

**Scanner 2000**  
**Steam Mass Flow Transmitter**  
**Installation and Maintenance Instructions**

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# *1. Safety information*

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Safe operation of this product can only be guaranteed if it is properly installed, commissioned, used and maintained by qualified personnel in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

## **1.1 Intended use**

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use / application.

- i) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- ii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

## 2. Mechanical installation

### 2.1 General requirements

It is important that the Scanner 2000 is installed with the correct pipeline unit. Please check that the serial number on the pipeline unit matches the one that is on the Scanner 2000 application tag.

The installation must conform to all relevant construction and electrical codes.

**Warning:** The standard Scanner 2000 is not approved for hazardous area applications.

CSA/FM and ATEX/CENELEC versions are available on request.

#### 2.1.1 Environmental conditions

The transmitter should be located in an environment that minimises the effects of heat, vibration, shock and electrical interference.

**CAUTION:** Exceeding the specified temperature limits will invalidate the warranty and can adversely affect the performance and may damage the Scanner 2000

#### 2.1.2 Other considerations: Be sure to allow sufficient clearance for:

- Installation of the impulse piping.
- Installation of conduit wiring.
- Removal of the display cap.

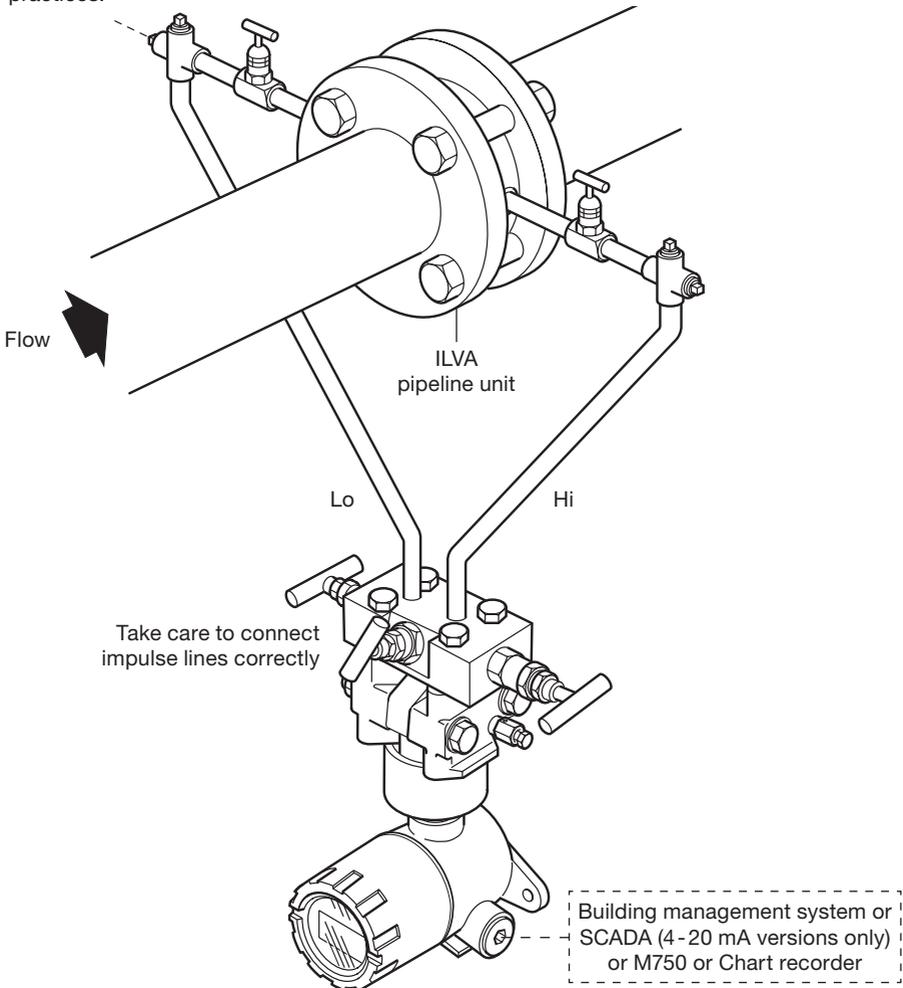
#### 2.1.3 Mounting the transmitter (see page 27 of the Hardware user manual)

The Scanner 2000 can be mounted using the bracket and 'U' bolts which are supplied. Mounting can be to a vertical or horizontal 2" (50 mm) pipe, or it can be surface mounted.



## 2.2 For installation of an ILVA on steam: -

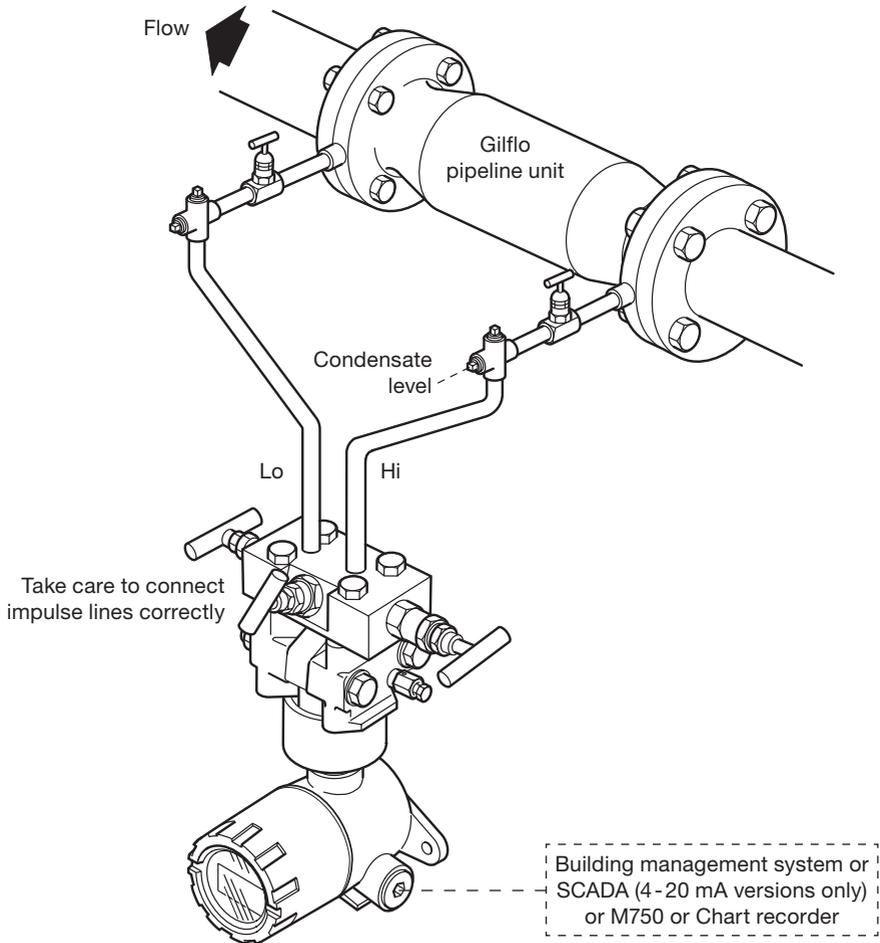
Before installing the Scanner 2000 please consult the hardware manual (page 39) for best practices.



### Installation points to watch:

1. Ensure all pipework is adequately supported and properly aligned.
2. The **minimum** recommended lengths of straight pipe are 6D upstream and 3D downstream. For full details see the ILVA Installation and Maintenance Instructions.
3. Ensure correct direction of flow is as indicated by the arrow on the ILVA body.
4. Avoid reverse flow through the ILVA.
5. Do not install the flowmeter downstream of a pressure reducing valve this may cause inaccuracies and /or damage. Avoid installing the flowmeter downstream of a partially open valve.
6. Actuated valves may cause rapid pressure fluctuations that could cause damage.
7. Provide adequate line drainage upstream of the flowmeter for all steam applications.

## 2.3 For installation of a Gilflo on steam: -



### Installation points to watch:

1. Ensure all pipework is adequately supported and properly aligned.
2. The minimum recommended lengths of straight pipe are 6D upstream and 3D downstream. For full details see the Gilflo Installation and Maintenance Instructions
3. Ensure correct direction of flow is as indicated by the arrow on the Gilflo body.
4. Avoid reverse flow through the Gilflo.
5. Do not install the flowmeter downstream of a pressure reducing valve this may cause inaccuracies and/or damage. Avoid installing the flowmeter downstream of a partially open valve.
6. Actuated valves may cause rapid pressure fluctuations that could cause damage.
7. Provide adequate line drainage upstream of the flowmeter for all steam applications.

## 3. Configuring software

Please note that if the Scanner 2000 has been supplied as part of an ILVA or Gilflo system, this option will have been configured during manufacture.

**Note:-**

A DB9 Serial RS232 to RS485 converter will be required to connect your PC to the Scanner 2000 if it does not have an RS485 serial port. If your PC only has USB ports, a USB to DB9 Serial port converter will be required. These are available from most electronics suppliers.

**Step 1** - Make sure that the Scanner 2000 is connected to a laptop or PC and power has been supplied to the unit.

**Step 2** - Start the selection process by opening the ModWorx pro software. Open the software by double clicking on the Icon shown below:



(Version numbers may vary)

**Step 3** - Click on the 'connect' button as shown below:



**Step 4** - Make sure that the 'Express Connect' option has been selected in the drop down box, entitled 'Select Method'. Tick the 'Use default permissions of connected device port' box and click on the 'connect now' button.

**Connection Settings**

**Connection Method**

Select Method: **Express Connect** (dropdown menu) Automatically connect to a single device without knowing its slave address or baud rate settings.

Connection Parameters:

Slave Address:

Baud Rate:

Timeout (ms):

Use default permissions of connected device port

User Name:

Password:

Save User Name and Password between Sessions

Use these settings to automatically connect next time

**Connect Now** (button)

**Step 5** - On the following screen please select 'Configure'.

Scanner 2000 - [s/n 1594]

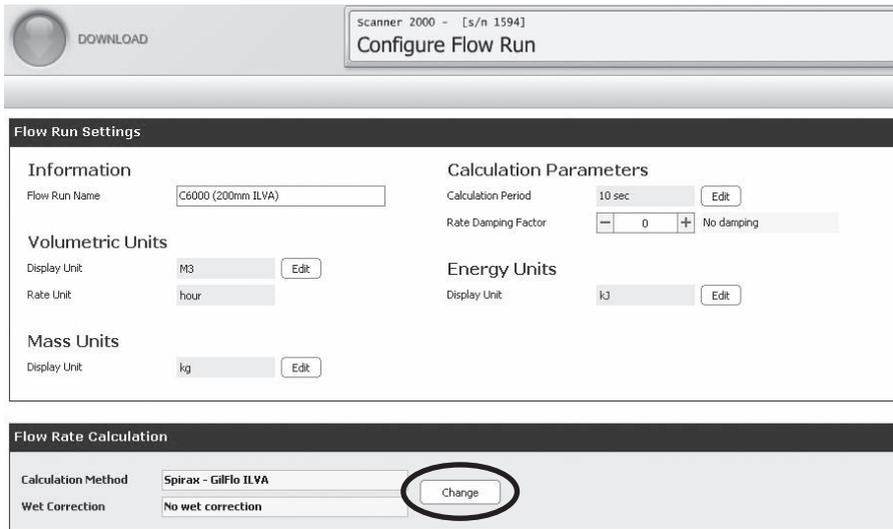
**Scanner 2000 Main Display**

Navigation Bar: Calibrate Inputs, Maintain Flow Run, Maintain Turbine, Manage PID, **Configure** (circled)

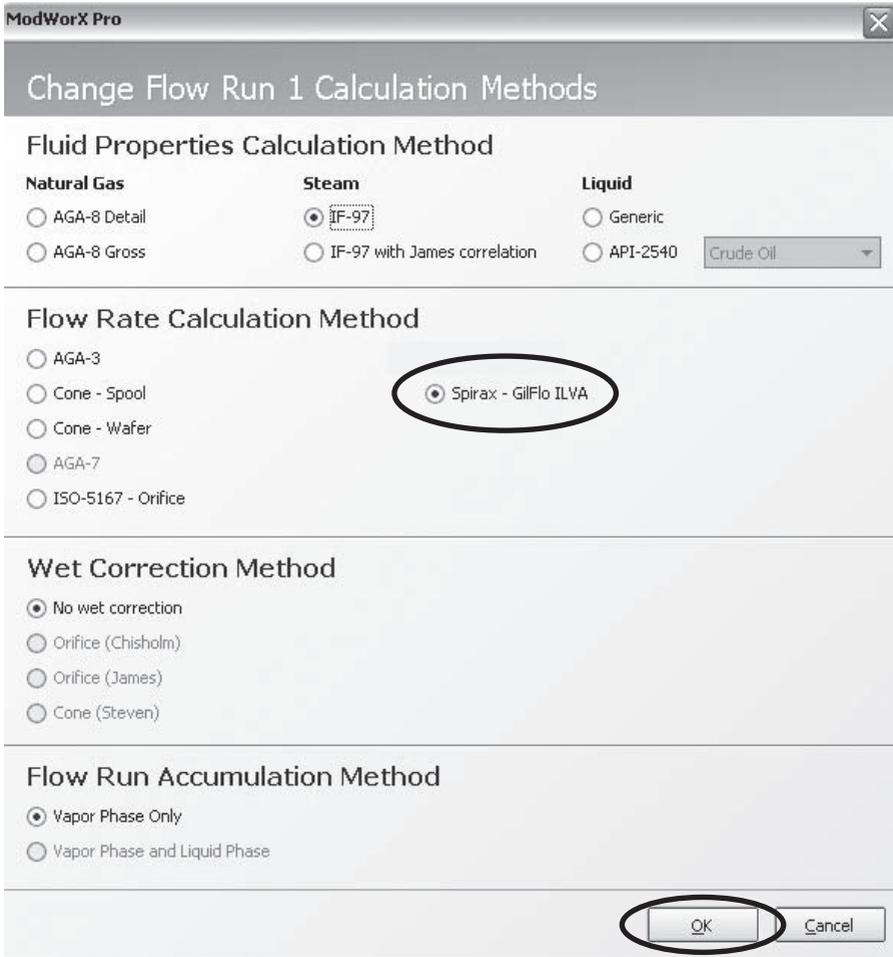
**Step 6** - From the options on the 'Scanner 2000 Configuration Menu' select 'Flow Run 1'.



**Step 7** - In the 'Configure Flow Run' menu, under the section entitled 'Flow Rate Calculation', click the 'Change' button as circled below:



**Step 8** - Please select your calculation method, and flowmeter type from the 'Flow Run 1' menu. In the example below, the 'IF-97 Steam Calculation Method' has been selected with the 'ILVA type Flowmeter', as the ILVA flowmeter will be used to measure steam flowrate in conjunction with the Scanner 2000:



When you have selected the calculation method and flowmeter type please click on the 'OK' button.

**Step 9** - The selection of the flowmeter is now complete.

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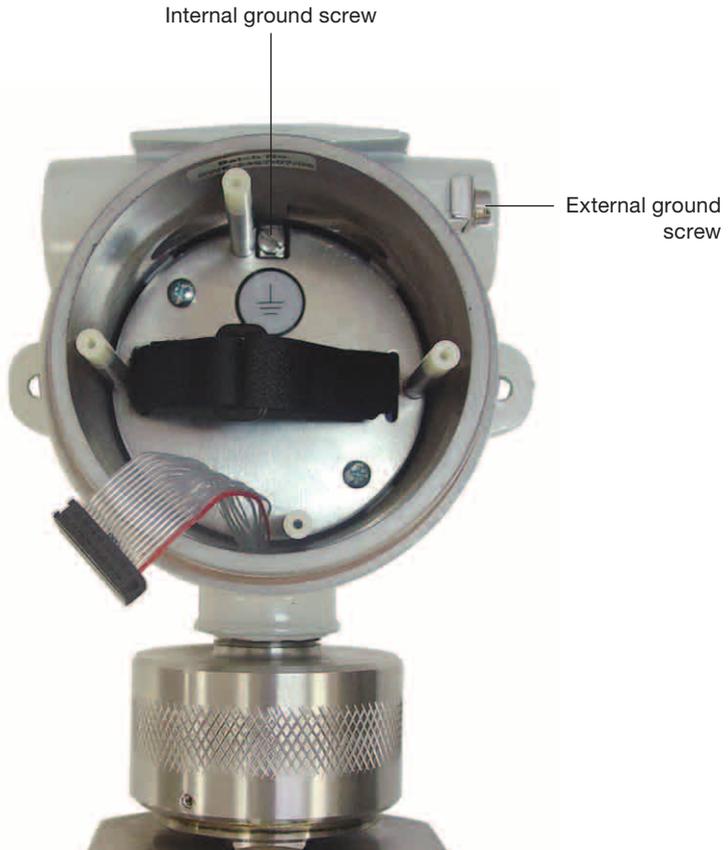
## 4. Wiring procedures

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### 4.1 Grounding procedures

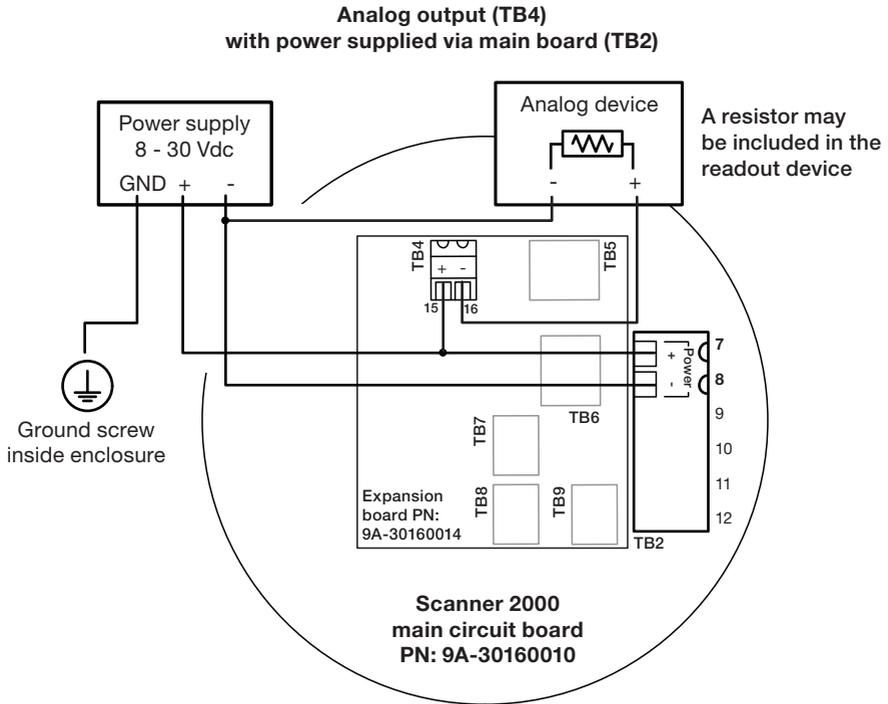
To power the Scanner 2000 microEFM with an external dc supply, route the ground conductor through a conduit opening in the top of the scanner 2000 enclosure with the power conductors and connect it to the ground screw inside the enclosure (note the round sticker that marks this location in the picture below).

If national or local electrical codes require the enclosure to be grounded, a protective earth-grounding conductor may be required. To install a protective earth ground, connect an earth ground conductor to the stainless ground lug near the top of the Scanner 2000 enclosure or to the internal ground screw, and connect the other end to a ground rod or other suitable system earth ground. The ground lugs will accept wire sizes from 14 AWG solid conductor to 4 AWG stranded conductor.



## 4.2 4 - 20 mA analogue output

The 4 - 20 mA output provides a linear current output that can be configured using ModWorX Pro software to represent any parameter in the holding registers. This output requires a two-conductor cable to be connected to an 8 to 30 Vdc power supply (voltage required is dependent on loop resistance) and a current readout device to be located in the remote location. See the ModWorX Pro Software User Manual for information on configuring zero and full-scale values using ModWorX software.



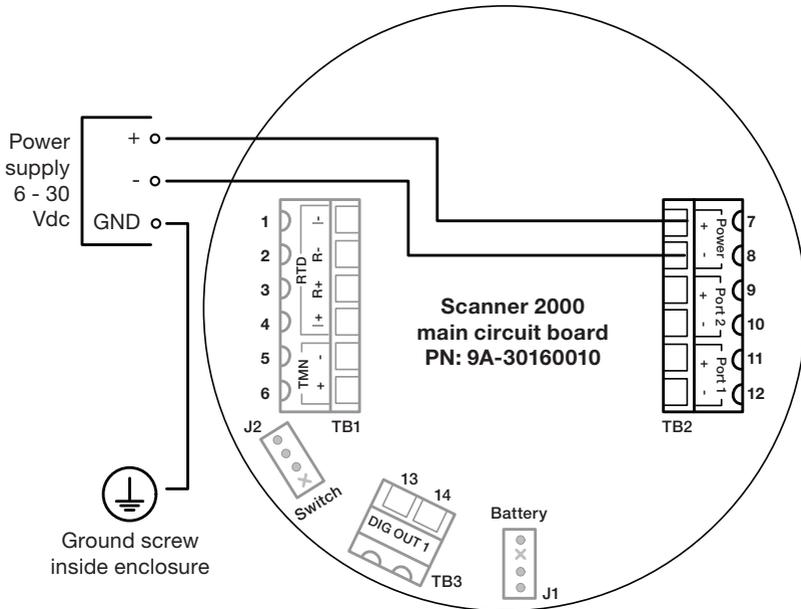
### 4.3 External power supply

The Scanner 2000 can be connected to a remote power supply by a two-conductor cable. The power supply and cable must be capable of supplying 6 to 30 Vdc @ 31 mA.

The external power supply must be approved SELV source, insulated from the ac main by double/reinforced insulation per CSA C 22.2 No. 61010-104/UL 61010-1 – 2nd Edition.

**Important:** In all applications using an external power supply, a switch or circuit breaker must be included in the safe area external power supply installation within easy reach of the operator. The switch or circuit breaker must be marked as the "disconnect" for the safe area external dc power supply.

**Important:** If the main circuit board is marked with a revision level of 02 or older (revisions 01, C, B, or A), a zener diode (Part No. 1.5 KE33CA) must be installed for CE approval. The zener diode is not required for revision 03 and newer circuit boards.



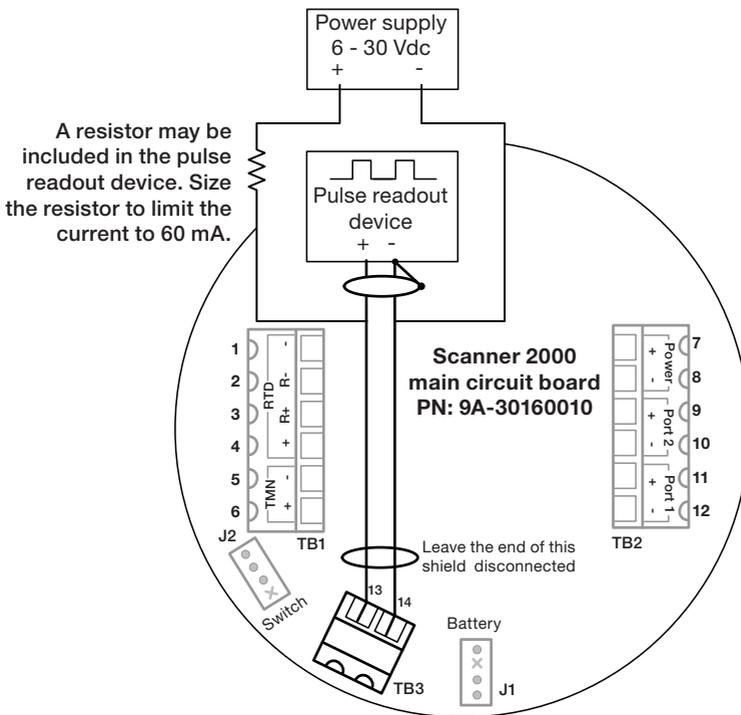
## 4.4 Output wiring

### 4.4.1 Digital output (Pulse or Alarm)

The standard Scanner 2000 supports a solid-state digital output that is configurable as either a pulse output or an alarm output. As a pulse output, the pulse width duration and pulse representation are both configurable. Because the circuit is isolated, it can be used in conjunction with any other feature on the Scanner 2000. A two-conductor cable from the Scanner 2000 to the remote location is required. The maximum rating of the digital output circuit is 60 mA at 30 Vdc.

For reduced power consumption, turn the digital output feature off when it is not in use.

**Important:** If the main circuit board is marked with a revision level of 02 or older (revisions 01, C, B, or A), a zener diode (Part No. 1.5 KE33CA) must be installed for CE approval. The zener diode is not required for revision 03 and newer circuit boards.



### 4.4.2 RS232 /RS485 interface converter

Cameron can supply the parts: -

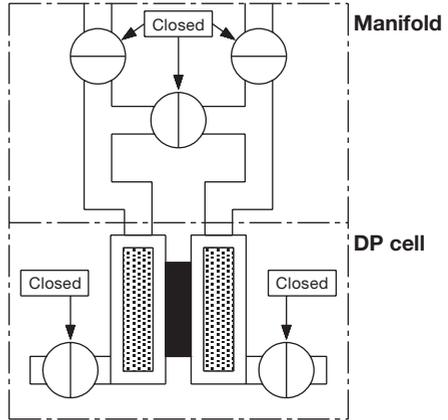
9A - 101283116	RS-232 to RS-485 converter, Serial Port Powered, DB9 Connector on PC End, Open Terminals on Instrument End
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Alternatively a suitable RS232 / RS485 converter can be supplied from RS Components or your local electronic supplier.

# 5. Placing the Scanner 2000 into operation

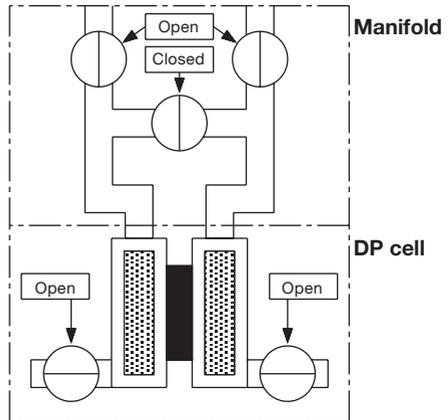
To put the scanner into operation:

**Step 1** - Make sure that all valves on the manifold are in the closed position.

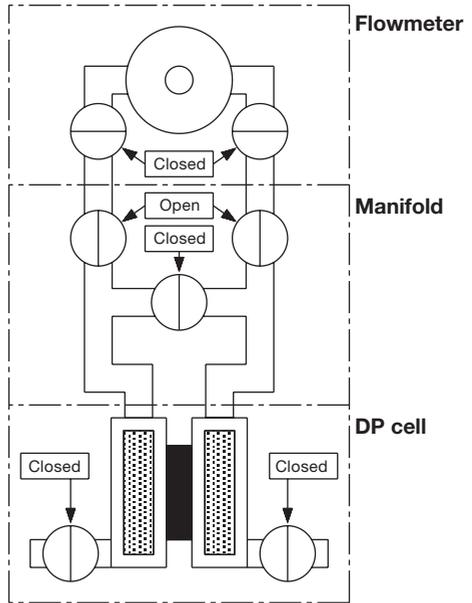


**Step 2** - Ensure impulse lines have been primed with cold water or antifreeze (depending on application).

**Step 3** - Open isolation valves and bleed valves on manifold to purge the Scanner 2000 of air.

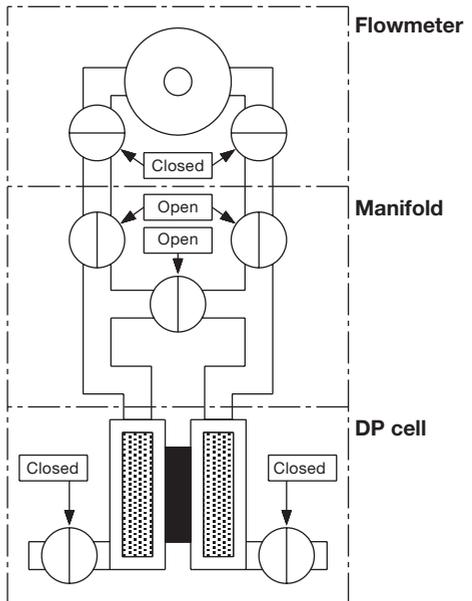


**Step 4** - Shut off isolation valves at the flowmeter and the bleed valves on the manifold.



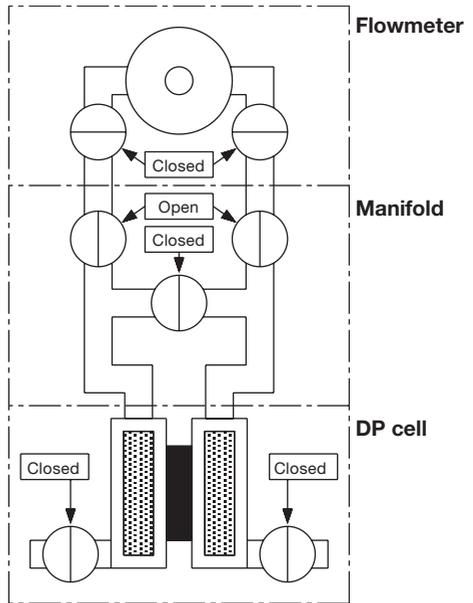
**Step 5** - Turn the system pressure on (optional but recommended)

**Step 6** - Open equalization valve.



**Step 7** - Check the 4 mA output.

**Step 8** - Close the equalization valve.



**Step 9** - Open isolation valves on the impulse lines at the flowmeter.

