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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 certificate

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

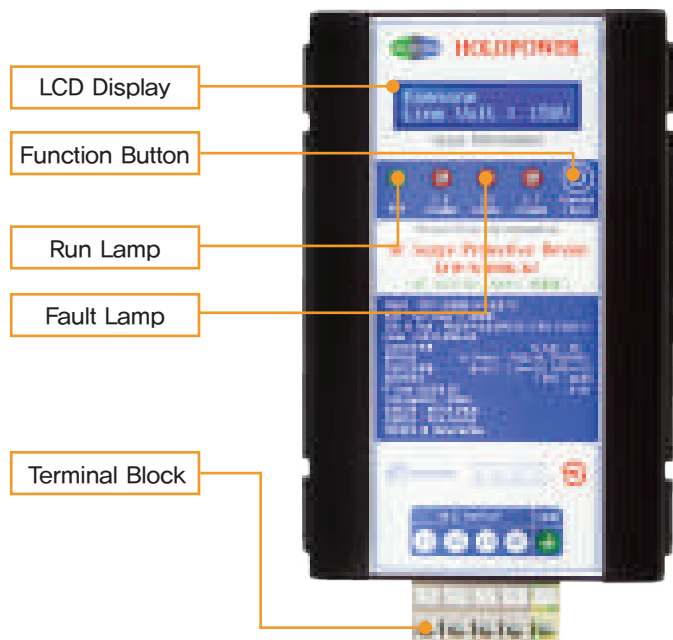
K O X - A - □ D C - □
① ② ③ * ④

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

Power Line Surge Protector

- Product feature
- Technical specification
- Product dimension
- Installation
- Operating manual

Feature – Power line Special I type



-  Surge Counter
-  Leakage Current
-  Line Voltage
-  Phase check



Voltage	AC 460V / 440V / 380V / 220V / 110V DC 600V / 440V / 380V / 200V
Type	3Phase 4Wire / 3Phase 3Wire / Single Phase 2Wire (Serial / Parallel)
Capacity	800kA / 500kA / 400kA / 360kA / 320kA / 240kA – total

Function

Surge counter Line voltage Leakage current Phase check...

[Product Features]

- CE, KS Certificate, Patent
- High-performance, High-capacity SPD [240kA – 800kA / total]
- 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 [0.0mA]
- Line Voltage measurement and display [3 mode]
- 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

Feature – Power line Special II type



Voltage	AC 460V / 440V / 380V / 220V / 110V DC 600V / 440V / 380V / 200V
Type	3Phase 4Wire / 3Phase 3Wire / Single Phase 2Wire (Serial / Parallel)
Capacity	800kA / 500kA / 400kA / 360kA / 320kA / 240kA – total

Function

Surge · Overvoltage · Undervoltage event record, Surge counter, Leakage current diagnosis
Line voltage check, RS485 · Ethernet communication, Mobile APP(bluetooth)

[Product Features]

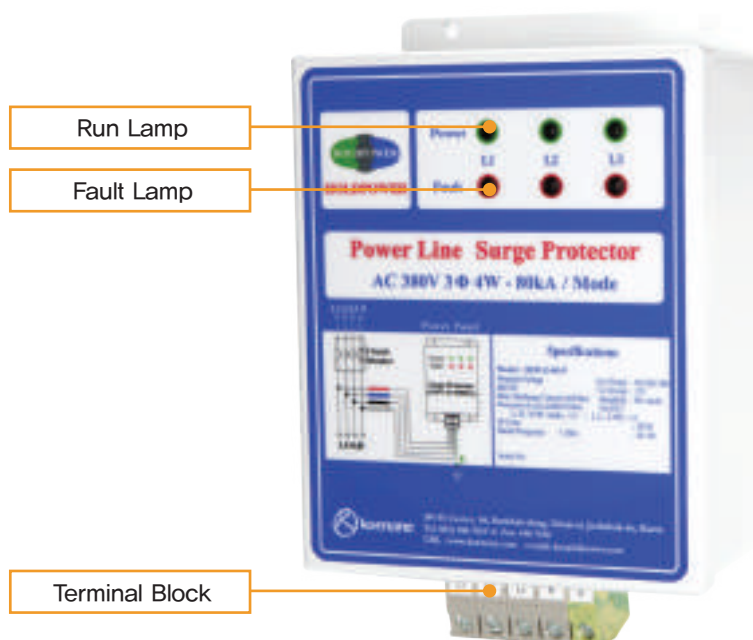
CE, KS Certificate, Patent
High-performance, High-capacity SPD [240kA – 800kA / total]
Full Mode Protection [Line–Neutral, Line–Ground, Line–Line] – < For Class I , II , III >
Performance in compliance with IEC 61643–11
Back Light LCD Surge Event List [Non-volatile Memory type]
Leakage current measurement and display [0.0mA]
Line Voltage measurement and display [3 mode]
Dual safety design [Current & Thermal fuse]
Lamp and buzzer for a normal or abnormal state check
Cumulative SPD operating hour display [Hour Meter]
Surge, Overvoltage, Undervoltage event record [Date & Time]
RS485, Ethernet communication support (Modbus RTU Protocol)
Mobile APP hookup support
Surge wave and surge current record (Option)
Aluminium case for proven safety against the surge protector failure

Power line SPD

Signal Telecom line
SPDLAN Coaxial line
SPDPower+LAN Integrated
Surge Protector

Hour Meter

Feature – Power line Normal type



Voltage	AC 460V / 440V / 380V / 220V / 110V DC 600V / 440V / 380V / 200V
Type	3Phase 4Wire / 3Phase 3Wire / Single Phase 2Wire (Parallel)
Capacity	40kA – mode / 80kA – mode

[Product Features]

CE Certificate

High-performance, High-capacity SPD [40kA – mode / 80kA – mode]

Full Mode Protection [Line–Neutral, Line–Ground, Line–Line] – < For Class II , III >

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]

Distribution ACB 2nd Panel, Distribution 1st Panel, Distribution 2nd Panel, UPS Input · Output, CCTV power, Instrument power [Flowmeter, Water gauge, Electronic scale etc], Actuator power, other device power.

• SPD Class	Class I SPD
• Model	KOP-B-20KI-KS [3Phase 4Wire, Parallel]
• SPD Type	Special I, II
• Application	[*LPZ0, *LPZ1] Power and earthing line lightning, Switching surge protection
• Application Field	Incoming panel, Distribution board, 3 phase UPS, Inverter, Motor driver, Actuator power and other 3 phase power devices



Electrical property

Rated voltage	Un	380~460V AC [Ph-Ph], 220~260V AC [Ph-N]
Rated current		N/A
Power system configuration		3Phase 4Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	480V AC [Ph-Ph], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

Protection property

Protection mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [KS / CE Class 1 test] (Iimp 12.5kA @ 10/350μs) – IEC 61643-11	Up	≤ 2,500V	≤ 2,500V	≤ 2,500V	≤ 1,500V
Max current capacity (@Current 8/20μs) [Total : 800kA]		250kA	250kA	250kA	50kA
Impulse discharge current for class 1 test (@Current 10/350μs) – IEC 61643-11	Iimp	12.5kA	12.5kA	12.5kA	12.5kA
Nominal discharge current (@Current 8/20μs)		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	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	101A IEC type [Awg 4~20 / 0.5~16mm²]
Size	[SP-1/SP-2] (W)140 x (L)276 x (H)90 mm cf. p25 A-1
Installation	Bolt mounting
Weight	Below 2.7 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

• SPD Class	Class I SPD
• Model	KOP-A-20KI-KS [Single Phase 2Wire, Parallel]
• SPD type	Special I , II
• Application	[*LPZ0, *LPZ1] Power and earthing line lightning, Switching surge protection
• Application Field [*LPZ0, *LPZ1]	Distribution board, UPS, PLC, DCS, Flowmeter, Water gauge, CCTV, LED, Security facility...other single phase power devices



Electrical property

Rated voltage	Un	220~260V AC [Ph-N]
Rated current		N/A
Power system configuration		Single Phase 2Wire 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	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

Protection property

Protection mode		L-N	N-G	L-G
Voltage protection level [KS / CE Class 1 test] (Iimp 20kA @ 10/350μs) – IEC 61643-11	Up	≤ 2,500V	≤ 2,500V	≤ 2,500V
Max current capacity (@Current 8/20μs) [Total : 250kA]		200kA	50kA	0kA
Impulse discharge current for class 1 test (@Current 10/350μs) – IEC 61643-11		20kA	20kA	0kA
Nominal discharge current (@Current 8/20μs)	In	40kA	40kA	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	Run = green lamp / Fault = red lamp [L-N]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	101A IEC type [Awg 4~20 / 0.5~16mm²]
Size	[SP1/SP2] (W)140 x (L)226 x (H)90 mm cf. p25 A-2
Installation	Bolt mounting
Weight	Below 2 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

• SPD Class	Class II SPD
• Model	KOP-B-500K-KS [3Phase 4Wire, Parallel]
• SPD type	Special I, II
• Application	[*LPZ1, *LPZ2] Power and earthing line lightning, Switching surge protection
• Application Field	Incoming panel, Distribution board, 3 phase UPS, Inverter, Motor driver, Actuator power and other 3 phase power devices



Electrical property

Rated voltage	Un	380~460V AC [Ph-Ph], 220~260V AC [Ph-N]
Rated current		N/A
Power system configuration		3Phase 4Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	480V AC [Ph-Ph], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

Protection property

Protection mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [KS / CE Class 2 test] (In 40kA @ 8/20μs) – IEC 61643-11	Up	≤ 2,500V	≤ 2,500V	≤ 2,500V	≤ 1,500V
Max current capacity (@Current 8/20μs) [Total : 500kA]		150kA	150kA	150kA	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	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °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. p26 B-2
Installation	Bolt mounting
Weight	Below 2 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

• SPD Class	Class II SPD
• Model	KOP-B-400K-KS [3Phase 4Wire, Parallel]
• SPD type	Special I , II
• Application	[*LPZ1, *LPZ2] Power and earthing line lightning, Switching surge protection
• Application Field [*LPZ1, *LPZ2]	Incoming panel, Distribution board, 3 phase UPS, Inverter, Motor driver, Actuator power and other 3 phase power devices



Electrical property

Rated voltage	Un	380~460V AC [Ph-Ph], 220~260V AC [Ph-N]
Rated current		N/A
Power system configuration		3Phase 4Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	480V AC [Ph-Ph], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

Protection property

Protection mode		L1-N	L2-N	L3-N	N-G
Voltage protection level [KS / CE Class 2 test] (In 20kA @ 8/20μs) – IEC 61643-11	Up	≤ 2,500V	≤ 2,500V	≤ 2,500V	≤ 1,000V
Max current capacity (@Current 8/20μs) [Total : 400kA]		100kA	100kA	100kA	100kA
Nominal discharge current (@Current 8/20μs)	In	20kA	20kA	20kA	20kA
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	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °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. p26 B-1 [SP-2] (W)140 x (L)216 x (H)90 mm B-2
Installation	Bolt mounting
Weight	Below 2 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

• SPD Class	Class II SPD
• Model	KOP-A-240K-KS [Single Phase 2Wire, Parallel]
• SPD type	Special I, II
• Application	[*LPZ1, *LPZ2] Power and earthing line lightning, Switching surge protection
• Application Field [*LPZ1, *LPZ2]	Distribution board, UPS, PLC, DCS, Flowmeter, Water gauge, CCTV, LED, Security facility...other single phase power devices



Electrical property

Rated voltage	Un	220~260V AC [Ph-N]
Rated current		N/A
Power system configuration		Single Phase 2Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	275V AC [Ph-Ph], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

Protection property

Protection mode		L-N	N-G	L-G
Voltage protection level [KS / CE Class 2 test] (In 20kA @ 8/20μs) – IEC 61643-11	Up	≤ 2,500V	≤ 1,500V	≤ 2,500V
Max current capacity (@Current 8/20μs) [Total : 240kA]		200kA	40kA	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	Run = green lamp / Fault = red lamp [L-N]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition Record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm²]
Size	[SP-1] (W)140 x (L)216 x (H)70 mm cf. p26 B-1 [SP-2] (W)140 x (L)216 x (H)90 mm B-2
Installation	Bolt mounting
Weight	Below 2 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

• SPD Class	Class III SPD
• Model	KOP-B-400K [3Phase 4Wire, Parallel]
• SPD type	Special I , II
• Application	[*LPZ2, *LPZ3] Power and earthing line lightning, Switching surge protection
• Application Field	Incoming panel, Distribution board, 3 phase UPS, Inverter, Motor driver, Actuator power and other 3 phase power devices



Electrical property

Rated voltage	Un	380~460V AC [Ph-Ph], 220~260V AC [Ph-N]
Rated current		N/A
Power system configuration		3Phase 4Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	480V AC [Ph-Ph], 275V AC [N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

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	≤ 2,500V	≤ 2,500V	≤ 2,500V	≤ 1,000V
Max current capacity (@Current 8/20μs) [Total : 400kA]		100kA	100kA	100kA	100kA
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	Run = green lamp / Fault = red lamp [L1-N , L2-N , L3-N]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. p27 C-1 [SP-2] (W)140 x (L)190 x (H)90 mm C-2
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

• SPD Class	Class III SPD
• Model	KOP-B-360K [3Phase 3Wire, Parallel]
• SPD type	Special I, II
• Application	[*LPZ2, *LPZ3] Power and earthing line lightning, Switching surge protection
• Application Field	Incoming panel, Distribution board, 3 phase UPS, Inverter, Motor driver, Actuator power and other 3 phase power devices



Electrical property

Rated voltage	Un	380~460V AC [Ph-Ph]
Rated current		N/A
Power system configuration		3Phase 3Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	275V AC [Ph-G], 480V AC [Ph-Ph]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

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	Up	≤ 2,500V	≤ 2,500V	≤ 2,500V
Max current capacity (@Current 8/20μs) [Total : 360kA]		120kA	120kA	120kA
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	Run = green lamp / Fault = red lamp [L1-G, L2-G, L3-G]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition Record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. p27 C-1 [SP-2] (W)140 x (L)190 x (H)90 mm C-2
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

· SPD Class	Class III SPD
· Model	KOP-A-360K [Single Phase 2Wire, Serial / Parallel]
· SPD type	Special I , II
· Application	[*LPZ2, *LPZ3] Power and earthing line lightning, Switching surge protection
· Application Field	Distribution board, UPS, PLC, DCS, Flowmeter, Water gauge, CCTV, LED, Security facility...other single phase power devices



Electrical property

Rated voltage	Un	110~120V AC [L-N] / 220~260V AC [L-N]
Rated current		Serial : below 10A, Parallel : N/A
Power system configuration		Single Phase 2Wire Serial / 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], 480V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

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	[110V AC] ≤ 1,000V [220V AC] ≤ 1,500V	≤ 1,500V ≤ 1,500V	≤ 1,500V ≤ 1,500V
Max current capacity (@Current 8/20μs) [Total: 360kA]		120kA	120kA	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	Run = green lamp / Fault = red lamp [L-N , L-G , N-G]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. p27 C-1 [SP-2] (W)140 x (L)190 x (H)90 mm C-2
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

• SPD Class	Class III SPD
• Model	KOP-A-320K [Single Phase 2Wire, Serial / Parallel]
• SPD type	Special I, II
• Application	[*LPZ2, *LPZ3] Power and earthing line lightning, Switching surge protection
• Application Field	Distribution board, UPS, PLC, DCS, Flowmeter, Water gauge, CCTV, LED, Security facility...other single phase power devices



Electrical property

Rated voltage	Un	110~120V AC [L-N] / 220~260V AC [L-N]
Rated current		Serial : below 10A, Parallel : N/A
Power system configuration		Single Phase 2Wire Serial / 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], 480V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

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	[110V AC] ≤ 1,000V [220V AC] ≤ 1,500V	≤ 1,500V ≤ 1,500V	≤ 1,500V ≤ 1,500V
Max current capacity (@Current 8/20μs) [Total: 320kA]		80kA	120kA	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	Run = green lamp / Fault = red lamp [L-N, L-G, N-G]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition Record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. p27 C-1 [SP-2] (W)140 x (L)190 x (H)90 mm C-2
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

· SPD Class	Class III SPD
· Model	KOP-A-240K [Single Phase 2Wire, Serial / Parallel]
· SPD type	Special I , II
· Application	[*LPZ2, *LPZ3] Power and earthing line lightning, Switching surge protection
· Application Field	Distribution board, UPS, PLC, DCS, Flowmeter, Water gauge, CCTV, LED, Security facility...other single phase power devices



Electrical property

Rated voltage	Un	110~120V AC [L-N] / 220~260V AC [L-N]
Rated current		Serial : below 10A, Parallel : N/A
Power system configuration		Single Phase 2Wire Serial / 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], 480V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

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	[110V AC] ≤ 1,000V [220V AC] ≤ 1,500V	≤ 1,500V ≤ 1,500V	≤ 1,500V ≤ 1,500V
Max current capacity (@Current 8/20μs) [Total: 240kA]		80kA	80kA	80kA
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	Run = green lamp / Fault = red lamp [L-N , L-G , N-G]
	Safety	Dual safety design [current & thermal fuse]
	Surge information display	Back light LCD surge counter
	Alarm	Fault buzzer
	Measurement	Leakage current measurement and display
Special II	SPD condition record	Surge event memory, Surge wave, Surge current memory Over voltage event memory, Under voltage event memory (Line to Line)
	Telecom	RS 485, Ethernet Modbus RTU Protocol (ASCII not Supported), APP(Bluetooth)
	Measurement	Temperature check and display, Hourmeter

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	57A Euro type [Awg 8~22 / 0.5~10mm²]
Size	[SP-1] (W)140 x (L)190 x (H)70 mm cf. p27 C-1 [SP-2] (W)140 x (L)190 x (H)90 mm C-2
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

• SPD Class	Class II, III SPD
• Model	KOP-C-40P [Single Phase 2Wire, Parallel]
• Application	[*LPZ2, *LPZ3] Power and earthing line lightning, Switching surge protection
• Application Field	Distribution board, UPS, PLC, DCS, Flowmeter, Water gauge, CCTV, LED, Security facility...other single phase power devices



Electrical property

Rated voltage	Un	220~260V AC [L-N]
Rated current		N/A
Power system configuration		Single Phase 2Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	275V AC [L-N], 480V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

Protection property

Protection mode		L-N	L-G	N-G
Voltage protection level [CE Class 2 test] (In 20kA @ 8/20μs) – IEC 61643-11	Up	≤ 2,500V	≤ 2,500V	≤ 2,500V
Max current capacity 40kA Mode (@Current 8/20μs) [Total : 120kA]		40kA	40kA	40kA
Nominal discharge current (@Current 8/20μs)	In	20kA	20kA	20kA
Response time (@10kV/μs)		Below 5 ns		

Feature

Operation status	Run = green lamp / Fault = red lamp [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	-10 ~ 80 °C, Below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm²]
Size	(W)113 x (L)171 x (H)80 mm cf. p28 D-1
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

• SPD Class	Class II, III SPD
• Model	KOP-C-80P [Single Phase 2Wire, Parallel]
• Application	[*LPZ2, *LPZ3] Power and earthing line lightening, Switching surge protection
• Application Field	Distribution board, UPS, PLC, DCS, Flowmeter, Water gauge, CCTV, LED, Security facility...other single phase power devices



Electrical property

Rated voltage	Un	220~260V AC [L-N]
Rated current		N/A
Power system configuration		Single Phase 2Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	275V AC [L-N], 480V AC [L-G, N-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

Protection property

Protection mode		L-N	L-G	N-G
Voltage protection level [CE Class 2 test] (In 40kA @ 8/20μs) – IEC 61643-11	Up	≤ 2,500V	≤ 2,500V	≤ 2,500V
Max current capacity 80kA Mode (@Current 8/20μs) [Total : 240kA]		80kA	80kA	80kA
Nominal discharge current (@Current 8/20μs)	In	40kA	40kA	40kA
Response time (@10kV/μs)		Below 5 ns		

Feature

Operation status	Run = green lamp / Fault = red lamp [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	-10 ~ 80 °C, Below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm²]
Size	(W)113 x (L)171 x (H)80 mm cf. p28 D-1
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

• SPD Class	Class II, III SPD
• Model	KOP-D-40P [3Phase 4Wire, Parallel]
• Application	[*LPZ2, *LPZ3] Power and earthing line lightening, Switching surge protection
• Application Field	Incoming panel, Distribution board, 3 phase UPS, Inverter, Motor driver, Actuator power and other 3 phase power devices



Electrical property

Rated voltage	Un	380~460V AC [Ph-Ph], 220~260V AC [Ph-N]
Rated current		N/A
Power system configuration		3Phase 4Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	275V AC [N-G], 480V AC [Ph-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

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	Up	≤ 2,500V	≤ 2,500V	≤ 2,500V	≤ 1,000V
Max current capacity 40kA mode (@Current 8/20μs) [Total : 160kA]		40kA	40kA	40kA	40kA
Nominal discharge current (@Current 8/20μs)	In	20kA	20kA	20kA	20kA
Response time (@10kV/μs)		Below 5 ns			

Feature

Operation status	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
Safety	Dual safety design [current & thermal fuse]

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C, Below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm²]
Size	(W)113 x (L)171 x (H)80 mm cf. p28 D-1
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

• SPD Class	Class II, III SPD
• Model	KOP-D-80P [3Phase 4Wire, Parallel]
• Application	[*LPZ2, *LPZ3] Power and earthing line lightening, Switching surge protection
• Application Field	Incoming panel, Distribution board, 3 phase UPS, Inverter, Motor driver, Actuator power and other 3 phase power devices



Electrical property

Rated voltage	Un	380~460V AC [Ph-Ph], 220~260V AC [Ph-N]
Rated current		N/A
Power system configuration		3Phase 4Wire Parallel connection
Max Continuous Operating Voltage (MCOV)	Uc	275V AC [N-G], 480V AC [Ph-G]
Rated frequency	f	50 / 60 Hz
Leakage current (@Uc)	IL	Below 1 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ

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	≤ 2,500V	≤ 2,500V	≤ 2,500V	≤ 1,000V
Max current capacity 80kA mode (L-N) (@Current 8/20μs) [Total : 280kA]		80kA	80kA	80kA	40kA
Nominal discharge current (@Current 8/20μs)	In	40kA	40kA	40kA	40kA
Response time (@10kV/μs)		Below 5 ns			

Feature

Operation status	Run = green lamp / Fault = red lamp [L1-N, L2-N, L3-N]
Safety	Dual safety design [current & thermal fuse]

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C , Below 95%
Terminal	76A IEC type [Awg 6~24 / 0.5~10mm²]
Size	(W)130 x (L)200 x (H)80 mm cf. p28 D-2
Installation	Bolt mounting
Weight	Below 1.5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std C62.62 [2018] Power line surge protector standard test specification

*LPZ : Lightning Protect Zone

Product Dimension – Power line Class I SPD Special I, II type



A-1 Model list
(W)140 x (L)276 x (H)90

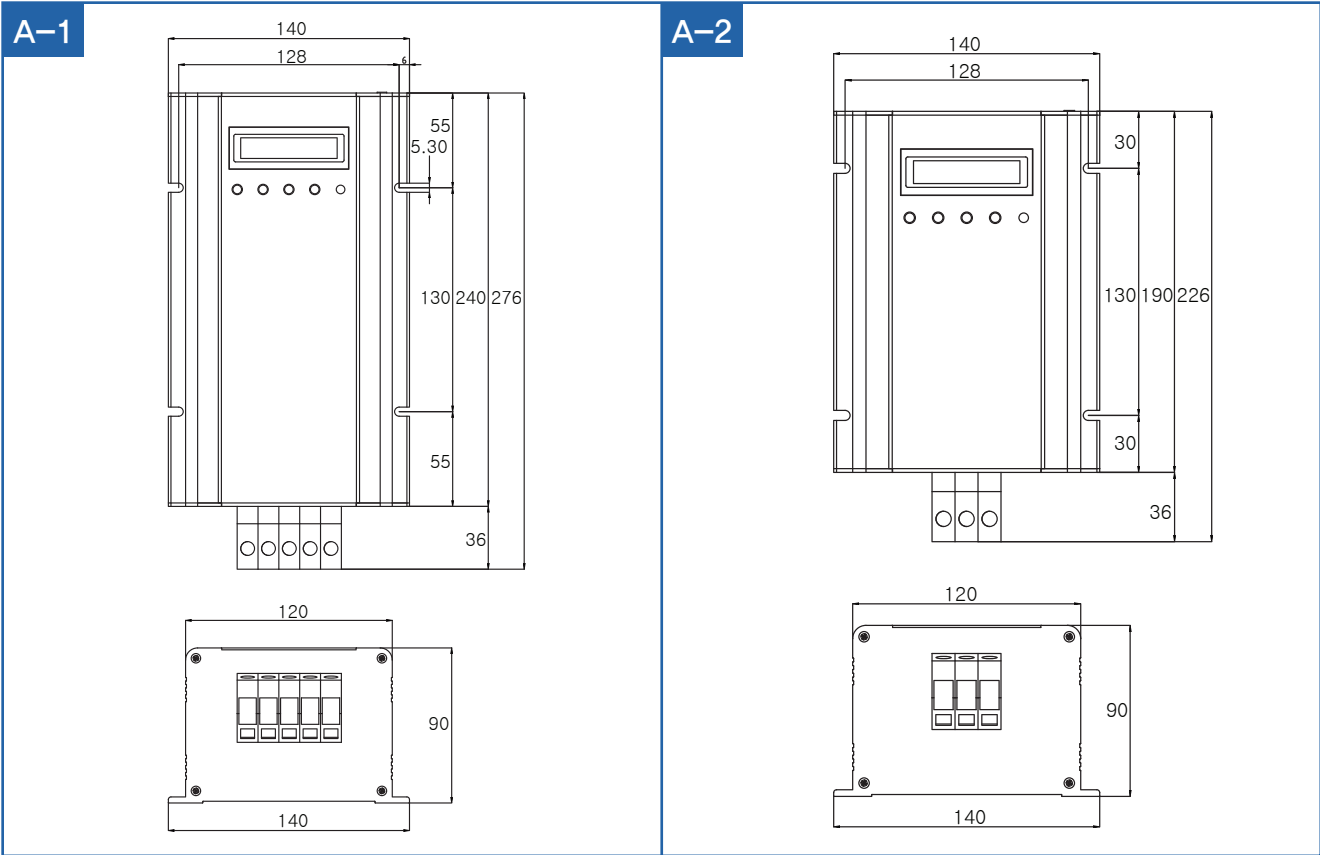
- 3Phase**
- KOP-B-20KI-KS (SP- I , II)



A-2 Model list
(W)140 x (L)226 x (H)90

- Single Phase**
- KOP-A-20KI-KS (SP- I , II)

[Unit : mm]



Product Dimension – Power line Class II SPD Special I, II type



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

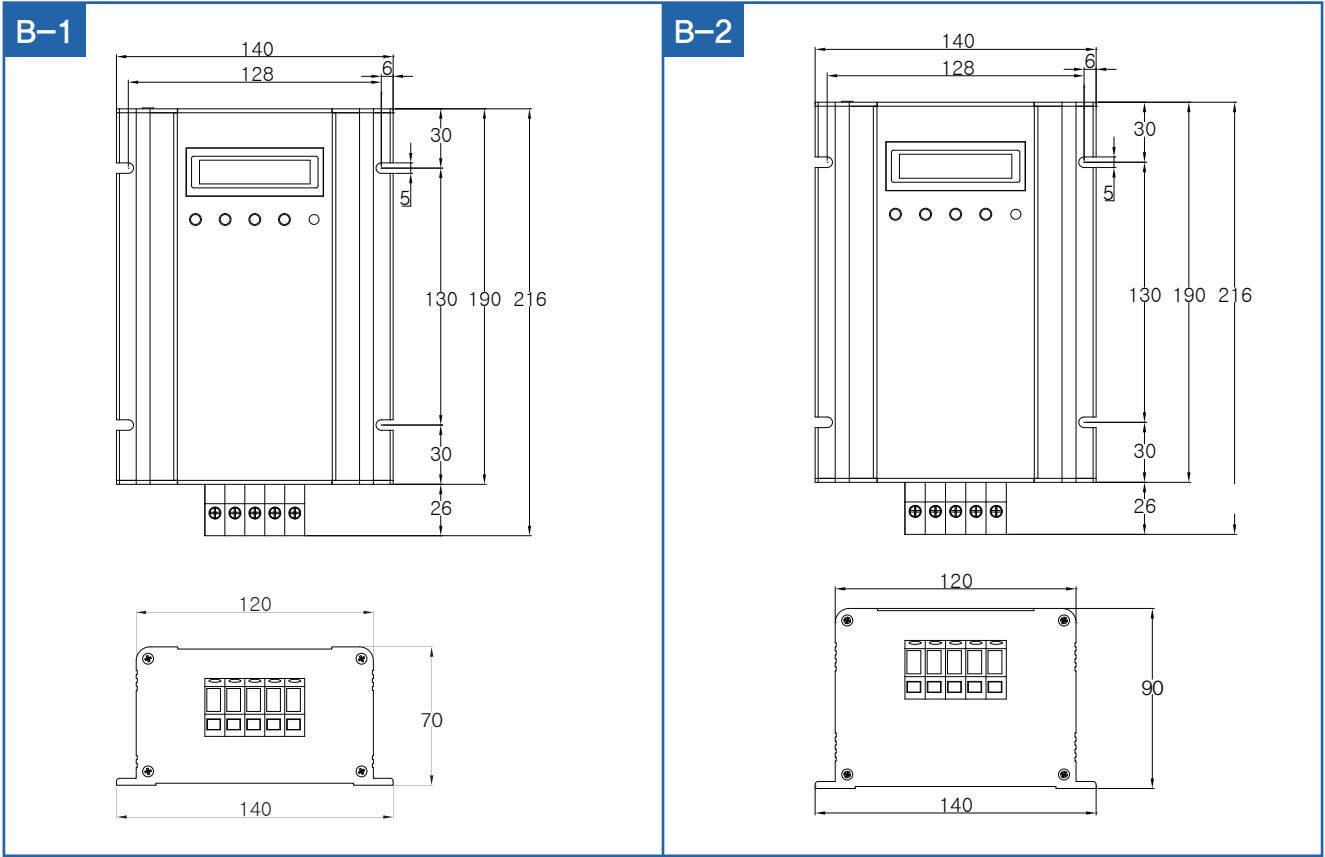
- Single Phase**
- KOP-A-240K-KS <SP- I >
- 3Phase**
- KOP-B-400K-KS <SP- I >



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

- Single Phase**
- KOP-A-240K-KS <SP- II >
- 3Phase**
- KOP-B-400K-KS <SP- II >
 - KOP-B-500K-KS <SP- I, II >

[Unit : mm]



Product Dimension – Power line Class III SPD Special I, II type



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

Single Phase

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

3Phase

- KOP-B-360K <SP- I >
- KOP-B-400K <SP- I >



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

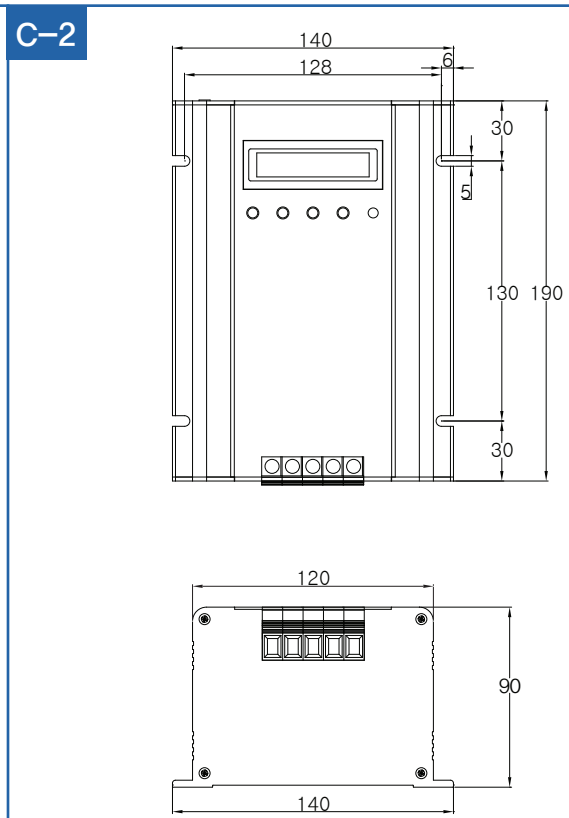
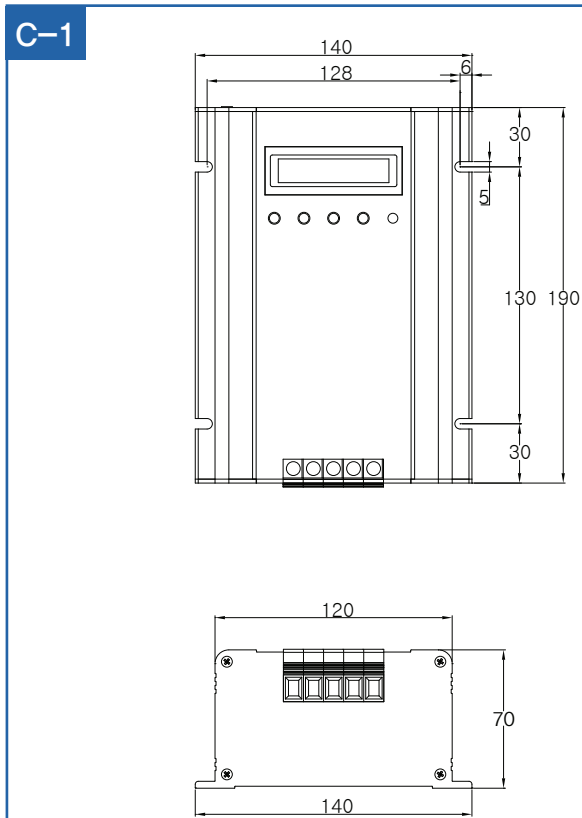
Single Phase

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

3Phase

- KOP-B-360K <SP- II >
- KOP-B-400K <SP- II >

[Unit : mm]



Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

Product Dimension – Power line Class II , III SPD Normal type



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

Single Phase

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

3Phase

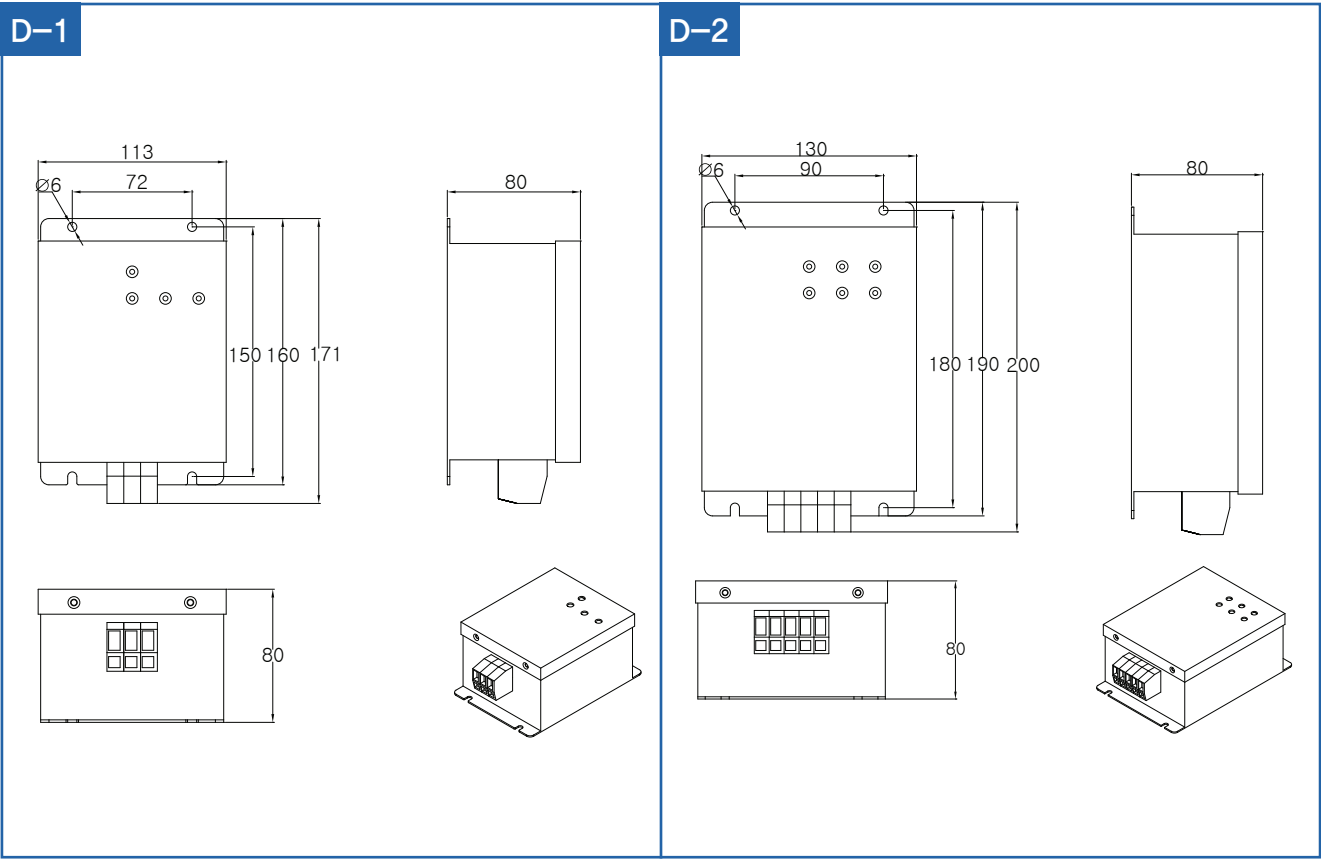
- KOP-D-40P

D-2 Model list
(W)130 x (L)200 x (H)80

3Phase

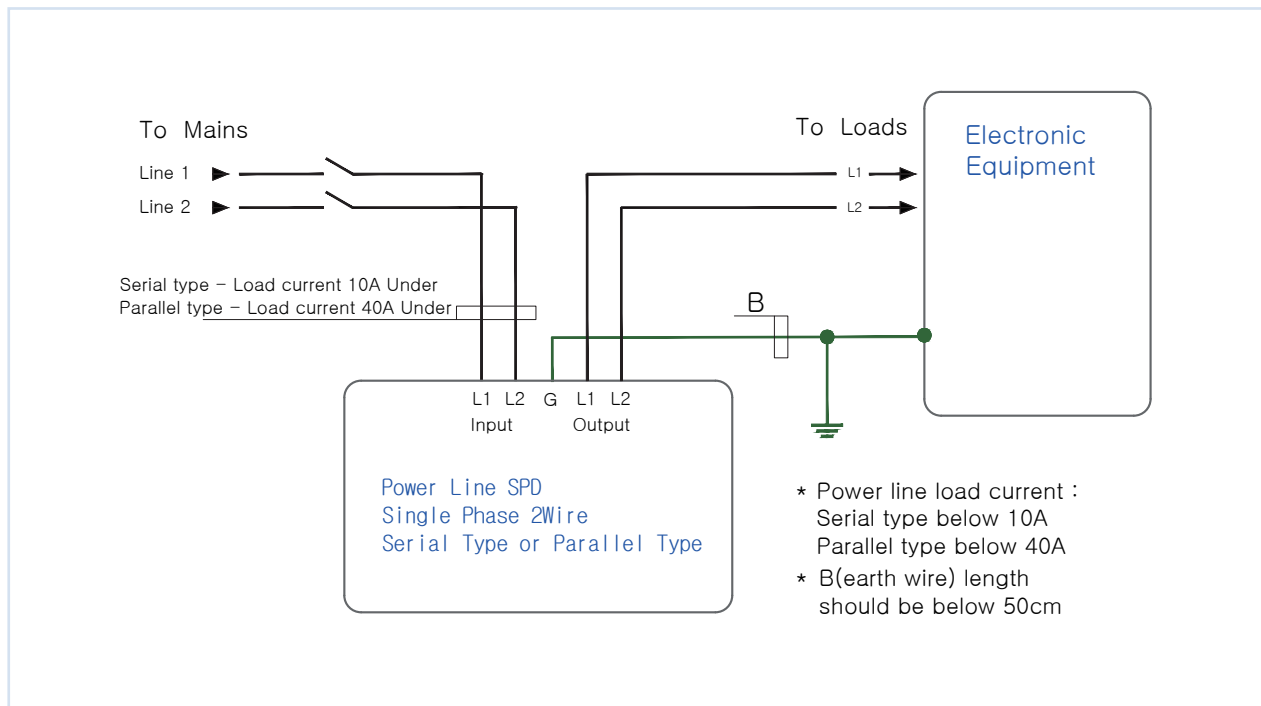
- KOP-D-80P

[Unit : mm]



Installation – Power line Single Phase 2Wire Parallel type / Serial type

Model List : KOP-A-240K,320K,360K,240K-KS (Parallel type)
KOP-A-240K,320K,360K (Serial type)



Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

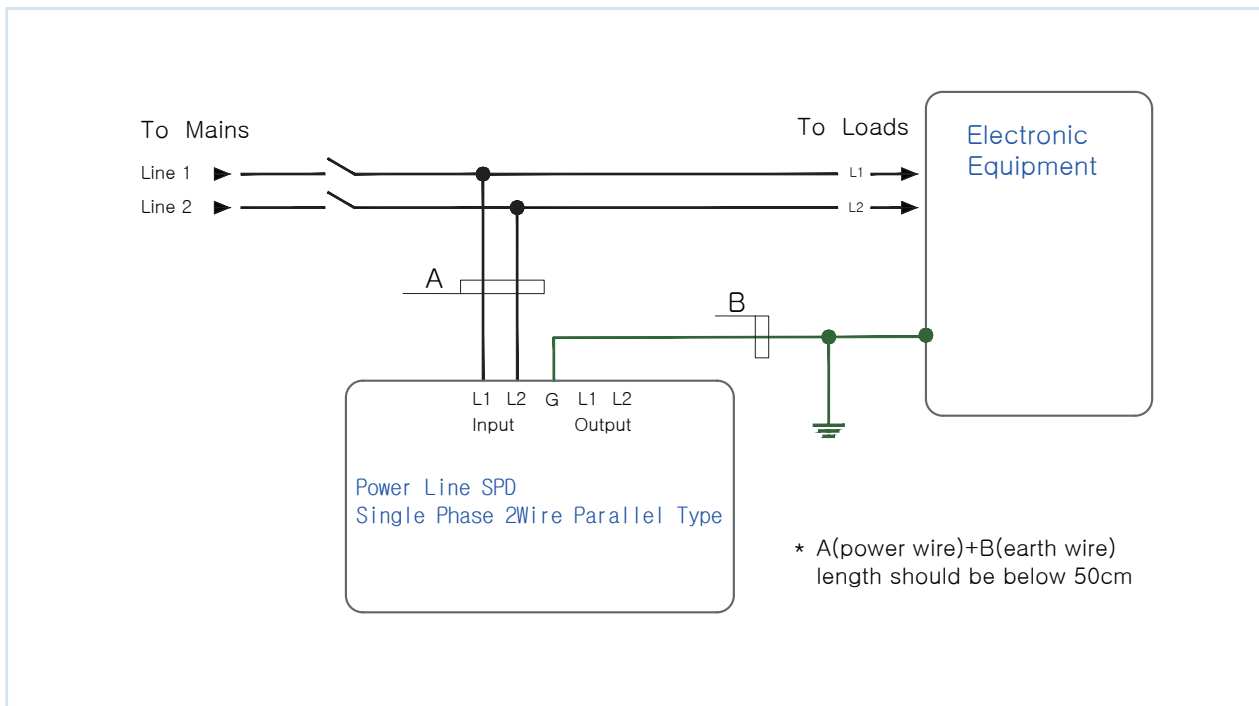
Hour Meter

[Single Phase Parallel / Serial Installation]

1. Turn off the power first.
2. Use the 4~5mm bolts to fix the Protector onto the 4 fixing holes.
3. Connect single phase power Line1, Line2 which has matched SPD rated to INPUT L1, L2 terminals.
4. Connect the load device to the OUTPUT L1 and L2 terminals.
[Serial type load current should be below 10A, Parallel type load current should be below 40A.
if not, please follow Power line Single Phase 2Wire Parallel type installation on page 29.]
5. Connect earth to the G terminal.
[Connect earth to a nearby earthed panel.
The length of the earth wire for this connection should be below 50cm (maximum).]
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. Special type SPD' LCD displays Surge Counter, Leakage Current, Voltage...
9. In case of some special 1 type SPD, if Line and Neutral wire position changed, alarm will work and display warning message 'Phase Change'. – it will release after change Line and Neutral wire.

Installation – Power line Single Phase 2Wire Parallel type

Model List : KOP-A-20KI-KS,240K,320K,360K,240K-KS
KOP-C-40,80



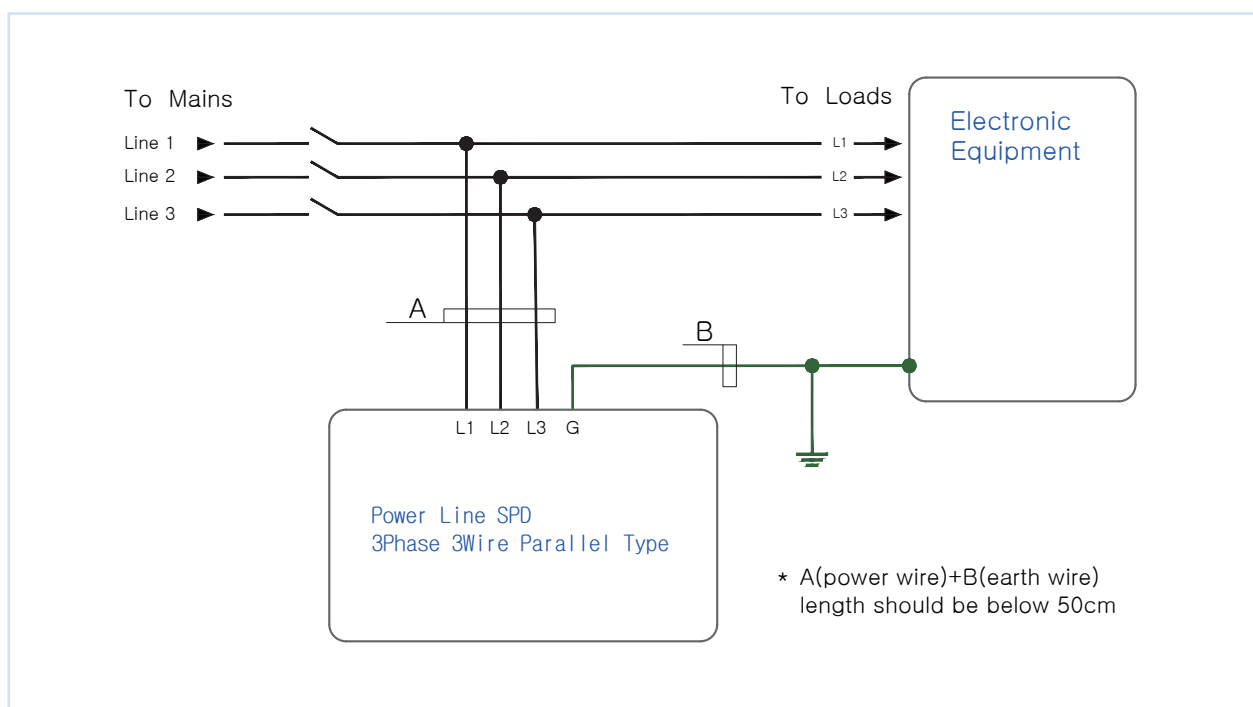
[Single Phase Parallel Installation]

1. Turn off the power first.
2. Use the 4~5mm bolts to fix the Protector onto the 4 fixing holes.
3. Connect single phase power Line1, Line 2 which has matched SPD rated to INPUT L1, L2 terminals.
4. Connect earth to the earth terminal.
[Connect earth to a nearby earthed panel.
The length of the earth wire + power wire for this connection should be below 50cm (maximum).]
5. After the above is done, supply the power to the device.
6. If the Power Run Lamp is turned on and the Fault Lamp is turned off, the system is normal.
7. Special type SPD' LCD displays Surge Counter, Leakage Current, Voltage...
8. In case of some special 1 type SPD, if Line and Neutral wire position changed, alarm will work and display warning message 'Phase Change'. – it will release after change Line and Neutral wire.

* IEC standard recommends the length of the earth wire + power wire should be below 50cm.

Installation – Power line 3Phase 3Wire Parallel type

Model List : KOP-B-360K



[3 Φ 3W 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 3 phase power R,S,T which has matched SPD rated to INPUT L1,L2,L3 terminals.
4. Connect earth to the earth terminal.

[Connect earth to a nearby earthed panel.]

The length of the earth wire + power wire for this connection should be below 50cm (maximum).]

5. After the above is done, supply the power to the device.
6. If the Power Run Lamp is turned on and the Fault Lamp is turned off, the system is normal.
7. Special type SPD' LCD displays Surge Counter, Leakage Current, Voltage...

* IEC standard recommends the length of the earth wire + power wire should be below 50cm.

Power line SPD

Signal Telecom line SPD

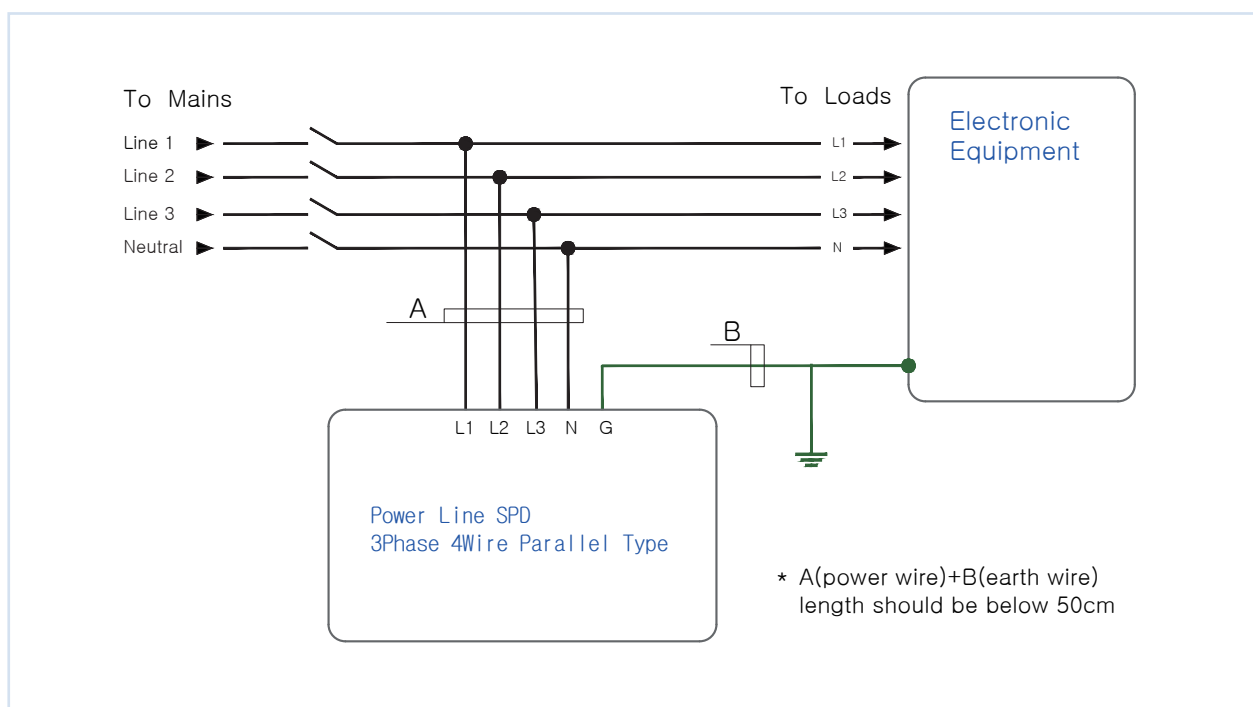
LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

Installation – Power line 3Phase 4Wire Parallel type

Model List : KOP-B-20KI-KS,500K-KS,400K-KS,400K
KOP-D-40,80



[3 Φ 4W 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 3 phase power R,S,T which has matched SPD rated to INPUT L1,L2,L3 terminals.
Connect Neutral to the N terminal.
4. Connect earth to the earth terminal.
[Connect earth to a nearby earthed panel.
The length of the earth wire + power wire for this connection should be below 50cm (maximum).]
5. After the above is done, supply the power to the device.
6. If the Power Run Lamp is turned on and the Fault Lamp is turned off, the system is normal.
7. Special type SPD' LCD displays Surge Counter, Leakage Current, Voltage...

* IEC standard recommends the length of the earth wire + power wire should be below 50cm.

Operating manual – Power line Special I type

[Display]



[Menu]

Normal state : The RUN lamp lights on, and Surge Counter / Line Voltage display.

Failure state

- Fuse fault : Fault fuse's line lamp flickers and buzzer sounds, LCD displays "Fuse Fault !".
- Leakage current fault : If leakage current exceeds limit,
Fault lamp flickers and buzzer sounds, LCD displays "LC Over Fault !".

[Function]

Button Function

- press Function/Reset button – Leakage current display
- press and hold Function/Reset button – Initialization (Surge counter value reset)

Leakage current Function

- Warning : If exceed configured warning leakage current limit, Fault lamp flickers and warning message displays.
- Fault : If exceed configured fault leakage current limit, Fault lamp flickers and fault message displays.
- * If press Function/Reset button, buzzer alarm is stopped.

Phase check Function

In case of Y connection, if Line(R, S, T) and Neutral(N) are incorrectly connected, "Phase Change" displays and buzzer sounds, Fault lamp flickers.

* If "Phase Change" displays, change the connected position of the Line and Neutral wire.

[Button description]



- FUNCTION : Button to display detailed function menu or return to previous page
- UP : Button to move up the menu or increase the set value
- DOWN : Button to move down the menu or decrease the set value
- ENTER : Button to apply revised setting value or move on to the next set

[Display]

34

Normal state : The RUN lamp lights on and Main Display displays

Failure state

- Fuse fault : Fault fuse's line lamp flickers and buzzer sounds, LCD displays "Fuse Fault !".
- Leakage current fault : If leakage current exceeds set limit,
Fault lamp flickers and buzzer sounds, LCD displays "LC Over Fault !".

Phase check Function

In case of Y connection, if Line(R, S, T) and Neutral(N) are incorrectly connected, "Phase Change" displays and buzzer sounds, Fault lamp flickers.

* If 'Phase Change' displays, change the connected position of the Line and Neutral wire.

[Function]

Menu	Sub menu		Detail
Event log	Surge Log		Surge input record display (Year/Month/Date Hour:Min:Sec)
	Over Voltage Log		Over voltage event record display
	Under Voltage Log		Under voltage event record display
Setup menu 1	RS485 Setup	ID Number	Modbus Slave Address
		Baud Rate	RS 485 communication speed set
	ETH Setup 1	ID Number	Communication ID (Option)
		DHCP On/Off	Host IP dynamic configuration set (Option)
		TCP/UDP	Access Protocol set (Option)
	ETH Setup 2	Master IP	Master IP set
		Port Number	Port Number set
		SPD IP	SPD IP set
	Time Setup		Current time set
Setup menu 2	Over Voltage Setup		Over-V condition for occurrence set
	Under Voltage Setup		Under-V condition for occurrence set
Special func menu	Event Reset		Recorded Event Reset
	H-Meter Reset		Recorded Hour Meter value Reset

[Communication Technical Data]

Device type	Slave
IP Configuration	Static (Default) DHCP (Option)
Network Protocol	Modbus TCP / UDP (Option)
Modbus Protocol	Modbus RTU
Supported modbus function codes	0x03 & 0x10
Error check	CRC
Connector type	RJ-45(TCP) & Terminal(485)

Signal / Telecom Line Surge Protector

- Product feature
- Technical specification
- Product dimension
- Installation

Feature – Signal / Telecom Line 2Wire type



Display View



SURGE COUNTER



COMMUNICATION



ANALOG SIGNAL



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, Patent [10–1736675]
- Performance in compliance with IEC 61643–21
- [When 20kV / 10kA(Voltage 1.2/50μs, Current 8/20μs) applied, within 150V~300V]
- High surge capacity – 100kA in total the highest in the world
- Indicator function – the first in the world
- [surge counter, Analog signal detection, Telecom state detection, 10–year Battery life–Replaceable]
- 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]

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

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

Feature – Signal / Telecom Line 3, 4Wire type



Display View



SURGE COUNTER



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

[Product Features]

CE Certificate, Patent

Performance in compliance with IEC 61643–21

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

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.

· SPD Class	Category C1, C2, D2
· 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	Un	5V DC
Max Continuous Operating Voltage (MCOV)	Uc	8V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-L2	L1-G	L2-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 100V	≤ 150V	≤ 150V
discharge current DM:0kA, CM:100kA (@Current 8/20μs)	I _{max}	0kA	50kA	50kA
Nominal discharge current (@Current 8/20μs)	I _n	20kA		
Response time (@10kV/μs)	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
Indicator type	Surge counter	Input surge counter display (1,000)
	4~20mA analog SPD	Analog current display
	RS 485 telecom SPD	RS 485 telecom state display

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

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

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

· SPD Class	Category C1, C2, D2
· 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		300 mA
Insulation resistance (@DC)	RIN	Above 20 M Ω
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-L2	L1-G	L2-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	U_p	$\leq 100V$	$\leq 150V$	$\leq 150V$
Max discharge current DM:0kA, CM:100kA (@Current 8/20 μ s)	I_{max}	0kA	50kA	50kA
Nominal discharge current (@Current 8/20 μ s)	I_n	20kA		
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
Indicator type	Surge counter	Input surge counter display (1,000)
	4~20mA analog SPD	Analog current display
	RS 485 telecom SPD	RS 485 telecom state display

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

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

· SPD Class	Category C1, C2, D2
· 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	36V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-L2	L1-G	L2-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 100V	≤ 150V	≤ 150V
Max discharge current DM:0kA, CM:100kA (@Current 8/20μs)	I _{max}	0kA	50kA	50kA
Nominal discharge current (@Current 8/20μs)	I _n	20kA		
Response time (@10kV/μs)	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
Indicator type	Surge counter	Input surge counter display (1,000)
	4~20mA analog SPD	Analog current display
	RS 485 telecom SPD	RS 485 telecom state display

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

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

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

· SPD Class	Category C1, C2, D2
· 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		300 mA
Insulation resistance (@DC)	RIN	Above 20 M Ω
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-L2	L1-G	L2-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	Up	$\leq 100V$	$\leq 150V$	$\leq 150V$
Max discharge current DM:0kA, CM:100kA (@Current 8/20 μ s)	I _{max}	0kA	50kA	50kA
Nominal discharge current (@Current 8/20 μ s)	I _n	20kA		
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
Indicator type	Surge counter	Input surge counter display (1,000)
	4~20mA analog SPD	Analog current display
	RS 485 telecom SPD	RS 485 telecom state display

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

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

· SPD Class	Category C1, C2, D2
· 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	Un	185V DC
Max Continuous Operating Voltage (MCOV)	Uc	200V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-L2	L1-G	L2-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 250V	≤ 300V	≤ 300V
Max discharge current DM:0kA, CM:100kA (@Current 8/20μs)	I _{max}	0kA	50kA	50kA
Nominal discharge current (@Current 8/20μs)	I _n	20kA		
Response time (@10kV/μs)	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
Indicator type	Surge counter	Input surge counter display (1,000)
	4~20mA analog SPD	Analog current display
	RS 485 telecom SPD	RS 485 telecom state display

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

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

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

· SPD Class	Category C1, C2, D2
· 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	Un	5V DC
Max Continuous Operating Voltage (MCOV)	Uc	8V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 M Ω
DC Loop resistance	R	Below 50 Ω / 1Wire

Protection property

Protection mode		L1-G	L2-G	L3-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	Up	$\leq 150V$	$\leq 150V$	$\leq 150V$
Max discharge current DM:0kA, CM:150kA (@Current 8/20 μ s)	I _{max}	50kA	50kA	50kA
Nominal discharge current (@Current 8/20 μ s)	I _n	20kA		
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	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

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

· SPD Class	CCategory C1, C2, D2
· 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		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-G	L2-G	L3-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 150V	≤ 150V	≤ 150V
Max discharge current DM:0kA, CM:150kA (@Current 8/20μs)	I _{max}	50kA	50kA	50kA
Nominal discharge current (@Current 8/20μs)	I _n	20kA		
Response time (@10kV/μs)	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	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

Power line SPD

Signal Telecom line
SPDLAN Coaxial line
SPDPower+LAN Integrated
Surge Protector

Hour Meter

· SPD Class	Category C1, C2, D2
· 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	Un	12V DC
Max Continuous Operating Voltage (MCOV)	Uc	16V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-L2/L3-L4	L1-G/L2-G	L3-G/L4-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 100V	≤ 150V	≤ 150V
Max discharge current DM:0kA, CM:200kA (@Current 8/20μs)	I _{max}	0kA	100kA	100kA
Nominal discharge current (@Current 8/20μs)	I _n	20kA		
Response time (@10kV/μs)	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	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

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

· SPD Class	Category C1, C2, D2
· 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	Un	48V DC
Max Continuous Operating Voltage (MCOV)	Uc	68V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-L2/L3-L4	L1-G/L2-G	L3-G/L4-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 100V	≤ 150V	≤ 150V
Max discharge current DM:0kA, CM:200kA (@Current 8/20μs)	I _{max}	0kA	100kA	100kA
Nominal discharge current (@Current 8/20μs)	I _n	20kA		
Response time (@10kV/μs)	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	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

Power line SPD

Signal Telecom line
SPDLAN Coaxial line
SPDPower+LAN Integrated
Surge Protector

Hour Meter

· SPD Class	Category C1, C2, D2
· 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	Un	185V DC
Max Continuous Operating Voltage (MCOV)	Uc	200V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode		L1-L2/L3-L4	L1-G/L2-G	L3-G/L4-G
Voltage protection level Category C2 (@20kV/10kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 250V	≤ 300V	≤ 300V
Max discharge current DM:0kA, CM:200kA (@Current 8/20μs)	I _{max}	0kA	100kA	100kA
Nominal discharge current (@Current 8/20μs)	I _n	20kA		
Response time (@10kV/μs)	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	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)32 X (L)96 X (H)95 mm cf. p49
Installation	DIN-rail or Bolt fastening
Weight	Below 300 g

Test standard & Reference

IEC 61643-21 [2015] Performance and Test Criteria for Data/Telecom/Signal Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1, 2, 3
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Surge Line Surge Protector standard test specification

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

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

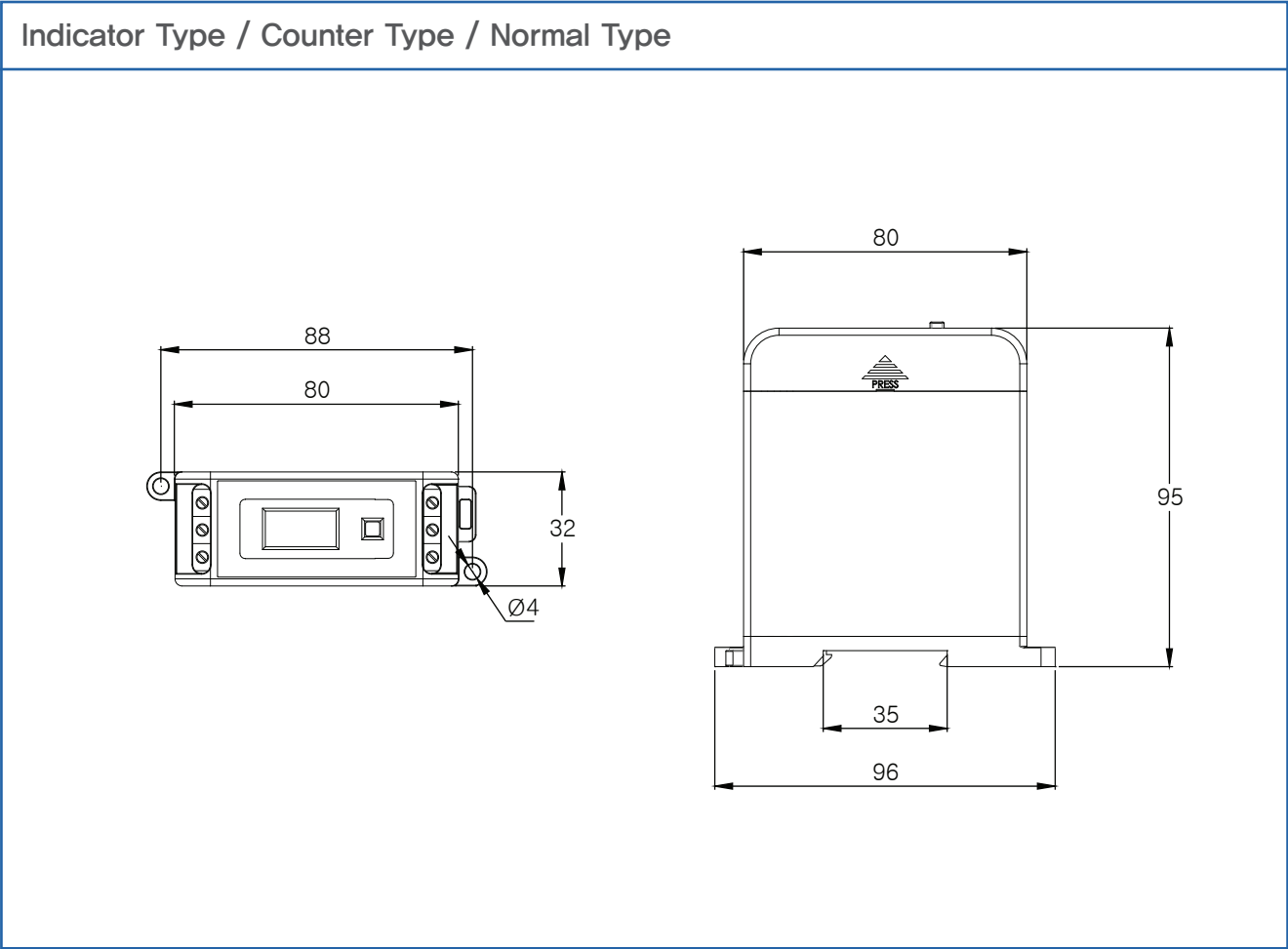
Product Dimension – Signal / Telecom [2Wire, 3Wire, 4Wire]



Model list
Indicator Type / Counter Type / Normal Type
(W)32 x (L)96 x (H)95

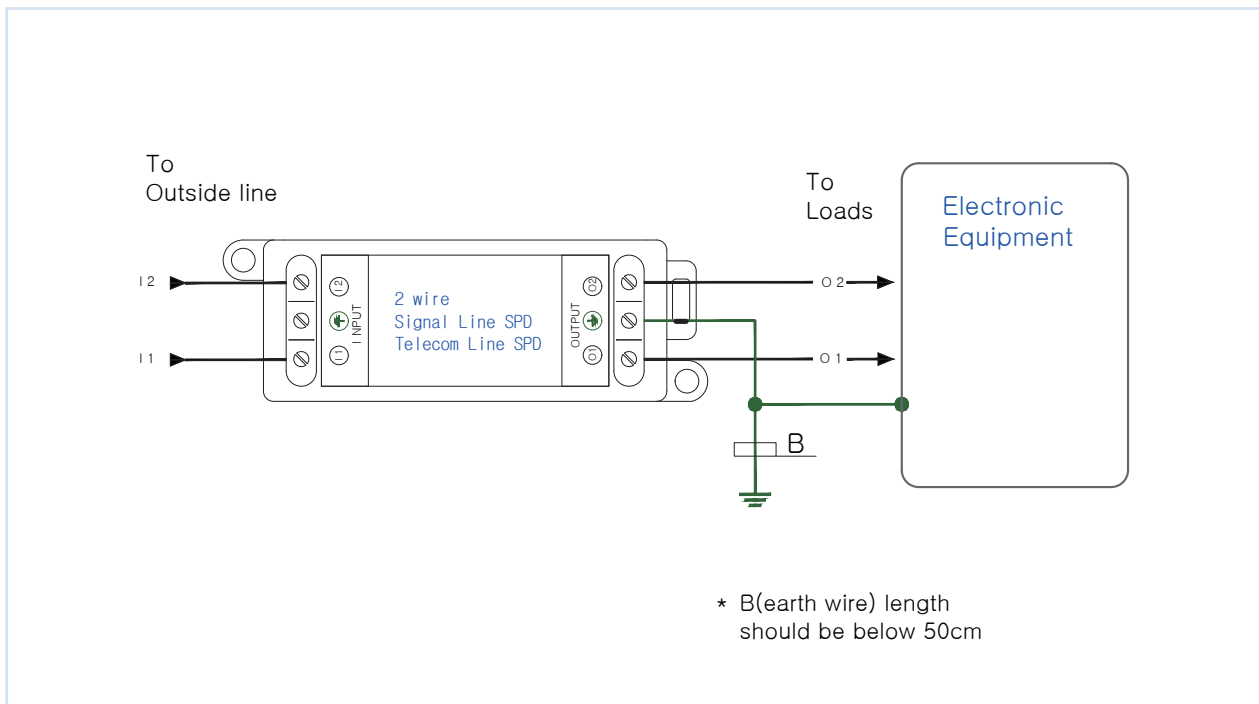
2wire	• KOS-A-5DC	: Data Line(5V)
	• KOS-A-12DC	: RS 485 Telecom Line
	• KOS-A-24DC	: 4~20mA Analog Line
	• KOS-A-48DC	: KT Private Modem Line
	• KOS-A-185DC	: KT ADSL, VDSL Line
4wire	• KOS-B-12DC	: RS 422 Telecom Line
	• KOS-B-48DC	: KT Private Modem Line
	• KOS-B-185DC	: KT ADSL, VDSL Line
3wire	•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

[Unit : mm]



Installation – Signal / Telecom Line 2Wire type

Model List : KOS-A-Model (2Wire type)

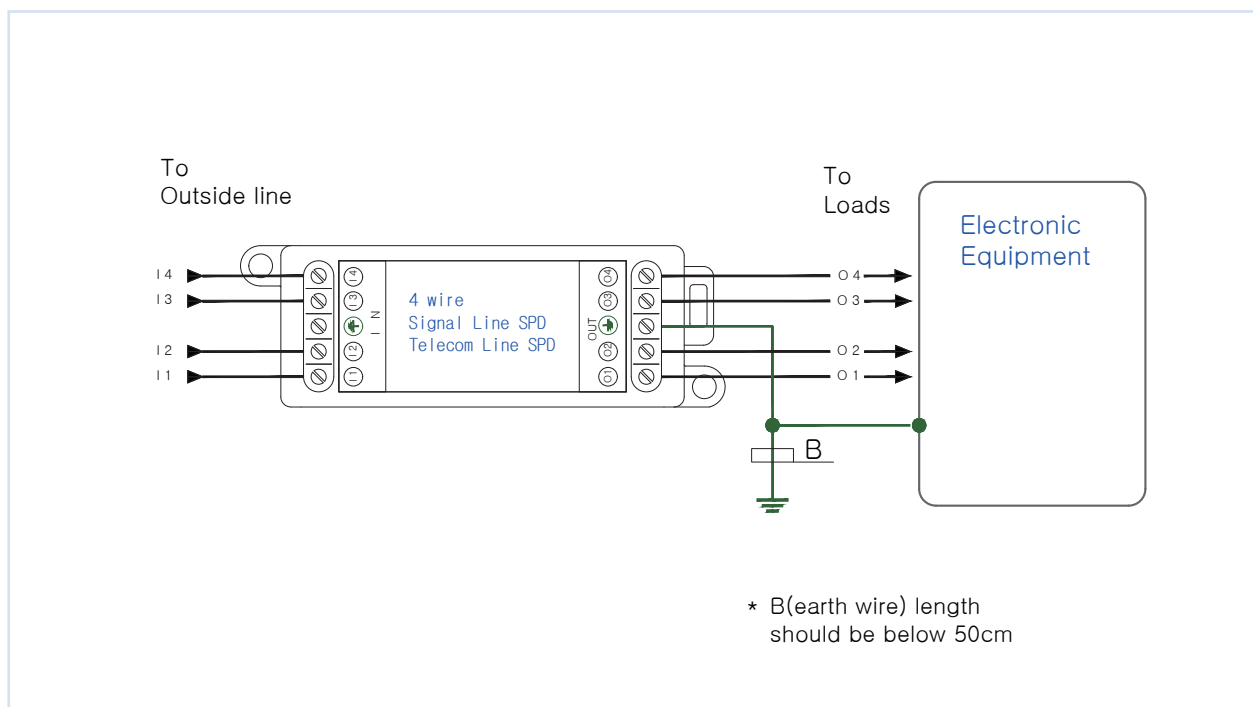


[2Wire type Installation]

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.
[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.]
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 earth terminal.
[Connect earth to a nearby earthed panel.
The length of the earth wire for this connection should be 50cm maximum.]
6. After the above is done, supply the power to the device.

Installation – Signal / Telecom Line 3, 4Wire type

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.
[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.]
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.
The length of the earth wire for this connection should be 50cm maximum.]
6. After the above is done, supply the power to the device.

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

LAN / Coaxial Line Surge Protector

- Product feature
- Technical specification
- Product dimension
- Installation

Feature – 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
- [When 6kV / 3kA(Voltage 1.2/50 μ s, Current 8/20 μ s) applied, within 100V]
- High Surge Capacity – 150kA / 200kA in total – the highest in the world
- RJ45 Jack
- LCD Surge Counter (Option) [10–year battery life]
- Aluminium case
- 1> 10/100 BASE Cat.5
- 2> 10/1000 BASE Cat.6

[Application]

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

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

Feature – Coaxial Line BNC Connector type



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

[Product Features]

- CE Certificate, Patent
- Performance in compliance with IEC 61643–21
- [When 6kV / 3kA(Voltage 1.2/50μs, Current 8/20μs) applied, within 100V]
- High surge capacity – 50kA in total – the highest in the world
- LCD Surge Counter (Option) [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.

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



Electrical property

Rated voltage	Un	48V DC
Max Continuous Operating Voltage (MCOV)	Uc	68V DC
Nominal current		Below 300 mA
Insulation resistance (@DC)	RIN	Above 20 M Ω
DC Loop resistance	R	Below 50 Ω / 1wire

Protection property

Protection mode (Full mode protection)		(1,2,3,6)-G, (4+5)-G, (7+8)-G
Voltage protection level (Category C2) (@6kV/3kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	Up	$\leq$ 100V
Max discharge current DM:0kA, CM:50kA (@Current 8/20 μ s)	Imax	150kA
Response time (@10kV/ μ s)	ta	Below 5 ns

Transmission property & Display function

Capacitance (@1MHz, 1Vrms)	C	1.5nF
Insertion loss (@3dB)	BW	DC~10MHz
Protector operation status indication		LCD Surge counter (Option) / 10 year battery life-replaceable
Correspondence		10 Base-T(IEEE 802.3i) 100 Base-T(IEEE 802.3u) POE(4/5+), 7/8(-)

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)42 x (L)98 x (H)30 mm cf. p59 F-1
Installation	DIN-rail or Bolt fastening
Weight	Below 250 g

Test standard & Reference

UL 497B

IEC 61643-21 [2015] Category A, B, C, Performance and Test criteria for Data/Telecom/Signal Line Surge Protector

IEC 62305-1,2,3,4 [2017]

ANSI / IEEE Std C62.41 [2002] Category A, B, C

ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard

IEEE Std C62.36 [2016] Data/Telecom/Signal Line Surge Protector standard test specification

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

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

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

· Model	KOX-A-48DC-E1000
· Application	1000 BASE Cat.6 Ethernet / LAN / F-net Protection
· Application Field	Ethernet, Data Line, F-net... communication field



Electrical property

Rated voltage	Un	48V DC
Max Continuous Operating Voltage (MCOV)	Uc	68V DC
Nominal current		Below 300 mA
Insulation resistance (@DC)	RIN	Above 20 M Ω
DC Loop resistance	R	Below 50 Ω / 1 wire

Protection property

Protection mode (Full mode protection)		(4,5,7,8)-G, (1,2,3,6)-G
Voltage protection level (Category C2) (@6kV/3kA Voltage 1.2/50 μ s, Current 8/20 μ s) – IEC 61643-21	Up	$\leq$ 100V
Max discharge current DM:0kA, CM:50kA (@Current 8/20 μ s)	Imax	200kA
Response time (@10kV/ μ s)	ta	Below 5 ns

Transmission property & Display function

Capacitance (@1MHz, 1Vrms)	C	1.5nF
Insertion loss (@3dB)	BW	DC~10MHz
Protector operation status indication		LCD Surge counter (Option) / 10 year battery life-replaceable
Correspondence		10 Base-T(IEEE 802.3i) 100 Base-T(IEEE 802.3u) 1000Base-T(IEEE 802.3ab)

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)42 x (L)98 x (H)35 mm cf. p59 F-2
Installation	DIN-rail or Bolt fastening
Weight	Below 250 g

Test standard & Reference

UL 497B
IEC 61643-21 [2015] Category A, B, C, Performance and Test criteria for Data/Telecom/Signal Line Surge Protector
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Line Surge Protector standard test specification

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

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

· Model	KOX-A-24DC
· Application	Antenna, RF Communication, Cable TV Protection
· Application Field	Antenna, RF Communication, Cable TV... industry field



Electrical property

Rated voltage	Un	24V DC
Max Continuous Operating Voltage (MCOV)	Uc	36V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1 wire

Protection property

Protection mode		L1-L2(G)
Voltage protection level (Category C2) (@6kV/3kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 100V
Max discharge current DM:0kA, CM:50kA (@Current 8/20μs)	I _{max}	50kA
Response time (@10kV/μs)	ta	Below 5 ns

Transmission property & Display function

Capacitance (@1MHz, 1Vrms)	C	1.5nF
Insertion loss (@3dB)	BW	DC~10MHz
Protector operation status indication		LCD Surge counter (Option) / 10 year battery life-replaceable

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)42 x (L)118 x (H)30 mm cf. p60
Installation	DIN-rail or Bolt fastening
Weight	Below 250 g

Test standard & Reference

UL 497B
IEC 61643-21 [2015] Category A, B, C, Performance and Test criteria for Data/Telecom/Signal Line Surge Protector
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Line Surge Protector standard test specification

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

Power line SPD

Signal Telecom line
SPDLAN Coaxial line
SPDPower+LAN Integrated
Surge Protector

Hour Meter

· Model	KOX-A-48DC
· Application	Antenna, RF Communication, Cable TV Protection
· Application Field	Antenna, RF Communication, Cable TV... industry field



Electrical property

Rated voltage	Un	48V DC
Max Continuous Operating Voltage (MCOV)	Uc	68V DC
Nominal current		300 mA
Insulation resistance (@DC)	RIN	Above 20 MΩ
DC Loop resistance	R	Below 50 Ω / 1 wire

Protection property

Protection mode		L1-L2(G)
Voltage protection level (Category C2) (@6kV/3kA Voltage 1.2/50μs, Current 8/20μs) – IEC 61643-21	Up	≤ 100V
Max discharge current DM:0kA, CM:50kA (@Current 8/20μs)	Imax	50kA
Response time (@10kV/μs)	ta	Below 5 ns

Transmission property & Display function

Capacitance (@1MHz, 1Vrms)	C	1.5nF
Insertion loss (@3dB)	BW	DC~10MHz
Protector operation status indication		LCD Surge counter (Option) / 10 year battery life-replaceable

Mechanical property

Protection rating level	IP20 (@IEC 60529), NEMA 1
Operating temperature	-10 ~ 80 °C
Operating humidity	Below 95%
Size	(W)42 x (L)118 x (H)30 mm cf. p60
Installation	DIN-rail or Bolt fastening
Weight	Below 250 g

Test standard & Reference

UL 497B
IEC 61643-21 [2015] Category A, B, C, Performance and Test criteria for Data/Telecom/Signal Line Surge Protector
IEC 62305-1,2,3,4 [2017]
ANSI / IEEE Std C62.41 [2002] Category A, B, C
ANSI / IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std C62.36 [2016] Data/Telecom/Signal Line Surge Protector standard test specification

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

Product Dimension – LAN RJ45 type



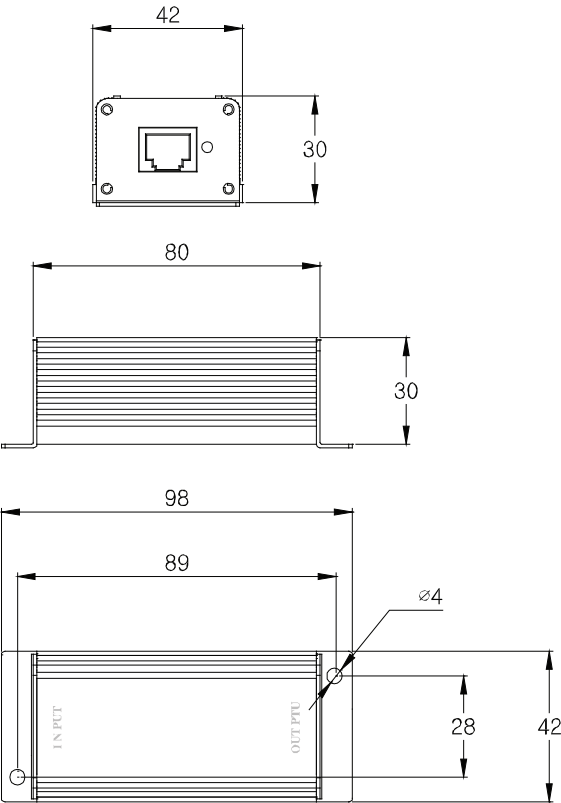
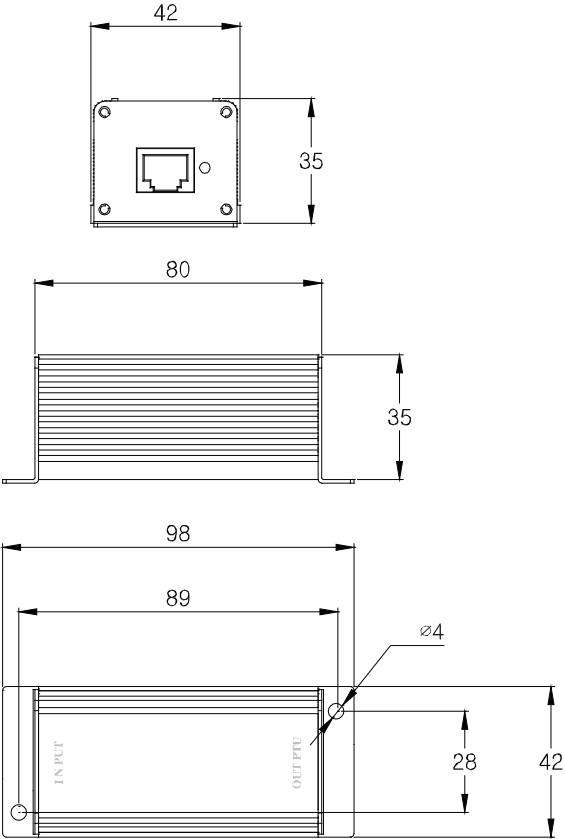
F-1 Model list
(W)42 x (L)98 x (H)30

- KOX-A-48DC-E100 : Cat 5

F-2 Model list
(W)42 x (L)98 x (H)35

- KOX-A-48DC-E1000 : Cat 6

[Unit : mm]

F-1	KOX-A-48DC-E100	F-2	KOX-A-48DC-E1000
			

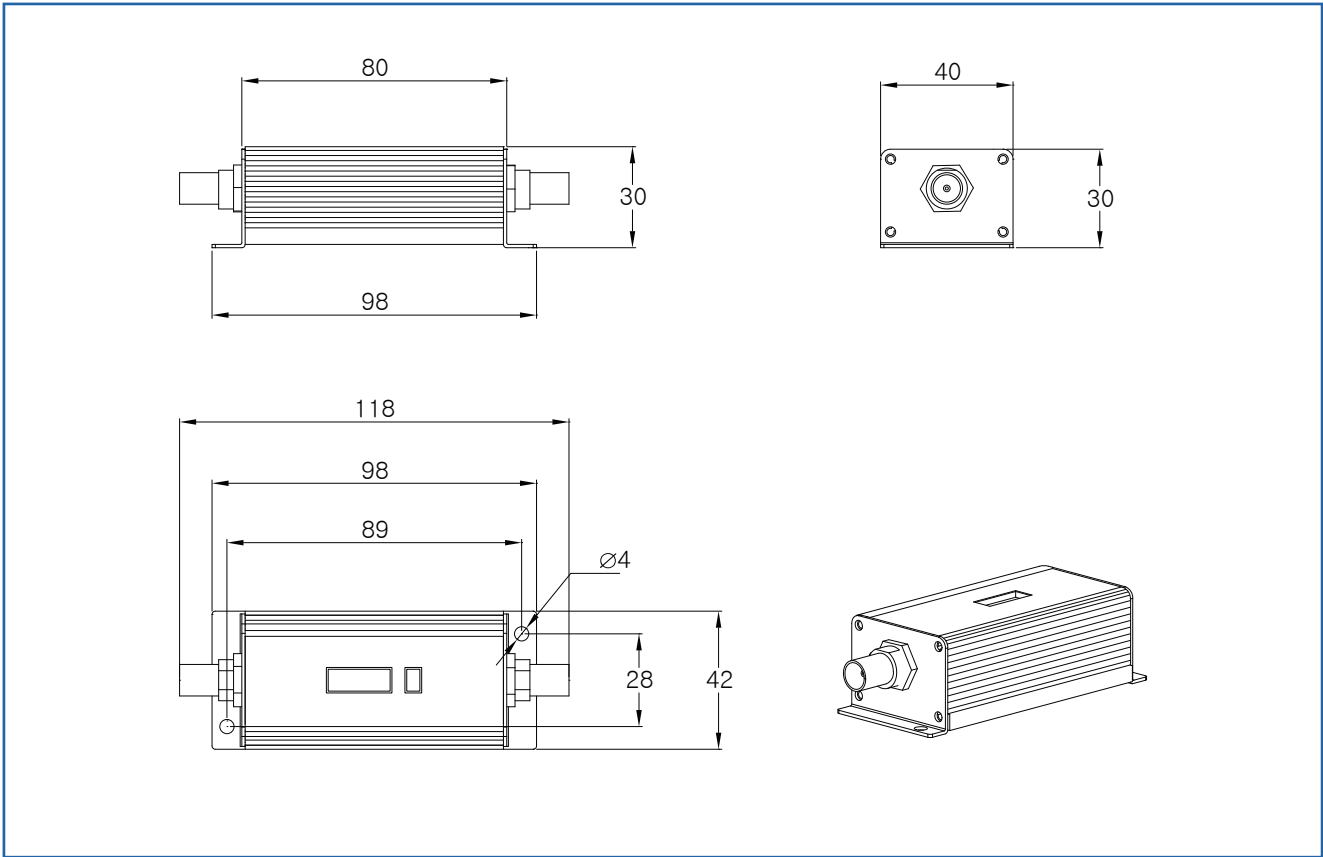
Product Dimension – Coaxial Line BNC type



Model list
(W)42 x (L)118 x (H)30

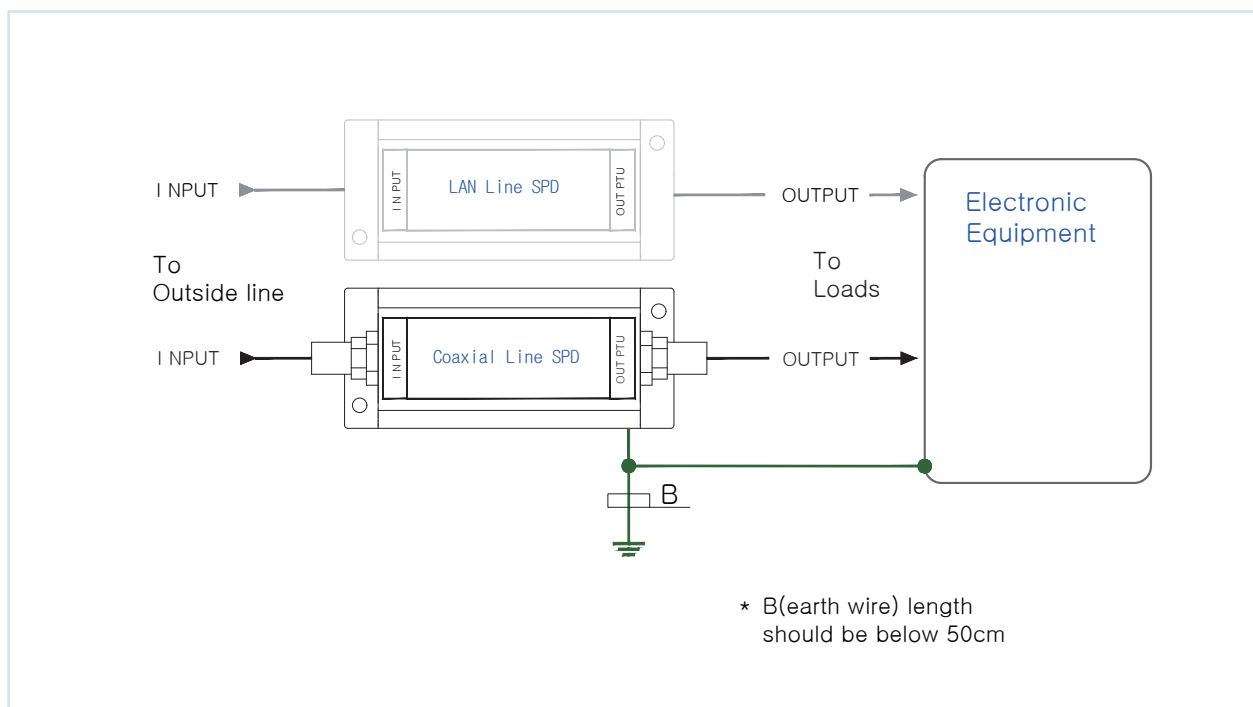
- KOX-A-24DC
- KOX-A-48DC

[Unit : mm]



Installation –Coaxial Line BNC type/LAN Line – RJ45 Jack

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 signal or telecom wire to the INPUT connector.
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.

The length of the earth wire for this connection should be 50cm maximum.]

6. After the above is done, supply the power to the device.

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

Power+LAN Integrated Surge Protector

- Product feature
- Technical specification
- Product dimension
- Installation

Feature – Power+LAN Intergrated Surge Protector for CCTV

[Power+LAN]



Voltage	Power : AC 220V / LAN : DC 48V
Type	Power + LAN(RJ45) type
Capacity	Power : 40kA – mode / LAN : 150kA – total, 25kA – mode

[Product Features]

Power+LAN Intergrated surge protector for CCTV : low cost high efficiency

Easy installation : installation at small space

Performance in compliance with KS C IEC standard

– Power : When 20kV / 10kA(Voltage 1.2/50 μ s, Current 8/20 μ s) applied, within 2.5V

– LAN : When 20kV / 10kA(Voltage 1.2/50 μ s, Current 8/20 μ s) applied, within 150V

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]

CCTV, Power + LAN line integrated protection

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Intergrated Surge Protector

Hour Meter

· Model	KOSPD-S/C [Power+LAN]
· Application	CCTV lightening, Switching surge
· Application Field	CCTV power, communication line lightening, Switching surge protection



Electrical property

		Power line	LAN line (100Mbps)
Rated voltage	Un	220A AC	48V DC
Rated current		N/A	N/A
Power system configuration		Single phase parallel	1 line serial
Max Continuous Operating Voltage (MCOV)	Uc	275V AC	68V DC
Rated frequency	f	50 / 60 Hz	N/A
Leakage current(@Uc)	IL	Below 1 mA	Below 0,5 mA
Insulation resistance (@500V DC)	RIN	Above 10 MΩ	Above 10 MΩ

Protection property

		Power line	LAN line (100Mbps)
Protection mode		L-L/L-G	(1,2,3,6)-G/(4+5)-G/(7+8)-G
Voltage protection level (@20kA/10kA Voltage 1,2/50μs, Current 8/20μs)	Up	≤ 1,5kV	≤ 150V
Max discharge current (@Current 8/20μs)	I _{max}	40kA/mode	150kA/total
Response time (@10kV/μs)	t _a	Below 5 ns	Below 5 ns
Power noise filter (Frequency band and Damping rate)	F _c	N/A	N/A

Feature

Operation status	Run = green lamp / Fault = red lamp
Safety	Dual safety design [current & thermal fuse]

Mechanical property

Protection rating level	IP20 (@IEC60529), NEMA1
Operating temperature and humidity	-10 ~ 80 °C , Below 95%
Terminal	Power : 25A [Awg 22~14] / LAN : RJ45
Size	(W)70 x (L)125 x (H)84 mm cf. p65
Installation	Bolt mounting
Weight	Below 1,5 kg

Test standard & Reference

IEC 61643-11 [2017] Performance and Test Criteria for Power Line Surge Protector
IEC 61643-12 [2017] Lightning Protection Zone 1,2,3
IEC 62305-1,2,3,4 [2017]
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 [2017] Power line surge protector performance standard
IEEE Std c62.62 [2018] Power line surge protector standard test specification
UL 497B
IEC 61643-21 [2015] Category A, B, C
ANSI/IEEE Std C62.64 [2009] Data/Telecom/Signal Line Surge Protector performance standard
IEEE Std c62.36 [2016] Data/Telecom/Signal Line Surge Protector standard test specification

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

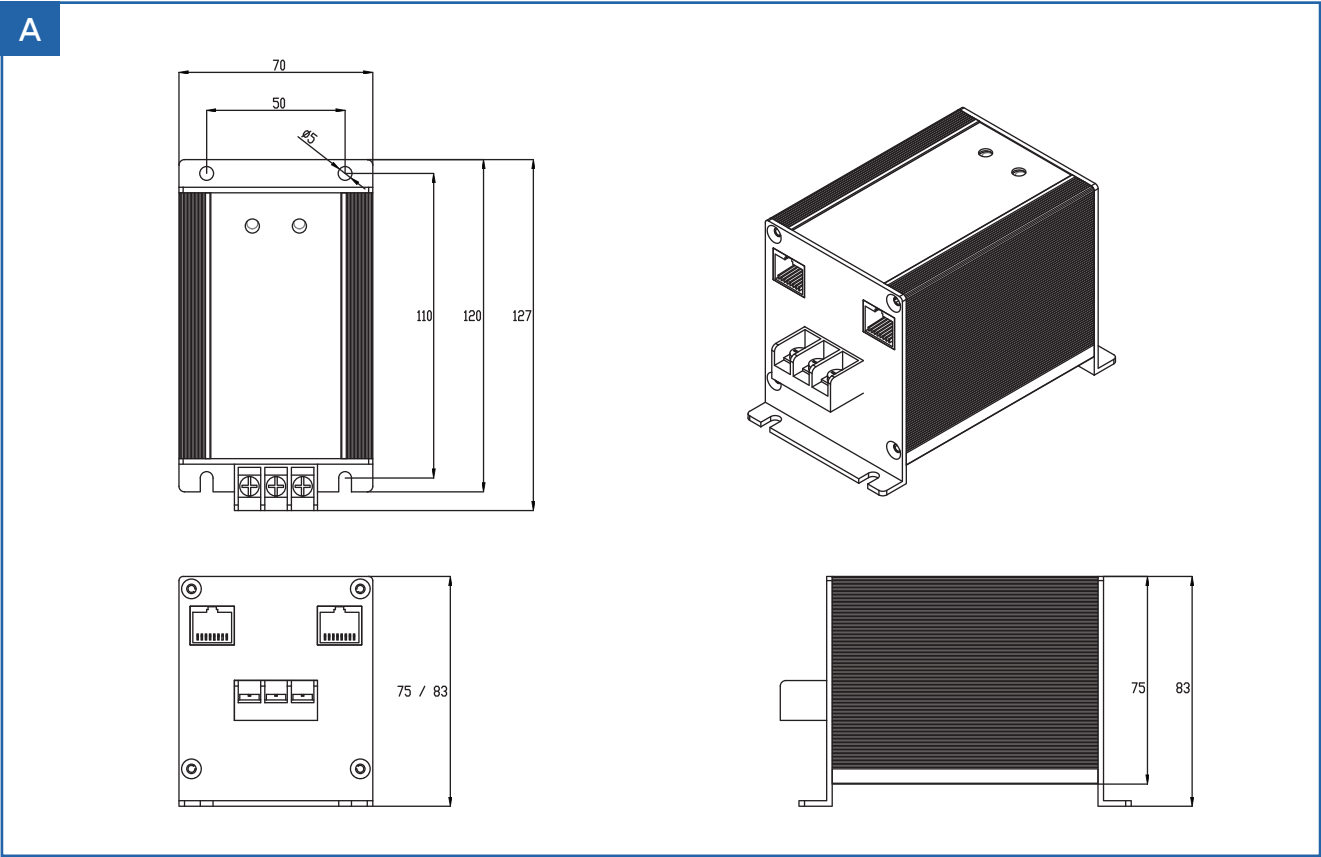
Product Dimension – Power+LAN Intergrated Surge Portector for CCTV



Model list
(W)70 x (L)127 x (H)83

- KOSPD–S/C

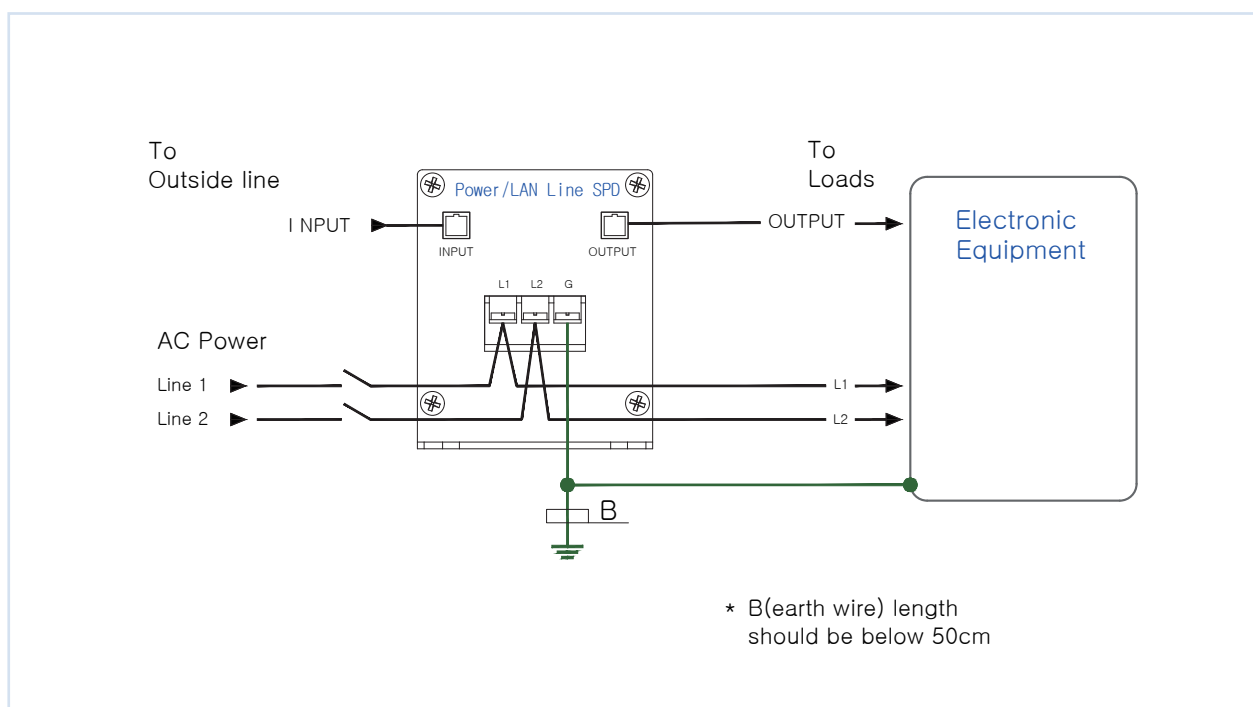
[Unit : mm]



Power line SPD
Signal Telecom line SPD
LAN Coaxial line SPD
Power+LAN Intergrated Surge Portector
Hour Meter

Installation – Power+LAN Intergrated Surge Portector for CCTV

Model List : KOSPD–S/C



[Power+LAN Intergrated Surge Portector Installation]

1. Turn off the power first.
2. Use 4~5mm bolts to fix the Protector onto the 4 fixing holes.
3. Connect AC 220V power wire to power terminal and then connect the power wire from power terminal to device.
4. Connect LAN cable to INPUT RJ45 Connector.
5. Connect LAN cable to OUTPUT RJ45 Connector.
6. After the above is done, supply the power to the device.

Hourmeter

- Product feature
- Technical specification
- Product dimension
- Installation

| Feature – Hour Meter



Voltage	AC 90V ~ 240V
Type	RS485 type
Capacity	Unable to initialization, which can be using for meter reading and verification.

[Product Features]

- Record hour meter operating time – unchangeable (power supply mode)
- Check data of hour meter operating time in remote location
- Save cumulative data during blackout
- FND display which has good visibility
- Aluminium case which has good durability
- Display – 000.0 (1/10 h)
- * 0.1 up per every 6 minutes

[Application]

- Device operating hour check for maintenance and replacement
- verification during blackout
- verification for AS and product warranty

· Model	KOH-A-T1
· Application	Industrial device, electronic equipment... operating hour check
· Application Field	Water treatment field, Manufacture field...



Feature

Display cipher	6 digit
Display mode	7 Segment FND
Character size	7 x 5,5 mm
Power voltage	AC 90V ~ 240V, 220V / 60Hz
Tolerance voltage range	± 10%
Power consumption	Below 0.4 A
Count range	0 to 99,999.0

Communication specification

Device type	Slave
Baud rates	9600 bps
Protocol	RTU (ASCII not supported)
Electrical interface	RS485 – 2wire
Connector type	Screw terminals
Maximum cable length	100 meter

Mechanical property

Terminal	AC(L), AC(N), 485(P), 485(N)
Display LCD size	45 x 10 mm
Size	60 x 68 x 75 mm cf. p70
Margin of error	0.5%
Case	Aluminium

Power line SPD

Signal Telecom line SPD

LAN Coaxial line SPD

Power+LAN Integrated Surge Protector

Hour Meter

Product Dimension – Hour Meter

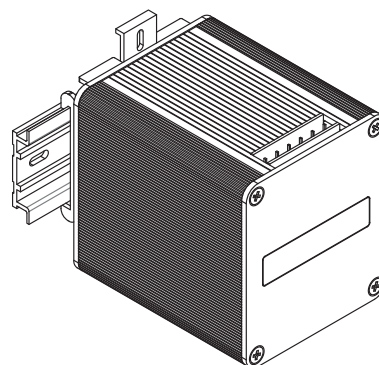
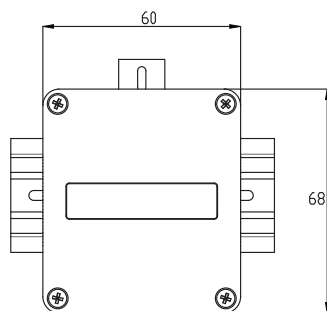
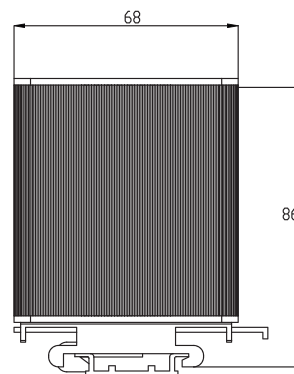
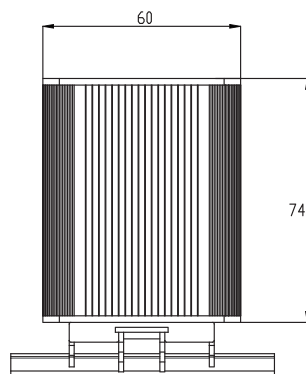


Model list

(W)60 x (L)68 x (H)75

- KOH-A-T1

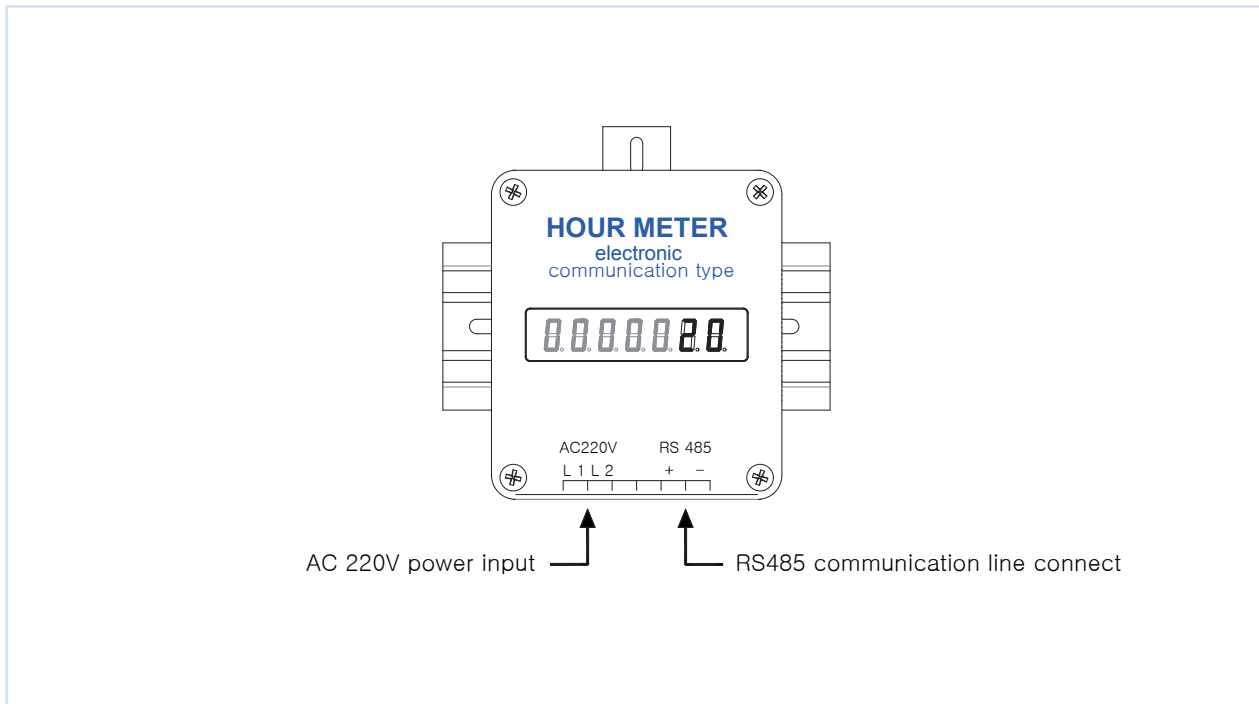
[Unit : mm]





Installation – Hour Meter

Model List : KOH-A-T1



[Hour Meter Installation]

1. Turn off the power first.
2. Use the Din-Rail to fix the Hourmeter
3. Connect AC 220V power wire to power terminal.
4. Connect communication wire to RS485 communication terminal.
5. After the above is done, supply the power to the device.

* provide communication protocol seperately.

Power line SPD

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Hour Meter