

Digital DC Motor Controls



Baldor Digital DC SCR based motor controls combine digital motor control circuitry with reliable SCR power devices to provide advanced DC motor control and protection. The onboard operator control allows easy programming of control setup and operating parameters. Optional motor feedback expansion boards enhance the drive capabilities by allowing the control to continuously monitor a motor mounted AC Tachometer, DC Tachometer or Incremental Encoder.

Motor controls from 35 to 165 Amps continuous include built in Line Contactor, Control Logic Supply, and Fuses (line, armature, field supply, and control logic). Other options include internally mounted blower motor starter, and various bus communications expansion boards.

- Series 29D provides uni-directional (single quadrant) digital motor control
- Series 30D provides bi-directional (four quadrant) regenerative motor control
- 220 to 500 Volts Line Input (+/- 10%) allows connection to the majority of power grids found around the world
- Universal 50 or 60 Hertz input voltage frequency capability for worldwide use
- Operator Keypad is remote mountable to 10 feet for optimum placement on the front of control cabinetry
- Optional Bus Communications expansion boards provide convenient connection to RS-485, Modbus, Profibus DP, and DeviceNet networks.

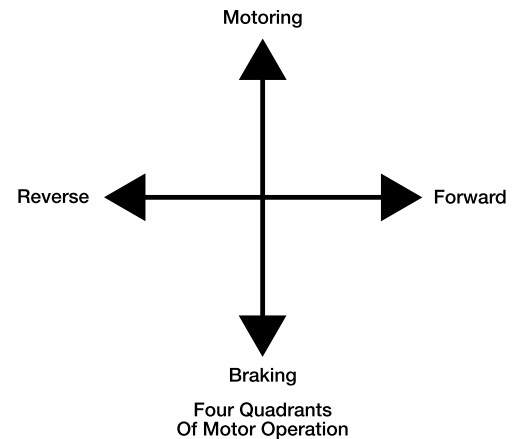
BALDOR[®]
MOTORS, DRIVES & GENERATORS

Regenerative or Non-regenerative, which motor control do I need?

All motor controls are classified by their ability to control the motor in one of four quadrants of operation. These quadrants identify the controls ability to provide forward direction motoring, reverse direction motoring, forward direction braking and reverse direction braking as shown in the figure.

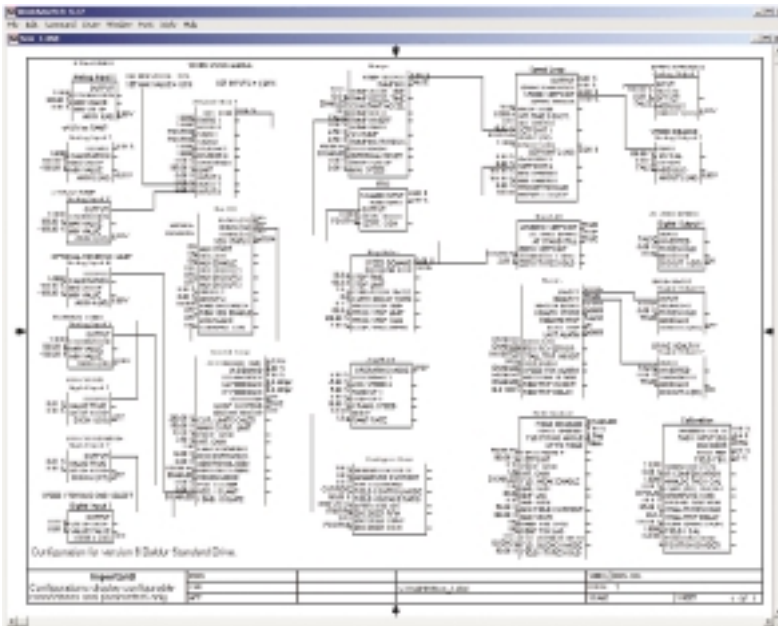
A Non-regenerative control is capable of direct control of a motor in one quadrant only. The operating quadrant is typically either the forward direction motoring or reverse direction motoring. The motor direction is selected by the connection of the motor armature connections at the motor control output.

A Regenerative control is usually necessary to provide the braking power quadrants and normally returns the motors generated energy back to the power grid during periods of motor braking. Regenerative controls also allow electronic motor direction reversing.



Workbench D - Control Configuration Software

Baldor digital DC motor controls can be configured with a personal computer using Workbench D software. Through the Windows® based operating environment the Series 29D and Series 30D motor control operating parameters can be set and reviewed. Using simple point and click commands the analog and digital inputs and outputs can be reconfigured to match an endless number of application requirements.



Using intuitive functional block programming the basic control functions can be modified or reconfigured to provide advanced motor control functionality. In addition to the standard function blocks for Ramps, Speed Loop, and Current Loop functions there are also optional function blocks for PID Process Control and Raise/Lower Input Commands.

The scaling and calibration of the Analog Inputs can be modified along with the calibration and status indication of the Analog and Digital Outputs. The Digital Inputs can be reconnected to provide alternate command inputs to suit your particular application requirements.

Specifications

Output	Output Voltage	DC: 0-1.2 times VAC input
	Ratings	Current Limit
Input Ratings	Voltage	220 - 500 VAC \pm 10%
	Frequency	50 or 60 Hz \pm 5%
	Phase	Three phase
	Control Logic Supply	Internally connected with voltage jumpers on sizes 1 and 2. Externally connected for 115 VAC on sizes 3 and larger
Control Spec.	Impedance	5% Maximum
	Control Method – 29D	NEMA type C full wave uni-directional DC control
	Control Method – 30D	NEMA type C full wave bi-directional regenerative DC control
	Speed Setting	\pm 10 VDC, 0-10 VDC, 4-20 mA. Digital via keypad. Optional by expansion board: RS485 serial, ProfibusDP or DeviceNet
	Accel / Decel	0-600 seconds
	Min. Speed	0 – 100% rated speed
	Max Speed	0 – 200% rated speed
	Motor Matching	Automatic tuning to motor with manual override
Field Power Supply	Type	Full wave fixed voltage or current regulated
	Voltage	DC: 0 to 90% of line input voltage
	Current	4 amps on size 1, 10 amps on size 2 and 3, 30 amps on size 4 and 5
	Field Economy Level	Off or 50%
Motor Feedback	Standard Feedback Type	Armature feedback
	Optional Feedback Type	Optional with expansion boards: DC or AC tachometer (200 volt max without dropping resistor), Incremental encoder or pulse generator (5 VDC or 12 VDC)
Protective Functions	Control Trip	Missing control power; Over-current; Armature over-voltage; Motor over-speed; Over temperature (motor and control); Phase Functions loss; Motor overload and over-current; Field loss; Encoder or tachometer loss
	Fusing	Standard input line, armature, field and control logic (Size 1 and 2 only); high energy MOVs
	External Output	LED indicator for trip conditions, 3 assignable logic outputs – 30 VDC max, 2 assignable 3 analog outputs \pm 10 VDC (2 assignable)
LCD Display	Running	Motor RPM, Output current, Voltage (selectable)
	Setting	Parameter values for setup and review
	Trip	Separate message for each trip, last trip retained in memory
Ambient Conditions	Operating Temperature	0 - 45°C for size 1 and 2, 0 - 40°C for size 3, 4 and 5. Output current values should be de-rated at 1% per degree Centigrade above rated temperature up to a maximum of 55°C
	Storage Temperature	-25° C to +55°C, shipping temperature -25°C to +70°C
	Altitude	Up to 1640 ft (500m) above sea level without derating
	Cooling	Forced air included on sizes 3, 4 and 5 (separate 115 VAC 1ph power required)
Approvals	UL / CUL	UL listed to US and Canadian safety standard UL508C (up to 675 amps – larger ratings pending)
	CE	Marked to EN50178 (Safety, Low Voltage Directive); EN50081-2 (1992) (EMC emissions, industrial environment with external filter fitted); EN50082-2 (1995) (EMC immunity, industrial environment)

NOTE: Series 29 and 30 specifications are pending at time of printing.
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Ordering Information

Approximate Horsepower		Input Voltage	Armature Output Current		Series 29D Catalog Number	Series 30D Catalog Number	Chassis Size	Notes	
230V	460V		Cont	Peak				Internal Contactor	Logic Supply
10	20	230-460	35	53	BC29D7A35-CO7	BC30D7A35-CO7	1	Yes	Internal
20	40	230-460	70	105	BC29D7A70-CO7	BC30D7A70-CO7	2	Yes	Internal
30	60	230-460	110	165	BC29D7A110-CO7	BC30D7A110-CO7	2	Yes	Internal
50	100	230-460	165	248	BC29D7A165-CO7	BC30D7A165-CO7	2	Yes	Internal
75	150	230-460	243	365	BC29D7A243-CO1	BC30D7A243-CO1	3	No	External 115
100	200	230-460	380	570	BC29D7A380-CO1	BC30D7A380-CO1	4	No	External 115
150	300	230-460	500	750	BC29D7A500-CO1	BC30D7A500-CO1	4	No	External 115
200	400	230-460	725	1088	BC29D7A725-CO1	BC30D7A725-CO1	4	No	External 115
250	500	230-460	830	1245	BC29D7A830-CO1	BC30D7A830-CO1	4	No	External 115
300	600	230-460	1580	2370	BC29D4A1580-CO1	BC30D4A1580-CO1	5	No	External 115

Expansion Boards

Motor Feedback expansion boards allow the motor control to continuously monitor the operation of the motor. Several options are available to allow connection of Tachometers and Encoders to the Series 29D and 30D motor controls. Bus Communications expansion boards allow the motor control to be connected to various automation protocols.

EXB01A01 Tachometer Expansion Board – Allows connection of AC or DC tachometers for better speed regulation. Full speed tachometer voltages are allowed up to 200 Volts. AC Tachometers provide speed information only. DC Tachometers provide both speed and direction information.

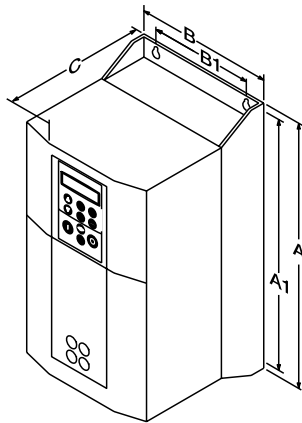
EXB02A01 5Volt Encoder Expansion Board – Provides power supply and connections to a 5 Volt encoder for better speed regulation.

EXB02A02 12Volt Encoder Expansion Board – Provides power supply and connections to a 12 Volt encoder for better speed regulation.

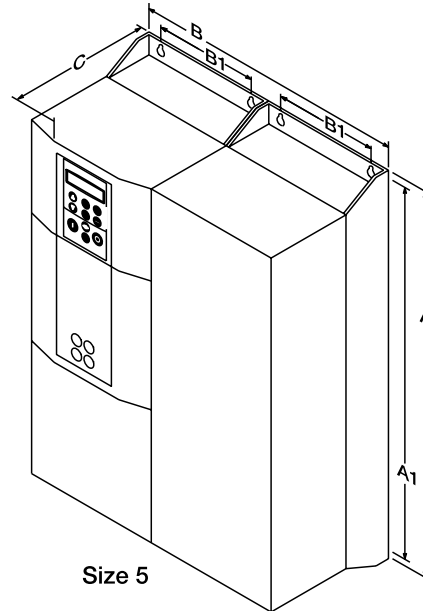
EXB03A01 Modbus Expansion Board – Allows connection to a Modbus communications network.

EXB04A01 Profibus DP Expansion Board – Allows connection to a Profibus DP communications network.

EXB05A01 DeviceNet Expansion Board – Allows connection to a DeviceNet communications network.



Size 1, 2, 3, 4



Size 5

NOTE: For safe operation, allow a clearance distance between each control and on all sides of each control.

Size	Amp Rating	Dimensions					Weight Lbs
		Outside			Mounting		
		Height - A	Width - B	Depth - C	Height - A1	Width - B1	
1	15-35	14.8 (375)	7.9 (200)	8.7 (220)	14.2 (360)	5.5 (140)	14
2	40-165	17.1 (434)	7.9 (200)	11.5 (292)	16.5 (418)	5.5 (140)	23
3	180	19.1 (485)	9.8 (250)	7.1 (180)	15.7 (400)	7.9 (200)	44
3	270	19.7 (500)	11.8 (300)	8.3 (210)	15.7 (400)	7.9 (200)	44
4	380-500	27.6 (700)	10.0 (253)	14.2 (358)	26.8 (680)	5.9 (150)	71
4	725-830	27.6 (700)	10.0 (253)	14.2 (358)	26.8 (680)	5.9 (150)	97
5	1580	27.6 (700)	20.0 (506)	14.2 (358)	26.8 (680)	5.9 (150)	200

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