PRODUCT CATALOG

8th Edition

Accurate Technology Services, Inc.

Specializing in surge protection and custom cables & harnesses for military, automotive and commercial applications.

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RackShield2

Application: The RackShield2 protects assorted communication interfaces from transients caused by direct or indirect lightning strikes and other electrical surges. The RackShield2 frame is a mix and match, modular, 1U high, 19" rack mounting surge protector with a flush face. Protection can be provided for up to 16 ports, with blanking plates available to cover any unused positions. Any mix of modules can be installed easily. Protection modules can be changed out or upgraded within seconds.

Installation: RackShield2 modules can be mounted on any standard 35mm DIN rail, or in a 1U high frame for rack mounted applications.

AT25001-D module on 35mm DIN-rail

RackShield2 Modules in a rack-mount frame

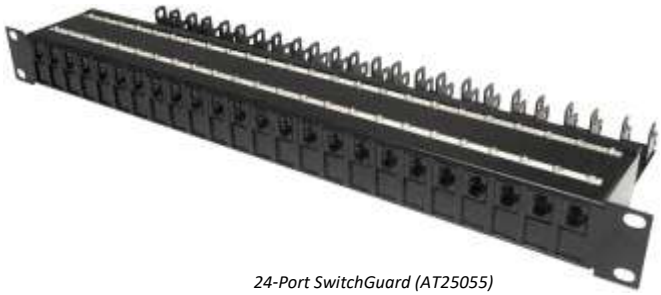
AT25012-DS shielded module on 35mm DIN-rail

Coax BNC and F-Type RackShield2 Modules

Part Number	Type	Max. Surge Current per Line	Working Voltage	Let-Through Voltage	Bandwidth	Connectors
AT25001	10/100 BaseT	1,000A	5V	10V	155MHz	RJ45
AT25002	T-1	1,000A	12V	27V	55MHz	RJ48C
AT25003	Pass Thru	—	—	—	—	RJ45
AT25004	Twinax	10,000A	15V	30V	5MHz	BJ57
AT25005	Cat5 PoE	1,000A	48V	60V	155MHz	RJ45
AT25006	10/100/1000 BT	1,000A	5V	10V	1,000MHz	RJ45
AT25007	Cover	—	—	—	—	—
AT25008	RS232	1,000A	12V	27V	10MHz	RJ45
AT25009	RS422	1,000A	5V	10V	15MHz	RJ45
AT25010	4 Wire Dial-up	1,000A	170V	240V	—	RJ45
AT25012	Cat 6 PoE	1,000A	48V	60V	1,000MHz	RJ45
AT25014	Coax	10,000A	10V	30V	10MHz	BNC
AT25015	2 Wire Dial-up	1,000A	170V	240V	—	RJ45
AT25016	Coax	10,000A	10V	30V	10MHz	TNC
AT25017	Coax	10,000A	10V	30V	10MHz	F

Din-Rail mounted modules are indicated by adding a "-D" to the end of the part number (e.g. AT25001-D)
Modules with shielded connectors are indicated by adding a "-S" to the end of the part number (e.g. AT25012-S)

SwitchGuard

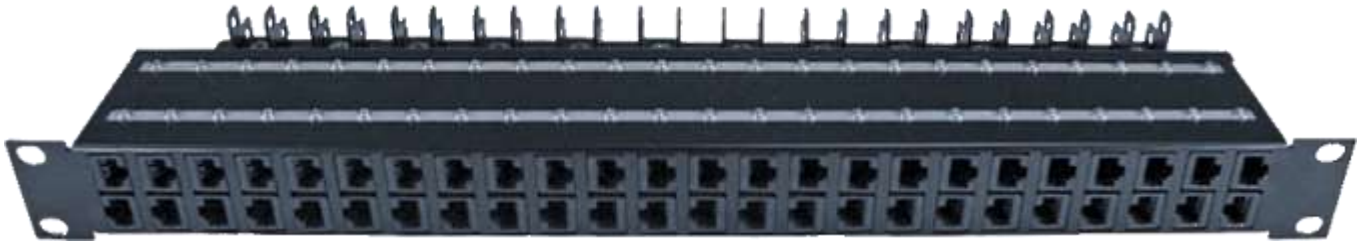


24-Port SwitchGuard (AT25055)

Application: The SwitchGuard is designed to protect 48 port Ethernet switches. This unit protects 48 CAT6 PoE ports in a 1U enclosure. The modular design allows each individual module to be easily replaced. The SwitchGuard also comes in a 24-port version, in a standard 1U enclosure, with a blanking plate (AT25007-SG) to cover unused ports.

Technology: The SwitchGuard modules employ solid state technology, enabling it to protect sensitive electronics against severe surges.

Installation: The SwitchGuard is a standard 1U high module that can be used for rack-mounted applications. The SwitchGuard utilizes built-in cable management tabs for network cable organization.



48-Port SwitchGuard (AT25054)

Part Number	Type	Maximum Surge Current Per Line	Working Voltage	Let-Through Voltage	Bandwidth	Connectors
AT25054[1]	Cat 6 PoE	1,000 A	48 V	80 V	1000 MHz	RJ45
AT25055[2]	Cat 6 PoE	1,000 A	48 V	80 V	1000 MHz	RJ45
AT25056[3]	-	-	-	-	-	-
AT25001-SG	10/100BaseT	1,000 A	5 V	10 V	155 MHz	RJ45
AT25002-SG	T1	1,000 A	12 V	27 V	55 MHz	RJ48C
AT25003-SG	Pass Through	-	-	-	-	RJ45
AT25005-SG	Cat5 PoE	1,000 A	48 V	60 V	155 MHz	RJ45
AT25006-SG	10/100/1000BaseT	1,000 A	5 V	10 V	1000 MHz	RJ45
AT25007-SG	*Blanking Plate for unused positions*					
AT25012-SG	Cat 6 PoE	1,000 A	48 V	80 V	1000 MHz	RJ45

[1]Model AT25054 is an AT25056 populated with 48 AT25012-SG modules

[2]Model AT25055 is an AT25056 populated with 24 AT25012-SG modules and 24 AT25007-SG plates

[3]Model AT25056 is an empty rack; protection modules sold separately

Modules with shielded connectors are indicated by adding a "-S" to the end of the part number (e.g. AT25012-SG-S)

SEPGuard

AT29022, Shielded CAT6 PoE+

Application: The SEPGuard is a surge suppression device that mounts directly into a Signal Entry Panel. The SEPGuard protects assorted communication interfaces from transients caused by direct or indirect lightning strikes and other electrical surges.

Technology: SEPGuard modules employ solid state technology, enabling them to protect sensitive electronics against even the most severe surges.

Installation: The SEPGuard series of surge protection devices can be mounted directly on your Signal Entry Panel. The SEPGuard is a MIL-DTL-38999 Series III Coupling style, size 19.

AT29012, CAT6 PoE+

AT29012, CAT6 PoE+

AT29022, Shielded CAT6 PoE+

Part Number	Type	Maximum Surge Current Per Line	Working Voltage	Let-Through Voltage	Bandwidth	Connectors
AT29001	10/100BaseT	1,000A	5V	10V	155MHz	RJ45
AT29002	T1	1,000A	12V	27V	55MHz	RJ48C
AT29004	Twinax	10,000A	15V	30V	5MHz	BJ157
AT29005	CAT5 PoE	1,000A	48V	60V	155MHz	RJ45
AT29006	10/100/1000BaseT	1,000A	5V	10V	1,000MHz	RJ45
AT29008	RS232	1,000A	12V	27V	10MHz	RJ45
AT29009	RS422	1,000A	5V	10V	15MHz	RJ45
AT29010	4-Wire Dial-Up	1,000A	170V	240V	-	RJ45
AT29012	CAT6 PoE	1,000A	48V	60V	1,000MHz	RJ45
AT29015	2-Wire Dial-Up	1,000A	170V	240V	-	RJ45
AT29021	CAT6A Shielded	1,000A	52V	60V	500MHz per pair	RJ45 Shielded
AT29022	Cat 6 PoE+ Shielded	1,000A	52V	60V	1,000MHz	RJ45 Shielded
AT29023	CAT6A PoE+ Shielded	1,000A	52V	60V	500MHz per pair	RJ45 Shielded

MA15

Application: The MA15 protects 120-240VAC and 140-280VDC from transients caused by direct or indirect lightning strikes and other electrical surges.

Technology: The MA15 surge suppressor is a hybrid type, employing high-energy metal oxide varistors (MOVs) and RFI filtering components. The MOVs are monitored with both thermal and short circuit fusing that disconnects if a failure occurs.

AT22035 MA15 modules mounted on 35mm DIN rail

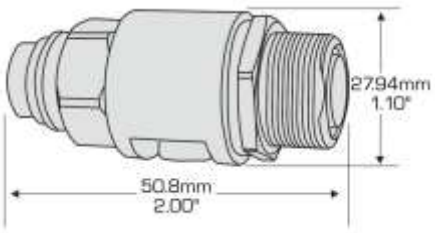
Installation: The MA15 can be mounted on a standard 35mm or top-hat DIN rail. Ground wire is required for surface mounted applications (included with purchase).

Specifications

Circuit Type:	Hybrid
Lines Protected:	3 (L, N, G)
Connectors:	Screw Clamp Terminal Strip
Surge Capacity:	18kA 8/20 impulse
Clamp Voltage:	120VAC/140VDC—330V (AT22035)
	240VAC/280VDC—800V (AT22036)
Rated Voltage:	125VAC (AT22035)
	240VAC (AT22036)
Attenuation:	-55dB Max. @ 100MHz
Max. Load Current:	15 Amperes
Case:	Polymide
Case Dimensions:	3.1” x 3.5” x 1.0 (70mm x 90mm x 25mm)
Weight:	3.5oz (100g)
Safety:	UL 1449 Recognized Component
	CE Approved
	UL Approved for Class I, Division 2,
	Groups A, B, C, and D hazardous locations

Part Number	UL 1449	500A Ring	500A 8/20	3kA 8/20	10kA 8/20
AT22035	330V	295V	320V	396V	585V
AT22036	800V	356V	800V	975V	1210V

AirGuard RGT



Dimensions vary depending on type of connector

Application: The AirGuard RGT Series of surge protection devices prevent surges and transient overvoltages conducted through coax cables. These surge protectors employ gas tube capsules that are easily replaceable ensuring a lifetime of protection. When replacing the gas tube, simply unscrew the capsule holder while installed. It is recommended that the capsules be replaced during routine maintenance, assuring uninterrupted protection.

Features

- Replaceable Gas Discharge Tube
- Bi-directional protection
- Low intermodulation
- DC to 4.0GHz
- Weatherproof
- Multiple strike capability

Specifications

Max. Discharge Current: 20kA (8/20µs)

Max. Power Rating: 1.25:1

Frequency Range: DC to 4.0GHz

Peak Pulse Current (8/20µs): 40kA (depending on connector type)

Part Number*	Mounting Connector	Frequency Range	VSWR	Insertion Loss	Peak Pulse Current (8/20µs)	Impedance
AT51062-x	7/16 Bulkhead (f) to 7/16 (m)	DC - 4.0GHz	1.25:1	0.1dB	40kA	50
AT51063-x	7/16 Bulkhead (f) to 7/16 (f)	DC - 2.5GHz	1.25:1	0.1dB	40kA	50
AT51064-x	N Bulkhead (f) to N (f)	DC - 2.5GHz	1.25:1	0.1dB	40kA	50
AT51065-x**	BNC Bulkhead (f) to BNC (f)	DC - 2.5GHz	1.25:1	0.1dB	40kA	50
AT51066-x	TNC Bulkhead (f) to TNC (f)	DC - 2.5GHz	1.25:1	0.2dB	40kA	50
AT51067-x	TNC (m) to TNC (f)	DC - 2.5GHz	1.25:1	0.2dB	40kA	50

*** Add alpha suffix to part number to specify required gas-tube voltage, e.g. AT51062-A for a 90V TNC (m) to TNC (f). See table below.**

**** NSN for AT51065-C: 5935015608163**

Parameter	Gas-Tube Voltage							
Voltage Code	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Gas-Tube Voltage Rating	90V	145V	230V	350V	470V	600V	800V	1000V
Max RF Watts	37V	96V	241V	558V	1006V	1640V	2915V	4555V
kA Transient Current for 8/20µs pulse	40V	40V	40V	40V	40V	40V	30V	20V
V Dynamic @ 5k V/µs	600V	600V	650V	800V	1200V	1500V	1900V	2200V
Let-Through Energy in mJ	0.3V	0.3V	0.35V	0.7V	2.2V	4.4V	9.0V	14V

AT51065C, 230V BNC Female to BNC Female

AirGuard WQWS

Application: The WQWS Series (Wideband Quarter-Wave Tubeless Stub) of surge protectors prevent surges and transient overvoltages. The WQWS uses an innovative "tubeless" design to achieve W-I-D-E-B-A-N-D performance. This compact unit has a high transient current capability with extremely low Passive Intermodulation (PIM). Typical applications for the WQWS include the protection of cellular, PCS and even 3G frequencies. It is also ideal as a single stock item device that can be used in any system up to 2,200MHz with outstanding performance.

Features

- Multi-application
- Low passive intermodulation (PIM)
- Weatherproof
- 60kA - 100kA surge current rated
- No discrete components to fail
- Nickel plated for corrosion resistance

Specifications

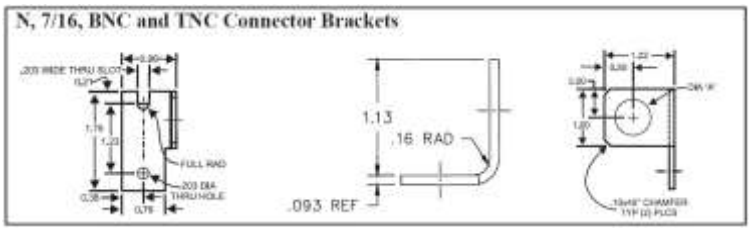
Max. Discharge Current: 60kA - 100kA (8/20µs)
Max. Power Rating (VSWR): 1.15:1
Frequency Range: 0.82 - 0.97GHz and 1.7 - 2.2GHz
Peak Pulse Current (8/20µs): N type - 60kA
7/16 type - 100kA
Impedance: 50 Ohms

Optimum Performance Frequencies

Frequency (GHz): 0.82 - 2.2
VSWR: 1.01:1 - 1.15:1
Insertion Loss (dB): 0.05 - 1.10

Part Number	Mounting Connector	Second Connector	Impedance
AT51037	7/16 Female Bulkhead	7/16 Male	50 Ohms
AT51038	7/16 Female Bulkhead	7/16 Female	50 Ohms
AT51039	N Female		50 Ohms
AT51040	N Female		50 Ohms

Bracket Part Number	Connectors	Diameter
AT51074	7/16 DIN	1.146"
AT51075	N	0.630



AirGuard NQWS

Application: The NQWS Series (Narrowband Quarterwave Tubeless Stub) of surge protectors prevent surges and transient overvoltages. The NQWS uses an innovative "tubeless" design to achieve the superior performance characteristics of a conventional quarterwave stub. This compact unit has a high transient current capability with extremely low Passive Intermodulation (PIM). Typical applications for the NQWS include the protection of radio telemetry systems, mobile communications base stations and where high induced voltages may be present.

AT51034H, N F/M (.82-2.2GHz)

Part Number	Mounting Connector	Second Connector	VSWR	Insertion Loss	Impedance	Surge Current
AT51033	N Bulkhead Female	N Female	1.1:1 to 1.15:1	0.1 to 0.15 dB	50 Ohms	60kA
AT51034	N Bulkhead Female	N Male	1.1:1 to 1.15:1	0.1 to 0.15 dB	50 Ohms	60kA
AT51035	7/16 Bulkhead Female	7/16 Female	1.1:1 to 1.15:1	0.1 to 0.15 dB	50 Ohms	100kA
AT51036	7/16 Bulkhead Female	7/16 Male	1.1:1 to 1.15:1	0.1 to 0.15 dB	50 Ohms	100kA

Note: Append alpha character from the table below to specify required frequency, e.g. AT51036A. The AT51035 & AT51036 are only available in frequency codes A, B, C, F, and I.

Bandwidth Frequency

Code	A	B	C	E	F	G	I	H
Frequency	0.411 - 0.194	0.82 - 0.96	1.7 - 2.0	2.2 - 2.6	3.0 - 3.6	5.15 - 5.88	0.82 - 2.2	2.4 - 6.0
Loss	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.15
VSWR	1.1	1.1	1.1	1.1	1.1	1.1	1.15	1.15

AirGuard QWS/GT Hybrid Series

Application: The QWS/GT Series (Wideband Quarterwave Tubeless Stub) of surge protectors prevent surges and transient overvoltages. Utilizing an innovative "tubeless" design, these surge protectors deliver true W-I-D-E-B-A-N-D performance. These compact units have a high transient current capability with extremely low Passive Intermodulation (PIM). Typical applications for the QWS/GT includes the protection of cellular, PCS and even 3G frequencies. It is also ideal as a single stock item device that can be used in any system up to 2,200MHz with outstanding performance.

AT51041, 7/16 F/F

Features

- Multi-application
- Low passive intermodulation (PIM)
- Weatherproof
- 120kA surge current rated
- No discrete components to fail
- Nickel plated for corrosion resistance

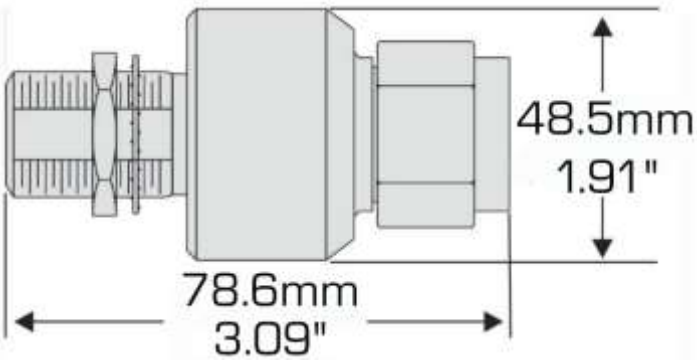
Specifications

Max. Discharge Current: 60kA (8/20µs)
Max. Power Rating (VSWR): 1.15:1
Frequency Range: 0.82 - 2.2GHz
Peak Pulse Current (8/20µs): 120kA
Impedance: 50 Ohms
RF Power Handling: To 3kW
Passes DC: 15ADC up to 48VDC
Low Passive Intermodulation: -150 dBc Pim (3rd order at 2x43 dBm tones)

Optimum Performance Frequencies

Frequency (GHz): 0.82 - 2.2
VSWR: 1.05:1 - 1.15:1
Insertion Loss (dB): 0.05 - 1.10
Protection Level Current: 120kA

Part Number	Mounting Connector	Second Connector	Impedance
AT51041	7/16 Female Bulkhead	7/16 Male	50 Ohms
AT51042	7/16 Female Bulkhead	7/16 Female	50 Ohms



Bracket Part Number	Connectors	Diameter
AT51074	7/16 DIN	1.146"
AT51075	N	0.630

AirGuard FGT

Application: The FGT Series of surge protection devices prevents surges and transient overvoltages conducted through coax cables used for wireless Local Multipoint Distribution System (LMDS), Wireless Local Loop (WLL), and Multichannel Multipoint Distribution Service (MMDS). These versatile products can be used in any "F" connector application from DC - 2.5GHz frequencies to 75 ohm impedance.

Typical applications for the FGT Series include the protection of radio telemetry systems, mobile communications base stations and where high induced voltages may be present.

AT51034H, N F/M (.82-2.2GHz)

Features

- Rugged Construction
- Economic Protection
- Versatile up to DC - 2.5GHz
- Allows DC/LF injection
- Weatherproof
- Multiple strike capability

Specifications

Max. Discharge Current: 20kA (8/20µs)

Max. Power Rating (VSWR): 1.5:1 @ 1.5GHz

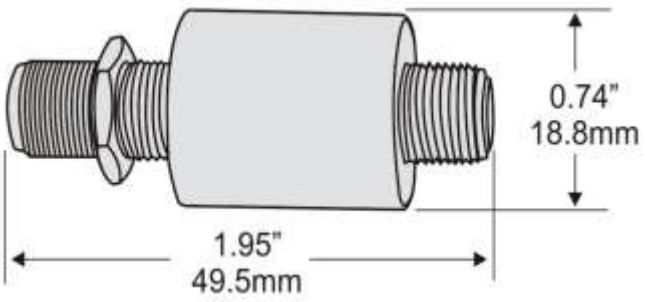
Frequency Range: DC - 2.5GHz

Peak Pulse Current (8/20µs): 15kA - 20kA

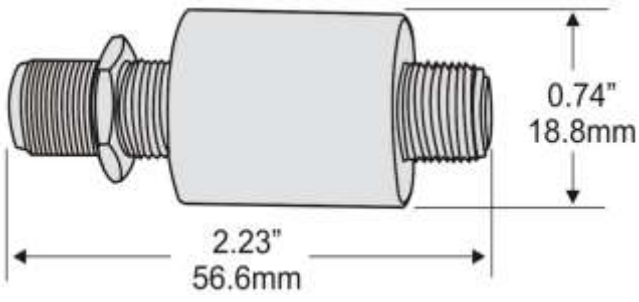
Impedance: 75 Ohms

Bracket Part Number	Connectors	Diameter
AT51076	F	0.385"

Part Number	Mounting Connector	Frequency Range	VSWR	Return Loss	Insertion Loss	Peak Pulse Current (8/20µs)	Impedance
AT51069	F(f) Bulkhead to F(f) for LMDS/RG 6 cable	DC - 2.5GHz	1.5:1 @ 1.5GHz	-	0.4dB	20kA	75 Ohms
AT51070	F(f) Bulkhead to F(f) for LMDS/RG 59 cable	DC - 2.5GHz	1.5:1 @ 1.5GHz	-	0.4dB	20kA	75 Ohms
AT51072	F(f) Bulkhead to F(f)	DC - 2.5GHz	-	-18dB	0.03dB	20kA	75 Ohms
AT51073	F(f) Bulkhead to F(f)	DC - 1.0GHz	-	-20dB	0.1dB	15kA	75 Ohms



Dimensions for AT51073



Dimensions for AT51069, AT51070, AT51072

SemperLite Power Series

Application: The SemperLite Power is a robust surge protection device with a wide range of input voltage, designed to protect mission critical equipment from failure due to lightning strikes and other transients.

Features

- TMOV Technology
- Solid State Diagnostics
- Bi-Directional
- <5nS Response Times
- 80,000A per Phase (Tested Capacity)
- Low Impedance Construction
- Thermal and Short Circuit Fusing for Safety
- Optional USB-A and USB-C Charging Ports
- 100-240VAC/50/60Hz
- 15 Amps Max.
- Ten Year Warranty
- Made in USA

Mechanical Specifications

Enclosure: Durable, lightweight, corrosion resistant, rugged metal
Dimensions (All Models, excluding cables & accessories): 5.87" x 4.72" x 2.25" (14.9mm x 120mm x 57.15mm)
Weight (All Models, excluding cables & accessories): 2.8 lbs. (1.27 Kg)
Mounting (Exluding the AT94008-xxxx): Surface Mount via four 0.17" (4mm) diameter holes
Operating Temperature: -40° to +176°F (-40° to +80°C)
Altitude: Up to 16,000 feet (5,000 meters)

Electrical Specifications

Status Indication:

Safety Fusing: Thermal & Short Circuit Fusing

AT94007-2100
5.87" x 4.72" x 2.25"
(14.9mm x 120mm x 57.15mm)

AT94006-11DD
5.87" x 4.72" x 2.25"
(14.9mm x 120mm x 57.15mm)

AT94008-00DP
4.72" x 4.72" x 2.39"
(120mm x 120mm x 60.6mm)

Part Number	Supply Voltage	Cat B 3kA 8/20µs	Cat C 10kA 8/20µs	Technology	Surge Capacity	MCOV	VPR	Power Input	Power Output	Cable Length
AT94000-xxxx	100-240V 1ø	890V	1200V	TMOV	80kA	320V	800V	C20	C19	12"
AT94001	*Accessory 25-Foot Power Cable, NEMA5-20P to C19*									
AT94002-xxxx	100-240V 1ø	890V	1200V	TMOV	80kA	320V	800V	C20	C19	30"
AT94003*	100-240V 1ø	890V	1200V	TMOV	80kA	320V	800V	C14	C13	30"
AT94004	*Accessory 25-Foot Power Cable, NEMA5-15P to C13*									
AT94005-xxxx	100-240V 1ø	890V	1200V	TMOV	80kA	320V	800V	C14	C13	12"
AT94006-xxxx	100-240V 1ø	890V	1200V	TMOV	80kA	320V	800V	NEMA 5-15P	NEMA 5-15R	6" each
AT94007-xxxx	100-240V 1ø	890V	1200V	TMOV	80kA	320V	800V	C14	C13	30"
AT94008-xxxx	100-240V 1ø	890V	1200V	TMOV	80kA	320V	800V	C14	X3 NEMA 5-15R	-

Replace "xxxx" part number suffix for optional features. See next page.
**AT94003 has been superseded by AT94007-xxxx, with additional features.*
Tested per ANSI/IEEE C62.45 and ANSI/IEEE C62.41
Independently NTRL tested and found to conform to Standard for Safety, Surge Protective Devices 1449 test requirements for SPD Type 3

SemperLite Options

Optional meters can be added to the SemperLite to provide more information about the power source being used. Picatinny and DIN rail mounts can also be provided for attaching additional ATS surge products. To specify the type of SemperLite you'd like to order, choose the features using the option codes below.

The example below shows how to create a part number for a SemperLite with a C14 input, a 12" C13 output, a green multimeter, DIN rail on the left, and Picatinny rail on the right.

AT94 005 - 1 1 D P

Series	Version	Display Type	Display Color	Left Mounts	Right Mounts
All Styles from the SemperLite Series.	Version code for required inputs/outputs. See previous page for details.	0 = No Display 1 = Multimeter 2 = Voltmeter	0 = N/A 1 = Green 2 = Red 3 = Blue	0 = No Mount D = DIN Rail P = Picatinny Rail	0 = No Mount D = DIN Rail P = Picatinny Rail

AT94006-22DP
Red Voltmeter with Lefthand DIN Rail/ Righthand Picatinny Rail Mounts

AT94006-12DP, *Red Multimeter with Lefthand DIN Rail/Righthand Picatinny Rail Mounts*

Semper4CAT6A, *Picatinny Mountable Network Protection Module* *(see pg. 12 for details)*

AT94xxx-1100
Green Multimeter

AT94xxx-2200
Red Multimeter

Multimeter Specifications

Measurement Limits	Min.	Typ.	Max.	Units
AC Voltage	85.0	-	264.0	Volts
AC Current, 32A	0.0	-	32.0	Amperes
Active Power, 32A	0	-	9999	Watts
Frequency	47.0	-	63.0	Hz
Power Factor	.00	1.00	-	-
Overcurrent Rating	1.5 x rated full-scale current			

Performance

Sampling Rate	2-3 samples / sec			
Voltage Accuracy			±1%	
Current Accuracy			±1%	
Power Accuracy			±2%	
Frequency Accuracy			±0.1%	Hz
Power Factor Accuracy			±3%	
Measurement Bandwidth	140Hz (Voltage), 14kHz (Current)			
Temperature Drift (0 to 60ºC)	0.5 Counts/ºC			
Zero-Current Reading (within 2 sec.)	0.00			Amps
Zero-Power Reading (within 2 sec.)	0			Watts
UL/IEC61010-1	Measurement Category II			

Voltmeter Specifications

Input

Voltage Range	85-264Vrms
UL/IEC61010-1	Measurement Category II
Frequency Range	47-63Hz
Current Consumption	50mArms (max.)

Performance

Sampling Rate	2.5 readings/second
Measurement Type	Half-wave average, rms calibrated for sinusoidal input
Accuracy@ +25ºC	±1V (typ.), ±2V (max.)
Temperature Drift (-25 to 60ºC)	±0.15 Volts/ºC (max.)

Semper4 Modules

Application: The Semper4 is a robust, versatile surge protection device, designed to protect mission critical equipment from failure due to lightning strikes and other transients. Each unit is stackable with other Semper4 units, as well as with the SemperLite Power SPD, providing customizable installations sizes. Semper4 modules can be populated with up to four RackShield2 modules[1] to meet user requirements. Pass-through or blank modules can fill unused slots for later expansion.

Features

- DIN and Picatinny rail mounting for easy installation and automatic grounding
- Precise voltage limiting
- Grounding DIN rail (AT94030) for standalone data SPD applications
- Modules are stackable to accommodate any number of ports
- Automatic grounding to SemperLite (AT94xxx-xxDD or DP) and individual RackShield2 modules via DIN or Picatinny rail with adapter
- Solid State Technology
- Ten Year Warranty
- Made in USA

Mechanical Specifications

Enclosure: Durable, lightweight, corrosion resistant, rugged metal
Dimensions (All Models, excluding cables & accessories): 2.9" x 2.8" x 2.4" (74mm x 72mm x 62mm)
Weight (All Models, excluding cables & accessories): 2.8 lbs. (1.27 Kg)
Mounting: 35mm DIN rail/clip or Picatinny rail/clamp
Operating Temperature: -40ºF to +158ºF (-40ºC to +70ºC)

AT94020-D
2.9" × 2.8" × 2.4"
(74mm × 72mm × 62mm)
Industrial Grade Connection via DIN Rail

AT94020-P[2]
2.9" × 2.8" × 2.4"
(74mm × 72mm × 62mm)
Military Grade Connection via Picatinny Rail

Part Number	Type/Mounts	Mounts	Max. Surge Current per Line	Working Voltage	Let-Through Voltage	Bandwidth	Connectors
AT94020-D	Cat 6A PoE+	DIN Rail/Clips	1,000A	48V	60V	1,000MHz	RJ45
AT94020-P	Cat 6A PoE+	Picatinny Rail/Clamps	1,000A	48V	60V	1,000MHz	RJ45
AT94021-D	2 Wire Dial-up	DIN Rail/Clips	1,000A	170V	240V	-	RJ45
AT94021-P	2 Wire Dial-up	Picatinny Rail/Clamps	1,000A	170V	240V	-	RJ45
AT94030	Din Rail with 12 AWG Grounding Terminal Block						

[1] *See page 1 for details.*
[2] *Requires Din2Pic adapter for use with RackShield2 modules*

Semper4 Options

Semper4 devices can be customized with a combination of four different modules. Picatinny and DIN rail mounts can also be provided for attaching and sharing ground between additional ATS surge products. To specify the type of SemperLite you'd like to order, choose the features using the option codes below.

The example below shows how to create a part number for a Semper4 with four unshielded modules: Two Cat 6A PoE, one PassThru, and one T1 module, with Picatinny rail mounts.

AT94500-9 9 0 2 - P S

Series	Module 1	Module 2	Module 3	Module 4	Mounts	Shielding
All Styles from the Semper4 Series.	0 = PassThru 1 = 10/100 BaseT 2 = T1 3 = 2WireDialUp 4 = Cat5PoE 5 = Cat 6A 6 = RS232 7 = RS422 8 = 4W DialUp 9 = Cat 6A PoE	0 = PassThru 1 = 10/100 BaseT 2 = T1 3 = 2WireDialUp 4 = Cat5PoE 5 = Cat 6A 6 = RS232 7 = RS422 8 = 4W DialUp 9 = Cat 6A PoE	0 = PassThru 1 = 10/100 BaseT 2 = T1 3 = 2WireDialUp 4 = Cat5PoE 5 = Cat 6A 6 = RS232 7 = RS422 8 = 4W DialUp 9 = Cat 6A PoE	0 = PassThru 1 = 10/100 BaseT 2 = T1 3 = 2WireDialUp 4 = Cat5PoE 5 = Cat 6A 6 = RS232 7 = RS422 8 = 4W DialUp 9 = Cat 6A PoE	D = DIN rail and clips P = Picatinny rail and clamp	U = Unshielded S = All modules shielded

Multiple Semper4 devices can be daisy chained, sharing ground across all attached devices, to provide flexible installation sizes to fit all surge protection applications.

Assorted Rackshield2 modules

Compatible RackShield2 Modules

Part Number	Semper4 Unit*	Type	Maximum Surge current per line	Working Voltage	Let-through Voltage	Bandwidth	Connectors
AT25001	AT94020-10/100	10/100 BaseT	1,000A	5V	10V	155MHz	RJ45
AT25002	AT94020-T1	T1	1,000A	12V	27V	55MHz	RJ48C
AT25003	AT94020-PassThru	Pass Thru	—	—	—	—	RJ45
AT25005	AT94020-Cat5	Cat 5 PoE	1,000A	48V	60V	155MHz	RJ45
AT25006	AT94020-GbE	10/100/1000 BT	1,000A	5V	10V	1,000MHz	RJ45
AT25008	AT94020-RS232	RS232	1,000A	12V	27V	10MHz	RJ45
AT25009	AT94020-RS422	RS422	1,000A	5V	10V	15MHz	RJ45
AT25010	AT94021-4WDU	4 Wire Dial-up	1,000A	170V	240V	—	RJ45
AT25012	AT94020	Cat 6A PoE	1,000A	48V	60V	1,000MHz	RJ45
AT25015	AT94021-2WDU	2 Wire Dial-up	1,000A	170V	240V	—	RJ45

**Each Semper4 unit contains 4x ports of a single connector type*

†Please see Page 1 for individual module information.

SemperMini

Application: The SemperMini is an extremely portable surge protection device, designed to protect mission critical equipment from failure due to lightning strikes and other transients, all in a compact form factor.

AT94100-DD
3.62" × 3.62" × 1.65"
(92mm × 92mm × 38mm)

Features

- Highly portable
- TMOV technology
- Low impedance construction
- <5ns response times
- DIN and Picatinny Rail Mounts for attaching and grounding Semper4 products
- Thermal and short circuit fusing for safety
- Ten year warranty
- Made in USA

Mechanical Specifications

Enclosure: Durable, lightweight, corrosion resistant, rugged metal

Dimensions (All Models, excluding cables & accessories): 3.62" x 3.62" x 1.65" (92mm x 92mm x 42mm)*

Weight (All Models, excluding cables & accessories): 2.3 lbs. (1.04 Kg)[1]

Mounting: 35mm DIN rail or Picatinny rail

Operating Temperature: -40°F to +185°F (-40°C to +85°C)

Electrical Specifications

Safety Fusing: Thermal & Short Circuit Fusing

SemperMini (AT94100-DD) and SemperLite (AT94006-11DP-0)

Part Number	Circuit Type	Working Voltage	Modes	Max. Surge Current	Leakage Current	MCOV	Vp @3kA 8/20µs	Vp @10kA 8/20µs
AT94100-xx	Parallel Hybrid	110-277 Vac, 47-63 Hz	L-N, L-G, N-G	20 kA 8/20 per mode 36 kA 8/20 total	<0.3 mA	320 Vac	920 V	1140 V

Replace "xx" part number suffix for optional features. See next page.
Tested per ANSI/IEEE C62.41 Location C; ANSI C136.2 10kV BIL
Circuit evaluated to 1449 V4 Type 4

SemperMini Options

Picatinny and DIN rail mounts can also be provided for attaching additional ATS surge products. Appending the appropriate four digit codes from the table below to any SemperMini version will add an optional multimeter.

AT94100-DD
Left and Righthand DIN Rail, mounted with Semper4Cat 6A (AT94020-D) and Rackshield2 BNC module (AT25014)

Part Number	Description
AT94100-00	No Mounts
AT94100-DD	Two DIN Rail Mounts
AT94100-PP	Two Picatinny Rail Mounts
AT94100-DP	Left DIN/Right Picatinny
AT94100-PD	Right Picatinny/Left DIN

AT94100-DP
Lefthand DIN Rail/Righthand Picatinny Rail Mounts

Semper4CAT6A (AT94020-P)
*Picatinny Mountable Network Protection Module**

*See page 11 for more details

DC Pro

Application: The DC-Pro Series of power surge protection devices is specifically designed for small DC distribution panels. These compact and durable devices offer cost effective, versatile, high capacity surge protection.

Features

- DC applications
- Straightforward and simple installation—surface mounting
- Optional LED status indication via solid state diagnostics, plus optional remote indication contacts
- Thermal and Short Circuit Fusing
- Ten Year Warranty
- Made in USA

AT89712
12V DC Pro
with Status LEDs

Options

DC Pro devices can be customized with a combination LEDs, Relays and required voltage. The example below shows how to create a part num-

A T 8 9 7 1 2

Series	LEDs & Relay	Voltage
All Styles from the DC Pro Series.	6 = None 7 = LEDs only 8 = Relay only 9 = LEDs & Relay	12 = 12VDC 24 = 24VDC 48 = 48VDC 75 = 120VDC 76 = 200VDC

Specifications

All figures typical at 77°F (25°C) unless otherwise stated

Maximum Surge Current: *See Specification Table below for details*
Lines Protected DC: V+ to V-, V+ to E, V-E
Duty Cycle Performance (8/20µs): 10,000A >4,000 impulses
100A infinite
Response Time: <5ns
Ambient Temperature Limits: -40°F to +185°F (-40°C to +85°C)—working
Humidity: 95% RH (non-condensing)
Enclosure: NEMA 1, 2, 3
Terminals: #14 AWG to #2 AWG
Mounting: Surface mount by four 0.17" (4mm) diameter holes ½"
Remote Contacts (Optional): C, NO, NC rated 60W DC or 120VAC, 3A Max.
Indication (Optional): Green LED ON: Protection Present
Green LED OFF: Internal failure or no power
Red LED ON: Internal Failure
NOTE: 120 and 200VDC models utilize two green LEDs. One or more unlit LEDs indicates internal failure or no power.
Weight: 2.1 lbs. (0.94Kg)
Dimensions: 4" x 4" x 3.27" (10.6cm x 10.6cm x 8.3cm)
EMC Compliance: BS EN 60950: 1992; BS EN 61000-6-2: 1999+

Working Voltage	MCOV	Limiting Voltage @3kA†	Limiting Voltage @10kA (in)†	Max. Surge Current
12VDC	18VDC	120	240	15kA
24VDC	32VDC	190	292	36kA
48VDC	56VDC	280	504	53kA
120VDC	140VDC	600V	900V	80kA
200VDC	230VDC	850V	1050V	80kA

† 8/20µs waveform—tested as per ANSI/IEEE C62.45 and ANSI/IEEE C62.41

Surveillance System Protection

Application: The AT87 Series, Surge Protection for Surveillance Systems or simply known as SPD (Surge Protection Device), is designed in accordance with IEC standards for application in CCTV system protection. Combining surge protection functions for power, audio/video, and pan-tilt-zoom (PTZ) control signals, this proven technology is highly effective in protecting very sensitive surveillance systems by preventing damage due to overvoltage through lightning and other induced voltages, and to prevent damages due to static discharge.

Working voltages of the AT87 include 120VAC, 12VDC and 24VDC. The 2-in-1 offers protection for power lines and audio/video signals. The 3-in-1 model offers protection of power line voltage for 12VDC, 24VDC and 120VAC, audio/video and PTZ control signal; effectively, satisfying various application scenarios of surveillance systems.

AT87024PS-3C
24V Plug/Socket 3-in-1 SPD with
F-Type Coax and PTZ Control modules

The AT87 Series SPD protects the power, audio/video, and PTZ control signals from direct and indirect lightning strikes. CCTV systems with or without the PTZ function, as well as other equivalent signal types, can be protected.

The versatile AT87 Series can be easily introduced into a wide variety of applications and locations, including banks, schools, malls, transportation and industrial facilities, and neighborhood security applications.

Features

- A low limiting voltage provides good protection effect with a fast response time
- Provides protection for differentiated mode, common mode and combination mode
- Protects power, audio/video and Pan-Tilt-Zoom control systems
- Compact design allows for easy installation
- Provides high impulse current, low loss interference, and high throughput
- Application is Type 3 tested, with high open-circuit voltage and no residual current
- Ten Year Warranty
- Made in USA

Part Number	Type	Protection
AT87001	Female/Female Coax BNC 1-in-1	Audio/video signals
AT87002	Male/Female Coax BNC 1-in-1	Audio/video signals
AT87003	Type F Coax 1-in-1	Audio/Video signals
AT87004	CAT 6 PoE & PoE Plus	Power, audio/video and pan-tilt-zoom
AT87005	2, 3, or 4 Wire Control 1-in-1	Pan-tilt-zoom signals
AT87012-1	12V 1-in-1	Power
AT87012PS-1	12V Plug/Socket 1-in-1	Power
AT87012-2*	12V 2-in-1 SPD	Power and audio/video signals
AT87012PS-2*	12V Plug/Socket 2-in-1 SPD	Power and audio/video signals
AT87012-3*	12V 3-in-1 SPD	Power, audio/video and pan-tilt-zoom signals (2 wires)
AT87012PS-3*	12V Plug/Socket 3-in-1 SPD	Power, audio/video and pan-tilt-zoom signals (2 wires)
AT87024-1	24V 1-in-1	Power
AT87024PS-1	24V Plug/Socket 1-in-1	Power
AT87024-2*	24V 2-in-1 SPD	Power and audio/video signals
AT87024PS-2*	24V Plug/Socket 2-in-1 SPD	Power and audio/video signals
AT87024-3*	24V 3-in-1 SPD	Power, audio/video and pan-tilt-zoom signals (2 wires)
AT87024PS-3*	24V Plug/Socket 3-in-1 SPD	Power, audio/video and pan-tilt-zoom signals (2 wires)
AT87120-1	120VAC 1-in-1	Power
AT87120-2*	120VAC 2-in-1 SPD	Power and audio/video signals
AT87120-3*	120VAC 3-in-1 SPD	Power, audio/video and pan-tilt-zoom signals (2 wires)

* Append “A” (AT87001), “B” (AT87002) or “C” (AT87003) to the part number to select the required coax module. Example: Use “AT87024-3B” to select the 24V 3-in-1 SPD with the M/F BNC Coax Module.
All models comply with the following standards:
<Low voltage surge protection device (SPD) Part 1: Low voltage power system surge protection functional requirement and test method> IEC 61643.11:2012
<Low voltage surge protection device (SPD) Part 21: Communication and signal network surge protection (SPD) functional requirement and test method> IEC 61643.21-2000
<Lightning protection Part 4: Electrical and electronic system inside building> IEC62305-4:2006

A/V Camera Protection

AT87003

AT87002

Coax modules protect your camera's audio/video signals (including 1080p AHD) from surges caused by lightning strikes and other transients.

AT87012-1

Individual 12 and 24Volt (AC or DC, 6-36V) or 120VAC modules offer high-grade protection for your camera's power supply.

AT87024-2C

Protect both power and A/V signals at once with the compact 2-in-1 unit.

AT87120-3C

Protect power, PTZ control and A/V signals with the modular 3-in-1 SPD.

AT87024PS-2B

AT87012PS-3C

AT87012PS-1

The AT87012PS and AT87024PS modules simplify connecting to 12V/24V AC and DC power supplies with pigtailed plug -to-socket connectors, combining ease of installation with solid protection.

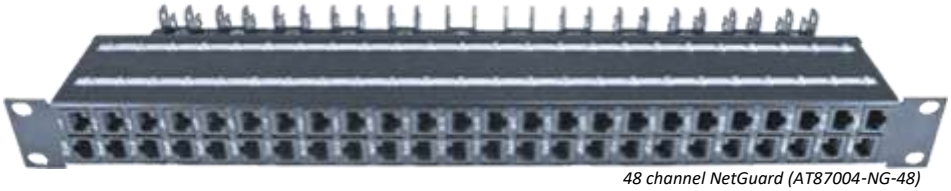
IP Camera Protection

The AT87004: The only device you need for network cameras. The AT87004 Cat 6 module is a nearly universal surge protection device, covering all your data needs, including network video, PoE & PoE Plus, PTZ signals, wireless access points and all other networking functions.

AT87004

Part Number	Type	Nominal Voltage	Max. Voltage	Voltage Protection Level	Max. Surge Current	Max. Rated Load Current	Attenuation	N.E.X.T.	Return Loss	Maximum Frequency
AT87004	CAT 6 PoE & PoE Plus	48V	52V	90V	1kA per wire	1.0A	Better than -0.05dB @ 250MHz	Worst Pair: Better than -37dB	Better than -10dB @ 250MHz	300 MHz per pair

Headend Protection



48 channel NetGuard (AT87004-NG-48)

Application: The NetGuard is a standard 1U high module that can be used for rack mounted applications. Its modules employ solid state protection technology enabling it to protect sensitive electronics against severe surges. The NetGuard is designed to protect 48 channel Ethernet switches. It also protects 48 CAT 6 PoE and PoE Plus channels in a 1U enclosure. The modular design allows each individual module to be easily replaced. The NetGuard also comes in a 24-channel version, which is a standard 1U enclosure with a blanking plate to cover unused channels.

Part Number	Type	Maximum Surge current per Line	Working Voltage	Let-Through Voltage	Bandwidth	Connectors
AT87004-NG-XX*	CAT 6 PoE & PoE Plus	1,000A	48V	60V	1000MHz	RJ45

*Replace -XX with either –24 or –48 for the required number of installed channels

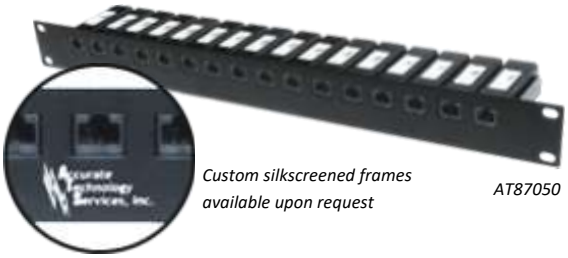
Surface and Rack Mounts

AT87051

The surface or rackmount 12-way frame is suitable for Ethernet, power, or coax modules.

AT87053

The surface or rackmount 24-way frame is suitable for Ethernet, power, or coax modules.



Custom silkscreened frames available upon request

AT87050

The rackmount 16-way frame is suitable for RJ45 type connections.

AT87205-XX

Hinged patch panel wall-mount brackets are available for 1U, 2U, 4U and 6U installations.

Panel Mount Cat 6 PoE+

AT29012

AT87004

Versatile CAT 6 PoE and PoE+ modules are suitable for a wide variety of applications.

Part Number	Type	Nominal Voltage	Max. Voltage	Voltage Protection Level	Max. Surge Current	Max. Rated Load Current	Attenuation	N.E.X.T.	Return Loss	Maximum Frequency
AT29012 AT87004	CAT 6 PoE & PoE+	48V	52V	90V	1kA per wire	1.0A	Better than -0.05dB @ 250MHz	Worst Pair: Better than -37dB	Better than -10dB @ 250MHz	300 MHz per pair

Custom Metalwork

If your project requires a custom housing, ATS can help design, source and assemble your metalwork. Customized screenprinting, coating and plating is available, all sourced in the USA for higher quality and faster lead-times.

Our custom metalwork projects include the Semper4 housing as well as the picatinny rail and clamp[1], the SwitchGuard[2], the SEPGuard[3], and Signal Entry Panels for COC (see below).

Custom metalwork examples available through ATS

Signal Entry Panels for COC

ATS has provided support for several military projects, such as JECCS, TSM, DTC, TDN and the USMC COC—Combat Operations Center. Signal Entry Panels (or SEPs) used in the COC include surge protection for a wide array of mission critical power and communication interfaces. Ethernet, audio/video, communication antennas and power

AT25060
Used with Storage Server

AT25067
Used with Dome Switch

AT25068
Used with A/V connections

AT35529
Used with Power connections

AT25062
Used with Switch Server

AT25069
Used with UPS

AT25060
Used with Antenna Hill

[1] *See Page 11 for more information*
[2] *See page 2 for more information*
[3] *See page 3 for more information*

Custom Cables and Harnesses

We offer custom, build-to-print military, automotive, medical and commercial cables utilizing state of the art assembly tools, built to IPC and ISO 9001:2015 standards. Our experienced team of technicians and engineers will work closely with you to help design, source, build and test the product that suits your needs. ATS offers high quality cables and harnesses at competitive pricing with typically fast delivery.

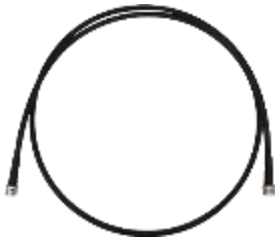
50-Foot NATO Slave to Mil-Circ

Audio to Mil-Circ

NEMA to Mil-Circ

Motorcycle Harness

Ethernet



Coax

Cables and Harnesses
(Manufacturing Engineering Assistance Offered)

- Custom Built Cables and Harnesses
- Built to Print (Military, Medical & Commercial)
- Power, Communication and Signal Cables
- Sealed Cables and Harnesses
- Discrete Wire Assembly
- Shielded and unshielded Ethernet Cables
- NATO Power Cables
- Audio Cables
- Soldered Micro Miniature D-Sub Assemblies
- Distribution, Switch and Junction Boxes
- Electro-Mechanical Assemblies
- Coax/Triax Cable Assemblies
- Coax, Semi-Rigid Assemblies
- Automotive Cables and Harnesses
- In-House Testing and Quality Assurance
- Non-RoHS and RoHS Compliance Available
- Built to Mil-Spec and IPC Standards
- ISO-9001:2015 Certified
- Custom Labeling Available

OFP (Optical Fiber Packaging), is an ATS partner with more than 40 years' experience designing, engineering and manufacturing rugged, reliable Fiber Optic products for Military, Naval, Sub-Sea, Space Flight and Federal applications. The company offers a vast range of products including connectors, custom fiber optics harnesses, rugged commercial fiber assemblies and even military grade transceiver and media conversion modules.

OFP also offers custom design solutions when Off-The-Shelf products are not available. Its innovative engineering team can provide rapid delivery prototypes and even in-house qualification services.

OFP products groups include:

- Expanded Beam Fiber connectors, harnesses and adaptors.
- Land, Naval and Air Mil grade fiber optic harnesses
- Fiber optic and hybrid electro/optical hermetic penetrators/ feedthroughs
- Space grade fiber connectors and harnesses
- Vacuum feedthroughs
- Military transceivers
- Ruggedized (IP-68) commercial style fiber connectors and harnesses
- Secure Fiber Optic and RJ-45 connector and patchcords for network protection

HMA (MIL-DTL-82526 to Duplex LC Adapter

Features

- Converts Expanded Beam plugs and bulkheads to duplex LC cabling/interface
- Expanded Beam port compliant to MIL-DTL-83526
- HMA, Pro-Beam Jnr, Q Mini, GMA intermateable
- SM or MM excess loss <= 1.5dB 850 nm - 1550 nm
- LC interface fully IEC 61754-20 compliant
- Compatible with commercial LC duplex
- IP-68 protected when coupled to OFP LC Max
- Compatible with OFP MLC (Metal LC Duplex)
- Lightweight highly rugged construction

Applications

- Military
- Industrial
- Broadcast
- Marine/Naval
- Oil & Gas
- Renewable Energy

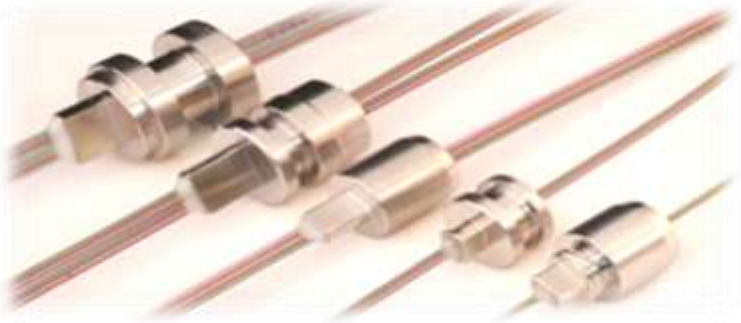
Submarine and Downhole Penetrators

Highest Reliability Fiber Optic Hermeticity

Overview: OFP has 30 years experience delivering Glass-to-Metal subsea seals for wellhead and downhole seal application with zero fails, specializing in fiber optic seals for the deepest and hottest environments on Earth. Our products are engineered to withstand life-time exposure to aggressive media such as oil, mud, chemicals and salt water.

Key Features

- **Low, 0.2 dB insertion loss & no ORL penalty**
- **From 1-36 fibers in all fiber types**
- **Swagelok, O-ring, C-ring, and welded mounting**
- **-50 - +177C and vacuum to 30,000 psi range**
- **Off-the shelf options with fast delivery**
- **Supplied as harnesses with optical connectors**
- **Custom sizes, channel count, opto-electrical hybrids and supplied with flanges**



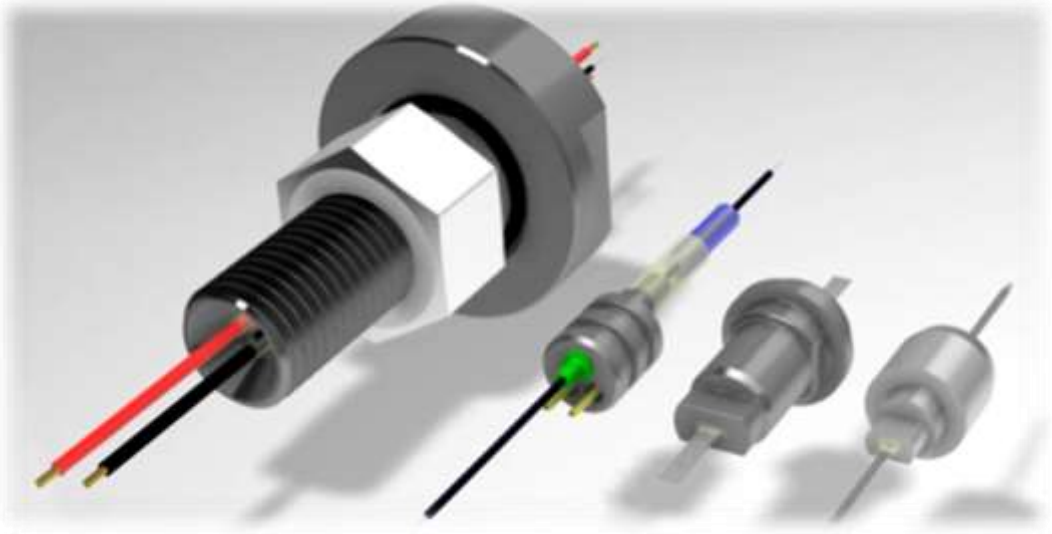
Custom Options

Fiber	**SMF, ZBL, MMF, HMT/XMT, PI coated**	**Target operating temperature**
Fiber Hybrid	**1, 2, 3, 4, 8, 12, 16, 24, 36**	**Target maximum pressure**
Hybrid	**Wire size, type, length, numbers**	**Harness length**
Flanges	**Available with mounting options**	**Connectors - LC, ST, MT, Dry Mate, etc.**

Penetrators and Feedthroughs

Custom Specification Options

Properties	Specifications
Dimensions	Diameter 1.5 – 20 mm, custom lengths
Materials feedthrough	Inconels, Stainless Steel, Alloys
Materials sealing	Glass to metal solder
Application	Submarine Telco, Downhole, Wellhead, CM, etc.
Maximum Pressure	Up to 30,000 psi
Fiber Type	SMF-28, MMF, SMF+MMF acrylate or polyamide ribbon
Fiber count (single or ribbon)	1,2,3,4,8,12,16,24, and 36
Operating Temperature	Up to -50C, +177C
Mounting	O-ring, C-ring, Swagelok, Welding
Leak Rates	Typical $<10^{-9}$ cc/s
Design Life time	Up to 25 years
Environment	Oil, gas, mud, salt water, etc.
Connectorization	Any type, single or multi-fiber
Pull & Bend Strength	Per O&G, Telcordia or MIL standards



Hermetic Optical Feedthroughs, Penetrators and Assemblies

Optical Fiber Packaging Ltd. (OFP) founded in 2016 is a carve out of AFP, leading designer, developer and manufacturer of optical and optoelectronic products for telecom/datacom, oil-and-gas, industrial, military and broadcast markets. OFP offers a wide range of components and modules in addition to specialized fiber assemblies for integration into complete packaging solutions.

Low Melting Point Glass (LMPG) sealing is the de-facto choice for highest performance fiber hermeticity over very wide operating pressure (vacuum to 30 kpsi) and temperature (-55C; +200C) ranges. Providing 100% reliable seals for all fiber types (SM, MM, PM), for counts from 1 to 24, AFP is the world's largest producer having shipped millions of hermetic assemblies.

Single Fiber Hermetic Assemblies are used as pigtails for hermetic component packaging They can be easily soldered into conventional packages using standard techniques. With leak rates better than 10-9 cc-atm/sec across all operating conditions, the assemblies exceed any industry's hermeticity requirements.

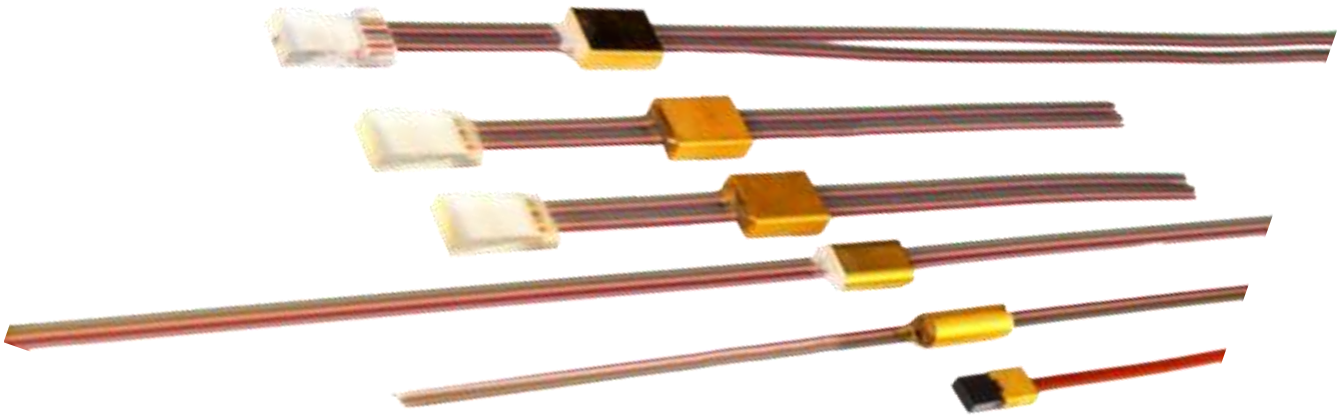
Multi-Fiber Hermetic Assemblies are OFP's 'claim to fame'. Commonly used across most of markets and applications such as WSS, High-Speed Actives, Switches, Integrated Optics, they are configured for 2 to 24 fibers, Custom configurations are available upon request.

Features

- **Telecom/Datacom**
- **Aviation/Sensors**
- **Submarine Telecom**
- **Nuclear plants**
- **Industrial**

Applications

- **Small standard and custom ferrules**
- **Wide T_{op}= -55, +200 C**
- **Harsh environment resistant**
- **Cost effective and scalable**



Hermetic Optical Feedthroughs, Penetrators and Assemblies

Properties	Specifications
Dimensions	DIA 0.7mm, 1.4mm, 2.2mm, etc.
Materials feedthrough	Kovar, inconel, special alloys
Materials sealing	Glass sealing, metallization
Metal plating	No plating or Au/Ni
Fiber Type	Any type—SMF, MMF, PM, ribbon
Fiber count	1,2,4,8,12, 16 and 24
Pin Count	1-200
Operating Temperature	-55C, +200C
Qualification	Telcordia 1221, 1209, 468; MIL specs
Leak Rates	$<10^{-9}$ cc/s
Design Life time	25 years
Environment	Air, O&G, fuel, water, etc.
Connectorization	Any connector can be added

Hermetic Electrical Feedthroughs and Connectors

Developed to withstand prolonged exposure to aggressive media such as oil, mud, chemicals and salt water. The products are qualified to perform reliably from **-55° C** to **+300° C** and at pressures up to **40,000 psi**, making them an ideal solution for space, subsea, and downhole environments.

The products are easily installed into wellheads, manifolds, pipes, pressure vessels, and in ROVs and UUVs. These high performance penetrators, feedthroughs, and connectors are available in single and multi-pin configurations. OFP's experienced and agile design team offers bespoke solutions to customer demands.

Applications

- Oil-and-Gas Industry
- Sub-Sea Exploration
- Submarine Telecom
- Com and Mil Aerospace
- Defence and Sensing
- Energy Applications
- Industrial Applications

Features

- Resistant to extreme pressures
- Wide operating temperatures
- Suitable for harsh environment
- Custom or industry standard designs
- Value added cabling, boots, O-rings, and custom packaging
- Hybrid electro-optical assemblies

Hermetic Electrical Feedthroughs and Connectors



Properties	Specifications
Dimensions	As required, any form factor
Housing Materials	Stainless steel (316L, 304L), Inconel (718, 625)
Sealing Materials	Soda lime and Borosilicate glasses
Contact Materials	Alloy 52, Copper-cored Alloy52, Kovar, Inconel (718, 625, 600)
Pin Count	1 - 200+
Metal Finish	Electropolished or Ni/Au plated
Maximum Pressure	Up to 40,000 psi
Operating Temperature	-55° C, +350° C
Insulation Resistance	10 G Ω at 500 V DC
Dielectric Withstand	Up to 2,000 V DC
Leak Rates	Down to 10^{-9} cc/sec He at 1 atm
Design Lifetime	25 years
Environment	Oil, gas, mud, salt water, etc.
Connectorization	Mil-std (38999, 26482, etc.) or custom

Space Grade FC Connectors and Assemblies

Overview: OFP's 'Space FC' is designed for aerospace and space flight applications. It features extra ruggedization against shock and vibration and is manufactured with specially selected and fully qualified materials for vacuum, corrosive environments, and extreme temperatures.

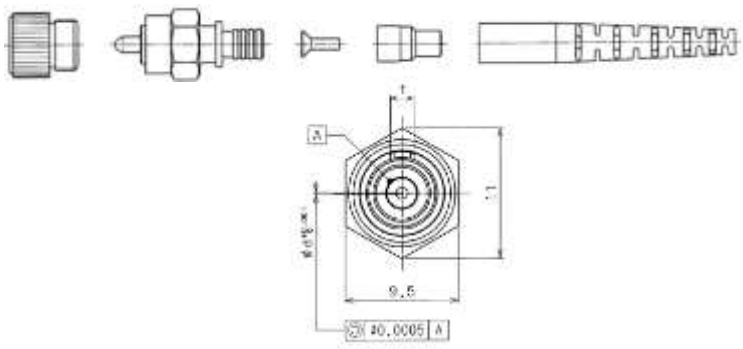
Connector Features

- 100% compatible with FC JIS C standards with excellent mechanical strength and corrosion resistance
- Hex-nut design to allow for precision torquing to 7 in-lbs tightness
- Compatible with Singlemode, PM, Micro Expanded Beam (MEB) and Multimode fibers up to 880um core
- High precision 'Elite' grade zirconia ceramics for ultra low insertion loss and performance stability
- Precision 'R' (narrow) type key machined into inner body, infinitely tuneable for maximum performance
- All boots manufactured in Hytrel 8068 material and vacuum baked to exceed NASA outgassing specs

Connector Styles

- For ruggedized cable from 1.8mm diameter to 3mm diameter
- For 900um tight buffered or 250um primary coated fibers
- Compatible with PEEK, SS armouring tubes and available for high temp polyimide fibers

Space Grade FC Connectors and Assemblies



Terminated Assemblies

OFP offers a full termination service for Space FC connectors starting from simple patchcord and pigtail assemblies.

Also, OFP's manufactures hermetic fiber tail assemblies pre-terminated with Space grade FC's for coupling by our customers to high performance active devices such as laser emitters, detectors and modulators. These typically include space quality hermetic feedthroughs for single or multiple fibers and precision laser ablation lensed or cleaved fiber tips for optimal coupling to and from practically any chip.

Termination services are available for all SM, PM and MM fiber types, for wavelengths from 400 nm to 2,000nm, 100% tested to the highest standards for both optical and mechanical performance.

Typical Connector and Termination Qualification Specifications

Test Type	Typical Test Standard	Prameters
Vibration	FOTP-11D, Random Vibration VI, Condition Letter K, Table 1	46.3 Overall RMS Gs 3 Axis, 20 mins per axis
Shock	M TIA-455-14 A	500G's 3 shocks per +/- Axis for full 18 shocks
Thermal Age	GR-326-CORE	168 hours at 85°C
Thermal Cycle (1)	TIA-455-3B	Temperature –40C to +60°C 10 Cycles. Hold time 30 mins. Also tested to < -200° C
Thermal Cycle (2)	GR-326-CORE increased upper temperature to +85°C from +75°C	Temperature -40°C to +85°C 21 Cycles. Hold time 1 hour. Total time 168 hours
Outgassing	Customer specified	Objective - NASA EEE-INST-002

Fiber Optics Vacuum Feedthroughs

Overview: OFP's 'In-line' HVac Feedthroughs feature truly hermetic glass to glass to metal (GTGTM) sealing technology that has been proven to have superior performance and reliability over traditional resin seals in a wide range of challenging applications.

Our compact multi-fiber technology allows for up to 96 fibers to be hermetically sealed through a single vacuum flange in very high density configurations. All types of Multimode, Singlemode and PM fibers can be sealed with outstanding insertion loss and return loss performance.

The assemblies are delivered in industry standard CF flange sizes, pre-terminated and fully tested ready for direct mounting to the vessel wall. (Custom ISO and KF flange configurations are also available on request).

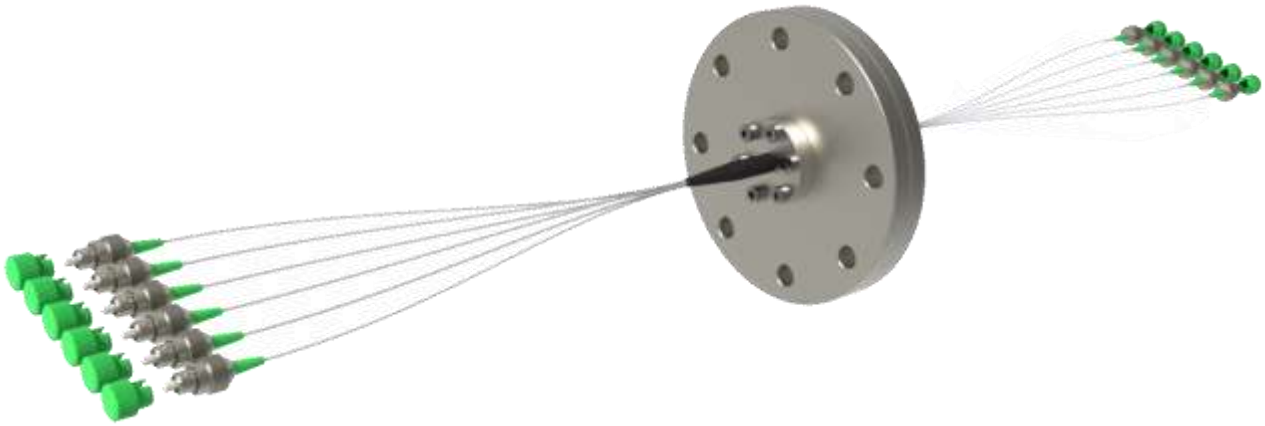
Features

- CF63, CF16 sizes standard. Custom flange/sealing arrangements on request
- Supplied with copper seals (specify OFHC type) & fastening bolts
- From 1F to 96F designs available
- SMF, PMF & MM fibers or mix
- Operating wavelengths from 400 nm to 2,000nm
- Ultra low insertion loss GTGTM technology with high PER on PM fibers
- Hermeticity fully FAT tested before delivery; Helium leak method or hydraulic
- Compact Hybrid optical and electrical power designs available
- Supplied with all standard types of connectors pre-terminated and factory tested

Fiber Optic Vacuum Feedthroughs

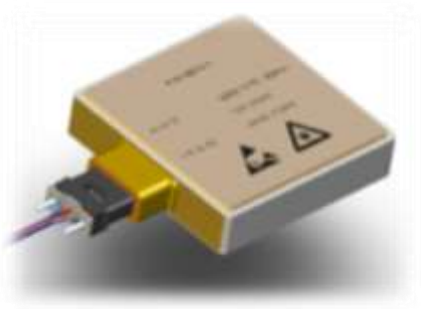
Typical Specifications

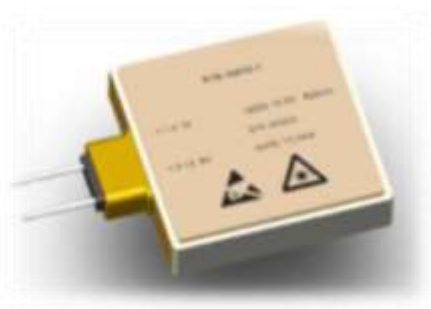
Excess loss Typical	0.05 dB -0.15 dB (780nm—1550nm) excluding pigtail connectors
Pigtail lengths	Up to 8m per side (customer specified)
Fiber types	SM, PM, Multimode — or mix in single flange. Customer specified coatings
Operating Temperature	-40º C to +135º C
Terminations	SMA 905, FC, LC, SC, ST, MT/MPO
Standard Flange Sizes	CF 16 , CF 63 (supplied with copper seals and bolts)
Flange material	Standard — 316 SS or 304 SS
Other materials	Vacuum compatible— selected for low outgassing, typically NASA rated
Fiber count	Standard 1,2,4,6,8,12,16,24,48, 72, and 96
Hermeticity Typical	10^{-9} mbars.l/s
Fiber Protection Options	Stainless steel flexi tubing, perforated PTFE tubing, boots or customized



High Speed Hermetic Pluggable Micro Optical Transceiver

Overview: OFP's hermetic, MT pluggable protocol agnostic transceiver products are designed for deployment in the harshest of land, sea, military and aerospace applications.





Transceiver Features

- 4 channel Transmit & 4 channel Receive @ 850nm Multi-mode.
- Hermetic package to MIL STD 883
- MT/MPO connection pluggable interface
- Wide operating temperature range -50℃ to +100℃ for enhanced reliability.
- Low to high speed secure data communications over multi-mode fibre (20Mbps to 10Gbps)
- Stable performance (<1dB Tx optical output) across the full operating temperature range
- Protocol agnostic giving flexibility to system design
- AC coupled electrical interface
- Ultra low power consumption (100mW/channel @+3.3V)
- Radiation Tolerant Circuitry for harsh environments.

High Speed Hermetic Pluggable Micro Optical Transceiver

Technical Specifications
P/N 16010

Parameter	Typical Performance	Units
Optical Wavelength	850	nm
Transmit Average Optical Power (per chl)	-3	dBm
Transmit Average Optical Power Stability (per chl)	±0.5	dB
Transmit Optical Extinction Ratio (per chl)	6.5	dB
Transmit Eye Mask Margin at 2GbFC (per chl)	45	%
Transmit Eye Mask Margin at 8GbFC (per chl)	20	%
Transmit Total Jitter Generation at 2GbFC (per chl)	90	pS
Transmit Deterministic Total Jitter Generation at 2GbFC (per chl)	20	pS
Receiver Sensitivity 2GbFC (per chl)	-18	dBm
Receiver Sensitivity 10.3GbFC (per chl)	-13	dBm
Receiver Overload (per chl at 3dB optical output)	Error Free	-
Receiver Data Out Total Jitter Generation (per chl)	< 100	pS
Receiver Data Out Deterministic Jitter Generation	< 20	pS
Power Supply Current	≈ 100	mA

Mechanical Specifications

Weight	< 12g
Size	25 x 25 x 6.9mm
Connection Interface	MY Ferrule
Fiber Interface	12F MM OM3
Fiber Assembly for Coupling	MT -> Customer Choice
Operating Temperature	-50°C to + 100°C
Junction Temperature	+15°C
Storage Temperature	-40°C to +125°C
Package Hermeticity	Helium Leak < 1x10-9 Pa·m3/s at 82.5 MPa

Product is manufactured and qualified in accordance with MIL PRF 38534 Class E (mix of both class H&K) /MIL STD 883

Splice on Expanded Beam
Single Mode Connectors & Termini

Overview: OFP's unique expanded beam connectors address the most common industry problem: loss of signal due to contamination. In addition to not requiring any cleaning during assembly in the field, all of the products are mechanically durable and resistant to vibration, shock, and explosion.

The connectors are ideal for harsh environment installation, including extreme conditions, such as low/ high pressures or aggressive media (oil, salt water, toxic chemicals, etc).

OFP's high performance Single Mode Expanded Beam (SMEB) fits into any industry standard connectors, allowing the user to terminate to 1.25mm, 2.5mm, and Mil Spec Termini.

Since the SMEB can be supplied as a pigtail, it can also easily be spliced on in the field using an "all in one" splicer.

How it Works

OFP has mastered the manufacturable process to produce a seamless fiber collimator. The SM core is thermally expanded and fused to the GRIN fiber. The SMEB tail, just like a standard GRIN lens, provides a collimated beam with well controlled parameters. A symmetrical SMEB tail receives the light from the emitting source allowing for a low-loss, uninterrupted connection.

Mated SMEB pairs have low sensitivity to lateral and axial movements due to the large beam diameter. The gap between the fiber pairs eliminates any issues related to multiple mate/demate requirements.

Splice on Expanded Beam
Single Mode Connectors & Termini

Benefits

Performance Criteria	Physical Contact Connector	Expanded Beam Connector
Insertion Loss	😊	😐
Return Loss (SM)	😊	😐
Lateral Connector	☹	😊
Mating Durability	😐	😊
Water Exposure	😐	😊
Dust Exposure	☹	😊
Vibration/Shock	☹	😊
Repair	😐	😊
Cleanability	☹	😊
Wear	☹	😊

Typical Optical Specifications

Requirement	GRIN EBeam
IL Type	0.5 dB
IL Max	0.9 dB
RL Type	33+ dB
Environment	Air, Oil, Water
Termini	LC, SC, ST, 29504, ARINC 801, M28876, TFOCA, LuxciS, Quadrax
Number of Fibers	Any number of fibers, including MT
Sensitivity	Tilt
Temperature	-55°C to +300°C
Pressure	Any

Termination Options

The SMEB connectors have a pre-installed and factory tested fiber collimator in the ceramic ferrule with a short fiber tail. In the back end of the connector housings there is a mini splice protection component. Using OFP's all in one SM splicer, the cable/fiber tail is attached to the SMEB connector with a low loss industry standard fusion splice. OFP's splice tooling performs fiber preparation, splicing and splice protection—all in one. Termination times are typically 3 minutes per fiber and can be done with minimal training.

MLC
Rugged Metal LC Connectors

‘Super Tough’ Uni-Boot Duplex LC

OFP’s Uni-Boot Duplex Metal Bodied LC is precision manufactured from both machined and die cast alloy materials. It provides an LC compatible connector able to withstand abuse in tough military, industrial, and science applications.

Differentiating OFP’s product from ’plastic’ commercial connectors, the MLC is compatible with normal commercial cables, as well as Industrial, and Military-Tactical type cables. It features superior pull-strength/retention between the connector and the cable, plus the metal latch arms give improved pull out strength to the LC connector ports.

Features

- Fully compliant to IEC 61754-20
- Heat resistant to 135° C
- Improved resistance to shock and vibration
- Improved wear performance
- Compatible with Industrial & Military cables
- Superior latch retention & cable retention
- Available for MM, SM/PC, and SM/APC
- Low loss stable performance
- Compatible with OFP LC-Max for IP-68 protection
- MLC are compatible with OFP’s SLC (Secure LC’s)
- Supplied with all standard types of connectors pre-terminated and factory tested

Applications

- Industrial
- Military
- Aerospace
- Marine
- FTTx deployments
- FTTA deployments
- Test and measurement

IP68 Duplex LC Connector

Rugged IP-68 Certified Protection

OFP's rugged Duplex LC provides unique protection of the fiber connection interface

- Mechanical & environmental protection for LC's
- Protection during install deployment
- IP-68 qualified

For Tactical Optical Cables

OFP's IP-68 rated LC is the only duplex uni-body LC designed to terminate directly to Mil & Broadcast type fiber cables

- Features unique metal rear shell on LC Duplex with tough metal release arm
- Kevlar from rugged cable crimps directly to LC and incorporates rugged boot

Standard LC Port Compatibility

OFP's rugged Duplex LC plugs directly to standard LC ports and retains the same mechanical envelope as standard duplex LC

- Fully IEC/TIA compliant
- Meets all industry standards for Optical and mechanical performance
- Available in Singlemode and

Optical Fiber Packaging, Ltd. *· Holland Centre, Holland Road Industrial Estate, Haverhill, Suffolk, England, CB9 8PR UK · Ph: +44 (0) 1440-766636 · sales@ofpgco.com*

IP68 Duplex LC Connector

Applications

For direct LC termination to rugged Cable Spools

- **Military**
- **Outside Broadcast**
- **Studio Broadcast**
- **Industrial premise**
- **Shipboard**
- **2 fibers to 6 fibers with cable furcation**

Part Numbers

CON11671-02	**2 Core Boot**
CON11671-04	**4 Core Boot**

OFP offers comprehensive cable assembly manufacturing services to support the IP-68 product and a variety of spool & cable types.

Please send us you enquiries.

Optical Specification:

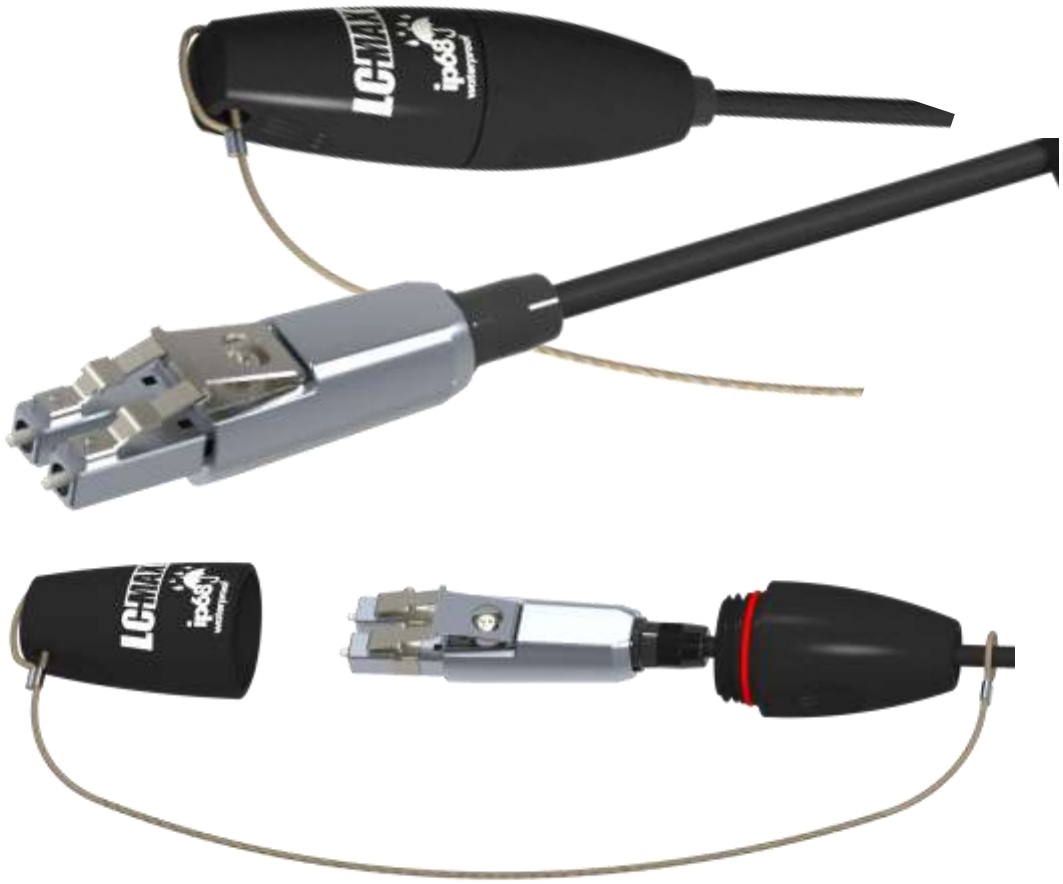
Insertion Loss: 0.1dB Typical for SM UPC, SM APC & MM PC

Return Loss: 55dB for SM UPC, 65dB for SM APC

Boot & Crimp Options: for 5.5mm & 6.00mm Mil & Broadcast cables

Mechanical: to meet and exceed Telcordia GR-326-CORE Issue 4 & with protective shells attached IP-68 rated.

IP68 Metal Duplex LC Connector



Rugged IP-68 Certified Protection

OFP's IP-68 Metal LC connector provides unique protection of the fiber connection interface with the shells closed

- Compliant to IEC 61754-20
- Heat resistant to 135° C
- Improved shock/vibration resistance
- Improved wear performance
- IP-68 qualified
- Available with OFP's SM MEB (Micro Expanded Beam) technology

For Tactical Optical Cables

The only duplex uni-body LC designed to terminate directly to Military & Broadcast type fiber cables

- Compatible with both industrial and military cables
- Features unique metal rear shell on LC Duplex with tough metal release arm
- Kevlar from rugged cable crimps directly to duplex LC and incorporates rugged boot

Standard LC Port Compatibility

OFP's IP-68 Metal LC plugs directly into standard LC ports and retains the same mechanical envelope as standard duplex LC

- Available in MM, SM/PC, and SM/APC
- Meets all industry standards for optical and mechanical performance
- Superior latch retention & cable retention

Secure Connectivity from OFP

OFP's patented Secure Connectivity products cover the most common fiber connector types: LC, SC, and RJ45. The connectors use a proprietary physical locking mechanism to prevent unauthorized access or changes to ports. Once the connector is inserted into the port, it can only be removed with a matching color-coded key. This added dimension of physical security is especially useful in Military, Federal, Healthcare, Co Lo Data centers, or WAN/LAN networks. The products help control network changes and create demarcations for network administrators.

The entire product line is extremely easy to use and requires no formal training. No changes are required to patch-panels or port hardware. Tamper-proof cabling can be delivered by simply retro-fitting OFP's secure patch cords to pre-existing network ports.

Competitive Advantages

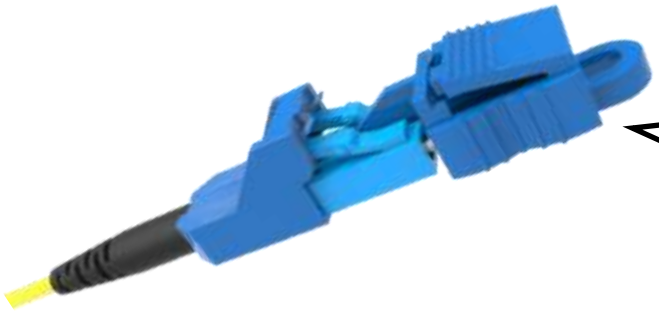
- When the connectors are pushed into a port, they are 'tamper-proof' and can only be unplugged with a Key Tool.
- Each color-coded connector has a custom design, meaning each has a unique mechanical key□way. For example,
- Each connector also has an Administrator Extraction Keytool, meaning it will undo all keyways.
- Each connector series features Port Blockers, or 'dummy plugs,' which can be used to ensure all empty ports in a
- The LC fiber optic Secure Connectors feature a special dust-cap that has to be put on to the connector to remove
- The connectors fully meet IEC & TIA connector interface standards and deliver excellent performance
- The LC series has a clip-on Extraction Tool Extender to help access and remove connectors deep in high density patch panels without disturbing the cabling in adjacent ports.

LC Connector:

SC Connector:

RJ45 Connector:

Secure LC Connectors



Secure LC

Prevents unauthorized access or changes

Compatible with all standard LC Passive or Active equipment ports

OFP's patented **Secure LC connectors** are designed to prevent unauthorized and inadvertent changes for critical applications such as Datacenters and Secure IT Networks, providing 'physical port security'

Features

- **Secure Military IT networks**
- **Secure Federal IT networks**
- **Healthcare & Educational networks**
- **Commercial Enterprise networks**
- **Datacenters**

Applications

- **Secure LC locks into ports once plugged. Keyed extraction tool required for removal**
- **8 key combinations with separate colors**
- **Plugs to standard LC Duplex & Quad adaptors and transceiver interfaces**
- **Compact Uni-body Duplex format**
- **Administrator key tool option**
- **Dust cap - discipline feature**
- Test and measurement

Secure LC Connectors

Secure LC Keyed Extraction Tool

The **Extraction Tools** allow for easy manual connector removal even from very high density patch panels and are colour coded to match the connector key type.

One additional product novelty is the unique dust-cap that has to be clipped on when extracting a connector,

Secure LC Port Blockers

The **LC port blockers** help ensure that all empty ports are protected from unauthorized access. This allows network engineers to physically lock closed empty ports

Optical Specifications

Insertion Loss:	0.1 dB typical for Singlemode, 0.20 dB typical for Multimode
Return Loss:	≥ 55 dB typical for SM- UPC
Durability:	<0.2 dB change 500 cycles for Singlemode , 0.2 dB change 500 cycles for Multimode
Operating Temperature:	-40°C to +85°C
Ferrule Criteria:	125.5 µm +/-0 Concentricity: ≤ 1µm for Singlemode. 127 µm nominal for Multimode

Keyway Options

Key/Housing Colours:

Black

Red

Green

Blue

Grey

White

Orange

Yellow

Boot Colours Black, White, Beige, Aqua, Blue

Boots and crimps fit Fig 8 & 2.8mm round cables

Secure LC Duplex Cable Assemblies

OFP's tamper proof LC cable assemblies are designed to prevent unauthorized and inadvertent changes in highly sensitive applications such as Datacenters and Secure IT networks, where multiple physical layer classifications may exist. All OFP's cable assemblies are manufactured to the highest industry standards and 100% for critical parameters. All OFP's SLC patch cords and pigtails are custom built to customer specifications.

OFP's patented Uni-Body Secure LC connectors plug to any industry compliant LC adaptor or transceiver interface, and can only be disconnected with a special keyed extraction tool. Eight different key configurations are available as standard options.

Extraction tools allow for easy cable assembly removal, even from very high density patch panels and are colour coded to match the connector key type. The connectors plug to both duplex and quad adaptors.

An optional RFID tag can be embedded in the connector enabling smart connecting and asset monitoring.

Features

- **Secure Military IT networks**
- **Secure Federal IT networks**
- **Healthcare & Educational networks**
- **Commercial Enterprise networks**
- **Datacenters**

Applications

- **Secure LC locks to ports once plugged Key required for removal**
- **8 Coloured Key combinations**
- **Plugs to standard LC Duplex & Quad adaptors and transceiver interfaces**
- **Compact Uni-body Duplex format**
- **Black Boots for 50/125, White for 62.5/125, Blue for SM and Aqua for 50/125 (10G)**
- **"Administrator key" option**
- **Dust cap 'discipline' feature**

Secure LC Duplex Cable Assemblies

OFP Cable Assemblies are fully tested, certified and manufactured using the highest quality Riser Rated (UL OFNR/ CSA FT- 4) , Plenum Rated or LSOH cable types

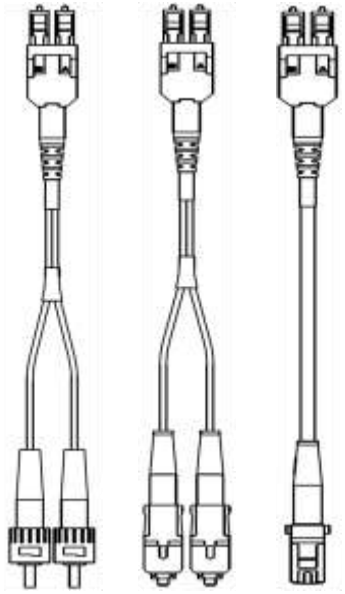
LC to LC duplex cables use 3mm diameter mini–duplex round cable to minimize cable volume. **Hybrid cables** use 1.6 mm sub-diameter mini fig 8 cables.

Cable Assembly Ordering Codes

Assembly Type	LC	LC	LC	LC
Cable Type	LC	MT-RJ	SC	ST
50/125µm Multimode	2030 11-**XX**-0Y	2030 12-**XX**-0Y	2030 13-**XX**-0Y	2030 14-**XX**-0Y
10 Gig 50/125µm	2031 11-**XX**-0Y	2031 12-**XX**-0Y	2031 13-**XX**-0Y	2031 14-**XX**-0Y
62.5/125µm Multimode	2040 11-**XX**-0Y	2040 12-**XX**-0Y	2040 13-**XX**-0Y	2040 14-**XX**-0Y
Singlemode Yellow	2050 11-**XX**-0Y	2050 12-**XX**-0Y	2050 13-**XX**-0Y	2050 14-**XX**-0Y

XX = Key Code: Black 2, Red 3, Green 4, Blue 5, Grey 6, White 7, Orange 8, Yellow 9
0Y = Cable Length: Example 3m OY = 03 or 15 m OY = 15

LC Key / Housing Color	Extraction Tool Part No.
Black	T0010121-**02**
Red	T0010121-**03**
Green	T0010121-**04**
Blue	T0010121-**05**
Grey	T0010121-**06**
White	T0010121-**07**
Orange	T0010121-**08**
Yellow	T0010121-**09**



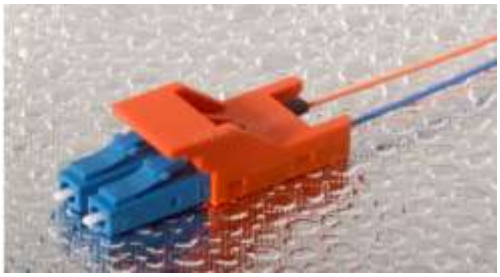
RoHS Directive Compliant. Conforms to GR-326. Flammability: UL 94 V-0 Grade

Secure LC Behind the Wall Connectors

SLC "BTW" Connectors

OFP's unique patented Secure LC connectors are designed to prevent unauthorized and inadvertent changes in highly sensitive applications such as Datacenters and Secure IT networks where multiple physical layer classifications may exist.

The **BTW Secure LC connectors** used for **900um secondary coated** fibers are designed to plug to any industry compliant LC adaptors or active device ports and **cannot be disconnected without a special extraction tool.**



Applications

- To secure the connectivity of 900um pigtails to the 'inside' of enclosures
- Military IT Networks
- Secure Federal IT Networks
- Commercial Data Centers & Telco
- Private Networks
- Industrial Process Control

Features

- Secure LC locks to port once plugged — keyed tool required for extraction
- 8 key combinations with separate colors plus administrator key option
- Compact design for wall-boxes, floor boxes and the inside panel of equipment racks
- Designed for field splicing of pigtails or on-site termination
- Dust cap "discipline" feature

The BTW connectors can be purchased as pre-terminated 3m pigtail kits for field splicing or as components for direct field termination. The extraction tools allow for easy manual connector removal even from very high density patch panels and are color coded to match the connector key type. The **connectors plug to both duplex and quad adaptors**.

An additional product novelty is the custom dust cap required to remove a connector from an extraction tool and hence promoting good 'fiber' discipline.

Secure LC Patent Application No.0903326.7

Secure LC Behind the Wall Connectors

Pre-Terminated Pigtails

BTW Connector Kit

Connector Property	Singlemode	Multimode
Insertion Loss	0.10dB typical	0.20dB typical
Return Loss	≥ 55dB typical for UPC	-
Durability	> 0.2dB change 500 cycles	< 0.2dB change 500 cycles
Operating Temperature	-40°C to +70°C	-40°C to +70°C
Ferrule Criteria	125.5µm +1/-0 Concentricity: ≥ 1µm	127µm nominal
Connector Part Number	CON-XX-0YS	CON-XX-0YM

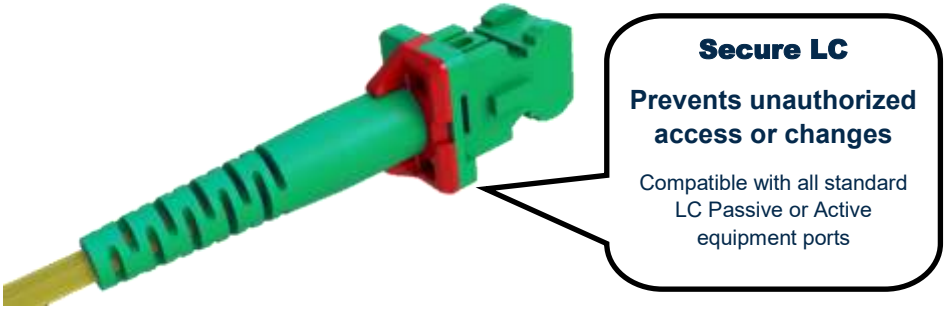
Extraction Tools

Port Plugs

Key/Housing Color	Connector dash No. XX	Extraction Tool No.	Locking Port Plug
Black	-12-	T0010121-12	PLG10271-12
Red	-13-	T0010121-13	PLG10271-13
Green	-14-	T0010121-14	PLG10271-14
Blue	-15-	T0010121-15	PLG10271-15
Grey	-16-	T0010121-16	PLG10271-16
White	-17-	T0010121-17	PLG10271-17
Orange	-18-	T0010121-18	PLG10271-18
Yellow	-19-	T0010121-19	PLG10271-19
Purple	Administrator Tool	T0010121-11	-

Y in connector part code designates boot color. Black = 2, White = 7, Beige = 8, Aqua = 4 Blue = 5
Replacement Connector Dust Cap—Part Number CAP10122-01
RoHS Directive Compliant. Conforms to GR-326. Flammability: UL 94 V-0 Grade

Secure Locking SC Connector

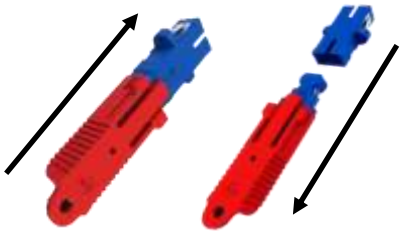


Simple Connection and Easy Removal

As Easy as 1, 2, 3!

Step 1: Push to plug

Step 2: Lock to port



Step 3: Use key tool to extract connector

Prevents Unauthorized Changes

OFP's Secure SC connectivity solution is designed to prevent unauthorized or inadvertent changes to cabling networks in highly sensitive applications such as datacentres, telecom rooms, enterprise networks including financial, educational, secure IT and military networks, where multiple physical layer access classifications are critical.

Tamper Proof

OFP's unique 'tamper proof' Secure SC connectivity solution is compatible and can be fitted to any industry standard SC ports in active network equipment, patch panels and customer premise equipment.

OFP's Secure SC solution is available in Pigtail, Patchcord and Multifiber cable formats. The Secure SC connectors are also

Easy Extraction with Color-Coded Key Tool

OFP locking Secure SC Connectors (SCS) can only be unplugged using a matching colour-coded extraction tool. These keyed tools allow automatic de-latching of the SCS connector from the port, limiting physical disturbance of adjacent live circuit connections.

Access to empty or unassigned ports can be prevented with the use of similarly keyed colour coded SCS Port Blockers.

Secure Locking SC Connector

The Secure SC cable assemblies and matching extraction tools are available in four key ways, signified by different colours. SM PC, APC & MM patch cords can be configured to suit specific customer requirements.

Complimenting the SCS connectors, OFP also provides Secure SC Locking Port Plugs acting as 'locking dust caps' enabling empty SC ports to be locked out, preventing the unauthorized insertion of a cable assembly or connector. The Port Plugs can be disconnected in the same way as the SCS connector simply by using the appropriate keyed extraction tool.

Secure SC Keyed Extraction Tool

Secure SC Locking Connectors

Secure SC Port Blockers

Applications

- FTTX,DWDM & bi-directional networks
- Telecom Rooms & ODF's
- Secure Military & Federal Networks
- Commercial Enterprise Networks
- Datacentres
- Customer Premise connections
- Test Labs

Features

- True locked keyed connector security
- Multiple key configurations of access control and tamper-proofing
- Compatible with all industry standard passive and active SC ports
- Industry standard colour coding of housings for easy identification and administration of SM and MM ports
- Blockers available for 'protecting' unused ports

Optical Specifications

Insertion Loss:	0.1dB Typical for SM UPC, SM APC & MM PC
Return Loss:	55dB for SM UPC, 65dB for SM APC
Lock Key options:	4 Key configurations in Red, Yellow, Black & White
Boot & Cable Options:	3mm, 2mm boot available
Mechanical:	To meet and exceed Telcordia GR-326-CORE Issue 4

Secure Locking Keyed RJ45 Assemblies

Secure RJ45

Prevents unauthorized access or changes

Compatible with any Standard RJ-45 equipment port

Easy to Connect and Remove

Step 1: Push to Plug & Lock

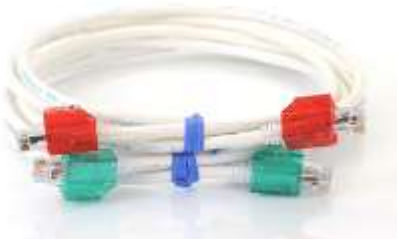
Step 2: Use key tool to extract connector

Applications

- **Secure Military IT networks**
- **Secure Federal IT networks**
- **Healthcare & Educational networks**
- **Commercial Enterprise networks**
- **Datacenters**

Features

- **Physically locking connector**
- **Multiple key configurations for access control and tamper-proofing**
- **Compatible with industry standard passive and active RJ45 ports**
- **Available in eight key colors to allow easy identification and administration of the network**
- Port Blockers available for locking out unused ports



Secure Locking Keyed RJ45 Assemblies

SRJ46 Keyed Extraction Tools

The **Locking Secure RJ connectors (SRJ)** can only be unplugged with matching colour-keyed extraction tools. These tools also automatically de-latch the RJ connectors from the ports, limiting disturbance and damage to adjacent connector channels in dense applications. The **Secure RJ Cable Assemblies and matching Extraction Tools** are available in eight key ways and colours.

SRJ Port Blockers

Complimenting the SRJ connectors, OFP provides **Secure RJ Locking Port Blockers** acting as 'locking dust caps', ensuring empty network ports can be 'locked-out', preventing the un-

Specifications

Cable types: CAT6 or CAT6A

Housing Keyway Colours:

- **Black**
- **Clear**
- **Yellow**
- **Orange**
- **Red**
- **Blue**
- **Green**
- **Purple**

Secure LC Extraction Tool Extension

OFP‟s patented Secure LC connectors are designed to prevent unauthorized and inadvertent changes in highly sensitive applications, such as Datacenters and Secure IT networks where multiple physical layer classifications may exist.

Part Number : T0010121-XT

Applications

- To automatically de-latch SLC connectors in inaccessible locations
- Highest density patching where manual plugging and extraction is impossible

Features

- Clips on and off standard SLC Keyed Extraction Tools
- 8 key combinations with separate colours
- Administrator key tool option

The SLC Extraction Tool Extension is a clip-on accessory for all the SLC standard extraction tools that allows accurate and easy remote removal of connectors in deep or high density access restricted patching environments. Reverse the tool, and it operates as an extended “insertion” tool.

Avoids disturbing or damaging adjacent cabling in the patching vicinity when using SLC cables or Port Plugs.

The tool comes equipped with a retained SLC dust cap required to remove the tool from the connector body.

Warranty Statement

At ATS, Accurate Technology Services, Inc., we believe that the future of our company relies on the satisfaction of our customers and their trust in our products, so we aim to provide our customers with the best products and service available. When you install ATS products, we know that you expect years of maintenance free and reliable surge protection for your equipment, and we are confident that our products will provide the performance that you rely on. That is why we offer a 10-Year, hassle-free warranty on all our surge protection devices regardless of application, so in the unlikely event of a failure you can easily exchange the faulty device for a new one.

1. What is covered.

Accurate Technology Services, Inc. (ATS) warrants, only to the original purchaser of new ATS products that are purchased directly from ATS's authorized distributers, for its own use and not for resale, that the ATS products shall be free from defects in materials and workmanship and shall conform to specifications set in the ATS Product Catalog, for the extent of the Warranty Period.

2. What is not covered.

This warranty does not cover any ATS product which has been: (a) modified, altered or subjected to abuse, misuse, negligence or accident; (b) improperly installed or installed in conjunction with equipment for which it was not designed; © damaged or destroyed by natural disasters.

3. Remedy

If a defective product is returned to ATS in accordance with the ATS warranty procedure, ATS will, at its sole option and expense, either: (a) replace the defective product or (b) repair the defective product. Except as otherwise provided by applicable state law, these remedies constitute the purchaser's sole and exclusive remedies and ATS's sole and exclusive obligation under this warranty.

4. Warranty Procedure

If purchaser discovers a failure of the ATS product that conforms to the terms with this warranty within the warranty period, the purchaser should promptly notify the relevant party as indicated below by either phone, email, or in writing to obtain a Return Authorization (RA) number and return the defective product to the relevant party. The designated RA number shall be marked on the outside of the return package and all subsequent correspondence pertaining to the defective product.

5. Warranty Period

10 years

ATS, Accurate Technology Services, Inc.
829 Gretel Avenue NW
Concord, NC 28027
Phone: +1 (704) 784-8287
Fax: +1 (704) 784-8290
Email: sales@atssurge.com
www.atssurge.com

Lightning Facts

- Lightning can reach over 5 miles (8 kilometers) in length, raise the temperature of the air by as much as 50,000 degrees Fahrenheit (27,700 degrees Celsius) and contain a hundred million electrical volts.

- Lightning is not confined to thunderstorms. It has been seen in volcanic eruptions, extremely intense forest fires, surface nuclear detonations, heavy snowstorms and in large hurricanes.

- Lightning strikes create powerful radio waves in the frequency range of 3 KHz through 10 MHz

- Most lightning strikes average 2-3 miles long and carry a current of 10,000 Amps at 100 million volts.

- It is estimated that the Earth, as a whole, is struck by an average of more than a hundred lightning bolts every second; more than eight million a year.

- A “Positive Giant” is a lightning strike that hits the ground up to 20 miles away from the storm. Because it seems to strike from a clear sky it is known as “A Bolt from the Blue”. These “Positive Giant” flashes strike between the storm top “anvil” and the Earth and carry several times the destructive energy of a “regular” lightning strike.

- Lightning is approximately between the size of a quarter and half dollar. Lightning can regularly strike up to 10 miles from the center of a thunderstorm.

- Talking on a landline phone is the leading cause of lightning related injuries inside structures.

- In addition to the visible flash that travels through the air, the current associated with the lightning discharge travels along the ground. Although some surges are caused by the main lightning strike, many electrical surges are from the resulting current moving in and along the ground.

- There are three main ways lightning enters structures: a direct strike, through wires, or along pipes that extend outside the structure and into the ground. Regardless of the method of entrance, once in a structure, the lightning can travel through the electrical, phone, plumbing, and radio or television reception systems. Lightning can also travel through any metal wires or bars in concrete walls or flooring.

- Lightning can—and often does—strike in the same place twice. Tall structures and communications towers/antennas are frequently hit by lightning. Objects have an “area of influence” with a radius equal to the objects height squared. A 100 ft. tower would have an “area of influence” with a radius of 10,000 ft. Lightning strikes within that area will be drawn towards the object.

ATS, Accurate Technology Services, Inc.
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www.atssurge.com