Section Updated 04 / 2012

ASTAT XT Soft Starter

Digital Soft Starters for 3ph Standard Induction Motors

Description

GE's new solid state ASTAT XT Soft Starter features microprocessor control digital technology. Setup and adjustment is performed through a six-button keypad and parameters or messages are displayed through a user-friendly LCD multi-language interface with two rows, sixteen alphanumeric characters each. The design includes isolated I/O and a high level of protection in circuits to minimize the disturbance effects while working in the harshest industrial environment.

ASTAT XT Soft Starter offers reliable performance and smooth acceleration for a variety of standard AC motors, up to 1400A and up to 690V, reducing mechanical shock to the driving system, resulting in extended component and motor life.

ASTAT XT Soft Starter offers many traditional features such as a motor overload function, adjustable ramps, current limit, kick start, as well as other high end features like inside-delta operation, torque control, pump control and a reliable motor and unit set of protections.

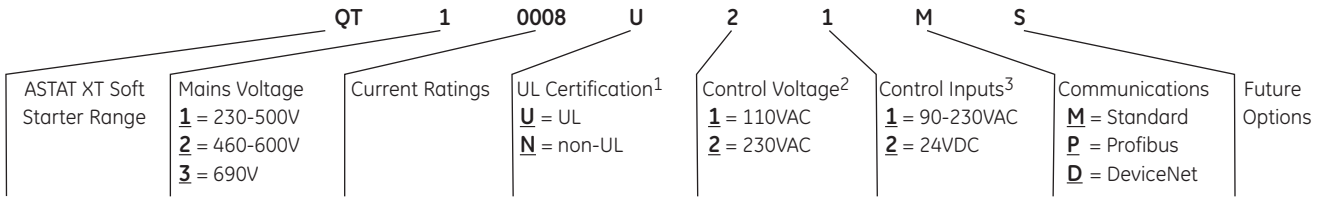
Features

—Ratings up to 1400 Amps and up to 690 VAC
—Friendly multi-language interface with two rows, sixteen characters each
—Built-in with three extra power terminals for external bypass
—In-line or inside-delta operation modes
—Torque control and pump control advanced features
—Motor protection according IEC 10,20 and NEMA 10, 20, 30, even if ASTAT XT Soft Starter is in bypass
—Built in RS485 port communications, and ModBus protocol as standard
—Profibus-DP and DeviceNet optional interfaces for communications

Standards

CE:	Full Range
cUL, UL:	For units up to 820A. "U" type

Product Number Configuration



Notes:

cUL Certification

[1]ASTAT XT Soft Starter up to 600V, and up to 170A (Product Numbers up to QT10170_ or QT2) are always cUL certified. Option "N" not available
Units QT2, from QT20008_, up to QT20820_ are always cUL certified. Option "N" not available.
Units QT1, or QT2 from QTx0950_ up to QTx1400 are not UL certified. Option "U" not available.
Units QT3__, rated to 690V, are not UL certified. Option "U" not available

Control and Inputs Voltage

[2]ASTAT XT Soft Starter standard Control Voltage is option 2, Voltage 230VAC, +10%, -15%

[3]ASTAT XT Soft Starter standard configuration for Inputs is option 1, Voltage 90-230VAC, +10%, -15%

All ASTAT XT Soft Starter models rated 950A and up **must** be operated with a bypass contactor.

Reduced Voltage Starters
Solid State
ASTAT XT Soft Starter

NEMA and IEC Ratings. Recommended Unit Type and Motor Ratings.

	Light Duty NEMA 10				Normal Duty NEMA 20				Heavy Duty NEMA 30					
	Current Rating	230V	460V	575V	Current Rating	230V	460V	575V	Current Rating	230V	460V	575V	Product Number	List Price GO-10A8
	A	HP	HP	HP	A	HP	HP	HP	A	HP	HP	HP		
Line Voltage	8	2	---	---	8	2	---	---	8	2	---	---	QT10008U11MS	**$1080.00**
230VAC	17	5	---	---	17	5	---	---	12	3	---	---	QT10017U11MS	**$1215.00**
	34	10	---	---	31	10	---	---	31	10	---	---	QT10031U11MS	**$1305.00**
	54	20	---	---	44	15	---	---	44	15	---	---	QT10044U11MS	**$1395.00**
	65	20	---	---	58	20	---	---	55	20	---	---	QT10058U11MS	**$1530.00**
	72	25	---	---	72	25	---	---	66		---	---	QT10072U11MS	**$1845.00**
	104	40	---	---	85	30	---	---	80	30	---	---	QT10085U11MS	**$2250.00**
	130	50	---	---	105	40	---	---	99	40	---	---	QT10105U11MS	**$2520.00**
	156	60	---	---	145	50	---	---	130	50	---	---	QT10145U11MS	**$3240.00**
	170	60	---	---	170	60	---	---	134	50	---	---	QT10170U11MS	**$3825.00**
	262	100	---	---	210	75	---	---	203	75	---	---	QT10210U11MS	**$4455.00**
	387	150	---	---	310	100	---	---	310	100	---	---	QT10310U11MS	**$5265.00**
	414	150	---	---	390	150	---	---	361	150	---	---	QT10390U11MS	**$5625.00**
	480	200	---	---	460	150	---	---	432		---	---	QT10460U11MS	**$7290.00**
	610	250	---	---	580	200	---	---	552	200	---	---	QT10580U11MS	**$9090.00**
	820		---	---	820	250	---	---	690	250	---	---	QT10820U11MS	**$11250.00**
Line Voltage	8	---	5	5	8	---	5	5	8	---	5	5	QT20008U11MS	**$1200.00**
460 - 600VAC	17	---	10	15	17	---	10	15	12	---	7.5	10	QT20017U11MS	**$1350.00**
	34	---	25	30	31	---	20	25	31	---	20	25	QT20031U11MS	**$1450.00**
	54	---	40	50	44	---	30	40	44	---	30	40	QT20044U11MS	**$1550.00**
	65	---	50	60	58	---	40	50	55	---	40	50	QT20058U11MS	**$1700.00**
	72	---	50	60	72	---	50	60	66	---	50	60	QT20072U11MS	**$2050.00**
	104	---	75	100	85	---	60	75	80	---	60	75	QT20085U11MS	**$2500.00**
	130	---	100	125	105	---	75	100	99	---	75	100	QT20105U11MS	**$2800.00**
	156	---	125	150	145	---	100	150	130	---	100	125	QT20145U11MS	**$3600.00**
	170	---	125	150	170	---	125	150	134	---			QT20170U11MS	**$4250.00**
	262	---	200	250	210	---	150	200	203	---	150	200	QT20210U11MS	**$4950.00**
	387	---	300	400	310	---	250	300	310	---	250	300	QT20310U11MS	**$5850.00**
	414	---	350		390	---	300	400	361	---	300		QT20390U11MS	**$6250.00**
	480	---	400	500	460	---	350		432	---	350	400	QT20460U11MS	**$8100.00**
	610	---	500		580	---	400		552	---	400	500	QT20580U11MS	**$10100.00**
	820	---			820	---	500	500	690	---	500		QT20820U11MS	**$12500.00**

					Normal Duty IEC Class 10				Heavy Duty IEC Class 20					
					A			690V KW	A			690V KW	Product Number	List Price GO-10A8
Line Voltage	---	---	---	---	8	---	---	5.5	8	---	---	5.5	QT30008N11MS	**$1320.00**
690V	---	---	---	---	17	---	---	15	12	---	---	7.5	QT30017N11MS	**$1485.00**
	---	---	---	---	31	---	---	22	31	---	---	22	QT30031N11MS	**$1595.00**
	---	---	---	---	44	---	---	37	44	---	---	37	QT30044N11MS	**$1705.00**
	---	---	---	---	58	---	---	55	55	---	---	45	QT30058N11MS	**$1870.00**
	---	---	---	---	72	---	---	55	66	---	---	55	QT30072N11MS	**$2255.00**
	---	---	---	---	85	---	---	75	80	---	---	75	QT30085N11MS	**$2750.00**
	---	---	---	---	105	---	---	90	99	---	---	90	QT30105N11MS	**$3080.00**
	---	---	---	---	145	---	---	132	130	---	---	90	QT30145N11MS	**$3960.00**
	---	---	---	---	170	---	---	160	134	---	---	132	QT30170N11MS	**$4675.00**
	---	---	---	---	210	---	---	200	203	---	---	200	QT30210N11MS	**$5445.00**
	---	---	---	---	310	---	---	250	310	---	---	250	QT30310N11MS	**$6435.00**
	---	---	---	---	390	---	---	355	344	---	---	315	QT30390N11MS	**$6875.00**
	---	---	---	---	460	---	---	400	432	---	---	400	QT30460N11MS	**$8910.00**
	---	---	---	---	580	---	---	560	488	---	---	400	QT30580N11MS	**$11110.00**
	---	---	---	---	650	---	---	630	552	---	---	560	QT30650N11MS	**$13750.00**
	---	---	---	---	950	---	---	900	950	---	---	900	QT30950N11MS	**$16610.00**
	---	---	---	---	1100	---	---	1000	1076	---	---	1000	QT31100N11MS	**$20350.00**
	---	---	---	---	1400	---	---	---	1400	---	---	---	QT31400N11MS	**$29260.00**

For 230V Control Voltage - Change the "1" in digit place 9 to "2". Example QT10031U**1**1MS becomes QT10031U**2**1MS. No Price Adder.
For 24V DC Digital I/O - Change the "1" in digit 10 to "2". Example QT20072U11MS becomes QT20072U**2**MS. No Price Adder.
For Profibus DP Communications - Change the "M" in digit 11 to "P". Example QT10390U11**M**S becomes QT10390U11**P**S. Price adder is $850.00
For DeviceNet Communications - Change the "M" in digit 11 to "D". Example QT20085U11**M**S becomes QT20085U11**D**S. Price adder is $950.00

All ASTAT XT Soft Starter models rated 950A and up **must** be operated with a bypass contactor.

ASTAT XT Soft Starter

Technical Specifications

Ratings

Main Voltage	3Ph AC supply - 230 to 500VAC +10%, -15% for QT1xxx units 460 to 600VAC +10%, -15% for QT2xxx units 690VAC +10%, -15% for QT3xxx units
Starter Current Rating	for 3Ph AC motors - From 8A up to 1400A.
Motor Current Rating	3 phase Induction motors - Motor rated current from 50% to 100% of starter current
Control Voltage	1ph AC supply - 230VAC, +10, -15%, 50/60Hz, or 110VAC, +10, -15%, 50/60Hz (optional)
Frequency Range	50/60Hz systems - Wide from 45Hz to 65Hz. Auto-tracking frequency range

Control Specifications

Control System	Digital control with microcontroller. Starting ramp, with progressive increase in voltage and current limitation
Operation Mode	In-Line (three wires) or Inside-Delta (six wires) of the motor
Run Operation	Soft Start and Soft Stop by multiple choices, including torque control both at Start or Stop phases
Operator Interface	By LCD display, keypad and indication LEDs Display: LCD with two rows, 16 characters each Type: Multi-language, Dip Switch selectable for English, Italian, Spanish and German Keys: Six keys, Mode, Reset, Set, Select and Up / Down LEDs: ON, Start, Run, Soft Stop, Stop, Save / Slow Speed, Dual Set / Reverse and Fault
Initial Voltage	10-50% Un. Up to 80% with expanded settings function
Starting Current	100-400% In. Can be extended up to 500%, by using extended settings
Acceleration Ramp time	1-30 sec. Can be extended up to 90sec, by using extended settings
Deceleration Ramp time	1-30 sec. Can be extended up to 90sec, by using extended settings
Current Limitation	100-400% of motor rated current. Can be extended up to 500% by using extended settings
Bypass	By external contactor while motor is full protected by ASTAT XT Soft Starter.
Monitoring	Motor Current, Line Voltage, motor thermistor resistance, Test & Maintenance and Statistics

Environmental Conditions

Operating Temperature	-10 up to 50ºC, derating from 40ºC
Storage Temperature	-20ºC up to 70ºC
Maximum Altitude	Up to 1000 mts. Ask your dealer for installation at higher altitude
Humidity	95% at 50ºC or 98% at 45ºC
Protection Degree	IP20 for units up to 72A, IP00 for units from 85A up to 1400A
Pollution Degree	Class 3

Standards

Global Standards	CE for the full range. UL, cUL for specified units up to 820A
EMC Emissions	EN 55011: CISPR 11 Class A
Immunity	EN 55082-2: ESD 8KV air, IEC 801-2; Electric RF field 10 V/m, 20-1000Mhz, IEC 801-3 Fast transients 2KV, IEC 801-4
Safety	EN 600947-1: Related to safety requirements. UL508C Additional emergency safe stop functionality may be required for your application.

Standard Functions

Soft Start and Soft Stop
ASTAT XT Soft Starter is provided with soft start and soft stop features, including five independent acceleration and deceleration curve models.

The factory default curve is used for general purpose; three are used for pump control and one for torque control.

Pump Control
Specific function for pump control, that avoids overpressure in the system at the end of acceleration phase and suppresses the hammering at stopping phase

Torque Control
Provides a smooth time controlled torque ramp acceleration and deceleration, with linear deceleration of the torque resulting in a close to linear speed deceleration, thus eliminating stall conditions.

In Line / Inside Delta
ASTAT XT Soft Starter allows either traditional Line operation or Inside Delta operation.

When the ASTAT XT Soft Starter is installed to operate Inside Delta, the individual phases of the starter are connected in series with the individual motor windings (six wiring connections like the Start-Delta starters), thus reducing the current x1.73, and allowing the use of a much smaller starter (x1.5 less than motor rated current)

Bypass
ASTAT XT Soft Starter allows bypass operation using an external contactor, controlled ON/OFF by starter function EOR (End Of Ramp).

The starter is provided with three dedicated power terminals to facilitate wiring to the bypass contactor. ASTAT XT Soft Starter protections to motor are enabled, even in bypass

All ASTAT XT Soft Starter models rated 950A and up **must** be operated with a bypass contactor.

Kick Start
This function allows the start of high friction loads that require high starting torque for a short period of time.

When this function is enabled, a pulse of 80% Un during an adjustable time from 0 to 1sec is given to the motor. After this pulse the output voltage ramps down to Starting Voltage setting, before ramping up again to full voltage.

End of Ramp
Detects end of acceleration and outputs a signal by a dry relay contact. This signal can be delayed by an adjustable timer from 0-120 sec.

Lock-Out
Allows control of the number of starts in a period of time, protecting both motor and ASTAT.

Dual Settings
By this function, ASTAT XT Soft Starter is able to control a secondary motor.

Dual setting of Starting Voltage, Starting Current, Current Limit, Ramp Up, Ramp Down and Motor current parameters can be selected by using one of the programmable ASTAT XT Soft Starter's inputs.

Energy Saving
Activated when the motor has a light load for extended periods of time, reducing the output voltage level and decreasing the reactive current and motor copper/Iron losses.

This function can be enabled or disabled by dedicated parameters in ASTAT XT Soft Starter.

Slow Speed
Function that allows the motor to run at 1/6 constant rated speed, for a short period of time, maximum 30sec. This function supports forward and reverse operation.

Auto Reset
This function allows the ASTAT XT Soft Starter to automatically recover after a fault caused by Undervoltage, Undercurrent or Phase lost. Auto-Reset can be programmed up to maximum 10 attempts.

Cooling Fan Control
Allows three methods of control for the ASTAT's built-in cooling fans:
- Continuous Operation
- Controlled by an external input
- Automatically OFF controlled; after five minutes ASTAT XT Soft Starter is stopped

Generator Supply
This is a specific function useful when the Starter is powered from a diesel generator rather than from a commercial power supply. The function is enabled by an internal dip switch, and helps to minimize the negative effects caused by the generator's voltage fluctuations during starting.

Keypad Lock
This function is enabled by means of starter's internal dip switch, locking the keypad. This is useful to prevent undesired parameter modifications.

Built-In Communications
ASTAT XT Soft Starter includes a ModBus RTU communications protocol. Communications are carried out through a half duplex RS485 port, with maximum baudrate of 9600, supporting up to 247 stations.

Statistical Data
ASTAT XT Soft Starter records useful data for maintenance and start up
- Last 10 trip events
- Number of starts, number of trip events and elapsed RUN time.
- Last trip data information of motor current, starting current and acceleration time.

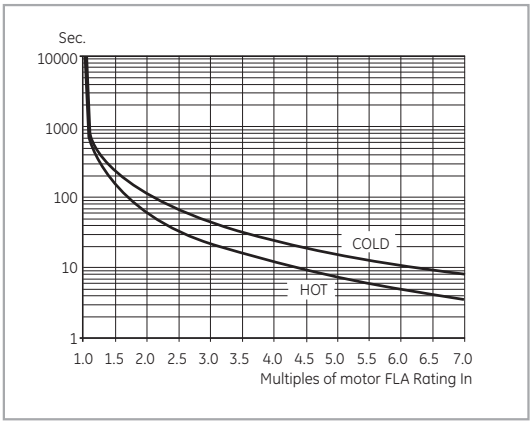
Motor and Starter Protections

Overload	Trips the ASTAT XT Soft Starter when current exceeds the Overload Trip level according IEC Class 10, 20 or NEMA 10, 20, 30
Motor Thermistor	Trips when motor thermistor resistance decreases below trip level set. ASTAT XT Soft Starter allows both PTC or NTC sensors, with adjustable trip level.
Too Many Starts	Trips if the number of starts, during Duty Cycle Time exceeds the preset number.
Long Start Time	Trips if output voltage does not reach rated voltage at the preset Max. Start time.
O/C JAM Fault	Trips under the following conditions: Instantaneously when current exceeds 8.5 x ASTAT XT Soft Starter Current During starting when current exceeds 8.5 x Motor Current During running when current exceeds 200-850% of Motor Current. O/C JAM has a programmable tripping delay of 0-5 seconds
Undercurrent	Trips when line current drops below the preset level for the preset time.
Undervoltage	Trips when line voltage drops below the preset level for the preset time.
Overvoltage	Trips when line voltage increases above a preset level for a preset time.
Phase Loss	Trips if 1 or 2 phases are lost.
Frequency Loss	Trips if frequency is not in the range of 40-66.6Hz.
Phase Sequence	Trips if line phase sequence is wrong.
Slow Speed Time	Trips when operating at slow speed for extended periods.
Wrong Connection	Trips the ASTAT XT Soft Starter when one or more motor phases is not properly connected to ASTAT XT Soft Starter's load terminals or if there is an internal disconnection in the motor winding.
Shorted SCR	Trips and prevents starting if any SCR is short-circuited or when motor windings are shorted.
Over Temperature	Heat-sink over-temperature. Trips the ASTAT XT Soft Starter when the heat-sink temperature rises above 85°C.
External Fault	Trips the ASTAT XT Soft Starter when a N.O. contact between terminals 19-21 closes for over two seconds.
Wrong Parameters	Parameters not transferred from RAM to EEPROM or vice versa.
OC or Wrong CON	Trips when the ASTAT XT Soft Starter is connected Inside Delta and wrong connection or overcurrent is detected.

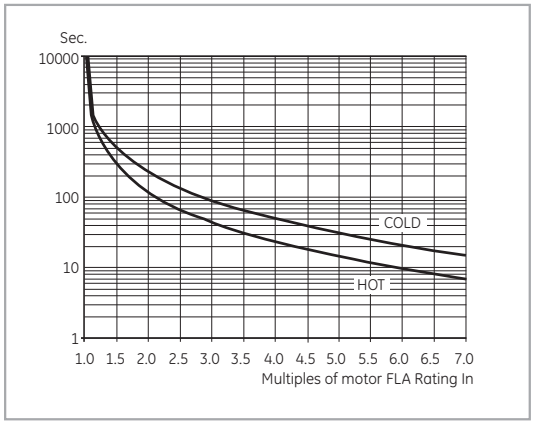
Overload Protections, Thermal Characteristics

The ASTAT XT Soft Starter allows motor protection according IEC Class 10 or Class 20 and NEMA 10, 20 or 30, user free selectable by ASTAT internal dedicated parameter.

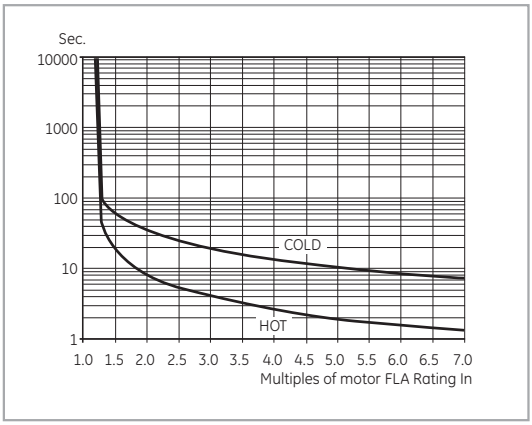
IEC Class 10



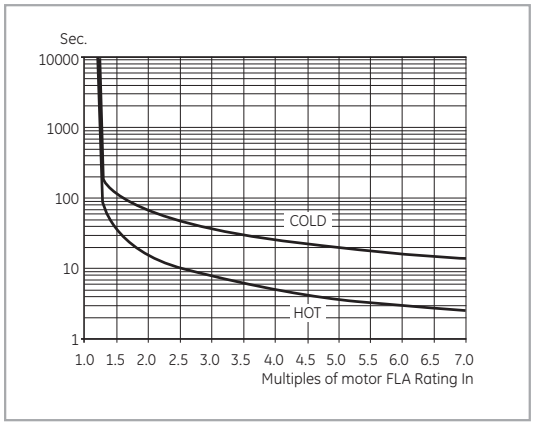
IEC Class 20



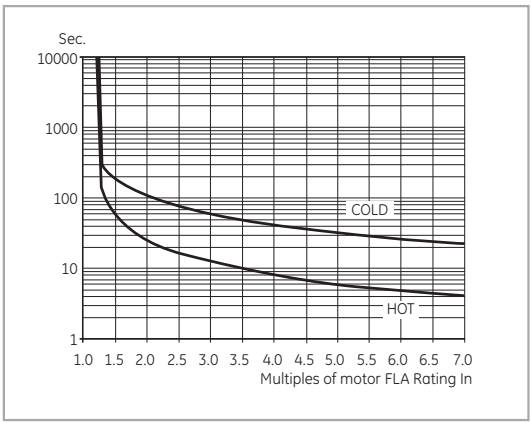
NEMA 10



NEMA 20



NEMA 30

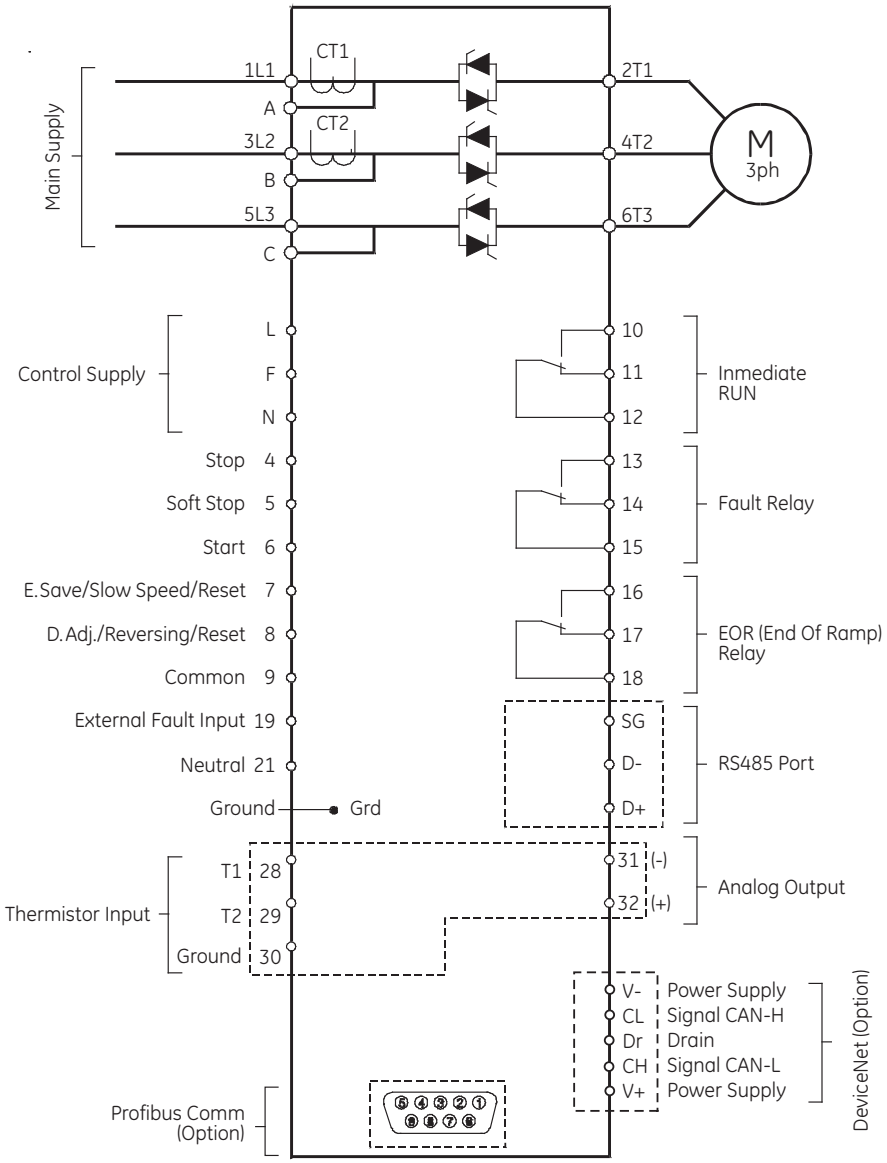


Maximum number starting / hour

		Ramp time		
		10s	20s	30s
Starting current I/In[1]	2	24	12	8
	3	16	8	5
	4	12	6	4

[1]In= rated current of ASTAT XT Soft Starter in the specified class IEC/NEMA.

I/O Wiring, Basic scheme



ASTAT XT Soft Starter

Technical Specifications

I/O Terminal Board Specifications

Power I/O Terminals

Terminal	Function	Description
1L1, 3L2, 5L3	Mains Input	3ph Input voltage according ASTAT XT Soft Starter Main Voltage Option rating (Option 1) 230-500VAC, +10%/-15% 50/60Hz (Option 2) 460-600VAC, +10%/-15% 50/60Hz (Option 3) 690VAC, +10%/-15% 50/60Hz
2T1, 4T2, 6T3	Output to motor	Power Output terminals to 3ph AC motor
A, B, C	Bypass	Bypass terminals for external bypass contactor
G	Ground	ASTAT XT Soft Starter, ground connection

Control Power Supply

Terminal	Function	Description
L, N	Control. Supply	110VAC or 220VAC, according ASTAT XT Soft Starter Control Voltage rating
F	Fan Control	Cooling fan external control, together with jumper J1
		Control Voltage & Fan consumption VA: QTx0008 to QTx0031: No fan. Total consumption: 150VA QTx0044 to QTx0072: Fan 35 VA. Total consumption 185VA QTx0085 to QTx0170: Fan 60 VA. Total consumption 210VA QTx0210 to QTx0390: Fans 105VA. Total consumption 255VA QTx0390 to QTx 1400A : Fans 150VA.Total consumption 300VA

Digital Inputs

Terminal	Function	Description
4	Stop	Dedicated input to Stop
5	Soft Stop	Dedicated input to Soft Stop
6	Start	Dedicated input to Start
7	Progamable Inputs	Programmable to functions Energy Saving, Slow Speed and Reset
8	Progamable Inputs	Programmable to functions Dual Set, Reverse and Reset
9	Common	Common terminal for digital inputs from 4, 5, 6, 7 and 8
	Operating Voltage of digital inputs from 4 to 9	
	Digital Input hardware is operated according either of below ordered voltage ratings	
	(Option 1, standard) From 90 to 230VAC +10%, 50/60Hz	
	(Option 2, Optional) 24VDC +10%/ -15%	

Other Inputs

Terminal	Function	Description
19, 21	External Fault	Requires a free voltage relay contact, to detect external fault
21	Neutral	This terminal may be connected to Mains Neutral when available
28, 29	Motor Thermistor	PTC or NTC programable input for motor thermistor protection The input can be enabled or disabled, and programmed at desired trip level resistance

Digital Outputs

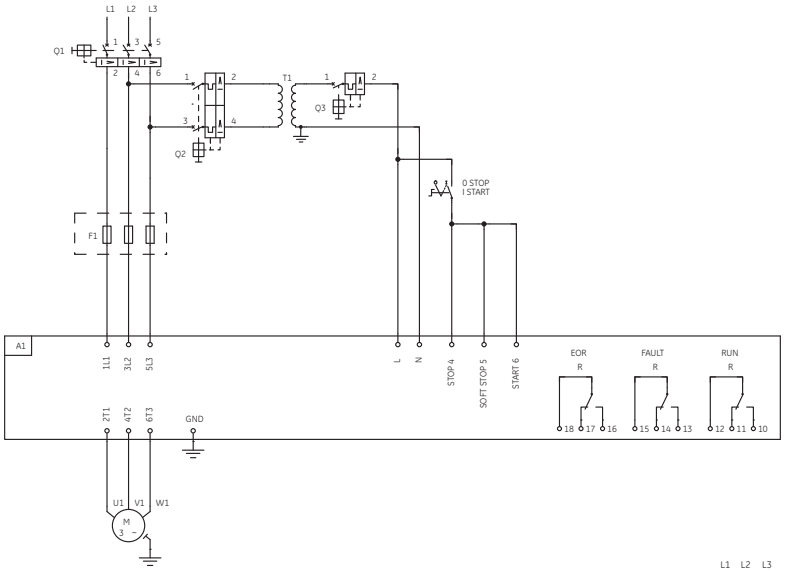
Terminal	Function	Description
10, 11, 12	RUN	Run Relay with NO & NC dry contact. Programmable ON delay
13, 14, 15	FAULT	Fault to ON or Fault to OFF programmable function
16, 17, 18	EOR	End Of Ramp relay. Programmable ON delay
	Relay Outputs Ratings	
	Max rating:	8A, 250VAC, 2000VA max

Analog Output

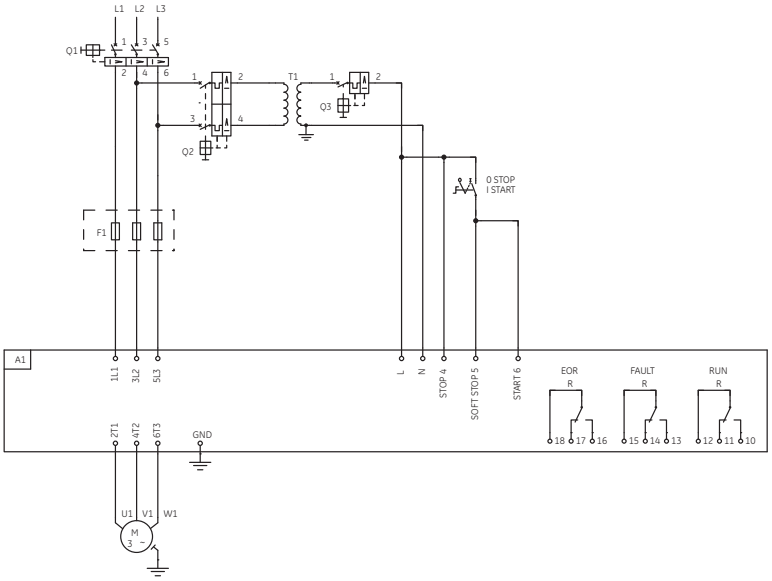
Terminal	Function	Description
31, 32	Current Output	Range 0 to 2xIn. Programmable 0-10VDC, 0-20mA or 4-20mA.
30	Ground	Ground terminal for Analog Output

Communications

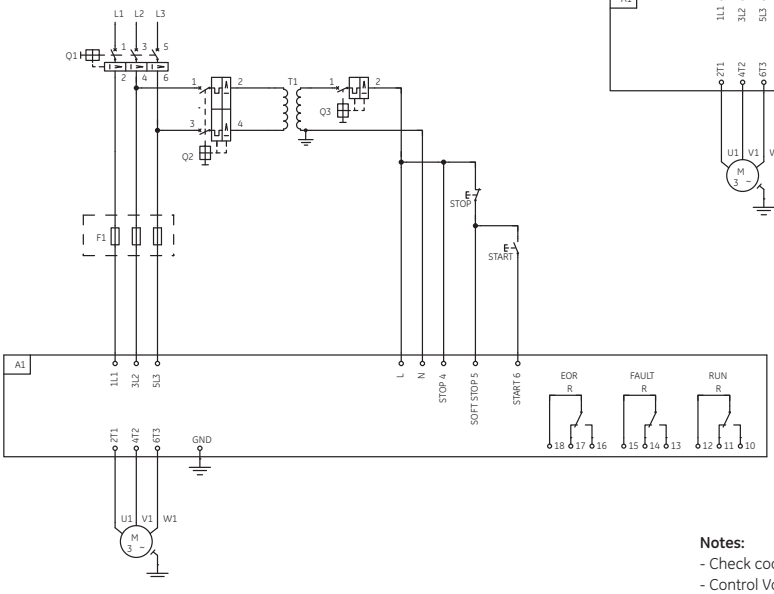
Terminal	Function	Description
D+, D-, SG	RS485 terminals	RS485 Communication port, half duplex for ModBus protocol Baudrate 1200, 2400, 4800, 9600 BPS
D-9 connector	Profibus Port	Optional Profibus Communications port
V+, CL, Dr, CH, V-	DeviceNet terminals	Optional DeviceNet Communications port



With Soft Start and Coast to Stop by Permanent Command Control



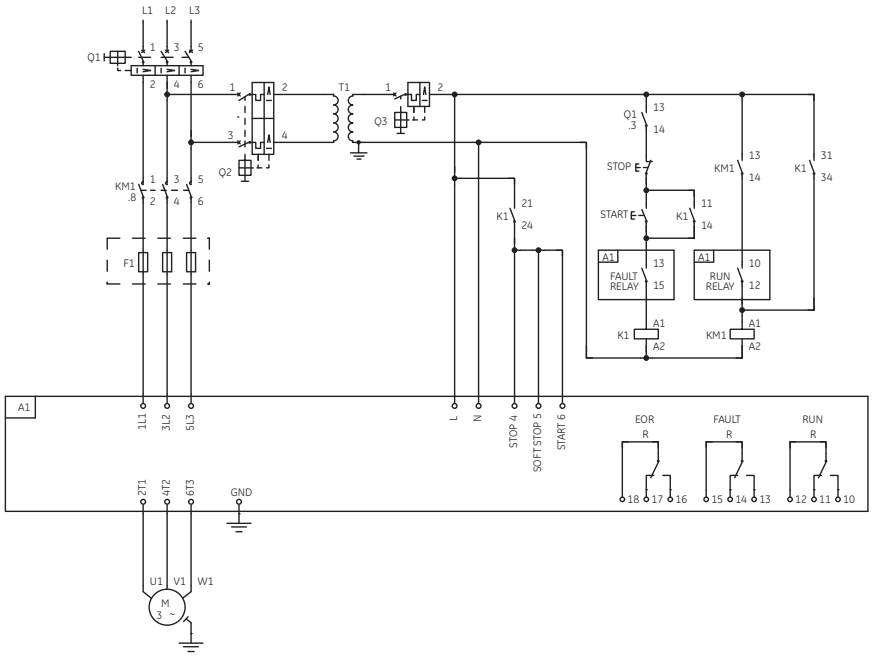
With Soft Start and Soft Stop by Permanent Command Control



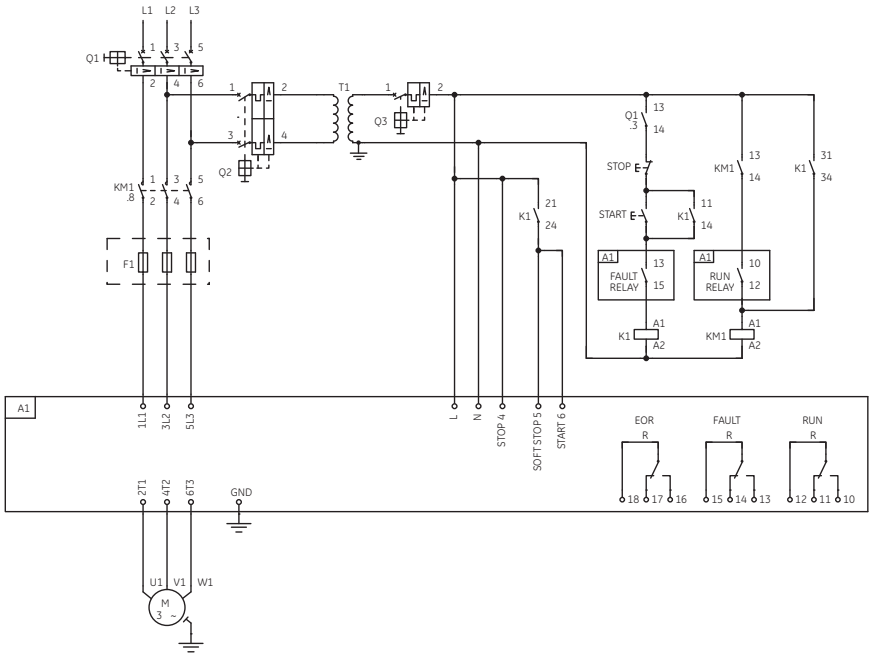
With Soft Start and Soft Stop by Push Button Control

Notes:
- Check coordination tables for proper selection of Breaker and Line contactor.
- Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
- Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables
- ASTAT XT Soft Starter can operate without line contactor, however the use of a line contactor will increase the operation safety, and provide a way to switch off the Breaker in case of an emergency.

Application Wiring Diagrams - Basic Diagram with Line Contactor



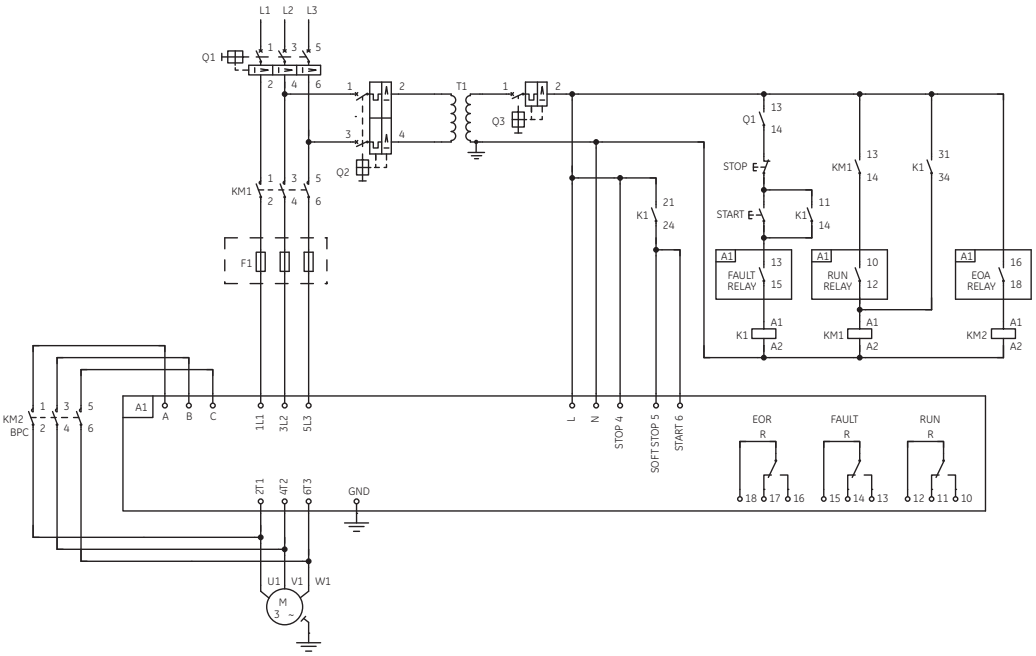
With Soft Start and Coast to Stop by Push Button Control



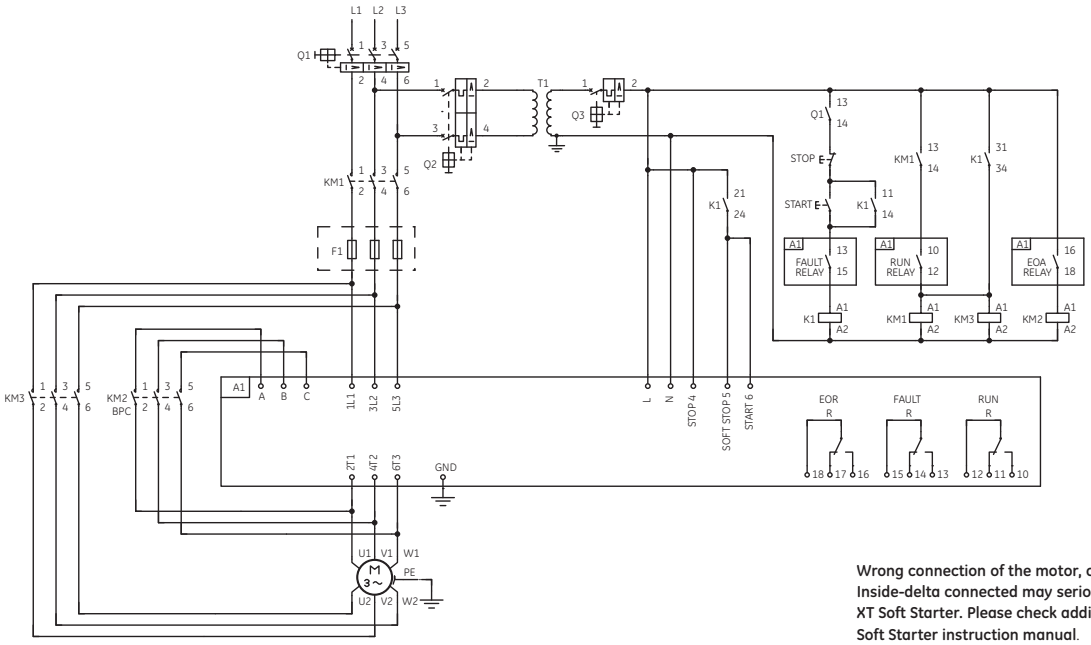
With Soft Start and Soft Stop by Push Button Control

Notes:

- Check coordination tables for proper selection of Breaker and Line contactor.
- Control Voltage and Control Input Voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control Input Voltage.
- Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables



Basic Diagram with Line and Bypass Contactors
With Soft Start and Soft Stop by Push Button Control



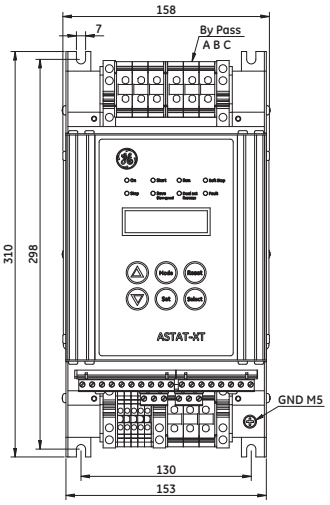
Basic Diagram in "Inside Delta" Configuration
with Line and Bypass Contactors
With Soft Start and Soft Stop by Push Button Control

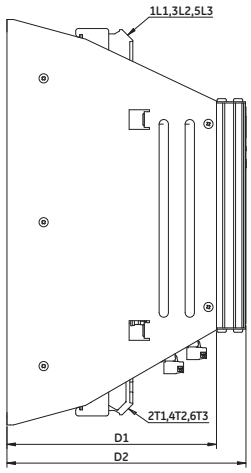
Wrong connection of the motor, or the ASTAT XT Soft Starter when it is Inside-delta connected may seriously damage the motor or the ASTAT XT Soft Starter. Please check additional details given in the ASTAT XT Soft Starter instruction manual.

Notes:
- Check coordination tables for proper selection of Breaker and Line contactor.
- Control Voltage and Control Input Voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control Input Voltage.
- Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables

All Units

Power Terminal Size (mm²)		
Input 1L1, 3L2, 5L3	Bypass A, B, C	Output 2T1, 4T2, 6T3
16	16	16
16	16	16
16	16	16
16	16	35
16	16	35
35	35	35



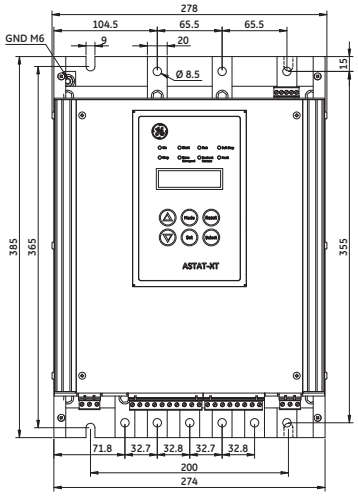


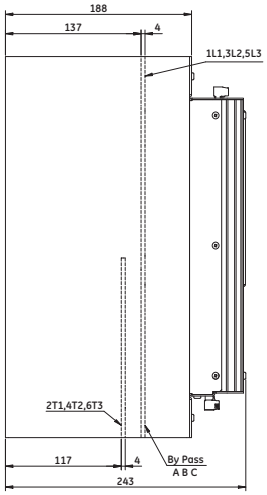
UL Certified Units

Product Number	Dimensions inches (mm) Height	Width	D1	D2	Weight lbs. (Kg)
QTx0008U__	12.2 (309.9)	6.2 (157.5)	6.3 (160)	7.2 (182.5)	1.9 (4.2)
QTx0017U__	12.2 (309.9)	6.2 (157.5)	6.3 (160)	7.2 (182.5)	1.9 (4.2)
QTx0031U__	12.2 (309.9)	6.2 (157.5)	6.3 (160)	7.2 (182.5)	2.4 (5.3)
QTx0044U__	12.2 (309.9)	6.2 (157.5)	8.1 (207)	9.0 (229.5)	3.0 (6.7)
QTx0058U__	12.2 (309.9)	6.2 (157.5)	8.1 (207)	9.0 (229.5)	3.0 (6.7)
QTx0072U__	12.2 (309.9)	6.2 (157.5)	8.1 (207)	9.0 (229.5)	3.0 (6.7)

UL Certified Units

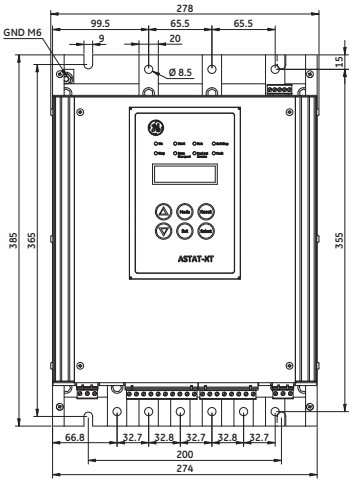
Product Number	Dimensions inches (mm) Height	Width	Depth	Weight lbs. (Kg)
QTx0085U__	15.2 (386.1)	10.9 (276.9)	9.6 (243.8)	6.9 (15.2)
QTx0105U__	15.2 (386.1)	10.9 (276.9)	9.6 (243.8)	6.9 (15.2)

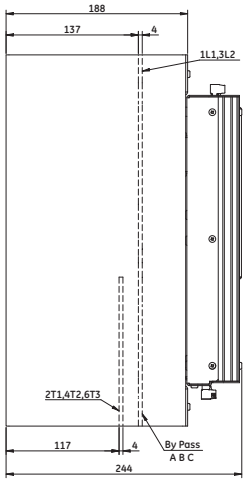




UL Certified Units

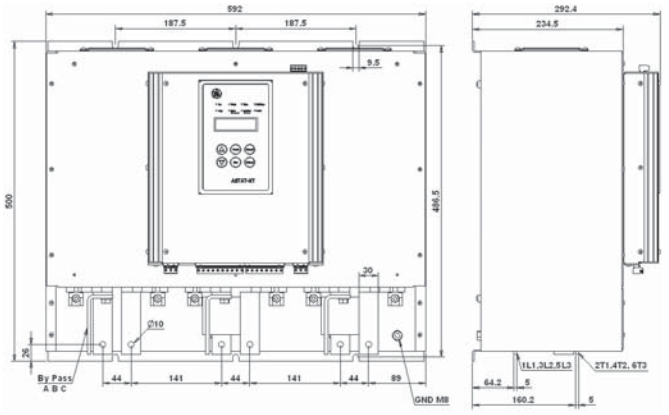
Product Number	Dimensions inches (mm) Height	Width	Depth	Weight lbs. (Kg)
QTx0145U__	15.2 (386.1)	10.9 (276.9)	9.6 (243.8)	6.9 (15.2)
QTx0170U__	15.2 (386.1)	10.9 (276.9)	9.6 (243.8)	6.9 (15.2)





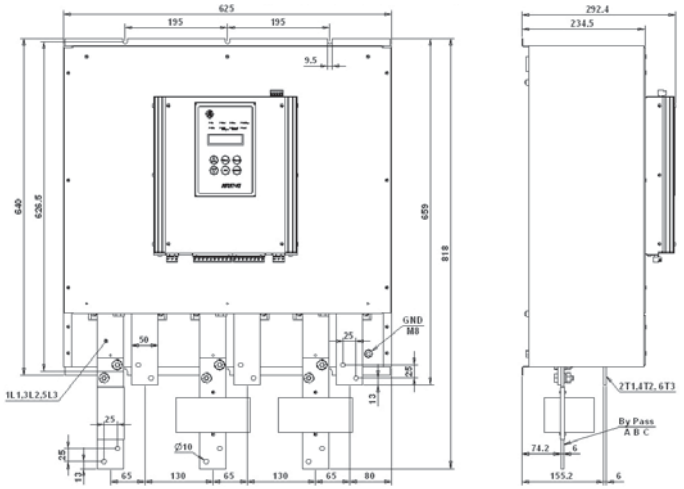
UL Certified Units

Product Number	Dimensions inches (mm) Height	Width	Depth	Weight lbs. (Kg)
QTx0210U__	19.7 (500.4)	23.3 (591.8)	11.5 (292.1)	14.9 (32.7)
QTx0310U__	19.7 (500.4)	23.3 (591.8)	11.5 (292.1)	14.9 (32.7)
QTx0390U__	19.7 (500.4)	23.3 (591.8)	11.5 (292.1)	14.9 (32.7)



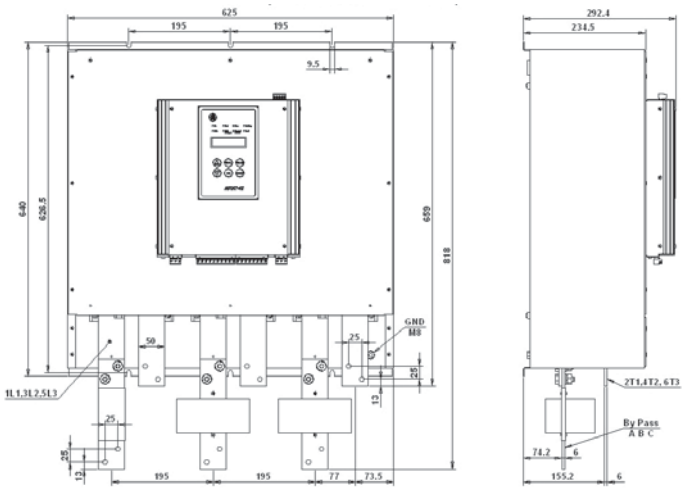
UL Certified Unit

Product Number	Dimensions inches (mm) Height	Width	Depth	Weight lbs. (Kg)
QTx0460U__	32.2 (817.9)	24.6 (624.8)	11.5 (292.1)	28.1 (61.8)



UL Certified Units

Product Number	Dimensions inches (mm) Height	Width	Depth	Weight lbs. (Kg)
QTx0580U__	32.2 (817.9)	24.6 (624.8)	11.5 (292.1)	31.6 (69.5)
QTx0820U__	32.2 (817.9)	24.6 (624.8)	11.5 (292.1)	31.6 (69.5)

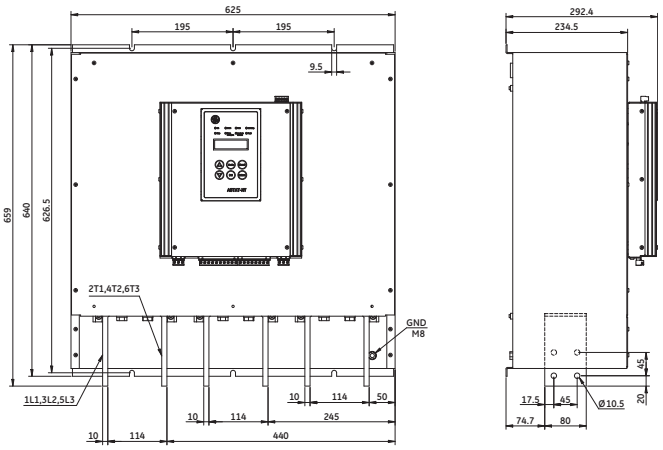


Non - UL Certified Unit

Product Number	Dimensions inches (mm) Height	Width	Depth	Weight lbs. (Kg)
QTx0950N__	25.9 (657.9)	24.6 (624.9)	11.5 (292.1)	39.4 (86.7)

Notes:
- All ASTAT XT Soft Starter models rated 950A and up **must** be operated with a bypass contactor.
- Add space for current transformers (supplied separately from the main unit) and bus bars for preparation for bypass

Approximate current transformers dimensions: W=240mm, H=130mm, D=90mm

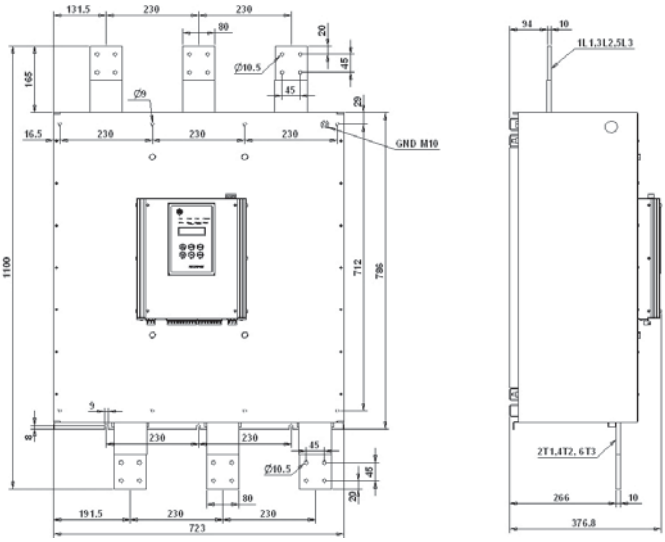


Non - UL Certified Units

Product Number	Dimensions inches (mm) Height	Width	Depth	Weight lbs. (Kg)
QTx1100N__	43.3 (1099.8)	28.5 (723.9)	14.8 (375.9)	77.7 (169.8)
QTx1400N__	43.3 (1099.8)	28.5 (723.9)	14.8 (375.9)	79.8 (175.5)

Notes:
- All ASTAT XT Soft Starter models rated 950A and up **must** be operated with a bypass contactor.
- Add space for current transformers (Supplied separately from main unit) and bus bars for preparation for bypass

Approximate current transformers dimensions:
W=240mm, H=130mm, D=90mm. (for 1100A unit, Product Numbers QTx1100N__)
W=270mm, H=155mm, D=90mm. (for 1400A unit, Product Numbers QTx1400N__)



ASTAT XT Soft Starter Panels

Description and Features

Description

Incorporating GE's newest solid state starter, the ASTAT XT Soft Starter Panel provides the functionality, reliability and ease of use needed for reduced voltage motor starting applications.

Loaded with traditional features such as motor overload function, adjustable ramps, current limit, kick start, as well as other high end functionality including operation, torque control, pump control and generator supply operation, the panels are available in NEMA 1, 12, 3R and Open Baseplate offerings.

Combining an easy to use interface, user defined protection, and a full range of options and features, the ASTAT XT Panel is designed to do even more.

Features

—Available in 230, 460, or 575Vac
—Ratings up to 500HP
—Run Time Bypass Contactor (AC1) or Full Voltage Bypass Starter (AC3) options
—Isolation Contactor with/without Bypass Contactor or Starter
—Friendly multi-language interface with two rows, sixteen characters each
—Torque, pump, and generator supply control algorithms
—ModBus RTU, Profibus-DP and DeviceNet communications

Standards

cUL, UL: 508A

Product Numbering System Diagram

(Product number for illustrative purposes only)

Description	CR47	X	XX	N	N	N	N	X	N	X	X
GE Product Code											

Type
- 0 = Non-Combination[1]
- 1 = Fusible Disconnect Combination (100k AIC)
- 2 = Mag Breaker Combination (65k AIC)

Frame Size

Starter frame size is a combination of Frame Code and Duty Rating Code.
Examples -
A 20HP, 230V Normal Duty unit will be EN.
A 300HP, 575V Heavy Duty unit will be MH.
See Frame Size table for details.

Enclosure Type
- 0 = Open Baseplate[1]
- 1 = Type 1
- 2 = Type 12
- 6 = Type 3R

Line Volts
- 3 = 230V
- 4 = 460V
- 5 = 575V

Control Circuit Options
- 0 = Common Control Voltage (No CPT. Only available on 230Vac units.)
- 1 = Separate Control (No CPT with Control Circuit Fuses, 120V Control)
- 2 = Standard Capacity CPT (120V Control)
- 3 = Extra Capacity CPT (100VA , 120V Control)

Contactor Options
- X = None
- 1 = Isolation Contactor
- 2 = Bypass Contactor (AC1 rating)
- 3 = Bypass Starter (AC3 rating)
- 4 = 1 + 2
- 5 = 1 + 3

Pilot Device Options
- X = None
- B = HOA with Start
- C = Start And Stop
- D = Hand-Off-Auto
- E = Red Run Light
- F = Green Run Light
- G = HOA with Start And Red Run Light
- H = HOA with Start And Red Run And Green Off Lights
- J = HOA with Start And Green Run Light
- K = HOA with Start And Stop

Auxiliary Contact Options
- X = None
- 1 = 1 Extra Relay 3NO-1NC
- 2 = 1 Extra Relay 2NO-2NC
- 3 = 1 Extra Relay 1NO-3NC

Meter Options
- X = None
- A = 1 Phase Ammeter
- 1 = 1 Phase Voltmeter
- 3 = 3 Phase Voltmeter
- E = ETM
- B = A + 1
- C = A + 3
- D = A + E
- F = 1 + E
- G = 3 + E
- H = A + 1 + E
- J = A + 3 + E

Communication Options
- X = Standard (Modbus RTU)
- D = DeviceNet
- P = Profibus

[1]Actual kAIC rating is dependant on user installtion. Install per instruction bulletin Circuit Protection and Short Circuit Ratings, DEH-40631, for details.

ASTAT XT Soft Starter Panels Frame Size Table

	Duty/NEMA Overload Rating											
	Light Duty NEMA 10 = L				Normal Duty NEMA 20 = N				Heavy Duty NEMA 30 = H			
Frame Code	Current Rating (Amps)	HP @ 230V	HP @ 460V	HP @ 575V	Current Rating (Amps)	HP @ 230V	HP @ 460V	HP @ 575V	Current Rating (Amps)	HP @ 230V	HP @ 460V	HP @ 575V
A	8	2	5	5	8	2	5	5	8	2	5	5
B	17	5	10	15	17	5	10	15	12	3	7.5	10
C	31	10	25	30	31	10	20	25	31	10	20	25
D	54	20	40	50	44	15	30	40	44	15	30	40
E	65	—	50	60	58	20	40	50	55	20	40	50
F	72	25	—	—	72	25	50	60	66	—	50	60
G	104	40	75	100	85	30	60	75	80	30	60	75
H	130	50	100	125	105	40	75	100	99	40	75	100
J	156	60	125	150	145	50	100	150	130	50	100	125
K	170	—	—	—	170	60	125	—	134	—	—	—
L	262	100	200	250	210	75	150	200	203	75	150	200
M	387	150	300	400	310	100	250	300	310	100	250	300
N	414	—	350	—	390	150	300	400	361	150	300	—
P	480	200	400	500	460	—	350	—	432	—	350	400
Q	610	250	500	—	580	200	400	—	552	200	400	500
R	—	—	—	—	820	250	500	500	690	250	500	—

Non-combination and Combination Pricing

As standard, all ASTAT XT Soft Starter Panels include through-the-door keypad access, a customer terminal board for control connections, and Modbus RTU communication protocol.

	List Price GO-10A8P		List Price Adders GO-10A8P			
	CR470 Non-combination					
Option Code	Open Baseplate[1]	NEMA 1	CR471 Fusible Disconnect	CR472 Mag Break	NEMA 12[2]	NEMA 3R[2]
A	$1745.00	$2600.00	$500.00	$300.00	$440.00	$850.00
B	$1995.00	$2800.00	$400.00	$200.00	$450.00	$900.00
C	$2145.00	$3000.00	$500.00	$200.00	$480.00	$1055.00
D	$2150.00	$3100.00	$900.00	$650.00	$560.00	$1165.00
E	$2285.00	$3300.00	$1200.00	$950.00	$600.00	$1245.00
F	$2170.00	$3500.00	$1700.00	$1150.00	$825.00	$2025.00
G	$2216.00	$3666.00	$1984.00	$1434.00	$925.00	$2240.00
H	$2450.00	$4080.00	$2345.00	$1420.00	$1100.00	$2605.00
J	$3150.00	$5250.00	$3150.00	$2130.00	$1475.00	$3450.00
K	$3550.00	$5900.00	$3860.00	$1925.00	$1800.00	$4115.00
L	$3975.00	$6600.00	$4000.00	$2900.00	$2000.00	$4520.00
M	—	$7500.00	$4300.00	$3400.00	$3225.00	$6200.00
N	—	$7900.00	$6125.00	$3400.00	$4175.00	$7815.00
P	—	$10200.00	$7975.00	$5500.00	—	—
Q	—	$13270.00	$10380.00	$5500.00	—	—
R	—	$16500.00	$12901.00	$8400.00	—	—

[1]Open Baseplate units are only available as Non-combination.
[2]NEMA 12 and 3R Adders are combined with NEMA 1 List Price to determine the panel's List Price.

Control Circuit Options

Option Description	Option Code	List Price Adder, GO-10A8P CR470	CR471 or CR472
Common Control Voltage (No CPT. Only available on 230Vac units.)	0	—	**-$160.00**
Separate Control (No CPT with Control Circuit Fuses, 120V Control)	1	—	**-$160.00**
Standard Capacity CPT (120V Control)	2	**$190.00**	—
Extra Capacity CPT (100VA, 120V Control)	3	**$280.00**	**$90.00**

Contactor Options

	List Price Adder, GO-10A8P Option Description and Code					
	None[1]	Isolation Contactor[1]	Bypass Contactor (AC1 rating)[3]	Isolation Contactor & Bypass Contactor (AC1 rating)[3]	Bypass Starter (AC3 rating)[2,4]	Isolation Contactor & Bypass Starter (AC3 rating)[2,4]
Option Codes	**X**	**1**	**2**	**4**	**3**	**5**
A	—	**$145.00**	**$200.00**	**$345.00**	**$600.00**	**$745.00**
B	—	**$164.00**	**$219.00**	**$383.00**	**$619.00**	**$783.00**
C	—	**$183.00**	**$238.00**	**$421.00**	**$638.00**	**$821.00**
D	—	**$275.00**	**$370.00**	**$645.00**	**$770.00**	**$978.00**
E	—	**$325.00**	**$420.00**	**$695.00**	**$820.00**	**$978.00**
F	—	**$363.00**	**$458.00**	**$783.00**	**$858.00**	**$1095.00**
G	—	**$591.00**	**$686.00**	**$1102.00**	**$1086.00**	**$1186.00**
H	—	**$591.00**	**$686.00**	**$1102.00**	**$1086.00**	**$1186.00**
J	—	**$738.00**	**$943.00**	**$1681.00**	**$1343.00**	**$1668.00**
K	—	**$1283.00**	**$1873.00**	**$3156.00**	**$2273.00**	**$3529.00**
L	—	**$1283.00**	**$1873.00**	**$3156.00**	**$2273.00**	**$3529.00**
M	—	**$2363.00**	**$3193.00**	**$5556.00**	**$3593.00**	**$4849.00**
N	—	**$3241.00**	**$4071.00**	**$7312.00**	**$4471.00**	**$5727.00**
P	—	**$4700.00**	**$5530.00**	**$10230.00**	**$5930.00**	**$7692.00**
Q	—	**$6450.00**	**$7280.00**	**$13730.00**	**$7680.00**	**$10921.00**
R	—	**$13428.00**	**$14628.00**	**$28056.00**	**$15028.00**	**$28856.00**

Pilot Device Options[2]

Option Description	Option Code	List Price Adder GO-10A8P
None	X	—
Hand-Off-Auto	D	**$115.00**
Hand-Off-Auto with Green Run Light	U	**$200.00**
Hand-Off-Auto with Red Run & Green Off Lights	T	**$285.00**
Hand-Off-Auto with Red Run Light	S	**$200.00**
Hand-Off-Auto with Start	B	**$180.00**
Hand-Off-Auto with Start & Green Run Light	J	**$265.00**
Hand-Off-Auto with Start & Red Run & Green Off Lights	H	**$350.00**
Hand-Off-Auto with Start & Red Run Light	G	**$265.00**
Hand-Off-Auto with Start & Stop	K	**$245.00**
Hand-Off-Auto with Start & Stop & Green Run Light	N	**$330.00**
Hand-Off-Auto with Start & Stop & Red Run & Green Off Lights	M	**$415.00**
Hand-Off-Auto with Start & Stop & Red Run Light	L	**$330.00**
Start & Stop	C	**$130.00**
Start & Stop & Green Run Light	R	**$215.00**
Start & Stop & Red Run & Green Off Lights	Q	**$300.00**
Start & Stop & Red Run Light	P	**$215.00**
Green Run Light	F	**$85.00**
Red Run & Green Off Lights	V	**$170.00**
Red Run Light	E	**$85.00**

Meter Options[2]

Option Description	Option Code	List Price Adder GO-10A8P
None	X	—
1-Phase Ammeter	A	**$750.00**
1-Phase Voltmeter	1	**$750.00**
3-Phase Voltmeter	3	**$960.00**
Elapsed Time Meter	E	**$275.00**
1-Phase Ammeter & 1-Phase Voltmeter	B	**$1500.00**
1-Phase Ammeter & 3-Phase Voltmeter	C	**$1710.00**
1-Phase Ammeter & ETM	D	**$1025.00**
1-Phase Voltmeter & ETM	F	**$1025.00**
3-Phase Voltmeter & ETM	G	**$1235.00**
1-PH Ammeter & 1-PH Voltmeter & ETM	H	**$1775.00**
1-PH Ammeter & 3-PH Voltmeter & ETM	J	**$1985.00**
Door Mounted Keypad[5]	K	**$650.00**
Door Mounted Keypad & 1-Phase Ammeter[5]	L	**$1400.00**
Door Mounted Keypad & 1-Phase Voltmeter[5]	M	**$1400.00**
Door Mounted Keypad & 3-Phase Voltmeter[5]	N	**$1610.00**
Door Mounted Keypad & ETM[5]	P	**$925.00**
Door Mounted Keypad, 1-Phase Ammeter & 1-Phase Voltmeter[5]	Q	**$2150.00**
Door Mounted Keypad, 1-Phase Ammeter & 3-Phase Voltmeter[5]	R	**$2360.00**
Door Mounted Keypad, 1-Phase Ammeter & ETM[5]	S	**$1675.00**
Door Mounted Keypad, 1-Phase Voltmeter & ETM[5]	T	**$1675.00**
Door Mounted Keypad, 3-Phase Voltmeter & ETM[5]	U	**$1885.00**
Door Mounted Keypad, 1-PH Ammeter & 1-PH Voltmeter & ETM[5]	V	**$2425.00**
Door Mounted Keypad, 1-PH Ammeter & 3-PH Voltmeter & ETM[5]	W	**$2635.00**

[1]Not available on NEMA 12 or 3R units.
[2]Not available on Open Baseplate units.
[3]AC1 units include a contactor rated for running current and the ASTAT overloads.
[4]AC3 units include a starter rated for starting and running currents, the ASTAT overload, and externally mounted overloads. This also includes a door mounted operator to allow running the motor from full voltage starter in the event of an ASTAT trip.
[5]Door mounted keypad is only available on NEMA 1 enclosures.

Auxiliary Contact Options

Option Description	Option Code	List Price Adder GO-10A8P
None	X	—
1 Extra Relay 3NO-1NC	1	**$62.00**
1 Extra Relay 2NO-2NC	2	**$62.00**
1 Extra Relay 1NO-3NC	3	**$62.00**
2 Extra Relay 3NO-1NC[1]	4	**$124.00**
2 Extra Relay 2NO-2NC[1]	5	**$124.00**
2 Extra Relay 1NO-3NC[1]	6	**$124.00**

Communication Options[2]

Option Description	Option Code	List Price Adder GO-10A8P
Modbus RTU (Standard)	X	—
Profibus	P	**$900.00**
DeviceNet	D	**$900.00**

[1]Not available with Bypass configurations.
[2]Communication options are not field installable.

Model Number and Pricing Example

Description:

460VAC, 50HP, Normal Duty ASTAT XT with Fusible Disconnect, Isolation Contactor, Bypass Starter (AC3), Hand-Off-Auto with Start, Standard CPT, DeviceNet communications, in a NEMA 12 Enclosure.

Model Number: CR471JN2425BXXD

NEMA 1 ASTAT XT:	**$5250.00**
NEMA 12 Adder:	**$1475.00**
Fusible Disconnect Adder:	**$3150.00**
Isolation Contactor and Bypass Starter (AC3 rating):	**$1668.00**
Hand-Off-Auto with Start:	**$180.00**
DeviceNet Communications:	**$900.00**
Total List Price:	**$12623.00**

GE Fastrac Program

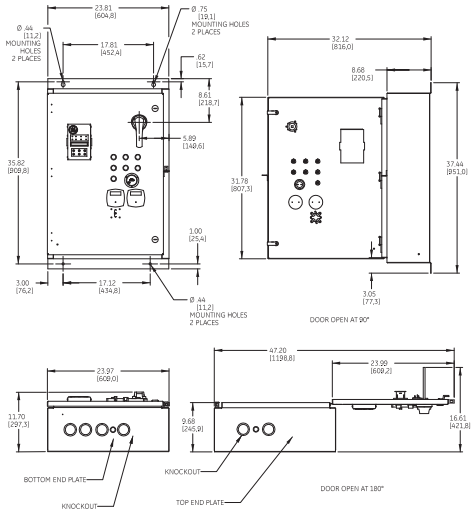
ASTAT XT Panels are available as part of GE's Fastrac program. This cuts normal cycle times in half, so you get the same product faster and meet your construction cycle needs.

The following products and configurations are available with the Soft Starter Panel Fastrac program:
—NEMA Type 1 panels
—2 through 60HP @ 230Vac and 5 through 100HP @ 460Vac
—Normal and Heavy Duty ratings
—Fusible disconnect or circuit breaker
—AC1 or AC3 rated bypass contactors
—Most common HOA operator and Run and Off Pilot lights combinations
—Modbus RTU communications

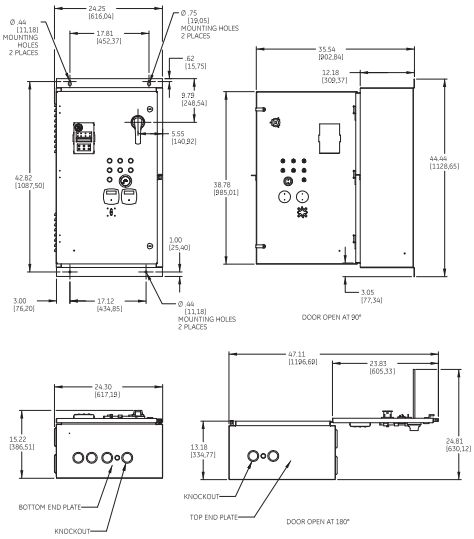
Contact your local GE Sales office for specifics on this program and for ordering assistance.

Type 1 Enclosures

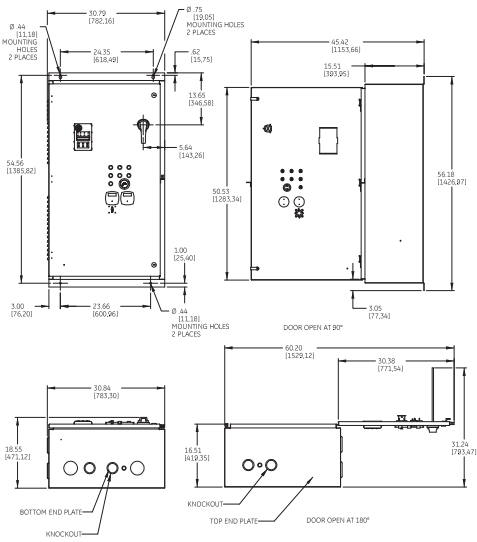
Description	Weight (lbs)	Weight (kgs)	H x W x D (in)	H x W x D (mm)	Drawing No.
2-10HP @ 230V, 5-25HP @ 460V, 5-30HP @ 575V	146.5	66.50	37.44 x 23.97 x 11.70	951.00 x 609.00 x 297.30	270A8104
15-25HP @ 230V, 30-50HP @ 460V, 40-60HP @ 575V	183.7	83.40	44.44 x 24.25 x 15.22	1128.65 x 616.04 x 386.51	270A8105
30-60HP @ 230V, 60-100HP @ 460V, 75-125HP @ 575V	306.9	139.40	56.18 x 30.84 x 18.55	1426.97 x 783.30 x 471.12	270A8106
75-100HP @ 230V, 125-200HP @ 460V, 150-250HP @ 575V	646.8	293.80	78.26 x 38.55 x 22.57	1987.8 x 979.17 x 573.278	270A8107
150HP @ 230V, 250-300HP @ 460V, 300HP @ 575V	909.4	413.00	94.48 x 48.50 x 26.77	2399.79 x 1231.80 x 679.8	270A8108
200-250HP @ 230V, 350-500HP @ 460V, 400-500HP @ 575V	1106.8	502.30	94.48 x 56.5 x 26.88	2399.79 x 1435.10 x 682.8	270A8109



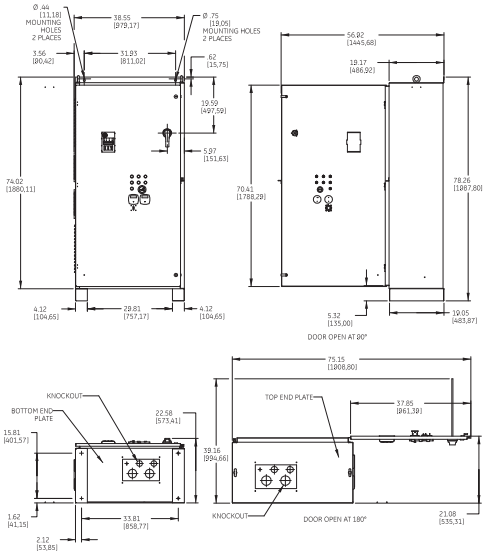
2-10HP @ 230V, 5-25HP @ 460V, 5-30HP @ 575V



15-25HP @ 230V, 30-50HP @ 460V, 40-60HP @ 575V

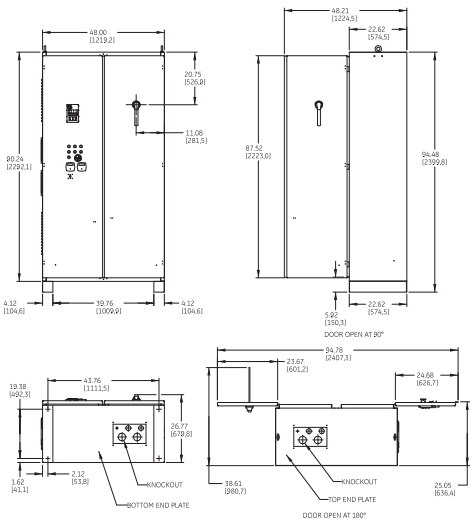


30-60HP @ 230V, 60-100HP @ 460V, 75-125HP @ 575V

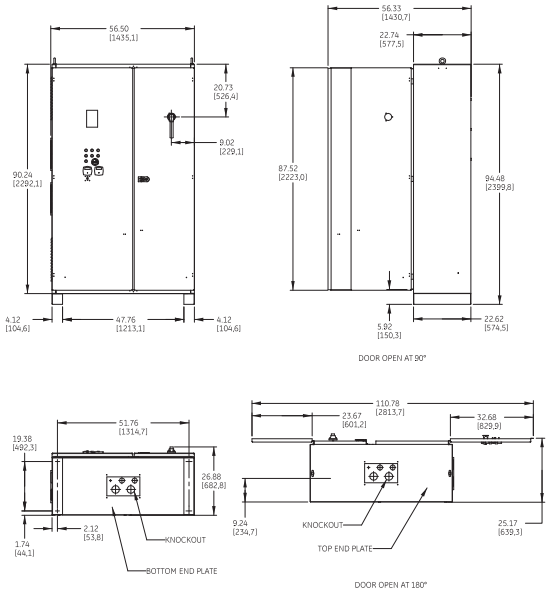


75-100HP @ 230V, 125-200HP @ 460V, 150-250HP @ 575V

Visit http://www.geindustrial.com for additional product information including programming guides, drawings, and much more.



150HP @ 230V, 250-300HP @ 460V, 300HP @ 575V



200-250HP @ 230V, 350-500HP @ 460V, 400-500HP @ 575V

Type 12 Enclosures

Description	Weight (lbs)	Weight (kgs)	H x W x D (in)	H x W x D (mm)	Drawing No.
2-10HP @ 230V, 5-25HP @ 460V, 5-30HP @ 575V	146.5	66.50	37.44 x 23.90 x 11.72	950.98 x 607.06 x 297.64	270A8110
15-25HP @ 230V, 30-50HP @ 460V, 40-60HP @ 575V	183.7	83.40	44.44 x 23.90 x 15.22	1128.65 x 607.06 x 386.51	270A8111
30-60HP @ 230V, 60-100HP @ 460V, 75-125HP @ 575V	306.9	139.40	56.18 x 30.39 x 18.55	1426.97 x 772.03 x 471.12	270A8112
75-100HP @ 230V, 125-200HP @ 460V, 150-250HP @ 575V	646.8	293.80	78.26 x 38.55 x 22.53	1987.8 x 979.17 x 573.278	270A8113
150HP @ 230V, 250-300HP @ 460V, 300 @ 575V	909.4	413.00	94.48 x 48.50 x 26.77	2399.79 x 1231.80 x 679.8	270A8114

Type 3R Enclosures

Description	Weight (lbs)	Weight (kgs)	H x W x D (in)	H x W x D (mm)	Drawing No.
2-10HP @ 230V, 5-25HP @ 460V, 5-30HP @ 575V	146.5	66.50	37.44 x 23.90 x 11.72	950.98 x 607.06 x 297.64	270A8115
15-25HP @ 230V, 30-50HP @ 460V, 40-60HP @ 575V	183.7	83.40	44.44 x 23.90 x 15.22	1128.65 x 607.06 x 386.51	270A8116
30-60HP @ 230V, 60-100HP @ 460V, 75-125HP @ 575V	306.9	139.40	56.18 x 30.39 x 18.55	1426.97 x 772.03 x 471.12	270A8117
75-100HP @ 230V, 125-200HP @ 460V and 150-250HP @ 575V	646.8	293.80	78.26 x 38.55 x 22.53	1987.8 x 979.17 x 573.278	270A8118
150HP @ 230V, 250-300HP @ 460V, 300 @ 575V	909.4	413.00	94.48 x 48.50 x 26.77	2399.79 x 1231.80 x 679.8	270A8119

Open Baseplate

Description	Weight (lbs)	Weight (kgs)	H x W x D (in)	H x W x D (mm)	Drawing No.
2-10HP @ 230V, 5-25HP @ 460V, 5-30HP @ 575V	70.9	32.20	30 x 20.24 x 7.81	762 x 514.096 x 198.374	270A8140
15-25HP @ 230V, 30-50HP @ 460V and 40-60HP @ 575V	79.3	36.00	36.99 x 20.24 x 11.43	939.546 x 514.096 x 290.40	270A8141
30-60HP @ 230V, 60-100HP @ 460V and 75-125HP @575V	137.6	62.50	48.74 x 26.78 x 13.56	1237.996 x 680.212 x 344.44	270A8142
75-100HP @ 230V, 125-200HP @ 460V and 150-250HP @ 575V	274.6	124.80	69.02 x 34.84 x 16.74	1753.108 x 884.936 x 425.30	270A8143

Wiring Diagrams (all configurations)

Description	Drawing No.
Elementary and Connection	190B8130

Visit http://www.geindustrial.com for additional product information including programming guides, drawings, and much more.

Description

The ASTAT-IBP Plus is a solid state reduced voltage starter with integral bypass. The ASTAT-IBP Plus consists of an electronic control module, a power base consisting of six SCRs in back-to-back parallel pairs for optimum performance, and a fully rated bypass contactor.

The ASTAT-IBP Plus advanced control technology individually fires each phase in a specially selected sequence to offer reliable performance for the smooth acceleration of all types of loads, reducing shock to mechanical components, thereby extending component and motor life. When the motor ramps up to full speed, the digital electronic control energizes a contactor placed in parallel with the SCRs. When the contactor closes, the SCRs are bypassed and the electronic circuit stops firing the SCRs. This method results in an improved thermal design that eliminates the need for heat sinks and cooling fans.

The ASTAT-IBP Plus bypass contactor is fully rated and can start a motor in backup mode in case of a failure in the electronics or SCRs. In addition, the ASTAT-IBP Plus rated from 200-600 VAC and allows for 115% continuous current-carrying capability, matching the characteristics of a 1.15 service factor motor.

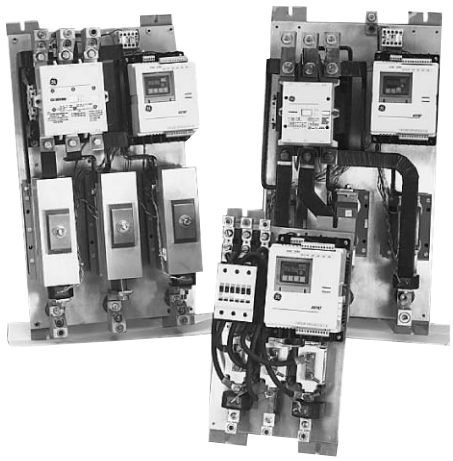
The ASTAT-IBP Plus includes many new advanced features that are standard to enhance performance and allow greater application flexibility. This simplifies the ordering process and results in lower inventories for distributors and OEM's.

Application

ASTAT-IBP Plus solid state reduced voltage starters are used to reduce or eliminate mechanical shock and stress on mechanical components, such as V-belts, gear boxes, chain drives, couplings, transmissions, and shafts. ASTAT-IBP Plus reduced voltage starters are used to:

—Reduce brownout conditions and may limit demand charges,
—Control processes,
—Smoothly accelerate and decelerate loads, and
—Restrict process surges.

Typical applications include compressors, pumps, belted equipment, centrifuges, conveyors, cranes, crushers, winches, fans and blowers, extruders, flywheels, hoists, laundry extractors, mixers, packaging equipment, machine tools, shears, saws, spinning frames, textile machinery, winders, and wire-drawing machines.



ASTAT-IBP Plus Solid State Reduced Voltage

Features

—Adjustable starting current limit and starting torque
—Soft start
—Soft stop
—Pump control setting for acceleration and deceleration
—Monitoring:
  Motor Current
  Line Voltage
  KW
  Power Factor
  Elapsed Time
—2 Programmable Inputs
—2 Programmable Outputs
—Electronic Overload Protection: Class 10, 20 or 30 overload selection
—Fault Diagnostics
—Error Tracing
—Kick Start setting
—Integral Snubbers and MOVs
—RS232 Communications

Standards

UL listed to UL508 and cUL listed
UL file number E100757

ASTAT-IBP Plus

350 Hp Max.@ 600V
Three-Phase
50/60 Hz

Standard Features

Digital Technology
Provides precise phase control of the back-to-back SCRs over each half-cycle. The ASTAT-IBP Plus design allows initial motor torque to be adjusted from 10%-90% at normal starting torque.

Digital Control Panel
Displays setup and operating parameters with an alphanumeric display. Provides accurate setting of parameters with visible indication of starter status, motor current, line voltage, kW, power factor, elapsed time and error codes.

Soft Starting
The most frequent application for the ASTAT-IBP Plus starter. It provides a linear increase in voltage at the motor terminals, eliminates starting shock to the load, and reduces stress on mechanical components, such as gears and belt drives. A special pump control setting is available as a standard feature to reduce pressure surges in pump systems during starting thereby limiting stress on pipe systems and valves.

Three-Segment Ramp
The Three-Segment Ramp consists of:
1. The initial voltage ramp, which lasts for five cycles, brings the motor voltage from 0 to the preset initial pedestal voltage (10%-90%).
2. The acceleration ramp, which increases the motor voltage from the preselected initial voltage to 100% voltage over the selected acceleration time period.
3. The fast ramp, which brings the motor voltage to 100% if the motor reaches full speed before the end of the acceleration ramp.

Electronic Overload Relay
Overload relay has selectable trip class for Class 10, 20 or 30 applications. Starting characteristics and Hp selection tables are rated as Standard Duty (300% current for 30 seconds—IEC 10/NEMA 20) or Heavy Duty (450% current for 30 sec—IEC 20/NEMA 30). Provides accurate, repeatable, reliable protection for both the motor and the ASTAT.

Kick Start
Initially boosts start loads with a high breakaway torque (belted conveyors, extruders, mixers). This feature may be engaged (95% voltage for a period of 1–999 ms) or it may be disengaged for applications not requiring a kick start.

Current Limit
The motor starting current may be limited with an adjustable current range from 100-450% of the frame rating.

Soft Stopping
Allows a motor-driven load to be brought to rest over an adjustable time period independently of the acceleration ramp. A deceleration cycle, exclusively designed for pump control, may be programmed to limit water hammer, surges, and sudden valve closure.

Motor Thermistor Protection Limit
Used with motors protected by a PTC thermistor. Trips within 200 ms when the resistance is higher than 2800-3200 ohms. Resets when the resistance falls below 1000 ohms.

Snubbers
An RC network connected in parallel with an SCR to protect against commutation spikes.

MOVs
Metal oxide varistors protect electronic components against external voltage spikes.

Error Traceability
Displays the last four error codes on the alphanumeric display. Provides feedback for corrective action.

Phase-Loss Protection
The ASTAT-IBP Plus will not operate if a phase loss is detected before starting or while soft starting or stopping the motor.

Fully Rated Contactor
The ASTAT-IBP Plus is supplied with a fully rated bypass contactor across the entire product line. In case of failure of the electronics or the SCRs, the bypass contactor can start and run the motor in back-up mode.

Reduced Heat Generation
The SCRs are used only during starting and stopping of the motor. After the motor ramps up, the bypass contactor is engaged, allowing the ASTAT-IBP Plus to run cool, thus eliminating the need for ventilation, large heat sinks, and fans, which are required for conventional solid state reduced voltage starters.

Dual Ramp
A secondary ramp may be programmed for ramp up, ramp down including a different initial torque parameter and will be enabled as an alternate ramp when the “A” parameter is “ON” or enabled through one of the two programmable inputs.

Service Factor
Motor Service Factor may be adjusted from 1.0 to 1.3 to meet the application need of most motors.

Overvoltage/Undervoltage Protection
Adjustable parameters allow overvoltage conditions to be detected from 0-30% above nominal voltage set during the initiation. Undervoltage may be detected from 0-50% under the nominal voltage. Trip time may be set from 0-99 seconds after the condition is detected. If conditions return to normal the trip time is reset. L1 voltage is monitored to provide this protection.

Standard Features (continued)

Overcurrent/Undercurrent Protection
Adjustable parameters allow overcurrent conditions to be detected from 0-50% above nominal current set during the initiation. Undercurrent may be detected from 0-99% of the nominal current. Trip time may be set from 0-99 seconds after the condition is detected. If conditions return to normal the trip time is reset. This feature is not functional in bypass applications.

Metering Functions
Phase A may be monitored for Voltage, Current, Power Factor plus motor kilowatts are calculated from the information obtained from phase A and B. Accuracy is ± 3% if the unit is calibrated during initialization.

Elapsed Time Monitor
An elapsed time monitor function is also provided as standard which displays run time in hours x 1000 and is read on the LED Display.

Programmable Inputs
Two inputs may be programmed for one or more of the following functions: Soft Stop, Pump Control, Kick Start, Local/Remote Control, Tach feedback ramp and Dual (second) Ramp. Functions may be programmed to be OFF, ON or assigned to 1 of the 2 programmable inputs and activated with a dry contact closure between terminals 57-3 or 57-4.

Programmable Outputs
Two programmable output relays (1r) and (3r) may be assigned to the following functions: End of Ramp, Fault, Run, or to detect Undervoltage, Overvoltage, Undercurrent or Overcurrent limits set for those parameters as a pre alarm to shutdown. Note: Relay (2r) has been factory assigned to End of Ramp for Bypass function.

Local Communications
The ASTAT-IBP Plus is capable of RS232C ASCII communication with the software package provided. This serial communication is suitable for on site setup of soft starters with a PC at the local sight. Communication distance is generally limited to 3 meters. An optional cable is available with RS232 connector on one end and identified ASTAT terminal connections on the other. Please order product number QCX000170.

Remote Communication
Modbus® RTU[1]—This single ended protocol may be used up to distances of 10 meters. For distances greater the 10 meters it is recommended that a RS232 to RS485 converter be used. The recommended converter is GE product number RS485RS232120. This converter requires a separate 120 Volt power supply. Up to 247 addressable ASTAT stations may be connected to this network.

DeviceNet™ [2]— A gateway module is available QCPDNTUS, which includes a 1-meter cable to connect the module to the ASTAT. The module is DIN rail mount, compact in size and may be easily added to new or existing enclosures with ASTAT Plus soft starters. The module incorporates a Brad Harrison® [3] micro connector for connection to the DeviceNet™ network. This gateway supports the COS (Change Of State), Polling and Explicit Messaging connections. All ASTAT parameters and settings may be viewed/changed using the DeviceNet module and the appropriate connection. Up to 63 ASTAT addresses, each requiring a module may be integrated into the network.

Thermal Overload Memory
The overload relay retains a memory of overload conditions to closely profile the motor winding thermal condition to insure adequate protection under repetitive overload conditions. The memory is maintained as long as control power remains applied to the soft starter.

SCR Overtemperature Protection
All units are fitted with thermostats to protect against overheating.

Frequency Error Detection
Electronic frequency sensing does not allow the starter to begin load ramp-up if frequency is less than 45 Hz or greater than 65 Hz, providing protection to the motor and starter if the frequency is excessively out of tolerance.

Long Start-Time Protection
If the current limit is set too low and/or the starting time is longer than 60 seconds, it is assumed that motor heating could be excessive. The ASTAT-IBP Plus starter provides long start-time protection and disconnects the load under these conditions.

[1]Modbus® is a registered trademark of AEG Schneider Automation INC.
[2]DeviceNet™ is a trademark of Open DeviceNet Vendor Association (ODVA).
[3]Brad Harrison® is a registered trademark of Woodhead Industries, Inc.

Three-Phase Standard-Duty Ratings

Frame Rating Amps	Max. Starting Current for 30 sec., A	Max. Nominal Current for 30 sec.	Starter Size	Motor Horsepower @ 200V	Motor Horsepower @ 230V	Motor Horsepower @ 460V	Motor Horsepower @ 575V	KW 1.0 S.F. 380V/415V	Product Number	List Price GO-10A5	Weight (lbs.)
55	165	300%	K	15	20	40	50	30	QI3KDP[1]	**$2093.00**	15
68	204	300%	L	20	25	50	60	37	QI3LDP	**$2475.00**	15
80	240	300%	Y	25	25	60	75	37	QI3YDP	**$3070.00**	15
105	315	300%	M	30	30	75	75	55	QI3MDP	**$3319.00**	22
130	390	300%	Z	40	50	100	125	63	QI3ZDP	**$4052.00**	28
156	468	300%	N	50	60	125	150	75	QI3NDP	**$4331.00**	28
192	576	300%	P	60	75	150	200	90	QI3PDP[2]	**$5697.00**	65
248	744	300%	Q	75	100	200	250	110	QI3QDP	**$6240.00**	65
302	906	300%	R	100	100	250	300	160	QI3RDP	**$7625.00**	65
361	1083	300%	S	125	150	300	350	200	QI3SDP	**$8450.00**	130

Overload relay parameter of "0" is set to 0 N2.

Three-Phase Heavy-Duty Ratings

Frame Rating Amps	Max. Starting Current for 30 sec., A	Max. Nominal Current for 30 sec.	Starter Size	Motor Horsepower @ 200V	Motor Horsepower @ 230V	Motor Horsepower @ 460V	Motor Horsepower @ 575V	KW 1.0 S.F. 380V/415V	Product Number	List Price GO-10A5	Weight (lbs.)
55	248	450%	K	15	20	40	50	30	QI3KDP[1]	**$2093.00**	15
105	473	450%	M	30	30	75	75	50	QI3MDP	**$3319.00**	22
130	585	450%	Z	40	50	100	125	63	QI3ZDP	**$4052.00**	28
156	702	450%	N	50	60	125	150	75	QI3NDP	**$4331.00**	28
192	864	450%	P	60	75	150	200	90	QI3PDP[2]	**$5697.00**	65
361	1116	450%	S	75	100	200	250	165	QI3SDP	**$8450.00**	130

Overload relay parameter of "0" is set to 0 N3.

[1]The heavy-duty ratings of starter sizes L and Y are identical to those of size K.
[2]The heavy-duty ratings of starter sizes Q and R are identical to those of size P.
NOTE: All open units are wired for separate customer-supplied and fused control power rated va @ 120 VAC.

Number of Starts Per Hour

The number of starts per hour for the ASTAT-IBP Plus varies by size, maximum current setting, and ramp-up time. The following table is provided to help select the appropriate unit for the intended application.

Starter Size	Starting Current		Number of Starts per Hour			
			Times			
	% of Frame Rating	Current, A	30	20	10	5
K	300%	165	6	15	30	30
	450%	246	1	8	20	30
L	300%	204	1	6	20	30
	450%	306	—	—	8	12
Y	300%	240	1	8	20	30
	450%	360	—	—	—	—
M	300%	315	6	12	28	30
	450%	473	2	8	15	30
Z	300%	390	4	10	20	30
	450%	585	1	6	10	30
N	300%	468	2	8	15	30
	450%	702	—	4	10	20
P	300%	576	6	14	30	30
	450%	864	2	4	10	20
Q	300%	744	4	9	24	30
	450%	1116	—	—	6	12
R	300%	906	2	4	10	25
	450%	1359	—	—	—	6
S	300%	1083	1	0	8	12
		1116[3]	1	3	8	12

[3] Maximum heavy-duty rating.

Accessories Cover Kit

Accessory cover used on open IBP starters to cover internal wire connections and to provide a more finished appearance.

For Use With	Outline Number	Product Number	List Price GO-10A5
QI3KDP, LDP, YDP, MDP	55-216620	QI3XX001	**$60.00**
QI3ZDP, NDP	55-216620	QI3XX002	**$70.00**
QI3PDP, QDP, RDP	55-216620	QI3XX003	**$80.00**
QI3SDP	55-216620	QI3XX004	**$100.00**

PC Connector Kit

Connects ASTAT-IBP Plus to PC for set-up. Kit consists of a 1.5m long cable with RS-232 connector on one end and identified wire leads for connection to ASTAT-IBP Plus on the other end.

Product Number	List Price GO-10A5
QCX000170	**$20.00**

Communications Module

Description	Product Number	List Price GO-10A5
DeviceNet Module	QCPDNTUS	**$950.00**

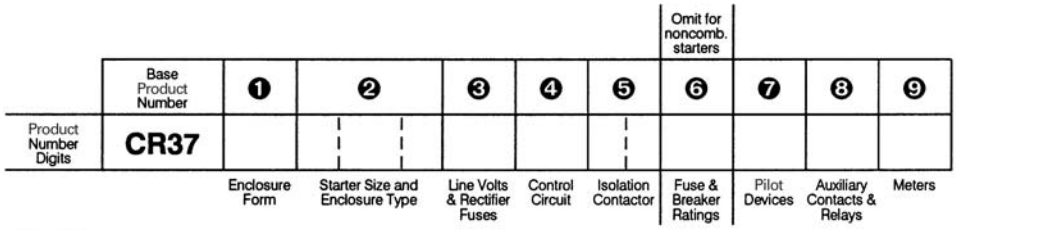
Product Number and List Price

Use this section to select the ASTAT-IBP Plus starter and enclosure to match your application requirements. It provides a step-by-step method for arriving at the product numbers and list prices.

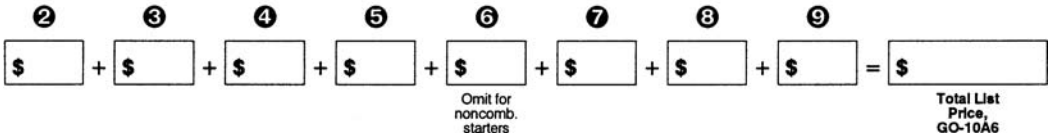
First, determine the enclosure form required—noncombination or combination. Then select the additional options, following the instructions. Transfer the product number digits for each option to the appropriate boxes and the price component for that selection to the corresponding price box.

When you're done, you will have the complete product number and **List Price, GO-10A6,** for your enclosed starter.

Product Number



List Price

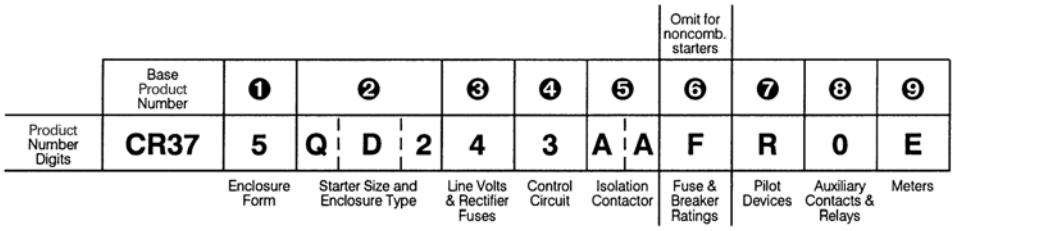


Example

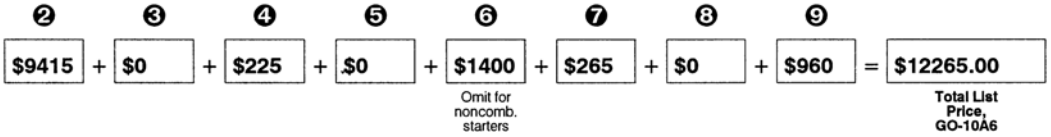
ASTAT-IBP Plus solid state reduced voltage starter for 200 Hp, 460 V motor (229 motor FLA) for a conveyor. Fused disconnect combination starter in NEMA Type 12/3R enclosure with 100 VA extra CPT, no rectifier fuses, three-phase voltmeter, START push button, H-O-A selector switch, and red RUN light.

❶ Enter 5 for combination form in product number box ❶ and nothing in price box.
❷ Enter QD2 for starter size and enclosure type in product number box ❷ and $9,415 in price box ❷.
❸ Enter 4 for 460 volts without rectifier fuses in product number box ❸ and 0 in price box ❸.
❹ Enter 3 for 100 VA extra CPT in product number box ❹ and $225 in price box ❹.
❺ Enter AA for bypass only in product number box ❺ and 0 in price box ❺.
❻ Enter F for fused disconnect in product number box ❻ and $1,400 in price box ❻.
❼ Enter R for START button, H-O-A selector switch, RED run light in product number box ❼ and $265 in price box ❼.
❽ Enter 0 for no additional auxiliary contacts in product number box ❽ and 0 in price box ❽.
❾ Enter E for three-phase voltmeter in product number box ❾ and $960 in price box ❾.

Product Number



List Price



Assemble new, complete product number: **CR375QD243AAFR0E. Total List Price, $12,265.00.**

Reduced Voltage Starters
Solid State
CR374, CR375
ASTAT-IBP Plus
Enclosed

❶ Enclosure Form

Transfer the product number digit corresponding to the enclosure form to box ❶ of the "product number" line.

Product No. Digit	Enclosure Form
4	Noncombination
5	Combination

❷ Starter Size and Enclosure Type

Select the starter size from the Size Selection tables, then find the desired enclosure type in the table below. Transfer the three product number digits to box ❷ in the "product number" line and the price to box ❷ in the "price" line.
All units are supplied with box lugs for line and load connections and terminal strips for external starting, where applicable.

Standard-Duty Ratings—300% current for 30 seconds maximum

Current Rating Amps (AC-3)[3]	Starter Size	Motor Horsepower			
		200 V	230 V	460 V	575 V
55	K	15	20	40	50
68	L	20	25	50	60
80	Y	25	25	60	75
105	M	30	30	75	75
130	Z	40	50	100	125
156	N	50	60	125	150
192	P	60	75	150	200
248	Q	75	75	200	250
312	R	100	100	250	300
361	S	125	150	300	350

[3] High inertia loads should not exceed .95 X frame Amps.

Heavy-Duty Ratings—450% current for 30 seconds maximum

Starter Size	Motor Horsepower			
	200 V	230 V	460 V	575 V
K[1]	15	20	40	50
M	30	30	75	75
Z	40	50	100	125
N	50	60	125	150
P[2]	60	75	150	200
S	75	75	200	250

[1] The heavy-duty ratings of starter sizes L and Y are identical to those of size K.
[2] The heavy-duty ratings of starter sizes Q and R are identical to those of size P.

Starter Size	Noncombination Forms				Combination Forms[4]			
	Product No. Digits, Type 1 Enclosure	List Price Adder, GO-10A6	Product No. Digits, Type 12/3R Enclosure	List Price Adder, GO-10A6	Product No. Digits, Type 1 Enclosure	List Price Adder, GO-10A6	Product No. Digits, Type 12/3R Enclosure	List Price Adder, GO-10A6
K	KD1	**$2669.00**	KD2	**$2698.00**	KD1	**$2817.00**	KD2	**$2907.00**
L	LD1	**$3549.00**	LD2	**$3710.00**	LD1	**$3809.00**	LD2	**$3950.00**
Y	YD1	**$4144.00**	YD2	**$4305.00**	YD1	**$4654.00**	YD2	**$4875.00**
M	MD1	**$4392.00**	MD2	**$4553.00**	MD1	**$4754.00**	MD2	**$4950.00**
Z	ZD1	**$5125.00**	ZD2	**$5286.00**	ZD1	**$5825.00**	ZD2	**$6091.00**
N	ND1	**$5731.00**	ND2	**$5899.00**	ND1	**$6821.00**	ND2	**$6921.00**
P	PD1	**$7097.00**	PD2	**$7265.00**	PD1	**$8187.00**	PD2	**$8550.00**
Q	QD1	**$7640.00**	QD2	**$7920.00**	QD1	**$9256.00**	QD2	**$9415.00**
R	RD1	**$9025.00**	RD2	**$9585.00**	RD1	**$10296.00**	RD2	**$11518.00**
S	SD1	**$9850.00**	SD2	**$10550.00**	SD1	**$11064.00**	SD2	**$12750.00**

[4] Combination forms have a fused disconnect or a circuit breaker in form CR375.

❸ Select Line Voltage and Rectifier Fuses

Select the line voltage and, if desired, rectifier fuses by frame size. Transfer the product number digit to box ❸ in the "product number" line and the price to box ❸ in the "price" line.

Rectifier Fuses	Frame Size	Product No. Digit by Line Volts			List Price Adder, GO-10A6	Product No. Digit	List Price Adder, GO-10A6
		200/208 V	230 V	460 V		575 V	
No	All	2	3	4	—	5	—
Standard-Duty	K	6	7	8	**$320.00**	9	**$420.00**
	L, Y, M	6	7	8	**$475.00**	9	**$580.00**
	Z, N, P, Q	6	7	8	**$625.00**	9	**$735.00**
	R, S	6	7	8	**$1260.00**	9	**$1375.00**
Heavy-Duty	K	A	B	C	**$320.00**	D	**$420.00**
	L, Y, M	A	B	C	**$475.00**	D	**$580.00**
	Z, N, P, Q	A	B	C	**$625.00**	D	**$735.00**
	R, S	A	B	C	**$1260.00**	D	**$1375.00**

These fuses remain in the circuit and protect the system even in bypass mode.

❹ Select Control Circuit Options

Select control circuit options by frame size. Transfer the product number digit to box ❹ in the "product number" line and the price to box ❹ in the "price" line.

Starter Size	Product No. Digit	Control Circuit	List Price Adder, GO-10A6
All except R, S	1	120 separate control/with CCF	—
	2	CPT standard capacity with 2 primary and 1 secondary fuse	**$160.00**
	3	CPT 100 VA extra capacity with 2 primary and 1 secondary fuse	**$225.00**
R, S	1	120 separate control/with CCF	—
	2	CPT standard capacity with 2 primary and 1 secondary fuse	**$225.00**
	3	CPT 100 VA extra capacity with 2 primary and 1 secondary fuse	**$295.00**

❺ Select Contactor Options

An isolation contactor disconnects line power from the ASTAT-IBP Plus.
Select the contactor options. Transfer the product number digit to box ❺ in the "product number" line and the price to box ❺ in the "price" line.

Product No. Digits	Contactor	List Price Adder, GO-10A6									
		K	L	Y	M	Z	N	P	Q	R	S
AA	Bypass Only	—	—	—	—	—	—	—	—	—	—
BA	Bypass & Isolation	**$275.00**	**$325.00**	**$385.00**	**$416.00**	**$695.00**	**$738.00**	**$950.00**	**$1283.00**	**$2363.00**	**$3241.00**

❻ Select Fused Disconnect or Circuit Breaker Options

Select the fused disconnect or circuit breaker (for form CR375 enclosures). Transfer the product number digit to box ❻ in the "product number" line and the price to box ❻ in the "price" line.

Product No. Digit	Starter Size	CR375 Fused Disconnect	List Price Adder, GO-10A6	Starter Size	CR375 Circuit Breaker	List Price Adder, GO-10A6
A	Any	Unfused	**$800.00**	—	N/A	—
D	K-M, Y	100 A max.	**$1000.00**	—	N/A	—
E	M-N, Z	200 A max.	**$1200.00**	—	N/A	—
F	M-R, Z	400 A max.	**$1400.00**	—	N/A	—
G	R-S	600 A max.	**$1750.00**	K-M, Y	100 A	**$950.00**
H	—	N/A	—	M-N, Z	150 A	**$1150.00**
J	—	N/A	—	N-Q, Z	225 A	**$1200.00**
K	—	N/A	—	Q-S	400 A	**$1600.00**
L	—	N/A	—	R-S	600 A	**$1900.00**

Fuse holders are for class J fuses. Customer to supply fuses.

❼ Select Pilot Device Options

Select pilot device options. Transfer the product number digit to box ❼ in the "product number" line and the price to box ❼ in the "price" line.

Product No. Digit	START/STOP Push Button	H-O-A Selector Switch	Red Light	Green Light	List Price Adder, GO-10A6
A	None				—
B	•				**$130.00**
C		•			**$115.00**
D			RUN		**$85.00**
E				RUN	**$85.00**
F			RUN	OFF	**$170.00**
G	•		RUN		**$215.00**
H	•			RUN	**$215.00**
J		•	RUN		**$200.00**
K		•		RUN	**$200.00**
L	•		RUN	OFF	**$300.00**
M		•	RUN	OFF	**$285.00**
N	START only	•			**$180.00**
R	START only	•	RUN		**$265.00**
S	START only	•		OFF	**$265.00**
T	START only	•	RUN	OFF	**$350.00**
U	•	•			**$245.00**
V	•	•	RUN		**$330.00**
X	•	•		OFF	**$330.00**
Z	•	•	RUN	OFF	**$415.00**

❽ Select Auxiliary Contacts and Relays

Select auxiliary contacts and relays. These contacts are in addition to the one each standard normally open and normally closed contacts on the interposing relay. Transfer the product number digit to box ❽ in the "product number" line and the price to box ❽ in the "price" line.

Product No. Digit	Extra Relays	3 NO & 1 NC	2 NO & 2 NC	1 NO & 3 NC	List Price Adder, GO-10A6
0	None				—
1	1	•			**$62.00**
2	1		•		**$62.00**
3	1			•	**$62.00**
5	2	•			**$120.00**
6	2		•		**$120.00**
7	2			•	**$120.00**

Auxiliary relay coils are wired in parallel with the control relay and are picked up when the ASTAT-IBP Plus is activated.

❾ Select Meter Options

Select meter options, then transfer the product number digit to box ❾ in the "product number" line and the price to box ❾ in the "price" line.

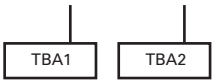
Product No. Digit	1-Phase[1] Ammeter	1-Phase[1] Voltmeter	3-Phase Ammeter	3-Phase Voltmeter	Elapsed[1] Time Meter	List Price Adder, GO-10A6
A			None			—
B	•					**$750.00**
C		•				**$750.00**
D			•			**$960.00**
E				•		**$960.00**
F					•	**$275.00**
G	•	•				**$1500.00**
H	•			•		**$1710.00**
J	•				•	**$1025.00**
K		•	•			**$1710.00**
L		•			•	**$1025.00**
M			•	•		**$1920.00**
N			•		•	**$1235.00**
P				•	•	**$1235.00**
R	•	•			•	**$1775.00**
S	•			•	•	**$1985.00**
T		•	•		•	**$1775.00**
W			•	•	•	**$2195.00**

[1] Single phase ammeter, voltmeter and elapsed time meter function is included as a digital readout on the ASTAT display. For separate analog meter(s) select catalog number digit shown in table ❾.

I/O Terminal Board Specifications

Power I/O Terminals

Terminal	Function	Description
1L1, 3L2, 5L3	Mains Input	3ph input voltage
2T1, 4T2, 6T3	Motor Output	Output terminals to 3ph AC motor
TBA1,TBA2	Input Control Voltage	110/120V AC, +10%, −15%



Digital Inputs

Terminal	Function	Description
57	Common for digital input	This is a common terminal for the digital input terminals specified below.
1	Run	Run order. Command signal may be provided by one NO dry momentary contact to terminals 1 and 57.
2	Stop	Stop order. Command signal may be provided by one NC dry momentary contact to terminals 2 and 57.
		Note: Run/Stop permanent command is allowed linking 1-57 and using one dry NO contact to 2-57 terminals.
3	Programmable input I3	These two inputs are programmable. Can be assigned to the following internal functions
4	Programmable input I4	soft stop, pump control, kick start, linear ramp, dual ramp selection, local/remote control
		Command signal should be provided by one NC dry contact to terminals 57-3 or terminals 57-4. By switching this contact ON/OFF it is possible to enable or disable the assigned function.

Digital Outputs

Terminal	Function	Description
11, 12, 14	Programmable relay 1r	11-12 = N.C., 11-14 = N.O. dry contacts. This relay can be assigned to several internal output functions. As default assigned to function RUN.
23,24	Fixed relay 2r	23-24 = N.O. dry contact. This relay is assigned to function EOR for bypass contactor control.
33, 34	Programmable relay 3r	33-34 = N.O. dry contact. This relay can be assigned to several internal output functions.
		Common for all relay output contacts — Maximum usage voltage: 380VAC (B300-UL); Thermal Current 8A; AC-15 use: 220V/3A, 380V/1A; DC-15 use: 30V max/3.5A

Analog I/O

Terminal	Function	Description
8	Analog input common (−)	This is a common terminal for the analog input terminal number 7, and analog output terminal number 9.
7	TG feedback input (+)	0.5V analog input for speed feedback. It should be provided by a DC tacho-generator coupled to the motor. This speed feedback signal is required when the "linear ramp" function is used
9	Current Output (+)	0.10V DC analog output for current measurement purpose (1 x I_r = 2V DC output) Load Impedance 10KΩ or higher

Motor Thermistor Terminals

Terminal	Function	Description
5, 6	Motor thermistor input	This input allows a motor thermistor with a response value from 2.8 to 3.2KΩ , and a reset value from 0.75 to 1KΩ to control motor temperature. When the motor thermistor is not used, a link must be used in terminals 5-6.

Communications

Terminal	Function	Description
SG, TD, RD	Gr, Tx, Rx data	RS232C, 3 wires, half duplex. Maximum cable length 3 meters (10 feet) Asynchronous data transmission, 9600 Bauds, 1 bit start, 8 bits data, 2 bits stop, no parity

General Specifications

Volts Rating	3ph AC Systems - Up to 600V for QI3xDP ASTAT-IBP Plus series
Frequency	50/60 - Hz - Control range of 45-65 Hz

Control Specifications

Control System	Digital system with microcontroller Starting ramp with progressive increase in voltage and current limitation
Initial Voltage (Pedestal)	% - 30-95 Un
Initial (Starting) Torque	% - 10-90 Mdirect start
Kick Start	% - 95 Un (90% $M_{direct\ start}$), adjustable 0 to 999 ms
Motor Unit Ratio	0.4 to 1.2
Current Limit	Adjustable from 1 to 4.5 (I_r/I_n) Max. 4.5 I_n
Acceleration Ramp Time	s - 1-45 (standard or linear ramp up)
Bypass	Direct control of a bypass contactor
Brake Time by Ramp	1 to 60 (1 to 60 in secondary ramp) adjustable independently of starting ramp time (types: standard, pump control or linear ramp down)
Monitoring	Motor current, line voltage (monitors L1), power, power factor and elapsed time

Running

External Control	Start-Stop
Acceleration Phase	Adjustable time
Stop Phase	Power cut-off/Ramp/Pump control

Inputs/Outputs

Inputs	4 digital optocoupled. Two fixed (Start, Stop), and 2 programmable (I3, I4) 1 Analog 0-5VDC for Tachogenerator input feedback
Outputs	2 programmable relays (1r, 3r); 1 fixed relay (2r) 1 Analog 0-10VDC output for current metering

ASTAT-IBP Losses

Frame	Control Circuit (watts)	Power Circuit (watts)	Bypass Contactor Inrush (va)	Bypass Contactor Holding (va)
K	15	189	191	17
L	15	210	191	17
Y	15	250	191	17
M	15	277	191	17
Z	15	342	350	20
N	15	524	350	20
P	15	750	425	20
Q	15	900	425	20
R	15	1350	425	20
S	15	1800	750	25

Bypass contactor used on all forms

Protections

Current Limit	Adjustable from 1 to 4.5 (I_r/I_n) Max. 4.5 I_n
Overload	IEC class 10 and 20; NEMA class 10, 20 and 30 all selectable
Cool-down Time after Overload Trip	See Restart Times
Loss on Input Phase	s - Trip at 3
Thyristor Short Circuit	ms - Trip at 200
Heatsink Overheating	ms - Trip at 200
Motor Thermistor	ms - Trip at 200 if thermistor impedance > response value
Loss on Output Phase	s - Trip at 3
Stalled Rotor	ms - Trip at 200
Supply Frequency Error	Hz - If f < 45 or f > 65, will not start
Overcurrent	100 to 150% In; trip time adjustable from 0 to 99 sec.
Undercurrent	0 to 99% In; trip time adjustable from 0 to 99 sec.
Overvoltage[1]	100 to 130% Un; trip time adjustable from 0 to 99 sec. (L1 voltage is monitored to provide this protection.)
Undervoltage[1]	0 to 50% Un; trip time adjustable from 0 to 99 sec. (L1 voltage is monitored to provide this protection.)
Error (CPU)	ms - 60
Memory	4 former errors
Long Start Time	s - 2 x ta (ta = acceleration ramp time)

[1]L1 voltage is monitored to provide this protection.

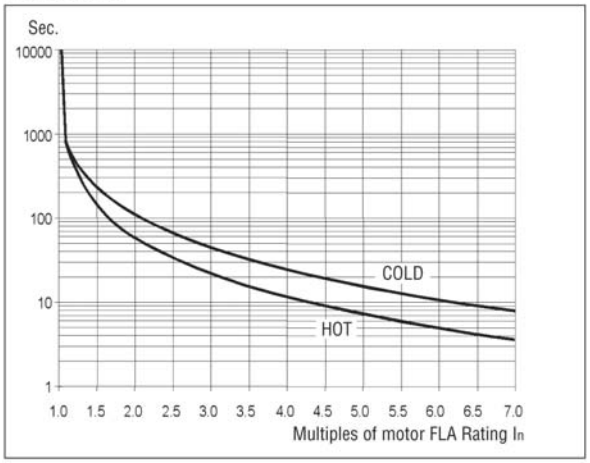
Environmental Conditions

Operation Temperature	0°C - 0 to +55 (derate output current by 1.5% 0°C above 40°C)
Relative Humidity	% - 95% without condensation
Maximum Altitude	m - 3000 (derate output current by 1%/100m above 1000m)
Mounting Position	Vertical
Protection Degree	IP00, UL Open

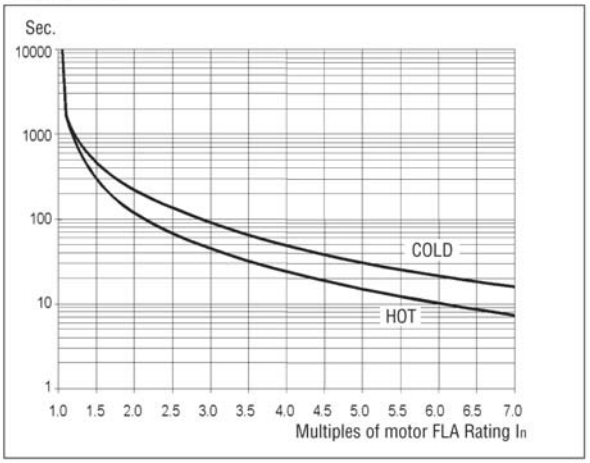
Standards

cUL, UL	UL, cUL conforming to UL508, UL File E 153901 (open), 100757 (enclosed)
Conducted & radiated emissions	Conforming IEC 947-4-2, Class A
Electrostatic discharges	Conforming to IEC 1000-4-2, level 3
Radioelectric interference	Conforming to IEC 1000-4-6, level 3 and to IEC 1000-4-3, level 3
Immunity to fast transients	Conforming to IEC 1000-4-4, level 3
Immunity to Surge Voltage	Conforming to IEC 1000-4-5, level 3

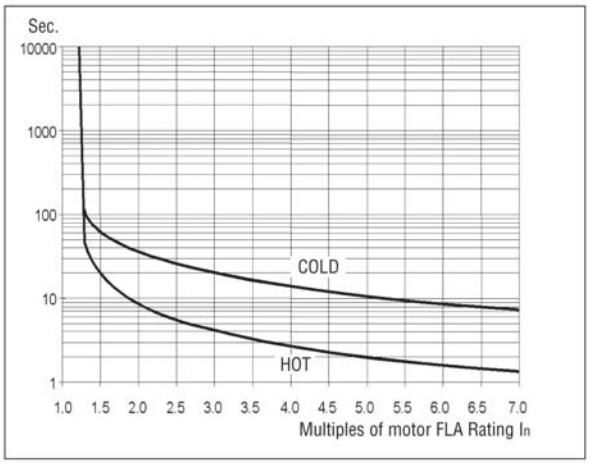
IEC Class 10



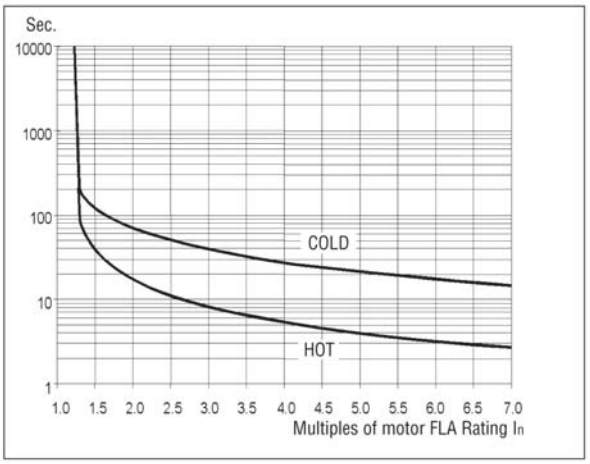
IEC Class 20



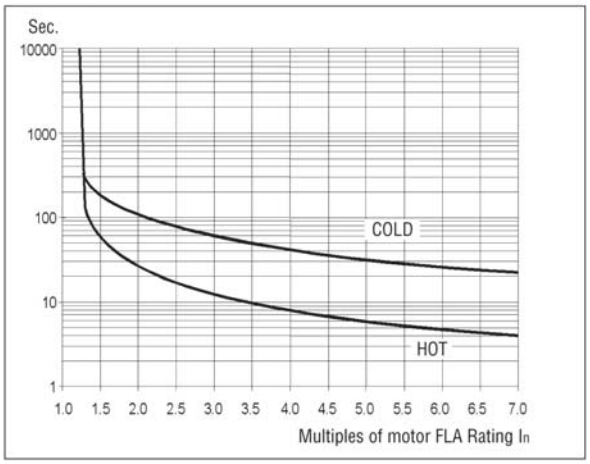
NEMA 10



NEMA 20



NEMA 30



Thermal memory:
If the control voltage is not removed, the unit has a cool down characteristic. The time for cool down is 300 sec. after the overload trip.
If the control voltage is removed after tripping, you must wait at least 5 minutes before the unit can be restarted. See Section 4-10 for restart limitations.

Note: The ASTAT-IBP Plus allows the user to select motor protection according to IEC Class 10, 20 and NEMA 10, 20, or 30, selectable by "0"-overload- parameter.

ASTAT-IBP Plus Thermal Characteristics

Branch Circuit Guide for Starter Specifications

ASTAT-IBP Plus starters are suitable for use on a circuit capable of delivering not more than[1] rms symmetrical amperes, for[2] volts maximum, when used with[3] for short-circuit protection. (Replace the circled numbers with the appropriate values from the following tables for branch-circuit protection with a circuit breaker, Class J fuses, or semiconductor fuses.[4])

Note that when ASTAT-IBP Plus reduced voltage starters are used in conjunction with semiconductor fuses, Type 2 coordination to IEC 947-4 is attained. These fuses are recommended for best overall short-circuit protection. The semiconductor fuses specified in the table below may provide branch-circuit protection. Refer to applicable local electrical codes.

Branch-Circuit Protection for CR375 Series with a Circuit Breaker[3]

Frame Size	Max. Circuit Breaker Size	Max. Short Circuit Current[1] 208/240/480 V[2]	600 V[2]
K	100 A	25 kA	10 kA
L	100 A	25 kA	10 kA
Y	100 A	25 kA	10 kA
M	150 A	25 kA[5]	10 kA
Z	150 A	25 kA[5]	10 kA
N	225 A	25 kA[5]	10 kA
P	225 A	25 kA[5]	10 kA
Q	400 A	25 kA[5]	10 kA
R	600 A	25 kA[5]	18 kA
S	600 A	25 kA[5]	18 kA

Branch-Circuit Protection with Class J Fuses[3]

Frame Size	Max. Class J Fuse Size	Max. Short Circuit Current[1] 208/240/480/600 V[2]
K	100 A	100 kA
L	100 A	100 kA
Y	100 A	100 kA
M	400 A	100 kA
Z	400 A	100 kA
N	400 A	100 kA
P	400 A	100 kA
Q	400 A	100 kA
R	600 A	100 kA
S	600 A	100 kA

Branch-Circuit Protection with Semiconductor Fuses[3]

	Gould-Shawmut Semiconductor Fuses						
	at 208/240/480 V[2]			at 208/240/480/600 V[2]			
Frame Size	Standard-Duty	Heavy-Duty	Fuse Type	Standard-Duty	Heavy-Duty	Fuse Type	Max. Short-Circuit Current[1]
K	125 A	175 A	A50QS	125 A	150 A	A70QS	100 kA
L	150 A	—	A50QS	150 A	—	170QS	100 kA
Y	175 A	—	A50QS	175 A	—	A70QS	100 kA
M	225 A	350 A	A50QS	225 A	250 A	A70QS	100 kA
Z	300 A	400 A	A50QS	300 A	400 A	A70QS	100 kA
N	350 A	450 A	A50QS	350 A	450 A	A70QS	100 kA
P	400 A	600 A	A50QS	400 A	450 A	A70QS	100 kA
Q	500 A	—	A50QS	500 A	—	A70QS	100 kA
R	600 A	—	A50QS	600 A	—	A70QS	100 kA
S	700 A	1000 A	A50QS	700 A	800 A	A70QS	100 kA

[4]Semiconductor fuses may be added to combination or noncombination forms.

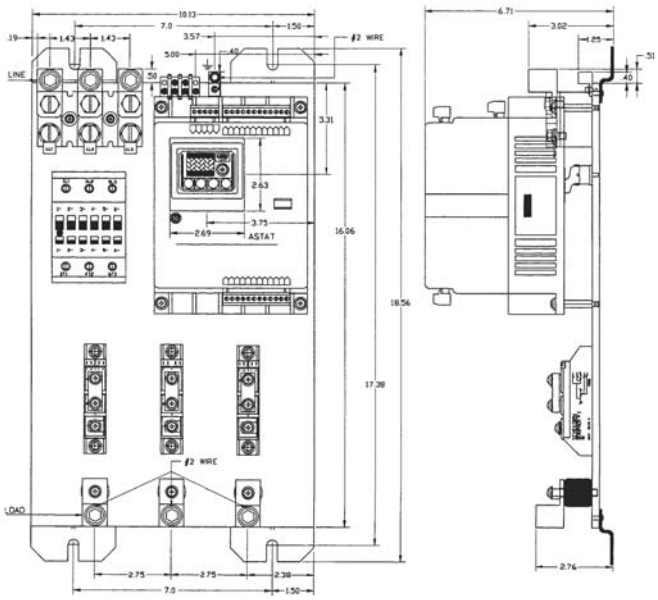
[5]Open starters of size M, Z, N, P, Q, R, and S have a branch circuit rating of 65 kA when used with circuit breakers that are rated for 65 kA or higher branch circuit protection.

Open Unit Installation

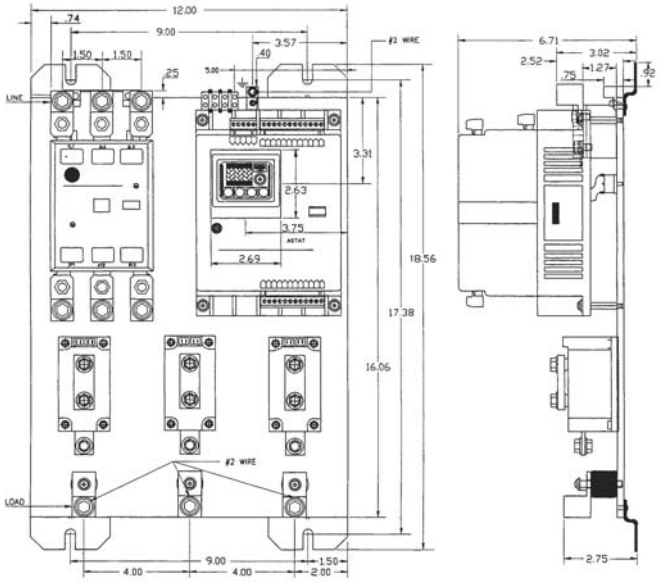
Open units are designed to use 5/16" bolts for attachment to mounting surfaces.

Use minimum of 75°C copper wire only for connections to ASTAT-IBP Plus terminals. The minimum wire size must conform to the 75°C table according to applicable electrical codes. Tighten connections to the torque values given in the table.

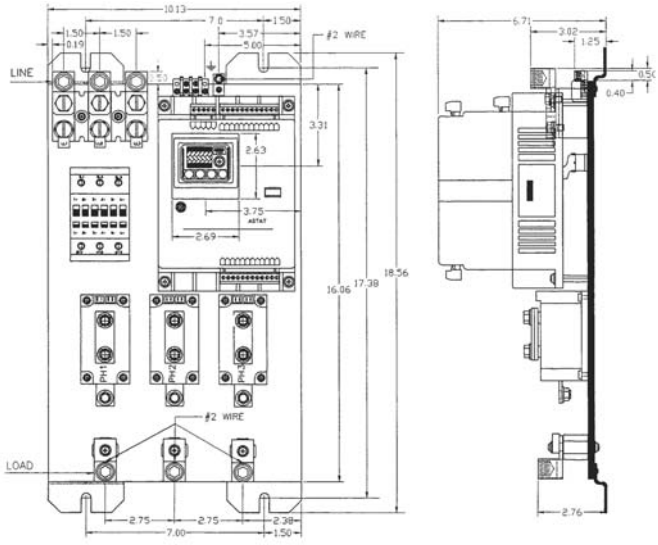
Product Number	Wire Range	Torque in./lb.
QI3K, QI3L, QI3Y, QI3M, QI3Z, QI3N	#14–#2 AWG	125
QI3P, QI3Q	#6 AWG–350 kcmil	275
QI3R, QI3S	#2 AWG–2x250 kcmil (or 1x600 kcmil)	550



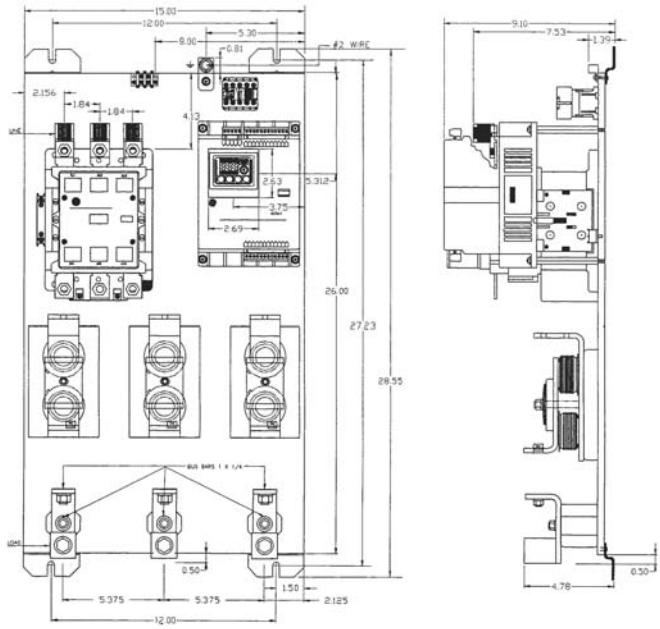
Frame Sizes K, L, and Y Dimensions



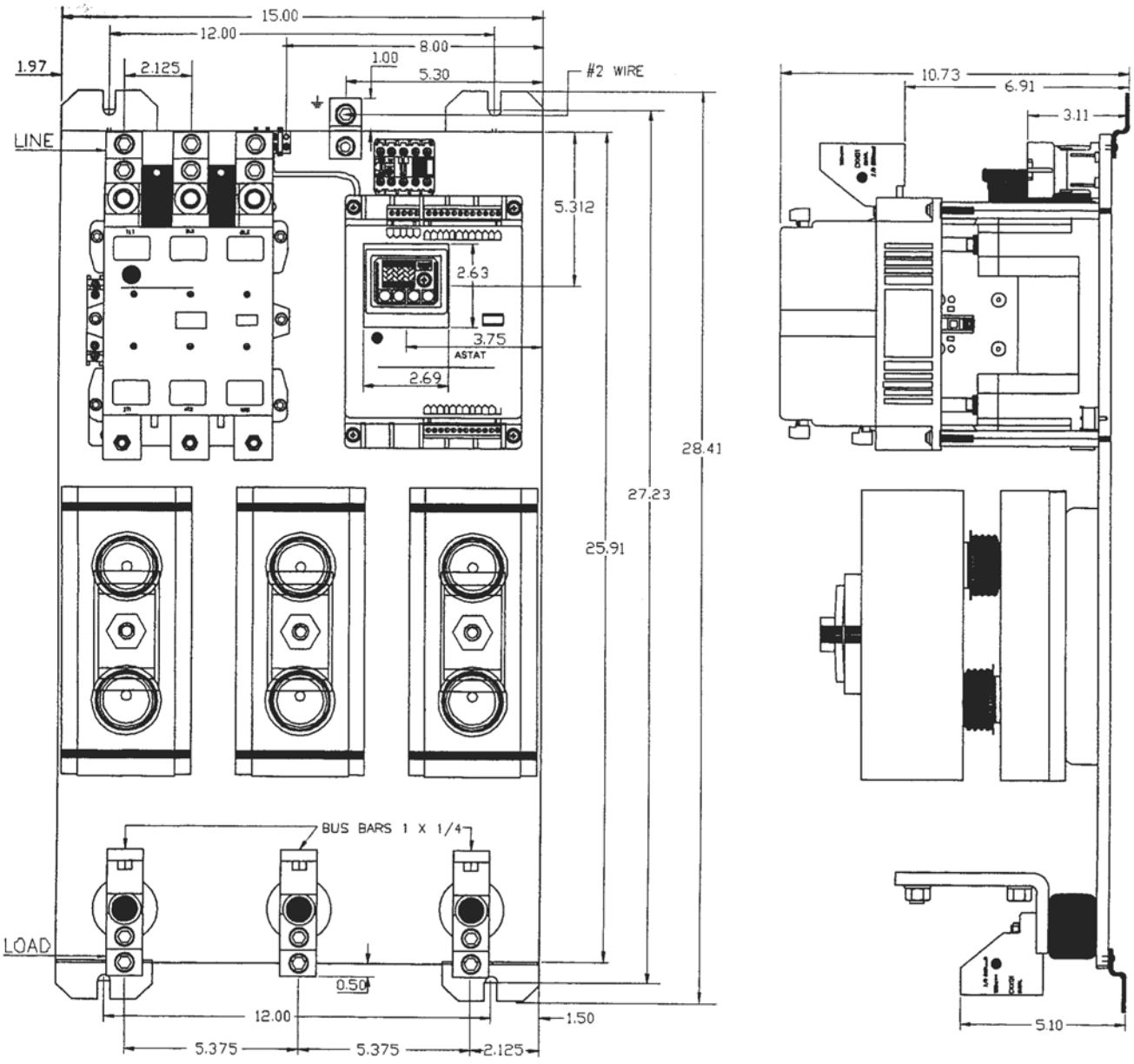
Frame Sizes Z and N Dimensions



Frame Size M Dimensions

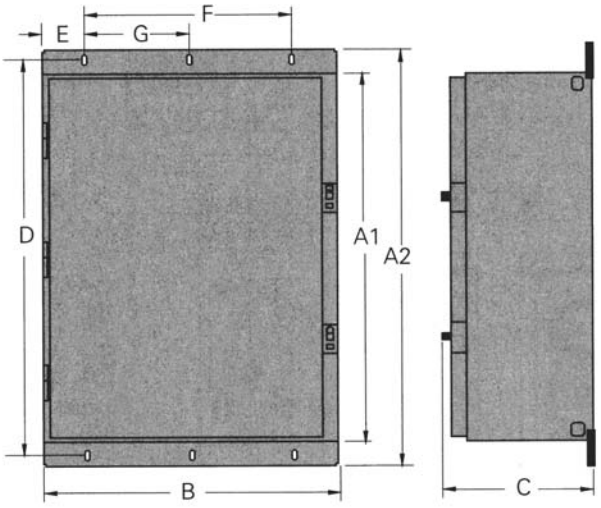


Frame Sizes P, Q and R Dimensions



Frame Size S Dimensions

Reduced Voltage Starters
Solid State
CR374, CR375
ASTAT-IBP
Enclosed
Outlines, Dimensions and Weights (For Estimating Only)



Enclosed Noncombination Starters—inches (mm)

A1 = Box height (excluding flanges)
A2 = Overall height (including flanges)
B = Width
C = Depth
D = Box height between centers of mounting holes
E = Edge of flange to center of end mounting hole
F = Distance between outer mounting holes
G = Distance between end and center mounting holes

CR374 Series Type 1

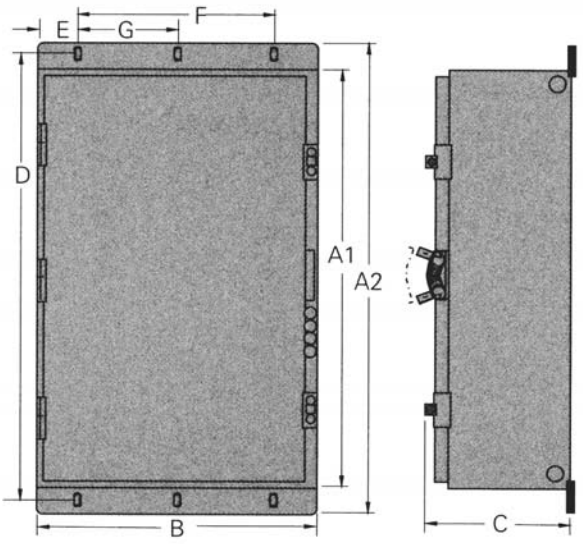
Frame Size	A1	A2	B	C	D	E	F	G	Approx. Weight lb.	Approx. Weight kg
K, L, Y	45.9 (1166)	49.7 (1262)	18.8 (478)	9.4 (239)	48 (121)	1.5 (3.8)	15.8 (40)	— —	56	25
M	45.9 (1166)	49.7 (1262)	18.8 (478)	9.4 (239)	48 (121)	1.5 (3.8)	15.8 (40)	— —	65	29
Z									72	33
N									72	33
P[1], Q[1]	51.7 (1323)	55.5 (1410)	21.9 (556)	12.8 (325)	53.6 (136)	1.5 (3.8)	18.1 (46)	— —	166	70
P, Q	71.2 (1809)	75.7 (1923)	35.9 (912)	13.0 (330)	73.4 (187)	1.5 (3.8)	31.9 (81)	16.0 (41)	176	80
R[1]	51.7 (1323)	55.5 (1410)	21.9 (556)	12.8 (325)	53.6 (136)	1.5 (3.8)	18.1 (46)	— —	166	70
S[2]									234	100
R	71.2 (1809)	75.7 (1923)	35.9 (912)	13.0 (330)	73.4 (187)	1.5 (3.8)	31.9 (81)	16.0 (41)	176	80
S									254	115

[1] Unit without isolation and without current metering.
[2] Unit without isolation, without current metering, and without SCR fuses.

CR374 Series Type 3R/12

Frame Size	A1	A2	B	C	D	E	F	G	Approx. Weight lb.	Approx. Weight kg
K, L, Y	46.2 (1173)	49.7 (1262)	18.8 (478)	9.4 (239)	47.8 (121)	1.5 (3.8)	15.8 (40)	— —	56	25
M	46.2 (1173)	49.7 (1262)	18.8 (478)	9.4 (239)	47.8 (121)	1.5 (3.8)	15.8 (40)	— —	65	29
Z									72	33
N									72	33
P[1], Q[1]	52.1 (1313)	55.5 (1410)	21.9 (556)	12.8 (325)	53.6 (136)	1.5 (3.8)	18.1 (46)	— —	166	70
P, Q	72.0 (1829)	75.7 (1923)	35.9 (912)	13.0 (330)	73.4 (187)	1.5 (3.8)	31.9 (81)	16.0 (41)	176	80
R[1]	52.1 (1313)	55.5 (1410)	21.9 (556)	12.8 (325)	53.6 (136)	1.5 (3.8)	18.1 (46)	— —	166	70
S[2]									234	100
R	72.0 (1829)	75.7 (1923)	35.9 (912)	13.0 (330)	73.4 (187)	1.5 (3.8)	31.9 (81)	16.0 (41)	176	80
S									254	115

[1] Unit without isolation and without current metering.
[2] Unit without isolation, without current metering, and without SCR fuses.



Enclosed Combination Starters—inches (mm)

A1 = Box height (excluding flanges)
A2 = Overall height (including flanges)
B = Width
C = Depth
D = Box height between centers of mounting holes
E = Edge of flange to center of end mounting hole
F = Distance between outer mounting holes
G = Distance between end and center mounting holes

CR375 Series Type 1

Frame Size	A1	A2	B	C	D	E	F	G	Approx. Weight lb.	Approx. Weight kg
K[1], L[1], Y[1]	54.3 (1379)	58.3 (1481)	18.0 (457)	8.5 (216)	57.0 (1448)	1.5 (38)	15.0 (381)	— —	75	34
K, L, Y	45.9 (1166)	49.7 (1262)	28.1 (714)	9.4 (239)	44.4 (1128)	1.5 (38)	25.1 (638)	— —	80	36
M[1], Z[1], N[1]	54.3 (1379)	58.3 (1481)	18.0 (457)	8.5 (216)	57.0 (1448)	1.5 (38)	15.0 (381)	— —	85	39
M Z N	45.9 (1166)	49.7 (1262)	28.1 (714)	9.4 (239)	44.4 (1128)	1.5 (38)	25.1 (638)	— —	88 96 96	40 43 43
P[1], Q[1]	76.5 (1943)	80.5 (2045)	19.0 (483)	8.5 (216)	78.7 (1999)	1.5 (38)	16.0 (406)	— —	210	95
P, Q	71.2 (1809)	75.7 (1923)	35.9 (912)	13.0 (330)	73.4 (1864)	1.5 (38)	33.1 (841)	16.6 (402)	256	116
R[1], S[1]	76.5 (1943)	80.5 (2045)	19.0 (483)	8.5 (216)	78.7 (1999)	1.5 (38)	16.0 (406)	— —	310	141
R S	71.2 (1809)	75.7 (1923)	35.9 (912)	13.0 (330)	73.4 (1864)	1.5 (38)	33.1 (841)	16.6 (402)	256 334	116 152

[1] Units without SCR fuses, isolation contactor, and current metering.

CR375 Series Type 3R/12

Frame Size	A1	A2	B	C	D	E	F	G	Approx. Weight lb.	Approx. Weight kg
K[1], L[1], Y[1]	54.3 (1379)	58.3 (1481)	18.0 (457)	8.5 (216)	57.0 (1448)	1.5 (38)	15.0 (381)	— —	75	34
K, L, Y	46.2 (1173)	49.7 (1262)	28.1 (714)	9.4 (239)	44.4 (1128)	1.5 (38)	25.1 (638)	— —	80	36
M[1], Z[1], N[1]	54.3 (1379)	58.3 (1481)	18.0 (457)	8.5 (216)	57.0 (1448)	1.5 (38)	15.0 (381)	— —	85	39
M Z N	46.2 (1173)	49.7 (1262)	28.1 (714)	9.4 (239)	44.4 (1128)	1.5 (38)	25.1 (638)	— —	88 96 96	40 43 43
P[1], Q[1]	76.5 (1943)	80.5 (2045)	19.0 (483)	8.5 (216)	78.7 (1999)	1.5 (38)	16.0 (406)	— —	210	95
P, Q	72.0 (1829)	75.7 (1923)	35.9 (912)	13.0 (330)	73.4 (1864)	1.5 (38)	33.1 (841)	16.6 (402)	256	116
R[1], S[1]	76.5 (1943)	80.5 (2045)	19.0 (483)	8.5 (216)	78.7 (1999)	1.5 (38)	16.0 (406)	— —	310	141
R S	72.0 (1829)	75.7 (1923)	35.9 (912)	13.0 (330)	73.4 (1864)	1.5 (38)	33.1 (841)	16.6 (402)	256 334	116 152

[1] Units without SCR fuses, isolation contactor, and current metering.

Reduced Voltage Starters
Solid State
ASTAT-CD Plus
700 Horsepower Max. @ 500V
Three-Phase
50/60Hz

Description

GE's new ASTAT-CD Plus solid state reduced voltage starter (soft starter) features microprocessor control digital technology. The control board uses surface mounted devices for higher reliability and more optimum design. Set-up and adjustment is performed through a four-button keypad with parameters and feedback provided through the four-character LED display. The design includes optioelectrically-isolated inputs and various levels of protection in their circuits to immunize the equipment against external disturbances and their effects.

The ASTAT-CD Plus starters advanced control technology individually fires each phase in a selected sequence to offer reliable performance and smooth acceleration for a variety of loads reducing mechanical shock to the motor driven system resulting in extended component and motor life.

Each starter consists of an electronic control module and a power base consisting of six SCR's arranged in back-to-back parallel pairs for optimum performance.

The ASTAT-CD Plus starter offers many traditional features such as motor overload protection, energy saving mode, adjustable voltage ramp, adjustable starting current limit, kick start, soft stop, loss of load and loss of phase protection. These plus many **NEW** standard features such as pump starting control mode, jog (slow speed) mode, reverse jog, dual ramp and dc braking mode coupled with voltage, current, kW, power factor and elapsed time monitoring make the ASTAT-CD Plus the choice for most applications. In addition the ASTAT-CD Plus offers as standard two programmable inputs, three programmable output relays and is RS232C and DeviceNet communications capable for maximum configuration flexibility. Protection is also high on the list of ASTAT-CD Plus standard features and includes thermal memory, overvoltage, undervoltage, overcurrent, undercurrent, frequency error, long start and long slow speed time. Error feedback is provided through the LED display which reports on the last four errors with 21 different error messages. ASTAT-CD Plus designed to do more...providing a solution to customer motor load starting problems.

Application

ASTAT-CD Plus solid state reduced voltage starters are used to reduce or eliminate mechanical shock and stress on mechanical components such as V-belts, gear boxes, chain drives, couplings, transmissions and shafts. ASTAT-CD Plus reduced voltage starters are used to reduce brownout conditions and may limit demand charges. ASTAT-CD Plus solid state reduced voltage starters are used to control processes, to smoothly accelerate and decelerate loads, to position and move loads and restrict process surges.

Typical applications include: compressors, pumps, belted equipment, centrifuges, conveyors, cranes, crushers, winches, fans/blowers, extruders, flywheels, hoists, laundry extractors, mixers, packaging equipment, machine tools, shears, saws, spinning frames, textile machinery, winders and wire drawing machines.

ASTAT-CD Plus Solid State Reduced Voltage

Standard Features

Digital Technology
Provides precise phase control of the back to back SCRs over each 1/2 cycle. The ASTAT-CD Plus design allows initial motor torque to be adjusted from 10%-90% of normal starting torque.

Digital Control Panel
Displays setup and operating parameters with alphanumeric display. Provides accurate setting of parameters with visible indication of starter status, motor current, line voltage, kW, power factor, elapsed time and error codes.

Soft Starting
Soft starting is the most frequent application for the ASTAT-CD Plus starter. It provides a linear increase in voltage at the motor terminals, eliminates starting shock to the load and reduces stress on mechanical components, such as gears, belt drives, piping and valves. A pump control setting is available as a standard feature to reduce pressure surges in pump systems during starting thereby limiting stress on pipe systems and valves.

Three-Segment Ramp
The Three-Segment Ramp consists of:
1. The initial voltage ramp, which lasts for five cycles, brings the motor voltage from 0 to the preset initial pedestal voltage (10%-90%).
2. The acceleration ramp, which increases the motor voltage from the preselected initial voltage to 100% voltage over the selected acceleration time period.
3. The fast ramp, which brings the motor voltage to 100% if the motor reaches full speed before the end of the acceleration ramp.

Electronic Overload Relay
Overload relay has selectable trip class for Class 10, 20 or 30 applications. Starting characteristics and hp selection tables are rated as Standard Duty (300% current for 30 seconds—IEC 10/NEMA 20) or Heavy Duty (450% current for 30 sec—IEC 20/NEMA 30). Provides accurate, repeatable, reliable protection for both the motor and the ASTAT.

Kick Start
Used to initially boost start loads with a high breakaway torque (belted conveyors, extruders, mixers). Feature may be engaged (95% voltage for a time period 1–999ms) or feature may be disengaged for applications not requiring kick start.

ASTAT-CD Plus

**700 Horsepower Max. @ 500V
Three-Phase
50/60Hz**

Standard Features (continued)

Current Limit
The motor starting current may be limited with adjustable current range from 100-450% of frame rating. This feature is used to reduce starting current to limit brownout/low voltage conditions during motor starting.

Soft Stopping
Allows motor driven load to be brought to rest over an adjustable time period independently of the acceleration ramp. A deceleration cycle exclusively designed for pump control may be programmed to limit water hammer, surges and sudden valve closure.

Energy Saving Mode
Reduces motor voltage under no load or low load conditions thereby reducing reactive power required by the motor. Motor voltage is automatically increased as the load is increased. Feature may be disengaged when desired.

DC Braking
Braking current is adjustable over a range from 0-250% of the motor nameplate full-load current for a predetermined time 0-99 seconds. Feature may be engaged when desired. Requires external contactor.

Loss of Load Detection
Prevents motor burnout for application in which driven load is also cooling motor (for example a submersible pump motor). Time delay is 10 seconds after load loss.

Motor Thermistor Protection Input
Used with motors protected with PTC thermistor. Trips within 200ms when resistance is higher than 2800-3200 ohms. Resets when resistance falls below 1000 ohms.

Stalled Rotor Protection
Power is removed from motor when stalled condition exceeds 200ms. Provides motor protection and process feedback.

Snubbers
RC network connected in parallel with SCR to protect against commutation spikes.

Retry
The retry function allows up to four attempts to restart the motor after a fault, allows user to set time between retries from 1-99 seconds.

Dual Ramp
A secondary ramp may be programmed for ramp up, ramp down plus the initial torque parameter which will be enabled as an alternate ramp when the "A" parameter is "ON" or enabled through one of the two programmable inputs.

Service Factor
Motor Service Factor may be adjusted from 1.0 to 1.3 to meet the application need of most motors.

ASTAT-CD Plus

Overvoltage/Undervoltage Protection
Adjustable parameters allow overvoltage conditions to be detected from 0-30% above nominal voltage set during the initialization. Undervoltage may be detected from 0-50% under the nominal voltage. Trip time may be set from 0-99 seconds after the condition is detected. If conditions return to normal the trip time is reset. L1 voltage is monitored to provide this protection.

Overcurrent/Undercurrent Protection
Adjustable parameters allow overcurrent conditions to be detected from 0-50% above nominal current set during the initialization. Undercurrent may be detected from 0-99% of the nominal current. Trip time may be set from 0-99 seconds after the condition is detected. If conditions return to normal the trip time is reset. This feature is not functional in bypass applications.

Monitoring Functions
Phase A may be monitored for Voltage, Current, Power Factor plus motor kilowatts calculated from the information obtained from phase A. Accuracy is ± 3% if unit is calibrated during initialization. An elapsed time monitor function is also provided which displays run time in hours x 1000.

Programmable Inputs
Two inputs may be programmed for one or more of the following functions: Soft Stop, Pump Control, Kick Start, Energy Saver, Bypass Function, DC Brake, Slow Speed Control (7% or 14%), Reverse Slow Speed (20%), Local or Remote Control, Tach feedback ramp and Dual (second) Ramp. Functions may be programmed to be OFF, ON or assigned to 1 of the 2 programmable inputs and activated with a dry contact closure.

Programmable Outputs
Three programmable output relays may be assigned to the following functions: End of Ramp, DC Brake (contactor control), Fault, Run, Jog or to detect Undervoltage, Overvoltage, Undercurrent or Overcurrent limits set for those parameters as a pre alarm to shutdown. Relay (2r) will automatically be assigned to End of Ramp when Bypass function "z" is on. Relay (3r) will be automatically assigned to DC Brake control when DC Brake function B is on.

ASTAT-CD Plus

700 Horsepower Max. @ 500V
Three-Phase
50/60Hz

Standard Features (continued)

Slow Speed (Jog)/Reverse Slow Speed
Allows user to engage 7 or 14% speed to align or position loads. Reverse jog (20% speed) may be used to loosen jam in mechanical load. Current is limited to the nominal current setting programmed from the keypad or function may be engaged from programmable input I3 or I4.

Tachometer Feedback
Provides linear speed ramp independent of load torque. Speed feedback is provided by a user supplied tachometer attached to the driven shaft. May be used for both the acceleration and deceleration ramp. A voltage transducer is required to match tachometer voltage to the required input voltage range (0-5VDC) programmed from the keypad or function may be engaged from programmable input I3 or I4.

Analog Output
0-10 Volt DC output for current measurement purpose. When the ASTAT is at rated Amps, the output equals 2V DC.

Communications
The ASTAT-CD Plus is supplied with communications capability to a computer via ASCII protocol. Through serial communications, this feature may be programmed to "ON" or be enabled through an assignment to one of the two programmable inputs.

MOVs
Metal oxide varistors to protect electronic components against external voltage spikes.

Error Traceability
Displays last 4 error codes on alphanumeric display. Provides feedback for corrective action.

Phase Loss Protection
Removes power from motor terminals in 3 seconds upon detection of phase loss. Provides additional protection against motor burnout.

Thermal Overload Memory
Overload relay retains memory of overload conditions to closely profile motor winding thermal condition to insure adequate protection under repetitive overload conditions. Memory is maintained as long as the control power remains applied to the soft starter.

SCR Over Temperature Protection
Heat sinks on sizes J-X are fitted with thermostats to protect SCR against fan failure.

Frequency Error Detection
Electronic frequency sensing will not allow starter to begin load ramp-up if frequency is < 45 Hz or > 65 Hz, providing protection to the motor and starter should frequency be excessively out of tolerance.

ASTAT-CD Plus Size Q Starter

Long Start Time Protection
If current limit is set too low and/or starting time is longer than two times the preselected acceleration ramp time (240 sec max.), it is assumed that the motor heating could be excessive. The ASTAT-CD Plus starter provides long start time protection and disconnects the load under these conditions.

Local Communications
The ASTAT-CD Plus is capable of RS232C ASCII communication with the software package provided. This serial communication is suitable for on site setup of soft starters with a PC at the local sight. Communication distance is generally limited to 3 meters. An optional cable is available with RS232 connector on one end and identified ASTAT terminal connections on the other. Please order product number QCX000170.

Remote Communication
Modbus® RTU—This single ended protocol may be used up to distances of 10 meters. For distances greater the 10 meters it is recommended that a RS232 to RS485 converter be used. The recommended converter is GE product number RS485RS232120. This converter requires a separate 120 Volt power supply. Up to 247 addressable ASTAT stations may be connected to this network.

DeviceNet™—A gateway module is available QCPDNTUS, which includes a 1-meter cable to connect the module to the ASTAT. The module is DIN rail mount, compact in size and may be easily added to new or existing enclosures with ASTAT Plus soft starters. The module incorporates a Brad Harrison® micro connector for connection to the DeviceNet™ network. This gateway supports the COS (Change Of State), Polling and Explicit Messaging connections. All ASTAT parameters and settings may be viewed/changed using the DeviceNet module and the appropriate connection. Up to 63 ASTAT addresses, each requiring a module may be integrated into the network.

Reduced Voltage Starters
Solid State
QC2
ASTAT-CD Plus
Open

ASTAT-CD Plus solid state reduced voltage starters (also referred to as Soft Starters) provide smooth, stepless acceleration/deceleration of AC squirrel-cage induction motors from zero to full speed over an adjustable time period.

ASTAT-CD Plus starters are supplied with 120/240 VAC (50/60 Hz) control power input. On starter sizes F-S, box lug terminals are supplied for line and load connections; on starter sizes T-V, order box lug terminal kits separately (see table below). Starters in sizes J and above are supplied with internal cooling fans.

Three-Phase

Current Rating Amps (AC-3)[1]	Standard-Duty, Heavy-Duty	Max. Nominal Current for 30 sec.	Motor Horsepower @ 200V	Motor Horsepower @ 230V	Motor Horsepower @ 460V	KW 1.0 S.F. 380V/415V	Product Number	List Price G0-10A5	Approx. Weight lbs. (kg)
14	Standard-Duty	300%	3	3	7.5	7.5	QC2FDP	**$1350.00**	9.48 (4.3)
	Heavy-Duty	450%	3	3	7.5	5.5			
17	Standard-Duty	300%	3	3	10	11	QC2GDP	**$1400.00**	9.48 (4.3)
	Heavy-Duty	450%	3	3	10	7.5			
22	Standard-Duty	300%	5	7.5	15	13	QC2HDP	**$1450.00**	9.48 (4.3)
	Heavy-Duty	450%	5	5	15	15			
34	Standard-Duty	300%	10	10	25	18.5	QC2IDP	**$1500.00**	10.14 (4.6)
	Heavy-Duty	450%	7.5	7.5	20	15			
48	Standard-Duty	300%	15	15	30	25	QC2JDP	**$1630.00**	27.56 (12.5)
	Heavy-Duty	450%	10	15	30	22			
63	Standard-Duty	300%	20	20	40	37	QC2KDP	**$1820.00**	27.56 (12.5)
	Heavy-Duty	450%	15	20	40	30			
72	Standard-Duty	300%	20	25	50	45	QC2LDP	**$2200.00**	37.48 (17)
	Heavy-Duty	450%	20	20	40	37			
105	Standard-Duty	300%	30	30	75	63	QC2MDP	**$2950.00**	37.48 (17)
	Heavy-Duty	450%	30	30	60	55			
156	Standard-Duty	300%	50	60	125	90	QC2NDP	**$3850.00**	99.20 (45)
	Heavy-Duty	450%	40	50	100	75			
240	Standard-Duty	300%	75	75	200	150	QC2QDP	**$5200.00**	99.20 (45)
	Heavy-Duty	450%	60	75	150	110			
315	Standard-Duty	300%	100	125	250	200	QC2RDP	**$6100.00**	121.25 (55)
	Heavy-Duty	450%	75	100	200	160			
370	Standard-Duty	300%	125	150	300	220	QC2SDP	**$6500.00**	121.25 (55)
	Heavy-Duty	450%	100	125	250	200			
500	Standard-Duty	300%	150	200	400	300	QC2TDP	**$8350.00**	176 (80)
	Heavy-Duty	450%	150	150	350	250			
630	Standard-Duty	300%	200	250	500	400	QC2UDP	**$10420.00**	231 (105)
	Heavy-Duty	450%	200	200	400	315			
850	Standard-Duty	300%	300	350	700	560	QC2VDP[2]	**$13650.00**	265 (120)
	Heavy-Duty	450%	250	300	600	460			
1075	Standard-Duty	300%	400	500	1000	715	QC2XDP[3]	**$18500.00**	330 (150)
	Heavy-Duty	450%	350	400	800	600			

[1]When operating motors at service factor loads, service factor amps must not exceed starter rating.
[2]Heavy-duty 800 amps max.
[3]Not UL listed. Available in open form only.

Terminal Lug Kits for Sizes T-V

Each terminal lug kit includes a set of 3 terminal lugs. One kit each is required for line and load side connections.

Frame Size	Kit Product Number	List Price G0-10A5
T	CR370X1	**$270.00**
U	CR370X2	**$270.00**
V	CR370X3	**$360.00**

PC Connector Kit

Connects ASTAT-CD Plus to PC for set-up. Kit consists of a 1.5m long cable with RS-232 connector on one end and identified wire leads for connection to ASTAT-CD Plus on the other end.

Product Number	List Price G0-10A5
QCX000170	**$20.00**

Communications Module

Description	Product Number	List Price G0-10A5
DeviceNet Module	QCPDNTUS	**$950.00**

Product Number Selection Instructions

1. Product numbers with # are incomplete. For starter sizes J and above in 12/3R enclosures, add one product number digit (in place of #) for overload relay current range for bypass contactor. Overload relay not included in pricing; add appropriate List Price Adder from Overload Relay Table (page 2-55).

Example:
To specify a non-combination starter used with a 460 V motor rated at 30 hp and a full load current of 40 amps in a Type 12 enclosure, select base product number CR370JD2412#.

Replace # with overload relay digit "E" from table, page 2-55. Complete product number is CR370JD2412E.

List Price $2583.00
Overload Adder $95.00
Total List Price, GO-10A6 $2678.00

2. Product Notes
When operating motors at service factor loads, service factor amps must not exceed starter rating. Enclosed starters rated for 40°C ambient temperatures, derate rated controller current by 1.5%/°C above 40°C, up to a maximum of 50°C.

Enclosed Noncombination Starters (CR370)

List Price includes ASTAT-CD Plus solid state reduced voltage starter in the enclosure selected. Starters for 200, 230, and 460 Volt motors are supplied with power supply configured for 115 V 60 Hz separate input, which includes control circuit fuses.

Interposing relay supplied with 1 extra normally open and 1 extra normally closed contact for optional user requirements. On starter sizes F-S, box lug terminal are supplied for line and load field power connections; on starter sizes T-V, order box lug terminals kits separately (see page 2-43).

Reduced Voltage Starters
Solid State
CR370
ASTAT-CD Plus
Enclosed
Noncombination

Three-Phase

Volts	Current Rating Amps (AC-3)	Standard-Duty Heavy Duty	Max. Nominal Current for 30 sec.	Motor Horsepower	NEMA Type 1				NEMA Type 12/3R			
					Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor	Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor
200V	14	Standard-Duty Heavy-Duty	300% 450%	3 3	370FD121	**$1955.00**	F	—	370FD221	**$2040.00**	F	No
200V	17	Standard-Duty Heavy-Duty	300% 450%	3 3	370GD121	**$2005.00**	G	—	370GD221	**$2109.00**	G	No
200V	22	Standard-Duty Heavy-Duty	300% 450%	5 5	370HD121	**$2055.00**	H	—	370HD221	**$2159.00**	H	No
200V	34	Standard-Duty Heavy-Duty	300% 450%	10 7.5	370ID121	**$2105.00**	I	—	370ID2212#	**$2411.00**	I	Yes
200V	34	Standard-Duty Heavy Duty	300% 400%	10 7.5	–	–	–	–	370ID221[1]	**$2228.00**	I	No
200V	48	Standard-Duty Heavy-Duty	300% 450%	15 10	370JD121	**$2350.00**	J	—	370JD2212#	**$2583.00**	J	Yes
200V	63	Standard-Duty Heavy-Duty	300% 450%	20 15	370KD121	**$2540.00**	K	—	370KD2212#	**$2825.00**	K	Yes
200V	72	Standard-Duty Heavy-Duty	300% 450%	20 20	370LD121	**$3330.00**	L	—	370LD2212#	**$4143.00**	L	Yes
200V	105	Standard-Duty Heavy-Duty	300% 450%	30 30	370MD121	**$4080.00**	M	—	370MD2212#	**$5121.00**	M	Yes
200V	156	Standard-Duty Heavy-Duty	300% 450%	50 40	370ND121	**$5250.00**	N	—	370ND2212#	**$6418.00**	N	Yes
200V	240	Standard-Duty Heavy-Duty	300% 450%	75 60	370QD121	**$6600.00**	Q	—	370QD2212#	**$8413.00**	Q	Yes
200V	315	Standard-Duty Heavy-Duty	300% 450%	100 75	370RD121	**$7500.00**	R	—	370RD2212#	**$10393.00**	R	Yes
200V	370	Standard-Duty Heavy-Duty	300% 450%	125 100	370SD121	**$7900.00**	S	—	370SD2212#	**$11671.00**	S	Yes
200V	500	Standard-Duty Heavy-Duty	300% 450%	150 150	370TD121	**$10200.00**	T	—	370TD2212#	**$14705.00**	T	Yes
200V	630	Standard-Duty Heavy-Duty	300% 450%	200 200	370UD121	**$13270.00**	U	—	370UD2212#	**$19520.00**	U	Yes
200V	850	Standard-Duty Heavy-Duty	300% 450%	300 250	370VD121[2]	**$16500.00**	V	—	370VD2212#[2]	**$2978.00**	V	Yes
230V	14	Standard-Duty Heavy-Duty	300% 450%	3 3	370FD131	**$1955.00**	F	—	370FD231	**$2040.00**	F	No
230V	17	Standard-Duty Heavy-Duty	300% 450%	3 3	370GD131	**$2005.00**	G	—	370GD231	**$2109.00**	G	No
230V	22	Standard-Duty Heavy-Duty	300% 450%	7.5 5	370HD131	**$2055.00**	H	—	370HD231	**$2159.00**	H	No
230V	34	Standard-Duty Heavy-Duty	300% 450%	10 7.5	370ID131	**$2105.00**	I	—	370ID231#	**$2411.00**	I	Yes
230V	34	Standard-Duty Heavy Duty	300% 400%	10 7.5	–	–	–	–	370ID231[1]	**$2228.00**	I	No
230V	48	Standard-Duty Heavy-Duty	300% 450%	15 15	370JD131	**$2350.00**	J	—	370JD2312#	**$2583.00**	J	Yes
230V	63	Standard-Duty Heavy-Duty	300% 450%	20 20	370KD131	**$2540.00**	K	—	370KD2312#	**$2825.00**	K	Yes
230V	72	Standard-Duty Heavy-Duty	300% 450%	25 20	370LD131	**$3330.00**	L	—	370LD2312#	**$4143.00**	L	Yes
230V	105	Standard-Duty Heavy-Duty	300% 450%	30 30	370MD131	**$4080.00**	M	—	370MD2312#	**$5121.00**	M	Yes
230V	156	Standard-Duty Heavy-Duty	300% 450%	60 50	370ND131	**$5250.00**	N	—	370ND2312#	**$6418.00**	N	Yes
230V	240	Standard-Duty Heavy-Duty	300% 450%	75 75	370QD131	**$6600.00**	Q	—	370QD2312#	**$8413.00**	Q	Yes
230V	315	Standard-Duty Heavy-Duty	300% 450%	125 100	370RD131	**$7500.00**	R	—	370RD2312#	**$10393.00**	R	Yes
230V	370	Standard-Duty Heavy-Duty	300% 450%	150 125	370SD131	**$7900.00**	S	—	370SD2312#	**$11671.00**	S	Yes
230V	500	Standard-Duty Heavy-Duty	300% 450%	200 150	370TD131	**$10200.00**	T	—	370TD2312#	**$14705.00**	T	Yes
230V	630	Standard-Duty Heavy-Duty	300% 450%	250 200	370UD131	**$13270.00**	U	—	370UD2312#	**$19520.00**	U	Yes
230V	850	Standard-Duty Heavy-Duty	300% 450%	350 300	370VD131[2]	**$16500.00**	V	—	370VD2312#[2]	**$29728.00**	V	Yes

[1]27 amps max (SF 1.0)
[2]Heavy-duty 800 amps max.

Reduced Voltage Starters
Solid State
CR370
ASTAT-CD Plus
Enclosed
Noncombination

Three-Phase

Volts	Current Rating Amps (AC-3)	Standard-Duty Heavy Duty	Max. Nominal Current for 30 sec.	Motor Horsepower	NEMA Type 1				NEMA Type 12/3R			
					Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor	Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor
460V	14	Standard-Duty Heavy-Duty	300% 450%	7.5 7.5	370FD141	**$1955.00**	F	—	370FD241	**$2040.00**	F	No
460V	17	Standard-Duty Heavy-Duty	300% 450%	10 10	370GD141	**$2005.00**	G	—	370GD241	**$2109.00**	G	No
460V	22	Standard-Duty Heavy-Duty	300% 450%	15 15	370HD141	**$2055.00**	H	—	370HD241	**$2159.00**	H	No
460V	34	Standard-Duty Heavy-Duty	300% 450%	25 20	370ID141	**$2105.00**	I	—	370ID2412#	**$2411.00**	I	Yes
460V	34	Standard-Duty Heavy Duty	300% 400%	25 20	—	—	—	—	370ID241[1]	**$2228.00**	I	No
460V	48	Standard-Duty Heavy-Duty	300% 450%	30 30	370JD141	**$2350.00**	J	—	370JD2412#	**$2583.00**	J	Yes
460V	63	Standard-Duty Heavy-Duty	300% 450%	40 40	370KD141	**$2540.00**	K	—	370KD2412#	**$2825.00**	K	Yes
460V	72	Standard-Duty Heavy-Duty	300% 450%	50 40	370LD141	**$3330.00**	L	—	370LD2412#	**$4143.00**	L	Yes
460V	105	Standard-Duty Heavy-Duty	300% 450%	75 60	370MD141	**$4080.00**	M	—	370MD2412#	**$5121.00**	M	Yes
460V	156	Standard-Duty Heavy-Duty	300% 450%	125 100	370ND141	**$5250.00**	N	—	370ND2412#	**$6418.00**	N	Yes
460V	240	Standard-Duty Heavy-Duty	300% 450%	200 150	370QD141	**$6600.00**	Q	—	370QD2412#	**$8413.00**	Q	Yes
460V	315	Standard-Duty Heavy-Duty	300% 450%	250 200	370RD141	**$7500.00**	R	—	370RD2412#	**$10393.00**	R	Yes
460V	370	Standard-Duty Heavy-Duty	300% 450%	300 250	370SD141	**$7900.00**	S	—	370SD2412#	**$11671.00**	S	Yes
460V	500	Standard-Duty Heavy-Duty	300% 450%	400 350	370TD141	**$10200.00**	T	—	370TD2412#	**$14705.00**	T	Yes
460V	630	Standard-Duty Heavy-Duty	300% 450%	500 400	370UD141	**$13270.00**	U	—	370UD2412#	**$19250.00**	U	Yes
460V	850	Standard-Duty Heavy-Duty	300% 450%	700 600	370VD141[2]	**$16500.00**	V	—	370VD2412#[2]	**$29728.00**	V	Yes

[1]27 amps max (SF 1.0)
[2]Heavy-duty 800 amps max.

Reduced Voltage Starters
Solid State
CR371
ASTAT-CD Plus
Enclosed Combination
Fusible Disconnect Type

List Price includes ASTAT-CD Plus solid state reduce voltage starter, in the enclosure selected, with a fusible disconnect switch operated by a side-mounted handle that indicates status as ON in the up position and OFF in the down position. The operating handle prevents entrance into the enclosure when the switch is in the ON position, unless the defeater mechanism is deliberately operated. The handle accepts up to 3 padlocks for securing the switch in the OFF position for maintenance shutdown. Provisions also are made for padlocking the handle in the ON position for continuous process applications requiring supervised shutdown. **Starters for 200, 230 and 460 volt motors are supplied with a control circuit transformer with 2 primary fuses and 1 secondary fuse**. Interposing relay supplied with 1 extra normally open and 1 extra normally closed contact for optional user requirements. On starter sizes F-S, box lug terminals are supplied for line and load field power connections; on starter sizes T-V, order box lug terminal kits separately (see page 2-43).

Product Number Selection Instructions

1. Product numbers with # are incomplete. For starter sizes J and above in 12/3R enclosures, add one product number digit (in place of #) for overload relay current range for bypass contactor. Overload relay not included in pricing; add appropriate List Price Adder from Overload Relay Table (page 2-55).

Example:
To specify a combination starter used with a 460 V motor rated at 30 hp and a full load current of 40 amps in a Type 12 enclosure, select base product number CR371JD242D2#.

Replace # with overload relay digit "E" from table, page 2-55. Complete product number is CR371JD242D2E.

List Price $3698.00
Overload Adder $95.00
Total List Price, GO-10A6 $3793.00

2. Product Notes
When operating motors at service factor loads, service factor amps must not exceed starter rating. Enclosed starters rated for 40°C ambient temperatures, derate rated controller current by 1.5%/°C above 40°C, up to a maximum of 50°C.

Three-Phase

Volts	Current Rating Amps (AC-3)	Standard-Duty Heavy Duty	Max. Nominal Current for 30 sec.	Motor Horsepower	Class J Fuse Clip Size	NEMA Type 1				NEMA Type 12/3R			
						Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor	Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor
200V	14	Standard-Duty Heavy-Duty	300% 450%	3 3	30	371FD122B	**$2685.00**	F	—	371FD222B	**$2919.00**	F	No
200V	17	Standard-Duty Heavy-Duty	300% 450%	3 3	30	371GD122B	**$2735.00**	G	—	371GD222B	**$2988.00**	G	No
200V	22	Standard-Duty Heavy-Duty	300% 450%	5 5	60	371HD122C	**$2785.00**	H	—	371HD222C	**$3038.00**	H	No
200V	34	Standard-Duty Heavy-Duty	300% 450%	10 7.5	60	371ID122C	**$2862.00**	I	—	371ID222C2#	**$3317.00**	I	Yes
200V	34	Standard-Duty Heavy Duty	300% 400%	10 7.5	60	—	—	—	—	371ID222C[1]	**$3134.00**	I	No
200V	48	Standard-Duty Heavy-Duty	300% 450%	15 10	100	371JD122D	**$3440.00**	J	—	371JD222D2#	**$3698.00**	J	Yes
200V	63	Standard-Duty Heavy-Duty	300% 450%	20 15	100	371KD122D	**$3830.00**	K	—	371KD222D2#	**$4140.00**	K	Yes
200V	72	Standard-Duty Heavy-Duty	300% 450%	20 20	100	371LD122D	**$4681.00**	L	—	371LD222D2#	**$5519.00**	L	Yes
200V	105	Standard-Duty Heavy-Duty	300% 450%	30 30	200	371MD122E	**$5714.00**	M	—	371MD222E2#	**$6900.00**	M	Yes
200V	156	Standard-Duty Heavy-Duty	300% 450%	50 40	200	371ND122E	**$7179.00**	N	—	371ND222E2#	**$8642.00**	N	Yes
200V	156	Standard-Duty Heavy-Duty	300% 450%	50 40	400	371ND122F	**$7778.00**	N	—	371ND222F2#	**$9241.00**	N	Yes
200V	240	Standard-Duty Heavy-Duty	300% 450%	75 60	400	371QD122F	**$9328.00**	Q	—	371QD222F2#	**$11336.00**	Q	Yes
200V	315	Standard-Duty Heavy-Duty	300% 450%	100 75	600	371RD122G	**$10614.00**	R	—	371RD222G2#	**$13902.00**	R	Yes
200V	370	Standard-Duty Heavy-Duty	300% 450%	125 100	600	371SD122G	**$11014.00**	S	—	371SD222G2#	**$15180.00**	S	Yes

[1]27 amps max (SF 1.0)

Reduced Voltage Starters
Solid State
CR371
ASTAT-CD Plus
Enclosed Combination
Fusible Disconnect Type

Three-Phase

Volts	Current Rating Amps (AC-3)	Standard-Duty Heavy Duty	Max. Nominal Current for 30 sec.	Motor Horsepower	Class J Fuse Clip Size	NEMA Type 1				NEMA Type 12/3R			
						Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor	Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor
230V	14	Standard-Duty Heavy-Duty	300% 450%	3 3	30	371FD132B	**$2685.00**	F	—	371FD232B	**$2919.00**	F	No
230V	17	Standard-Duty Heavy-Duty	300% 450%	3 3	30	371GD132B	**$2735.00**	G	—	371GD232B	**$2988.00**	G	No
230V	22	Standard-Duty Heavy-Duty	300% 450%	7.5 5	60	371HD132C	**$2862.00**	H	—	371HD232C	**$3038.00**	H	No
230V	34	Standard-Duty Heavy-Duty	300% 450%	10 7.5	60	371ID132C	**$2862.00**	I	—	371ID232C2#	**$3317.00**	I	Yes
230V	34	Standard-Duty Heavy Duty	300% 400%	10 7.5	60	—	—	—	—	371ID232C[1]	**$3134.00**	I	No
230V	48	Standard-Duty Heavy-Duty	300% 450%	15 15	100	371JD132D	**$3440.00**	J	—	371JD232D2#	**$3698.00**	J	Yes
230V	63	Standard-Duty Heavy-Duty	300% 450%	20 20	100	371KD132D	**$3830.00**	K	—	371KD232D2#	**$4140.00**	K	Yes
230V	72	Standard-Duty Heavy-Duty	300% 450%	25 20	100	371LD132D	**$4681.00**	L	—	371LD232D2#	**$5519.00**	L	Yes
230V	105	Standard-Duty Heavy-Duty	300% 450%	30 30	200	371MD132E	**$5714.00**	M	—	371MD232E2#	**$6900.00**	M	Yes
230V	156	Standard-Duty Heavy-Duty	300% 450%	60 50	200	371ND132E	**$7179.00**	N	—	371ND232E2#	**$8642.00**	N	Yes
230V	156	Standard-Duty Heavy-Duty	300% 450%	60 50	400	371ND132F	**$7778.00**	N	—	371ND232F2#	**$9241.00**	N	Yes
230V	240	Standard-Duty Heavy-Duty	300% 450%	75 75	400	371QD132F	**$9328.00**	Q	—	371QD232F2#	**$11336.00**	Q	Yes
230V	315	Standard-Duty Heavy-Duty	300% 450%	125 100	400	371RD132F	**$10228.00**	R	—	371RD232F2#	**$13516.00**	R	Yes
230V	315	Standard-Duty Heavy-Duty	300% 450%	125 100	600	371RD132G	**$10614.00**	R	—	371RD232G2#	**$13902.00**	R	Yes
230V	370	Standard-Duty Heavy-Duty	300% 450%	150 125	600	371SD132G	**$11014.00**	S	—	371SD232G2#	**$15180.00**	S	Yes
460V	14	Standard-Duty Heavy-Duty	300% 450%	7.5 7.5	30	371FD142B	**$2685.00**	F	—	371FD242B	**$2919.00**	F	No
460V	17	Standard-Duty Heavy-Duty	300% 450%	10 10	30	371GD142B	**$2735.00**	G	—	371GD242B	**$2988.00**	G	No
460V	22	Standard-Duty Heavy-Duty	300% 450%	15 15	60	371HD142C	**$2785.00**	H	—	371HD242C	**$3038.00**	H	No
460V	34	Standard-Duty Heavy-Duty	300% 450%	25 20	60	371ID142C	**$2862.00**	I	—	371ID242C2#	**$3317.00**	I	Yes
460V	34	Standard-Duty Heavy Duty	300% 400%	25 20	60	—	—	—	—	371ID242C[1]	**$3134.00**	I	No
460V	48	Standard-Duty Heavy-Duty	300% 450%	30 30	100	371JD142D	**$3440.00**	J	—	371JD242D2#	**$3698.00**	J	Yes
460V	63	Standard-Duty Heavy-Duty	300% 450%	40 40	100	371KD142D	**$3830.00**	K	—	371KD242D2#	**$4140.00**	K	Yes
460V	72	Standard-Duty Heavy-Duty	300% 450%	50 40	100	371LD142D	**$4681.00**	L	—	371LD242D2#	**$5519.00**	L	Yes
460V	105	Standard-Duty Heavy-Duty	300% 450%	75 60	200	371MD142E	**$5714.00**	M	—	371MD242E2#	**$6900.00**	M	Yes
460V	156	Standard-Duty Heavy-Duty	300% 450%	125 100	400	371ND142F	**$7778.00**	N	—	371ND242F2#	**$9241.00**	N	Yes
460V	240	Standard-Duty Heavy-Duty	300% 450%	200 150	400	371QD142F	**$9328.00**	Q	—	371QD242F2#	**$11336.00**	Q	Yes
460V	315	Standard-Duty Heavy-Duty	300% 450%	250 200	400	371RD142F	**$10228.00**	R	—	371RD242F2#	**$13516.00**	R	Yes
460V	315	Standard-Duty Heavy-Duty	300% 450%	250 200	600	371RD142G	**$10614.00**	R	—	371RD242G2#	**$13902.00**	R	Yes
460V	370	Standard-Duty Heavy-Duty	300% 450%	300 250	600	371SD142G	**$11014.00**	S	—	371SD242G2#	**$15180.00**	S	Yes

[1]27 amps max (SF 1.0)

Reduced Voltage Starters
Solid State
CR373
ASTAT-CD Plus
Enclosed Combination
Mag-Break Type®

List Price includes ASTAT-CD Plus solid state reduce voltage starter, in the enclosure selected, with a Mag-breaker operated by a side-mounted handle that indicates status as ON in the up position and OFF in the down position. The operating handle prevents entrance into the enclosure when the switch is in the ON position, unless the defeater mechanism is deliberately operated. The handle accepts up to 3 padlocks for securing the switch in the OFF position for maintenance shutdown. Provisions also are made for padlocking the handle in the ON position for continuous process applications requiring supervised shutdown. **Starters for 200, 230 and 460 volt motors are supplied with a control circuit transformer with 2 primary fuses and 1 secondary fuse**. Interposing relay supplied with 1 extra normally open and 1 extra normally closed contact for optional user requirements. On starter sizes F-S, box lug terminals are supplied for line and load field power connections; on starter sizes T-V, order box lug terminal kits separately (see page 2-43).

Product Number Selection Instructions

1. Product numbers with # are incomplete. For starter sizes J and above in 12/3R enclosures, add one product number digit (in place of #) for overload relay current range for bypass contactor. Overload relay not included in pricing; add appropriate List Price Adder from Overload Relay Table (page 2-55).

Example:
To specify a combination starter used with a 460 V motor rated at 30 hp and a full load current of 40 amps in a Type 12 enclosure, select base product number CR373JD242F2#.

Replace # with overload relay digit "E" from table, page 2-55. Complete product number is CR373JD242F2E.

List Price $3652.00
Overload Adder $95.00
Total List Price, GO-10A6 $3747.00

2. Product Notes
When operating motors at service factor loads, service factor amps must not exceed starter rating. Enclosed starters rated for 40°C ambient temperatures, derate rated controller current by 1.5%/°C above 40°C, up to a maximum of 50°C.

Three-Phase

Volts	Current Rating Amps (AC-3)	Standard-Duty Heavy Duty	Max. Nominal Current for 30 sec.	Motor Horsepower	Circuit Interrupter Rating (Amps)	NEMA Type 1				NEMA Type 12/3R			
						Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor	Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor
200V	14	Standard-Duty Heavy-Duty	300% 450%	3 3	15	373FD122D	**$2720.00**	F	—	373FD222D	**$2954.00**	F	No
200V	17	Standard-Duty Heavy-Duty	300% 450%	3 3	15	373GD122D	**$2770.00**	G	—	373GD222D	**$3023.00**	G	No
200V	22	Standard-Duty Heavy-Duty	300% 450%	5 5	30	373HD122E	**$2820.00**	H	—	373HD222E	**$3073.00**	H	No
200V	34	Standard-Duty Heavy-Duty	300% 450%	10 7.5	30	373ID122E	**$2870.00**	I	—	373ID222E2#	**$3325.00**	I	Yes
200V	34	Standard-Duty Heavy Duty	300% 400%	10 7.5	30	—	—	—	—	373ID222E[1]	**$3142.00**	I	No
200V	48	Standard-Duty Heavy-Duty	300% 450%	15 10	50	373JD122F	**$3394.00**	J	—	373JD222F2#	**$3652.00**	J	Yes
200V	48	Standard-Duty Heavy-Duty	300% 450%	15 10	100	373JD122G	**$3409.00**	J	—	373JD222G2#	**$3667.00**	J	Yes
200V	63	Standard-Duty Heavy-Duty	300% 450%	20 15	100	373KD122G	**$3799.00**	K	—	373KD222G2#	**$4109.00**	K	Yes
200V	72	Standard-Duty Heavy-Duty	300% 450%	20 20	100	373LD122G	**$4650.00**	L	—	373LD222G2#	**$5488.00**	L	Yes
200V	105	Standard-Duty Heavy-Duty	300% 450%	30 30	150	373MD122H	**$5501.00**	M	—	373MD222H2#	**$6687.00**	M	Yes
200V	156	Standard-Duty Heavy-Duty	300% 450%	50 40	150	373ND122H	**$6966.00**	N	—	373ND222H2#	**$8429.00**	N	Yes
200V	156	Standard-Duty Heavy-Duty	300% 450%	50 40	225	373ND122J	**$7379.00**	N	—	373ND222J2#	**$8842.00**	N	Yes
200V	240	Standard-Duty Heavy-Duty	300% 450%	75 60	225	373QD122J	**$8929.00**	Q	—	373QD222J2#	**$10937.00**	Q	Yes
200V	240	Standard-Duty Heavy-Duty	300% 450%	75 60	400	373QD122K	**$9498.00**	Q	—	373QD222K2#	**$11506.00**	Q	Yes
200V	315	Standard-Duty Heavy-Duty	300% 450%	100 75	400	373RD122K	**$10398.00**	R	—	373RD222K2#	**$13686.00**	R	Yes
200V	370	Standard-Duty Heavy-Duty	300% 450%	125 100	400	373SD122K	**$10798.00**	S	—	373SD222K2#	**$14964.00**	S	Yes
200V	370	Standard-Duty Heavy-Duty	300% 450%	125 100	600	373SD122L	**$11289.00**	S	—	373SD222L2#	**$15455.00**	S	Yes
200V	500	Standard-Duty Heavy-Duty	300% 450%	150 150	600	373TD122L	**$15700.00**	T	—	373TD222L2#	**$20705.00**	T	Yes
200V	630	Standard-Duty Heavy-Duty	300% 450%	200 200	700	373UD122M	**$18770.00**	U	—	373UD222M2#	**$25650.00**	U	Yes
200V	850	Standard-Duty Heavy-Duty	300% 450%	300 250	800	373VD122N[2]	**$24900.00**	V	—	373VD222N2#[2]	**$38978.00**	V	Yes
200V	850	Standard-Duty Heavy-Duty	300% 450%	300 250	1200	373VD122R[2]	**$24900.00**	V	—	373VD222R2#[2]	**$38978.00**	V	Yes

[1]27 amps max (SF 1.0).
[2]Heavy-Duty 800 amps max.

Reduced Voltage Starters
Solid State
CR373
ASTAT-CD Plus
Enclosed Combination
Mag-Break Type®

Three-Phase

Volts	Current Rating Amps (AC-3)	Standard-Duty Heavy Duty	Max. Nominal Current for 30 sec.	Motor Horsepower	Circuit Interrupter Rating (Amps)	NEMA Type 1				NEMA Type 12/3R			
						Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor	Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor
230V	14	Standard-Duty Heavy-Duty	300% 450%	3 3	15	373FD132D	**$2720.00**	F	—	373FD232D	**$2964.00**	F	No
230V	17	Standard-Duty Heavy-Duty	300% 450%	3 3	15	373GD132D	**$2770.00**	G	—	373GD232D	**$3023.00**	G	No
230V	22	Standard-Duty Heavy-Duty	300% 450%	7.5 5	30	373HD132E	**$2820.00**	H	—	373HD232E	**$3073.00**	H	No
230V	34	Standard-Duty Heavy-Duty	300% 450%	10 7.5	30	373ID132E	**$2870.00**	I	—	373ID232E2#	**$3325.00**	I	Yes
230V	34	Standard-Duty Heavy Duty	300% 400%	10 7.5	30	—	—	—	—	373ID232E[1]	**$3142.00**	I	No
230V	48	Standard-Duty Heavy-Duty	300% 450%	15 15	50	373JD132F	**$3394.00**	J	—	373JD232F2#	**$3652.00**	J	Yes
230V	63	Standard-Duty Heavy-Duty	300% 450%	20 20	100	373KD132G	**$3799.00**	K	—	373KD232G2#	**$4109.00**	K	Yes
230V	72	Standard-Duty Heavy-Duty	300% 450%	25 20	100	373LD132G	**$4650.00**	L	—	373LD232G2#	**$5488.00**	L	Yes
230V	105	Standard-Duty Heavy-Duty	300% 450%	30 30	100	373MD132G	**$5480.00**	M	—	373MD232G2#	**$6668.00**	M	Yes
230V	156	Standard-Duty Heavy-Duty	300% 450%	60 50	225	373ND132J	**$7379.00**	N	—	373ND232J2#	**$8842.00**	N	Yes
230V	240	Standard-Duty Heavy-Duty	300% 450%	75 75	400	373QD132K	**$9498.00**	Q	—	373QD232K2#	**$11506.00**	Q	Yes
230V	315	Standard-Duty Heavy-Duty	300% 450%	125 100	400	373RD132K	**$10398.00**	R	—	373RD232K2#	**$13686.00**	R	Yes
230V	370	Standard-Duty Heavy-Duty	300% 450%	150 125	400	373SD132K	**$10798.00**	S	—	373SD232K2#	**$14964.00**	S	Yes
230V	370	Standard-Duty Heavy-Duty	300% 450%	150 125	600	373SD132L	**$11289.00**	S	—	373SD232L2#	**$15455.00**	S	Yes
230V	500	Standard-Duty Heavy-Duty	300% 450%	200 150	500	373TD132K	**$15700.00**	T	—	373TD232K2#	**$20705.00**	T	Yes
230V	500	Standard-Duty Heavy-Duty	300% 450%	200 150	600	373TD132L	**$15700.00**	T	—	373TD232L2#	**$20705.00**	T	Yes
230V	630	Standard-Duty Heavy-Duty	300% 450%	250 200	600	373UD132L	**$18770.00**	U	—	373UD232L2#	**$25650.00**	U	Yes
230V	630	Standard-Duty Heavy-Duty	300% 450%	250 200	800	373UD132N	**$18770.00**	U	—	373UD232N2#	**$25650.00**	U	Yes
230V	850	Standard-Duty Heavy-Duty	300% 450%	350 300	1000	373VD132P[2]	**$24900.00**	V	—	373VD232P2#[2]	**$38978.00**	V	Yes
230V	850	Standard-Duty Heavy-Duty	300% 450%	350 300	1200	373VD132R[2]	**$24900.00**	V	—	373VD232R2#[2]	**$38978.00**	V	Yes

[1]27 amps max (SF 1.0).
[2]Heavy-Duty 800 amps max.

Reduced Voltage Starters
Solid State
CR373
ASTAT-CD Plus
Enclosed Combination
Mag-Break Type®

Product Number Selection Instructions

1. Product numbers with # are incomplete. For starter sizes J and above in 12/3R enclosures, add one product number digit (in place of #) for overload relay current range for bypass contactor. Overload relay not included in pricing; add appropriate List Price Adder from Overload Relay Table (page 2-55).

Example:
To specify a combination starter used with a 460 V motor rated at 30 hp and a full load current of 40 amps in a Type 12 enclosure, select base product number CR373JD242F2#.

Replace # with overload relay digit "E" from table, page 2-55. Complete product number is CR373JD242F2E.

List Price $3652.00
Overload Adder $95.00
Total List Price, GO-10A6 $3747.00

2. Product Notes
When operating motors at service factor loads, service factor amps must not exceed starter rating. Enclosed starters rated for 40°C ambient temperatures, derate rated controller current by 1.5%/°C above 40°C, up to a maximum of 50°C.

Three-Phase

						NEMA Type 1				NEMA Type 12/3R			
Volts	Current Rating Amps (AC-3)	Standard-Duty Heavy Duty	Max. Nominal Current for 30 sec.	Motor Horsepower	Circuit Interrupter Rating (Amps)	Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor	Product Number CR	List Price GO-10A6	Starter Size	Bypass Contactor
460V	14	Standard-Duty Heavy-Duty	300% 450%	7.5 7.5	15	373FD142D	**$2720.00**	F	—	373FD242D	**$2954.00**	F	No
460V	17	Standard-Duty Heavy-Duty	300% 450%	10 10	30	373GD142E	**$2770.00**	G	—	373GD242E	**$3023.00**	G	No
460V	22	Standard-Duty Heavy-Duty	300% 450%	15 15	30	373HD142E	**$2820.00**	H	—	373HD242E	**$3073.00**	H	No
460V	34	Standard-Duty Heavy-Duty	300% 450%	25 25	50	373ID142F	**$2905.00**	I	—	373ID242F2#	**$3325.00**	I	Yes
460V	34	Standard-Duty Heavy Duty	300% 400%	25 25	50	—	—	—	—	373ID242F[1]	**$3177.00**	I	No
460V	48	Standard-Duty Heavy-Duty	300% 450%	30 30	50	373JD142F	**$3394.00**	J	—	373JD242F2#	**$3652.00**	J	Yes
460V	63	Standard-Duty Heavy-Duty	300% 450%	40 40	100	373KD142G	**$3799.00**	K	—	373KD242G2#	**$4109.00**	K	Yes
460V	72	Standard-Duty Heavy-Duty	300% 450%	50 40	100	373LD142G	**$4650.00**	L	—	373LD242G2#	**$5488.00**	L	Yes
460V	105	Standard-Duty Heavy-Duty	300% 450%	75 60	150	373MD142H	**$5501.00**	M	—	373MD242H2#	**$6687.00**	M	Yes
460V	156	Standard-Duty Heavy-Duty	300% 450%	125 100	150	373ND142H	**$6966.00**	N	—	373ND242H2#	**$8429.00**	N	Yes
460V	156	Standard-Duty Heavy-Duty	300% 450%	125 100	225	373ND142J	**$7379.00**	N	—	373ND242J2#	**$8842.00**	N	Yes
460V	240	Standard-Duty Heavy-Duty	300% 450%	200 150	400	373QD142K	**$9498.00**	Q	—	373QD242K2#	**$11506.00**	Q	Yes
460V	315	Standard-Duty Heavy-Duty	300% 450%	250 200	400	373RD142K	**$10398.00**	R	—	373RD242K2#	**$13686.00**	R	Yes
460V	315	Standard-Duty Heavy-Duty	300% 450%	250 200	600	373RD142L	**$10889.00**	R	—	373RD242L2#	**$14177.00**	R	Yes
460V	370	Standard-Duty Heavy-Duty	300% 450%	300 250	600	373SD142L	**$11289.00**	S	—	373SD242L2#	**$15455.00**	S	Yes
460V	500	Standard-Duty Heavy-Duty	300% 450%	400 350	600	373TD142L	**$15700.00**	T	—	373TD242L2#	**$20705.00**	T	Yes
460V	630	Standard-Duty Heavy-Duty	300% 450%	500 400	700	373UD142M	**$18770.00**	U	—	373UD242M2#	**$25650.00**	U	Yes
460V	630	Standard-Duty Heavy-Duty	300% 450%	500 400	800	373UD142N	**$18770.00**	U	—	373UD242N2#	**$25650.00**	U	Yes
460V	850	Standard-Duty Heavy-Duty	300% 450%	700 600	1000	373VD142P[2]	**$24900.00**	V	—	373VD242P2#[2]	**$38978.00**	V	Yes
460V	850	Standard-Duty Heavy-Duty	300% 450%	700 600	1200	373VD142R[2]	**$24900.00**	V	—	373VD242R2#[2]	**$38978.00**	V	Yes

[1]27 amps max (SF 1.0).
[2]Heavy-Duty 800 amps max.

Reduced Voltage Starters
Solid State
CR370, CR371, CR373
ASTAT-CD Plus
Enclosed
Factory Installed Modifications

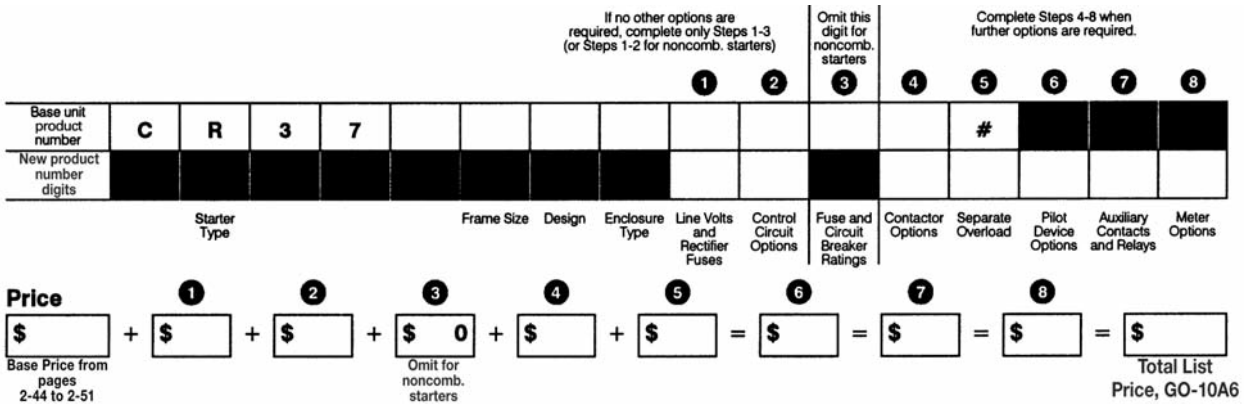
Use this section to select starters with factory-installed modifications not available in the general selection tables. It provides a step-by-step method for arriving at the product numbers and list prices for starters with those modifications.

First, select your basic enclosed starter from pages 2-44 to 2-51. Fill in the digits of the product number selected in the appropriate boxes of the base unit product number line below and enter the base list price in the appropriate price box. Then, to select additional modifications, follow the step-by-step instructions.

As instructed, transfer the resulting product number digits to the new product number digits line and the price component for your selection to the appropriate price boxes. (Make copies of this blank form for future use).

When you're done, your complete product number will be your base unit product number, with all digits from the new product number digits line replacing or adding to the original digits. Your total **List Price, GO-10A6,** will be the sum of the amounts in the boxes in the price line.

Product Number



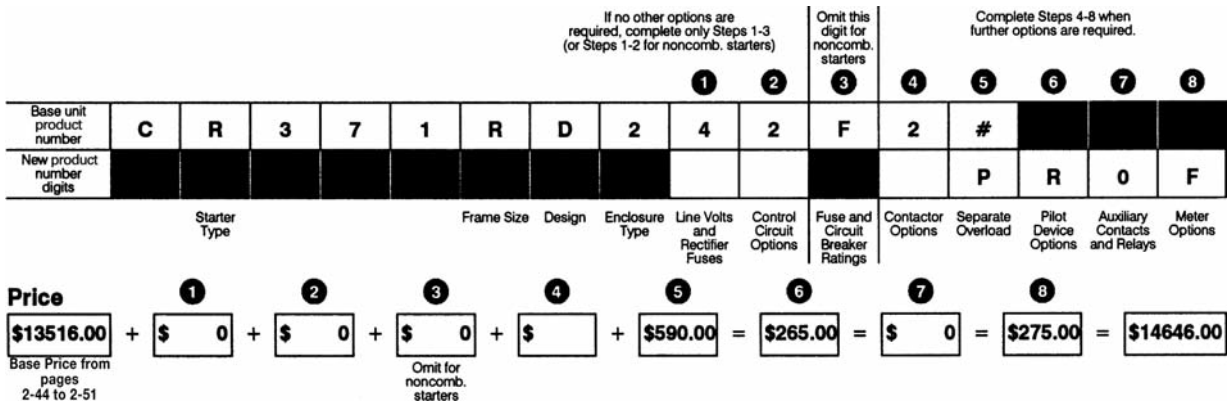
Example

ASTAT-CD Plus solid state reduced voltage starter for a 200 hp, 460 volt motor (229 motor FLA) for a conveyor. Fused disconnect combination starter in NEMA Type 12 enclosure with 120V secondary CPT, dual primary fuses, external elapsed time meter and START push button, H-O-A selector switch and red RUN light.

Select base unit from table on page 2-48. Enter product number CR371RD242F2# and **$13,516.00 Base Price** in spaces provided.

1. Select line volts and rectifier fuses. None required. Make no change to product number box ❶ and enter **$0** in price box ❶.
2. Select control circuit options. None required because CPT is standard on combination starters. Make no change to product number box ❷ and enter **$0** in price box ❷.
3. No change.
4. Select contactor options. None required because bypass contactor is included with unit selected. Make no change to product number box ❹ and enter **$0** in price box ❹.
5. Select overload relay. Enter P in product number box ❺ and **$590** in price box ❺.
6. Select pilot device options. Enter R in product number box ❻ and **$265** in price box ❻.
7. Select auxiliary contacts and relays. No additional contacts or relays required. Enter 0 in product number box ❼ and **$0** in price box ❼.
8. Select meter options. Enter F in product number box ❽ and **$275** in price box ❽.

Product Number



Assemble new, complete product number: CR371RD242F2PR0F. Total list price adders: **$14,646.00, List Price, GO-10A6.**

Reduced Voltage Starters
Solid State
CR370, CR371, CR373
ASTAT-CD Plus
Enclosed
Factory Installed Modifications

❶ Select line volts and rectifier fuses

Select line volts and, if desired, rectifier fuses by frame size. Transfer the product number digit to box ❶ in the "new product number digits" line and the price to box ❶ in the price line.

Rectifier Fuses	Frame size	Product No. Digit by Line Volts			List Price Adder, GO-10A6
		200/208 V	230 V	460 V	
No	F-V	2	3	4	—
Yes	F-I	6	7	8	**$260.00**
	J-K	6	7	8	**$320.00**
	L-M	6	7	8	**$475.00**
	N-Q	6	7	8	**$625.00**
	R-S	6	7	8	**$1260.00**
	T	6	7	8	**$1500.00**
	U	6	7	8	**$3000.00**
	V	6	7	8	**$3500.00**

❷ Select control circuit options

Select control circuit options by frame size. Transfer the product number digit to box ❷ in the "new product number digits" line and the price to box ❷ in the price line.

Frame Size	Product No. Digit (Replaces #)	Control Circuit	VA	List Price Adder, GO-10A6	
				Noncombination Starters	Combination Starters[1]
F-I	0	Control voltage from power lines L1 & L2 (240 V only)	—	—	**$(160.00)**
	1	120 V separate control	—	—	**$(160.00)**
	2	CPT standard capacity	50	**$160.00**	—
	3	CPT 100VA extra capacity	150	**$225.00**	**$65.00**
J-Q	0	Control voltage from power lines L1 & L2 (240 V only)	—	—	**$(190.00)**
	1	120 V separate control	—	—	**$(190.00)**
	2	CPT standard capacity	100	**$190.00**	—
	3	CPT 100VA extra capacity	250	**$285.00**	**$93.00**
R-T	0	Control voltage from power lines L1 & L2 (240 V only)	—	—	**$(270.00)**
	1	120 V separate control	—	—	**$(270.00)**
	2	CPT standard capacity	150	**$225.00**	—
	3	CPT 100VA extra capacity	250	**$285.00**	**$60.00**
U-V	0	Control voltage from power lines L1 & L2 (240 V only)	—	—	**$(200.00)**
	1	120 V separate control	—	—	**$(250.00)**
	2	CPT standard capacity	250	**$285.00**	—
	3	CPT 100VA extra capacity	375	**$355.00**	**$70.00**

[1]Standard capacity CPT is included in the base price for combination starters listed in the general selection tables on pages 2-44 to 2-51.

Product Number Selection Instructions: See page 2-52

❸ Fuse and circuit breaker ratings reference table

For reference only. For combination starters, the product number digit is included in the number brought forward from the general selection tables on pages 2-44 to 2-51. For noncombination starters, skip this step and omit the corresponding digit in your product number. If no further factory-installed modifications are desired, you may stop after this step and you will have built a valid and complete product number and list price for all Type 1 enclosed starters and all Type 12/3R enclosed starters in frame sizes F-I.

	Combination, Fusible Disconnect (CR371)		Combination, Mag-Break Circuit Breaker (CR373), Frame Sizes F-S		Combination, Mag-Break Circuit Breaker (CR373), Frame Sizes T-V	
Product No. Digit	Frame Size	Class J Fuse/Fuse Clip Rating (Amps)	Frame Size	Circuit Breaker Rating (Amps)	Frame Size	Circuit Breaker Rating (Amps)
A	F-V	unfused	—	—	—	—
B	F-I	30	—	—	—	—
C	H-J	60	F	7	—	—
D	J-M	100	F-G	15	—	—
E	M-N	200	G-I	30	—	—
F	M-R	400	I-J	50	—	—
G	R-S	600	J-M	100	—	—
H	—	—	M-N	150	—	—
J	—	—	N-Q	225	—	—
K	—	—	Q-S	400	T	500
L	—	—	R-S	600	T-U	600
M	—	—	—	—	U-V	700
N	—	—	—	—	U-V	800
P	—	—	—	—	U-V	1000
R	—	—	—	—	U-V	1200

❹ Select contactor options

Bypass contactors are required for enclosed starters with frame sizes J or larger in Type 12/3R enclosures and are included in the base price of frame size J starters or larger in Type 12 enclosure. Any option including a bypass contactor requires that you also select an overload relay from table ❺ below.

Select contactor options. Transfer the product number digit to box ❹ in the "new product number digits" line and the price for your frame size to box ❹ in the price line.

Product No. Digit	0	1	2		3	4		5	7		8	
Contactor(s)	None	Isolation	Bypass		DC Brake	Isolation+Bypass		Isolation+DC Brake	Maintenance Bypass w/Manual Switch		Isolation+ Maintenance Bypass w/Manual Switch	
Enclosure Type	1,12/3R	1, 12/3R	1	12/3R	1, 12/3R	1	12/3R	1, 12/3R	1[1]	12/3R	1[1]	12/3R
Frame Size	List Price Adder GO-10A6, by Frame Size	List Price Adder GO-10A6, by Frame Size	List Price Adder GO-10A6, by Frame Size		List Price Adder GO-10A6, by Frame Size	List Price Adder GO-10A6, by Frame Size		List Price Adder GO-10A6, by Frame Size	List Price Adder GO-10A6, by Frame Size		List Price Adder GO-10A6, by Frame Size	
F	-	$145.00	$145.00	$145.00	$145.00	$290.00	$290.00	$290.00	$545.00	$545.00	$690.00	$690.00
G	-	$164.00	$164.00	$164.00	$164.00	$328.00	$328.00	$328.00	$564.00	$563.00	$728.00	$728.00
H	-	$183.00	$183.00	$183.00	$183.00	$366.00	$366.00	$366.00	$583.00	$583.00	$766.00	$766.00
I	-	$183.00	$183.00	$183.00	$183.00	$366.00	$366.00	$366.00	$583.00	$400.00	$766.00	$766.00
J	-	$275.00	$275.00	*	$208.00	$550.00	$275.00	$483.00	$675.00	$400.00	$883.00	$675.00
K	-	$275.00	$325.00	*	$208.00	$600.00	$275.00	$483.00	$725.00	$400.00	$883.00	$675.00
L	-	$325.00	$363.00	*	$275.00	$688.00	$325.00	$600.00	$763.00	$400.00	$1000.00	$725.00
M	-	$416.00	$591.00	*	$275.00	$1007.00	$416.00	$691.00	$991.00	$400.00	$1091.00	$816.00
N	-	$738.00	$738.00	*	$325.00	$1476.00	$738.00	$1063.00	$1138.00	$400.00	$1463.00	$1138.00
Q	-	$1283.00	$1283.00	*	$1256.00	$2566.00	$1283.00	$2539.00	$1683.00	$400.00	$2939.00	$1683.00
R	-	$2363.00	$2363.00	*	$1256.00	$4726.00	$2363.00	$3619.00	$2763.00	$400.00	$4019.00	$2763.00
S	-	$3241.00	$3241.00	*	$1256.00	$6482.00	$3241.00	$4497.00	$3641.00	$400.00	$4897.00	$3641.00
T	-	$4700.00	$4700.00	*	$1762.00	$9400.00	$4700.00	$6462.00	$5100.00	$400.00	$6862.00	$5100.00
U	-	$6450.00	$6450.00	*	$3241.00	$12900.00	$6450.00	$9691.00	$6850.00	$400.00	$10091.00	$6850.00
V	-	$13428.00	$13428.00	*	$3241.00	NA	NA	NA	$13828.00	$400.00	NA	NA

*Bypass included in base price for Type 12/3R.
[1]Overload relay required in maintenance bypass mode, include overload relay in Step 5

Product Number Selection Instructions: See page 2-52

Reduced Voltage Starters
Solid State
CR370, CR371, CR373
ASTAT-CD Plus
Enclosed
Factory Installed Modifications

❺ Select Overload Relay

Required with bypass contactor. Add price shown to the list price for all base units on pages 2-44 to 2-51 that contain a "#" in their product number.

Select the overload relay from among those applicable to your frame size. Transfer the product number digit to box ❺ in "new product number digits" line and the price to box ❺ in the price line.

Product No. Digit	Motor Full-Load Ampere Range	Applicability by Size															List Price Adder, GO-10A6
		F	G	H	I	J	K	L	M	N	Q	R	S	T	U	V	
A	None																—
L	4-6.3	•															$55.00
M	5.5-8.5	•	•														$55.00
N	8.0-12	•	•														$55.00
P	10-16	•	•	•	•												$55.00
S	14.5-18		•	•	•												$55.00
T	17.4-22			•	•	•											$55.00
U	21-26				•	•											$55.00
V	25-32				•	•	•	•									$55.00
W	30-40				•												$55.00
E	30-43					•	•	•									$95.00
G	42-55					•	•	•	•								$95.00
H	54-65						•	•	•	•							$95.00
J	64-82							•	•	•							$95.00
L	78-97								•	•							$95.00
M	90-110								•								$95.00
M	90-120									•	•						$205.00
E	110-140									•	•						$205.00
F	140-190									•	•						$205.00
N	120-190										•	•	•				$590.00
P	175-280										•	•	•				$590.00
C	250-400											•	•	•			$830.00
D	315-500													•	•		$830.00
E	430-650													•	•		$830.00
F	500-820															•	$1200.00
G	800-1260															•	$1200.00
Z	—	Special (subsequent digits start with 0001)															—

❻ Select Pilot Device Options

Select pilot device options. Transfer the product number digit to box ❻ in the "new product number digits" line and the price to box ❻ in the price line.

Product No. Digit	START/STOP Push Button	H-O-A Selector Switch	Red Light	Green Light	List Price Adder, GO-10A6
A		None			—
B	•				$130.00
C		•			$115.00
D			RUN		$85.00
E				RUN	$85.00
F			RUN	OFF	$255.00
G	•		RUN		$215.00
H	•			RUN	$215.00
J		•	RUN		$200.00
K		•		RUN	$200.00
L	•		RUN	OFF	$255.00
M		•	RUN	OFF	$240.00
N	START only	•			$180.00
R	START only	•	RUN		$265.00
S	START only	•		OFF	$265.00
U	•	•			$245.00
V	•	•	RUN		$330.00
X	•	•		OFF	$330.00
Z	•	•	RUN	OFF	$415.00

❼ Select Auxiliary Contacts and Relays (1NO-1NC standard)

Select auxiliary contacts and relays. Transfer the product number digit to box ❼ in the "new product number digits" line and the price to box ❼ in the price line.

Product No. Digit	Extra Relays	3NO-1NC	2NO-2NC	1NO-3NC	List Price Adder, GO-10A6
0	None				—
1	1	•			$62.00
2	1		•		$62.00
3	1			•	$62.00
5[1]	2	•			$124.00
6[1]	2		•		$124.00
7[1]	2			•	$124.00

[1]Not available with bypass.

❽ Select Meter Options

Select meter options. Transfer the product number digit to box ❽ in the "new product number digits" line and the price to box ❽ in the price line.

Product No. Digit	1-Phase[2] Ammeter	1-Phase[2] Voltmeter	3-Phase Ammeter	3-Phase Voltmeter	Elapsed[2] Time Meter	List Price Adder, GO-10A6
A			None			—
B	•					$750.00
C		•				$750.00
D			•			$960.00
E				•		$960.00
F					•	$275.00
G	•	•				$1500.00
H	•			•		$1710.00
J	•				•	$1025.00
K		•	•			$1710.00
L		•			•	$1025.00
M			•	•		$1920.00
N			•		•	$1235.00
P				•	•	$1235.00
R	•	•			•	$1775.00
S	•			•	•	$1985.00
T		•	•		•	$1985.00
W			•	•	•	$2195.00

[2]Single phase ammeter, voltmeter and elapsed time meter function is included as a digital readout on the ASTAT display. For external separate analog meter, select product number digit shown in the table above.

Reduced Voltage Starters
Solid State
QC2
ASTAT-CD Plus
Technical Specifications

General Specifications

Volts Rating	3ph AC Systems - Up to 500V
Frequency	50/60 - Hz - Control range 0f 45-65 Hz

Control Specifications

Control System	Digital system with microcontroller Starting ramp with progressive increase in voltage and current limitation
Initial Voltage (Pedestal)	% - 30-95 U_n
Initial (Starting) Torque	% - 10-90 Mdirect start
Kick Start	% - 95 U_n (90% $M_{direct\ start}$), adjustable 0 to 999 ms
Motor Unit Ratio (N)	0.4 to 1.2
Current Limit (Starting)	Adjustable from 1 to 4.5 (I_r/I_n) max. 7.0 I_n
Acceleration Ramp Time	s - 1 to 99 (types: standard or linear ramp up)
Energy Savings	Output voltage reduction according to power factor
Override	Fixed output voltage permanently equal to supply voltage
Bypass	Direct control of a bypass contactor
Brake Time by Ramp	s - 1 to 120 (1 to 99 in secondary ramp) adjustable independently of starting ramp time (types: standard, pump control or linear ramp down)
DC Braking	0 to 99 s; 0.0 to 2.5 x I_n
Slow Speed	Direct torque: 7% or 14% of nominal speed; reverse torque: 20% of nominal speed
Retry	0 to 4 attempts, and 1 to 99 sec. retry time
Monitoring	Motor current, line voltage (L1 voltage is monitored to provide this protection), power, power factor and elapsed time

Running

External Control	Start-Stop
Acceleration Phase	Adjustable time
Permanent Phase	Energy savings/Override choice
Stop Phase	Power cut-off/Ramp/DC braking/Pump control

Inputs/Outputs

Inputs	4 digital optocoupled. Two fixed (Start, Stop), and 2 programmable (I3, I4) 1 Analog 0-5VDC for Tachogenerator feedback input
Outputs	3 programmable relays (1r, 2r, 3r) 1 Analog 0-10VDC output for current metering

Protections

Current Limit	Adjustable from 1 to 4.5 (I_r/I_n) max. 7.0 I_n
Overload	IEC class 10 and 20; NEMA class 10, 20 and 30 all selectable
Cool-down Time after Overload Trip	s - 300 for reset
Loss on Input Phase	s - Trip at 3
Thyristor Short Circuit	ms - Trip at 200
Heatsink Overheating	ms - Trip at 200
Motor Thermistor	ms - Trip at 200 if thermistor impedance > response value
Loss on Output Phase	s - Trip at 3
Stalled Rotor	ms - Trip at 200
Supply Frequency Error	Hz - If f < 45 or f > 65, will not start
Overcurrent	100 to 150% I_n; trip time adjustable from 0 to 99 sec.
Undercurrent	0 to 99% I_n; trip time adjustable from 0 to 99 sec.
Overvoltage	100 to 130% U_n; trip time adjustable from 0 to 99 sec. (L1 voltage is monitored to provide this protection.)
Undervoltage	0 to 50% U_n; trip time adjustable from 0 to 99 sec. (L1 voltage is monitored to provide this protection.)
Error (CPU)	ms - 60
Memory	4 former errors
Long Start Time	s - 2 x ta (ta = acceleration ramp time)
Long Slow Speed Time	s - 120

Environmental Conditions

Operation Temperature	°C - 0 to +55 (derate output current by 1.5%/°C above 40°C)
Relative Humidity	% - 95% without condensation
Maximum Altitude	m - 3000 (derate output current by 1%/100m above 1000m)
Mounting Position	Vertical
Protection Degree	IP00, UL Open

Standards

CE, cUL, UL	CE Conforming IEC 947-4-2; UL, cUL conforming to UL508, UL File E 153901 (open), 100757 (enclosed)
Conducted & Radiated emissions	Conforming IEC 947-4-2, Class A
Electrostatic discharges	Conforming to IEC 1000-4-2, level 3
Radioelectric interference	Conforming to IEC 1000-4-6, level 3 and to IEC 1000-4-3, level 3
Immunity to fast transients	Conforming to IEC 1000-4-4, level 3
Immunity to Surge Voltage	Conforming to IEC 1000-4-5, level 3

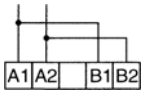
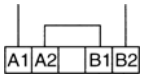
L1 voltage is monitored to provide this protection.

ASTAT-CD Losses

Frame	Control Circuit (watts)	Power Circuit (watts)	Bypass Contactor Inrush (va)	Bypass Contactor Holding (va)
F	15	41	45	6
G	15	50	45	6
H	15	59	45	6
I	15	92	88	9
J	47	131	88	9
K	47	189	88	6
L	47	210	191	17
M	47	277	191	17
N	67	524	191	17
Q	67	834	350	20
R	93	970	350	20
S	93	1043	350	20
T	93	1721	425	20
U	183	1832	750	25
V	183	2377	750	25
X	183	3310	1600	210

Control circuit losses includes cooling fan power
Bypass contactor used with selected enclosed forms

Power I/O Terminals

Terminal	Function	Description
1L1, 3L2, 5L3	Mains Input	3ph input voltage, 200 - 480 Volts QC2xxx type
2T1, 4T2, 6T3	Motor Output	Output terminals to 3ph AC motor
A1, A2, B1, B2	Input Control Voltage	110/120V AC, +10%, −15%  220/240V AC, +10%, −15% 

Digital Inputs

Terminal	Function	Description
57	Common for digital inputs	This is a common terminal for digital input terminals specified below.
1	Run	Run order. Command signal may be provided by one NO dry momentary contact to terminals 1 and 57.
2	Stop	Stop order. Command signal may be provided by one NC dry momentary contact to terminals 2 and 57.
		Note: Run/Stop permanent command allows linking 1-57 and using one dry NO contact to 2-57 terminals.
3	Programmable input I3	These two inputs are programmable. Can be assigned to the following internal functions
4	Programmable input I4	soft stop, pump control, kick start, override, DC brake, slow speed control, reverse slow speed, local/remote control, linear ramp, dual ramp selection, bypass function
		Command signal should be provided by one NC dry contact to terminals 57-3 or terminals 57-4. By switching this contact ON/OFF it is possible to enable or disable the assigned function.

Digital Outputs

Terminal	Function	Description
11, 12, 14	Programmable relay 1r	11-12 = NC, 11-14 = N.O. dry contacts. This relay can be assigned to several internal output functions. As default assigned to function RUN.
23, 24	Programmable relay 2r	23-24 = N.O. dry contact. This relay can be assigned to several internal output functions. As default assigned to function EOR.
33, 34	Programmable relay 3r	33-34 = N.O. dry contact. This relay can be assigned to several internal output functions. As default assigned to function DC BRAKE.
		Common for all relay output contacts — Maximum usage voltage: 380VAC (B300-UL); Thermal current 8A; AC-15 use: 220V/3A, 380V/1A; DC-15 use: 30V max/3.5A

Analog I/O

Terminal	Function	Description
8	Analog input common (−)	This is a common terminal for the analog input terminal number 7 and analog output terminal number 9.
7	TG feedback input (+)	0-5V analog input for speed feedback. It should be provided by a DC tacho-generator coupled to the motor. This speed feedback signal is required when the "linear ramp" function is used.
9	Current Output (+)	0-10V DC analog Output for current measurement purpose (1 x I_r = 2V DC output) Load Impedance 10KΩ or higher

Motor Thermistor Terminals

Terminal	Function	Description
5, 6	Motor thermistor input	This input allows a motor thermistor with a response value from 2.8 to 3.2KΩ, and a reset value from 0.75 to 1KΩ to control motor temperature. When the motor thermistor is not used, a link must be used between terminals 5-6.

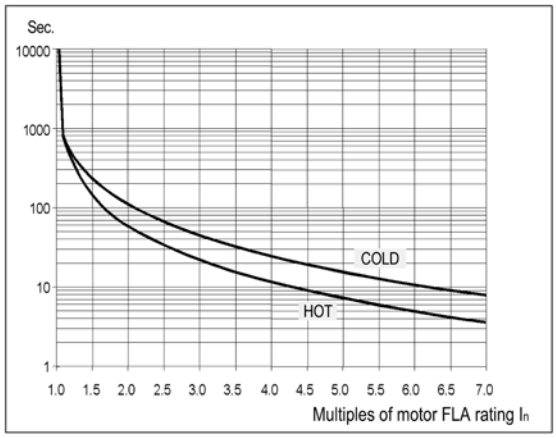
Communications

Terminal	Function	Description
TD, RD, SG	Tx, Rx, Gr data	RS232C, 3 wires, half duplex. Maximum cable length 3 meters (10 feet) Asynchronous data transmission, 9600 Bauds, 1 bit start, 8 bits data, 2 bits stop, no parity.

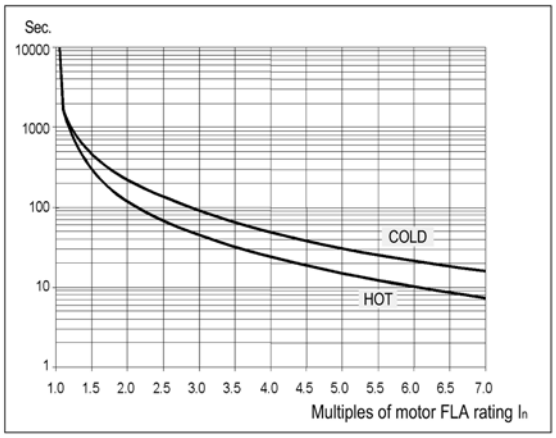
Abbreviations

I	Actual measured motor current
I_m	Maximum starting current desired
I_n	Nominal motor nameplate FLA
I_r	ASTAT rated nameplate FLA
L	Current limit for starting I_m/I_r
L_{max}	Current limit for starting I_m/I_r
Mdirect start	Full voltage starting torque
N	L_n/L_r
SF	Service factor
U_n	Full line voltage

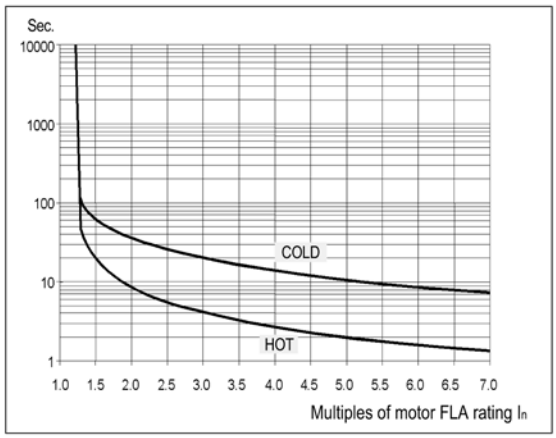
IEC Class 10



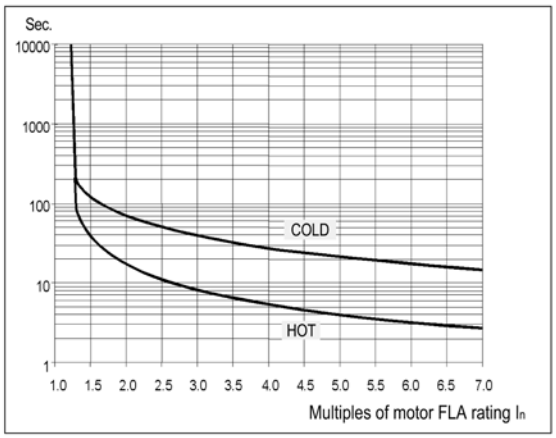
IEC Class 20



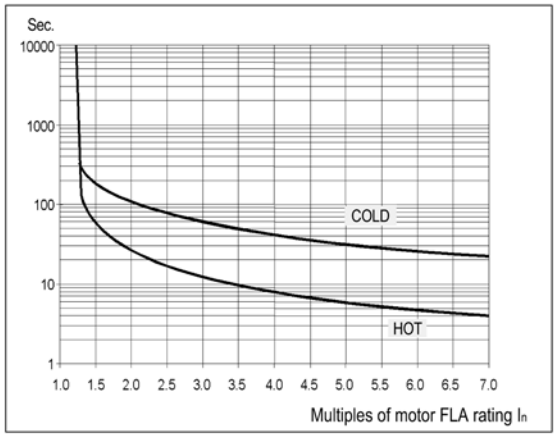
NEMA 10



NEMA 20



NEMA 30



Thermal memory:
If the control voltage is not removed, the unit has a cool down characteristic. The time for cool down is 300 sec. after the overload trip. If the control voltage is removed after tripping, you must wait at least 2 minutes before the unit can be restarted.

Operations per hour:
Using a cycle T, with starting time of t1, running time of T-2t1 at rated current and OFF time of t1 sec. (minimum), the ASTAT-CD Plus allows the following operations per hour.

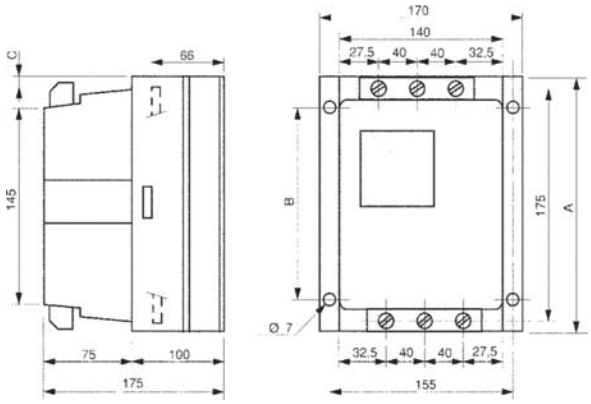
Starting Current	Operations / Hour. Starting time t1= 10sec.	Operations / Hour Starting time t1=20 sec.
2 Ir	180	90
3 Ir	160	60
4 Ir	30	10

The ASTAT-CD Plus allows the user to select motor protection according to IEC Class 10, 20 and NEMA 10, 20 or 30, selectable by "o" -overload- parameter.

Open
Outlines, Dimensions (in. / mm) and Weights lbs. (kg)
(For Estimating Only)

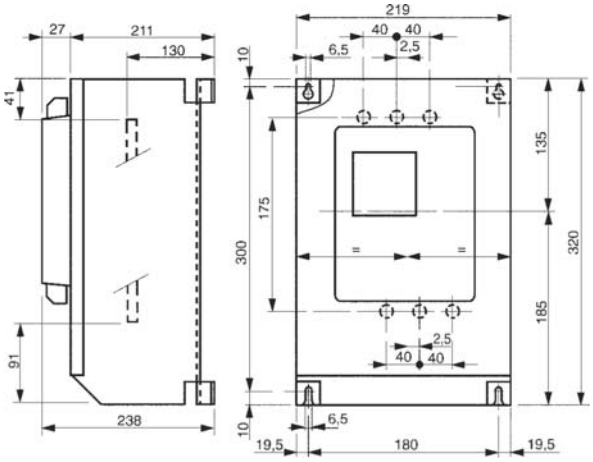
Open Starters

Product Number	Dimension A	Dimension B	Dimension C	Dimension D	Weight
QC2FDP	7.88 (200)	6.30 (160)	.24 (6)	.89 (22.5)	9.48 (4.3)
QC2GDP	7.88 (200)	6.30 (160)	.24 (6)	.89 (22.5)	9.48 (4.3)
QC2HDP	7.88 (200)	6.30 (160)	.24 (6)	.89 (22.5)	9.48 (4.3)
QC2IDP	9.85 (250)	7.88 (200)	1.22 (31)	1.67 (42.5)	10.14 (4.6)



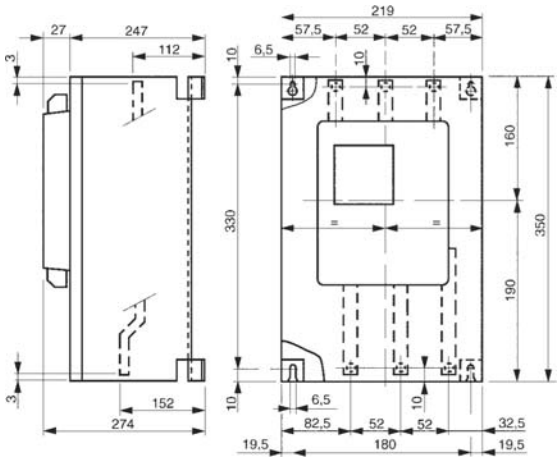
Open Starters

Product Number	Dimension A	Dimension B	Weight
QC2JDP	1.58 (40)	.10 (2.5)	27.56 (12.5)
QC2KDP	1.58 (40)	.10 (2.5)	27.56 (12.5)



Open Starters

Product Number	Weight
QC2LDP	37.48 (17)
QC2MDP	37.48 (17)

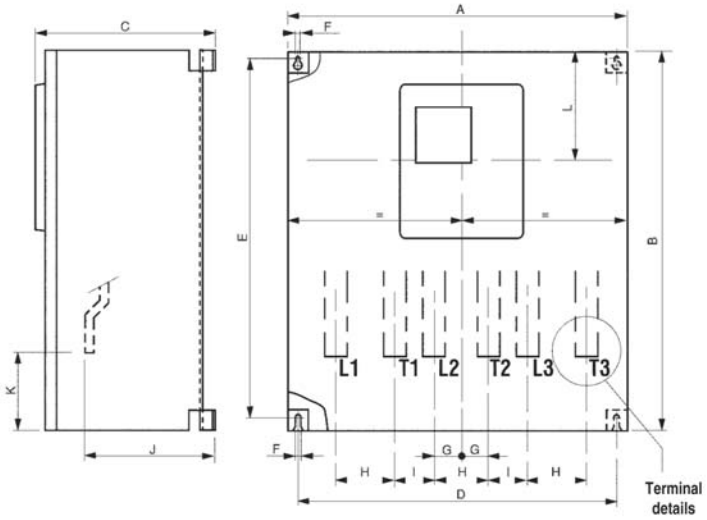


Open Starters

Product Number	Dimension A	Dimension B	Dimension C	Dimension D	Dimension E	Dimension F	Dimension G	Dimension H	Weight
QC2NDP	20.08 (510)	19.30 (490)	12.00 (305)	18.11 (460)	18.31 (465)	.35 (9)	2.09 (53)	4.18 (106)	99.20 (45)
QC2QDP	20.08 (510)	19.30 (490)	12.00 (305)	18.11 (460)	18.31 (465)	.35 (9)	2.09 (53)	4.18 (106)	99.20 (45)
QC2RDP	21.66 (550)	21.26 (540)	12.48 (317)	18.90 (480)	19.49 (495)	.35 (9)	2.33 (59)	4.65 (118)	121.25 (55)
QC2SDP	21.66 (550)	21.26 (540)	12.48 (317)	18.90 (480)	19.49 (495)	.35 (9)	2.33 (59)	4.65 (118)	121.25 (55)
QC2TDP	23.23 (590)	26.97 (685)	12.48 (317)	20.47 (520)	25.20 (640)	.35 (9)	2.32 (59)	4.65 (118)	176 (80)
QC2UDP	31.10 (790)	33.46 (850)	15.83 (402)	27.56 (700)	31.70 (805)	.43 (11)	2.36 (60)	4.72 (120)	231 (105)
QC2VDP	31.10 (790)	33.46 (850)	15.83 (402)	27.56 (700)	31.70 (805)	.43 (11)	2.36 (60)	4.72 (120)	265 (120)
QC2XDP	31.89 (810)	39.37 (1000)	16.02 (407)	28.35 (720)	37.60 (955)	.43 (11)	2.76 (70)	5.51 (140)	330 (150)

Open Starters

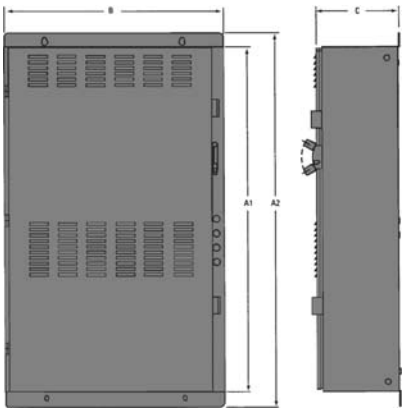
Product Number	Dimension J	Dimension K	Dimension L	Dimension M	Dimension N	Dimension O	Weight
QC2NDP	9.45 (240)	1.35 (34)	.50 (12.5)	3.86 (98)	8.43 (214)	2.12 (54)	99.20 (45)
QC2QDP	9.45 (240)	1.35 (34)	.50 (12.5)	3.86 (98)	8.43 (214)	2.12 (54)	99.20 (45)
QC2RDP	9.64 (245)	0.3 (8)	.89 (22.5)	3.47 (88)	8.82 (224)	2.12 (54)	121.25 (55)
QC2SDP	9.64 (245)	0.3 (8)	.89 (22.5)	3.47 (88)	8.82 (224)	2.12 (54)	121.25 (55)
QC2TDP	10.63 (270)	3.94 (100)	.89 (22.5)	3.47 (88)	9.60 (244)	2.54 (64.5)	176 (80)
QC2UDP	13.86 (352)	4.72 (120)	.89 (22.5)	3.74 (95)	13.15 (334)	4.72 (120)	231 (105)
QC2VDP	13.86 (352)	4.72 (120)	.89 (22.5)	3.74 (95)	13.15 (334)	4.72 (120)	265 (120)
QC2XDP	14.05 (357)	4.72 (120)	.89 (22.5)	3.74 (95)	13.54 (344)	4.33 (110)	330 (150)



Outlines, Dimensions (in. / mm) and Weights lbs. (kg) (For Estimating Only)

NEMA Type 1

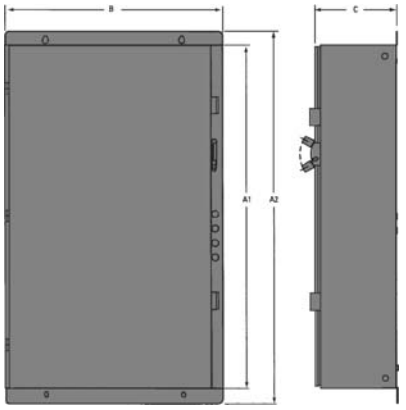
Product Number	Dimension A1	Dimension A2	Dimension B	Dimension C	Weight
CR370FD121	22.6 (574)	-	11.5 (292)	8.9 (226)	45 (20.4)
CR370GD121	22.6 (574)	-	11.5 (292)	8.9 (226)	45 (20.4)
CR370HD121	22.6 (574)	-	11.5 (292)	8.9 (226)	45 (20.4)
CR370ID121[1]	22.6 (574)	-	11.5 (292)	8.9 (226)	45 (20.4)
CR370JD121	26.6 (676)	-	15.1 (384)	10.9 (277)	91 (41.3)
CR370KD121	26.6 (676)	-	15.1 (384)	10.9 (277)	91 (41.3)
CR370LD121	36.6 (930)	-	18.0 (457)	12.3 (312)	150 (68.0)
CR370MD121	36.6 (930)	-	18.0 (457)	12.3 (312)	150 (68.0)
CR370ND121	43.7 (1110)	48.7 (1237)	31.2 (792)	15.0 381)	295 (134.0)
CR370QD121	46.3 (1176)	51.3 (1303)	26.3 (668)	15.0 (381)	345 (156.5)
CR370RD121	46.3 (1176)	51.3 (1303)	26.3 (668)	15.0 (381)	375 (170.0)
CR370SD121	46.3 (1176)	51.3 (1303)	26.3 (668)	15.0 (381)	375 (170.0)
CR370TD121[4]	78 (1981)	-	44 (1118)	24.5 (622)	900 (409.0)
CR370UD121[4]	90 (2286)	-	56 (1423)	26.5 (673)	1300 (5900)
CR370VD121[4]	90 (2286)	-	56 (1423)	26.5 (673)	1400 (636.0)



NEMA Type 1

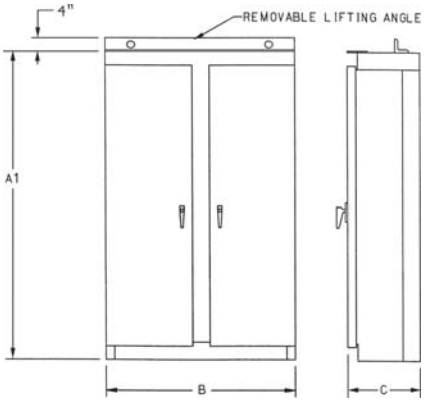
NEMA Type 12/3R

Product Number	Dimension A1	Dimension A2	Dimension B	Dimension C	Weight
CR370FD221	22.6 (574)	25.6 (650)	11.5 (292)	8.9 (226)	58 (26.3)
CR370GD221	22.6 (574)	25.6 (650)	11.5 (292)	8.9 (226)	58 (26.3)
CR370HD221	22.6 (574)	25.6 (650)	11.5 (292)	8.9 (226)	58 (26.3)
CR370ID2212 #	22.6 (574)	25.6 (650)	11.5 (292)	8.9 (226)	58 (26.3)
CR370JD2212#	26.6 (676)	30.0 (762)	15.1 (384)	10.9 (277)	100 (45.4)
CR370KD2212#	26.6 (676)	30.0 (762)	15.1 (384)	10.9 (277)	100 (45.4)
CR370LD2212#	36.6 (930)	40.0 (1016)	18.0 (457)	12.3 (312)	160 (72.6)
CR370MD2212#	36.6 (930)	40.0 (1016)	18.0 (457)	12.3 (312)	160 (72.6)
CR370ND2212#[2]	43.7 (1110)	48.7 (1237)	31.2 (792)	15.0 (381)	315 (143.0)
CR370QD2212#[3]	46.3 (1176)	51.3 (1303)	26.3 (668)	15.0 (381)	390 (177.0)
CR370RD2212#[3]	46.3 (1176)	51.3 (1303)	26.3 (668)	15.0 (381)	450 (204.0)
CR370SD2212#[3]	46.3 (1176)	51.3 (1303)	26.3 (668)	15.0 (381)	450 (204.0)
CR370TD2212#[4]	78 (1981)	-	44 (1118)	24.5 (622)	900 (409.0)
CR370UD2212#[4]	90 (2286)	-	56 (1423)	26.5 (673)	1300 (590.0)
CR370VD2212#[4]	90 (2286)	-	56 (1423)	26.5 (673)	1400 (636.0)



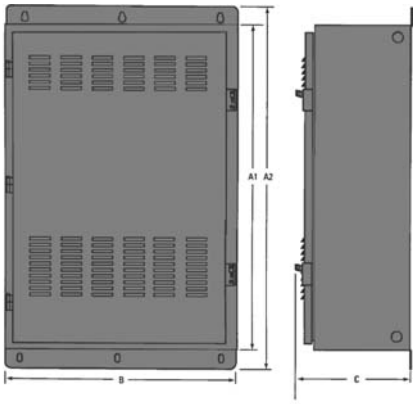
NEMA Type 12/3R

[1]Use J or K size enclosure if isolation contactor is included.
[2]For 2 contactors use combination enclosure on page 2-63.
[3]Only for ASTAT without contactors. Use combination enclosure on page 2-63 if contactors are included.
[4]Use bottom outline for enclosure with two doors.
A1 = Box height (excluding flanges)
A2 = Overall height (including flanges)
B = Width
C = Depth



A1 = Box Height (excluding flanges);
A2 = Overall Height (including flanges);
B = Width; C = Depth

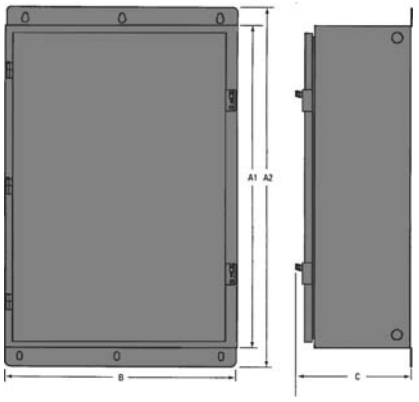
Reduced Voltage Starters
Solid State
CR370, CR371, CR373
ASTAT-CD Plus
Enclosed Combination
Outlines, Dimensions (in. / mm) and Weights lbs. (kg) (For Estimating Only)



NEMA Type 1

NEMA Type 1

Product Number	Dimension A1	Dimension A2	Dimension B	Dimension C	Weight
CR371FD122B	26.8 (681)	30.0 (762)	20.2 (513)	9.3 (236)	96 (44)
CR371GD122B	26.8 (681)	30.0 (762)	20.2 (513)	9.3 (236)	96 (44)
CR371HD122C	26.8 (681)	30.0 (762)	20.2 (513)	9.3 (236)	96 (44)
CR371ID122C	26.8 (681)	30.0 (762)	20.2 (513)	9.3 (236)	96 (44)
CR371JD122D	38.0 (965)	43.1 (1095)	26.0 (660)	11.6 (295)	173 (78)
CR371KD122D	38.0 (965)	43.1 (1095)	26.0 (660)	11.6 (295)	173 (78)
CR371LD122D	38 .3 (973)	43.6 (1107)	31.3 (795)	12.0 (305)	207 (94)
CR371MD122E	38 .3 (973)	43.6 (1107)	31.3 (795)	12.0 (305)	207 (94)
CR371ND122E	60.3 (1532)	65.3 (1659)	38.3 (973)	15.0 (381)	440 (200)
CR371QD122F	60.3 (1532)	65.3 (1659)	38.3 (973)	15.0 (381)	440 (200)
CR371RD122G	60.3 (1532)	65.3 (1659)	38.3 (973)	15.0 (381)	485 (220)
CR371SD122G	60.3 (1532)	65.3 (1659)	38.3 (973)	15.0 (381)	500 (227)
CR373TD122L[1]	78 (1981)	-	44 (1118)	24.5 (622)	1000 (454.0)
CR373UD122M[1]	90 (2286)	-	56 (1423)	26.5 (673)	1400 (636.0)
CR373VD122N[1]	90 (2286)	-	56 (1423)	26.5 (673)	1500 (682.0)

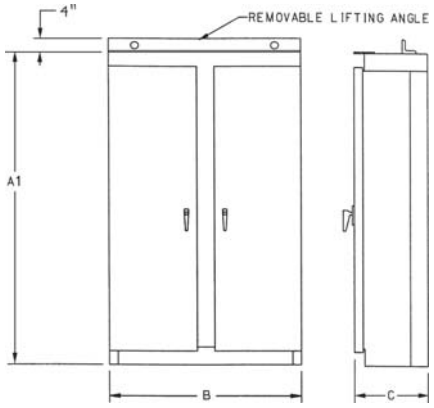


NEMA Type 12/3R

NEMA Type 12/3R

Product Number	Dimension A1	Dimension A2	Dimension B	Dimension C	Weight
CR371FD222B	26.8 (681)	30.0 (762)	20.2 (513)	9.3 (236)	96 (44)
CR371GD222B	26.8 (681)	30.0 (762)	20.2 (513)	9.3 (236)	96 (44)
CR371HD222C	26.8 (681)	30.0 (762)	20.2 (513)	9.3 (236)	96 (44)
CR371ID232C2#	26.8 (681)	30.0 (762)	20.2 (513)	9.3 (236)	96 (44)
CR371JD222D2#	38.0 (965)	43.1 (1095)	26.0 (660)	11.6 (295)	180 (82)
CR371KD222D2#	38.0 (965)	43.1 (1095)	26.0 (660)	11.6 (295)	180 (82)
CR371LD222D2#	38.3 (973)	43.6 (1107)	31.3 (795)	12.0 (305)	220 (100)
CR371MD222E2#	38.3 (973)	43.6 (1107)	31.3 (795)	12.0 (305)	220 (100)
CR371ND222E2#	60.3 (1532)	65.3 (1659)	38.3 (973)	15.0 (381)	480 (218)
CR371QD222F2#	60.3 (1532)	65.3 (1659)	38.3 (973)	15.0 (381)	480 (218)
CR371RD222G2#	60.3 (1532)	65.3 (1659)	38.3 (973)	15.0 (381)	536 (243)
CR371SD222G2#	60.3 (1532)	65.3 (1659)	38.3 (973)	15.0 (381)	550 (250)
CR373TD222L2#[1]	78 (1981)	-	44 (1118)	24.5 (622)	1000 (454.0)
CR373UD222M2#[1]	90 (2286)	-	56 (1423)	26.5 (673)	1400 (636.0
CR373VD222N2#[1]	90 (2286)	-	56 (1423)	26.5 (673)	1500 (682.0)

[1]Use bottom outline for enclosure with two doors.
A1 = Box height (excluding flanges)
A2 = Overall height (including flanges)
B = width
C = Depth



A1 = Box Height (excluding flanges);
A2 = Overall Height (including flanges);
B = Width; C = Depth

Reduced Voltage Starters Electromechanical

CR331, CR332, CR330

Reduced Voltage Starters

Reduced Voltage Starters

A reduced voltage starter reduces inrush line current and/or starting torque to a polyphase squirrel-cage induction motor. This is done by either reducing voltage applied to the motor during starting or by using only part of the motor windings during starting. GE can supply the three popular types of reduced voltage starters, each designed for specific applications requiring this type starting autotransformer, wye-delta and part-winding starters.

Typical CR331 Starter for Wall Mounting

CR331 Size 6 Starter

CR332 NEMA Size 6
Combination Wye-Delta Motor Starter

Reduced Voltage Starters
Electromechanical

CR331

Autotransformer Starters
800 Horsepower Max.@ 230V
1500 Horsepower Max. @ 600V
NEMA Sizes 2-9
Three-Phase
50/60 Hz

Typical CR331 Starter for Wall Mounting

Description

These starters in a NEMA Type 1 enclosure consist of a three-leg autotransformer, three contactors (START, RUN, WYE), a pneumatic timer, a three-phase block overload relay, and an autotransformer overtemperature device.

Application

These automatic, closed-transition starters are for use with squirrel-cage motors where reduced starting currents or limited starting torques are required. Overload protection is provided.

Common uses are for blowers, compressors, conveyors, and pump motors.

Standard Features

—**Closed Transition**: no interruption in line current during transition
—**Three-Leg Autotransformer**: for balanced starting currents and minimum line disturbance. Starting current and torque adjustment easily made by changing autotransformer taps.
—**Accurate Adjustment**: pneumatic timing relay permits easy adjustment of starting time on reduced voltage.
—**Flexibility**: complete line of factory-installed modifications available.
—**High Torque Efficiency:** provides maximum torque per line Ampere.

Starting Characteristics

Voltage Tap % Full Voltage	Starting Torque % Normal	Line Current % Locked Rotor
100%	100%	100%
80%	64%	64%
65%	42%	42%
50%	25%	25%

Product Number Selection Instructions: See page 2-66

Reduced Voltage Starters Electromechanical

CR331

Autotransformer Starters
800 Horsepower Max.@ 230V
1500 Horsepower Max. @ 600V
NEMA Sizes 2-9
Three-Phase
50/60 Hz

CR331 Size 6 Starter

Product Number Selection Instructions

NEMA Sizes 2-5

1. Specify starters by complete product number.
Example: CR331EG411 at **$4314.00, GO-10G1**.

2. Select and specify overload heaters necessary on the basis of motor's full-load current.

3. Order starters not listed or special features by complete description using a listed product number as a reference whenever possible and include motor ratings and horsepower. Example: Similar to CR331EG411 except with a control transformer and START-STOP push button at total **List Price $5082.00, GO-10G1**. Starter to control a 50-horsepower, 460-Volt, 60-Hertz motor having a full-load current of 68 Amperes.

NEMA Sizes 6-9

1. Specify: Starter type (CR331) — NEMA Size — Type enclosure — Control circuit voltage — Short-circuit protective device — Line voltage

2. Motor data: Motor type — Horsepower — Voltage — Phase — Number of wires — Frequency — Temperature-rise — Full-load current — Service factor

3. Modifications: (See page 2-77 and 2-78)

4. Ordering Example:
One CR331HB311 NEMA Size 6, nonreversing autotransformer starter in NEMA Type 1 enclosure. For a squirrel-cage induction motor rated 200-horsepower, 230-Volts, three-phase, 60-Hertz, 40°C rise, 500-Amperes full-load current, 3000-Amperes locked-rotor current.
Total **List Price $24657.00, GO-10G1**.

Additional Forms

1. Combination Starters
Combination starters with fusible or nonfusible disconnect switch, or circuit breaker are also available. See page 2-78, (Tables 1 and 2) for list price additions.

2. 50-Hertz Starters
50-Hertz starters are available. Contact nearest GE Energy Sales Office for proper selection and pricing of 380 Volt 50 Hertz forms.

3. Special Enclosures
Starters are also available in NEMA Type 3R, 4 and 12 enclosures. See page 2-78 (Table 3) for list price adders.

4. Product Notes
Motor full-load current should not exceed continuous ampere rating of starter.

Reference Publications

Instructions	GEH-4899 (Sizes 2-5)
Instructions	GEH-4863 (Sizes 6-9)

CR331

Autotransformer Starters

Three heaters should be ordered as separate items.

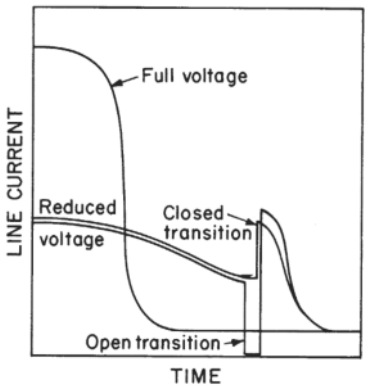
Three-Phase NEMA Type 1

NEMA Size	Motor Voltage (60 Hz)	Horsepower	Product Number	List Price GO-10G1
2	200-208	10	CR331DA111	$3402.00
3	200-208	25	CR331ED111	$4170.00
4	200-208	40	CR331FF111	$7758.00
5	200-208	75	CR331GJ111	$12315.00
6	200-208	150	CR331HA111	$23805.00
2	230-240	15	CR331DB311	$3402.00
3	230-240	30	CR331EE311	$4170.00
4	230-240	50	CR331FG311	$7758.00
5	230-240	75	CR331GJ311	$12315.00
5	230-240	100	CR331GK311	$13281.00
6	230-240	125	CR331HT311	$22833.00
6	230-240	150	CR331HA311	$23805.00
6	230-240	200	CR331HB311	$24657.00
7[1]	230-240	250	CR331JC311	$37665.00
7[1]	230-240	300	CR331JD311	$38943.00
8[1]	230-240	400	CR331KF311	$51519.00
8[1]	230-240	450	CR331KG311	$54879.00
9[1]	230-240	500	CR331LH311	$72351.00
9[1]	230-240	600	CR331LJ311	$74721.00
9[1]	230-240	800	CR331LL311	$80163.00
2	460-480	15	CR331DB411	$3402.00
2	460-480	25	CR331DD411	$3402.00
3	460-480	30	CR331EE411	$4170.00
3	460-480	50	CR331EG411	$4314.00
4	460-480	75	CR331FJ411	$7902.00
4	460-480	100	CR331FK411	$7902.00
5	460-480	150	CR331GM411	$12777.00
5	460-480	200	CR331GN411	$14445.00
6	460-480	250	CR331HC411	$23997.00
6	460-480	300	CR331HD411	$25389.00
6	460-480	400	CR331HF411	$26121.00
7[1]	460-480	500	CR331JH411	$40773.00
7[1]	460-480	600	CR331JJ411	$41745.00
8[1]	460-480	700	CR331KK411	$56535.00
8[1]	460-480	800	CR331KL411	$58539.00
8[1]	460-480	900	CR331KM411	$60645.00
9[1]	460-480	1000	CR331LN411	$81471.00
9[1]	460-480	1250	CR331LP411	$84327.00
9[1]	460-480	1500	CR331LR411	$89409.00
2	575-600	15	CR331DB511	$3402.00
2	575-600	25	CR331DD511	$3402.00
3	575-600	30	CR331EE511	$4170.00
3	575-600	50	CR331EG511	$4314.00
4	575-600	75	CR331FJ511	$7902.00
4	575-600	100	CR331FK511	$7902.00
5	575-600	150	CR331GM511	$12777.00
5	575-600	200	CR331GN511	$14445.00
6	575-600	250	CR331HC511	$23997.00
6	575-600	300	CR331HD511	$25389.00
6	575-600	400	CR331HF511	$26121.00
7[1]	575-600	500	CR331JH511	$40773.00
7[1]	575-600	600	CR331JJ511	$41745.00
8[1]	575-600	700	CR331KK511	$56535.00
8[1]	575-600	800	CR331KL511	$58539.00
8[1]	575-600	900	CR331KM511	$60645.00
9[1]	575-600	1000	CR331LN511	$81471.00
9[1]	575-600	1250	CR331LP511	$84327.00
9[1]	575-600	1500	CR331LR511	$89409.00

[1]Size 7 starters and higher are not UL listed. UL508A is available as a factory quoted option.

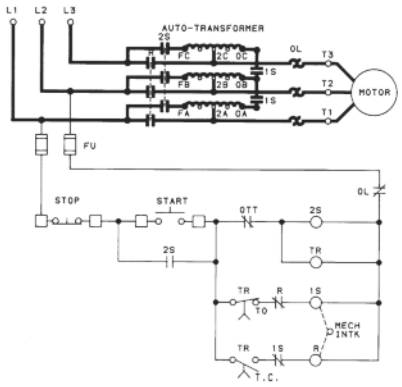
Diagram Legend

□—Terminal Board
1S—Wye Contactor
2S—Start Contactor
AT—Autotransformer
CR—Control Relay
CT—Current Transformer
FU—Fuse
OL—Thermal Overload Relay (Motor)
OTT—Over Temperature Thermostat
R—Run Contactor
TC—Time Closing Contact
TO—Time Opening Contact
TR—Pneumatic Timer

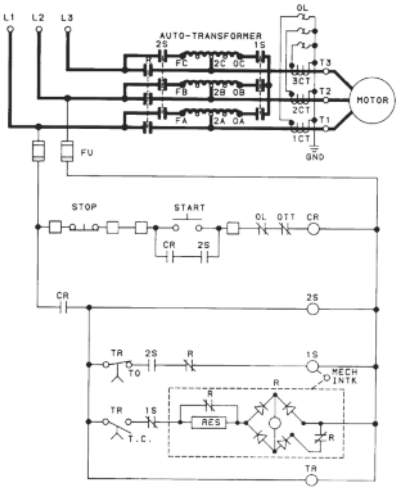


Starting Current Comparison

The above is a comparison of starting current for full-voltage starters, closed transition and open transition autotransformer-type reduced voltage starters. All CR331 starters are the closed transition type.



Schematic Diagram – NEMA Size 4



Schematic Diagram – NEMA Size 7

Product Number Selection Instructions: See page 2-66

CR331

Autotransformer Starters

Outlines, Dimensions (in. (mm)) and Weights lbs. (For Estimating Only)

CR331 NEMA Type 1 Sizes 2-4

Product Number	Dimension A	Dimension B	Dimension C	Dimension D	Dimension E	Dimension F	Weight
CR331D	43.00 (1092.2)	26.00 (660.4)	10.75 (273.0)	40.50 (1028.7)	22.00 (558.8)	38.00 (965.2)	250
CR331E	53.00 (1346.2)	36.00 (914.4)	10.75 (273.0)	50.50 (1282.7)	32.00 (812.8)	48.00 (1219.2)	450
CR331F	53.00 (1346.2)	36.00 (914.4)	10.75 (273.0)	50.50 (1282.7)	32.00 (812.8)	48.00 (1219.2)	450

CR331 NEMA Type 1 Size 5

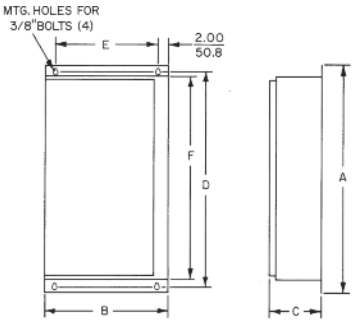
See Diagram For Dimensions

CR331 NEMA Type 1 Size 6

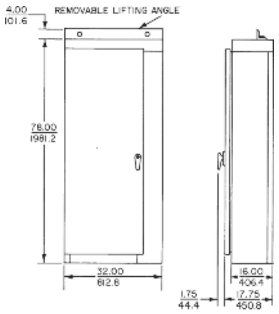
NEMA Size	Non-Combination/ Combination	Motor Voltage	Height	Width	Depth	Weight
6	Non-combination	All ratings	90.0 (2286)	44.0 (1118)	20.0 (508)	1500
6	Combination w/ circuit breakers	All ratings	90.0 (2286)	44.0 (1118)	20.0 (508)	1500
6	Combination /all others	200/208	90.0 (2286)	44.0 (1118)	20.0 (508)	1600
6	Combination /all others	230	90.0 (2286)	44.0 (1118)	20.0 (508)	1600
6	Combination /all others	460	90.0 (2286)	44.0 (1118)	20.0 (508)	1600
6	Combination /all others	575	90.0 (2286)	44.0 (1118)	20.0 (508)	1400/1600

CR331 NEMA Type 1 Sizes 7-9

NEMA Size	Non-Combination/ Combination	Motor Voltage	Height	Width	Depth	Weight
7	Non-combination	All ratings	90.0 (2286)	44.0 (1118)	20.0 (508)	1500
7	Combination w/ circuit breakers	All ratings	90.0 (2286)	44.0 (1118)	20.0 (508)	1700
7	Combination /All others	All ratings	90.0 (2286)	44.0 (1118)	20.0 (508)	1900
8	Non-combination	All ratings	90.0 (2286)	88.0 (2235)	40.0 (1016)	2400
8	Combination	All ratings	90.0 (2286)	88.0 (2235)	40.0 (1016)	2800
9	Non-combination	All ratings	90.0 (2286)	88.0 (2235)	40.0 (1016)	2600
9	Combination	All ratings	90.0 (2286)	88.0 (2235)	40.0 (1016)	3000



CR331, NEMA Type 1, Size 2-4



CR331G, NEMA Type 1, Size 5, 750 lbs.

CR332

Wye-Delta Starters
800 Horsepower Max.@ 230V
1500 Horsepower Max. @ 600V
NEMA Sizes 1YD-8YD
Three-Phase
50/60 Hz

Description

The wye-delta (open transition) starter consists of the following components in a Type 1 enclosure: three contactors, one block overload relay (for three-phase protection), and one pneumatic time delay relay. The wye-delta (closed transition) starter consists of the following components in a Type 1 enclosure: same as in the open transition plus one transition contactor and required number of transition resistors.

Application

The wye-delta magnetic motor starters are for use with low starting torque applications such as fans, compressors, and conveyors driven by six lead wye-delta motors capable of being connected in wye and in delta. Wye-delta starting provides a low inrush current which results in low starting torque. When the motor windings are connected in wye, starting torque is approximately 1/3 of normal. Reconnecting to delta on run applies full voltage to each winding.

Closed transition forms are characterized by the addition of resistors during transition from start to run. This eliminates opening the circuit and prevents transient currents which might occur and cause objectionable light flicker.

Features

—**Variety of Enclosures**: complete line of enclosures for every purpose.
—**Easy to Wire**: ample wiring is front connected.
—**Accurate Adjustment**: pneumatic time-delay relay permits accurate adjustment of starting time on wye connection.
—**Motor Protection**: provided by overload relays and holding interlocks.
—**Flexibility**: complete line of factory-installed modifications available.
—**Reduce High Transient Currents**: closed transition forms eliminate opening the circuit during transition, thereby reducing light flicker and high transient currents.

Product Number Selection Instructions

NEMA Sizes 1YD-5YD

1. Order starter by complete product number.
   Example: CR332EG314 at **$4917.00, GO-10G1**.
2. Select and specify three overload heaters on basis of motor's full-load current.
3. Order forms not listed or special features by complete description using a listed product number as a reference wherever possible and include full-load motor ratings and horsepower.
   Example: Similar to CR332DF414 except to have a control transformer and START-STOP push button installed at total **List Price $4365.00, GO-10G1**.

CR332 NEMA Size 6
Combination Wye-Delta Motor Starter

NEMA Sizes 6YD-8YD

1. Specify: Starter type (CR332) — NEMA Size — Line voltage — Type enclosure — Control circuit voltage — Short-circuit protective device — Open- or closed-circuit transition
2. Motor data: Motor type — Horsepower — Voltage — Phase — Number of wires — Frequency — Temperature-rise — Full-load current — Service factor — Delta-connected locked-rotor current
3. Modifications: (See page 2-78)
4. Ordering Example:
   One CR332HA311 NEMA Size 6 wye-delta open-transition starter in NEMA Type 1 enclosure. For squirrel-cage induction motor 200-horsepower, 230-Volt, three-phase, 60-Hertz, 40°C rise, 500-Ampere full-load current, 3000-Ampere locked-rotor current.

Additional Forms

1. **Combination Forms**
   Combination forms with fusible or nonfusible disconnect switch are available. Circuit breaker forms of closed transition starters only are also available. Refer to page 2-78 for list price additions.
2. **50-Hertz Forms**
   50-Hertz starters are available. Contact nearest GE Energy Sales Office for proper selection and pricing of 380 Volt 50 Hertz forms.
3. **Special Enclosures**
   Wye-delta starters are also available in NEMA Type 3R, 4 and 12 enclosures. Order by description using listed product number as reference. See page 2-77 (non-combination) or 2-78 (combination) for list price adders.
4. **Product Notes**
   Full-load current should not exceed continuous ampere rating of starter.

Reference Publications

Instructions: NEMA Size 1YD-5YD	
Open transition	GEH-5076
Closed transition	GEH-5077

CR332 Open Circuit Transition

Wye-Delta Starters

Three heaters should be ordered as separate items.

Three-Phase NEMA Type 1 Open Circuit Transition

NEMA Size	Motor Voltage (60 Hz)	Horsepower	Product Number	List Price GO-10G1
1YD	200-208	10	CR332CA111	**$2061.00**
2YD	200-208	15	CR332DB111	**$2439.00**
2YD	200-208	20	CR332DC111	**$2439.00**
3YD	200-208	25	CR332ED111	**$3549.00**
3YD	200-208	30	CR332EE111	**$3549.00**
3YD	200-208	40	CR332EF111	**$3549.00**
4YD	200-208	50	CR332FG111	**$7401.00**
4YD	200-208	60	CR332FH111	**$7401.00**
5YD	200-208	75	CR332GJ111	**$13305.00**
5YD	200-208	100	CR332GK111	**$13305.00**
5YD	200-208	125	CR332GL111	**$13305.00**
5YD	200-208	150	CR332GM111	**$13305.00**
6YD	200-208	200	CR332HA111	**$28473.00**
6YD	200-208	250	CR332HB111	**$28473.00**
6YD	200-208	300	CR332HC111	**$28473.00**
7YD[1]	200-208	350	CR332JD111	**$38403.00**
7YD[1]	200-208	400	CR332JE111	**$38403.00**
7YD[1]	200-208	450	CR332JF111	**$38403.00**
7YD[1]	200-208	500	CR332JG111	**$38403.00**
8YD[1]	200-208	600	CR332KH111	**$53145.00**
8YD[1]	200-208	700	CR332KJ111	**$53145.00**
8YD[1]	200-208	750	CR332KK111	**$53145.00**
1YD	230-240	10	CR332CA311	**$2061.00**
2YD	230-240	15	CR332DB311	**$2439.00**
2YD	230-240	20	CR332DC311	**$2439.00**
2YD	230-240	25	CR332DD311	**$2439.00**
3YD	230-240	30	CR332EE311	**$3549.00**
3YD	230-240	40	CR332EF311	**$3549.00**
3YD	230-240	50	CR332EG311	**$3549.00**
4YD	230-240	60	CR332FH311	**$7401.00**
4YD	230-240	75	CR332FJ311	**$7401.00**
5YD	230-240	100	CR332GK311	**$13305.00**
5YD	230-240	125	CR332GL311	**$13305.00**
5YD	230-240	150	CR332GM311	**$13305.00**
6YD	230-240	200	CR332HA311	**$28473.00**
6YD	230-240	250	CR332HB311	**$28473.00**
6YD	230-240	300	CR332HC311	**$28473.00**
6YD	230-240	350	CR332HD311	**$28473.00**
7YD[1]	230-240	400	CR332JE311	**$38403.00**
7YD[1]	230-240	450	CR332JF311	**$38403.00**
7YD[1]	230-240	500	CR332JG311	**$38403.00**
8YD[1]	230-240	600	CR332KH311	**$53145.00**
8YD[1]	230-240	700	CR332KJ311	**$53145.00**
8YD[1]	230-240	750	CR332KK311	**$53145.00**
8YD[1]	230-240	800	CR332KL311	**$53145.00**

[1]Size 7 starters and higher are not UL listed. UL508A is available as a factory quoted option for Type 1 enclosures.

Three-Phase NEMA Type 1 Open Circuit Transition

NEMA Size	Motor Voltage (60 Hz)	Horsepower	Product Number	List Price GO-10G1
1YD	460-480	15	CR332CB411	**$2061.00**
2YD	460-480	20	CR332DC411	**$2439.00**
2YD	460-480	25	CR332DD411	**$2439.00**
2YD	460-480	30	CR332DE411	**$2439.00**
2YD	460-480	40	CR332DF411	**$2439.00**
3YD	460-480	50	CR332EG411	**$3549.00**
3YD	460-480	60	CR332EH411	**$3549.00**
3YD	460-480	75	CR332EJ411	**$3549.00**
4YD	460-480	100	CR332FK411	**$7401.00**
4YD	460-480	125	CR332FL411	**$7401.00**
4YD	460-480	150	CR332FM411	**$7401.00**
5YD	460-480	200	CR332GN411	**$13305.00**
5YD	460-480	250	CR332GP411	**$13305.00**
5YD	460-480	300	CR332GR411	**$13305.00**
6YD	460-480	350	CR332HD411	**$28473.00**
6YD	460-480	400	CR332HE411	**$28473.00**
6YD	460-480	450	CR332HF411	**$28473.00**
6YD	460-480	500	CR332HG411	**$28473.00**
6YD	460-480	600	CR332HH411	**$28473.00**
6YD	460-480	700	CR332HJ411	**$28473.00**
7YD[1]	460-480	750	CR332JK411	**$38403.00**
7YD[1]	460-480	800	CR332JL411	**$38403.00**
7YD[1]	460-480	900	CR332JM411	**$38403.00**
7YD[1]	460-480	1000	CR332JN411	**$38403.00**
8YD[1]	460-480	1250	CR332KP411	**$53145.00**
8YD[1]	460-480	1500	CR332KR411	**$53145.00**
1YD	575-600	15	CR332CB511	**$2061.00**
2YD	575-600	20	CR332DC511	**$2439.00**
2YD	575-600	25	CR332DD511	**$2439.00**
2YD	575-600	30	CR332DE511	**$2439.00**
2YD	575-600	40	CR332DF511	**$2439.00**
3YD	575-600	50	CR332EG511	**$3549.00**
3YD	575-600	60	CR332EH511	**$3549.00**
3YD	575-600	75	CR332EJ511	**$3549.00**
4YD	575-600	100	CR332FK511	**$7401.00**
4YD	575-600	125	CR332FL511	**$7401.00**
4YD	575-600	150	CR332FM511	**$7401.00**
5YD	575-600	200	CR332GN511	**$13305.00**
5YD	575-600	250	CR332GP511	**$13305.00**
5YD	575-600	300	CR332GR511	**$13305.00**
6YD	575-600	350	CR332HD511	**$28473.00**
6YD	575-600	400	CR332HE511	**$28473.00**
6YD	575-600	450	CR332HF511	**$28473.00**
6YD	575-600	500	CR332HG511	**$28473.00**
6YD	575-600	600	CR332HH511	**$28473.00**
6YD	575-600	700	CR332HJ511	**$28473.00**
7YD[1]	575-600	750	CR332JK511	**$38403.00**
7YD[1]	575-600	800	CR332JL511	**$38403.00**
7YD[1]	575-600	900	CR332JM511	**$38403.00**
7YD[1]	575-600	1000	CR332JN511	**$38403.00**
8YD[1]	575-600	1250	CR332KP511	**$53145.00**
8YD[1]	575-600	1500	CR332KR511	**$53145.00**

Factory Installed Modifications: See page 2-78
Heater Selection Table: See page 2-80

Reduced Voltage Starters
Electromechanical
CR332 Closed Circuit Transition
Wye-Delta Starters
Three heaters should be ordered as separate items.

Page Updated 04 / 2012

Three-Phase NEMA Type 1 Closed Circuit Transition

NEMA Size	Motor Voltage (60 Hz)	Horsepower	Product Number	List Price GO-10G1
1YD	200-208	10	CR332CA114	**$3147.00**
2YD	200-208	15	CR332DB114	**$3525.00**
2YD	200-208	20	CR332DC114	**$3561.00**
3YD	200-208	25	CR332ED114	**$4785.00**
3YD	200-208	30	CR332EE114	**$4785.00**
3YD	200-208	40	CR332EF114	**$4917.00**
4YD	200-208	50	CR332FG114	**$9399.00**
4YD	200-208	60	CR332FH114	**$9399.00**
5YD	200-208	75	CR332GJ114	**$16161.00**
5YD	200-208	100	CR332GK114	**$16161.00**
5YD	200-208	125	CR332GL114	**$16305.00**
5YD	200-208	150	CR332GM114	**$16305.00**
6YD	200-208	200	CR332HA114	**$32787.00**
6YD	200-208	250	CR332HB114	**$32787.00**
6YD	200-208	300	CR332HC114	**$32787.00**
7YD[1]	200-208	350	CR332JD114	**$49797.00**
7YD[1]	200-208	400	CR332JE114	**$49797.00**
7YD[1]	200-208	450	CR332JF114	**$49797.00**
7YD[1]	200-208	500	CR332JG114	**$49797.00**
8YD[1]	200-208	600	CR332KH114	**$68127.00**
8YD[1]	200-208	700	CR332KJ114	**$68127.00**
8YD[1]	200-208	750	CR332KK114	**$68127.00**
1YD	230-240	10	CR332CA314	**$3147.00**
2YD	230-240	15	CR332DB314	**$3525.00**
2YD	230-240	20	CR332DC314	**$3561.00**
2YD	230-240	25	CR332DD314	**$3561.00**
3YD	230-240	30	CR332EE314	**$4785.00**
3YD	230-240	40	CR332EF314	**$4917.00**
3YD	230-240	50	CR332EG314	**$4917.00**
4YD	230-240	60	CR332FH314	**$9399.00**
4YD	230-240	75	CR332FJ314	**$9687.00**
5YD	230-240	100	CR332GK314	**$16161.00**
5YD	230-240	125	CR332GL314	**$16305.00**
5YD	230-240	150	CR332GM314	**$16305.00**
6YD	230-240	200	CR332HA314	**$32787.00**
6YD	230-240	250	CR332HB314	**$32787.00**
6YD	230-240	300	CR332HC314	**$32787.00**
6YD	230-240	350	CR332HD314	**$32787.00**
7YD[1]	230-240	400	CR332JE314	**$49797.00**
7YD[1]	230-240	450	CR332JF314	**$49797.00**
7YD[1]	230-240	500	CR332JG314	**$49797.00**
8YD[1]	230-240	600	CR332KH314	**$68127.00**
8YD[1]	230-240	700	CR332KJ314	**$68127.00**
8YD[1]	230-240	750	CR332KK314	**$68127.00**
8YD[1]	230-240	800	CR332KL314	**$68127.00**

[1]Size 7 starters and higher are not UL listed. UL508A is available as a factory quoted option for Type 1 enclosures.

Three-Phase NEMA Type 1 Closed Circuit Transition

NEMA Size	Motor Voltage (60 Hz)	Horsepower	Product Number	List Price GO-10G1
1YD	460-480	15	CR332CB414	**$3147.00**
2YD	460-480	20	CR332DC414	**$3561.00**
2YD	460-480	25	CR332DD414	**$3561.00**
2YD	460-480	30	CR332DE414	**$3561.00**
2YD	460-480	40	CR332DF414	**$3693.00**
3YD	460-480	50	CR332EG414	**$4917.00**
3YD	460-480	60	CR332EH414	**$5001.00**
3YD	460-480	75	CR332EJ414	**$5559.00**
4YD	460-480	100	CR332FK414	**$10071.00**
4YD	460-480	125	CR332FL414	**$10215.00**
4YD	460-480	150	CR332FM414	**$10215.00**
5YD	460-480	200	CR332GN414	**$16701.00**
5YD	460-480	250	CR332GP414	**$16701.00**
5YD	460-480	300	CR332GR414	**$17607.00**
6YD	460-480	350	CR332HD414	**$32787.00**
6YD	460-480	400	CR332HE414	**$32787.00**
6YD	460-480	450	CR332HF414	**$32787.00**
6YD	460-480	500	CR332HG414	**$32787.00**
6YD	460-480	600	CR332HH414	**$32787.00**
6YD	460-480	700	CR332HJ414	**$32787.00**
7YD[1]	460-480	750	CR332JK414	**$49797.00**
7YD[1]	460-480	800	CR332JL414	**$49797.00**
7YD[1]	460-480	900	CR332JM414	**$49797.00**
7YD[1]	460-480	1000	CR332JN414	**$49797.00**
8YD[1]	460-480	1250	CR332KP414	**$68127.00**
8YD[1]	460-480	1500	CR332KR414	**$68127.00**
1YD	575-600	15	CR332CB514	**$3147.00**
2YD	575-600	20	CR332DC514	**$3561.00**
2YD	575-600	25	CR332DD514	**$3561.00**
2YD	575-600	30	CR332DE514	**$3561.00**
2YD	575-600	40	CR332DF514	**$3693.00**
3YD	575-600	50	CR332EG514	**$4917.00**
3YD	575-600	60	CR332EH514	**$5001.00**
3YD	575-600	75	CR332EJ514	**$5559.00**
4YD	575-600	100	CR332FK514	**$10071.00**
4YD	575-600	125	CR332FL514	**$10215.00**
4YD	575-600	150	CR332FM514	**$10215.00**
5YD	575-600	200	CR332GN514	**$16701.00**
5YD	575-600	250	CR332GP514	**$16701.00**
5YD	575-600	300	CR332GR514	**$17607.00**
6YD	575-600	350	CR332HD514	**$32787.00**
6YD	575-600	400	CR332HE514	**$32787.00**
6YD	575-600	450	CR332HF514	**$32787.00**
6YD	575-600	500	CR332HG514	**$32787.00**
6YD	575-600	600	CR332HH514	**$32787.00**
6YD	575-600	700	CR332HJ514	**$32787.00**
7YD[1]	575-600	750	CR332JK514	**$49797.00**
7YD[1]	575-600	800	CR332JL514	**$49797.00**
7YD[1]	575-600	900	CR332JM514	**$49797.00**
7YD[1]	575-600	1000	CR332JN514	**$49797.00**
8YD[1]	575-600	1250	CR332KP514	**$68127.00**
8YD[1]	575-600	1500	CR332KR514	**$68127.00**

Heater Selection Table: See page 2-80
Product Number Selection Instructions: See page 2-69
Factory Installed Modifications: See page 2-78

CR332

Wye-Delta Starters

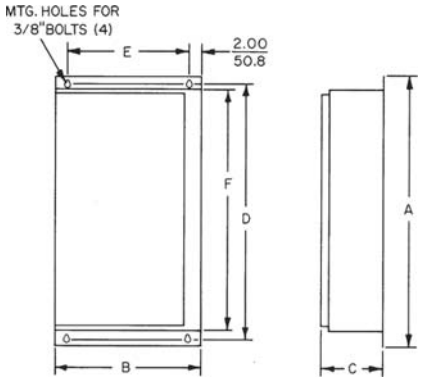
Outlines, Dimensions (in./mm) and Weights lbs. (For Estimating Only)

CR332 NEMA Type 1 Sizes 1YD-4YD Open Circuit Transition

Product Number	Dimension A	Dimension B	Dimension C	Dimension D	Dimension E	Dimension F	Weight
CR332C	35.00 (889.0)	24.00 (609.6)	8.25 (209.5)	32.50 (825.5)	20.00 (508.0)	30.00 (762.0)	150
CR332D	35.00 (889.0)	24.00 (609.6)	8.25 (209.5)	32.50 (825.5)	20.00 (508.0)	30.00 (762.0)	150
CR332E	53.00 (1346.2)	30.00 (762.0)	10.75 (273.0)	50.50 (1282.7)	26.00 (660.4)	48.00 (1219.2)	250
CR332F	53.00 (1346.2)	30.00 (762.0)	10.75 (273.0)	50.50 (1282.7)	26.00 (660.4)	48.00 (1219.2)	250

CR332 NEMA Type 1 Sizes 1YD-4YD Closed Circuit Transition

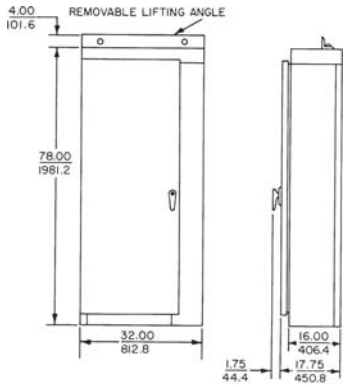
Product Number	Dimension A	Dimension B	Dimension C	Dimension D	Dimension E	Dimension F	Weight
CR332C	35.00 (889.0)	24.00 (609.6)	8.25 (209.5)	32.50 (825.5)	20.00 (508.0)	30.00 (762.0)	175
CR332D	43.00 (1092.2)	26.00 (660.4)	10.75 (273.0)	40.50 (1028.7)	22.00 (558.8)	38.00 (965.2)	200
CR332E	53.00 (1346.2)	30.00 (762.0)	10.75 (273.0)	50.50 (1282.7)	26.00 (660.4)	48.00 (1219.2)	300
CR332F	53.00 (1346.2)	30.00 (762.0)	10.75 (273.0)	50.50 (1282.7)	26.00 (660.4)	48.00 (1219.2)	300



NEMA Type 1, Sizes 1YD-4YD

CR332 NEMA Type 1 Size 5YD

See Diagram For Dimensions

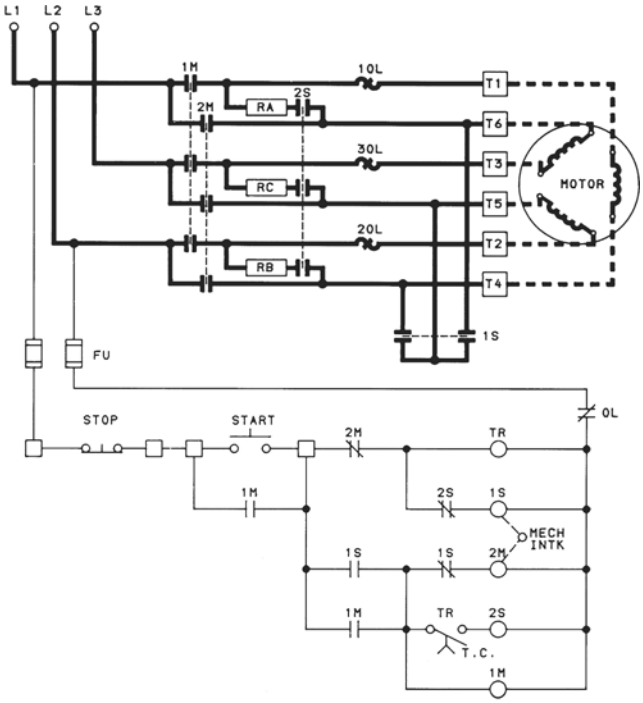


NEMA Size 5YD Floor-Mounted Enclosure, Open or Closed Transition; 650lbs.

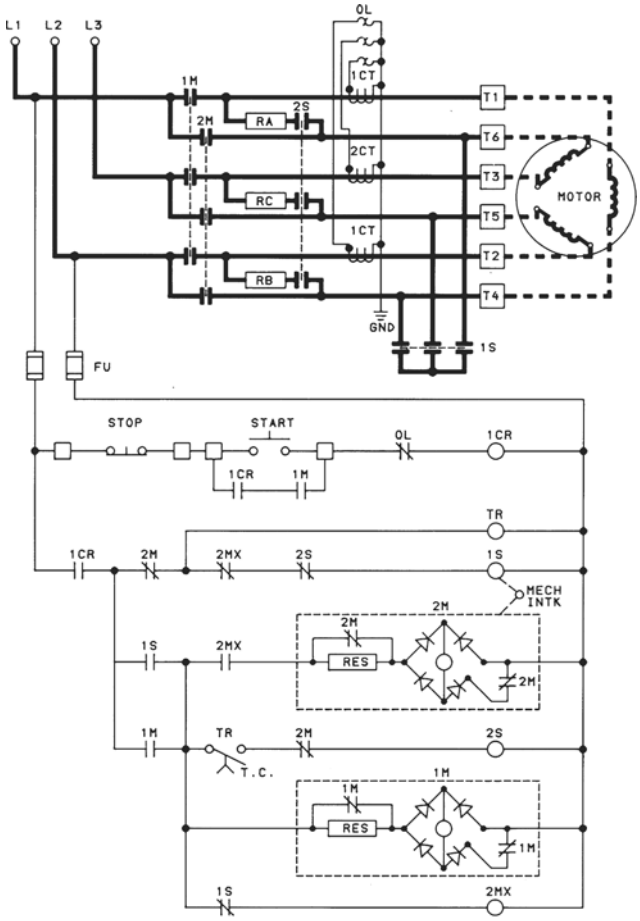
CR332 NEMA Type 1 Sizes 6YD-8YD

NEMA Size	Non-combination/Combo	Height	Width	Depth	Weight
6YD	Non-combination	90.0 (2286)	56.0 (1422)	20.0 (508)	1800
7YD	Non-combination	90.0 (2286)	56.0 (1422)	20.0 (508)	2600
8YD[1]	Non-combination	Contact your GE Energy Representative.			
6YD	Combination	90.0 (2286)	56.0 (1422)	20.0 (508)	2100
7YD	Combination	90.0 (2286)	56.0 (1422)	20.0 (508)	2800
8YD[1]	Combination	Contact your GE Energy Representative			

[1]Circuit breaker should not be used with open transition forms because the transient currents associated with the open transition may cause nuisance tripping of the circuit breaker.



Typical Schematic Diagram for Closed Transition Wye-Delta Starter (NEMA Size 4YD)



Typical Schematic Diagram for Closed Transition Wye-Delta Starter (NEMA Size 7YD)

Diagram Legend
1M, 2M - Line Contactors
1S, 2S - Start Contactors
RA, RB, RC - Transition Resistors
OL - Thermal Overload Relay
TR - Pneumatic Timing Relay
2MX - 2M Auxiliary Relay
ICR - Control Relay
TR - Timing Relay
FU - Fuse
TC - Time Closing
CT - Current Transformer
RES - Resistor
□ - Terminal Board Point

Product Number Selection Instructions: See page 2-69

Reduced Voltage Starters Electromechanical

CR330

Part-Winding Starters
700 Horsepower Max.@ 230V
1400 Horsepower Max. @ 600V
NEMA Sizes 1PW-8PW
Three-Phase
50/60 Hz

Description

A part-winding starter consists of two, three-pole magnetic contactors, each selected for one-half the current rating of the motor; a pneumatic timing head; and two bimetallic three-phase block overload relays.

Application

Used where the power company specifies limitations on increments of current inrush. Frequent installations are in commercial buildings driving air conditioning compressors, pumps, fans and blowers. This method of starting is normally less expensive than most other forms of reduced inrush starting, but has its limitations on the type of load that can be accelerated on the first point. Inrush current is limited to approximately 65 percent of normal. Overload protection is provided.

These starters may be applied to any standard dual voltage 230/460 Volt induction motor that is to be used on 230 Volt systems. For motors with part-winding starting on 460 Volts or higher, contact nearest GE Energy Sales Office.

Features

—**Simple Construction**: two contactors, a timing relay and two overload relays.
—**Small Size**: starters are smaller than others in the reduced voltage category with comparable rating.
—**Closed Transition**: inherently provided.
—**Accurate Adjustment**: pneumatic time-delay contact permits accurate adjustment of maximum motor speeds on starting connections.
—**Flexibility**: complete line of factory-installed modifications available.

Product Number Selection Instructions

NEMA Sizes 1PW-5PW

1. Specify starter by complete product number.
Example: CR330DF411 at **$1872.00, GO-10G1.**

2. Select and specify overload heaters necessary, as a separate item, on basis of motor's full-load current (six heaters required).

3. Order starters not listed or special features by complete description using a listed product number as reference wherever possible and include motor rating and horsepower. Example: Similar to CR330DF411 except with a HAND-OFF-AUTO selector switch and a red indicating light in the flange, at total **List Price, $2352.00, GO-10G1.** Starter to control a 40-hp, 460-Volt, 60-Hertz motor having a full-load current of 57 Amperes.

NEMA Sizes 6PW-9PW

1. Starter type (CR330): — Line voltage — Short-circuit protective device — Control circuit voltage — NEMA Size — Type enclosure.

2. Motor data: Motor type — Horsepower — Voltage — Phase — Number of wires — Frequency — Temperature-rise — Full-load current — Service factor.

3. Modifications: (See page 2-77)

4. Ordering Example:
One CR330J NEMA Size 7 part-winding, nonreversing starter in NEMA Type 1 enclosure. For part winding induction motor rated 400 horsepower, 230 Volts, three-phase, 60 Hertz, 40°C rise, 1000 Amperes full-load current, 6000 Amperes locked-rotor current. Starter enclosure to have HAND-OFF-AUTO selector switch and START push button installed on flange area at **$450.00** addition. Total **List Price $35730.00, GO-10G1.**

Additional Forms

1. Combination forms with fusible or nonfusible disconnect switch, or circuit breakers, are available. Part winding starters are also available as open forms; or in NEMA Type 3R, 4 and 12 enclosures. Order by description, using listed form as reference. See page 2-78 for list price adders.

2. 50 Hertz Starters
50 Hertz starters are available. Contact your nearest GE Energy sales office for proper selection and pricing of 380 V, 50 Hz forms.

3. Product Notes
Two-pole vertical motors, 50 Hp and larger require special starters. Contact your nearest GE Energy sales office for information. Hp ratings are based on locked rotor currents corresponding to 65% of full winding values.

Reference Publications

Instructions	
GEH 4897	(Sizes 1-5)

CR330

Part Winding Starters

List price does not include HOA selector switch or START push button. Six heaters should be ordered as separate items.

Three-Phase NEMA Type 1

NEMA Size	Motor Voltage (60 Hz)	Horsepower[1]	Product Number	List Price GO-10G1
1 PW	200-208	10	CR330CA111	**$1314.00**
2 PW	200-208	20	CR330DC111	**$1872.00**
3 PW	200-208	40	CR330EF111	**$2640.00**
4 PW	200-208	75	CR330FJ111	**$5646.00**
5 PW	200-208	150	CR330GM111	**$11826.00**
1 PW	230-240	10	CR330CA311	**$1314.00**
2 PW	230-240	25	CR330DD311	**$1872.00**
3 PW	230-240	50	CR330EG311	**$2640.00**
4 PW	230-240	75	CR330FJ311	**$5646.00**
5 PW	230-240	150	CR330GM311	**$11826.00**
6 PW	230-240	300	CR330HC311	**$24624.00**
7 PW[3]	230-240	450	CR330JF311	**$35280.00**
8 PW[3]	230-240	700	CR330KJ311[2]	**$47238.00**
1 PW	460-480	15	CR330CB411	**$1314.00**
2 PW	460-480	40	CR330DF411	**$1872.00**
3 PW	460-480	75	CR330EJ411	**$2640.00**
4 PW	460-480	150	CR330FM411	**$5646.00**
5 PW	460-480	350	CR330GT411	**$11826.00**
6 PW	460-480	600	CR330HH411	**$24624.00**
7 PW[3]	460-480	900	CR330JL411	**$35280.00**
8 PW[3]	460-480	1400	CR330KN411[2]	**$47238.00**
1 PW	575-600	15	CR330CB511	**$1314.00**
2 PW	575-600	40	CR330DF511	**$1872.00**
3 PW	575-600	75	CR330EJ511	**$2640.00**
4 PW	575-600	150	CR330FM511	**$5646.00**
5 PW	575-600	350	CR330GT511	**$11826.00**
6 PW	575-600	600	CR330HH511	**$24624.00**
7 PW[3]	575-600	900	CR330JL511	**$35280.00**
8 PW[3]	575-600	1400	CR330KN511[2]	**$47238.00**

[1]Hp ratings are based on locked rotor currents corresponding to 65% of full winding values.
[2]Size 8PW starters are back-connected and require rear access.
[3]Size 7 starters and higher are not UL listed. UL508A is available as a factory quoted option for Type 1 enclosures.

Part-Winding Starters
Outlines, Dimensions (in. / mm) and Weights lbs. (For Estimating Only)

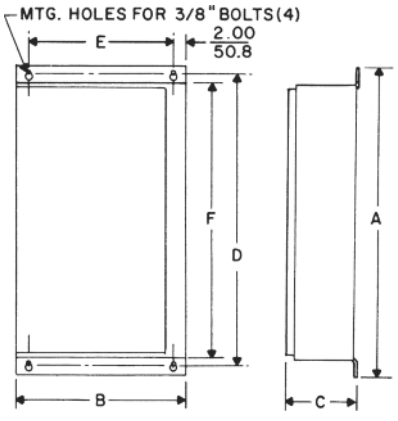
CR330 NEMA Type 1 Sizes 1-5

Product Number	Dimension A	Dimension B	Dimension C	Dimension D	Dimension E	Dimension F	Weight
CR330C	35.00 (889.0)	24.00 (609.6)	8.25 (209.5)	32.50 (825.5)	20.00 (508.0)	30.00 (762.0)	150
CR330D	35.00 (889.0)	24.00 (609.6)	8.25 (209.5)	32.50 (825.5)	20.00 (508.0)	30.00 (762.0)	150
CR330E	53.00 (1346.2)	26.00 (660.4)	10.75 (273.0)	50.50 (1282.7)	22.00 (558.8)	48.00 (1219.2)	250
CR330F	53.00 (1346.2)	26.00 (660.4)	10.75 (273.0)	50.50 (1282.7)	22.00 (558.8)	48.00 (1219.2)	250
CR330G	53.00 (1346.2)	36.00 (914.4)	10.75 (273.0)	50.50 (1282.7)	32.00 (812.8)	48.00 (1219.2)	350

CR330 NEMA Type 1 Sizes 6-8

NEMA Size	Non-combination/Combo	Height	Width	Depth	Weight
6 PW	Non-combination	90.0 (2286)	44.0 (1118)	20.0 (508)	1500
7 PW	Non-combination	90.0 (2286)	44.0 (1118)	20.0 (508)	1600
8 PW[2]	Non-combination	Contact your GE Energy Representative			
6 PW	Combination	90.0 (2286)	44.0 (1118)	20.0 (508)	2000
7 PW	Combination	90.0 (2286)	44.0 (1118)	20.0 (508)	2100
8 PW[2]	Combination	Contact your GE Energy Representative.			

[2]Size 8PW starters are back-connected and require rear access.

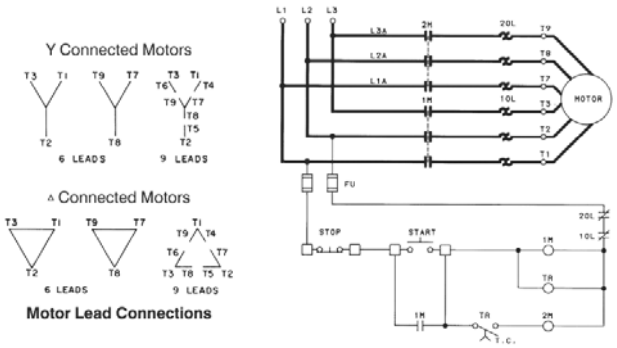


CR330, NEMA Type 1, Sizes 1-5

Product Number Selection Instructions: See page 2-74

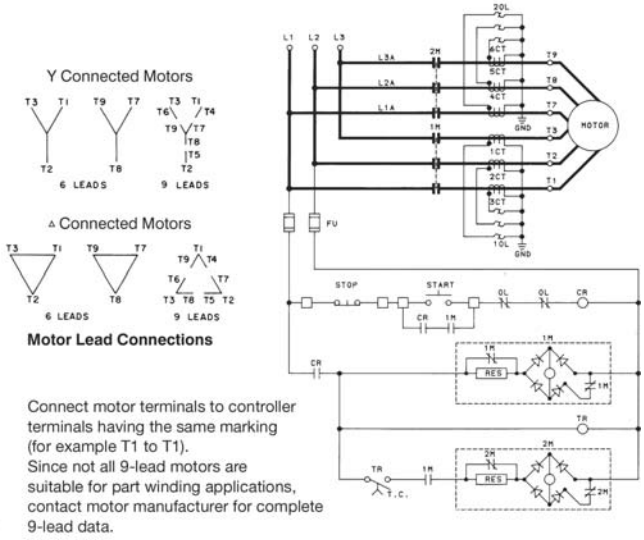
CR330

Part-Winding Starters
Schematic Diagrams



Connect motor terminals to controller terminals having the same marking (for example T1 to T1).
Since not all 9-lead motors are suitable for part winding applications, contact motor manufacturer for complete 9-lead data.

Typical Schematic Diagram
(NEMA Size 4 PW)



Connect motor terminals to controller terminals having the same marking (for example T1 to T1).
Since not all 9-lead motors are suitable for part winding applications, contact motor manufacturer for complete 9-lead data.

Typical Schematic Diagram
(NEMA Size 7 PW)

Diagram Legend
1M - Accelerating Contactor
2M - Run Contactor
TR - Pneumatic Timing Relay
OL - Thermal Overload Relay
CR - Control Relay
CT - Current Transformer
FU - Fuse
RES - Resistor
TC - Time Closing
TR - Timing Relay
☐ - Terminal Board Point

Reduced Voltage Starters Electromechanical

CR330, CR331, CR332

Factory Installed Modifications

Order should read "Similar to (list basic device product number), except with . . ."

				List Price Addition, GO-10G1 (Apply to List Price of Complete Device)					
	Control Product Line Covered			NEMA Size					
Description	CR330 (Partwinding)	CR331 (Autotransformers)	CR332 (Wye-Delta)	1, 1YD or 1PW	2, 2YD or 2PW	3, 3YD or 3PW	4, 4YD or 4PW	5, 5YD or 5PW	6-9, 6-8YD or 6-8PW
1. Devices mounted in cover or flange of enclosure.									
a) START-STOP push button (provides undervoltage protection, or	X	X	X	$300.00	$300.00	$300.00	$300.00	$300.00	$300.00
b) HAND-OFF-AUTO selector switch, or	X	X	X	$300.00	$300.00	$300.00	$300.00	$300.00	$300.00
c) HAND-OFF-AUTO selector switch and START push button (provides undervoltage protection), or	X	X	X	$450.00	$450.00	$450.00	$450.00	$450.00	$450.00
d) Red indicating light unit (for any of the above)	X	X	X	$180.00	$180.00	$180.00	$180.00	$180.00	$180.00
2. Auxiliary contact unit 1 normally open or 1 normally closed each	X	X	X	$66.00	$192.00	$192.00	$192.00	$192.00	$198.00
3. Control circuit transformer with control relay (with primary and secondary fusing)	X	X	X	$288.00	$372.00	$468.00	$528.00	$588.00	$588.00
4. Enclosures (noncombination) forms)									
a) NEMA Type 4	—	X	X(C.T.)[1]	$1860.00	$1860.00	$1860.00	$3420.00	$3420.00	$4500.00
b) NEMA Type 3R or Type 12	—	X	X(C.T.)[1]	$900.00	$1080.00	$1140.00	$1440.00	$1620.00	$2250.00
c) NEMA Type 4	X	—	X(O.T.)[2]	$720.00	$810.00	$1170.00	$1842.00	$3420.00	$4500.00
d) NEMA Type 3R or Type 12	X	—	X(O.T.)[2]	$600.00	$750.00	$900.00	$1200.00	$1620.00	$2250.00
5. Enclosure omission	X	X	X	—	(-)144.00	(-)372.00	(-)660.00	(-)1332.00	—
6. Separate control (115 VAC)	X	X	X	NC	NC	NC	NC	NC[3]	NC[3]
7. AC Ammeter (single-phase, includes one C.T.)	X	X	X	$1188.00	$1188.00	$1188.00	$1188.00	$1188.00	$1188.00
8. AC Ammeter and transfer switch (3-phase, no C.T.'s)	X	X	X	$1800.00	$1800.00	$1800.00	$1800.00	$1800.00	$1800.00
9. AC Voltmeter (single-phase)	X	X	X	$1188.00	$1188.00	$1188.00	$1188.00	$1188.00	$1188.00
10. AC Voltmeter and transfer switch (3-phase)	X	X	X	$1800.00	$1800.00	$1800.00	$1800.00	$1800.00	$1800.00
11. Elapsed time meter	X	X	X	$348.00	$348.00	$348.00	$348.00	$348.00	$348.00
12. Current transformers									
800 Amperes maximum, each	X	X	X	$312.00	$312.00	$312.00	$312.00	$312.00	$840.00
4000 Amperes maximum, each	X	X	X	—	—	—	—	—	$2130.00
13. Fused control circuit—two fuses	X	X	X	$132.00	$132.00	NC	NC	NC	NC
14. Overload relay with 1NO-1NC contacts	X	X	X	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00
15. Ambient compensated overload protection	X	X	X	$27.00[4]	$27.00[4]	$27.00[4]	$27.00[4]	$27.00[4]	$27.00[4]
16. Incomplete sequence protection	X	X	X	$714.00	$714.00	$714.00	$714.00	$714.00	$714.00
17. Running phase-reversal and phase-failure protection	X	X	X	$1056.00	$1056.00	$1056.00	$1056.00	$1056.00	$1056.00
18. Space heater—per starter (control not included)	X	X	X	$420.00	$420.00	$420.00	$420.00	$420.00	$420.00
19. Thermostat for control of space heaters	X	X	X	$420.00	$420.00	$420.00	$420.00	$420.00	$420.00

[1]Closed transition.
[2]Open transition.
[3]Supplied as a control relay, for low control circuit power consumption.
[4]**Add $54.00, GO-10G1** for part winding starters.

Product Number Selection Instructions:
See page 2-66 (Autotransformers), page 2-69, 2-70 (Wye Delta), page 2-74 (Part Winding)

CR330, CR331, CR332

Factory Installed Modifications

Table No. 1—Combination Reduced Voltage Starters (In Type 1 Enclosure)

Disconnect switch or circuit breaker type short-circuit protection can be supplied at the following additions to the basic starter price.

CR330 (PW)[1]				CR332 (YD)[1]				Nonfusible Disconnect	Fusible Disconnect[2]	Circuit Breaker[3]
NEMA Size	Maximum Horsepower 200-208 V	230-240 V	460-575 V	NEMA Size	Maximum Horsepower 208-240 V	230-240 V	460-575 V	List Price Addition, GO-10G1	List Price Addition, GO-10G1	List Price Addition, GO-10G1
1PW	10	10	15	1YD	10	10	15	$720.00	See Table No. 2 below	$1032.00
2PW	20	25	40	2YD	20	25	40	$912.00	See Table No. 2 below	$1122.00
3PW	40	50	75	3YD	40	50	75	$1260.00	See Table No. 2 below	$2052.00
4PW	75	75	150	4YD	60	75	150	$2256.00	See Table No. 2 below	$3990.00
5PW	150	150	350	5YD	150	150	300	$5178.00	See Table No. 2 below	$5874.00
6PW	—	200	400	6YD	—	200	400	$5178.00	$8490.00	$5874.00
	—	250	500		—	250	500	$5478.00	$11224.00	$5874.00
	—	300	600		—	300	600	$5478.00	$11224.00	$8142.00
	—	—	—		—	350	700	$5478.00	$15864.00	$8142.00
7WP	—	400	—	7YD	—	400	—	$12720.00	$15864.00	$13800.00
	—	450	—		—	450	—	$12720.00	$18546.00	$13800.00
	—	—	—		—	500	—	$12720.00	$40626.00	$13800.00
	—	—	800		—	—	800	$12720.00	$15864.00	$13800.00
	—	—	900		—	—	1000	$12720.00	$18546.00	$13800.00
8PW	—	—	—	8YD	—	—	—	$12720.00	$40626.00	$13800.00
	—	700	—		—	800	—	$48324.00	$55254.00	$27444.00
	—	—	1000		—	—	—	$12720.00	$18546.00	$13800.00
	—	—	1400		—	—	1500	$48324.00	$55272.00	$27444.00

CR331[1]				Nonfusible Disconnect	Fusible Disconnect[2]	Circuit Breaker
NEMA Size	Maximum Horsepower 200-208V	230-240V	460-575V	List Price Addition, GO-10G1	List Price Addition, GO-10G1	List Price Addition, GO-10G1
2	10	15	25	$720.00	See Table No. 2 below	$1032.00
3	25	30	50	$912.00	See Table No. 2 below	$1122.00
4	40	50	100	$1260.00	See Table No. 2 below	$2052.00
5	75	100	200	$2256.00	See Table No. 2 below	$3990.00
6	150	200	400	$5178.00	$8490.00	$5874.00
7	—	300	600	$5478.00	$11224.00	$8142.00
8	—	400	—	$12720.00	$15864.00	$13800.00
	—	450	—	$12720.00	$18546.00	$13800.00
	—	—	800	$12720.00	$15864.00	$13800.00
	—	—	900	$12720.00	$18546.00	$13800.00
9	—	500	—	$12720.00	$40626.00	$13800.00
	—	800	—	$48324.00	$55254.00	$27444.00
	—	—	1000	$12720.00	$18546.00	$13800.00
	—	—	1500	$48324.00	$55272.00	$27444.00

[1]For 50 Hertz applications, contact nearest GE Energy Sales Office.
[2]Price additions include current-limiting fuses.
[3]Not available for YD open transition.

Table No. 2—Combination Reduced Voltage Starters (In Type 1 Enclosure)

Fusible Disconnect, NEMA Sizes 1-5, 1PW-5PW, 1YD-5YD

A fusible disconnect can be supplied on starters at the following additions to the basic noncombination price. When ordering, please specify the required fuse clip rating. Price additions shown do not include fuses.

Product Number and NEMA Size			List Price Additions, GO-10G1—Fusible Disconnect Fuse Clip Size—Amperes				
CR330	CR332	CR331	30 or 60	100	200	400	600
1PW	1YD	2	$768.00	$894.00	—	—	—
2PW	2YD	3	$984.00	$984.00	$1224.00	—	—
3PW	3YD	4	—	$1524.00	$1524.00	$2172.00	—
4PW	4YD	5	—	—	$2472.00	$2472.00	—
5PW	5YD	—	—	—	—	—	$5814.00

Table No. 3—Combination Reduced Voltage Starters (In Type 3R, Type 4, and Type 12 Enclosures) Use with Tables No. 1 & No. 2

Type Of Enclosure	Base Product Number	List Price Additions, GO-10G1 Starter Size—Additions to NEMA Type 1 Price 1, 1YD, 1PW	2, 2YD, 2PW	3, 3YD, 3PW	4, 4YD, 4PW	5, 5YD, 5PW	6-8, 6-8YD, 6-8PW	9, 9YD, 9PW
3R or 12	CR330, 332 (O.T.)	$648.00	$834.00	$1068.00	$1440.00	$2070.00	$2250.00	—
	CR331, 332 (C.T.)	$912.00	$1128.00	$1224.00	$1608.00	$1860.00	$2250.00	$2250.00
4	CR330, 332 (O.T.)	$1176.00	$1266.00	$2154.00	$2826.00	$5220.00	$4500.00	—
	CR331, 332 (C.T.)	$2316.00	$2316.00	$2316.00	$4404.00	$4404.00	$4500.00	$4500.00

[1]For 50 Hertz applications, contact nearest GE Energy Sales Office.
[2]Price additions include current-limiting fuses.
[3]Not available for YD open transition.

How to Select Heaters

Listed values are for continuous rated motors with 1.15 service factor. For continuous rated motors with 1.0 service factor, multiply full-load current of motor by 0.9 and use this value to select heater.

1. Find device table (Example: CR330E)
2. Determine maximum motor full-load Amperes of your device. Then find heater product number
   (Example: CR330E, if maximum amperes is 56.9 then heater product number will be CR123F327B)

Note: If full-load Amperes of motor falls between increments in table, use next higher rating.

Ordering Information

All CR123C and CR123F heaters are packaged three to a carton. Items of these heaters, ordered for either customer's stock or any other purpose, are to be specified in multiples of three (such as 3, 6, 9, 12, 15, etc.). Minimum order quantity is three.

Pricing Information

All heaters, product numbers CR123C and CR123F are **List Price $9.00 each, GO-10H**. Packaged in quantities of three; must be ordered in multiples of three.

Part Winding (6 heaters required)

CR330C, Size 1PW		CR330D, Size 2PW		CR330E, Size 3PW		CR330F, Size 4PW		CR330G, Size 5PW	
Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number
11.0	CR123C592A	27.2	CR123C151B	54.0	CR123F300B	96.8	CR123F567B	230	CR123C592A
11.8	CR123C630A	33.4	CR123C163B	58.2	CR123F327B	111.2	CR123F614B	250	CR123C630A
12.9	CR123C695A	35.8	CR123C180B	63.6	CR123F357B	114.8	CR123F658B	270	CR123C695A
14.4	CR123C778A	37.8	CR123C198B	67.9	CR123F395B	120.1	CR123F719B	302	CR123C778A
16.4	CR123C867A	40.8	CR123C214B	72.9	CR123F430B	138.9	CR123F772B	328	CR123C867A
17.4	CR123C955A	45.4	CR123C228B	86.4	CR123F487B	143.4	CR123F848B	358	CR123C955A
19.3	CR123C104B	49.4	CR123C250B	92.5	CR123F567B	159.9	CR123F914B	390	CR123C104B
20.1	CR123C113B	52.6	CR123C273B	107.4	CR123F614B	184.7	CR123F104C	430	CR123C113B
22.0	CR123C125B	59.0	CR123C303B	111.6	CR123F658B	193.8	CR123F114C	462	CR123C125B
24.8	CR123C137B	65.0	CR123C330B	119.3	CR123F719B	210.0	CR123F118C	510	CR123C137B
26.4	CR123C151B	73.3	CR123C366B	136.2	CR123F772B	226.0	CR123F133C	—	—
30.8	CR123C163B	77.9	CR123C400B	143.0	CR123F848B	248.0	CR123F149C	—	—
34.2	CR123C180B	—	—	—	—	—	—	—	—
36.2	CR123C198B	—	—	—	—	—	—	—	—
40.0	CR123C214B	—	—	—	—	—	—	—	—
43.0	CR123C228B	—	—	—	—	—	—	—	—
45.0	CR123C250B	—	—	—	—	—	—	—	—

Note: Select heaters based on motor full-load Amperes. Due to starter design, actual heaters are sized to 50% of motor FLA. Solid state overloads should be set to the same level.

Autotransformers (3 heaters required)

CR331D, Size 2		CR331E, Size 3		CR331F, Size 4		CR331G, Size 5	
Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number
7.15	CR123C867A	25.1	CR123F300B	33.9	CR123F430B	125	CR123C630A
7.58	CR123C955A	27.0	CR123F327B	40.1	CR123F487B	135	CR123C695A
8.39	CR123C104B	30.5	CR123F357B	43.1	CR123F567B	151	CR123C778A
9.11	CR123C113B	31.5	CR123F395B	48.4	CR123F614B	164	CR123C867A
9.67	CR123C125B	33.9	CR123F430B	54.0	CR123F658B	179	CR123C955A
11.0	CR123C137B	40.1	CR123F487B	57.0	CR123F719B	195	CR123C104B
12.0	CR123C151B	43.1	CR123F567B	64.5	CR123F772B	215	CR123C113B
14.4	CR123C163B	48.4	CR123F614B	68.6	CR123F848B	231	CR123C125B
16.3	CR123C180B	54.0	CR123F658B	73.3	CR123F914B	255	CR123C137B
17.3	CR123C198B	57.0	CR123F719B	83.6	CR123F104C	270	CR123C151B
19.3	CR123C214B	64.5	CR123F772B	93.0	CR123F114C	—	—
20.9	CR123C228B	68.6	CR123F848B	106.0	CR123F118C	—	—
22.9	CR123C250B	73.3	CR123F914B	123.0	CR123F133C	—	—
24.7	CR123C273B	83.6	CR123F104C	131.0	CR123F149C	—	—
28.0	CR123C303B	90.0	CR123F114C	135.0	CR123F161C	—	—
31.1	CR123C330B	—	—	—	—	—	—
35.9	CR123C366B	—	—	—	—	—	—
41.5	CR123C400B	—	—	—	—	—	—
43.4	CR123C440B	—	—	—	—	—	—
45.0	CR123C460B	—	—	—	—	—	—

Wye-Delta (3 heaters required)

CR332C, Size 1YD		CR332D, Size 2YD		CR332E, Size 3YD		CR332F, Size 4YD		CR332G, Size 5YD	
Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number	Max. Motor Full-Load Amperes	Heater Product Number
12.4	CR123C867A	20.8	CR123C151B	43.5	CR123F300B	72.3	CR123F430B	216	CR123C630A
13.1	CR123C955A	24.9	CR123C163B	45.4	CR123F327B	83.8	CR123F487B	234	CR123C695A
14.5	CR123C104B	28.2	CR123C180B	52.8	CR123F357B	90.7	CR123F567B	262	CR123C778A
15.8	CR123C113B	30.0	CR123C198B	54.6	CR123F395B	95.7	CR123F614B	284	CR123C867A
16.8	CR123C125B	32.4	CR123C214B	58.6	CR123F430B	111.7	CR123F658B	310	CR123C955A
19.1	CR123C137B	35.1	CR123C228B	67.3	CR123F487B	122.5	CR123F719B	338	CR123C104B
20.6	CR123C151B	38.5	CR123C250B	72.3	CR123F567B	135.1	CR123F772B	372	CR123C113B
24.8	CR123C163B	42.8	CR123C273B	83.8	CR123F614B	154.0	CR123F848B	400	CR123C125B
27.9	CR123C180B	47.0	CR123C303B	90.7	CR123F658B	166.1	CR123F914B	442	CR123C137B
29.8	CR123C198B	55.6	CR123C330B	95.7	CR123F719B	188.8	CR123F104C	467	CR123C151B
32.3	CR123C214B	62.2	CR123C366B	111.7	CR123F772B	213.0	CR123F114C	—	—
34.6	CR123C228B	69.7	CR123C400B	122.5	CR123F848B	226.9	CR123F118C	—	—
36.7	CR123C250B	72.9	CR123C440B	135.1	CR123F914B	233.0	CR123F133C	—	—
40.5	CR123C273B	77.9	CR123C460B	154.0	CR123F104C	—	—	—	—
43.8	CR123C303B	—	—	156.0	CR123F114C	—	—	—	—
46.8	CR123C330B	—	—	—	—	—	—	—	—

Note: Select heaters based on motor full-load Amperes. Due to starter design, actual heaters are sized to 58% of motor FLA. Solid state overloads should be set to the same level.