2090-Series Motor/Actuator Cables

A wide variety of motor/actuator cables with rugged DIN connectors are available for connecting your motion control system. Standard (non-flex) motor power and feedback cables are available for all Allen-Bradley servo motors and actuators. Continuous-flex rated cables, intended for moving applications, are also available. Continuous-flex extension and standard (non-flex) transition cables are also available for your applications that require them.

IMPORTANT	All flying-lead feedback cables require breakout components or connector kits for drive-end terminations. Refer to Breakout Components and Connector Kits beginning on page 65 for catalog numbers and descriptions.

IMPORTANT	Standard (non-flex) cables have a regular maintenance and installation bend radius of 10 times the cable diameter. For flexing applications, continuous-flex cables have an operational bend radius of 12 times the cable diameter.

Catalog Numbers - 2090-Series Motor/Actuator Cable

Catalog numbers consist of various characters, each of which identifies a specific option for that component. Use the catalog numbering charts below to understand the configuration of your component. For questions regarding product availability, contact your Allen-Bradley distributor.

Motor Power/Brake, Feedback, and Extension Cables

2090 - C *xx* M*x* D*x* - C*x* A*x* *xx*

Cable Length
Refer to Technical Specifications - 2090-Series Motor/Actuator Cables beginning on page 30.

Cable Type
AA = Standard, non-flex
AF = Continuous-flex

Encoder Type (applies to feedback cables)
CB = Serial incremental/Serial absolute - battery backup
CC = Serial incremental/Incremental
CD = SIN/COS High-resolution/Incremental
CE = SIN/COS High-resolution/Resolver

Wire Gauge Size (applies to power cables)
16, 14, 12, 10, 8, 6, 4, and 2 AWG

Drive-end Connector Type
DF = Drive-end, flying-lead
DD = Drive-end, D-sub connector
E7 = Extension receptacle (SpeedTec ready)

Motor-end Connector Type
M6 = Circular plastic connector
M4 = Threaded DIN connector
M7 = SpeedTec DIN connector

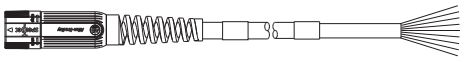
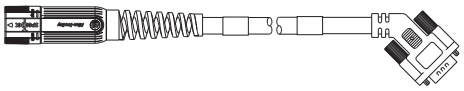
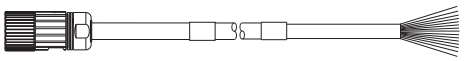
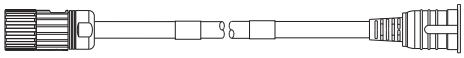
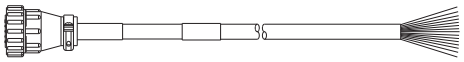
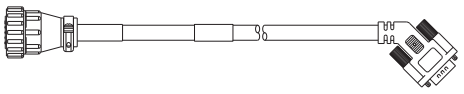
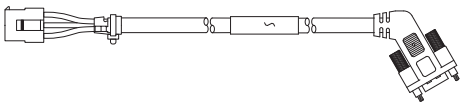
Cable Type
PB = Motor power with brake wires
PW = Motor power only
FB = Motor feedback only

Accessory Component
C = Cable

Bulletin Number

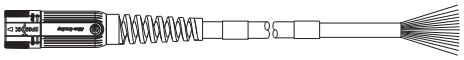
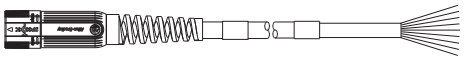
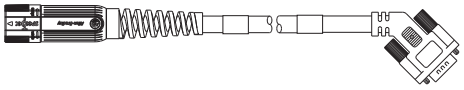
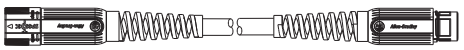
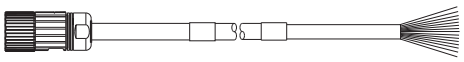
2090-Series Motor/Actuator Cables Overview

Feedback Cable Descriptions (standard, non-flex)

Standard Cable Cat. No.	Description	Cable Configuration	Motor/Actuator Connector
		Motor/Acutator End — Drive End	
2090-CFBM7DF-CEAA*xx*	• Drive-end flying-leads (DF) • High-resolution or resolver applications (CE)		SpeedTec DIN (M7)
2090-CFBM7DD-CEAA*xx*	• Drive-end 15-pin connector (DD) • High-resolution or resolver applications (CE)		
2090-XXNFMF-S*xx*	• Drive-end flying-leads • High-resolution or incremental applications		Threaded DIN (M4)
2090-CFBM4E2-CATR	• Drive-end bayonet (E2), transition (TR) cable (1) • Motor-end threaded DIN (M4) • All feedback types (CA)		
2090-CFBM6DF-CBAA*xx*	• Drive-end flying-leads (DF) • High-resolution, battery backup or Incremental applications (CB)		Circular Plastic (M6)
2090-CFBM6DD-CCAA*xx*	• Drive-end 15-pin connector (DD) • Incremental applications only (CC)		
2090-DANFCT-S*xx*	• Drive-end 20-pin connector • High-resolution applications		Rectangular Plastic

(1) Threaded DIN connector (motor end) and bayonet connector for 2090-XXNFMP-S*xx* cable. Refer to 2090-Series Motor Power and Feedback Transition Cables on page 17.

Feedback Cable Descriptions (continuous-flex)

Continuous-flex Cable Cat. No.	Description	Cable Configuration	Motor/Actuator Connector
		Motor/Acutator End — Drive End	
2090-CFBM7DF-CDAF*xx*	• Drive-end flying-leads (DF) • High-resolution or incremental applications (CD)		SpeedTec DIN (M7)
2090-CFBM7DF-CEAF*xx*	• Drive-end flying-leads (DF) • High-resolution or resolver applications (CE)		
2090-CFBM7DD-CEAF*xx*	• Drive-end 15-pin connector (DD) • High-resolution or resolver applications (CE)		
2090-CFBM7E7-CDAF*xx*	• Drive-end (male) connector, extension (E7) (1) • Motor-end SpeedTec DIN cable plug (M7)		
2090-CFBM7E7-CEAF*xx*			
2090-CFBM4DF-CDAF*xx*	• Drive-end flying-leads • High-resolution or incremental applications		Threaded DIN (M4)

(1) SpeedTec DIN connector (motor end) and male connector for extending SpeedTec or threaded DIN cable. Refer to SpeedTec DIN Continuous-flex Extension Cables on page 16.

IMPORTANT Feedback cables with the CE designation, for example 2090-CFBM7DF-CEAA*xx*, are intended for high-resolution encoder or resolver applications and have fewer conductors than feedback cables with the CD designation, for example 2090-CFBM7DF-CDAF*xx* that are intended for high-resolution or incremental encoder applications.

TL-Series Low Inertia Motors

Cat. No.	Drive Compatibility	Feedback Type	Feedback Cable Cat. No.	IP Rating
TLY-A*xxxx*-H	2093-AC05-MP*x* or 2093-AM*xx* 2094-AC*xx*-M*xx*-S or 2094-AM*xx*-S 2097-V3*x*PR*x* or 2097-V3*x*PR*x*-LM 2098-DSD-*xxx*	Incremental	2090-CFBM6DF-CBAA*xx* (flying lead) or 2090-CFBM6DD-CCAA*xx* (premolded connector)	Shaft seal is optional: • IP54 without shaft seal • IP65 with shaft seal Cable connectors IP30
	2071-A*xx*		2090-CFBM6DF-CBAA*xx* (flying lead)	
TLY-A*xxxx*-B	2093-AC05-MP*x* or 2093-AM*xx* 2097-V3*x*PR*x* or 2097-V3*x*PR*x*-LM	Multi-turn High Resolution Absolute Encoder Feedback	2090-CFBM6DF-CBAA*xx* (flying lead) or 2090-CFBM6DD-CCAA*xx* (premolded connector)	
	2071-A*xx*		2090-CFBM6DF-CBAA*xx* (flying lead)	
TL-A*xxxx*-B	2071-A*xx*		2090-DANFCT-S*xx* (1)	

(1) Use when high-resolution absolute encoder feedback is not required. For high-resolution encoder applications, remove the drive-side connector and wire flying leads to the 2071-TBMF connector kit with customer-supplied 3.6V lithium battery.

TL-Series (200V-class) Motors	Power Cable Cat. No.	IP Rating
TLY-A*xxxx*-H	2090-CPBM6DF-16AA*xx* (power and brake) 2090-CPWM6DF-16AA*xx* (power without brake)	Shaft seal is optional: • IP54 without shaft seal • IP65 with shaft seal Cable connectors IP30
TLY-A*xxxx*-B		
TL-A*xxxx*-B	2090-DANPT-16S*xx*	

TL-Series (200V-class) Motors	Brake Cable Cat. No.	IP Rating
TL-A*xxxx*-B motors	2090-DANBT-18S*xx*	Shaft seal is optional: • IP54 without shaft seal • IP65 with shaft seal Cable connectors IP30

For cable configuration illustrations and feature descriptions, by catalog number, refer to 2090-Series Motor/Actuator Cables Overview beginning on page 13.
Cable length *xx* is in meters. Refer to Technical Specifications - 2090-Series Motor/Actuator Cables beginning on page 30.
For N-Series retrofit cable information, refer to the Kinetix Rotary Motion Technical Data, publication GMC-TD001.

IMPORTANT TL-A*xxxx*-B motors have rectangular plastic connectors and are intended for use with Kinetix 3 (Bulletin 2071) servo drives. The TLY-A*xxxx* motors have circular plastic connectors and are intended for use with Bulletin 2093, 2094, 2097, and 2098 (200V-class) servo drives.

LDAT-Series Integrated Linear Thrusters

Actuator Cat. No.	Drive Compatibility	Feedback Type	Feedback Cable Cat. No.	IP Rating
LDAT-S*xxxxxx*-x**D***x* (230V operation)	2198-H*xxx*-ERS or 2198-H*xxx*-ERS2 2097-V3*x*PR*x*	Absolute Linear Encoder Feedback	2090-CFBM7DF-CEAA*xx* or 2090-CFBM7DD-CEAA*xx* (standard, non-flex) 2090-CFBM7DF-CEAF*xx* 2090-CFBM7DD-CEAF*xx* (continuous-flex)	IP30
LDAT-S*xxxxxx*-x**D***x* (460V operation)	2198-H*xxx*-ERS or 2198-H*xxx*-ERS2 2198-D*xxx*-ERS3 2097-V34PR*x*			
LDAT-S*xxxxxx*-x**B***x* (230V operation)	2093-AC05-MP*x* or 2093-AM*xx* 2094-AC*xx*-M*xx*-S or 2094-AM*xx*-S 2097-V3*x*PR*x* 2098-DSD-*xxx* 2071-A*xx*	Incremental Encoder Feedback	2090-XXNFMF-S*xx* (standard, non-flex) 2090-CFBM7DF-CDAF*xx* (continuous-flex)	
LDAT-S*xxxxxx*-x**B***x* (460V operation)	2198-D*xxx*-ERS3 2094-BC*xx*-M*xx*-S or 2094-BM*xx*-S 2094-BC*xx*-M*xx*-M or 2094-BM*xx*-M 2097-V34PR*x* 2098-DSD-HV*xxx*			

LDAT-Series (230V or 460V operation) Linear Thrusters	Power Cable Cat. No.	IP Rating
LDAT-S031*xxx*, LDAT-S032*xxx*, LDAT-S033*xxx*	2090-CPWM7DF-16AA*xx* (standard, non-flex) 2090-CPWM7DF-16AF*xx* (continuous-flex)	IP30
LDAT-S051*xxx*, LDAT-S052*xxx*, LDAT-S053*xxx*, LDAT-S054*xxx*		
LDAT-S072*xxx*, LDAT-S073*xxx*, LDAT-S074*xxx*, LDAT-S076*xxx*-E*xx*		
LDAT-S102*xxx*, LDAT-S103*xxx*, LDAT-S104*xxx*, LDAT-S106*xxx*-E*xx*		
LDAT-S152*xxx*, LDAT-S153*xxx*, LDAT-S154*xxx*, LDAT-S156*xxx*-E*xx*		
LDAT-S076*xxx*-D*xx*	2090-CPWM7DF-14AA*xx* (standard, non-flex) 2090-CPWM7DF-14AF*xx* (continuous-flex)	
LDAT-S106*xxx*-D*xx*		
LDAT-S156*xxx*-D*xx*		

For cable configuration illustrations and feature descriptions, by catalog number, refer to 2090-Series Motor/Actuator Cables Overview beginning on page 13.
Cable length *xx* is in meters. Refer to Technical Specifications - 2090-Series Motor/Actuator Cables beginning on page 30.

TL-Series Electric Cylinders

Actuator Cat. No.	Drive Compatibility	Feedback Type	Motor Feedback Cable	IP Rating
TLAR-A*xxxxx*	2093-AC05-MP*x* or 2093-AM*xx* 2097-V3*x*PR*x* or 2097-V3*x*PR*x*-LM 2071-A*xx*	Multi-turn High Resolution Absolute Encoder Feedback	2090-CFBM6DF-CBAA*xx* (flying-lead) standard, non-flex	IP40 (1)

TL-Series (200V-class) Electric Cylinders	Motor Power Cable	IP Rating
TLAR-A*xxxxx*	2090-CPBM6DF-16AA*xx* (power and brake) standard, non-flex 2090-CPWM6DF-16AA*xx* (power without brake) standard, non-flex	IP40 (1)

(1) Applies to complete unit, including rod-end seal and breather port.

For cable configuration illustrations and feature descriptions, by catalog number, refer to 2090-Series Motor/Actuator Cables Overview beginning on page 13.
Cable length *xx* is in meters. Refer to Technical Specifications - 2090-Series Motor/Actuator Cables beginning on page 30.

Brake Cable Specifications

Brake Cables Cat. No.	Cable Type/ Jacket Color	Description	Wire Size AWG	Weight, approx kg/m (lb/ft)	Standard Cable Lengths m (ft)		
2090-DANBT-18S*xx*	Standard (non-flex) cable, Industrial TPE, Black	Two conductor, 600V, 18 AWG, shielded cable for motor brake.	18	0.070 (0.047)	01 (3.2) 02 (6.5) 03 (9.8) 04 (13.1)	05 (16.4) 07 (22.9) 09 (29.5) 12 (39.4)	15 (49.2) 20 (65.6) 25 (82.0) 30 (98.4)

Feedback Cable Specifications

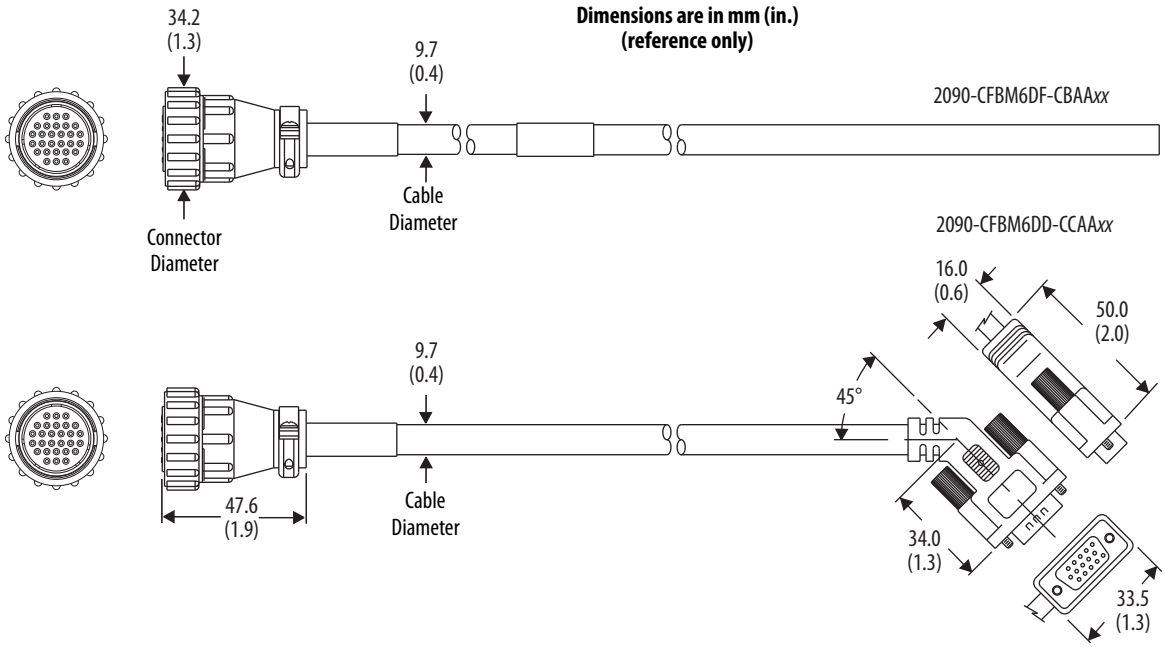
Feedback Cables (1) (2) Cat. No.	Cable Type/ Jacket Color	Description	Wire Size AWG	Weight, approx kg/m (lb/ft)	Standard Cable Lengths m (ft)		
2090-XXNFMF-S*xx*	Standard (non-flex) cable, Industrial TPE, Black	Threaded DIN connector (motor end) to flying leads (drive end), 30V.	28 Feedback 16 Power, 5V 22 Power, 9V	0.120 (1.35)	01 (3.2) 02 (6.5) 03 (9.8) 04 (13.1) 05 (16.4)	07 (22.9) 09 (29.5) 12 (39.4) 15 (49.2) 20 (65.6)	25 (82.0) 30 (98.4) 40 (131.2) 60 (196.8) 90 (295.3)
2090-CFBM7DD-CEAA*xx*	Standard (non-flex) cable, Industrial TPE, Green (DESINA, RAL 6018)	SpeedTec DIN connector (motor end) to premolded connector (drive end), 600V.	22 All conductors	0.136 (0.092)			
2090-CFBM7DF-CEAA*xx*		SpeedTec DIN connector (motor end) to flying leads (drive end), 600V.					
2090-UXNFM-S*xx* (3)	Standard (non-flex) cable, Industrial TPE, Black	Flying-leads (motor end) to premolded connector (drive end), 30V.	28 Feedback 16 Power, 5V 22 Power, 9V	0.120 (1.35)	01 (3.2) 03 (9.8) 09 (29.5)	15 (49.2) 30 (98.4)	
2090-CFBM6DF-CBAA*xx*		Circular plastic connector (motor end) to flying leads (drive end), 300V.	28 Feedback 16 Power, 5V 22 BAT+		01 (3.2) 02 (6.5) 03 (9.8) 04 (13.1)	05 (16.4) 07 (22.9) 09 (29.5) 12 (39.4)	15 (49.2) 20 (65.6) 25 (82.0) 30 (98.4)
2090-CFBM6DD-CCAA*xx*		Circular plastic connector (motor end) to premolded connector (drive end), 300V.	28 Feedback 16 Power, 5V				
2090-DANFCT-S*xx*		Rectangular plastic connector (motor end) to premolded connector (drive end), 30V.	28 Feedback 16 Power, 5V 22 BAT+	0.130 (0.088)			
2090-CFBM4DF-CDAF*xx*	Continuous-flex cable Industrial TPE, Green (DESINA, RAL 6018)	Threaded DIN connector (motor end) to flying leads (drive end), 600V.	26 Feedback 16 Power, 5V 22 Power, 9V	0.177 (0.119)	01 (3.2) 02 (6.5) 03 (9.8) 04 (13.1) 05 (16.4) 07 (22.9)	09 (29.5) 12 (39.4) 15 (49.2) 20 (65.6) 25 (82.0) 30 (98.4)	40 (131.2) 50 (164.0) 60 (196.8) 75 (264.0) 90 (295.3)
2090-CFBM7DF-CDAF*xx*		SpeedTec DIN connector (motor end) to flying leads (drive end), 600V.					
2090-CFBM7DF-CEAF*xx*			22 All conductors	0.143 (0.096)			
2090-CFBM7DD-CEAF*xx*		SpeedTec DIN connector (motor end) to premolded connector (drive end), 600V.					

(1) 2090-CFBM7*xx*-CEA*xxx* feedback cables are UL Listed, bulk cable, type PLTC-ER.

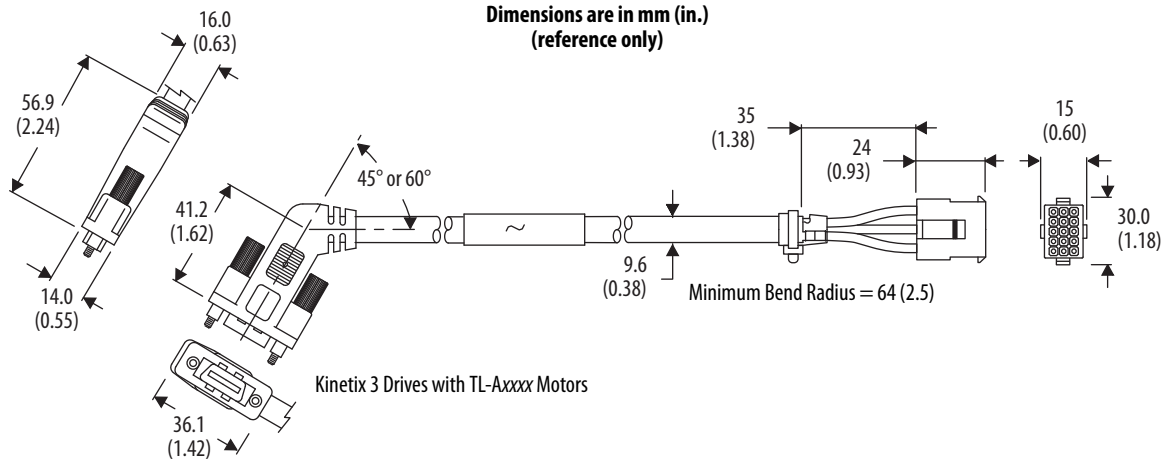
(2) 2090-CFBM4DF-CDA*xxx* and 2090-CFBM7*xx*-CDA*xxx* feedback cables are UL Listed, bulk cable, type CM.

(3) Use with 2090-KFBM4-CAAA (threaded) or 2090-KFBM7-CAAA (SpeedTec) DIN connector kit.

Feedback Cable Dimensions (catalog numbers 2090-CFBM6DF-CBAA*xx* and 2090-CFBM6DD-CCAA*xx*)



Feedback Cable Dimensions (catalog number 2090-DANFCT-S*xx*)



Low-profile Connector Kit Components

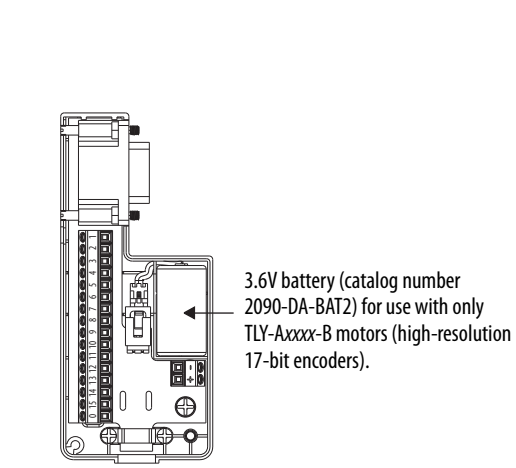
Low-profile connector kits are designed for use with the Kinetix 300/350, Kinetix 6000, Kinetix 6200/6500, Kinetix 2000, and Kinetix 7000 drives, and LIM modules. Use this table to identify the low-profile connector kit for your feedback or I/O connector.

IMPORTANT The flying-lead compatible cables listed below require connector kits to complete feedback and I/O connections to the drive.

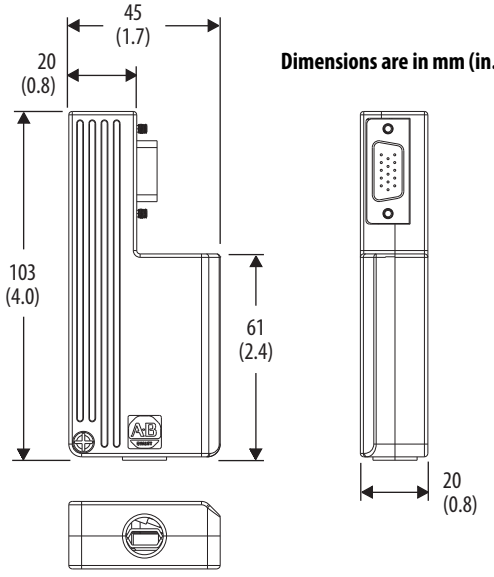
Cat. No.	Description	Cable Compatibility
2090-K2CK-D15M	Low-profile connector kit for motor feedback (15-pin, male, D-sub). Use with any Kinetix 2000 IAM/AM module or Kinetix 300/350 drive and compatible motors with incremental or high-resolution feedback. Does not include 3.6V battery (catalog number 2090-DA-BAT2) required for use with TLY-A*xxxx*-B high-resolution motors and 17-bit encoders.	2090-XXNFMF-S*xx* 2090-CFBM4DF-CDAF*xx* 2090-CFBM7DF-CEAA*xx* 2090-CFBM7DF-CEAF*xx* 2090-CFBM7DF-CDAF*xx* 2090-CFBM6DF-CBAA*xx*
2090-K2CK-COMBO	Low-profile connector kit for motor feedback (15-pin, male, D-sub) and I/O (44-pin, male, D-sub). Use with any Kinetix 2000 IAM/AM module and compatible motors with incremental or high-resolution feedback. Does not include 3.6V battery (catalog number 2090-DA-BAT2) required for use with TLY-A*xxxx*-B high-resolution motors and 17-bit encoders. The 2090-K2CK-COMBO kit, mounted on the Kinetix 2000 (IAM/AM) drive, fits in a standard 10 in. enclosure.	
2090-K6CK-D15M	Low-profile connector kit for motor feedback (15-pin, male, D-sub). Use with any Kinetix 6000, Kinetix 6200/6500, or Kinetix 7000 drive and compatible motors with incremental or high-resolution feedback.	
	Low-profile connector kit for motor feedback (15-pin, male, D-sub). Use with any Kinetix 6000 IAM/AM module and MPL-B*xxxx*-R or MPM-A/B*xxxxx*-2 (resolver feedback) motors.	2090-CFBM7DF-CEAA*xx* 2090-CFBM7DF-CEAF*xx*
2090-K6CK-D15F	Low-profile connector kit for auxiliary feedback (15-pin, female, D-sub). Use with any Kinetix 6000 IAM/AM module or Kinetix 7000 drive auxiliary feedback application.	Customer supplied
2090-K6CK-D26M	Low-profile connector kit for I/O (26-pin, male, D-sub). For use with any Kinetix 6000 IAM/AM module, Kinetix 7000 drive, or 2094-AL09 and 2094-BL02 LIM module.	
2090-K6CK-D44M	Low-profile connector kit for I/O, safety, and auxiliary feedback (44-pin, male, D-sub). For use with any Kinetix 6200 or Kinetix 6500 control module.	
2090-K6CK-D44S0	Low-profile connector kit for I/O and cascading safe torque-off signals (44-pin, male, D-sub). For use with any Kinetix 6200 or Kinetix 6500 (safe torque-off, -S0 control module). Refer to Kinetix 6200 and Kinetix 6500 Safe-off Components on page 93 for example diagrams.	2090-CS0DSDS-AA*xx*

Dimensions - Low-profile Connector Kits

Catalog Number 2090-K2CK-D15M



2090-K2CK-D15M (motor feedback)
15-pin Feedback Connector



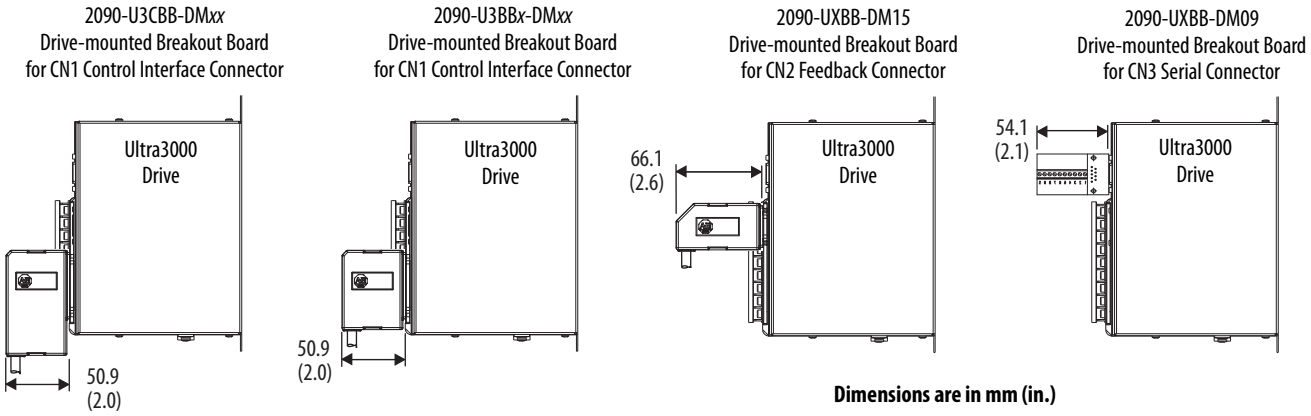
Dimensions are in mm (in.)

Drive-mounted Breakout Board Kits

Use these examples to identify the best solution for wiring your flying-lead control interface, motor feedback, and serial cables to Ultra3000 and Kinetix 3 drives.

In this example, the Ultra3000 drives are shown with drive-mounted breakout board kits (catalog number 2090-U*xxx*-DM*xx*). Drive-mounted breakout board kits are available for the control interface (CN1), motor feedback (CN2), and serial interface (CN3) connectors. Refer to Drive-mounted Breakout Board Components on page 72 for more information.

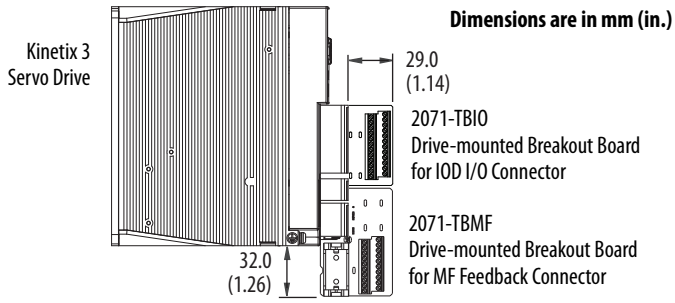
Ultra3000 Drive-mounted Breakout Board Examples



TIP The 2090-UXBB-DM15 (feedback) kit is also compatible with the Kinetix 2000 IAM/AM, Kinetix 6000 IAM/AM, and Kinetix 7000 drives (MF feedback connectors only).

In this example, the Kinetix 3 drives are shown with drive-mounted breakout boards (catalog numbers 2071-TBMF and 2071-TBIO). Use the 2071-TBMF breakout board with 2090-CFBM6DF-CBAA*xx* feedback cables or when your motor or actuator has high-resolution encoder feedback. Use the 2071-TBIO breakout board for making flying-lead cable connections to twenty-four of the most commonly used terminals in the 50-pin IOD connector. Refer to Drive-mounted Breakout Board Components on page 72 for more information.

Kinetix 3 Drive-mounted Breakout Board Examples



Panel-mounted Breakout Board Components

Breakout boards, cables, and kits (designed for DIN rail mounting on the panel) and for use with Kinetix drives as specified in the description are shown below. These breakout board components can be ordered separately, or as a kit containing both terminal block and cable.

Panel-mounted Breakout Board Kits

Cat. No.	Description	Cable Compatibility
2090-UXBK-D15*xx*	DIN rail terminal block (catalog number 2090-U*x*BB-D*xx*) and cable (catalog number 2090-U*x*BC-D*xxxx*) for motor feedback connector (15-pin, male, D-sub). Use with any Kinetix 300/350, Kinetix 2000, Kinetix 6000, Kinetix 6200/6500, or Kinetix 7000 drives (MF connector) or Ultra3000 drives (CN2 connector) for motor feedback connections.	2090-XXNFMF-S*xx* 2090-CFBM4DF-CDAF*xx* 2090-CFBM7DF-CEAA*xx* 2090-CFBM7DF-CEAF*xx* 2090-CFBM6DF-CBAA*xx*
	Terminal block and cable for motor feedback connector (15-pin, male, D-sub). Use with Kinetix 6000 drives, MPL-B*xxxx*R, and MPM-A/B*xxxx*-2 (resolver feedback) motors.	2090-CFBM7DF-CEAA*xx*
2090-U3BK-D44*xx*	Terminal block and cable for control interface connector (44-pin, male, D-sub). Use with Ultra3000 drives (CN1 connector) or Kinetix 2000 drives (IOD/AF connector).	Customer Supplied

Panel-mounted Breakout Boards

Cat. No.	Description
2090-UXBB-D15	15-pin terminal block with D-sub connector. Use with any Kinetix 300/350, Kinetix 2000, Kinetix 6000, Kinetix 6200/6500, or Kinetix 7000 drives (MF connector) or Ultra3000 drives (CN2 connector) for motor feedback connections.
2090-U3BB-D44	44-pin terminal block with D-sub connector. Use with Ultra3000 drives (CN1 connector) or Kinetix 2000 drives (IOD/AF connector) for control interface connections.

IMPORTANT The flying-lead compatible cables listed above require either 2090-UXBB-DM15 (drive-mounted) or 2090-UXBB-D15 (panel-mounted) breakout board connector kits to complete feedback and I/O connections to the drive.

Panel-mounted Breakout Cables

Cat. No.	Description
2090-UXBC-D15*xx*	15-pin cable with D-sub connector. Use with any Kinetix 300/350, Kinetix 2000, Kinetix 6000, Kinetix 6200/6500, or Kinetix 7000 drives (MF connector) or Ultra3000 drives (CN2 connector) for motor feedback connections.
2090-U3BC-D44*xx* (1)	44-pin cable with D-sub connector. Use with Ultra3000 drives (CN1 connector) or Kinetix 2000 drives (IOD/AF connector) for control interface connections.

(1) This cable does not carry the unbuffered motor encoder signals (CN1 pins 10…15). Contact your Rockwell Automation sales representative if these signals are required for your application.