



# KINETIX 5100

## CATALOG

# Kinetix 5100 Single-axis EtherNet/IP Servo Drives

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Kinetix® 5100 servo drives have multiple control modes to support a wide range of high-speed, low-power motion control applications. The drive can be used with a Micro800 controller, a Logix controller or even by itself, allowing OEMs to choose how the product best functions in their applications. The Kinetix 5100 servo drive with Kinetix TLP motor and cable can function as a system without a controller and provide a more cost-effective option for OEMs building smaller machines.

## Kinetix 5100 Servo Drive Features

- Offers a more comprehensive power range than comparable solutions:
  - 0.40...2.0 kW at 120...230V AC (single-phase and three-phase)
  - 3.0...15 kW at 230V AC (three-phase)
- TÜV Rheinland certified, PL d, category 3, SIL 2
  - Hardwired Safe Torque Off (STO) standard, without additional parts or wiring
- Features 10 assignable digital inputs (including 2 fast input functions) and 6 assignable digital outputs
- Flexible control architecture for PTO, digital/analog I/O control, or explicit messaging with PLC
- EtherNet/IP™ indexing control and AOI control with PAC
- Provides indexing function (with 99 segments) that provides more motion commands than comparable solutions without the need for a control system
- Support for Hiperface, 24-bit high-resolution serial, and incremental encoder feedback from Allen-Bradley® servo motors
  - Accepts Hiperface multi-turn and single-turn encoder feedback from Kinetix MP servo motors
  - Accepts 24-bit high-resolution serial encoder feedback from Kinetix TLP servo motors
  - Accepts Digital AqB with UVW from Kinetix MPL servo motors with incremental (-H) encoders
- Accepts load and master feedback from incremental (TTL) encoders
- Helps control system resonance with auto tuning features

## Kinetix 5100 Servo Drive Selection

Cat. No.	Input Voltage	Continuous Output Power kW	Continuous Output Current A (rms)	Continuous Output Current A (0-pk)	Features
2198-E1004-ERS	95...132V rms single-phase 170...253V rms single-phase 170...253V rms three-phase	0.20 0.40 0.40	2.6	3.7	Safe Torque-off
2198-E1007-ERS		0.375 0.75 0.75	5.1	7.2	
2198-E1015-ERS		0.75 1.50 1.50	7.9	11.2	
2198-E1020-ERS		1.00 2.00 2.00	13.4	18.9	
2198-E2030-ERS	170...253V rms three-phase	3.00	17.9	25.3	
2198-E2055-ERS		5.50	41.3	58.4	
2198-E2075-ERS		7.50	49.0	69.3	
2198-E2150-ERS		15.00	78.0	110.3	

## Kinetix 5100 Servo Drive & TLP Motor Recommend Sets

Watts	Detail	Catalog Number (3 meters)	Catalog Number (5 meters)
<b>100W</b>	Kinetix 5100 Servo Drive, 200V 1/3 Phase, 0.4kW	2198-E1004-ERS	2198-E1004-ERS
	50 Pin IO Connector Kit	2198-TBIO	2198-TBIO
	TLP Servo Motor, 230VAC, Frame Size 46mm, Keyed shaft	TLP-A046- <b>010</b> -DJA32A	TLP-A046- <b>010</b> -DJA32A
	TLP Motor Power Cable, No brake (non-flex)	2090-CTPW-MADF-18A03	2090-CTPW-MADF-18A05
	TLP Motor Feedback Cable, Absolute encoder	2090-CTFB-MADD-CFA03	2090-CTFB-MADD-CFA05
<b>200W</b>	Kinetix 5100 Servo Drive, 200V 1/3 Phase, 0.4kW	2198-E1004-ERS	2198-E1004-ERS
	50 Pin IO Connector Kit	2198-TBIO	2198-TBIO
	TLP Servo Motor, 230V AC, Frame Size 70mm, Keyed shaft	TLP-A070- <b>020</b> -DJA32A	TLP-A070- <b>020</b> -DJA32A
	TLP Motor Power Cable, No brake (non-flex)	2090-CTPW-MADF-18A03	2090-CTPW-MADF-18A05
	TLP Motor Feedback Cable, Absolute encoder	2090-CTFB-MADD-CFA03	2090-CTFB-MADD-CFA05
<b>400W</b>	Kinetix 5100 Servo Drive, 200V 1/3 Phase, 0.4kW	2198-E1004-ERS	2198-E1004-ERS
	50 Pin IO Connector Kit	2198-TBIO	2198-TBIO
	TLP Servo Motor, 230V AC, Frame Size 70mm Keyed shaft	TLP-A070- <b>040</b> -DJA32A	TLP-A070- <b>040</b> -DJA32A
	TLP Motor Power Cable, No brake (non-flex)	2090-CTPW-MADF-18A03	2090-CTPW-MADF-18A05
	TLP Motor Feedback Cable, Absolute encoder	2090-CTFB-MADD-CFA03	2090-CTFB-MADD-CFA05
<b>750W</b>	Kinetix 5100 Servo Drive, 200V 1/3 Phase, 0.75kW	2198-E1007-ERS	2198-E1007-ERS
	50 Pin IO Connector Kit	2198-TBIO	2198-TBIO
	TLP Servo Motor, 230V AC, Frame Size 90mm, Keyed shaft	TLP-A090- <b>075</b> -DJA32A	TLP-A090- <b>075</b> -DJA32A
	TLP Motor Power Cable, No brake (non-flex)	2090-CTPW-MADF-18A03	2090-CTPW-MADF-18A05
	TLP Motor Feedback Cable, Absolute encoder	2090-CTFB-MADD-CFA03	2090-CTFB-MADD-CFA05
<b>1500W</b>	Kinetix 5100 Servo Drive, 200V 1/3 Phase, 1.5kW	2198-E1015-ERS	2198-E1015-ERS
	50 Pin IO Connector Kit	2198-TBIO	2198-TBIO
	TLP Servo Motor, 230V AC, Frame Size 145mm, Keyed shaft	TLP-A145- <b>150</b> -DJMC2A	TLP-A145- <b>150</b> -DJMC2A
	TLP Motor Power Cable, No brake (non-flex)	2090-CTPW-MCDF-12A03	2090-CTPW-MCDF-12A05
	TLP Motor Feedback Cable, Absolute encoder	2090-CTFB-MFDD-CFA03	2090-CTFB-MFDD-CFA05

## Technical Specifications - Kinetix 5100 Servo Drives

### Kinetix 5100 Input 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, 1-phase (120V nom) 170...253V rms, 1-phase (200...230V nom) 170...253V rms, 3-phase (230V nom)			
AC input frequency	47...63 Hz			
Main AC input current <sup>(1)</sup>				
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, 1-phase, with 120V AC input power 170...253V rms, 200...230V AC nom, 1-phase, with 200...230V AC input power			
Control power input current				
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) <sup>(2)</sup>	6.5 A	15.4 A	23.7 A	40.6 A
Peak output current (0-pk)	9.2 A	21.8 A	33.5 A	57.4 A
Continuous power output @ 120V nom @ 230V nom	0.20 kW 0.40 kW	0.375 kW 0.75 kW	0.75 kW 1.50 kW	1.0 kW 2.0 kW
Internal shunt on	370V @120V AC input			
Internal shunt off	370V @230V AC input			
Internal shunt resistor	100 $\Omega$	100 $\Omega$	100 $\Omega$	20 $\Omega$
Internal shunt power	5 W	14 W	14 W	20 W
Undervoltage threshold	70V @120V AC input 150V @230V AC input			
Overvoltage	410V @120V AC input 410V @230V AC input			
Bus capacitance	540 $\mu$ F	1680 $\mu$ F	1680 $\mu$ F	2160 $\mu$ F
Capacitive energy absorption	6.24 J	19.40 J	19.40 J	24.95 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) Peak RMS current allowed for up to 1.8 seconds.

**Kinetix 5100 Input Power Specifications (three-phase)**

Attribute	2198-E2030-ERS	2198-E2055-ERS	2198-E2075-ERS	2198-E2150-ERS
AC input voltage	170...253V rms, 3-phase (230V nom)			
AC input frequency	47...63 Hz			
Main AC input current <sup>(1)</sup>				
Nom (rms) 230V input (3-phase)	14.65 A	27.32 A	37.90 A	70.45 A
Max inrush (0-pk) 230V input	4.42 A	9.55 A	28.68 A	32.0 A
Control power input voltage	170...253V rms, 200...230V AC nom, 1-phase, with 200...230V AC input power			
Control power input current				
Nom (rms) 230V input	0.35 A	0.46 A	0.48 A	0.92 A
Max inrush (0-pk)	36.40 A	32.80 A	40.0 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) <sup>(2)</sup>	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
Continuous power output @ 230V nom	3.0 kW	5.5 kW	7.5 kW	15.0 kW
Internal shunt on	370V @230V AC input			
Internal shunt off				
Internal shunt resistor	20 $\Omega$	—	—	—
Internal shunt power	20 W	—	—	—
Undervoltage threshold	150V @230V AC input			
Overvoltage	410V @230V AC input			
Bus capacitance	2160 $\mu$ F	4100 $\mu$ F	7000 $\mu$ F	13,500 $\mu$ F
Capacitive energy absorption	24.95 J	47.36 J	69.30 J	155.93 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) Peak RMS current allowed for up to 1.8 seconds.

**Circuit Breaker/Fuse Specifications**

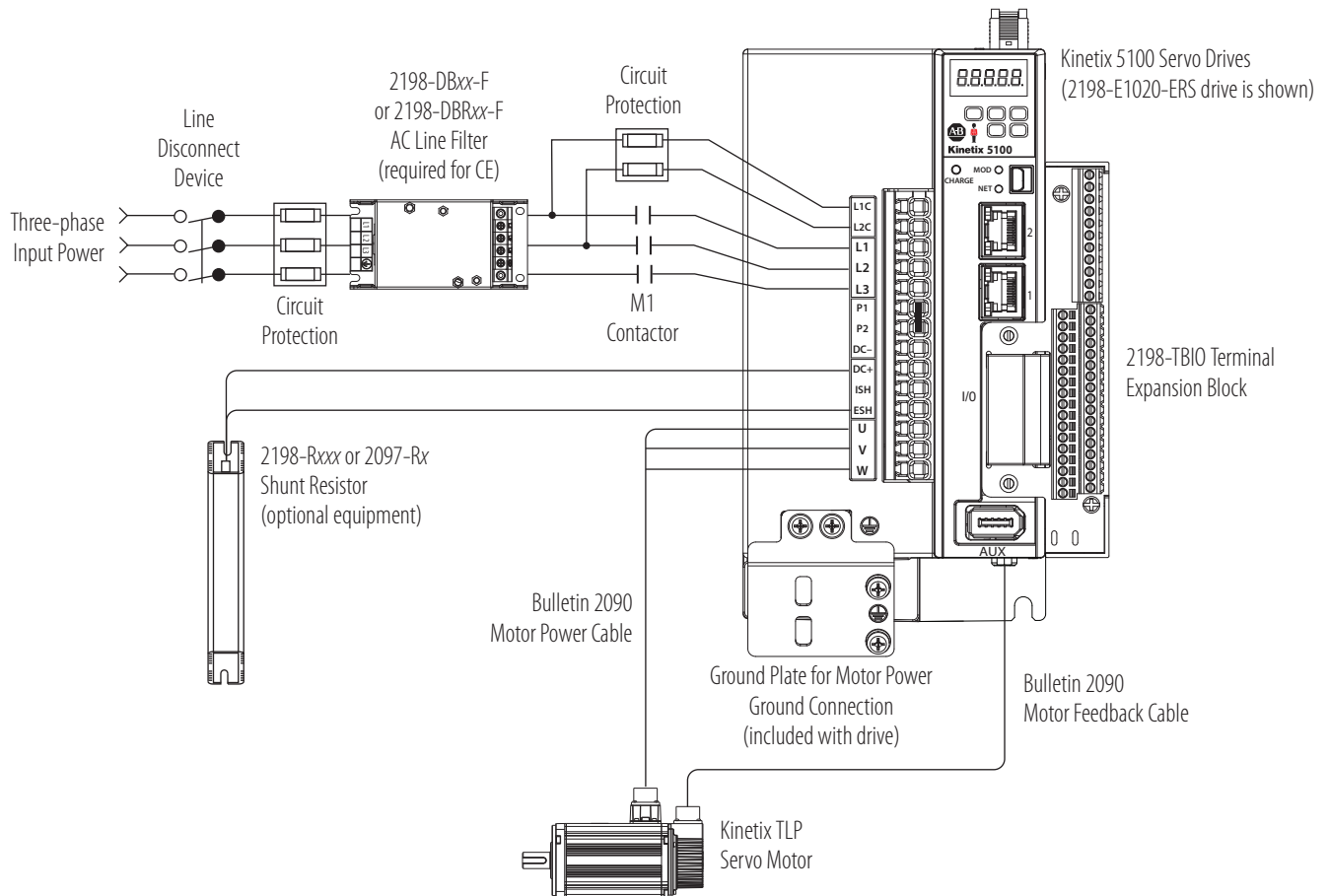
Kinetix 5100 servo drives use internal solid-state motor short-circuit protection and, when protected by suitable branch circuit protection, are rated for use on a circuit capable of delivering up to 5,000 A when protected by fuses or circuit breakers. These fuses and Allen-Bradley circuit breakers are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

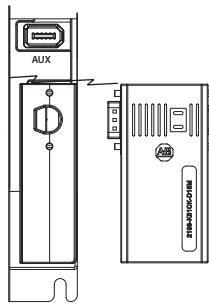
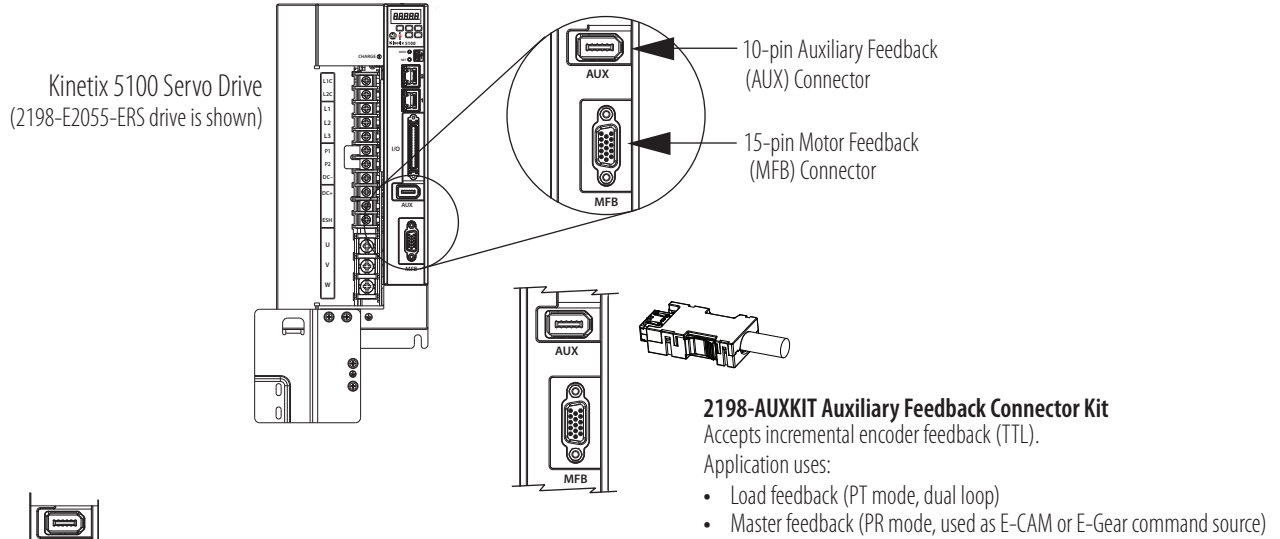
## Typical Hardware Configuration

Typical Kinetix 5100 drive systems include single-phase and three-phase standalone configurations. In this example, three-phase input power is applied to the Kinetix 5100 drive.



## Motor and Auxiliary Feedback Configurations

Motor feedback connections are made at the 15-pin motor feedback (MFB) connector. Auxiliary feedback connections are made by using the auxiliary feedback (AUX) connector. These examples illustrate how you can use the Bulletin 2198 connector kits for making these connections.

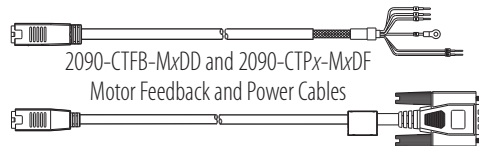
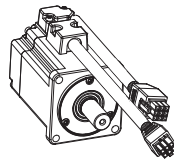


### 2198-K51CK-D15M Motor Feedback Connector Kit

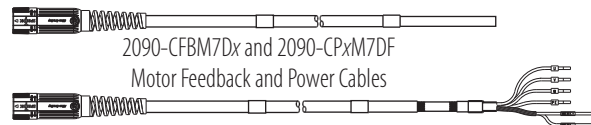
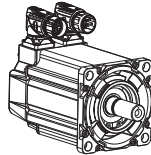
Accepts multiple encoder feedback types:

- Hiperface high-resolution absolute multi-turn and single-turn encoders
  - Kinetix MPL-Axxx-S/M, MPM-Axxx-S/M, MPF-Axxx-S/M, MPS-Axxx-S/M servo motors
  - Kinetix MPL-Axxx-E/V servo motors
- 24-bit high-resolution serial encoder
  - Kinetix TLP-Axxx-xxx-D servo motors
- Digital AqB (TTL) encoders with UVW (incremental)
  - MPL-A15xxx-H, MPL-A2xxx-H, MPL-A3xxx-H, MPL-A4xxx-H, MPL-A45xxx-H rotary motors

Kinetix TLP Servo Motors  
(TLP-A046-010 motor is shown)



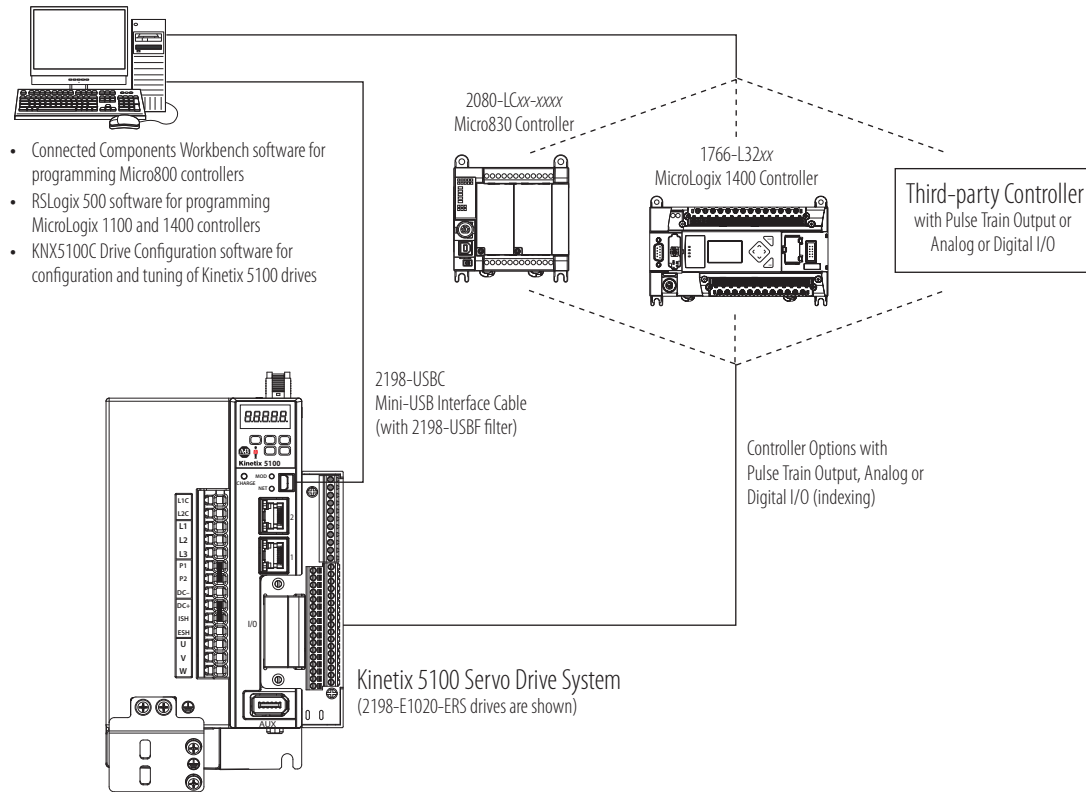
Kinetix MP Servo Motors  
(MPL-Axxxx motor is shown)



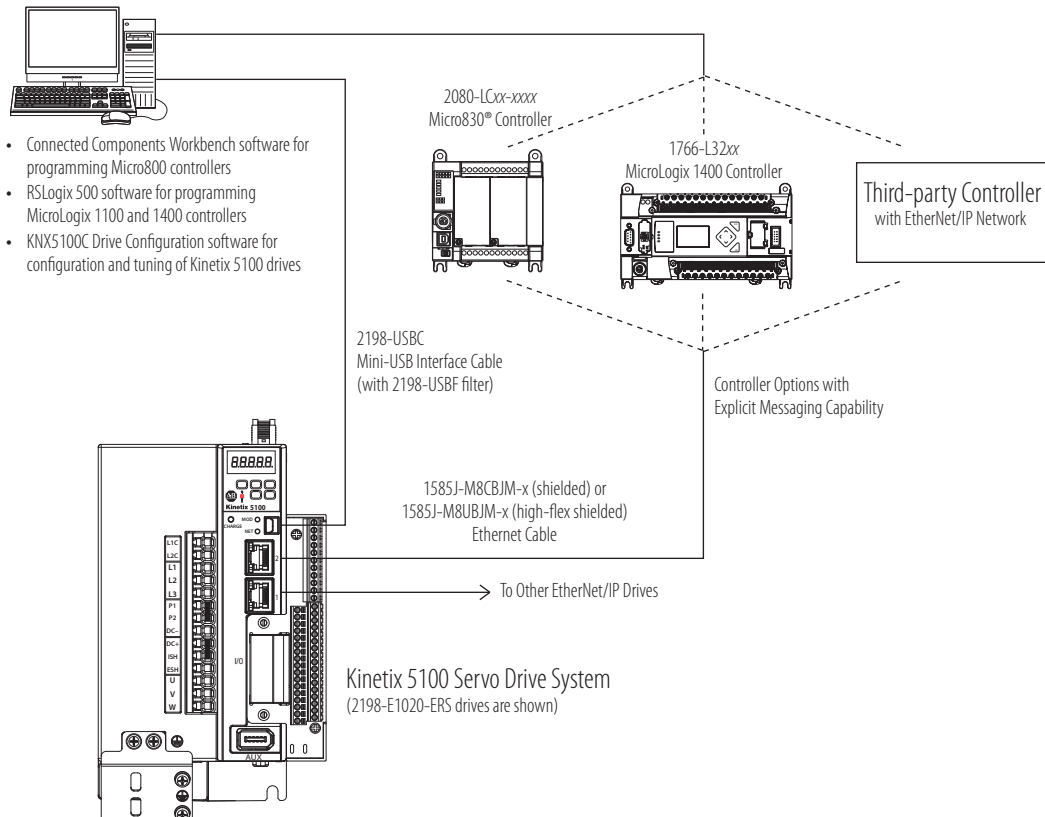


## Typical Control Configurations

### Kinetix 5100 Drive System with PLC Controller and PTO, Analog or Digital I/O Control

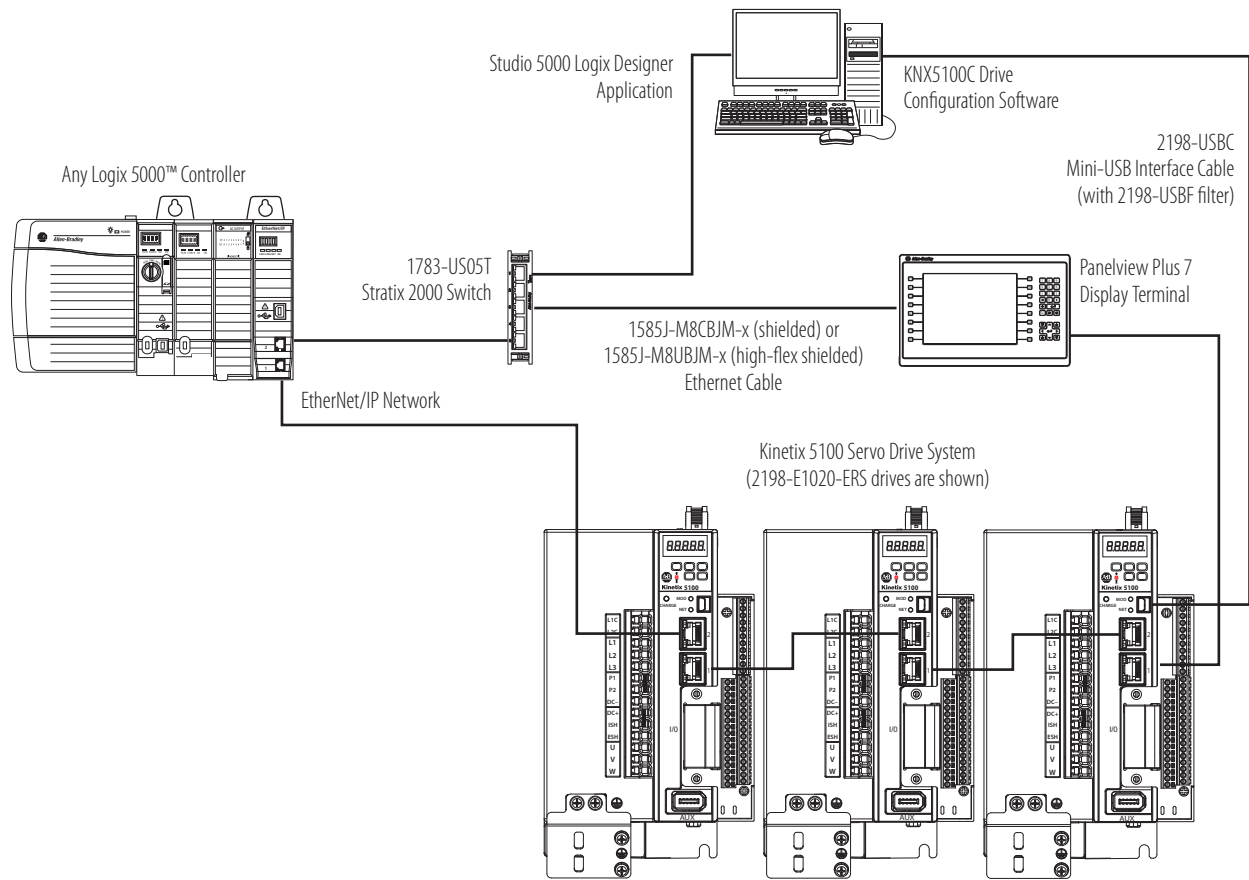


### Kinetix 5100 Drive System with PLC Controller and Explicit Messaging Control





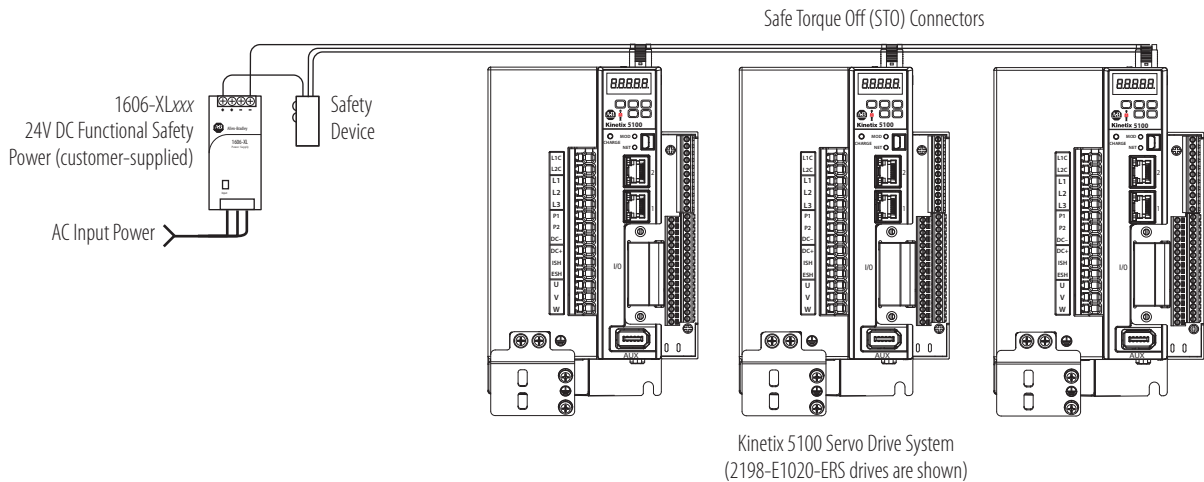
Kinetix 5100 Drive System with PAC Controller and EtherNet/IP Network Control



Safe Torque Off Configuration

Kinetix 5100 servo drives are capable of Safe Torque Off (STO) safety functions via hardwired connections. In this example, the Safe Torque Off (STO) connectors are wired to external safety-devices with cascading, hardwired, safety connections from one drive to another.

Hardwired Safe Torque Off



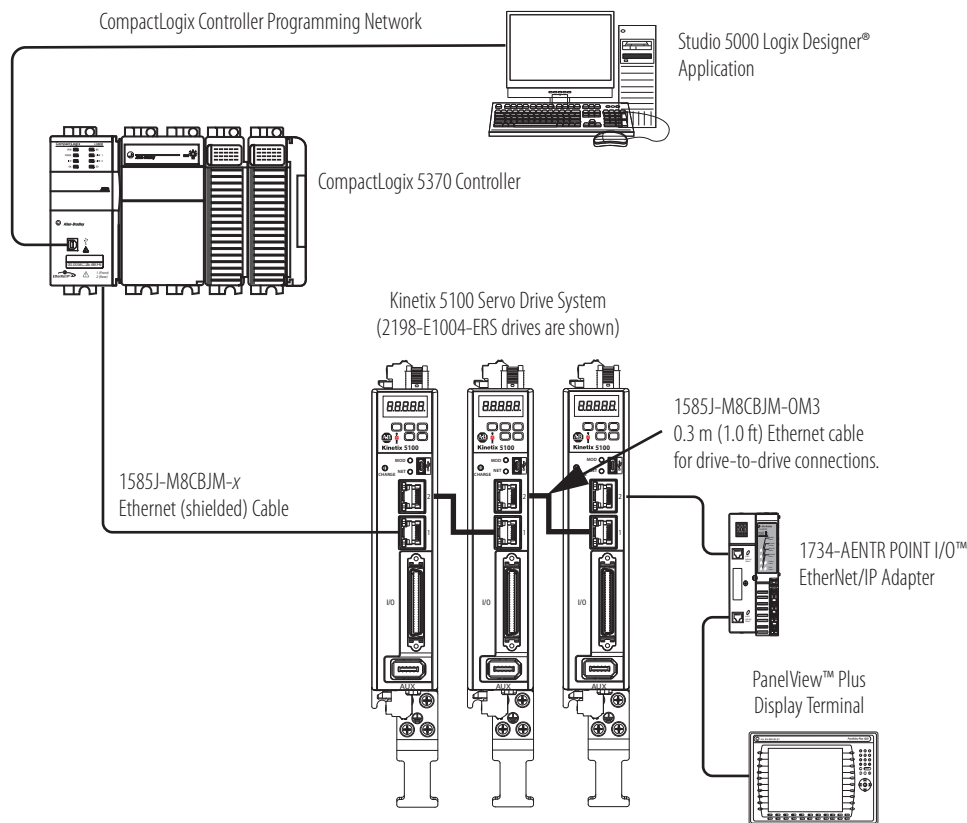
## Typical Communication Configurations

The Kinetix 5100 drives support linear, ring, and star Ethernet topologies by using ControlLogix®, CompactLogix™, MicroLogix™, and Micro800 controllers.

These examples feature the CompactLogix 5370 programmable automation controllers (catalog number 1769-LxxER, for example) with support for Kinetix 5100 drives via implicit messaging (by using Add-On Instruction, for example) or Explicit Messaging over the EtherNet/IP network. Other Allen-Bradley controllers are also compatible with the Kinetix 5100 servo drives.

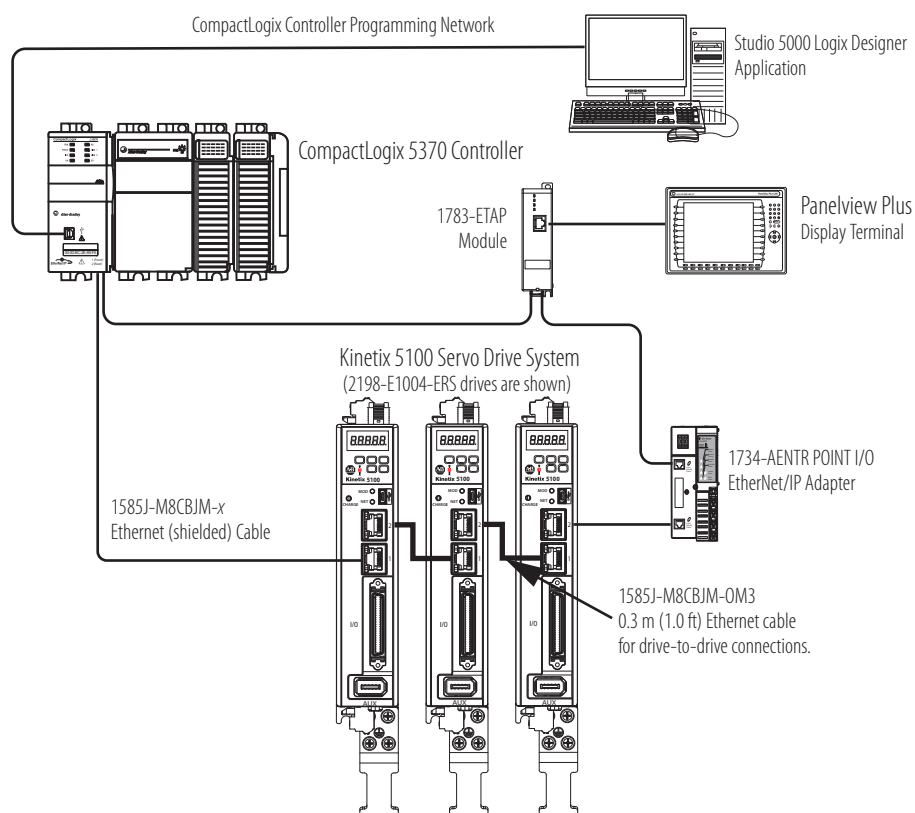
In this example, all devices are connected in linear topology. The Kinetix 5100 drives include dual-port connectivity, however, if any device becomes disconnected, all devices downstream of that device lose communication. Devices without dual-ports must include the 1783-ETAP module or be connected at the end of the line.

### Kinetix 5100 Linear Communication

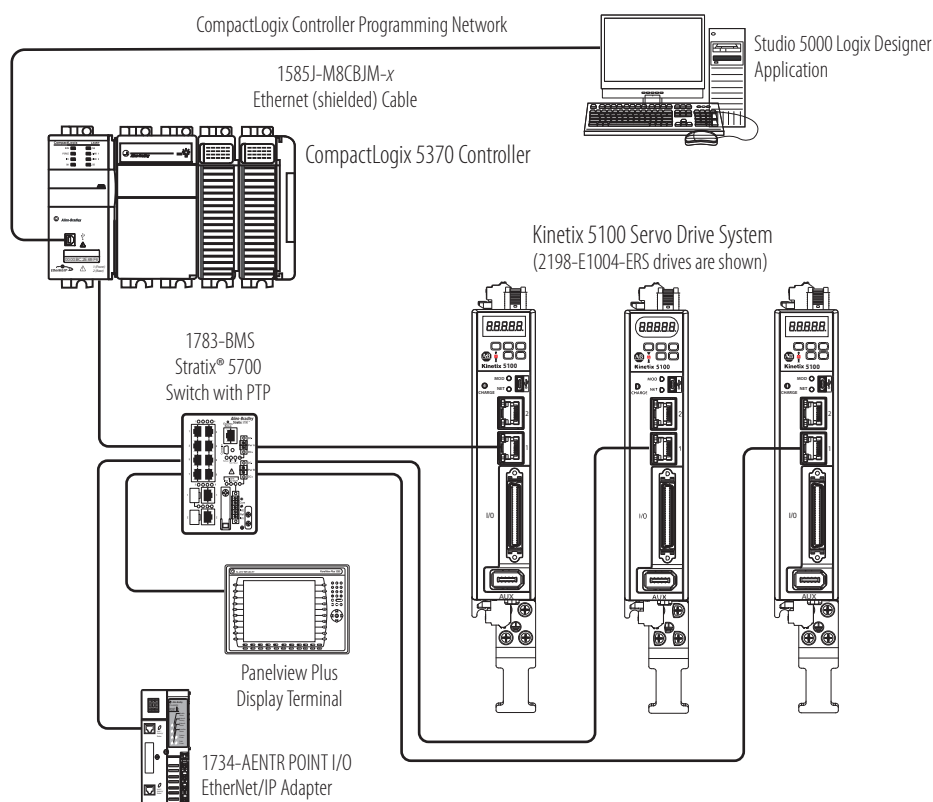


In this example, the devices are connected by using ring topology. If only one device in the ring is disconnected, the rest of the devices continue to communicate. Devices without dual-ports, for example the display terminal, require a 1783-ETAP module.

## Kinetix 5100 Ring Communication



## Kinetix 5100 Star Communication



# Kinetix TLP Servo Motors



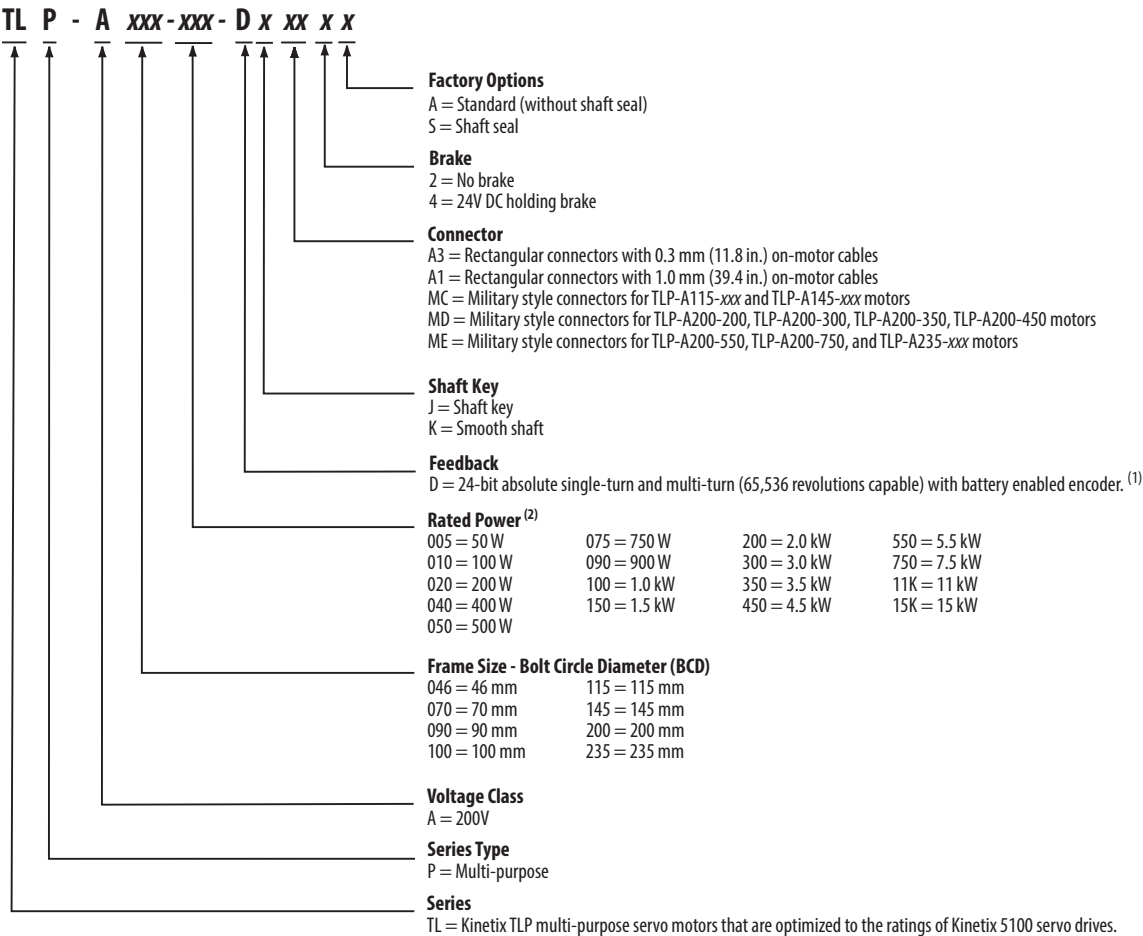
Kinetix® TLP servo motors, tested and validated for optimal performance with Kinetix 5100 servo drives, are available with or without 24V DC holding brakes, and a wide-range of other economical and customizable options. You are responsible for inspecting the equipment before accepting the shipment from the freight company. Check the items you receive against your purchase order. Notify the carrier of shipping damage or missing items immediately. Store or operate your motor in a clean and dry location within the Environmental Specifications

## Kinetix TLP Motor Performance Specifications with Kinetix 5100 Drives

Rotary Motor Cat. No.	Rated Speed rpm	Speed, max rpm	System Continuous Stall Current A rms	System Continuous Stall Torque N·m (lb·in)	System Peak Stall Current A rms	System Peak Stall Torque N·m (lb·in)	Motor Rated Output kW (Hp)	Kinetix 5100 Drives (230V AC input)
TLP-A046-005	3000	6000	0.70	0.16 (1.42)	2.286	0.447 (3.96)	0.05 (0.067)	2198-E1004-ERS
TLP-A046-010	3000	6000	0.96	0.32 (2.83)	3.370	1.034 (9.15)	0.10 (0.134)	2198-E1004-ERS
TLP-A070-020	3000	6000	1.65	0.64 (5.66)	5.500	2.160 (19.12)	0.20 (0.268)	2198-E1004-ERS
TLP-A070-040	3000	6000	2.60	1.22 (10.8)	6.500	2.91 (25.80)	0.38 (0.509)	2198-E1004-ERS
			2.70	1.27 (11.2)	9.500	4.275 (37.84)	0.40 (0.536)	2198-E1007-ERS
TLP-A090-075	3000	6000	4.50	2.39 (21.2)	15.41	7.505 (66.42)	0.75 (1.005)	2198-E1007-ERS
TLP-A100-100	3000	3000	4.31	3.18 (28.2)	12.37	8.740 (77.36)	1.0 (1.34)	2198-E1007-ERS
								2198-E1015-ERS
TLP-A115-100	3000	5000	7.45	3.18 (28.2)	23.70	8.455 (74.83)	1.0 (1.34)	2198-E1015-ERS
TLP-A115-200	3000	5000	12.50	6.37 (56.4)	40.58	17.48 (154.7)	2.0 (2.68)	2198-E1020-ERS
TLP-A145-050	2000	3000	3.26	2.39 (21.6)	9.180	6.81 (60.27)	0.50 (0.670)	2198-E1007-ERS
TLP-A145-090	1000	2000	7.90	8.30 (73.5)	21.80	20.52 (181.6)	0.87 (1.167)	2198-E1015-ERS
			8.12	8.59 (76.0)			0.90 (1.206)	2198-E1020-ERS
TLP-A145-100	2000	3000	6.11	4.77 (42.2)	19.73	13.30 (117.7)	1.0 (1.34)	2198-E1015-ERS
TLP-A145-150	2000	3000	7.90	6.22 (55.1)	23.70	15.92 (140.9)	1.3 (1.74)	2198-E1015-ERS
			8.80	7.16 (63.4)	29.13	19.66 (174.0)	1.5 (2.01)	2198-E1020-ERS
TLP-A200-200	2000	3000	12.30	9.55 (84.5)	33.66	21.85 (193.4)	2.0 (2.68)	2198-E1020-ERS
TLP-A200-300	1500	2500	17.90	16.81 (148.8)	55.95	45.62 (403.7)	2.6 (3.49)	2198-E2030-ERS
			20.25	19.10 (169.1)	57.50	47.03 (416.3)	3.0 (4.02)	2198-E2055-ERS
TLP-A200-350	2000	3000	22.16	16.71 (147.9)	65.40	43.23 (382.6)	3.5 (4.69)	2198-E2055-ERS
TLP-A200-450	1500	3000	37.07	28.65 (253.6)	91.40	64.04 (566.8)	4.5 (6.03)	2198-E2055-ERS
TLP-A200-550	1500	3000	41.13	35.01 (309.9)	91.40	67.67 (598.9)	5.5 (7.37)	2198-E2055-ERS
					108.0	79.96 (707.7)		2198-E2075-ERS
TLP-A200-750	1500	2500	49.0	45.36 (401.4)	127.5	104.30 (923.1)	7.1 (9.52)	2198-E2075-ERS
			49.80	47.74 (422.5)			7.5 (10.1)	2198-E2150-ERS
TLP-A235-11K	1500	2000	57.72	70.0 (619.6)	129.5	144.30 (1277)	11.0 (14.7)	2198-E2150-ERS
TLP-A235-15K	1500	2000	75.40	95.40 (844.4)	162.0	184.57 (1634)	15.0 (20.1)	2198-E2150-ERS

Performance specification data and curves reflect nominal system performance of a typical system with motor ambient at 40 °C (104 °F), drive ambient at 50 °C (122 °F), and rated line voltage. For additional information on ambient and line conditions, refer to Motion Analyzer software.

## Catalog Number Explanation



(1) Multi-turn revolution depends on the system settings and configuration.

(2) Rated power hierarchy is only for comparative purposes. Use Motion Analyzer to size and select motors for your application, and/or the torque/speed curves in the Kinetix 5100 Drive Systems Design Guide, publication [KNX-RM011](#).

## Before You Install the Motor

Perform these inspection steps and review the guidelines for shaft seals, couplings and pulleys, and electrical noise prevention

1. Remove the motor carefully from its shipping container.
2. Visually inspect the motor for any damage.
3. Examine the motor frame, front output shaft, and mounting pilot for any defects.
4. Notify the carrier of shipping damage immediately.



**ATTENTION:** Do not attempt to open and modify the motor. Only a qualified Rockwell Automation employee can service this motor.

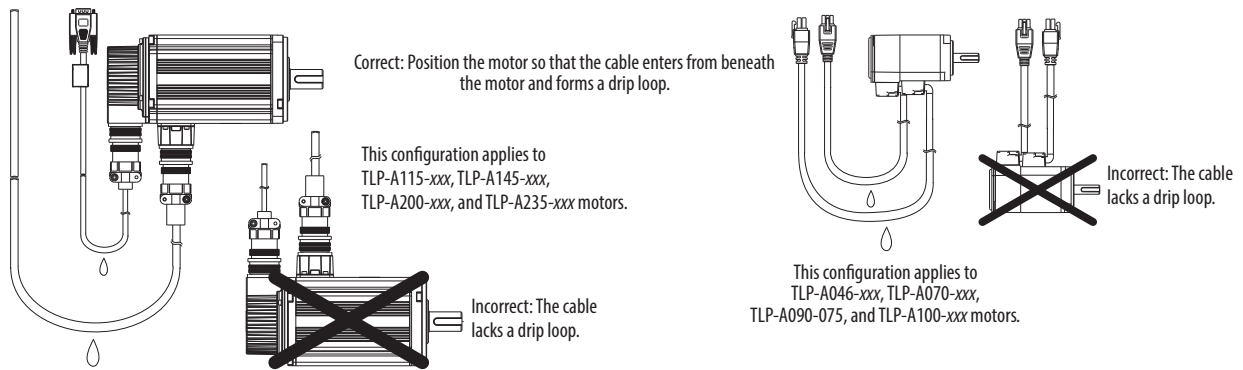
## Remove the Shaft Cap

Remove the protective cap installed on the motor shaft by hand pressure only. Do not use a hammer or other tools as they can damage the motor shaft and shaft seal.

## Prolong Motor Life

Proper design and maintenance can increase the life of a servo motor. Follow these guidelines to maximize the life of a servo motor operated within the [Environmental Specifications](#)

- Always provide a drip loop to carry liquids away from the connection to the motor.



- Whenever possible, provide shields that protect the motor housing, shaft, seals, and their junctions from contamination by foreign matter or fluids.
- Shaft seals are subject to wear and require periodic inspection and replacement. Replacement is recommended every 3 months, no exceed 12 months, depending on use.
- Inspect the motor and seals for damage or wear on a regular basis. If you detect damage or excessive wear, replace the item.
- The brake option on this servo motor is a spring-set holding brake that releases when voltage is applied to the brake coil. A separate power source is required to disengage the brake. This power source can be applied by a servo motor controller or manual operator control. If system main power fails, holding brakes can withstand occasional use as stopping brakes. However, this creates rotational mechanical backlash that can cause damage to the system, increase brake wear, and reduce brake life.

Holding brakes are not designed to stop rotation of the motor shaft, and they are not intended to be used as a safety device. They are designed to hold a motor shaft at 0 rpm for loads up to the rated brake holding torque. Follow these steps to prevent motor shaft rotation.

### IMPORTANT

1. Command the servo drive to 0 rpm.
2. Verify the motor is at 0 rpm.
3. Engage the brake.
4. Disable the drive.

Disabling the drive removes the potential for brake wear caused by a badly-tuned servo system oscillating the shaft.

## Shaft Seals

An additional seal is required on the motor shaft near the motor front bearing if the shaft is exposed to significant amounts of fine dust or fluids, such as lubricating oil from a gearbox. An IP65 rating for the motor requires a shaft seal and environmentally sealed connectors and cables. The additional seal is not recommended in applications where the motor shaft area is free of liquids or fine dust, and a lower rating is sufficient:

- See [Environmental Specifications](#) for a brief description of the IP rating for these motors.
- See [Shaft Seal Kits](#) for seal kits compatible with your motor.
- See Kinetix Rotary Motion Specifications Technical Data, publication [KNX-TD001](#), for Bulletin 2090 cables with environmentally sealed connectors compatible with these motors.

## Couplings and Pulleys

Mechanical connections to the motor shaft, such as couplings and pulleys, require a torsionally rigid coupling or a reinforced timing belt. The high dynamic performance of servo motors can cause couplings, pulleys, or belts to loosen or slip over time. A loose or slipping connection causes system instability and can damage the motor shaft. All connections between the system and the servo motor shaft must be rigid to achieve acceptable response from the system. Periodically inspect connections to verify their rigidity.

When mounting couplings or pulleys to the motor shaft, verify that the connections are properly aligned and that axial and radial loads are within the specifications of the motor. See Load Force Ratings for guidelines to achieve 40,000 hours of motor bearing life.



**ATTENTION:** Damage can occur to the motor bearings and the feedback device if sharp impact is applied to the shaft during installation of couplings and pulleys. Damage to the feedback device can result from applying leverage to the motor mounting face when removing devices mounted on the motor shaft. Do not strike the shaft, couplings, or pulleys with tools during installation or removal. Use a wheel puller, to apply pressure from the user end of the shaft, when attempting to remove any device from the motor shaft.

---

## Prevent Electrical Noise

Electromagnetic interference (EMI), commonly called electrical noise, can affect motor performance. Follow these guidelines to reduce the effects of EMI:

- Isolate the power transformers or install line filters on all AC input power lines.
- Use shielded cables.
- Shield signal cables from power wiring.
- Do not route motor cables over the vent openings on servo drives.
- Ground all equipment by using a single-point parallel ground system that employs ground bus-bars or large straps.
- If necessary, use additional electrical-noise reduction techniques to reduce EMI in noisy environments.

See System Design for Control of Electrical Noise Reference Manual, publication [GMC-RM001](#), for additional information on reducing EMI.

## Install Cables

Correct cable routing and careful cable construction improve system electromagnetic compatibility (EMC).

Follow these guidelines to build and install the cables:

- Keep the wire lengths as short as possible.
- Route noise sensitive wiring (encoder, serial, and I/O) away from input power and motor power wiring.
- Separate cables by 0.3 m (1 ft) minimum for every 9 m (30 ft) of parallel run.
- Ground both ends of the encoder cable shield and twist the signal wire pairs to help prevent EMI from other equipment.



**ATTENTION:** High voltage can be present on the shield of a power cable, if the shield is not grounded. Verify that there is a connection to ground for any power cable shield.

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## Motor Installation

Motor installation must comply with all local regulations and use of equipment and installation practices that promote safety and electromagnetic compatibility:

- All motors include a mounting pilot for aligning the motor on a machine.
- Preferred fasteners are stainless steel.



**ATTENTION:** Unmounted motors, disconnected mechanical couplings, loose shaft keys, and disconnected cables are dangerous if power is applied. Identify (tag-out) disassembled equipment and restrict access to (lock-out) the electrical power. Before applying power to the motor, remove the shaft key and other mechanical couplings that could be thrown from the shaft.

---



**ATTENTION:** Verify that cables are installed and restrained to prevent uneven tension or flexing at the connector. Provide support at 3 m (10 ft) intervals throughout the cable run. Excessive and uneven lateral force at the cable connector can result in the connector's environmental seal opening and closing as the cable flexes.

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## Install the Motor

Perform these steps to install the motor.



**ATTENTION:** Damage can occur to the motor bearings and the feedback device if sharp impact is applied to the shaft during installation of couplings and pulleys. Damage to the feedback device can result from applying leverage to the motor mounting face when removing devices mounted on the motor shaft.

Do not strike the shaft, couplings, or pulleys with tools during installation or removal. Use a wheel puller, to apply pressure from the user end of the shaft, when attempting to remove any device from the motor shaft.

1. Leave enough space around the motor so it can dissipate heat and stay within its specified operating temperature range.  
See [Environmental Specifications](#) for the operating temperature range. Do not enclose the motor unless forced air is blown across the motor for cooling. A fan that blows air across the motor improves its performance. Keep other heat-producing devices away from the motor.
2. See [Load Force Ratings](#) to determine the radial and axial shaft load limitations of your motor.
3. Install the motor with the connector positioned beneath the motor housing.  
This position can provide better environmental protection for the connector.



**BURN HAZARD:** Outer surfaces of the motor can reach a high temperature, 125 °C (257 °F), during motor operation.

Take precautions to prevent accidental contact with hot surfaces. Consider motor surface temperature when selecting motor mating connections and cables.

4. Mount and align the motor.
5. Attach the motor cables that transmit power, feedback, and brake signals as described below.
  - a. Carefully align the cable connector with the motor connector.



**ATTENTION:** Keyed connectors must be properly aligned and hand-tightened.

Do not use tools, or apply excessive force, when mating the cable to the motor connector. If the connectors do not go together with light hand force, realign and try again.

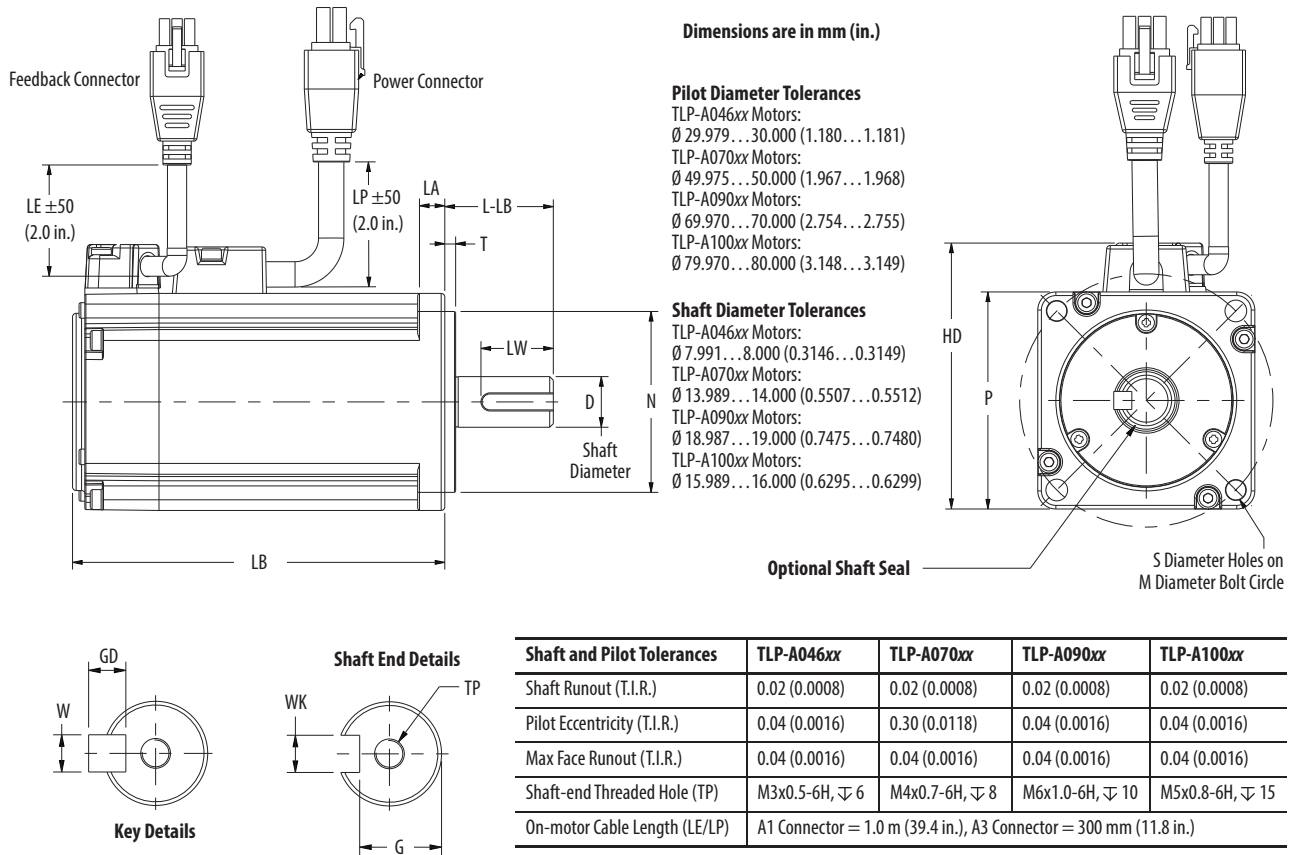
- b. Hand-tighten military style connectors on TLP-A115...TLP-A235 motors and press rectangular connectors together on TLP-A046...TLP-A100 motors until the contacts are inserted and a click is heard.



**ATTENTION:** The overall shield on the motor cable must be grounded to obtain an effective encoder signal.

The encoder data signal is transmitted through an impedance-matched twisted-wire pair that requires effective shielding for optimum performance. Make sure there is an effective connection between the motor cable shield and the drive system ground.

## Motor Dimensions (046...100 mm frame sizes)



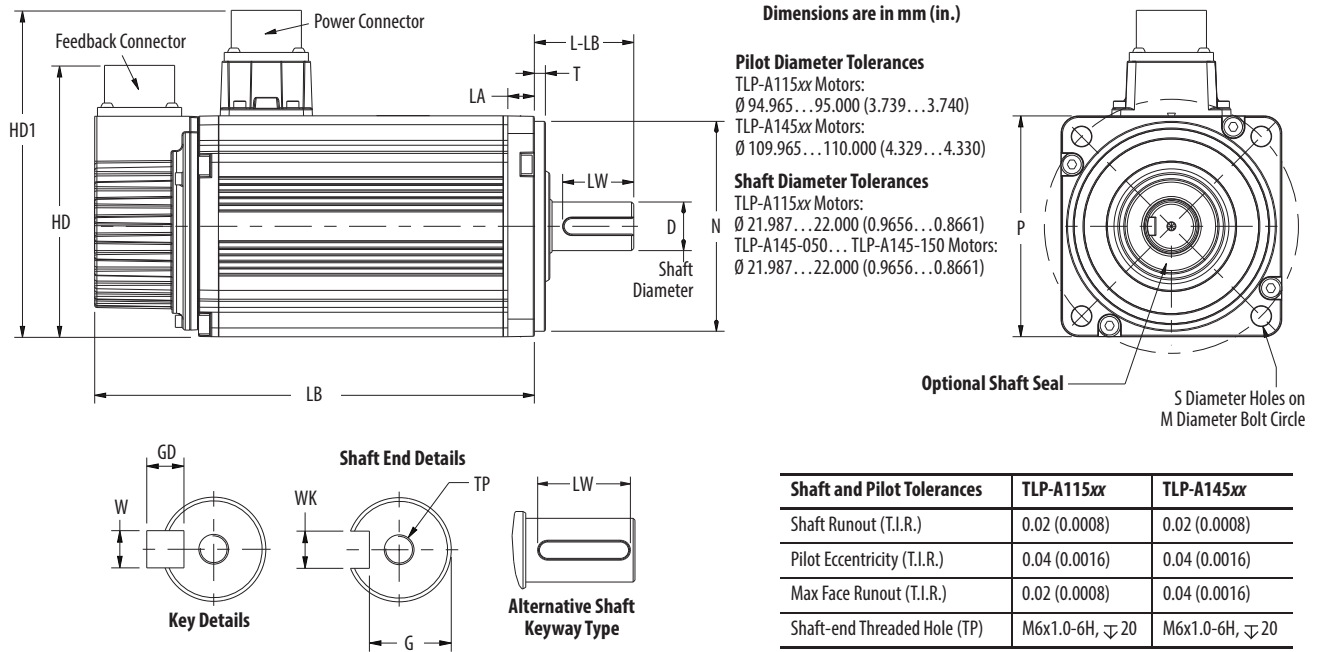
## Motor Dimensions (046...100 mm frame sizes)

Motor Cat. No.	HD mm (in.)	LA mm (in.)	LB <sup>(1)</sup> mm (in.)	L-LB <sup>(2)</sup> mm (in.)	LW mm (in.)	D mm (in.)	M mm (in.)	S mm (in.)	N <sup>(5)</sup> mm (in.)	P mm (in.)	G mm (in.)	GD mm (in.)	W mm (in.)	WK mm (in.)
TLP-A046-005	53.8 (2.12)	5.0 (0.20)	71.9 (2.83)	25.0 (0.98)	16.0 (0.630)	8.0 (0.3149)	46.0 (1.811)	4.50 <sup>(3)</sup> (0.177)	30.0 (1.181)	40.0 (1.57)	6.20 (0.244)	3.0 (0.118)	3.0 <sup>(6)</sup> (0.118)	3.0 <sup>(8)</sup> (0.118)
TLP-A046-010			86.0 (3.39)											
TLP-A070-020	74.1 (2.92)	7.5 (0.30)	84.7 (3.33)	30.0 (1.18)	20.0 (0.787)	14.0 (0.5512)	70.0 (2.756)	5.50 <sup>(4)</sup> (0.216)	50.0 (1.968)	60.0 (2.36)	11.0 (0.433)	5.0 (0.197)	5.0 <sup>(7)</sup> (0.197)	5.0 <sup>(7)</sup> (0.197)
TLP-A070-040			106.7 (4.20)											
TLP-A090-075	94.1 (3.70)	8.0 (0.31)	116.5 (4.59)	40.0 (1.57)	25.0 (0.984)	19.0 (0.7480)	90.0 (3.543)	6.60 <sup>(4)</sup> (0.260)	70.0 (2.755)	80.0 (3.15)	15.5 (0.610)	6.0 (0.236)	6.0 <sup>(7)</sup> (0.236)	6.0 <sup>(7)</sup> (0.236)
TLP-A100-100	98.8 (3.89)		153.9 (6.06)	35.0 (1.38)	20.0 (0.787)	16.0 (0.6299)	100 (3.937)	6.60 <sup>(3)</sup> (0.260)	80.0 (3.149)	86.0 (3.38)	13.0 (0.630)	5.0 (0.197)	5.0 <sup>(7)</sup> (0.197)	5.0 <sup>(7)</sup> (0.197)

- (1) For TLP-A046-005 motors with brake, add 34.2 mm (1.35 in.). For TLP-A046-010 motors with brake, add 34.8 mm (1.37 in.).  
 For TLP-A070-020 motors with brake, add 33.6 mm (1.32 in.). For TLP-A070-040 motors with brake, add 33.7 mm (1.33 in.).  
 For TLP-A090-075 motors with brake, add 37.4 mm (1.47 in.).  
 For TLP-A100-100 motors with brake, add 31.1 mm (1.22 in.).
- (2) Tolerance for this dimension is  $\pm 0.50$  mm ( $\pm 0.020$  in.).
- (3) Tolerance for this dimension is  $\pm 0.10$  mm ( $\pm 0.0039$  in.).
- (4) Tolerance for this dimension is  $\pm 0.20$  mm ( $\pm 0.0079$  in.).
- (5) See dimensions diagram for tolerances.
- (6) Tolerance for this dimension is  $-0.004$ ,  $-0.029$  mm (0.000157, -0.001141 in.).
- (7) Tolerance for this dimension is  $+0$ ,  $-0.030$  mm (+0, -0.001181 in.).
- (8) Tolerance for this dimension is  $+0$ ,  $-0.025$  mm (+0, -0.000984 in.).

Motors are designed to metric dimensions. Inch dimensions are approximate conversions from millimeters. Dimensions without tolerances are for reference.

## Motor Dimensions (115 and 145 mm frame sizes)



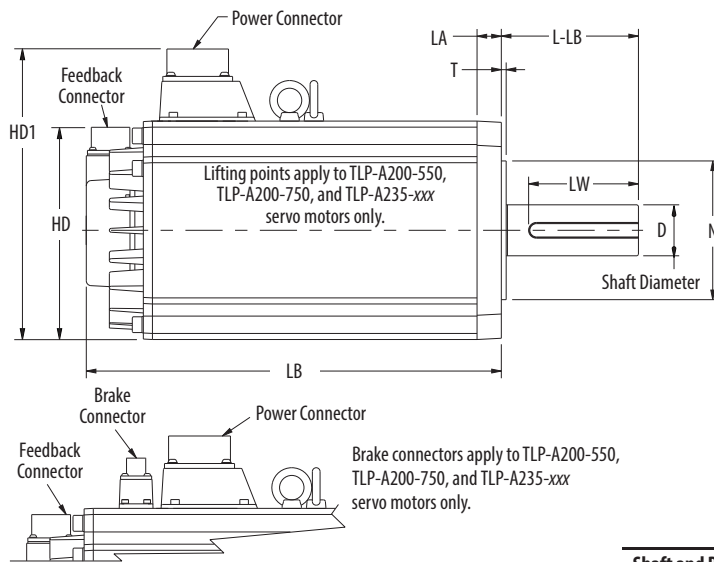
## Motor Dimensions (115 and 145 mm frame sizes)

Motor Cat. No.	HD mm (in.)	HD1 mm (in.)	LA mm (in.)	LB <sup>(1)</sup> mm (in.)	L-LB mm (in.)	LW mm (in.)	D <sup>(3)</sup> mm (in.)	M mm (in.)	S <sup>(4)</sup> mm (in.)	N <sup>(3)</sup> mm (in.)	P mm (in.)	G mm (in.)	GD mm (in.)	W <sup>(5)</sup> mm (in.)	WK <sup>(5)</sup> mm (in.)
TLP-A115-100	122.9 (4.84)	148.1 (5.83)	12.0 (0.47)	154.0 (6.06)	45.0 <sup>(2)</sup> (1.77)			115 (4.53)		95.0 (3.74)	100 (3.94)				
TLP-A115-200				199.7 (7.86)											
TLP-A145-050				148.2 (5.83)		36.0 (1.42)	22.0 (0.87)		9.0 (0.354)			18.0 (0.71)	7.0 (0.28)	8.0 (0.315)	8.0 (0.315)
TLP-A145-090				164.2 (6.46)											
TLP-A145-100	138.6 (5.46)	176.4 (6.94)	11.5 (0.45)	148.2 (5.83)	55.0 (2.17)			145 (5.71)		110 (4.33)	130 (5.12)				
TLP-A145-150				168.2 (6.62)											

- (1) For TLP-A115-100 motors with brake, add 39.3 mm (1.55 in.).  
 For TLP-A115-200 motors with brake, add 27.0 mm (1.06 in.).  
 For TLP-A145-050 and TLP-A145-100 motors with brake, add 36.0 mm (1.42 in.).  
 For TLP-A145-090 and TLP-A145-150 motors with brake, add 34.5 mm (1.36 in.).
- (2) Tolerance for this dimension is +0.38, -0.50 mm (+0.015, -0.020 in.).
- (3) See dimensions diagram for tolerances.
- (4) For TLP-A115 motors, the tolerance is  $\pm 0.10$  mm ( $\pm 0.0039$  in.).  
 For TLP-A145 motors, the tolerance is  $\pm 0.30$  mm ( $\pm 0.0118$  in.).
- (5) Tolerance for this dimension is +0, -0.036 mm (+0, -0.01417 in.).

Motors are designed to metric dimensions. Inch dimensions are approximate conversions from millimeters. Dimensions without tolerances are for reference.

## Motor Dimensions (200 and 235 mm frame sizes)



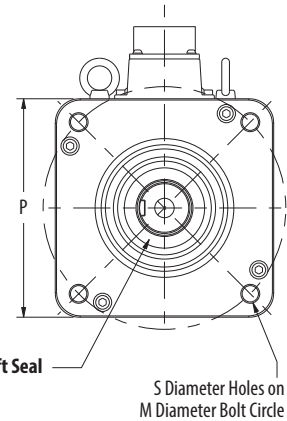
Dimensions are in mm (in.)

### Pilot Diameter Tolerances

TLP-A200-200...TLP-A200-750 Motors:  
 Ø 114.265...114.300 (4.4986...4.500)  
 TLP-A235-11K...TLP-A235-15K Motors:  
 Ø 199.954...200.00 (7.8722...7.8740)

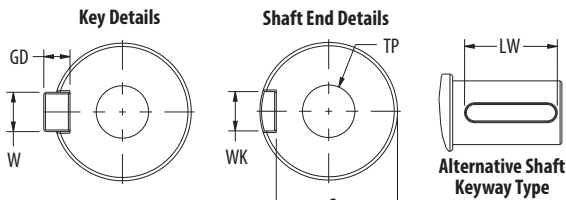
### Shaft Diameter Tolerances

TLP-A200-200...TLP-A200-450 Motors:  
 Ø 34.984...35.000 (1.3773...1.3779)  
 TLP-A200-550...TLP-A200-750 Motors:  
 Ø 41.984...42.000 (1.6529...1.6535)  
 TLP-A235-11K Motors:  
 Ø 41.984...42.000 (1.6529...1.6535)  
 TLP-A235-15K Motors:  
 Ø 54.989...55.030 (2.1649...2.1665)



Optional Shaft Seal

S Diameter Holes on  
M Diameter Bolt Circle



Shaft and Pilot Tolerances	TLP-A200-xxx	TLP-A235-11K	TLP-A235-15K
Shaft Runout (T.I.R.)	0.02 (0.0008)	0.04 (0.0016)	0.04 (0.0016)
Pilot Eccentricity (T.I.R.)	0.04 (0.0016)	0.04 (0.0016)	0.04 (0.0016)
Max Face Runout (T.I.R.)	0.04 (0.0016)	0.06 (0.0024)	0.06 (0.0024)
Shaft-end Threaded Hole (TP)	M12x1.75-6H, $\nabla$ 25	M16x2.0-6H, $\nabla$ 32	M20x2.5-6H, $\nabla$ 40

## Motor Dimensions (200 and 235 mm frame sizes)

Motor Cat. No.	HD mm (in.)	HD1 mm (in.)	LA mm (in.)	LB <sup>(1)</sup> mm (in.)	L-LB <sup>(2)</sup> mm (in.)	LW mm (in.)	D mm (in.)	M mm (in.)	S mm (in.)	N <sup>(5)</sup> mm (in.)	P mm (in.)	G mm (in.)	GD mm (in.)	W mm (in.)	WK <sup>(5)</sup> mm (in.)
TLP-A200-200	174.9 (6.89)	231.0 (9.09)	20.0 (0.79)	169.7 (6.68)	79.0 (3.11)	63.0 (2.48)	35.0 (1.38)	200.0 (7.87)	13.5 <sup>(3)</sup> (0.53)	114.3 (4.50)	180.0 (7.09)	30.0 (1.18)	8.0 (0.31)	10.0 <sup>(6)</sup> (0.394)	10.0 <sup>(6)</sup> (0.394)
TLP-A200-300				202.8 (7.98)											
TLP-A200-350				254.0 (10.0)											
TLP-A200-450				280.4 (11.04)											
TLP-A200-550	194.6 (7.66)	279.1 (10.99)	20.0 (0.79)	342.7 (13.49)	113.0 (4.45)	90.0 (3.54)	42.0 (1.65)	235.0 (9.25)	13.5 <sup>(4)</sup> (0.53)	200.0 (7.87)	220.0 (8.66)	37.0 (1.46)	10.0 (0.39)	12.0 <sup>(7)</sup> (0.47)	12.0 <sup>(7)</sup> (0.47)
TLP-A200-750				372.1 (14.65)											
TLP-A235-11K				451.1 (17.76)											
TLP-A235-15K				451.1 (17.76)			55.0 (2.17)					49.0 (1.93)	10.0 (0.39)	16.0 <sup>(7)</sup> (0.63)	16.0 <sup>(7)</sup> (0.63)

- (1) For TLP-A200-200 and TLP-A200-750 motors with brake, add 34.1 mm (1.34 in.).  
 For TLP-A200-300 and TLP-A200-350 motors with brake, add 33.2 mm (1.31 in.).  
 For TLP-A200-450 motors with brake, add 44.0 mm (1.73 in.).  
 For TLP-A200-550 motors with brake, add 32.0 mm (1.26 in.).  
 For TLP-A235-11K and TLP-A235-15K motors with brake, add 63.0 mm (2.48 in.).
- (2) Tolerance for this dimension is +0.38, -0.50 mm (+0.015, -0.020 in.).
- (3) Tolerance for this dimension is ±0.10 mm (±0.0039 in.).
- (4) Tolerance for this dimension is ±0.20 mm (±0.0079 in.).
- (5) See dimensions diagram for tolerances.
- (6) Tolerance for this dimension is +0, -0.036 mm (+0, -0.01417 in.).
- (7) Tolerance for this dimension is +0, -0.043 mm (+0, -0.00169 in.).

Motors are designed to metric dimensions. Inch dimensions are approximate conversions from millimeters. Dimensions without tolerances are for reference.

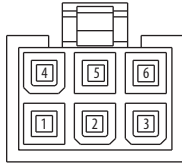
## Connector Data

This section identifies the power, feedback, and brake pins on the motor connectors.

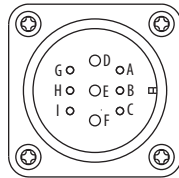
The motor power connector pinouts apply to the motor catalog numbers listed.

### Motor Power Connector Pinouts

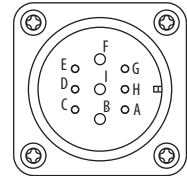
Pin	Signal	Motor Cat. No.
1	U	TLP-A046 TLP-A070 TLP-A090 TLP-A100
2	V	
3	BR+	
4	W	
5	$\oplus$	
6	BR-	



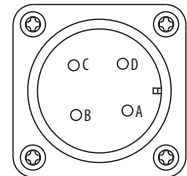
Pin	Signal	Motor Cat. No.
A	BR+	TLP-A200-200 TLP-A200-300 TLP-A200-350 TLP-A200-450
B	BR-	
C	—	
D	U	
E	V	
F	W	
G	$\oplus$	
H	—	
J	—	



Pin	Signal	Motor Cat. No.
A	—	TLP-A115 TLP-A145
B	W	
C	—	
D	—	
E	$\oplus$	
F	U	
G	BR+	
H	BR-	
I	V	



Pin	Signal	Motor Cat. No.
A	U	TLP-A200-550 TLP-A200-750 TLP-A235-11K TLP-A235-15K
B	V	
C	W	
D	$\oplus$	



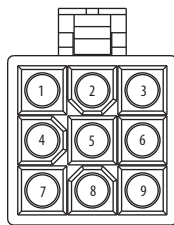
### Motor Brake Connector Pinout

Pin	Signal	Motor Cat. No.
A	BR+	TLP-A200-550 TLP-A200-750 TLP-A235-11K TLP-A235-15K
B	BR-	

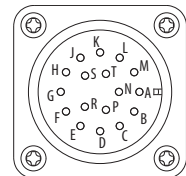


### Motor Feedback Connector Pinouts

Pin	Signal	Motor Cat. No.
1	T+	TLP-A046 TLP-A070 TLP-A090 TLP-A100
2	BAT+	
3	—	
4	T-	
5	BAT-	
6	—	
7	DC+5V	
8	$\oplus$	
9	SHIELD	



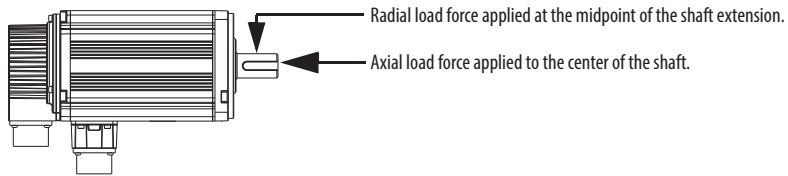
Pin	Signal	Motor Cat. No.
A	T+	TLP-A115 TLP-A145 TLP-A200 TLP-A235
B	T-	
C	BAT+	
D	BAT-	
E...K	—	
L	SHIELD	
M...P	—	
R	$\oplus$	
S	DC+5V	
T	—	



## Load Force Ratings

Motors are capable of operating with a sustained shaft load. The location and direction of radial and axial load forces are shown in the figure, and maximum load rating values are in the tables.

### Load Forces on Shaft



The following tables represent 40,000-hour bearing fatigue life at various loads and speeds. This 40,000-hour bearing life does not account for possible application-specific life reduction, such as bearing grease contamination from external sources.

### Radial Load Force Ratings (maximum) for Non-brake Motors

Motor Cat. No. <sup>(1)</sup>	Speed, max rpm	RPM														
		500 kgf	750 kgf	1000 kgf	1125 kgf	1250 kgf	1500 kgf	2000 kgf	2250 kgf	2500 kgf	3000 kgf	3375 kgf	3750 kgf	4500 kgf	5000 kgf	6000 kgf
TLP-A046-005-Dxxx2x	6000	—	—	—	—	—	8.8	—	—	—	7.0	—	—	6.1	—	5.6
TLP-A046-010-Dxxx2x	6000	—	—	—	—	—	9.7	—	—	—	7.7	—	—	6.8	—	6.1
TLP-A070-020-Dxxx2x	6000	—	—	—	—	—	22.4	—	—	—	17.8	—	—	15.5	—	14.1
TLP-A070-040-Dxxx2x	6000	—	—	—	—	—	25	—	—	—	19.9	—	—	17.4	—	15.8
TLP-A090-075-Dxxx2x	6000	—	—	—	—	—	35.6	—	—	—	28.2	—	—	24.7	—	22.4
TLP-A100-100-Dxxx2x	3000	—	61.8	—	—	—	49.0	—	42.8	—	38.9	—	—	—	—	—
TLP-A115-100-Dxxx2x	5000	—	—	—	—	52.9	—	—	—	42	—	—	36.7	—	33.3	—
TLP-A115-200-Dxxx2x	5000	—	—	—	—	58.1	—	—	—	46.1	—	—	10.3	—	36.6	—
TLP-A145-050-Dxxx2x	3000	—	106.8	—	—	—	84.7	—	74	—	67.3	—	—	—	—	—
TLP-A145-090-Dxxx2x	2000	130.1	—	103.3	—	—	90.2	82	—	—	—	—	—	—	—	—
TLP-A145-100-Dxxx2x	3000	—	106.8	—	—	—	84.7	—	74	—	67.3	—	—	—	—	—
TLP-A145-150-Dxxx2x	3000	—	113.6	—	—	—	90.2	—	78.8	—	71.6	—	—	—	—	—
TLP-A200-200-Dxxx2x	3000	—	125.9	—	—	—	99.9	—	87.3	—	79.3	—	—	—	—	—
TLP-A200-300-Dxxx2x	2500	—	140	—	—	—	111.1	—	97.1	—	88.2	—	—	—	—	—
TLP-A200-350-Dxxx2x	3000	—	140	—	—	—	111.1	—	97.1	—	88.2	—	—	—	—	—
TLP-A200-450-Dxxx2x	3000	—	149.7	—	—	—	118.8	—	103.8	—	94.3	—	—	—	—	—
TLP-A200-550-Dxxx2x	3000	—	149.2	—	—	—	118.4	—	103.4	—	94	—	—	—	—	—
TLP-A200-750-Dxxx2x	2500	—	159.3	—	—	—	126.4	—	110.4	—	100.3	—	—	—	—	—
TLP-A235-11K-Dxxx2x	2000	435	—	345.3	—	—	301.6	274	—	—	—	—	—	—	—	—
TLP-A235-15K-Dxxx2x	2000	463.1	—	367.6	—	—	321.1	291.7	—	—	—	—	—	—	—	—

(1) 1.0 kgf = 2.2 lbf or 9.8 N.

**Axial Load Force Ratings (maximum radial load) for Non-brake Motors**

Motor Cat. No. <sup>(1)</sup>	Speed, max rpm	RPM														
		500 kgf	750 kgf	1000 kgf	1125 kgf	1250 kgf	1500 kgf	2000 kgf	2250 kgf	2500 kgf	3000 kgf	3375 kgf	3750 kgf	4500 kgf	5000 kgf	6000 kgf
TLP-A046-005-Dxxx2x	6000	—	—	—	—	—	5.6	—	—	—	4.1	—	—	3.4	—	3.0
TLP-A046-010-Dxxx2x	6000	—	—	—	—	—	6	—	—	—	4.4	—	—	3.7	—	3.3
TLP-A070-020-Dxxx2x	6000	—	—	—	—	—	10.1	—	—	—	7.4	—	—	6.2	—	5.5
TLP-A070-040-Dxxx2x	6000	—	—	—	—	—	11.3	—	—	—	8.3	—	—	7.0	—	6.2
TLP-A090-075-Dxxx2x	6000	—	—	—	—	—	13.6	—	—	—	10.1	—	—	8.5	—	7.5
TLP-A100-100-Dxxx2x	3000	—	18.4	—	—	—	13.6	—	11.4	—	10.1	—	—	—	—	—
TLP-A115-100-Dxxx2x	5000	—	—	—	—	18.1	—	—	—	13.4	—	—	11.2	—	9.9	—
TLP-A115-200-Dxxx2x	5000	—	—	—	—	20.5	—	—	—	15.1	—	—	12.7	—	11.2	—
TLP-A145-050-Dxxx2x	3000	—	28.1	—	—	—	20.8	—	17.5	—	15.4	—	—	—	—	—
TLP-A145-090-Dxxx2x	2000	37.2	—	27.5	—	—	23.1	20.4	—	—	—	—	—	—	—	—
TLP-A145-100-Dxxx2x	3000	—	28.1	—	—	—	20.8	—	17.5	—	15.4	—	—	—	—	—
TLP-A145-150-Dxxx2x	3000	—	31.2	—	—	—	23.1	—	19.4	—	17.1	—	—	—	—	—
TLP-A200-200-Dxxx2x	3000	—	54.3	—	—	—	40.2	—	33.7	—	29.7	—	—	—	—	—
TLP-A200-300-Dxxx2x	2500	—	60.8	—	—	—	45.0	—	37.7	—	33.3	—	—	—	—	—
TLP-A200-350-Dxxx2x	3000	—	60.8	—	—	—	45.0	—	37.7	—	33.3	—	—	—	—	—
TLP-A200-450-Dxxx2x	3000	—	65.3	—	—	—	48.3	—	40.5	—	35.8	—	—	—	—	—
TLP-A200-550-Dxxx2x	3000	—	65.0	—	—	—	48.1	—	40.3	—	35.6	—	—	—	—	—
TLP-A200-750-Dxxx2x	2500	—	69.8	—	—	—	51.7	—	43.3	—	38.2	—	—	—	—	—
TLP-A235-11K-Dxxx2x	2000	65.0	—	48.1	—	—	40.3	35.6	—	—	—	—	—	—	—	—
TLP-A235-15K-Dxxx2x	2000	77.7	—	57.5	—	—	48.2	42.6	—	—	—	—	—	—	—	—

(1) 1.0 kgf = 2.2 lbf or 9.8 N.

**Axial Load Force Ratings (zero radial load) for Non-brake Motors**

Motor Cat. No. <sup>(1)</sup>	Speed, max rpm	RPM														
		500 kgf	750 kgf	1000 kgf	1125 kgf	1250 kgf	1500 kgf	2000 kgf	2250 kgf	2500 kgf	3000 kgf	3375 kgf	3750 kgf	4500 kgf	5000 kgf	6000 kgf
TLP-A046-005-Dxxx2x	6000	—	—	—	—	—	7.8	—	—	—	5.7	—	—	4.8	—	4.2
TLP-A046-010-Dxxx2x	6000	—	—	—	—	—	7.8	—	—	—	5.7	—	—	4.8	—	4.2
TLP-A070-020-Dxxx2x	6000	—	—	—	—	—	15.4	—	—	—	11.4	—	—	9.5	—	8.4
TLP-A070-040-Dxxx2x	6000	—	—	—	—	—	15.4	—	—	—	11.4	—	—	9.5	—	8.4
TLP-A090-075-Dxxx2x	6000	—	—	—	—	—	20.4	—	—	—	15.1	—	—	12.6	—	11.1
TLP-A100-100-Dxxx2x	3000	—	27.5	—	—	—	20.4	—	17.1	—	15.1	—	—	—	—	—
TLP-A115-100-Dxxx2x	5000	—	—	—	—	27.9	—	—	—	20.6	—	—	17.3	—	15.3	—
TLP-A115-200-Dxxx2x	5000	—	—	—	—	27.9	—	—	—	20.6	—	—	17.3	—	15.3	—
TLP-A145-050-Dxxx2x	3000	—	56.4	—	—	—	41.7	—	35.0	—	30.9	—	—	—	—	—
TLP-A145-090-Dxxx2x	2000	67.2	—	49.7	—	—	41.7	36.8	—	—	—	—	—	—	—	—
TLP-A145-100-Dxxx2x	3000	—	56.4	—	—	—	41.7	—	35.0	—	30.9	—	—	—	—	—
TLP-A145-150-Dxxx2x	3000	—	56.4	—	—	—	41.7	—	35.0	—	30.9	—	—	—	—	—
TLP-A200-200-Dxxx2x	3000	—	91.9	—	—	—	68.0	—	57.0	—	50.3	—	—	—	—	—
TLP-A200-300-Dxxx2x	2500	—	91.9	—	—	—	68.0	—	57.0	—	50.3	—	—	—	—	—



**Axial Load Force Ratings (zero radial load) for Non-brake Motors (continued)**

Motor Cat. No. <sup>(1)</sup>	Speed, max rpm	RPM														
		500 kgf	750 kgf	1000 kgf	1125 kgf	1250 kgf	1500 kgf	2000 kgf	2250 kgf	2500 kgf	3000 kgf	3375 kgf	3750 kgf	4500 kgf	5000 kgf	6000 kgf
TLP-A200-350-Dxxx2x	3000	—	91.9	—	—	—	68.0	—	57.0	—	50.3	—	—	—	—	—
TLP-A200-450-Dxxx2x	3000	—	91.9	—	—	—	68.0	—	57.0	—	50.3	—	—	—	—	—
TLP-A200-550-Dxxx2x	3000	—	91.9	—	—	—	68.0	—	57.0	—	50.3	—	—	—	—	—
TLP-A200-750-Dxxx2x	2500	—	91.9	—	—	—	68.0	—	57.0	—	50.3	—	—	—	—	—
TLP-A235-11K-Dxxx2x	2000	136.5	—	101.0	—	—	84.7	74.8	—	—	—	—	—	—	—	—
TLP-A235-15K-Dxxx2x	2000	136.5	—	101.0	—	—	84.7	74.8	—	—	—	—	—	—	—	—

(1) 1.0 kgf = 2.2 lbf or 9.8 N.

**Radial Load Force Ratings (maximum) for Brake Motors**

Motor Cat. No. <sup>(1)</sup>	Speed, max rpm	RPM														
		500 kgf	750 kgf	1000 kgf	1125 kgf	1250 kgf	1500 kgf	2000 kgf	2250 kgf	2500 kgf	3000 kgf	3375 kgf	3750 kgf	4500 kgf	5000 kgf	6000 kgf
TLP-A046-005-Dxxx4x	6000	—	—	—	—	—	10.5	—	—	—	8.4	—	—	7.3	—	6.6
TLP-A046-010-Dxxx4x	6000	—	—	—	—	—	10.9	—	—	—	8.7	—	—	7.6	—	6.9
TLP-A070-020-Dxxx4x	6000	—	—	—	—	—	26	—	—	—	20.6	—	—	18	—	16.4
TLP-A070-040-Dxxx4x	6000	—	—	—	—	—	27.3	—	—	—	21.7	—	—	18.9	—	17.2
TLP-A090-075-Dxxx4x	6000	—	—	—	—	—	39.3	—	—	—	31.2	—	—	27.2	—	24.7
TLP-A100-100-Dxxx4x	3000	—	65.3	—	—	—	51.8	—	45.3	—	41.1	—	—	—	—	—
TLP-A115-100-Dxxx4x	5000	—	—	—	—	57.9	—	—	—	45.9	—	—	40.1	—	36.4	—
TLP-A115-200-Dxxx4x	5000	—	—	—	—	60.3	—	—	—	47.8	—	—	41.8	—	38	—
TLP-A145-050-Dxxx4x	3000	—	120.3	—	—	—	95.5	—	83.4	—	75.8	—	—	—	—	—
TLP-A145-090-Dxxx4x	2000	142.1	—	112.8	—	—	98.5	89.5	—	—	—	—	—	—	—	—
TLP-A145-100-Dxxx4x	3000	—	120.3	—	—	—	95.5	—	83.4	—	75.8	—	—	—	—	—
TLP-A145-150-Dxxx4x	3000	—	124.1	—	—	—	98.5	—	86	—	78.2	—	—	—	—	—
TLP-A200-200-Dxxx4x	3000	—	140.4	—	—	—	111.4	—	97.3	—	88.4	—	—	—	—	—
TLP-A200-300-Dxxx4x	2500	—	149.7	—	—	—	118.8	—	103.8	—	94.3	—	—	—	—	—
TLP-A200-350-Dxxx4x	3000	—	149.7	—	—	—	118.8	—	103.8	—	94.3	—	—	—	—	—
TLP-A200-450-Dxxx4x	3000	—	158.8	—	—	—	126.1	—	110.1	—	100.1	—	—	—	—	—
TLP-A200-550-Dxxx4x	3000	—	154.8	—	—	—	122.9	—	107.3	—	97.5	—	—	—	—	—
TLP-A200-750-Dxxx4x	2500	—	163.3	—	—	—	129.6	—	113.2	—	102.9	—	—	—	—	—
TLP-A235-11K-Dxxx4x	2000	458.3	—	363.8	—	—	317.8	288.7	—	—	—	—	—	—	—	—
TLP-A235-15K-Dxxx4x	2000	478.8	—	380	—	—	332	301.6	—	—	—	—	—	—	—	—

(1) 1.0 kgf = 2.2 lbf or 9.8 N.

**Axial Load Force Ratings (maximum radial load) for Brake Motors**

Motor Cat. No. <sup>(1)</sup>	Speed, max rpm	RPM														
		500 kgf	750 kgf	1000 kgf	1125 kgf	1250 kgf	1500 kgf	2000 kgf	2250 kgf	2500 kgf	3000 kgf	3375 kgf	3750 kgf	4500 kgf	5000 kgf	6000 kgf
TLP-A046-005-Dxxx4x	6000	—	—	—	—	—	6.7	—	—	—	5	—	—	4.2	—	3.7
TLP-A046-010-Dxxx4x	6000	—	—	—	—	—	6.9	—	—	—	5.1	—	—	4.3	—	3.8
TLP-A070-020-Dxxx4x	6000	—	—	—	—	—	11.7	—	—	—	8.7	—	—	7.3	—	6.4
TLP-A070-040-Dxxx4x	6000	—	—	—	—	—	12.3	—	—	—	9.1	—	—	7.6	—	6.7
TLP-A090-075-Dxxx4x	6000	—	—	—	—	—	15.3	—	—	—	11.3	—	—	9.5	—	8.4
TLP-A100-100-Dxxx4x	3000	—	20.1	—	—	—	14.9	—	12.5	—	11	—	—	—	—	—
TLP-A115-100-Dxxx4x	5000	—	—	—	—	20.3	—	—	—	15	—	—	12.6	—	11.1	—
TLP-A115-200-Dxxx4x	5000	—	—	—	—	21.5	—	—	—	15.9	—	—	13.3	—	11.8	—
TLP-A145-050-Dxxx4x	3000	—	34.2	—	—	—	25.3	—	21.2	—	18.7	—	—	—	—	—
TLP-A145-090-Dxxx4x	2000	42.9	—	31.8	—	—	26.6	23.5	—	—	—	—	—	—	—	—
TLP-A145-100-Dxxx4x	3000	—	34.2	—	—	—	25.3	—	21.2	—	18.7	—	—	—	—	—
TLP-A145-150-Dxxx4x	3000	—	36	—	—	—	26.6	—	22.3	—	19.7	—	—	—	—	—
TLP-A200-200-Dxxx4x	3000	—	60.9	—	—	—	45.1	—	37.8	—	33.4	—	—	—	—	—
TLP-A200-300-Dxxx4x	2500	—	65.3	—	—	—	48.3	—	40.5	—	35.8	—	—	—	—	—
TLP-A200-350-Dxxx4x	3000	—	65.3	—	—	—	48.3	—	40.5	—	35.8	—	—	—	—	—
TLP-A200-450-Dxxx4x	3000	—	69.6	—	—	—	51.5	—	43.2	—	38.1	—	—	—	—	—
TLP-A200-550-Dxxx4x	3000	—	67.7	—	—	—	50.1	—	42	—	37.1	—	—	—	—	—
TLP-A200-750-Dxxx4x	2500	—	71.7	—	—	—	53.1	—	44.5	—	39.3	—	—	—	—	—
TLP-A235-11K-Dxxx4x	2000	75.5	—	55.9	—	—	46.8	41.3	—	—	—	—	—	—	—	—
TLP-A235-15K-Dxxx4x	2000	85	—	62.9	—	—	52.8	46.6	—	—	—	—	—	—	—	—

(1) 1.0 kgf = 2.2 lbf or 9.8 N.

**Axial Load Force Ratings (zero radial load) for Brake Motors**

Motor Cat. No. <sup>(1)</sup>	Speed, max rpm	RPM														
		500 kgf	750 kgf	1000 kgf	1125 kgf	1250 kgf	1500 kgf	2000 kgf	2250 kgf	2500 kgf	3000 kgf	3375 kgf	3750 kgf	4500 kgf	5000 kgf	6000 kgf
TLP-A046-005-Dxxx4x	6000	–	–	–	–	–	8.1	–	–	–	6	–	–	5.0	–	4.4
TLP-A046-010-Dxxx4x	6000	–	–	–	–	–	8.1	–	–	–	6	–	–	5.0	–	4.4
TLP-A070-020-Dxxx4x	6000	–	–	–	–	–	15.4	–	–	–	11.4	–	–	9.5	–	8.4
TLP-A070-040-Dxxx4x	6000	–	–	–	–	–	15.4	–	–	–	11.4	–	–	9.5	–	8.4
TLP-A090-075-Dxxx4x	6000	–	–	–	–	–	20.4	–	–	–	15.1	–	–	12.6	–	11.1
TLP-A100-100-Dxxx4x	3000	–	27.5	–	–	–	20.4	–	17.1	–	15.1	–	–	–	–	–
TLP-A115-100-Dxxx4x	5000	–	–	–	–	27.9	–	–	–	20.6	–	–	17.3	–	15.3	–
TLP-A115-200-Dxxx4x	5000	–	–	–	–	27.9	–	–	–	20.6	–	–	17.3	–	15.3	–
TLP-A145-050-Dxxx4x	3000	–	56.4	–	–	–	41.7	–	35.0	–	30.9	–	–	–	–	–
TLP-A145-090-Dxxx4x	2000	67.2	–	49.7	–	–	41.7	36.8	–	–	–	–	–	–	–	–
TLP-A145-100-Dxxx4x	3000	–	56.4	–	–	–	41.7	–	35.0	–	30.9	–	–	–	–	–
TLP-A145-150-Dxxx4x	3000	–	56.4	–	–	–	41.7	–	35.0	–	30.9	–	–	–	–	–
TLP-A200-200-Dxxx4x	3000	–	91.9	–	–	–	68.0	–	57.0	–	50.3	–	–	–	–	–
TLP-A200-300-Dxxx4x	2500	–	91.9	–	–	–	68.0	–	57.0	–	50.3	–	–	–	–	–
TLP-A200-350-Dxxx4x	3000	–	91.9	–	–	–	68.0	–	57.0	–	50.3	–	–	–	–	–
TLP-A200-450-Dxxx4x	3000	–	91.9	–	–	–	68.0	–	57.0	–	50.3	–	–	–	–	–
TLP-A200-550-Dxxx4x	3000	–	91.9	–	–	–	68.0	–	57.0	–	50.3	–	–	–	–	–
TLP-A200-750-Dxxx4x	2500	–	91.9	–	–	–	68.0	–	57.0	–	50.3	–	–	–	–	–
TLP-A235-11K-Dxxx4x	2000	136.5	–	101.0	–	–	84.7	74.8	–	–	–	–	–	–	–	–
TLP-A235-15K-Dxxx4x	2000	136.5	–	101.0	–	–	84.7	74.8	–	–	–	–	–	–	–	–

(1) 1.0 kgf = 2.2 lbf or 9.8 N.

## Environmental Specifications

Always store motors in a clean and dry location within the environmental conditions.

### Environmental Specifications

Attribute	Value
Temperature, operating	0...40 °C (32...104 °F)
Temperature, storage	-10...+80 °C (-14...+176 °F)
Relative humidity	20...95% noncondensing

### Environmental Ratings

Kinetix TLP Motors	IP Rating <sup>(1)</sup>	Dust Protection	Liquid Protection
On-motor cable connectors.	IP30	Protection from objects with a diameter of 2.5 mm (0.098 in.) or more.	No protection from liquids.
Motor with shaft seal and Bulletin 2090 environmentally sealed cable connectors.	IP65 <sup>(2)</sup>	Total protection from dust.	Protected against low-pressure jets of water from all directions.

(1) IP rating descriptions are for reference only. Refer to the international standards for more complete rating descriptions.

(2) IP40 without shaft seal installed.

## Motor Accessories

The following accessories are available for Kinetix TLP servo motors.

### 2090-Series Motor Cables

Factory manufactured feedback, power, and brake cables are available in standard cable lengths. They provide the sealing that is needed to achieve environmental ratings and shield termination. If you choose to build your own cables, connector kits available for Kinetix TLP motors are described in the Kinetix Motion Accessories Specifications Technical Data, publication [KNX-TD004](#)

Contact your nearest Rockwell Automation sales office or refer to the Kinetix Motion Accessories Technical Data, publication [KNX-TD004](#), for information about available 2090-Series cables for Kinetix TLP motors

### Shaft Seal Kits

Shaft seal kits are available, as are replacement kits for field installation. A shaft seal provides a barrier that prevents moisture and particles from entering the motor bearings. Shaft seals are made of nitrile and kits and require lubrication to reduce wear.

#### IMPORTANT

Shaft seals are subject to wear and require periodic inspection and replacement. Replacement is recommended every 3 months, not to exceed 12 months, depending on use.

### Shaft Seal Kit Selection

Motor Cat. No.	Shaft Seal Kit Cat. No.
TLP-A046	TLP-SSN-F046
TLP-A070	TLP-SSN-F070
TLP-A090	TLP-SSN-F090
TLP-A100	TLP-SSN-F100

Motor Cat. No.	Shaft Seal Kit Cat. No.
TLP-A115	TLP-SSN-F115
TLP-A145	TLP-SSN-F145
TLP-A200	TLP-SSN-F200
TLP-A235	TLP-SSN-F235

See Shaft Seal Kits for Kinetix TLP Installation Instructions, publication [2090-IN044](#), for instructions on how to install a shaft seal.