-B	18	INb3	RTD 3-b

CIRCUIT DIAGRAM



■ Input Connection Example



POTENTIOMETER INPUT MODULE, 4 points

MODEL: R7D-MS4

SPECIFICATIONS

Isolation: Input 0 to input 1 to input 2 to input 3 to DeviceNet
Converted data range: 0 - 10000 of the input range
Potentiometer: Total resistance 100 Ω - 20 kΩ
Minimum span: 50 % of total resistance
Excitation: Approx. 0.2 V DC
Conversion rate / conversion accuracy:
 10 msec./±0.8 %, 20 msec./±0.4 %, 40 msec./±0.2 %, 80 msec./±0.1 %
Response time: Conversion rate × 2 + 50 msec. (0 - 90 %)
Temperature coefficient: ±0.015 %/°C (±0.008 %/°F)

OPERATING MODE SETTING

(*) Factory setting
 Caution ! - SW1-5, 1-6, 1-7, 1-8 are unused. Be sure to turn off unused ones.

• Conversion Rate / Accuracy (SW1-3, 1-4)

SW1-3	SW1-4	Conversion rate / Accuracy
OFF	OFF	80 msec. / ±0.1% (*)
ON	OFF	40 msec. / ±0.2%
OFF	ON	20 msec. / ±0.4%
ON	ON	10 msec. / ±0.8%

• Extension (SW1-1, 1-2)

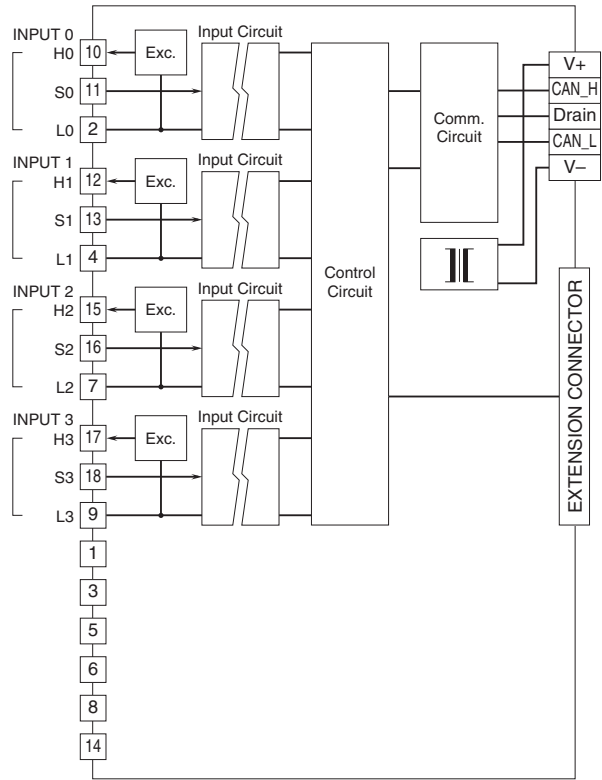
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

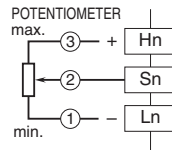
10	11	12	13	14	15	16	17	18
H0	S0	H1	S1	NC	H2	S2	H3	S3
1	2	3	4	5	6	7	8	9
NC	L0	NC	L1	NC	NC	L2	NC	L3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	H0	Pot H0
2	L0	Pot L0	11	S0	Pot S0
3	NC	No connection	12	H1	Pot H1
4	L1	Pot L1	13	S1	Pot S1
5	NC	No connection	14	NC	No connection
6	NC	No connection	15	H2	Pot H2
7	L2	Pot L2	16	S2	Pot S2
8	NC	No connection	17	H3	Pot H3
9	L3	Pot L3	18	S3	Pot S3

CIRCUIT DIAGRAM



■ Input Connection Example



AC CURRENT INPUT MODULE, 4 points

(clamp-on current sensor CLSE use)

MODEL: R7D-CT4E

SPECIFICATIONS

Isolation: Input 0 to input 1 to input 2 to input 3 to DeviceNet

Converted data range:

Engineering unit value (A) × 100 (Integer)

(Engineering unit value (A) × 1000 (Integer) for CLSE-R5)

Input range (Optional)

CLSE-R5: 0 - 5 A AC

CLSE-05: 0 - 50 A AC

CLSE-10: 0 - 100 A AC

CLSE-20: 0 - 200 A AC

CLSE-40: 0 - 400 A AC

CLSE-60: 0 - 600 A AC

Frequency: 50/60 Hz

Overload capacity: 120 % continuous

Operational range: 5 - 115 % of rating (Operational range for the CLSE-60 is limited up to approx. 109 % (65535).)

(Note: Use for the circuit not exceed 480 V)

Conversion rate / conversion accuracy:

10 msec./±2.0 %, 20 msec./±1.0 %, 40 msec./±0.5 %, 80 msec./±0.5 %

(The conversion accuracy does not include the accuracy of the sensor.)

Response time: ≤ 1.0 sec. (0 - 90 %)

Temperature coefficient: ±0.015 %/°C (±0.008 %/°F)

OPERATING MODE SETTING

(*) Factory setting

• Input Range (SW1-5, 1-6, 1-7, 1-8)

SW1-5	SW1-6	SW1-7	SW1-8	Input range
OFF	OFF	OFF	OFF	CLSE-60 (*)
ON	OFF	OFF	OFF	CLSE-40
OFF	ON	OFF	OFF	CLSE-20
ON	ON	OFF	OFF	CLSE-10
OFF	OFF	ON	OFF	CLSE-05
ON	OFF	ON	OFF	CLSE-R5
ON	ON	ON	ON	PC Configurator setting

• Conversion Rate / Accuracy (SW1-3, 1-4)

SW1-3	SW1-4	Conversion rate / Accuracy
OFF	OFF	80 msec. / ±0.5% (*)
ON	OFF	40 msec. / ±0.5%
OFF	ON	20 msec. / ±1.0%
ON	ON	10 msec. / ±2.0%

• Extension (SW1-1, 1-2)

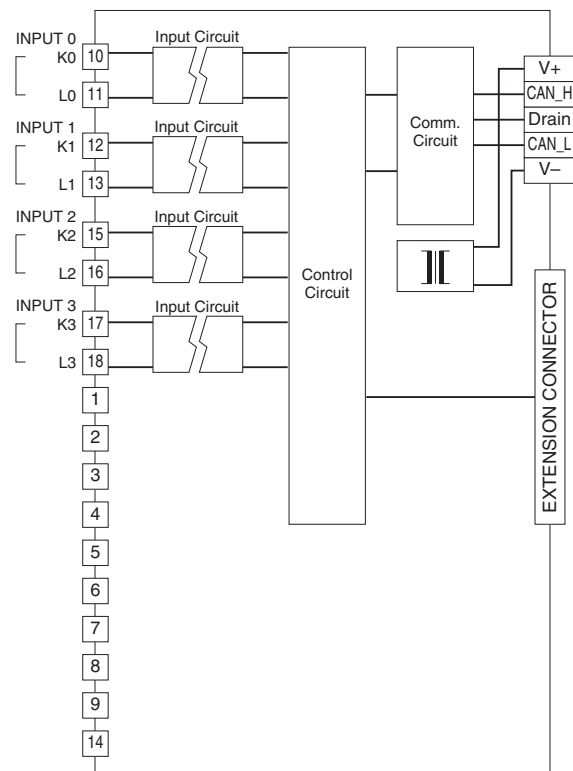
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

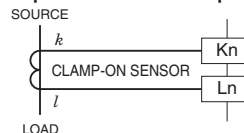
10	11	12	13	14	15	16	17	18
K0	L0	K1	L1	NC	K2	L2	K3	L3
1	2	3	4	5	6	7	8	9
NC	NC	NC	NC	NC	NC	NC	NC	NC

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	K0	AC current K0
2	NC	No connection	11	L0	AC current L0
3	NC	No connection	12	K1	AC current K1
4	NC	No connection	13	L1	AC current L1
5	NC	No connection	14	NC	No connection
6	NC	No connection	15	K2	AC current K2
7	NC	No connection	16	L2	AC current L2
8	NC	No connection	17	K3	AC current K3
9	NC	No connection	18	L3	AC current L3

CIRCUIT DIAGRAM



■ Input Connection Example



TOTALIZED PULSE INPUT MODULE, 8 points

MODEL: R7D-PA8

SPECIFICATIONS

Common: Positive or negative common (NPN/PNP) per 8 points

Number of I/O: Input, 8 points

Input status indicator: LED turns ON with contact ON

Isolation: Input to DeviceNet

■ **External excitation (PNP, NPN input)**

Sensing voltage: 24 V DC $\pm 10\%$; ripple 5 %p-p max

ON voltage / ON current: ≥ 16 V DC (input terminal - Cx) / ≤ 3.7 mA

OFF voltage / OFF current: ≤ 5 V DC (input terminal - Cx) / ≤ 1 mA

Voltage pulse input

ON voltage / ON current: ≥ 16 V DC (input terminal - Cx) / ≤ 3.7 mA

OFF voltage / OFF current: ≤ 5 V DC (input terminal - Cx) / ≤ 1 mA

Input current: ≤ 5.5 mA per point at 24 V DC

Input resistance: Approx. 4.4 k Ω

ON delay: ≤ 2.0 msec.

OFF delay: ≤ 2.0 msec.

Max. Frequency: 100 Hz (This unit is designed to be able to accept a frequency up to 100 Hz, however, 'chattering' contact must be avoided for accurate measuring of such high frequency. Use relays that do not cause any chattering.)

Minimum ON/OFF pulse requirements: 5 ms

Accumulated pulse count: 0 - 4 294 967 295

Max. accumulated pulse count: 1 000 - 4 294 967 295

(Factory default: 9 999 999)

Overflow: 0 or 1 (Factory default: 0)

OPERATING MODE SETTING

(*) Factory setting

Caution ! - SW1-3 through 1-8 are unused. Be sure to turn off unused ones.

• **Extension (SW1-1, 1-2)**

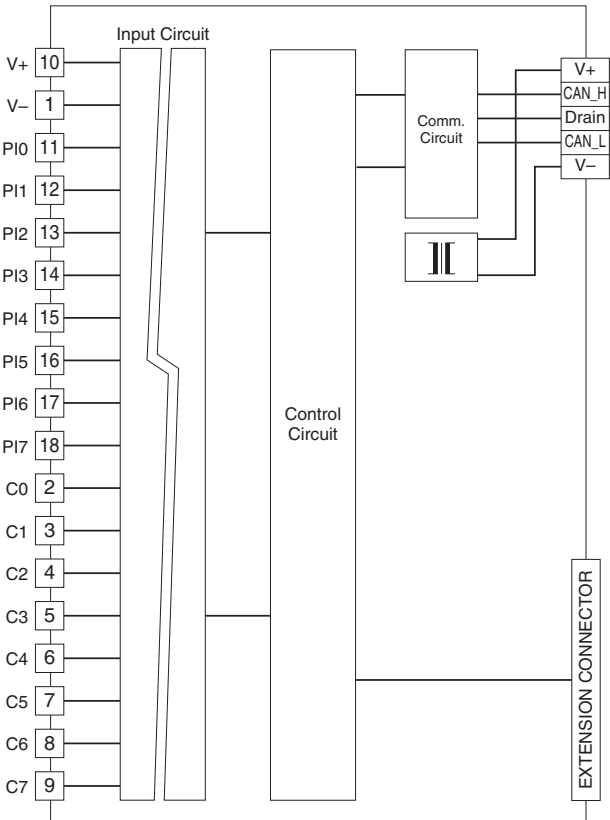
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

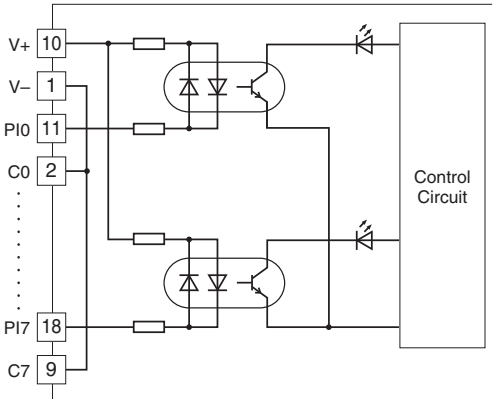
10	11	12	13	14	15	16	17	18
V+	PI0	PI1	PI2	PI3	PI4	PI5	PI6	PI7
1	2	3	4	5	6	7	8	9
V-	C0	C1	C2	C3	C4	C5	C6	C7

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	V -	Power (-)	10	V +	Power (+)
2	C0	Common	11	PI0	Input 0
3	C1	Common	12	PI1	Input 1
4	C2	Common	13	PI2	Input 2
5	C3	Common	14	PI3	Input 3
6	C4	Common	15	PI4	Input 4
7	C5	Common	16	PI5	Input 5
8	C6	Common	17	PI6	Input 6
9	C7	Common	18	PI7	Input 7

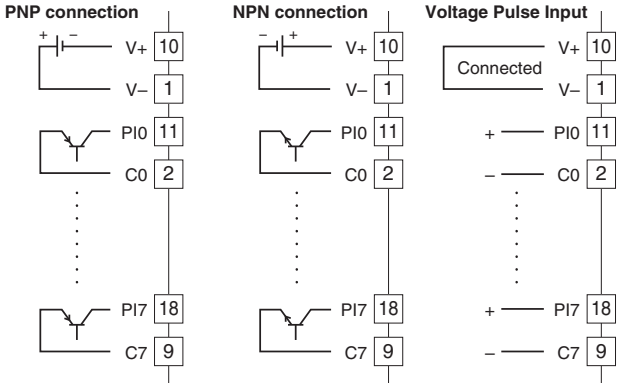
CIRCUIT DIAGRAM



■ Input Circuit



■ Input Connection Examples



DC VOLTAGE OUTPUT MODULE, 2 points

MODEL: R7D-YV2

SPECIFICATIONS

Isolation: Output 0 to output 1 to DeviceNet
Converted data range: 0 - 10000 of the output range
Output range
Wide span voltage: -10 - +10 V DC, -5 - +5 V DC, 0 - 10 V DC, 0 - 5 V DC, 1 - 5 V DC
Narrow span voltage: -1 - +1 V DC, 0 - 1 V DC, -0.5 - +0.5 V DC
Operational range: -15 - +115 % of the output range (except -10 - +10 V DC); approx. -11.5 - +11.5 V DC (-10 - +10 V DC)
Load resistance: $\geq 100 \text{ k}\Omega$
Conversion accuracy: $\pm 0.1 \%$
Response time: 250 msec. (0 - 90 %)
Temperature coefficient: $\pm 0.015 \text{ }^\circ\text{C}$ ($\pm 0.008 \text{ }^\circ\text{F}$)

OPERATING MODE SETTING

(*) Factory setting
 Caution ! - SW1-3 is unused. Be sure to turn off unused ones.

• Output Range (SW1-5, 1-6, 1-7, 1-8)

SW1-5	SW1-6	SW1-7	SW1-8	Output range
OFF	OFF	OFF	OFF	-10 - +10 V DC (*)
ON	OFF	OFF	OFF	-5 - +5 V DC
OFF	ON	OFF	OFF	-1 - +1 V DC
ON	ON	OFF	OFF	0 - 10 V DC
OFF	OFF	ON	OFF	0 - 5 V DC
ON	OFF	ON	OFF	1 - 5 V DC
OFF	ON	ON	OFF	0 - 1 V DC
ON	ON	ON	OFF	-0.5 - +0.5 V DC
ON	ON	ON	ON	PC Configurator setting

• Output at the Loss of Communication (SW1-4)

SW1-4	Output at the loss of communication
OFF	Reset the output (to -15% or approx. -11.5V DC)
ON	Hold the output (*) (maintains the last data received normally)

• Extension (SW1-1, 1-2)

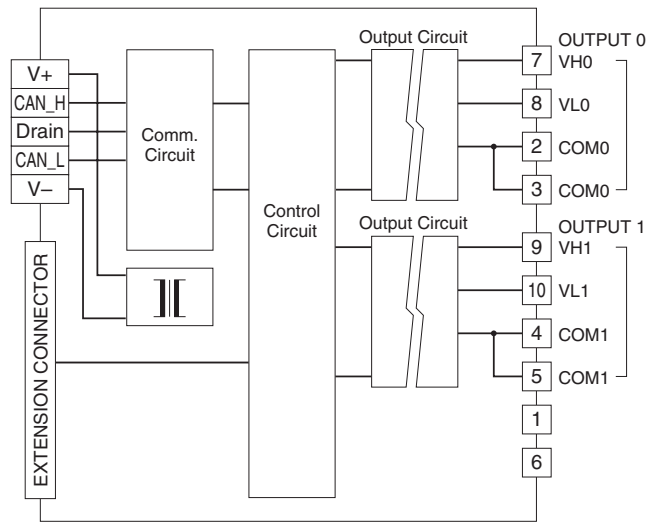
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

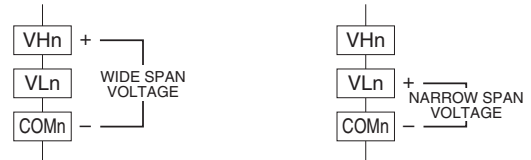
6	7	8	9	10
NC	VH0	VL0	VH1	VL1
1	2	3	4	5
NC	COM0	COM0	COM1	COM1

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	6	NC	No connection
2	COM0	Common 0	7	VH0	Wide span volt. 0
3	COM0	Common 0	8	VL0	Narrow span volt. 0
4	COM1	Common 1	9	VH1	Wide span volt. 1
5	COM1	Common 1	10	VL1	Narrow span volt. 1

CIRCUIT DIAGRAM



■ Output Connection Examples



DC VOLTAGE OUTPUT MODULE, 2 points

(external power supply)

MODEL: R7D-YV2A

SPECIFICATIONS

Isolation: Output 0 to output 1 to DeviceNet to external power supply

Converted data range: 0 - 10000 of the output range

Output range

Wide span voltage: -10 - +10 V DC, -5 - +5 V DC, 0 - 10 V DC, 0 - 5 V DC, 1 - 5 V DC

Narrow span voltage: -1 - +1 V DC, 0 - 1 V DC, -0.5 - +0.5 V DC

Operational range: -15 - +115 % of the output range (except -10 - +10 V DC);

approx. -11.5 - +11.5 V DC (-10 - +10 V DC)

Load resistance: $\geq 100 \text{ k}\Omega$

Supply output: 24 V DC $\pm 10 \%$, $\geq 40 \text{ mA}$

Conversion accuracy: $\pm 0.1 \%$

Response time: 250 msec. (0 - 90 %)

Temperature coefficient: $\pm 0.015 \%/^{\circ}\text{C}$ ($\pm 0.008 \%/^{\circ}\text{F}$)

OPERATING MODE SETTING

(*) Factory setting

Caution ! - SW1-3 is unused. Be sure to turn off unused ones.

• Output Range (SW1-5, 1-6, 1-7, 1-8)

SW1-5	SW1-6	SW1-7	SW1-8	Output range
OFF	OFF	OFF	OFF	-10 - +10 V DC (*)
ON	OFF	OFF	OFF	-5 - +5 V DC
OFF	ON	OFF	OFF	-1 - +1 V DC
ON	ON	OFF	OFF	0 - 10 V DC
OFF	OFF	ON	OFF	0 - 5 V DC
ON	OFF	ON	OFF	1 - 5 V DC
OFF	ON	ON	OFF	0 - 1 V DC
ON	ON	ON	OFF	-0.5 - +0.5 V DC
ON	ON	ON	ON	PC Configurator setting

• Output at the Loss of Communication (SW1-4)

SW1-4	Output at the loss of communication
OFF	Reset the output (to -15% or approx. -11.5V DC)
ON	Hold the output (*) (maintains the last data received normally)

• Extension (SW1-1, 1-2)

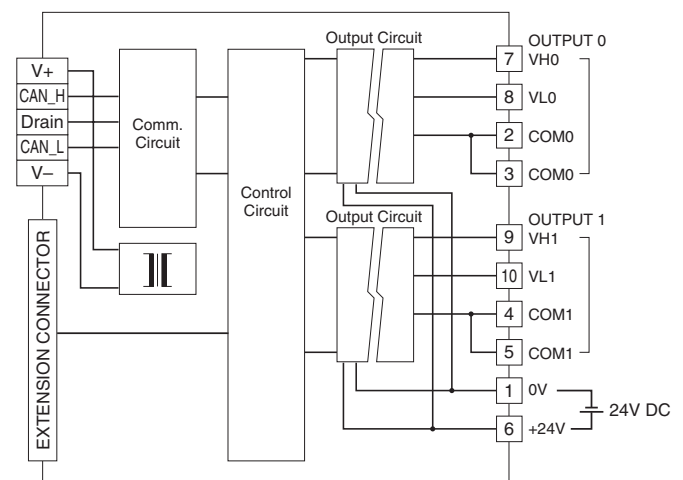
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS

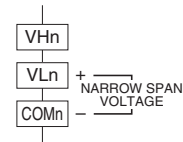
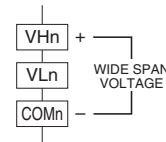
6	7	8	9	10
+24V	VH0	VL0	VH1	VL1
1	2	3	4	5
0V	COM0	COM0	COM1	COM1

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0V	0V	6	+24V	24V DC
2	COM0	Common 0	7	VH0	Wide span volt. 0
3	COM0	Common 0	8	VL0	Narrow span volt. 0
4	COM1	Common 1	9	VH1	Wide span volt. 1
5	COM1	Common 1	10	VL1	Narrow span volt. 1

CIRCUIT DIAGRAM



■ Output Connection Examples



DC CURRENT OUTPUT MODULE, 2 points

MODEL: R7D-YS2

SPECIFICATIONS

- Isolation: Output 0 to output 1 to DeviceNet
- Converted data range: 0 - 10000 of the output range
- Output range: 4 - 20 mA DC
- Load resistance: ≤ 600Ω
- Conversion accuracy: ±0.1 %
- Response time: 250 msec. (0 - 90 %)
- Temperature coefficient: ±0.015 %/°C (±0.008 %/°F)

OPERATING MODE SETTING

(*) Factory setting

Caution ! - SW1-3, 1-5 through 1-8 are unused. Be sure to turn off unused ones.

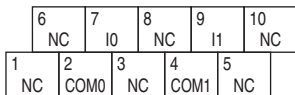
• Output at the Loss of Communication (SW1-4)

SW1-4	Output at the loss of communication	
OFF	Reset the output (to -15%)	
ON	Hold the output (*) (maintains the last data received normally)	

• Extension (SW1-1, 1-2)

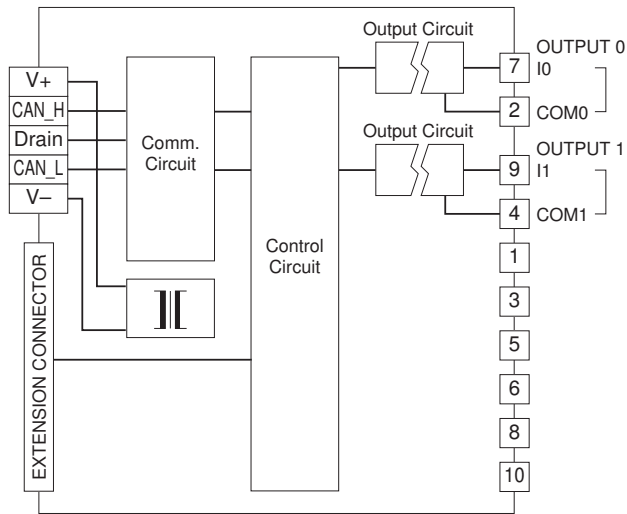
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS



NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	6	NC	No connection
2	COM0	Common 0	7	I0	Current 0
3	NC	No connection	8	NC	No connection
4	COM1	Common 1	9	I1	Current 1
5	NC	No connection	10	NC	No connection

CIRCUIT DIAGRAM



DC CURRENT OUTPUT MODULE, 2 points

(external power supply)

MODEL: R7D-YS2A

SPECIFICATIONS

Isolation: Output 0 to output 1 to DeviceNet to external power supply

Converted data range: 0 - 10000 of the output range

Output range: 4 - 20 mA DC

Load resistance: ≤ 600Ω

Supply output: 24 V DC ±10 %, ≥ 70 mA

Conversion accuracy: ±0.1 %

Response time: 250 msec. (0 - 90 %)

Temperature coefficient: ±0.015 %/°C (±0.008 %/°F)

OPERATING MODE SETTING

(*) Factory setting

Caution ! - SW1-3, 1-5 through 1-8 are unused. Be sure to turn off unused ones.

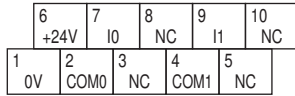
• Output at the Loss of Communication (SW1-4)

SW1-4	Output at the loss of communication
OFF	Reset the output (to -15%)
ON	Hold the output (*) (maintains the last data received normally)

• Extension (SW1-1, 1-2)

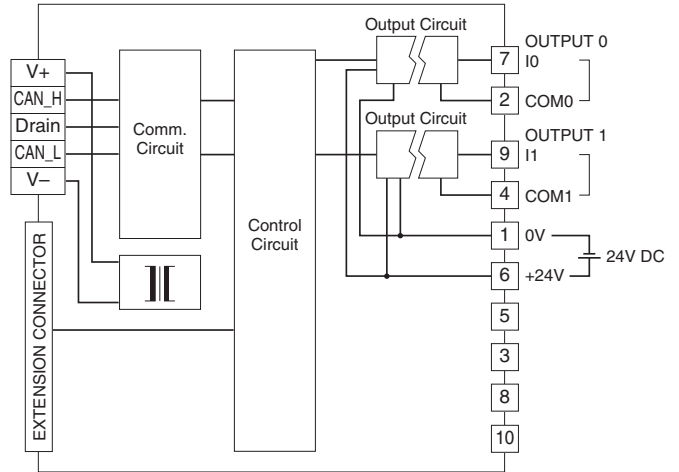
SW1-1	SW1-2	Extension
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

TERMINAL ASSIGNMENTS



NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0V	0V	6	+24V	24V DC
2	COM0	Common 0	7	I0	Current 0
3	NC	No connection	8	NC	No connection
4	COM1	Common 1	9	I1	Current 1
5	NC	No connection	10	NC	No connection

CIRCUIT DIAGRAM



DISCRETE INPUT EXTENSION MODULE, 8 points

MODEL: R7D-EA8

SPECIFICATIONS

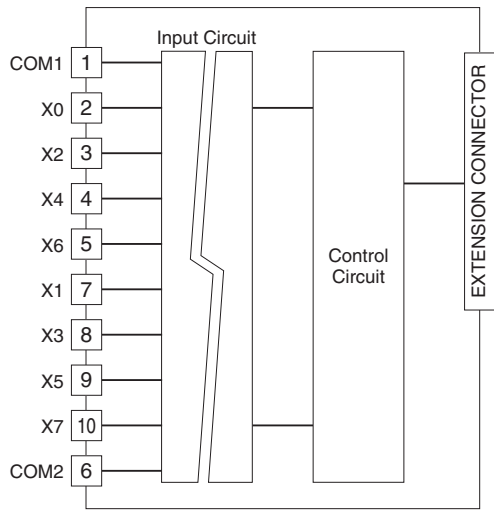
- Common:** Positive or negative common (NPN/PNP) per 8 points
- Number of I/O:** Input, 8 points
- Maximum inputs applicable at once:** No limit (at 24 V DC)
- Input status indicator:** LED turns ON with contact ON
- Isolation:** Input to internal circuits
- Rated input voltage:** 24 V DC $\pm 10\%$; ripple 5 %p-p max.
- ON voltage/current:** ≥ 15 V DC (input-COM1) / ≥ 3.5 mA
- OFF voltage/current:** ≤ 5 V DC (input-COM1) / ≤ 1 mA
- Input current:** ≤ 5.5 mA per point at 24 V DC
- Input resistance:** Approx. 4.4 k Ω
- ON delay:** ≤ 2.0 msec.
- OFF delay:** ≤ 2.0 msec.

TERMINAL ASSIGNMENTS

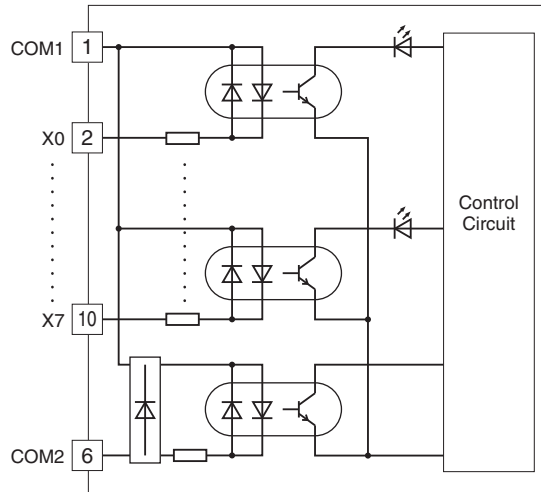
6	7	8	9	10
COM2	X1	X3	X5	X7
1	2	3	4	5
COM1	X0	X2	X4	X6

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	COM1	Common 1	6	COM2	Common 2
2	X0	Input 0	7	X1	Input 1
3	X2	Input 2	8	X3	Input 3
4	X4	Input 4	9	X5	Input 5
5	X6	Input 6	10	X7	Input 7

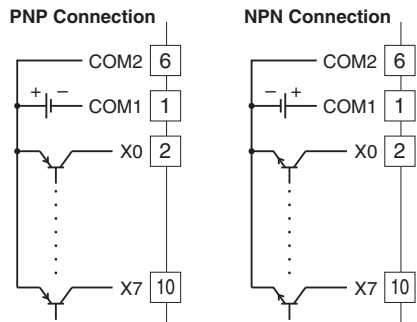
CIRCUIT DIAGRAM



Input Circuit



Input Connection Examples



DISCRETE INPUT EXTENSION MODULE, 16 points

CIRCUIT DIAGRAM

MODEL: R7D-EA16

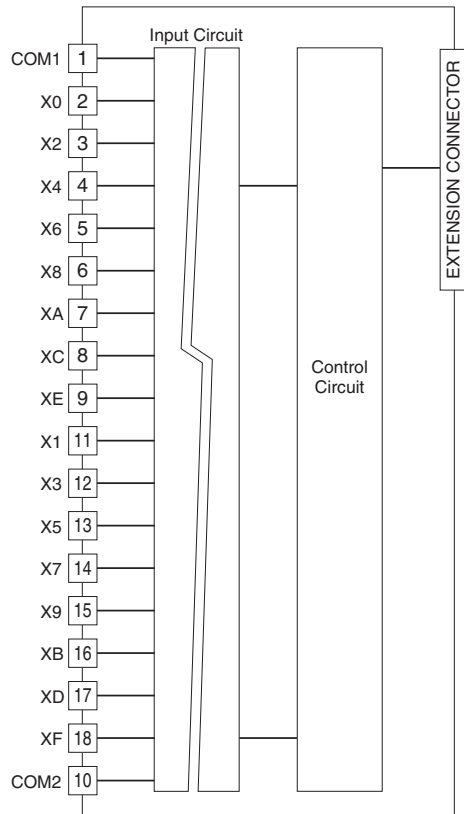
SPECIFICATIONS

- Common:** Positive or negative common (NPN/PNP) per 16 points
- Number of I/O:** Input, 16 points
- Maximum inputs applicable at once:** No limit (at 24 V DC)
- Input status indicator:** LED turns ON with contact ON
- Isolation:** Input to internal circuits
- Rated input voltage:** 24 V DC $\pm 10\%$; ripple 5 %p-p max.
- ON voltage/current:** ≥ 15 V DC (input-COM1) / ≥ 3.5 mA
- OFF voltage/current:** ≤ 5 V DC (input-COM1) / ≤ 1 mA
- Input current:** ≤ 5.5 mA per point at 24 V DC
- Input resistance:** Approx. 4.4 k Ω
- ON delay:** ≤ 2.0 msec.
- OFF delay:** ≤ 2.0 msec.

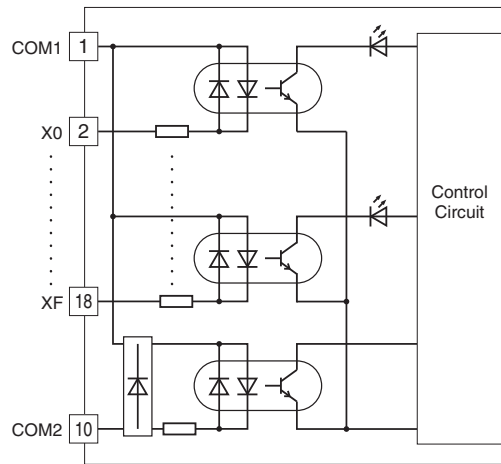
TERMINAL ASSIGNMENTS

10	11	12	13	14	15	16	17	18
COM2	X1	X3	X5	X7	X9	XB	XD	XF
1	2	3	4	5	6	7	8	9
COM1	X0	X2	X4	X6	X8	XA	XC	XE

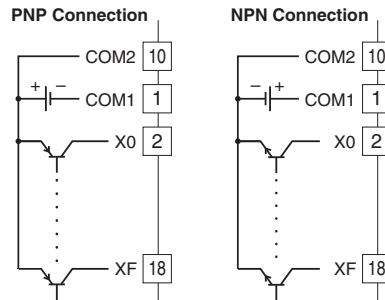
NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	COM1	Common 1	10	COM2	Common 2
2	X0	Input 0	11	X1	Input 1
3	X2	Input 2	12	X3	Input 3
4	X4	Input 4	13	X5	Input 5
5	X6	Input 6	14	X7	Input 7
6	X8	Input 8	15	X9	Input 9
7	XA	Input 10	16	XB	Input 11
8	XC	Input 12	17	XD	Input 13
9	XE	Input 14	18	XF	Input 15



Input Circuit



Input Connection Examples



NPN TRANSISTOR OUTPUT EXTENSION MODULE, 8 points

CIRCUIT DIAGRAM

MODEL: R7D-EC8A

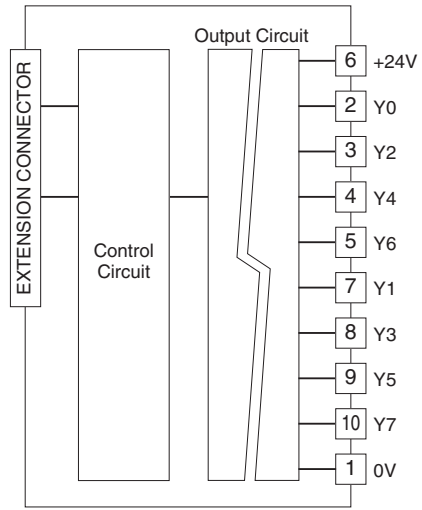
SPECIFICATIONS

- Common:** Negative common (NPN) per 8 points
 - Number of I/O:** Output, 8 points
 - Maximum outputs applicable at once:** No limit (at 24 V DC)
 - Output status indicator:** LED turns ON with contact ON
 - Isolation:** Output to internal circuits
 - Rated load voltage:** 24 V DC $\pm 10\%$
 - 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.
- (When driving an inductive load, connect a diode in parallel with the load.)

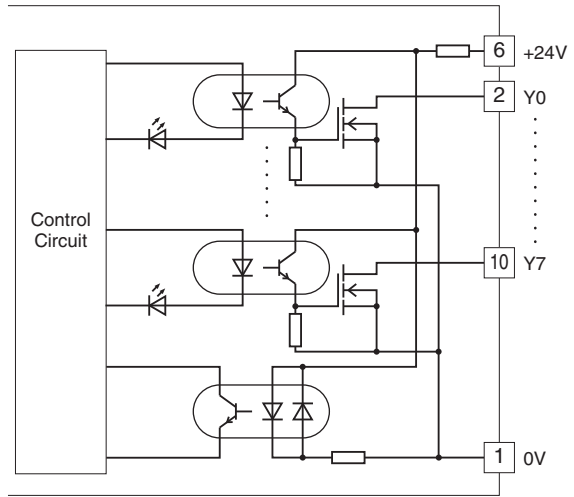
TERMINAL ASSIGNMENTS



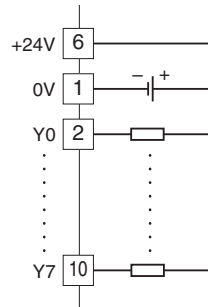
NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0 V	0 V (common)	6	+24 V	24 V DC
2	Y0	Output 0	7	Y1	Output 1
3	Y2	Output 2	8	Y3	Output 3
4	Y4	Output 4	9	Y5	Output 5
5	Y6	Output 6	10	Y7	Output 7



■ Output Circuit



■ Output Connection Example



NPN TRANSISTOR OUTPUT EXTENSION MODULE, 16 points

CIRCUIT DIAGRAM

MODEL: R7D-EC16A

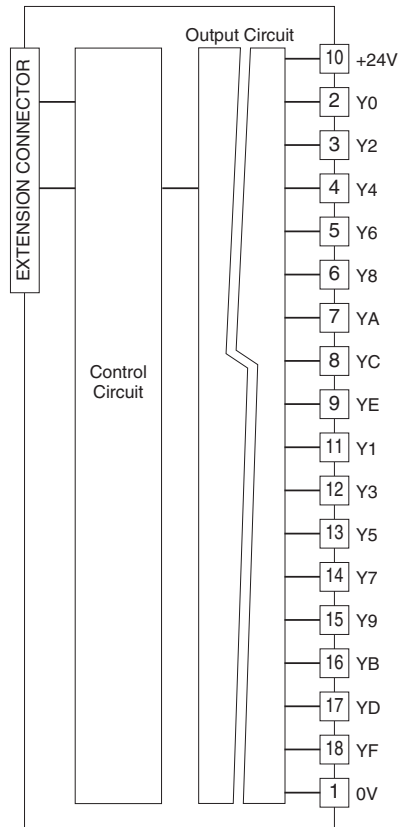
SPECIFICATIONS

- Common:** Negative common (NPN) per 16 points
 - Number of I/O:** Output, 16 points
 - Maximum outputs applicable at once:** No limit (at 24 V DC)
 - Output status indicator:** LED turns ON with contact ON
 - Isolation:** Output to internal circuits
 - Rated load voltage:** 24 V DC $\pm 10\%$
 - 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.
- (When driving an inductive load, connect a diode in parallel with the load.)

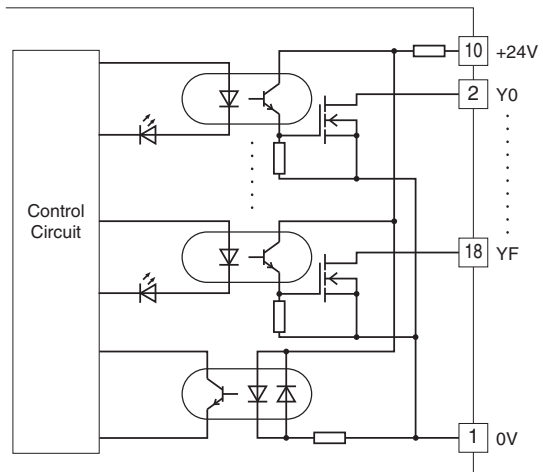
TERMINAL ASSIGNMENTS

10	11	12	13	14	15	16	17	18
+24V	Y1	Y3	Y5	Y7	Y9	YB	YD	YF
1	2	3	4	5	6	7	8	9
0V	Y0	Y2	Y4	Y6	Y8	YA	YC	YE

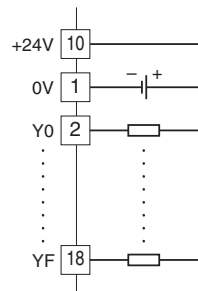
NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0 V	0 V (common)	10	+24 V	24 V DC
2	Y0	Output 0	11	Y1	Output 1
3	Y2	Output 2	12	Y3	Output 3
4	Y4	Output 4	13	Y5	Output 5
5	Y6	Output 6	14	Y7	Output 7
6	Y8	Output 8	15	Y9	Output 9
7	YA	Output 10	16	YB	Output 11
8	YC	Output 12	17	YD	Output 13
9	YE	Output 14	18	YF	Output 15



■ Output Circuit



■ Output Connection Example



PNP TRANSISTOR OUTPUT EXTENSION MODULE, 8 points

CIRCUIT DIAGRAM

MODEL: R7D-EC8B

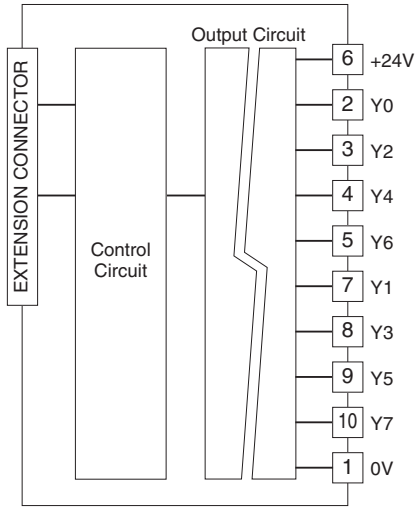
SPECIFICATIONS

- Common:** Positive common (PNP) per 8 points
 - Number of I/O:** Output, 8 points
 - Maximum outputs applicable at once:** No limit (at 24 V DC)
 - Output status indicator:** LED turns ON with contact ON
 - Isolation:** Output to internal circuits
 - Rated load voltage:** 24 V DC $\pm 10\%$
 - 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.
- (When driving an inductive load, connect a diode in parallel with the load.)

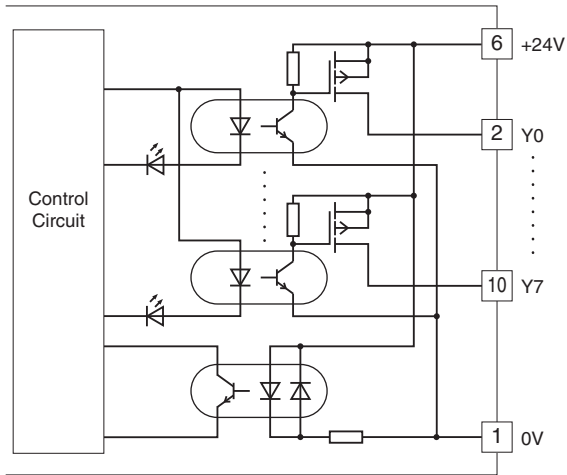
TERMINAL ASSIGNMENTS



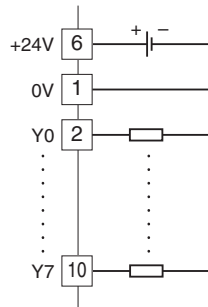
NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0 V	0 V	6	+24 V	24 V DC (common)
2	Y0	Output 0	7	Y1	Output 1
3	Y2	Output 2	8	Y3	Output 3
4	Y4	Output 4	9	Y5	Output 5
5	Y6	Output 6	10	Y7	Output 7



■ Output Circuit



■ Output Connection Example



PNP TRANSISTOR OUTPUT EXTENSION MODULE, 16 points

CIRCUIT DIAGRAM

MODEL: R7D-EC16B

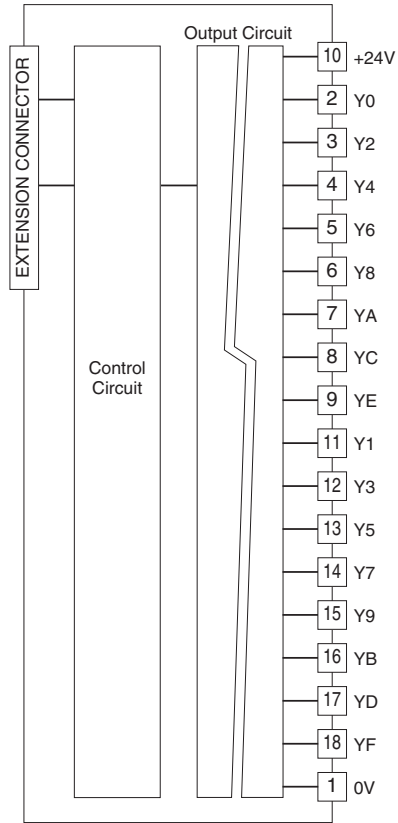
SPECIFICATIONS

- Common:** Positive common (PNP) per 16 points
 - Number of I/O:** Output, 16 points
 - Maximum outputs applicable at once:** No limit (at 24 V DC)
 - Output status indicator:** LED turns ON with contact ON
 - Isolation:** Output to internal circuits
 - Rated load voltage:** 24 V DC $\pm 10\%$
 - 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.
- (When driving an inductive load, connect a diode in parallel with the load.)

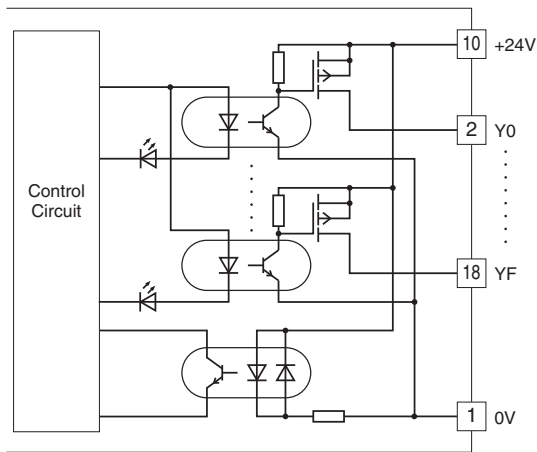
TERMINAL ASSIGNMENTS

10	11	12	13	14	15	16	17	18
+24V	Y1	Y3	Y5	Y7	Y9	YB	YD	YF
1	2	3	4	5	6	7	8	9
0V	Y0	Y2	Y4	Y6	Y8	YA	YC	YE

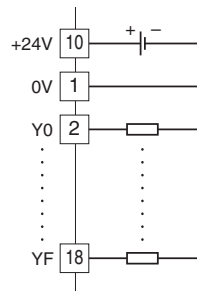
NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0 V	0 V	10	+24 V	24 V DC (common)
2	Y0	Output 0	11	Y1	Output 1
3	Y2	Output 2	12	Y3	Output 3
4	Y4	Output 4	13	Y5	Output 5
5	Y6	Output 6	14	Y7	Output 7
6	Y8	Output 8	15	Y9	Output 9
7	YA	Output 10	16	YB	Output 11
8	YC	Output 12	17	YD	Output 13
9	YE	Output 14	18	YF	Output 15



■ Output Circuit



■ Output Connection Example





Specifications are subject to change without notice.