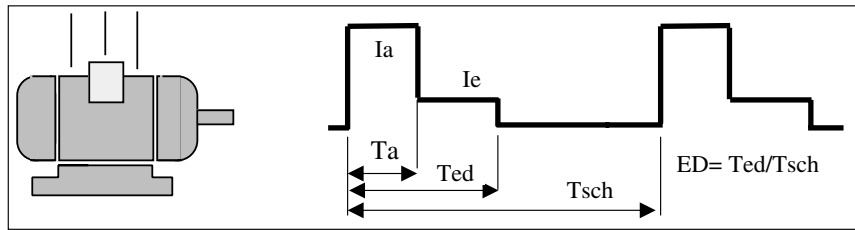
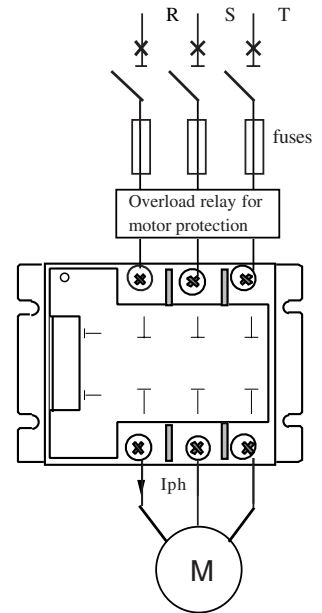


CHOOSING A SOLID STATE SOLUTION Controlling a three phase asynchronous motor



AC-53



Ia : Starting current Ta : Starting time Ie=I AC-53 = Nominal current
 Ted : On time Tsch : ON+OFF time ED =Ted/Tsch : duty cycle

The characteristics of the solid state relays and contactors for AC53a applications are given following **2 ways of calculations and tests** :

The I_{AC53} values have been designed in order to be applicable to :

- 2 up to 8 poles motors
- 400V - 50/60Hz motors
- Starting periode duration $\leq 1,6s$.
- High start/stop cycle frequency (up to 1 starting cycle every 1,5s).

1 - The characteristics which takes into account (table 1):

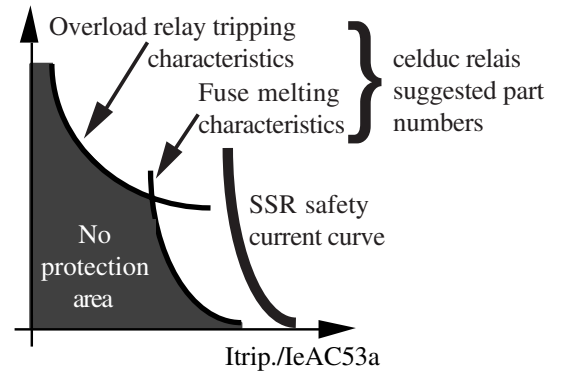
* the IEC947-4-2 (solid state motor starter standard) requirements :

$I_a = 8x I_e$ & $T_a = 1,6s$

* oversized power elements in order to guarantee the overload and short circuit protection of the relay in association with the specified protections (fuse + overload relay).

* a high lifetime expectancy of the relay ($> 1 \times 10^7$ operations)

Tripping time



2 - The characteristics takes into account (table 2):

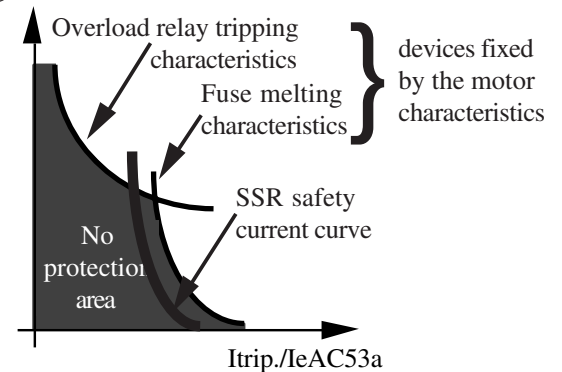
* the repetitive ITSM of the relay as a limit value

* the actual motor characteristics during starting ($4,5xI_n < I_a < 8xI_n$), depending on the power of the motor.

* a medium lifetime expectancy of the relay ($> 1 \times 10^6$ operations)

The obtained I_{AC53} value is based on the maximum acceptable inrush current that the relay can sustain during the motor direct starting. Naturally, the fuses and overload relay to be used at that current might be oversized compared with celduc required values. The relay protection against short-circuit and overloads cannot be therefore guaranted by celduc relais.

Tripping time



WARNING : In any case, the fuse and the overload relay associated to the solid state relay must protect the line wires and the other devices. The user must then take care to choose the right wire sizes in association with the protection means.

CHOOSING A SOLID STATE SOLUTION
Control of a three phase asynchronous motor : Selection charts

ON/OFF CONTACTORS 1 : hard conditions -

AC-53

SSR + HEATSINK SELECTION IN COMPLIANCE WITH EN60947-4-2 or in hard conditions .

SSR SELECTION AC53 motors for a permanent current		Relays without heatsink					heatsink ambient =40°C	Relays with heatsink	Ferraz fuse 14x51 size / max. rating	Overload relay type Klöckner- Moeller
Motor power	In motor (@ 400V)	Thyristor rating : 12A	Thyristor rating : 50A	Thyristor rating : 75A	Thyristor rating : 95A	Thyristor rating : 125A	with integrated DIN RAIL adaptor	three legs ambient =40°C	I2t fuse < I2t SSR	
0,75 kW	2A	SGT664xxx SVT861xxx					no	SWT8603xx	gRC 8A /690V	Z00-2.4
1,1 kW	2,6A		SGT865xxx SVT864xxx				no	SWT8603xx	gRC 8A /690V	Z00-6
1,5 kW	3,5A		SGT865xxx SVT864xxx				WF121000	SWT8612xx	am 12A/500V	Z00-6
2,2 kW	5A		SGT865xxx SVT864xxx				WF121000	SWT8612xx	am 12A/500V	Z00-6
3 kW	6,6A		SGT865xxx SVT864xxx				WF121000	SWT8612xx	am 12A/500V	Z00-10
4 kW	8,5A		SGT865xxx SVT864xxx				WF121000	SWT8612xx	am 12A/500V	Z00-10
5,5 kW	11,5A			SGT867xxx SVT867xxx			WF121000	SWT8617xx	am 20A/500V	Z00-16
7,5 kW	15,5A				SVT868xxx		WF115100	SWT8620xx	am 32A/500V	Z00-16
9 kW	19A					SVT869xxx	WF115100	-	am 50A/500V	Z00-24
11 kW	22,5A					SVT869xxx	WF031000	-	am 50A/500V	Z00-24

ON/OFF CONTACTORS -2 : other conditions-

AC-53

SSR + HEATSINK SELECTION for using with Id/In << 8 , low start/stop cycle frequency

SSR SELECTION AC53 motors for a permanent current		Relays without heatsink					heatsink ambient =40°C	Relays with heatsink	fuse	Overload relay
Motor power	In motor (@ 400V)	Thyristor rating : 12A	Thyristor rating : 50A	Thyristor rating : 75A	Thyristor rating : 95A	Thyristor rating : 125A	with integra- ted DIN RAIL adaptor	three legs ambient =40°C	I2t fuse < 1/2 I2t SSR	
0,75 kW	2A	SGT664xxx SVT861xxx XKMxxxx					no	SWT8603xx	To be determine by the user	To be determine by the user
1,1 kW	2,6A	SGT664xxx SVT861xxx	SGT865xxx SVT864xxx				no	SWT8603xx	To be determine by the user	To be determine by the user
1,5 kW	3,5A		SGT865xxx SVT864xxx				WF121000	SWT8603xx	To be determine by the user	To be determine by the user
2,2 kW	5A		SGT865xxx SVT864xxx				WF121000	SWT8612xx	To be determine by the user	To be determine by the user
3 kW	6,6A		SGT865xxx SVT864xxx				WF121000	SWT8612xx	To be determine by the user	To be determine by the user
4 kW	8,5A		SGT865xxx SVT864xxx				WF121000	SWT8612xx	To be determine by the user	To be determine by the user
5,5 kW	11,5A		SGT865xxx SVT864xxx				WF121000	SWT8612xx	To be determine by the user	To be determine by the user
7,5 kW	15,5A			SGT867xxx SVT867xxx			WF115100	SWT8617xx	To be determine by the user	To be determine by the user
9 kW	19A				SVT868xxx		WF115100	SWT8620xx	To be determine by the user	To be determine by the user
11 kW	22,5A				SVT868xxx		WF115100	SWT8620xx	To be determine by the user	To be determine by the user
15 kW	30A					SVT869xxx	WF031100	-	To be determine by the user	To be determine by the user



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CHOOSING A SOLID STATE SOLUTION
Control of a three phase asynchronous motor : Selection charts

ON/OFF CONTACTORS -3 : other SSRs-

AC- 53

The most important parameter for controlling an SSR is the using of the adapted power element , because it is necessary to sustain the inrush current at the turn ON and overvoltages at the turn OFF. The present selection charts is given with the more standard three phase SSRs. But it is also possible to use XKM range for controlling small motors (<1kWatts). SCT range (three legs) can be also use , or SCB (two legs) , but we advise to add an external VDR .

MOTORS SOFT -STARTERS

AC- 53

See the new documentation of SOFT START range

MOTORS REVERSERS

AC- 4

REVERSERS + HEATSINK SELECTION IN COMPLIANCE WITH EN60947-4-2							
SSR SELECTION motors soft-staters for a permanent current		Relays without heatsink		heatsink ambient =40°C heatsink =80°C	Relays with heatsink	Ferraz fuse type 14x51 size / max. rating	Overload relay type Klöckner- Moeller
Motor power	In motor (@ 400V)	two legs models 50A	three legs models 40A	with integrated DIN RAIL adaptor	two legs ambient =40°C		
0,75 kW	2A	SG969300 -SV969300	SG969100	no	SW960330	am 8A/500V	Z00-2.4
1,1 kW	2,6A	SG969300 -SV969300	SG969100	no	SW960330	am 8A/500V	Z00-6
1,5 kW	3,5A	SG969300 -SV969300	SG969100	no	SW960330	am 12A/500V	Z00-6
2,2 kW	5A	SG969300 -SV969300	SG969100	WF121000	SW961230	am 12A/500V	Z00-6
3 kW	6,6A	SG969300 -SV969300	SG969100	WF121000	SW961230	am 12A/500V	Z00-10
4 kW	8,5A	SG969300 -SV969300	-	WF121000	SW961230	am 12A/500V	Z00-10

For motor > 4kW consult us : we have the solution with one pôle or three pôles SSRs .
 The protection must be done on the application.
 For small SSRs , a XKR product can be used



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