

2090-Series Single Motor Cables

Catalog Numbers 2090-CSBM1DF, 2090-CSWM1DF, 2090-CSBM1DE, 2090-CSWM1DE, 2090-CSBM1DG, 2090-CSWM1DG, 2090-CSBM1E1

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Summary of Changes

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

Topic	Page
Added 2090-Series Cables - Series Change to help clarify the impact of series-B cables with 18 AWG brake conductors.	2
Added 2090-CSBM1DE (18 and 14 AWG) with-brake pinout illustration and series-B cable specifications.	7
Added 2090-CSBM1DE (18 and 14 AWG) without brake pinout illustration.	8
Added 2090-CSBM1DE (10, 8, 6 AWG) with-brake pinout illustration and series-B cable specifications.	9
Added 2090-CSBM1E1-06AFxx and 2090-CSBM1E1-08AFxx extension cable pinout illustration.	10
Added 2090-CSBM1E1-06AFxx and 2090-CSBM1E1-08AFxx extension cable specifications.	11

2090-Series Cables - Series Change

To meet the current requirements of motor brake circuits on Kinetix® 5700 servo drive systems with cable lengths that exceed 50 m (164 ft), the 2090-CSBM1DE (series B) cables are available with 18 AWG brake conductors. Series B cables are designed for applications with cable lengths from 51 m (167 ft)...90 m (294 ft) and are available in 1.0 m (3.3 ft) increments. For Kinetix 5700 drive systems requiring cable lengths from 1.0 m (3.3 ft)...50 m (164 ft), the 2090-CSBM1DE (series A) cables are still available.

Single Motor Cables

Cable Cat. No.	Drive Compatibility	Brake Conductors AWG	Available Cable Lengths, max ⁽²⁾ m (ft)
2090-CSBM1DF (series A and B)	Kinetix 5500	22	50 (164)
2090-CSBM1DG	Kinetix 5500 and Kinetix 5700	22	
2090-CSBM1DE-18	Kinetix 5700	22	90 (294)
2090-CSBM1DE-14 (series A) 2090-CSBM1DE-10 (series A)			50 (164)
2090-CSBM1DE-14 (series B) ⁽¹⁾ 2090-CSBM1DE-10 (series B) ⁽¹⁾		18	90 (294)
2090-CSBM1DE-08 2090-CSBM1DE-06			

(1) Series B cables are used in applications with cable lengths from 51 m (167 ft) . . . 90 m (294 ft).

(2) 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. For details, see [Additional Resources](#) on [page 11](#) for the publication number of your servo drive user manual.

Single Extension Cables

Cable Cat. No.	Drive Compatibility	Brake Conductors (series B) AWG	Brake Conductors (series A) AWG	Available Cable Length, max m (ft)
2090-CSBM1E1-18	Kinetix 5500 and Kinetix 5700	N/A	22	30 (98.4)
2090-CSBM1E1-14		18	22 ⁽¹⁾	
2090-CSBM1E1-10				

(1) Series B cables replace series A cables. These series A cables are no longer offered.

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 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.

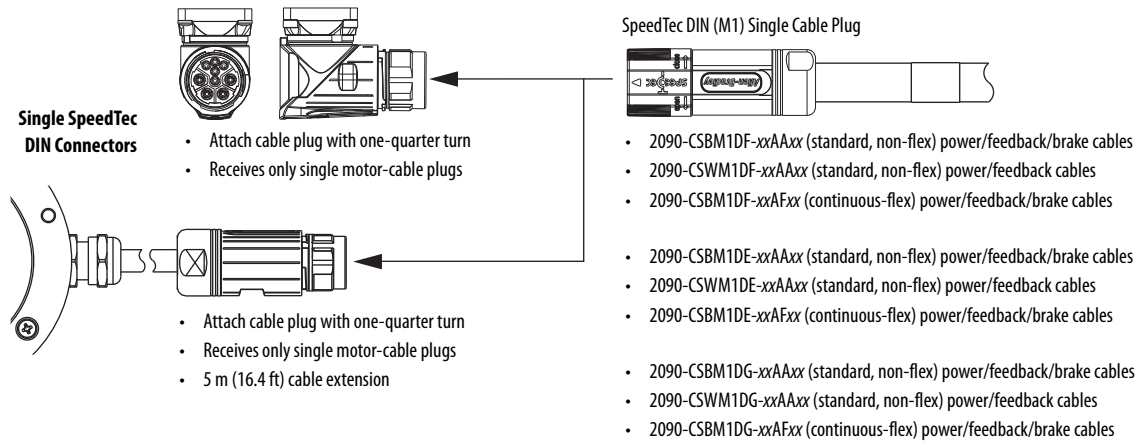
IMPORTANT Standard (non-flex) cables can be bent or reformed during installation and maintenance. Continuous-flex cables can be flexed repeatedly within a specified bend radius when properly installed.

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

Single Motor Cable Applications

SpeedTec DIN single (M1) motor cables are compatible with only Kinetix VP motors.

Single Motor Connector and Cable Plug Compatibility



The cable technology used in single cables is the same regardless of the catalog number. What is different about each cable is the lead preparation and feedback conductor terminations.

- 2090-CSxM1DF cable conductors have flying-leads and lead preparation that is designed specifically for Kinetix 5500 servo drives. No on-site lead preparation is required.
- 2090-CSxM1DE cables include the 2198-KITCON-DSL connector kit. The kit is pre-assembled with the feedback conductors and lead preparation for the flying-lead power conductors is designed specifically for Kinetix 5700 servo drives. No on-site lead preparation is required.



ATTENTION: To avoid damage to the 2198-KITCON-DSL connector kit pre-wired to 2090-CSxM1DE cables, use caution when installing the cable and when routing the cable to the drive.

- 2090-CSxM1DG cable conductors have flying-leads and lead preparation that is designed for either Kinetix 5500 or Kinetix 5700 servo drives. No on-site lead preparation is required, however, 2090-CSxM1DG cable leads are longer than 2090-CSxM1DF cable leads to accommodate either drive family.

IMPORTANT To avoid problems securing the cable in the shield clamp and routing the flying leads to the motor power, feedback, and brake connector plugs, make sure that you are using the cable that is best suited for your application.

- Use 2090-CSxM1DF cables with Kinetix 5500 servo drives (2198-KITCON-DSL connector kit is included with the drive)
- Use 2090-CSxM1DE cables with Kinetix 5700 servo drives (2198-KITCON-DSL connector kit is pre-wired to the feedback conductors)
- Use 2090-CSxM1DG cables with Kinetix 5500 or Kinetix 5700 servo drives (when used with Kinetix 5700 drives, the 2198-KITCON-DSL connector kit is ordered separately)

Single Motor Cable Bend Radius Specifications

When installing cable runs between the motor and drive, be careful not to stress the cable by making bends too sharp. See the [Bend Radius Definitions](#) table when making static and continuous bend-radius cable bends.

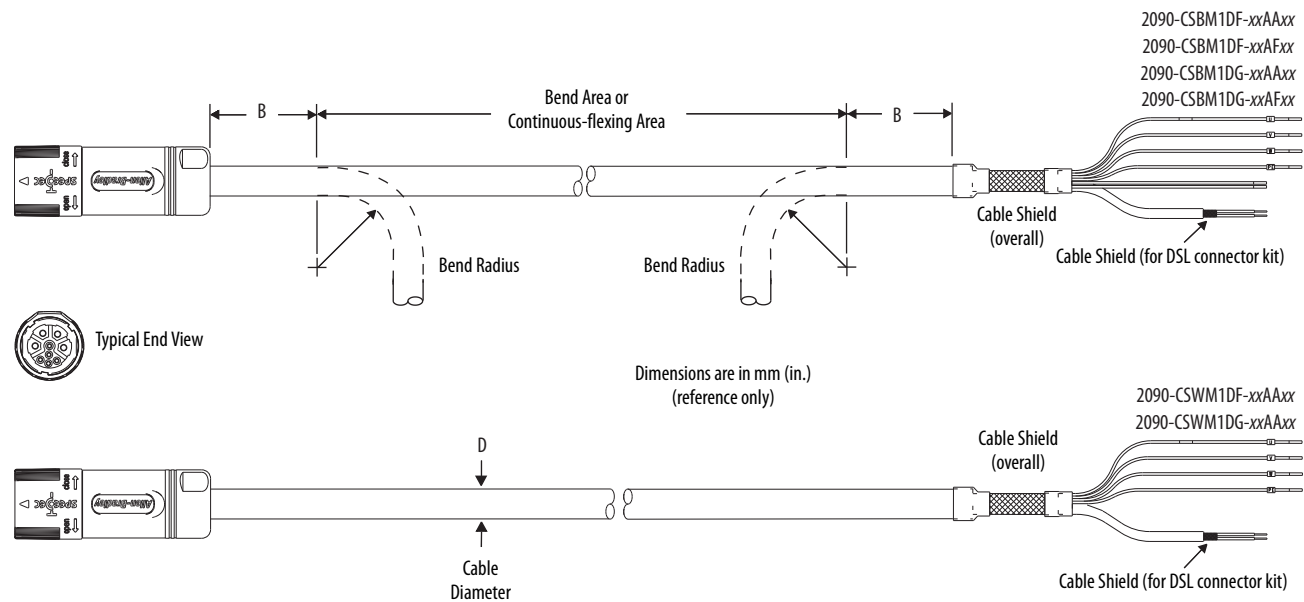
Bend Radius Definitions

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 single motor cables is 10 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 prevents the cable from 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.

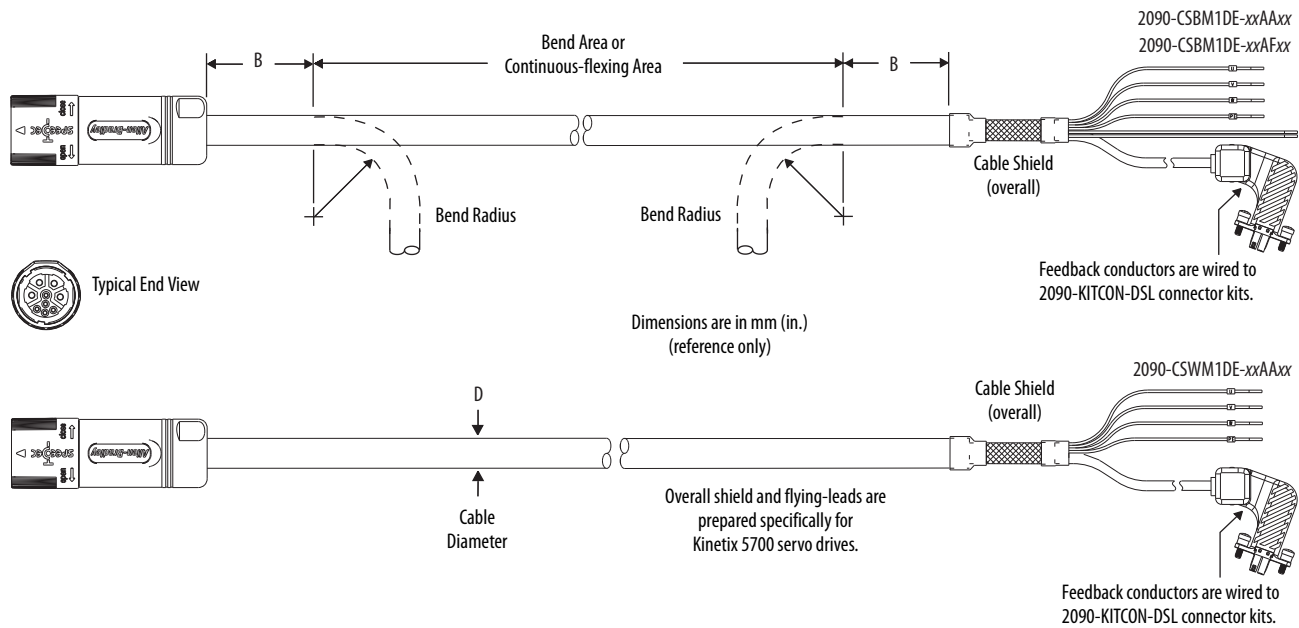
Install Single Motor Cables

These figures illustrate how to measure the bend radius and where cable bends can be made on single motor cables. Use these figures with the cable pinout and specification tables that follow when routing cables during system installation.

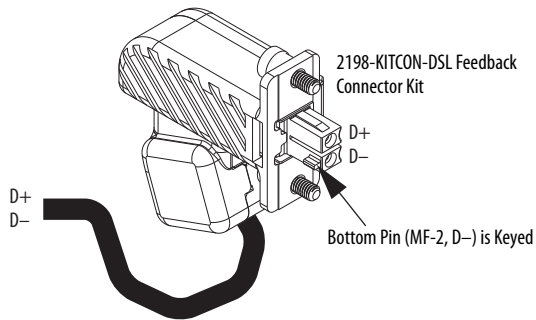
2090-CSxM1DF and 2090-CSxM1DG Motor Cables



2090-CSxM1DE Motor Cables



DSL Connector Kit Pin Orientation



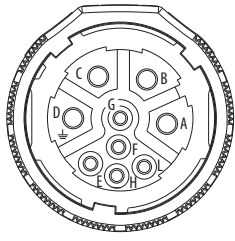
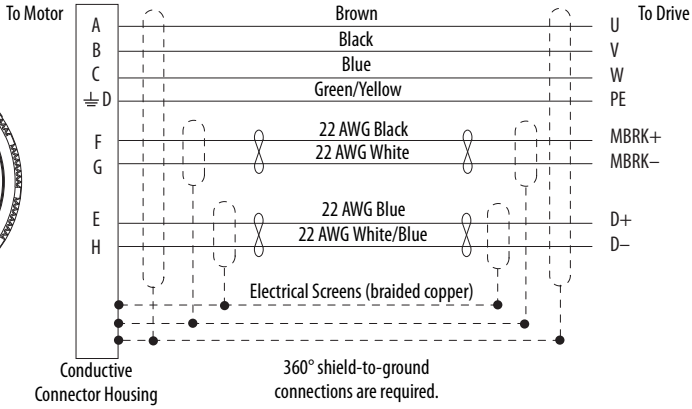
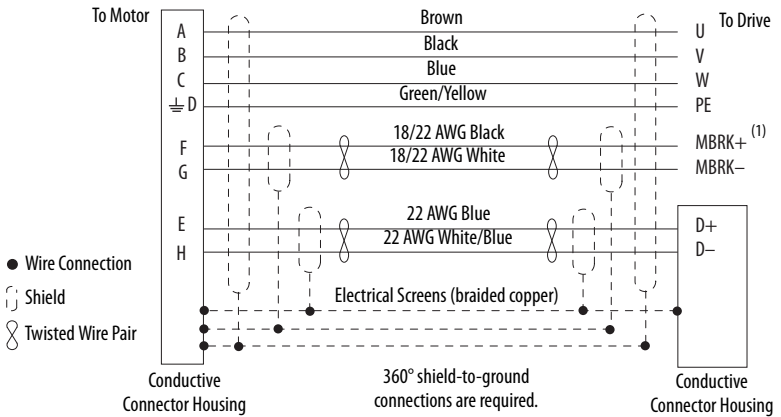
ATTENTION: To avoid damage to the 2198-KITCON-DSL connector kit that is pre-wired to 2090-CSxM1DE cables, use caution when installing the cable and when routing the cable to the drive.

IMPORTANT

To avoid problems securing the cable in the shield clamp and routing the flying leads to the motor power, feedback, and brake connector plugs, make sure that you are using the cable that is best suited for your application.

- Use 2090-CSxM1DF cables with Kinetix 5500 servo drives (2198-KITCON-DSL connector kit is included with the drive)
- Use 2090-CSxM1DE cables with Kinetix 5700 servo drives (2198-KITCON-DSL connector kit is pre-wired to the feedback conductors)
- Use 2090-CSxM1DG cables with Kinetix 5500 or Kinetix 5700 servo drives (when used with Kinetix 5700 drives, the 2198-KITCON-DSL connector kit is ordered separately)

Power/Feedback/Brake Cable Pinouts (18 and 14 AWG)

Cable Type	Cable Cat. No.	Description
Standard, non-flex	2090-CSBM1DF-18AAxx, 2090-CSBM1DF-14AAxx, 2090-CSBM1DG-18AAxx, 2090-CSBM1DG-14AAxx	 
Continuous-flex	2090-CSBM1DF-18AFxx, 2090-CSBM1DF-14AFxx, 2090-CSBM1DG-18AFxx, 2090-CSBM1DG-14AFxx	
Standard, non-flex	2090-CSBM1DE-18AAxx, 2090-CSBM1DE-14AAxx	
Continuous-flex	2090-CSBM1DE-18AFxx, 2090-CSBM1DE-14AFxx	

(1) 18 AWG brake conductors apply to 2090-CSBM1DE (series B) cables. 22 AWG brake conductors apply to 2090-CSBM1DE (series A) cables.

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

Cable Cat. No.	Wire Size AWG	D mm (in.)	B ⁽¹⁾ mm (in.)
2090-CSBM1DF-18AAxx 2090-CSBM1DF-14AAxx	18 14	15.0 (0.59)	105 (4.1)
2090-CSBM1DG-18AAxx 2090-CSBM1DG-14AAxx	18 14		
2090-CSBM1DE-18AAxx 2090-CSBM1DE-14AAxx (series A)	18 14		
2090-CSBM1DE-14AAxx (series B)	14	16.3 (0.64)	114 (4.5)

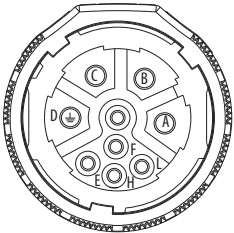
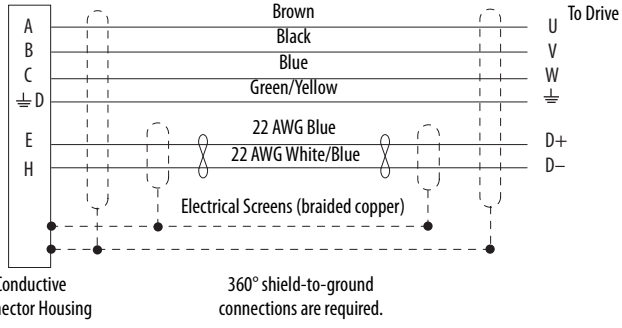
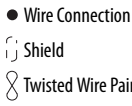
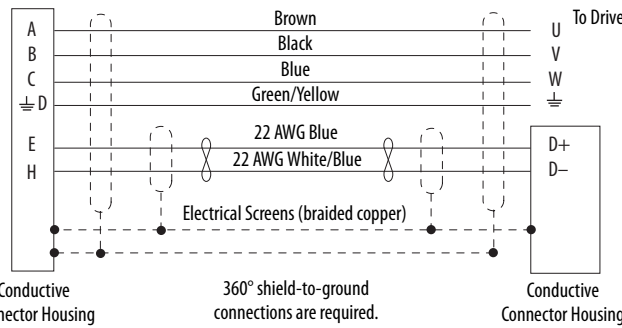
(1) Dimension B is based on the cable diameter. See Bend Radius Definitions on page 5 for more information.

Power/Feedback/Brake Cable Specifications (continuous-flex)

Cable Cat. No.	Wire Size AWG	D mm (in.)	B ⁽¹⁾ mm (in.)	Continuous Bend Radius ⁽¹⁾ mm (in.)
2090-CSBM1DF-18AFxx 2090-CSBM1DF-14AFxx	18 14	15.0 (0.59) 17.0 (0.67)	105 (4.1) 119 (4.7)	150 (5.9) 170 (6.7)
2090-CSBM1DG-18AFxx 2090-CSBM1DG-14AFxx	18 14	15.0 (0.59) 17.0 (0.67)	105 (4.1) 119 (4.7)	150 (5.9) 170 (6.7)
2090-CSBM1DE-18AFxx 2090-CSBM1DE-14AFxx (series A and B)	18 14	15.0 (0.59) 17.0 (0.67)	105 (4.1) 119 (4.7)	150 (5.9) 170 (6.7)

(1) Dimension B and continuous bend radius are based on the cable diameter. See Bend Radius Definitions on page 5 for more information.

Power/Feedback Cable Pinouts (18 and 14 AWG)

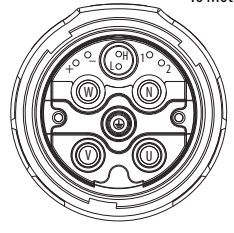
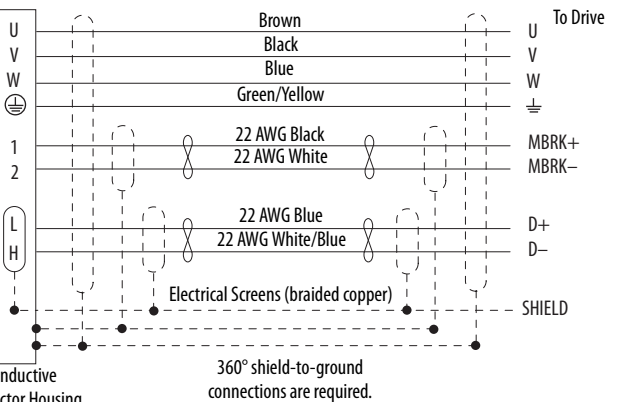
Cable Type	Cable Cat. No.	Description
Standard, non-flex	2090-CSWM1DF-18AAxx, 2090-CSWM1DF-14AAxx, 2090-CSWM1DG-18AAxx, 2090-CSWM1DG-14AAxx	 <p>To Motor</p>  <p>To Drive</p> <p>Conductive Connector Housing</p> <p>360° shield-to-ground connections are required.</p>
Standard, non-flex	2090-CSWM1DE-18AAxx, 2090-CSWM1DE-14AAxx	 <p>To Motor</p>  <p>To Drive</p> <p>Conductive Connector Housing</p> <p>360° shield-to-ground connections are required.</p> <p>Conductive Connector Housing</p>

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

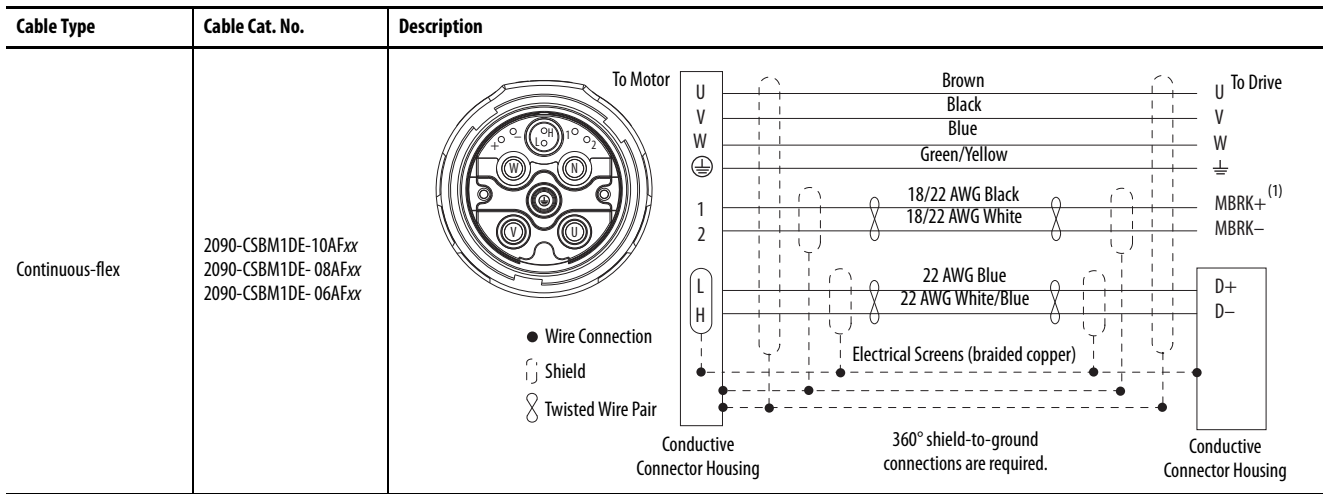
Cable Cat. No.	Wire Size AWG	D mm (in.)	B ⁽¹⁾ mm (in.)
2090-CSWM1DF-18AAxx 2090-CSWM1DF-14AAxx	18 14	15.0 (0.59)	105 (4.1)
2090-CSWM1DG-18AAxx 2090-CSWM1DG-14AAxx	18 14		
2090-CSWM1DE-18AAxx 2090-CSWM1DE-14AAxx	18 14		

(1) Dimension B is based on the cable diameter. See Bend Radius Definitions on [page 5](#) for more information.

Power/Feedback/Brake Cable Pinouts (10 AWG)

Cable Type	Cable Cat. No.	Description
Continuous-flex	2090-CSBM1DF-10AFxx 2090-CSBM1DG-10AFxx	 <p>To Motor</p>  <p>To Drive</p> <p>Conductive Connector Housing</p> <p>360° shield-to-ground connections are required.</p>

Power/Feedback/Brake Cable Pinouts (10, 8, and 6 AWG)



(1) 18 AWG brake conductors apply to 2090-CSBM1DE-10AFxx (series B) cables and 2090-CSBM1DE-08AFxx and 2090-CSBM1DE-06AFxx cables. 22 AWG brake conductors apply to 2090-CSBM1DE-10AFxx (series A) cables.

Power/Feedback/Brake Cable Specifications (continuous-flex)

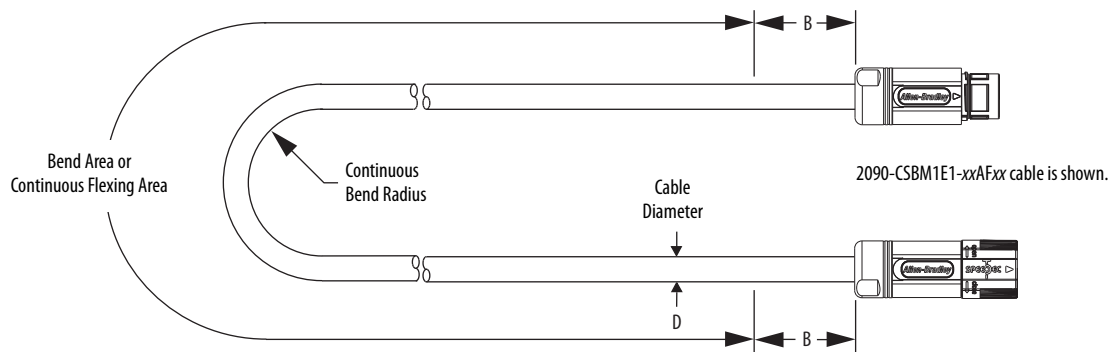
Cable Cat. No.	Wire Size AWG	D mm (in.)	B ⁽¹⁾ mm (in.)	Continuous Bend Radius ⁽¹⁾ mm (in.)
2090-CSBM1DF-10AFxx	10	19.0 (0.75)	133 (5.2)	190 (7.5)
2090-CSBM1DG-10AFxx				
2090-CSBM1DE-10AFxx (series A)	10	19.0 (0.75)	133 (5.2)	190 (7.5)
2090-CSBM1DE-10AFxx (series B)	10	20.3 (0.80)	142 (5.6)	203 (8.0)
2090-CSBM1DE-08AFxx	8	25.0 (0.98)	200 (8.0)	250 (10.0)
2090-CSBM1DE-06AFxx	6			

(1) Dimension B and continuous bend radius are based on the cable diameter. See Bend Radius Definitions on page 5 for more information.

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 Cable Pinouts

Extension Cable Type	Cable Cat. No.	Description
Continuous-flex	2090-CSBM1E1-18AFxx, 2090-CSBM1E1-14AFxx, 2090-CSBM1E1-10AFxx	
	2090-CSBM1E1-06AFxx, 2090-CSBM1E1-08AFxx	

(1) On 18 AWG and 14 AWG cables, the electrical screen of the blue and white/blue pair is grounded to the connector chassis.
 (2) On 10, 8, and 6 AWG cables, the electrical screen of the blue and white/blue pair is grounded to the internal metal EMC/EMI tube.

Extension Cable Specifications (continuous-flex)

Cable Cat. No.	Wire Size AWG	D mm (in.)	B ⁽¹⁾ mm (in.)	Continuous Bend Radius ⁽¹⁾ mm (in.)
2090-CSBM1E1-18AFxx	18	15.0 (0.59)	105 (4.1)	150 (5.9)
2090-CSBM1E1-14AFxx (series A and B)	14	17.0 (0.67)	119 (4.7)	170 (6.7)
2090-CSBM1E1-10AFxx (series A)	10	19.0 (0.75)	133 (5.2)	190 (7.5)
2090-CSBM1E1-10AFxx (series B)	10	20.3 (0.80)	142 (5.6)	203 (8.0)
2090-CSBM1E1-08AFxx	8	25.0 (0.98)	200 (8.0)	250 (10.0)
2090-CSBM1E1-06AFxx	6			

(1) Dimension B and continuous bend radius are based on the cable diameter. See Bend Radius Definitions on [page 5](#) for more information.

Additional Resources

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

Resource	Description
Kinetix Rotary Motion Specifications, publication KNX-TD001	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	Product specifications for LDAT-Series linear thrusters, Bulletin MPAS and MPMA linear stages, Bulletin MPAR, MPAL, and TLAR electric cylinders, and LDC-Series™ and LDL-Series™ linear motors.
Kinetix Servo Drives Specifications, publication KNX-TD003	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	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	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 5500 Servo Drives User Manual, publication 2198-UM001	Provides information on installing, configuring, startup, troubleshooting, and applications for your servo drive system.
Kinetix 5700 Servo Drives User Manual, publication 2198-UM002	
System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001	Provides information, examples, and techniques designed to minimize system failures 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.

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Local Technical Support Phone Numbers	Locate the phone number for your country.	http://www.rockwellautomation.com/global/support/get-support-now.page
Direct Dial Codes	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	http://www.rockwellautomation.com/global/support/direct-dial.page
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	http://www.rockwellautomation.com/global/literature-library/overview.page
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	http://www.rockwellautomation.com/global/support/pcdc.page

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