



Reduced Voltage Starters-Solid State

ASTAT XT Soft Starter

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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

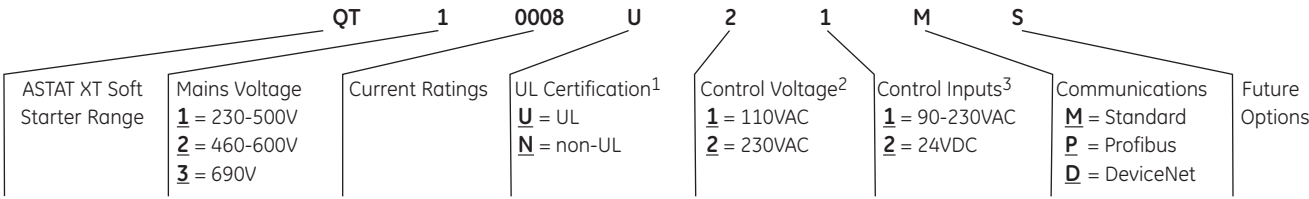
CE: Full Range
cUL, UL: For units up to 820A. "U" type



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ASTAT XT Soft Starter

Section 2

Product Number Configuration



Notes:
cUL Certification
¹ASTAT 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
²ASTAT XT Soft Starter standard Control Voltage is option 2, Voltage 230VAC, +10%, -15%

³ASTAT 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.



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Section 2

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

	Light Duty NEMA 10				Normal Duty NEMA 20				Heavy Duty NEMA 30				Product Number	List Price GO-10A8		
	Current Rating	230V	460V	575V	Current Rating	230V	460V	575V	Current Rating	230V	460V	575V				
	A	HP	HP	HP	A	HP	HP	HP	A	HP	HP	HP				
Line Voltage 230VAC	8	2	---	---	8	2	---	---	8	2	---	---	QT10008U11MS	\$1080.00		
	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 460 - 600VAC	8	---	5	5	8	---	5	5	8	---	5	5	QT20008U11MS	\$1200.00		
	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								Product Number	List Price GO-10A8		
	A				A											
	690V KW				690V KW											
Line Voltage 690V	---	---	---	---	8	---	---	5.5	8	---	---	5.5	QT30008N11MS	\$1320.00		
	---	---	---	---	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 QT10031U11MS becomes QT10031U21MS. No Price Adder.
For 24V DC Digital I/O - Change the "1" in digit 10 to "2". Example QT20072U11MS becomes QT20072U12MS. No Price Adder.
For Profibus DP Communications - Change the "M" in digit 11 to "P". Example QT10390U11MS becomes QT10390U11PS. Price adder is \$850.00
For DeviceNet Communications - Change the "M" in digit 11 to "D". Example QT20085U11MS becomes QT20085U11DS. Price adder is \$950.00

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



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Technical Specifications

Section 2

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 50°C, derating from 40°C
Storage Temperature	-20°C up to 70°C
Maximum Altitude	Up to 1000 mts. Ask your dealer for installation at higher altitude
Humidity	95% at 50°C or 98% at 45°C
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.



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ASTAT XT Soft Starter

Functions

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% U_n 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.



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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.



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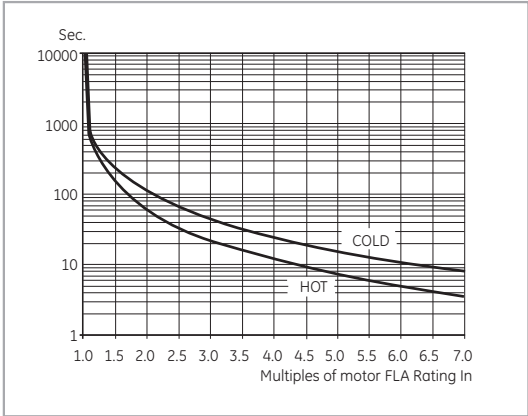
Technical Specifications

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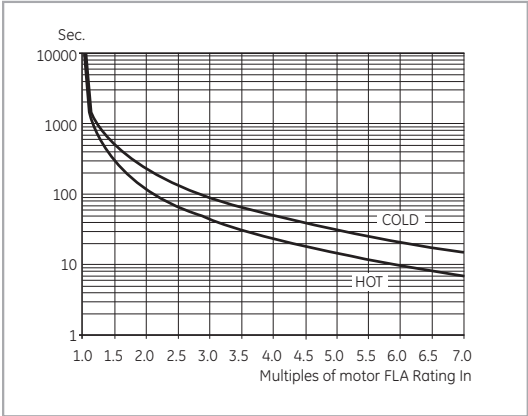
Overload Protections, Thermal Characteristics

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.

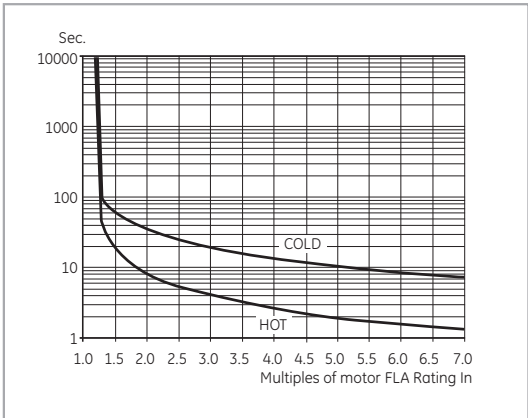
IEC Class 10



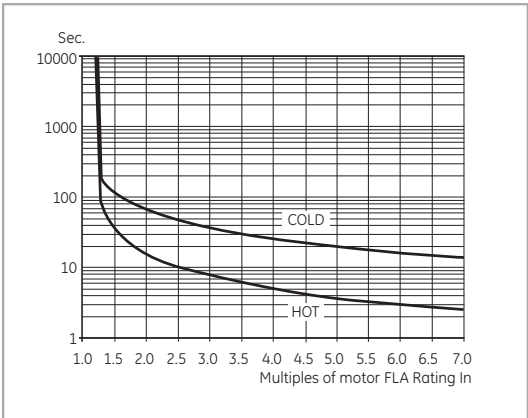
IEC Class 20



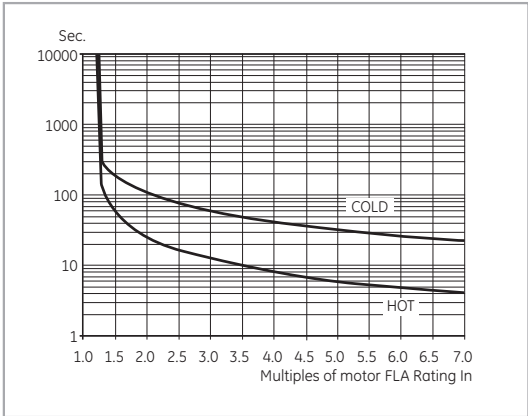
NEMA 10



NEMA 20



NEMA 30



Maximum number starting / hour

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

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



Reduced Voltage Starters

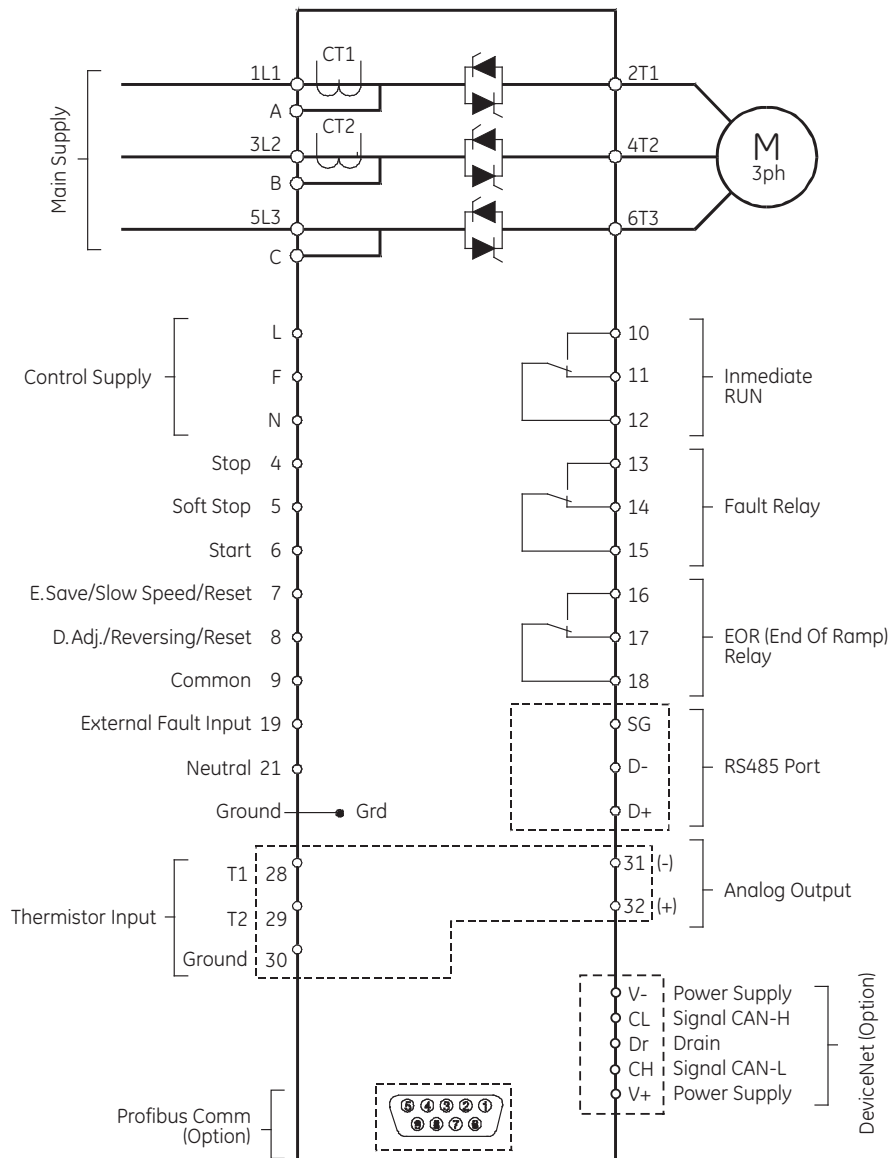
Solid State

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Technical Specifications

I/O Wiring, Basic scheme

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Technical Specifications

Section 2

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
<u>Control Voltage & Fan consumption VA:</u> 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	Programable Inputs	Programmable to functions Energy Saving, Slow Speed and Reset
8	Programable Inputs	Programmable to functions Dual Set, Reverse and Reset
9	Common	Common terminal for digital inputs from 4, 5, 6, 7 and 8
<u>Operating Voltage of digital inputs from 4 to 9</u> 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
<u>Relay Outputs Ratings</u> 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



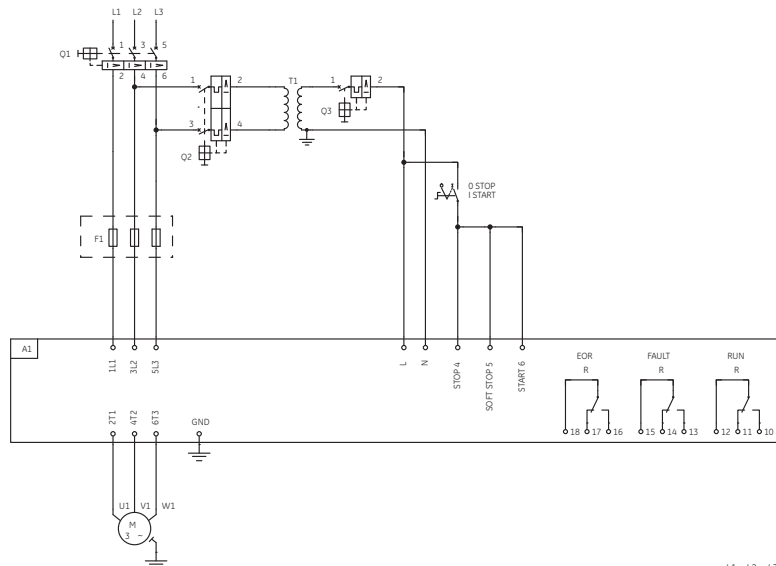
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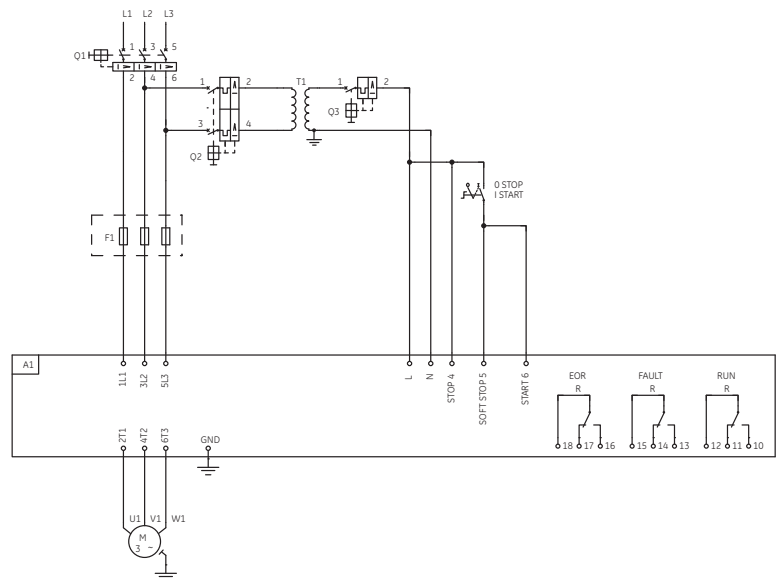
ASTAT XT Soft Starter

Application Wiring Diagrams - Basic Diagram without Line Contactor

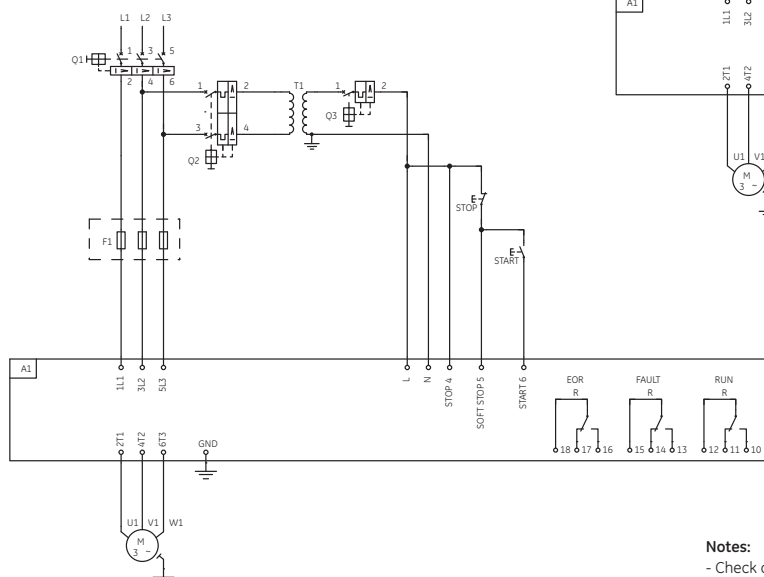
Section 2



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.

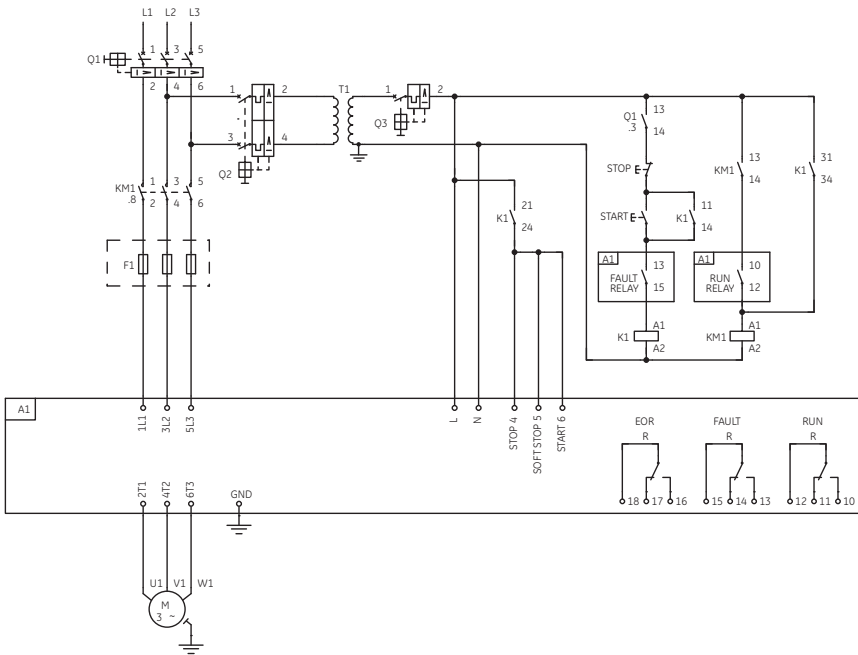


Reduced Voltage Starters

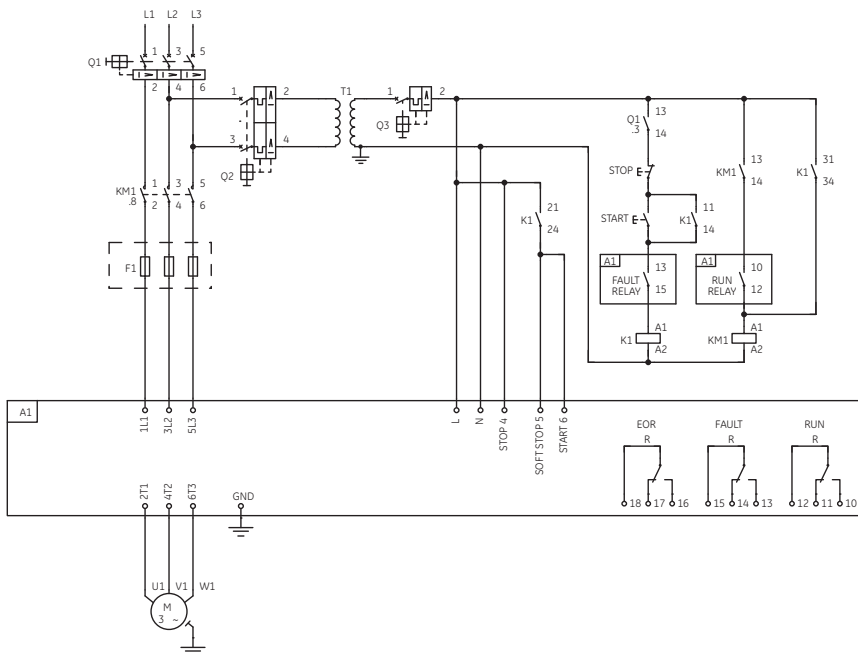
Solid State

ASTAT XT Soft Starter

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



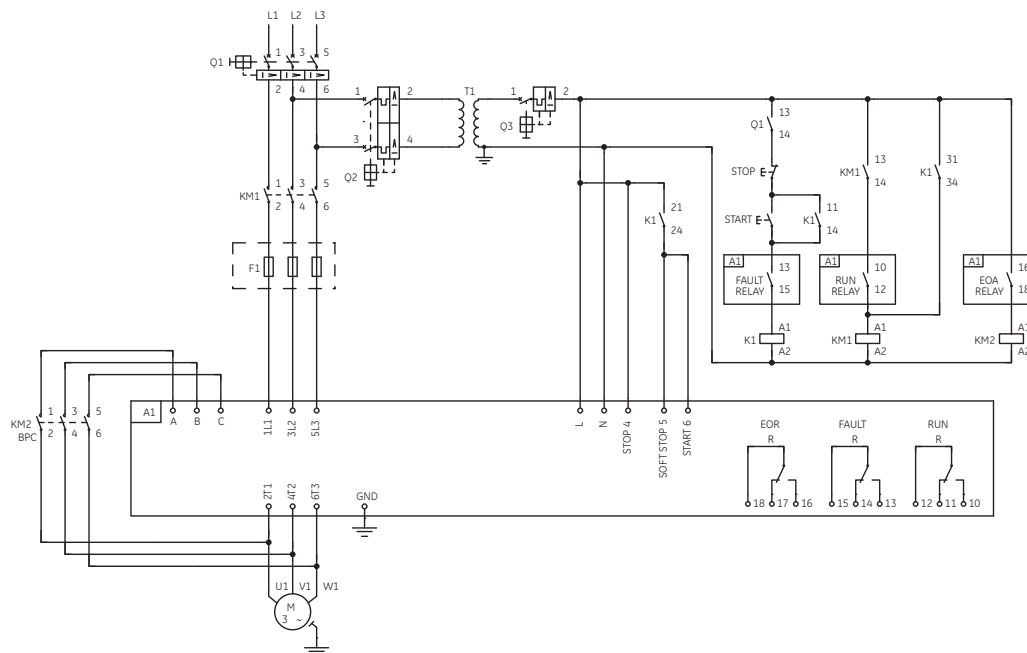
Reduced Voltage Starters

Solid State

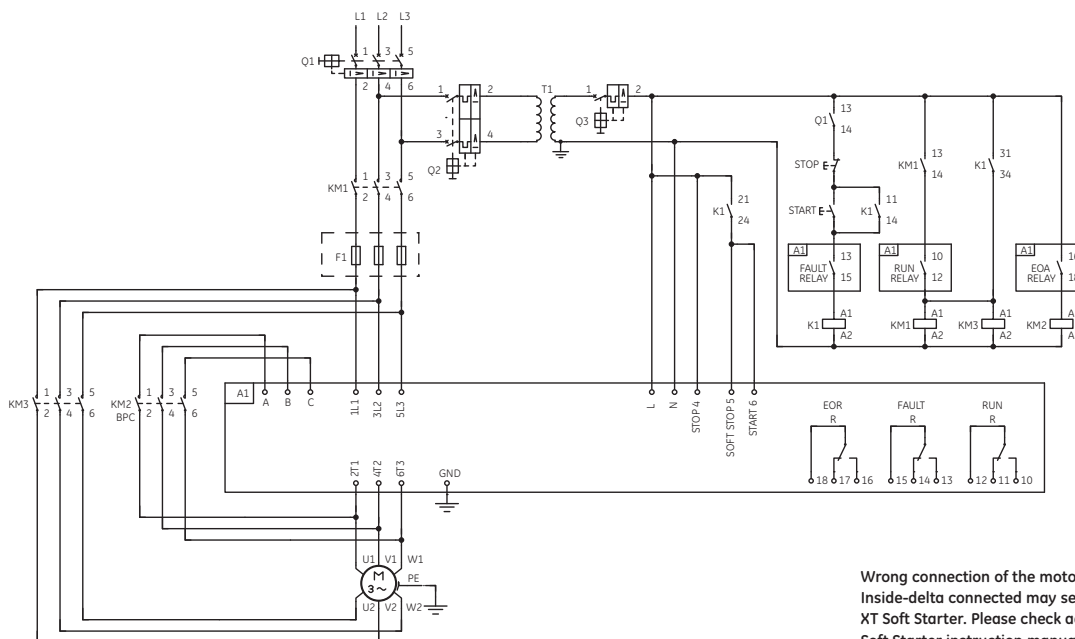
ASTAT XT Soft Starter

Application Wiring Diagrams

Section 2



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



Reduced Voltage Starters

Solid State

ASTAT XT Soft Starter

Outlines and Dimensions

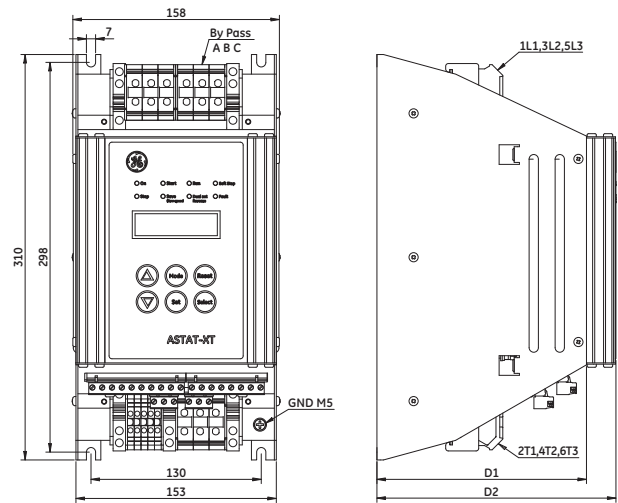
Section 2

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

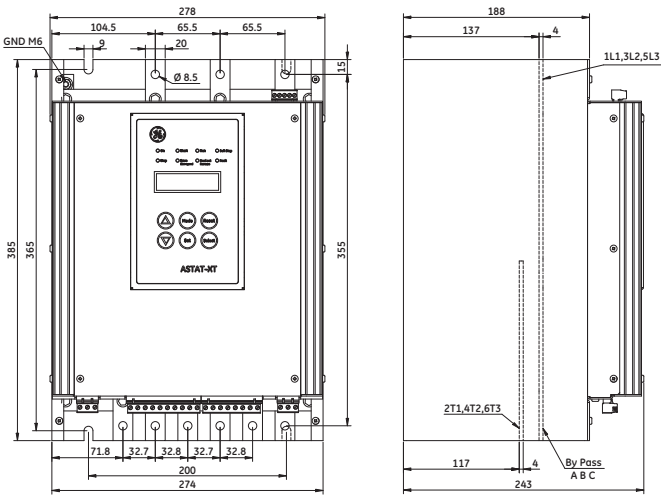
UL Certified Units

Product Number	Dimensions inches (mm)				Weight lbs. (Kg)
	Height	Width	D1	D2	
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)



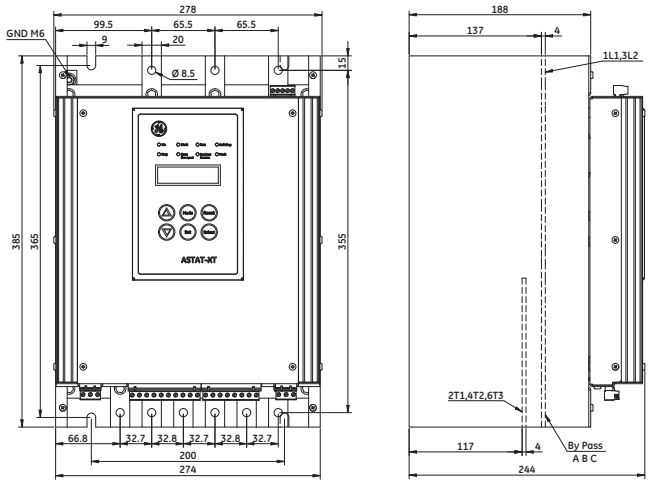
UL Certified Units

Product Number	Dimensions inches (mm)				Weight lbs. (Kg)
	Height	Width	Depth		
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)				Weight lbs. (Kg)
	Height	Width	Depth		
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)



Reduced Voltage Starters

Solid State

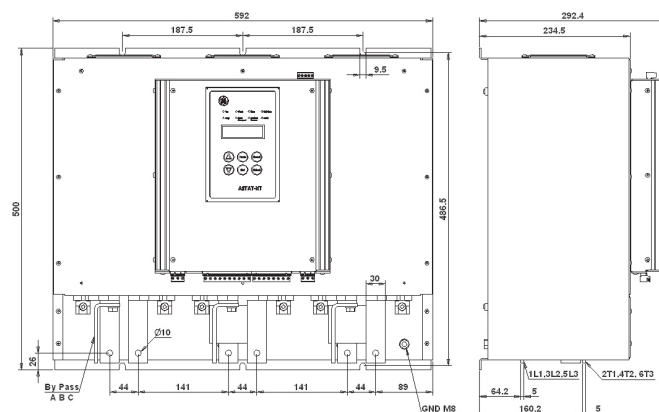
ASTAT XT Soft Starter

Outlines and Dimensions

Section 2

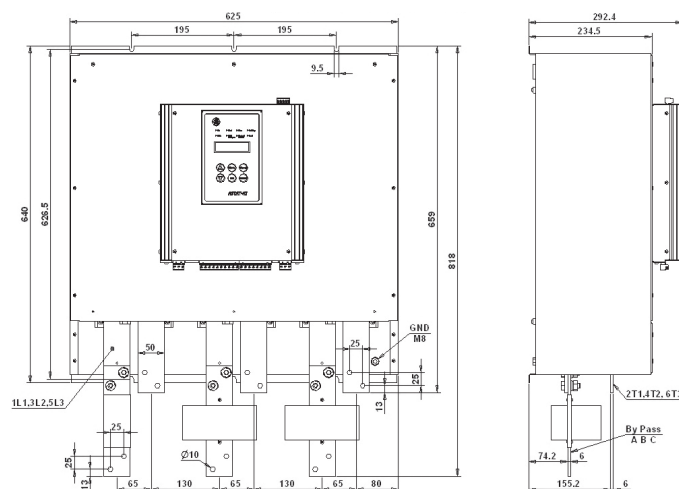
UL Certified Units

Product Number	Dimensions inches (mm)			Weight lbs. (Kg)
	Height	Width	Depth	
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)



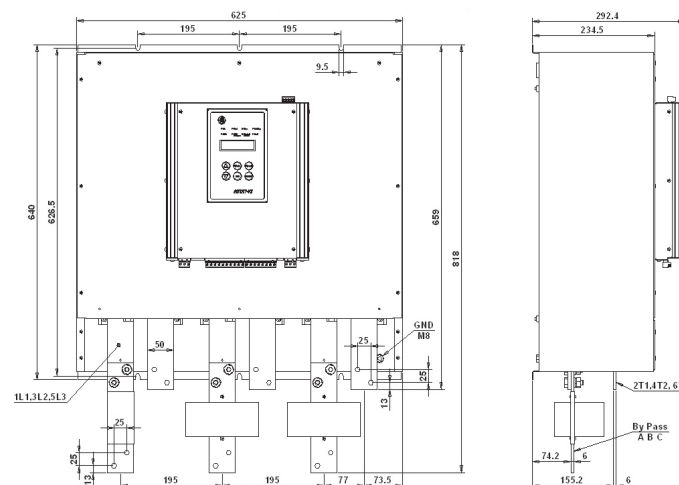
UL Certified Unit

Product Number	Dimensions inches (mm)			Weight lbs. (Kg)
	Height	Width	Depth	
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)			Weight lbs. (Kg)
	Height	Width	Depth	
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)



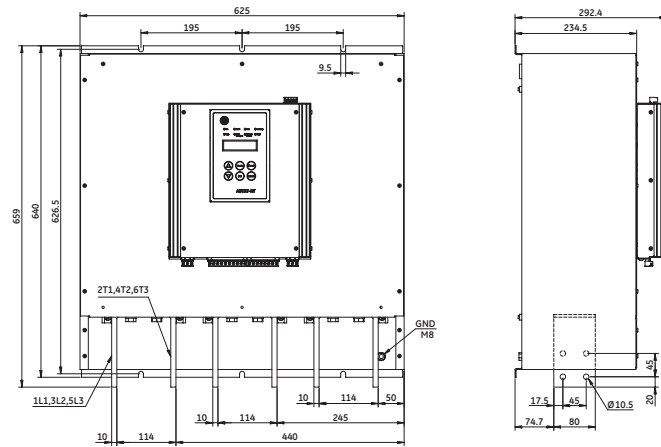
Non - UL Certified Unit

Product Number	Dimensions inches (mm)			Weight lbs. (Kg)
	Height	Width	Depth	
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)			Weight lbs. (Kg)
	Height	Width	Depth	
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)

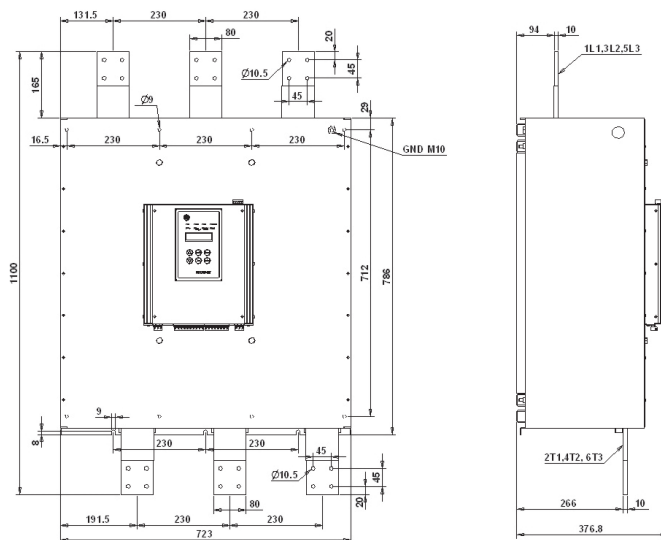
Notes:

- 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__)



Reduced Voltage Starters

Solid State

ASTAT XT Soft Starter Panels

Description and Features

Section 2

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



Reduced Voltage Starters

Solid State

ASTAT XT Soft Starter Panels

Section 2

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											Communication Options
0 = Non-Combination ¹											X = Standard (Modbus RTU)
1 = Fusible Disconnect Combination (100k AIC)											D = DeviceNet
2 = Mag Breaker Combination (65k AIC)											P = Profibus
Frame Size											Meter Options
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.											X = None
Enclosure Type											Auxiliary Contact Options
0 = Open Baseplate ¹											X = None
1 = Type 1											1 = 1 Extra Relay 3NO-1NC
2 = Type 12											2 = 1 Extra Relay 2NO-2NC
6 = Type 3R											3 = 1 Extra Relay 1NO-3NC
Line Volts											Pilot Device Options
3 = 230V											X = None
4 = 460V											B = HOA with Start
5 = 575V											C = Start And Stop
Control Circuit Options											D = Hand-Off-Auto
0 = Common Control Voltage (No CPT. Only available on 230Vac units.)											E = Red Run Light
1 = Separate Control (No CPT with Control Circuit Fuses, 120V Control)											F = Green Run Light
2 = Standard Capacity CPT (120V Control)											G = HOA with Start And Red Run Light
3 = Extra Capacity CPT (100VA , 120V Control)											H = HOA with Start And Red Run And Green Off Lights
Contactor Options											J = HOA with Start And Green Run Light
X = None											K = HOA with Start And Stop
1 = Isolation Contactor											
2 = Bypass Contactor (AC1 rating)											
3 = Bypass Starter (AC3 rating)											
4 = 1 + 2											
5 = 1 + 3											

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



Reduced Voltage Starters

Solid State

ASTAT XT Soft Starter Panels

Pricing

Section 2

ASTAT XT Soft Starter Panels Frame Size Table

Frame Code	Duty/NEMA Overload Rating											
	Light Duty NEMA 10 = L				Normal Duty NEMA 20 = N				Heavy Duty NEMA 30 = H			
	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.

Option Code	List Price GO-10A8P		List Price Adders GO-10A8P			
	CR470 Non-combination					
	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	—	—

¹Open Baseplate units are only available as Non-combination.

²NEMA 12 and 3R Adders are combined with NEMA 1 List Price to determine the panel's List Price.



Reduced Voltage Starters

Solid State

ASTAT XT Soft Starter Panels

Options Pricing

Section 2

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

Option Codes	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}
	X	1	2	4	3
A	—	\$145.00	\$200.00	\$345.00	\$600.00
B	—	\$164.00	\$219.00	\$383.00	\$619.00
C	—	\$183.00	\$238.00	\$421.00	\$638.00
D	—	\$275.00	\$370.00	\$645.00	\$770.00
E	—	\$325.00	\$420.00	\$695.00	\$820.00
F	—	\$363.00	\$458.00	\$783.00	\$858.00
G	—	\$591.00	\$686.00	\$1102.00	\$1086.00
H	—	\$591.00	\$686.00	\$1102.00	\$1086.00
J	—	\$738.00	\$943.00	\$1681.00	\$1343.00
K	—	\$1283.00	\$1873.00	\$3156.00	\$2273.00
L	—	\$1283.00	\$1873.00	\$3156.00	\$2273.00
M	—	\$2363.00	\$3193.00	\$5556.00	\$3593.00
N	—	\$3241.00	\$4071.00	\$7312.00	\$4471.00
P	—	\$4700.00	\$5530.00	\$10230.00	\$5930.00
Q	—	\$6450.00	\$7280.00	\$13730.00	\$7680.00
R	—	\$13428.00	\$14628.00	\$28056.00	\$15028.00

Pilot Device Options²

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

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 ⁵	4	\$124.00
2 Extra Relay 2NO-2NC ⁵	5	\$124.00
2 Extra Relay 1NO-3NC ⁵	6	\$124.00

¹Not available on NEMA 12 or 3R units.

²Not available on Open Baseplate units.

³AC1 units include a contactor rated for running current and the ASTAT overloads.

⁴AC3 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.

⁵Not available with Bypass configurations.



Reduced Voltage Starters

Solid State

ASTAT XT Soft Starter Panels

Options Pricing

Section 2

Meter Options¹

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 ²	K	\$650.00
Door Mounted Keypad & 1-Phase Ammeter ²	L	\$1400.00
Door Mounted Keypad & 1-Phase Voltmeter ²	M	\$1400.00
Door Mounted Keypad & 3-Phase Voltmeter ²	N	\$1610.00
Door Mounted Keypad & ETM ²	P	\$925.00
Door Mounted Keypad, 1-Phase Ammeter & 1-Phase Voltmeter ²	Q	\$2150.00
Door Mounted Keypad, 1-Phase Ammeter & 3-Phase Voltmeter ²	R	\$2360.00
Door Mounted Keypad, 1-Phase Ammeter & ETM ²	S	\$1675.00
Door Mounted Keypad, 1-Phase Voltmeter & ETM ²	T	\$1675.00
Door Mounted Keypad, 3-Phase Voltmeter & ETM ²	U	\$1885.00
Door Mounted Keypad, 1-PH Ammeter & 1-PH Voltmeter & ETM ²	V	\$2425.00
Door Mounted Keypad, 1-PH Ammeter & 3-PH Voltmeter & ETM ²	W	\$2635.00

Communication Options³

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

¹Not available on Open Baseplate units.

²Door mounted keypad is only available on NEMA 1 enclosures.

³Communication 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: CR471JN2425BXDX

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



Reduced Voltage Starters

Solid State

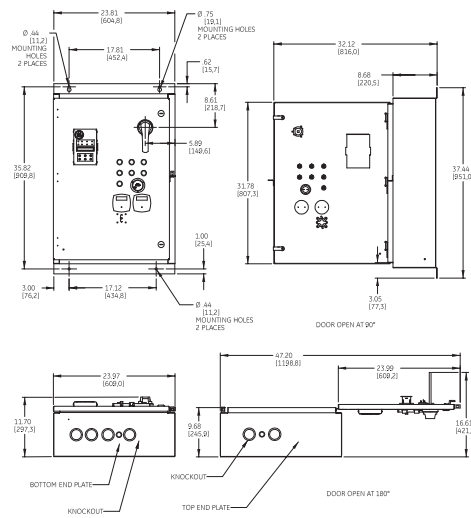
ASTAT XT Soft Starter Panels

Outlines, Dimensions and Weights

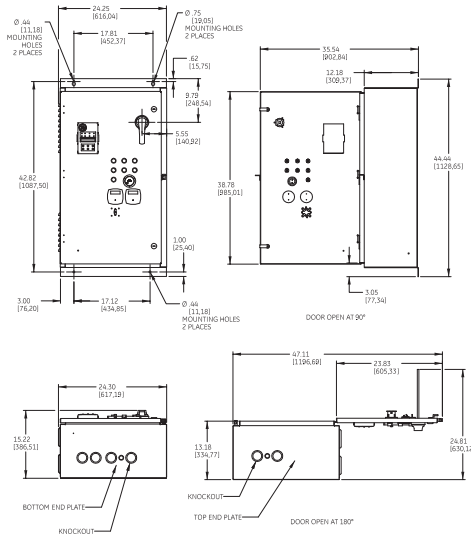
Section 2

Type 1 Enclosures

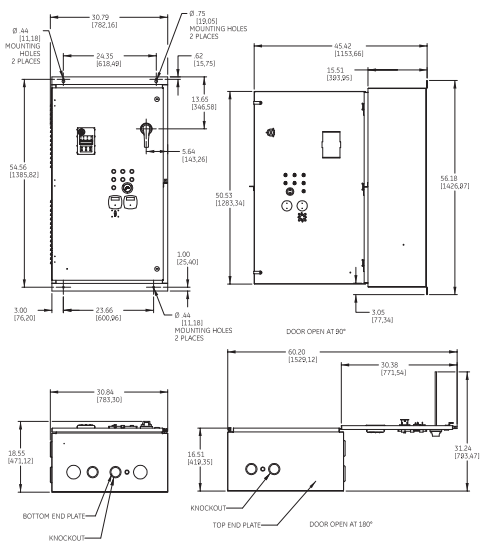
Description	Weight (lbs)	Weight (kgs)	H x W x D (in)	H x W x D (mm)	Drawing No.
2-10HP @ 230V, 5-25HP @ 460V, 5-30HP @ 575V	146.5	66.50	37.44 x 23.97 x 11.70	951.00 x 609.00 x 297.30	270A8104
15-25HP @ 230V, 30-50HP @ 460V, 40-60HP @ 575V	183.7	83.40	44.44 x 24.25 x 15.22	1128.65 x 616.04 x 386.51	270A8105
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



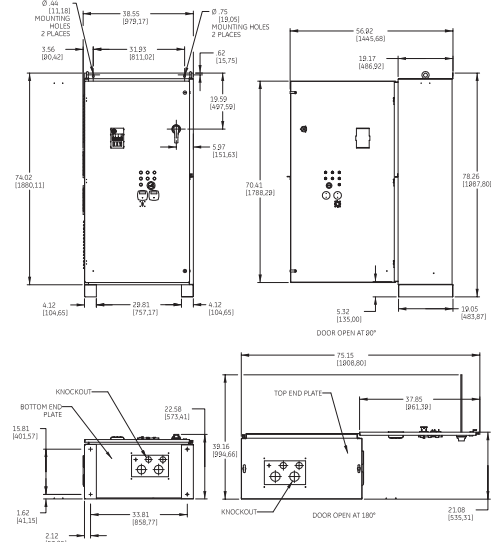
2-10HP @ 230V, 5-25HP @ 460V, 5-30HP @ 575V



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.



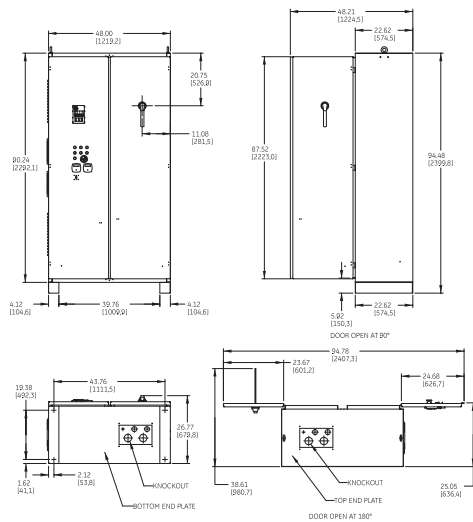
Reduced Voltage Starters

Solid State

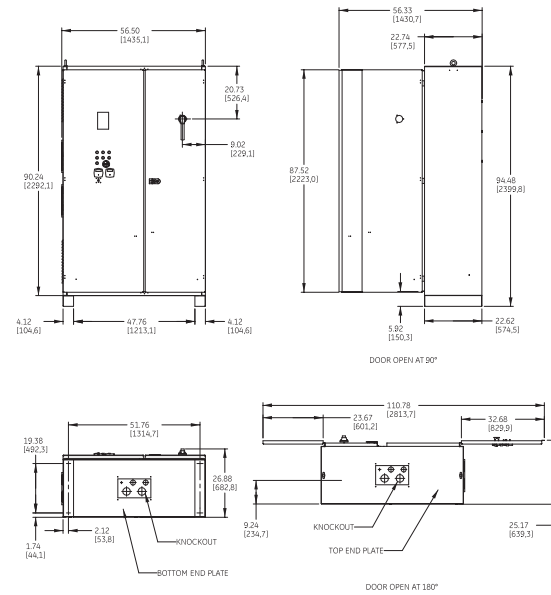
ASTAT XT Soft Starter Panels

Outlines, Dimensions and Weights

Section 2



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.



Reduced Voltage Starters Solid State

ASTAT XB, XBm and XL Soft Starters

Overview

Description

The GE ASTAT family of Low Voltage Soft Starters has expanded to include the new XB and XBm series in the power range from 18 to 200A, 7.5 to 110kW at 400Vac, 10 to 180HP at 460Vac, with a wide voltage range of 200 to 575Vac, and the new XL series in the power range from 23 to 1600A, 11 to 850kW at 400Vac, 15 to 1340HP at 460Vac, with a wide voltage range of 200 to 690Vac.

The new XB and XBm series are compact and cost effective soft starter solutions, offering simple operation, with a built-in bypass function and conformal coated as standard. They feature easy DIN-rail mounting for sizes up to 60A, 30kW/50HP at 460Vac; 2-wire or 3-wire start/stop control and excellent starting duty (4 x In for 6 seconds); heavy starting ratings at 4x In for 20 seconds; and are compatible with grounded delta power systems. The XB and XBm series are ideal for applications that include pumps, fans, compressors and conveyors.

The ASTAT XBm is a Constant Current system with current measurement and control. It provides a range of motor protection functions in addition to soft start and soft stop. Protections include motor overload, phase loss and excess start time, along with a programmable relay.

The new XL series has an intuitive user-friendly keypad, with four-line multi-language text (8 languages: English, German, French, Spanish, Portuguese, Italian, Chinese and Russian), real-time graphs of motor operating performance and 3 types of setup menus: Standard, Extended and Quick. It can record the last 8 trips, up to 99 events log.

The ASTAT XL is a Constant Current and Current Ramp but also able to control acceleration. According to your application, you can select between early, constant or late acceleration/ deceleration. The XL series are ideal for applications that include pumps, fans, compressors, conveyors, mixers, mills and centrifuges.

XB and XBm Features

- Compact design
- Built-in bypass
- User friendly
- Conformal coated PCBs (3C2)
- DIN-rail mounting up to 30kW at 400Vac, 50HP at 460Vac
- Motor protections (XBm series)
- Remote operator kit available as option

XL Features

- Compact design
- Built-in bypass (up to 1000A)
- User-friendly programming and feedback
- Conformal coated PCBs (3C2)
- Automatically detects in-line or inside delta connection
- Adjustable busbars for both top and bottom entry above 360A, 200kW at 400Vac, 300HP at 460Vac
- Motor protections
- DC injection braking distributed over the 3 phases



ASTAT XB



ASTAT XBm



ASTAT XL



Reduced Voltage Starters

Solid State

ASTAT XB, XBm and XL Soft Starters

Section 2

Function Overview

Series ASTAT	XB	XBm	XL
Starting functions			
Timed Voltage Ramp	•	–	–
Current Limit	–	•	•
Current Ramp	–	•	•
Kick Start	–	–	•
Adaptative Control	–	–	•
Stopping			
Coast to stop	•	•	•
Timed Voltage Ramp	•	•	•
Adaptative Control	–	–	•
Protection			
Excess Start time	–	•	•
Phase loss	–	•	•
Phase sequence	–	•	•
Current imbalance	–	•	•
Instantaneous overcurrent	–	•	•
Undercurrent	–	–	•
Motor overload	–	•	•
Motor thermistor	–	•	•
Bypass overload	–	•	•
Power Circuit fault	•	•	•
Supply frequency	•	•	•
Communications failure	•	•	•
Interface			
Fixed relay (main contactor)	•	•	•
Programmable relay (Trip or Run)	–	•	•
Run relay	•	–	•
Accessories			
Remote operator	•	•	•
Modbus RTU interface	•	•	•
Modbus TCP/IP interface	•	•	•
Profibus interface	•	•	•
Profinet interface	•	•	•
Ethernet/IP interface	•	•	•
DeviceNet interface	•	•	•
USB interface	•	•	•
IP20 Terminal protection kit (above 140A)	•	•	•
IP20 Terminal protection kit (from 255 to 1000A)	–	–	•
ASTAT Select tool ed.1 (free download)	•	•	•
ASTAT Setup tool ed.3 (free download)	•	•	•

Legend • = AVAILABLE – = NOT AVAILABLE



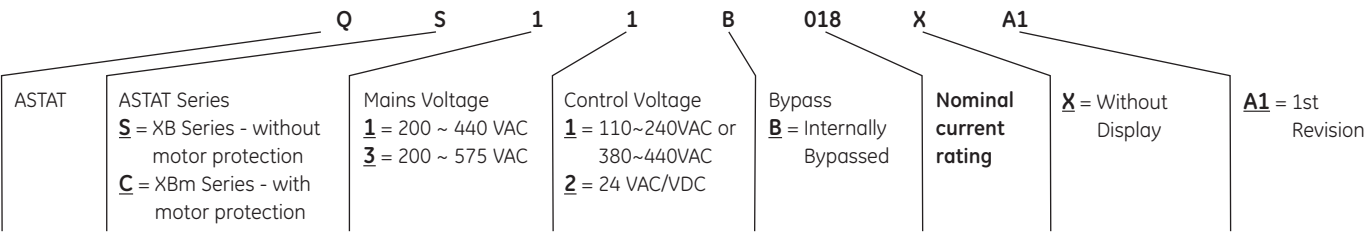
Reduced Voltage Starters Solid State

Section 2

ASTAT XB, XBm and XL Soft Starters

Product Number Configuration

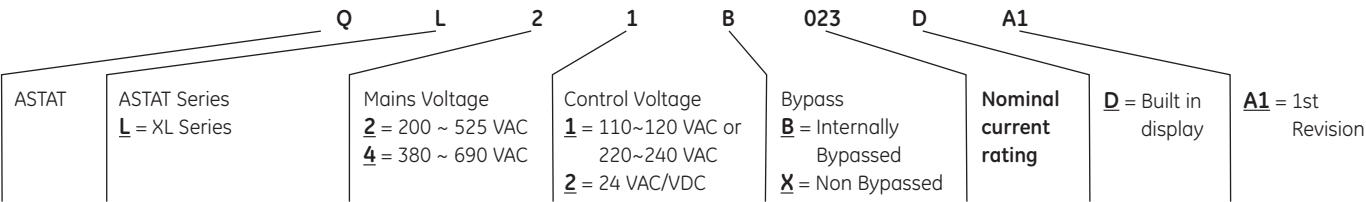
ASTAT XB and XBm



Current Ratings

Unit Size	
18A	1
34A	
48A	
60A	
75A	2
85A	
100A	
140A	
170A	3
200A	
AC53b 4.0-6:354	
AC53b 4.0-6:394	

ASTAT XL



Current Ratings

Bypassed		Non Bypassed	
18	23A	3C	-
	43A		-
	50A		-
	53A		-
	76A		-
	97A		-
	100A		-
	105A		-
	145A		-
	170A		-
28	200A	4C	-
	220A		-
	255A		360A
	350A		380A
38	425A	5C	430A
	500A		620A
	580A		650A
	700A		790A
	820A		930A
	920A		1200A
487	1000A	5C	1410A
	-		1600A
	-		-



Reduced Voltage Starters

Solid State

ASTAT XB and XBm Soft Starters

Ordering Information

Section 2

ASTAT XB and XBm Ordering Information

				Mains voltage: 200 to 440Vac ; Control voltage: 110 to 240Vac ¹		Mains voltage: 200 to 575Vac ; Control voltage: 110 to 240Vac ¹	
Normal Duty		Heavy Duty		ASTAT XB	ASTAT XBm	ASTAT XB	ASTAT XBm
AC53b 4-6:354		AC53b 4-20:340					
40°C	50°C	40°C	50°C	Product Number	Product Number	Product Number	Product Number
Current Rating							
18A	17A	17A	15A	QS11B018XA1	QC11B018XA1	QS31B018XA1	QC31B018XA1
34A	32A	30A	28A	QS11B034XA1	QC11B034XA1	QS31B034XA1	QC31B034XA1
42A	40A	36A	33A	QS11B042XA1	QC11B042XA1	QS31B042XA1	QC31B042XA1
48A	44A	40A	36A	QS11B048XA1	QC11B048XA1	QS31B048XA1	QC31B048XA1
60A	55A	49A	45A	QS11B060XA1	QC11B060XA1	QS31B060XA1	QC31B060XA1
AC53b 4-6:594		AC53b 4-20:580					
40°C	50°C	40°C	50°C	Product Number	Product Number	Product Number	Product Number
Current Rating							
75A	68A	65A	59A	QS11B075XA1	QC11B075XA1	QS31B075XA1	QC31B075XA1
85A	78A	73A	67A	QS11B085XA1	QC11B085XA1	QS31B085XA1	QC31B085XA1
100A	100A	96A	87A	QS11B100XA1	QC11B100XA1	QS31B100XA1	QC31B100XA1
140A	133A	120A	110A	QS11B140XA1	QC11B140XA1	QS31B140XA1	QC31B140XA1
170A	157A	142A	130A	QS11B170XA1	QC11B170XA1	QS31B170XA1	QC31B170XA1
200A	186A	165A	152A	QS11B200XA1	QC11B200XA1	QS31B200XA1	QC31B200XA1

¹Control voltage: 24Vac/dc is also available, please consult GE.

Above values are for altitude < 1000m/3300ft.

ASTAT XB and XBm Options

Description	Product Number
Ethernet Communication module	QOEIP
DeviceNet Communication module	QODEV
Modbus RTU Communication module	QOMB
Modbus TCP Communication module	QOMBTCP
Profibus Communication module	QOPDP
Profinet Communication module	QOPRT
USB module	QOUSB
Remote Control Panel	QORCPXB
IP20 finger protection 140 to 200A	QOFPROTXB

AC53b Utilization Code

80A	:	AC-53b	3.5	-	15	:	345
							Off time (seconds)
							Start time (seconds)
							Start current (multiple of motor full load current)
							Start current rating (Amperes)

Starter Current Rating: The full load current rating of the soft starter given the parameters detailed in the remaining sections of the utilization code.

Start Current: The maximum available start current.

Start Time: The maximum allowable start time.

Off Time: The minimum allowable time between the end of one start and the beginning of the next start.



Reduced Voltage Starters

Solid State

ASTAT XL Soft Starters

Ordering Information

Section 2

ASTAT XL Ordering Information

Current ratings for bypass operation

In-line connection

				Mains voltage: 200 to 525Vac ; Control voltage: 110 to 240Vac ¹	Mains voltage: 380 to 690Vac ; Control voltage: 110 to 240Vac ¹
Light Duty	Normal Duty	Heavy Duty	Severe Duty	ASTAT XL	ASTAT XL
AC53b 3.0-10:350	AC53b 3.5-15:345	AC53b 4.0-20:340	AC53b 4.5-30:330		
40°C				Product Number	Product Number
Current Rating					
23A	20A	17A	15A	QL21B023DA1	QL41B023DA1
43A	37A	31A	26A	QL21B043DA1	QL41B043DA1
50A	44A	37A	30A	QL21B050DA1	QL41B050DA1
53A	53A	46A	37A	QL21B053DA1	QL41B053DA1
AC53b 3.0-10:390	AC53b 3.5-15:385	AC53b 4.0-20:580	AC53b 4.5-30:570		
40°C				Product Number	Product Number
Current Rating					
76A	64A	55A	47A	QL21B076DA1	QL41B076DA1
97A	82A	69A	58A	QL21B097DA1	QL41B097DA1
100A	88A	74A	61A	QL21B100DA1	QL41B100DA1
105A	105A	95A	78A	QL21B105DA1	QL41B105DA1
145A	123A	106A	90A	QL21B145DA1	QL41B145DA1
170A	145A	121A	97A	QL21B170DA1	QL41B170DA1
200A	189A	160A	134A	QL21B200DA1	QL41B200DA1
220A	210A	178A	148A	QL21B220DA1	QL41B220DA1
255A	231A	201A	176A	QL21B255DA1	QL41B255DA1
255A	231A	201A	176A	QL21X255DA1	QL41X255DA1
350A	329A	284A	244A	QL21B350DA1	QL41B350DA1
360A	360A	310A	263A	QL21X360DA1	QL41X360DA1
380A	380A	359A	299A	QL21X380DA1	QL41X380DA1
425A	411A	355A	305A	QL21B425DA1	QL41B425DA1
430A	430A	368A	309A	QL21X430DA1	QL41X430DA1
500A	445A	383A	326A	QL21B500DA1	QL41B500DA1
580A	492A	425A	364A	QL21B580DA1	QL41B580DA1
620A	620A	540A	434A	QL21X620DA1	QL41X620DA1
650A	650A	561A	455A	QL21X650DA1	QL41X650DA1
700A	592A	512A	438A	QL21B700DA1	QL41B700DA1
790A	790A	714A	579A	QL21X790DA1	QL41X790DA1
820A	705A	606A	516A	QL21B820DA1	QL41B820DA1
920A	804A	684A	571A	QL21B920DA1	QL41B920DA1
930A	930A	829A	661A	QL21X930DA1	QL41X930DA1
1000A	936A	796A	664A	QL21B1K0DA1	QL41B1K0DA1
1200A	1200A	1200A	1071A	QL21X1K2DA1	QL41X1K2DA1
1410A	1410A	1319A	1114A	QL21X1K4DA1	QL41X1K4DA1
1600A	1600A	1600A	1353A	QL21X1K6DA1	QL41X1K6DA1

¹Control voltage: 24Vac/dc is also available, please consult GE.

Above values are for altitude < 1000m/3300ft.



Reduced Voltage Starters

Solid State

ASTAT XL Soft Starters

Ordering Information

Section 2

ASTAT XL Ordering Information

Current ratings for bypass operation

Inside delta connection

				Mains voltage: 200 to 525Vac ; Control voltage: 110 to 240Vac ¹	Mains voltage: 380 to 690Vac ; Control voltage: 110 to 240Vac ¹
Light Duty	Normal Duty	Heavy Duty	Severe Duty	ASTAT XL	ASTAT XL
AC53b 3.0-10:350	AC53b 3.5-15:345	AC53b 4.0-20:340	AC53b 4.5-30:330	Product Number	Product Number
40°C					
Current Rating					
34A	30A	26A	22A	QL21B023DA1	QL41B023DA1
64A	59A	51A	44A	QL21B043DA1	QL41B043DA1
75A	66A	55A	45A	QL21B050DA1	QL41B050DA1
79A	79A	69A	55A	QL21B053DA1	QL41B053DA1
AC53b 3.0-10:390	AC53b 3.5-15:385	AC53b 4.0-20:580	AC53b 4.5-30:570	Product Number	Product Number
40°C					
Current Rating					
114A	96A	83A	70A	QL21B076DA1	QL41B076DA1
145A	123A	104A	87A	QL21B097DA1	QL41B097DA1
150A	132A	112A	92A	QL21B100DA1	QL41B100DA1
157A	157A	143A	117A	QL21B105DA1	QL41B105DA1
218A	184A	159A	136A	QL21B145DA1	QL41B145DA1
255A	217A	181A	146A	QL21B170DA1	QL41B170DA1
300A	283A	241A	200A	QL21B200DA1	QL41B200DA1
330A	315A	268A	223A	QL21B220DA1	QL41B220DA1
382A	346A	302A	264A	QL21B255DA1	QL41B255DA1
382A	346A	302A	264A	QL21X255DA1	QL41X255DA1
525A	494A	427A	366A	QL21B350DA1	QL41B350DA1
540A	540A	465A	395A	QL21X360DA1	QL41X360DA1
570A	570A	539A	449A	QL21X380DA1	QL41X380DA1
638A	617A	533A	458A	QL21B425DA1	QL41B425DA1
645A	645A	552A	464A	QL21X430DA1	QL41X430DA1
750A	668A	575A	490A	QL21B500DA1	QL41B500DA1
870A	738A	637A	546A	QL21B580DA1	QL41B580DA1
930A	930A	810A	651A	QL21X620DA1	QL41X620DA1
975A	975A	842A	683A	QL21X650DA1	QL41X650DA1
1050A	889A	768A	658A	QL21B700DA1	QL41B700DA1
1185A	1185A	1071A	868A	QL21X790DA1	QL41X790DA1
1230A	1058A	910A	774A	QL21B820DA1	QL41B820DA1
1380A	1206A	1026A	857A	QL21B920DA1	QL41B920DA1
1395A	1395A	1244A	992A	QL21X930DA1	QL41X930DA1
1500A	1404A	1194A	997A	QL21B1K0DA1	QL41B1K0DA1
1800A	1800A	1800A	1606A	QL21X1K2DA1	QL41X1K2DA1
2115A	2115A	1979A	1671A	QL21X1K4DA1	QL41X1K4DA1
2400A	2400A	2400A	2030A	QL21X1K6DA1	QL41X1K6DA1

¹Control voltage: 24Vac/dc is also available, please consult GE.

Note: Models QLxxX__DA1 must be externally bypassed.

Above values are for altitude < 1000m/3300ft.



Reduced Voltage Starters

Solid State

ASTAT XL Soft Starters

Ordering Information

Section 2

ASTAT XL Ordering Information

Current ratings for continuous operation (not bypassed)

In-line connection

				Mains voltage: 200 to 525Vac ; Control voltage: 110 to 240Vac ¹	Mains voltage: 380 to 690Vac ; Control voltage: 110 to 240Vac ¹
Light Duty	Normal Duty	Heavy Duty	Severe Duty	ASTAT XL	ASTAT XL
AC53b 3-10:50-6	AC53b 3.5-15:50-6	AC53b 4-20:50-6	AC53b 4.5-30:50-6		
40°C				Product Number	Product Number
Current Rating					
255A	222A	195A	171A	QL21X255DA1	QL41X255DA1
360A	351A	303A	259A	QL21X360DA1	QL41X360DA1
380A	380A	348A	292A	QL21X380DA1	QL41X380DA1
430A	413A	355A	301A	QL21X430DA1	QL41X430DA1
620A	614A	515A	419A	QL21X620DA1	QL41X620DA1
650A	629A	532A	437A	QL21X650DA1	QL41X650DA1
790A	790A	694A	567A	QL21X790DA1	QL41X790DA1
930A	930A	800A	644A	QL21X930DA1	QL41X930DA1
1200A	1200A	1135A	983A	QL21X1K2DA1	QL41X1K2DA1
1410A	1355A	1187A	1023A	QL21X1K4DA1	QL41X1K4DA1
1600A	1600A	1433A	1227A	QL21X1K6DA1	QL41X1K6DA1

¹Control voltage: 24Vac/dc is also available, please consult GE.

Above values are for altitude < 1000m/3300ft.

ASTAT XL Ordering Information

Current ratings for continuous operation (not bypassed)

Inside delta connection

				Mains voltage: 200 to 525Vac ; Control voltage: 110 to 240Vac ¹	Mains voltage: 380 to 690Vac ; Control voltage: 110 to 240Vac ¹
Light Duty	Normal Duty	Heavy Duty	Severe Duty	ASTAT XL	ASTAT XL
AC53b 3-10:50-6	AC53b 3.5-15:50-6	AC53b 4-20:50-6	AC53b 4.5-30:50-6		
40°C				Product Number	Product Number
Current Rating					
382A	334A	293A	257A	QL21X255DA1	QL41X255DA1
540A	527A	455A	388A	QL21X360DA1	QL41X360DA1
570A	570A	522A	437A	QL21X380DA1	QL41X380DA1
645A	620A	533A	451A	QL21X430DA1	QL41X430DA1
930A	920A	773A	628A	QL21X620DA1	QL41X620DA1
975A	943A	778A	656A	QL21X650DA1	QL41X650DA1
1185A	1185A	1041A	850A	QL21X790DA1	QL41X790DA1
1395A	1395A	1200A	966A	QL21X930DA1	QL41X930DA1
1800A	1800A	1702A	1474A	QL21X1K2DA1	QL41X1K2DA1
2115A	2033A	1780A	1535A	QL21X1K4DA1	QL41X1K4DA1
2400A	2400A	2149A	1840A	QL21X1K6DA1	QL41X1K6DA1

¹Control voltage: 24Vac/dc is also available, please consult GE.

Above values are for altitude < 1000m/3300ft.



Reduced Voltage Starters

Solid State

ASTAT XL Soft Starters

Section 2

ASTAT XL Minimum and Maximum Current settings

Model	In-line connection		Inside delta connection	
	Minimum	Maximum	Minimum	Maximum
QLxxB023D	5A	23A	5A	34A
QLxxB043D	9A	43A	9A	64A
QLxxB050D	10A	50A	10A	75A
QLxxB053D	11A	53A	11A	79A
QLxxB076D	15A	76A	15A	114A
QLxxB097D	19A	97A	19A	145A
QLxxB100D	20A	100A	20A	150A
QLxxB105D	21A	105A	21A	157A
QLxxB145D	29A	145A	29A	217A
QLxxB170D	34A	170A	34A	255A
QLxxB200D	40A	200A	40A	300A
QLxxB220D	44A	220A	44A	330A
QLxxB255D	51A	255A	51A	382A
QLxxX255D	51A	255A	51A	382A
QLxxB350D	70A	350A	70A	525A
QLxxX360D	72A	360A	72A	540A
QLxxX380D	76A	380A	76A	570A
QLxxB425D	85A	425A	85A	638A
QLxxX430D	86A	430A	86A	645A
QLxxB500D	100A	500A	100A	750A
QLxxB580D	116A	580A	116A	870A
QLxxX620D	124A	620A	124A	930A
QLxxX650D	130A	650A	130A	975A
QLxxB700D	140A	700A	140A	1050A
QLxxX790D	158A	790A	158A	1185A
QLxxB820D	164A	820A	164A	1230A
QLxxB920D	184A	920A	184A	1380A
QLxxX930D	186A	930A	186A	1395A
QLxxB1K0D	200A	1000A	200A	1500A
QLxxX1K2D	240A	1200A	240A	1800A
QLxxX1K4D	282A	1410A	282A	2115A
QLxxX1K6D	320A	1600A	320A	2400A

ASTAT XL Options

Description	Product Number
Ethernet Communication module	QOEIP
DeviceNet Communication module	QODEV
Modbus RTU Communication module	QOMB
Modbus TCP Communication module	QOMBTCP
Profibus Communication module	QOPDP
Profinet Communication module	QOPRT
USB module	QOUSB
Remote Control Panel	QORCPXL
IP20 finger protection 145 to 220A	QOFPROTXL2
IP20 finger protection 255 to 425A	QOFPROTXL3
IP20 finger protection 500 to 1000A	QOFPROTXL4



Reduced Voltage Starters Solid State

ASTAT XB, XBm Soft Starters

Accessories

Section 2

Semiconductor Fuses

Semiconductor fuses can be used with ASTAT XB and XBm soft starters to reduce the potential for damage to SCRs from transient overload currents and for Type 2 coordination. ASTAT XB and XBm soft starters have been tested to achieve Type 2 coordination with semiconductor fuses. Suitable Bussmann and Ferraz/Mersen semiconductor fuses are detailed below:

Model	SCR I ² t (A ² s)	Ferraz/Mersen Fuse European/IEC style (North American style)	Bussmann Fuse Square body	Bussmann Fuse British style (BS88)
QS/QCxx018	1150	6.6URD30xxxA0063 (A070URD30xxx0063)	170M-1314	63 FE
QS/QCxx034	8000	6.6URD30xxxA0125 (A070URD30xxx0125)	170M-1317	160 FEE
QS/QCxx042	10500	6.6URD30xxxA0160 (A070URD30xxx0160)	170M-1318	160 FEE
QS/QCxx048	15000	6.6URD30xxxA0160 (A070URD30xxx0160)	170M-1318	180 FM
QS/QCxx060	18000	6.6URD30xxxA0160 (A070URD30xxx0160)	170M-1319	180 FM
QS/QCxx075	51200	6.6URD30xxxA0250 (A070URD30xxx0250)	170M-1321	250 FM
QS/QCxx085	80000	6.6URD30xxxA0315 (A070URD30xxx0315)	170M-1321	250 FM
QS/QCxx100	97000	6.6URD30xxxA0315 (A070URD30xxx0315)	170M-1321	250 FM
QS/QCxx140	168000	6.6URD31xxxA0450 (A070URD31xxx0450)	170M-1322	500 FMM
QS/QCxx170	245000	6.6URD31xxxA0450 (A070URD31xxx0450)	170M-3022	500 FMM
QS/QCxx200	320000	6.6URD31xxxA0450 (A070URD31xxx0450)	170M-3022	500 FMM



Reduced Voltage Starters Solid State

Section 2

ASTAT XB, XBm and XL Soft Starters Accessories

Remote Operator (for ASTAT XB and XBm)

The remote operator controls and monitors motor performance via a communication module including:

- Operational control (start, stop, reset)
- Status monitoring (start, run and trip)
- Performance monitoring (motor current and temperature)
- Trip Code display
- 4-20 mA analog output

Description	Product Number
Remote Operator (only for ASTAT XB and XBm)	QORCPXB

Remote Control Panel (for ASTAT XL)

Besides the control panel located on the soft starter ASTAT XL, it is possible to have a remote control panel that replicates display functionality and content, while operating in parallel. This control panel is hot removable and it has the copycat function. Remote mountable keypad with IP65 and supplied with 3m cable.

Description	Product Number
Remote Control Panel (for XL only)	QORCPXL

Common accessories XB - XBm - XL

Communication Modules

Supports USB and many network communication such as Profibus, Profinet, Ethernet, DeviceNet and Modbus RTU protocols, via an easy-to-install Plug & Play communication interface modules.

Description	Product Number
Ethernet Communication module	QOEIP
DeviceNet Communication module	QODEV
Modbus RTU Communication module	QOMB
Modbus TCP Communication module	QOMBTCP
Profibus Communication module	QOPDP
Profinet Communication module	QOPRT
USB module	QOUSB

IP20 Protection Kit

This option ensures personnel safety by preventing accidental contact with live terminals. Provide IP20 protection when used with cable of diameter 22 mm or greater.

Description	For use with	Product Number
IP20 finger protection 140 to 200A	XB and XBm	QOFPROTXB
IP20 finger protection 145 to 220A	XL	QOFPROTXL2
IP20 finger protection 255 to 425A	XL	QOFPROTXL3
IP20 finger protection 500 to 1000A	XL	QOFPROTXL4

ASTAT Setup Tool ed.3

With this new edition, exclusive for ASTAT XB, XBm and XL series, you can control and monitor your soft starter from your desktop computer.



Reduced Voltage Starters

Solid State

ASTAT XB, XBm and XL Soft Starters

Section 2

Technical Specifications

Series	XB - XBm	XL
Rated Current Range	18 to 200A	23 to 1600A
Motor connection	In-line	In-line or Inside delta
Bypass	Internal	Internal, from 23 to 1000A External, from 255 to 1600A
Supply		
Mains frequency	45 Hz to 66 Hz	45 Hz to 66 Hz
Rated insulation voltage	600Vac	600Vac
Mains Voltage (A1, A2, A3)		
XB series: QS1_B_XA1	3 x 200 VAC ~ 440 VAC (+ 10%/-15%)	-
XBm series: QC1_B_XA1		
XB series: QS3_B_XA1	3 x 200 VAC ~ 575 VAC (+ 10%/-15%)	-
XBm series: QC3_B_XA1		
XL series: QL2_B/X_D A1	-	3 x 200 VAC ~ 525 VAC (± 10%)
	-	3 x 380 VAC ~ 600 VAC (± 10%)
XL series: QL4_B/X_D A1	-	(in-line or inside delta connection)
	-	3 x 380 VAC ~ 690 VAC (±10%)
		(earthed star supply system only)
Control Voltage (A1, A2, A3)		
XB series: QS_1B_XA1	110 ~ 240 VAC (+ 10% / -15%)	-
XBm series: QC_1B_XA1	or 380 ~ 440 VAC (+ 10% / -15%)	-
XB series: QS_2B_XA1		-
XBm series: QC_2B_XA1	24 VAC AC/24 VDC (+ 20%)	-
XL series: QL_1B/X_D A1	-	110 ~ 240 VAC (+ 10% / -15%), 600mA
XL series: QL_2B/X_D A1	-	24 VAC AC/24 VDC (+ 20%), 2.8A
Current consumption (during run)	< 100mA	-
Current consumption (inrush)		
QSx1xxxxXA1	10A	-
QSx2xxxxXA1	2A	-
Input		
Input rating	-	Active 24 VDC, 8mA approx
Start (terminal 01)	NO, 150 kOhm at 300 VAC max and 5.6 kOhm at 24 VAC/DC	-
Start (terminal 54, 55)	-	NO
Stop (terminal 02)	NO, 150 kOhm at 300 VAC max and 5.6 kOhm at 24 VAC/DC	-
Stop (terminal 56, 57)	-	NC
Reset (terminal 58, 57)	-	NC
Programmable input (terminal 53, 55)	-	NO
Motor Thermistor (B4, B5) (ASTAT XBm only)	-	-
Motor Thermistor (terminal 64, 65)	-	Trip > 3.6kOhm, reset <1.6kOhm
Relay Outputs	-	10A at 250 VAC resistive, 5A at 250 VAC AC15 pf 0.3
Main Contactor (13, 14)	NO	-
	6A, 30 VDC resistive / 2A, 400 VAC, AC11	-
ASTAT XB - Run relay	NO	-
ASTAT XBm - Programmable relay (23, 24)	NO	-
	6A, 30 VDC resistive / 2A, 400 VAC, AC11	-
Programmable Outputs		
Relay A (terminal 13, 14)	-	NO
Relay B (terminal 21, 22, 24)	-	CO
Relay C (terminal 33, 34)	-	NO
Analog output (terminal 40, 41)		
Maximum load	-	0-20mA or 4-20mA (selectable)
Accuracy	-	600W (12 VDC at 20mA)
	-	+/- 5%
24 VDC output (terminal 55, 41)		
Maximum load	-	200 mA
Accuracy	-	+/- 10%



Reduced Voltage Starters

Solid State

ASTAT XB, XBm and XL Soft Starters

Section 2

Technical Specifications

Series	XB - XBm	XL
Environmental		
IP20	18 to 100A	23 to 105A
IP00	140 to 200A	145 to 1600A
Operating temperature	-10 °C, max 60 °C, above 40 °C with derating	
Storage temperature	-25 °C to +60 °C	
Operating altitude	0 - 1000m, above 1000m with derating	
Humidity	5% to 95% Relative Humidity	
Pollution degree	Degree 3	
Vibration	IEC 60068 Test Fc Sinusoidal	
	4Hz to 13.2Hz: +/- 1mm displacement	
	13.2Hz to 200Hz: +/- 0.7 g	
	Standard (3C2)	
Conformal Coating		
Electromagnetic Capability (Compliant With EU Directive 89/336/EEC)		
EMC Emission	IEC 60947-4-2 Class B and Lloyds Marine No 1 Specification	
Equipment class (EMC)	Class B	
Conducted radio frequency emission	0.15 MHz to 0.5MHz: < 56 - 46 dB (µV), 0.5 MHz to 5 MHz: < 46 dB (µV), 5 MHz to 30 MHz: < 50 dB (µV)	
Radiated radio frequency emission	30 MHz to 230 MHz: < 30 dB (µV/m), 230 MHz to 1000 MHz: < 37 dB (µV/m)	
EMC Immunity	IEC 60947-4-2	
Electrostatic discharge	4kV contact discharge, 8kV air discharge	-
Radio frequency electromagnetic field	0.15 MHz to 1000 MHz: 140 dB (µV)	-
Rated impulse withstand voltage (fast transients 5/50 ns)	2kV line to earth, 1kV line to line	-
Voltage dip and short time interruption	100ms (at 40% nominal voltage)	-
Harmonics and distortion	IEC 61000-2-4 (Class 3), EN/IEC 61800-3-	
Short Circuit Capability		
Rated short circuit current XB, XBm: 18 to 48A	5kA ¹	-
Rated short circuit current XB, XBm: 60 to 200A	10kA ¹	-
Coordination with semiconductor fuses	-	Type 2
Coordination with HRC fuses	-	Type 1
QLxxB023D ~ QLxxB220D	-	prospective current 65kA
QLxxB255D ~ QLxxB1K0D	-	prospective current 85kA
QLxxX255D ~ QLxxX930D	-	prospective current 85kA
QLxxX1K2D ~ QLxxX1K6D	-	prospective current 100kA
Heat Dissipation		
During Start	3 W/Ampere	4.5 W/Ampere
During Run	10 W typical	
QLxxB023D ~ QLxxB053D	-	≤ 39 W approx.
QLxxB076D ~ QLxxB105D	-	≤ 51 W approx.
QLxxB145D ~ QLxxB220D	-	≤ 120 W approx.
QLxxB255D ~ QLxxB500D	-	≤ 140 W approx.
QLxxB580D ~ QLxxB1K0D	-	≤ 357 W approx.
QLxxX255D ~ QLxxX1K6D	-	4.5 W/ampere approx.
UL certification		
QLxxB023D ~ QLxxB105D	-	No additional requirement
QLxxB145D ~ QLxxB220D	-	Use finger guard kit, QOFPROTXL2
	-	Use the recommended pressure terminal/connector kit
QLxxB255D ~ QLxxB425D	-	Use finger guard kit, QOFPROTXL3
	-	Use the recommended pressure terminal/connector kit
QLxxX255D	-	Use the recommended pressure terminal/connector kit
QLxxX360D ~ QLxxX1K6D	-	Configure the busbar for line / load terminals at opposite ends of ASTAT XL (i.e. Top In, Bottom Out or Top Out, Bottom In)
	-	Use the recommended pressure terminal/connector kit
	-	These models are UL recognized components. Separate cable landing busbars may be required within the electrical cabinet when terminating cables sized according to the National Wiring Code (NEC) regulations
QLxxB500D ~ QLxxB1K0D	-	

¹These short circuit ratings are with fuses used as given in the table under Semiconductor fuses

IMPORTANT: ADDITIONAL REQUIREMENTS AND CONFIGURATION SETTINGS FOR ASTAT XL TO BE UL-COMPLIANT

See also UL Fuse selection and Short Circuit ratings



Reduced Voltage Starters

Solid State

ASTAT XB, XBm and XL Soft Starters

Section 2

Soft Start Methods

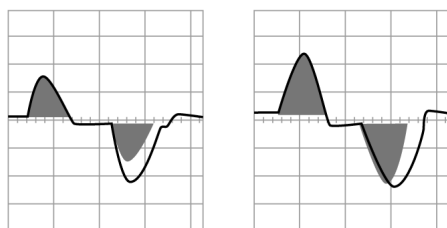
Balanced Vector Control

In the past soft starters using 2 phase control caused extra heating in the motor and required higher starting currents because the output waveform was not symmetrical.

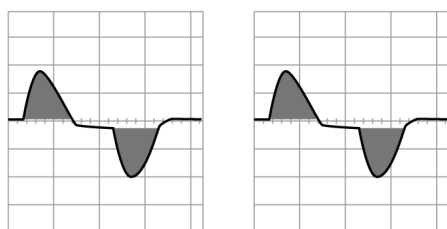
ASTAT XB and XBm soft starters control only two phases, but include balanced vector control technology that balances the output waveform to make it symmetrical. By balancing the waveform the ASTAT XB and XBm provides 3 phase like performance with compact soft starter technology.

This eliminates previous limitations of 2 phase controllers such as:

- Limited starts per hour
- Limited to light loads only
- Limited to motor < 55kW at 400Vac, 75HP at 460Vac



Typical two phase waveforms



Balanced Vector Control

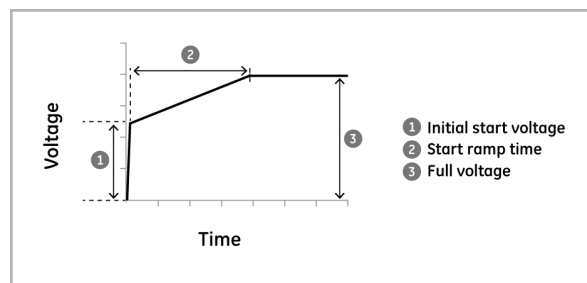
Three phase starting waveform

Start methods

Voltage Ramp (ASTAT XB)

Voltage ramp soft starting raises the voltage from a specified starting level (1) to full voltage over an extended period of time (2).

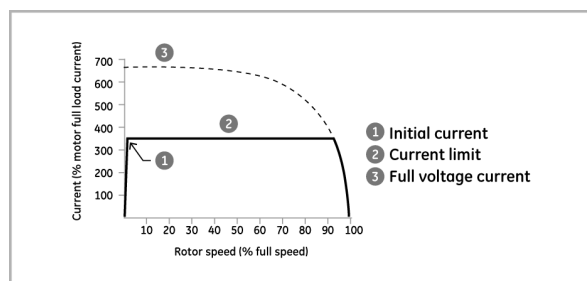
Voltage ramp starting is the simplest way to influence start current and torque.



Constant Current (ASTAT XBm)

Constant current is the traditional form of soft starting, which raises the current from zero to a specified level and keeps the current stable at that level until the motor has accelerated.

Constant current starting is ideal for applications where the start current must be kept below a particular level.

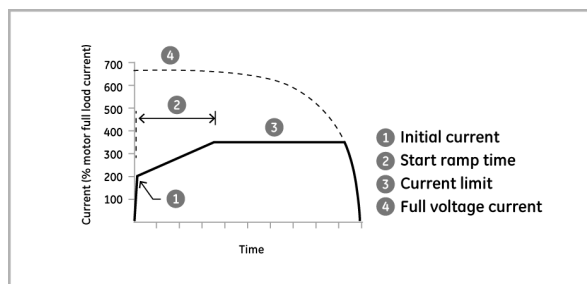


Current Ramp (ASTAT XBm)

Current ramp soft starting raises the current from a specified starting level (1) to a maximum limit (3), over an extended period of time (2).

Current ramp starting can be useful for applications where:

- the load can vary between starts
- the load breaks away easily, but starting time needs to be extended
- the electricity supply is limited



Reduced Voltage Starters

Solid State

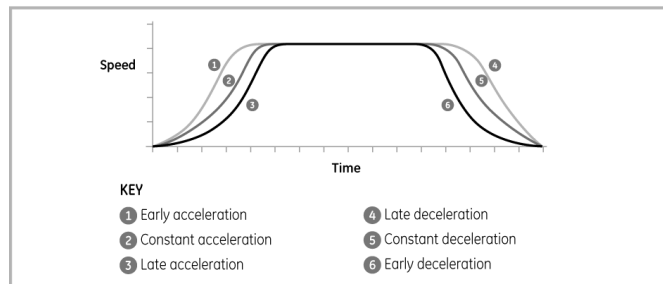
ASTAT XL Soft Starters

Section 2

ASTAT XL - Adaptive Control

New soft start control type that allows the selection of different acceleration and deceleration profiles according to application needs.

Gradual and shock free acceleration can benefit all motor applications, but many situations need more precise control over acceleration and/or deceleration. Ideal for pump stopping: Match the deceleration profile to the unique hydraulic characteristics of the individual system.



Two algorithms

Adaptive control is based on two algorithms, one for measuring (learning) the motor characteristics and one for controlling the motor

Starting and stopping profiles

The control algorithm defines starting and stopping profiles which relate motorspeed to elapsed time.

Comparison

During each start and stop, adaptive control compares the motor's estimated speed with the selected profile.

Refining the model

The algorithm refines its model with data from every subsequent start and stop.

First soft start

During the first soft start the measuring algorithm measures the motor's characteristics at zero speed and at maximum efficiency

Up to six profiles

ASTAT XL allows for control with three acceleration and three deceleration profiles.

Adjustment

The soft starter then adjusts the power to the motor to achieve the selected profile (more power if the estimated speed is to low, less power if the speed is to high).

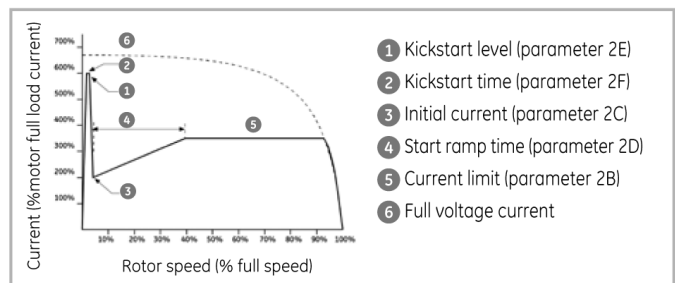
Fine tuning

The user can fine tune the adaptive control gain for smoother performance.

Kickstart (ASTAT XL)

Provides a short boost of extra torque at the beginning of a start, and can be used in conjunction with current ramp or constant current starting.

Kickstart can be useful to help start loads that require high breakaway torque but then accelerate easily (for example: flywheel loads such as presses).



Reduced Voltage Starters

Solid State

ASTAT XL Soft Starters

Section 2

Other features

Emergency Run Mode (Fire mode)

In some cases, the equipment must run at all costs (eg ventilation fans in high rise buildings must run in case of fire, regardless of the risk to the starter). It initiates a start and deactivates all protections, allowing the motor to run as long as possible.

Dual Parameter Set

Supports two sets of motor data and start/stop profile:

- duty-standby pumps
- different start performance for varying load conditions
- soft braking

PowerThrough

The starter can operate in two-phase control if one SCR is damaged. This allows continued operation while arranging repairs.

Auto-Reset

Auto-reset selected trips. It allows uninterrupted safe operation of unmanned installations.

You can select which trips to reset, reset delay and maximum resets.

DC Brake

Electrically brakes high inertia loads. It increase productivity of machines such as band-saws and chippers by reducing the time needed to replace saw bands or cutting heads. The starter pulses the DC over all three phases and does not require an external contactor.

24 VDC Output

Provides an in-built 24 VDC auxiliary power supply, removing the cost of a separate supply.

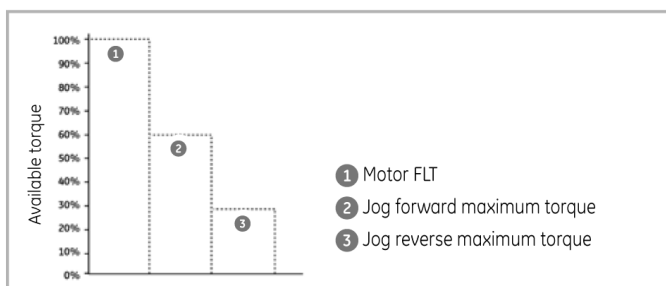
Jog

Run the motor at part speed (approx 11%). The maximum torque is approx 60% of motor FLT in forward and 45% FLT in reverse. Ideal to position loads such as mixers or hopper bins ready for unloading

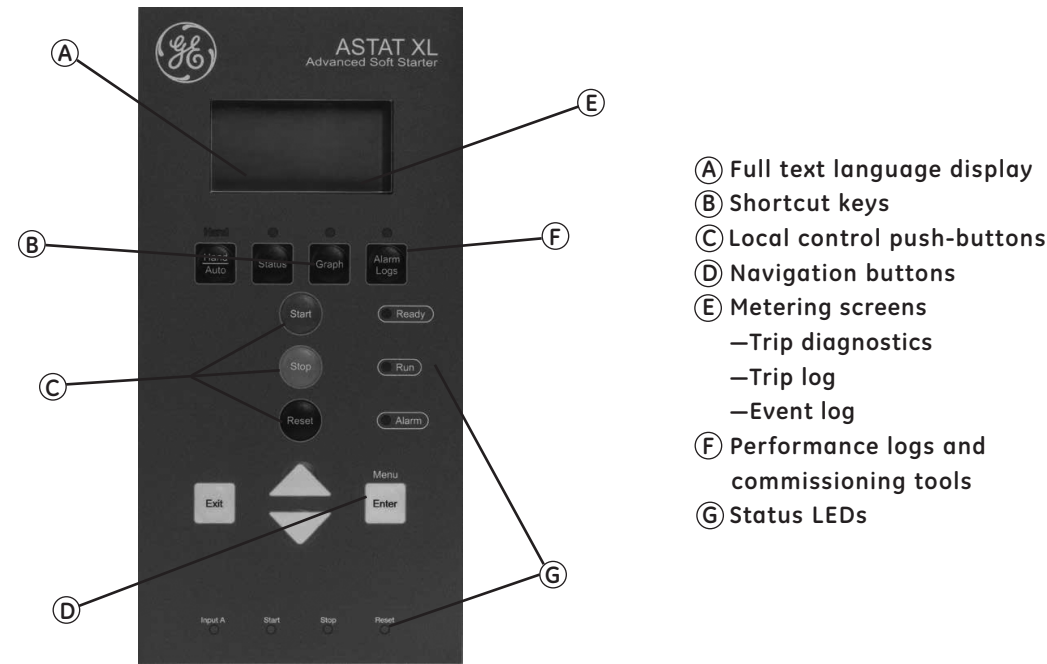
UL Compliance: Terminal/Connector Parts

For models QLxxB145D~QLxxB425D and QLxxX255D~QLxxX1K6D to be UL compliant, you must use the recommended pressure terminal/connector as detailed in the table below.

Model	FLC (A)	No. of wires	Recommended lugs part No.
QLxxB145D	145	1	OPHD 95-16
QLxxB170D	170	1	OPHD 120-16
QLxxB200D	200	1	OPHD 150-16
QLxxB220D	220	1	OPHD 185-16
QLxxB255D	255	1	OPHD 240-20
QLxxB350D	350	1	OPHD 400-16
QLxxB425D	425	2	OPHD 185-16
QLxxX255D	255	1	OPHD 240-20
QLxxX360D	360		
QLxxX380D	380		
QLxxX430D	430	2	1 x 600T-2
QLxxX620D	620		
QLxxX650D	650		
QLxxX790D	790	4	2 x 600T-2
QLxxX930D	930	3	2 x 600T-2
QLxxX1K2D	1200	4	1 x 750T-4
QLxxX1K4D	1410		
QLxxX1K6D	1600	5	1 x 750T-4 and 1 x 600T-3



Control Panel



Quick Setup

1. Select your application
2. Starter suggests typical parameters and values
3. Review and adjust as required

Quick Setup		
Pump centrifugal ->	- > Pump centrifugal	
Pump submercible	Parameter	Suggested value
fan, damped	Motor FLC	Model dependent
Fan, undamped	Stat mode	Adaptive control
Compressor, screw	Adaptive Start Profile	Early acceleration
Compressor, reciprocating	Start ramp time	10 seconds
Conveyor	Stop mode	Adaptive control
Crusher, rotary	Adaptive stop profile	Late deceleration
Crusher, jaw	Stop time	15 seconds

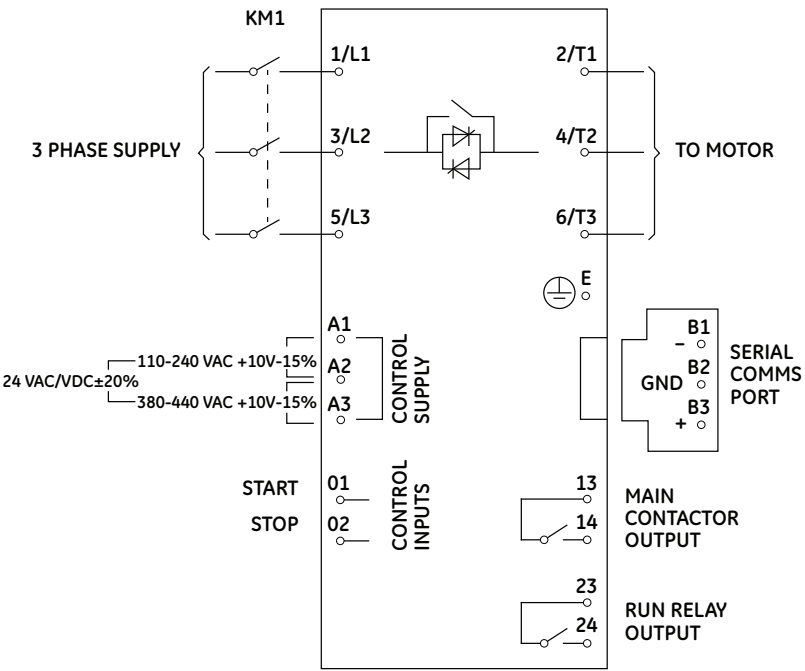


Reduced Voltage Starters

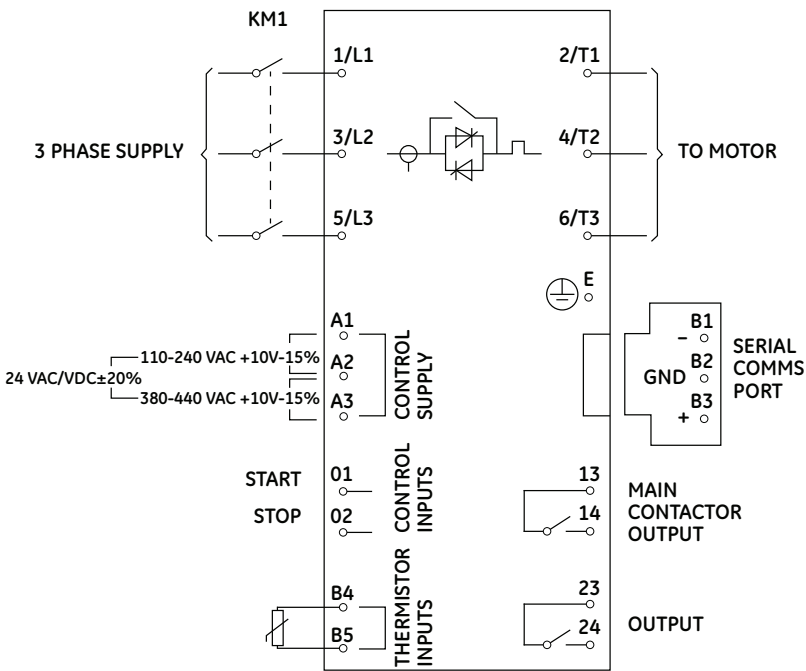
Solid State

ASTAT XB, XBm and XL Soft Starters

Basic Wiring Diagrams



ASTAT XB



ASTAT XBm



Reduced Voltage Starters

Solid State

ASTAT XL Soft Starters

Section 2

Basic wiring diagrams

- 1 x programmable input where you can connect transducers and probes, simpler control circuits and lower installation cost.
- 3 x remote digital inputs
- 3 x programmable outputs
- 1 x Analog output

Adjustable Busbars

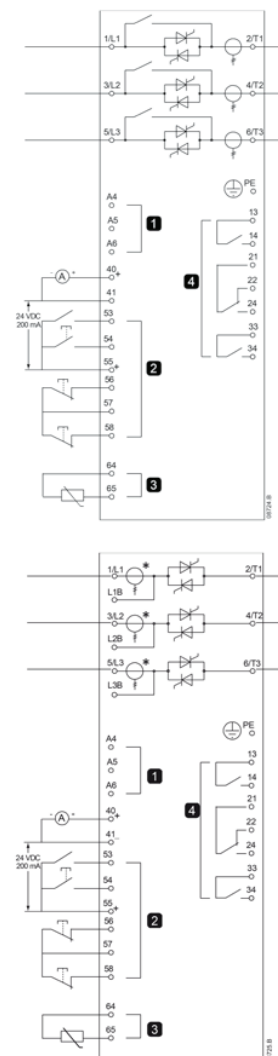
Cabling or busbar work for higher power installations can be costly and require significant panel space. ASTAT XL soft starters ≥ 360 A reduce cable costs and panel space requirements because they allow for top or bottom connection of both input and output cabling.

Easy access of Control terminals

Pluggable terminal blocks make wiring easy. Separate terminal blocks for control and I/O ensure tidier wiring.



Schematic diagrams



1	Control voltage (model dependent)
2	Remote control inputs
3	Motor thermistor input
4	Relay outputs
40, 41	Analog output
55, 41	24 VDC output
54, 55	Start
56, 57	Stop
58, 57	Reset
53, 55	Programmable input A
13, 14	Relay output A
21, 22, 24	Relay output B
33, 34	Relay output C

NOTE

Different models require control voltage to different terminals:

- 1 (110~120 VAC) A5, A6
- 1 (220~240 VAC) A4, A6
- 2 (24 VAC/VDC) A5, A6

NOTE

* QLxxX255D current transformers are located on the output.
Bypass terminals are labelled T1B, T2B and T3B.

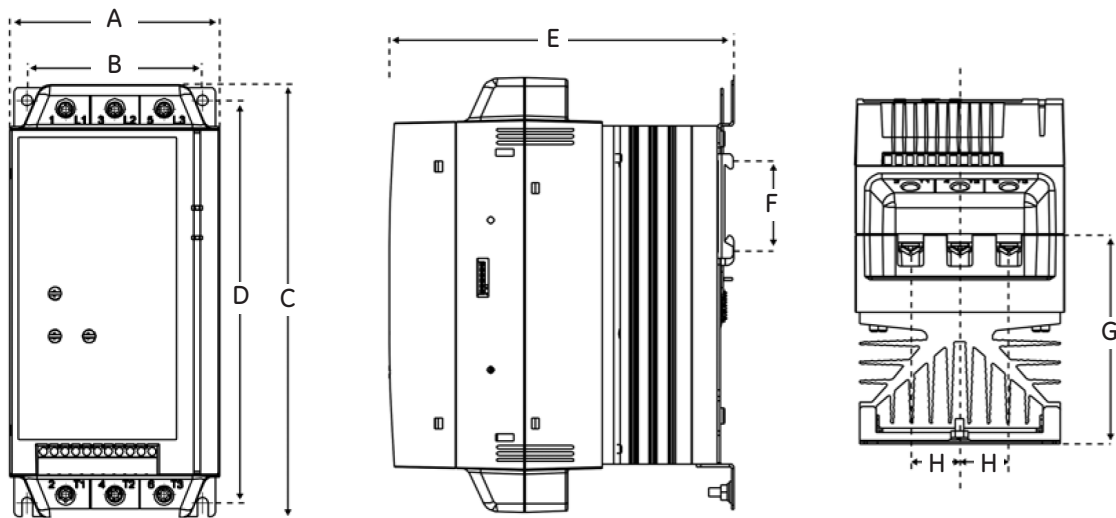


Reduced Voltage Starters

Solid State

ASTAT XB, XBm and XL Soft Starters

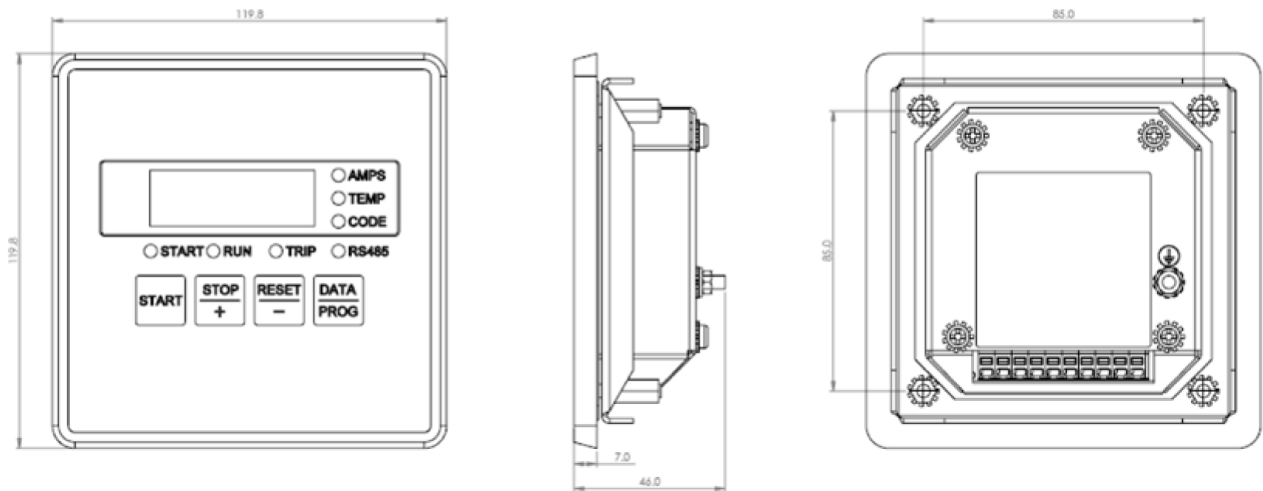
Dimensions



ASTAT XB and XBm

ASTAT XB and XBm (Dimensions in mm (inch))

Model	A (Width)	B (Width)	C (Height)	D (Height)	E (Depth)	F	G	H	Weight kg (lb)
QS/QCxxB018X	98 (3.85)	82 (3.22)	201 (7.91)	188 (7.40)	165 (6.49)	55 (2.16)	90.5 (3.6)	23 (0.9)	2.1 (4.6)
QS/QCxxB034X									
QS/QCxxB042X									
QS/QCxxB048X									
QS/QCxxB060X	145 (5.70)	124 (4.88)	215 (8.46)	196 (7.71)	193 (7.59)		110.5 (4.4)	37 (1.5)	3.8 (8.4)
QS/QCxxB075X									
QS/QCxxB085X									
QS/QCxxB100X									
QS/QCxxB140X	200 (7.87)	160 (6.29)	240 (9.44)	216 (8.50)	214 (8.42)		114.5 (4.5)	51 (2.0)	6.1 (13.5)
QS/QCxxB170X									
QS/QCxxB200X									



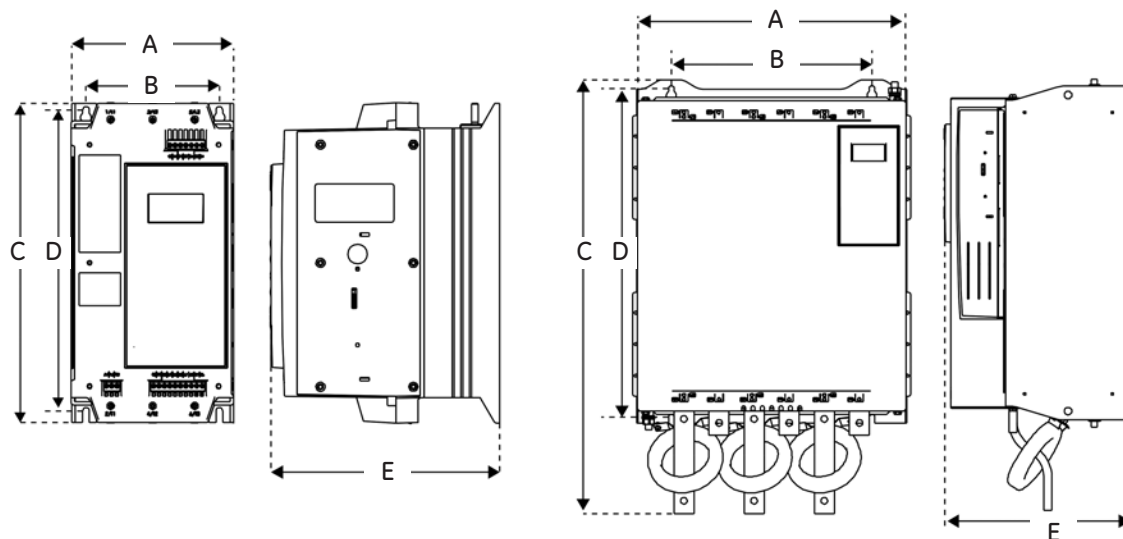
Remote operator of ASTAT XB and XBm



Reduced Voltage Starters Solid State ASTAT XB, XBm and XL Soft Starters

Dimensions

Section 2



ASTAT XL

ASTAT XL (Dimensions in mm (inch))

Model	A (Width)	B (Width)	C (Height)	D (Height)	E (Depth)	Weight kg (lb)
QLxxB0023D						
QLxxB0043D					183 (7.2)	4.1 (9.0)
QLxxB0050D						
QLxxB0053D	150 (5.9)	124 (4.9)	295 (11.6)	278 (10.9)		4.4 (9.7)
QLxxB0076D					213 (8.4)	
QLxxB0097D						4.9 (10.8)
QLxxB0100D						
QLxxB0105D						13.6 (30.0)
QLxxB0145D						13.8 (30.4)
QLxxB0170D	275 (10.8)	250 (9.8)	438 (17.2)	380 (15.0)	248 (9.8)	14.6 (32.2)
QLxxB0200D						26 (57.3)
QLxxB0220D						29.4 (64.8)
QLxxB0255D						
QLxxB0350D	424 (16.7)	376 (14.8)	440 (17.3)	392 (15.4)	296 (11.7)	49 (108.0)
QLxxB0425D						
QLxxB0500D						62.5 (137.8)
QLxxB0580D						
QLxxB0700D	433 (17.0)	320 (12.6)	640 (25.2)	600 (23.6)	293 (11.5)	63 (138.9)
QLxxB0820D						
QLxxB0920D						
QLxxB1000D						
QLxxX0255D	390 (15.4)	320 (12.6)	460 (18.1)	400 (15.7)	278 (10.9)	23 (50.7)
QLxxX0360D						
QLxxX0380D						36 (79.4)
QLxxX0430D						
QLxxX0620D	430 (16.9)	320 (12.6)	689 (27.1)	522 (20.6)	301 (11.9)	39.5 (87.1)
QLxxX0650D						
QLxxX0790D						
QLxxX0930D						51.5 (113.5)
QLxxX1200D						128.5 (283.3)
QLxxX1410D	574 (22.6)	500 (19.7)	860 (33.9)	727 (28.6)	362 (14.3)	130 (286.6)
QLxxX1600D						140 (308.6)

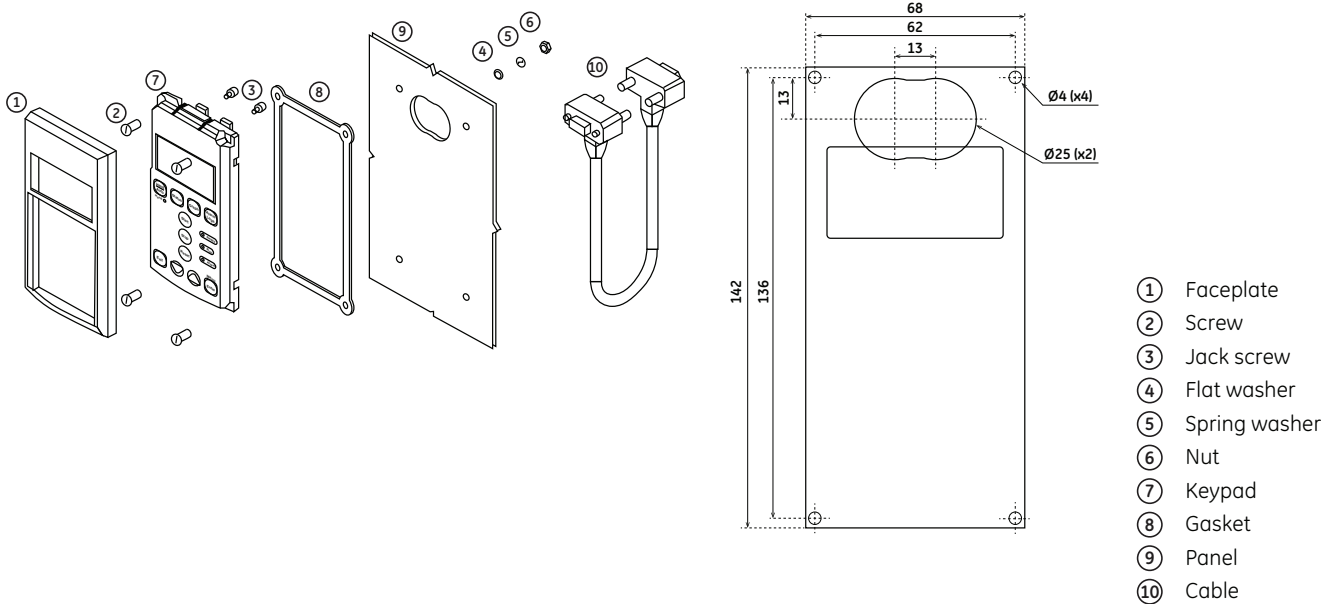


Reduced Voltage Starters

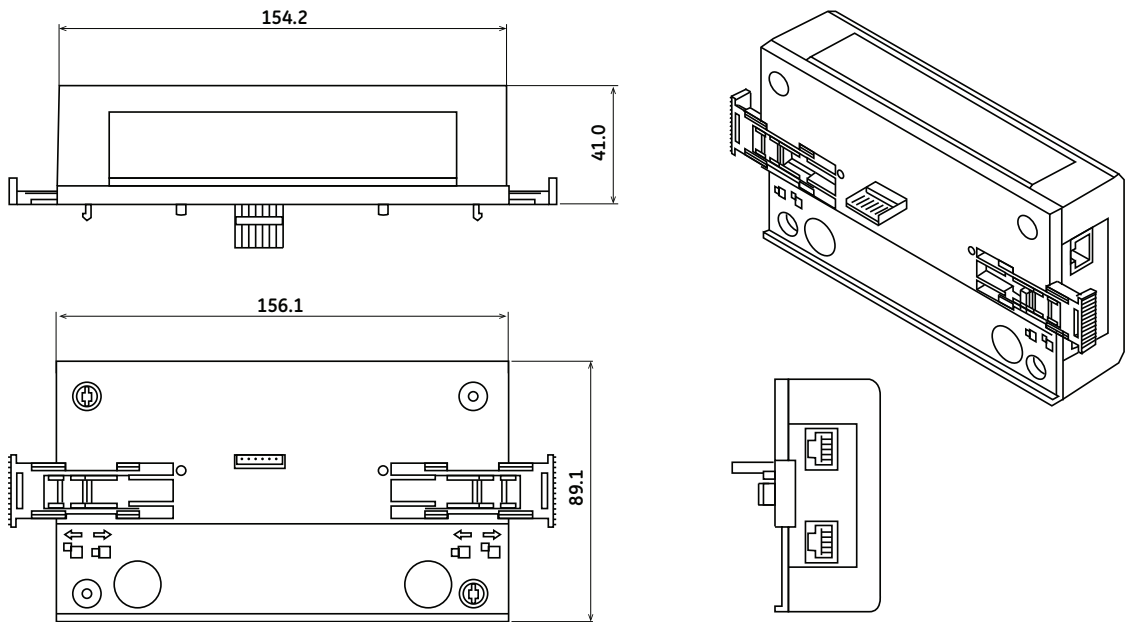
Solid State

ASTAT XB, XBm and XL Soft Starters

Dimensions



ASTAT XL remote control panel



Communication modules



Reduced Voltage Starters Electromechanical CR331, CR332, CR330 Reduced Voltage Starters

Section 2

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

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%

Section 2



Typical CR331 Starter for Wall Mounting



Product Number Selection Instructions: See page 2-47

Reduced Voltage Starters Electromechanical

Section 2

CR331

Autotransformer Starters

800 Horsepower Max.@ 230V

1500 Horsepower Max. @ 600V

NEMA Sizes 2-9

Three-Phase

50/60 Hz

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 2-58 and 2-59)

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**.



CR331 Size 6 Starter

Additional Forms

1. Combination Starters

Combination starters with fusible or nonfusible disconnect switch, or circuit breaker are also available. See page 2-59, (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 2-59 (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)



Reduced Voltage Starters

Electromechanical

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
9 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
9 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

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

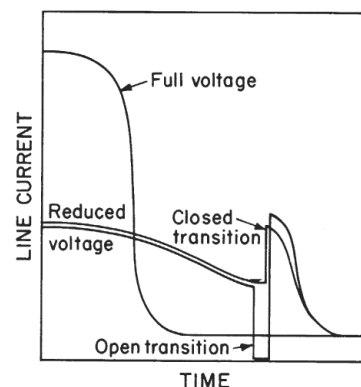
Diagram Legend

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



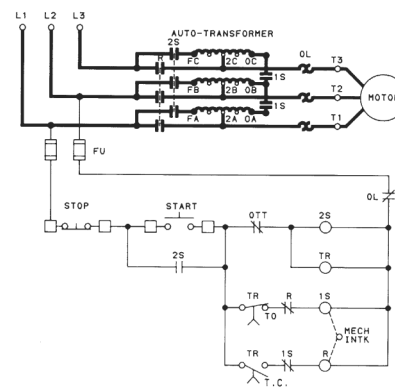
Product Number Selection Instructions: See page 2-47

Section 2

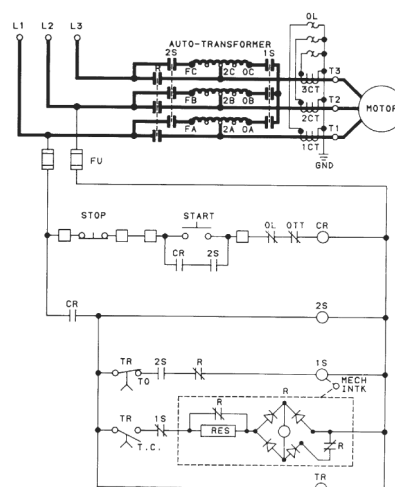


Starting Current Comparison

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

Reduced Voltage Starters Electromechanical CR331

Autotransformer Starters

Outlines, Dimensions (^{in.}_{mm}) and Weights lbs. (For Estimating Only)

Section 2

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

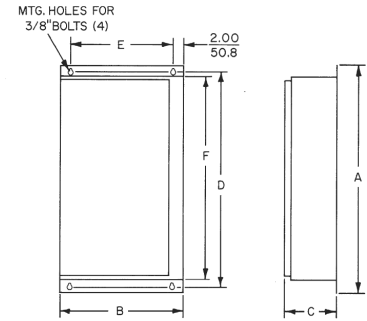
See Diagram For Dimensions

CR331 NEMA Type 1 Size 6

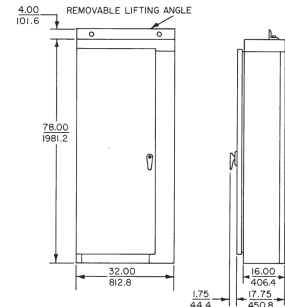
NEMA Size	Non-Combination/ Combination	Motor Voltage	Height	Width	Depth	Weight
6	Non-combination	All ratings	90.0 (2286)	44.0 (1118)	20.0 (508)	1500
6	Combination w/ circuit breakers	All ratings	90.0 (2286)	44.0 (1118)	20.0 (508)	1500
6	Combination /all others	200/208	90.0 (2286)	44.0 (1118)	20.0 (508)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



Reduced Voltage Starters Electromechanical

Section 2

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



CR332 NEMA Size 6
Combination Wye-Delta Motor Starter

List Price **\$4365.00, GO-10G1**.

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 2-59)
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 2-59 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 2-58 (non-combination) or 2-59 (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



Reduced Voltage Starters Electromechanical

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

¹Size 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 2-59
Heater Selection Table: See page 2-60

Reduced Voltage Starters Electromechanical

CR332 Closed Circuit Transition

Wye-Delta Starters

Three heaters should be ordered as separate items.

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

¹Size 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 2-60
Product Number Selection Instructions: See page 2-50
Factory Installed Modifications: See page 2-58

Reduced Voltage Starters Electromechanical

CR332

Wye-Delta Starters

Outlines, Dimensions ($\frac{\text{in.}}{\text{mm}}$) and Weights lbs. (For Estimating Only)

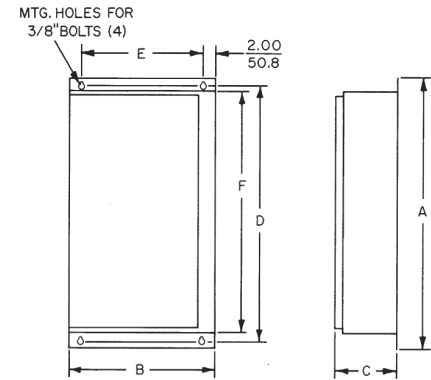
Section 2

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

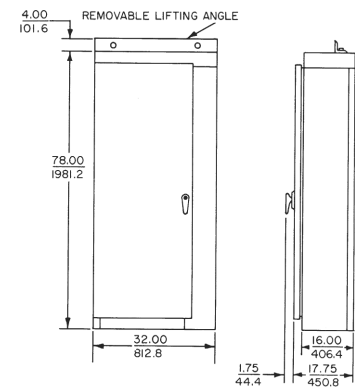
Product Number	Dimension A	Dimension B	Dimension C	Dimension D	Dimension E	Dimension F	Weight
CR332C	35.00 (889.0)	24.00 (609.6)	8.25 (209.5)	32.50 (825.5)	20.00 (508.0)	30.00 (762.0)	175
CR332D	43.00 (1092.2)	26.00 (660.4)	10.75 (273.0)	40.50 (1028.7)	22.00 (558.8)	38.00 (965.2)	200
CR332E	53.00 (1346.2)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

¹Circuit 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.



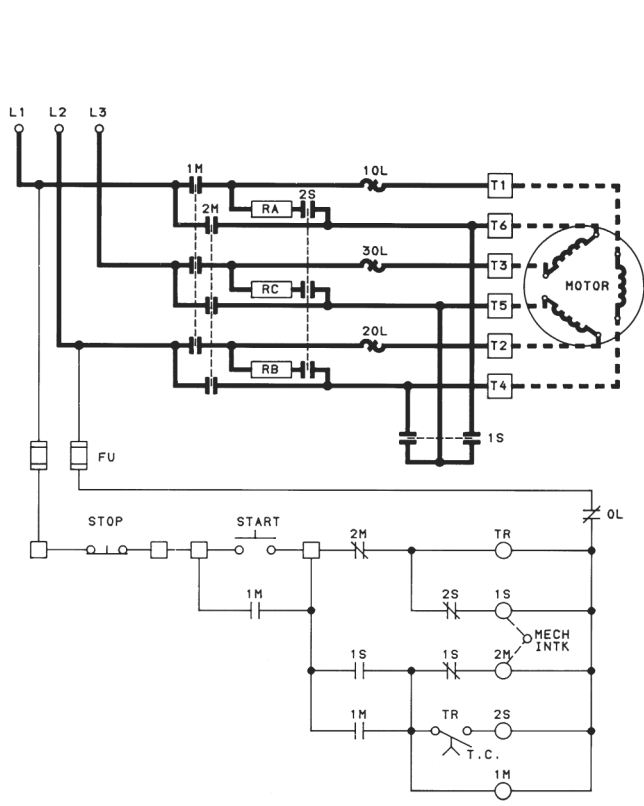
Reduced Voltage Starters

Electromechanical

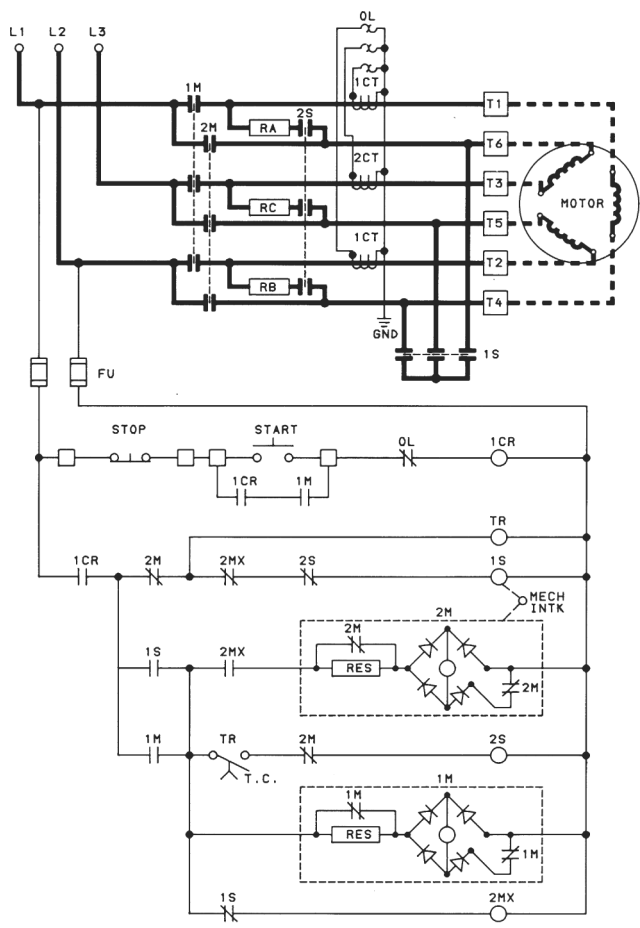
CR332

Wye-Delta Starters
Schematic Diagrams

Section 2



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 2-50

Reduced Voltage Starters Electromechanical

Section 2

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 2-58)
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 2-59 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)



Reduced Voltage Starters Electromechanical

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

¹Hp ratings are based on locked rotor currents corresponding to 65% of full winding values.

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

³Size 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) and Weights lbs. (For Estimating Only)

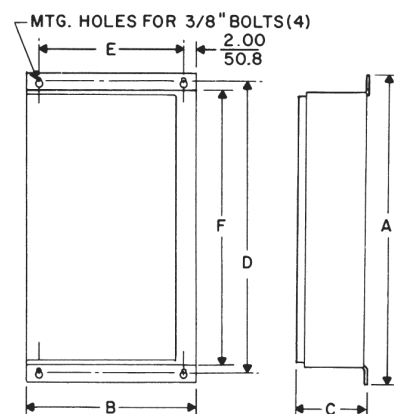
CR330 NEMA Type 1 Sizes 1-5

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.			

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



CR330, NEMA Type 1, Sizes 1-5



Product Number Selection Instructions: See page 2-55

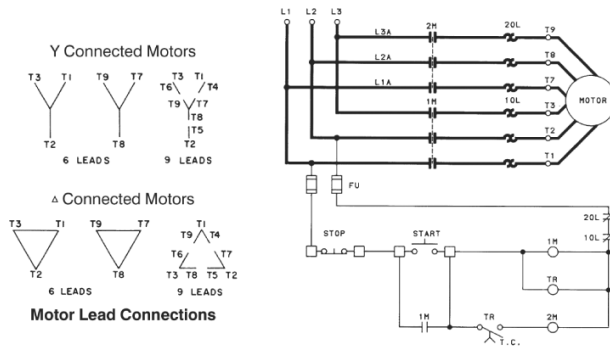
Reduced Voltage Starters

Electromechanical

CR330

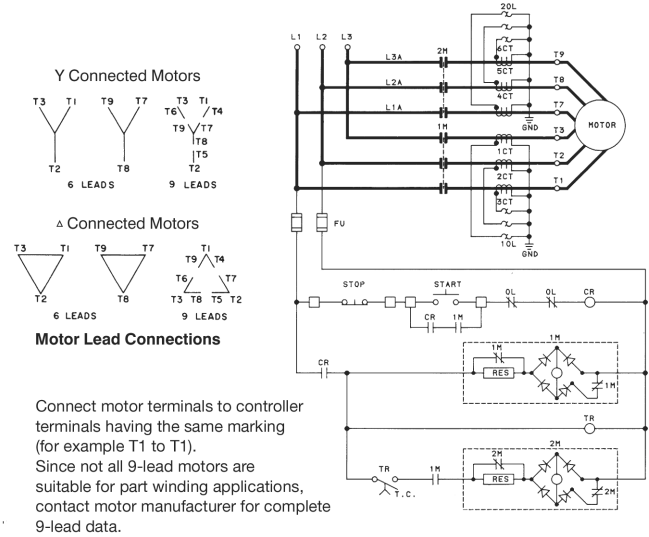
Part-Winding Starters Schematic Diagrams

Section 2



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

Section 2

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

List Price Addition, GO-10G1 (Apply to List Price of Complete Device)									
Description	Control Product Line Covered			NEMA Size					
	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

¹Closed transition.

²Open transition.

³Supplied as a control relay, for low control circuit power consumption.

⁴Add \$54.00, GO-10G1 for part winding starters.



Product Number Selection Instructions:
See page 2-47 (Autotransformers), page 2-50,
2-51 (Wye Delta), page 2-55 (Part Winding)

Reduced Voltage Starters Electromechanical CR330, CR331, CR332 Factory Installed Modifications

Section 2

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	200-208 V	Maximum Horsepower 230-240 V	460-575 V	NEMA Size	208-240 V	Maximum Horsepower 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	200-208V	Maximum Horsepower 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

¹For 50 Hertz applications, contact nearest GE Energy Sales Office.

²Price additions include current-limiting fuses.

³Not 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			
CR330	CR332	CR331	Fuse Clip Size—Amperes			
1PW	1YD	2	30 or 60	100	200	400
2PW	2YD	3	\$768.00	\$894.00	—	—
3PW	3YD	4	\$984.00	\$984.00	\$1224.00	—
4PW	4YD	5	—	\$1524.00	—	\$2172.00
5PW	5YD	—	—	—	\$2472.00	—
—	—	—	—	—	—	\$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		List Price Additions, GO-10G1						
Base Product Number		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

¹For 50 Hertz applications, contact nearest GE Energy Sales Office.

²Price additions include current-limiting fuses.

³Not available for YD open transition.



Reduced Voltage Starters Electromechanical CR123, CR123F Heaters

Section 2

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	—	—	—	—	—	—



Reduced Voltage Starters Electromechanical CR123, CR123F Heaters

Section 2

Wye-Delta (3 heaters required)

CR332C, Size 1YD		CR332D, Size 2YD		CR332E, Size 3YD		CR332F, Size 4YD		CR332G, Size 5YD	
Max. Motor	Heater	Max. Motor	Heater	Max. Motor	Heater	Max. Motor	Heater	Max. Motor	Heater
Full-Load Amperes	Product Number	Full-Load Amperes	Product Number	Full-Load Amperes	Product Number	Full-Load Amperes	Product Number	Full-Load Amperes	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.



Section 2

[illegible]