



Specialist ROV Tooling Services Ltd
 Unit 5 Inch Business Park, Inch,
 Aberdeenshire AB52 6XF

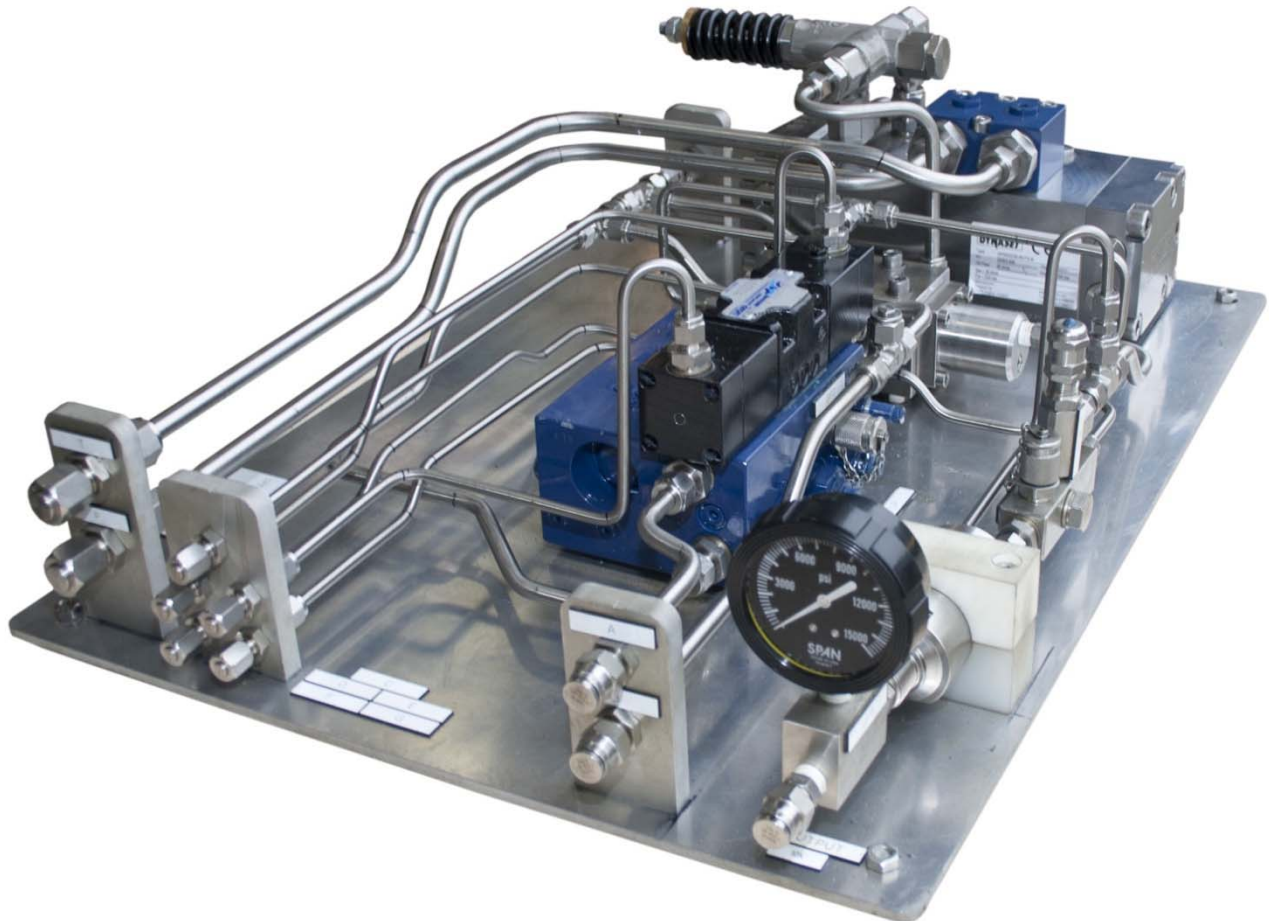
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4 Stage 10Kpsi IHPU – Operation Manual


Doc: SRTS_PRMA_905

Rev: 2

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2 Introduction

2.1 Scope

The scope of this manual is to provide information regarding set up/operating instructions for the 4 Stage 10Kpsi IHPU.

3 Safety Recommendations

3.1 General – Operations

Only authorised people and qualified personnel should work on the system, and take suitable precautions to prevent injury.

Always adhere to authorised working practices, and use the correct tools for the job. To facilitate this, make sure that these are available before commencing.

Ensure that overalls and other garments are kept clean and free of oil or chemicals. Ensure that any cuts or skin abrasions are protected before handling oil or chemicals to prevent ingress into the body. Protect the hands and arms with a suitable barrier cream and gloves and ensure that all system fluids or chemicals are removed from the skin as soon as possible.

Ensure that the working area is kept clear and uncluttered.

3.2 General – Hydraulic

Do not work on pressurised systems. Hydraulic systems contain a large amount of stored energy when pressurised, therefore the system (including any accumulators) should be de-pressurised, and the power pack switched off, prior to working on the system. Exceptions to this would be system adjustments to components requiring the presence of pressure and/or flow.


Any personnel authorised to work on the system must have a complete understanding of the operation of the hydraulic system, so that they will be aware of any system liable to remain pressurised or hazardous in any other way.

Ensure that all personnel are clear of any mechanical/hydraulic system likely to move if pressure to system actuators is released or applied.

Do not attempt to tighten any leaking fittings whilst under pressure. A rupture could result, leading to injury from flying components and/or oil jets.

Regularly inspect fittings and pipe-work for mechanical damage. If any such damage is found, the item must be repaired or replaced as necessary before pressure is applied to the system. Do not allow damaged fittings to remain in service.

Take care when inspecting, commissioning, repairing or maintaining the system to avoid jets of oil issuing from open orifices; pipe ends etc. if pressure is applied. Particular care should be taken to protect the eyes.

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Hydraulic components may be heavy and slippery when covered in oil. Ensure that adequate protective clothing and footwear is used.

Any moving component should be treated with caution when the system is pressurised during operation, and especially during on-deck testing and repair. Keep clear of all moving components, and take all necessary precautions to avoid injury when working on these systems by preventing movement of any components likely to cause injury.

3.3 General – Mechanical

Ensure that all the guards are in place before applying power to the system. The power must be turned off and any potential movement prevented before removal of any guard.

Beware of and keep clear of all moving components. Do not work on the system whilst power is applied, or if there is any potential for components to move.

Ensure that all load bearing components are adequately and regularly inspected. If damage is found the component must be repaired/replaced as necessary. Do not allow damaged components to remain in service.

Some mechanical components/assemblies are heavy and, if covered in oil/water, also slippery. Always ensure that items are correctly and adequately supported before removal, and that authorised lifting equipment and procedures are used.



Note: trying to lift heavy components in an awkward position by hand without the assistance of correct lifting equipment, or lifting any component without adopting the correct stance, can lead to serious injury.

Ensure that when working within or underneath the machine that your presence is known to your supervisor. If working underneath the machine, always ensure that there are no loose or unsupported assemblies, components or tools above.


4 Quality, Health, Safety and Environment (QHSE)

4.1 Quality

It is the prime objective of Specialist ROV Tooling Services Ltd to perform all work safely and efficiently in accordance with our Quality Procedure, Legislative and Client specifications and requirements. In performing this work, the quality system of Specialist ROV Tooling Services Ltd shall be adhered to, so as to ensure that Client requirements are met.



Certification No. 187786

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4.2 Health and Safety

The company considers that prevention of accidents incidents and hazardous occurrences resulting in injury to personnel, damage to equipment and the environment is essential to ensure employees safety. Reducing injuries and ill health, protecting the environment and reducing unnecessary losses and liability contributes to a good safety record which, goes hand in hand with safe operating practices and high quality standards.

The Company is committed to continuous improvement involving the constant development of procedures, approaches to implementation and techniques of risk assessment and control.

To meet these criteria all personnel will be trained to identify, eliminate or control the effects of hazards in their area of work.

It is expected that all employees will exercise a personal responsibility in preventing injury to themselves, their fellow workers, the general public and the environment.

Only through close communication and co-operation by all personnel can safety performance be established and maintained.

It is the duty of all employees to confirm to the Company Safety Policies, codes, plans, procedures and manuals and to accept and undertake their responsibilities.

All employees and those of our sub-contractors have a legal duty to take reasonable care of themselves and any other person who may be affected by their acts and omissions whilst at work and to co-operate with the Company and any persons directly or indirectly involved in the Company's activities.

4.3 Environmental

Specialist ROV Tooling Services Ltd pledges to comply with current environment legislation and best environmental practices, and achieve a balance between economic, social and environmental responsibilities. We are committed to avoiding damage to the environment by any of our actions and operations.

Specialist ROV Tooling Services Ltd is committed to continual improvement, and efficient use of resources, which will be achieved by setting and ensuring successful implementation of environmental objectives.


5 Persons to Contact

All technical enquiries relating to the tooling should be addressed to:

Mike Bisset

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6 Description

The Specialist ROV Tooling Services Ltd 4 stage IHPU is a unit that can be utilised for many Subsea tasks such as:

- Pressure testing
- Activating Blow Out Preventor
- Fluid Transfer
- Torque Tool Operation

The unit will pump separate media from ROV circuit held in an isolated reservoir and pump through hot stab at pressures up to 10,000 psi. As the name suggests you can select 4 different pressures.

3 different pressures can be set to operate through Directional control valves to a maximum of 5000 psi through the A + B PORTS and the high pressure is reached through an intensifier circuit up to 10,000 psi on the C port. The unit can be easily reconfigured to carry out many different tasks.

The system consists of a Dynaset pump which is connected to a high pressure DCV which diverts the pressure to a 3 stage manifold which in turn goes out to ports A and B, when the DCV is activated the pressure then gets diverted to the Intensifier circuit which can then generate pressure up to 10,000 psi.

7 Specifications

Specification	Measurement
Hydraulic Input	
Pressure	210Bar (3000psi)
Flow	35-65Lmin
Hydraulic Output	
Pressure	690Bar (10000psi)
Flow	30Lmin
Directional Control	Up to 5000psi
Selectable Pressures	4 (up to 10000psi)
Fluids	Water/Glycol Hydraulic Mineral Oil



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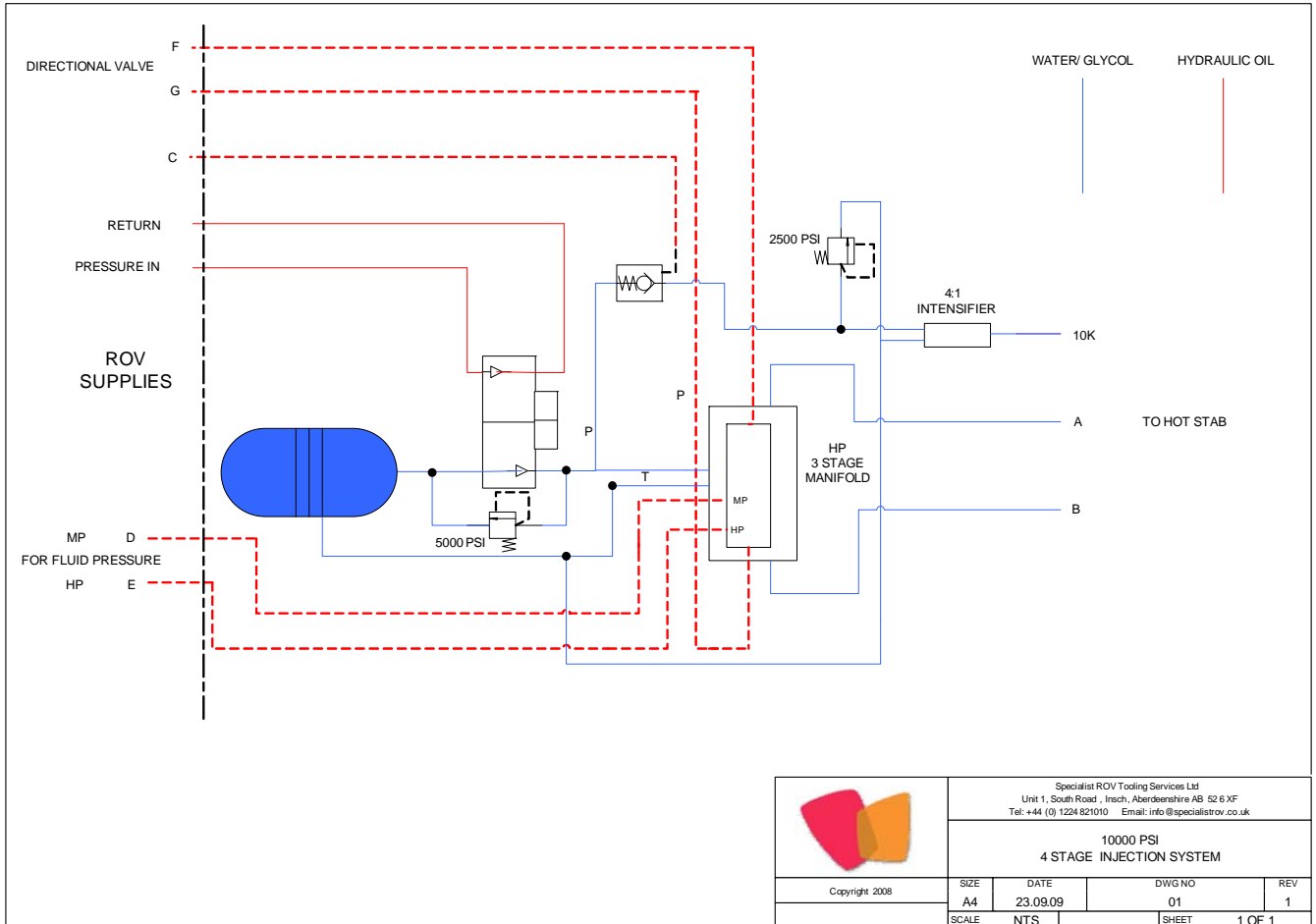
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8 Schematic



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9 Connection to ROV

Hydraulic connection from ROV pressure system is connected straight to Dynaset pump (marked **P** on panel) however, if slower output flow is needed then simply connect through a flow control valve. The return is connected straight from Dynaset pump back in to vehicle reservoir marked **T**

The hydraulic pilots are taken from vehicle GFVP as per schematic making sure there are no check valves mounted underneath solenoids in GFVP as this will result in trapped pressure and pilot valves staying on.

The Isolated media is taken from reservoir in to rear of Dynaset pump via a 12 JIC connection.

There are 3 outputs on the unit which can easily be reconfigured to only operating two or simply one only depending on the task you wish to perform.

Output	Pressure
Output 10K	High Pressure up to 10000psi
Output A	Through DCV pressure up to 5000psi
Output B	Through DCV pressure up to 5000psi



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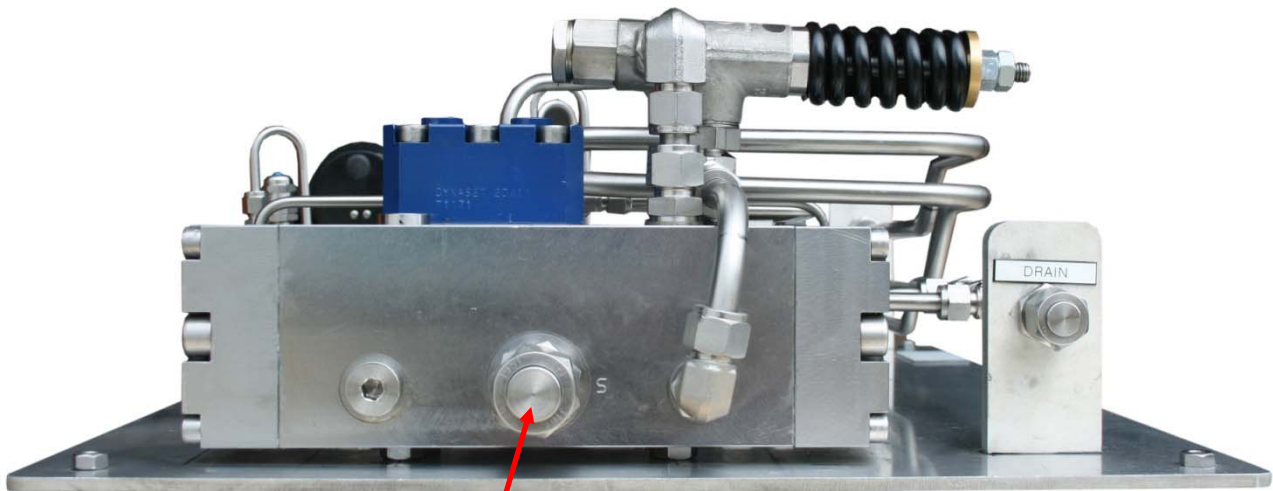
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9.1 Connection of Reservoir to System

To connect a subsea reservoir to the system simply remove the cap from the suction side of pump unit and connect to reservoir via supplied suction hose.



Remove caps and connect using
supplied suction hose (12JIC)

Subsea Reservoir
(Gel type reservoir bag)





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10 Operation

Ensure system is connected correctly. When system is running, it will automatically provide pressure set on the main Dynaset relief valve, this can be set up to a maximum of 5000 psi by adjusting main relief valve RV1.

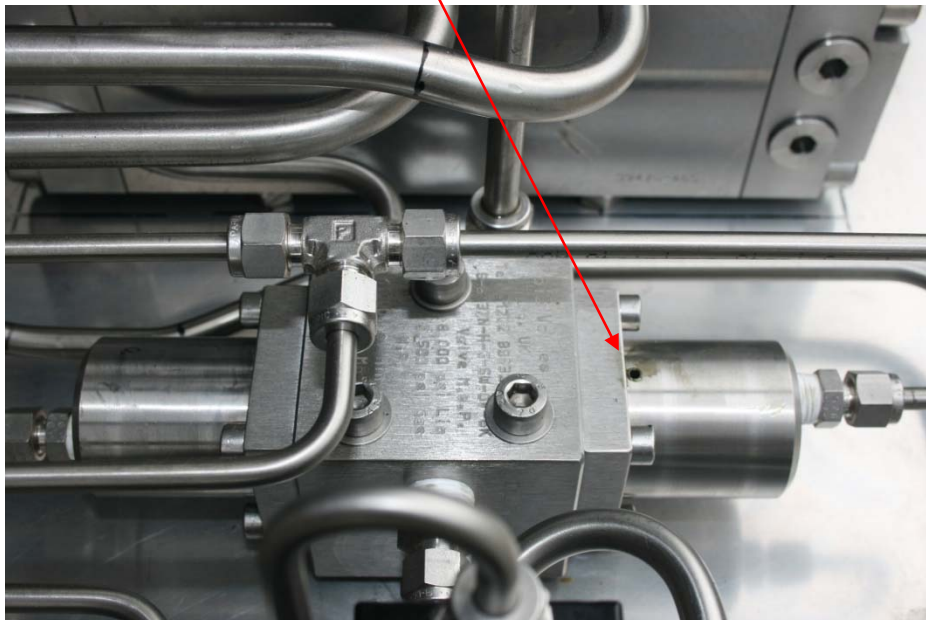
If no pilot is selected the pressure will go to 3 STAGE MANIFOLD and it will automatically go down to LOW PRESSURE setting. When Directional control valve marked either E or G is selected the LOW pressure will then go out to either port A or B.

When a higher pressure is required then either MP (medium pressure) or HP (high pressure) pilot will need to be activated which is done through pilots marked F for MP and D for HP .This circuit enables you to have Directional control at 3 different pressures.

When higher pressure is needed, then the pilot marked C should be operated, which diverts pressure to the intensifier circuit giving a maximum pressure of 10,000 psi.



Ensure plug hole is filled with aqualube prior to diving





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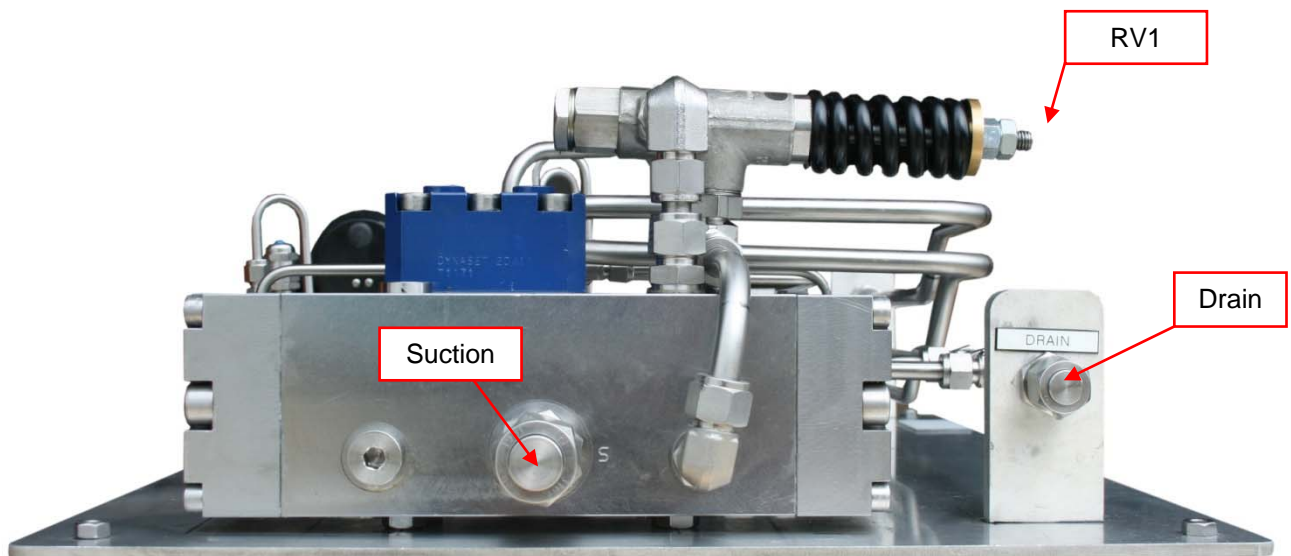
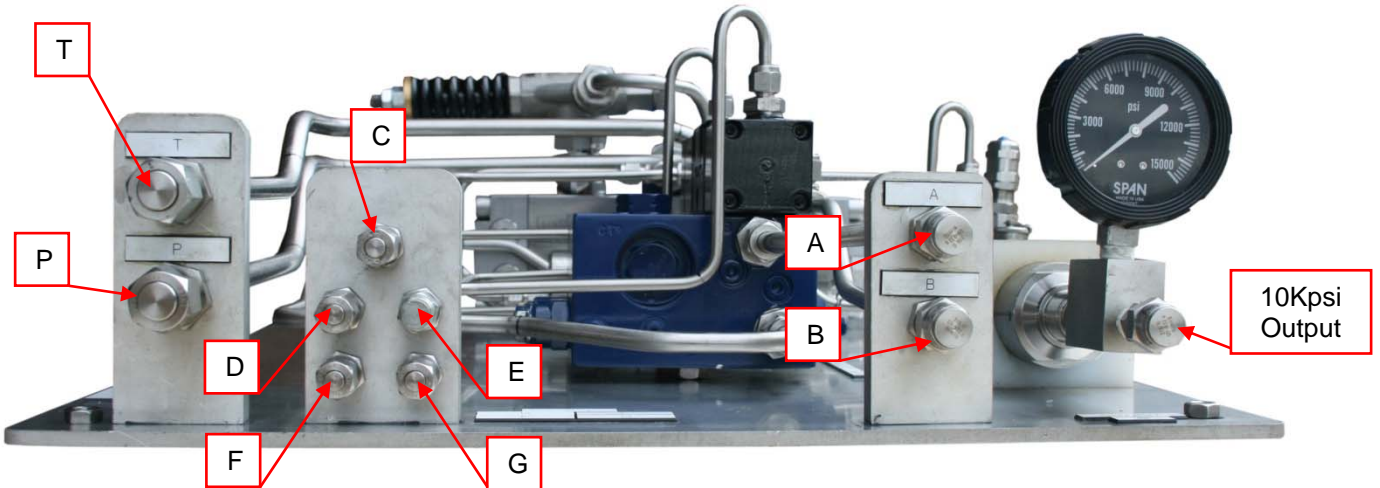
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10.1 Main Connections





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10.2 Adjusting pressure on 3 Stage Manifold

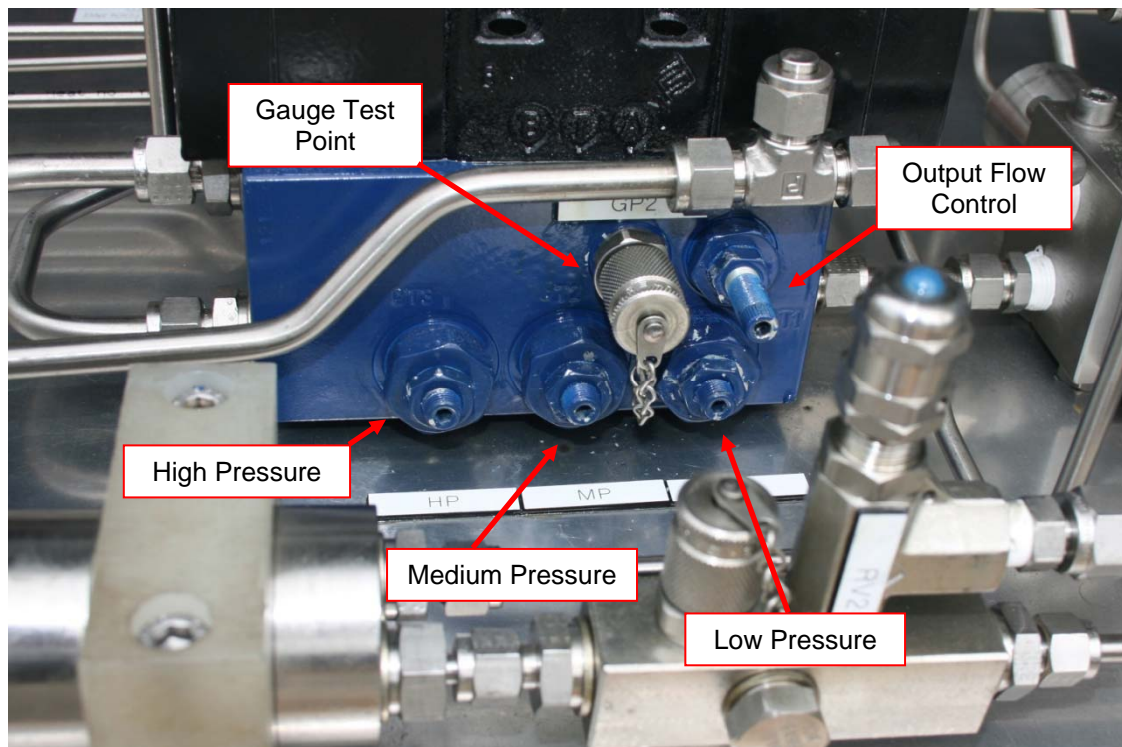
Ensure valves Marked MP and HP are screwed fully in and LP is fully out.

LP Adjustment Connect gauge to gauge port on 3 stage manifold mark GP1
Run system and monitor pressure on gauge
Adjust valve marked LP and monitor gauge readings

MP Adjustment Run System
Activate Pilot D for Med. Pressure
Adjust valve marked MP and monitor gauge readings

HP Adjustment Run System
Activate Pilot E for High pressure
Adjust HP and monitor gauge readings

Adjusting Intensifier Pressure
Ensure no air is trapped in system
Activate pilot C
Adjust relief valve mounted on intensifier
Monitor Gauge
Lock at desired pressure





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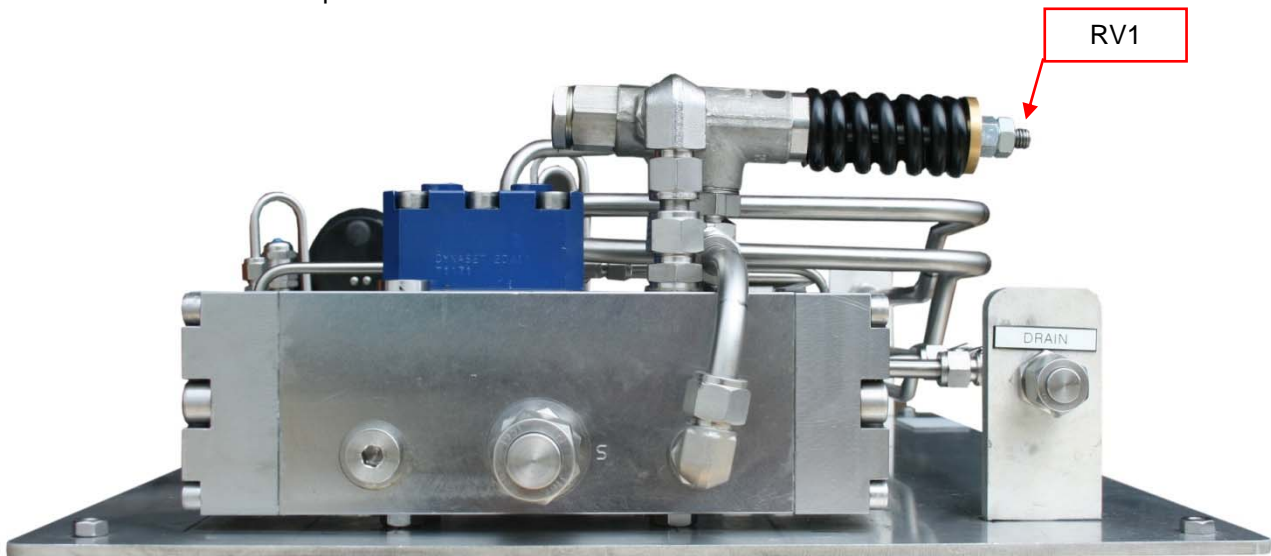
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10.3 Adjusting Main System Pressure

To adjust main system pressure of the IHPU

Take 2 x 17 mm spanners and slacken lock nut of RV1
Adjust nut nearest spring clockwise for higher pressure
Counter clockwise for lower pressure.



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11 HPW Pump Information