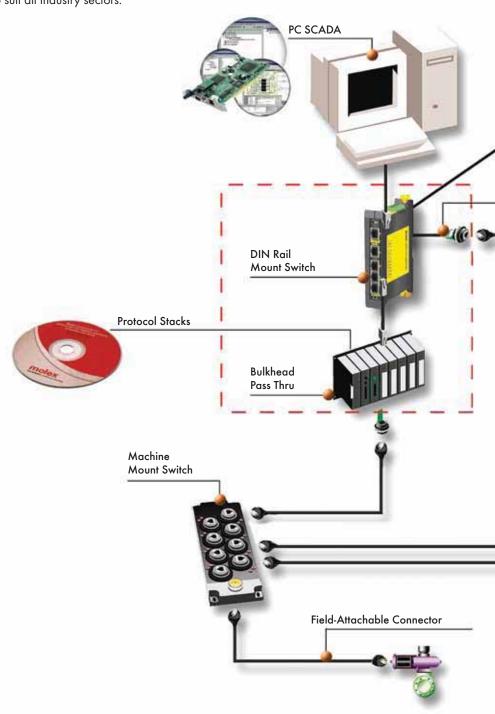
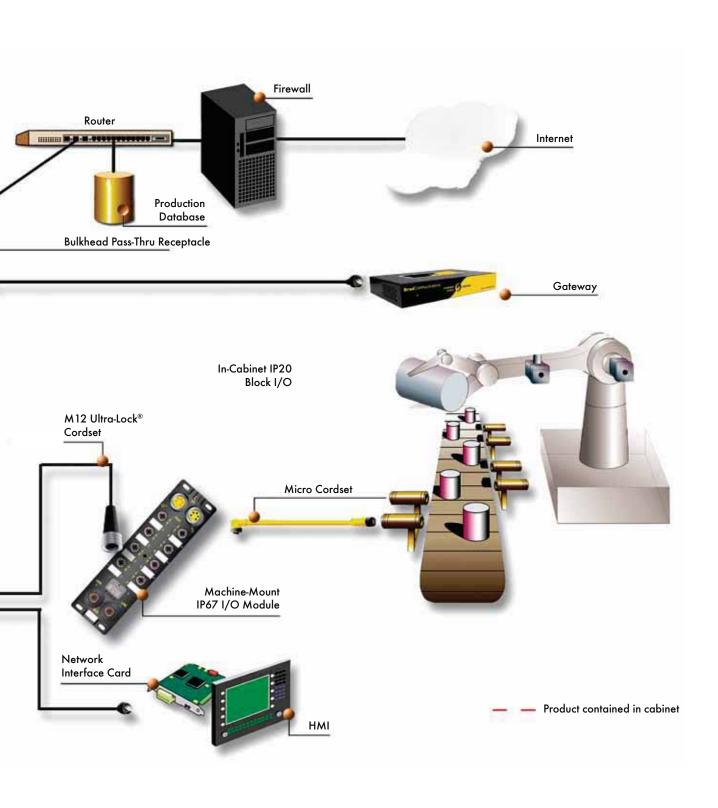
# **Brad® Ethernet**

Brad® ethernet products provide solutions that enable the world's most popular Local Area Network to be reliably utilized on the factory floor or in harsh commercial environments. The Brad line offers a large choice of products including physical media, IP67 I/O modules, unmanaged and managed switches, powerful network interfaces, industrial gateways and protocol development kits to connect the most popular Ethernet industrial networks and fieldbuses. Brad Ethernet products give the user a complete communication and connectivity solution to design a large scope of industrial applications—PC-Based control, supervision, data storage, protocol bridging, etc.—to suit all industry sectors.



# Ethernet



## Brad® Ethernet Software Development Kit for PROFINET IO

112106

## **IO-Controller and IO-Device**





## **Features and Benefits**

- Master and slave protocol stacks can address both controller (master) or device (slave) manufacturers who want to implement PROFINET networks
- Brad stacks have no hardware and OS dependencies and can be easily implemented on a large range of hardware system platforms or software operating systems
- Sample applications with source codes are provided and can be quickly and easily implemented
- Brad stacks are successfully tested with PNO conformance test tools
- Molex can provide stack training, technical support and engineering development for both hardware and software design

## **Description**

- PROFINET IO Class-A/Class-B (RT Class-1, RT Class-2)
- Portable on any real time or not operating systems implementing multithread (Windows, VxWorks, Linux, QNX, ThreadX, eCOS, etc)
- Hardware: Compatible with 32-bit microprocessors
- Multiplatform (Intel, ARM, PowerPC, Fido, Texas DSP, etc)
- Support of Intel and Motorola formats
- Consistent 10 data access through shared memory (configurable or automatic) or messaging access (API)

#### **Conformance**

- Conforms to PROFINET IO specifications v2.2
- Molex is an active member of PROFINET technical working groups

## Included Hardware/Software

## PROFINET IO—Controller Stack

- Supported Services: Context management, configuration, 10 data, alarm, and diagnostic
- Manage up to 128 IO-Devices
- Cyclic Data Exchange: Up to 1440 Input bytes and 1440 Output bytes per IO-Device slot
- IP Device Configuration: DCP or Local
- LLDP (PROFINET MIB)
- SDK initialization via XML file
- CD Deliverable: Single product line licensing (with royalties), ANSI C source code, electronic documentation, application samples

## **PROFINET 10 Device Stack**

- 10 Data: Up to 1440 Input bytes and 1440 Output bytes per IO-Device slot
- GSD File: Yes
- IP Device Configuration: DCP or Local
- LLDP (PROFINET MIB)
- Allows design of fixed and modular device

## **OEM Engineering Console**

- Generate IO-Controller stack configuration files (XML format)
- Automatic 10-Device network detection including module configuration
- GSD device library management
- 10-Device commissioning (Set Name, Device blinking, etc.)
- Integrated diagnostic
- Windows 32-bit (XP,Vista)
- OEM customization
- USB donale protection

## MRP Client/Manager Stack

- Manage media redundancy for Ethernet ring topology according PROFINET Class-B
- CD Deliverable: Single product line licensing (no royalty),
   ANSI C source code, electronic documentation
- Does not include PNO MRP patent

## **Ordering Information**

| Engineering No.   | Standard Order No. | Description   |  |
|-------------------|--------------------|---|--|
| SDK-PFN-DEV       | 112106-5001        | PROFINET 10-Device Software Development Kit                             |  |
| SDK-PFN-DEV-UPD   | 112106-5002        | PROFINET 10-Device SDK Maintenance Update                               |  |
| SDK-PFN-CON       | 112106-5005        | PROFINET IO-Controller Software Development Kit—1 License Fee included  |  |
| SDK-PFN-CON-UPD   | 112106-5006        | PROFINET 10-Controller SDK Maintenance Update                           |  |
| SDK-PFN-CON-L     | 112106-5010        | PROFINET 10-Controller License Fee                                      |  |
| SDK-PFN-CON-CNF-U | 112106-5012        | PROFINET 10-Controller OEM Configuration Console, USB Dongle, 1 license |  |
| SDK-PFN-MRP       | 112106-5007        | Client/Manager Media Redundancy Protocol SDK for PROFINET IO            |  |

## **Support/Training Information**

| Engineering No. Standard Order No. |             | Description  |  |  |
|------------------------------------|-------------|--|--|--|
| SDK-PFN-EDS 860000-0142            |             | Engineering Development Support for PROFINET stack |  |  |
| SDK-PFN-TRN                        | 860000-0144 | Training Support for PROFINET stack                |  |  |



## **Brad® Ethernet Software Development Kit for** EtherNet/IP

## 112106

## **Scanner and Adapter**





## **Features and Benefits**

**Ordering Information** Engineering No.

SDK-FIP-ADP

SDK-EIP-ADP-UPD

SDK-FIP-SCA

SDK-EIP-SCA-UPD

SDK-EIP-SCA-L

SDK-EIP-CON-CNF-U

Engineering No.

SDK-EIP-EDS

SDK-EIP-TRN

Support/Training Information

- Master and slave protocol stacks can address both controller (master) or device (slave) manufacturers who want to implement EtherNet/IP networks
- Brad stacks have no hardware and OS dependencies and can be easily implemented on a large range of hardware system platforms or software operating systems
- Sample applications with source codes are provided and can be guickly and easily implemented
- Brad stacks are successfully tested with ODVA conformance test tools
- Molex can provide stack training, technical support and engineering development for both hardware and software design

Standard Order No.

112106-0000

112106-5000

112106-5003

112106-5004

112106-5009

112106-5011

Standard Order No.

860000-0141

860000-0143

## Description

- implementing multithread (Windows, VxWorks, Linux, QNX, ThreadX, eCOS, etc)
- Hardware: Compatible with 32-bit microprocessors
- Multi platform (Intel, ARM, PowerPC, etc)
- Support of Intel and Motorola formats
- Consistent process data image access through messaging access (API)

#### **Conformance**

- Conforms to ODVA specifications v1.4 and CIP v3.3
- Fully compatible with EtherNet/IP Conformance Test Suite Version A7
- Molex is an active member of ODVA technical working

## Included Hardware/Software

## EtherNet/IP Scanner and Adapter

- CIP Features:
  - 10 messaging (process data)
  - Explicit messaging (configuration/diagnostic)
- Supported Objects according to CIP Standard
  - Identity Object
  - Message Router Object
  - Assembly Object
  - Connection Manager Object
  - Connection Configuration Object

Description EtherNet/IP Adapter Software Development Kit

EtherNet/IP Adapter SDK Maintenance Update

EtherNet/IP Scanner/Adapter Software Development Kit—1 License Fee included

EtherNet/IP Scanner/Adapter SDK Maintenance Update EtherNet/IP Scanner/Adapter License Fee

EtherNet/IP Scanner OEM Configuration Console, USB Dongle, 1 license

Description

Engineering Development Support for EtherNet/IP stack

Training Support for EtherNet/IP stack

- TCP/IP Interface Object
- Ethernet Link Object
- Stack Resolution: Timing resolution in microseconds
- Application Watchdog
- Rack Optimization for best performances with PointIO and Flex10 devices
- CD Deliverable: single product line licensing (with royalties), ANSI C source code, electronic documentation, application samples

## EtherNet/IP Adapter

- CIP Features:
  - 10 messaging (process data)
  - Explicit messaging (configuration/diagnostic)
- Supported Objects according to CIP Standard
  - Identity Object
  - Message Router Object
  - Assembly Object
  - Connection Manager Object
  - Connection Configuration Object
  - TCP/IP Interface Object
  - Ethernet Link Object
- Stack Resolution: Timing resolution in microseconds
- Application Watchdog
- Generic EDS file
- CD Deliverable: single product line licensing (no royalty), ANSI C source code, electronic documentation, application samples

## **OEM Engineering Console**

- Generate EtherNet/IP stack configuration files
- Automatic EtherNet/IP network detection including module configuration
- ESD device library management
- Device commissioning
- Integrated diagnostic
- Windows 32-bit (XP,Vista)
- OEM customization
- USB dongle protection

Portable on any real time or not operating systems



# Brad® Windows Compatible Multi-Slave Driver for PROFINET

## 112027

## **PROFINET Multi IO-Device**



## **Features and Benefits**

- Connect a PC under Windows to PROFINET controller
- Use standard Ethernet card
- Support PROFINET IO Real-Time communication
- Support multi-slave functionnality on single PC by using multiple Ethnernet ports
- Typical applications:
- HMI/Operator panel
- Workbench
- 10 simulation

## Description

- Conform to PROFINET IO v2.2 specifications
- Support up to 32 IO-Device connections in a single PC
- Support PROFINET Alarms
- Engineering Tools:
  - Configuration console
  - Test and diagnostic tools
- Includes Windows Library (DLL)
- Windows (32-bit): Seven, 2008 Server, Windows Vista, 2003 Server, Windows XP®

| Included | l Hard | ware, | /Sol | tware |
|----------|--------|-------|------|-------|
|----------|--------|-------|------|-------|

- 10 Data: Up to 1440 Input bytes and 1440 Output bytes per IO-Device slot
- Automatic generation of GSD file based on user configuration ready to use in PROFINET I/O-Controller engineering software
- Allows design of fixed and modular device
- IP Device configuration: DCP or Local
- Software Protection

#### **Conformance**

- Conform to PNO conformance test tool (PN Tester)
- Molex is an active member of PROFINET technical working groups

# Engineering No. Standard Order No. Description DRL-EPN-SWF-S 112027-5007 Windows PROFINET Multi IO-Device Driver, Software protection key

# Brad® Windows Compatible Explicit Messaging Driver for EtherNet/IP

# 112106

## EtherNet/IP EM Driver



## **Features and Benefits**

- Fastest and easiest solution to implement EtherNet/ IP Explicit Messaging communication on PC-based systems
- User friendly library, no EtherNet/IP knowledge required
- Typical applications:
- Engineering tool
- Commissioning console
- Diagnostic and Monitoring tools
- HMI/Scada applications
- Custom software

## Description

- EIP\_Driver provides an Application Programming Interface (API) that simply send/receive buffer of data on the network with remote EtherNet/IP EM Server devices
- The EIP\_Driver manages the complete CIP communication (connection/reconnection, etc) so the developer needs no special expertise in the EtherNet/IP protocol.

## Included Hardware/Software

- Send and receive explicit messages
- Client mode (Server mode on request)
- Supports connected and unconnected messages
- Supports synchronous and asynchronous modes
- Support of ListIdentify service to detect all EtherNet/IP stations connected to the network
- DLL library for Windows 32-bit (Seven/XP/Vista)
  - Designed to be used in multi-threaded applications
  - Several applications can use the EIP\_Driver simultaneously
- DLL library can be statically or dynamically linked with the target application
- CD Deliverable: single product line licensing (no royalty), ANSI C source code, electronic documentation, application samples

- Fully compatible with EtherNet/IP Conformance Test Suite Version A7
- Molex is an active member of ODVA (Open DeviceNet® Vendor Association) technical working groups

| Engineering No.         | gineering No. Standard Order No. Description |   |
|-------------------------|--|---|
| SDK-EIP-EML 112106-5008 |  | EtherNet/IP Explicit Messaging DLL library, Client mode |

## **Brad® Direct-Link® Windows Compatible Protocol Drivers**

112027 Ethernet TCP/IP and Serial



## **Features and Benefits**

- Direct-Link™ SW1000 provides data acquisition between Windows PC-based applications and industrial devices connected to Ethernet TCP/IP
- Economic solution; well suited for embedded and light architecture (laptop, panel PC, MMI)
- 100% software solution; use PC COM port or integrated Ethernet interface (3COM, NE2000)
- Wide variety of open and vendor specific industrial
- 1000 tags, full tags and Siemens (S5, S7, TI) versions

## **Description**

- Based on Windows TCP/IP socket
- All Ethernet protocols can run simultaneously
- All Ethernet protocols can run Client and Server modes
- Database (32 Kbits, 32 Kwords) for Server mode to exchange data with applications

## **Included Hardware/Software**

- Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
- Compatible Data Servers:
- OPC DA v3.0, 2.05 and 1.0a
- Wonderware® DAServer (XP only)
- Wonderware I/O (SuiteLink/FastDDE) (XP only)
- Includes Development Libraries
- Windows Compatibility (32-bit and 64-bit): Seven, 2008 Server, Windows Vista®, 2003 Server, Windows XP®
- Software or Dongle (Parallel or USB) Protection

| Engineering No. Standard Order No. |                           | Standard Order No. | Description  |
|------------------------------------|---------------------------|--------------------|--|
|                                    | DRL-ALL-SWL-S 112027-0005 |                    | SW1000 software drivers, 1000 tags, Software key protection.         |
|                                    | DRL-ALL-SWF-S 112027-0002 |                    | SW1000 software drivers, Full tags, Software key protection.         |
|                                    | DRL-SIE-SWF-S             | 112027-5014        | SW1000 for Siemens (S5, S7, T1), Full tags, Software key protection. |
|                                    | DRL-ALL-SWL-P 112027-0004 |                    | SW1000 software drivers, 1000 tags, Parallel dongle protection       |
|                                    | DRL-ALL-SWF-P 112027-0001 |                    | SW1000 software drivers, Full tags, Parallel dongle protection       |
|                                    | DRL-SIE-SWF-P 112027-5013 |                    | SW1000 for Siemens (S5, S7, T1), Full tags, Software key protection. |
| DRL-ALL-SWL-U 112027-0006          |                           | 112027-0006        | SW1000 software drivers, 1000 tags, USB dongle protection            |
| DRL-ALL-SWF-U 112027-0003          |                           | 112027-0003        | SW1000 software drivers, Full tags, USB dongle protection            |
|                                    | DRL-SIE-SWF-U             | 112027-5015        | SW1000 for Siemens (S5, S7, T1), Full tags, Software key protection. |
|                                    | DRI-IIPG-SWF              | 112027-0010        | SW1000 ungrade from 1000 tags to Full tags                           |

## **Compatible Protocols**

## Ethernet TCP/IP

- Altus® Alnet II (AL200x, webgate); Client/Server
- Alstom® SRTP (C80-35, C80-75); Client/Server
- Allen-Bradley® Logix5000 (ControlLogix and FlexLogix);
- GE Fanuc® SRTP ( C90-30, C90-70); Client/Server
- Mitsubishi® Melsec (A and Q); Client/Server
- Omron<sup>®</sup> FINS (C, CV, CS); Client/Server
- Schneider® Modbus TCP and UDP; Client/Server
- Schneider® UNI-TE (Premium and Micro); Client/Server
- Siemens® Industrial Ethernet (S5, S7, TI); Client/Server

- Modbus Master (ASCII and RTU)
- Modbus Slave (ASCII and RTU)
- GE Fanuc® SNPX Master (90-xx and 80-xx Series)
- Schneider® Uni-Telway Slave (TSX 7 Series)
- Siemens® AS511 Master (Simatic S5 Series)
- Siemens® PPI/PPI+ Master (Simatic S7-200 Series)
- Siemens® Ti-Dir Master (Simatic TI-505 Series)

## Brad® applicom® Network Interface Card

## 112000

## **Industrial Ethernet**



## **Features and Benefits**

- Fast data acquisition between PC-based applications and industrial devices connected to Ethernet TCP/IP
- On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
- All protocols are included
- Best choice for Supervision/HMI/SCADA applications
- Equipment redundancy via OPC server
- Combo offer:
  - Ethernet + PROFIBUS (1.5 Mbps)
  - Ethernet + Serial (38.4 Kbps)

## **Description**

- Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
- Compatible Data Servers:
- OPC DA v3.0
- Wonderware® DAServer (XP only)
- Wonderware IO (SuiteLink/FastDDE) (XP only)
- Includes Development Libraries
- Supported OS:
  - Windows (32-bit and 64-bit): Seven, 2008 Server, Windows Vista®, 2003 Server, Windows XP®/ XP Embedded
  - Others: Linux, VxWorks, RTX VenturCom

## **Included Hardware/Software**

- Bus Format
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
- PCI Express 1x
- Hardware plug and play
- AMD SC520
- 16 Mb SDRAM
- 4 Mb Flash Memory
- One Ethernet port
  - Fast Ethernet 10/100 Mbps, auto negotiating
  - Base-T (RJ45), 4 leds (Rx, Tx, Link, 10/100)

## **Compatible Protocols**

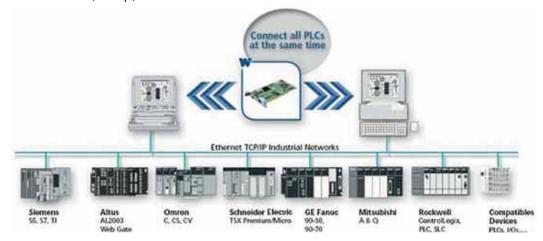
## **Ethernet TCP/IP (Client/Server modes)**

- Altus<sup>®</sup> Alnet II (AL 200x, Webgate)
- Alstom® SRTP (C80-35, C80-75)
- Allen-Bradley® EtherNet/IP(PCCC) (Logix, PLC-5 and SLC 500)
- GE Fanuc® SRTP (90-30, 90-70)
- Mitsubishi<sup>®</sup> Melsec (A, Q)
- Omron® FINS (C, CV, CS)
- Schneider Electric® Open Modbus TCP
- Schneider Electric® UNI-TE (Premium and Micro)
- Siemens® Industrial Ethernet (S5, S7, TI)
- UDP Send/Receive (Free messaging)

## **Ethernet ISO**

- Schneider Electric<sup>®</sup> Ethway
- Siemens® Industrial Ethernet ISO (S5, S7, TF and TI)

- RoHS compliant
- CE
- OPC certified
- Rockwell Encompass<sup>™</sup>
- Schneider Collaborative



| Engineering No. Standard Order No.  |  | Description  |
|---|--|--|
| APP-ETH-PCU-C 112000-0005 PCU2000ETH PCI Network Interface Card for Ethernet      |  | PCU2000ETH PCI Network Interface Card for Ethernet                     |
| APP-ETH-PCIE 112000-5026 PCIE2000ETH PCI Express Network Interface Card for Ether |  | PCIE2000ETH PCI Express Network Interface Card for Ethernet            |
| APP-EPB-PCU-C   | 112000-0001  | PCU2000ETH PCI Network Interface Card for Ethernet + Profibus          |
| APP-EPB-PCIE  | 112000-5028  | PCIE2000ETH PCI Express Network Interface Card for Ethernet + Profibus |
| APP-ESR-PCU-C   | -C 112000-0003 PCU2000ETH PCI Network Interface Card for Ethernet + Serial |  |
| APP-ESR-PCIE  | 112000-5027  | PCIE2000ETH PCI Express Network Interface Card for Ethernet + Serial   |

## Brad® applicom® Network Interface Card

## 112000

## **Ethernet Fieldbus**



## **Features and Benefits**

- Deterministic data acquisition for real time PC-based control applications
- On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
- Very Easy-to-Use; no knowledge of protocol required
- Remote Access via TCP/IP connection; to able configuration and diagnostic when using real time OS (VxWorks, QNX, etc)

## **Description**

- Auto mapping of IO in card DPRAM
- 10 exchange up to 14 Kbytes
- Hardware and software Watchdog
- Auto-Boot (Configuration stored in Flash)
- Engineering Tools:
  - Engineering console with automatic test and diagnostic tools
- Compabtible Data Servers:
- OPC DA v3.0, 2.05 and 1.0a
- Wonderware® DAServer
- Wonderware IO (SuiteLink/FastDDE)
- Includes Development Libraries
- Supported OS:
  - Windows (32-bit and 64-bit): Seven, 2008 Server, Windows Vista®, 2003 Server, Windows XP®/ XP Embedded
  - Others: Linux, VxWorks, RTX VenturCom

## **Included Hardware/Software**

- PCI Universal bus 3.3V/5V (PCI-X compatible)
- Hardware plug and play
- AMD SC520
- 16 Mb SDRAM; 4 Mb Flash Memory
- 1 Digital Input + 1 Digital Output
- 1 Ethernet port
  - Fast Ethernet 10/100 Mbps, auto negotiating
  - Base-T (RJ45), 4 LEDs (Rx, Tx, Link, 10/100)

## **Compatible Protocols**

## **Modbus TCP and UDP**

- Client mode
- Up to 127 simultaneous devices

## EtherNET/IP

- Scanner and adapter
- Explicit messaging (Client/Server)
- Up to 128 simultaneous CIP connections
- EtherNet/IP Devices supported: Generic and Rockwell IO through EDS files (FlexIO, CompactLogix, etc)
- IP address settings configurable via the console or DHCP/ BOOTP server
- Client DNS Supported

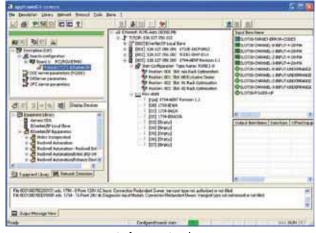
## **PROFINET 10-Controller**

- RT Class-1
- Up to 127 IO-Devices; max. IO size 14K
- Cyclic Data Exchange (IO); up to 1437 In and 1437 Out per device
- Acyclic Data Exchange (for Configuration + Diagnostic)
- Minimum cycle time 1 ms
- Alarm handling
- IP Address manager
- Commissioning tool (set name, set IP address, device blinking, etc)

## **PROFINET 10-Device**

- RT Class-1
- Up to 1437 In and 1437 Out; 1 slot for Inputs + 1 slot for Outputs
- Instructions and Maintenance 0, 1, 2, 3
- 1x Record for user custom diagnostics
- Process- and Diagnostic Alarm
- GSD file

- RoHS compliant
- (E
- OPC certified
- ODVA conformance tested
- Rockwell Encompass<sup>™</sup>



Configuration Console

| Corrector State  | List of Invalid Modules in Configure   | ine  |
|--|--|--|
| Connected  | Nase   | Vide   |
| State Descriptor  U UK U | Earligand (der life ann Yourban<br>Feel bloodlende Feelbe<br>wolder (hier<br>hearlies of hydroches)<br>Earligand (der life alter Hartise<br>Feel bloodlender Feelbe<br>today (hier<br>hartise of Tuberobies) | SciOT<br>Propositional del sub-<br>del<br>APRODATS (w/MXC) |
| Correction Mode  Y districts  Other                    | Seed Seed  | an artistost.  |

**Device Diagnostics** 

| Engineering No.  | Order No   | Description  |
|--|--|--|
| DRL-EMB-PCU 112000-5029 PCU-ETHIO PCI Network Interface Card for Modbus TCP/IP |  | PCU-ETHIO PCI Network Interface Card for Modbus TCP/IP         |
| DRL-EMB-PCIE   | 112000-5034  | PCU-ETHIO PCI Express Network Interface Card for Modbus TCP/IP |
| DRL-EIP-PCU  | 112000-5030  | PCU-ETHIO PCI Network Interface Card for EtherNet/IP           |
| DRL-EIP-PCIE   | E 112000-5033 PCU-ETHIO PCI Express Network Interface Card for EtherNet/IP |  |
| DRL-EPN-PCU  | EPN-PCU 112000-5031 PCU-ETHIO PCI Network Interface Card for PROFINET IO   |  |
| DRL-EPN-PCIE   | 112000-5032  | PCU-ETHIO PCI Express Network Interface Card for PROFINET IO   |

# Brad® SST™ Communication Module for Rockwell ControlLogix

112073

## **Modbus TCP and Serial**





## **Features and Benefits**

- Connects your Allen-Bradley® ControlLogix to a Modbus Ethernet or Serial network
- Direct 10 Mapping, no Ladder Logic to write for configuration and data transfer between module and CLX processor
- Fully integrated into the Rockwell<sup>®</sup> Automation environment
- User-friendly configuration tool with intuitive graphical interface

#### **Description**

- RLL support: remote configuration and monitoring via
   RSI inv
- Add-On-Profile for Rockwell® RSLogix5000
- USB port for user configuration and firware upgrade
- Engineering console simplified user configuration and diagnostic
- Support multiple modules in a chassis
- Support Local and Remote chassis
- Easy diagnostics: Built-in LEDs and 4 characters display

## Included Hardware/Software

- 128 MB of onboard memory
- 8 MB of flash memory (user configuration data and firmware)
- CPU Data exchange:
  - 496 Inputs bytes + 496 Output bytes
- 32.000 Words Registers (CIP messaging)
- Type A, USB 2 and 1.1 compatible
- Communication Ports
  - 1x Ethernet, 10/100 Mbps, RJ45
  - 2x Serial, 110 bps to 115.2 kbps, RS232/RS485/ RS422, RJ45 (DB9 male supplied cable)

## **Compatible Protocols**

- Modbus Master (RTU or ASCII)
- Modbus Slave (RTU or ASCII)
- Modbus TCP and UDP Client and Server

- RoHS compliant
- CE, UL, cUL
- Class 1 Div 2
- Rockwell Encompass<sup>™</sup>

| Engineering No.  | Standard Order No. | Description   |  |
|------------------|--------------------|---|--|
| SST-ESR2-CLX-RLL | 112073-0001        | Modbus communication module for Rockwell ControlLogix |  |
|                  |                    |   |  |

# Brad® applicom® Industrial Multi-Protocol Gateway

112034

## **Ethernet, Serial and PROFIBUS**



## **Features and Benefits**

- Allows simultaneous communication between industrial devices using up to 20 different Ethernet TCP/IP, PROFIBUS and Serial protocols
- Typical architectures: data translator, data concentrator, Industrial firewall
- No programming, just configuring (tools included)
- Supports unsolicited data exchange from Client device

#### Description

- Real-Time data exchange through internal database (32 Kbits/32 Kwords)
- Upload/Download configuration and diagnostic through Remote TCP/IP
- Up to 128 PLCs on Ethernet TCP and 126 PROFIBUS devices
- Full management of Read/Write cyclic access through word status commands
- Engineering Tools:
  - Configuration console
  - Test and diagnostic tools

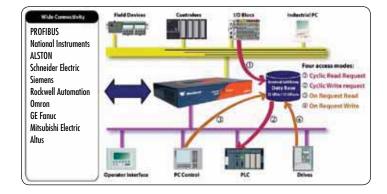
## **Included Hardware/Software**

- RAM 32 Mbytes; Flash Disk 32 Mbytes
- Diagnostic LEDs
- Communication Ports
  - 1x Serial, 2400 bps up to 115.2 Kbps, RS485/422 (2-wire or 4-wire), DB9 male
  - 1x Ethernet, 10/100 Mbps, RJ45
- 1x PROFIBUS, 9.6 Kbps up to 12 Mbps, DB9 female
- Embedded 6 Digital Inputs/2 Digital Outputs
- Desktop or DIN Rail mounting

## Compatible Protocols

- Ethernet TCP/IP (Client/Server modes)
  - Altus® Alnet II (AL 200x, Webgate)
  - Alstom® SRTP (C80-35, C80-75)
  - Allen-Bradley® EtherNet/IP (Logix, PLC-5 and SLC 500)
  - GE Fanuc® SRTP (90-30, 90-70)
  - Mitsubishi® Melsec (A, Q)
  - Omron® FINS (C, CV, CS)
  - Schneider Electric® Open Modbus TCP and UDP
  - Schneider Electric® Uni-TE (Premium and Micro)
  - Siemens® Industrial Ethernet (S5, S7, TI)
- PROFIBUS
  - DP-VO Master
- DP-VO Slave
- S7/MPI Client
- FDL S5 Client
- Serial
  - Allen-Bradley® DF1 Master
  - GE Fanuc® SNP-X Master
  - Modbus Master/Slave (ASCII and RTU)
  - Schneider Electric® Uni-Telway Slave
  - Siemens® AS511 Master
  - Siemens® TI-Dir Master

- RoHS compliant
- (E



| Engineering No.  | Standard Order No. | Description                                  |
|--|--------------------|--|
| APP-ESP-GTW 112034-0001 Ethernet to PROFIBUS/Ethernet/Serial Gateway |                    | Ethernet to PROFIBUS/Ethernet/Serial Gateway |
| APP_FSR_GTW  | 112034-0002        | Ethernet to Ethernet / Serial Gateway        |

## **Brad® HarshIO 600**

112095

## Digital IP67 IO module



## **Features and Benefits**

- Reliable solution for connecting industrial controllers to 10 devices in harsh duty environments.
- Accepts M12 threaded connectors or Brad Ultra-Lock® Push-Pull connection system
- Standard hole housing pattern allows for interchangeability with popular IO modules
- User configurable versions; user can set up each digital channel as either an input or output
- Scrolling 4 characters and visible LEDs provide maintenance personnel with the ability to easily determine 10, module and network status

## **Description**

- Rated IP67 for harsh environments
- Designed for direct machine mount applications
- Sixteen digital input/output per module
- Supports PNP and NPN input devices
- IP addressing via BootP, DHCP or static (through web interface, push button and PLC Scanner command)
- Built-in 2-port Ethernet switch for daisy chain topology
- Configurable IO capability (through webinterface and PLC Scanner commands)
- Watchdog with output reply state
- Built-in web server for remote configuration and diagnostics

## **Compatible Protocols**

- Modbus TCP and UDP Server
- EtherNet/IP Adapter
- PROFINET IO-Device

#### Conformance

- IP67 according to IEC 60529
- NEMA 6P
- Vibration: MIL-STD-202F, method 204D, condition A
- Mechanical Shock: MIL-STD-202F, method 213B, condition B
- Thermal Shock: MIL-STD-1344A
- CE, UL, cUL
- RoHS compliant
- ODVA certified
- PNO certified

## Included Hardware/Software

- IO Configurations:
  - 16 inputs
  - 14 inputs + 2 outputs
  - 12 inputs + 4 outputs
  - 8 inputs + 8 outputs
  - Universal
  - User configurable
- 10 Connectors: 8x M12 ports, Ultra-Lock® M12 female 5-pole, internally threaded
- Ethernet Connectors: Ultra-Lock M12 female, 4-pole D-coded acting as a switch, crossover capability
- Power Connectors:
  - Power In—Male Mini-Change®, 4- or 5-pole
- Power Out-Female Mini-Change, 4- or 5-pole
- Power Requirements:
  - Module Input Power—24V DC
  - Module Output Power—24V DC, 2.0A max. per channel, 8.0A max. per module
- Communication Rate: 10/100 Mbps auto-sensing, auto-crossing, half/full duplex
- Input Type:
  - Compatible with dry contact and PNP or NPN 3-wire switches.
  - Electronic short circuit protection
- Input Delay: 2.5ms default or configurable (through web interface and PLC Scanner commands)
- Input Device Supply: 200mA per port at 25°C
- Output Load Current: 2.0A max. per channel, electronic short circuit protection
- Maximum Switching Frequency: 200 Hz
- Housing Dimensions: 60.00mm (2.36") by 220.00mm (8.66") by 20.00mm (.78")
- Mounting Dimensions:
  - 37.50mm (1.48") horizontal on centers
  - 210.00mm (8.27") vertical on centers
  - Center hole
- Operating Temperature: -25 to +70°C
- Storage Temperature: -40 to +85°C

## **Modbus TCP**

| F               | Standard Order No. | N{ D D:           | IO Confi             | iguration   | l                  |
|-----------------|--------------------|-------------------|----------------------|-------------|--------------------|
| Engineering No. | Standard Order No. | No. of Power Pins | Input                | Output      | Input Channel Type |
| TCDEM-8DON-D1U  | 112095-0007        | 5                 | 16                   |             | NPN                |
| TCDEM-8C2N-D1U  | 112095-0005        | 5                 | 14                   | 2           | NPN                |
| TCDEM-8B4N-D1U  | 112095-0003        | 5                 | 12                   | 4           | NPN                |
| TCDEM-888N-D1U  | 112095-0001        | 5                 | 8                    | 8           | NPN                |
| TCDEM-8D0P-D1U  | 112095-0008        | 5                 | 16                   |             | PNP                |
| TCDEM-8C2P-D1U  | 112095-0006        | 5                 | 14                   | 2           | PNP                |
| TCDEM-8B4P-D1U  | 112095-0004        | 5                 | 12                   | 4           | PNP                |
| TCDEM-888P-D1U  | 112095-0002        | 5                 | 8                    | 8           | PNP                |
| TCDEM-8YYX-D1U  | 112095-0009        | 5                 | 16 User Configurable |             | User Configurable  |
| TCDEM-8DON-DYU  | 112095-5021        | 4                 | 16                   |             | NPN                |
| TCDEM-8C2N-DYU  | 112095-5022        | 4                 | 14                   | 2           | NPN                |
| TCDEM-8B4N-DYU  | 112095-5023        | 4                 | 12                   | 4           | NPN                |
| TCDEM-888N-DYU  | 112095-5024        | 4                 | 8                    | 8           | NPN                |
| TCDEM-8DOP-DYU  | 112095-5025        | 4                 | 16                   |             | PNP                |
| TCDEM-8C2P-DYU  | 112095-5026        | 4                 | 14                   | 2           | PNP                |
| TCDEM-8B4P-DYU  | 112095-5027        | 4                 | 12                   | 4           | PNP                |
| TCDEM-888P-DYU  | 112095-5028        | 4                 | 8                    | 8           | PNP                |
| TCDEM-8YYX-DYU  | 112095-5038        | 4                 | 16 User Co           | onfigurable | User Configurable  |

## EtherNet/IP

| Faratara da an Na | Standard Order No. | No. of Power Pins | IO Configuration     |             | I (I I             |
|-------------------|--------------------|-------------------|----------------------|-------------|--------------------|
| Engineering No.   |                    | No. of Power Pins | Input                | Output      | Input Channel Type |
| TCDEI-8DON-D1U    | 112095-5003        | 5                 | 16                   |             | NPN                |
| TCDEI-8C2N-D1U    | 112095-5004        | 5                 | 14                   | 2           | NPN                |
| TCDEI-8B4N-D1U    | 112095-5005        | 5                 | 12                   | 4           | NPN                |
| TCDEI-888N-D1U    | 112095-5006        | 5                 | 8                    | 8           | NPN                |
| TCDEI-8DOP-D1U    | 112095-5007        | 5                 | 16                   |             | PNP                |
| TCDEI-8C2P-D1U    | 112095-5008        | 5                 | 14                   | 2           | PNP                |
| TCDEI-8B4P-D1U    | 112095-5009        | 5                 | 12                   | 4           | PNP                |
| TCDEI-888P-D1U    | 112095-5010        | 5                 | 8                    | 8           | PNP                |
| TCDEI-8YYX-D1U    | 112095-5011        | 5                 | 16 User Configurable |             | User Configurable  |
| TCDEI-8DON-DYU    | 112095-5012        | 4                 | 16                   |             | NPN                |
| TCDEI-8C2N-DYU    | 112095-5013        | 4                 | 14                   | 2           | NPN                |
| TCDEI-8B4N-DYU    | 112095-5014        | 4                 | 12                   | 4           | NPN                |
| TCDEI-888N-DYU    | 112095-5015        | 4                 | 8                    | 8           | NPN                |
| TCDEI-8DOP-DYU    | 112095-5016        | 4                 | 16                   |             | PNP                |
| TCDEI-8C2P-DYU    | 112095-5017        | 4                 | 14                   | 2           | PNP                |
| TCDEI-8B4P-DYU    | 112095-5018        | 4                 | 12                   | 4           | PNP                |
| TCDEI-888P-DYU    | 112095-5019        | 4                 | 8                    | 8           | PNP                |
| TCDEI-8YYX-DYU    | 112095-5020        | 4                 | 16 User Co           | onfigurable | User Configurable  |

## PROFINET 10

| Engineering No. | Standard Order No. | No. of Power Pins | IO Configuration |                   | Input Channel Type |
|-----------------|--------------------|-------------------|------------------|-------------------|--------------------|
| Engineering No. | Standard Order No. | No. of Fower Fins | Input            | Output            | inpur Channel Type |
| TCDEP-8DON-D1U  | 112095-5029        | 5                 | 16               |                   | NPN                |
| TCDEP-8C2N-D1U  | 112095-5030        | 5                 | 14               | 2                 | NPN                |
| TCDEP-8B4N-D1U  | 112095-5031        | 5                 | 12               | 4                 | NPN                |
| TCDEP-888N-D1U  | 112095-5032        | 5                 | 8                | 8                 | NPN                |
| TCDEP-8D0P-D1U  | 112095-5033        | 5                 | 16               |                   | PNP                |
| TCDEP-8C2P-D1U  | 112095-5034        | 5                 | 14               | 2                 | PNP                |
| TCDEP-8B4P-D1U  | 112095-5035        | 5                 | 12               | 4                 | PNP                |
| TCDEP-888P-D1U  | 112095-5036        | 5                 | 8                | 8                 | PNP                |
| TCDEP-8YYX-D1U  | 112095-5037        | 5                 | 16 User Co       | User Configurable |                    |

## Brad® Direct-Link® Harsh Duty Ethernet Switches

112115/112105

Series 750 (5-port) and 780 (8-port)



As our world becomes more connected, an increasing number of manufacturers and installers are specifying Ethernet devices for their harsh applications. The Brad family of rugged connectivity products is a leading product line provider of Ethernet infrastructure for Molex.

The Molex Direct-Link, harsh-duty, Ethernet switches have been developed to allow customers to convert from traditional in-cabinet to on-machine mounting, moving the switch closer to the machine and thereby reducing cabling.

The Molex Ultra-Lock® system of connectors and cordsets complete the Direct-Link Harsh-Duty Switches line.

Available in 5-port and 8-port versions, the Molex durable switches with push/pull connectors save cabling and reduce installation time and cost compared with existing cabinet installations. They provide easier system maintenance and produce a seal when connected regardless of labor skill. The connections are tested to IP69K ratings to ensure operation through dust, pressure-wash and immersion in water. Mechanical keying and radial seals eliminate the risk for operator error commonly found in other systems.

Narrow dimensions are sized to fit standard machine extrusions for easy mounting. Auto-learning features make each unit truly plug-and-play, suitable for both the novice and expert in network setup.

Operating temperature ratings of -20 to +75°C ensure that networks linked using the harsh-duty switches can run in extreme environments. Coupled with Class 1, Division 2 certification these switches can also be used in Oil and Gas, Mining and utility applications.

## **Features and Benefits**

- Ultra-Lock® Connection system—faster, simpler and more secure connections than any other system on the market
- NEMA 6 and IP69k rated environmental Protection withstands dust, pressure-wash and submersion in water
- Class 1, Division 2 rated—suitable for Oil and Gas markets where hazardous gases may be present
- Operating temperature -20 to +75°C enables installation in extreme temperature applications
- 30mm and 60mm formats with standard hole patterns allows use of standard machine extrusion members
- Auto-learning with no software or configuration required—plug-and-play capabilities means less-skilled labor is able to install systems

## **Characteristics and Performance**

Switch Type: Unmanaged (Store and Forward)
Ports: 10BaseT/100BaseTx M12
Latency (10Mb): 16 \mus + frame time
Latency (100Mb): 5 \mus + frame time
Duplex Operation: Full or half
Mounting: Screw mount

Power Input: Redundant input terminals Input Power: 2.0W max. (DRL-750), 2.4W max. (DRL-78x)

Voltage: 9-36VDC (continuous) Isolation: 1500 VRMS 1 minute Dimensions: 176 x 30 x 34 (DRL-750)

220 x 60 x 37 (DRL-78x) Weight: 230g (DRL-750)

# 580g (DRL-7Bx) Environmental

Humidity: 5-95% RH non condensing

## References

Vibration: 7g (IEC68-2-29) Shock: 50g (IEC68-2-29) Electrical Safety: EN61010-1 (IEC61010) EMI Emissions: FCC part 15, ICES 003, EN55011 Class A (DRL-78x), Class B (DRL-750)

EMC Immunity: EN61326, EN61000-4-4, EN61000-4-5, EN61000-4-2;

> 8Kv contact/16Kv Air (DRL-750) 4Kv contact/8Kv Air (DRL-78x)

UL: File number pending

Hazardous Rating: Class 1, Division 2 certification

#### Physical

Operating Temperature: -20 to +75°C Storage Temperature: -40 to +85°C

| DDI 750 110111 5001 ID/7 5 + 5-1 + 11      |                                     |
|--|-------------------------------------|
| DRL-750 112111-5001 IP67 Fast Ethernet Unm | naged Switch 5 M12                  |
| DRL-780 112105-5002 IP67 Fast Ethernet Unm | naged Switch 8 Mini-Change® (5-pin) |
| DRL-781 112105-5004 IP67 Fast Ethernet Unm | naged Switch 8 Mini-Change (4-pin)  |

## Brad® Common Industrial Protocol (CIP\*) Safety Software Kit (Stack)

112115/112116/112117

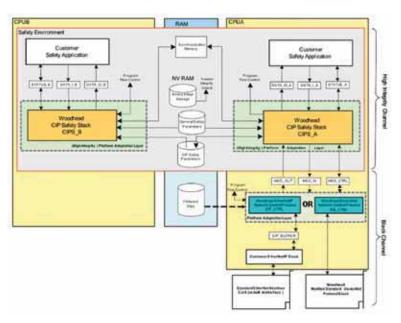
# DeviceNet and EtherNet/IP\* Stack Development Kits



Molex demonstrates market leadership with the comprehensive CIP\* Safety Stack software solution, allowing industrial-device manufacturers to embed CIP Safety Stack technology quickly and economically within their products

Common Industrial Protocol (CIP) Safety is a protocol extension developed by the ODVA. The CIP Safety protocol offers a set of highly-integrated safety services which leverage the underlying communications stacks of the standard CIP networks to transport data from a source to a destination. CIP Safety allows end-users to implement safety systems in a more integrated, cost-effective manner. The Molex CIP Safety Software Kit (also called Stack) is offered as a tool kit, with the stack provided as modular "C" code that is pre-tested. The software allows a manufacturer of intelligent industrial products to implement the necessary safety-application layer that enables products to comply with the CIP Safety specification (Edition 2.1) from ODVA. The CIP Safety Stack is available for both DeviceNet\* and EtherNet/ IP\*, and both are endorsed by Rockwell Automation under the Value Added Design Partner program.

The CIP Safety Stack is approved by TUV for SIL3 applications and it has been conformance tested using the ODVA Conformance Test. Molex can support customers that request assistance with design implementation and/or guidance through TUV approval.



\*CIP Safety Software Stack Concept for a Slave (Adapter) Application

| Engineering No.   | Standard Order No. | Device Type         | Network  | Description   |  |  |
|-------------------|--------------------|---------------------|--|---|--|--|
| SDK-DNS-SAF       | 112115-0001        |                     |  | Stack Development Kit (Standard Source Code)                  |  |  |
| SDK-DNS-SAF-O     | 112115-0002        | Slave               | Slave DeviceNet Stack Development Kit (Source Code Obfusca |   |  |  |
| SDK-DNS-SAF-L     | 112116-0001        |                     |  | Royalty (per device)  |  |  |
| SDK-EIP-ADP-SAF   | 112117-0001        |                     |  | Stack Development Kit (Standard Source Code)                  |  |  |
| SDK-EIP-ADP-SAF-O | 112117-0002        | Adapter EtherNet/IP |  | Stack Development Kit (Source Code Obfuscation <sup>†</sup> ) |  |  |
| SDK-EIP-ADP-SAF-L | 112116-0002        |                     |  | Royalty (per device)  |  |  |
| SDK-DEP-SAP-SAF   | 112115-0003        | Slave and Adapter   | DeviceNet and  | Stack Development Kit (Standard Source Code)                  |  |  |
| SDK-DEP-SAP-SAF-O | 112115-0004        | Slave and Adapter   | EtherNet/IP  | Stack Development Kit (Source Code Obfuscation <sup>†</sup> ) |  |  |
| SDK-CIP-EDS-SAF   | 112115-0005        | N/A                 | N/A  | Engineering Support   |  |  |

<sup>\*</sup>CIP, DeviceNet and EtherNet/IP are trademarks of ODVA, Inc.

†Note: Source code obfuscation means that the "C" code is protected, but the compiler can process it.

## **Features and Benefits**

- Meets IEC 61508, SIL3 ensuring international market acceptance
- Approved by TUV and tested by ODVA means a high-quality solution for minimal project risk and faster time-to-market
- Pre-tested modular ANSI C code is easy to compile using standard compilers; faster time-to-market
- Molex engineers can support protocol-integration requests minimizing investment required for in-house resources
- Designed for use with other Molex/Brad offerings: Hardware (DN4 network interface cards), Software (DeviceNet or EtherNet/IP software stacks) which results in a complete CIP communication solution

## **Specifications**

- ANSI C code is provided for the safety portion of the Stack (Compliant with CIP Safety Specification 2.1)
- ANSI C code for black-channel components (NET CTRL 10)
- Interface specification for high-integrity and blackchannel environments
- Safety integration manual (including safety measure requirements)
- Optionally, modified standard CIP stacks (software/ firmware) for DeviceNet (Slave) or EtherNet/IP (Adapter)
- Optionally, ANSI C code for the Platform Adaptation Layers (both safety and non-safety)
- Documentation required by certification bodies (TÜV, ODVA)
- Support during certification process of vendor's final product

## **Markets and Applications**

- Industrial Device Manufacturers
- I/O blocks
- Valves
- Drives
- Complex machines (OEM)
- End-Users
- Automotive
- Consumer goods
- Heavy industries

## Brad® Direct-Link® In-Cabinet Ethernet Switches

112036

## **Series 200 and 300**



A complete line of industrial Ethernet switches for managed or unmanaged applications.

Comband Colon No.

## **Features and Benefits**

- 5-, 8- and 9-port configurations support both Copper and fiber wiring
- Unique ergonomic design with DIN rail or panel mount option using a dual-clip system for quick and easy installation
- Small footprint in IP30 industrial package
- Supports all standard IEEE 802.3 protocols
- Redundant, dual-DC power inputs

## Series 200—Unmanaged Switches

- Direct-Link Industrial Ethernet unmanaged switches provide enhanced performance allowing you to achieve real-time deterministic operation of your Ethernet network
- Plug-and-play—no configuration required
- Best value for reducing network collisions

## Series 300—Managed Switches

- Direct-Link Industrial Ethernet managed switches offer many features to meet your network management and diagnostic needs
- Advanced Network Management
  - Rapid Spanning Tree Protocol (RSTP) for fault-tolerant loops
  - VLAN (port and tag based) for traffic segregation
  - Message filtering to stop multi-cast storms (IGMP snooping)
  - Priority queuing for real-time performance (QoS)
  - Web-browser interface
- Comprehensive Network Diagnostics
  - RMON and port mirroring
  - SNMP agent v1, v2 and v3 (for extra security)

| Engineering No. | Standard Order No. | Product Description  |  |  |
|-----------------|--------------------|--|--|--|
| DRL-241-MSC     | 112036-0006        | Industrial 5-port Ethernet switch, unmanaged, 4 RJ-45, 1 fiber, multi-mode, SC connector   |  |  |
| DRL-241-MST     | 112036-0007        | Industrial 5-port Ethernet switch, unmanaged, 4 RJ-45, 1 fiber multi-mode, ST connector    |  |  |
| DRL-250         | 112036-0010        | Industrial 5-port Ethernet switch, unmanaged, 5 RJ-45                                      |  |  |
| DRL-280         | 112036-0011        | Industrial 8-port Ethernet switch, unmanaged, 8 RJ-45                                      |  |  |
| DRL-281-MST     | 112036-0013        | Industrial 9-port Ethernet switch, unmanaged, 8 RJ-45, 1 fiber multi-mode, ST connector    |  |  |
| DRL-332-MSC     | 112036-0016        | Industrial 5-port Web-managed Ethernet switch, 3 RJ-45, 2 fiber, multi-mode, SC connector  |  |  |
| DRL-332-MST     | 112036-0017        | Industrial 5-port Web-managed Ethernet switch, 3 RJ-45, 2 fiber, multi-mode, ST connector  |  |  |
| DRL-350         | 112036-0020        | Industrial 5-port Ethernet switch, managed, 5 RJ-45, redundant power supply                |  |  |
| DRL-362-MSC     | 112036-0021        | Industrial 8-port Web-managed Ethernet switch, 6 RJ-45, 2 fiber, multi-mode, SC connector  |  |  |
| DRL-362-MST     | 112036-0022        | Industrial 8-port Web-managed Ethernet switch, 6 RJ-45, 2 fiber, multi-mode, ST connector  |  |  |
| DRL-362-SSC     | 112036-0023        | Industrial 8-port Web-managed Ethernet switch, 6 RJ-45, 2 fiber, single-mode, SC connector |  |  |
| DRL-380         | 112036-0025        | Industrial 8-port Ethernet switch, managed, 8 RJ-45  |  |  |
| DRL-3FO         | 112036-0026        | Industrial 16-port Ethernet Switch, RJ-45, Managed, Redundant Power                        |  |  |
| DRL-3HO         | 112036-1127        | Industrial 18-port Ethernet Switch, RJ-45, Managed, Redundant Power                        |  |  |
|                 |                    |  |  |  |

## **Specifications**

Ethernet protocols supported:

IEEE 802.3 protocols (IEEE 802.3, 802.3u, 802.3x)

10/100BaseT(x) Ports: Shielded RJ45

Auto-negotiating:

10/100 Mbps auto-negotiation

**UL Approval:** 

- UL 508 (E205563)

- UL 1604 (E314891)

Class 1, Div 2

Group A, B, C, D hazardous locations

Auto-crossover (Auto-mdi/mdi-x): Supported on all ports

Flow Control: Half or full duplex Ethernet Isolation: 1500 VRMS 1 minute Forwarding Mode: Store and forward

Latency (Typical): 5 usec (time to route a message from one

port to another internally at 100 Mps)

MAC Addresses: 1K or 2K Address Learning: Automatic Illegal Frames: Dropped per 802.3 Late Collisions: Dropped after 512 bit times

Supply Voltage: 10-30V DC

Power Consumption (Typical): 2–5 W (dependent on model)

Power Saving: Automatic
Mounting: DIN rail or panel direct
Dimensions: Height—142.24mm (5.60")
Depth—102.36mm (4.03")
Width—5-port: 27.18mm (1.07")
8- and 9-port: 38.74mm (1.525")

## **Environmental**

Humidity: 5 to 95% (non-condensing)

## Certification

Vibration: IEC68-2-6 Electrical Safety: EN61010-1

EMI Emissions: FCC part 15, ICES 003, EN55011 (Class A)

EMC Immunity: EN61326 Packaging: IP30 protection

#### **Physical**

Operating Temperature: -10 to +60°C Storage Temperature: -40 to +85°C

# Industrial Ethernet Brad® RJ-Lnxx® RJ-45 Single-Ended Cordsets

## 130050

## Male, Pigtail Straight



#### **Features and Benefits**

- RJ-45 plug, combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
- Category 5e compliant
- Several cable options available

## **ENS—Solid Core Cable**

#### **Physical**

Cable: Solid core

Conductors: 24 AWG solid bare Copper,

0.020" (0.510 mm)

Insulation: 0.009" (0.229 mm) of Cellular Polyethylene 0.04" (1.00mm) nominal diameter

Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum

Shield: Aluminum/Polyester tape, 20% overlay minimum Drain Wire: 24 AWG stranded (7/32") Tin-plated Copper

Jacket:

Black Polyurethane 0.025" (.635 mm) nominal thickness

Operating Temperature: -20 to +80°C

Wiring Sequence: Choice of TIA/EIA, 568A/B, or 10 Base-T

## Electrical at 20°C

TIA/EIA Rating: Category 5e

## **ENP—Kevlar Wrapped Cable**

## **Physical**

Cable: Proplex Kevlar wrapped

Conductors: 26 AWG stranded bare Copper Insulation: Color coded HFFR, halogen free, 0.035" (0.90mm) nominal diameter

Pair: Cabled with Kevlar strength member and tape wrapped

Core: Four pairs cabled together

Shield: Inner—Aluminum mylar, 100% coverage

Outer—Tinned Copper

Operating Temperature: -70 to +105°C

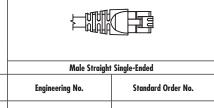
Jacket: Black Urethane 0.059" (1.50mm) nominal thickness

Diameter: 0.287" (7.30 mm) nominal

Wiring Sequence: Choice of TIA/EIA, 568A/B, or 10 Base-T

## Electrical at 20°C

TIA/EIA Rating: Category 5



|   |                     | maio on aigin onigio annou |        |                 |                    |
|---|---------------------|----------------------------|--------|-----------------|--------------------|
| Cable Type  | Cable Jacket Wiring |                            | Length | Engineering No. | Standard Order No. |
| Shielded Stranded Proplex™<br>Kevlar* Wrapped (ENP) | PUR                 | 10 Base-T (4 wire)         | 1.0m   | ENP1305M010     | 130050-0105        |
| Chialded Calid Care (ENC)                           | DVC                 | 568A (8 wire)              | 1.0m   | ENS2305M010     | 130050-0392        |
| Shielded Solid Core (ENS)                           | PVC                 | 568B (8 wire)              | 1.0111 | ENS3305M010     | 130050-0436        |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code† Build-a-Part Number

|        |        | <b>V</b> |                                |
|--------|--------|----------|--------------------------------|
|        | Length | Code     |                                |
|        | 2      | M020     |                                |
| Meters | 5      | M050     |                                |
|        | 10     | M100     | ENP1305M010                    |
|        |        |          | ➤ Wiring Option ➤ Cable Option |

<sup>\*</sup>Kevlar is a trademark of DuPont

# Industrial Ethernet Brad® RJ-Lnxx RJ-45 Double-Ended Cordsets

## 130050

## Male-Male Straight Standard RJ-45





## **Features and Benefits**

- RJ-45 plug, combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
- Category 5e compliant
- Several cable options available

Unshielded Stranded (ENQ)

## **ENS—Shielded Solid Core Cable**

#### **Physical**

Cable: Solid core

Conductors: 24 AWG solid bare Copper, 0.020" (0.510mm) Insulation: 0.009" (0.229mm) of cellular polyethylene

0.04" (1.0mm) nominal diameter

Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum Shield: Aluminum/polyester tape, 20% overlay minimum

Drain Wire: 24 AWG stranded (7/32") Tin-plated Copper Jacket: Black polyurethane 0.025" (.635mm) nominal

thickness

Operating Temperature: -20 to +80°C Diameter: 0.245" (6.223mm) nominal TIA/EIA Rating: Category 5e

## **ENQ**—Unshielded Stranded Cable

## **Physical**

Cable: Stranded

Conductors: 24 AWG stranded tinned Copper

Insulation: Polyolefin 0.037" (0.94mm) nominal diameter Pair: Two insulated conductors twisted together, lay lengths

varied between pairs to minimize cross talk
Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum

Operating Temperature: -20 to +80°C

Jacket: PVC 0.025" (0.635mm) nominal thickness

Diameter: 0.220" (5.588mm) nominal TIA/EIA Rating: Category 5e

24

## ENP—Shielded Standard Proplex™ Kevlar Wrapped Cable

## **Physical**

Cable: Proplex Kevlar wrapped

Conductors: 26 AWG stranded bare Copper Insulation: Color coded HFFR, halogen free, 0.035" (0.90mm) nominal diameter

Pair: Cabled with Kevlar strength member and tape wrapped

Core: Four pairs cabled together

Shield: Inner—Aluminum mylar, 100% coverage Outer—Tinned Copper braid, 80% coverage

Operating Temperature: -70 to +105°C

Jacket: Black urethane 0.059" (1.5mm) nominal thickness

Diameter: 0.287" (7.3mm) nominal TIA/EIA Rating: Category 5e

## **ENV**—Shielded Solid Core

## Physical

Cable: Solid core

Conductors: 24 AWG solid bare Copper, 0.020" (0.510mm) Insulation: Polyethylene, 0.042" (1.07mm) nominal diameter Pair: Two insulated conductors twisted together, lay lengths

varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum

Shield: Aluminum/polyester tape

Drain Wire: 24 AWG Tin Copper matt polyurethane
Jacket: Black Polyurethane UV stable, 0.0244" (0.620mm)

nominal thickness

Diameter: 0.244" (6.200mm) nominal Operating Temperature: -20 to 60°C

Wiring Sequence: Choice of TIA/EIA 568A/B or 10 Base-T

FNQ3335M010

130050-0507

TIA/EIA Rating: Category 5e

| Cable Type   | Cable Jacket         | ket Wire Size AWG | Wiring             | Lounth | Male Straight-to-Male Straight |                    |
|--|----------------------|-------------------|--------------------|--------|--------------------------------|--------------------|
| Capie Type   |                      |                   | vviring            | Length | Engineering No.                | Standard Order No. |
| clillic. I in I mw I                               | PUR With Kevlar Wrap | 26                | 10 Base-T (4 wire) | 1.0m   | ENP1335M010                    | 130050-0107        |
| Shielded Stranded Proplex™ Kevlar<br>Wrapped (ENP) |                      |                   | 568A (8 wire)      |        | ENP2335M010                    | 130050-0150        |
| Widphea (FM)                                       |                      |                   | 568B (8 wire)      |        | ENP3335M010                    | 130050-0457        |
|  |                      |                   | 10 Base-T (4 wire) |        | ENS1335M010                    | 130050-0324        |
| Shielded Solid Core (ENS)                          | PUR                  | 24                | 568A (8 wire)      | 1.0m   | ENS2335M010                    | 130050-0394        |
|  |                      |                   | 568B (8 wire)      |        | ENS3335M010                    | 130050-0503        |
| Shielded Solid Core (ENV)                          | PUR                  | 24                | 568B (8 wire)      | 1.0m   | ENV3335M010                    | 130050-0512        |

Note: Sales drawings for all standard order numbers are available on molex.com

PVC

Configuration Code\*

Build-a-Part Number

|        |        | <b>V</b> |             |                                |
|--------|--------|----------|-------------|--------------------------------|
|        | Length | Code     |             |                                |
|        | 2      | M020     |             |                                |
| Meters | 5      | M050     |             |                                |
|        | 10     | M100     | ENP1335M010 |                                |
|        |        |          |             | → Wiring Option → Cable Option |

568B (8 wire)

## Industrial Ethernet Brad® Standard RJ-45 to RJ-45 Cable Assembly Unshielded PVC

## 130048

Male Plug-to-Male Plug Straight-Wired



## **Features and Benefits**

 RJ-45 plug combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection

• Category 5e compliant

## **Reference Information**

UL File No.: E200650

#### **Physical**

RJ-45 Plug: Clear Polycarbonate

**Boot: PVC** 

Operating Temperature: -20 to +75°C

## **Environmental**

Protection: IP20

## Cable

## 03—Unshielded PVC

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.250" (5.60mm) nominal

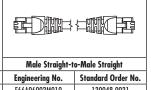
Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE

Certification: UL type CMR, Cec C(UL) type CMR

TIA/EIA Rating: Category 5e

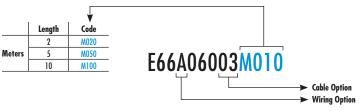
Operating Temperature: -40 to +75°C



WiringCable TypeCable JacketWire Size AWGLengthEngineering No.Standard Order No.10 Base-T (4 wire)Unshielded StrandedPVC4/241.0m (3.28')E66A06003M010130048-0031

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number



# Industrial Ethernet Brad® RJ-Lnxx® RJ-45 Single-Ended Cordsets

## 130050

Threaded Male Straight



## **Features and Benefits**

- RJ-45 plug, combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
- Category 5e compliant
- Several cable options available
- Achieves IEC IP67 rates seal when mated with an RJ-Lnxx<sup>®</sup> receptacle

## **ENS—Shielded Solid Core Cable**

#### **Physical**

Cable: Solid Core

Conductors: 24 AWG solid bare Copper, 0.020" (0.510mm) Insulation: 0.009" (0.229mm) of cellular polyethylene 0.04" (1.0mm) nominal diameter

Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum Shield: Aluminum/Polyester tape, 20% overlay minimum

Drain Wire: 24 AWG stranded (7/32") Tin-plated Copper Jacket: Black Polyurethane 0.025" (.635mm) nominal thickness

Operating Temperature: -20 to +80°C Diameter: 0.245" (6.223mm) nominal TIA/EIA Rating: Category 5e

## **ENQ**—Unshielded Stranded Cable

## **Physical**

Cable: Stranded

Conductors: 24 AWG stranded tinned Copper

Insulation: Polyolefin 0.037" (0.94mm) nominal diameter Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum

Operating Temperature: -20 to +80°C

Jacket: PVC 0.025" (0.635mm) nominal thickness

Diameter: 0.220" (5.588mm) nominal TIA/EIA Rating: Category 5e

## ENP—Shielded Standard Proplex™ Kevlar\* Wrapped Cable

## **Physical**

Cable: Proplex Kevlar wrapped

Conductors: 26 AWG stranded bare Copper Insulation: Color coded HFFR, Halogen free, 0.035"

(0.90mm) nominal diameter

Pair: Cabled with Kevlar strength member and tape wrapped

Core: Four pairs cabled together

Shield: Inner—Aluminum Mylar, 100% coverage

Outer—Tinned Copper braid, 80% coverage

Operating Temperature: -70 to +105°C

Jacket: Black Urethane 0.059" (1.50mm) nominal thickness

Diameter: 0.287" (7.30mm) nominal TIA/EIA Rating: Category 5e

## ENV—Shielded Solid Core

## **Physical**

Cable: Solid core

Conductors: 24 AWG solid bare Copper, 0.020" (0.510mm) Insulation: Polyethylene, 0.042" (1.07mm) nominal diameter Pair: Two insulated conductors twisted together, lay lengths

varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum

Shield: Aluminum/Polyester tape

Drain Wire: 24 AWG Tin Copper matt Polyurethane
Jacket: Black Polyurethane UV stable, 0.0244" (0.620mm)

nominal thickness

Diameter: 0.244" (6.200mm) nominal Operating Temperature: -20 to 60°C

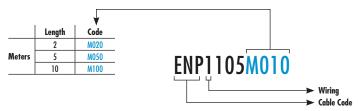
Wiring Sequence: Choice of TIA/EIA 568A/B or 10 Base-T

TIA/EIA Rating: Category 5e

| Cable Type   | Cable Jacket       | Wire Size | Wiring             | Length | Male Straight   |                    |
|--|--------------------|-----------|--------------------|--------|-----------------|--------------------|
| Cubie Type   | Capie Jacker       | AWG       | viiliig            | Lengin | Engineering No. | Standard Order No. |
| civil ice i in i amici                             |                    |           | 10 Base-T (4 wire) |        | ENP1105M010     | 130050-0071        |
| Shielded Stranded Proplex™ Kevlar<br>Wrapped (ENP) | PUR Kevlar Wrapped | 26        | 568A (8 wire)      | 1.0m   | ENP2105M010     | 130050-0112        |
| Widphea (ENI )                                     |                    |           | 568B (8 wire)      |        | ENP3105M010     | 130050-0162        |
|  | PUR                | 24        | 10 Base-T (4 wire) | 1.0m   | ENS1105M010     | 130050-0277        |
| Shielded Solid Core (ENS)                          |                    |           | 568A (8 wire)      |        | ENS2105M010     | 130050-0328        |
|  |                    |           | 568B (8 wire)      |        | ENS3105M010     | 130050-0408        |
| Shielded Solid Core (ENV)                          | PUR                | 24        | 568B (8 wire)      | 1.0m   | ENV3105M010     | 130050-8023        |
| Unshielded Stranded (ENQ)                          | PVC                | 24        | 568B (8 wire)      | 1.0m   | ENQ3105M010     | 130050-0506        |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code<sup>†</sup>
Build-a-Part Number



<sup>\*</sup>Kevlar is a trademark of DuPont

# Industrial Ethernet Brad® RJ-Lnxx® RJ-45 Double-Ended Cordsets

## 130050

Threaded
Male-Male Straight
RJ-45 (Industrial)-toRJ-45 (Industrial) and
RJ-45 (Industrial)-toRJ-45 (Standard)





## **Features and Benefits**

- RJ-45 plug, combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
- Category 5e compliant
- Several cable options available
- Achieves IEC IP67 rates seal when mated with an RJ-Lnxx<sup>®</sup> receptacle

## **ENS—Shielded Solid Core Cable**

## **Physical**

Cable: Solid Core

Conductors: 24 AWG solid bare Copper, 0.020" (0.510mm) Insulation: 0.009" (0.229mm) of cellular polyethylene 0.04" (1.0mm) nominal diameter

Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum
Shield: Aluminum/Polyester tape, 20% overlay minimum

Drain Wire: 24 AWG stranded (7/32") Tin-plated Copper Jacket: Black Polyurethane 0.025" (.635mm) nominal thickness

Diameter: 0.245" (6.223mm) nominal TIA/EIA Rating: Category 5e

## **ENQ**—Unshielded Stranded Cable

Operating Temperature: -20 to +80°C

## **Physical**

Cable: Stranded

Conductors: 24 AWG stranded tinned Copper Insulation: Polyolefin 0.037" (0.94mm) nominal diameter Pair: Two insulated conductors twisted together, lay lengths

varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum Operating Temperature: -20 to +80°C

Jacket: PVC 0.025" (0.635mm) nominal thickness

Diameter: 0.220" (5.588mm) nominal TIA/EIA Rating: Category 5e

## ENP—Shielded Standard Proplex™ Kevlar\* Wrapped Cable

## Physical

Cable: Proplex Kevlar wrapped

Conductors: 26 AWG stranded bare Copper Insulation: Color coded HFFR, Halogen free, 0.035"

(0.90mm) nominal diameter

Pair: Cabled with Kevlar strength member and tape wrapped

Core: Four pairs cabled together

Shield: Inner—Aluminum Mylar, 100% coverage

Outer—Tinned Copper Braid: 80% coverage

Operating Temperature: -70 to +105°C

Jacket: Black Urethane 0.059" (1.5mm) nominal thickness

Diameter: 0.287" (7.3mm) nominal TIA/EIA Rating: Category 5e

## **ENV**—Shielded Solid Core

## Physical

Cable: Solid core

Conductors: 24 AWG solid bare Copper, 0.020" (0.510mm) Insulation: Polyethylene, 0.042" (1.07mm) nominal diameter Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk

Core: Four pairs cabled together

Binder: Polyester tape, 20% overlay minimum

Shield: Aluminum/Polyester tape

Drain Wire: 24 AWG Tin Copper matt Polyurethane Jacket: Black Polyurethane UV stable, 0.0244" (0.620mm)

nominal thickness

Diameter: 0.244" (6.200mm) nominal Operating Temperature: -20 to 60°C

Wiring Sequence: Choice of TIA/EIA 568A/B or 10 Base-T

TIA/EIA Ratina: Category 5e

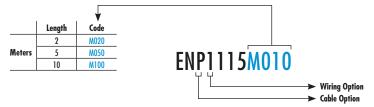
## RJ-Lnxx-to-RJ-45 RJ-Lnxx RJ-45 Male, Double-Ended

| KJ-LNXX-10-KJ-43 KJ-LNXX KJ-43 Male, Double-Ended  |                    |           |                    |        | _                  | _                                      |                 |                                      |  |
|--|--------------------|-----------|--------------------|--------|--------------------|--|-----------------|--------------------------------------|--|
| Calla Tana   | Cable Jacket       | Wire Size |                    | Lounth | Male Straight Indu | Male Straight Industrial-to-Industrial |                 | Male Straight Industrial-to-Standard |  |
| Cable Type   | Cable Jacket       | AWG       | Wiring             | Length | Engineering No.    | Standard Order No.                     | Engineering No. | Standard Order No.                   |  |
| clillic. I In I TM                                 |                    |           | 10 Base-T (4 wire) |        | ENP1115M010        | 130050-0076                            | ENP1135M010     | 130050-0093                          |  |
| Shielded Stranded Proplex™<br>Kevlar Wrapped (ENP) | PUR Kevlar Wrapped | 26        | 568A (8 wire)      | 1.0m   | ENP2115M010        | 130050-0122                            | ENP2135M010     | 130050-0140                          |  |
| Keviui Wiuppeu (Livi)                              |                    |           | 568B (8 wire)      |        | ENP3115M010        | 130050-0170                            | ENP3135M010     | 130050-8036                          |  |
|  |                    |           | 10 Base-T (4 wire) |        | ENS1115M010        | 130050-0284                            |                 |                                      |  |
| Shielded Solid Core (ENS)                          | PUR                | PUR 24    | 568A (8 wire)      | 1.0m   | ENS2115M010        | 130050-0336                            | ENS2135M010     | 130050-0371                          |  |
|  |                    |           | 568B (8 wire)      |        | ENS3115M010        | 130050-0412                            | ENS3135M010     | 130050-0429                          |  |
| Shielded Solid Core (ENV)                          | PUR                | 24        | 568B (8 wire)      | 1.0m   | ENV3115M010        | 130050-8025                            | ENV3135M010     | 130050-8029                          |  |
| Unshielded Stranded (ENQ)                          | PVC                | 24        | 568B (8 wire)      | 1.0m   | ENQ3115M010        | 130050-0251                            | ENQ3135M010     | 130050-0262                          |  |

Note: Sales drawings for all standard order numbers are available on molex.com

\*Kevlar is a trademark of DuPont

Configuration Code†
Build-a-Part Number



130053/130055

Female Panel Mount External Thread Straight



## **Features and Benefits**

- Simple field termination of cable using a standard punchdown tool
- Category 5e compliant
- Can be used with TIA 568A or 568B wiring sequences
- Color-coded block simplifies field wiring
- Achieves IEC IP67 rated seal when mated with RJ-Lnxx cordset—but also compatible with commercial RJ-45 patch cords

## **Environmental**

Protection: IEC IP67

TIA/EIA Rating: Category 5e compliant

## Physical

O-Ring Material: Viton

Insert Material: Acrylonitrile-Butadiene-Styrene (ABS)

Overmold Material: Polyurethane

Coupling Nut Material: Acrylonitrile-Butadiene-Styrene (ABS)

Shell Material: Acrylonitrile-Butadiene-Styrene (ABS)

Knockout Hole: 1.063

Thread Size: UNC 1"—14
Panel Thickness: .125" maximum with gasket,

.187" maximum without gasket,

.062" minimum

Operating Temperature: -20 to +80°C

Return Loss: 5 dB at 100 MHz

## RJ-45 Jack

Plating: 50  $\mu$ m of Gold over 100  $\mu$ m of Nickel

Current Rating: 1.5A Voltage Rating: 125V DC



| Face View | Description                                     | Female Straight |                    |  |
|-----------|---|-----------------|--------------------|--|
| race view | Description                                     | Engineering No. | Standard Order No. |  |
|           | RJ-45 Receptacle W/110<br>Punchdown Termination | ENDR2FB5        | 130053-0002        |  |

Note: Sales drawings for all standard order numbers are available on molex.com

130053/130055

Male **Straight Panel Mount External Thread** 



## **Features and Benefits**

- Ideal for OEMs looking to incorporate a sealed, robust connection into their field device
- Category 5 compliant
- Short depths for space constrained applications
- Achieves IEC IP67 rated seal when mated with an RJ-Lnxx cordset—but also compatible with commercial RJ-45 patch cords

#### **Environmental**

Protection: IEC IP67

TIA/EIA Rating: Category 5 compliant

## **Physical**

O-Ring Material: Viton

Insert Material: Acrylonitrile-Butadiene-Styrene (ABS)

Overmold Material: Polyurethane

Coupling Nut Material: Acrylonitrile-Butadiene-Styrene (ABS) Shell Material: Acrylonitrile-Butadiene-Styrene (ABS)

Knockout Hole: 1.063

Thread Size: UNC 1"—14
Panel Thickness: .125" maximum with gasket,

.187" maximum without gasket,

.062" minimum

Operating Temperature: -20 to +80°C Return Loss: 5 dB at 100 MHz

## RJ-45 Jack

Plating: 50  $\mu m$  of Gold over 100  $\mu m$  of Nickel

Current Rating: 1.5A Voltage Rating: 125V DC

| Face View | Description                      | Female          | Straight           |
|-----------|----------------------------------|-----------------|--------------------|
| race view | Description                      | Engineering No. | Standard Order No. |
|           | Direct PC Board Mount Receptacle | ENPRIFFS        | 130053-0004        |

Note: Sales drawings for all standard order numbers are available on molex.com

130053/130055

Female, Male Straight Panel Mount External Thread



## **Features and Benefits**

- Highly flexible solution for OEMs or end users looking to incorporate a sealed, robust receptacle into their field device or control panel
- Achieves IEC IP67 rated seal when mated with RJ-Lnxx cordset—but also compatible with commercial RJ-45 patch cords

## **Environmental**

Protection: IEC IP67

TIA/EIA Rating: Not rated as additional customer termination is required

## **Physical**

O-Ring Material: Viton

Insert Material: Acrylonitrile-Butadiene-Styrene (ABS)

Overmold Material: Polyurethane

Coupling Nut Material: Acrylonitrile-Butadiene-Styrene (ABS) Shell Material: Acrylonitrile-Butadiene-Styrene (ABS)

Knockout Hole: 1.063 Thread Size: UNC 1"—14

Panel Thickness: .125" maximum with gasket,

.187" maximum without gasket,

.062" minimum

Operating Temperature: -20 to +80°C Return Loss: 5 dB at 100 MHz

## RJ-45 Jack

Plating: 50  $\mu$ m of Gold over 100  $\mu$ m of Nickel

Current Rating: 1.5A Voltage Rating: 125V DC

| Face View | Description                         | Female          | Straight           |
|-----------|-------------------------------------|-----------------|--------------------|
| race view | Description                         | Engineering No. | Standard Order No. |
|           | Receptacle with PC Board            | ENSR1FB5        | 130055-0016        |
|           | Receptacle with PC and 12" of Cable | ENSR1FB5M010    | 130055-0020        |

(10 Base-T)

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number

|        |        | $\overline{}$ |              |
|--------|--------|---------------|--------------|
|        | Length | Code          |              |
|        | 2      | M020          | -            |
| Meters | 5      | M050          | ENSR1FB5M010 |
|        | 10     | M100          | LNSKIIDSMOTO |

<sup>\*</sup>Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

130055/130058

Female Bulkhead Pass-Through Straight External Thread



## **Features and Benefits**

- Easy method for bringing an Ethernet connection in from a harsh environment to an industrial enclosure
- Category 5e compliant
- Achieves IEC IP67 rated seal when mated with RJ-Lnxx cordset—but also compatible with commercial RJ-45 patch cords

#### **Environmental**

Protection: IEC IP67 TIA/EIA Rating: Category 5e

## Physical

O-Ring Material: Viton Insert Material: ABS

Overmold Material: Polyurethane Coupling Nut Material: ABS

Shell Material: ABS Knockout Hole: 1.063 Thread Size: UNC 1"—14"

Panel Thickness: .125" max. with gasket, .187" max. without gasket,

.062" min.

Operating Temperature: -20 to +80°C Return Loss: 5 dB at 100 Mhz

## RJ-45 Jack

Plating: 50  $\mu m$  of Gold over 100  $\mu m$  of Nickel

Current Rating: 1.5A Voltage Rating: 125V DC

## RJ-11 Jack

Plating: 50 µm of Gold over 100 µm of Nickel

Current Rating: 1.5A Voltage Rating: 125V DC

| Face View | Description   | Female          | Straight           |
|-----------|---|-----------------|--------------------|
| rute view | Description   | Engineering No. | Standard Order No. |
|           | RJ-11 Bulkhead Pass-Through Receptacles with<br>Backside Jack             | ENSP6F5         | 130055-0014        |
|           | RJ-11 Bulkhead Pass-Through Receptacles with 12"<br>Male RJ-45 Patch Cord | ENSP1F5M010     | 130055-0005        |
|           | RJ-11 Bulkhead Pass-Through Receptacles with<br>Backside Jack             | ENSP1F5         | 130055-0001        |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number

|        | Length | Code |             |
|--------|--------|------|-------------|
|        | 2      | M020 | FNCD1FFM010 |
| Meters | 5      | M050 | ENSP1F5M010 |
|        | 10     | M100 |             |

<sup>\*</sup>Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

## 130058

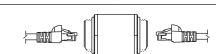
## **Threaded Interconnect**





## **Features and Benefits**

- Allows either molded or field attachable male connectors to be mated together, extending overall system length
- Two M40 nylon lock nuts and threaded barrel allow the interconnected to be positively fixed to a panel or enclosure wall



|           |                       | ٣ـــــ          |                    |  |
|-----------|-----------------------|-----------------|--------------------|--|
| Face View | Description           | Female Straight |                    |  |
| (Female)  | 2004 Phon             | Engineering No. | Standard Order No. |  |
|           | In-Line—Interconnect  | RJBG16821       | 130058-0057        |  |
|           | Threaded—Interconnect | RJBG16821       | 130058-0059        |  |

# Industrial Ethernet Brad® RJ-Lnxx® RJ-45 Sealed Field Attachable Connectors

130057

Female Straight

## **Features and Benefits**

- Create an industrial Ethernet cordset in the field using standard crimp tools
- Achieves IEC IP67 rated seal when mated with an RJ-Lnxx receptacle

## **Physical**

O-Ring Material: Viton

Insert Material: Acrylonitrile-Butadiene-Styrene (ABS)

Overmold Material: Polyurethane

Coupling Nut Material: Acrylonitrile-Butadiene-Styrene (ABS) Shell Material: Acrylonitrile-Butadiene-Styrene (ABS)

Thread Size: UNC 1.00—14.00"
Operating Temperature: -20 to +80°C

**Environmental** 

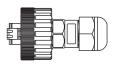
Protection: IEC IP67











| Description                          | Engineering No. | Standard<br>Order No. |
|--------------------------------------|-----------------|-----------------------|
| RJ-45 Connector (for Stranded Cable) | ENQAM315        | 130057-0001           |
| RJ-45 Connector (for Solid Cable)    | ENSAM315        | 130057-0003           |

Note: Sales drawings for all standard order numbers are available on molex.com

## Industrial Ethernet Brad® RJ-Lnxx® RJ-45 Sealed Accessories

## 130058

Female, Male Closure Caps



## **Features and Benefits**

 Attaches to RJ-Lnxx receptacles to provide an IEC IP65 rated seal for instances when a cordset is not mated

## **Physical**

Material: Protective Cap—PA6 Nylon GF (UV Stabilized)
Lanyard—EPDM Rubber

Thread Size: UNC 1.00—14.00"
Operating Temperature: -20 to +80°C

## **Environmental**

Protection: IEC IP65 (65-0300), IP67 (67-0300)





| T               | Description | Female          |                    | Male            |                    |
|-----------------|-------------|-----------------|--------------------|-----------------|--------------------|
| Туре            | Description | Engineering No. | Standard Order No. | Engineering No. | Standard Order No. |
| Сар             | IP65 Rated  | 65-0300         | 130058-0033        | 65-0301         | 130058-0034        |
| Cap and Lanyard | IP67 Rated  | 67-0300         | 130058-0035        | 67-0301         | 130058-0036        |

Note: Sales drawings for all standard order numbers are available on molex.com

# Industrial Ethernet Brad® Sealed RJ-45 Overmolded Single-Ended Cordsets

84702 Bayonet Style RJ-45 Plug



## **Features and Benefits**

- One sealing surface reduces chance of failure
- IP67 and NEMA 6P ratings ensure cable assemblies for water and dust tight functional integrity
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Category 5e specified provides high data transmission speeds
- Overmolded cable assemblies allow for faster installation

## **Reference Information**

Packaging: Bag

Mates With: 84700 and 84702 Designed In: Inches

## **Electrical**

Voltage: 150V AC Current: 1.5A

Contact Resistance: 20 milliohms max. Dielectric Withstanding Voltage:

Adjacent Contacts—1000V AC Contacts to Ground—1500V AC Insulation Resistance: 500 Megohms min.

Type: Category 5e

Transmission Performance: Category 5e RJ-45 Connection Interface: TIA/EIA-568-B Shielding Effectiveness: 20 dB min.

## Mechanical

Durability: 200 mating cycles min.

Coupling Ring Destructive Torque: 2.26Nm (20 in. lb) or more

## **Physical**

Overmolded Body: PVC, black Coupling Ring: PBT, black Holder: PBT, black Wedge: PBT, black Gasket Seal: Nitrile, black Contact: Phosphor Bronze

Plating: Contact Area—1.27 $\mu$ m (50 $\mu$ ") Gold

Underplating—Nickel
Operating Temperature: -40 to +85°C

| Standard Order No. | Length           | Lead-free |
|--------------------|------------------|-----------|
| 84702-3001         | 0.30m (1.00')    |           |
| 84702-3003         | 0.91m (3.00')    |           |
| 84702-3006         | 1.83m (6.00')    |           |
| 84702-3009         | 2.74m (9.000')   | Yes       |
| 84702-3012         | 3.66m (12.00')   | ies       |
| 84702-3020         | 6.10m (20.00')   |           |
| 84702-3050         | 15.20m (50.00')  |           |
| 84702-3100         | 30.50m (100.00') |           |

## Industrial Ethernet Brad® Sealed RJ-45 Overmolded Double-Ended Cordsets

## 84702

Bayonet Style RJ-45 Plug-to-Bayonet Style RJ-45 Plug



| Order No.  | Length         | Lead-free |
|------------|----------------|-----------|
| 84702-1001 | 0.30m (1.00')  |           |
| 84702-1003 | 0.91m (3.00')  |           |
| 84702-1006 | 1.83m (6.00')  |           |
| 84702-1007 | 2.13m (7.00')  |           |
| 84702-1009 | 2.74m (9.000') |           |
| 84702-1010 | 3.00m (10.00') | Yes       |
| 84702-1012 | 3.66m (12.00') |           |
| 84702-1015 | 4.57m (15.00') |           |
| 84702-1020 | 6.10m (20.00') |           |
| 84702-1021 | 6.40m (21.00') |           |
| 84702-1030 | 9 14m (30 00') |           |

## **Features and Benefits**

- One sealing surface reduces chance of failure
- IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Category 5e specified provides high data transmission speeds
- Overmolded cable assemblies allow for faster installation

## **Reference Information**

Packaging: Bag Mates With: 84700 and 84702 Designed In: Inches

## **Electrical**

Voltage: 150V AC Current: 1.5A

Contact Resistance: 20 milliohms max.
Dielectric Withstanding Voltage:
Adjacent Contacts—1000V AC
Contacts to Ground—1500V AC
Insulation Resistance: 500 Megohms min.
Transmission Performance: Category 5e
RJ-45 Connection Interface: TIA/EIA-568-B
Shielding Effectiveness: 20 dB min.

## Mechanical

Durability: 200 mating cycles min.

Coupling Ring Destructive Torque: 2.26Nm (20 in. lb) or

## **Physical**

Overmolded Body: PVC, black Coupling Ring: PBT, black Holder: PBT, black Wedge: PBT, black Gasket Seal: Nitrile, black Contact: Phosphor Bronze

Plating: Contact Area—1.27µm (50µ") Gold

Underplating—Nickel
Operating Temperature: -40 to +85°C

# Industrial Ethernet Brad® Sealed RJ-45 Overmolded Double-Ended Cordsets

## 84702

Bayonet Style RJ-45 Plug-to-Standard RJ-45 Plug



| Order No.  | Length         | Lead-free |
|------------|----------------|-----------|
| 84702-2001 | 0.30m (1.00')  |           |
| 84702-2003 | 0.91m (3.00')  | ]         |
| 84702-2006 | 1.83m (6.00')  |           |
| 84702-2007 | 2.13m (7.00')  |           |
| 84702-2009 | 2.74m (9.000') |           |
| 84702-2010 | 3.00m (10.00') | Yes       |
| 84702-2012 | 3.66m (12.00') |           |
| 84702-2015 | 4.57m (15.00') |           |
| 84702-2020 | 6.10m (20.00') |           |
| 84702-2021 | 6.40m (21.00') |           |
| 84702-2030 | 9.14m (30.00') |           |

## **Features and Benefits**

- One sealing surface reduces chance of failure
- IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Category 5e specified provides high data transmission speeds
- Overmolded cable assemblies allow for faster installation

## **Reference Information**

Packaging: Bag

Mates With: 84700 and 84702 Designed In: Inches Electrical

Voltage: 150V AC Current: 1.5A

Contact Resistance: 20 milliohms max. Dielectric Withstanding Voltage:

Adjacent Contacts—1000V AC
Contacts to Ground—1500V AC
Insulation Resistance: 500 Megohms min.
Transmission Performance: Category 5e
RJ-45 Connection Interface: TIA/EIA-568-B
Shielding Effectiveness: 20 dB min.

## Mechanical

Durability: 200 mating cycles min.

Coupling Ring Destructive Torque: 2.26Nm (20 in. lb)

## **Physical**

Overmolded Body: PVC, black Coupling Ring: PBT, black Holder: PBT, black Wedge: PBT, black Gasket Seal: Nitrile, black Contact: Phosphor Bronze

Plating: Contact Area—1.27µm (50µ") Gold

Underplating—Nickel
Operating Temperature: -40 to +85°C

# **Industrial Ethernet Brad® Sealed RJ-45** Receptacles

## 84702

## **Bayonet Style PCB** Mount and **Punchdown Panel Mount**





**PCB Mount** 

Punchdown Panel Mount

#### Standard Order No. Description Lead-free 84702-0005 PCB Mount Receptacle 84702-0006 Punchdown Panel Mount Receptacle 84702-0007 PCB Mount Receptacle, Potted Yes 84702-0008 Punchdown Panel Mount Receptacle, Potted 84702-0009 Punchdown with 100 Ohm Resistors

## **Features and Benefits**

- One sealing surface reduces chance of failure
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Punchdown version supports simple IDC termination

## **Reference Information**

Packaaina: Baa

Mates With: 84700 and 84702 Designed In: Inches

## Mechanical

**Electrical** 

Voltage: 150V AC

Contact Resistance: 20 milliohms max.

Adjacent Contacts—1000V AC Contacts to Ground—1500V AC

Insulation Resistance: 500 Megohms min.

RJ-45 Connection Interface: TIA/EIA-568-B

Transmission Performance: Category 5e

Shielding Effectiveness: 20 dB min.

Dielectric Withstanding Voltage:

Current: 1.5A

Durability: 200 mating cycles min. Lock Nut Destructive Torque: 2.71Nm (24 in. lb)

Receptacle Housing: PBT, black Lock Nut: Polyamide 6/6, black Panel Gasket: Neoprene, black Punchdown Block: Thermoplastic, white Wire Range (Punchdown Receptacle): 22 to 26 AWG solid and stranded, limiting outside diameter 1.40mm (.055") Operating Temperature: -40 to +85°C

# **Industrial Ethernet Brad® Sealed RJ-45 Bulkhead Pass-Through** Receptacle

## 84700 **Bayonet Style Panel Mount**

84700-0001



#### Standard Order No. Lead-free Description

## **Features and Benefits**

- Back-to-back RJ-45 pass-through brings ethernet connectivity into a control cabinet and eliminates need for conduit entry
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Meets ODVA/EtherNet™ IP specification

## **Reference Information**

Packaging: Bag Designed in: Inches

Mates With: 84700 and 84702

Waterproof: Meets requirements of IP67 and NEMA 6P for water tightness

Mechanical

**Electrical** Voltage: 150V AC

Current: 1.5A

Durability: 500 mating cycles min.

Shielding Effectiveness: 20 dB min.

Return Loss: 5 dB at 100MHz

Contact Resistance: 20 milliohms max.

Insulation Resistance: 500 Megohms min.

RJ-45 Connection Interface: TIA/EIA-568-B

Transmission Performance: Category 5e

Receptacle Housing: PBT, black Panel Gasket: Neoprene, black Lock Nut: Steel

Platina: Lock Nut-Zinc

Operating Temperature: -40 to +85°C



Yes

Panel Mount Receptacle \*EtherNet IP and DeviceNet are trademarks of the Open DeviceNet Vendor Association.

# Industrial Ethernet Brad® Sealed RJ-45 Field Wireable Connectors

## 84700



| Standard Order No. | Description           | Lead-free |
|--------------------|-----------------------|-----------|
| 84700-0002         | Field Attachable Plug | Yes       |

 $<sup>^{*}</sup>$ EtherNet IP is a trademark of the Open DeviceNet Vendor Association.

## **Features and Benefits**

- One sealing surface reduces chance of failure
- IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Superior strain relief
- Easy termination allows custom length cable to be made in the field
- Compatible with shielded and unshielded cable
- Meets ODVA/EtherNet™ IP\* specification

## **Reference Information**

Packaging: Bag

Mates With: 84700 and 84702

Designed In: Inches

Waterproof: Meets requirements of IP67 and NEMA

6P for water tightness

## Electrical

Voltage: 56.5V DC

150V RMS AC (ringing voltage only)

Current: 1.5A at 25°C (77°F)
Contact Resistance: 20 milliohms max.
Insulation Resistance: 500 Megohms min.
Transmission Performance: Category 5e
RJ-45 Connection Interface: TIA/EIA-568-B
Shielding Effectiveness: 20 dB min.

## Mechanical

Durability: 500 mating cycles min.

#### Physical

Coupling Ring: PBT, black O-Ring: Nitrile Gasket Seal: Nitrile, black Plug Holder: PBT, black

Retainer Wedge: PBT, black Wire Gauge: 24 AWG (stranded or solid conductors)

Operating Temperature: -40 to +85°C

Cable Seal Assembly: Polyamide, TPE Gland, black

# Industrial Ethernet Brad® Sealed RJ-45 Tethered Dust Cap

## 84700 Bayonet Style



| Standard Order No. | Description | Lead-free |
|--------------------|-------------|-----------|
| 84700-0003         | Dust Cover  | Yes       |

## **Features and Benefits**

- One sealing surface means less likelihood of failure
- Attachable tether so cap never gets lost
- Maintains IP67 and NEMA 6P ratings for functional integrity when connector is not mated
- IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity

## **Reference Information**

Packaging: Bag

Use With: 84700, 84702, 84729, 84730

Designed In: Inches

## Physical

Dust Cap: PBT, black Tether: PE or PP, black Gasket Seal: Nitrile, black Screw: Brass, #8-32 Plating: Screw—Nickel

Operating Temperature: -40 to +85°C

# Industrial Ethernet Brad® Micro-Change® (M12) Single-Ended Cordsets

## 130048

## Male Threaded



## **Features and Benefits**

- Familiar, proven M12 form factor provides robust connection
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Code to ensure proper alignment/mating

## Reference Information

UL File No.: E200650

#### Cables

## 03—Unshielded PVC

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.250" (5.6mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE

Certification: UL Type CMR, CEC C(UL) Type CMR

TIA/EIA Rating: Category 5e Operating Temperature: -40 to 75°C

## 05—Shielded TPE

Conductors: 22 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.236" (5.90mm) nominal

Jacket Material: Teal TPE

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE Shield Type: Foil shield, 100% coverage, 25% minimum overlap

Flex Rating: Trailing cable, 5 million bending cycles Certification: UL Type CMR, CEC C(UL) Type CMR

TIA/EIA Rating: Category 5e Operating Temperature: -20 to 75°C

## 10—Shielded PUR

Conductors: 22 AWG stranded tinned wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.255" (6.50mm) nominal

Jacket Material: Green PUR
Cable Properties: Sun resistant
Inner Material Insulation: FRNC
Shield Type: Foil Shield—100% coverage
Braid Shield—85% coverage

Flex Rating: Trailing cable, 5 million bending cycles Certification: UL Listed CMX

TIA/EIA Rating: Category 5e
Operating Temperature: -40 to 70°C

## 15—Shielded PVC

Conductors: 26 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.236" (5.99mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant

Inner Material Insulation: Foamed polypropylene

Shield Type: Foil shield, 100% coverage, 25% min. overlap

Certification: UL Type CMR, CEC C(UL) type CMR

TIA/EIA Rating: Category 5e Operating Temperature: -20 to 75°C

| Face View                       | Max. Current per Contact                       | Max. Voltage | Cable Type         | Cable Jacket | Wire Size<br>AWG | Length       | Engineering No. | Standard<br>Order No. | Engineering No. | Standard<br>Order No. |
|---------------------------------|--|--------------|--------------------|--------------|------------------|--------------|-----------------|-----------------------|-----------------|-----------------------|
| 4 Pole                          |  |              | Unshielded         | PVC          | 24               |              | E10A00603M010   | 130048-0038           | E10A00703M010   | 130048-0062           |
| -4                              |  |              | Shielded           | PVC          | 22               |              | E10A00610M010   | 130048-0046           | E10A00710M010   | 130048-0070           |
| 2                               | 1.5A   | 30V          | Shielded           | PUR          | 24               | 1.0m (3.37') | E10A00615M010   | 130048-0054           | E10A00715M010   | 130048-0078           |
| 1 - Orange (TD+) 2 - Blue (RD+) |  |              | Shielded High-Flex | TPE          | 9/               |              | E10A00605M010   | 120108-0186           |                 |                       |
| 4 - Blue/White (TD-)            | 3 - Orange/White (TD-)<br>4 - Blue/White (TD-) |              | Shielded High-Flex | irt          | 26               |              | E10A00705M010   | 120108-0187           |                 |                       |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number



# Industrial Ethernet Brad® Micro-Change® (M12) Double-Ended Cordsets

## 120049/120108/130048

Male-to-Male Straight, Right Angle Threaded



## **Features and Benefits**

- Familiar, proven M12 form factor provides robust connection
- Category 5e compliant
- D-Coded to ensure proper alignment/mating
- IP67 rated for harsh environments

## **Reference Information**

UL File No.: E200650

#### **Physical**

Connector Body: PUR O-Ring: Viton

J-Kilig. Viloli Saadsaa Mara Medad

Coupling Nut: Nickel-plated Brass

Contacts: Copper alloy with Gold over Nickel plating

## **Environmental**

Protection: IP67 NEMA Rating: NEMA 6

Operating Temperature: -20 to +75°C

## **Cables**

## 03—Unshielded PVC

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.250" (5.6mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE

Certification: UL Type CMR, CEC C (UL) Type CMR

TIA/EIA Rating: Category 5e Operating Temperature: -40 to +75° C

## 04—Unshielded TPE

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.210" (5.3mm) nominal

Jacket Material: Teal TPE

Cable Properties: Sun, oil and weld slag resistant

Inner Material Insulation: HDPE

Flex Rating: rolling band and torsional flex, 10 million cycles

Certification: UL Type CMX, CEC C (UL) Type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -20 to +75° C

## 10-Unshielded PUR

Conductors: 22 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.255" (6.5mm) nominal

Jacket Material: Green PUR

Cable Properties: Sun and oil resistant Inner Material Insulation: FRNC

Sheild Type: Foil Sheild—100% Coverage

Braid Sheild—85% Coverage

Flex Rating: Trailing cable, 5 million bending cycles Certification: UL Listed CMX

Certification: UL Listed CMX TIA/EIA Rating: Category 5e Operating Temperature: -40 to +70° C

## 05—Shielded TPE

Conductors: 26 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.236" (5.99mm) nominal

Jacket Material: Teal TPE

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE Shield Type: Foil shield, 100% coverage,

25% minimum overlap

Certification: UL Type CMR, CEC C(UL) Type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -20 to +75° C

## 15—Shielded PVC

Conductors: 26 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.236" (5.99mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant

Inner Material Insulation: Foamed polypropylene Shield Type: Foil shield, 100% coverage,

25% minimum overlap

Certification: UL Type CMR, CEC C(UL) Type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -20 to +75° C

|   |                             |                 |                         | 411             |                  |        | Male Straight-to-Male Straight |                       | Male Straight-to- | Male Right Angle      | Male Right Angle-to-Male Right Angle |                       |
|---|-----------------------------|-----------------|-------------------------|-----------------|------------------|--------|--------------------------------|-----------------------|-------------------|-----------------------|--------------------------------------|-----------------------|
| Face View   | Max. Current<br>Per Contact | Max.<br>Voltage | Cable Type              | Cable<br>Jacket | Wire Size<br>AWG | Length | Engineering No.                | Standard<br>Order No. | Engineering No.   | Standard<br>Order No. | Engineering No.                      | Standard<br>Order No. |
| 4 Pole  |                             |                 | Unshielded              | PVC             | 24               |        | E11A06003M010                  | 130048-0088           | E11A06203M010     | 130048-0137           | E11A06303M010                        | 130048-0161           |
| 5 5 5 5   |                             |                 | Unshielded<br>High Flex | TPE             | 24               |        | E11A06004M010                  | 130048-0095           |                   |                       | E11A06304M010                        | 120108-0167           |
| 1-24  | 1.5A                        | 30V             | Shielded                | PUR             | 22               | 1.0 m  | E11A06010M010                  | 130048-0114           | E11A06210M010     | 130048-0145           | E11A06310M010                        | 130048-0170           |
| 1 - Yellow (TD+) 4 - Blue (RD-)<br>2 - White (RD+) 5 - D-Code |                             |                 | Shielded                | PVC             | 26               |        | E11A06015M010                  | 130048-0122           | E11A06215M010     | 130048-0153           | E11A06315M010                        | 130048-0179           |
| 3 - Orange (TD-)  |                             |                 | Shielded                | TPE             | 26               |        | E11A06005M010                  | 120108-0188           | E11A06205M010     | 120108-0189           | E11A06305M010                        | 120108-0174           |

Note: Sales drawings for all standard order numbers are available on molex.com



Configuration Code\*
Build-a-Part Number

# Industrial Ethernet Brad® Micro-Change® (M12) Double-Ended Cordsets

## 130048

Female-to-Male Straight Threaded



## **Features and Benefits**

- Familiar, proven M12 form factor provides robust connection
- Category 5e compliant
- D-Coded to ensure proper alignment/mating
- IP67 rated for harsh environments

#### Reference Information

UL File No.: E200650

## **Physical**

Connector Body: PUR O-Ring: Viton

Coupling Nut: Nickel-plated Brass

Contacts: Copper alloy with Gold over Nickel plating

## **Environmental**

Protection: IP67 NEMA Rating: NEMA 6

Operating Temperature: -20 to 75°C

## **Cables**

## 03—Unshielded PVC

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.250" (5.6mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE

Certification: UL Type CMR, CEC C(UL) Type CMR

TIA/EIA Rating: Category 5e Operating Temperature: -40 to +75°C

## 15—Shielded PVC

Conductors: 26 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.236" (5.99mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant

Inner Material Insulation: Foamed Polypropylene

Shield Type: Foil Shield, 100% coverage, 25% min. overlap

Certification: UL Type CMR, CEC C(UL) Type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -20 to +75°C



| Face View   | Max. Current | Max.    | California | Cable Jacke | Wire Size | 1 41-  | Female Straight- | to-Male Straight   |
|---|--------------|---------|------------|-------------|-----------|--------|------------------|--------------------|
| race view   | Per Contact  | Voltage | Cable Type | Capie Jacke | AWG       | Length | Engineering No.  | Standard Order No. |
| 4 Pole 2 3 5 6 6 6 6  | 1.5A         | 30V     | Unshielded | PVC         | 24        | 1.0 m  | E11B03003M002    | 130048-0193        |
| 1 - Yellow (TD+) 4 - Blue (RD-)<br>2 - White (RD+) 5 - D-Code<br>3 - Orange (TD-) | 1.ЭА         | 307     | Shielded   | PVC         | 26        | 1.U M  | E11803015M002    | 130048-0195        |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number

|        | Length | Code |                             |
|--------|--------|------|-----------------------------|
|        | 1      | M010 |                             |
| Meters | 2      | M020 |                             |
| Meters | 5      | M050 | E11B03003M002               |
|        | 10     | M100 | Y                           |
|        |        |      | Cable Option  Wiring Option |

# Industrial Ethernet Brad® Micro-Change®-toRJ-45 Standard Plug Double-Ended Cordsets

## 130048

Female-to-Male Straight Threaded to RJ-45



## **Features and Benefits**

- Familiar, proven M12 form factor provides robust connection
- Category 5e compliant
- D-Coded to ensure proper alignment/mating
- IP67 rated for harsh environments

#### Connector

#### M12

## **Reference Information**

UL File No.: E200650

## **Physical**

Connector Body: PUR O-Ring: Viton

Coupling Nut: Nickel-plated Brass

Contacts: Copper alloy with Gold over Nickel plating

Operating Temperature: -25 to +75°C

## **Environmental**

Protection: IP67 NEMA Rating: NEMA 6

## **RJ-45**

## **Reference Information**

UL File No.: E200650

## **Physical**

RJ-45 Plug: Polycarbonate, clear

Boot: PVC

Operating Temperature: -20 to +75°C

## **Environmental**

Protection: IP20

## **Cables**

## 03—Unshielded PVC

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP Patch cable

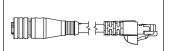
Outside Diameter: 0.250" (5.6 mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE

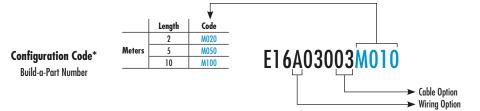
Certification: UL Type CMR, CEC C(UL) Type CMR

TIA/EIA Rating: Category 5e Operating Temperature: -40 to +75°C



| Face View   | Max. Current | Max.    | Cuble Tune | Cable Jacket | Wire Size | Launth | Female Straight- | to-Male Straight   |
|---|--------------|---------|------------|--------------|-----------|--------|------------------|--------------------|
| race view   | Per Contact  | Voltage | Cable Type | Cable Jacker | AWG       | Length | Engineering No.  | Standard Order No. |
| 4 Pole  2 5 1 1 - Yellow (TD+) 4 - Blue (RD-) 2 - White (RD+) 5 - D-Code 3 - Orange (TD-) | 1.5A         | 30V     | Unshielded | PVC          | 24        | 1.0 m  | E16A03003M010    | 130048-0197        |

Note: Sales drawings for all standard order numbers are available on molex.com



# Industrial Ethernet Brad® Micro-Change® (M12) Field Attachable Connectors

## 130047

Female, Male Straight Threaded





## **Features and Benefits**

- Fast field termination without special tooling
- D-Code to ensure proper alignment/mating

## Mechanical

Coupling Nut: Zinc diecast Shell Material: Zinc diecast

Contacts: Gold-plated Palladium Nickel

## **Cable**

22 to 24 AWG 0.25 to 0.34mm<sup>2</sup>

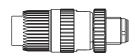
Cable Diameter: 5.50 to 7.20mm

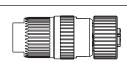
## **Environmental**

Protection: IP67

Physical

Operating Temperature: -25 to +85°C





| Poles   | Max. Current | Max. Voltage | Cable Diameter Range | Male S          | traight            | Female Straight |                    |  |
|---|--------------|--------------|----------------------|-----------------|--------------------|-----------------|--------------------|--|
| (Female View)   | per Contact  | Max. Vollage | Cable Diameter Kange | Engineering No. | Standard Order No. | Engineering No. | Standard Order No. |  |
| 4 Pole  |              |              |                      |                 |                    |                 |                    |  |
| 2 0 0 3   | 4.0A         | 32V          | 5.50-7.20mm          | E1ASO6-52       | 130047-0018        | E1ASOO-52       | 130047-0017        |  |
| 1 - Yellow (TD+) 3 - Orange (TD-)<br>2 - White (RD+) 4 - Blue (RD-) |              |              |                      |                 |                    |                 |                    |  |

Note: Sales drawings for all standard order numbers are available on molex.com

# Industrial Ethernet Brad® Ultra-Lock® (M12) Double-Ended Cordsets

## 120108

Male-to-Male Straight, Right Angle Push-to-Lock



## **Features and Benefits**

- Push-to-Lock technology assures fast, reliable connections every time
- Reliable performance in high vibration environments due to positive locking mechanism
- Ideal for wash-down and temporary submersion applications due to improved sealing design
- Ergonomic push to lock mechanisms reduce fatigue and user errors when a high number of connections need to be made
- Category 5e compliant
- D-Code to ensure proper alignment/mating
- IP67/68/69K rated for harsh environments

## Refernce Information

UL File No.: E200650

## **Physical**

Connector Body: PUR O-Ring: Viton

Coupling Nut: Nickel-plated Brass

Contacts: Copper alloy with Gold over Nickel plating Operating Temperature: -20 to +75°C

## **Environmental**

Protection: IP67/ P68/IP69K NEMA Rating: NEMA 6

## **Cables**

## 03—Unshielded PVC

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.250" (5.60mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE

Certification: UL type CMR, CEC C(UL) type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -40 to +75°C

## 04—Unshielded TPE

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.210" (5.30mm) nominal

Jacket Material: Teal TPE

Cable Properties: Sun, oil and weld slag resistant

Inner Material Insulation: HDPE

Flex Rating: Rolling band and torsional flex, 10 million cycles

Certification: UL type CMX, CEC C(UL) type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -20 to +75°C

## 10—Shielded PUR

Conductors: 22 AWG stranded tinned wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.255" (6.50mm) nominal

Jacket Material: Green PUR
Cable Properties: Sun resistant
Inner Material Insulation: FRNC
Shield Type: Foil Shield—100% coverage
Braid Shield—85% coverage

Flex Rating: Trailing cable, 5 million bending cycles Certification: UL Listed CMX

Certification: UL Listed CMX
TIA/EIA Rating: Category 5e
Operating Temperature: -40 to 70° C

## 15—Shielded PVC

Conductors: 26 AWG stranded tinned copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.236" (5.99mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant

Inner Material Insulation: Foamed polypropylene Shield Type: Foil shield, 100% coverage, 25% min. overlap

Certification: UL type CMR, CEC C(UL) type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -20 to +75°C

|   | Max. Current | Max.    | Cable Type              | Cable  | Wire Size | Length | Male Straight-to-Male Straight |                    | Male Straight-to | Male Right Angle   | Male Right Angle- | to-Male Right Angle |
|---|--------------|---------|-------------------------|--------|-----------|--------|--------------------------------|--------------------|------------------|--------------------|-------------------|---------------------|
| (Male)  | per Contact  | Voltage | Cubic Type              | Jacket | AWG       | Lengin | Engineering No.                | Standard Order No. | Engineering No.  | Standard Order No. | Engineering No.   | Standard Order No.  |
| 1_ 4  |              |         | Unshielded              | PVC    | 24        |        | EWWA06003M010                  | 120108-0066        | EWWA06203M010    | 120108-0074        | EWWA06303M010     | 120108-0082         |
|   | 1.5A         | 30V     | Unshielded<br>High Flex | TPE    | 24        | 1.0m   |                                |                    |                  |                    | EWWA06304M010     | 120108-5020         |
| 2 - 3<br>1 - White/Orange 3 - Orange<br>2 - White/Green 4 - Green | 1.5A         | 307     | Shielded                | PUR    | 22        | 1.UM   | EWWA06010M010                  | 120108-0090        | EWWA06210M010    | 120108-0098        | EWWA06310M010     | 120108-0106         |
| 2 - Mille, Oleell 4 - Oleell                                      |              |         | Shielded                | PVC    | 26        |        | EWWA06015M010                  | 120108-0042        | EWWA06215M010    | 120108-0050        | EWWA06315M010     | 120108-0058         |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number



# Industrial Ethernet Brad® Ultra-Lock® (M12) Double-Ended Cordset

## 130048

Female-to-Male Straight Push-to-Lock Crossover-Wired



#### Features and Benefits

- Brad M12 Micro-Change® Threaded to Push-to-Lock Ultra-Lock® technology assures fast, reliable connections every time
- Reliable performance in high vibration environments due to positive locking mechanism
- Ergonomic push to lock mechanisms reduce fatigue and user errors when a high number of connections need to be made
- Category 5e compliant
- D-Code to ensure proper alignment/mating
- IP67 rated for harsh environments

## Reference Information

UL File No.: E200650

## **Physical**

Connector Body: PUR O-Ring: Viton

Coupling Nut: Nickel-plated Brass

Contacts: Copper alloy with Gold over Nickel plating

Operating Temperature: -20 to +75°C

## **Environmental**

Protection: IP67 NEMA Rating: NEMA 6

## **Cables**

## 03—Unshielded PVC

Conductors: 24 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.250" (5.60mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant Inner Material Insulation: HDPE

Certification: UL type CMR, CEC C(UL) type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -40 to +75°C

## 10—Shielded PUR

Conductors: 22 AWG stranded tinned wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.255" (6.50mm) nominal

Jacket Material: Green PUR
Cable Properties: Sun resistant
Inner Material Insulation: FRNC
Shield Type: Foil Shield—100% coverage
Braid Shield—85% coverage

Flex Rating: Trailing cable, 5 million bending cycles Certification: UL Listed CMX

TIA/EIA Rating: Category 5e
Operating Temperature: -40 to +70°C

## 15—Shielded PVC

Conductors: 26 AWG stranded tinned Copper wire

Pair: Two pair UTP patch cable

Outside Diameter: 0.236" (5.99 mm) nominal

Jacket Material: Teal PVC

Cable Properties: Sun and oil resistant

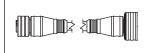
Inner Material Insulation: Foamed polypropylene

Shield Type: Foil Shield, 100% coverage, 25% min. overlap

Certification: UL type CMR, CEC C(UL) type CMR

TIA/EIA Rating: Category 5e

Operating Temperature: -20 to +75°C



| Face View   | Max. Current | Max. Voltage | Cable Type | Cable Jacket | Wire Size<br>AWG | Length |                 | Female Straight-to-<br>k Male Straight |
|---|--------------|--------------|------------|--------------|------------------|--------|-----------------|--|
|   | per Contact  |              |            |              | AVVO             |        | Engineering No. | Standard Order No.                     |
| 4 Pole 2 3  |              |              | Unshielded | PVC          | 24               |        | E1WB03003M002   | 130048-0207                            |
| 5 6 6 6   | 1.5A         | 30V          | Shielded   | PUR          | 22               | 1.0m   | E1WB03010M002   | 130048-0208                            |
| 1 - Yellow (TD+) 4 - Blue (RD-)<br>2 - White (RD+) 5 - D-Code<br>3 - Orange (TD-) |              |              | Shielded   | PVC          | 26               |        | E1WB03015M002   | 130048-0209                            |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number



<sup>\*</sup>Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

# Industrial Ethernet Brad® Ultra-Lock® (M12) Receptacles

## 120109

Female Front Panel Mount Back Panel Mount Internal Thread



## **Features and Benefits**

- Mates with both threaded M12 and Ultra-Lock® M12 cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Code to ensure proper alignment/mating

## **Reference Information**

UL File No.: E200650

## **Physical**

Shell: Nickel-plated Brass

Insert: PUR

Conductors: Brass Gold plated/Bronze selective Gold plated

O-Ring: Viton

Operating Temperature: -20 to +80°C

## **Environmental**

Protection: IP67 NEMA Rating: NEMA 6

|  |                             | Configuration   |                 | el Mount/<br>Omm Wire Leads |                 | el Mount/<br>Omm Wire Leads |                 | el Mount/<br>Omm Wire Leads |
|--|-----------------------------|-----------------|-----------------|-----------------------------|-----------------|-----------------------------|-----------------|-----------------------------|
|  |                             | Wire Type       |                 |                             | PVC Leads       | s, UL 1061                  | •               |                             |
|  |                             | Wire Size (AWG) |                 |                             |                 | AWG                         |                 |                             |
|  |                             | Length          |                 |                             | 0.              | 5m                          |                 |                             |
| Pole<br>(Female View)  | Max. Current per<br>Contact | Max. Voltage    | Engineering No. | Standard Order No.          | Engineering No. | Standard Order No.          | Engineering No. | Standard Order No.          |
| 4 Pole 2 5 1 - Yellow (TD+) 4 - Blue (RD-) 2 - White (RD+) 5 - D-Code 3 - Orange (TD-) | 1.5A                        | 125V            | ERWAAJ3000C050  | 120109-0004                 | ERWAAU3000C050  | 120109-5001                 | ERWAAU7000C050  | 120109-5002                 |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number

|             |        | . 🔻  |                    |
|-------------|--------|------|--------------------|
|             | Length | Code |                    |
| Centimeters | 5      | C050 | EDW4 4 10000 CO EO |
|             | 0.3    | M003 | ERWAAJ3000C050     |
| Meters      | 1      | M010 |                    |
|             | 2      | M020 |                    |

<sup>\*</sup>Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

# Industrial Ethernet Brad® Ultra-Lock® (M12) Receptacles

120109

Female Back Panel Mount Front Panel Mount



## **Features and Benefits**

- Mates with both threaded M12 and Brad Ultra-Lock® M12 cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Coded to ensure proper alignment/mating

#### Mechanical

Shell: Nickel-plated Brass

Insert: PUR

Conductors: Brass Gold plated/Bronze selective Gold plated

O-Ring: Viton

## Electrical

TIA/EIA Rating: Category 5e

## **Environmental**

Protection: IP67 NEMA Rating: NEMA 6

|   |                             | Configuration | Front Panel Mo  | unt, PG9 Thread    | Front Panel Mo  | unt, M16 Thread    | Back-Panel Mou  | ınt, M16 Thread    |
|---|-----------------------------|---------------|-----------------|--------------------|-----------------|--------------------|-----------------|--------------------|
|   |                             |               | PCB /           | Mount              | PCB I           | Mount              | PCB I           | Mount              |
| Poles   | Max. Current per<br>Contact | Max. Voltage  | Engineering No. | Standard Order No. | Engineering No. | Standard Order No. | Engineering No. | Standard Order No. |
| 4 Pole  2 5 1 - Yellow (TD+) 4 - Blue (RD-) 2 - White (RD+) 5 - D-Code 3 - Orange (TD-) | 1.5A                        | 125V          | ERWD2J30        | 120109-5003        | ERWD2U30        | 120109-5004        | ERWD2U7O        | 120109-5005        |

Note: Sales drawings for all standard order numbers are available on molex.com

# Industrial Ethernet Brad® Ultra-Lock® (M12) Receptacles

## 120109

Female Straight Back Panel Mount



## **Features and Benefits**

- Mates with both threaded M12 and Ultra-Lock® M12 cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Coded to ensure proper alignment/mating

#### Mechanical

Shell: Nickel-plated Brass

Insert: PUR

Conductors: Brass Gold plated/Bronze selective Gold plated

## **Electrical**

TIA/EIA Rating: Category 5e

## **Environmental**

Protection: IP67 NEMA Rating: NEMA 6

|--|

|  |                          |              | Straight, Back Panel Mount |                    |
|--|--------------------------|--------------|----------------------------|--------------------|
| Poles  | Max. Current per Contact | Max. Voltage | Engineering No.            | Standard Order No. |
| 4 Pole   |                          |              | ERWAAJ4002M002             | 130054-0012        |
| 1 - Yellow (TD+) 3 - Orange (TD-) 2 - White (RD+) 4 - Blue (RD-) | 1.5A                     | 125V         | ERWAAJ4002M020             | 130054-0013        |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number

|             |        | <b>T</b> |                |
|-------------|--------|----------|----------------|
|             | Length | Code     |                |
| Centimeters | 200    | C200     |                |
|             | 2      | M020     |                |
| Meters      | 5      | M050     | ERWAAU3000C200 |
|             | 10     | M100     |                |

# Industrial Ethernet Brad® Ultra-Lock® (M12) Double-Ended Receptacles

## 120109

M12 Panel Mount Female Receptacle-to-RJ-45 Male Plug



## **Features and Benefits**

- Mates with both threaded M12 and Ultra-Lock M12 cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Coded to ensure proper alignment/mating

## Reference Information

UL File No.: E200650

## Mechanical

Shell: Nickel-plated Brass

Insert: Nylon

Conductors: Brass Gold plated/Bronze selective Gold plated

O-Ring: Viton Cable: PVC Jacket

## **Electrical**

TIA/EIA Rating: Category 5E

**Environmental** 

Protection: IP67

| <u> </u> |  |
|----------|--|

| Pole                                       | Man Computers Control    | Max. Voltage | Straight, Back Panel Mount, M16 Thread |                    |
|--|--------------------------|--------------|--|--------------------|
| (Female View)                              | Max. Current per Contact |              | Engineering No.                        | Standard Order No. |
| 1 - (TD+) 3 - (TD-)<br>2 - (RD+) 4 - (RD-) | 1.5A                     | 125V         | ERWPAU7003M006                         | 120109-0005        |

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code\*
Build-a-Part Number

|        |        | . 🔻  |                |
|--------|--------|------|----------------|
|        | Length | Code |                |
|        | 2      | M020 | ERWPAU7003M006 |
| Meters | 5      | M050 |                |
|        | 10     | M100 |                |

Industrial Ethernet Brad® Micro-Change® (M12) Bulkhead Pass-Through Adapters

## 130054

Female Straight, Female Straight-to-Right Angle Threaded Back Panel Mount



## **Features and Benefits**

- Mates with both threaded M12 and (M12) cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Coded to ensure proper alignment/mating

## Mechanical

Shell: Nickel-plated Brass

Insert: PUR

Conductors: Brass Gold plated/Bronze selective Gold plated

O-Ring: Viton

## **Electrical**

Voltage Rating: 215V Current: 4.0A TIA/EIA Rating: Category 5e

Environmental

Protection: IP67

|--|



|  | M12-to-RJ-45 Adapter with M16 Mounting Thread |                    |                                |                    |
|--|---|--------------------|--------------------------------|--------------------|
| n i  | Female Straight                               |                    | Female-Straight-to-Right Angle |                    |
| Poles  | Engineering No.                               | Standard Order No. | Engineering No.                | Standard Order No. |
| 4 Pole  2 (RD+)  D-Code  1 (TD+)  4 (RD-)  1 - Yellow (TD+)  2 - White (RD+)  4 - Blue (RD-) | ER1 PADAPTER                                  | 130054-0009        | ER 1 PADAPTER 90               | 130054-0010        |

Note: Sales drawings for all standard order numbers are available on molex.com



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