



INSTRUCTION MANUAL PIGGING SYSTEM XSR Type

(XSR issue A)

**Equipment intended for use in
Potentially explosive
atmospheres**

Directive 2014/68/EU

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1. GENERALITES

The XSR type pigging system is a process line accessory designs for the recovering of residual product in a transfer line.

This manual corresponds to the instructions for use of the pigging system.

In case of difficulties that would not be solved by this instruction manual, please require additional information to the manufacturer or to his agent in the EC.

The manufacturer reserves rights of modifications and technical improvements.

Any person using this instruction manual must have the requested qualification. The operators must be informed in accordance with this instruction manual.

2. MARKING

This Pigging system is stamped with a self-adhesive on the launching.

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Année : XXXX
Réf : XXXXXXXXXXX/XXXX
N° Lot : OFXXXXXX
N° Fab : X

 II 2GD c IIb T4

The pigging system is marked with the manufacturer serial number on the body rep. 1 :

- this number is composed by the three-digit group : SVX
- followed by the manufacturing working operation numbers.

Example : OF25640 will show a marking : SVX25640

3. OPERATION

XSR standard definition

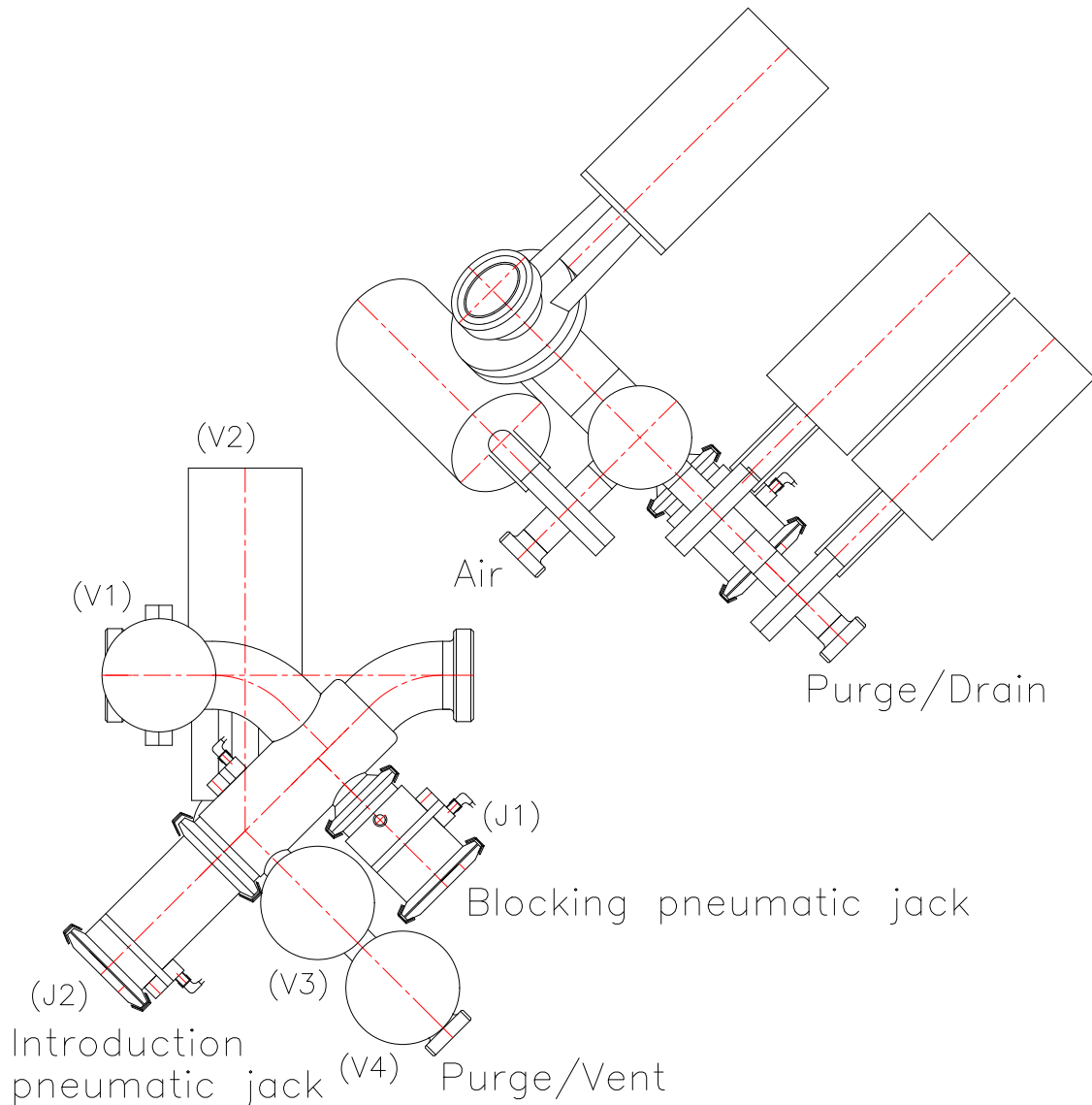
The standard version of XSR pigging system is used for clear or viscous liquids. All its components are installed in line and are of a reduced bulkiness.

This version is composed of an in-line launching station, a receiving station, and a pig.

The pig is stored in a body isolated from the transfer line. The volume of product in this body is very small.

The cleaning of the pig is carried out at the same time as the cleaning of the line.

The ATEX pigging system is available in automatisable version. Valves are not supplied.



Launching station

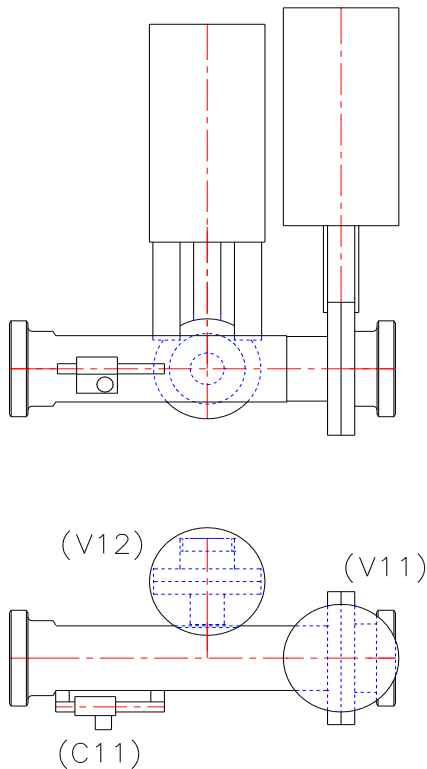
The launching station is composed of a body to be connected to the transfer line and that enables pig storing. The launching station is supplied with male/male connections to the transfer line.

The launching station is equipped with :

- a double acting pneumatic jack for the blocking of the pig (J1) ;
- a double acting pneumatic jack for the introduction of the pig into the transfer line (J2) ;
- a magneto-inductive detection system (C1).

The launching station will have to be equipped with :

- a butterfly valve (V1) for the sectioning of the transfer ;
- a butterfly valve for air arrival (V2) that enables the sending of the pig during pigging phase;
- two butterfly valves for purge (V3) and vent (V4);



Receiving station

The receiving station is composed of a collar to be connected to the transfer line. The receiving station is supplied with male/male connections to the transfer line.

The receiving station is equipped with :

- a mechanical system for pig blocking ;
- a magneto-inductive detection system (C11).

The launching station will have to be equipped with :

- a butterfly valve (V11) for the sectioning of the transfer line ;
- a butterfly valve for air arrival (V12) that enables the sending of the pig back to the launching station ;

PIG

Operating principle

Pigging consists in recovering residual product in a transfer line.

The pigging process first consists in introducing the pig into the process line (upstream the residual product) through the launching station. The pig is then driven from the launching station to the receiving station and he pushes the product slurries in front of it. The pig allows, with a dedicated process, the isolation of two different products, using one after the other one, the same line.

The pig is manufactured in elastomer adapted to the product to be pig. Its particular shape, with several disc ensures the tightness.

The pig is generally equipped with a magnetic insert that enables position detection.

Caution for use

This pigging system must be used for clear liquid or viscous products line, with working pressure up to 10 bar, and a working temperature up to 120°C according to the selected elastomer.

Chemical compatibility of the elastomer with the product used in the line should be checked.

The pig is bi-directional. Thanks to its particular shape, it can efficiently push the residual product and scrap the line with a front pressure due to the the residual product and come back to the departure in reverse motion without rotating. The discs must be located in front of the pig, facing the line to be pushed.

As the diameter of the pig caters precisely for a required standard, the line to be pigged should have a constant internal diameter (with a +2/-1 % tolerance).

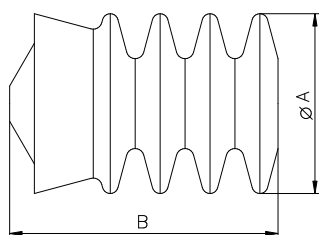
Technical data**Materials**

Product wetted parts	: EPDM, Viton, Nitrile rubber or Silicone
Elastomer hardness	: 50 shore
Magnetic insert	: Néodymium

Sizes (mm)

The pigging system is available in the following sizes :

- For SMS pipes: 25 mm (1"), 38 mm (1.1/2"), 51 mm (2"), 63.5 mm (2.1/2"), 76.1 mm (3") and 104 mm (4").
- For DIN 11851 pipes: DN40, DN50, DN65, DN80 and DN100.

**DIN Pig**

Sizes	DN40	DN50	DN65	DN80	DN100
Pipes	40 x 1,5	52 x 1	70 x 2	85 x 2	104 x 2
A	37.7	51	67.3	82.6	102
B	65	76	97	120	146

SMS Pig

Sizes	25mm	38mm	51mm	63.5mm	76.1mm	104mm
Pipes	25 x 1.2	38 x 1.2	51 x 1.2	63.5x1.5	76 x 1.6	104 x 2
A	23	36.7	49.6	61.7	74.3	102
B	40	65	74	91	110	146

STORAGE

Store in dry place, away from dust and light, in non corrosive atmosphere, if possible in its original packing.

STARTING UP

The pig is wearing part and so, It is recommended to check its aspect before any introduction into the line : the pig must be free of unusual wearing of the discs (check eventually the A size), and free of any surface cracks.

As the diameter of the pig caters precisely for a required standard in order to ensure a proper tightness, the external diameter is equal to the internal diameter of the line increased by 2%, and so the introduction of the pig shouldn't be easy.

MAINTENANCE

The pig don't request a dedicated maintenance. Nevertheless a detailed inspection must be performed periodically to visually check the absence of cracking or premature wear. The frequency of these visits depends on the operating conditions and is to be determined for each case.

4. CAUTION FOR USE

4.1 Technical data

Product wetted parts	: stainless steel 1.4404
Other parts	: stainless steel 1.4301
Seals	: EPDM, Silicone, Viton or Nitrile rubber
Pig	: EPDM, Silicone, Viton or Nitrile rubber

4.2 Specifications

This equipment is destined to be used in surface installations (group II).

Protection level category 2 is appropriate for normal operation and disturbances that occur frequently , or for which operating defaults are normally taken into account. The described equipment is destined for an environment in which explosive atmospheres are sue to mixtures of air and gas (G), steam, mists and where mixtures of air and dust (D) will probably occur.

The surface temperature is the temperature of the fluid transported and so the maximum working temperature (120°C) defined the classification of the system : the pigging system is T4 classified.

This pigging system must be used with working pression up to 10 bar, and a working temperature up to 120°C.

According to the EN 12266, the pigging system is subbmited to an hydrostatic test at 15 bars.

General drawing is attached.

4.3 Fluid supply

Compressed air for pig introduction and pig blocking jacks : lubricated compressed air, pressure : 6 bar, maximum supply flow : 110 l/min.

Driving fluid :

The driving fluid must be a 'neutral liquid' from group 2 if the pushed product is a fluid from group 1 (in the sense of Article 9, paragraph 2, of directive 2014/68/EU). If the pushed product is a fluid from group 2, driving fluid could be gas or liquid from group 2.

Air could be used as driving fluid for the following pipes diameters : DN ≤ 80mm.

The maximum flow rate of the driving fluid corresponding to a maximum speed of circulation of the pig of 1 m/s is bellow given.

Pipes nominal diameter DN	25	38/40	50	76/80	100
Maximum flow rate (m ³ /h)	1.4	3.4	6	15	28

4.4 Corrosion of seals by the liquid product

The quality of seals must be determined according to liquid product and working conditions.

Seals must be changed and bearings must be checked at least once a year in order to avoid any risk of leakage and any temperature out of the acceptable range mentioned on the equipment.

Any intervention on any seal must be followed up by a tightness testing before the re-starting of the equipment.

5. HANDLING

5.1 Storage

Storage temperature from 0°C to +60°C, in dry place and away from dust, if possible in its original packing.

5.2 Transport

Transportation temperature from 0°C to +60°C,

Protection against any external danger (clash, blow, vibration...).

5.3 Use

When use at high fluid temperature, high temperature (up to 120°C) can be reached on the surface of the body: risk of severe burning.

6. INSTALLATION

Installation is part of the user scope. The conformity of Servinox equipment assembly is only ensured if all of the components in the Atex kit have been correctly assembled in compliance with the instructions.

When unpacking the pigging system, handle it with precaution. The system must be free of shocks. Any drop should involve a return to the manufacturer.

One must check the proper positioning of the seals, pneumatic connection, assembly onto the line with proper fittings and check the tightness of the system before any starting up.

Assembly and disassembly should be carried out by qualified personnel.

The piping system should be linked to earth by the user in compliance with standard good practices. Electrical conductivity in between each component must be checked.

Sensors must be installed in compliance with the attached manufacturer instruction manual.

Users must comply with the decree of the 31st March 1980 from the Ministry of the Environment and DIRECTIVE 1999/92/CE OF THE EUROPEAN PARLIAMENT AND COUNCIL of the 16 December 1999, concerning the minimum prescriptions aimed at improving protection in terms of the health and safety of workers liable to be exposed to the risks of explosive atmospheres (fifteenth specific directive in the sense of Article 16, paragraph 1, of directive 89/391/CEE)

7. STARTING UP

Before starting up a new installation or before starting up of an installation after reparations or modifications, one must imperatively check the following points:

- All assembly work is accurately completed.
- Make sure that the system is free of any foreign body.
- The starting up is carried out only by "qualified people".

8. MAINTENANCE

- System out of pressure and emptied installation.
- Cooled down equipment
- If the system has been used in hazardous media (corrosive and aggressive), it must be decontaminated before disassembly by flushing in order to remove any hazardous material and aeration of the pipe network. Any person involved in the removal and disassembly of the valve should wear in such case the proper protective clothing and equipment.
- Cleaning of the system must be periodically carried out in order to avoid any dust accumulation.
- Assembling work must be carried out only by "qualified people".
- Follow up the general directives for mounting and dismantling.
- Used only Servinox supplies spare parts (list given in technical document).
- It is strictly prohibited to modify the equipment. The conformity of Servinox equipment assembly is only ensured if all of the components in the Atex kit have been correctly assembled in compliance with the instructions and without any modification.
- Check the proper functioning of the pig blocking and pig introduction jacks. In case of trouble, see the dismantling instruction.

8.1 Disassembling of the pigging system

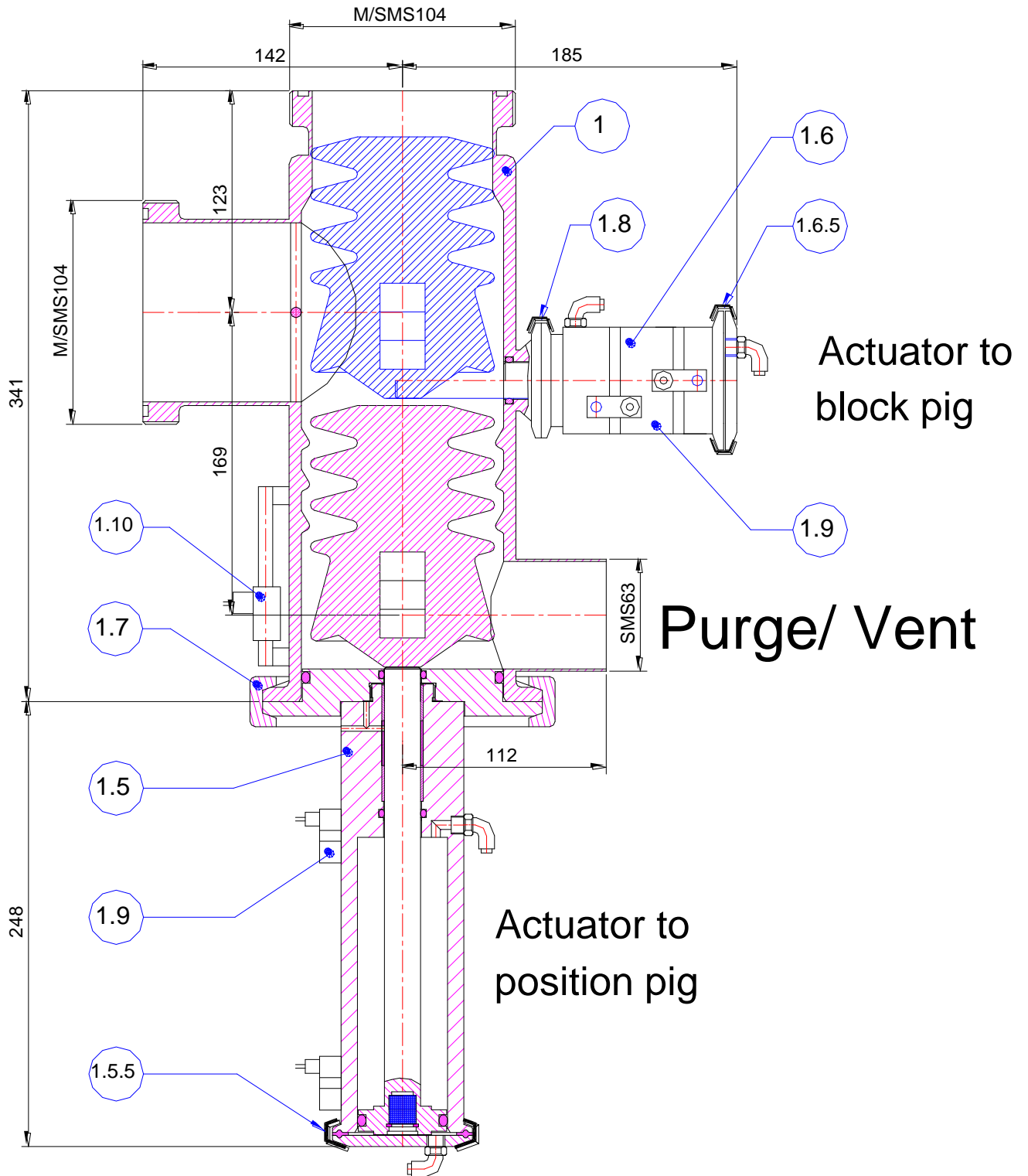
To disassemble the receiving and launching station :

- Disconnect the jack sensors (rep 1.9) and the sensors of the receiving and launching station (rep 1.10 et 2.2) as well as any other electrical connector.
- Disconnect all the pneumatic connection of the receiving and launching stations components.
- Take off the stations from the pipeline (rep 1 et 2).

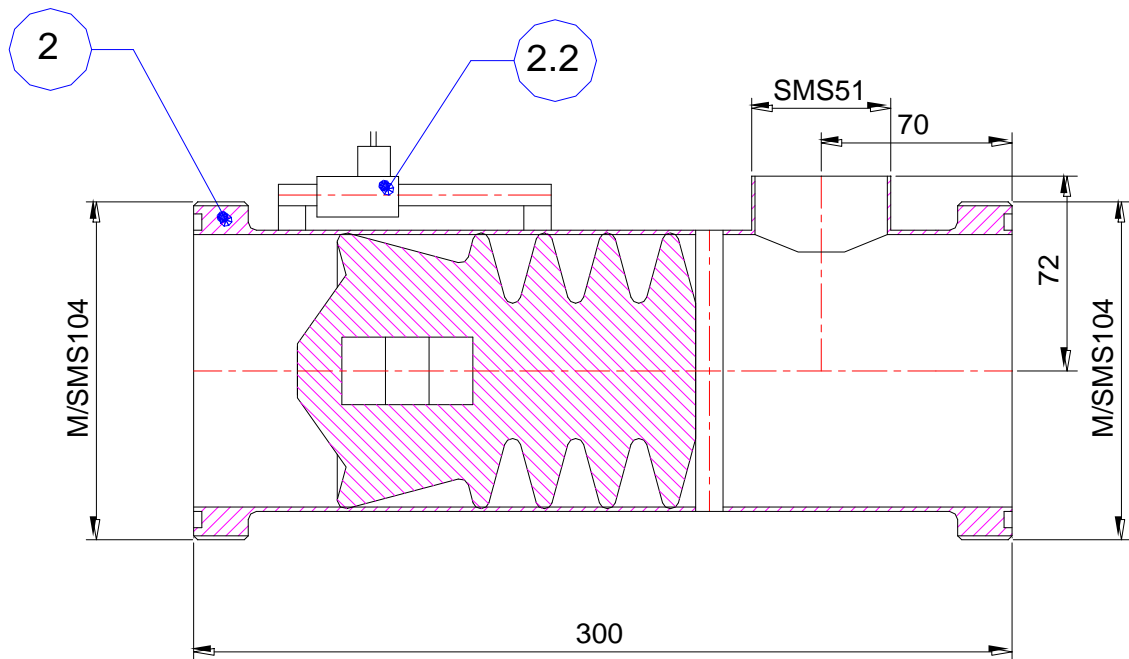
To disassemble the launching station :

- Remove the clamp rings (Rep 1.7et 1.6) and the pig blocking and pig introduction jacks.
- Take off the pig

Lauching station



Receiving station



8.2 Re-assembling of the pigging system

Having assured that all critical surfaces and components have been inspected, carefully cleaned, and or replaced, re-assemble of the launching station can be begun:

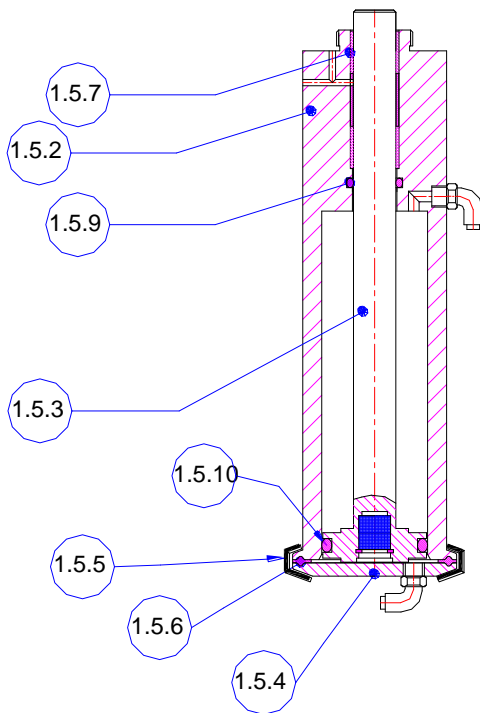
- Before re-installing the launching station, the proper functioning of the of the pig blocking (1.6) and pig introduction jacks (1.5) must be checked.
- The pipeline and the stations must be free of dirt, burrs, welding residues and any foreign body.
- Seals and gasket surfaces must be clean.
- Re-install the pig blocking jack (1.6) with the clamp ring (1.8), after replacing the seal.
- Re-introduce the pig
- Re-install the pig blocking jack (1.5) with the clamp ring (1.7), after replacing the seal.

Having assured that all critical surfaces and components have been inspected, carefully cleaned, and or replaced, re-assemble of the stations can be begun:

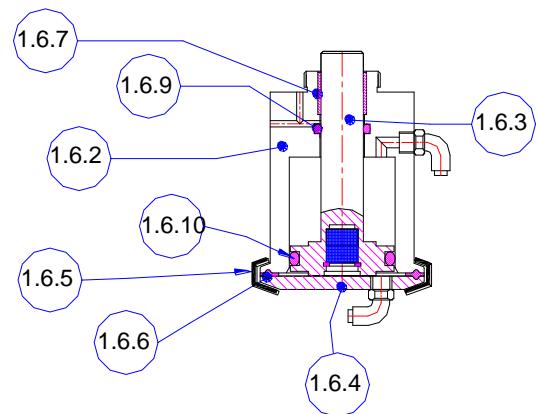
- Re-install the stations (1 and 2) with the male/male connection onto the transfer line, after replacing the seals.
- Connect the jack sensors (rep 1.9) and the sensors of the receiving and launching station (rep 1.10 et 2.2) as well as any other electrical connector and check the proper functioning.
- Connect the air arrival and purge valves.
- Connect the pneumatic connection of the receiving and launching stations components.
- Check the proper functioning of all the components
- Check the tightness of the system through an hydrostatic test.

8.3 Disassembling and re-assembling of the pig blocking and introduction jacks

Actuator to position pig



Actuator to block pig



To dismantle the jacks :

- Jacks must be disassembled from the station, compress air disconnected, sensors disconnected.
- Dismantle the clamp ring rep (1.5.5) and (1.6.5).
- Take off the cylinder rod rep (1.5.3) and (1.6.3).
- Change the seals rep (1.5.9), (1.6.9), (1.5.10) and (1.6.10).
- Check the bearings rep (1.5.7) and (1.6.7) and replace it if requested.
- Check the seals rep (1.5.6) and (1.6.6) and replace it if requested.

To re-assemble the jacks :

- check the seals and bearings.
- Jack must be free of dirt, burrs, welding residues and any foreign body.
- Re-install the rods rep (1.5.3) and (1.6.3)
- Re-install the covers rep (1.5.4) (1.6.4) and the clamp seals rep (1.5.6) and (1.6.6).
- Re-install the clamps ring rep (1.5.5) and (1.6.5).
- Check the proper functioning.

9. APPENDIX

- General drawing
- Spare parts list
- Sensor's Instruction manual