

# Specifications



## Eaton 168977

Eaton S811 Soft starter, 37 A, 200 - 600 V AC, Us= 24 V DC, with control unit and pump algorithm, Frame size N

### General specifications

|                     |                         |
|---------------------|-------------------------|
| <b>PRODUCT NAME</b> | Eaton S811 Soft starter |
|---------------------|-------------------------|

|                       |        |
|-----------------------|--------|
| <b>CATALOG NUMBER</b> | 168977 |
|-----------------------|--------|

|                   |             |
|-------------------|-------------|
| <b>MODEL CODE</b> | S811+N37P3S |
|-------------------|-------------|

|            |               |
|------------|---------------|
| <b>EAN</b> | 4015081654734 |
|------------|---------------|

|                             |          |
|-----------------------------|----------|
| <b>PRODUCT LENGTH/DEPTH</b> | 163.9 mm |
|-----------------------------|----------|

|                       |          |
|-----------------------|----------|
| <b>PRODUCT HEIGHT</b> | 174.5 mm |
|-----------------------|----------|

|                      |         |
|----------------------|---------|
| <b>PRODUCT WIDTH</b> | 67.5 mm |
|----------------------|---------|

|                       |        |
|-----------------------|--------|
| <b>PRODUCT WEIGHT</b> | 2.6 kg |
|-----------------------|--------|

### CERTIFICATIONS

C-Tick  
IEC/EN 60947-4-2  
CSA-C22.2 No. 14  
CE  
UL  
CCC  
CSA File No.: LR 353  
GB14048  
CSA22.2-14-1995  
CSA  
UL 508  
UL Category Control No.:  
NMFT  
CSA Class No.: 3211-06,  
2411-01  
UL File No.: E202571



Powering Business Worldwide

## Climatic environmental conditions

|                                                |                                                                                     |
|------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>ALTITUDE</b>                                | Above 2000 m with 0.5 %<br>derating per 100 m<br>Max. 2000 m                        |
| <b>AMBIENT OPERATING<br/>TEMPERATURE - MAX</b> | 50 °C                                                                               |
| <b>AMBIENT STORAGE<br/>TEMPERATURE - MAX</b>   | 70 °C                                                                               |
| <b>AMBIENT OPERATING<br/>TEMPERATURE - MIN</b> | -30 °C                                                                              |
| <b>AMBIENT STORAGE<br/>TEMPERATURE - MIN</b>   | -50 °C                                                                              |
| <b>CLIMATIC PROOFING</b>                       | Damp heat, constant, to<br>IEC 60068-2-3<br>Damp heat, cyclic, to IEC<br>60068-2-30 |

## Control circuit

|                                                              |                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CURRENT<br/>CONSUMPTION</b>                               | 1000 mA, Control circuit,<br>Regulator supply<br>100 mA, Control circuit,<br>Digital inputs, External 24<br>V (no-load)<br>10 A/150 ms, Control<br>circuit, Regulator supply at<br>peak performance (close<br>bypass) at 24 V DC<br>150 mA, Control circuit,<br>Digital inputs, External 24<br>V |
| <b>DROP-OUT TIME</b>                                         | 100 ms, DC operated                                                                                                                                                                                                                                                                              |
| <b>DROP-OUT VOLTAGE</b>                                      | 0 - 3 V, DC operated                                                                                                                                                                                                                                                                             |
| <b>PICK-UP TIME</b>                                          | 100 ms at DC                                                                                                                                                                                                                                                                                     |
| <b>PICK-UP VOLTAGE</b>                                       | 21.6 - 26.4 V DC                                                                                                                                                                                                                                                                                 |
| <b>RATED CONTROL SUPPLY<br/>VOLTAGE (US) AT DC -<br/>MAX</b> | 24 V                                                                                                                                                                                                                                                                                             |
| <b>RATED CONTROL SUPPLY<br/>VOLTAGE (US) AT DC -<br/>MIN</b> | 24 V                                                                                                                                                                                                                                                                                             |

## Design verification

### 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.

### 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 RESIST. OF INSUL. MAT. TO ABNORMAL HEAT/FIRE BY INTERNAL ELECT. 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

Does not apply, since the

## Features & functions

### FAULT MEMORY

10 Faults

### FITTED WITH:

Internal bypass  
Internal bypass contacts  
Display  
Motor overload protection

### FUNCTIONS

Current limitation  
Soft start function  
Suppression of DC components for motors  
Underload monitoring  
Potential isolation between power and control sections  
Suppression of closing transients  
Overload monitoring  
Single direction  
Min. ramp time 1 s - fast switching (semiconductor contactor)

### INTERFACES

Modbus RTU (built-in)

|                                                                      |                                                                    |
|----------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>AGAINST ELECTRIC SHOCK</b>                                        | entire switchgear needs to be evaluated.                           |
| <b>10.6 INCORPORATION OF SWITCHING DEVICES AND COMPONENTS</b>        | Does not apply, since the entire switchgear needs to be evaluated. |
| <b>10.7 INTERNAL ELECTRICAL CIRCUITS AND CONNECTIONS</b>             | Is the panel builder's responsibility.                             |
| <b>10.8 CONNECTIONS FOR EXTERNAL CONDUCTORS</b>                      | Is the panel builder's responsibility.                             |
| <b>10.9.2 POWER-FREQUENCY ELECTRIC STRENGTH</b>                      | Is the panel builder's responsibility.                             |
| <b>10.9.3 IMPULSE WITHSTAND VOLTAGE</b>                              | Is the panel builder's responsibility.                             |
| <b>10.9.4 TESTING OF ENCLOSURES MADE OF INSULATING MATERIAL</b>      | Is the panel builder's responsibility.                             |
| <b>EQUIPMENT HEAT DISSIPATION, CURRENT-DEPENDENT PVID</b>            | 25 W                                                               |
| <b>HEAT DISSIPATION CAPACITY PDISS</b>                               | 0 W                                                                |
| <b>HEAT DISSIPATION PER POLE, CURRENT-DEPENDENT PVID</b>             | 0 W                                                                |
| <b>RATED OPERATIONAL CURRENT FOR SPECIFIED HEAT DISSIPATION (IN)</b> | 37 A                                                               |
| <b>STATIC HEAT DISSIPATION, NON-CURRENT-DEPENDENT PVS</b>            | 25 W                                                               |

## General information

|                                               |                                                                                                                                    |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>CLASS</b>                                  | Adjustable                                                                                                                         |
| <b>CONNECTION TO SMARTWIRE-DT</b>             | No                                                                                                                                 |
| <b>DEGREE OF PROTECTION</b>                   | IP00<br>NEMA Other                                                                                                                 |
| <b>FRAME SIZE</b>                             | N                                                                                                                                  |
| <b>MAINS VOLTAGE - MAX</b>                    | 600 V                                                                                                                              |
| <b>MAINS VOLTAGE - MIN</b>                    | 200 V                                                                                                                              |
| <b>MOUNTING POSITION</b>                      | As required                                                                                                                        |
| <b>OVERVOLTAGE CATEGORY</b>                   | II                                                                                                                                 |
| <b>POLLUTION DEGREE</b>                       | 3                                                                                                                                  |
| <b>RADIO INTERFERENCE CLASS</b>               | Class A (EN 55011)                                                                                                                 |
| <b>RATED IMPULSE WITHSTAND VOLTAGE (UIMP)</b> | 4000 V                                                                                                                             |
| <b>RATED INSULATION VOLTAGE (UI)</b>          | 660 V                                                                                                                              |
| <b>SHOCK RESISTANCE</b>                       | 15 g, Mechanical                                                                                                                   |
| <b>STARTUP CLASS</b>                          | CLASS 20 (heavy starting duty $3 \times I_e$ for 45 s)<br>CLASS 10 (star-delta replacement)<br>CLASS 30 ( $6 \times I_e$ for 30 s) |
| <b>SUITABLE FOR</b>                           | Branch circuits, not as BCPD, (UL/CSA)                                                                                             |
| <b>TYPE</b>                                   | Soft starter for three-phase loads, with control unit and pump algorithm                                                           |
| <b>VOLTAGE TYPE</b>                           | DC                                                                                                                                 |

## Input/Output

|                                                |                                                                  |
|------------------------------------------------|------------------------------------------------------------------|
| <b>INPUT CURRENT</b>                           | 4 - 20 mA (Analog inputs)                                        |
| <b>NUMBER OF INPUTS</b>                        | 1 (current input)                                                |
| <b>NUMBER OF OUTPUTS</b>                       | 2 Relay Outputs (programmable)                                   |
| <b>OUTPUT VOLTAGE</b>                          | 120 V AC/DC (relay outputs)                                      |
| <b>PROTECTION</b>                              | Finger and back-of-hand proof, Protection against direct contact |
| <b>RATED CONTROL VOLTAGE (UC)</b>              | 24 V DC<br>24 V DC (-10 %/+10 %)                                 |
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-11</b> | 3 A                                                              |

## Main conducting paths

|                                                          |                                                         |
|----------------------------------------------------------|---------------------------------------------------------|
| <b>OVERLOAD CYCLE</b>                                    | AC-53a: 4.0 - 32: 99 - 3                                |
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-53</b>           | 37 A                                                    |
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-53, IN-DELTA</b> | 65 A                                                    |
| <b>RATED OPERATIONAL VOLTAGE (UE) - MAX</b>              | 600 V                                                   |
| <b>RATED OPERATIONAL VOLTAGE (UE) - MIN</b>              | 200 V                                                   |
| <b>SHORT-CIRCUIT PROTECTION RATING</b>                   | NZMN1-S40, Type "1" coordination, Main conducting paths |
| <b>SUPPLY FREQUENCY</b>                                  | 50/60 Hz, fLN, Main circuit                             |
| <b>VOLTAGE RATING - MAX</b>                              | 600 V                                                   |

## Motor rating

|                                                             |         |
|-------------------------------------------------------------|---------|
| <b>ASSIGNED MOTOR POWER AT 200/208 V, 60 HZ, 3-PHASE</b>    | 10 HP   |
| <b>ASSIGNED MOTOR POWER AT 220/230 V, 60 HZ, 3-PHASE</b>    | 10 HP   |
| <b>ASSIGNED MOTOR POWER AT 460/480 V, 60 HZ, 3-PHASE</b>    | 25 HP   |
| <b>ASSIGNED MOTOR POWER AT 600 V, 60 HZ, 3-PHASE</b>        | 30 HP   |
| <b>ASSIGNED MOTOR POWER IN-DELTA AT 220/230 V, 60 HZ</b>    | 20 HP   |
| <b>ASSIGNED MOTOR POWER IN-DELTA AT 460/480 V, 60 HZ</b>    | 50 HP   |
| <b>ASSIGNED MOTOR POWER IN-DELTA AT 575/600 V, 60 HZ</b>    | 60 HP   |
| <b>RATED OPERATIONAL POWER AT 220/230 V, 50 HZ</b>          | 7.5 kW  |
| <b>RATED OPERATIONAL POWER AT 400 V, 50 HZ</b>              | 18.5 kW |
| <b>RATED OPERATIONAL POWER AT 500 V, 50 HZ</b>              | 22 kW   |
| <b>RATED OPERATIONAL POWER IN-DELTA AT 220/230 V, 50 HZ</b> | 18.5 kW |
| <b>RATED OPERATIONAL POWER IN-DELTA AT 400 V, 50 HZ</b>     | 30 kW   |
| <b>RATED OPERATIONAL POWER IN-DELTA AT 500 V, 50 HZ</b>     | 45 kW   |

## Soft start function

### APPLICATION

- 3-phase motors: Yes
- Soft starting of three-phase asynchronous motors

### DELAY TIME

0 - 120 s, Soft start function, Ramp times

### KICKSTART

100% (Kickstart voltage)  
Max. 2000 ms (Kickstart Duration)

### RAMP/RUN-UP TIME

360 s

### START VOLTAGE

Max. 85 %, Soft start function, Start voltage = turn-off voltage

## Terminal capacities

### SCREWDRIVER SIZE

1.5 x 6 mm, Terminal screw, Main cables  
0.6 x 3.5 mm, Terminal screws, Control circuit cables

### TERMINAL CAPACITY (FLEXIBLE WITH FERRULE)

2 x (1 - 2.5) mm<sup>2</sup>, Control circuit cables  
1 x (2.5 - 35) mm<sup>2</sup>, Main cables  
1 x (2.5 - 4) mm<sup>2</sup>, Control circuit cables

### TERMINAL CAPACITY (SOLID)

2 x (1 - 2.5) mm<sup>2</sup>, Control circuit cables  
1 x (2.5 - 35) mm<sup>2</sup>, Main cables  
1 x (2.5 - 4) mm<sup>2</sup>, Control circuit cables

### TERMINAL CAPACITY (SOLID/STRANDED AWG)

2 x (14 - 12), Control circuit cables  
1 x (14 - 2), Main cables

### TERMINAL CAPACITY (STRANDED)

2 x (1 - 2.5) mm<sup>2</sup>, Control circuit cables  
1 x (2.5 - 35) mm<sup>2</sup>, Main cables  
1 x (2.5 - 4) mm<sup>2</sup>, Control circuit cables

### TIGHTENING TORQUE

5 Nm ( $\leq$  25 mm<sup>2</sup>)  
4 Nm ( $\leq$  6 mm<sup>2</sup>)  
0.4 Nm, Screw terminals, Control circuit cables  
4.5 Nm ( $\leq$  10 mm<sup>2</sup>)  
5.6 Nm ( $>$  25 mm<sup>2</sup>)

## Resources

|                            |                                                                                                                                                                    |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| APPLICATION NOTES          | <a href="#">eaton-softstarter-s801-to-s811-ap039013-en-us.pdf</a>                                                                                                  |
| BROCHURES                  | <a href="#">eaton-softstarter-s811-ds7-brochure-br039001en-en-us.pdf</a>                                                                                           |
| CATALOGUES                 | <a href="#">eaton-drives-soft-starter-catalog-ca04020001zen-us.pdf</a>                                                                                             |
| DECLARATIONS OF CONFORMITY | <a href="#">eaton-soft-starter-declaration-of-conformity-eu260065en.pdf</a>                                                                                        |
| DRAWINGS                   | <a href="#">eaton-semiconductor-contactors-s811-soft-starter-dimensions.eps</a><br><a href="#">eaton-semiconductor-contactors-s811-soft-starter-3d-drawing.eps</a> |
| ECAD MODEL                 | <a href="#">DA-CE-ETN.S811_N37P3S</a>                                                                                                                              |
| INSTALLATION INSTRUCTIONS  | <a href="#">s801+-soft-starter-frame-n-IL03901020E.pdf</a>                                                                                                         |
| MCAD MODEL                 | <a href="#">DA-CS-s811_n</a><br><a href="#">eaton-low-voltage-soft-starters-mcad-drawings-s811-n.dwg</a>                                                           |

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**PROJECT NAME:**

**PROJECT NUMBER:**

**PREPARED BY:**

**DATE:**

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**Eaton Corporation plc** Eaton House  
30 Pembroke Road  
Dublin 4, Ireland  
Eaton.com

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