

COMMERCIAL HVAC MOTOR STARTERS



HVAC SMART STARTERS CATALOG

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For the most up-to-date product information, visit franklin-controls.com.





SAFETY FIRST!

As with all electrical equipment, only qualified, expert personnel should perform maintenance and installation. Comply with all applicable local and national codes and laws that regulate the installation and operation of equipment and read manuals thoroughly. Use only installation manuals and not this sales brochure for installation procedures. It is up to the installer to determine product suitability for a given application.

STARTER COMPARISON CHART

EMS, BAS, SAS, & BAS-1P

	EMS ENERGY MANAGEMENT STARTER	BAS BUILDING AUTOMATION STARTER	SAS STANDARD AUTOMATION STARTER	BAS-1P BUILDING AUTOMATION STARTER
Drive/Page	 <p>PG. 4</p>	 <p>PG. 8</p>	 <p>PG. 13</p>	 <p>PG. 17</p>
Description	The most comprehensive building automation starter featuring optional BACnet integration, metering, and over/under voltage protection.	The industry standard, proven for reliability and conventional control system compatibility.	Advanced protection and high reliability make the SAS an incredible value.	HOA capability in a single phase package with wide range overload. Universal application.
Ranges	10, 120 - 230V, 1/10-25HP 30, 200 - 575V, 1/2-300HP	30, 200 - 575V, 1/2-30HP 30, 200 - 575V, 1/2-30HP	30, 200 - 575V, 1/2-30HP 30, 200 - 575V, 1/2-30HP	10, 110V, 1/10-1HP 10, 240V, 1/10-1HP
User Interface	HOA keypad with LEDs & LCD display	HOA keypad with LEDs	HOA keypad with LEDs	On/Off switch, recessed Hand-Auto mode switch, LEDs
Overload Type	Wide range electronic overload (class 5-30)	Wide range electronic overload (class 10/20)	Wide range electronic overload (class 10)	Wide range electronic overload (class 10)
Standard	Voltage/dry contact auto run inputs	Voltage/dry contact auto run inputs	Voltage/dry contact auto run inputs	Voltage/dry contact auto run inputs
	Proof of flow (true power) output	Proof of flow current status	Proof of flow current status	Current status (On/Off)
	Fault relay output	Fault relay output	-	-
	Fireman's override input	Fireman's override input	-	-
	Shut down input	Shut down input	-	-
	Permissive auto input	Permissive auto input	-	-
	Damper control	Damper control	-	-
Options	Metering - Analog kW, Pulse kWh	-	-	-
	Metering - BACnet	-	-	-
	BACnet communications	-	-	-
	Modbus RTU communications	-	-	-
	Over/Under voltage	-	-	-
	Over/Under power (belt loss protection)	-	-	-
	Ground fault protection	-	-	-
	Backspin/on delay timers	-	-	-
Ethernet Fault Logging	-	-	-	

EMS ENERGY MANAGEMENT STARTER 1Ø, 120 - 230V, 1/10-25HP 3Ø, 200 - 575V, 1/2-300HP

SMARTSTART®

THE MOST INTELLIGENT STARTER YET

Power metering, optional BACnet or Modbus communications, and an intuitive interface allow the EMS to integrate seamlessly with building automation systems. By combining starter operation with controls, you extend equipment life and save energy. Installation is cost-effective thanks to integrated sensing and control points.

POWER METERING

- 1% ANSI grade metering
- Pulse/analog output for accurate measurements (optional)
- kW and kWh data available on LCD display

SUPERIOR MOTOR PROTECTION

- **SMARTSTART®** Motor Protection
 - 1-95A Electronic Overload
 - Locked rotor
 - Cycle fault
 - Max time to start
 - Out of calibration (detects incorrect FLA setting)
 - Selectable trip class 5-30
- Current and voltage phase unbalance
- Over/under power (new standard feature!)
 - Prevents free-wheeling motor damage (belt loss)
- Over/under voltage
- Reverse phase

PROOF OF FLOW VERIFICATION

- True power measure detects belt loss and alerts automation system
- Eliminates costly current sensors

VOLTAGE & DRY CONTACTS FOR AUTO RUN COMMAND

- True power measure detects belt loss and alerts automation system
- Eliminates costly current sensors

FIREMAN'S OVERRIDE

- True power measure detects belt loss and alerts automation system

DAMPER CONTROL

- Provides a 24VAC (or optional 120VAC) output for powering a damper motor
- Interlocks damper with starter ensuring proper sequence of operation
- Prevents damage to duct work, saves energy from heat loss
- Saves on automation panel points, reduces wiring, saves on installation costs



HOA KEYPAD WITH LCD DISPLAY

- Plain English operation – easy to set up and simple to operate
- LEDs indicate Hand/Off/Auto modes, run and fault conditions

FLEXIBLE CONTROL TRANSFORMER (CPT)

- Multi-tap CPT input accepts all common motor voltages
- Integrated secondary protection – no fuses required

COMBINATION VERSIONS INCLUDE DISCONNECT

- Motor circuit protection disconnect provides short circuit protection
- High interrupting ratings for maximum electrical system compatibility
- No fuses required – save time and money
- Lockable handle for safety

EMS ENERGY MANAGEMENT STARTER

OPTIONS

- BACnet or Modbus Communications with power metering for energy savings
 - Ideal for LEED projects (Measurement & Verification credit), tenant sub-metering ,cost allocation, load shedding and performance contracting
 - Native RS-485 76800 BPS for high performance
- Comprehensive point list including HOA status, overload faults, and all metering attributes (kW, kWh, kVar, V, A, etc. aggregate and per phase).
 - Additional programmable digital input. Additional analog input, selectable between 0-10V, 4-20 mA, or 10K thermistor
 - Includes power metering display with programmable parameters
 - Tested to BTL standards
- 120V Damper Control
 - Option in lieu of 24VAC standard
- Ethernet Fault Logging (Time & Date Stamped)
 - Records up to 100 faults and alarms (e.g. underpower, overload, etc.)
 - Data easily is easily displayed & saved on any web browser using an Ethernet connection. Starter incorporates internal web server. No programming required.
- Ground Fault Protection
 - Protects motors from damage due to ground current conditions
 - UL 1053 Certified

ORDERING & SIZING INFORMATION - UL TYPE 1

COMBINATION PART NUMBERS									
PART NUMBER	UL HP RATINGS						SCIC KAIC @		CONTACTOR NEMA SIZE
	1Ø		3Ø				240V	460V	
	120V	230V	208V	230V	460V	575V			
EMSI-9/J-G1.6-9	-	1/10	-	-	3/4	3/4	100	65	00
EMSI-9/J-G2.5-9	-	1/6	1/2	1/2	1	1.5	100	65	
EMSI-9/J-G4-9	1/8	1/3	3/4	3/4	2	3	100	65	
EMSI-9/J-G6-9	1/4	1/2	1	1.5	3	5	100	65	
EMSI-9/J-G8-9	1/3	1	2	2	5	5	100	65	
EMSI-18/J-G10-18	1/2	1.5	2	3	5	7.5	100	65	0
EMSI-18/J-G13-18	1/2	2	3	3	7.5	10	100	65	
EMSI-18/J-G17-18	1	3	3	5	10	15	100	30	
EMSI-32/J-G22-32	1.5	3	5	7.5	15	20	100	30	1
EMSI-32/J-G26-32	2	3	7.5	7.5	15	20	100	30	
EMSI-32/J-G32-32	2	5	7.5	10	20	30	100	30	
EMSI-50/J-G40-50	3	7.5	10	10	30	30	100	50	2
EMSI-50/J-G50-50	3	10	15	15	30	40	100	50	
EMSI-85/J-G63-85	5	10	20	20	40	-	100	50	3
EMSI-85/J-G75-85	5	15	20	25	50	-	100	50	
EMSI-85/J-G90-85	7.5	20	25	30	60	-	100	50	

Energy Management Starter - 1 & 3-Phase, 50/60 Hz, 120-575 VAC
 UL Type 1 Enclosed - Combination Starter, SCM Electronic Overload
 Includes MCP Disconnect

STANDARD PART NUMBERS									
PART NUMBER	UL HP RATINGS						SCIC KAIC @		CONTACTOR NEMA SIZE
	1Ø		3Ø				240V	460V	
	120V	230V	208V	230V	460V	575V			
EMSI-9/J-9	1/3	1	2	2	5	7.5	5	5	00
EMSI-18/J-18	1	3	5	5	10	15	5	5	0
EMSI-32/J-32	2	5	7.5	10	20	25	5	5	1
EMSI-50/J-50	3	10	15	15	30	40	5	5	2
EMSI-85/J-85	7.5	15	25	30	60	-	10	10	3

Energy Management Starter - 1 & 3-Phase, 50/60 Hz, 120-575 VAC
 UL Type 1 Enclosed - Standard Starter, SCM Electronic Overload
 Disconnect Not Included

EMS ENERGY MANAGEMENT STARTER

ORDERING & SIZING INFORMATION - UL TYPE 3R

UL TYPE 3R ENCLOSED - COMBINATION STARTER, SCM ELECTRONIC OVERLOAD, INCLUDES MCP DISCONNECT									
PART NUMBER	UL HP RATINGS						SCIC KAIC @		CONTACTOR NEMA SIZE
	1Ø		3Ø				240V	460V	
	120V	230V	208V	230V	460V	575V			
EMSSR-9/J-G1.6-9	-	1/10	-	-	3/4	3/4	100	65	00
EMSSR-9/J-G2.5-9	-	1/6	1/2	1/2	1	1.5	100	65	
EMSSR-9/J-G4-9	1/8	1/3	3/4	3/4	2	3	100	65	
EMSSR-9/J-G6-9	1/4	1/2	1	1.5	3	5	100	65	
EMSSR-9/J-G8-9	1/3	1	2	2	5	5	100	65	
EMSSR-18/J-G10-18	1/2	1.5	2	3	5	7.5	100	65	0
EMSSR-18/J-G13-18	1/2	2	3	3	7.5	10	100	65	
EMSSR-18/J-G17-18	1	3	3	5	10	15	100	30	
EMSSR-32/J-G22-32	1.5	3	5	7.5	15	20	100	30	1
EMSSR-32/J-G26-32	2	3	7.5	7.5	15	20	100	30	
EMSSR-32/J-G32-32	2	5	7.5	10	20	30	100	30	2
EMSSR-50/J-G40-50	3	7.5	10	10	30	30	100	50	
EMSSR-50/J-G50-50	3	10	15	15	30	40	100	50	
EMSSR-85/J-G63-85	5	10	20	20	40	-	100	50	3
EMSSR-85/J-G75-85	5	15	20	25	50	-	100	50	
EMSSR-85/J-G90-85	7.5	20	25	30	60	-	100	50	

Energy Management Starter - 1 & 3-Phase, 50/60 Hz, 120-575 VAC
 UL Type 1 Enclosed - Combination Starter, SCM Electronic Overload
 Includes MCP Disconnect

UL TYPE 3R ENCLOSED - STANDARD STARTER, SCM ELECTRONIC OVERLOAD, DISCONNECT NOT INCLUDED									
PART NUMBER	UL HP RATINGS						SCIC KAIC @		CONTACTOR NEMA SIZE
	1Ø		3Ø				240V	460V	
	120V	230V	208V	230V	460V	575V			
EMSSR-9/J-9	1/3	1	2	2	5	7.5	5	5	00
EMSSR-18/J-18	1	3	5	5	10	15	5	5	0
EMSSR-32/J-32	2	5	7.5	10	20	25	5	5	1
EMSSR-50/J-50	3	10	15	15	30	40	5	5	2
EMSSR-85/J-85	7.5	15	25	30	60	-	10	10	3

Energy Management Starter - 1 & 3-Phase, 50/60 Hz, 120-575 VAC
 UL Type 1 Enclosed - Standard Starter, SCM Electronic Overload
 Disconnect Not Included

OPTIONS

PART NUMBER	DESCRIPTION
EMS-BN-COM*	BACnet communications card with power metering
EMS-MB-COM*	Modbus RTU communications card
EMS-PWR*	Power metering card with pulse/analog output
EMS-ENET*	Ethernet data and fault logging card
EMS-GFLT	Ground fault protection (UL1053 certified)
EMS-120	120VAC control circuit and damper/actuator control (in lieu of 24VAC)
EMS-1PH	1-phase wiring for EMS starters

*Items cannot be installed in combination with other items marked with ****

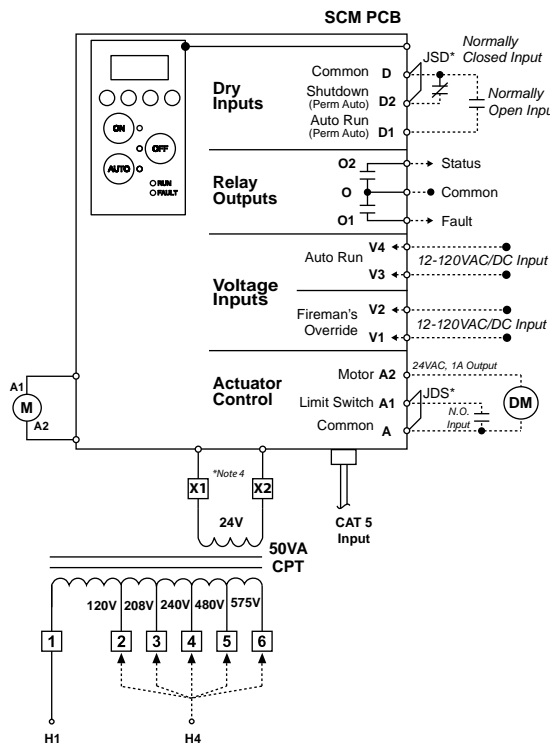
EMS ENERGY MANAGEMENT STARTER

SPECIFICATIONS

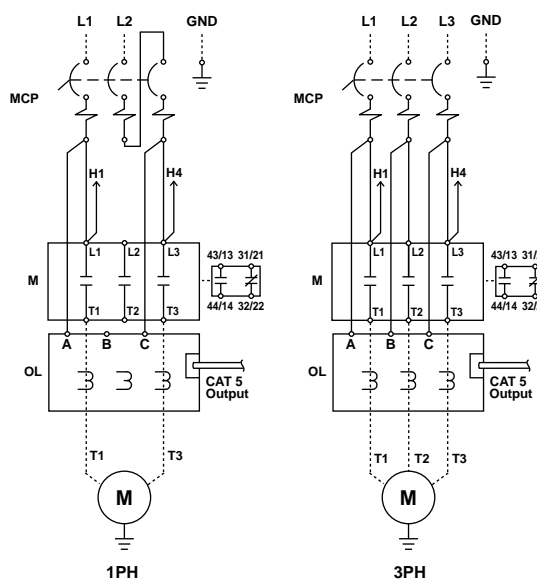
STARTER TYPE			
EMS - Energy Management Starter			
120-575VAC, 1 & 3-Phase, 50/60Hz input, Across the line, full-voltage non-reversing			
NEMA Type 1 or 3R Enclosed			
USER INTERFACE			
Hand-Off-Auto	Door mounted Hand-Off-Auto keypad (water-tight-membrane)		
Programming	Door mounted display with programming keys (LCD, back-lit, 16 character)		
Mode Indication	Integrated LEDs, Hand-Off-Auto-Run-Fault indication		
STANDARD CONTROL OPERATIONS			
Inputs	Voltage Auto-Run	Accepts 12-130VAC/DC. Applying voltage will send a run command to the starter when in Auto mode.	
	Dry Contact Auto-Run	Normally Open dry contact. When closed, the starter will be commanded to run when in Auto mode.	
	Fireman's Override	Accepts 12-130VAC/DC. Applying voltage will command the motor to run in all modes and will supersede a Shutdown command. Hand/Off/Auto/Run/Fault LEDs will flash.	
	Shutdown	Normally Closed dry contact. When open, the contactor will open and the starter will disengage the contactor and will not accept a run command with the exception of Fireman's Override. Hand/Off/Auto LEDs will flash.	
	Permissive Auto	Normally Open dry contact. When closed, the starter will not accept a run command when in Auto mode.	
	Actuator Position Switch	Normally Open dry contact. To be used in series with customer provided actuator contacts which disable the motor starter until the actuator is in position. (ie. The contactor will not close unless this contact is closed)	
Outputs	Status Relay	Normally Open relay contacts. Status Relay will close when the motor draws a user defined percentage of the FLA setting.	
	Fault Relay	Fault Relay will close in the event of a fault trip. <u>Contact Ratings: 0.3A @ 125VAC, 1A @ 24VAC</u>	
	Actuator Power	24VAC, 1A max. (Optional 120VAC, 0.25A max.)	
Operational	Overload Type	Electronic, I ² t trip curve	
	Power Fail Modes	Restart in last mode (Hand/Off/Auto) with no delay (default)	
		Restart in Off mode	
		Restart in Off mode if power failure lasts longer than 2 seconds. Restart in last mode if power failure is less than 2 seconds.	
	On/Off Time Delay	On/Off, Adjustable: 0.1-99 seconds	
Fault Reset	Adjustable: Manual or Automatic		
ENVIRONMENTAL			
Ambient Operating Temp	-5° to 140° F (-20° to 60° C)		
Ambient Storage Temp	-5° to 185° F (-20° to 85° C)		
Relative Humidity	5% to 95% non-condensing		
MOTOR PROTECTION		ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Overload Current Setting Range	Differs per model		Per FLA
Overload Trip Class	Adjustable: 5-30		10
Overload Service Factor	Adjustable: 0.00-2.00		1.15
Under Power	On/Off, Adjustable: 0-99% of measured electrical input		Off / 80%
Over Power	On/Off, Adjustable: 101-200% of measured electrical input		Off / 120%
Over / Under Voltage	On/Off, Adjustable: +5-25% over/under the nominal voltage setting		On / 10%
Voltage Phase Unbalance	On/Off, Adjustable: 1-20% voltage phase deviation		On / 3%
Voltage Phase Loss	Always On, Adjustable: 1-50% voltage phase deviation		5%
Voltage Phase Sequence Reversal	On/Off, Trips within 0.1 seconds upon voltage phase reversal detection		On
Ground Fault (Optional)	On/Off, Adjustable: 1.0-9.9A		Off / 1A
Cycle Fault	On/Off, Trips if contactor cycle rate exceeds 20 starts/minute		On
Warm Start Provision	On/Off, Delays motor restart after a fault trip, based on calculated motor temperature		On
SMARTSTART™ PROTECTION		ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Current Phase Unbalance	On/Off, Adjustable: 1-50% current phase unbalance		On / 20%
Locked Rotor / Stall	On/Off, Trips within 0.5 seconds		On
Out of Calibration	On/Off, Trips after 10 seconds if the FLA setting is incorrect (set above calculated FLA range), ie. Start current is outside of an acceptable range. (FLA setting * 5 < inrush < fla setting * 14).		On
Max Time to Start	On/Off, Regardless of FLA or I ² t curve, always trip at start if starting current is outside of an acceptable range (inrush / 5) and still decreasing after 10 seconds.		On

EMS ENERGY MANAGEMENT STARTER

CONTROL WIRING DIAGRAM



POWER WIRING DIAGRAM



NOTES:

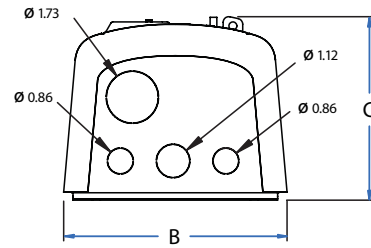
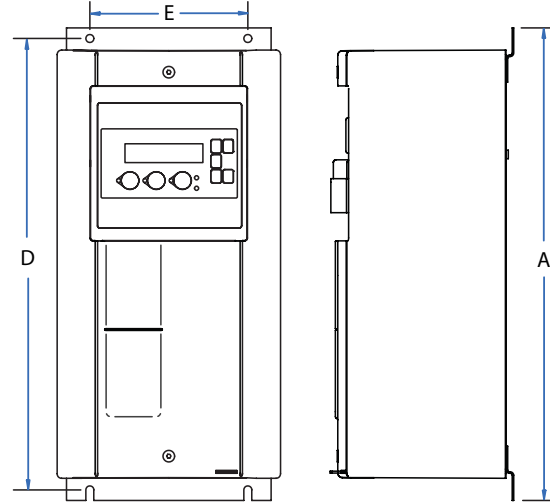
1. DASHED LINES INDICATE FIELD WIRING
2. REMOVE JUMPER JDS TO WIRE LIMIT SWITCH
3. REMOVE JUMPER JSD TO WIRE SHUTDOWN INPUT
4. X1 AND X2 TERMINALS APPLY FOR TYPE 3R ENCLOSED STARTERS ONLY

SCHM-EMS/C/50VA-1

EMS ENERGY MANAGEMENT STARTER

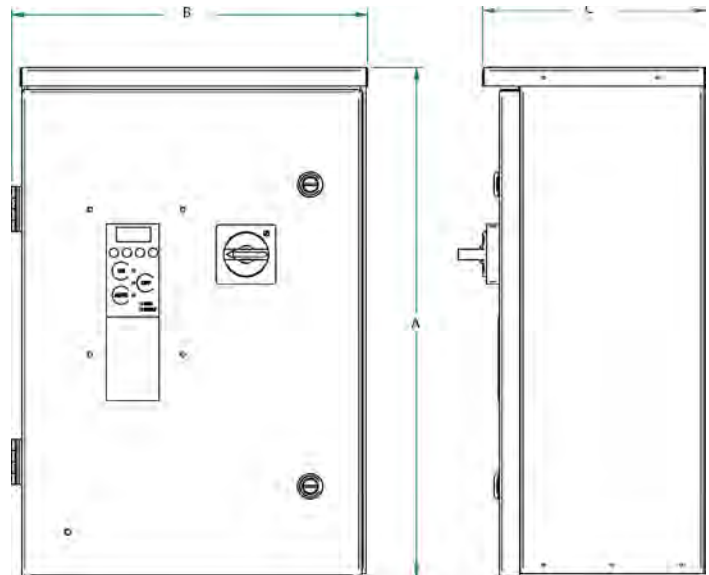
DIMENSIONS - UL TYPE 1

UL TYPE 1 EMS DIMENSIONS					
ENCLOSURE FRAME SIZE 1	A	B	C	D	E
EMSI-9 - EMSI-50 (STANDARD)	15.7	7.5	6.1	15	5.3
EMSI-9 - EMSI-32 (COMBINATION)					
ENCLOSURE FRAME SIZE 2	A	B	C	D	E
EMSI-85 (STANDARD)	14	12	6.5	13.3	9.5
ENCLOSURE FRAME SIZE 3	A	B	C	D	E
EMSI-50 - EMSI-85 (COMBINATION)	20	16	10	15.3	11.3



DIMENSIONS - UL TYPE 3R

UL TYPE 3R EMS DIMENSIONS			
ENCLOSURE FRAME SIZE 1	A	B	C
EMSR-9 - EMSR-85 (STANDARD)	16.3	12.5	7.7
ENCLOSURE FRAME SIZE 2	A	B	C
EMSR-9 - EMSR-50 (COMBINATION)	22.3	15.5	9.7
ENCLOSURE FRAME SIZE 3	A	B	C
EMSR-85 (COMBINATION)	32.3	15.5	9.7



BAS BUILDING AUTOMATION STARTER 3Ø, 200 - 575V, 1/2-30HP

SMARTER & MORE VERSATILE THAN EVER

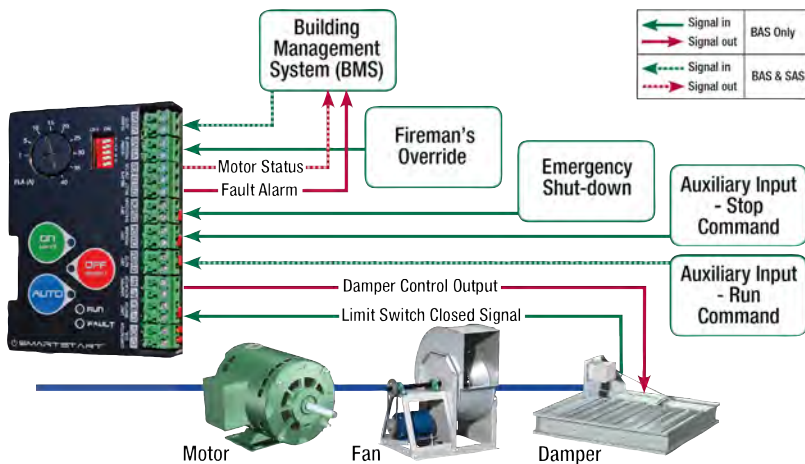
Equipped with advanced I/O including Fireman's Override and damper control, the BAS was designed from the ground up for easy integration with automation systems. With a 200 to 575V input and 1-40A adjustable overload, the BAS is the right starter for almost any job.

FEATURES

- Designed for ease of integration with automation systems
 - Comprehensive inputs/outputs for building automation systems
 - Reduces installation costs
 - High reliability
- SmartStart™ patented superior motor protection
 - Electronic overload protection including locked rotor, cycle fault and maximum time to start (due to mis-sized motor or overload)
 - FLA out of calibration indication--ensures installer sets overload correctly based on calculated motor size
- Advanced control inputs eliminate interposing relays
 - Three dry inputs for auto-run, permissive auto and shutdown
 - Two voltage inputs (12-250VAC) for auto run and fireman's override
- Logging retains critical information
 - Logging information is obtainable for starter failure (Factory retrievable only)
 - Last 10 start conditions, including FLA setting, max inrush, run current, time to start, and safety start mode.
 - Last 10 fault conditions, including FLA setting, fault type, fault current, and run time.
- Universal application
 - Automatically detects voltage (200 to 575VAC)
 - Converts to 24V for control power
 - UL Type 1 and 3R enclosures
- Lockable enclosure
 - 3R features lockable keypad cover
 - Type 4 & 4X enclosure options available (consult factory)
- Hand/Off/Auto keypad with LED status indicators
 - Intuitive operation and control with Hand (manual run), Off, and Auto run modes
- Combination versions include disconnect
 - Motor circuit protection disconnect provides short circuit protection
 - High interrupting ratings for maximum electrical system compatibility
 - No fuses required
 - Lockable handle for safety



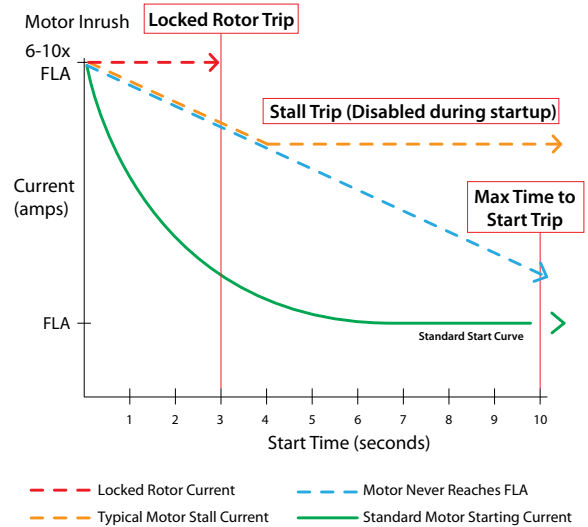
BAS IS AUTOMATION READY



BAS BUILDING AUTOMATION STARTER

THE TECHNOLOGY BEHIND SMARTSTART™

- **Smart** - Start safely. SmartStart patented technology predicts a safe operating range for your motor.
- **Intelligent** - With SmartStart enabled, if the starter isn't in range, it alarms and trips notifying you before damage occurs.
- **Active** - SmartStart detects harmful extended starting conditions with maximum time to start. Monitors motor inrush current conditions and trips if the motor doesn't start within 10 seconds (class 10 overload) regardless of FLA setting.
- **Ingenious** - Active current monitoring provides superior protection against locked rotor and stall conditions, tripping faster than a standard inverse trip curve, regardless of the FLA setting!
- **Thoughtful** - "Blackbox" recording feature retains critical information on last ten faults and starts (factory retrievable only).



ORDERING & SIZING INFORMATION - UL TYPE 1

COMBINATION									
PART NUMBER	UL HP RATINGS					SCIC KAIC @			CONTACTOR NEMA SIZE
	1Ø	3Ø				240V	460V	575V	
	230V	208V	230V	460V	575V	240V	460V	575V	
BASI-9/P-G1.6-40	1/10	-	-	3/4	3/4	100	65	25	00
BASI-9/P-G2.5-40	1/6	1/2	1/2	1	1.5	100	65	25	
BASI-9/P-G4-40	1/3	3/4	3/4	2	3	100	65	25	
BASI-9/P-G6-40	1/2	1	1.5	3	3	100	65	25	
BASI-9/P-G8-40	1	2	2	5	5	100	65	25	
BASI-18/P-G10-40	1.5	2	3	5	7.5	100	65	25	0
BASI-18/P-G13-40	2	3	3	7.5	10	100	65	25	
BASI-18/P-G17-40	3	3	5	10	15	100	30	10	
BASI-32/P-G22-40	3	5	7.5	15	20	100	30	10	1
BASI-32/P-G26-40	3	7.5	7.5	15	20	100	30	10	
BASI-32/P-G32-40	5	7.5	10	20	25	100	30	10	
BASI-40/P-G40-40	7.5	10	10	30	30	100	30	10	1+

Building Automation Starter - 1 & 3-Phase, 50/60 Hz, 200-600 VAC
 UL Type 1 Enclosed - Combination Starter, Electronic Overload
 Includes MCP Disconnect

STANDARD									
PART NUMBER	UL HP RATINGS					SCIC KAIC @			CONTACTOR NEMA SIZE
	1Ø	3Ø				240V	460V	575V	
	230V	208V	230V	460V	575V	240V	460V	575V	
BASI-9/P-40	1	2	2	5	7.5	5	5	5	00
BASI-18/P-40	3	5	5	10	15	5	5	5	0
BASI-32/P-40	5	7.5	10	20	25	5	5	5	1
BASI-40/P-40	7.5	10	10	30	30	5	5	5	2

Building Automation Starter - 1 & 3-Phase, 50/60 Hz, 200-600 VAC
 UL Type 1 Enclosed - Standard Starter, Electronic Overload
 Disconnect Not Included

BAS BUILDING AUTOMATION STARTER

ORDERING & SIZING INFORMATION - UL TYPE 3R

COMBINATION PART NUMBERS									
PART NUMBER	UL HP RATINGS					SCIC KAIC @			CONTACTOR NEMA SIZE
	1Ø	3Ø				240V	460V	575V	
	230V	208V	230V	460V	575V				
BAS3R-9/P-G1.6-40	1/10	-	-	3/4	3/4	100	65	25	00
BAS3R-9/P-G2.5-40	1/6	1/2	1/2	1	1.5	100	65	25	
BAS3R-9/P-G4-40	1/3	3/4	3/4	2	3	100	65	25	
BAS3R-9/P-G6-40	1/2	1	1.5	3	3	100	65	25	
BAS3R-9/P-G8-40	1	2	2	5	5	100	65	25	
BAS3R-9/P-G10-40	1.5	2	3	5	7.5	100	65	25	
BAS3R-18/P-G13-40	2	3	3	7.5	10	100	65	25	0
BAS3R-18/P-G17-40	3	3	5	10	15	100	30	10	
BAS3R-32/P-G22-40	3	5	7.5	15	20	100	30	10	1
BAS3R-32/P-G26-40	3	7.5	7.5	15	20	100	30	10	
BAS3R-32/P-G32-40	5	7.5	10	20	25	100	30	10	
BAS3R-40/P-G40-40	7.5	10	10	30	30	100	30	10	1+

Building Automation Starter - 1 & 3-Phase, 50/60 Hz, 200-600 VAC

UL Type 3R Enclosed - Combination Starter, Electronic Overload

Includes MCP Disconnect

STANDARD PART NUMBERS									
PART NUMBER	UL HP RATINGS					SCIC KAIC @			CONTACTOR NEMA SIZE
	1Ø	3Ø				240V	460V	575V	
	230V	208V	230V	460V	575V				
BAS3R-9/P-40	1	2	2	5	7.5	5	5	5	00
BAS3R-18/P-40	3	5	5	10	15	5	5	5	0
BAS3R-32/P-40	5	7.5	10	20	25	5	5	5	1
BAS3R-40/P-40	7.5	10	10	30	30	5	5	5	2

Building Automation Starter - 1 & 3-Phase, 50/60 Hz, 200-600 VAC

UL Type 3R Enclosed - Standard Starter, Electronic Overload

Disconnect Not Included

BAS BUILDING AUTOMATION STARTER

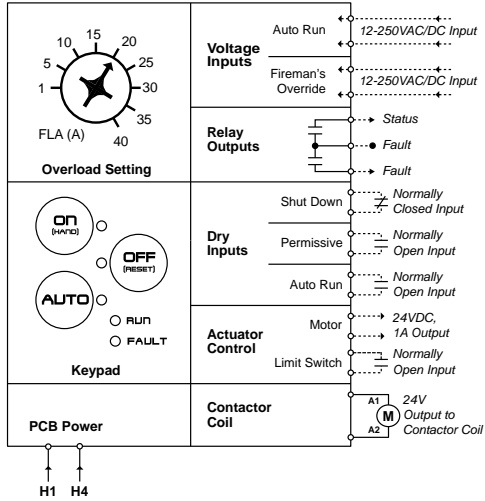
SPECIFICATIONS

STARTER TYPE			
BAS - Building Automation Starter			
200-575VAC, 3-Phase, 50/60Hz input, Across the line, full-voltage non-reversing			
NEMA Type 1 or 3R Enclosed			
USER INTERFACE			
Hand/Off/Auto Keypad with LED mode indication			
STANDARD CONTROL OPERATIONS			
Inputs	Voltage Auto-Run	Accepts 12-250VAC/DC. Applying voltage will send a run command to the starter when in Auto mode.	
	Dry Contact Auto-Run	Normally Open dry contact. When closed, the starter will be commanded to run when in Auto mode.	
	Fireman's Override	Accepts 12-250VAC/DC. Applying voltage will cause the starter to run in all modes and all LEDs will flash.	
	Shutdown	Normally Closed dry contact. When closed, the starter will disengage the contactor and will not accept a run command (except Fireman's Override). Hand/Off/Auto LEDs will flash.	
	Permissive Auto	Normally Closed dry contact. When closed, the starter will not accept run commands in Auto mode (except Fireman's Override)	
	Damper Limit Switch	Normally Open dry contact. When used with the damper motor output, the contactor coil is in series with customer provided damper contacts which disable the motor starter until the damper is in position.	
Outputs	Status Relay	Normally Open relay contacts. Status Relay will close when the motor draws 60% of the FLA dial setting. Fault Relay will close in the event of a fault trip. Contact Ratings: 110VDC, 0.3A Resistive 125VDC, 0.5A GP 30VDC, 2.0A Resistive 120VAC 50/60Hz, 0.5A Resistive 125VAC 50/60Hz, 1.0A GP 240VAC 50/60Hz, 0.25A Resistive	
	Fault Relay		
	Damper/Actuator		24VDC, 1A max.
Operational	Overload Type	Electronic I2t trip curve	
	Fault Reset	Manual (default) or Automatic	
	Power Fail Modes	Return to last mode the starter was placed in (Hand/Off/Auto) with no delay (default)	
		Return to last mode the starter was placed in (Hand/Off/Auto) with a 10 second delay	
		Return to Off mode (LED of last mode the starter was placed in will be flash)	
ENVIRONMENTAL			
Ambient Operating Temp	-5° to 140° F (-20° to 60° C)		
Ambient Storage Temp	-5° to 185° F (-20° to 85° C)		
Relative Humidity	5% to 95% non-condensing		
MOTOR PROTECTION		ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Overload Current Setting Range	1-40A		Per FLA
Overload Trip Class	Adjustable: Class 10 or 20, Trip current = 115% of FLA setting		Class 10
Cycle Fault	Trip if cycle rate exceeds 20 starts/minute		Always On
Stall	Trips within 0.5 seconds (disabled during startup)		Always On
SMARTSTART™ PROTECTION		ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Current Phase Unbalance	On/Off	Trips within 3 sec @ 25% current unbalance. *Trip threshold changes to 80% unbalance when switched to Off	On
Locked Rotor		Trips within 0.5 seconds	
Out of Calibration		Trips after 10 seconds if the FLA dial setting is incorrect (Set above calculated FLA range), ie. Start current is outside of an acceptable range (fla setting * 5 < inrush < fla setting * 14).	
Max Time to Start		Regardless of FLA or I2t curve, always trip at start if starting current is outside of an acceptable range (inrush / 5) and still decreasing after 10 seconds.	

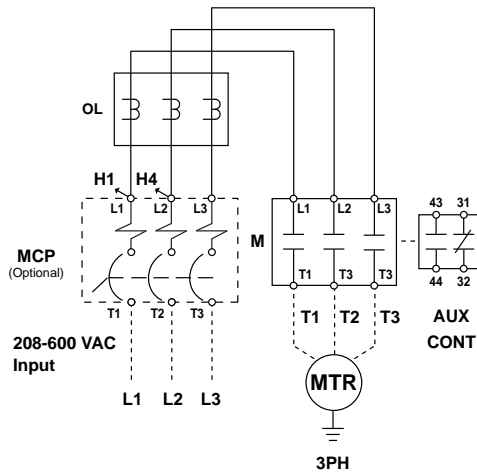
BAS BUILDING AUTOMATION STARTER

WIRING DIAGRAM

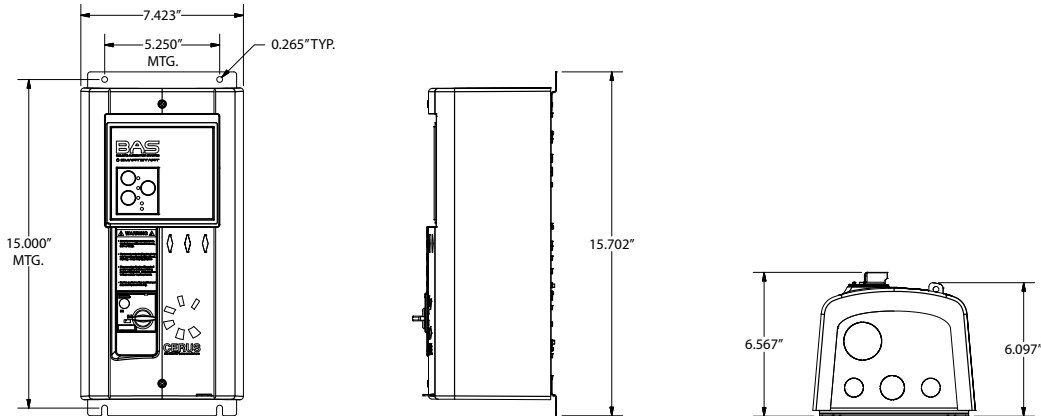
BAS CONTROL WIRING



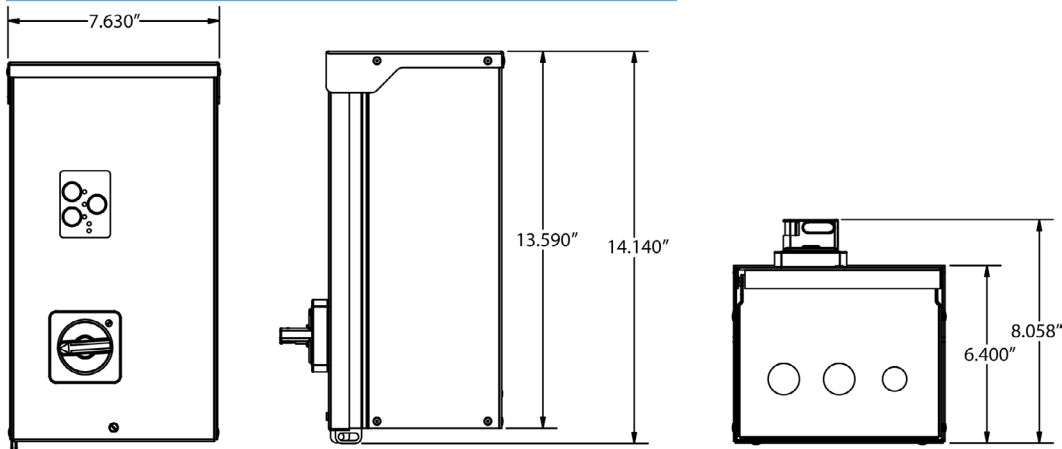
BAS STARTER POWER WIRING



DIMENSIONS - UL TYPE 1



DIMENSIONS - UL TYPE 3R



*NEMA 4X & 12 enclosures available upon request

SAS STANDARD AUTOMATION STARTER 3Ø, 200 - 575V, 1/2-30HP

ADVANCED PROTECTION, INCREDIBLE VALUE

Like the BAS, the SAS accepts 200 to 575VAC incoming power, making it a plug and play device. The 1-40A electronic overload ensures you will have the right starter for the job, and SmartStart™ revolutionary technology protects motors from potentially harmful start-up conditions. The SAS is automation compatible.

FEATURES

- Automation compatible
- Higher reliability than traditional motor starters
- Comprehensive inputs/outputs for energy management systems
 - Reduces installation costs
 - Increased energy savings
- SmartStart™ patented superior motor protection
 - Electronic overload protection including locked rotor, cycle fault and maximum time to start (due to mis-sized motor or overload)
 - FLA out of calibration indication ensures installer sets overload correctly based on calculated motor size
- Wide range overload, universal application
 - 1-40A electronic overload eliminates call backs due to mis-sized heaters
 - Accepts 200 to 575VAC
- Combination versions include disconnect
 - Motor circuit protection disconnect provides short circuit protection
 - High interrupting ratings for maximum electrical system compatibility
 - No fuses required
 - Lockable handle for safety
- Control inputs eliminate interposing relays
 - Wet & dry auto run inputs
- UL Type 1 and 3R enclosures
 - Lockable enclosure
 - 3R features lockable keypad cover
- Hand/Off/Auto keypad with LED status indicators
 - Intuitive operation and control with Hand (manual run), Off, and Auto run modes
- Logging retains critical information
 - Logging information is obtainable for starter failure (Factory retrievable only)
 - Last 10 start conditions, including FLA setting, max inrush, run current, time to start, and safety start mode.
 - Last 10 fault conditions, including FLA setting, fault type, fault current, and run time.



SAS STANDARD AUTOMATION STARTER

ORDERING & SIZING INFORMATION - UL TYPE 1

PART NUMBER	UL HP RATINGS					SCIC KAIC @			CONTACTOR NEMA SIZE
	1Ø	3Ø				240V	460V	575V	
	230V	208V	230V	460V	575V				
SASI-9/L-G1.6-40	1/10	-	-	3/4	3/4	100	65	25	00
SASI-9/L-G2.5-40	1/6	1/2	1/2	1	1.5	100	65	25	
SASI-9/L-G4-40	1/3	3/4	3/4	2	3	100	65	25	
SASI-9/L-G6-40	1/2	1	1.5	3	3	100	65	25	
SASI-9/L-G8-40	1	2	2	5	5	100	65	25	
SASI-18/L-G10-40	1.5	2	3	5	7.5	100	65	25	0
SASI-18/L-G13-40	2	3	3	7.5	10	100	65	25	
SASI-18/L-G17-40	3	3	5	10	15	100	30	10	
SASI-32/L-G22-40	3	5	7.5	15	20	100	30	10	1
SASI-32/L-G26-40	3	7.5	7.5	15	20	100	30	10	
SASI-32/L-G32-40	5	7.5	10	20	25	100	30	10	
SASI-40/L-G40-40	7.5	10	10	30	30	100	30	10	1+

Building Automation Starter - 1 & 3-Phase, 50/60 Hz, 200-600 VAC

UL Type 1 Enclosed - Combination Starter, Electronic Overload

Includes MCP Disconnect

PART NUMBER	UL HP RATINGS					SCIC KAIC @			CONTACTOR NEMA SIZE
	1Ø	3Ø				240V	460V	575V	
	230V	208V	230V	460V	575V				
SASI-9/L-40	1	2	2	5	7.5	5	5	5	00
SASI-18/L-40	3	5	5	10	15	5	5	5	0
SASI-32/L-40	5	7.5	10	20	25	5	5	5	1
SASI-40/L-40	7.5	10	10	30	30	5	5	5	2

Building Automation Starter - 1 & 3-Phase, 50/60 Hz, 200-600 VAC

UL Type 1 Enclosed - Standard Starter, Electronic Overload

Disconnect Not Included

ORDERING & SIZING INFORMATION - UL TYPE 3R

PART NUMBER	UL HP RATINGS					SCIC KAIC @			CONTACTOR NEMA SIZE
	1Ø	3Ø				240V	460V	575V	
	230V	208V	230V	460V	575V				
SAS3R-9/L-G1.6-40	1/10	-	-	3/4	3/4	100	65	25	00
SAS3R-9/L-G2.5-40	1/6	1/2	1/2	1	1.5	100	65	25	
SAS3R-9/L-G4-40	1/3	3/4	3/4	2	3	100	65	25	
SAS3R-9/L-G6-40	1/2	1	1.5	3	3	100	65	25	
SAS3R-9/L-G8-40	1	2	2	5	5	100	65	25	
SAS3R-18/L-G10-40	1.5	2	3	5	7.5	100	65	25	0
SAS3R-18/L-G13-40	2	3	3	7.5	10	100	65	25	
SAS3R-18/L-G17-40	3	3	5	10	15	100	30	10	
SAS3R-32/L-G22-40	3	5	7.5	15	20	100	30	10	1
SAS3R-32/L-G26-40	3	7.5	7.5	15	20	100	30	10	
SAS3R-32/L-G32-40	5	7.5	10	20	25	100	30	10	
SAS3R-40/L-G40-40	7.5	10	10	30	30	100	30	10	1+

Building Automation Starter - 1 & 3-Phase, 50/60 Hz, 200-600 VAC

UL Type 3R Enclosed - Combination Starter, Electronic Overload

Includes MCP Disconnect

PART NUMBER	UL HP RATINGS					SCIC KAIC @			CONTACTOR NEMA SIZE
	1Ø	3Ø				240V	460V	575V	
	230V	208V	230V	460V	575V				
SAS3R-9/L-40	1	2	2	5	7.5	5	5	5	00
SAS3R-18/L-40	3	5	5	10	15	5	5	5	0
SAS3R-32/L-40	5	7.5	10	20	25	5	5	5	1
SAS3R-40/L-40	7.5	10	10	30	30	5	5	5	2

Building Automation Starter - 1 & 3-Phase, 50/60 Hz, 200-600 VAC

UL Type 3R Enclosed - Standard Starter, Electronic Overload

Disconnect Not Included

SAS STANDARD AUTOMATION STARTER

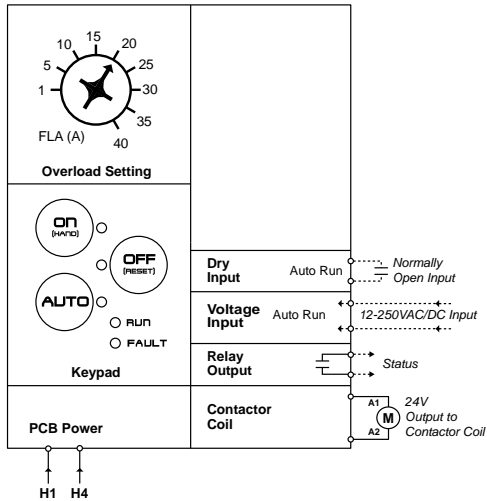
SPECIFICATIONS

STARTER TYPE			
SAS - Standard Automation Starter			
200-575VAC, 3-Phase, 50/60Hz input, Across the line, full-voltage non-reversing			
NEMA Type 1 or 3R Enclosed			
USER INTERFACE			
Hand/Off/Auto Keypad with LED mode indication			
STANDARD CONTROL OPERATIONS			
Inputs	Voltage Auto-Run	Accepts 12-250VAC/DC. Applying voltage will send a run command to the starter when in Auto mode.	
	Dry Contact Auto-Run	Normally Open dry contact. When closed, the starter will be commanded to run when in Auto mode.	
Output	Status Relay	Normally Open relay contact. Status Relay will close when the motor draws 60% of the FLA dial setting. Contact Ratings: 110VDC, 0.3A Resistive 125VDC, 0.5A GP 30VDC, 2.0A Resistive 120VAC 50/60Hz, 0.5A Resistive 125VAC 50/60Hz, 1.0A GP 240VAC 50/60Hz, 0.25A Resistive	
Operational	Overload Type	Electronic I2t trip curve	
	Fault Reset	Manual (default) or Automatic	
	Power Fail Mode	Return to last mode the starter was placed in (Hand/Off/Auto) with no delay (default)	
ENVIRONMENTAL			
Ambient Operating Temp		-5° to 140° F (-20° to 60° C)	
Ambient Storage Temp		-5° to 185° F (-20° to 85° C)	
Relative Humidity		5% to 95% non-condensing	
MOTOR PROTECTION		ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Overload Current Setting Range		1-40A	Per FLA
Overload Trip Class		Class 10, Trip current = 115% of FLA setting	Class 10
Cycle Fault		Trip if cycle rate exceeds 20 starts/minute	Always On
Stall		Trips within 0.5 seconds (disabled during startup)	Always On
SMARTSTART™ PROTECTION		ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Current Phase Unbalance	On/Off	Trips within 3 sec @ 25% current unbalance. *Trip threshold changes to 80% unbalance when switched to Off	On
Locked Rotor		Trips within 0.5 seconds	
Out of Calibration		Trips after 10 seconds if the FLA dial setting is incorrect (set above calculated FLA range), ie. Start current is outside of an acceptable range (fla setting * 5 < inrush < fla setting * 14).	
Max Time to Start		Regardless of FLA or I2t curve, always trip at start if starting current is outside of an acceptable range (inrush / 5) and still decreasing after 10 seconds.	

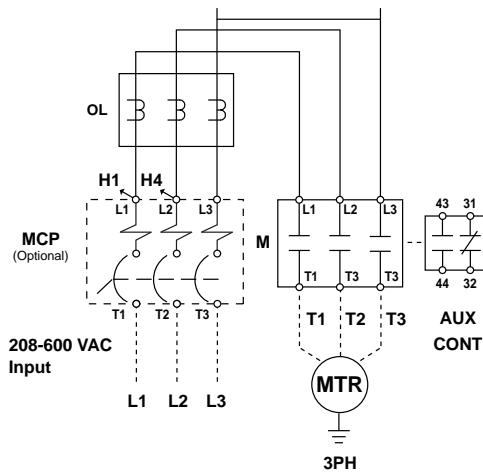
SAS STANDARD AUTOMATION STARTER

WIRING DIAGRAM

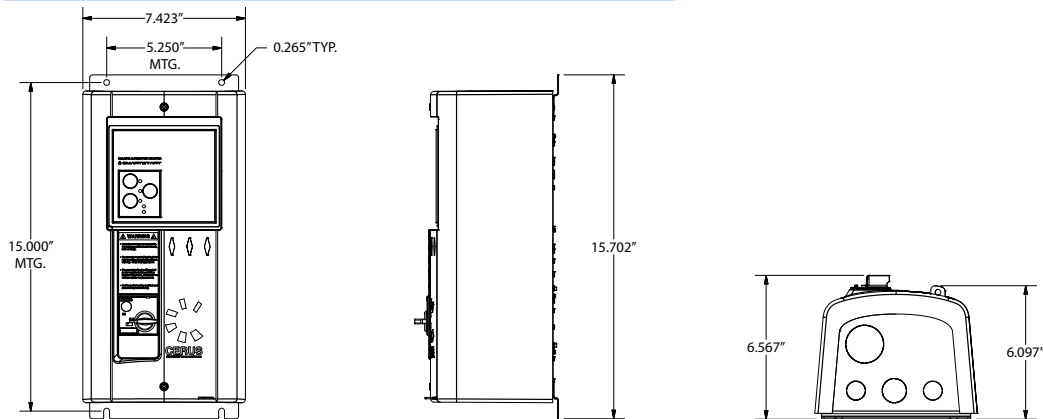
SAS CONTROL WIRING



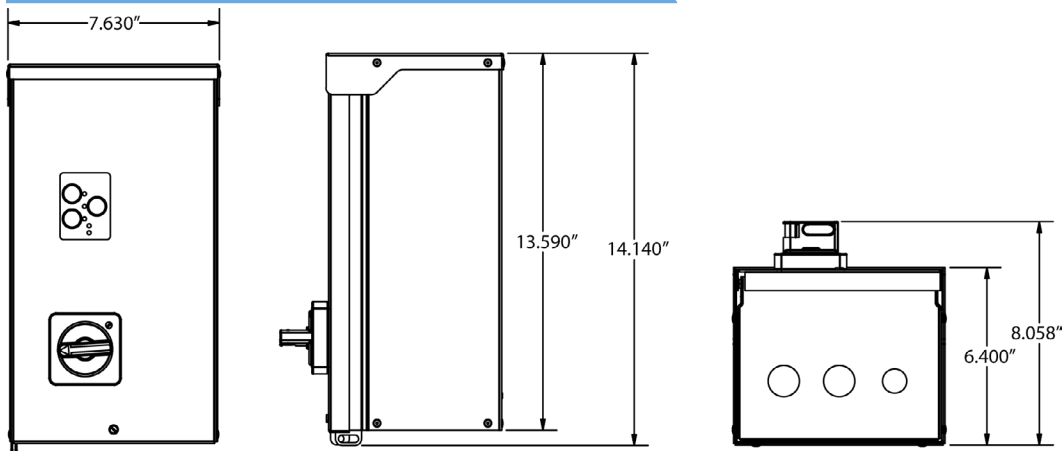
SAS STARTER POWER WIRING



DIMENSIONS - UL TYPE 1



DIMENSIONS - UL TYPE 3R



BAS-1P 1Ø BUILDING AUTOMATION STARTER 1Ø, 110V, 1/10 - 1HP | 1Ø, 240V, 1/10 - 1HP

ONE PHASE, ONE SOLUTION

The BAS-1P protects single phase motors with an adjustable 1-16A class 10 electronic overload. It includes features like run status verification, a concealed Hand/Auto switch, lockable on/off switch, and system override mode (smoke purge). All of this in a compact design that installs on a single junction box.

FEATURES

- On/Off Disconnect Switch with Recessed Hand/Auto Modes
 - Concealed Hand/Auto switch discourages tampering
 - Lockable motor-rated On/Off switch meets safety regulations
 - Meets NEC motor service disconnect requirements when properly installed
- LED indicator lights for power, run and fault
 - Run Status Verification
 - Integrated current sensing confirms motor operational status
 - Quickly and accurately pinpoint malfunctioning equipment
- Voltage & Dry Inputs for Auto Run Command
 - Wire directly from the automation system to the starter, no interposing relays necessary
 - Save on installation costs and increase reliability.
- System Override Mode (Fireman’s, Occupancy or Manual)
 - Initiates smoke purge sequence during emergency situations for safety and code compliance or use for occupancy sensor run input (dry contact)
- Wide Range Class 10 Electronic Overload
 - Prevents ordering confusion and eliminates call backs due to mis-sized heaters
- Advanced protective features including anti-cycling, manual reset, etc.
- Standard Single Gang Box Installation
 - Easy to install in any location
 - Surface or flush mount capability
- High Reliability
- Heavy duty motor-rated switch and control relay
- No thermal elements to fail
- All units include a 5-Year warranty
- UL 508 Listed



ORDERING INFORMATION

PART NUMBER	DESCRIPTION
BAS-1P	Starter with Manual Overload Trip Reset



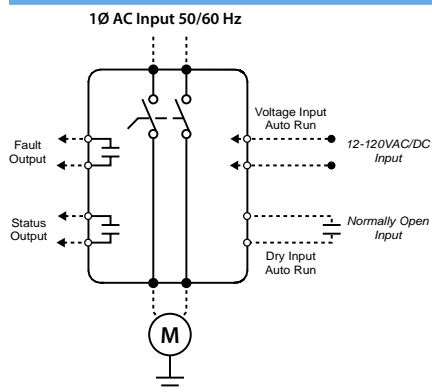
- Adjustable overload (1-16A) eliminates sizing heaters

BAS-1P 1Ø BUILDING AUTOMATION STARTER

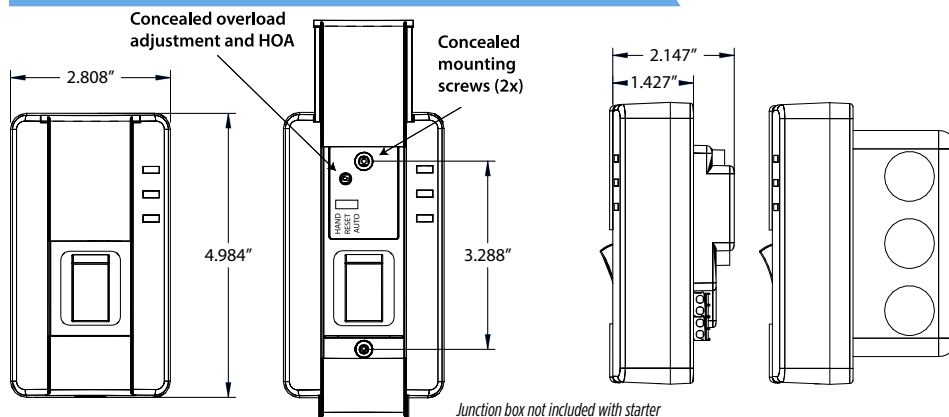
SPECIFICATIONS

STARTER TYPE		
BAS-1P - Standard Automation Starter, 1-Phase		
120-230VAC, 1-Phase, 50/60Hz input, Across the line, full-voltage non-reversing (IHP)		
NEMA Type 1		
USER INTERFACE		
On/Off Switch, Concealed Hand-Off-Auto Switch		
STANDARD CONTROL OPERATIONS		
Inputs	Voltage Auto-Run	Accepts 12-120VAC/DC. Applying voltage will send a run command to the starter when in Auto mode.
	Dry Contact Auto-Run	Normally Open dry contact. When closed, the starter will be commanded to run when in Auto mode.
Outputs	Status Relay	Normally Open relay contacts. Status Relay will close when the motor draws 60% of the FLA dial setting.
	Fault Relay	Fault Relay will close in the event of a fault trip. Contact Ratings: 0.3A @ 125VAC, 1A @ 24VAC
Operational	Overload Type	Electronic I ² t trip curve
	Fault Reset	Manual or Automatic
	Power Fail Mode	Return to last mode the starter was placed in (Hand/Off/Auto) with no delay (default)
ENVIRONMENTAL		
Ambient Operating Temp		-5° to 104° F (-20° to 40° C)
Ambient Storage Temp		-5° to 185° F (-20° to 85° C)
Relative Humidity		5% to 95% non-condensing
MOTOR PROTECTION	ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Overload Current Setting Range	1-16A	Per FLA
Overload Trip Class	Class 10, Trip current = 115% of FLA setting	Class 10
Locked Rotor / Stall	Trips within 2 seconds @ 300% FLA setting	Always On

WIRING DIAGRAM



DIMENSIONS



EMS-RV ENERGY MANAGEMENT SOFT-STARTER 3Ø, 208 - 480V, 2-250HP

THE MOST INTELLIGENT SOFT-STARTER YET

Retaining the incredible features from the original EMS such as Power metering & BACnet communications, the EMS-RV has the added benefit of reduced voltage starting. Reducing the inrush current further increases energy savings and extends equipment life.

FEATURES

- Soft Start
 - Energy savings through reduced inrush current
 - Adjustable current limit, initial voltage, start/stop time
 - Coast to stop
 - Torque boost
 - SCR over-temperature detection
 - Shorted SCR detection
 - Across-the-line start for emergency situations
- Superior motor protection
 - Class 5-30 Electronic Overload
 - Phase loss/unbalance protection
 - Stall/locked rotor condition
 - Cycle fault
 - Underpower (Protects the motor in a belt loss condition)
- Built-in power monitoring, fault logging and communications
 - 1% ANSI grade metering
 - kW and kWh data available on LCD display
 - Last 15 fault types are recorded (e.g. underpower, overload, voltage/current loss/unbalance, etc.)
 - Fault counter: stores how many times each fault type has occurred (Up to 255)
 - Logs changes to parameter settings (e.g. overload, OV/UV, underpower)
 - All power condition values are displayed
 - Built-in RS-485 for Modbus RTU communication
- HOA keypad with LCD display
 - Plain English operation – easy to set up and simple to operate
 - LEDs indicate Hand/Off/Auto modes, run and fault conditions
- Building automation system ready
 - Relay outputs for fault and proof of flow verification
 - Detects belt loss and alerts automation system
 - Eliminates costly current sensors
 - Voltage inputs for auto run and fireman’s override (accepts 12-120VAC/DC)
 - Wire directly from the automation system to the starter, no interposing relays necessary
 - Fireman’s override initiates smoke purge sequence during emergency situations for safety and code compliance
 - Dry inputs for auto run, emergency shutdown, and permissive auto (N.O. dry contact closure)
 - Analog input for (selectable) 0-10V, 4-20mA, 10k Thermistor, viewable as a Modbus point
- Optional circuit breaker disconnect
 - Molded case circuit breaker provides branch and short circuit protection
 - High interrupting ratings for maximum electrical system compatibility
 - No fuses required – save time and money
 - Lockable handle for safety
- Multi-tap control power transformer (CPT)
 - Multi-tap CPT input accepts all common motor voltages
 - Integrated secondary protection – no fuses required



- Our multi-tap power transformer accepts inputs of: 208, 230, & 460V

EMS-RV ENERGY MANAGEMENT SOFT-STARTER

OPTIONS

120V control circuit

- Option in lieu of 24VAC standard

Ground fault protection

- Protects motors from damage due to ground current conditions
- UL 1053 Certified

PART NUMBER	DESCRIPTION
EMS-SRG240	208-240VAC Surge Suppressor
EMS-SRG480	480-575VAC Surge Suppressor
EMS-GFLT	Ground Fault Protection
EMS-120	120VAC Control Circuit

ORDERING & SIZING INFORMATION - UL TYPE 3R

UL THREE PHASE HP			SCIC KAIC @		PART NUMBER
208V	230V	460V	208/230V	460V	
2	2	5	100	65	EMS3R-RV-9/J-G15
3	3	7.5	100	65	EMS3R-RV-18/J-G20
5	5	10	100	65	EMS3R-RV-22/J-G30
5	7.5	15	100	65	EMS3R-RV-32/J-G40
7.5	10	20	100	65	EMS3R-RV-40/J-G50
10	10	25	100	65	EMS3R-RV-40/J-G60
-	15	30	100	65	EMS3R-RV-50/J-G80
15	20	40	100	65	EMS3R-RV-65/J-G100
20	25	50	100	65	EMS3R-RV-85/J-G125
25	30	60	100	65	EMS3R-RV-100/J-G150
30	40	75	100	65	EMS3R-RV-150/J-G200
40	50	100	100	65	EMS3R-RV-150/J-G250
40	50	100	18	18	EMS3R-RV-330/J-G250
50	60	125	18	18	EMS3R-RV-330/J-G300
60	75	150	18	18	EMS3R-RV-330/J-G400
74	100	200	18	18	EMS3R-RV-330/J-G500
100	125	250	18	18	EMS3R-RV-400/J-G600

NEMA Type 3R Indoor/Outdoor Enclosure
 Combination Energy Management Soft Starter - 3-Phase, 208-460VAC
 Includes Molded Case Circuit Breaker Disconnect

UL THREE PHASE HP			STANDARD SCIC KAIC @	HIGH FAULT* SCIC KAIC @		PART NUMBER
208V	230V	460V	208/230V/460V	208/230V	460V	
15	15	30	5	100	65	EMS3R-RV-50/J
25	30	60	10	100	65	EMS3R-RV-100/J
40	50	100	10	100	65	EMS3R-RV-150/J
100	125	250	18	18	18	EMS3R-RV-400/J

*A molded case circuit breaker must be used in order to obtain the high fault SCIC KAIC ratings
 NEMA Type 3R Indoor/Outdoor Enclosure
 Standard Energy Management Soft Starter - 3-Phase, 208-460VAC

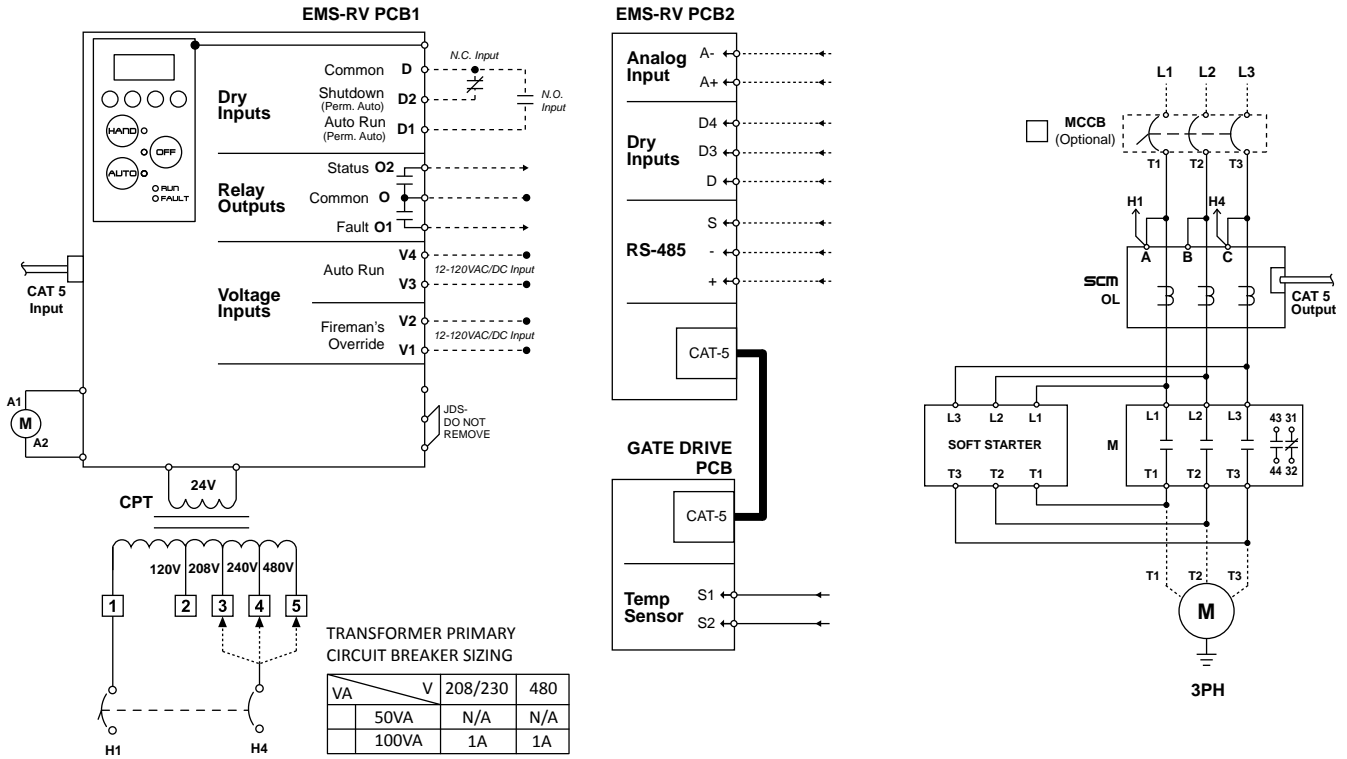
EMS-RV ENERGY MANAGEMENT SOFT-STARTER

SPECIFICATIONS

STARTER TYPE		
EMS-RV - Energy Management Starter - Reduced Voltage (Soft Starter)		
200-575VAC, 3-Phase, 50/60Hz input, Reduced voltage starter		
NEMA Type 3R Enclosed		
USER INTERFACE		
Hand-Off-Auto	Door mounted Hand-Off-Auto keypad (water-tight-membrane)	
Programming	Internal display with programming keys (LCD, back-lit, 16 character)	
Mode Indication	Integrated LEDs, Hand-Off-Auto-Run-Fault indication	
STANDARD CONTROL OPERATIONS		
Inputs	Voltage Auto-Run	Accepts 12-130VAC/DC. Applying voltage will send a run command to the starter when in Auto mode.
	Dry Contact Auto-Run	Normally Open dry contact. When closed, the starter will be commanded to run when in Auto mode.
	Fireman's Override	Accepts 12-130VAC/DC. Applying voltage will command the motor to run in all modes and will supersede a Shutdown command. Hand/Off/Auto/Run/Fault LEDs will flash.
	Shutdown	Normally Closed dry contact. When open, the contactor will open and the starter will disengage the contactor and will not accept a run command with the exception of Fireman's Override. Hand/Off/Auto LEDs will flash.
	Permissive Auto	Normally Open dry contact. When closed, the starter will not accept a run command when in Auto mode.
	RS-485	Modbus RTU slave
	Analog Input	Selectable 0-10V, 4-20mA 10k Thermistor, viewable as a Modbus point
Outputs	Status Relay	Normally Open relay contacts. Status Relay will close when the motor draws a user defined percentage of the FLA setting.
	Fault Relay	Fault Relay will close in the event of a fault trip. Contact Ratings: 0.3A @ 125VAC, 1A @ 24VAC
Operational	Starts	6/hour, 20 seconds max start time @ 400% FLA, 30 seconds max start time @ 300% FLA
	Overload Type	Electronic, I ² t trip curve
	Power Fail Modes	Restart in last mode (Hand/Off/Auto) with no delay (default)
		Restart in Off mode
	On/Off Time Delay	Restart in Off mode if power failure lasts longer than 2 seconds. Restart in last mode if power failure is less than 2 seconds. On/Off, Adjustable: 0.1-99 seconds
Fault Reset	Adjustable: Manual or Automatic	
ENVIRONMENTAL		
Ambient Operating Temp	-5° to 140° F (-20° to 60° C)	
Ambient Storage Temp	-5° to 185° F (-20° to 85° C)	
Relative Humidity	5% to 95% non-condensing	
MOTOR / SOFT STARTER PROTECTION	ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Overload Current Setting Range	Differs per model	Per FLA
Overload Trip Class	Adjustable: 5-30	10
Overload Service Factor	Adjustable: 0.00-2.00	1.15
Under Power	On/Off, Adjustable: 0-99% of measured electrical input	Off / 80%
Over Power	On/Off, Adjustable: 101-200% of measured electrical input	Off / 120%
Over / Under Voltage	On/Off, Adjustable: +5-25% over/under the nominal voltage setting	On / 10%
Voltage Phase Unbalance	On/Off, Adjustable: 1-20% voltage phase deviation	On / 3%
Voltage Phase Loss	Always On, Adjustable: 1-50% voltage phase deviation	5%
Voltage Phase Sequence Reversal	On/Off, Trips within 0.1 seconds upon voltage phase reversal detection	On
Ground Fault (Optional)	On/Off, Adjustable: 1.0-9.9A	Off / 1A
Cycle Fault	On/Off, Trips if contactor cycle rate exceeds 20 starts/minute	On
Warm Start Provision	On/Off, Delays motor restart after a fault trip, based on calculated motor temperature	On
Current Phase Unbalance	On/Off, Adjustable: 1-50% current phase unbalance	On / 20%
Locked Rotor / Stall	On/Off, Trips within 0.5 seconds	On
Shorted SCR	Always On, Trips upon detection of a shorted SCR or no motor	On
Open SCR	Always On, Trips if no current is detected during startup or bypass	On
SCR Over-Temperature	Always On, Trips if any SCR reaches 125oC	On
Across-The-Line Start	On/Off, Allows the user to start the motor across-the-line	Off

EMS-RV ENERGY MANAGEMENT SOFT-STARTER

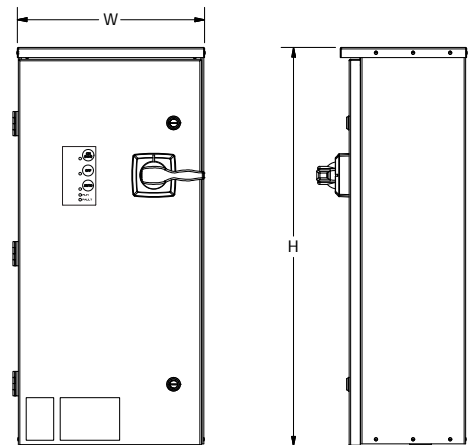
WIRING DIAGRAM



DIMENSIONS

COMBINATION				
STARTER SIZE	DIMENSIONS (IN)			
	H	W	D	
EMS3R-RV-9/J-G15 - EMS3R-RV-100/J-G150	32	15	10	
EMS3R-RV-150/J-GXXX	36	24	12	
EMS3R-RV-330/J-G250 - EMS3R-RV-330/J-G400	42	30	12	
EMS3R-RV-330/J-G500 - EMS3R-RV-400/J-G600	48	30	16	

STANDARD				
STARTER SIZE	DIMENSIONS (IN)			
	H	W	D	
EMS3R-RV-50/J - EMS3R-RV-100/J	32	15	10	
EMS3R-RV-150/J	36	24	12	
EMS3R-RV-400/J	42	30	12	



SAS-RV STANDARD AUTOMATION SOFT-STARTER 3Ø, 200 - 575V, 1/2-30HP

RELIABLE PROTECTION, ADVANCED FEATURES

The SAS-RV provides reliable protection with the added value of soft-starting capabilities. Like the standard SAS, the SAS-RV is automation compatible and has unique and convenient features such as a built in electronic overload and a universal (200-575VAC) power supply.

FEATURES

- Soft-start motor protection
- Full-Load Rated Contactor Bypass
- Adjustable Current Limit, Initial Voltage, Start/Stop Time
- SCR Over-Temperature detection
- Shorted SCR detection
- Across-the-line Start for Emergency Situations
- Automation compatible
 - Comprehensive inputs/outputs for building automation systems
 - Reduces installation costs
 - Increased energy savings
- Electronic motor protection
 - Class 10 electronic overload
 - Stall/Locked rotor
 - Phase unbalance
 - Cycle fault
- Universal power supply
 - Automatically detects voltage (200 to 575VAC)
 - Converts to 24V for control power
- Control inputs/outputs eliminate interposing relays
 - One N.O dry input for auto run and one wet input for auto run
 - Status relay output
- UL Type 3R Enclosed (4 and 4X available)
 - Door mounted Hand/Off/Auto (HOA) keypad
 - Combination versions include disconnect
 - Molded case circuit breaker provides branch and short circuit protection
 - High interrupting ratings for maximum electrical system compatibility
 - No fuses required
 - Lockable handle for safety



OPTIONS

PART NUMBER	DESCRIPTION
SAS-SRG240	208-240V surge suppressor
SAS-SRG480	480-575V surge suppressor

SAS-RV STANDARD AUTOMATION SOFT-STARTER

ORDERING & SIZING INFORMATION - UL TYPE 3R

PART NUMBER	UL THREE PHASE HP				SCIC KAIC @		
	208V	230V	460V	575V	200/230V	460V	575V
SAS3R-RV-9/J-G15	2	2	5	5	100	65	14
SAS3R-RV-18/J-G20	3	3	7.5	10	100	65	14
SAS3R-RV-22/J-G30	5	5	10	15	100	65	14
SAS3R-RV-32/J-G40	5	7.5	15	20	100	65	14
SAS3R-RV-40/J-G50	7.5	10	20	25	100	65	14
SAS3R-RV-40/J-G60	10	10	25	30	100	65	14
SAS3R-RV-50/J-G80	-	15	30	40	100	65	14
SAS3R-RV-65/J-G100	15	20	40	50	100	65	14
SAS3R-RV-85/J-G125	20	25	50	60	100	65	14
SAS3R-RV-100/J-G150	25	30	60	75	100	65	18

UL/NEMA Type 3R Outdoor Enclosure
 Combination Standard Automation Soft Starter - 3-Phase, 200-575VAC
 Includes Molded Case Circuit Breaker Disconnect

PART NUMBER	UL THREE PHASE HP				STANDARD SCIC KAIC @	HIGH FAULT* SCIC KAIC @		
	208V	230V	460V	575V		200/230V/460V	200/230V	460V
	HP	HP	HP	HP				
SAS3R-RV-9/J	2	2	5	7.5	5	100	65	14
SAS3R-RV-18/J	5	5	10	15	5	100	65	14
SAS3R-RV-32/J	7.5	10	20	25	5	100	65	14
SAS3R-RV-40/J	10	10	30	30	5	100	65	14
SAS3R-RV-50/J	15	15	30	40	5	100	65	14
SAS3R-RV-100/J	25	30	60	75	10	100	65	18

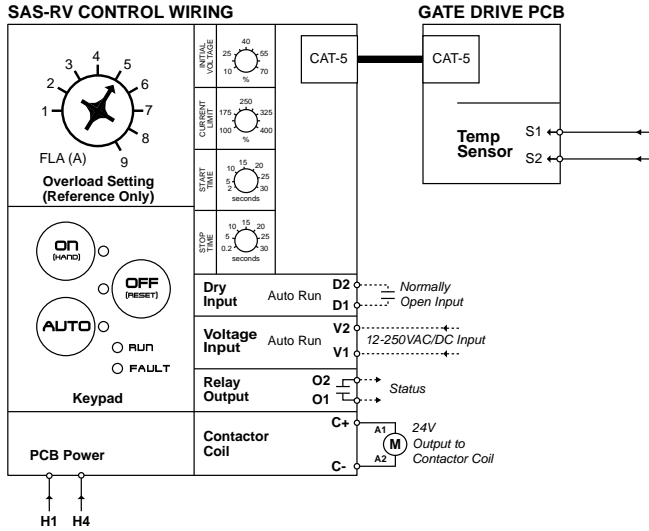
UL/NEMA Type 3R Outdoor Enclosure
 Standard Automation Soft Starter - 3-Phase, 200-575VAC
 *A molded case circuit breaker must be used in order to obtain the high fault SCIC KAIC ratings

SPECIFICATIONS

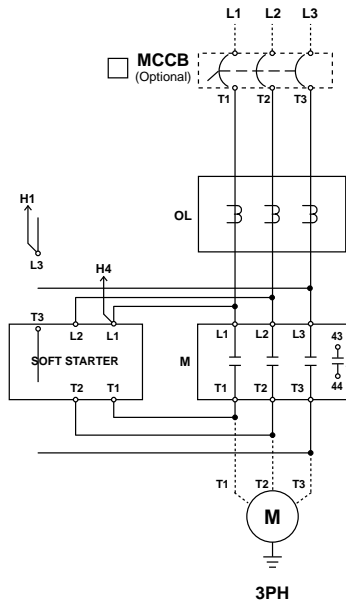
STARTER TYPE		
SAS-RV - Standard Automation Starter - Reduced Voltage (Soft Starter)		
200-575VAC, 3-Phase, 50/60Hz input, Reduced voltage starter		
NEMA Type 3R Enclosed		
USER INTERFACE		
Hand-Off-Auto	Door mounted Hand-Off-Auto keypad (water-tight-membrane)	
Programming	Internal dials	
Mode Indication	Integrated LEDs, Hand-Off-Auto-Run-Fault indication	
STANDARD CONTROL OPERATIONS		
Inputs	Voltage Atuo-Run	Accepts 12-130VAC/DC. Applying voltage will send a run command to the starter when in Auto mode.
	Dry Contact Auto-Run	Normally Open dry contact. When closed, the starter will be commanded to run when in Auto mode.
Output	Status Relay	Normally Open relay contact. Status Relay will close when the motor draws a user defined percentage of the FLA setting. Contact Ratings: 0.3A @ 125VAC, 1A @ 24VAC
Operational	Starts	6/hour, 20 seconds max start time @ 400% FLA, 30 seconds max start time @ 300% FLA
	Overload Type	Electronic, I2t trip curve
	Power Fail Modes	Restart in last mode (Hand/Off/Auto) with no delay (default)
	Fault Reset	Adjustable: Manual or Automatic
ENVIRONMENTAL		
Ambient Operating Temp	-5° to 140° F (-20° to 60° C)	
Ambient Storage Temp	-5° to 185° F (-20° to 85° C)	
Relative Humidity	5% to 95% non-condensing	
MOTOR / SOFT STARTER PROTECTION	ADJUSTMENT / DESCRIPTION	DEFAULT SETTING
Overload Current Setting Range	Differs per model	Per FLA
Overload Trip Class	Class 10, Trip current = 115% of FLA setting	10
Overload Service Factor	1.15	1.15
Cycle Fault	Always On,, Trips if contactor cycle rate exceeds 20 starts/minute	On
Current Phase Unbalance	Always On, Trips @ 50% current phase unbalance	50%
Locked Rotor / Stall	Always On,, Trips within 0.5 seconds	On
Shorted SCR	Always On, Trips upon detection of a shorted SCR or no motor	On
Open SCR	Always On, Trips if no current is detected during startup or bypass	On
SCR Over-Temperature	Always On, Trips if any SCR reaches 125oC	On
Across-The-Line Start	On/Off, Allows the user to start the motor across-the-line	Off

SAS-RV STANDARD AUTOMATION SOFT-STARTER

WIRING DIAGRAM

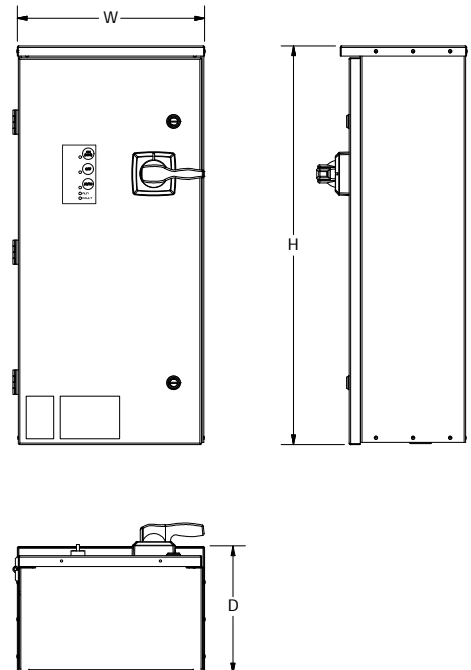


SAS-RV STARTER POWER WIRING



DIMENSIONS

STARTER SIZE	DIMENSIONS (IN)		
	H	W	D
SAS3R-RV-9 - SAS3R-RV-50	22	15	10
SAS3R-RV-65 - SAS3R-RV-100	32	15	10





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