CONTAMINATION MONITORING PRODUCTS

INSTALLATION GUIDE

ICM 2.0 / 4.0

IN-LINE CONTAMINATION SENSOR

EN

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ENGLISH

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1 General warnings and information for the operator

1.1 General Safety Warnings

Do not operate, maintain or carry out any procedure before reading this manual. Any individual operating the unit shall wear the following Personal Protective Equipment:

- Protective eyewear
- Safety shoes
- Gloves

Before carrying out any machine installation procedures and/or before use, one should scrupulously follow the instructions listed in this manual. Moreover, it is necessary to comply with the current regulations related to occupational accident prevention and safety in the workplace.

Notices aimed at the prevention of health hazards for personnel operating the machine are highlighted in this document with signs having the following meaning:

It relates to important information concerning the product, its use or part of this documentation to which special attention must be paid — NOTE

It means that failure to comply with the relevant safety regulations may result in mild injury or property damage. — CAUTION

It means that failure to comply with the relevant safety regulations may result in death, serious injury or serious property damage. — DANGER

Failure to comply with the relevant safety regulations may result in death, serious injury or serious property damage.

To allow rapid identification of the employees who must read this manual, definitions have been used with the following meaning:

OPERATOR	This is any individual whose task is to use the machine for production purposes. The operator is aware of all the measures taken by the machine manufacturer in order to eliminate any source of injury risk in the workplace and takes into account the operational constraints.

MAINTENANCE TECHNICIAN	This is any individual whose task is to carry out maintenance activities on the machine. The maintenance technician is aware of the possible danger situations that may arise and takes the appropriate precautions in order to eliminate the risks of accidents in the workplace.

GENERAL WARNINGS

1.2 Operator position and dangerous areas

No operator is required for operating the unit.

The unit shall be taken out of service and/or dismantled in accordance with the current regulations in force in the country where the machinery is installed

NOTE

1.3 Dangers and Hazards that cannot be eliminated

- Burn risk because of high temperatures
- Accidental oil leaks with consequent risk of slipping
- Hose breakage and resulting lubricant loss
- With oil temperatures exceeding 40/45 °C (104/113 °F), it is vital to be extremely careful when handling and moving the unit. Avoid direct contact with hot oil.

ALL EQUIPMENT SHOULD BE ALLOWED TO COOL PRIOR TO HANDLING

1.4 Personal Protective Equipment

When operating the unit, personnel must be wearing safety shoes, gloves and protective eyewear. In general, the PPEs to be used according to the activities on the machinery are listed in the following table:

ACTIVITY	PPE
Ordinary operation	Shoes, gloves, goggles, overalls
Planned maintenance	Shoes, gloves, goggles, overalls

1.5 General operation

Physical checks

- Oil leaks on and around the unit
- Fatigue in hoses and pipework that might then leak when under system pressure

Specific risks

- Ensure hoses are properly connected and pressures are within target range to prevent spills and risks of scalding from hot fluids

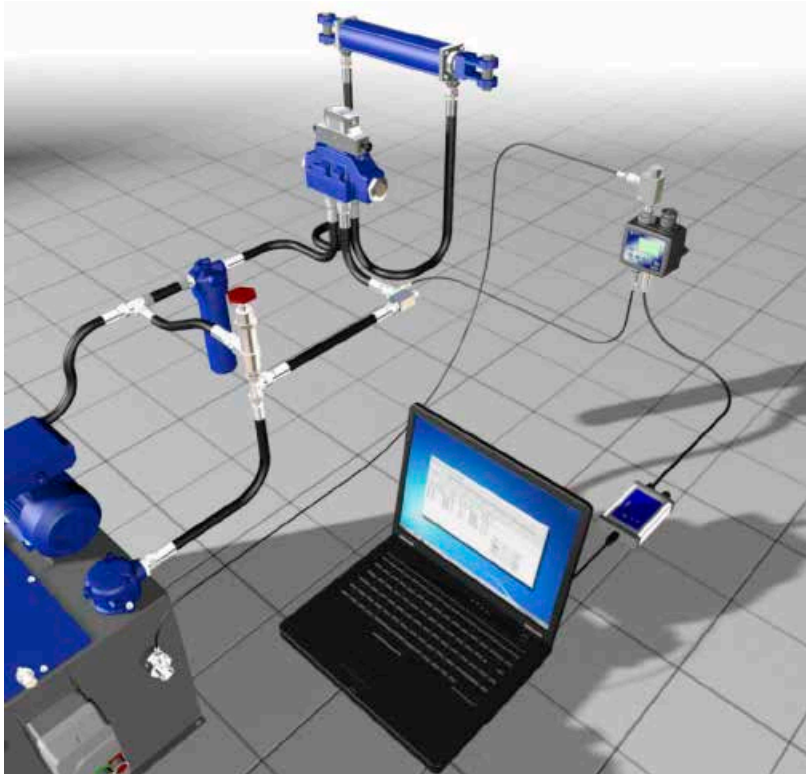

Figure 1

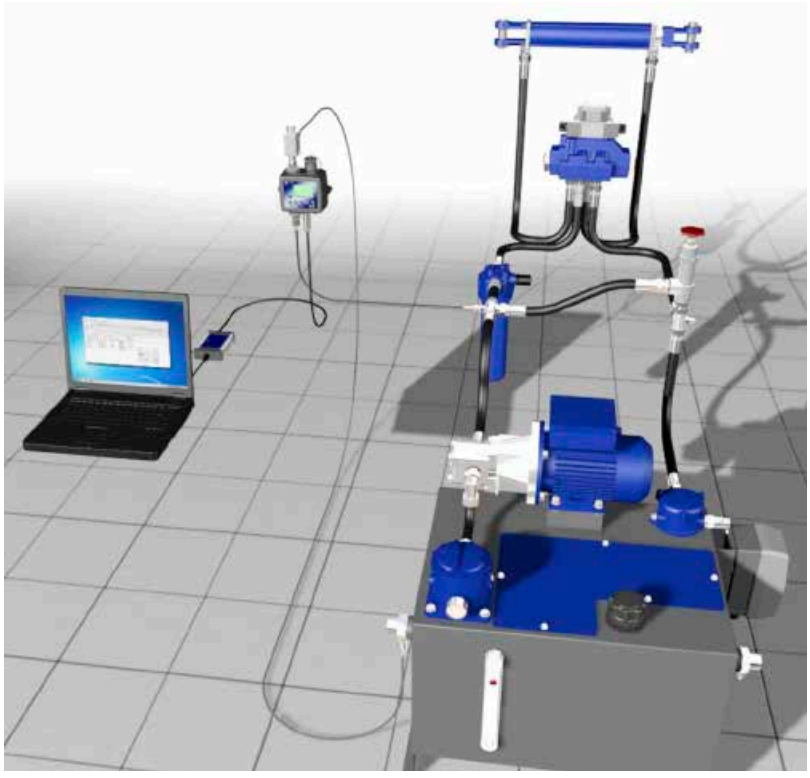

Figure 2

2 Setting up your ICM

- Hydraulic hoses should be sourced to suit connection type and system pressures
- If utilising microbore pressure hoses (G1 connection), it is recommended that a maximum length of 1500mm is used to the inlet of the ICM
- If the media being tested is over 220 centistokes it may be necessary to use a larger internal bore hose to create enough flow through ICM
- Check flow is in an acceptable range. There needs to be a differential pressure placed across the ICM, so that a flow of fluid is generated within the range of the unit.

When installing the ICM into a pressure line a minimum of 1 bar (14.5 psi) to maximum 420 bar (6000 psi) is required.

CAUTION! High Pressure System ⚠ *CAUTION*

PRODUCT INSTALLATION

Typically a M16 x 2 test point is used for this connection on both the ICM and sampling point on application - see Figure 3

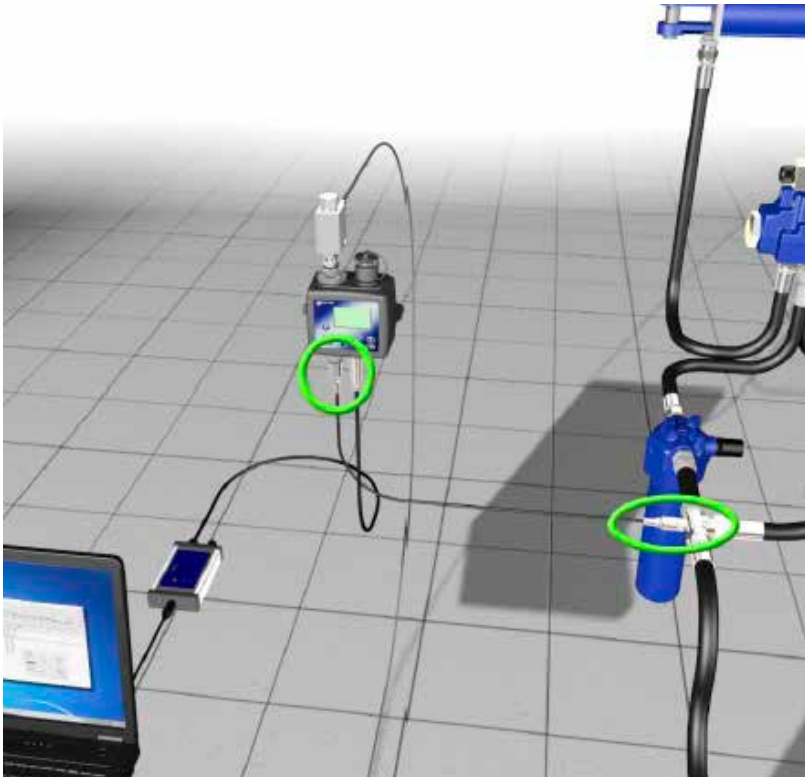

Figure 3

The ICM is connected to the system using a microbore hose M16 x2 Microbore Hose x 1500 mm long plated steel (Max Length inlet). Part Number – 95.Y30Y30X261150

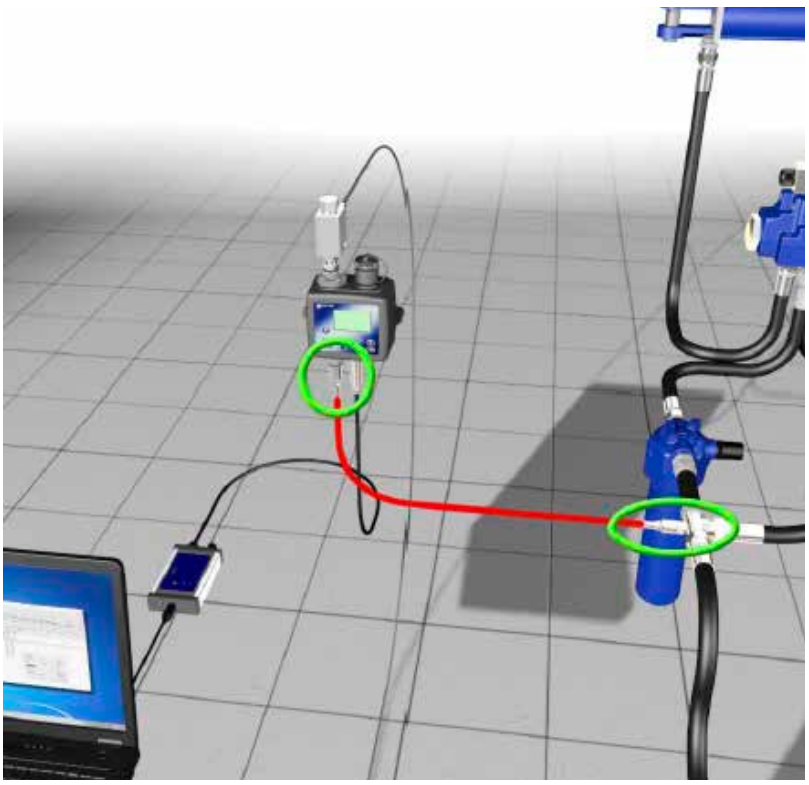

Figure 4

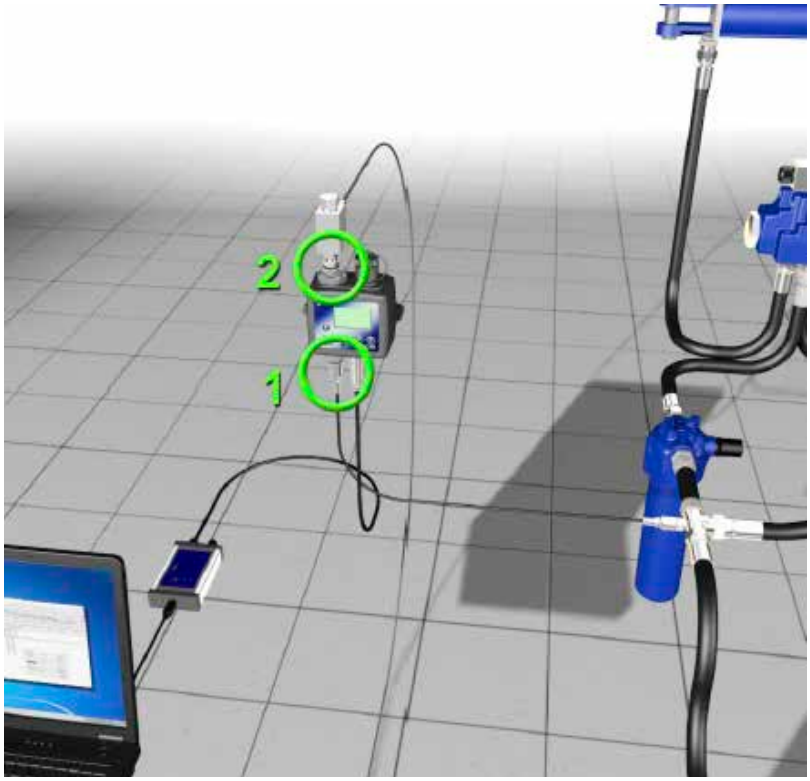

Figure 5

A minimum pressure differential of 0.5 bar (7 psi) between point 1 and point 2, to a maximum of 420 bar (6091 psi), is required to achieve a flow across the ICM.

CAUTION! High Pressure System ⚠ *CAUTION*

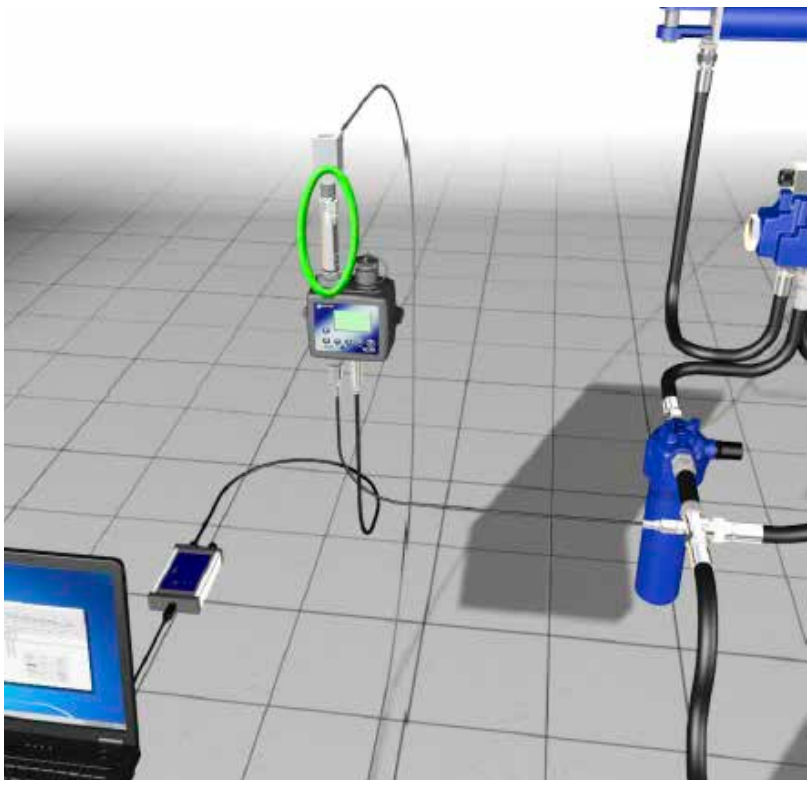

Figure 6

Should the flow across the ICM exceed 400 ml per minute then use Flow Control Valve (below) ICMFC1MV1

Figure 7

This is installed on the outlet of the ICM (see image left).

PRODUCT INSTALLATION

2.1 ICM Installation Guide for In-line Pressure Circuit - Option 1

It is always very important to fit a check-valve, see figure 8, (1/4 inch BSP thread). Check-valve value 1 bar (14.5 psi) to 2 bar (29 psi).

This is fitted to create a pressure drop across the ICM and aid in the influence of air the effect of air in the system.

Options and part numbers for check valves and manifold blocks are below

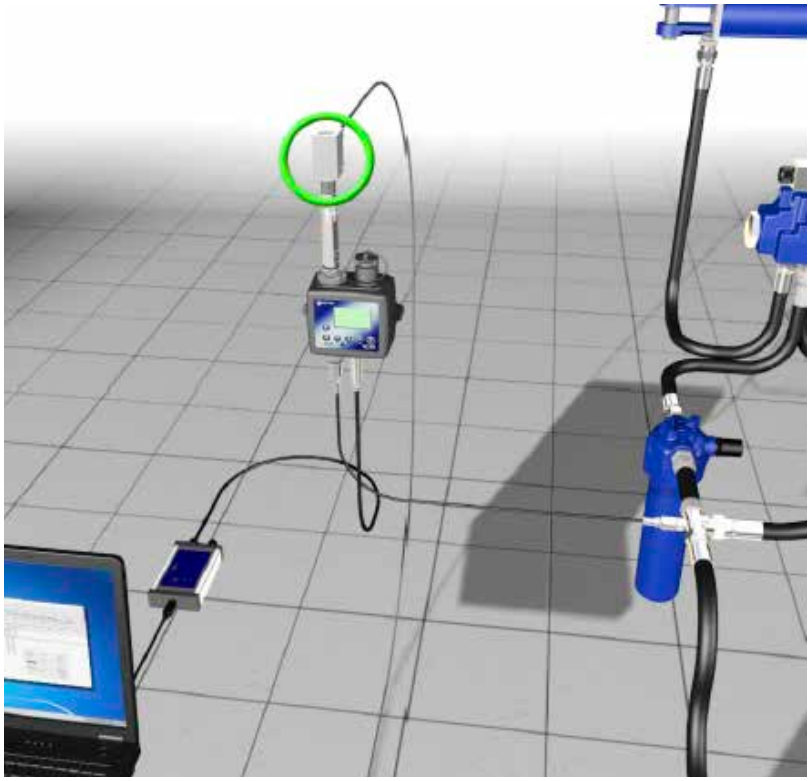

Figure 8

11.560	1 bar (14.5 psi) check valve (to suit 11.565 manifold)
11.561	2 bar (29 psi) check valve (to suit 11.565 manifold)
11.562	3.5 bar (51 psi) check valve (to suit 11.565 manifold)
11.563	5 bar (72.5 psi) check valve (to suit 11.565 manifold)
11.564	7 bar (101.5 psi) check valve (to suit 11.565 manifold)
11.565	Check valve manifold - G1/4" female ports

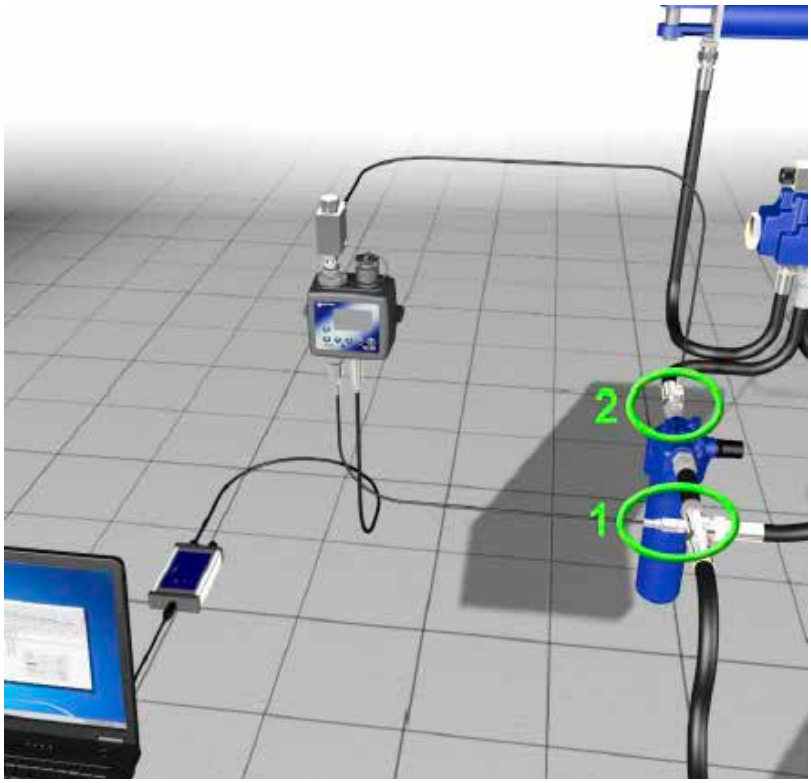

Figure 9

2.2 ICM Installation Guide for Pressure Circuit - Option 2

The ICM can also be installed in the pressure line in the range of 1 bar to 420 bar (14.5 psi to 6091 psi) by fitting a microbore M16x2 test point in the pressure line - highlighted 1 and 2 (Figure 9).

It is essential there is a pressure differential across the inlet of the ICM and the ICM return line back to the circuit so that a flow of fluid is generated within the *recommended* range of the unit. The minimum recommendation of the pressure differential is 0.5 bar (7 psi).

CAUTION! High Pressure System ⚠ *CAUTION*

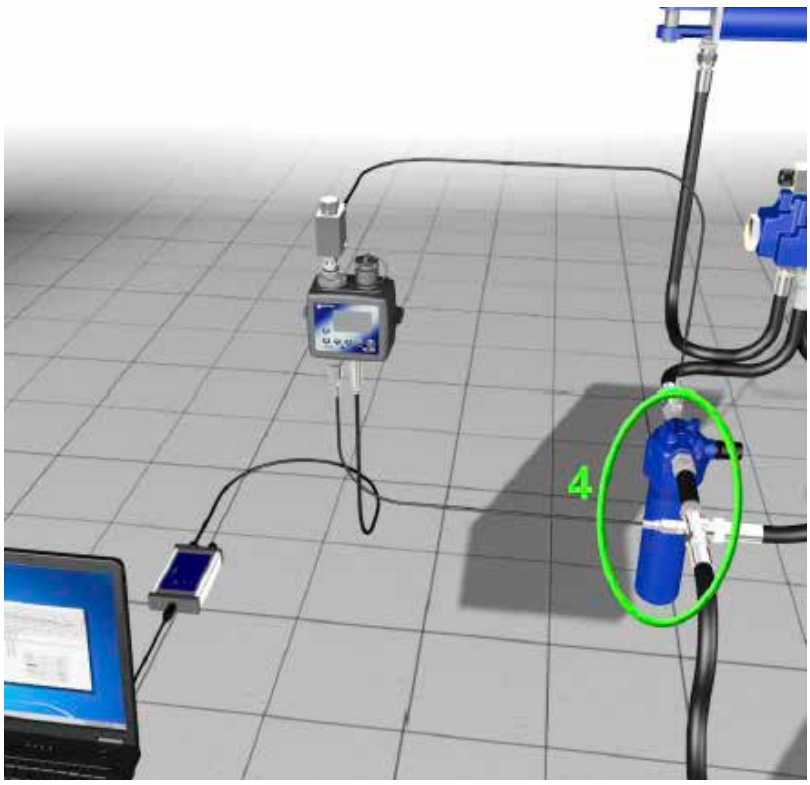

Figure 10

In this case the differential pressure between branching test point 1 and reentry point 2 (Figure 9) is created across the pressure filter - highlighted at point 4 (Figure 10).

Please note this is an example. Depending on the type of filter and its micron rating and the circuit parameters - flows/pressures/viscosities - a 0.5 bar (7 psi) differential may not be achievable.

If this is the case the operator will need to choose another option or component to facilitate the correct differential that creates the correct flow rate for the ICM device

PRODUCT INSTALLATION

Other hydraulic components which allow a differential pressure to create a flow through the ICM can be used. The ICM is highlighted at point 3 (Figure 11).

One example could be a heat exchanger/cooler in the circuit.

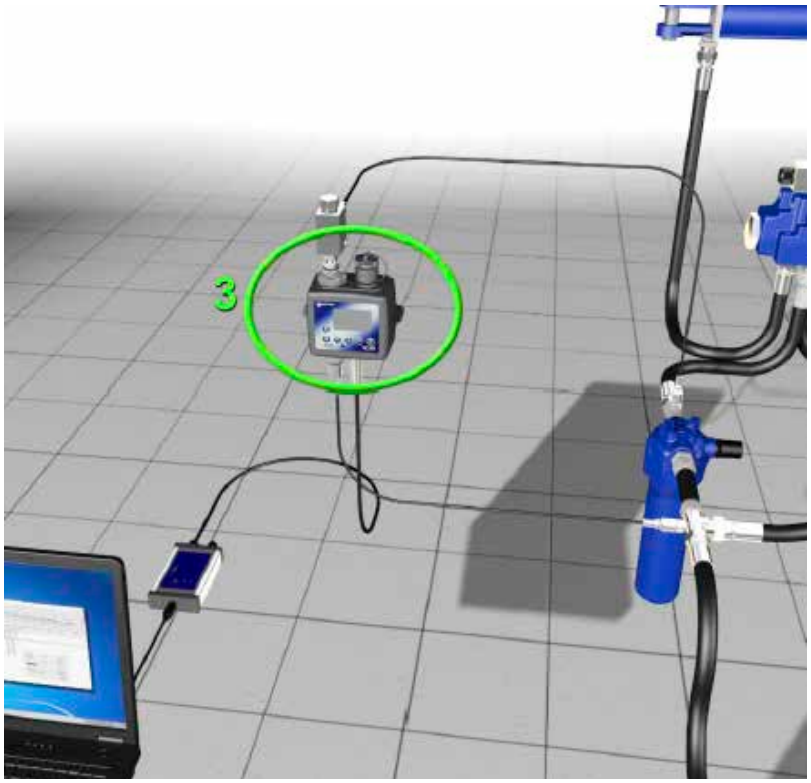

Figure 11

Depending on the differential pressure a pressure compensated Flow Control Valve (see figure 13) may be required to regulate the flow through the ICM - point 5.

This flow control valve will be needed if the flow exceeds 400 ml per minute.

This is installed on the outlet of the ICM.

Figure 13

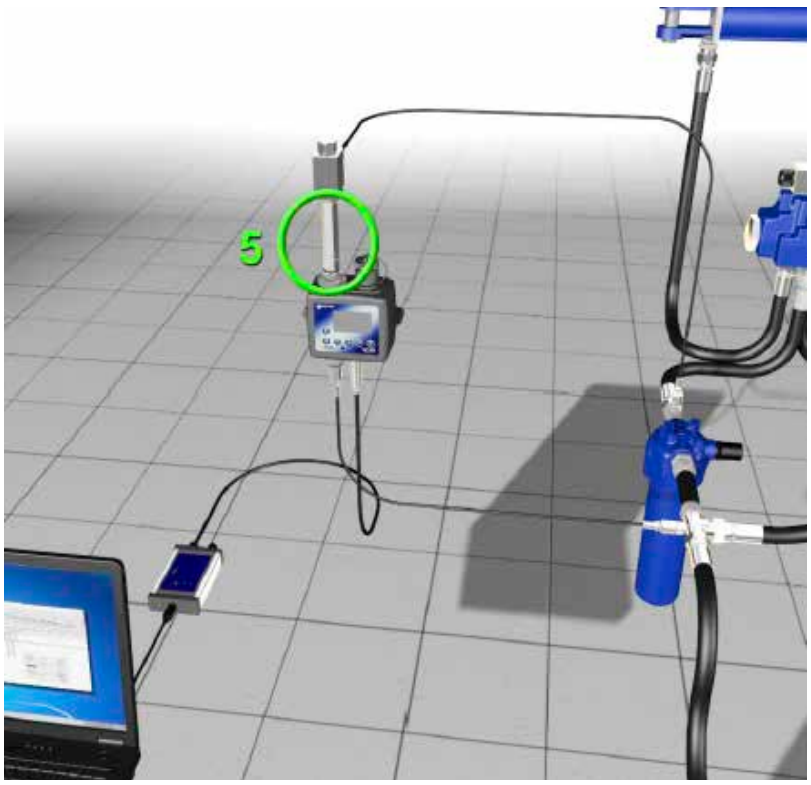

Figure 12

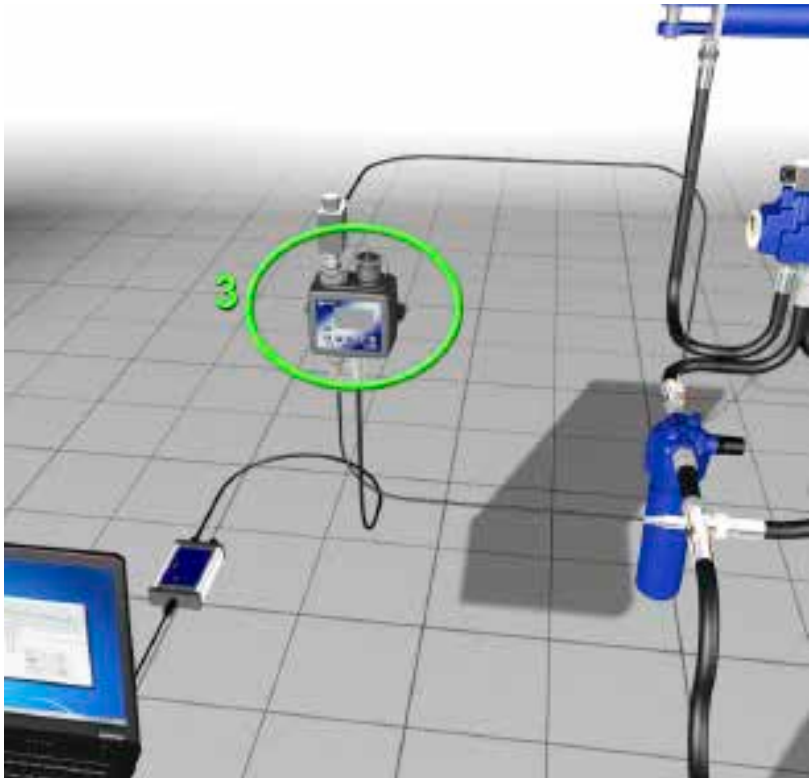

Figure 14

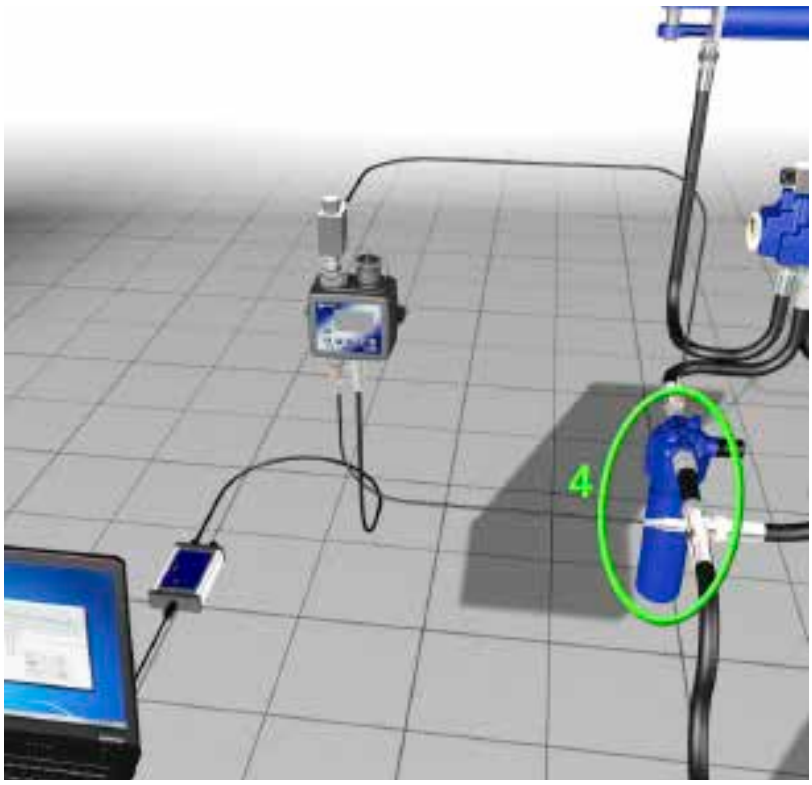

Figure 15

The flow across the ICM highlighted in example 3 (Figure 14) is determined by the pressure-drop across the pressure filter highlighted 4 (see figure 16 below). A minimum flow 20 ml per minute to 400 ml per minute is allowable.

PRODUCT INSTALLATION

2.3 ICM Installation Guide for Return Line

On the return side of the components, the check valve needs to be installed at highlighted point V1 (Figure 16) after the sampling point to create an 'artificial' back pressure.

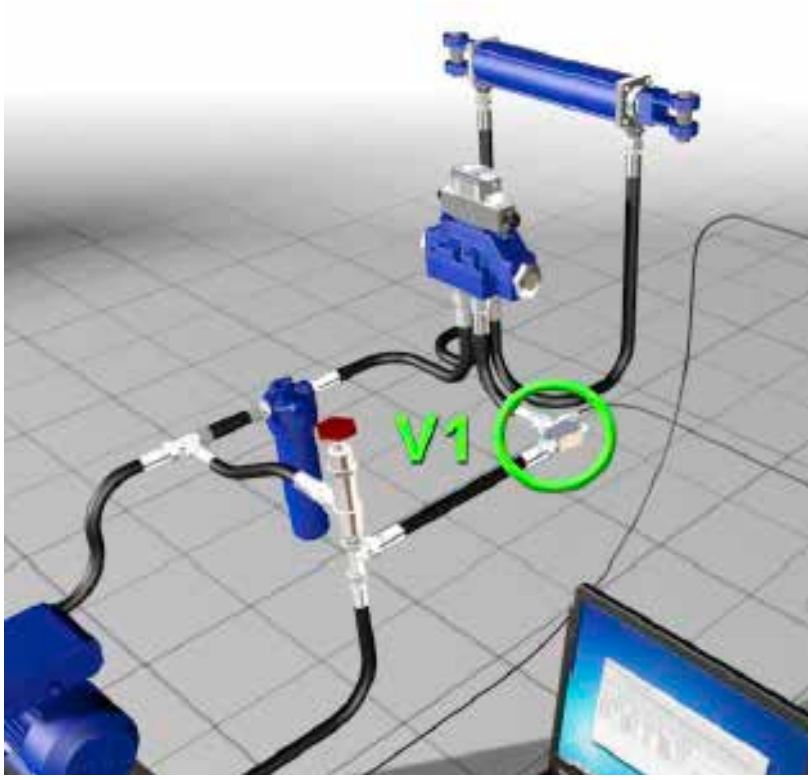

Figure 16

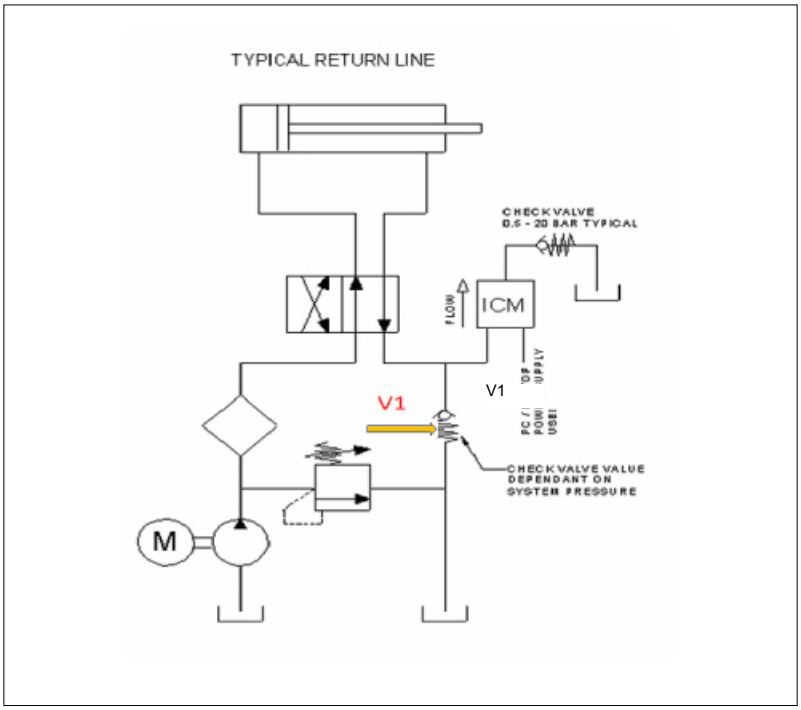

Figure 17

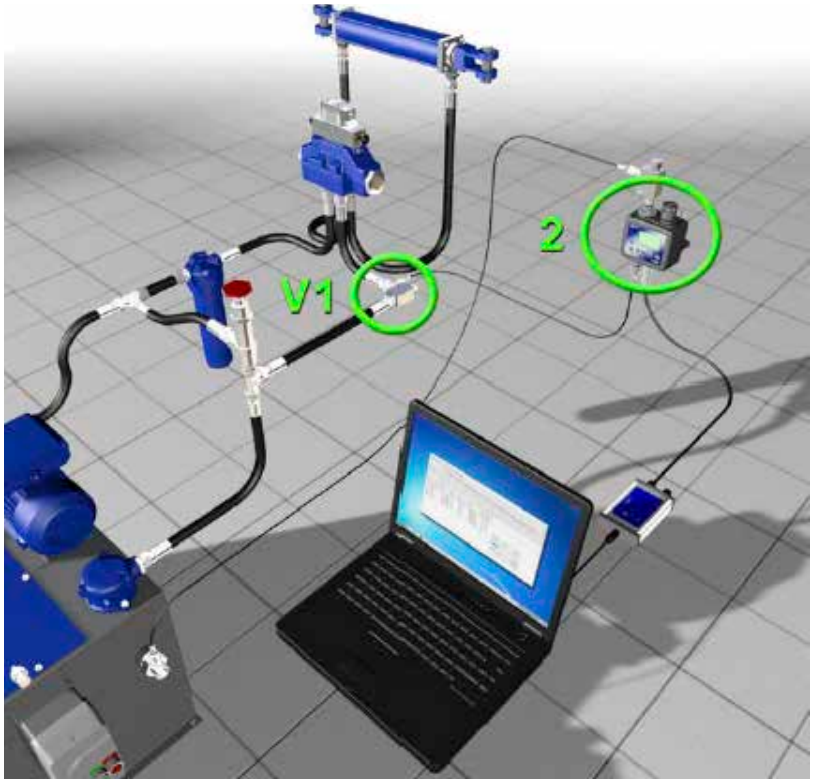

Figure 18

This will create a differential pressure across the ICM - highlighted point 2 (figure 18) before returning the hydraulic fluid back to the reservoir.

PRODUCT INSTALLATION

A further check-valve should be mounted either on the ICM - highlighted point V2 or before returning the hydraulic fluid back into the reservoir - test point highlighted 3 (Figure 19).

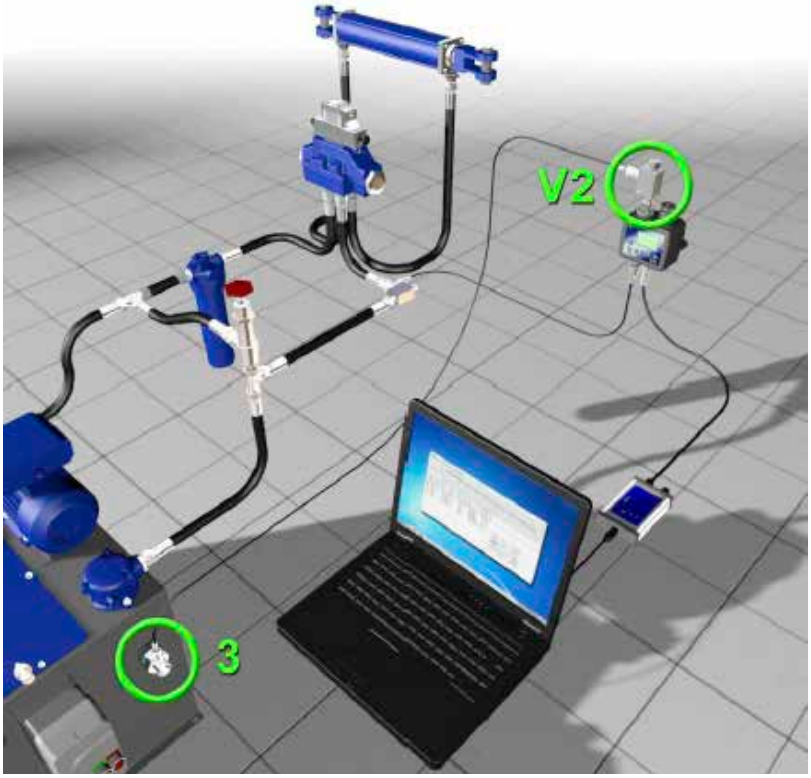

Figure 19

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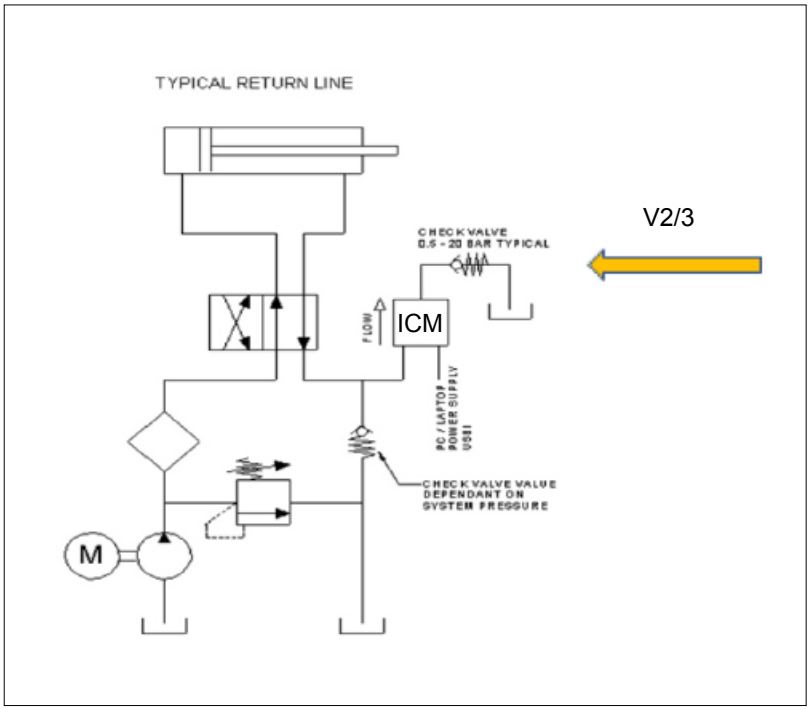

Figure 20

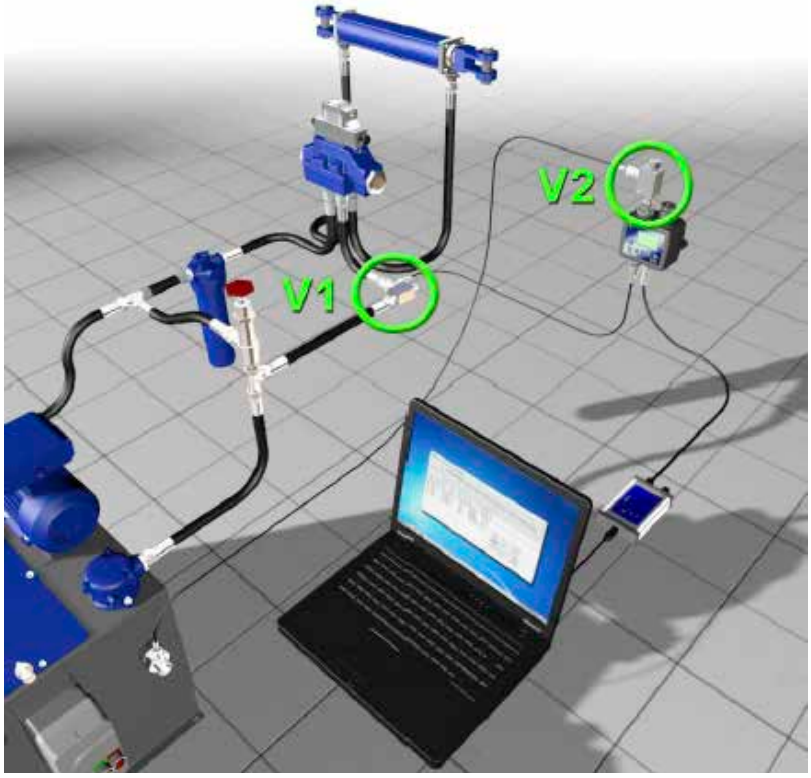

Figure 21

These check-valves V1 and V2 perform two functions:

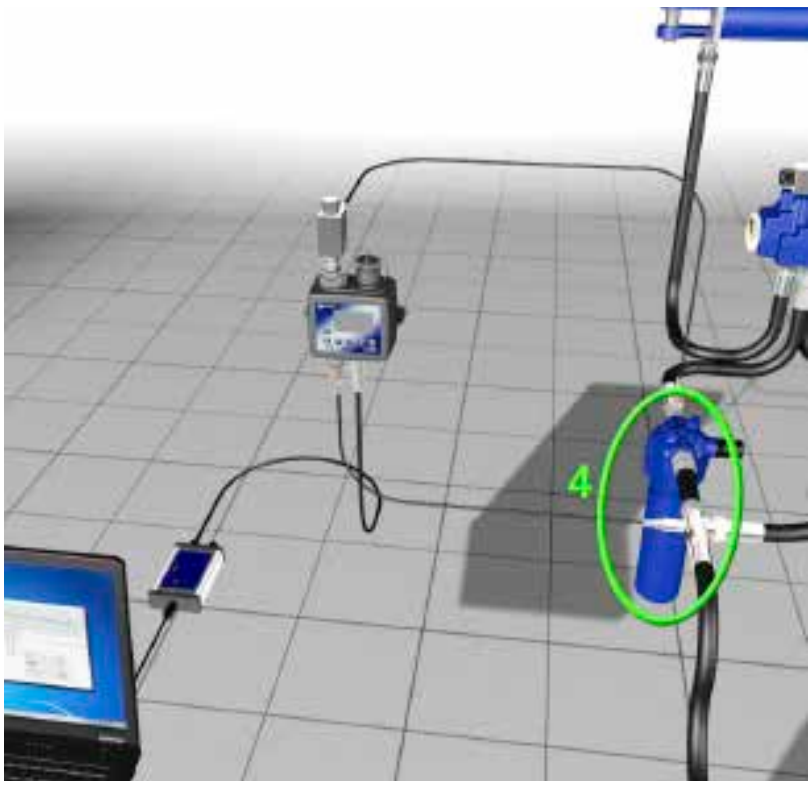

Figure 22

To create a differential between the ICM - highlighted point 4 (Figure 22) inlet and outlet - optimum differential pressure is 1 - 2 bar (14.5 - 29 psi).

PRODUCT INSTALLATION

The check-valve after the ICM, highlighted point V2 (Figure 23), is also fitted to prevent any back-flow of oil and air expansion across the ICM analysis chamber. If this is not fitted then the readings of the ICM could be influenced by the air and increase the variable particle counts and codes.

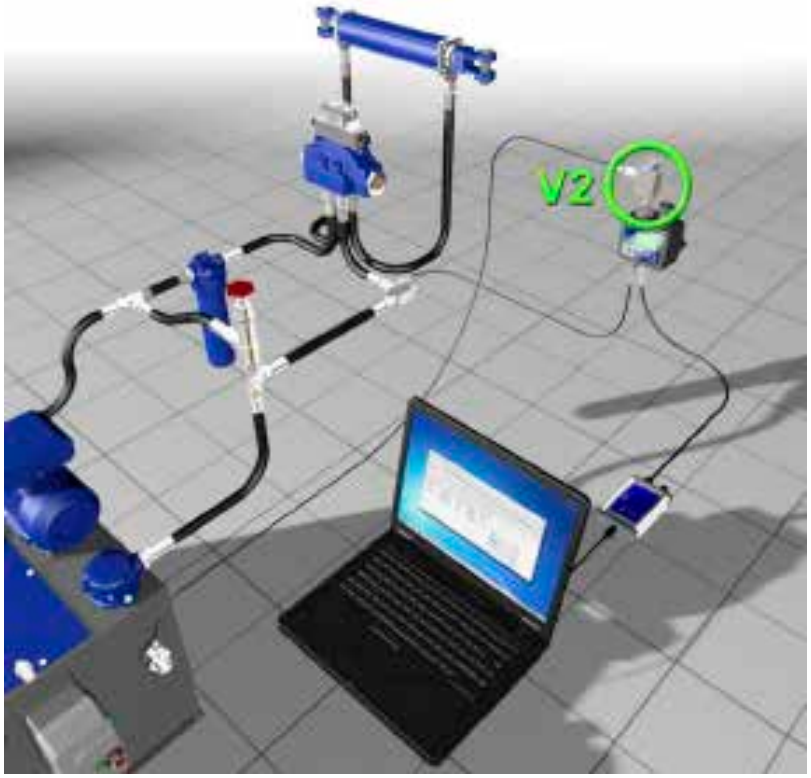

Figure 23

Please restrict all inlet hoses/pipes to a maximum of 1500mm. If utilising microbore pressure hoses (G1 connection), it is recommended that a maximum length of 1500mm is used to the Inlet of the ICM (Viscosity range of 20 – 219mm2/s).

Note 1: If the viscosity of the media is less than 20mm centistokes, a minimum 1000mm length microbore hose is recommended.

Note 2: If the media being tested is over 220 centistokes it maybe necessary to use a larger internal bore hose to create enough flow through the ICM.

For the return outlet hose from the ICM, (i.e. back to a reservoir or system), the length of microbore hose is not critical. It should be noted that pressure-drops across the length of hose should be considered here. (See ICM 2.0 Operator's Guide for examples).

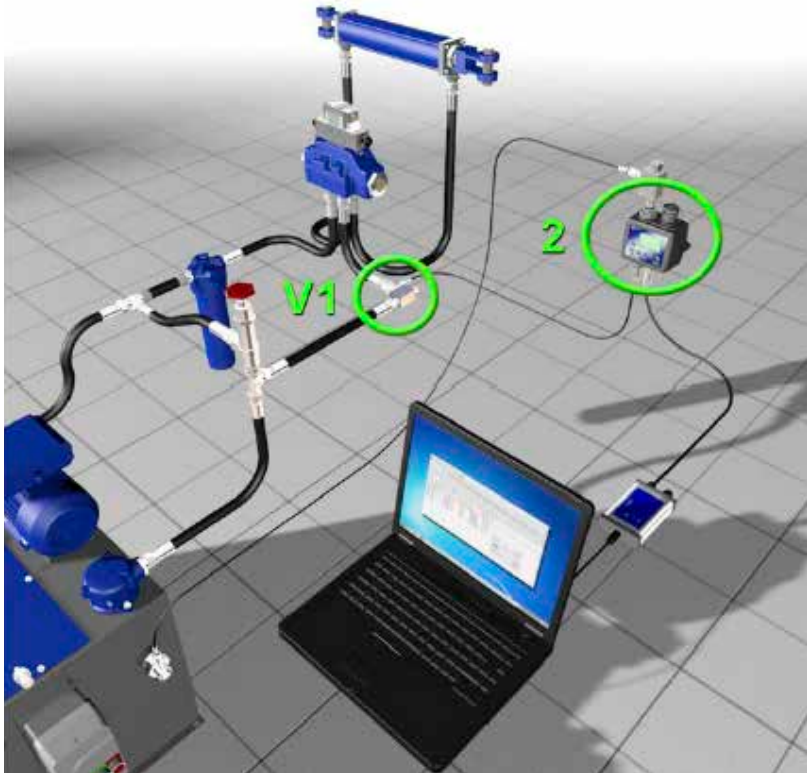

Figure 24

WORLDWIDE NETWORK

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