

koenone Hold SPD
Power Surge / Signal / LAN Line Coaxial Line Surge Protector

[SPD · TVSS] SURGE PROTECTOR



Contents

Greetings

Products guide

Main Features of K-surge Protector

· Power Line – Special I type	08
· Power Line – Special II type	09
· Power Line – Normal type	10
· Signal / Telecom Line – 2Wire type	11
· Signal / Telecom Line – 3, 4Wire type	12
· LAN Line RJ48 Jack type	13
· Coaxial Line BNC Connector type	14
· Auto Recovery Circuit Breaker	15
· Smart Power Supply System	16

Power Line Surge Protector – Special type

· Dimension	18
-------------	----

Class I type

· KOP-B-20KI-KS [380V 3P4W]	21
-----------------------------	----

Class II type

· KOP-B-500K-KS [380V 3P4W]	22
· KOP-B-400K-KS [380V 3P4W]	23
· KOP-A-240K-KS [220V 1P2W]	24

Class III type

· KOP-B-400K [380V 3P4W]	25
· KOP-B-360K [380V 3P3W]	26
· KOP-A-360K [110V/220V 1P2W]	27
· KOP-A-320K [110V/220V 1P2W]	28
· KOP-A-240K [110V/220V 1P2W]	29

Power Line Surge Protector – Normal type

· Dimension	30
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Class I, II, III type

· KOP-C-40-P [110V/220V 1P2W]	31
· KOP-C-80-P [110V/220V 1P2W]	32
· KOP-D-40-P [380V 3P4W]	33
· KOP-D-80-P [380V 3P4W]	34

Signal / Telecom Line Surge Protector

- Dimension 36

Signal / Telecom Line [2Wire type]

- KOS-A-5DC 37
 - Data Line(5V)
- KOS-A-12DC 38
 - RS 485 Telecom Line
- KOS-A-24DC 39
 - 4~20mA Analog Line
- KOS-A-48DC 40
 - KT Private Modem Line
- KOS-A-185DC 41
 - KT ADSL, VDSL Line

Signal / Telecom Line [3, 4Wire type]

- KOS-C-5DC [3Wire] 42
 - RTD Sensor Line
- KOS-C-24DC [3Wire] 43
 - RS 232 Telecom Line
- KOS-B-12DC [4Wire] 44
 - RS 422 Telecom Line
- KOS-B-48DC [4Wire] 45
 - KT Private Modem Line
- KOS-B-185DC [4Wire] 46
 - KT ADSL, VDSL Line (2channel)

LAN / Coaxial Line Surge Protector

LAN Line RJ48 type Jack type

- Dimension 48
- KOX-A-48DC-E100 49
- KOX-A-48DC-E1000 50

Coaxial Line BNC Connector type

- Dimension 51
- KOX-A-24DC 52
- KOX-A-48DC 53

Auto Recovery Circuit Breaker / Smart Power Supply System

Auto Recovery Circuit Breaker

- Dimension 55
- KOEL-S-C-30AF 56

Smart Power Supply System

- Dimension 58
- KO-SPS-A 59
- KO-SPS-S 59

Installation

Power Line Installation [Special type]

- Single Phase Parallel type Installation <1> 61
- Single Phase Parallel type Installation <2> 62
- Single Phase Serial type Installation 63
- 3-Phase 3Wire Parallel type Installation 64
- 3-Phase 4Wire Parallel type Installation 65

[Normal type]

- Single Phase Parallel type Installation 66
- 3-Phase 4Wire Parallel type Installation 66

Signal / Telecom Installation

- 2Wire type Installation 68
- 3, 4Wire type Installation 69

Coaxial / LAN Line Installation

- Coaxial Line Installation 71
- LAN Line Installation 71

Smart Power Supply System Installation

- Smart Power Supply System Installation 73

INTRODUCTION

Power, Signal, Telecom
Coaxial Line, LAN Line
Surge Protective Device
Auto Recovery ELB, Smart Power Supply System

K–surge specializes in the supply; **Power, Signal, Telecom, Coaxial Line, LAN Line Auto Recovery ELB, Smart Power Supply System**; of total solution for **surge** protection, encompassing the **manufacture** of Surge Protective Devices [SPD], **analysis** of surge damages and design of **anti–surge** measures to protect sensitive electronic equipment and personnel from destructive transient over voltages originating from lightning strikes and electrical disturbances.

Based on **its proprietary know–how and technology**, the Company supplies high quality surge protectors that accompany **complete protection**, strict safety and surge information, thereby promoting the **system stability and efficient facility management** for your key equipment.

Greetings!

It is our great pleasure to be able to introduce you to our products. Koenone is surge protection specialized company which providing total solutions for surge protection, surge damage and surge design.

Koenone is ready to deal with the damage caused from lightning strikes and surges, and we are committed to provide the better quality products and customer satisfaction.

We wish to grow further and with you. your interests and suggestions are always welcome.

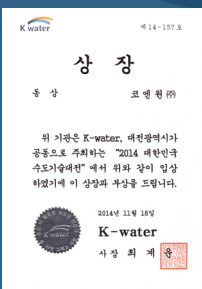
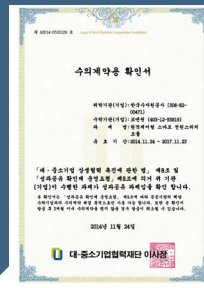
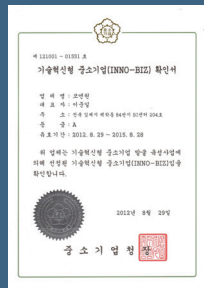
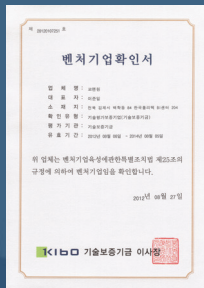
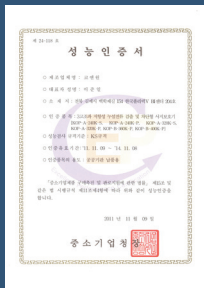
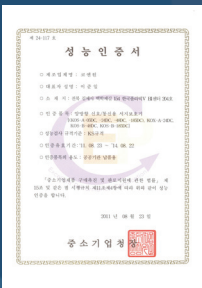
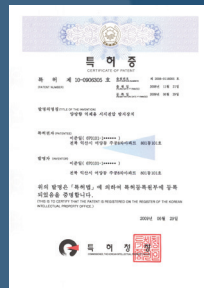
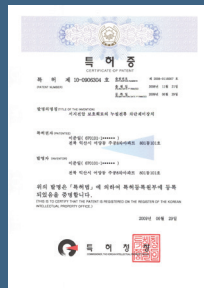
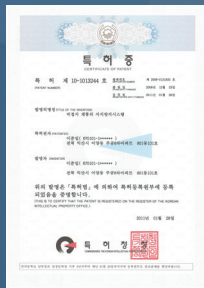
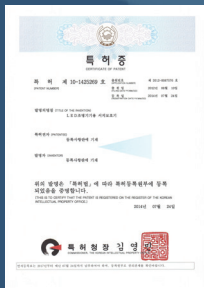
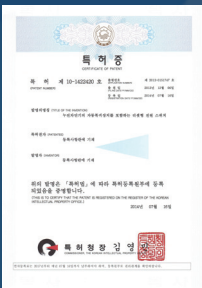
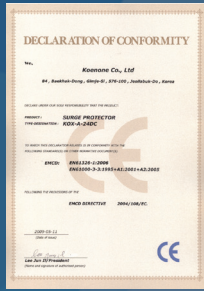
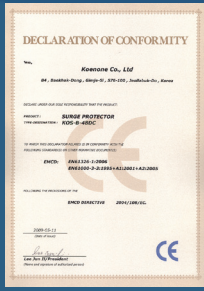
Because of your support you have given to us, we are exporting to many countries around the world.

Thank you very much for your support. Koenone always try to be our best with humble mind to meet your satisfaction.

Thank you.

From the entire staff of K–surge.

Patent and Certification



Special

K O P - A / B - □ K - K S
 ① ② ③ ④ ⑤

- ① Company
- ② Product Classification [P : Power Line]
- ③ Phase [A : Single phase / B : 3 phase]
- ④ Capacity
- ⑤ KS certificat

Normal

K O P - C / D - □ K - P
 ① ② ③ ④

- ① Company
- ② Product Classification [P : Power Line]
- ③ Phase [C : Single phase / D : 3 phase]
- ④ Capacity

Signal / Telecom

K O S - A / B / C - □ D C
 ① ② ③ ④

- ① Company
- ② Product Classification [S : Signal/Telecom Line]
- ③ Wire [A : 2Wire / B : 4Wire / C : 3Wire]
- ④ Voltage

LAN / Coaxial

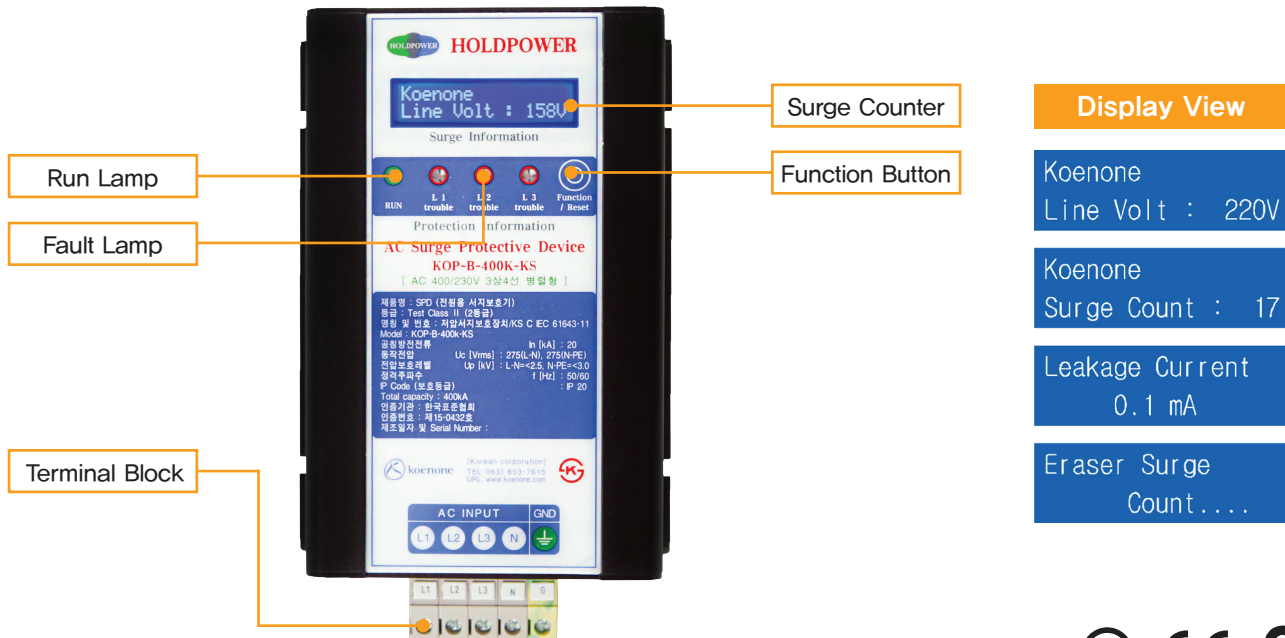
K O X - A - □ D C - □
 ① ② ③ *④

- ① Company
- ② Product Classification [X : Coaxial/LAN Line]
- ③ Voltage
- *④ Only For LAN Line [E100 – 100Mbps / E1000 – 1G]

Surge Protector Feature

Main Features of K-Surge Protector
Power / Signal / Coaxial / LAN Line Surge Protector

Power line – Special I type



Voltage	AC 440V / 380V / 220V / 110V DC 600V / 440V / 380V / 200V
Type	3-Phase 4Wire / 3-Phase 3Wire / Single Phase 2Wire(Serial / Parallel)
Capacity	800kA / 500kA / 400kA / 360kA / 320kA / 260kA / 240kA

Function Surge counter Line voltage Leakage current [diagnosis]

[Product Features]

- CE, KS Certificate, Patent
- High-performance, High-capacity SPD [240kA – 800kA]
- Full Mode Protection [Line-Neutral, Line-Ground, Line-Line] – < For Class I II III >
- Performance in compliance with IEC 61643-11
- Back Light LCD Surge Counter [Non-volatile Memory type]
- Leakage current measurement and display [0.00mA]
- Line Voltage measurement and display [Line Voltage]
- Dual Safety Design [Current & Thermal Fuse]
- Lamp and Buzzer for a normal or abnormal state check
- Aluminium case for proven safety against the surge protector failure

[Application]

Instrument power [Flowmeter, Water gauge, Electronic scale etc], Actuator power, other singular, device power.

Power line – Special II type



Display View

2017/02/13 09:58:22

Surge Counter 0007

Line V : 380V

Surge Event 09:58:22

2017/02/15 15:40:51
2017/02/08 16:40:10
2017/01/25 16:50:01
2017/01/15 17:30:51
2017/01/10 20:11:01

Leak. Curr. 09:58:22

0.1mA

Fuse Chk. 09:58:22

Good



Voltage	AC 440V / 380V / 220V / 110V DC 600V / 440V / 380V / 200V
Type	3-Phase 4Wire / 3-Phase 3Wire / Single Phase 2Wire(Serial / Parallel)
Capacity	800kA / 500kA / 400kA / 360kA / 320kA / 260kA / 240kA

F

unction

Surge event memory

Over voltage event memory

Surge counter

Over voltage counter

Leakage current [diagnosis]

Line voltage

RS 485 Telecom

[Product Features]

CE, KS Certificate, Patent

High-performance, High-capacity SPD [240kA – 800kA]

Full Mode Protection [Line-Neutral, Line-Ground, Line-Line] – 〈 For Class I II III 〉

Performance in compliance with IEC 61643-11

Back Light LCD Surge Event List[Non-volatile Memory type]

Leakage current measurement and display [0.00mA]

Line Voltage measurement and display [Line Voltage]

Dual Safety Design [Current & Thermal Fuse]

Lamp and buzzer for a normal or abnormal state check

Surge and Over voltage event memory [Date, Time]

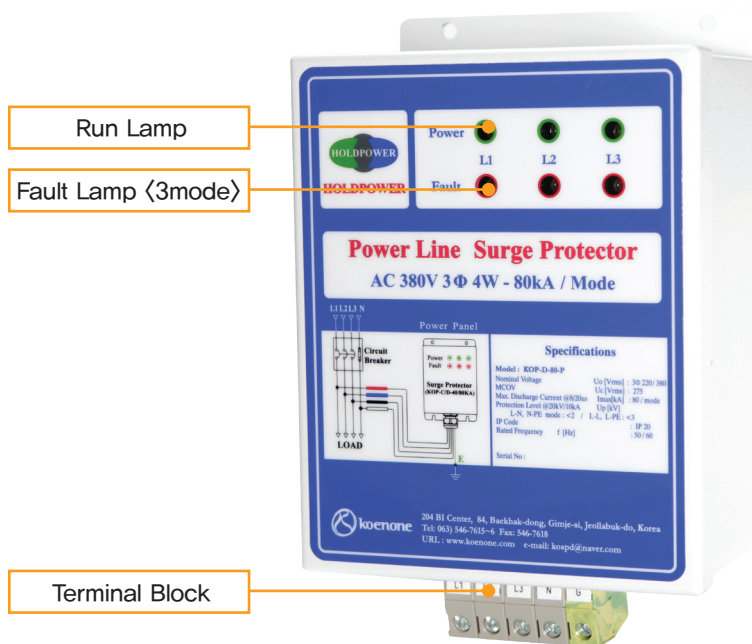
RS485 Communication [Surge event memory, Over Voltage event memory, SPD state, Surge counter, Leakage current]

Aluminium case for proven safety against the surge protector failure

[Application]

Instrument power [Flowmeter, Water gauge, Electronic scale etc], Actuator power, other singular, device power.

Power line – Normal type



Voltage	AC 440V / 380V / 220V / 110V DC 600V / 440V / 380V / 200V
Type	3-Phase 4Wire / 3-Phase 3Wire / Single Phase 2Wire(Serial / Parallel)
Capacity	40kA-Mode / 80kA-Mode

[Product Features]

- Officially tested in compliance with the LH(Korea Public enterprise) Corporation's Construction Specification High-performance High-capacity SPD [40kA-Mode / 80kA-Mode]
- Performance in compliance with IEC 61643-11
- Dual Safety Design [Current & Thermal Fuse]
- Run and Fault Lamp for a normal or abnormal state check
- Steel case for proven safety against the surge protector failure

[Application]

ACB2 Distribution Panel, Distribution Panel1, Distribution Panel2, UPS Input, Output, CCTV power, Instrument power [Flowmeter, Water gauge, Electronic scale etc], Actuator power, other singular device power.

Signal / Telecom Line – 2Wire type



Voltage	DC 185V / 48V / 24V / 12V / 5V
Type	Signal / Telecom 2Wire, Serial
Capacity	100kA – total / 50kA – Mode

Function

- Surge counter
- Analog current display
- Telecom state display

[Product Features]

- CE Certificate (in compliance with IEC 61643–21)
- Patent [10–0906305] / strengthening patent pending [10–2016–0100960]
- Qualification product in compliance with KS C IEC 61643–21 [20kV / 10kA (Voltage 1.2/50µs, Current 8/20µs) within 150V~300V when applied]
- High Surge Capacity – 100kA in total the highest in the world
- Indicator function – the first in the world, domestic patent [surge counter · Analog signal detection · Telecom state detection] [10–year Battery Life / Replaceable Battery]
- Quadruple Hybrid Design – the first in the world
- Reverse Surge Protection – the first in the world
- Fastening by DIN–Rail or Bolt
- Flame Retardant ABS Case and epoxy molding for fire protection

[Application]

4~20mA Analog Signal Line, RS485, Fnet Telecom Line, Load cell, Data Line, ADSL Modem, PC LAN etc.

Signal / Telecom Line – 3, 4Wire type

Display View



SURGE COUNTER



Voltage	DC 185V / 48V / 24V / 12V / 5V
Type	Signal / Telecom 3Wire, 4Wire Serial
Capacity	150kA [3Wire] / 200kA [4Wire] [3Wire] 150kA – total / 50kA – mode [4Wire] 200kA – total / 50kA – mode

[Product Features]

CE Certificate, Patent

Performance in compliance with KS C IEC 61643–21

[20kV / 10kA(Voltage 1.2/50 μ s, Current 8/20 μ s) within 150V~300V when applied]

High Surge Capacity – 200kA/150kA in total – the highest in the world

LCD Surge Counter

[10-year Battery Life / Replaceable Battery]

Quadruple Hybrid Design – the first in the World

Reverse Surge protection – the first in the world

Fastening by DIN-Rail or Bolt

Flame Retardant ABS Case

[Application]

4 Wire type : RS422, RS432, Dedicated Line Modem etc.

3 Wire type : RTD (Resistance Temperature Detector), RS232 etc.

LAN Line – RJ45 Jack



Voltage	DC 48V
Type	RJ45 type for LAN
Capacity	[10/100] 150kA – total / 25kA – mode [10/1000] 200kA – total / 25kA – mode

[Product Features]

CE Certificate, Patent

Performance in compliance with IEC 61643–21

[6kV / 3kA(Voltage 1.2/50 μ s, Current 8/20 μ s) within 100V when applied]

High Surge Capacity – 150kA / 200kA in total – the highest in the world

RJ45 Jack

Aluminium Case

1) 10/100 BASE Cat.5

2) 10/1000 BASE Cat.6

[Application]

Ethernet, LAN, F-Net, CCTV Data transmission line etc.

Coaxial Line – BNC Connector type



Voltage	DC 24V / 5V
Type	Coaxial, Serial type
Capacity	50kA – total / 25kA mode

[Product Features]

CE Certificate, Patent

Performance in compliance with IEC 61643–21

[6kV / 3kA(Voltage 1.2/50 μ s, Current 8/20 μ s) within 100V when applied]

High Surge Capacity – 50kA in total – the highest in the world

LCD Surge Counter [10-year Battery Life]

Reverse Surge Protection – the first in the world

BNC Connector

Aluminium Case

[Application]

CCTV/DVR Video Line, Ultrasonic Flowmeter Line, Wireless Antenna etc.

Auto Recovery Circuit Breaker



voltage	AC 220V
Type	Single Phase 2Wire / 30AF (5A, 10A, 15A, 20A, 30A)

Function

Surge counter Leakage current counter
Over load counter

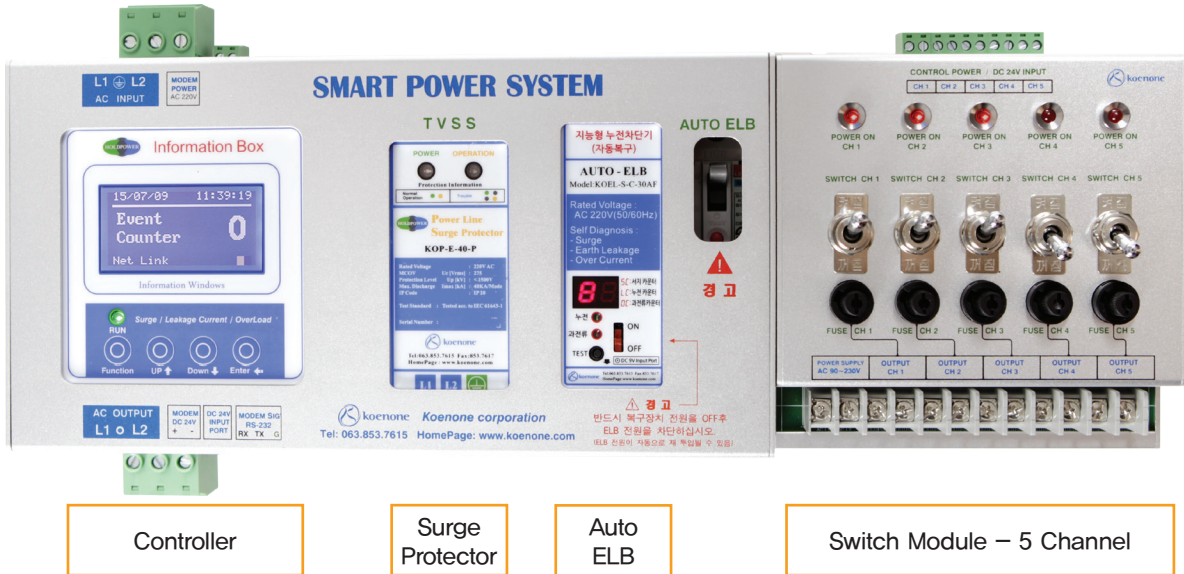
[Product Features]

- Surge INPUT counter function / Over load counter function / Leakage current counter function
- When the ELB works, after assessing & resolving what caused the break, start to restore
- When the ELB works by lightning surge, immediate recovery
- When the ELB works by over-current, recovering stop
- Application of super capacitor for improving battery life
- Telecom port & remote monitoring (Option)
- Power recovery after load analysis when the circuit breaker operates
- Discrimination protection : surge & over current

[Application]

- Unmanned Automated Facility
- Low Pressure Distribution Panel
- Street Light, Traffic Light, Outdoor Ad Tower
- Farming Facility, Small Pump Station, Tube Well
- Other power devices that require auto recovery

Smart Power Supply System



voltage	AC 220V
Type	Single Phase 2Wire

Function

- Auto recovery function
- Surge protection function
- Power ON/OFF function
- Display[Surge counter, ELD, Telecom failure, Over load]
- Telecom recovery function

[Product Features]

- Joint development product through benefit sharing project with Korea Water Resources Corporation
- Measuring instrument's power on/off controlling(remote & site)
- Surge protection function for measuring instrument
- Power off function when lightning strikes
- Automatic restore function of leakage breaker power
- Telecom failure recovery function(automatic & manual)
- Surge, Leakage, Over-voltage, Telecom state – counter & date recording
- Safety block function (fuse) for each port of power supplies

[Application]

- Water and sewage TM/TC manless automatic facilities
- Mobile communications unmanned stations
- Unmanned emergency management facility and communication equipment (Military & police)
- Broadcasting facilities unmanned relay station
- Other power control facilities (signal, CCTV, Lightning equipment, electronic display etc)

Power Line Surge Protector

Power / Signal / Coaxial / LAN Line Surge Protector



Product Dimension – Special I, II type

Power Line SPD



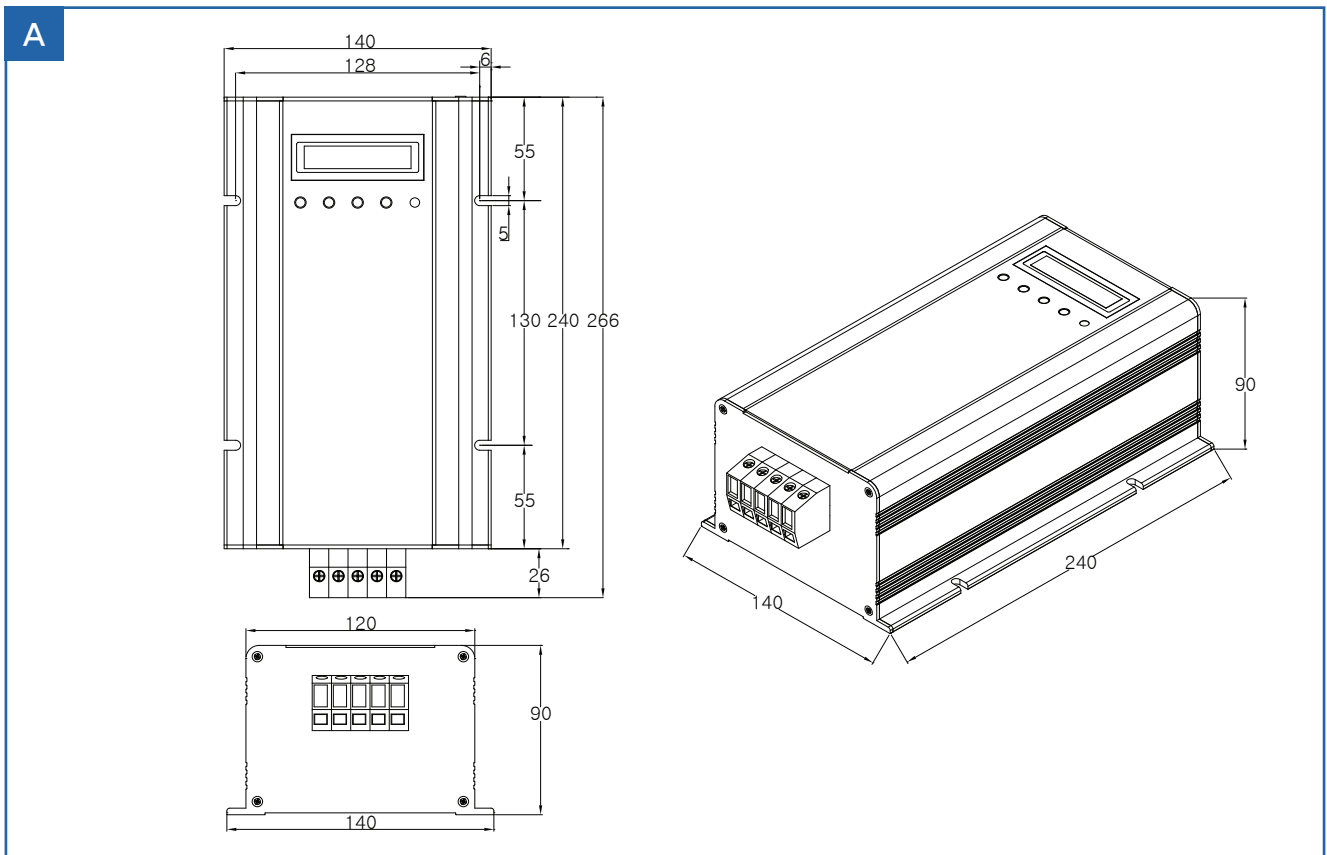
A Model list

(W)140 x (L)266 x (H)90

KOP-B-20KI-KS (SP-I)

KOP-B-20KI-KS (SP-II)

[Unit : mm]



Product Dimension – Special I, II type

Power Line SPD



B-1 Model list
(W)140 x (L)216 x (H)70

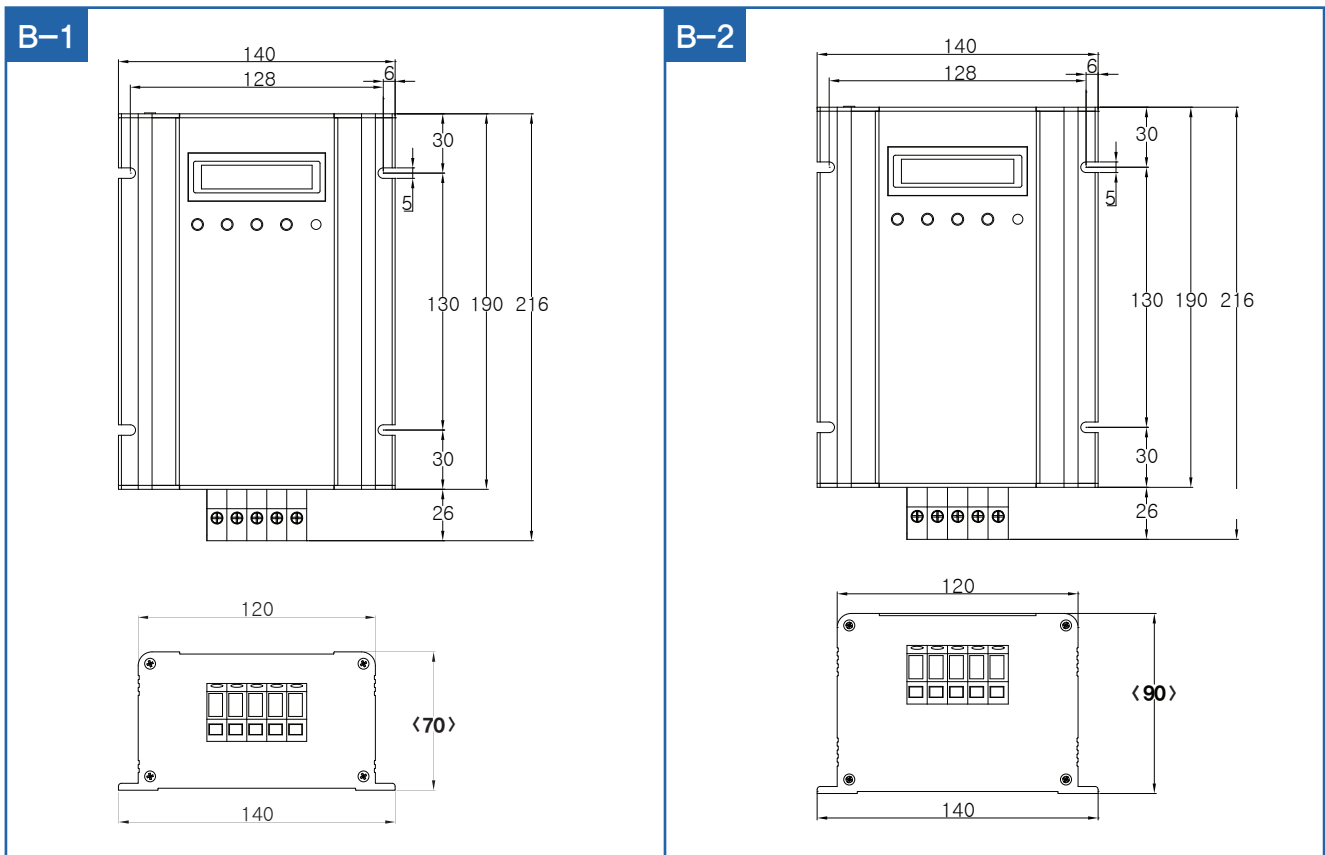
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- KOP-B-400K-KS <SP- I >



B-2 Model list
(W)140 x (L)216 x (H)90

- KOP-B-500K-KS <SP- I >
- KOP-B-500K-KS <SP- II >
- KOP-B-400K-KS <SP- II >
- KOP-A-240K-KS <SP- II >

[Unit : mm]



Product Dimension – Special I, II type

Power Line SPD



C-1 Model list
(W)140 x (L)190 x (H)70

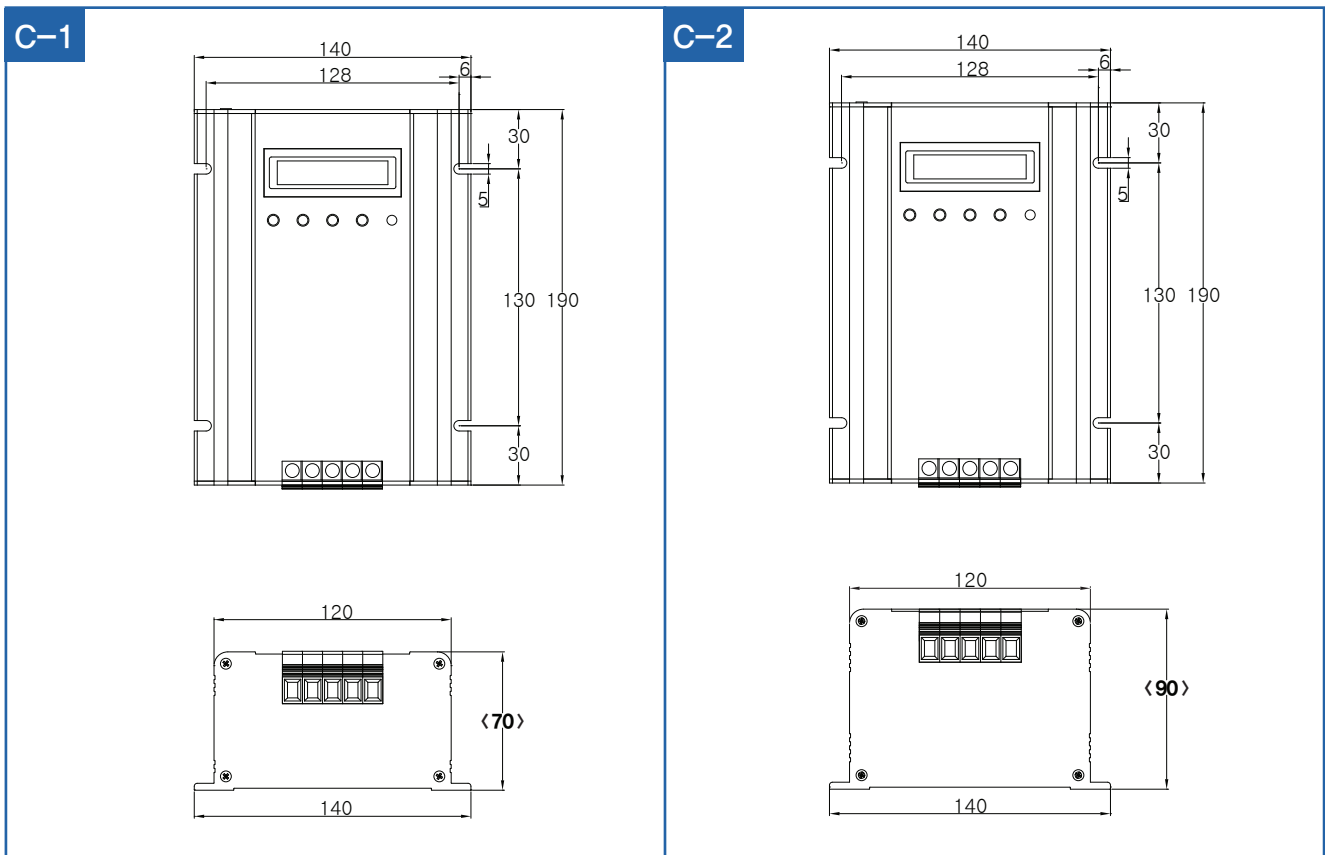
- KOP-A-240K <SP- I >
- KOP-A-320K <SP- I >
- KOP-A-360K <SP- I >
- KOP-B-360K <SP- I >
- KOP-B-400K <SP- I >



C-2 Model list
(W)140 x (L)190 x (H)90

- KOP-A-240K <SP- II >
- KOP-A-320K <SP- II >
- KOP-A-360K <SP- II >
- KOP-B-360K <SP- II >
- KOP-B-400K <SP- II >

[Unit : mm]



· Model Class I **KOP-B-20KI-KS [3Phase 4Wire] [Parallel connection]**

· Type Special I, II

· Application Power line lightening, Switching surge

· Application Field
[*LPZ0, *LPZ1] Distribution board, UPS(input & output) , Water gauge, Flowmeter,
Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	380~440V AC [Ph-Ph], 220~240V AC [Ph-N]
Rated Current		N/A
Power system configuration		3Phase 4Wires Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	275V AC [Ph-N], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [CE class 1 test] (Iimp 12.5kA @ 10/350μs) – IEC 61643-11	Up	< 2,500 V	< 2,500 V	< 2,500 V	< 1,500 V
Max current capacity (@Current 10/350μs) [Total : 800kA]		250kA	250kA	250kA	50kA
Impulse discharge current for class 1 test (@Current 10/350μs)	Iimp	12.5kA	12.5kA	12.5kA	12.5kA
Response Time (@10kV/μs)	ta	below 5 ns			
Power noise filter (Frequency band and Damping rate)	Fc	N/A			

Feature

Special I, II	Operation status expression	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20(@IEC60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm ²]
Size	[SP-1/SP-2] (W)140 x (L)266 x (H)90 mm cf. A p18
Installation	Bolt mounting
Weight	Below 2.7 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
*LPZ : Lightning Protect Zone

· Model Class II	KOP-B-500K-KS [3Phase 4Wire] [Parallel connection]
· Type	Special I , II
· Application	Power line lightning, Switching surge
· Application Field [*LPZ1, *LPZ2]	Distribution board, UPS(input & output) , CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	380~440V AC [Ph-Ph], 220~240V AC [Ph-N]
Rated Current		N/A
Power system configuration		3Phase 4Wires Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	275V AC [Ph-N], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [CE class 2 test] (In 40kA @ 8/20μs) – IEC 61643-11	Up	L1-N < 2,500 V	L2-N < 2,500 V	L3-N < 2,500 V	N-G < 1,500 V
Max current capacity (@Current 8/20μs) [Total : 500kA]		L1-N 150kA	L2-N 150kA	L3-N 150kA	N-G 50kA
Nominal discharge current (@Current 8/20μs)	In	40kA	40kA	40kA	40kA
Response Time (@10kV/μs)	ta	below 5 ns			
Power noise filter (Frequency band and Damping rate)	Fc	N/A			

Feature

Special I , II	Operation status expression	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20(@IEC60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm ²]
Size	[SP-1/SP-2] (W)140 x (L)216 x (H)90 mm cf. B-2 p19
Installation	Bolt mounting
Weight	Below 2 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
 *LPZ : Lightning Protect Zone

· Model Class II	KOP-B-400K-KS [3Phase 4Wire] [Parallel connection]
· Type	Special I, II
· Application	Power line lightening, Switching surge
· Application Field [*LPZ1, *LPZ2]	Distribution board, UPS(input & output), CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	U _n	380~440V AC [Ph-Ph], 220~240V AC [Ph-N]
Rated Current		N/A
Power system configuration		3Phase 4Wires Parallel connection
Max Continuous Operating Voltage(MCOV)	U _c	275V AC [Ph-N], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@U _c)	I _L	1 mA or lower
Insulation resistance (@500 V DC)	R _{IN}	10 MΩ or higher

Protection property

Protection Mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [CE class 2 test] (In 20kA @ 8/20μs) – IEC 61643-11	U _p	L1-N < 2,500 V	L2-N < 2,500 V	L3-N < 2,500 V	N-G < 1,000 V
Max current capacity (@Current 8/20μs) [Total : 400kA]		L1-N 100kA	L2-N 100kA	L3-N 100kA	N-G 100kA
Nominal discharge current (@Current 8/20μs)	I _n	20kA	20kA	20kA	20kA
Response Time (@10kV/μs)	t _a	below 5 ns			
Power noise filter (Frequency band and Damping rate)	F _c	N/A			

Feature

Special I, II	Operation status expression	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20(@IEC60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C, below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm ²]
Size	[SP-1] (W)140 x (L)216 x (H)70 mm cf. B-1 [SP-2] (W)140 x (L)216 x (H)90 mm cf. B-2 p19
Installation	Bolt mounting
Weight	Below 2 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
 *LPZ : Lightning Protect Zone

· Model Class II	KOP-A-240K-KS [Single Phase 2Wire] [Parallel connection]
· Type	Special I, II
· Application	Power line lightning, Switching surge
· Application Field [*LPZ1, *LPZ2]	Distribution board, UPS(input & output), CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	220~240V AC [Ph-N]
Rated Current		Serial : below 10A, Parallel : N/A
Power system configuration		Single Phase 2Wires Series / Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	275V AC [Ph-N], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L-N	N-G	L-G
Voltage protection level [CE class 2 test] (In 20kA @ 8/20μs) – IEC 61643-11	Up	L-N < 2,500 V	N-G < 1,500 V	L-G < 2,500 V
Max current capacity (@Current 8/20μs) [Total : 240kA]		L-N 200kA	N-G 40kA	L-G 0kA
Nominal discharge current (@Current 8/20μs)	In	20kA	20kA	0kA
Response Time (@10kV/μs)	ta	below 5 ns		
Power noise filter (Frequency band and Damping rate)	Fc	N/A		

Feature

Special I, II	Operation status expression	Run = green lamp / Fault = red lamp [L-N]
	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20(@IEC60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C, below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm ²]
Size	[SP-1] (W)140 x (L)216 x (H)70 mm cf. B-1 [SP-2] (W)140 x (L)216 x (H)90 mm cf. B-2 p19
Installation	Bolt mounting
Weight	Below 2 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
 *LPZ : Lightning Protect Zone

· Model Class III	KOP-B-400K [3Phase 4Wire] [Parallel connection]
· Type	Special I, II
· Application	Power line lightning, Switching surge
· Application Field [*LPZ1, *LPZ2]	Distribution board, UPS(input & output), CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	U _n	380~440V AC [Ph-Ph], 220~240V AC [Ph-N]
Rated Current		N/A
Power system configuration		3Phase 4Wires Parallel connection
Max Continuous Operating Voltage(MCOV)	U _c	275V AC [Ph-N], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@U _c)	I _L	1 mA or lower
Insulation resistance (@500 V DC)	R _{IN}	10 MΩ or higher

Protection property

Protection Mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	U _p	L1-N < 2,500 V	L2-N < 2,500 V	L3-N < 2,500 V	N-G < 1,000 V
Max current capacity DM:120kA, CM:280kA (@Current 8/20μs) [Total : 400kA]		L1-N 120kA	L2-N 120kA	L3-N 120kA	N-G 40kA
Response Time (@10kV/μs)	t _a	below 5 ns			
Power noise filter (Frequency band and Damping rate)	F _c	N/A			

Feature

Special I, II	Operation status expression	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C, below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm ²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. C-1 [SP-2] (W)140 x (L)190 x (H)90 mm cf. C-2 p20
Installation	Bolt mounting
Weight	below 1.5 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
 *LPZ : Lightning Protect Zone

· Model Class III	KOP-B-360K [3Phase 3wires] [Parallel connection]
· Type	Special I, II
· Application	Power line lightning, Switching surge
· Application Field [*LPZ1, *LPZ2]	Distribution board, UPS(input & output), CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	U _n	380~440V AC [Ph-Ph]
Rated Current		N/A
Power system configuration		3phase 3wire type Parallel connection
Max Continuous Operating Voltage(MCOV)	U _c	275V AC [Ph-G], 460V AC [Ph-Ph]
Rated frequency	f	50 / 60 Hz
Leakage current (@U _c)	I _L	1 mA or lower
Insulation resistance (@500 V DC)	R _{IN}	10 MΩ or higher

Protection property

Protection Mode		L1-G	L2-G	L3-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	U _p	L1-G < 2,500 V	L2-G < 2,500 V	L3-G < 2,500 V
Max current capacity (@Current 8/20μs) [Total : 360kA]		L1-G 120kA	L2-G 120kA	L3-G 120kA
Response Time (@10kV/μs)	t _a	below 5 ns		
Power noise filter (Frequency band and Damping rate)	F _c	N/A		

Feature

Special I, II	Operation status expression	Run = green lamp / Fault = red lamp [L1-G, L2-G, L3-G]
	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C, below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm ²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. C-1 [SP-2] (W)140 x (L)190 x (H)90 mm cf. C-2 p20
Installation	Bolt mounting
Weight	below 1.5 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
 *LPZ : Lightning Protect Zone

· Model Class III	KOP-A-360K [Single Phase 2Wire] [Series / Parallel connection]
· Type	Special I , II
· Application	Power line lightening, Switching surge
· Application Field [*LPZ1, *LPZ2]	Distribution board, UPS(input & output) , CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	110~120 V AC [L-N] / 220~240 V AC [L-N]
Rated Current		Serial : below 10A , Parallel : N/A
Power system configuration		Single phase 2wire type Series / Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	110V AC : 175V AC [L-N], 275V AC [L-G, N-G] 220V AC : 275V AC [L-N], 460V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L-N	L-G	N-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	Up	[110 V AC] < 1,000 V [220 V AC] < 1,500 V	< 1,500 V < 1,500 V	< 1,500 V < 1,500 V
Max current capacity (@Current 8/20μs) [Total: 360kA]		L-N 120kA	L-G 120kA	N-G 120kA
Response Time (@10kV/μs)	ta	below 5 ns		
Power noise filter (Frequency band and Damping rate)	Fc	Serial : 10 kHz – 30 MHz / Parallel : N/A		

Feature

	Operation status expression	Run = green lamp / Fault = red lamp [L-N , L-G , N-G]
Special I , II	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	57A Euro type [Awg 8~22 / 0,5~10mm ²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. C-1 [SP-2] (W)140 x (L)190 x (H)90 mm cf. C-2 p20
Installation	Bolt mounting
Weight	

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
*LPZ : Lightning Protect Zone

· Model Class III	KOP-A-320K [Single Phase 2Wire] [Series / Parallel connection]
· Type	Special I , II
· Application	Power line lightning, Switching surge
· Application Field [*LPZ1, *LPZ2]	Distribution board, UPS(input & output) , CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	110~120 V AC [L-N] / 220~240 V AC [L-N]
Rated Current		Serial : below 10A , Parallel : N/A
Power system configuration		Single phase 2wire type Series / Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	110V AC : 175V AC [L-N], 275V AC [L-G, N-G] 220V AC : 275V AC [L-N], 460V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L-N	L-G	N-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	Up	L-N [110 V AC] < 1,000 V [220 V AC] < 1,500 V	L-G < 1,500 V < 1,500 V	N-G < 1,500 V < 1,500 V
Max current capacity (@Current 8/20μs) [Total: 320kA]		L-N 80kA	L-G 120kA	N-G 120kA
Response Time (@10kV/μs)	ta	below 5 ns		
Power noise filter (Frequency band and Damping rate)	Fc	Serial : 10 kHz – 30 MHz / Parallel : N/A		

Feature

Special I , II	Operation status expression	Run = green lamp / Fault = red lamp [L-N , L-G , N-G]
	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm ²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. C-1 [SP-2] (W)140 x (L)190 x (H)90 mm cf. C-2 p20
Installation	Bolt mounting
Weight	below 1.5 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
*LPZ : Lightning Protect Zone

· Model Class III	KOP-A-240K [Single Phase – 2Wire] [Series / Parallel connection]
· Type	Special I, II
· Application	Power line lightning, Switching surge
· Application Field [*LPZ1, *LPZ2]	Distribution board, UPS(input & output), CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	U _n	110~120 V AC [L-N] / 220~240 V AC [L-N]
Rated Current		Serial : below 10A , Parallel : N/A
Power system configuration		Single phase 2wire type Series / Parallel connection
Max Continuous Operating Voltage(MCOV)	U _c	110V AC : 175V AC [L-N], 275V AC [L-G, N-G] 220V AC : 275V AC [L-N], 460V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@U _c)	I _L	1 mA or lower
Insulation resistance (@500 V DC)	R _{IN}	10 MΩ or higher

Protection property

Protection Mode		L-N	L-G	N-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	U _p	L-N [110 V AC] < 1,000 V [220 V AC] < 1,500 V	L-G < 1,500 V < 1,500 V	N-G < 1,500 V < 1,500 V
Max current capacity (@Current 8/20μs) [Total: 240kA]		L-N 80kA	L-G 80kA	N-G 80kA
Response Time (@10kV/μs)	t _a	below 5 ns		
Power noise filter (Frequency band and Damping rate)	F _c	Serial : 10 kHz – 30 MHz / Parallel : N/A		

Feature

Special I, II	Operation status expression	Run = green lamp / Fault = red lamp [L-N, L-G, N-G]
	Safety	Dual safety design [current & thermal fuse]
	Display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	Record	Surge event memory, Over voltage event memory (Line to Line)
	Telecom	RS 485

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm ²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. C-1 [SP-2] (W)140 x (L)190 x (H)90 mm cf. C-2 p20
Installation	Bolt mounting
Weight	below 1.5 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
*LPZ : Lightning Protect Zone

Product Dimension – Normal type

Power Line SPD



D-1 Model list
(W)113 x (L)171 x (H)80

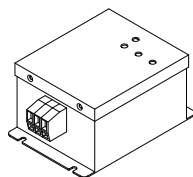
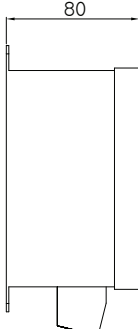
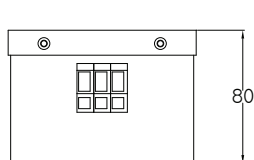
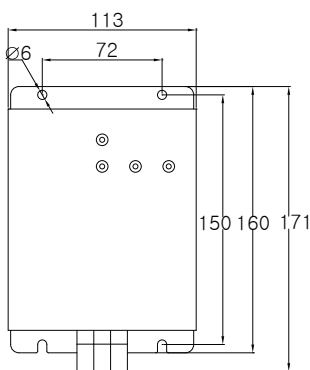
KOP-C-40P
KOP-C-80P
KOP-D-40P

D-2 Model list
(W)113 x (L)200 x (H)80

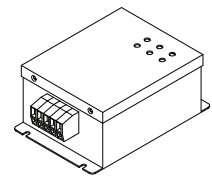
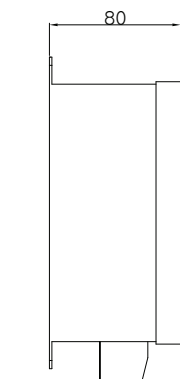
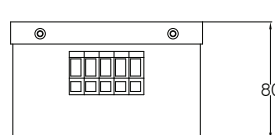
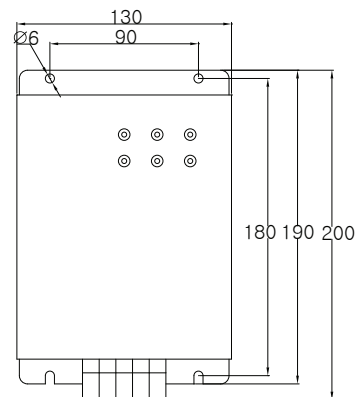
KOP-D-80P

[Unit : mm]

D-1



D-2



· Model	KOP-C-40P [Single Phase 2Wire]
· Application	Power line lightening, Switching surge
· Application Field	Distribution board, UPS(input & output) , CCTV, Water gauge, [*LPZ1, *LPZ2, *LPZ3] Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	110~120 V AC [L-N] / 220~240 V AC [L-N]
Rated Current		N/A
Power system configuration		Single phase 2wire type Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	110V AC : 175V AC [L-N], 275V AC [L-G, N-G] 220V AC : 275V AC [L-N], 460V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L-N	L-G	N-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	Up	[110 V AC] < 1,000 V [220 V AC] < 1,500 V	< 1,500 V < 1,500 V	< 1,500 V < 1,500 V
Max current capacity 40kA Mode (@Current 8/20μs) [Total : 120kA]		L-N 40kA	L-G 40kA	N-G 40kA
Nominal discharge current (@Current 8/20μs)	In	20kA	20kA	20kA
Response Time (@10kV/μs)		below 5 ns		

Feature

Operation status expression	Green lamp ON [L-N]
Display/Alarm	Red lamp ON [L-N, L-G, N-G]
Safety	Dual safety design [current & thermal fuse]

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm ²]
Size	(W)113 x (L)171 x (H)80 mm cf. [D-1] p30
Installation	Bolt mounting
Weight	below 1.5 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
IEEE Std C62.34 [1996] Standard Test Specification for Power Line Surge Protector
IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
 *LPZ : Lightning Protect Zone

· Model	KOP-C-80P [Single Phase 2Wire]
· Application	Power line lightening, Switching surge
· Application Field	Distribution board, UPS(input & output) , CCTV, Water gauge, [*LPZ1, *LPZ2, *LPZ3] Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	110~120 V AC [L-N] / 220~240 V AC [L-N]
Rated Current		N/A
Power system configuration		Single phase 2wire type Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	110V AC : 175V AC [L-N], 275V AC [L-G, N-G] 220V AC : 275V AC [L-N], 460V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L-N	L-G	N-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	Up	[110 V AC] < 1,000 V [220 V AC] < 1,500 V	< 1,500 V < 1,500 V	< 1,500 V < 1,500 V
Max current capacity 80kA Mode (@Current 8/20μs) [Total : 300kA]		L-N 100kA	L-G 100kA	N-G 100kA
Nominal discharge current (@Current 8/20μs)	In	40kA	40kA	40kA
Response Time (@10kV/μs)		below 5 ns		

Feature

Operation status expression	Green lamp ON [L-N]
Display/Alarm	Red lamp ON [L-N, L-G, N-G]
Safety	Dual safety design [current & thermal fuse]

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm ²]
Size	(W)113 x (L)171 x (H)80 mm cf. D-1 p30
Installation	Bolt mounting
Weight	below 1.5 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
ANSI / IEEE Std C62.45[2002] Guideline to Surge Test for Low-pressure Device
ANSI / IEEE Std C62.41[2002] Category A, B, C
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IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
 *LPZ : Lightning Protect Zone

· Model	KOP-D-40P [3 Phase 4wire]
· Application	Power line lightning, Switching surge
· Application Field [*LPZ1, *LPZ2, *LPZ3]	Distribution board, UPS(input & output) , CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	380~440V AC [Ph-Ph], 220~240V AC [Ph-N]
Rated Current		N/A
Power system configuration		3phase 4wire type Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	275V AC [Ph-N]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	Up	L1-N < 2,500 V	L2-N < 2,500 V	L3-N < 2,500 V	N-G < 1,000 V
Max current capacity 40kA mode (@Current 8/20μs) [Total : 160kA]		L1-N 40kA	L2-N 40kA	L3-N 40kA	N-G 40kA
Nominal discharge current (@Current 8/20μs)	In	20kA	20kA	20kA	20kA
Response Time (@10kV/μs)		below 5 ns			

Feature

Operation status expression	Green lamp ON [L1, L2, L3]
Display/Alarm	Red lamp ON [L1, L2, L3]
Safety	Dual safety design [current & thermal fuse]

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm ²]
Size	(W)113 x (L)171 x (H)80 mm cf. [D-1] p30
Installation	Bolt mounting
Weight	below 1,5 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
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IEEE Std C62.62 [2010] Standard Test Specification for Power Line Surge Protector

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode
 *LPZ : Lightning Protect Zone

· Model	KOP-D-80P [3 Phase 4wire]
· Application	Power line lightning, Switching surge
· Application Field [*LPZ1, *LPZ2, *LPZ3]	Distribution board, UPS(input & output) , CCTV, Water gauge, Flowmeter, Electronic scale, Actuator power and other power devices



Electrical property

Rated voltage	Un	380~440V AC [Ph-Ph], 220~240V AC [Ph-N]
Rated Current		N/A
Power system configuration		3phase 4wire type Parallel connection
Max Continuous Operating Voltage(MCOV)	Uc	275V AC [Ph-N]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	1 mA or lower
Insulation resistance (@500 V DC)	RIN	10 MΩ or higher

Protection property

Protection Mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [CE class 3 test] (@20kV/10kA voltage 1.2/50μs, current 8/20μs) – IEC 61643-11	Up	L1-N < 2,500 V	L2-N < 2,500 V	L3-N < 2,500 V	N-G < 1,000 V
Max current capacity 80kA mode (L-N) (@Current 8/20μs) [Total : 280kA]		L1-N 80kA	L2-N 80kA	L3-N 80kA	N-G 40kA
Nominal discharge current (@Current 8/20μs)	In	40kA	40kA	40kA	40kA
Response Time (@10kV/μs)		below 5 ns			

Feature

Operation status expression	Green lamp ON [L1, L2, L3]
Display/Alarm	Red lamp ON [L1, L2, L3]
Safety	Dual safety design [current & thermal fuse]

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating Temperature and Humidity	-40 ~ 90 °C , below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm ²]
Size	(W)113 x (L)200 x (H)80 mm cf. [D-2] p30
Installation	Bolt mounting
Weight	below 1,5 kg

Test standard

IEC 61643-11 [2012] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12[2007] Lightning Protection Zone 1,2,3
IEC 61000-4-5 [2014] Surge Immunity Test
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*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
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 *LPZ : Lightning Protect Zone

Signal / Telecom Line Surge Protector

Power / Signal / Coaxial / LAN Line Surge Protector

Product Dimension – Signal/Telecom [2wire, 3wire, 4wire]

Signal/Telecom SPD



Model list

	KOS-A-5DC	: Data Line(5V)
	KOS-A-12DC	: RS 485 Telecom Line
2wire	KOS-A-24DC	: 4~20mA Analog Line
	KOS-A-48DC	: KT Private Modem Line
	KOS-A-185DC	: KT ADSL, VDSL Line
4wire	KOS-B-12DC	: RS 422 Telecom Line
	KOS-B-48DC	: KT Private Modem Line
	KOS-B-185DC	: KT ADSL, VDSL Line
3wire	KOS-C-5DC	: RTD Sensor Line
	KOS-C-24DC	: RS 232 Telecom Line

[Unit : mm]

Indicator Type / Counter Type	Normal Type

· Model	KOS-A-5DC [2Wire type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	Data Line(5V) 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	U _n	5V DC
Max Continuous Operating Voltage (MCOV)	U _c	8V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2	L1-G	L2-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	L1-L2 100V or lower	L1-G 150V or lower	L2-G 150V or lower
Max Discharge Current DM:0kA, CM:100kA (@Current 8/20 μ s)	I _{max}	L1-L2 0kA	L1-G 50kA	L2-G 50kA
Response Time (@10kV/ μ s)	t _a	below 5 ns		

Feature

Common	Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
	Protection Circuit	Four Stage Hybrid Protection Circuit
	Protection Method	Reverse Surge Protection System
	Common	LCD Surge Counter / 10-year Battery Life / Replaceable Battery
4~20mA Analog SPD		Analog current display
RS 485 Telecom SPD		RS 485 telecom state display

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Indicator Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-A-12DC [2Wire type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	RS 485 Telecom Line 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	U _n	12V DC
Max Continuous Operating Voltage (MCOV)	U _c	15V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2	L1-G	L2-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	L1-L2 100V or lower	L1-G 150V or lower	L2-G 150V or lower
Max Discharge Current DM:0kA, CM:100kA (@Current 8/20 μ s)	I _{max}	L1-L2 0kA	L1-G 50kA	L2-G 50kA
Response Time (@10kV/ μ s)	t _a	below 5 ns		

Feature

Common	Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
	Protection Circuit	Four Stage Hybrid Protection Circuit
	Protection Method	Reverse Surge Protection System
	Common	LCD Surge Counter / 10-year Battery Life / Replaceable Battery
4~20mA Analog SPD		Analog current display
RS 485 Telecom SPD		RS 485 telecom state display

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Indicator Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode

*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-A-24DC [2Wire type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	4~20mA Analog Line 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	Un	24V DC
Max Continuous Operating Voltage (MCOV)	Uc	58V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	RIN	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2	L1-G	L2-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	Up	L1-L2 100V or lower	L1-G 150V or lower	L2-G 150V or lower
Max Discharge Current DM:0kA, CM:100kA (@Current 8/20 μ s)	I _{max}	L1-L2 0kA	L1-G 50kA	L2-G 50kA
Response Time (@10kV/ μ s)	t _a	below 5 ns		

Feature

Common	Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
	Protection Circuit	Four Stage Hybrid Protection Circuit
	Protection Method	Reverse Surge Protection System
	Common	LCD Surge Counter / 10-year Battery Life / Replaceable Battery
4~20mA Analog SPD		Analog current display
RS 485 Telecom SPD		RS 485 telecom state display

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Indicator Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-A-48DC [2Wire type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	KT Private Modem Line 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	Un	48V DC
Max Continuous Operating Voltage (MCOV)	Uc	68V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	RIN	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2	L1-G	L2-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	Up	L1-L2 100V or lower	L1-G 150V or lower	L2-G 150V or lower
Max Discharge Current DM:0kA, CM:100kA (@Current 8/20 μ s)	Imax	L1-L2 0kA	L1-G 50kA	L2-G 50kA
Response Time (@10kV/ μ s)	ta	below 5 ns		

Feature

Common	Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
	Protection Circuit	Four Stage Hybrid Protection Circuit
	Protection Method	Reverse Surge Protection System
	Common	LCD Surge Counter / 10-year Battery Life / Replaceable Battery
4~20mA Analog SPD	Analog current display	
RS 485 Telecom SPD	RS 485 telecom state display	

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Indicator Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-A-185DC [2Wire type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	KT ADSL, VDSL Line 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	U _n	185V DC
Max Continuous Operating Voltage (MCOV)	U _c	200V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2	L1-G	L2-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	L1-L2 250V or lower	L1-G 300V or lower	L2-G 300V or lower
Max Discharge Current DM:0kA, CM:100kA (@Current 8/20 μ s)	I _{max}	L1-L2 0kA	L1-G 50kA	L2-G 50kA
Response Time (@10kV/ μ s)	t _a	below 5 ns		

Feature

Common	Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
	Protection Circuit	Four Stage Hybrid Protection Circuit
	Protection Method	Reverse Surge Protection System
	Common	LCD Surge Counter / 10-year Battery Life / Replaceable Battery
4~20mA Analog SPD		Analog current display
RS 485 Telecom SPD		RS 485 telecom state display

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Indicator Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-C-5DC [3Wire type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	RTD Sensor Line 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	U _n	5V DC
Max Continuous Operating Voltage (MCOV)	U _c	8V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2	L2-L3	L1-G	L2-G	L3-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	L1-L2 100V or lower	L2-L3 100V or lower	L1-G 150V or lower	L2-G 150V or lower	L3-G 150V or lower
Max Discharge Current DM:0kA, CM:150kA (@Current 8/20 μ s)	I _{max}	L1-L2 0kA	L2-L3 0kA	L1-G 25kA	L2-G 100kA	L3-G 25kA
Response Time (@10kV/ μ s)	t _a	below 5 ns				

Feature

Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
Protection Circuit	Four Stage Hybrid Protection Circuit
Protection Method	Reverse Surge Protection System
Operation Indication	LCD Surge Counter / 10-year Battery Life / Replaceable Battery

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Counter Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode

*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-C-24DC [3Wire type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	RS 232 Telecom Line 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	Un	24V DC
Max Continuous Operating Voltage (MCOV)	Uc	39V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	RIN	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2	L2-L3	L1-G	L2-G	L3-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	Up	L1-L2 100V or lower	L2-L3 100V or lower	L1-G 150V or lower	L2-G 150V or lower	L3-G 150V or lower
Max Discharge Current DM:0kA, CM:150kA (@Current 8/20 μ s)	I _{max}	L1-L2 0kA	L2-L3 0kA	L1-G 25kA	L2-G 100kA	L3-G 25kA
Response Time (@10kV/ μ s)	t _a	below 5 ns				

Feature

Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
Protection Circuit	Four Stage Hybrid Protection Circuit
Protection Method	Reverse Surge Protection System
Operation Indication	LCD Surge Counter / 10-year Battery Life / Replaceable Battery

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Counter Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-B-12DC [4Wire Type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	RS 422 Telecom Line 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	U _n	12V DC
Max Continuous Operating Voltage (MCOV)	U _c	16V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2/L3-L4	L1/L2-G	L3/L4-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	L1-L2/L3-L4 100V or lower	L1/L2-G 150V or lower	L3/L4-G 150V or lower
Max Discharge Current DM:0kA, CM:200kA (@Current 8/20 μ s)	I _{max}	L1-L2/L3-L4 0kA	L1/L2-G 100kA	L3/L4-G 100kA
Response Time (@10kV/ μ s)	t _a	below 5 ns		

Feature

Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
Protection Circuit	Four Stage Hybrid Protection Circuit
Protection Method	Reverse Surge Protection System
Operation Indication	LCD Surge Counter / 10-year Battery Life / Replaceable Battery

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Counter Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode

*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-B-48DC [4Wire Type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	KT Private Modem Line 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	U _n	48V DC
Max Continuous Operating Voltage (MCOV)	U _c	68V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2/L3-L4	L1/L2-G	L3/L4-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	L1-L2/L3-L4 100V or lower	L1/L2-G 150V or lower	L3/L4-G 150V or lower
Max Discharge Current DM:0kA, CM:200kA (@Current 8/20 μ s)	I _{max}	L1-L2/L3-L4 0kA	L1/L2-G 100kA	L3/L4-G 100kA
Response Time (@10kV/ μ s)	t _a	below 5 ns		

Feature

Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
Protection Circuit	Four Stage Hybrid Protection Circuit
Protection Method	Reverse Surge Protection System
Operation Indication	LCD Surge Counter / 10-year Battery Life / Replaceable Battery

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Counter Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOS-B-185DC [4Wire Type]
· Application	Data Line, Analog / Digital Signal Line, Telecom Line Protection
· Application Field	KT ADSL, VDSL Line(2channel) 4~20mA / 0~10V Analog Signal, Modem, RTU, PLC, SCADA, Load Cell etc



Electrical property

Rated voltage	U _n	185V DC
Max Continuous Operating Voltage (MCOV)	U _c	200V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2/L3-L4	L1/L2-G	L3/L4-G
Class 3 Test (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	L1-L2/L3-L4 250V or lower	L1/L2-G 300V or lower	L3/L4-G 300V or lower
Max Discharge Current DM:0kA, CM:200kA (@Current 8/20 μ s)	I _{max}	L1-L2/L3-L4 0kA	L1/L2-G 100kA	L3/L4-G 100kA
Response Time (@10kV/ μ s)	t _a	below 5 ns		

Feature

Transmission Property	Free of Voltage Drop, Signal Attenuation, Distortion
Protection Circuit	Four Stage Hybrid Protection Circuit
Protection Method	Reverse Surge Protection System
Operation Indication	LCD Surge Counter / 10-year Battery Life / Replaceable Battery

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	Counter Type : (W)32 X (L)96 X (H)95 mm Normal Type : (W)32 X (L)96 X (H)87 mm cf. p36
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	300g or lower

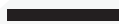
Test standard

IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
IEC 61643-12 (2002), Lightning Protection Zone 1, 2, 3
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode

*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

LAN / Coaxial Line Surge Protector



Power / Signal / Coaxial / LAN Line Surge Protector

Product Dimension – LAN RJ45 type

LAN Line SPD

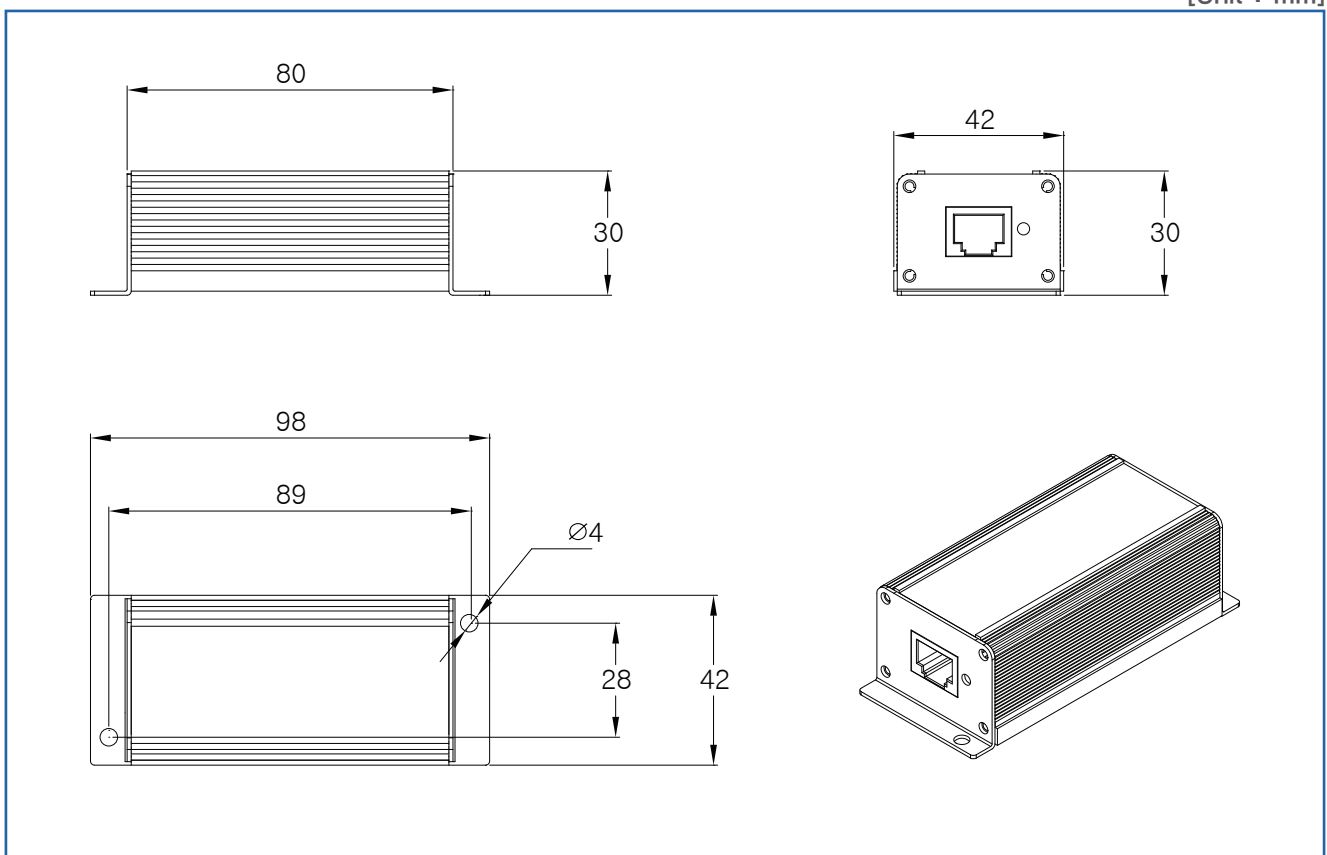


Model list

KOX-A-48DC-E100

KOX-A-48DC-E1000

[Unit : mm]



· Model	KOX-A-48DC-E100
· Application	LAN Line Surge Protection
· Application Field	POE LINE 10/100 BASE Cat.5 Ethernet / LAN / F-net etc.



Electrical property

Rated voltage	U _n	48V DC
Max Continuous Operating Voltage (MCOV)	U _c	68V DC
Nominal Current		300mA or lower
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode (Full Mode Protection)		(1,2,3,6)-G, (4+5)-G, (7+8)-G, 1-2, 3-6, (4+5)-(7+8)
Voltage Protection Level (C2 Category) (@6kV/3kA Voltage, 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	100V or lower
Max Discharge Current DM:0kA, CM:50kA (@Current 8/20 μ s)	I _{max}	150kA
Response Time (@10kV/ μ s)	t _a	5nsec or lower

Transmission Property & Display Function

Capacity (@1MHz, 1Vrms)	C	1.5nF
Insertion Loss (@3dB)	BW	DC~10MHz
Protector Operation Status Indication		N/A
Correspondence		10 Base-T(IEEE 802.3i) 100 Base-T(IEEE 802.3u) POE(IEEE 802.3af) POE(IEEE 802.3at)

Mechanical property

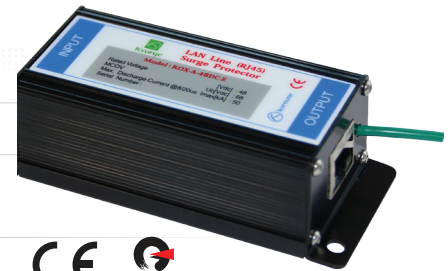
Protection rating level		IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature		-40~90 °C
Operational Environment Humidity		95% or lower
Dimensions		(W)42 x (L)98 x (H)30mm cf. p48
Fastening (Installation)		DIN-Rail or Bolt Fastening
Weight		250g or lower

Test standard

UL 497B
IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOX-A-48DC-E1000
· Application	LAN Line Surge Protection
· Application Field	POE Line 1000 BASE Cat.6 Ethernet / LAN / F-net etc.



Electrical property

Rated voltage	U _n	48V DC
Max Continuous Operating Voltage (MCOV)	U _c	68V DC
Nominal Current		300mA or lower
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode (Full Mode Protection)		(4,5,7,8)-G, 4-5, 7-8, (1,2,3,6)-G, 1-2, 5-6
Voltage Protection Level (C2 Category) (@6kV/3kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	100V or lower
Max Discharge Current DM:0kA, CM:50kA (@Current 8/20 μ s)	I _{max}	200kA
Response Time (@10kV/ μ s)	t _a	5nsec or lower

Transmission Property & Display Function

Capacity (@1MHz, 1Vrms)	C	1.5nF
Insertion Loss (@3dB)	BW	DC~10MHz
Protector Operation Status Indication		N/A
Correspondence		10 Base-T(IEEE 802.3i) 100 Base-T(IEEE 802.3u) 1000Base-T(IEEE 802.3ab) POE(IEEE 802.3af) POE(IEEE 802.3at)

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	(W)42 x (L)98 x (H)30mm cf. p48
Fastening (Installation)	DIN-Rail or Bolt Fastening
Weight	250g or lower

Test standard

UL 497B
IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
*CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

Product Dimension – Coaxial Line BNC type

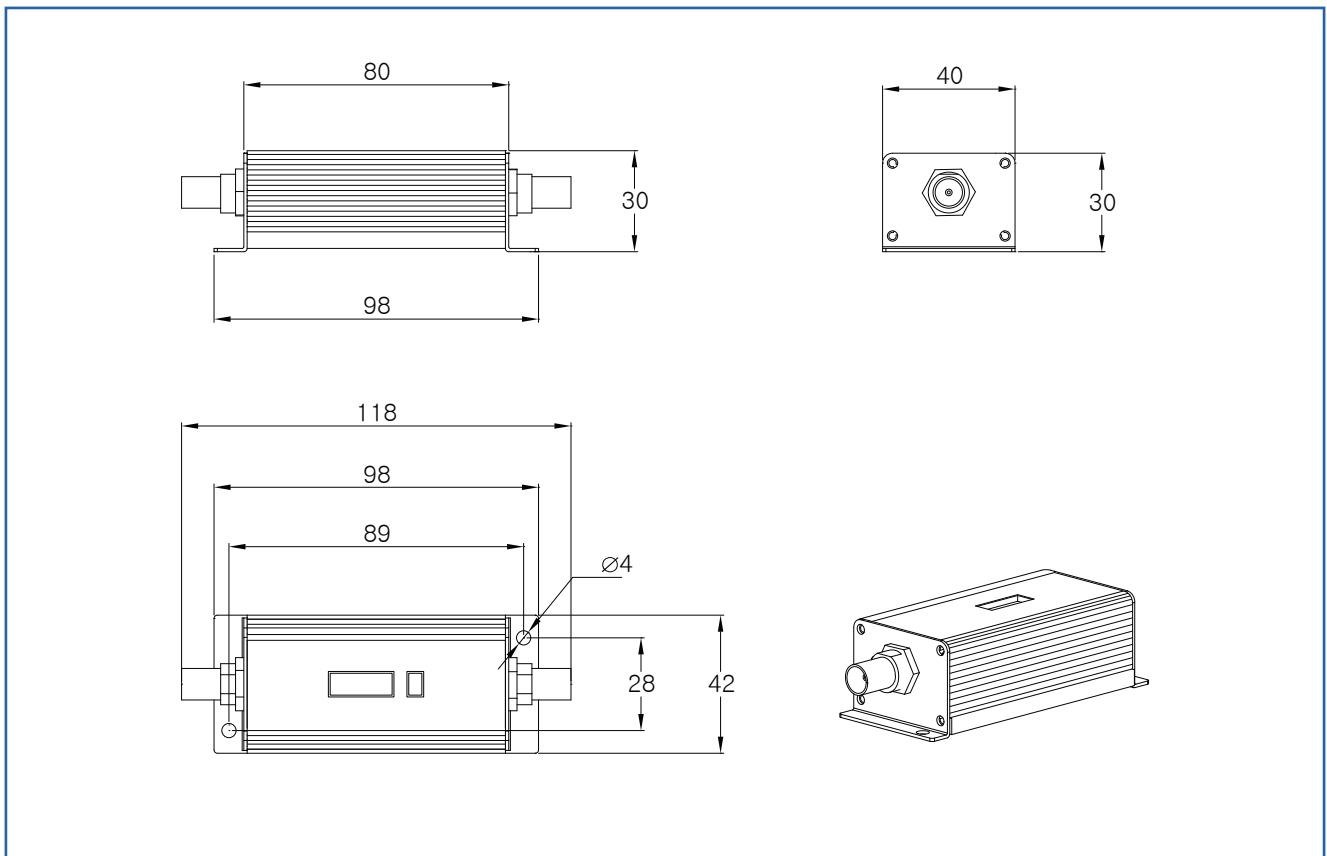
Coaxial Line SPD



Model list

- KOX-A-24DC
- KOX-A-48DC

[Unit : mm]



· Model	KOX-A-24DC
· Application	Coaxial Line Surge Protection (N-type Connector application)
· Application Field	Antenna, RF Communication, Cable TV etc



Electrical property

Rated voltage	U _n	24V DC
Max Continuous Operating Voltage (MCOV)	U _c	36V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	R _{IN}	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2(G)
Voltage Protection Level (C2 Category) (@6kV/3kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U _p	L1-L2(G) 100V or lower
Max Discharge Current DM:0kA, CM:50kA (@Current 8/20 μ s)	I _{max}	L1-L2(G) 50kA
Response Time (@10kV/ μ s)	t _a	5nsec or lower

Transmission Property & Display Function

Capacity (@1MHz, 1Vrms)	C	1.5nF
Insertion Loss (@3dB)	BW	DC~10MHz
Protector Operation Status Indication		Surge Counter

Mechanical property

Protection rating level		IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature		-40~90 °C
Operational Environment Humidity		95% or lower
Dimensions		(W)42 x (L)118 x (H)30mm cf. p51
Fastening (Installation)		DIN-Rail or Bolt Fastening
Weight		250g or lower

Test standard

UL 497B
IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

· Model	KOX-A-48DC
· Application	Coaxial Line Surge Protection (N-type Connector application)
· Application Field	Antenna, RF Communication, Cable TV etc



Electrical property

Rated voltage	Un	48V DC
Max Continuous Operating Voltage (MCOV)	Uc	68V DC
Nominal Current		300mA
Insulation Resistance(@Dc)	RIN	20M Ω or higher
DC Loop Resistance	R	50 Ω or lower / 1Wire

Protection property

Protection Mode		L1-L2(G)
Voltage Protection Level (C2 Category) (@6kV/3kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	Up	L1-L2(G) 100V or lower
Max Discharge Current DM:0kA, CM:50kA (@Current 8/20 μ s)	Imax	L1-L2(G) 50kA
Response Time (@10kV/ μ s)	ta	5nsec or lower

Transmission Property & Display Function

Capacity (@1MHz, 1Vrms)	C	1.5nF
Insertion Loss (@3dB)	BW	DC~10MHz
Protector Operation Status Indication		Surge Counter

Mechanical property

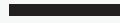
Protection rating level		IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature		-40~90 $^{\circ}$ C
Operational Environment Humidity		95% or lower
Dimensions		(W)42 x (L)118 x (H)30mm cf. p51
Fastening (Installation)		DIN-Rail or Bolt Fastening
Weight		250g or lower

Test standard

UL 497B
IEC 61643-21 (2000), Category A, B, C
IEC 61000-4-5 (2001), Surge Immunity Test
ANSI / IEEE Std C62.41 (2002), Category A, B, C
ANSI / IEEE Std C62.64 (1997), Data/Telecom/Signal Circuit Surge Protector – Standard Specification
IEEE Std C62.36 (2000), Data/Telecom/Signal Circuit Surge Protector Test Standard

*DM(Differential Mode)=NM(Normal Mode)=Symmetrical Mode
 *CM(Common Mode)=LM(Longitudinal Mode)=Asymmetrical Mode

Auto Recovery ELB



Auto Recovery Earth Leakage Breaker

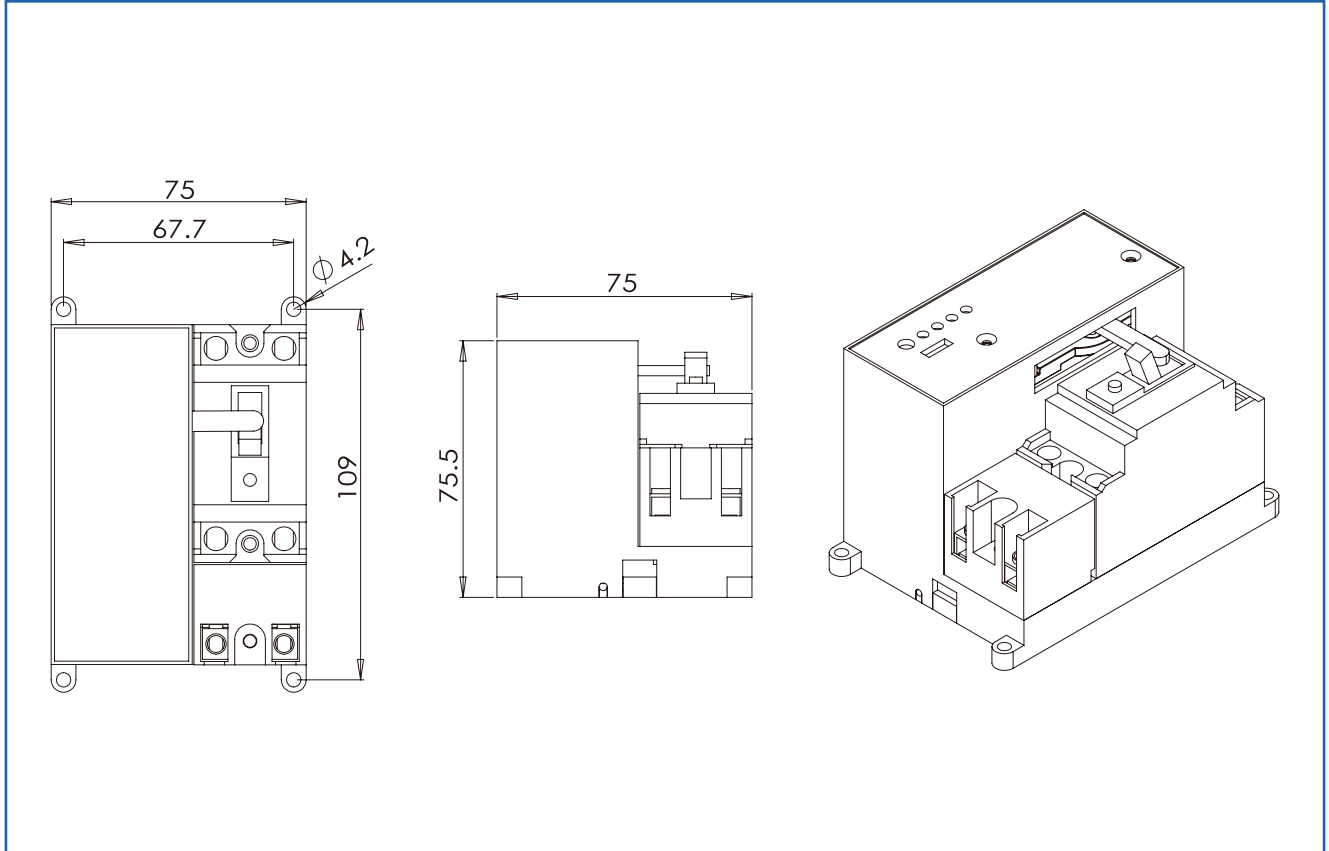
Product Dimension – Auto Recovery Circuit Breaker



Model list

KOEL-S-C-30AF

[Unit : mm]



Auto Recovery Circuit Breaker Technical Specification

· Model	KOEL-S-C-30AF
· Application	Protection for 220V Power Line against leakage and over-current
· Application Field	Distribution Panel, Street Light, Traffic Light, External Ad Tower, other power devices



Electrical property

Rated Voltage	220V AC
Rated Current	5A, 10A, 15A, 20A, 30A
Rated Sensitive Current	30mA
Rated Non-operating Current	15mA
Rated Breaking Current	2.5kA
Operating Time	0.03sec
Power System	Single Phase 2Wire

Transmission Property & Display Function

Recovery after load analysis when the circuit breaker works by power leakage
Discriminated protection between surge and over-current
Display of Cause of Breaker Operation (Over-current, Surge, Leakage)
Recovery after release and analysis of leakage
Immediate recovery after lightning surge
Power block at the occurrence of over-current
Application of super capacitor for improved battery life
Telecom Port & Remote Monitoring (Option)

Application

Unmanned automated facility
Low-pressure Distributing Board
Street Light, Traffic Light, Outdoor Ad Tower
Industrial and agricultural Facilities
Other electrical facilities

Mechanical property

Protection rating level	IP 20 (@IEC 60529), NEMA 1
Operational Environment Temperature	-40~90 °C
Operational Environment Humidity	95% or lower
Dimensions	(W)75 x (L)120 x (H)75.5mm cf. p55
Fastening (Installation)	Bolt Fastening
Weight	350g or lower

Smart Power Supply System

Smart Power Supply System

Product Dimension – Smart Power Supply System

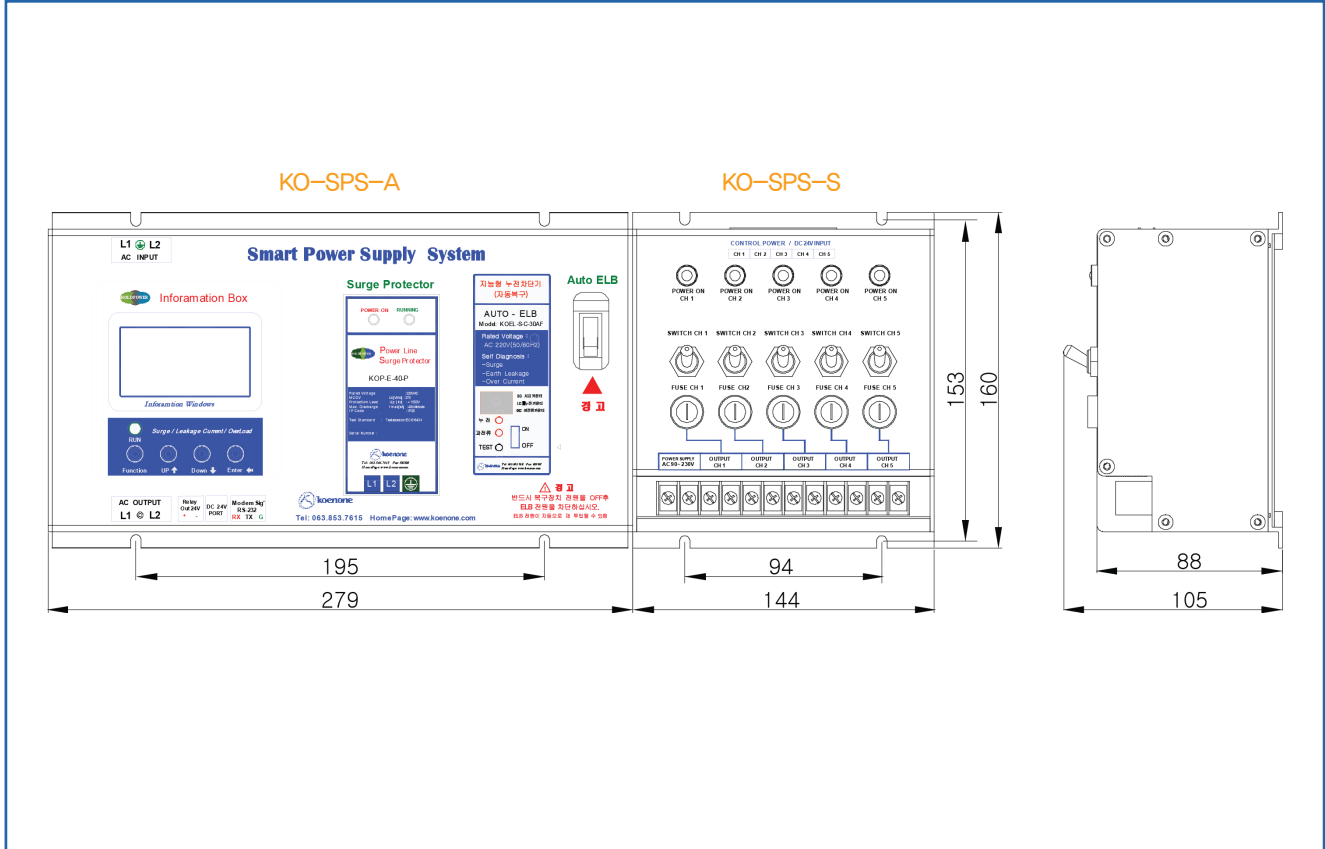


Model list

KO-SPS-A (Control BOX)
(W)105 x (L)279 x (H)160

KO-SPS-S (Switch BOX)
(W)105 x (L)144 x (H)160

[Unit : mm]



Smart Power Supply System Technical Specification

· Mode	KO-SPS-A / KO-SPS-S
· Application	Power supply system
· Application Field	TM/TC manless automatic facilities, other power control facilities



Electrical property

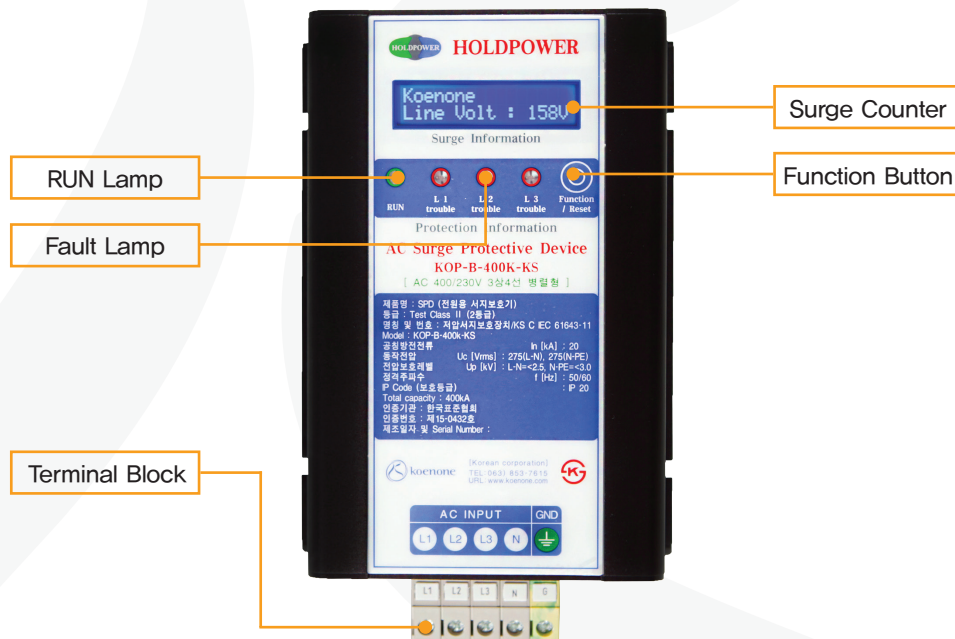
Rated Voltage	220V / 50 ~ 60Hz
Rated Current	15 / 20 / 30A
Limited Voltage Surge	below 2.5kV
Surge protection Mode	L1-L2, L1-G, L2-G (3Mode)
Display	Failure, Operation, other information
Recording	Surge, Leakage, over-voltage counter / Surge, Leakage, over-event memory
Safety	Dual safety design – Overheating, Over-voltage
Protection rating	IP 20
Operating Temperature and Humidity	below -40~90°C / 95%
Size	KO-SPS-A : (W)105 x (L)279 x (H)160mm KO-SPS-S : (W)105 x (L)144 x (H)160mm cf. p58

Component

KO-SPS-A (Control BOX)	Diagnosis & Display box	Modem telecom monitoring function Modem telecom recovery function Power line voltage between wires display function Surge, Leakage, Overload, Network error detection and date memory, display function When the surge input, control measurement power block function
	Surge protection system	Full Mode protection @20kV/10kA (Voltage 1,2/50μs, current 8/20μs) Total surge capacity : 120kA (8/20μs) Operation power display Fault display
	Auto-recovery leakage breaker	Power: 220V, 15A/20A/30A Surge, Leakage, Overload detection function Leakage state diagnosis function Auto-recovery against the blockage function Leakage overload counter function RS232 telecom function
KO-SPS-S (Switch BOX)	Control switch box	Remote ON/OFF function per each port Onsite ON/OFF function per each port Power control function per each port Safety block function per each port (Fuse) DC 24V control power input terminal composition

Power Line Surge Protector

Power Line Surge Protector Installation
Power / Signal / Coaxial / LAN Line Surge Protector



Power Line Surge Protector [Special type] Manual

Normal State

The RUN Lamp lights on and Surge Counter / Line Voltage are displayed repeatedly

Failure State

The Fault Lamp of the corresponding fault mode flickers, and LCD Display (L-N Fault) and the Buzzer indicates the erroneous status.

Leakage Current Check

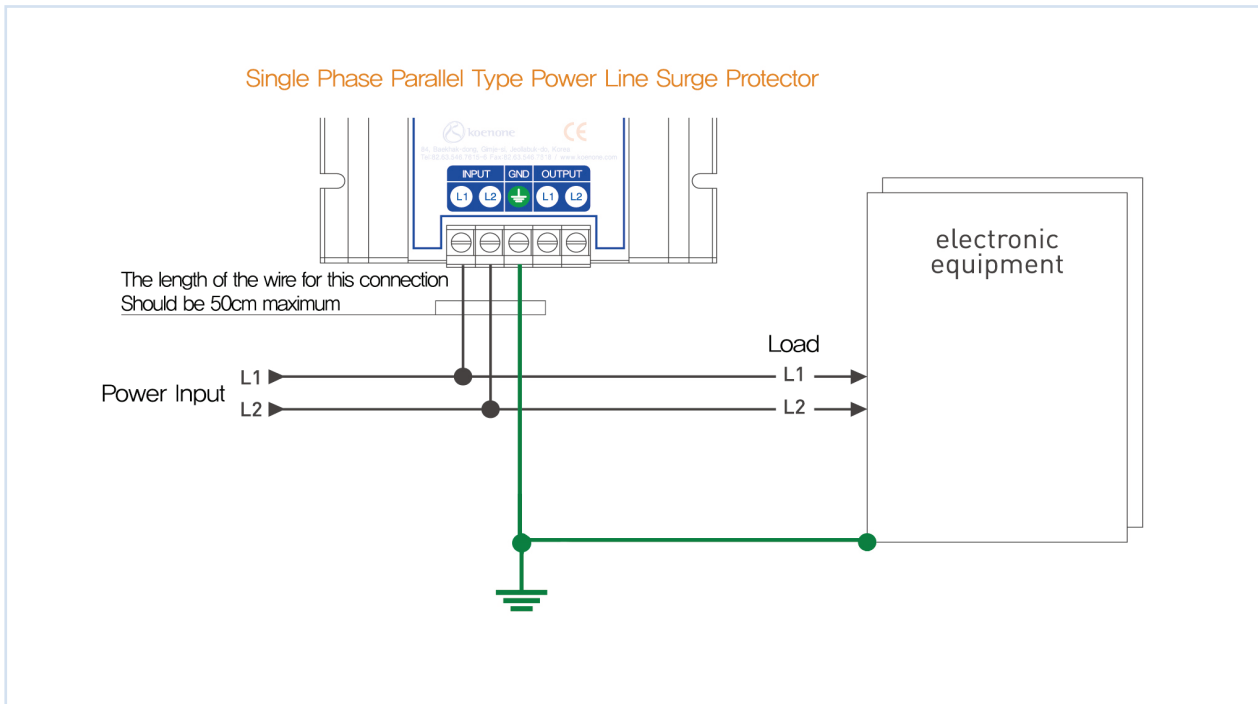
Press the Function & Reset Button and the leakage current value appears in about 2 seconds followed by recovery in several seconds. (It is normal if Leakage Current is 5mA or below)

Initialization

Press and hold the Function & Reset Button for about 3 seconds to initialize with the buzzer sounding. (Resetting the Surge Counter value)

KOP-A Type, Parallel type Installaiton – 〈 1 〉

Model List : KOP-A-240K,320K,360K,240K-KS (1Phase/2Wire Parallel type)



[Single Phase Parallel Installation 1]

1. Turn off the power first.
2. Use the 4~5mm bolts to fix the Protector onto the 4 fixing holes.
3. Connect the input power to the INPUT L1 and L2 terminals.
[The length of the wire for this connection should be 50cm maximum.]
4. Connect earth to the earth terminal.
[Connect earth to a nearby earthed panel]
5. After the above is done, supply the power to the device.
6. When the Power Run Lamp is turned on and the Fault Lamp is turned off, the system is normal.
7. The LCD should display "Surge Count 0" . The counter value is increased when surge is happened.
8. If press the Function & Reset Button and the leakage current value will be displayed. 3 seconds later, automatically returned (Special I Type)
9. Press and hold the Function & Reset Button for more than 3 seconds to initialize all memories including the surge counter. (Special I Type)

*KOP-A-240K-KS

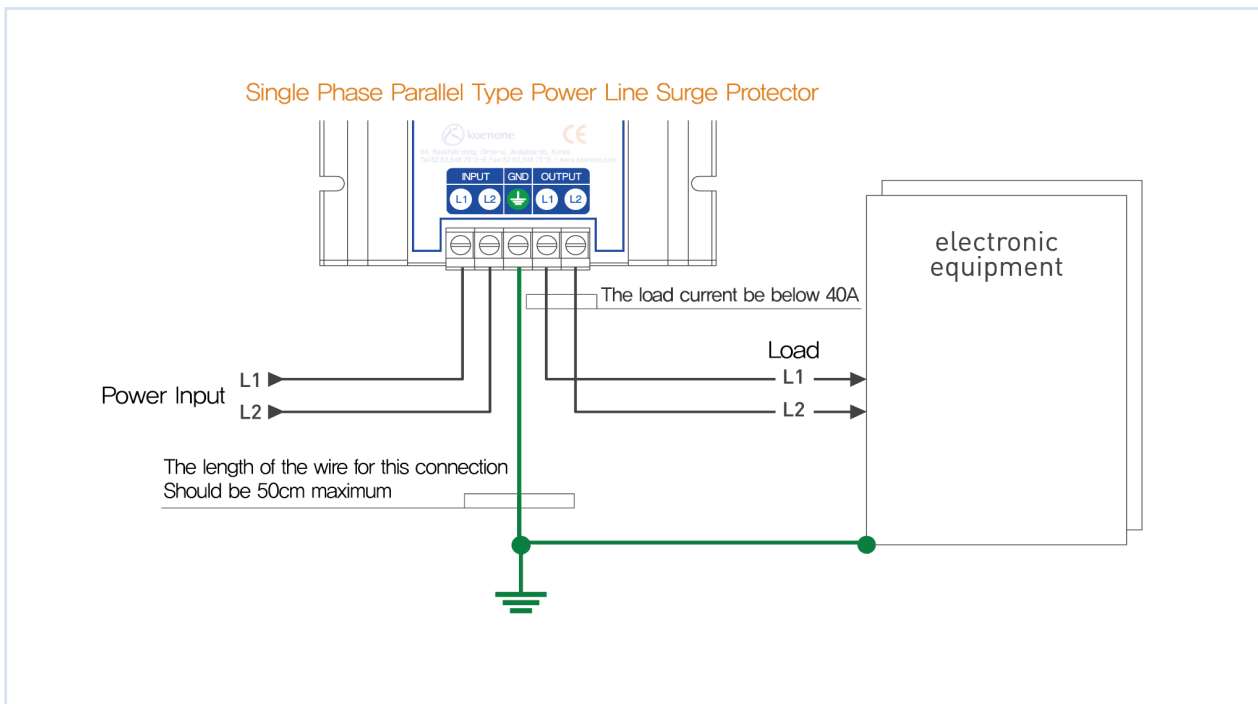
Connect input power line to input L,N,G terminals

Be careful not to be changed connect position of the phase wire (L) and neutral wire (N)

– After connecting power, if it displays "phase change" message and alarms, change the connected phase (L,N)

KOP-A Type, Parallel type Installation – 〈2〉

Model List KOP-A-240K,320K,360K,240K-KS (1Phase/2Wire Parallel type)



[Single Phase Parallel Installation 2 – The load current should be below 40A]

1. Turn off the power first
2. Use the 4~5mm bolts to fix Protector onto the 4 fixing holes.
3. Connect the input power to the INPUT L1 and L2 terminals.
4. Connect the load device to the OUTPUT L1 and L2 terminals.
[The load should be below 40A. If over, please follow the instructions of Single Phase Parallel Installation 〈1〉]
5. Connect earth to the terminal.
[Connect earth to a nearby earthed panel]
6. After the above is done, supply the power to the device.
7. If the Power Run Lamp is turned on and the Fault Lamp is turned off, the system is normal.
8. The LCD should display “Surge Count 0”. The counter value is increased when surge is happened.
9. If press the Function & Reset Button and the leakage current value will be displayed. 3 seconds later, automatically returned
10. Press and hold the Function & Reset Button for more than 3 seconds to initialize all memories including the surge counter. (Special I Type)

*KOP-A-240K-KS

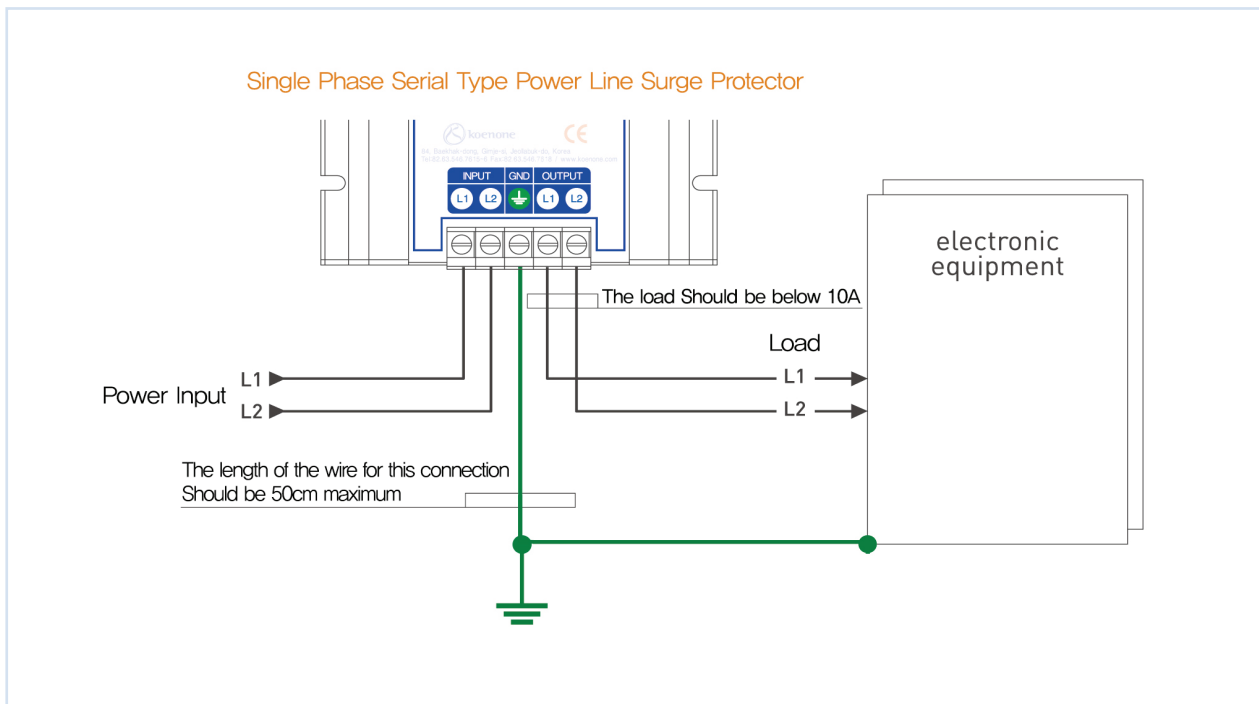
Connect input power line to input L,N,G terminals

Be careful not to be changed connect position of the phase wire (L) and neutral wire (N)

– After connecting power, if it displays “phase change” message and alarms, change the connected phase (L,N)

KOP-A Type, Serial type Installation

Model List KOP-A-240K,320K,360K (1Phase/2Wire Serial type)

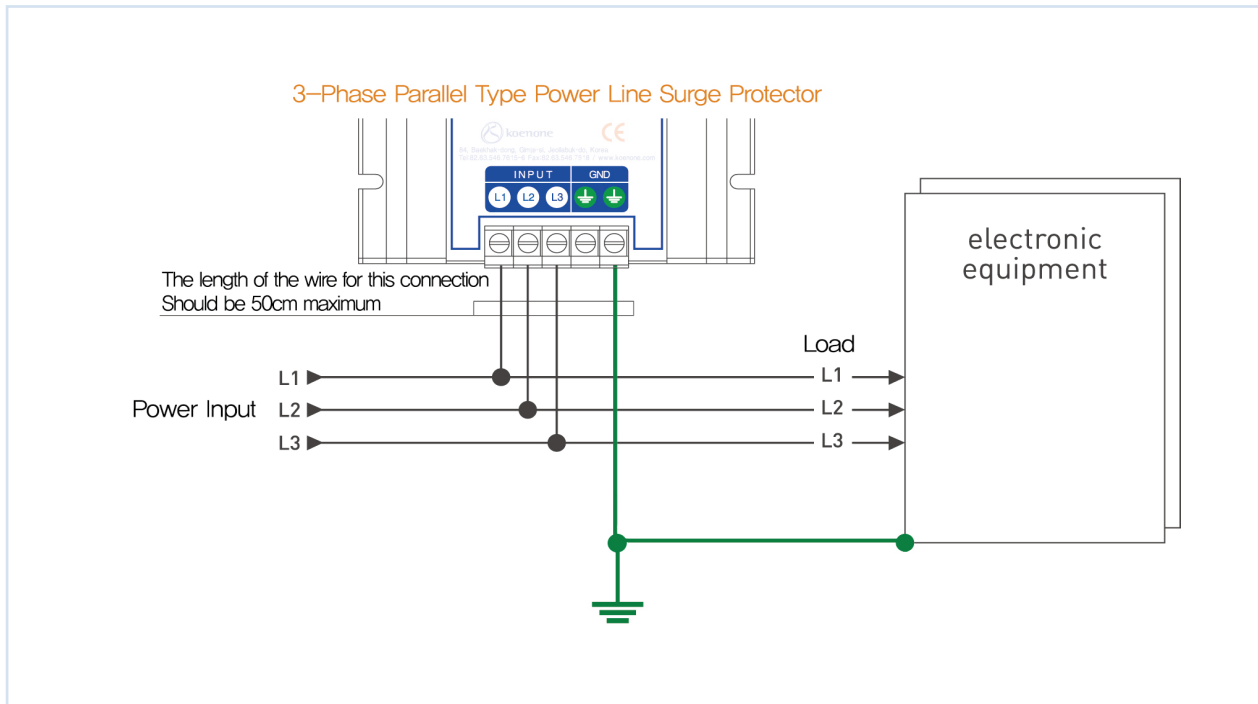


[Single Phase Serial Installation – The load current should be below 10A]

1. Turn off the power first
2. Use the 4–5mm bolts to fix Protector onto the 4 fixing holes.
3. Connect the input power to the INPUT L1 and L2 terminals.
4. Connect the load device to the OUTPUT L1 and L2 terminals.
[The load should be below 10A]
5. Connect earth to the terminal.
[Connect earth to a nearby earthed panel]
6. After the above is done, supply the power to the device.
7. When the Power Run Lamp is turned on and the Fault Lamp is turned off, the system is normal.
8. The LCD should display "Surge Count 0". The counter value is increased when surge is happened.
9. If press the Function & Reset Button and the leakage current value will be displayed. 3 seconds later, automatically returned
10. Press and hold the Function & Reset Button for more than 3 seconds to initialize all memories including the surge counter. (Special I Type)

KOP-B Type, Parallel type Installation – 3Phase/3Wire

Model List KOP-B-360K (3Phase / 3Wire Parallel Type)

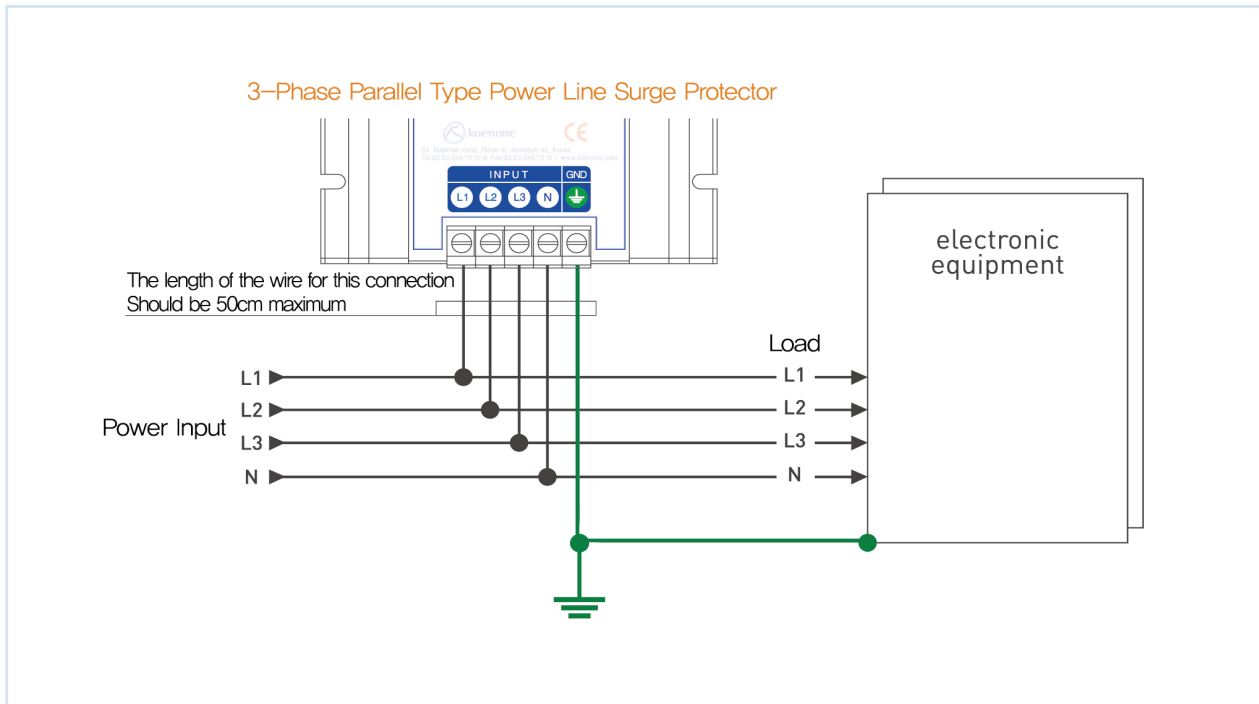


[3-Phase 3Wire type Parallel Installation]

1. Turn off the power first.
2. Use the 4~5mm bolts to fix the Protector onto the 4 fixing holes.
3. Connect the phase to the INPUT L1, L2 and L3 terminals.
[The length of the wire for this connection should be 50cm maximum.]
4. Connect earth to the earth terminal.
[Connect earth to a nearby earthed panel]
5. After the above is done, supply the power to the device.
6. When the Power Run Lamp is turned on and the Fault Lamp is turned off, the system is normal.
7. The LCD should display "Surge Count 0". The counter value is increased when surge is happened.
8. If press the Function & Reset Button and the leakage current value will be displayed. 3 seconds later, automatically returned (Special I Type)
9. Press and hold the Function & Reset Button for more than 3 seconds to initialize all memories including the surge counter. (Special I Type)

KOP-B Type, Parallel type Installation – 3Phase/4Wire

Model List KOP-B-20KI,500K-KS,400K-KS,400K (3Phase / 4Wire Parallel Type)

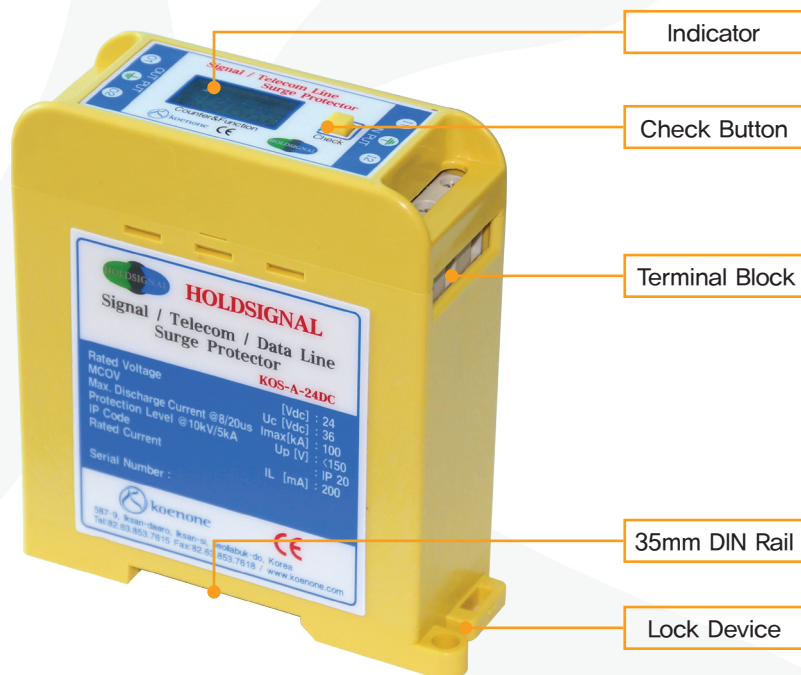


[3-Phase 4Wire type Parallel Installation]

1. Turn off the power first
2. Use the 4~5mm bolts to fix the Protector onto the 4 fixing holes.
3. Connect the phase to the INPUT L1, L2 and L3 terminals. Connect Neutral to the N terminal.
[The length of the wire for this connection should be 50cm maximum.]
4. Connect earth to the earth terminal.
[Connect earth to a nearby earthed panel]
5. After the above is done, supply the power to the device.
6. When the Power Run Lamp is turned on and the Fault Lamp is turned off, the system is normal.
7. The LCD should display "Surge Count 0". The counter value is increased when surge is happened.
8. If press the Function & Reset Button and the leakage current value will be displayed. 3 seconds later, automatically returned
(Special I Type)
9. Press and hold the Function & Reset Button for more than 3 seconds to initialize all memories including the surge counter.
(Special I Type)

Signal / Telecom Data Line Surge Protector

To Install Signal / Telecom Data Line Surge Protector
Power / Signal / Coaxial / LAN Line Surge Protector



Signal / Telecom Surge Protector Manual

Normal State

It is normal if L1-L2 / L1-G / L2-G are 1 MΩ or higher

* L1 = I1, O1 / L2 = I2, O2

Failure State

If L1-L2 / L1-G / L2-G are several KΩ or lower, it indicates short

Initialization

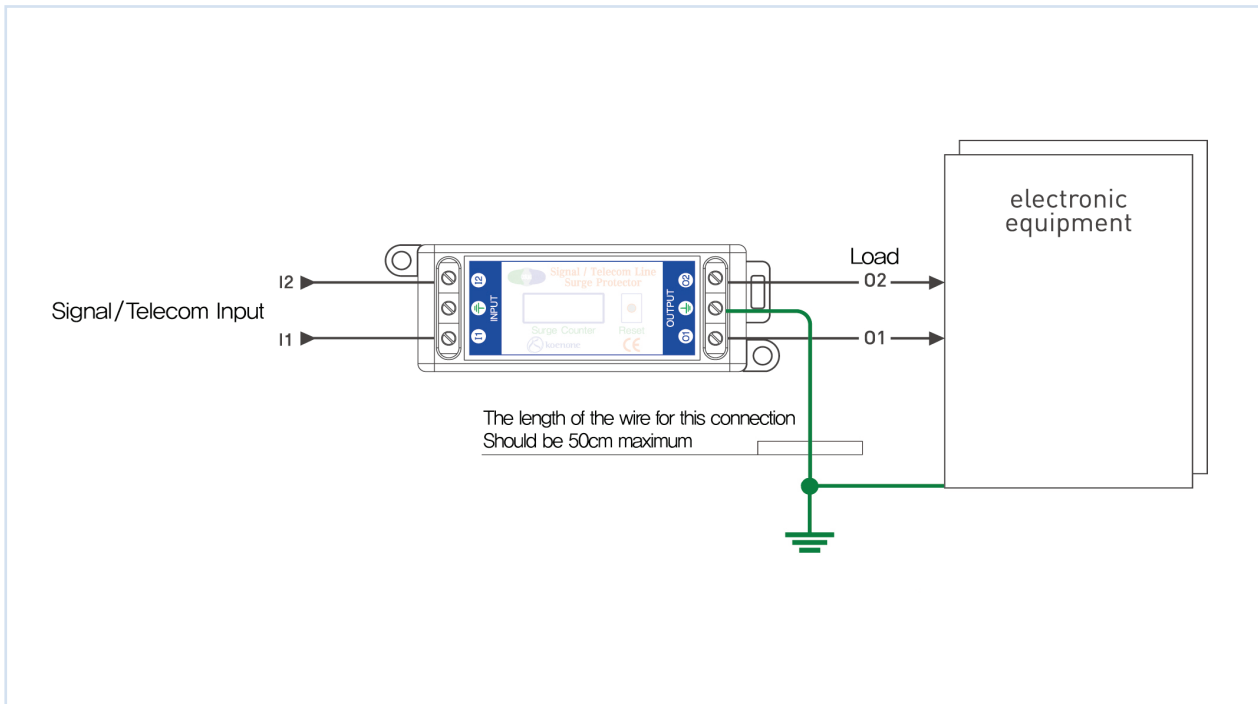
To initialize, open the top cover and put out the battery and then put in it again.

Battery Life

Battery has a 10-year life. To replace, open the top cover and replace the 3V mercury cell.

KOS-A Type, Serial type Installation – 2Wire

Model List KOS – A – Model (2Wire Type)

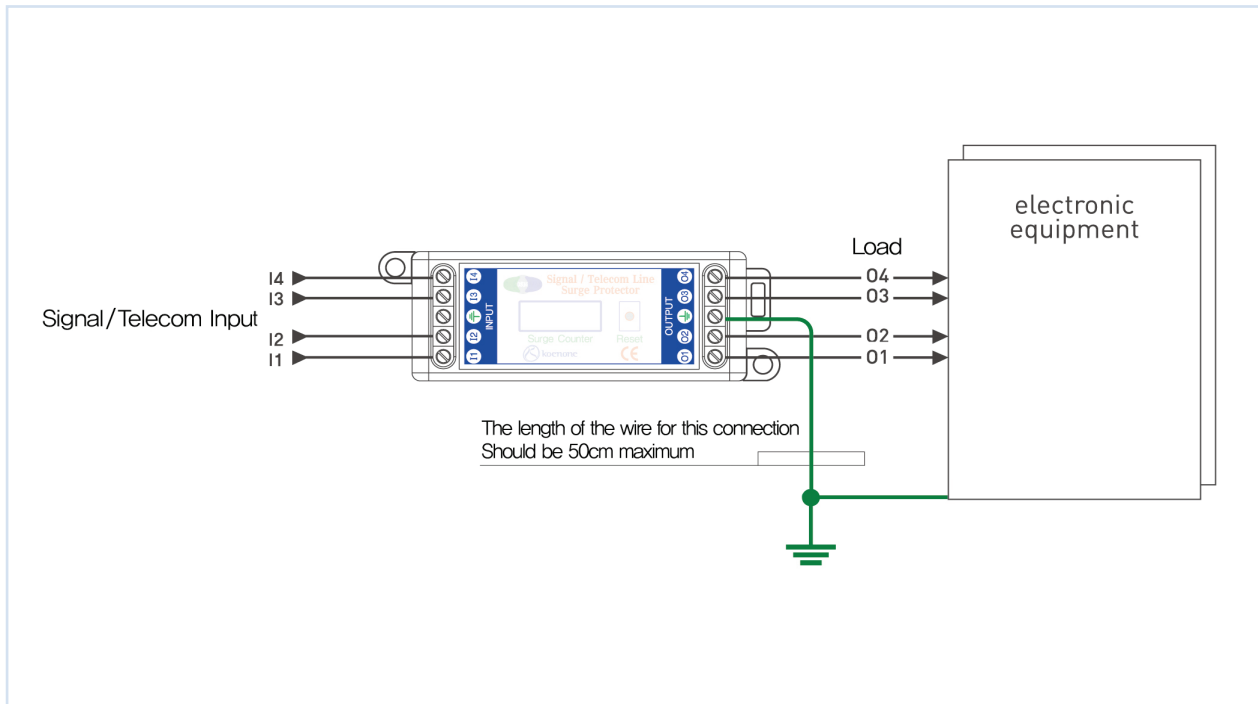


[2Wire type Installation]

1. Turn off the power first.
2. Use the Din-Rail or 3-4mm bolts to fix the Protector onto the 2 fixing holes.
3. Connect the input or output signal/communication wire to the INPUT I1 and I2 terminals.
4. Connect a load device to the OUTPUT O1 and O2 terminals.
[The INPUT I1-OUTPUT O1 and INPUT I2-OUTPUT O2 are the same wire.
If these are changed, a signal or communication error will occur.]
5. Connect earth to the IN or OUT earth terminal.
[Connect earth to a nearby earthed panel]
6. If more than one Protector is installed, connect earth individually to a nearby earthed panel.
7. Once the above is done, supply the power to the device.

KOS-A Type, Serial type Installation – 3/4Wire

Model List KOS – B/C – Model (3/4Wire Type)



[3/4Wire type Installation]

1. Turn off the power first.
2. Use the Din-Rail or 3–4mm bolts to fix the Protector onto the 2 fixing holes.
3. Connect the input or output signal/communication wire to the INPUT I1, I2, I3, I4 terminals.
4. Connect a load device to the OUTPUT O1 O2 O3 and O4 terminals.
[The INPUT I1–OUTPUT O1, INPUT I2–OUTPUT O2, INPUT I3–OUTPUT O3 and INPUT I4–OUTPUT O4 are the same wire. If these are changed, a signal or communication error will occur.]
5. Connect earth to the IN or OUT earth terminal.
[Connect earth to a nearby earthed panel]
6. If more than one Protector is installed, connect earth individually to a nearby earthed panel.
7. Once the above is done, supply the power to the device.

Coaxial / LAN Line Surge Protector

Coaxial / LAN Line Surge Protector Install
Power / Signal / Coaxial / LAN Line Surge Protector



Coaxial · LAN Line Surge Protector Manual

Normal State

LAN type : If LAN communication state is okay, it is normal

Coaxial type : Connector (+) to (-) is several M Ω or higher, BNC Connector in (+) – OUT(+) is 50 Ω or lower, and there is no signal and communication Error, it is normal

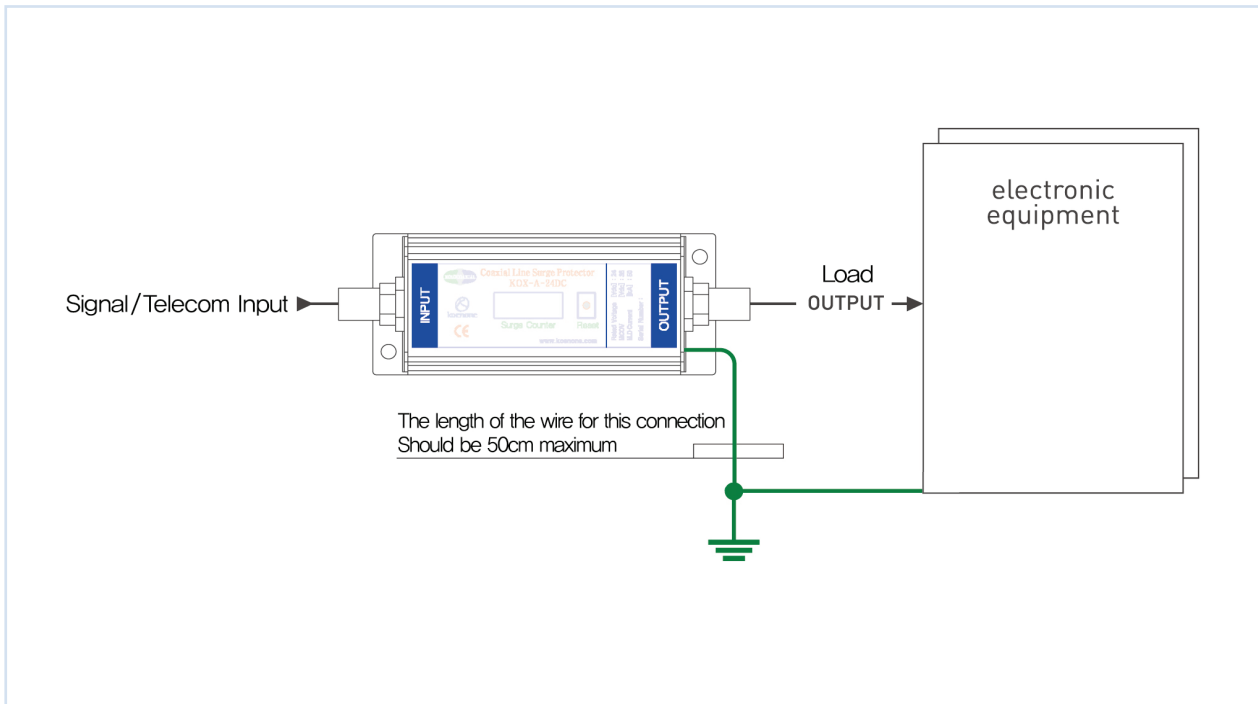
Failure State

LAN type : If LAN communication state is unconnected, you need to check the network state by network checking tool

Coaxial type: If L1–L2/L1–G/L2–G are several K Ω or lower, it indicates Short between wires,
If L1–O1/L2–O2 are several M Ω or higher, it indicates snapping of the In–Out wire.
As a result, signal and communication Errors occur.

KOX-A Type, Serial type Installation

Model List KOX-A / KOX-A-E Model (Coaxial/LAN Type)



[Coaxial/LAN Line Installation]

1. Turn off the power first.
2. Use the 3~4mm bolts to fix the Protector onto the 2 fixing holes.
3. Connect the IN or OUT telecom wire to the INPUT connector.
* Connector = BNC or RJ45 or N type...
4. Connect a load device to the OUTPUT Connector.
5. Connect earth to the IN or OUT earth terminal.
[Connect earth to a nearby earthed panel]
6. If more than one Protector is installed, connect earth individually to the bus bar or to a nearby earthed panel.
7. Once the above is done, supply the power to the device.

Smart power supply system

Smart power supply system installation



[Smart Power Supply System Manual]

Surge Function

S/F ON/OFF : set whether to block the power when the surge happened
S/F Time : set how long the power is blocked when there is the first surge event

Net Function 1(Communication signal detection function)

N/F ON/OFF – Modem RTU, PLC etc., when the communication device is not responding, specify whether to reset the power
N/F Counter – when the communication device is not responding, specify how many times repeat the power reset

Net Function 2

N/F Start – Communication interval setting mode (start to check the communication error after ~min)
N/F Time – Time setting mode for determining communication blockage (if there is no communication signal over ~sec, specify whether to reset the power.)

Time Setting

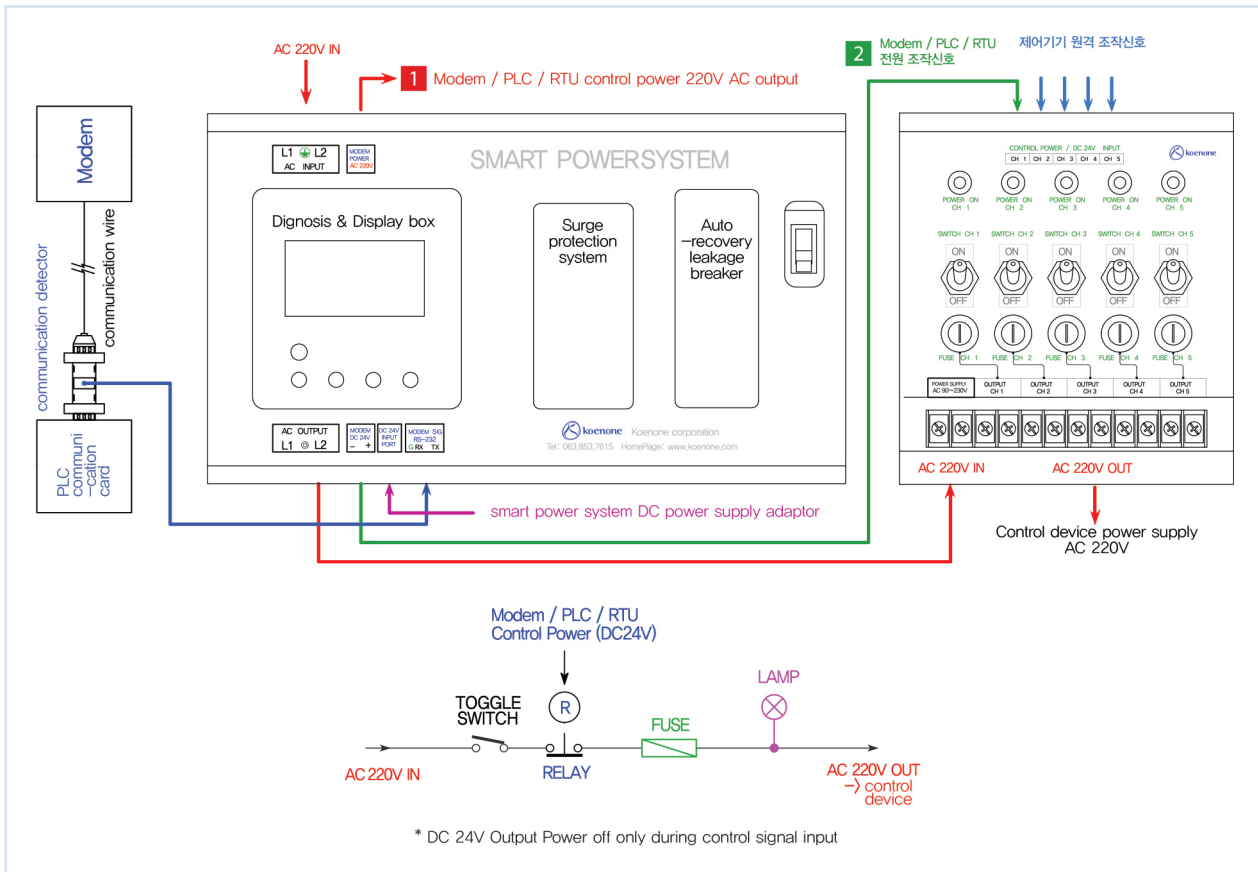
Setting the time of smart power device (it is factory set, resetting in case of error)

Count Reset

Menu for initialization of all data which is recored on Smart power device (if select “yes” and then press the key, all datas of surge, overload, leakage, communication error are returned to “0”)

Smart Power supply System Installation

Model List : Smart Power supply System



[Smart Power Supply System Installation]

1. Turn off the power of the device.
2. Use the 4~5mm bolts to fix the device onto the 4 fixing holes.
3. Connect the AC220V L1, L2 or earth terminal to INPUT terminal
4. Connect the AC220V device which SPD will be installed to OUTPUT terminal.
5. Connect the supplied adaptor to DC24V INPUT terminal.
6. Connect supplied communication detector's wire to the MODEM SIG RS-232 terminal
[Install the communication detector between PLC communication card and Modem]
7. After the above is done, supply the power to the device and switch on the Auto recovery circuit breaker
 - 1) AC220V control power output : it is applied when it supplies single device's AC 220V power by direct supply without any other device.(modem, PLC etc)
 - 2) AC24V control signal output : it is applied when it supplies many devices' AC 220V power by switch box. (modem, PLC etc)



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