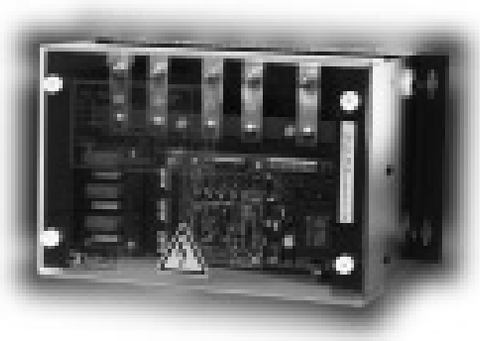
Softstarters - ESG series

- Softstarter
- 3-phase control
- Reduced mechanical stress on drives
- Reduced starting current compared with direct start
- Prepared for W3C-connection



Technical data

1. Functions
Reducing mechanical stress on drives during the acceleration and the retardation phase of motors
Temperature monitoring for both device as well as motor winding
Monitoring of phase loss

2. Time ranges

	Adjustment range	
Acceleration time:	0s	45s
Retardation time:	0s	45s

3. Indicators

LED1 red:	indication overtemperature device (heat sink)
LED2 red:	indication of phase loss
LED3 red:	indication of overtemperature motor (PTC)
LED4 green:	indication of auxiliary voltage
LED "Start" green:	indication of activation
LED "Run" green:	indication of control voltage
LED "Perm" green:	indication of max. output voltage

4. Mechanical design
Metal housing with plastic cover, IP rating IP00
Mounting on mounting plate

Distance to other devices:	min. 100mm
Mounting position:	cooling fins vertical
Terminal:	depends on power class (cross-head or hexagon-head screw), IP rating IP00
Initial torque:	depends on termial screw
Terminal capacity:	see table (page 2)

5. Input circuit

Supply voltage:	230V AC (other voltages on request)	terminals L1-N
Tolerance:	±15%	
Rated frequency:	48 to 63Hz	
Duration of operation:	100%	

6. Conrol contact 1-2

Function:	activation of softstart
Line length:	max. 10m, twisted pair
Loadable:	No

7. Control contact 3-4

Function:	activation of retardation
Line length:	max. 10m, twisted pair
Loadable:	no

8. Control contact 5-6

Function:	rapid switch-off (without retardation)
Line length:	max. 10m, twisted pair
Loadable:	No

9. Signaling contact S1
1 potential free change over contact

Function:	indication of activation
Connections:	14-15-16
Switching capacity:	1500VA (6A / 250V AC)
Fusing:	6A

10. Indicator contact S2
1 potential free change over contact

Function:	indication of max. output voltage
Connections:	17-18-19
Switching capacity:	1500VA (6A / 250V AC)
Fusing:	6A

11. Signaling contact Fault
1 potential free change over contact

Function:	centralized alarm
Connections:	20-21-22
Switching capacity:	1500VA (6A / 250V AC)
Fusing:	6A

12. Power circuit

Supply voltage:	3~ 400V to 500V AC	terminals L1-L2-L3
Tolerance:	±20%	
Rated frequency:	48 to 63Hz	
Starting torque:	0% to 100%	
Stopping torque:	0% to 100%	
Starting current:	0.3 to 3.5 x I_N	
Stopping current:	0% to 100%	
Start-up cycles:	max. 20/h	
Impuls series relay:	external (not included)	

13. Power classes
See table (page 2)

14. Ambient conditions

Ambient temperature:	-25 to +55°C (according to IEC 68-1)
Storage temperature:	-25 to +75°C
Transport temperature:	-25 to +75°C
Relative humidity:	5% to 95% not condensing (according to IEC 721-3-3 class 3K3)
Pollution degree:	2 (according to IEC 664-1)

15. Optional modules
Current limiting module (ESG-I)

Accerlation time:	max. 45s
Retardation time:	max. 45s
Starting current limitation:	0.3 to 3.5 x I_N
Retardation current:	0% to 100%

Note:
Standard for high motor powers beginning with 110kW
See table (page 2)

DC motor brake modul ESG and ESG-I

Braking time:	max. 45s
Braking current:	0 to 3 x I_N

Note:
Braking module has to be ordered with the device. There is no possibility for later adaption !!!

9. Power classes

Type	Max. motor power at 3x400V (kW)[1) 2) 3)]	Max. permissable start-up current A	Recommended semiconductor fuse (optional) A	Line fuse A	Recommended line cross section mm²	Weight kg	Size	Permanent operation
ESG 2,2	2.2	15	12 / □	10	1.5	1.3	A	■
ESG 3	3.0	25	16 / □	10	2.5	1.4	A	■
ESG 4	4.0	35	30 / □	16	2.5	1.5	A	■
ESG 5,5	5.5	55	35 / □	16	2.5	2.8	B	■
ESG 7,5	7.5	70	50 / □	20	4	2.8	B	■
ESG 11	11.0	90	63 / □	25	6	3.0	B	■
ESG 15	15.0	120	80 / □	35	10	3.0	B	■
ESG 18,5	18.5	155	80 / □	35	16	3.0	B	■
ESG 22	22.0	200	100 / □	63	16	3.5	B	■
ESG 30	30.0	240	125 / □	63	25	8.0	C	□
ESG 37	37.0	280	160 / □	100	35	8.5	C	□
ESG 45	45.0	350	200 / □	100	35	8.5	C	□
ESG 55	55.0	420	250 / □	125	50	9.0	C	□
ESG 75	75.0	600	350 / □	160	70	9.5	C	□
ESG 90	90.0	700	350 / □	200	95	10.5	C	□
ESG-I 110	110.0	750	500 / ■	250	120	18	D	■
ESG-I 140	140.0	920	500 / ■	300	150	18	D	■
ESG-I 160	160.0	1250	500 / ■	350	240	41	E	■
ESG-I 200	200.0	1400	630 / ■	400	300	41	E	■
ESG-I 250	250.0	1800	630 / ■	400	300	42	E	■
ESG-I 315	315.0	2100	750 / ■	630	2x 185	42	E	■
ESG-I 355	355.0	2800	800 / ■	630	2x 240	44	E	■
ESG-I 400	400.0	3200	800 / ■	1250	2x 300	51	F	■
ESG-I 560	560.0	4500	1250 / ■	1250	2x 350	53	F	■

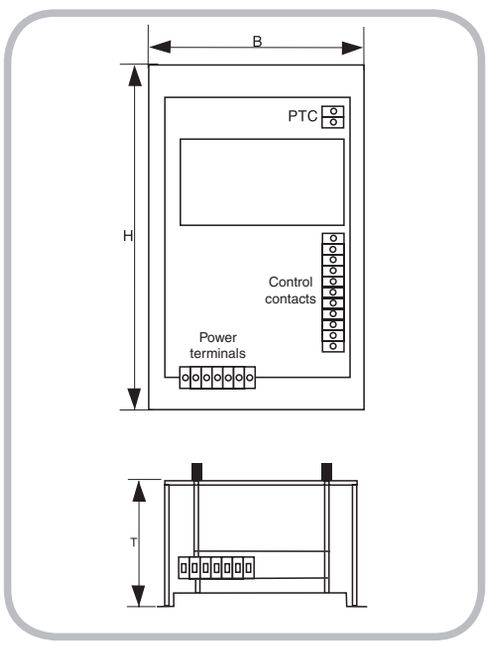
□= optional (additional charge) ■ = standard

1) All values refer to standardized motors according to IEC 72 und UNE 20106
2) At variant motor voltages max. motor output changes similar
3) If used with W3C-connection the maximum connectable motor power is 1.73-times higher

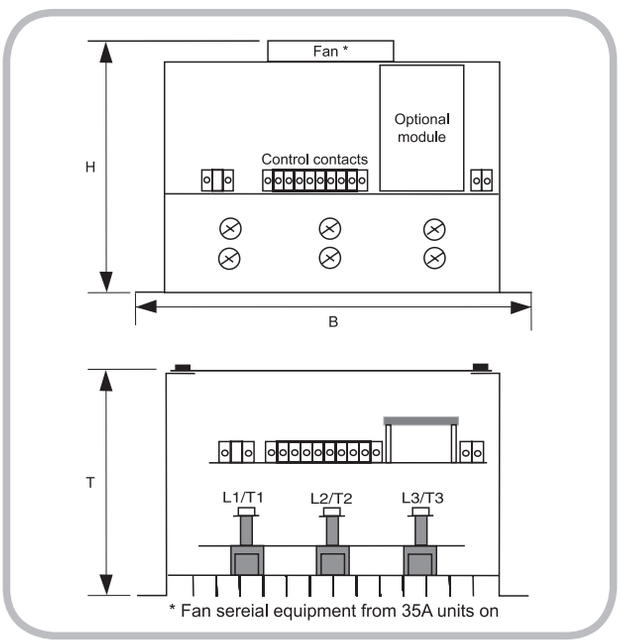
Dimensions

Size	Dimensions H x W x D (mm)
A	200 x 140 x 115
B	160 x 260 x 170
C	200 x 360 x 200
D	400 x 360 x 240
E	545 x 600 x 346
F	715 x 850 x 396

Size A

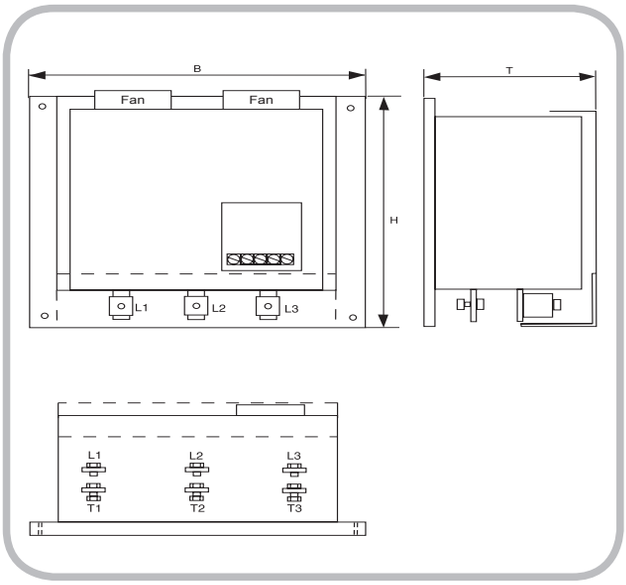


Size B

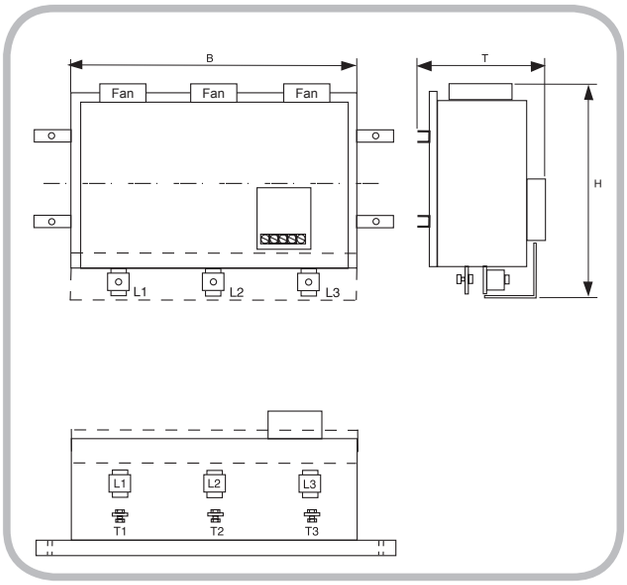


Dimensions

Size C, D



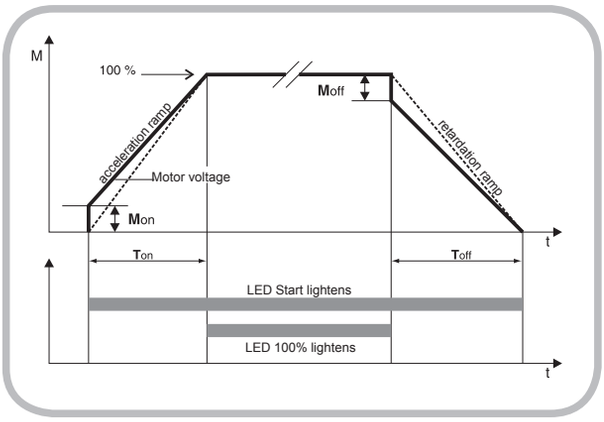
Size E, F



Functions

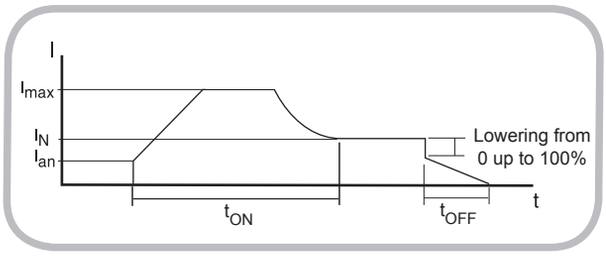
Controllable softstart and retardation of a motor

The basic function of the ESG is to provide soft motor startup and retardation. In the process, both the temperature of the ESG and the temperature of the motor (PTC) are monitored. By reducing the phase control of a three-phase thyristor bridge the motor voltage is continually increased over the entire startup period (t_{ON}). As the voltage increases, so too does the torque, just rising above the load moment. The motor therefore starts with slow acceleration.
By specifying a motor-specific startup moment the voltage (torque) increases rapidly when the softstarter is activated, until the startup torque set on the M_{ON} controller is reached. Only then does the voltage start increasing slowly for the remaining acceleration time until full system voltage is reached. In this way, more effective use is made of the acceleration time and wear and tear is kept to a minimum.
When retardation is activated the voltage is continually reduced over the specified retardation time.

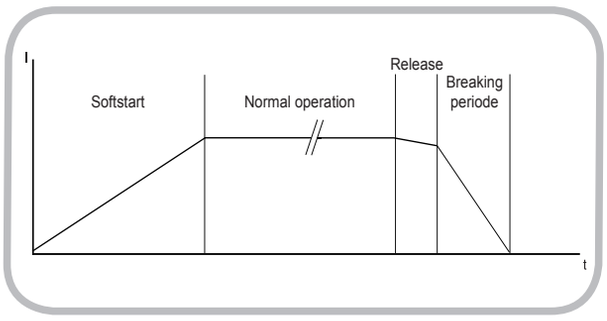


Add-on modules

Current limiting module
The current limiting module continually measures the motor current during the startup phase and limits it if it rises above the specified threshold value. To do this it reduces the firing angle of the thyristor bridge as required.



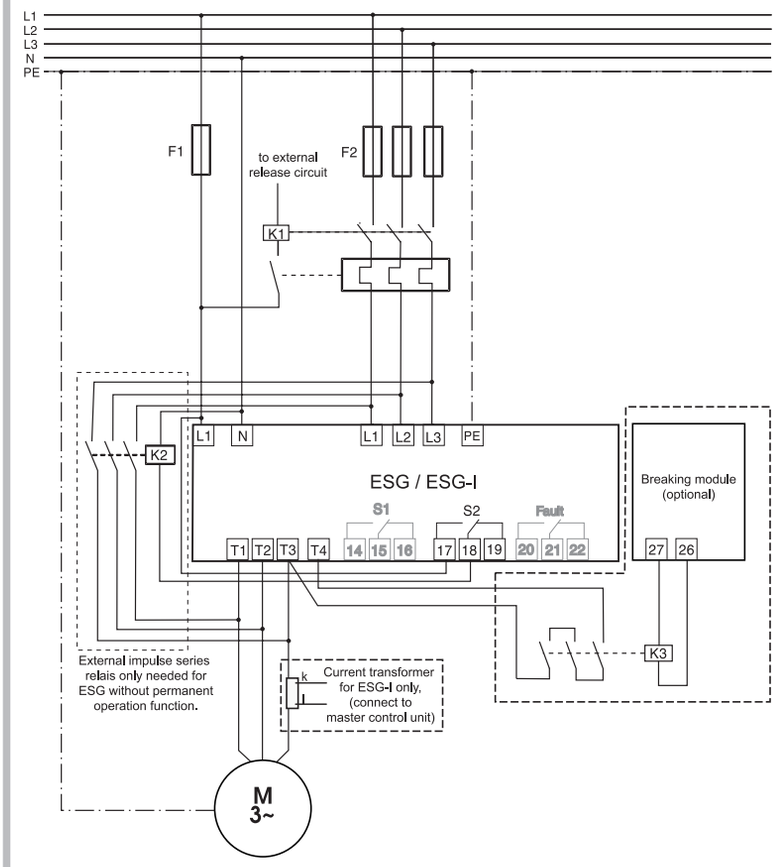
Brake module
The brake module is an additional function designed for machines with high centrifugal mass or a short retardation time. If the retardation function is selected the module applies an adjustable DC voltage to a motor winding. The rotor attempts to follow the magnetic field induced in the stator and is slowed down by the resulting speed-dependent braking torque within the time set on the t_B controller. Experience has shown that the information necessary to exactly calculate the braking torque or braking current I_B and the braking time t_B is hardly known for all of the occurring moments of inertia and for the drive system. The necessary braking torque should therefore be recorded on-site during a test run. Please note that the coil resistance continuously changes until the operating temperature is reached.
As one feature of this DC current braking no current is induced inside the rotor when the motor is stopped. The motor therefore has no holding torque when it is stopped.



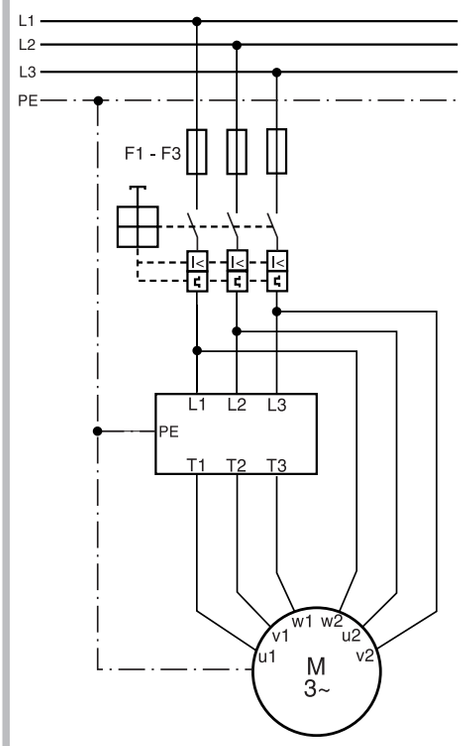
Connections

Power circuit

Standard circuit



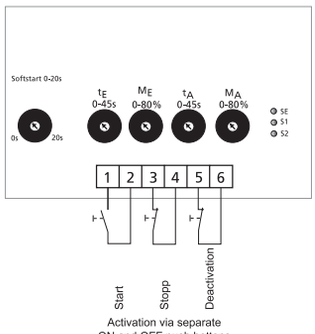
W3C-circuit



If connected according to W3C circuit the ESG can handle motors with up to 1.73 times increased outpower.

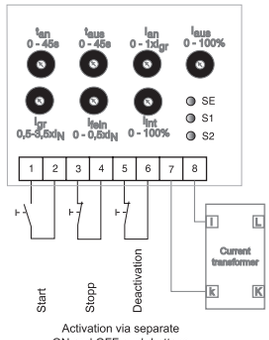
Master control units

Push-botton controlled ESG



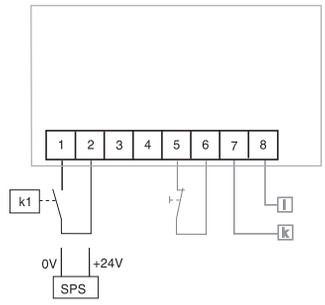
Activation via separate ON and OFF push bottons

Push-botton controlled ESG-I



Activation via separate ON and OFF push bottons

SPS- or relais controlled ESG/ESG-I



Activation via potential free contact or control voltage. Softstart starts when a signal is applied at the terminals 1-2, time-off slowing down starts after the control signal is removed from these.