

# Mustang Series

Gigabit Ethernet, TFOCA II®,  
100Base-T/FX and 1000Base-T/SX  
Media Converter, Multimode, 850nM,  
28VDC

**Dual Port, Jam Nut**

## FEATURES

- Port 0 compliant with IEEE-802.3:2005 Fast Ethernet 100Base-T and 100Base-FX
- Port 1 Compliant with IEEE-802.3:2005 Gigabit Ethernet 1000Base-T and 1000Base-SX
- Optical fiber link distances up to 550 meters for GbE and 2.0 Km for Fast Ethernet
- 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.

- Fast and 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 quadrx 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 10/100/1000Base-TX electrical to 100Base-FX and 100 Base-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 100Base-T/FX and 1000Base-T/SX | P51J-4SAS-FZ-V |

Dual Port Mustang Series \*TFOCA II® Connector, 10/100/1000Base-T to  
100Base-FX and 1000Base-SX Media Converter, Multimode, 850nm, 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           |       |

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100Base-FX and 1000Base-SX Media Converter, Multimode, 850nM, 28VDC

**TRANSMITTERS**  $T_A$  = Operating Temperature Range,  $V_{cc}$  = 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,  $V_{cc}$  = 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,  $V_{cc}$  = Operating Voltage Range

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

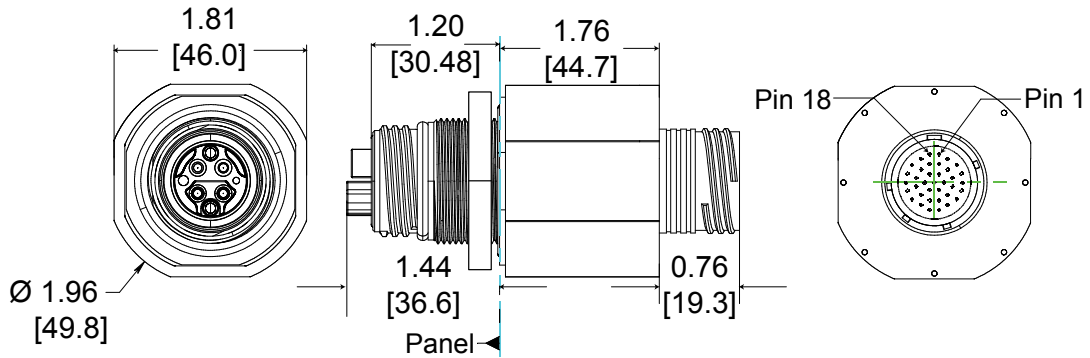
**OPTICAL FIBER LINK DISTANCES**

| Application                                       | Fiber Specification | Distance |
|---|---------------------|----------|
| Fast Ethernet - 100Base-FX                        | 62.5/125 $\mu$ MMF  | 2.0KM    |
|   | 50/125 $\mu$ MMF    | 2.0KM    |
| Gigabit Ethernet - 1000Base-SX<br>IEEE 802.3:2005 | 62.5/125 $\mu$ MMF  | 275M     |
|   | 50/125 $\mu$ MMF    | 550M     |

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### OUTLINE DRAWING

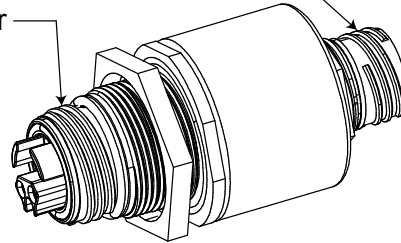
Dimensions are shown as: inches [mm]



J2 = D38999/24xD35PN

x = finish class

J1 = TFOCA II Connector



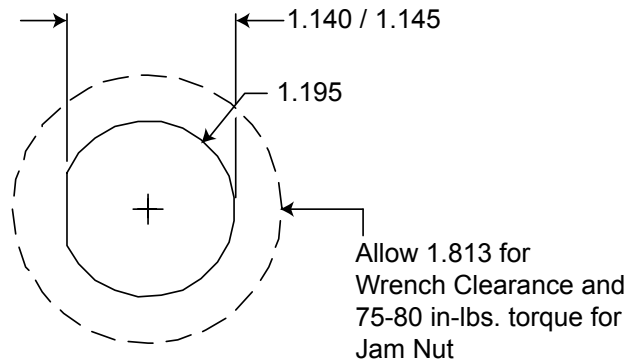
### PORT / FUNCTION ASSIGNMENTS

| Port # | Function                       |
|--------|--------------------------------|
| J1     | 1x100Base-FX and 1x1000Base-SX |
| J2     | 2x10/100/1000Base-T + 28VDC    |

### Panel Cutout Dimensions

Dimensions are shown as: inches

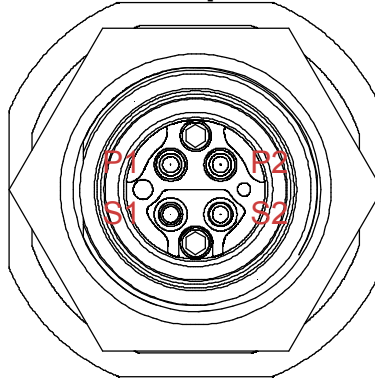
Panel Thickness: 0.12 to 0.26



Dual Port Mustang Series \*TFOCA II® Connector, 10/100/1000Base-T to 100Base-FX and 1000Base-SX Media Converter, Multimode, 850nm, 28VDC

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

Top



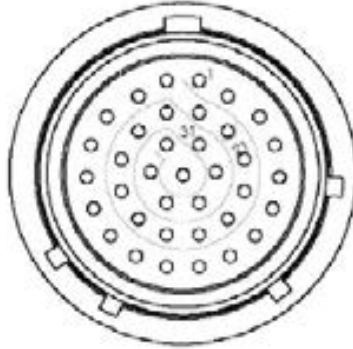
Front view of the TFOCA II media converter optical insert shown - fiber optic cable plug opposite

### OPTICAL PORT ASSIGNMENTS

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

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**J2 / D38999/24WD35PN 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     | NC        | 4               | N/A                        |
| 2     | 0     | NC        | 5               |                            |
| 3     | 0     | NC        | 7               |                            |
| 4     | 0     | NC        | 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 100Base-TX |
| 16    | 0     | MDA-      | 2               |                            |
| 17    | 0     | MDB+      | 3               |                            |
| 18    | 0     | MDB-      | 6               |                            |

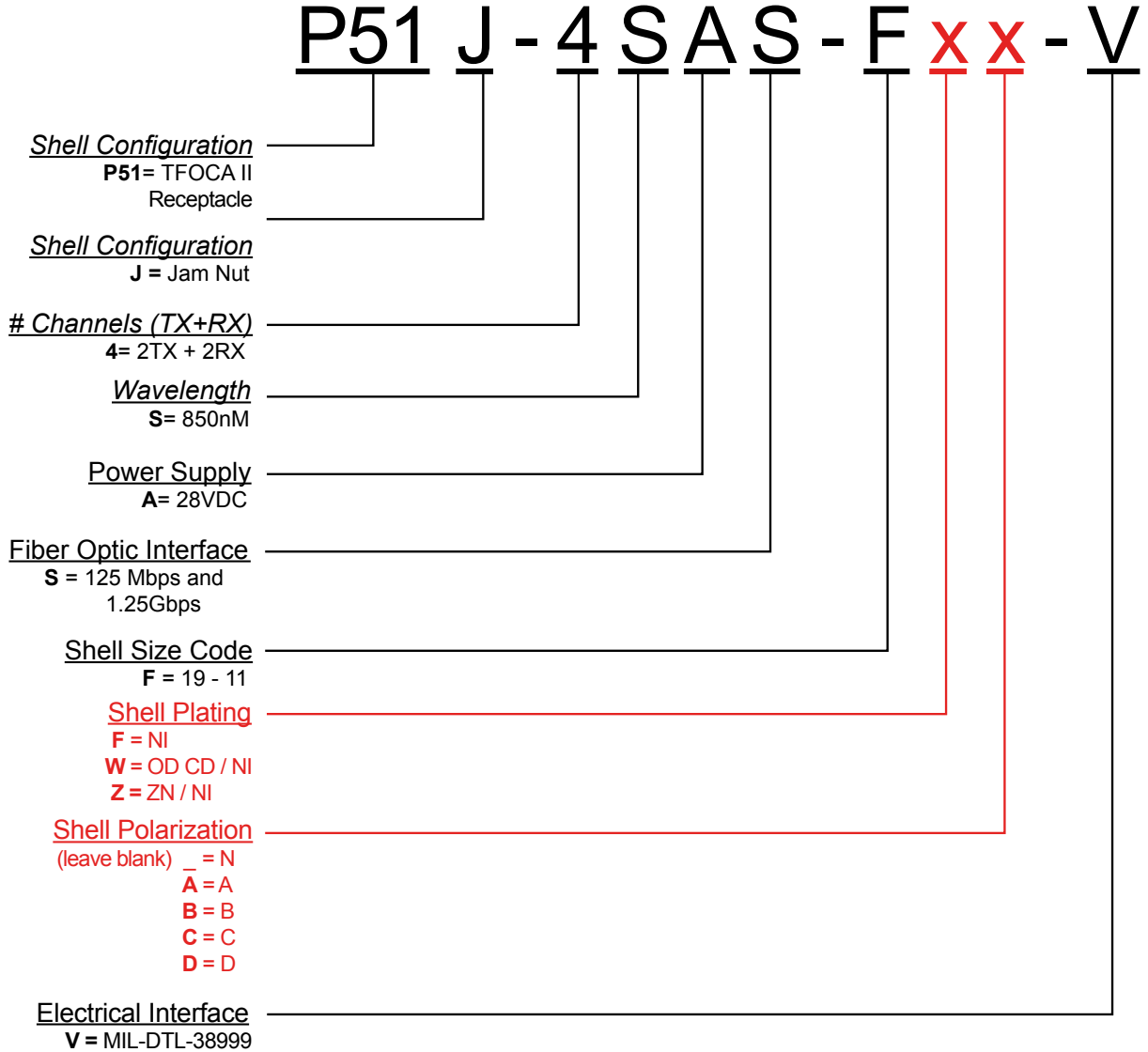
All others are signal GND

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## APPENDIX A1

### PART NUMBER OPTIONS

TFOCA II Media Converter, Dual Port, Gigabit Ethernet / Multimode / 850nm



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