

**DESCRIPTION**

The MLP-100 is a high-performance surge protective device (SPD) for AC/DC contact signals or synchro-analog converter signal lines that protects electrical instruments by absorbing lightning-induced surge voltage.

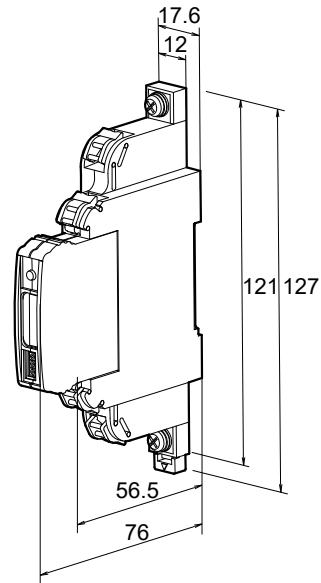
This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function that allows users to check it for deterioration with a special tester. The product is designed such that the signal is not interrupted even if the plug is removed from the socket for replacement.

**ORDERING INFORMATION**

Ordering Code MLP-100
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**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance
Maximum Continuous Operating Voltage (Uc)	—	180V DC 140V AC
Rated Current	—	3A
Operation Starting Voltage	100V/s	T1-T2: 400-900V T-E: 280-500V
Insulation Resistance	180V DC	100MΩ min.
Insertion Loss	DC to 10MHz	1.0dB max.
Voltage Protection Level (Up)	1.2/50μs, 4kV	T1-T2: 1500V max. T-E: 800V max.
Impulse Durability	8/20μs (cat. C2)	10 times (2kA)
	10/350μs (cat. D1)	2 times (0.5kA)
Maximum Discharge Current (Imax)	8/20μs	L1-L2: 5kA L-E: 10kA (5kA×2)
	10/350μs	L1-L2: 0.5kA L-E: 1kA (0.5kA×2)
Overstressed Fault Mode	—	mode 1
Response Time	—	3ns max.
Plug Replacement Timing Indicator	Checked with special tester	Normal: LED ON Faulty: LED OFF
JIS Compliance	JIS C 5381-21 (category: C2/D1)	


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	96% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	96% RH max. (non-condensing)
Altitude	2000m max.

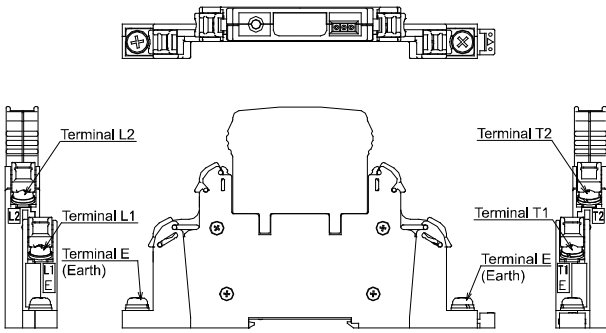
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting (wall-mountable)
Wiring	M4 screw terminal connection Terminals L1, L2, T1, T2 Stranded wire: 0.2mm <sup>2</sup> (AWG24) to 2mm <sup>2</sup> (AWG14) Insulated solderless terminal for M4, e.g., 0.3-4.1, 1.25-4, 2-4
	Terminal E Stranded wire: 2mm <sup>2</sup> (AWG14) min. Insulated solderless terminal for M4, e.g., 2-4
Screwing Torque	0.75 Nm
Dimensions	W17.6 × D127 × H76 mm
Weight	Approx. 90g

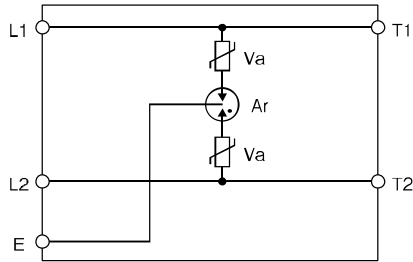
**● MATERIAL**

Plug / Socket	Polyamide
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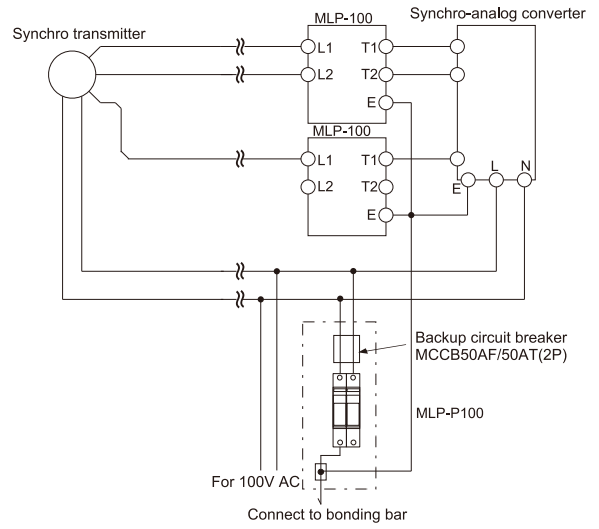
### TERMINAL ASSIGNMENTS



### BLOCK DIAGRAM



### INSTALLATION EXAMPLE



For synchro-analog converters, two units should be used.

NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.

**DESCRIPTION**

The MLP-C24 is a high-performance surge protective device (SPD) for 4-20mA signal lines or 2-wire pulse signals (24V DC) that protects electrical instruments by absorbing lightning-induced surge voltage.

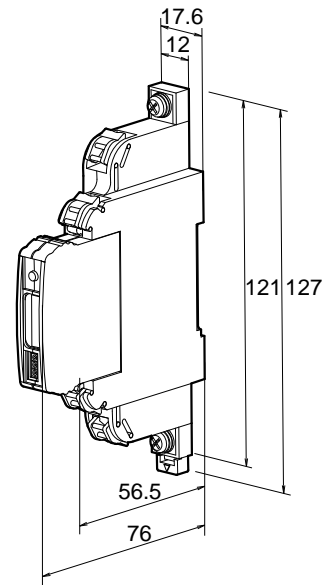
This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function that allows users to check it for deterioration with a special tester. The product is designed such that the signal is not interrupted even if the plug is removed from the socket for replacement.

**ORDERING INFORMATION**

Ordering Code
MLP-C24

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance
Maximum Continuous Operating Voltage (Uc)	—	27V DC
Rated Current	—	100mA DC
Operation Starting Voltage	V1mA (L-E)	T1-T2: 68-76V T-E: 34-38V
Leakage Current	27V DC	5μA max.
Series Resistance	100mA	5Ω±10%
Insertion Loss	DC to 400kHz	1.0dB max.
Voltage Protection Level (Up)	1.2/50μs, 10kV	T1-T2: 140V max. T-E: 120V max.
Impulse Durability	8/20μs (cat. C2)	10 times (5kA)
	10/350μs (cat. D1)	2 times (2.5kA)
Maximum Discharge Current (Imax)	8/20μs	L1-L2: 5kA L-E: 10kA (5kA×2)
	10/350μs	L1-L2: 1kA L-E: 2kA (1kA×2)
AC Durability	50Hz 0.5A 1s	5 times
Overstressed Fault Mode	—	mode 1
Response Time	—	3ns max.
Plug Replacement Timing Indicator	Checked with special tester	Normal: LED ON
		Faulty: LED OFF
JIS Compliance	JIS C 5381-21 (category: C2/D1)	


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	96% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	96% RH max. (non-condensing)
Altitude	2000m max.

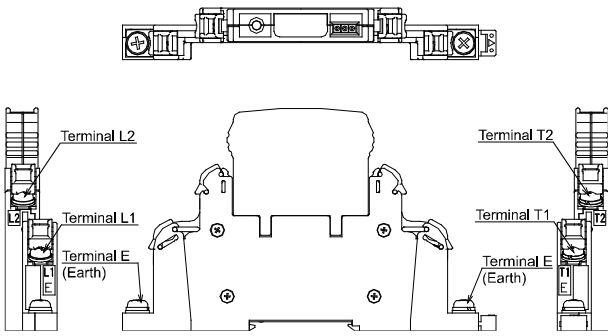
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting (wall-mountable)
Wiring	M4 screw terminal connection Terminals L1, L2, T1, T2 Stranded wire: 0.2mm <sup>2</sup> (AWG24) to 2mm <sup>2</sup> (AWG14) Insulated solderless terminal for M4, e.g., 0.3-4.1, 1.25-4, 2-4
	Terminal E Stranded wire: 2mm <sup>2</sup> (AWG14) min. Insulated solderless terminal for M4, e.g., 2-4
Screwing Torque	0.75 Nm
Dimensions	W17.6 × D127 × H76 mm
Weight	Approx. 90g

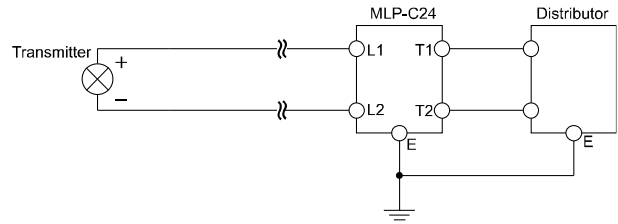
**● MATERIAL**

Plug / Socket	Polyamide
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### TERMINAL ASSIGNMENTS

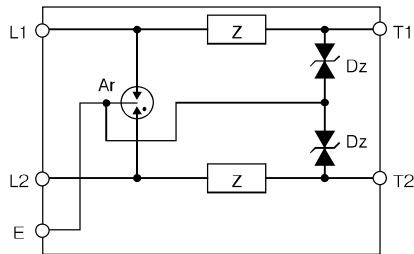


### INSTALLATION EXAMPLE



NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.

### BLOCK DIAGRAM



**DESCRIPTION**

The MLP-C48 is a high-performance surge protective device (SPD) for 10-50mA signal lines or 2-wire pulse signals (48V DC) that protects electrical instruments by absorbing lightning-induced surge voltage.

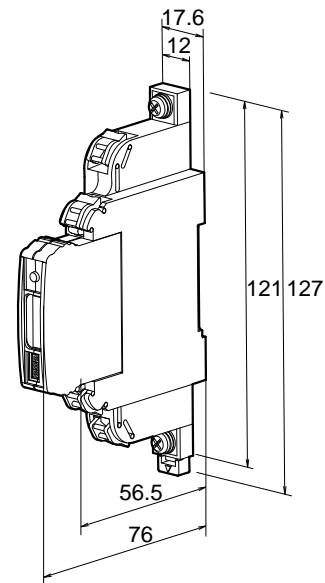
This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function that allows users to check it for deterioration with a special tester. The product is designed such that the signal is not interrupted even if the plug is removed from the socket for replacement.

**ORDERING INFORMATION**

Ordering Code
MLP-C48

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance
Maximum Continuous Operating Voltage (Uc)	—	52V DC
Rated Current	—	100mA DC
Operation Starting Voltage	100V/s	T1-T2: 85-147V
	V1mA (L-E)	T-E: 62-70V
Leakage Current	52V DC	5μA max.
Series Resistance	100mA	5Ω±10%
Insertion Loss	DC to 400kHz	1.0dB max.
Voltage Protection Level (Up)	1.2/50μs, 10kV	T1-T2: 200V max. T-E: 140V max.
	8/20μs (cat. C2)	10 times (5kA)
Impulse Durability	10/350μs (cat. D1)	2 times (2.5kA)
	8/20μs	L1-L2: 5kA L-E: 10kA (5kA×2)
Maximum Discharge Current (Imax)	10/350μs	L1-L2: 1kA L-E: 2kA (1kA×2)
	AC Durability	50Hz 0.5A 1s
Overstressed Fault Mode	—	mode 1
Response Time	—	3ns max.
Plug Replacement Timing Indicator	Checked with special tester	Normal: LED ON
		Faulty: LED OFF
JIS Compliance	JIS C 5381-21 (category: C2/D1)	


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	96% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	96% RH max. (non-condensing)
Altitude	2000m max.

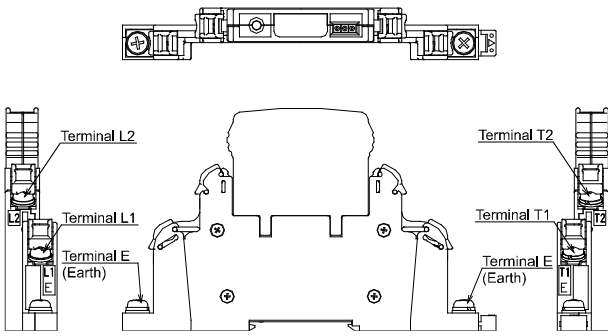
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting (wall-mountable)
Wiring	M4 screw terminal connection Terminals L1, L2, T1, T2 Stranded wire: 0.2mm <sup>2</sup> (AWG24) to 2mm <sup>2</sup> (AWG14)
	Insulated solderless terminal for M4, e.g., 0.3-4.1, 1.25-4, 2-4
	Terminal E Stranded wire: 2mm <sup>2</sup> (AWG14) min. Insulated solderless terminal for M4, e.g., 2-4
Screwing Torque	0.75 Nm
Dimensions	W17.6 × D127 × H76 mm
Weight	Approx. 90g

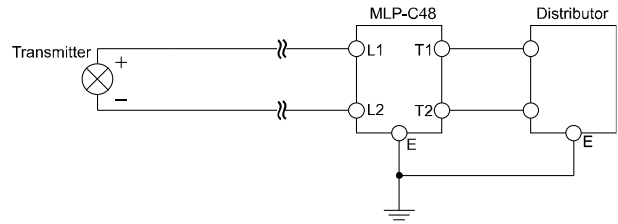
**● MATERIAL**

Plug / Socket	Polyamide
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### TERMINAL ASSIGNMENTS

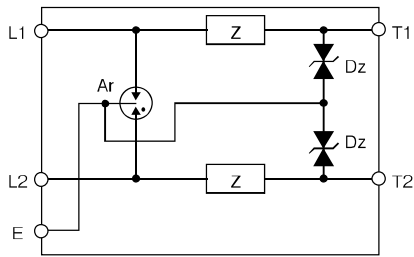


### INSTALLATION EXAMPLE



NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.

### BLOCK DIAGRAM



**DESCRIPTION**

The MLP-D24 is a high-performance surge protective device (SPD) for 24VDC power circuits that protects electrical instruments by absorbing lightning-induced surge voltage.

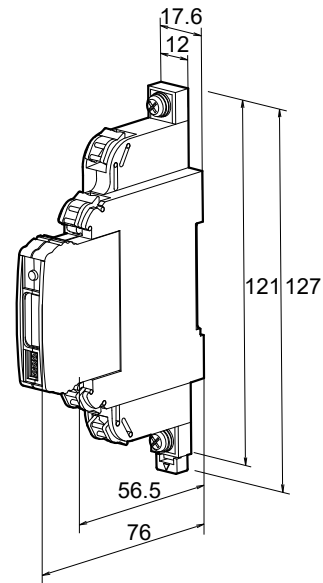
This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function that allows users to check it for deterioration with a special tester. The product is designed such that the signal is not interrupted even if the plug is removed from the socket for replacement.

**ORDERING INFORMATION**

Ordering Code
MLP-D24

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance
Maximum Continuous Operating Voltage (Uc)	—	27V DC
Rated Current	—	3A DC
Operation Starting Voltage	V1mA (L-E)	T1-T2: 148-180V T-E: 74-90V
Leakage Current	27V DC	5μA max.
Insertion Loss	DC to 1MHz	1.0dB max.
Voltage Protection Level (Up)	1.2/50μs, 10kV	T1-T2: 600V max. T-E: 500V max.
Nominal Discharge Current (In)	8/20μs	2kA
Impulse Durability	8/20μs (cat. C2)	10 times (2kA)
	10/350μs (cat. D1)	2 times (0.5kA)
Maximum Discharge Current (Imax)	8/20μs	L1-L2: 5kA L-E: 10kA (5kA×2)
	10/350μs	L1-L2: 0.5kA L-E: 1kA (0.5kA×2)
AC Durability	50Hz 0.5A 1s	5 times
Overstressed Fault Mode	—	mode 1
Response Time	—	3ns max.
Plug Replacement Timing Indicator	Checked with special tester	Normal: LED ON Faulty: LED OFF
JIS Compliance	JIS C 5381-21 (category: C2/D1)	


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	96% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	96% RH max. (non-condensing)
Altitude	2000m max.

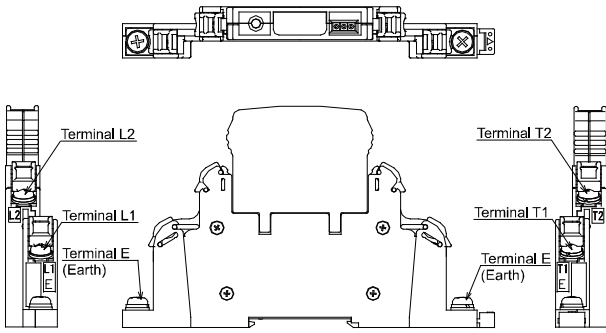
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting (wall-mountable)
Wiring	M4 screw terminal connection Terminals L1, L2, T1, T2 Stranded wire: 0.2mm <sup>2</sup> (AWG24) to 2mm <sup>2</sup> (AWG14) Insulated solderless terminal for M4, e.g., 0.3-4.1, 1.25-4, 2-4
	Terminal E Stranded wire: 2mm <sup>2</sup> (AWG14) min. Insulated solderless terminal for M4, e.g., 2-4
Screwing Torque	0.75 Nm
Dimensions	W17.6 × D127 × H76 mm
Weight	Approx. 90g

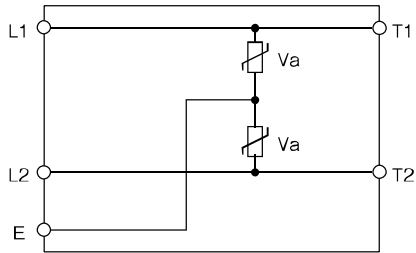
**● MATERIAL**

Plug / Socket	Polyamide
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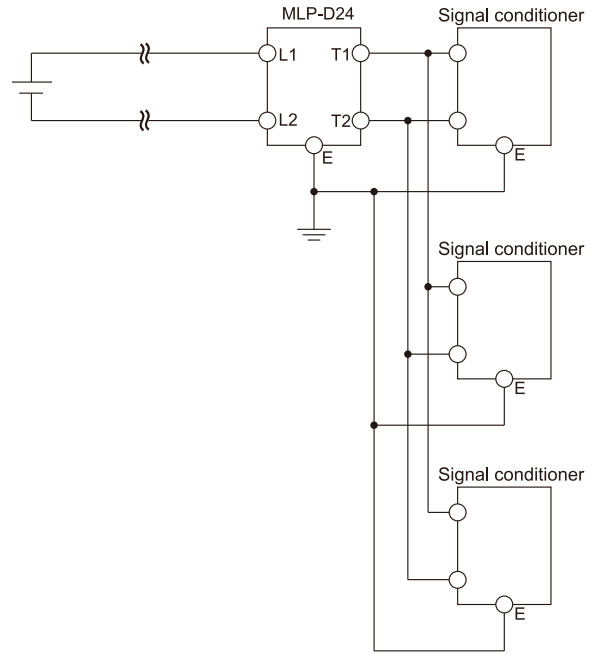
**TERMINAL ASSIGNMENTS**



**BLOCK DIAGRAM**



**INSTALLATION EXAMPLE**



NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.

**DESCRIPTION**

The MLP-D48 is a high-performance surge protective device (SPD) for 48VDC power circuits that protects electrical instruments by absorbing lightning-induced surge voltage.

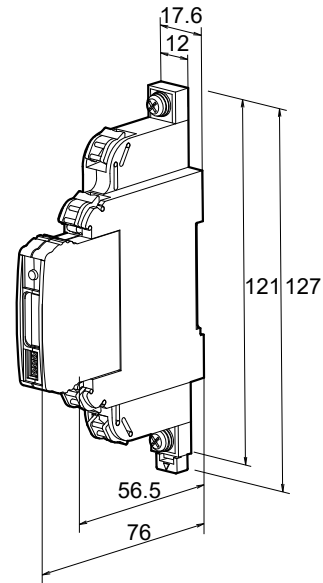
This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function that allows users to check it for deterioration with a special tester. The product is designed such that the signal is not interrupted even if the plug is removed from the socket for replacement.

**ORDERING INFORMATION**

Ordering Code
MLP-D48

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance
Maximum Continuous Operating Voltage (Uc)	—	52V DC
Rated Current	—	3A DC
Operation Starting Voltage	V1mA	T1-T2: 148-180V T-E: 74-90V
Leakage Current	52V DC	10μA max.
Insertion Loss	DC to 1MHz	1.0dB max.
Voltage Protection Level (Up)	1.2/50μs, 4kV	T1-T2: 600V max. T-E: 500V max.
Nominal Discharge Current (In)	8/20μs	2kA
Impulse Durability	8/20μs (cat. C2)	10 times (2kA)
	10/350μs (cat. D1)	2 times (0.5kA)
Maximum Discharge Current (Imax)	8/20μs	L1-L2: 5kA L-E: 10kA (5kA×2)
	10/350μs	L1-L2: 0.5kA L-E: 1kA (0.5kA×2)
AC Durability	50Hz 0.5A 1s	5 times
Overstressed Fault Mode	—	mode 1
Response Time	—	3ns max.
Plug Replacement Timing Indicator	Checked with special tester	Normal: LED ON Faulty: LED OFF
JIS Compliance	JIS C 5381-21 (category: C2/D1)	


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	96% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	96% RH max. (non-condensing)
Altitude	2000m max.

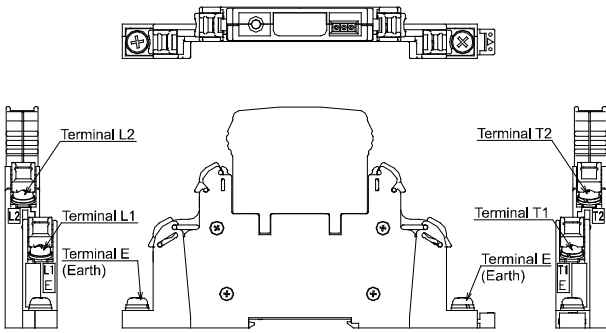
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting (wall-mountable)
Wiring	M4 screw terminal connection Terminals L1, L2, T1, T2 Stranded wire: 0.2mm <sup>2</sup> (AWG24) to 2mm <sup>2</sup> (AWG14) Insulated solderless terminal for M4, e.g., 0.3-4.1, 1.25-4, 2-4
	Terminal E Stranded wire: 2mm <sup>2</sup> (AWG14) min. Insulated solderless terminal for M4, e.g., 2-4
Screwing Torque	0.75 Nm
Dimensions	W17.6 × D127 × H76 mm
Weight	Approx. 90g

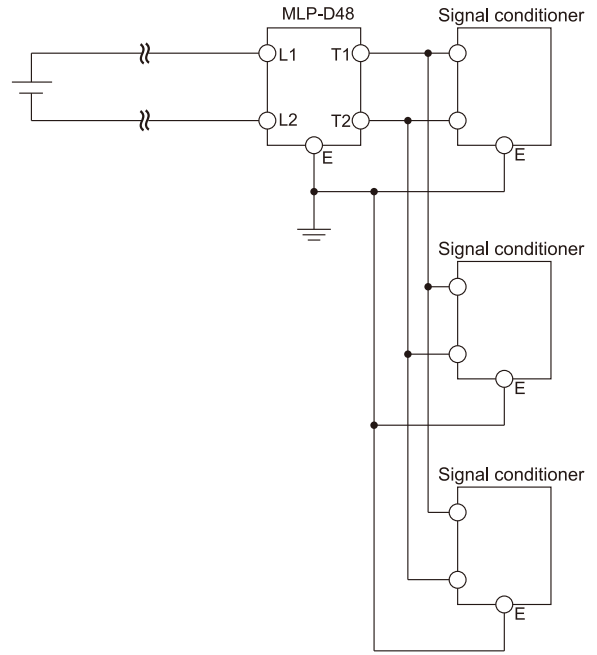
**● MATERIAL**

Plug / Socket	Polyamide
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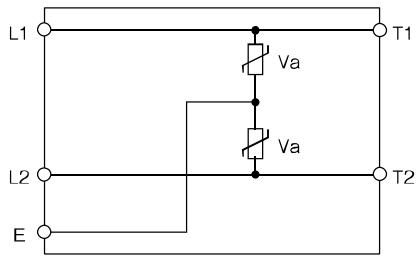
**TERMINAL ASSIGNMENTS**



**INSTALLATION EXAMPLE**



**BLOCK DIAGRAM**



NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.

**DESCRIPTION**

The MLP-P100 is a high-performance surge protective device (SPD) for 100V AC power lines that protects electrical instruments by absorbing lightning-induced surge voltage.

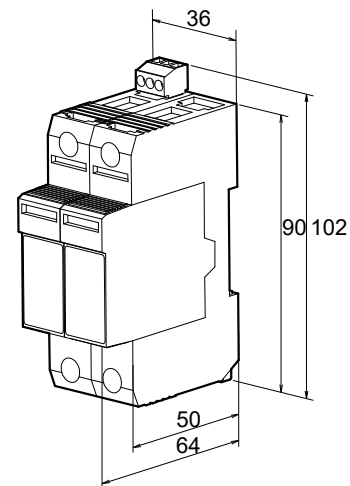
This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function.

**ORDERING INFORMATION**

Ordering Code
MLP-P100

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance	
Maximum Continuous Operating Voltage (Uc)	—	150V AC (50/60Hz)	
Nominal Voltage (Un)	—	Single-phase 2-wire 100V, 150V	
Operation Starting Voltage	V1mA	L-L: 512-620V L-E: 256-310V	
Maximum Discharge Current (Imax)	8/20μs	L-L-E: 40kA	
Nominal Discharge Current (In)	8/20μs	L-L-E: 5kA	
Voltage Protection Level (Up)	As per JIS	L-L: 1400V max. L-E: 700V max.	
Overcurrent Protection	L/N-PE	Fuse 30A (FDS-20kA)	
Short-circuit Current Rating (IscCR)	—	25kA	
Temporary Overvoltage Characteristics (UT)	—	175V, 5 sec.	
Residual Current (IPE)	132V AC (L/N-PE)	1mA max.	
Response Time	—	3ns max.	
Degree of Protection	—	IP20	
Terminal Identification	—	Provided	
Status Indicator	Normal/Faulty	Green/Red	
Location Category	—	Indoor	
Terminals for Deterioration Detection	Normal	11-12	Closed
		11-14	Open
	Faulty	11-12	Open
		11-14	Closed
	Maximum Operating Voltage/Current	—	250V/1.5A AC
JIS Compliance	JIS C 5381-11 (class II)		


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	90% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	90% RH max. (non-condensing)
Altitude	2000m max.

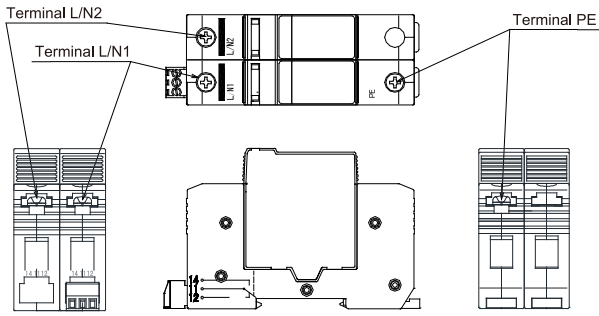
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting
Wiring	M4 screw terminal connection (less than 12mm wide)
	Recommended cable: 2mm <sup>2</sup> (AWG14) to 8mm <sup>2</sup> (AWG8) Tightening torque: 1.27 to 1.96 Nm NOTE: When using two solderless terminals stacked together, J.S.T. Mfg's V2-P4 or FV2-P4 is recommended.
Terminals for Deterioration Detection	Recommended cable: 0.05mm <sup>2</sup> (AWG30) to 2mm <sup>2</sup> (AWG14) Stripping length: 7 to 8 mm
Dimensions	W36 × D102 × H64 mm
Weight	Approx. 215g

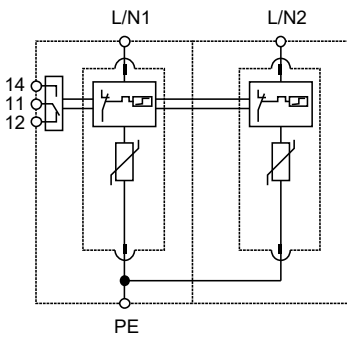
**● MATERIAL**

Plug / Socket	Polycarbonate
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### TERMINAL ASSIGNMENTS

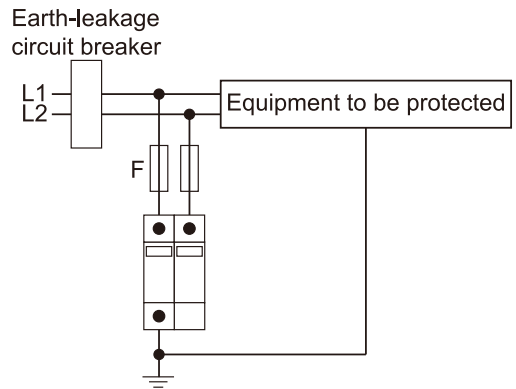


### BLOCK DIAGRAM



### INSTALLATION EXAMPLE

100V AC, secondary side of earth-leakage circuit breaker  
Single-phase, two-wire system, without earthing



F: Recommended fuses (FDS-20kA)

NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.

**DESCRIPTION**

The MLP-P200 is a high-performance surge protective device (SPD) for 200V AC power lines that protects electrical instruments by absorbing lightning-induced surge voltage.

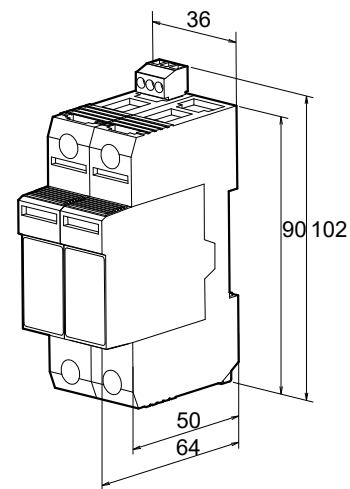
This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function.

**ORDERING INFORMATION**

Ordering Code
MLP-P200

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance	
Maximum Continuous Operating Voltage (Uc)	—	255V AC (50/60Hz)	
Nominal Voltage (Un)	—	Single-phase 2-wire 200V, 230V	
Operation Starting Voltage	V1mA	L-L: 774-946V L-E: 387-473V	
Maximum Discharge Current (Imax)	8/20μs	L-L-E: 40kA	
Nominal Discharge Current (In)	8/20μs	L-L-E: 20kA	
Voltage Protection Level (Up)	As per JIS	L-L: 2.8kV max. L-E: 1.4kV max.	
Overcurrent Protection	L/N-PE	Fuse 30A (FDS-20kA)	
Short-circuit Current Rating (IscCR)	—	25kA	
Temporary Overvoltage Characteristics (UT)	—	335V, 5 sec.	
Residual Current (IPE)	255V AC (L/N-PE)	1mA max.	
Response Time	—	3ns max.	
Degree of Protection	—	IP20	
Terminal Identification	—	Provided	
Status Indicator	Normal/Faulty	Green/Red	
Location Category	—	Indoor	
Terminals for Deterioration Detection	Normal	11-12	Closed
		11-14	Open
	Faulty	11-12	Open
		11-14	Closed
	Maximum Operating Voltage/Current		250V/1.5A AC
JIS Compliance	JIS C 5381-11 (class II)		


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	90% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	90% RH max. (non-condensing)
Altitude	2000m max.

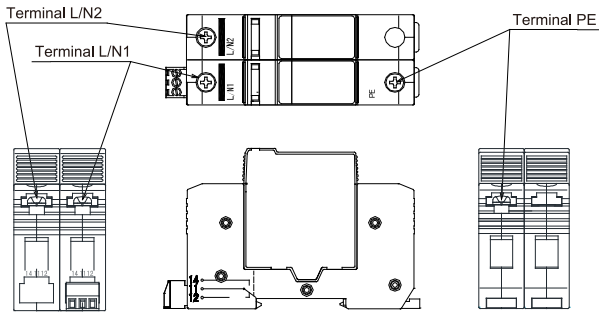
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting
Wiring	M4 screw terminal connection (less than 12mm wide)
	Recommended cable: 2mm <sup>2</sup> (AWG14) to 8mm <sup>2</sup> (AWG8) Tightening torque: 1.27 to 1.96 Nm NOTE: When using two solderless terminals stacked together, J.S.T. Mfg's V2-P4 or FV2-P4 is recommended.
Terminals for Deterioration Detection	Recommended cable: 0.05mm <sup>2</sup> (AWG30) to 2mm <sup>2</sup> (AWG14) Stripping length: 7 to 8 mm
Dimensions	W36 × D102 × H64 mm
Weight	Approx. 230g

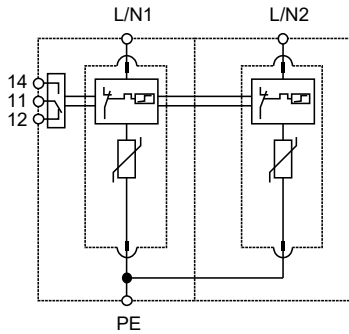
**● MATERIAL**

Plug / Socket	Polycarbonate
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### TERMINAL ASSIGNMENTS

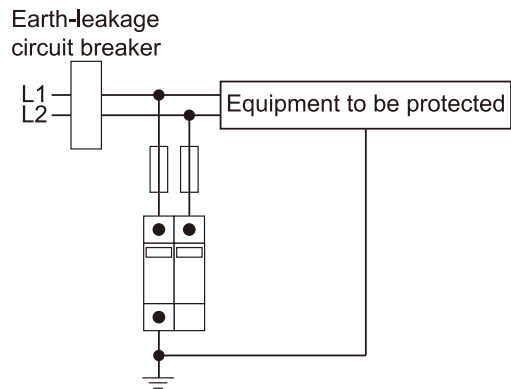


### BLOCK DIAGRAM



### INSTALLATION EXAMPLE

200V AC, secondary side of earth-leakage circuit breaker  
Single-phase, two-wire system, without earthing



F: Recommended fuses (FDS-20kA)

NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.

**DESCRIPTION**

The MLP-P200AR is a high-performance surge protective device (SPD) for 200V AC power lines that protects electrical instruments by absorbing lightning-induced surge voltage.

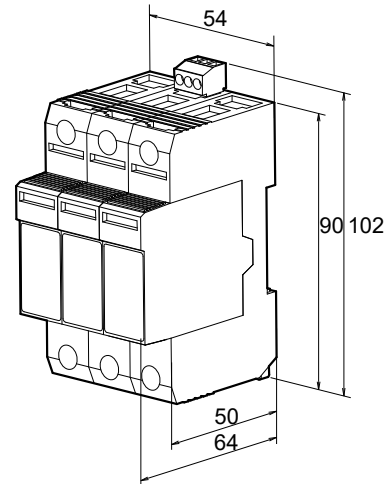
This SPD consists of a plug part and a socket part, and the plug part has a deterioration indication function. The product features a gas discharge tube (GDT) between the neutral (N) and protective earth (PE) lines.

**ORDERING INFORMATION**

Ordering Code
MLP-P200AR

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance
Maximum Continuous Operating Voltage (Uc)	L-N	255V AC (50/60Hz)
	N-PE	255V AC (50/60Hz)
Nominal Voltage (Un)	—	Single-phase 2-wire: 200V, 230V Single-phase 3-wire: 100V, 200V
Operation Starting Voltage	L-L (V1mA)	774-946V
	L-N (V1mA)	387-473V
	N-PE (100V/s)	800V min.
Maximum Discharge Current (Imax)	L-N/L-L (8/20μs)	40kA
	N-PE (8/20μs)	75kA
Nominal Discharge Current (In)	L-N/L-L (8/20μs)	20kA
	N-PE (8/20μs)	60kA
Voltage Protection Level (Up)	L-L (As per JIS)	2.8kV max.
	L-N (As per JIS)	1.4kV max.
	N-PE (As per JIS)	1.5kV max.
Overcurrent Protection	L-N	Fuse 30A (FDS-20kA)
Short-circuit Current Rating (IscCR)	L-N	25kA (50/60Hz)
Follow Current Interrupt Rating (Ifi)	N-PE	100A (50/60Hz)
Temporary Overvoltage Characteristics (U <sub>T</sub> )	L-N	335V, 5 sec.
	N-PE	120V, 200ms
Residual Current (I <sub>PE</sub> )	255V AC (L-N/N-PE)	1mA max.
Response Time	—	3ns max.
Degree of Protection	—	IP20
Location Category	—	Indoor
Terminal Identification	—	Provided



Status Indicator (L-N only)	Normal/Faulty	Green/Red	
Disconnection Indication	—	Provided	
Terminals for Deterioration Detection	Normal	11-12	Closed
		11-14	Open
	Faulty	11-12	Open
		11-14	Closed
Maximum Operating Voltage/Current		250V/1.5A AC	
JIS Compliance	JIS C 5381-11 (class II)		

**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	90% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	90% RH max. (non-condensing)
Altitude	2000m max.

**● PHYSICAL**

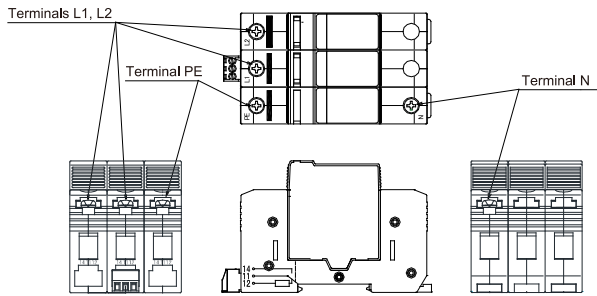
Construction	Plug-and-socket, two-piece construction (N-PE module is not detachable.)
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting
Wiring	M4 screw terminal connection (less than 12mm wide)
	Recommended cable: 2mm <sup>2</sup> (AWG14) to 8mm <sup>2</sup> (AWG8) Tightening torque: 1.27 to 1.96 Nm NOTE: When using two solderless terminals stacked together, J.S.T. Mfg's V2-P4 or FV2-P4 is recommended.

Terminals for Deterioration Detection	Recommended cable: 0.05mm <sup>2</sup> (AWG30) to 2mm <sup>2</sup> (AWG14) Stripping length: 7 to 8 mm
Dimensions	W54 × D102 × H64 mm
Weight	Approx. 325g

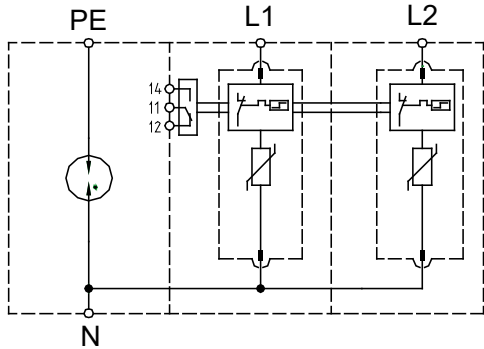
● MATERIAL

Plug / Socket	Polycarbonate
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TERMINAL ASSIGNMENTS



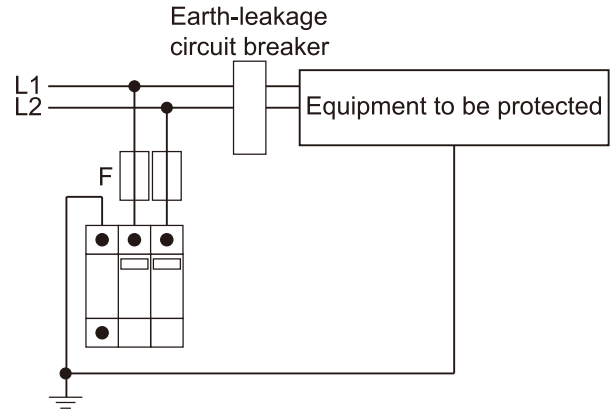
BLOCK DIAGRAM



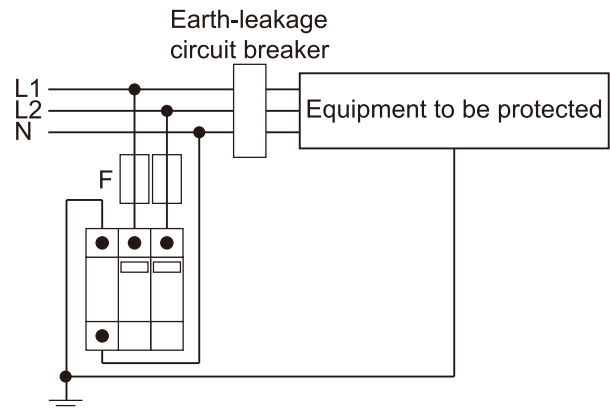
INSTALLATION EXAMPLE

100V/200V AC, primary side of earth-leakage circuit breaker

Single-phase 2-wire (MLP-P200AR)



Single-phase 3-wire (MLP-P200AR)



**DESCRIPTION**

The MLPT1 is a device to supply power to the deterioration detection LED in MLP series SPDs for signal lines and SPDs for power circuits, MLP-D24 and MLP-D48.

**ORDERING INFORMATION**

Ordering Code	MLPT1
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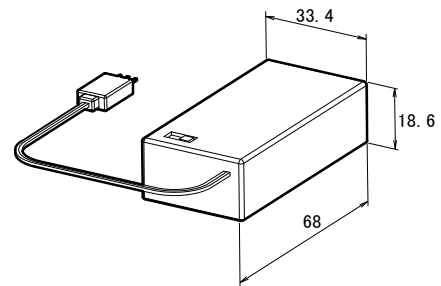
**SPECIFICATIONS**

● **PERFORMANCE**

Operating Temperature Range	0 to 40°C
Operating Humidity Range	90% RH max. (non-condensing)
Storage Temperature	-20 to 40°C

● **PHYSICAL**

Material	Case: ABS resin Terminal: Nylon 66
Dimensions	W33.4 × D68 × H18.6 mm Cable to terminal: 160 mm
Weight	Approx. 25g

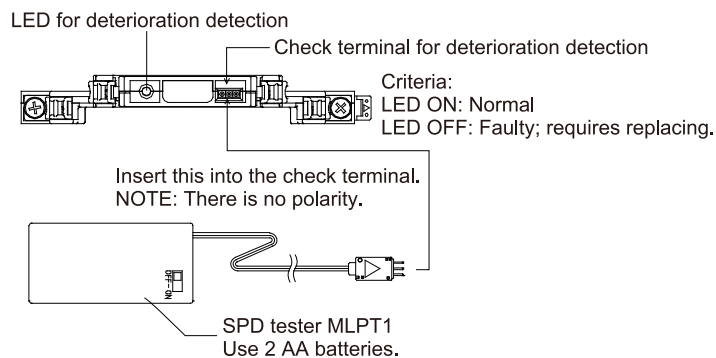


NOTE: Requires 2 AA batteries (not included).

SPDs should be inspected with respect to the following items, and any SPD found to be faulty requires the replacement of its plug with a new one. It is recommended that inspection should be performed once or twice a year.

- Check the terminals for any signs of sparks.
- Check the case for deformation or corrosion.
- Verify that the SPD is working normally (LED ON).

To check for deterioration, connect the MLPT1 tester terminal to the MLPT1 check terminal of the plug. If the green LED lights up, it means the SPD is normal. If the LED is off, it means the device is faulty and requires the plug to be replaced.



**DESCRIPTION**

The MLP-TC is a high-performance surge protective device (SPD) for thermocouple (millivolt) signal lines that protects electrical instruments by absorbing lightning-induced surge voltage.

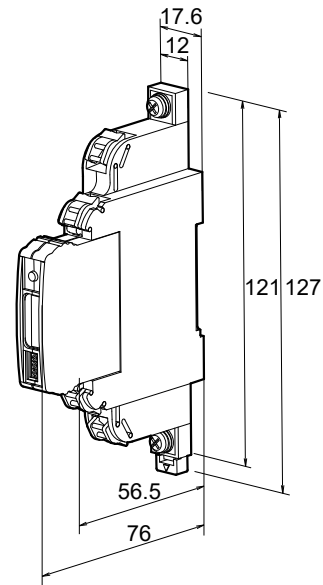
This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function that allows users to check it for deterioration with a special tester. The product is designed such that the signal is not interrupted even if the plug is removed from the socket for replacement.

**ORDERING INFORMATION**

Ordering Code
MLP-TC

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance
Maximum Continuous Operating Voltage (Uc)	—	150V DC
Rated Current	—	3A DC
Operation Starting Voltage	100V/s	T1-T2: 250-560V T-E: 180-280V
Insulation Resistance	150V DC	10MΩ min.
Insertion Loss	DC to 1MHz	1.0dB max.
Voltage Protection Level (Up)	1.2/50μs, 4kV	T1-T2: 1500V max. T-E: 1000V max.
Impulse Durability	8/20μs (cat. C2)	10 times (2kA)
	10/350μs (cat. D1)	2 times (0.5kA)
Maximum Discharge Current (Imax)	8/20μs	L1-L2: 5kA L-E: 10kA (5kA×2)
	10/350μs	L1-L2: 0.5kA L-E: 1kA (0.5kA×2)
Impulse Reset	48V DC 260mA	30ms max.
AC Durability	50Hz 0.5A 1s	5 times
Overstressed Fault Mode	—	mode 1
Response Time	—	3ns max.
Plug Replacement Timing Indicator	Checked with special tester	Normal: LED ON
		Faulty: LED OFF
JIS Compliance	JIS C 5381-21 (category: C2/D1)	


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	96% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	96% RH max. (non-condensing)
Altitude	2000m max.

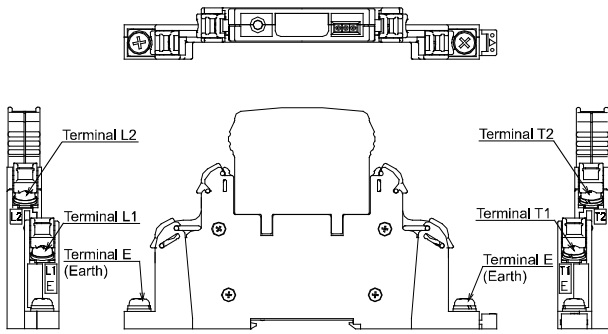
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting (wall-mountable)
Wiring	M4 screw terminal connection Terminals L1, L2, T1, T2 Stranded wire: 0.2mm <sup>2</sup> (AWG24) to 2mm <sup>2</sup> (AWG14) Insulated solderless terminal for M4, e.g., 0.3-4.1, 1.25-4, 2-4
	Terminal E Stranded wire: 2mm <sup>2</sup> (AWG14) min. Insulated solderless terminal for M4, e.g., 2-4
Screwing Torque	0.75 Nm
Dimensions	W17.6 × D127 × H76 mm
Weight	Approx. 90g

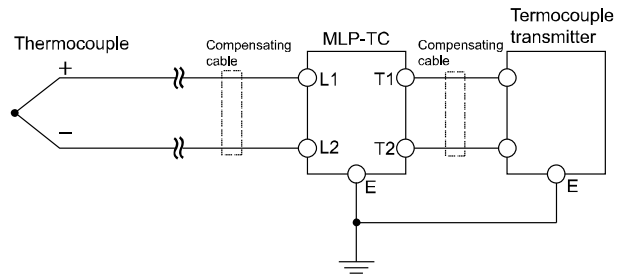
**● MATERIAL**

Plug / Socket	Polyamide
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### TERMINAL ASSIGNMENTS

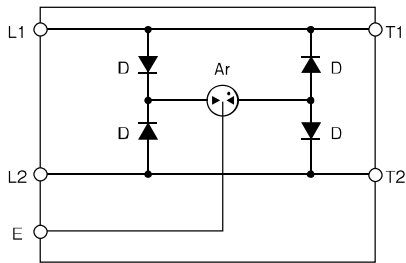


### INSTALLATION EXAMPLE



NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.

### BLOCK DIAGRAM



**DESCRIPTION**

The MLP-TR is a high-performance surge protective device (SPD) for RTD or potentiometer signal lines that protects electrical instruments by absorbing lightning-induced surge voltage.

This SPD consists of a plug part and a socket part. The plug part features a deterioration indication function that allows users to check it for deterioration with a special tester. The product is designed such that the signal is not interrupted even if the plug is removed from the socket for replacement.

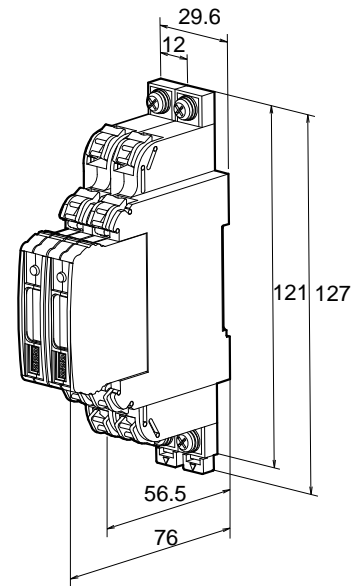
The MLP-TR is offered in a set of two units.

**ORDERING INFORMATION**

Ordering Code
MLP-TR

**SPECIFICATIONS**
**● PERFORMANCE**

Item	Measuring Conditions	Performance
Maximum Continuous Operating Voltage (Uc)	—	150V DC
Operation Starting Voltage	100V/s	L1-L2: 250-560V L-E: 180-280V
Insulation Resistance	150V DC	10MΩ min.
Insertion Loss	DC to 1MHz	1.0dB max.
Voltage Protection Level (Up)	1.2/50μs, 4kV	L1-L2: 1500V max. L-E: 1000V max.
Impulse Durability	8/20μs (cat. C2)	10 times (2kA)
	10/350μs (cat. D1)	2 times (0.5kA)
Maximum Discharge Current (Imax)	8/20μs	L1-L2: 5kA L-E: 10kA (5kA×2)
	10/350μs	L1-L2: 0.5kA L-E: 1kA (0.5kA×2)
Impulse Reset	48V DC 260mA	30ms max.
AC Durability	50Hz 0.5A 1s	5 times
Overstressed Fault Mode	—	mode 1
Response Time	—	3ns max.
Plug Replacement Timing Indicator	Checked with special tester	Normal: LED ON
		Faulty: LED OFF
JIS Compliance	JIS C 5381-21 (category: C2/D1)	


**● ENVIRONMENTAL**

Location of Use	Machine room or equipment enclosure
Rated Operating Temperature	-40 to 70°C
Rated Operating Humidity	96% RH max. (non-condensing)
Storage Temperature	-40 to 70°C
Storage Humidity	96% RH max. (non-condensing)
Altitude	2000m max.

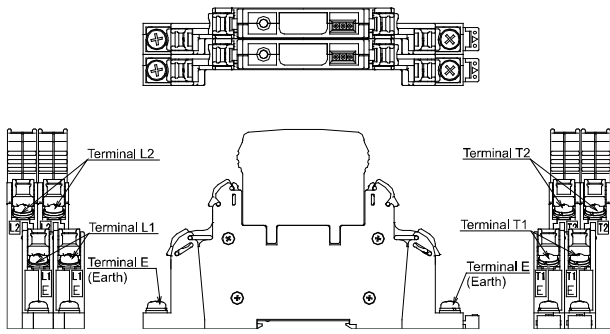
**● PHYSICAL**

Construction	Plug-and-socket, two-piece construction
Grounding	Class D [100Ω max.]
Installation	DIN rail mounting (wall-mountable)
Wiring	M4 screw terminal connection Terminals L1, L2, T1, T2 Stranded wire: 0.2mm <sup>2</sup> (AWG24) to 2mm <sup>2</sup> (AWG14) Insulated solderless terminal for M4, e.g., 0.3-4.1, 1.25-4, 2-4
	Terminal E Stranded wire: 2mm <sup>2</sup> (AWG14) min. Insulated solderless terminal for M4, e.g., 2-4
Screwing Torque	0.75 Nm
Dimensions	W29.6 × D127 × H76 mm (two units)
Weight	Approx. 180g (two units)

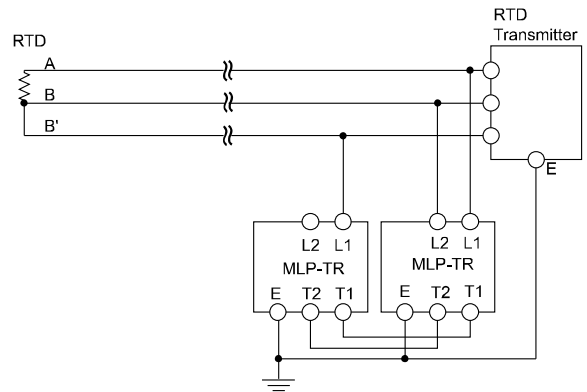
**● MATERIAL**

Plug / Socket	Polyamide
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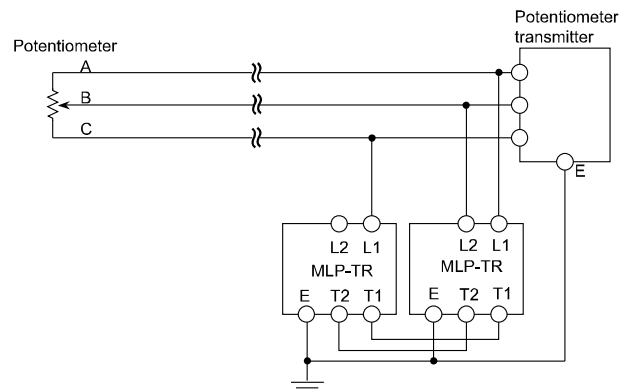
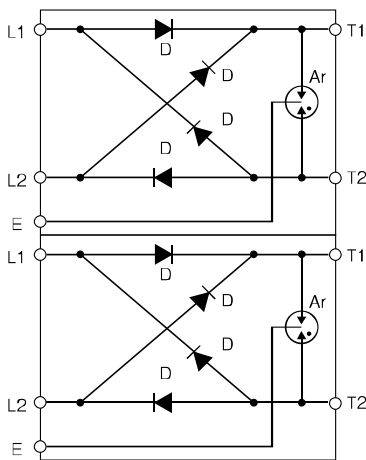
### TERMINAL ASSIGNMENTS



### INSTALLATION EXAMPLE



### BLOCK DIAGRAM



NOTE: If the distance from the MLP device to the equipment to be protected is over 10 meters, it is recommended that an additional MLP device adjacent to the equipment to be protected should be installed.