VE NPT Retractable Sampling Probe Installation, Operation and Retraction Instruction

Installation, Operation & Maintenance – NPT Retractable Probe

General

All VE probes are individually marked with a 4 digit serial number, eg. **VE** ****, and this serial number is traceable to all relevant documentation. The serial number can be found on the power screw housing and on the corresponding gauge rod.

All ***"standard"*** probes are designed for a maximum pipeline pressure of 99.3 Barg (1440 PSIG) and a maximum pipeline gas velocity of 25 metres per second (80 fps) and for use on pipelines with a maximum diameter of 1200mm (48 inches). Do not attempt to use a standard probe on any application where any one of these values is exceeded (Special versions of Retractable VE probes are available for conditions exceeding the values stated above). In general each probe is designed for each specific application, if you have any doubts as to the application the probe is to be used for consult your supplier giving the specific serial number of the probe to be used.

All probes are designed for vertical installation, ie the probe is to be connected to a branch tee that is in the vertical plane, and the probe should be connected vertically above this branch tee. **Do NOT** connect a retractable VE probe to anything other than a vertical branch.

The installation of each and every probe requires specific individual consideration and therefore a full risk assessment and method statement should be completed by the customer and be available for each and every installation taking into account all relevant site conditions and situations.
Generally we recommend that the individual risk assessments and method statements cross references the installation site and pipeline identifier to the probe serial number.

Each probe is supplied factory pressure and leak tested and undergoes a tick box inspection/check list prior to dispatch.

All exposed components of NPT Retractable VE probes are designed using highly corrosion resistant materials eg: 316 stainless steel for all main parts and phosphor bronze for mating parts on the moving threads and A2/A4 stainless steel for grub screws nuts bolts washers grease nipples etc. The probe therefore does not require painting and **must not be painted** on any of the rotational parts. Note once the probe has been inserted the active length of the power screw thread will be fully enclosed and protected by the thread cover tube.

For probes that have been installed for a long period of time a grease nipple point with plastic cover cap has been provided to inject a small amount of additional ***"Castrol Spheerol SX2"*** grease into the mating area of the power screw thread and power screw nut. You **should not routinely** grease through this point and it should only be used when retracting the probe and then only after the probe has been installed for a long period of time and if the mechanism is stiff and feeling in need of lubrication.

IMPORTANT: SECURE PROBE ASSEMBLY IN PLACE ONCE INSTALLED. PREFERABLY AT THE HEX (REFER TO FIGURE 1) TO ENSURE THE NPT CONNECTION DOES NOT MOVE WHEN PROBE IS RETRACTED

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Installation

Before commencing any installation work visually check probe for any signs of damage that may have occurred in transportation and handling and check to see that the correct factory pressure test certificate is available.

Any probe should only be installed by a trained and qualified person for such an operation.

Read the **whole** installation procedure and relevant accompanying method statement and risk assessment and understand fully prior to starting installation.

The following statements are given as a guide only; you should always follow the method statement provided for your particular installation, however sections **4, 5, 8, 9, 10, 11, and 17 MUST BE complied with for safe installation and operation of the probe.**

1. Check probe serial number matches the method statement.
2. Check that the pressure test certificate is available and that the test pressure matches or is higher than that required for the application to which it is to be used. (Normally the test pressure is at least 1.5 X the maximum allowable working pressure)
3. Remove the packaging from the probe and make sure any/all protective caps are removed from the probe tip. Note if you requested a factory ***"functional"*** test of the probe then the power screw thread will have a residual coating of grease applied to it.
4. Make sure the probe is in the ***"fully"*** retracted position, ie the probe tip is exactly level/flush to the bottom of the NPT connection. (The probes are normally shipped at or near this condition) Make a check measurement of the dimension between the bottom of the hex and the underside of the power screw housing (See Fig. 1) This dimension should tie up with the documentation provided with the probe and with the gauge rod attached to the probe.

   Remove the gauge rod to use as a check at stage 14.

   Keep a record of this dimension for reference purposes and any extraction of the probe to be made at a later date.
5. With the pipeline branch connection suitably isolated connect the probe to the female NPT connection. The probe must be suitably supported whilst it is being connected. We strongly recommend that the probe be laterally supported whilst in the retracted position and during the insertion procedure that follows. We recommend that the probe remains laterally supported whilst in use to avoid the possibility of causing undue stresses onto the process pipework unless your calculations show otherwise.
6. Whilst the pipeline branch remains isolated connect a suitable pressure source to the probe outlet valve and follow the specific leak and pressure test procedure documented in the site specific pipeline identifier method statement to test the newly made NPT connection.
7. On completion of this pressure/leak test disconnect the pressure source and close the probe outlet valve as detailed in the site specific pipeline identifier method statement.

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8. Attach the two hand wheels supplied (with the probe) to the probe in 2 of the 4 threaded connections provided on the power screw housing and at 180° to each other. The threaded connection points are "capped" with plastic plugs when the probe leaves the factory. **Note** additional handwheel attachment points are provided on the End Cap, however you should only use the attachment points on the power screw housing unless there are items of plant that restrict this mode of operation.
9. From the underside of the power screw housing measure down the required insertion depth/length as detailed in the site specific pipeline identifier method statement and set the top of the bronze locknut to this position. Lock the locknut in position with the two M3 set screws provided in the locknut.
10. Thoroughly apply a light coating of the ***"Castrol Spheerol SX2"*** grease to the stainless steel power screw acme form threaded section between the bottom of the power screw housing to the top of the ***"set in position lock nut"*** using a stiff paint brush or other suitable applicator making sure all sections of the thread are **lightly** coated.
11. **When safe so to do (see step 13)** according to the site specific pipeline identifier method statement: **a)** slowly fully open the pipeline branch isolation valve and **b)** rotate the probe cover tube using the attached hand wheels on the probe in a clockwise direction (if looking from above) (for a standard right hand thread) until the underside of the power screw housing meets and lightly locks against the ***"set in position lock nut"***. **If at any time the insertion motion becomes unduly stiff (taking into account for any tolerances within the acme thread) STOP IMMEDIATELY do not attempt to force the probe in further as this may result in irreparable damage to the probe and may result in a situation that the probe can not be retracted from its present position as it may become bent. Should this situation occur refer to the site specific pipeline identifier retraction method statement and follow accordingly as amended by an authorised person after taking due account of the current situation.**
12. If a tight locking of the probe position is required slacken the M3 socket set screws in the lock nut and tighten the lock nut against the power screw housing rather than tightening the probe to the locknut. Re-set/tighten the M3 socket set screws in the lock nut.
13. **Note before starting the actual insertion process (rotating the probe cover tube) make sure:**
    A. The probe branch isolation valve is **fully** open.
    B. The probe branch isolation valve was designed to allow the probe to pass through with sufficient clearance to accommodate any misalignment of the installed probe/NPT mating/piping configuration installed.
    C. Ideally the probe branch isolation valve should be locked in the open position with labelling to denote that it should not be attempted to be closed until the probe has been retracted in accordance with the site specific pipeline identifier probe retraction method statement.
14. Check the dimension from the bottom of the hex to the underside of the power screw nut and subtract from the dimension measured in step 4 to ensure that the probe is installed to the correct depth. With one end of the labelled measurement gauge against the end of the hex check the distance that the top of the gauge is above the bottom of the power screw housing, this should equal the required insertion depth of the probe.
15. Remove hand wheels and store in safe place for use if/when the probe is to be retracted at a later date. Replace the thread plugs.
16. Re-attach the gauge rod to the probe with the original bolt and pipe clip provided, which must be done to provide a reference and reminder when the probe is to be retracted.
17. Do not attempt to retract probe without fully reading and complying with the site specific pipeline identifier method statement for retracting the probe.

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Retraction

Any probe should only be retracted by a trained and qualified person for such an operation.

Read the **whole** installation procedure/method statement and understand fully prior to starting.

The following statements are given as a guide only; you should always follow the method statement provided for your particular installation, however sections **4, 5, 7, 8, 9, 10, and 11 MUST BE complied with for safe installation and operation of the probe**.

1. Check probe serial number matches the method statement.
2. Check that you have the correct gauge rod for the probe (Match the serial numbers). The gauge rod is a very important item as it must be used to gauge the fully extracted position of the probe. Should the original gauge rod not be available then a substitute gauge rod of the **exact** length of the original should be obtained so that the probe can be retracted to the exact safe position. This helps to prevent a potentially dangerous situation and damage to the probe by either trying to over extract (forcing the probe beyond the stop mechanism) or under extract and trying to close the pipeline branch isolation valve while the probe is ***"within"*** the valve. Also make sure you have the correct factory supplied handwheels for attachment to the power screw nut to ***"un-wind"***/extract the probe.
3. Remove the gauge rod from the probe and keep to hand for use as the probe is extracted. Attach the handwheels to the power screw nut.
4. Undo M3 socket set screws in lock nut and back off lock nut from the power screw nut using suitable spanner.
5. Ensure the pipeline branch isolation valve is in the **fully open** position.
6. Close the probe outlet valve, depressurise the sample off-take line according to the site specific pipeline identifier method statement and disconnect the sample line from the probe isolation valve again according to the site specific pipeline identifier method statement.
7. **Ensure the hex & NPT connection on the probe assembly connection will not move. If you do not secure the entire probe assembly could become disconnected with pipeline in service.** ONLY Rotate the thread cover tube in an anti-clockwise direction, when viewed from above, utilising the attached handwheels.
8. Continue rotating the thread cover tube until, **and only until**, the gauge rod just fits between the end of the hex and the underside of the power screw nut. See fig 1.
9. Fully close the pipeline branch isolation valve.
10. Slowly open the probe isolation valve to vent down the small trapped volume of gas within the probe according to the site specific pipeline identifier method statement.
11. When fully vented and no further gas continues to escape from the fully open probe isolation valve, checked according to the site specific pipeline identifier method statement then the probe can either be removed or closed off according to the site specific pipeline identifier method statement.
12. Re-attach the gauge rod to the probe as found. Remove and store the probe handwheels for safe keeping all as detailed in the site specific pipeline identifier method statement.

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Operation

Once the probe is installed/inserted there is little or no operation required apart from opening or closing the probe isolation valve.

It should be noted however that:

A. If the probe is inserted and the pipeline is then pressurised or:

B. If the probe is in-use/inserted and the pipeline is de-pressurised and then the pipeline is re-pressurised

Then there is a small possibility that the sliding seal mechanism will weep or leak. (The seal is designed to seal against a sudden increase in pressure and remain sealed against all pipeline pressures within the design conditions). Should leakage occur due to these conditions then the leakage can be rectified by retracting the probe, isolating the probe from the pipeline, venting down the probe and then carrying out a re-installation process from step 11 of the installation procedure.

Note under conditions A. & B. above, sometimes the seal can be re-made simply by rotating the thread cover tube or just retracting the probe to its fully retracted position without having to de- pressurise.

Warning/Note to rotate the thread cover tube it will be necessary to disconnect the sample line from the probe isolation valve.

(Original document reference No. EA01 0007)

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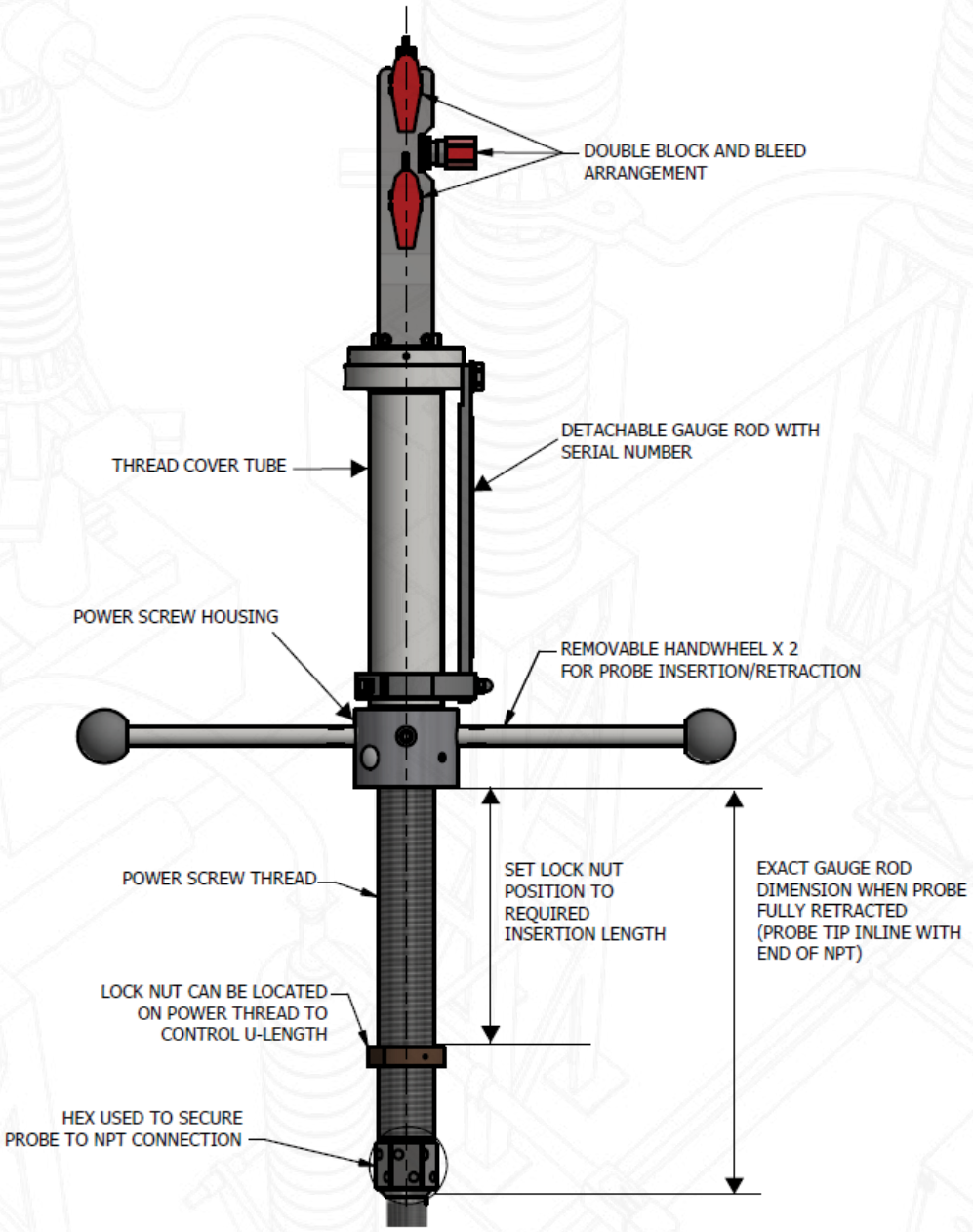

Figure 1: NPT Retractable Probe