Y-Series Motor Conversions

Catalog Numbers
Y-1002-2, Y-1003-2, Y-2006-2, Y-2012-2, Y-3023-2

Publication Y-TD001A-EN-P — April 2008

About This Publication

This publication provides a migration path for replacing your Y-Series motor with a TL-Series (Bulletin TLY) servo motor. Included are mounting and wiring differences between the motor families. Also included are motor specifications and drive/motor system performance specifications for your Y-Series to TL-Series conversion.

This publication is written specifically for systems converting from Y-Series motors paired with Kinetix 2000, Kinetix 6000, and Ultra3000 drives.

ATTENTION

While executing the migration, a risk assessment should be conducted to make sure that all task-hazard combinations have been identified and addressed. The risk assessment may require additional circuitry to reduce the risk to an acceptable level.

Additional Resources, on page 23, contains publication numbers for the Kinetix Motion Control Selection Guide, the Motion Analyzer CD, and the drive manuals you will need to complete your Y-Series to TL-Series motor conversion.

About Converting from Y-Series Motors

You can reuse your existing Y-Series motor power and feedback cables with the TL-Series (Bulletin TLY) motors. The Bulletin TLY cables, designed specifically for use with TL-Series (Bulletin TLY) motors, are also available as replacements or for use with additional axes.

Y-Series Motor Conversion Cables

Y-Series Motor Cables (Bulletin TLY motor compatible)			TL-Series (Bulletin TLY) Motor Cables	
Cable Type	**Cable Cat. No.**		**Cable Type**	**Cable Cat. No.**
Incremental feedback	2090-XXNFY-S*xx* (flying-leads at drive end)	-->	Incremental feedback	2090-CFBM6DF-CBAA*xx* (flying-leads at drive end)
	2090-UXNFBY-S*xx* (connector at drive end)	-->		2090-CFBM6DD-CCAA*xx* (connector at drive end)
Power (only)	N/A	-->	Power (only)	2090-CPWM6DF-16AA*xx*
Power with brake wires	2090-XXNPY-16S*xx* or 2090-UXNPAY-16S*xx*	-->	Power with brake wires	2090-CPBM6DF-16AA*xx*

For each TL-Series motor/drive combination, you need a connector kit to terminate the flying-lead motor feedback cable.

TL-Series Motor Connector Kits

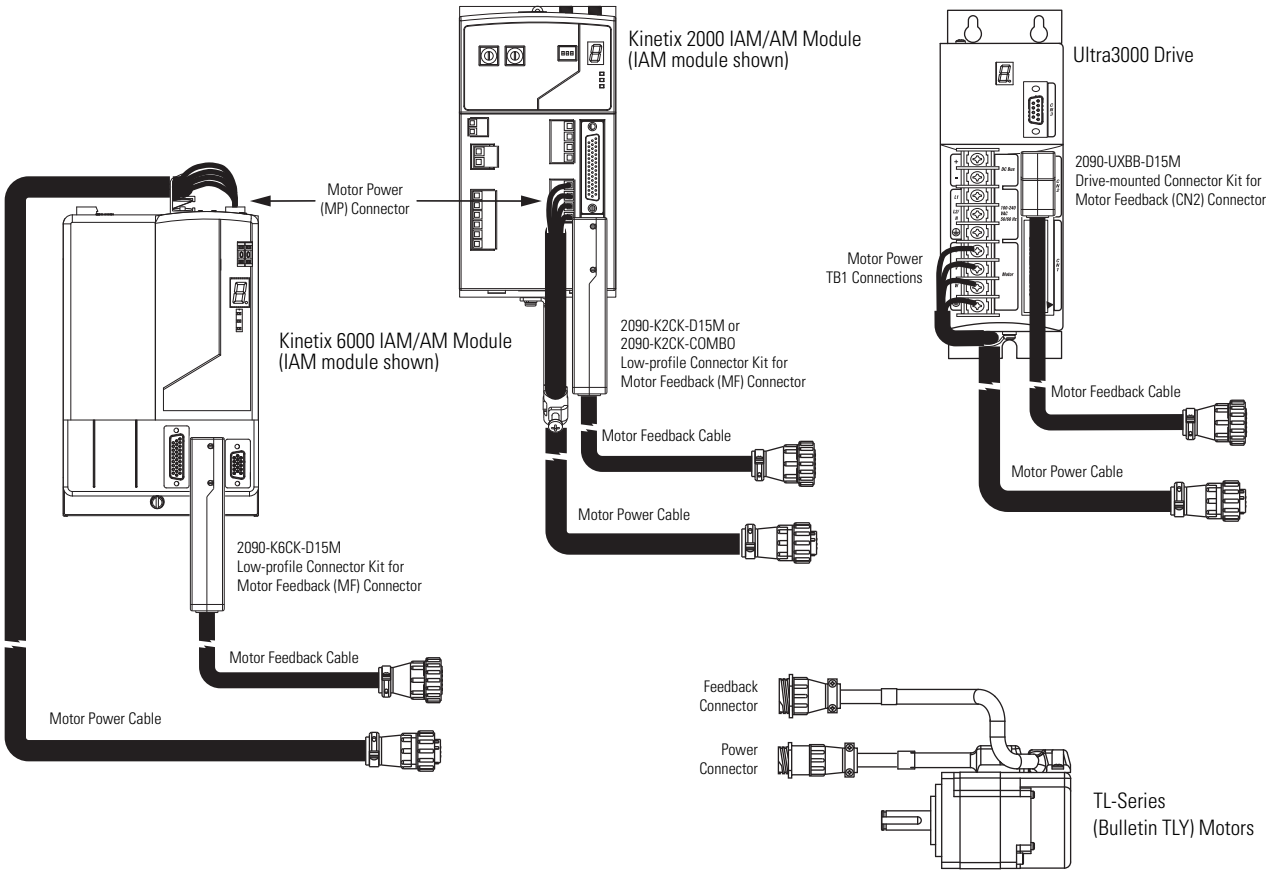
Servo Drive Family	Connector Kit Cat. No.	Cable Type	Feedback Cable Cat. No.
Kinetix 2000	2090-K2CK-D15M (1)	Incremental feedback	2090-CFBM6DF-CBAA*xx* or 2090-XXNFY-S*xx* (flying-leads at drive end)
	2090-K2CK-COMBO (1)	Incremental feedback and I/O	
Kinetix 6000	2090-K6CK-D15M	Incremental feedback	
Ultra3000	2090-UXBB-D15M		

(1) Battery backup is not required for incremental feedback applications.

System Overview with TL-Series Motors

The TL-Series (Bulletin TLY) motors are low-inertia high-performance servo motors featuring metric frame sizes. They combine a compact size with a high-torque density afforded by their superior stator design. The result is a package that provides substantial power in a small footprint. When used with the Kinetix 2000, Kinetix 6000, or Ultra3000 drives, the TL-Series motors are able to offer the benefits of Kinetix Integrated Motion.

Typical Configuration - Servo Drives with TL-Series Motors



Y-Series to TL-Series Motor Conversions

Use this table as a starting point for your Y-Series to TL-Series motor conversion. Find your Y-Series motor catalog number and read across to determine the TL-Series motor with the best possible conversion solution.

Y-Series to TL-Series Motor Conversions

Y-Series Motors			TL-Series (Bulletin TLY) Motors	
Cat. No.	**Description**		**Cat. No.**	**Description**
Y-1002-2-H00AA	No brake	--->	TLY-A120T-HK62AA	No brake
Y-1002-2-H04AA	Brake	--->	TLY-A120T-HK64AA	Brake
Y-1003-2-H00AA	No brake	--->	TLY-A130T-HK62AA	No brake
Y-1003-2-H04AA	Brake	--->	TLY-A130T-HK64AA	Brake
Y-2006-2-H00AA	No brake	--->	TLY-A220T-HK62AA	No brake
Y-2006-2-H04AA	Brake	--->	TLY-A220T-HK64AA	Brake
Y-2012-2-H00AA	No brake	--->	TLY-A230T-HK62AA	No brake
Y-2012-2-H04AA	Brake	--->	TLY-A230T-HK64AA	Brake
Y-3023-2-H00AA	No brake	--->	TLY-A2540P-HK62AA	No brake
Y-3023-2-H04AA	Brake	--->	TLY-A2540P-HK64AA	Brake

Use these tables to find your Y-Series motor catalog number and compare the significant differences in specifications to the TL-Series motor beneath it.

Y-10*xx* to TLY-A1*xx*T-H Motor Specifications Summary

Motor	**Brake Option**	**Rated Speed** RPM	**Cont. Torque** Nm (lb-in)	**Peak Torque** Nm (lb-in)	**Motor Rated Output** kW	**Rotor Inertia** kg-m^2 (lb-in-s^2)	**Shaft Dia.** mm (in.)	**Pilot Dia.** mm (in.)	**Bolt Circle Dia.** mm (in.)	**Bolt Hole Dia.** mm (in.)	**Flange** mm (in.)	**Motor Length** mm (in.)
Y-1002-2-H00AA	No brake	4500	0.17 (1.5)	0.48 (4.3)	0.069	0.0000031 (0.000027)	8.0 (0.31)	30.0 (1.18)	46.0 (1.81)	4.5 (0.18)	40.0 (1.57)	95.0 (3.74)
TLY-A120T-HK62AA		6000	0.181 (1.60)	0.36 (3.20)	0.086	0.000002 (0.000018)						84.5 (3.33)
Y-1002-2-H04AA	Brake	4500	0.17 (1.5)	0.48 (4.3)	0.069	0.0000039 (0.000034)						133.5 (5.26)
TLY-A120T-HK64AA		6000	0.163 (1.44)	0.36 (3.20)	0.077	0.000005 (0.000044)						120.1 (4.73)
Y-1003-2-H00AA	No brake	5000	0.35 (3.1)	0.97 (8.6)	0.12	0.0000051 (0.000045)						113.0 (4.45)
TLY-A130T-HK62AA		6000	0.325 (2.88)	0.76 (6.70)	0.14	0.000003 (0.000027)						98.5 (3.88)
Y-1003-2-H04AA	Brake	5000	0.35 (3.1)	0.97 (8.6)	0.12	0.0000059 (0.000052)						151.5 (5.96)
TLY-A130T-HK64AA		6000	0.293 (2.59)	0.76 (6.70)	0.13	0.000006 (0.000053)						134.1 (5.28)

Y-20*xx* to TLY-A2*xx*T-H Motor Specifications Summary

Motor	Brake Option	Rated Speed RPM	Cont. Torque Nm (lb-in)	Peak Torque Nm (lb-in)	Motor Rated Output kW	Rotor Inertia kg-m^2 (lb-in-s^2)	Shaft Dia. mm (in.)	Pilot Dia. mm (in.)	Bolt Circle Dia. mm (in.)	Bolt Hole Dia. mm (in.)	Flange mm (in.)	Motor Length mm (in.)
Y-2006-2-H00AA	No brake	5000	0.69 (6.1)	1.92 (17.0)	0.23	0.000015 (0.00013)	14.0 (0.55)	50.0 (1.97)	70.0 (2.76)	5.5 (0.22)	60.0 (2.36)	125.5 (4.94)
TLY-A220T-HK62AA		6000	0.836 (7.40)	1.48 (13.1)	0.35	0.000018 (0.00016)	12.0 (0.47)					106.1 (4.18)
Y-2006-2-H04AA	Brake	5000	0.69 (6.1)	1.92 (17.0)	0.23	0.000020 (0.00018)	14.0 (0.55)					163.5 (6.44)
TLY-A220T-HK64AA		6000	0.757 (6.70)	1.48 (13.1)	0.24	0.000028 (0.00025)	12.0 (0.47)					140.7 (5.54)
Y-2012-2-H00AA	No brake	4500	1.4 (12.0)	3.8 (33.7)	0.51	0.000026 (0.00023)	14.0 (0.55)					153.5 (6.04)
TLY-A230T-HK62AA		6000	1.30 (11.50)	3.05 (27.0)	0.44	0.000034 (0.00030)	12.0 (0.47)					128.0 (5.04)
Y-2012-2-H04AA	Brake	4500	1.4 (12.0)	3.8 (33.7)	0.51	0.000032 (0.00028)	14.0 (0.55)					191.5 (7.54)
TLY-A230T-HK64AA		6000	1.16 (10.3)	3.05 (27.0)	0.32	0.000044 (0.00039)	12.0 (0.47)					162.6 (6.40)

Y-3023 to TLY-A2540P-H Motor Specifications Summary

Motor	Brake Option	Rated Speed RPM	Cont. Torque Nm (lb-in)	Peak Torque Nm (lb-in)	Motor Rated Output kW	Rotor Inertia kg-m^2 (lb-in-s^2)	Shaft Dia. mm (in.)	Pilot Dia. mm (in.)	Bolt Circle Dia. mm (in.)	Bolt Hole Dia. mm (in.)	Flange mm (in.)	Motor Length mm (in.)
Y-3023-2-H00AA	No brake	4500	2.5 (22.5)	7.10 (63.0)	0.91	0.000064 (0.00056)	16.0 (0.63)	70.0 (2.76)	90.0 (3.54)	6.6 (0.26)	80.0 (3.15)	180.0 (7.09)
TLY-A2540P-HK62AA		5000	2.94 (26.0)		0.86	0.00011 (0.00096)		80.0 (3.15)				143.7 (5.66)
Y-3023-2-H04AA	Brake	4500	2.5 (22.5)		0.91	0.000069 (0.00061)		70.0 (2.76)				220.5 (8.68)
TLY-A2540P-HK64AA		5000	2.94 (26.0)		0.66	0.00013 (0.0012)		80.0 (3.15)				180.3 (7.10)

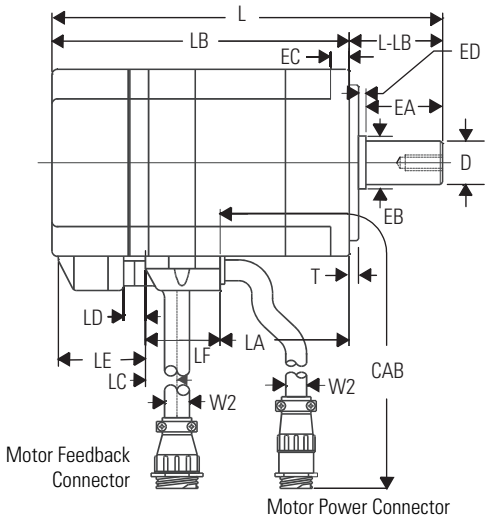
IMPORTANT If your drive system software doesn't include the Bulletin TLY motors in the motion database, you'll need to update your database before configuring the motor and drive properties.

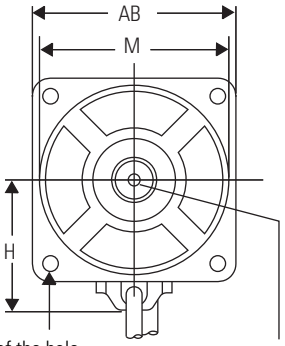
Refer to Reconfigure Your Software on page 14 for more information.

Y-Series Motor Dimensions

These drawings illustrate the mounting dimensions for the Y-Series motors.

Y-Series Motor Dimensions





S is the diameter of the hole.
SS is the diameter of the bolt circle.

Shaft End Threaded Hole
Y-2006, Y-2012, Y-3023:
Thread - M5 x 0.8 mm (0.0315 in.)
Thread Depth - 12 mm (0.47 in.)

LA, LC, LD, LE, LF, W1, and W2 are Supplemental Y-Series Motor Dimensions on page 7.

Y-Series Motor Dimensions

Motor	AB [3] mm (in.)	CAB [7] mm (in.)	D mm (in.)	EA [2] mm (in.)	EB [2] mm (in.)	EC [3] mm (in.)	ED mm (in.)	H [5] mm (in.)	L mm (in.)	LB [5] with Brake mm (in.)	LB [5] mm (in.)	L-LB [4] mm (in.)	M mm (in.)	S [1] mm (in.)	SS [1] mm (in.)	T [2] mm (in.)
Y-1002	40 (1.58)	1100 (43.34)	8 [8] (0.31)	–	–	5 (0.20)	–	30 (1.18)	95 (3.74)	108.5 (4.27)	70 (2.75)	25 (0.98)	30 (1.18)	4.5 (0.18)	46 (1.81)	2.5 (0.10)
Y-1003	40 (1.58)	1100 (43.34)	8 [8] (0.31)	–	–	5 (0.20)	–	30 (1.18)	113 (4.45)	126.5 (4.98)	88 (3.46)	25 (0.98)	30 (1.18)	4.5 (0.18)	46 (1.81)	2.5 (0.10)
Y-2006	60 (2.36)	1100 (43.34)	14 [9] (0.55)	–	–	6 (0.24)	–	41 (1.61)	125.5 (4.94)	133.5 (5.3)	95.5 (3.76)	30 (1.18)	50 (1.97)	5.5 (0.22)	70 (2.75)	3.0 (0.12)
Y-2012	60 (2.36)	1100 (43.34)	14 [9] (0.55)	–	–	6 (0.24)	–	41 (1.61)	153.5 (6.04)	161.5 (6.36)	123.5 (4.87)	30 (1.18)	50 (1.97)	5.5 (0.22)	70 (2.75)	3.0 (0.12)
Y-3023	80 (3.15)	1100 (43.34)	16 [9] (0.63)	35 (1.38)	19.5 (0.77)	8 (0.31)	2.0 (0.08)	52 (2.05)	180 (7.09)	180.5 (7.11)	140 (5.57)	40 (1.57)	70 (2.75)	6.6 (0.26)	90 (3.54)	3.0 (0.12)

(1) Tolerance is ±0.2 mm (±0.00788 in.).
(2) Tolerance is ±0.3 mm (±0.01182 in.).
(3) Tolerance is ±0.5 mm (±0.0197 in.).
(4) Tolerance is ±0.8 mm (±0.03152 in.).
(5) Tolerance is ±1.0 mm (±0.0394 in.).
(6 Tolerance is ±2.0 mm (±0.0788 in.).
(7) Tolerance is ±100 mm (±3.94 in.).
(8) Tolerance is –0.009 mm (–0.0004 in.).
(9) Tolerance is –0.011 mm (–0.0004 in.).

Motors are designed to metric dimensions. Inch dimensions are approximate conversions from millimeters.

Supplemental Y-Series Motor Dimensions

Motor	LA [2] mm (in.)	LC [1] [2] mm (in.)	LC [1] [2] (Brake) m (in.)	LD [2] mm (in.)	LD [2] (Brake) mm (in.)	LE [4] mm (in.)	LE [1] [4] (Brake) mm (in.)	LF [5] mm (in.)	W1 [5] mm (in.)	W2 [5] mm (in.)
Y-1002	23.5 (0.90)	17.5 (0.7)	56 (2.2)	–	–	–	–	21.5 (0.84)	6 (0.24)	8 (0.32)
Y-1003	41.5 (1.60)									
Y-2006		–	–	7 (0.28)	45 (1.77)	28 (1.1)	66 (2.6)	24 (0.95)	6.7 (0.27)	
Y-2012	69.5 (2.7)									
Y-3023	80.5 (3.2)						68.5 (2.7)	30 (1.2)		

1 Measurement is to the center of the perpendicular motor encoder cable. Motor encoder cable exits perpendicular to the frame on Y-1002 and Y-1003 motors (not as shown).

2 Tolerance is ±2.0 mm (±0.0788 in.).

3 Tolerance is ±0.5 mm (±0.0197 in.).

4 Tolerance is ±2.5 mm (±0.0985 in.).

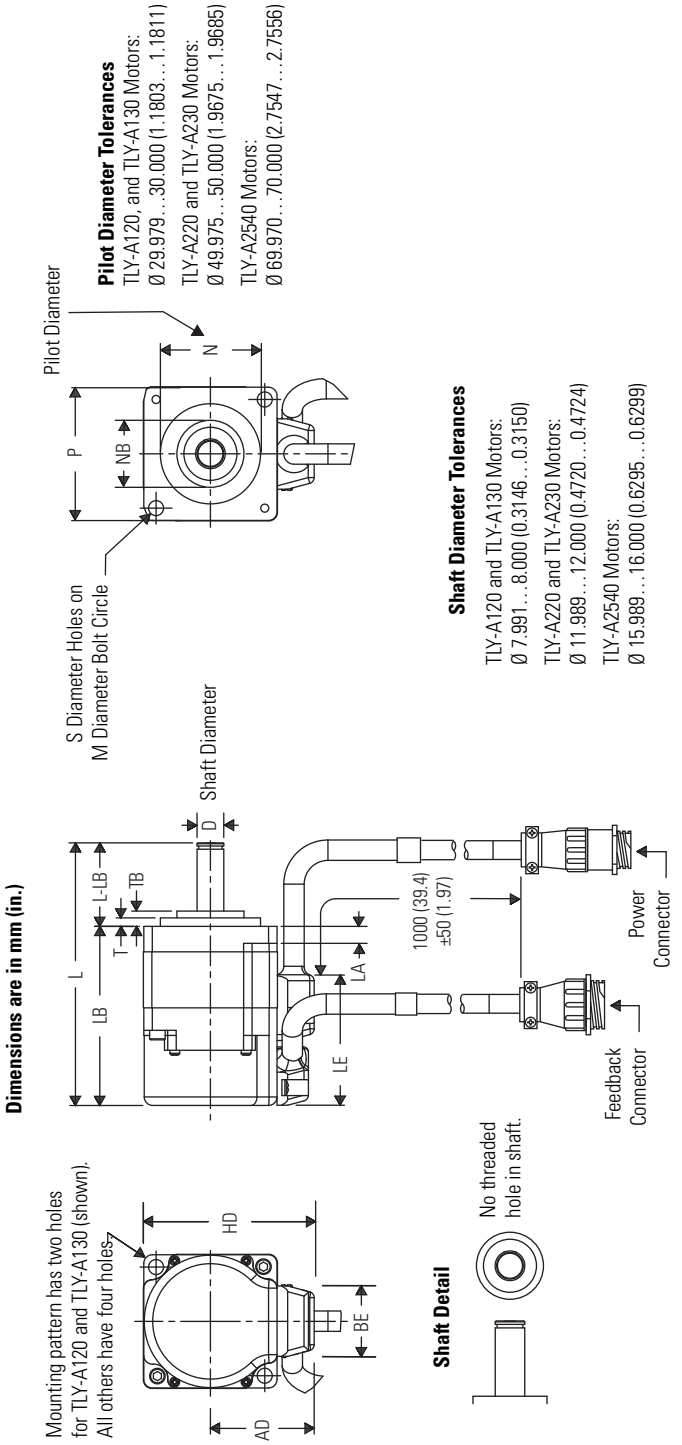
5 Tolerance is ±1.0 mm (±0.0394 in.).

Motors are designed to metric dimensions. Inch dimensions are approximate conversions from millimeters.

TL-Series Motor Dimensions

These drawings illustrate the mounting dimensions for the TL-Series (Bulletin TLY) metric motors.

TL-Series Motor Dimensions (TLY-A*xxxx*-HK6*x*AA)



Shaft, Pilot, and Keyway Tolerances	TLY-A1*xx*	TLY-A2*xx*	TLY-A25*xx*
Shaft Runout (T.I.R.)	0.02 (0.001)	0.02 (0.001)	0.02 (0.001)
Pilot Eccentricity (T.I.R.)	0.06 (0.0024)	0.06 (0.0024)	0.06 (0.0024)
Max Face Runout (T.I.R.)	0.07 (0.003)	0.07 (0.003)	0.07 (0.003)

TL-Series Motor Dimensions (TLY-A*xxxx*-HK6*x*AA)

Motor Series TLY-	**AD** mm (in.)	**BE** mm (in.)	**D** mm (in.)	**HD** mm (in.)	**L** [1] mm (in.)	**L-LB** [2] mm (in.)	**LA** mm (in.)	**LB** [1] mm (in.)	**LE** [1] mm (in.)	**M** mm (in.)	**N** mm (in.)	**NB** mm (in.)	**P** mm (in.)	**S** mm (in.)	**T** mm (in.)	**TB** mm (in.)
A120	31.1 (1.22)	21.0 (0.83)	8.0 (0.31)	51.1 (2.01)	84.5 (3.33)	25.0 (0.98)	5.0 (0.20)	59.5 (2.34)	39.1 (1.54)	46.0 (1.81)	30.0 (1.18)	20.0 (0.79)	40.0 (1.57)	4.5 (0.18)	2.5 (0.10)	4.5 (0.18)
A130					98.5 (3.88)			73.5 (2.89)								
A220	43.0 (1.69)	27.6 (1.09)	12.0 (0.47)	73.0 (2.87)	106.1 (4.18)	30.0 (1.18)	6.0 (0.24)	76.1 (3.00)	42.8 (1.69)	70.0 (2.76)	50.0 (1.97)	27.0 (1.06)	60.0 (2.36)	5.5 (0.22)	3.0 (0.12)	7.0 (0.28)
A230					128.0 (5.04)			98.1 (3.86)								
A2540	53.0 (2.09)	27.6 (1.09)	16.0 (0.63)	93.0 (3.66)	143.7 (5.66)	35.0 (1.38)	8.0 (0.32)	108.7 (4.28)	43.8 (1.72)	90.0 (3.54)	70.0 (2.76)	34.0 (1.34)	80.0 (3.15)	6.6 (0.26)	3.0 (0.12)	7.0 (0.28)

(1) If ordering an TLY-A120 or TLY-A130 motor with brake, add 35.6 mm (1.40 in.) to dimensions L, LB, and LE.

If ordering an TLY-A220 or TLY-A230 motor with brake, add 34.6 mm (1.36 in.) to dimensions L, LB, and LE.

If ordering an TLY-A2540 motor with brake, add 36.6 mm (1.44 in.) to dimensions L, LB, and LE.

(2) Tolerance for this dimension is ±1.0 mm (±0.039 in.).

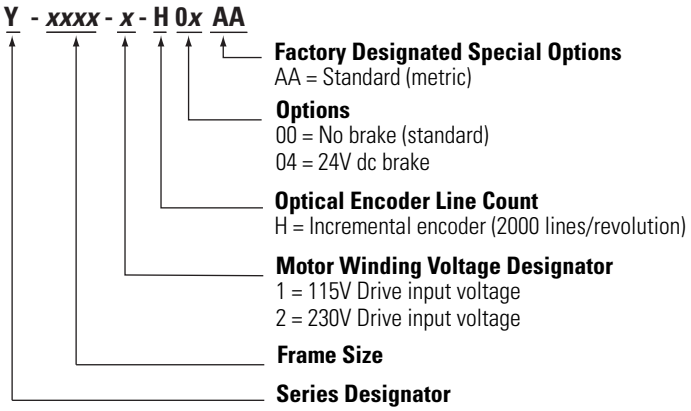
Motors are designed to metric dimensions. Inch dimensions are approximate conversions from millimeters. Dimensions without tolerances are for reference.

Publication Y-TD001A-EN-P — April 2008

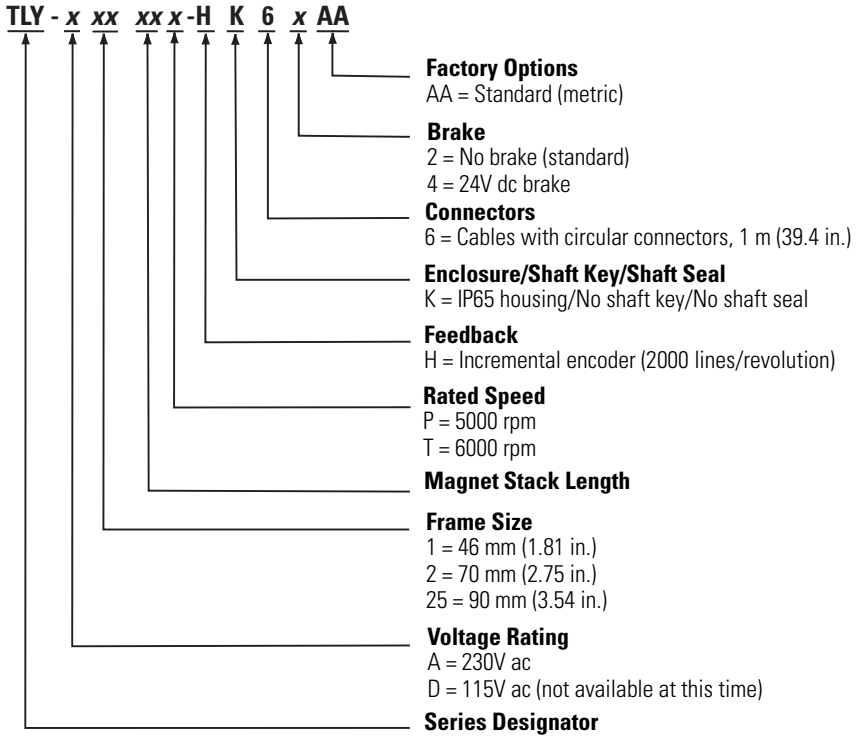
Catalog Number Explanations

Catalog numbers consist of various characters, each of which identifies a specific version or option for that component. Use these configuration charts to understand the Y-Series and TL-Series motor catalog numbers.

Y-Series Motor Catalog Numbers



TL-Series Motor Catalog Numbers



Wiring Motor Power

Wiring motor power connections for TL-Series motors is identical to the Y-Series motors. For motor/drive wiring diagrams, refer to the documentation that came with your drive, or Additional Resources on page 23.

This table provides pinouts for wiring motor power drive-end connections using the 2090-CPWM6DF-16AA*xx* feedback cable.

Motor Power Connections (motor power only)

Servo Motor	Kinetix 2000 and Kinetix 6000 IAM/AM Modules		Ultra3000 Drives	
TL-Series	**Pin**	**Signal**	**Pin**	**Signal**
U / Brown	MP-1	U	TB1	U
V / Black	MP-2	V	TB1	V
W / Blue	MP-3	W	TB1	W
⏚ Yellow/Green	MP-4	⏚	⏚	⏚

This table provides pinouts for wiring motor power and brake drive-end connections using any of these cables:

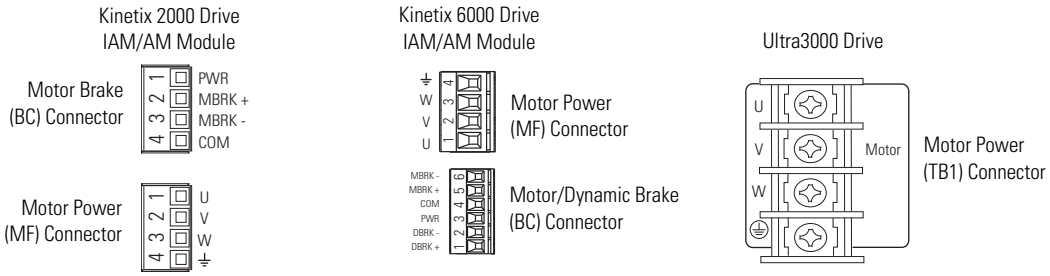
- 2090-CPBM6DF-16AA*xx*
- 2090-XXNPY-16S*xx*
- 2090-UXNPAY-16S*x*

Motor Power Connections (motor power and brake)

Y-Series Servo Motors		TL-Series Servo Motors	Kinetix 2000 IAM/AM Modules		Kinetix 6000 IAM/AM Modules		Ultra3000 Drives	
Wire / Color		**Wire / Color**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1 / Black	--->	U / Brown	MP-1	U	MP-1	U	TB1	U
2 / Black	--->	V / Black	MP-2	V	MP-2	V	TB1	V
3 / Black	--->	W / Blue	MP-3	W	MP-3	W	TB1	W
Green/Yellow	--->	⏚ Yellow/Green	MP-4	⏚	MP-4	⏚	⏚	⏚
7 / White	--->	7 / White	BC-2	MBRK+	BC-5	MBRK+	CN1-43 (1)	Relay Output +
9 / Black	--->	9 / Black	BC-3	MPRK-	BC-6	MPRK-	CN1-44 (1)	Relay Output -

(1) Refer to Ultra3000 Integration Manual, publication 2098-IN005, for additional motor brake circuitry required between the Ultra3000 drive and motor with brake.

Motor Power and Brake Connectors



Wiring Motor Feedback

Wiring motor feedback connections for TL-Series motors is identical to the Y-Series motors. For motor/drive wiring diagrams, refer to the documentation that came with your drive, or Additional Resources on page 23.

This table provides pinouts for wiring the TL-Series motor feedback connector.

Motor Feedback Pinouts

Y-Series or TL-Series Motor (1) Connector Pin	Incremental Feedback Signal	Wire Color (2)	Drive (3) Connector Kit Pin
9	AM+	Black	1
10	AM-	White/Black	2
11	BM+	Red	3
12	BM-	White/Red	4
13	IM+	Green	5
14	IM-	White/Green	10
15	S1	White/Blue	12
17	S2	Yellow (4)	13
19	S3	White/Yellow (5)	8
22	EPWR_5V	Grey	14
23	ECOM	White/Grey	6
24	Shield	–	Connector Housing

(1) All other motor connector pins are reserved.

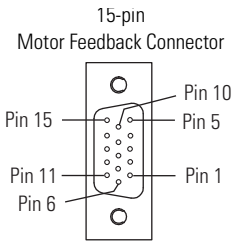
(2) Wire colors for 2090-CFBM6DF-CBAA*xx* cable is shown.

(3) Motor feedback drive connector is MF for Kinetix 2000 and Kinetix 6000 drives, and CN2 for Ultra3000 drives.

(4) Wire color for 2090-XXNFY-S*xx* feedback cable (pin 17) is blue.

(5) Wire color for 2090-XXNFY-S*xx* feedback cable (pin 19) is brown.

Motor Feedback Connector



Y-Series to TL-Series Motor Conversion Example

These procedures assume that you have your equivalent TL-Series (Bulletin TLY) motor (refer to Y-Series to TL-Series Motor Conversions on page 4) and are ready for installation.

Refer to the TL-Series Servo Motors Installation Instructions, publication TL-IN003, for additional installation information.

Remove and Replace Your Y-Series Motor

Follow these steps to remove and replace your Y-Series motor.

1. Remove three-phase power from the servo drive that controls your Y-Series motor.
2. Disconnect the motor power cable from your Y-Series motor.
3. Disconnect the motor feedback cable from your Y-Series motor.
4. Remove the Y-Series motor from the machine.
5. Install your new TL-Series motor.
6. Reconnect the motor power cable to your new TL-Series motor.

   Refer to Wiring Motor Power on page 11.
7. Reconnect the motor feedback cable to your TL-Series motor.

   Refer to Wiring Motor Feedback on page 12.
8. Go to Reconfigure Your Software, on page 14, to reconfigure your software for the new drive/motor combination.

Reconfigure Your Software

If Bulletin TLY motors are not selectable in your drive/motor configuration software, your motion database requires updating.

Refer to the table below for the software used to configure your drive and motor. If you determine that your motion database does not include the TLY-A*xxxx* motors, go to the Rockwell Automation Knowledgebase website, http://www.rockwellautomation.com/knowledgebase and search for Adding Bulletin TLY Motors to the Motion Database (ID 50909).

Drive/Motor Configuration Software

Drive Family	Drive Type	Software
Kinetix 2000	SERCOS	RSLogix 5000
Kinetix 6000		
Ultra3000	SERCOS	
	Analog	Ultraware and RSLogix 5000 (1)
	DeviceNet	Ultraware and RSNetWorx
	DeviceNet with Indexing	
	Indexing	Ultraware
Ultra 100 and Ultra 200 Series	All drive types	Ultra Master

(1) Use RSLogix 5000 software when the 1756-M02AE analog module controls the Ultra3000 drive.

Refer to Additional Resources on page 23 for the appropriate user manual to further configure the software for your motor conversion.

Y-Series Motor Specifications

This section provides motor performance, motor brake, motor weight, and load-force rating specifications for the Y-Series motors.

Y-Series Motor Performance Specifications

Y-Series motors are available with 230V windings.

Y-Series (230V) Performance Specifications

Motor	Max Speed rpm	Continuous Stall Torque Nm (lb-in)	Peak Stall Torque Nm (lb-in)	Motor Rated Output kW	Rotor Inertia (1) kg-m^2 (lb-in-s^2)
Y-1002-2	4500	0.17 (1.5)	0.48 (4.3)	0.069	0.0000031 (0.000027)
Y-1003-2	5000	0.35 (3.1)	0.97 (8.6)	0.12	0.0000051 (0.000045)
Y-2006-2	5000	0.69 (6.1)	1.92 (17)	0.23	0.000015 (0.00013)
Y-2012-2	4500	1.4 (12)	3.8 (33.7)	0.51	0.000026 (0.00023)
Y-3023-2	4500	2.5 (22.5)	7.1 (63)	0.91	0.000064 (0.00056)

(1) Refer to Y-Series Motor Brake Specifications for Brake Motor Inertia.

Y-Series Motor Brake Specifications

Motor	Holding Torque Nm (lb-in)	Coil Current at 24V dc A	Brake Motor Inertia kg-m^2 (lb-in-s^2)	Brake Motor Weight kg (lb)
Y-1002	(0.157) 1.39	0.26	0.0000039 (0.000034)	0.5 (1.1)
Y-1003	(0.32) 2.83		0.0000059 (0.000052)	0.7 (1.5)
Y-2006	(0.637) 5.64	0.31	0.000020 (0.00018)	1.3 (2.9)
Y-2012	(1.274) 11.24		0.000032 (0.00028)	1.9 (4.1)
Y-3023	(2.38) 21.06	0.37	0.000069 (0.00061)	3.5 (7.8)

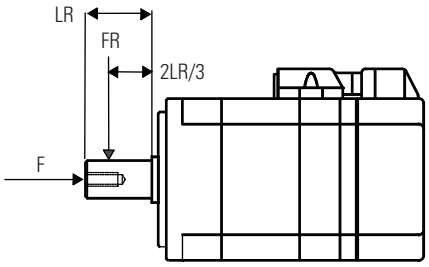
Y-Series Weight Specifications

Motor	Motor Weight, Approx. kg (lb)
Y-1002	0.5 (1.1)
Y-1003	0.7 (1.5)
Y-2006	1.3 (2.9)
Y-2012	1.9 (4.1)
Y-3023	3.5 (7.8)

Y-Series Motor Load-force Ratings

Y-Series motors are capable of operating with the maximum radial or axial shaft loads as listed. Radial loads listed are applied in the middle of the shaft extension. The table represents an L_{10} bearing-fatigue life of 20,000 hours. This 20,000-hour life does not account for possible application-specific life reduction that may occur due to bearing grease contamination from external sources.

Location on Shaft Where Rating Is Applied



Y-Series Motor Load Forces

Motor Series	Shaft Radial Load (FR) [1] kg (lb)	Axial Load (F) [1] kg (lb)
Y-1002	10 (22.05)	3 (6.615)
Y-1003		
Y-2006	20 (44.1)	8 (17.64)
Y-2012	25 (55.125)	10 (22.05)
Y-3023	35 (77.175)	20 (44.1)

(1) The FR and F refer to loads applied as shown in the drawing above.

TL-Series Motor Specifications

This section provides motor performance specifications for the TL-Series motors.

TL-Series Motor Performance Specifications

These tables provide performance specifications for TL-Series motors with and without holding brakes.

TL-Series (Non-brake) Motor Performance Specifications

Motor	Max Speed rpm	Continuous Stall Torque Nm (lb-in)	Peak Stall Torque Nm (lb-in)	Motor Rated Output kW	Speed at Motor Rated Output rpm	Rotor Inertia kg-m^2 (lb-in-s^2)
TLY-A120T	6000	0.181 (1.60)	0.36 (3.20)	0.086	5000	0.000002 (0.000018)
TLY-A130T		0.325 (2.88)	0.76 (6.70)	0.14	5000	0.000003 (0.000027)
TLY-A220T		0.836 (7.40)	1.48 (13.1)	0.35	5000	0.000018 (0.00016)
TLY-A230T		1.30 (11.50)	3.05 (27.0)	0.44	5000	0.000034 (0.00030)
TLY-A2540P	5000	2.94 (26.0)	7.10 (63.0)	0.86	4575	0.00011 (0.00096)

TL-Series (Brake) Motor Performance Specifications

Motor	Max Speed rpm	Continuous Stall Torque Nm (lb-in)	Peak Stall Torque Nm (lb-in)	Motor Rated Output kW	Speed at Motor Rated Output rpm	Rotor Inertia kg-m^2 (lb-in-s^2)
TLY-A120T	6000	0.163 (1.44)	0.36 (3.20)	0.077	5000	0.000005 (0.000044)
TLY-A130T		0.293 (2.59)	0.76 (6.70)	0.13	5000	0.000006 (0.000053)
TLY-A220T		0.757 (6.70)	1.48 (13.1)	0.24	5000	0.000028 (0.00025)
TLY-A230T		1.16 (10.3)	3.05 (27.0)	0.32	4250	0.000044 (0.00039)
TLY-A2540P	5000	2.94 (26.0)	7.10 (63.0)	0.66	3750	0.00013 (0.0012)

TL-Series Motor Brake Specifications

Motor	Max Backlash (brake engaged) arc minutes	Holding Torque Nm (lb-in)	Coil Current at 24V dc A	Brake Response Time		
				Release ms	Engage (using external arc suppression device)	
					MOV ms	Diode ms
TLY-A120T	60	0.32 (2.8)	0.18…0.22	21	7	40
TLY-A130T						
TLY-A220T		1.24 (11.0)	0.333…0.407	22	13	73
TLY-A230T						
TLY-A2540P		2.5 (22.0)	0.351…0.429	42	14	86

TL-Series Mechanical Specifications

These tables provide shaft-seal dimensions and motor weights for the TL-Series motors.

TL-Series Motor Shaft Seal Kit Dimensions

Motor Series	Catalog Number	Inside Diameter mm (in.)	Outside Diameter mm (in.)	Width mm (in.)
TLY-A1*xx*	TL-SSN-1	8.9 (0.35)	16 (0.71)	3 (0.12)
TLY-A2*xx*	TL-SSN-2	14 (0.55)	24 (0.95)	5 (0.20)
TLY-A25*xx*	TL-SSN-3	19.8 (0.78)	30 (1.18)	5 (0.20)

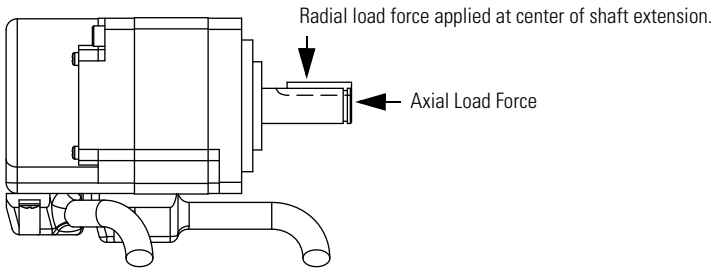
TL-Series Motor Weight Specifications

Motor	High Resolution Feedback Option		Incremental Feedback Option	
	Motor Weight, Approx. kg (lb)	Brake Motor Weight, Approx. kg (lb)	Motor Weight, Approx. kg (lb)	Brake Motor Weight, Approx. kg (lb)
TLY-A120T	0.34 (0.75)	0.59 (1.3)	0.35 (0.78)	0.59 (1.3)
TLY-A130T	0.46 (1.0)	0.68 (1.5)	0.50 (1.1)	0.68 (1.5)
TLY-A220T	0.95 (2.1)	1.4 (3.0)	1.1 (2.4)	1.5 (3.4)
TLY-A230T	1.4 (3.0)	1.8 (4.0)	1.5 (3.3)	2.0 (4.4)
TLY-A2540P	2.6 (5.7)	3.5 (7.7)	2.6 (5.8)	3.5 (7.7)

TL-Series (Bulletin TLY) Motor Load-force Ratings

TL-Series motors are capable of operating with the maximum radial or maximum axial shaft loads as listed. Radial loads listed are applied in the middle of the shaft extension. The tables represent an L_{10} bearing-fatigue life of 20,000 hours. This 20,000-hour life does not account for possible application-specific life reduction that may occur due to bearing grease contamination from external sources. Maximum operating speed is limited by motor winding.

Location on Shaft Where Rating Is Applied



Radial Load Force Ratings

Motor Series	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	4500 rpm kg (lb)	5000 rpm kg (lb)
TLY-A120T	12 (26)	10 (21)	8 (18)	–	7 (15)
TLY-A130T	13 (29)	10 (23)	9 (20)	–	8 (17)
TLY-A220T	27 (60)	22 (48)	19 (42)	–	16 (35)
TLY-A230T	31 (68)	24 (54)	21 (47)	–	18 (40)
TLY-A2540P	50 (110)	39 (87)	34 (76)	–	29 (64)

Axial Load Force Ratings (maximum radial load)

Motor Series	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	4500 rpm kg (lb)	5000 rpm kg (lb)
TLY-A120T	9 (20)	7 (16)	5 (12)	–	5 (10)
TLY-A130T	10 (22)	8 (17)	6 (13)	–	5 (11)
TLY-A220T	15 (32)	11 (24)	9 (20)	–	7 (16)
TLY-A230T	15 (34)	12 (26)	10 (21)	–	8 (17)
TLY-A2540P	18 (39)	13 (29)	11 (25)	–	9 (20)

Axial Load Force Ratings (zero radial load)

Motor Series	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	4500 rpm kg (lb)	5000 rpm kg (lb)
TLY-A120T	12 (26)	9 (20)	7 (16)	–	6
TLY-A130T	12 (26)	9 (20)	7 (16)	–	6
TLY-A220T	19 (41)	14 (30)	11 (25)	–	9
TLY-A230T	19 (41)	14 (30)	11 (25)	–	9
TLY-A2540P	23 (50)	17 (37)	14 (31)	–	11

Motor and Drive Cable Compatibility

This section provides motor/drive cable compatibility information for your Y-Series to TL-Series motor conversion.

Y-Series Motors

Cat. No.	Drive Compatibility	Feedback Type	Motor Feedback Cable
Y-1002 and Y-1003, Y-2006 and Y-2012, Y-3023	2093-AC05-MP*x* or 2093-AM*xx* 2094-AC*xx*-M*xx*-S or 2094-AM*xx*-S 2098-DSD-*xxx*	Incremental	2090-XXNFY-S*xx* (flying leads) or 2090-UXNFBY-S*xx* (premolded connector)

Cat. No.	Motor Power Cable
Y-1002 and Y-1003, Y-2006 and Y-2012, Y-3023	2090-XXNPY-16S*xx* or 2090-UXNPAY-16S*xx* (power and brake)

IMPORTANT The power and motor feedback cables used with Y-Series motors are all compatible with TLY-A*xxxxx*-H (Bulletin TLY) motors.

TL-Series Low Inertia Motors

Cat. No.	Drive Compatibility	Feedback Type	Motor Feedback Cable
TLY-A120T-H, TLY-A130T-H, TLY-A220T-H, TLY-A230T-H, TLY-A2540P-H	2093-AC05-MP*x* or 2093-AM*xx* (1) 2094-AC*xx*-M*xx*-S or 2094-AM*xx*-S (2) 2098-DSD-*xxx* (3)	Incremental	2090-CFBM6DF-CBAA*xx* (flying lead) or 2090-CFBM6DD-CCAA*xx* (premolded connector)

(1) Use low-profile motor feedback connector kit (catalog number 2090-K2CK-D15M) and panel-mounted breakout-board kit (catalog number 2090-U3BK-D44*xx*) or motor feedback and I/O connector kit (catalog number 2090-K2CK-COMBO) on drive end.

(2) Use low-profile connector kit (catalog number 2090-K6CK-D15M) or panel-mounted breakout-board kit (catalog number 2090-UXBK-D15*xx*) on drive end.

(3) Use drive-mounted connector kit (catalog number 2090-UXBB-D15M) or panel-mounted breakout-board kit (catalog number 2090-UXBK-D15*xx*) on drive end.

Cat. No.	Motor Power Cable
TLY-A120T-H, TLY-A130T-H, TLY-A220T-H, TLY-A230T-H, TLY-A2540P-H	2090-CPBM6DF-16AA*xx* (power and brake) 2090-CPWM6DF-16AA*xx* (power without brake)

IMPORTANT Order these cables for additional TL-Series (Bulletin TLY) axes or if you are replacing the cables from your Y-Series motor/drive combination.

Drive/Motor System Combinations

This section provides drive/motor system combinations for your Y-Series to TL-Series motor conversion.

Y-Series Motors/Drive System Performance Specifications

These tables represent typical performance when the Y-Series (230V) motors are paired with Kinetix 2000, Kinetix 6000, or Ultra3000 drives.

Y-Series (230V) Motor/Drive Combinations

Motor	Kinetix 2000 IAM/AM Module	Kinetix 6000 IAM/AM Module	Ultra3000 Drive Module
Y-1002-2	2093-AMP2	2094-AMP5	2098-DSD-005
Y-1003-2	2093-AMP2	2094-AMP5	2098-DSD-005
Y-2006-2	2093-AM01	2094-AM01	2098-DSD-010
Y-2012-2	2093-AM01	2094-AM01	2098-DSD-010
Y-3023-2	2093-AM02	2094-AM02	2098-DSD-020

Y-Series (230V) Motor/Drive Performance Specifications

Motor [1]	Max Speed rpm	System Continuous Stall Current A 0-pk	System Continuous Stall Torque Nm (lb-in)	System Peak Stall Current A 0-pk	System Peak Stall Torque Nm (lb-in)	Motor Rated Output kW
Y-1002-2	4500	1.2	0.17 (1.5)	4.6	0.48 (4.2)	0.06
Y-1003-2	4500	1.8	0.35 (3.1)	5.0	0.96 (8.5)	0.1
Y-2006-2	5000	3.6	0.69 (6.1)	9.0	1.9 (16.8)	0.25
Y-2012-2	4500	4.1	1.4 (12.4)	11.3	3.8 (33.6)	0.5
Y-3023-2	4500	8.7	2.55 (22.5)	23.7	7.2 (63.7)	0.95

(1) Performance specification data and curves reflect nominal system performance of a typical system with motor at 40 °C (104 °F) and drive at 50 °C (122 °F) ambient and rated line voltage. For additional information on ambient and line conditions, refer to Motion Analyzer CD, version 4.2 or later.

TL-Series Motors/Drive System Performance Specifications

These tables represent typical performance when the TL-Series motors are paired with Kinetix 2000, Kinetix 6000, or Ultra3000 drives.

TL-Series Motor/Drive Combinations

Motor	Kinetix 2000 IAM/AM Module	Kinetix 6000 IAM/AM Module	Ultra3000 Drive Module
TLY-A120T	2093-AMP1	2094-AMP5	2098-DSD-005
TLY-A130T	2093-AMP2	2094-AMP5	2098-DSD-005
TLY-A220T	2093-AMP5	2094-AMP5	2098-DSD-010
TLY-A230T	2093-AM01	2094-AM01	2098-DSD-020
TLY-A2540P	2093-AM02	2094-AM02	2098-DSD-020

TL-Series (Non-brake) Motor/Drive System Performance Specifications

Motor [1]	Max Speed rpm	System Continuous Stall Current A 0-pk	System Continuous Stall Torque Nm (lb-in)	System Peak Stall Current A 0-pk	System Peak Torque Nm (lb-in)	Motor Rated Output kW
TLY-A120T	6000	1.03	0.181 (1.60)	2.50	0.36 (3.20)	0.086
TLY-A130T		1.85	0.325 (2.88)	4.90	0.76 (6.70)	0.14
TLY-A220T		3.50	0.836 (7.40)	7.90	1.48 (13.1)	0.35
TLY-A230T		5.50	1.30 (11.5)	15.5	3.05 (27.0)	0.44
TLY-A2540P	5000	10.0	2.94 (26.0)	24.8	7.10 (63.0)	0.86

(1) Performance specification data and curves reflect nominal system performance of a typical system with motor at 40 °C (104 °F) and drive at 50 °C (122 °F) ambient and rated line voltage. For additional information on ambient and line conditions, refer to Motion Analyzer CD, version 4.2 or later.

TL-Series (Brake) Motor/Drive System Performance Specifications

Motor [1]	Max Speed rpm	System Continuous Stall Current A 0-pk	System Continuous Stall Torque Nm (lb-in)	System Peak Stall Current A 0-pk	System Peak Torque Nm (lb-in)	Motor Rated Output kW
TLY-A120T	6000	0.93	0.163 (1.44)	2.50	0.36 (3.20)	0.077
TLY-A130T		1.67	0.293 (2.59)	4.90	0.76 (6.70)	0.13
TLY-A220T		3.15	0.757 (6.70)	7.90	1.48 (13.1)	0.24
TLY-A230T		4.95	1.16 (10.3)	15.5	3.05 (27.0)	0.32
TLY-A2540P	5000	10.0	2.94 (26.0)	24.8	7.10 (63.0)	0.66

(1) Performance specification data and curves reflect nominal system performance of a typical system with motor at 40 °C (104 °F) and drive at 50 °C (122 °F) ambient and rated line voltage. For additional information on ambient and line conditions, refer to Motion Analyzer CD, version 4.2 or later.

Additional Resources

These documents contain additional information concerning related Rockwell Automation products.

Resource	Description
TL-Series Servo Motor Installation Instructions, publication TL-IN003	Information for installing and wiring your TL-Series servo motor, including motor specifications and dimension drawings.
Y-Series Servo Motor Installation Instructions, publication 1398-IN518	Information for installing and wiring your Y-Series servo motor, including motor specifications and dimension drawings.
Kinetix 2000 Multi-axis Servo Drive User Manual, publication 2093-UM001	Information on installing, configuring, startup, troubleshooting, and applications for your Kinetix 2000 servo drive system.
Kinetix 6000 Multi-axis Servo Drive User Manual, publication 2094-UM001	Information on installing, configuring, startup, troubleshooting, and applications for your Kinetix 6000 servo drive system.
Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003	Information on installing, troubleshooting, and applications for your Ultra3000 digital servo drives.
Ultra3000 Digital Servo Drive Integration Manual, publication 2098-IN005	Information on configuring, startup, troubleshooting, and applications for your Ultra3000 digital servo drives.
ULTRA 100 Series Drives Installation Manual, publication 1398-5.2	Information on installing, configuring, startup, troubleshooting, and applications for your ULTRA 100 Series servo drives.
ULTRA 200 Digital Servo Drives User Manual, publication 1398-5.0	Information on installing, configuring, startup, troubleshooting, and applications for your ULTRA 200 digital servo drives.
Kinetix Motion Control Selection Guide, publication GMC-SG001	Product specifications and motor/drive system combinations with torque/speed curves for selecting Kinetix Motion Control drives, motors, and accessory items.
Motion Analyzer CD, publication PST-SG003	Drive and motor sizing with application analysis software.
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.
EMC Noise Management DVD, publication GMC-SP004	
Motion Modules in Logix5000 Control Systems User Manual, publication LOGIX-UM002	Information for configuring and troubleshooting your ControlLogix and CompactLogix SERCOS interface modules.
Ultraware User Manual, publication 2098-UM001	Information for operating and configuring your Ultra3000 drive in analog and indexing applications.
Rockwell Automation Configuration and Selection Tools, website http://ab.com/e-tools	Online product selection and system configuration tools, including AutoCAD (DXF) drawings.
Rockwell Automation Product Certification website, http://www.ab.com	For declarations of conformity (DoC) currently available from Rockwell Automation.
National Electrical Code, published by the National Fire Protection Association of Boston, MA	An article on wire sizes and types for grounding electrical equipment.
Allen-Bradley Industrial Automation Glossary, publication AG-7.1	A glossary of industrial automation terms and abbreviations.

You can view or download publications at http://literature.rockwellautomation.com. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://support.rockwellautomation.com you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States	1.440.646.3434 Monday – Friday, 8 a.m. – 5 p.m. EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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Publication Y-TD001A-EN-P — April 2008