ELITE®

Series 5 - 300 HP DC Motor Controls
Regenerative and Non-Regenerative

General Description

The Elite® Series of D.C. motor controls provides full range speed and torque control of 5 - 300 HP D.C. motors rated for NEMA type “C” or “D” power supplies. The E06000 models provide six SCR non-regenerative control, while the E12000 models provide twelve SCR full four quadrant regenerative control. Ten E06000 and Ten E12000 basic models are offered in compact panel mounted assemblies to cover the 5 - 300 HP range.

Each Elite® model has an electrically isolated control circuit and is easily programmed for operation on 230 VAC, 380 VAC or 460 VAC line supplies. 230 VAC input models supply variable armature voltage up to 240 VDC and a fixed field supply of 150 VDC. 380 VAC input models supply variable armature voltage up to 415 VDC and a fixed field supply of 247 VDC. 460 VAC input models supply variable armature voltage up to 500 VDC with a fixed field at 300 VDC.

All models of the Elite® Series feature a field economy circuit. This circuit automatically reduces the field supply voltage by 35% when the drive is stopped for an adjustable time period of 1 minute to 3 minutes.

Semiconductor fuses are provided for protection of the three phase A.C. line input. Auxiliary three phase fuses are provided for optional equipment and for the field supply. Also provided is fuse protection for the 115 VAC control voltage input.

Standard relay logic in the Elite® Series interfaces with customer supplied operators for Emergency Stop, Ramp Stop, Run, and Jog. Forward/Reverse direction control by a customer supplied selector switch is also available in the E12000 regenerative models. Logic is also supplied to interface a motor mounted thermostat and limit switches which can be used to lockout operation in either forward or reverse directions.

Available options include contactor run/brake chassis models, braking resistors, disconnect switches, blower starters, and Nema 12 enclosures. Carotron also offers a hand held, plug-in drive circuit monitor, Model DCM100-000, which provides precise digital voltage readouts for 20 separate circuit signals to assist in setup and troubleshooting.

Standard Features

- Programmable for operation from 230, 380 or 460 VAC 3 phase line input
- Insensitive to phase rotation of A.C. line input
- Full 10 ampere rated field supply with provisions for interfacing the Field Loss circuit to an external field supply or regulator
- Automatic Field Economy with customer adjustable “delay after stop” to reduce “idling” field voltage by 35%
- Current transformers for isolated armature current sensing
- Impedance isolation for armature voltage sensing
- Electrically isolated power modules rated at 1400 volts PIV and 1000 volts/microsecond DVDT
- Individual SCR R-C networks for transient protection
- Semiconductor line fuses for power circuit protection
- Thermostatically controlled fan (on forced ventilated models) to extend fan life
- Latching FAULT logic for safety shutdown with form “C” contact output and LED indicators for Phase Loss, Field Loss, Heatsink Overtemp and Overcurrent.
- 5 jumper selectable armature current ranges for each model to match motor rated armature current
- Timed Foldback current limiting and Overcurrent Trip with four programmable time periods of 15/75, 30/150, 45/225 and 60/300 seconds. The first number specifies time allowed at 150% current before “fold back” to 112% current. Second number speci fies time of continued operation at 112% before Overcurrent Trip occurs.
- Independent control of positive and negative motor torque from external pot or voltage reference (negative torque on E12000 regen model only)
- Lockout of forward and reverse direction of motor rotation from external contact (reverse on E12000 regen models only)
- Independently adjustable linear acceleration and deceleration from 1 to 60 seconds for forward direction and reverse directions (reverse on E12000 regen models only)
- Speed feedback is jumper selectable for Armature Voltage, D.C. Tachometer voltage (7, 50 or 100 VDC/1000 RPM), A.C. Tachometer voltage (45 or 90 VAC/1000 RPM) or Digital Encoder (300 PPR)
- D.C. Tachometer voltage is insensitive to polarity
- 12 VDC @ 100mA rated power supply for encoder excitation
- Summing input for auxiliary input signals with on-board trim pot. for scaling and jumper selection for polarity
- Buffered armature current signal output
- Buffered velocity signal output
- Buffered velocity reference signal output
- Inner current loop type control circuit for responsive and precise control of motor speed and torque
- 115 VAC logic for customer operator interface
- Zero speed logic for controlled ramp-to-stop (braking torque supplied by E12000 regen models only)
- Jog Delay circuit to allow rapid jogging without de-energizing armature contactor to give longer contactor life
- LED indicators Run, Jog, Zero Speed and Foldback for monitoring operating status of the drive
- All important adjustment potentiometers mounted on de-pluggable “Personality Board” to allow Control board replacement while preserving setup parameters. Critical pots are multiturn and normal customer adjustments are single turn with a knob
- Multilevel construction with hinged cover and sub-panel allows ready access to all printed circuit boards, fuses and power components for ease of service and replacement

Specifications

A.C. Input
- 230 VAC ± 10%, 3 phase, 50/ 60 Hz ± 2 Hz
- 380 VAC ± 10%, 3 phase, 50/60 Hz ± 2 Hz
- 460 VAC ± 10%, 3 phase, 50/60 Hz ± 2 Hz

Armature Output
- 0 to 240 VDC @ 230 VAC input
- 0 to 415 VDC @ 380 VAC input
- 0 to 500 VDC @ 460 VAC input

Field Output
- 150 VDC, 10 amps max @ 230 VAC input
- 247 VDC, 10 amps max @ 380 VAC input
- 300 VDC, 10 amps max @ 460 VAC input

Note: With drive stopped, Field Economy function reduces field voltage by 35% after adjustable time delay.

Speed Regulation
- Armature Feedback: ±1% of base speed
- Tachometer Feedback: ±0.5% of base speed
- Encoder Feedback: ±0.5% of base speed

Torque Regulation
- ±2% of range selected

Speed Range
- 20:1, motor dependent

Temperature Range
- Chassis: 0 to 55° C
- Enclosed: 0 to 40° C

Adjustments: Fuse Board
- Delay Time

Adjustments: Personality Board for E06000 Models

P1, Velocity Integral
P2, Velocity Proportional
P3, Current Integral
P4, Current Proportional
P5, Positive Current Limit
P6, IR Comp
P7, Sum Trim
P8, Integral Null
P9, Max. Speed
P10, Accel Rate
P11, Decel Rate
P12, Jog Speed
P13, Min Speed (after Fall, 95)

Adjustments: Personality Board for E12000 Models

P1, Velocity Integral
P2, Velocity Proportional
P3, Current Integral
P4, Current Proportional
P5, Positive Current Limit
P6, Negative Current Limit
P7, IR Comp
P8, Sum Trim
P9, Integral Null
P10, Forward Max. Speed
P11, Forward Accel
P12, Reverse Accel
P13, Jog Speed
P14, Reverse Max. Speed
P15, Forward Decel
P16, Reverse Decel

Horsepower ranges and current ratings

Non-regen models	Regen models	HP @ 240 VDC	HP @ 500 VDC	Cont. Amps	Peak Amps
E06020-000	E12020-000	10 HP	20 HP	36 A	54 A
E06040-000	E12040-000	20 HP	40 HP	71 A	107 A
E06060-000	E12060-000	30 HP	60 HP	107 A	161 A
E06075-000	E12075-000	40 HP	75 HP	140 A	210 A
E06100-000	E12100-000	50 HP	100 HP	174 A	263 A
E06125-000	E12125-000	60 HP	125 HP	206 A	314 A
E06150-000	E12150-000	75 HP	150 HP	256 A	384 A
E06200-000	E12200-000	100 HP	200 HP	340 A	510 A
E06250-000	E12250-000	125 HP	250 HP	425 A	637 A
E06300-000	E12300-000	150 HP	300 HP	510 A	765 A

Standard Models and Descriptions

230 VAC input	460 VAC input	Model number	Description	Approx. Shpg. Wt.	Dim.	Conn.
5-10 HP	5-20 HP	E06020-000	Chassis only, basic non-regen model	65 lbs.	H.1	H.12
15-20 HP	25-40 HP	E06040-000	Chassis only, basic non-regen model	65 lbs.	H.1	H.12
25-30 HP	50-60 HP	E06060-000	Chassis only, basic non-regen model	65 lbs.	H.1	H.12
40 HP	75 HP	E06075-000	Chassis only, basic non-regen model	65 lbs.	H.1	H.12
50 HP	100 HP	E06100-000	Chassis only, basic non-regen model	70 lbs.	H.1	H.12
60 HP	125 HP	E06125-000	Chassis only, basic non-regen model	70 lbs.	H.1	H.12
75 HP	150 HP	E06150-000	Chassis only, basic non-regen model	75 lbs.	H.2	H.12
100 HP	200 HP	E06200-000	Chassis only, basic non-regen model	200 lbs.	H.2.1	H.12.1
125 HP	250 HP	E06250-000	Chassis only, basic non-regen model	200 lbs.	H.2.1	H.12.1
150 HP	300 HP	E06300-000	Chassis only, basic non-regen model	200 lbs.	H.2.1	H.12.1

Standard Models and Descriptions

230 VAC input	460 VAC input	Model number	Description	Approx. Shpg. Wt.	Dim.	Conn.
5-10 HP	5-20 HP	E12020-000	Chassis only, basic regen model	65 lbs.	H.1	H.12
15-20 HP	25-40 HP	E12040-000	Chassis only, basic regen model	65 lbs.	H.1	H.12
25-30 HP	50-60 HP	E12060-000	Chassis only, basic regen model	65 lbs.	H.1	H.12
40 HP	75 HP	E12075-000	Chassis only, basic regen model	65 lbs.	H.1	H.12
50 HP	100 HP	E12100-000	Chassis only, basic regen model	70 lbs.	H.1	H.12
60 HP	125 HP	E12125-000	Chassis only, basic regen model	70 lbs.	H.1	H.12
75 HP	150 HP	E12150-000	Chassis only, basic regen model	75 lbs.	H.2	H.12
100 HP	200 HP	E12200-000	Chassis only, basic regen model	200 lbs.	H.2.1	H.12.1
125 HP	250 HP	E12250-000	Chassis only, basic regen model	200 lbs.	H.2.1	H.12.1
150 HP	300 HP	E12300-000	Chassis only, basic regen model	200 lbs.	H.2.1	H.12.1

Non-Regen Contactor Models

230 VAC input	460 VAC input	Model number	Description	Approx. Shpg. Wt.	Dim.	Conn.
5-10 HP	10-20 HP	E06020-C20	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	125 lbs.	H.3	H.12 & H.13
15-20 HP	25-40 HP	E06040-C40	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	125 lbs.	H.3	H.12 & H.13
25-30 HP	50-60 HP	E06060-C60	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	125 lbs.	H.3	H.12 & H.13
40 HP	75 HP	E06075-C75	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	165 lbs.	H.3	H.12 & H.13
50 HP	100 HP	E06100-C100	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	180 lbs.	H.3	H.12 & H.13
60 HP	125 HP	E06125-C125	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	190 lbs.	H.3	H.12 & H.13
75 HP	150 HP	E06150-C150	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	200 lbs.	H.3	H.12 & H.13
100 HP	200 HP	E06200-C200	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	350 lbs.	H.4	H.12.1 & H.14
125 HP	250 HP	E06250-C250	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	350 lbs.	H.4	H.12.1 & H.14
150 HP	300 HP	E06300-C300	Non-regenerative run/stop chassis model w/ arm. contactor & control XFMR	350 lbs.	H.4	H.12.1 & H.14

Standard Models and Descriptions

Regen Contactor Models

230 VAC input	460 VAC input	Model number	Description	Approx. Shpg. Wt.	Dim.	Conn.
5-10 HP	10-20 HP	E12020-C20	Regenerative run/stop chassis model with arm. contactor and control XFMR	125 lbs.	H.3	H.12 & H.13
15-20 HP	25-40 HP	E12040-C40	Regenerative run/stop chassis model with arm. contactor and control XFMR	125 lbs.	H.3	H.12 & H.13
25-30 HP	50-60 HP	E12060-C60	Regenerative run/stop chassis model with arm. contactor and control XFMR	125 lbs.	H.3	H.12 & H.13
40 HP	75 HP	E12075-C75	Regenerative run/stop chassis model with arm. contactor and control XFMR	165 lbs.	H.3	H.12 & H.13
50 HP	100 HP	E12100-C100	Regenerative run/stop chassis model with arm. contactor and control XFMR	180 lbs.	H.3	H.12 & H.13
60 HP	125 HP	E12125-C125	Regenerative run/stop chassis model with arm. contactor and control XFMR	190 lbs.	H.3	H.12 & H.13
75 HP	150 HP	E12150-C150	Regenerative run/stop chassis model with arm. contactor and control XFMR	200 lbs.	H.3	H.12 & H.13
100 HP	200 HP	E12200-C200	Regenerative run/stop chassis model with arm. contactor and control XFMR	350 lbs.	H.4	H.12.1 & H.14
125 HP	250 HP	E12250-C250	Regenerative run/stop chassis model with arm. contactor and control XFMR	350 lbs.	H.4	H.12.1 & H.14
150 HP	300 HP	E12300-C300	Regenerative run/stop chassis model with arm. contactor and control XFMR	350 lbs.	H.4	H.12.1 & H.14

Blower Starter Options

Option Number	Description	Compatible with these Blower Models	Approx. Shpg. Wt.	Dim.	Conn.
E612BS-001	0.6 to 1.0 AMP Overload Range for Three Phase	MTP-FVB2180,230VAC,1PH.	1 lb.	Mounts to Run/Stop Contactor models	Fig. H.13 & H.14
E612BS-002	0.4 to 0.6 AMP Overload Range for Three Phase	MTP-FVB3210,460VAC,3PH. MTP-FVB3250,460VAC,3PH.	1 lb.	Mounts to Run/Stop Contactor models	Fig. H.13 & H.14
E612BS-003	0.6 to 1.0 AMP Overload Range for Three Phase	MTP-FVB3210,230VAC,3PH. MTP-FVB3250,230VAC,3PH. MTP-FVB4280,460VAC,3PH.	1 lb.	Mounts to Run/Stop Contactor models	Fig. H.13 & H.14
E612BS-004	1.4 to 1.8 AMP Overload Range for Three Phase	MTP-FVB4280,230VAC,3PH. MTP-FVB6320,460VAC,3PH. MTP-FVB6400,460VAC,3PH.	1 lb.	Mounts to Run/Stop Contactor models	Fig. H.13 & H.14
E612BS-005	2.8 to 4.0 AMP Overload Range for Three Phase	MTP-FVB6230,230VAC,3PH. MTP-FVB6400,230VAC,3PH.	1 lb.	Mounts to Run/Stop Contactor models	Fig. H.13 & H.14

Disconnect Switch Options

Option Number	Description	Compatible with these models	Approx Shpg. Wt.	Dimensions	Connections
E612DS-150	150 AMP, 600 VAC, molded case disconnect switch	E06020-C20, E12020-C20 E06040-C40, E12040-C40 E06060-C60, E12060-C60 E06075-C75, E12075-C75	5 lbs.	Mounts to Run/Stop Contactor models	Fig. H.13
E612DS-225	225 AMP, 600 VAC, molded case disconnect switch	E06100-C100 E12100-C100 E06125-C125 E12125-C125	7 lbs.	Mounts to Run/Stop Contactor models	Fig. H.13
E612DS-400	400 AMP, 600 VAC, molded case disconnect switch	E06150-C150, E12150-C150 E06200-C200, E12200-C200	15 lbs.	Mounts to Run/Stop Contactor models	Fig. H.13 & H.14
E612DS-600	600 AMP, 600 VAC, Molded Case Disconnect Switch	E06250-C250, E12250-C250 E06300-C300, E12300-C300	25 lbs.	Mounts to Run/Stop Contactor Models	Fig. H.14,

Enclosure Options

Option Number	Description	Compatible with these Models	Approx. Shpg. Wt.	Dimensions
E612EN-001	NEMA 12 Enclosure	E06020-C20, E12020-C20 E06040-C40, E12040-C40 E06060-C60, E12060-C60 E06075-C75, E12075-C75	95 lbs.	Fig. H.4
E612EN-002	NEMA 12 Enclosure	E06100-C100 E12100-C100	155 lbs.	Fig. H.4
E612EN-003	NEMA 12 Enclosure	E06125-C125 E06150-C150 E12125-C125 E12150-C150	395 lbs.	Fig. H.5
E612EN-004	Blower/Filter Cooled Enclosure	E06200-C200, E12200-C200 E06250-C250, E12250-C250 E06300-C300, E12300-C300	600 lbs.	Fig. H.5

240 VDC Dynamic Braking Options

Option Number	Description	Compatible with these Motor Ratings	Approx. Shpg. Wt.	Dimensions	Connections
E612BR-205	NEMA 12 Enclosed Brake Resistor	5 HP, 240 VDC Arm.	10 lbs.	Fig. H.6	Fig. H.7
E612BR-207	NEMA 12 Enclosed Brake Resistor	7.5 HP, 240 VDC Arm.	11 lbs.	Fig. H.6	Fig. H.8
E612BR-210	NEMA 12 Enclosed Brake Resistor	10 HP, 240 VDC Arm.	19 lbs.	Fig. H.6	Fig. H.7
E612BR-215	NEMA 12 Enclosed Brake Resistor	15 HP, 240 VDC Arm.	20 lbs.	Fig. H.6	Fig. H.7
E612BR-220	NEMA 12 Enclosed Brake Resistor	20 HP, 240 VDC Arm.	30 lbs.	Fig. H.6	Fig. H.8
E612BR-225	NEMA 12 Enclosed Brake Resistor	25 HP, 240 VDC Arm.	27 lbs.	Fig. H.6	Fig. H.7
E612BR-230	NEMA 12 Enclosed Brake Resistor	30 HP, 240 VDC Arm.	27 lbs.	Fig. H.6	Fig. H.7
E612BR-240	Expanded Metal Enclosed Brake Resistor	40 HP, 240 VDC Arm.	13 lbs.	Fig. H.6	Fig. H.10
E612BR-275	Expanded Metal Enclosed Brake Resistor	50 HP, 240 VDC Arm. 60 HP, 240 VDC Arm. 75 HP, 240 VDC Arm.	15 lbs.	Fig. H.6	Fig. H.10
E612BR-2100	Expanded Metal Enclosed Brake Resistor	100 HP, 240 VDC Arm.	25lbs.	Fig. H.6	Fig. H.11
E612BR-2125	Expanded Metal Enclosed Brake Resistor	125 HP, 240 VDC Arm.	45lbs.	Fig. H.6	Fig. H.11.1
E612BR-2150	Expanded Metal Enclosed Brake Resistor	150 HP, 240 VDC Arm.	48lbs.	Fig. H.6	Fig. H.11.1

500 VDC Dynamic Braking Options

Option Number	Description	Compatible with these Motor Ratings	Approx. Shpg. Wt.	Dimensions	Connections
E612BR-405	NEMA 12 Enclosed Brake Resistor	5 HP, 500 VDC Arm.	10 lbs.	Fig. H.6	Fig. H.7
E612BR-407	NEMA 12 Enclosed Brake Resistor	7.5 HP, 500 VDC Arm.	11 lbs.	Fig. H.6	Fig. H.8
E612BR-410	NEMA 12 Enclosed Brake Resistor	10 HP, 500 VDC Arm.	11 lbs.	Fig. H.6	Fig. H.8
E612BR-415	NEMA 12 Enclosed Brake Resistor	15 HP, 500 VDC Arm.	20 lbs.	Fig. H.6	Fig. H.7
E612BR-420	NEMA 12 Enclosed Brake Resistor	20 HP, 500 VDC Arm.	22 lbs.	Fig. H.6	Fig. H.7
E612BR-425	NEMA 12 Enclosed Brake Resistor	25 HP, 500 VDC Arm.	32 lbs.	Fig. H.6	Fig. H.8
E612BR-430	NEMA 12 Enclosed Brake Resistor	30 HP, 500 VDC Arm.	32 lbs.	Fig. H.6	Fig. H.9
E612BR-440	NEMA 12 Enclosed Brake Resistor	40 HP, 500 VDC Arm.	61 lbs.	Fig. H.6	Fig. H.8
E612BR-450	NEMA 12 Enclosed Brake Resistor	50 HP, 500 VDC Arm.	72 lbs.	Fig. H.6	Fig. H.9
E612BR-460	NEMA 12 Enclosed Brake Resistor	60 HP, 500 VDC Arm.	72 lbs.	Fig. H.6	Fig. H.9
E612BR-475	Expanded Metal Enclosed Brake Resistor	75 HP, 500 VDC Arm.	20 lbs.	Fig. H.6	Fig. H.11
E612BR-4150	Expanded Metal Enclosed Brake Resistor	100 HP, 500 VDC Arm. 125 HP, 500 VDC Arm. 150 HP, 500 VDC Arm.	24 lbs.	Fig. H.6	Fig. H.11
E612BR-4200	Expanded Metal Enclosed Brake Resistor	200 HP, 500 VDC Arm.	55 lbs.	Fig. H.6	Fig. H.11
E612BR-4250	Expanded Metal Enclosed Brake Resistor	250 HP, 500 VDC Arm.	70 lbs.	Fig. H.6	Fig. H.11
E612BR-4300	Expanded Metal Enclosed Brake Resistor	300 HP, 500 VDC Arm.	85 lbs.	Fig. H.6	Fig. H.11

Dimensions

5 - 25 HP

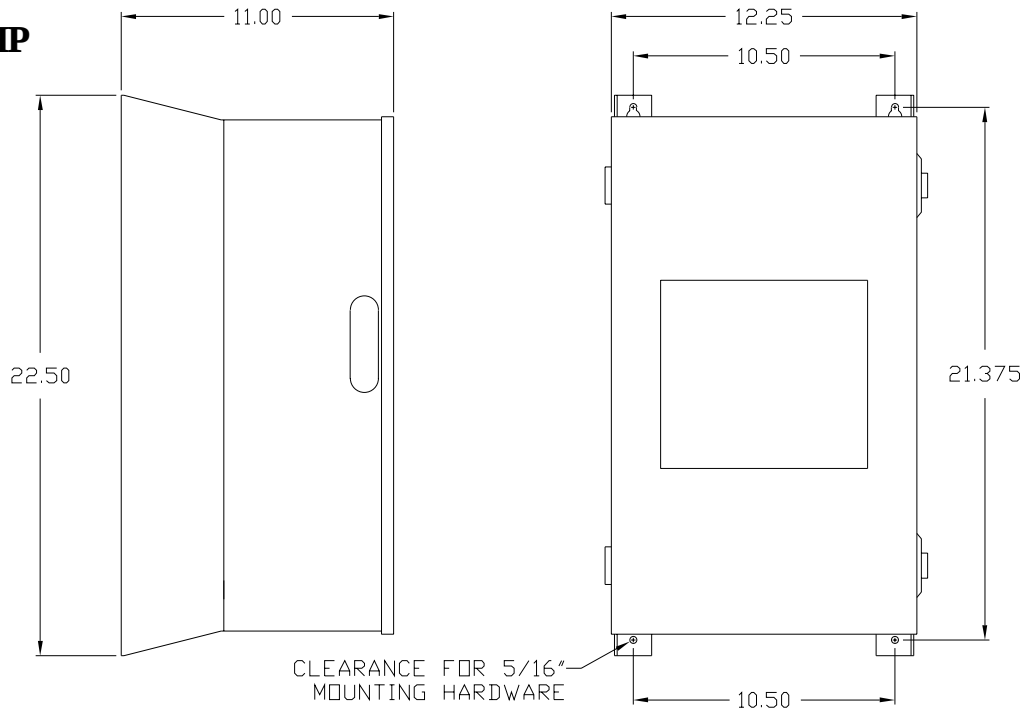


Fig. H.1

150 HP

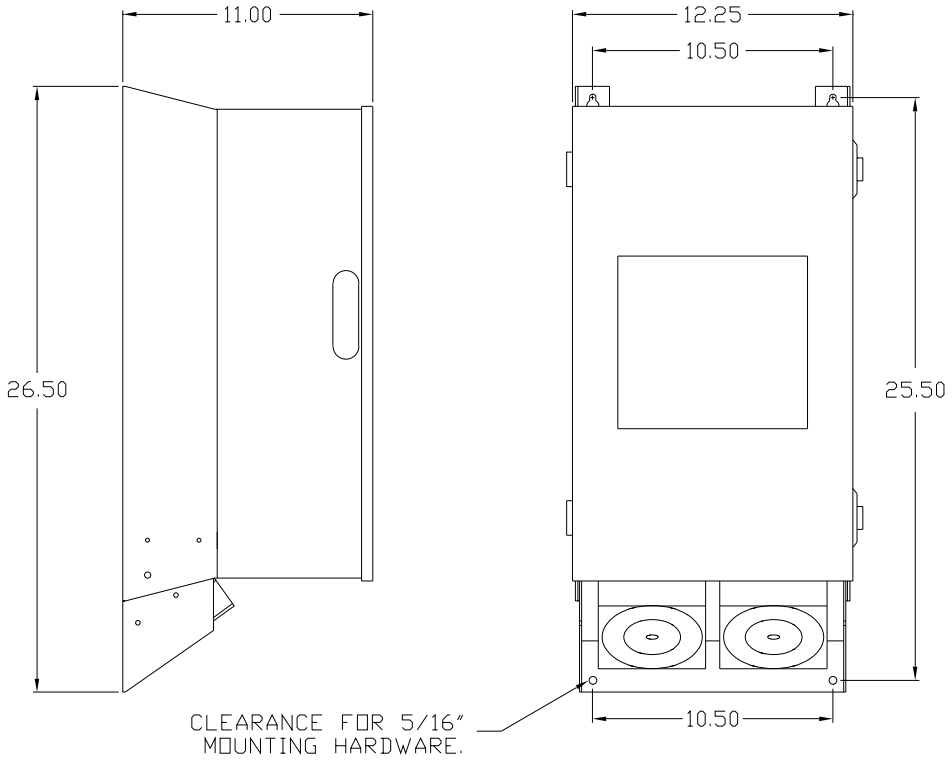


Fig. H.2

Dimensions

Option Chassis

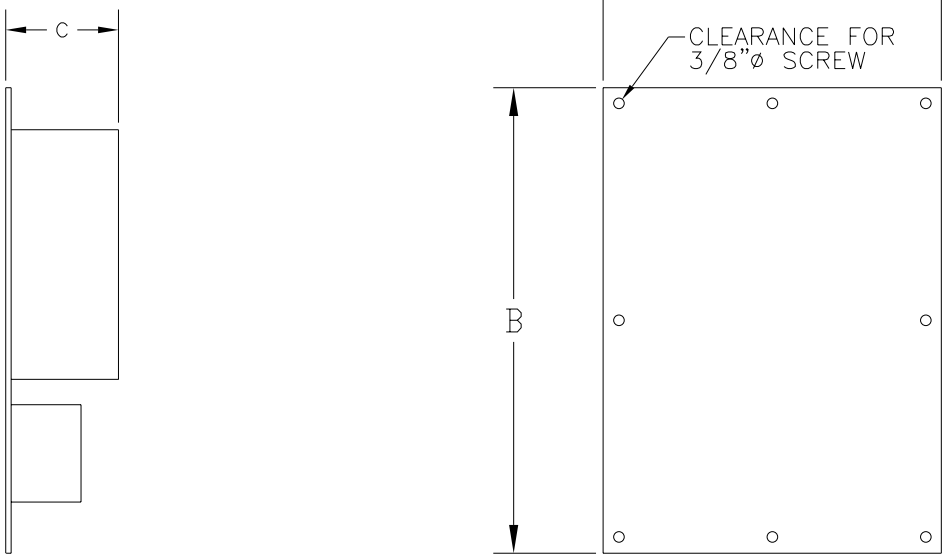


Fig. H.3

PANEL

5 - 100 HP Enclosed Options

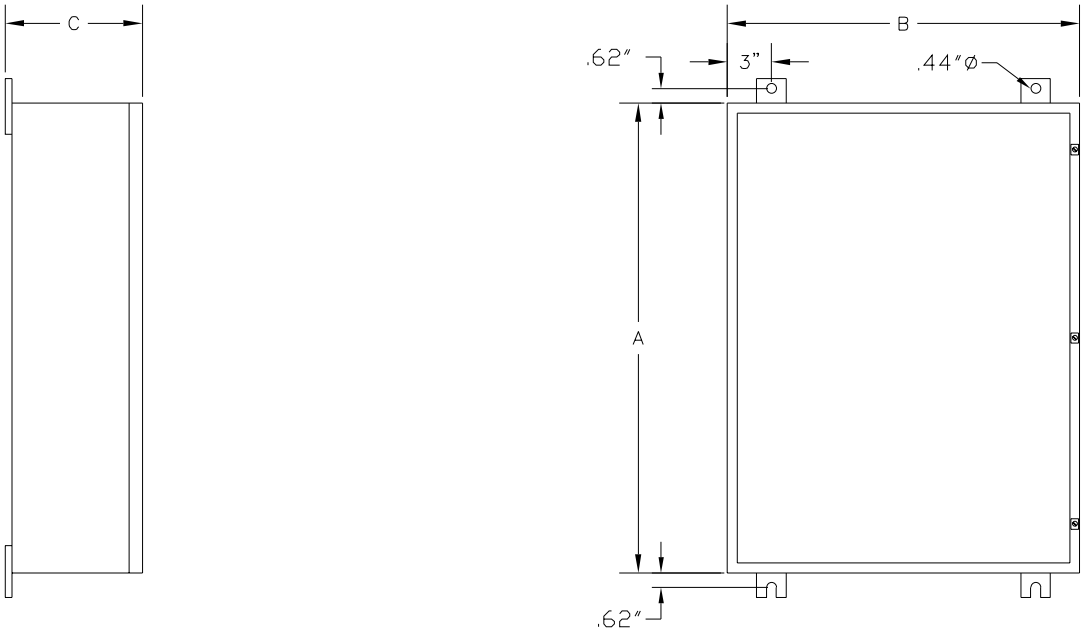
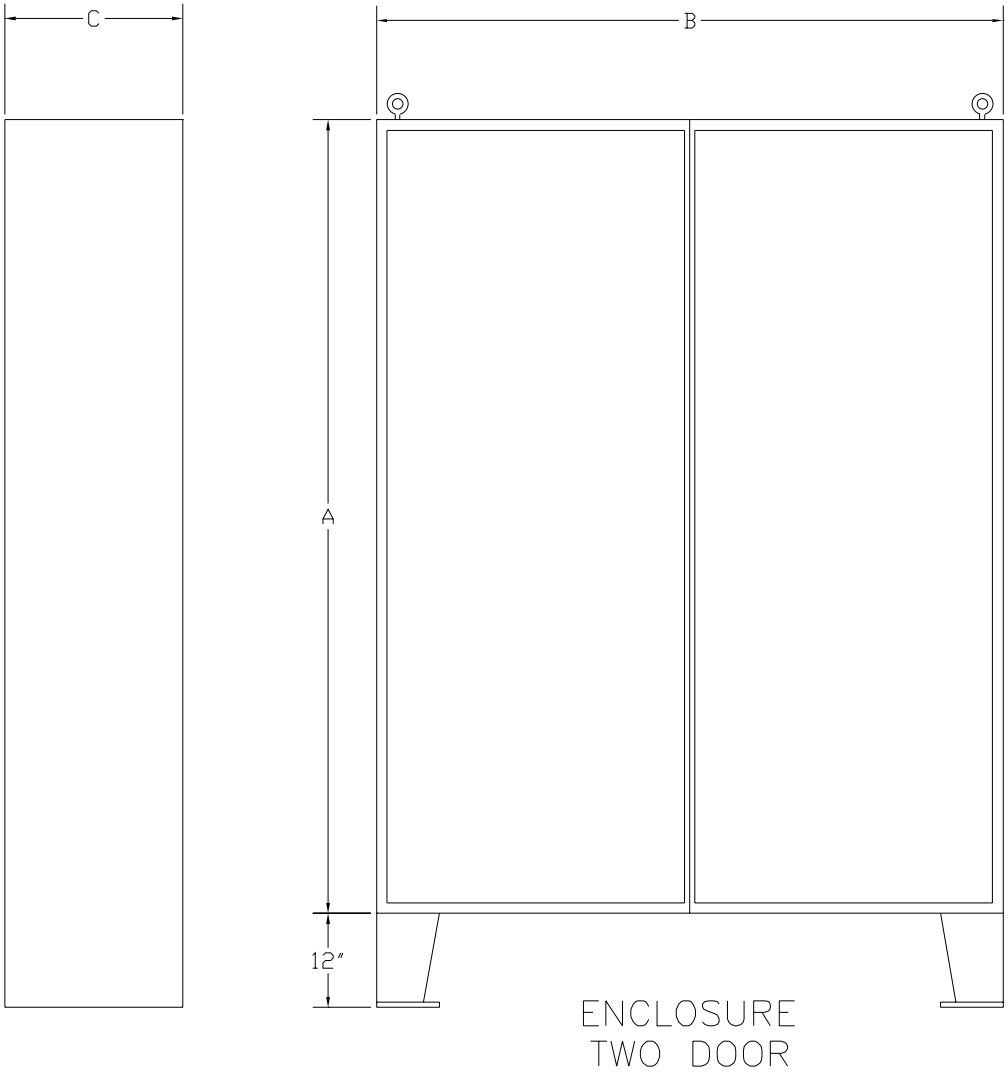


Fig. H.4

ENCLOSURE
SINGLE DOOR

Dimensions

125 - 300 HP Enclosed Options

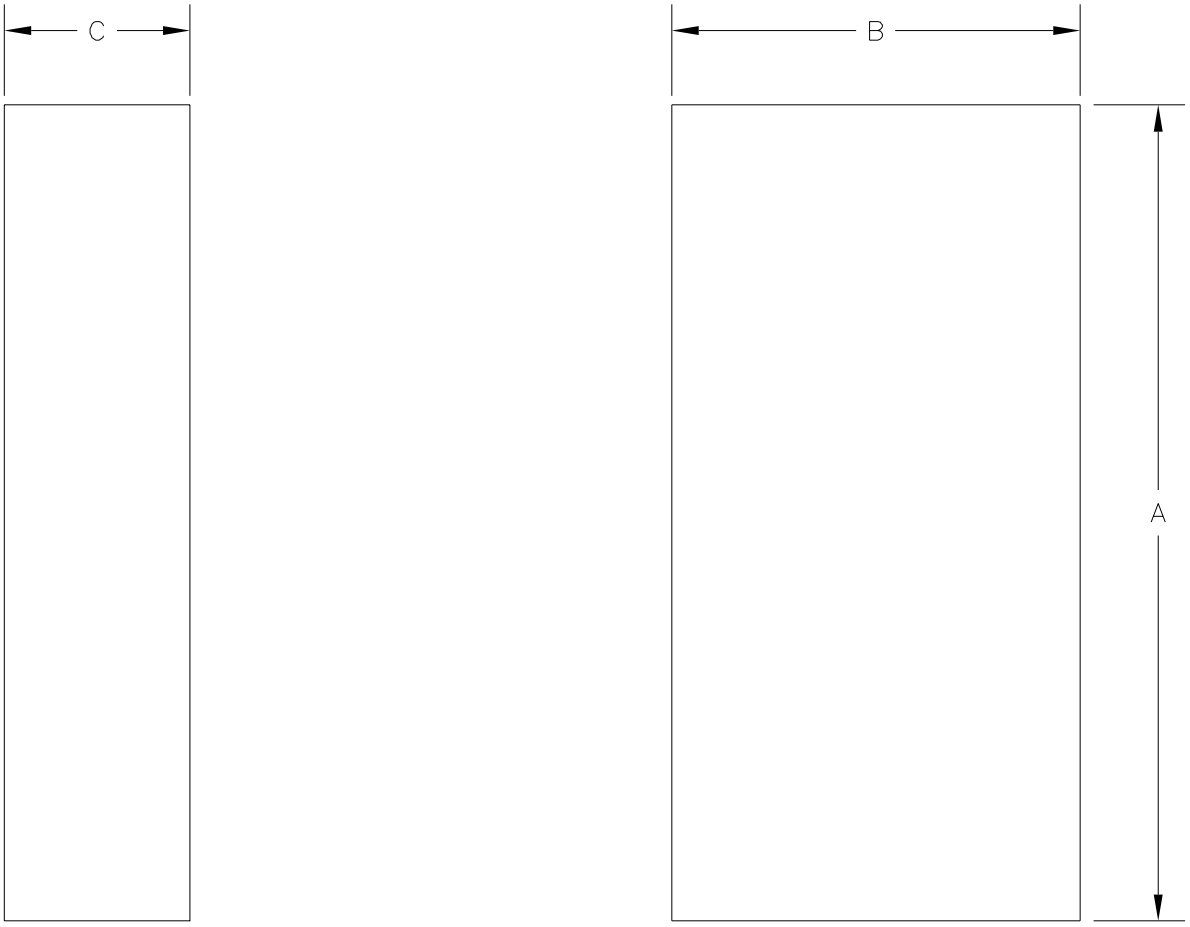


OPTIONAL DASH NO.	A	B	C
003, H03 & H04	60	48	16
004, H05 & H06	72	60	16

Fig. H.5

Dimensions

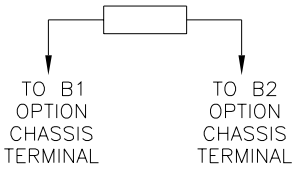
Dynamic Breaking Options



OPTIONAL DASH NO.	A	B	C	ENCLOSURE TYPE
205,207,405,407,410	18.25	5.50	4.26	NEMA 12
210,215,225,230,415,420	24.25	7.50	6.25	NEMA 12
220,425,430	24.25	9.50	8.25	NEMA 12
240,275	18.50	7.00	5.00	NEMA 12
2100	22.00	13.00	5.00	EXPANDED METAL
2125,2150	22.00	10.00	10.00	EXPANDED METAL
440,450,460	36.25	13.50	12.27	NEMA 12
475,4150	18.50	13.00	5.00	EXPANDED METAL
4200	22.00	13.00	10.00	EXPANDED METAL
4250	22.00	13.00	15.00	EXPANDED METAL
4300	22.00	13.00	20.00	EXPANDED METAL

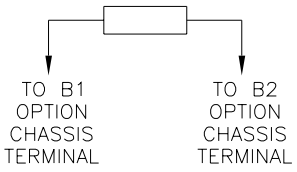
Fig. H.6

Dynamic Breaking Options



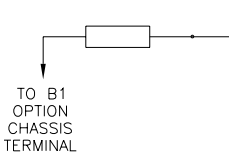
SINGLE RESISTOR
MODELS E612BR–205
E612BR–210
E612BR–215
E612BR–225
E612BR–230
E612BR–405
E612BR–415
E612BR–420

Fig. H.7



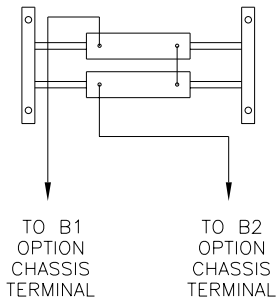
SINGLE RESISTOR
MODELS E612BR–205
E612BR–210
E612BR–215
E612BR–225
E612BR–230
E612BR–405
E612BR–415
E612BR–420

Fig. H.8



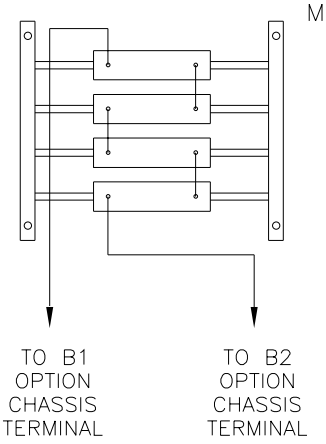
2 RESISTORS IN SERIES
MODELS E612BR–430
E612BR–450
E612BR–460

Fig. H.9



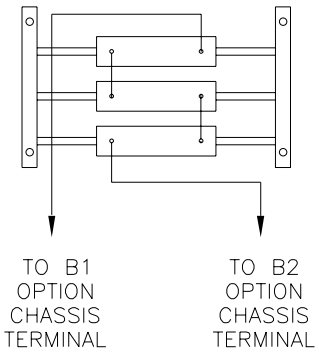
MODELS E612BR–240
E612BR–275

Fig. H.10



MODELS E612BR–475
E612BR–4150
E612BR–2100
E612BR–4200
E612BR–4250
E612BR–4300

Fig. H.11



MODELS E612BR–2125
E612BR–2150

Fig. H.11.1

200 - 300 HP Chassis Only Models

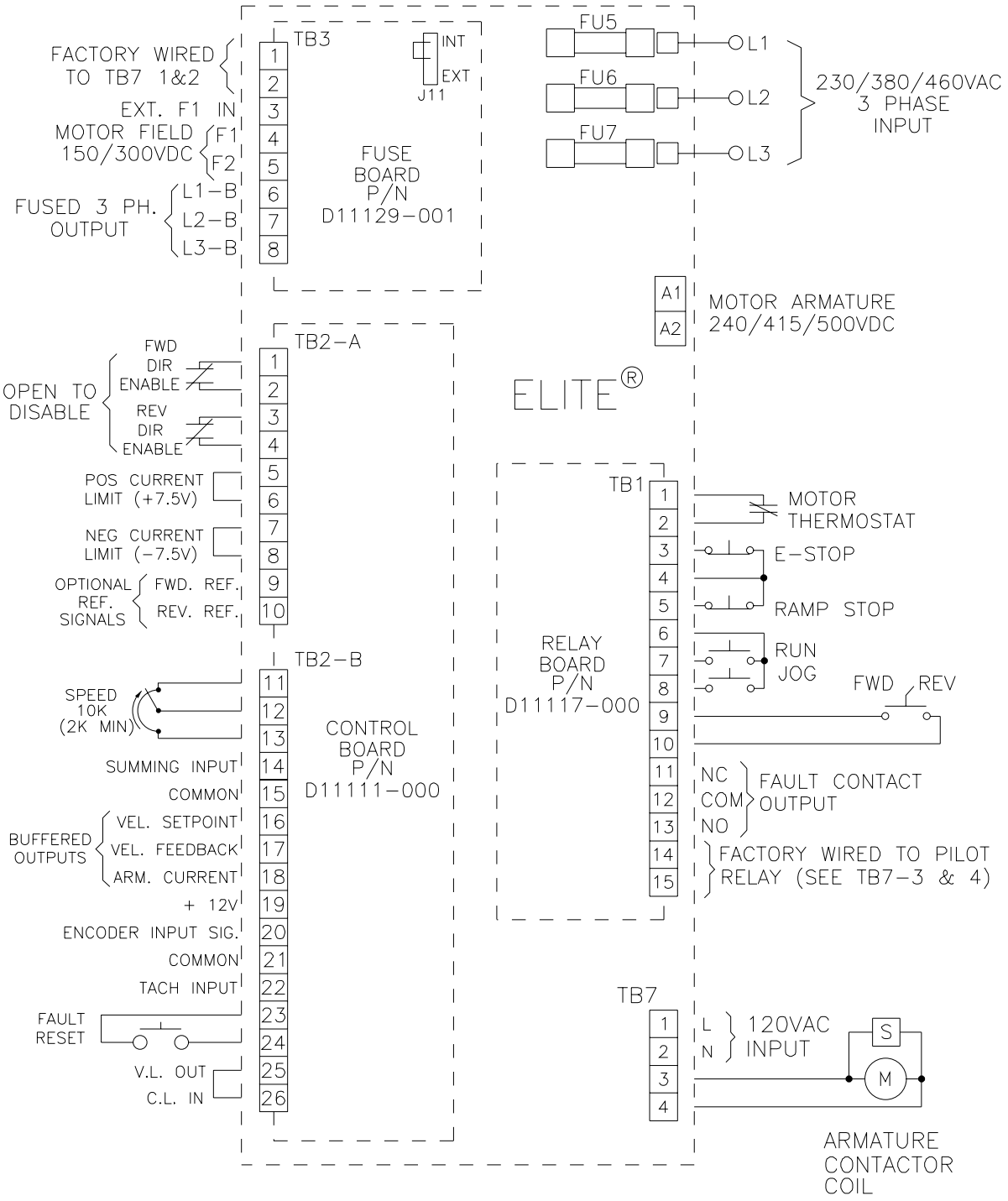


Fig. H.12.1

50 - 150 HP Run/Stop Contactors Models

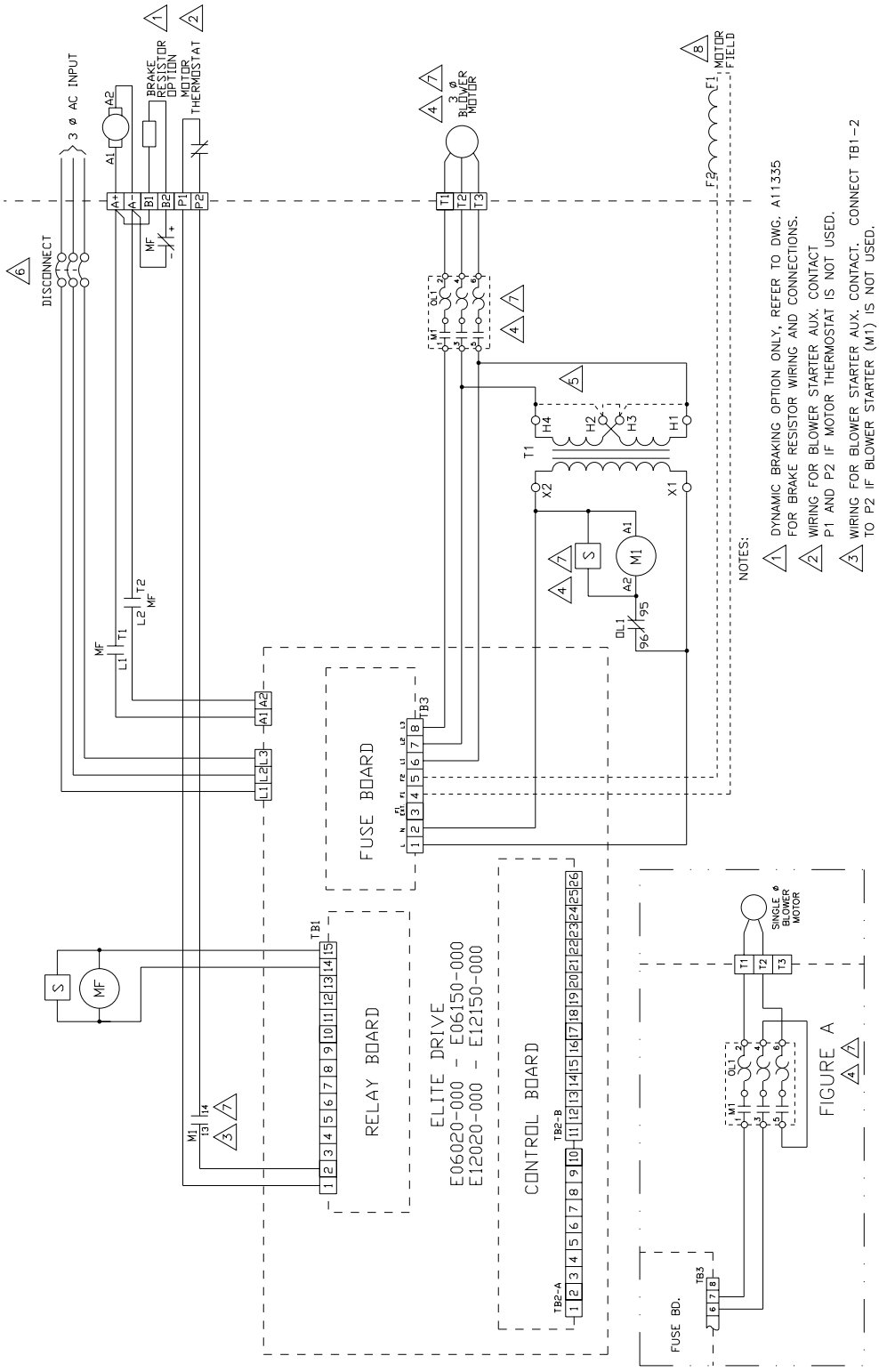


Fig. H.13

200 - 300 HP Run/Stop Contactors Models

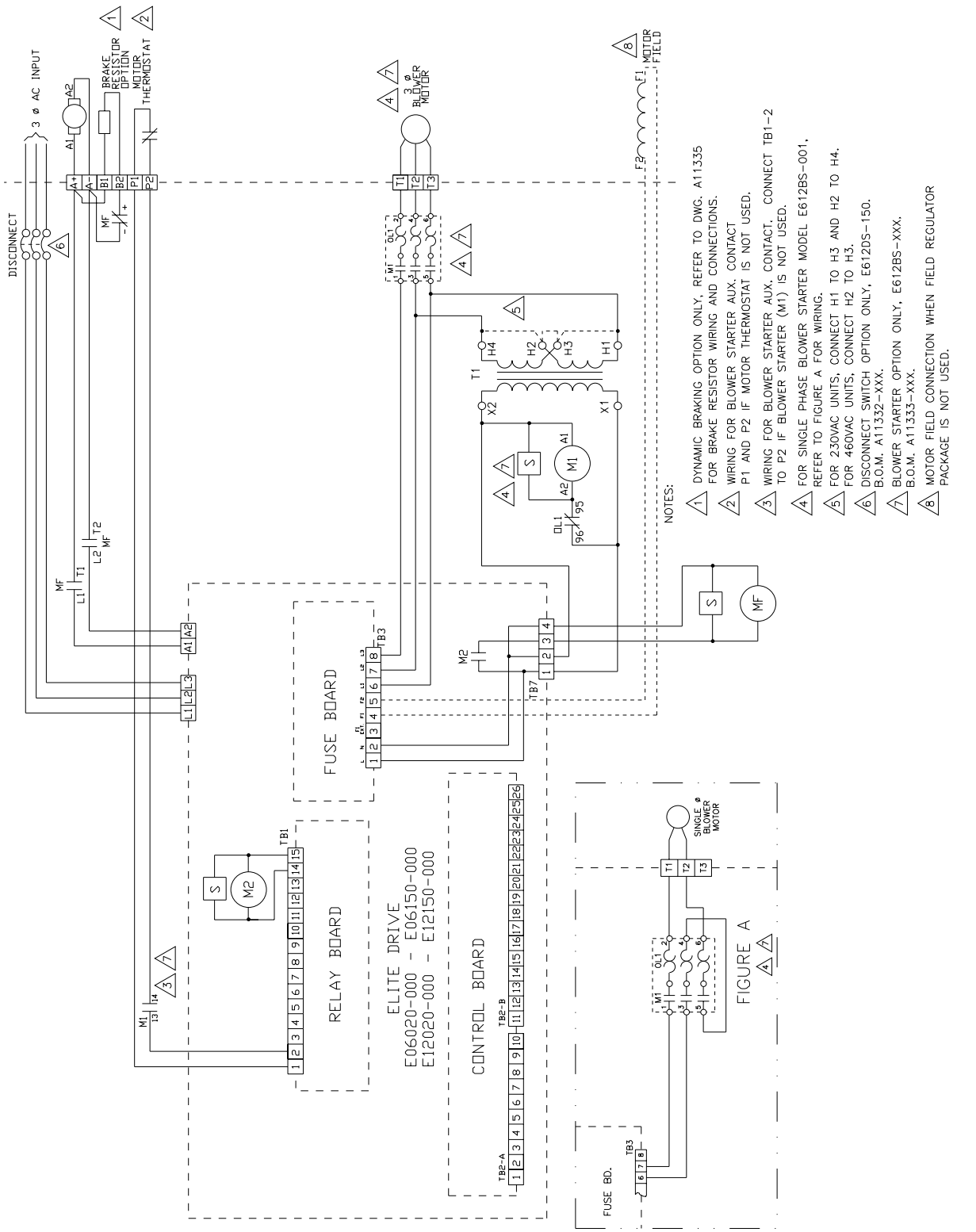


Fig. H.13