# DATASHEET - SPX250A1-5A4N1

Variable frequency drive, 600 V AC, 3-phase, 250 kW, IP21, Radio interference suppression filter, OLED display, FR10

| | |
|---|---|
| Part no. | SPX250A1-5A4N1 |
| Catalog No. | 125407 |
| Alternate Catalog No. | SPX250A1-5A4N1 |
| EL-Nummer (Norway) | 4100154 |

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## Delivery program

| | | | |
|---|---|---|---|
| Product range | | | Variable frequency drives |
| Part group reference (e.g. DIL) | | | SPX |
| Rated operational voltage | $U_e$ | | 600 V AC, 3-phase<br>690 V AC, 3-phase |
| Output voltage with $V_e$ | $U_2$ | | 600 V AC, 3-phase<br>690 V AC, 3-phase |
| Mains voltage (50/60Hz) | $U_{LN}$ | V | 525 (-15%) - 690 (±10%) |
| **Rated operational current** | | | |
| At 150% overload | $I_e$ | A | 261 |
| At 110% overload | $I_e$ | A | 325 |
| **Assigned motor rating** | | | |
| Note | | | For AC motors with internal and external ventilation with 50 Hz / 60 Hz |
| Note | | | Overload cycle for 60 s every 600 s |
| Note | | | at 690 V, 50 Hz |
| 150 % Overload | P | kW | 250 |
| 110 % Overload | P | kW | 315 |
| 150 % Overload | $I_M$ | A | 253 |
| 110 % Overload | $I_M$ | A | 316 |
| Note | | | at 690 V, 60 Hz |
| 150 % Overload | P | HP | 250 |
| 110 % Overload | P | HP | 300 |
| 150 % Overload | $I_M$ | A | 211 |
| 110 % Overload | $I_M$ | A | 251 |
| Degree of Protection | | | IP21 |
| Fieldbus connection (optional) | | | PROFIBUS-DP<br>PROFINET<br>EtherCAT<br>EtherNet/IP<br>LonWorks<br>CANopen®<br>DeviceNet<br>Modbus-TCP<br>Modbus-RTU<br>BACnet MS/TP |
| Fitted with | | | Radio interference suppression filter<br>OLED display |
| Frame size | | | FR10 |
| Connection to SmartWire-DT | | | no |

## Technical data

### General

| | | | |
|---|---|---|---|
| Standards | | | Specification for general requirements: IEC/EN 61800-2<br>EMC requirements: IEC/EN 61800-3<br>Safety requirements: IEC/EN 61800-5-1 |
| Certifications | | | CE, UL, cUL, RCM |
| Approvals | | | DNV |
| Production quality | | | RoHS, ISO 9001 |

| | | | |
|---|---|---|---|
| Climatic proofing | $\rho_w$ | % | < 95% relative humidity, no condensation, no corrosion, no dripping water |
| Ambient temperature | | | |
|     Operating ambient temperature min. | | °C | -10 |
|     Operating ambient temperature max. | | °C | + 50 |
|     operation (110 % overload) | $\vartheta$ | °C | -10 - +40 |
|     Storage | $\vartheta$ | °C | -40 - +70 |
| Radio interference level | | | |
|     Radio interference class (EMC) | | | C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary. |
|     Environment (EMC) | | | 1st and 2nd environments as per EN 61800-3 |
| Mounting position | | | Vertical |
| Altitude | | m | 0 - 1000 m above sea level<br>above 1000 m with 1 % performance reduction per 100 m<br>max. 3000 m |
| Degree of Protection | | | IP21 |
| Protection against direct contact | | | BGV A3 (VBG4, finger- and back-of-hand proof) |

## Main circuit

| | | | |
|---|---|---|---|
| Supply | | | |
|     Rated operational voltage | $U_e$ | | 600 V AC, 3-phase<br>690 V AC, 3-phase |
|     Mains voltage (50/60Hz) | $U_{LN}$ | V | 525 (-15%) - 690 (±10%) |
|     System configuration | | | AC supply systems with earthed center point |
|     Supply frequency | $f_{LN}$ | Hz | 50/60 |
|     Frequency range | $f_{LN}$ | Hz | 45–66 (± 0%) |
| Power section | | | |
|     Function | | | Variable frequency drive with internal DC link and IGBT inverter |
|     Output voltage with $V_e$ | $U_2$ | | 600 V AC, 3-phase<br>690 V AC, 3-phase |
|     Output Frequency | $f_2$ | Hz | 0 - 50/60 (max. 320) |
|     Switching frequency | $f_{PWM}$ | kHz | 1.5<br>adjustable 1 - 6 |
|     Operation Mode | | | U/f control<br>sensorless vector control (SLV)<br>optional: Vector control with feedback (CLV) |
|     Frequency resolution (setpoint value) | $\Delta f$ | Hz | 0.01 |
|     Rated operational current | | | |
|         At 150% overload | $I_e$ | A | 261 |
|         At 110% overload | $I_e$ | A | 325 |
|     Fitted with | | | Radio interference suppression filter<br>OLED display |
|     Frame size | | | FR10 |
| Motor feeder | | | |
|     Note | | | For AC motors with internal and external ventilation with 50 Hz / 60 Hz |
|     Note | | | Overload cycle for 60 s every 600 s |
|     Note | | | at 690 V, 50 Hz |
|     150 % Overload | P | kW | 250 |
|     110 % Overload | P | kW | 315 |
|     Note | | | at 690 V, 60 Hz |
|     150 % Overload | P | HP | 250 |
|     110 % Overload | P | HP | 300 |

## Control section

| | | | |
|---|---|---|---|
| External control voltage | $U_c$ | V | 24 V DC (max. 250 mA) |
| Reference voltage | $U_s$ | V | 10 V DC (max. 10 mA) |
| Analog inputs | | | 2, parameterizable, 0 - 10 V DC, 0/4 - 20 mA |
| Analog outputs | | | 1, parameterizable, 0/4 - 20 mA |
| Digital inputs | | | 6, parameterizable, max. 30 V DC |
| Digital outputs | | | 1, parameterizable, 48 V DC/50 mA |
| Relay outputs | | | 2, parameterizable, N/O, 8 A (24 V DC) / 8 A (250 V AC) / 0,4 A (125 V DC) |

## Assigned switching and protective elements

| Motor feeder | | | |
|---|---|---|---|
| motor choke | | | |
| 150 % overload (CT/$I_H$, at 50 °C) | | | DX-LM3-260 |
| 110 % overload (VT/$I_L$, at 40 °C) | | | DX-LM3-450 |
| Sine filter | | | |
| 150 % overload (CT/$I_H$, at 50 °C) | | | SIN-0390-6-0-P |
| 110 % overload (VT/$I_L$, at 40 °C) | | | SIN-0390-6-0-P |

## Design verification as per IEC/EN 61439

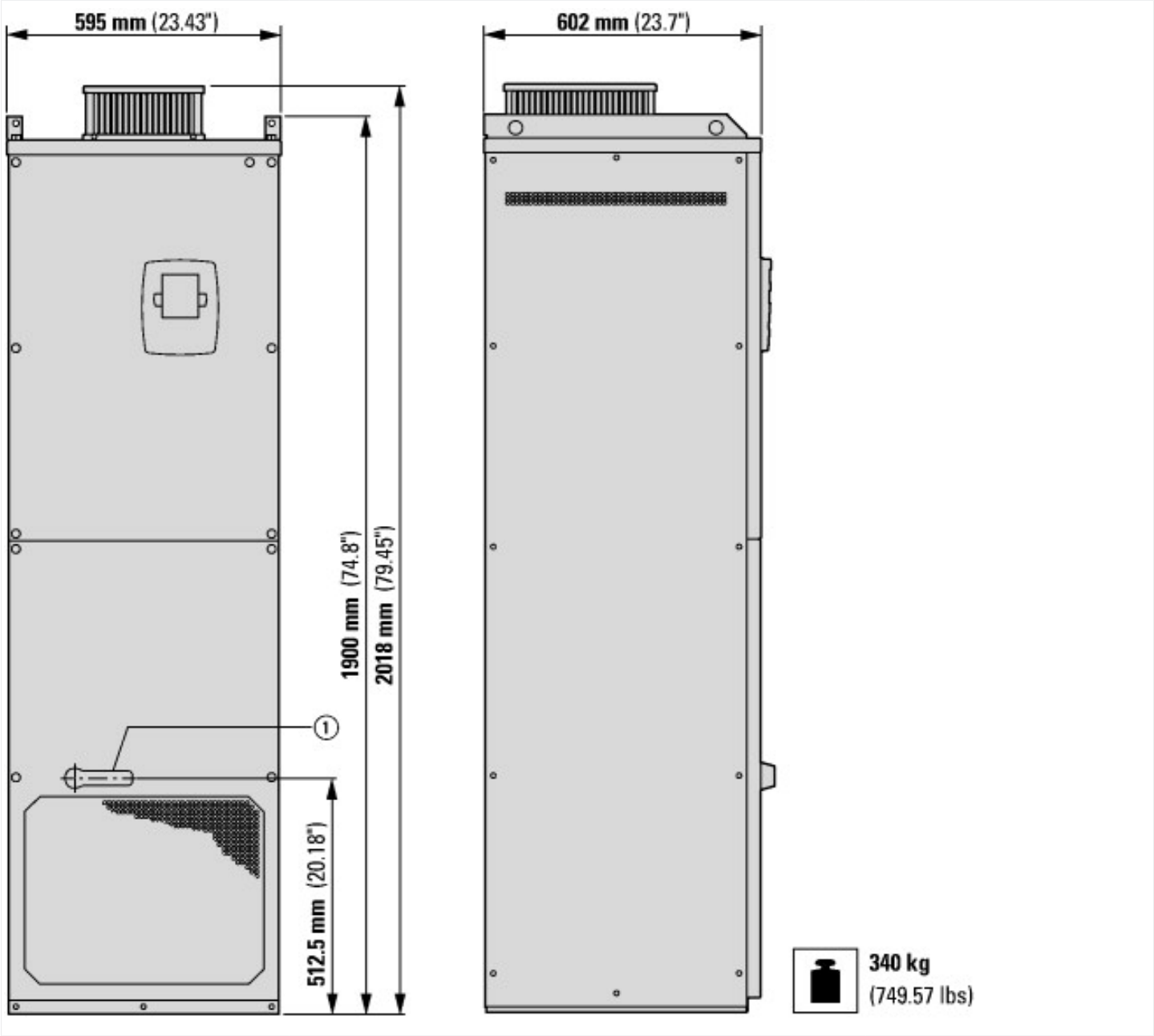| Technical data for design verification | | | |
|---|---|---|---|
| Rated operational current for specified heat dissipation | $I_n$ | A | 261 |
| Heat dissipation per pole, current-dependent | $P_{vid}$ | W | 0 |
| Equipment heat dissipation, current-dependent | $P_{vid}$ | W | 6250 |
| Static heat dissipation, non-current-dependent | $P_{vs}$ | W | 0 |
| Heat dissipation capacity | $P_{diss}$ | W | 0 |
| Operating ambient temperature min. | | °C | -10 |
| Operating ambient temperature max. | | °C | 50 |
| | | | Operation (with 150 % overload) |
| 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) / Frequency converter =< 1 kV (EC001857) | | | |
|---|---|---|---|
| Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kV (ecl@ss10.0.1-27-02-31-01 [AKE177014]) | | | |
| Mains voltage | | V | 525 - 690 |
| Mains frequency | | | 50/60 Hz |
| Number of phases input | | | 3 |
| Number of phases output | | | 3 |
| Max. output frequency | | Hz | 320 |

| | | | |
|---|---|---|---|
| Max. output voltage | | V | 690 |
| Nominal output current I2N | | A | 325 |
| Max. output at quadratic load at rated output voltage | | kW | 315 |
| Max. output at linear load at rated output voltage | | kW | 250 |
| Relative symmetric net frequency tolerance | | % | 10 |
| Relative symmetric net voltage tolerance | | % | 10 |
| Number of analogue outputs | | | 1 |
| Number of analogue inputs | | | 2 |
| Number of digital outputs | | | 1 |
| Number of digital inputs | | | 6 |
| With control unit | | | Yes |
| Application in industrial area permitted | | | Yes |
| Application in domestic- and commercial area permitted | | | Yes |
| Supporting protocol for TCP/IP | | | Yes |
| Supporting protocol for PROFIBUS | | | Yes |
| Supporting protocol for CAN | | | Yes |
| Supporting protocol for INTERBUS | | | No |
| Supporting protocol for ASI | | | No |
| Supporting protocol for KNX | | | No |
| Supporting protocol for MODBUS | | | No |
| Supporting protocol for Data-Highway | | | Yes |
| Supporting protocol for DeviceNet | | | Yes |
| Supporting protocol for SUCONET | | | No |
| Supporting protocol for LON | | | Yes |
| 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 BACnet | | | No |
| Supporting protocol for other bus systems | | | Yes |
| Number of HW-interfaces industrial Ethernet | | | 0 |
| Number of interfaces PROFINET | | | 0 |
| Number of HW-interfaces RS-232 | | | 0 |
| Number of HW-interfaces RS-422 | | | 0 |
| Number of HW-interfaces RS-485 | | | 1 |
| Number of HW-interfaces serial TTY | | | 0 |
| Number of HW-interfaces USB | | | 0 |
| Number of HW-interfaces parallel | | | 0 |
| Number of HW-interfaces other | | | 1 |
| With optical interface | | | No |
| With PC connection | | | Yes |
| Integrated breaking resistance | | | No |
| 4-quadrant operation possible | | | Yes |
| Type of converter | | | U converter |
| Degree of protection (IP) | | | IP21 |
| Degree of protection (NEMA) | | | 1 |
| Height | | mm | 2020 |
| Width | | mm | 595 |
| Depth | | mm | 602 |

## Approvals

| | |
|---|---|
| Product Standards | UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking |
| UL File No. | E134360 |
| UL Category Control No. | NMMS, NMMS2, NMMS7. NMMS8 |
| CSA File No. | UL report applies to both US and Canada |
| CSA Class No. | 3211-06 |
| North America Certification | UL listed, certified by UL for use in Canada |
| Specially designed for North America | No |
| Suitable for | Branch circuits |
| Max. Voltage Rating | 3~ 690 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey) |
| Degree of Protection | IEC: IP21 |

## Dimensions



595 mm (23.43")
602 mm (23.7")
1900 mm (74.8")
2018 mm (79.45")
512.5 mm (20.18")
① 
340 kg
(749.57 lbs)

## Assets (links)

**Declaration of CE Conformity**
00002807

**Instruction Leaflets**
IL04020008Z2018_05

## Additional product information (links)

**IL04020008Z Frequency inverter 9000X**

| | |
|---|---|
| IL04020008Z Frequency inverter 9000X | ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL04020008Z2018_05.pdf |
| Documentation | http://www.eaton.eu/Europe/Electrical/ProductsServices/AutomationControl/SwitchingProtectingDrivingMotors/9000X/SPX9000/index.htm#tabs-4 |