



# **PSM INSTRUMENTATION LTD**

## **Installation Operation & Maintenance Instruction Manual**

### **BLS9200 Bilge/ Flood Detection Switch**

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## 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 an hermetically sealed SPDT reed switch potted in epoxy.

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

## 2 - Storage and Environmental Data

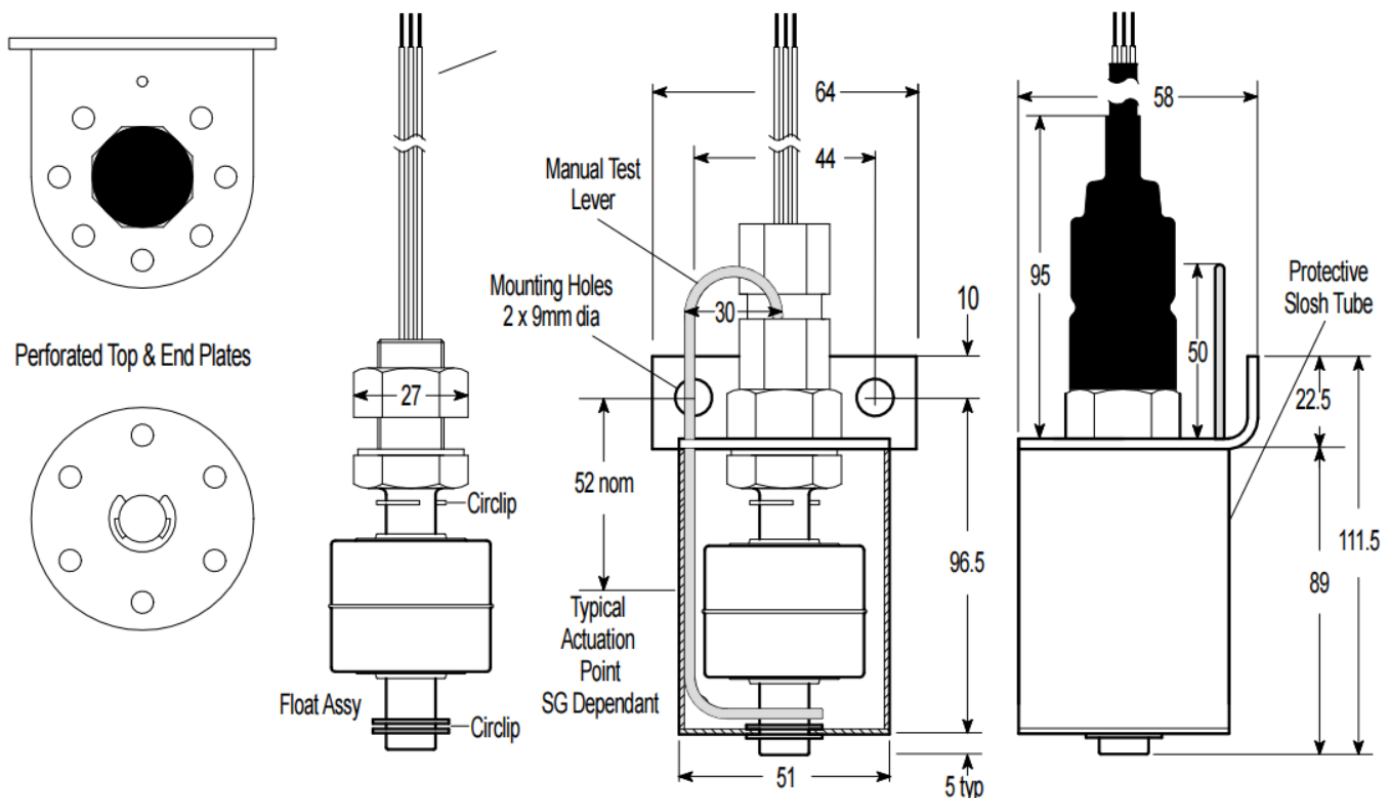
The BLS 9200 is a robust construction which is designed to withstand the in-service conditions it will encounter. Where the switch is to be stored prior to installation and use normal precautions must be taken to prevent the unit from mechanical damage and ingress of moisture into the exposed cable end. 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 remove it as this will compromise the integrity of the seals used to ensure full submersibility.

## 4 - Installation

The BLS9200 is provided with an integral mounting bracket having 2 holes 9mm diameter on 44 mm centres.



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.

## **5 - 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.

Refer to PSM drawing 170423-WD-001 for connection details

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.

### **5.1 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

## 6 - Protection of the internal Reed Switch

**Note:** Attempting to put excessive power through the bilge switch will irreparably damage the reed switch internals.

- **If the power rating of the switch is greatly exceeded, the contacts will become permanently welded together.**
- **If the switch is allowed to arc (spark) as it opens or closes the plated contacts will fail over time. [ the greater the arc - the more rapidly failure will occur]**

Do not be misled by the resistive ratings of the switches. Most applications involve inductive loads and many low wattage loads are often high inductance devices.

Switches ratings are quoted for a **resistive load**. Suppression is important to protect the switch.

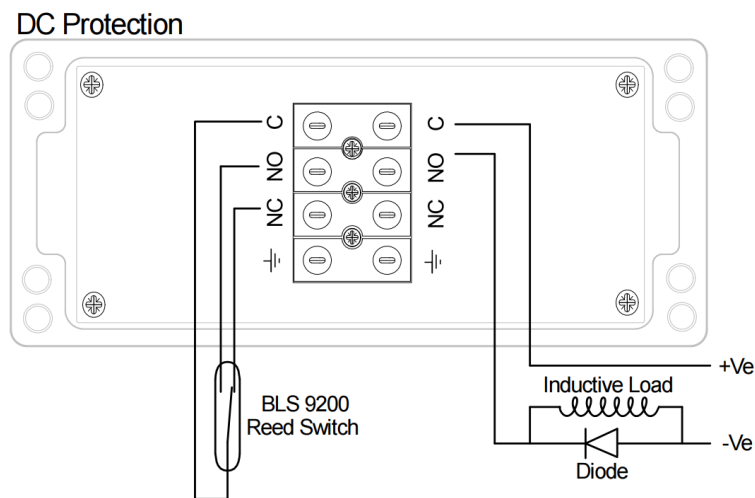
## 7 - Lamp loads

Incandescent lamp loads can be very destructive to reed switch applications.

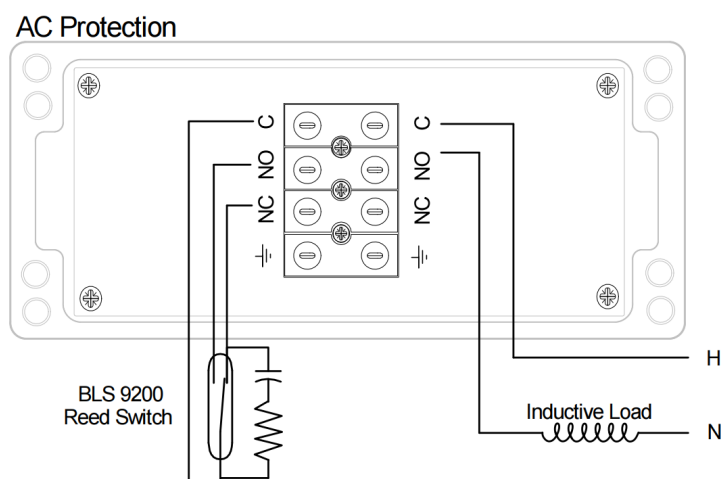
These type of loads have a 6-10 times the normal operating current when first energised [inrush current].

## 8 - Fitting ARC suppression

- **For a DC circuit** – a one amp diode should be placed in parallel with the load to suppress the arc. Select a diode with a voltage rating of at least three times [3x] or more than that of the circuit rating. Connect diode cathode to positive.



- **For an AC circuit** - a capacitor and resistor fitted in parallel with the switch. Use a 0.1mf 400-600V capacitor and a 50 to 100 ohm ¼ watt resistor in series with the capacitor.



## **9 - 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.

## **10 - 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.

## 11 - Repair

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

If a switch is 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 compatible with stainless steel.

To assist in access for flushing, the bottom cover of the switch shield may be temporarily removed, this is held in place by a circlip.

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.

Inverting the switch will show the circlip on the bottom of the central switch stem. This may be removed using standard hand tools (small screwdriver or needle nosed pliers) . Once removed the lower cover can be lifted away to carefully clean any sediment present.

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 then the switch must be replaced as a complete assembly.

## 12 - Specification - BLS 9200

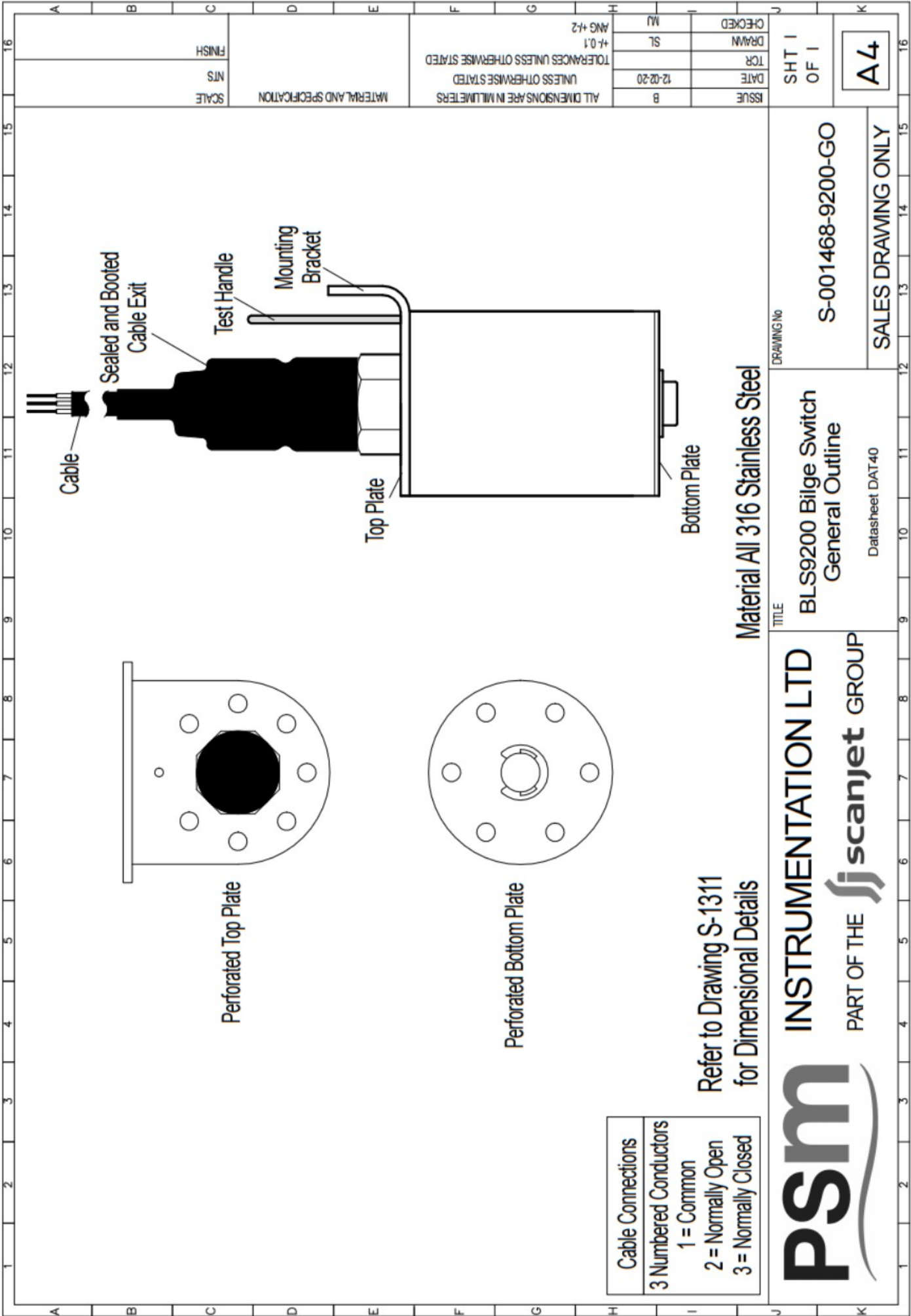
<b>Materials</b>	All 316 Stainless Steel
<b>Switch Rating:</b>	100VA SPDT
<b>Process Temp.</b>	-10 to +90C
<b>Max load rating:</b>	100W ac/dc resistive
<b>Max Current</b>	3A
<b>Min load rating:</b>	3W
<b>Max load volts:</b>	500V dc / 250V ac
<b>Float S.G.</b>	0.62

<b>WIRING</b>
<b>1 = Common</b> <b>2 = Normally Open</b> <b>3 = Normally Closed</b>

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

## 13 - Drawings

Refer to following pages



Refer to Drawing S-1311  
for Dimensional Details

<b>Cable Connections</b>
3 Numbered Conductors
1 = Common
2 = Normally Open
3 = Normally Closed

**Material All 316 Stainless Steel**

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**BLS9200 Bilge Switch  
General Outline**  
Datasheet DAT40

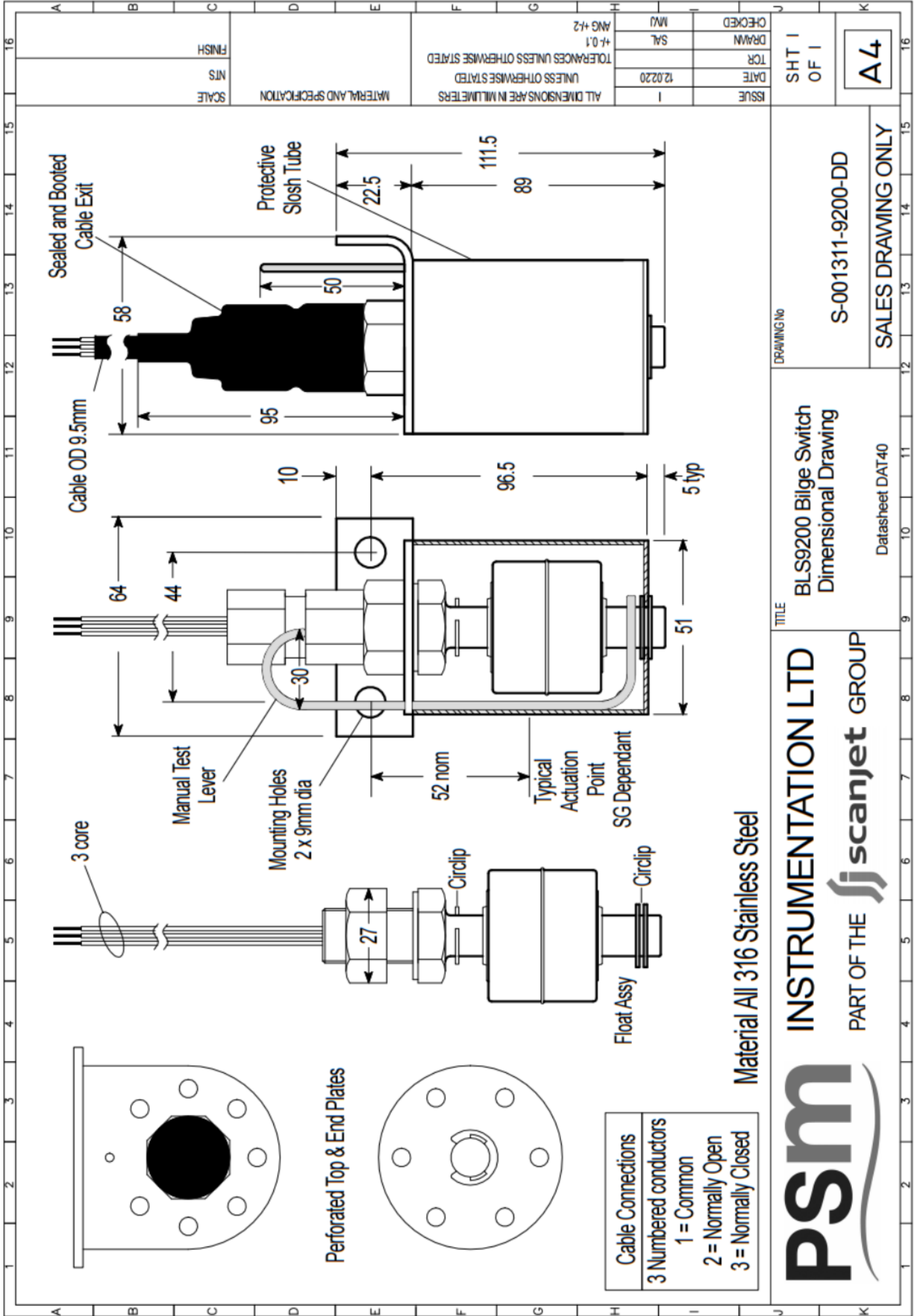
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Material All 316 Stainless Steel



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**BLS9200 Bilge Switch**  
 Dimensional Drawing

Datasheet DAT40

DRAWING No

S-001311-9200-DD

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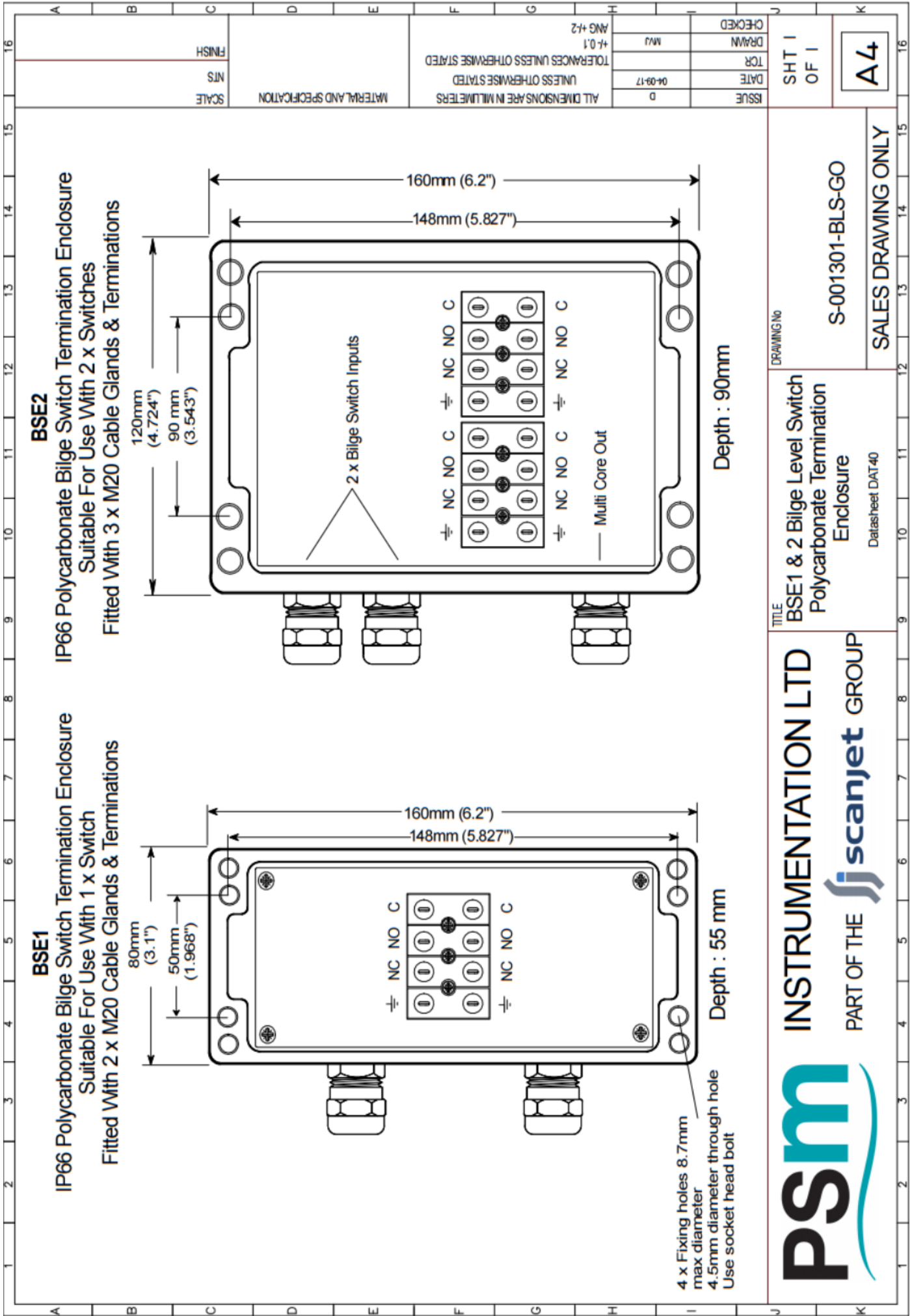
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**TITLE**  
BSE1 & 2 Bilge Level Switch  
Polycarbonate Termination  
Enclosure  
Datasheet DAT40

**DRAWING No**  
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**SALES DRAWING ONLY**

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