

## Mustang Series

Gigabit Ethernet, TFOCA II<sup>®</sup>,  
1000Base-T/LX Media Converter,  
Single Mode, 1310nm

### Dual Port, Jam Nut

#### FEATURES

- Compliant with IEEE-802.3:2005 Gigabit Ethernet 1000Base-T and 1000Base-LX
- Optical fiber link distances up to 10.0 Kilometers
- Copper link distances up to 100 Meters (EIA/TIA Cat-5E)
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per MIL-STD-810
- Aluminum housings are strong, durable and light weight
- TFOCA II<sup>®</sup> compliant optical fiber connector interface
- MIL-DTL-38999 electrical interface for power and signals

#### APPLICATIONS

Mustang series bulkhead mounted 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 TFOCA II<sup>®</sup> shell provides a sealed optical interface that is water-tight to MIL-STD-810 when mated.

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

\*TFOCA-II<sup>®</sup> is a registered trademark of Amphenol Fiber Systems International.



#### TFOCA II to D38999 / Optical to Electrical Media Converter DESCRIPTION

Mustang series Gigabit Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 1000Base-TX electrical to 1000Base-LX optical media conversion circuitry into a jam-nut TFOCA II<sup>®</sup> fiber optic connector assembly.

The optical transmitters are high output 1310nm devices. The optical receivers consist of InGaAs PIN and preamplifier assemblies and limiting post-amplifiers.

The electrical interface to the Mustang series optical media converters is a MIL-DTL-38999 cylindrical connector enabling interconnection to a customer supplied cable assembly for 28VDC power and Ethernet signal sources.

Mustang 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	Product Number
Dual Port 1000Base-T/LX - 28VDC	P51J-4LAT-FZ-V

# Facilitating Secure Communications in Harsh Environments

## Dual Port Mustang Series \*TFOCA II® Connector, 1000Base-T to 1000Base-LX Media Converter, Single Mode, 1310nm, 28VDC

### 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	+28.0	+36.0	VDC
Power Supply Noise (p-p)	$N_p$			200	mV

### SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
MIL-STD-883	ESD	Class II	2200V
MIL-STD-810	Vibration	3.8g <sup>2</sup> /Hz	43G rms
MIL-STD-810	Shock	40.0g	6-9mS
MIL-STD-1344	Flame Resistance	Method 1012	30 Seconds
MIL-STD-1344	Damp Heat	10 Cycles	24 Hours
TFOCA II	Mating Durability	2000 Cycles	EIA/TIA-455-21
FDA / CDRH / IEC-825-1	Eye Safety	Class 1	No Safety Interlocks Required

### MATERIALS

Item	Detail	Notes
D38999 & TFOCA II Cylindrical Shells	Aluminum	
D38999 & TFOCA II Finish	ZN-NI, OD-CD or NI	
D38999 Inserts	Thermoplastic	
Interfacial Seals	Elastomer	
Optical Ferrules	Zirconia	
Printed Circuits	FR-4	
Housing	Aluminum	

# Facilitating Secure Communications in Harsh Environments

Dual Port Mustang Series \*TFOCA II® Connector, 1000Base-T to  
1000Base-LX Media Converter, Single Mode, 1310nm, 28VDC

## TRANSMITTERS $T_A$ = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power	$P_o$	-9.5		-3.0	dBm
Optical Output Wavelength	$\lambda_{OUT}$	1285	1310	1335	nM

## RECEIVERS $T_A$ = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity	$P_i$	-19.0		0.0	dBm
Optical Wavelength	$\lambda_{IN}$	1100		1590	nM

## SUPPLY CURRENT $T_A$ = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per Port @ 28Vdc	$I_{cct}$		150	200	mA

## OPTICAL FIBER LINK DISTANCES

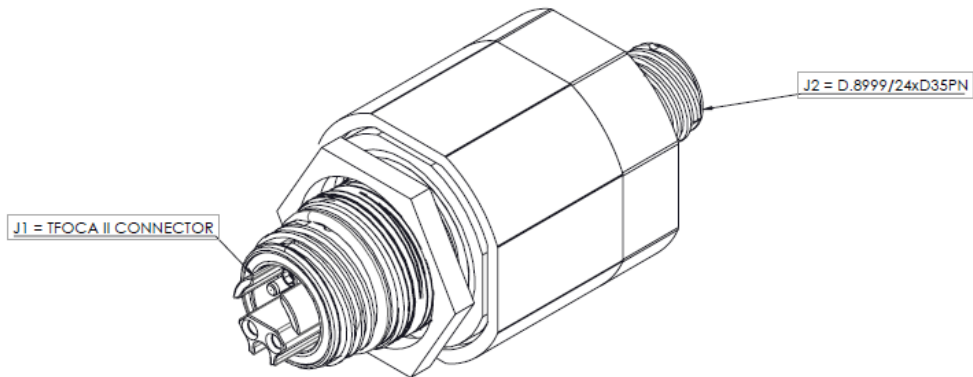
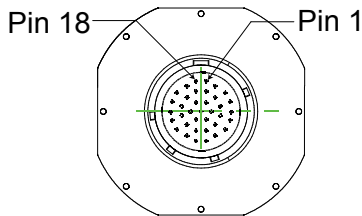
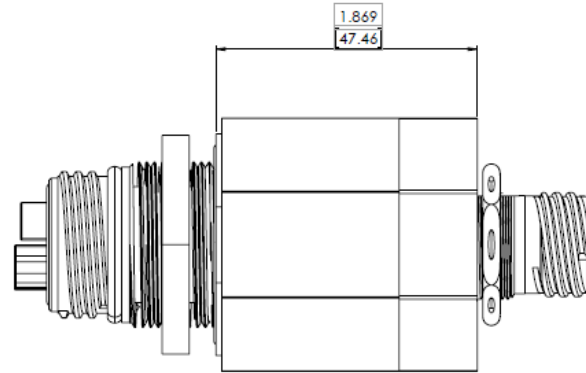
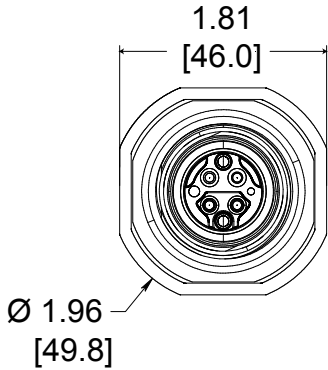
Application	Fiber Specification	Distance
Gigabit Ethernet - 1000Base-LX IEEE 802.3:2005	9/125 $\mu$ SMF	10.0Km

# Facilitating Secure Communications in Harsh Environments

Dual Port Mustang Series \*TFOCA II® Connector, 1000Base-T to 1000Base-LX Media Converter, Single Mode, 1310nm, 28VDC

## OUTLINE DRAWING

Dimensions are shown as: inches [mm]

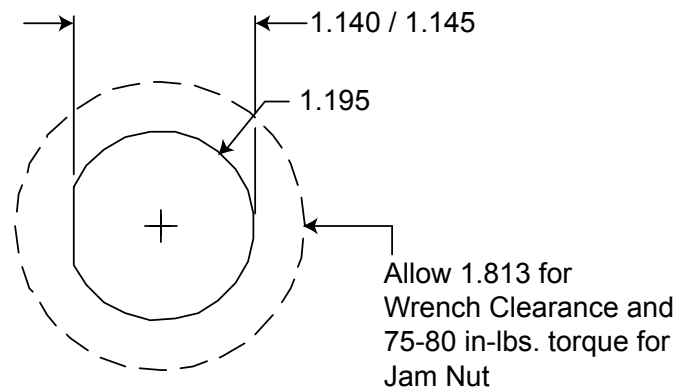


### PORT / FUNCTION ASSIGNMENTS

Port #	Function
J1	2x1000Base-LX
J2	2x1000Base-T + 28VDC

### Panel Cutout Dimensions

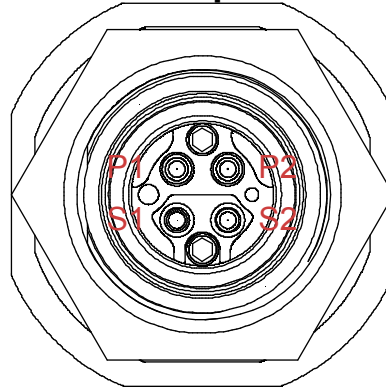
Dimensions are shown as: inches  
Panel Thickness: 0.12 to 0.26



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## J1 OPTICAL INSERT PIN FUNCTIONS Ethernet Port and Pin Assignments

Top



Front view of the TFOCA II media converter optical  
insert shown - fiber optic cable plug opposite

### OPTICAL PORT ASSIGNMENTS

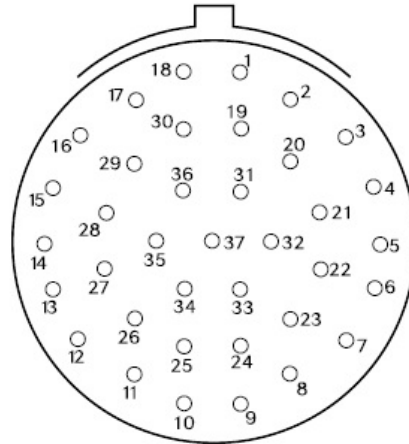
PORT NUMBER	RX	TX
0	P2	S2
1	P1	S1

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## J2 / D38999/24xD35PN ELECTRICAL PIN FUNCTIONS

TOP



Front view of the J2 connector shown - mating cable plug opposite

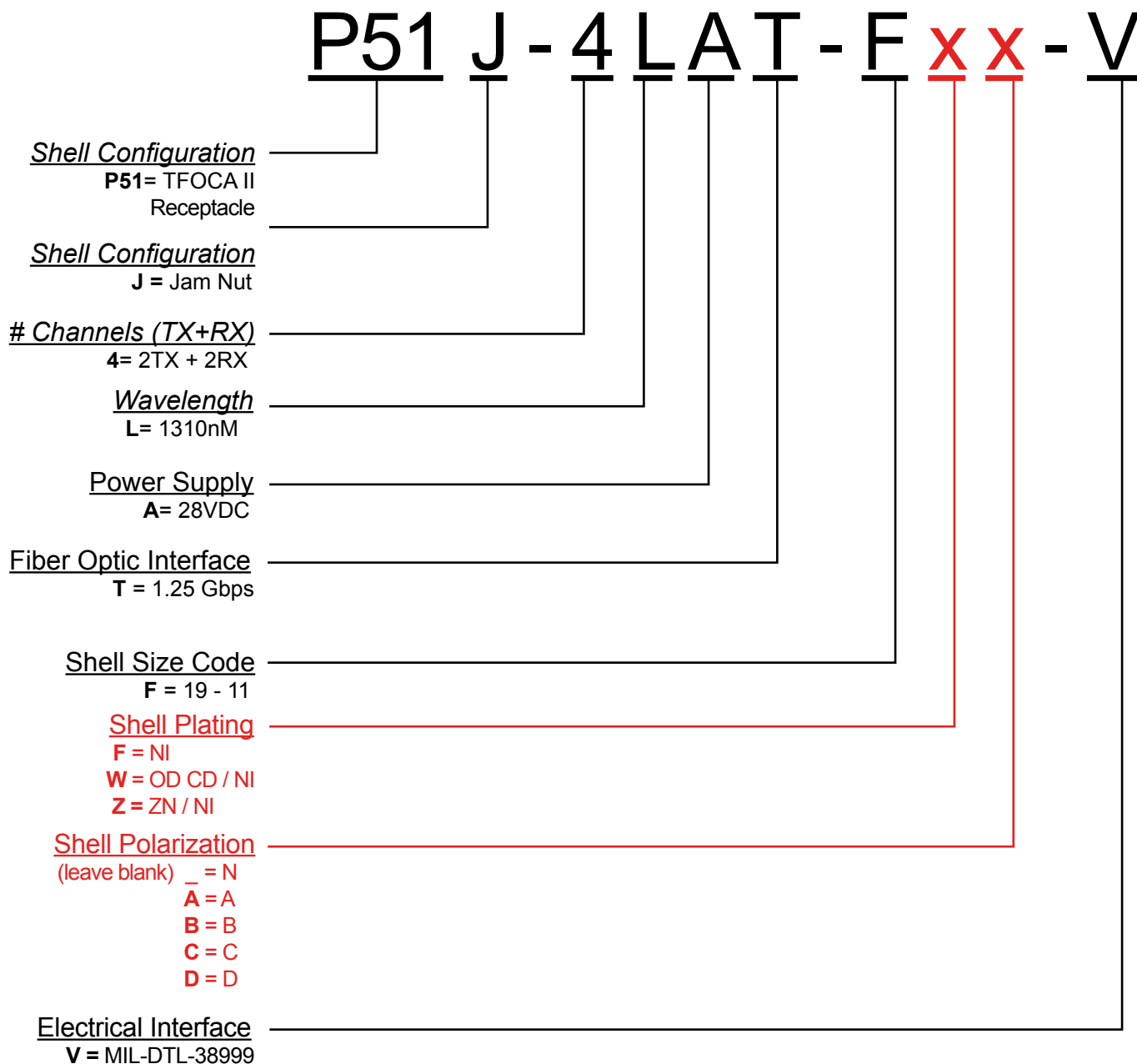
PIN #	PORT	FUNCTION	RJ-45 Eq. Pin #	Logic Family
1	0	MDC+	4	IEEE-802.3:2005 1000Base-T
2	0	MDC-	5	
3	0	MDD+	7	
4	0	MDD-	8	
5	0 - 1	28VDC Rtn	N/A	N/A
6	1	MDD-	8	IEEE-802.3:2005 1000Base-T
7	1	MDD+	7	
8	1	MDC-	5	
9	1	MDC+	4	
10	1	MDB-	6	
11	1	MDB+	3	
12	1	MDA-	2	
13	1	MDA+	1	
14	0 - 1	28VDC	N/A	N/A
15	0	MDA+	1	IEEE-802.3:2005 1000Base-T
16	0	MDA-	2	
17	0	MDB+	3	
18	0	MDB-	6	

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## APPENDIX A1 PART NUMBER OPTIONS

TFOCA II Media Converter, Dual Port, Gigabit Ethernet / Single Mode / 1310nm



Other wavelength, mounting and port count options are available.  
Please consult the Protokraft website for alternate configurations.