# DATASHEET - EMS2-DOS-T-9-SWD

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

| | |
|---|---|
| **Part no.** | EMS2-DOS-T-9-SWD |
| **Catalog No.** | 192389 |
| **Alternate Catalog No.** | EMS2-DOS-T-9-SWD |

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## Delivery program

| | | | |
|---|---|---|---|
| Product range | | | Electronic motor starter |
| Product range | | | SmartWire-DT slave |
| Subrange | | | SmartWire-DT electronic motor starters |
| Basic function | | | DOL starters (complete devices) |
| Function | | | For connecting to SmartWire-DT for expanded diagnostics |
| Description | | | DOL starting<br>Motor protection<br>Circuit design: safety output stage with bypass, three-phase disconnect.<br>Controlled stop via additional enable signal terminal up to SIL3/Ple. |
| Messages | | | Operational readiness<br>Operating direction feedback<br>Enable signal<br>Motor current in %<br>Motor current in A<br>Thermal motor image in %<br>Overload prewarning<br>Trip indications (overload, phase failure, etc.)<br>Set short-circuit release value<br>Device Type |
| Commands | | | Operating the motor starter<br>Manual reset<br>Automatic reset |

### Conformity, Approval

| | | | |
|---|---|---|---|
| Explosion protection (according to ATEX 94/9/EC) | | | II (2) G [Ex db] [Ex eb] [Ex pxb]<br>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 | P | kW | 0.55 - 3 |
| Setting range of overload releases | I$_r$ | A_x | 1,5 - 7 (AC-53a)<br>1,5 - 9 (AC-51) |
| Actuating voltage | | | 24 V DC |
| Connection technique | | | Push in terminals |
| Stop Function | | | Controlled stop |
| Connection to SmartWire-DT | | | yes |

## Technical data
### General

| | | | |
|---|---|---|---|
| Standards | | | IEC/EN 60947-4-2<br>IEC 61508<br>ISO 13849<br>UL508 |
| Ambient temperature | | | |
| Storage | | °C | |
| Min. ambient temperature, storage | | °C | - 40 |
| Ambient temperature, storage max. | | °C | + 80 |
| Open | | °C | |
| Operating ambient temperature min. | | °C | -5 |
| Operating ambient temperature max. | | °C | + 55 |

| | | | |
|---|---|---|---|
| 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<br>Motor feeder at bottom |
| Terminal capacity | | | |
| Push-in terminals | | | |
| | | mm$^2$ | 0.2 - 2.5 |
| | | AWG | 24 - 14 |

## Main conducting paths

| | | | |
|---|---|---|---|
| Rated operational voltage | $U_e$ | 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)<br>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 | | % | ≦ 5 |
| Rated control current | $I_s$ | mA | 60 |
| Current draw inrush | | mA | 120 |
| 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 | 7 |

## Electromagnetic compatibility (EMC)

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

## Technical safety parameters:

| | | | |
|---|---|---|---|
| **Notes** | | | Safe switch off.<br>motor protection |
| Ambient temperature | | °C | 60 |
| Values according to EN ISO 13849-1 | | | |
| MTTF$_d$ | Years | | 60 (Sicheres Abschalten) / 82 (Motorschutz) |
| Performance level | PL | | e (Sicheres Abschalten) |
| Category | | | 3 (Sicheres Abschalten) |
| Values according to IEC 62061 | | | |
| | | | Abschaltzeit [ms]: 200 (Sicheres Abschalten) / Class 10A (Motorschutz)<br>λsd [FIT]: 0<br>λsu [FIT]: 3481 (Sicheres Abschalten) / 2538 (Motorschutz)<br>λdd [FIT]: 1887 (Sicheres Abschalten) / 1375 (Motorschutz)<br>λdu [FIT]: 0,3 (Sicheres Abschalten) / 23 (Motorschutz)<br>SFF [%]: 99<br>DC [%]: 99 (Sicheres Abschalten) / 98 (Motorschutz)<br>PFH$_d$ [FIT]: 0,3 (Sicheres Abschalten)<br>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 | -5 |
| Operating ambient temperature max. | | °C | 55 |
| | | | If necessary, Allow for 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 | | | Reversing starter |
| With short-circuit release | | | No |
| Rated control supply voltage Us at AC 50HZ | | V | 0 - 0 |
| Rated control supply voltage Us at AC 60HZ | | V | 0 - 0 |
| Rated control supply voltage Us at DC | | V | 24 - 24 |
| Voltage type for actuating | | | DC |
| Rated operation power at AC-3, 230 V, 3-phase | | kW | 0.55 |
| Rated operation power at AC-3, 400 V | | kW | 1.1 |
| Rated power, 460 V, 60 Hz, 3-phase | | kW | 0 |
| Rated power, 575 V, 60 Hz, 3-phase | | kW | 0 |
| Rated operation current Ie | | A | 3 |
| Rated operation current at AC-3, 400 V | | A | 3 |
| Overload release current setting | | A | 0.18 - 3 |
| 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 | | 0 |
| Number of auxiliary contacts as normally closed contact | | 0 |
| 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 | | No |
| Coordination class according to IEC 60947-4-3 | | |
| Number of indicator lights | | 5 |
| 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 | | Yes |
| Width | mm | 22.5 |
| Height | mm | 112.5 |
| 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
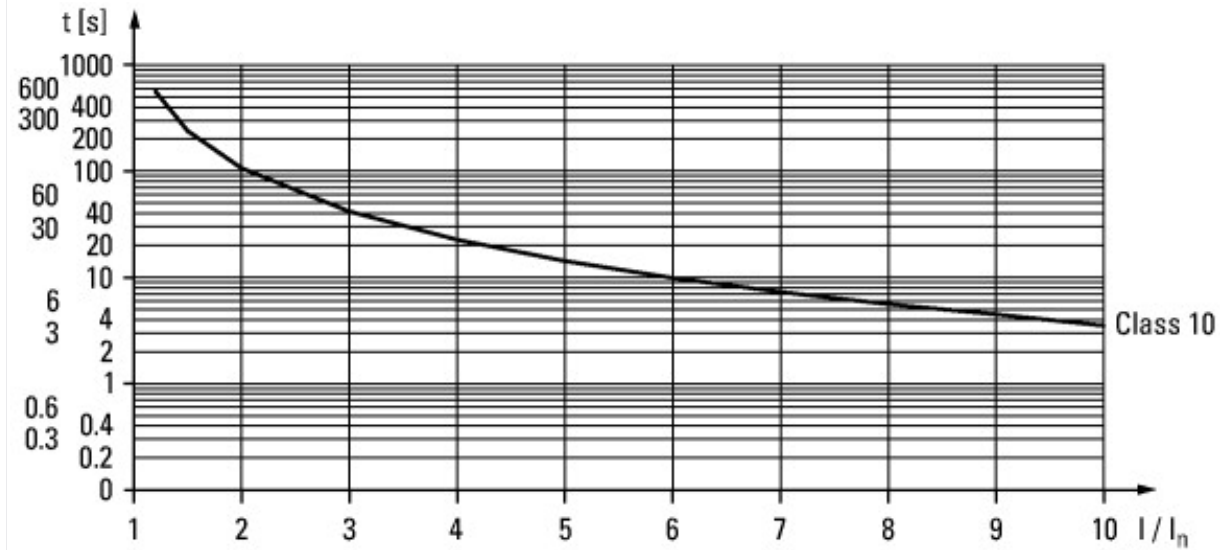


Tripping characteristic curve
CLASS 10
set motor current ≦ 4 A
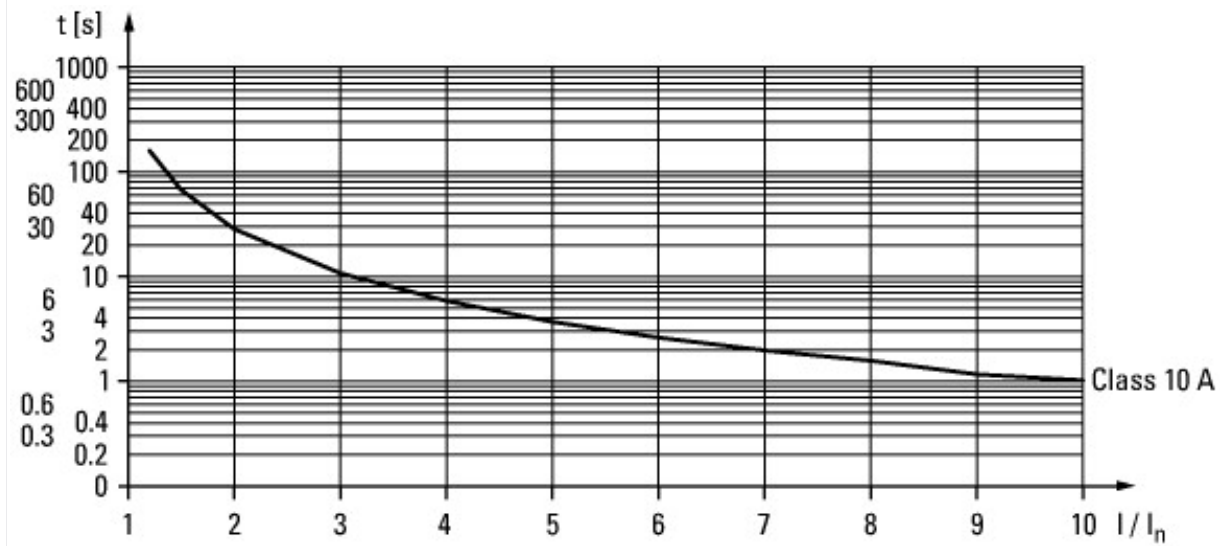


Tripping characteristic curve
CLASS 10A
set motor current > 4 A
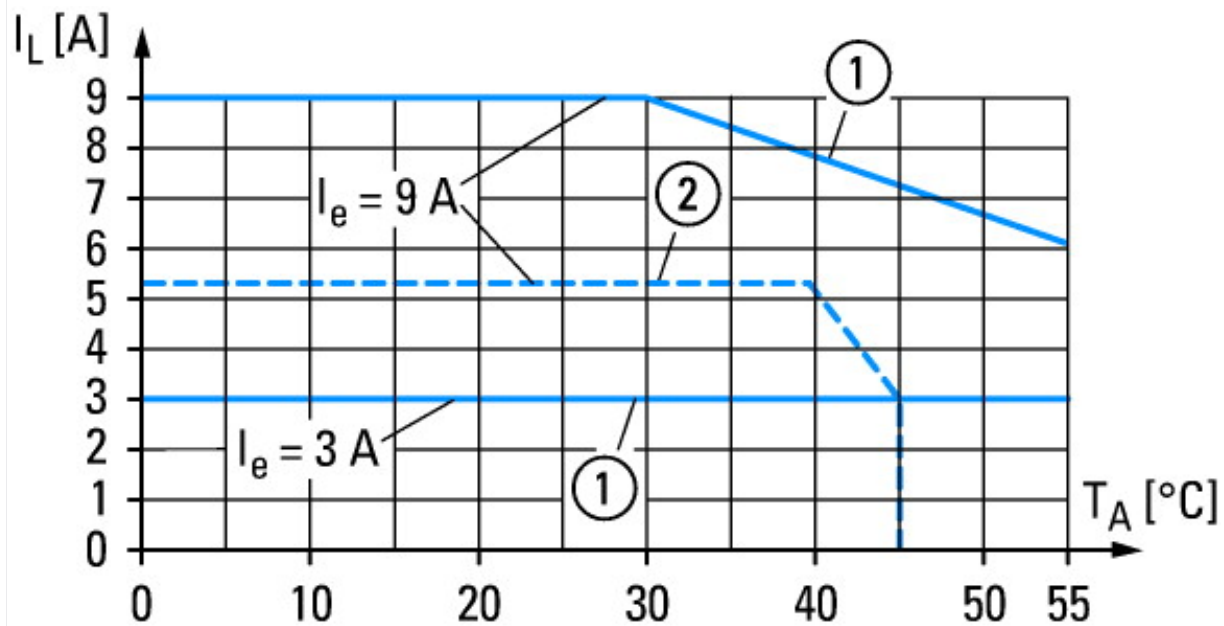


Current derating
① For devices installed with a minimum clearance of 20 mm

## Dimensions

112.5 mm (4.43")

22.5 mm (0.89")

113.6 mm (4.47")