# NMEA 2000® Brad® Micro-Change® (M12) and Brad® Mini-Change® Cables and Connectors

molex®

# NMEA® 2000 Brad® Micro-Change® (M12) and Brad® Mini-Change® Cables and Connectors

## MICRO-CHANGE® NMEA 2000® NETWORK EXAMPLE

## MINI-CHANGE® NMEA 2000® NETWORK EXAMPLE

## Molex Enables the NMEA 2000® Physical Layer

# NMEA® 2000 Brad® Micro-Change® (M12) and Brad® Mini-Change® Cables and Connectors

Molex designs, manufactures and supports a complete line of open standard cables, cable assemblies, connectors, terminators and power products supporting the NMEA 2000 system.

NMEA 2000 is a low-cost data network operating at 250 Kbps and utilizing the Controller Area Network (CAN) integrated circuit (IC). It allows multiple electronic devices to be connected together on a common channel for the purpose of easily sharing information.

The NMEA 2000 cables and connectors are available in two styles; the Mini-Change® for thick backbones and the Micro-Change® for thin backbones.

## SPECIFICATIONS

### Reference Information

NMEA 2000 Approved

UL File No.: E81982

### Electrical

Current:
- Micro-Change: up to 4.0A
- Mini-Change: up to 8.0A

### Physical

Molded Connector: PVC

Coupling Ring: Brass, Nickel

Contacts: Copper Alloy, Gold Plated

Cable: PVC Jacket, Gray

Wire: Micro-Change:
- Two shielded pair 22 and 24 AWG with copper drain wire between pairs

Mini-Change:
- Two shielded pair 18 and 15 AWG with copper drain wire between pairs
- Power Pair: Red/Black
- Data Pair: Blue/White

### Environmental

Operating Temperature: -20 to 80°C

Designed and Tested to IEC IP67 Standard

Vibration:
- Complies with MIL-STD 202F, Test Method 204, Test Condition B

Corrosion:
- Micro-Change: 300 hour salt spray protection per MIL-STD 202 Method 101
- Mini-Change: 300 hour salt spray protection per MIL-STD 202 Method 101

# NMEA® 2000 Brad® Micro-Change® (M12) and Brad® Mini-Change® Cables and Connectors

## Bulk Cable

| Brad® Micro-Change® (M12) | | |
|---|---|---|
| **Cable Type** | **Length** | **Order No.** |
| DeviceNet Thin Cable | 100m (328.10′) | 84854-9316 |

| Brad® Mini-Change® | | |
|---|---|---|
| **Cable Type** | **Length** | **Order No.** |
| DeviceNet Thick Cable | 100m (328.10′) | 84695-9095 |

## Receptacles

| Brad® Micro-Change® | |
|---|---|
| **Male** | |
| **Description** | **Order No.** |
| 12″ Leads | 84864-9001 |
| PCB Mount | 84864-9002 |
| Right Angle PCB Mount | 84864-9003 |

| Brad® Micro-Change® | |
|---|---|
| **Female** | |
| **Description** | **Order No.** |
| 12″ Leads | 84864-9004 |
| PCB Mount | 84864-9005 |
| Right Angle PCB Mount | 84864-9006 |

## Field Attachable Connectors

| Brad® Micro-Change® (M12) |
|---|
| **Order No.** |
| **Female** |
| 84854-9317 |
| **Male** |
| 84854-9318 |

| Brad® Mini-Change® |
|---|
| **Order No.** |
| **Female** |
| 84856-9101 |
| **Male** |
| 84856-9102 |

* Other configurations available. Please contact Molex for more information

# NMEA® 2000 Brad® Micro-Change® (M12) and Brad® Mini-Change® Cables and Connectors

## Bulkhead Feed Through Receptacles

| Brad® Micro-Change® (M12) |
|---|
| **Order No.** |
| 84854-9300 |

| Brad® Mini-Change® |
|---|
| **Order No.** |
| 84856-9103 |

## Single-Ended Cable Assemblies

| Brad® Micro-Change® (M12) | | | |
|---|---|---|---|
| **Female** | | | |
| **Circuits** | **Length** | **Vertical** | **Right Angle** |
| 5 | .05m (1.64′) | 84854-7021 | 84854-7028 |
| | 1.0m (3.28′) | 84854-7022 | 84854-7029 |
| | 2.0m (6.56′) | 84854-7023 | 84854-7030 |
| | 3.0m (9.84′) | 84854-7024 | 84854-7031 |
| | 4.0m (13.12′) | 84854-7025 | 84854-7031 |
| | 5.0m (16.40′) | 84854-7026 | 84854-7031 |
| | 6.0m (19.69′) | 84854-7027 | 84854-7031 |

| Male | | | |
|---|---|---|---|
| **Circuits** | **Length** | **Vertical** | **Right Angle** |
| 5 | .05m (1.64′) | 84854-8021 | 84854-8028 |
| | 1.0m (3.28′) | 84854-8022 | 84854-8029 |
| | 2.0m (6.56′) | 84854-8023 | 84854-8030 |
| | 3.0m (9.84′) | 84854-8024 | 84854-8031 |
| | 4.0m (13.12′) | 84854-8025 | 84854-8031 |
| | 5.0m (16.40′) | 84854-8026 | 84854-8031 |
| | 6.0m (19.69′) | 84854-8027 | 84854-8031 |

* Other configurations available. Please contact Molex for more information

molex

# NMEA® 2000 Brad® Micro-Change® (M12) and Brad® Mini-Change® Cables and Connectors

## Double-Ended Cable Assemblies

| Brad® Micro-Change® (M12) | | | |
|---|---|---|---|
| Circuits | Connection Type | Length | Order No. |
| 5 | Male-to-Female | .05m (1.64′) | 84854-6034 |
| | | 1.0m (3.28′) | 84854-6035 |
| | | 2.0m (6.56′) | 84854-6036 |
| | | 3.0m (9.84′) | 84854-6037 |
| | | 4.0m (13.12′) | 84854-6038 |
| | | 5.0m (16.40′) | 84854-6039 |
| | | 6.0m (19.69′) | 84854-6055 |
| | | 7.0m (22.97′) | 84854-6041 |
| | | 8.0m (26.25′) | 84854-6042 |
| | | 9.0m (29.53′) | 84854-6043 |
| | | 10.0m (32.81′) | 84854-6044 |

| Brad® Mini-Change® | | | |
|---|---|---|---|
| Circuits | Connection Type | Length | Order No. |
| 5 | Male-to-Female | .05m (1.64′) | 84856-1200 |
| | | 1.0m (3.28′) | 84856-1201 |
| | | 2.0m (6.56′) | 84856-1202 |
| | | 3.0m (9.84′) | 84856-1203 |
| | | 4.0m (13.12′) | 84856-1204 |
| | | 5.0m (16.40′) | 84856-1205 |
| | | 6.0m (19.69′) | 84856-1206 |
| | | 7.0m (22.97′) | 84856-1207 |
| | | 8.0m (26.25′) | 84856-1208 |
| | | 9.0m (29.53′) | 84856-1209 |
| | | 10.0m (32.81′) | 84856-1210 |

## Power Tap Tee Connector

| Brad® Mini-Change® | | |
|---|---|---|
| Description | Connection Type | Order No. |
| 2 Power/2Ground with Fuse and LED Diagnostics | Female-to-Female | 84856-9112 |

## Power Cable Assemblies (for use with Power Tap Tee)

| Brad® Mini-Change® | | |
|---|---|---|
| Description | Length | Order No. |
| 2 Power/2 Ground | 1.0m (3.28′) | 84856-9113 |
| | 5.0m (16.40′) | 84856-9114 |
| | 10.0m (32.81′) | 84856-9115 |

* Other configurations available. Please contact Molex for more information

# NMEA® 2000 Brad® Micro-Change® (M12) and Brad® Mini-Change® Cables and Connectors

## Tee Connectors

| Brad® Micro-Change® (M12) | | | | |
|---|---|---|---|---|
| **Description** | **Connection Type** | **Cable Type** | **Length** | **Order No.** |
| Tee Connector | N/A | | | 84586-0017 |
| 6-way Tee Connector | | | | 84587-0005 |
| Power Tap | N/A | Drop Cable | 1.0m (3.28′) | 84863-9001 |
| | Female Left-to-Female Right | | 5.0m (16.40′) | 84863-9002 |
| | | | 10.0m (32.81′) | 84863-9003 |

| Brad® Mini-Change® | |
|---|---|
| **Description** | **Order No.** |
| Tee Connector | 84856-9104 |
| Mini-Change-to-M12 Micro-Change | 84856-9105 |

## Junction Boxes

| Brad® Micro-Change® (M12) 4-Port | |
|---|---|
| **Length** | **Order No.** |
| .05m (1.64′) | 84859-9001 |
| 1.0m (3.28′) | 84859-9002 |
| 2.0m (6.56′) | 84859-9003 |
| 3.0m (9.84′) | 84859-9004 |

* Other configurations available. Please contact Molex for more information

# NMEA® 2000 Brad® Micro-Change® (M12) and Brad® Mini-Change® Cables and Connectors

## *Terminator Resistors*

| Brad® Micro-Change® (M12) | |
|---|---|
| **Connection Type** | **Order No.** |
| Male | 84586-0018 |
| Female | 84586-0019 |

| | |
|---|---|
| In-Line | 84854-9319 |

| Brad® Mini-Change® | |
|---|---|
| **Connection Type** | **Order No.** |
| Male | 84856-9108 |
| Female | 84856-9109 |
| Male with LED | 84856-9110 |
| Female with LED | 84856-9111 |

## *Closure Caps*

| | | |
|---|---|---|
| **Brad® Micro-Change® (M12)** | For Female Connector | 84854-9019 |
| | For Male Connector | 13020-11133 |
| **Brad® Mini-Change®** | For Female Connector | 84856-9106 |
| | For Male Connector | 84856-9107 |

* Other configurations available. Please contact Molex for more information



© 2011, Molex