



IECEx Certificate of Conformity – Annex



Certificate No.: IECEx ICS 15.0026X **Issue:** 0 **Date:** 2016-05-27
Electrical Apparatus: Safety and Control System SCS-400

1. EQUIPMENT

The SCS400 is installed on a vehicle that enters the hazardous area.

The SCS-400 has an aluminium enclosure with approximate dimensions of 347mm x 226mm x 91mm. It has an external cover and an internal flameproof (FLP-100) cover. Therefore, the enclosure comprises two chambers / enclosures.

- The flameproof (FLP-100) chamber with the flameproof cover and cable entries into this chamber are part of the flameproof concept. The cover has a separate label (FLP-100) to make clear that it is a flameproof enclosure.
The flameproof enclosure (chamber) contains electronics including the associated apparatus circuits for the external intrinsic safety circuits. The associated apparatus connects to the electronics in the non-flameproof chamber, as well as external intrinsic safety equipment, e.g. sensors.
- The following cable entries are provided for in the enclosure:
 - Four threaded entries (M20 x 1.5 – 6H) are provided on the one side in the external wall of the flameproof (FLP-100) enclosure, as well as three threaded entries (M20 x 1.5) into the intrinsically safe chamber.
 - In the opposite external wall an optional M16 x 1.5 – 6H threaded entry is provided in the flameproof (FLP-100) enclosure. The B-ANT-EXD bushing with hard wired ANT-GSM antenna is located in this entry.
 - An M16 x 1.5 – 6H threaded entry is provided in an extrusion of the internal cast flameproof (FLP-100) cover.
- Some intrinsically safe circuits exit the flameproof enclosure via internal tracks in a PCB, which is sandwiched in the flange flamepath of the flameproof (FLP-100) enclosure, between the base and the cover. The PCB has copper layers forming the flange flamepath on both sides of the PCB. The cover is secured with sixteen M6 x 1.0 x 25mm – grade 12.9 SHCS (socket head cap screw). Washers are fitted to the fastener up to 3.1mm thick maximum.
- The external cover covers all the internal electronics (outside the flameproof compartment), as well as the flameproof (FLP-100) cover.
 - A BBU-500 battery pack is attached to the flameproof enclosure cover. The battery is fully encapsulated and connected via a flying lead and a flameproof bushing B-BAT-EXD to a charging circuit inside the flameproof enclosure. The battery is used as follows:
 - When power is applied to the SCS400, the charging of the battery is managed by the charging electronics inside the flameproof enclosure. The BBU-500 is charged in a safe area only.
 - When power to the SCS400 is removed, the BBU-500 battery provides power to the electronics.
 - The electronics outside the flameproof enclosure is powered from the associated apparatus circuits in the flameproof enclosure and allows for connection to external intrinsic safety equipment, e.g. sensors.
 - The external cover is fitted with an optional i-button reader (with o-ring), an o-ring, two polycarbonate windows with gaskets and a keypad with a gasket in the cover. Two LCD displays are visible through the two windows. The cover is secured with four M6 fastener.

The following safety parameters were allocated.

Power to the non-i.s. electronics in the flameproof enclosure:

Um = 35Vdc

ANT [Ex ib] (824MHz to 1990MHz)

Uo = 3.3V
Io = 2.5A
Po = 45mW
Co = 1.2uF
Lo = 45.5uH

J8 - 5 WIRE INTERFACE [Ex ia]

Uo = 11.76V
Io = 235mA
Po = 0.69W
Co = 10uF
Lo = 5.1mH



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Lo/Ro = 412uH/Ω

J9 – CANBUS [Ex ia]

Uo = 8V
Io = 3.119A
Po = 4.254W
Co = 982.5uF
Lo = 29.2uH
Lo/Ro = 45.6uH/Ω

J12 - 2 WIRE INTERFACE [Ex ia]

Uo = 11.76V
Io = 84.2mA
Po = 0.247W
Co = 10uF
Lo = 40mH
Lo/Ro = 1.14mH/Ω

J11 - PROXY INTERFACE [Ex ia]

Uo = 5.88V
Io = 12.38mA
Po = 18.2mW
Co = 600uF
Lo = 460mH
Lo/Ro = 15mH/Ω

J10 – OUTPUT (pin 1 w.r.t 2) INTERFACE [Ex ia]

Uo = 13.65V
Io = 2.934A
Po = 1.77W
Co = 18uF (Allocated to J10 Output.)
Lo = 33uH
Lo/Ro = 28.4uH/Ω

J10 – INPUT (pin 3 w.r.t 4) INTERFACE [Ex ia]

Uo = 5.88V
Io = 1.88mA
Po = 2.8mW
Co = 300uF
Lo = 1H
Lo/Ro = 103mH/Ω

JJ8 – DALLAS TAG INTERFACE [Ex ia]

Uo = 5.88V
Io = 248.4mA
Po = 0.86W
Co = 60uF
Lo = 2mH
Lo/Ro = 1.9mH/Ω

J7 - GPI INTERFACE [Ex ia]

Ui = 13V
Ii = 250mA



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Pi = 0.7W
Ci = 360nF
Li = 0

Where safety parameters are not allocated it was not required to be limited for intrinsic safety.

The above load parameters apply where;

- The external circuit contains no combined lumped inductance (L_i) or lumped capacitance (C_i) greater than 1% of the above values. OR
- The external circuit contains either only lumped inductance (L_i) or lumped capacitance (C_i) in combination with a cable. OR
- The inductance and capacitance are distributed as in a cable.

In all other situations e.g. the external circuit contains combined lumped inductance and capacitance, up to 50% of each of the inductance and capacitance values are allowed.

2. CONDITIONS OF CERTIFICATION

Conditions of manufacture:

- A routine overpressure test is not required based on the equipment passing a 4 times overpressure test as per IEC 60079-1.

Special conditions of use:

The following special conditions of use are applicable

- The BBU-500 inside the SCS-400 enclosure may only be charged in the safe area.
- The circuit ground and local earth is electrically in contact with each other, which must be considered during installation. (Therefore, the 500Vrms isolation is not maintained.)
- When connecting intrinsically safe equipment to the barrier device where the transient current for the rating of internal components are required to be considered the principles of ExTAG DS 2006/008 (December 2006) with capacitance 100pF ($\pm 20\%$) for a single series capacitor and the applicable U_m value must be used.
- The bushing material may not be subjected to direct UV exposure or mechanisms of generating static electricity.
- The B-ANT-EXD shall be installed as to not be subjected to any mechanical stress on the cable.
- The system approval of peripheral devices is not part of the certification.
- Only suitably certified glands / blanking elements, with additional rating of at least IP54 may be utilised on the equipment. All unused entries must be blanked.
- Some flamepaths are more restrictive than the minimum requirements in the standard. Information w.r.t. the flamepaths must be obtained from the manufacturer as required.