

Ajusto-Spede® Controllers

Model EC-2000 Controllers



Description

The Dynamatic® EC-2000 Digital Controller consists of a single printed circuit board rated for 115 VAC, 1 phase, 60 Hz input. It has the flexibility of 45 or 90 VDC coil voltage at 8 Amps and is available for use with a wide range of drives and brakes rated 1 through 200 horsepower and high powered applications up to 2,000 horsepower. Please consult factory for high-powered applications. A power relay is a standard feature. The basic circuit board includes provisions for many control functions. Some of these functions are multiple cascading, linear accel/decel, manual or auto signal follower. The EC-2000 can also be run in speed mode or in torque mode. Selection of these options is made through the soft touch keypad. Many other modifications are included. This controller is designed to offer all standard industrial modifications without the need for auxiliary modification boards. An optional 230/460 VAC, 1 phase transformer is also available.

Features	Customer Benefits
0.1% Speed Regulation	Precise speed control standard. No over-speed trips.
Digital Processing.	Easy repeatable setup and control.
Parameter Setup.	PC computer programming capability.
Dual Output Voltage.	Compatible with 45, 90, 180 & 220 VDC and auto 45 VDC forcing.
Low Power Requirements.	Virtually no electrical noise created plant power-friendly.
No Line Harmonic Distortion.	High PF and standard power company correction compatible.
High Starting Torque.	Idle motor start with 250% starting torque capability.
Wide Speed Range.	No additional cost for low speed operation.
Loss of Feedback Protection.	No speed runaway.
Loss of Reference Protection.	Choice continuation or stop at loss of reference.
Loss of Coil Continuity.	Automatic troubleshooting of coil loss.
Long Life.	Controllers are built to give long, reliable, low cost life in diverse applications.

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Specifications

EC-2000 Controller	Units used with	Fractional HP Drives AS-14 - 27 Drives AT-140 - 440 Drives DCD-132 - 225 Drives AS-703 - 705 (45 or 90 VDC) AS-706 - 707 (90 VDC only) Air-Cooled Brakes WC-620 - WC-640 Water-Cooled Brakes
	Horsepower range	1-200 HP - Standard
	Digital	Standard
	Input, power maximum	115 VAC, +/- 10%, 1 Ph, 50/60 Hz, 285 to 1295 watts
	Standard Output, power maximum	45 VDC, 8 Amps; 90 VDC, 8 Amps
	High Power	45 VDC, 20 Amps; 45 VDC, 50 Amp; 90 VDC, 20 Amps; 90 VDC, 50 Amps – Consult Factory for other ratings
	Speed regulation 25% to full load change	0.1% - Standard
	Regulated speed range	68:1 - Standard
	Enclosure	NEMA 1 - Standard
	Operator devices (Keypad)	Run & Jog operation, Stop button and Run Speed settable reference from the keypad - Standard
	Built-in modifications	Linear accel/decel, torque control, 0.01% regulation, adjustable braking, spring set braking (relay contacts available), signal follower input, adjustable jog, torque/speed control and threading - Standard
	Field modifications	None
	Closed Loop speed control	Standard
	Controller protective features	Input fuses, low line voltage, line transients, isolated signal circuits output over-current, trip or indication only
	Line regulation for +/-10% input line voltage change	+/-0.3%
	Thermal drift per degree C	0%
	Minimum regulated speed range	25 RPM
	Maximum ambient	104° F (40° C) enclosed 149° F (65° C) panel mount

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Pricing & Ordering Information

The Model EC-2000 Controller can be provided as a panel mount, or it can be provided in a NEMA 1 or NEMA 12 Enclosure. The NEMA 1 and NEMA 12 enclosures include the installed keypad. The panel mount versions do not include the keypad, cable or mounting hardware, but may be ordered loose (see below). A power relay is built in. Optional current transformers are required for torque limit operation and are priced starting on Page 124. Input transformers are not required, but are available. Please contact the factory for further information.

EC-2000 Controller Pricing & Selection Table - 8 A

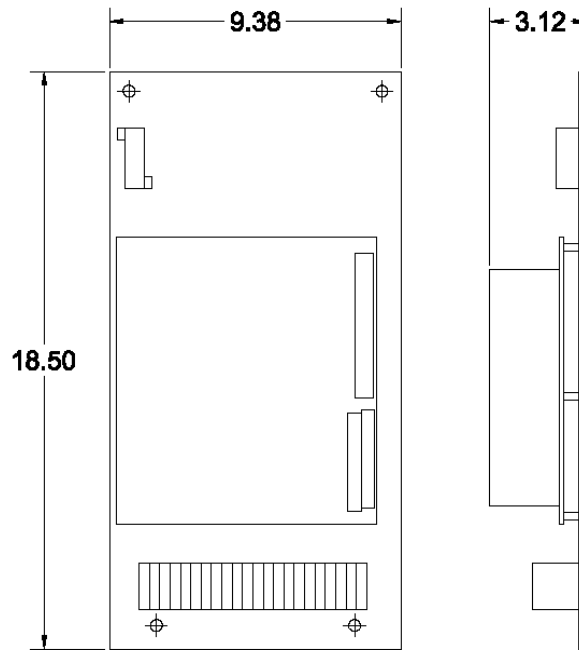
Description	Part Number
Panel Mount Control w/o Keypad	15-002000-0100
Panel Mount Replacement for Mark III Control w/o Keypad (Dimensional Replacement)	15-002000-0200
Includes NEMA 1 Enclosure and Keypad	15-002000-0300
Includes NEMA 12 Enclosure and Keypad	15-002000-0400
Press Drive Control (keypad not included, CT extra)	15-002000-0500
Keypad Kit with Cable & Mounting Hardware	37-000544-0100
Current Transformer 0 to 70 Amps	15-000203-0003
Power Transformer 230/460V Primary 8.0 Amp	15-000361-0001

NOTE 1 - Panel mount, NEMA 1 and NEMA 12 are standard designs, 45VDC/90VDC programmable, see below for large Higher Power Eddy Current units. For Specials, consult factory.

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STANDARD CONTROLLER ENGINEERING INFORMATION

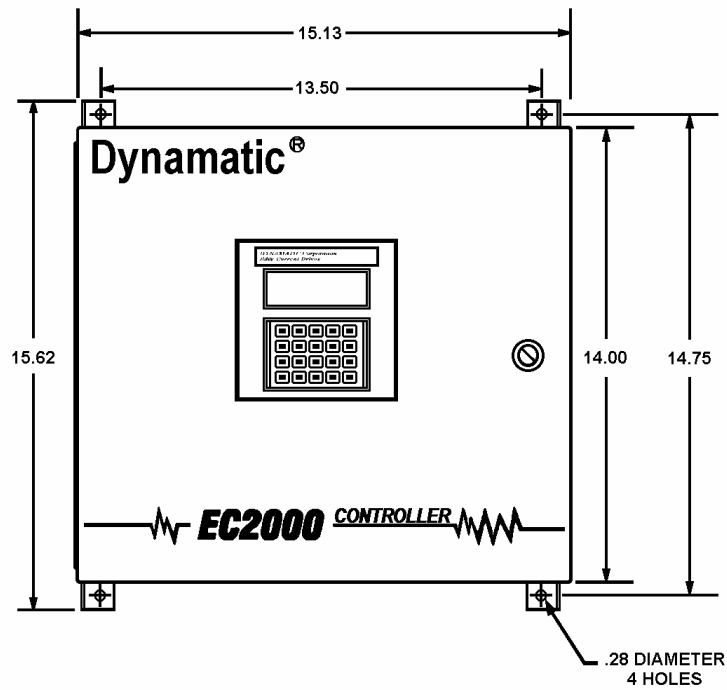
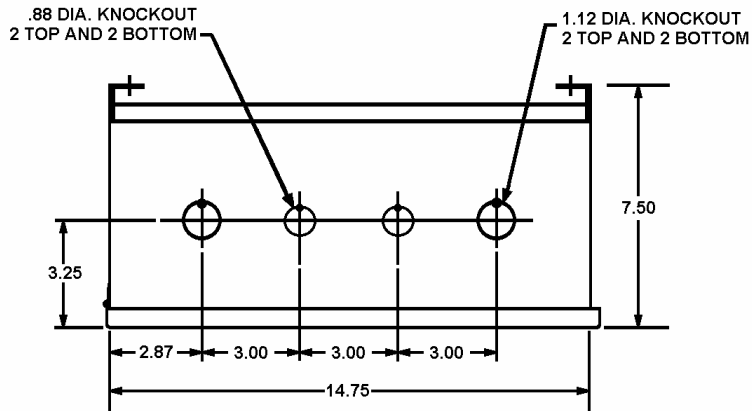
Standard EC-2000 Open Panel Outline Drawing



DIMENSIONS ARE IN INCHES

Ajusto-Spede® Controllers

Standard EC-2000 NEMA-1 Enclosure Outline Drawing (31-606-3 B)



DIMENSIONS ARE IN INCHES

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EC-2000 HIGH POWER CONTROLLERS



Description

The EC-2000 power control board has been designed to allow the use of off-board power conversion assemblies for other output voltages and current ratings. A complete open sub panel design, based on the standard Mark-III base, has been assembled into a compact basic controller that can be used for applications requiring output currents of up to 32-amperes at voltages of 50-, 100-, or 200-volts. These standard panels may also be supplied in NEMA enclosures, or used as a basis for special engineered applications. These assemblies may be used as direct replacements for many standard and pre-engineered Mark-III and 4-58 controllers. Special high voltage, low current units are also available for replacement of the old V3A4, MA-440 and Louis Allis MD-9S controllers, permitting operation with coils rated to 220-volts at 2-amperes.

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STANDARD EC-2000 CONTROL FUNCTIONS

The control features provided in the standard EC-2000 8-amp version are also available in the high power series. These include:

- Speed – Torque Mode Select
- Manual – Automatic Signal Follower
- Local – Remote Operation
- Separately Adjustable Jog Input
- Two Channel Analog Signal Output
- Programmable Control parameters
- Manual Reference Potentiometer
- Digital Reference from Local Keypad
- Preset Control References
- Torque Limit Motor Protection
- Two Channel Meter Functions
- Password Security Protection

Ajusto-Spede® Controllers

STANDARD CONFIGURATIONS

1000-SERIES STANDARD OPEN PANEL SUB ASSEMBLIES

The EC-2000-HP control panels listed above are configured as open sub panel assemblies. The base panel measures 18.50-inches high by 9.38-inches wide by 6.12-inches deep, and is physically interchangeable with the Mark-III size 1, 2, 5, and 6 controllers. The basic 32-amp control units are jumper programmable for maximum output current ratings of 32-, 24-, and 16-amps, while the 8-amp units may be jumpered for 8-, 5.5-, and 4-amps maximum output current, expanding the list to fifteen standard sub panel controllers.

2000-SERIES AUGMENTED OPEN PANEL ASSEMBLIES

The standard sub panel controller may be mounted on the large Mark-III panel with an isolation step down transformer and a customer terminal block. This panel measures 23.00-inches high by 22.00-inches wide and is physically interchangeable with the Mark-III size 3, 4, 7, and 8 controllers. These assemblies are limited to controllers with ratings of 4-kva or less.

3000-SERIES NEMA-12 ENCLOSED ASSEMBLIES WITHOUT TRANSFORMERS

All standard sub panel controllers may be mounted in a NEMA-12 enclosure. All enclosed units are shipped complete with a door mounted, gasketed keypad/display unit. This 3000-series assembly does not include any step down or isolation transformer.

4000-SERIES NEMA-12 ENCLOSED ASSEMBLIES WITH TRANSFORMERS

All standard sub panel units may be mounted in a NEMA-12 enclosure, complete with a door mounted, gasketed keypad/display unit, and a properly sized step down isolation transformer. Smaller transformers are panel mounted. Transformers above 4-kva are mounted on the enclosure floor. Larger enclosures may be fitted with floor mounting kits.

5000-SERIES SPECIAL ENGINEERED ASSEMBLIES

Controllers for application-specific functions, or those requiring modifications to the standard features, are specified by adding an "E" prefix to the standard catalog number, along with a description of the required control functions. Part numbers indicating a 5000-series engineered controller will be assigned by our engineering department.

ORDERING CURRENT TRANSFORMERS AND STEP-DOWN TRANSFORMERS

Current transformers and step-down power transformers must be specified and purchased as separate line items when specifying a 1000-series or 3000-series control assembly. A step-down isolation transformer is included as part of a standard 2000-series open panel assembly, 4000-series NEMA-12 enclosed assembly, or 5000-series engineered package when the transformer is part of the specification. The cost of the included step down transformer is included in the selling price of the controller. However, the current transformer must be specified and purchased as a separate line item, specifying the motor current rating.

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STANDARD CONTROL ASSEMBLIES

FULL WAVE BRIDGE CONFIGURATION

These complete controllers provide for the most economical solution by connecting directly to 120-VAC or 240-VAC power mains without the use of transformers. **The 50-VDC controller is not available in the bridge configuration.**

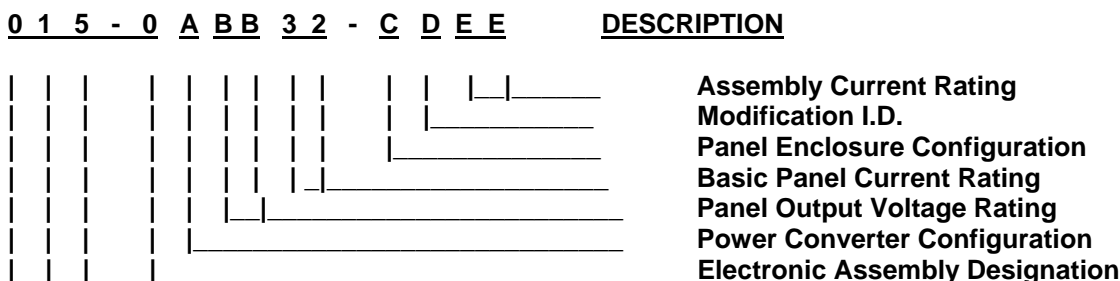
<u>BASIC PANEL</u>	<u>VOLTS IN</u>	<u>VOLTS OUT</u>	<u>AMPS OUT</u>
EC-42008-1000	240 VAC	200 VDC	4, 5.5, 8 ADC
EC-41032-1000	120 VAC	100 VDC	16, 24, 32 ADC
EC-42032-1000	240 VAC	200 VDC	16, 24, 32 ADC

FULL WAVE CENTER-TAPPED CONFIGURATION

These controllers require the use of a center-tapped transformer and feature the same power conversion scheme as the original Mark-III. The transformer provides step down and complete isolation from the high line mains, allowing the power assembly to be grounded.

<u>BASIC PANEL</u>	<u>VOLTS IN</u>	<u>VOLTS OUT</u>	<u>AMPS OUT</u>
EC-20532-1000	120 V CT	50 VDC	16, 24, 32 ADC
EC-21032-1000	240 V CT	100 VDC	16, 24, 32 ADC

EC-2000-HP Part Number Structure



- A:** Number of controlled SCR's: "2" indicates Center-Tap configuration, "4" is Bridge configuration
- B:** "05" = 50-VDC, "10" = 100-VDC, "20" = 200-VDC
- C:** "1" = Standard Mark-III type open sub panel assembly
 "2" = Standard sub panel assembly mounted on Large Mark-III panel with Transformer and Terminal Block
 "3" = Standard sub panel assembly mounted in NEMA-12 Enclosure WITHOUT Transformer
 "4" = Standard sub panel assembly mounted in NEMA-12 Enclosure WITH Transformer
 "5" = Special Engineered assembly per specification
- D:** "0" = Standard universal configuration
- E:** "16" = 16-amps, "24" = 24-amps, "32" = 32-amps

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STANDARD CONTROLLER ENGINEERING INFORMATION

PREFERRED CONFIGURATIONS:	50-VDC Output:	EC-20532-1000
	100-VDC Output:	EC-41032-1000
	200-VDC Output:	EC-42008-1000
		EC-42032-1000

NEMA-12 ENCLOSURE SIZES & TRANSFORMERS

FULL WAVE BRIDGE CONFIGURATION

<u>BASIC PANEL</u>	<u>PANEL P/N</u>	<u>DCV OUT</u>	<u>DCA OUT</u>	<u>ENCLOSURE SIZE AND (TRANSFORMER)</u>			
EC-41032-1000	015-041032-1016	100-VDC	16-ADC	1 None	3	64-429	
EC-41032-1000	015-041032-1024	100-VDC	24-ADC	2 None	4	64-401	
EC-41032-1000	015-041032-1032	100-VDC	32-ADC	3 None	*	64-402	
EC-42008-1000	015-042008-1004	200-VDC	4-ADC	1 None	2	64-362	
EC-42008-1000	015-042008-1006	200-VDC	5.5-ADC	1 None	3	64-428	
EC-42008-1000	015-042008-1008	200-VDC	8-ADC	1 None	3	64-428	
EC-42032-1000	015-042032-1016	200-VDC	16-ADC	2 None	*	64-431	
EC-42032-1000	015-042032-1024	200-VDC	24-ADC	3 None	*	(2)	64-401
EC-42032-1000	015-042032-1032	200-VDC	32-ADC	3 None	*	(2)	64-402

FULL WAVE CENTER-TAPPED CONFIGURATION

<u>BASIC PANEL</u>	<u>PANEL P/N</u>	<u>DCV OUT</u>	<u>DCA OUT</u>	<u>ENCLOSURE SIZE AND (TRANSFORMER)</u>			
EC-20532-1000	015-020532-1016	50-VDC	16-ADC	1 (None)	2	64-429	
EC-20532-1000	015-020532-1024	50-VDC	24-ADC	1 (None)	3	64-430	
EC-20532-1000	015-020532-1032	50-VDC	32-ADC	1 (None)	4	64-401	
EC-21032-1000	015-021032-1016	100-VDC	16-ADC	1 (None)	3	64-431	
EC-21032-1000	015-021032-1024	100-VDC	24-ADC	1 (None)	4	64-431	
EC-21032-1000	015-021032-1032	100-VDC	32-ADC	2 (None)	*	64-432	

ENCL. SIZE AREA (SQ.IN.) SIZE (H-W-D) DSI PART NO.

1	1840	24x20x10	31-672
2	2304	24x24x12	31-662
3	3744	36x30x12	31-630
4	6144	48x36x16	31-647

* Consult factory for alternate cooling options

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STANDARD CURRENT TRANSFORMERS FOR USE WITH THE EC-2000 AND EC-2000-HP

Drive Source International, Inc. offers four standard motor current transformer assemblies for use with the EC-2000 and EC-2000-HP controllers for motors with full load current ratings to 500-amperes. These current transformers may also be used with the 4000/4050 and DSI-700 controllers.

<u>Current Transformer p/n</u>	<u>Motor FLA</u>
015-000203-0003	0 to 70 amps
015-000203-0125	60 to 125 amps
015-000203-0250	125 to 250 amps
015-000203-0500	250 to 500 amps

The motor full load current rating is necessary to order the proper current transformer. The actual motor full load amps (FLA) may be obtained from the motor name plate. If this information is not available, enter the "TYPICAL MOTOR FULL LOAD CURRENT" table below with the motor horsepower rating and line voltage to determine the typical motor current.

Specify actual line voltage and motor HP when ordering. (Example: 230V or 460V, not 230/460V)

Typical Motor Full Load Current

3 Phase AC Induction Type – Squirrel Cage and Wound Rotor				
HP	200V	230V	460V	575V
½	2.3	2	1	0.8
¾	3.2	2.8	1.4	1.1
1	4.15	3.6	1.8	1.4
1½	6	5.2	2.6	2.1
2	7.8	6.8	3.4	2.7
3	11	9.6	4.8	3.9
5	17.5	15.2	7.6	6.1
7½	25	22	11	9
10	32	28	14	11
15	48	42	21	17
20	62	54	27	22
25	78	68	34	27
30	92	80	40	32
40	120	104	52	41
50	150	130	65	52
60	177	154	77	62
75	221	192	96	77
100	285	248	124	99
125	358	312	156	125
150	415	360	180	144
200	550	480	240	192

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EC2000 High Power Pump Controller Selection Table

Full Wave Center Tapped Configuration				
Rating	Model	Part #	Enclosure	XFMR #
50VDC 16A	EC-20532-1000	015-020532-1016	Chassis	64-429
50VDC 24A	EC-20532-1000	015-020532-1024	Chassis	64-430
50VDC 32A	EC-20532-1000	015-020532-1032	Chassis	64-401
100VDC 16A	EC-21032-1000	015-021032-1016	Chassis	64-431
100VDC 24A	EC-21032-1000	015-021032-1024	Chassis	64-431
100VDC 32A	EC-21032-1000	015-021032-1032	Chassis	64-432

Full Wave Bridge Configuration				
100VDC 16A	EC-41032-1000	015-041032-1016	Chassis	64-429
100VDC 24A	EC-41032-1000	015-041032-1024	Chassis	64-401
100VDC 32A	EC-41032-1000	015-041032-1032	Chassis	64-402
200VDC 4A	EC-42008-1000	015-042008-1004	Chassis	64-362
200VDC 5.5A	EC-42008-1000	015-042008-1006	Chassis	64-428
200VDC 8.0A	EC-42008-1000	015-042008-1008	Chassis	64-428
200VDC 16A	EC-42032-1000	015-042032-1016	Chassis	64-431
200VDC 24A	EC-42032-1000	015-042032-1024	Chassis	(2) 64-401
200VDC 32A	EC-42032-1000	015-042032-1032	Chassis	(2) 64-402

Keypad		
Keypad Kit with cable & Mounting Hardware	037-000544-0100	NEMA 4

Current Transformers For EC-2000-HP & EC-2000			
0 to 70 Amp		015-000203-0003	Open
60 to 125 Amp		015-000203-0125	Open
125 to 250 Amp		015-000203-0250	Open
250 to 500 Amp		015-000203-0500	Open