Technical Data

Original Instructions

Kinetix Servo Drive Specifications

Bulletin 2071, 2093, 2094, 2097, 2099, 2198

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This document provides catalog numbers and product specifications, including power, performance, environmental, certifications, dimension drawings, and accessories for Allen-Bradley® servo drives.

Use this publication with the Kinetix® Motion Control Selection Guide, publication KNX-SG001, to help make decisions selecting the motion control products that are best suited for your system requirements.

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
Updated the Kinetix 5700 DC-bus power supply input-voltage range and shared DC power range to include 240V AC (nom) operation (firmware revision 13.001 or later).	10…16
Added additional detail to Kinetix 5500 maximum cable length limitations.	54
Added Kinetix 5300 (200V and 400V-class) servo drive specifications.	69…88
Added Kinetix 5100 (400V-class) servo drive specifications.	89…113
Added Kinetix 5100 ground plate specifications.	104
Added Kinetix 5100 USB interface cable and filter specifications.	113
Updated Kinetix 6000 servo drive specifications where series D drives apply.	131…149
Updated input power circuit protection specifications for Kinetix 6000, Kinetix 6200, and Kinetix 6500 drives by removing a circuit breaker device that is no longer available.	122 and 141

Servo Drive Compatibility

Servo Drive Family	Kinetix VPL	Kinetix VPC	Kinetix VPF	Kinetix VPH	Kinetix VPS	Kinetix MPL	Kinetix MPM	Kinetix MPF	Kinetix MPS	Kinetix TLP	Kinetix TL	Kinetix TLY	Kinetix RDB	Kinetix HPK
Kinetix 5700	X	X	X	X	X	X	X	X	X	–	–	–	X	X
Kinetix 5500	X	–	X	X	X	X	X	X	X	–	–	–	–	–
Kinetix 5100	–	–	–	–	–	X	X	X	X	X	X	X	–	–
Kinetix 5300	–	–	–	–	–	X	X	X	X	X	X	X	–	–
Kinetix 6500	–	–	–	–	–	X	X	X	X	–	–	–	X	–
Kinetix 6200	–	–	–	–	–	X	X	X	X	–	–	–	X	–
Kinetix 6000	–	–	–	–	–	X	X	X	X	–	–	X (TLY-A*xx*-H)	X	–
Kinetix 300/350	–	–	–	–	–	X	X	X	X	–	–	X	–	–
Kinetix 3	–	–	–	–	–	–	–	–	–	–	X (TL-A*xx*-B)	X	–	–
Kinetix 2000	–	–	–	–	–	X	X	X	X	–	–	X	–	–
Kinetix 7000	–	–	–	–	–	X	X	–	–	–	–	–	X	X

Kinetix 5700 Servo Drives



The Kinetix 5700 drive family helps expand the value of integrated motion on EtherNet/IP™ to large, custom machine-builder applications. Drive modules connect and operate by using ControlLogix® controllers, GuardLogix® controllers, CompactLogix™ controllers, or Compact GuardLogix controllers.

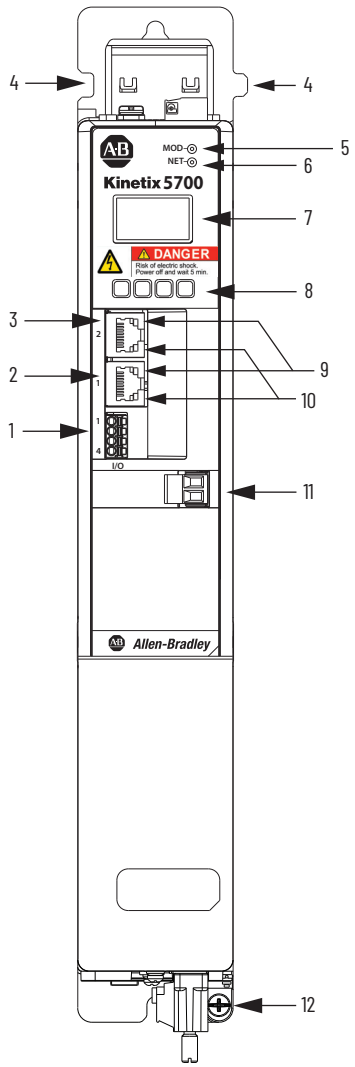
With the Logix Designer application as a single control engine, and one design environment – Studio 5000® – machine builders now have more flexibility to scale, design, and control to help meet their needs. Kinetix 5700 servo drives can help reduce commissioning time and improve machine performance. They offer the simplicity, power, and space savings you need to help get your machine up and running faster.

Kinetix 5700 servo drives are designed for machines with high axis-counts and high-power requirements. Single and dual-axis inverters are available with integrated (drive-based and controller-based) safety functions and hardwired (drive-based) safety functions.

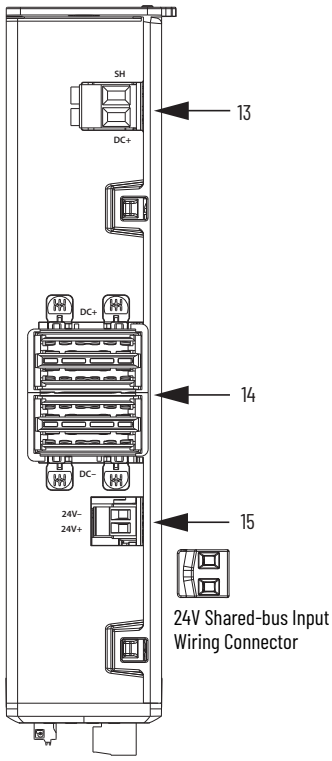
The iTRAK® power supply integrates the iTRAK system with the Kinetix 5700 drive family.

Kinetix 5700 Drive Module Features and Indicators

DC-bus Power Supply Features and Indicators

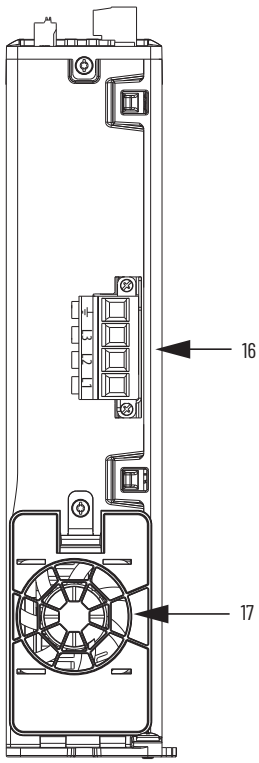


DC-bus Power Supply, Front View
(2198-P031 module is shown)



24V Shared-bus Input
Wiring Connector

DC-bus Power Supply, Top View
(2198-P031 module is shown)



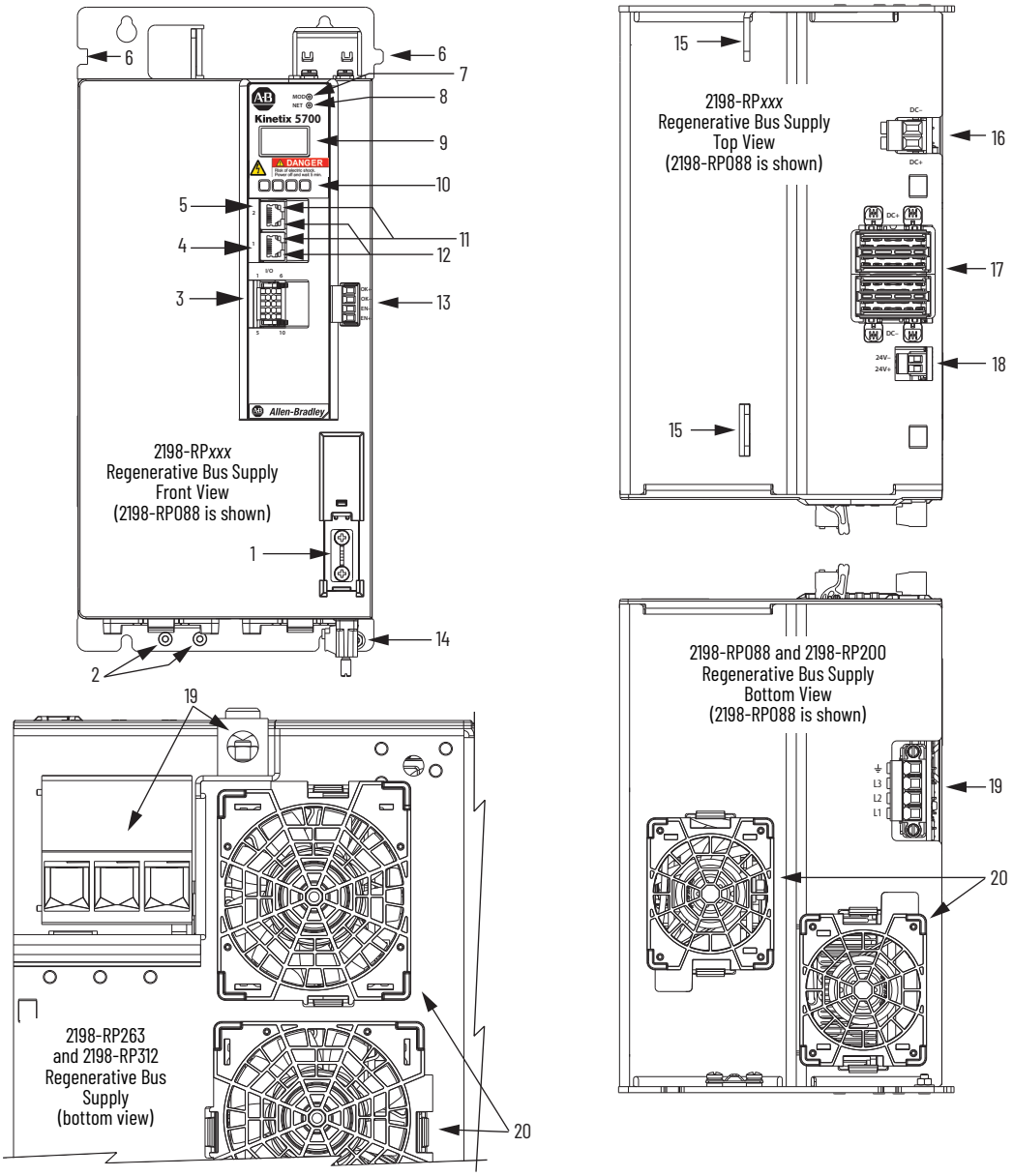
DC-bus Power Supply, Bottom View
(2198-P031 module is shown)

Item	Description
1	Digital inputs (IOD) connector
2	Ethernet (PORT1) RJ45 connector
3	Ethernet (PORT2) RJ45 connector
4	Zero-stack mounting tab/cutout
5	Module status indicator
6	Network status indicator

Item	Description
7	LCD display
8	Navigation pushbuttons
9	Link speed status indicators
10	Link/Activity status indicators
11	Contactor enable (EN) connector
12	Ground terminal

Item	Description
13	Shunt resistor (RC) connector
14	DC bus (DC) connector
15	24V control input power (CP) connector
16	AC Input power (IPD) connector
17	Cooling fan

Regenerative Bus Supply Features and Indicators



Regenerative Bus Supply Features and Indicators

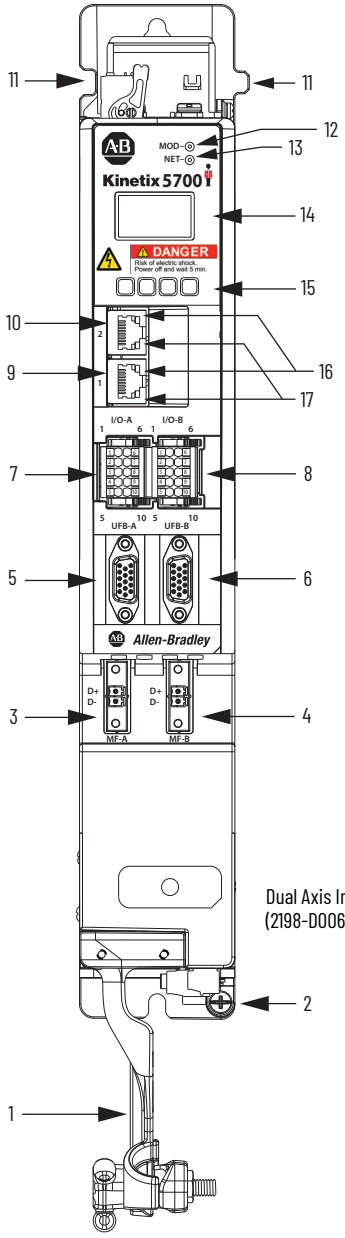
Item	Description
1	Ground jumper in operation
2	Ground jumper in storage
3	Digital inputs (IOD) connector
4	Ethernet (PORT1) RJ45 connector
5	Ethernet (PORT2) RJ45 connector
6	Zero-stack mounting tab/cutout
7	Module status indicator

Item	Description
8	Network status indicator
9	LCD display
10	Navigation push buttons
11	Link speed status indicators
12	Link/Activity status indicators
13	Contactor enable (CED) connector
14	Ground lug (partially obscured by input plug)

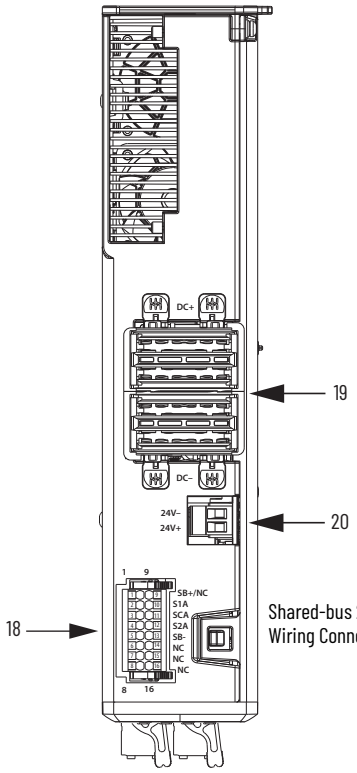
Item	Description
15	Lifting points
16	Active shunt (RC) connector
17	DC bus (DC) connector
18	24V control input power (CP) connector
19	AC Input power (IPD) connector (1)
20	Cooling fans

(1) Connector plug orientation applies to 2198-RP088 and 2198-RP200 modules (2198-RP200 connector size is larger). See adjacent figure for 2198-RP263 and 2198-RP312 connector plug size and orientation.

Dual-axis Inverter Features and Indicators

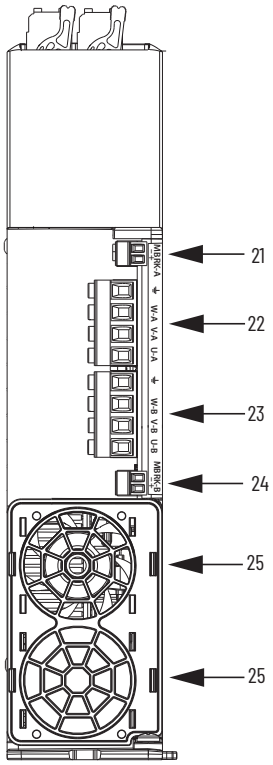


Dual Axis Inverter, Front View
(2198-D006-ERS4 module is shown)



Shared-bus 24V Input
Wiring Connector

Dual Axis Inverter, Top View
(2198-D006-ERS4 module is shown)



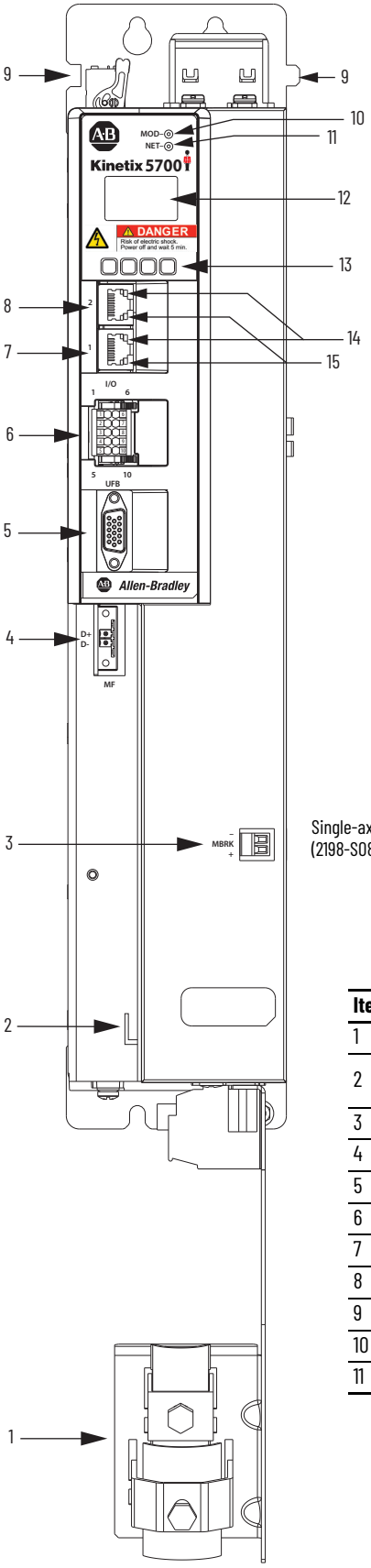
Dual Axis Inverter, Bottom View
(2198-D006-ERS4 module is shown)

Item	Description
1	Motor cable clamp
2	Ground terminal
3	Motor feedback (MF) connector - A
4	Motor feedback (MF) connector - B
5	Universal feedback (UFB) connector - A
6	Universal feedback (UFB) connector - B
7	Digital inputs (IOD) connector - A
8	Digital inputs (IOD) connector - B
9	Ethernet (PORT1) RJ45 connector

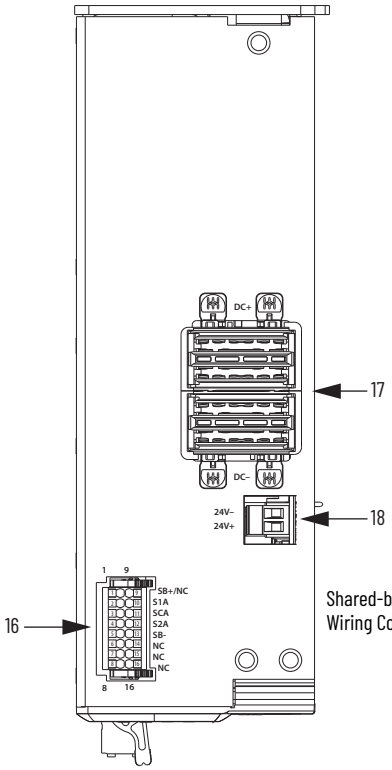
Item	Description
10	Ethernet (PORT2) RJ45 connector
11	Zero-stack mounting tab/cutout
12	Module status indicator
13	Network status indicator
14	LCD display
15	Navigation pushbuttons
16	Link speed status indicators
17	Link/Activity status indicators
18	Safe Torque Off (STO) connector

Item	Description
19	DC bus (DC) connector
20	24V control input power (CP) connector
21	Motor brake (BC) connector - A
22	Motor power (MP) connector - A
23	Motor power (MP) connector - B
24	Motor brake (BC) connector - B
25	Cooling fan

Single-axis Inverter Features and Indicators (catalog numbers 2198-S086-ERS*x*, 2198-S130-ERS*x*, and 2198-S160-ERS*x*)

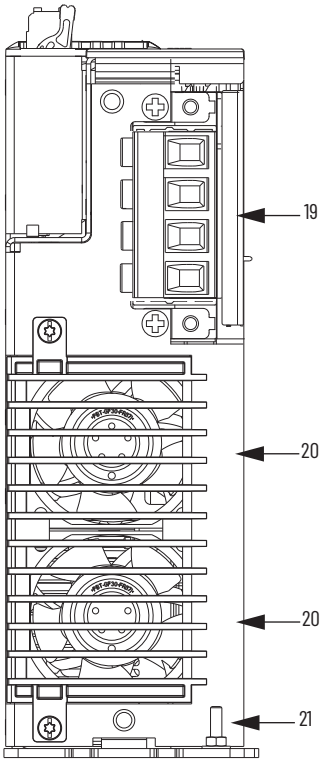


Single-axis Inverter, Front View
(2198-S086-ERS4 module is shown)



Shared-bus 24V Input
Wiring Connector

Single-axis Inverter, Top View
(2198-S086-ERS4 module is shown)

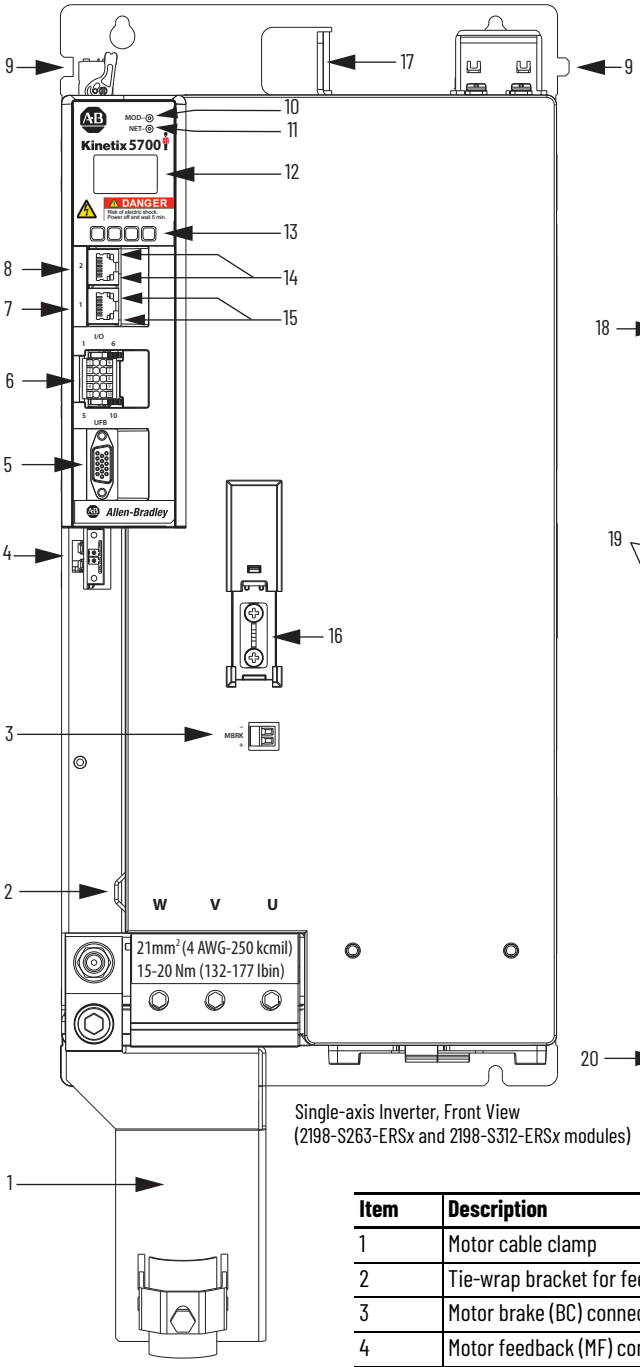


Single-axis Inverter, Bottom View
(2198-S086-ERS4 module is shown)

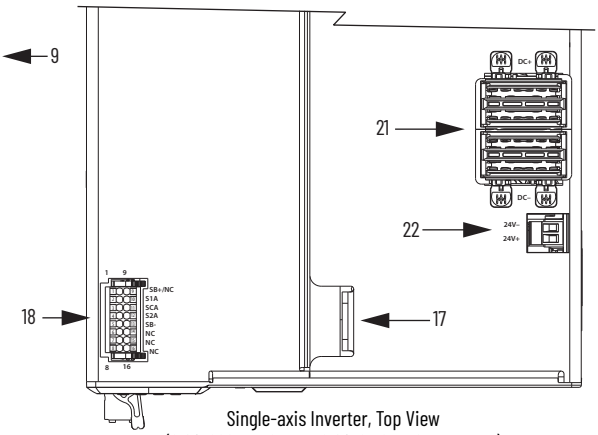
Item	Description
1	Motor cable clamp
2	Motor feedback cable tie-wrap bracket
3	Motor brake (BC) connector
4	Motor feedback (MF) connector
5	Universal feedback (UFB) connector
6	Digital inputs (IOD) connector
7	Ethernet (PORT1) RJ45 connector
8	Ethernet (PORT2) RJ45 connector
9	Zero-stack mounting tab/cutout
10	Module status indicator
11	Network status indicator

Item	Description
12	LCD display
13	Navigation pushbuttons
14	Link speed status indicators
15	Link/Activity status indicators
16	Safe Torque Off (STO) connector
17	DC bus (DC) connector
18	24V control input power (CP) connector
19	Motor power (MP) connector
20	Cooling fans
21	Ground terminal

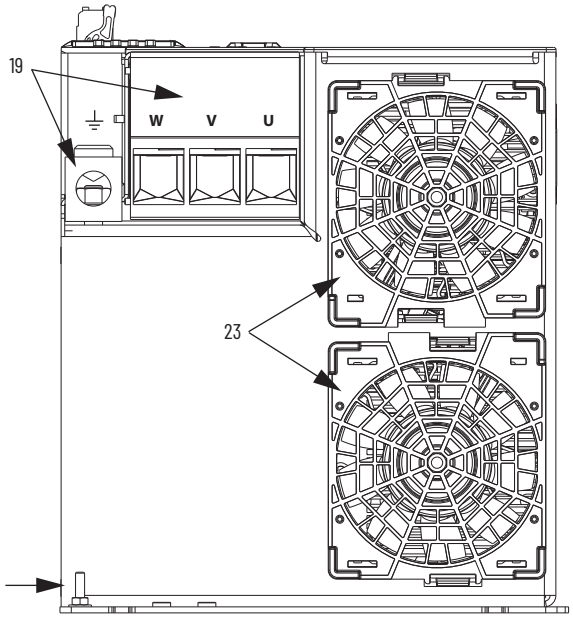
Single-axis Inverter Features and Indicators (catalog numbers 2198-S263-ERSx and 2198-S312-ERSx)



Single-axis Inverter, Front View
(2198-S263-ERSx and 2198-S312-ERSx modules)



Single-axis Inverter, Top View
(2198-S263-ERSx and 2198-S312-ERSx modules)

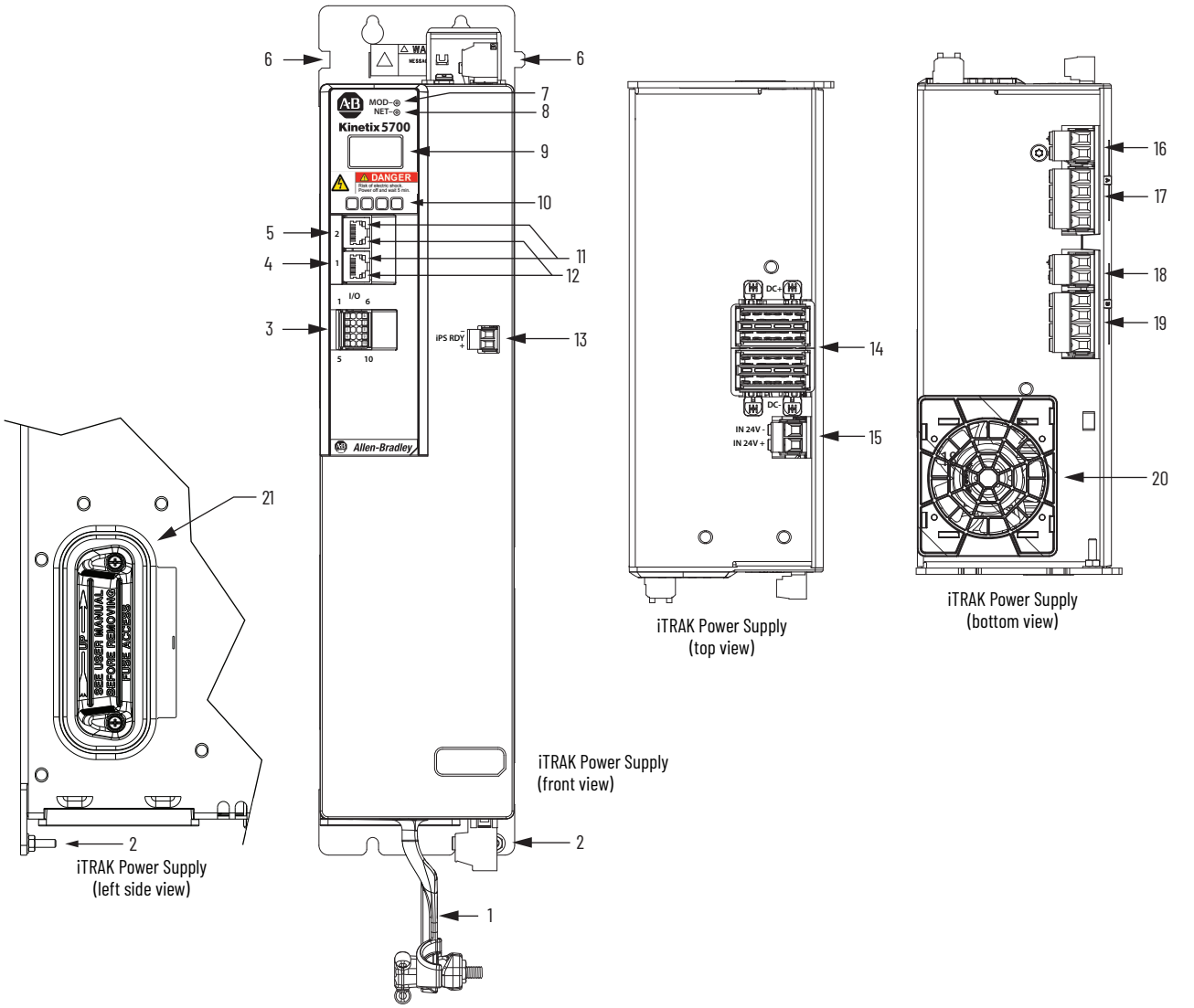


Single-axis Inverter, Bottom View
(2198-S263-ERSx and 2198-S312-ERSx modules)

Item	Description
1	Motor cable clamp
2	Tie-wrap bracket for feedback cable
3	Motor brake (BC) connector
4	Motor feedback (MF) connector
5	Universal feedback (UFB) connector
6	Digital inputs (IOD) connector
7	Ethernet (PORT1) RJ45 connector
8	Ethernet (PORT2) RJ45 connector
9	Zero-stack mounting tab/cutout
10	Module status indicator
11	Network status indicator
12	LCD display

Item	Description
13	Navigation pushbuttons
14	Link speed status indicators
15	Link/Activity status indicators
16	Ground jumper in operation
17	Safe torque-off (STO) connector
18	Lifting points
19	Motor power (MP) connector
20	Ground terminal
21	DC bus (DC) connector
22	24V control input power (CP) connector
23	Cooling fans (replacement kits available)

iTRAK Power Supply Features and Indicators



iTRAK Power Supply (front view)

iTRAK Power Supply (top view)

iTRAK Power Supply (bottom view)

iTRAK Power Supply (left side view)

Item	Description
1	Power bus cable clamp
2	Ground lug (partially obscured by output plugs)
3	Digital inputs (IOD) connector
4	Ethernet (PORT1) RJ45 connector
5	Ethernet (PORT2) RJ45 connector
6	Zero-stack mounting tab/cutout
7	Module status indicator

Item	Description
8	Network status indicator
9	LCD display
10	Navigation push buttons
11	Link speed status indicators
12	Link/Activity status indicators
13	iTRAK PS ready (IR) connector
14	DC bus input (DC) connector

Item	Description
15	24V control input power (CP) connector
16	24V control output power (ICP) connector -A
17	DC bus output (IDC) connector - A
18	24V control output power (ICP) connector - B
19	DC bus output (IDC) connector - B
20	Cooling fan
21	Power supply internal fuse

See Additional Resources on page 199 for the publications that support the iTRAK system.

Technical Specifications - Kinetix 5700 Drive Modules

DC-bus Power Supply Specifications

Attribute	2198-P031	2198-P070	2198-P141	2198-P208
AC input voltage	195...528V rms, three-phase (240/480V nom)			
AC input frequency	47...63 Hz			
Main AC input current [1] 195...528V (rms) three-phase	11.2A	27.0 A	49.6 A	73.1 A
Max inrush (0-pk)	33.0 A	33.0 A	33.0 A	33.0 A
Peak AC input current 195...528V (rms) three-phase	33.4 A	74.3 A	148.7 A	219.2 A
Line loss ride through	20 ms			
Control power DC input voltage	24V DC ±10%			
Control power DC input current [1] [2]	0.8 A_{DC}		1.9 A_{DC}	
Nominal bus output voltage	276...747V DC			
Continuous output current to bus Three-phase	10.5 A_{DC}	25.5 A_{DC}	46.9 A_{DC}	69.2 A_{DC}
Peak output current to bus Three-phase	31.6 A_{DC}	70.3 A_{DC}	140.8 A_{DC}	207.6 A_{DC}
Peak output current duration [3]	1.0 s	1.0 s	1.0 s	0.1 s
Continuous output power to bus Nom (240V rms, three-phase at 1/2 power) Nom (480V rms, three-phase)	3.5 kW 7.0 kW	8.5 kW 17.0 kW	15.5kW 31.0 kW	23.0 kW 46.0 kW
Peak output power to bus Nom (240V rms, three-phase at 1/2 power) Nom (480V rms, three-phase)	10.5 kW 21.0 kW	23.0 kW 46.0 kW	46.5 kW 93.0 kW	69.0 kW 138.0 kW
Bus overvoltage 240V, nom AC input 480V, nom AC input	460V DC 832V DC			
Internal shunt resistance	37.5 Ω		13.5 Ω	
Internal shunt power	75 W		200 W	
Shunt on 240V, nom AC input 480V, nom AC input	400V plus 30V x bus regulator capacity/utilization [4] 775V plus 30V x bus regulator capacity/utilization [4]			
Shunt off 240V, nom AC input 480V, nom AC input	390V plus 30V x bus regulator capacity/utilization [4] 765V plus 30V x bus regulator capacity/utilization [4]			
Efficiency	99%			
Internal Capacitance	585 µF	780 µF	1640 µF	2050 µF
Capacitive energy absorption	129 J	172 J	362 J	453 J
Short-circuit current rating	200,000 A (rms) symmetrical			

(1) All modules are limited to 1 power cycle per minute.
(2) For current values when motors include a holding brake and additional information, refer to Control Power Current Specifications on page 13.
(3) Peak output current duration with 10% duty cycle.
(4) The shunt on and shunt off voltages increase during periods of shunting activity to promote sharing of shunt power in multi-axis configurations. Shunt utilization is equivalent to the BusRegulatorCapacity tag in the Logix Designer application.

Regenerative Bus Supply Specifications

Attribute	2198-RP088	2198-RP200	2198-RP263	2198-RP312
AC input voltage (1)	324...506V rms, three-phase (480V nom)			
AC input frequency	47...63 Hz			
Main AC input current (2) 324...506V (rms) three-phase	30.0 A	85.0 A	150.0 A	192.0 A
Max inrush (0-pk)	76.0 A	176.0 A	362.0 A	362.0 A
Peak AC input current 324...506V (rms) three-phase	75.0 A	170.0 A	225.0 A	288.9 A
Line loss ride through	20 ms			
Control power DC input voltage	24V DC ±10%			
Control power DC input current (2) (3)	4.3 A_{DC}	5.4 A_{DC}	9.1 A_{DC}	
Nominal bus output voltage	458...747V DC			
Continuous output current to bus	35.3 A_{DC}	100.0 A_{DC}	176.4 A_{DC}	207.0 A_{DC}
Peak output current to bus	88.0 A_{DC}	200.0 A_{DC}	263.0 A_{DC}	312.0 A_{DC}
Peak output current duration (4)	1.0 s/3.0 s			
Continuous output power to bus Nom (480V rms, three-phase)	24.0 kW	67.0 kW	119.0 kW	140.0 kW
Peak output power to bus Nom (480V rms, three-phase)	60.0 kW	135.8 kW	179.7 kW	211.4 kW
Bus overvoltage - 480V, nom AC input	832V DC			
Internal shunt resistance (5)	–		–	
Efficiency	98%			
Internal Capacitance	940 µF	2460 µF	4510 µF	5740 µF
Capacitive energy absorption	207 J	542 J	994 J	1265 J
Short-circuit current rating	200,000 A (rms) symmetrical			

(1) Applies when DC-bus voltage regulation is enabled. If DC-bus voltage regulation is not enabled, the input voltage range is 324....528V AC. For more information on these two modes of operation, see the Kinetix 5700 Servo Drives User Manual, publication 2198-UM002.
(2) All modules are limited to 1 power cycle per minute.
(3) For current values when motors include a holding brake and additional information, refer to Control Power Current Specifications on page 13.
(4) 1.0 second peak output current duration with 10% duty cycle. 3.0 second peak output current duration with 5% duty cycle.
(5) The 2198-RP*xxx* regenerative bus supply has no internal shunt resistor.

Single-axis Inverter Power Specifications

Attribute	2198-S086-ERS3 2198-S086-ERS4	2198-S130-ERS3 2198-S130-ERS4	2198-S160-ERS3 2198-S160-ERS4	2198-S263-ERS3 2198-S263-ERS4	2198-S312-ERS3 2198-S312-ERS4
Bandwidth (1) Velocity loop, max Current loop	 400 Hz 1000 Hz				
PWM frequency	4 kHz				
Continuous output current (rms)	43.0 A	65.0 A	85.0 A	150.0 A	192.0 A
Continuous output current (0-pk)	60.8 A	91.9 A	120.2 A	212.1 A	271.5 A
Peak output current (rms)	86.0 A (2)	130.0 A (2)	160.0 A (2)	263.0 A@ 1 and 3 s duration 183.0 A@ 60 s duration	312.0 A@ 1 and 3 s duration 234.0 A@ 60 s duration
Peak output current (0-pk)	121.6 A (2)	183.8 A (2)	226.2 A (2)	371.9 A@ 1 and 3 s duration 258.8 A@ 60 s duration	441.2 A@ 1 and 3 s duration 330.9 A@ 60 s duration
Continuous power out (nom) Nom (240V rms, three-phase at 1/2 power) Nom (480V rms, three-phase)	 14.9 kW 29.7 kW	 22.5 kW 44.9 kW	 30.1 kW 60.1 kW	 45.0 kW 90.0 kW	 56.0 kW 112.0 kW
DC input current @ 276...747V DC	45.7 A_{DC}	69.0 A_{DC}	92.3 A_{DC}	164.0 A_{DC}	207.0 A_{DC} (3)
Internal Capacitance	560 µF	840 µF	1120 µF	2050 µF	2050 µF

(1) Bandwidth values vary based on tuning parameters and mechanical components.
(2) Peak current duration (T_{PKmax}) equals 1.0 second.
(3) UL tested to 175.0 A_{DC}.

Dual-axis Inverter Power Specifications

Attribute	Per Axis (1)	2198-D006-ERS3 2198-D006-ERS4	2198-D012-ERS3 2198-D012-ERS4	2198-D020-ERS3 2198-D020-ERS4	2198-D032-ERS3 2198-D032-ERS4	2198-D057-ERS3 2198-D057-ERS4
Bandwidth (2) Velocity loop, max Current loop		 400 Hz 1000 Hz				
PWM frequency		4 kHz				
Continuous output current (rms)	X	2.5 A	5.0 A	8.0 A	13.0 A	23.0 A
Continuous output current (0-pk)	X	3.5 A	7.0 A	11.3 A	18.3 A	32.5 A
Peak output current (rms) (3)	X	6.3 A	12.5 A	20.0 A	32.5 A	57.5 A
Peak output current (0-pk) (3)	X	8.8 A	17.6 A	28.2 A	45.9 A	81.3 A
Continuous power out (nom) Nom (240V rms, three-phase at 1/2 power) Nom (480V rms, three-phase)	X	 0.9 kW 1.7 kW	 1.7 kW 3.4 kW	 2.8 kW 5.5 kW	 4.5 kW 8.9 kW	 8.0 kW 15.9 kW
DC input current @ 276...747V DC	X	2.7 A_{DC}	5.3 A_{DC}	8.5 A_{DC}	13.7 A_{DC}	24.5 A_{DC}
Internal Capacitance		165 µF		330 µF	390 µF	705 µF

(1) These attributes apply to both of the axes in each dual-axis inverter.
(2) Bandwidth values vary based on tuning parameters and mechanical components.
(3) Peak current duration (T_{PKmax}) equals 1.0 second.

iTRAK Power Supply Specifications

Attribute	2198T-W25K-ER
Input voltage	458...747V DC
Continuous output current (per output)	12.5 A
Peak output current	25 A
Continuous power output DC-bus output (low voltage) DC-bus output (high voltage)	4.1 kW 165V DC 330V DC
DC input current (1) @ 458V DC in @ 747V DC in	 10 A 6.2 A
Internal capacitance	390 µF

(1) Because the iTRAK power supply is a DC-DC converter with a constant output rating, input current varies linearly with input voltage.

Control Power Current Specifications

Kinetix 5700 servo drives, the accessory modules, and iTRAK power supply have different 24V DC power consumption. Factors to consider when calculating the combined current demand from your 24V DC power supply include the following:

- Catalog number for each drive in the system
- Whether servo motors include the holding brake option
- Whether the system includes capacitor modules or DC-bus conditioner modules
- Whether the system includes 2198T-W25K-ER iTRAK power supplies and the number of iTRAK motor modules supported

Control Power Current Specifications

Drive Module	Drive Module Cat. No.	24V Current Per Module (non-brake motor) A_{DC}	24V Current, max (with maximum brake current) A_{DC}	24V Inrush Current [1] A
DC-bus Power Supplies	2198-P031	0.8	–	4.0
	2198-P070			
	2198-P141	1.9		
	2198-P208			
Regenerative Bus Supplies	2198-RP088	4.3	–	4.0
	2198-RP200	5.4		
	2198-RP263	9.1		
	2198-RP312			
Dual-axis Inverters	2198-D006-ERSx	1.4 [2]	5.5 [3]	4.0
	2198-D012-ERSx			
	2198-D020-ERSx			
	2198-D032-ERSx	1.7 [2]	7.7 [3]	
	2198-D057-ERSx	2.3 [2]	8.3 [3]	
Single-axis Inverters	2198-S086-ERSx	4.6	9.6 [4]	4.0
	2198-S130-ERSx			
	2198-S160-ERSx			
	2198-S263-ERSx			
	2198-S312-ERSx			
iTRAK Power Supply [5]	2198T-W25K-ER	1.3	–	2.2
Capacitor Module	2198-CAPMOD-2240	0.1	–	7.0
Extension Module	2198-CAPMOD-DCBUS-IO	–		–
DC-bus Conditioner Module	2198-DCBUSCOND-RP312	0.1		7.0

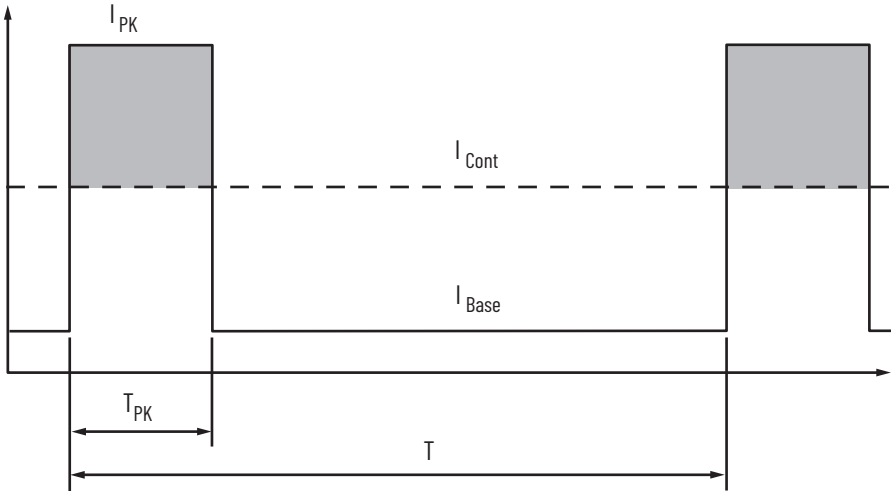
(1) Inrush current duration is less than 30 ms.
(2) Values are base current per module.
(3) Values assume two brake motors, each drawing the maximum rating of 2 A, are attached to each module.
(4) Values assume the maximum rated brake current of 5 A.
(5) These values represent only the iTRAK power supply. They do not include the iTRAK motor modules that are connected to the iTRAK power supply and also draw current from this 24V control power input. For more information regarding 24V control power requirements, see the iTRAK System User Manual, publication 2198T-UM001.

When the Kinetix 5700 inverter catalog number ends in -ERSx, for example 2198-D057-ERSx, the variable (x) indicates that the inverter (using this example) can be 2198-D057-ERS3 or 2198-D057-ERS4.

Peak Current Specifications

Load Duty-cycle Profile Example

$$D = \frac{T_{PK}}{T} \times 100\%$$



The 2198-S263-ERS*x* and 2198-S312-ERS*x* single-axis inverters have overload ratings for 1, 3, and 60 second durations to simplify migration from Kinetix 7000 high-power servo drives.

Overload Ratings for 2198-S263-ERS*x* and 2198-S312-ERS*x* Servo Drives

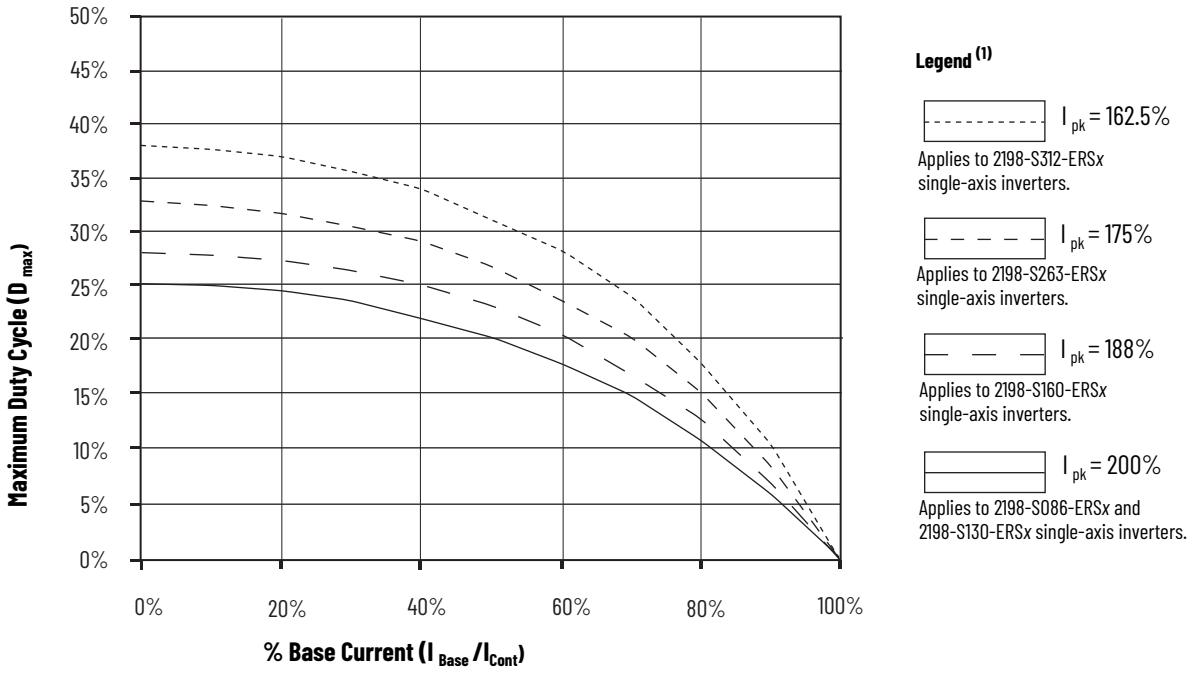
Drive Cat. No.	1 Second Overload Rating, max		3 Second Overload Rating, max		60 Second Overload Rating, max			
	Current for 1 s	Current for Off Period	Current for 3 s	Current for Off Period	Current for 60 s	Current for Off Period	Current for 3 s	Current for Off Period
2198-S263-ERS*x*	263 A rms	30 A for ≤9 s	263 A rms	30 A for ≤57 s	183 A rms	98 A for ≤540 s	183 A rms	98 A for ≤540 s
2198-S312-ERS*x*	312 A rms	30 A for ≤9 s	312 A rms	30 A for ≤57 s	234 A rms	98 A for ≤540 s	234 A rms	98 A for ≤540 s

Peak Duty Cycle Definition of Terms

Term	Definition (1)
Continuous Current Rating (I_{Cont})	The maximum value of current that can be output continuously.
Peak Current Rating (I_{PKmax})	The maximum value of peak current that the drive can output. This rating is valid only for overload times less than T_{PKmax}.
Duty Cycle (D)	The ratio of time at peak to the Application Period is defined as: $D = \frac{T_{PK}}{T} \times 100\%$
Time at Peak (T_{PK})	The time at peak current (I_{PK}) for a given loading profile. Must be less than or equal to T_{PKmax}.
Peak Current (I_{PK})	The level of peak current for a given loading profile. I_{PK} must be less than or equal to the Peak Current Rating (T_{PKMAX}) of the drive.
Base Current (I_{Base})	The level of current between the pulses of peak current for a given loading profile. I_{Base} must be less than or equal to the continuous current rating (I_{Cont}) of the drive.
Loading Profile	The loading profile is composed of I_{PK}, I_{Base}, T_{PK}, and D (or T) values and completely specify the operation of the drive in an overload situation. These values are collectively defined as the Loading Profile of the drive.
Application Period (T)	The sum of the times at I_{PK} (T_{PK}) and I_{Base}.

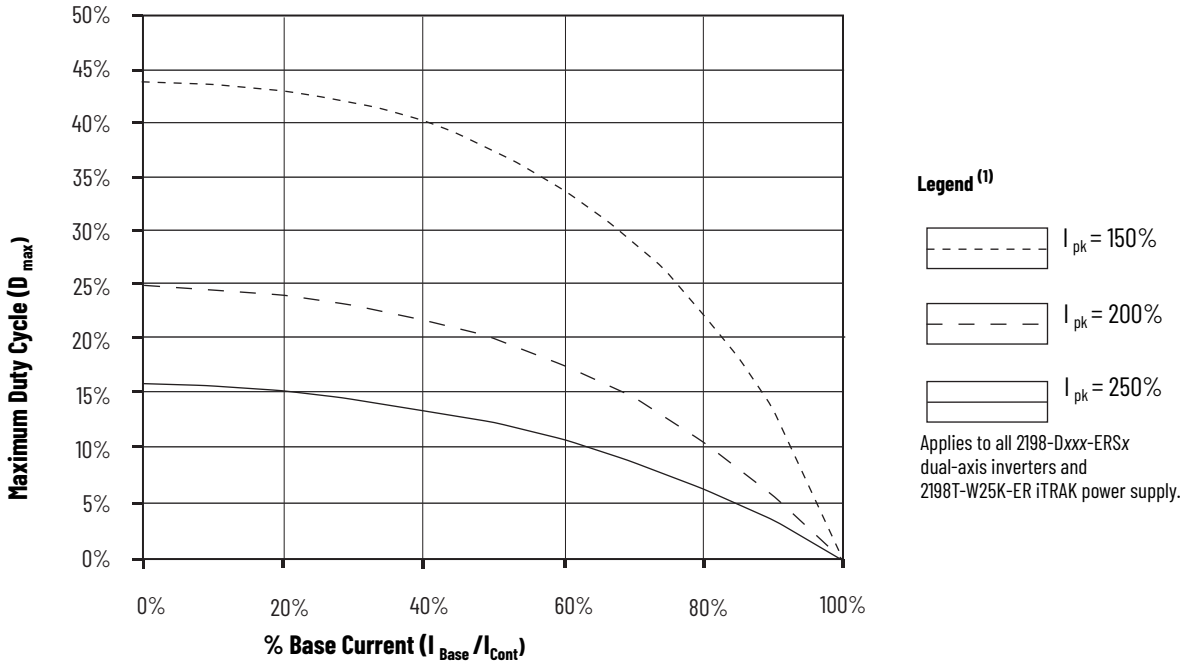
(1) All current values are specified as RMS.

Peak Single-axis Inverter Overload (T_{PK} < 1.0 s)



(1) Base current (I_{Base}) and peak current (I_{PK}) are a percentage of the continuous drive current rating (I_{Cont}).

Peak Dual-axis Inverter and iTRAK Power Supply Overload (T_{PK} < 1.0 s)



(1) Base current (I_{Base}) and peak current (I_{PK}) are a percentage of the continuous drive current rating (I_{Cont}).

Circuit Breaker/Fuse Specifications

The Kinetix 5700 drives use internal solid-state motor short-circuit protection and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 200,000 A (fuses) and 65,000 A (circuit breakers).

DC-bus Power Supply UL/CSA Circuit-protection Specifications

DC-bus Power Supply Cat. No.	Input Voltage (three-phase) nom	Bussmann Fuses (1) Cat. No.	Miniature CB (2) Cat. No.	Motor Protection CB, (2) Self Protected CMC Cat. No.	Molded Case CB Cat. No.
2198-P031	195…528V AC	LPJ-15SP (15A)	1489-M3D250	140M-D8E-C25	140G-G6C3-C25
2198-P070		LPJ-40SP (40A)	N/A	140M-F8E-C45	140G-G6C3-C50
2198-P141		LPJ-70SP (70A)	N/A	N/A	140G-G6C3-C90
2198-P208		LPJ-100SP (100A)	N/A	N/A	140G-G6C3-D12

(1) For applications requiring CSA certification, fuses (Bussmann catalog number 170M1760) must be added to the DC link between the two drive clusters when circuit breakers are used for branch circuit protection. The DC bus fuses are not required when AC line fuses are used for branch circuit protection.
(2) These Bulletin 140M circuit breakers, when used as self-protected (Type E) devices, and Bulletin 1489 circuit breakers can be used on only WYE power systems (480Y/277V).

Regenerative Bus Supply UL/CSA Circuit-protection Specifications

Cat. No.	Input Voltage (1) (three-phase) nom	Bussmann Fuses (2) Cat. No.	Mersen Fuses Cat. No.	Miniature CB Cat. No.	Molded Case CB Cat. No.
2198-RP088	324…506V AC rms	LPJ-45SP (45A)	AJT45 (45A)	–	140G-G6C3-C60
2198-RP200		LPJ-125SP (125A)	AJT125 (125A)	–	140G-J6F3-D15
2198-RP263		LPJ-200SP (200A)	AJT200 (200A)	–	140G-K6F3-D30
2198-RP312		LPJ-250SP (250A)	AJT250 (250A)	–	140G-K6F3-D40

(1) Applies when DC-bus voltage regulation is enabled. If DC-bus voltage regulation is not enabled, then the input voltage range is 324….528V AC. For more information on these two modes of operation, see the Kinetix 5700 Servo Drives User Manual, publication 2198-UM002.
(2) For applications requiring CSA certification, fuses (Bussmann catalog number 170M1760) must be added to the DC link between the two drive clusters when circuit breakers are used for branch circuit protection. The DC bus fuses are not required when AC line fuses are used for branch circuit protection.

DC-bus Power Supply IEC (non-UL/CSA) Circuit-protection Specifications

DC-bus Power Supply Cat. No.	Input Voltage (three-phase) nom	DIN gG Fuses Amps, max	Miniature CB Cat. No.		Motor Protection CB Cat. No.	Molded Case CB Cat. No.
2198-P031	195…528V AC	16	1489-M3D250	N/A	140M-D8E-C25	140G-G6C3-C25
2198-P070		40	N/A	1492-SPM3D400	140M-F8E-C45	140G-G6C3-C50
2198-P141		75	N/A	1492-SPM3D630	140MG-H8E-C60	140G-G6C3-C90
2198-P208		110	N/A	N/A	140MG-H8E-D10	140G-G6C3-D12

Regenerative Bus Supply IEC (non-UL/CSA) Circuit-protection Specifications

Regenerative Bus Supply Cat. No.	Input Voltage (1) (three-phase) nom	DIN gG Fuses Amps, max	Miniature CB Cat. No.		Motor Protection CB Cat. No.	Molded Case CB Cat. No.
2198-RP088	324…506V AC rms	50	1489-M3C600	1492-SPM3C630	140MG-H8E-C60	140G-G6C3-C60
2198-RP200		125	–	–	140MG-J8E-D15	140G-J6F3-D15
2198-RP263		200	–	–	–	140G-K6F3-D30
2198-RP312		250	–	–	–	140G-K6F3-D40

(1) Applies when DC-bus voltage regulation is enabled. If DC-bus voltage regulation is not enabled, then the input voltage range is 324….528V AC. For more information on these two modes of operation, see the Kinetix 5700 Servo Drives User Manual, publication 2198-UM002.

Contactor Specifications

The DC-bus power supply contactor enable relay (CED connector) is rated at 24V DC and 1.0 A, max.

DC-bus Power Supply Contactor Specifications

DC-bus Power Supply Cat. No.	Contactor [1] [2] Cat. No.	Intermediate Relay [3] Cat. No.
2198-P031	100-C16EJ10	N/A
2198-P070	100-C37EJ10	
2198-P141	100-C72DJ10	700-HB32Z24 (relay) 700-HN153 (socket)
2198-P208	100-C97DJ10	
2198-P208 (2 in parallel)	100-E190KJ11	
2198-P208 (3 in parallel)	100-E305KJ11	

(1) Auxiliary contact configuration (10) is for 1 N.O. 0 N.C. Other configurations are available.
(2) For contactors that are not Bulletin 100-E type, the integrated diode is required with the contactor coil.
(3) These DC-bus power supplies require an additional intermediate relay used with the contactor.

The regenerative power supply contactor enable relay (CED connector) is rated at 24V DC.

Regenerative Bus Supply Contactor Specifications

Regenerative Bus Supply [1] Cat. No.	Contactor [2] [3] Cat. No.	Intermediate Relay Cat. No.
2198-RP088	100-C43EJ10	N/A
2198-RP200	100-E116KJ11	
2198-RP263	100-E205KJ11	
2198-RP312	100-E265KJ11	

(1) These regenerative bus supplies can require an additional intermediate relay to be used with the contactor. Verify the peak current rating of the main contactor coil.
(2) Auxiliary contact configuration (10) is for 1 N.O. 0 N.C. Other configurations are available.
(3) For contactors that are not Bulletin 100-E type, the integrated diode is required with the contactor coil.

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 5700 drive system.

DC-bus Power Supply Cat. No.	Usage as % of Rated Power Output (watts)				
	20%	40%	60%	80%	100%
2198-P031	97	101	105	109	113
2198-P070	108	119	130	140	151
2198-P141	249	267	286	304	323
2198-P208	265	294	323	352	380
Regenerative Bus Supply Cat. No.					
2198-RP088	253	399	544	690	835
2198-RP200	532	832	1132	1432	1732
2198-RP263	850	1261	1672	2083	2494
2198-RP312	1037	1576	2115	2654	3193
Dual-axis Inverter Cat. No. (1)					
2198-D006-ERS*x*	17	29	41	53	65
2198-D012-ERS*x*	34	58	82	106	130
2198-D020-ERS*x*	52	84	116	148	180
2198-D032-ERS*x*	100	155	210	265	320
2198-D057-ERS*x*	252	354	456	558	660
Single-axis Inverter Cat. No.					
2198-S086-ERS*x*	190	255	325	400	475
2198-S130-ERS*x*	225	340	460	590	725
2198-S160-ERS*x*	270	420	570	760	950
2198-S263-ERS*x*	556	759	989	1245	1529
2198-S312-ERS*x*	610	883	1200	1561	1965
iTRAK Power Supply Cat. No.					
2198T-W25K-ER	206	272	338	404	470
Capacitor Module Cat. No.					
2198-CAPMOD-2240	28	34	42	51	62
2198-CAPMOD-DCBUS-IO	1.1	1.4	1.6	2.1	2.5
DC-bus Conditioner Module Cat. No.					
2198-DCBUSCOND-RP312	1.4	2.1	3.2	4.7	6.7

(1) Values for the dual-axis inverters are based on both axes (each axis dissipates half the rated power output). For example, the 2198-D006-ERSx dual-axis inverter (axis A) with usage of 20% (17/2=8.5 W) and (axis B) with usage of 60% (41/2= 20.5 W) dissipates a total of 29 W.

Weight Specifications

DC-bus Power Supply Cat. No.	Weight, approx kg (lb)
2198-P031	4.33 (9.55)
2198-P070	4.42 (9.74)
2198-P141	6.91 (15.2)
2198-P208	7.04 (15.5)

Regenerative Bus Supply Cat. No.	Weight, approx kg (lb)
2198-RP088	13.61 (30.0)
2198-RP200	38.56 (85.0)
2198-RP263	61.23 (135)
2198-RP312	

iTRAK Power Supply Cat. No.	Weight, approx kg (lb)
2198T-W25K-ER	**7.60 (16.8)**

Dual-axis Inverter Cat. No.	Weight, approx kg (lb)
2198-D006-ERS*x*	4.16 (9.17)
2198-D012-ERS*x*	
2198-D020-ERS*x*	
2198-D032-ERS*x*	
2198-D057-ERS*x*	6.76 (14.9)

Single-axis Inverter Cat. No.	Weight, approx kg (lb)
2198-S086-ERS*x*	5.21 (11.5)
2198-S130-ERS*x*	5.44 (12.0)
2198-S160-ERS*x*	6.80 (15.0)
2198-S263-ERS*x*	15.88 (35.0)
2198-S312-ERS*x*	

Maximum Cable Lengths

Combined motor power cable length for all axes on the same DC bus depends on the Kinetix 5700 system power supply and EMC line filter in use.

- For applications that include the 2198-P*xxx* DC-bus power supply and 2198-DB*xx*-F EMC line filter, the maximum length is up to 400 m (1312 ft)
  - When used with 2198-DBR*xx*-F EMC line filter, the maximum length is up to 1200 m (3937 ft)
- For applications that include the 2198-RP*xxx* regenerative bus supply and 2198-DBR*xx*-F EMC line filter, the maximum length is up to 1200 m (3937 ft)
  - 2198-DB*xx*-F EMC line filters are not compatible with 2198-RP*xxx* regenerative bus supplies

Drive-to-motor feedback cables up to 90 m (295 ft) can be used, depending on the feedback type and overall system design. See the Kinetix Motion Accessories Technical Data, publication KNX-TD004, for cable specifications.

Drive-to-Motor Feedback Cable Length

Feedback Type	Cable Length, max m (ft)
Single-turn or multi-turn absolute	up to 90 (295)
Incremental	up to 30 (98)
EnDat	up to 90 (295)

IMPORTANT For more information on maximum motor cable lengths, see the Kinetix 5700 Servo Drives User Manual, publication 2198-UM002.

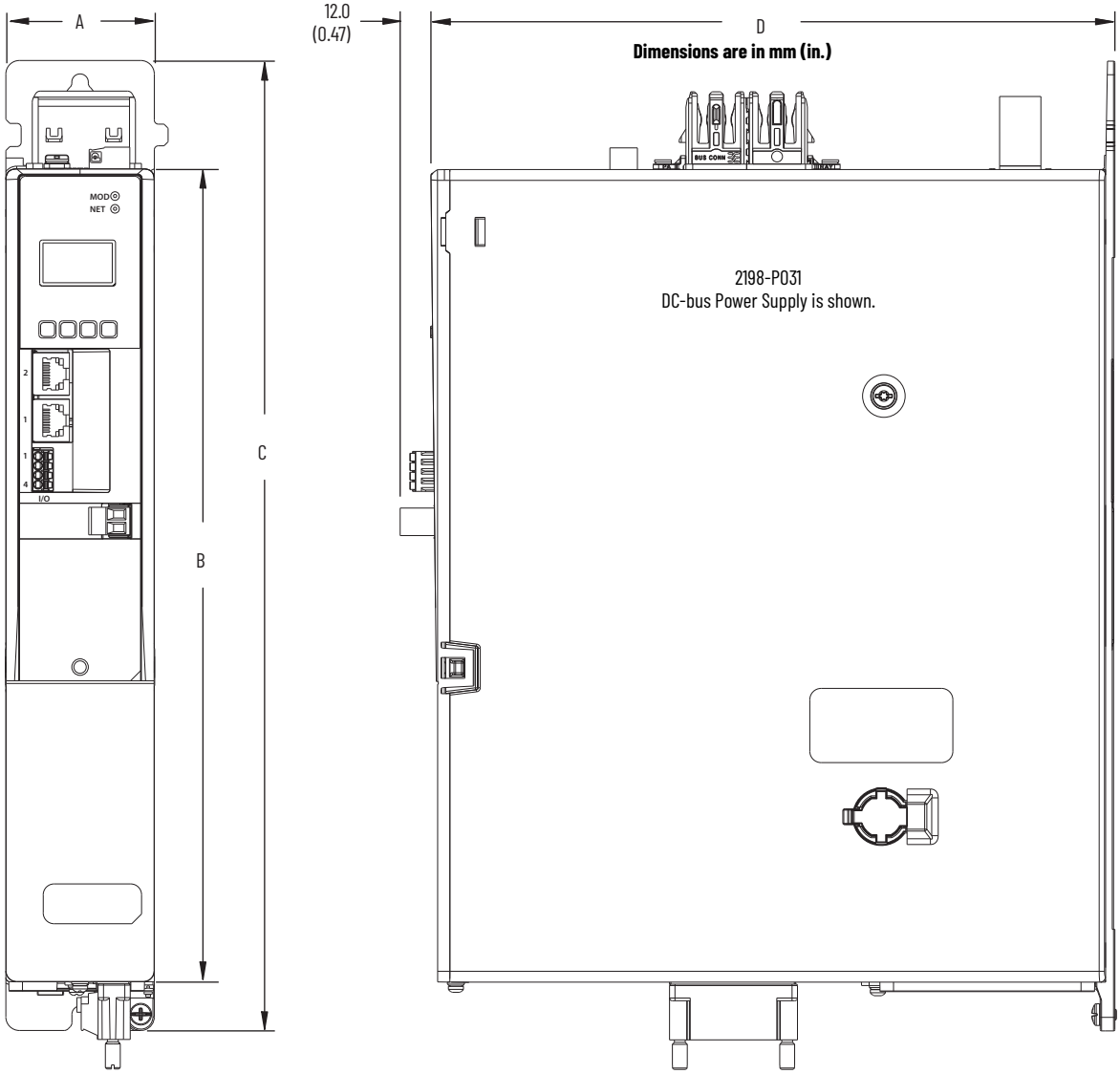
For iTRAK systems, cables from iTRAK power supply to motor modules up to 30 m (98 ft) can be used. See the iTRAK System Technical Data, publication 2198T-TD001, for cable specifications.

IMPORTANT System performance was tested at these cable lengths. These limitations also apply when meeting CE requirements.

Dimensions - Kinetix 5700 Servo Drives

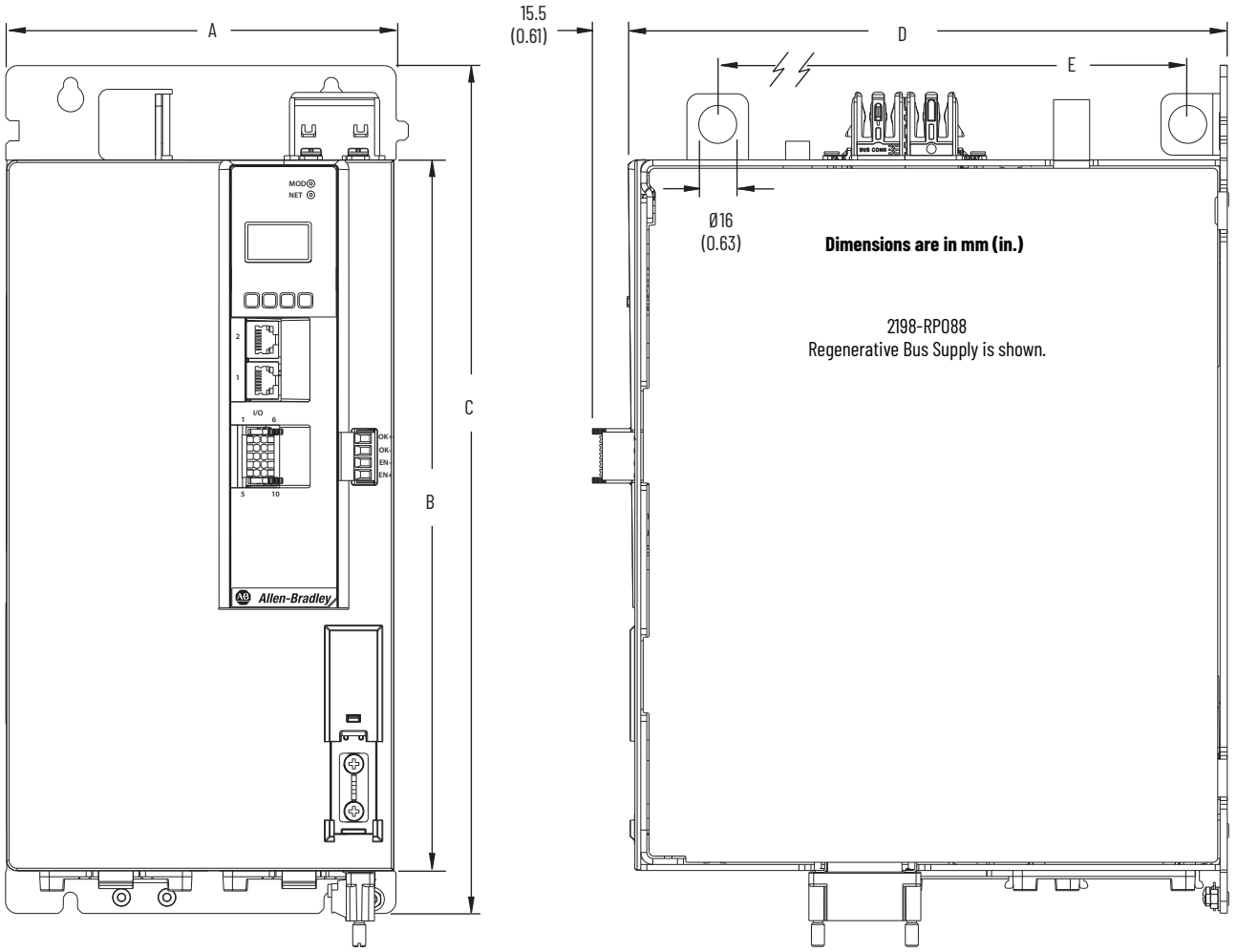
These drawings provide mounting dimensions for Kinetix 5700 power supplies, servo drives, and iTRAK power supply. Also included are drawings showing the impact of compatible motor feedback connector kits on the mounting dimensions. Refer to page 24 for dimensions when using these kits.

DC-bus Power Supply Dimensions



DC-bus Power Supply Cat. No.	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)
2198-P031	55 (2.17)	300 (11.81)	358 (14.09)	252 (9.92)
2198-P070				
2198-P141	85 (3.35)	375 (14.76)	433 (17.04)	
2198-P208				

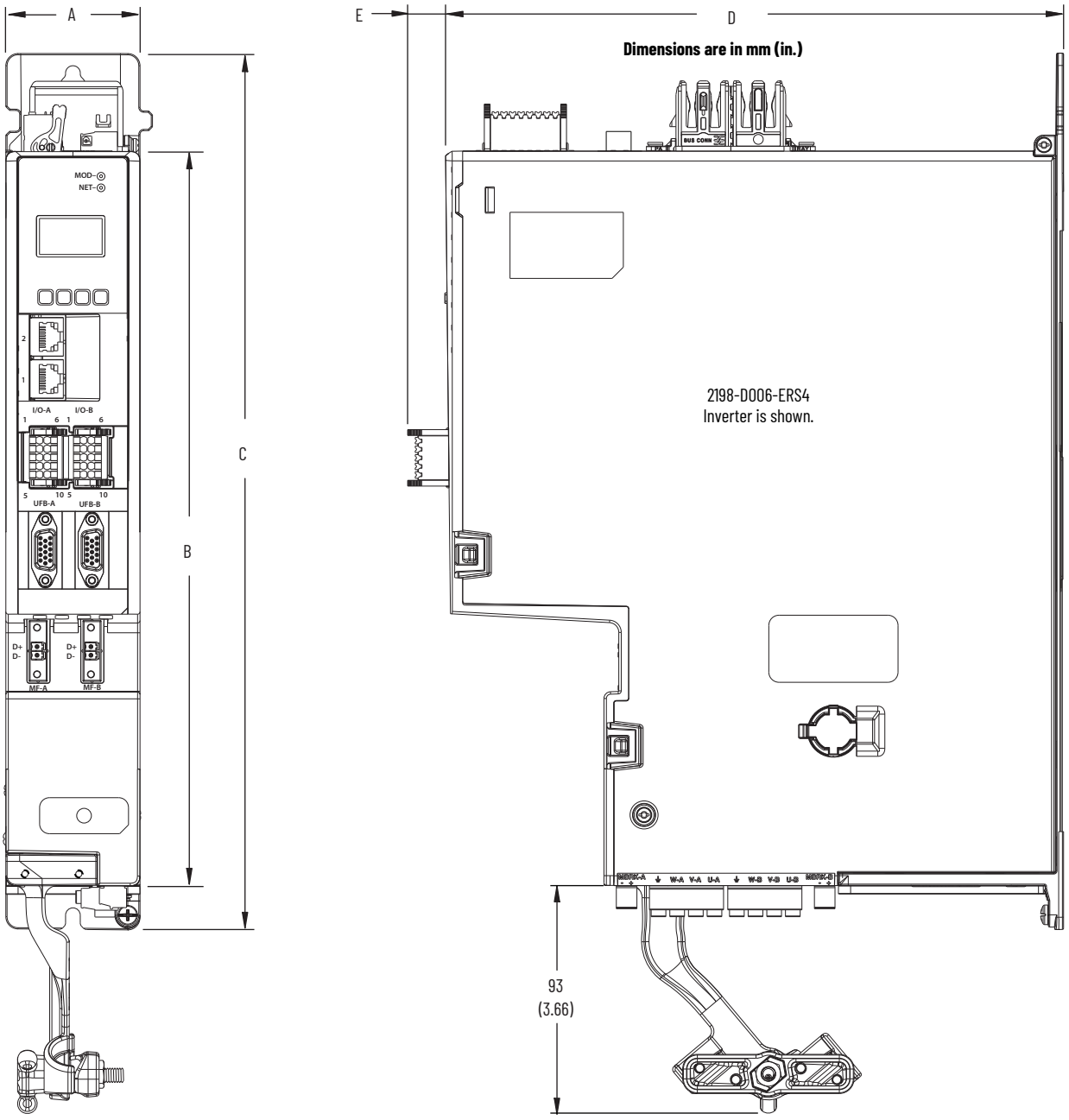
Regenerative Bus Supply Dimensions



Regenerative Bus Supply Cat. No.	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E (1) mm (in.)
2198-RP088	165 (6.50)	300 (11.8)	358 (14.1)	252 (9.92)	198 (7.80)
2198-RP200	275 (10.83)	420 (16.54)	478 (18.82)		225 (8.86), max
2198-RP263	440 (17.32)				233 (9.17), max
2198-RP312					

(1) Maximum distance between lift points.

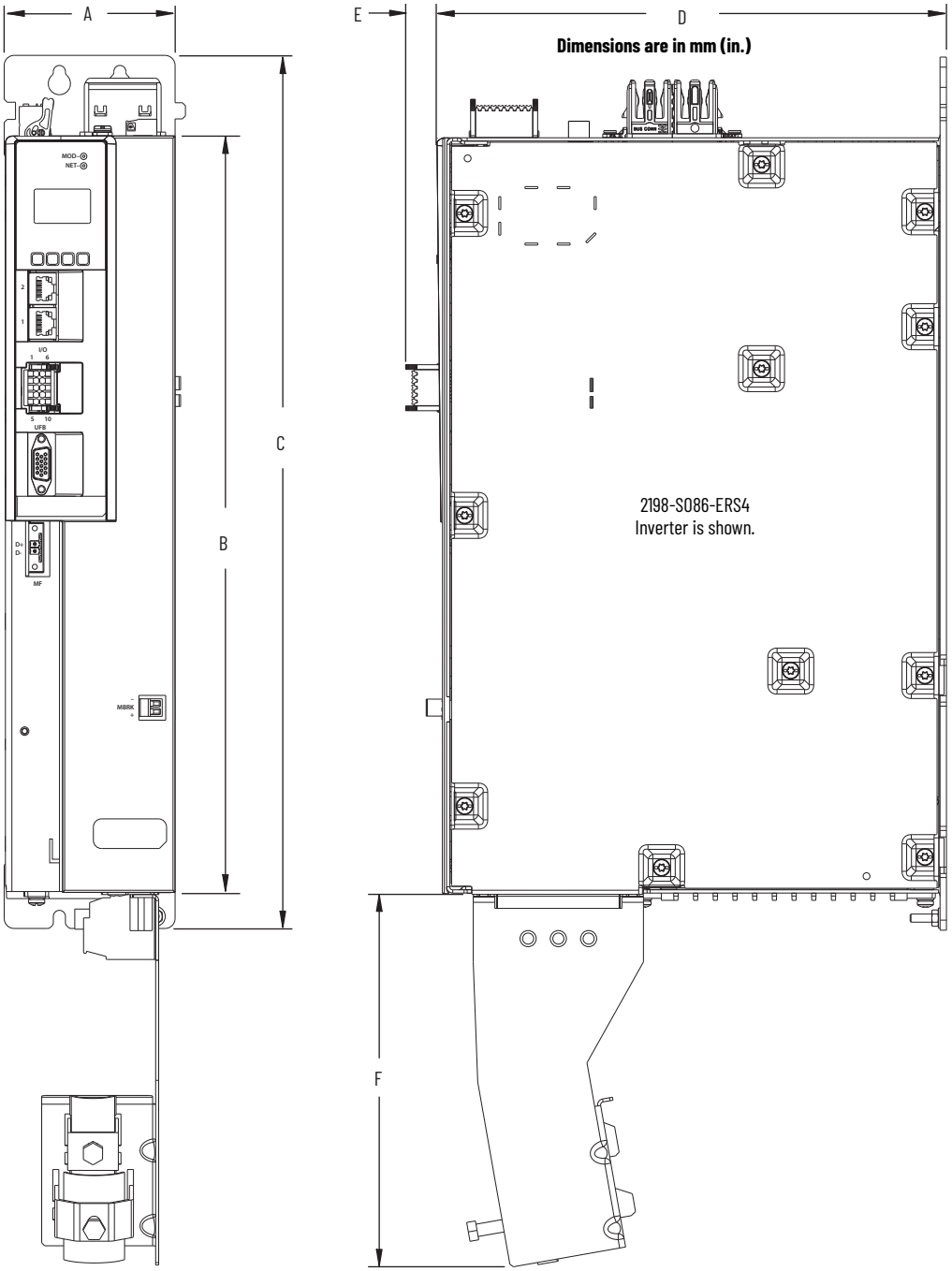
Dual-axis Inverter Dimensions



Dual-axis Inverter Cat. No.	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)
2198-D006-ERS*x*	55 (2.17)	300 (11.81)	358 (14.09)	252 (9.92)	15.5 (0.61) [1]
2198-D012-ERS*x*					
2198-D020-ERS*x*					
2198-D032-ERS*x*					
2198-D057-ERS*x*	85 (3.35)	375 (14.76)	433 (17.0)		

(1) Applies to 2198-D*xxx*-ERS4 and 2198-D*xxx*-ERS3 (series B) inverters. 2198-D*xxx*-ERS3 (series A) inverter value is 12.0 (0.47).

Single-axis Inverter Dimensions



Single-axis Inverter Cat. No.	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)	F mm (in.)
2198-S086-ERSx	85.0 (3.35)	375 (14.8)	433 (17.0)	252 (9.92)	15.5 (0.61) (1)	185 (7.28)
2198-S130-ERSx						
2198-S160-ERSx	100 (3.94)	420 (16.54)	478 (18.82)			
2198-S263-ERSx	220 (8.66)	420 (16.54)	478 (18.82)		15.5 (0.61)	132 (5.19)
2198-S312-ERSx						

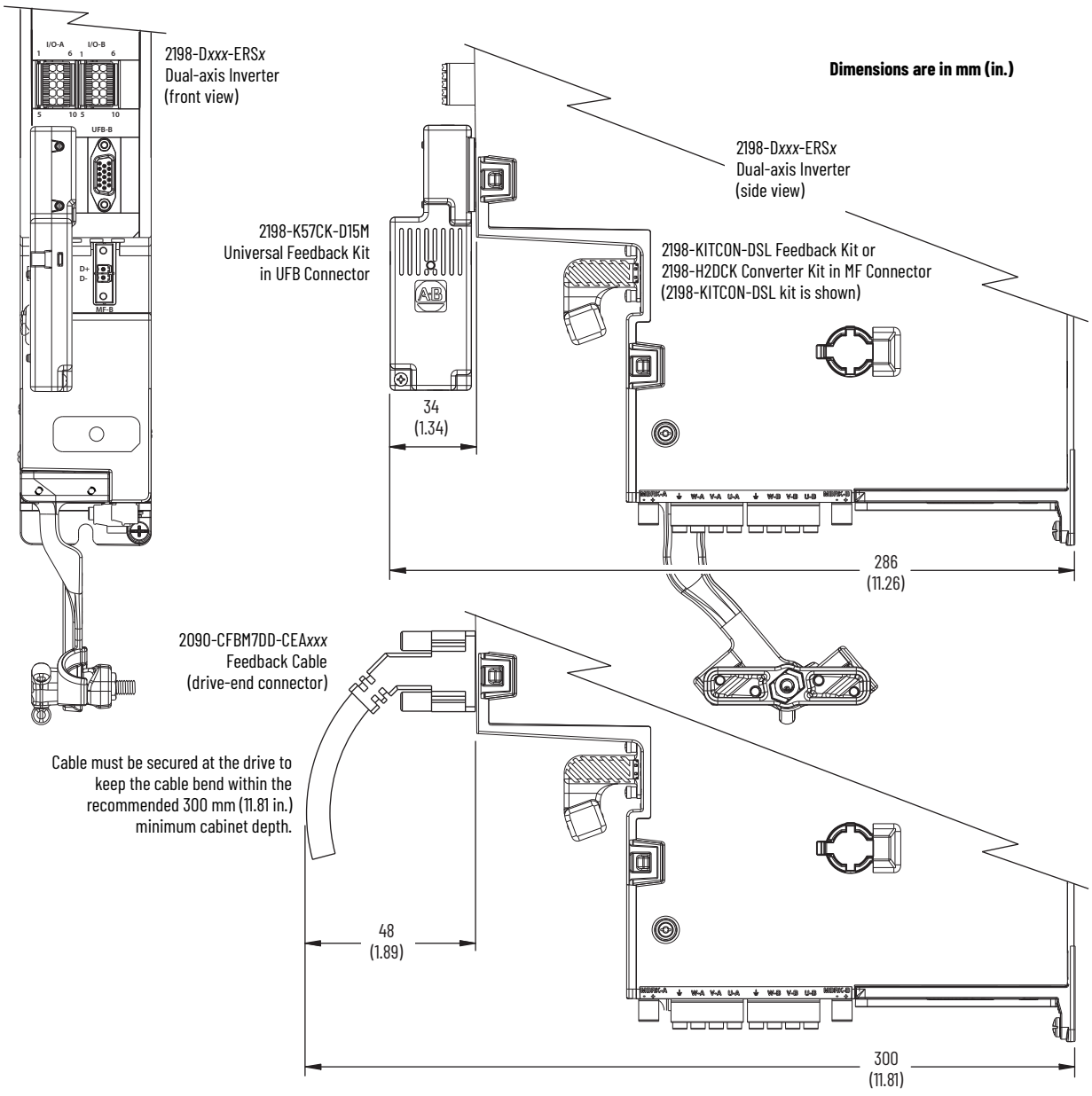
(1) Applies to 2198-S*xxx*-ERS4 and 2198-S*xxx*-ERS3 (series B) inverters. 2198-S*xxx*-ERS3 (series A) inverter value is 12.0 (0.47).

The 2198-KITCON-DSL feedback connector kit and 2198-H2DCK feedback converter kit do not affect the mounting dimensions of the drive. No portion of those kits extend out from the front of the drive or below the drive.

IMPORTANT The 2198-K57CK-D15M universal feedback kit and 2090-CFBM7DD (drive-end connector) feedback cable extend out from the UFB connector as shown and covers a portion of the other two kits (when they are used), which requires you to install feedback kits in the MF connector first.

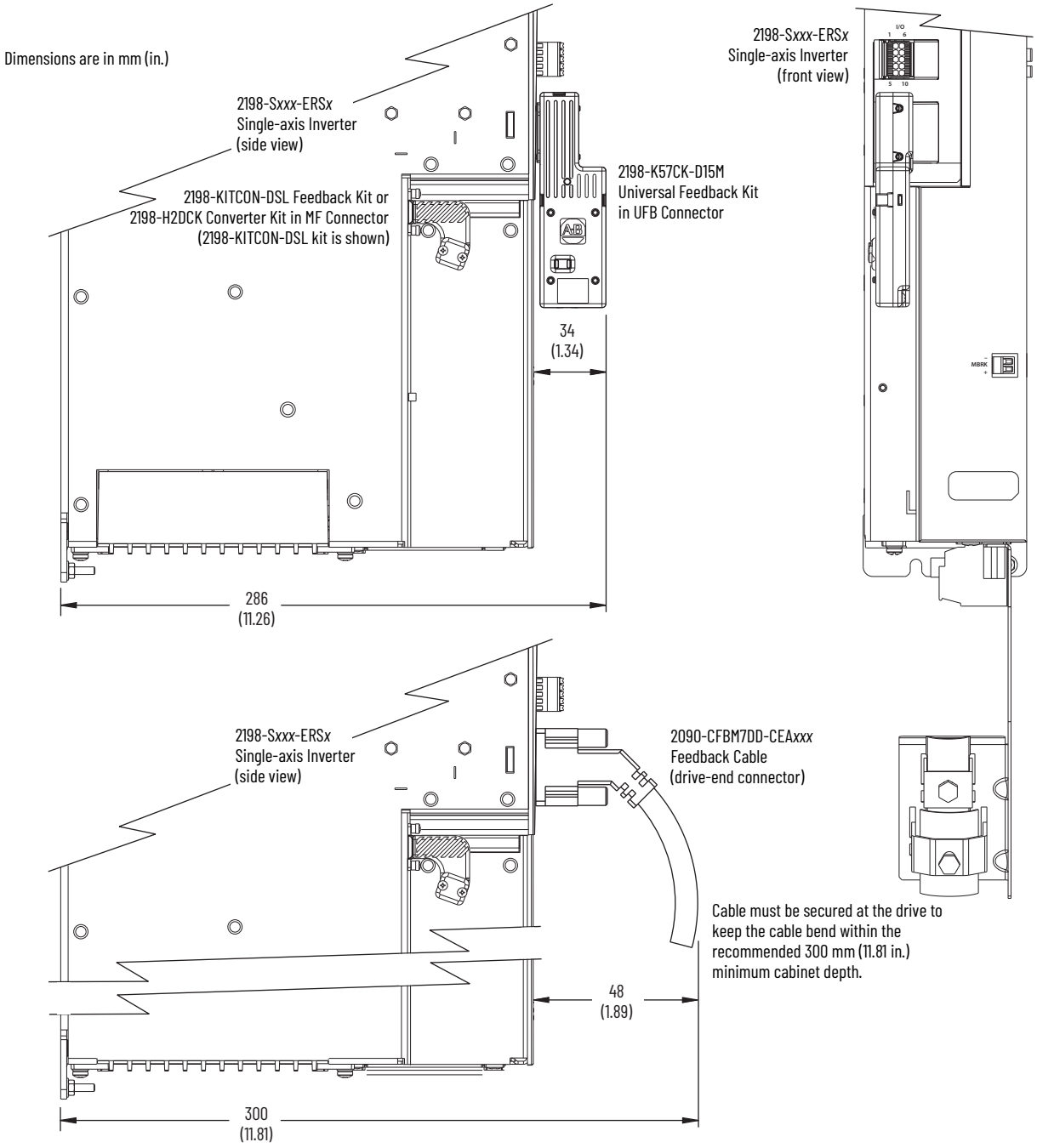
These examples show the 2198-K57CK-D15M universal feedback kit and 2090-CFBM7DD feedback cable that is mounted above (covering) the 2198-KITCON-DSL connector kit in the MF connector. You can replace the 2198-KITCON-DSL feedback kit with the 2198-H2DCK converter kit, if needed, without affecting these mounting dimensions.

Dual-axis Inverter With 2198-K57CK-D15M Universal Feedback Kit



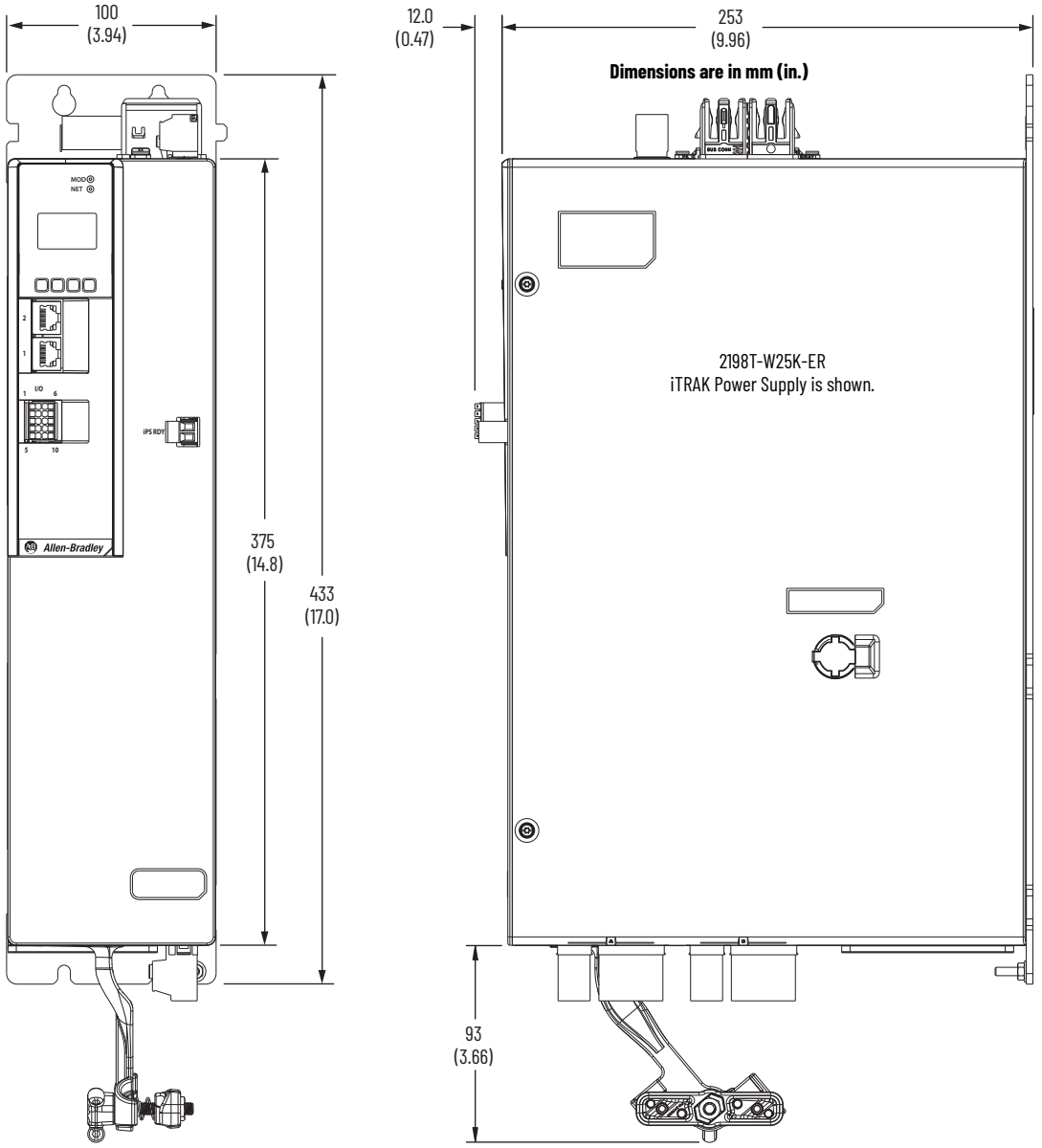
Refer to Universal Feedback Connector Kit on page 44 for motor/actuator compatibility and product dimensions.

Single-axis Inverter With 2198-K57CK-D15M Universal Feedback Kit



Refer to Hiperface-to-DSL Feedback Converter Kit on page 45 for motor/actuator compatibility and page 67 product dimensions.

iTRAK Power Supply Dimensions



Environmental Specifications - Kinetix 5700 Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Ambient temperature	0...50 °C (32...122 °F)	-40...+70 °C (-40...+158 °F)
Relative humidity	5...95% noncondensing	5...95% noncondensing
Protection class (IEC 60529)	IP20	
Degree of pollution (IEC 61800-5-1)	2	
Altitude	• 1500 m (4921 ft) derate 3% per 300 m (984 ft) above 1500 m • 2000 m (6562 ft) max, with corner-grounded input power • 3000 m (9843 ft) max, with non corner-grounded input power	3000 m (9843 ft) during transport
Vibration	5...55 Hz @ 0.35 mm (0.014 in.) double amplitude, continuous displacement; 55...500 Hz @ 2.0 g peak constant acceleration	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications

Kinetix 5700 Servo Drives

Agency Certification [1]	Standards
cULus [2]	UL Listed to U.S. and Canadian safety standards (UL 61800-5-1, File E59272).
	Solid-state motor overload protection provides dynamic fold-back of motor current when 110% of the motor rating is reached with a peak current limit based on the peak rating of the motor as investigated by UL to comply with UL 61800-5-1, (UL File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with IEC 61800-5-1:2007 - Adjustable speed electrical power drive systems.
Functional Safety	TÜV Certified for Functional Safety: up to SIL CL3, according to IEC 61800-5-2, IEC 61508, and IEC 62061; up to Performance Level PLe and Category 3, according to ISO 13849-1; when used as described in the Kinetix 5700 Servo Drives User Manual, publication 2198-UM002 or the Kinetix 5700 Safe Monitor Functions Safety Reference Manual, publication 2198-RM001.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 2008 • Radiocommunications Labeling (Electromagnetic Compatibility) Notice: 2008
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2198
ODVA	• EtherNet/IP conformance tested • CIP Security™ conformance tested
OSHA	Maximum audible noise from the servo drive system complies with OSHA standard 3074, Hearing Conservation (<85 dBA).

(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.
(2) UL has not evaluated the Safe Torque Off options in these products.

Kinetix 5700 iTRAK Power Supply

Agency Certification [1]	Standards
cULus	UL Listed to U.S. and Canadian safety standards (UL 61800-5-1, File E59272 and CSA C22.2 No 274-13).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with IEC 61800-5-1:2007 - Adjustable speed electrical power drive systems.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 2008 • Radiocommunications Labeling (Electromagnetic Compatibility) Notice: 2008
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2198
OSHA	Maximum audible noise from the servo drive system complies with OSHA standard 3074, Hearing Conservation (<85 dBA).

(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.

Accessories - Kinetix 5700 Servo Drives

Kinetix 5700 drive accessories include the accessory modules, passive shunt modules, the encoder output module, line reactors, AC line filters, feedback connector kits, the system mounting toolkit, and shared-bus connector kits.

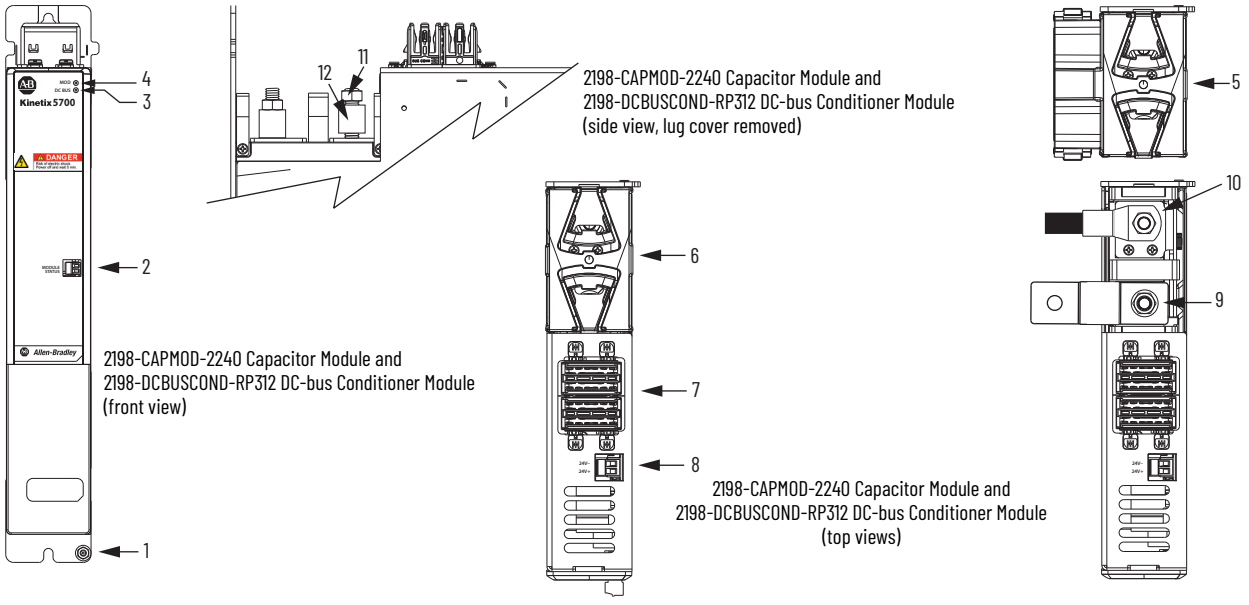
Accessory Modules

The 2198-CAPMOD-2240 capacitor module, 2198-CAPMOD-DCBUS-IO extension module, and 2198-DCBUSCOND-RP312 DC-bus conditioner module are referred to as Kinetix 5700 accessory modules.

Accessory Module [1] Cat. No.	Description
2198-CAPMOD-2240 capacitor modules are used:	• For energy storage and to extend the DC-bus voltage to another inverter cluster • As connection points for an external active shunt module • In systems with external DC-bus current of up to 104 A, however, can parallel with itself or with another accessory module for up to 208 A.
2198-CAPMOD-DCBUS-IO extension modules are used:	• With another accessory module when the external DC-bus current is >104 A, up to a maximum of 208 A • To extend the DC-bus voltage to another inverter cluster
2198-DCBUSCOND-RP312 DC-bus conditioner modules are used:	• To decrease the voltage stress on isolation components in inverter systems with long cable lengths and other use cases • To extend the DC-bus voltage to another inverter cluster • In systems with external DC-bus current of up to 104 A, however, can parallel with itself or with another accessory module for up to 208 A.

(1) Accessory modules can be used in any Kinetix 5700 drive system configurations with DC-bus power supplies, regenerative bus supplies, and 8720MC-RPS power supplies.

Capacitor Module and DC-bus Conditioner Module Features and Indicators



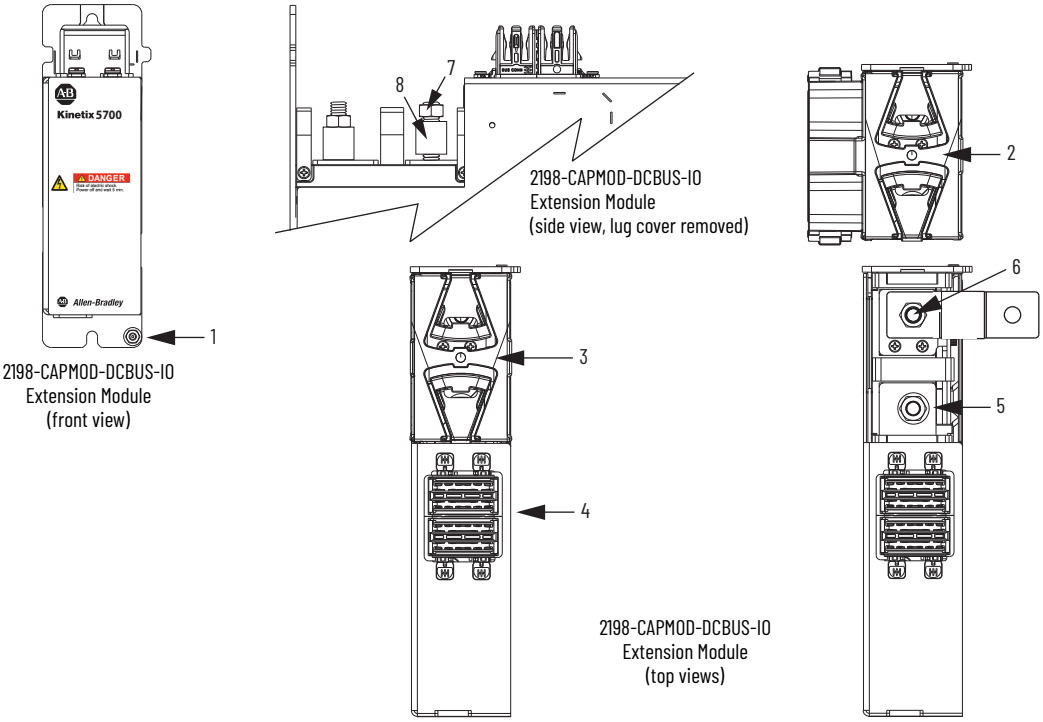
Item	Description
1	Ground stud
2	Module status (MS) connector
3	DC-bus status indicator
4	Module status indicator

Item	Description
5	Stud/lug cover with wires [1]
6	Stud cover without wires
7	DC-bus (DC) connector
8	24V control input power (CP) connector

Item	Description
9	DC– M8 stud (external DC-bus), shown with flexible bus-bar [2]
10	DC+ M8 stud (external DC-bus), shown with wire lug
11	M8 hex nut
12	Lug spacer

(1) This example shows the lug cover oriented for wires exiting to the left (capacitor module is on the far left of the drive configuration). Rotate lug cover 180° when wires exit to the right (capacitor module is on the far right of the drive configuration).
(2) Flexible bus-bars are included with only the 2198-CAPMOD-DCBUS-IO extension module. So, if you have two capacitor modules, two DC-bus conditioner modules, or a capacitor module and DC-bus conditioner module mounted side by side, you must order the 2198-KITCON-CAPMOD2240 or 2198-KITCON-DCBUSCOND connector set separately.

Extension Module Features and Indicators



Item	Description
1	Ground lug
2	Stud/lug cover with wires (1)
3	Stud cover without wires
4	DC-bus (DC) connector

Item	Description
5	DC– M8 stud (external DC-bus)
6	DC+ M8 stud (external DC-bus), shown with flexible bus-bar (2)
7	M8 hex nut
8	Lug spacer

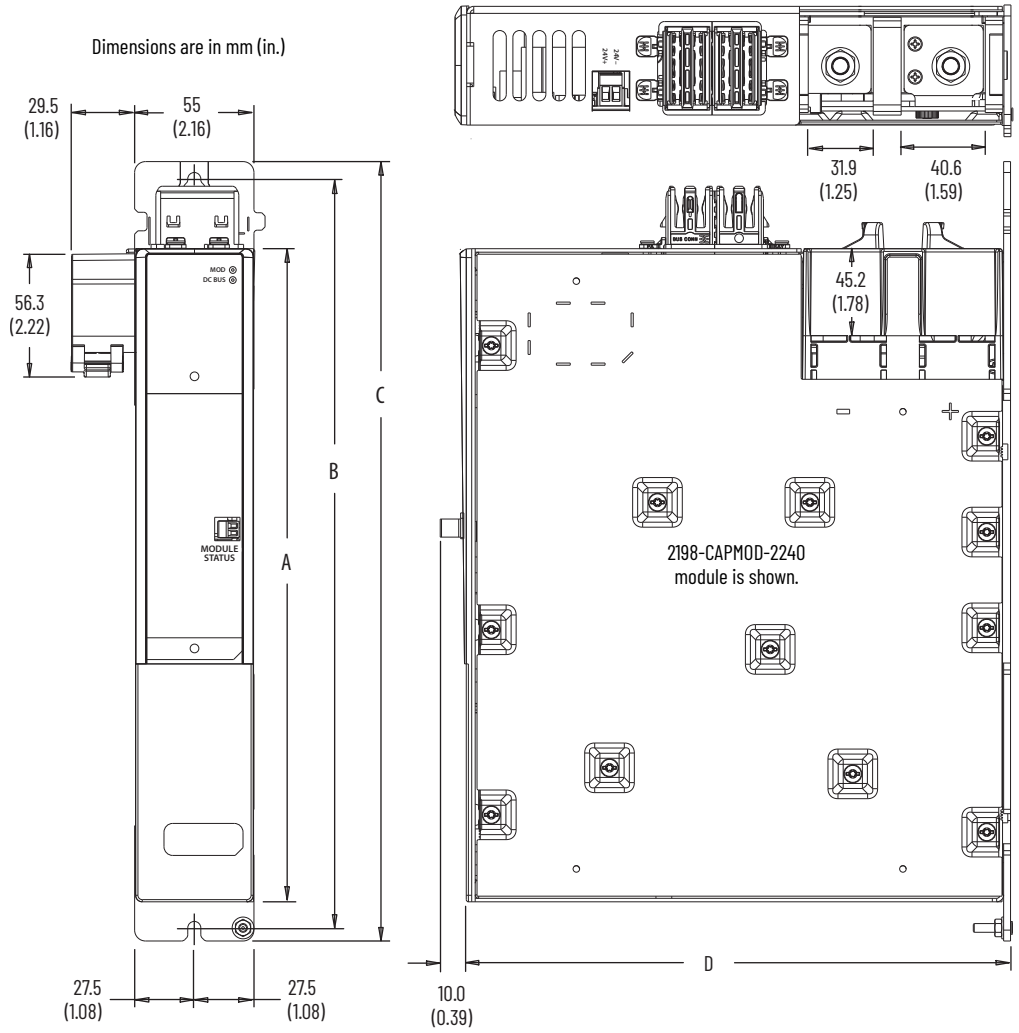
(1) This example shows the lug cover oriented for wires exiting to the left (extension module is on the far left of drive configuration). Rotate lug cover 180° when wires exit to the right (extension module is on the far right of drive configuration).

(2) Flexible bus-bars are included with only the 2198-CAPMOD-DCBUS-IO extension module.

Module Specifications

Module Cat. No.	Voltage Range V DC	Capacitance µF	Energy Storage J	Continuous Current A, avg	Weight, approx kg (lb)
2198-CAPMOD-2240	276…747	2240	734	104	3.3 (7.2)
2198-CAPMOD-DCBUS-IO		–	–	104	1.2 (2.7)
2198-DCBUSCOND-RP312		–	–	104	2.0 (4.4)

Capacitor Module, Extension Module, and DC-bus Conditioner Module Dimensions



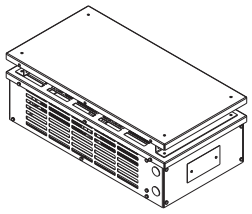
Module Cat. No.	A	B (1)	C	D
2198-CAPMOD-2240	300 (11.81)	345 (13.58)	358 (14.09)	253 (10.0)
2198-DCBUSCOND-RP312				
2198-CAPMOD-DCBUS-IO	131 (5.16)	176 (6.93)	189 (7.44)	248 (9.76)

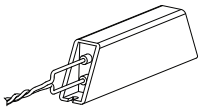
(1) The recommended mounting hardware is M5 (#10-32) steel bolts. Apply 4.0 N•m (35.4 lb•in) maximum torque to each fastener.

Passive Shunt Modules and Resistors

The Kinetix 5700 passive shunts are external modules that provide additional shunt capacity for applications where the DC-bus power supply's internal shunt capacity is exceeded. Catalog numbers 2198-R014, 2198-R031, and 2198-R127 are composed of resistor coils that are housed inside an enclosure. Catalog number 2198-R004 is a shunt resistor without an enclosure.

2198-R014, 2198-R031, and 2198-R127 Shunt Modules





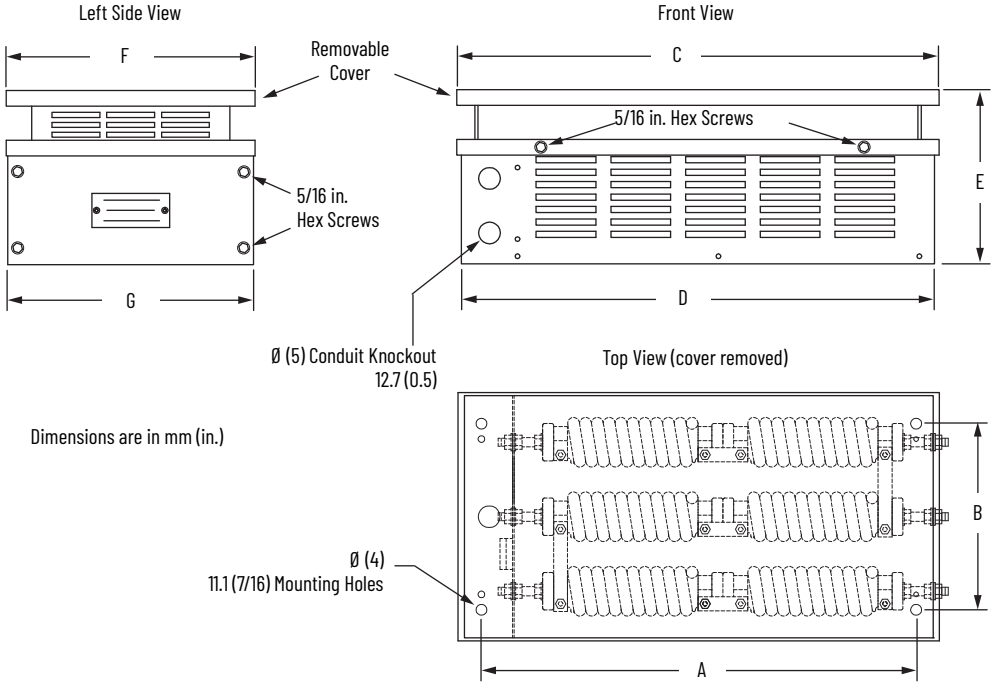
2198-R004 Shunt Resistor

Shunt Module Specifications

Shunt Module Cat. No.	Resistance Ohms	Continuous Power W	Weight, approx kg (lb)
2198-R004	33	400	1.8 (4.0)
2198-R014	9.4	1400	9.1 (20)
2198-R031	33	3100	16.8 (37)
2198-R127 (1)	13	12,700	22.2 (49)

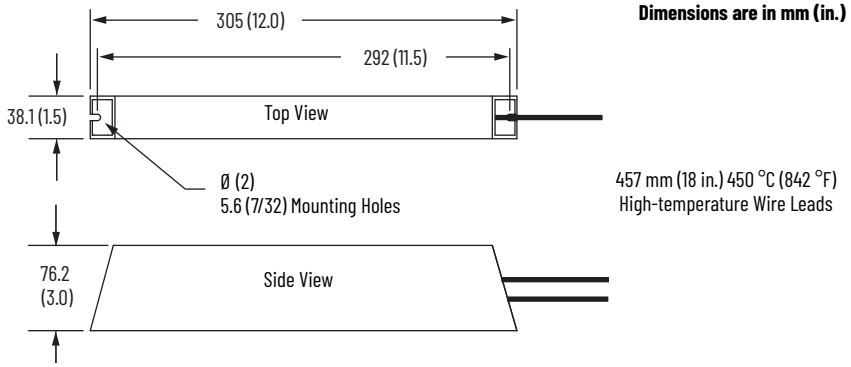
(1) This product presents a lift hazard. To avoid personal injury, use care when lifting the product.

Shunt Module Dimensions (catalog numbers 2198-R014, 2198-R031, and 2198-R127)



Shunt Module Cat. No.	A	B	C	D	E	F	G
2198-R014	445 (17.5)	191 (7.5)	492 (19.38)	483 (19.0)	178 (7.0)	254 (10.0)	251 (9.88)
2198-R031	635 (25.0)	343 (13.5)	683 (26.88)	673 (26.5)		406 (16.0)	403 (15.88)
2198-R127	673 (26.5)	267 (10.5)	721 (28.38)	711 (28.0)	305 (12.0)	330 (13.0)	327 (12.88)

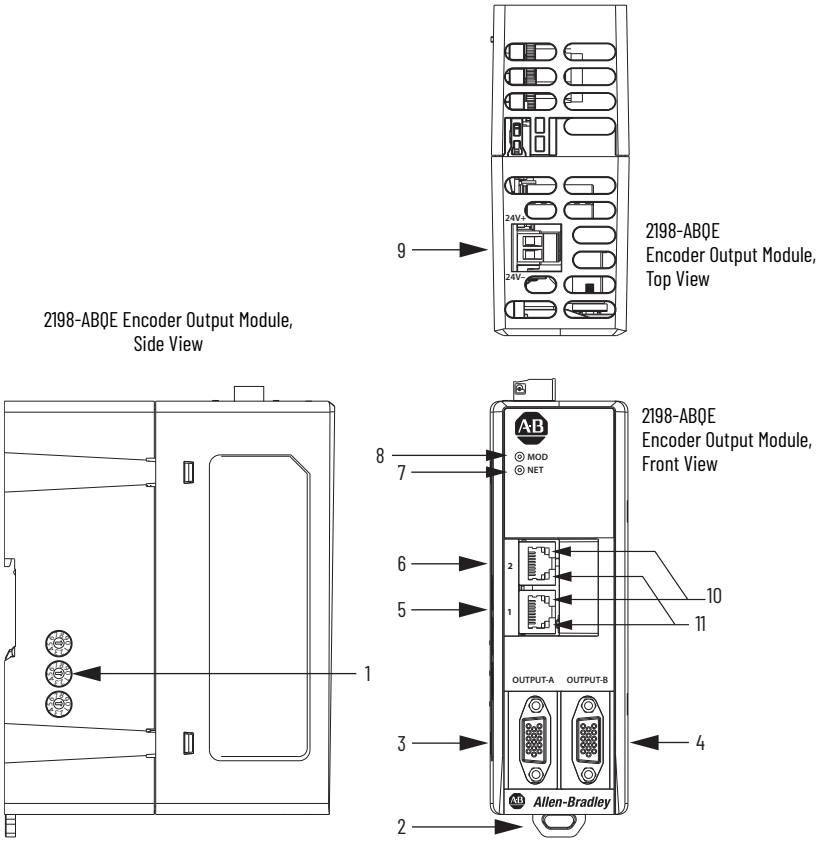
Shunt Resistor Dimensions (catalog number 2198-R004)



Encoder Output Module

The Allen-Bradley encoder output module (catalog number 2198-ABQE) is a DIN-rail mounted EtherNet/IP network-based standalone module capable of outputting encoder pulses to a customer-supplied peripheral device (cameras, for example, used in line-scan vision systems). The encoder output module supports real and virtual axes for systems using the integrated motion on EtherNet/IP network.

Module Features and Indicators

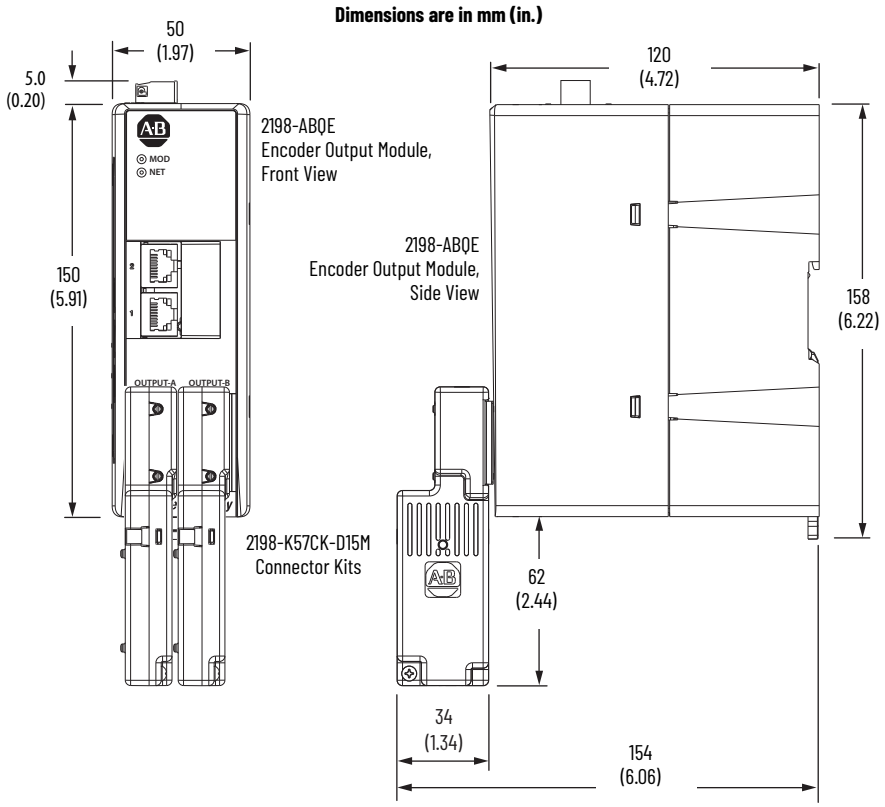


Item	Description
1	IP address switches
2	Mounting latch
3	15-pin output connector - A
4	15-pin output connector - B
5	Ethernet (PORT1) RJ45 connector
6	Ethernet (PORT2) RJ45 connector
7	Network status indicator
8	Module status indicator
9	24V control input power (CP) connector
10	Link speed status indicators
11	Link/Activity status indicators

These items are required for installation and are ordered separately:

- 2198-K57CK-D15M connector kit, for terminating output cable conductors (1 for each output connector)
- 2198-KITCON-ABQE spare connector and end-anchor set that includes the following:
  - 24V wiring plug for control power input (replacement)
  - Label for recording the IP address and attaching to the encoder output module (replacement)
  - DIN-rail end-anchors for holding the module in position (2 per module)

Encoder Output Module Dimensions



Included in the dimensions are 2198-K57CK-D15M connector kits attached to the output connectors. End anchors, used to secure the module on the DIN rail, add 8 mm (0.31 in.) on either side of the module.

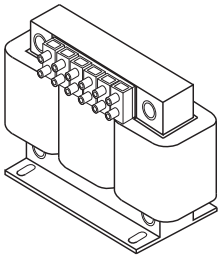
Encoder Output Module General Specifications

Attribute	Value
Control input power (24V) ratings (SELV and LIM or Class 2 power supply)	21.6...26.4V DC (24 V DC, nom) 0.3 A, 7.2 W, max @ 24V DC
Control (input power) inrush current, max	3 A
Control input power connector wire size	16...24 AWG
Output supply power rating for single-ended outputs only (SELV and LIM or Class 2 power supply)	12...30V DC 0.14 A, max
Output connector wire size	16...28 AWG
Output signal type	Differential (RS422) or single-ended
Weight	0.50 kg (1.1 lb)

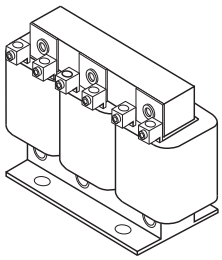
Bulletin 1321 Line Reactors

Bulletin 1321 line reactors help keep equipment running longer by absorbing many of the power line disturbances that can shut down your power supply. For 2198-RP*xxx* regenerative bus supplies, line reactors can significantly reduce the amount of circulating currents between the integrated LC filter and other devices on the common AC input-power source. For multiple 2198-P208 DC-bus power supplies with common input power, each supply must have its own line reactor.

Bulletin 1321 Line Reactors



Catalog Numbers
1321-3R12-B and 1321-3R35-B



Catalog Numbers
1321-3R55-B and 1321-3R80-B

For line reactor use-cases with Kinetix 5700 power supplies, see the Kinetix 5700 Servo Drives User Manual, publication 2198-UM002.

Bulletin 1321 Line Reactor Selection

Kinetix 5700 Power Supply	Power Supply Cat. No.	Number of Power Supplies in a Bus Group	Bulletin 1321 Line Reactor Cat. No.	Status
DC-bus Power Supply	2198-P031	1	1321-3R12-B	Recommended
	2198-P070	1	1321-3R35-B	Recommended
	2198-P141	1	1321-3R55-B	Recommended
	2198-P208	1	1321-3R80-B	Recommended
		2		Required
		3		Required
Regenerative Bus Supply	2198-RP088	1	1321-3R35-A	Recommended
	2198-RP200	1	1321-3R100-A	Recommended
	2198-RP263	1	1321-3R160-B	Recommended
	2198-RP312	1	1321-3R200-A	Recommended

For line reactor specifications, terminations, and dimensions, see the 1321 Power Conditioning Products Technical Data, publication 1321-TD001.

Kinetix 5700 AC Line Filters

An AC line filter is required to meet CE requirements. Install the AC line filter as close to the 2198-P*xxx* DC-bus power supply or 2198-RP*xxx* regenerative bus supply as possible.

AC Line Filter Selection

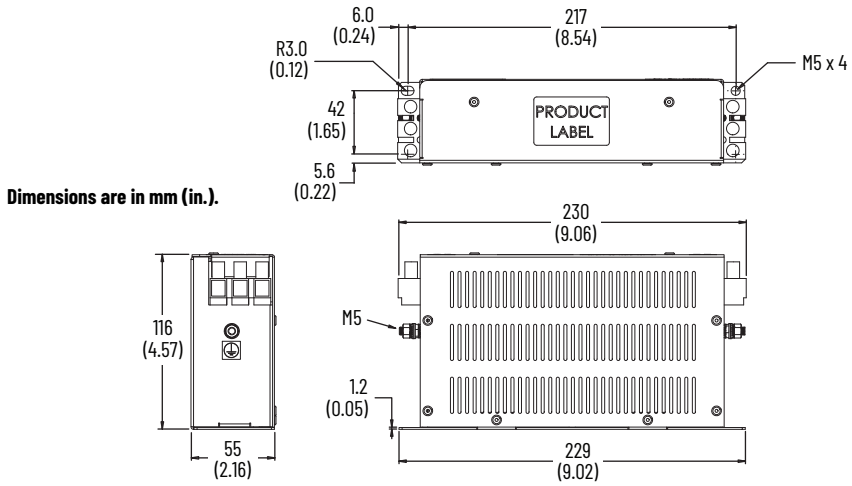
DC-bus Power Supply Cat. No.	AC Line Filter [1] Cat. No.
2198-P031	• 2198-DBR20-F or • 2198-DB20-F
2198-P070	• 2198-DBR40-F or • 2198-DB42-F
2198-P141 2198-P208	• 2198-DBR90-F or • 2198-DB80-F
2198-P208 (2 in parallel) 2198-P208 (3 in parallel)	• 2198-DBR200-F or • 2198-DB290-F

Regenerative Bus Supply Cat. No.	AC Line Filter Cat. No.
2198-RP088	2198-DBR40-F
2198-RP200	2198-DBR90-F
2198-RP263 2198-RP312	2198-DBR200-F

(1) The use of 2198-DBR*xx*-F line filters provide a maximum total motor-power cable length of up to 1200 m (3937 ft). Maximum total motor-power cable length with 2198-DB*xx*-F line filters is 400 m (1312 ft). See the Kinetix 5700 Servo Drives User Manual, publication 2198-UM002 for more information on maximum cable lengths and how the use of 2198-DBR*xx*-F line filters affect ground screw/jumper settings.

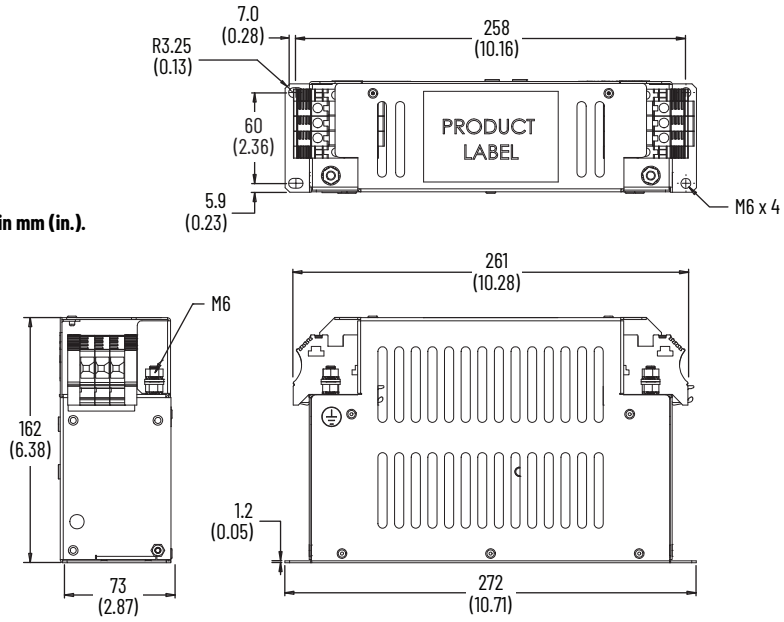
AC Line Filter Dimensions (catalog number 2198-DBR20-F)

Dimensions are in mm (in.).



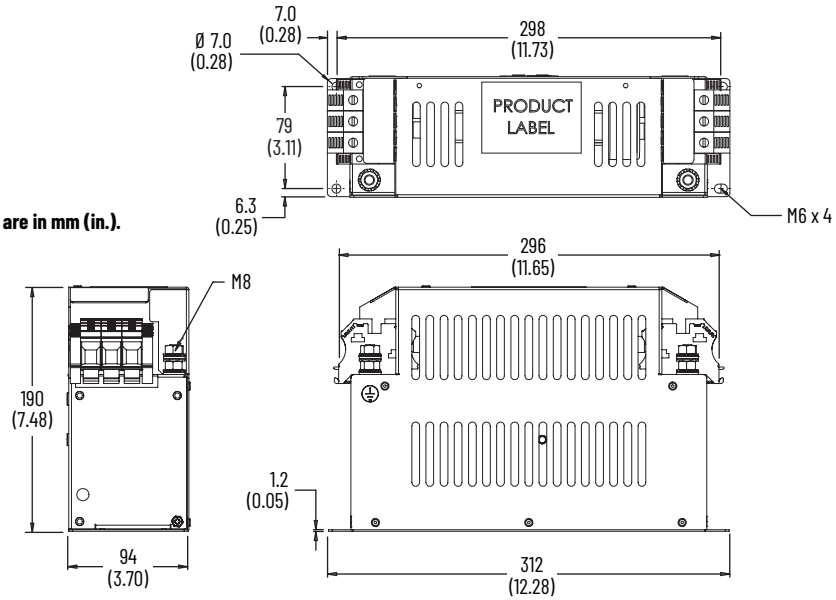
AC Line Filter Dimensions (catalog number 2198-DBR40-F)

Dimensions are in mm (in.).



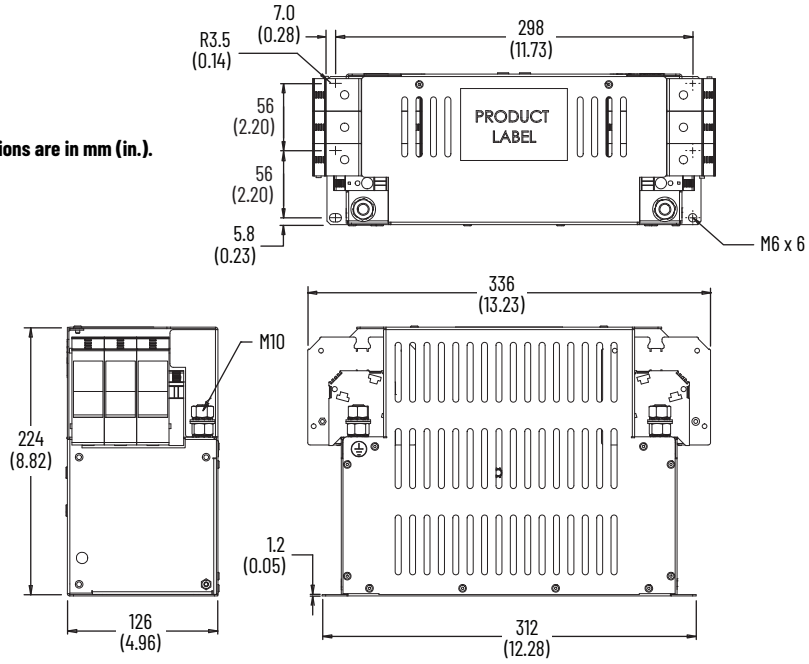
AC Line Filter Dimensions (catalog number 2198-DBR90-F)

Dimensions are in mm (in.).



AC Line Filter Dimensions (catalog number 2198-DBR200-F)

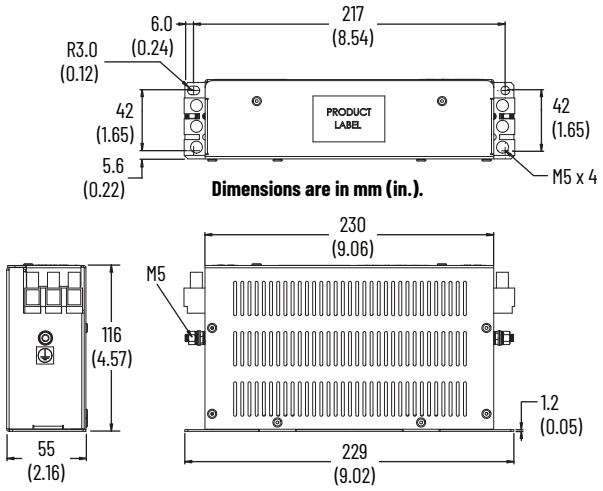
Dimensions are in mm (in.).



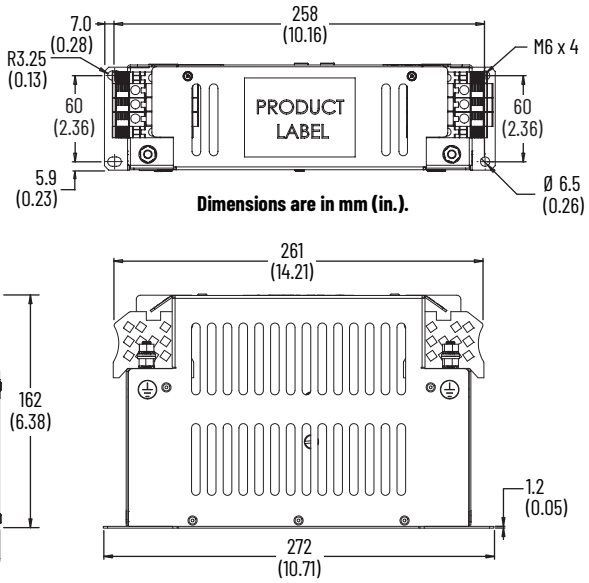
2198-DBR*xx*-F AC Line Filter Specifications

AC Line Filter Cat. No.	Voltage Rating, max	Current Rating A @ 50 °C (122 °F)	Power Loss W	Leakage Current mA	Weight, approx kg (lb)	Operating Temperature
2198-DBR20-F	528V AC three-phase 50/60 Hz	20	4.2	30.0	1.0 (2.20)	0...50 °C (32...122 °F)
2198-DBR40-F		54	15.0		3.3 (7.28)	
2198-DBR90-F		90	16.8	34.0	4.1 (9.04)	
2198-DBR200-F		200	34.5	46.0	7.2 (15.87)	

AC Line Filter Dimensions (catalog number 2198-DB20-F)

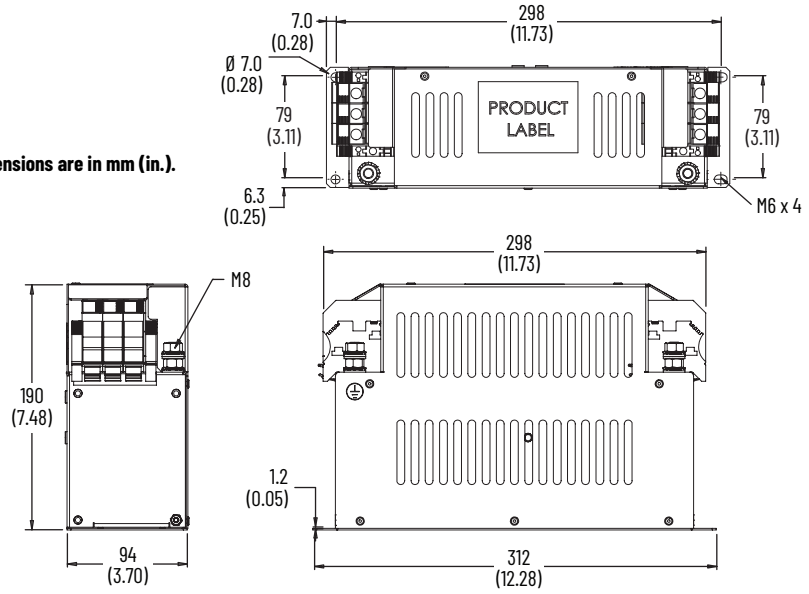


AC Line Filter Dimensions (catalog number 2198-DB42-F)



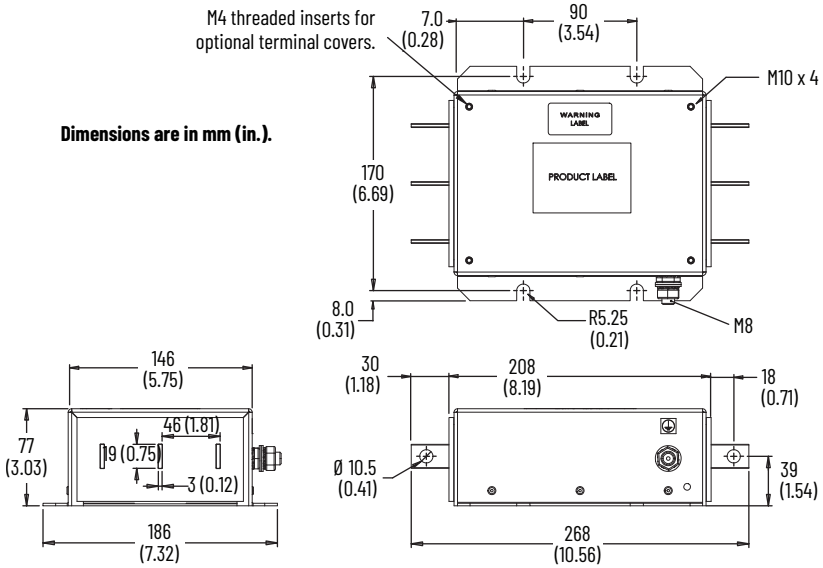
AC Line Filter Dimensions (catalog number 2198-DB80-F)

Dimensions are in mm (in.).



AC Line Filter Dimensions (catalog number 2198-DB290-F)

Dimensions are in mm (in.).



2198-DB*xx*-F AC Line Filter Specifications

AC Line Filter Cat. No.	Voltage Rating, max	Current Rating A @ 50 °C (122 °F)	Power Loss W	Leakage Current mA	Weight, approx kg (lb)	Operating Temperature
2198-DB20-F	528V AC three-phase 50/60 Hz	20	5.1	5.2	1.63 (3.59)	0…50 °C (32…122 °F)
2198-DB42-F		42	14.7	4.0	2.70 (5.95)	
2198-DB80-F		80	18.3	13.0	3.95 (8.71)	
2198-DB290-F		290	32.7	19.4	4.20 (9.26)	

DC-bus Link Connector Kits

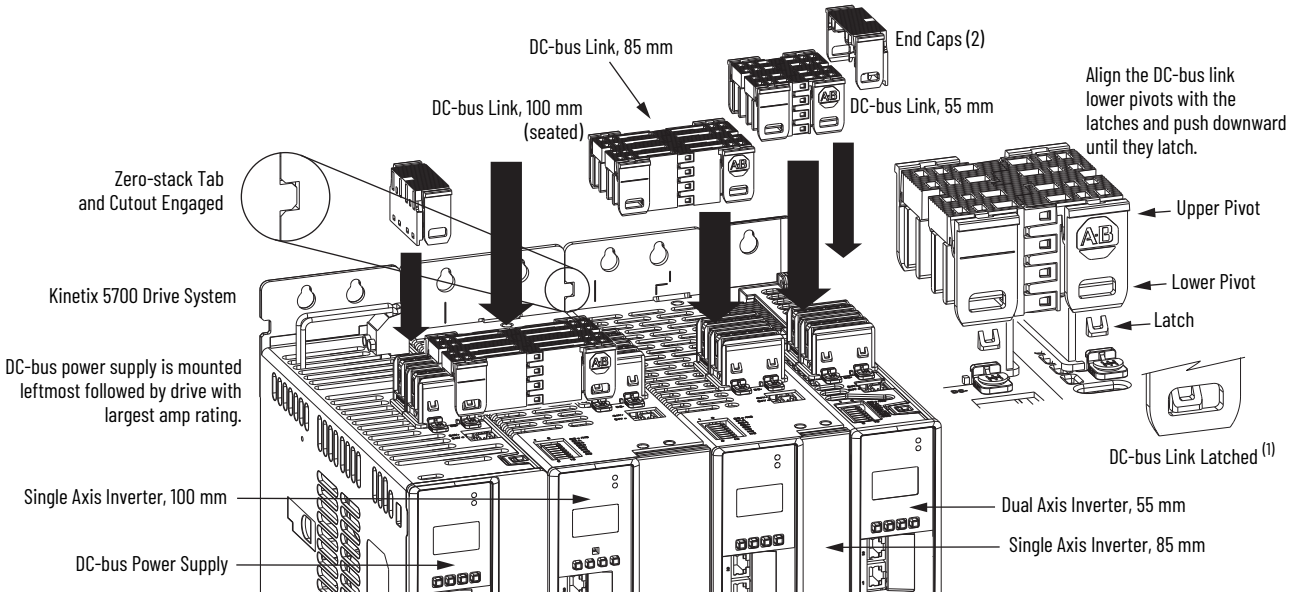
DC-bus link connector kits are used to extend DC-bus power from module-to-module.

IMPORTANT Use of the DC-bus link connector kits is required and the zero-stack tab and cutout must be engaged between adjacent drives.

The DC-bus link connector kits are required and comprised of these two components:

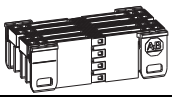
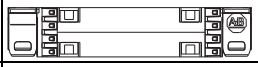
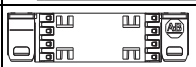
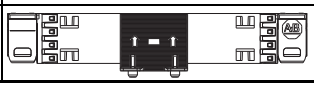
- DC-bus links that are inserted between drive modules to extend the DC-bus from module-to-module. DC-bus links are included with inverter modules and the iTRAK power supply as indicated in the table below.
- DC-bus end-caps are inserted into the first and last drive modules to cover the exposed DC-bus connector on both ends of the bus and are included with the DC-bus power supplies and regenerative bus supplies.

DC-bus Link Connector Example

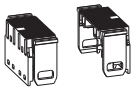


(1) DC-bus links latch on both sides when inserted into the DC-bus connectors. To remove the DC-bus link, depress both sets of upper pivots to unlatch the lower pivots, hold the DC-bus link firmly, and pull upward.

DC-bus Link Connector Kit Catalog Numbers

Replacement Kit Cat. No.	Description	Module Type	Module Cat. No.	Illustration
2198-BARCON-55DC200	DC-bus link, 55 mm, 208 A	Dual axis inverter	2198-D006-ERSx, 2198-D012-ERSx 2198-D020-ERSx, 2198-D032-ERSx 2198-CAPMOD-2240 2198-CAPMOD-DCBUS-IO 2198-DCBUSCOND-RP312	
2198-BARCON-85DC200	DC-bus link, 85 mm, 208 A	Dual axis inverter	2198-D057-ERSx	
		Single axis inverter	2198-S086-ERSx 2198-S130-ERSx	
2198-BARCON-100DC200	DC-bus link, 100 mm, 208 A	Single axis inverter	2198-S160-ERSx	
		iTRAK power supply	2198T-W25K-ER	
2198-BARCON-220DC200	DC-bus link, 220 mm, 208 A	Single-axis inverter	2198-S263-ERSx 2198-S312-ERSx	
2198-BARCON-165DC200	DC-bus link, 165 mm, 208 A	Regenerative Bus Supply	2198-RP088	
2198-BARCON-275DC200	DC-bus link, 275 mm, 208 A	Regenerative Bus Supply	2198-RP200	

DC-bus Link Connector Kit Catalog Numbers (continued)

Replacement Kit Cat. No.	Description	Module Type	Module Cat. No.	Illustration
2198-BARCON-440DC200	DC-bus link, 440 mm, 208 A	Regenerative Bus Supply	2198-RP263 2198-RP312	
2198-KITCON-ENDCAP200	DC-bus end caps, 208 A	DC-bus power supply	2198-P031, 2198-P070 2198-P141, 2198-P208	
		Regenerative Bus Supply	2198-RP088, 2198-RP200 2198-RP263, 2198-RP312	

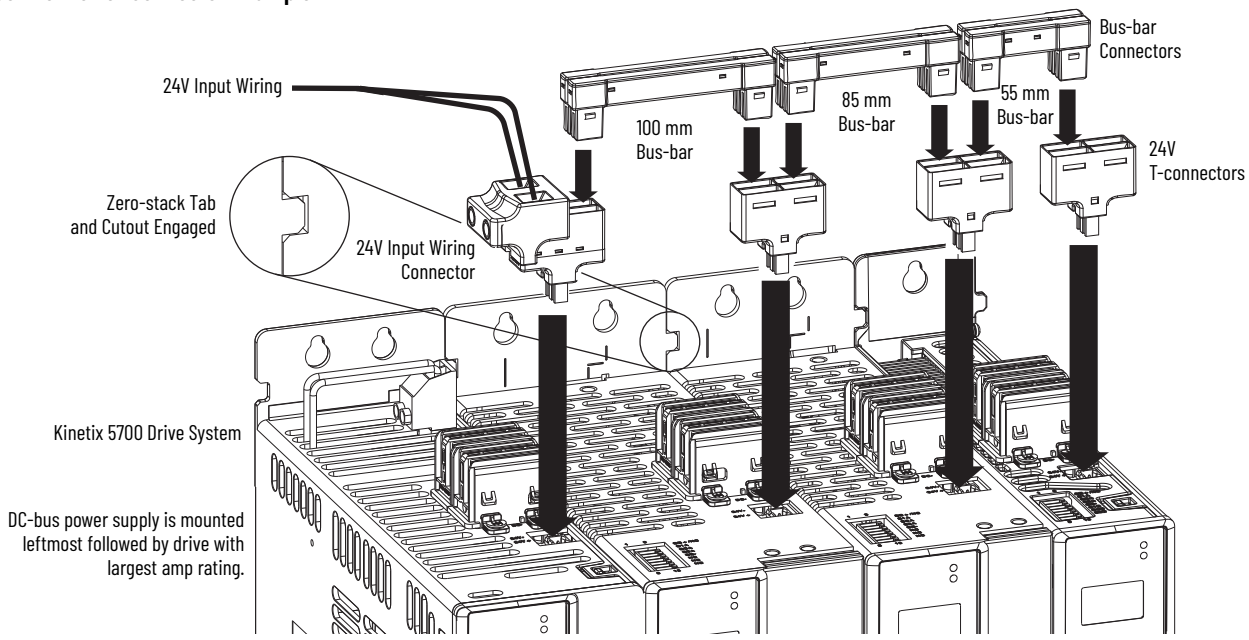
24V Shared-bus Connector Kits

24V shared-bus connector kits are used to extend 24V control power from module-to-module. The 24V control power connection system is optional and mounted onto modules working from left to right. 24V shared-bus systems always start with a 24V DC input wiring connector followed by T-connectors and bus-bars. A 24V DC connection system is comprised of these three components:

- The 24V input wiring connector that plugs into the DC-bus power supply or regenerative bus supply and receives input wiring for 24V DC (catalog numbers 2198-TCON-24VDCIN36 or 2198T-W25K-P-IN)
- 24V DC T-connector that plugs into a module downstream and to the right of the 24V input wire connector or previous T-connector.
- Bus bars that connect between a 24V input wiring connector and one or more T-connectors to extend the 24V control power from module to module.

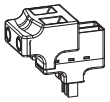
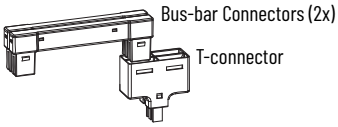
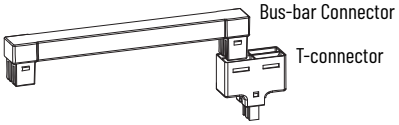
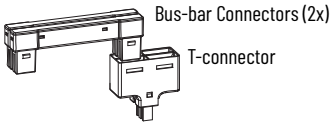
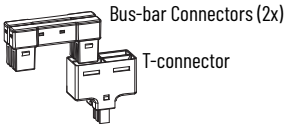
IMPORTANT The maximum current rating for the 24V input power connection system is 40 A. If needed, you can insert another 2198-TCON-24VDCIN36 or 2198T-W25K-P-IN control power input wiring connector at any point in the drive cluster.

Control Power Connector Example



IMPORTANT The input wiring connector can be inserted into any drive module (mid-stream in the drive system) to begin a new 24V control bus when the maximum current value is reached. However, the input connector must always extend the 24V DC-bus from left to right.

24V Shared-bus Connector Kit Catalog Numbers

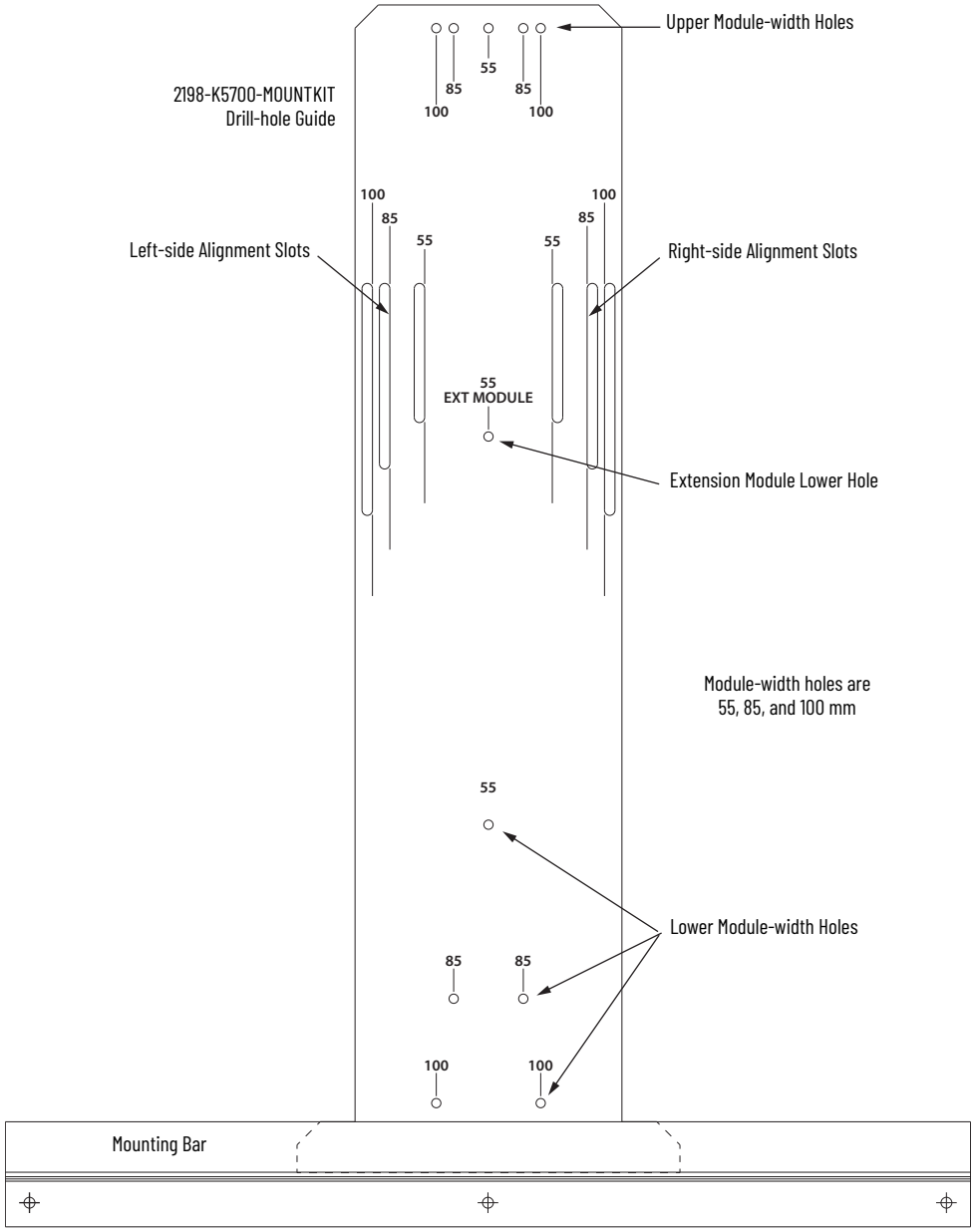
Kit Cat. No.	Description	Module Type	Module Cat. No.	Illustration
2198-TCON-24VDCIN36	Control power input wiring connector	Regenerative bus supplies DC-bus power supplies Dual-axis inverters Single-axis inverters Capacitor module DC-bus conditioner module	2198-RP088, 2198-RP200 2198-P*xxx* 2198-D*xxx*-ERS*x* 2198-S086-ERS*x* 2198-S130-ERS*x* 2198-S160-ERS*x* 2198-CAPMOD-2240 2198-DCBUSCOND-RP312	 Control Power Input Connector
2198T-W25K-P-IN		iTRAK power supply	2198T-W25K-ER	
		Regenerative bus supplies	2198-RP263 2198-RP312	
		Single axis inverter	2198-S263-ERS*x* 2198-S312-ERS*x*	
2198T-W25K-P-T	Control power T-connector Bus-bar connectors, 100 mm, quantity 2	iTRAK power supply	2198T-W25K-ER	 Bus-bar Connectors (2x) T-connector
2198-S160-P-T		Single axis inverter	2198-S160-ERS*x*	
2198-S312-P-T	Control power T-connector Bus-bar connector, 220 mm, quantity 1	Single axis inverter	2198-S263-ERS*x* 2198-S312-ERS*x*	 Bus-bar Connector T-connector
2198-H070-P-T	Control power T-connector Bus-bar connectors, 85 mm, quantity 2	DC-bus power supplies	2198-P141 2198-P208	 Bus-bar Connectors (2x) T-connector
		Dual axis inverter	2198-D057-ERS*x*	
		Single axis inverters	2198-S086-ERS*x* 2198-S130-ERS*x*	
2198-H040-P-T	Control power T-connector Bus-bar connectors, 55 mm, quantity 2	DC-bus power supplies	2198-P031 2198-P070	 Bus-bar Connectors (2x) T-connector
		Dual axis inverters	2198-D006-ERS*x* 2198-D012-ERS*x* 2198-D020-ERS*x* 2198-D032-ERS*x*	
		Capacitor module DC-bus conditioner module	2198-CAPMOD-2240 2198-DCBUSCOND-RP312	

System Mounting Toolkit

The 2198-K5700-MOUNTKIT system mounting toolkit is used to locate the drill-holes for your Kinetix 5700 drive system. Properly spaced drill-holes are essential for engaging the zero-stack tab and cutout from module-to-module so that the DC-bus connectors are spaced properly and accept the DC-bus links. The Kinetix 5700 system mounting toolkit includes the drill-hole guide and mounting bar. Two M4 thread-forming fasteners are also included.

The mounting bar is mounted horizontally on the system panel. The drill-hole guide inserts behind the mounting bar and slides left and right. Holes and slots in the drill-hole guide let you establish the location of each Kinetix 5700 drive module.

Kinetix 5700 System Mounting Toolkit



Universal Feedback Connector Kit

The 2198-K57CK-D15M universal feedback kit passes feedback signals straight through from the encoder to the universal feedback (UFB) connector on the drive. The following encoder feedback types are accepted:

- Hiperface high-resolution absolute (multi-turn and single-turn)
- Heidenhain EnDat high-resolution absolute (digital)
  - EnDat sine/cosine encoders support only Kinetix RDB direct-drive motors
  - EnDat digital encoders support only third-party motors
- Digital AqB (TTL) and Digital AqB (TTL) with UVW (incremental)
- Sine/Cosine and Sine/Cosine with UVW (incremental)
- Feedback-only, master feedback, or load feedback (absolute single-turn/multi-turn Hiperface)
- Feedback-only, master feedback, or load feedback (incremental)
- Feedback-only, master feedback, or load feedback (generic sine/cosine)

Use the universal feedback connector kit in the following types of installations:

- New installations with Kinetix 5700 servo drives and the compatible motors and actuators
- Existing motor/actuator installations when upgrading with Kinetix 5700 servo drives

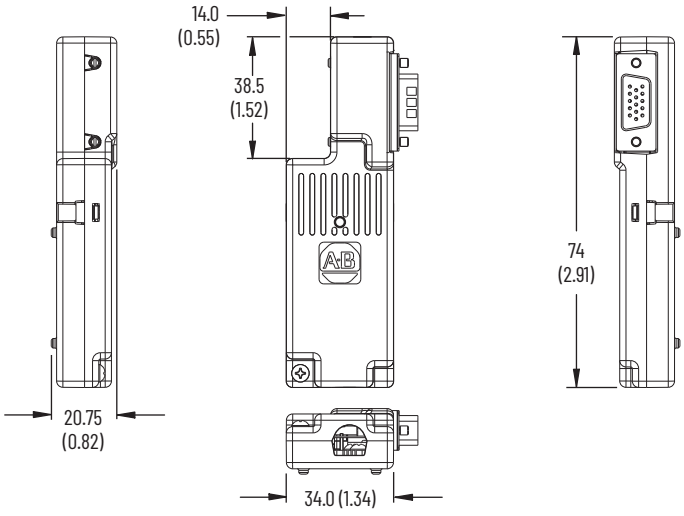
Compatible Allen-Bradley Motors and Actuators

Rotary Motors	Linear Actuators	2090-Series Feedback Cables (1)
Kinetix VPC continuous-duty motors (VPC-B*xxxxx*-S, VPC-B*xxxxx*-M, and VPC-B*xxxxx*-Y)	LDAT-Series integrated linear thrusters (2)	2090-CFBM7DF-CEAA*xx* (standard, non-flex) 2090-CFBM7DF-CEAF*xx* (continuous-flex) 2090-XXNFMF-S*xx* (standard, non-flex) 2090-CFBM7DF-CDAF*xx* (continuous-flex)
Kinetix MPL low-inertia motors		
Kinetix MPM medium-inertia motors	Kinetix MPAS integrated linear stages (3)	
Kinetix MPF food-grade motors	Kinetix MPMA multi-axis linear stages (3)	
Kinetix MPS stainless-steel motors	Kinetix MPAR electric cylinders	
Kinetix HPK asynchronous servo motors	Kinetix MPAI heavy-duty electric cylinders	
Kinetix RDB direct-drive motors	LDC-Series™ iron-core linear motors	

(1) These are typical feedback cables. Refer to the Kinetix 5700 Servo Drives Design Guide, publication KNX-RM010, for the cables required for specific drive and motor/actuator combinations.
(2) LDAT-Series linear thrusters with absolute high-resolution encoders and incremental encoders are compatible.
(3) Kinetix MPAS and MPMA (ballscrew) linear stages and direct-drive linear stages are compatible.

Universal Feedback Connector Kit Dimensions

Dimensions are in mm (in.).



Hiperface-to-DSL Feedback Converter Kit

The 2198-H2DCK Hiperface-to-DSL feedback kit (series B or later) converts 15-pin Hiperface encoder feedback signals to 2-pin DSL feedback signals on the motor feedback (MF) connector. The following feedback types are accepted:

- Hiperface high-resolution absolute multi-turn and single-turn encoders
- Feedback-only, master feedback, or load feedback (absolute single-turn/multi-turn Hiperface)

Use the converter kit for Hiperface auxiliary-encoder feedback in applications that require dual-loop or load feedback when the 15-pin universal feedback (UFB) connector is already in use for a different compatible feedback type.

Compatible Allen-Bradley Motors and Actuators

Rotary Motors	Linear Actuators	2090-Series Feedback Cables (1)
Kinetix VPC continuous-duty motors (VPC-B*xxxxx*-S, VPC-B*xxxxx*-M, and VPC-B*xxxxx*-Y)	LDAT-Series integrated linear thrusters (2)	2090-CFBM7DF-CEAA*xx* (standard, non-flex) 2090-CFBM7DF-CEAF*xx* (continuous-flex) 2090-XXNFMF-S*xx* (standard, non-flex) 2090-CFBM7DF-CDAF*xx* (continuous-flex)
Kinetix MPL low-inertia motors		
Kinetix MPM medium-inertia motors	Kinetix MPAS integrated linear stages (ballscrew) (3)	
Kinetix MPF food-grade motors	Kinetix MPMA multi-axis linear stages (ballscrew0 (3)	
Kinetix MPS stainless-steel motors	Kinetix MPAR electric cylinders	
Kinetix HPK asynchronous servo motors	Kinetix MPAI heavy-duty electric cylinders	

(1) These are typical feedback cables. Refer to the Kinetix 5700 Servo Drives Design Guide, publication KNX-RM010, for the cables required for specific drive and motor/actuator combination.
(2) LDAT-Series linear thrusters with absolute high-resolution encoders are compatible. Linear stages with incremental encoders are not compatible.
(3) Kinetix MPAS and MPMA (ballscrew) linear stages are compatible. Direct-drive linear stages are not compatible.

The 2198-H2DCK feedback converter kit can be used to convert Hiperface feedback signals from the motor encoder to DSL feedback signals that are accepted by the motor feedback (MF) connector. Compatible Allen-Bradley rotary motors and linear actuators must have high-resolution absolute encoders. Cable length restrictions also exist, refer to Maximum Cable Lengths on page 19 for more information.

For product dimensions, refer to Hiperface-to-DSL Feedback Converter Kit on page 67.

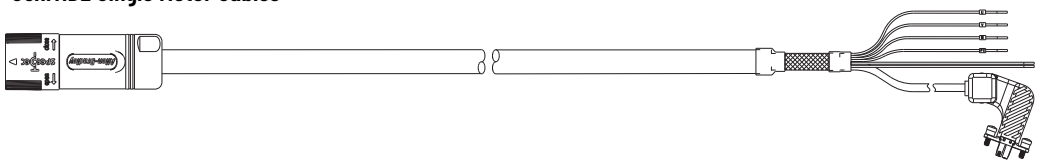
Replacement Parts and Connector Kits - Kinetix 5700 Servo Drives

Replacement parts and kits available for Kinetix 5700 servo drives include the DSL feedback connector kit, power-sharing bus-bars, power connector sets, and fan kits.

DSL Feedback Connector Kit

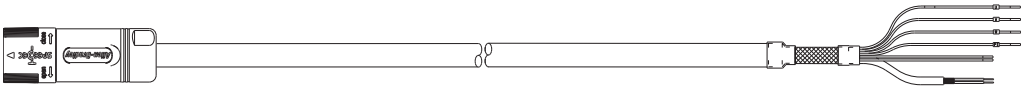
The 2198-KITCON-DSL feedback connector kit is required for making feedback connections from Kinetix VP motors and actuators, and is included with each 2090-CSxM1DE cable. Motor power, brake, and the 2-wire feedback connections are made by using a single 2090-CSxM1DE cable. Refer to the Kinetix Motion Accessories Specifications Technical Data, publication KNX-TD004, for cable specifications.

2090-CSxM1DE Single Motor Cables



Motor power, brake, and the 2-wire feedback connections can also be made by using a single 2090-CSxM1DG cable, however, the 2198-KITCON-DSL feedback connector kit is not included and must be ordered separately. Refer to the Kinetix Motion Accessories Specifications Technical Data, publication KNX-TD004, for cable specifications.

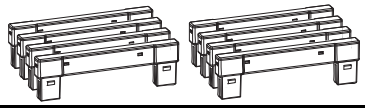
2090-CSxM1DG Single Motor Cables



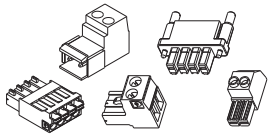
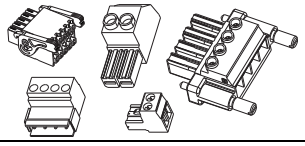
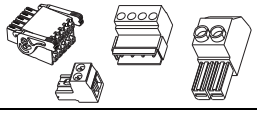
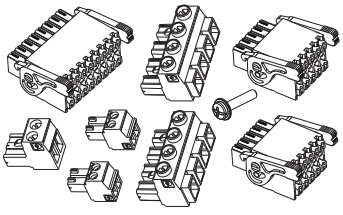
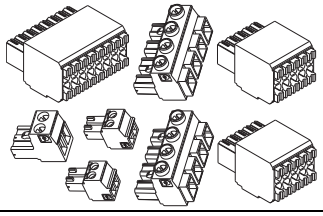
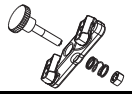
Order the 2198-KITCON-DSL feedback connector kit separately.

Power Sharing Bus-bars and Connector Sets

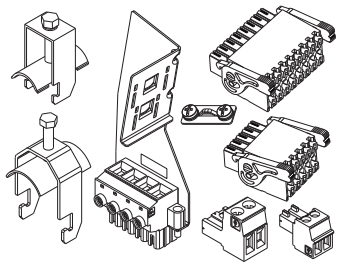
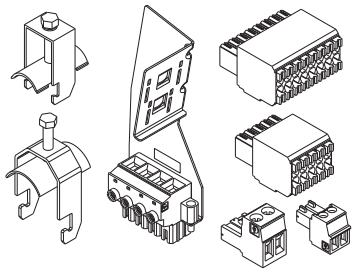
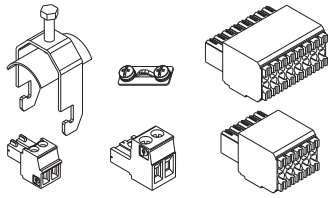
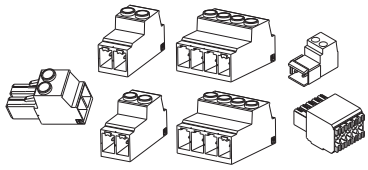
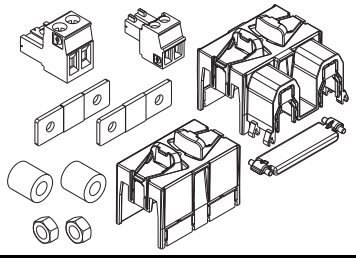
Replacement Power Sharing Bus-bars

Replacement Kit Cat. No.	Description	Module Type	Module Cat. No.	Illustration
2198-BARCON-55DCAC100	Bus-bar connectors, 55 mm, quantity 8	DC-bus power supplies	2198-P031, 2198-P070	
		Dual-axis inverters	2198-D006-ERS*x* 2198-D020-ERS*x* 2198-D012-ERS*x* 2198-D032-ERS*x*	
		Capacitor module	2198-CAPMOD-2240	
		DC-bus conditioner module	2198-DCBUSCOND-RP312	
2198-BARCON-85DCAC100	Bus-bar connectors, 85 mm, quantity 8	DC-bus power supplies	2198-P141, 2198-P208	
		Dual-axis inverters	2198-D057-ERS*x*	
		Single-axis inverters	2198-S086-ERS*x*, 2198-S130-ERS*x*	
2198-BARCON-100DC100	Bus-bar connectors, 100 mm, quantity 8	Single-axis inverters	2198-S160-ERS*x*	
		iTRAK power supply	2198T-W25K-ER	

Replacement Connector Sets

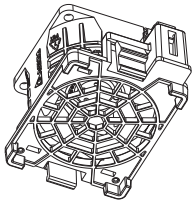
Replacement Kit Cat. No.	Description	Module Type	Module Cat. No.	Illustration
2198-KITCON-P070	• One AC input power (IPD) connector • One 24V input power (CP) connector • One contactor enable (CED) connector • One passive shunt (RC) connector • One I/O (IOD) connector	DC-bus power supplies	2198-P031 2198-P070	
2198-KITCON-P208			2198-P141 2198-P208	
2198-KITCON-RP088	• One AC input power (IPD) connector • One 24V input power (CP) connector • One contactor enable (CED) connector • One active shunt (RC) connector • One I/O (IOD) connector	Regenerative bus supplies	2198-RP088	
2198-KITCON-RP200			2198-RP200	
2198-KITCON-RP312	• One 24V input power (CP) connector • One contactor enable (CED) connector • One active shunt (RC) connector • One I/O (IOD) connector		2198-RP263 2198-RP312	
2198-KITCON-D032-L	• One 24V input power (CP) connector • Two motor power (MP) connectors • Two motor brake (BC) connectors • Two I/O (IOD) connectors • One Safe Torque Off (STO) connector • One ground screw IOD and STO connector plugs are compatible with 2198-D*xxx*-ERS4 drives and 2198-D*xxx*-ERS3 (series B) drives.	Dual-axis inverters	2198-D006-ERS*x* 2198-D012-ERS*x* 2198-D020-ERS*x* 2198-D032-ERS*x*	
2198-KITCON-D057-L			2198-D057-ERS*x*	
2198-KITCON-D032	• One 24V input power (CP) connector • Two motor power (MP) connectors • Two motor brake (BC) connectors • Two I/O (IOD) connectors • One Safe Torque Off (STO) connector IOD and STO connector plugs are compatible with 2198-D*xxx*-ERS3 (series A) drives.	Dual-axis inverters	2198-D006-ERS3 2198-D012-ERS3 2198-D020-ERS3 2198-D032-ERS3 (series A drives)	
2198-KITCON-D057			2198-D057-ERS3 (series A drives)	
2198-5700-CLAMPSPACER	Two clamp spacers	Dual-axis inverters	2198-D*xxx*-ERS*x*	
2198-K5700-DACLAMPKIT	One cable clamp	Dual-axis inverters	2198-D*xxx*-ERS*x*	

Replacement Connector Sets (continued)

Replacement Kit Cat. No.	Description	Module Type	Module Cat. No.	Illustration
2198-KITCON-S160-L	• One 24V input power (CP) connector • One motor power (MP) connector and clamp bracket • Two motor cable clamps • One motor brake (BC) connector • One I/O (IOD) connector • One Safe Torque Off (STO) connector • One ground jumper IOD and STO connector plugs are compatible with 2198-S*xxx*-ERS4 drives and 2198-S*xxx*-ERS3 (series B) drives.	Single-axis inverters	2198-S086-ERS*x* 2198-S130-ERS*x* 2198-S160-ERS*x*	
2198-KITCON-S160	• One 24V input power (CP) connector • One motor power (MP) connector and clamp bracket • Two motor cable clamps • One motor brake (BC) connector • One I/O (IOD) connector • One Safe Torque Off (STO) connector IOD and STO connector plugs are compatible with 2198-S*xxx*-ERS3 (series A) drives.	Single-axis inverters	2198-S086-ERS3 2198-S130-ERS3 2198-S160-ERS3 (series A drives)	
2198-KITCON-S312-L	• One 24V input power (CP) connector • One motor cable clamp • One motor brake (BC) connector • One I/O (IOD) connector • One Safe Torque Off (STO) connector • One ground jumper IOD and STO connector plugs are compatible with 2198-S*xxx*-ERS4 drives and 2198-S*xxx*-ERS3 (series B) drives.	Single-axis inverters	2198-S263-ERS*x* 2198-S312-ERS*x*	
2198T-W25K-KITCON	• One 24V input power (CP) connector • Two DC-bus output (IDC) connectors • Two control output (ICP) connectors • One I/O (IOD) connector • One iTRAK PS ready (IR) connector	iTRAK power supply	2198T-W25K-ER	
2198-KITCON-CAPMOD2240	• One stud/lug cover with wires • One stud cover without wires • One bottom plate • One 24V input power (CP) connector • One module status (MS) connector • Two flexible bus-bars • Two lug spacers • Two M8 hex nuts	Capacitor module	2198-CAPMOD-2240	
		Extension module	2198-CAPMOD-DCBUS-IO	
2198-KITCON-DCBUSCOND		DC-bus conditioner module	2198-DCBUSCOND-RP312	

Fan Kits

Replacement Fan Kits

Replacement Kit Cat. No.	Description	Module Type	Module Cat. No.	Illustration
2198-SK1-FAN060	Replacement fan and carrier assembly	Regenerative bus supply	2198-RP088	
2198-SK1-FAN092	Replacement fan and carrier assembly	Regenerative bus supplies	2198-RP200 2198-RP263 2198-RP312	
		Single-axis inverters	2198-S263-ERS*x* 2198-S312-ERS*x*	

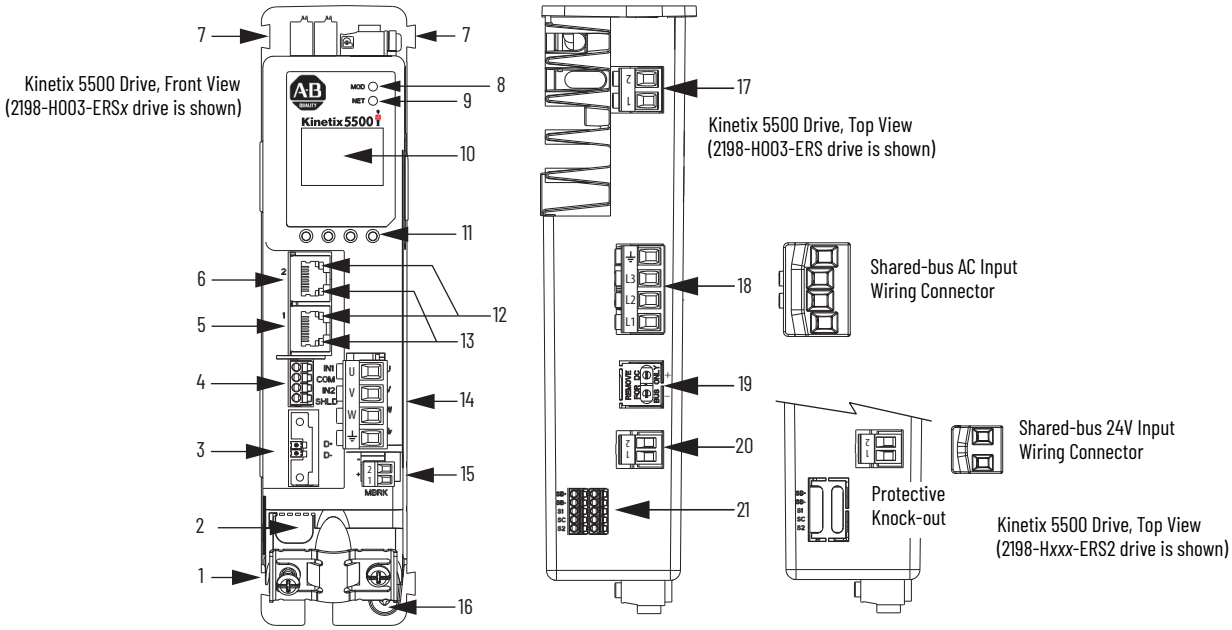
Kinetix 5500 Servo Drives



The Kinetix 5500 servo drives and Kinetix VP servo motors provide a cost-effective motion solution that delivers high performance and scalability with motor windings matched to drive ratings for optimized system sizing.

Enhancing the current midrange architecture portfolio, this motion system is designed to connect and operate with the ControlLogix, GuardLogix, and CompactLogix controllers by using the Studio 5000 Logix Designer® application and supporting integrated motion and safety on the EtherNet/IP network. With the benefits of this motion system, you can now run motion applications on a single control platform by using a single network, simplifying the design, operation, and maintenance of equipment.

Kinetix 5500 Drive Features and Indicators



Item	Description
1	Motor cable shield clamp
2	Converter kit mounting hole (1) (under cover)
3	Motor feedback (MF) connector
4	Digital inputs (IOD) connector
5	Ethernet (PORT1) RJ45 connector
6	Ethernet (PORT2) RJ45 connector
7	Zero-stack mounting tab/cutout

Item	Description
8	Module status indicator
9	Network status indicator
10	LCD display
11	Navigation pushbuttons
12	Link speed status indicators
13	Link/Activity status indicators
14	Motor power (MP) connector

Item	Description
15	Motor brake (BC) connector
16	Ground terminal
17	Shunt resistor (RC) connector
18	AC mains input power (IPD) connector
19	DC bus (DC) connector (under cover) (2)
20	24V control input power (CP) connector
21	Safe Torque Off (STO) connector (3) (does not apply to 2198-Hxxx-ERS2 drives)

(1) Protective knock-out covers the 2198-H2DCK Hiperface-to-DSL feedback converter kit mounting hole. Remove knock-out for use with the converter kit.
(2) DC-bus connector ships with protective knock-out cover that can be removed for use in shared-bus configurations.
(3) Protective knock-out cover is removed on 2198-Hxxx-ERS (hardwired STO) drives.

Technical Specifications - Kinetix 5500 Servo Drives

Kinetix 5500 Input Power Specifications

Attribute		2198-H003-ERS 2198-H003-ERS2	2198-H008-ERS 2198-H008-ERS2	2198-H015-ERS 2198-H015-ERS2	2198-H025-ERS 2198-H025-ERS2	2198-H040-ERS 2198-H040-ERS2	2198-H070-ERS 2198-H070-ERS2
AC input voltage		195...264V rms, single-phase (240V nom) 195...264V rms, three-phase (240V nom) 324...528V rms, three-phase (480V nom)			195...264V rms, three-phase (240V nom) 324...528V rms, three-phase (480V nom)		
AC input frequency		47...63 Hz					
Main AC input current [1] 324...528V rms, three-phase 195...264V rms, single-phase		 1.0 A 0.7 A	 2.60 A 1.70 A	 5.20 A 3.40 A	 8.30 A N/A	 13.4 A N/A	 23.7 A N/A
Max inrush (0-pk)		15.0 A			30.0 A		60.0 A
Peak AC input current 324...528V rms, three-phase 195...264V rms, single-phase		 3.0 A 2.1 A	 7.8 A 5.1 A	 15.6 A 10.2 A	 24.9 A N/A	 40.2 A N/A	 71.1 A N/A
Line loss ride through		20 ms					
Control power DC input voltage		24V DC ±10%					
Control power DC input current [1] [2] (non-brake motors)		0.4 A_{DC}		0.8 A_{DC}			1.3 A_{DC}
Nominal bus output voltage		276...747V DC					
Continuous output current to bus 195...264V rms, single-phase 324...528V rms, three-phase		 0.67 A_{DC} 1.0 A_{DC}	 1.60 A_{DC} 2.40 A_{DC}	 3.27 A_{DC} 4.90 A_{DC}	 N/A 7.80 A_{DC}	 N/A 12.7 A_{DC}	 N/A 22.50 A_{DC}
Peak output current to bus [3] 195...264V rms, single-phase 324...528V rms, three-phase		 2.0 A_{DC} 3.0 A_{DC}	 4.8 A_{DC} 7.2 A_{DC}	 9.8 A_{DC} 14.7 A_{DC}	 N/A 23.4 A_{DC}	 N/A 38.1 A_{DC}	 N/A 67.5 A_{DC}
Continuous output power to bus Nom (230V rms, single-phase) Nom (230V rms, three-phase) Nom (480V rms, three-phase)		 0.2 kW 0.3 kW 0.6 kW	 0.5 kW 0.8 kW 1.6 kW	 1.0 kW 1.6 kW 3.2 kW	 N/A 2.5 kW 5.2 kW	 N/A 4.0 kW 8.4 kW	 N/A 7.2 kW 14.9 kW
Peak output power to bus Nom (230V rms, single-phase) Nom (230V rms, three-phase) Nom (480V rms, three-phase)		 0.6 kW 1.0 kW 1.9 kW	 1.6 kW 2.4 kW 4.9 kW	 3.2 kW 4.9 kW 9.7 kW	 N/A 7.8 kW 15.6 kW	 N/A 12.7 kW 25.3 kW	 N/A 22.4 kW 44.8 kW
DC input voltage (common bus follower)		276...747V DC					
DC input current (common bus follower)		1.0 A_{DC}	2.4 A_{DC}	4.9 A_{DC}	7.8 A_{DC}	12.7 A_{DC}	22.5 A_{DC}
Bus overvoltage	240V, nom AC input	440V DC					
	480V, nom AC input	810V DC					
Bus undervoltage	240V, nom AC input	138V DC					
	480V, nom AC input	275V DC					
Efficiency		97%					
Capacitive energy absorption		11.54 J		19.58 J	39.15 J	58.73 J	104.87 J
Short-circuit current rating		200,000 A (rms) symmetrical					

(1) All drives are limited to 1 power cycle per minute.
(2) For current values when motors include a holding brake and additional information, refer to Control Power Current Specifications on page 50.
(3) Peak output current duration equals 1.0 second.

Kinetix 5500 Output Power Specifications

Attribute	2198-H003-ERS 2198-H003-ERS2	2198-H008-ERS 2198-H008-ERS2	2198-H015-ERS 2198-H015-ERS2	2198-H025-ERS 2198-H025-ERS2	2198-H040-ERS 2198-H040-ERS2	2198-H070-ERS 2198-H070-ERS2
Bandwidth [1] Velocity loop, max Current loop	 300 Hz 1000 Hz					
PWM frequency	8 kHz	4 kHz				
Continuous output current (rms)	1.0 A	2.5 A	5.0 A	8.0 A	13.0 A	23.0 A
Continuous output current (0-pk)	1.4 A	3.5 A	7.1 A	11.3 A	18.4 A	32.5 A
Peak output current (rms) [2]	2.5 A	6.25 A	12.5 A	20.0 A	32.5 A	57.5 A
Peak output current (0-pk) [2]	3.5 A	8.8 A	17.7 A	28.3 A	45.9A	81.3A
Continuous power out (nom) 195…264V rms, single-phase 195…264V rms, three-phase 324…528V rms, three-phase	 0.2 kW 0.3 kW 0.6 kW	 0.5 kW 0.8 kW 1.6 kW	 1.0 kW 1.5 KW 3.2 kW	 N/A 2.4 kW 5.1 kW	 N/A 4.0 kW 8.3 kW	 N/A 7.0 kW 14.6 kW
Internal shunt resistance	100 Ω		60 Ω			40 Ω
Internal shunt power	30 W		50 W			75 W
Shunt on	775V plus 30V x bus regulator capacity/utilization [3]					
Shunt off	765V plus 30V x bus regulator capacity/utilization [3]					

(1) Bandwidth values vary based on tuning parameters and mechanical components.
(2) Peak current duration (T_{PKmax}) equals 1.0 second.
(3) The shunt on and shunt off voltages increase during periods of shunting activity to promote sharing of shunt power in multi-axis configurations. Shunt utilization is equivalent to the BusRegulatorCapacity tag in the Logix Designer application.

Control Power Current Specifications

Kinetix 5500 servo drives and the Bulletin 2198 capacitor module have different 24V DC power consumption. Factors to consider when calculating the combined current demand from your 24V DC power supply include the following:

- Catalog number for each drive in the system
- Whether servo motors include the holding brake option
- Whether the system includes Bulletin 2198 capacitor modules (1 to 4 modules are possible)

Control Power Current Specifications

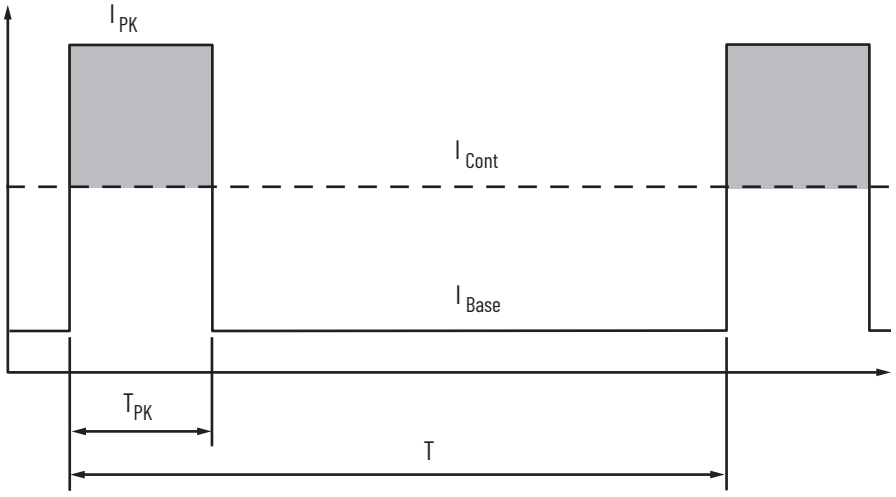
Drive Cat. No.	24V Current (non-brake motor) A_{DC}	24V Current (2 A brake motor) A_{DC}	24V Inrush Current [1] A
2198-H003-ERS*x*	0.4	2.4	2.0
2198-H008-ERS*x*			
2198-H015-ERS*x*	0.8	2.8	3.0
2198-H025-ERS*x*			
2198-H040-ERS*x*			
2198-H070-ERS*x*	1.3	3.3	
2198-CAPMOD-1300	0.3	N/A	2.0

(1) Inrush current duration is less than 30 ms.

Peak Current Specifications

Load Duty-cycle Profile Example

$$D = \frac{T_{PK}}{T} \times 100\%$$

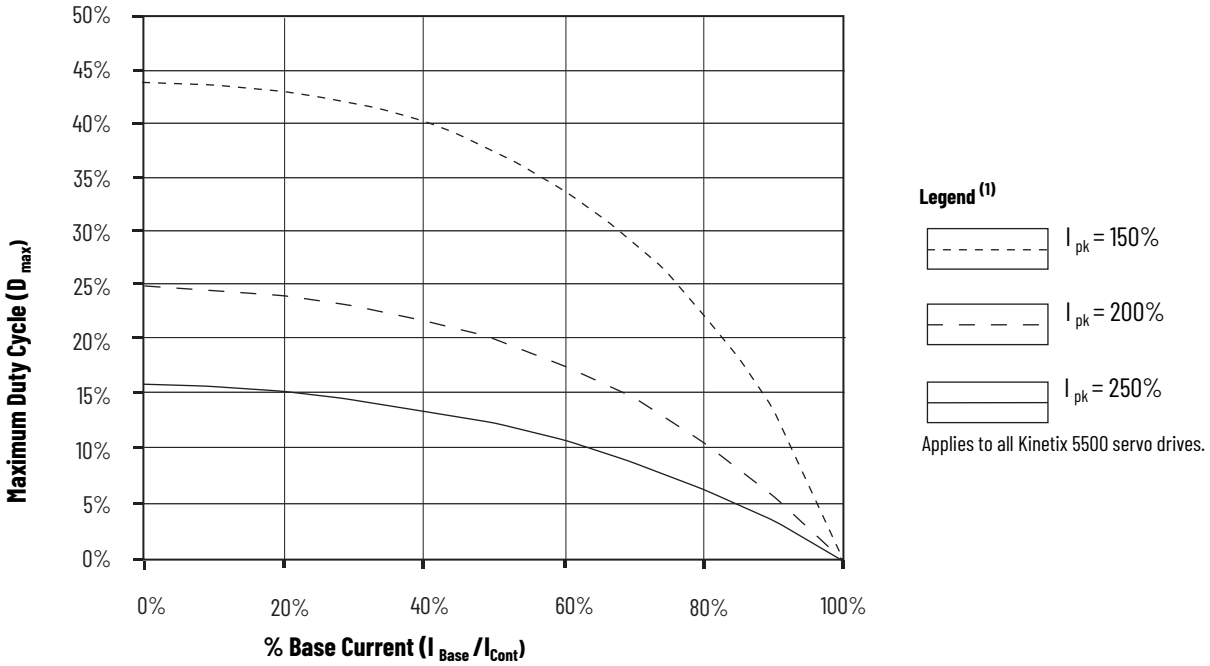


Peak Duty Cycle Definition of Terms

Term	Definition (1)
Continuous Current Rating (I_{Cont})	The maximum value of current that can be output continuously.
Peak Current Rating (I_{PKmax})	The maximum value of peak current that the drive can output. This rating is valid only for overload times less than T_{PKmax}.
Duty Cycle (D)	The ratio of time at peak to the Application Period is defined as: $D = \frac{T_{PK}}{T} \times 100\%$
Time at Peak (T_{PK})	The time at peak current (I_{PK}) for a given loading profile. Must be less than or equal to T_{PKmax}.
Peak Current (I_{PK})	The level of peak current for a given loading profile. I_{PK} must be less than or equal to the Peak Current Rating (T_{PKMAX}) of the drive.
Base Current (I_{Base})	The level of current between the pulses of peak current for a given loading profile. I_{Base} must be less than or equal to the continuous current rating (I_{Cont}) of the drive.
Loading Profile	The loading profile is composed of I_{PK}, I_{Base}, T_{PK}, and D (or T) values and completely specify the operation of the drive in an overload situation. These values are collectively defined as the Loading Profile of the drive.
Application Period (T)	The sum of the times at I_{PK} (T_{PK}) and I_{Base}.

(1) All current values are specified as RMS.

Peak Inverter Overload (T_{PK} < 1.0 s)



(1) Base current (I_{Base}) and peak current (I_{PK}) are a percentage of the continuous drive current rating (I_{Cont}).

Circuit Breaker/Fuse Specifications

The Kinetix 5500 drives use internal solid-state motor short-circuit protection and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 200,000 A (fuses) and 65,000 A (circuit breakers).

Standalone Drive Systems

Kinetix 5500 Drives			UL Applications		IEC (non-UL) Applications	
Drive Cat. No.	**Drive Voltage, nom**	**Phase**	**Bussmann Fuses Cat. No.**	**Molded Case CB Cat. No.**	**DIN gG Fuses** Amps (max)	**Molded Case CB Cat. No.**
2198-H003-ERSx	240V	Single-phase	KTK-R-2	140U-D6D2-B10	2	140U-D6D2-B10
	240/480V	Three-phase	KTK-R-3	140U-D6D3-B20	4	140U-D6D3-B20
2198-H008-ERSx	240V	Single-phase	KTK-R-5	140U-D6D2-B20	6	140U-D6D2-B20
	240/480V	Three-phase	KTK-R-7	140U-D6D3-B60	6	140U-D6D3-B60
2198-H015-ERSx	240V	Single-phase	KTK-R-10	140U-D6D2-B80	10	140U-D6D2-B80
	240/480V	Three-phase	KTK-R-15	140U-D6D3-C12	16	140U-D6D3-C12
2198-H025-ERSx	240/480V	Three-phase	KTK-R-20	140U-D6D3-C20	20	140U-D6D3-C20
2198-H040-ERSx	240/480V	Three-phase	KTK-R-25	140U-D6D3-C25	25	140U-D6D3-C25
2198-H070-ERSx	240/480V	Three-phase	LPJ-35SP	140G-G6C3-C40	35	140G-G6C3-C40

Shared DC (common-bus) Drive Systems

Kinetix 5500 Drives Cat. No.	Drive Voltage, (three-phase) nom	UL Applications		IEC (non-UL) Applications	
		Bussmann Fuses Cat. No.	**Molded Case CB Cat. No.**	**DIN gG Fuses** Amps (max)	**Molded Case CB Cat. No.**
2198-H003-ERSx	240/480V	KTK-R-10	140U-D6D3-C15	10	140U-D6D3-C15
2198-H008-ERSx	240/480V	KTK-R-10	140U-D6D3-C15	10	140U-D6D3-C15
2198-H015-ERSx	240/480V	KTK-R-15	140U-D6D3-C15	16	140U-D6D3-C15
2198-H025-ERSx	240/480V	KTK-R-20	140U-D6D3-C20	20	140U-D6D3-C20
2198-H040-ERSx	240/480V	KTK-R-25	140U-D6D3-C25	25	140U-D6D3-C25
2198-H070-ERSx	240/480V	LPJ-35SP	140G-G6C3-C40	35	140G-G6C3-C40

Shared AC Drive Systems

Input Power UL Circuit-protection Specifications

Kinetix 5500 Drives Cat. No.	Drive Voltage, (three-phase) nom	Bussmann Fuses Cat. No.				Molded Case CB Cat. No.			
		2 Axes	3 Axes	4 Axes	5 Axes	2 Axes	3 Axes	4 Axes	5 Axes
2198-H003-ERS*x*	240/480V	KTK-R-15				140U-D6D3-C15			
2198-H008-ERS*x*	240/480V	KTK-R-15				140U-D6D3-C15			
2198-H015-ERS*x*	240/480V	KTK-R-20	KTK-R-25	N/A		140U-D6D3-C15	140U-D6D3-C20	N/A	
2198-H025-ERS*x*	240/480V	KTK-R-30		N/A		140U-D6D3-C25	140U-D6D3-C30	N/A	
2198-H040-ERS*x*	240/480V	LPJ-35SP	LPJ-45SP	N/A		140G-G6C3-C40	140G-G6C3-C50	N/A	
2198-H070-ERS*x*	240/480V	LPJ-60SP	N/A			140G-G6C3-C60	N/A		

Input Power IEC (non-UL) Circuit-protection Specifications

Kinetix 5500 Drives Cat. No.	Drive Voltage, (three-phase) nom	DIN gG Fuses Amps (max)				Molded Case CB Cat. No.			
		2 Axes	3 Axes	4 Axes	5 Axes	2 Axes	3 Axes	4 Axes	5 Axes
2198-H003-ERS*x*	240/480V	16				140U-D6D3-C15			
2198-H008-ERS*x*	240/480V	16				140U-D6D3-C15			
2198-H015-ERS*x*	240/480V	20	25	N/A		140U-D6D3-C15	140U-D6D3-C20	N/A	
2198-H025-ERS*x*	240/480V	32		N/A		140U-D6D3-C25	140U-D6D3-C30	N/A	
2198-H040-ERS*x*	240/480V	35	50			140G-G6C3-C40	140G-G6C3-C50	N/A	
2198-H070-ERS*x*	240/480V	63	N/A			140G-G6C3-C60	N/A		

Shared AC/DC and Hybrid Systems

Input Power UL Circuit-protection Specifications

Kinetix 5500 Drives Cat. No.	Drive Voltage, (three-phase) nom	Bussmann Fuse Cat. No.							Molded Case CB Cat. No.						
		2 Axes	3 Axes	4 Axes	5 Axes	6 Axes	7 Axes	8 Axes	2 Axes	3 Axes	4 Axes	5 Axes	6 Axes	7 Axes	8 Axes
2198-H003-ERS*x*	240/480V	KTK-R-10					KTK-R-15		140U-D6D3-C15						
2198-H008-ERS*x*	240/480V	KTK-R-15				KTK-R-20			140U-D6D3-C15					140U-D6D3-C20	
2198-H015-ERS*x*	240/480V	KTK-R-20			N/A				140U-D6D3-C15	140U-D6D3-C20	N/A				
2198-H025-ERS*x*	240/480V	KTK-R-30			N/A				140U-D6D3-C20	140U-D6D3-C30	N/A				
2198-H040-ERS*x*	240/480V	KTK-R-30	LPJ-45SP	LPJ-50SP	N/A				140U-D6D3-C30	140G-G6C3-C50	N/A				
2198-H070-ERS*x*	240/480V	LPJ-50SP	N/A						140G-G6C3-C50	N/A					

Input Power IEC (non-UL) Circuit-protection Specifications

Kinetix 5500 Drives Cat. No.	Drive Voltage, (three-phase) nom	DIN gG Fuses Amps (max)							Molded Case CB Cat. No.						
		2 Axes	3 Axes	4 Axes	5 Axes	6 Axes	7 Axes	8 Axes	2 Axes	3 Axes	4 Axes	5 Axes	6 Axes	7 Axes	8 Axes
2198-H003-ERS*x*	240/480V	10					16		140U-D6D3-C15						
2198-H008-ERS*x*	240/480V	16				20			140U-D6D3-C15					140U-D6D3-C20	
2198-H015-ERS*x*	240/480V	20			N/A				140U-D6D3-C15	140U-D6D3-C20	N/A				
2198-H025-ERS*x*	240/480V	32			N/A				140U-D6D3-C20	140U-D6D3-C30	N/A				
2198-H040-ERS*x*	240/480V	32	50		N/A				140U-D6D3-C30	140G-G6C3-C50	N/A				
2198-H070-ERS*x*	240/480V	50	N/A						140G-G6C3-C50	N/A					

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 5500 drive system.

Kinetix 5500 Drive Cat. No.	Usage as % of Rated Power Output (watts)				
	20%	40%	60%	80%	100%
2198-H003-ERS*x* 2198-H008-ERS*x*	12	25	37	50	62
2198-H015-ERS*x* 2198-H025-ERS*x* 2198-H040-ERS*x*	40	80	120	160	200
2198-H070-ERS*x*	64	128	192	256	320

Weight Specifications

Kinetix 5500 Drive Cat. No.	Weight, approx kg (lb)
2198-H003-ERS*x*	1.4 (3.0)
2198-H008-ERS*x*	
2198-H015-ERS*x*	2.3 (5.0)
2198-H025-ERS*x*	
2198-H040-ERS*x*	
2198-H070-ERS*x*	4.1 (9.0)

Maximum Cable Lengths

The Kinetix 5500 drive maximum cable length depends on several factors, including the drive/motor combination and motor/cable combination (see Drive/Motor/Cable Considerations table below). The maximum cable length also depends on the AC input-power source used in the application, as shown on page 55. Use the shorter cable length specified between the two tables for your application.

Drive/Motor/Cable Considerations

Kinetix 5500 Servo Drive Cat. No.	Kinetix VP Servo Motors/Actuators m (ft)		Other Compatible Rotary Motors and Linear Actuators (1)
	Standard (non-flex) Cables Cat. No. 2090-CSxM1DF-*xx*AA*xx* Cat. No. 2090-CSxM1DG-*xxx*A*xx* Cat. No. 2090-CSxM1E1-*xx*VA*xx*	Continuous-flex Cables (2) Cat. No. 2090-CSxM1DF-*xx*AF*xx* Cat. No. 2090-CSxM1DG-*xxx*F*xx* Cat. No. 2090-CSxM1E1-*xxx*F*xx*	Bulletin 2090 Motor/Actuator Cables (3) Cat. No. 2090-C*xx*M7DF m (ft)
2198-H003-ERS*x* 2198-H008-ERS*x*	50 (164)	30 (98.4)	20 (65.6)
2198-H015-ERS*x* 2198-H025-ERS*x* 2198-H040-ERS*x*	50 (164)		
2198-H070-ERS*x*	50 (164)		

(1) Requires use of the 2198-H2DCK Hiperface-to-DSL feedback converter kit (series B or later).
(2) When using any continuous-flex cable (whether extension or flying-lead) in your application, the maximum cable length including any standard (non-flex) cable back to the drive, is 30 m (98.4 ft).
(3) The 20 m (65.6 ft) limitation is attributed to the 2090-CPxM7DF power/brake cable. In 2198-H2DCK converter kit applications, you can replace the 2090-CPxM7DF power/brake cable with a 2090-CSxM1DF or 2090-CSxM1DG single motor cable (and reuse the 2090-CFBM7DF feedback cable) to increase the maximum cable length to 50 m (164 ft). This applies to only 18 and 14 AWG single cables. 2090-CSBM1D*x*-10*xxxx* (10 AWG/M40 connector) single cables are not compatible with 2090-CPBM7DF-10A*xxx* (10 AWG/M40 connector) power/brake cables.

Refer to the Kinetix Motion Accessories Technical Data, publication KNX-TD004, for cable specifications.

Maximum cable length for the following input power configurations are dependent on these configuration variables:

- AC input power type
  - WYE grounded
  - WYE impedance grounded
  - WYE/Delta corner grounded or ungrounded
- AC input voltage
  - 240V AC
  - 400V AC
  - 480V AC

AC Input Power Considerations (400V-class motors and actuators)

AC Input Power Source Type	Compatible Motor and Actuator Cat. No.	Cable Length, max m (ft)	
		400V AC Input	480V AC Input
• WYE Grounded • WYE Impedance Grounded (1) • WYE Ungrounded (2) • Delta Ungrounded (2)	LDAT-S*xxxxxx*-x*Dx*	10 (32.8)	
	• VP*x*-B063*xx*, VP*x*-B075*xx* • VP*x*-B100*xx*...VP*x*-B165*xx* • VPAR-B1*xxxx*, VPAR-B2*xxxx* • MPAR-B3*xxxx* • VPAR-B3*xxxx* • MP*x*-B3*xxx*...MP*x*-B6*xxx* • MPM-B115*xx*...MPM-B215*xx*	50 (164)	
	• MPL-B15*xx*, MPL-B2*xx* • MPAR-B1*xxxx*, MPAR-B2*xxxx* • MPAS-B*xxxx*1, MPAS-B*xxxx*2 • MPAI-B*xxxxx*	50 (164)	20 (65.6)
Delta Corner Grounded	• VP*x*-B063*xx*, VP*x*-B075*xx* • MPL-B15*xx*, MPL-B2*xx* • MPAR-B1*xxxx*, MPAR-B2*xxxx* • VPAR-B1*xxxx*, VPAR-B2*xxxx* • MPAS-B*xxxx*1, MPAS-B*xxxx*2 • MPAI-B*xxxxx*	50 (164)	15 (49.2)
	• VP*x*-B100*xx*...VP*x*-B165*xx* • MPAR-B3*xxxx* • VPAR-B3*xxxx* • MP*x*-B3*xxx*...MP*x*-B6*xxx* • MPM-B115*xx*...MPM-B215*xx*	50 (164)	

(1) Impedance grounded systems running in ground fault conditions, for prolonged periods of time, cause additional stress to the motor insulation and can cause premature motor failure.
(2) Unbalanced, floating, ungrounded systems can cause additional stress to the motor.

AC Input Power Considerations (200V-class motors and actuators)

AC Input Power Source Type	Compatible Motor and Actuator Cat. No.	Cable Length, max m (ft)
		240V AC Input
Delta Corner Grounded	• VP*x*-A063*xx*, VP*x*-A075*xx* • VP*x*-A100*xx*...VP*x*-A165*xx* • MPL-A15*xx*, MPL-A2*xx* • MP*x*-A3*xxx*...MP*x*-A5*xxx* • MPM-A115*xx*...MPM-A215*xx* • MPAR-A1*xxxx*, MPAR-A2*xxxx*, MPAR-A3*xxxx* • VPAR-A1*xxxx*, VPAR-A2*xxxx*, VPAR-A3*xxxx* • MPAS-A*xxxx*1, MPAS-A*xxxx*2 • MPAI-A*xxxxx*	50 (164)

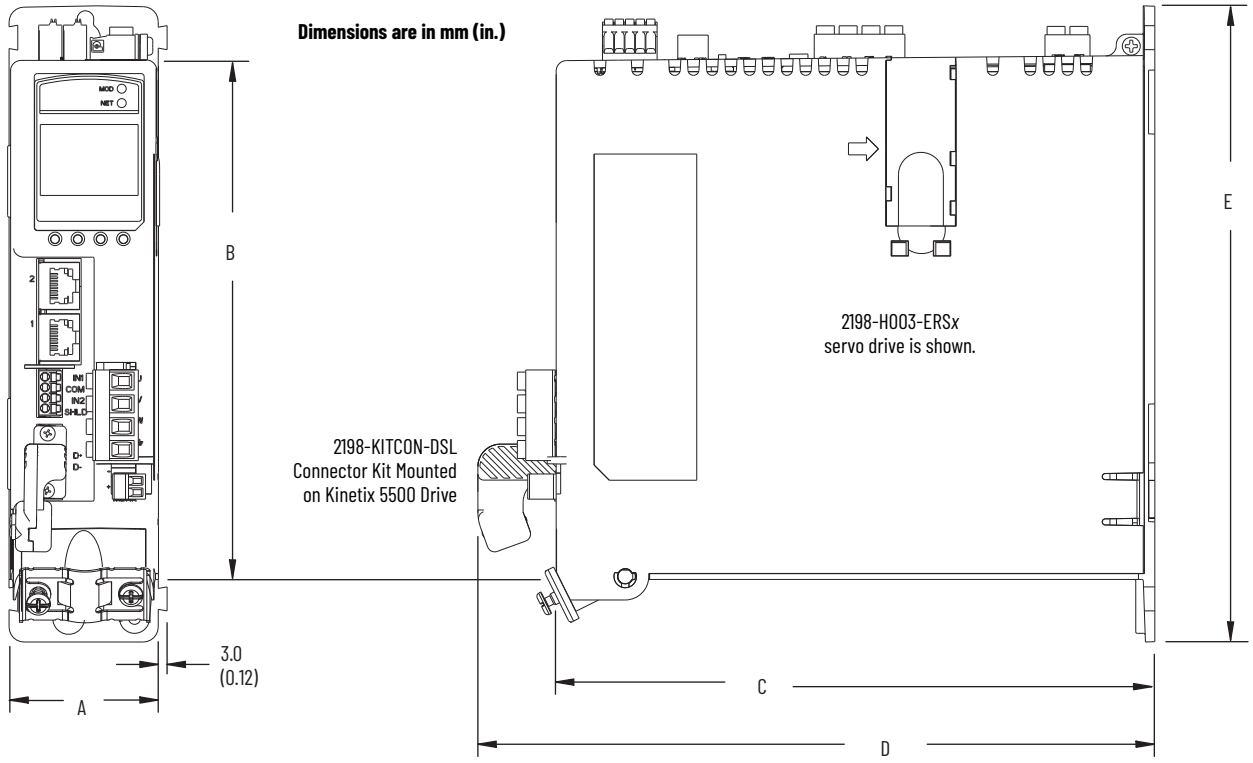
Combined power cable lengths for all axes on the same DC bus must not exceed 250 m (820 ft).

IMPORTANT System performance was tested at these cable lengths. These limitations also apply when meeting CE requirements.

Dimensions - Kinetix 5500 Servo Drives

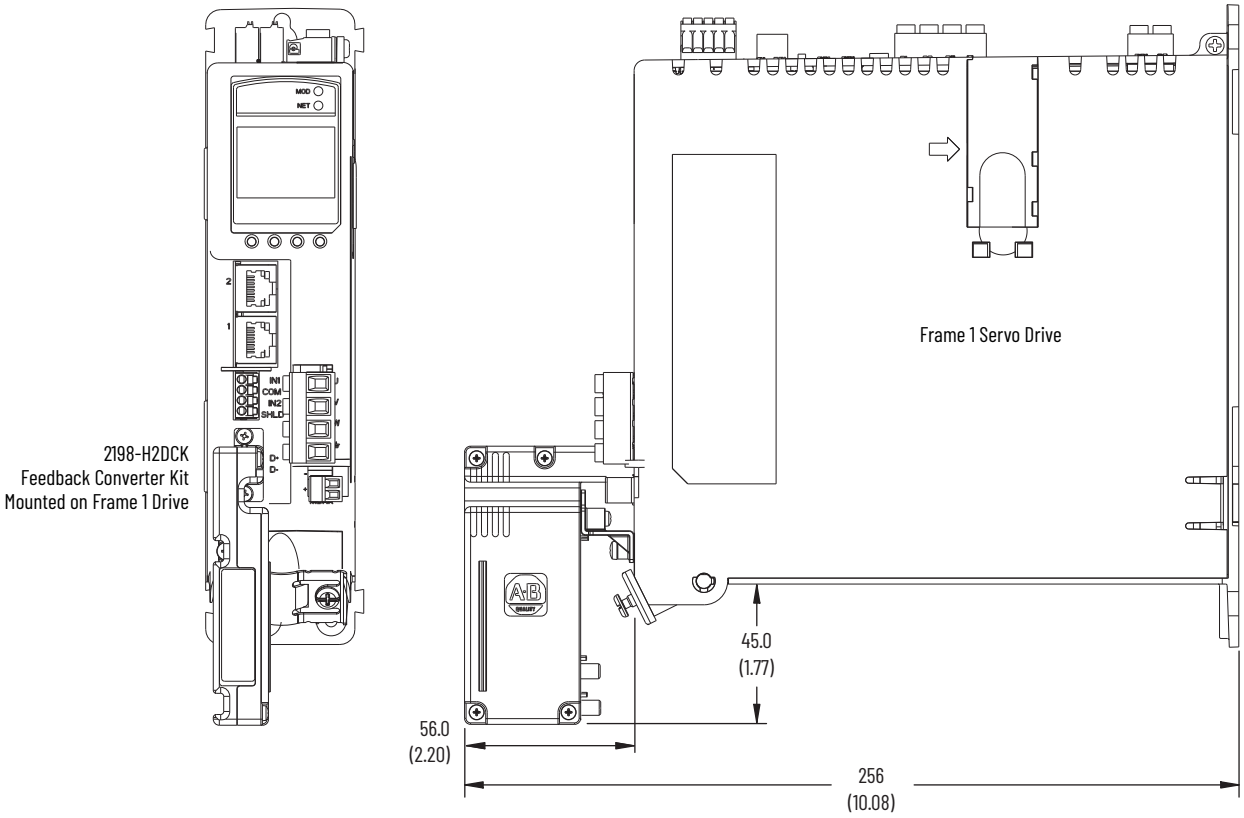
These drawings provide mounting dimensions for Kinetix 5500 servo drives. Also included are drawings showing the impact of compatible motor feedback connector kits on the mounting dimensions. Kinetix 5500 servo drives include the 2198-KITCON-DSL feedback connector kit for use with Kinetix VP motors. The 2198-H2DCK feedback converter kit, for Hiperface-to-DSL conversion, is used with LDAT-Series linear thrusters and Kinetix MP rotary motors and linear actuators. Refer to page 57 for dimensions when using the converter kit.

Kinetix 5500 Drives with 2198-KITCON-DSL Connector Kit

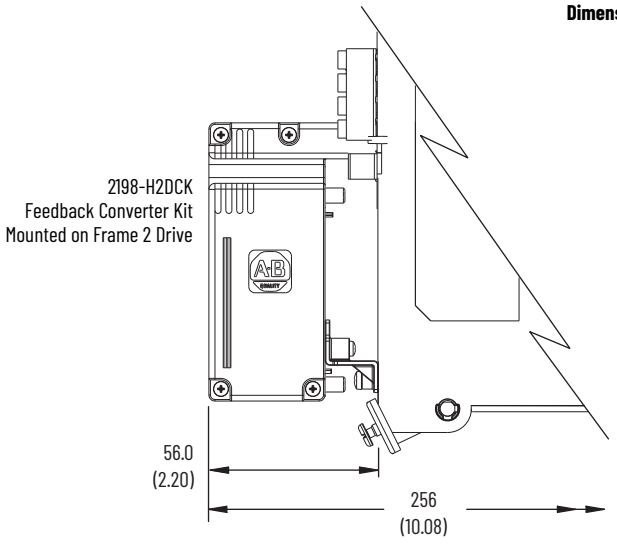


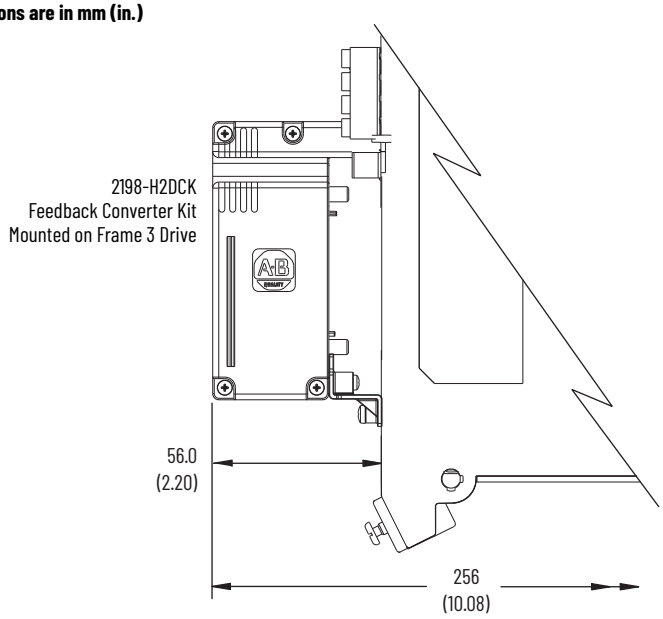
Kinetix 5500 Drive Cat. No.	Frame Size	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)
2198-H003-ERSx	Frame 1	50 (1.97)	175 (6.89)	200 (7.87)	226 (8.90)	215 (8.46)
2198-H008-ERSx						
2198-H015-ERSx	Frame 2	55 (2.16)	225 (8.86)			265 (10.43)
2198-H025-ERSx						
2198-H040-ERSx						
2198-H070-ERSx	Frame 3	85.2 (3.35)	250 (9.84)			294 (11.57)

Kinetix 5500 Drives with 2198-H2DCK Converter Kit



Dimensions are in mm (in.)





Refer to Hiperface-to-DSL Feedback Converter Kit on page 67 for motor/actuator compatibility and product dimensions.

Environmental Specifications - Kinetix 5500 Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Ambient temperature (with 2198-KITCON-DSL connector kit)	0...50 °C (32...122 °F)	-40...+70 °C (-40...+158 °F)
Ambient temperature (with 2198-H2DCK converter kit and the existing 2090-CPBM7DF motor power/brake cable and 2090-CFBM7DF motor feedback cable) (1)	0...40 °C (32...104 °F)	
Relative humidity	5...95% noncondensing	5...95% noncondensing
Protection class (IEC 60529)	IP20	
Degree of pollution (IEC 61800-5-1)	2	
Altitude	• 1000 m (3281 ft) derate 15% per 1000 m above 1000 m • 2000 m (6562 ft) max, with corner-grounded input power • 3000 m (9843 ft) max, with non corner-grounded input power	3000 m (9843 ft) during transport
Vibration	5...55 Hz @ 0.35 mm (0.014 in.) double amplitude, continuous displacement; 55...500 Hz @ 2.0 g peak constant acceleration	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

(1) When the 2198-H2DCK converter kit is used with the existing motor feedback cable (catalog number 2090-CFBM7DF) and single motor cable (catalog number 2090-CSBM1DF) for power and brake connections, derating the operational ambient temperature is not required.

Certifications - Kinetix 5500 Servo Drives

Agency Certification (1)	Standards
cULus (2)	UL Listed to U.S. and Canadian safety standards (UL 508C File E59272).
	Solid-state motor overload protection provides dynamic fold-back of motor current when 110% of the motor rating is reached with a peak current limit based on the peak rating of the motor as investigated by UL to comply with UL 508C (UL File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with IEC 61800-5-1:2007 - Adjustable speed electrical power drive systems.
Functional Safety	TÜV certified for functional safety when used as described in the Kinetix 5500 Servo Drives User Manual, publication 2198-UM001. • 2198-H*xxx*-ERS (hardwired safety) drive ratings: up to Performance Level (PL) d, Category 3 according to ISO 13849; up to SIL CL2 according to IEC 61508, IEC 61800-5-2, and IEC 62061. • 2198-H*xxx*-ERS2 (integrated safety) drive ratings: up to Performance Level (PL) e, Category 3 according to ISO 13849; up to SIL CL3 according to IEC 61508, IEC 61800-5-2, and IEC 62061.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 1, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2198
ODVA	EtherNet/IP conformance tested.
OSHA	Maximum audible noise from the servo drive system complies with OSHA standard 3074, Hearing Conservation (<85 dBA).

(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.
(2) UL has not evaluated the Safe Torque Off or the Safe Speed Monitor options in these products.

Accessories - Kinetix 5500 Servo Drives

Kinetix 5500 drive accessories include the Bulletin 2198 capacitor module, shunt resistors, the encoder output module, AC line filters, and the shared-bus connection system. Kinetix 5500 servo drives are also compatible with Bulletin 2097 external shunt resistors.

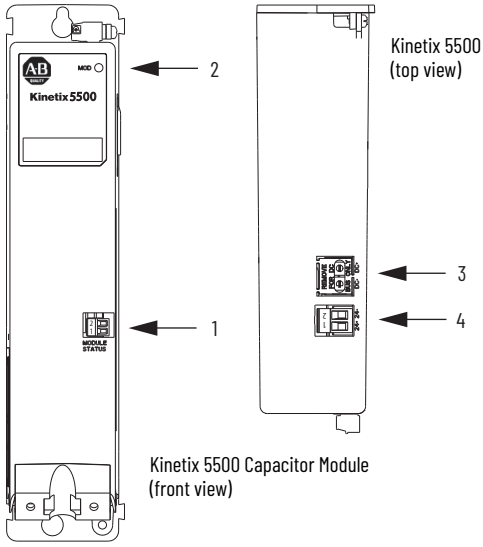
Capacitor Module

The Kinetix 5500 capacitor module provides 1360 µF capacitance for applications where the Kinetix 5500 internal shunt module capacity is exceeded. The capacitor module can be used alone or in combination with a Bulletin 2097 external shunt module for applications with excessive regenerative energy.

The Bulletin 2198-CAPMOD-1300 capacitor module is an option for Bulletin 2198 servo drive configurations with 200V or 400V-class operation. This section contains features, specifications, and product dimensions.

IMPORTANT Use the 2198-CAPMOD-1300 capacitor module in Kinetix 5500 drive configurations where DC-bus power is shared through the shared-bus connection system. You cannot use the capacitor module in configurations where only AC input power is shared.

Capacitor Module Features and Indicators



Item	Description
1	Module status (MS) connector
2	Module status indicator
3	DC bus (DC) connector (under cover) (1) (2)
4	24V control input power (CP) connector (2)

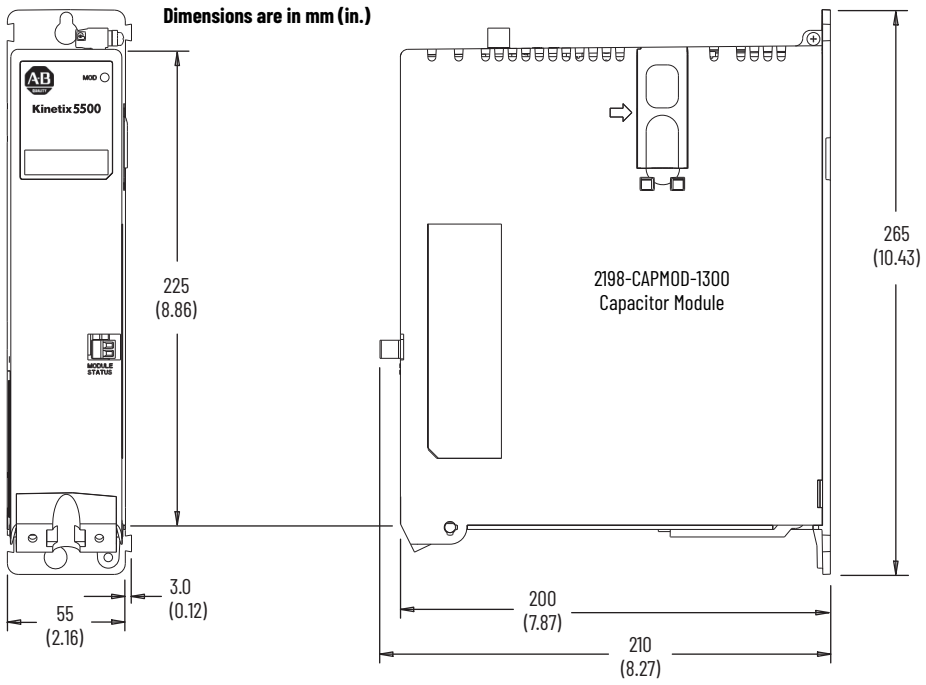
(1) DC bus connector ships with protective knock-out cover that can be removed for use in shared-bus configurations.
(2) The shared-bus kit for the capacitor module, catalog number 2198-KITCON-CAP1300, is included. Replacement kits are also available, refer to Power-sharing Bus-bars and Connector Sets on page 68.

Capacitor Module Support

Kinetix 5500 Drive Cat. No.	Frame Size	Standalone Single Phase Operation	Three-phase Operation			
			Standalone	Shared DC	Shared AC/DC	Shared AC/DC Hybrid
		Number of capacitor modules connected, max				
2198-H003-ERSx (1)	1	0	0			
2198-H008-ERSx (1)			1		2	
2198-H015-ERSx (1)	2				4	
2198-H025-ERSx		N/A	3			
2198-H040-ERSx						
2198-H070-ERSx	3		4			

(1) Catalog number 2198-H003-ERS and any drive in standalone single-phase operation is not compatible with the Kinetix 5500 capacitor module.

Capacitor Module Dimensions



Capacitor Module Specifications

Capacitor Module Cat. No.	Voltage Range V DC	Capacitance µF	Energy Storage J	Continuous Current A, 0-pk	Weight kg (lb)
2198-CAPMOD-1300	275...747	1360	446 (460V AC input) 132 (230V AC input)	26.0	2.3 (5.0)

Shunt Resistor

The Bulletin 2097 passive shunts are compatible with Kinetix 5500 servo drives. The shunt resistor wires directly to the drive. Refer to Shunt Resistor on page 163, for dimensions and additional specifications.

Shunt Resistor Power Specifications

Shunt Module Cat. No.	Resistance Ohms	Continuous Power W	Peak Power kW	Peak Current A	D_Application, max (1) %	Weight kg (lb)	Kinetix 5500 Drive Cat. No.
2097-R6	75	150	7.9	10.3	1.90	0.3 (0.7)	2198-H040-ERS*x* 2198-H070-ERS*x*
2097-R7	150	80	4.0	5.1	2.02	0.2 (0.4)	2198-H003-ERS*x* 2198-H008-ERS*x* 2198-H015-ERS*x* 2198-H025-ERS*x*

(1) D_Application is the application duty cycle in percent. For the intermittent regeneration applications, use D_Application = t/T, where t is the duration when regeneration is needed and T is the time interval between two regenerations. Both t and T must use the same time units, for example, seconds.

Encoder Output Module

The Allen-Bradley encoder output module (catalog number 2198-ABQE) is a DIN-rail mounted EtherNet/IP network-based standalone module capable of outputting encoder pulses to a customer-supplied peripheral device (cameras, for example, used in line-scan vision systems). The encoder output module supports real and virtual axes for systems using the integrated motion on EtherNet/IP network. For more information, refer to Encoder Output Module on page 32.

Kinetix 5500 AC Line Filters

The Kinetix 5500 drives were tested by using these recommended line filters and are required to meet CE requirements. These Bulletin 2198 AC line filters apply to Kinetix 5500 drives used in single-phase and three-phase operation.

Single Drive AC Line Filter Selection

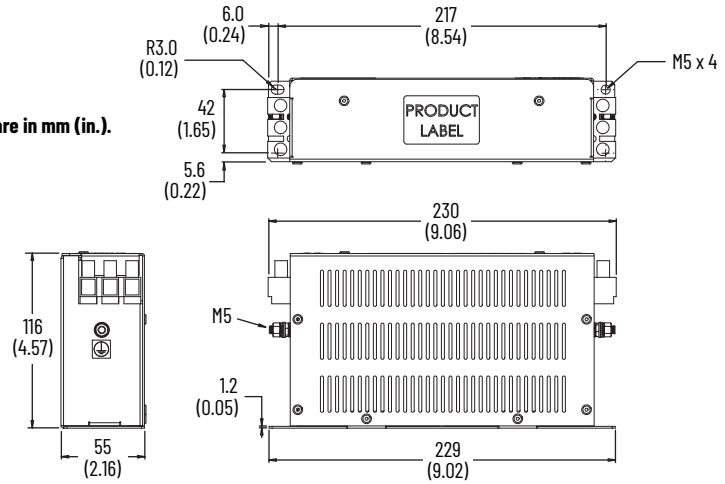
Kinetix Drive Module Cat. No.	AC Line Filter Cat. No.
2198-H003-ERS*x* 2198-H008-ERS*x* 2198-H015-ERS*x*	2198-DB08-F
2198-H025-ERS*x* 2198-H040-ERS*x*	• 2198-DBR20-F or • 2198-DB20-F
2198-H070-ERS*x*	• 2198-DBR40-F or • 2198-DB42-F

Multi-axis AC Line Filter Selection for Shared AC and Shared AC/DC and Hybrid Systems

Kinetix 5500 Drives Cat. No.	Drive Voltage, (three-phase) nom	AC Line Filter Cat. No.						
		2 Axes	3 Axes	4 Axes	5 Axes	6 Axes	7 Axes	8 Axes
2198-H003-ERS*x*	240/480V	2198-DBR20-F						
2198-H008-ERS*x*	240/480V	2198-DBR20-F						
2198-H015-ERS*x*	240/480V	2198-DBR20-F			–			
2198-H025-ERS*x*	240/480V	2198-DBR40-F			–			
2198-H040-ERS*x*	240/480V	2198-DBR40-F	2198-DBR90-F		–			
2198-H070-ERS*x*	240/480V	2198-DBR90-F	–					

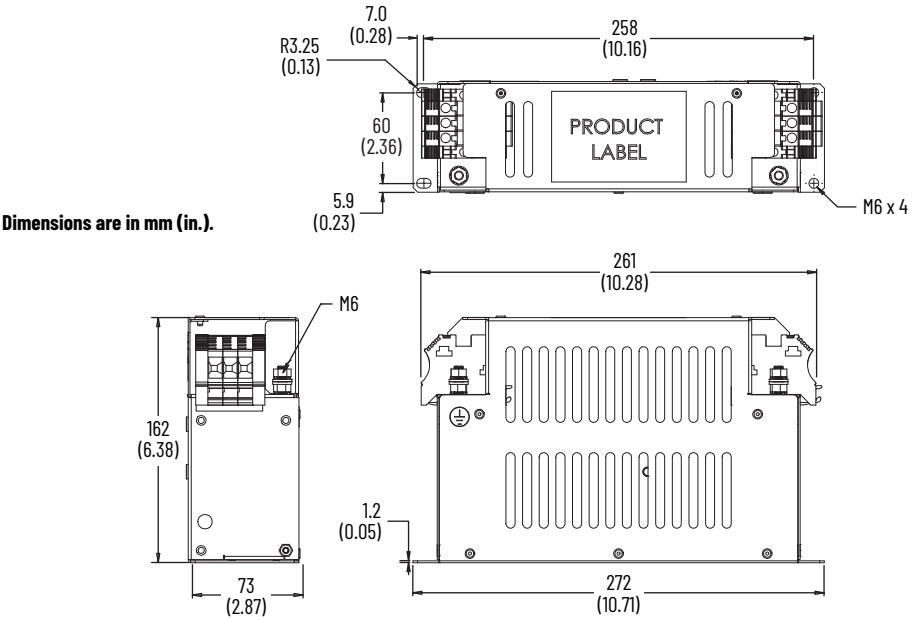
AC Line Filter Dimensions (catalog number 2198-DBR20-F)

Dimensions are in mm (in.).



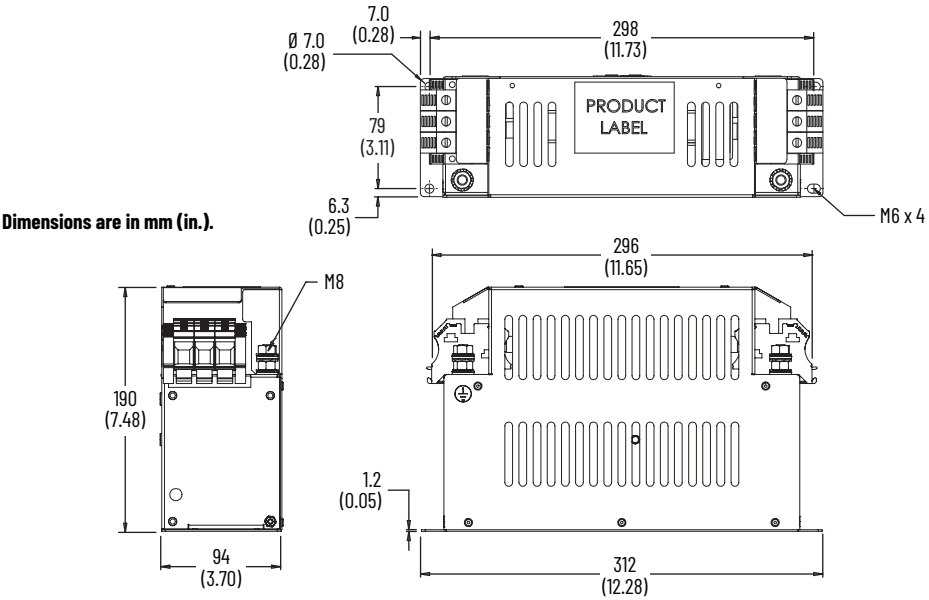
AC Line Filter Dimensions (catalog number 2198-DBR40-F)

Dimensions are in mm (in.).



AC Line Filter Dimensions (catalog number 2198-DBR90-F)

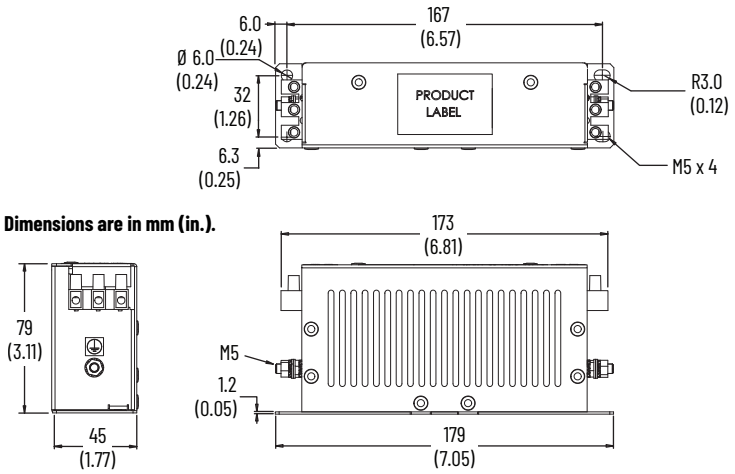
Dimensions are in mm (in.).



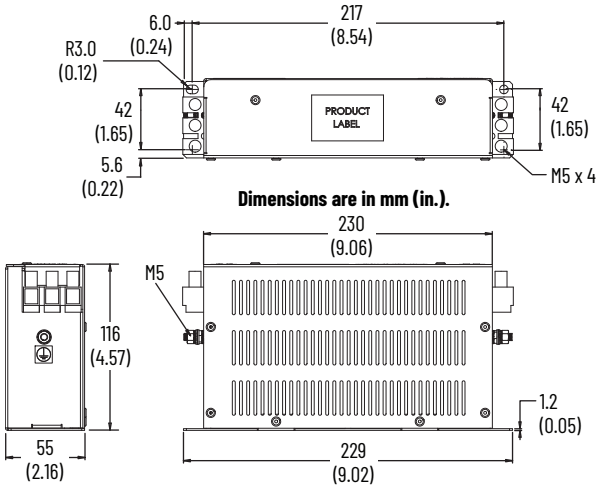
2198-DBR*xx*-F AC Line Filter Specifications

AC Line Filter Cat. No.	Voltage Rating, max	Current Rating A @ 50 °C (122 °F)	Power Loss W	Leakage Current mA	Weight, approx kg (lb)	Operating Temperature
2198-DBR20-F	528V AC three-phase 50/60 Hz	20	4.2	30.0	1.0 (2.20)	0...50 °C (32...122 °F)
2198-DBR40-F		54	15.0		3.3 (7.28)	
2198-DBR90-F		90	16.8	34.0	4.1 (9.04)	

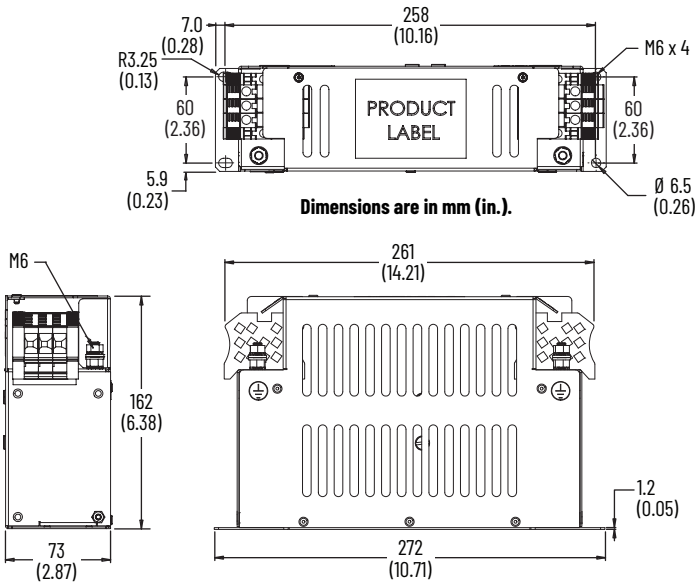
AC Line Filter Dimensions (catalog number 2198-DB08-F)



AC Line Filter Dimensions (catalog number 2198-DB20-F



AC Line Filter Dimensions (catalog number 2198-DB42-F



2198-DB*xx*-F AC Line Filter Specifications

AC Line Filter Cat. No.	Voltage Rating, max	Current Rating A @ 50 °C (122 °F)	Power Loss W	Leakage Current mA	Weight, approx kg (lb)	Operating Temperature
2198-DB08-F (1)	528V AC three-phase 50/60 Hz	7.5	3.6	2.5	0.77 (1.70)	0...50 °C (32...122 °F)
2198-DB20-F		20	5.1	5.2	1.63 (3.59)	
2198-DB42-F		42	14.7	4.0	2.70 (5.95)	

(1) Applies to installations with single-phase or three-phase input power.

Shared-bus Connection System

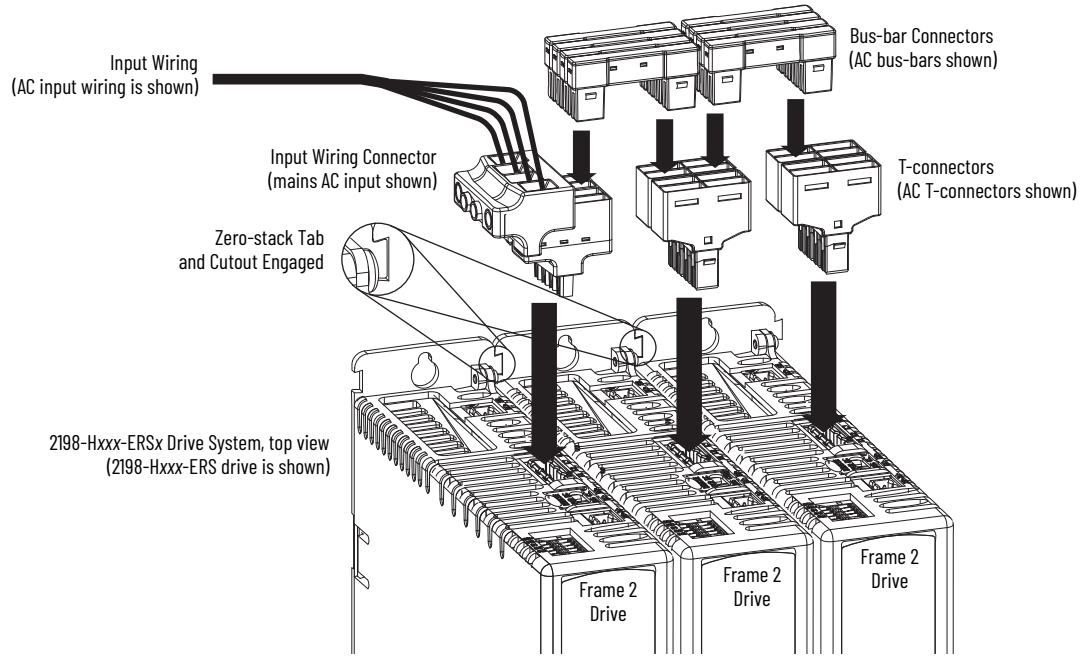
The shared-bus connection system is used to extend the mains AC input, 24V control input, and the DC-bus power from drive-to-drive in shared-bus multi-axis configurations.

IMPORTANT When the shared-bus connection system is used, the zero-stack tab and cutout must be engaged between adjacent drives.

The shared-bus connection system is composed of three components:

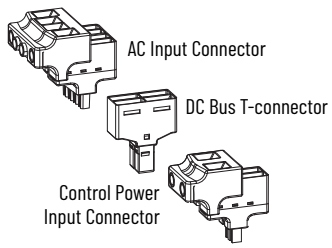
- Input wiring connectors that plug into the leftmost drive and receive input wiring for mains AC and 24V DC.
- AC bus, DC bus, and 24V DC T-connectors that plug into the drives downstream from the first where AC, DC, and/or 24V control power is shared. DC bus T-connectors also plug into the first drive where DC-bus power is shared.
- Bus bars that connect between drives to extend the mains AC bus, DC bus, and 24V DC control power from drive-to-drive.

Shared-bus Connection System Example



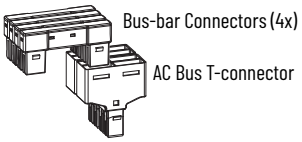
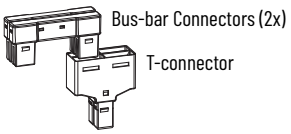
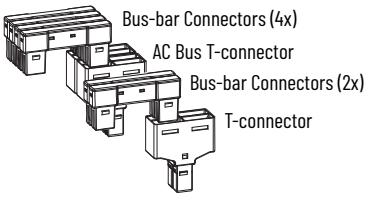
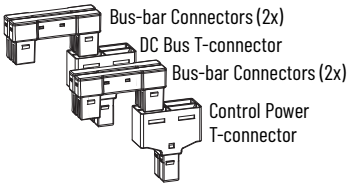
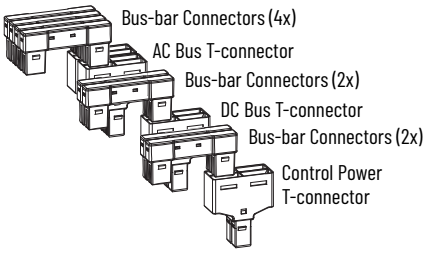
For each shared-bus servo drive system, you'll need one connector kit catalog number for each drive. Use these tables to determine which connector kits you'll need for your system.

Input Power Connector Kit Catalog Numbers

Frame Size	Kit Cat. No.	Description	Contents	Illustration
1 and 2	2198-H040-ADP-IN	Kinetix 5500 Frame 1 and 2 connectors for the first drive in a multi-axis system.	• AC input connector for frame 1 and 2 drives • DC bus T-connector • Control power input connector	
3	2198-H070-ADP-IN	Kinetix 5500 Frame 3 connectors for the first drive in a multi-axis system.	• AC input connector for frame 3 drive • DC bus T-connector • Control power input connector	

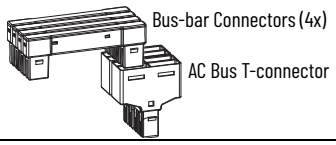
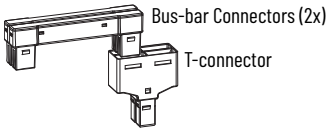
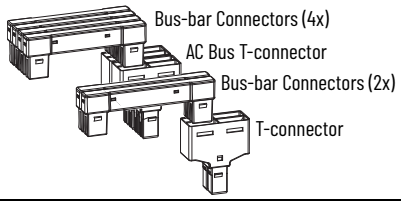
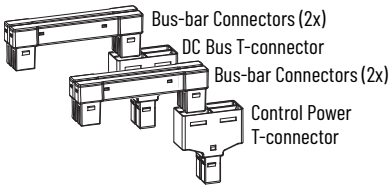
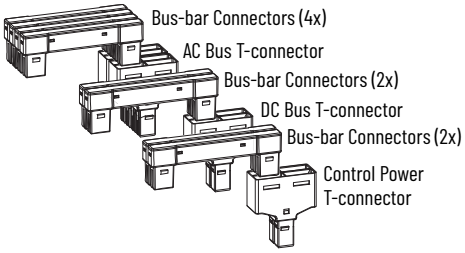
Use these connector kits when the first drive is frame 1, 2, or 3 and the follower drive is frame 1 or 2.

Frame 1 or 2 Follower Drive Connector Kit Catalog Numbers

Kit Cat. No.	Description	Contents	Illustration
2198-H040-A-T	T-connector and bus-bars for the AC bus on Frame 1 or 2 follower drives	• AC bus T-connector • Bus-bar connectors, 55 mm, quantity 4	
2198-H040-D-T	T-connector and bus-bars for the DC bus on Frame 1 or 2 follower drives	• DC bus T-connector • Bus-bar connectors, 55 mm, quantity 2	
2198-H040-P-T	T-connector and bus-bars for control power on Frame 1 or 2 follower drives	• Control power T-connector • Bus-bar connectors, 55 mm, quantity 2	
2198-H040-AD-T	T-connectors and bus-bars for the AC and DC bus on Frame 1 or 2 follower drives	• AC bus T-connector • DC bus T-connector • Bus-bar connectors, 55 mm, quantity 6	
2198-H040-AP-T	T-connectors and bus-bars for the AC bus and control power on Frame 1 or 2 follower drives	• AC bus T-connector • Control power T-connector • Bus-bar connectors, 55 mm, quantity 6	
2198-H040-DP-T	T-connectors and bus-bars for the DC bus and control power on Frame 1 or 2 follower drives	• DC bus T-connector • Control power T-connector • Bus-bar connectors, 55 mm, quantity 4	
2198-H040-ADP-T	T-connectors and bus-bars for the AC bus, DC bus, and control power on Frame 1 or 2 follower drives	• AC bus T-connector • DC bus T-connector • Control power T-connector • Bus-bar connectors, 55 mm, quantity 8	

Use these connector kits when the first drive is frame 3 and the follower drive is also frame 3.

Frame 3 Follower Drive Connector Kit Catalog Numbers

Kit Cat. No.	Description	Contents	Illustration
2198-H070-A-T	T-connector and bus-bars for the AC bus on Frame 3 follower drives	• AC bus T-connector • Bus-bar connectors, 85 mm, quantity 4	
2198-H070-D-T	T-connector and bus-bars for the DC bus on Frame 3 follower drives	• DC bus T-connector • Bus-bar connectors, 85 mm, quantity 2	
2198-H070-P-T	T-connector and bus-bars for control power on Frame 3 follower drives	• Control power T-connector • Bus-bar connectors, 85 mm, quantity 2	
2198-H070-AD-T	T-connectors and bus-bars for the AC and DC bus on Frame 3 follower drives	• AC bus T-connector • DC bus T-connector • Bus-bar connectors, 85 mm, quantity 6	
2198-H070-AP-T	T-connectors and bus-bars for the AC bus and control power on Frame 3 follower drives	• AC bus T-connector • Control power T-connector • Bus-bar connectors, 85 mm, quantity 6	
2198-H070-DP-T	T-connectors and bus-bars for the DC bus and control power on Frame 3 follower drives	• DC bus T-connector • Control power T-connector • Bus-bar connectors, 85 mm, quantity 4	
2198-H070-ADP-T	T-connectors and bus-bars for the AC bus, DC bus, and control power on Frame 3 follower drives	• AC bus T-connector • DC bus T-connector • Control power T-connector • Bus-bar connectors, 85 mm, quantity 8	

Hiperface-to-DSL Feedback Converter Kit

The 2198-H2DCK Hiperface-to-DSL feedback kit (series B or later) converts 15-pin Hiperface encoder feedback signals to 2-pin DSL feedback signals. The following feedback types are accepted:

- Hiperface high-resolution absolute multi-turn and single-turn encoders
- Feedback-only axes (absolute single-turn/multi-turn Hiperface)

Use the converter kit for new installations with Kinetix 5500 servo drives and existing compatible motor/actuator installations when upgrading with Kinetix 5500 servo drives.

Compatible Allen-Bradley Motors and Actuators

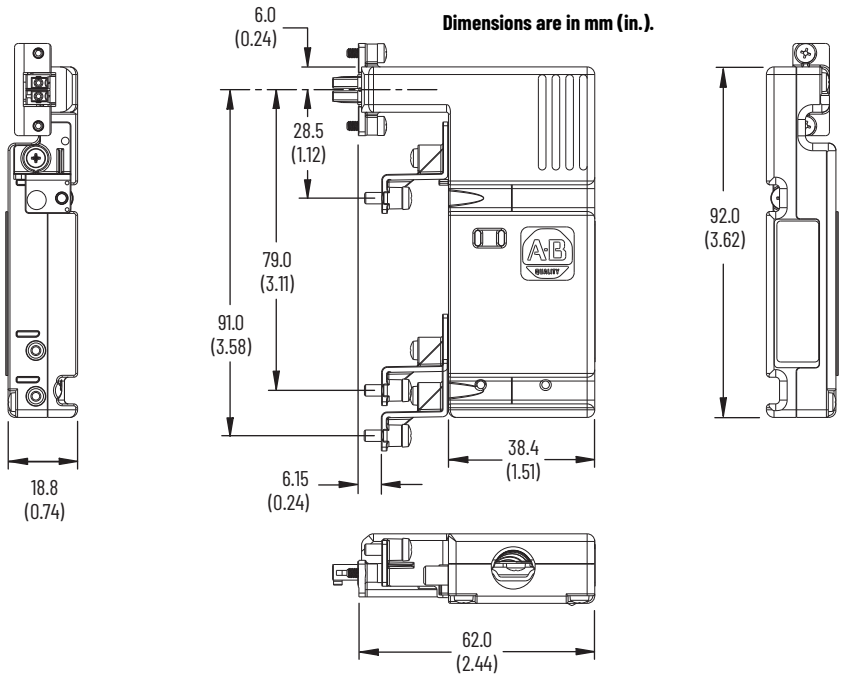
Rotary Motors	Linear Actuators	2090-Series Feedback Cables (1)
Kinetix MPL low-inertia motors	LDAT-Series integrated linear thrusters (2)	2090-CFBM7DF-CEAA*xx* (standard, non-flex) 2090-CFBM7DF-CEAF*xx* (continuous-flex) 2090-XXNFMF-S*xx* (standard, non-flex) 2090-CFBM7DF-CDAF*xx* (continuous-flex)
Kinetix MPL medium-inertia motors	Kinetix MPAS integrated linear stages (3)	
Kinetix MPF food-grade motors	Kinetix MPMA multi-axis linear stages (3)	
Kinetix MPS stainless-steel motors	Kinetix MPAR electric cylinders	
	Kinetix MPAI heavy-duty electric cylinders	

(1) These are typical feedback cables. Refer to the Kinetix 5500 Servo Drives Design Guide, publication KNX-RM009, for the cables required for specific drive and motor/actuator combination.
(2) LDAT-Series linear thrusters with absolute high-resolution encoders are compatible. Linear stages with incremental encoders are not compatible.
(3) Kinetix MPAS and MPMA (ballscrew) linear stages are compatible. Direct-drive linear stages are not compatible.

IMPORTANT The 2198-H2DCK feedback converter kit is required for converting Hiperface feedback signals from the motor encoder to DSL feedback signals that are accepted by the Kinetix 5500 drive.

Compatible Allen-Bradley rotary motors and linear actuators must have high-resolution absolute encoders. Cable length restrictions also exist, refer to Maximum Cable Lengths on page 54 for more information.

Converter Kit Dimensions



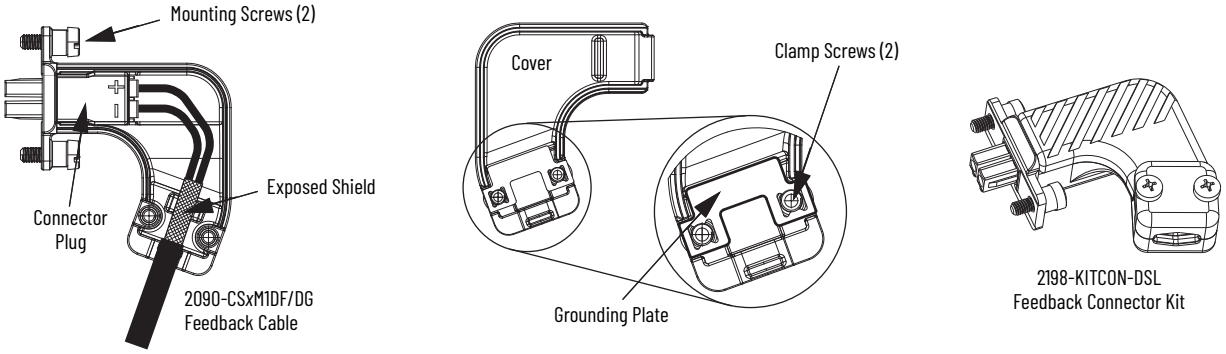
Replacement Parts and Connector Kits - Kinetix 5500 Servo Drives

Replacement parts and kits available for Kinetix 5500 servo drives include the DSL feedback connector kit, power-sharing bus-bars, safety and digital input connectors, and power connector sets.

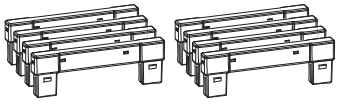
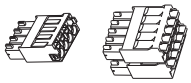
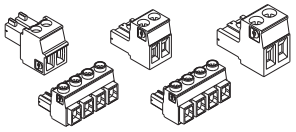
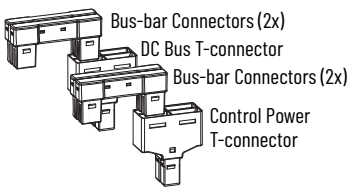
DSL Feedback Connector Kit

The Bulletin 2198-KITCON-DSL feedback connector kit is required for making feedback connections from Kinetix VP motors and actuators, and is included with each Kinetix 5500 servo drive. Motor power, brake, and the 2-wire feedback connections are made by using a single Bulletin 2090-CSxM1DF/DG cable. Refer to the Kinetix Motion Accessories Specifications Technical Data, publication KNX-TD004, for motor cable information.

DSL Feedback Connector Kit Features



Power-sharing Bus-bars and Connector Sets

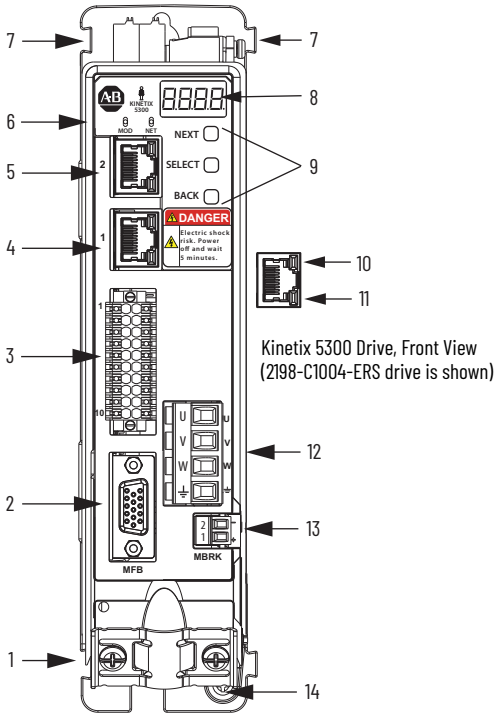
Replacement Kit Cat. No.	Description	Contents	Illustration
2198-BARCON-85DCAC100	Replacement bus-bars for shared-bus connection system: • First drive is Frame 3 • Adjacent drive is Frame 3	Bus-bar connectors, 85 mm, quantity 8	
2198-BARCON-55DCAC100	Replacement bus-bars for shared-bus connection system: • First drive is Frame 1, 2, or 3 • Adjacent drive is Frame 1 or 2	Bus-bar connectors, 55 mm, quantity 8	
2198-KITCON-IOSP	Replacement IOD and STO connectors with spring clamp	• One (4-pin) digital inputs (IOD) connector • One (5-pin) Safe Torque Off (STO) connector (two 5-pin connectors joined together)	
2198-KITCON-IOSC	Replacement IOD and STO connectors with screw clamp		
2198-KITCON-PWR70	Replacement IDP, RC, CP, MP, and BC connectors for Frame 3 servo drives	• One AC input power (IPD) connector • One shunt (RC) connector • One control power (CP) connector • One motor power (MP) connector • One motor brake (BC) connector	
2198-KITCON-PWR40	Replacement IDP, RC, CP, MP, and BC connectors for Frame 1 or 2 servo drives		
2198-KITCON-CAP1300	T-connectors and bus-bars for the DC bus and control power input on the Bulletin 2198 capacitor module	• DC bus T-connector • Control power T-connector • Bus-bar connectors, 55 mm, quantity 4	

Kinetix 5300 Single-axis EtherNet/IP Servo Drives

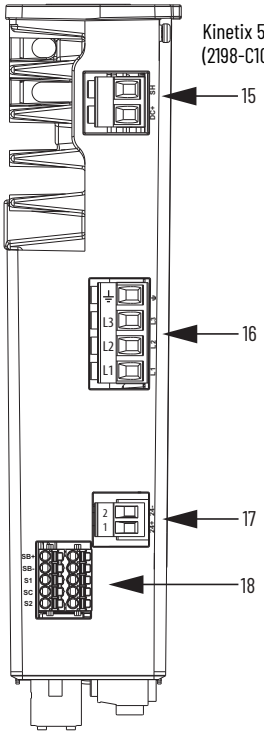


The Kinetix 5300 servo drives support integrated motion on the EtherNet/IP network. By using the Studio 5000 Logix Designer® application and Logix 5000™ controllers, this cost-effective motion solution delivers high performance and scalability with Kinetix TLP servo motors that are matched to drive ratings for optimized system sizing. In addition, Kinetix 5300 drives also accept high-resolution and incremental feedback types that are required for many of the other Allen-Bradley rotary and linear products. The drive comes with standard inputs and hardwired Safe Torque Off with dual-port EtherNet/IP for various network topologies.

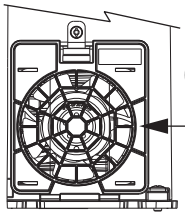
Kinetix 5300 Drive Features and Indicators



Kinetix 5300 Drive, Front View
(2198-C1004-ERS drive is shown)

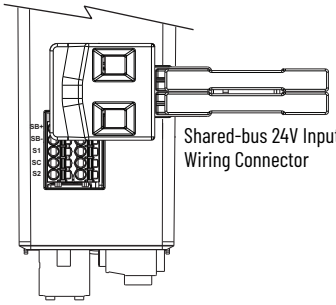


Kinetix 5300, Top View
(2198-C1004-ERS drive is shown)



Kinetix 5300, Bottom View
(frame 2 and 3 drives only)

Cooling Fan



Shared-bus 24V Input
Wiring Connector

Item	Description
1	Motor cable shield clamp
2	Motor feedback (MFB) connector
3	Digital inputs and auxiliary feedback connector
4	Ethernet (PORT1) RJ45 connector
5	Ethernet (PORT2) RJ45 connector
6	Module and Network status indicators

Item	Description
7	Zero-stack mounting tab/cutout
8	Four-character status display
9	Navigation pushbuttons
10	Link speed status indicators
11	Link/Activity status indicators
12	Motor power connector

Item	Description
13	Motor brake connector
14	Ground terminal
15	Shunt resistor connector
16	AC mains input power connector
17	24V control input power connector
18	Safe torque-off (STO) connector

Technical Specifications - Kinetix 5300 Servo Drives

Kinetix 5300 (110 and 230V, single-phase and three-phase) Power Specifications

Attribute	2198-C1004-ERS	2198-C1007-ERS	2198-C1015-ERS	2198-C1020-ERS
AC input voltage	85…132V rms, single-phase (110V nom) 170…253V rms, single-phase (230V nom) 170…253V rms, three-phase (230V nom)			
AC input frequency	47…63 Hz			
Main AC input current (rms) (1)	2.17 A	3.56 A	6.58 A	9.45 A
Max inrush current (0-pk) Nom 110V input (single-phase) Nom 230V input (single-phase) Nom 230V input (three-phase)	 6.0 A 11.5 A 7.4 A	 6.0 A 11.5 A 7.4 A	 6.0 A 11.5 A 7.4 A	 6.0 A 11.5 A 7.4 A
Peak AC input current (rms)	6.99 A	10.48 A	19.75 A	27.46 A
Control power input voltage (2)	21.6…26.4V DC 24V DC nom			
Control power input current (1) (3) (non-brake motors)	0.4 A_{DC}	0.4 A_{DC}	0.9 A_{DC}	0.9 A_{DC}
Continuous output current (rms) Nom 110V input (single-phase) Nom 230V input (single-phase) Nom 230V input (three-phase)	 2.8 A	 4.6 A	 8.5 A	 12.2 A
Continuous output current (0-pk) Nom 110V input (single-phase) Nom 230V input (single-phase) Nom 230V input (three-phase)	 4.0 A	 6.5 A	 12.0 A	 17.3 A
Peak output current (rms) (4) Nom 110V input (single-phase) Nom 230V input (single-phase) Nom 230V input (three-phase)	 6.6 A 9.5 A 9.5 A	 9.7 A 15.5 A 15.5 A	 12.2 A 20.5 A 29.2 A	 25.0 A 40.6 A 40.6 A
Peak output current (0-pk) Nom 110V input (single-phase) Nom 230V input (single-phase) Nom 230V input (three-phase)	 9.3 A 13.4 A 13.4 A	 13.7 A 21.9 A 21.9 A	 17.3 A 29.0 A 41.3 A	 35.4 A 57.4 A 57.4 A
Line loss ride through	20 ms			
Continuous output power @ 110V nom single-phase @ 230V nom single-phase @ 230V nom three-phase	 0.22 kW 0.46 kW 0.72 kW	 0.36 kW 0.76 kW 1.18 kW	 0.67 kW 1.41 kW 2.18 kW	 0.97 kW 2.02 kW 3.13 kW
Internal shunt on	387.5V			
Internal shunt off	377.5V			
Internal shunt resistor	100 Ω	100 Ω	60 Ω	60 Ω
Internal shunt power	30 W	30 W	50 W	50 W
Bus undervoltage limit	72V @110V AC input 144V @230V AC input			
Bus overvoltage limit	405V			
Bus capacitance	330 µF	560 µF	660 µF	1120 µF
Capacitive energy absorption @ 110V nom AC input @ 230V nom AC input	 21.31 J 5.94 J	 36.17 J 10.08 J	 42.63 J 11.88 J	 72.34 J 20.16 J
Efficiency @ 110V nom single-phase AC input @ 230V nom single-phase AC input @ 230V nom three-phase AC input	 91% 95% 97%			
Short-circuit current rating	200,000 A (rms) symmetrical			

(1) Drives are limited to one power cycle per minute.
(2) The cooling fan runs as part of the control power startup routine, when the inverter is enabled, and if the inverter temperature exceeds preset threshold.
(3) For current values when motors include a holding brake, refer to Control Power Current Specifications on page 74.
(4) Peak RMS current allowed for up to 1.0 seconds.

Kinetix 5300 (230V, three-phase) Input Power Specifications

Attribute	2198-C2030-ERS	2198-C2055-ERS	2198-C2075-ERS
AC input voltage	170...253V rms, three-phase (230V nom)		
AC input frequency	47...63 Hz		
Main AC input current (rms) (1)	15.18 A	31.13 A	36.93 A
Max inrush current (0-pk)	7.4 A	14.8 A	14.8 A
Peak AC input current (rms)	41.26 A	73.06 A	86.25 A
Control power input voltage (2)	21.6...26.4V DC 24V DC nom		
Control power input current (1) (3) (non-brake motors)	0.9 A_{DC}	1.7 A_{DC}	1.7 A_{DC}
Continuous output current (rms)	19.6 A	40.2 A	47.7 A
Continuous output current (0-pk)	27.7 A	56.9 A	67.5 A
Peak output current (rms) (4)	61.0 A	108.0 A	127.5 A
Peak output current (0-pk)	86.3 A	152.7 A	180.3 A
Line loss ride through	20 ms		
Continuous output power	5.02 kW	10.30 kW	12.22 kW
Internal shunt on	387.5V		
Internal shunt off	377.5V		
Internal shunt resistor	60 Ω	40 Ω	
Internal shunt power	50 W	75 W	
Bus undervoltage limit	144V		
Bus overvoltage limit	405V		
Bus capacitance	1680 µF	2460 µF	3280 µF
Capacitive energy absorption	30.25 J	44.29 J	59.05 J
Efficiency	97%		
Short-circuit current rating	200,000 A (rms) symmetrical		

(1) Drives are limited to one power cycle per minute.
(2) The cooling fan runs as part of the control power startup routine, when the inverter is enabled, and if the inverter temperature exceeds preset threshold.
(3) For current values when motors include a holding brake, refer to Control Power Current Specifications on page 74.
(4) Peak RMS current allowed for up to 1.0 seconds.

Kinetix 5300 (480V, three-phase) Input Power Specifications

Attribute	2198-C4004-ERS	2198-C4007-ERS	2198-C4015-ERS	2198-C4020-ERS
AC input voltage	342…528V rms, three-phase (480V nom)			
AC input frequency	47…63 Hz			
Main AC input current (rms) (1)	1.24 A	2.25 A	4.03 A	5.65 A
Max inrush current (0-pk)	15.5 A	15.5 A	15.5 A	15.5 A
Peak AC input current (rms)	3.59 A	6.29 A	12.18 A	16.10 A
Control power input voltage (2)	21.6…26.4V DC 24V DC nom			
Control power input current (1) (3) (non-brake motors)	0.4 A $_{DC}$	0.4 A $_{DC}$	0.9 A $_{DC}$	0.9 A $_{DC}$
Continuous output current (rms)	1.6 A	2.9 A	5.2 A	7.3 A
Continuous output current (0-pk)	2.3 A	4.1 A	7.4 A	10.3 A
Peak output current (rms) (4)	5.3 A	9.3 A	18.0 A	23.8 A
Peak output current (0-pk)	7.5 A	13.2 A	25.5 A	33.7 A
Line loss ride through	20 ms			
Continuous output power	0.86 kW	1.55 kW	2.78 kW	3.90 kW
Internal shunt on	775V			
Internal shunt off	765V			
Internal shunt resistor	100 Ω	100 Ω	60 Ω	60 Ω
Internal shunt power	30 W	30 W	50 W	50 W
Bus undervoltage limit	275V			
Bus overvoltage limit	810V			
Bus capacitance	165 µF	165 µF	280 µF	330 µF
Capacitive energy absorption	8.13 J		13.79 J	16.26 J
Efficiency	97%			
Short-circuit current rating	200,000 A (rms) symmetrical			

(1) Drives are limited to one power cycle per minute.
(2) The cooling fan runs as part of the control power startup routine, when the inverter is enabled, and if the inverter temperature exceeds preset threshold.
(3) For current values when motors include a holding brake, refer to Control Power Current Specifications on page 74.
(4) Peak RMS current allowed for up to 1.0 seconds.

Kinetix 5300 (480V, three-phase) Input Power Specifications (continued)

Attribute	2198-C4030-ERS	2198-C4055-ERS	2198-C4075-ERS
AC input voltage	342…528V rms, three-phase (480V nom)		
AC input frequency	47…63 Hz		
Main AC input current (rms) (1)	9.06 A	17.50 A	21.29 A
Max inrush current (0-pk)	30.9 A	30.9 A	46.4 A
Peak AC input current (rms)	23.07 A	39.57 A	49.72 A
Control power input voltage (2)	21.6…26.4V DC 24V DC nom		
Control power input current (1) (3) (non-brake motors)	0.9 A $_{DC}$	1.7 A $_{DC}$	1.7 A $_{DC}$
Continuous output current (rms)	11.7 A	22.6 A	27.5 A
Continuous output current (0-pk)	16.5 A	32.0 A	38.9 A
Peak output current (rms) (4)	34.1 A	58.5 A	73.5 A
Peak output current (0-pk)	48.3 A	82.7 A	103.9 A
Line loss ride through	20 ms		
Continuous output power	6.25 kW	12.08 kW	14.70 kW
Internal shunt on	775V		
Internal shunt off	765V		
Internal shunt resistor	60 Ω	40 Ω	
Internal shunt power	50 W	75 W	
Bus undervoltage limit	275V		
Bus overvoltage limit	810V		
Bus capacitance	560 µF	820 µF	1230 µF
Capacitive energy absorption	27.59 J	40.40 J	60.60 J
Efficiency	97%		
Short-circuit current rating	200,000 A (rms) symmetrical		

(1) Drives are limited to one power cycle per minute.
(2) The cooling fan runs as part of the control power startup routine, when the inverter is enabled, and if the inverter temperature exceeds preset threshold.
(3) For current values when motors include a holding brake, refer to Control Power Current Specifications on page 74.
(4) Peak RMS current allowed for up to 1.0 seconds.

Control Power Current Specifications

Kinetix 5300 servo drives have different 24V DC power consumption. Factors to consider when calculating the combined current demand from your 24V DC power supply include the following:

- Catalog number for each drive in the system
- Whether servo motors include the holding brake option

Control Power Current Specifications

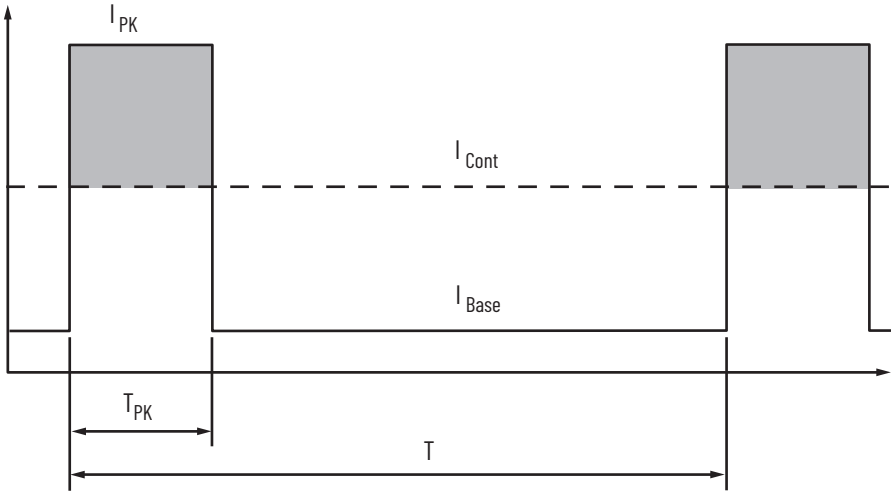
Kinetix 5300 Drive Cat. No.	24V Current per Module (non-brake motor) A_{DC}	24V Current (2 A brake motor) (1) A_{DC}	24V Inrush Current (2) A
2198-C1004-ERS	0.4	2.4	1.8
2198-C1007-ERS			
2198-C4004-ERS			
2198-C4007-ERS			
2198-C1015-ERS	0.9	2.9	2.4
2198-C1020-ERS			
2198-C2030-ERS			
2198-C4015-ERS			
2198-C4020-ERS			
2198-C4030-ERS			
2198-C2055-ERS	1.7	3.7	3.0
2198-C2075-ERS			
2198-C4055-ERS			
2198-C4075-ERS			

(1) See Kinetix Rotary Motion Specifications Technical Data, publication KNX-TD001, for brake current specifications of Kinetix MP, TLP, and TL/TLY rotary motors.
(2) Inrush current duration is less than 30 ms.

Peak Current Specifications

Load Duty-cycle Profile Example

$$D = \frac{T_{PK}}{T} \times 100\%$$



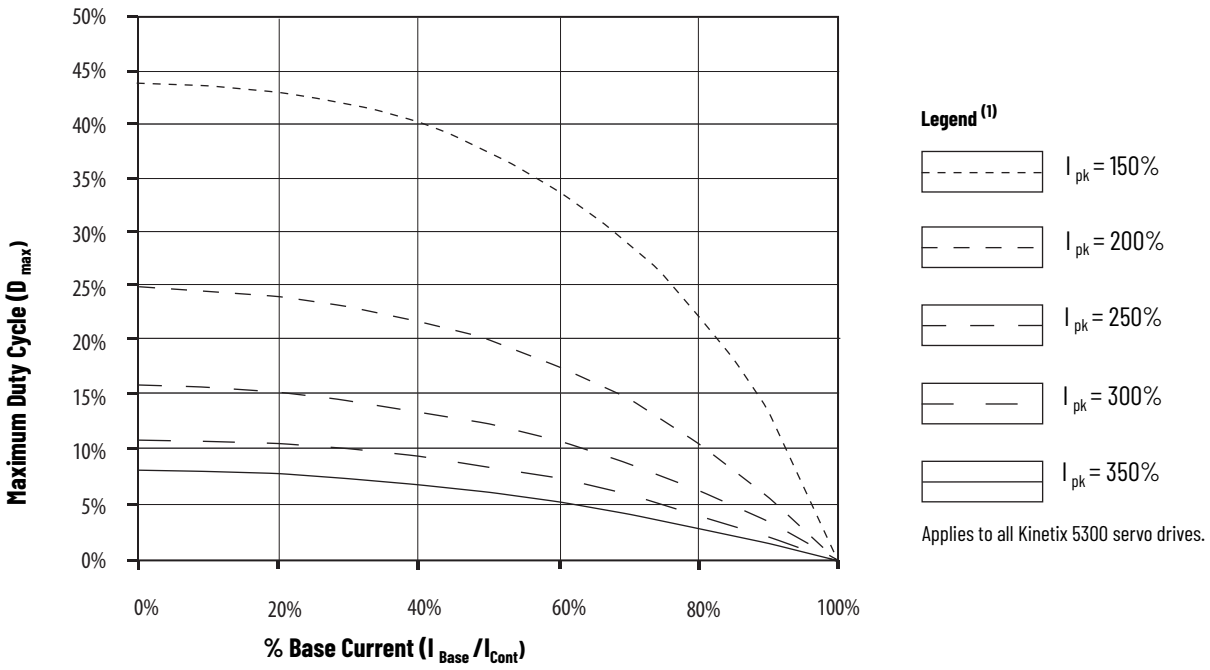
Peak Duty Cycle Definition of Terms

Term	Definition [1]
Continuous Current Rating (I_{Cont})	The maximum value of current that can be output continuously.
Peak Current Rating (I_{PKmax})	The maximum value of peak current that the drive can output. This rating is valid only for overload times less than T_{PKmax}.
Duty Cycle (D)	The ratio of time at peak to the Application Period is defined as: $D = \frac{T_{PK}}{T} \times 100\%$
Time at Peak (T_{PK})	The time at peak current (I_{PK}) for a given loading profile. Must be less than or equal to T_{PKmax}.
Peak Current (I_{PK})	The level of peak current for a given loading profile. I_{PK} must be less than or equal to the Peak Current Rating (T_{PKMAX}) of the drive.
Base Current (I_{Base})	The level of current between the pulses of peak current for a given loading profile. I_{Base} must be less than or equal to the continuous current rating (I_{Cont}) of the drive.
Loading Profile	The loading profile is composed of I_{PK}, I_{Base}, T_{PK}, and D (or T) values and completely specify the operation of the drive in an overload situation. These values are collectively defined as the Loading Profile of the drive.
Application Period (T)	The sum of the times at I_{PK} (T_{PK}) and I_{Base}.

(1) All current values are specified as RMS.

For more information on system sizing and selection, see the Motion Analyzer software website https://motionanalyzer.rockwellautomation.com/.

Peak Inverter Overload (T_{PK} < 1.0 s)



(1) Base current (I_{Base}) and peak current (I_{PK}) are a percentage of the continuous drive current rating (I_{Cont}).

Circuit Breaker/Fuse Specifications

The Kinetix 5300 drives use internal solid-state motor short-circuit protection and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 200,000 A (fuses, UL applications), 10,000 A (miniature circuit breakers), and 65,000 A (molded-case circuit breakers).

Kinetix 5300 UL/CSA Circuit Protection Specifications

Drive Cat. No.	AC Input Voltage, nom	Phase	Bussmann Fuses Cat. No.	Molded Case CB Cat. No.
2198-C1004-ERS	200...240V AC	Three phase	KTK-R-6	140U-D6D3-B40
2198-C1007-ERS			KTK-R-10	140U-D6D3-B80
2198-C1015-ERS			KTK-R-15	140U-D6D3-C12
2198-C1020-ERS			KTK-R-25	140U-D6D3-C20
2198-C2030-ERS			KTK-R-30	140U-D6D3-C30
2198-C2055-ERS			LPJ-50SP	140G-G6C3-C50
2198-C2075-ERS			LPJ-60SP	140G-G6C3-C60
2198-C4004-ERS	380...480V AC		KTK-R-3	140U-D6D3-B20
2198-C4007-ERS			KTK-R-6	140U-D6D3-B40
2198-C4015-ERS			KTK-R-12	140U-D6D3-B80
2198-C4020-ERS			KTK-R-15	140U-D6D3-C12
2198-C4030-ERS			KTK-R-25	140U-D6D3-C15
2198-C4055-ERS			LPJ-30SP	140U-D6D3-C30
2198-C4075-ERS			LPJ-35SP	140U-D6D3-C30
2198-C1004-ERS	100...120V AC	Single phase	KTK-R-6	140U-D6D2-B40
2198-C1007-ERS			KTK-R-10	140U-D6D2-B80
2198-C1015-ERS			KTK-R-15	140U-D6D2-C12
2198-C1020-ERS			KTK-R-25	140U-D6D2-C20
2198-C1004-ERS	200...240V AC		KTK-R-6	140U-D6D2-B40
2198-C1007-ERS			KTK-R-10	140U-D6D2-B80
2198-C1015-ERS			KTK-R-15	140U-D6D2-C12
2198-C1020-ERS			KTK-R-25	140U-D6D2-C20

Kinetix 5300 IEC (non-UL/CSA) Circuit Protection Specifications

Drive Cat. No.	AC Input Voltage, nom	Phase	DIN gG Fuses Amps, max	Miniature CB Cat. No.	Molded Case CB Cat. No.
2198-C1004-ERS	200...240V AC	Three phase	6	1489-M3C060	140U-D6D3-B40
2198-C1007-ERS			10	1489-M3C100	140U-D6D3-B80
2198-C1015-ERS			16	1489-M3C160	140U-D6D3-C12
2198-C1020-ERS			25	1489-M3C250	140U-D6D3-C20
2198-C2030-ERS			32	1489-M3C400	140U-D6D3-C30
2198-C2055-ERS			40	–	140G-G6C3-C50
2198-C2075-ERS			50	–	140G-G6C3-C60
2198-C4004-ERS	380...480V AC		2	1489-M3C030	140U-D6D3-B20
2198-C4007-ERS			6	1489-M3C060	140U-D6D3-B40
2198-C4015-ERS			12	1489-M3C100	140U-D6D3-B80
2198-C4020-ERS			16	1489-M3C130	140U-D6D3-C12
2198-C4030-ERS			25	1489-M3C200	140U-D6D3-C15
2198-C4055-ERS			32	1489-M3C350	140U-D6D3-C30
2198-C4075-ERS			32	1489-M3C400	140U-D6D3-C30
2198-C1004-ERS	100...120V AC	Single phase	6	1489-M2C060	140U-D6D2-B40
2198-C1007-ERS			10	1489-M2C100	140U-D6D2-B80
2198-C1015-ERS			16	1489-M2C160	140U-D6D2-C12
2198-C1020-ERS			25	1489-M2C250	140U-D6D2-C20
2198-C1004-ERS	200...240V AC		6	1489-M2C060	140U-D6D2-B40
2198-C1007-ERS			10	1489-M2C100	140U-D6D2-B80
2198-C1015-ERS			16	1489-M2C160	140U-D6D2-C12
2198-C1020-ERS			25	1489-M2C250	140U-D6D2-C20

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 5300 drive system.

Kinetix 5300 Drive Cat. No.	AC Input, nom	Usage as a % of Rated Power Output [1] (watts)				
		20%	40%	60%	80%	100%
2198-C1004-ERS	200...240V three-phase	12	16	20	25	29
2198-C1007-ERS		14	19	24	30	37
2198-C1015-ERS		26	36	47	59	71
2198-C1020-ERS		35	52	71	91	112
2198-C2030-ERS		53	87	124	164	206
2198-C2055-ERS		87	139	193	250	308
2198-C2075-ERS		97	159	225	293	364
2198-C4004-ERS	380...480V three-phase	16	21	26	31	36
2198-C4007-ERS		20	30	39	48	58
2198-C4015-ERS		33	48	62	78	93
2198-C4020-ERS		39	58	79	101	124
2198-C4030-ERS		57	89	123	157	193
2198-C4055-ERS		112	171	231	293	356
2198-C4075-ERS		134	204	273	344	417
2198-C1004-ERS	200...240V single-phase	12	16	20	25	30
2198-C1007-ERS		14	19	24	30	37
2198-C1015-ERS		25	36	47	59	72
2198-C1020-ERS		35	52	72	92	115
2198-C1004-ERS	100...120V single-phase	11	14	18	22	26
2198-C1007-ERS		12	17	21	27	32
2198-C1015-ERS		23	32	42	53	64
2198-C1020-ERS		30	44	59	77	96

(1) Internal shunt power is not included in the calculations and must be added based on utilization.

Weight Specifications

Kinetix 5300 Drive Cat. No.	Frame Size	Weight, approx kg (lb)
2198-C1004-ERS	1	1.30 (2.87)
2198-C1007-ERS		1.34 (2.95)
2198-C1015-ERS	2	1.85 (4.08)
2198-C1020-ERS		1.91 (4.21)
2198-C2030-ERS		2.02 (4.45)
2198-C2055-ERS	3	3.54 (7.80)
2198-C2075-ERS		3.60 (7.94)
2198-C4004-ERS	1	1.34 (2.95)
2198-C4007-ERS		1.34 (2.95)
2198-C4015-ERS	2	1.89 (4.17)
2198-C4020-ERS		1.93 (4.25)
2198-C4030-ERS		2.05 (4.52)
2198-C4055-ERS	3	3.60 (7.94)
2198-C4075-ERS		3.81 (8.40)

Maximum Cable Lengths

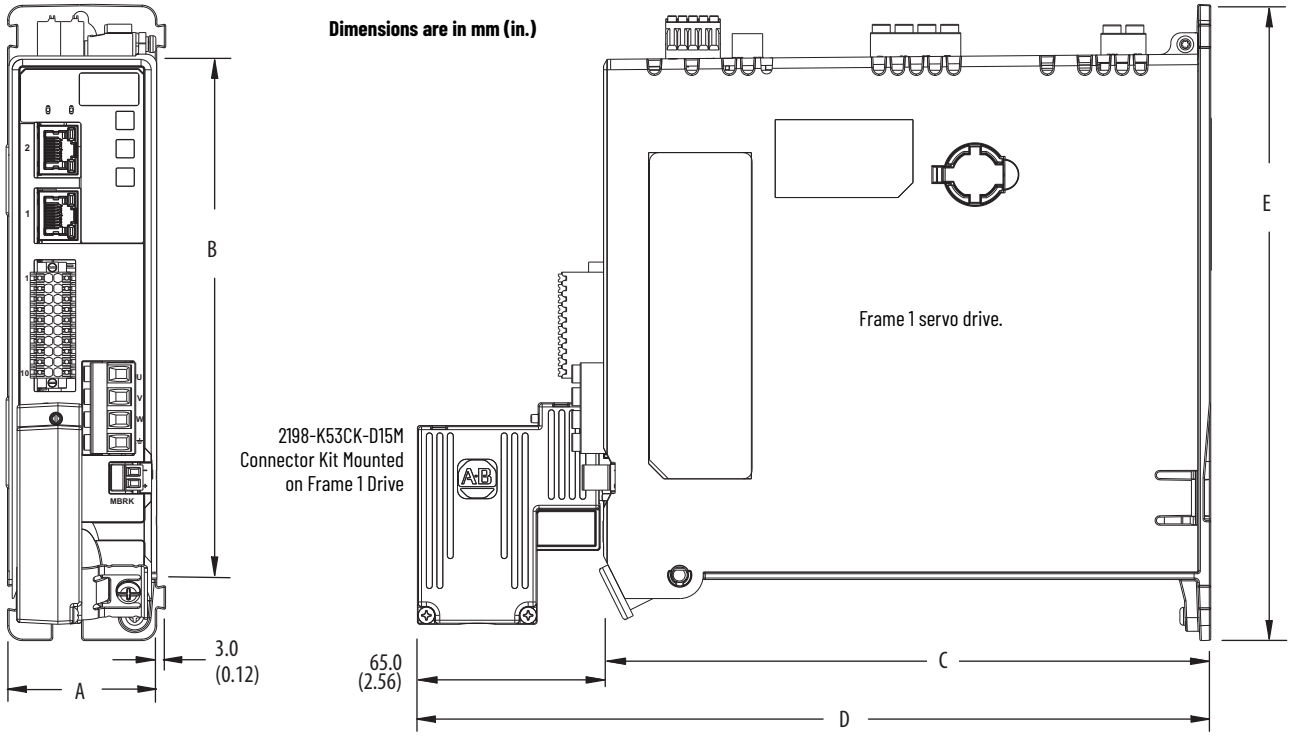
The Kinetix 5300 drive maximum cable length depends on feedback type and input voltage used in the application. These tables assume the use of recommended cables as shown in the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Compatible Motor and Actuator Cat. No.	Feedback Type	Cable Length, max m (ft)	
		≤ 400V AC Input	480V AC Input
TLP-A/B*xxx*-*xxx*-D	Nikon (24-bit) absolute high-resolution, multi-turn and single-turn	50 (164)	
MPL-A/B15*xxx*-V/E*x*7xAA MPL-A/B2*xxx*-V/E*x*7xAA	Hiperface, absolute high-resolution, multi-turn and single-turn	50 (164)	20 (65.6)
MPL-A/B3*xxx*-S/M*x*7xAA MPL-A/B4*xxx*-S/M*x*7xAA MPL-A/B45*xxx*-S/M*x*7xAA MPL-A/B5*xxx*-S/M*x*7xAA MPL-B6*xxx*-S/M*x*7xAA MPL-B8*xxx*-S/M*x*7xAA MPL-B9*xxx*-S/M*x*7xAA		50 (164)	
MPM-A/B*xxxx*-S/M MPF-A/B*xxxx*-S/M MPS-A/B*xxxx*-S/M			
MPAR-A/B3*xxxx*-M			
MPAS-A/B*xxxx*1-V05SxA (ballscrew) MPAS-A/B*xxxx*2-V20SxA (ballscrew) MPAR-A/B1*xxxx*-V and MPAR-A/B2*xxxx*-V (series B) MPAI-A/B*xxxxx*M3	Absolute high-resolution, multi-turn	50 (164)	20 (65.6)
MPL-A/B15*xxx*-H*x*7xAA MPL-A/B2*xxx*-H*x*7xAA	Incremental encoder	30 (98.4)	20 (65.6)
MPL-A/B3*xxx*-H*x*7xAA MPL-A/B4*xxx*-H*x*7xAA MPL-A/B45*xxx*-H*x*7xAA		30 (98.4)	
MPAS-A/B*xxxx*-ALM*x*2C (direct drive)	Incremental, magnetic linear		
TLY-A*xxxx*-B	Tamagawa (17-bit) absolute high-resolution, multi-turn		
TL-A*xxxx*-B			
TLY-A*xxxx*-H	Incremental encoder		
LDAT-S*xxxxxx*-xD*x*	Hiperface, absolute, magnetic scale	10 (33.1)	
LDAT-S*xxxxxx*-xB*x*	Incremental, magnetic scale		
LDC-C*xxxxxx*-xH, LDL-*xxxxxxx*-xH	Sin/Cos or TTL encoder		

Dimensions - Kinetix 5300 Servo Drives

These drawings provide mounting dimensions for Kinetix 5300 servo drives. The 2198-K53CK-D15M feedback connector kit is available for Kinetix 5300 servo drives when flying-lead cable is used with compatible motors and actuators. Mounting dimensions that include the feedback connector kit or drive-end cable connector are also shown.

Kinetix 5300 Drives with 2198-K53CK-D15M Connector Kit

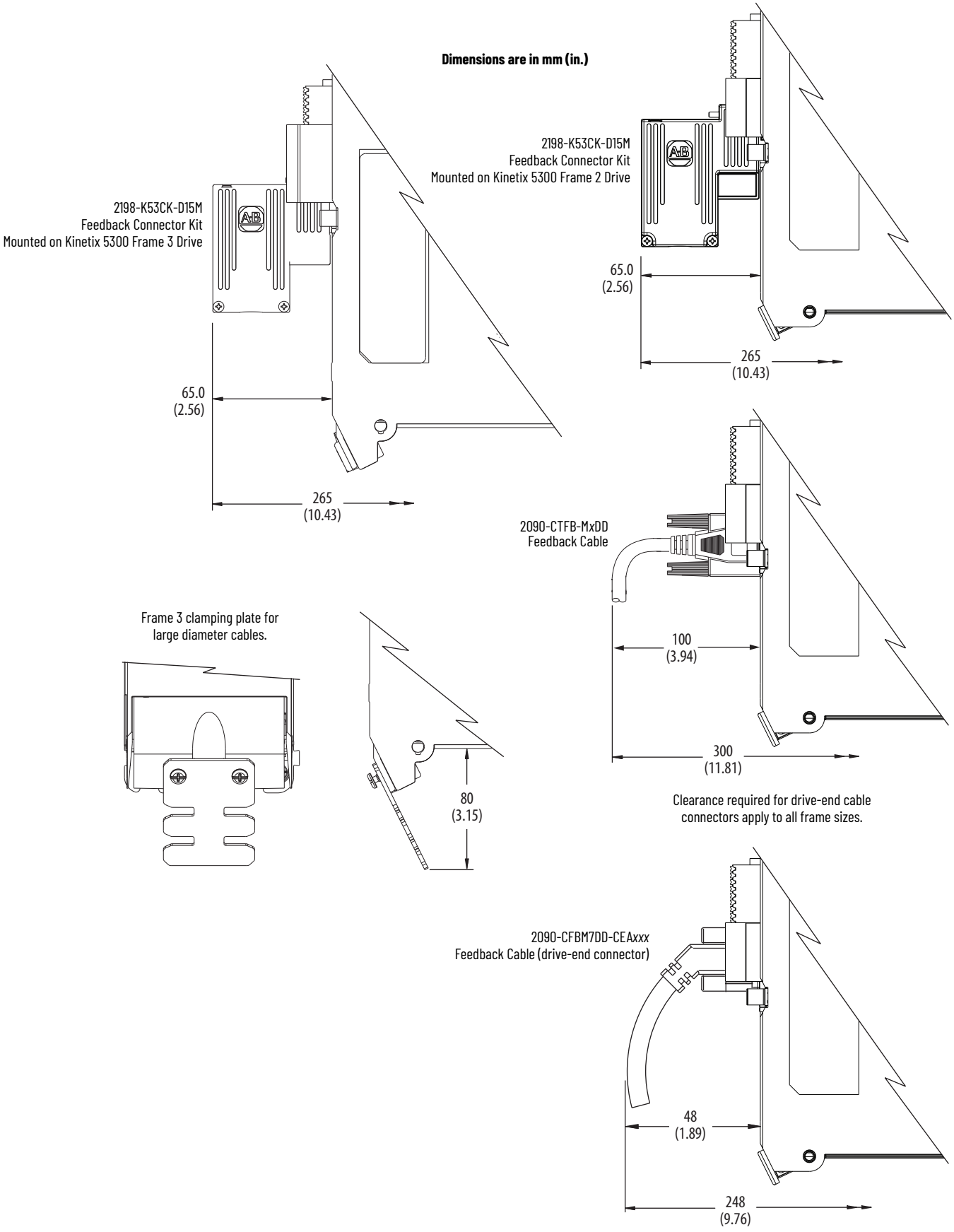


200V-class Drives Cat. No.	400V-class Drives Cat. No.	Frame Size	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)
2198-C1004-ERS	2198-C4004-ERS	Frame 1	50.0 (1.97)	175 (6.89)	204 (8.03)	265 (10.43)	215 (8.46)
2198-C1007-ERS	2198-C4007-ERS						
2198-C1015-ERS	2198-C4015-ERS	Frame 2	55.0 (2.16)	225 (8.86)			265 (10.43)
2198-C1020-ERS	2198-C4020-ERS						
2198-C2030-ERS	2198-C4030-ERS						
2198-C2055-ERS	2198-C4055-ERS	Frame 3	85.2 (3.35)	250 (9.84)			294 (11.57)
2198-C2075-ERS	2198-C4075-ERS						

Refer to Kinetix 5300 Drives with Connector Kit Accessories (Frames 2 and 3) on page 81 for product dimensions when the connector kit or drive-end cable connector is used with frame 2 and 3 servo drives.

Kinetix 5300 Drives with Connector Kit Accessories (Frames 2 and 3)

Dimensions are in mm (in.)



Environmental Specifications - Kinetix 5300 Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Ambient temperature	0…50 °C (32…122 °F)	-35…+70 °C (-31…+158 °F)
Relative humidity	5…85% noncondensing	5…95% noncondensing
Protection class (IEC 60529)	IP20	
Degree of pollution (IEC 61800-5-1)	2	
Altitude	1000 m (3281 ft)	1000 m (3281 ft)
Vibration	5…55 Hz @ 0.35 mm (0.014 in.) double amplitude, continuous displacement; 55…500 Hz @ 2.0 g peak constant acceleration (ten sweeps in each of three mutually perpendicular directions)	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications - Kinetix 5300 Servo Drives

Agency Certification (1)	Standards
cULus (2)	UL Listed to U.S. and Canadian safety standards (UL61800-5-1 File E59272).
	Solid-state motor overload protection provides dynamic fold-back of motor current when 110% of the motor rating is reached with a peak current limit based on the peak rating of the motor as investigated by UL to comply with (UL61800-5-1 File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with IEC 61800-5-1:2007 - Adjustable speed electrical power drive systems.
Functional Safety	TÜV certified for functional safety when used as described in the Kinetix 5300 Servo Drives User Manual, publication 2198-UM005. 2198-C*xxxx*-ERS (hardwired safety) drive ratings: up to Performance Level (PL) d, Category 3 according to ISO 13849; up to SIL CL2 according to IEC 61508, IEC 61800-5-2, and IEC 62061.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 1, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2198
ODVA	• EtherNet/IP conformance tested • CIP Security conformance tested
OSHA	Maximum audible noise from the servo drive system complies with OSHA standard 3074, Hearing Conservation (<85 dBA).

(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.
(2) UL has not evaluated the Safe Torque Off option in these products.

Accessories - Kinetix 5300 Servo Drives

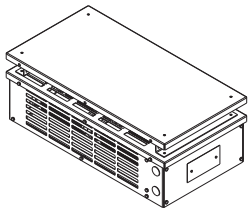
Kinetix 5300 drive accessories include the Bulletin 2198 and 2097 external shunt resistors, AC line filters, the 24V shared-bus connection system, and feedback connector kit.

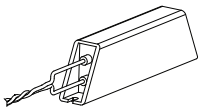
Shunt Resistor

Bulletin 2097-R*x* and 2198-R*xxx* external passive shunts are available to provide additional shunt capacity for applications where the internal shunt capacity is exceeded.

- Catalog numbers 2198-R014 and 2198-R031 are composed of resistor coils that are housed inside an enclosure.
- Catalog numbers 2198-R004, 2097-R6, and 2198-R7 are shunt resistors without an enclosure.

2198-R014 and 2198-R031
Shunt Modules





2198-R004,
2097-R6, 2097-R7
Shunt Resistors

Passive-shunt and Drive Compatibility

Drive Cat. No.	Internal Shunt Specifications		Bulletin 2198 External Shunt Module (1) Cat. No.			Bulletin 2097 External Shunt Module (1) Cat. No.	
	Ω	W	2198-R004	2198-R014	2198-R031	2097-R6	2097-R7
2198-C1004-ERS	100	30	–	–	–	X	X
2198-C1007-ERS			–	–	–	X	X
2198-C1015-ERS	60	50	X	–	X	X	X
2198-C1020-ERS			X	–	X	X	X
2198-C2030-ERS			X	–	X	X	X
2198-C2055-ERS	40	75	X	X	X	X	X
2198-C2075-ERS			X	X	X	X	X
2198-C4004-ERS	100	30	–	–	–	X	X
2198-C4007-ERS			–	–	–	X	X
2198-C4015-ERS	60	50	X	–	X	X	X
2198-C4020-ERS			X	–	X	X	X
2198-C4030-ERS			X	–	X	X	X
2198-C4055-ERS	40	75	X	X	X	X	X
2198-C4075-ERS			X	X	X	X	X

(1) Shunt resistor selection is based on the needs of your actual hardware configuration.

Shunt Module Specifications

Shunt Module Cat. No.	Resistance Ohms	Continuous Power W	Weight, approx kg (lb)
2097-R6	75	150	0.3 (0.7)
2097-R7	150	80	0.2 (0.4)
2198-R004	33	400	1.8 (4.0)
2198-R014	9.4	1400	9.1 (20)
2198-R031	33	3100 (1)	16.8 (37)

(1) The 2198-R031 shunt is limited to 2000 W when used with 2198-C1015-ERS, 2198-C1020-ERS, 2198-C2030-ERS, 2198-C4015-ERS, 2198-C4020-ERS, 2198-C4030-ERS (frame 2) drives.

Refer to Passive Shunt Modules and Resistors on page 31 and/or Shunt Resistor on page 163 for product dimensions and additional specifications.

Kinetix 5300 AC Line Filters

The Kinetix 5300 drives were tested by using these recommended line filters and are required to meet CE requirements. These Bulletin 2198 AC line filters apply to Kinetix 5300 drives used in single-phase and three-phase operation.

AC Line Filter Selection

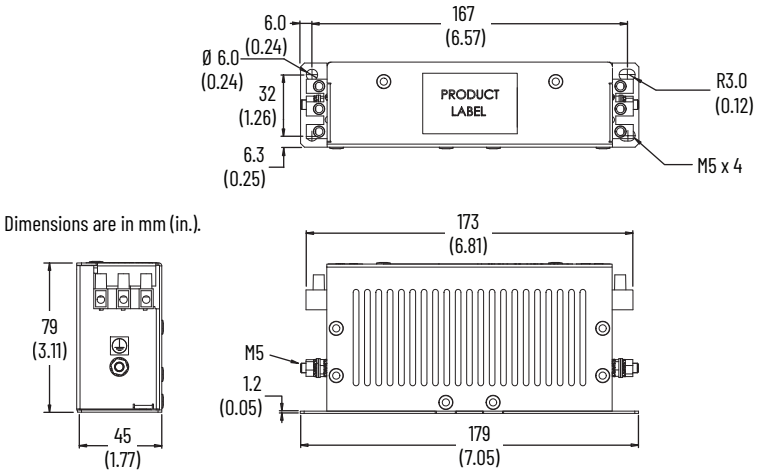
Drive Cat. No.	Frame Size	AC Line Filter Cat. No.
2198-C1004-ERS	1	2198-DB08-F
2198-C1007-ERS		
2198-C1015-ERS	2	2198-DBR20-F
2198-C1020-ERS		
2198-C2030-ERS		2198-DBR40-F
2198-C2055-ERS	3	
2198-C2075-ERS		
2198-C4004-ERS	1	2198-DB08-F
2198-C4007-ERS		
2198-C4015-ERS	2	
2198-C4020-ERS		
2198-C4030-ERS		2198-DBR20-F
2198-C4055-ERS	3	2198-DBR40-F
2198-C4075-ERS		

2198-DB*xxx*-F AC Line Filter Specifications

AC Line Filter Cat. No.	Voltage Rating, max	Current Rating A @ 50 °C (122 °F)	Power Loss W	Leakage Current mA	Weight, approx kg (lb)	Operating Temperature
2198-DB08-F (1)	528V AC three-phase 50/60 Hz	7.5	3.6	2.5	0.77 (1.70)	0...50 °C (32...122 °F)
2198-DBR20-F		20	4.2	30.0	1.0 (2.20)	
2198-DBR40-F		54	15.0		3.3 (7.28)	

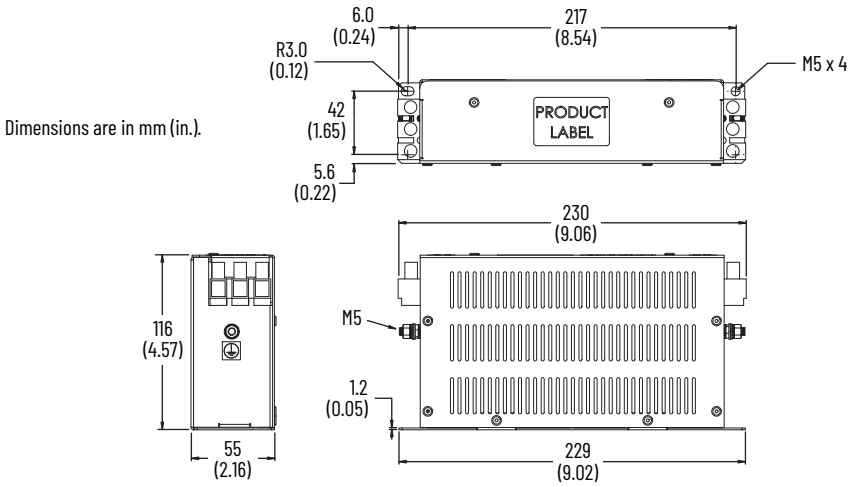
(1) Applies to installations with single-phase or three-phase input power.

AC Line Filter Dimensions (catalog number 2198-DB08-F)



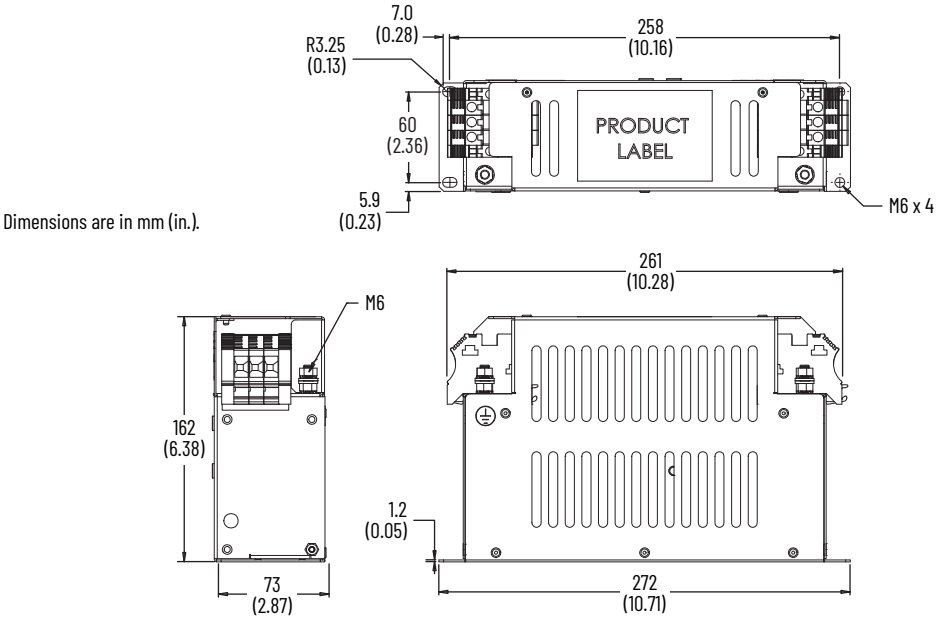
AC Line Filter Dimensions (catalog number 2198-DBR20-F)

Dimensions are in mm (in.).



AC Line Filter Dimensions (catalog number 2198-DBR40-F)

Dimensions are in mm (in.).



24V Shared-bus Connection System

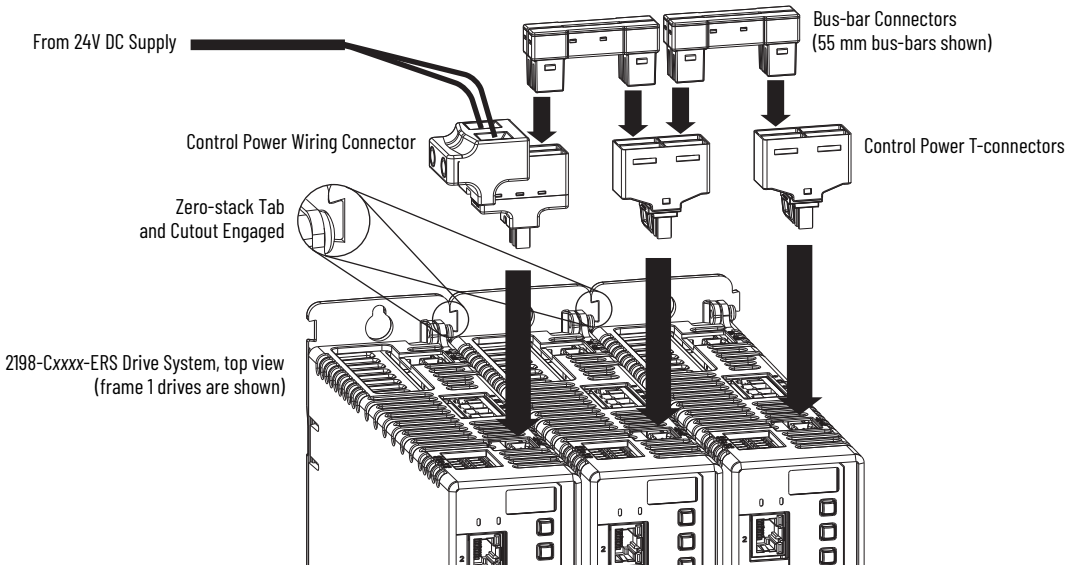
Kinetix 5300 drives can use the zero-stack feature with the 24V DC shared-bus connection system to extend control power to multiple drives.

IMPORTANT When the 24V shared-bus connection system is used, the zero-stack tab and cutout must be engaged between adjacent drives.

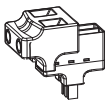
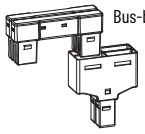
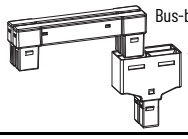
The shared-bus connection system is composed of three components:

- Input wiring connectors that plug into the leftmost drive and receive input wiring for 24V DC.
- 24V DC T-connectors that plug into the drives downstream from where 24V control power is input.
- Bus bars that connect between drives to extend the 24V DC control power from drive-to-drive.

Shared-bus Connection System Example



24V Shared-bus Connector Kit Catalog Numbers

Kit Cat. No.	Frame Size	Description	Illustration
2198-TCON-24VDCIN36	1, 2, or 3	Control power (24V) input wiring connector	 Control Power Input Connector
2198-H040-P-T	1 or 2	• Control power T-connector • Bus-bar connectors, quantity 2	 Bus-bar Connectors (2x) T-connector
2198-H070-P-T	3	• Control power T-connector • Bus-bar connectors, quantity 2	 Bus-bar Connectors (2x) T-connector

Kinetix 5300 Feedback Connector Kit

The 2198-K53CK-D15M connector kit passes feedback signals straight through from the encoder to the (MFB) feedback connector on the drive. The following encoder feedback types are accepted:

- Hiperface high-resolution absolute (multi-turn and single-turn)
- Nikon (24-bit) high-resolution serial encoder
- Tamagawa (17-bit) high-resolution serial encoder
- Digital AqB (TTL) with UVW (incremental)
- Generic sin/cos with UVW (incremental)

Use the feedback connector kit in the following types of installations:

- New installations with Kinetix 5300 servo drives and the compatible motors and actuators with flying lead cables
- Existing motor/actuator installations when upgrading with Kinetix 5300 servo drives

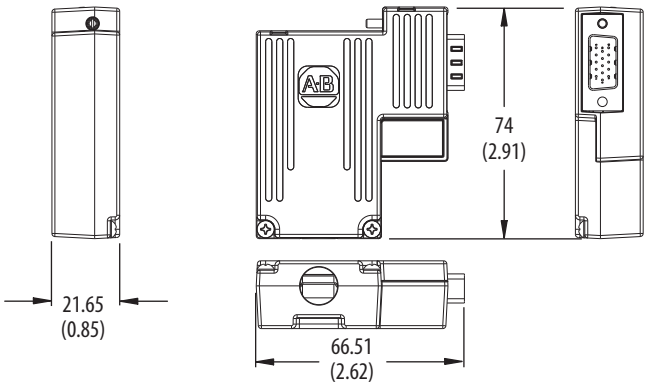
Compatible Allen-Bradley Motors and Actuators

Rotary Motors	2090-Series Feedback Cables (1)	
	High-resolution Encoder	Incremental Encoder
TLP-A046-*xxx*, TLP-A/B070-*xxx*, TLP-A/B090-*xxx*, TLP-A100-*xxx*	2090-CTFB-MADD-CFA*xx* (standard) or 2090-CTFB-MADD-CFF*xx* (continuous-flex)	–
TLP-A/B115-*xxx*, TLP-A/B145-*xxx*, TLP-A/B200-*xxx*, TLP-A/B235-*xxx*	2090-CTFB-MFDD-CFA*xx* (standard) or 2090-CTFB-MFDD-CFF*xx* (continuous-flex)	–
MPL-A/B15*xxx*-V/E, MPL-A/B2*xxx*-V/E, MPL-A/B3*xxx*-S/M, MPL-A/B4*xxx*-S/M, MPL-A/B45*xxx*-S/M, MPL-A/B5*xxx*-S/M, MPL-B6*xxx*-S/M, MPL-B8*xxx*-S/M, MPL-B9*xxx*-S/M	2090-CFBM7DF-CEAA*xx* (standard) or 2090-CFBM7DF-CEAF*xx* (continuous-flex)	–
MPM-A/B*xxxx*-S/M, MPF-A/B*xxxx*-S/M, MPS-A/B*xxxx*-S/M		–
MPAR-A/B1*xxxx*-V and MPAR-A/B2*xxxx*-V (series B) MPAR-A/B3*xxxx*-M MPAI-A/B*xxxxx*M3		–
MPAS-A/B*xxxx*1-V05SxA (ballscrew) MPAS-A/B*xxxx*2-V20SxA (ballscrew)		–
LDAT-S*xxxxxx*-x*D*x		–
MPL-A/B15*xxx*-H, MPL-A/B2*xxx*-H, MPL-A/B3*xxx*-H MPL-A/B4*xxx*-H, MPL-A/B45*xxx*-H	–	2090-XXNFMF-S*xx* (standard) or 2090-CFBM7DF-CDAF*xx* (continuous-flex)
MPAS-A/B*xxxx*-ALM*x*2C (direct drive)	–	
LDAT-S*xxxxxx*-x*B*x	–	
LDC-C*xxxxxx*-xH LDL-*xxxxxxx*-xH	–	
TLY-A*xxxx*-B	2090-CFBM6DF-CBAA*xx* (standard) or 2090-CFBM6DD-CCAA*xx* (standard)	2090-CFBM6DF-CBAA*xx* (standard) or 2090-CFBM6DD-CCAA*xx* (standard)
TLY-A*xxxx*-H		
TL-A*xxxx*-B	2090-DANFCT-S*xx* (standard)	–

(1) These are typical feedback cables. Refer to the Kinetix 5300 Servo Drives Design Guide, publication KNX-RM012, for the cables required for specific drive and motor/actuator combinations.

Kinetix 5300 Feedback Connector Kit Dimensions

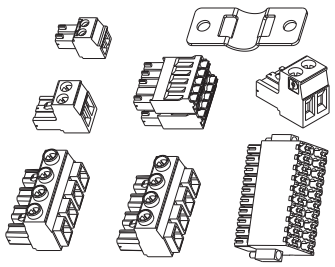
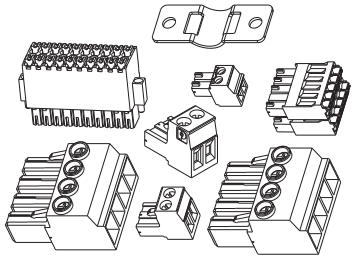
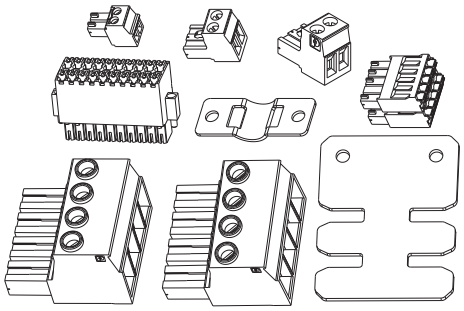
Dimensions are in mm (in.).



Replacement Parts - Kinetix 5300 Servo Drives

Connector sets are included with each drive and these replacement sets are also available.

Replacement Connector Sets

Replacement Kit Cat. No.	Description	Contents	Illustration
2198-CONKIT-PWR20	Replacement connector set for Frame 1 and Frame 2 servo drives, except 2198-C2030-ERS (Frame 2) drive.	• One shunt connector [1] • One AC input power connector • One control power connector • One motor power connector • One motor brake connector • One digital inputs and auxiliary feedback connector • One safe torque-off connector • One clamp spacer	
2198-CONKIT-PWR30	Replacement connector set for 2198-C2030-ERS (Frame 2) servo drives.	• One shunt connector [1] • One AC input power connector • One control power connector • One motor power connector • One motor brake connector • One digital inputs and auxiliary feedback connector • One safe torque-off connector • One clamp spacer	
2198-CONKIT-PWR75	Replacement connector set for 2198-C2055-ERS, 2198-C2075-ERS, 2198-C4055-ERS, 2198-C4075-ERS (Frame 3) servo drives.	• One shunt connector [1] • One AC input power connector • One control power connector • One motor power connector • One motor brake connector • One digital inputs and auxiliary feedback connector • One safe torque-off connector • One clamp spacer • One clamping plate	

(1) This shunt connector plug is intended for use with an (optional) external shunt. Each 2198-C*xxxx*-ERS drive also includes a shunt connector plug installed and wired to the internal shunt.

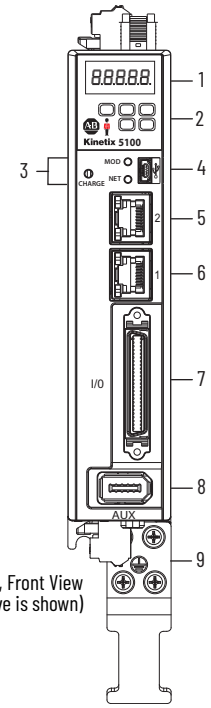
Kinetix 5100 EtherNet/IP Indexing Servo Drives



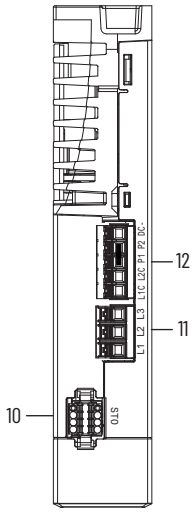
Our Kinetix 5100 servo drives provide a scalable, cost-effective servo control choice in a single product line. With a wide power range (up to 15 kW) to choose from, Kinetix 5100 drives support applications controlled by stand-alone, Micro800™, MicroLogix™, and Logix 5000 controllers for a range of performance requirements. With Integrated Architecture™ capabilities in mind, the Kinetix 5100 drives can be readily integrated with specially built AOI's in Logix Designer applications. The drive comes with standard inputs and outputs, different modes of control, plus Safe Torque Off and dual-port EtherNet/IP for various network topologies. Designed for versatility, with the Kinetix 5100 drives you can select the power you need to fit the unique needs of the application.

Kinetix 5100 Drive Features and Indicators

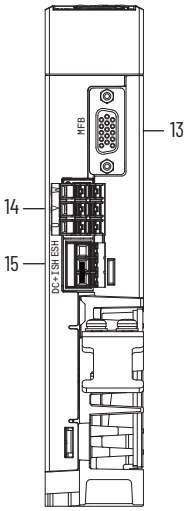
Features and Indicators (catalog numbers 2198-E1004-ERS, 2198-E1007-ERS, and 2198-E1015-ERS)



Kinetix 5100 Drive, Front View
(2198-E1004-ERS drive is shown)



Kinetix 5100 Drive, Top View
(2198-E1004-ERS drive is shown)



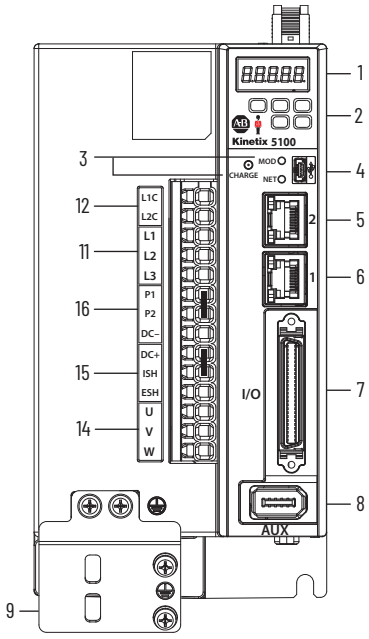
Kinetix 5100 Drive, Bottom View
(2198-E1004-ERS drive is shown)

Features and Indicators Description

Item	Description
1	Status display
2	Navigation push buttons
3	Module, Network, and Charge status indicators
4	Mini USB connector
5	Ethernet (PORT2) RJ45 connector
6	Ethernet (PORT1) RJ45 connector
7	I/O signal connector
8	Auxiliary feedback (AUX) connector

Item	Description
9	Motor cable ground plate
10	Safe torque-off (STO) connector
11	Mains input power connector
12	• Control power input (L1C and L2C) connections • Reserved (P1, P2, and negative DC bus) not-used connections
13	Motor feedback (MFB) connector
14	Motor power output terminals
15	Shunt resistor terminals

Features and Indicators (catalog numbers 2198-E1020-ERS, 2198-E2030-ERS, 2198-E4004-ERS, 2198-E4007-ERS, 2198-E4015-ERS)



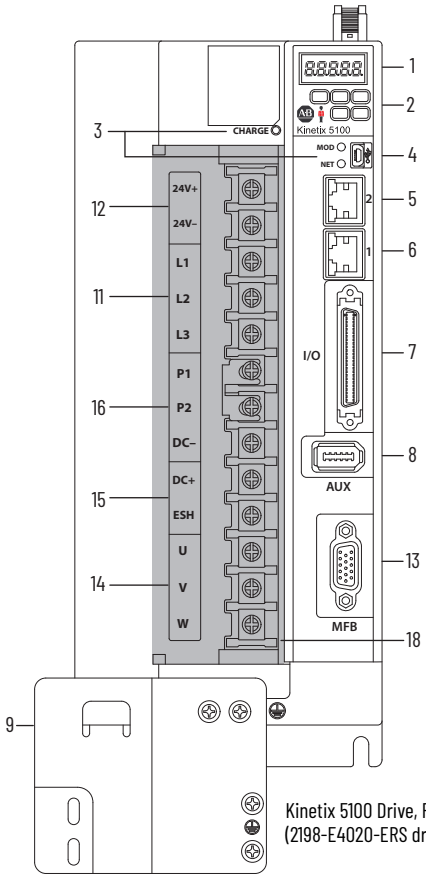
Kinetix 5100 Drive, Front View
(2198-E1020-ERS drive is shown)

Kinetix 5100 Drive, Top View
(2198-E1020-ERS drive is shown)

Kinetix 5100 Drive, Bottom View
(2198-E1020-ERS drive is shown)

For feature descriptions see table on page 91.

Features and Indicators (catalog numbers 2198-E4020-ERS, 2198-E4030-ERS)



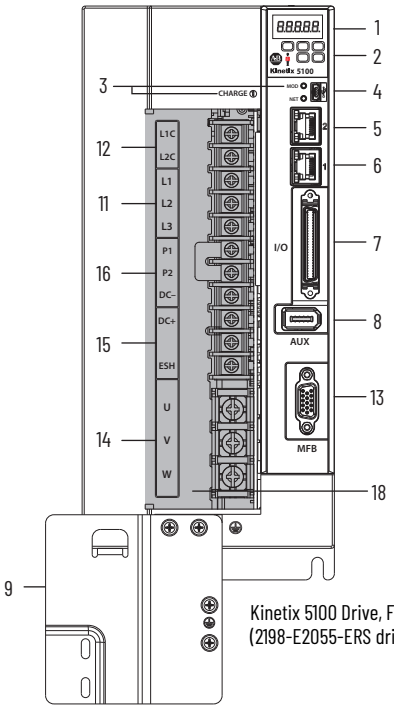
Kinetix 5100 Drive, Front View
(2198-E4020-ERS drive is shown)

Kinetix 5100 Drive, Top View
(2198-E4020-ERS drive is shown)

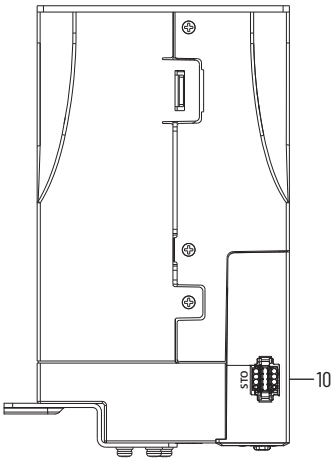
Kinetix 5100 Drive, Bottom View
(2198-E4020-ERS drive is shown)

For feature descriptions see table on page 91.

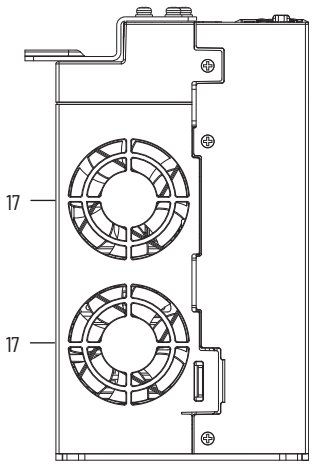
Features and Indicators
(catalog numbers 2198-E2055-ERS, 2198-E2075-ERS, 2198-E2150-ERS, 2198-E4055-ERS, 2198-E4075-ERS, and 2198-E4150-ERS)



Kinetix 5100 Drive, Front View
(2198-E2055-ERS drive is shown)



Kinetix 5100 Drive, Top View
(2198-E2055-ERS drive is shown)



Kinetix 5100 Drive, Bottom View
(2198-E2055-ERS drive is shown)

Features and Indicators Description

Item	Description
1	Status display
2	Navigation push buttons
3	Module, Network, and Charge status indicators
4	Mini USB connector
5	Ethernet (PORT2) RJ45 connector
6	Ethernet (PORT1) RJ45 connector
7	I/O signal connector
8	Auxiliary feedback (AUX) connector
9	Motor cable ground plate

Item	Description
10	Safe torque-off (STO) connector
11	Mains input power terminals
12	Control power input terminals [1]
13	Motor feedback (MFB) connector
14	Motor power output terminals
15	Shunt resistor terminals
16	Reserved (P1, P2, and negative DC bus) not-used connections
17	Cooling fans
18	Protective cover

(1) Control power terminals are labeled L1C/L2C for 2198-1*xxx*-ERS and 2198-2*xxx*-ERS (200V-class) drives and 24V+/24V- for 2198-4*xxx*-ERS (400V-class) drives.

Technical Specifications - Kinetix 5100 Servo Drives

Kinetix 5100 Power Specifications (single-phase and three-phase)

Attribute	2198-E1004-ERS	2198-E1007-ERS	2198-E1015-ERS	2198-E1020-ERS
AC input voltage	95…132V rms, single-phase (120V nom) 170…253V rms, single-phase (200…230V nom) 170…253V rms, three-phase (230V nom)			
AC input frequency	47…63 Hz			
Mains AC input current [1]				
Nom (rms) 120V input (single-phase)	4.08 A	7.88 A	12.22 A	18.40 A
Max inrush (0-pk) 120V input	0.84 A	0.76 A	0.76 A	2.56 A
Nom (rms) 230V input (single-phase)	4.79 A	8.85 A	14.41 A	21.36 A
Max inrush (0-pk) 230V input	1.40 A	1.32 A	1.36 A	4.40 A
Nom (rms) 230V input (three-phase)	2.84 A	5.20 A	7.87 A	11.57 A
Max inrush (0-pk) 230V input	1.44 A	1.40 A	1.44 A	4.64 A
Control power input voltage	95…132V rms, 120V AC nom, single-phase, with 120V AC input power 170…253V rms, 200…230V AC nom, single-phase, with 200…230V AC input power			
Control power input current [2]				
Nom (rms) 120V input	0.34 A	0.38 A	0.38 A	0.63 A
Max inrush (0-pk)	15.80 A	18.20 A	19.20 A	19.20 A
Nom (rms) 230V input	0.20 A	0.22 A	0.22 A	0.35 A
Max inrush (0-pk)	37.0 A	37.40 A	39.80 A	32.40 A
Continuous output current (rms)	2.6 A	5.1 A	7.9 A	13.4 A
Continuous output current (0-pk)	3.7 A	7.2 A	11.2 A	18.9 A
Peak output current (rms) [3]	6.5 A	15.41 A	23.7 A	40.58 A
Peak output current (0-pk)	9.2 A	21.8 A	33.5 A	57.4 A
Line loss ride through	20 ms			
Continuous output power				
@ 120V nom	0.20 kW	0.375 kW	0.75 kW	1.0 kW
@ 230V nom	0.40 kW	0.75 kW	1.50 kW	2.0 kW
Internal shunt on	370V @120V AC input 370V @230V AC input			
Internal shunt off				
Internal shunt resistor	100 Ω	100 Ω	100 Ω	20 Ω
Internal shunt power	5 W	14 W	14 W	20 W
Bus undervoltage	70V @120V AC input 150V @230V AC input			
Bus overvoltage	410V @120V AC input 410V @230V AC input			
Bus capacitance	540 µF	1680 µF	1680 µF	2160 µF
Capacitive energy absorption	9.6 J	29.9 J		38.4 J
Short-circuit current rating	5,000 A (rms) symmetrical			

(1) Kinetix 5100 drive modules are limited to 1 AC mains power cycling per minute.
(2) Kinetix 5100 drive modules are limited to 1 control power cycling every 20 seconds.
(3) Peak RMS current allowed for up to 1.8 seconds.

Kinetix 5100 Power Specifications (230V nom three-phase)

Attribute	2198-E2030-ERS	2198-E2055-ERS	2198-E2075-ERS	2198-E2150-ERS
AC input voltage	170…253V rms, three-phase (230V nom)			
AC input frequency	47…63 Hz			
Mains AC input current [1] Nom (rms) 230V input (three-phase) Max inrush (0-pk) 230V input	 14.65 A 4.42 A	 27.32 A 9.55 A	 37.90 A 28.68 A	 70.45 A 32.0 A
Control power input voltage	170…253V rms, 200…230V AC nom, single-phase, with 200…230V AC input power			
Control power input current [2] Nom (rms) 230V input Max inrush (0-pk)	 0.35 A 36.40 A	 0.46 A 32.80 A	 0.48 A 40.0 A	 0.92 A 37.0 A
Continuous output current (rms)	17.9 A	41.3 A	49.0 A	78.0 A
Continuous output current (0-pk)	25.3 A	58.4 A	69.3 A	110.3 A
Peak output current (rms) [3]	55.95 A	91.4 A	127.5 A	162.0 A
Peak output current (0-pk)	79.1 A	129.2 A	180.3 A	229.1 A
Line loss ride through	20 ms			
Continuous output power	3.0 kW	5.5 kW	7.5 kW	15.0 kW
Internal shunt on	370V			
Internal shunt off				
Internal shunt resistor	20 Ω	–	–	–
Internal shunt power	20 W	–	–	–
Bus undervoltage	150V			
Bus overvoltage	410V			
Bus capacitance	2160 µF	4100 µF	6000 µF	13,500 µF
Capacitive energy absorption	38.4 J	72.9 J	106.7 J	240.1 J
Short-circuit current rating	5,000 A (rms) symmetrical			

(1) Kinetix 5100 drive modules are limited to 1 AC mains power cycling per minute.
(2) Kinetix 5100 drive modules are limited to 1 control power cycling every 20 seconds.
(3) Peak RMS current allowed for up to 1.8 seconds.

Kinetix 5100 Power Specifications (480V nom three-phase)

Attribute	2198-E4004-ERS	2198-E4007-ERS	2198-E4015-ERS	2198-E4020-ERS
AC input voltage	342...528V rms, three-phase (480V nom)			
AC input frequency	47...63 Hz			
Mains AC input current [1]				
Nom (rms) 380V input (three-phase)	1.49 A	2.31 A	5.009 A	6.29 A
Max inrush (0-pk) 380V input	5.66 A	5.66 A	5.66 A	9.43 A
Nom (rms) 480V input (three-phase)	1.34 A	2.08 A	4.38 A	4.94 A
Max inrush (0-pk) 480V input	7.15 A	7.15 A	7.15 A	11.91 A
Control power input voltage	21.6...26.4V DC 24V DC nom			
Control power input current @ 24V DC [2] Control power in-rush current @ 24V DC	1.27 A_{DC} 4.14 A_{DC}			1.40 A_{DC} 4.97 A_{DC}
Continuous output current (rms)	1.60 A	3.19 A	6.05 A	7.42 A
Continuous output current (0-pk)	2.26 A	4.51 A	8.56A	10.49 A
Peak output current (rms) [3]	5.40 A	8.0 A	15.11 A	20.78 A
Peak output current (0-pk)	7.63 A	11.31 A	21.36 A	29.38 A
Line loss ride through	20 ms			
Continuous output power	0.40 kW	0.75 kW	1.50 kW	2.0 kW
Internal shunt on	760V			
Internal shunt off				
Internal shunt resistor	80 Ω			–
Internal shunt power	10 W			–
Bus undervoltage	282V			
Bus overvoltage	820V			
Bus capacitance	165 µF		235 µF	470 µF
Capacitive energy absorption	11.2 J		16.0 J	32.0 J
Short-circuit current rating	5,000 A (rms) symmetrical			

(1) Kinetix 5100 drive modules are limited to 1 AC mains power cycling per minute.
(2) Kinetix 5100 drive modules are limited to 1 control power cycling every 20 seconds.
(3) Peak RMS current allowed for up to 1.8 seconds.

Kinetix 5100 Power Specifications (480V nom three-phase, continued)

Attribute	2198-E4030-ERS	2198-E4055-ERS	2198-E4075-ERS	2198-E4150-ERS
AC input voltage	342...528V rms, three-phase (380/480V nom)			
AC input frequency	47...63 Hz			
Mains AC input current [1]				
Nom (rms) 380V input (three-phase)	9.96 A	16.825 A	23.664 A	36.855 A
Max inrush (0-pk) 380V input	9.43 A	9.43 A	9.43 A	28.28 A
Nom (rms) 480V input (three-phase)	7.91 A	13.35 A	18.78 A	29.25 A
Max inrush (0-pk) 480V input	11.91 A	11.91 A	11.91 A	35.73 A
Control power input voltage	21.6...26.4V DC, 24V DC nom			
Control power input current @ 24V DC [2]	1.77 A_{DC}	2.03 A_{DC}		4.43 A_{DC}
Control power in-rush current @ 24V DC	4.97 A_{DC}	3.24 A_{DC}		3.40 A_{DC}
Continuous output current (rms)	13.95 A	24.8 A	31.0 A	41.26 A
Continuous output current (0-pk)	19.73 A	35.07 A	43.84 A	58.35 A
Peak output current (rms) [3]	26.08 A	37.65 A	53.32 A	70.14 A
Peak output current (0-pk)	36.88 A	53.24 A	75.39 A	99.18 A
Line loss ride through	20 ms			
Continuous output power	3.0 kW	5.5 kW	7.5 kW	15.0 kW
Internal shunt on	760V			
Internal shunt off				
Internal shunt resistor	–	–	–	–
Internal shunt power	–	–	–	–
Bus undervoltage	282V			
Bus overvoltage	820V			
Bus capacitance	560 µF	1120 µF	1640 µF	2500 µF
Capacitive energy absorption	38.2 J	76.3 J	111.7 J	170.3 J
Short-circuit current rating	5,000 A (rms) symmetrical			

(1) Kinetix 5100 drive modules are limited to 1 AC mains power cycling per minute.
(2) Kinetix 5100 drive modules are limited to 1 control power cycling every 20 seconds.
(3) Peak RMS current allowed for up to 1.8 seconds.

Circuit Breaker/Fuse Specifications

Kinetix 5100 servo drives use internal solid-state motor short-circuit protection and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 5,000 A when protected by fuses or circuit breakers. These fuses and Allen-Bradley circuit breakers are recommended for use with 2198-E*xxxx*-ERS drives.

Control Power Circuit-protection Specifications

Kinetix 5100 Drive Cat. No.	Fuse (Bussmann) Cat. No	Circuit Breaker Cat. No.
2198-E1004-ERS	KTK-R-2 (2A)	1489-M2D010
2198-E1007-ERS		
2198-E1015-ERS		
2198-E1020-ERS		1489-M2D020
2198-E2030-ERS		1489-M2D010
2198-E2055-ERS	KTK-R-3 (3A)	1489-M2D016
2198-E2075-ERS		
2198-E2150-ERS	KTK-R-5 (5A)	1489-M2D030

Input Power UL/CSA Circuit-protection Specifications

Kinetix 5100 Drive Cat. No.	Drive Voltage	Fuses (Bussmann) Cat. No.	Miniature Circuit Breaker Cat. No.	Molded Case Circuit Breaker Cat. No.
2198-E1004-ERS	120V/230V AC, single-phase	KTK-R-15 (15A)	1489-M2D100	–
	230V AC, three-phase	KTK-R-10 (10A)	1489-M3D100	–
2198-E1007-ERS	120/230V AC, single-phase	KTK-R-20 (20A)	1489-M2D200	–
	230V AC, three-phase	KTK-R-15 (15A)	1489-M3D130	–
2198-E1015-ERS	120/230V AC, single-phase	KTK-R-30 (30A)	1489-M2D300	–
	230V AC, three-phase	KTK-R-25 (25A)	1489-M3D200	–
2198-E1020-ERS	120/230V AC, single-phase	LPJ-40SP (40A)	1489-M2D400	–
	230V AC, three-phase	LPJ-35SP (35A)	1489-M3D300	–
2198-E2030-ERS	230V AC, three-phase	LPJ-50SP (50A)	1489-M3D350	–
2198-E2055-ERS		LPJ-70SP (70A)	1489-M3D600	–
2198-E2075-ERS		LPJ-80SP (80A)	–	140G-G2C3-C70
2198-E2150-ERS		LPJ-125SP (125A)	–	140G-G2C3-D12
2198-E4004-ERS	380...480V AC, three-phase	KTK-R-10 (10A)	1489-M3D100	–
2198-E4007-ERS		KTK-R-15 (15A)	1489-M3D100	–
2198-E4015-ERS		KTK-R-20 (20A)	1489-M3D150	–
2198-E4020-ERS		KTK-R-25 (25A)	1489-M3D200	–
2198-E4030-ERS		KTK-R-30 (30A)	1489-M3D300	–
2198-E4055-ERS		LPJ-35SP (35A)	–	–
2198-E4075-ERS		LPJ-45SP (45A)	–	–
2198-E4150-ERS		LPJ-90SP (90A)	–	–

Input Power IEC (non-UL/CSA) Circuit-protection Specifications

Kinetix 5100 Drive Cat. No.	Drive Voltage	DIN gG Fuses Amps, Max	Miniature Circuit Breaker Cat. No.	Molded Case Circuit Breaker Cat. No.
2198-E1004-ERS	120/230V AC, single-phase	15	1489-M2D100	–
	230V AC, three-phase	10	1489-M3D100	–
2198-E1007-ERS	120/230V AC, single-phase	20	1489-M2D200	–
	230V AC, three-phase	15	1489-M3D130	–
2198-E1015-ERS	120/230V AC, single-phase	30	1489-M2D300	–
	230V AC, three-phase	25	1489-M3D200	–
2198-E1020-ERS	120/230V AC, single-phase	40	1489-M2D400	–
	230V AC, three-phase	35	1489-M3D300	–
2198-E2030-ERS	230V AC, three-phase	50	1489-M3D350	–
2198-E2055-ERS		70	1489-M3D600	–
2198-E2075-ERS		80	–	140G-G2C3-C70
2198-E2150-ERS		125	–	140G-G2C3-D12
2198-E4004-ERS	380...480V AC, three-phase	10	1489-M3D100	–
2198-E4007-ERS		15	1489-M3D100	–
2198-E4015-ERS		20	1489-M3D150	–
2198-E4020-ERS		25	1489-M3D200	–
2198-E4030-ERS		30	1489-M3D300	–
2198-E4055-ERS		35	1489-M3D350	–
2198-E4075-ERS		45	–	140G-G6C3-C45
2198-E4150-ERS		90	–	140G-G6C3-C60

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 5100 drive system.

Kinetix 5100 (200V) Drives Cat. No.	Loss, max W
2198-E1004-ERS	38.06
2198-E1007-ERS	66.33
2198-E1015-ERS	87.23
2198-E1020-ERS	139.83
2198-E2030-ERS	179.53
2198-E2055-ERS	328.52
2198-E2075-ERS	372.33
2198-E2150-ERS	648.55

Kinetix 5100 (400V) Drives Cat. No.	Loss (380V), max W	Loss (480V), max W
2198-E4004-ERS	51	56
2198-E4007-ERS	71	86
2198-E4015-ERS	99	117
2198-E4020-ERS	109	123
2198-E4030-ERS	214	220
2198-E4055-ERS	342	363
2198-E4075-ERS	467	494
2198-E4150-ERS	501	541

Leakage Current Specifications

Kinetix 5100 (200V-class) Servo Drives

Kinetix 5100 Drive Cat. No.	Without Line Filter @ 253V AC, Single-phase mA, max	Without Line Filter @ 253V AC, Three-phase mA, max	With Line Filter @ 253V AC, Single-phase mA, max	With Line Filter @ 253V AC, Three-phase mA, max
2198-E1004-ERS	16.2	26.1	58.5	4.04
2198-E1007-ERS	16.8	19.3	56.8	3.78
2198-E1015-ERS	16.5	26.6	57.3	9.60
2198-E1020-ERS	23.4	36.4	55.3	10.10
2198-E2030-ERS	–	36.6	–	9.80
2198-E2055-ERS	–	45.0	–	14.30
2198-E2075-ERS	–	45.6	–	39.3
2198-E2150-ERS	–	42.7	–	40.4

Kinetix 5100 (400V-class) Servo Drives

Kinetix 5100 Drive Cat. No.	Without Line Filter @ 528V AC, Three-phase mA, max	With Line Filter @ 528V AC, Three-phase mA, max
2198-E4004-ERS	67.5	5.4
2198-E4007-ERS	66.6	5.7
2198-E4015-ERS	45.4	7.2
2198-E4020-ERS	19.7	5.2
2198-E4030-ERS	33.1	5.7
2198-E4055-ERS	17.7	6.0
2198-E4075-ERS	11.0	7.1
2198-E4150-ERS	13.0	8.5

Weight Specifications

Kinetix 5100 (200V-class) Drive Cat. No.	Weight, approx kg (lb)
2198-E1004-ERS	0.92 (2.0)
2198-E1007-ERS	1.30 (2.87)
2198-E1015-ERS	1.30 (2.87)
2198-E1020-ERS	2.70 (5.95)
2198-E2030-ERS	2.70 (5.95)
2198-E2055-ERS	5.0 (11.02)
2198-E2075-ERS	8.0 (17.62)
2198-E2150-ERS	15.0 (33.07)

Kinetix 5100 (400V-class) Drive Cat. No.	Weight, approx kg (lb)
2198-E4004-ERS	2.70 (5.95)
2198-E4007-ERS	
2198-E4015-ERS	
2198-E4020-ERS	4.50 (9.92)
2198-E4030-ERS	
2198-E4055-ERS	5.0 (11.02)
2198-E4075-ERS	10.0 (22.0)
2198-E4150-ERS	15.0 (33.07)

Maximum Cable Lengths

Kinetix 5100 drive maximum cable length depends on the feedback type and input voltage that is used in the application. These tables assume the use of recommended cables as shown in the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Maximum Cable Lengths (200V-Class) Motors

Compatible Motor and Actuator Cat. No.	Feedback Type	Cable Length, max m (ft)
TLP-A*xxx*-*xxx*-D	Nikon (24-bit) absolute high-resolution, multi-turn and single-turn	50 (164)
MPL-A15*xxx*-V/Ex7xAA MPL-A2*xxx*-V/Ex7xAA	Hiperface, absolute high-resolution, multi-turn and single-turn	
MPL-A3*xxx*-S/Mx7xAA MPL-A4*xxx*-S/Mx7xAA MPL-A45*xxx*-S/Mx7xAA MPL-A5*xxx*-S/Mx7xAA		
MPM-A*xxxx*-S/M MPF-A*xxxx*-S/M MPS-A*xxxx*-S/M		
MPL-A15*xxx*-Hx7xAA MPL-A2*xxx*-Hx7xAA	Incremental	30 (98.4)
MPL-A3*xxx*-Hx7xAA MPL-A4*xxx*-Hx7xAA MPL-A45*xxx*-Hx7xAA		
TLY-A*xxxx*-B	Tamagawa (17-bit) absolute high-resolution, multi-turn	
TL-A*xxxx*-B		
TLY-A*xxxx*-H	Incremental	

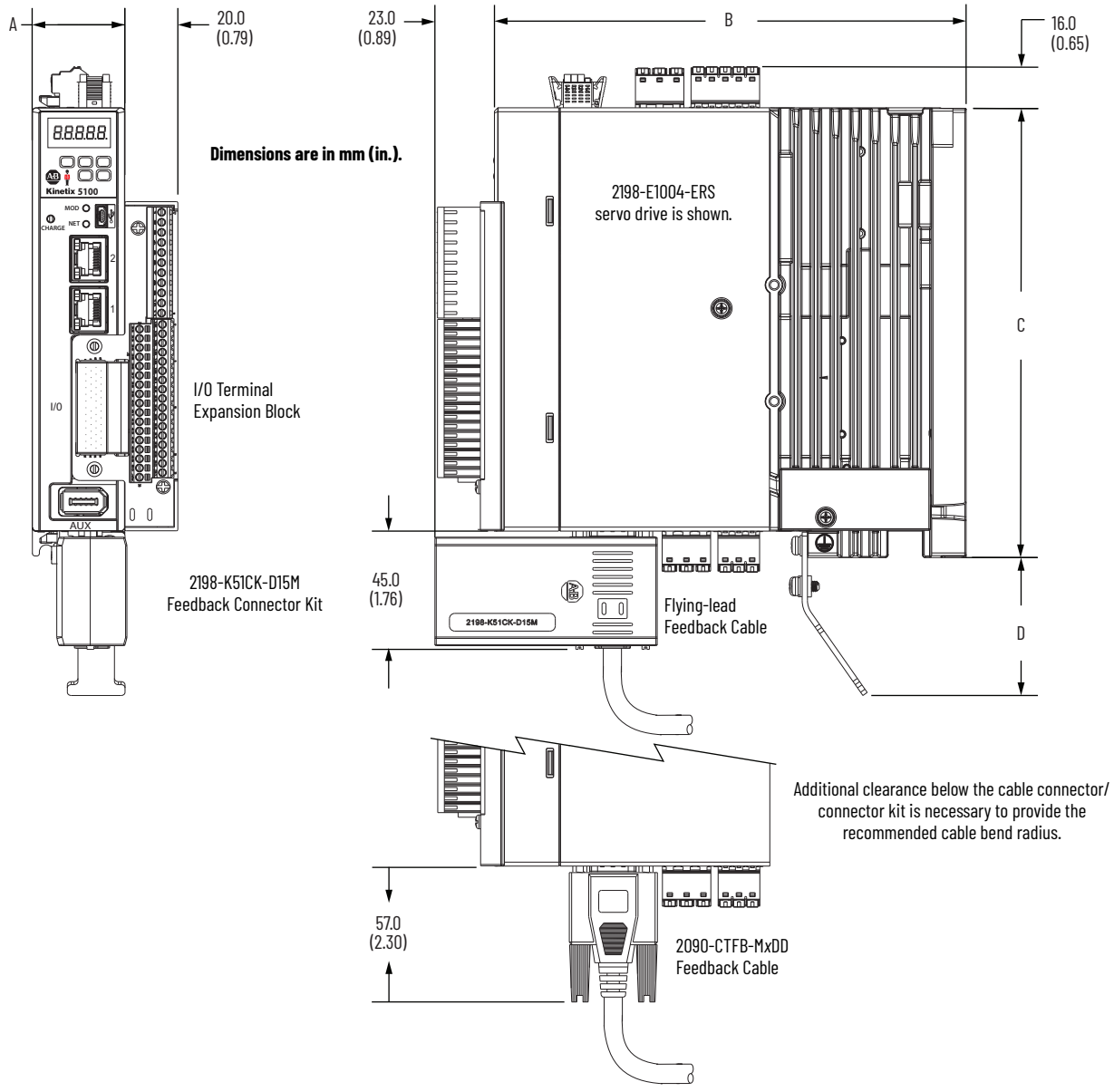
Maximum Cable Lengths (400V-Class) Motors

Compatible Motor and Actuator Cat. No.	Feedback Type	Cable Length, max m (ft)	
		≤ 400V AC Input	480V AC Input
TLP-B200-*xxx*-D	Nikon (24-bit) absolute high-resolution, multi-turn and single-turn	50 (164)	15 (49.2)
TLP-B070-*xxx*-D, TLP-B090-*xxx*-D, TLP-B115-*xxx*-D, TLP-B145-*xxx*-D, TLP-B235-*xxx*-D			50 (164)
MPL-B15*xxx*-V/Ex7xAA MPL-B2*xxx*-V/Ex7xAA	Hiperface, absolute high-resolution, multi-turn and single-turn	50 (164)	20 (65.6)
MPL-B3*xxx*-S/Mx7xAA MPL-B4*xxx*-S/Mx7xAA MPL-B45*xxx*-S/Mx7xAA MPL-B5*xxx*-S/Mx7xAA MPL-B6*xxx*-S/Mx7xAA MPL-B8*xxx*-S/Mx7xAA MPL-B9*xxx*-S/Mx7xAA		50 (164)	
MPM-B*xxxx*-S/M MPF-B*xxxx*-S/M MPS-B*xxxx*-S/M			
MPL-B15*xxx*-Hx7xAA MPL-B2*xxx*-Hx7xAA	Incremental	30 (98.4)	20 (65.6)
MPL-B3*xxx*-Hx7xAA MPL-B4*xxx*-Hx7xAA MPL-B45*xxx*-Hx7xAA		30 (98.4)	

Dimensions - Kinetix 5100 Servo Drives

These drawings provide mounting dimensions for Kinetix 5100 servo drives. Mounting dimensions that include the feedback connector kit or drive-end cable connector are also shown.

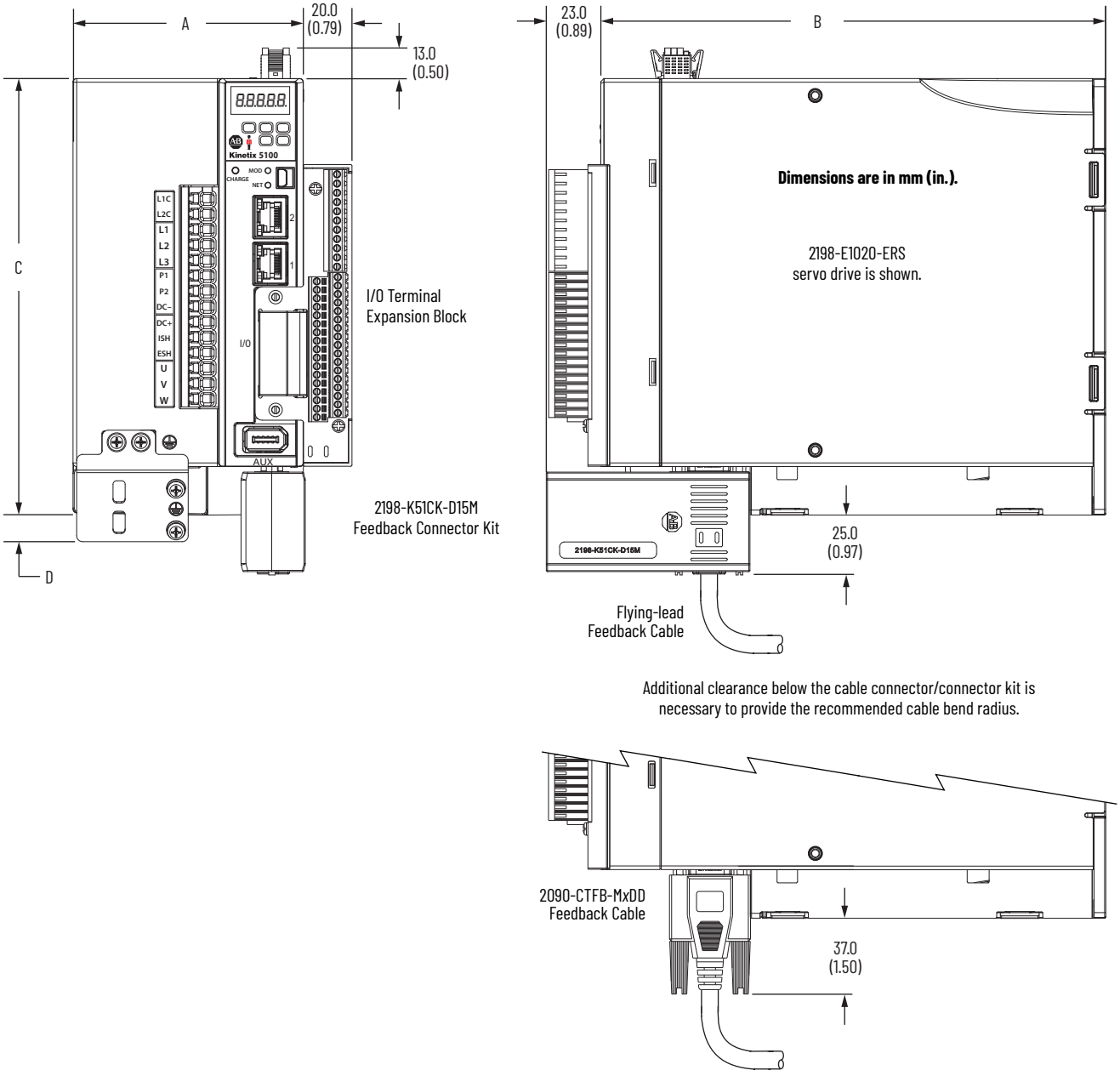
Catalog Numbers 2198-E1004-ERS, 2198-E1007-ERS, and 2198-E1015-ERS



Kinetix 5100 Drive Dimensions

Cat. No.	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)
2198-E1004-ERS	35.0 (1.37)	178 (7.0)	170 (6.68)	52.0 (2.05)
2198-E1007-ERS	50.0 (2.0)	188 (7.41)	180 (7.10)	47.0 (1.84)
2198-E1015-ERS				

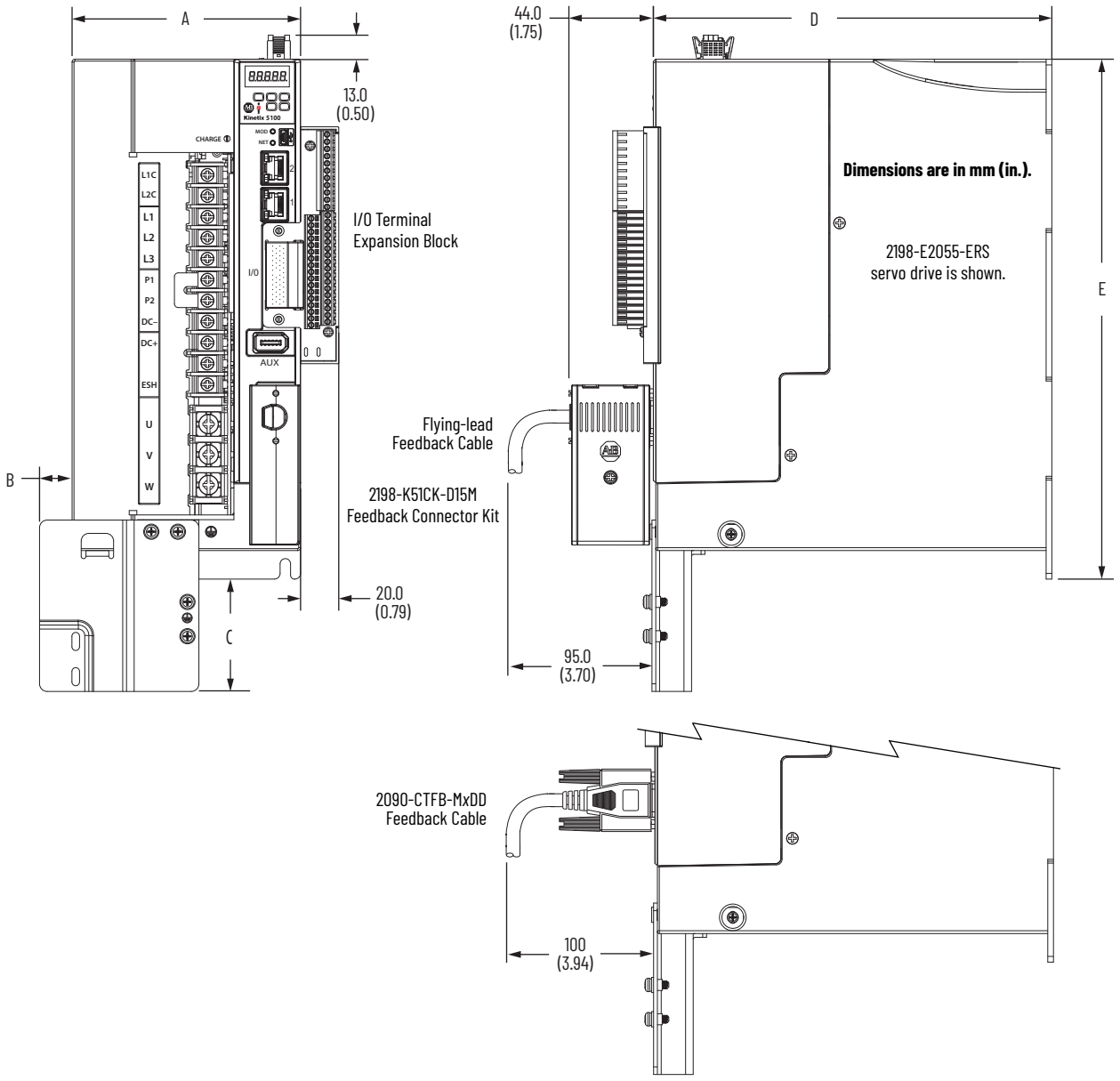
Catalog Numbers 2198-E1020-ERS, 2198-E2030-ERS, 2198-E4004-ERS, 2198-E4007-ERS, and 2198-E4015-ERS



Kinetix 5100 Drive Dimensions

Cat. No.	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)
2198-E1020-ERS	95.0 (3.74)	208 (8.20)	180 (7.09)	11.0 (0.43)
2198-E2030-ERS				
2198-E4004-ERS				
2198-E4007-ERS				
2198-E4015-ERS				

Catalog Numbers
2198-E4020-ERS, 2198-E4030-ERS, 2198-E2055-ERS, 2198-E4055-ERS, 2198-E2075-ERS, 2198-E4075-ERS, 2198-E2150-ERS, and 2198-E4150-ERS



Kinetix 5100 Drive Dimensions

Cat. No.	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)
2198-E4020-ERS	110 (4.33)	14.0 (0.55)	38.0 (1.50)	204 (8.02)	260 (10.24)
2198-E4030-ERS					
2198-E2055-ERS	120 (4.72)	37.0 (1.47)	59.0 (2.32)	209 (8.24)	273 (10.75)
2198-E4055-ERS					
2198-E2075-ERS	141 (5.55)	16.0 (0.65)	35.0 (1.36)	225 (8.87)	312 (12.28)
2198-E4075-ERS					
2198-E2150-ERS	186 (7.32)			281 (11.08)	390 (15.35)
2198-E4150-ERS					

Environmental Specifications - Kinetix 5100 Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Temperature, ambient	0...50 °C (32...122 °F)	-40...+70 °C (-40...158 °F)
Relative humidity	5...85% noncondensing	5...95% noncondensing
Altitude	1000 m (3281 ft)	1000 m (3281 ft)
Vibration	5...55 Hz @ 0.35mm (0.014in) double amplitude, continuous displacement; 55...500 Hz @ 2.0G peak constant acceleration (10 sweeps in each of 3 mutually perpendicular directions)	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications - Kinetix 5100 Servo Drives

Agency Certification (1) (when product is marked)	Standards
cULus (2)	UL Listed to U.S. and Canadian safety standards (UL 61800-5-1 and CSA 22.2 No. 274, File E59272).
	Solid-state motor overload protection is provided when 110% of the motor rating is reached with a peak current limit based on the peak rating of the motor as investigated by UL to comply with UL 61800-5-1 (UL File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with IEC 61800-5-1:2007 - Adjustable speed electrical power drive systems.
Functional Safety	TÜV certified for functional safety: up to Performance Level (PL) d, Category 3 according to ISO 13849; up to SIL CL2 according to IEC 61508, IEC 61800-5-2, and IEC 62061 when used as described in the Kinetix 5100 Single-axis EtherNet/IP Servo Drives User Manual, publication 2198-UM004.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 1, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2198
ODVA	EtherNet/IP conformance tested.

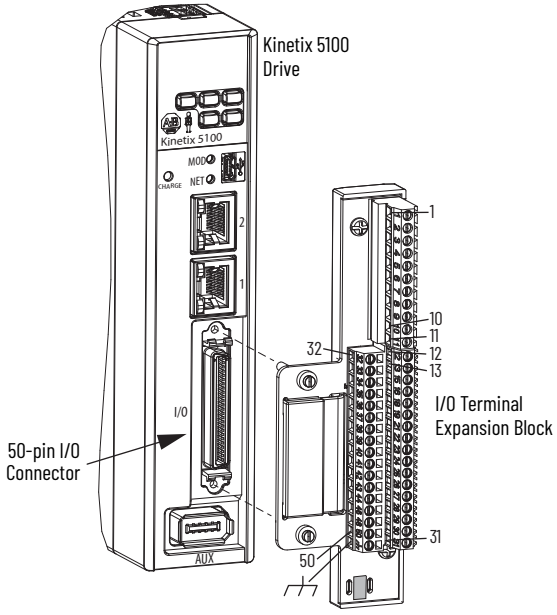
(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.
(2) UL has not evaluated the Safe Torque Off option in these products.

Accessories - Kinetix 5100 Servo Drives

Kinetix 5100 drive accessories include the I/O terminal block, ground plates, passive shunt modules and resistors, AC line filters, a motor-feedback connector kit, and the feedback battery-box kit.

I/O Terminal Expansion Block

The 2198-TBIO terminal expansion block is a drive-mounted breakout board for making flying-lead cable connections to the 50-pin I/O connector.



I/O Terminal Block Specifications

Attribute	Value
Wire size	1.5...0.05 mm^2 (16...30 AWG)
Change in depth of drive (1)	18 mm (0.70 in.)
Change in width of drive (1)	20 mm (0.79 in.)

(1) Add this value to the dimensions of your Kinetix 5100 drive.

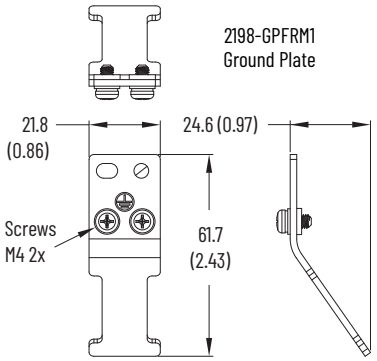
Ground Plates

Ground plates are designed to provide a chassis ground connection for the motor-power cable shield and three-phase ground terminations. Each drive includes a ground plate and replacement ground plates are also available.

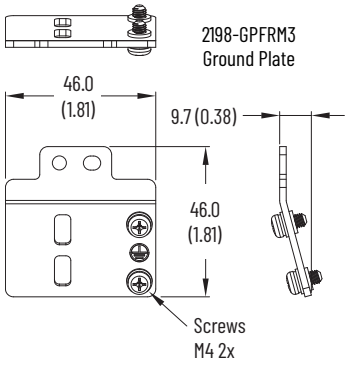
Ground Plate Catalog Numbers

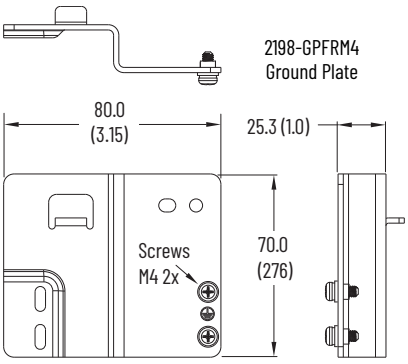
Ground Plate Cat. No.	Kinetix 5100 (200V-class) Drives Cat. No.	Kinetix 5100 (400V-class) Drives Cat. No.
2198-GPFRM1	2198-E1004-ERS 2198-E1007-ERS 2198-E1015-ERS	–
2198-GPFRM3	2198-E1020-ERS 2198-E2030-ERS	2198-E4004-ERS 2198-E4007-ERS 2198-E4015-ERS
2198-GPFRM4	–	2198-E4020-ERS 2198-E4030-ERS
2198-GPFRM5	2198-E2055-ERS	2198-E4055-ERS
2198-GPFRM6	2198-E2075-ERS	2198-E4075-ERS
2198-GPFRM7	2198-E2150-ERS	2198-E4150-ERS

Ground Plate Dimensions

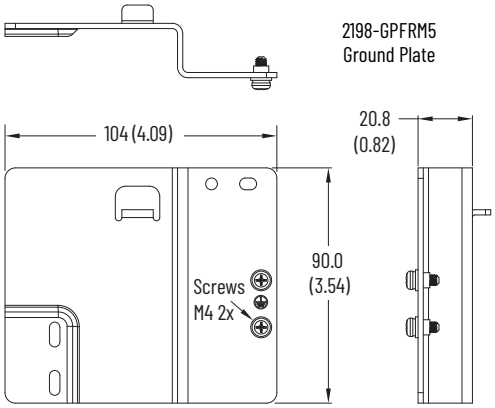


Dimensions are in mm (in.)

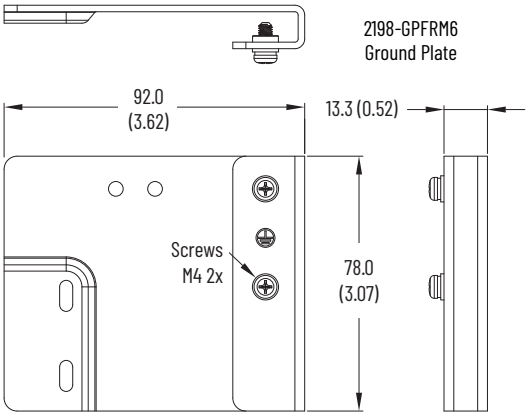


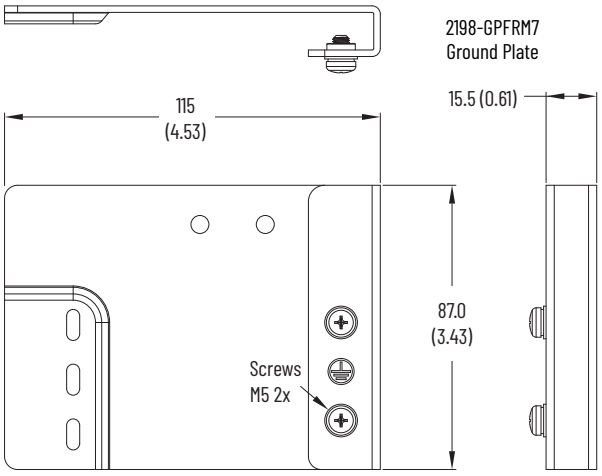


Dimensions are in mm (in.)



Dimensions are in mm (in.)

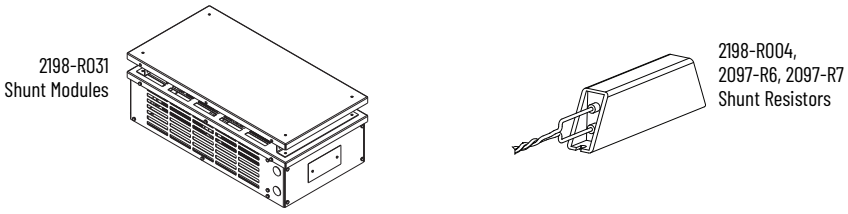




Passive Shunt Modules and Resistors

Bulletin 2097-R*x* and 2198-R*xxx* external passive shunts are available to provide additional shunt capacity for applications where the internal shunt capacity is exceeded.

- Catalog number 2198-R031 is composed of resistor coils that are housed inside an enclosure.
- Catalog numbers 2198-R004, 2097-R6, and 2198-R7 are shunt resistors without an enclosure.



Passive-shunt and Drive Compatibility

Drive Eat. No.	Internal Shunt Resistor	Shunt Power Capacity of Resistor	External Shunt Reisitance, min	Bulletin 2198 External Shunt Module (1) Cat. No.		Bulletin 2097 External Shunt Module (1) Cat. No.	
	Ω	W	Ω	2198-R031	2198-R004	2097-R6	2097-R7
2198-E1004-ERS	100	5	60	–	–	X	X
2198-E1007-ERS		14		–	–	X	X
2198-E1015-ERS			30	X	X	X	X
2198-E1020-ERS	20	20	15	X	X	X	X
2198-E2030-ERS				X	X	X	X
2198-E2055-ERS	–	–	10	X	X	X	X
2198-E2075-ERS	–	–		X	X	X	X
2198-E2150-ERS	–	–	5	X	X	X	X
2198-E4004-ERS	80	10	80	–	–	–	X
2198-E4007-ERS			60	–	–	X	X
2198-E4015-ERS			40	–	–	X	X
2198-E4020-ERS	–	–		–	–	X	X
2198-E4030-ERS	–	–	30	X	X	X	X
2198-E4055-ERS	–	–	20	X	X	X	X
2198-E4075-ERS	–	–	15	X	X	X	X
2198-E4150-ERS	–	–	12	X	X	X	X

(1) Shunt resistor selection is based on the needs of your actual hardware configuration.

Shunt Module Specifications

Shunt Module Cat. No.	Resistance Ohms	Continuous Power W	Weight, approx kg (lb)
2097-R6	75	150	0.3 (0.7)
2097-R7	150	80	0.2 (0.4)
2198-R004	33	400	1.8 (4.0)
2198-R031	33	3100	16.8 (37)

Refer to Passive Shunt Modules and Resistors on page 31 and/or Shunt Resistor on page 163 for product dimensions and additional specifications.

Kinetix 5100 AC Line Filters

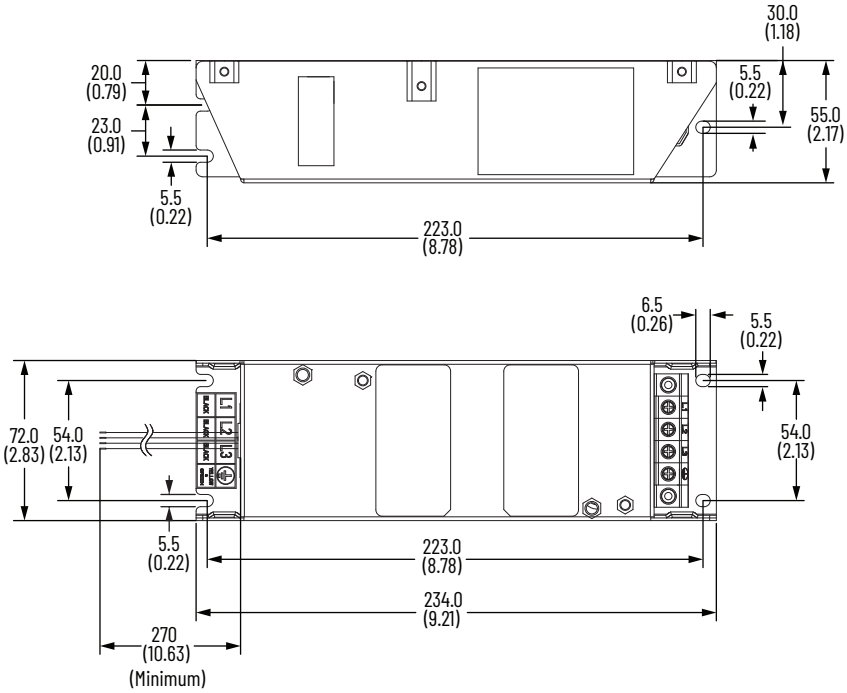
An AC line filter is required to meet CE requirements. Install the AC line filter as close to the drive as possible.

AC Line Filter Selection

Kinetix 5100 Drive Cat. No.	AC Line Filter Cat. No. (single-phase operation)	AC Line Filter Cat. No. (three-phase operation)
2198-E1004-ERS (1)	2198-DB111-F	2198-DB310-F
2198-E1007-ERS (1)	2198-DB127-F	
2198-E1015-ERS (1)		2198-DB324-F
2198-E1020-ERS (1)		
2198-E2030-ERS	–	
2198-E2055-ERS	–	2198-DB335-F
2198-E2075-ERS	–	2198-DB356-F
2198-E2150-ERS	–	2198-DBR90-F
2198-E4004-ERS	–	2198-DB418-F
2198-E4007-ERS	–	
2198-E4015-ERS	–	
2198-E4020-ERS	–	
2198-E4030-ERS	–	
2198-E4055-ERS	–	2198-DB433-F
2198-E4075-ERS	–	
2198-E4150-ERS	–	2198-DBR40-F

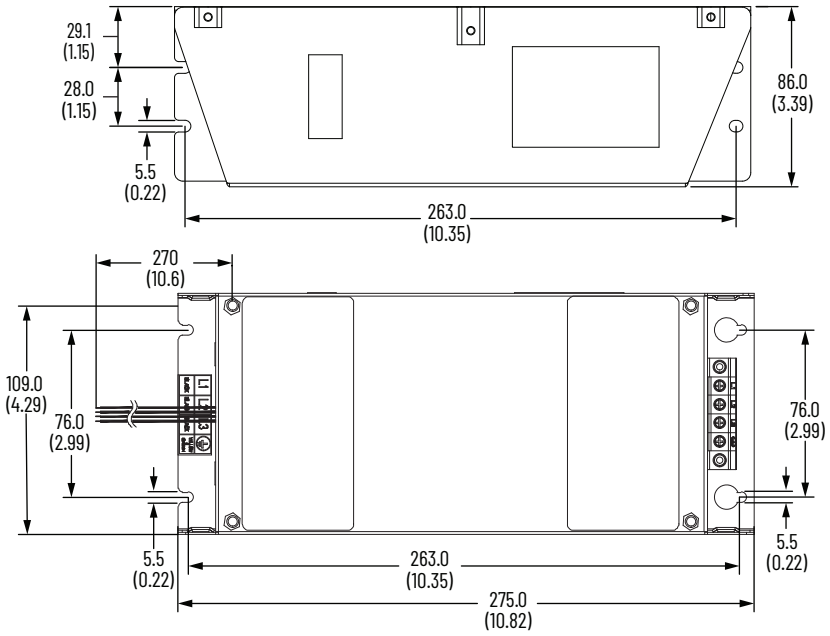
(1) Only these drives support single-phase operation.

AC Line Filter Dimensions (catalog numbers 2198-DB111-F and 2198-DB310-F)



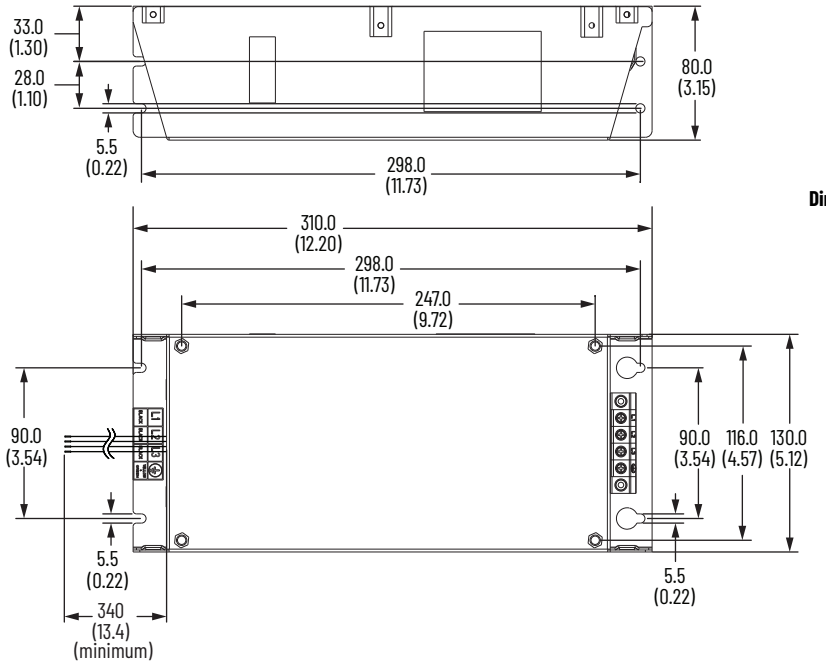
Dimensions are in mm (in.).

AC Line Filter Dimensions (catalog numbers 2198-DB127-F, 2198-DB324-F, and 2198-DB418-F)



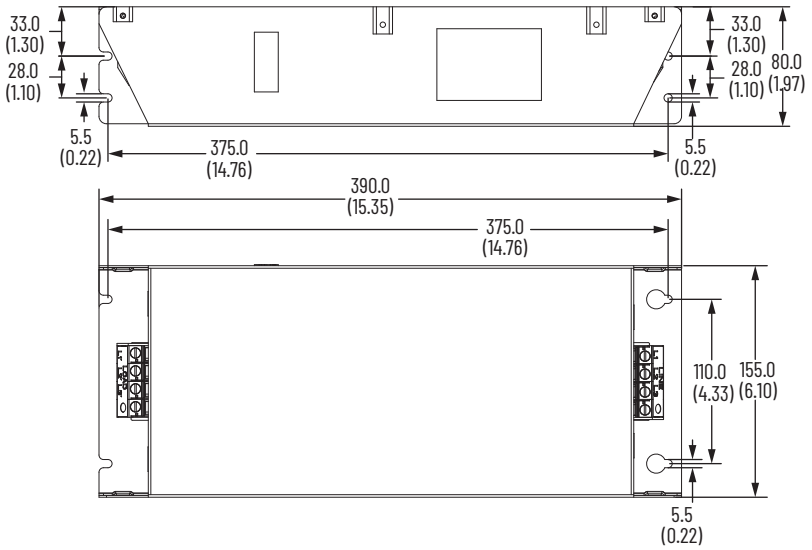
Dimensions are in mm (in.).

AC Line Filter Dimensions (catalog number 2198-DB335-F and 2198-DB433-F)



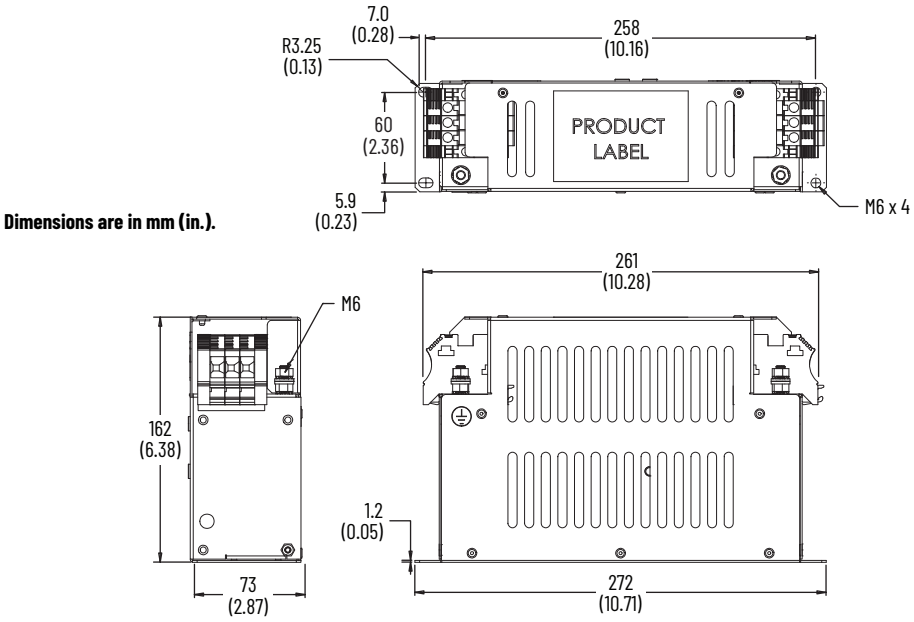
Dimensions are in mm (in.).

AC Line Filter Dimensions (catalog number 2198-DB356-F)



Dimensions are in mm (in.).

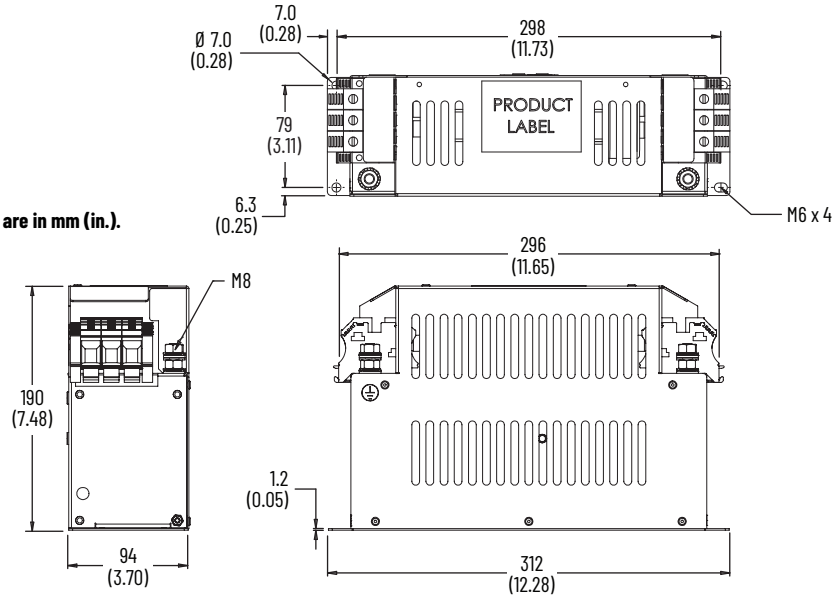
AC Line Filter Dimensions (catalog number 2198-DBR40-F)



Dimensions are in mm (in.).

AC Line Filter Dimensions (catalog number 2198-DBR90-F)

Dimensions are in mm (in.).



AC Line Filter Specifications

Cat. No.	Voltage Rating, max	Current Rating @ 50 °C (122 °F) A	Power Loss @ Rated Current W	Leakage Current, typical mA	Weight, approx kg (lb)	Operating Temperature
2198-DB111-F	253V AC single-phase, 50/60 Hz	11.0	4.9	52.9	1.05 (2.314)	0...50 °C (32...122 °F)
2198-DB127-F		27.0	15.5	54.9	1.80 (3.968)	
2198-DB310-F	253V AC three-phase, 50/60 Hz	10.0	14.0	3.9	1.10 (2.425)	
2198-DB324-F		24.0	29.0	9.3	1.95 (3.968)	
2198-DB335-F	253V AC three-phase, 50/60 Hz	34.8	30.0	5.8	2.90 (6.393)	
2198-DB356-F		56.0	57.0	2.8	4.00 (8.818)	
2198-DB418-F	528V AC three-phase, 50/60 Hz	18.4	16.0	4.21	1.2 (2.65)	
2198-DB433-F		33.0	35.0	3.58	1.9 (4.19)	
2198-DBR40-F		54.0	15.0	30.0	3.3 (7.28)	
2198-DBR90-F		90.0	16.8	34.0	7.2 (15.87)	

Kinetix 5100 Feedback Connector Kit

The 2198-K51CK-D15M feedback connector kit passes feedback signals from the encoder to the motor feedback (MFB) connector on the drive. The following encoder feedback types are accepted:

- Hiperface high-resolution absolute (multi-turn and single-turn)
- Nikon (24-bit) high-resolution serial encoder
- Tamagawa (17-bit) high-resolution serial encoder
- Digital AqB (TTL) and Digital AqB (TTL) with UVW incremental encoders

The 2198-K51CK-D15M feedback kit requires assembly with 2090-CFBM7DF or other customer-supplied cable. See Kinetix 5100 Feedback Connector Kit Installation Instructions, publication 2198-IN019, for more information.

Use the motor feedback connector kit in the following types of installations:

- New installations with Kinetix 5100 servo drives and compatible motors when flying-lead cable is used. For example, when building your own cables.
  - The 2198-K51CK-D15M feedback kit is not required when 2090-CTFB-MxDD feedback cable with premolded D-sub connector is used.
- Existing motor installations with flying-lead cable when upgrading with Kinetix 5100 servo drives.
- Any flying-lead feedback cable where battery backup is required for maintaining position data in the event of a power loss.
  - 3.6V 1/2 AA, ER14252 or equivalent battery
  - See Kinetix 5100 Feedback Battery Box Kit on page 112, for more battery specifications.

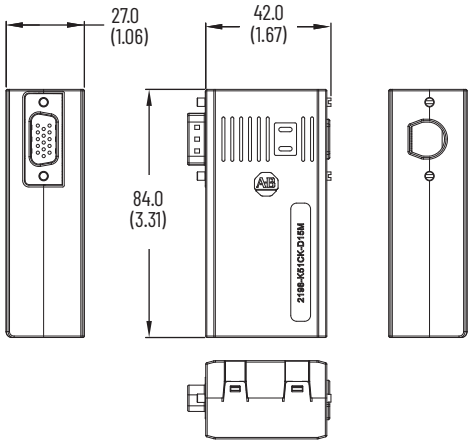
Compatible Allen-Bradley Motors and Actuators

Rotary Motors	2090-Series Feedback Cables (1)	
	High-resolution Encoder	Incremental Encoder
TLP-A046-*xxx*, TLP-A/B070-*xxx*, TLP-A/B090-*xxx*, TLP-A100-*xxx*	2090-CTFB-MADD-CFA*xx* (standard) or 2090-CTFB-MADD-CFF*xx* (continuous-flex)	–
TLP-A/B115-*xxx*, TLP-A/B145-*xxx*, TLP-A/B200-*xxx*, TLP-A/B235-*xxx*	2090-CTFB-MFDD-CFA*xx* (standard) or 2090-CTFB-MFDD-CFF*xx* (continuous-flex)	–
MPL-A/B15*xxx*-V/E, MPL-A/B2*xxx*-V/E, MPL-A/B3*xxx*-S/M, MPL-A/B4*xxx*-S/M, MPL-A/B45*xxx*-S/M, MPL-A/B5*xxx*-S/M, MPL-B6*xxx*-S/M, MPL-B8*xxx*-S/M, MPL-B9*xxx*-S/M	2090-CFBM7DF-CEAA*xx* (standard) or 2090-CFBM7DF-CEAF*xx* (continuous-flex)	–
MPM-A/B*xxxx*-S/M, MPF-A/B*xxxx*-S/M, MPS-A/B*xxxx*-S/M		–
MPL-A/B15*xxx*-H, MPL-A/B2*xxx*-H, MPL-A/B3*xxx*-H MPL-A/B4*xxx*-H, MPL-A/B45*xxx*-H	–	2090-XXNFMF-S*xx* (standard) or 2090-CFBM7DF-CDAF*xx* (continuous-flex)
TLY-A*xxxx*-B	2090-CFBM6DF-CBAA*xx* (standard) or 2090-CFBM6DD-CCAA*xx* (standard)	2090-CFBM6DF-CBAA*xx* (standard) or 2090-CFBM6DD-CCAA*xx* (standard)
TLY-A*xxxx*-H		
TL-A*xxxx*-B	2090-DANFCT-S*xx* (standard)	–

(1) These are typical feedback cables. Refer to the Kinetix 5100 Servo Drives Design Guide, publication KNX-RM011, for the cables required for specific drive and motor/actuator combinations.

Motor Feedback Connector Kit Dimensions

Dimensions are in mm (in.).



Kinetix 5100 Auxiliary Feedback Connector Kit

The 2198-AUXKIT auxiliary feedback kit passes encoder signals to the auxiliary feedback (AUX) connector. Digital AqB (TTL) without UVW encoder feedback is accepted.

- Master feedback
- Load feedback

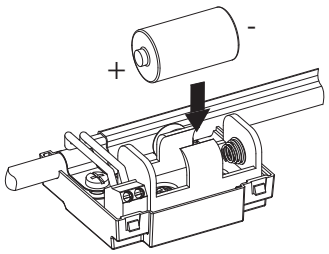
The 2198-AUXKIT auxiliary feedback kit requires assembly with customer-supplied cable. See Kinetix 5100 Auxiliary Feedback Connector Kit Installation Instructions, publication 2198-IN018, for more information.

Kinetix 5100 Feedback Battery Box Kit

The 2198-KTBT feedback battery-box kit (with user-supplied battery) is used with Kinetix TLP motors when multi-turn positioning is required. 2090-CTFB-MxDD cables include this battery box and the 2198-KTBT battery box kit is available as a replacement. The battery box (with user-supplied battery) retains the multi-turn position over a power cycle.

The absolute encoders used with Kinetix TLP motors can also operate as a single-turn absolute feedback device, however in this case, no battery box (with user-supplied battery) is required to retain the single-turn position over a power cycle.

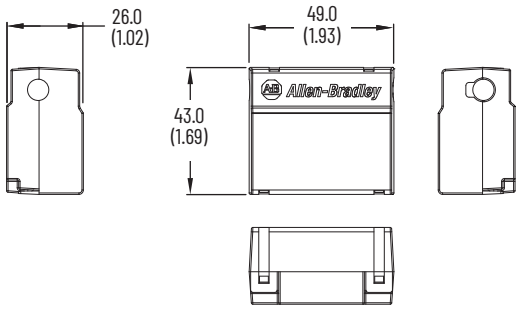
The customer-supplied 3.6V lithium battery, when installed in the battery box kit, provides multi-turn encoder operation to Kinetix TLP servo motors.



Battery Specifications

Attribute	Value
International size reference	1/2 AA, ER14252 or equivalent
Capacity, nom @ 0.5 mA, to 2V	1.2 Ah
Rated voltage	3.6V
Continuous current, max	50 mA

Battery Box Kit Dimensions

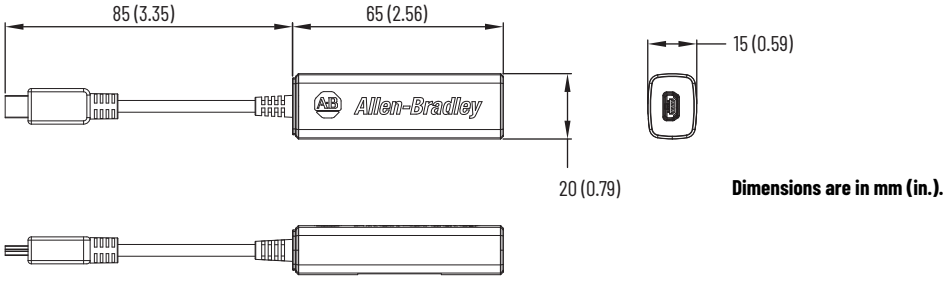


Dimensions are in mm (in.).

Kinetix 5100 USB Interface Cable and Filter

Use the 2198-USBC mini-USB interface cable and 2198-USBF filter to provide the USB connection between your PC (KNX5100C drive configuration software) and drive. The USB filter provides a high-voltage isolation barrier between your PC and the drive.

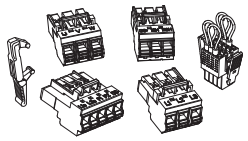
USB Filter Dimensions



Dimensions are in mm (in.).

Replacement Parts and Connector Kits - Kinetix 5100 Servo Drives

Replacement parts available for Kinetix 5100 servo drives include two drive connector-set kits.

Replacement Kit Cat. No.	Description	Drive Cat. No.		Illustration
2198-CONKIT-PKG	• One mains input power connector • One control input power connector • One motor power connector • One shunt connector • One safe torque-off (STO) connector • One wire insertion tool	2198-E1004-ERS (1) 2198-E1007-ERS 2198-E1015-ERS		
2198-CONKIT-STO	One safe torque-off (STO) connector	2198-E1020-ERS 2198-E2030-ERS 2198-E2055-ERS 2198-E2075-ERS 2198-E2150-ERS	2198-E4004-ERS 2198-E4007-ERS 2198-E4015-ERS 2198-E4020-ERS 2198-E4030-ERS 2198-E4055-ERS 2198-E4075-ERS 2198-E4150-ERS	

(1) If all that is needed for these catalog numbers is the STO connector, order 2198-CONKIT-STO.

Kinetix 6200 and Kinetix 6500 Modular Multi-axis Servo Drives



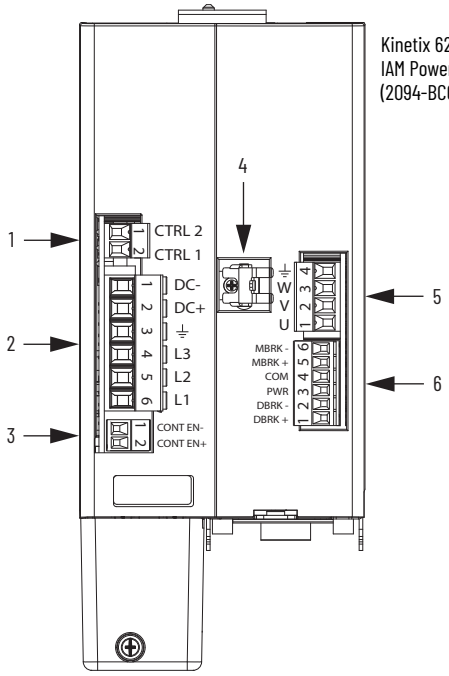
These modular Safe Speed Monitor servo drives help increase productivity and protect personnel with embedded safety features. Modular design and control provides ease of maintenance and greater flexibility as the drive easily transitions from Safe Torque Off to Safe Speed Monitor.

The Kinetix 6500 servo drives provide Integrated Motion on the EtherNet/IP network by using CIP Motion™ and CIP Sync™ technology from ODVA, all built on the Common Industrial Protocol (CIP™).

The Kinetix 6200 servo drives provide Integrated Motion capability through the Sercos interface and compatibility with Kinetix 6000 drives, letting you migrate to the enhanced features exactly when and where you need them.

Kinetix 6200 and Kinetix 6500 Drive Features and Indicators

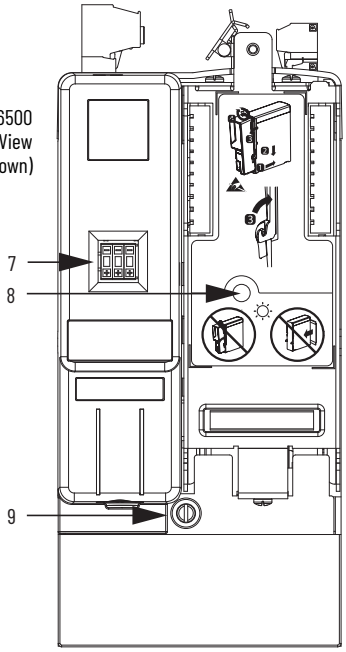
2094-AC*xx*-M*xx*-M and 2094-BC*xx*-M*xx*-M IAM Power Module Features and Indicators



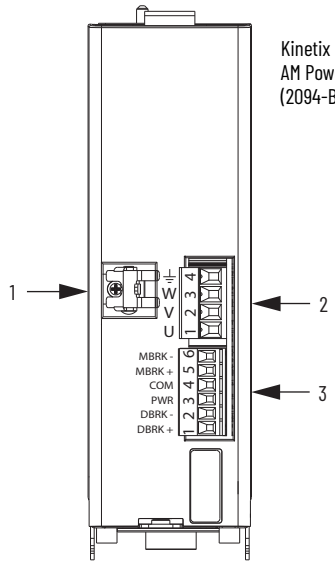
Kinetix 6200 or Kinetix 6500
IAM Power Module, Top View
(2094-BC01-MP5-M module is shown)

Item	Description
1	Control power (CPD) connector
2	DC bus/AC input power (IPD) connector
3	Contactor Enable (CED) connector
4	Motor cable shield clamp
5	Motor power (MP) connector
6	Motor/resistive brake (BC) connector
7	Node address switch
8	Power-applied indicator
9	Mounting screw

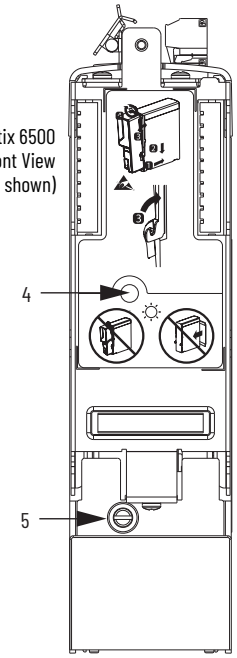
Kinetix 6200 or Kinetix 6500
IAM Power Module, Front View
(2094-BC01-MP5-M module is shown)



2094-AMxx-M and 2094-BMxx-M AM Power Module Features and Indicators



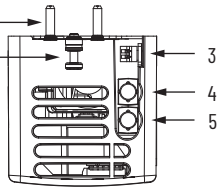
Kinetix 6200 or Kinetix 6500
AM Power Module, Top View
(2094-BMP5-M module is shown)



Kinetix 6200 or Kinetix 6500
AM Power Module, Front View
(2094-BMP5-M module is shown)

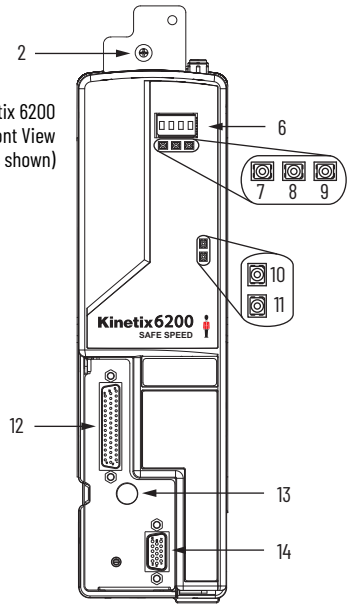
Item	Description
1	Motor cable shield clamp
2	Motor power (MP) connector
3	Motor/resistive brake (BC) connector
4	Power-applied indicator
5	Mounting screw

Control Module Features and Indicators (Sercos)



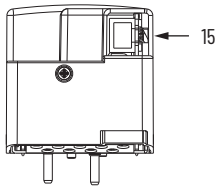
Kinetix 6200
Control Module, Top View
(2094-SE02F-M00-S1 module is shown)

Item	Description
1	Guide pins (2x)
2	Captive screw
3	Sercos communication rate and optical power switches
4	Sercos transmit (Tx) connector
5	Sercos receive (Rx) connector



Kinetix 6200
Control Module, Front View
(2094-SE02F-M00-S1 module is shown)

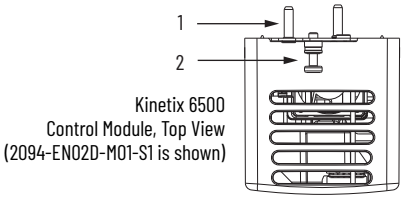
Item	Description
6	Four-character status display
7	PORT 1 status Indicator
8	Drive status indicator
9	Comm status indicator
10	DC bus status indicator
11	Safety lock status indicator (2094-SE02F-M00-S1 modules only)
12	I/O, safety, and aux feedback (IOD) connector
13	Power module mounting screw access hole
14	Motor feedback (MF) connector



Kinetix 6200
Control Module, Bottom View
(2094-SE02F-M00-S1 module is shown)

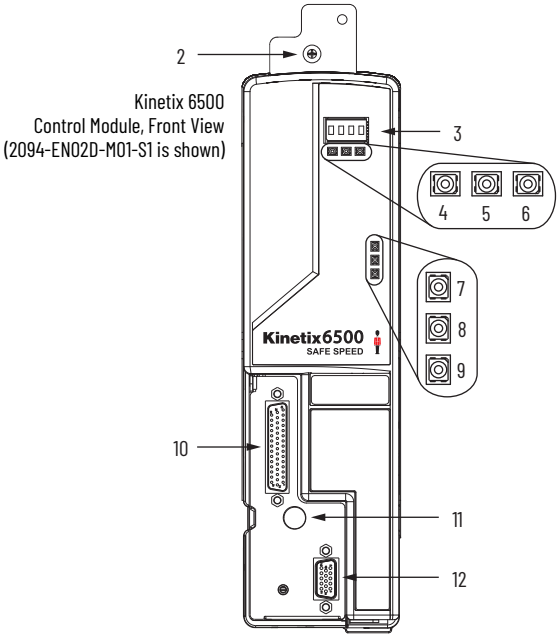
Item	Description
15	Ethernet (PORT1) connector

Control Module Features and Indicators (EtherNet/IP network)



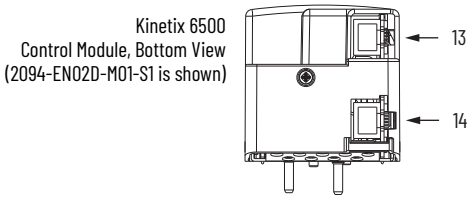
Kinetix 6500
Control Module, Top View
(2094-EN02D-M01-S1 is shown)

Item	Description
1	Guide pins (2x)
2	Captive screw



Kinetix 6500
Control Module, Front View
(2094-EN02D-M01-S1 is shown)

Item	Description
3	Four-character status display
4	PORT 1 status indicator
5	PORT 2 status indicator
6	Module status indicator
7	Network status indicator
8	DC bus status indicator
9	Safety lock status indicator (2094-EN02D-M01-S1 modules only)
10	I/O, safety, and aux feedback (IOD) connector
11	Power module mounting screw access hole
12	Motor feedback (MF) connector



Kinetix 6500
Control Module, Bottom View
(2094-EN02D-M01-S1 is shown)

Item	Description
13	Ethernet (PORT1) connector
14	Ethernet (PORT2) connector

Technical Specifications - Kinetix 6200 and Kinetix 6500 Control Modules

Control modules couple with IAM and AM power modules to provide drive status indicators and an interface to I/O, communication, functional safety, and feedback.

Control Module Features

Feature	Safe Torque Off		Safe Speed Monitor	
	2094-EN02D-M01-S0	2094-SE02F-M00-S0	2094-EN02D-M01-S1	2094-SE02F-M00-S1
Ethernet ports	2	1	2	1
Sercos ports	–	Rx/Tx	–	Rx/Tx
DC-bus status indicator	X	X	X	X
Network status indicator	X	–	X	–
Module status indicator	X	–	X	–
Drive status indicator	–	X	–	X
Comm status indicator	–	X	–	X
Safety lock status indicator	–	–	X	X
PORT 1 status indicator	X	X	X	X
PORT 2 status indicator	X	–	X	–
IOD connector for I/O, safety, and auxiliary feedback	X	X	X	X
MF connector for motor feedback	X	X	X	X

Weight Specifications

Kinetix 6200 Control Module	Cat. No.	Weight, approx kg (lb)
Sercos interface	2094-SE02F-M00-S0	0.68 (1.5)
	2094-SE02F-M00-S1	

Kinetix 6500 Control Module	Cat. No.	Weight, approx kg (lb)
EtherNet/IP network	2094-EN02D-M01-S0	0.68 (1.5)
	2094-EN02D-M01-S1	

Technical Specifications - Kinetix 6200 and Kinetix 6500 Power Modules

IAM Module (converter, 400V-class) Power Specifications

Attribute	2094-BC01-MP5-M	2094-BC01-M01-M	2094-BC02-M02-M	2094-BC04-M03-M	2094-BC07-M05-M
AC input voltage	324…528V rms three-phase (360…480V nom)				
AC input frequency	47…63 Hz				
Main AC input current Nom (rms) Max inrush (0-pk) (1)	10.0 A 11.0 A		24.0 A 22.0 A	44.0 A 31.1 A	71.0 A 62.2 A
DC input voltage (common bus follower)	458…747V DC				
DC input current (common-bus follower)	9.0 A		22.6 A	41.5 A	67.7 A
Control power AC input voltage	95…264V rms single-phase (110…240V rms nom)				
Control power AC input current Nom (@ 220/230V AC) rms Nom (@ 110/115V AC) rms Max inrush (0-pk)	6 A 6 A 98 A (2)				
Control power cycling, max	2 cycles per minute with a 90% on-time, 10% off-time duty cycle				
Nominal bus output voltage	650V DC				
Line loss ride through	20 ms				
Continuous output current to bus (A_{DC})	9.0 A		22.6 A	41.5 A	67.7 A
Peak output current to bus (A_{DC}) (3)	22.6 A		56.4 A	103.8 A	203.2 A
Bus overvoltage	825V DC				
Bus undervoltage	275V DC (when enabled) 425V DC (at the completion of pre-charge)				
Internal shunt Continuous power Peak power	50 W 5.6 kW			200 W 22.5 W	
Internal shunt resistor	115 Ω			27.75 Ω	
Shunt on	805V DC				
Shunt off	765V DC				
Continuous power output to bus	6 kW		15 kW	27.6 kW	45 kW
Peak power output at 480V (3)	15 kW		37.5 kW	69 kW	135 kW
Efficiency	97%				
Converter inductance	500 µH			125 µH	75 µH
Converter capacitance	110 µF		220 µF	940 µF	1410 µF
Short-circuit current rating	200,000 A (rms) symmetrical				

(1) All IAM power modules are limited to 2 contactor cycles per minute (with up to 4 axes), or 1 contactor cycle per minute (with 5…8 axes). The cycle capability also depends on the converter power rating and the total system capacitance. To calculate cycle capability, refer to the Kinetix 6200 and Kinetix 6500 Modular Multi-axis Servo Drives User Manual, publication 2094-UM002.

(2) For eight axis systems with 230V AC control input voltage and 50 °C (122°F) ambient temperature the maximum inrush duration is less than 1/2 line cycle. To calculate the maximum inrush duration for other configurations, refer to the Kinetix 6200 and Kinetix 6500 Modular Multi-axis Servo Drives User Manual, publication 2094-UM002.

(3) Converter peak output duration equals 400 ms with a duty cycle of 16%.

Control Power Current Requirements

Modules on Power Rail	110/115V AC Input		220/230V AC Input	
	Input Current A	Input VA VA	Input Current A	Input VA VA
IAM module only	0.56	67	0.36	85
IAM and 1 AM module	0.99	119	0.64	153
IAM and 2 AM module	1.43	172	0.92	220
IAM and 3 AM module	1.87	224	1.20	287
IAM and 4 AM module	2.31	277	1.48	354
IAM and 5 AM module	2.74	329	1.75	421
IAM and 6 AM module	3.18	382	2.03	488
IAM and 7 AM module	3.62	434	2.31	555

AM Module (inverter, 400V-class) Power Specifications

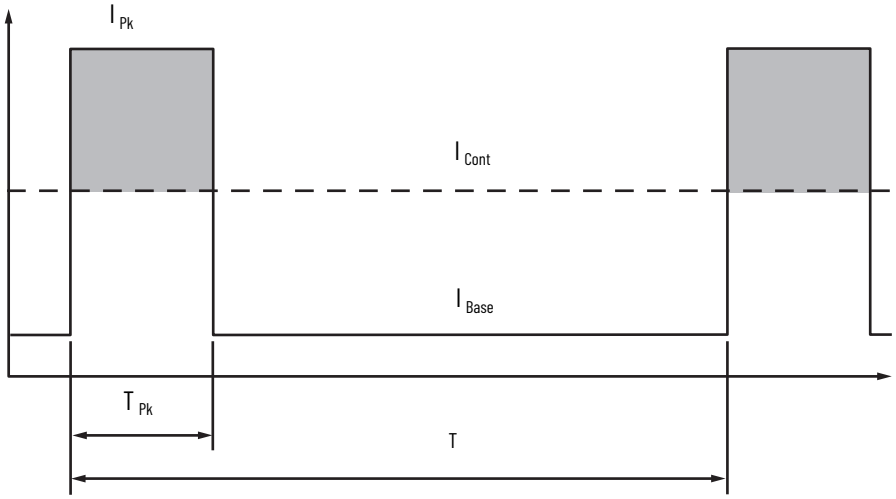
Attribute [1]	2094-BMP5-M (2094-BC01-MP5-M)	2094-BM01-M (2094-BC01-M01-M)	2094-BM02-M (2094-BC02-M02-M)	2094-BM03-M (2094-BC04-M03-M)	2094-BM05-M (2094-BC07-M05-M)
Bandwidth [2] Velocity loop Current loop	 500 Hz 1300 Hz				
PWM frequency	8 kHz		4 kHz		
Nominal input voltage	650V DC				
Continuous current (rms) [3]	2.8 A	6.1 A	10.3 A	21.2 A	34.6 A
Continuous current (sine) 0-pk [3]	4.0 A	8.6 A	14.6 A	30.0 A	48.9 A
Peak current (rms) [3]	7.0 A	15.3 A	25.8 A	53.0 A	69.2 A
Peak current (0-pk) [3]	9.9 A	21.6 A	36.4 A	75.0 A	97.9 A
Continuous power out (nom)	1.8 kW	3.9 kW	6.6 kW	13.5 kW	22.0 kW
Internal shunt Continuous power Peak power	 50 W 5.6 kW			 200 W 22.5 kW	
Internal shunt resistor	115 Ω			28.75 Ω	
Shunt on	805V DC				
Shunt off	765V DC				
Efficiency	98%				
Capacitance	75 µF	150 µF	270 µF	840 µF	1175 µF
Capacitive energy absorption	10 J	19 J	35 J	108 J	152 J
Short-circuit current rating	200,000 A (rms) symmetrical				

(1) These specifications apply to the axis module specified in the column heading by catalog number and the same axis module (inverter section) that resides within an IAM power module.
(2) Bandwidth values vary based on tuning parameters and mechanical components.
(3) Continuous and peak current ratings are for high-speed operation. For constant velocity operation at an electrical output frequency below 5 Hz (75 rpm for 8-pole motors), the output current rating is reduced. See Motion Analyzer software to correctly size your drive. Refer to Peak Current Specifications on page 120 for duty cycle capability.

Peak Current Specifications

Load Duty-cycle Profile Example

$$D = \frac{T_{PK}}{T} \times 100\%$$

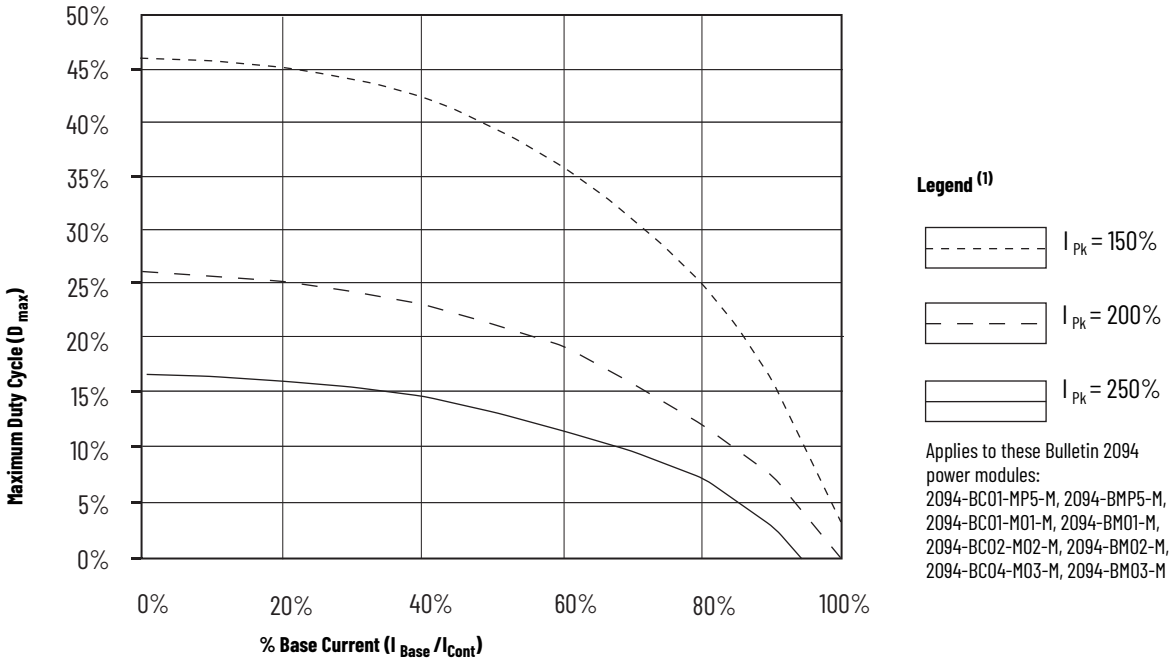


Peak Duty-cycle Definition of Terms

Term	Definition (1)
Continuous Current Rating (I_{Cont})	The maximum value of current that can be output continuously.
Peak Current Rating (I_{PKmax})	The maximum value of peak current that the drive can output. This rating is valid for only overload times less than T_{PKmax}.
Duty Cycle (D)	The ratio of time at peak to the Application Period and is defined as: $D = \frac{T_{PK}}{T} \times 100\%$
Time at Peak (T_{PK})	The time at peak current (I_{PK}) for a given loading profile. Must be less than or equal to T_{PKmax}.
Peak Current (I_{PK})	The level of peak current for a given loading profile. I_{PK} must be less than or equal to the Peak Current Rating (T_{PKMAX}) of the drive.
Base Current (I_{Base})	The level of current between the pulses of peak current for a given loading profile. I_{Base} must be less than or equal to the continuous current rating (I_{Cont}) of the drive.
Loading Profile	The loading profile is composed of I_{PK}, I_{Base}, T_{PK}, and D (or T) values and completely specify the operation of the drive in an overload situation. These values are collectively defined as the Loading Profile of the drive.
Application Period (T)	The sum of the times at I_{PK} (T_{PK}) and I_{Base}.

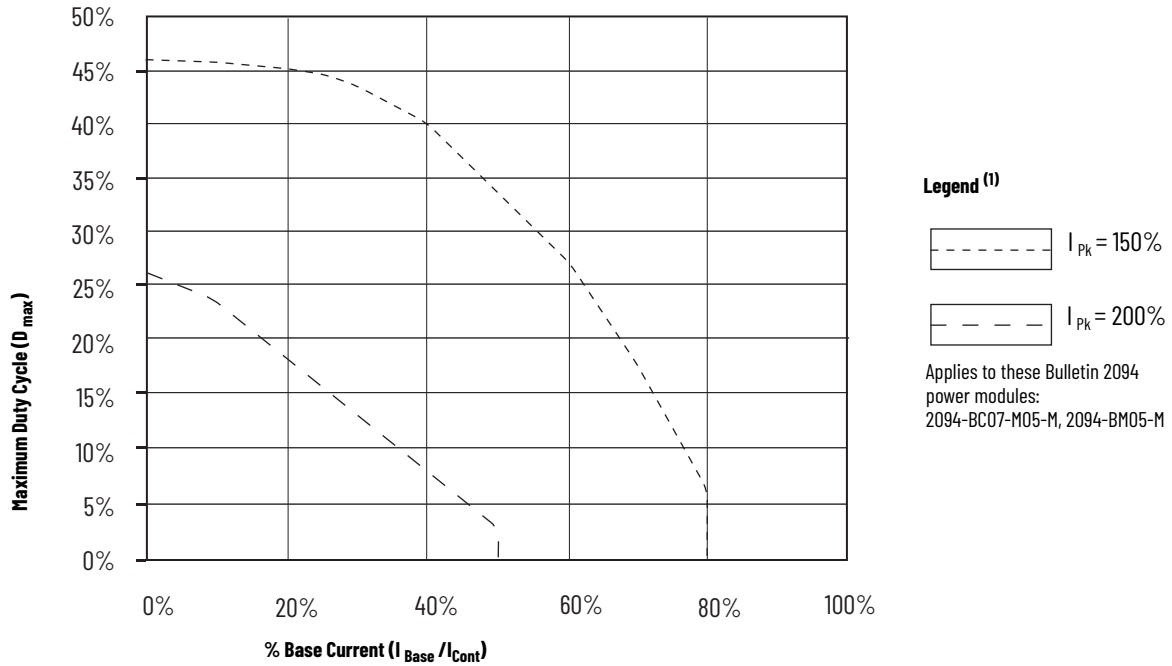
(1) All current values are specified as RMS.

Peak Inverter Mode (T_{PK} < 2.0 s)



(1) Base current (I_{Base}) and peak current (I_{PK} are a percentage of the continuous drive current rating (I_{Cont}).

Peak Inverter Overload (T_{PK} < 2.0 s)



(1) Base current (I_{Base}) and peak current (I_{PK}) are a percentage of the continuous drive current rating (I_{Cont}).

Circuit Breaker/Fuse Specifications

The 2094-BC*xx*-M*xx*-M and 2094-BM*xx*-M drive modules use internal solid-state motor short-circuit protection and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 200,000 A.

Control and DC-bus Circuit-protection Specifications

IAM Power Module Cat. No.	Control Input Power		DC-bus Power	
	Bussmann Fuse (1)	Allen-Bradley Circuit Breaker (2) (non-UL)	Bussmann Fuse	Mersen Fuse (3)
2094-BC01-MP5-M	FNQ-R-10 (10 A) or FNQ-R-7.5 (7.5 A)	1492-SPM2D060 or 1492-SPM1D150	FWJ-20A14F	DCT20-2
2094-BC01-M01-M				
2094-BC02-M02-M			FWJ-40A	A70QS40-4
2094-BC04-M03-M			FWJ-70A	A70QS70-4
2094-BC07-M05-M			FWJ-125A	A70QS125-4

(1) Use FNQ-R-7.5 circuit breaker for higher single -cycle inrush current capability. This is recommended when the continuous control-power current exceeds 3.0 A.
(2) Use 1492-SPM1D150 circuit breaker for higher single -cycle inrush current capability. This is recommended when the continuous control-power current exceeds 3.0 A.
(3) Mersen fuses were formerly known as Ferraz Shawmut.

Input Power Circuit Protection (LIM)

The 2094-BL02 line interface modules (LIM) contains supplementary protection devices and, when protected by suitable branch circuit protection, is rated for use on a circuit capable of delivering up to 5000 A. When this module is used, protection on the line side of the LIM module is required. Fuses must be class J or CC only.

The 2094-BL*xx*S and 2094-XL75S-C*x* LIM modules contain branch circuit rated devices suitable for use on a circuit capable of delivering up to 65,000 A (400V-class). Refer to the Line Interface Module Installation Instructions, publication 2094-IN005, for power specifications and more information on using the LIM module.

Input Power Circuit Protection (without LIM)

The fuses and Allen-Bradley circuit breakers listed on page 122 are recommended for use with 2094-BC*xx*-M*xx*-M IAM power modules when the line interface module (LIM) is not used.

IMPORTANT LIM modules (catalog numbers 2094-BL*xx*S and 2094-XL75S-C*x*) can provide branch circuit protection to the IAM power module. Follow all applicable NEC and local codes.

Input Power UL Circuit-protection Specifications

Kinetix 6200 and Kinetix 6500 Drives		UL Applications			
IAM Power Module Cat. No.	Drive Voltage (three-phase) nom	Bussmann Fuses Cat. No.	Miniature CB (1) Cat. No.	Motor Protection CB, (1) Self-protected CMC Cat. No.	Molded Case CB Cat. No.
2094-BC01-MP5-M	360...480V	KTK-R-20 (20 A) Class CC	1489-M3D300	140M-F8E-C32	–
2094-BC01-M01-M	360...480V	KTK-R-20 (20 A) Class CC		140M-F8E-C32	
2094-BC02-M02-M	360...480V	KTK-R-30 (30 A) Class CC	–	140M-F8E-C45	
2094-BC04-M03-M	360...480V	LPJ-45SP (45 A) Class J		–	140G-G6C3-C50
2094-BC07-M05-M	360...480V	LPJ-80SP (80 A) Class J			140G-G6C3-C90

(1) These Bulletin 140M circuit breakers, when used as self-protected (Type E) devices, and Bulletin 1489 circuit breakers can be used on only WYE power systems (480Y/277V).

Input Power IEC (non-UL) Circuit-protection Specifications

Kinetix 6200 and Kinetix 6500 Drives		IEC (non-UL) Applications			
IAM Power Module Cat. No.	**Drive Voltage (three-phase) nom**	**Miniature CB Cat. No.**		**Motor Protection CB Cat. No.**	**Molded Case CB Cat. No.**
2094-BC01-MP5-M	360...480V	1492-SPM3D300	1489-M3D300	140M-F8E-C32	–
2094-BC01-M01-M	360...480V			140M-F8E-C32	
2094-BC02-M02-M	360...480V	1492-SPM3D400	–	140M-F8E-C45	
2094-BC04-M03-M	360...480V	N/A		–	140G-G6C3-C50
2094-BC07-M05-M	360...480V				140G-G6C3-C90

Contactor Ratings

This table provides the recommended contactor ratings for IAM power modules installed without a LIM module.

IAM Power Module Cat. No.	Contactor Cat. No.
2094-BC01-MP5-M 2094-BC01-M01-M	100-C23x10 (AC coil) 100-C23*xx*10 (DC coil)
2094-BC02-M02-M	100-C37x10 (AC coil) 100-C37*xx*10 (DC coil)
2094-BC04-M03-M	100-C60x10 (AC coil) 100-C60*xx*10 (DC coil)
2094-BC07-M05-M	100-C85x10 (AC coil) 100-C85*xx*10 (DC coil)

Input Transformer for Control Power

Attribute	Value	Cat. No. (1)
Input volt-amperes	750VA	1497B-A10-*xx-x*-N
	1000VA	1497B-A11-*xx-x*-N
	1500VA	1497B-A12-*xx-x*-N
Input voltage	460V AC	
Output voltage	120...240V AC	

(1) Variables (*xx-x*) determine the input voltage and wiring configuration.

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 6200 and Kinetix 6500 drive system.

Bulletin 2094 Drive Modules (1)	Usage as % of Rated Power Output (watts)				
	20%	40%	60%	80%	100%
IAM (converter) module (2)					
2094-BC01-MP5-M	18	21	25	29	34
2094-BC01-M01-M					33
2094-BC02-M02-M	36	44	54	64	75
2094-BC04-M03-M	50	67	87	110	135
2094-BC07-M05-M	71	101	137	179	226
IAM (inverter) module or AM module (2)					
2094-BC01-MP5-M or 2094-BMP5-M	46	54	61	69	77
2094-BC01-M01-M or 2094-BM01-M	57	73	90	108	126
2094-BC02-M02-M or 2094-BM02-M	53	72	93	116	142
2094-BC04-M03-M or 2094-BM03-M	94	130	169	211	255
2094-BC07-M05-M or 2094-BM05-M	121	183	252	326	407
Shunt module - 2094-BSP2	68	121	174	227	280

(1) Power dissipation for the Bulletin 2094 control modules, catalog numbers 2094-SE02F-M00-Sx and 2094-EN02D-M01-Sx, is included in the IAM and AM power module specifications.
(2) Internal shunt power is not included in the calculations and must be added based on utilization.

Power dissipation specifications are based on these calculations. This is an example:
2094-BC02-M02-M with 4.52 A_{dc} (=20%) converter DC current and 10.3 A_{rms} (=100%) inverter output current.
Converter loss (36 W) + Inverter loss (142 W) = 178 W total power dissipation.

Weight Specifications

Bulletin 2094 Drive Modules	Cat. No.	Weight, approx kg (lb)
IAM (400V-class)	2094-BC01-MP5-M	5.67 (12.5)
	2094-BC01-M01-M	5.67 (12.5)
	2094-BC02-M02-M	5.90 (13.0)
	2094-BC04-M03-M	9.53 (21.0)
	2094-BC07-M05-M	9.98 (22.0)
Power rails (Slim)	2094-PRS1	1.05 (2.3)
	2094-PRS2	1.59 (3.5)
	2094-PRS3	2.14 (4.7)
	2094-PRS4	2.67 (5.9)
	2094-PRS5	3.11 (6.8)
	2094-PRS6	3.55 (7.8)
	2094-PRS7	3.99 (8.8)
	2094-PRS8	4.43 (9.7)

Bulletin 2094 Drive Modules	Cat. No.	Weight, approx kg (lb)
AM (400V-class)	2094-BMP5-M	3.18 (7.0)
	2094-BM01-M	3.18 (7.0)
	2094-BM02-M	3.40 (7.5)
	2094-BM03-M	5.44 (12.0)
	2094-BM05-M	5.90 (13.0)
Shunt module	2094-BSP2	3.10 (6.8)
Slot-filler module	2094-PRF	0.45 (1.0)

Maximum Feedback Cable Lengths

Although motor feedback cables are available in standard lengths up to 90 m (295.3 ft), the drive/motor/feedback combination can limit the maximum feedback cable length. These tables assume the use of recommended cables as shown in the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Cable Lengths for Compatible Rotary Motors

Motor Cat. No.	Absolute High-resolution (5V) Encoder m (ft)	Absolute High-resolution (9V) Encoder m (ft)	Incremental/TTL (5V) Encoder m (ft)
MPL-B15*xxx*... MPL-B2*xxx*-E/V		90 (295.3)	
MPL-B3*xxx*... MPL-B5*xxx*-S/M		90 (295.3)	
MPL-B15*xxx*... MPL-B45*xxx*-H			30 (98.4)
MPM-B*xxxxx*-S/M		90 (295.3)	
MPF-B*xxxx*-S/M		90 (295.3)	
MPS-B*xxxx*-S/M		90 (295.3)	
RDB-B215*xx*-7/3	30 (98.4)		
RDB-B290*xx*-7/3 or RDB-B410*xx*-7/3	90 (295.3)		

Cable Lengths for Compatible Linear Actuators

Actuator Cat. No.	Absolute High-resolution (9V) Encoder m (ft)	Incremental/TTL (5V) Encoder m (ft)
MPMA-B*xxxxx* or MPAS-B*xxxxx*-V (ballscrew)	90 (295.3)	
MPMA-B*xxxxx* or MPAS-B*xxxxx*-A (direct drive)		30 (98.4)
MPAR-B*xxxxx*-V/M	90 (295.3)	
MPAI-B*xxxxx*M3	90 (295.3)	
LDAT-S*xxxxxx*-*x*B*x*		30 (98.4)

Cable Lengths for Compatible Linear Motors

Motor Cat. No.	Absolute High-resolution (5V) Encoder m (ft)	Incremental/TTL (5V) Encoder m (ft)
LDC-Series	30 (98.4)	30 (98.4)

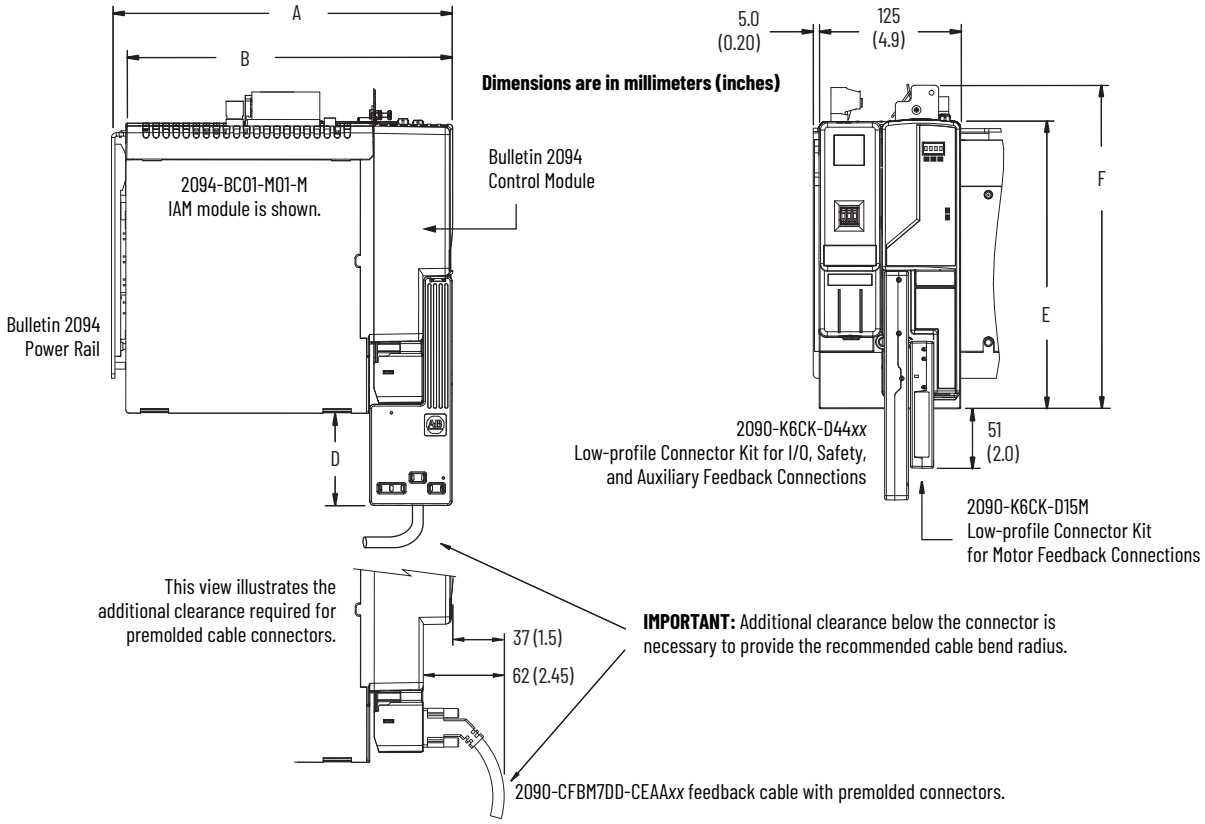
Maximum Power Cable Length

Although motor power cables are available in standard lengths up to 90 m (295.3 ft) and the Kinetix 6000 power rail is available in sizes up to eight axes, to meet CE requirements and improve system performance the combined motor power length for all axes on the same DC bus must not exceed 240 m (787 ft) for 400V-class systems.

Dimensions - Kinetix 6200 and Kinetix 6500 Modular Servo Drives

These drawings provide mounting dimensions for Kinetix 6200 and Kinetix 6500 servo drives. Mounting dimensions that include the feedback connector kit or drive-end cable connector are also shown.

2094-BC01-MP5-M, 2094-BC01-M01-M, and 2094-BC02-M02-M IAM Modules

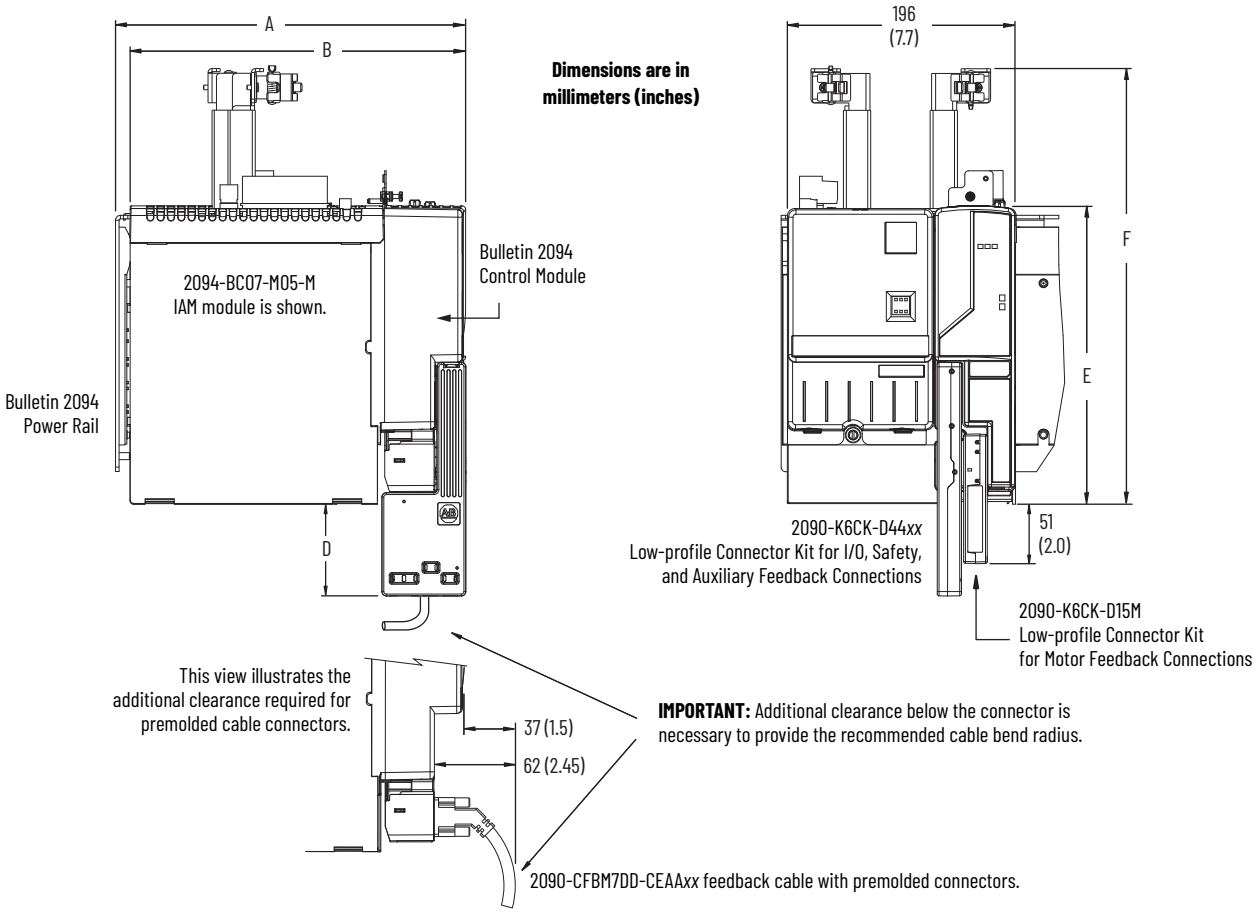


The IAM power module is shown mounted to the power rail with the control module attached.

IAM Power Module Dimensions

IAM Power Module Cat. No.	A mm (in.)	B mm (in.)	D mm (in.)	E mm (in.)	F mm (in.)
2094-BC01-MP5-M	302 (11.9)	290 (11.4)	80.0 (3.2)	260 (10.25)	285 (11.2)
2094-BC01-M01-M					
2094-BC02-M02-M					

2094-BC04-M03-M and 2094-BC07-M05-M IAM Modules

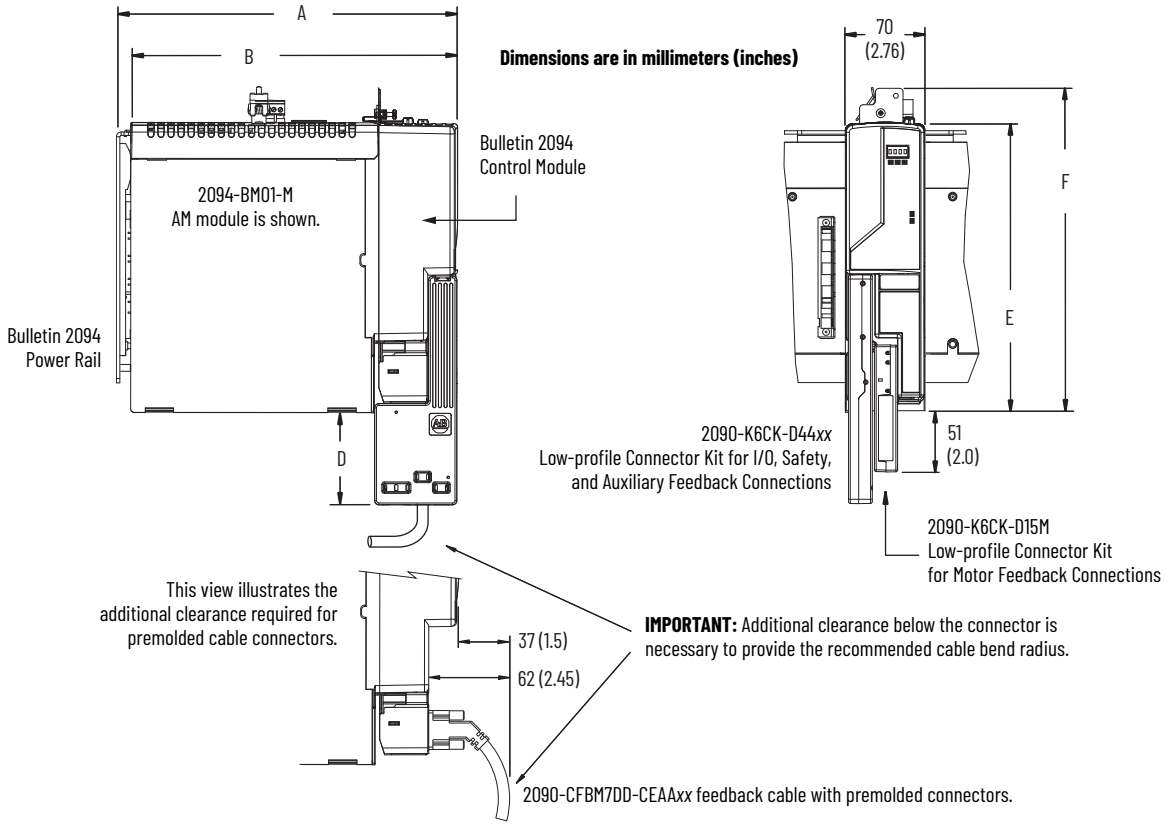


The IAM power module is shown mounted to the power rail with the control module attached.

IAM Power Module Dimensions

IAM Power Module Cat. No.	A mm (in.)	B mm (in.)	D mm (in.)	E mm (in.)	F mm (in.)
2094-BC04-M03-M	302 (11.9)	290 (11.4)	80 (3.1)	260 (10.25)	375 (14.7)
2094-BC07-M05-M					

2094-BMP5-M, 2094-BM01-M, and 2094-BM02-M AM Modules

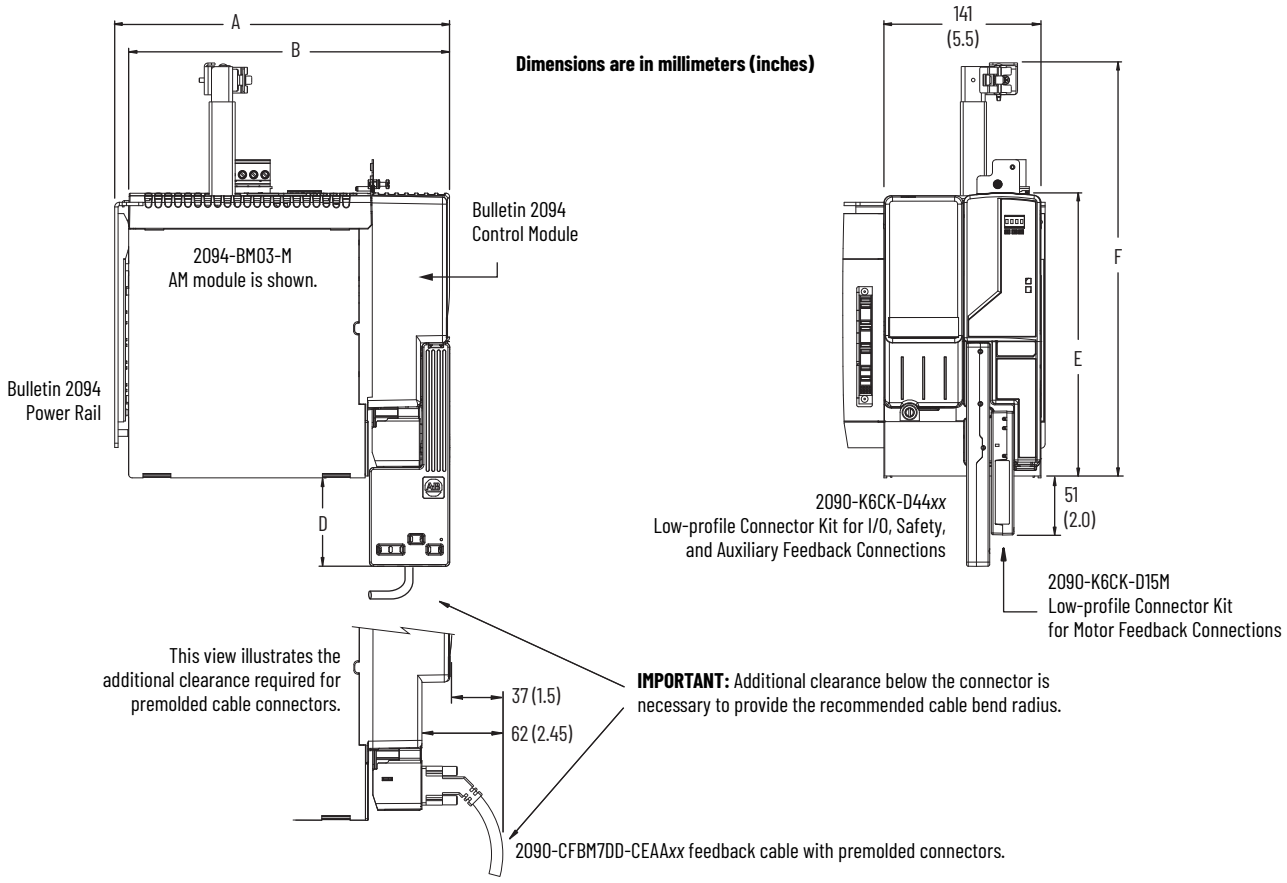


The AM power module is shown mounted to the power rail with the control module attached.

AM Power Module Dimensions

AM Power Module Cat. No.	**A** mm (in.)	**B** mm (in.)	**D** mm (in.)	**E** mm (in.)	**F** mm (in.)
2094-BMP5-M	302 (11.9)	290 (11.4)	80.0 (3.2)	260 (10.25)	285 (11.2)
2094-BM01-M					
2094-BM02-M					

2094-BM03-M and 2094-BM05-M AM Modules



The AM power module is shown mounted to the power rail with the control module attached.

AM Power Module Dimensions

AM Power Module Cat. No.	**A** mm (in.)	**B** mm (in.)	**D** mm (in.)	**E** mm (in.)	**F** mm (in.)
2094-BM03-M	302 (11.9)	290 (11.4)	80 (3.1)	260 (10.25)	375 (14.7)
2094-BM05-M					

Environmental Specifications - Kinetix 6200 and Kinetix 6500 Modular Servo Drives

Attribute	**Operational Range**	**Storage Range (nonoperating)**
Temperature, ambient	0…50 °C (32…122 °F)	-40…+70 °C (-40…+158 °F)
Relative humidity	5…95% noncondensing	5…95% noncondensing
Altitude	1000 m (3281 ft) 3000 m (9843 ft) with derating	3000 m (9843 ft) during transport
Vibration	5…55 Hz @ 0.35 mm (0.014 in.) double amplitude, continuous displacement; 55…500 Hz @ 2.0 g peak constant acceleration (10 sweeps in each of 3 mutually perpendicular directions)	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications - Kinetix 6200 and Kinetix 6500 Modular Servo Drives

Agency Certification (1)	Standards
cULus (2)	UL Listed to U.S. and Canadian safety standards (UL 508C File E59272).
	Solid-state motor overload protection provides dynamic fold-back of motor current when 110% of the motor rating is reached with a peak current limit based on the peak rating of the motor as investigated by UL to comply with UL 508C (UL File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC requirements and specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with: • IEC 61800-5-1:2007 - Adjustable speed electrical power drive systems. • IEC 50178:1997 - Electronic Equipment for use in Power Installations.
Functional Safety	TÜV certified for functional safety: up to Performance Level (PL) e, Category 4 according to ISO 13849; up to SIL CL3 according to IEC 61508, IEC 61800-5-2, and IEC 62061 when used as described in the Kinetix 6200 and Kinetix 6500 Safe Speed Monitor Safety Reference Manual, publication 2094-RM001, and the Kinetix 6200 and Kinetix 6500 Safe Torque Off Safety Reference Manual, publication 2094-RM002.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 2, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2094
ODVA	EtherNet/IP conformance tested (applies to Kinetix 6500 drives).

(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.
(2) UL has not evaluated the Safe Torque Off or the Safe Speed Monitor options in these products.

Accessories - Kinetix 6200 and Kinetix 6500 Modular Servo Drives

Kinetix 6200 and Kinetix 6500 drive accessories include the Bulletin 2094 power rail, shunt module, slot filler module, encoder output module, mounting brackets, feedback connector kits, AC line filters, and other drive accessories common to Bulletin 2094 drives. For product specifications, including motor and interface cables, refer to the Kinetix Motion Accessories Specifications Technical Data, publication KNX-TD004.

Encoder Output Module

The Allen-Bradley encoder output module (catalog number 2198-ABQE) is a DIN-rail mounted EtherNet/IP network-based standalone module capable of outputting encoder pulses to a customer-supplied peripheral device (cameras, for example, used in line-scan vision systems). The encoder output module supports real and virtual axes for systems using the integrated motion on EtherNet/IP network (Kinetix 6500 drives). For more information, refer to Encoder Output Module on page 32.

Kinetix 6000 Multi-axis Servo Drives



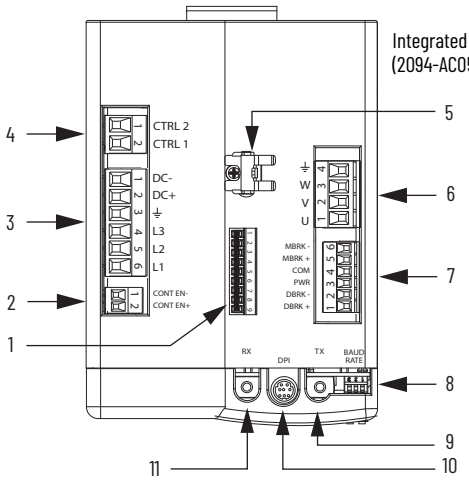
The Kinetix 6000 multi-axis servo drives provide powerful simplicity to handle even the most demanding applications quickly, easily, and cost-effectively. By providing advanced control capability along with innovative design and installation features, the Kinetix 6000 drives can significantly improve system performance while saving time and money. The compact size, simplified wiring, and easy-to-use components make the Kinetix 6000 drives an ideal choice for both OEMs and end-users. Target applications for the Kinetix 6000 drives include packaging, material handling, converting, and assembly.

The Kinetix 6000 servo drives provide Integrated Motion capability through Sercos interface and compatibility with Kinetix 6200 drives, letting you migrate to the enhanced features exactly when and where you need them.

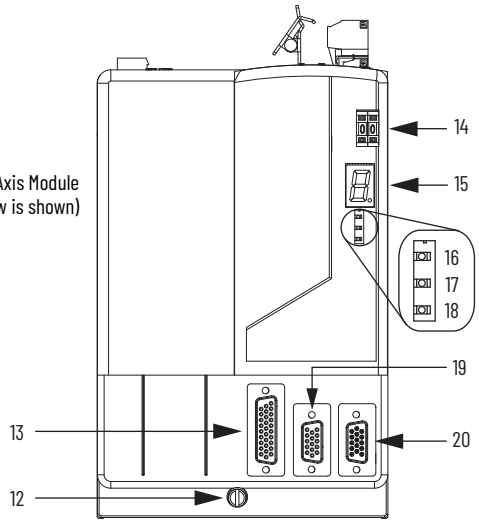
Kinetix 6000 Drive Features and Indicators

2094-AC*xx*-M*xx*-S and 2094-BC*xx*-M*xx*-S IAM Features and Indicators

Integrated Axis Module
(2094-AC05-M01-S top view is shown)



Integrated Axis Module
(2094-AC05-M01-S front view is shown)

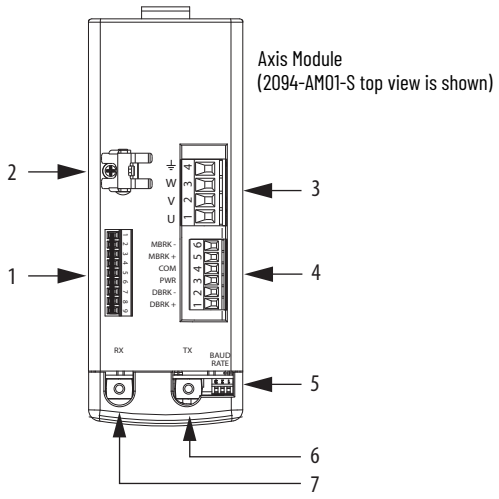


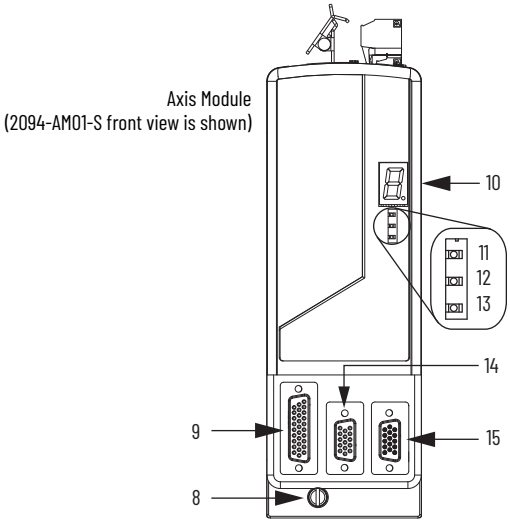
Item	Description
1	Safe Torque Off (STO) connector
2	Contactor enable (CED) connector
3	DC bus/AC input power (IPD) connector
4	Control power (CPD) connector
5	Motor cable shield clamp
6	Motor power (MP) connector
7	Motor/resistive brake (BC) connector

Item	Description
8	Sercos communication rate and optical power switches
9	Sercos transmit (Tx) connector
10	DPI connector
11	Sercos receive (Rx) connector
12	Mounting screw
13	I/O (IOD) connector
14	Sercos node address switch

Item	Description
15	Seven-segment fault status indicator
16	Drive status indicator
17	COMM status indicator
18	Bus status indicator
19	Motor feedback (MF) connector
20	Auxiliary feedback (AF) connector

2094-AMxx-S and 2094-BMxx-S AM Features and Indicators





Item	Description
1	Safe Torque Off (STO) connector
2	Motor cable shield clamp
3	Motor power (MP) connector
4	Motor/resistive brake (BC) connector
5	Sercos communication rate and optical power switches

Item	Description
6	Sercos transmit (Tx) connector
7	Sercos receive (Rx) connector
8	Mounting screw
9	I/O (IOD) connector
10	Seven-segment fault status indicator

Item	Description
11	Drive status indicator
12	COMM status indicator
13	Bus status indicator
14	Motor feedback (MF) connector
15	Auxiliary feedback (AF) connector

Technical Specifications - Kinetix 6000 Multi-axis Servo Drives

IAM Module (converter, 200V-class) Power Specifications (series A, C, and D)

Attribute	2094-AC05-MP5-S	2094-AC05-M01-S	2094-AC09-M02-S	2094-AC16-M03-S	2094-AC32-M05-S
AC input voltage	195...264V rms, three-phase (230V nom)				
AC input frequency	47...63 Hz				
Main AC input current Nom (rms) Max inrush (0-pk) (1)	 10 A 19 A		 19 A 37 A	 36 A 73 A	 71 A 138 A
DC input voltage (common-bus follower)	275...375V DC				
DC input current (common-bus follower)	10 A		19 A	36 A	71 A
Control power AC input voltage	95...264V rms, single-phase (110...240V nom)				
Control power AC input current Nom (@ 220/230V AC) rms Nom (@ 110/115V AC) rms Max inrush (0-pk)	 3 A 6 A 20 A			 3 A 6 A 83 A (2)	
Nominal bus output voltage	325V DC				
Line loss ride through	20 ms				
Continuous output current to bus (A_{DC})	10 A		19 A	36 A	71 A
Peak output current to bus (A_{DC}) (3)	20 A		38 A	72 A	142 A
Bus overvoltage	415V DC				
Bus undervoltage	138V DC				
Internal shunt Continuous power Peak power	 N/A N/A		 50 W 8200 W	 200 W 5700 W	 200 W 5700 W
Internal shunt resistor	N/A		20 Ω	28.75 Ω	28.75 Ω
Shunt on	N/A		405V DC		
Shunt off	N/A		375V DC		
Continuous power output to bus	3 kW		6 kW	11.3 kW	22.5 kW
Peak power output	6 kW		12 kW	22.6 kW	45.0 kW
Efficiency	95%				
Converter inductance	N/A			150 µH	75 µH
Converter capacitance	270 µF		540 µF	1320 µF	1980 µF
Short-circuit current rating	200,000 A (rms) symmetrical				

(1) All 2094-xC*xx* IAM modules are limited to 2 contactor cycles per minute (with up to 4 axes), or 1 contactor cycle per minute (with 5...8 axes). The cycle capability also depends on the converter power rating and the total system capacitance. To calculate cycle capability, refer to the Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001.
(2) For eight axis systems with 230V AC control input voltage and 50 °C (122°F) ambient temperature the maximum inrush duration is less than 1/2 line cycle. To calculate the maximum inrush duration for other configurations, refer to the Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001.
(3) Peak output current duration equals 250 ms.

IAM Module (converter, 400V-class) Power Specifications (series A, B, C, and D)

Attribute	2094-BC01-MP5-S	2094-BC01-M01-S	2094-BC02-M02-S	2094-BC04-M03-S	2094-BC07-M05-S
AC input voltage	324…528V rms three-phase (360…480V nom)				
AC input frequency	47…63 Hz				
Main AC input current Nom (rms) Max inrush (0-pk) (1)	 10.0 A 11.0 A		 24.0 A 22.0 A	 44.0 A 31.1 A	 71.0 A 62.2 A
DC input voltage (common bus follower)	458…747V DC				
DC input current (common-bus follower)	9.0 A		22.6 A	41.5 A	67.7 A
Control power AC input voltage	95…264V rms single-phase (110…240V rms nom)				
Control power AC input current Nom (@ 220/230V AC) rms Nom (@ 110/115V AC) rms Max inrush (0-pk)	 6 A 6 A 98 A (2)				
Control power cycling, max	2 cycles per minute with a 90% on-time, 10% off-time duty cycle				
Nominal bus output voltage	650V DC				
Line loss ride through	20 ms				
Continuous output current to bus (A_{DC})	9.0 A		22.6 A	41.5 A	67.7 A
Peak output current to bus (A_{DC}) Series A drives (3) Series B, C, and D drives	 18.1 A 22.6 A (4)		 45.2 A 56.4 A (4)	 83.1 A 103.8 A (4)	 135.4 A 203.2 A (5)
Bus overvoltage	825V DC				
Bus undervoltage	275V DC				
Internal shunt Continuous power Peak power	 50 W 5.6 kW			 200 W 22.5 kW	
Internal shunt resistor	115 Ω			28.75 Ω	
Shunt on	805V DC				
Shunt off	755V DC				
Continuous power output to bus	6 kW		15 kW	27.6 kW	45 kW
Peak power output Series A drives (3) Series B, C, and D drives	 12 kW 15 kW (4)		 30 kW 37.5 kW (4)	 55.2 kW 69 kW (4)	 90 kW 135 kW (5)
Efficiency	97%				
Converter inductance	500 µH			125 µH	75 µH
Converter capacitance	110 µF		220 µF	940 µF	1410 µF
Short-circuit current rating	200,000 A (rms) symmetrical				

(1) All 2094-xCxx IAM modules are limited to 2 contactor cycles per minute (with up to 4 axis modules), or 1 contactor cycle per minute (with 5 to 8 axis modules). The cycle capability also depends on the converter power rating and the total system capacitance. Refer to the Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001 when making calculations.
(2) For eight axis systems with 230V AC control input voltage and 50 °C (122°F) ambient temperature the maximum inrush duration is less than 1/2 line cycle. To calculate the maximum inrush duration for other configurations, refer to the Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001.
(3) Peak output current duration equals 250 ms.
(4) Converter peak output duration equals 400 ms with a duty cycle of 16%.
(5) Converter peak output duration equals 200 ms with a duty cycle of 3%.

Control Power Current Requirements

Modules on Power Rail	110/115V AC Input		220/230V AC Input	
	Input Current A	Input VA VA	Input Current A	Input VA VA
IAM module only	0.56	67	0.36	85
IAM and 1 AM module	0.99	119	0.64	153
IAM and 2 AM module	1.43	172	0.92	220
IAM and 3 AM module	1.87	224	1.20	287
IAM and 4 AM module	2.31	277	1.48	354
IAM and 5 AM module	2.74	329	1.75	421
IAM and 6 AM module	3.18	382	2.03	488
IAM and 7 AM module	3.62	434	2.31	555

AM Module (inverter, 200V-class) Power Specifications

Attribute [1]	2094-AMP5-S (2094-AC05-MP5-S)	2094-AM01-S (2094-AC05-M01-S)	2094-AM02-S (2094-AC09-M02-S)	2094-AM03-S (2094-AC16-M03-S)	2094-AM05-S (2094-AC32-M05-S)
Bandwidth [2] Velocity loop Current loop	 500 Hz 1300 Hz				
PWM frequency	8 kHz		4 kHz		
Input voltage (nom)	325V DC				
Continuous current (rms)	3.7 A	6.0 A	10.6 A	17.3 A	34.6 A
Continuous current (0-pk)	5.2 A	8.5 A	15.0 A	24.5 A	48.9 A
Peak current (rms) [3]	7.4 A	12.0 A	21.2 A	34.6 A	51.9 A
Peak current (0-pk) [3]	10.5 A	17.0 A	30.0 A	48.9 A	73.4 A
Continuous power out (nom)	1.2 kW	1.9 kW	3.4 kW	5.5 kW	11.0 kW
Internal shunt Continuous power Peak power	 N/A N/A			 50 W 1400 W	
Internal shunt resistor	N/A			115 Ω	
Shunt on	N/A			405V DC	
Shunt off	N/A			375V DC	
Efficiency	98%				
Capacitance	390 µF	660 µF	780 µF	1320 µF	2640 µF
Capacitive energy absorption	15 J	25 J	29 J	50 J	99 J
Short-circuit current rating	200,000 A (rms) symmetrical				

(1) These specifications apply to the axis module specified in the column heading by catalog number and the same axis module (inverter section) that resides within an IAM power module.
(2) Bandwidth values vary based on tuning parameters and mechanical components.
(3) Peak current duration equals 100 ms.

IMPORTANT The peak current ratings of the Kinetix 6000 AM modules (series A, B, C, and D) are configured at the factory as 150% of continuous current. You can program 2094-BMP5-S, 2094-BM01-S, 2094-BM02-S, and 2094-BM03-S series-B and C drives and their equivalent IAM (inverter) modules, up to 250% of continuous inverter current. You can program the 2094-BM05-S (AM module) and the 2094-BC07-M05-S (inverter) module up to 200% of continuous inverter current.

AM Module (inverter, 400V-class) Power Specifications (series A, B, C, and D)

Attribute	2094-BMP5-S (2094-BC01-MP5-S)	2094-BM01-S (2094-BC01-M01-S)	2094-BM02-S (2094-BC02-M02-S)	2094-BM03-S (2094-BC04-M03-S)	2094-BM05-S (2094-BC07-M05-S)
Bandwidth [1] Velocity loop Current loop	 500 Hz 1300 Hz				
PWM frequency	8 kHz		4 kHz		
Nominal input voltage	650V DC				
Continuous current (rms) [2]	2.8 A	6.1 A	10.3 A	21.2 A	34.6 A
Continuous current (sine) 0-pk [3]	4.0 A	8.6 A	14.6 A	30.0 A	48.9 A
Peak current (rms) [3] Series A drives Series B and C drives [3]	 4.2 A 7.0 A	 9.2 A 15.3 A	 15.5 A 25.8 A	 31.8 A 53.0 A	 51.9 A 69.2 A
Peak current (0-pk) [3] Series A drives Series B and C drives [3]	 5.9 A 9.9 A	 12.9 A 21.6 A	 21.8 A 36.4 A	 45.0 A 75.0 A	 73.4 A 97.9 A
Continuous power out, nom	1.8 kW	3.9 kW	6.6 kW	13.5 kW	22.0 kW
Internal shunt Continuous power Peak power	 50 W 5.6 kW			 200 W 22.5 kW	
Internal shunt resistor	115 Ω			28.75 Ω	
Shunt on	805V DC				
Shunt off	755V DC				
Efficiency	98%				
Capacitance	75 µF	150 µF	270 µF	840 µF	1175 µF
Capacitive energy absorption	10 J	19 J	35 J	108 J	152 J
Short-circuit current rating	200,000 A (rms) symmetrical				

(1) Bandwidth values vary based on tuning parameters and mechanical components.
(2) Continuous and peak current ratings are for high-speed operation. For constant velocity operation at an electrical output frequency below 5 Hz (75 rpm for 8-pole motors), the output current rating is reduced. See Motion Analyzer software to correctly size your drive.
(3) Applies to series-B and C drives when configured for Peak-enhanced mode. For more information on drive performance in the Peak-enhanced mode, refer to Peak Enhancement Specifications on page 137.

Peak Enhancement Specifications

Drives that support the Peak-enhanced mode have the capability of increasing the maximum inverter peak current to achieve greater overload performance.

IMPORTANT The peak enhancement feature requires the use of RSLogix 5000® software and drive firmware (as specified below) or the Studio 5000 Logix Designer application.

Peak Enhancement Software and Firmware Requirements

IAM Module Cat. No.	AM Module Cat. No.	RSLogix 5000 Software Version	Kinetix 6000 Drive Firmware Revision
2094-BC01-MP5-S	2094-BMP5-S	16 or later	1.111 or later
2094-BC01-M01-S	2094-BM01-S	16 or later	1.111 or later
2094-BC02-M02-S	2094-BM02-S	16 or later	1.111 or later
2094-BC04-M03-S	2094-BM03-S	17 or later	1.117 or later
2094-BC07-M05-S	2094-BM05-S	17 or later	1.117 or later

Kinetix 6000 Peak Overload Support

IAM/AM Module Cat. No.	Module	Safe Torque Off Drive	Series A	Series B, C, and D
2094-BC*xx*-M*xx*	IAM	Non Safe Torque Off	Standard	–
2094-BM*xx*	AM			
2094-BC*xx*-M*xx*-S	IAM	Safe Torque Off	Standard	Standard or Peak enhanced (1)
2094-BM*xx*-S	AM			

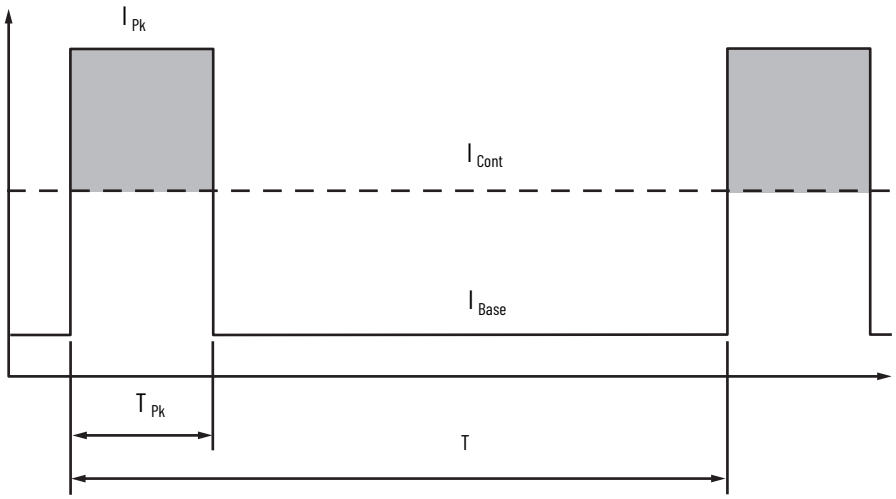
(1) Standard mode is enabled by default to preserve backward compatibility, but you can enable the Peak-enhanced mode to achieve increased peak current performance. Refer to the Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001, for information on enabling the Peak-enhanced mode.

Kinetix 6000 Peak Current Ratings

IAM/AM Module Cat. No.	Peak Inverter Current Rating		Peak Converter Current Rating	
	Standard	Peak Enhanced	Series A	Series B, C, and D
2094-BC01-MP5-S	150%	250%	200%	250%
2094-BC01-M01-S	150%	250%	200%	250%
2094-BC02-M02-S	150%	250%	200%	250%
2094-BC04-M03-S	150%	250%	200%	250%
2094-BC07-M05-S	150%	200%	200%	300%
2094-BMP5-S	150%	250%	–	–
2094-BM01-S	150%	250%	–	–
2094-BM02-S	150%	250%	–	–
2094-BM03-S	150%	250%	–	–
2094-BM05-S	150%	200%	–	–

Load Duty-cycle Profile Example

$$D = \frac{T_{PK}}{T} \times 100\%$$

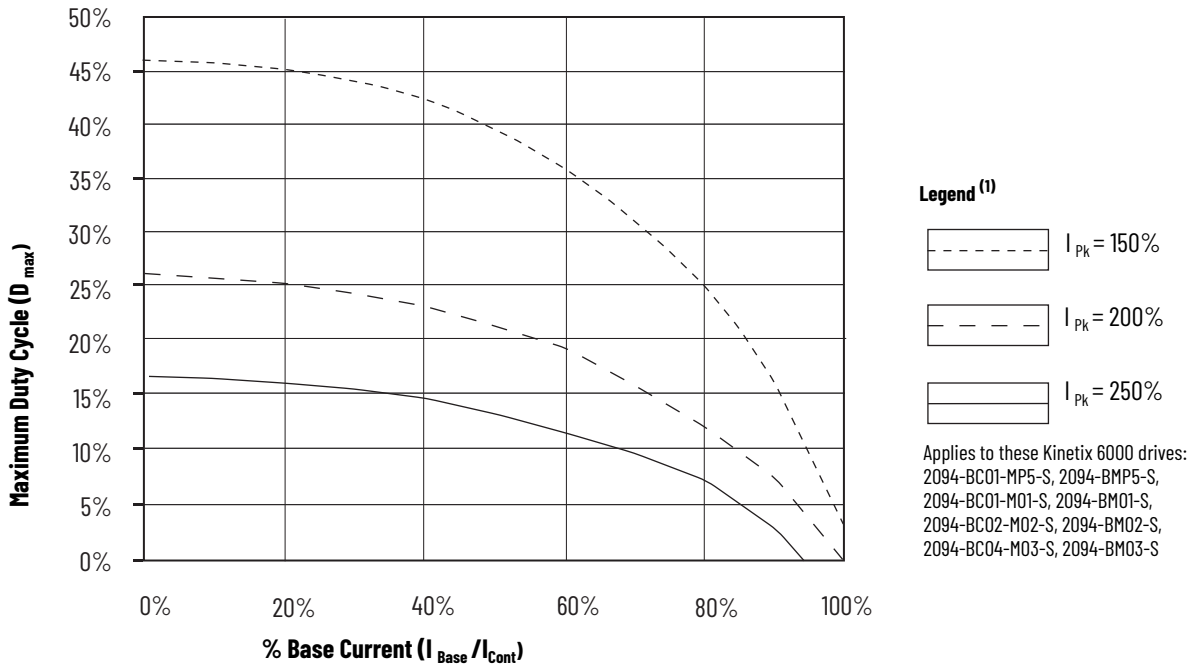


Peak Duty-cycle Definition of Terms

Term	Definition (1)
Continuous Current Rating (I_{Cont})	The maximum value of current that can be output continuously.
Peak Current Rating (I_{PKmax})	The maximum value of peak current that the drive can output. This rating is valid for only overload times less than T_{PKmax}.
Duty Cycle (D)	The ratio of time at peak to the Application Period and is defined as: $D = \frac{T_{PK}}{T} \times 100\%$
Time at Peak (T_{PK})	The time at peak current (I_{PK}) for a given loading profile. Must be less than or equal to T_{PKmax}.
Peak Current (I_{PK})	The level of peak current for a given loading profile. I_{PK} must be less than or equal to the Peak Current Rating (T_{PKMAX}) of the drive.
Base Current (I_{Base})	The level of current between the pulses of peak current for a given loading profile. I_{Base} must be less than or equal to the continuous current rating (I_{Cont}) of the drive.
Loading Profile	The loading profile is composed of I_{PK}, I_{Base}, T_{PK}, and D (or T) values and completely specify the operation of the drive in an overload situation. These values are collectively defined as the Loading Profile of the drive.
Application Period (T)	The sum of the times at I_{PK} (T_{PK}) and I_{Base}.

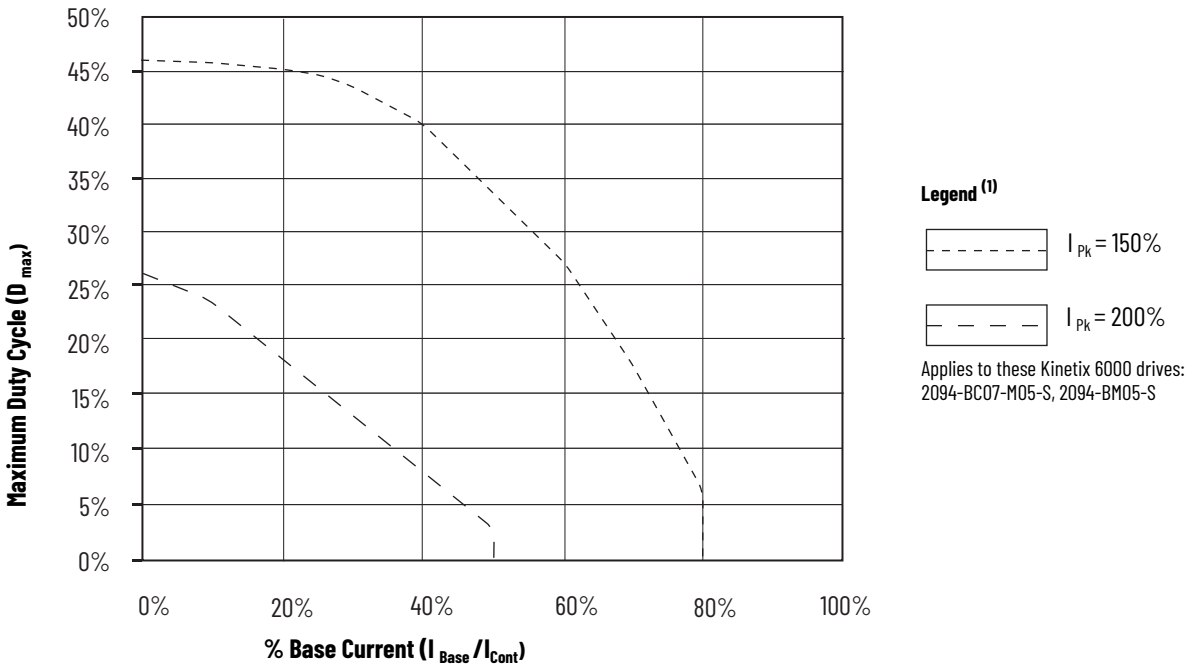
(1) All current values are specified as RMS.

Peak Enhanced Inverter Mode (T_{PK} < 2.0 s)



(1) Base current (I_{Base}) and peak current (I_{PK} are a percentage of the continuous drive current rating (I_{Cont}).

Peak Inverter Overload (T_{PK} < 2.0 s)



(1) Base current (I_{Base}) and peak current (I_{PK}) are a percentage of the continuous drive current rating (I_{Cont}).

Circuit Breaker/Fuse Specifications

The 2094-*x*C*xx*-M*xx*-S and 2094-*x*M*xx*-S drive modules use internal solid-state motor short-circuit protection and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 200,000 A.

Control and DC-bus Circuit-protection Specifications

IAM Module Cat. No.	Control Input Power		DC-bus Power	
	Bussmann Fuse (1)	Allen-Bradley Circuit Breaker (2) (non-UL)	Bussmann Fuse	Mersen Fuse (3)
2094-AC05-MP5-S	FNQ-R-10 (10 A)	1492-SPM2D060	N/A	A50P20-1
2094-AC05-M01-S				
2094-AC09-M02-S			FWH-35B	A50P35-4
2094-AC16-M03-S		1492-SPM2D200	FWH-60B	A50P60-4
2094-AC32-M05-S			FWH-125B	A50P125-4
2094-BC01-MP5-S	FNQ-R-10 (10 A) or FNQ-R-7.5 (7.5 A)	1492-SPM2D060 or 1492-SPM1D150	FWJ-20A14F	DCT20-2
2094-BC01-M01-S				
2094-BC02-M02-S			FWJ-40A	A70QS40-4
2094-BC04-M03-S			FWJ-70A	A70QS70-4
2094-BC07-M05-S			FWJ-125A	A70QS125-4

(1) Use FNQ-R-7.5 circuit breaker for higher single -cycle inrush current capability. This is recommended when the continuous control-power current exceeds 3.0 A.
(2) Use 1492-SPM1D150 circuit breaker for higher single -cycle inrush current capability. This is recommended when the continuous control-power current exceeds 3.0 A.
(3) Mersen fuses were formerly known as Ferraz Shawmut.

Input Power Circuit Protection (LIM)

The 2094-AL09 and 2094-BL02 line interface modules (LIM) contain supplementary protection devices and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 5000 A. When these modules are used, protection on the line side of the LIM module is required. Fuses must be class J or CC only.

The 2094-AL*xx*S, 2094-BL*xx*S, and 2094-XL75S-C*x* LIM modules contain branch circuit rated devices suitable for use on a circuit capable of delivering up to 65,000 A (400V-class) or 100,000 A (200V-class).

Refer to the Line Interface Module Installation Instructions, publication 2094-IN005, for power specifications and more information on using the LIM module.

Input Power Circuit Protection (without LIM)

These fuses and Allen-Bradley circuit breakers are recommended for use with 2094-*x*C*xx*-M*xx*-S IAM modules when the line interface module (LIM) is not used.

IMPORTANT LIM modules (catalog numbers 2094-AL*xx*S, 2094-BL*xx*S, and 2094-XL75S-C*x*) can provide branch circuit protection to the IAM module. Follow all applicable NEC and local codes.

Input Power UL Circuit-protection Specifications

Kinetix 6000 Drives		UL Applications			
IAM Module Cat. No.	**Drive Voltage (three-phase) nom**	**Bussmann Fuses Cat. No.**	**Miniature CB (1) Cat. No.**	**Motor Protection CB, (1) Self-protected CMC Cat. No.**	**Molded Case CB Cat. No.**
2094-AC05-MP5-S	230V	KTK-R-20 (20 A) Class CC	1489-M3D300	140M-F8E-C16	–
2094-AC05-M01-S	230V	KTK-R-20 (20 A) Class CC		140M-F8E-C16	
2094-AC09-M02-S	230V	KTK-R-30 (30 A) Class CC	–	140M-F8E-C20	
2094-AC16-M03-S	230V	LPJ-45SP (45 A) Class J		–	140G-G6C3-C50
2094-AC32-M05-S	230V	LPJ-80SP (80 A) Class J			140G-G6C3-C90
2094-BC01-MP5-S	360...480V	KTK-R-20 (20 A) Class CC	1489-M3D300	140M-F8E-C32	–
2094-BC01-M01-S	360...480V	KTK-R-20 (20 A) Class CC		140M-F8E-C32	
2094-BC02-M02-S	360...480V	KTK-R-30 (30 A) Class CC	–	140M-F8E-C45	
2094-BC04-M03-S	360...480V	LPJ-45SP (45 A) Class J		–	140G-G6C3-C50
2094-BC07-M05-S	360...480V	LPJ-80SP (80 A) Class J			140G-G6C3-C90

(1) These Bulletin 140M circuit breakers, when used as self-protected (Type E) devices, and Bulletin 1489 circuit breakers can be used on only WYE power systems (480Y/277V).

Input Power IEC (non-UL) Circuit-protection Specifications

Kinetix 6000 Drives		IEC (non-UL) Applications			
IAM Module Cat. No.	**Drive Voltage (three-phase) nom**	**Miniature CB Cat. No.**		**Motor Protection CB Cat. No.**	**Molded Case CB Cat. No.**
2094-AC05-MP5-S	230V	1492-SPM3D300	1489-M3D300	140M-F8E-C16	–
2094-AC05-M01-S	230V			140M-F8E-C16	
2094-AC09-M02-S	230V	1492-SPM3D400	–	140M-F8E-C20	
2094-AC16-M03-S	230V	–		–	140G-G6C3-C50
2094-AC32-M05-S	230V				140G-G6C3-C90
2094-BC01-MP5-S	360...480V	1492-SPM3D300	1489-M3D300	140M-F8E-C32	–
2094-BC01-M01-S	360...480V			140M-F8E-C32	
2094-BC02-M02-S	360...480V	1492-SPM3D400	–	140M-F8E-C45	
2094-BC04-M03-S	360...480V	–		–	140G-G6C3-C50
2094-BC07-M05-S	360...480V				140G-G6C3-C90

Contactor Ratings

This table lists the recommended contactor ratings for integrated axis modules installed without a line interface module.

IAM Module (200V-class) Cat. No.	Contactor
2094-AC05-MP5-S	100-C23*x*10 (AC coil) 100-C23*xx*10 (DC coil)
2094-AC05-M01-S	
2094-AC09-M02-S	100-C37*x*10 (AC coil) 100-C37*xx*10 (DC coil)
2094-AC16-M03-S	100-C72*x*10 (AC coil) 100-C72*xx*10 (DC coil)
2094-AC32-M05-S	100-C85*x*10 (AC coil) 100-C85*xx*10 (DC coil)

IAM Module (400V-class) Cat. No.	Contactor
2094-BC01-MP5-S	100-C23*x*10 (AC coil) 100-C23*xx*10 (DC coil)
2094-BC01-M01-S	
2094-BC02-M02-S	100-C37*x*10 (AC coil) 100-C37*xx*10 (DC coil)
2094-BC04-M03-S	100-C60*x*10 (AC coil) 100-C60*xx*10 (DC coil)
2094-BC07-M05-S	100-C85*x*10 (AC coil) 100-C85*xx*10 (DC coil)

Input Transformer for Control Power

Attribute	Value	Cat. No. (1)
Input volt-amperes	750VA	1497B-A10-*xx-x*-N
	1000VA	1497B-A11-*xx-x*-N
	1500VA	1497B-A12-*xx-x*-N
Input voltage	460V AC	
Output voltage	120...240V AC	

(1) Variables (*xx-x*) determine the input voltage and wiring configuration.

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 6000 drive system.

Bulletin 2094 Drive Modules	Usage as % of Rated Power Output (watts)				
	20%	40%	60%	80%	100%
IAM (converter) module (1)					
2094-AC05-MP5-S	8	11	15	19	24
2094-AC05-M01-S	9	12	16	20	25
2094-AC09-M02-S	14	20	28	36	46
2094-AC16-M03-S	19	30	43	58	74
2094-AC32-M05-S	41	68	100	136	176
2094-BC01-MP5-S	18	21	25	29	34
2094-BC01-M01-S					33
2094-BC02-M02-S	36	44	54	64	75
2094-BC04-M03-S	50	67	87	110	135
2094-BC07-M05-S	71	101	137	179	226
IAM (inverter) module or AM module (2)					
2094-AC05-MP5-S or 2094-AMP5-S	28	32	37	41	46
2094-AC05-M01-S or 2094-AM01-S	31	38	46	54	62
2094-AC09-M02-S or 2094-AM02-S	34	45	57	70	84
2094-AC16-M03-S or 2094-AM03-S	48	68	91	116	144
2094-AC32-M05-S or 2094-AM05-S	104	156	212	274	342
2094-BC01-MP5-S or 2094-BMP5-S	46	54	61	69	77
2094-BC01-M01-S or 2094-BM01-S	57	73	90	108	126
2094-BC02-M02-S or 2094-BM02-S	53	72	93	116	142
2094-BC04-M03-S or 2094-BM03-S	94	130	169	211	255
2094-BC07-M05-S or 2094-BM05-S	121	183	252	326	407
Shunt module - 2094-BSP2	68	121	174	227	280

(1) Internal shunt power is not included in the calculations and must be added based on utilization.

Power dissipation specifications are based on these calculations. This is an example:
2094-BC02-M02-S with 4.52 A_{DC} (=20%) converter DC current and 10.3 A_{rms} (=100%) inverter output current.
Converter loss (36 W) + Inverter loss (142 W) = 178 W total power dissipation.

Weight Specifications

Kinetix 6000 Drive Module	Cat. No.	Weight, approx kg (lb)
IAM (200V-class)	2094-AC05-MP5-S	2.23 (4.9)
	2094-AC05-M01-S	2.27 (5.0)
	2094-AC09-M02-S	2.31 (5.1)
	2094-AC16-M03-S	4.71 (10.4)
	2094-AC32-M05-S	7.43 (16.4)
AM (200V-class)	2094-AMP5-S	1.46 (3.2)
	2094-AM01-S	1.50 (3.3)
	2094-AM02-S	1.54 (3.4)
	2094-AM03-S	3.13 (6.9)
	2094-AM05-S	3.18 (7.0)
Power rails (Slim)	2094-PRS1	1.05 (2.3)
	2094-PRS2	1.59 (3.5)
	2094-PRS3	2.14 (4.7)
	2094-PRS4	2.67 (5.9)
	2094-PRS5	3.11 (6.8)
	2094-PRS6	3.55 (7.8)
	2094-PRS7	3.99 (8.8)
	2094-PRS8	4.43 (9.7)

Kinetix 6000 Drive Module	Cat. No.	Weight, approx kg (lb)
IAM (400V-class)	2094-BC01-MP5-S	4.98 (11.0)
	2094-BC01-M01-S	5.03 (11.1)
	2094-BC02-M02-S	5.08 (11.2)
	2094-BC04-M03-S	9.60 (21.1)
	2094-BC07-M05-S	10.1 (22.3)
AM (400V-class)	2094-BMP5-S	2.44 (5.4)
	2094-BM01-S	2.49 (5.5)
	2094-BM02-S	2.54 (5.6)
	2094-BM03-S	4.58 (10.1)
	2094-BM05-S	4.98 (11.0)
Shunt module	2094-BSP2	3.10 (6.8)
Slot-filler module	2094-PRF	0.45 (1.0)

Maximum Feedback Cable Lengths

Although motor feedback cables are available in standard lengths up to 90 m (295.3 ft), the drive/motor/feedback combination can limit the maximum feedback cable length. These tables assume the use of recommended cables as shown in the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Cable Lengths for Compatible Rotary Motors

Motor Cat. No.	Absolute High-resolution (5V) Encoder m (ft)	Absolute High-resolution (9V) Encoder m (ft)	Incremental/TTL (5V) Encoder m (ft)	Resolver m (ft)
MPL-A15*xxx*... MPL-A2*xxx*-E/V	30 (98.4)			
MPL-A3*xxx*... MPL-A5*xxx*-S/M (1)	30 (98.4)			
MPL-B15*xxx*... MPL-B2*xxx*-E/V		90 (295.3)		
MPL-B3*xxx*... MPL-B5*xxx*-S/M		90 (295.3)		
MPL-A/B15*xxx*... MPL-A/B45*xxx*-H			30 (98.4)	
MPL-B*xxxx*-R				90 (295.3)
MPM-A*xxxxx*-S/M	30 (98.4)			
MPM-B*xxxxx*-S/M		90 (295.3)		
MPM-A/B*xxxxx*-2				90 (295.3)
MPF-A*xxxx*-S/M (1)	30 (98.4)			
MPF-B*xxxx*-S/M		90 (295.3)		
MPS-A*xxxx*-S/M	30 (98.4)			
MPS-B*xxxx*-S/M		90 (295.3)		
RDB-B215*xx*-7/3	30 (98.4)			
RDB-B290*xx*-7/3 or RDB-B410*xx*-7/3	90 (295.3)			
TLY-A*xxxx*-H			30 (98.4)	

(1) MPL-A5*xxx* and MPF-A5*xxx* motor encoders are rated for 9V, the remaining Bulletin MPL and MPF (200V-class) motor encoders are rated for 5V.

Cable Lengths for Compatible Linear Actuators

Actuator Cat. No.	**Absolute High-resolution (5V) Encoder** m (ft)	**Absolute High-resolution (9V) Encoder** m (ft)	**Incremental/TTL (5V) Encoder** m (ft)
MPMA-A*xxxxx* or MPAS-A*xxxxx*-V (ballscrew)	30 (98.4)		
MPMA-A*xxxxx* or MPAS-A*xxxxx*-A (direct drive)			30 (98.4)
MPMA-B*xxxxx* or MPAS-B*xxxxx*-V (ballscrew)		90 (295.3)	
MPMA-B*xxxxx* or MPAS-B*xxxxx*-A (direct drive)			30 (98.4)
MPAR-A*xxxxx*-V/M	30 (98.4)		
MPAR-B*xxxxx*-V/M		90 (295.3)	
MPAI-A*xxxxx*M3	30 (98.4)		
MPAI-B*xxxxx*M3		90 (295.3)	
LDAT-S*xxxxxx*-xB*x*			30 (98.4)

Cable Lengths for Compatible Linear Motors

Motor Cat. No.	**Absolute High-resolution (5V) Encoder** m (ft)	**Incremental/TTL (5V) Encoder** m (ft)
LDC-Series or LDL-Series™	30 (98.4)	30 (98.4)

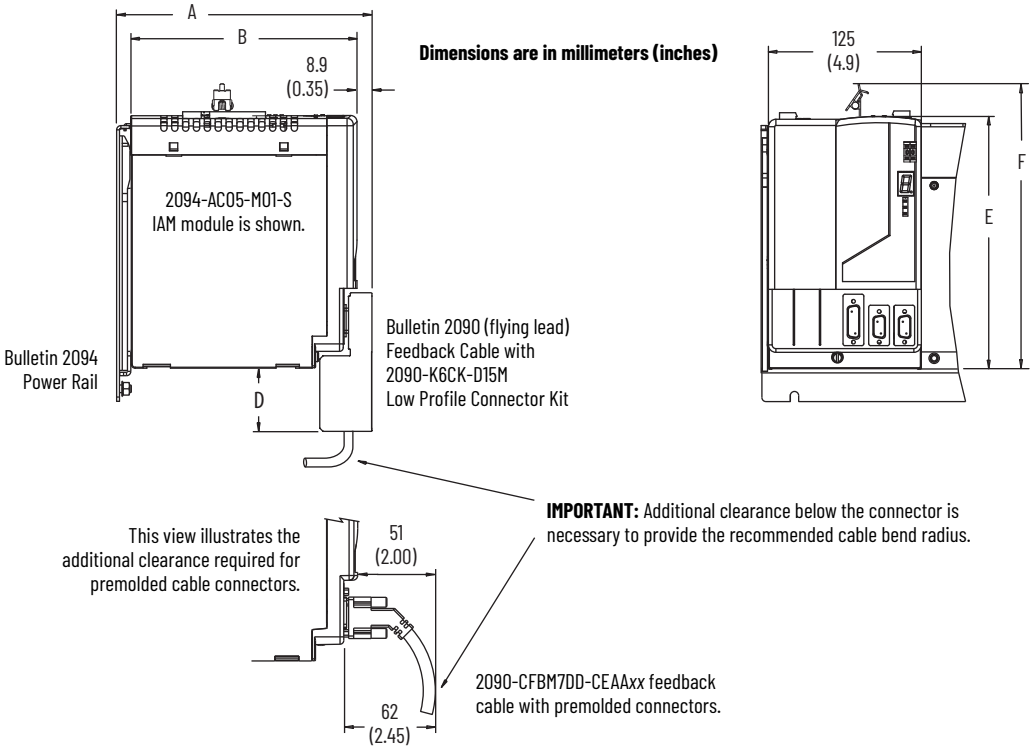
Maximum Power Cable Length

Although motor power cables are available in standard lengths up to 90 m (295.3 ft) and the Kinetix 6000 power rail is available in sizes up to eight axes, to meet CE requirements and improve system performance the combined motor power length for all axes on the same DC bus must not exceed 160 m (525 ft) for 200V-class systems and 240 m (787 ft) for 400V-class systems.

Dimensions - Kinetix 6000 Multi-axis Servo Drives

These drawings provide mounting dimensions for Kinetix 6000 servo drives. Mounting dimensions that include the feedback connector kit or drive-end cable connector are also shown.

2094-AC05-MP5-S, 2094-AC05-M01-S, and 2094-AC09-M02-S Dimensions (200V-class)
2094-BC01-MP5-S, 2094-BC01-M01-S, and 2094-BC02-M02-S Dimensions (400V-class)

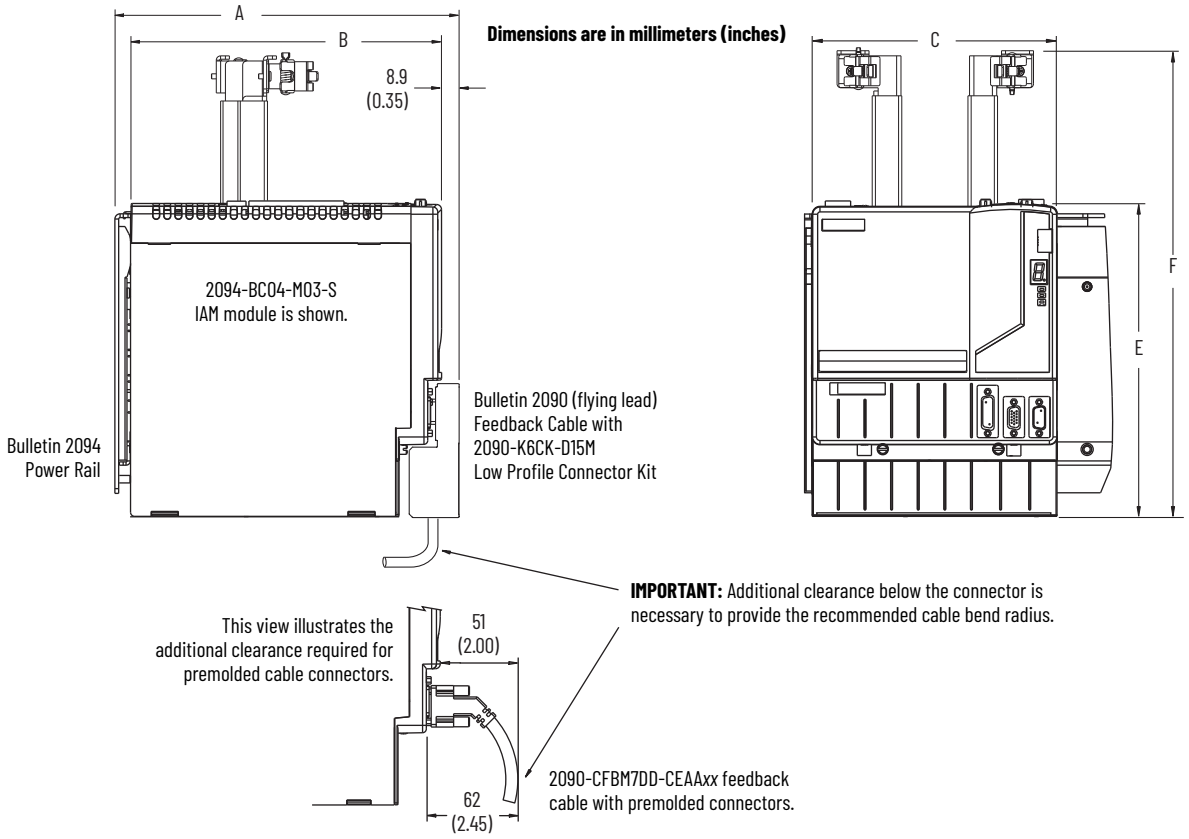


Modules are shown mounted to the power rail and the dimensions reflect that in the depth of the module.

IAM Module Dimensions

IAM Module Cat. No.	Series	A mm (in.)	B mm (in.)	D mm (in.)	E mm (in.)	F mm (in.)
2094-AC05-MP5-S	A, C, and D	198 (7.8)	176 (7.0)	51 (2.0)	206 (8.2)	237 (9.3)
2094-AC05-M01-S						
2094-AC09-M02-S						
2094-BC01-MP5-S	A, B, C, and D	272 (10.7)	249 (9.8)	0 (0)	256 (10.1)	287 (11.3)
2094-BC01-M01-S						
2094-BC02-M02-S						

2094-AC16-M03-S and 2094-AC32-M05-S Dimensions (200V-class)
2094-BC04-M03-S and 2094-BC07-M05-S Dimensions (400V-class)

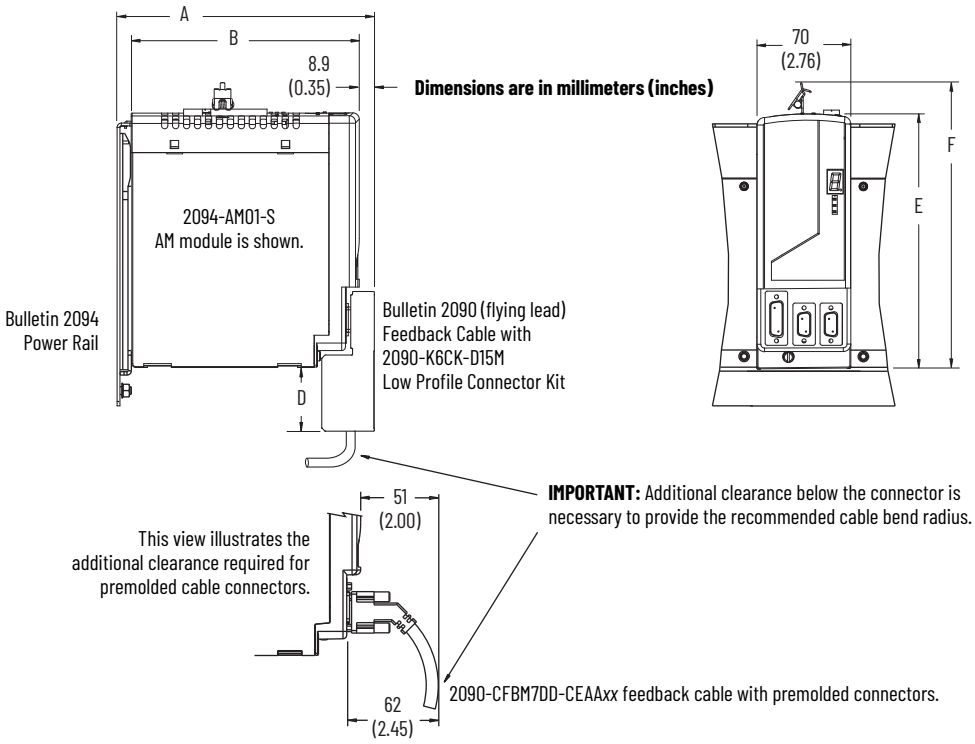


Modules are shown mounted to the power rail and the dimensions reflect that in the depth of the module.

IAM Module Dimensions

IAM Module Cat. No.	Series	A mm (in.)	B mm (in.)	C mm (in.)	E mm (in.)	F mm (in.)
2094-AC16-M03-S	A, C, and D	198 (7.8)	176 (7.0)	125 (4.9)	302 (11.9)	420 (16.5)
2094-AC32-M05-S				196 (7.7)		
2094-BC04-M03-S	A and D	272 (10.7)	249 (9.8)	196 (7.7)	256 (10.1)	375 (14.7)
2094-BC07-M05-S					318 (12.5)	436 (17.2)
2094-BC04-M03-S	B, C, and D	272 (10.7)	249 (9.8)	196 (7.7)	256 (10.1)	375 (14.7)
2094-BC07-M05-S						

2094-AMP5-S, 2094-AM01-S, and 2094-AM02-S Dimensions (200V-class)
2094-BMP5-S, 2094-BM01-S, and 2094-BM02-S Dimensions (400V-class)

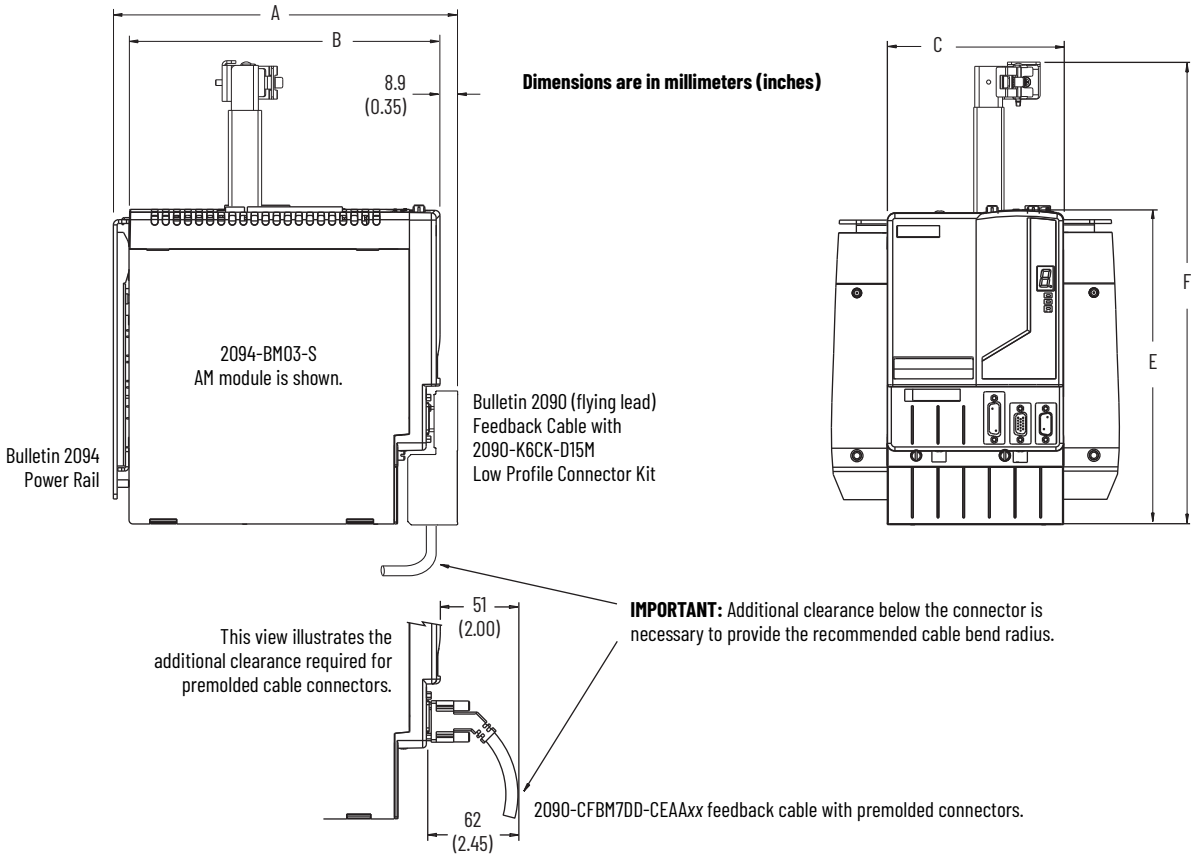


Modules are shown mounted to the power rail and the dimensions reflect that in the depth of the module.

AM Module Dimensions

AM Module Cat. No.	Series	A mm (in.)	B mm (in.)	D mm (in.)	E mm (in.)	F mm (in.)
2094-AMP5-S	A, C, and D	198 (7.8)	176 (7.0)	51 (2.0)	206 (8.2)	237 (9.3)
2094-AM01-S						
2094-AM02-S						
2094-BMP5-S	A, B, C, and D	272 (10.7)	249 (9.8)	0 (0)	256 (10.1)	287 (11.3)
2094-BM01-S						
2094-BM02-S						

2094-AM03-S and 2094-AM05-S Dimensions (200V-class)
2094-BM03-S and 2094-BM05-S Dimensions (400V-class)



Modules are shown mounted to the power rail and the dimensions reflect that in the depth of the module.

AM Module Dimensions

AM Module Cat. No.	Series	A mm (in.)	B mm (in.)	C mm (in.)	E mm (in.)	F mm (in.)
2094-AM03-S	A, C, and D	198 (7.8)	176 (7.0)	70 (2.8)	302 (11.9)	420 (16.5)
2094-AM05-S						
2094-BM03-S	A and D	272 (10.7)	249 (9.8)	141 (5.5)	256 (10.1)	375 (14.7)
2094-BM05-S					318 (12.5)	436 (17.2)
2094-BM03-S	B, C, and D	272 (10.7)	249 (9.8)	141 (5.5)	256 (10.1)	375 (14.7)
2094-BM05-S						

Environmental Specifications - Kinetix 6000 Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Temperature, ambient	0...50 °C (32...122 °F)	-40...+70 °C (-40...+158 °F)
Relative humidity	5...95% noncondensing	5...95% noncondensing
Altitude	1000 m (3281 ft) 3000 m (9843 ft) with derating	3000 m (9843 ft) during transport
Vibration	5...55 Hz @ 0.35 mm (0.014 in.) double amplitude, continuous displacement; 55...500 Hz @ 2.0 g peak constant acceleration (10 sweeps in each of 3 mutually perpendicular directions)	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications - Kinetix 6000 Servo Drives

Agency Certification (1)	Standards
cULus (2)	UL Listed to U.S. and Canadian safety standards (UL 508C File E59272).
	Solid-state motor overload protection provides dynamic fold-back of motor current when 110% of the motor rating is reached with a peak current limit based on the peak rating of the motor as investigated by UL to comply with UL 508C (UL File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC requirements and specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with: • IEC 61800-5-1:2007 - Adjustable speed electrical power drive systems. • IEC 50178:1997 - Electronic Equipment for use in Power Installations.
Functional Safety	TÜV certified for functional safety: up to Performance Level (PL) e, Category 3 according to ISO 13849; up to SIL CL3 according to IEC 61508, IEC 61800-5-2, and IEC 62061 when used as described in the Kinetix Safe Torque Off Feature Safety Reference Manual, publication GMC-RM002.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 2, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2094

(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.
(2) UL has not evaluated the Safe Torque Off option in these products.

Accessories - Kinetix 6000 Servo Drives

Kinetix 6000 drive accessories include the Bulletin 2094 power rail, shunt module, slot filler module, mounting brackets, feedback connector kits, AC line filters, and other drive accessories common to Bulletin 2094 drives. For product specifications, including motor and interface cables, refer to the Kinetix Motion Accessories Specifications Technical Data, publication KNX-TD004.

Kinetix 300 and Kinetix 350 EtherNet/IP Servo Drives



Kinetix 300 Servo Drive

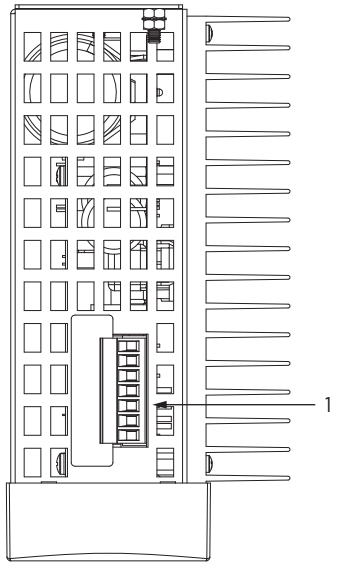
The Kinetix 300 EtherNet/IP indexing drive provides a cost-effective single-axis solution for low axis-count motion control applications. By using one standard EtherNet/IP network for an entire machine - including Motion, Control, I/O, and HMI, simplifies wiring, reduces panel layout costs, and allows easy integration into manufacturing and enterprise systems. In addition, Safe Torque Off functionality helps protect personnel while increasing machine productivity.



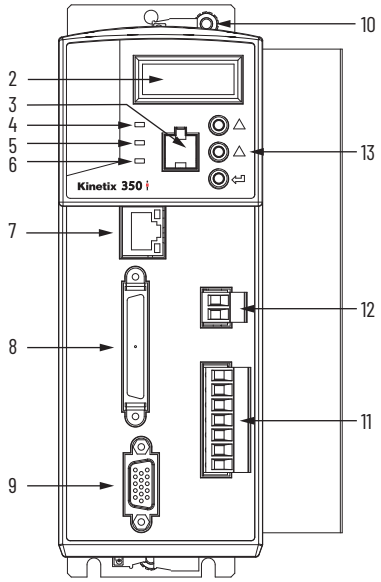
Kinetix 350 Servo Drive

The Kinetix 350 single-axis EtherNet/IP servo drive was developed to provide scalability for your motion control system by simplifying integration of the entire control solution on one network. The Kinetix 350 servo drive is designed to connect and operate with the ControlLogix controllers supporting Integrated Motion on the EtherNet/IP network. Combined as a system, they can provide you a cost-effective motion solution that delivers the high performance and scalability you need to compete in today's industry. With its compact design, the Kinetix 350 requires less panel space and can be connected easily. In addition, you can reduce installation and commissioning time by reusing code across integrated products throughout your entire machine portfolio.

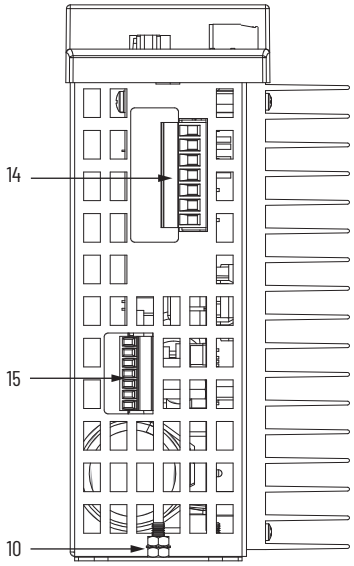
Kinetix 300 and Kinetix 350 Drive Features and Indicators



Kinetix 300/350 Drive, Top View
(2097-V33PR5-*xx* drive is shown)



Kinetix 300/350 Drive, Front View
(2097-V33PR5-LM drive is shown)



Kinetix 300/350 Drive, Bottom View
(2097-V33PR5-*xx* drive is shown)

Item	Description
1	Mains (IPD) connector
2	Status and diagnostic display
3	Memory module socket
4	Network status indicator (2)
5	Module status indicator (2)
6	Axis status indicator (2)
7	Ethernet communication port (Port 1)
8	I/O (IOD) connector

Item	Description
9	Motor feedback (MF) connector (1)
10	Ground lug
11	Shunt resistor and DC bus (BC) connector
12	Back-up power (BP) connector
13	Display control push buttons (3)
14	Motor power (MP) connector
15	Safe Torque Off (STO) connector

(1) The MF (15-pin) connector requires the 2090-K2CK-D15M low-profile connector kit.
(2) Status indicators apply to only Kinetix 350 servo drives.

Technical Specifications - Kinetix 300 and Kinetix 350 Servo Drives

The 2097-V31PR*x-xx* drives with 120V input are capable of driving 240V motors at full speed.

Kinetix 300/350 Drive (single-phase) Power Specifications

Attribute	2097-V31PR0 2097-V31PR0-LM	2097-V31PR2 2097-V31PR2-LM	2097-V32PR0 2097-V32PR0-LM	2097-V32PR2 2097-V32PR2-LM	2097-V32PR4 2097-V32PR4-LM
AC input voltage	70...132V rms single-phase (120V nom) voltage-doubler mode 80...264V rms single-phase (120/240V nom)		80...264V rms single-phase (240V nom)		
AC input frequency	48...62 Hz				
Main AC input current (1) Nom (rms) 120V input (voltage doubler) Max inrush (0-pk) 120V input Nom (rms) 120/240V input Max inrush (0-pk) 240V input	 9.70 A 1.15 A 5.0 A 1.1 A	 15.0 A 1.15 A 8.6 A 1.1 A	 5.0 A 136 A	 8.6 A 2.3 A	 15.0 A 2.3 A
Integrated AC line filter	No	No	Yes	Yes	Yes
Control power back-up input voltage	20...26V DC				
Control power back-up input current Nom Max inrush (0-pk)	 500 mA 30 A				
Continuous output current (rms)	2.0 A	4.0 A	2.0 A	4.0 A	8.0 A
Continuous output current (0-pk)	2.8 A	5.7 A	2.8 A	5.7 A	11.3 A
Peak output current (rms) (2)	6.0 A	12.0 A	6.0 A	12.0 A	24.0 A
Peak output current (0-pk)	8.5 A	17.0 A	8.5 A	17.0 A	33.9 A
Continuous power output (3) @ 240V nom or 120V (voltage-doubler) mode	0.40 kW (4)	0.80 kW (4)	0.40 kW	0.80 kW	1.70 kW
Shunt on	390V DC				
Shunt off	375V DC				
Overvoltage	430V DC				
Short-circuit current rating	100,000 A (rms) symmetrical				

(1) Kinetix 300/350 drive modules are limited to 1 AC mains power cycling per every 2 minutes.
(2) Peak RMS current allowed for up to 2 seconds with a 50% duty cycle.
(3) Nominal continuous power output (kW) applies to 240V AC drives. Value is approximately one-half of this kW rating when using 120V AC.
(4) The 120V voltage-doubler mode applies to only the 2097-V31PR*x-xx* drives.

Kinetix 300/350 Drive (single-phase and three-phase) Power Specifications

Attribute	2097-V33PR1 2097-V33PR1-LM	2097-V33PR3 2097-V33PR3-LM	2097-V33PR5 2097-V33PR5-LM	2097-V33PR6 2097-V33PR6-LM
AC input voltage	80...132V rms single-phase (120V nom) 80...264V rms single-phase (240V nom) 80...264V rms three-phase (240V nom)			
AC input frequency	48...62 Hz			
Main AC input current (1) Nom (rms) 120/240V input, single-phase Max inrush (0-pk) 120/240V input Nom (rms) 240V input, three-phase Max inrush (0-pk) 240V input	 5.0 A 68.0 A 3.0 A 136 A	 8.6 A 1.15 A 5.0A 2.3 A	 15.0 A 1.15 A 8.7A 2.3 A	 24.0 A 5.65 A 13.9 A 11.3 A
Integrated AC line filter	No	No	No	No
Control power back-up input voltage	20...26V DC			
Control power back-up input current Nom Max inrush (0-pk)	 500 mA 30 A			
Continuous output current (rms)	2.0 A	4.0 A	8.0 A	12.0 A
Continuous output current (0-pk)	2.8 A	5.7 A	11.3 A	17.0 A
Peak output current (rms) (2)	6.0 A	12.0 A	24.0 A	36.0 A
Peak output current (0-pk)	8.5 A	17.0 A	33.9 A	50.9 A
Continuous power output (3) @ 240V nom	0.50 kW	1.00 kW	2.00 kW	3.00 kW
Shunt on	390V DC			
Shunt off	375V DC			
Overvoltage	430V DC			
Short-circuit current rating	100,000 A (rms) symmetrical			

(1) Kinetix 300/350 drive modules are limited to 1 AC mains power cycling per every 2 minutes.
(2) Peak RMS current allowed for up to 2 seconds with a 50% duty cycle.
(3) Nominal continuous power output (kW) applies to 240V AC drives. Value is approximately one-half of this kW rating when using 120V AC.

Kinetix 300/350 Drive (three-phase) Power Specifications

Attribute	2097-V34PR3 2097-V34PR3-LM	2097-V34PR5 2097-V34PR5-LM	2097-V34PR6 2097-V34PR6-LM
AC input voltage	320...528V rms three-phase (480V nom)		
AC input frequency	48...62 Hz		
Main AC input current (1) Nom (rms) Max inrush (0-pk)	 2.7 A 4.5 A	 5.5 A 4.5 A	 7.9 A 22.6 A
Integrated AC line filter	No	No	No
Control power back-up input voltage	20...26V DC		
Control power back-up input current Nom Max inrush (0-pk)	 500 mA 30 A		
Continuous output current (rms)	2.0 A	4.0 A	6.0 A
Continuous output current (0-pk)	2.8 A	5.7 A	8.5 A
Peak output current (rms) (2)	6.0 A	12.0 A	18.0 A
Peak output current (0-pk)	8.5 A	17.0 A	25.5 A
Continuous power output @ 480V nom	1.00 kW	2.00 kW	3.00 kW
Shunt on	780V DC		
Shunt off	750V DC		
Overvoltage	850V DC		
Short-circuit current rating	100,000 A (rms) symmetrical		

(1) Kinetix 300/350 drive modules are limited to 1 AC mains power cycling per every 2 minutes.
(2) Peak RMS current allowed for up to 2 seconds with a 50% duty cycle.

Circuit Breaker/Fuse Specifications

Kinetix 300 and Kinetix 350 servo drives use internal solid-state motor short-circuit protection and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 100,000 A (fuses) and 65,000 A (circuit breakers). These fuses and Allen-Bradley circuit breakers are recommended for use with 2097-V*xx*PR*x*-*xx* drives.

Input Power UL Circuit-protection Specifications

Kinetix 300 and Kinetix 350 Drives			UL Applications		
Drive Cat. No.	**Drive Voltage**	**Phase**	**Fuses (Bussmann) Cat. No.**	**Miniature CB (1) (3) Cat. No.**	**Motor Protection CB, (1) (2) (3) Self-protected CMC Cat. No.**
2097-V31PR0-*xx*	120V	Single-phase (voltage doubler)	KTK-R-20 (20A)	1489-M1C200	140M-D8E-C20
	120/240V	Single-phase	KTK-R-10 (10A)	1489-M1C100	140M-C2E-C10
2097-V31PR2-*xx*	120V	Single-phase (voltage doubler)	KTK-R-30 (30A)	1489-M1C300	140M-F8E-C32
	120/240V	Single-phase	KTK-R-20 (20A)	1489-M1C200	140M-D8E-C20
2097-V32PR0-*xx*	240V	Single-phase	KTK-R-20 (20A)	1489-M1C150	140M-D8E-C16
2097-V32PR2-*xx*			KTK-R-20 (20A)	1489-M1C200	140M-D8E-C20
2097-V32PR4-*xx*			KTK-R-30 (30A)	1489-M1C300	140M-F8E-C32
2097-V33PR1-*xx*	120/240V	Single-phase	KTK-R-20 (20A)	1489-M1C200	140M-D8E-C20
	240V	Three-phase	KTK-R-15 (15A)	1489-M3C150	140M-D8E-C16
2097-V33PR3-*xx*	120/240V	Single-phase	KTK-R-20 (20A)	1489-M1C200	140M-D8E-C20
	240V	Three-phase	KTK-R-15 (15A)	1489-M3C150	140M-D8E-C16
2097-V33PR5-*xx*	120/240V	Single-phase	KTK-R-30 (30A)	1489-M1C300	140M-F8E-C32
	240V	Three-phase	KTK-R-20 (20A)	1489-M3C200	140M-D8E-C20
2097-V33PR6-*xx*	120/240V	Single-phase	LPJ-40SP (40A) Class J	N/A	140M-F8E-C32
	240V	Three-phase	KTK-R-30 (30A)	1489-M3C300	
2097-V34PR3-*xx*	480V	Three-phase	KTK-R-10 (10A)	1489-M3C100	140M-C2E-C10
2097-V34PR5-*xx*			KTK-R-10 (10A)	1489-M3C100	140M-C2E-C10
2097-V34PR6-*xx*			KTK-R-20 (20A)	1489-M3C200	140M-D8E-C20

(1) Bulletin 1492 and 1489 circuit protection devices have lower short-circuit current ratings than Bulletin 140M devices.
Refer to http://ab.rockwellautomation.com/allenbradley/productdirectory.page? for product literature with specific short-circuit ratings.
(2) For UL applications, Bulletin 140M devices are applied as self-protected combination motor controllers.
(3) These Bulletin 140M circuit breakers, when used as self-protected (Type E) devices, and Bulletin 1489 circuit breakers can be used on only WYE power systems (480Y/277V).

Input Power IEC (non-UL) Circuit-protection Specifications

Kinetix 300 and Kinetix 350 Drives			IEC (non-UL) Applications		
Drive Cat. No.	**Drive Voltage**	**Phase**	**Miniature CB (1) Cat. No.**		**Motor Protection CB (1) Cat. No.**
2097-V31PR0-*xx*	120V	Single-phase (voltage doubler)	1489-M1C200	1492-SPM1D200	140M-D8E-C20
	120/240V	Single-phase	1489-M1C100	1492-SPM1D100	140M-C2E-C10
2097-V31PR2-*xx*	120V	Single-phase (voltage doubler)	1489-M1C300	1492-SPM1D300	140M-F8E-C32
	120/240V	Single-phase	1489-M1C200	1492-SPM1D200	140M-D8E-C20
2097-V32PR0-*xx*	240V	Single-phase	1489-M1C150	1492-SPM1D150	140M-D8E-C16
2097-V32PR2-*xx*			1489-M1C200	1492-SPM1D200	140M-D8E-C20
2097-V32PR4-*xx*			1489-M1C300	1492-SPM1D320	140M-F8E-C32
2097-V33PR1-*xx*	120/240V	Single-phase	1489-M1C200	1492-SPM1D200	140M-D8E-C20
	240V	Three-phase	1489-M3C150	1492-SPM3D150	140M-D8E-C16
2097-V33PR3-*xx*	120/240V	Single-phase	1489-M1C200	1492-SPM1D200	140M-D8E-C20
	240V	Three-phase	1489-M3C150	1492-SPM3D150	140M-D8E-C16
2097-V33PR5-*xx*	120/240V	Single-phase	1489-M1C300	1492-SPM1D300	140M-F8E-C32
	240V	Three-phase	1489-M3C200	1492-SPM3D200	140M-D8E-C20

Input Power IEC (non-UL) Circuit-protection Specifications (continued)

Kinetix 300 and Kinetix 350 Drives			IEC (non-UL) Applications		
Drive Cat. No.	**Drive Voltage**	**Phase**	**Miniature CB [1] Cat. No.**		**Motor Protection CB [1] Cat. No.**
2097-V33PR6-*xx*	120/240V	Single-phase	N/A	N/A	140M-F8E-C32
	240V	Three-phase	1489-M3C300	1492-SPM3D300	
2097-V34PR3-*xx*	480V	Three-phase	1489-M3C100	1492-SPM3D100	140M-C2E-C10
2097-V34PR5-*xx*			1489-M3C100	1492-SPM3D100	140M-C2E-C10
2097-V34PR6-*xx*			1489-M3C200	1492-SPM3D200	140M-D8E-C20

Contactor Ratings

Kinetix 300/350 Drives (120/240V)

Drive Cat. No.	Drive Voltage	AC Coil Contactor	DC Coil Contactor
2097-V31PR0-*xx*	120V	100-C23x10	100-C23Zx10
	240V	100-C12x10	100-C12Zx10
2097-V31PR2-*xx*	120V	100-C30x10	100-C30Zx10
	240V	100-C23x10	100-C23Zx10

Kinetix 300/350 Drives (240V)

Drive Cat. No.	Drive Voltage	AC Coil Contactor	DC Coil Contactor
2097-V32PR0-*xx*	240V	100-C23x10	100-C23Zx10
2097-V32PR2-*xx*	240V	100-C23x10	100-C23Zx10
2097-V32PR4-*xx*	240V	100-C30x10	100-C30Zx10
2097-V33PR1-*xx*	120V	100-C23x10	100-C23Zx10
	240V	100-C16x10	100-C16Zx10
2097-V33PR3-*xx*	120V	100-C23x10	100-C23Zx10
	240V	100-C16x10	100-C16Zx10
2097-V33PR5-*xx*	120V	100-C30x10	100-C30Zx10
	240V	100-C23x10	100-C23Zx10
2097-V33PR6-*xx*	120V	N/A	N/A
	240V	100-C30x10	100-C30Zx10

Kinetix 300/350 Drives (480V)

Drive Cat. No.	Drive Voltage	AC Coil Contactor	DC Coil Contactor
2097-V34PR3-*xx*	480V	100-C12x10	100-C12Zx10
2097-V34PR5-*xx*		100-C12x10	100-C12Zx10
2097-V34PR6-*xx*		100-C23x10	100-C23Zx10

Transformer Specifications for Control Input Power

Attribute	Value (400V-class system)
Input volt-amperes	750VA
Input voltage	460V AC
Output voltage	120...240V AC

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 300/350 drive system.

Drive Cat. No.	Loss, max W
2097-V31PR0-*xx*	28
2097-V31PR2-*xx*	39
2097-V32PR0-*xx*	28
2097-V32PR2-*xx*	39
2097-V32PR4-*xx*	67
2097-V33PR1-*xx*	28

Drive Cat. No.	Loss, max W
2097-V33PR3-*xx*	39
2097-V33PR5-*xx*	67
2097-V33PR6-*xx*	117
2097-V34PR3-*xx*	39
2097-V34PR5-*xx*	58
2097-V34PR6-*xx*	99

Weight Specifications

Drive Cat. No.	Weight, approx kg (lb)
2097-V31PR0-*xx*	1.3 (2.9)
2097-V31PR2-*xx*	1.5 (3.3)
2097-V32PR0-*xx*	1.4 (3.1)
2097-V32PR2-*xx*	1.7 (3.7)
2097-V32PR4-*xx*	2.2 (4.9)
2097-V33PR1-*xx*	1.3 (2.9)

Drive Cat. No.	Weight, approx kg (lb)
2097-V33PR3-*xx*	1.5 (3.3)
2097-V33PR5-*xx*	2.0 (4.4)
2097-V33PR6-*xx*	1.9 (4.2)
2097-V34PR3-*xx*	1.5 (3.3)
2097-V34PR5-*xx*	2.0 (4.4)
2097-V34PR6-*xx*	1.8 (4.0)

Maximum Feedback Cable Lengths

Although motor power and feedback cables are available in standard lengths up to 90 m (295.3 ft), Kinetix 300/350 drive maximum feedback cable length is 20 m (65.6 ft). These tables assume the use of recommended cables as shown in the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Cable Lengths for Compatible Rotary Motors

Motor Cat. No.	Absolute High-resolution (5V) Encoder m (ft)	Absolute High-resolution (9V) Encoder m (ft)	Incremental/TTL (5V) Encoder m (ft)	Absolute High-resolution (5V) 17-bit Encoder m (ft)
MPL-A3*xxx*... MPL-A5*xxx*-S/M (1)	20 (65.6)			
MPL-A15*xxx*... MPL-A2*xxx*-E/V	20 (65.6)			
MPL-B3*xxx*... MPL-B9*xxx*-S/M		20 (65.6)		
MPL-B15*xxx*... MPL-B2*xxx*-E/V		20 (65.6)		
MPL-A/B15*xxx*... MPL-A/B45*xxx*-H			20 (65.6)	
MPM-A*xxxxx*-S/M	20 (65.6)			
MPM-B*xxxxx*-S/M		20 (65.6)		
MPF-A*xxxx*-S/M (1)	20 (65.6)			
MPF-B*xxxx*-S/M		20 (65.6)		
MPS-A*xxxx*-S/M	20 (65.6)			
MPS-B*xxxx*-S/M		20 (65.6)		
TLY-A*xxxx*-B				20 (65.6)
TLY-A*xxxx*-H			20 (65.6)	

(1) MPL-A5*xxx* and MPF-A5*xxx* motor encoders are rated for 9V, the remaining Bulletin MPL and MPF (200V-class) motor encoders are rated for 5V.

Cable Lengths for Compatible Linear Actuators

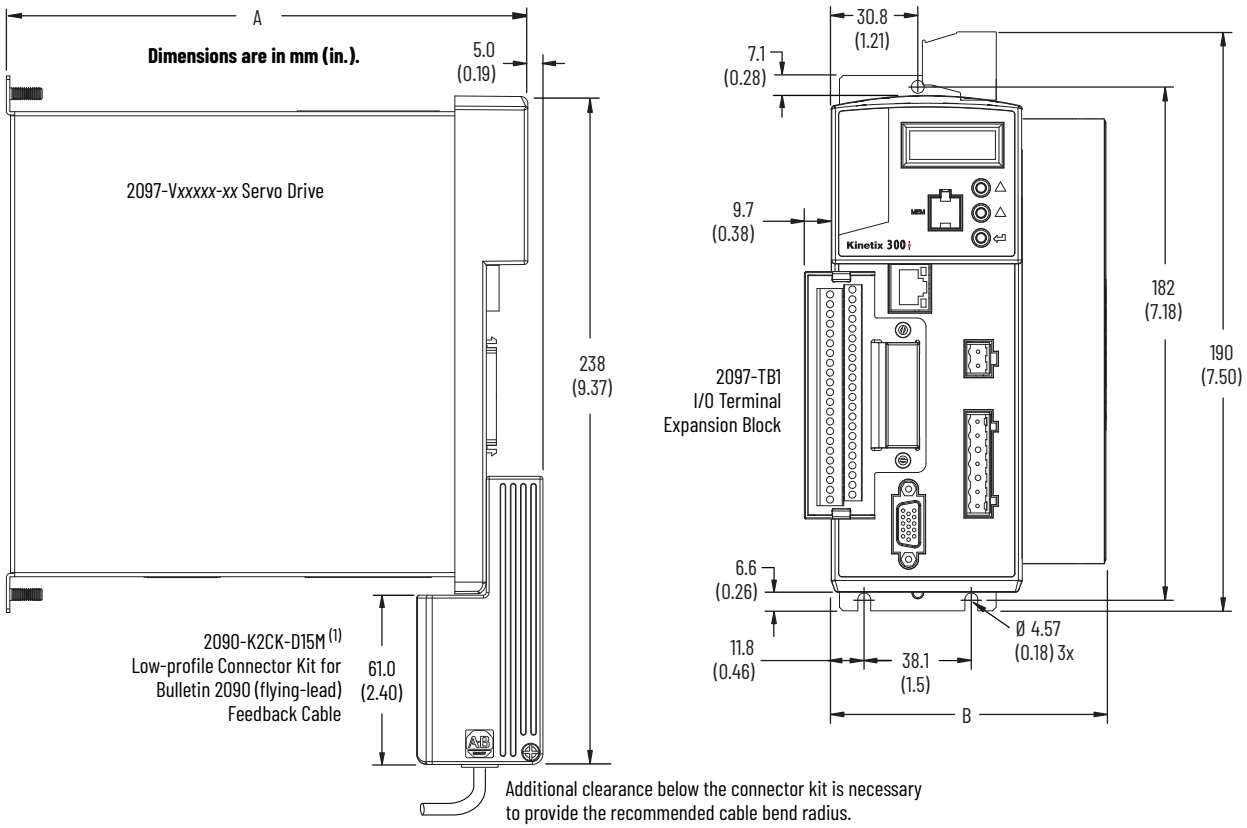
Actuator Cat. No.	**Absolute High-resolution (5V) Encoder** m (ft)	**Absolute High-resolution (9V) Encoder** m (ft)	**Incremental/TTL (5V) Encoder** m (ft)	**Absolute High-resolution (5V) 17-bit Encoder** m (ft)
MPMA-A*xxxxx* or MPAS-A*xxxxx*-V (ballscrew)	20 (65.6)			
MPMA-A*xxxxx* or MPAS-A*xxxxx*-A (direct drive)			20 (65.6)	
MPMA-B*xxxxx* or MPAS-B*xxxxx*-V (ballscrew)		20 (65.6)		
MPMA-B*xxxxx* or MPAS-B*xxxxx*-A (direct drive)			20 (65.6)	
MPAR-A*xxxxx*-V/M	20 (65.6)			
MPAR-B*xxxxx*-V/M		20 (65.6)		
MPAI-A*xxxxx*M3	20 (65.6)			
MPAI-B*xxxxx*M3		20 (65.6)		
LDAT-S*xxxxxx*-x*D*x		20 (65.6)		
LDAT-S*xxxxxx*-x*B*x			20 (65.6)	

Cable Lengths for Compatible Linear Motors

Motor Cat. No.	**Absolute High-resolution (5V) Encoder** m (ft)	**Incremental/TTL (5V) Encoder** m (ft)
LDC-Series or LDL-Series	20 (65.6)	20 (65.6)

Dimensions - Kinetix 300 and Kinetix 350 Servo Drives

These drawings provide mounting dimensions for Kinetix 300 and Kinetix 350 servo drives. Mounting dimensions that include the feedback connector kit and I/O terminal block are also shown.



(1) Use the LDAT-CONKIT-ABS connector kit with added circuitry for Kinetix 300 drives and LDAT-Series linear thrusters with absolute high-resolution encoders. Both kits have the same physical dimensions.

Kinetix 300/350 Drive Dimensions

Cat. No.	A mm (in.)	B mm (in.)
2097-V31PR0-*xx*	185 (7.29)	68.0 (2.68)
2097-V31PR2-*xx*	185 (7.29)	69.0 (2.70)
2097-V32PR0-*xx*	230 (9.04)	68.0 (2.68)
2097-V32PR2-*xx*	230 (9.04)	69.0 (2.70)
2097-V32PR4-*xx*	230 (9.04)	87.0 (3.42)
2097-V33PR1-*xx*	185 (7.29)	68.0 (2.68)

Cat. No.	A mm (in.)	B mm (in.)
2097-V33PR3-*xx*	185 (7.29)	69.0 (2.70)
2097-V33PR5-*xx*	185 (7.29)	94.0 (3.72)
2097-V33PR6-*xx*	230 (9.04)	68.0 (2.68)
2097-V34PR3-*xx*	185 (7.29)	69.0 (2.70)
2097-V34PR5-*xx*	185 (7.29)	94.0 (3.72)
2097-V34PR6-*xx*	230 (9.04)	68.0 (2.68)

Environmental Specifications - Kinetix 300 and Kinetix 350 Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Temperature, ambient	0...40 °C (32...104 °F)	-10...+70 °C (14...158 °F)
Relative humidity	5...95% noncondensing	5...95% noncondensing
Altitude	Derate by 1% per 300 m (1000 ft) above 1500 m (5000 ft)	3000 m (9842 ft) during transport
Vibration	5...2000 Hz @ 2.5 g peak, 0.015 mm (0.0006 in.) displacement, max	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications - Kinetix 300 and Kinetix 350 Servo Drives

Agency Certification (1) (when product is marked)	Standards
cULus (2)	UL Listed to U.S. and Canadian safety standards (UL 508 C File E59272).
	Solid-state motor overload protection provides dynamic fold-back of motor current when 110% of the motor rating is reached with a peak current limit based on the peak rating of the motor as investigated by UL to comply with UL 508C (UL File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with: • IEC 61800-5-1:2007 - Adjustable speed electrical power drive systems. • IEC 50178:1997 - Electronic Equipment for use in Power Installations.
Functional Safety	TÜV certified for functional safety: up to Performance Level (PL) d, Category 3 according to ISO 13849; up to SIL CL2 according to IEC 61508, IEC 61800-5-2, and IEC 62061 when used as described in the Kinetix 300 EtherNet/IP Indexing Servo Drives User Manual, publication 2097-UM001 and the Kinetix 350 Single-axis EtherNet/IP Servo Drives User Manual, publication 2097-UM002.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 1, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2097
ODVA	EtherNet/IP conformance tested (applies to Kinetix 350 servo drives).

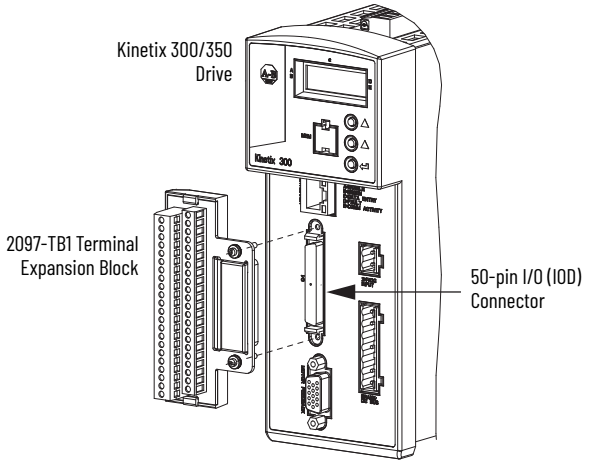
(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.
(2) UL has not evaluated the Safe Torque Off option in these products.

Accessories - Kinetix 300 and Kinetix 350 Servo Drives

Kinetix 300/350 drive accessories include the I/O terminal block, memory module programmer, memory modules, ABS connector kit, AC line filters, shunt resistors, and the encoder output module.

I/O Terminal Expansion Block

The 2097-TB1 I/O terminal expansion block is a drive-mounted breakout board for making flying-lead cable connections to the 50-pin IOD connector.



2097-TB1 I/O Terminal Block Specifications

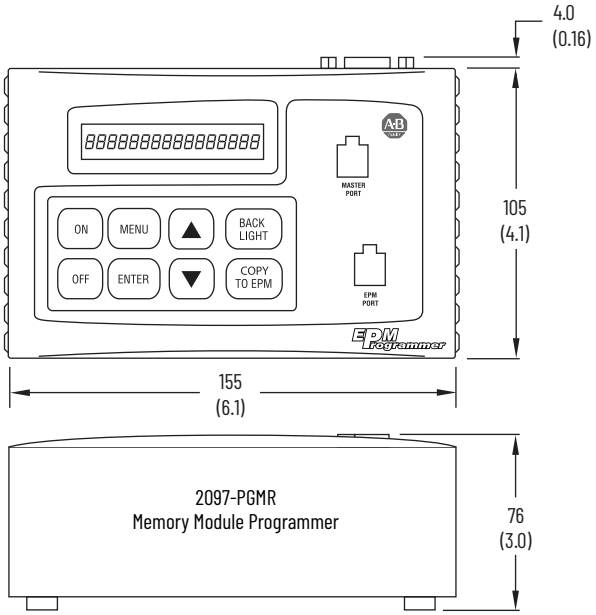
Attribute	Value
Wire size	1.5...0.2 mm^2 (16...24 AWG)
Change in depth of drive (1)	11 mm (0.42 in.)
Change in width of drive (1)	10 mm (0.38 in.)

(1) Add this value to the dimensions of your Kinetix 300 drive.

Memory Module Programmer

The 2097-PGMR memory module programmer is a hand-held device for duplicating your Kinetix 300/350 drive configuration to reduce down-time and troubleshooting.

Dimensions are in mm (in.)



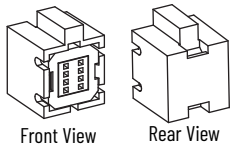
2097-PGMR Memory Module Programmer Specifications

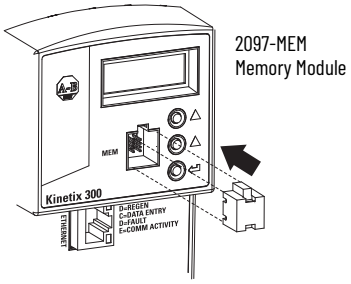
Attribute		Value
DC supply	Internal batteries	+ 6V DC, min 150 mA supply
		4 mono-cells (type D), 1.5V DC each
	External power supply unit	+ 6V DC, 300 mA, stabilized
Display	Type	LCD
	Display format	Text
	Lines x characters	1 x 16
	Contrast setting	Via menu
Memory	Data memory	Up to 120 parameter files for inverter drive controllers
Serial interface	DB9 connector	RS-232
Weight	2097-PGMR	1.3 kg (2.87 lb), with batteries

Memory Module 12-packs

The 2097-MEM memory modules use EEPROM technology in a plastic casing for protection and ruggedness to safe-guard your Kinetix 300/350 drive configuration.

Use the 2097-MEM memory modules to back up your drive configuration for easy Automatic Device Replacement (ADR).

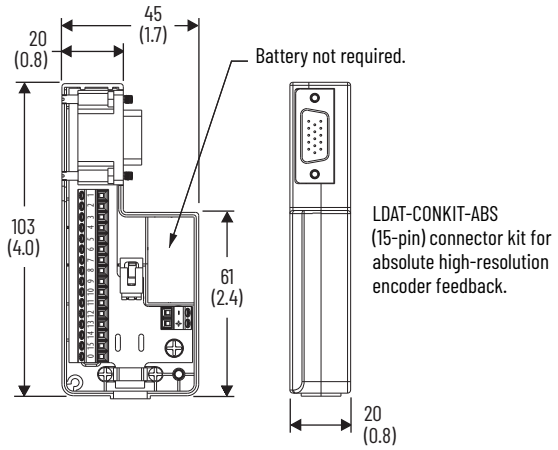




Connector Kit for Absolute Encoders

Use the LDAT-CONKIT-ABS connector kit on Kinetix 300 drives with LDAT-Series linear thrusters and absolute high-resolution encoders.

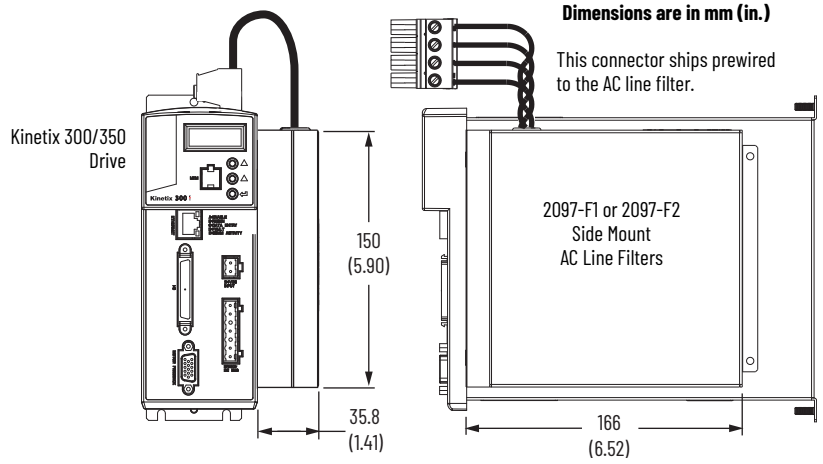
The LDAT-CONKIT-ABS connector kit has the same physical dimensions as catalog number 2090-K2CK-D15M, but contains added circuitry required for Kinetix 300 drives with absolute high-resolution encoders.



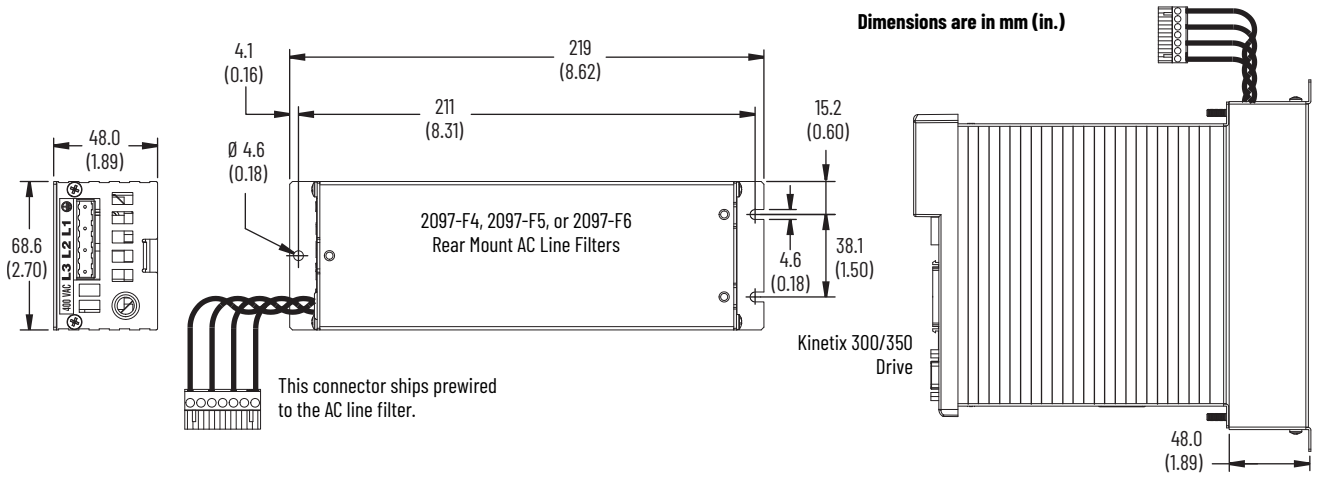
AC Line Filters

The Kinetix 300/350 drives were tested by using recommended line filters. Use of these filters is also needed to meet CE requirements. The 2097-V32PR0-*xx*, 2097-V32PR2-*xx*, and 2097-V32PR4-*xx* drives have integrated AC line filters.

2097-F1 and 2097-F2 side-mount line filters add 35.8 mm (1.41 in.) to the width of your drive.



2097-F4, 2097-F5, and 2097-F6 rear-mount line filters add 48 mm (1.89 in.) to the depth of your drive.



AC Line Filter Specifications

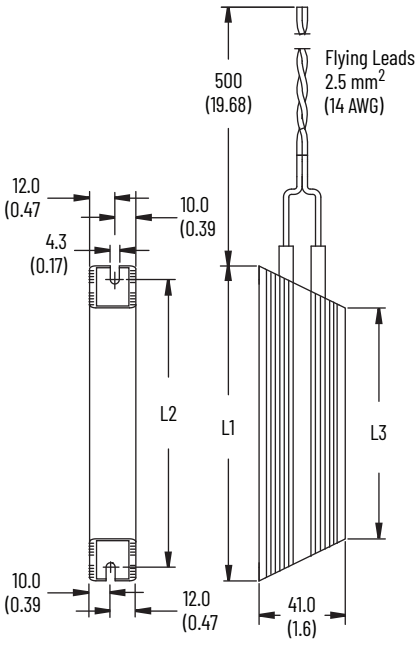
AC Line Filter Cat. No.	Mount	Voltage 50/60 Hz	Phase	Current A @ 40 °C (104 °F)	Power Loss W	Leakage Current mA	Weight, approx kg (lb)	Kinetix 300/350 [1] Drive Cat. No.
2097-F1	Side	240V AC	1	24.0	5.2	9.0	0.6 (0.13)	2097-V33PR6-*xx* [2]
2097-F2		480V AC	3	10.0	2.8	1.0		**2097-V34PR6-*xx***
2097-F4 [3]	Rear	240/480V AC	3	4.40	1.2	1.0	0.8 (0.18)	2097-V33PR1-*xx* [4]
								2097-V34PR3-*xx*
2097-F5 [3]				6.90	1.3			2097-V34PR5-*xx*
								2097-V33PR3-*xx* [5]
2097-F6 [3]				15.0	4.1			2097-V33PR5-*xx* [6]

(1) Use 2090-UXLF-110 (single-phase) line filter for 2097-V31PR0-*xx* drive operation. Use 2090-XXLF-TC116 (single-phase) line filter for 2097-V31PR2-*xx* drive operation.
(2) Use 2097-F1 (single-phase) line filter for 2097-V33PR6-*xx* (single-phase) drive operation. Use the 2090-XXLF-TC316 (three-phase) line filter for 2097-V33PR6-*xx* (three-phase) drive operation.
(3) This filter is rated for multiple voltage/phase line conditions.
(4) Use 2090-UXLF-106 (single-phase) line filter for 2097-V33PR1-*xx* (single-phase) drive operation.
(5) Use 2090-UXLF-110 (single-phase) line filter for 2097-V33PR3-*xx* (single-phase) drive operation.
(6) Use 2090-UXLF-123 (single-phase) line filter for 2097-V33PR5-*xx* (single-phase) drive operation.
Refer to the Kinetix Motion Accessories Technical Data, publication KNX-TD004 for AC line filter specifications not listed here.

Shunt Resistor

The Bulletin 2097 passive shunt resistor wires directly to the Kinetix 300/350 drive.

Shunt Resistor Dimensions



Dimensions are in mm (in.)

Shunt Resistor Cat. No.	L1	L2	L3
2097-R2	210 (8.3)	197 (7.7)	170 (6.7)
2097-R3	210 (8.3)	197 (7.7)	170 (6.7)
2097-R4	150 (5.9)	137 (5.4)	110 (4.3)
2097-R6	210 (8.3)	197 (7.7)	170 (6.7)
2097-R7	150 (5.9)	137 (5.4)	110 (4.3)

Shunt Resistor Power Specifications

Shunt Module Cat. No.	Resistance Ohms	Continuous Power W	Peak Power kW	Peak Current A	D_Application, max (1) %	Weight kg (lb)	Kinetix 300/350 Drive Cat. No.
2097-R2	20	150	7.6	19.5	1.97	0.3 (0.7)	2097-V32PR4-*xx* 2097-V33PR5-*xx*
2097-R3	30		5.1	13.0	2.96		2097-V33PR6-*xx*
2097-R4	40	80	3.8	9.8	2.10	0.2 (0.4)	2097-V31PR0-*xx* 2097-V31PR2-*xx* 2097-V32PR0-*xx* 2097-V32PR2-*xx* 2097-V33PR1-*xx* 2097-V33PR3-*xx*
2097-R6	75	150	7.9	10.3	1.90	0.3 (0.7)	2097-V34PR5-*xx* 2097-V34PR6-*xx*
2097-R7	150	80	4.0	5.1	2.02	0.2 (0.4)	2097-V34PR3-*xx*

(1) D_Application is the application duty cycle in percent. For the intermittent regeneration applications, use D_Application = t/T, where t is the duration when regeneration is needed and T is the time interval between two regenerations. Both t and T must use the same time units, for example, seconds.

Encoder Output Module

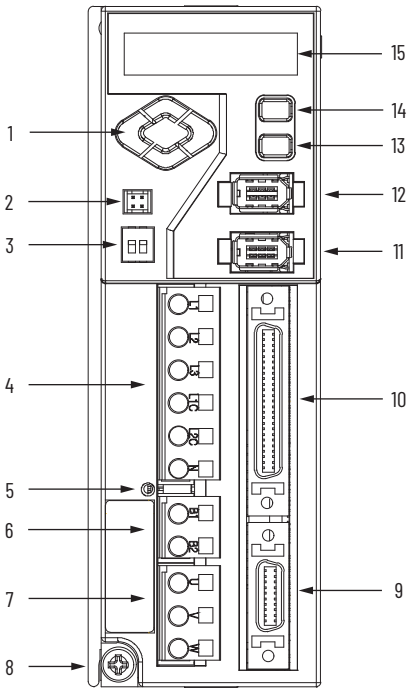
The Allen-Bradley encoder output module (catalog number 2198-ABQE) is a DIN-rail mounted EtherNet/IP network-based standalone module capable of outputting encoder pulses to a customer-supplied peripheral device (cameras, for example, used in line-scan vision systems). The encoder output module supports real and virtual axes for systems using the integrated motion on EtherNet/IP network (Kinetix 350 drives). For more information, refer to Encoder Output Module on page 32.

Kinetix 3 Component Servo Drives



The Kinetix 3 component servo drive provides a cost-effective motion control solution for smaller, low-axis count applications. By providing the ability to apply the appropriate level of control for the application along with download-able configuration software and automatic motor recognition, the Kinetix 3 servo drive delivers a motion solution that is easy to use at minimum cost. Its compact size and lower power ranges make it ideal for a variety of applications including indexing tables, medical manufacturing, laboratory automation equipment, and semiconductor processing.

Kinetix 3 Drive Features and Indicators



Item	Description
1	Left/right and up/down keys
2	Analog output (A.out) connector
3	RS-485 communication termination switch
4	Input power (IPD) connector
5	Main power status indicator
6	Shunt power (BC) connector
7	Motor power (MP) connector
8	Ground lug
9	Motor feedback (MF) connector
10	Input/output (IOD) connector
11	Serial interface (Comm0B) down
12	Serial interface (Comm0A) up
13	Enter key
14	Mode/set key
15	7-segment status indicator

Technical Specifications - Kinetix 3 Component Servo Drives

Kinetix 3 Servo Drive Power Specifications

Attribute	2071-AP0	2071-AP1	2071-AP2	2071-AP4	2071-AP8	2071-A10	2071-A15
AC input voltage	170...264V rms						
AC input phase	Single-phase				Three-phase/ Single-phase	Three-phase	
AC input frequency	47...63 Hz						
Mains AC input current [1] Nom (rms) Max inrush (0-pk)	1.30 A 21.9 A	2.38 A	3.68 A	7.14 A	6.25 A (three-phase) 10.52 A (single-phase) 22.6 A	8.75 A	12.37 A
Mains AC line loss ride through	20 ms						
Nominal bus output voltage	311V DC						
Bandwidth [2] Velocity loop Current loop	 550 Hz 2000 Hz						
PWM frequency	10 kHz						
Control power AC input voltage	170...264V rms						
Control power input current Nom (rms) Max inrush (0-pk)	 0.1 A 31 A						
Continuous output current (rms)	0.61 A	1.11 A	1.72 A	3.33 A	5.05 A	7.07 A	9.90 A
Continuous output current (0-pk)	0.85 A	1.56 A	2.40 A	4.67 A	7.07 A	9.90 A	13.99 A
Peak output current (rms)	1.80 A	3.30 A	5.10 A	9.90 A	14.99 A	18.88 A	29.69 A
Peak output current (0-pk)	2.55 A	4.67 A	7.21 A	14.0 A	21.21 A	26.70 A	41.99 A
Continuous output power	50 W	100 W	200 W	400 W	800 W	1.0 kW	1.5 kW
Bus overvoltage	405V DC						
Bus undervoltage	190V DC						
Internal shunt resistor	N/A			50 Ω	30 Ω		
Internal shunt Continuous power Peak power	 N/A N/A			 30 W 300 W	 70 W 700 W		
Shunt on	390V DC						
Shunt off	380V DC						
Efficiency	90%						
Bus capacitance	390 µF	780 µF			1170 µF		
Capacitive energy absorption	13 J	26 J			39 J		
Short-circuit current rating	100,000 A (rms) symmetrical						

(1) Kinetix 3 drive modules are limited to 1 AC mains power cycling every 2 minutes.
(2) Bandwidth values vary based on tuning parameters and mechanical components.

Fuse/Contactor Specifications

Make sure the selected components are properly coordinated and meet acceptable codes including any requirements for branch circuit protection. The following fuse examples are recommended for use with Kinetix 3 drives.

Fuse and Contactor Specifications

Drive Cat. No.	AC Input Power (1) (2) (3) Recommended Fuse	Control Power (2) (4) Recommended Fuse	Contactor (5)
2071-AP0	FNQ-R-7	FRS-R-2-1/2 FNQ-R-7-1/2 LPJ-6	100-K05*xy*
2071-AP1			
2071-AP2			100-K09*xy*
2071-AP2	FNQ -R-10		100-K12*xy*
2071-AP8	FNQ-R-20 LPJ-20		100-C16*xy*
2071-A10			
2071- A15	FNQ-R-30 LPJ-30		100-C23*xy*

(1) Fuses specified are Bussmann fuses.
(2) FNQ-R fuses are described as time-delay fuses, Class CC.
(3) LPJ fuses are described as dual-element time-delay fuses, Class J.
(4) FRS-R fuses are described as dual-element time-delay fuses, Class RK5.
(5) For contactors: *x* represents coil voltage, *y* represents the number of contacts.

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 3 drive system.

Drive Cat. No.	Usage as % of Rated Power Output (watts)				
	20%	40%	60%	80%	100%
2071-AP0	19.3	20.0	20.6	21.3	22.0
2071-AP1	20.1	21.6	23.1	24.6	26.2
2071-AP2	21.7	24.6	27.6	30.6	33.7
2071-AP4	25.6	31.9	38.4	45.2	52.2
2071-AP8	26.4	32.3	38.6	45.1	52.0
2071-A10	30.9	40.2	50.1	60.5	71.5
2071-A15	37.4	50.1	63.8	78.4	93.9

Weight Specifications

Drive Cat. No.	Weight, approx kg (lb)
2071-AP0	0.70 (1.5)
2071-AP1	0.75 (1.6)
2071-AP2	
2071-AP4	1.0 (2.2)
2071-AP8	1.75 (3.9)
2071-A10	
2071-A15	

Maximum Feedback Cable Lengths

Although motor power and feedback cables are available in standard lengths up to 90 m (295.3 ft), Kinetix 3 drive maximum feedback cable length is 30 m (98.4 ft). These tables assume the use of recommended cables as shown in the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Maximum Cable Lengths for Compatible Motors and Actuators

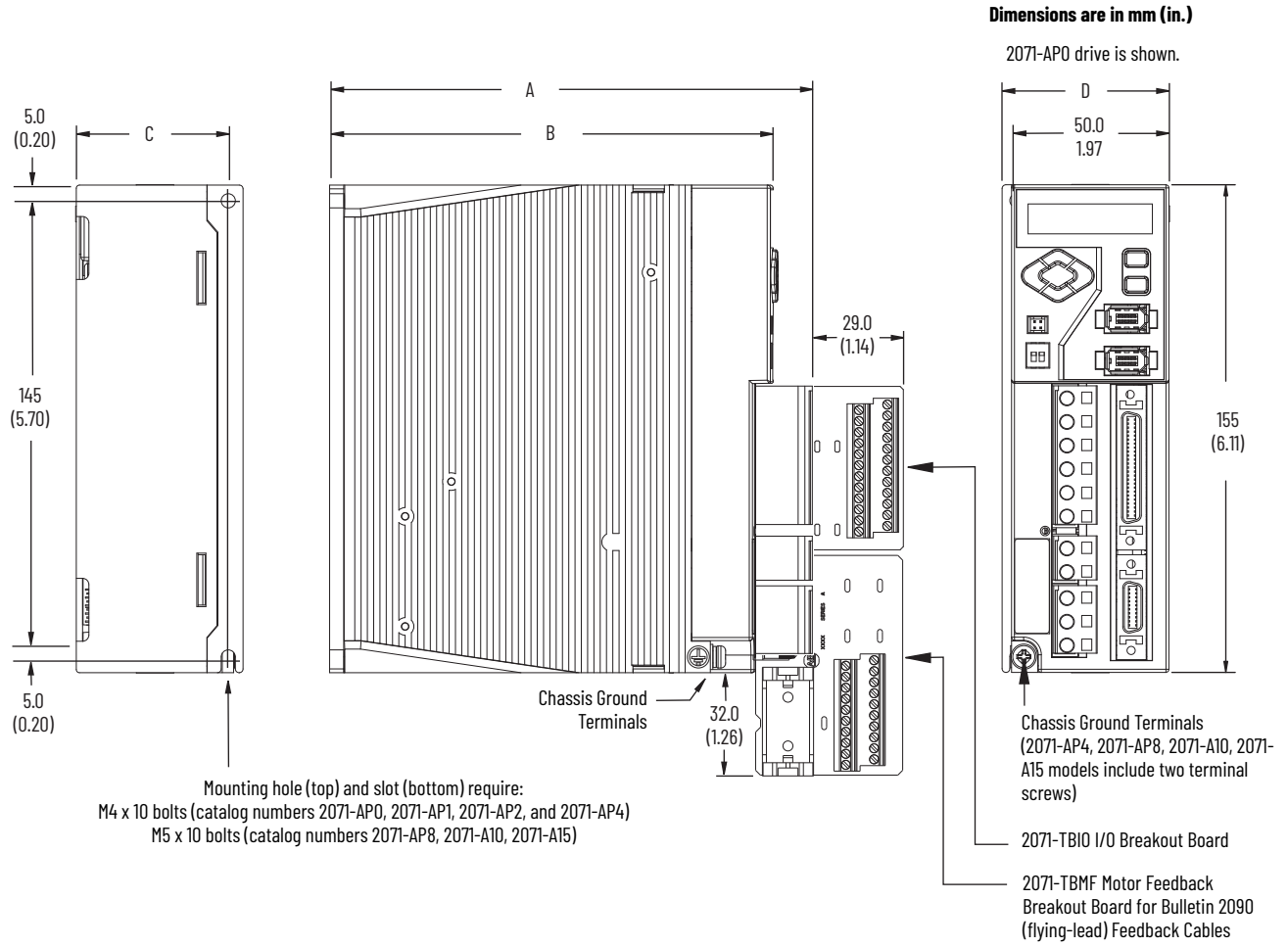
Rotary Motor Cat. No.	**Incremental/TTL (5V) Encoder** m (ft)	**Absolute High-resolution (5V) 17-bit Encoder** m (ft)
TL-A*xxxx*-B		30 (98.4)
TLY-A*xxxx*-B		
TLY-A*xxxx*-H	30 (98.4)	

Actuator Cat. No.	**Incremental/TTL (5V) Encoder** m (ft)	**Absolute High-resolution (5V) 17-bit Encoder** m (ft)
MPAS-A*xxxx* (direct drive)	30 (98.4)	
LDAT-S*xxxxxx*-x*B*x	30 (98.4)	

Linear Motor Cat. No.	**Incremental/TTL (5V) Encoder** m (ft)
LDC-Series or LDL-Series	30 (98.4)

Dimensions - Kinetix 3 Component Servo Drives

These drawings provide mounting dimensions for Kinetix 3 servo drives. Mounting dimensions that include the motor feedback and I/O breakout boards are also shown.



Kinetix 3 Drive Dimensions

Drive Cat. No.	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)
2071-AP0	153 (6.04)	141 (5.55)	48.3 (1.90)	53.0 (2.09)
2071-AP1				
2071-AP2				
2071-AP4				58.0 (2.29)
2071-AP8	198 (7.82)	186 (7.33)	59.0 (2.32)	81.0 (3.19)
2071-A10				
2071-A15				

Environmental Specifications - Kinetix 3 Component Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Temperature, ambient	0…50 °C (32…122 °F)	-25…+85 °C (-13…+185 °F)
Relative humidity	5…95% noncondensing	5…95% noncondensing
Altitude	1000 m (3281 ft) 3000 m (9843) with derating	3000 m (9843 ft) during transport
Vibration	5…55 Hz @ 0.35 mm (0.014 in.) double amplitude, continuous displacement; 55…500 Hz @ 2.0 g peak constant acceleration (10 sweeps in each of 3 mutually perpendicular directions)	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications - Kinetix 3 Component Servo Drives

Agency Certification (1) (when product is marked)	Standards
cULus	UL Listed to U.S. and Canadian safety standards (UL 508 C File E59272).
	This drive provides integral solid-state short-circuit protection, but does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes. This drive provides solid-state motor overload protection that is adjustable. Refer to the Kinetix 3 Component Servo Drives User Manual, publication 2071-UM001, for more information.
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with IEC 61800-5-1:2007 - Adjustable Speed Electrical Power Drive Systems.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 2, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2071-A15 • Registration number: KCC-REM-RAA-2071-AP4

(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.

Accessories - Kinetix 3 Component Drives

Kinetix 3 drive accessories include drive-mounted 20-pin and 50-pin breakout boards for making flying-lead motor feedback and I/O connections. For control and configuration serial interface cable specifications, refer to the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Motor Feedback Breakout Board

Use the 2071-TBMF breakout board with 2090-CFBM6DF-CBAA*xx* flying-lead feedback cables or when your motor or actuator has high-resolution encoder feedback.

Motor Feedback Breakout Board Specifications

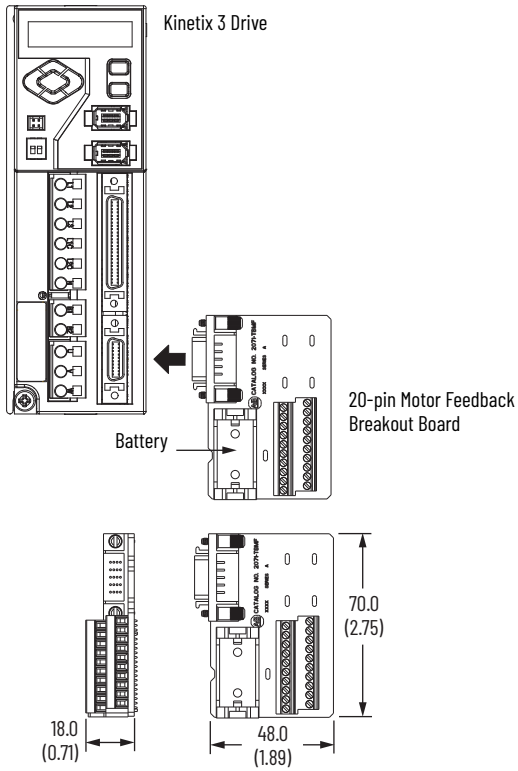
Attribute	Value
Wire size	1.5...0.2 mm^2 (16...24 AWG)
Change in depth of drive (1)	29 mm (1.14 in.)
Change in height of drive (1)	32 mm (1.26 in.)

(1) Add this value to the dimensions of your Kinetix 3 drive. Refer to Dimensions - Kinetix 3 Component Servo Drives on page 168.

The customer-supplied 3.6V lithium battery, when installed in a motor feedback breakout board, provides multi-turn encoder operation to Kinetix TLY and Kinetix TL motors.

Battery Specifications

Attribute	Value
International size reference	1/2AA, ER14252
Capacity, nom @ 0.5 mA, to 2V	1.2 Ah
Rated voltage	3.6V
Recommended continuous current, max	50 mA



Dimensions are in mm (in.)

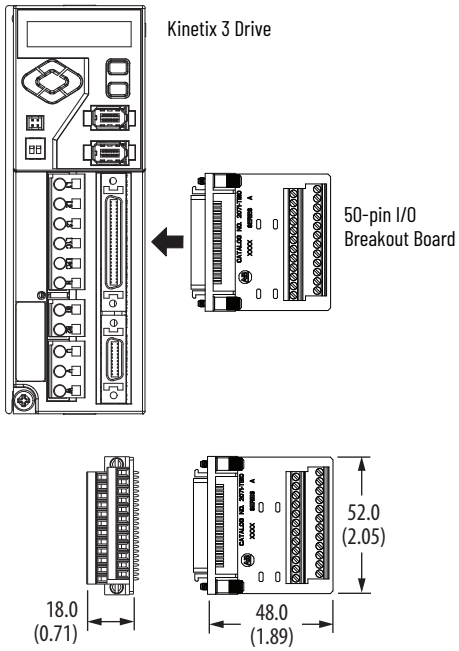
I/O Breakout Board

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.

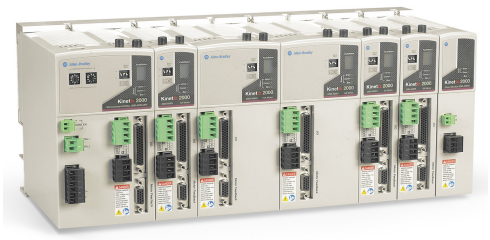
I/O Breakout Board Specifications

Attribute	Value
Wire size	1.5...0.2 mm^2 (16...24 AWG)
Change in depth of drive (1)	29 mm (1.14 in.)

(1) Add this value to the dimensions of your Kinetix 3 drive. Refer to Dimensions - Kinetix 3 Component Servo Drives on page 168.



Kinetix 2000 Multi-axis Servo Drives

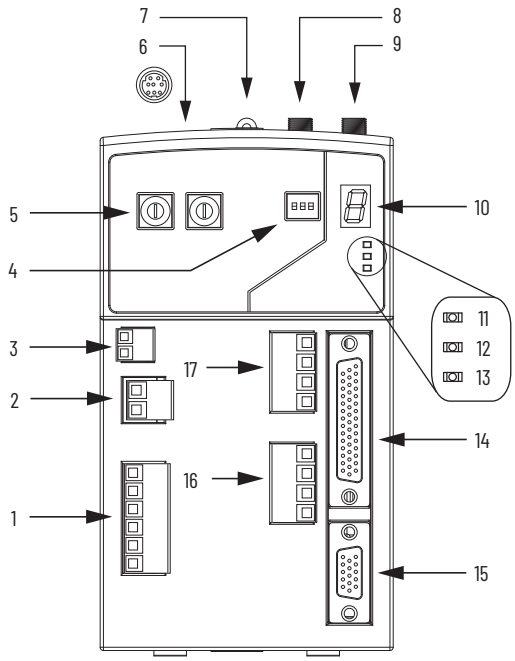


Extend the benefits of Kinetix Integrated Motion to low-power motion control applications with the Kinetix 2000 servo drive. This multi-axis servo drive provides simplicity at its best, letting you save time and money from initial wiring and programming to operation and diagnostics. With a continuous output current (rms) from 1.0...9.5 amps, the Kinetix 2000 drive offers the same compact design, exceptional performance, and cost saving features as the Kinetix 6000 drives. The commonality among Kinetix drives lets you learn once and reuse your product knowledge. Paired with the CompactLogix 1768-L4*x* controller, the Kinetix 2000 drive is ideal for small and mid-sized applications looking to improve productivity, quality, and time to market while reducing the total cost of ownership.

The Kinetix 2000 servo drives provide Integrated Motion capability through the Sercos interface and are part of the Kinetix Integrated Motion solution.

Kinetix 2000 Features and Indicators

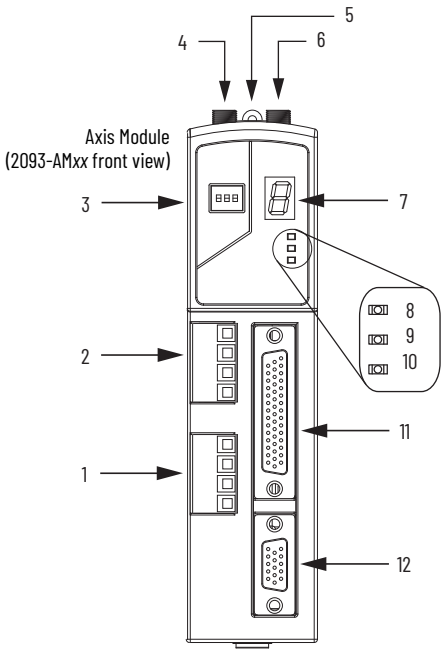
2093-AC05-MPx IAM Features and Indicators



Integrated Axis Module
(2093-AC05-MPx front view)

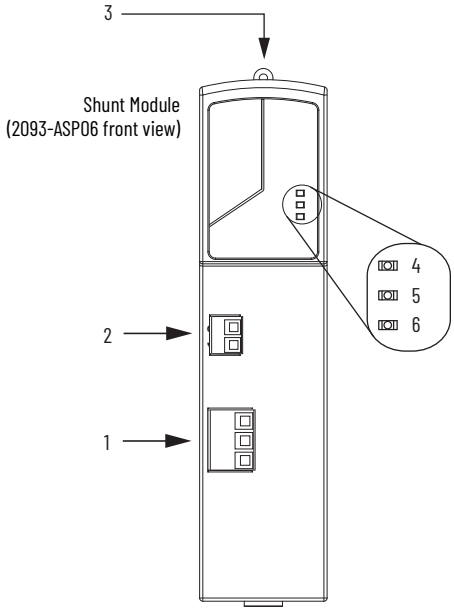
Item	Description
1	DC Bus / AC input power (IPD) connector
2	Control power (CPD) connector
3	Contactor enable (CED) connector
4	Sercos communication rate and optical power switches
5	Sercos node address switch
6	DPI connector (facing up)
7	Mounting screw
8	Sercos receive (Rx) connector
9	Sercos transmit (Tx) connector
10	Seven-segment fault status indicator
11	Drive status indicator
12	COMM status indicator
13	Bus status indicator
14	I/O and auxiliary feedback (IOD/AF) connector
15	Motor feedback (MF) connector
16	Motor power (MP) connector
17	Motor brake (BC) connector

2093-AMxx AM Features and Indicators



Item	Description
1	Motor power (MP) connector
2	Motor brake (BC) connector
3	Sercos communication rate and optical power switches
4	Sercos receive (Rx) connector
5	Mounting screw
6	Sercos transmit (Tx) connector
7	Seven-segment fault status indicator
8	Drive status indicator
9	COMM status indicator
10	Bus status indicator
11	I/O and auxiliary feedback (IOD/AF) connector
12	Motor feedback (MF) connector

2093-ASP06 Shunt Module Features and Indicators



Item	Description
1	External shunt resistor (RC) connector
2	External thermal switch (TS) connector
3	Mounting screw
4	Shunt fault status indicator
5	Over-temp fault status indicator
6	Bus status indicator

Technical Specifications - Kinetix 2000 Multi-axis Servo Drives

The converter section of these modules is identical. Select your IAM module based on the inverter requirements of your application.

IAM Module (three-phase and single-phase) Power Specifications

Attribute	2093-AC05-MPx Three-phase Input (230V nom)	2093-AC05-MPx Single-phase Input (230V nom)
AC input voltage	170…264V rms	
AC input frequency	47…63 Hz	
Main AC input current (1) Nom (rms) Max inrush (0-pk)	 11.66 A 34.0 A	 10.95 A 34.0 A
DC input voltage (common bus follower)	240…375V DC	
DC input current (common bus follower)	9.76 A	6.42 A
Control power AC input voltage	170…264V rms, single-phase (230V nom)	
Control power AC input current Nom (@ 230V AC) rms Max inrush (0-pk)	 1.25 A 93.0 A (2)	
Nominal bus output voltage	325V DC	
Line loss ride through	20 ms	
Continuous output current to bus (A_{DC})	9.67 A	6.42 A
Peak output current to bus (A_{DC}) (3)	19.34 A	12.84 A
Bus overvoltage	415V DC	
Bus undervoltage	135.5V DC	
Internal shunt Continuous power Peak power	 15 W 3000 W	
Internal shunt resistor	50 Ω	
Shunt on	405V	
Shunt off	375V	
Continuous power output to bus	3.0 kW	2.0 kW
Peak power output	6.0 kW	4.0 kW
Efficiency	95%	
Converter inductance	N/A	
Converter capacitance	540 µF	
Converter leakage current (max)	2.0 mA	

(1) All 2093-AC05 integrated axis modules are limited to 2 contactor cycles per minute (with up to 4 axis modules), or 1 contactor cycle per minute (with 5…8 axis modules).
(2) Maximum inrush duration is less than 1/2 line cycle.
(3) Peak output current duration equals 250 ms.

Control Power Current Requirements

Modules on Power Rail	220/230V AC Input A	Input VA VA
IAM only	0.15	50
IAM, 1 AM	0.30	99
IAM, 2 AM	0.45	148
IAM, 3 AM	0.60	197
IAM, 4 AM	0.75	247
IAM, 5 AM	0.90	296
IAM, 6 AM	1.05	345
IAM, 7 AM	1.20	395
IAM, 7 AM, 1 Shunt module	1.25	410

These specifications apply to the axis module specified in the column heading by catalog number and the same axis module (inverter section) that resides within an integrated axis module.

AM Module Power Specifications

Attribute	2093-AMP1 (2093-AC05-MP1)	2093-AMP2 (2093-AC05-MP2)	2093-AMP5 (2093-AC05-MP5)	2093-AM01	2093-AM02
Bandwidth [1] Velocity Loop Current Loop	 500 Hz 1300 Hz				
PWM frequency	8 kHz				
Nominal input voltage	325V DC				
Continuous current (rms)	1.0 A	2.0 A	3.0 A	6.0 A	9.5 A
Continuous current (0-pk)	1.41 A	2.83 A	4.24 A	8.48 A	13.4 A
Peak current (rms)	3.0 A	6.0 A	9.0 A	18.0 A	28.5 A
Peak current (0-pk)	4.20 A	8.48 A	12.7 A	25.5 A	40.3 A
Peak output current time (max)	3 s from 0% drive utilization (0% soak)				
Continuous power out (nom)	0.3 kW	0.6 kW	0.9 kW	1.9 kW	3.0 kW
Efficiency	98%				
Capacitance	200 μF			540 μF	
Capacitive energy absorption	7.5 J			20 J	
Inverter PCB leakage current	1 mA				

(1) Bandwidth values vary based on tuning parameters and mechanical components.

Circuit Breaker/Fuse Specifications

The following fuse examples and Allen-Bradley circuit breakers are recommended for control power and DC-bus power.

Control and DC-Bus Circuit-protection Specifications

Kinetix 2000 Drives Cat. No.	Control Input Power		DC Common Bus
	Bussmann Fuse	Bulletin 1492 CB	Mersen Fuse [1]
2093-AC05-MP1	FNQ-R-10 (10 A) Class CC or LPJ-10SP (10 A) Class J	1492-SPM2D060	A50P20-1
2093-AC05-MP2			
2093-AC05-MP5			
2093-AC05-MP1			A50P20-1
2093-AC05-MP2			
2093-AC05-MP5			

(1) Mersen fuses were formerly known as Ferraz Shawmut.

These fuses and Allen-Bradley circuit breakers are recommended for use with 2093-AC*xx*-MP*x* IAM modules when the line interface (LIM) module is not used.

IMPORTANT 2094-AL*xx*S and 2094-XL75S-C2 line interface (LIM) modules can provide branch circuit protection to the IAM module. Follow all applicable NEC and local codes.

Input Power Circuit-protection Specifications

Kinetix 2000 Drives		UL Applications			IEC (non-UL) Applications		
Drive Cat. No.	**Input Voltage/ Phase**	**Bussmann Fuse**	**Miniature CB (1) Cat. No.**	**Motor Protection CB, (1) Self-protected CMC Cat. No.**	**Miniature CB Cat. No.**		**Motor Protection CB Cat. No.**
2093-AC05-MP1	170...264 AC three-phase (230V nom)	KTK-R-20 (20 A)	1489-M3D300	140M-F8E-C16	1489-M3D300	1492-SPM3D300	140M-F8E-C16
2093-AC05-MP2							
2093-AC05-MP5							
2093-AC05-MP1	170...264 AC single-phase (230V nom)	KTK-R-20 (20 A)	1489-M3D300	N/A	1489-M3D300	1492-SPM3D300	N/A
2093-AC05-MP2							
2093-AC05-MP5							

(1) These Bulletin 140M circuit breakers, when used as self-protected (Type E) devices, and Bulletin 1489 circuit breakers can be used on only WYE power systems (480Y/277V).

Contactor Ratings

This table lists the recommended contactor ratings for IAM modules installed without a LIM module.

IAM Cat. No.	Input Voltage	Contactor
2093-AC05-MP1	170...264 AC single-phase or three-phase operation	100-C23x10 (AC coil) 100-C23Zx10 (DC coil)
2093-AC05-MP2		
2093-AC05-MP5		

Transformer Specifications for Control Power Input

You can use any general purpose transformer with these ratings.

Attribute	Value
Input volt-amperes	500VA
Output voltage	200...240V AC

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 2000 drive system.

Kinetix 2000 Modules		Usage as % of Rated Power Output (watts)				
		20%	40%	60%	80%	100%
Integrated Axis Module (IAM Converter) (1)						
2093-AC05-MP1	Three-phase input	7.0	10.5	14.0	17.4	20.9
2093-AC05-MP2						
2093-AC05-MP5						
2093-AC05-MP1	Single-phase input	5.8	8.0	10.3	12.6	14.8
2093-AC05-MP2						
2093-AC05-MP5						
Integrated Axis Module (IAM Inverter) or Axis Module (AM) (1)						
2093-AC05-MP1 or 2093-AMP1		31.6	33.6	35.6	37.6	39.6
2093-AC05-MP2 or 2093-AMP2		33.0	36.4	39.8	43.3	46.8
2093-AC05-MP5 or 2093-AMP5		36.2	42.9	49.8	56.8	63.9
2093-AM01		38.3	46.7	55.3	64.1	73.1
2093-AM02		44.3	55.6	67.3	79.2	91.4
Shunt Module						
2093-ASP06		35.8	45.8	55.8	65.8	75.8

(1) Internal shunt power is not included in the calculations and must be added based on utilization.

Weight Specifications

Kinetix 2000 Module	Cat. No.	Weight, approx kg (lb)
IAM	2093-AC05-MP1	1.32 (2.9)
	2093-AC05-MP2	
	2093-AC05-MP5	
AM	2093-AMP1	0.67 (1.5)
	2093-AMP2	
	2093-AMP5	
	2093-AM01	0.95 (2.1)
	2093-AM02	
Shunt module	2093-ASP06	0.59 (1.3)

Kinetix 2000 Module	Cat. No.	Weight, approx kg (lb)
Power Rails (Slim)	2093-PRS1	0.27 (0.6)
	2093-PRS2	0.38 (0.8)
	2093-PRS3	0.51 (1.1)
	2093-PRS4	0.64 (1.4)
	2093-PRS5	0.77 (1.7)
	2093-PRS7	1.03 (2.3)
	2093-PRS8S	1.28 (2.8)
Slot-filler module	2093-PRF	0.15 (0.3)

Maximum Feedback Cable Lengths

Although motor feedback cables are available in standard lengths up to 90 m (295.3 ft), the Kinetix 2000 drive maximum feedback cable length is 30 m (98.4 ft). These tables assume the use of recommended cables as shown in the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Cable Lengths for Compatible Rotary Motors

Motor Cat. No.	Absolute High-resolution (5V) Encoder m (ft)	Incremental/TTL (5V) Encoder m (ft)	Absolute High-resolution (5V) 17-bit Encoder m (ft)
MPL-A3*xxx*... MPL-A5*xxx*-S/M (1)	30 (98.4)		
MPL-A15*xxx*... MPL-A2*xxx*-E/V	30 (98.4)		
MPL-A15*xxx*... MPL-A45*xxx*-H		30 (98.4)	
MPM-A*xxxxx*-S/M	30 (98.4)		
MPF-A*xxxx*-S/M (1)	30 (98.4)		
MPS-A*xxxx*-S/M	30 (98.4)		
TLY-A*xxxx*-B			30 (98.4)
TLY-A*xxxx*-H		30 (98.4)	

(1) MPL-A5*xxx* and MPF-A5*xxx* motor encoders are rated for 9V, the remaining Bulletin MPL and MPF (200V-class) motor encoders are rated for 5V.

Cable Lengths for Compatible Linear Actuators

Actuator Cat. No.	Absolute High-resolution (5V) Encoder m (ft)	Incremental/TTL (5V) Encoder m (ft)
MPMA-A*xxxxx* or MPAS-A*xxxxx*-V (ballscrew)	30 (98.4)	
MPMA-A*xxxxx* or MPAS-A*xxxxx*-A (direct drive)		30 (98.4)
MPAR-A*xxxxx*-V/M	30 (98.4)	
MPAI-A*xxxxx*M3	30 (98.4)	
LDAT-S*xxxxxx*-x*Bx*		30 (98.4)

Cable Lengths for Compatible Linear Motors

Motor Cat. No.	Absolute High-resolution (5V) Encoder m (ft)	Incremental/TTL (5V) Encoder m (ft)
LDC-Series or LDL-Series	30 (98.4)	30 (98.4)

Maximum Power Cable Length

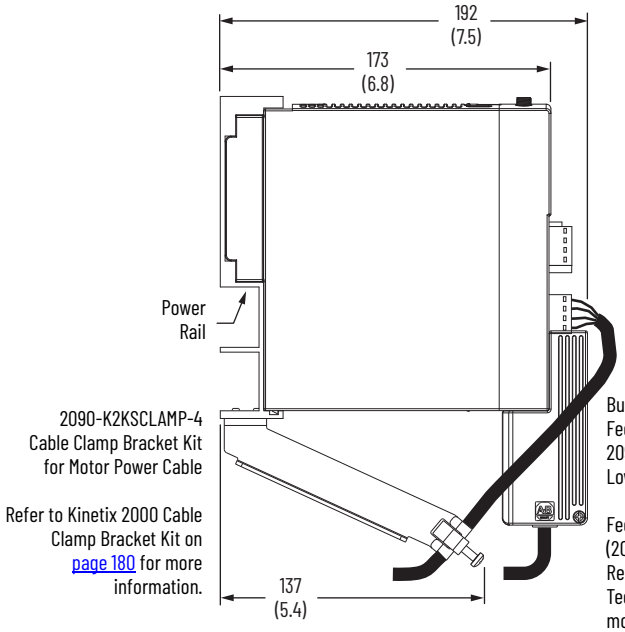
Although motor power cables are available in standard lengths up to 90 m (295.3 ft) and the Kinetix 2000 power rail is available in sizes up to eight axes, to meet CE requirements and improve system performance the combined motor power length for all axes on the same DC bus must not exceed 160 m (525 ft).

IMPORTANT Operating the Kinetix 2000 drive at maximum temperature with maximum cable length can necessitate derating of the drive.

Dimensions - Kinetix 2000 Multi-axis Servo Drives

These drawings provide mounting dimensions for Kinetix 2000 servo drives. Mounting dimensions that include the feedback connector kit is also shown.

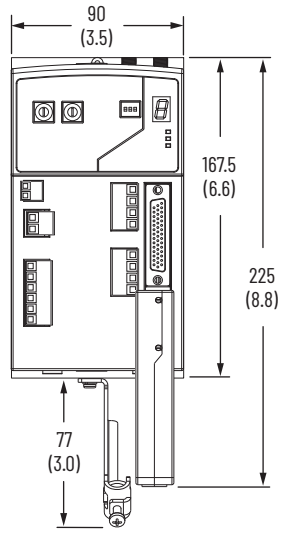
2093-AC05-MP1, 2093-AC05-MP2, and 2093-AC05-MP5 Dimensions



Bulletin 2090 (flying lead)
Feedback Cable with
2090-K2CK-D15M
Low-profile Connector Kit

Feedback and I/O cable connector kit (2090-K2CK-COMBO) is also available. Refer to the Kinetix Motion Accessories Technical Data, publication KNX-TD004, for more information.

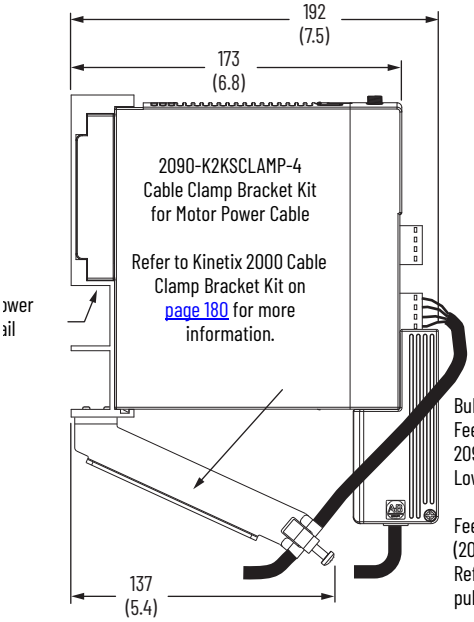
Dimensions are in mm (in.)



Important: Additional clearance below the connectors is necessary to provide the recommended cable bend radius.

Modules are shown mounted to the power rail and the dimensions reflect that in the depth of the module.

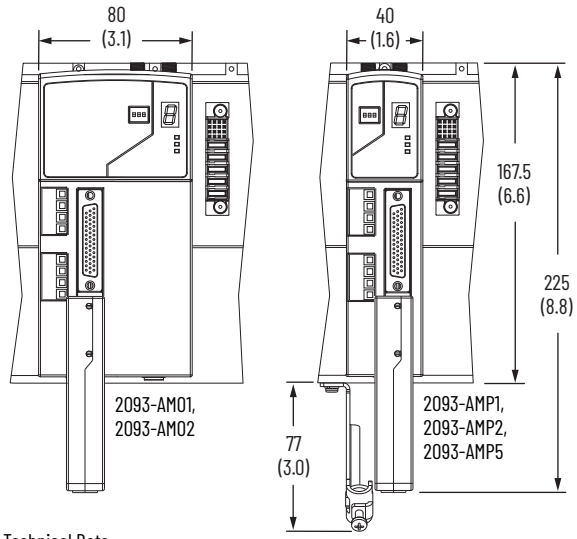
2093-AMP1, 2093-AMP2, 2093-AMP5, 2093-AM01, and 2093-AM02 Dimensions



Bulletin 2090 (flying lead)
Feedback Cable with
2090-K2CK-D15M
Low-profile Connector Kit

Feedback and I/O cable connector kit (2090-K2CK-COMBO) is also available. Refer to the Kinetix Motion Accessories Technical Data, publication KNX-TD004, for more information.

Dimensions are in mm (in.)



Important: Additional clearance below the connectors is necessary to provide the recommended cable bend radius.

Modules are shown mounted to the power rail and the dimensions reflect that in the depth of the module.

Environmental Specifications - Kinetix 2000 Multi-axis Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Temperature, ambient	0…50 °C (32…122 °F)	-40…+85 °C (-40…+185 °F)
Relative humidity	5…95% noncondensing	5…95% noncondensing
Altitude	1000 m (3281 ft) 3000 m (9843 ft) with derating	3000 m (9843 ft) during transport
Vibration	5…55 Hz @ 0.35 mm (0.014 in.) double amplitude, continuous displacement; 55…500 Hz @ 2.0 g peak constant acceleration (10 sweeps in each of 3 mutually perpendicular directions)	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications - Kinetix 2000 Multi-axis Servo Drives

Agency Certification (1)	Standards
cULus	UL Listed to U.S. and Canadian safety standards (UL 508C File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with IEC 50178:1997 - Electronic Equipment for use in Power Installations.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 2, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2093-ACO5-MP5 • Registration number: KCC-REM-RAA-2093-ASP06

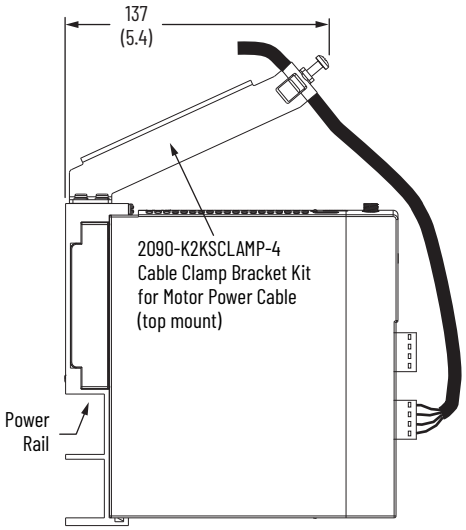
(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.

Accessories - Kinetix 2000 Multi-axis Servo Drives

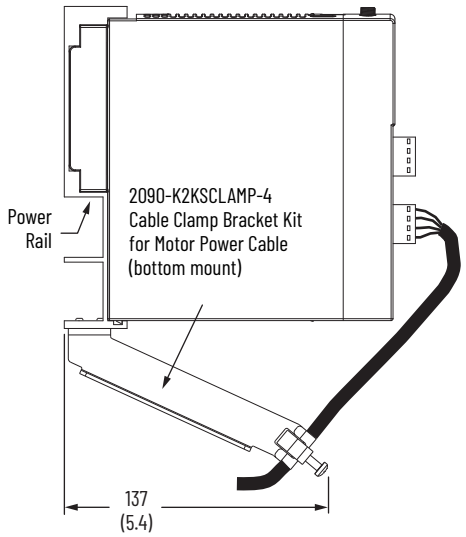
Kinetix 2000 Cable Clamp Bracket Kit

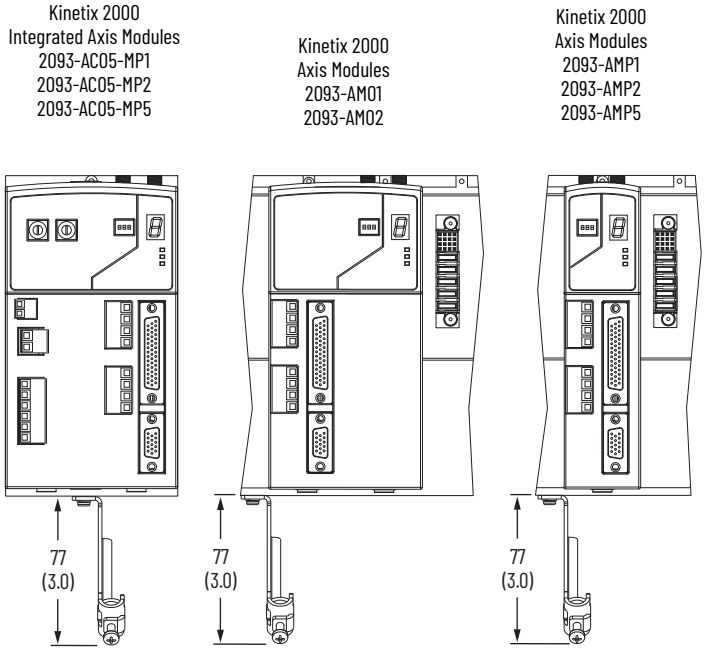
The cable clamp bracket kit (catalog number 2090-K2KSCLAMP-4) is designed for use with the Kinetix 2000 IAM and AM drive modules. The clamp mounts to the power rail and provides stress relief for the motor power cable and an electrical path from the cable shield to machine ground. You can mount the bracket to the top or bottom of the power rail, depending on the layout of cables within your panel.

Cable Clamp Bracket Kit (catalog number 2090-K2KSCLAMP-4)



Dimensions are in mm (in.)





IMPORTANT: Additional clearance below the connector is necessary to provide the recommended cable bend radius.

Kinetix 2000 Power Rail

Kinetix 2000 IAM, AM, and Shunt Module Slot Requirements

IAM Cat. No.	Converter Slot Used	Inverter Slots Used
2093-AC05-MP1	1	1
2093-AC05-MP2		1
2093-AC05-MP5		1

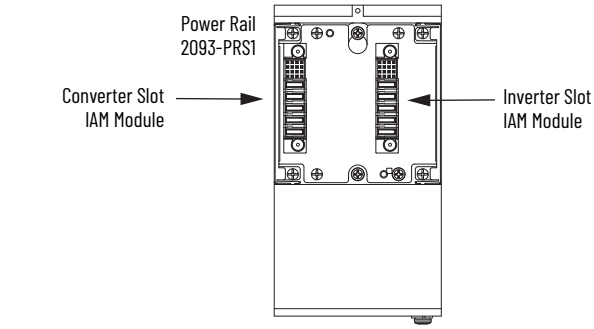
AM Cat. No.	Converter Slot Used	Inverter Slots Used
2093-AMP1	0	1
2093-AMP2		1
2093-AMP5		1
2093-AM01		2 (1)
2093-AM02		2

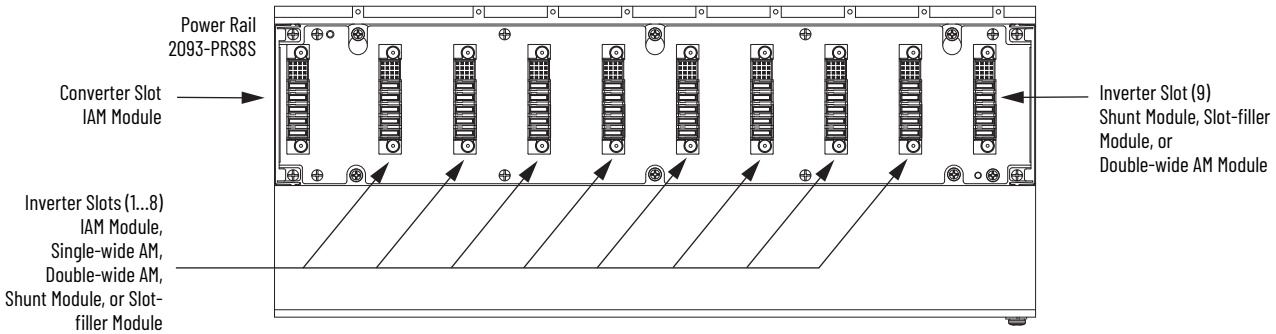
Shunt Module Cat. No.	Converter Slot Used	Inverter Slots Used
2093-ASP06	0	1

(1) 2093-AM01 and 2093-AM02 axis modules are double-wide modules and require two slots on the power rail.

The far-left slot on each power rail is the converter slot and used by only the IAM. All other slots are inverter slots and are used by the IAM, AM, or shunt module (refer to the figure below). The power rail catalog number indicates the maximum number axes that each power rail can hold.

Power Rail Slots





For example, the 2093-PRS1 power rail contains one inverter slot. This limits the use of this power rail to systems requiring only one inverter slot. Similarly, the 2093-PRS2 power rail contains two inverter slots. This limits the use of this power rail to systems requiring up to two inverter slots. When selecting a power rail, determine the number of inverter slots required by all rail-mounted modules and select one with that minimum number of inverter slots.

IMPORTANT If you select a power rail with slots exceeding the minimum required for your system, you must install a 2093-PRF slot-filler module in each unused slot.

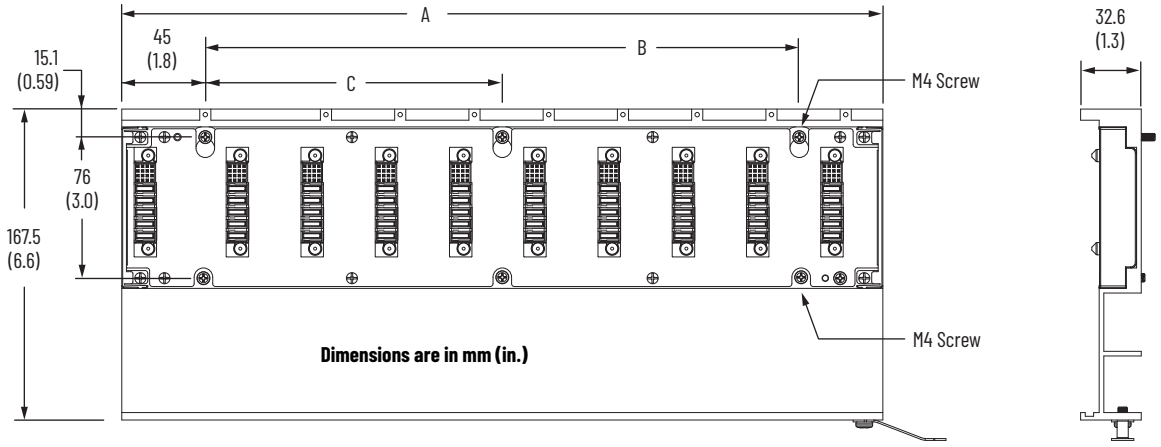
The 2093-PRS8S power rail is unique in that it accommodates eight axes, but has nine inverter slots. The far-right (ninth) inverter slot is reserved for a shunt module, but could also be occupied by a slot-filler module or double-wide axis module. These power rail configurations are supported.

2093-PRS8S Configurations

8-axis		7-axis		6-axis		5-axis		
IAM	IAM	IAM	IAM	IAM	IAM	IAM	IAM	IAM
AM	AM	AM (double-wide)	AM (double-wide)	AM (double-wide)	AM (double-wide)	AM (double-wide)	AM (double-wide)	AM (double-wide)
AM	AM							
AM	AM	AM	AM	AM (double-wide)	AM (double-wide)	AM (double-wide)	AM (double-wide)	AM (double-wide)
AM	AM	AM	AM					
AM	AM	AM	AM	AM	AM	AM (double-wide)	AM (double-wide)	AM (double-wide)
AM	AM	AM	AM	AM	AM			
AM	AM	AM	AM	AM	AM	AM (double-wide)	AM	AM
Shunt module	Slot-filler module	Shunt module	Slot-filler module	Shunt module	Slot-filler module		Shunt module	Slot-filler module

IMPORTANT The maximum number of axes supported by the 2093-PRS8S power rail is eight axes. Do not install an axis module (AM) in the far-right (ninth) inverter slot.

2093-PRS1, 2093-PRS2, 2093-PRS3, 2093-PRS4, 2093-PRS5, 2093-PRS7, and 2093-PRS8S Dimensions



Power Rail Cat. No.	Description	Dimension A mm (in.)	Dimension B mm (in.)	Dimension C mm (in.)
2093-PRS1	1 axis power rail	90 (3.54)	N/A	N/A
2093-PRS2	2 axis power rail	130 (5.12)	40 (1.57)	N/A
2093-PRS3	3 axis power rail	170 (6.69)	80 (3.15)	N/A
2093-PRS4	4 axis power rail	210 (8.26)	120 (4.72)	N/A
2093-PRS5	5 axis power rail	250 (9.84)	160 (6.30)	N/A
2093-PRS7	7 axis power rail	330 (12.99)	240 (9.45)	120 (4.72)
2093-PRS8S	8 axis power rail	410 (16.14)	320 (12.60)	160 (6.30)

Kinetix 2000 Shunt Module

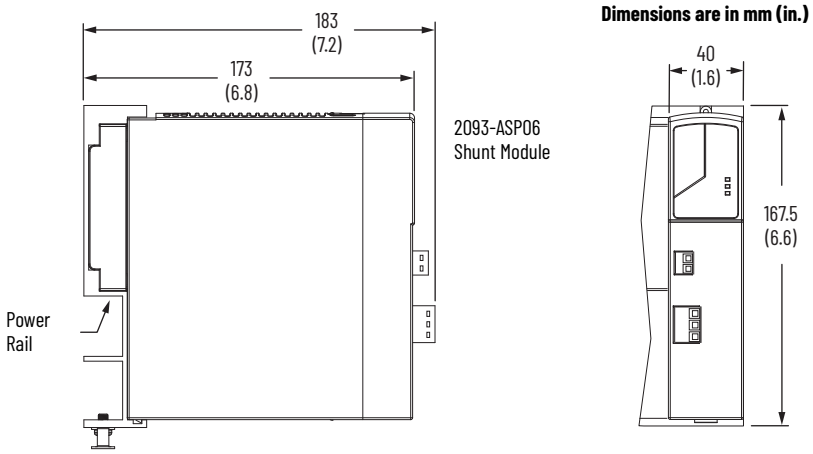
This section contains specifications, mounting dimensions, and catalog numbers for the 2093-ASP06 Shunt Module.

Shunt Module Power Specifications

Drive Cat. No.	Shunt Module Cat. No.	Drive Voltage V AC	Resistance Ohms	Peak Power kW	Peak Current A	Continuous Power W	Capacitance µF	Fuse Replacement
2093-AC05-MP1	2093-ASP06	230	15.0	10.9	27.0	50	164	N/A (no internal fuse)
2093-AC05-MP2								
2093-AC05-MP5								

For more information on external shunt resistors compatible with the Kinetix 2000 drive, refer to the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Shunt Module Dimensions



Modules are shown mounted to the power rail and the dimensions reflect that.

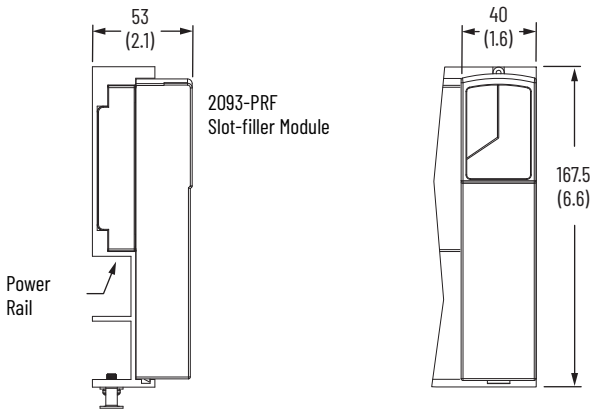
Kinetix 2000 Slot-filler Module

This section contains dimensions and catalog numbers for the 2093-PRF slot-filler module.

IMPORTANT The Kinetix 2000 slot-filler module (catalog number 2093-PRF) is compatible with all Kinetix 2000 systems. Power rail slots not occupied by an IAM, AM, or shunt module, must have a slot-filler module installed.

Slot-filler Module Dimensions

Dimensions are in mm (in.)



Kinetix 7000 High Power Servo Drives

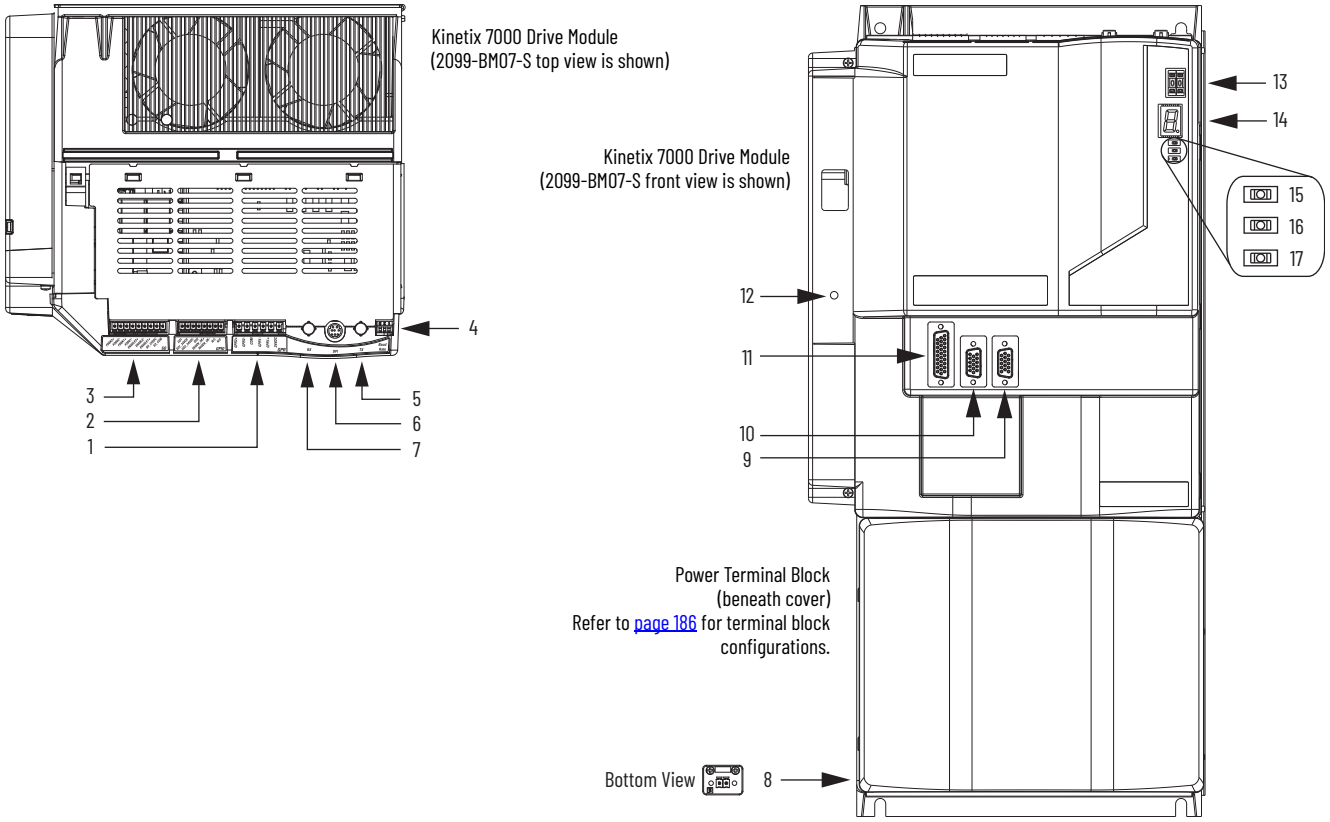


The Kinetix 7000 high-power servo drive is designed to accommodate the most demanding requirements and extends the benefits of Kinetix Integrated Motion to applications up to 149 kW. The Kinetix 7000 high power drive supports three-phase AC input power (380...480V AC) and DC input for common bus applications. In addition, the safe-off capability integrated into this drive increases productivity by allowing manufacturers and machine builders to implement machine solutions that provide both safety and maximum machine availability.

The Kinetix 7000 servo drives provide Integrated Motion capability through the Sercos interface and are part of the Kinetix Integrated Motion solution.

Kinetix 7000 Servo Drive Features and Indicators

Kinetix 7000 Drive Features and Indicators

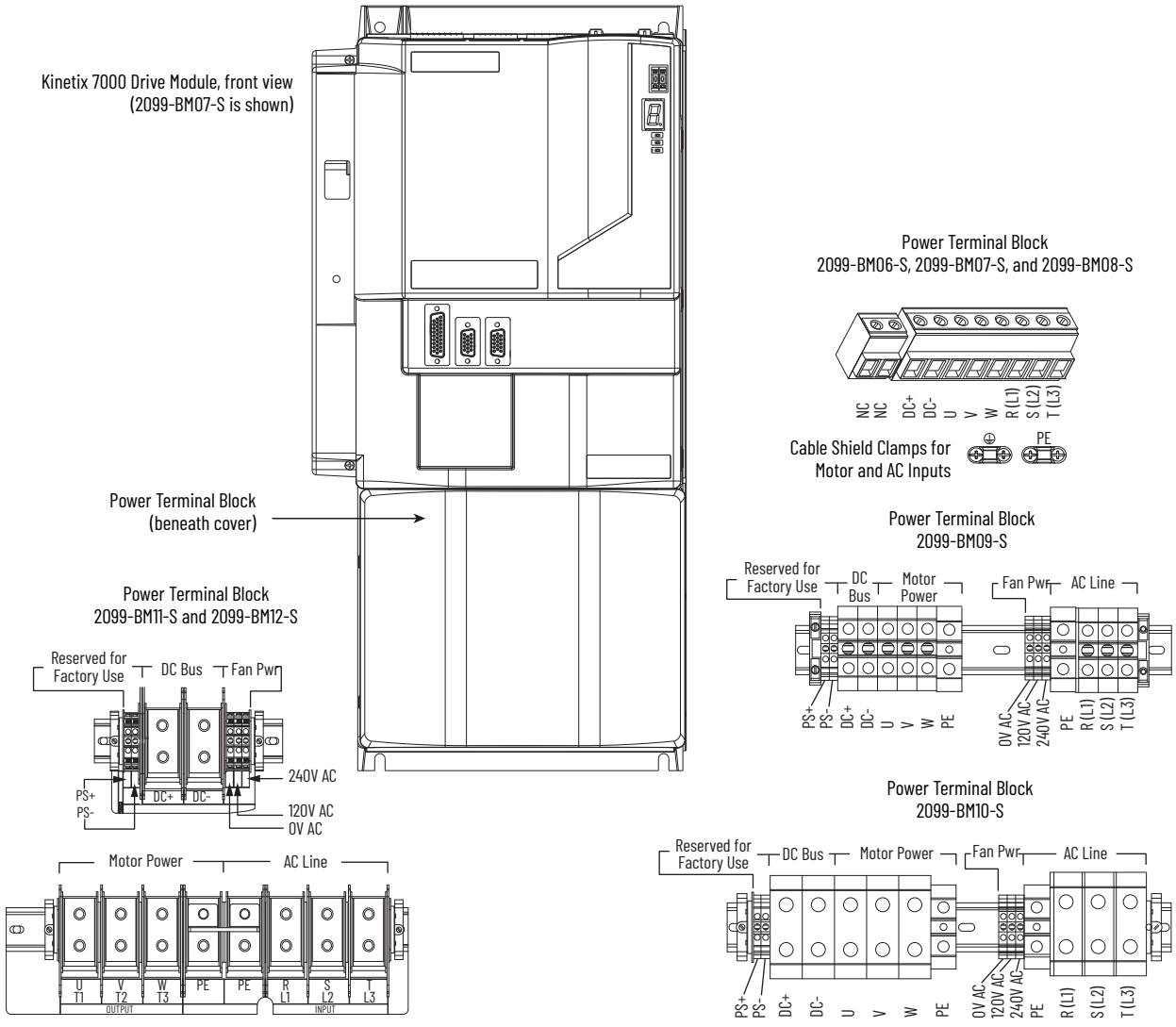


Item	Description
1	General purpose (GPR) connector
2	General purpose (GPIO) connector
3	Safe-off (SO) connector
4	Sercos communication rate and optical power switches
5	Sercos transmit (Tx) connector
6	DPI connector

Item	Description
7	Sercos receive (Rx) connector
8	Control power (CP) connector (facing down)
9	Auxiliary feedback (AF) connector
10	Motor feedback (MF) connector
11	I/O (IOD) connector
12	Control power status indicator

Item	Description
13	Sercos node address switches
14	Seven-segment fault status indicator
15	Drive status indicator
16	COMM status indicator
17	Bus status indicator

Kinetix 7000 Power Terminal Blocks



Kinetix 7000 System Power Component Compatibility Charts

These tables provide input power component combinations for Kinetix 7000 drives with compatible motors. Combinations are designed to provide optimum performance in common-bus configurations.

Input Power Components with HPK-B (460V) Motors

Kinetix 7000 Drive Cat. No.	Common Bus Accessories		Compatible Motors
	8720MC Regenerative Power Supply (1) 8720MC-RPS	**8720MC Line Reactor (1)**	
2099-BM07-S	8720MC-RPS065BM	8720MC-LR05-048B	HPK-B1307C
			HPK-B1308C
2099-BM08-S			HPK-B1307E
			HPK-B1310C
2099-BM09-S		8720MC-LR10-062B	HPK-B1308E
	8720MC-RPS065BM and 8720MC-RPS065BS	8720MC-LR05-048B (two units)	HPK-B1609E
			HPK-B1613C
2099-BM11-S		8720MC-LR10-062B (two units)	HPK-B1611E
			HPK-B1815C
	8720MC-RPS190BM	8720MC-LR10-100B (two units)	HPK-B1613E
			HPK-B2010C
			HPK-B2010E
			HPK-B2212C
2099-BM12-S			HPK-B2010E
			HPK-B2212C
			HPK-B2510C

(1) Regenerative Power Supply (RPS) selection is for this single motor/drive combination. When combining multiple drives on the same RPS module, the selection can change.

Input Power Components with HPK-E (400V) Motors

Kinetix 7000 Drive Cat. No.	Common Bus Accessories		Compatible Motors
	8720MC Regenerative Power Supply (1)	**8720MC Line Reactor (1)** 8720MC-LR*xx*-*xxx*B	
2099-BM08-S	8720MC-RPS065BM	8720MC-LR05-048B	HPK-E1307C
2099-BM09-S		8720MC-LR14-070B	HPK-E1308E
		8720MC-LR10-062B	HPK-E1310C
2099-BM11-S	8720MC-RPS065BM and 8720MC-RPS065BS	8720MC-LR05-048B (two units)	HPK-E1613C
		8720MC-LR10-062B (two units)	HPK-E1609E
			HPK-E1611E
			HPK-E1815C
	8720MC-RPS190BM	8720MC-LR10-100B (two units)	HPK-E1613E
			HPK-E2010C

(1) Regenerative Power Supply (RPS) selection is for this single motor/drive combination. When combining multiple drives on the same RPS module, the selection can change.

Input Power Components with MPL-B (460V) Motors

Kinetix 7000 Drive Cat. No.	Common Bus Accessories		Compatible Motors
	8720MC Regenerative Power Supply (1)	8720MC Line Reactor (1)	
2099-BM06-S	8720MC-RPS065BM	8720MC-LR05-048B	MPL-B540K
			MPL-B560F
			MPL-B580F
			MPL-B580J
			MPL-B640F
			MPL-B660F
			MPL-B680D
			MPL-B680F
			MPL-B860D
			MPL-B960B
			MPL-B980B
2099-BM07-S			MPL-B880C
		8720MC-LR10-062B	MPL-B880D
2099-BM08-S			MPL-B960C
			MPL-B960D
			MPL-B980C
			MPL-B980D

(1) Regenerative Power Supply (RPS) selection is for this single motor/drive combination. When combining multiple drives on the same RPS module, the selection can change.

Input Power Components with MPM-B (480V) Motors

Kinetix 7000 Drive Cat. No.	Common Bus Accessories		Compatible Motors
	8720MC Regenerative Power Supply (1)	8720MC Line Reactor (1)	
2099-BM06-S	8720MC-RPS065BM	8720MC-LR05-048B	MPM-B1651M
2099-BM06-S			MPM-B1652E
2099-BM06-S			MPM-B1652F
2099-BM06-S			MPM-B1653C
2099-BM06-S			MPM-B1653E
2099-BM06-S			MPM-B1653F
2099-BM06-S			MPM-B2152C
2099-BM07-S			MPM-B2152F
2099-BM06-S			MPM-B2152M
2099-BM06-S			MPM-B2153B
2099-BM07-S			MPM-B2153E
2099-BM07-S			MPM-B2153F
2099-BM07-S			MPM-B2154B
2099-BM07-S			MPM-B2154E
2099-BM06-S			MPM-B2154F

(1) Regenerative Power Supply (RPS) selection is for this single motor/drive combination. When combining multiple drives on the same RPS module, the selection can change.

Input Power Components with RDB-B (480V) Motors

Kinetix 7000 Drive Cat. No.	Common Bus Accessories		Compatible Motors
	8720MC Regenerative Power Supply (1)	8720MC Line Reactor (1)	
2099-BM06-S	8720MC-RPS065BM	8720MC-LR05-048B	RDB-B2152C
2099-BM06-S			RDB-B2153C
2099-BM07-S			RDB-B29029
2099-BM06-S			RDB-B29036
2099-BM08-S			RDB-B29039
2099-BM06-S			RDB-B41016
2099-BM08-S			RDB-B41018
2099-BM06-S			RDB-B41024
2099-BM09-S			RDB-B41026
2099-BM09-S			RDB-B41035

(1) Regenerative Power Supply (RPS) selection is for this single motor/drive combination. When combining multiple drives on the same RPS module, the selection can change.

Technical Specifications - Kinetix 7000 High Power Servo Drives

Kinetix 7000 Drive Power Specifications

Attribute	2099-BM06-S	2099-BM07-S	2099-BM08-S	2099-BM09-S	2099-BM10-S	2099-BM11-S	2099-BM12-S
AC input voltage	342…528V AC rms three-phase (380…480V nom)						
AC input frequency	47…63 Hz						
Bandwidth [1] Velocity loop Current loop	 500 Hz 1300 Hz						 500 Hz 500 Hz
PWM frequency	4 kHz						2 kHz
Main AC input current Nom (rms) Max inrush (A peak)	 36.7 A 18.0 A	 47.7 A 18.0 A	 59.6 A 18.0 A	 90.1 A 96.0 A	 117 A 118 A	 169 A 141 A	 233 A 141 A
DC input voltage	450…750V DC						
DC input current	42.9 A	55.7 A	69.7 A	105 A	137 A	204 A	281 A
Control power input Voltage	18…30V DC (24V DC, nom)						
Control power DC input current Nom (rms) Maximum inrush (rms)	 3.3 A 6.0 A						
Continuous output current (rms)	40.0 A	52.0 A	65.0 A	96.0 A	125 A	180 A	248 A
Continuous output current (0-pk)	56.0 A	73.0 A	92.0 A	135 A	176 A	254 A	351 A
Peak output current (rms) 3 s duration 60 s duration	 68.0 A 51.0 A	 80.0 A 60.0 A	 104 A 78.0A	 154 A 115 A	 163 A 138 A	 312 A 234 A	 372 A 273 A
Peak output current (0-pk) 3 s duration 60 s duration	 96.0 A 72.0 A	 113 A 84.8 A	 147 A 110 A	 217.7 A 162.6 A	 230.5 A 195 A	 441 A 331 A	 526 A 386 A
Bus overvoltage	800V DC						
Bus undervoltage	275…560V DC [2]						
Continuous power output, nom	22 kW	30 kW	37 kW	56 kW	75 kW	112 kW	149 kW
Continuous power output (Hp)	30 Hp	40 Hp	50 Hp	75 Hp	100 Hp	150 Hp	200 Hp
Maximum power cycles/minute AC line DC bus	 4 per minute (pre-charge provided by drive) 2 per minute (DC pre-charge provided by the regenerative power supply)						
DC bus discharge time	3 minutes after removal of main AC power						
Efficiency	97.5%						
Total capacitance [3]	1800 µF	2400 µF	3000 µF	4500 µF	6000 µF	8400 µF	8400 µF
Short-circuit current rating	200,000 A (rms) symmetrical						

(1) Bandwidth values vary based on tuning parameters and mechanical components.
(2) Bus undervoltage can vary based on input line voltage.
(3) If DC input is supplied to 2099-BM09-S, 2099-BM10-S, or 2099-BM11-S drives, the precharge capability must be provided at the system level. Disconnect switches must not be used between the input of the drive and a common DC bus without the use of an external precharge device.

Circuit Breaker/Fuse Specifications

While circuit breakers offer some convenience, there are limitations for their use. Circuit breakers do not handle high current inrush as well as fuses. Make sure the selected components are properly coordinated and meet acceptable codes including any requirements for branch circuit protection. Evaluation of the short-circuit available current is critical and must be kept below the short-circuit current rating of the circuit breaker.

Use class CC, T, RK1, or J fuses, with current rating as indicated in the table below. The following fuse examples and short-circuit current ratings are recommended for use with the 2099-BM*xx*-S drives when the Line Interface Module (LIM) is not used.

IMPORTANT LIM modules (catalog numbers 2094-BL*xx*S and 2094-XL75S-C*x*) provide branch circuit protection to the Kinetix 7000 drive. Follow all applicable NEC and local codes.

Fuse Specifications (AC input)

Drive Cat. No.	Bussmann Fuse	Dual Element Time Delay Fuse (min/max) A rms	Non-Time Delay Fuse (min/max) A rms	Motor Circuit Protector (max) A rms
2099-BM06-S	LPJ-90SP	50/90	50/150	50
2099-BM07-S	LPJ-110SP	60/110	60/200	70
2099-BM08-S	LPJ-125SP	80/125	80/250	100
2099-BM09-S	LPJ-200SP	125/200	125/300	125
2099-BM10-S	LPJ-250SP	150/250	150/500	150
2099-BM11-S	LPJ-400SP	225/400	225/600	250
2099-BM12-S	LPJ-500SP	300/550	300/700	400

Fuse Specifications (DC common bus)

Drive Cat. No.	Bussmann Fuse	Mersen Fuse (1)
2099-BM06-S	FWJ-80A	**HSJ80**
2099-BM07-S	FWJ-100A	HSJ90
2099-BM08-S	FWJ-125A	HSJ100
2099-BM09-S	FWJ-175A	HSJ175
2099-BM10-S	FWJ-200A	HSJ200
2099-BM11-S	FWJ-500A	HSJ400
2099-BM12-S	FWJ-500A	HSJ400

(1) Mersen fuses were formerly known as Ferraz Shawmut.

Weight Specifications

Drive Cat. No.	Weight, approx kg (lb)
2099-BM06-S	18.55 (40.9)
2099-BM07-S	
2099-BM08-S	
2099-BM09-S	37.2 (82.0)
2099-BM10-S	
2099-BM11-S	71.4 (157.5)
2099-BM12-S	

Contactor Ratings

The table below lists the recommended contactor ratings for Kinetix 7000 drives installed without a Line Interface Module.

Drive Cat. No.	Contactor	Safety Contactor	Coil Type	Coil Voltage Requirements
2099-BM06-S	100-C43DJ01	100S-C43-DJD4C	Standard with Diode	24V DC
2099-BM07-S	100-D95EN11	100S-D95EN22C	Electronic Coil (1)	24V DC for control and 480V AC for coil power
2099-BM08-S				
2099-BM09-S				
2099-BM10-S	100-D140EN11	100S-D140EN22C		
2099-BM11-S	100-D180EN11	100S-D180EN22C		
2099-BM12-S	100-D250EN11	100S-D250EN22C		

(1) Electronic coil control power requirements = 24V DC @ 15 mA.

Power Dissipation Specifications

Use this table to size an enclosure and calculate required ventilation for your Kinetix 7000 drive system.

Drive Cat. No.	Usage as % of Rated Power Output W	
	50%	100%
2099-BM06-S	294	465
2099-BM07-S	388	619
2099-BM08-S	452	730

Drive Cat. No.	Usage as % of Rated Power Output W	
	50%	100%
2099-BM09-S	645	1072
2099-BM10-S	882	1479
2099-BM11-S	1275	2125
2099-BM12-S	1438	2437

Maximum Feedback Cable Lengths

Although motor power and feedback cables are available in standard lengths up to 90 m (295.3 ft), the drive/motor/feedback combination can limit the maximum feedback cable length. This table assumes the use of recommended cables as shown in the Kinetix Motion Accessories Technical Data, publication KNX-TD004.

Cable Lengths for Compatible Rotary Motors

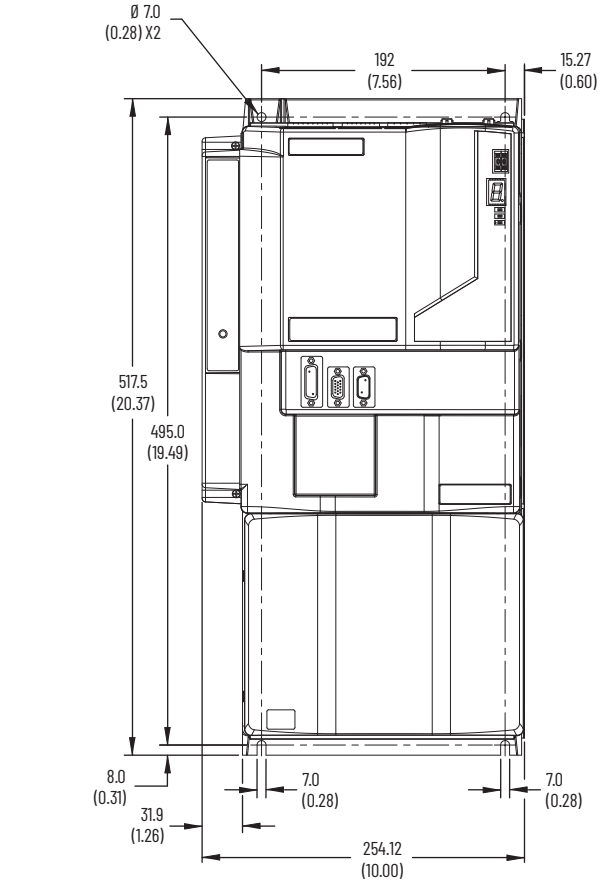
Motor Cat. No.	Absolute High-resolution (5V) Encoder m (ft)	Absolute High-resolution (9V) Encoder m (ft)
MPL-B5*xxx*... MPL-B9*xxx*-S/M		90 (295.3)
MPM-B165*xx*... MPM-B215*xx*-S/M		90 (295.3)
RDB-B215*xx*-7/3	30 (98.4)	
RDB-B290*xx*-7/3 or RDB-B410*xx*-7/3	90 (295.3)	
HPK-B*xxxxx*-S/M or HPK-E*xxxxx*-S/M		90 (295.3)

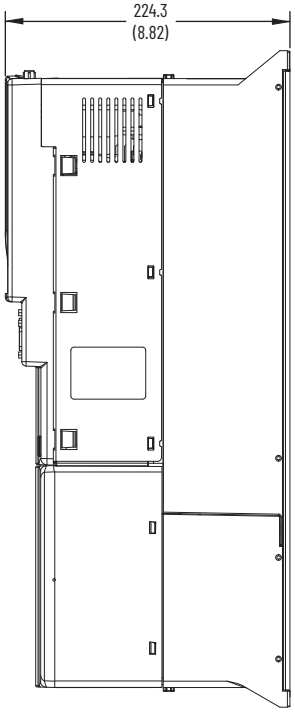
Dimensions - Kinetix 7000 High Power Servo Drives

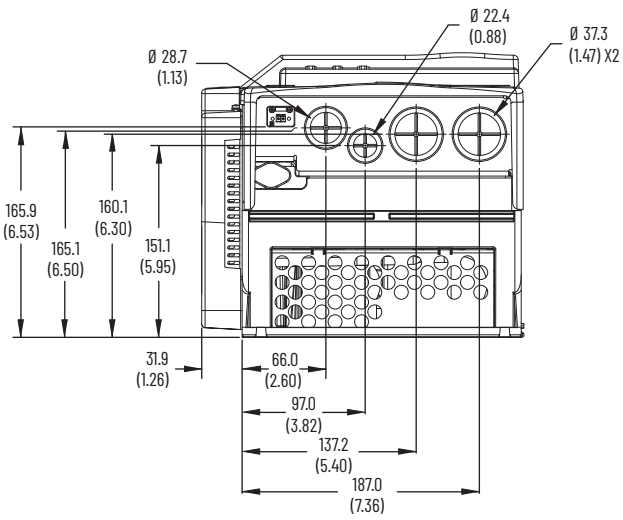
These drawings provide mounting dimensions for Kinetix 7000 servo drives.

2099-BM06-S, 2099-BM07-S, and 2099-BM08-S Dimensions

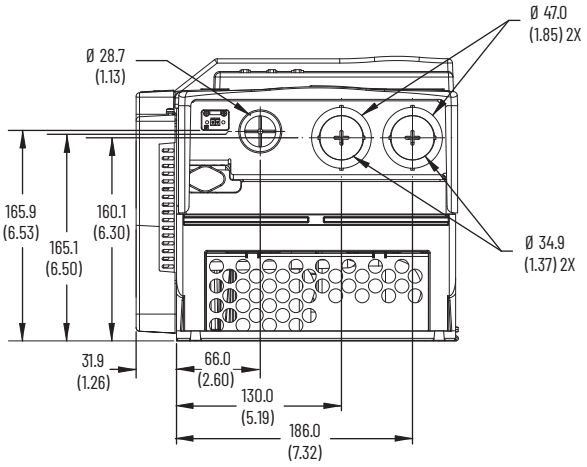
Dimensions are in mm (in.)







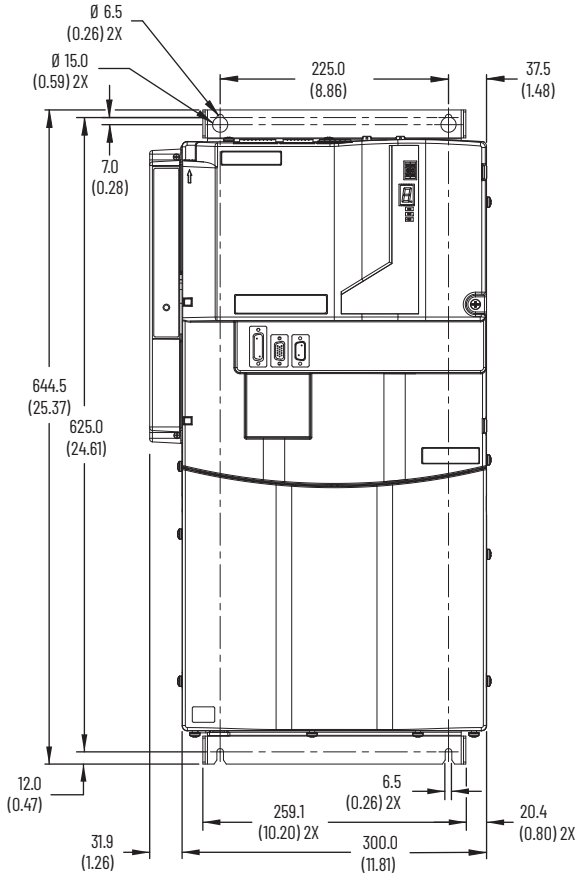
Bottom View
(2099-BM06-S and 2099-BM07-S)



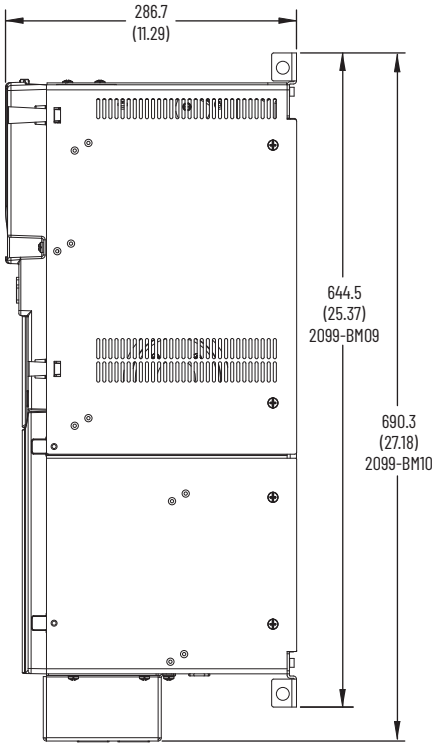
Bottom View
(2099-BM08-S)

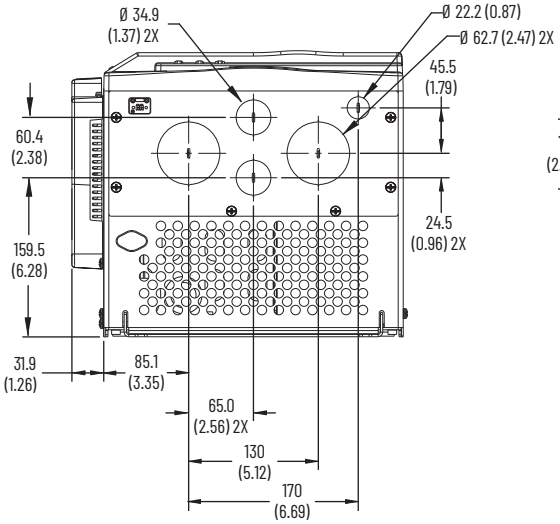
2099-BM09-S and 2099-BM10-S Dimensions

Dimensions are in mm (in.)

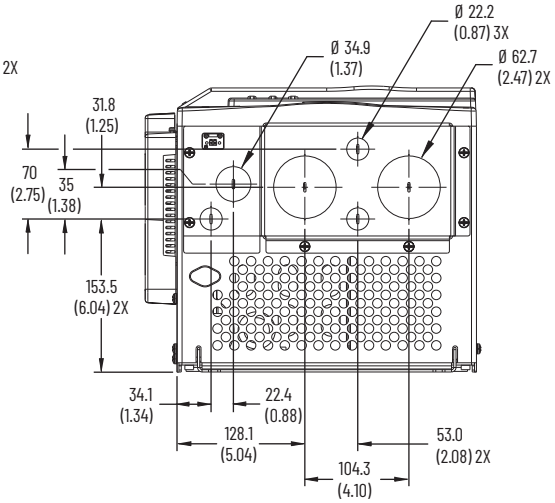


Some Components are Removed for Clarity





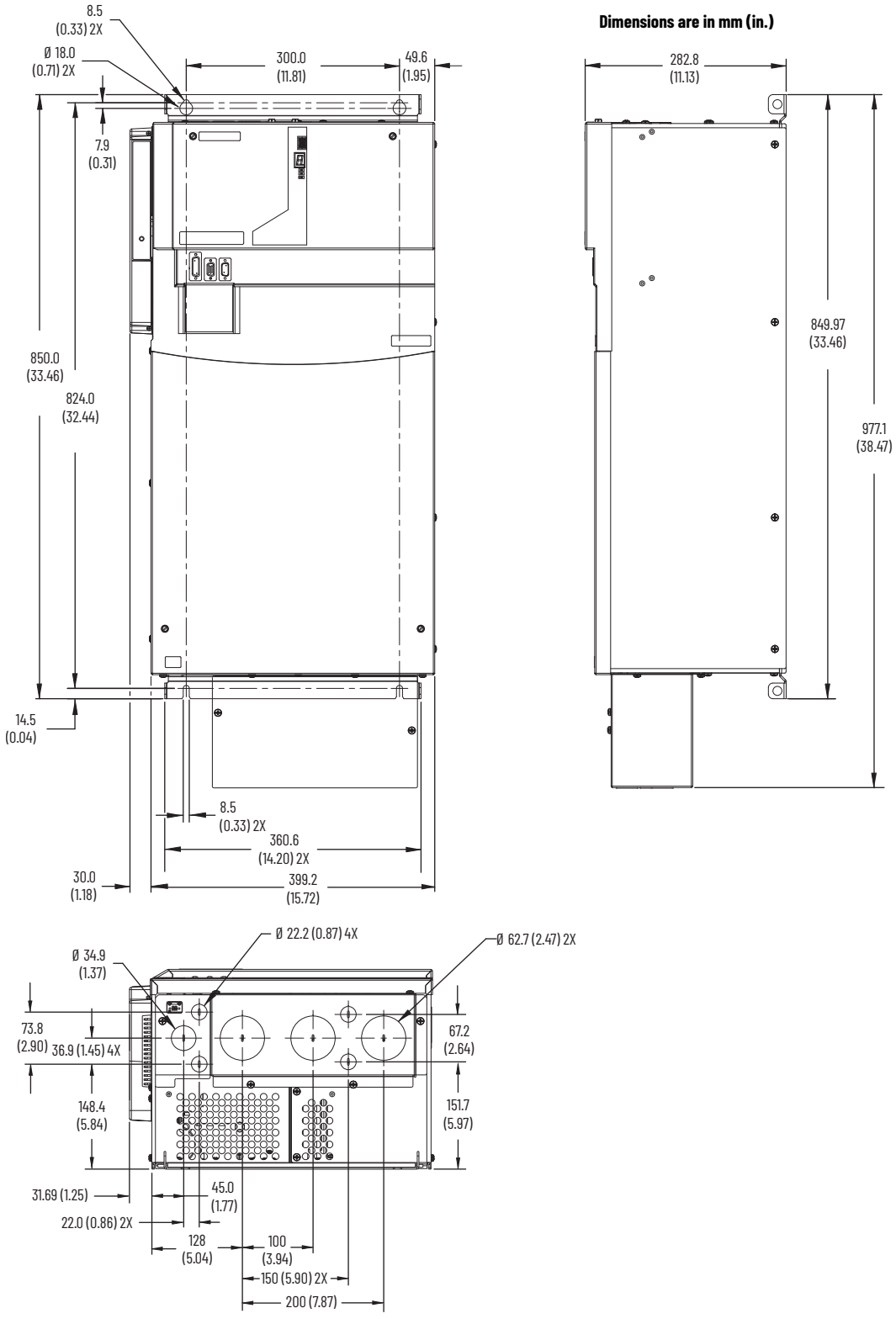
Bottom View
(2099-BM09-S)



Bottom View
(2099-BM10-S)

2099-BM11-S and 2099-BM12-S Dimensions

Dimensions are in mm (in.)



Environmental Specifications - Kinetix 7000 High Power Servo Drives

Attribute	Operational Range	Storage Range (nonoperating)
Temperature, ambient	0…50 °C (32…122 °F)	-40…+70 °C (-40…+158 °F)
Relative humidity	5…95% noncondensing	5…95% noncondensing
Altitude	1000 m (3281 ft) 3000 m (9843 ft) with derating	3000 m (9843 ft) during transport
Vibration	5…55 Hz @ 0.35 mm (0.014 in.) double amplitude, continuous displacement; 55…500 Hz @ 2.0 g peak constant acceleration (10 sweeps in each of 3 mutually perpendicular directions)	
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	

Certifications - Kinetix 7000 High Power Servo Drives

Agency Certification (1)	Standards
cULus (2)	UL Listed to U.S. and Canadian safety standards (UL 508C File E59272).
	Solid-state motor overload protection provides dynamic fold-back of motor current when 110% of the motor rating is reached with a peak current limit based on the peak rating of the motor as investigated by UL to comply with UL 508C (UL File E59272).
CE	European Union 2004/108/EC EMC Directive compliant with IEC 61800-3:2004 + A1:2012: Adjustable Speed Electrical Power Drive Systems - Part 3; EMC Product Standard including specific test methods.
	European Union 2006/95/EC Low Voltage Directive compliant with IEC 50178:1997 - Electronic Equipment for use in Power Installations.
Functional Safety	TÜV certified for functional safety: up to Performance Level (PL) e, Category 3 according to ISO 13849; up to SIL CL3 according to IEC 61508, IEC 61800-5-2, and IEC 62061 when used as described in the Kinetix Safe Torque Off Feature Safety Reference Manual, publication GMC-RM002.
RCM	Australian Radiocommunications Act, compliant with: • Radiocommunications Act: 1992 • Radiocommunications (Electromagnetic Compatibility) Standard: 1998 • Radiocommunications (Compliance Labeling - Incidental Emissions) Notice: 1998 • AS/NZS CISPR 11: 2002 (Group 2, Class A)
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3 • Registration number: KCC-REM-RAA-2099

(1) See rok.auto/certifications for declarations of conformity, certificates, and other certification details.
(2) UL has not evaluated the safe-off option in these products.

Accessories - Kinetix 7000 High Power Servo Drives

Cat. No.	Description
2099-K7KCB-1	Control board assembly kit. Replacement control board for 2099-BM*xx*-S drives.
2099-K7KCP-1	DC-DC converter cassette kit. Replacement DC-DC converter for 2099-BM*xx*-S drives.

Motor Overload Protection

Allen-Bradley servo drives use solid-state motor overload protection that operates in accordance with UL requirements. Motor overload protection is provided by algorithms (thermal memory) that predict actual motor temperature based on operating conditions as long as control power is continuously applied.

In addition to thermal memory protection, these drives provide an input for an external temperature sensor/thermistor device, embedded in the motor, to support the UL requirement for motor overload protection.

Servo drives using DSL (digital servo link) encoder technology require the encoder to perform motor temperature monitoring and transmit the data over the single motor cable. Kinetix VP (Bulletin VPL, VPF, VPH, VPS, and VPC-B*xxxxx*-Q) motors use DSL technology that performs this function. No additional wiring is required.

Some motors supported by Kinetix 5500 and Kinetix 5700 drives (firmware revision 3.001 or earlier) do not contain temperature sensors/thermistors; therefore, motor overload protection against excessive consecutive motor overloads with power cycling is not supported. For Kinetix 5500 and Kinetix 5700 drives with firmware revision 4.001 and later, thermal retention is supported regardless of the motor or encoder type in use.

Some motors supported by Kinetix 5100 and Kinetix 5300 drives (Kinetix TLP motors, for example), do not contain temperature sensors/thermistors; therefore, motor overload protection against excessive consecutive motor overloads with power cycling is not supported.

These servo drives meet the following UL requirements for solid-state overload protection.

Motor Overload Protection Trip Point	Value
Ultimately	100% overload
Within 8 minutes	200% overload
Within 20 seconds	600% overload



ATTENTION: To avoid damage to your motor due to overheating caused by excessive, successive motor overload trips, follow the wiring diagram provided in the user manual for your motor and drive combination.

Refer to your servo drive user manual for the interconnect diagram that illustrates the wiring between your motor and drive.

Notes:

Additional Resources

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

Resource	Description
Kinetix Rotary Motion Specifications Technical Data, publication KNX-TD001	Product specifications for Kinetix VPL, VPC, VPF, VPH, and VPS; Kinetix MPL, MPM, MPF, and MPS; Kinetix TLY and TL; and Kinetix HPK rotary motors.
Kinetix Linear Motion Specifications Technical Data, publication KNX-TD002	Product specifications for Kinetix MPAS and MPMA linear stages, Kinetix MPAR and MPAI electric cylinders, and LDC-Series and LDL-Series linear motors.
Kinetix Motion Accessories Specifications Technical Data, 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.
iTRAK System Technical Data, publication 2198T-TD001	Product specifications for the iTRAK system components, motor modules, movers, and cables.
iTRAK System User Manual, publication 2198T-UM001	Information on how to install, configure, startup, and troubleshoot the iTRAK system.
Encoder Output Module User Manual, publication 2198-UM003	Provides information on how to access and install the Add On Profile (AOP) and Add On Instructions (AOI) for your drive system that includes an encoder output module. Also includes troubleshooting information for your encoder output module.
1321 Power Conditioning Products Technical Data, publication 1321-TD001	Information on typical use cases, specifications, terminations, and dimensions.
Kinetix 5700 Drive Systems Design Guide, publication KNX-RM010	System design guide to determine and select the required (drive specific) drive module, power accessory, connector kit, motor cable, and interface cable catalog numbers for your drive and motor/actuator motion control system. Included are system performance specifications and torque/speed curves (rotary motion) and force/velocity curves (linear motion) for your motion application.
Kinetix 5500 Drive Systems Design Guide, publication KNX-RM009	
Kinetix 5300 Drive Systems Design Guide, publication KNX-RM012	
Kinetix 5100 Drive Systems Design Guide, publication KNX-RM011	
Kinetix 6000 and Kinetix 6200/6500 Drive Systems Design Guide, publication KNX-RM003	
Kinetix 300/350 Drive Systems Design Guide, publication KNX-RM004	
Kinetix 3 Drive Systems Design Guide, publication KNX-RM005	
Kinetix 2000 Drive Systems Design Guide, publication KNX-RM006	
Kinetix 7000 Drive Systems Design Guide, publication GMC-RM007	
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.
System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001	Information, examples, and techniques designed to minimize system failures caused by electrical noise.
Servo Drive Installation Best Practices Application Technique, publication MOTION-AT004	Best practice examples to help reduce the number of potential noise or electromagnetic interference (EMI) sources in your system and to make sure that the noise sensitive components are not affected by the remaining noise.
ControlLogix Selection Guide, publication 1756-SG001	Information to determine which ControlLogix controller fits your application and the product specifications to help design a ControlLogix system and select the appropriate components.
CompactLogix Selection Guide, publication 1769-SG001	Information to determine which CompactLogix controller fits your application and the product specifications to help design a CompactLogix system and select the appropriate components.
Industrial Ethernet Media Brochure, publication 1585-BR001	Information to determine which Bulletin 1585 Ethernet cable fits your application and the product specifications to help select the appropriate components.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.
Motion Analyzer System Sizing and Selection Tool https://motionanalyzer.rockwellautomation.com/	Comprehensive motion application sizing tool used for analysis, optimization, selection, and validation of your Kinetix Motion Control system.
Rockwell Automation Product Selection and Configuration website https://www.rockwellautomation.com/en-us/support/product/product-selection-configuration.html	Online product selection and system configuration tools, including AutoCAD (DXF) drawings.

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

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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