

# Smart DeviceNet Capabilities



**Optimize Uptime, Reduce Maintenance Surprises  
Without Touching the Control Programming**



# Delivering on the Promise of Open Device-Level Communication

Until now, diagnostics in field network devices have been limited to things like “device present” or “broken wire,” and access to this information required lengthy control program implementation. Omron’s DRT2 DeviceNet Smart Slaves give you powerful tools to diagnose network problems and establish preventive maintenance plans.

Omron Configuration Software provides the ability to constantly monitor and update this information without any control system programming at all. The combination of much greater information capability, plus parallel access to that information, removes the barriers to gaining maximum benefit from your investment in a DeviceNet installation. The promise of enhanced uptime and effective maintenance that prevents breakdowns is now possible and easily implemented.

## DeviceNet Benefits

- Open communication standard assures multi-vendor device interoperability
- Wide range of ODVA certified products to meet your DeviceNet system needs
- Fast, easy installation saves money in space and time
- Easily expandable, DeviceNet meets changing needs with simple network additions
- make on-the-fly configuration changes and additions without powering down to maintain productivity
- Omron is a dedicated developer of DeviceNet core technology and leading edge solutions
- DeviceNet configuration software provides simple drag-and-drop setup for ease of use



## DeviceNet and Omron

Omron is one of the founding members of the Open DeviceNet Vendors Association (ODVA), charged with setting and maintaining open standards and specifications for equipment from hundreds of manufacturers worldwide. Both Omron and ODVA actively promote DeviceNet as the best choice for device-level communications and continue to encourage the development of products that take advantage of the intelligent features built into the network. With ODVA's strong conformance testing policies, DeviceNet ensures the interchangeability and interoperability of control devices from participating manufacturers. These include everything from PLCs and remote I/O, fiber-optic sensors, vision systems controllers, servos and inverters, to process and temperature controllers.

## Put DeviceNet's Time Tracking to Work for You

Omron DRT2 Smart I/O Slaves can report maintenance timing to the user in two ways:

- Contact operation counter
- ON-Time monitor

It is simple to configure a preventive maintenance system. Set up a threshold for each I/O point depending on type of device: Sensor, Actuator, Solenoid, Motor Starter, Relay, etc.

If the number of operations, or ON-Time duration, exceeds the threshold, the terminal sends a message to the master mounted on the PLC or PC.

# Three Big Wishes Fulfilled

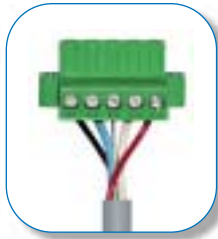
## 1. Shorten Installation Time

Reduce I/O wiring from thick bundles to just four wires going back to the control cabinet for each node. Free the communications of complex or limiting wiring and exchange data wirelessly throughout the manufacturing area. Omron's wide range of DeviceNet products can deliver a solution with significant installation cost savings built in. It adds up quickly:

- Less wiring
- Less labor to pull and tag and test wiring
- Reduced time to productivity



Standard wiring requires rigid conduit, hundreds of individual wire terminations and tags, and hours of testing.



DeviceNet cables transmit I/O status and more over just five wires, ending in error-proof, color-coded connectors.

## 2. Reduce Down Time Troubleshooting System Failures

Omron's Smart Slaves automatically collect data on communications system performance. You designate what data to collect and how to report it from easy-to-use DeviceNet Configurator Software. Typical errors detected include excessive electrical noise around a terminal block, low power level during transmission, and component performance degradation measured by excessive time to complete a cycle. To speed accurate response for replacement servicing, the Configurator Software allows detailed comments for each device connected to a DeviceNet terminal, including valuable information on installation location, manufacturer, part number and stockroom location.

### Failure recovery information

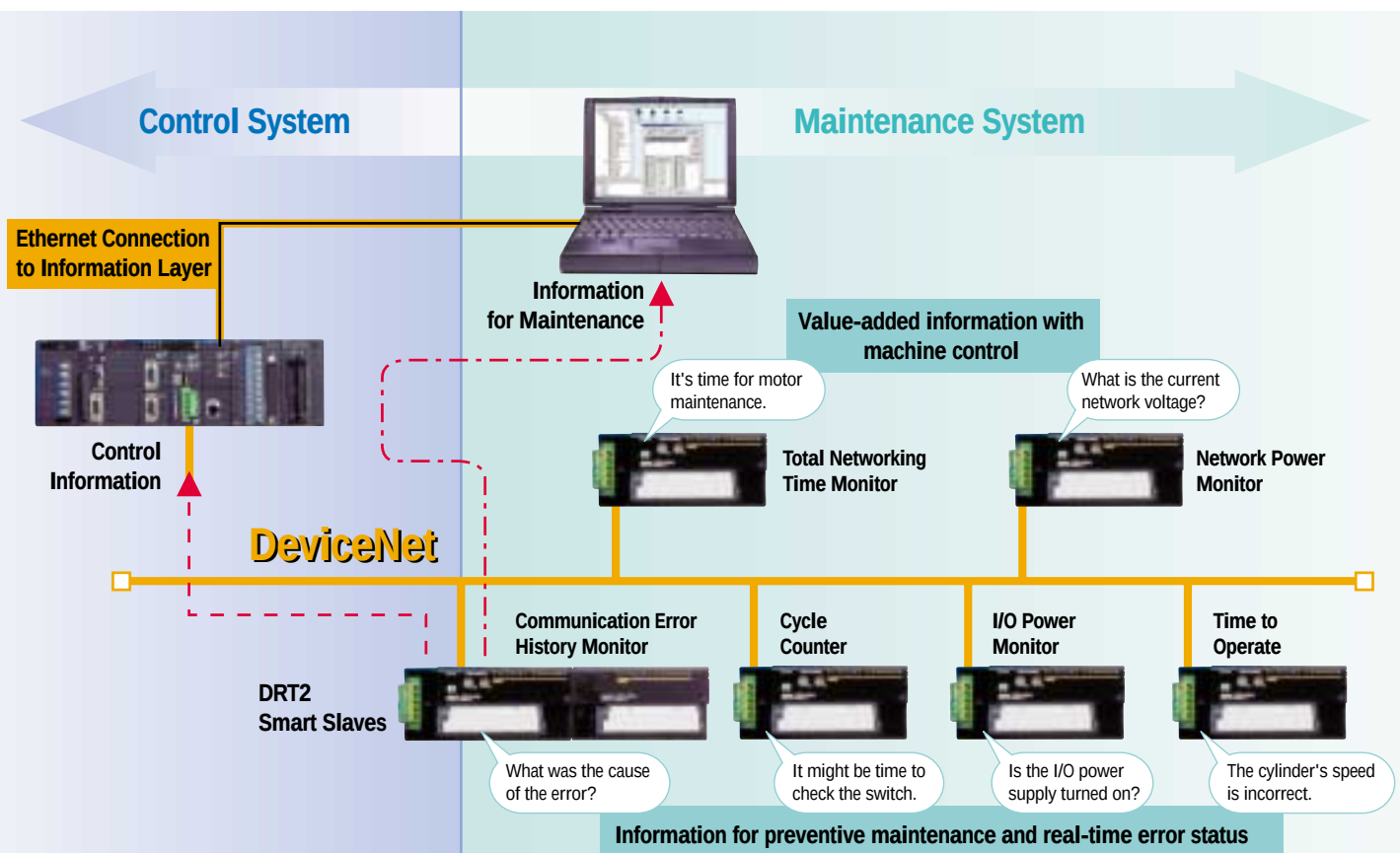
- Device description including location, manufacturer and part number
- I/O power monitor
- Communication error history monitor
- Sensor disconnected detection
- Short circuit detection

## 3. Implement a Preventive Maintenance System Without Touching the Control Programming

No one wants to rewrite validated control programming and risk slowing productivity or shutting down a line to test the impact of new data requests. Omron's Smart DeviceNet Terminals sidestep the control programming and handle DeviceNet diagnostic communications by using a combination of common data link area and separate bus access. You can implement a preventive maintenance system that runs parallel to production and provides feedback to that system without changes in control programming.

### Preventive maintenance

- Cycle counter
- Total working time monitor
- Network power monitor
- Conduction time monitor



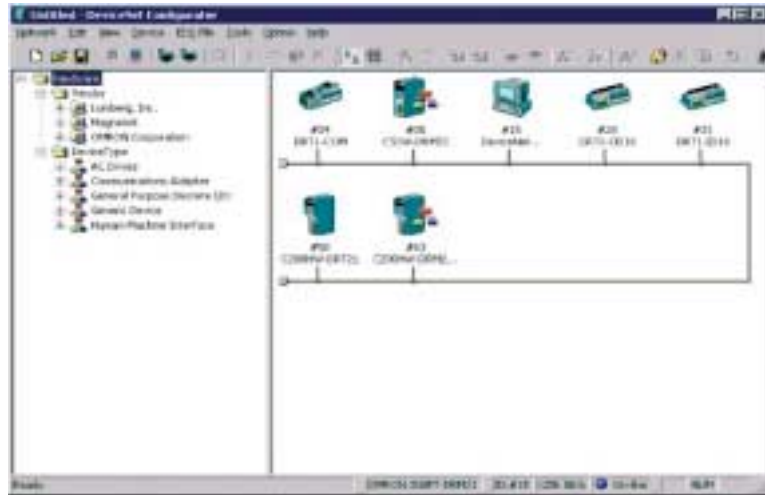
# Software Unlocks the Wealth of Data

Omron's DeviceNet Configurator Software unlocks the wealth of data automatically collected by DRT2 Smart I/O Terminals. Use it to shorten network setup and troubleshooting time, and optimize performance by setting I/O allocation. The software uses drag-and-drop commands as well as pull down menus, for a familiar and effective Windows® work environment.

The Configurator Software provides the ability to connect and monitor the factory floor network in two ways:

- Via Ethernet connection
- Through configuration hardware tools without need of any control programming or interruption

### Automatically registers network components from all manufacturers



## Optional user-set I/O allocation for DeviceNet slaves



## Shorten troubleshooting with extensive comments



Comments, stored in each node, can include program reference, machine location, manufacturer name and part number to identify failed parts and speed their replacement



# Smart I/O Terminals

## Collect Valuable Data

Omron's DRT2 Smart Slaves for DeviceNet lead the industry in capabilities for monitoring both I/O status and network communications status. They allow you to remotely monitor and diagnose such common problems as low network voltage, communications errors, and short circuits for connected devices.

DRT2 Smart Slaves provide enhanced I/O and network diagnostics. Common to all Smart Slaves are the following features:

### Network Status Monitoring

- **Communications power supply voltage monitoring** – a unique Omron feature – monitors and reports the communications voltage present at a slave
- **Communications error log** – a unique Omron network monitoring feature – records the last four communications errors by the individual slave

### I/O Status Monitoring

- **Slave comments** – add comments regarding each slave, including machine location and other valuable information that can speed diagnostics later
- **Connected device comment** – ability to define each connected device to the slave with location, manufacturer name, and part number to speed troubleshooting and replacement

### Digital I/O Smart Slave Features

- **High-speed operation time monitoring** – the time from an output turning on to sensing the completion of the operation
- **I/O power status monitoring** – short circuit detection and status of power supply to a sensor
- **Number of operations monitoring** – preventive maintenance tool that can alert maintenance to the number of times a device has been activated
- **Expansion bits** – provides for a single node to be able to attach a single expansion block of either inputs or outputs to the main block

### Analog Smart Slave Features

- **Scaling** – analog values can be converted inside the slave to the actual performance data such as flow volume
- **Analog value integral function** – allows sampling and scaling of process variable within the Smart Slave without need for programming this function
- **Comparator function** – allows user to set flags at peaks and valleys of measured variable



Transistor input and output terminals available with expansions (top left), IP67 rated I/O terminals with M12 connectors (lower left), and analog input and output terminals (right)

**Communication error log monitors network status**

**Connected device comments improves diagnostic response time**

**I/O power status monitor shows power problem at a glance**

**Scaling converts the range to useful engineering units**

**Monitor Device - General**

| No. | I/O Comment | On/Off | Machine   | Short-cir.  | Off-wire |
|-----|-------------|--------|-----------|-------------|----------|
| 00  | Sensor 00   | OFF    | 0 Seco... | No Short... | -----    |
| 01  | Sensor 01   | OFF    | 0 Seco... | No Short... | -----    |
| 02  | Sensor 02   | OFF    | 0 Seco... | No Short... | -----    |
| 03  | Sensor 03   | OFF    | 0 Seco... | Short-ci... | On-wire  |
| 04  | Sensor 04   | OFF    | 0 Seco... | No Short... | -----    |
| 05  | Sensor 05   | OFF    | 0 Seco... | No Short... | -----    |
| 06  | Sensor 06   | OFF    | 0 Seco... | No Short... | -----    |
| 07  | Sensor 07   | OFF    | 0 Seco... | No Short... | -----    |

**I/O Comment: Sensor07**

Last Measurement Date: 2002/01/02

Function Choice: ☒ Scaling ☐ Test/Status ☐ Compare ☐ Rate of Change

Range/Units Allocation: Scaling

| Parameter Name          | Value           |
|-------------------------|-----------------|
| 0000 Scaling Type       | Default Scaling |
| 0001 Scaling Point000   | 0               |
| 0002 Scaling Point10000 | 1000            |
| 0003 Scaling Offset     | 0               |

Help: This parameter is available only when both SC4.180 in Function Group Parameter and SC4.180 in Scaling

Default: 0000 Min: -20000 Max: 20000

Default Setting

# Freeing DeviceNet to go Wireless

## SPECIFICATIONS

### Wireless Master

- Up to 64 slaves per master
- Up to 3200 I/O per master
- 1600 In/1600 Out

### Transmission

- 60 m (197 ft) distance
- Up to 240 m (787 ft) — that's over 1/8 mile using relay stations
- Through concrete and drywall
- Supports explicit messaging — this allows communications to DeviceNet products that have additional information or that can be configured over the network.

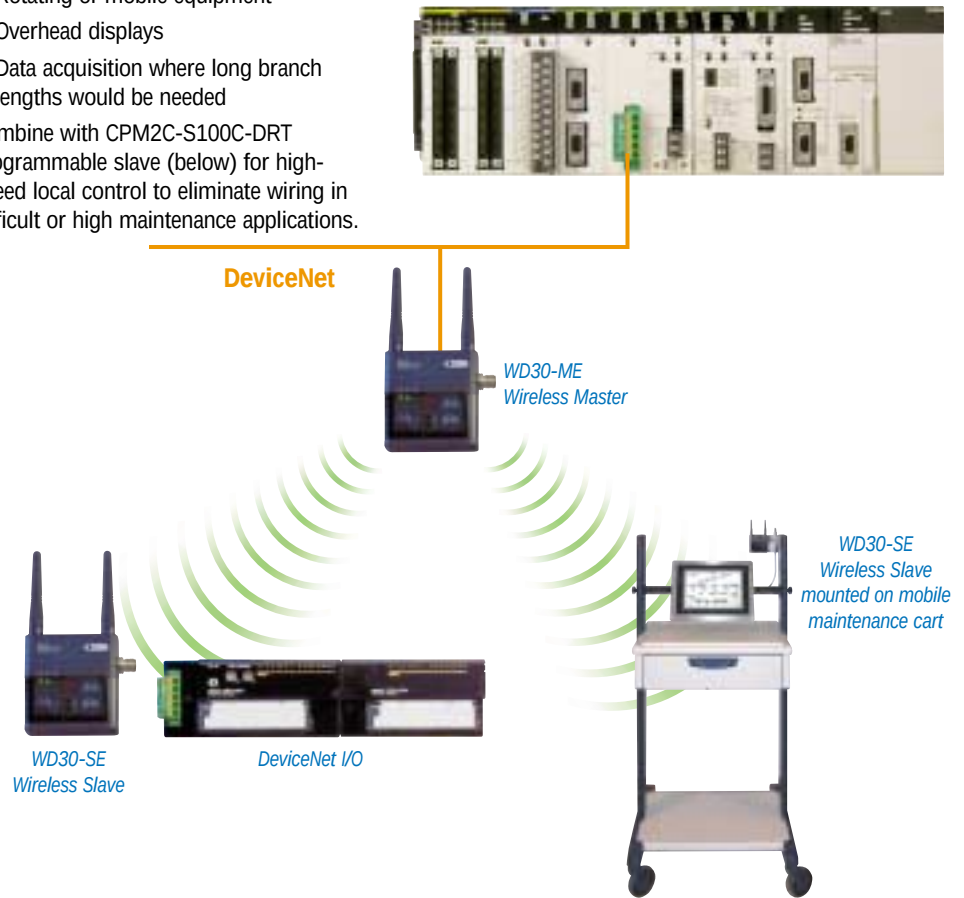
### Frequency

- 2.4 GHz
- 35-channel selection
- Spread spectrum for maximum security

## Typical Applications

- Rotating or mobile equipment
- Overhead displays
- Data acquisition where long branch lengths would be needed

Combine with CPM2C-S100C-DRT programmable slave (below) for high-speed local control to eliminate wiring in difficult or high maintenance applications.



## SPECIFICATIONS

### Capacity

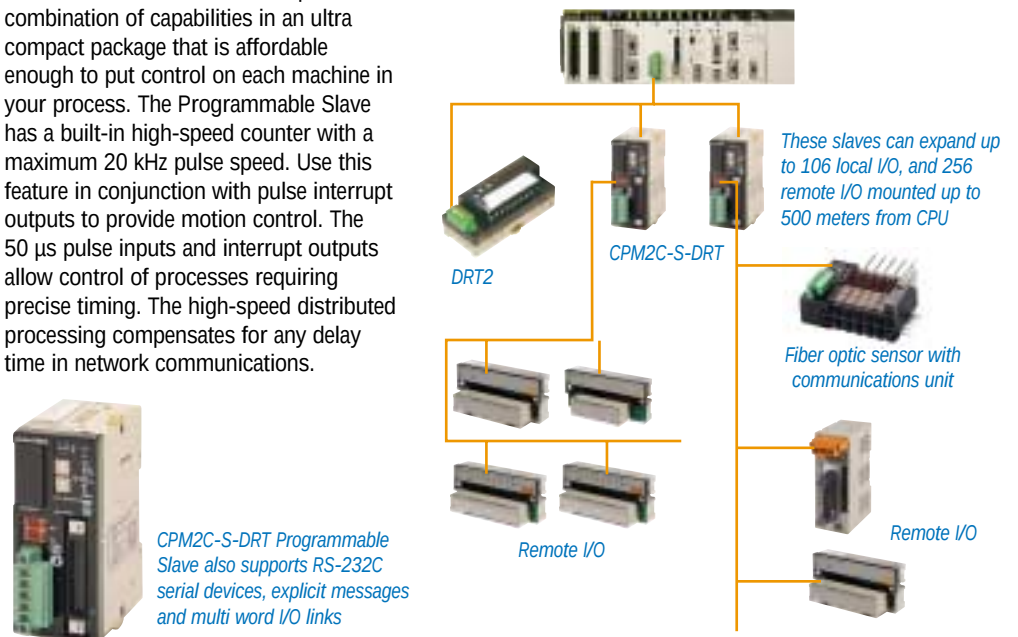
- 4 Inputs (24 VDC)/6 Outputs (transistor) on the CPU
- Up to 362 total I/O - 106 Local I/O with 3 expansion modules and up to 256 Remote I/O, mounted up to 500 meters from the CPU
- DeviceNet slave and CompoBus/S master built in
- Real-time clock function

### Performance

- Scan time of 2 ms with 500-step program
- Less than 1 ms update for 256 I/O
- 50  $\mu$ s pulse inputs and interrupt outputs
- Built-in high-speed counter with a maximum 20 kHz pulse speed
- DeviceNet "I/O Link" of 512 In/512 Out bits

## Programmable Slave

Omron's CPM2C-S offers a unique combination of capabilities in an ultra compact package that is affordable enough to put control on each machine in your process. The Programmable Slave has a built-in high-speed counter with a maximum 20 kHz pulse speed. Use this feature in conjunction with pulse interrupt outputs to provide motion control. The 50  $\mu$ s pulse inputs and interrupt outputs allow control of processes requiring precise timing. The high-speed distributed processing compensates for any delay time in network communications.



## High-Speed Local Control with a DeviceNet Link

# Wide Range of DeviceNet Products

## DeviceNet Masters



| Product                        | Specifications | Part No.        | Standards       |
|--------------------------------|----------------|-----------------|-----------------|
| Master for CJ1 series PLCs     | Micro size     | CJ1W-DRM21      | cULus, C1D2, CE |
| Master for CS1 series PLCs     | Medium rack    | CS1W-DRM21      | UL, CSA, CE     |
| Master for C200H Alpha PLCs    | Medium rack    | C200HW-DRM21-V1 | UL, CSA, CE     |
| Master for CVM1/CV series PLCs | Large rack     | CVM1-DRM21-V1   | UL, CSA, CE     |

## Programmable Slaves and I/O Link Modules



| Product                                                       | Specifications                                                                                      | Part No.        | Standards    |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------|--------------|
| CPM2C PLC with built-in DeviceNet slave and CompoBus/S master | Controller with 6 inputs, 4 NPN outputs up to 362 total I/O with local and remote expansion         | CPM2C-S100C-DRT | UL, CSA, CE  |
|                                                               | Controller with 6 inputs, 4 PNP outputs up to 362 total I/O with local and remote expansion         | CPM2C-S110C-DRT | UL, CSA, CE  |
| I/O Link Modules for shared data area                         | 512 internal inputs/512 internal output between CS1 Series or C200H Alpha PLCs and DeviceNet master | C200HW-DRT21    | UL, CSA, CE  |
|                                                               | 16 internal inputs/16 internal outputs between CQM1H and DeviceNet master                           | CQM1-DRT21      | UL, CSA, CE  |
|                                                               | 32 internal inputs/32 internal outputs between CPM1A or CPM2A and DeviceNet master                  | CPM1A-DRT21     | cUL, CSA, CE |

## DeviceNet System Selection Notes:

### Determine the type of wiring preference for the installation

- “Open” style or “Quick Disconnect” (usually IP67)

### Make sure you have a way to connect each node to the network

- Nodes can be “Daisy chained” from one branch tap in the “Open” style

### Every network must have two terminating resistors

- T-Branch Taps have terminating resistors included

Consult Operation Manual W347 at our website for complete system wiring details

## Wireless DeviceNet



| Product                                                                    | Specifications           | Part No.            | Standards  |
|----------------------------------------------------------------------------|--------------------------|---------------------|------------|
| Wireless master and slave modules, built-in pencil antennas                | 1600 inputs/1600 outputs | Master<br>WD30-ME   | cULus, FCC |
|                                                                            |                          | Slave<br>WD30-SE    | cULus, FCC |
| Wireless master and slave modules, remote antennas antennas on 6 ft cables | 1600 inputs/1600 outputs | Master<br>WD30-ME01 | cULus, FCC |
|                                                                            |                          | Slave<br>WD30-SE01  | cULus, FCC |
| Remote antenna replacements                                                | For WD30-ME01/SE01       | Pair<br>WD30-ATT01  | cULus, FCC |

## Configurator Software



| Product                                                                     | Specifications            | Part No.      | Standards |
|-----------------------------------------------------------------------------|---------------------------|---------------|-----------|
| DeviceNet Configurator software only (for use with CJ1/CS1 masters)         | CD-ROM                    | WS02-CFDC1-E  | —         |
| DeviceNet Configurator for other masters from Omron and other manufacturers | ISA board with software   | 3G8F5-DRM21-E | —         |
|                                                                             | PCMCIA card with software | 3G8E2-DRM21-E | —         |

## Smart DeviceNet I/O Terminals

### Basic Units



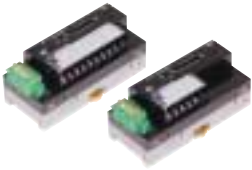
| Product                                                                                                 | Specifications |     | Part No.    | Standards |
|---------------------------------------------------------------------------------------------------------|----------------|-----|-------------|-----------|
| Smart I/O basic units automatically collect network status and connected device performance information | 16 inputs      | NPN | DRT2-ID16   | cULus, CE |
|                                                                                                         | 16 inputs      | PNP | DRT2-ID16-1 | cULus, CE |
|                                                                                                         | 16 outputs     | NPN | DRT2-OD16   | cULus, CE |
|                                                                                                         | 16 outputs     | PNP | DRT2-OD16-1 | cULus, CE |

### Expansion Units



| Product                                                                                      | Specifications |     | Part No.   | Standards |
|----------------------------------------------------------------------------------------------|----------------|-----|------------|-----------|
| Smart expansion I/O units provide mix and match flexibility in distributed I/O configuration | 8 inputs       | NPN | XWT-ID08   | cULus, CE |
|                                                                                              | 8 inputs       | PNP | XWT-ID08-1 | cULus, CE |
|                                                                                              | 8 outputs      | NPN | XWT-OD08   | cULus, CE |
|                                                                                              | 8 outputs      | PNP | XWT-OD08-1 | cULus, CE |
|                                                                                              | 16 inputs      | NPN | XWT-ID16   | cULus, CE |
|                                                                                              | 16 inputs      | PNP | XWT-ID16-1 | cULus, CE |
|                                                                                              | 16 outputs     | NPN | XWT-OD16   | cULus, CE |
|                                                                                              | 16 outputs     | PNP | XWT-OD16-1 | cULus, CE |

### Analog I/O Terminal



| Product                | Specifications                                                                |                                                             | Part No.  | Standards           |
|------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------|-----------|---------------------|
| Analog input terminal  | 4 inputs (0 to 5 V, 1 to 5 V, 0 to 10 V, $\pm 10$ V, 0 to 20 mA, 4 to 20 mA)  | Resolution: 12 bit; 1/6,000; 4 ms max./4 pt conversion time | DRT2-AD04 | cULus, CE, CL1 Div2 |
| Analog output terminal | 2 outputs (0 to 5 V, 1 to 5 V, 0 to 10 V, $\pm 10$ V, 0 to 20 mA, 4 to 20 mA) | Resolution: 12 bit; 6,000; 2 ms/pt conversion time          | DRT2-DA02 | cULus, CE, CL1 Div2 |

### IP67 Rated Transistor I/O Terminals with M12 Connectors



| Product                                             | Specifications |     | Part No.     | Standards |
|-----------------------------------------------------|----------------|-----|--------------|-----------|
| Terminals with IP67-rated water-washdown resistance | 16 inputs      | NPN | DRT2-HD16C   | cULus, CE |
|                                                     | 16 inputs      | PNP | DRT2-HD16C-1 | cULus, CE |
|                                                     | 8 inputs       | NPN | DRT2-ID08C   | cULus, CE |
|                                                     | 8 inputs       | PNP | DRT2-ID08C-1 | cULus, CE |
|                                                     | 8 outputs      | NPN | DRT2-OD08C   | cULus, CE |
|                                                     | 8 outputs      | PNP | DRT2-OD08C-1 | cULus, CE |

## Peripheral Products

### Thin Cables, Micro-size Connector Type



| Product            | Specifications                                                | Part No.      | Standards |
|--------------------|---------------------------------------------------------------|---------------|-----------|
| M12 connector type | Shielded connectors at both ends                              | DCA1-5CN□□W1* | —         |
|                    | Shielded connector (female socket) at one end                 | DCA1-5CN□□F1* | —         |
|                    | Shielded connector (male plug) at one end                     | DCA1-5CN□□H1* | —         |
|                    | Shielded connectors at both ends                              | DCA1-5CN□□W5* | —         |
|                    | M12 micro-size plug (male) and M12 micro-size socket (female) |               |           |
|                    | Shielded T-branch connector (one branch line)                 | DCN2-1        | —         |

### Thick Cables, Mini-size Connector Type



| Product             | Specifications                                    | Part No.      | Standards |
|---------------------|---------------------------------------------------|---------------|-----------|
| M18 size connectors | Shielded connectors at both ends (socket, plug)   | DCA2-5CN□□W1* | —         |
|                     | Shielded connector (female socket) at one end     | DCA2-5CN□□F1* | —         |
|                     | Shielded connector (male plug) at one end         | DCA1-5CN□□H1* | —         |
|                     | Shielded T-branch connector (one branch line M18) | DCN3-11       | —         |
|                     | Shielded T-branch connector (one branch line M12) | DCN3-12       | —         |

\*To complete DeviceNet cable part number, replace □□ using the following code:

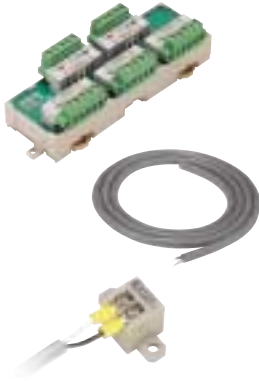
C5 = .5 meter / 01 = 1 meter / 02 = 2 meters / 03 = 3 meters / 04 = 4 meters / 05 = 5 meters / 10 = 10 meters





## Connectors with Terminating Resistance

| Product                                               | Specifications | Part No. | Standards |
|-------------------------------------------------------|----------------|----------|-----------|
| M8 (Micro-size) connector with terminating resistance | Male plug      | DRS2-1   | —         |
|                                                       | Female socket  | DRS2-2   | —         |
| M12 (Mini-size) connector with terminating resistance | Male plug      | DRS3-1   | —         |



## Bulk Cables, Branch Taps with Connectors

| Product                 | Specifications                                                                   | Part No.       | Standards |
|-------------------------|----------------------------------------------------------------------------------|----------------|-----------|
| T-branch Tap            | T-branch tap for 1 branch line with 3 connectors, standard terminating resistor  | DCN1-1C        | —         |
|                         | T-branch tap for 3 branch lines with 5 connectors, standard terminating resistor | DCN1-3C        | —         |
| DeviceNet Bulk Cable    | Thin cable, outer diameter: 7.0 mm, length: 100 m                                | DCA1-5C10      | —         |
|                         | Thick cable, outer diameter: 11.6 mm, length: 100 m                              | DCA2-5C10      | —         |
| Connector               |                                                                                  | XW4B-05C1-H1-D | —         |
| Terminal-block Terminal | Resistance of 121 $\Omega$                                                       | DRS1-T         | —         |

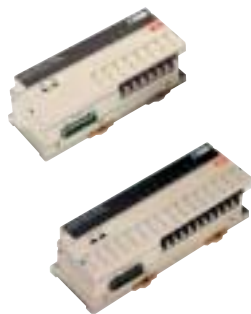
## Single Node I/O Terminals

### High Density Transistor Modules



| Product                       | Specifications | Part No.      | Standards    |
|-------------------------------|----------------|---------------|--------------|
| Digital input, 32 points      | NPN (+common)  | DRT1-ID32ML   | cRU, CE, CSA |
|                               | PNP (-common)  | DRT1-ID32ML-1 | cRU, CE, CSA |
| Digital mixed I/O, 16IN/16OUT | NPN (+common)  | DRT1-MD32ML   | cRU, CE, CSA |
|                               | PNP (-common)  | DRT1-MD32ML-1 | cRU, CE, CSA |
| Digital output, 32 points     | NPN (+common)  | DRT1-OD32ML   | cRU, CE, CSA |
|                               | PNP (-common)  | DRT1-OD32ML-1 | cRU, CE, CSA |

### Compact Transistor Models



| Product                   | Specifications | Part No.    | Standards   |
|---------------------------|----------------|-------------|-------------|
| Digital input, 8 points   | NPN (+common)  | DRT1-ID08   | UL, CSA, CE |
|                           | PNP (-common)  | DRT1-ID08-1 | UL, CSA, CE |
| Digital output, 8 points  | NPN (-common)  | DRT1-OD08   | UL, CSA, CE |
|                           | PNP (+common)  | DRT1-OD08-1 | UL, CSA, CE |
| Digital input, 16 points  | NPN (+common)  | DRT1-ID16   | UL, CSA, CE |
|                           | PNP (-common)  | DRT1-ID16-1 | UL, CSA, CE |
| Digital output, 16 points | NPN (-common)  | DRT1-OD16   | UL, CSA, CE |
|                           | PNP (+common)  | DRT1-OD16-1 | UL, CSA, CE |

### Remote Adapter for Relay I/O Terminal Blocks



| Product                   | Specifications | Part No.            | Standards    |
|---------------------------|----------------|---------------------|--------------|
| Digital input, 16 points  | NPN (+common)  | DRT1-ID16X (Note 1) | cRU, CE, CSA |
|                           | PNP (-common)  | DRT1-ID16X-1        | cRU, CE, CSA |
| Digital output, 16 points | NPN (-common)  | DRT1-OD16X (Note 2) | cRU, CE, CSA |
|                           | PNP (+common)  | DRT1-OD16X-1        | cRU, CE, CSA |

Note:

1. Use this input terminal with Relay I/O Terminals G7TC-ID16-5 and G7TC-IA16-5.
2. Use this output terminal with Relay I/O Terminals G70D-SOC16, G70D-FOM16, G7TC-OC16, G7TC-OC08, and G70A-ZOC16-3.

## Single Node I/O Terminals (continued)

### Sensor Module



| Product                  | Specifications |                 | Part No.   | Standards   |
|--------------------------|----------------|-----------------|------------|-------------|
| Digital input, 16 points | NPN (+common)  | Screw terminals | DRT1-HD16S | UL, CSA, CE |
| Digital I/O, 8 IN/8 OUT  |                |                 | DRT1-ND16S | UL, CSA, CE |

### IP67 Rated Transistor I/O Terminals with M12 Connectors



| Product                                             | Specifications |     | Part No.      | Standards |
|-----------------------------------------------------|----------------|-----|---------------|-----------|
| Terminals with IP67-rated water and dust resistance | 4 inputs       | NPN | DRT1-ID04CL 4 | CE, cULus |
|                                                     | 4 inputs       | PNP | DRT1-ID04CL-1 | CE, cULus |
|                                                     | 8 inputs       | NPN | DRT1-ID08CL   | CE, cULus |
|                                                     | 8 inputs       | PNP | DRT1-ID08CL-1 | CE, cULus |
|                                                     | 4 outputs      | NPN | DRT1-OD04CL 4 | CE, cULus |
|                                                     | 4 outputs      | PNP | DRT1-OD04CL-1 | CE, cULus |
|                                                     | 8 outputs      | NPN | DRT1-OD08CL   | CE, cULus |
|                                                     | 8 outputs      | PNP | DRT1-OD08CL-1 | CE, cULus |

### Analog I/O Terminals



| Product                                                  | Specifications                                                               |                                                      | Part No.   | Standards   |
|----------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------|------------|-------------|
| Analog input terminal, high conversion speed             | 4 inputs (0 to 5 V, 1 to 5 V, 0 to 10 V, $\pm 10$ V, 0 to 20 mA, 4 to 20 mA) | Resolution: 12 bit; 1/6,000; 2 ms/pt conversion      | DRT1-AD04  | UL, CSA, CE |
| Analog input terminal, inputs insulated from one another | 4 inputs (0 to 5 V, 1 to 5 V, 0 to 10 V, 0 to 20 mA, 4 to 20 mA)             | Resolution: 15 bit; 1/30,000; 250 ms/4 pt conversion | DRT1-AD04H | UL, CSA, CE |
| Analog output terminal                                   | 2 outputs (1 to 5 V, 0 to 10 V, $\pm 10$ V, 0 to 20 mA, 4 to 20 mA)          | Resolution: 12 bit; 1/6,000; 2 ms/pt conversion      | DRT1-DA02  | UL, CSA, CE |

### Temperature Input Terminal



| Product                     | Specifications                                                              |                                                                                                             | Part No.   | Standards   |
|-----------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------|-------------|
| Thermocouple input terminal | 4 inputs<br>Types R, S, K1, K2, J1, J2, T, E, B, N, L1, L2, U, W, and PLII) | Accuracy: $\pm 0.5\%$ of indication value of $\pm 2^\circ\text{C}$ , whichever is larger $\pm 1$ digit max. | DRT1-TS04T | UL, CSA, CE |
| Platinum RTD input terminal | 4 inputs<br>(Pt100, JPt100)                                                 | Accuracy: $\pm 0.5\%$ of indication value of $\pm 1^\circ\text{C}$ , whichever is larger $\pm 1$ digit max. | DRT1-TS04P | UL, CSA, CE |

### RS-232C-to-DeviceNet Terminal



| Product                                                                | Specifications                                                                         |                      | Part No.   | Standards   |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------|------------|-------------|
| Exchange data with RS-232C compatible peripheral devices via DeviceNet | Two RS-232C ports; one input word as status area; uses explicit message communications | 1024 bytes x 2 ports | DRT1-232C2 | UL, CSA, CE |

## Multiple I/O Terminals (many terminals counted as one node)



| Product                      | Specifications                                      |                           | Part No.                                | Standards    |           |
|------------------------------|-----------------------------------------------------|---------------------------|-----------------------------------------|--------------|-----------|
| Communications module        | Connects up to 8 modules to DeviceNet as 1 node     |                           | DRT1-COM                                | UL, CSA, CE  |           |
| Digital I/O, terminal block  | 16 inputs, NPN transistor                           | M3 terminal board         | GT1-ID16                                | UL, CSA, CE  |           |
|                              | 16 inputs PNP transistor                            |                           | GT1-ID16-1                              | UL, CSA, CE  |           |
|                              | 16 outputs, NPN transistor                          |                           | GT1-OD16                                | UL, CSA, CE  |           |
|                              | 16 outputs, PNP transistor                          |                           | GT1-OD16-1                              | UL, CSA, CE  |           |
| Digital I/O, connector model | 16 inputs, NPN transistor                           | Molex connector           | GT1-ID16MX                              | UL, CSA, CE  |           |
|                              | 16 inputs, PNP transistor                           |                           | GT1-ID16MX-1                            | UL, CSA, CE  |           |
|                              | 16 outputs, NPN transistor                          |                           | GT1-OD16MX                              | UL, CSA, CE  |           |
|                              | 16 outputs, PNP transistor                          |                           | GT1-OD16MX-1                            | UL, CSA, CE  |           |
|                              | 10 cables with female Molex connectors, 1 m length  |                           | GCN1-MX010A                             | —            |           |
|                              | 10 cables with female Molex connectors, .5 m length |                           | GCN1-MX004A                             | —            |           |
|                              | 16 inputs, NPN transistor                           | Fujitsu connector         | GT1-ID16ML                              | UL, CSA, CE  |           |
|                              | 16 inputs, PNP transistor                           |                           | GT1-ID16ML-1                            | UL, CSA, CE  |           |
|                              | 16 outputs, NPN transistor                          |                           | GT1-OD16ML                              | UL, CSA, CE  |           |
|                              | 16 outputs, PNP transistor                          |                           | GT1-OD16ML-1                            | UL, CSA, CE  |           |
|                              | 16 inputs, NPN transistor                           | D-sub 25-pin connector    | GT1-ID16DS                              | UL, CSA, CE  |           |
|                              | 16 inputs, PNP transistor                           |                           | GT1-ID16DS-1                            | UL, CSA, CE  |           |
|                              | 16 outputs, NPN transistor                          |                           | GT1-OD16DS                              | UL, CSA, CE  |           |
|                              | 16 outputs, PNP transistor                          |                           | GT1-OD16DS-1                            | UL, CSA, CE  |           |
|                              | High-density digital I/O                            | 32 inputs, NPN transistor | Fujitsu connector for flat ribbon cable | GT1-ID32ML   | cRUus, CE |
|                              |                                                     | 32 inputs, PNP transistor |                                         | GT1-ID32ML-1 | cRUus, CE |
| 32 outputs, NPN transistor   |                                                     | GT1-OD32ML                |                                         | cRUus, CE    |           |
| 32 outputs, PNP transistor   |                                                     | GT1-OD32ML-1              |                                         | cRUus, CE    |           |

## Analog I/O Terminal



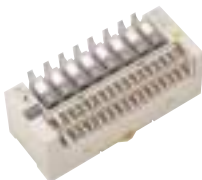
| Product                           | Specifications                                                                                                             |                 | Part No.   | Standards   |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------|------------|-------------|
| Analog input terminal, 8 inputs   | Ranges: 0 to 5 V, 1 to 5 V, 0 to 10 V, ±10 V, 0 to 20 mA, 4 to 20 mA; Resolution: 12 bit; 1/6,000; 1 ms/pt conversion time | Molex connector | GT1-AD08MX | UL, CSA, CE |
| Analog input terminal, 4 inputs   |                                                                                                                            | Terminal block  | GT1-AD04   | UL, CSA, CE |
| Analog output terminal, 4 outputs | Ranges: 0 to 5 V, 1 to 5 V, 0 to 10 V, ±10 V; Resolution: 12 bit; 1/6,000; 1 ms/pt conversion time                         | Molex connector | GT1-DA04MX | UL, CSA, CE |
|                                   | Ranges: 0 to 5 V, 1 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA; Resolution: 12 bit; 1/6,000; 1 ms/pt conversion time             | Terminal block  | GT1-DA04   | UL, CSA, CE |

## High-Speed Pulse Counter Module



| Product                                                      | Specifications                                                                                                                |                         | Part No. | Standards   |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|-------------|
| High-speed pulse counter with 1x or 4x multiplication factor | 50 kHz counting speed; Differential phase pulse input or pulse and direction input from an incremental open collector encoder | Two, NPN, 0.5 A outputs | GT1-CT01 | UL, CSA, CE |

## Relay Output Modules



| Product                                        | Specifications                               | Part No.  | Standards   |
|------------------------------------------------|----------------------------------------------|-----------|-------------|
| Output modules with plug-in replaceable relays | 16 pts, 5 A at 24 VDC each (SPST-NO) G6D-1A  | GT1-ROS16 | UL, CSA, CE |
|                                                | 8 pts, 2 A at 24 VDC each (SPST-NO) G2R-1-SN | GT1-ROP08 | UL, CSA, CE |



F150-C10E-2-DRT



E3X-DRT21



E5EK-AA2-DRT



E5ZN-DRT DC24



V600-HAM42-DRT



3G3MV-PDRT1-SINV1

## DeviceNet Enhanced Products

| Product                                                                       | Specifications                                                                                                                                                                                                              |                   | Part No.          | Standards   |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------|
| Vision sensors                                                                | Single camera system                                                                                                                                                                                                        |                   | F150-C10E-2-DRT   | CE          |
|                                                                               | Two-camera system                                                                                                                                                                                                           |                   | F150-C10E-3-DRT   | CE          |
| Operator interface terminal adapter for NT31/NT631 touch screens              | Combined with CS1 slave, up to 15 terminals/network; with CJ1 slave, up to 41 terminals/network                                                                                                                             |                   | NT-DRT21          | CE, cULus   |
| Communications module for fiber-optic sensor block                            | Up to 16 E3X-DA-N amplifiers form a wire-saving sensor input slave block                                                                                                                                                    |                   | E3X-DRT21         | cRUus       |
| Temperature/process controllers, single loop, 1/8 DIN                         | Controller with LED display; requires plug-in control output modules; to use heater burnout alarm, order a current transformer                                                                                              |                   | E5EK-AA2-DRT      | RU, CSA, CE |
| Multi-zone temperature controller, 8 loops, optional display unit             | Heating mode, voltage output, heater open circuit                                                                                                                                                                           | Thermo-couple     | E5ZE-8AQHD1TCB-V2 | CE          |
|                                                                               |                                                                                                                                                                                                                             | RTD               | E5ZE-8AQHD1PB-V2  | CE          |
|                                                                               | Heating mode, voltage output                                                                                                                                                                                                | Thermocouple      | E5ZE-8AQAD1TCB-V2 | CE          |
|                                                                               |                                                                                                                                                                                                                             | RTD               | E5ZE-8AQAD1PB-V2  | CE          |
|                                                                               | Heating mode, current output                                                                                                                                                                                                | Thermocouple      | E5ZE-8ACAD1TCB-V2 | CE          |
|                                                                               |                                                                                                                                                                                                                             | RTD               | E5ZE-8ACAD1PB-V2  | CE          |
|                                                                               | Heat/cool mode,voltage output, heater open circuit                                                                                                                                                                          | Thermo-couple     | E5ZE-8VQHD1TCB-V2 | CE          |
|                                                                               |                                                                                                                                                                                                                             | RTD               | E5ZE-8VQHD1PB-V2  | CE          |
| Heat/cool mode, voltage output                                                | Thermocouple                                                                                                                                                                                                                | E5ZE-8VQAD1TCB-V2 | CE                |             |
|                                                                               | RTD                                                                                                                                                                                                                         | E5ZE-8VQAD1PB-V2  | CE                |             |
| Heat/cool mode, current output                                                | Thermocouple                                                                                                                                                                                                                | E5ZE-8VCAD1TCB-V2 | CE                |             |
|                                                                               | RTD                                                                                                                                                                                                                         | E5ZE-8VCAD1PB-V2  | CE                |             |
| Communications module for multi-loop (2 to 32) plug-in temperature controller | Set parameters and monitor status via DeviceNet for all loops                                                                                                                                                               |                   | E5ZN-DRT DC24     | cRUus, CE   |
| Intelligent flag ID system                                                    | Set addresses and monitor work-in-process based on unique ID via DeviceNet; reads 24 bits of data max.; writes 16 bits of data max.                                                                                         |                   | V600-HAM42-DRT    | cRUus, CE   |
|                                                                               | M12 threaded sensing head                                                                                                                                                                                                   |                   | V600-HS51         | —           |
|                                                                               | 30.5 x 18 x 10 mm head                                                                                                                                                                                                      |                   | V600-HS61         | —           |
|                                                                               | 53 x 50 x 23 mm head                                                                                                                                                                                                        |                   | V600-HS63         | —           |
|                                                                               | 100 x 100 x 30 mm head                                                                                                                                                                                                      |                   | V600-HS67         | —           |
| AC inverter, MV-series adapter                                                | Monitor Run/Stop and operating conditions and make changes in set values from a PLC via DeviceNet using this adapter for all 3G3MV inverters                                                                                |                   | 3G3MV-PDRT1-SINV1 | UL, CSA, CE |
| AC inverter, G5-series adapter                                                | Monitor Run/Stop and operating conditions and make changes in set values from a PLC via DeviceNet using this adapter for all G5 inverters                                                                                   |                   | SI-N1             | cRUus       |
| Servo drive, W-series adapter                                                 | Communicate positioning commands, drive parameters, positioning data, motor characteristics etc., between the W-Series servo and a DeviceNet master. Commands received via DeviceNet are output to the W-Series Servo Drive |                   | R88A-NCW152-DRT   | cULus, CE   |

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