




**DOL starter, 230 V AC, 0,18 - 2,4 A, Screw terminals**

**Part no.** EMS2-DO-Z-2,4-230VAC  
**Catalog No.** 197168  
**Alternate Catalog No.** EMS2-DO-Z-2,4-230VAC

### Delivery program

|  |                |                |  |
|--|----------------|----------------|--|
| Product range  |                |                | Electronic motor starter   |
| Basic function   |                |                | DOL starters (complete devices)  |
| Description  |                |                | DOL starting<br>Motor protection<br>Circuit design: safety output stage with bypass, three-phase disconnect. |
| <b>Motor ratings</b>   |                |                |  |
| Max. rating for three-phase motors, 50 - 60 Hz                                   |                |                |  |
| AC-53a   |                |                |  |
| 380 V 400 V 415 V  | P              | kW             | 0.06 - 0.75  |
| Setting range of overload releases   | I <sub>r</sub> | A <sub>x</sub> | 0,18 - 2,4   |
|  |                |                |  |
| Actuating voltage  |                |                | 230 V AC   |
| Connection technique   |                |                | Screw terminals  |
| Connection to SmartWire-DT   |                |                | no   |

### Technical data

|  |  |                 |                                    |
|--|--|-----------------|------------------------------------|
| <b>General</b>                                 |  |                 |                                    |
| Standards                                      |  |                 | IEC/EN 60947-4-2<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              | -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<br>Motor feeder at bottom |
| Terminal capacity                              |  |                 |                                    |
| Screw terminals                                |  |                 |                                    |
| Terminal capacity main cable                   |  | mm <sup>2</sup> | 0.2 - 2.5                          |
|  |  | AWG             | 24 - 14                            |
| Terminal capacity control circuit cables       |  | mm <sup>2</sup> | 0.14 - 2.5                         |
|  |  | AWG             | 26 - 14                            |
| tightening torque                              |  | N/m             | 0.5 - 0.6                          |

### Main conducting paths

|                              |                |      |     |
|------------------------------|----------------|------|-----|
| 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     | 2.4                                    |
| AC-53a                             | $I_e$ | A     | 2.4                                    |
|                                    |       |       | AC-53a: Please note possible derating. |
| Setting range of overload releases | $I_r$ | A_x   | 0,18 - 2,4                             |
| Release class                      |       | CLASS | 10                                     |
| Heat dissipation                   | $P_V$ | W     | 2.6 - 4.7                              |

### Control section

|                               |       |      |               |
|-------------------------------|-------|------|---------------|
| Rated control voltage         | $U_s$ | V AC | 230           |
| Control voltage range         |       | V    | 85 - 253 V AC |
| Rated control current         | $I_s$ | mA   | 4             |
| Actuating circuit (ON, L, R)  |       |      |               |
| Rated actuation voltage       | $U_c$ | V    | 230           |
| Switching level "Low"         |       | V    | 0 - 48 V AC   |
| Switching level "confirm Off" |       | V    | < 5 V DC      |
| Switching level "High"        |       | V    | 85 - 253 V AC |
| Rated actuating current       | $I_c$ | mA   | 7             |
| Relay outputs                 |       |      |               |
| Contacts                      |       |      |               |
| CO = changeover               |       |      | 1 CO          |
| Rated operational current     |       |      |               |
| AC-15                         |       |      |               |
| 230 V                         | $I_e$ | A    | 3             |
| DC-13                         |       |      |               |
| 24 V                          | $I_e$ | A    | 2             |

### Electromagnetic compatibility (EMC)

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

### Technical safety parameters:

|       |  |  |                  |
|-------|--|--|------------------|
| Notes |  |  | motor protection |
|-------|--|--|------------------|

## Design verification as per IEC/EN 61439

|  |            |    |  |
|--|------------|----|--|
| Technical data for design verification   |            |    |  |
| Rated operational current for specified heat dissipation   | $I_n$      | A  | 2.4  |
| Heat dissipation per pole, current-dependent   | $P_{vid}$  | W  | 0  |
| Equipment heat dissipation, current-dependent  | $P_{vid}$  | W  | 4.7  |
| Static heat dissipation, non-current-dependent   | $P_{vs}$   | W  | 1  |
| Heat dissipation capacity  | $P_{diss}$ | W  | 0  |
| Operating ambient temperature min.   |            | °C | -25  |
| Operating ambient temperature max.   |            | °C | 70   |
|  |            |    | 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

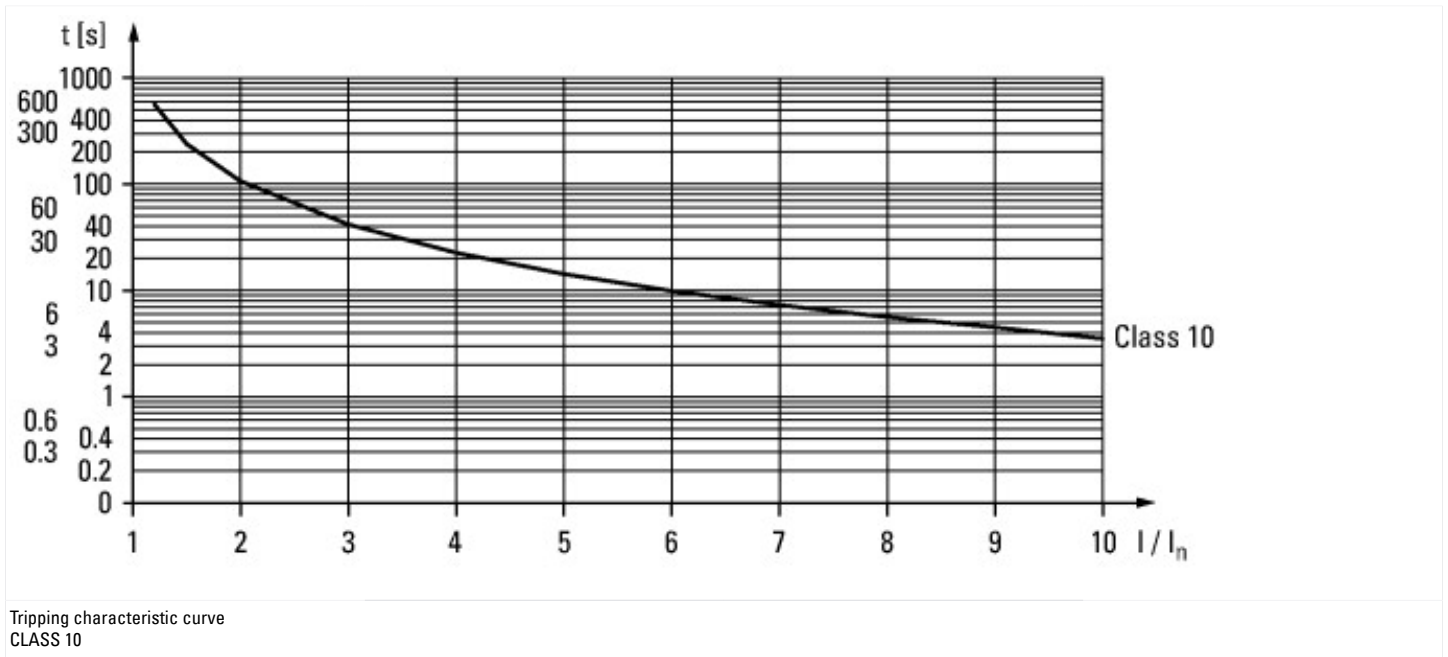
|  |    |                  |
|--|----|------------------|
| Low-voltage industrial components (EG000017) / Motor starter/Motor starter combination (EC001037)  |    |                  |
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Load breakout, motor breakout / Motor starter combination (ecl@ss10.0.1-27-37-09-05 [AJZ718013]) |    |                  |
| Kind of motor starter  |    | Direct starter   |
| With short-circuit release   |    | No               |
| Rated control supply voltage $U_s$ at AC 50HZ  | V  | 230 - 230        |
| Rated control supply voltage $U_s$ at AC 60HZ  | V  | 0 - 0            |
| Rated control supply voltage $U_s$ at DC   | V  | 0 - 0            |
| Voltage type for actuating   |    | AC               |
| Rated operation power at AC-3, 230 V, 3-phase  | kW | 0.37             |
| Rated operation power at AC-3, 400 V   | kW | 0.75             |
| 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  | 2.4              |
| Rated operation current at AC-3, 400 V   | A  | 2.4              |
| 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  |    | 1                |
| Number of auxiliary contacts as normally closed contact  |    | 1                |
| Ambient temperature, upper operating limit   | °C | 60               |
| 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   |    |                  |
| Number of command positions  |    |                  |
| Suitable for emergency stop  |    |                  |
| Coordination class according to IEC 60947-4-3  |    |                  |
| Number of indicator lights   |    |                  |
| External reset possible  |    |                  |
| With fuse  |    |                  |
| Degree of protection (IP)  |    | IP20             |
| Degree of protection (NEMA)  |    |                  |
| 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 |    |
| Height  | mm |    |
| Depth   | mm |    |

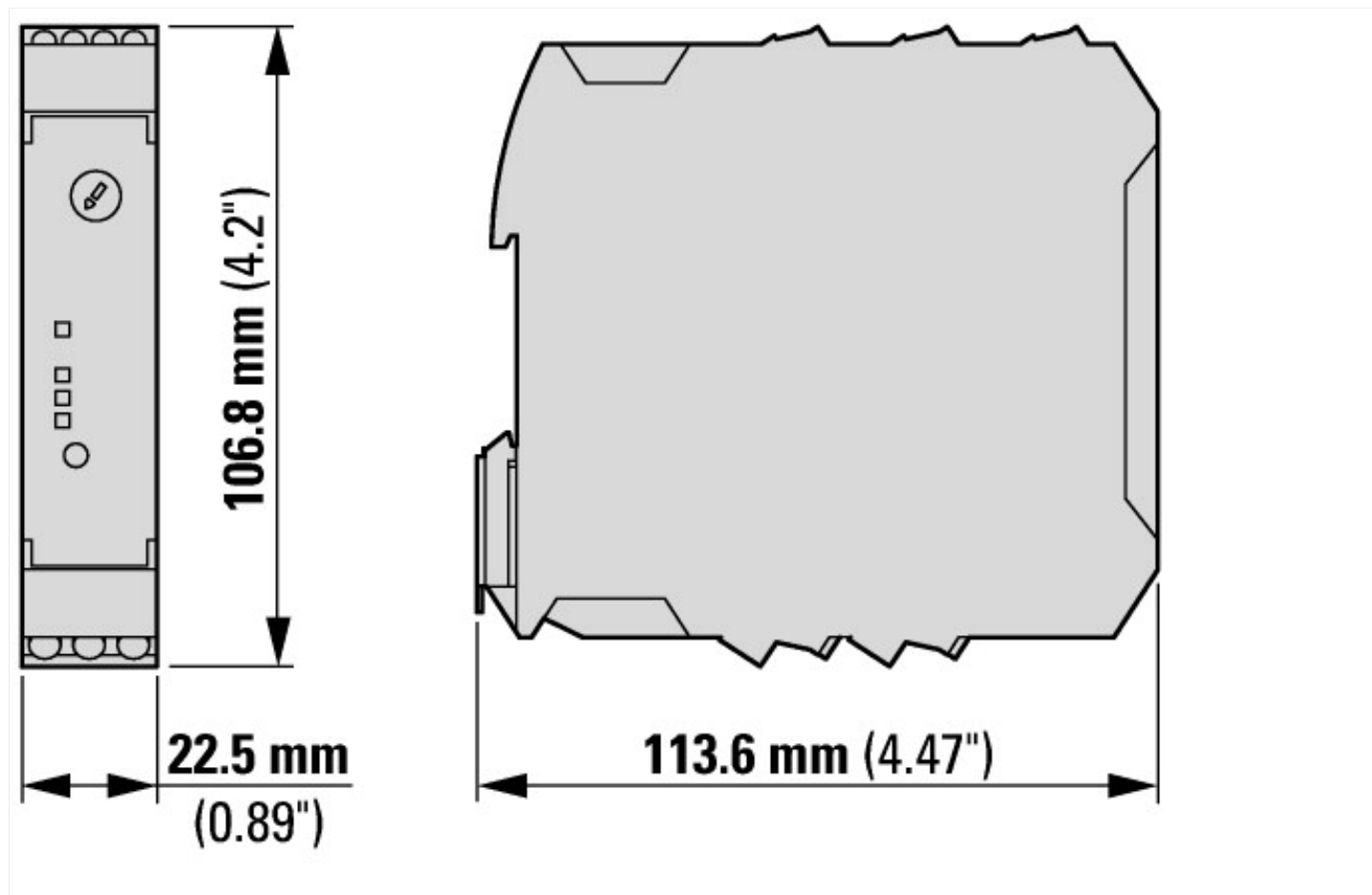
## Approvals

|                                      |  |  |
|--------------------------------------|--|--|
| Product Standards                    |  | UL 60947-4-1; CSA C22.2 No. 60947-4-1-14; CE marking |
| UL File No.                          |  | E29096   |
| 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



## Dimensions



## Additional product information (links)

|   |   |
|---|---|
| <b>IL034064ZU Electronic motor starter EMS2</b>     |   |
| IL034064ZU Electronic motor starter EMS2            | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL034064ZU2019_07.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL034064ZU2019_07.pdf</a> |
| <b>MN034003 Electronic Motorstarter EMS2</b>        |   |
| MN034003 Elektronischer Motorstarter EMS2 - Deutsch | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN034003DE.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN034003DE.pdf</a>                         |
| MN034003 Electronic Motorstarter EMS2 - English     | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN034003EN.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN034003EN.pdf</a>                         |