



**RUGGEDIZED HIGH-SPEED  
INTERCONNECT SOLUTION**



MACHFORCE is an innovative D38999 style 10G Ethernet connector engineered for sophisticated, high-speed electronics in the aerospace and defense market. MACHFORCE connectors were designed to maximize performance of high-speed electronics while minimizing footprint and reducing installation time.

**HELPING HIGH-SPEED  
DATA PROJECTS  
TAKE FLIGHT WITH  
TOMORROW'S  
RUGGEDIZED  
CONNECTIVITY  
SOLUTIONS—*TODAY***

**OUTSTANDING HIGH  
SPEED PERFORMANCE**



**TRANSMITS MORE  
DATA IN LESS SPACE**



**REDUCES INSTALLATION  
TIME & OFFERS  
REPAIRABILITY**



**RUGGEDIZED TECHNOLOGY  
FOR CHALLENGING  
ENVIRONMENTS**

# THE PATENTED **HIGH-SPEED MODULE** MAKES IT POSSIBLE

The patented High-Speed Module (HSM) is the heart of the MACHFORCE connector. It increases data density and ensures signal integrity, while also allowing for easy termination and multiple disconnections.

## **MAXIMIZED DENSITY REDUCES INTERCONNECT FOOTPRINT**

- Single-row configuration for improved port density.
- Size 25 housing accommodates 10 Ethernet cables.
- Size 17 housing accommodates 4 Ethernet cables.

## **ROBUST SIGNAL INTEGRITY FOR MULTIPLE CONNECTIONS**

- Aluminum fins on the HSM separate data pairs to reduce crosstalk.
- A unique shield termination design provides 360° grounding contact.

## **DIRECT ACCESS TO TERMINATED PINS MAKES ON-SITE REPAIRS POSSIBLE**

- Industry-standard tools and 22D pins & sockets allow for easy termination on-site.
- The connector body's interface with the HSM provides direct access to terminated wires.
- The anti-decoupling ring allows for quick disconnect by a gloved hand.

## **DURABILITY SUPPORTS SOPHISTICATED ELECTRONICS IN HARSH ENVIRONMENTS**

- The anti-decoupling ring provides a secure connection in environments with high shock and vibration.
- Backshells protect against sand, dust and fluids while providing strain relief.



# ENABLING HIGH DENSITY MILITARY SWITCHES

**How do you squeeze massive amounts of data into a 19" 2U chassis?  
With MACHFORCE Size 25 Connectors**

When Crystal Rugged® was asked to provide the military with an ISR system requiring 48 ports of 10G Ethernet capacity, but no other existing connector would work, the patented MACHFORCE D38999 style data connector was the answer to solve their port density need.

Crystal Group® partnered with PIC Wire & Cable to integrate the MACHFORCE into their RCS7750-48CM network switch. The rugged switch provides an intelligent, scalable, stackable LAN solution for small or medium applications that require fail-safe operation in MIL-SPEC environments. These switches need connectors that can handle extreme temperatures, humidity, shock, vibration, dust, sand, and salt fog.

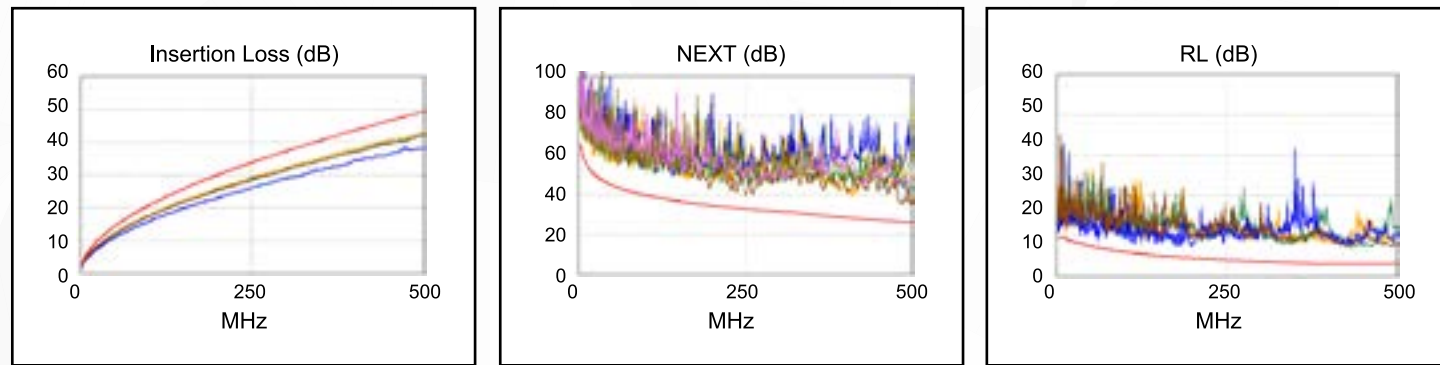
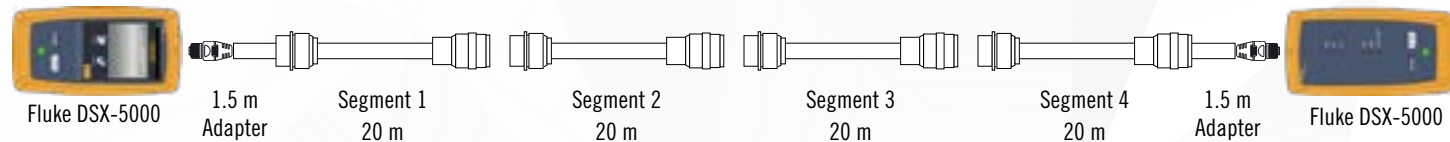
The MACHFORCE connector optimizes space and provides the highest density 10G connector on the market by utilizing the patented High-Speed Module. In this case, Crystal Group's high-data density networking switch features five MACHFORCE connectors for a total of 48 10G Ethernet ports, squeezing massive amounts of data into a 19" chassis that also allows for multiple disconnects in the aircraft.



# SUPERIOR PERFORMANCE

## SHIELDED 10G ETHERNET CABLE SOLUTIONS

MACHFORCE connectors have been tested and qualified with PICMates 10G Ethernet cables. The E6A6824 and E6A6826 CAT6a cables minimize crosstalk between twisted pairs. These cables feature silver-plated copper braided shielding and foil shielding that reduce electromagnetic waves emitted from the pairs. When the MACHFORCE connector is paired with E6A6824 and E6A6826 cables, the resulting electrical performance allows for industry-leading cable lengths and multiple connection breaks.



\*E6A6824 electrical performance over 80M with 6.4dB of headroom

## PHYSICAL AND ENVIRONMENTAL CONNECTOR TESTING

TEST PROCEDURE	TEST STANDARD	RESULT
Random Vibration (37.8grms – 3 axes)	MIL-DTL-38999 Rev M: 4.5.23.1	PASS
Mechanical Shock (300g – 3 shocks per each of 6 axes)	MIL-DTL-38999 Rev M: 4.5.24.1	PASS
Salt Spray (Dynamic) 500 Hours	MIL-DTL-38999 Rev M: 4.5.13.2	PASS
Ingress Protection*	IEC 60529: IP67	PASS
Dust (Fine Sand)	MIL-DTL-38999 Rev M: 4.5.41	PASS
Lightning Strike	MIL-DTL-38999 Rev M: 4.5.47	PASS
Humidity	MIL-DTL-D38999 Rev M: 4.5.26	PASS
Ethernet Performance at Temperature (-65°C to 200°C)	EIA-568-C CAT6A	PASS
Shell-to-Shell Conductivity	MIL-DTL-38999 Rev M: 4.5.25	PASS

\*Testing completed only for E6A6824

# PART NUMBER BUILDER

## CONNECTOR

SAMPLE PART NUMBER: MF 3825 F S W N - EC

PRODUCT	MF	Family: MACHFORCE								
SHELL TYPE	3825	D38999 – Size 25	3817	D38999 – Size 17						
SHELL STYLE	F	Flange Mount Receptacle*	P	Straight Plug	J	Jam Nut Receptacle				
CONTACT	S	Sockets (F or J Shell Style)	P	Pin (Plug Only)						
PLATING	W	Olive Drab Cadmium								
KEY POSITION DETAIL	N	80	142	196	293	C	66	140	200	257
	A	135	170	200	310	D	62	145	180	280
	B	49	169	200	244					
CABLE TYPE	EC	24 AWG Ethernet (E6A6824)	PC1	PCB Mount (F or J Style)						
	ED	26 AWG Ethernet (E6A6826)								

\*¼ Mounting Nut Plates Available



## BACKSHELL

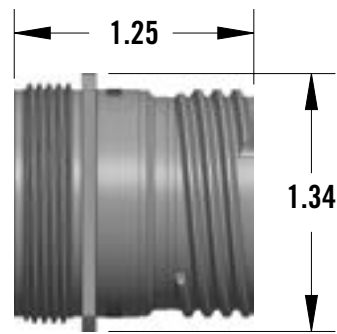
SAMPLE PART NUMBER: MF 3825 SP W S BC

PRODUCT	MF	Family: MACHFORCE		
SHELL TYPE	3825	D38999 – Size 25	3817	D38999 – Size 17
STYLE	SP	Standard Profile Sealed	LP	Low Profile Unsealed
PLATING	W	Olive Drab Cadmium		
ANGLE	S	Straight	R	Right Angle (SP Style, 3817 Shell Type Only)
CABLE TYPE	BC	24 AWG Ethernet (E6A6824)	BD	26 AWG Ethernet (E6A6826)

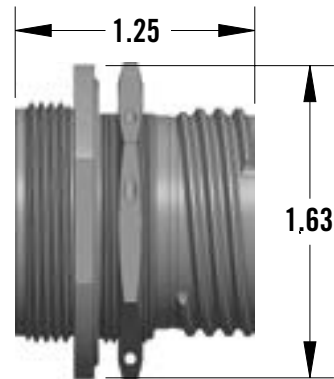


Looking for a solution that perfectly fits your unique application? Contact us now to explore customized configurations.

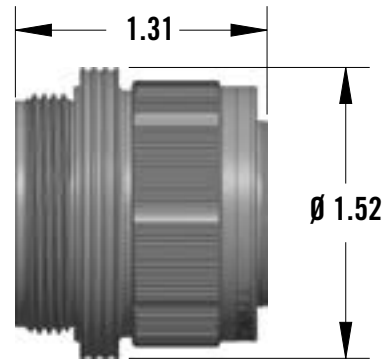
# SIZE 17 DIMENSIONS



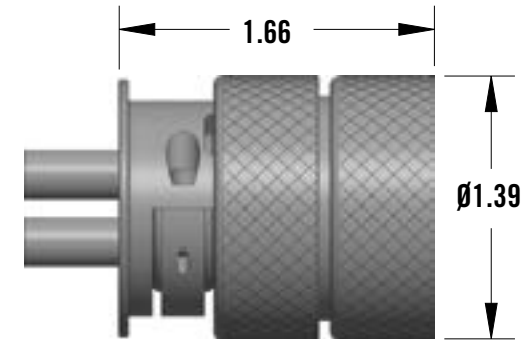
Flange



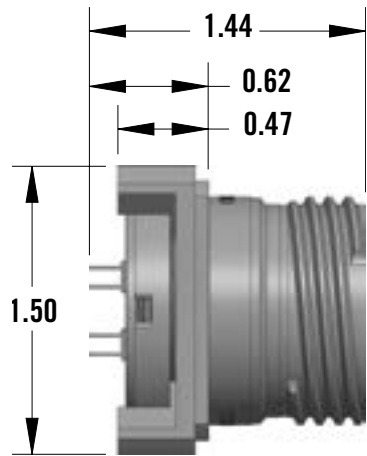
Jam Nut



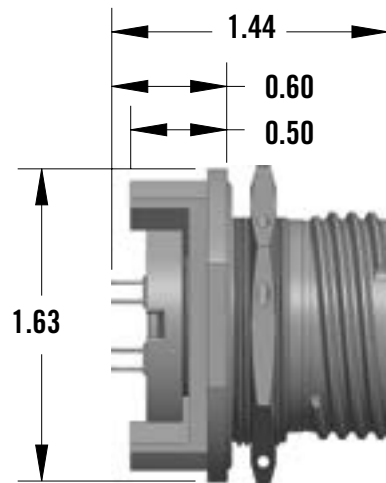
Plug



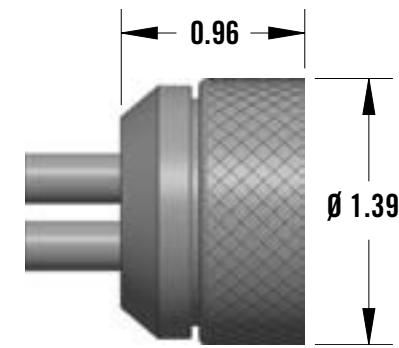
Standard Profile Sealed Backshell



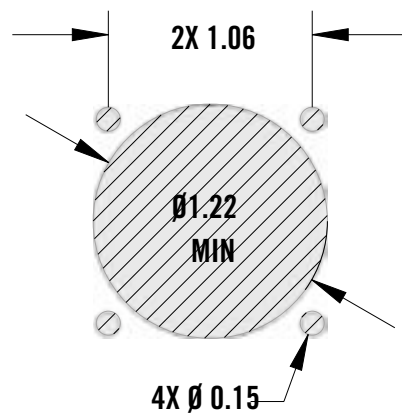
Flange with PCB Mount



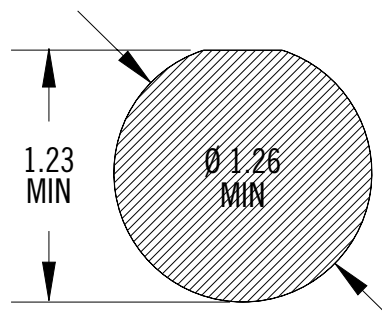
Jam Nut with PCB Mount



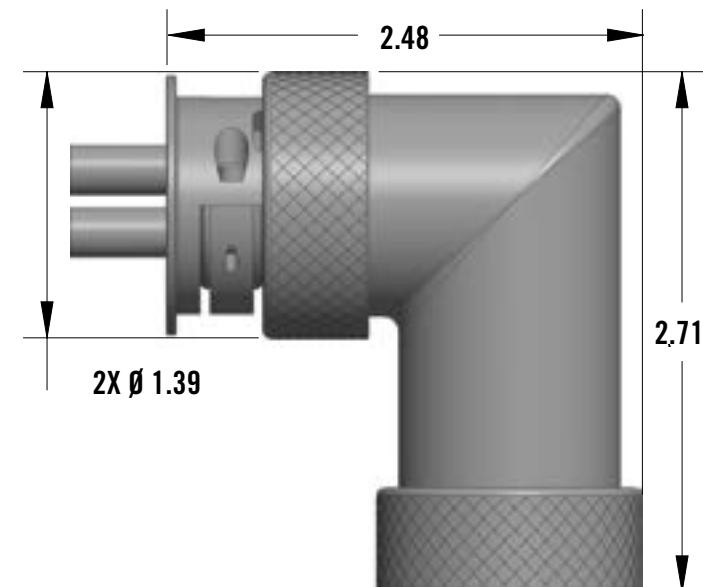
Low Profile Unsealed Backshell



Flange Mounting Cut-Out



Jam Nut Mounting Cut-Out



90° Standard Profile Sealed Backshell

All dimensions are in inches unless otherwise specified.

## SIZE 17 PROPERTIES

### SHELL

- Type: D38999 Series III Style
- Styles: Flange, Jam Nut, & Plug
- Max. Clearance Panel Thickness:
  - Flange: 0.228" (5.79mm)
  - Jam Nut: 0.126" (3.20mm)

### PLATING

- Olive Drab Cadmium

### OPERATING TEMPERATURE

- -65°C to 175°C

### MATERIALS

- Body Components: Aluminum
- ADR Ring: Stainless Steel

### WEIGHT

- Flange: 0.10lbs (45.4g)
- Jam Nut: 0.11lbs (49.9g)
- Plug: 0.16lbs (72.6g)
- PCB: 0.17lbs (77.1g)
- Standard Backshell: 0.09lbs (40.8g)
- Low Profile Backshell: 0.04lbs (18.1g)
- 90° Backshell: 0.11lbs (49.9g)

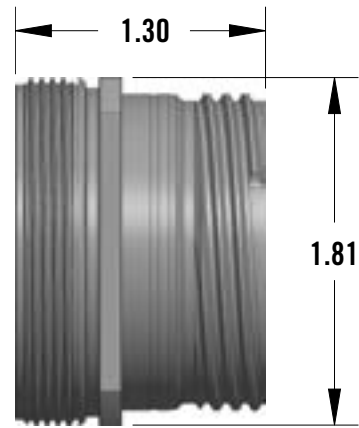
### CONTACTS

- M39029/58-360 & M39029/57-354

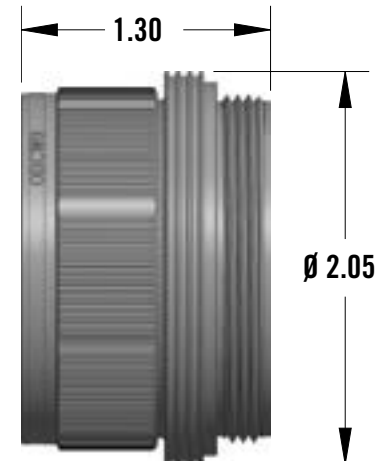
### COUPLING TORQUE

- Max. Engagement & Disengagement: 24 in-lb (2.7 Nm)
- Min. Disengagement: 3 in-lb (0.34 Nm)

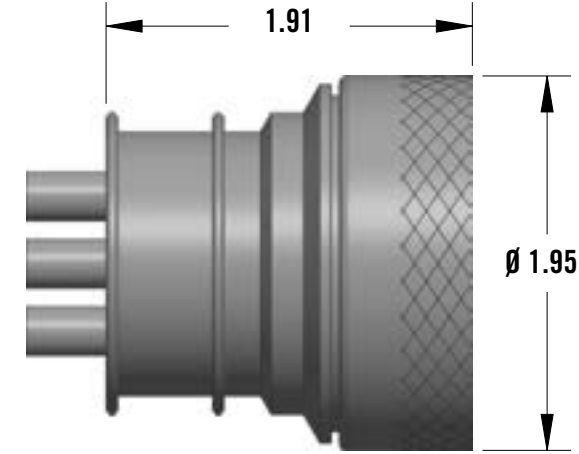
# SIZE 25 DIMENSIONS



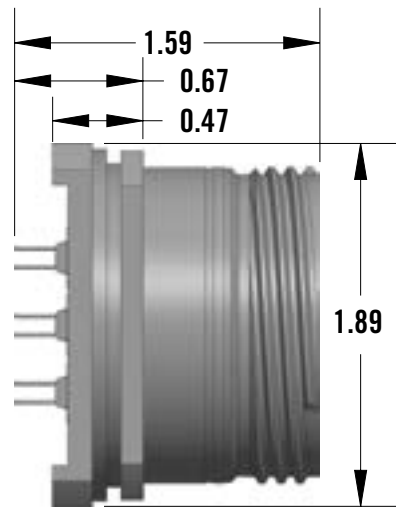
Flange



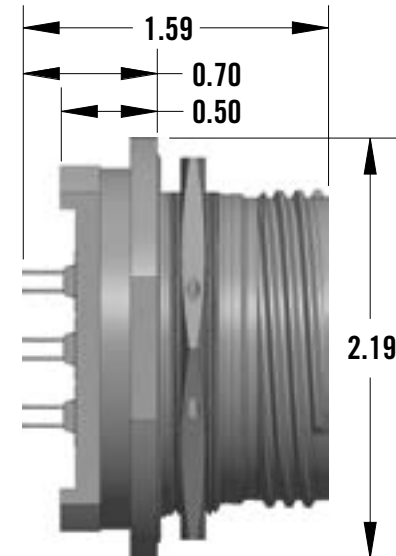
Plug



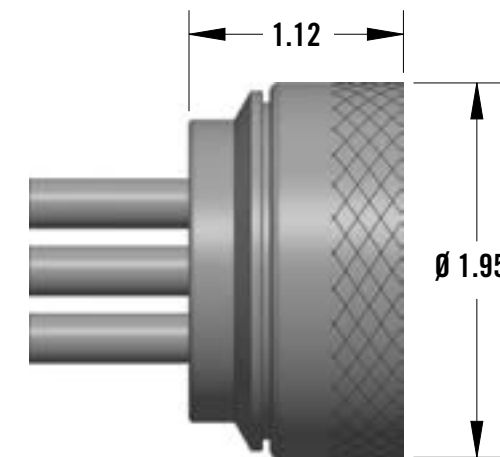
Standard Profile Sealed Backshell



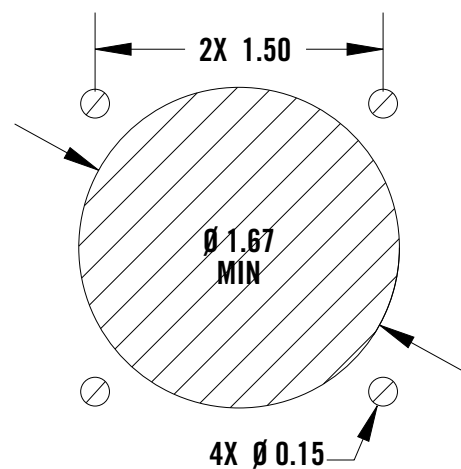
Flange with PCB Mount



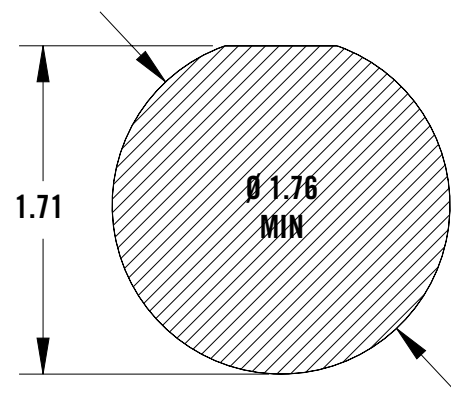
Jam Nut with PCB Mount



Low Profile Unsealed Backshell



Flange Mounting Cut-Out



Jam Nut Mounting Cut-Out

## SIZE 25 PROPERTIES

### SHELL

- Type: D38999 Series III
- Styles: Plug, Flange & Jam Nut
- Max. Clearance Panel Thickness:  
Flange: 0.197" (5.00mm)  
Jam Nut- PCB Mount: 0.126" (3.20mm)

### PLATING

- Olive Drab Cadmium

### OPERATING TEMPERATURE

-65°C to 175°C

### MATERIALS

- Body Components: Aluminum
- ADR Ring: Stainless Steel

### WEIGHT

- Flange: 0.17lbs (77.1g)
- Plug: 0.27lbs (122.5g)
- Standard Backshell: 0.12lbs (54.4g)
- Low Profile Backshell: 0.08lbs (36.2g)
- PCB: 0.21lbs (95.3 g)

### CONTACTS

- M39029/58-360 & M39029/57-354

### COUPLING TORQUE

- Max. Engagement & Disengagement:  
40 in-lb (4.5 Nm)
- Min. Disengagement: 5 in-lbs (0.56 Nm)

All dimensions are in inches unless otherwise specified.

LET PIC WIRE & CABLE FIND SOLUTIONS FOR YOUR  
TOUGHEST CONNECTIVITY CHALLENGES



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