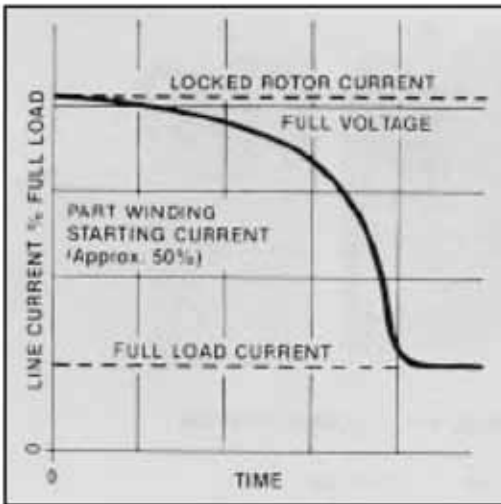


# REDUCED VOLTAGE STARTERS



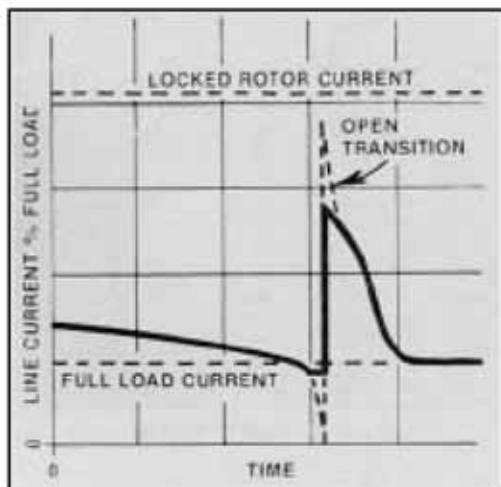
## Full Voltage and Part Winding Starters

**Full Voltage Magnetic Starters** provide the simplest method of starting and stopping AC squirrel cage motors. A full voltage starter connects the motor windings directly to the power line. It consists of magnetically actuated switch and thermal overload relay.

A typical squirrel cage motor when started across-the-line will result in a line current of approximately 6 times full load current as shown in the diagram.

**Part-winding Reduced Voltage Starters** are the simplest type reduced voltage starters.

Part-winding motors have two sets of identical winding which are energized in sequence to reduce the starting inrush current. The two identical windings are operated in parallel. Most (but not all) 230/460 volt motors are suitable for part-winding start is required. During the period when one winding only is energized, a part-winding motor will draw approximately 60-70% inrush current and will develop approximately 45-50% torque.



## Wye-Delta Starters

Wye-Delta motors are similar in construction to standard squirrel cage motors, except that both ends of each of the three (3) windings are brought out to terminals. By using starters having the required number of contacts properly wired, the motor starts in Wye and runs in Delta. This starter can be built as either an open or closed transition device. The closed transition starter requires an extra contactor and resistor bank and are considerably more expensive. By far, the majority of Wye-Delta starters supplied world wide are OPEN transition type.

By starting with Wye connection, line current is reduced to one-third (<sup>1/3</sup>) of the current which would be obtained with a Delta connection.

This starter is frequently applied to unload compressors and other loads that require less than 33% of normal starting torque.

## REDUCED VOLTAGE STARTERS

★ ★ OVERLOAD RELAY SUFFIX			
Suffix	O.L., Relay Setting Range (Amps)	Suffix	O.L., Relay Setting Range (Amps)
-A	0.12-0.18	-N	11-17
-B	0.18-0.28	-O	15-23
-C	0.28-0.4	-P	22-32
-D	0.4-0.6	-Q	32-50
-E	0.56-0.8	-RN	50-63
-F	0.8-1.2	-SN	63-80
-G	1.2-1.8	-TN	80-110
-H	1.8-2.8	-TT	110-135
-I	2.8-4	-UN	135-150
-K	4-6	-UU	150-180
-L	5.6-8	-VT	175-280
-M	8-12	-WT	250-400
		-X	310-500

★ COIL VOLTAGE SUFFIX			
AC ★	60HZ	50HZ	
A	120 V	110 V	
C	208V/230 V	220 V	
E	480 V	440 V	
F	600 V	550 V	
D		380 V	
G	24 V	22V	
DC ★★			
MTW	12 VDC		
NTW	24 VDC		•Price
OTW	48 VDC		Addition
PTW	120 VDC		for DC
RTW	220VDC		Coil.

## ENCLOSURES

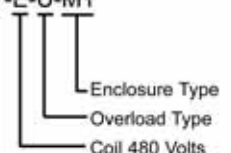
▶ A complete selection of enclosures is available.

- M1 General Purpose
- M12 Industrial Dust Tight
- M7 Hazardous Area
- 4X Non Metal Outdoor
- M3R Metal Rain Tight

▶ TYPE 4X ENCLOSED STARTERS.

Type 4X starters are UL/CSA listed starters enclosed in 4X U.L. Listed enclosures. Type 4X enclosures are designed for outdoor / hose down / dust tight applications and are non-metal corrosion resistant.

TYPICAL ORDER ITEM  
150 HP 460V Starter  
WLS107-E-U-M1



# Reduced Voltage Starters WYE-DELTA TYPE YLS

## OPEN TRANSITION TYPE YLS

CLOSED  
TRANSITION

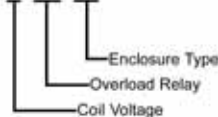


HORSEPOWER RATING (MAX HP RATINGS)				(Includes 3-pole O.L.) Catalogue No.	- OO Open	ENCLOSURE SUFFIX - (LIST PRICES)			Type YCLS - M1 Enclosed NEMA 1	Comparable NEMA	
						- M1 NEMA 1 General Purpose	- M12+ NEMA 1 2 Industrial Dust Tight	- MB Add For Main Breaker		460/ 575V HP	SIZE
208V HP	240V HP	440/ 480V HP	550/ 600V HP								
5	7 <sup>1/2</sup>	15	15	YLS4-***	\$ 625	\$ 675	\$ 745	\$+ 490	\$ 1,415		
7 <sup>1/2</sup>	10	20	20	YLS17-***	725	775	845	+ 490	1,525		0YD
15	15	30	30	YLS27-***	880	930	1,000	+ 490	1,755		1YD
20	20	40	40	YLS37-***	1,047	1,100	1,290	+ 702	1,900		1 <sup>1/2</sup> YD
25	25	60	60	YLS47-***	1,464	1,580	1,700	+ 880	2,400	40	2YD
40	40	75	100	YLS57-***	1,650	1,770	1,890	+ 960	2,520		2 <sup>1/2</sup> YD
40	50	100	125	YLS77-***	2,080	2,200	2,380	+ 960	2,870	75	3YD
60	75	150	200	YLS87-***	3,100	3,400	3,600	+ 1,770	4,300		3 <sup>1/2</sup> YD
	85	175	200	YLS107-***	4,290	4,590	4,790	+ 1,770	6,000	150	4YD
	125	250	300	YLS177-***	6,550	6,950	7,350	+ 3,460	9,040		4 <sup>1/2</sup> YD
	175	350	400	YLS247-***	7,990	8,990	9,990	+ 3,460	10,420	300	5YD
	250	500	750	YLS220K-***	10,290	12,330	12,330	+ 5,070	15,530		5 <sup>1/2</sup> YD
	350	700	850	YLS280K-***	11,200	13,200	13,200	+ 5,070	16,200	700	6YD
	450	900	1100	YLS375K-***	13,200	15,200	15,200	+ 5,070	17,000		

The Y-Delta overload is in the phase winding and set at 0.58 of the line current. When sizing overload use this formula:  
**Example: Y Delta, 75 HP, 460 Volt, 3 phase = 88 FLA**  
 $88 \text{ FLA} \times .58 = 51 \text{ Amps}$   
 Use overload suffix "RN"

Order Example: 150HP 460V  
 YLS87-E-TN-M1

For larger sizes thru 4,000 HP, check with main office.  
 For modifications and accessories consult factory.  
 For NEMA 4X Enclosure add \$200 List.



SIZE 2<sup>1/2</sup> Y-D  
 75 H.P.

(Check with Factory for  
 Deduction for omission of wiring)

## Reduced Voltage Starters PART-WINDING TYPE WLS

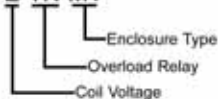
All Starters Supplied With BUILT-IN Heaters & Single Phasing Protection as Standard.

HORSEPOWER RATING (MAX HP RATINGS)				(Includes 3-pole O.L.) Catalogue No.	ENCLOSURE SUFFIX - (LIST PRICES)		Comparable NEMA			
					- M1 NEMA 1 General Purpose	- M12+ NEMA 1 2 Industrial Dust Tight	200V HP	230 HP	460/ 575V HP	SIZE
208V HP	240V HP	440/ 480V HP	550/ 600V HP							
30	30	60	60	WLS47-***	\$1,377	\$1,577	25	25	40	2PW
40	40	90	90	WLS57-***	1,492	1,692				2 <sup>1/2</sup> PW
50	50	100	100	WLS77-***	1,791	1,991	50	50	75	3PW
60	80	150	150	WLS87-***	3,035	3,335				3 <sup>1/2</sup> PW
100	100	200	200	WLS107-***	3,518	3,818	75	75	150	4PW
150	150	300	300	WLS177-***	5,010	5,410				4 <sup>1/2</sup> PW
200	200	400	400	WLS247-***	7,100	8,300	150	150	300	5PW
350	350	700	700	WLS220K-***	9,620	10,620				5 <sup>1/2</sup> PW
400	400	800	800	WLS280K-***	10,820	11,820	300	300	600	6PW
500	500	1000	1000	WLS375K-***	14,900	15,900				

NOTE: For larger sizes thru 4,000 HP, check with main office. For modifications and accessories consult factory. The contactor overload is in the phase winding and set at 1/2 of the full motor current.

+ For NEMA 4X Enclosure add \$200 List.

Order Example: 150HP 460V  
 WLS87-E-TN-M1



SIZE 3 PW  
 100 HP Less Wiring  
 (Check with Factory for Deduction for  
 omission of wiring)