



# Saturn Series

Gigabit Ethernet, Sealed RJ-45 & LC, 1000Base-T / SX Media Converter, 24Vdc, Multimode, 850nm VCSEL's

## Single Port, LC / RJ-45

### FEATURES

- Compliant with IEEE-802.3:2005 Gigabit Ethernet
- Optical fiber link distances up to 550 Meters
- Maximum optical channel bit error rate less than  $1 \times 10^{-12}$
- Operating temperature range from -40°C to +85°C
- Shock, vibration and ESD resistant per IEC 60068
- Olive Drab Cadmium or Nickel plating meets stringent EMI / RFI performance specifications
- Aluminum alloy chassis and cylindrical connectors are strong, durable, corrosion resistant and light weight
- \*LC-Field® compliant optical fiber connector interface
- \*RJ-Field® electrical interface provides robust interconnection to vehicle wiring

### APPLICATIONS

Saturn series Gigabit Ethernet media converters enable high speed network communications over long distances in harsh environments.

- Gigabit Ethernet switches and peripherals
- Telecom and datacom switch / router rack-to-rack links
- Storage or computation clusters

The Amphenol RJ-Field® and LC-Field® connectors provide sealed optical and electrical interfaces that are water-tight to IP67 / NEMA-4x when mated.

The multimode optical fiber interface supports applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, twinax or quadax copper conductors unacceptable.

\*RJ-Field® and LC-Field® are trademarks of Amphenol.



Sealed LC to RJ-45 Optical to Electrical Media Converter

### DESCRIPTION

Saturn series Gigabit Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 1000Base-T Ethernet electrical to 1000Base-SX Ethernet optical media conversion circuitry into an environmentally sealed unit.

The optical transmitters are high output 850nm VCSEL's. The optical receivers consist of GaAs PIN and preamplifier assemblies and limiting post-amplifiers.

The optical interface to the Saturn series optical media converters is an Amphenol LC-Field® connector enabling interconnection to preterminated LC based optical fiber cable assemblies.

The electrical interface to the Saturn series optical media converters is an Amphenol RJ-Field® connector enabling interconnection to preterminated RJ-45 Cat-5E cable assemblies.

Saturn series Gigabit Ethernet media converters are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

- Sealed against liquid and solid contaminants
- Shock and vibration resistant

### ORDERING INFORMATION

Application	Item Number
1000Base-T to 1000Base-SX, <b>OD Cad.</b>	M45L-2SAT-FW
1000Base-T to 1000Base-SX, <b>Nickel</b>	M45L-2SAT-FF

M45L-2SAT-Fx-DS - November 2, 2007 - Preliminary

Single Port Saturn Series, Sealed RJ-45 / LC, 1000Base-T to 1000Base-SX,  
Gigabit Ethernet Media Converter, Multimode, 24Vdc, 850nM VCSEL's

### ABSOLUTE MAXIMUM RATINGS

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	$T_s$	-55		+100	°C
Supply Voltage	$V_{cc}$	-0.5		45.0	V
Data Input Voltage	$V_i$	-0.5		$V_{cc}$	V

### RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	$T_A$	-40		+85	°C
Supply Voltage	$V_{cc}$	+18.0		+36.0	VDC
Power Supply Noise (p-p)	$N_p$			200	mV

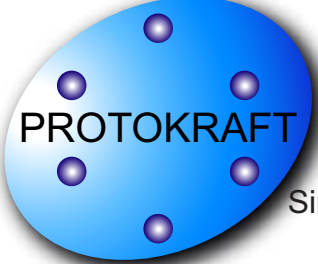
### SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
EN 61000-4-2	ESD	HBM	6kV contact / 8kV air discharge
IEC 60068-2-6	Vibration	10g	10Hz - 500Hz
IEC 60068-2-27	Shock	15g, 50g	11ms duration
FCC CFR47	EMC	Part 15	
EN 55022	EMC	Class A	
UL	Flame Resistance	94V-0	

### MATERIALS

Item	Detail	Notes
Cylindrical Connector Shells	Aluminum Alloy	
Shell and Housing Plating	Olive Drab Cadmium or Nickel	
Connector Inserts	Thermoplastic	
Interfacial Seals	Elastomer	
Optical Alignment Sleeves	Composite Polymer	
Printed Circuits	Polyimide / FR-4	
Housing	Aluminum Alloy	

M45L-2SAT-Fx-DS - November 2, 2007 - Preliminary



## Facilitating Secure Communications in Harsh Environments

Single Port Saturn Series, Sealed RJ-45 / LC, 1000Base-T to 1000Base-SX,  
Gigabit Ethernet Media Converter, Multimode, 24Vdc, 850nm VCSEL's

### OPTICAL TRANSMITTERS $T_A$ = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power	$P_o$	-9.5		-4.0	dBm
Optical Output Wavelength	$\lambda_{OUT}$	830	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nM

### OPTICAL RECEIVERS $T_A$ = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity	$P_i$	-17.0		-2.0	dBm
Optical Wavelength	$\lambda_{IN}$	830	850	860	nM

### POWER SUPPLY CURRENT $T_A$ = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per Port @ 24VDC	$I_{CCT}$		100	150	mA

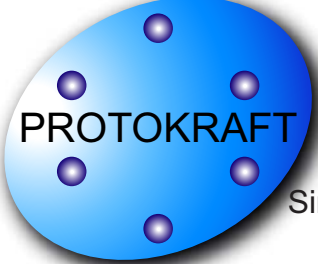
### OPTICAL LINK DISTANCES

Protocol	Cable Specification	Distance
Gigabit Ethernet - IEEE-802.3:2005 - 1000BASE-SX	62.5/125 $\mu$ 200MHz*Km	275M
	50/125 $\mu$ 500MHz*Km	550M

### COPPER LINK DISTANCES

Protocol	Cable Specification	Distance
Gigabit Ethernet - IEEE-802.3:2005 - 1000BASE-T	TIA/EIA-568-B Cat 5E - for other transmission media, please consult the factory	100M

M45L-2SAT-Fx-DS - November 2, 2007 - Preliminary

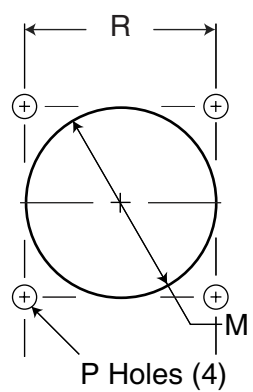
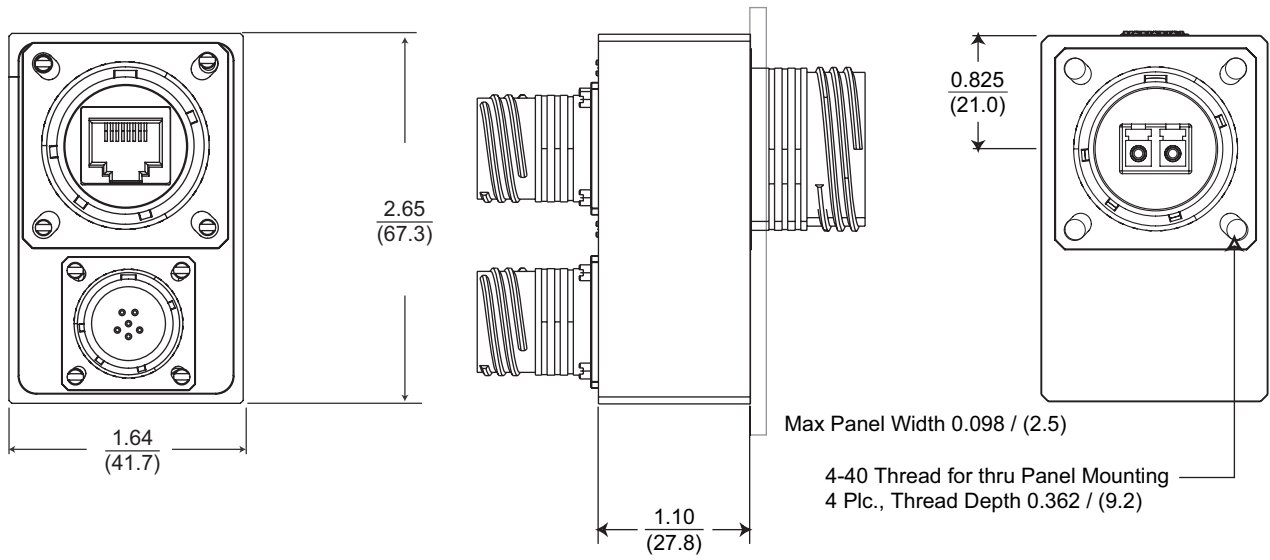


**Facilitating Secure Communications in Harsh Environments**

Single Port Saturn Series, Sealed RJ-45 / LC, 1000Base-T to 1000Base-SX,  
Gigabit Ethernet Media Converter, Multimode, 24Vdc, 850nm VCSEL's

**OUTLINE DRAWING**

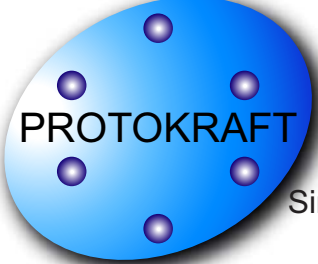
Dimensions are shown as: inches (mm)



**Panel Cutout Dimensions**  
Rear Panel Mounting Only

Shell Size Code	Shell Size	M Min	P Holes	R Bsc
F	19	1.297 (32.94)	0.133 (3.4) 0.123 (3.1)	1.156 (29.4)

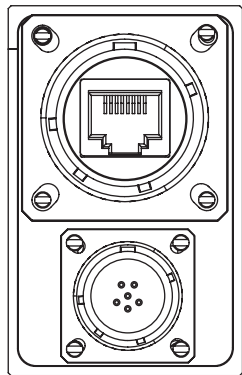
M45L-2SAT-Fx-DS - November 2, 2007 - Preliminary



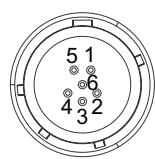
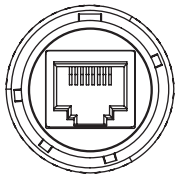
## Facilitating Secure Communications in Harsh Environments

Single Port Saturn Series, Sealed RJ-45 / LC, 1000Base-T to 1000Base-SX,  
Gigabit Ethernet Media Converter, Multimode, 24Vdc, 850nm VCSEL's

### MEDIA CONVERTER INSERT ARRANGEMENTS



#### Media Converter Insert Pin Numbers



#### Media Converter Pin Functions

**1000Base-T**  
 Pin 1 = MDA+  
 Pin 2 = MDA-  
 Pin 3 = MDB+  
 Pin 6 = MDB-  
 Pin 4 = MDC+  
 Pin 5 = MDC-  
 Pin 7 = MDD+  
 Pin 8 = MDD-

#### Power Supply

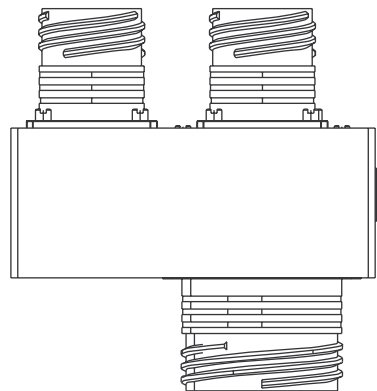
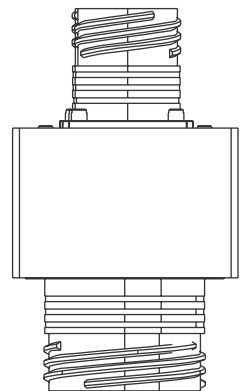
Pin 1 = Case Ground  
 Pin 2 = Case Ground  
 Pin 3 = Case Ground  
 Pin 4 = Case Ground  
 Pin 5 = VEE  
 Pin 6 = VCC

#### Mating Cable Plug Connector P/N

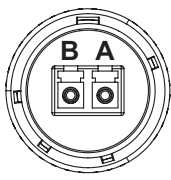
See Appendix A3  
 Cat-5E Twisted Pair Cable

See Appendix A4  
 20 Guage Copper Wire

Media Converter Pin Numbers and Functions Shown - Mating Cable Plugs Opposite



#### Media Converter Optical Pin Numbers



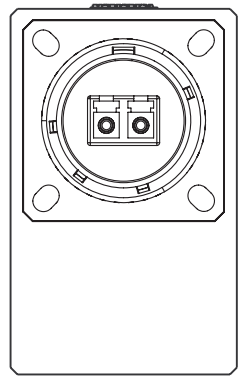
#### Media Converter Optical Functions

Position B = Optical TX  
 Position A = Optical RX

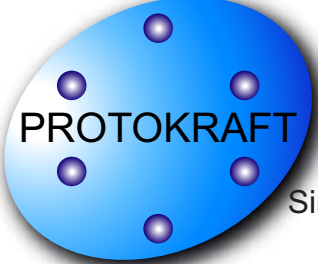
#### Mating Cable Plug Connector P/N

See Appendix A2

Media Converter Fiber Pin Numbers and Functions Shown - Mating Cable Plugs Opposite  
 For LC-Field Protective Caps, See Appendix A1



M45L-2SAT-Fx-DS - November 2, 2007 - Preliminary



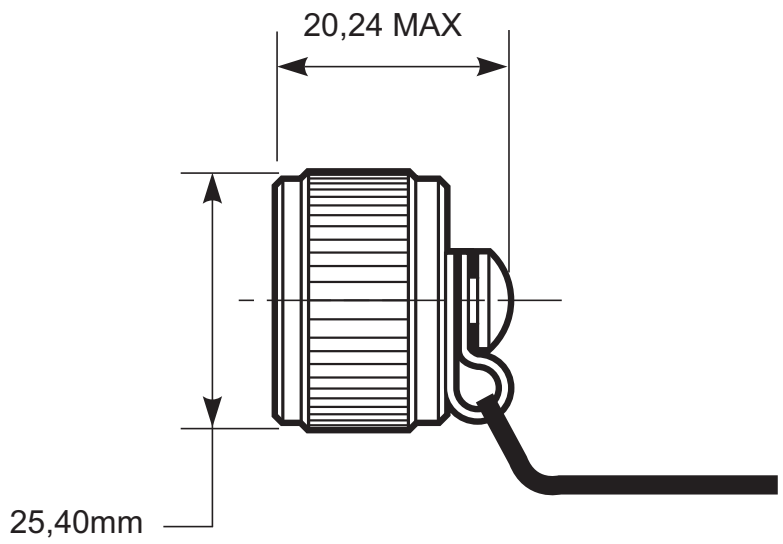
*Facilitating Secure Communications in Harsh Environments*

Single Port Saturn Series, Sealed RJ-45 / LC, 1000Base-T to 1000Base-SX,  
Gigabit Ethernet Media Converter, Multimode, 24Vdc, 850nm VCSEL's

**APPENDIX A1**

**AMPHENOL LC-FIELD® RECEPTACLE PROTECTIVE CAPS\***

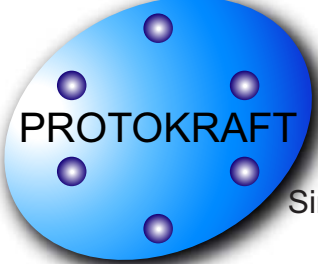
PLATING	WIRE TYPE	PART NUMBER*
Olive Drab Cadmium	Nylon Cord	BFNTVW19
Olive Drab Cadmium	Metal Chain	BFTVW19
Nickel	Nylon Cord	BFNTVF19
Nickel	Metal Chain	BFTVF19



Nylon Cord shown above

\*Contact your local Amphenol Sales Representative for more information about the Amphenol LC-Field® Protective Caps

M45L-2SAT-Fx-DS - November 2, 2007 - Preliminary



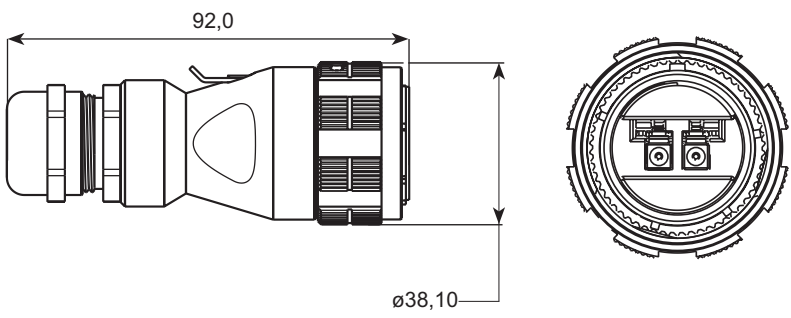
## Facilitating Secure Communications in Harsh Environments

Single Port Saturn Series, Sealed RJ-45 / LC, 1000Base-T to 1000Base-SX,  
Gigabit Ethernet Media Converter, Multimode, 24Vdc, 850nm VCSEL's

### APPENDIX A2

#### AMPHENOL LC-FIELD® CABLE PLUGS\*

PLATING	AMPHENOL PART NUMBER*
Olive Drab Cadmium	LCFTV6MGN
Nickel	LCFTV6MNN



\*Contact your local Amphenol Sales Representative for more information about the Amphenol LC-Field® Cable Plugs



M45L-2SAT-Fx-DS - November 2, 2007 - Preliminary



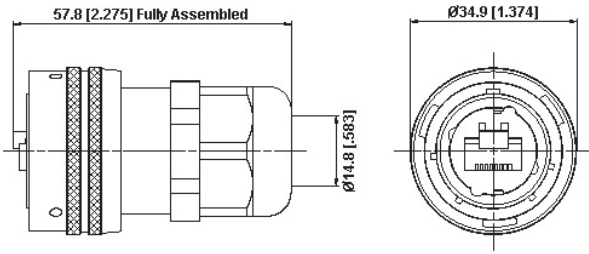
**Facilitating Secure Communications in Harsh Environments**

Single Port Saturn Series, Sealed RJ-45 / LC, 1000Base-T to 1000Base-SX,  
Gigabit Ethernet Media Converter, Multimode, 24Vdc, 850nm VCSEL's

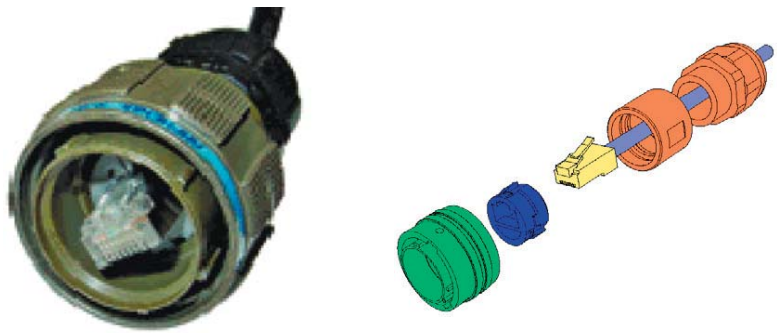
**APPENDIX A3**

**AMPHENOL RJ-FIELD® CABLE PLUGS\***

PLATING	AMPHENOL PART NUMBER*
Olive Drab Cadmium	RJFTV6MG
Nickel	RJFTV6MN

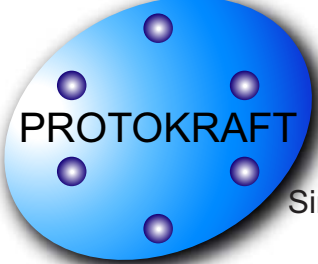


\*Contact your local Amphenol Sales Representative for more information about the Amphenol RJ-Field® Cable Plugs



M45L-2SAT-Fx-DS - November 2, 2007 - Preliminary





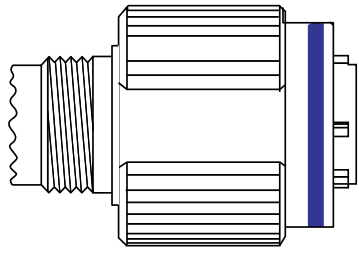
**Facilitating Secure Communications in Harsh Environments**

Single Port Saturn Series, Sealed RJ-45 / LC, 1000Base-T to 1000Base-SX,  
Gigabit Ethernet Media Converter, Multimode, 24Vdc, 850nm VCSEL's

**APPENDIX A4**  
**Power Cable - Plug Configuration**

**POWER CABLE PLUG - SOCKET INSERT\***

PLATING	GENERIC P/N	AMPHENOL P/N*
Olive Drab Cadmium	D38999/26WA35SN	TV06RW-9-35SN
Nickel	D38999/26FA35SN	TV06RF-9-35SN



**POWER CABLE PLUG - SOCKET CONTACTS\***

CONFIGURATION	GENERIC P/N	AMPHENOL P/N*
Size 22D	M39029/56-348	10-407035-725

\*Contact your local Amphenol Sales Representative for more information about the Amphenol D38999 power cable plugs