Installation Operation & Maintenance Instruction Manual

BLS9200-IS Bilge/ Flood Detection Switch

Specific to Intrinsically Safe Installations under ATEX, IECEx, & UKCA

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Contents

1 Introduction

The Bilge Switch Model BLS 9200 is designed to be installed in ships bilges and tanks, where it is bolted in situ at the required alarm level. This switch is manufactured in corrosion resistant stainless steel fully submersible construction with a hermetically sealed Single Pole Changeover reed switch potted in epoxy.
The switch is actuated by a rise in liquid level to the point that it moves the float past its actuation point.

The switch is also designed with a manual lift test mechanism to be used to check switch operation.

The switch is certified Intrinsically Safe for use in hazardous locations. Where used in such installations, for full compliance the switch must be used in conjunction with a Safety Barrier. Refer to Section 4 of this manual for details.

2 Storage and Environmental Data

The BLS 9200 is a robust construction which is designed to withstand the in-service conditions it will encounter. Where the switch is to be stored prior to installation and use normal precautions must be taken to prevent the unit from mechanical damage and ingress of moisture into the exposed cable end. Warehouse storage without secondary packaging is acceptable provided these precautions are taken and the actual storage conditions are clean and dry and within the temperature range of 0°C to +40°C.

3 Safety and Handling Precautions

The BLS 9200 switch is a lightweight construction weighing less than 1Kg typically (depending upon length of attached cable). No special precautions are necessary in the handling of the switch other than to ensure that it is stored and handled appropriately to ensure that no mechanical damage can occur to either the switch, its attached test handle, and especially to the outer sheathing of the attached cable. Note that the cable is permanently fixed to the switch and no attempt should be made to remote it as this will compromise the integrity of the seals used to ensure full submersibility.

4 ATEX, IECEx & UKCA Certification

For intrinsically safe installations BLS9200 switches in the hazardous area must be connected to the safe area via approved safety barriers. These barriers fall broadly into two categories:

- Zener barriers (based on the shunt diode principle)
- Galvanic isolators

Either type of barrier may be employed subject to it meeting the required safety description. PSM can provide guidance on a range of suitable barriers.

Shunt diode Zener barriers provide a resistor to limit the current flow, a (non-replaceable) fuse to limit power and a Zener diode arrangement to limit voltage levels and provide a safe path to earth. Zener barriers tie the 0v side of the transmitter supply to earth either directly or via a diode arrangement. They must be connected to a high integrity earth to function as intended.

Intrinsically Safe Earth Connections are required to be made but should be made to a separate instrumentation ‘Clean Earth’

There are generally two earthing systems recognised. The so-called 'dirty earth' has all the non- critical data equipment and general equipment attached to it. The 'clean earth' has all the critical data systems attached to it on the basis that less ‘noise’ will be found on this earth

Galvanic Isolators provide full galvanic isolation between safe area and hazardous area circuits with power limiting achieved by using a diode resistor network similar to that of a shunt-diode barrier. They do not require a high integrity earth, each side may be earthed independently overcoming potential issues with earth loops.

For all intrinsically safe installations of the BLS9200 it is essential that the instrument is powered from an isolated power supply. When a zener barrier is employed for power limiting this will effectively tie the sensor supply 0V to earth, meaning a non-isolated power source can lead to issues with any onboard earth fault monitoring system, resulting in unwanted earth current loops and instability / interference caused by any other equipment on the same power supply.

The use of an isolated supply means that there is no direct connection between the 0 volts / I.S. earth at the sensor and the 0 volts at the ships supply.

Barrier selection

When selecting a Barrier the following parameters must be complied with:

Ui = 28Vdc
Ii = 150mA
Pi = 0.8W
Li = 7.32µH (based on the switch having 20 metres of cable)
Ci = 2.5nF (based on the switch having 20 metres of cable)

Conditions of Certification

Non-metallic parts on the exterior of the pressure transmitter may present an electrostatic charging hazard.

Warning – Potential electrostatic charging hazard. Clean only using a damp cloth

Installation requirements

The following standard should be followed when carrying out a hazardous area installation:
60079 Part 14

Strictly no modifications or user repairs are allowed

If any problems occur with the equipment, please contact PSM Instrumentation Ltd. Refer to Section 11 Drawings for full details of labelling.

ATEX & IECEx Dual Certified Label

PSM Instrumentation Ltd
Burrell Road
Haywards Heath
West Sussex
RH16 1TW
www.psmmarine.com

Model Code: ????

S/N: ????
Cable: ????

Date of manufacture: ??/??/????

Connection
1: Common
2: Normally Open
3: Normally Closed

Specification
-10°C≤ Ta ≤ +90°C
Output: SPCO
Rating: 100VA Resistive load

CE (Ex) XXXX

II 1 G Ex ia IIC T5 Ga
Ui = 28Vdc Ii = 150mA
Pi = 0.8W Ci = 2.5nF (for 20m Cable)
Li = 7.32µH (for 20m Cable)

ATEX : ITS-I 24ATEX 4123X BLS9200/I

IECEx ITS 24.0026X BLS9200/X

WARNING: Non-Metallic parts may present electrostatic hazard. Refer to manufacturer instructions.

UKCA Label

PSM Instrumentation Ltd
Burrell Road
Haywards Heath
West Sussex
RH16 1TW
www.psmmarine.com

Model Code: ????

S/N: ????
Cable: ????

Date of manufacture: ??/??/????

Connection
1: Common
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Specification
-10°C≤ Ta ≤ +90°C
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UKCA (Ex) XXXX

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Li = 7.32µH (for 20m Cable)

ITS24UKEX0813X BLS9200/U

WARNING: Non-Metallic parts may present electrostatic hazard. Refer to manufacturer instructions.

5 Installation

The BLS9200 is provided with an integral mounting bracket having 2 holes 9mm diameter on 44 mm centres, refer to the drawings in section 14 of this manual.

The nominal switch actuation point is at a dimension of 50mm below the mounting holes and actuates on a rising level, therefore in tank fixing should be located at a datum of 50mm above the desired alarm actuation point.

The mounting arrangement should be rigid and not liable to vibration or flexing and it must be ensured that the BLS 9200, when mounted is vertical both when viewed from the side and the front. If the switch is not mounted vertically there is a risk that the movement of the float will be impeded.

The switch float is well protected by the perforated stainless steel shield but in general it should be ensured that the selected location for installation is away from any area which is liable to collect debris or other contaminants which could, over time, cause a build-up and / or blockage to restrict the free movement of liquid to actuate the float.

6 Electrical Connection

The BLS 9200 is manufactured with the cable permanently bonded to the body. No attempt should be made to disconnect it. The actual length provided will have been specified at time of manufacture to suit the duty.

If required, it can be cut to length.

The conductors on the three-core cable are labelled as indicated in the key below.

1 = Common
2 = Normally Open
3 = Normally Closed

When the switch is not in alarm there is a circuit between Common and Normally Closed. When the switch enters alarm mode there is a circuit between Common and Normally Open.

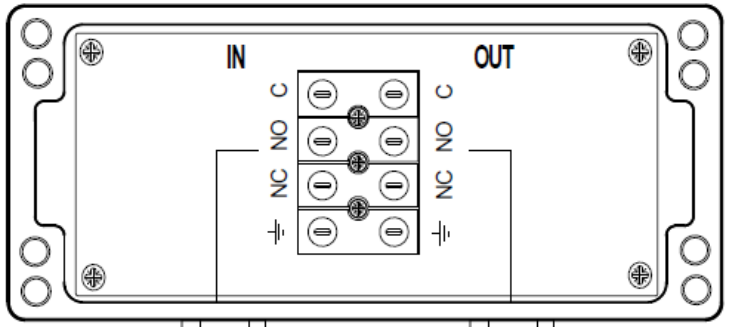
Once the electrical connections are completed correct operation of the switch can be validated by using the test handle. Refer to the section “Operation and In Service Test” for details.

6.1 Optional Termination Enclosures

PSM provide three options for termination enclosures for the BLS 9200:

- In Polycarbonate: BSE1 for a single switch, and BSE2 for two switches;
- In Aluminium: BSE10 for a single switch;
- Protection: IP65 (all versions).

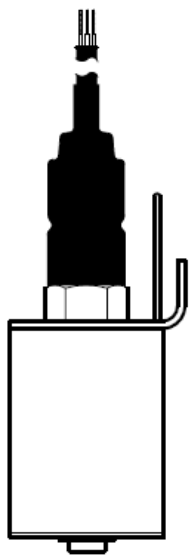
Refer to the drawings at the end of this manual for further details



Example Termination Enclosure PSM Model BSE1

BLS9200
3 core cable
Length as required
Core idents
1 = Common
2 = Normally Open
3 = Normally Closed

Connection to
Monitoring System
3 core cable



Switch:	S.P.C.O. reed form c
Max rating:	100 Watt AC/DC resistive load.
Max voltage:	500 Vdc / 250Vac
Max current:	3 A
Float S.G.:	0.62

Fitted with Customer specified length of Cable for connection to Termination Enclosure

7 Operation and In-Service Test

When the BLS 9200 is installed and in normal operation there is no requirement for user intervention. Operation is fully automatic where the switch will respond to the presence of liquid which causes the internal float to rise and operate the internal reed switch causing it to change state.

Likewise, when the liquid level reduces below the switch position the BLS 9200 will automatically reset and the reed switch again change state.

For in-service test purposes the BLS9200 has an integral test handle. This handle may be used to simulate the presence of liquid to check that the switch operates as expected.

Gently lifting the handle upwards will cause the internal float to lift which will in turn cause the reed switch to changeover.

When the handle is released, the float will reset to its alarm off position.

To confirm correct operation, use a multi-meter or other continuity tester to check that there is a closed circuit between normally closed and common when the float is at rest, and between normally open and common when the float is manually lifted by the test handle.

8 Maintenance Needs

The BLS9200 has been designed for long and maintenance free operation. There are no specific service requirements, and no need for lubrication or other consumables.

As a precautionary measure it is recommended that the switch is visually inspected on a periodic basis to ensure that it remains free from contamination, and that operation and free movement of the internal float is confirmed by lifting of the test handle as detailed in the preceding section. This may also be used to validate alarm reporting on the remote monitoring system.

It is recommended that this inspection is undertaken on a monthly to quarterly basis.

If it is required to specifically test the function and correct operation of the switch in respect of its changeover action, then this should be undertaken when it is not immersed by first disconnecting the output cables and connecting the continuity meter across the common and normally closed terminals. This should show continuity.

Next the switch should be operated by lifting the handle to confirm that contact is broken between common and normally closed.

The test should then be repeated for the common and normally open contact by ensuring that when the switch is in its active position (lifted) that there is continuity and that there is no continuity when the switch handle is released.

9 Repair

The BLS9200 is a fully welded and sealed assembly which contains no user serviceable parts.

If a switch if found not to be operational after carrying out the tests detailed in the previous section, then it may be removed from its mountings and visually inspected.

If it appears that contamination within the protective shield is preventing free movement of the float, then the switch may be flushed using clean warm water or a mild solvent / detergent compatible with stainless steel.

Removal of the switch will necessitate undoing of the two securing bolts and lifting the complete switch away from the mounting removing any securing ties that have been used to retain the switch cable.

Once cleaned the switch can be checked to determine the float actually operates by immersing in a small container full of water and observing both the float and the action of the contacts as detailed in the previous section.

If it is found that the float does not operate or that the contacts do not change state, then the switch must be replaced as a complete assembly.

10 Specification - BLS 9200

Materials	All 316 Stainless Steel
Float S.G.	0.62
Process Temp.	-10 to +90C

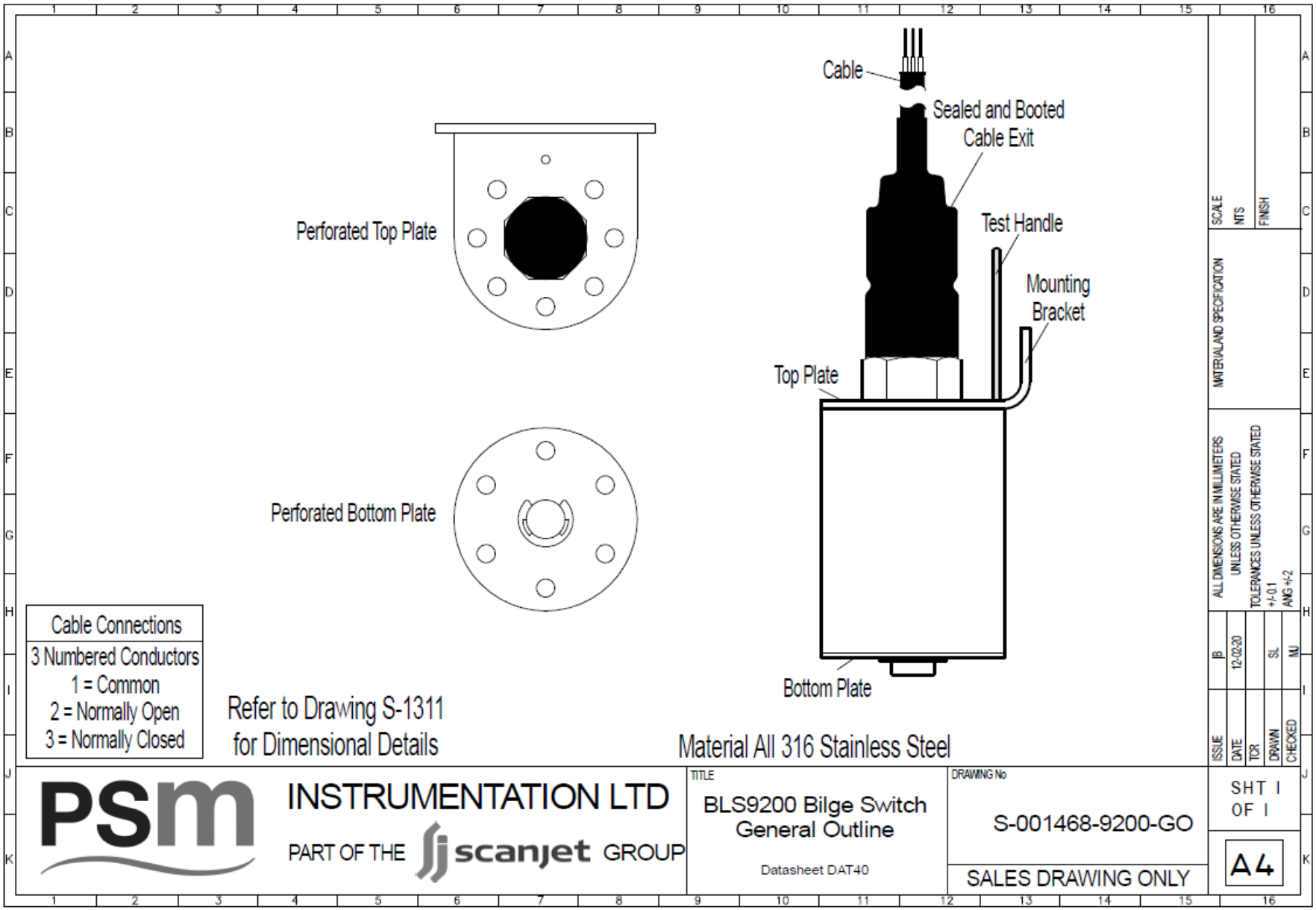
WIRING

1 = Common
2 = Normally Open
3 = Normally Closed

NOTE: The actuation point can vary slightly depending on the temperature and specific gravity of the individual liquid being detected.

11 Drawings

Refer to following pages


Cable
Sealed and Booted
Cable Exit
Test Handle
Mounting
Bracket
Top Plate
Bottom Plate
Perforated Top Plate
Perforated Bottom Plate
Cable Connections
3 Numbered Conductors
1 = Common
2 = Normally Open
3 = Normally Closed
Refer to Drawing S-1311
for Dimensional Details
Material All 316 Stainless Steel
SCALE
NTS
FINISH
MATERIAL AND SPECIFICATION
ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE STATED
TOLERANCES UNLESS OTHERWISE STATED
+/- 0.1
ANG +/-2
ISSUE
DATE
12-02-20
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DRAWN
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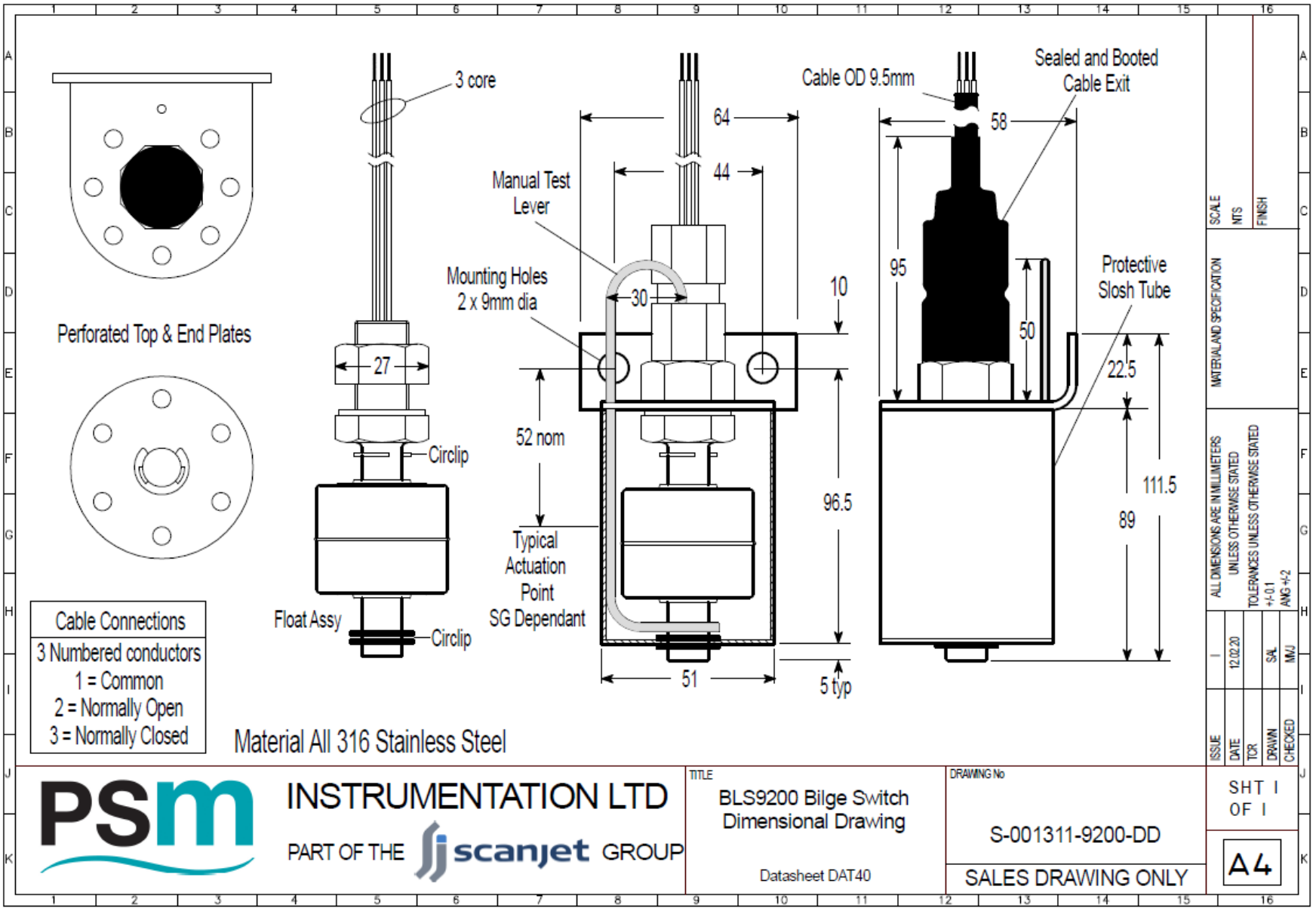
MJ
PSM
INSTRUMENTATION LTD
PART OF THE scanjet GROUP
TITLE
BLS9200 Bilge Switch
General Outline
Datasheet DAT40
DRAWING No
S-001468-9200-GO
SALES DRAWING ONLY
SHT 1
OF 1
A4


Perforated Top & End Plates
3 core
27
Circlip
Float Assy
Circlip
Manual Test Lever
Mounting Holes 2 x 9mm dia
64
44
30
10
52 nom
96.5
Typical Actuation Point SG Dependant
51
5 typ
Cable OD 9.5mm
Sealed and Booted Cable Exit
58
95
50
Protective Slosh Tube
22.5
111.5
89
Cable Connections
3 Numbered conductors
1 = Common
2 = Normally Open
3 = Normally Closed
Material All 316 Stainless Steel
SCALE NTS
FINISH
MATERIAL AND SPECIFICATION
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED
TOLERANCES UNLESS OTHERWISE STATED +/-0.1 ANG +/-2
ISSUE I
DATE 12.02.20
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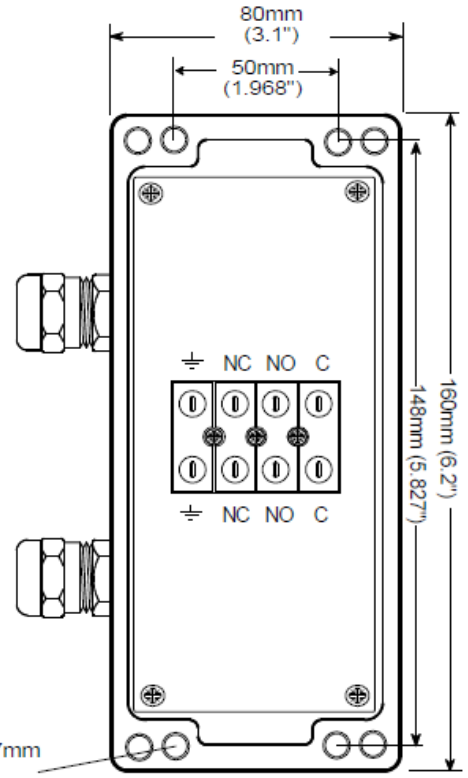
PSM
INSTRUMENTATION LTD
PART OF THE scanjet GROUP
TITLE
BLS9200 Bilge Switch Dimensional Drawing
Datasheet DAT40
DRAWING No
S-001311-9200-DD
SALES DRAWING ONLY
SHT I OF I
A4

BSE1

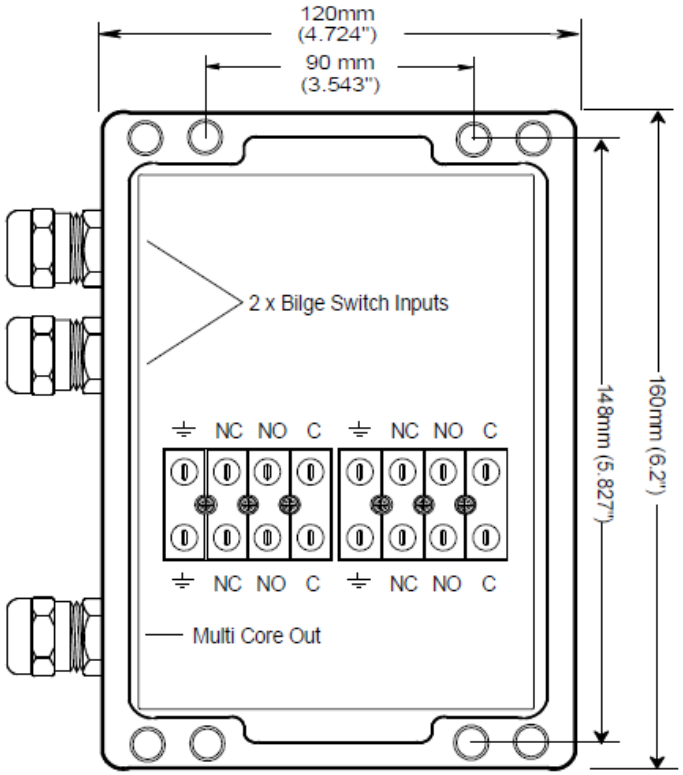
IP66 Polycarbonate Bilge Switch Termination Enclosure
Suitable For Use With 1 x Switch
Fitted With 2 x M20 Cable Glands & Terminations



Depth : 55 mm

BSE2

IP66 Polycarbonate Bilge Switch Termination Enclosure
Suitable For Use With 2 x Switches
Fitted With 3 x M20 Cable Glands & Terminations



Depth : 90mm

SCALE	NTS
FINISH	
MATERIAL AND SPECIFICATION	
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED	
TOLERANCES UNLESS OTHERWISE STATED	+/-0.1 ANG +/-2
ISSUE	0
DATE	04-09-13
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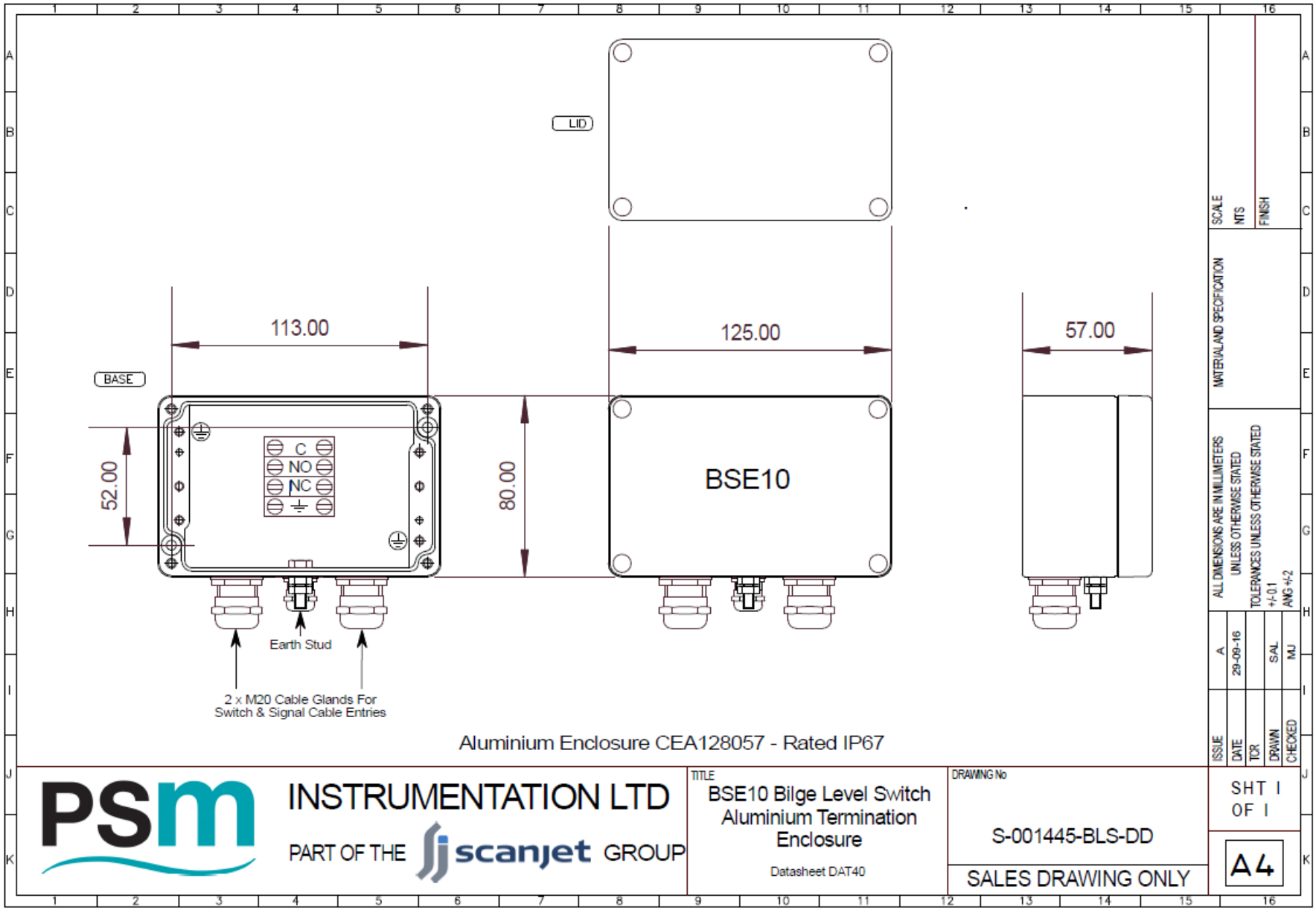
TITLE
BSE1 & 2 Bilge Level Switch Polycarbonate Termination Enclosure
Datasheet DAT40

DRAWING No
S-001301-BLS-GO
SALES DRAWING ONLY

SHT 1 OF 1

A4


LID
BASE
113.00
125.00
57.00
52.00
80.00
C
NO
NC
BSE10
Earth Stud
2 x M20 Cable Glands For
Switch & Signal Cable Entries
Aluminium Enclosure CEA128057 - Rated IP67
SCALE
NTS
FINISH
MATERIAL AND SPECIFICATION
ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE STATED
TOLERANCES UNLESS OTHERWISE STATED
+/- 0.1
ANG +/-2
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29-09-16
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PSM
INSTRUMENTATION LTD
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TITLE
BSE10 Bilge Level Switch
Aluminium Termination
Enclosure
Datasheet DAT40
DRAWING No
S-001445-BLS-DD
SALES DRAWING ONLY
SHT 1
OF 1
A4

ATEX & IECEx Dual Certified Label

PSM Instrumentation Ltd
Burrell Road
Haywards Heath
West Sussex
RH16 1TW
www.psmmarine.com

Model Code: ????

S/N: ????
Cable: ????

Date of manufacture: ??/??/????

Connection
1: Common
2: Normally Open
3: Normally Closed

Specification
-10°C≤ Ta ≤ +90°C
Output: SPCO
Rating: 100VA Resistive load

CE XXXX Ex

II 1 G Ex ia IIC T5 Ga
Ui = 28Vdc Ii = 150mA
Pi = 0.8W Ci = 2.5nF (for 20m Cable)
Li = 7.32µH (for 20m Cable)

ATEX : ITS-I 24ATEX 4123X BLS9200/I

IECEx ITS 24.0026X BLS9200/X

WARNING: Non-Metallic parts may present electrostatic hazard. Refer to manufacturer instructions.

UKCA Label

PSM Instrumentation Ltd
Burrell Road
Haywards Heath
West Sussex
RH16 1TW
www.psmmarine.com

Model Code: ????

S/N: ????
Cable: ????

Date of manufacture: ??/??/????

Connection
1: Common
2: Normally Open
3: Normally Closed

Specification
-10°C≤ Ta ≤ +90°C
Output: SPCO
Rating: 100VA Resistive load

UK CA XXXX Ex

II 1 G Ex ia IIC T5 Ga
Ui = 28Vdc Ii = 150mA
Pi = 0.8W Ci = 2.5nF (for 20m Cable)
Li = 7.32µH (for 20m Cable)

ITS24UKEX0813X BLS9200/U

WARNING: Non-Metallic parts may present electrostatic hazard. Refer to manufacturer instructions.

Certified Product
No Modfications permitted
Without reference to the
Notified Body

XXXX is replaced by the number of the Notified body responsible for the Quality Assurance Notification

???? is replaced by data specific to the product

Adhesive: permanent modified acrylic aqueous dispersion with excellent resistance to UV light and ageing.
Label thickness:
Including adhesive <0.15mm
Dimensions as artwork drawing: P19014-APT-AW

SCALE NTS
FINISH
MATERIAL AND SPECIFICATION
ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE STATED
TOLERANCES UNLESS OTHERWISE STATED
+/- 0.1
ANG +/-2

ISSUE	DATE	TCR	DRAWN	CHECKED
B	11/07/2024		MJ	JS

scanjet PSM

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TITLE
BLS9200 ATEX, IECEx & UKCA LABELS

DRAWING No
P92030-9200-DT

SHT 1 OF 1

A4

PSM WEEE Producer Registration No WEE/HC0106WW

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