

Soft Starter (three controlled phases)



- Rated operational voltage up to 600 VAC 50/60Hz
- Rated operational current up to 86A (inside delta)
- Output signal for By-Pass and Start/Stop
- Ramp Up and Down time adjustable
- Initial Torque adjustable with kick start
- Wide control voltage range
- Meets EN 60947-4-2 requirements

Item selection and technical specifications

Load ratings AC-53a without by-pass AC-53b with by-pass ¹ Inside delta configuration	Item number by 208-240VAC 50/60Hz Line Voltage	Item number by 400-480VAC 50/60Hz Line Voltage	Item number by 550-600VAC 50/60Hz Line Voltage	Ramp- Up / Down adjustment	Torque adjustment	Module- width
15A AC-53a	SMC 33 DA 2315	SMC 33 DA 4015	SMC 33 DA 6015			90mm
17A AC-53a no by-pass	SMC 33 DA 2325BP	SMC 33 DA 4025BP	SMC 33 DA 6025BP			90mm
25A AC-53b w. by-pass	SMC 33 DA 2325BP	SMC 33 DA 4025BP	SMC 33 DA 6025BP	Ramp-up time 0.5 - 30 sec.	0- 85% adjustable of nominal torque with selectable kick start 200ms (break losse funtion)	90mm
29A AC-53a ¹	SMC 33 DA 2340DBP	SMC 33 DA 4040DBP	SMC 33 DA 6040DBP			90mm
43A AC-53b w. by-pass ¹	SMC 33 DA 2340DBP	SMC 33 DA 4040DBP	SMC 33 DA 6040DBP			90mm
35A AC-53a no by-pass	SMC 33 DA 2350BP	SMC 33 DA 4050BP	SMC 33 DA 6050BP	Ramp-down time 0.5 - 60 sec.		180mm
50A AC-53b w. by-pass	SMC 33 DA 2350BP	SMC 33 DA 4050BP	SMC 33 DA 6050BP			180mm
60A AC-53a ¹	SMC 33 DA 2385DBP	SMC 33 DA 4085DBP	SMC 33 DA 6085DBP			180mm
86A AC-53b w. by-pass ¹	SMC 33 DA 2385DBP	SMC 33 DA 4085DBP	SMC 33 DA 6085DBP			180mm

Load specified with utilisation category AC-53a

SMC 33 DA XXXX **BP** AC-53a: No by-pass contactors is nessesary during running

SMC 33 DA XXXX **DBP** AC-53a: No by-pass contactors is nessesary but motor shall be connected in an inside-delta configuration

Load specified with utilisation category AC53b

SMC 33 DA XXXX **BP** AC-53b: By-pass contactor shall be used for bypassing the soft starter during running

SMC 33 DA XXXX **DBP** AC-53b: By-pass contactor shall be used and motor connected in an inside-delta configuration

Output load specification (90mm module)

Overload current profile AC-53a (without by-pass contactor)	X-Tx:6-5 : 100-120
Overload current profile AC-53b (with by-pass contactor)	X-Tx:5-5 : 30
Overload relay trip class AC-53a/AC53b	10 or 10A
Leakage current: 5mA ACmax.	Min. operational current: 50mA

Output load specification (180mm module)

Overload current profile AC-53a (without by-pass contactor)	X-Tx:6-6: 100-120
Overload current profile AC-53b (with by-pass contactor)	X-Tx:6-6: 30
Overload relay trip class AC-53a/AC53b	10 or 10A
Leakage current: 5mA ACmax.	Min. operational current: 50mA

Control terminal specifications

Control voltage by line voltage 208-240VAC A1-A2	24 - 230 VAC/DC
Control voltage by line voltage 400-480VAC A1-A2	24 - 480 VAC/DC
Pick-up voltage max.	20.4 VAC/DC
Drop-out voltage min.	5 VAC/DC
Max. control current for no operation	1mA
Response time max.	70msec.
Control current / power max.	15mA / 2VA

Auxiliary contacts

Terminal: 13-14, Output for start/stop function,
Terminal: 23-24, Output for connection of by-pass contactor.

Output specifications for 90mm module: SRC: 0.5A AC-14, AC15
24-230/480V AC 50-60Hz Fusing:10 A gI/gG Max I²t 72A²Sr

Output specifications for 180mm module: SRC: 1.0A AC-14, AC15
24-230/480V AC 50-60Hz Fusing:10 A gI/gG Max I²t 72A²Sr

Terminal: 11-12, have no connection with the internal circuit. Can be used in conjunction with a thermal overload protection or for other wiring purposes. See under general technical information.

Thermal specification

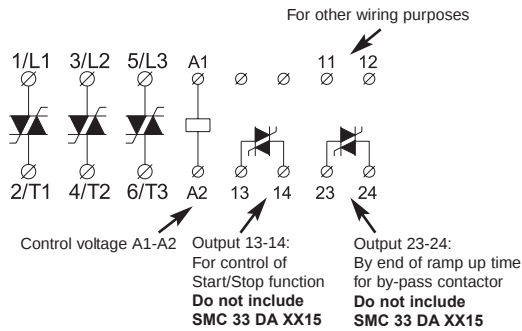
Power dissipation for continuous operation PDmax	3 W/A without by-pass
Power dissipation with semiconductor by-passed	5 W Max. with by-pass
Cooling method	Natural convection
Mounting	Vertical +/-30°
Operating temperature range EN 60947-4-2	-5C° to 40C°
Storage temperature EN 60947-4-2	-20C° to 80C°
Max. operating temperature with current derating	60C°

Operation in ambient temperatures exceeding 40°C is possible if the power dissipation is limited either by reducing the steady-state current or by reducing the duty-cycle of the soft starter as shown in the table. Max.cycle time 15min.

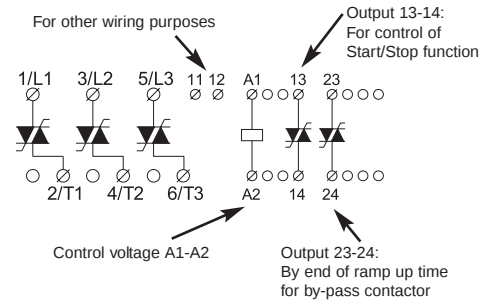
By 40°C	By 50°C	By 60°C
100 % load	80% load	70% load

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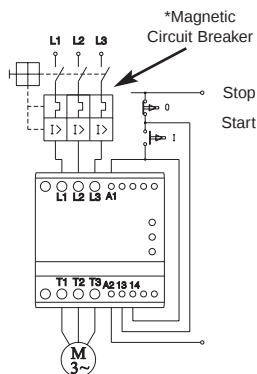
Wiring specifications (90mm module)



Wiring specifications (180mm module)



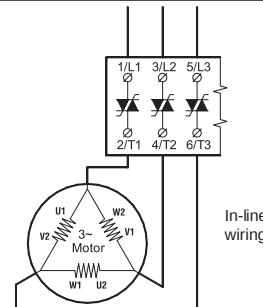
Wiring example: Start-stop function terminal 13-14



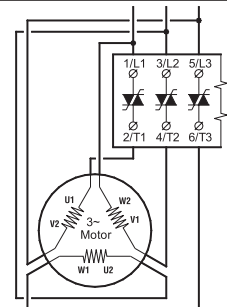
Auxiliary SCR output contact 13 & 14 is used in connection with standard motors where the output contact can be used for controlling a Start-Stop function directly wired to the soft starter.

*Use UL approved Magnetic Circuit Breaker or UL specified back-up fuse type K5 or H Class

Wiring specifications

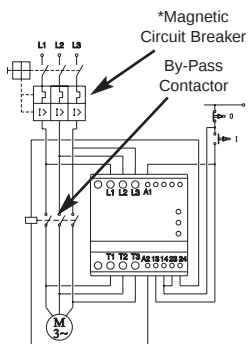


Standard wiring of a softstarter to a 3-phase motor in delta configuration.



Inside wiring of a softstarter to a 3-phase motor. When using the inside-delta configuration the load performance of the soft starter can be increased with $\sqrt{3}$.

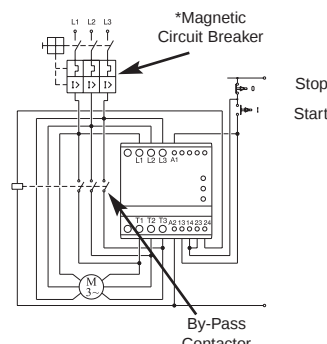
Wiring example: By-pass function terminal 23-24



Auxiliary SRC output contact 23-24 is activated when the ramp-up time has elapsed. Can be used either for by-passing the soft starter with an external connected electromechanical contactor or signalling to a PLC or similar that the motor voltage has reach its nominal value.

*Use UL approved Magnetic Circuit Breaker or UL specified back-up fuse type K5 or H Class

Wiring example: Inside-delta with by-pass contactor



Auxiliary SRC output contact 23-24 is activated when the ramp-up time has elapsed. Is used for by-passing the soft starter with an external connected electromechanical contactor.

Auxiliary SCR output contact 13 - 14 is used for controlling a Start-Stop function directly wired to the soft starter.

*Use UL approved Magnetic Circuit Breaker or UL specified back-up fuse type K5 or H Class

Short-circuit protection by circuit breaker or fuses

Two type of short-circuit protection can be used:

- Short-circuit protection by circuit breaker.
- Short-circuit protection by fuses.

Short-circuit protection is divided into 2 levels **Type 1** or **Type 2**

Co-ordination Type1: Short-circuit protects the installation

Co-ordination Type 2: Short-circuit protects the installation and the semiconductors inside the motor controller

a) Short-circuit protection by circuit breaker

A 3-Phase motor with correctly installed and adjusted overload relay will not short circuit totally to earth or between the 3 phases. Part of the winding will normally limit the short circuit current to a value that will cause instantaneous magnetic tripping of the circuit breaker without damage to the soft starter. The magnetic trip response current is approx. 11 times the max. adjustable current. A short-circuit coordination test has been made with the Danfoss CTI 25.

b) Short-circuit protection by fuses

Type 1: SMC 33 DA XX15	Protection max. 50 A. gL/gL/gG.
Type 1: SMC 33 DA XX25 BP	Protection max. 80 A. gL/gL/gG.
Type 1: SMC 33 DA XX40 DBP	Protection max. 80 A. gL/gL/gG.
Type 1: SMC 33 DA XX50 BP	Protection max. 125 A. gL/gL/gG.
Type 1: SMC 33 DA XX85 DBP	Protection max. 125 A. gL/gL/gG.
Type 2: SMC 33 DA XX15	Protection max. 12t of the fuse 1800 A2S
Type 2: SMC 33 DA XX25 BP	Protection max. 12t of the fuse 6300 A2S
Type 2: SMC 33 DA XX40 DBP	Protection max. 12t of the fuse 6300 A2S
Type 2: SMC 33 DA XX50 BP	Protection max. 12t of the fuse 25300 A2S
Type 2: SMC 33 DA XX85 DBP	Protection max. 12t of the fuse 25300 A2S

Recommended fuse :	Ferraz	Siemens
SMC 33 DA XX15	6,600 CP URG A 22x58/50	Sillized 5SD4 60
SMC 33 DA XX25	6,600 CP URG A 22x58/80	Sillized 5SD5 20
SMC 33 DA XX40	6,600 CP URG A 22x58/80	Sillized 5SD5 20
SMC 33 DA XX50	6,621 CP URG D 27x60/160	
SMC 33 DA XX85	6,621 CP URG D 27x60/160	

Approval

cUL Std No. 508 Pending

Application, adjustment hints and general specifications

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