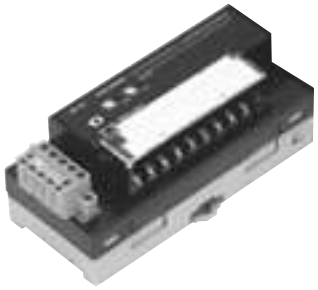
Transistor Remote I/O Terminals

DRT2-□D08(-1)/□D16(-1)

Allows I/O Expansion with Transistor Terminals

- Wide variety of data, such as maintenance system data, can be collected without affecting the productivity of the control system.
- Valuable information can be collected and managed through the network, including information on the communications power supply voltage levels, Unit wear and tear, and equipment operating information.
- Expansion via Expansion I/O Units
- With no communications baud rate settings required and detachable terminal blocks, maintenance is easier.



Smart Slave Functions

Operation time monitor (input and output only) *1
Contact operation counter
Unit conduction time monitor
Total ON time monitor
Unit comments
Connected device comments
Network power supply voltage monitor
I/O power supply monitor function
Communications error log monitor
Input filter (input or I/O only)
Power-ON inrush current protection (input or I/O only)
Removable terminal block
Communications speed auto-detection
No need to wire Unit power supply
Expansion via Expansion I/O Units *2
Last maintenance date

✻1. The operation time monitor cannot be used with the DRT2-□D08(-1).
✻2. Expansion Units cannot be added with the DRT2-□D08(-1)or DRT2-MD16(-1).

Ordering Information

Specifications			I/O connections	Rated internal circuit power supply voltage	Rated I/O power supply voltage	Model
Inputs	NPN (+ common)	16 points	M3 Screw terminals	Supplied from the communications connector	24 VDC	**DRT2-ID16**
	PNP (- common)					**DRT2-ID16-1**
Outputs	NPN (- common)					**DRT2-OD16**
	PNP (+ common)					**DRT2-OD16-1**
I/O	NPN (input: + common, output: - common)	Input: 8 points/ Output: 8 points				**DRT2-MD16**
	PNP (input: - common, output: + common)					**DRT2-MD16-1**
Inputs	NPN (+ common)	8 points				**DRT2-ID08**
	PNP (- common)					**DRT2-ID08-1**
Outputs	NPN (- common)	8 points				**DRT2-OD08**
	PNP (+ common)					**DRT2-OD08-1**

Expansion Units

One Expansion Unit can be added to each DRT2-ID16(-1)/-OD16(-1) or DRT2-ROS16 I/O Slave.
The following Expansion Units are available to enable flexible expansion with combinations for the required number of points.

Model	Number of I/O points
XWT-ID08	8-point inputs (NPN)
XWT-ID08-1	8-point inputs (PNP)
XWT-OD08	8-point outputs (NPN)
XWT-OD08-1	8-point outputs (PNP)
XWT-ID16	16-point inputs (NPN)
XWT-ID16-1	16-point inputs (PNP)
XWT-OD16	16-point outputs (NPN)
XWT-OD16-1	16-point outputs (PNP)

General Specifications

Communications power supply voltage	11 to 25 VDC
Unit power supply voltage	Not required (Supplied from the communications connector.)
I/O power supply voltage	20.4 to 26.4 VDC (24 VDC -15%/+10%)
Current consumption (Communications)	DRT2-ID08(-1)/MD16: 55 mA max. DRT2-OD08/MD16-1: 50 mA max. DRT2-OD08-1: 45 mA max. DRT2-ID16(-1)/OD16(-1): 60 mA max.
Dielectric strength	500 VAC (between isolated circuits)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)
Vibration resistance	10 to 60 Hz, 0.7-mm double amplitude, 60 to 150 Hz, 50 m/s^2 for 80 min each in the X, Y, and Z directions
Shock resistance	150m/s^2, 6 directions, 3 times each
Mounting method	DIN 35 mm-track mounting
Screw tightening torque	M3 (power, I/O terminal): 0.5 N·m
Ambient operating temperature	–10°C to 55°C
Ambient operating humidity	25 to 85% (with no condensation)
Ambient storage temperature	-25°C to 65°C
Weight	DRT2-ID08(-1)/OD08(-1): 135 g max. DRT2-MD16(-1): 145 g max. DRT2-ID16(-1)/OD16(-1): 140 g max.

Input Specifications

●8-point Inputs Terminals with Transistors

Item / Model	DRT2-ID08	DRT2-ID08-1
Internal I/O common	NPN	PNP
Number of I/O points	8 inputs	
ON voltage	15 VDC min. (between each input terminal and V)	15 VDC min. (between each input terminal and G)
OFF voltage	5 VDC max. (between each input terminal and V)	5 VDC min. (between each input terminal and G)
OFF current	1.0 mA max.	
Input current	6.0 mA max. per point at 24 VDC 3.0 mA max. per point at 17 VDC	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Number of points per common	8 per common	

●16-point Inputs Terminals with Transistors

Item / Model	DRT2-ID16	DRT2-ID16-1
Internal I/O common	NPN	PNP
Number of I/O points	16 inputs	
ON voltage	15 VDC min. (between each input terminal and V)	15 VDC min. (between each input terminal and G)
OFF voltage	5 VDC max. (between each input terminal and V)	5 VDC min. (between each input terminal and G)
OFF current	1.0 mA max.	
Input current	6.0 mA max. per point at 24 VDC 3.0 mA max. per point at 17 VDC	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Number of points per common	16 per common	

●8-point Inputs/8-point Outputs Terminals with Transistors

Item / Model	DRT2-MD16	DRT2-MD16-1
Internal I/O common	NPN	PNP
Number of I/O points	8 inputs	
ON voltage	15 VDC min. (between each input terminal and V)	15 VDC min. (between each input terminal and G)
OFF voltage	5 VDC max. (between each input terminal and V)	5 VDC min. (between each input terminal and G)
OFF current	1.0 mA max.	
Input current	6.0 mA max. per point at 24 VDC 3.0 mA max. per point at 17 VDC	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Number of points per common	8 per common	

Output Specifications

●8-point Outputs Terminals with Transistors

Item / Model	DRT2-OD08	DRT2-OD08-1
Internal I/O common	NPN	PNP
Number of I/O points	8 outputs	
Rated output current	0.5 A per point, 4 A per common	
Residual voltage	1.2 V max. (0.5 A DC between each output terminal and G)	1.2 V max. (0.5 A DC between each output terminal and V)
Leakage current	0.1 ms max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	
Number of points per common	8 per common	

●16-point Outputs Terminals with Transistors

Item / Model	DRT2-OD16	DRT2-OD16-1
Internal I/O common	NPN	PNP
Number of I/O points	16 outputs	
Rated output current	0.5 A per point, 4 A per common	
Residual voltage	1.2 V max. (0.5 A DC between each output terminal and G)	1.2 V max. (0.5 A DC between each output terminal and V)
Leakage current	0.1 ms max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	
Number of points per common	16 per common	

●8-point Inputs/8-point Outputs Terminals with Transistors

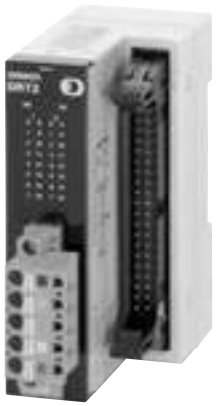
Item / Model	DRT2-MD16	DRT2-MD16-1
Internal I/O common	NPN	PNP
Number of I/O points	8 outputs	
Rated output current	0.5 A per point, 4 A per common	
Residual voltage	1.2 V max. (0.5 A DC between each output terminal and G)	1.2 V max. (0.5 A DC between each output terminal and V)
Leakage current	0.1 ms max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	
Number of points per common	8 per common	

MIL Connector Terminals with Transistors

DRT2-□D32ML(-1)/□D16ML(-1)

Very Compact 16-/32-point Remote Terminals

- Used in combination with Interface Conversion Boards (e.g., D-Sub) to connect to a wide range of interfaces.
- 35 x 60 x 80 mm (W x D x H)



Smart Slave Functions

Operation time monitor	Contact operation counter	Unit conduction time monitor
Total ON time monitor	Unit comments	Connected device comments
Network power supply voltage monitor	I/O power supply monitor function	Communications error log function
Input filter (input or I/O only)	Power-ON inrush current protection (input or I/O only)	
Communications speed auto-detection	No need to wire Unit power supply	Last maintenance date

Ordering Information

Specifications			I/O connections	Rated internal circuit power supply voltage	Rated I/O power supply voltage	Model
Inputs	NPN (+ common)	32 points	MIL connector	Supplied from the communications connector	24 VDC	**DRT2-ID32ML**
	PNP (- common)					**DRT2-ID32ML-1**
Outputs	NPN (- common)					**DRT2-OD32ML**
	PNP (+ common)					**DRT2-OD32ML-1**
I/O	NPN (input: + common, output: - common)	16 inputs/ 16 outputs				**DRT2-MD32ML**
	PNP (input: - common, output: + common)					**DRT2-MD32ML-1**
Inputs	NPN (+ common)	16 points	MIL connector			**DRT2-ID16ML**
	PNP (- common)					**DRT2-ID16ML-1**
Outputs	NPN (- common)					**DRT2-OD16ML**
	PNP (+ common)					**DRT2-OD16ML-1**
Inputs	NPN (+ common)		MIL connector (Connector with 10-cm cable)			**DRT2-ID16MLX**
	PNP (- common)					**DRT2-ID16MLX-1**
Outputs	NPN (- common)					**DRT2-OD16MLX**
	PNP (+ common)					**DRT2-OD16MLX-1**
Mounting Bracket						**SRT2-ATT02**

General Specifications

Communications power supply voltage	11 to 25 VDC (Supplied from the communications connector.)
Communications power supply current consumption	DRT2-ID32ML(-1): 100 mA DRT2-OD32ML(-1): 120 mA DRT2-MD32ML(-1): 110 mA DRT2-ID16ML(-1): 80 mA DRT2-OD16ML(-1): 80 mA DRT2-ID16MLX(-1): 80 mA DRT2-OD16MLX(-1): 80 mA
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)
Vibration resistance	10 to 60 Hz, 0.7-mm double amplitude, 60 to 150 Hz, 50 m/s^2
Shock resistance	150m/s^2
Dielectric strength	500 VAC (between isolated circuits)
Insulation resistance	20 MΩ min.
Ambient operating temperature	-10°C to 55°C
Ambient operating humidity	25% to 85% (with no condensation)
Ambient operating atmosphere	No corrosive gases
Ambient storage temperature	-25°C to 65°C
Mounting method	DIN 35 mm-track mounting
Weight	120 g max. ✻

✻ The Connector Cable provided with the DRT2-ID16MLX(-1) and DRT2-OD16MLX(-1) is 10 g max.

Input Specifications

●32-point Inputs Terminals with Connectors

Item / Model	DRT2-ID32ML	DRT2-ID32ML-1
Internal I/O common	NPN	PNP
I/O points	32 inputs	
ON voltage	17 VDC min. (between each input terminal and V)	17 VDC min. (between each input terminal and G)
OFF voltage	5 VDC max. (between each input terminal and V)	5 VDC max. (between each input terminal and G)
OFF current	1.0 mA max.	
Input current	24 VDC: 6.0 mA max./point 17 VDC: 3.0 mA max./point	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Number of circuits per common	32 per common	

●16-point Inputs/16-point Outputs Terminals with Connectors
●16-point Inputs Terminals with Connectors

Model / Item	DRT2-MD32ML DRT2-ID16ML DRT2-ID16MLX	DRT2-MD32ML-1 DRT2-ID16ML-1 DRT2-ID16MLX-1
Internal I/O common	NPN	PNP
I/O points	16 inputs	
ON voltage	17 VDC min. (between each input terminal and V)	17 VDC min. (between each input terminal and G)
OFF voltage	5 VDC max. (between each input terminal and V)	5 VDC max. (between each input terminal and G)
OFF current	1.0 mA max.	
Input current	24 VDC: 6.0 mA max./point 17 VDC: 3.0 mA max./point	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Number of simultaneously inputs	16	
Number of circuits per common	16 per common	

Output Specifications

●32-point Outputs Terminals with Connectors

Item / Model	DRT2-OD32ML	DRT2-OD32ML-1
Internal I/O common	NPN	PNP
I/O points	32 outputs	
Rated output current	0.3 A/point, 4 A/common ✻	
Residual voltage	1.2 VDC max. (0.3 A DC between output and G terminal)	1.2 VDC max. (0.3 A DC between output and V terminal)
Leakage current	0.1 mA max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	
Number of circuits per common	32 per common	

✻ The maximum total load current is 4 A.
The maximum current for the V and G terminals is 1 A per terminal.

●16-point Inputs/16-point Outputs Terminals with Connectors
●16-point Outputs Terminals with Connectors

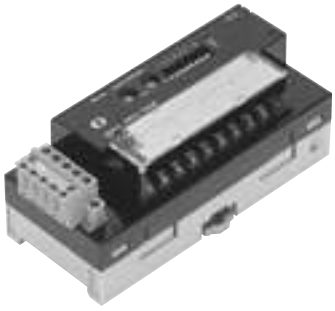
Model / Item	DRT2-MD32ML DRT2-OD16ML DRT2-OD16MLX	DRT2-MD32ML-1 DRT2-OD16ML-1 DRT2-OD16MLX-1
Internal I/O common	NPN	PNP
I/O points	16 outputs	
Rated output current	0.3 A/point, 4 A/common ✻	
Residual voltage	1.2 VDC max. (0.3 A DC between output and G terminal)	1.2 VDC max. (0.3 A DC between output and V terminal)
Leakage current	0.1 mA max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	
Number of circuits per common	16 per common	

✻ The maximum total load current is 2 A.
The maximum current for the V and G terminals is 1 A per terminal.

Temperature Input Terminals
DRT2-TS04□

Temperature Input Terminal with Smart Functionality

- The Temperature Input Terminal can be used with almost the same functionality as a Analog Input Terminal, such as with scaling and comparator functions.
- Enhanced performance is provided with functionality specific to the Temperature Input Terminal, such as the recording the operating time in a preset temperature range and temperature difference detection between input channels.



Smart Slave Functions

Unit conduction time monitor	Unit comments	Connected device comments	Network power supply voltage monitor
Communications error log function	Removable terminal block	Communications speed auto-detection	No need to wire Unit power supply
Scaling	User calibration	Last maintenance date	Integration
Moving averaging	Peak/bottom hold	Top/valley hold	Rate of change calculation
Comparator	Top/valley count	Operating time in preset temperature range	Temperature difference detection between input channels

Ordering Information

Input type	I/O points	Model
Thermocouple input	4 inputs allocated 4 input words at the Master Unit (8 input words allocated when 1/100 display mode is selected).	**DRT2-TS04T**
Platinum-resistance thermometer input		**DRT2-TS04P**

General Specifications

Item / Model	DRT2-TS04T	DRT2-TS04P
Input type	Thermocouple input	Platinum-resistance thermometer input
I/O points	4 inputs allocated 4 input words at the Master Unit (8 input words allocated when 1/100 display mode is selected)	
Communications power supply voltage	11 to 25 VDC (Supplied from the communications connector)	
Current consumption	70 mA max. at 24 VDC	
Noise immunity	Conforms to IEC61000-4-4, 2.0 kV	
Vibration resistance	10 to 150 Hz, 0.7-mm single amplitude	
Shock resistance	150 m/s^2	
Dielectric strength	500 VAC (between isolated circuits)	
Insulation resistance	20 MΩ min. (initial value) at 100 VDC	
Ambient operating temperature	-10°C to 55°C (with no icing or condensation)	
Ambient operating humidity	25% to 85%	
Ambient operating atmosphere	No corrosive gases	
Ambient storage temperature	-25°C to 65°C	
Mounting method	DIN 35 mm-track mounting	
Mounting strength	50 N 10 N (in the DIN Track direction)	
Screw tightening torque	M3: 0.5 N·m	
Terminal strength	No damage when 50 N pull load was applied.	
Weight	160 g max.	

Performance Specifications

<table>
<tr><th>Item
Model</th><th>DRT2-TS04T</th><th>DRT2-TS04P ✻1</th></tr>
<tr><td>Input types</td><td>Switchable between R, S, K1, K2, J1, J2, T, B, L1, L2, E, U, N, W, and PLII
When set with Configurator: Input types can be set individually for each input.
When set with DIP switch: The same input type setting applies to all 4 inputs.</td><td>Switchable between PT, JPT, PT2, and JPT2
When set with Configurator: Input types can be set individually for each input.
When set with DIP switch: The same input type setting applies to all 4 inputs.</td></tr>
<tr><td>Indicator accuracy</td><td>(±0.3% of indication value or ±1°C, whichever is larger) ±1 digit max. ✻2
<table>
<tr><th>Input type</th><th>Input accuracy</th></tr>
<tr><td>K1, K2, T, and N below -100°C</td><td>±2°C ±1 digit max.</td></tr>
<tr><td>U, L1, and L2</td><td>±2°C ±1 digit max.</td></tr>
<tr><td>R and S below 200°C</td><td>±3°C ±1 digit max.</td></tr>
<tr><td>B below 400°C</td><td>Not specified.</td></tr>
<tr><td>W</td><td>±0.3% of indication value or ±3°C (whichever is larger) ±1 digit max.</td></tr>
<tr><td>PLII</td><td>±0.3% of indication value or ±2°C (whichever is larger) ±1 digit max.</td></tr>
</table></td><td>-200 to 850°C input range:
(±0.3% of indication value or ±0.8°C, whichever is larger) ±1 digit max.
-200 to 200°C input range:
(±0.3% of indication value or ±0.5°C, whichever is larger) ±1 digit max.</td></tr>
<tr><td>Conversion cycle</td><td colspan="2">250 ms/4 points</td></tr>
<tr><td>Temperature conversion data</td><td colspan="2">Binary data (4-digit hexadecimal when normal display mode is selected or 8-digit hexadecimal when 1/100 display mode is selected.)</td></tr>
<tr><td>Insulation method</td><td colspan="2">Between input and communication lines: Photocoupler insulation
Between temperature input signals: Photocoupler insulation</td></tr>
</table>

✻1. A current of 0.35 mA flows to sensors connected to the DRT2-TS04P.
✻2. The indicator accuracy specifications differ depending on the mounting direction. Refer to the above table for details.

●Indicator accuracy when only the Unit or the Terminal Block is replaced

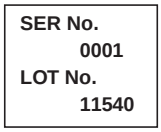
In the DRT2-TS04T, a cold junction compensator is included in the Terminal Block. The indicator accuracy will be reduced depending on the mounting direction if only the Terminal Unit is replaced and the Lot No. and serial No. of the Terminal Block and Terminal Unit do not match. The Lot No. and serial No. of the Terminal Block and Terminal Unit can be found on the labels affixed to the products as shown below.

Terminal Unit Label

Remove the terminal block. The label is affixed to the top of the unit.

Terminal Block Label

The label is affixed to the left side of the terminal block.



If the Lot No. and serial No. of the terminal block and Unit are the same, basic performance specifications apply regardless of the mounting direction. If the numbers are different, the following indication accuracies apply.

<table>
<tr><th>Mounting direction</th><th>Indication accuracies</th></tr>
<tr><td>Mounted normally (1)</td><td>As specified in the Performance Specifications.</td></tr>
<tr><td>Mounted in any other direction other than (1)</td><td>(±0.3% of indication value or ±2°C, whichever is greater) ±1 digit max.
<table>
<tr><th>Input type</th><th>Indication accuracies</th></tr>
<tr><td>K1, K2, T, and N below -100°C</td><td>±3°C ±1 digit max.</td></tr>
<tr><td>U, L1, and L2</td><td>±3°C ±1 digit max.</td></tr>
<tr><td>R and S below 200°C</td><td>±4°C ±1 digit max.</td></tr>
<tr><td>B below 400°C</td><td>Not specified.</td></tr>
<tr><td>W</td><td>±0.3% of indication value or ±4°C (whichever is larger) ±1 digit max.</td></tr>
<tr><td>PLII</td><td>±0.3% of indication value or ±3°C (whichever is larger) ±1 digit max.</td></tr>
</table></td></tr>
</table>