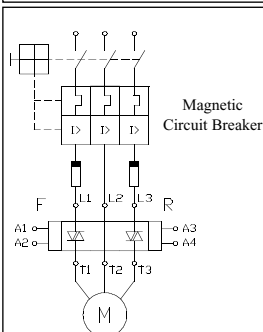


Application hints Reversing / Motor Controller type SRC 3 & SMC 3 DOL

Overload Protection in Motor Control Reversing



Overload protection of the motor is easily achieved by installing a manual thermal magnetic circuit breaker on the supply side of the motor.

The circuit breaker provides means for padlocking and the necessary clearance for use as a circuit isolator according to EN 60204-1. Select the manual circuit breaker from the selection table or equivalent according to the rated current of the motor. Adjust the current limit on the MCB according to the rated nominal current of the motor

Short-circuit Protection

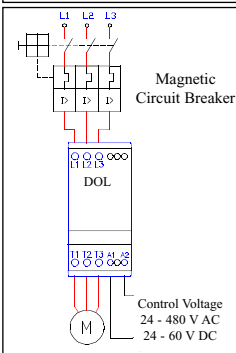
Two types of short-circuit protection can be used:

- Short circuit protection by circuit breaker.
 - Short circuit protection by fuses.
- Short circuit protection is divided into 2 levels Type 1 / Type 2
- Type 1: Short circuit protects the installation
- 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 a correctly installed and adjusted overload relay will not short 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 semiconductors. The magnetic trip response current is approx. 11 times the max. adjustable current. A short circuit coordination test has been made with the Danfoss CTI25. Consult also the MCB datasheet.

Overload Protection in Motor Control Direct On Line DOL



Overload and short-circuit protection of the motor is easily achieved by installing a circuit breaker on the supply side of the starter.

The circuit breaker provides means for padlocking and the necessary clearance for use as a circuit isolator according to EN 60204-1 (electrical equipment of industrial machines Part: 1 General requirements)

Short-circuit Protection of SRC 3 by circuit breaker

Motor full load current in A	Short-circuit protection (Line voltage 380 - 415)		
	MCB Danfoss CTI 25	Max. prospective short-circuit current	
		Type 1 (10 A)	Type 2 (10 A)
0.10 - 0.16 A	047B3020	50 kA	50 kA
0.16 - 0.25 A	047B3021	50 kA	50 kA
0.25 - 0.40 A	047B3022	50 kA	50 kA
0.40 - 0.63 A	047B3023	50 kA	50 kA
0.63 - 1.00 A	047B3024	50 kA	50 kA
1.00 - 1.63 A	047B3025	50 kA	50 kA
1.60 - 2.50 A	047B3026	50 kA	1 kA
2.50 - 4.00 A	047B3027	50 kA	1 kA
4.00 - 6.00 A	047B3028	20 kA	1 kA
6.00 - 10.0 A	047B3029	50 kA	1 kA

Short-circuit Protection of SMC 3 DOL by circuit breaker

Motor full load current in A	Short-circuit protection (Line voltage 380 - 415)		
	MCB Danfoss CTI 25	Max. prospective short-circuit current	
		Type 1 (15 A)	Type 2 (15 A)
0.10 - 0.16 A	047B3020	50 kA	50 kA
0.16 - 0.25 A	047B3021	50 kA	50 kA
0.25 - 0.40 A	047B3022	50 kA	50 kA
0.40 - 0.63 A	047B3023	50 kA	50 kA
0.63 - 1.00 A	047B3024	50 kA	50 kA
1.00 - 1.63 A	047B3025	50 kA	50 kA
1.60 - 2.50 A	047B3026	50 kA	1 kA
2.50 - 4.00 A	047B3027	50 kA	1 kA
4.00 - 6.00 A	047B3028	50 kA	1 kA
6.00 - 10.0 A	047B3029	20 kA	1 kA
10.0 - 16.0 A	047B3030	10 kA	1 kA

Protection of SRC 3 / SMC 3....DOL for overload

Motor full load current in A	MCB Danfoss CTI 25	MCB ABB MS 325	MCB Telemecanique GV
0.10 - 0.16 A	047B3020	MS 325 - 0.16	GV 2-M 01
0.16 - 0.25 A	047B3021	MS 325 - 0.25	GV 2-M 02
0.25 - 0.40 A	047B3022	MS 325 - 0.40	GV 2-M 03
0.40 - 0.63 A	047B3023	MS 325 - 0.63	GV 2-M 04
0.63 - 1.00 A	047B3024	MS 325 - 1.00	GV 2-M 05
1.00 - 1.63 A	047B3025	MS 325 - 1.60	GV 2-M 06
1.60 - 2.50 A	047B3026	MS 325 - 2.50	GV 2-M 07
2.50 - 4.00 A	047B3027	MS 325 - 4.00	GV 2-M 08
4.00 - 6.00 A	047B3028	MS 325 - 6.30	GV 2-M 10
6.00 - 10.0 A	047B3029	MS 325 - 10.0	GV 2-M 14
10.0 - 16.0 A*	047B3030*	MS 325 - 16.0*	GV 2-M 20*

*note only SMC3 Dol

*note only SMC3 Dol

*note only SMC3 Dol

*note only SMC3 Dol

Short circuit Protection of SRC 3 / SMC 3 DOL by fuses

b) Short-circuit protection by fuses

Type 1: SRC 3 DX 4010 : SMC 3 DA XX15 DOL protection max 50 A. gL/gL/gG. protection max 50 A. gL/gL/gG.

Type 2: SRC 3 DX 4010 : SMC 3 DA XX15 DOL protection max I_{2t} of the fuse 450 A²S protection max I_{2t} of the fuse 1800 A²S

Recommended fuse : Ferraz 660 gRB10-30 Siemens Sillized 5SD4 80A
SRC 3 DX 4010 6,600 CP URG 14.51/50 Sillized 5SD4 60A max 500 v
SMC 3 DA XX15DOL

Comparison of lifetime in different utilization categories

Utilization-categories	Typical applications	Electro-mechanical Contactor	Semiconductor Contactors SMC3DA....DOL
AC-52a	Control of slip-ring motors, starting, switching Off	0.7 Mill. Cycles	25 Mill. Cycles
AC-53a	Control of squirrel-cage motors, starting, switching Off	1.3 Mill. Cycles	25 Mill. Cycles
AC-4	Control of squirrel-cage motors, starting, plugging, inching	0.06 Mill. Cycles	5 Mill. Cycles

SMC 3 DOL General application information

The SMC 3 DOL has been developed for cranes and other harsh applications where inching, jogging and plugging is frequently used and where a high number of operating cycles are essential.

In such applications the lifetime of the equipment is normally limited by the short lifetime of the electromechanical contactor. Electromechanical contactors are not designed to switch off motors in locked rotor- or overload conditions where the current is 6 times the nominal operational current (AC-4). The severe arcing will burn the contact elements resulting in unreliable function.

The Semiconductor Contactor will close the contacts in the zero crossing of the mains voltage and switch-Off will always occur in the zero crossing of the motor current in this way voltage kickback from the inductive motor windings is avoided. The lifetime, therefore, of the Semiconductor Contactor will always be at least one decade longer than the electromechanical contactor.

Utilisation Categories (IEC 947-4-2)

AC - 52a Control of slipring motor stators

AC - 53a Control of squirrel cage motor

AC - 58a Control of hermetic refrigerant compressors with automatic resetting of overload releases

Specifications are subject to change without notice