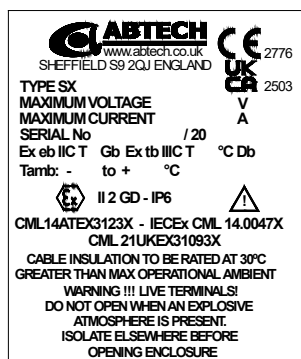


Installation, Operation & Maintenance Instructions For Abtech 'SX' Range Busbar Connection Boxes to CML 21UKEX31093X, CML 14ATEX3123X and IECEx CML 14.0047X



Marking

The marking shown is for an apparatus certified SX busbar box.

The ambient temperature range for which this product is suitable is marked on the label and identified by

T_{amb} °C

The 'T' rating is variable depending on ambient temperature range and maximum current. This rating must be equal to or better than the 'T' rating assigned to the hazardous area in which it is installed.

Additional or alternative marking may be present relating to the connection of optical fibres.

Where the marking includes Ex op is the optical signal strength must not exceed the following maximums:

- For a box marked T6 the maximum optical signal strength is 15mW.
- For a box marked T4 the maximum optical signal strength is 35mW.
- For marking including Ex op pr the maximum optical signal strength is 100mW and the ambient temperature range is limited from -40°C to +60°C.

The marking 'op is' or 'op pr' will be preceded by 'eb'.

Enclosures with windows are limited to a maximum operating temperature of +80°C (i.e. rated T6 only) and a minimum ambient temperature of -40°C.

The gas group IIC marking may be replaced by IIB marking. When marked IIC the maximum coating thickness is 200 microns. When marked IIB the maximum coating thickness is 2.0mm. If the coating is conductive these thickness limitations do not apply.

Note: The symbol  is not always present. When it is present the installer must take particular note of these instructions.

Special condition of safe use

When the protection concept Ex op is is included The optical signal source supplying the fibre in this equipment shall be suitably certified as compliant with EN60079-28:2006 or later and provide an inherently safe optical source (op is), EPL Gb, subsequently following the parameters listed below:

T6 & T85°C (Ta = +65°C max.)

The 'op is' is used with or without terminals.

The optical source maximum signal strength is limited to 15mW and a maximum irradiance of 5mW/mm² (surface area not exceeding 400mm²).

T4 & T135°C (Ta = +80°C max.)

The 'op is' is used without terminals.

The optical source maximum signal strength is limited to 35mW and a maximum irradiance of 5mW/mm² (surface area not exceeding 400mm²).

When the protection concept Ex op pr is included the only permitted connection method is a fused connection secured in an Ex op pr certified cassette to prevent damage. The recommended connection facility is the ABTECH type FJC Optical Fibre Cassette covered by certificates IECEx CML 17.0020U and CML 17ATEX9035U. reference must be made to document ABTQ-240 for instructions covering their installation, operation and maintenance.

The marked minimum ambient temperature may be extended below -50°C to match the minimum operating temperature detailed on the 'Ex' certificate for the terminals installed. The minimum permitted for the enclosure is -65°C

WARNING!

If the marking is extended below -60°C, no work may be performed on the junction box until the ambient temperature is at least -60°C.

NOTE

All cable, cable entry devices and terminals used must be suitable for the minimum ambient temperature expected and the maximum operational temperature expected. Cable insulation must be suitable for +30°C greater than the maximum operational ambient.

All cable glands must be Ex e or Ex d certified and rated IP66 as a minimum to provide adequate resistance against cable pulling and adequate protection against the ingress of dust.

Installation

- 1) Using the mounting dimensions data provided, either in the product catalogue data sheets or on the drawings supplied (as part of the project documentation) mark out the positions for the mounting holes on the surface where installation is required.
- 2) Drill the mounting holes for M10 fixing studs, unless detailed otherwise by the purchase order specification.
- 3) Insert the top two studs leaving 8 to 10mm protruding and lift the enclosure into position, using such assistance as may be necessary to avoid injury, and hang the top fixing brackets of the box onto the studs.

NOTE: If the weight of the box at this point of the installation process exceeds 18kg assistance must be sought.

Ensuring that the box is secure, insert and tighten the bottom two studs. Now complete tightening the top two studs.

- 4) If the gland plate is undrilled detach it and remove to a machine shop for cable entry provision. Replace using the original gaskets and fixings, secured to a torque of 2.5Nm to 3.5Nm.
- 5) Install and secure the cable glands in accordance with the manufacturer's instructions.
- 6) Pull the cables into the box leaving trailing leads sufficient to reach the top of the appropriate busbar and secure any cable armour in accordance with site practice.
- 7) Ensure that all cable glands are tightened in accordance with the manufacturer's instructions prior to any further work being carried out. This will prevent cable weight external to the box from transferring to the busbar supports.
- 8) Where slotted trunking has been supplied (solid trunking is not permitted) for the protection of optical fibres, ensure that it is suitable for the proposed T classification of the final certified product. Where the T6 is the proposed rating and no windows are fitted any polymeric or metallic slotted trunking may be used. For other T classifications and where a window is fitted metallic slotted trunking must be used. Trunking may be mounted in any orientation in the box, vertically, horizontally or diagonally.
- 9) Trunking must not be used for laying or securing electrical cables inside the enclosure.
- 10) Cable crimp lugs must be secured to the cable conductors using crimping equipment manufactured or recommended by the crimp lug manufacturer to ensure that the crimped connection meets the requirements of BS EN 61238-1.
- 11) The bus bar is threaded for crimp lug securing machine screws selected from the table in point 12 below as specified on the purchase order. A two-spanner method (one of which is a calibrated torque wrench) must be used for securing the crimp lugs to a) prevent the machine screw from rotating whilst the nut is tightened and b) prevent undue torque being applied to the busbar threads. *(If the thread is stripped in a busbar ABTECH recommend replacement, though certification will not necessarily be void).*
- 12) The spanner must be used behind the busbar to prevent the machine screw from rotating. The torque wrench must be used to secure the nut to the appropriate torque detailed in the following table:

Crimp lug / Busbar machine screw size	Brass		A4.70 S/S		A4.80 S/S	
	Tightening Torque (Nm)		Tightening Torque (Nm)		Tightening Torque (Nm)	
	Lubricated	Dry	Lubricated	Dry	Lubricated	Dry
M8	8.5 to 9.5	11.5 to 12.5	17.5 to 19.5	23.5 to 25.5	23 to 26	31 to 34
M10	17.5 to 19.5	23 to 25	34.5 to 39.5	46 to 51	46 to 53	61 to 68
M12	30 to 34	40 to 43	59.5 to 67.5	79 to 87	79 to 90	105 to 116
M16	79 to 83	98 to 108	145 to 166.5	195 to 216	193 to 222	260 to 288
M20	142 to 162	191 to 210	283 to 324.5	382.5 to 420	377 to 433	510 to 560

- 13) If installed with Brass machine screws and nuts, a light coating of carbon conductive silicone grease should be applied to all fastener mating surfaces to minimise frictional torque losses. The torque setting in the left-hand column are then appropriate.

NOTE: Lubricant must not be applied to the mating surface between the busbar and the cable crimp lug. If any lubricant is accidentally applied to those surfaces they must be wiped clean.

- 14) If the installer selects A4-70 or A4-80 for the machine screw material the aforementioned lubricant is essential. Note that galling may be an issue if the nut material is also A4.
- 15) Where the conductor sizes are 35mm² or smaller the busbar will be pre-drilled for crimp lug anti-rotation machine screws. The machine screws are provided.
- 16) For 35mm² and 25mm² crimp lugs the anti-rotation screws must use the M4 pre-drilled locations, with machine screws tightened to between 0.9Nm and 1.0 Nm.
- 17) For smaller crimp lug sizes either the M3 pre-drilled locations, with machine screws tightened to between 0.5Nm and 0.6Nm, or the M4 pre-drilled locations may be used, (see point 12, above).
- 18) Anti-rotation facilities are not required for cables with conductors larger than 35mm².

Connection of optical fibres (where applicable)

- 19) Optical fibres carrying op is signals may be joined using bulkhead connectors and/or fused joints installed in cassettes. Optical fibres carrying signals which do not meet the op is limitations must be joined by fusing and the fused joints then secured in the Ex op pr certified cassette. The attention of the installer is drawn to the installation, operation and maintenance instructions provided by the manufacturer of the Ex op pr certified fibre cassette. When such a cassette is provided by ABTECH a copy of the relevant instructions ABTQ-240 will append, and form part of, this document.
- 20) Secure the lid by closing the lid and tightening the lid fixing screws and ensure that all gland plate securing screws are tightened.
- 21) For additional security a padlock may be fitted.

NOTE: Changes in type or quantity of the supplied internal components may invalidate the certification of the enclosure. Advice from ABTECH is recommended before any changes are made.

Earthing/Grounding

- 22) An internal and external earthing/grounding facility is provided. This must be connected to the appropriate earth bonding circuit before electrical power is connected to the contents of the enclosure.
- 23) An earth connection between the lid and the box is provided. Care must be taken to ensure this is not damaged during installation or maintenance.

Operation

- 24) The lid must be secured using all the lid screws provided to maintain the IP rating.
- 25) No attempt must be made to remove the enclosure lid whilst electrical power is connected to the contents of the enclosure.
- 26) The earthing/grounding facility must be connected to the earth bonding circuit whenever electrical power is connected to the enclosure.

Maintenance

27) Routine maintenance is likely to be a requirement of local Health and Safety legislation. The laws of the applicable country must be considered and maintenance checks carried out accordingly.

28) Additional checks that are advisable to ensure the efficiency of ABTECH SX range enclosures are:-

Activity		Frequency
1	Check that the lid seal is not damaged and is in place	Each time the enclosure is opened
2	Check that all lid fixing screws are in place and secured	Each time the enclosure is opened
3	Check that all gland plate fixing screws are in place and secured	Each time the enclosure is opened
4	Check that the lid earth strap is not frayed or damaged and is secure at both ends	Each time the enclosure is opened
5	Check lid and gland plate earth strap continuity (hot work permit may be required)	Every 3 years
6	Check that the mounting bolts are tight and free of corrosion	Every 3 years
7	Check the security of all cable glands	Every 3 years
8	Check the enclosure for damage	Every 3 years
9	Check that crimp lug securing screws are tight to the torque detailed in point 12 of the installation instructions (above).	Every 3 years
10	Check that busbar insulators and securing screws are tight	Every 3 years
11	When the enclosure contains Ex op pr connections, check that the incoming fibre is not under any tensile stress, that the fibres are not damaged and that no escape of optical radiation can be detected inside the enclosure.	After one year initially, then every 3 years and each time the enclosure is opened.

Chemical Attack

The ABTECH SX range enclosures are available in mild steel or 316 stainless steel. The following additional material are also used :-

Silicone rubber, Copper, Brass, GRP, Carbon conductive silicone grease

If the enclosure is of mild steel it may be zinc plated prior to painting. The standard paint finish is epoxy polyester grey hammer.

Stainless steel enclosures are not painted except to customer specifications.

Consideration should be given to the environment in which these enclosures are to be used to determine the suitability of these materials to withstand any corrosive agents that may be present.

Static Hazard

Unpainted SX range enclosures do not present a hazard from static electricity. If painted, the paint thickness shall be suitable for the gas group marking in accordance with the requirements of IEC 60079-0. Any additional coating applied on site must ensure that the final total paint thickness does not exceed those requirements, unless the coating has a surface resistance of less than 10^6 ohms, i.e. less than one megohm.

Vibration

SX range enclosures are designed for use in areas subject to normal industrial levels of vibration. They are not designed for use in areas subject to intentional or extreme conditions of vibration.

Protection from Foreseeable Faults

Circuits connected in the enclosure must be externally protected using suitable circuit interruption devices to prevent overloading. Provided the enclosure is correctly installed, there should be no foreseeable faults.