

**ASEA CONTROL**

**Reduced Voltage**

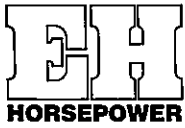
# **Starters**

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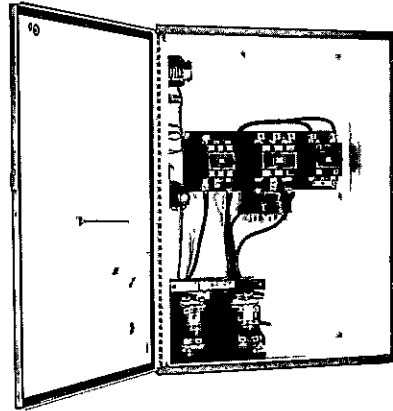
JUN 29 1967



Features



# Reduced Voltage Starters



S-RV

- Compact, space saving design
- 10 sizes, 2-7
- Maximum horsepower ratings
- Mechanically interlocking as standard for Wye-Delta and Autotransformer starters
- Incomplete sequence timer as standard for Wye-Delta and Autotransformer starters
- Remote customer connection point at separate terminal blocks
- High reliability
- Long trouble free mechanical life
- Easy removal of arc chute for quick inspection and change of contacts
- Control circuit transformer standard
- Heavy duty construction for even longer electrical life
- Double break contact design with magnetic arc chamber extinguishes arc in the shortest possible time
- Class 10 adjustable overload relays
  - Single phase & phase unbalance protection
  - Isolated alarm circuit (N.O.) contact
  - Ambient compensation from -20°C to +65°C
  - Manual test
  - Manual or automatic reset
  - Factory calibrated and tested for high accuracy
  - Self-contained heater coils -- no field installation is necessary (included in price)
  - Wide adjustment range

**GENERAL COMPARISON OF CHARACTERISTICS OF VARIOUS METHODS OF REDUCED VOLTAGE MOTOR STARTING**

CHARACTERISTICS	REDUCED VOLTAGE STARTING				
	AUTOTRANSFORMER <sup>①</sup>			PART-WINDING 2-Step	WYE (STAR)-DELTA
	50% Tap	65% Tap	80% Tap		
Starting current drawn from line as % of that which would be drawn upon full-voltage starting	25%	42%	64%	65% <sup>②</sup>	33 <sup>1</sup> / <sub>3</sub> %
Starting torque developed as % of that which would be developed on full-voltage starting. <sup>③</sup>	25%	42%	64%	42% <sup>②</sup>	33 <sup>1</sup> / <sub>3</sub> %
Smoothness of acceleration.	First in order of smoothness.			Third in order of smoothness.	Second in order of smoothness.
Starting current and torque adjustment.	Adjustable within limits of various taps.			Fixed.	
Allowable Class 10 overload relay acceleration.	30 sec <sup>④</sup>	25 sec	10 sec	4 sec <sup>⑤</sup>	40 sec
Allowable Class 20 overload relay acceleration.	30 sec <sup>④</sup>	30 sec <sup>④</sup>	20 sec	4 sec	60 sec <sup>⑤</sup>

<sup>①</sup> Closed transition.  
<sup>②</sup> Approximate values only. Exact values can be obtained from motor manufacturer.  
<sup>③</sup> Full-voltage start usually draws between 500% and 600% of full-load current.  
<sup>④</sup> Based on medium duty transformer.  
<sup>⑤</sup> Limited by motor design.

### General Descriptions

The purpose of a reduced voltage starter is to reduce the voltage to the motor during start-up. The reduced voltage lowers the inrush current to meet power company restrictions and provide a softer start.

#### AUTOTRANSFORMER STARTERS

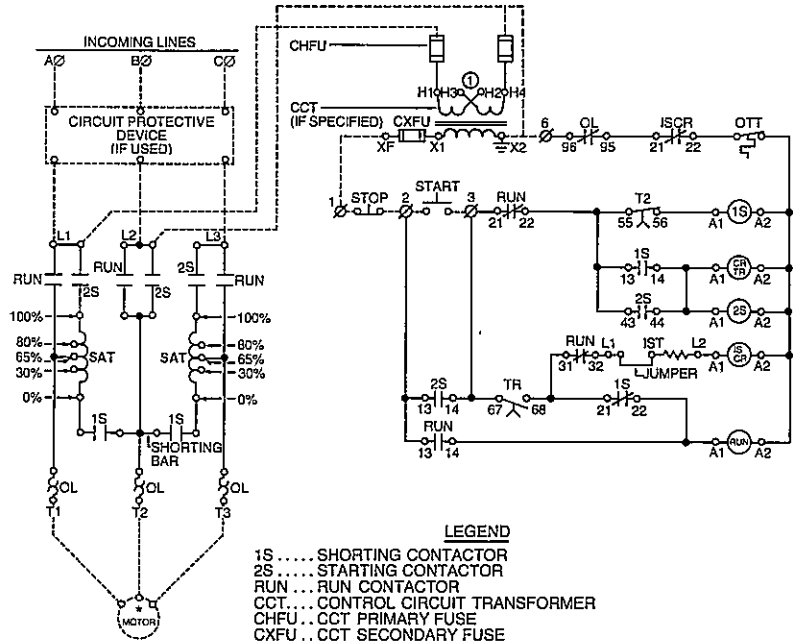
An autotransformer starter reduces inrush current by using a transformer in the line just ahead of the motor to step down the voltage applied to the motor terminals. By reducing the voltage, the current drawn from the line is reduced during start-up.

When the motor is up to speed and the setting time on the timer has expired, the auto-transformer is bypassed. The 1S contactor drops out, the run contactor closes, and the 2S contactor opens providing full voltage to the motor.

The ASEA CONTROL autotransformer starter is a closed transition type meaning that the motor remains connected to the line during the entire acceleration period.

The transformer has three taps which provide 50%, 65%, and 80% of full line voltage. At delivery, the transformer is connected to the 65% tap; the inrush current will be reduced to 42% of normal; and the starting torque will be reduced to 42%.

This starter can be used for any squirrel-cage motor.



- LEGEND**
- 1S ..... SHORTING CONTACTOR
  - 2S ..... STARTING CONTACTOR
  - RUN ..... RUN CONTACTOR
  - CCT ..... CONTROL CIRCUIT TRANSFORMER
  - CHF ..... CCT PRIMARY FUSE
  - CXF ..... CCT SECONDARY FUSE
  - OL ..... OVERLOAD RELAY
  - IST ..... INCOMPLETE SEQUENCE TIMER
  - ISCR ..... INCOMPLETE SEQUENCE CONTROL RELAY
  - SAT ..... STARTING AUTO TRANSFORMER
  - OTT ..... OVER-TEMPERATURE THERMOSTAT (ON SAT)
  - CR ..... CONTROL RELAY
  - TR ..... TIMING RELAY
  - CT ..... CURRENT TRANSFORMER
  - \* ..... REMOTE DEVICE
  - TB ..... TERMINAL BLOCK
  - Ø ..... CUSTOMER CONNECTION POINT AT TB

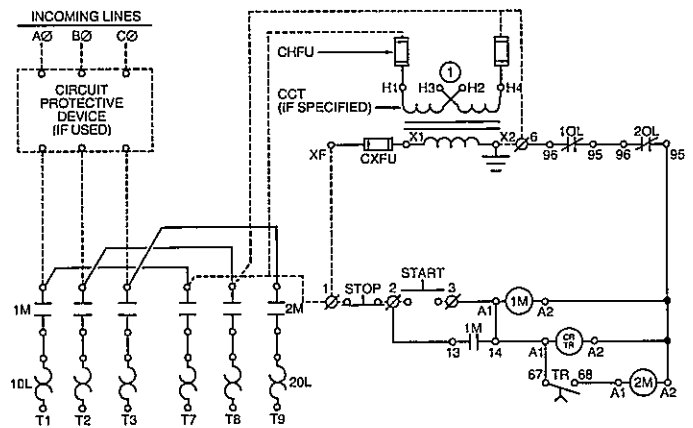
#### PART WINDING STARTERS

The part winding starter reduces inrush current by using two different sets of windings in the motor. Therefore, part winding starters can only be used with motors having stator windings divided into two equal parts with the terminals of each part available for external connection.

The part winding starter consists of two across the line starters and a timer. The first starter is used to connect one winding of the motor across the line. The starting current from one winding will be about 50% of the starting current if both windings were connected. The starting torque is correspondingly 50%.

Because the starting torque is so low and will not increase when only one winding is connected, the motor may not begin to accelerate. Therefore, the time delay for the second winding to be energized should be no more than 4 seconds.

When the second winding is energized, the inrush current will increase depending on the speed the motor has when the second winding is energized.



- LEGEND**
- CCT ..... CONTROL CIRCUIT TRANSFORMER
  - CHF ..... CCT PRIMARY FUSE
  - CXF ..... CCT SECONDARY FUSE
  - CR ..... CONTROL RELAY
  - TR ..... TIMING RELAY
  - 1M ..... FIRST MAIN CONTACTOR
  - 2M ..... SECOND MAIN CONTACTOR
  - 1OL ..... FIRST OVERLOAD RELAY
  - 2OL ..... SECOND OVERLOAD RELAY
  - TB ..... TERMINAL BLOCK
  - Ø ..... CUSTOMER'S CONNECTION POINT AT TB
  - Ø3 ..... CONNECTION POINT ON DEVICE W/NUMBER
  - \* ..... REMOTE DEVICE

### General Descriptions

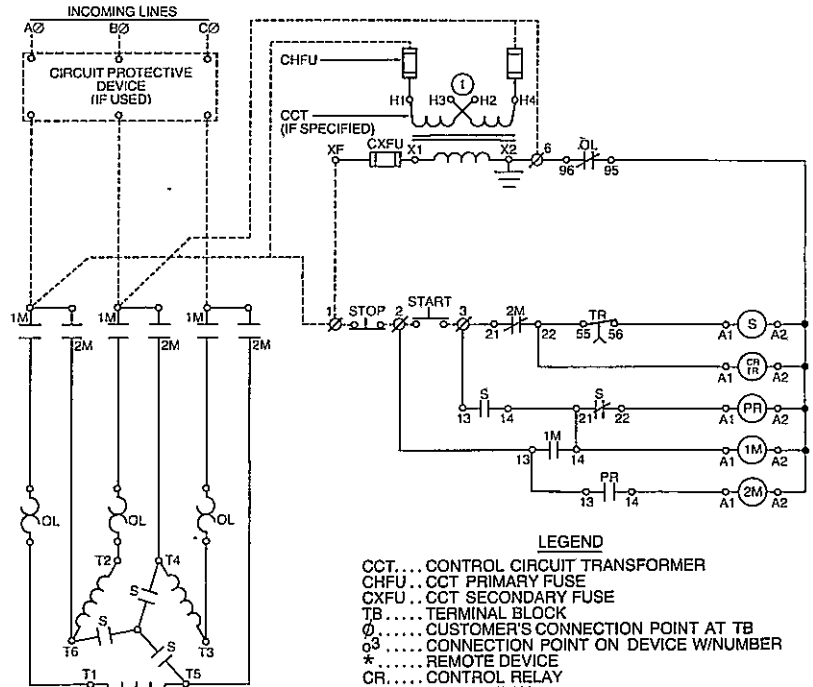
S-RV

#### WYE-DELTA STARTER Open Transition

The wye-delta open transition starter starts the motor by closing the S and 1M contactors which energize the windings in wye. The inrush current in wye is reduced to 33% of what it would be if the motor was started with an across the line starter.

The starting time in wye is adjustable with a timer. After the elapsed time, the S contactor opens which closes the 2M contactor; there is a short period (about 50ms) when the motor is not energized; and then the motor runs full voltage in delta.

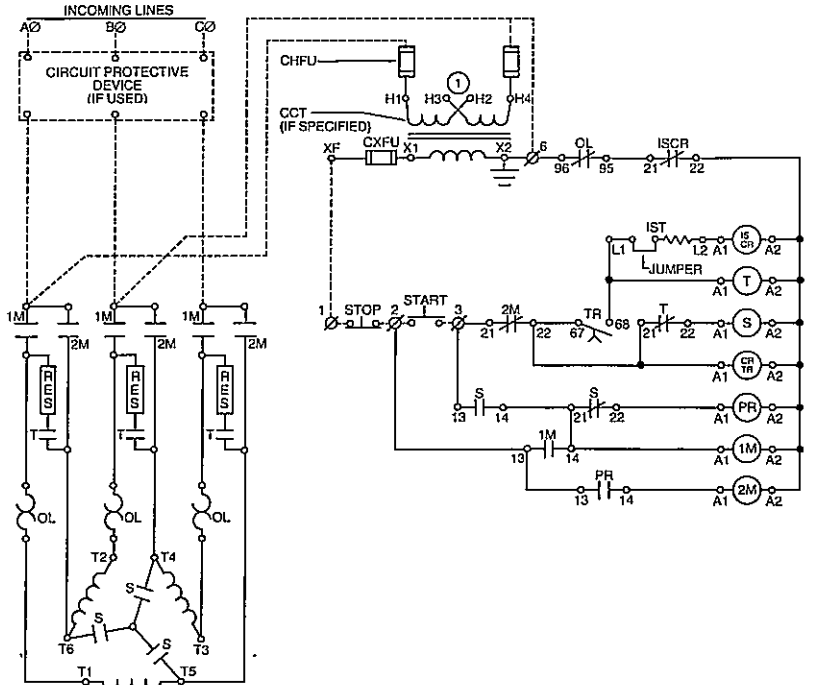
A wye-delta starter requires a wye-delta wound motor with all six leads terminated outside the motor housing.



- LEGEND**
- CCT... CONTROL CIRCUIT TRANSFORMER
  - CHF... CCT PRIMARY FUSE
  - CXFU... CCT SECONDARY FUSE
  - TB... TERMINAL BLOCK
  - Ø... CUSTOMER'S CONNECTION POINT AT TB
  - ø³... CONNECTION POINT ON DEVICE W/NUMBER
  - \*... REMOTE DEVICE
  - CR... CONTROL RELAY
  - PR... PILOT RELAY
  - TR... TIMING RELAY
  - CT... CURRENT TRANSFORMER
  - OL... OVERLOAD RELAY
  - S... SHORTING (or WYE) CONTACTOR
  - 1M... FIRST MAIN CONTACTOR
  - 2M... SECOND MAIN CONTACTOR

#### WYE-DELTA STARTER Closed Transition

The wye-delta closed transition starter works the same way as the open transition wye-delta starter except the closed transition version utilizes a set of resistors during the transition from start to run (wye to delta connection). These resistors eliminate the open circuit and prevent transient currents.



- LEGEND**
- CCT... CONTROL CIRCUIT TRANSFORMER
  - CHF... CCT PRIMARY FUSE
  - CXFU... CCT SECONDARY FUSE
  - TB... TERMINAL BLOCK
  - Ø... CUSTOMER'S CONNECTION POINT AT TB
  - ø³... CONNECTION POINT ON DEVICE W/NUMBER
  - \*... REMOTE DEVICE
  - CR... CONTROL RELAY
  - PR... PILOT RELAY
  - TR... TIMING RELAY
  - CT... CURRENT TRANSFORMER
  - OL... OVERLOAD RELAY
  - S... SHORTING (or WYE) CONTACTOR
  - 1M... FIRST MAIN CONTACTOR
  - 2M... SECOND MAIN CONTACTOR
  - T... TRANSITION CONTACTOR
  - RES... TRANSITION RESISTOR(S)
  - ISCR... INCOMPLETE SEQUENCE CONTROL RELAY
  - IST... INCOMPLETE SEQUENCE TIMER

## Auto Transformer Type, Closed Transition, Non-Combination

-RV

NEMA SIZE Ⓞ Ⓢ	MAXIMUM HORSEPOWER RATINGS			OVERLOAD RELAY AMP RANGE Ⓞ	NON-COMBINATION OPEN ⓄⓄⓄ CATALOG NUMBER	LIST PRICE	NON-COMBINATION NEMA 1 ⓄⓄ CATALOG NUMBER	LIST PRICE
	230V	460V	575V					
2 EH 50	15	30 40	40 50	28-42 28-42 40-52 28-42 40-52	EH50SA-1D2B EH50SA-1D4E EH50SA-1E4F EH50SA-1D6F EH50SA-1E6G	\$ 2057	EH50SA1-1D2B EH50SA1-1D4E EH50SA1-1E4F EH50SA1-1D6F EH50SA1-1E6G	\$ 2286
2½ EH 65	20	50	60	52-65 52-65 52-65	EH65SA-1F2C EH65SA-1F4G EH65SA-1F6H	2115	EH65SA1-1F2C EH65SA1-1F4G EH65SA1-1F6H	2350
3 EH 100	25 30	60	75	50-80 50-80 50-80 50-80	EH100SA-1G2D EH100SA-1G2E EH100SA-1G4H EH100SA-1G6J	2417	EH100SA1-1G2D EH100SA1-1G2E EH100SA1-1G4H EH100SA1-1G6J	2686
4 EH 150	40 50	75 100	100 125	80-130 80-130 80-130 80-130 80-130 80-130	EH150SA-1J2F EH150SA-1J2G EH150SA-1J4J EH150SA-1J4K EH150SA-1J6K EH150SA-1J6L	4671	EH150SA1-1J2F EH150SA1-1J2G EH150SA1-1J4J EH150SA1-1J4K EH150SA1-1J6K EH150SA1-1J6L	5190
4½ EH 160	60	125	150	115-160 115-160 115-160	EH160SA-1K2H EH160SA-1K4L EH160SA-1K6M	6919	EH160SA1-1K2H EH160SA1-1K4L EH160SA1-1K6M	7688
5 EH 250	75 100	150 200	200 250	128-200 200-300 128-200 200-300 128-200 200-300	EH250SA-1G2J EH250SA-1P2K EH250SA-1G4M EH250SA-1P4N EH250SA-1G6N EH250SA-1P6P	7423	EH250SA1-1G2J EH250SA1-1P2K EH250SA1-1G4M EH250SA1-1P4N EH250SA1-1G6N EH250SA1-1P6P	8248
5½ EH 450	125 150	250 300 350	300 350 400	200-300 320-480 200-300 320-480 320-480 200-300 320-480 320-480	EH450SA-1P2L EH450SA-1J2M EH450SA-1P4P EH450SA-1J4R EH450SA-1J4S EH450SA-1P6R EH450SA-1J4S EH450SA-1J6T	10,433	EH450SA1-1P2L EH450SA1-1J2M EH450SA1-1P4P EH450SA1-1J4R EH450SA1-1J4S EH450SA1-1P6R EH450SA1-1J4S EH450SA1-1J6T	11,592
6 EH 550	200	400	500	320-480 320-480 320-480	EH550SA-1J2N EH550SA-1J4T EH550SA-1J6U	14,810	EH550SA1-1J2N EH550SA1-1J4T EH550SA1-1J6U	16,456
6½ EH 700	250	500	600	480-720 480-720 480-720	EH700SA-1K2P EH700SA-1K4U EH700SA-1K6V	17,032	EH700SA1-1K2P EH700SA1-1K4U EH700SA1-1K6V	18,924
7 EH 800	300	600	600	600-900 600-900 375-600	EH800SA-1J2R EH800SA-1J4V EH800SA-1P6V	23,904	EH800SA1-1J2R EH800SA1-1J4V EH800SA1-1P6V	26,560

### OVERLOAD RELAY PROTECTION

The catalog number and price includes a Class 10 overload relay with self-contained adjustable heater elements. If a Class 20 overload relay is desired, refer to page 12.

- Ⓞ In-between sizes are determined by the manufacturer and are not defined by NEMA.
- Ⓞ Consult factory for smaller sizes.
- Ⓞ Overload relay has been sized for 1800 RPM. Check the FLA on the motor to ensure proper overload protection.
- Ⓞ Starters listed above have 120V, 60Hz Coils. For other coil voltages, see Coil Voltage Selection Chart on the next page.
- Ⓞ FACTORY MODIFICATIONS — Refer to page 11.
- Ⓞ Open type autotransformer starters are supplied with a separate unwired autotransformer.

## Auto Transformer Type, Closed Transition, Combination

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COMBINATION WITH NON-FUSIBLE DISCONNECT SWITCH NEMA 1 ①②	LIST PRICE	COMBINATION WITH FUSIBLE DISCONNECT SWITCH NEMA 1 ①②		LIST PRICE	COMBINATION WITH THERMAL MAGNETIC CIRCUIT BREAKER ③④		LIST PRICE
		FUSE CLIP RATING ⑤	CATALOG NUMBER		BREAKER AMP RATING 600V	CATALOG NUMBER	
EH50SAN1-1D2B EH50SAN1-1D4E EH50SAN1-1E4F EH50SAN1-1D6F EH50SAN1-1E6G	\$ 2766	100A 250V 100A 600V 100A 600V 100A 600V 100A 600V	EH50SAF1-1D2B EH50SAF1-1D4E EH50SAF1-1E4F EH50SAF1-1D6F EH50SAF1-1E6G	\$ 2798	70 70 100 80 100	EH50SAB1-1D2B EH50SAB1-1D4E EH50SAB1-1E4F EH50SAB1-1D6F EH50SAB1-1E6G	\$ 2974
EH65SAN1-1F2C EH65SAN1-1F4G EH65SAN1-1F6H	2958	100A 250V 100A 600V 100A 600V	EH65SAF1-1F2C EH65SAF1-1F4G EH65SAF1-1F6H	3006	100 100 100	EH65SAB1-1F2C EH65SAB1-1F4G EH65SAB1-1F6H	3070
EH100SAN1-1G2D EH100SAN1-1G2E EH100SAN1-1G4H EH100SAN1-1G6J	3294	100A 250V 200A 250V 200A 600V 200A 600V	EH100SAF1-1G2D EH100SAF1-1G2E EH100SAF1-1G4H EH100SAF1-1G6J	3342	100 125 125 125	EH100SAB1-1G2D EH100SAB1-1G2E EH100SAB1-1G4H EH100SAB1-1G6J	3434
EH150SAN1-1J2F EH150SAN1-1J2G EH150SAN1-1J4J EH150SAN1-1J4K EH150SAN1-1J6K EH150SAN1-1J6L	6030	200A 250V 200A 250V 200A 600V 200A 600V 200A 600V 200A 600V	EH150SAF1-1J2F EH150SAF1-1J2G EH150SAF1-1J4J EH150SAF1-1J4K EH150SAF1-1J6K EH150SAF1-1J6L	6206	150 200 150 200 150 200	EH150SAB1-1J2F EH150SAB1-1J2G EH150SAB1-1J4J EH150SAB1-1J4K EH150SAB1-1J6K EH150SAB1-1J6L	6557
EH160SAN1-1K2H EH160SAN1-1K4L EH160SAN1-1K6M	9192	400A 250V 400A 600V 400A 600V	EH160SAF1-1K2H EH160SAF1-1K4L EH160SAF1-1K6M	9336	250 250 250	EH160SAB1-1K2H EH160SAB1-1K4L EH160SAB1-1K6M	10,348
EH250SAN1-1G2J EH250SAN1-1P2K EH250SAN1-1G4M EH250SAN1-1P4N EH250SAN1-1G6N EH250SAN1-1P6P	9752	400A 250V 400A 250V 400A 600V 400A 600V 400A 600V 400A 600V	EH250SAF1-1G2J EH250SAF1-1P2K EH250SAF1-1G4M EH250SAF1-1P4N EH250SAF1-1G6N EH250SAF1-1P6P	9896	300 350 300 350 300 350	EH250SAB1-1G2J EH250SAB1-1P2K EH250SAB1-1G4M EH250SAB1-1P4N EH250SAB1-1G6N EH250SAB1-1P6P	10,908
EH450SAN1-1P2L EH450SAN1-1J2M EH450SAN1-1P4P EH450SAN1-1J4R EH450SAN1-1J4S EH450SAN1-1P6R EH450SAN1-1J4S EH450SAN1-1J6T	15,044	600A 250V 600A 250V 600A 600V 600A 600V 800A 600V 600A 600V 600A 600V 600A 600V	EH450SAF1-1P2L EH450SAF1-1J2M EH450SAF1-1P4P EH450SAF1-1J4R EH450SAF1-1J4S EH450SAF1-1P6R EH450SAF1-1J4S EH450SAF1-1J6T	15,936	500 600 600 600 700 500 500 600	EH450SAB1-1P2L EH450SAB1-1J2M EH450SAB1-1P4P EH450SAB1-1J4R EH450SAB1-1J4S EH450SAB1-1P6R EH450SAB1-1J4S EH450SAB1-1J6T	15,502
EH550SAN1-1J2N EH550SAN1-1J4T EH550SAN1-1J6U	19,908	800A 250V 800A 600V 800A 600V	EH550SAF1-1J2N EH550SAF1-1J4T EH550SAF1-1J6U	20,800	700 700 700	EH550SAB1-1J2N EH550SAB1-1J4T EH550SAB1-1J6U	20,372
EH700SAN1-1K2P EH700SAN1-1K4U EH700SAN1-1K6V	22,576	1200A 250V 1200A 600V 1200A 600V	EH700SAF1-1K2P EH700SAF1-1K4U EH700SAF1-1K6V	26,540	1000 1000 1000	EH700SAB1-1K2P EH700SAB1-1K4U EH700SAB1-1K6V	24,352
EH800SAN1-1J2R EH800SAN1-1J4V EH800SAN1-1K6V	30,212	1200A 250V 1200A 600V 1200A 600V	EH800SAF1-1J2R EH800SAF1-1J4V EH800SAF1-1K6V	34,176	1200 1200 1000	EH800SAB1-1J2R EH800SAB1-1J4V EH800SAB1-1K6V	31,988

### VOLTAGE SELECTION CHARTS

COIL VOLTAGE											CONTROL TRANSFORMERS				LIST PRICE ADDERS			
Hz	VOLTS										VOLTS							
	12	24	48	110	120	208	220	240	380	440	480	500	600	208/120		230-240/120	460-480/120	575-600/120
60Hz		F	G		1	B		2		3	4		6	0	7	8	9	EH50, 65 EH100 EH150, 160 EH250 EH450, 550 EH700, 800
50Hz				1		J			3			5						
D.C.	U	Y	W	P			R			T								

© Fuse clips are for Class R fuses up to 600A. Above 600A, Class L fuse blocks are used. Fuses are not supplied.

## Wye-Delta, Open Transition Non-Combination

**RV**

NEMA SIZE ① ②	MAXIMUM HORSEPOWER RATINGS			OVERLOAD RELAY AMP RANGE ③	NON-COMBINATION OPEN ④ ⑤ CATALOG NUMBER	LIST PRICE	NON-COMBINATION NEMA 1 ④ ⑤ CATALOG NUMBER	LIST PRICE
	230V	460V	575V					
2 EH 50	20 25	40 50 60	50 60	28-42 28-42 28-42 28-42 40-52 28-42 28-42	EH50SG-1D2C EH50SG-1D2D EH50SG-1D4F EH50SG-1D4G EH50SG-1E4H EH50SG-1D6G EH50SG-1E6H	\$ 1548	EH50SG1-1D2C EH50SG1-1D2D EH50SG1-1D4F EH50SG1-1D4G EH50SG1-1E4H EH50SG1-1D6G EH50SG1-1E6H	\$ 1644
2½ EH 65	30	75	75 100	40-52 52-65 40-52 52-65	EH65SG-1E2E EH65SG-1F4J EH65SG-1E6J EH65SG-1F6K	1594	EH65SG1-1E2E EH65SG1-1F4J EH65SG1-1E6J EH65SG1-1F6K	1693
3 EH 100	40 50	100	125	52-65 50-80 52-65 50-80	EH100SG-1F2F EH100SG-1G2G EH100SG-1F4K EH100SG-1G4L	2080	EH100SG1-1F2F EH100SG1-1G2G EH100SG1-1F4K EH100SG1-1G4L	2384
4 EH 150	60 75	125 150	150 200	80-130 80-130 80-130 80-130 80-130 80-130	EH150SG-1J2H EH150SG-1J2J EH150SG-1J4L EH150SG-1J4M EH150SG-1J6M EH150SG-1J6N	4512	EH150SG1-1J2H EH150SG1-1J2J EH150SG1-1J4L EH150SG1-1J4M EH150SG1-1J6M EH150SG1-1J6N	4952
4½ EH 160	100	200	250	115-160 115-160 115-160	EH160SG-1K2K EH160SG-1K4N EH160SG-1K6P	8274	EH160SG1-1K2K EH160SG1-1K4N EH160SG1-1K6P	8482
5 EH 250	125 150	250 300 350	300 400	128-200 200-320 128-200 200-320 200-320 128-200 200-320	EH250SG-1G2L EH250SG-1P2M EH250SG-1G4P EH250SG-1P4R EH250SG-1P4S EH250SG-1G6R EH250SG-1P6T	8448	EH250SG1-1G2L EH250SG1-1P2M EH250SG1-1G4P EH250SG1-1P4R EH250SG1-1P4S EH250SG1-1G6R EH250SG1-1P6T	8888
5½ EH 450	200 250	400 500 600	500 600 700	200-320 320-480 200-320 320-480 320-480 200-320 320-480 320-480	EH450SG-1P2N EH450SG-1J2P EH450SG-1P4T EH450SG-1J4U EH450SG-1J4V EH450SG-1P6U EH450SG-1J6V EH450SG-1J6W	12,952	EH450SG1-1P2N EH450SG1-1J2P EH450SG1-1P4T EH450SG1-1J4U EH450SG1-1J4V EH450SG1-1P6U EH450SG1-1J6V EH450SG1-1J6W	14,376
6 EH 550	300 350	700	800 900	320-480 480-720 320-480 320-480 480-720	EH550SG-1J2R EH550SG-1K2S EH550SG-1J4W EH550SG-1J6X EH550SG-1K6Y	17,100	EH550SG1-1J2R EH550SG1-1K2S EH550SG1-1J4W EH550SG1-1J6X EH550SG1-1K6Y	19,000
6½ EH 700	400	800	1000	480-720 480-720 480-720	EH700SG-1K2T EH700SG-1K4X EH700SG-1K6Z	17,613	EH700SG1-1K2T EH700SG1-1K4X EH700SG1-1K6Z	19,570
7 EH 800	500	1000	1000	600-900 600-900 375-600	EH800SG-1J2U EH800SG-1J4Z EH800SG-1P6Z	23,058	EH800SG1-1J2U EH800SG1-1J4Z EH800SG1-1P6Z	25,620

**WYE-DELTA CLOSED TRANSITION**

To order wye-delta closed transition starters, use the "SY" suffix in the 6th & 7th digit of the catalog number. Refer to Wye-Delta Closed Transition Chart on page 11 for list price adder information.

**OVERLOAD RELAY PROTECTION**

The catalog number and price includes a Class 10 overload relay with self-contained adjustable heater elements. If a Class 20 overload relay is desired, refer to page 12.

① In-between sizes are determined by the manufacturer and are not defined by NEMA.  
 ② Consult factory for smaller sizes.  
 ③ Overload relay has been sized for 1800 RPM. Check the FLA on the motor to ensure proper overload protection. For Wye-Delta starters, the overload relay must be set at .58 x FLA.  
 ④ Starters listed above have 120V, 60Hz coils. For other coil voltages, see Coil Voltage Selection Chart on the next page.  
 ⑤ FACTORY MODIFICATIONS — Refer to page 11.



## Wye-Delta, Open Transition Combination

S-RV

COMBINATION WITH NON-FUSIBLE DISCONNECT SWITCH NEMA 1 ⓄⓄ	LIST PRICE	COMBINATION WITH FUSIBLE DISCONNECT SWITCH NEMA 1 ⓄⓄ		LIST PRICE	COMBINATION WITH THERMAL MAGNETIC CIRCUIT BREAKER NEMA 1 ⓄⓄ		LIST PRICE
		FUSE CLIP RATING Ⓞ	CATALOG NUMBER		BREAKER AMP RATING 600V	CATALOG NUMBER	
EH50SGN1-1D2C EH50SGN1-1D2D EH50SGN1-1D4F EH50SGN1-1D4G EH50SGN1-1E4H EH50SGN1-1D6G EH50SGN1-1D6H	\$ 2252	100A 250V 100A 250V 100A 600V 100A 600V 200A 600V 100A 600V 100A 600V	EH50SGF1-1D2C EH50SGF1-1D2D EH50SGF1-1D4F EH50SGF1-1D4G EH50SGF1-1D4H EH50SGF1-1D6G EH50SGF1-1D6H	\$ 2300	80 100 80 100 125 80 90	EH50SGB1-1D2C EH50SGB1-1D2D EH50SGB1-1D4F EH50SGB1-1D4G EH50SGB1-1D4H EH50SGB1-1D6G EH50SGB1-1D6H	\$ 2392
EH65SGN1-1E2E EH65SGN1-1F4J EH65SGN1-1E6J EH65SGN1-1F6K	2357	200A 250V 200A 600V 200A 600V 200A 600V	EH65SGF1-1E2E EH65SGF1-1F4J EH65SGF1-1E6J EH65SGF1-1F6K	2405	125 150 125 150	EH65SGB1-1E2E EH65SGB1-1F4J EH65SGB1-1E6J EH65SGB1-1F6K	2497
EH100SGN1-1F2F EH100SGN1-1G2G EH100SGN1-1F4K EH100SGN1-1G4L	3224	200A 250V 200A 250V 200A 600V 200A 600V	EH100SGF1-1F2F EH100SGF1-1G2G EH100SGF1-1F4K EH100SGF1-1G6L	3400	150 200 175 175	EH100SGB1-1F2F EH100SGB1-1G2G EH100SGB1-1F4K EH100SGB1-1G6L	3752
EH150SGN1-1J2H EH150SGN1-1J2J EH150SGN1-1J4L EH150SGN1-1J4M EH150SGN1-1J6M EH150SGN1-1J6N	6456	400A 250V 400A 250V 400A 600V 400A 600V 400A 600V 400A 600V	EH150SGF1-1J2H EH150SGF1-1J2J EH150SGF1-1J4L EH150SGF1-1J4M EH150SGF1-1J6M EH150SGF1-1J6N	7164	225 250 225 250 225 250	EH150SGB1-1J2H EH150SGB1-1J2J EH150SGB1-1J4L EH150SGB1-1J4M EH150SGB1-1J6M EH150SGB1-1J6N	7612
EH160SGN1-1K2K EH160SGN1-1K4N EH160SGN1-1K6P	11,934	400A 250V 400A 600V 400A 600V	EH160SGF1-1K2K EH160SGF1-1K4N EH160SGF1-1K6P	12,358	350 350 350	EH160SGB1-1K2K EH160SGB1-1K4N EH160SGB1-1K6P	12,398
EH250SGN1-1G2L EH250SGN1-1P2M EH250SGN1-1G4P EH250SGN1-1P4R EH250SGN1-1P4S EH250SGN1-1G6R EH250SGN1-1P6T	12,340	600A 250V 600A 250V 600A 600V 600A 600V 600A 600V 600A 600V 600A 600V	EH250SGF1-1G2L EH250SGF1-1P2M EH250SGF1-1G4P EH250SGF1-1P4R EH250SGF1-1P4S EH250SGF1-1G6R EH250SGF1-1P6T	12,764	450 500 450 500 600 400 600	EH250SGB1-1G2L EH250SGB1-1P2M EH250SGB1-1G4P EH250SGB1-1P4R EH250SGB1-1P4S EH250SGB1-1G6R EH250SGB1-1P6T	12,804
EH450SGN1-1P2N EH450SGN1-1J2P EH450SGN1-1P4T EH450SGN1-1J4U EH450SGN1-1J4V EH450SGN1-1P6U EH450SGN1-1J6V EH450SGN1-1J6W	18,028	800A 250V 800A 250V 800A 600V 800A 600V 1200A 600V 800A 600V 800A 600V 800A 600V	EH450SGF1-1P2N EH450SGF1-1J2P EH450SGF1-1P4T EH450SGF1-1J4U EH450SGF1-1J4V EH450SGF1-1P6U EH450SGF1-1J6V EH450SGF1-1J6W	21,892	700 800 700 800 1000 700 800 800	EH450SGB1-1P2N EH450SGB1-1J2P EH450SGB1-1P4T EH450SGB1-1J4U EH450SGB1-1J4V EH450SGB1-1P6U EH450SGB1-1J6V EH450SGB1-1J6W	19,804
EH550SGN1-1J2R EH550SGN1-1K2S EH550SGN1-1J4W EH550SGN1-1J6X EH550SGN1-1K6Y	22,652	1200A 250V 1200A 250V 1200A 600V 1200A 600V 1200A 600V	EH550SGF1-1J2R EH550SGF1-1K2S EH550SGF1-1J4W EH550SGF1-1J6X EH550SGF1-1K6Y	26,516	1000 1200 1200 1000 1200	EH550SGB1-1J2R EH550SGB1-1K2S EH550SGB1-1J4W EH550SGB1-1J6X EH550SGB1-1K6Y	24,428
EH700SGN1-1K2T EH700SGN1-1K4X EH700SGN1-1K6Z	24,002	1600A 250V 1600A 600V 1600A 600V	EH700SGF1-1K2T EH700SGF1-1K4X EH700SGF1-1K6Z	30,146	1400 1400 1400	EH700SGB1-1K2T EH700SGB1-1K4X EH700SGB1-1K6Z	28,770
EH800SGN1-1J2U EH800SGN1-1J4Z EH800SGN1-1P6Z	30,052	1600A 250V 1600A 600V 1600A 600V	EH800SGF1-1J2U EH800SGF1-1J4Z EH800SGF1-1P6Z	36,196	1600 1600 1600	EH800SGB1-1J2U EH800SGB1-1J4Z EH800SGB1-1P6Z	34,820

### VOLTAGE SELECTION CHARTS

COIL VOLTAGE												CONTROL TRANSFORMERS							
Hz	VOLTS											VOLTS				LIST PRICE ADDERS			
	12	24	48	110	120	208	220	240	380	440	480	500	600	208/120	230-240 / 120		460-480 / 120	575-600 / 120	
60Hz		F	G		1	B		2		3	4		6	0	7	8	9	EH50, 65 EH100 EH150, 160 EH250 EH450, 550 EH700, 800	\$152 224 272 308 345 386
50Hz				1		J		3			5								
D.C.	U	Y	W	P		R				T									

© Fuse clips are for Class R fuses up to 600A. Above 600A, Class L fuse blocks are used. Fuses are not supplied.

## Part Winding Non-Combination

-RV

NEMA SIZE ⓪ Ⓣ	MAXIMUM HORSEPOWER RATINGS			OVERLOAD RELAY AMP RANGE Ⓣ	NON-COMBINATION OPEN ⓉⓉ CATALOG NUMBER	LIST PRICE	NON-COMBINATION NEMA 1 ⓉⓉ CATALOG NUMBER	LIST PRICE
	230V	460V	575V					
2 EH 50	25 30	50 60	60 75	28-42 28-42 28-42 28-42 28-42 28-42	EH50SH-1D EH50SH-1D EH50SH-1D EH50SH-1D EH50SH-1D EH50SH-1D	\$ 1202	EH50SH1-1D EH50SH1-1D EH50SH1-1D EH50SH1-1D EH50SH1-1D EH50SH1-1D	\$ 1266
2½ EH 65	40	75	100	40-52 40-52 40-52	EH65SH-1E EH65SH-1E EH65SH-1E	1238	EH65SH1-1E EH65SH1-1E EH65SH1-1E	1304
3 EH 100	50	100	125	52-65 52-65 52-65	EH100SH-1F EH100SH-1F EH100SH-1F	1666	EH100SH1-1F EH100SH1-1F EH100SH1-1F	1778
4 EH 150	60 75	125 150	150 200	50-80 80-130 50-80 80-130 50-80 80-130	EH150SH-1G EH150SH-1J EH150SH-1G EH150SH-1J EH150SH-1G EH150SH-1J	3574	EH150SH1-1G EH150SH1-1J EH150SH1-1G EH150SH1-1J EH150SH1-1G EH150SH1-1J	3782
4½ EH 160	100	200	250	80-130 80-130 80-130	EH160SH-1J EH160SH-1J EH160SH-1J	6980	EH160SH1-1J EH160SH1-1J EH160SH1-1J	7188
5 EH 250	125 150	250 300 350	300 350 400	128-200 128-200 128-200 128-200 200-320 128-200 128-200 128-200	EH250SH-1G EH250SH-1G EH250SH-1G EH250SH-1G EH250SH-1P EH250SH-1G EH250SH-1G EH250SH-1G	7462	EH250SH1-1G EH250SH1-1G EH250SH1-1G EH250SH1-1G EH250SH1-1P EH250SH1-1G EH250SH1-1G EH250SH1-1G	7902
5½ EH 450	200 250	400 500 600	500 600 700	200-320 200-320 200-320 200-320 320-480 200-320 200-320 200-320 320-480	EH450SH-1P EH450SH-1P EH450SH-1P EH450SH-1P EH450SH-1J EH450SH-1P EH450SH-1P EH450SH-1P EH450SH-1J	10,404	EH450SH1-1P EH450SH1-1P EH450SH1-1P EH450SH1-1P EH450SH1-1J EH450SH1-1P EH450SH1-1P EH450SH1-1P EH450SH1-1J	11,828
6 EH 550	300 350	700	800 900	320-480 320-480 320-480 320-480 320-480	EH550SH-1J EH550SH-1J EH550SH-1J EH550SH-1J EH550SH-1J	14,807	EH550SH1-1J EH550SH1-1J EH550SH1-1J EH550SH1-1J EH550SH1-1J	16,452
6½ EH 700	400	800	1000	300-480 300-480 300-480	EH700SH-1J EH700SH-1J EH700SH-1J	15,251	EH700SH1-1J EH700SH1-1J EH700SH1-1J	16,946
7 EH 800	500	1000	1000	375-600 375-600 375-600	EH800SH-1P EH800SH-1P EH800SH-1P	21,200	EH800SH1-1P EH800SH1-1P EH800SH1-1P	23,556

### OVERLOAD RELAY PROTECTION

The catalog number and price includes a Class 10 overload relay with self-contained adjustable heater elements. If a Class 20 overload relay is desired, refer to page 12.

Ⓣ In-between sizes are determined by the manufacturer and are not defined by NEMA.  
 Ⓣ Consult factory for smaller sizes.  
 Ⓣ Overload relay has been sized for 1800 RPM. Check the FLA on the motor to ensure proper overload protection. For Part Winding starters, the overload relay must be set at .5 x FLA.  
 Ⓣ Starters listed above have 120V, 60Hz coils. For other coil voltages, see Coil Voltage Selection Chart on the next page.  
 Ⓣ FACTORY MODIFICATIONS — Refer to page 11.

## Part Winding Combination

S-R

COMBINATION WITH NON-FUSIBLE DISCONNECT SWITCH NEMA 1 @	LIST PRICE	COMBINATION WITH FUSIBLE DISCONNECT SWITCH NEMA 1 @		LIST PRICE	COMBINATION WITH THERMAL MAGNETIC CIRCUIT BREAKER @		LIST PRICE
		FUSE CLIP RATING @	CATALOG NUMBER		BREAKER AMP RATING 600V	CATALOG NUMBER	
EH50SHN1-1D2D EH50SHN1-1D2E EH50SHN1-1D4G EH50SHN1-1D4H EH50SHN1-1D6H EH50SHN1-1D6J	\$ 1874	100A 250V 200A 250V 100A 600V 200A 600V 100A 600V 100A 600V	EH50SHF1-1D2D EH50SHF1-1D2E EH50SHF1-1D4G EH50SHF1-1D4H EH50SHF1-1D6H EH50SHF1-1D6J	\$ 1922	100 125 100 125 100 125	EH50SHB1-1D2D EH50SHB1-1D2E EH50SHB1-1D4G EH50SHB1-1D4H EH50SHB1-1D6H EH50SHB1-1D6J	\$ 2014
EH65SHN1-1E2F EH65SHN1-1E4J EH65SHN1-1E6K	1968	200A 250V 200A 600V 200A 600V	EH65SHF1-1E2F EH65SHF1-1E4J EH65SHF1-1E6K	2016	175 150 150	EH65SHB1-1E2F EH65SHB1-1E4J EH65SHB1-1E6K	2108
EH100SHN1-1F2G EH100SHN1-1F4K EH100SHN1-1F6L	2618	200A 250V 200A 600V 200A 600V	EH100SHF1-1F2G EH100SHF1-1F4K EH100SHF1-1F6L	2794	200 175 175	EH100SHB1-1F2G EH100SHB1-1F4K EH100SHB1-1F6L	3146
EH150SHN1-1G2H EH150SHN1-1J2J EH150SHN1-1G4L EH150SHN1-1J4M EH150SHN1-1G6M EH150SHN1-1J6N	5286	400A 250V 400A 250V 400A 600V 400A 600V 400A 600V 400A 600V	EH150SHF1-1G2H EH150SHF1-1J2J EH150SHF1-1G4L EH150SHF1-1J4M EH150SHF1-1G6M EH150SHF1-1J6N	5994	225 300 225 300 225 300	EH150SHB1-1G2H EH150SHB1-1J2J EH150SHB1-1G4L EH150SHB1-1J4M EH150SHB1-1G6M EH150SHB1-1J6N	6442
EH160SHN1-1J2K EH160SHN1-1J4N EH160SHN1-1J6P	10,640	400A 250V 400A 600V 400A 600V	EH160SHF1-1J2K EH160SHF1-1J4N EH160SHF1-1J6P	11,064	350 350 350	EH160SHB1-1J2K EH160SHB1-1J4N EH160SHB1-1J6P	11,104
EH250SHN1-1G2L EH250SHN1-1G2M EH250SHN1-1G4P EH250SHN1-1G4R EH250SHN1-1P4S EH250SHN1-1G6R EH250SHN1-1G6S EH250SHN1-1G6T	11,354	600A 250V 600A 250V 600A 600V 600A 600V 600A 600V 600A 600V 600A 600V 600A 600V	EH250SHF1-1G2L EH250SHF1-1G2M EH250SHF1-1G4P EH250SHF1-1G4R EH250SHF1-1P4S EH250SHF1-1G6R EH250SHF1-1G6S EH250SHF1-1G6T	11,778	450 500 450 500 600 400 500 600	EH250SHB1-1G2L EH250SHB1-1G2M EH250SHB1-1G4P EH250SHB1-1G4R EH250SHB1-1P4S EH250SHB1-1G6R EH250SHB1-1G6S EH250SHB1-1G6T	11,818
EH450SHN1-1P2N EH450SHN1-1P2P EH450SHN1-1P4T EH450SHN1-1P4U EH450SHN1-1J4V EH450SHN1-1P6U EH450SHN1-1P6V EH450SHN1-1J6W	15,480	800A 250V 800A 250V 800A 600V 800A 600V 1200A 600V 800A 600V 800A 600V 800A 600V	EH450SHF1-1P2N EH450SHF1-1P2P EH450SHF1-1P4T EH450SHF1-1P4U EH450SHF1-1J4V EH450SHF1-1P6U EH450SHF1-1P6V EH450SHF1-1J6W	19,344	700 800 700 800 1000 700 800 1000	EH450SHB1-1P2N EH450SHB1-1P2P EH450SHB1-1P4T EH450SHB1-1P4U EH450SHB1-1J4V EH450SHB1-1P6U EH450SHB1-1P6V EH450SHB1-1J6W	17,256
EH550SHN1-1J2R EH550SHN1-1J2S EH550SHN1-1J4W EH550SHN1-1J6X EH550SHN1-1J6Y	20,104	1200A 250V 1200A 250V 1200A 600V 1200A 600V 1200A 600V	EH550SHF1-1J2R EH550SHF1-1J2S EH550SHF1-1J4W EH550SHF1-1J6X EH550SHF1-1J6Y	23,968	1000 1200 1200 1200 1200	EH550SHB1-1J2R EH550SHB1-1J2S EH550SHB1-1J4W EH550SHB1-1J6X EH550SHB1-1J6Y	21,880
EH700SHN1-1J2T EH700SHN1-1J4X EH700SHN1-1J6Z	21,378	1600A 250V 1600A 600V 1600A 600V	EH700SHF1-1J2T EH700SHF1-1J4X EH700SHF1-1J6Z	29,522	1400 1400 1400	EH700SHB1-1J2T EH700SHB1-1J4X EH700SHB1-1J6Z	26,146
EH800SHN1-1P2U EH800SHN1-1P4Z EH800SHN1-1P6Z	27,988	1600A 250V 1600A 600V 1600A 600V	EH800SHF1-1P2U EH800SHF1-1P4Z EH800SHF1-1P6Z	34,132	1600 1600 1600	EH800SHB1-1P2U EH800SHB1-1P4Z EH800SHB1-1P6Z	32,756

### VOLTAGE SELECTION CHARTS

Hz	COIL VOLTAGE												CONTROL TRANSFORMERS				LIST PRICE ADDERS		
	VOLTS												VOLTS						
	12	24	48	110	120	208	220	240	380	440	480	500	600	208/120	230-240/120	460-480/120		575-600/120	
60Hz		F	G		1	B		2		3	4		6	0	7	8	9	EH50, 65 EH100 EH150, 160 EH250 EH450, 550 EH700, 800	\$152 224 272 308 345 386
50Hz				1		J		3				5							
D.C.	U	Y	W	P		R				T									

© Fuse clips are for Class R fuses up to 600A. Above 600A, Class L fuse blocks are used. Fuses are not supplied.

## Catalog Numbering System

RV

### EH160 SA F 1 - 1 K 4 N A

**STARTER SIZE** \_\_\_\_\_

**Starter Type** \_\_\_\_\_

SA - Autotransformer  
 SG - Wye-Delta Open Transition  
 SY - Wye-Delta Close Transition  
 SH - Part-Winding  
 SE - Primary Resistor

**Combination Type** \_\_\_\_\_

No Digit - Non-Combination  
 N - Non-fusible Disconnect  
 F - Fusible Disconnect  
 B - Thermal Magnetic Circuitbreaker  
 M - Motor Circuit Protection (MCP)

**Enclosure** \_\_\_\_\_

No Digit - Open  
 1 - NEMA 1  
 2 - NEMA 12  
 3 - NEMA 3R  
 4 - NEMA 4  
 X - NEMA 4X

**Coil Voltage** \_\_\_\_\_

See Coil Voltage Selection Chart

**Overload Range** \_\_\_\_\_

See Overload Relay Suffix Chart

**Accessories**

A - Start-Stop Pushbutton  
 C - 2 Pos. Sel. Switch  
 D - 3 Pos. Sel. Switch  
 E - Pilot Light  
 F - Start-Stop Pushbutton and Pilot Light  
 H - 2 Pos. Sel. Switch and Pilot Light  
 J - 3 Pos. Sel. Switch and Pilot Light

**Horsepower**

A - 10    N - 200  
 B - 15    P - 250  
 C - 20    R - 300  
 D - 25    S - 350  
 E - 30    T - 400  
 F - 40    U - 500  
 G - 50    V - 600  
 H - 60    W - 700  
 J - 75    X - 800  
 K - 100   Y - 900  
 L - 125   Z - 1000  
 M - 150

**Line Voltage**

1 - 200-208V  
 2 - 230-240V  
 4 - 460-480V  
 6 - 575-600V

#### OVERLOAD RELAY SUFFIX CHART

FOR CONTACTOR SIZE	OVERLOAD RELAY	CURRENT RANGE	SUFFIX
2-3 EH 50-100	RVH65	10-14	A
		14-20	B
		20-28	C
		28-42	D
		40-52	E
		52-65	F
3-4 1/2 EH 100-160	RVP160	50-80	G
		80-120	J
		115-160	K
5 EH 250	RVH22-CT5	80-128	F
		128-200	G
		200-320	P
5 1/2-6 EH 450-550	RVH22-CT6	128-200	G
		200-320	P
		320-480	J
		480-720	K
6 1/2 EH 700	RVH22-CT6.5	192-300	G
		300-480	P
		480-720	J
7 EH 800	RVH22-CT7	240-375	G
		375-600	P
		600-900	K
HEATER TYPE ALL SIZES	—	SEE HEATER SELECTION CHART PAGE 12	H

#### COIL VOLTAGE SELECTION CHART

Hz	VOLTS													
	12	24	48	110	120	208	220	240	277	380	440	480	500	600
60		F	G		1	B		2	C		3	4		6
50				1			J			3				5
D.C.	U	Y	W	P			R				T			

#### COIL VOLTAGE SELECTION CHART Control Transformers

Hz	VOLTS			
	208/120	230-240/120	460-480/120	575-600/120
60	0	7	8	9

For Wye-Delta starters, the overload must be set at .58 x FLA.  
 For Part Winding starters, the overload must be set at .5 x FLA.

**Factory Modifications**

**ENCLOSURES**

TYPE	SUFFIX <sup>Ⓞ</sup>	LIST PRICE ADDER (TO BE ADDED TO NEMA 1 ENCLOSED STARTER PRICE)								
		SIZE 2	SIZE 2 1/2	SIZE 3	SIZE 4	SIZE 4 1/2	SIZE 5	SIZE 6	SIZE 6 1/2	SIZE 7
NEMA 12	2	949	949	1141	1575	1849	2000	2000	2000	2000
NEMA 3R	3	949	949	1141	1575	1849	2000	2000	2000	2000
NEMA 4	4	1469	1469	1675	1850	2000	2200	2200	2200	2200

**S-R**

**COVER CONTROL ACCESSORIES**

DESCRIPTION	SUFFIX	LIST PRICE ADDER
Start-stop pushbutton	A	\$ 88
2 pos. selector switch	C	88
3 pos. selector switch	D	88
Pilot light	E	60
Start-stop pushbutton & pilot light	F	148
2 pos. selector switch & pilot light	H	148
3 pos. selector switch & pilot light	J	148

**WYE-DELTA CLOSED TRANSITION**

HORSEPOWER	LIST PRICE ADDER
10-15	\$ 724
25-30	748
40	836
50	912
60	1008
75	1340
100	1780
150	1876
200-400	2264

**METERS & INSTRUMENTS**

DESCRIPTION	LIST PRICE ADDER
AC Ammeter <sup>Ⓞ</sup>	\$ 792
AC Voltmeter	792
AC Ammeter Switch	408
AC Voltmeter Switch	408

**MOUNTING FEET**

DESCRIPTION	LIST PRICE
Mounting feet for wall mounted enclosures	\$ 200

<sup>Ⓞ</sup> Includes one ammeter and C.T.

## Heater Selection Charts



### SIZE 2

STARTER SIZE	STARTER COMPONENT BASE MOUNTED TYPE				HEATER CATALOG NUMBER	SEPARATE MOUNTED TYPE			
	3-PHASE					3-PHASE			
	OPEN STARTER BIMETALLIC RELAY		ENCLOSED STARTER BIMETALLIC RELAY OPEN OR ENCLOSED STARTERS AMBIENT COMPENSATED RELAY			BIMETALLIC AND AMBIENT COMPENSATED		HEATER CATALOG NUMBER	
	MOTOR AMPERE RATING @					STARTER SIZE	MOTOR @ AMPERE RATING		\$6 LIST
MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MIN.	MAX.				
2	—	—	—	—	2442	10.1	11.1	2444	
	8.80	9.65	8.48	9.19	2443	11.2	12.8	2445	
	9.66	10.6	9.20	10.1	2444	12.9	14.3	2446	
	10.7	12.2	10.2	11.6	2445	14.4	16.4	2447	
	12.3	13.7	11.7	13.0	2446	16.5	18.5	2448	
	13.8	15.7	13.1	14.9	2447	18.6	20.0	2450	
	15.8	17.6	15.0	16.8	2448	20.1	22.1	2451	
	—	—	—	—	2448	22.2	26.1	2452	
	17.7	18.0	16.9	18.0	2450	26.2	28.4	2453	
	—	—	—	—	—	28.5	30.0	2454	
	17.7	19.1	16.9	18.2	2450	—	—	2453	
	19.2	20.9	18.3	19.9	2451	—	—	2454	
	21.0	24.3	20.0	23.1	2452	28.5	32.2	2455	
	24.4	26.0	23.2	24.7	2453	32.3	36.1	2455	
	—	—	—	—	2453	36.2	41.4	2456	
	26.1	27.0	24.8	27.0	2454	41.5	47.9	2457	
	—	—	—	—	—	48.0	50.0	2459	
	26.1	29.3	24.8	27.9	2454	—	—	—	
	29.4	31.4	28.0	29.9	2455	—	—	—	
	31.5	34.8	30.0	33.1	2456	—	—	—	
34.9	40.1	33.2	38.3	2457	—	—	—		
40.2	43.6	38.4	41.5	2459	—	—	—		
43.7	45.0	41.6	45.0	2460	—	—	—		

### SIZE 5 ④

STARTER COMPONENT—Base Mounted Type			HEATER CATALOG NUMBER
OPEN OR ENCLOSED STARTERS BIMETALLIC OR AMBIENT COMPENSATED RELAY		MOTOR AMPERE RATING	
MINIMUM	MAXIMUM		
76.8	81.5	2418	
81.6	89.4	2419	
89.5	94.1	2420	
94.2	105.9	2421	
106.0	119.9	2422	
120.0	134.9	2423	
135.0	156.9	2424	
157.0	170.9	2425	
171.0	188.9	2426	
189.0	211.9	2427	
212.0	229.9	2429	
230.0	256.9	2430	
257.0	270.0	2431	

### SIZE 3 & 4

STARTER SIZE	STARTER COMPONENT—Base Mounted Type				HEATER CATALOG NUMBER
	OPEN STARTER BIMETALLIC RELAY		ENCLOSED STARTER BIMETALLIC RELAY AND OPEN OR ENCLOSED STARTERS AMBIENT COMPENSATED		
	MOTOR AMPERE RATING @				
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	
3 4	29.2	32.3	28.6	31.6	2525
	32.4	36.0	31.7	35.2	2526
	36.1	39.9	35.3	39.1	2527
	40.0	43.4	39.2	42.3	2528
	43.5	47.6	42.4	46.4	2529
	47.7	52.4	46.5	50.8	2530
	52.5	59.2	50.9	57.3	2531
	59.3	66.0	57.4	63.7	2532
	66.1	73.3	63.8	70.7	2533
	73.4	80.4	70.8	77.3	2534
	80.5	87.9	77.4	83.1	2535
	88.0	90.0	83.2	90.0	2537 <sup>③</sup>
	88.0	95.0	83.2	90.9	2536
	95.1	102.7	91.0	97.6	2537
	102.8	111.9	97.7	106.0	2538
	112.0	122.9	106.1	115.4	2539
	123.0	133.9	115.5	123.9	2540
	134.0	135.0	124.0	135.0	2541

### SIZE 5 1/2 & 6 ④

STARTER COMPONENT—Base Mounted Type			HEATER CATALOG NUMBER
OPEN OR ENCLOSED STARTERS BIMETALLIC OR AMBIENT COMPENSATED RELAY		MOTOR AMPERE RATING @	
MINIMUM	MAXIMUM		
95.2	106.0	2421	
106.1	121.0	2422	
121.1	136.0	2423	
136.1	158.0	2424	
158.1	172.0	2425	
172.1	190.0	2426	
190.1	214.0	2427	
214.1	231.0	2429	
231.1	259.0	2430	
259.1	281.0	2431	
281.1	312.0	2432	
312.1	340.0	2433	
340.1	390.0	2434	
390.1	438.0	2435	
438.1	484.0	2436	
484.1	520.0	2437	
520.1	540.0	2438	

NOTE: 3 heater elements are required for autotransformer and wye-delta starters.  
6 heater elements are required for part-winding starters.

- ④ Branch circuit protection should be provided for per the National Electric Code (USA) or the Canadian Electric Code.
- ④ "Low amperage" heaters for size 3 & 4 starters are available upon request. Not UL approved. For additional information, contact your sales representative.
- ④ For Type EG starters, use No. 2536.
- ④ Size 5 & 6 starters use three coil current transformers with 400/5A current ratio.
- ④ Branch circuit protection should be provided for per the National Electric Code (USA) or the Canadian Electric Code. Exceptions: for heater coil No. 2537, use 240 amp max. fuse. For heater coil No. 2541, use 400 amp max fuse.
- ④ Branch circuit protection should be provided for per the National Electric Code (USA) or the Canadian Electric Code. Exception: For heater coil No. 2438, use 1200 amp. max. fuse.

### Approximate Dimensions

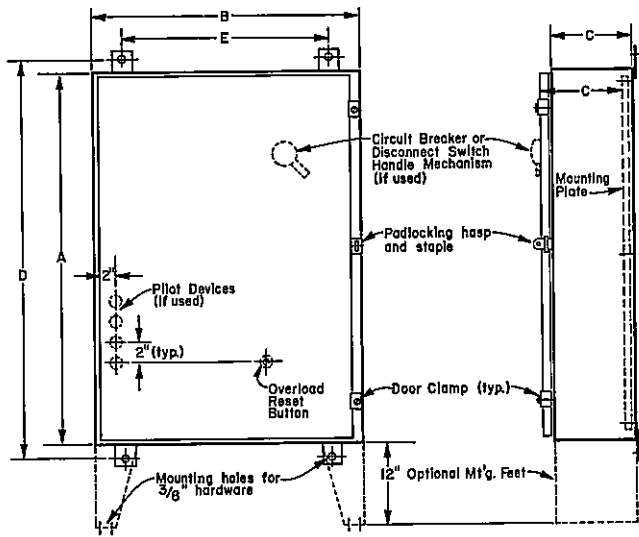


Fig. 1

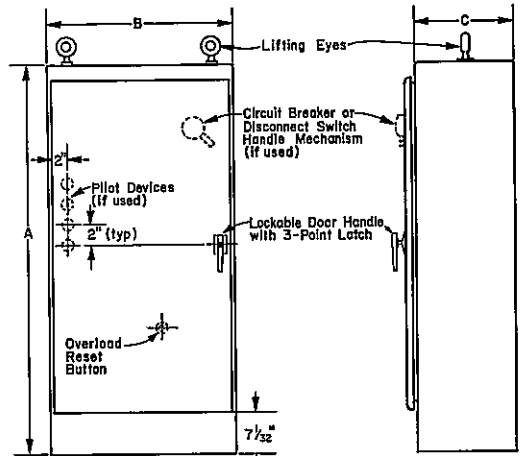


Fig. 2

DWG NO.	FIG NO.	DIMENSIONS				
		A	B	C	D	E
1	1	24	20	10	25 1/4	14
2	1	36	30	10	37 1/4	24
3	1	36	30	12	37 1/4	24
4	1	48	36	16	49 1/4	30
5	2	60	36	24	—	—
6	2	72	36	18	—	—
7	2	90	36	20	—	—
8	2	90	36	24	—	—

### AUTOTRANSFORMER

NEMA SIZE ⊙	HORSEPOWER				NON-COMBI-NATION	CIRCUIT BREAKER	DISCONNECT SWITCH	FUSED DISCONNECT SWITCH
	208V	240V	480V	600V				
2 EH 50	15	15	30	40	2	2	2	4
			40	50	2	2	2	4
	20	20	50	60	3	3	3	4
			60	75	3	3	3	4
3 EH 100	25	25	30	60	2	2	2	4
			60	75	2	2	2	4
	30	40	50	100	3	4	4	4
			75	125	3	4	4	4
4 EH 150	40	50	75	150	2	4	4	4
			100	125	2	4	4	4
	60	125	150	200	3	4	4	4
			200	250	3	4	4	4
4 1/2 EH 160	40	50	60	150	2	4	4	4
			125	200	3	4	4	4
	60	150	200	250	3	4	4	4
			250	300	3	4	4	4

NEMA SIZE ⊙	HORSEPOWER				NON-COMBI-NATION	CIRCUIT BREAKER	DISCONNECT SWITCH	FUSED DISCONNECT SWITCH
	208V	240V	480V	600V				
5 EH 250	60	75	100	200	4	4	4	4
			200	250	4	4	4	4
	100	125	150	300	4	6	6	6
			300	400	4	6	6	6
5 1/2 EH 450	150	200	400	500	4	6	6	6
			500	600	4	6	6	6
	200	250	300	600	5	7	7	7
			600	700	5	7	7	7
6 EH 550	250	300	400	600	4	7	7	7
			600	700	4	7	7	7
	300	400	500	700	5	8	8	8
			700	800	5	8	8	8
6 1/2 EH 700	300	400	500	800	4	8	8	8
			600	700	4	8	8	8
	400	500	600	800	5	8	8	8
			700	800	5	8	8	8
7 EH 800	500	600	700	800	4	8	8	8
			800	900	4	8	8	8
	600	700	800	900	5	8	8	8
			900	1000	5	8	8	8

⊙ In-between sizes are determined by the manufacturer and are not defined by NEMA.

## Approximate Dimensions

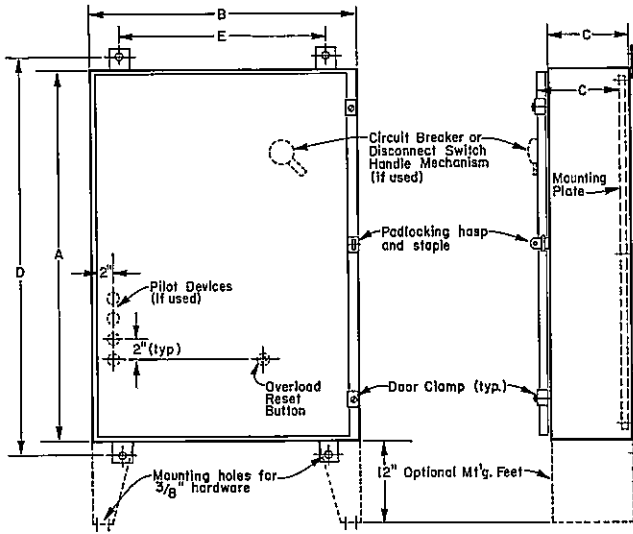


Fig. 1

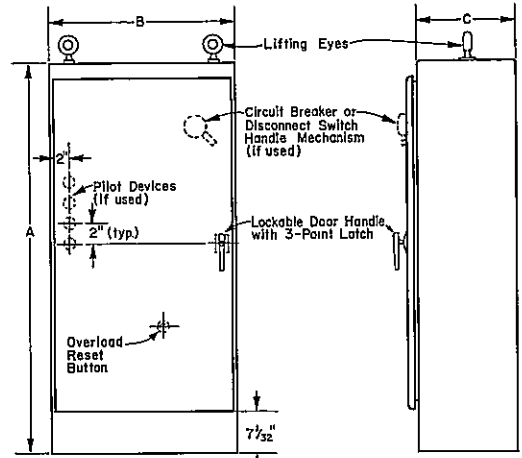


Fig. 2

DWG NO.	FIG NO.	DIMENSIONS				
		A	B	C	D	E
1	1	24	20	10	25 1/4	14
2	1	36	30	10	37 1/4	24
3	1	36	30	12	37 1/4	24
4	1	48	36	16	49 1/4	30
5	2	60	36	24	—	—
6	2	72	36	18	—	—
7	2	90	36	20	—	—
8	2	90	36	24	—	—

### WYE-DELTA — Open Transition

NEMA SIZE ⊙	HORSEPOWER				NON-COMBI-NATION	CIRCUIT BREAKER	DISCONNECT SWITCH	FUSED DISCONNECT SWITCH			
	208V	240V	480V	600V							
	DRAWING NUMBER										
2 EH 50	10	20	40	50	1	2	2	2			
	15				1	2	2	2			
	25				1	2	2	2			
	2 1/2 EH 65	20			75	100	1	2	2	2	
							1	2	2	2	
							1	2	2	2	
3 EH 100	30	40	100	125	2	2	4	4			
	40				2	2	4	4			
	50				2	2	4	4			
	4 EH 150	50			125	150	2	2	4	4	
							60	2	2	4	4
							75	2	2	4	4
4 1/2 EH 160	60	100	200	250	2	2	4	4			
	75				2	2	4	4			
	100				2	2	4	4			
	5 EH 250	20			75	100	2	2	4	4	
							125	2	2	4	4
							150	2	2	4	4

NEMA SIZE ⊙	HORSEPOWER				NON-COMBI-NATION	CIRCUIT BREAKER	DISCONNECT SWITCH	FUSED DISCONNECT SWITCH				
	208V	240V	480V	600V								
	DRAWING NUMBER											
5 EH 250	100	125	250	300	4	4	4	6				
					150	300	4	4	4	6		
							350	350	4	4	4	6
	5 1/2 EH 450	125							200	400	4	7
					150	250					4	7
							200	400			4	7
6 EH 550	250	300	700	4					7	7	7	
				350	800	4			7	7	7	
						900	1000	4	7	7	7	
	6 1/2 EH 700	350						400	800	4	7	7
				400	500					4	7	7
						7 EH 800	400			500	1000	4
1000	1000	4	7					7	7			
		4	7	7	7							

⊙ In-between sizes are determined by the manufacturer and are not defined by NEMA.



## Approximate Dimensions

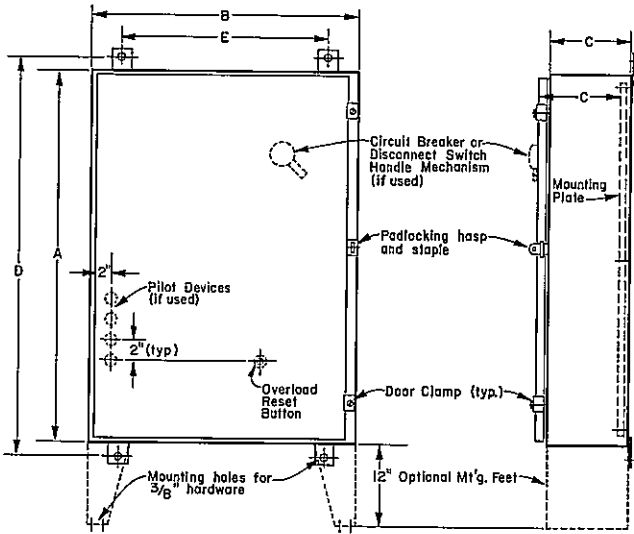


Fig. 1

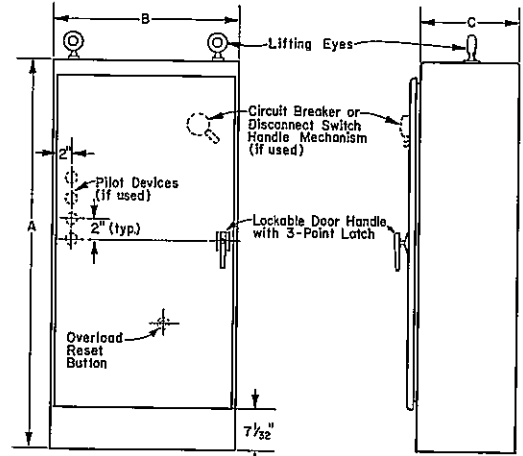


Fig. 2

DWG NO.	FIG NO.	DIMENSIONS				
		A	B	C	D	E
1	1	24	20	10	25 1/4	14
2	1	36	30	10	37 1/4	24
3	1	36	30	12	37 1/4	24
4	1	48	36	16	49 1/4	30
5	2	60	36	24	—	—
6	2	72	36	18	—	—
7	2	90	36	20	—	—
8	2	90	36	24	—	—

### WYE-DELTA — Closed Transition

NEMA SIZE ⊙	HORSEPOWER				NON-COMBI-NATION	CIRCUIT BREAKER	DISCONNECT SWITCH	FUSED DISCONNECT SWITCH
	208V	240V	480V	600V				
2 EH 50	10	20	40	50	1	2	2	4
	15				1	2	2	4
	25				1	2	2	4
	2 1/2 EH 65	30	75	100	1	2	2	4
					1	2	2	4
1					2	2	4	
3 EH 100	30	40	100	2	2	4	4	
				2	2	4	4	
	40	50	125	2	2	4	4	
				2	2	4	4	
4 EH 150	50	60	150	2	4	4	4	
				2	4	4	4	
				2	4	4	4	
	60	75	200	2	4	4	4	
				2	4	4	4	
4 1/2 EH 160	100	200	250	2	4	4	4	
				2	4	4	4	
				2	4	4	4	

NEMA SIZE ⊙	HORSEPOWER				NON-COMBI-NATION	CIRCUIT BREAKER	DISCONNECT SWITCH	FUSED DISCONNECT SWITCH	
	208V	240V	480V	600V					
5 EH 250	100	125	150	200	4	4	4	6	
					4	4	4	6	
					4	4	4	6	
	5 1/2 EH 450	125	150	200	250	4	7	7	7
						4	7	7	7
4						7	7	7	
6 EH 550	250	300	350	400	4	7	7	7	
					4	7	7	7	
					4	7	7	7	
	300	350	400	500	5	8	8	8	
					5	8	8	8	
6 1/2 EH 700	350	400	500	600	4	7	7	7	
					4	7	7	7	
					4	7	7	7	
7 EH 800	400	500	600	700	5	8	8	8	
					5	8	8	8	
					5	8	8	8	

⊙ In-between sizes are determined by the manufacturer and are not defined by NEMA.

## Approximate Dimensions

-RV

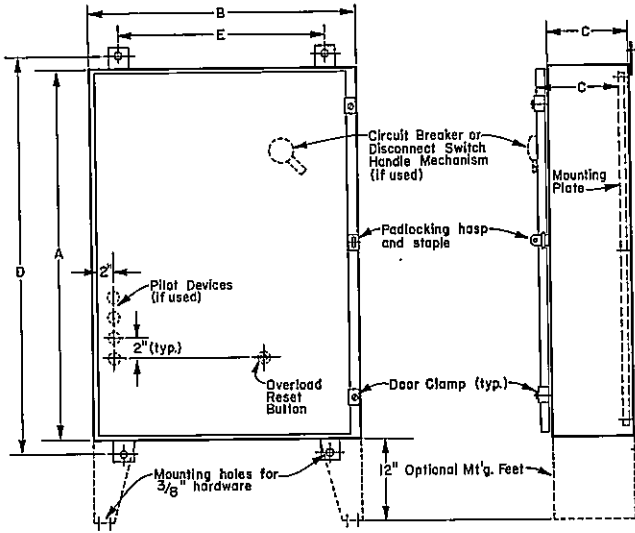


Fig. 1

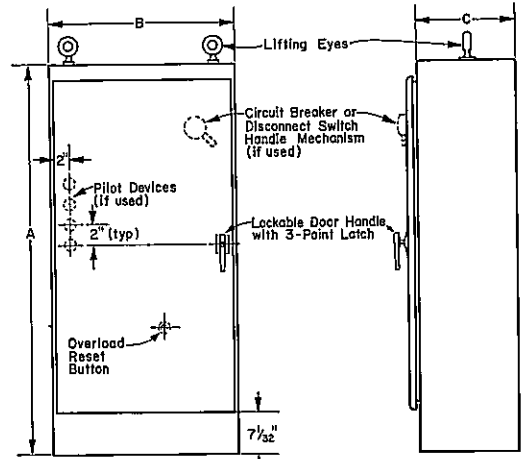


Fig. 2

DWG NO.	FIG NO.	DIMENSIONS				
		A	B	C	D	E
1	1	24	20	10	25 1/4	14
2	1	36	30	10	37 1/4	24
3	1	36	30	12	37 1/4	24
4	1	48	36	16	49 1/4	30
5	2	60	36	24	—	—
6	2	72	36	18	—	—
7	2	90	36	20	—	—
8	2	90	36	24	—	—

### PART WINDING

NEMA SIZE Ⓞ	HORSEPOWER				NON-COMBI-NATION	CIRCUIT BREAKER	DISCONNECT SWITCH	FUSED DISCONNECT SWITCH
	208V	240V	480V	600V				
2 EH 50	15	25 30	50 60	60 75	1	1	1	2
	20				1	1	1	2
	EH 50	1			1	1	2	
		1			1	1	2	
		1			1	1	2	
2 1/2 EH 65	25	40	75 100	100	1	1	1	2
	30				1	1	1	2
	EH 65	1			1	1	2	
		1			1	1	2	
		1			1	1	2	
3 EH 100	40	50	100 125	125	2	2	4	4
	EH 100				2	2	4	4
		2			2	4	4	
		2			2	4	4	
	4 EH 150	50			60 75	125 150 150 200	200	2
EH 150		2	2	4				4
		2	2	4	4			
		2	2	4	4			
4 1/2 EH 160		60	75	100 200	250			2
	EH 160	2				2	4	4
		2	2			4	4	
		2	2			4	4	

NEMA SIZE Ⓞ	HORSEPOWER				NON-COMBI-NATION	CIRCUIT BREAKER	DISCONNECT SWITCH	FUSED DISCONNECT SWITCH
	208V	240V	480V	600V				
5 EH 250	100	125 150	250 300 350	300 350 400	3	4	4	4
	125				3	4	4	4
	150	3			4	4	4	
	EH 250	3			4	4	4	
		3			4	4	4	
3		4	4	4				
5 1/2 EH 450	200	200 250	400 500 600	500 600 700	4	4	7	7
	EH 450				4	4	7	7
		4			4	7	7	
		4			4	7	7	
	6 EH 550	250			300 350	700	800 900	4
EH 550		4	4	7				7
		4	4	7	7			
		4	4	7	7			
6 1/2 EH 700		300	350	400	800			4
	EH 700	4				7	7	7
		4	7			7	7	
		4	7			7	7	
	7 EH 800	400	500			1000	1000	4
EH 800		4		7	7			7
		4	7	7	7			
		4	7	7	7			

Ⓞ In-between sizes are determined by the manufacturer and are not defined by NEMA.



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**ASEA CONTROL**