**Installation Instructions**

Original Instructions

Allen-Bradley by ROCKWELL AUTOMATION

# 2090-Series Kinetix TLP Power and Feedback Cables

Catalog Numbers 2090-CTPW-MEDF, 2090-CTPW-MDDF, 2090-CTPB-MDDF, 2090-CTPW-MCDF, 2090-CTPB-MCDF, 2090-CTPB-MADF, 2090-CTPW-MADF, 2090-CTBK-MBDF, 2090-CTFB-MADD, 2090-CTFB-MFDD, 2090-CTPW-MEET, 2090-CTPW-MDET, 2090-CTPB-MDET, 2090-CTPW-MCET, 2090-CTPB-MCET, 2090-CTPW-MAET, 2090-CTPB-MAET, 2090-CTBK-MBET, 2090-CTFB-MFET, 2090-CTFB-MAET


| Topic | Page |
|---|---|
| Summary of Changes | 1 |
| Before You Begin | 2 |
| Catalog Number Explanation | 3 |
| Motor Connector/Cable Compatibility | 3 |
| Install Kinetix TLP Motor Cables | 5 |
| Install Continuous-flex Extension Cables | 7 |
| Pinout Specifications | 9 |
| Additional Resources | 12 |


## Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

| Topic | Page |
|---|---|
| Added catalog numbers for the Kinetix TLP 400V motors. | 3...4 |

Rockwell Automation

## Before You Begin

Remove all packing material from within and around the item. After unpacking, verify the catalog number against the purchase order and visually inspect the cable and each connector for damage. If necessary, notify the carrier of any shipping damage immediately.

Cables are stored and shipped in a coil. Cables retain this shape until you straighten the cable. To straighten a cable, hang a short cable from its mid-point or lay a long cable on the floor in a straight line. Any coiling that remains in the cable is straightened out within the next 24 hours. This practice makes the cable easier to install.

**ATTENTION:** Observe the following precautions when installing cables in a servo system. Failure to observe these safety notices can result in personal injury or damage to the motor and equipment.

- Arcing or unexpected motion can occur if the power/brake or feedback cables are connected or disconnected while power is applied to the drive. Always remove power to the servo drive before connecting or disconnecting cables at the drive or at the motor.
- To avoid electrical shock, make sure that shielded power cables are grounded at a minimum of one point. To prevent the build-up of electrical energy, factory-supplied power cables use one of these grounding techniques:
  - The overall shield is bonded to the connector housing.
  - A section of the overall shield is exposed for connection to ground.
  - The overall shield is connected to a ground wire.

  If the exposed cable braid or a ground wire is present, connect it to the power cable clamp, housing, or another suitable chassis ground on the drive.
- The maximum cable length between the drive and the motor varies, depending on the application, but never exceeds 50 m (164 ft) for Kinetix® 5100 drives, See Kinetix Servo Drives Specifications, publication KNX-TD003, for additional information.
- Do not tightly gather or coil the excess length of a power cable. Heat is generated within a cable whenever power is applied. Always position a power cable so it can freely dissipate heat.
  - Do not coil a power cable except for temporary use when building or testing a machine. If you temporarily coil a power cable, you must also derate the cable to meet local code or follow an authoritative directive, such as Engineering Section 310.15(C) of the NEC Handbook.
- The examples in this publication show all available connections. Some connections are not used for specific installations. See your drive installation instructions or user manual for recommended wire trim lengths and wiring examples for your drive and motor application.
  - Do not connect unused wires. Trim and finish unused wires to prevent accidental contact with other wires or wire shields, or with a ground connection.

**IMPORTANT** Standard (non-flex) cables can be bent or reformed during installation and maintenance. Continuous-flex cables can be flexed repeatedly within a specified bend radius when properly installed.

Do not use standard cables in a continuous-flex operation.

## Catalog Number Explanation

Catalog numbers consist of various characters, each of which identifies a specific option. Use the catalog numbering chart below to understand the configuration of your Kinetix TLP cable.

**2090 - C T *xx* - *xx xx* - *xx x xx***

**Cable Length**
See the Technical Specifications in the Kinetix Motion Accessories Specifications Technical Data, publication KNX-TD004.

**Cable Type**
A = Standard, non-flex
F = Continuous-flex

**Wire Gauge Size (PB, PW, and BK cable types)**
20, 18, 16, 14, 12,10, 08, 06, and 04 AWG

**Encoder Type (FB cable types)**
CF = Serial absolute, battery backup

**Drive-end Connector Type**
DF = Flying-lead power and brake cable
DD = Premolded connector on feedback cable
ET = Extension receptacle on power, feedback, and brake cables

**Motor-end Connector Type (BK cable type)**
MB = Military style, applies to TLP-A200-550, TLP-A200-750, and TLP-A/B235-*xxx* motors

**Motor-end Connector Type (FB cable type)**
MA = Rectangular, applies to TLP-A046, TLP-A/B070, TLP-A/B090, and TLP-A100 motors
MF = Military style, applies to TLP-A/B115, TLP-A/B145, TLP-A/B200, and TLP-A/B235 motors

**Motor-end Connector Type (PB and PW cable type)**
MA = Rectangular, applies to TLP-A046, TLP-A/B070, TLP-A/B090, and TLP-A100 motors
MC = Military style, applies to TLP-A/B115-xxx and TLP-A/B145-xxx motors
MD = Military style, applies to TLP-A200-200, TLP-A/B200-300, TLP-A200-350, TLP-A/BB200-450, TLP-B200-550, and TLP-B200-750 motors
ME = Military style, applies to TLP-A200-550, TLP-A200-750, and TLP-A/B235-xxx motors

**Cable Type**
PB = Motor power with brake wires
PW = Motor power only
FB = Motor feedback
BK = Motor brake

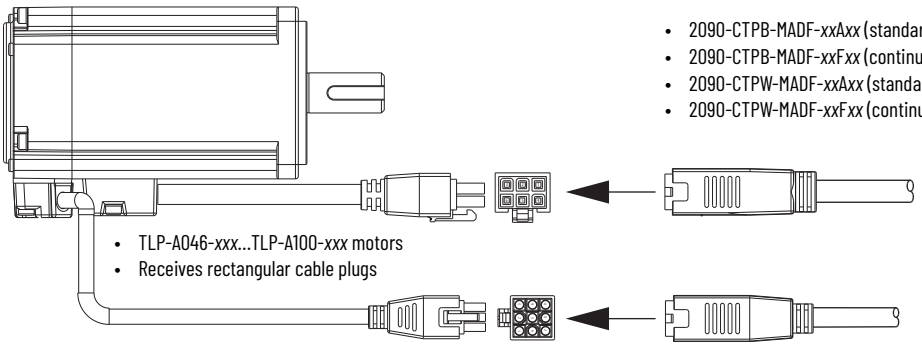
**Matching Motor Family**
T = Compatible with Kinetix TLP servo motors

**Accessory Component**
C = Cable

**Bulletin Number**

## Motor Connector/Cable Compatibility

TLP-A046...TLP-A100 servo motors are equipped with rectangular connectors.

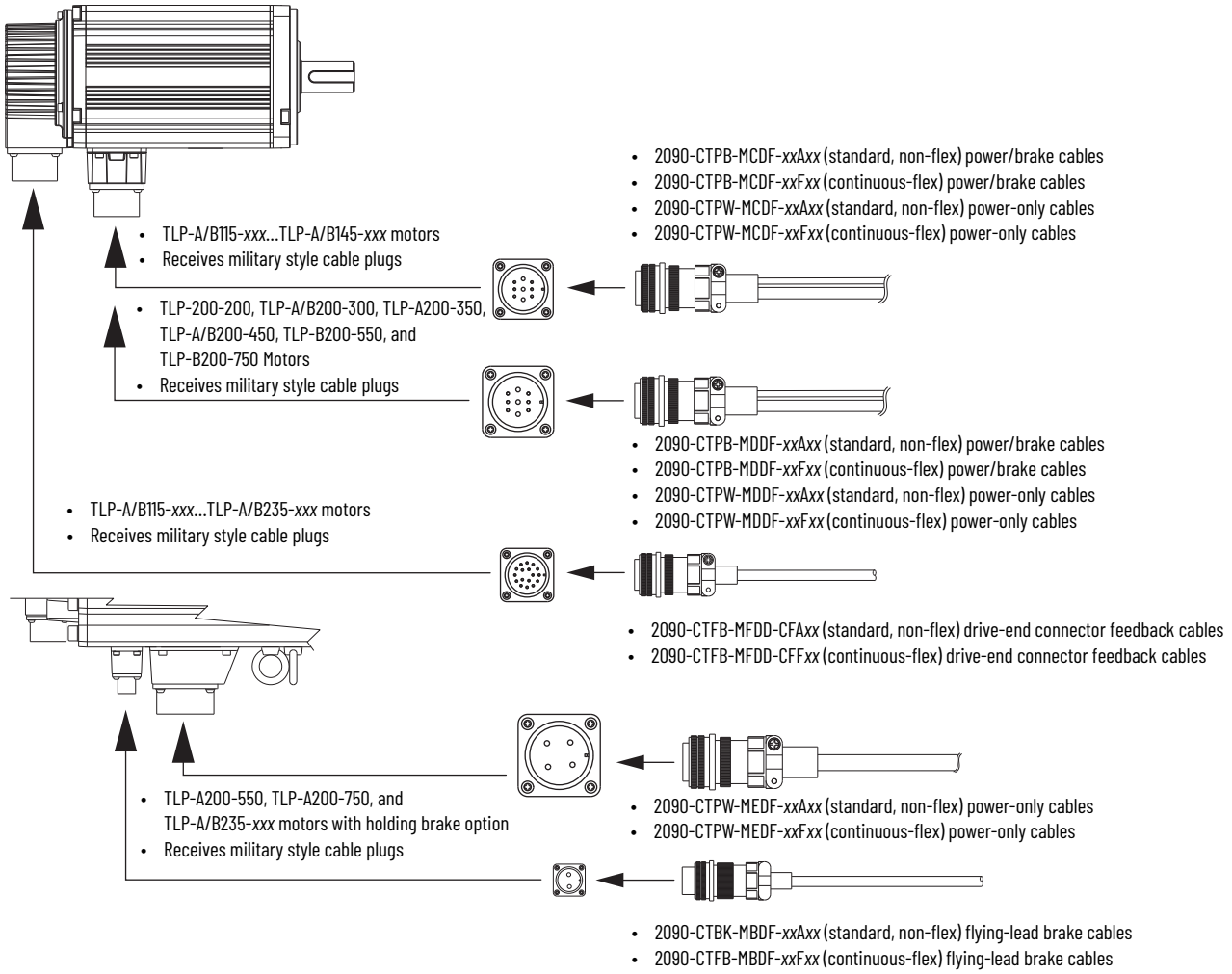


- 2090-CTPB-MADF-*xx*A*xx* (standard, non-flex) power/brake cables
- 2090-CTPB-MADF-*xx*F*xx* (continuous-flex) power/brake cables
- 2090-CTPW-MADF-*xx*A*xx* (standard, non-flex) power-only cables
- 2090-CTPW-MADF-*xx*F*xx* (continuous-flex) power-only cables

- TLP-A046-*xxx*...TLP-A100-*xxx* motors
- Receives rectangular cable plugs

- 2090-CTFB-MADD-CFA*xx* (standard, non-flex) drive-end connector feedback cables
- 2090-CTFB-MADD-CFF*xx* (continuous-flex) drive-end connector feedback cables

TLP-A/B115...TLP-A/B235 servo motors are equipped with military style connectors.




For cable specifications, refer to Kinetix Motion Accessories Technical Data, publication KNX-TD004.

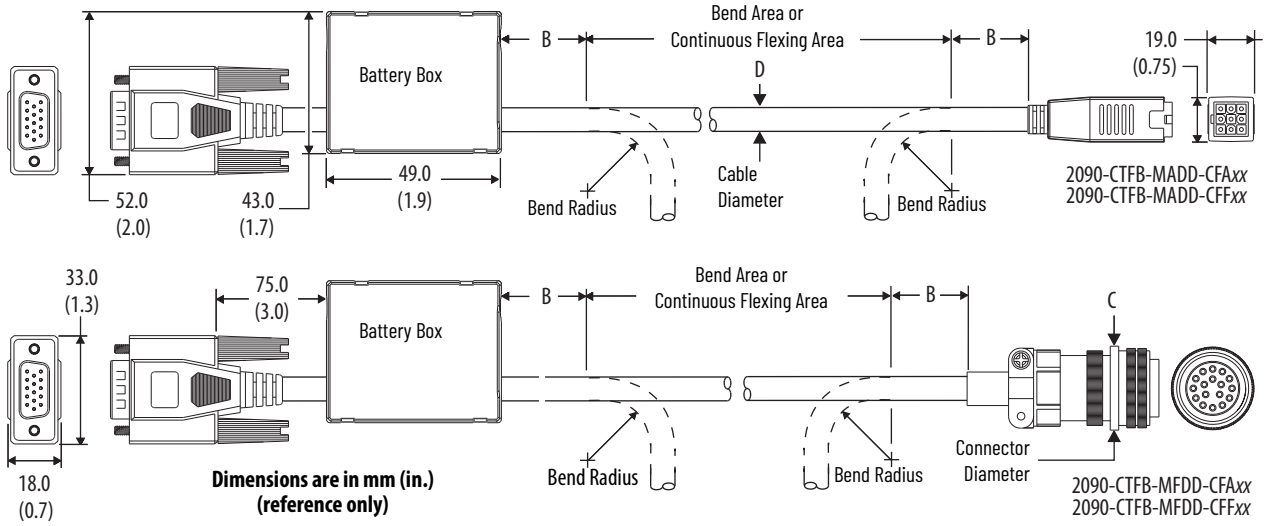
# Install Kinetix TLP Motor Cables

When installing cable runs between the motor and drive, be careful not to stress the cable by making bends too sharp. Refer to the table below for bend radius definitions and the dimension diagrams that follow when routing cables during system installation.

## Motor Power/brake, Feedback, and Brake Cable Bend Radius Definitions

| Type of Bend Radius | Type of Cable | Description |
|---|---|---|
| Static bend radius | Standard (non-flex) | The static (installation) bend radius and dimension B are 8 times the cable diameter:<br>• Do not begin a static bend inside dimension B.<br>• Use this measurement when routing the cable in a non-flex application between motor and drive (the bend area).<br>– The bend area is where standard (non-flex) or continuous-flex cables can be bent to their specified bend radius. |
| | Continuous flex | |
| Continuous bend radius | Continuous flex | The continuous bend radius for Bulletin 2090-CT*xx*-M*xxx* motor power and feedback cables is 12 times the cable diameter:<br>• Secure the continuous-flexing area, at least 7 cable diameters (dimension B) from each end of the cable, with a rigid mount that helps prevent the cable from flexing where it connects to the motor or shield clamp.<br>• Use this measurement when routing the cable in a continuous-flex application between motor and drive (the continuous-flexing area).<br>– The continuous flexing area is where continuous-flex cables can be flexed repeatedly. |

**Feedback Cable Dimensions**

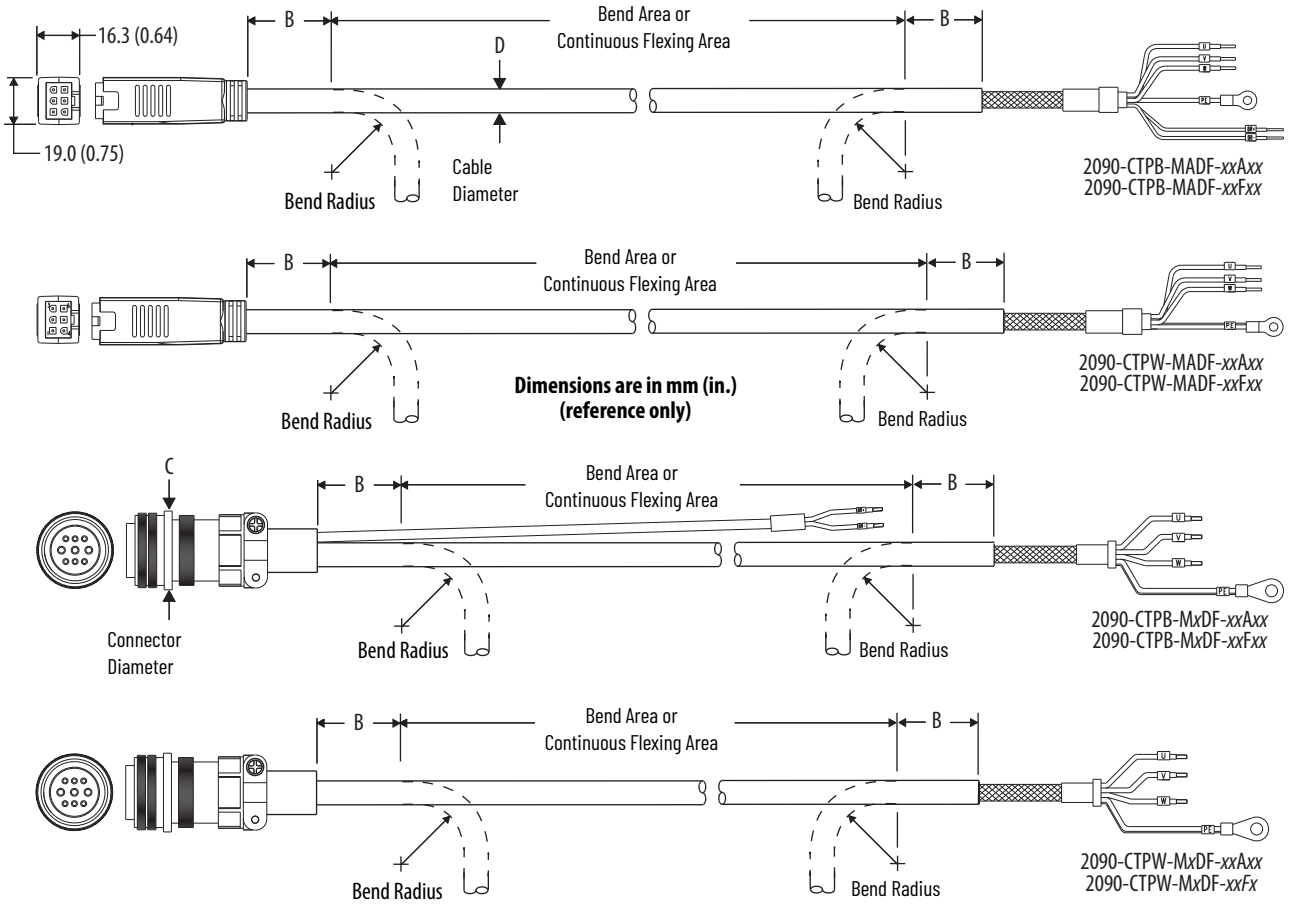



| Power Cable Cat. No. | B (1) mm (in.) | Continuous Bend Radius (1) mm (in.) | C (2) mm (in.) | D mm (in.) |
|---|---|---|---|---|
| 2090-CTFB-MADD-CF*xxx* | 56.0 (2.2) | 84.0 (3.31) | 19.0 (0.75) | 7.0 (0.28) |
| 2090-CTFB-MFDD-CF*xxx* | | | 37.2 (1.50) | |

(1) Dimension B and Continuous Bend Radius are based on the cable diameter. Refer to Motor Power/brake, Feedback, and Brake Cable Bend Radius Definitions on page 5 for more information.

(2) Drive-end (15-pin) connector that is 33.0 mm (1.30 in.) high, requires a 50 mm (1.97 in.) hole to pass through.
The motor-end (rectangular) connector that is 19.0 mm (0.75 in.) square, requires a 26 mm (1.02 in.) hole to pass through.
The motor-end (military-style) connector that is 37.2 mm (1.50 in.) diameter, requires a 48 mm (1.89 in.) hole to pass through.

**Power Cable Dimensions**

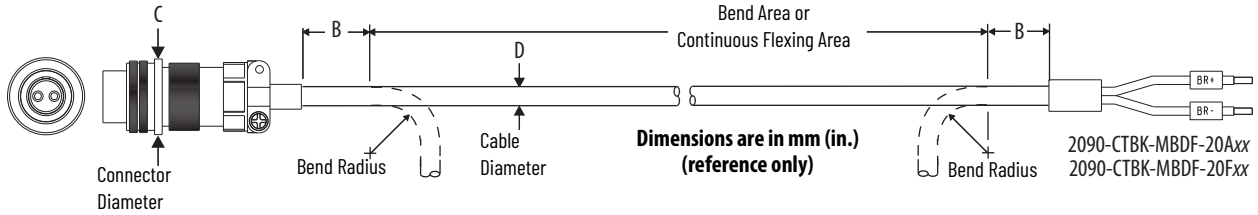



| Power Cable Cat. No. | B (1) mm (in.) | Continuous Bend Radius (1) mm (in.) | C (2) mm (in.) | D mm (in.) |
|---|---|---|---|---|
| 2090-CTPB-MADF-18*xxx* | 72.0 (2.83) | 108.0 (4.25) | 19.0 (0.75) | 9.0 (0.35) |
| 2090-CTPB-MADF-16*xxx* | 96.0 (3.78) | 144.0 (5.67) | | 12.0 (0.47) |
| 2090-CTPW-MADF-18*xxx* | 65.61 (2.58) | 97.2 (3.83) | | 8.1 (0.32) |
| 2090-CTPW-MADF-16*xxx* | 88.0 (3.46) | 132.0 (5.20) | | 11.0 (0.43) |
| 2090-CTPB-MCDF-16*xxx* | 88.0 (3.46) | 132.0 (5.20) | 37.2 (1.46) | 11.0 (0.43) |
| 2090-CTPB-MCDF-12*xxx* | 116.0 (4.57) | 174.0 (6.85) | | 14.5 (0.57) |
| 2090-CTPW-MCDF-16*xxx* | 88.0 (3.46) | 132.0 (5.20) | | 11.0 (0.43) |
| 2090-CTPW-MCDF-12*xxx* | 116.0 (4.57) | 174.0 (6.85) | | 14.5 (0.57) |
| 2090-CTPB-MDDF-12*xxx* | 116.0 (4.57) | 174.0 (6.85) | 43.0 (1.69) | 14.5 (0.57) |
| 2090-CTPW-MDDF-12*xxx* | | | | |
| 2090-CTPB-MDDF-08*xxx* | 176.0 (6.93) | 264.0 (10.39) | 43.0 (1.69) | 22.0 (0.87) |
| 2090-CTPW-MDDF-08*xxx* | | | | |
| 2090-CTPW-MEDF-06*xxx* | 224.0 (8.82) | 336.0 (13.23) | 55.2 (2.17) | 28.0 (1.10) |
| 2090-CTPW-MEDF-04*xxx* | 256.0 (10.08) | 384.0 (15.12) | | 32.0 (1.26) |

(1) Dimension B and Continuous Bend Radius are based on the cable diameter. Refer to Motor Power/brake, Feedback, and Brake Cable Bend Radius Definitions on page 5 for more information.

(2) The motor-end (rectangular) connector that is 19.0 mm (0.75 in.) high, requires a 24 mm (0.94 in.) hole to pass through.
The motor-end (military-style) connector that is 37.2 mm (1.50 in.) diameter, requires a 48 mm (1.89 in.) hole to pass through.
The motor-end (military-style) connector that is 43.0 (1.69) diameter, requires a 53 mm (2.09 in.) hole to pass through.
The motor-end (military-style) connector that is 55.2 mm (2.17 in.) diameter, requires a 65 mm (2.56 in.) hole to pass through.

**Brake Cable Dimensions**

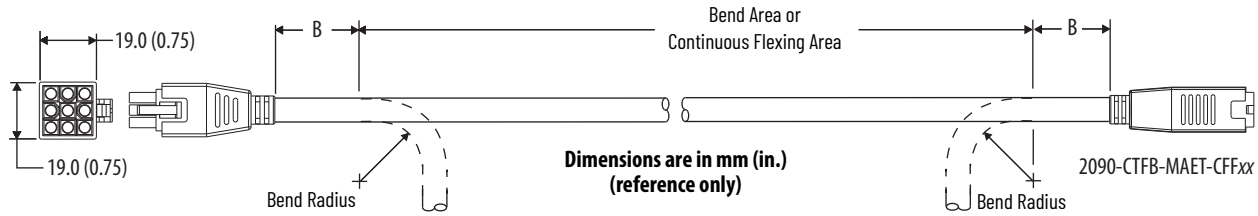


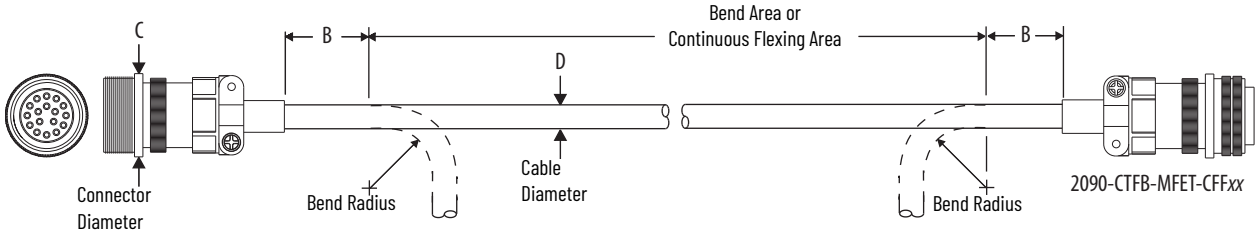

| Brake Cable Cat. No. | B (1) mm (in.) | Continuous Bend Radius (1) mm (in.) | C (2) mm (in.) | D mm (in.) |
|---|---|---|---|---|
| 2090-CTBK-MBDF-20*xxx* | 44.0 (1.73) | 66.0 (2.60) | 23.0 (0.91) | 5.5 (0.22) |

(1) Dimension B and Continuous Bend Radius are based on the cable diameter. Refer to Motor Power/brake, Feedback, and Brake Cable Bend Radius Definitions on page 5 for more information.
(2) The motor-end (military-style) connector that is 23.0 mm (0.91 in.) diameter, requires 28.0 mm (1.10 in.) hole to pass through.

# Install Continuous-flex Extension Cables

**Feedback Cable Dimensions**

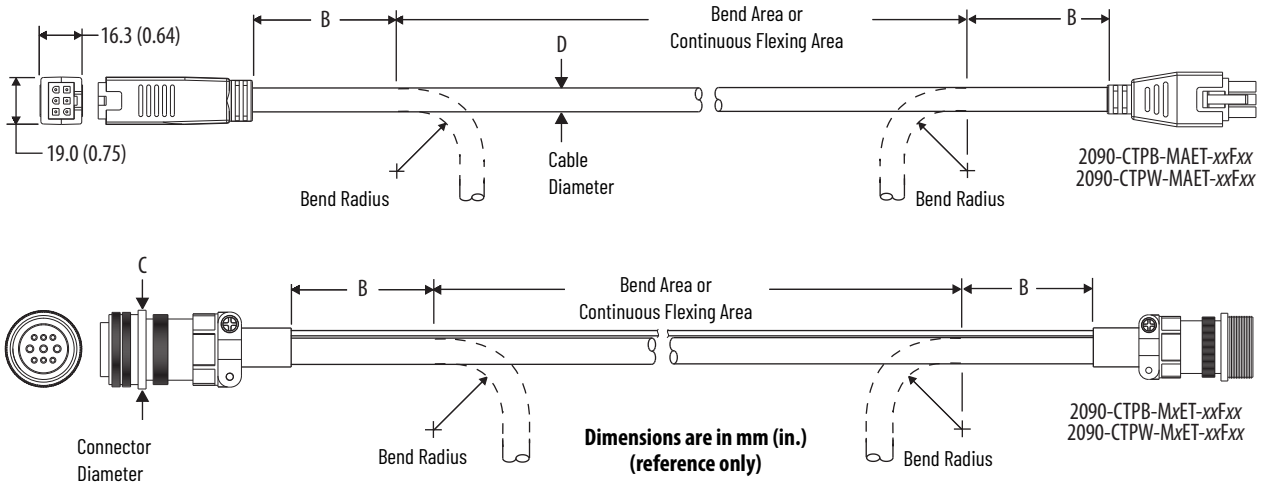



| Feedback Cable Cat. No. | B (1) mm (in.) | Continuous Bend Radius (1) mm (in.) | C (2) mm (in.) | D mm (in.) |
|---|---|---|---|---|
| 2090-CTFB-MAET-CFF*xx* | 56.0 (2.20) | 84.0 (3.31) | 19.0 (0.75) | 7.0 (0.28) |
| 2090-CTFB-MEET-CFF*xx* | | | 37.2 (1.50) | |

(1) Dimension B and Continuous Bend Radius are based on the cable diameter. Refer to Motor Power/brake, Feedback, and Brake Cable Bend Radius Definitions on page 5 for more information.
(2) The motor-end (rectangular) connector that is 19.0 mm (0.75 in.) square, requires a 26 mm (1.02 in.) hole to pass through.
The motor-end (military-style) connector that is 37.2 mm (1.50 in.) diameter, requires a 48 mm (1.89 in.) hole to pass through.

**Power Cable Dimensions**

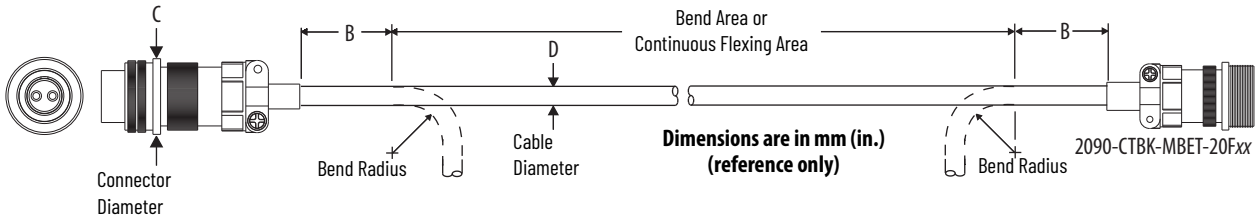



| Power Cable Cat. No. | B (1) mm (in.) | Continuous Bend Radius (1) mm (in.) | C (2) mm (in.) | D mm (in.) |
|---|---|---|---|---|
| 2090-CTPB-MAET-18F*xx* | 72.0 (2.83) | 108.0 (4.25) | 19.0 (0.75) | 9.0 (0.35) |
| 2090-CTPB-MAET-16F*xx* | 96.0 (3.78) | 144.0 (5.67) | | 12.0 (0.47) |
| 2090-CTPW-MAET-18F*xx* | 64.8 (2.55) | 97.2 (3.83) | | 8.1 (0.32) |
| 2090-CTPW-MAET-16F*xx* | 88.0 (3.46) | 132.0 (5.20) | | 11.0 (0.43) |
| 2090-CTPB-MCET-16F*xx* | 88.0 (3.46) | 132.0 (5.20) | 37.2 (1.46) | 11.0 (0.43) |
| 2090-CTPB-MCET-12F*xx* | 116.0 (4.57) | 174.0 (6.85) | | 14.5 (0.57) |
| 2090-CTPW-MCET-16F*xx* | 88.0 (3.46) | 132.0 (5.20) | | 11.0 (0.43) |
| 2090-CTPW-MCET-12F*xx* | 116.0 (4.57) | 174.0 (6.85) | | 14.5 (0.57) |
| 2090-CTPB-MDET-12F*xx* | 116.0 (4.57) | 174.0 (6.85) | 43.0 (1.69) | 14.5 (0.57) |
| 2090-CTPW-MDET-12F*xx* | | | | |
| 2090-CTPB-MDET-08F*xx* | 176.0 (6.93) | 264.0 (10.39) | | 22.0 (0.87) |
| 2090-CTPW-MDET-08F*xx* | | | | |
| 2090-CTPW-MEET-06F*xx* | 224.0 (7.82) | 336.0 (13.23) | 55.2 (2.17) | 28.0 (1.10) |
| 2090-CTPW-MEET-04F*xx* | 256.0 (10.08) | 384.0 (15.12) | | 32.0 (1.26) |

(1) Dimension B and Continuous Bend Radius are based on the cable diameter. Refer to Motor Power/brake, Feedback, and Brake Cable Bend Radius Definitions on page 5 for more information.

(2) The motor-end (rectangular) connector that is 19.0 mm (0.75 in.) high, requires a 24 mm (0.94 in.) hole to pass through.
The motor-end (military-style) connector that is 37.2 mm (1.50 in.) diameter, requires 48 mm (1.89 in.) hole to pass through.
The motor-end (military-style) connector that is 43.0 mm (1.69 in.) diameter, requires a 53 mm (2.09 in.) hole to pass through.
The motor-end (military-style) connector that is 55.2 mm (2.17 in.) diameter, requires a 65 mm (2.56 in.) hole to pass through.

**Brake Cable Dimensions**




## Brake Cable Dimensions

| **Brake Cable Cat. No.** | **B** (1) mm (in.) | **Continuous Bend Radius** (1) mm (in.) | **C** (2) **mm (in.)** | **D mm (in.)** |
|---|---|---|---|---|
| 2090-CTBK-MBET-20F*xx* | 44.0 (1.73) | 66.0 (2.60) | 23.0 (0.91) | 5.5 (0.22) |

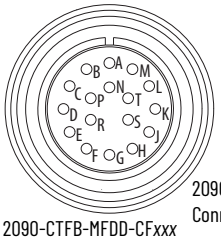
(1) Dimension B and Continuous Bend Radius are based on the cable diameter. Refer to Motor Power/brake, Feedback, and Brake Cable Bend Radius Definitions on page 5 for more information.
(2) The motor-end (military-style) connector that is 23.0 mm (0.91 in.) diameter, requires a 28.0 mm (1.10 in.) hole to pass through.

# Pinout Specifications

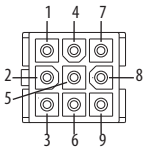
These cable pinouts apply to 2090-Series Kinetix TLP cables. Where two connector types are available, the schematic maps both pin configurations. For example, A/1 shows the wire corresponding to A for one type of connector and 1 for the other.

## Feedback Cable Pinouts (premolded connector)

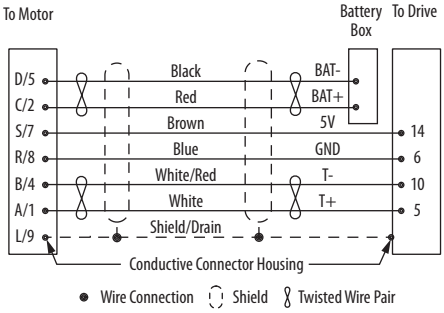
| **Cable Type** | **Cable Cat. No.** |
|---|---|
| Feedback cables (standard, non-flex) | 2090-CTFB-MADD-CFA*xx* |
| | 2090-CTFB-MFDD-CFA*xx* |
| Feedback cables (continuous-flex) | 2090-CTFB-MADD-CFF*xx* |

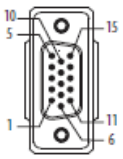



2090-CTFB-MFDD-CF*xxx*
Connector to Motor



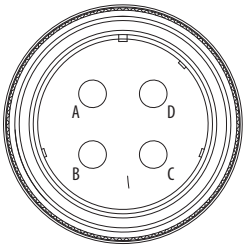

2090-CTFB-MADD-CF*xxx*
Connector to Motor



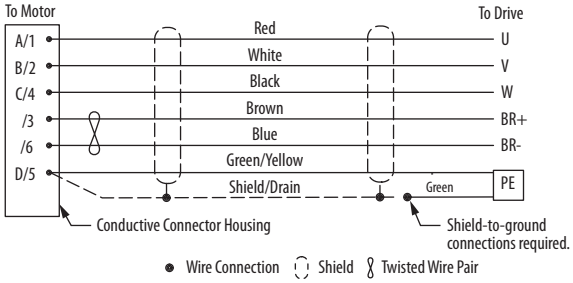

2090-CTFB-MFDD-CF*xxx*
2090-CTFB-MADD-CF*xxx*
Connector to Drive

## Power Cables with and without Brake Pinouts (18, 16, 12, 8, 6, 4 AWG)

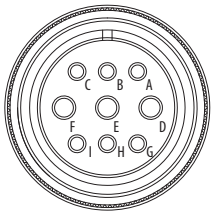



2090-CTPW-MEDF-*xx*F*xx*
2090-CTPW-MEDF-*xx*A*xx*
6 and 4 AWG Cables

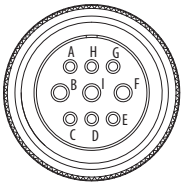

2090-CTPW-MADF-*xx*F*xx*
2090-CTPW-MADF-*xx*A*xx*
2090-CTPB-MADF-*xx*F*xx*
2090-CTPB-MADF-*xx*A*xx*
18 and 16 AWG Cables



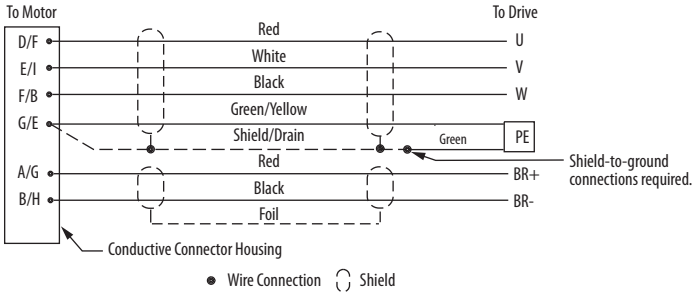

2090-CTPW cables exclude (BR+/BR–) motor brake conductors.




2090-CTPW-MDDF-*xx*F*xx*
2090-CTPW-MDDF-*xx*A*xx*
2090-CTPB-MDDF-*xx*F*xx*
2090-CTPB-MDDF-*xx*A*xx*
12 and 8 AWG Cables

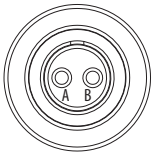



2090-CTPW-MCDF-*xx*F*xx*
2090-CTPW-MCDF-*xx*A*xx*
2090-CTPB-MCDF-*xx*F*xx*
2090-CTPB-MCDF-*xx*A*xx*
16 and 12 AWG Cables

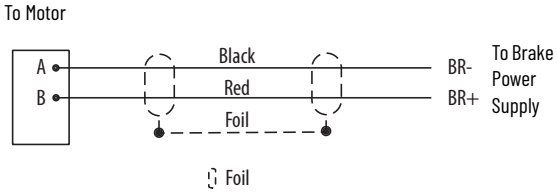



2090-CTPW cables exclude (BR+/BR–) motor brake conductors.

## Brake Only Cable Pinout




2090-CTBK-MBDF-20F*xx*
2090-CTBK-MBDF-20A*xx*




**ATTENTION:** To avoid electrical shock, make sure that shielded power cables are grounded at a minimum of one point. To prevent the buildup of electrical energy, factory-supplied power cables use one of these grounding techniques:

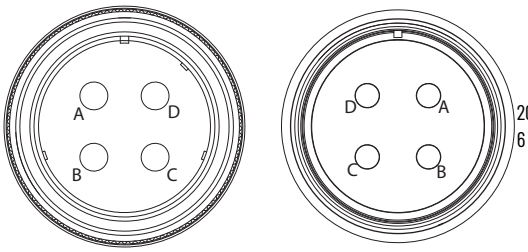
- The overall shield is bonded to the connector housing.
- A section of the overall shield is exposed for connection to ground.
- The overall shield is connected to a ground wire.

If the exposed cable braid or a ground wire is present, connect it to the power cable clamp, housing, or another suitable chassis ground on the drive.

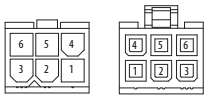
**ATTENTION:** Do not tightly gather or coil the excess length of a power cable. Heat is generated within a cable whenever power is applied. Always position a power cable so it can freely dissipate heat.

Do not coil a power cable except for temporary use when building or testing a machine. If you temporarily coil a power cable, you must also derate the cable to meet local code or follow an authoritative directive, such as Engineering Section 310.15(C) of the NEC Handbook.

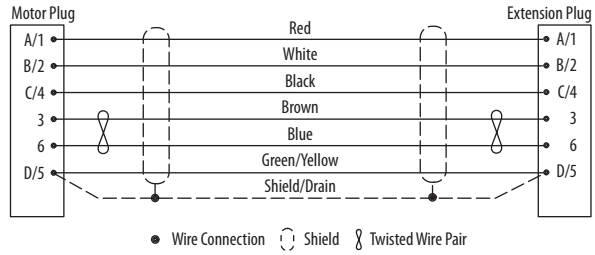
## Power Extension Cables with and without Brake Pinouts (18, 16, 12, 8, 6, 4 AWG)



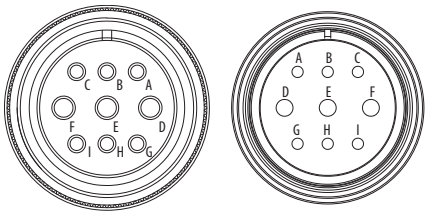

2090-CTPW-MEET-*xx*F*xx*
6 AWG and 4 AWG Cables



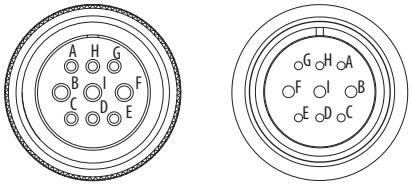

2090-CTPW-MAET-*xx*F*xx*
2090-CTPB-MAET-*xx*F*xx*
18 AWG and 16 AWG Cables



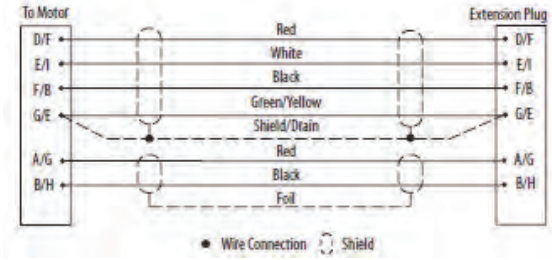

2090-CTPW-MAET and 2090-CTPW-MEET cables exclude the Brown and Blue conductors.




2090-CTPW-MDET-*xx*F*xx*
2090-CTPB-MDET-*xx*F*xx*
12 AWG and 8 AWG Cables

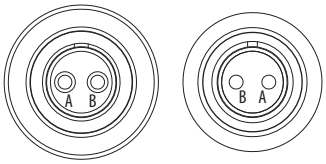



2090-CTPW-MCET-*xx*F*xx*
2090-CTPB-MCET*xx*F*xx*
16 AWG and 12 AWG Cables

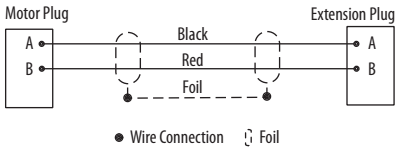



2090-CTPW-MCET and 2090CTPW-MDET cables exclude the Red and Black twisted pair conductors.

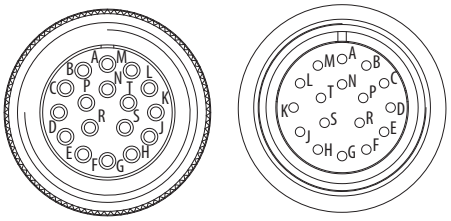
## Brake Only Extension Cable Pinout



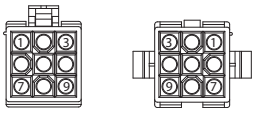

2090-CTBK-MBET-20F*xx*



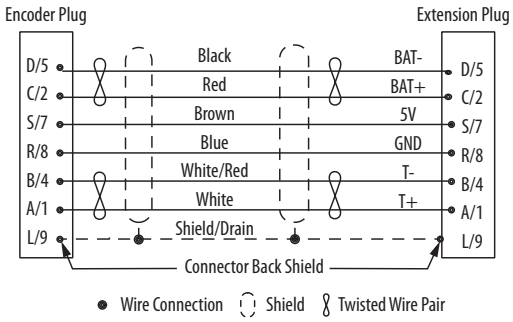

## Feedback Extension Cable Pinouts



2090-CTFB-MFET-CFF*xx*



2090-CTFB-MAET-CFF*xx*



## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

| Resource | Description |
|---|---|
| Kinetix Rotary Motion Specifications Technical Data, publication KNX-TD001 | Provides product specifications for Kinetix VPL, VPC, VPF, VPH, VPS, Kinetix MPL, MPM, MPF, MPS, Kinetix TLP, Kinetix TL and TLY, and Kinetix HPK rotary motors. |
| Kinetix Linear Motion Specifications Technical Data, publication KNX-TD002 | Provides product specifications for LDAT-Series linear thrusters, Kinetix MPAS and MPMA linear stages, Kinetix VPAR, MPAR and MPAI electric cylinders, and LDC-Series™ and LDL-Series™ linear motors. |
| Kinetix Servo Drives Specifications Technical Data, publication KNX-TD003 | Provides product specifications for Kinetix Integrated Motion over the EtherNet/IP™ network, Integrated Motion over Sercos interface, EtherNet/IP networking, and component servo drive families. |
| Kinetix Motion Accessories Specifications Technical Data, publication KNX-TD004 | Provides product specifications for Bulletin 2090 motor and interface cables, low-profile connector kits, drive power components, and other servo drive accessory items. |
| Kinetix 5100 Single-axis EtherNet/IP Servo Drive User Manual, publication 2198-UM004 | Provides information on applications and how to install, configure, startup, and troubleshoot your Kinetix servo drive system. |
| Kinetix Motion Control Selection Guide, publication KNX-SG001 | Provides overview of Kinetix servo drives, motors, actuators, and motion accessories that are designed to help make initial decisions for the motion control products best suited for your system requirements. |
| System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001 | Information, examples, and techniques that are designed to minimize system failures caused by electrical noise. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation industrial system. |
| Product Certifications website: rok.auto/certifications | Provides declarations of conformity, certificates, and other certification details. |

You can view or download publications at rok.auto/literature.

## Notes:

# Rockwell Automation Support

Use these resources to access support information.

| | | |
|---|---|---|
| **Technical Support Center** | Find help with how-to videos, FAQs, chat, user forums, and product notification updates. | rok.auto/support |
| **Knowledgebase** | Access Knowledgebase articles. | rok.auto/knowledgebase |
| **Local Technical Support Phone Numbers** | Locate the telephone number for your country. | rok.auto/phonesupport |
| **Literature Library** | Find installation instructions, manuals, brochures, and technical data publications. | rok.auto/literature |
| **Product Compatibility and Download Center (PCDC)** | Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes. | rok.auto/pcdc |

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# Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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For technical support, visit rok.auto/support.

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