New!

OMRON

# DeviceNet Smart Slaves

**Remote I/O Terminals with Transistors**
DRT2-ID08(-1)/OD08(-1)/MD16(-1)

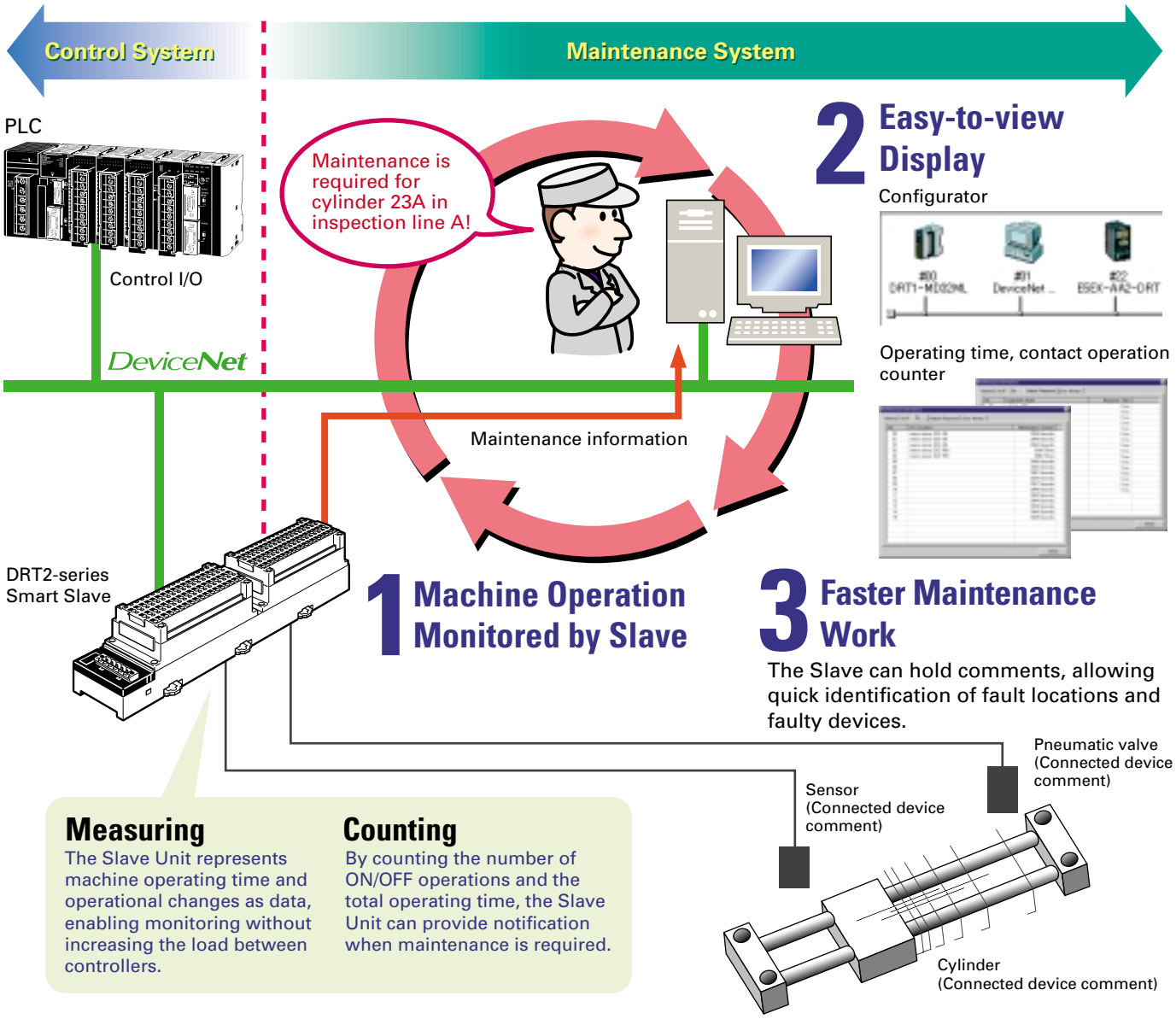
**MIL Connector Terminals with Transistors**
DRT2-ID16ML(-1)/OD16ML(-1)/ID16MLX(-1)/OD16MLX(-1)

**Environment-resistive Terminals with Transistors (without detection functions)**
DRT2-ID04CL(-1)/OD04CL(-1)/ID08CL(-1)/OD08CL(-1)/
MD16CL(-1)/HD16CL(-1)


realizing

# Use production site information in a variety of applications, such as maintenance and quality control.

OMRON's DRT2-series Smart Slaves do not just input and output ON/OFF signals. They collect a variety of value-added information to help increase the rate of operation without changing the wiring for existing DeviceNet networks. In particular, they allow the separation of control systems and maintenance systems so that maintenance systems can be created independently of control systems.




### Measuring

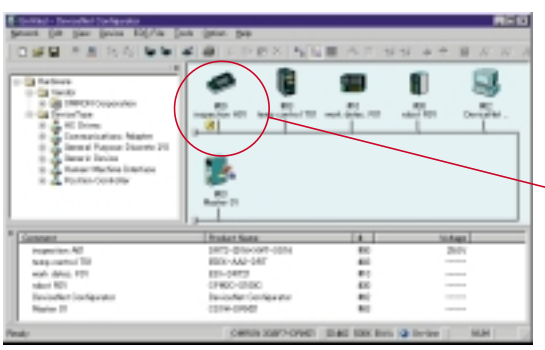
The Slave Unit represents machine operating time and operational changes as data, enabling monitoring without increasing the load between controllers.

### Counting

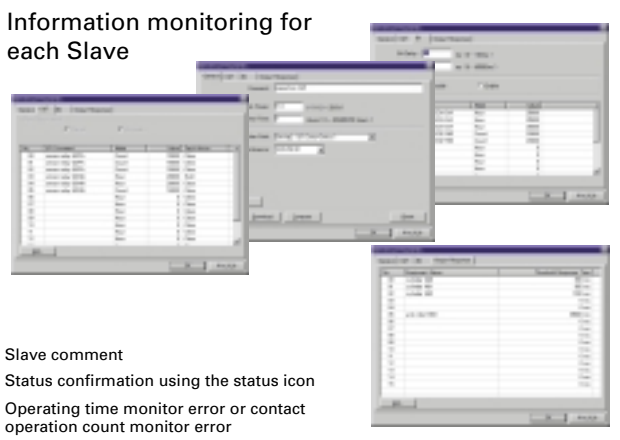
By counting the number of ON/OFF operations and the total operating time, the Slave Unit can provide notification when maintenance is required.

# Collect a variety of data from maintenance systems without influencing control systems and productivity.

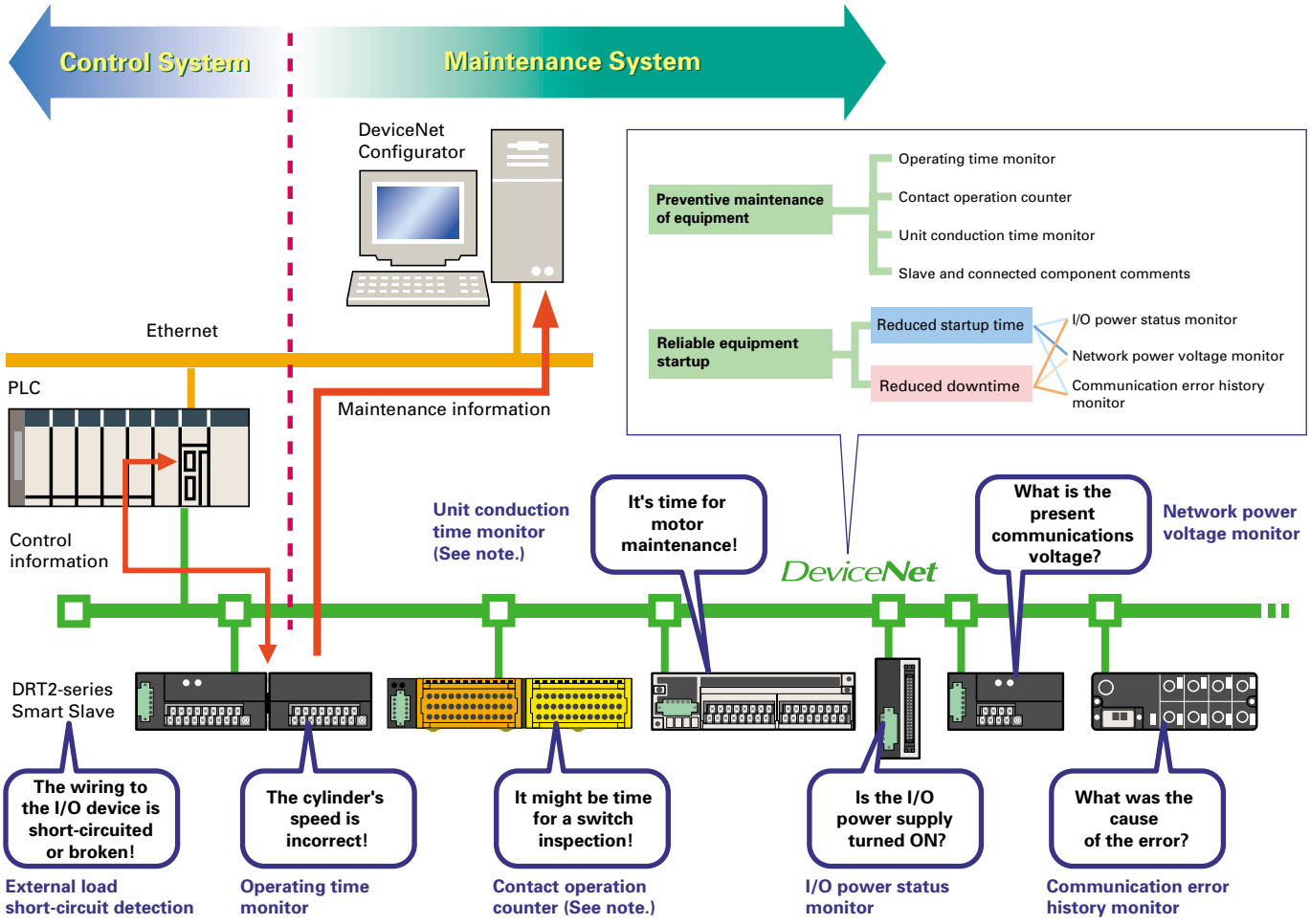
All data can be converted to electronic format and, by combining with an OMRON PLC (CS/CJ Series), checked directly from Ethernet or the Internet to allow remote maintenance.



Information monitoring for each Slave




- Slave comment
- Status confirmation using the status icon
- Operating time monitor error or contact operation count monitor error
- Unit conduction time monitor error
- Communications power voltage monitor error



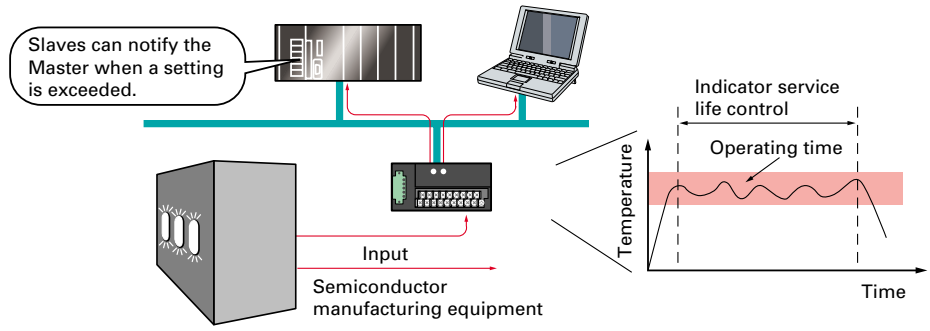

**Note:** The contact operation counter function and the unit conduction time monitor function cannot be used simultaneously.

# Using OMRON Temperature Input Terminals for Maintenance

## Failure Prediction and Maintenance

If prolonging the time it takes to reach a certain temperature may degrade equipment:

**The operating time of a preset temperature range is counted in 1-s units.**

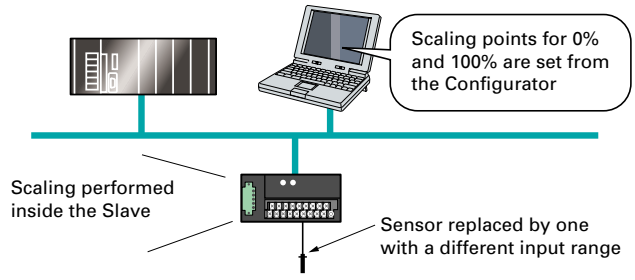



**The peaks or valleys of temperature inputs that change in a regular pattern are counted to predict when devices operating with severe temperature swings are due for maintenance.**

## Short Startup

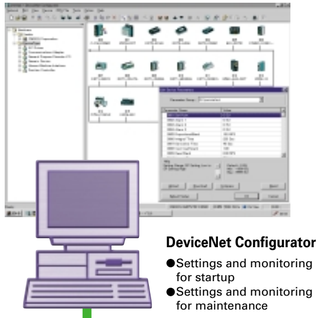
If it takes too long to modify the ladder program on the Master when a Temperature Sensor is replaced:

**Slaves internally convert display values to temperature input values so the Controller program no longer has to be modified to perform this task.**



# Wide variety of control and maintenance functions using DeviceNet.

## Monitor network devices using a DeviceNet Configurator.



**DeviceNet Configurator**
- Settings and monitoring for startup
- Settings and monitoring for maintenance

**CS/CJ-series DeviceNet Unit**

**PLC**

## I/O Control and Maintenance

### Board Terminals with MIL Connectors

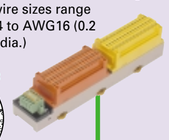
**DRT2-ID32B(-1)**
**DRT2-OD32B(-1)**
**DRT2-MD32B(-1)**
**DRT2-ID32BV(-1)**
**DRT2-OD32BV(-1)**
**DRT2-MD32BV(-1)**

- First Board-type Smart Slave Terminals
- User boards attach easily to the DRT2-□D32V(-1) using screws.

### Remote I/O Terminals with Screw-less Clamps

**DRT2-ID32SL(H)(-1)**
**DRT2-OD32SL(H)(-1)**
**DRT2-MD32SL(H)(-1)**

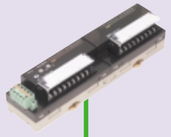
- Wiring is completed in a single action.
- No screw tightening required. Removable terminal blocks.
- Advanced models detect ground faults and broken lines in I/O wiring.
- Applicable wire sizes range from AWG24 to AWG16 (0.2 to 1.25 mm² dia.)

### Remote I/O Terminals with Transistors

**DRT2-ID16(-1)**
**DRT2-OD16(-1)**
**DRT2-ID08(-1)** NEW
**DRT2-OD08(-1)** NEW
**DRT2-MD16(-1)** NEW

- I/O points can be extended by adding Expansion Units.



### Remote I/O Terminal with Relay Outputs

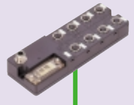
**DRT2-ROS16**

- One-step relay exchange
- Operation time monitor function enabled by combining Remote I/O Terminals with Expansion I/O Units.

### Environment-resistive Terminals with Transistors (with detection functions)

**DRT2-ID08C(-1)**
**DRT2-OD08C(-1)**
**DRT2-HD16C(-1)**

- High resistance to environments (IP67).
- Detecting shorts in the sensor power supply is also possible.



### Environment-resistive Terminals with Transistors (without detection functions)

**DRT2-ID04CL(-1)** NEW
**DRT2-OD04CL(-1)** NEW
**DRT2-ID08CL(-1)** NEW
**DRT2-OD08CL(-1)** NEW
**DRT2-MD16CL(-1)** NEW
**DRT2-HD16CL(-1)** NEW
**DRT2-WD16CL(-1)** NEW

### Remote I/O Terminals with 3-tier Terminal Blocks

**DRT2-ID16TA(-1)**
**DRT2-OD16TA(-1)**
**DRT2-MD16TA(-1)**

- The 3-tier Terminal Block means that wiring locations are easy to find with no wiring to intermediate terminals.

### MIL Connector Terminals

**DRT2-ID32ML(-1)**
**DRT2-OD32ML(-1)**
**DRT2-MD32ML(-1)**
**DRT2-ID16ML(-1)** NEW
**DRT2-OD16ML(-1)** NEW
**DRT2-ID16MLX(-1)** NEW
**DRT2-OD16MLX(-1)** NEW

- Ultra-small 32-point remote terminals (35 x 60 x 80 mm (W x D x H)).

## New Lineup

### Models with 8 Input, 8 Output, or 16 I/O Points Added to the Lineup

**Remote I/O Terminals with Transistors**
**DRT2-ID08(-1)/OD08(-1)/MD16(-1)**

- Collect a variety of data from maintenance systems without influencing control systems and productivity.
- Communications power supply voltage monitor, deterioration due to aging, operating time data, and other information can be easily collected and managed via the network.
- Locations of problems can be easily identified.

### Remote I/O Terminals with IP67 High Environmental Resistance

**Environment-resistive Terminals with Transistors**
**DRT2-ID04CL(-1)/OD04CL(-1)/ID08CL(-1)/OD08CL(-1)/MD16CL(-1)/HD16CL(-1)/WD16CL(-1)**

- Smart Slave functions provide robust support for effective maintenance and monitoring device operation status.
- The terminals conform to IP67 and use materials selected for resistance to oil and spattering.
- Models with two-output connector are also available to improve ease of connection with hydraulic valve devices.

### Terminals with 16 Inputs or Outputs

**MIL Connector Terminals with Transistors**
**DRT2-ID16ML(-1)/OD16ML(-1)/ID16MLX(-1)/OD16MLX(-1)**

- Connection with an array of I/O interfaces is achieved by combining adaptor boards for D-Sub or other interfaces.

### e-CON Connector Terminals

**DRT2-ID16S(-1)**
**DRT2-MD16S(-1)**

- Includes industry-standard e-CON connector that can be used to connect prewired sensors without using special tools.
  (The OMRON XN2 Connector can be used.)

**Sensor Input and Maintenance**

### Analog I/O Terminals

**DRT2-AD04/DRT2-AD04H**
**DRT2-DA02**

- The DRT2-AD04H offers high resolution at 1/30,000 (full scale) and insulation between input channels.
- The DRT2-AD04 and DRT2-DA02 support a wide variety of data sampling function, including scaling, peak/bottom hold, top/valley hold, comparator, integral, and differential operation functions.

### Temperature Input Terminals

**DRT2-TS04T**
**DRT2-TS04P**

- Offers basically the same functions as Analog Input Terminals, such as scaling and comparators. Also provides functions that are available only from Temperature Input Terminals, such as the time in a preset temperature range and temperature difference detection between input channels.

### DeviceNet Communications Unit for E5ZN Digital Temperature Controllers

**E5ZN-DRT**

- Monitoring and setting of Temperature Controller from PLC.
- Batch download of all Temperature Controller parameters from Configurator.

**Analog Control and Maintenance**

### DeviceNet Communications Units/Cards for Inverters

**3G3MV-PDRT2 (for 3G3MV Series)**
**3G3RV-PDRT2 (for 3G3RV Series)**

- Frequencies and other specifications can be designated from PLC.
- Monitor-related maintenance possible, including output current (torque) error detection/trace, operation monitor, and general-purpose I/O read.

**Monitor Control and Maintenance**

## Functions Supported by Smart Slaves

| Slave name | General-purpose Slaves | | | | | | | | | | | | | | | General-purpose Slaves | | | | | | Environment-resistive Slaves | | | | | General-purpose Slaves | Analog Slaves | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Remote I/O Terminals | | | | | | | | | MIL Connector Terminals | | | Board Terminals | | | Screw-less Clamp Terminals | | | | | | Environment-resistive Terminals | | | | | e-con Connector Terminals | Analog I/O Terminals | | | Temperature Input Terminals |
| Type | Models with Transistors | | | | Model with Relay Outputs | Models with 3-tier Terminal Blocks | | | | Models with Transistors | | | Models with MIL Connectors | | | Models with Transistors With Detection Functions | | | Models with Transistors Without Detection Functions | | | Models with Transistors With Detection Functions | | Models with Transistors Without Detection Functions | | | | | | |
| Model | DRT2-□D16(-1) | | DRT2-□D08(-1) | | DRT2-MD16(-1) | DRT2-ROS16 | DRT2-□D16TA(-1) | | | DRT2-□D32ML(-1)<br>DRT2-□D16ML(-1)<br>DRT2-□D16MLX(-1) | | | DRT2-□D32B(-1)<br>DRT2-□D32BV(-1) | | | DRT2-□D32SLH(-1) | | | DRT2-□D32SL(-1) | | | DRT2-□D08C(-1)<br>DRT2-□D16C(-1) | | DRT2-□D04CL(-1)<br>DRT2-□D08CL(-1)<br>DRT2-□D16CL(-1) | | | DRT2-□D16S(-1) | DRT2-AD04 | DRT2-AD04H | DRT2-DA02 | DRT2-TS04□ |
| Function / I/O classification | Input | Output | Input | Output | Input/output | Output | Input | Output | Input/output | Input | Output | Input/output | Input | Output | Input/output | Input | Output | Input/output | Input | Output | Input/output | Input | Output | Input | Output | Input/output | Input | Input/output | Input | | Output | Input |
| Operating time monitor | ❍ (Inputs and outputs only) | | --- | | ❍ | | ❍ | | | ❍ | | | ❍ | | | ❍ | | | ❍ | | | --- | | | | ❍ | --- | ❍ | --- | | | --- |
| Contact operation count monitor | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | --- | | --- |
| Unit conduction time monitor | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | ❍ | | ❍ |
| Total RUN (ON) time monitor | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | --- | | --- |
| Unit comment | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | ❍ | | ❍ |
| Connected device comment | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | ❍ | | ❍ |
| Network power voltage monitor | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | ❍ | | ❍ |
| I/O power status monitor | ❍ | | | | | --- | ❍ | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | --- | | --- | | --- |
| Communications error history monitor | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | ❍ | | ❍ |
| Input filter | ❍ | --- | ❍ | --- | ❍ | --- | ❍ | --- | ❍ | ❍ | --- | ❍ | ❍ | --- | ❍ | ❍ | --- | ❍ | | | ❍ | ❍ | --- | ❍ | --- | ❍ | ❍ | | --- | | --- |
| Prevention of malfunctions due to sensor inrush current | ❍ | --- | ❍ | --- | ❍ | --- | ❍ | --- | ❍ | ❍ | --- | ❍ | ❍ | --- | ❍ | ❍ | --- | ❍ | | | ❍ | ❍ | --- | ❍ | --- | ❍ | ❍ | | --- | | --- |
| Sensor power short-circuit detection | --- | | | | | | | | | --- | | | --- | | | ❍ | --- | ❍ | | --- | | ❍ | --- | | | | ❍ | | --- | | --- |
| External load short-circuit detection | --- | | | | | | | | | --- | | | --- | | | --- | ❍ (See note.) | | | --- | | --- | ❍ | | --- | | --- | ❍ | --- | | --- |
| Sensor disconnection detection | --- | | | | | | | | | --- | | | --- | | | ❍ | --- | ❍ | | --- | | ❍ | --- | | | | --- | | --- | | --- |
| External load disconnection detection | --- | | | | | | | | | --- | | | --- | | | --- | ❍ | ❍ | | --- | | --- | | | | | --- | | --- | | --- |
| Removable terminal blocks | ❍ | | | | | | | | | --- | | | --- | | | ❍ | | | | | | --- | | | | | --- | | ❍ | | ❍ |
| Automatic baud rate detection | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | ❍ | | ❍ |
| Unit power supply wiring not required | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | ❍ | | ❍ |
| Power supply wiring not required for input devices | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | ❍ | --- | | | | ❍ | | --- | | --- |
| Expansion I/O Units mountable | ❍ | --- | | | ❍ | --- | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | --- | | --- |
| Scaling | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | | ❍ |
| User calibration | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | | ❍ |
| Last maintenance date | ❍ | | | | | | | | | ❍ | | | ❍ | | | ❍ | | | | | | ❍ | | | | | ❍ | | ❍ | | ❍ |
| Integral function | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | | ❍ |
| Moving average processing | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | --- | ❍ |
| Number of AD conversion points setting (conversion cycle) | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | --- | --- |
| Peak/bottom hold | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | --- | ❍ |
| Top/valley hold | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | --- | ❍ |
| Change rate calculations | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | --- | ❍ |
| Comparator function | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | ❍ | --- | ❍ |
| Setting output value for errors | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | --- | ❍ | --- |
| Top/valley count | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | --- | | ❍ |
| Operating time in a preset temperature range | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | --- | | ❍ |
| Temperature difference detection between input channels | --- | | | | | | | | | --- | | | --- | | | --- | | | | | | --- | | | | | --- | | --- | | ❍ |

❍: Yes, ---: No

**Note:** The contact operation count monitor and the total RUN (ON) time monitor cannot be used at the same time for one contact.
External load detection is supported only by the DRT2-MD32SLH-1 and DRT2-OD32SLH-1.

## Specifications

| | | |
|---|---|---|
| Communications power supply voltage | 11 to 25 VDC (supplied from communications connector) | |
| I/O power supply voltage | 20.4 to 26.4 VDC (24 VDC −15% to +10%) | |
| Noise immunity | Conforms to IEC61000-4-4, 2 kV (power lines) | |
| Vibration resistance | 10 to 60 Hz, 0.7-mm double amplitude, 60 to 150 Hz, 50 $ms^2$ for 80 min each in the X, Y, and Z directions | |
| Shock resistance | 150$m/s^2$, 6 directions, 3 times each | |
| Dielectric strength | 500 VAC (between isolated circuits) | |
| Insulation resistance | 20 MΩ min. (between isolated circuits) | |
| Ambient operating temperature | −10 to 55°C | |
| Ambient operating humidity | 25 to 85% | |
| Ambient operating atmosphere | No corrosive gases | |
| Ambient storage temperature | −20 to 65°C | |
| Degree of protection | IP67 | |
| Mounting method | DRT2-□D08□-1□/□D16(-1):<br>DRT2-□D32ML(-1)/□D16ML(-1):<br>DRT2-□D04CL(-1)/□D08CL(-1)/□D16CL(-1): | 35-mm DIN Track<br>35-mm DIN Track<br>M5 screws mounting (front or back) |
| Screw tightening torque | DRT2-□D08(-1)/□D16(-1):<br>DRT2-□D32ML(-1)/□D16ML(-1):<br><br>DRT2-□D04CL(-1)/□D08CL(-1)/□D16CL(-1): | M3 (power supply and I/O terminals): 0.3 to 0.5 N·m<br>M2 (communications connector screws): 0.26 to 0.3 N·m,<br>M3 (screw terminals): 0.3 to 0.5N·m<br>Round connectors (communications connector, power supply, and I/O): 0.39 to 0.49 N·m<br>M5 (Unit mounting from the front): 1.47 to 1.96 N·m |

# Input Specifications

## ■Remote I/O Terminals with Transistors

### ●Terminals with 8 Inputs

| Item | Model | DRT2-ID08(-1) |
|---|---|---|
| Input current | | 6.0 mA max. per point at 24 VDC |
| ON delay time | | 1.5 ms max. |
| OFF delay time | | 1.5 ms max. |
| ON voltage | NPN | 15 VDC min. (between each input terminal and V) |
| | PNP | 15 VDC min. (between each input terminal and G) |
| OFF voltage | NPN | 5 VDC max. (between each input terminal and V) |
| | PNP | 5 VDC min. (between each input terminal and G) |
| OFF current | | 1.0 mA max. |
| Isolation method | | Photocoupler isolation |
| Input indicator | | Yellow LED indicator |

### ●Terminals with 8 Inputs/8 Outputs

| 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 mA max. | |
| Input current | | 6.0 mA max. per point at 24 VDC<br>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 points per common | |

## ■MIL Connector Terminals with Transistors

### ●Terminals with 16 Inputs, with Connectors

| Item | Model | DRT2-ID16ML<br>DRT2-ID16MLX | DRT2-ID16ML-1<br>DRT2-ID16MLX-1 |
|---|---|---|---|
| Internal I/O common | | NPN | PNP |
| Number of 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) | 15 VDC min. (between each input terminal and G) |
| OFF current | | 1 mA max. | |
| Input current | | 6.0 mA max. per point at 24 VDC<br>3.0 mA max. per point at 17 VDC | |
| ON delay time | | 1.5 ms max. | |
| OFF delay time | | 1.5 ms max. | |
| Max. number of simultaneous ON input points | | 16 | |
| Number of points per common | | 16 points per common | |

## ■Standard Environment-resistive Terminals and Environment-resistive Terminals with Transistors

### ●Terminals with 4 Inputs

| Item | Model | DRT2-ID04CL | DRT2-ID04CL-1 |
|---|---|---|---|
| Internal I/O common | | NPN | PNP |
| Number of I/O points | | 4 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 mA max. | |
| Input current | | 6.0 mA max. per point at 24 VDC<br>3.0 mA max. per point at 17 VDC | |
| I/O power supply voltage | | 20.4 to 26.4 VDC (24 VDC, –15 to +10%) | |
| ON delay time | | 1.5 ms max. | |
| OFF delay time | | 1.5 ms max. | |
| Number of points per common | | 4 points per common | |

### ●Terminals with 8 Inputs

| Item | Model | DRT2-ID08CL | DRT2-ID08CL-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 mA max. | |
| Input current | | 6.0 mA6.0 mA max. per point at 24 VDC<br>3.0 mA max. per point at 17 VDC | |
| I/O power supply voltage | | 20.4 to 26.4 VDC (24 VDC, –15 to +10%) | |
| ON delay time | | 1.5 ms max. | |
| OFF delay time | | 1.5 ms max. | |
| Number of points per common | | 8 points per common | |

### ●Terminals with 16 Inputs

| Item | Model | DRT2-HD16CL | DRT2-HD16CL-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) | 15 VDC min. (between each input terminal and G) |
| OFF currrent | | 1 mA max. | |
| Input current | | 6.0 mA max. per point at 24 VDC<br>3.0 mA max. per point at 17 VDC | |
| I/O power supply voltage | | 20.4 to 26.4 VDC (24 VDC, –15 to +10%) | |
| ON delay time | | 1.5 ms max. | |
| OFF delay time | | 1.5 ms max. | |
| Number of points per common | | 16 points per common | |

### ●Terminals with 8 Inputs/8 Outputs

| Item | Model | DRT2-MD16CL | DRT2-MD16CL-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 currrent | | 1 mA max. | |
| Input current | | 6.0 mA max. per point at 24 VDC<br>3.0 max. per point at 17 VDC | |
| I/O power supply voltage | | 20.4 to 26.4 VDC (24 VDC, –15 to +10%) | |
| ON delay time | | 1.5 ms max. | |
| OFF delay time | | 1.5 ms max. | |
| Number of points per common | | 8 points per common | |

# Output Specifications

## ■Remote I/O Terminals with Transistors

### ●Terminals with 8 Outputs

| Item / Model | DRT2-OD08(-1) |
|---|---|
| Rated output current | 0.5 A per point, 4.0 A per common |
| ON delay time | 0.5 ms max. |
| OFF delay time | 1.5 ms max. |
| Residual voltage | 1.2 V max. |
| Leakage current | 0.1 mA max. |
| Isolation method | Photocoupler isolation |
| Output indicator | Yellow LED indicator |

### ●Terminals with 8 Inputs/8 Outputs

| 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 mA max. | |
| ON delay time | 0.5 ms max. | |
| OFF delay time | 1.5 ms max. | |
| Number of points per common | 8 points per common | |

## ■MIL Connector Terminals with Transistors

### ●Terminals with 16 Outputs, with Connectors

| Item / Model | DRT2-OD16ML<br>DRT2-OD16MLX | DRT2-OD16ML-1<br>DRT2-OD16MLX-1 |
|---|---|---|
| Internal I/O common | NPN | PNP |
| Number of I/O points | 16 outputs | |
| Rated output current | 0.3 A per point, 2 A per common (See note.) | |
| Residual voltage | 1.2 V max. (0.3 A DC between each output terminal and G) | 1.2 V max. (0.3 A DC between each output terminal and V) |
| Leakage current | 0.1 mA max. | |
| ON delay time | 0.5 ms max. | |
| OFF delay time | 1.5 ms max. | |
| Number of points per common | 16 points per common | |

**Note:** Make sure the total external load current does not exceed 2 A.
Make sure that the V and G terminals do not exceed 1 A per terminal.

## ■Standard Environment-resistive Terminals and Environment-resistive Terminals with Transistors

### ●Terminals with 4 Outputs

| Item / Model | DRT2-OD04CL | DRT2-OD04CL-1 |
|---|---|---|
| Internal I/O common | NPN | PNP |
| Number of I/O points | 4 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 mA max. | |
| I/O power supply voltage | 20.4 to 26.4 VDC (24 VDC, –15 to +10%) | |
| ON delay time | 0.5 ms max. | |
| OFF delay time | 1.5 ms max. | |
| Number of points per common | 4 points per common | |

### ●Terminals with 8 Outputs

| Item / Model | DRT2-OD08CL | DRT2-OD08CL-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 mA max. | |
| I/O power supply voltage | 20.4 to 26.4 VDC (24 VDC, –15 to +10%) | |
| ON delay time | 0.5 ms max. | |
| OFF delay time | 1.5 ms max. | |
| Number of points per common | 8 points per common | |

### ●Terminals with 16 Outputs

| Item / Model | DRT2-WD16CL | DRT2-WD16CL-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 mA max. | |
| I/O power supply voltage | 20.4 to 26.4 VDC (24 VDC, –15 to +10%) | |
| ON delay time | 0.5 ms max. | |
| OFF delay time | 1.5 ms max. | |
| Number of points per common | 16 points per common | |

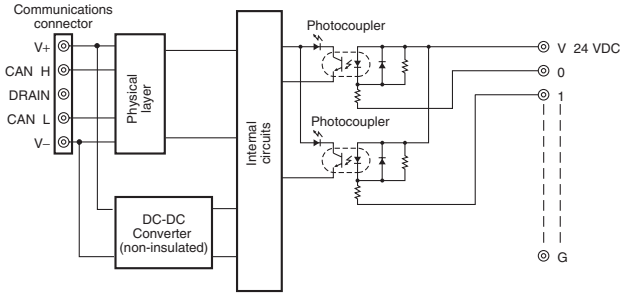
### ●Terminals with 8 Inputs/8 Outputs

| Item / Model | DRT2-MD16CL | DRT2-MD16CL-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 mA max. | |
| I/O power supply voltage | 20.4 to 26.4 VDC (24 VDC, –15 to +10%) | |
| ON delay time | 0.5 ms max. | |
| OFF delay time | 1.5 ms max. | |
| Number of points per common | 8 points per common | |

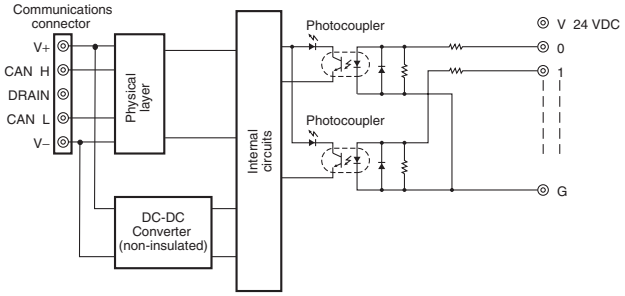
# Internal Circuit Configuration

## ■Remote I/O Terminals with Transistors

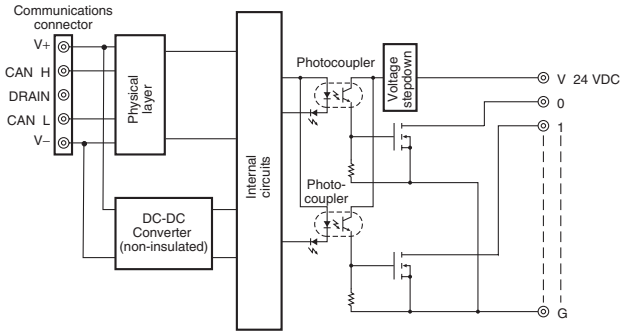
### DRT2-ID08 (NPN)



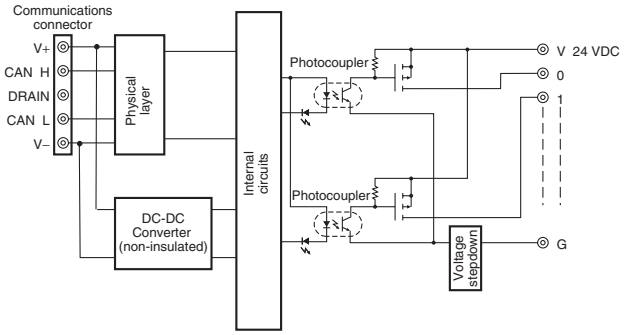

### DRT2-ID08-1 (PNP)



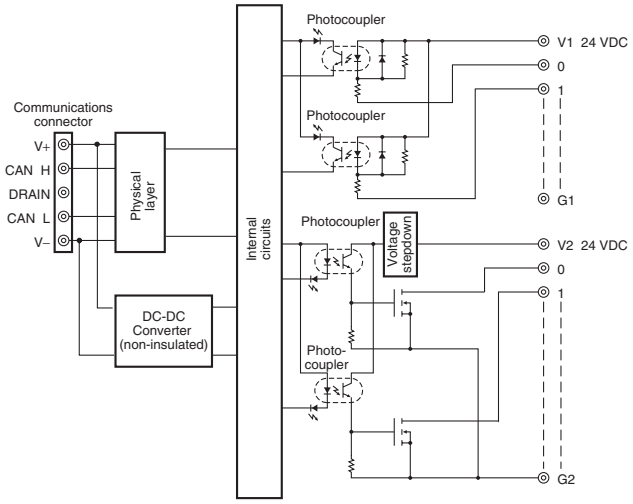

### DRT2-OD08 (NPN)



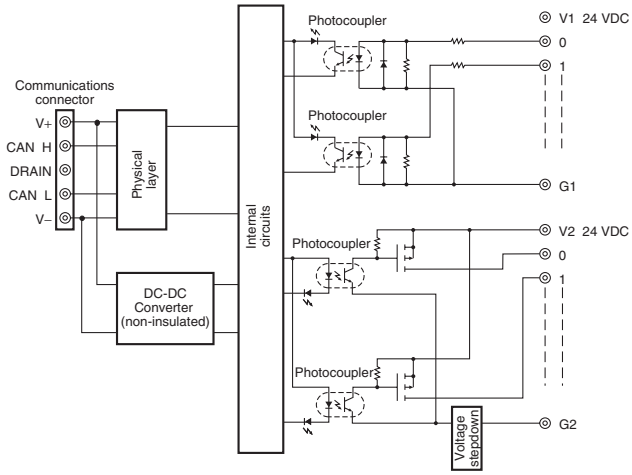

### DRT2-OD08-1 (PNP)




### DRT2-MD16 (NPN)

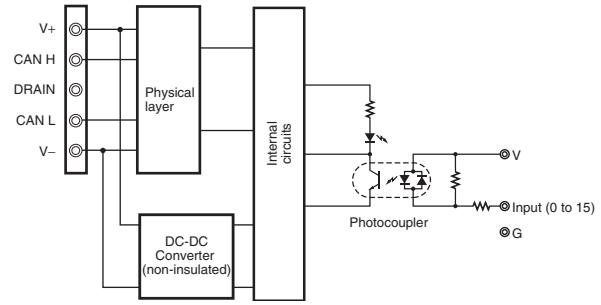



### DRT2-MD16-1 (PNP)

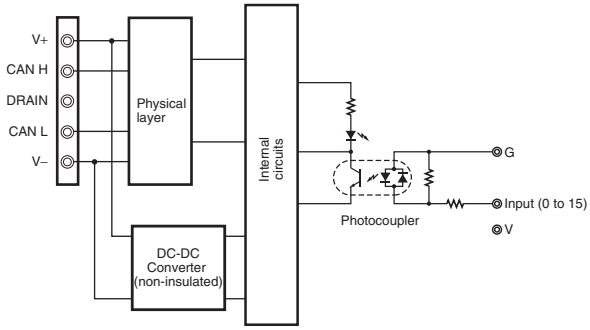


## ■MIL Connector Terminals with Transistors

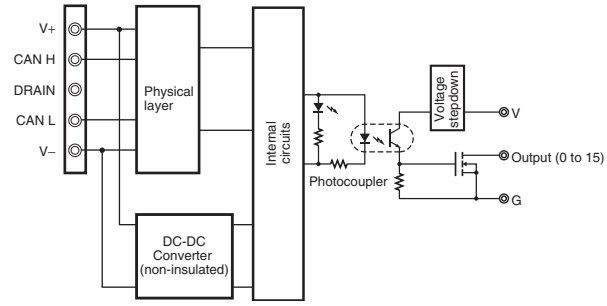
DRT2-ID16ML(X)



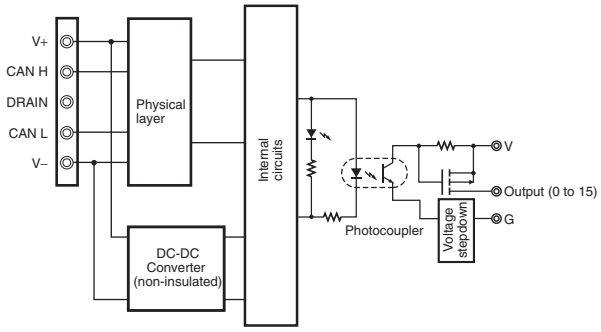

DRT2-ID16ML(X)-1




DRT2-OD16ML(X)

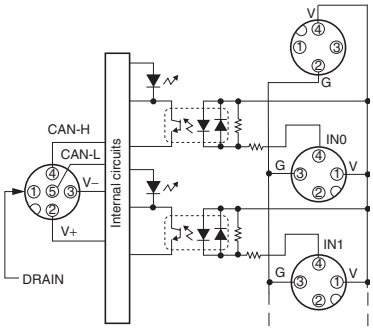



DRT2-OD16ML(X)-1

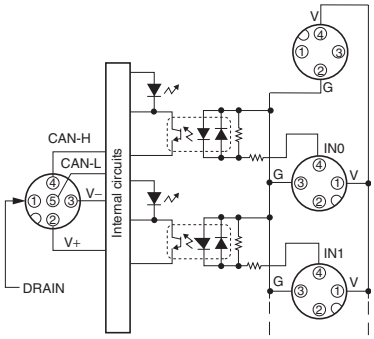


## ■Standard Environment-resistive Terminals and Environment-resistive Terminals with Transistors

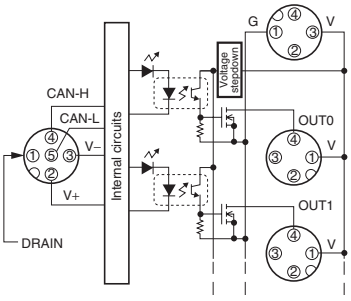
DRT2-ID04CL (NPN)



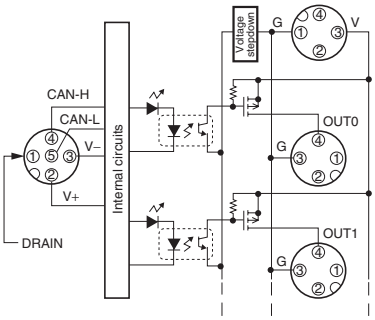

DRT2-ID04CL-1 (PNP)



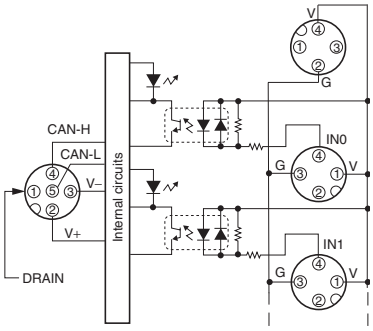

DRT2-OD04CL (NPN)



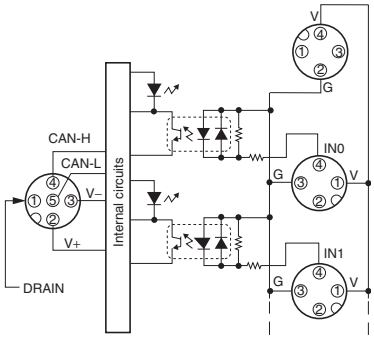

DRT2-OD04CL-1 (PNP)



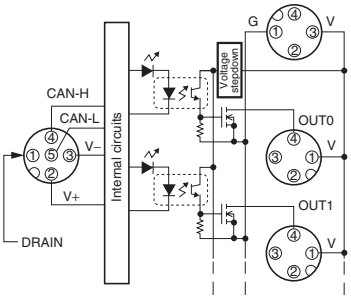

DRT2-ID08CL (NPN)



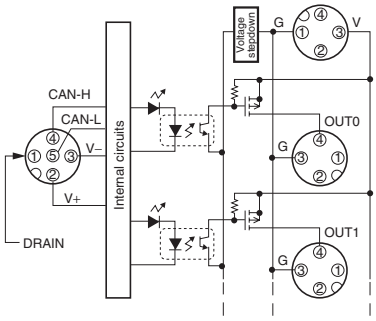

DRT2-ID08CL-1 (PNP)



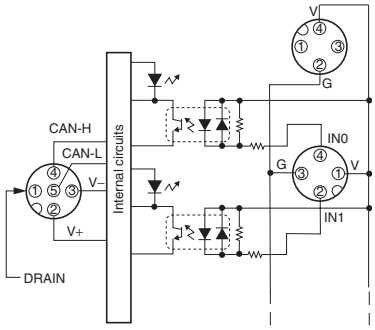

DRT2-OD08CL (NPN)



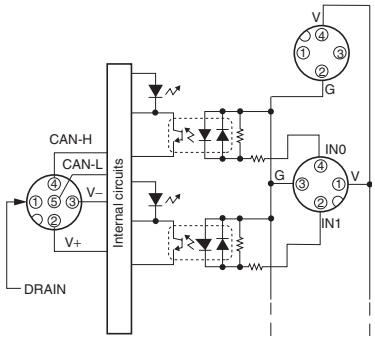

DRT2-OD08CL-1 (PNP)



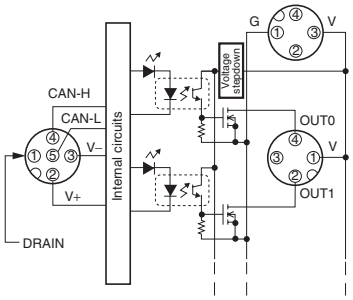
DRT2-HD16CL (NPN)



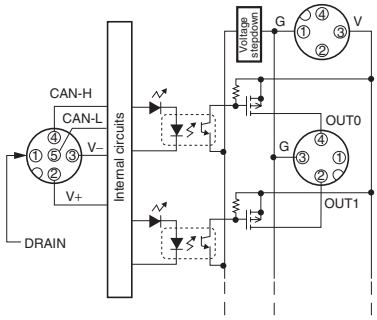

DRT2-HD16CL-1 (PNP)



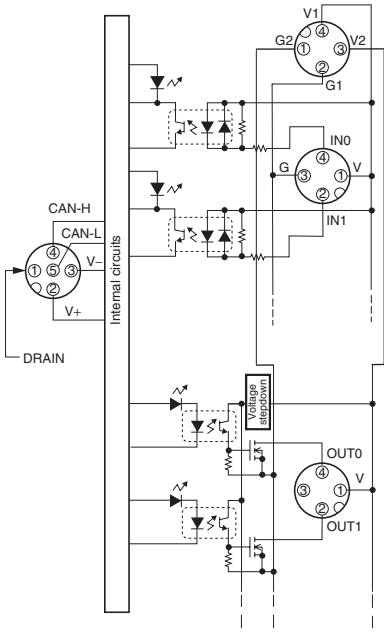

DRT2-WD16CL (NPN)



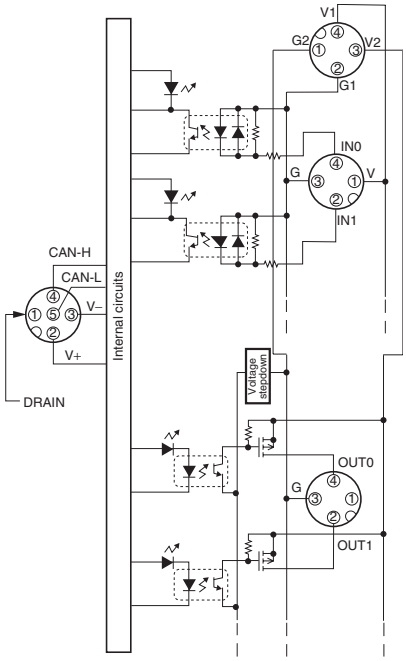

DRT2-WD16CL-1 (PNP)




DRT2-MD16CL (NPN)




DRT2-MD16CL-1 (PNP)



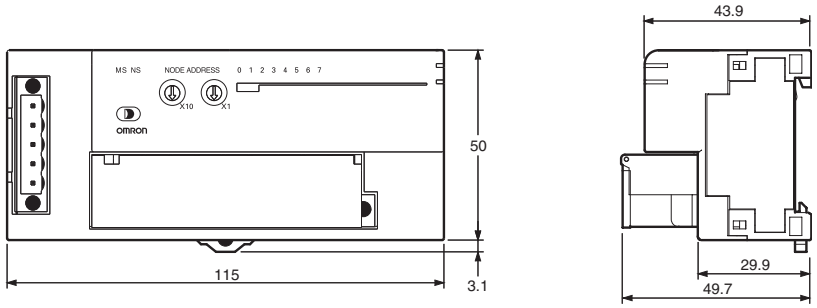
# Dimensions

(Unit: mm)

## ■Remote I/O Terminals with Transistors

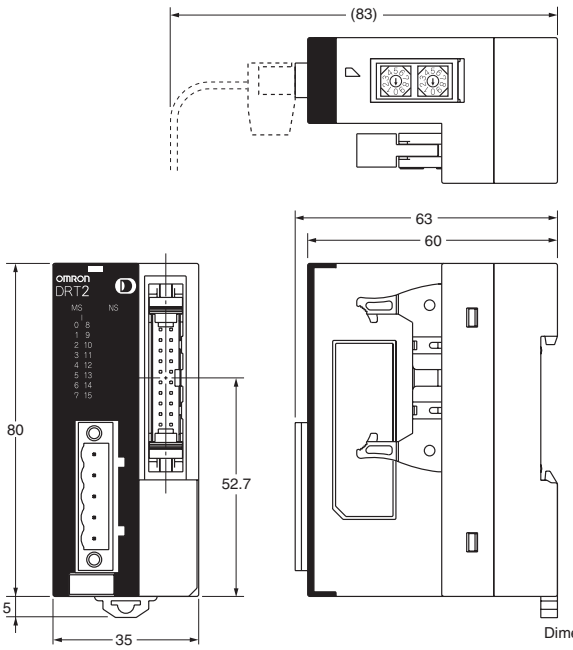
●Remote I/O Terminals

DRT2-ID08(-1)
DRT2-OD08(-1)
DRT2-MD16(-1)




## ■MIL Connector Terminals with Transistors

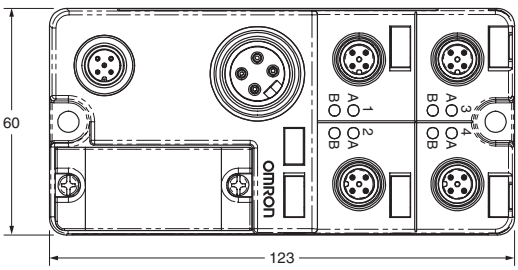
DRT2-ID16ML(-1)
DRT2-OD16ML(-1)
DRT2-ID16MLX(-1)
DRT2-OD16MLX(-1)

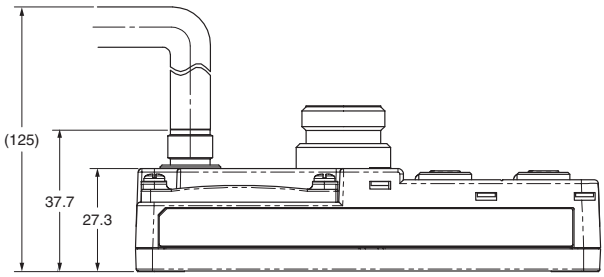


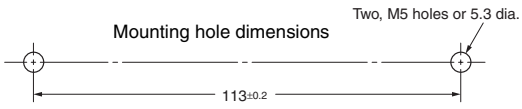

Dimensions inside parentheses are for reference only.

## ■Standard Environment-resistive Terminals and Environment-resistive Terminals with Transistors

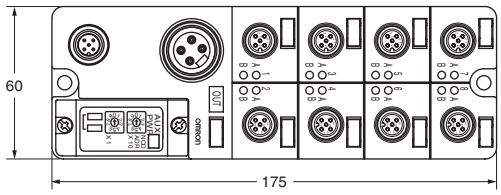
DRT2-ID04CL(-1)
DRT2-OD04CL(-1)

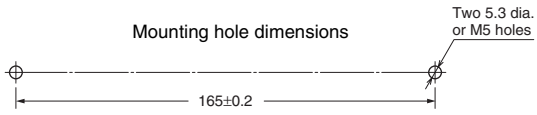


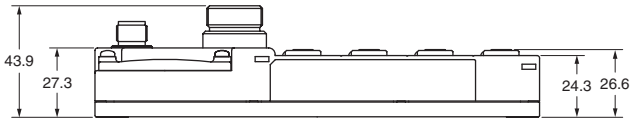



DRT2-ID08CL(-1)
DRT2-OD08CL(-1)
DRT2-HD16CL(-1)
DRT2-WD16CL(-1)
DRT2-MD16CL(-1)



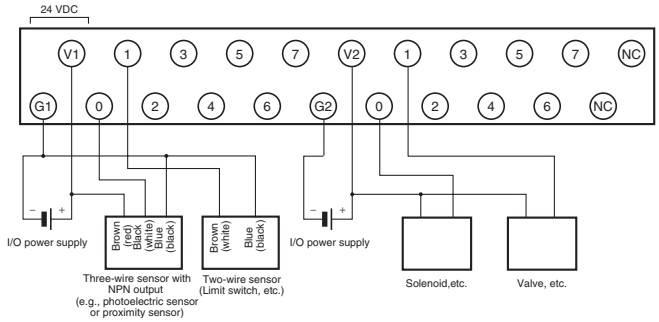



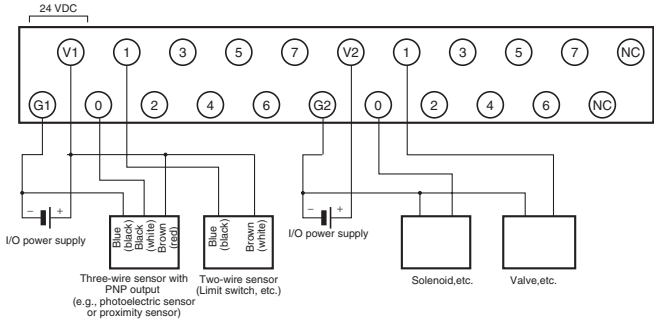

## Wiring Diagrams

### ■Remote I/O Terminals with Transistors

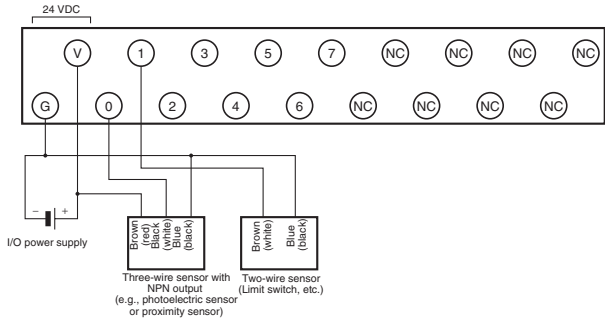
DRT2-MD16 (NPN)



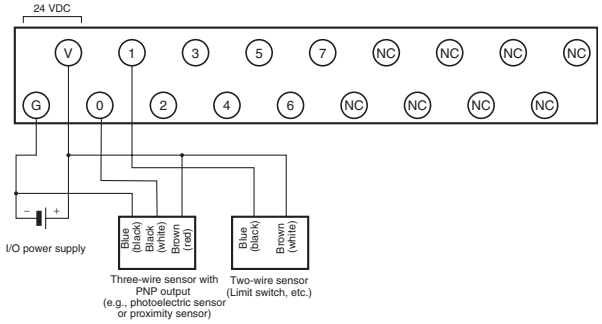

DRT2-MD16-1 (PNP)



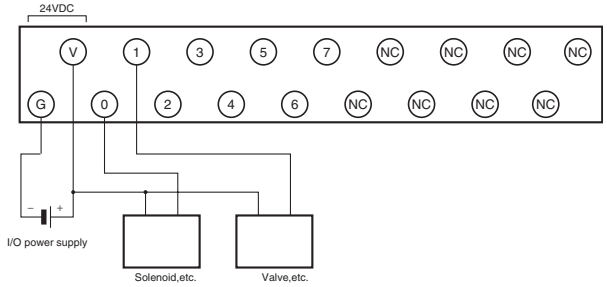

DRT2-ID08 (NPN)



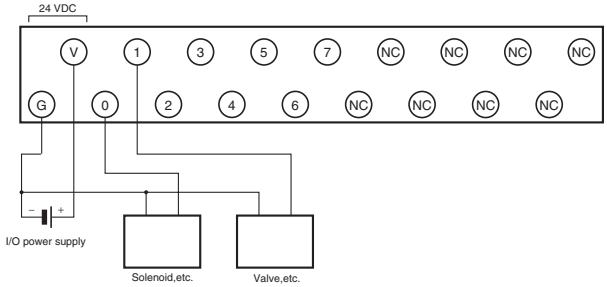

DRT2-ID08-1 (PNP)




DRT2-OD08 (NPN)

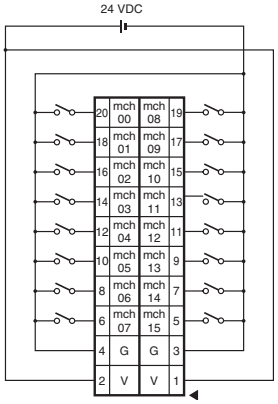



DRT2-OD08-1 (PNP)

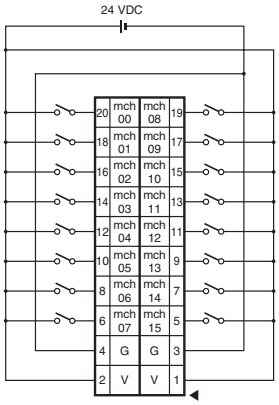


## ■MIL Connector Terminals with Transistors

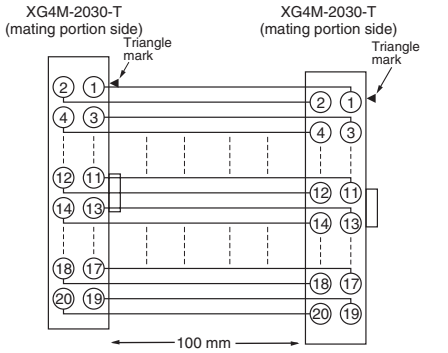
DRT2-ID16ML(X)



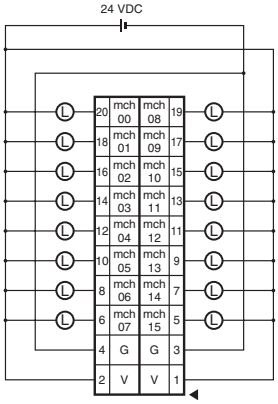

DRT2-ID16ML(X)-1



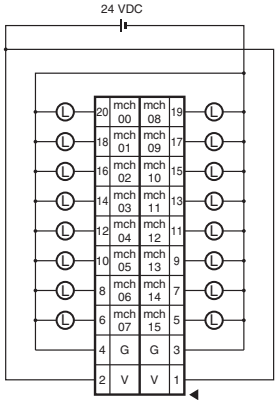

DRT2-ID16MLX(-1)/DRT2-OD16MLX(-1)
Wiring Diagram for Enclosed Cable (with Connectors)




DRT2-OD16ML(X)

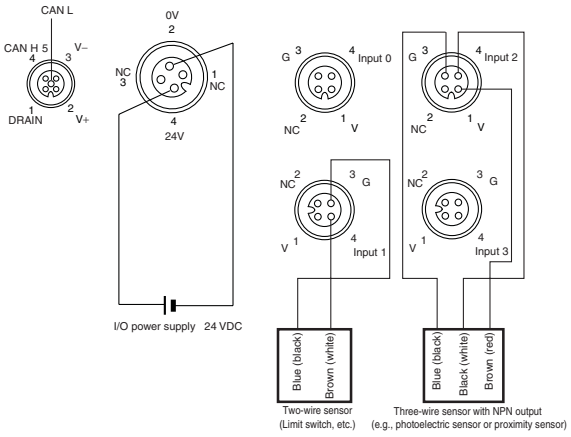



DRT2-OD16ML(X)-1

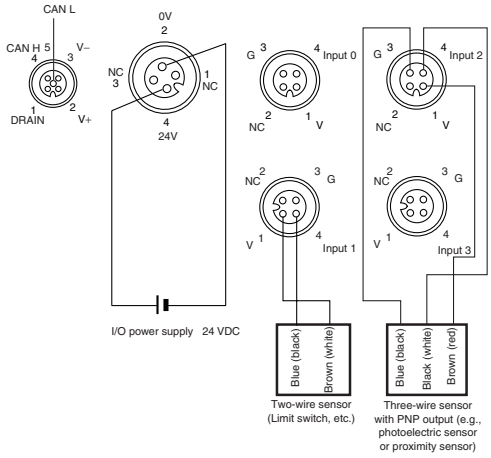


## ■Standard Environment-resistive Terminals and Environment-resistive Terminals with Transistors

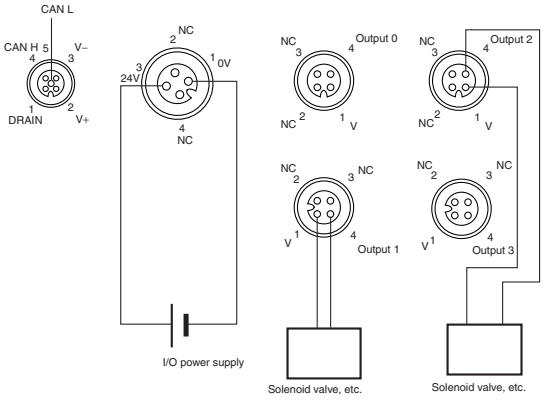
### DRT2-ID04CL (NPN)



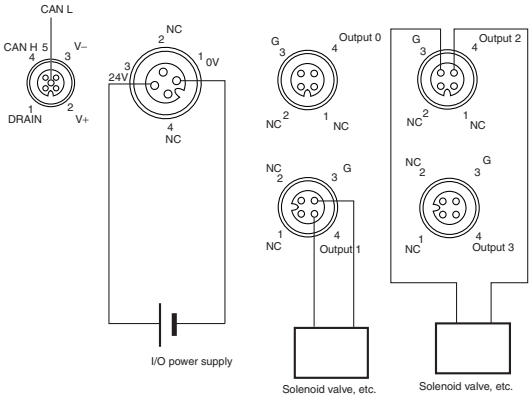

### DRT2-ID04CL-1 (PNP)



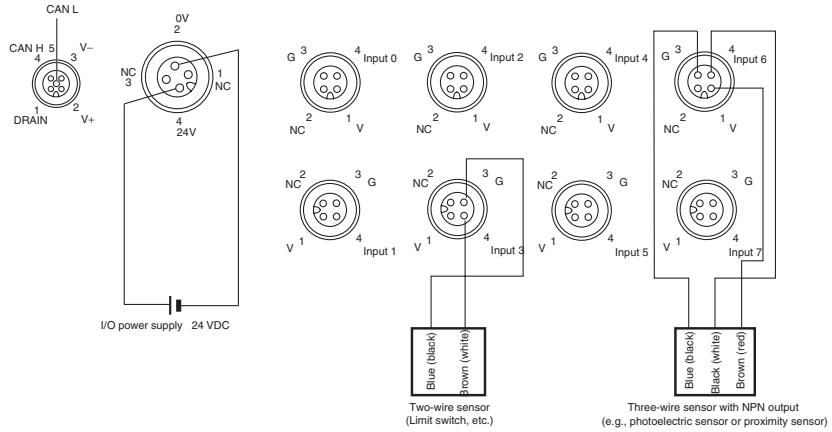

### DRT2-OD04CL (NPN)



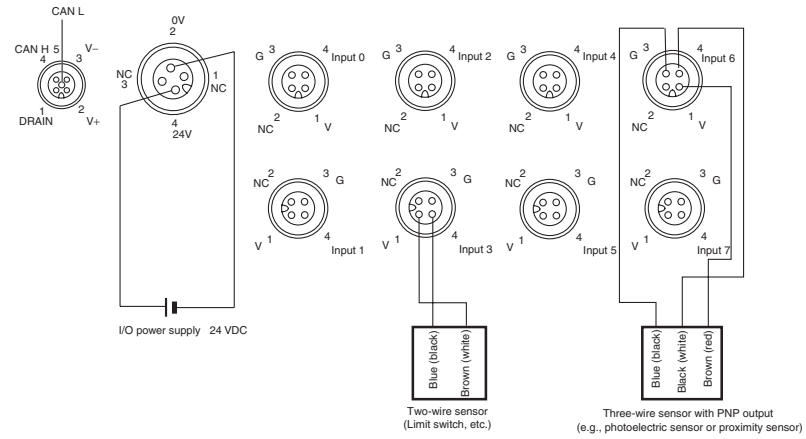

### DRT2-OD04CL-1 (PNP)



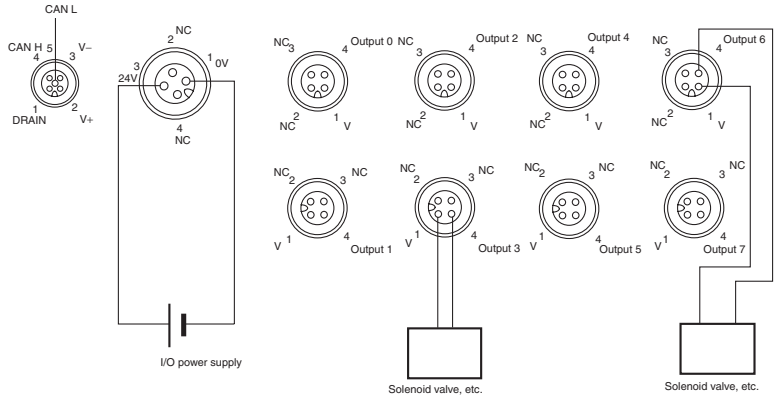
## DRT2-ID08CL (NPN)



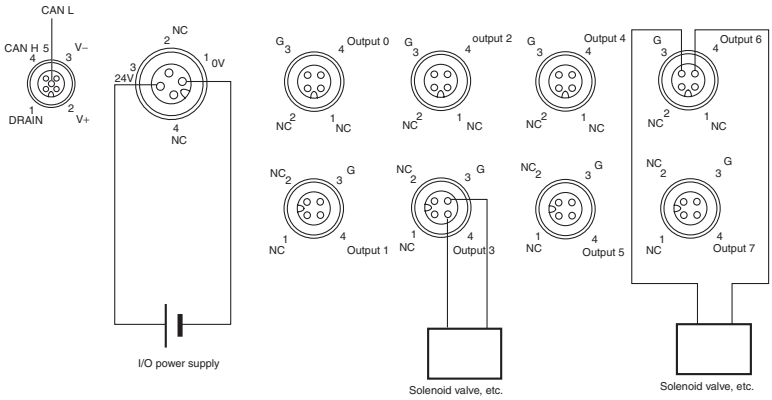

## DRT2-ID08CL-1 (PNP)



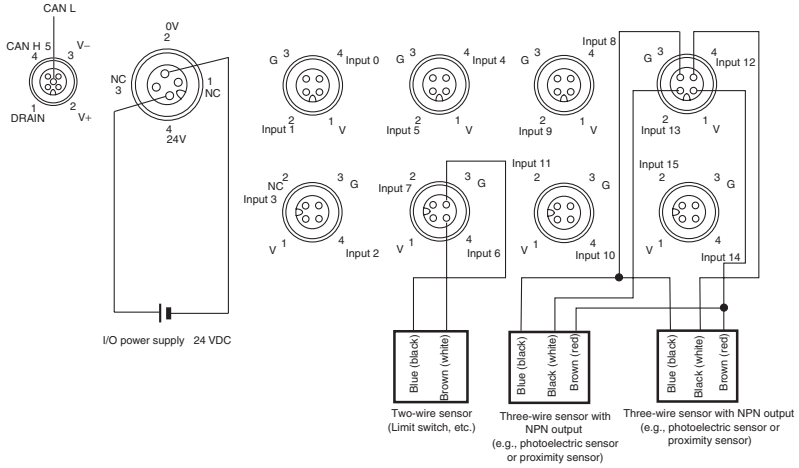

## DRT2-OD08CL (NPN)



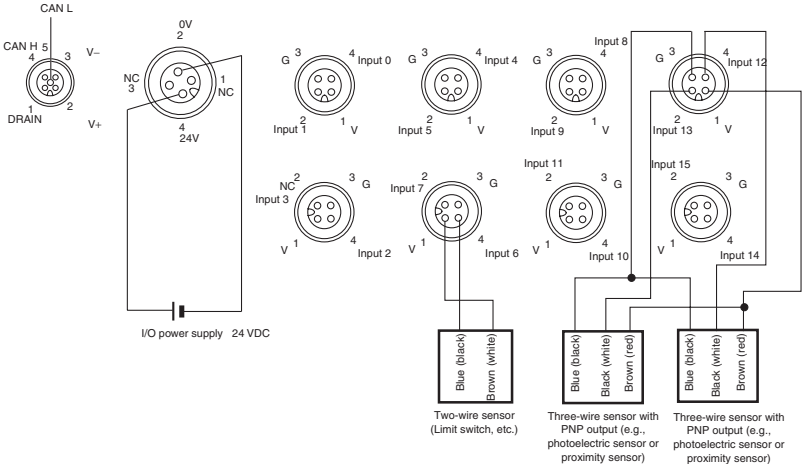
## DRT2-OD08CL-1 (PNP)



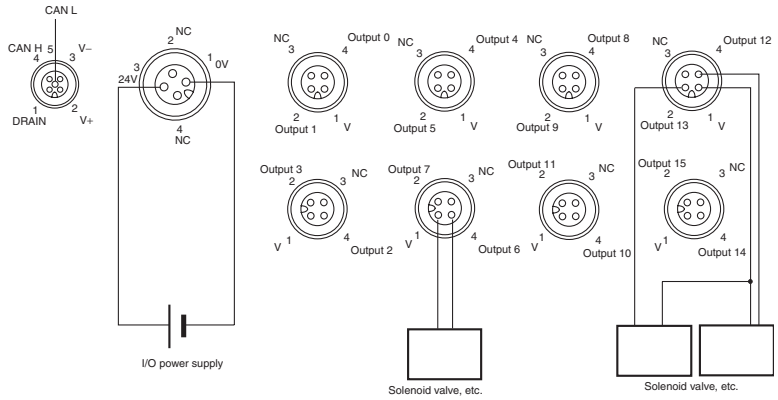

## DRT2-HD16CL (NPN)



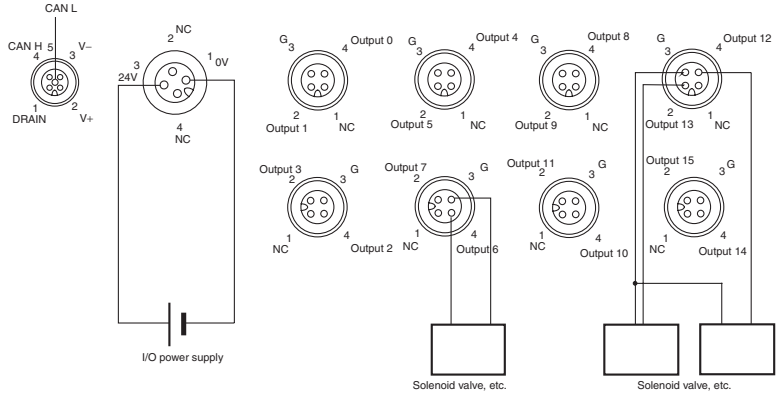

## DRT2-HD16CL-1 (PNP)



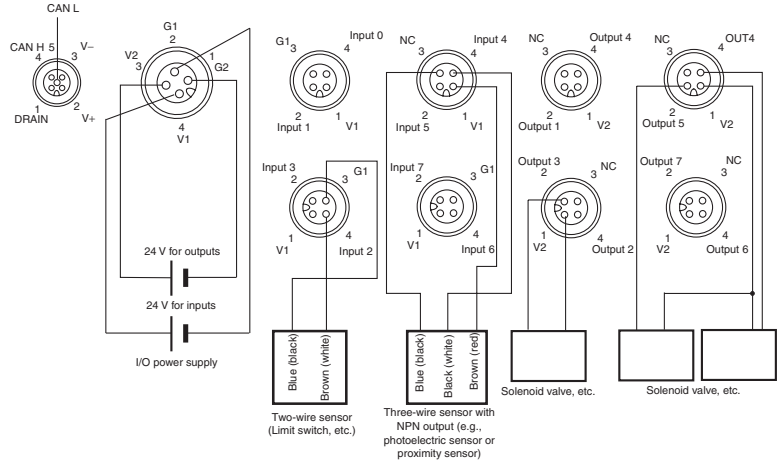
## DRT2-WD16CL (NPN)



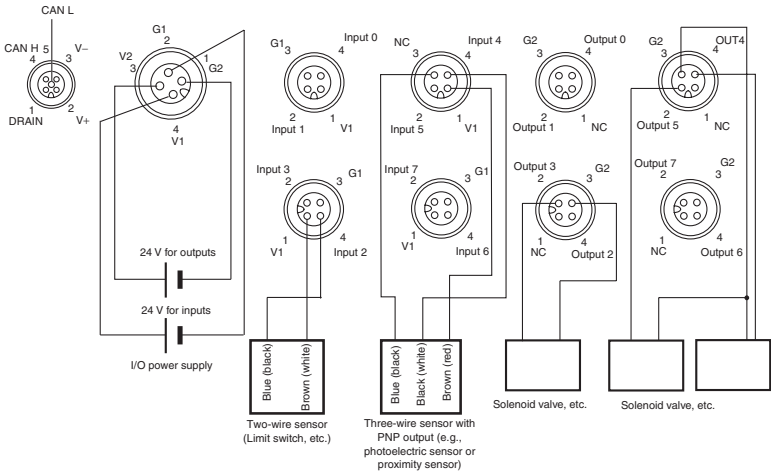

## DRT2-WD16CL-1 (PNP)




## DRT2-MD16CL (NPN)



DRT2-MD16CL-1 (PNP)



# Applicable Cables

## ■MIL Connectors with Transistors

### ●Connector-Terminal Block Conversion Unit and Connecting Cable (16 Points)

Cables with Connectors (1:1)

| Model | Applicable cable | Connected Relay Terminal | Remarks |
|---|---|---|---|
| DRT2-ID16ML<br>DRT2-ID16ML-1<br>DRT2-OD16ML<br>DRT2-OD16ML-1 | G79-O□C | XW2D-20G6<br>XW2B-20G5<br>XW2B-20G4<br>XW2C-20G6-IO16 | Connector Terminal Block Conversion Unit |

### ●I/O Relay Terminal Connector Cables (16 Points)

Cables with Connectors (1:1)

| Model | Applicable cable | Connected Relay Terminal | Remarks |
|---|---|---|---|
| DRT2-ID16ML | G79-I□C | G7TC-ID16<br>G7TC-IA16 | For I/O Relay Terminal inputs |
| DRT2-ID16ML-1 | --- | --- | (No applicable models) |
| DRT2-OD16ML | G79-O□C | G7TC-OC16/OC08<br>G70D-SOC16/VSOC16<br>G70D-FOM16/VFOM16<br>G70A-ZOC16-3<br>G70D-SOC08<br>G70R-SOC08 | For I/O Relay Terminal outputs |
| DRT2-OD16ML-1 | G79-I□C | G7TC-OC16-1 | For I/O Relay Terminal outputs |
| | G79-O□C | G70D-SOC16-1<br>G70D-FOM16-1<br>G70A-Z0C16-4 | For I/O Relay Terminal outputs |

### ●Cables with Loose Wires with Crimp Terminals

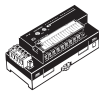
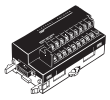
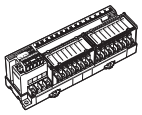
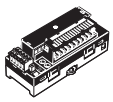
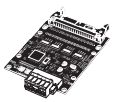
| Model | Applicable cable | Remarks |
|---|---|---|
| DRT2-ID16ML<br>DRT2-ID16ML-1<br>DRT2-OD16ML<br>DRT2-OD16ML-1 | G79A-Y□C-D1 | 20-pole connector/ bundled cable (with crimp-style terminals) conversion cable |

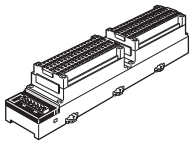
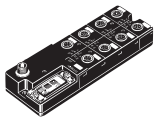
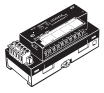
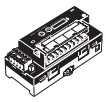
### ●Cables with Loose Wires

| Model | Applicable cable | Remarks |
|---|---|---|
| DRT2-ID16ML<br>DRT2-ID16ML-1<br>DRT2-OD16ML<br>DRT2-OD16ML-1 | G79A-A□C-D1 | 20-pole connector/ bundled cable conversion cable |

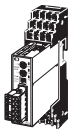
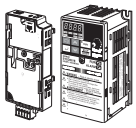
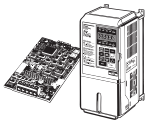
# List of Models

## ●DRT2-series Smart Slaves

| Product name | Shape | Model | Specifications | Approved standards |
|---|---|---|---|---|
| Remote I/O Basic Terminals with Transistors |  | DRT2-ID16 | 16 inputs, NPN ( + common) | UC, CE |
| | | DRT2-ID16-1 | 16 inputs, PNP ( – common) | |
| | | DRT2-OD16 | 16 outputs, NPN ( – common) | |
| | | DRT2-OD16-1 | 16 outputs, PNP ( + common) | |
| | | DRT2-MD16 | 8 inputs/8 outputs with NPN, + common for inputs, – common for outputs | |
| | | DRT2-MD16-1 | 8 inputs/8 outputs with PNP, – common for inputs, + common for outputs | |
| | | DRT2-ID08 | 8 inputs, NPN ( + common) | |
| | | DRT2-ID08-1 | 8 inputs, PNP ( – common) | |
| | | DRT2-OD08 | 8 outputs, NPN ( – common) | |
| | | DRT2-OD08-1 | 8 outputs, PNP ( + common) | |
| Remote I/O Terminal Expansion Units with Transistors |  | XWT-ID08 | 8 inputs for terminals with NPN, + common | UC, CE |
| | | XWT-ID08-1 | 8 inputs for terminals with PNP, – common | |
| | | XWT-OD08 | 8 outputs for terminals with NPN, – common | |
| | | XWT-OD08-1 | 8 outputs for terminals with PNP, + common | |
| | | XWT-ID16 | 16 inputs for terminals with NPN, + common | |
| | | XWT-ID16-1 | 16 inputs for terminals with PNP, – common | |
| | | XWT-OD16 | 16 outputs for terminals with NPN, – common | |
| | | XWT-OD16-1 | 16 outputs for terminals with PNP, + common | |
| Remote I/o Terminals with 3-tier Terminal Blocks with Transistors |  | DRT2-ID16TA | 16 inputs with NPN, + common | UC, CE |
| | | DRT2-ID16TA-1 | 16 inputs with PNP, – common | |
| | | DRT2-OD16TA | 16 outputs with NPN, – common | |
| | | DRT2-OD16TA-1 | 16 outputs with PNP, + common | |
| | | DRT2-MD16TA | 8 inputs/8 outputs with NPN, + common for inputs, – common for outputs | |
| | | DRT2-MD16TA-1 | 8 inputs/8 outputs with PNP, – common for inputs, + common for outputs | |
| MIL Connector Terminals with Transistors |  | DRT2-ID32ML | 32 inputs with NPN, + common | UC, CE |
| | | DRT2-ID32ML-1 | 32 inputs with PNP, – common | |
| | | DRT2-OD32ML | 32 outputs with NPN, – common | |
| | | DRT2-OD32ML-1 | 32 outputs with PNP, + common | |
| | | DRT2-MD32ML | 16 inputs/16 outputs with NPN, + common for inputs, – common for outputs | |
| | | DRT2-MD32ML-1 | 16 inputs/16 outputs with PNP, – common for inputs, + common for outputs | |
| | | DRT2-ID16ML | 16 inputs with NPN, + common | |
| | | DRT2-ID16ML-1 | 16 inputs with PNP, – common | |
| | | DRT2-OD16ML | 16 outputs with NPN, – common | |
| | | DRT2-OD16ML-1 | 16 outputs with PNP, + common | |
| | | DRT2-ID16MLX | 16 inputs with NPN, + common, cable with connectors: 10 cm | |
| | | DRT2-ID16MLX-1 | 16 inputs with PNP, – common, cable with connectors: 10 cm | |
| | | DRT2-OD16MLX | 16 outputs with NPN, – common, cable with connectors: 10 cm | |
| | | DRT2-OD16MLX-1 | 16 outputs with PNP, + common, cable with connectors: 10 cm | |
| Remote I/O Terminals with Relay Outputs |  | DRT2-ROS16 | 16 outputs | UR, CE |
| Board Terminals with MIL Connectors (horizontal mounting) |  | DRT2-ID32B | 32 inputs, NPN ( + common) | U, CE |
| | | DRT2-ID32B-1 | 32 inputs, PNP ( – common) | |
| | | DRT2-OD32B | 32 outputs, NPN ( – common) | |
| | | DRT2-OD32B-1 | 32 outputs, PNP ( + common) | |
| | | DRT2-MD32B | 16 inputs/16 outputs, NPN (inputs: + common/outputs: – common) | |
| | | DRT2-MD32B-1 | 16 inputs/16 outputs, PNP (inputs: – common/outputs: + common) | |
| Board Terminals with MIL Connectors (vertical mounting) |  | DRT2-ID32BV | 32 inputs, NPN ( + common) | U, CE |
| | | DRT2-ID32BV-1 | 32 inputs, PNP ( – common) | |
| | | DRT2-OD32BV | 32 outputs, NPN ( – common) | |
| | | DRT2-OD32BV-1 | 32 outputs, PNP ( + common) | |
| | | DRT2-MD32BV | 16 inputs/16 outputs, NPN (inputs: + common/outputs: – common) | |
| | | DRT2-MD32BV-1 | 16 inputs/16 outputs, PNP (inputs: – common/outputs: + common) | |

| Product name | Shape | Model | Specifications | Approved standards |
|---|---|---|---|---|
| Screw-less Clamp Terminals with Transistors |  | DRT2-ID32SLH | 32 inputs, NPN ( + common) with detection functions | UC, CE |
| | | DRT2-ID32SLH-1 | 32 inputs, PNP ( – common) with detection functions | |
| | | DRT2-OD32SLH | 32 outputs, NPN ( – common) with detection functions | |
| | | DRT2-OD32SLH-1 | 32 outputs, PNP ( + common) with detection functions | |
| | | DRT2-MD32SLH | 16 inputs/16 outputs, NPN (inputs: + common/outputs: – common) with detection functions | |
| | | DRT2-MD32SLH-1 | 16 inputs/16 outputs, PNP (inputs: – common/outputs: + common) with detection functions | |
| | | DRT2-ID32SL | 32 inputs, NPN ( + common) without detection functions | |
| | | DRT2-ID32SL-1 | 32 inputs, PNP ( – common) without detection functions | |
| | | DRT2-OD32SL | 32 outputs, NPN ( – common) without detection function | |
| | | DRT2-OD32SL-1 | 32 outputs, PNP ( + common) without detection function | |
| | | DRT2-MD32SL | 16 inputs/16 outputs, NPN (inputs: + common/outputs: – common) without detection function | |
| | | DRT2-MD32SL-1 | 16 inputs/16 outputs, PNP (inputs: – common/outputs: + common) without detection function | |
| Environment-resistive Terminals with Transistors |  | DRT2-ID08C | 8 inputs, NPN ( + common) with detection functions | UC, CE |
| | | DRT2-ID08C-1 | 8 inputs, PNP ( – common) with detection functions | |
| | | DRT2-OD08C | 8 outputs, NPN ( – common) with detection functions | |
| | | DRT2-OD08C-1 | 8 outputs, PNP ( + common) with detection functions | |
| | | DRT2-HD16C | 16 inputs, NPN ( + common) with detection functions | |
| | | DRT2-HD16C-1 | 16 inputs, PNP ( – common) with detection functions | |
| Environment-resistive Terminals with Transistors |  | DRT2-ID04CL | 4 inputs, NPN ( + common) without detection functions | UC, CE |
| | | DRT2-ID04CL-1 | 4 inputs, PNP ( – common) without detection functions | |
| | | DRT2-OD04CL | 4 outputs, NPN ( – common) without detection functions | |
| | | DRT2-OD04CL-1 | 4 outputs, PNP ( + common) without detection functions | |
| |  | DRT2-ID08CL | 8 inputs, NPN ( + common) without detection functions | UC, CE |
| | | DRT2-ID08CL-1 | 8 inputs, PNP ( – common) without detection functions | |
| | | ÅDRT2-OD08CL | 8 outputs, NPN ( – common) without detection functions | |
| | | DRT2-OD08CL-1 | 8 outputs, PNP ( + common) without detection functions | |
| | | DRT2-HD16CL | 16 inputs, NPN ( + common) without detection functions | |
| | | DRT2-HD16CL-1 | 16 inputs, PNP ( – common) without detection functions | |
| | | DRT2-WD16CL | 16 outputs, NPN ( – common) without detection functions | |
| | | DRT2-WD16CL-1 | 16 outputs, PNP ( + common) without detection functions | |
| | | DRT2-MD16CL | 8 inputs/8 outputs, NPN (inputs: + common/outputs: – common) without detection function | |
| | | DRT2-MD16CL-1 | 8 inputs/8 outputs, PNP (inputs: – common/outputs: + common) without detection function | |
| e-con Connector Terminals |  | DRT2-ID16S | 16 inputs, NPN ( + common) | UC, CE |
| | | DRT2-ID16S-1 | 16 inputs, PNP ( – common) | |
| | | DRT2-MD16S | 8 inputs/8 outputs, NPN (inputs: + common/outputs:– common) | |
| | | DRT2-MD16S-1 | 8 inputs/8 outputs, PNP (inputs: – common/outputs: + common) | |
| Analog Input Terminals |  | DRT2-AD04 | 4 inputs (resolution: 6,000) | UC, CE |
| | | DRT2-AD04H | 4 inputs (resolution: 30,000) | |
| Analog Output Terminals | | DRT2-DA02 | 2 outputs | |
| Temperature Input Terminals with Thermocouple Inputs |  | DRT2-TS04T | 4 inputs | U, CE |
| Temperature Input Terminals with Resistance-thermometer Inputs | | DRT2-TS04P | 4 inputs | |

## ●Intelligent Slaves

| Product name | Shape | Model | Specifications | Approved standards |
|---|---|---|---|---|
| Modular Temperature Controllers |  | E5ZN-DRT | DeviceNet Communications Unit for E5ZN | --- |
| | | E5ZN-SCT24S | Terminal Unit | |
| | --- | E5ZN-SDL | Setting Display Unit | |
| Multi-function Compact Inverter |  | 3G3MV-PDRT2 | Communications Unit for 3G3MV Inverters | U, CE |
| High-function General-purpose Inverters |  | 3G3RV-PDRT2 | 3G3RV/3G3FV DeviceNet Communications Card | U, CE |

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2. Prices; Payment Terms. All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
3. Discounts. Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. Interest. Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. Orders. Omron will accept no order less than $200 net billing.
6. Governmental Approvals. Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. Taxes. All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. Financial. If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. Cancellation; Etc. Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. Force Majeure. Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. Shipping; Delivery. Unless otherwise expressly agreed in writing by Omron:
    a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
    b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
    c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
    d. Delivery and shipping dates are estimates only; and
    e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. Claims. Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. Warranties. (a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See http://oeweb.omron.com or contact your Omron representative for published information.
14. Limitation on Liability; Etc. OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
15. Indemnities. Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. Property; Confidentiality. Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. Export Controls. Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (iii) sale of products to "forbidden" or other proscribed persons; and (ii) disclosure to non-citizens of regulated technology or information.
18. Miscellaneous. (a) Waiver. No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) Assignment. Buyer may not assign its rights hereunder without Omron's written consent. (c) Law. These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) Amendment. These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) Severability. If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) Setoff. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) Definitions. As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

# Certain Precautions on Specifications and Use

1. Suitability of Use. Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
   (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
   (ii) Use in consumer products or any use in significant quantities.
   (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
   (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.
   NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. Programmable Products. Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. Performance Data. Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. Change in Specifications. Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. Errors and Omissions. Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

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# Terms and Conditions of Sale

1. Offer; Acceptance. These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
2. Prices; Payment Terms. All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
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8. Financial. If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. Cancellation; Etc. Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. Force Majeure. Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
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    e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
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15. Indemnities. Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. Property; Confidentiality. Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. Export Controls. Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (iii) sale of products to "forbidden" or other proscribed persons; and (ii) disclosure to non-citizens of regulated technology or information.
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   (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
   (ii) Use in consumer products or any use in significant quantities.
   (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
   (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.
   NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. Programmable Products. Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. Performance Data. Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. Change in Specifications. Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. Errors and Omissions. Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

**Note:** This datasheet is provided as a guideline for selecting products. Do not use this document to operate the Unit.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.


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