

OMRON TYPE DST1-ID12SL-1 TYPE DST1-MRD08SL-1 TYPE DST1-MD16SL-1 TYPE DST1-XD0808SL-1 Safety I/O Terminal

English INSTRUCTION MANUAL

Thank you for purchasing this OMRON product. This manual primarily describes precautions required in installing and operating the product.

- Only qualified person trained in professional electrical technique should be handle the DST1.
Before operating the DST1, read this manual through to acquire sufficient knowledge of the DST1.
To ensure safe and correct use of the DST1, also read the following manuals:
DeviceNet Safety DST1 Series Safety I/O Terminal OPERATION MANUAL (Cat.No.Z904)
DeviceNet Safety SYSTEM CONFIGURATION MANUAL (Cat.No.Z905)
DeviceNet OPERATION MANUAL (Cat.No.W267)
Keep this manual for future reference.
Make sure that information written in this document are delivered to the final user of the product.

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Instructions in the official EU languages and a signed EU Declaration of Conformity in English are available on our website at http://www.ia.omron.com/support/models/.

EU Declaration of Conformity

OMRON declares that DST1 Series is in conformity with the requirements of the following EU Directives: EMC Directive:2014/30/EU Machinery Directive:2006/42/EC

Standards

Table listing standards: EN ISO13849-1:2015 Cat.4 PL e, EN ISO13849-2, IEC 62061, IEC62061 SIL3, IEC61508 parts 1-7 SIL3, EN61131-2, EN60204-1, UL508, ANSI/ISA 12.12.01, EN ISO13849-2, IEC 61326-3-1, EN ISO13850, NFPA 79, ANSI RIA 15.06, ANSI B11.19, CSA C22.2 No.142, No.213, ANSI/UL1998

WARNING Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

- Meaning of Alert Symbols: The following alert symbols are used in this manual.
Indicates prohibited actions
Indicates mandatory actions

Alert Statements

Table with 2 columns: Alert Symbol (Warning, Prohibited, Mandatory) and Alert Statement (Serious injury may possibly occur due to loss of required safety functions. Do not use test outputs of the DST1 as any safety outputs. Serious injury may possibly occur due to loss of required safety functions. Do not use DeviceNet standard I/O data or Explicit message data as any safety data. Serious injury may possibly occur due to loss of required safety functions. Do not use LEDs on the DST1 for safety operations. Serious injury may possibly occur due to breakdown of outputs. Do not connect loads beyond the rated value to the safety outputs and the test outputs. Serious injury may possibly occur due to loss of required safety functions. Wire the DST1 properly so that 24VDC line do NOT touch the outputs accidentally or unintentionally. Serious injury may possibly occur due to loss of required safety functions. Ground the 0V line of the power supply for external output devices so that the devices do Not turn ON when the safety output line or the test output line is grounded. For Model DST1-MRD08SL-1, Apply only one AC line phase to the relays. For Model DST1-MRD08SL-1, Insert a fuse rated at 3.15A or less for each output terminal to protect safety output contacts from welding. Confirm the fuse selection with fuse manufacturer to ensure the dependability of the characteristics of the connected load. Serious injury may possibly occur due to loss of required safety functions. Use appropriate components or devices according to the requirements given in the following table.

Table with 2 columns: Controlling Devices and Requirements. Rows include Emergency stop switch, Door interlocking switch, Limit switch, Safety sensor, Relay with forcibly guided contacts, Contactor, Other devices.

Precautions for Safe Use

- Handle with care: Do not drop the DST1 to the ground or excessive vibration or mechanical shocks. The DST1 may be damaged and may not function properly.
Installation and storage environment: Do not use or store the DST1 in any of the following locations.
Locations subject to direct sunlight.
Locations subject to temperatures or humidity outside the range specified in the specifications.
Locations subject to condensation as the result of severe changes in temperature.
Locations subject to corrosive or flammable gases.
Locations subject to dust (especially iron dust) or salts.
Locations subject to water, oil, or chemicals.
Locations subject to shock or vibration.
Take appropriate and sufficient countermeasures when installing systems in the following locations. Inappropriate and insufficient measures may result in malfunction.
Locations subject to static electricity or other forms of noise.
Locations subject to strong electromagnetic fields.
Locations subject to possible exposure to radioactivity.
Locations close to power supplies.

- Installation/ Mounting: Use the DST1 within an enclosure with IP54 protection or higher of IEC/EN 60529. Use DIN rail (TH35-7.5 according to IEC60715) for placing the DST1 into the control board. Mount the DST1 to DIN rails with attachments (TYPE PFP-M, not incorporated to this product), not to drop out of rails by vibration etc. Spacing should be available around the DST1 at least 50mm from its top and bottom surfaces for ventilation and wiring. This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

- Installation/ Wiring: Use the following to wire external I/O devices to the DST1.
Solid wire: 0.2 to 2.5mm² AWG24 to 12
Standard (Flexible) wire: 0.34 to 1.5mm² AWG22 to 16
Disconnect the DST1 from power supply when wiring. Devices connected to DST1 may operate unexpectedly.
Apply the specified voltage and current to the DST1 inputs. Applying a non-specified DC voltage or an AC voltage, or supplying a current that exceeds the I/O power current value to the I/O power input, will cause the DST1 to fail.
Be sure to separate the communication cable and the I/O cable from the high-voltage/current lines.
Be cautious not to have your fingers caught when attaching connectors to the plugs on the DST1.
Mount screw of DeviceNet Connector and I/O Connector correctly. (0.25-0.3N*m)
Incorrect wiring may lead to loss of safety function. Wire conductors correctly and verify the operation of the DST1 before commissioning the system in which DST1 is incorporated.
After wiring is completed, be sure to remove label for wire clipping prevention on the DST1 to enable heat to escape for proper cooling.

- Power Supply Selection: Use DC power supply satisfying requirements below.
Secondary circuits of DC power supply is isolated from its primary circuit by double insulations or reinforced insulations.
DC power supply satisfies the requirement for class 2 circuits or limited voltage/current circuit stated in UL 508.
20ms or over of the output hold time.
DC power supply that satisfies the requirements for SELV given in IEC/EN60950-1 or EN 50178.

- Periodical Inspection and Maintenance: Disconnect the DST1 from power supply when replacing. Devices connected to the DST1 may operate unexpectedly. Do not dismantle, repair, or modify the DST1. It may lead to loss of its safety functions. The maintenance interval for the relay contacts must not exceed a period of 6 month.

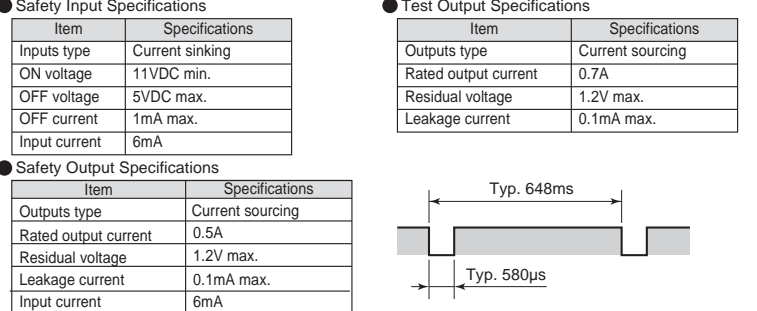
- Disposal: Be cautious not to have you injured when dismantling the DST1. The above-mentioned is a part of directions. Please use it after reading the operation manual.

Additional Precautions According to ANSI/ISA 12.12.01

- This equipment is suitable for use in Class I, Div. 2, Group A, B, C, D or Non-Hazardous Location Only.
WARNING - Explosion Hazard - Substitution of Components May Impair Suitability For Class I, Div. 2.
WARNING - Explosion Hazard - Do not Disconnect Equipment Unless Power Has Been Switched Off Or The Area Is Known To Be Non-Hazardous.
This device is open-type and is required to be installed in an enclosure suitable for the environment and can only be accessed with the use of a tool or key.
Cet équipement convient à l'utilisation dans des emplacements de Classe I, Division 2, Groupes A, B, C, D, ou ne convient qu'à l'utilisation dans des endroits non dangereux.
AVERTISSEMENT - Risque d'explosion - La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, Division 2.
AVERTISSEMENT - Risque d'explosion - Avant de débrancher l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.
Ce dispositif est de type ouvert et doit être installé dans un coffret adapté à l'environnement et auquel on ne pourra accéder uniquement au moyen d'un outil ou d'une clef.

1. SPECIFICATIONS

Table with 2 columns: Item and Specifications. Rows include Environmental Specifications (Communications power supply voltage, current consumption, I/O power supply voltage, current, EMC, Operating Temperature, Storage Temperature, Relative Humidity, Vibration resistance, Shock resistance, Operating environment, Protection degree, Over Voltage Category, Weight), Safety Input Specifications (Inputs type, ON voltage, OFF voltage, OFF current, Input current), Test Output Specifications (Outputs type, Rated output current, Residual voltage, Leakage current), Safety Output Specifications (Outputs type, Rated output current, Residual voltage, Leakage current, Input current).



In case that a safety output is configured as "Safety pulsed test", while this output is in an ON state, the signal sequence shown below is output continuously to enable diagnosis. Confirm the response times of devices connected to the safety outputs so that the devices do not malfunction due to the OFF pulse.

Table with 2 columns: Item and Specifications. Rows include Relay type, Failure rate P level, Rated load for a resistive load, Durability (Mechanical), Durability (Electrical), Note: This value applies to a switching frequency of 300 operations/min.

2. PART NAMES AND FUNCTION / DIMENSIONS

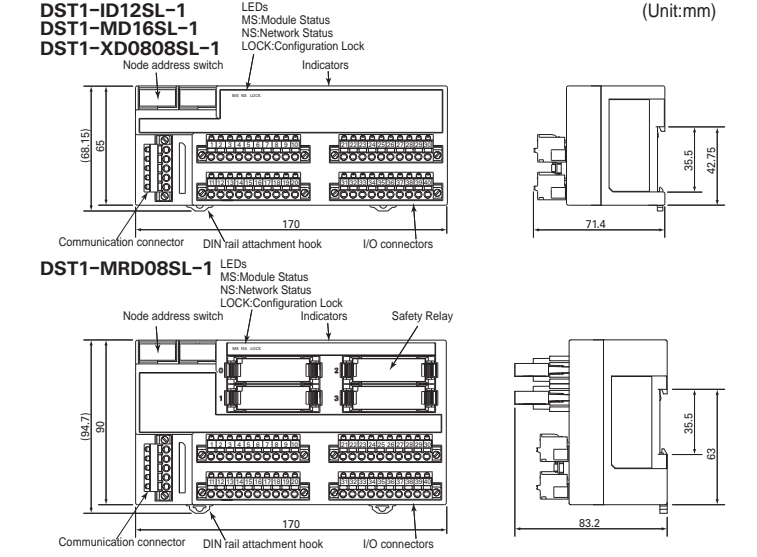


Table with 4 columns: LED name, Color, Status, Description. Rows include MS (Green, Red, Green/Red), NS (Green, Red), LOCK (Yellow), IN PWR/OUT PWR (Green, Yellow, Red).

Table with 2 columns: I/O Connectors and Specifications. Rows include Solid wire (0.2 to 2.5 mm², AWG 24 to 12) and Stranded (Flexible) wire (0.34 to 1.5 mm², AWG 22 to 16).

3. INTERNAL CIRCUITRY AND TERMINAL POSITION

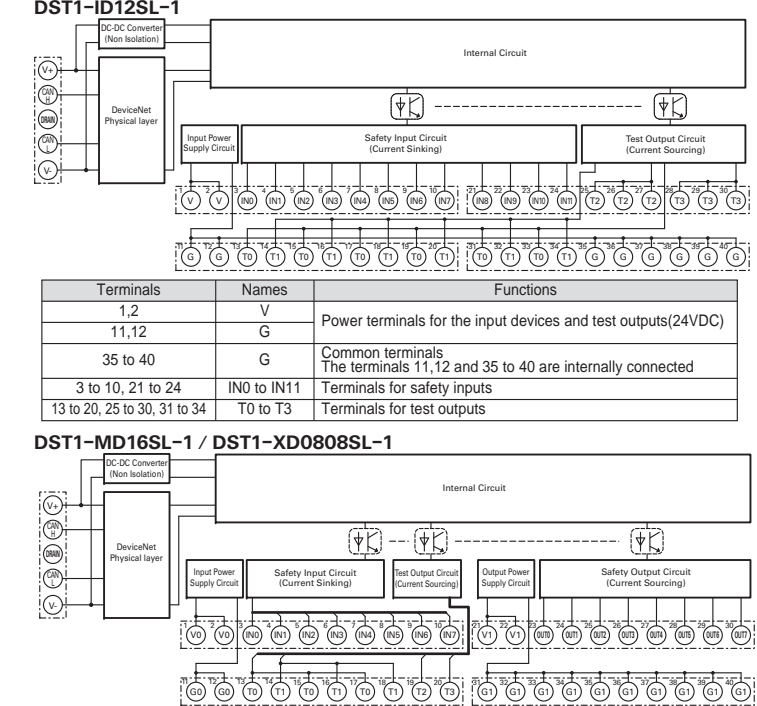


Table with 3 columns: Terminals, Names, Functions. Rows include power terminals (1,2; 11,12; 35 to 40), safety input terminals (3 to 10, 21 to 24; 13 to 20, 25 to 30, 31 to 34), and safety output terminals (23 to 30; 33 to 40).

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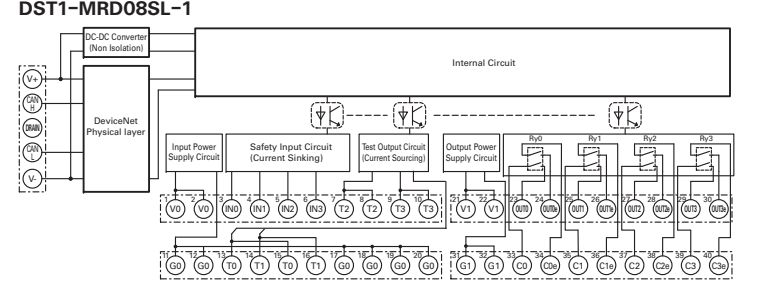
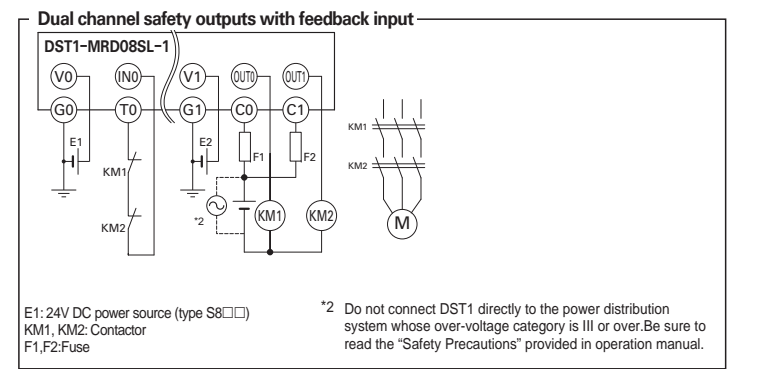
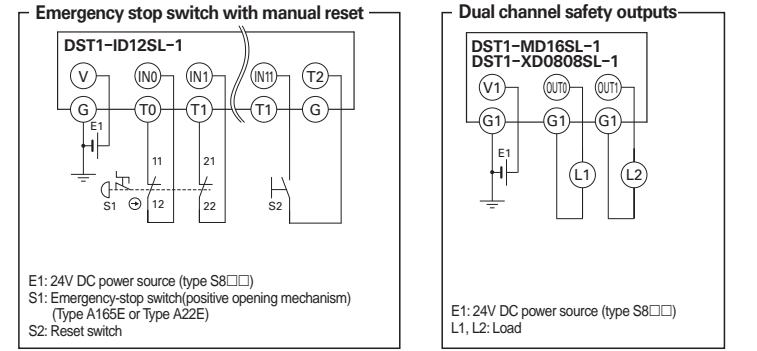


Table with 3 columns: Terminals, Names, Functions. Rows include V0, G0, G1, IN0 to IN3, T0 to T3, V1, G1, and safety output terminals (OUT0 to OUT3, C0 to C3).

4. APPLICATION EXAMPLE



E1: 24V DC power source (type S8□□) S1: Emergency-stop switch(positive opening mechanism) (Type A165E or Type A22E) S2: Reset switch

Suitability for 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.

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 PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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