

Remote I/O R7 Series

CC-Link I/O MODULE

MODEL **R7C**

MODEL & SUFFIX CODE SELECTION

■BASIC MODULE

MODEL _____ I/O TYPE _____ **R7C-□-R**

DA16 : Discrete input, 16 points
DC16A : NPN transistor output, 16 points *1
DC16B : PNP transistor output, 16 points *1
SV4 : DC voltage/current input (10V/20mA), 4 points
TS4 : Thermocouple input, 4 points
RS4 : RTD input, 4 points
YV2 : DC voltage output, 2 points
YS2 : DC current output, 2 points
POWER INPUT _____

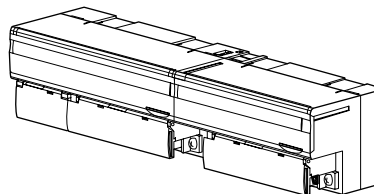
R : 24V DC

*1. The R7C-EA16 cannot be used with the R7C-DC16A or the R7C-DC16B.

■EXTENSION MODULE

MODEL _____ I/O TYPE _____ **R7C-□**

EA16 : Discrete input, 16 points
EC16A : NPN transistor output, 16 points
EC16B : PNP transistor output, 16 points



FUNCTIONS & FEATURES

The R7C interfaces analog and discrete I/O signals with a PLC via CC-Link.

A 'basic' module can 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 and 16-point discrete I/Os. Only the combination of basic discrete output and extension discrete input modules is not available.

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, the PC Configurator Software (model: R7CON) is used.

ORDERING INFORMATION

Specify code number. (e.g. R7C-DC16A-R)

RELATED PRODUCTS

- PC configurator software (model: R7CON)
Downloadable at M-System's web site:
<http://www.m-system.co.jp>
- PC configurator cable (model: MCN-CON)

GENERAL SPECIFICATIONS

COMMON SPECIFICATIONS

Power input: 24V DC $\pm 10\%$

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

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

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 +148°F)

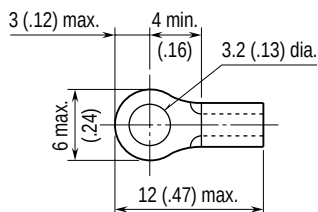
Mounting: DIN rail (35 mm wide)

Network cable: CC-Link cable designated by
Mitsubishi Electric

Connection: M3 screw terminals

Screw terminal material: Nickel-plated steel
(torque 0.5 N·m)

Recommended solderless terminal: Refer to the
drawing below (unit: mm (inch)). Appli-
cable wire size 0.3 to 0.75 mm²



CURRENT CONSUMPTION & WEIGHT

MODEL	CURRENT CONSUMPTION (at 24V DC)	WEIGHT
R7C-DA16	60mA	200 g (7.1 oz)
R7C-DC16A	75mA	200 g (7.1 oz)
R7C-DC16B	75mA	200 g (7.1 oz)
R7C-SV4	90mA	200 g (7.1 oz)
R7C-TS4	90mA	200 g (7.1 oz)
R7C-RS4	90mA	200 g (7.1 oz)
R7C-YV2	100mA	150 g (5.3 oz)
R7C-YS2	140mA	150 g (5.3 oz)
R7C-EA16	20mA	150 g (5.3 oz)
R7C-EC16A	20mA	150 g (5.3 oz)
R7C-EA16B	20mA	150 g (5.3 oz)

STATION TYPE

MODEL	STATION TYPE
R7C-DA16	Remote I/O
R7C-DC16A	Remote I/O
R7C-DC16B	Remote I/O
R7C-SV4	Remote device
R7C-TS4	Remote device
R7C-RS4	Remote device
R7C-YV2	Remote device
R7C-YS2	Remote device

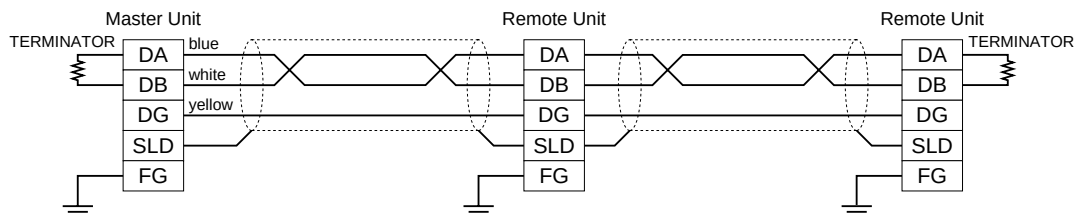
CONNECTION DIAGRAMS

POWER SUPPLY, CC-LINK TERMINAL ASSIGNMENT

4	5	6	7
DA	DG	+24V	0V
1	2	3	
DB	SLD	FG	

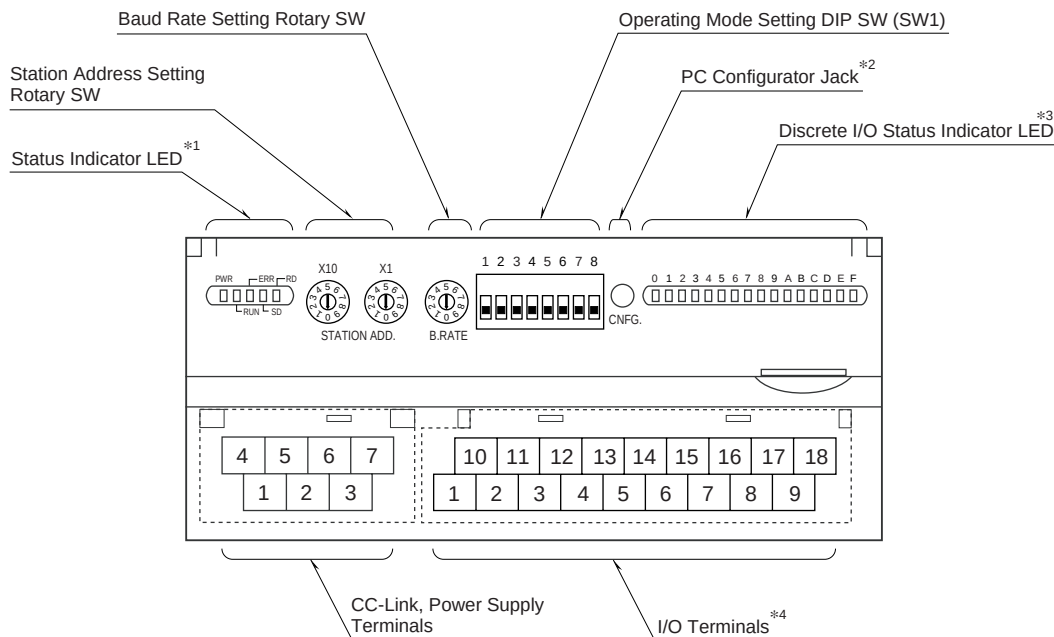
NO.	ID	FUNCTION, NOTES
1	DB	White
2	SLD	Shield
3	FG	FG
4	DA	Blue
5	DG	Yellow
6	+24V	Power input (24V DC)
7	0V	Power input (0V)

MASTER CONNECTION



Be sure to connect the terminating resistor included in the product package to the unit at both ends of transmission line.
The terminator must be connected across DA and DB.
The Master Unit can be located other than at the extreme ends of transmission line.

SIDE & FRONT VIEWS



*1. Refer to 'Status Indicator LED' section for detailed information.

*2. Not available with discrete I/O modules.

*3. Not available with analog I/O modules.

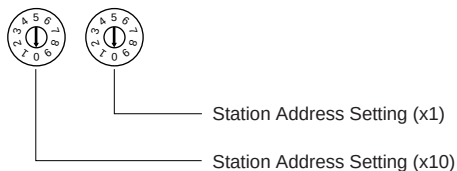
*4. 10 screw terminals for analog output modules.

■STATUS INDICATOR LED

ID	COLOR	FUNCTION
PWR	Red	Turns on when the internal 5V is supplied normally.
RUN	Red	Turns on when the refresh data is received normally.
ERR	Red	Turns on when the received data is abnormal.
SD	Red	Turns on when the module is transmitting.
RD	Red	Turns on when the module is receiving.

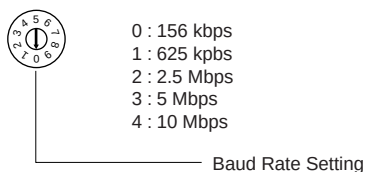
■STATION ADDRESS

Station Address is selected between 1 and 64 in decimal. The left switch determines the tenth place digit, while the right switch does the ones place digit of the address.



■BAUD RATE

Baud Rate is selected with the rotary switch.



■OPERATING MODE

Operating mode setting depends upon I/O type and ranges. Refer to the respective I/O sections.

■PC CONFIGURATOR JACK

Analog I/O modules are equipped with the PC Configurator Jack.

The PC Configurator is used to set the following parameters for each channel.

- Zero and span adjustments
- Scaling
- Sensor type and range

Discrete I/O modules are not equipped with one.

In order to use the PC Configurator (model: R7CON), the cable model MCN-CON is needed.

Before starting programming, turn on the front SW1-5 through 1-8. For more information about the programming using the R7CON, please refer to the R7CON Users Manual.

INDICATOR LED**■STATUS INDICATOR LED**

PWR	RUN	ERR	SD	RD	STATUS
ON	ON	FL	FL	ON	Communicates normally with occasional CRC errors due to noise interference.
ON	ON	FL	FL	ON	Communicates normally but the Baud Rate and/or Station Address switches failed. ERR LED flashes approximately in 0.5 second intervals.
ON	ON	FL	FL	OFF	----
ON	ON	FL	OFF	ON	CRC error found in the received data. Unable to respond.
ON	ON	FL	OFF	OFF	----
ON	ON	OFF	FL	ON	Normal communication
ON	ON	OFF	FL	OFF	----
ON	ON	OFF	OFF	ON	Unable to receive data addressed to the station.
ON	ON	OFF	OFF	OFF	----
ON	OFF	FL	FL	ON	Performs the interval-timed responses but CRC error found in receiving the refresh data.
ON	OFF	FL	FL	OFF	----
ON	OFF	FL	OFF	ON	CRC error found in the data addressed to the station.
ON	OFF	FL	OFF	OFF	----
ON	OFF	OFF	FL	ON	Link is not started.
ON	OFF	OFF	FL	OFF	----
ON	OFF	OFF	OFF	ON	No data addressed to the station. Or unable to receive data addressed to the station due to noise interference. (Missing parts of the data sent from the master)
ON	OFF	OFF	OFF	OFF	Unstable to receive data due to wire breakdown
ON	OFF	ON	OFF	ON/OFF	Faulty Baud Rate and/or Station Address setting
OFF	OFF	OFF	OFF	OFF	Power input removed. Or power supply failure.

OFF = OFF, ON = ON, FL = Flashing

---- = Inconceivable in normal operations (e.g. LED failure)

■DISCRETE I/O STATUS INDICATOR LED

Discrete I/O modules including those for extensions have LED indicators showing I/O signal status.

Contact ON : LED ON

Contact OFF: LED OFF

DATA CONVERSION

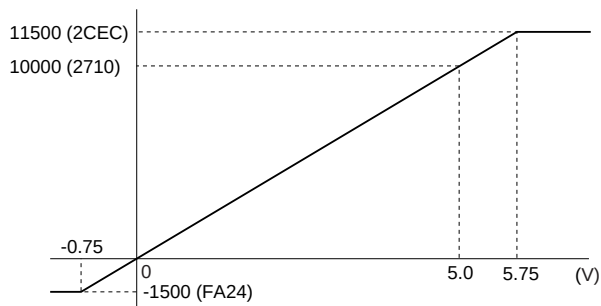
■0 – 100% DATA CONVERSION

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 signed 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.

- Input Range 0 – 5V DC

Input Value	Input %	Converted Data, Decimal	Converted Data, Hex
$\leq -0.75\text{V}$	-15%	-1500	FA24
0V	0%	0	0
5V	100%	10000	2710
$\geq 5.75\text{V}$	115%	11500	2CEC



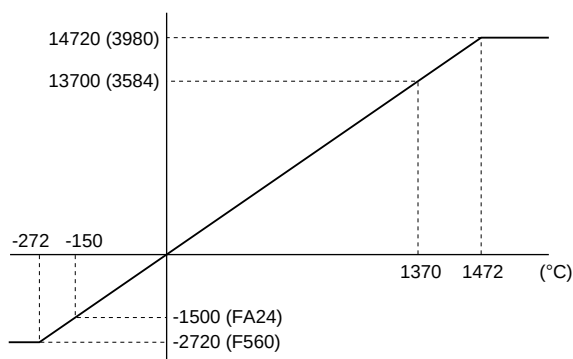
Analog output is converted in the reverse order of the input data. The output range 0 – 5V DC is expressed as 10000 at 5.0V (100%) and 0 at 0V (0%).

■TEMPERATURE DATA CONVERSION

Temperature data (thermocouple and RTD) are represented in engineering unit value, °C, multiplied by 10 and expressed in signed 16 bits.

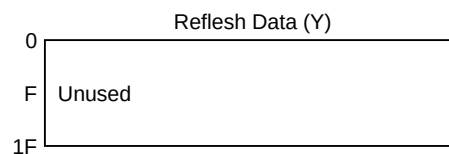
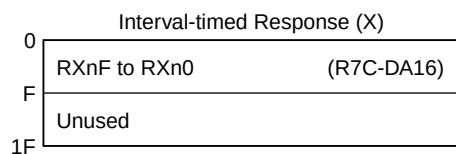
- Input Type K Thermocouple

Input Value	Converted Data, Decimal	Converted Data, Hex
$\leq -272^{\circ}\text{C}$	-2720	F560
-150°C	-1500	FA24
1370°C	13700	3584
$\geq 1472^{\circ}\text{C}$	14720	3980

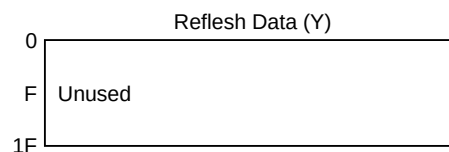
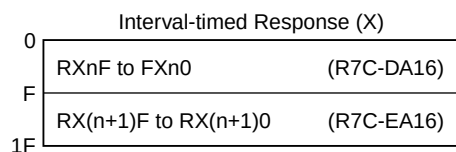


DATA ALLOCATION

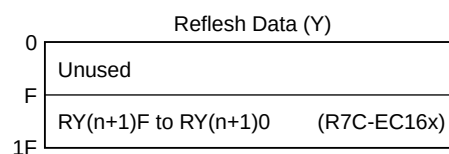
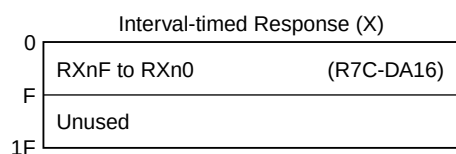
■R7C-DA16



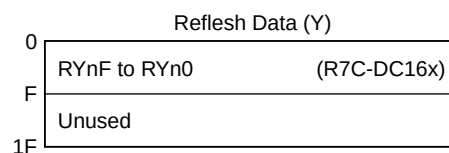
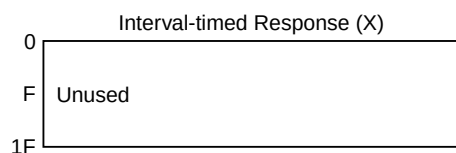
■R7C-DA16 + R7C-EA16



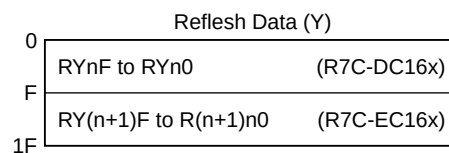
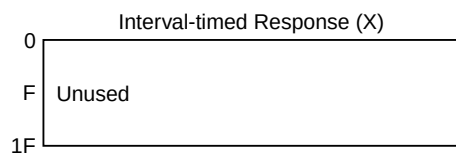
■R7C-DA16 + R7C-EC16x



■R7C-DC16x



■R7C-DC16x + R7C-EC16x



DATA ALLOCATION

■ANALOG INPUT, 4 POINTS

•Models R7C-SV4, R7C-TS4, R7C-RS4

Interval-timed Response (X)	
RW _{rn} +0	Analog input 0
+1	Analog input 1
+2	Analog input 2
+3	Analog input 3

Refresh Data (Y)	
RW _{wn} +0	Unused
+1	Unused
+2	Unused
+3	Unused

•Without Extension Module

Interval-timed Response (X)	
0	RX _{nF} to RX _{n0} (Status)
F	
1F	Reserved

Refresh Data (Y)	
0	Unused
F	
1F	

•With Extension Module R7C-EA16

Interval-timed Response (X)	
0	RX _{nF} to RX _{n0} (R7C-EA16) (Status)
F	
1F	Reserved

Refresh Data (Y)	
0	Unused
F	
1F	

•With Extension Module R7C-EC16x

Interval-timed Response (X)	
0	RX _{nF} to RX _{n0} (Status)
F	
1F	Reserved

Refresh Data (Y)	
0	RY _{nF} to RY _{n0} (R7C-EC16x) (Status)
F	
1F	Unused

DATA ALLOCATION**■ANALOG OUTPUT, 2 POINTS****•Models R7C-YV2, R7C-YS2**

Interval-timed Response (X)	
RW _{rn} +0	Unused
+1	Unused
+2	Unused
+3	Unused

Refresh Data (Y)	
RW _{wn} +0	Analog output 0
+1	Analog output 1
+2	Unused
+3	Unused

•Without Extension Module

Interval-timed Response (X)	
0	Unused
F	Reserved
1F	

Refresh Data (Y)	
0	
F	Unused
1F	

•With Extension Module R7C-EA16

Interval-timed Response (X)	
0	RX _{nF} to RX _{n0} (R7C-EA16)
F	Reserved
1F	

Refresh Data (Y)	
0	
F	Unused
1F	

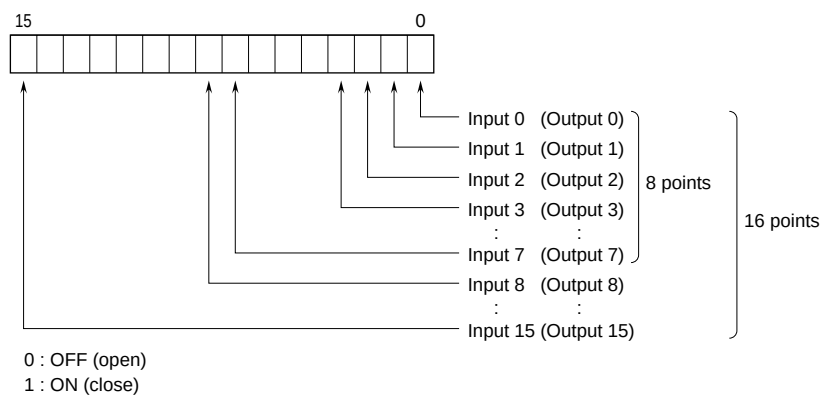
•With Extension Module R7C-EC16x

Interval-timed Response (X)	
0	Unused
F	Reserved
1F	

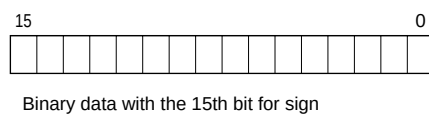
Refresh Data (Y)	
0	RY _{nF} to RY _{n0} (R7C-EC16x)
F	Unused
1F	

BIT ALLOCATION

■DISCRETE I/O

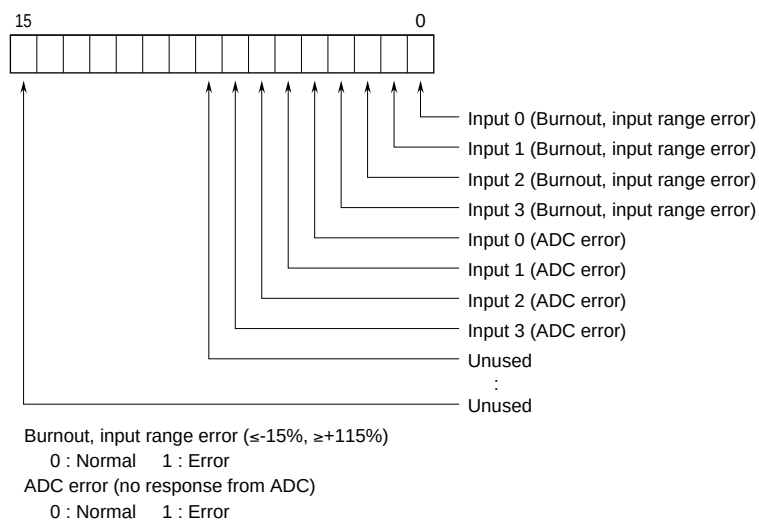


■ANALOG I/O



■STATUS

Analog input modules (models: R7C-SV4, R7C-TS4, R7C-RS4) without extension module can show input status of each channel.



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 and 16-point discrete I/Os.

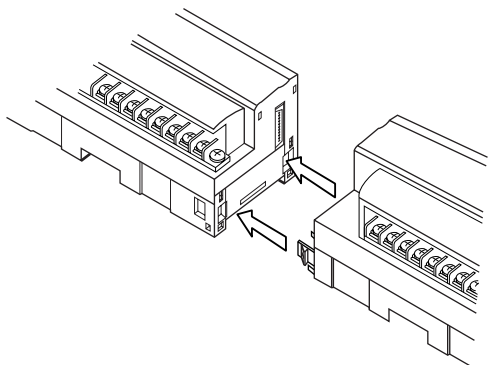
MODULE COMBINATIONS

BASIC MODULE	EXTENSION MODULE
R7C-DA16	R7C-EA16, R7C-EC16A, R7C-EC16B
R7C-DC16A *1	R7C-EC16A, R7C-EC16B
R7C-DC16B *1	R7C-EC16A, R7C-EC16B
R7C-SV4	R7C-EA16, R7C-EC16A, R7C-EC16B
R7C-TS4	R7C-EA16, R7C-EC16A, R7C-EC16B
R7C-RS4	R7C-EA16, R7C-EC16A, R7C-EC16B
R7C-YV2	R7C-EA16, R7C-EC16A, R7C-EC16B
R7C-YS2	R7C-EA16, R7C-EC16A, R7C-EC16B

*1. The R7C-EA16 cannot be added.

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.

OUTPUT AT THE LOSS OF COMMUNICATION

•When the extension module is connected to the R7C-DA16 or the R7C-DC16x

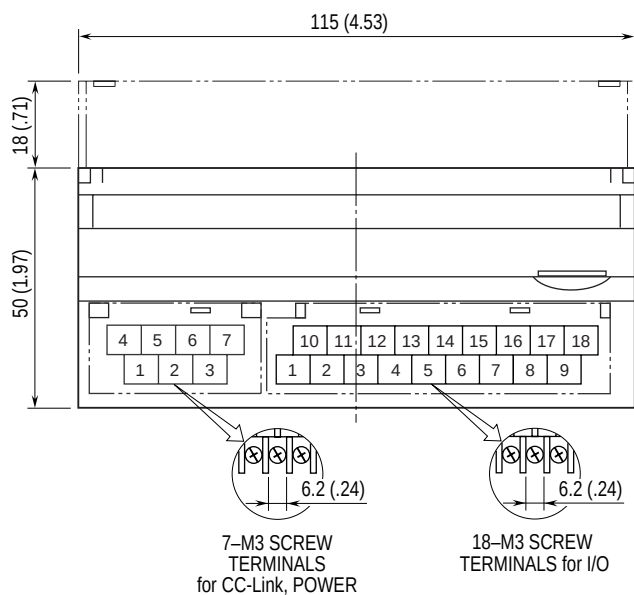
The extension module is set to 'Reset Output' or 'Hold Output' according to the setting of SW1-5 of the module.

•When the extension module is connected to a module other than the R7C-DA16 or the R7C-DC16x

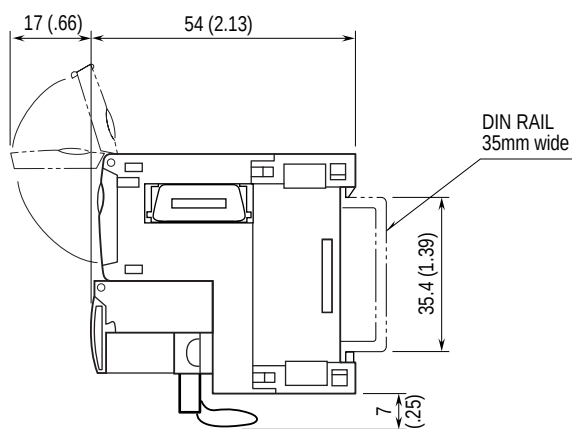
The extension module is set to 'Hold Output' by factory default setting. The PC Configurator is used to change the setting to 'Reset Output.'

EXTERNAL DIMENSIONS mm (inch)

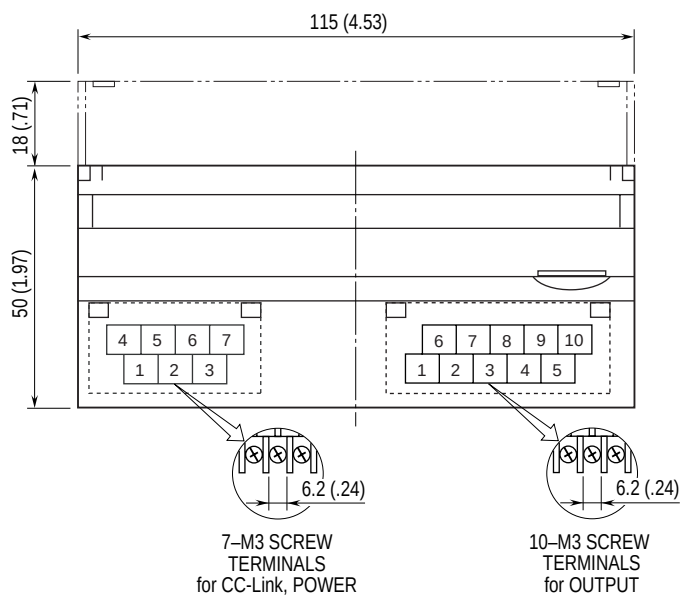
■ BASIC MODULE



• R7C-TS4

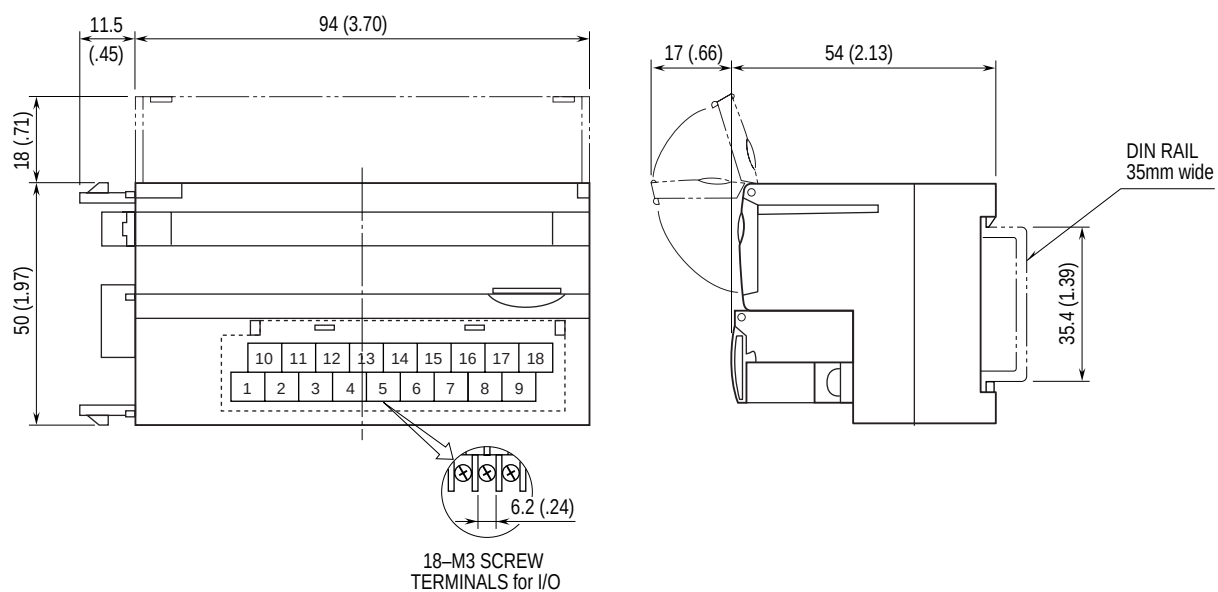


■ BASIC MODULE, ANALOG OUTPUT



EXTERNAL DIMENSIONS mm (inch)

■EXTENSION MODULE



DISCRETE INPUT MODULE, 16 points

MODEL **R7C-DA16**

SPECIFICATIONS

Common: Positive or negative common (NPN/PNP) per 16 points

Number of I/O: Input, 16 points

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

ON voltage/current: $\geq 15V$ DC (input-COM) / $\geq 3.5mA$

OFF voltage/current: $\leq 5V$ DC (input-COM) / $\leq 1mA$

Input current: $\leq 5.5mA$ per point at 24V DC

Input resistance: Approx. $4.4k\Omega$

ON delay: ≤ 2.0 msec.

OFF delay: ≤ 2.0 msec.

I/O status indicator: LED turns on with closed contact.

Maximum inputs applicable at once: No limit (at 24V DC)

Isolation: Input to power input to CC-Link or FG

CC-Link: Conforms to Version 1.10

Station type: Remote I/O

Occupied stations: 1

OPERATING MODE SETTING

•Extension (SW1-1, 1-2, 1-3, 1-4)

SW1-1	SW1-2	SW1-3	SW1-4	Extension
ON	OFF	OFF	OFF	No extension (*)
ON	OFF	OFF	ON	Discrete input, 16 points
OFF	OFF	OFF	ON	Discrete output, 16 points

•Output at the loss of communication (SW1-5)

SW1-5	Output at the loss of communication
OFF	Reset the output (turned off)
ON	Hold the output (*) (maintains the last data received normally)

(*) Factory setting

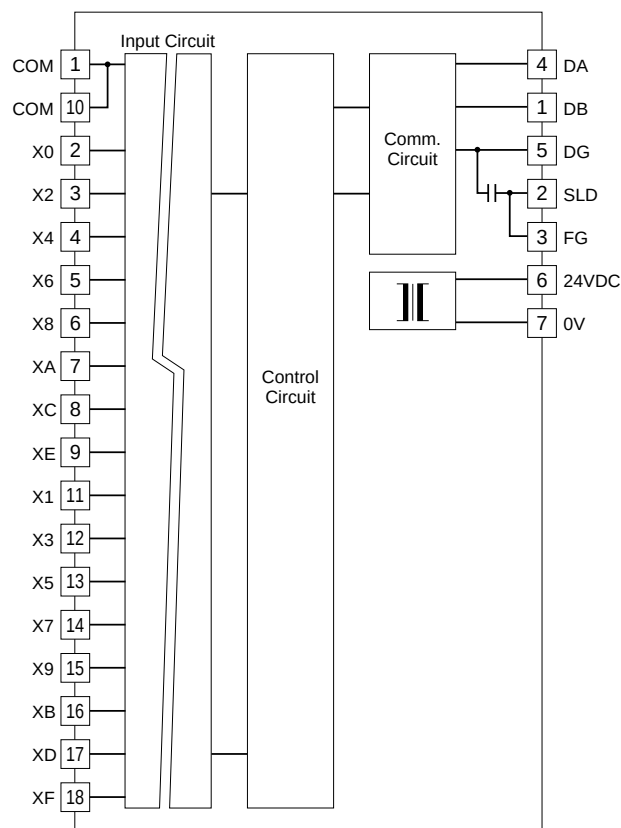
Caution ! - SW1-6, 1-7, 1-8 are unused. Be sure to turn off unused ones.

TERMINAL ASSIGNMENTS

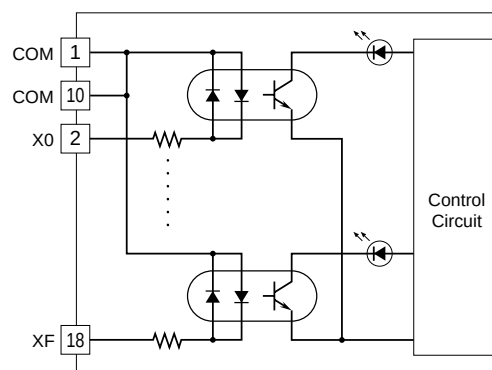
10	11	12	13	14	15	16	17	18
COM	X1	X3	X5	X7	X9	XB	XD	XF
1	2	3	4	5	6	7	8	9
COM	X0	X2	X4	X6	X8	XA	XC	XE

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	COM	Common	10	COM	Common
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

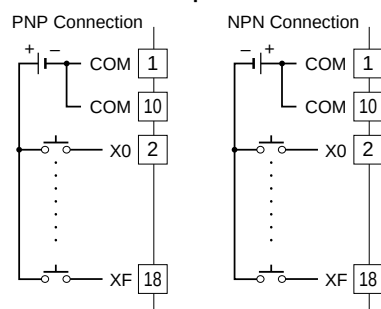
CIRCUIT DIAGRAM



■Input Circuit



■Input Connection Examples



NPN TRANSISTOR OUTPUT MODULE, 16 points

MODEL **R7C-DC16A**

SPECIFICATIONS

Common: Negative common (NPN) per 16 points**Number of I/O:** Output, 16 points**Rated load voltage:** 24V DC $\pm 10\%$ **Rate output current:** 0.25A per point, 2.0A per common**Residual voltage:** $\leq 1.2V$ **Leakage current:** $\leq 0.1A$ **ON delay:** ≤ 0.5 msec.**OFF delay:** ≤ 1.5 msec.**I/O status indicator:** LED turns on with closed contact.**Maximum outputs provided at once:** No limit (at 24V DC)**Isolation:** Output to power input to CC-Link or FG**CC-Link:** Conforms to Version 1.10**Station type:** Remote I/O**Occupied stations:** 1

OPERATING MODE SETTING

•Extension (SW1-1, 1-2, 1-3, 1-4)

SW1-1	SW1-2	SW1-3	SW1-4	Extension
OFF	ON	OFF	OFF	No extension (*)
OFF	ON	OFF	ON	Discrete output, 16 points

•Output at the loss of communication (SW1-5)

SW1-5	Output at the loss of communication
OFF	Reset the output (turned off)
ON	Hold the output (*) (maintains the last data received normally)

(*) Factory setting

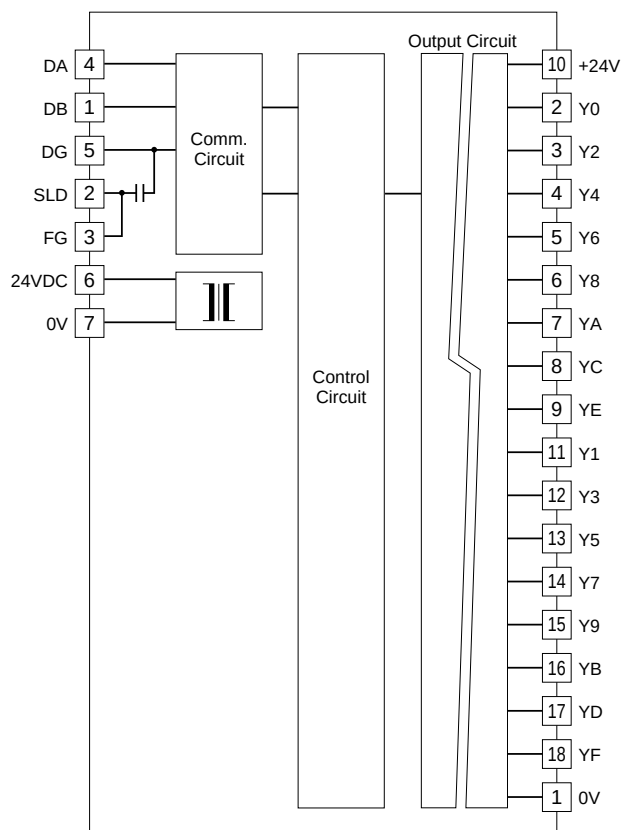
Caution ! - SW1-6, 1-7, 1-8 are unused. Be sure to turn off unused ones.

TERMINAL ASSIGNMENTS

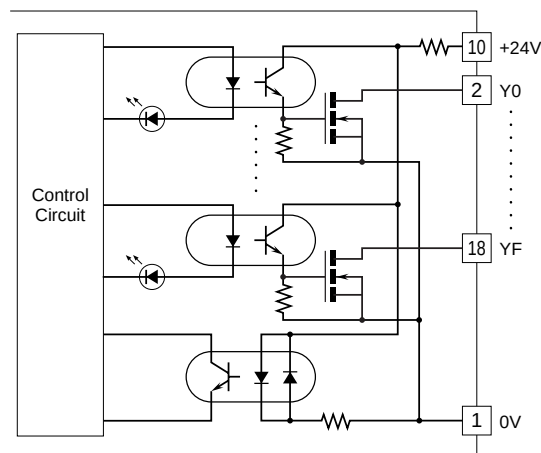
10	11	12	13	14	15	16	17	18
+24V	Y1	Y3	Y5	Y7	Y9	YB	YD	YF
1	2	3	4	5	6	7	8	9
0V	Y0	Y2	Y4	Y6	Y8	YA	YC	YE

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0V	0V (common)	10	+24V	24V 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

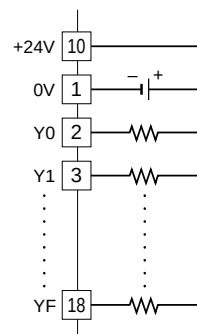
CIRCUIT DIAGRAM



■Output Circuit



■Output Connection Example



PNP TRANSISTOR OUTPUT MODULE, 16 points

MODEL **R7C-DC16B**

SPECIFICATIONS

Common: Positive common (PNP) per 16 points
Number of I/O: Output, 16 points
Rated load voltage: 24V DC $\pm 10\%$
Rate output current: 0.25A per point, 2.0A per common
Residual voltage: $\leq 1.2V$
Leakage current: $\leq 0.1A$
ON delay: ≤ 0.5 msec.
OFF delay: ≤ 1.5 msec.
I/O status indicator: LED turns on with closed contact.
Maximum outputs provided at once: No limit (at 24V DC)
Isolation: Output to power input to CC-Link or FG
CC-Link: Conforms to Version 1.10
Station type: Remote I/O
Occupied stations: 1

OPERATING MODE SETTING

•Extension (SW1-1, 1-2, 1-3, 1-4)

SW1-1	SW1-2	SW1-3	SW1-4	Extension
OFF	ON	OFF	OFF	No extension (*)
OFF	ON	OFF	ON	Discrete output, 16 points

•Output at the loss of communication (SW1-5)

SW1-5	Output at the loss of communication
OFF	Reset the output (turned off)
ON	Hold the output (*) (maintains the last data received normally)

(*) Factory setting

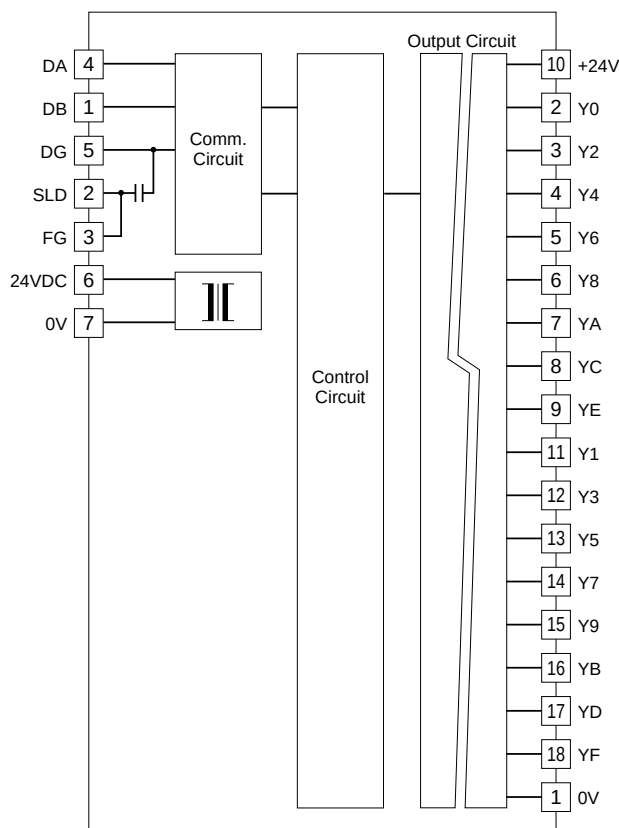
Caution ! - SW1-6, 1-7, 1-8 are unused. Be sure to turn off unused ones.

TERMINAL ASSIGNMENTS

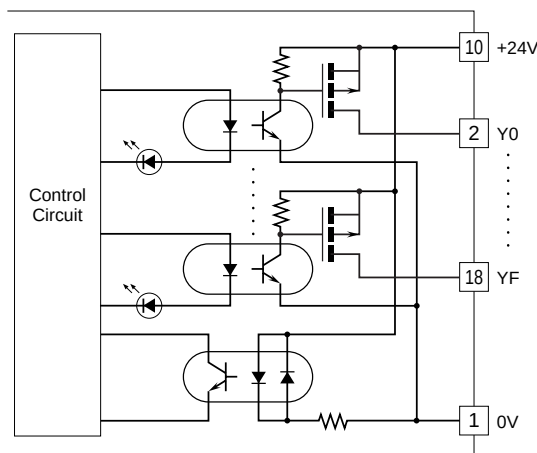
10	11	12	13	14	15	16	17	18
+24V	Y1	Y3	Y5	Y7	Y9	YB	YD	YF
1	2	3	4	5	6	7	8	9
0V	Y0	Y2	Y4	Y6	Y8	YA	YC	YE

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0V	0V	10	+24V	24V 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

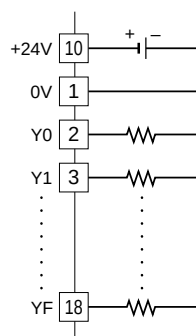
CIRCUIT DIAGRAM



■Output Circuit



■Output Connection Example



DC VOLTAGE/CURRENT INPUT MODULE, 4 points

MODEL **R7C-SV4**

SPECIFICATIONS

Input range & resistance

Wide span voltage: -10 – +10V DC, -5 – +5V DC,
0 – 10V DC, 0 – 5V DC, 1 – 5V DC;
input resistance 1M Ω minimum

Narrow span voltage: -1 – +1V DC, 0 – 1V DC,
-0.5 – +0.5V DC;
input resistance 100k Ω minimum

Current range: -20 – +20mA DC, 0 – 20mA DC,
4 – 20mA DC; input resistance 70 Ω

Conversion rate/conversion accuracy:

10 msec./ $\leq 0.8\%$, 20 msec./ $\leq 0.4\%$,

40 msec./ $\leq 0.2\%$, 80 msec./ $\leq 0.1\%$

Response time: Conversion rate $\times 2 + 50$ msec.
(0 – 90%)

Temperature coefficient: $\pm 0.015\%/^{\circ}\text{C}$

Converted data range: 0 – 10000 of the input range

Isolation: Input 0 to input 1 to input 2 to input 3 to
power input to CC-Link or FG

CC-Link: Conforms to Version 1.10

Station type: Remote device

Occupied stations: 1

OPERATING MODE SETTING

•Extension (SW1-1, 1-2)

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

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

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

•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 – +10V DC (*)
ON	OFF	OFF	OFF	-5 – +5V DC
OFF	ON	OFF	OFF	-1 – +1V DC
ON	ON	OFF	OFF	0 – 10V DC
OFF	OFF	ON	OFF	0 – 5V DC
ON	OFF	ON	OFF	1 – 5V DC
OFF	ON	ON	OFF	0 – 1V DC
ON	ON	ON	OFF	-0.5 – +0.5V DC
ON	OFF	OFF	ON	-20 – +20mA DC
OFF	ON	OFF	ON	4 – 20mA DC
ON	ON	OFF	ON	0 – 20mA DC
ON	ON	ON	ON	PC Configurator setting

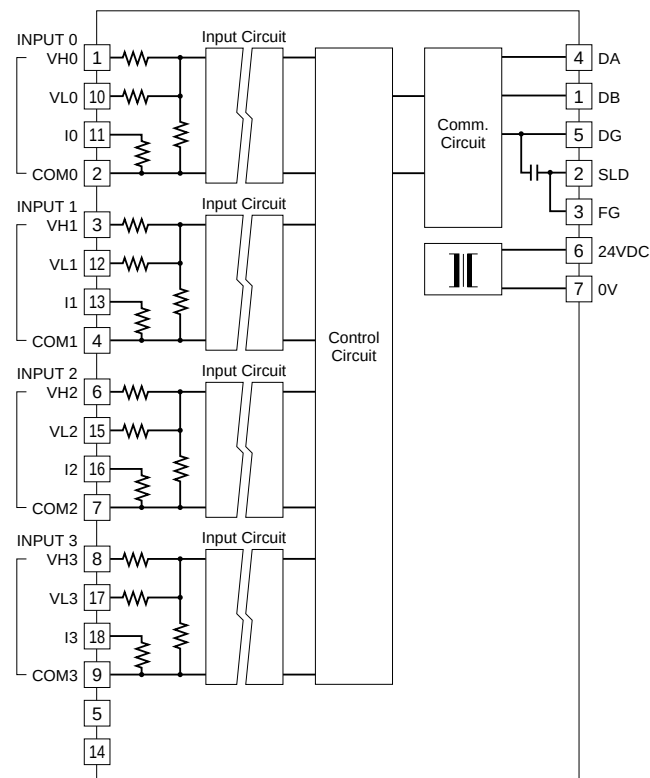
(*) Factory setting

TERMINAL ASSIGNMENTS

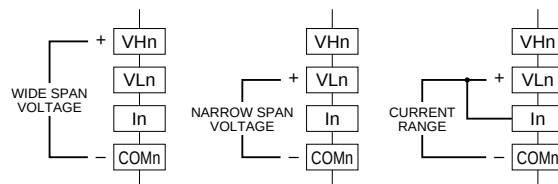
10	11	12	13	14	15	16	17	18
VL0	I0	VL1	I1	NC	VL2	I2	VL3	I3
1	2	3	4	5	6	7	8	9
VH0	COM0	VH1	COM1	NC	VH2	COM2	VH3	COM3

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 **R7C-TS4**

SPECIFICATIONS

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

Input resistance: 30kΩ minimum

Burnout sensing: ≤0.1μA

Burnout indication: Maximum value (upscale burnout) or minimum value (downscale burnout) of the usable range

Conversion accuracy: ±1°C (±2.0°C 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

CJC error: ±1.0°C maximum (at 25°C ±10°C)

Converted data range: Engineering unit value (°C) × 10 (integer)

Isolation: Input 0 to input 1 to input 2 to input 3 to power input to CC-Link or FG

CC-Link: Conforms to Version 1.10

Station type: Remote device

Occupied stations: 1

T/C	USABLE RANGE (°C)	CONFORMANCE RANGE (°C)
K (CA)	-272 to +1472	-150 to +1370
E (CRC)	-272 to +1100	-170 to +1000
J (IC)	-260 to +1300	-180 to +1200
T (CC)	-270 to + 500	-170 to + 400
B (RH)	24 to 1920	400 to 1760
R	-100 to +1860	200 to 1760
S	-100 to +1860	0 to 1760
C (WRe 5-26)	-52 to +2416	0 to 2315
N	-272 to +1400	-130 to +1300
U	-252 to + 700	-200 to +600
L	-252 to +1000	-200 to +900
P (Platinel II) (PR)	-52 to +1496	0 to 1395
	-52 to +1860	0 to 1760

Max. (upscale) or min. (downscale) value of the usable range when a burnout is detected. Overrange input (out of the usable range) is also handled as burnout.

OPERATING MODE SETTING

•Extension (SW1-1, 1-2)

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

•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

(*) Factory setting

•Conversion rate (SW1-3)

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

(*) Factory setting

•Burnout (SW1-4)

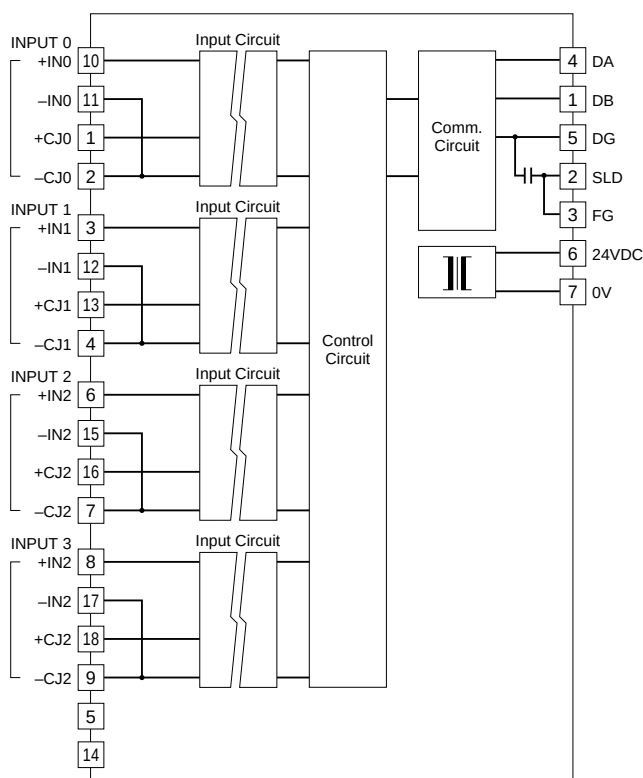
SW1-4	Burnout
OFF	Upscale (*)
ON	Downscale

TERMINAL ASSIGNMENTS

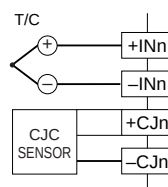
10	11	12	13	14	15	16	17	18
+IN0	-IN0	+IN1	-IN1	NC	+IN2	-IN2	+IN3	-IN3
1	2	3	4	5	6	7	8	9
+CJ0	-CJ0	+CJ1	-CJ1	NC	+CJ2	-CJ2	+CJ3	-CJ3

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 - 4

CIRCUIT DIAGRAM



■Input Connection Example



RTD INPUT MODULE, 4 points

MODEL R7C-RS4

SPECIFICATIONS

RTD: Pt 100 (IEC 751), Pt 100 (JIS '89), JPt 100 (JIS '89), Pt 50 (JIS '81), Ni 100, Cu 10, Cu 50

Input resistance: 1MΩ minimum

Maximum leadwire resistance: 100Ω per wire

Burnout indication: Maximum value (upscale burnout) or minimum value (downscale burnout) of the usable range

Sensing current: ≤1mA

Conversion accuracy: ±1°C (±3.0°C for Cu 10)

Conversion rate: 250 msec. or 500 msec.

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

Temperature coefficient: ±0.015%/°C

Converted data range: Engineering unit value (°C) × 10 (integer)

Isolation: Input 0 to input 1 to input 2 to input 3 to power input to CC-Link or FG

CC-Link: Conforms to Version 1.10

Station type: Remote device

Occupied stations: 1

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

Max. (upscale) or min. (downscale) value of the usable range when a burnout is detected. Overrange input (out of the usable range) is also handled as burnout.

OPERATING MODE SETTING

•Extension (SW1-1, 1-2)

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

•Conversion rate (SW1-3)

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

•Burnout (SW1-4)

SW1-4	Burnout
OFF	Upscale (*)
ON	Downscale

•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 (IEC 751) (*)
ON	OFF	OFF	OFF	Pt 100 (JIS '89)
OFF	ON	OFF	OFF	JPt 100 (JIS '89)
ON	ON	OFF	OFF	Pt 50 (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

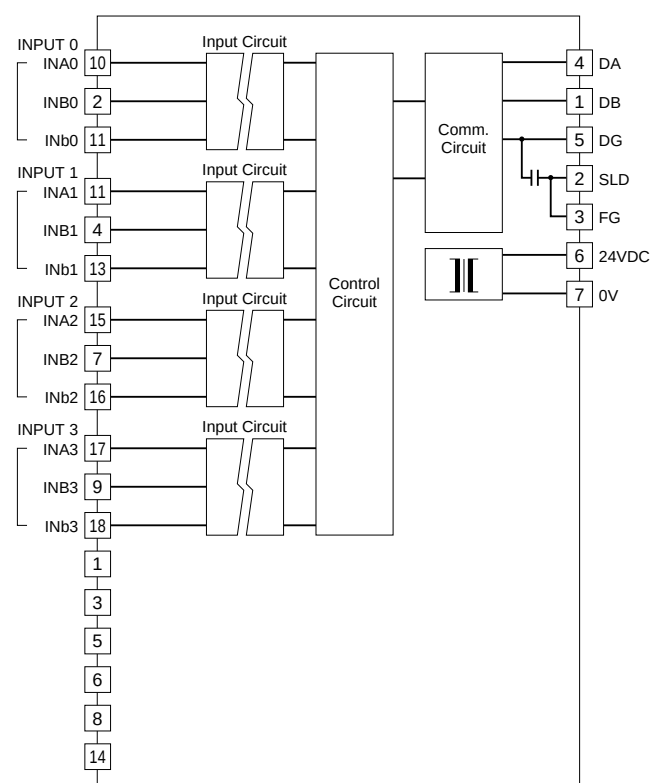
(*) Factory setting

TERMINAL ASSIGNMENTS

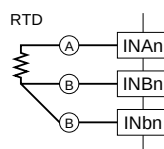
10	11	12	13	14	15	16	17	18
INA0	INb0	INA1	INb1	NC	INA2	INb2	INA3	INb3
1	2	3	4	5	6	7	8	9
NC	INB0	NC	INB1	NC	NC	INB2	NC	INB3

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



DC VOLTAGE OUTPUT MODULE, 2 points

MODEL **R7C-YV2**

SPECIFICATIONS

Output range

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

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

Operational range: -11.5 – +11.5V DC or -15 – +115%

Load resistance: 100kΩ minimum

Conversion accuracy: ±0.1%

Response time: 250 msec. (0 – 90%)

Temperature coefficient: ±0.015%/°C

Converted data range: 0 – 10000 of the output range

Isolation: Output 0 to output 1 to power input to
CC-Link or FG

CC-Link: Conforms to Version 1.10

Station type: Remote device

Occupied stations: 1

OPERATING MODE SETTING

•Extension (SW1-1, 1-2)

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

•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)

•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 – +10V DC (*)
ON	OFF	OFF	OFF	-5 – +5V DC
OFF	ON	OFF	OFF	-1 – +1V DC
ON	ON	OFF	OFF	0 – 10V DC
OFF	OFF	ON	OFF	0 – 5V DC
ON	OFF	ON	OFF	1 – 5V DC
OFF	ON	ON	OFF	0 – 1V DC
ON	ON	ON	OFF	-0.5 – +0.5V DC
ON	ON	ON	ON	PC Configurator setting

(*) Factory setting

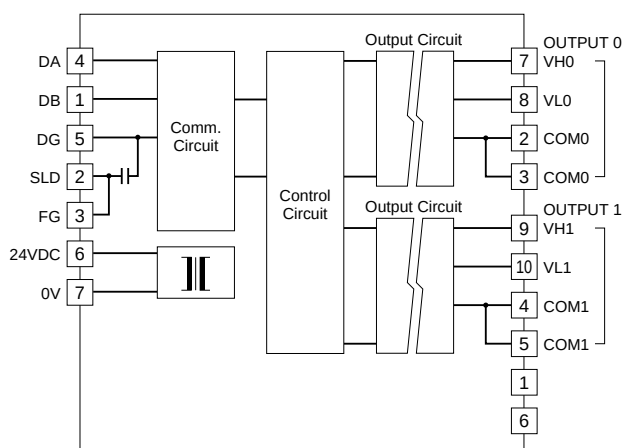
Caution ! - SW1-3 is unused. Be sure to turn off unused one.

TERMINAL ASSIGNMENTS

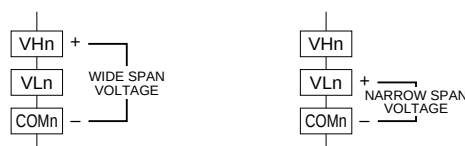
6	7	8	9	10
NC	VH0	VL0	VH1	VL1
1	2	3	4	5
NC	COM0	COM0	COM1	COM1

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 CURRENT OUTPUT MODULE, 2 points

MODEL **R7C-YS2**

SPECIFICATIONS

Output range: 4 – 20mA DC

Load resistance: 600Ω maximum

Conversion accuracy: $\pm 0.1\%$

Response time: 250 msec. (0 – 90%)

Temperature coefficient: $\pm 0.015\%/^{\circ}\text{C}$

Converted data range: 0 – 10000 of the output range

Isolation: Output 0 to output 1 to power input to CC-Link or FG

CC-Link: Conforms to Version 1.10

Station type: Remote device

Occupied stations: 1

OPERATING MODE SETTING

- **Extension (SW1-1, 1-2)**

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

- **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)

(*) Factory setting

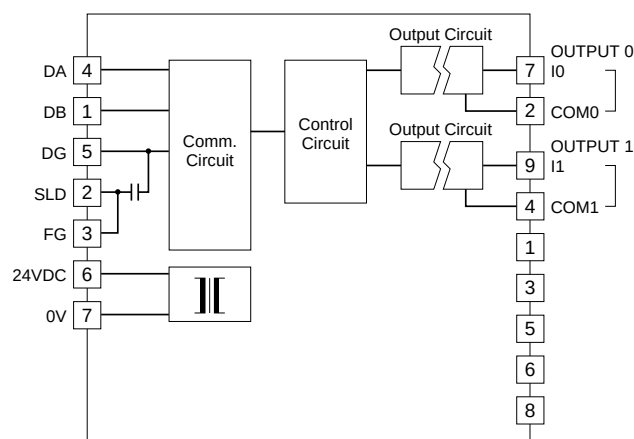
Caution ! - SW1-3, 1-5 through 1-8 are unused. Be sure to turn off unused ones.

TERMINAL ASSIGNMENTS

6 NC		7 IO		8 NC		9 I1		10 NC	
1 NC		2 COM0		3 NC		4 COM1		5 NC	

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



DISCRETE INPUT EXTENSION MODULE, 16 points MODEL **R7C-EA16**

SPECIFICATIONS

Common: Positive or negative common (NPN/PNP)
per 16 points

Number of I/O: Input, 16 points

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

ON voltage/current: $\geq 15V$ DC (input-COM1) / $\geq 3.5mA$

OFF voltage/current: $\leq 5V$ DC (input-COM1) / $\leq 1mA$

Input current: $\leq 5.5mA$ per point at 24V DC

Input resistance: Approx. $4.4k\Omega$

ON delay: ≤ 2.0 msec.

OFF delay: ≤ 2.0 msec.

I/O status indicator: LED turns on with closed contact.

Maximum inputs applicable at once: No limit (at
24V DC)

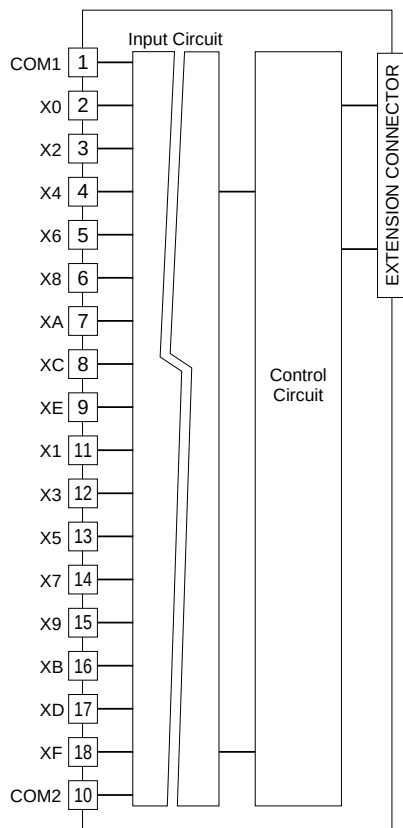
Isolation: Input to internal circuits

TERMINAL ASSIGNMENTS

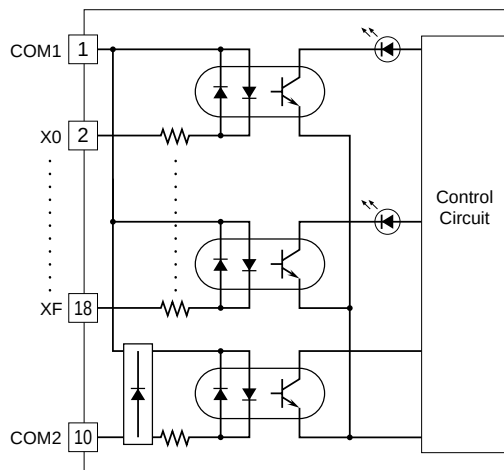
10	11	12	13	14	15	16	17	18
COM1	X1	X3	X5	X7	X9	XB	XD	XF
1	2	3	4	5	6	7	8	9
COM2	X0	X2	X4	X6	X8	XA	XC	XE

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	COM1	Common	10	COM2	Common
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

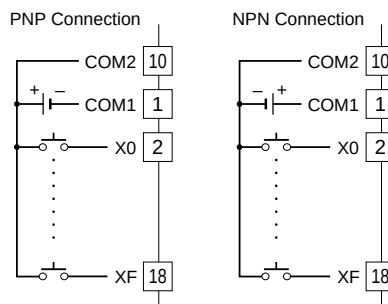
CIRCUIT DIAGRAM



Input Circuit



Input Connection Examples

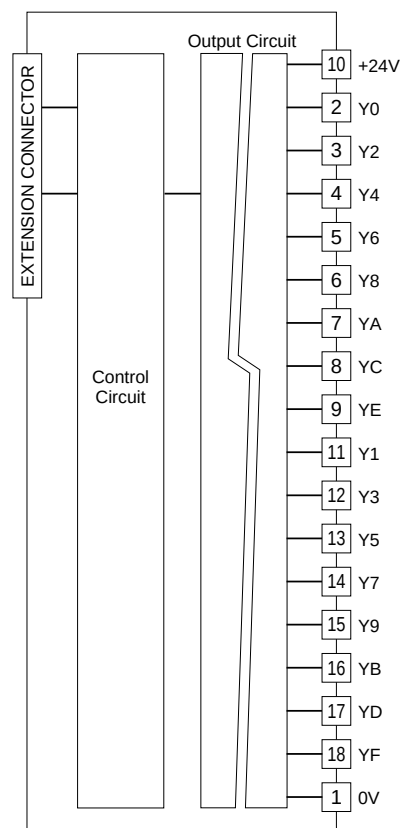
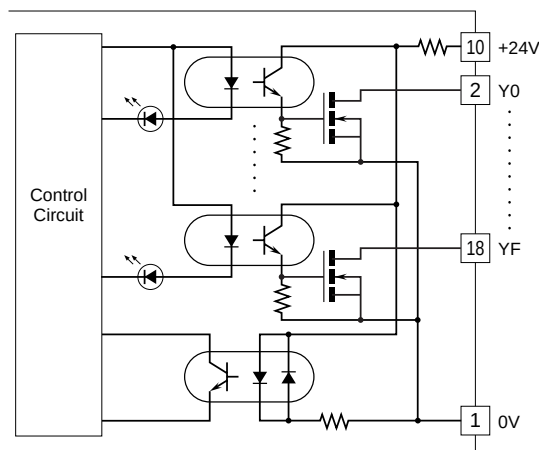
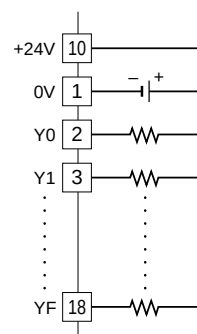


NPN TRANSISTOR OUTPUT EXTENSION MODULE, 16 points

MODEL **R7C-EC16A****SPECIFICATIONS****Common:** Negative common (NPN) per 16 points**Number of I/O:** Output, 16 points**Rated load voltage:** 24V DC $\pm 10\%$ **Rate output current:** 0.25A per point, 2.0A per common**Residual voltage:** $\leq 1.2V$ **Leakage current:** $\leq 0.1A$ **ON delay:** ≤ 0.5 msec.**OFF delay:** ≤ 1.5 msec.**I/O status indicator:** LED turns on with closed contact.**Maximum outputs provided at once:** No limit (at 24V DC)**Isolation:** Output to internal circuits**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	0V	0V (common)	10	+24V	24V 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**

Specifications subject to change without notice.

PNP TRANSISTOR OUTPUT EXTENSION MODULE, 16 points

MODEL **R7C-EC16B**

SPECIFICATIONS

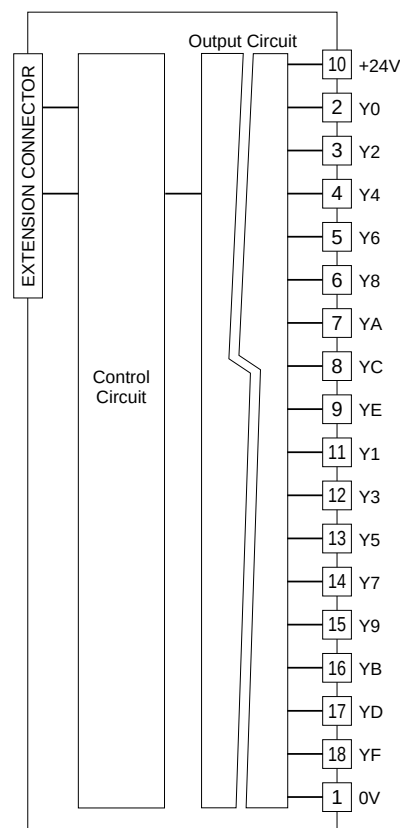
Common: Positive common (PNP) per 16 points
Number of I/O: Output, 16 points
Rated load voltage: 24V DC $\pm 10\%$
Rate output current: 0.25A per point, 2.0A per common
Residual voltage: $\leq 1.2V$
Leakage current: $\leq 0.1A$
ON delay: ≤ 0.5 msec.
OFF delay: ≤ 1.5 msec.
I/O status indicator: LED turns on with closed contact.
Maximum outputs provided at once: No limit (at 24V DC)
Isolation: Output to internal circuits

TERMINAL ASSIGNMENTS

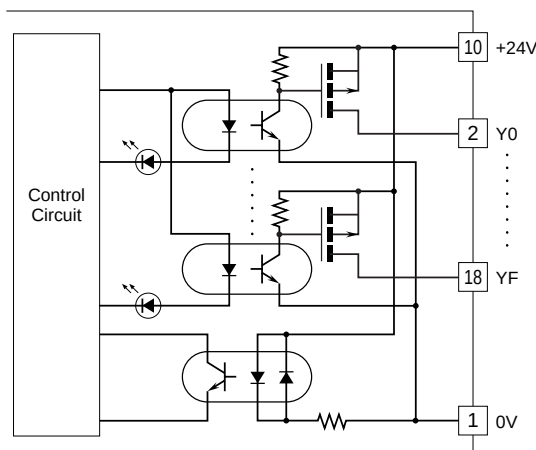
10	11	12	13	14	15	16	17	18
+24V	Y1	Y3	Y5	Y7	Y9	YB	YD	YF
1	2	3	4	5	6	7	8	9
0V	Y0	Y2	Y4	Y6	Y8	YA	YC	YE

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0V	0V	10	+24V	24V 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

