



**Soft starter, 180 A, 200 - 690 V AC,  $U_s = 24$  V DC, with control unit and pump algorithm, for 690-V grids, Frame size T**

**Part no.** S811+T18V3S  
**Catalog No.** 168986  
**Alternate Catalog No.** S811PLUST18V3S  
**EL-Nummer (Norway)** 4137470

## Delivery program

|                                                             |          |      |                                                                                                                                    |
|-------------------------------------------------------------|----------|------|------------------------------------------------------------------------------------------------------------------------------------|
| Description                                                 |          |      | With internal bypass contacts                                                                                                      |
| Function                                                    |          |      | Soft starter for three-phase loads, with control unit and pump algorithm, for 690-V grids                                          |
| Mains supply voltage (50/60 Hz)                             | $U_{LN}$ | V AC | 200 - 690                                                                                                                          |
| Supply voltage                                              | $U_s$    |      | 24 V DC                                                                                                                            |
| Control voltage                                             | $U_C$    |      | 24 V DC                                                                                                                            |
| <b>Assigned motor rating (Standard connection, In-Line)</b> |          |      |                                                                                                                                    |
| at 400 V, 50 Hz                                             | P        | kW   | 90                                                                                                                                 |
| at 690 V, 50 Hz                                             | P        | kW   | 160                                                                                                                                |
| at 460 V, 60 Hz                                             | P        | HP   | 150                                                                                                                                |
| <b>Rated operational current</b>                            |          |      |                                                                                                                                    |
| AC-53                                                       | $I_e$    | A    | 180                                                                                                                                |
| Startup class                                               |          |      | CLASS 10 (star-delta replacement)<br>CLASS 20 (heavy starting duty $3 \times I_e$ for 45 s)<br>CLASS 30 ( $6 \times I_e$ for 30 s) |
| Rated operational voltage                                   | $U_e$    |      | 200 V<br>230 V<br>400 V<br>480 V<br>600 V<br>690 V                                                                                 |
| Connection to SmartWire-DT                                  |          |      | no                                                                                                                                 |
| Frame size                                                  |          |      | T                                                                                                                                  |
| Ordering information                                        |          |      | Terminal blocks for the terminals are required for frame sizes T, U, and V -> Accessories                                          |

## Technical data

### General

|                                       |          |    |                                                                                                         |
|---------------------------------------|----------|----|---------------------------------------------------------------------------------------------------------|
| Standards                             |          |    | IEC/EN 60947-4-2<br>UL 508<br>CSA22.2-14-1995<br>GB14048                                                |
| Approvals                             |          |    | CE                                                                                                      |
| Approvals                             |          |    | UL<br>CSA<br>C-Tick<br>CCC                                                                              |
| Climatic proofing                     |          |    | Damp heat, constant, to IEC 60068-2-3<br>Damp heat, cyclic, to IEC 60068-2-10                           |
| Ambient temperature                   |          |    |                                                                                                         |
| Operation                             | $\theta$ | °C | -30 - +50                                                                                               |
| Storage                               | $\theta$ | °C | -50 - +70                                                                                               |
| Altitude                              |          | m  | 0 - 2000 m, above that each 100 m 0.5% Derating                                                         |
| Mounting position                     |          |    | As required                                                                                             |
| Degree of protection                  |          |    |                                                                                                         |
| Degree of Protection                  |          |    | IP20 (terminals IP00)                                                                                   |
| Integrated                            |          |    | An IP20 degree of protection can be achieved on all sides by using optional terminal covers SS-IP20-TU. |
| Protection against direct contact     |          |    | Finger- and back-of-hand proof                                                                          |
| Overvoltage category/pollution degree |          |    | II/3                                                                                                    |
| Shock resistance                      |          |    | 15 g                                                                                                    |

|                                                |                 |    |      |
|------------------------------------------------|-----------------|----|------|
| Radio interference level (IEC/EN 55011)        |                 |    | A    |
| Static heat dissipation, non-current-dependent | P <sub>VS</sub> | W  | 37   |
| Weight                                         |                 | kg | 18.6 |

Main conducting paths

|                                                      |                 |      |                                 |
|------------------------------------------------------|-----------------|------|---------------------------------|
| Rated operating voltage                              | U <sub>e</sub>  | V AC | 200 - 690                       |
| Supply frequency                                     | f <sub>LN</sub> | Hz   | 50/60                           |
| Rated operational current                            | I <sub>e</sub>  | A    |                                 |
| AC-53                                                | I <sub>e</sub>  | A    | 180                             |
| Assigned motor rating (Standard connection, In-Line) |                 |      |                                 |
| at 230 V, 50 Hz                                      | P               | kW   | 55                              |
| at 400 V, 50 Hz                                      | P               | kW   | 90                              |
| at 500 V, 50 Hz                                      | P               | kW   | 110                             |
| at 690 V, 50 Hz                                      | P               | kW   | 160                             |
| at 200 V, 60 Hz                                      | P               | HP   | 60                              |
| at 230 V, 60 Hz                                      | P               | HP   | 60                              |
| at 460 V, 60 Hz                                      | P               | HP   | 150                             |
| at 600 V, 60 Hz                                      | P               | HP   | 150                             |
| at 690 V, 60 Hz                                      | P               | HP   | 200                             |
| Assigned motor rating (delta connection)             |                 |      |                                 |
| at 690 V, 60 Hz                                      | P               | HP   | 350                             |
| Overload cycle to IEC/EN 60947-4-2                   |                 |      |                                 |
| AC-53a                                               |                 |      | 180 A: AC-53a: 4.0 - 32: 99 - 3 |
| Internal bypass contacts                             |                 |      | ✓                               |
| Short-circuit rating                                 |                 |      |                                 |
| Type “1” coordination                                |                 |      | NZMN2-S200                      |

Terminal capacities

|                            |  |                 |                                            |
|----------------------------|--|-----------------|--------------------------------------------|
| Cable lengths              |  |                 |                                            |
| Solid                      |  | mm <sup>2</sup> | 1 x (70 - 240)<br>2 x (25 - 240)           |
| Flexible with ferrule      |  | mm <sup>2</sup> | 1 x (70 - 240)<br>2 x (25 - 240)           |
| Stranded                   |  | mm <sup>2</sup> | 1 x (70 - 240)<br>2 x (25 - 240)           |
| Solid or stranded          |  | AWG             | 1 x (4 - 500 kcmil)<br>2 x (4 - 500 kcmil) |
| Tightening torque          |  | Nm              | 25.5 (≤ 150 mm²); 28.3 (> 150 mm²)         |
| Screwdriver (PZ: Pozidriv) |  | mm              | 4 mm Innensechskant                        |
| Control cables             |  |                 |                                            |
| Solid                      |  | mm <sup>2</sup> | 1 x (2.5 - 4)<br>2 x (1.0 - 2.5)           |
| Flexible with ferrule      |  | mm <sup>2</sup> | 1 x (2.5 - 4)<br>2 x (1.0 - 2.5)           |
| Stranded                   |  | mm <sup>2</sup> | 1 x (2.5 - 4)<br>2 x (1.0 - 2.5)           |
| Solid or stranded          |  | AWG             | 11 x (12 - 14)<br>2 x (12 - 14)            |
| Tightening torque          |  | Nm              | 0.4                                        |
| Screwdriver                |  | mm              | 0,6 x 3,5                                  |

Control circuit

|                          |                  |                  |                      |
|--------------------------|------------------|------------------|----------------------|
| Digital inputs           |                  |                  |                      |
| Control voltage          |                  |                  |                      |
| DC-operated              |                  | V DC             | 24 V DC +10 %/- 10 % |
| Current consumption 24 V |                  | mA               |                      |
| External 24 V            |                  | mA               | 150                  |
| External 24 V (no-load)  |                  | mA               | 100                  |
| Pick-up voltage          |                  | x U <sub>s</sub> |                      |
| DC-operated              |                  | V DC             | 21.6 - 26.4          |
| Drop-out voltage         | x U <sub>s</sub> |                  |                      |
| DC operated              |                  | V DC             |                      |

|                                                                   |                   |      |                         |
|-------------------------------------------------------------------|-------------------|------|-------------------------|
| Drop-out voltage, DC-operated, max.                               |                   | V DC | 3                       |
| Pick-up time                                                      |                   |      |                         |
| DC operated                                                       |                   | ms   | 100                     |
| Drop-out time                                                     |                   |      |                         |
| DC operated                                                       |                   | ms   | 100                     |
| Regulator supply                                                  |                   |      |                         |
| Voltage                                                           | U <sub>s</sub>    | V    | 24 V DC +10 %/- 10 %    |
| Current consumption                                               | I <sub>e</sub>    | mA   | 1000                    |
| Current consumption at peak performance (close bypass) at 24 V DC | I <sub>Peak</sub> | A/ms | 10/150                  |
| Notes                                                             |                   |      | External supply voltage |
| Analog inputs                                                     |                   |      |                         |
| Number of current inputs                                          |                   |      | 1                       |
|                                                                   |                   |      |                         |
| Current input                                                     |                   | mA   | 4 - 20                  |
| Relay outputs                                                     |                   |      |                         |
| Number                                                            |                   |      | 2                       |
| of which programmable                                             |                   |      | 2                       |
| Voltage range                                                     |                   | V AC | 120 V AC/DC             |
| AC-11 current range                                               |                   | A    | 3 A, AC-11              |

### Soft start function

|                                    |  |    |                                                  |
|------------------------------------|--|----|--------------------------------------------------|
| Ramp times                         |  |    |                                                  |
| Acceleration                       |  | s  |                                                  |
| Ramp time, max.                    |  | s  | 360                                              |
| Deceleration                       |  | s  | 0 - 120                                          |
| Start voltage (= turn-off voltage) |  | %  |                                                  |
| Start voltage, max.                |  | %  | 85                                               |
| Start pedestal                     |  | %  |                                                  |
| Start voltage, max.                |  | %  | 85                                               |
| Kickstart                          |  |    |                                                  |
| Voltage                            |  | %  |                                                  |
| Kickstart voltage, max.            |  | %  | 100                                              |
| Duration                           |  |    |                                                  |
| 50 Hz                              |  | ms |                                                  |
| Kickstart Duration 50 Hz max.      |  | ms | 2000                                             |
| 60 Hz                              |  | ms |                                                  |
| Kickstart Duration 60 Hz max.      |  | ms | 2000                                             |
| Fields of application              |  |    |                                                  |
| Fields of application              |  |    | Soft starting of three-phase asynchronous motors |
| 3-phase motors                     |  |    | ✓                                                |

### Functions

|                                                        |  |        |                                                  |
|--------------------------------------------------------|--|--------|--------------------------------------------------|
| Fast switching (semiconductor contactor)               |  |        | - (minimum ramp time 1s)                         |
| Soft start function                                    |  |        | ✓                                                |
| Reversing starter                                      |  |        | External solution required (reversing contactor) |
| Suppression of closing transients                      |  |        | ✓                                                |
| Current limitation                                     |  |        | ✓                                                |
| Overload monitoring                                    |  |        | ✓                                                |
| Underload monitoring                                   |  |        | ✓                                                |
| Fault memory                                           |  | Faults | 10                                               |
| Suppression of DC components for motors                |  |        | ✓                                                |
| Potential isolation between power and control sections |  |        | ✓                                                |
|                                                        |  |        |                                                  |
| Communication Interfaces                               |  |        | Modbus RTU                                       |

## Design verification as per IEC/EN 61439

|                                        |  |  |
|----------------------------------------|--|--|
| Technical data for design verification |  |  |
|----------------------------------------|--|--|

|                                                                                                                        |                   |    |                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------|-------------------|----|----------------------------------------------------------------------------------------------------------------------------------|
| Rated operational current for specified heat dissipation                                                               | I <sub>n</sub>    | A  | 180                                                                                                                              |
| Heat dissipation per pole, current-dependent                                                                           | P <sub>vid</sub>  | W  | 0                                                                                                                                |
| Equipment heat dissipation, current-dependent                                                                          | P <sub>vid</sub>  | W  | 37                                                                                                                               |
| Static heat dissipation, non-current-dependent                                                                         | P <sub>vs</sub>   | W  | 37                                                                                                                               |
| Heat dissipation capacity                                                                                              | P <sub>diss</sub> | W  | 0                                                                                                                                |
| Operating ambient temperature min.                                                                                     |                   | °C | -30                                                                                                                              |
| Operating ambient temperature max.                                                                                     |                   | °C | 50                                                                                                                               |
| 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) / Soft starter (EC000640)                                                                                                                                                |  |    |                  |
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Load breakout, motor breakout / Semiconductor motor controller or soft starter (ec1@ss10.0.1-27-37-09-07 [AC0300011]) |  |    |                  |
| Rated operation current I <sub>e</sub> at 40 °C T <sub>u</sub>                                                                                                                                                        |  | A  | 180              |
| Rated operating voltage U <sub>e</sub>                                                                                                                                                                                |  | V  | 200 - 690        |
| Rated power three-phase motor, inline, at 230 V                                                                                                                                                                       |  | kW | 55               |
| Rated power three-phase motor, inline, at 400 V                                                                                                                                                                       |  | kW | 90               |
| Rated power three-phase motor, inside delta, at 230 V                                                                                                                                                                 |  | kW | 90               |
| Rated power three-phase motor, inside delta, at 400 V                                                                                                                                                                 |  | kW | 160              |
| Function                                                                                                                                                                                                              |  |    | Single direction |
| Internal bypass                                                                                                                                                                                                       |  |    | Yes              |
| With display                                                                                                                                                                                                          |  |    | Yes              |
| Torque control                                                                                                                                                                                                        |  |    | No               |
| Rated surrounding temperature without derating                                                                                                                                                                        |  | °C | 50               |
| Rated control supply voltage U <sub>s</sub> at AC 50HZ                                                                                                                                                                |  | V  | 0 - 0            |
| Rated control supply voltage U <sub>s</sub> at AC 60HZ                                                                                                                                                                |  | V  | 0 - 0            |
| Rated control supply voltage U <sub>s</sub> at DC                                                                                                                                                                     |  | V  | 24 - 24          |
| Voltage type for actuating                                                                                                                                                                                            |  |    | DC               |
| Integrated motor overload protection                                                                                                                                                                                  |  |    | Yes              |

|                             |  |            |
|-----------------------------|--|------------|
| Release class               |  | Adjustable |
| Degree of protection (IP)   |  | IP00       |
| Degree of protection (NEMA) |  | Other      |

Approvals

|                             |  |                                      |
|-----------------------------|--|--------------------------------------|
| Product Standards           |  | IEC/EN 60947-4-2; UL 508; CE marking |
| UL File No.                 |  | E202571                              |
| UL Category Control No.     |  | NMFT                                 |
| North America Certification |  | UL listed                            |
| Suitable for                |  | Branch Circuits, not as BCPD         |
| Max. Voltage Rating         |  | 690 Vac                              |
| Degree of Protection        |  | IP20 with kit                        |

Dimensions

