



**197166**  
**EMS2-DOS-Z-9-24VDC**

Overview

Specifications

Resources



Delivery program

Technical data

Design verification as per IEC/EN 61439

Technical data ETIM 7.0

Approvals

Characteristics

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## 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.


### Conformity, Approval

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

## Motor ratings

Max. rating for three-phase motors, 50 - 60 Hz  
AC-53a  
380 V 400 V 415 V [F]  
0.55 - 3 kW

Setting range of overload releases  [I]  
1,5 - 7 (AC-53a)  
1,5 - 9 (AC-51) A\_x

Actuating voltage  
24 V DC

Connection technique  
Screw terminals

Stop Function  
Controlled stop

Connection to SmartWire-DT  
no

## TECHNICAL DATA

### General

Standards  
IEC/EN 60947-4-2  
IEC 61508  
ISO 13849  
UL508

Ambient temperature  
Storage  
Mn. ambient temperature, storage  
- 40 °C

Ambient temperature  
Storage  
Ambient temperature, storage max.  
+ 80 °C

Ambient temperature

Open  
Operating ambient temperature min.  
-25 °C

Ambient temperature  
Open  
Operating ambient temperature max.  
+70 °C

Weight  
0.22 kg

Mbunting  
Top-hat rail IEC/EN 60715, 35 mm

Protection type (IEC/EN 60529, EN 50178, VBG 4)  
IP20

Mbunting position  
Vertical  
Mtor feeder at bottom

Terminal capacity  
Screw terminals  
Terminal capacity main cable  
0.2 - 2.5 mm<sup>2</sup>

Terminal capacity  
Screw terminals  
Terminal capacity main cable  
24 - 14 AWG

Terminal capacity  
Screw terminals  
Terminal capacity control circuit cables  
0.14 - 2.5 mm<sup>2</sup>

Terminal capacity  
Screw terminals  
Terminal capacity control circuit cables  
26 - 14 AWG

Terminal capacity  
Screw terminals  
tightening torque  
0.5 - 0.6 Nm

## Main conducting paths

Rated operational voltage [ $U_e$ ]  
500 V AC


Operational voltage range  
Operating voltage range min.  
42 V

Operational voltage range  
Operating voltage range max.  
550 V

Rated operational current  
AC-51 [ $I_e$ ]  
9 A

Rated operational current  
AC-53a [ $I_e$ ]  
7 A

Rated operational current  
AC-53a: Please note possible derating.

Rated operational current  
Setting range of overload releases  [ $I_r$ ]  
1,5 - 7 (AC-53a)  
1,5 - 9 (AC-51) A\_x

Release class  
10A CLASS

Heat dissipation [ $P_V$ ]  
1 - 12 W

## Control section

Rated control voltage [ $U_c$ ]  
24 V DC

Control voltage range  
19,2 - 30 V DC V

Residual ripple on the input voltage  
 5 %

Rated control current [ $I_c$ ]  
40 mA

Actuating circuit (ON, L, R)  
Rated actuation voltage [ $U_c$ ]  
24 V

Actuating circuit (ON, L, R)  
Switching level "Low"  
-3 - +9.6 V DC V

Actuating circuit (ON, L, R)  
Switching level "confirm Off"  
< 5 V DC V

Actuating circuit (ON, L, R)  
Switching level "High"  
19.2 - 30 V DC V

Actuating circuit (ON, L, R)  
Rated actuating current [ $I_a$ ]  
10 mA

Relay outputs  
Contacts  
CO = changeover  
1 CO

Rated operational current  
AC-15  
230 V [ $U_e$ ]  
2 A

Rated operational current  
DC-13  
24 V [ $U_e$ ]  
2 A

## Electromagnetic compatibility (EMC)

Radio interference suppression  
EN 55011  
EN 61000-6-3, Class A (emitted interference,  
radiated)

## Technical safety parameters:

## Notes

Safe switch off.  
motor protection

Ambient temperature  
60 °C

Values according to EN ISO 13849-1  
MTTF<sub>d</sub> [Years]  
70 (Sicheres Abschalten) / 60 (Motorschutz)

Values according to EN ISO 13849-1  
Performance level [PL]  
e (Sicheres Abschalten)

Values according to EN ISO 13849-1  
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 [ $I_r$ ]  
9 A

Heat dissipation per pole, current-dependent [ $P_{vid}$ ]  
0 W

Equipment heat dissipation, current-dependent

[ $P_{vid}$ ]  
12 W

Static heat dissipation, non-current-dependent [ $P_{vs}$ ]

2 W

Heat dissipation capacity [ $P_{diss}$ ]

0 W

Operating ambient temperature min.

-25 °C

Operating ambient temperature max.

+70 °C

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 Strength of materials and parts

10.2.3.1 Verification of thermal stability of enclosures

Meets the product standard's requirements.

10.2 Strength of materials and parts

10.2.3.2 Verification of resistance of insulating materials to normal heat

Meets the product standard's requirements.

10.2 Strength of materials and parts

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 Strength of materials and parts

10.2.4 Resistance to ultra-violet (UV) radiation

Meets the product standard's requirements.

10.2 Strength of materials and parts

10.2.5 Lifting

Does not apply, since the entire switchgear needs to be evaluated.

10.2 Strength of materials and parts

10.2.6 Mechanical impact

Does not apply, since the entire switchgear needs to be evaluated.

10.2 Strength of materials and parts

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 Insulation properties

10.9.3 Impulse withstand voltage

Is the panel builder's responsibility.

10.9 Insulation properties

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

0 - 0 V

Rated control supply voltage  $U_s$  at AC 60HZ

0 - 0 V

Rated control supply voltage  $U_s$  at DC

24 - 24 V

Voltage type for actuating

DC

Rated operation power at AC-3, 230 V, 3-phase  
1.5 kW

Rated operation power at AC-3, 400 V  
3 kW

Rated power, 460 V, 60 Hz, 3-phase  
0 kW

Rated power, 575 V, 60 Hz, 3-phase  
0 kW

Rated operation current  $I_e$   
9 A

Rated operation current at AC-3, 400 V  
7 A

Overload release current setting  
1.5 - 9 A

Rated conditional short-circuit current, type 1, 480  
Y/277 V  
0 A

Rated conditional short-circuit current, type 1, 600  
Y/347 V  
0 A

Rated conditional short-circuit current, type 2, 230  
V  
0 A

Rated conditional short-circuit current, type 2, 400  
V  
0 A

Number of auxiliary contacts as normally open  
contact  
1

Number of auxiliary contacts as normally closed  
contact  
1

Ambient temperature, upper operating limit  
40 °C

Temperature compensated overload protection  
Yes

Release class  
CLASS 10

Type of electrical connection of main circuit  
Screw connection

Type of electrical connection for auxiliary- and  
control current circuit  
Screw 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 PROFI-safe  
No

Supporting protocol for SafetyBUS p  
No

Supporting protocol for other bus systems  
No

Width  
22.5 mm

Height  
106.8 mm

Depth  
113.6 mm

## 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

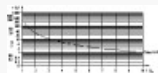
## CHARACTERISTICS

Characteristic curve



Tripping characteristic curve  
CLASS 10  
set motor current  4 A

Characteristic curve



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

Characteristic curve



Electricity derating devices with  $I_b = 9 A$   
 For devices installed with a minimum clearance  
of 20 mm  
 For devices in direct sequence

## DIMENSIONS

