

2090-Series Power and Feedback Cables

Catalog Numbers 2090-CPBM7DF, 2090-CPWM7DF, 2090-CPBM7E7, 2090-CFBM7E7, 2090-CFBM7DF, 2090-CFBM7DD

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Summary of Changes

This publication contains new and updated information as indicated in the following table.

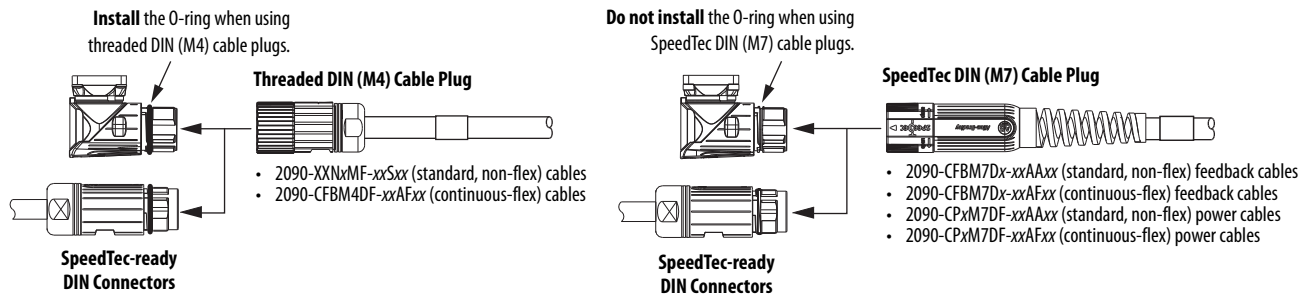
Topic	Page
Updated tables and graphics to make better use of space on the page.	Throughout
Changed the publication title to emphasize cables that are required for motors with separate power and feedback connectors.	1
Updated the introductory text in Verify the O-ring Installation for Threaded DIN Cable Plugs to enhance the O-ring description.	2
Added the 2090-CPWM7DF cable view to Motor Power/Brake Bend Radius Example.	4

Verify the O-ring Installation for Threaded DIN Cable Plugs

Allen-Bradley® motors and actuators with SpeedTec motor power/brake and feedback connectors include O-rings that are enclosed in a separate bag. The type of plug on the connecting cable determines whether an O-ring is required to be installed on the motor connector, cable extension, or continuous-flex extension cable receptacles.

IMPORTANT If your motor/actuator includes a SpeedTec-ready DIN (M7) connector and mates with a threaded DIN (M4) cable plug, install the O-ring on the motor/actuator connector before connecting the M4 cable plug.

O-ring Applications



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 and a straight cable is 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® 5500 drives and 90 m (295 ft) for Kinetix 5700 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.

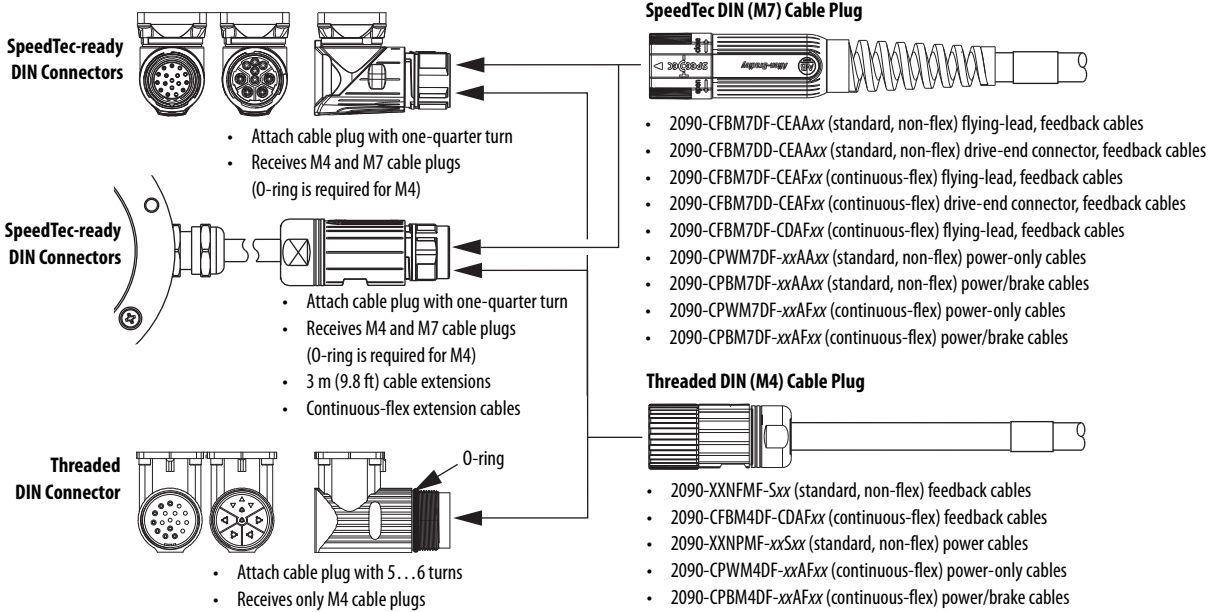
Do not use standard cables in a continuous-flex operation.

Motor/Actuator (M4 and M7) Cable Applications

Observe these guidelines when connecting your cable plug with the mating motor connector, motor extension cable, or an extension cable receptacle:

- Motors and actuators that are equipped with SpeedTec-ready DIN (M7) connectors are compatible with threaded DIN (M4) cable plugs.
- SpeedTec-ready DIN motor connectors are also compatible with SpeedTec DIN (M7/E7) extension cable plugs.
- Motors and actuators that are equipped with threaded DIN (M4) connectors are compatible with only threaded DIN (M4) cable plugs.

Motor/Actuator Connector and Cable Plug Compatibility



Power/Brake and Feedback Cables

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

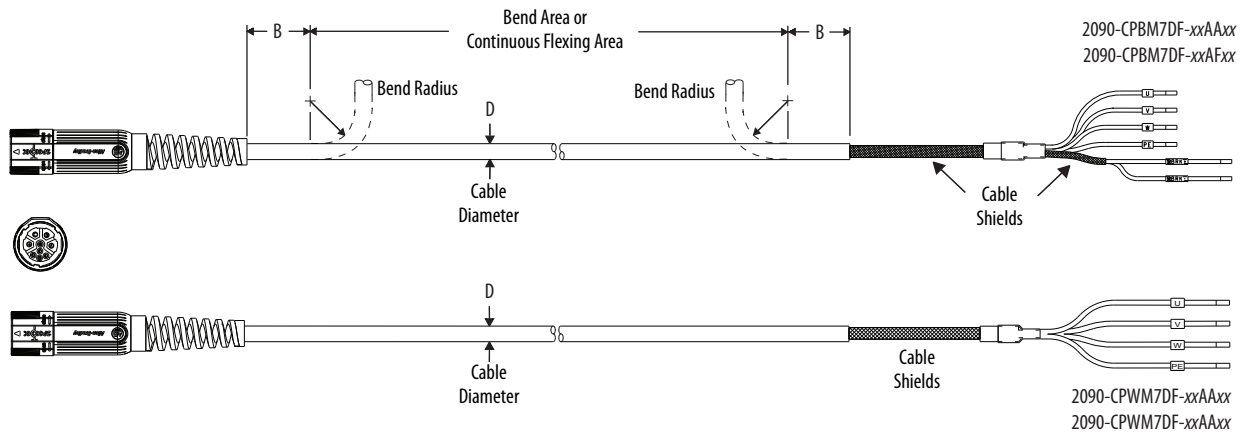
Motor Power and Feedback Cable Bend Radius Definitions

Type of Bend Radius	Type of Cable	Description
Static bend radius	Standard (non-flex)	The static (installation) bend radius and dimension B are 7 times the cable diameter: <ul style="list-style-type: none"> • Do not begin a static bend inside dimension B. • Use this measurement when routing the cable in a non-flex application between motor and drive (the bend area). <ul style="list-style-type: none"> – 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 motor power and feedback cables is 12 times the cable diameter: <ul style="list-style-type: none"> • Secure the continuous-flexing area, at least 7 cable diameters (dimension B) from each end of the cable, with a rigid mount that helps protect against cable flexing where it connects to the motor or shield clamp. • Use this measurement when routing the cable in a continuous-flex application between motor and drive (the continuous-flexing area). <ul style="list-style-type: none"> – The continuous flexing area is where continuous-flex cables can be flexed repeatedly.

Install Motor Power/Brake Cables

This figure illustrates how to measure the bend radius and where cable bends can be made on motor power/brake cables.

Motor Power/Brake Bend Radius Example



Power/Brake Cable Specifications (standard, non-flex)

Cable Type	Cable Cat. No.	Wire Size AWG	D mm (in.)	B ⁽¹⁾ mm (in.)
Power/brake cables (standard, non-flex)	2090-CPBM7DF-16AAxx	16	11.6 (0.47)	81.2 (3.2)
	2090-CPBM7DF-14AAxx	14	12.7 (0.50)	88.9 (3.5)
	2090-CPBM7DF-12AAxx	12	14.3 (0.56)	100 (3.9)
	2090-CPBM7DF-10AAxx	10	16.8 (0.66)	118 (4.6)
	2090-CPBM7DF-08AAxx	8	20.1 (0.79)	141 (5.5)
	2090-CPBM7DF-06AAxx	6	24.3 (0.96)	170 (6.7)
	2090-CPBM7DF-04AAxx	4	28.8 (1.13)	202 (7.9)
Power-only cables (standard, non-flex)	2090-CPWM7DF-16AAxx	16	9.20 (0.36)	64.4 (2.5)
	2090-CPWM7DF-14AAxx	14	10.3 (0.40)	72.1 (2.8)
	2090-CPWM7DF-12AAxx	12	11.2 (0.44)	78.4 (3.1)
	2090-CPWM7DF-10AAxx	10	15.3 (0.6)	107 (4.2)
	2090-CPWM7DF-08AAxx	8	18.7 (0.74)	131 (5.2)

(1) Dimension B is based on the cable diameter. See Motor Power and Feedback Cable Bend Radius Definitions on [page 3](#) for more information.

Power/Brake Cable Specifications (continuous-flex)

Cable Type	Cable Cat. No.	Wire Size AWG	D mm (in.)	B ⁽¹⁾ mm (in.)	Continuous Bend Radius ⁽¹⁾ mm (in.)
Power/brake cables (continuous-flex)	2090-CPBM7DF-16AFxx	16	12.5 (0.49)	87.5 (3.4)	150 (5.9)
	2090-CPBM7DF-14AFxx	14	13.7 (0.54)	95.9 (3.8)	164 (6.5)
	2090-CPBM7DF-10AFxx	10	17.8 (0.70)	125 (4.9)	214 (8.4)
	2090-CPBM7DF-08AFxx	8	20.6 (0.81)	144 (5.7)	247 (9.7)
Power-only cables (continuous-flex)	2090-CPWM7DF-16AFxx	16	9.7 (0.38)	67.9 (2.7)	116 (4.6)
	2090-CPWM7DF-14AFxx	14	10.4 (0.41)	72.8 (2.9)	125 (4.9)
	2090-CPWM7DF-10AFxx	10	15.7 (0.62)	110 (4.3)	188 (7.4)
	2090-CPWM7DF-08AFxx	8	20.2 (0.79)	141 (5.5)	242 (9.5)

(1) Dimension B and continuous bend radius are based on the cable diameter. See Motor Power and Feedback Cable Bend Radius Definitions on [page 3](#) for more information.

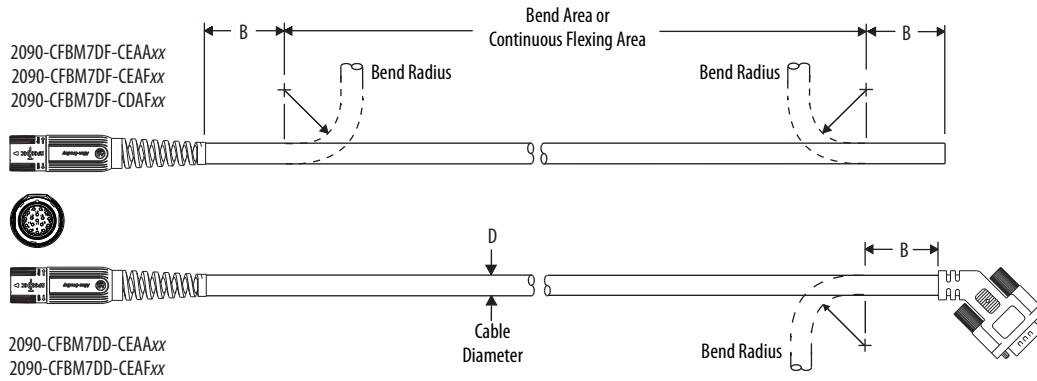
Power/Brake Cable Pinouts

Power/Brake Cable Type	Cable Cat. No.	Description
Power/brake cables (standard, non-flex)	2090-CPBM7DF-16AAxx, 2090-CPBM7DF-14AAxx, 2090-CPBM7DF-12AAxx	<p>To Motor: A, B, C, D, E, F, G</p> <p>To Drive: U, V, W, PE, MBRK+, MBRK-</p> <p>Legend: Twisted Wire Pair, Shield, Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connections required.</p>
Power/brake cables (continuous-flex)	2090-CPBM7DF-16AFxx, 2090-CPBM7DF-14AFxx	<p>To Motor: A, B, C, D, E, F, G</p> <p>To Drive: U, V, W, PE, MBRK+, MBRK-</p> <p>Legend: Twisted Wire Pair, Shield, Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connections required.</p>
Power-only cables (standard, non-flex)	2090-CPWM7DF-16AAxx, 2090-CPWM7DF-14AAxx, 2090-CPWM7DF-12AAxx	<p>To Motor: A, B, C, D</p> <p>To Drive: U, V, W, PE</p> <p>Legend: Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connection required.</p>
Power-only cables (continuous-flex)	2090-CPWM7DF-16AFxx, 2090-CPWM7DF-14AFxx	<p>To Motor: A, B, C, D</p> <p>To Drive: U, V, W, PE</p> <p>Legend: Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connection required.</p>
Power/brake cables (standard, non-flex)	2090-CPBM7DF-10AAxx, 2090-CPBM7DF-08AAxx, 2090-CPBM7DF-06AAxx	<p>To Motor: U, V, W, PE, MBRK+, MBRK-</p> <p>To Drive: U, V, W, PE, MBRK+, MBRK-</p> <p>Legend: Twisted Wire Pair, Shield, Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connections required.</p>
Power/brake cables (continuous-flex)	2090-CPBM7DF-10AFxx, 2090-CPBM7DF-08AFxx	<p>To Motor: U, V, W, PE, MBRK+, MBRK-</p> <p>To Drive: U, V, W, PE, MBRK+, MBRK-</p> <p>Legend: Twisted Wire Pair, Shield, Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connections required.</p>
Power-only cables (standard, non-flex)	2090-CPWM7DF-10AAxx, 2090-CPWM7DF-08AAxx	<p>To Motor: U, V, W, PE</p> <p>To Drive: U, V, W, PE</p> <p>Legend: Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connections required.</p>
Power-only cables (continuous-flex)	2090-CPWM7DF-10AFxx, 2090-CPWM7DF-08AFxx	<p>To Motor: U, V, W, PE</p> <p>To Drive: U, V, W, PE</p> <p>Legend: Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connections required.</p>
Power/brake cables (standard, non-flex)	2090-CPBM7DF-04AAxx, 2090-CPBM7DF-02AAxx	<p>To Motor: U, V, W, PE, MBRK+, MBRK-</p> <p>To Drive: U, V, W, PE, MBRK+, MBRK-</p> <p>Legend: Twisted Wire Pair, Shield, Wire Connection</p> <p>Notes: Connector Backshell Shielded 360°, 360° shield-to-ground connections required.</p>

Install Motor Feedback Cables

This figure illustrates how to measure the bend radius and where cable bends can be made on motor feedback cables.

Motor Feedback Bend Radius Examples



Feedback Cable Specifications

Cable Type	Cable Cat. No.	D mm (in.)	B ⁽¹⁾ mm (in.)	Continuous Bend Radius ⁽¹⁾ mm (in.)
Feedback cables (standard, non-flex)	2090-CFBM7DD-CEAAxx	9.8 (0.39)	68.6 (2.7)	N/A
	2090-CFBM7DF-CEAAxx			
Feedback cables (continuous-flex)	2090-CFBM7DD-CEAFxx	10.3 (0.40)	72.1 (2.8)	124 (4.9)
	2090-CFBM7DF-CEAFxx			
	2090-CFBM7DF-CDAFxx	11.7 (0.46)	81.9 (3.2)	140 (5.5)

(1) Dimension B and continuous bend radius are based on the cable diameter. See Motor Power and Feedback Cable Bend Radius Definitions on page 3 for more information.

Feedback Cable Pinouts (premolded cable connectors)

Feedback Cable Type	Cable Cat. No.	Description																																																												
Feedback cable (standard, non-flex)	2090-CFBM7DD-CEAAxx	<p>2090-CFBM7DD-CEAAxx feedback cables (-CE designation) have fewer conductors and are designed for motors with high-resolution absolute-position encoders.</p>																																																												
Feedback cable (continuous-flex)	2090-CFBM7DD-CEAFxx	<p>Motor Plug</p> <table border="1"> <tr><td>1</td><td>SIN+/AM+</td><td>22 AWG Black</td><td>SIN+/AM+</td><td>1</td></tr> <tr><td>2</td><td>SIN-/AM-</td><td>22 AWG White/Black</td><td>SIN-/AM-</td><td>2</td></tr> <tr><td>3</td><td>COS+/BM+</td><td>22 AWG Red</td><td>COS+/BM+</td><td>3</td></tr> <tr><td>4</td><td>COS-/BM-</td><td>22 AWG White/Red</td><td>COS-/BM-</td><td>4</td></tr> <tr><td>5</td><td>DATA+/IM+/R1</td><td>22 AWG Green</td><td>DATA+/IM+/R1</td><td>5</td></tr> <tr><td>6</td><td>DATA-/IM-/R2</td><td>22 AWG White/Green</td><td>DATA-/IM-/R2</td><td>10</td></tr> <tr><td>9</td><td>EPWR 5V</td><td>22 AWG Gray</td><td>EPWR 5V</td><td>14</td></tr> <tr><td>10</td><td>ECOM</td><td>22 AWG White/Gray</td><td>ECOM</td><td>6</td></tr> <tr><td>11</td><td>EPWR 9V</td><td>22 AWG Orange</td><td>EPWR 9V</td><td>7</td></tr> <tr><td>13</td><td>TS+</td><td>22 AWG White/Orange</td><td>TS+</td><td>11</td></tr> <tr><td>14</td><td>TS-</td><td></td><td></td><td></td></tr> <tr><td>12</td><td>ECOM</td><td></td><td></td><td></td></tr> </table> <p>Drive Plug</p> <p>36 AWG Shield</p> <p>Connector Backshell Shielded 360°</p> <p>Twisted Wire Pair Shield Wire Connection</p>	1	SIN+/AM+	22 AWG Black	SIN+/AM+	1	2	SIN-/AM-	22 AWG White/Black	SIN-/AM-	2	3	COS+/BM+	22 AWG Red	COS+/BM+	3	4	COS-/BM-	22 AWG White/Red	COS-/BM-	4	5	DATA+/IM+/R1	22 AWG Green	DATA+/IM+/R1	5	6	DATA-/IM-/R2	22 AWG White/Green	DATA-/IM-/R2	10	9	EPWR 5V	22 AWG Gray	EPWR 5V	14	10	ECOM	22 AWG White/Gray	ECOM	6	11	EPWR 9V	22 AWG Orange	EPWR 9V	7	13	TS+	22 AWG White/Orange	TS+	11	14	TS-				12	ECOM			
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5	DATA+/IM+/R1	22 AWG Green	DATA+/IM+/R1	5																																																										
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Feedback Cable Pinouts (flying leads)

Feedback Cable Type	Cable Cat. No.	Description																																				
Feedback cable (standard, non-flex)	2090-CFBM7DF-CEAxx	<p>Motor Plug</p> <p>To Drive</p> <table border="1"> <tr><td>1</td><td>SIN+/AM+</td><td>22 AWG Black</td></tr> <tr><td>2</td><td>SIN-/AM-</td><td>22 AWG White/Black</td></tr> <tr><td>3</td><td>COS+/BM+</td><td>22 AWG Red</td></tr> <tr><td>4</td><td>COS-/BM-</td><td>22 AWG White/Red</td></tr> <tr><td>5</td><td>DATA+/IM+/R1</td><td>22 AWG Green</td></tr> <tr><td>6</td><td>DATA-/IM-/R2</td><td>22 AWG White/Green</td></tr> <tr><td>9</td><td>EPWR 5V</td><td>22 AWG Gray</td></tr> <tr><td>10</td><td>ECOM</td><td>22 AWG White/Gray</td></tr> <tr><td>11</td><td>EPWR 9V</td><td>22 AWG Orange</td></tr> <tr><td>13</td><td>TS+</td><td>22 AWG White/Orange</td></tr> <tr><td>14</td><td>TS-</td><td>22 AWG White/Orange</td></tr> <tr><td>12</td><td>ECOM</td><td>36 AWG Shield</td></tr> </table> <p>Connector Backshell Shielded 360°</p> <p>Connect Cable Shield to Ground</p> <p>Twisted Wire Pair</p> <p>Shield</p> <p>Wire Connection</p>	1	SIN+/AM+	22 AWG Black	2	SIN-/AM-	22 AWG White/Black	3	COS+/BM+	22 AWG Red	4	COS-/BM-	22 AWG White/Red	5	DATA+/IM+/R1	22 AWG Green	6	DATA-/IM-/R2	22 AWG White/Green	9	EPWR 5V	22 AWG Gray	10	ECOM	22 AWG White/Gray	11	EPWR 9V	22 AWG Orange	13	TS+	22 AWG White/Orange	14	TS-	22 AWG White/Orange	12	ECOM	36 AWG Shield
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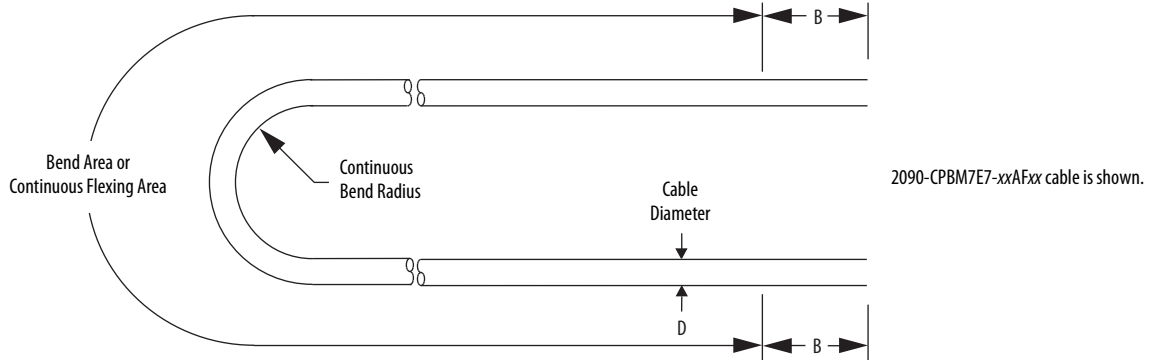
Feedback Cable Pinouts (flying-leads with Hall signals)

Feedback Cable Type	Cable Cat. No.	Description																																																			
Feedback cable (continuous-flex)	2090-CFBM7DF-CDAFxx	<p>Motor Plug</p> <p>To Drive</p> <table border="1"> <tr><td>1</td><td>SIN+/AM+</td><td>26 AWG Black</td></tr> <tr><td>2</td><td>SIN-/AM-</td><td>26 AWG White/Black</td></tr> <tr><td>3</td><td>COS+/BM+</td><td>26 AWG Red</td></tr> <tr><td>4</td><td>COS-/BM-</td><td>26 AWG White/Red</td></tr> <tr><td>5</td><td>DATA+/IM+</td><td>26 AWG Green</td></tr> <tr><td>6</td><td>DATA-/IM-</td><td>26 AWG White/Green</td></tr> <tr><td>9</td><td>EPWR 5V</td><td>16 AWG Gray</td></tr> <tr><td>10</td><td>ECOM</td><td>16 AWG White/Gray</td></tr> <tr><td>11</td><td>EPWR 9V</td><td>22 AWG Orange</td></tr> <tr><td>13</td><td>TS+</td><td>22 AWG White/Orange</td></tr> <tr><td>14</td><td>TS-</td><td>26 AWG Blue</td></tr> <tr><td>15</td><td>S1</td><td>26 AWG White/Blue</td></tr> <tr><td>16</td><td>S2</td><td>26 AWG Yellow</td></tr> <tr><td>17</td><td>S3</td><td>26 AWG White/Yellow</td></tr> <tr><td>7</td><td>Spare</td><td>26 AWG Brown</td></tr> <tr><td>8</td><td>ABS</td><td>26 AWG White/Brown</td></tr> <tr><td>12</td><td>ECOM</td><td>36 AWG Shield</td></tr> </table> <p>Connector Backshell Shielded 360°</p> <p>Connect Cable Shield to Ground</p> <p>Twisted Wire Pair</p> <p>Shield</p> <p>Wire Connection</p> <p>2090-CFBM7DF-CDAFxx feedback cables (-CD designation) include Hall signal conductors and are designed for motors with incremental encoders.</p>	1	SIN+/AM+	26 AWG Black	2	SIN-/AM-	26 AWG White/Black	3	COS+/BM+	26 AWG Red	4	COS-/BM-	26 AWG White/Red	5	DATA+/IM+	26 AWG Green	6	DATA-/IM-	26 AWG White/Green	9	EPWR 5V	16 AWG Gray	10	ECOM	16 AWG White/Gray	11	EPWR 9V	22 AWG Orange	13	TS+	22 AWG White/Orange	14	TS-	26 AWG Blue	15	S1	26 AWG White/Blue	16	S2	26 AWG Yellow	17	S3	26 AWG White/Yellow	7	Spare	26 AWG Brown	8	ABS	26 AWG White/Brown	12	ECOM	36 AWG Shield
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12	ECOM	36 AWG Shield																																																			

Install Continuous-flex Extension Cables

This figure illustrates how to measure the bend radius and where cable bends can be made on continuous-flex extension cables.

Continuous-flex Extension Cable Bend Radius Example



Extension Power Cable Pinout Diagrams and Specifications

Extension Power/Brake Cable Pinouts

Extension Cable Type	Cable Cat. No.	Description
Extension power/brake cable (continuous-flex)		<p>2090-CPBM7E7-10AFxx 2090-CPBM7E7-08AFxx</p>
	2090-CPBM7E7-16AFxx, 2090-CPBM7E7-14AFxx, 2090-CPBM7E7-10AFxx, 2090-CPBM7E7-08AFxx	<p>2090-CPBM7E7-16AFxx 2090-CPBM7E7-14AFxx</p>
	<p>Motor Plug</p> <p>Extension Plug</p> <p>Connector Backshell Shielded 360°</p> <p>Connect Cable Shield to Ground</p> <p>Twisted Wire Pair</p> <p>Shield</p> <p>Wire Connection</p>	

Extension Power/Brake Cable Specifications

Cable Type	Cable Cat. No.	Wire Size AWG	D mm (in.)	B ⁽¹⁾ mm (in.)	Continuous Bend Radius ⁽¹⁾ mm (in.)
Extension power/brake cables (continuous-flex)	2090-CPBM7E7-16AFxx	16	12.5 (0.49)	87.5 (3.4)	150 (5.9)
	2090-CPBM7E7-14AFxx	14	13.7 (0.54)	95.9 (3.8)	164 (6.4)
	2090-CPBM7E7-10AFxx	10	17.8 (0.70)	125 (4.9)	214 (8.4)
	2090-CPBM7E7-08AFxx	8	20.6 (0.81)	144 (5.7)	247 (9.7)

(1) Dimension B and continuous bend radius are based on the cable diameter. See Motor Power and Feedback Cable Bend Radius Definitions on [page 3](#) for more information.

Extension Feedback Cable Pinout Diagrams and Specifications

2090-CFBM7E7 extension feedback cables are available with and without Hall signal conductors.

- 2090-CFBM7E7-CEAFxx feedback cables (-CE designation) have fewer conductors and are designed for motors with high-resolution absolute-position encoders.
- 2090-CFBM7E7-CDAFxx feedback cables (-CD designation) include Hall signal conductors and are designed for motors with incremental encoders.

Extension Feedback Cable Pinouts

Cable Type	Cable Cat. No.	Description																																																
Extension feedback cable (continuous-flex)	2090-CFBM7E7-CEAFxx, 2090-CFBM7E7-CDAFxx	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Motor Plug</th> <th>Wire Color</th> <th>Extension Plug</th> </tr> </thead> <tbody> <tr><td>1</td><td>26 AWG Black</td><td>SIN+/AM+</td></tr> <tr><td>2</td><td>26 AWG White/Black</td><td>SIN-/AM-</td></tr> <tr><td>3</td><td>26 AWG Red</td><td>COS+/BM+</td></tr> <tr><td>4</td><td>26 AWG White/Red</td><td>COS-/BM-</td></tr> <tr><td>5</td><td>26 AWG Green</td><td>DATA+/IM+</td></tr> <tr><td>6</td><td>26 AWG White/Green</td><td>DATA-/IM-</td></tr> <tr><td>9</td><td>16 AWG Gray</td><td>EPWR 5V</td></tr> <tr><td>10</td><td>16 AWG White/Gray</td><td>ECOM</td></tr> <tr><td>11</td><td>22 AWG Orange</td><td>EPWR 9V</td></tr> <tr><td>13</td><td>22 AWG White/Orange</td><td>TS+</td></tr> <tr><td>14</td><td>26 AWG Blue</td><td>TS-</td></tr> <tr><td>15*</td><td>26 AWG White/Blue</td><td>S1</td></tr> <tr><td>16*</td><td>26 AWG Yellow</td><td>S2</td></tr> <tr><td>17*</td><td>26 AWG White/Yellow</td><td>S3</td></tr> <tr><td>12</td><td>36 AWG Shield</td><td>N/C</td></tr> </tbody> </table> <p> Connector Backshell Shielded 360° Connector Backshell Shielded 360° ⊗ Twisted Wire Pair ⊘ Shield ● Wire Connection </p>	Motor Plug	Wire Color	Extension Plug	1	26 AWG Black	SIN+/AM+	2	26 AWG White/Black	SIN-/AM-	3	26 AWG Red	COS+/BM+	4	26 AWG White/Red	COS-/BM-	5	26 AWG Green	DATA+/IM+	6	26 AWG White/Green	DATA-/IM-	9	16 AWG Gray	EPWR 5V	10	16 AWG White/Gray	ECOM	11	22 AWG Orange	EPWR 9V	13	22 AWG White/Orange	TS+	14	26 AWG Blue	TS-	15*	26 AWG White/Blue	S1	16*	26 AWG Yellow	S2	17*	26 AWG White/Yellow	S3	12	36 AWG Shield	N/C
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Extension Feedback Cable Specifications

Cable Type	Cable Cat. No.	D mm (in.)	B ⁽²⁾ mm (in.)	Continuous Bend Radius ⁽²⁾ mm (in.)
Extension feedback cables (continuous-flex)	2090-CFBM7E7-CEAFxx	10.3 (0.40)	72.1 (2.8)	124 (4.9)
	2090-CFBM7E7-CDAFxx ⁽¹⁾	11.7 (0.46)	81.9 (3.2)	140 (5.5)

(1) Pins 15, 16, and 17 (marked with an asterisk) for Hall signals S1, S2, and S3, apply to only the -CD feedback cable. Feedback cables with the -CE designation do not include these conductors.

(2) Dimension B and continuous bend radius are based on the cable diameter. See Motor Power and Feedback Cable Bend Radius Definitions on [page 3](#) for more information.

Install the Right Angle Cables

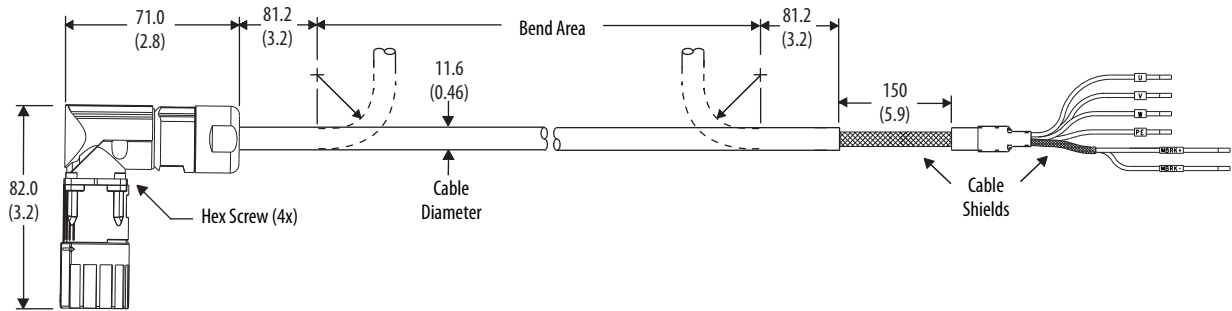
Follow these steps to attach a right-angle cable connector to the motor connector.

1. Align all flat surfaces on the cable connector with the flat surface on the motor connector.
2. Push the cable connector onto the motor connector to fully seat the connection.
3. Twist the knurled front end of the cable connector clockwise approximately 60° to secure the connection.

Right-angle Power/Brake Cables

This figure illustrates how to measure the bend radius and where cable bends can be made on right-angle power/brake cables.

Right-angle Power/Brake Cable Bend Radius Example



Right-angle Power/Brake Cable Specifications

Power/Brake Cable Type	Cable Cat. No.	Wire Size AWG	Available Lengths mm (in.)	Connector IP Rating
Right-angle power/brake cable (standard, non-flex)	2090-CPBM7DF-16RAxx	16 (power) 18 (brake)	3, 6, 9, 15 m (10, 16, 30, 49 ft)	IP54 (dust protected, splashing water)

You can reposition right-angle power cables in 90° increments. Follow these steps to reposition the power cable connector.

1. Remove the four 2 mm hex screws on the back of the cable connector.
2. Reposition the connector body to a new position by rotating the connector 90°, 180°, or 270°.
3. Secure the two parts together with the four 2 mm hex screws.
Torque screws to 0.25 N•m (2.2 lb•in), maximum.

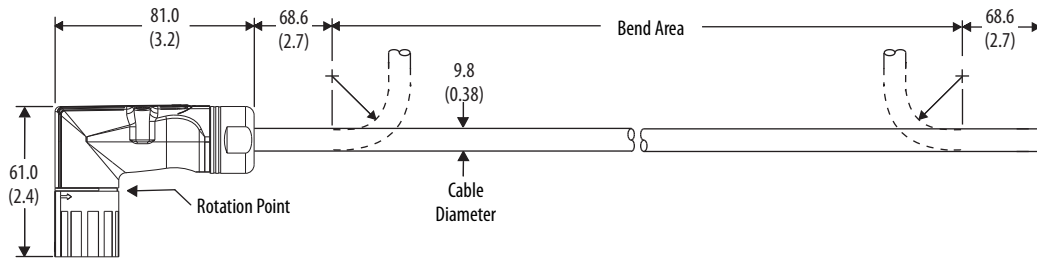
Right-angle Power/Brake Cable Pinouts

Power/Brake Cable Type	Cable Cat. No.	Description
Right-angle power/brake cable (standard, non-flex)	2090-CPBM7DF-16RAxx	

Right-angle Feedback Cables

This figure illustrates how to measure the bend radius and where cable bends can be made on right-angle feedback cables.

Right-angle Power/Brake Cable Bend Radius Example



Right-angle Feedback Cable Specifications

Feedback Cable Type	Cable Cat. No.	Wire Size AWG	Available Lengths mm (in.)	Connector IP Rating
Right-angle feedback cable (standard, non-flex)	2090-CFBM7DF-CERAxx	22	3, 6, 9, 15 m (10, 16, 30, 49 ft)	IP67 (dust tight, water immersion)

The right-angle feedback cable can be rotated 124° to the left of center or 200° to the right of center. Follow these steps to rotate the feedback cable connector.

1. Mount the cable on the motor connector.
2. Use two hands to rotate the connector into position.
 - a. Grasp the front and rear sections of the connector.
 - b. Use one hand to stabilize the front section of the connector (the area with the knurled locking sleeve) and the connector on the motor.
 - c. Use your other hand to rotate the back section of the connector (the area with the cable) into position.

Right-angle Feedback Cable Pinout

Feedback Cable Type	Cable Cat. No.	Description																																				
Right-angle feedback cable (standard, non-flex)	2090-CFBM7DF-CERAxx	<table border="1" style="margin-left: 20px;"> <tr><td>1</td><td>Black</td><td>SIN+/AM+</td></tr> <tr><td>2</td><td>White/Black</td><td>SIN-/AM-</td></tr> <tr><td>3</td><td>Red</td><td>COS+/BM+</td></tr> <tr><td>4</td><td>White/Red</td><td>COS-/BM-</td></tr> <tr><td>5</td><td>Green</td><td>DATA+/IM+/R1</td></tr> <tr><td>6</td><td>White/Green</td><td>DATA-/IM-/R2</td></tr> <tr><td>9</td><td>Gray</td><td>EPWR 9V DC</td></tr> <tr><td>10</td><td>White/Gray</td><td>COM</td></tr> <tr><td>11</td><td>Orange</td><td>EPWR 5V DC</td></tr> <tr><td>13</td><td>White/Orange</td><td>TS+</td></tr> <tr><td>14</td><td>TS-</td><td></td></tr> <tr><td>12</td><td>COM</td><td></td></tr> </table> <p style="text-align: right;">• Wire Connection ⌘ Twisted Wire Pair</p>	1	Black	SIN+/AM+	2	White/Black	SIN-/AM-	3	Red	COS+/BM+	4	White/Red	COS-/BM-	5	Green	DATA+/IM+/R1	6	White/Green	DATA-/IM-/R2	9	Gray	EPWR 9V DC	10	White/Gray	COM	11	Orange	EPWR 5V DC	13	White/Orange	TS+	14	TS-		12	COM	
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Additional Resources

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

Resource	Description
Kinetix Rotary Motion Specifications, publication KNX-TD001	Provides product specifications for Kinetix VP (Bulletin VPL, VPF, VPS), MP-Series™ (Bulletin MPL, MPM, MPF, MPS), Kinetix 6000M (Bulletin MDF), TL-Series™, RDD-Series™, and HPK-Series™ rotary motors.
Kinetix Linear Motion Specifications, publication KNX-TD002	Provides product specifications for LDAT-Series linear thrusters, Bulletin MPAS and MPMA linear stages, Bulletin MPAI, and TLAR electric cylinders, and LDC-Series™ and LDL-Series™ linear motors.
Kinetix Servo Drives Specifications, 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, 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 Motion Control Selection Guide, publication KNX-SG001	Provides overview of Kinetix servo drives, motors, actuators, and motion accessories designed to help make initial decisions for the motion control products best suited for your system requirements.
Kinetix 5700 Servo Drives User Manual, publication 2198-UM002	Provides information on installing, configuring, startup, troubleshooting, and applications for your Kinetix servo drive system.
Kinetix 5500 Servo Drives User Manual, publication 2198-UM001	
Kinetix 6200 and Kinetix 6500 Modular Servo Drives User Manual, publication 2094-UM002	
Kinetix 6000 Multi-axis Servo Drive User Manual, publication 2094-UM001	
Kinetix 300 EtherNet/IP Indexing Servo Drives User Manual, publication 2097-UM001	
Kinetix 350 Single-axis EtherNet/IP Servo Drives User Manual, publication 2097-UM002	
Kinetix 3 Component Servo Drives User Manual, publication 2071-UM001	
System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001	Provides information, examples, and techniques that are designed to minimize system failures that are caused by electrical noise.
Rockwell Automation® Product Certification, website http://www.rockwellautomation.com/global/certification/overview.page	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/global/literature-library/overview.page>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Rockwell Automation Support

For technical support, visit <http://www.rockwellautomation.com/support/overview.page>.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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