

Compumotor DR-1045B-230*1C

Dynaserv Direct-Drive Servo



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Dynaserv DR Series



Direct-Drive Brushless Servo Systems

CE (LVD and EMC*)

The Dynaserv DR Series provides the user with a high-performance direct-drive servo system with resolver feedback. Each of the thirteen models includes a direct-drive motor, integral resolver, microprocessor-based drive and a 10-foot motor-to-drive cable.

The DR Series motor is brushless and without gears allowing for long, maintenance-free operation. The cross roller bearing design can support up to 4 tons of compression load and 370 ft-lbs of overhung load. The center hole in the motor is up to 6 inches in diameter and can be used to simplify system wiring.

The user can elect to operate the DR Series in either a position, velocity or torque mode. In the position mode, the drive accepts step and direction input from any Compumotor indexer or user-supplied pulse source. Operating in the velocity mode requires a $\pm 10\text{VDC}$ input and torque mode requires a $\pm 8.5\text{VDC}$ input.

High performance closed loop operation is obtained with a sophisticated I-PD digital and analog control algorithm. The analog velocity loop provides high bandwidth for excellent system response. The digital position loop simplifies position control and optimizes system accuracy. A built-in test mode and position/velocity monitors allow for convenient and efficient tuning.

The DR Drive is fully protected against open and short circuits, overcurrent, overvoltage and overtemperature. A seven segment LED indicator provide the user with the status and diagnostic information from the front panel.

Features

- Brushless direct drive motor with 10 foot cable
- 20 models available in 4-, 6-, 8- or 10-inch diameters
- Resolver feedback
- Torques to 370 ft-lbs (500 Nm)
- Resolutions to 819,200 steps/rev
- Supports 4 tons of compression load

- Microprocessor control of I-PD control algorithm
- Analog velocity loop/digital position loop
- Built-in test mode for easy tuning
- Diagnostic LED display
- Step and direction input/position control
- $\pm 10\text{V}$ for velocity control, $\pm 8.5\text{V}$ for torque control
- Gain settings can be changed "on the fly"
- Configurable position accuracy to reduce system settling time
- Complete system, ready for operation
- Also compatible with M2 controller/drive

Accessories

- **Compumotor Controllers**
The Dynaserv is compatible with all Compumotor controllers
- **Bases**
Mounting bases to simplify mounting to a flat surface (DR-B Series only)
- **Dynamic Braking**
Capacitor type or Speed-switching type for each motor size
- **Precision Machining**
Axial and radial run-out of .01, .02 or .005 mm is available on most Dynaserv models. Standard axial and radial run-out for all motors is 0.1 mm
- **Mechanical Braking**
Most motors can be ordered with mechanical brakes for power down, or emergency use. Not available with DR-1008B and DR-E series
- DR5000B and DR5000C Series only: line filters for CE installations
- Interface cables for use with Compumotor's 6K and 6000 Series controllers

* EMC with proper filter and installation procedures.

Specifications

Parameter	Value
Performance	Repeatability: ± 5 arc-sec, ± 10 arc-sec for DR5000B and DR5000C Accuracy: ± 30 arc-sec DRA Series ± 45 arc-sec, ± 90 arc-sec for DR5000B, DRB, DRE and DR5000A Series Max stepping rate: 1,600,000 steps/sec
Power	Volts (se note): ± 50 arc-sec for DR5000C Range: +10% to -15% Current: 20 amps max
Inputs	Command interface: • Step input: Low going low pulse, 150 nanoseconds minimum pulse width • Direction: Logic high = CW rotation Logic low = CCW rotation Analog input: $\pm 10V$ command signal for velocity control, $\pm 8.5V$ command signal for torque control
Outputs	Encoder output: A/B encoder output 400 kHz max
Environmental	Driver 13.2 lb (6 kg), 24 lb (11 kg) DR5000A 32° to 122° F (0° to 50°C) -4° to 185° F (-20° to 85°C) 20 to 90% noncondensing No corrosive gases. Dust free atmosphere. The Dynaserv is not waterproof, oil proof or dust proof. Motor See Table Below 32° to 113° F max (0° to 45°C) -4° to 185° F (-20° to 85°C) 20 to 85% noncondensing

NOTE: Volts 115VAC 1 phase, all except DR5000A/B; 230VAC 1 phase, all except DR5000A; 200VAC 3 phase, DR5000A

DR Series Motor Data

		Model 1008B	Model 1015B	Model 1030B	Model 1045B	Model 1060B	Model 1070E	Model 1100E	Model 1130E	Model 1160E
Peak torque	ft-lbs (Nm)	6 (8)	11 (15)	22 (30)	33 (45)	44 (60)	52 (70)	74 (100)	96 (130)	118 (160)
Rated speed, 115/230VAC	rps	2.0/2.0	2.0/2.0	1.5/2.0	1.0/2.0	1.0/1.5	1.5/2.0	1.0/1.5	0.5/1.0	0.5/1.0
Maximum power consumption	KVA	0.7	1.0	1.8	1.8	1.8	2.0	2.3	2.5	2.8
Rotor inertia	oz-in ² x 10 ² (Kgm ² x 10 ⁻³)	7.9 (15)	11 (21)	13 (24)	14 (26)	18 (33)	46 (85)	55 (100)	68 (125)	77 (140)
Max resolution		507,904	507,904	507,904	507,904	507,904	614,400	614,400	614,400	614,400
Motor weight*	lbs (kg)	13 (6)	20 (9)	24 (11)	29 (13)	35 (16)	49 (22)	57 (26)	70 (32)	79 (36)
Maximum static axial load**										
• Compression	lbs	6,744	6,744	6,744	6,744	6,744	8,992	8,992	8,992	8,992
• Tension	lbs	2,248	2,248	2,248	2,248	2,248	4,496	4,496	4,496	4,496
Maximum static overhung load**	ft-lb	148	148	148	148	148	295	295	295	295

DR Series Motor Data

		Model 1100A	Model 1200A	Model 1300A	Model 1400A
Peak torque	ft-lbs (Nm)	74 (100)	148 (200)	221 (300)	295 (400)
Rated speed, 115/230VAC	rps	1.0/1.0	0.5/1.0	0.25/0.5	0.25/0.5
Maximum power consumption, 115/230VAC	KVA	2.5	3.0	3.2	3.2
Rotor inertia	oz-in ² x 10 ² (Kgm ² x 10 ⁻³)	109 (200)	156 (285)	186 (340)	219 (400)
Maximum resolution		819,200	819,200	819,200	819,200
Motor weight*	lbs (kg)	68 (31)	101 (46)	125 (57)	150 (68)
Maximum static axial load**					
• Compression	lbs	8,992	8,992	8,992	8,992
• Tension	lbs	4,496	4,496	4,496	4,496
Maximum Static Overhung Load*	ft-lb	295	295	295	295

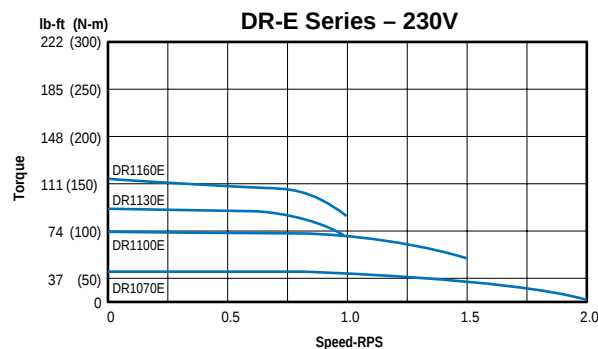
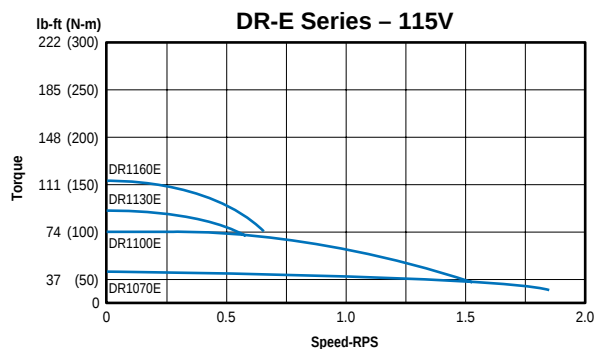
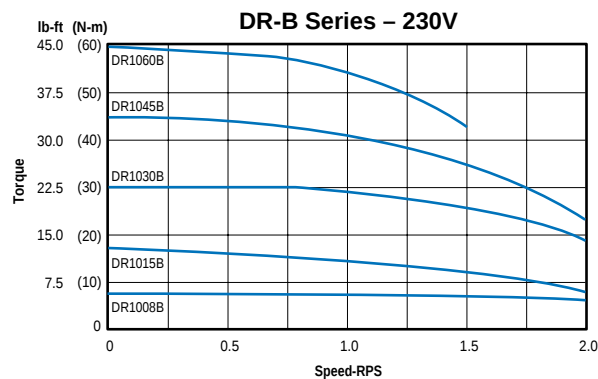
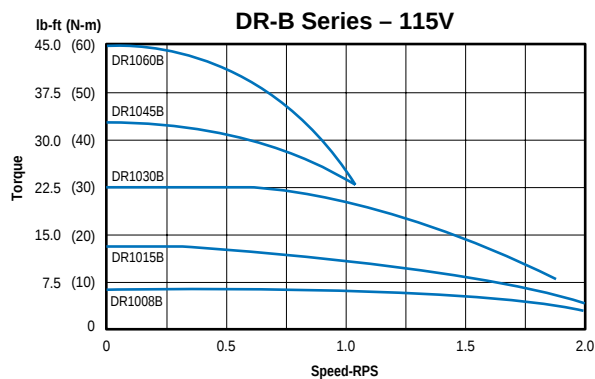
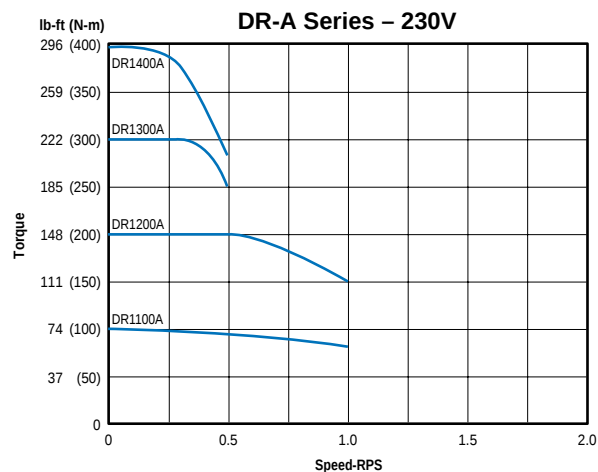
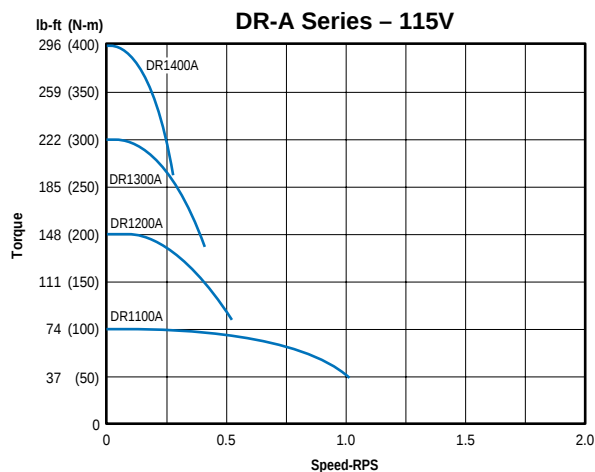
** When designing a system, de-rate the maximum load to the values shown below:

Application	De-rate Factor
Smooth, rotary motion	1/3
Intermittent press loading	1/5
Repetitive shock loading	1/10

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Motor Speed-Torque Performance Curves

The speed-torque curves represent peak torque available, continuous torques are approximately 2/3 of the peak value.



Specifications

Value

Performance		DR5000A	DR5000B	DR5000C
Repeatability	Accuracy	±5 arc-sec	±10 arc-sec	±10 arc-sec
	Max stepping rate	±45 arc-sec	±90 arc-sec	±50 arc-sec
		1,600,000 steps/sec	1,400,000 steps/sec	
Power				
Volts	Range	200VAC, 3 Phase,	230VAC, 1 Phase,	115VAC
	Current	50/60 Hz	50/60 Hz	50/60 Hz
		+10% to -15%	+10% to -15%	+10% to -15%
Inputs (all models)				
Command interface	• Step input	Step and direction-Position control ±10VDC velocity control; ±8VDC torque control low going pulse, 150 nanosecond minimum pulse width Logic high = CW rotation Logic low = CCW rotation ±10VDC max 5 to 24 volts pullup		
	• Direction			
	• Analog input			
Outputs (all models)				
Encoder output	Other outputs (in position, alarm, etc.)	A, B Quadrature signal (400KHz max) Z Channel-"A": to 104 pulses/rev-"B": to 68 pulses/rev TTL		
Environmental		Driver	Motor	
Weight	• DR5000A	24 lbs (11 kg)	See Table below	
	• DR5000B	13.2 lbs (6 kg)	See Table below	
	• DR5000C	13.2 lbs (6 kg)	See Table below	
Operating	• Temperature	0-50°C	0-45°C	
	• Humidity	20-90%-Non-condensing	20-85%-Non-condensing	
	Storage			
• Temperature	• Humidity	-20-85°C	-20-85°C	
	• Humidity	20-90%-Non-condensing	20-85%-Non-condensing	
	Environment	No corrosive gases. Dust-free atmosphere. The Dynaserv is not waterproof, oil proof or dust proof.	See below	

DR5000 Series-Motor Data

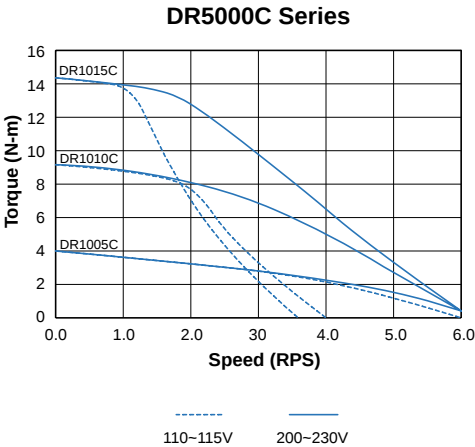
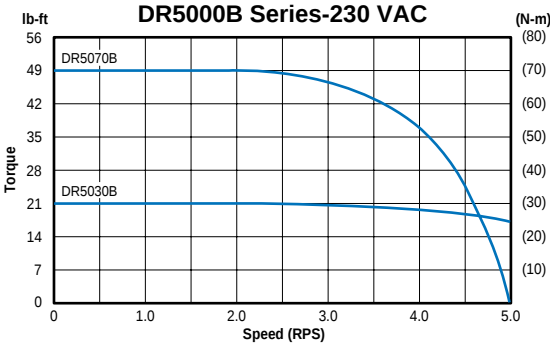
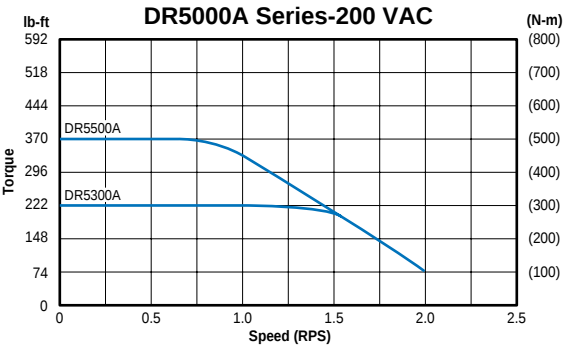
		Model 5005C	Model 5010C	Model 5015C	Model 5030B	Model 5070B	Model 5300A	Model 5500A
Peak torque	ft-lbs	2.8	5.9	10.3	22	52	221	369
	(Nm)	(3.8)	(8)	(14)	(30)	(70)	(300)	(500)
Rated speed	rps	6	6	6	4	4	1.5	1.5
Rotor inertia	oz-in ² x10 ²	3.28	3.83	4.37	4.4	19.7	185.9	251.5
	(kgm ²)x10 ⁻³	(0.006)	(0.007)	(0.008)	(8)	(36)	(340)	(460)
Resolution	Steps/rev	212,992	212,992	212,992	278,528	278,528	425,984	425,984
Motor weight	lbs	11.0	13.2	15.4	15.4	38.5	121	165
	(kg)	(5.0)	(6.0)	(7.0)	(7.0)	(17.5)	(55)	(75)
Maximum static axial load**								
	• Compression	1124	1124	1124	6600	6600	8800	8800
	• Tension	674	674	674	2200	2200	4400	4400
Maximum static overhung load**	ft-lb	15	15	15	148	148	296	296
Maximum power consumption	KVA	1.0	1.0	1.0	3.6	3.6	5.5	7.5

Application	De-rate Factor
Smooth, rotary motion	1/3
Intermittent press loading	1/5
Repetitive shock loading	1/10

** When designing a system, de-rate the maximum load to the value as shown at the left:

Motor Speed-Torque Performance Curves

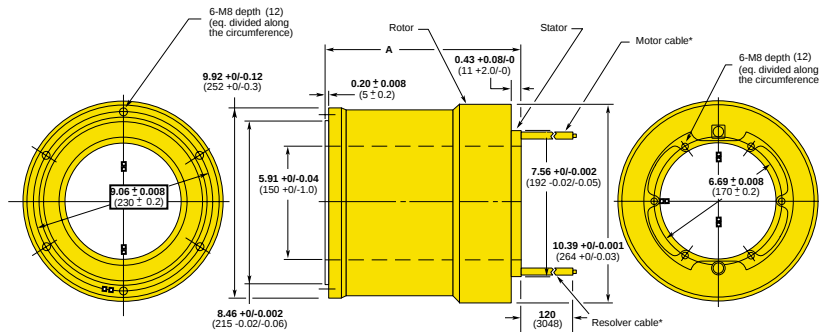
The speed-torque curves represent peak torque available, continuous torques are approximately 2/3 of the peak value.



DR Series Dimensional Drawings

DR-A Series

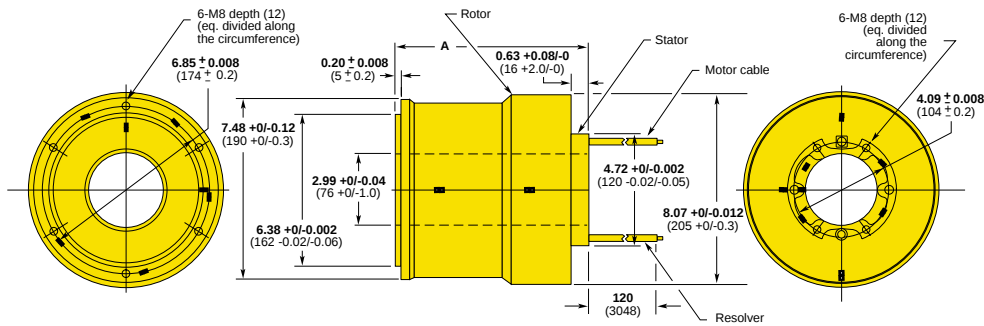
Dimensions in inches (mm)



Model	A	
DR1100A	7.28 $\pm$ 0.04	(185 $\pm$ 1)
DR1200A	9.84 $\pm$ 0.04	(250 $\pm$ 1)
DR1300A	11.97 $\pm$ 0.04	(304 $\pm$ 1)
DR1400A	14.09 $\pm$ 0.04	(358 $\pm$ 1)

DR-E Series

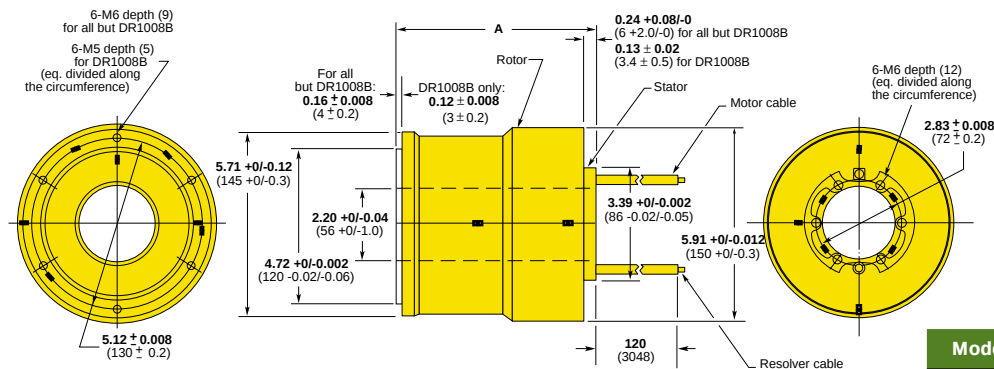
Dimensions in inches (mm)



Model	A	
DR1070E	7.20 $\pm$ 0.04	(183 $\pm$ 1)
DR1100E	8.27 $\pm$ 0.04	(210 $\pm$ 1)
DR1130E	9.57 $\pm$ 0.04	(243 $\pm$ 1)
DR1160E	10.67 $\pm$ 0.04	(271 $\pm$ 1)

DR-B Series

Dimensions in inches (mm)



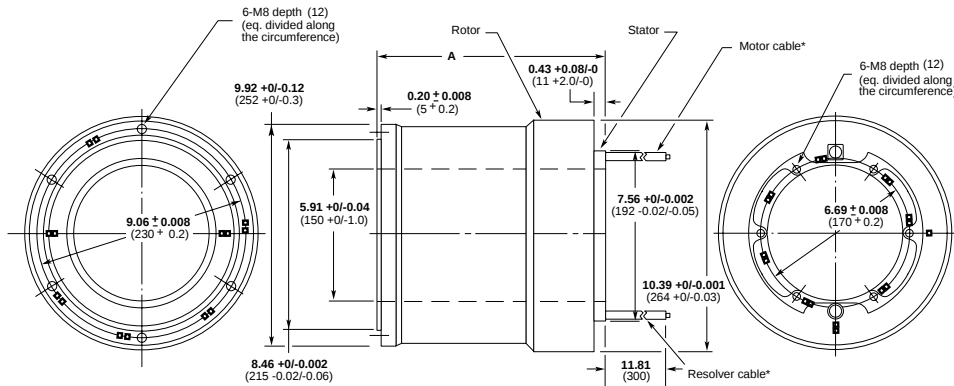
Model	A	
DR1008B	3.35 $\pm$ 0.04	(85 $\pm$ 1)
DR1015B	4.84 $\pm$ 0.04	(123 $\pm$ 1)
DR1030B	5.94 $\pm$ 0.04	(151 $\pm$ 1)
DR1045B	7.05 $\pm$ 0.04	(179 $\pm$ 1)
DR1060B	8.15 $\pm$ 0.04	(207 $\pm$ 1)

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Dimensional Drawings

DR5000A Series

Dimensions in inches (mm)

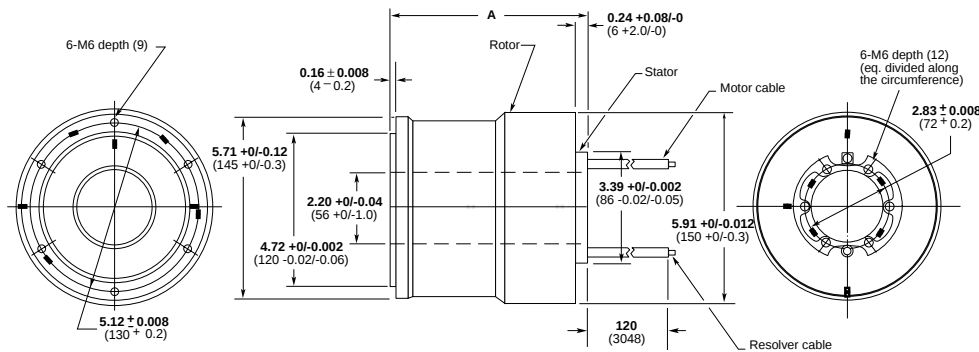


Note: Motor and resolver cables for DR5000-A Series are 11.81 in (300 mm) in length.

Model	A
DR5300A	12.2 ± 0.04 (309 ± 1)
DR5500A	16.4 ± 0.04 (417 ± 1)

DR5000B Series

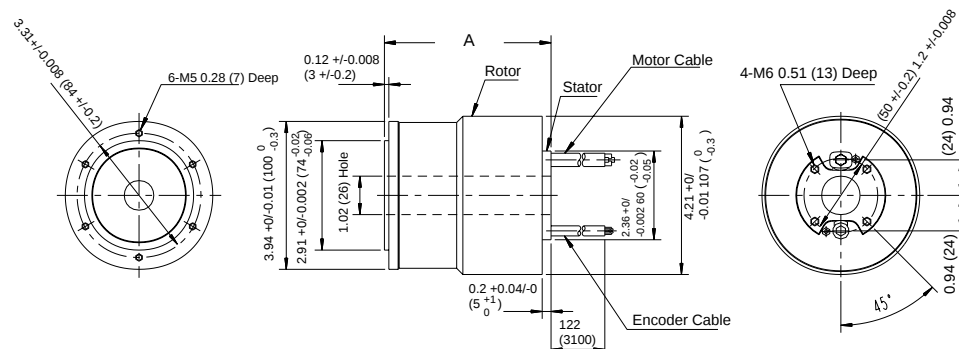
Dimensions in inches (mm)



Model	A
DR5030B	7.24 ± 0.04 (184 ± 1)
DR5070B	9.45 ± 0.04 (240 ± 1)

DR5000C Series

Dimensions in inches (mm)



Model	A
DR5005C	4.45 ± 0.04 (113 ± 1)
DR5010C	5.51 ± 0.04 (140 ± 1)
DR5015C	6.57 ± 0.04 (167 ± 1)

DR Series Pinout Lists

Indexer 50-pin Honda

Pin No.	Signal
1-8	Servo stiffness input (FC0-FC8)
9-12	Position end pulse width input (POSW1, POSW0)
13	A+ output
14	A- output
15	Servo ready + output
16	Servo ready - output
17	Velocity monitor + output
18	Velocity monitor - output
19	Direction - input
20	Direction + input
21	Integral capacitor reset + input
22	Integral capacitor reset - input
23	Servo on - input
24	Servo on + input
25-26	Integral/proportional action input
27	In position + output
28	In position - output
29	B+ output
30	B- output
31	TLIM/TFF (option)
32	AGND
33-38	Gain selection inputs - low, medium, high
39	CPU reset + input
40	CPU reset - input
41	Counter overflow + output
42	Counter overflow - output
43	Z+ output
44	Z- output
45	Step + input
46	Step - input
47	Overload + output
48	Overload - output
49	Analog input ($\pm 10V$)
50	Analog input GND

Motor Screw Terminal

Pin No.	Signal
1	Motor A
2	Motor B
3	Motor C
4	GND

Power Screw Terminal

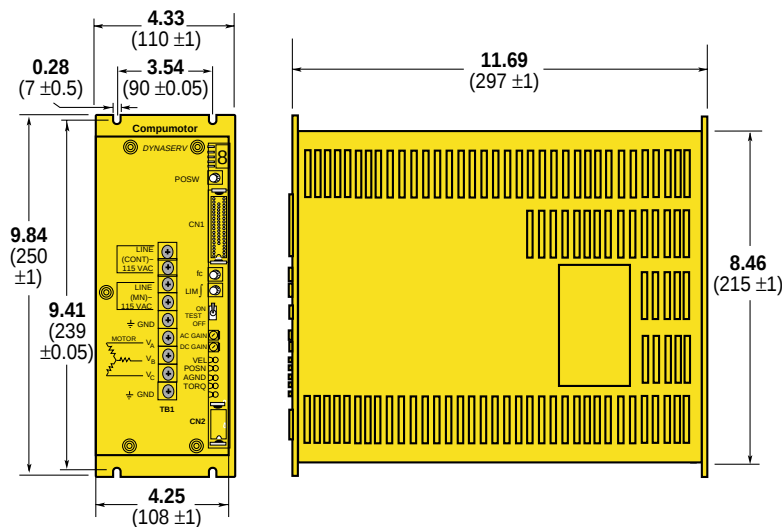
Pin No.	Signal
1	115 or 230VAC line-control
2	115 or 230VAC neutral-control
3	115 or 230VAC line-main
4	115 or 230VAC neutral-main
5	115 or 230VAC GND

Resolver Honda Connector

Pin No.	Signal
1	+S0 (Brown/White)
1	+S180 (Green/White)
2	-S0 (Brown)
3	-S180 (Green)
4	Shield
5	FG (Black)
6	+C0 (Orange/White)
6	+C180 (Blue/White)
7	-C0 (Orange)
8	-C180 (Blue)

DR Series Drive Dimensions

Dimensions in inches (mm)



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DR5000 Series Pin-Out Lists

CN-1 Controller Connections 50-Pin Honda

Pin No.	Signal
1-8	Servo stiffness input (FC0-FC8)
9-12	Position end pulse width input (POSW1, POSW0)
13	A+ output
14	A- output
15	Servo ready + output
16	Servo ready - output
17	Velocity monitor + output
18	Velocity monitor - output
19	Direction - input
20	Direction + input
21	Integral capacitor reset + input
22	Integral capacitor reset - input
23	Servo on - input
24	Servo on + input
25-26	Integral/proportional action input
27	In position + output
28	In position - output
29	B+ output
30	B- output
31	No connection
32	No connection
33-38	Gain selection inputs - low, medium, high
39	CPU reset + input
40	CPU reset - input
41	Counter overflow + output
42	Counter overflow - output
43	Z+ output
44	Z- output
45	Step + input
46	Step - input
47	Overload + output
48	Overload - output
49	Analog input ($\pm 10V$)
50	Analog input GND

Power Screw Terminal DR5000A (200VAC 3 ϕ)

Pin No.	Signal
1	Phase 1 (main)
2	Phase 2 (main)
3	Phase 3 (main)
4	Line (control)
5	Neutral (control)
6	GND
7	Motor A
8	Motor B
9	Motor C
10	GND

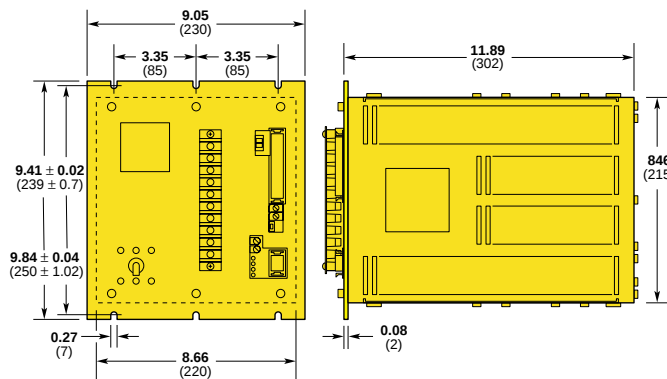
Power Screw Terminal DR5000B (230VAC 1 ϕ)

Pin No.	Signal
1	Line (control)
2	Neutral (control)
3	Line (main)
4	Neutral (main)
5	GND
6	Motor A
7	Motor B
8	Motor C
9	GND

Resolver Honda Connector

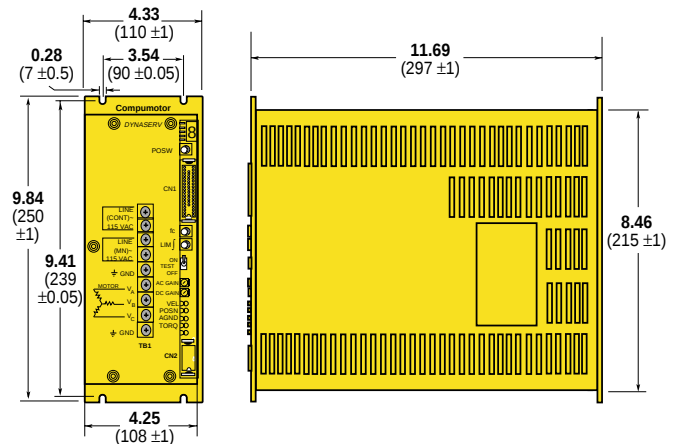
Pin No.	Signal
1	+S0 (Brown/White)
1	+S180 (Green/White)
2	-S0 (Brown)
3	-S180 (Green)
4	Shield
5	FG (Black)
6	+C0 (Orange/White)
6	+C180 (Blue/White)
7	-C0 (Orange)
8	-C180 (Blue)

Dimensions in inches (mm)



DR5000 A

Dimensions in inches (mm)



DR5000 B

Please refer to the ordering information matrix on page 159

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