# Mustang Series

## Gigabit Ethernet, TFOCA II®, 1000Base-T/SX Media Converter, Multimode, 850nM, 28VDC

### Dual Port, Jam Nut

## FEATURES

- Compliant with IEEE-802.3:2005 Gigabit Ethernet 1000Base-T and 1000Base-SX
- Optical fiber link distances up to 550 meters
- 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
- OD-CD plating meets stringent corrosion resistance specifications
- Aluminum housings are strong, durable and light weight
- TFOCA II® compliant optical fiber connector interface
- MIL-DTL-38999 electrical interface for power and signals

## APPLICATIONS

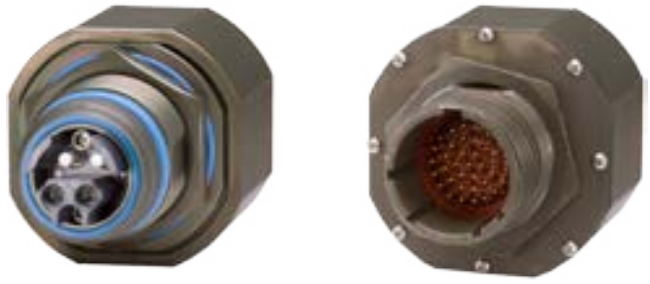
Mustang series bulkhead mounted Gigabit Ethernet media converters enable high speed network communications over long distances in harsh environments.

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

The TFOCA II® shell provides a sealed optical interface that is water-tight to MIL-STD-810 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 quadrax copper conductors unacceptable.

*TFOCA-II® 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-SX optical media conversion circuitry into a jam-nut TFOCA II® fiber optic connector assembly.

The optical transmitters are high output 850nM devices. The optical receivers consist of GaAs 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/SX - 28VDC | P51J-4SAT-Fx-V |

## 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 | $3.8g^2/Hz$ | 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 / Shell Finish | ZN-NI, OD-CD or NI | |
| TFOCA II Finish | ZN-NI | |
| D38999 Inserts | Thermoplastic | |
| Interfacial Seals | Elastomer | |
| Optical Ferrules | Zirconia | |
| Printed Circuits | FR-4 | |
| Housing | Aluminum | |

## TRANSMITTERS $T_A$ = Operating Temperature Range, Vcc = Operating Voltage Range

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|---|---|---|---|---|---|
| Optical Output Power | $P_o$ | -9.5 | | -3.0 | dBm |
| Optical Output Wavelength | $\lambda_{OUT}$ | 830 | 850 | 860 | nM |

## RECEIVERS $T_A$ = Operating Temperature Range, Vcc = Operating Voltage Range

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|---|---|---|---|---|---|
| Optical Sensitivity | $P_I$ | -19.0 | | 0.0 | dBm |
| Optical Wavelength | $\lambda_{IN}$ | 700 | | 900 | nM |

## SUPPLY CURRENT $T_A$ = Operating Temperature Range, Vcc = Operating Voltage Range

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|---|---|---|---|---|---|
| Supply Current per Port | $I_{CCT}$ | | 150 | 200 | mA |

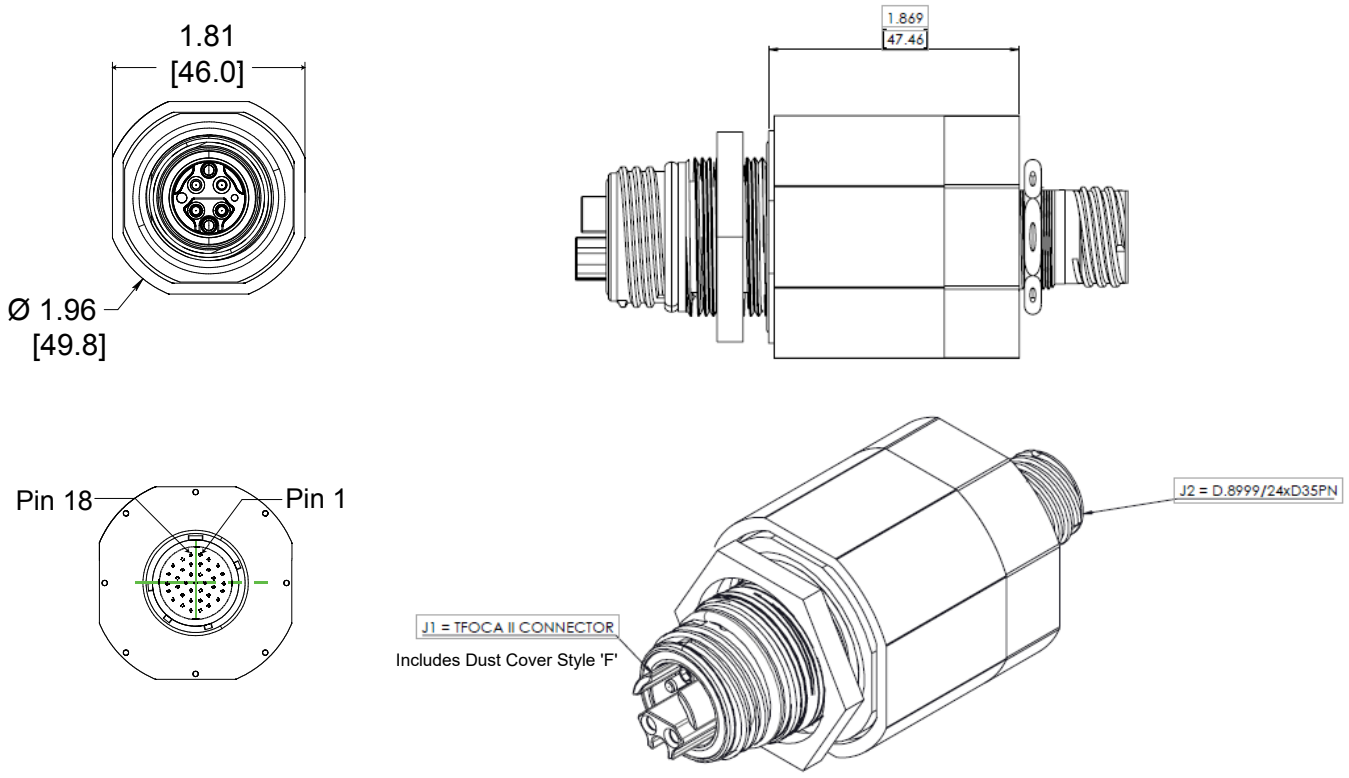
## OPTICAL FIBER LINK DISTANCES

| Application | Fiber Specification | Distance |
|---|---|---|
| Gigabit Ethernet - 1000Base-SX<br>IEEE 802.3:2005 | 62.5/125µ MMF | 275M |
| | 50/125µ MMF | 550M |

Dual Port Mustang Series *TFOCA II® Connector, 1000Base-T to 1000Base-SX Media Converter, Multimode, 850nM, 28VDC

## OUTLINE DRAWING

Dimensions are shown as: inches [mm]

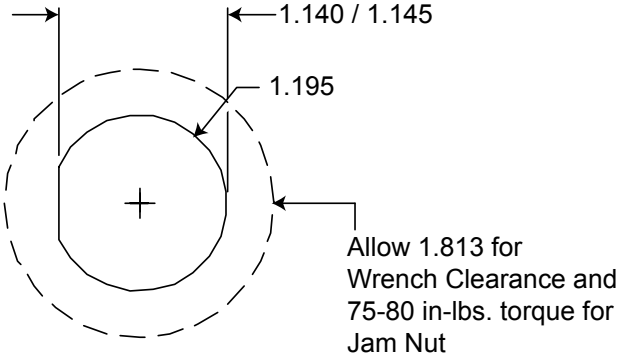



## PORT / FUNCTION ASSIGNMENTS

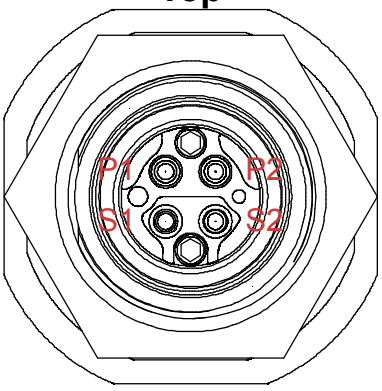
| Port # | Function |
|---|---|
| J1 | 2x1000Base-SX |
| J2 | 2x1000Base-T + 28VDC |

## Panel Cutout Dimensions

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



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

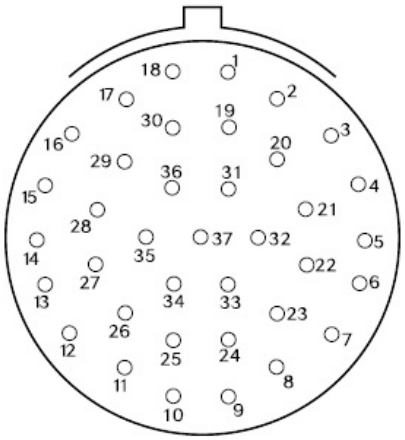



**Front view of the TFOCA II media converter optical insert shown - fiber optic cable plug opposite**

## OPTICAL PORT ASSIGNMENTS

| PORT NUMBER | RX | TX |
|---|---|---|
| 0 | P2 | S2 |
| 1 | P1 | S1 |

## J2 / D38999/24WD35PN ELECTRICAL PIN FUNCTIONS
## TOP

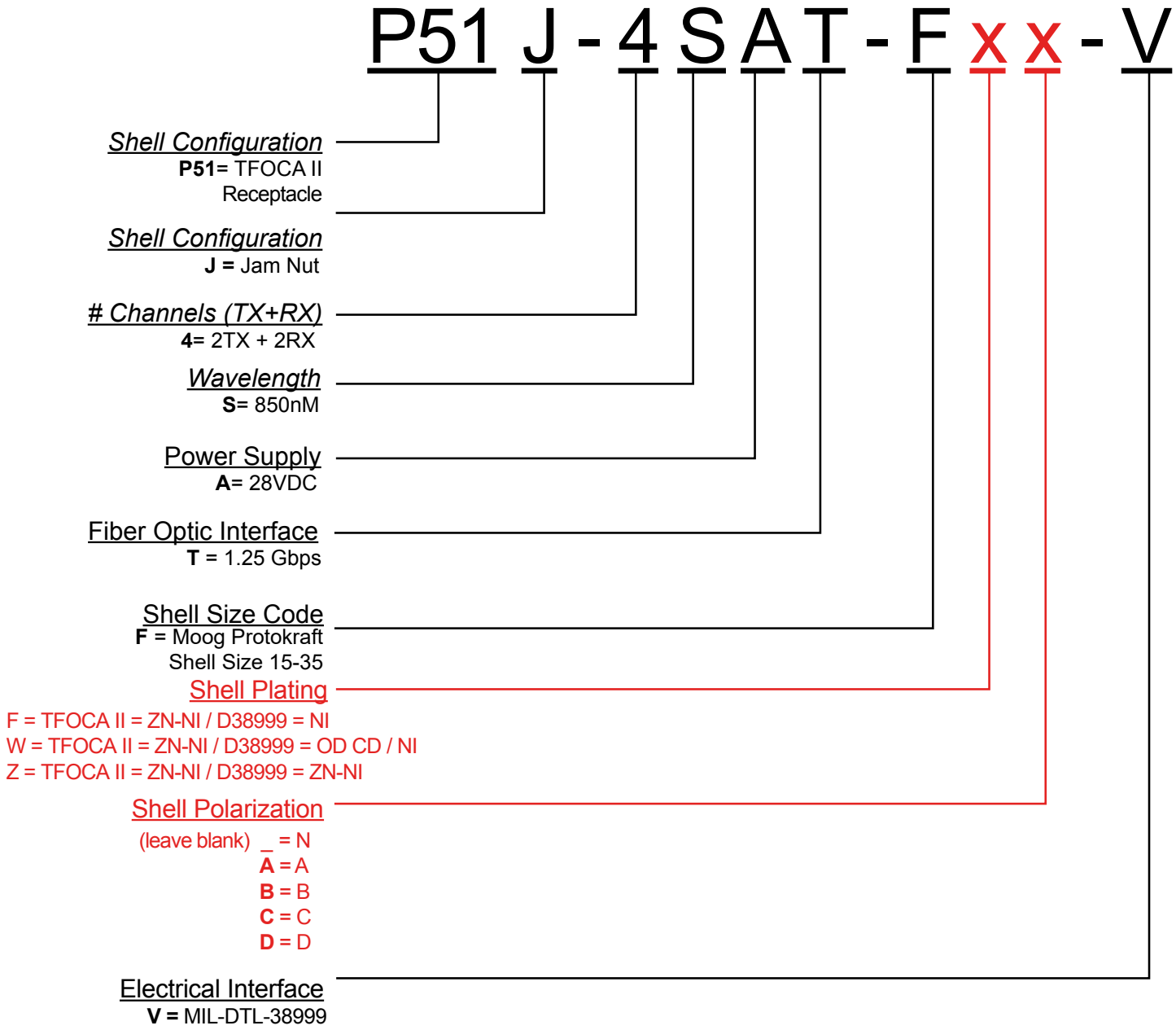



### Front view of the J2 connector shown - mating cable plug opposite

| 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 | |

All other pins are NC.

# APPENDIX A1
## PART NUMBER OPTIONS
TFOCA II Media Converter, Dual Port, Gigabit Ethernet / Multimode / 850nm





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