M-RESTER Lightning Surge Protectors for Electronics Equipment

MG CO., LTD.
Make Greener automation

2026-03
EC-Z706-A
Rev. 0

M-RESTER Lightning Surge Protectors for Electronics Equipment

APPLICATIONS


PV system PAGE 20


Standard signal line PAGE 22


Sensor signal PAGE 25


Strain gauge, self-synch PAGE 26


Pulse & ON/OFF signal PAGE 27


Network PAGE 28


Transmission line PAGE 31


DC power supply line PAGE 32


Power supply line, small capacity PAGE 33


Power supply line, medium/large capacity PAGE 34


One-port SPD PAGE 34


Related products PAGE 35

Check out the product videos on our website!

▶ https://www.mgco.jp/video_e/

M-RESTER Demonstration Kit to experience the effects of surge protectors

In this video, you will experience the effects of the lightning surge protectors M-RESTER for electronic equipment, using a demonstration kit.
The working principle and the usage of the kit is thoroughly explained in the demonstration.

This symbol identifies those products which contain less than the maximum levels of the 10 restricted substances specified by the RoHS Directive.

www.mgco.jp

Website

Request Info

MG CO., LTD.
Make Greener automation

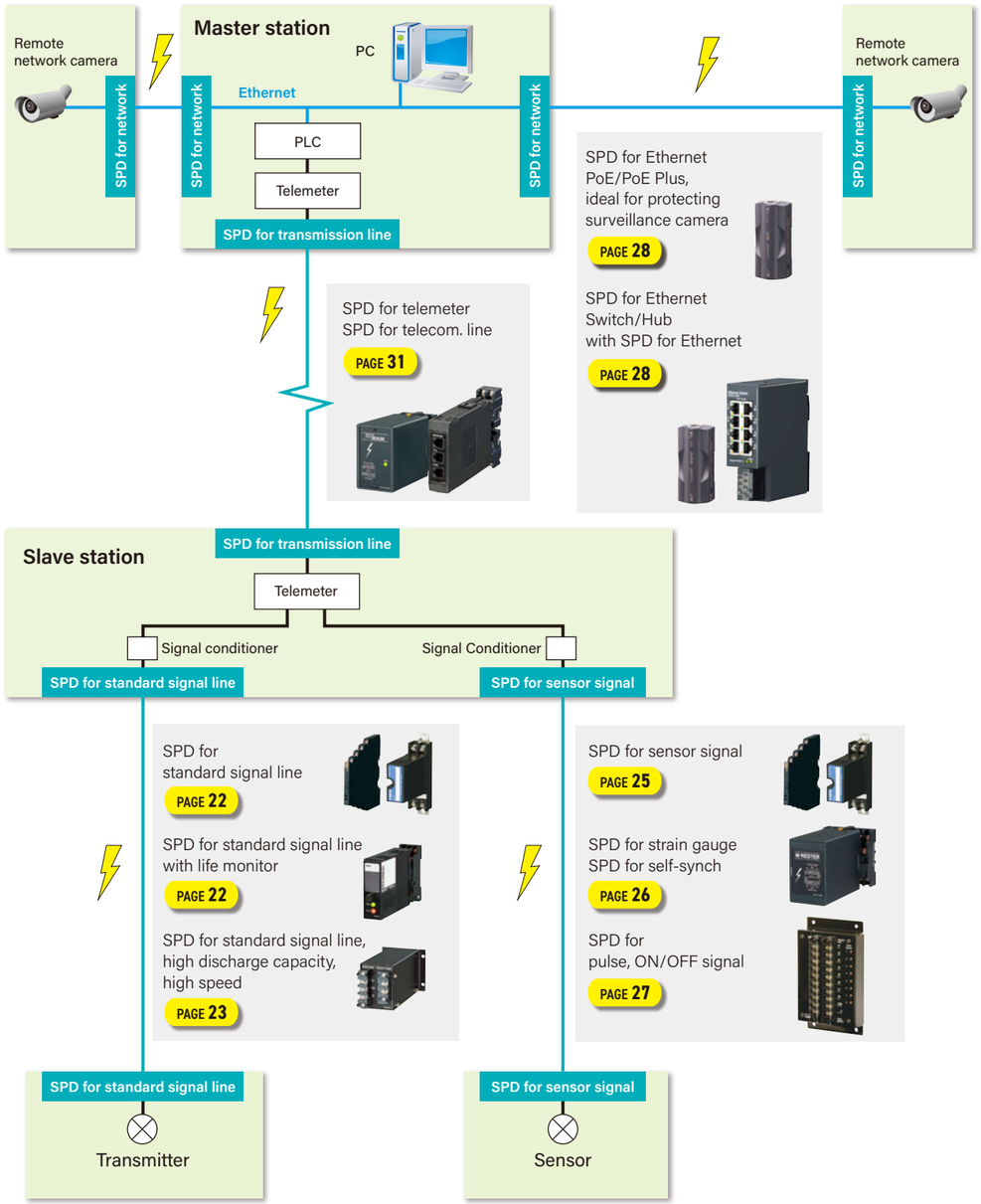
Your local representative:

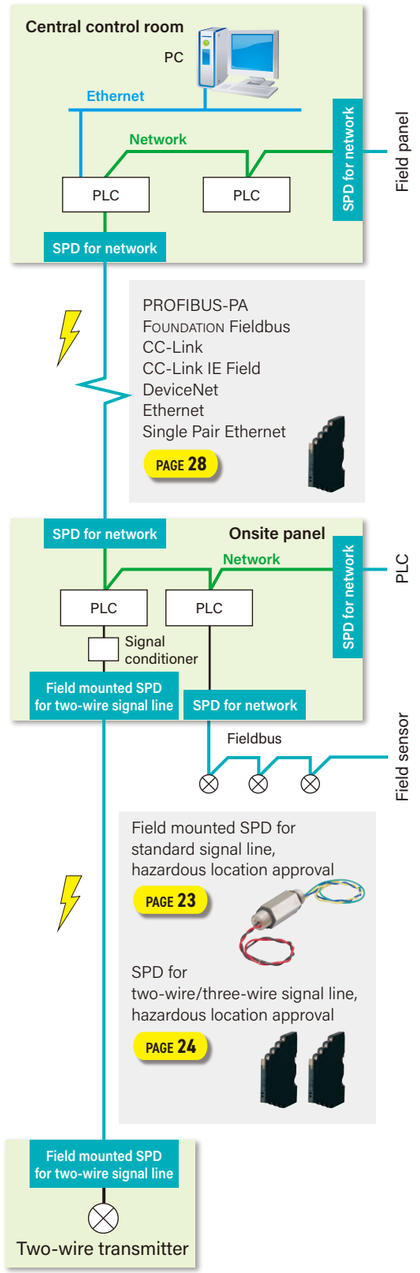
Specifications are subject to change without notice. When ordering, use the latest data sheets available at our web site: www.mgco.jp

Surge Protector Application Guide

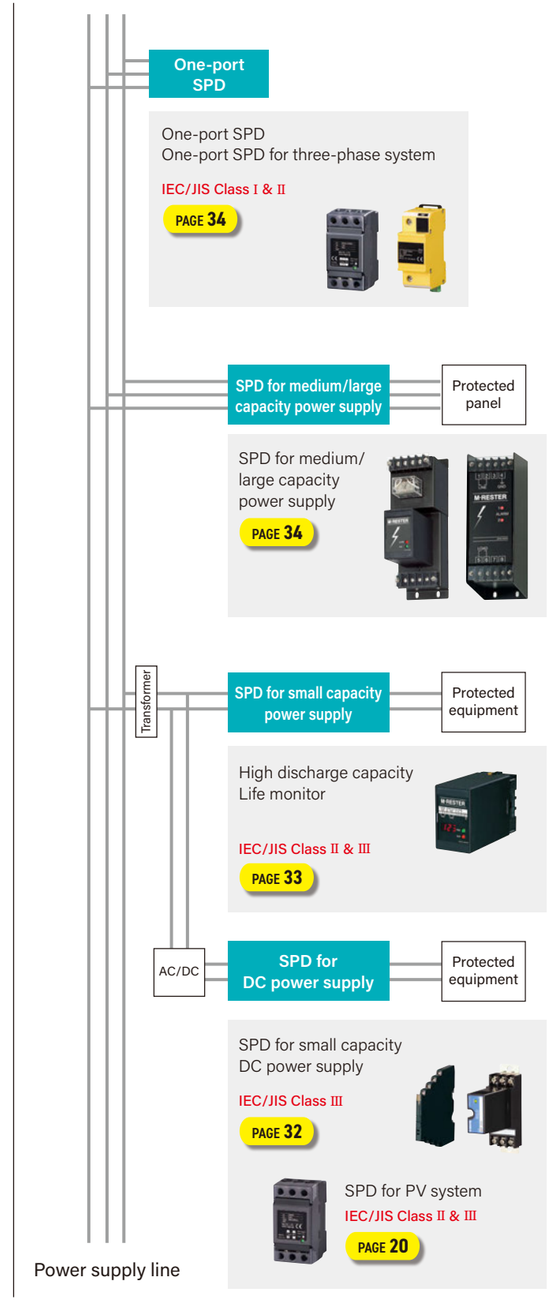
■ Signal line, transmission line, and network

SPD : Surge Protection Device (Surge Protector)





■ Power supply line

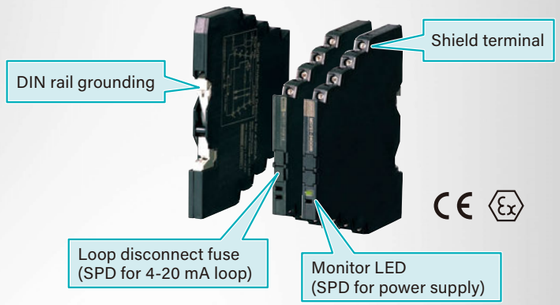


The connection diagrams and SPD layouts are images provided for the purpose of introducing our product lineup and do not accurately represent how the products will be used in actual applications.

Ultra-slim Lightning Surge Protectors

MD7 Series

- **High density mounting with 7 mm (0.28 in.) wide modules**
- **Excellent protection by multi-stage SPD**
- **Max. discharge current 20 kA (8/20 μsec)**
- **Independent shield terminal (three for signal, one for shield)**
- **Floating mode for the shield selectable to avoid ground loops**
- **Optional loop disconnect fuse for 4 – 20 mA signal line to separate the MD7 failed in shortcircuit mode, to protect other devices**
- **DIN rail mounting / grounding**
- **Conforms to IEC 61643-21, Categories C1, C2, D1**



The MD7 Series are lightning and surge protectors for instrumentation signal, network and power supply. Housed in only 7-mm-wide (0.28″) ultra slim housings, 16 surge protectors lined side by side take only 110-mm-wide (4.33″) space. With the height and depth similar to PLCs and remote I/Os, they are ideal to be installed in panels and cabinets together with these instruments.

Four poles of terminals are equipped on each of surge side and protected side, three for signal and one for shield. By adapting an independent set of shield terminals, floating and grounding can be selected in free combinations to suit users' applications.

High performance

The multi-stage protection combining discharge elements at the first stage and the series resistances and diodes ensures to limit the current flow.

The maximum discharge current capacity is as high as 20 kA for an impulse wave of 8/20 microseconds. The MD7 Series are tested according to IEC 61643-21 standard to be suitable for categories C1, C2 and D1. C1 category requires the surge protector to withstand 300 times of average induced surges, C2 to withstand 10 times of strong induced surges generated in a harsh environment without electromagnetic shielding. D1 category is tested by two direct hits.

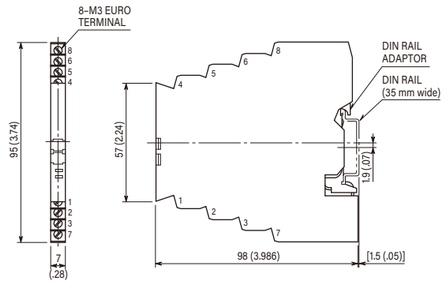
Easy commissioning

The MD7 Series are designed for multi-point, ultra-high-density installation. DIN rail mounting/grounding and slanted terminal block help installation and wiring work in such tight space.

When the DIN rail is grounded at single point, surge protectors mounted on it are automatically connected to the earth. There is no need of cross-wiring individual module.

Thanks to the terminal blocks slightly slanted forward, access from the front side to the terminals is easy even after the protectors are mounted on the rail.

EXTERNAL DIMENSIONS unit: mm (inch)



Independent shield terminal

Floating and grounding modes are selectable in free combination between shield and signal, shield and ground.

In the floating mode, the shield is normally insulated from the signal and the ground by a discharge element. When an elevated potential is detected by a lightning surge, the discharge element is immediately activated to prevent discharge at an undesirable location.

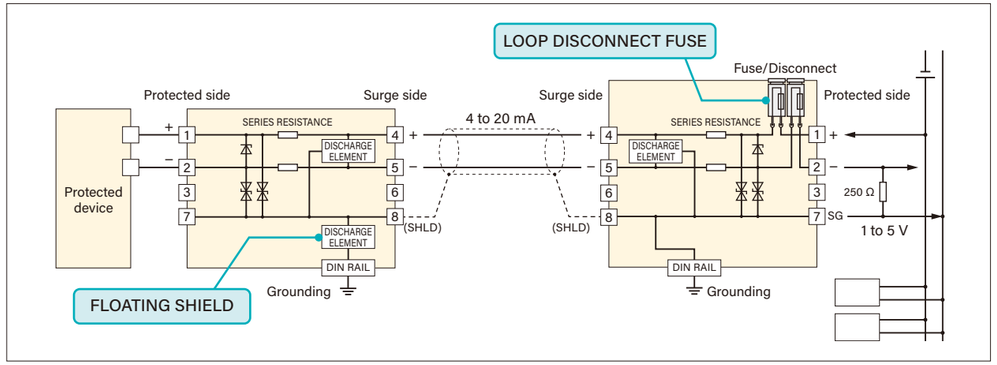
In the grounding mode, the shield is normally connected via difference of several to several tens of volts, and connected permanently to the ground.

Each installation or network protocol requires different earth grounding method, such like both-end grounding, single-end grounding, SG terminal connection. The MD7 Series provide the most suitable grounding type for each application.

Loop disconnect fuse

The model MD7ST, designed specifically for 4 – 20 mA loop, is provided with fuses to disconnect a failed device from the power bus supplying multiple devices. When the device protected by the MD7ST fails in shortcircuit mode, the fuse separates it from the power bus and protects the entire system.

MD7 Series function diagram and wiring example



Battery powered health testing

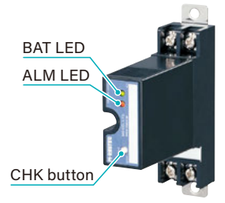
Without question, the main complaint in the industry with regard to lightning surge protectors is the difficulty in determining whether the lightning surge protector installed to protect your control system components is still functional.

Consider opening a panel with a large number of surge suppressors. Instead of unplugging and testing every unit, for the life monitor series models MD7AST and MDPA-24, all that is necessary is a quick visual inspection with a push button. No further tools or checking are required.

The lightning surge protector models MD7AST and MDPA-24 monitor not only the number of suppressed surges across the signal lines but also the leakage current from signal to ground which gives you more precise warning than most typical surge protectors monitoring only the number of suppressed surges. When a predetermined level of either the leakage current or number of suppressed surges is exceeded, respective indicators illuminate with a prompt of the 'Test' button.

Low in cost, these devices pay for themselves by providing early warning alarms and reducing ongoing unnecessary panel maintenance. When it comes to comparing the cost of downtime versus lightning surge protector replacement, the choice is obvious.

MD7AST



MDPA-24

Life indicator LEDs show surge protector's life status.

BAT	ALM	Battery	Discharge element	Voltage limiter	Replacement
☼	●	Normal			No need
☼	☼	Normal	Near end	Normal	Near
●	☼	Normal	End of life	Degraded*	Immediately required
●	●	Discharged	Unable to judge		

☼ON ● OFF

*With pulsating line signal or that containing ripples, the LED may flicker or blink when the voltage limiter is degraded.

How many surge devices does your company have installed that are potentially in poor health and still 'protecting' your control system?

Protection of PV system (industrial solar park)

Surge protectors designed to withstand high temperature and high voltage for photovoltaic (PV) systems

Power voltage

Models MATP and MATPH are usable for power voltages 600 V, 750 V and 1000 V DC.

Life monitor function

Models MATP, MATPH and MDM2AT have the life monitor function. Degradation of protective functions can be monitored by the front indicator LEDs. Alarm contact output is also available for remote monitoring of the surge protectors' life status.

Wide operating temperature range

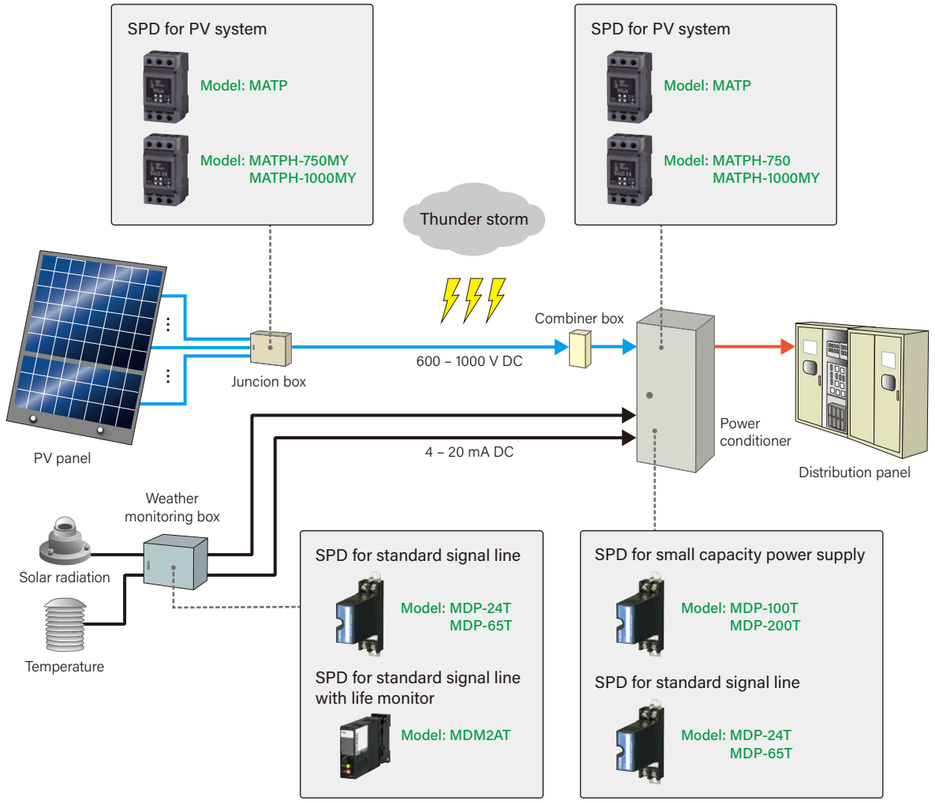
Models MATP and MATPH can be adopted in a high operating temperature range between -20 and +80°C (-4 and +176°F).

Lineup of lightning surge protectors for peripheral devices

Model: MDP-24T, MDP-65T
Surge protector for standard signal line, operating temperature -20 to +80°C (-4 to +176°F)

Model: MDP-100T, MDP-200T
Surge protector for small capacity power supply line, operating temperature -20 to +80°C (-4 to +176°F)

Model: MDM2AT
Surge protector for standard signal line with life monitor, operating temperature -20 to +70°C (-4 to +158°F)



Surge protector for PV system

Surge protector for PV system

Surge protector
for photovoltaic system

600 V DC line use
Model: MATP PAGE 20

IEC/JIS Class II

- Surge protection for photovoltaic array and power conditioner
- High discharge current capacity 20 kA or 40 kA (8/20 μs)
- Operating temperature range -25 to +80°C (-13 to +176°F)
- IP20 protection
- IEC 61643-1 Class II
- Degraded head element is automatically separated from the power lines by the incorporated thermal breaker, and the LED lamp (turns off) and the relay contact alerts the failure status.
- Breakdown of the surge protector remotely detected with the alarm output

Surge protector
for photovoltaic system

750 V DC line use
Model: MATPH-750MY PAGE 20

1000 V DC line use
Model: MATPH-1000MY PAGE 20

IEC/JIS Class II

- Surge protection for photovoltaic array and power conditioner
- Operating temperature range -25 to +80°C (-13 to +176°F)
- IP20 protection
- IEC 61643-1 Class II
- Degraded head element is automatically separated from the power lines by the incorporated thermal breaker, and the LED lamp (turns off) and the relay contact alerts the failure status.
- Breakdown of the surge protector remotely detected with the alarm output
- Photovoltaic system's resistance to earth is measurable without removing the SPD due to spark gap employed between line and earth.

Surge protector for standard signal line, life monitor

Surge protector
for photovoltaic system and instrument shelter

24, 48, 65 V DC line use, life monitor
Model: MDM2AT PAGE 20

- Designed specifically for 4 – 20 mA DC and pulse signal lines
- Absorbs surges only without affecting instrumentation signal
- LED light and alarm output indicate the degradation and life span of the surge protection circuits
- Operating temperature range -20 to +70°C (-4 to +158°F)

Surge protector for AC/DC power supply line

Surge protector
for photovoltaic system and instrument shelter

120 V AC line use
Model: MDP-100T PAGE 21

250 V AC line use
Model: MDP-200T PAGE 21

IEC/JIS Class III

- Designed for AC and specifically for DC power supplies up to 1 A
- Operating temperature range -20 to +80°C (-4 to +176°F)
- IEC 61643-1 Class III

Surge protector for standard signal line

Surge protector
for photovoltaic system and instrument shelter

24 V DC line use
Model: MDP-24T PAGE 21

65 V DC line use
Model: MDP-65T PAGE 21

IEC/JIS

- Designed specifically for 4 – 20mA DC and pulse signal line including both 4-wire and 2-wire transmitters
- No interruption of signal by unplugging surge protector element
- Operating temperature range -20 to +80°C (-4 to +176°F)
- IEC 61643-21 Categories C1, C2, D1

Class I one-port surge protector

Class I SPDs are designed to withstand the partial lightning current produced by a direct lightning strike.

- High discharge current capacity of 25 kA (10/350 μs)
- Detect degraded discharge element, with a relay contact output to alert the failure status.
- IEC 61643-1 Class I
- DIN rail mounting

Front view Rear view

IEC/JIS
Class I

Size: W35 × H98 × D64 mm
(1.38" × 3.86" × 2.52")
H103 mm (4.06"), alarm output option

PAGE 34

One-port Surge protector for power supply use (Class I)

Model: MAL

MODEL	RATING	FUNCTION
MAL-230Y	230 V AC	
MAL-230A	230 V AC	Alarm output
MAL-400A	400 V AC	Alarm output

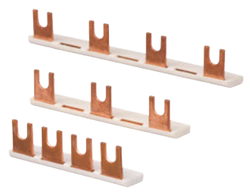
PAGE 35

One-port Surge protector for power supply use (Class I, between neutral and protective earth)

Model: MALN

MODEL	RATING	FUNCTION
MALN-230	230 V AC	

Clustered mounting



Wiring bridge

Wiring bridge for MAL and MALN

Model: CNB

MODEL	TYPE	FUNCTION
CNB2-2	Two poles	
CNB2-4	Four poles	for 2 units
CNB2-5	Five poles	for 3 units
CNB2-7	Seven poles	for 4 units

Class II and III surge protector product lineup

Surge protector for three-phase power supply

PAGE 35

Surge protector
for three-phase power supply

IEC 61643-11/JIS C5381-11 Class II
Model: MAT3

IEC 61643-1/JIS C5381-1 Class II
Model: MAT2

IEC/JIS Class II

Surge protector for power supply

PAGE 33

Surge protector for power supply, fast response 3 nsec.

IEC 61643-1/JIS C5381-1 Class II, III
Model: MMAJ

IEC/JIS Class II & III

High speed response

Surge energy attenuation ratio -74 dB *1
High discharge current capacity of 20 kA

*1. -40 dB to -56 dB for Model MMAJ, surge protector for power supply

Surge protector for standard signal line

PAGE 23

Surge protector
for standard signal line,
fast response 3 nsec.

Model: MDJST

IEC/JIS

- Designed specifically for 4 – 20 mA DC and pulse signal line
- Battery-powered status indicator
- High discharge current capacity 20 kA (8/20 μs)
- Shield terminal provided
- Compatible with IEC 61643-21 categories C1, C2, D1.

Surge protector for power supply

PAGE 33

Surge protector for power supply,
fast response 3 nsec.

Model: MMAJ

IEC/JIS Class II & III

- Designed to protect equipment from induced lightning surges entering through power supply cables
- High discharge current capacity type with a maximum of 20 kA is available.
- Degraded head element is automatically separated from the power lines by the incorporated thermal breaker, and the LED lamp (turns off) and the relay contact alert the failure status.
- Conforms to IEC 61643-1 Class II, III

Lightning protection standards

IEC 62305-3 JIS Z 9290-3	Protection against lightning - Part 3: Physical damage to structures and life hazard	External lightning protection system	Air-termination systems (rod) Down-conductor systems Earth-termination system
		Internal lightning protection system	Lightning equipotential bonding Separation distance
IEC 62305-4 JIS Z 9290-4	Protection against lightning - Part 4: Electrical and electronic systems within structures	IEC 60364 / JIS C 60364	Low voltage electrical installations
		IEC 60664 / JIS C 60664	Insulation coordination of equipment within low-voltage systems
		IEC 61643 / JIS C 5381	Low voltage surge protective devices

SPD classifications (IEC 61643)

■ SPD for power lines

CLASS	TEST WAVEFORM	DESCRIPTIONS	RECOMMENDED LOCATIONS
Class I	10/350 μs (direct surge)	SPDs which withstand the partial lightning current produced by a direct lightning strike	Line entrance to buildings (main distribution board)
Class II	8/20 μs (induced surge)	SPDs which withstand the induced surge current	Subdistribution board, control panel
Class III	Combination wave	SPDs which withstand the induced surge current	Near from terminal equipment

■ SPD for signal and transmission lines

CATEGORY	TEST WAVEFORM	DESCRIPTIONS	RECOMMENDED LOCATIONS
Category A	Rise rate ≥1000 μs	SPDs which withstand the power surge	Subdistribution board, control panel
Category B	Rise rate 10 μs	SPDs which withstand the induced surge current	Subdistribution board, control panel
Category C	Rise rate 1.2 μs	SPDs which withstand the induced surge current	Entrance to signaling network, subdistribution board, control panel
Category D	High energy	SPDs which withstand the partial lightning current produced by a direct lightning strike	Entrance to signaling network

Protection of open network system

Lightning surge protectors specifically designed to protect electronic equipment connected to open networks

Please see P.28 - P.30 for detailed information.

SUPPORTED OPEN NETWORKS

CC-Link　CC-Link IE Field　DeviceNet

PROFIBUS-PA　FOUNDATION Fieldbus　RS-422/RS-485

Ethernet　SPE (Single Pair Ethernet)

Surge protector for Ethernet (protecting network cameras)

PAGE 28

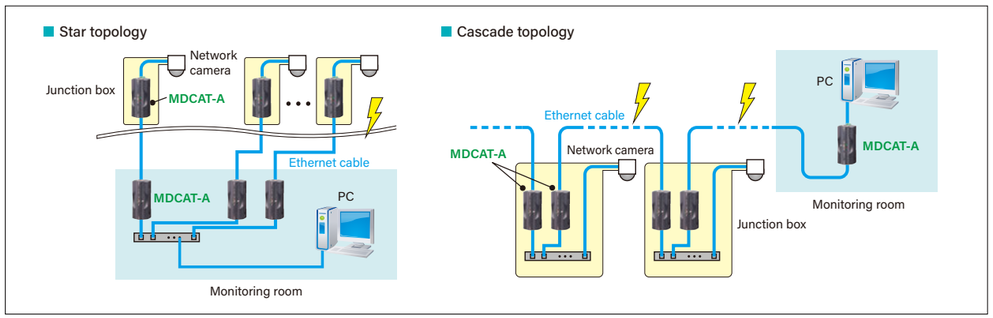
Surge protector for Ethernet, PoE / 10 BASE-T / 100 BASE-TX / 1000 BASE-T

With life monitor function
Model: MDCAT-A

Without life monitor function
Model: MDCAT

- Designed specifically for Ethernet network
- Conforms with 1000 Base-T, PoE and PoE Plus
- LAN cable's shield wire can be floating or grounding by a shortcircuit bar
- Pressing CHK (Check) button confirms with LEDs the life span of the surge protect device (MDCAT-A)
- Compact design suitable for installation in a junction box for surveillance cameras
- DIN rail mounting

System configuration example



Surge protector for CC-Link

PAGE 29

Surge protector for CC-Link, CC-Link Ver. 1.10/2.0.

Model: MDW5-CC

- Approved by CLPA (CC-Link Partner Association)
- Available with CC-Link Ver. 1.10/2.00
- Conforms to IEC 61643-21 Categories C1, C2, D1

Surge protector for CC-Link IE Field Network

PAGE 29

Surge protector for CC-Link IE Field Network

Model: MDCAT-NC

- Recommended for CC-Link IE Field Network
- LAN cable's shield wire can be floating or grounding by a shortcircuit bar
- Grounding with M3 screw terminal or via DIN rail
- Conforms to IEC 61643-21 Categories C1, C2

Surge protector for DeviceNet

PAGE 29

Surge protector for DeviceNet

Load capacity 8 A
Model: MD-DNM

Load capacity 2 A
Model: MD-DNS

- Compact, palm-top sized surge protector
- Single module is applicable to all 5-core cable lines of DeviceNet
- Alarm relay contact turns on in an abnormality of surge absorber element.
- Surge absorber failure indicator

Surge protector for PROFIBUS-PA / FOUNDATION Fieldbus

PAGE 30

Surge protector for PROFIBUS-PA / FOUNDATION Fieldbus, Ultra-slim

PROFIBUS-PA
Model: MD7PA

FOUNDATION Fieldbus
Model: MD7FB

- High discharge current capacity 20 kA (8/20 μs), 1 kA (10/350 μs)
- Ultra-thin 7-mm-wide (0.28") module can be mounted in high density
- Excellent protection employing multi-stage SPD circuits
- DIN rail mounting and grounding
- Shield terminal provided
- Conforms to IEC 61643-21 Categories C1, C2, D1

Surge protector for SPE (Single Pair Ethernet)

PAGE 30

Surge protector for SPE, PoDL

With life monitor function
Model: MDCAT-SPE-A

Without life monitor function
Model: MDCAT-SPE

- Conforms with PoDL
- Compact and light weight
- Cables' shield wire can be floating or grounding by a shortcircuit bar
- DIN rail mounting
- Pressing CHK (Check) button confirms with LEDs the life span of the surge protect device (MDCAT-SPE-A)
- Conforms to IEC 61643-21 Categories C2, D1

Lightning Surge Protectors for Electronics Equipment

M-RESTER Series

M-RESTER absorbs only the lightning surges with no interruption of the instrumentation signal

Surge protector series developed specifically for electronics equipment

Each model, identified with a specific sensor or network type, is easy to choose.
Carefully chosen specifications for maximum protection.

Introducing surge protectors by application

PV system ..... Page 20
Standard signal line ..... Page 22
Sensor signal ..... Page 25
Strain gauge and self-synch ..... Page 26
Pulse and ON/OFF signals ..... Page 27
Network ..... Page 28
Transmission line ..... Page 31
DC power supply ..... Page 32
Power supply, small capacity ..... Page 33
Power supply, medium/large capacity ... Page 34
One-port SPD ..... Page 34
Related products ..... Page 35

Surge protector for PV system

DC POWER SUPPLY LINE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
SURGE PROTECTOR FOR PHOTOVOLTAIC SYSTEM	MATP	*P. 20*	IEC/JIS Class II
SURGE PROTECTOR FOR PHOTOVOLTAIC SYSTEM (750 V DC, 1000 V DC use)	MATPH	*P. 20*	IEC/JIS Class II

STANDARD SIGNAL LINE, LIFE MONITOR

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (life monitor, 24 V, 48 V or 65 V DC line voltage, photovoltaic system, instrument shelter)	MDM2AT	*P. 20*	

SMALL CAPACITY POWER SUPPLY LINE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR AC/DC POWER SUPPLY USE (1A) (photovoltaic system, instrument shelter)	MDP-100T	*P. 21*	IEC/JIS Class III
LIGHTNING SURGE PROTECTOR FOR AC/DC POWER SUPPLY USE (1A) (photovoltaic system, instrument shelter)	MDP-200T	*P. 21*	IEC/JIS Class III

STANDARD SIGNAL LINE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (photovoltaic system, instrument shelter)	MDP-24T	*P. 21*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (photovoltaic system, instrument shelter)	MDP-65T	*P. 21*	IEC/JIS Categories C1, C2, D1

Surge protector for standard signal line

STANDARD SIGNAL LINE, LIFE MONITOR

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE (ultra-slim; life monitor)	MD7AST	*P. 22*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE	MDPA-24	*P. 22*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE	MDPA-65	*P. 22*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (life monitor, 24 V DC line voltage)	MDM2A-24	*P. 22*	
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (life monitor, 48 V or 65 V DC line voltage)	MDM2A-65	*P. 22*	
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (life monitor, 24 V, 48 V or 65 V DC line voltage, photovoltaic system, instrument shelter)	MDM2AT	*P. 20*	

STANDARD SIGNAL LINE, SLIM OR COMPACT SIZE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE (ultra-slim)	MD7ST	*P. 22*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE	MDP-24-1	*P. 22*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE	MDP-65-1	*P. 22*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (photovoltaic system, instrument shelter)	MDP-24T	*P. 21*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (photovoltaic system, instrument shelter)	MDP-65T	*P. 21*	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (24 V DC; rack mounted)	MGD-24	*P. 22*	
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (65 V DC; rack mounted)	MGD-65	*P. 22*	
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE USE	MDK-24	*P. 22*	

■ STANDARD SIGNAL LINE, HIGH DISCHARGE CURRENT CAPACITY, HIGH SPEED RESPONSE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE (fast response: 3 nsec.)	MDJST	P. 23	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE USE (high discharge current capacity)	MMD	P. 23	
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE USE (high speed/high discharge current capacity)	MMDH	P. 23	

■ STANDARD SIGNAL LINE, CONDUIT MOUNT (HAZARDOUS LOCATION APPROVAL)

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (conduit mount, weather-proof, 24 V DC line voltage)	MD6N-24	P. 23	Ex FM APPROVED
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (conduit mount, weather-proof; 65 V DC line voltage)	MD6N-65	P. 23	Ex FM APPROVED
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (conduit mount, weather-proof, 24 V DC line voltage)	MD6T-24	P. 23	Ex
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (conduit mount, weather-proof; 65 V DC line voltage)	MD6T-65	P. 23	Ex
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (conduit mount, weather-proof, 24 V DC line voltage)	MD6P-24	P. 23	Ex FM APPROVED
LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (conduit mount, weather-proof; 65 V DC line voltage)	MD6P-65	P. 23	Ex FM APPROVED

■ STANDARD SIGNAL LINE, TWO-WIRE/THREE-WIRE LOOP (HAZARDOUS LOCATION APPROVAL)

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR TWO-WIRE SIGNAL LOOP (ultra-slim)	MD72W	P. 24	Ex IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR TWO-WIRE SIGNAL LOOP (ultra-slim; 2 channels)	MD72WD	P. 24	Ex IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR THREE-WIRE SIGNAL LOOP (ultra-slim)	MD73W	P. 24	Ex IEC/JIS Categories C1, C2, D1

Surge protector for sensor signal

■ THERMOCOUPLE & RECEIVING INSTRUMENT

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR THERMOCOUPLE USE (ultra-slim)	MD7TC	P. 25	Ex IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR THERMOCOUPLE USE	MDP-TC	P. 25	IEC/JIS Categories C1, C2, D1

■ RTD & RECEIVING INSTRUMENT

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR RTD USE (ultra-slim)	MD7RB	P. 25	Ex IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR RTD USE	MDP-RB	P. 25	IEC/JIS Categories C1, C2, D1

■ POTENTIOMETER & RECEIVING INSTRUMENT

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR POTENTIOMETER USE (ultra-slim)	MD7PM	P. 25	Ex IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR POTENTIOMETER USE	MDP-PM	P. 25	IEC/JIS Categories C1, C2, D1

■ STANDARD SIGNAL LINE WITH SENSOR EXCITATION

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR SIGNAL LINE WITH EXCITATION USE	MDK-LV	P. 25	

Surge protector for strain gauge and self-synch

■ STRAIN GAUGE & RECEIVING INSTRUMENT

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR STRAIN GAUGE (ultra-slim)	MD7LC	P. 26	Ex IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR STRAIN GAUGE USE	MDP-LC	P. 26	IEC/JIS Category C3
LIGHTNING SURGE PROTECTOR FOR STRAIN GAUGE USE	MDK-LC	P. 26	
LIGHTNING SURGE PROTECTOR FOR STRAIN GAUGE USE (6-wire remote sensing)	MD-LC2	P. 26	

■ SELF-SUNCH & RECEIVING INSTRUMENT

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR SELF-SYNCH (ultra-slim)	MD7JS	P. 26	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR SELF-SYNCH USE	MDP-JS	P. 26	IEC/JIS Categories C1, C2, D1

Surge protector for pulse and ON/OFF signal

■ PULSE & ON/OFF SIGNAL

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR PULSE SIGNAL (ultra-slim)	MD7PL	P. 27	Ex IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR LOW FREQUENCY USE	MDP-SP	P. 27	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR MULTI-CHANNEL USE (high discharge current capacity)	MDR2	P. 27	IEC/JIS Categories C1, C2, D1
MULTI M-RESTER	MDR-8	P. 27	

Surge protector for network

RS-485 / RS-422

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR RS-485 / RS-422 (ultra-slim)	MD74R	P. 28	IEC/JIS Categories C1, C2
LIGHTNING SURGE PROTECTOR FOR RS-485 / RS-422	MDP-4R	P. 28	IEC/JIS Categories C1, C2
LIGHTNING SURGE PROTECTOR FOR RS-485 / RS-422 (life monitor)	MDW2A-4R	P. 28	
LIGHTNING SURGE PROTECTOR FOR RS-485 / RS-422 (full-duplex)	MDW5-4R	P. 28	

ETHERNET

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR ETHERNET (PoE / 10 BASE-T / 100 BASE-TX / 1000 BASE-T)	MDCAT	P. 28	IEC/JIS Categories C1, C2
LIGHTNING SURGE PROTECTOR FOR ETHERNET (PoE / 10 BASE-T / 100 BASE-TX / 1000 BASE-T, life monitor)	MDCAT-A	P. 28	IEC/JIS Categories C1, C2
LIGHTNING SURGE PROTECTOR FOR ETHERNET (100 BASE-TX / 10 BASE-T)	MDM5E-A	P. 28	IEC/JIS Category C1

ETHERNET SWITCH WITH SURGE PROTECTOR

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
8-PORT ETHERNET SWITCH (with surge protector)	SHSP	P. 29	

CC-Link

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR CC-Link	MDW5-CC	P. 29	IEC/JIS Categories C1, C2, D1

CC-Link IE Field NETWORK

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR CC-Link IE Field Network	MDCAT-NC	P. 29	IEC/JIS Categories C1, C2

DeviceNet

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR DeviceNet (load capacity 8 A)	MD-DNM	P. 29	
LIGHTNING SURGE PROTECTOR FOR DeviceNet (load capacity 2 A)	MD-DNS	P. 29	

PROFIBUS-PA

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR PROFIBUS-PA (ultra-slim)	MD7PA	P. 30	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR PROFIBUS-PA	MDP-PA	P. 30	IEC/JIS Categories C1, C2

FOUNDATION Fieldbus

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR FOUNDATION Fieldbus (ultra-slim)	MD7FB	P. 30	IEC/JIS Categories C1, C2, D1

SINGLE PAIR ETHERNET

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR SINGLE PAIR ETHERNET (PoDL)	MDCAT-SPE	P. 30	IEC/JIS Categories C2, D1
LIGHTNING SURGE PROTECTOR FOR SINGLE PAIR ETHERNET (PoDL, life monitor)	MDCAT-SPE-A	P. 30	IEC/JIS Categories C2, D1

Surge protector for transmission line

TRANSMISSION LINE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR TELEMETERING USE (3.4 kHz)	MDP-FT	P. 31	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR TELEMETERING USE (50 bps)	MDP-MFA	P. 31	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR TELECOMMUNICATION LINE USE	MDP-TL	P. 31	IEC/JIS Categories C1, C2
LIGHTNING SURGE PROTECTOR FOR ANALOG TELECOM LINE USE (life monitor)	MDA-TL	P. 31	
LIGHTNING SURGE PROTECTOR FOR TELECOMMUNICATION LINE USE	MD-TL	P. 31	
LIGHTNING SURGE PROTECTOR FOR ISDN CIRCUIT USE	MD-INS	P. 31	
LIGHTNING SURGE PROTECTOR FOR DATA-M USE	MDP-DM	P. 31	IEC/JIS Categories C1, C2
LIGHTNING SURGE PROTECTOR FOR MsysNet USE	MDP-DM3	P. 31	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR EC-CABLE USE	MDP-EC	P. 31	IEC/JIS Categories C1, C2

Surge protector for DC power supply line

DC POWER SUPPLY LINE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR DC POWER SUPPLY (max. 1.2 A; ultra-slim)	MD7DP	P. 32	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (DC power use)	MDH	P. 32	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (DC power use; life monitor)	MDHA	P. 32	
LIGHTNING SURGE PROTECTOR FOR DC POWER SUPPLY USE	MDP-D	P. 32	IEC/JIS Class III
SURGE PROTECTOR FOR PHOTOVOLTAIC SYSTEM	MATP	P. 20	IEC/JIS Class II
SURGE PROTECTOR FOR PHOTOVOLTAIC SYSTEM (750 V DC, 1000 V DC use)	MATPH	P. 20	IEC/JIS Class II

Surge protector for small capacity power supply line

SMALL CAPACITY POWER SUPPLY LINE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR AC POWER SUPPLY (max. 3 A; ultra-slim)	MD7AP	P. 33	IEC/JIS Categories C1, C2, D1
LIGHTNING SURGE PROTECTOR FOR AC/DC POWER SUPPLY USE (1 A)	MDP-100	P. 33	IEC/JIS Class III
LIGHTNING SURGE PROTECTOR FOR AC/DC POWER SUPPLY USE (1 A)	MDP-200	P. 33	IEC/JIS Class III
LIGHTNING SURGE PROTECTOR FOR AC/DC POWER SUPPLY USE (1 A) (photovoltaic system, instrument shelter)	MDP-100T	P. 21	IEC/JIS Class III
LIGHTNING SURGE PROTECTOR FOR AC/DC POWER SUPPLY USE (1 A) (photovoltaic system, instrument shelter)	MDP-200T	P. 21	IEC/JIS Class III
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (2 A, 120 V AC / 170 V DC; rack-mounted)	MGA-100	P. 33	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (2 A, 250 V AC / 350 V DC; rack mounted)	MGA-200	P. 33	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY (2 A, 100 V / 110 V / 120 V AC)	MA-100	P. 33	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY (2 A, 200 V / 220 V / 240 V AC)	MA-200	P. 33	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (5 A; high discharge current capacity; life monitor)	MAA	P. 33	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (5A; high discharge current capacity; life monitor/surge counter)	MAAC	P. 33	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (fast response: 3 nsec.)	MMAJ	P. 33	IEC/JIS Class II, III
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (10 A; high discharge current capacity)	MMA	P. 33	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (10 A; high speed/high discharge current capacity)	MMAH	P. 33	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (5 A; high discharge current capacity)	MAX	P. 33	
SURGE ABSORBER ELEMENT (For MAX use)	MEL	--	

Surge protector for medium capacity power supply line

■ MEDIUM CAPACITY POWER SUPPLY LINE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (20 A)	MAH	*P. 34*	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (10 – 30 A; replaceable arrester module)	MMH	*P. 34*	
ARRESTER MODULE (For MMH use)	MEH	--	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (5 A, 100 V / 110 V / 120 V AC)	MH-105A	*P. 34*	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (10 A, 100 V / 110 V / 120 V AC)	MH-110A	*P. 34*	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (30 A, 100 V / 110 V / 120 V AC)	MH-130A	*P. 34*	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (5 A, 200 V / 220 V / 240 V AC)	MH-205A	*P. 34*	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (10 A, 200 V / 220 V / 240 V AC)	MH-210A	*P. 34*	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (30 A, 200 V / 220 V / 240 V AC)	MH-230A	*P. 34*	

Surge protector for large capacity power supply line

■ LARGE CAPACITY POWER SUPPLY LINE

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (100 V / 110 V / 120 V AC, single phase)	MA-1201	*P. 34*	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (200 V / 220 V / 240 V AC, single phase)	MH-2201	*P. 34*	
LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (200 V / 220 V / 240 V AC, 3-phase)	MH-2203	*P. 34*	

One-port surge protector

■ ONE-PORT SURGE PROTECTOR

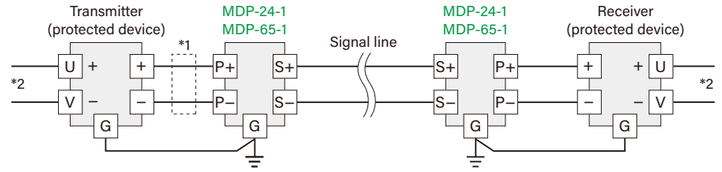
PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
ONE-PORT SURGE PROTECTOR FOR POWER SUPPLY USE (class I)	MAL	*P. 34*	IEC/JIS Class I
ONE-PORT SURGE PROTECTOR BETWEEN NEUTRAL AND PROTECTIVE EARTH (class I)	MALN	*P. 35*	IEC/JIS Class I
LIGHTNING SURGE PROTECTOR FOR THREE-PHASE POWER SUPPLY	MAT3	*P. 35*	IEC/JIS Class II
LIGHTNING SURGE PROTECTOR FOR THREE-PHASE POWER SUPPLY	MAT2	*P. 35*	IEC/JIS Class II
ONE-PORT SURGE PROTECTOR FOR POWER SUPPLY USE	MAKF	*P. 35*	
ONE-PORT SURGE PROTECTOR BETWEEN NEUTRAL AND PROTECTIVE EARTH	MAKN	*P. 35*	IEC/JIS Class II

Related products

■ ACCESSORY

PRODUCT	MODEL	PAGE	STANDARD/APPROVAL
DIN RAIL MOUNTING ADAPTER	A-33	*P. 35*	
M-RESTER TESTER	C-106A-1	*P. 35*	
OUTDOOR HOUSING (weather-proof)	BX-W1	*P. 35*	
LOOP DISCONNECT FUSE	MD7F	--	
TERMINAL BLOCK FOR GROUNDING (ultra-slim)	MD7G	--	
SINGLE MOUNT ADAPTOR	MBS	--	
WIRING BRIDGE	CNB	--	
WIRING BRIDGE	CNB2	--	

■ Connection example Protecting electronic instruments' I/O



*1. Install a circuit protector when the transmitter output current exceeds 100 mA.
*2. The M-RESTER is designed in particular to protect signal lines. To protect power supply lines, install other types of surge protectors.

Surge protector for PV system

DC POWER SUPPLY

Model	MATP-600	MATPH-750	MATPH-1000
	 IEC/JIS Class II	 IEC/JIS Class II CE	
Functions & features	One-port SPD for PV system	One-port SPD for PV system	
Nominal voltage	600 V DC	750 V DC	1000 V DC
Max. continuous operating voltage (Uc)	600 V	750 V	1000 V
Voltage protection level (Up)	2.5 kV	2.5 kV	2.5 kV
Maximum discharge current (Imax)	20 kA (8/ 20 μs), 40 kA (8/ 20 μs)	20 kA (8/ 20 μs)	
Operating temperature	-25 to +80°C (-13 to +176°F)		

STANDARD SIGNAL LINE, LIFE MONITOR

Model	MDM2AT-24	MDM2AT-65
	 CE	
Functions & features	4-20 mA DC and pulse signal line use, for photovoltaic system, instrument shelter	
Nominal voltage	24 V DC	48 V or 65 V DC
Max. continuous operating voltage (Uc)	30 V	70 V
Voltage protection level (Up)	45 V	100 V
Discharge current capacity	5000 A (8/ 20 μs)	
Max. load current	100 mA	
Internal series resistance	20 Ω ±10 % (including return)	
Operating temperature	-20 to +70°C (-4 to +158°F)	

Surge protector for PV system

SMALL CAPACITY POWER SUPPLY LINE

Model	MDP-100T	MDP-200T
	 IEC/JIS Class III	 IEC/JIS Class III
Functions & features	Small capacity power supply line up to 1 A, for photovoltaic system, instrument shelter	
Nominal voltage	120 V AC	250 V AC
Max. line voltage (Uc)	120 V AC (peak voltage 170V)	250 V AC (peak voltage 355V)
Voltage protection level (Up)	400 V	800 V
Max. discharge current (Imax)	1000 A (8/ 20 μs)	
Nominal current (I_N)	1.0 A	
Operating temperature	-20 to +80°C (-4 to +176°F)	

STANDARD SIGNAL LINE

Model	MDP-24T	MDP-65T
	 IEC/JIS CE	 IEC/JIS CE
Functions & features	4-20 mA DC and pulse signal line use, for photovoltaic system, instrument shelter	
Max. continuous operating voltage (Uc)	30 V	70 V
Voltage protection level (Up)	45 V	110 V
Max. discharge current (Imax)	5000 A (8/ 20 μs)	
Nominal current (I_N)	100 mA	
Internal series resistance	20 Ω ±10 % (including return)	
Operating temperature	-20 to +80°C (-4 to +176°F)	

Surge protector for standard signal line

STANDARD SIGNAL LINE, LIFE MONITOR

Model	MD7AST-24	MD7AST-60	MDPA-24	MDPA-65	MDM2A-24	MDM2A-65
						
Features	Ultra-slim design, life monitor		Compact plug-in style, life monitor		Life monitor alerted by contact output	
Application	Protecting 4-20 mA DC, 1-5 V DC and pulse signal line					
Nominal voltage	24 V DC	60 V DC	24 V DC	65 V DC	24 V DC	48 V or 65 V DC
Max. continuous operating voltage (Uc)	30 V	70 V	30 V	70 V	30 V	70 V
Voltage protection level (Up)	60 V	115 V	50 V	100 V	45 V	85 V
Max. discharge current (Imax) or discharge current capacity	20 kA (8/20 μs), 1.0 kA (10/350 μs)		5000 A (8/ 20 μs)		5000 A (8/ 20 μs)	
Nominal current (I_N)	250 mA		100 mA		100 mA	
Internal series resistance	4.7 Ω ±10 % per line	10 Ω ±10 % per line	20 Ω ±10 % (including return)		20 Ω ±10 % (including return)	

STANDARD SIGNAL LINE, SLIM OR COMPACT SIZE

Model	MD7ST-24	MD7ST-60	MDP-24-1	MDP-65-1	MGD-24	MGD-65
			 UL listing for MDP-24-1 only			
Features	Ultra-slim design		Compact plug-in style		Rack-mounted, 2 channels	
Application	Protecting 4-20 mA DC, 1-5 V DC and pulse signal line					
Nominal voltage	24 V DC	60 V DC	24 V DC	65 V DC	24 V DC	65 V DC
Max. continuous operating voltage (Uc)	30 V	70 V	30 V	70 V	30 V	70 V
Voltage protection level (Up)	60 V	115 V	45 V	110 V	40 V	80 V
Max. discharge current (Imax) or discharge current capacity	20 kA (8/20 μs), 1.0 kA (10/350 μs)		5000 A (8/ 20 μs)		1000 A (8/ 20 μs)	
Nominal current (I_N)	250 mA		100 mA		100 mA	
Internal series resistance	See Table below		20 Ω ±10 % (including return)		Approx. 20 Ω (including return)	

Internal series resistance	MD7ST-24	Without fuse	4.7 Ω ±10 % per line
		With fuse	7.5 Ω ±10 % per line
	MD7ST-60	Without fuse	10 Ω ±10 % per line
		With fuse	12.5 Ω ±10 % per line

Model	MDKT-24
	
Functions & features	Shallow depth 50 mm (1.97")
Application	Protecting 4-20 mA DC, 1-5 V DC and pulse signal line
Max. continuous operating voltage (Uc)	30 V
Voltage protection level (Up)	40 V
Discharge current capacity	5000 A (8/ 20 μs)
Nominal current (I_N)	100 mA
Internal series resistance	20 Ω ±5 %

Surge protector for standard signal line

STANDARD SIGNAL LINE, HIGH DISCHARGE CURRENT CAPACITY, HIGH SPEED RESPONSE

Model	MDJST-12	MDJST-24	MDJST-48	MMD-24	MMDH-24
					
Features	High speed response 3 nsec.			High discharge current capacity	High discharge current capacity, high speed response 4 nsec.
Application	Protecting 4-20 mA DC, 1-5 V DC signal line				
Nominal voltage	12 V DC	24 V DC	48 V DC	24 V DC	24 V DC
Max. continuous operating voltage (Uc)	±18 V	±36 V	±60 V	±40 V	±40 V
Voltage protection level (Up)	±30 V	±50 V	±90 V	±50 V	±50 V
Max. discharge current (Imax) or discharge current capacity	20 kA (8/20 μs)			10000 A (8/ 20 μs)	20000 A (8/ 20 μs)
Nominal current (I_N)	1 A			0.1 A	0.1 A
Internal series resistance	≤ 3 Ω			≤ 0.4 Ω (including return)	≤ 0.4 Ω (including return)

STANDARD SIGNAL LINE, CONDUIT MOUNT (HAZARDOUS LOCATION APPROVAL)

Model	MD6N-24	MD6N-65	MD6T-24	MD6T-65	MD6P-24	MD6P-65
						
Features	Leadwire connection, pipe nipple type		Terminal block connection type		Leadwire connection, stopping plug type	
Application	Protecting 4-20 mA DC, 1-5 V DC and pulse signal line					
Hazardous location approval	FM explosion-proof, ATEX flameproof		ATEX flameproof		FM explosion-proof, ATEX flameproof	
Body material	Nickel-plated brass or stainless steel 316					
Nominal voltage	24 V DC	65 V DC	24 V DC	65 V DC	24 V DC	65 V DC
Max. continuous operating voltage (Uc)	30 V	70 V	30 V	70 V	30 V	70 V
Voltage protection level (Up)	40 V	100 V	40 V	100 V	40 V	100 V
Discharge current capacity	10000 A (8/20 μs)		10000 A (8/20 μs)		10000 A (8/20 μs)	
Nominal current (I_N)	100 mA		100 mA		100 mA	
Internal series resistance	Approx. 22 Ω (including return)		Approx. 22 Ω (including return)		Approx. 22 Ω (including return)	

Surge protector for standard signal line

STANDARD SIGNAL LINE, TWO-WIRE/THREE-WIRE LOOP (HAZARDOUS LOCATION APPROVAL)

Model	MD72W-07	MD72W-16	MD72W-32	MD72W-55	MD72WD-07	MD72WD-16	MD72WD-32
							
Features	Ultra-slim design				Ultra-slim design		
Application	Protecting two-wire signal line				Protecting two-wire signal line, two channels		
Nominal voltage	7 V DC	16 V DC	32 V DC	55 V DC	7V DC	16 V DC	32 V DC
Max. continuous operating voltage (Uc)	±7 V	±16 V	±32 V	±55 V	±7 V	±16 V	±32 V
Voltage protection level (Up)	20 V	30 V	50 V	80 V	30 V	45 V	70 V
Max. discharge current (Imax)	20 kA (8/20 µs), 1.0 kA (10/350 µs)				20 kA (8/20 µs), 1.0 kA (10/350 µs)		
Nominal current (IN)	400 mA without fuse, 250 mA with fuse				250 mA		
Internal series resistance	2.2 Ω ±20 % per line, without fuse 4 Ω ±20 % per line, with fuse				4.7 Ω ±20 % per line		

Model	MD73W
	
Features	Ultra-slim design
Application	Protecting three-wire signal line
Nominal voltage	32 V DC
Max. continuous operating voltage (Uc)	±32 V
Voltage protection level (Up)	±60 V
Max. discharge current (Imax)	20 kA (8/20 µs), 1.0 kA (10/350 µs)
Nominal current (IN)	400 mA
Internal series resistance	2.2 Ω ±20 % per line

Surge protector for sensor signal

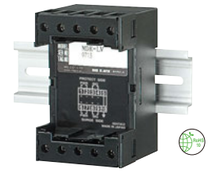
THERMOCOUPLE & RECEIVING INSTRUMENT

Model	MD7TC	MDP-TC
		
Features	Ultra-slim design	Compact plug-in style
Max. line voltage (Uc)	7.5 V	7.5 V
Voltage protection level (Up)	25 V	20 V
Max. discharge current (Imax)	20 kA (8/20 µs), 1.0 kA (10/350 µs)	5000 A (8/ 20 µs)
Nominal current (IN)	100 mA	100 mA
Internal series resistance	4.7 Ω ±10 % per line	20 Ω ±10 % (including return)

RTD & RECEIVING INSTRUMENT

Model	MD7RB	MDP-RB
		
Features	Ultra-slim design	Compact plug-in style
Max. continuous operating voltage (Uc)	±3 V	B to C: ±6 V, B or C to A: ±3 V
Voltage protection level (Up)	±25 V	2 to 3: ±40 V, 2 or 3 to 1: ±25 V
Max. discharge current (Imax)	20 kA (8/20 µs), 1.0 kA (10/350 µs)	5000 A (8/ 20 µs)
Nominal current (IN)	100 mA	100 mA
Internal series resistance	5.12 Ω ±0.3 %, ±30 ppm/°C per line	10 Ω ±0.1 %, 30 ppm/°C

POTENTIOMETER & RECEIVING INSTRUMENT, SIGNAL LINE WITH SENSOR EXCITATION

Model	MD7PM	MDP-PM	MDK-LV
			
Features	Ultra-slim design	Compact plug-in style	Shallow depth 50 mm (1.97")
Application	Potentiometer signal line	Potentiometer signal line	Signal line with sensor excitation
Max. continuous operating voltage (Uc)	7.5 V	B to C: ±7.5 V, B or C to A: 7.5 V	Excitation side: 30 V min. Signal side: 10 V min.
Voltage protection level (Up)	25 V	2 to 3: ±25 V, 2 or 3 to 1: 25 V	Excitation side: 40 V max. Signal side: 20 V max.
Max. discharge current (Imax) or discharge current capacity	20 kA (8/20 µs), 1.0 kA (10/350 µs)	5000 A (8/ 20 µs)	5000 A (8/ 20 µs)
Nominal current (IN)	100 mA	100 mA	100 mA
Internal series resistance	4.7 Ω ±10 % per line	10 Ω ±0.1 %, ±30 ppm/°C	10 Ω ±5 %

Surge protector for strain gauge, self-synch

STRAIN GAUGE & RECEIVING INSTRUMENT

Model		MD7LC-0	MD7LC-1	MDP-LC	MDK-LC
		 CE / ATEX for MD7LC-1 only			
Features		Ultra-slim design		Compact plug-in style	Shallow depth 50 mm (1.97″)
Application		Strain gauge signal line		Strain gauge signal line	Strain gauge signal line
Series resistance		Without	With	Without	With
Max. continuous operating voltage (Uc)	Out. side	±0.2 V		±0.3 V	±0.3 V
	Exc. side	15 V		15 V	15 V
Voltage protection level (Up)	Out. side	±15 V @0.2 kV	±40 V @6 kV	±15 V	±15 V
	Exc. side	30 V @0.2 kV	50 V @6 kV	30 V	30 V
Max. discharge current (Imax) or discharge current capacity	Out. side	100 A (8/20 µs)	20 kA (8/20 µs) 1.0 kA (10/350 µs)	100 A (8/20 µs), 25 A (10/1000 µs)	100 A (8/ 20 µs)
	Exc. side			50 A (8/20 µs), 25 A (10/1000 µs)	50 A (8/ 20 µs)
Nominal current (IN)		---	250 mA	---	---
Internal series resistance		---	1.5 Ω ±10 % per line	---	≤ 0.1 Ω

STRAIN GAUGE, SELF-SYNCH & RECEIVING INSTRUMENT

Model	MD-LC2	MD7JS	MDP-JS
			
Features	Remote sensing	Ultra-slim design	Compact plug-in style
Application	Six-wire strain gauge signal line	Self-synch signal line	Self-synch signal line
Max. continuous operating voltage (Uc)	Signal side: ±0.3 V Excitation side: 15 V	±130 V	A to B to C: ±170 V
Voltage protection level (Up)	Signal side: ±20 V Excitation side: 140 V	±450 V	1 to 2 to 3: ±450 V
Max. discharge current (Imax) or discharge current capacity	5000 A (8/20 µs)	20 kA (8/20 µs), 1.0 kA (10/1000 µs)	5000 A (8/20 µs)
Nominal current (IN)	Signal (L1, L2) each: approx. 10 Ω; 100 mA Exc. (+, –) each: approx. 4 Ω; 200 mA Exc. (S+, S–) each: approx. 10 Ω; 100 mA	500 mA	500 mA
Internal series resistance		2 Ω ±10 % per line	Approx. 2 Ω per line

Surge protector for pulse and ON/OFF signal

PULSE & ON/OFF SIGNAL

Model	MD7PL-P	MD7PL-N	MDP-SP	MDR-8
				
Features	Ultra-slim design		Compact plug-in style	Terminal board style, 8 channels
Application	Pulse signal		Low frequency pulse signal	ON-OFF signals, protecting semiconductor switches
Common	Positive	Negative	---	---
Max. continuous operating voltage (Uc)	-30 V	+30 V	B to C: ±14 V, B or C to A: 14 V	30 V
Voltage protection level (Up)	-50 V	+50 V	2 to 3: ±30 V, 2 or 3 to 1: 30 V	40 V
Max. discharge current (Imax) or discharge current capacity	20 kA (8/20 µs), 1.0 kA (10/350 µs)		5000 A (8/20 µs)	1000 A (8/20 µs)
Nominal current (IN)	100 mA		50 mA	100 mA
Internal series resistance	11 Ω ±10 % per line		10 Ω ±10 %	Approx. 100 Ω

Model		MDR2-8P	MDR2-8N
			
Features		Terminal board style, 8 channels, high discharge current capacity	
Application		Semiconductor switches of discrete outputs, multi analog signals (non-isolation between channels)	
Common		Positive	Netagive
Max. continuous operating voltage (Uc)		-30 V	+30 V
Voltage protection level (Up) @4 kV/2 kA (1.2/50 µs)	Without leakage current indicator	-50 V	+50 V
	With leakage current indicator	-60 V	+60 V
Max. discharge current (Imax)		10 kA	
Nominal current (IN)		150 mA	
Internal series resistance		22 Ω ±20 %	

Surge protector for network

RS-485 / RS-422

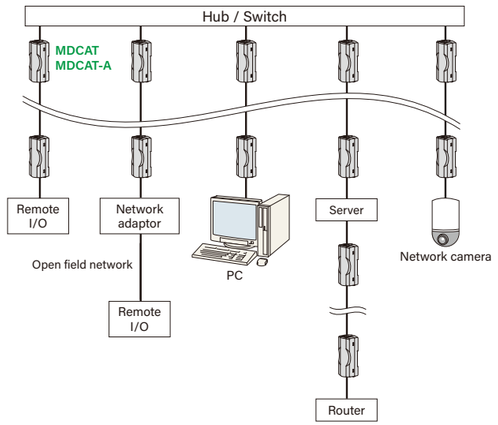
Model	MD74R	MDP-4R	MDM2A-4R	MDW5-4R
				
Functions & features	Ultra-slim design	Compact plug-in style	Life monitor	Full-duplex
Max. continuous operating voltage (Uc)	±5 V	B to C: ±5 V	7 to 8: ±5 V	6 to 7, 8 to 9: ±5 V
Voltage protection level (Up)	±25 V	2 to 3: ±20 V	4 to 5: ±25 V	1 to 2, 3 to 4: ±25 V
Max. discharge current (Imax) or discharge current capacity	20 kA (8/20 µs) 1.0 kA (10/350 µs)	5000 A (8/20 µs)	5000 A (8/20 µs)	10 kA (8/20 µs)
Nominal current (IN)	100 mA	100 mA	100 mA	100 mA
Internal series resistance	2 Ω ±10 % per line	Approx. 4.5 Ω (including return)	Approx. 5 Ω (including return)	Approx. 4 Ω (including return)

ETHERNET

Model	MDCAT-5E	MDCAT-6	MDCAT-A-5E	MDCAT-A-6	MDM5E-A
					
Functions & features	PoE / PoE Plus, 10 BASE-T / 100 BASE-TX / 1000 BASE-T		PoE / PoE Plus, 10 BASE-T / 100 BASE-TX / 1000 BASE-T, life monitor		100 BASE-TX / 10 BASE-T
Max. continuous operating voltage (Uc)	±6 V	±3.3 V	±6 V	±3.3 V	±6 V
Voltage protection level (Up)	±15 V	±10 V	±15 V	±10 V	±38 V
Max. discharge current (Imax)	100 A		100 A		500 A (8/20 µs)
Nominal current (IN)	1 A		1 A		---
Internal series resistance	Approx. 0 Ω		Approx. 0 Ω		Approx. 0 Ω

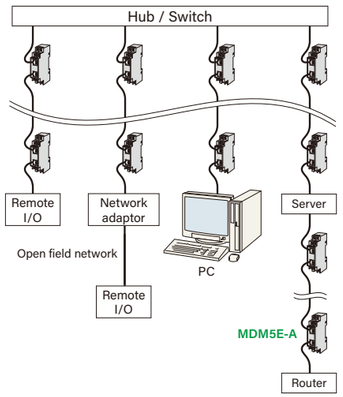
System configuration example for MDCAT/MDCAT-A

PoE/PoE Plus / 10 BASE-T/100 BASE-TX/1000 BASE-T



System configuration example for MDM5E-A

100BASE-TX/10BASE-T



Surge protector for network

8-PORT ETHERNET SWITCH
(with surge protector)

100-240 V AC powered
Model: SHSP-1-M2

24 V DC powered
Model: SHSP-1-R

CE marking for 24 V DC powered type only.

- Protects Ethernet devices from surges entering through LAN cables
- Surge protector function for each port
- Surge protector life monitor function with LED and contact output alarm

Main specifications

Alarm contact output: Turns on when the surge protector life ends, when the power supply is lost, or when an internal error is detected.
Power input: 85 – 264 V, 47 – 66 Hz
24 V ±10 %, ripple 10 %p-p max.
(supports redundant power supply)
Number of ports: 8; All ports support AUTO-MDIX
Data transfer rate: 10 Mbps (10BASE-T), 100 Mbps (100BASE-TX);
Supports Auto-Negotiation
Dielectric strength: 2000 V AC @ 1 minute
(port or FG or G or power to alarm contact)
1500 V AC @ 1 minute (port or FG or G to power)
Compliant standard: EN 61000-4-5 level X
Between ports: 1 kV (combination waveform)
Port to G: 10 kV (combination waveform)
FG (shield) to G: 15 kV (combination waveform)
EU conformity: (applied only to DC powered model)
EMC Directive
EN 55032 Class A (EMI)
EN 55035 (EMS)

CC-Link

Model	MDW5-CC
	
Functions & features	For CC-Link Ver. 1.10/2.00
Max. continuous operating voltage (Uc)	±5 V (DA to DB)
Voltage protection level (Up)	±20 V (DA to DB)
Discharge current capacity	10 kA (8/20 µs)
Nominal current (IN)	100 mA
Internal series resistance	Approx. 2 Ω per line

CC-Link IE Field NETWORK

Model	MDCAT-NC
	
Functions & features	Recommended for CC-Link IE Field network
Max. continuous operating voltage (Uc)	±6 V (line-to-line 1), ±58 V (line-to-line 2)
Voltage protection level (Up)	±15 V (line-to-line 1, @2 kV, 1.2/50 µs) ±100 V (line-to-line 2, @2 kV, 1.2/50 µs)
Max. discharge current (Imax)	100 A (8/20 µs)
Nominal current (IN)	1 A
Internal series resistance	Approx. 0 Ω

Note: "Line-to-line 1" stands for electrodes 1 – 2, 3 – 6, 4 – 5 and 7 – 8, "line-to-line 2" stands for electrodes 1 or 2 – 3 or 6 and 4 or 5 – 7 or 8 of RJ-45 modular jack.

DeviceNet

Model	MD-DNM	MD-DNS
		
Functions & features	For DeviceNet	
Load capacity	8 A	2 A
Max. continuous operating voltage (Uc)	±5 V (signal line) 26 V (power line)	
Voltage protection level (Up)	±18 V (signal line) 120 V (power line)	
Discharge current capacity	1500 A	
Max. load current	100 mA (signal line) 8 A (power line)	100 mA (signal line) 2 A (power line)
Internal series resistance	2 Ω × 2 (signal line) ≤0.2 Ω (power line)	

Surge protector for network

PROFIBUS-PA, FOUNDATION Fieldbus

Model	MD7PA	MDP-PA	MD7FB
			
Functions & features	Ultra-slim design, PROFIBUS-PA use	Compact plug-in style, PROFIBUS-PA use	Ultra-slim design, FOUNDATION Fieldbus use
Max. continuous operating voltage (Uc)	±32 V	±27 V	±32 V
Voltage protection level (Up)	±60 V	±60 V	±60 V
Max. discharge current (Imax)	20 kA (8/20 µs), 1.0 kA (10/350 µs)	5000 A (8/20 µs)	20 kA (8/20 µs), 1.0 kA (10/350 µs)
Nominal current (IN)	400 mA	500 mA	400 mA
Internal series resistance	1.5 Ω ±10 % per line	≤3.3 Ω (including return)	1.5 Ω ±10 % per line

SINGLE PAIR ETHERNET

Model	MDCAT-SPE	MDCAT-SPE-A
		
Functions & features	SPE (Single Pair Ethernet), PoDL	SPE (Single Pair Ethernet), PoDL, life monitor
Max. continuous operating voltage (Uc)	±60 V	±60 V
Voltage protection level (Up)	≤600 V (line to ground)	≤600 V (line to ground)
Max. discharge current (Imax)	5 kA (8/20 µs), 1 kA (10/350 µs)	5 kA (8/20 µs), 1 kA (10/350 µs)
Nominal current (IN)	1.5 A	1.5 A
Internal series resistance	Approx. 0 Ω	Approx. 0 Ω

Surge protector for transmission line

TRANSMISSION LINE

Model	MDP-FT	MDP-MFA	MDP-TL
			
Functions & features	Telemetering use, 3.4 kHz	Telemetering use, 50 bps	Telecommunication line use
Max. continuous operating voltage (Uc)	±1.2 V	B to C: ±110 V	±160 V
Voltage protection level (Up)	±45 V	2 to 3: ±320 V	±550 V
Max. discharge current (Imax)	5000 A (8/20 µs)	5000 A (8/20 µs)	Modular jack: 500 A (8/20 µs) Screw terminal: 1000 A (8/20 µs)
Nominal current (IN)	100 mA	100 mA	500 mA
Internal series resistance	8 Ω ±20 % (including return)	20 Ω ±10 % (including return)	≤0.1 Ω (including return)

Model	MDA-TL	MD-TL	MD-INS
			
Functions & features	Analog telecom. line use, life monitor	Telecommunication line use	ISDN circuit use
Discharge voltage (peak voltage)	±190 V	±160 V	±65 V
Maximum surge voltage	±500 V	±650 V	±100 V
Discharge current capacity	Modular jack: 500 A (8/20 µs) Screw terminal: 10000 A (8/20 µs)	1000 A (8/20 µs)	Modular jack: 500 A (8/20 µs) Screw terminal: 10000 A (8/20 µs)
Maximum load current	200 mA	500 mA	100 mA
Internal series resistance	Approx. 4 Ω (including return)	Approx. 0.1 Ω (including return)	Approx. 4 Ω (including return)

Model	MDP-DM	MDP-DM3	MDP-EC
			
Functions & features	DATA-M use	MsysNet use	EC-CABLE use
Max. continuous operating voltage (Uc)	±140 V	B to C: ±5 V	±12 V
Voltage protection level (Up)	±800 V	2 to 3: ±20 V	±30 V
Max. discharge current (Imax)	5000 A (8/20 µs)	5000 A (8/20 µs)	5000 A (8/20 µs)
Nominal current (IN)	100 mA	100 mA	100 mA
Internal series resistance	≤0.1 Ω	4 Ω ±10 % (including return)	20 Ω ±10 % (including return)

Surge protector for DC power supply line

DC power supply line

Model	MD7DP-12	MD7DP-24	MDP-D12	MDP-D24
				
Functions & features	Ultra-slim design		Compact plug-in style	
Nominal voltage	12 V DC	24 V DC	12 V DC	24 V DC
Max. continuous operating voltage (Uc)	14 V	27 V	14 V	27 V
Voltage protection level (Up)	±150 V	±170 V	20 V	40 V
Max. discharge current (Imax)	20 kA (8/20 µs), 1.0 kA (10/350 µs)		5000 A (8/20 µs)	
Nominal current (IN)	1.2 A		1.0 A	

Model	MDH-12	MDH-24	MDH-48	MDHA-12	MDHA-24
					
Functions & features	Plug-in style			Plug-in style, life monitor	
Nominal voltage	12 V DC	24 V DC	48 V DC	12 V DC	24 V DC
Discharge voltage (peak)	24 V	50 V	88 V	±15 V	±30 V
Maximum surge voltage	70 V	140 V	210 V	±80 V	±120 V
Discharge current capacity	2000 A (8/20 µs)			10000 A (8/20 µs)	
Maximum load current	5 A			5 A	

Surge protector for small capacity power supply line

Small capacity power supply line

Model	MD7AP-100	MD7AP-200	MDP-100	MDP-200	MGA-100	MGA-200	MA-100	MA-200
								
Functions & features	Ultra-slim design, high discharge current capacity		Compact plug-in style		Rack-mounted, 2 channels		Plug-in style, fuse	
Nominal voltage	100/110/120 V AC	200/220/240 V AC	120 V AC	250 V AC	100/110/120 V AC	250 V AC	100/110/120 V AC	200/220/240 V AC
Max. continuous operating voltage (Uc)	140 V AC	275 V AC	120 V AC	250 V AC	190 V	410 V	190 V	410 V
Voltage protection level (Up)	±550 V	±850 V	400 V	800 V	400 V	800 V	350 V	700 V
Max. discharge current (Imax) or discharge current capacity	10 kA (8/20 µs)		1000 A (8/20 µs)		1000 A (8/20 µs)		1000 A (8/20 µs)	
Nominal current (IN)	3 A		1.0 A		2 A		2 A	

Model	MAA-100	MAA-200	MAAC-100	MAAC-200	MAX-100	MAX-200
						
Functions & features	Plug-in style, high discharge current capacity, life monitor		Plug-in style, high discharge current capacity, surge counter, life monitor		Plug-in style, high discharge current capacity, replaceable surge absorber element	
Nominal voltage	100/110/120 V AC	200/220/240 V AC	100/110/120 V AC	200/220/240 V AC	100/110/120 V AC	200/220/240 V AC
Discharge voltage (peak)	190 V	410 V	190 V	410 V	190 V	410 V
Maximum surge voltage	380 V	700 V	400 V	700 V	350 V	700 V
Discharge current capacity	10000 A (8/20 µs)		10000 A (8/20 µs)		10000 A (8/20 µs)	
Maximum load current	5 A		5 A		5 A	

Model	MMAJ-100	MMAJ-200	MMA-100	MA-200	MMAH-100	MMAH-200
						
Functions & features	High speed response 3 nsec.		High discharge current capacity		high speed / high discharge current capacity	
Nominal voltage	100/110/120 V AC	200/220/240 V AC	100/110/120 V AC	200/220/240 V AC	100/110/120 V AC	200/220/240 V AC
Max. continuous operating voltage (Uc)	132 V	264 V	190 V	410 V	190 V	410 V
Voltage protection level (Up)	900 V	1500 V	350 V	700 V	400 V	750 V
Max. discharge current (Imax)	10 kA, 20 kA		10000 A (8/20 µs)		20000 A (8/20 µs)	
Nominal current (IN)	10 A, 20 A, 30 A		10 A		10 A	

Surge protector for medium/large capacity power supply line

MEDIUM CAPACITY POWER SUPPLY LINE

20 A CAPACITY POWER SUPPLY LINE

Model	Nominal voltage	Discharge voltage (peak)	Maximum surge voltage	Maximum load current	Discharge current capacity
MAH-121	Single phase 2-wire, 100/110/120 V AC	190 V	350 V	20 A	10000 A (8/20 µs)
MAH-221	Single phase 2-wire, 200/220/240 V AC	380 V	700 V		
MAH-123	Single phase 3-wire, 100/110/120 V AC (line to neutral)	190 V (line to neutral) 380 V (1 to 3)	350 V (line to neutral) 700 V (1 to 3)		
MAH-223	Three phase 3-wire, 200/220/240 V AC	380 V	700 V		

10 – 30 A CAPACITY POWER SUPPLY LINE, REPLACEABLE ARRESTER MODULE

Model	Nominal voltage	Discharge voltage (peak)	Maximum surge voltage	Maximum load current	Discharge current capacity
MMH-110	100/110 V AC	190 V	350 V	10 A	10000 A (8/20 µs)
MMH-210	200/220 V AC	410 V	700 V		
MMH-130	100/110 V AC	190 V	350 V	30 A	
MMH-230	200/220 V AC	410 V	700 V		

5 – 30 A CAPACITY POWER SUPPLY LINE

Model	Nominal voltage	Discharge voltage (peak)	Maximum surge voltage	Maximum load current	Discharge current capacity
MH-105A	100/110/120 V AC	190 V	350 V	5 A	10000 A (8/20 µs)
MH-205A	200/220/240 V AC	410 V	700 V		
MH-110A	100/110/120 V AC	190 V	350 V	10 A	
MH-210A	200/220/240 V AC	410 V	700 V		
MH-130A	100/110/120 V AC	190 V	350 V	30 A	
MH-230A	200/220/240 V AC	410 V	700 V		

LARGE CAPACITY POWER SUPPLY LINE

200 A CAPACITY POWER SUPPLY LINE

Model	Nominal voltage	Discharge voltage (peak)	Maximum surge voltage	Maximum load current	Discharge current capacity
MH-1201	Single phase, 100/110/120 V AC	190 V	350 V	200 A	10000 A (8/20 µs)
MH-2201	Single phase, 200/220/240 V AC	380 V	700 V		
MH-2203	Three phase, 200/220/240 V AC	380 V	700 V		

One-port surge protector

ONE-PORT SURGE PROTECTOR

IEC/JIS Class I

ONE-PORT SURGE PROTECTOR FOR POWER SUPPLY USE (Class I)

Model	Nominal voltage	Max. continuous operating voltage (Uc)	Voltage protection level (Up)	Max. discharge current (Imax)
MAL-230Y	230 V AC	255 V AC	1000 V	25 kA (10/350 µs)
MAL-230A (alarm output)	230 V AC	255 V AC	1000 V	
MAL-400A (alarm output)	440 V AC	440 V AC	2000 V	

One-port surge protector

ONE-PORT SURGE PROTECTOR

IEC/JIS Class I

ONE-PORT SURGE PROTECTOR BETWEEN NEUTRAL AND PROTECTIVE EARTH (Class I)

Model	Nominal voltage	Max. continuous operating voltage (Uc)	Voltage protection level (Up)	Max. discharge current (Imax)
MALN-230	230 V AC	255 V AC	4000 V	100 kA (10/350 µs)

IEC/JIS Class II

LIGHTNING SURGE PROTECTOR FOR THREE-PHASE POWER SUPPLY

Model	Nominal voltage	Max. continuous operating voltage (Uc)	Voltage protection level (Up)	Max. discharge current (Imax)
MAT3-240	240 V AC	240 V AC (between lines)	1500 V	20 kA (8/20 µs)

IEC/JIS Class II

LIGHTNING SURGE PROTECTOR FOR THREE-PHASE POWER SUPPLY

Model	Nominal voltage	Max. continuous operating voltage (Uc)	Voltage protection level (Up)	Max. discharge current (Imax)
MAT2-240	240 V AC	240 V AC (between lines)	1500 V	20 kA (8/20 µs) 40 kA (8/20 µs)
MAT2-440	440 V AC	440 V AC (between lines)	2500 V	

ONE-PORT SURGE PROTECTOR FOR POWER SUPPLY USE

Model	Nominal voltage	Max. continuous operating voltage (Uc)	Discharge voltage	Voltage protection level (Up) @1.0 kA (8/20 µs)	Voltage protection level (Up) @5 kA (8/20 µs)	Max. discharge current
MAKF-120	120 V AC	150 V AC	250 V min.	600 V max.	800 V max.	20 kA × twice (8/20 µs)
MAKF-240	240 V AC	275 V AC	420 V min.	1000 V max.	1400 V max.	
MAKF-280	280 V AC	320 V AC	460 V min.	1100 V max.	1500 V max.	
MAKF-400	400 V AC	440 V AC	670 V min.	1500 V max.	2100 V max.	
MAKF-480	480 V AC	530 V AC	820 V min.	1800 V max.	2500 V max.	

IEC/JIS Class II

ONE-PORT SURGE PROTECTOR BETWEEN NEUTRAL AND PROTECTIVE EARTH

Model	Nominal voltage	Max. continuous operating voltage (Uc)	Voltage protection level (Up)	Max. discharge current (Imax)
MAKN-220	220 V AC	260 V AC	1500 V @6 kA (1.2/50 µs) @5 kA (8/20 µs)	40 kA (8/20 µs)

RELATED PRODUCTS: ACCESSORY

DIN RAIL MOUNTING ADAPTER
Model: A-33

- Used for mounting MDP type lightning surge protectors on a DIN rail

M-RESTER TESTER
Model: C-106A-1

- Test kit used to check performance of MDP type lightning surge protectors
- Easy-to-carry handy case

OUTDOOR HOUSING (weather-proof)
Model: BX-W1

- Used for outdoor installation of the lightning surge protectors
- Adoptable pipe: 2B (2")