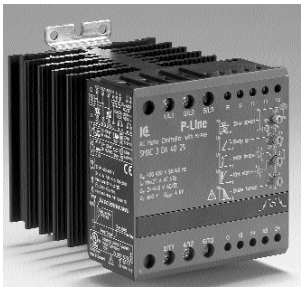
Soft Starter with Dynamic Brake (SMBC 3 two controlled phases)



- Rated operational voltage up to 480VAC 50/60Hz
- Rated operational current 1-25A
- Output signal for By-Pass and control of mechanical brake
- Ramp Up time and initial torque adjustable with kick start
- Adjustable Brake current
- Automatic stop detection
- Fast action brake mode with automatic motor field reduction
- Meets EN 60947-4-2 requirements

Item selection and technical specifications (see also motor table at page 11)

Load ratings	Item number by 208-240VAC 50/60Hz Line Voltage	Item number by 400-480VAC 50/60Hz Line Voltage		Ramp-Up / Brake-adjustment	Torque adjustment	Module-width
25A AC-53a 27A AC-53b w. by-pass	SMBC 3 DA 2325	SMBC 3 DA 4025 SMBC 3 DA 4025		Ramp-up time 0.5 - 10 sec. Brake current 0-50ADC.	0- 85% adjustable of norminal torque with selectable kick start 200ms (break loose function)	90mm 90mm

Load specified with utilisation category AC-53a

SMBC 3 DA XX25 AC-53a: No by-pass contactors is nessesary during running

Load specified with utilisation category AC53b

SMBC 3 DA 4025 AC-53b: By-pass contactor shall be used for bypassing the soft starter during running of the motor by 27A/15kW 400V load

Output load specification

SMBC 3 DA XX25 (without by-pass contactor)	More info. page 45	SMBC 3 DA XX25 (with by-pass contactor)	More info. page 45
Overload current profile AC-53a	X-Tx:8-3:100-3000	Overload current profile AC-53b	X-Tx:5-5 : 30
Overload relay trip class AC-53a	10 or 10A	Overload relay trip class AC-53b	10 or 10A
Leakage current	5mA ACmax.	Min. operational current	1A

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 - 300 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.	100msec.
Control current / power max.	15mA / 2VA

AC Auxiliary contacts

Output specifications for SMBC 3 DA XXXX BP

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

Output specifications: SCR: 0.5A AC-14, AC15 24-230/480V 50-60Hz
Fusing:gl/gG Max i^2t 72A^{2}S

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	2W/A without BP
Power dissipation with semiconductor by-passed	4 W Max.
Cooling method	Natural convection
Mounting	Vertical +/-30^o
Operating temperature range EN 60947-4-2	-5^{o}C to 40^{o}C
Max. operating temperature with current derating	60^{o}C
Storage temperature EN 60947-4-2	-20^{o}C to 80^{o}C

Operation in ambient temperatures exceeding 40^{o}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^{o}C	By 50^{o}C	By 60^{o}C
100% load Duty-cycle 100%	80% load Duty-cycle max. 0.8	70% load Duty-cycle max. 0.65

Insulation specifications

Rated insulation voltage	Ui 660 Volt
Rated impulse withstand voltage	Uimp. 4 kVolt
Installation catagory	III

Approval

cUL Std No. 508

UL:Use thermal overload protection as required by the National Electric Code. When protected by a non-time delay K5 or H Class fuse, rated 266% of motor FLA, this device is rated for use on a circuit capable of delivering not more than 5,000 rms. symmetrical amperes, 600 V maximum. Maximum surrounding temperature 40°C.

Environment

Degree of protection	IP 20	Pollution degree	3

EMC

This component meets the requirements of the product standard EN60947-4-2 and is CE marked according to this standard.
This products has been designed for class A equipment. Use of the product in domestic environments may cause radio interference, in which case the user may be required to employ additional mitigation methods.

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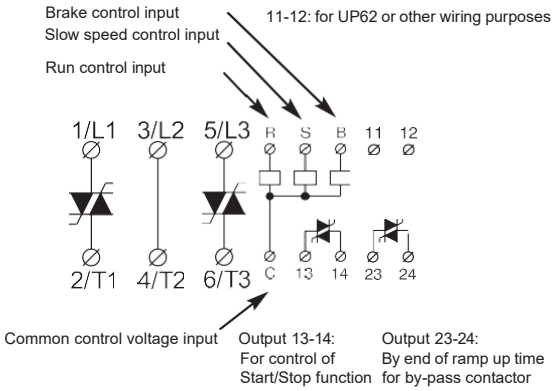
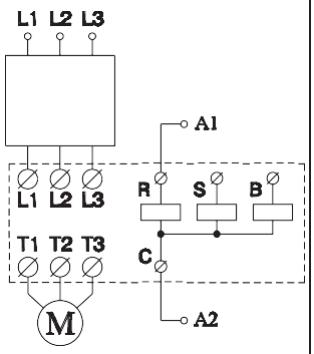
Wiring diagram

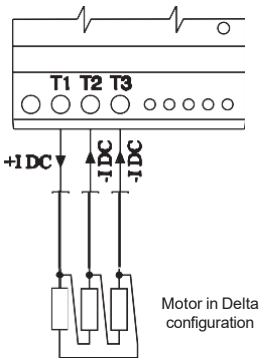


Wiring example: automatic brake to stop function



Set Ramp-Up and Initial Torque adjustments for best start-up function. Adjust brake torque to reach a complete stop after each working cycle

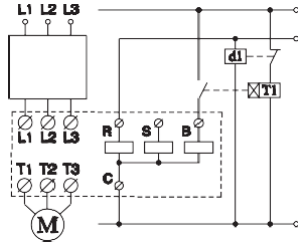
Wiring example: DC brake current configuration



To achieve maximum brake torque the DC current is applied on all 3 motor windings.
Direction of current is from T1 to T2 and T3.

Do not open any switches in the DC current path during the braking cycle as this might cause severe burning of the contacts.

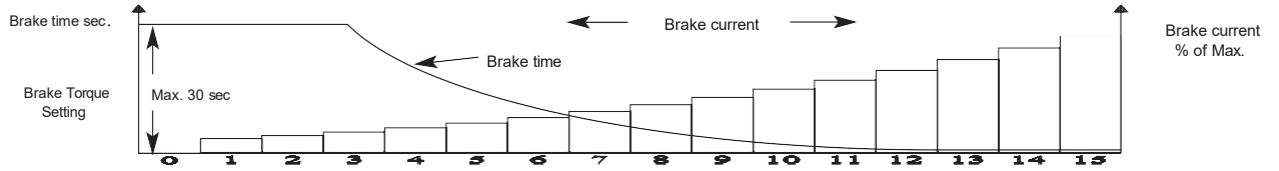
Wiring example: Timer controlled brake cycle



If the application only can accept a low braking torque below the sensing range of the stop detection it is possible to connect an external “delay on” operate timer to the Brake control input.

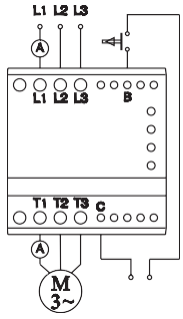
Functional description:
When control relay d1 and Run input is switched off timer T1 will activate the Brake input for the adjusted time.

Adjusting the brake current (connexion between brake torque, setting, brakecurrent and braketime)



When the Brake current is set it is actually a DC voltage that is adjusted. The current is therefore depending on the ohmic resistance of the windings and the actual connection of the motor (Delta).
For small motors a high DC voltage is necessary and for bigger motors a low voltage can produce sufficient brake current. Therefore the brake current must be adjusted for the actual application.
Before start-up of an unknown application set the Brake Torque adjustment to 1. Increase until the desired stop time is achieved.
If it is impossible to reach a time long enough for the application an external timer must be connected. See also application information next page.

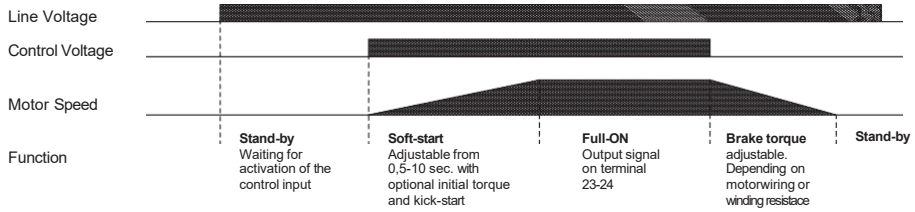
Automatic stop detection



The motor speed is detected by sensing the DC brake current. As this controller can operate a wide range of motors with different wiring configurations, the ohmic resistance of the actual motor has a wide range, it is therefore necessary to adjust the “Brake Torque” (DC Brake current) to achieve correct function in the actual application.
If the current is set to a low value the brake will be switched off before the motor has come to a complete stop. If the current is set too high, it will be out of the detection range and cannot be switched off before end of the build-in maximum time (30 sec.).
The LED’s will flash to indicate failure condition. The mains must be switched off and reapplied to reset this condition

CAUTION ! For bigger motors the current can be adjusted to a value that will destroy the controller or open the circuit breaker or fuse.
Before start-up of an unknown application set the Brake Torque adjustment to 1. To measure the Brake current activate the Brake Control input.
The DC brake current can be measured on the out put of T1 only. The AC value of the Brake current can be measured in L1 or L2. The DC current is approx. 1,5 times the AC current.

Functional diagram



Basic application.

When the control voltage is applied the motor will soft-start. When the control voltage is switched off the automatic Brake cycle will operate. The application shall be overload- and shortcircuit protected by fuses or circuit breaker.