




**DOL starter, 24 V DC, 1,5 - 7 (AC-53a), 9 (AC-51) A, Push in terminals, Controlled stop, PTB 19 ATEX 3000**

**Part no.** EMS2-DOS-T-9-24VDC  
**Catalog No.** 192397  
**Alternate Catalog No.** EMS2-DOS-T-9-24VDC

### Delivery program

Product range			Electronic motor starter
Basic function			DOL starters (complete devices)
Description			DOL starting Motor protection Emergency-stop actuator Circuit design: safety output stage with bypass, three-phase disconnect.
<b>Conformity, Approval</b>			
Explosion protection (according to ATEX 94/9/EC)			II (2) G [Ex db] [Ex eb] [Ex pxb] II (2) D [Ex tb] [Ex pb]
EC-prototype test certification			PTB 19 ATEX 3000
<b>Motor ratings</b>			
Max. rating for three-phase motors, 50 - 60 Hz			
AC-53a			
380 V 400 V 415 V	P	kW	0.55 - 3
Setting range of overload releases	I <sub>r</sub>	A <sub>x</sub>	1,5 - 7 (AC-53a) 1,5 - 9 (AC-51)
			
Actuating voltage			24 V DC
Connection technique			Push in terminals
Stop Function			Controlled stop
Connection to SmartWire-DT			no

### Technical data

<b>General</b>			
Standards			IEC/EN 60947-4-2 IEC 61508 ISO 13849 UL508
Ambient temperature			
Storage		°C	
Min. ambient temperature, storage		°C	- 40
Ambient temperature, storage max.		°C	+ 80
Open		°C	
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	+ 70
Weight		kg	0.22
Mounting			Top-hat rail IEC/EN 60715, 35 mm
Protection type (IEC/EN 60529, EN50178, VBG 4)			IP20
Mounting position			Vertical Motor feeder at bottom
Terminal capacity			
Push-in terminals			
		mm <sup>2</sup>	0.2 - 2.5
		AWG	24 - 14
<b>Main conducting paths</b>			
Rated operational voltage	U <sub>e</sub>	V AC	500
Operational voltage range		V	

Operating voltage range min.		V	42
Operating voltage range max.		V	550
Rated operational current			
AC-51	$I_e$	A	9
AC-53a	$I_e$	A	7
			AC-53a: Please note possible derating.
Setting range of overload releases	$I_r$	A_x	1,5 - 7 (AC-53a) 1,5 - 9 (AC-51)
Release class		CLASS	10A
Heat dissipation	$P_V$	W	1 - 12

### Control section

Rated control voltage	$U_s$	V DC	24
Control voltage range		V	19,2 - 30 V DC
Residual ripple on the input voltage		%	$\leq 5$
Rated control current	$I_s$	mA	40
Actuating circuit (ON, L, R)			
Rated actuation voltage	$U_c$	V	24
Switching level "Low"		V	-3 - +9.6 V DC
Switching level "confirm Off"		V	< 5 V DC
Switching level "High"		V	19.2 - 30 V DC
Rated actuating current	$I_c$	mA	10
Relay outputs			
Contacts			
CO = changeover			1 CO
Rated operational current			
AC-15			
230 V	$I_e$	A	2
DC-13			
24 V	$I_e$	A	2

### Electromagnetic compatibility (EMC)

Radio interference suppression			EN 55011 EN 61000-6-3, Class A (emitted interference, radiated)
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### Technical safety parameters:

<b>Notes</b>			Safe switch off. motor protection
Ambient temperature		°C	60
Values according to EN ISO 13849-1			
MTTF <sub>d</sub>	Years		70 (Sicheres Abschalten) / 60 (Motorschutz)
Performance level	PL		e (Sicheres Abschalten)
Category			3 (Sicheres Abschalten)
Values according to IEC 62061			
			Abschaltzeit [ms]: 200 (Sicheres Abschalten) / Class 10A (Motorschutz) $\lambda_{sd}$ [FIT]: 0 $\lambda_{su}$ [FIT]: 2884 (Sicheres Abschalten) / 2683 (Motorschutz) $\lambda_{dd}$ [FIT]: 1628 (Sicheres Abschalten) / 1876 (Motorschutz) $\lambda_{du}$ [FIT]: 13,8 (Sicheres Abschalten) / 17,7 (Motorschutz) SFF [%]: 99,7 (Sicheres Abschalten) / 99,6 (Motorschutz) DC [%]: 99,2 (Sicheres Abschalten) / 99,1 (Motorschutz) PFH <sub>d</sub> [FIT]: 13,8 (Sicheres Abschalten) SIL 3 (Sicheres Abschalten) / SIL 2 (Motorschutz)

### Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	$I_n$	A	9
Heat dissipation per pole, current-dependent	$P_{vid}$	W	0
Equipment heat dissipation, current-dependent	$P_{vid}$	W	12
Static heat dissipation, non-current-dependent	$P_{vs}$	W	2
Heat dissipation capacity	$P_{diss}$	W	0
Operating ambient temperature min.		°C	-25

Operating ambient temperature max.	°C	70
		Please observe > 55 °C derating
IEC/EN 61439 design verification		
10.2 Strength of materials and parts		
10.2.2 Corrosion resistance		Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures		Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat		Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects		Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation		Meets the product standard's requirements.
10.2.5 Lifting		Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact		Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions		Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES		Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances		Meets the product standard's requirements.
10.5 Protection against electric shock		Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components		Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections		Is the panel builder's responsibility.
10.8 Connections for external conductors		Is the panel builder's responsibility.
10.9 Insulation properties		
10.9.2 Power-frequency electric strength		Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage		Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material		Is the panel builder's responsibility.
10.10 Temperature rise		The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating		Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility		Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function		The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

## Technical data ETIM 7.0

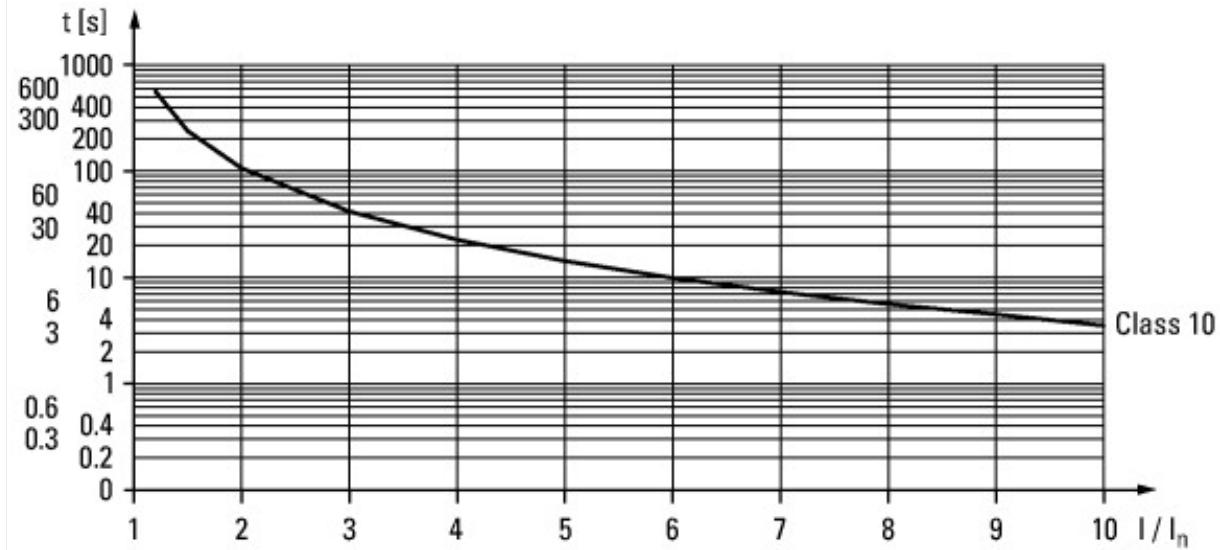
Low-voltage industrial components (EG000017) / Motor starter/Motor starter combination (EC001037)		
Electric engineering, automation, process control engineering / Low-voltage switch technology / Load breakout, motor breakout / Motor starter combination (ecl@ss10.0.1-27-37-09-05 [AJZ718013])		
Kind of motor starter		Direct starter
With short-circuit release		No
Rated control supply voltage $U_s$ at AC 50HZ	V	0 - 0
Rated control supply voltage $U_s$ at AC 60HZ	V	0 - 0
Rated control supply voltage $U_s$ at DC	V	24 - 24
Voltage type for actuating		DC
Rated operation power at AC-3, 230 V, 3-phase	kW	1.5
Rated operation power at AC-3, 400 V	kW	3
Rated power, 460 V, 60 Hz, 3-phase	kW	0
Rated power, 575 V, 60 Hz, 3-phase	kW	0
Rated operation current $I_e$	A	9
Rated operation current at AC-3, 400 V	A	7
Overload release current setting	A	1.5 - 9
Rated conditional short-circuit current, type 1, 480 Y/277 V	A	0
Rated conditional short-circuit current, type 1, 600 Y/347 V	A	0
Rated conditional short-circuit current, type 2, 230 V	A	0
Rated conditional short-circuit current, type 2, 400 V	A	0
Number of auxiliary contacts as normally open contact		1
Number of auxiliary contacts as normally closed contact		1
Ambient temperature, upper operating limit	°C	40
Temperature compensated overload protection		Yes
Release class		CLASS 10

Type of electrical connection of main circuit		Spring clamp connection
Type of electrical connection for auxiliary- and control current circuit		Spring clamp connection
Rail mounting possible		Yes
With transformer		No
Number of command positions		
Suitable for emergency stop		Yes
Coordination class according to IEC 60947-4-3		
Number of indicator lights		3
External reset possible		Yes
With fuse		No
Degree of protection (IP)		IP20
Degree of protection (NEMA)		Other
Supporting protocol for TCP/IP		No
Supporting protocol for PROFIBUS		No
Supporting protocol for CAN		No
Supporting protocol for INTERBUS		No
Supporting protocol for ASI		No
Supporting protocol for MODBUS		No
Supporting protocol for Data-Highway		No
Supporting protocol for DeviceNet		No
Supporting protocol for SUCONET		No
Supporting protocol for LON		No
Supporting protocol for PROFINET IO		No
Supporting protocol for PROFINET CBA		No
Supporting protocol for SERCOS		No
Supporting protocol for Foundation Fieldbus		No
Supporting protocol for EtherNet/IP		No
Supporting protocol for AS-Interface Safety at Work		No
Supporting protocol for DeviceNet Safety		No
Supporting protocol for INTERBUS-Safety		No
Supporting protocol for PROFIsafe		No
Supporting protocol for SafetyBUS p		No
Supporting protocol for other bus systems		No
Width	mm	22.5
Height	mm	110.8
Depth	mm	113.6

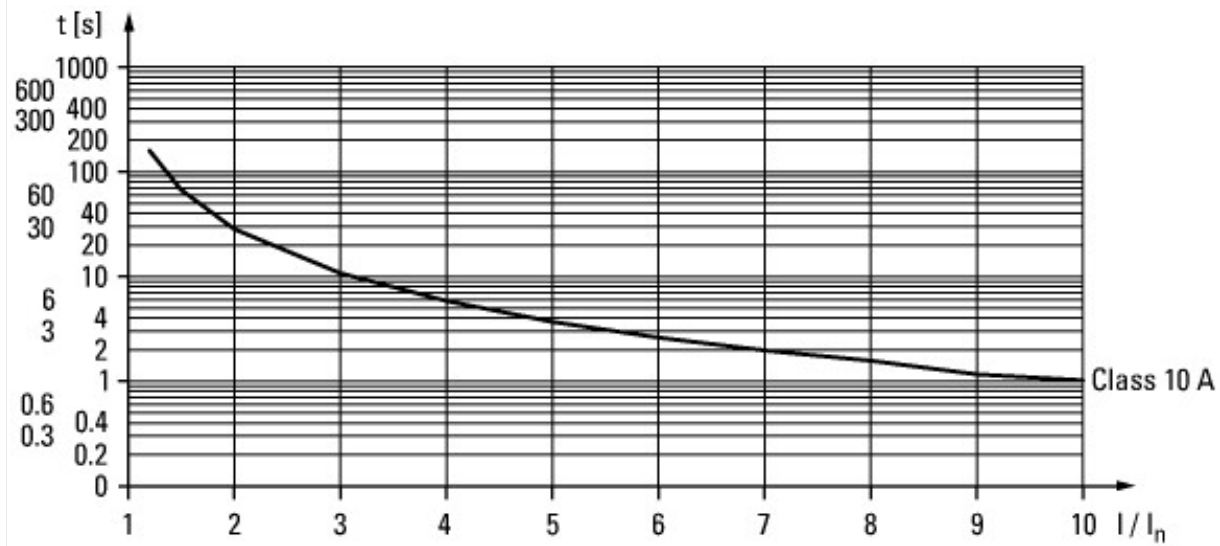
## Approvals

Product Standards		UL 60947-4-1; CSA C22.2 No. 60947-4-1-14; CE marking
UL File No.		E338590
UL Category Control No.		NLDX, NLDX7
CSA File No.		UL report applies to both US and Canada
North America Certification		UL listed, certified by UL for use in Canada
Specially designed for North America		No

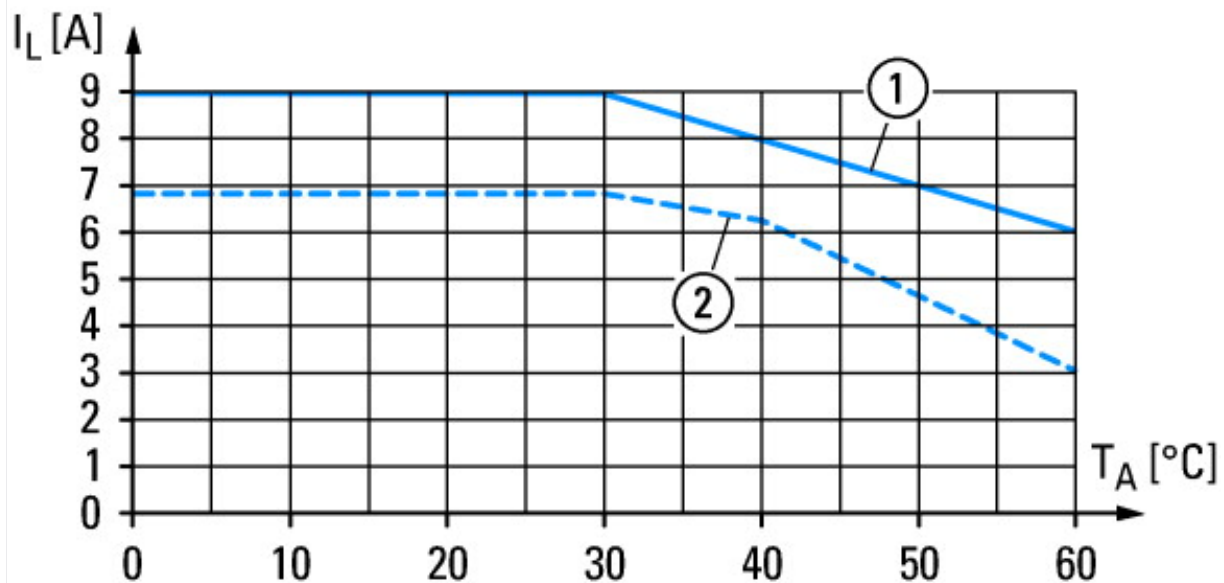
## Characteristics



Tripping characteristic curve  
CLASS 10  
set motor current  $\leq 4$  A



Tripping characteristic curve  
CLASS 10A  
set motor current  $> 4$  A



Electricity derating devices with  $I_o = 9$  A

- ① For devices installed with a minimum clearance of 20 mm
- ② For devices in direct sequence

## Dimensions

