

Series 22H Line Regenerative Vector Drive



10 thru 50 Hp
10 thru 50 Hp

230 VAC
460 VAC

3 Phase - 50/60 Hz
3 Phase - 50/60 Hz

Applications: Variable torque, constant torque or constant horsepower applications. New installations, replacements and original equipment manufacturers. (OEM).

Features: NEMA 1 enclosure as standard. Output frequency 0-500Hz with peak overload capability of 170-200%. Automatic tuning to motor and full rated torque down to zero speed. Digital speed or torque control. Built in two and three input PID process control loop.

Design Specifications

- Process follower
±5VDC 0-5 VDC,
±10VDC, 0-10 VDC ,
4-20mA, digital via keypad
or optional RS232/485
- Linear or S-curve deceleration
- Controlled reversing
- 15 preset speeds
- 2 assignable analog outputs
- 2 assignable logic outputs
- 2 assignable relay outputs
- 2 assignable analog inputs
- Motor shaft orient to marker

Operator Keypad

- Forward/Reverse command
- Motor RUN and JOG
- Local/Remote key
- Stop command
- 32 character display
- Remote mount to 100 feet (60m)
from control
- NEMA 4X enclosure when
mounted on panel

Environmental and Operating Conditions

- Input voltage
Three phase 200-240 VAC ±10%
Three phase 378-480 VAC ±10%
- Input frequency
50 or 60Hz ±5%
- Service factor - 1.0
- Duty - continuous
- Humidity - 90% max RH non-condensing
- Altitude - 3300 feet (1000m)
max without derate

Protective Features

- Adjustable current limit
- Isolated control circuitry
- Digital display for fault conditions
- Selectable automatic restart at
momentary power loss
- DC bus charge indicator
- Cause of last 31 trips retained
in memory

Output Ratings	Overload Capacity	150% for 60 seconds, 170-200% for 3 seconds for constant torque 115% for 60 seconds for variable torque
	Frequency	0-500 Hz
	Voltage	0-Maximum input voltage (RMS)
Input Ratings	Frequency	50 or 60 Hz ±5%
	Voltage	180 - 264 VAC; 340 - 528 VAC
	Phase	Three phase
	Impedance	3.0% minimum required
Control Spec	Control Method	Microprocessor controlled PWM output
	PWM Frequency	Adjustable 1-5kHz STD, 1-16 kHz quiet
	Speed Setting	±5 VDC, 0-5 VDC ±10 VDC, 0-10 VDC, 4-20 mA; digital via keypad, RS232/485
	Accel/Decel	0-3600 sec
	Motor Matching	Automatic tuning to motor with manual override
Motor Feedback	Feedback Type	Incremental encoder coupled to motor shaft
	Pulses/Rev	60-15,000 selectable, 1024 standard
	Voltage Output	2 channel in quadrature, 5 VDC, differential
	Marker Pulse	Required for position orientation
	Power Input	5 VDC, 300 mA maximum
	Max. Frequency	1 MHz
	Positioning	Optional buffered encoder pulse train output for position loop controller
Protective Functions	Vector Trip	Missing control power, over current, over voltage, under voltage, motor over speed Over temperature (motor or control), output shorted or grounded, motor overload
	External Output	LED indicator for trip conditions, 4 assignable logic outputs, 2 assignable analog outputs 0-5 VDC
	Short Circuit	Phase to phase, phase to ground
LCD Display	Running	Output frequency, motor RPM; output current, voltage (selectable)
	Setting	Parameter values for setup and review
	Trip	Separate message for each trip, last 31 trips retained in memory
Ambient Conditions	Temperature	-10 to +40°C for UL listing
	Cooling	Forced air included when required

OPTIONS: See pages 301-302 for optional Expansion Boards including RS-232, RS-485.

Series 22H Line Regenerative Vector Drive Output Ratings

Catalog Number	Size	Heavy Duty			Normal Duty			List Price	Mult. Sym.
		Hp	Continuous	Peak	Hp	Continuous	Peak		
230 Volts - Three Phase									
ZD22H210-EL	C+	10	28	56	10	28	32	10,488	E1
ZD22H215-EL	C+	15	42	72	15	42	48	11,655	E1
ZD22H220-EL	C+	20	55	110	20	55	62	13,645	E1
ZD22H225-EL	C+	25	68	116	25	68	78	15,939	E1
ZD22H230-EL	D+	30	80	136	30	80	92	17,333	E1
ZD22H240-EL	D+	40	105	200	40	105	120	21,583	E1
ZD22H250-EL	D+	50	130	225	50	130	150	26,493	E1
460 Volts - Three Phase									
ZD22H410-EL	C+	10	15	30	10	15	17	10,920	E1
ZD22H415-EL	C+	15	21	36	15	21	24	11,877	E1
ZD22H420-EL	C+	20	27	50	20	27	31	13,831	E1
ZD22H425-EL	C+	25	34	58	25	34	39	15,585	E1
ZD22H430-EL	D+	30	40	70	30	40	46	17,593	E1
ZD22H440-EL	D+	40	55	100	40	55	63	21,701	E1
ZD22H450-EL	D+	50	65	115	50	65	75	26,186	E1

NOTE: See notes on inside back flap.
OPTIONS: See pages 301-302 for optional Expansion Boards.

Series 15H, 18H, and 22H Keypad Extension Cable

For the convenience of our customers, we offer a connector plug/cable assembly. This assembly provides the connectors from the keypad to the control for remote keypad operation.

Catalog Number	Cable Extension Length	List Price	Mult. Sym.	Approx. Shpg. Wgt.
CBLH015KP	5 feet (1.5 meter)	84	E8	1
CBLH030KP	10 feet (3.0 meter)	119	E8	1
CBLH046KP	15 feet (4.6 meter)	152	E8	1
CBLH061KP	20 feet (6.1 meter)	254	E8	2
CBLH091KP	30 feet (9.1 meter)	389	E8	3
CBLH152KP	50 feet (15.2 meter)	509	E8	3
CBLH229KP	75 feet (22.9 meter)	559	E8	4
CBLH305KP	100 feet (30.5 meter)	693	E8	5

Dimensions in/(mm)

Size	Outside			Mounting		Ap'x Shpg. Wgt.
	Height	Width	Depth	Height	Width	
C+	30/(762)	11.5/(292)	12.2/(310)	29.25/(743)	10.5/(267)	160
D+	36/(914)	14.5/(368)	12.2/(310)	35.25/(895)	13.50/(343)	280

Farm Duty Motors

Definite Purpose Motors

Unit Handling Motors

Brake Motors

200 & 575 Volt Motors

IEC Frame Motors

50 Hertz Motors

Inverter/Vector Motors & Controls

DC Motors and Controls

Soft Starters & Dynamic Brakes

Series 15H and 18H Dynamic Braking Transistor Assemblies

Dynamic Braking Transistor Assemblies include braking transistor completely assembled and mounted into a NEMA 1 enclosure, to be used with External Dynamic Braking Resistor Assemblies (RGA). Select RGA assembly with matching minimum OHMS and continuous regenerative power (Watts) capacity to meet load requirements. For use with -EO and -MO Controls.

Hp	Maximum Braking Torque In % Of Motor Rating			
	380-480 Vac		550-600 Vac	
300	62%	125%	29%	100%
350	54%	108%	-	87%
400	47%	94%	-	76%
450	41%	84%	-	68%
Cat. No.	RTA4-4	RTA4-2	RTA5-14	RTA5-4
List Price	2,816	3,973	2,354	3,098
Mult. Sym.	E8	E8	E8	E8

Series 15H and 18H Dynamic Braking Resistor Assemblies

Dynamic Braking Resistor Assemblies include braking resistors completely assembled and mounted into a NEMA 1 enclosure. For 20 Hp and above (-EO, -MO Controls), select the braking resistor from the table with the matching ohms for the RTA selected and adequate continuous watts capacity to meet load requirements. For 1 to 15 Hp (-E, -ER Controls) select the braking resistor that has correct ohm value for the control and adequate continuous watts capacity to meet load requirements.

Input Voltage	Hp	Total Ohms	Continuous Rated Watts			
			4800	6400	9600	14200
460	300-450	2	RGA4802	RGA6402	RGA9602	RGA14202
		List Price	2,107	5,312	8,525	11,731
		Mult. Sym.	EC	EC	EC	EC

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**Series 15H, 18H, 19H, 20H and 22H
Expansion and Accessory Boards**

Baldor offers a wide variety of plug-in expansion boards for Series 15H Inverters, Series 18H or 22H Vector Drives and Series 19H or 20H DC Controls. Expansion boards allow the drive to be interfaced with various inputs and outputs. Each control has the capability to utilize up to two expansion boards. The following list shows boards available. The matrix shows which boards may be used together in the same control.

Board Number	Description	List Price	Mult. Sym.
ACB003A01	Isolated Input/2 Relay Output Accessory Board Contains 9 Isolated inputs for 90-130VAC. All inputs must be the same voltage. Also has 2 relay outputs, Form "C": N.O. and N. C. Accessory Board mounts in Expansion Board slot but uses wiring harness to connect to motor control card. Requires control board with onboard 24VDC power supply.	373	E8
EXB003A04	Isolated Input Board Contains 9 isolated inputs jumper configurable for 10-30 VAC or 10-30 VDC. All must be the same voltage - one side of all inputs is common. This board replaces the opto inputs on the main control board. Uses screw terminals for connection. (Use with Series 15H, 18H and 22H only)	295	E8
EXB003A05	Isolated Input Board Contains 9 isolated inputs jumper configurable for 90-130 VAC. All must be the same voltage - one side of all inputs is common. This board replaces the opto inputs on the main control board. Uses screw terminals for connection. (Use with Series 15H, 18H and 22H only).	295	E8
EXB004A01	Four Output Relays / 3-15 PSI Pneumatic Interface Converts 3-15 PSI air pressure to 0-10 VDC or 10-0 VDC (inverted). Also has four relays, 2 of which are jumper selectable as N.O. or N.C., rated for 230VAC, 5 amps max and two form "C". Uses screw terminals for connections. Air hose connects to 1/8" O.D. nipple on board.	542	E8
EXB005A01	Master Pulse Reference / Isolated Pulse Follower—Bi-directional jumper selectable for: 1. Master quadrature pulse reference. Provides 5 volt quadrature A and B channel outputs with complements at a pulse rate proportional to accel-decel limited speed commands. Phase of B channel is reversed for reverse direction. 2. Master speed step-direction pulse reference. Provides 5 volt pulse and direction outputs with complements at a pulse rate proportional to accel-decel limited speed command. 3. Quadrature pulse follower. Provides opto isolated inputs for 5-15 volt quadrature A and B channel input speed commands and retransmits this input as 5 volt channel A and B outputs with complements at a pulse rate proportional to accel-decel limited speed command. Motor direction reverses with input channel phase reversal. 4. Speed step and direction pulse follower. Provides opto isolated inputs for 5-15 volt input pulse and direction. Commands and retransmits these inputs as 5 volt pulse and direction outputs with complements at a pulse rate proportional to accel-decel limited speed command.	461	E8
EXB006A01	DC Tachometer Interface Allows for DC tach input voltage for motor or process feedback Jumper selectable for input voltage with software trim for 10% tolerance. 250 VDC total maximum input voltage or can be used for one analog input with 16 bits resolution for ±10V and 15 bits resolution for 0-10 VDC input. Uses screw terminals for connection.	567	E8

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**Series 15H, 18H, 19H, 20H and 22H
Expansion and Accessory Boards continued...**

Board No.	Description	List Price	Mult. Sym.												
EXB007A02	<p>High Resolution Analog Board Allows one input with up to 16 bits resolution. DC inputs: ± 10V, 0-10V, ± 5V, 0-5V, with 300 microvolt resolution. Current inputs: 4-20 mA, with 0.6 microamps resolution.</p> <table border="0"> <tr> <td style="text-align: center;">Input</td> <td style="text-align: center;">Resolution</td> </tr> <tr> <td style="text-align: center;">± 10 V</td> <td style="text-align: center;">16 bit</td> </tr> <tr> <td style="text-align: center;">0 - 10 V</td> <td style="text-align: center;">15 bit</td> </tr> <tr> <td style="text-align: center;">± 5 V</td> <td style="text-align: center;">15 bit</td> </tr> <tr> <td style="text-align: center;">0 - 5 V</td> <td style="text-align: center;">14 bit</td> </tr> <tr> <td style="text-align: center;">4 - 20 mA</td> <td style="text-align: center;">15 bit</td> </tr> </table> <p>Both the 0-10 V and 4-20 mA inputs may be inverted to 10-0 V and 20-4 mA. Two outputs, each with ± 10 VDC, 0-10 VDC or 4-20 mA with inverting capability. This replaces the analog outputs on the main control board. Uses screw terminals for connection.</p>	Input	Resolution	± 10 V	16 bit	0 - 10 V	15 bit	± 5 V	15 bit	0 - 5 V	14 bit	4 - 20 mA	15 bit	749	E8
Input	Resolution														
± 10 V	16 bit														
0 - 10 V	15 bit														
± 5 V	15 bit														
0 - 5 V	14 bit														
4 - 20 mA	15 bit														
EXB008A01	<p>Isolated Encoder Feedback Board This board is recommended for use with motors that do not have an electrically isolated encoder (Baldor Vector drive motors have isolated encoders). Contains a 0-15 VDC (300mA) isolated power supply to allow use with 5, 12 and 15 VDC encoders by jumper selection. Isolates A, B and index channels with complements. The retransmitted encoder signals may be configured in two ways with a board level jumper as follows:</p> <ol style="list-style-type: none"> For 2 channel quadrature output (A and B with complements), set jumper to disable the marker channel (index pulse) as an input. To use the marker channel (index pulse) as an input, jumper must be set to disable channel B (and compliment) output. Retransmitted signals will always be 5 VDC differential. Uses screw terminals for connection. 	791	E8												
EXB010A01	<p>Two analog output/three relay output board. Provides two isolated analog outputs each with 0-5VDC, 0-10VDC, or 4-20mA capability. Also includes three relay outputs jumper selectable for N.O. or N.C. rated for 230VAC, 5 amps maximum. Uses screw terminals for connection.</p>	461	E8												
EXB012A01	<p>RS232 and RS485 High Speed Serial Communications Allows Series 15H and 18H controls to be connected to RS232 half and full duplex and isolated RS485 half duplex, 230.4K Baud maximum. Uses DB-9 connector for RS232 and screw terminals for RS485.</p>	295	E8												
EXB013A01	<p>DeviceNet Expansion Board Allows Series 15H and 18H controls to be connected to DeviceNet Communications Bus. Uses plug in terminals for connection</p>	774	E8												
EXB014A01	<p>Profibus DP Expansion Board Allows Series 15H and 18H controls to be connected to Profibus Communications Bus. Uses plug in terminals for connection</p>	932	E8												
EXB015A01	<p>Modbus plus Expansion Board Allows Series 15H and 18H controls to be connected to Modbus Communications Bus. Uses plug in terminals for connection</p>	1,114	E8												

Notes on Mounting

Expansion Boards plug into a slot inside the control. When using one expansion board either a Group 1 or 2 board will connect by a connector on the side of the board. When two expansion boards are used one must be from Group 1 and one from Group 2.

Accessory Boards can mount into either a Group 1 or Group 2 slot. When using an Accessory Board only one other Expansion Board may be used.

Group 1 Boards

- Isolated Input Board
- EXB003A04
- EXB003A05
- Master Pulse Reference/
- Isolated Pulse Follower
- EXB005A01
- DC Tachometer Interface
- EXB006A01
- Isolated Encoder Feedback
- EXB008A01

Group 2 Boards

- Four Output Relays /
- 3-15 PSI Pneumatic Interface
- EXB004A01
- High Resolution Analog Board
- EXB007A02
- Two analog output/three relay outputs
- EXB010A01
- RS232/RS485 High Speed Serial
- Communication
- EXB012A01
- DeviceNet Communication
- EXB013A01
- Profibus DP Communication
- EXB014A01
- Modbus Plus Communication
- EXB015A01

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