

A GUIDE TO THE INSTALLATION, OPERATION & MAINTENANCE OF SprinklerSense Portable Test Interface Unit, PTI FOR USE WITH SPDB30 & SPDB90 TYPE FLOW SWITCHES



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1 Specification & Operation

1.1 Introduction

The SprinklerSense PTI is designed specifically for use with Influx SPDB30 and SPDB90 type LPCB approved flow switches via a WM unit which is permanently wall mounted at an easily accessible height, providing means of connection. The PTI provides a temporary user interface to access the self-test features of the flow switch and enable connection to a PC via USB lead.

Three LEDs are provided to indicate the current status of the flow switch. The integral display can then be used to show which error type has been detected.

If there are no errors detected, Fire Safety personnel can use the key switch to start a flow switch check which will test the function of the flow switch electronics and activate the Flow output. The function of the output relay, site wiring, panel input and other devices that may be connected to the output can then be checked.

A PC app. can be used which allows further interrogation of the flow switch via the USB connection.

1.2 Construction & Specification

Housing: Coated Steel, handheld

Operating Temperature Range: 2 to 68°C

Supply Voltage: Provided by wall connection

1.3 Operation

The PTI is connected to the SprinklerSense flow switch via a serial communications link (wired). When plugged in, it continuously requests status information from the sensor and reacts accordingly. In normal use, without flow or errors, the green LED will flash slowly to indicate that the flow switch is functioning OK. If a sprinkler flow rate is detected the red LED will flash quickly. If an error is detected the yellow LED will flash at a medium rate.

Connection

To connect the PTI first locate the WM (wall mounted connection unit) for the flow switch in question. Plug the PTI's Mini-DIN type connector to the socket on the WM unit. The PTI should power up and is now ready for use.



System Errors

While the yellow LED is flashing, personnel with access to the key for the switch can if required, turn the key to the TEST position which will allow the error type to be displayed. If the key is left in this position, the unit will timeout. The key will then have to be turned back to ON before the display can be reactivated.

An error condition will be activated in the event of one of the following:

- 1) A fault is detected with one or more of the sensor probes.
- 2) A calibration error is detected outside of factory tolerances.
- 3) The SPDB30/90 flow switch is not responding.

The following conditions will also cause an error condition if enabled:

- 1) The sensor cannot detect water in the pipe, Dry Pipe (enabled by default).
- 2) A temperature of less than 2°C is detected in the pipe, Freeze Risk (enabled by default).
- 3) A flow is detected that is significant but not of high enough level or long enough duration to trigger a FLOW alarm, SFE (enabled by default).

Note: Settings are stored in the flow switch.

1.4 Commissioning Routine

Once the SprinklerSense FTI has been installed with an Influx SPDB30/90 type LPCB approved flow switch and the pipework has been **filled with water and fully vented of air***, it is advised to carry out a short commissioning routine. This routine involves placing the Sprinklersense system into a self-test mode which takes up to 5 minutes to complete. Any problems detected are then reported back via the integral display for the engineer to investigate.

When the Commissioning routine has been completed the SprinklerSense system is ready to for use, monitoring both its own function and the status within the pipework.

Pipework Design and Retard Times

The piping system should be designed to minimise the possibility of trapped air*. Air pockets downstream of the flow switch will expand and contract as the system pressure falls and rises due to temperature, leaks, test flows and pump action. This expansion and contraction will displace water, causing flow to occur. This flow may be detected by the flow switch and for this reason Sprinklersense units have a default retard time setting of 90 seconds to avoid false triggering. In well designed and managed systems where trapped air is kept to a minimum it may be possible to reduce this retard time if required.

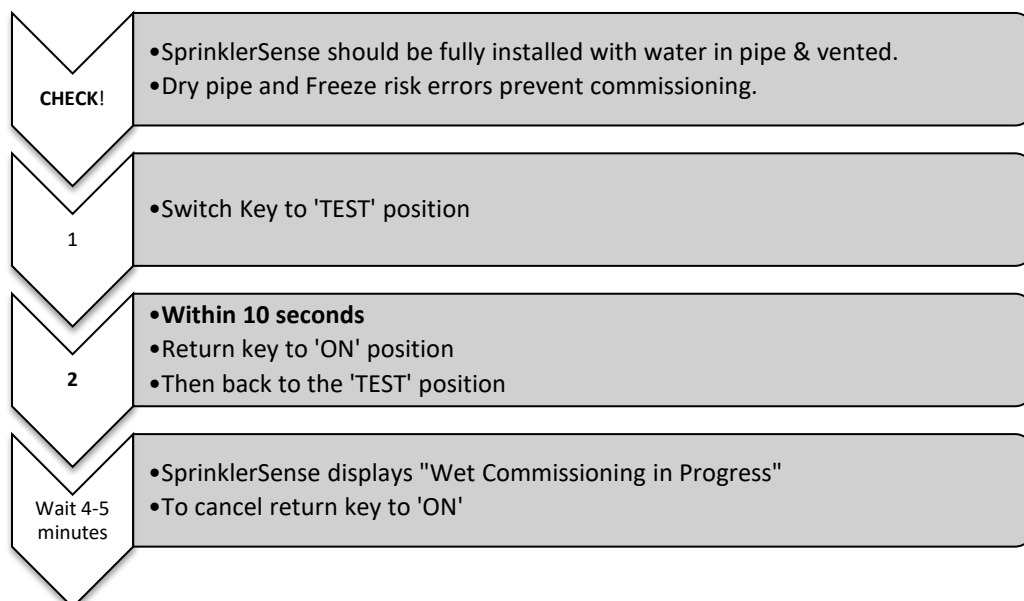
*Dry pipe and vent air/check messages may be an indication of excessive air trapped within a system. Air pockets can result in corrosion within metal pipework systems, and can also amplify the effects of flow and pressure surges, leading to false alarm signals. These risks can be significantly reduced if sections of the system prone to this are identified and fully vented. The 2016 NFPA 13 now adds a requirement to install at least one air vent at the top of each wet sprinkler system.

Starting the Commissioning Routine

This procedure should only be carried out by or with the permission of Fire Safety personnel.

- 1) Check the LED status on the PTI, if either the red or yellow are flashing then the Commissioning procedure may not be available. In this case refer to the diagnostic section of this document.
- 2) Turn the key to the TEST position to display “Waiting” on the display.
- 3) Within 10 seconds, turn the key back to ON and then again to TEST. The screen will now show “Wet Commission in Progress” for 4 to 5 minutes.
- 4) If commissioning is not started within the 10 seconds that “Waiting” is displayed, a Flow Switch Check could be started which may send a Flow Switch alarm to the main panel. To cancel, switch the key back to the ON position.

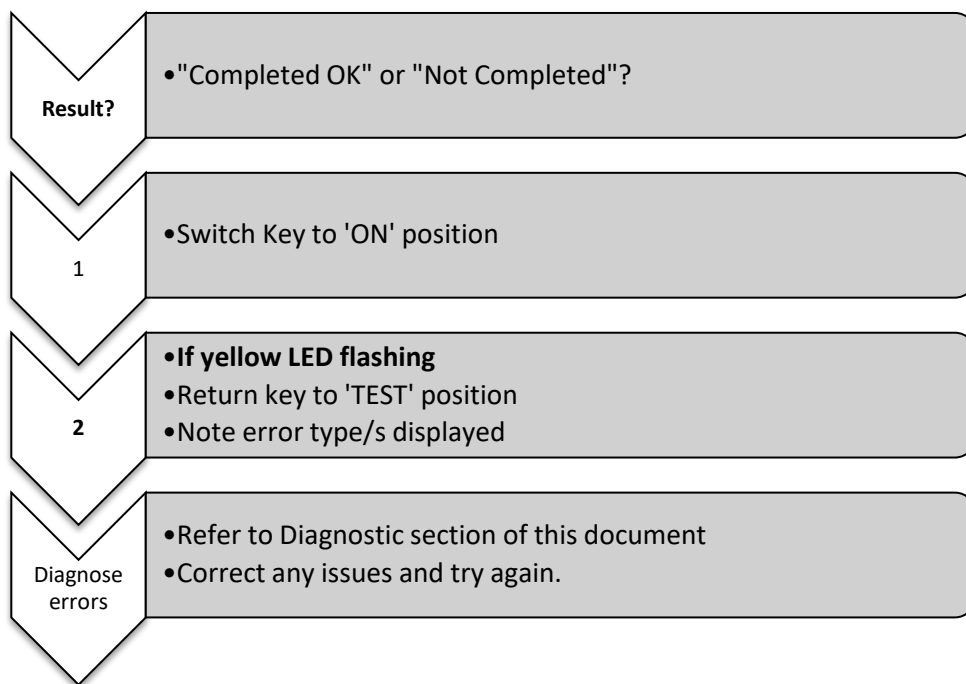
Summary of Procedure:



Ending the Commissioning Routine

- 5) If the tests have been carried out successfully the unit will display “Commissioning OK” and a measure of each sensor probe’s status ranging from 0 to 100%. A reading below 25% shows that the sensitivity of the sensor is significantly lower than expected and corrective action should be planned or carried out. If the sensitivity is at 0% the unit will display “Commissioning Not Completed”. In this case corrective action should be carried out immediately.
- 6) Return the key to the ON position.
- 7) Any problems found will cause the yellow LED to flash. In this case, switch the key to TEST. After 10 seconds the error type/s will be displayed on the screen.
- 8) Make a note of the error/s and see the diagnostic section of this document.

Summary of Procedure:

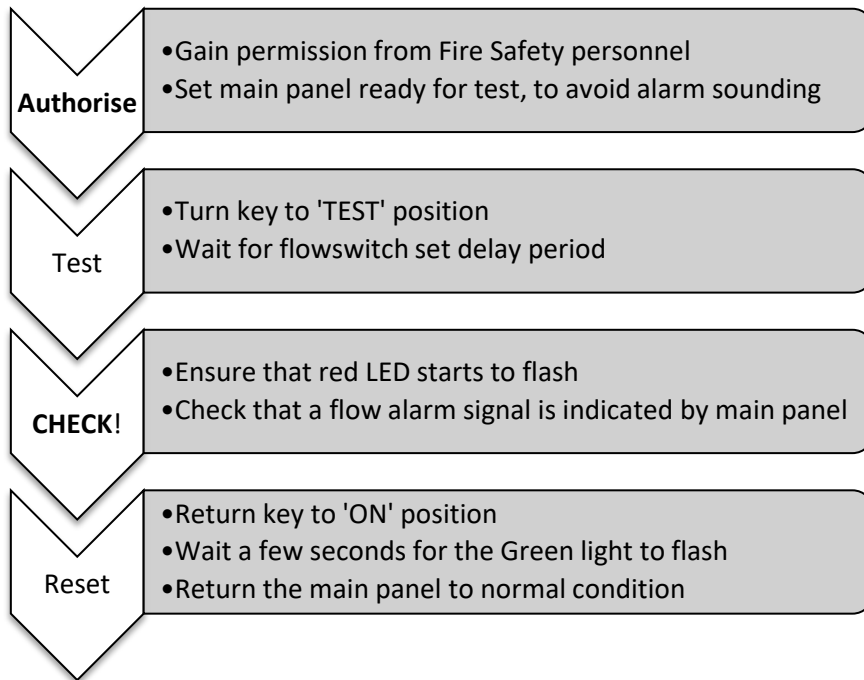


1.5 Flow Switch Check

After Commissioning has completed OK a SprinklerSense Flow Switch Check should be carried out to test the system and flow switch wiring back to the main panel.

While the green LED is flashing, turning the key to TEST will start the SprinklerSense flow switch check. This should only be carried out by or with the permission of Fire Safety personnel, after the main panel has been set ready for the test. Failure to carry out this procedure in the correct order could result in a false alarm condition. If the key is left in this position, the unit will timeout back to its normal ON mode. To start a test if the key has been left in the TEST position and timed out, the key must be returned to ON position and then re-set to TEST.

Flow Switch Test Procedure:

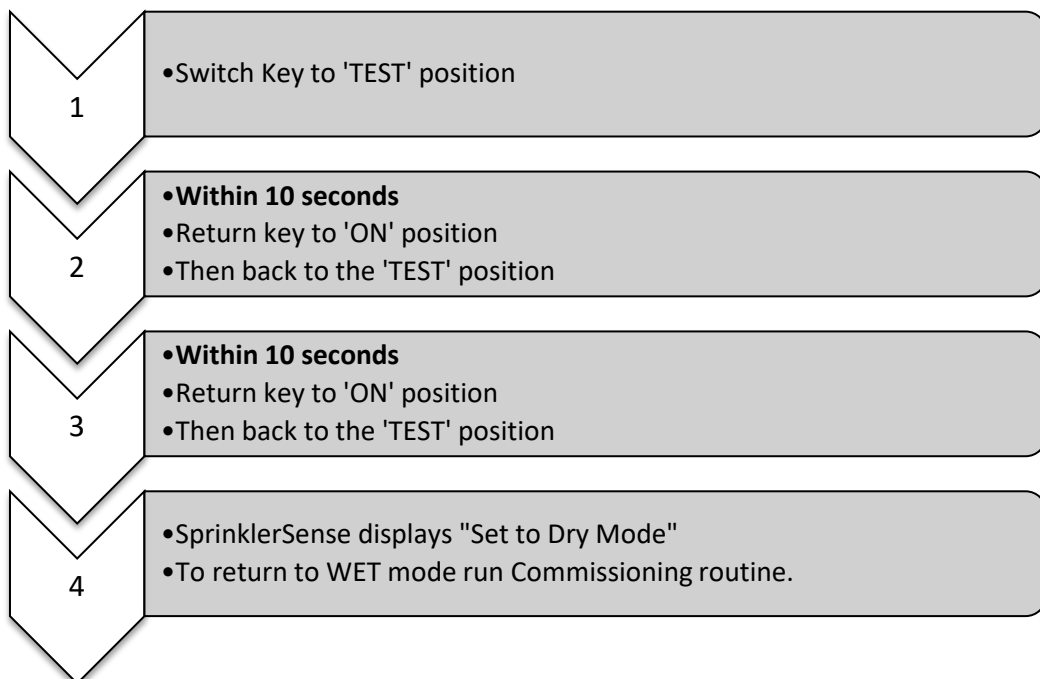


When newly installed or following any major works, it is advisable to also carry out an Inspector's Valve water flow test. This is to ensure that all of the other sprinkler system elements such as valves and pumps are set in their correct working condition.

1.6 WET and DRY modes

- 1) The Sprinkler Sense system is primarily designed for use on sprinkler systems which are permanently filled with water (WET mode). The default mode is factory set to WET.
For systems which are systematically drained for long periods Sprinkler Sense can be set to DRY mode. This mode disables the Dry pipe supervisory and some of the self-diagnostics which require water to be present. An extra supervisory is added which warns if the pipe is filled with water at the flow switch position.
If a sprinkler is activated during DRY mode, the flow switch output will be set as normal once water flow is detected. Note that multiple zones may detect flow as the system fills with water and air pockets are compressed.
- 2) Turn the key to the TEST position to display “Waiting” on the display.
- 3) Within 10 seconds, turn the key back to ON and then again to TEST.
The screen will now show “Wet Commission”.
- 4) Within 10 seconds, turn the key back to ON and then again to TEST.
The screen will now show “Set to Dry Mode”.
- 5) TO RETURN TO WET MODE, fill the pipe with water, bleed trapped air from the system and then carry out the Commissioning routine in 1.4 above.

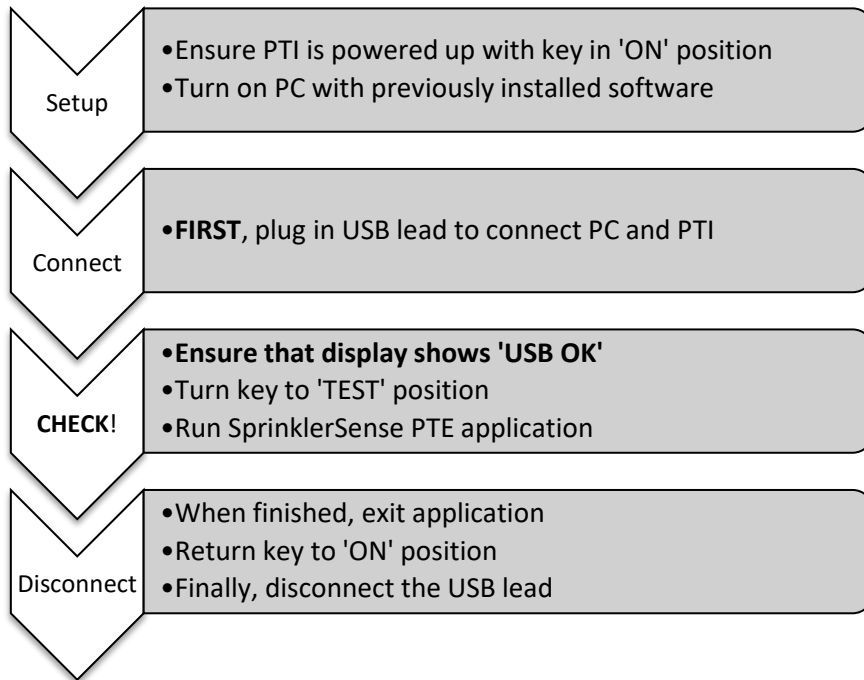
Summary of Procedure:



1.7 PC Connection via USB

If a PC with the SprinklerSense PTE application installed is connected via a USB lead, the key must be turned to TEST to enable the connection. This should only be enabled after the PC is on and connected, and the PTI display shows “USB OK”. It is good practice to return the key to the ON position before disconnecting the USB or shutting down the PC. Failure to carry out this procedure in the correct order could result in a false alarm condition. While connected to a PC the key position will not timeout.

USB Connection Procedure:



For SprinklerSense PTE installation, refer to the software installation guide. If the software is installed but ‘USB OK’ is not displayed when expected, it is likely that the PC has not yet recognised that the device is connected. This can be checked using the Device Manager which can be found via Control Panel and then System on the PC. The device should appear as a COM port in the list. The list can be refreshed by right clicking on the top level text and selecting ‘Scan for hardware changes’.

2 Maintenance

If the PTI fails to indicate or respond, first check that the SprinklerSense SPDB30/90 Flow Switch power supply is correct and turned on.

If the unit still does not function it should be replaced by a new unit. PTI units are interchangeable and require no setting up.

3 Diagnostic Information

The errors that can be detected are listed in this section in the order of which they are most likely to be seen. If multiple errors are displayed it is possible that one error type has caused the other/s. When more than one error is noted, address them in the order listed here. If these measures are unsuccessful consult service and/or replace unit.

3.1 No LEDs, Display or Apparent Power

When connected, the PTI unit should normally indicate power on and good function by flashing the green LED momentarily once every 5 seconds. The alphanumeric display will be blank unless: a sprinkler flow occurs; the key switch is turned to the TEST position; or a PC with correctly installed drivers is connected via USB lead.

- 3.1.1 If there is no indication of power, check that the power supply is connected correctly: at the power supply source; the WM; and at the SPDB30/90, and that it is switched on.
- 3.1.2 Measure the voltage between V+ and V- terminals of the WM using a multimeter. The power supply must be between 18VDC and 30VDC. Nominally the voltage should be 24VDC. The power supply must provide a DC voltage, NOT AC.
- 3.1.3 When using a battery backup system to power the SprinklerSense, ensure that the battery system's installation manual has been followed correctly and that batteries have been installed.

3.2 Dry Pipe

The Dry Pipe error indicates that the sensors are not submerged in water. This could be indicative of an empty or a partially filled pipe.

- 3.2.1 Ensure that the pipe section with the sensor installed is supplied with water.
- 3.2.2 Check that the water is within the designed system pressure range and that the system pumps are enabled.
- 3.2.3 Vent air from the system using any bleed valve fitted and/or by running flow through the system via the inspector's test valve until no more pulses of air are noticed.
- 3.2.4 If the problem persists, a bleed valve may need to be fitted at the highest point in each zone.
- 3.2.5 The design of the pipework should be such that the sensor is not fitted in a high section of pipe which could trap air. Ideally the pipework downstream of the SPDB30/90 sensor should be at a higher level, so allowing air to exit towards the sprinkler heads and inspectors test valve.
- 3.2.6 If the pipework is intentionally drained for a planned "cold weather" period, the Sprinkler Sense system may need to be set to DRY mode as in 1.6 above.

Once the sensors are submerged the indicated error will automatically reset.

3.3 Vent/Check H/T or Sensitivity below 25%

This error can be a result of the long-term sensor self-check to detect scale build up or debris around the sensors which could prevent the detection of a sprinkler being activated. The symptoms looked for by this test can however also be caused by an empty or partially filled pipe and by low system pressure.

- 3.3.1 Check as for Dry Pipe error above and re-commission.
- 3.3.2 If this does not remedy the problem, remove the sensor from the pipework and check for signs of debris or scale build up on the sensor legs. Clean if necessary. Refit the sensor and re-commission.

Once the cause is removed it is recommended to carry out the Commissioning Routine in Section 1.4 above to check and reset in 5 minutes. Otherwise the error will reset only after several days.

3.4 Freeze Risk

This error indicates that the water temperature in the pipe near the sensor has been below 2°C (36°F) and has not yet risen back above 3°C (37.4°F), giving a warning of potential freezing within the pipework.

3.4.1 Carry out appropriate steps to ensure operation above 3°C, e.g. trace heating.

This error will automatically clear when the water temperature rises above 3°C. Note that this error can be disabled using a PC via the USB interface.

3.5 Flow Event (Sub-alarm Flow Event)

A flow event is identified when a flow of more than 66% of the sprinkler flow switch point is present for more than 66% of the set retard time without the Flow output activating. This is indicative of large air pockets trapped within the sprinkler system.

3.5.1 Vent air from the system using any bleed valve fitted and/or by running flow through the system via the inspector's test valve until no more pulses of air are noticed.

3.5.2 If the problem persists, a bleed valve may need to be fitted at high points in the piping, where air may be trapped.

3.5.3 If venting cannot be carried out immediately the retard time should be increased to minimise the possibility of false triggering of the flow output.

This error will automatically clear after 14 to 28 hours or can be cleared immediately by activating the commissioning routine.

3.6 Wet Pipe

The Wet Pipe error indicates that the sensors are submerged in water when the system is set to DRY mode.

3.6.1 Ensure that the pipe section with the sensor installed is drained of water.

3.6.2 If the system has been intentionally filled with water at the end of the planned Dry period, the Sprinkler Sense system should be set to WET mode by running the Commissioning routine.

3.6.3 The design of the pipework should be such that the sensor is not fitted in a high section of pipe which could trap air or a low section which could retain water when drained.

Once the sensors are no longer submerged the indicated error will automatically reset.

3.7 Battery Low

This error warns that the supply voltage has gradually reduced below minimum requirement. Total Power failure is detected by the SPDB30/90 and signalled by its Error output relay.

3.7.1 Investigate as in Section 3.1 above.

3.7.2 If the building's mains power has failed, take reasonable precautions until power is restored.

Once the power supply has been reinstated this error will automatically reset.

3.8 No Unit Comms

This signifies that communication has failed between the PTI and the SPDB30/90 sensor.

3.8.1 Check the power supply at the SPDB30/90, terminals 1 (+ve) and 2(-ve).

3.8.2 With the power off, check the wiring continuity and polarity to terminals 3 (+ve) and 4 (-ve) of the SPDB30/90.

Once communications have been resumed this error will automatically reset.

3.9 C/H/T Test Error

This self-test error detects changes in the sensor legs' temperature calibration.

- 3.9.1 Check as for Dry Pipe error above and re-commission.
- 3.9.2 Ensure that the ambient and water temperatures are within the flow switches operating range of 3 to 68°C.

To check and reset in 5 minutes, carry out the Commissioning Routine in Section 1 above, otherwise this error may take up to 12 hours to reset. If the error has not cleared and a full pipe has been assured consult service and/or replace SPDB30/90.

3.10 C/H/T PRT Fault

This error reports an electrical short or open circuit within a sensor leg.

- 3.10.1 Check the sensor legs for signs of damage.
- 3.10.2 Carefully remove the SPDB30/90 lower sensor lid (not the top terminal lid) by unscrewing the four corner screws. The sensor should be connected to the electronics via six short leads. Check for damage to these leads and that they are all soldered to the PCB connector. Note that this should be carried out with care as the leads are short. Do not pull on the sensor wires or use them to suspend the electronics.

This error will reset automatically if the problem is cleared.

3.11 EEPROM Fault

The EEPROM Fault error indicates that a problem has occurred with the electronics' memory. Default data is now being used. It is possible that calibration data has been lost and that the unit will not function to specification.

- 3.11.1 A replacement SPDB30/90 unit should be used.
- 3.11.2 It is possible that a sprinkler flow will still be detected. To test this, carry out a flow test by opening the inspectors test valve. Even if this test is passed the unit should only be left as a temporary solution until a new unit is installed.
- 3.11.3 Other errors that are also indicated may be due to the EEPROM Fault and will probably not be able to be cleared using the appropriate steps above.

REPLACE THE SPDB30/90 SENSOR UNIT.

3.12 No Sensor Comms

The SPDB30/90 sensor unit has developed an internal communications error.

- 3.12.1 Remove power from the sensor, leave for around 2 minutes and re-apply power.
- 3.12.2 Fit a replacement SPDB30/90 unit.

This error will reset automatically if the problem is cleared.