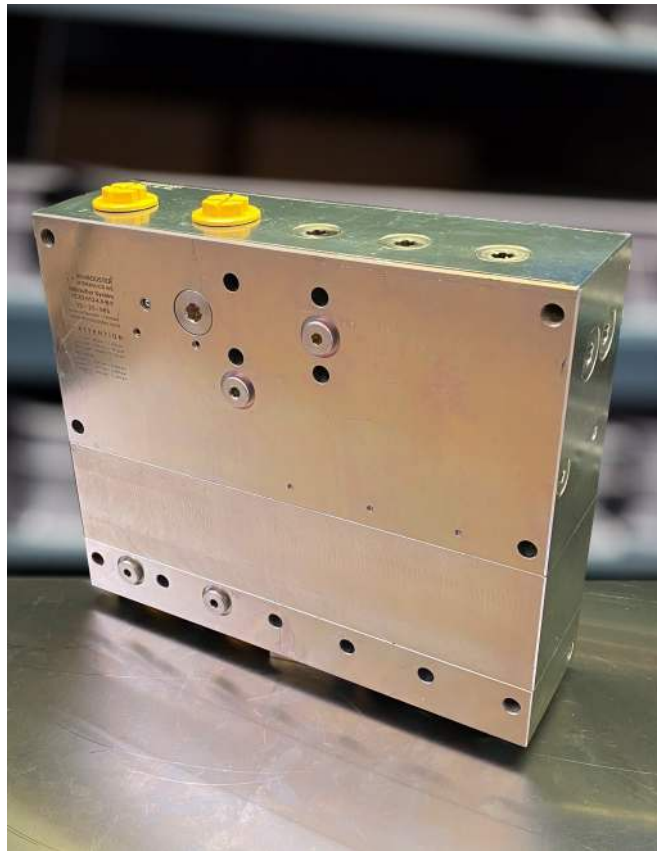


INSTRUCTION MANUAL

INTENSIFIER SYSTEM

HC63-013



MINIMUM SIZE – MAXIMUM POWER

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1.1 - Safety Precautions - IMPORTANT -

Although the miniBOOSTER hydraulic intensifier system has been designed with operator safety in mind, it still requires the operator to be vigilant upon use.

Therefore it should be observed that the below mentioned safety instructions are followed to. Contact miniBOOSTER or your local miniBOOSTER distributor in case of any doubt.



Read all instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation. miniBOOSTER cannot be held responsible for damage or injury resulting from unsafe use, lack of maintenance or incorrect product and/or system operation. Contact your miniBOOSTER distributor if in doubt as to the safety precautions and operations.



Eye protection must be worn while unpacking, installing, repairing and initial start-up of this miniBOOSTER product.



Gloves must be worn while unpacking, installing, repairing and initial start-up of this miniBOOSTER product.



The hydraulic system should always be de-pressurised before any couplings are disconnected. Check the integrity of connections before applying any hydraulic pressure.



Do not apply any hydraulic pressure to non-connected fittings.



Do not unscrew any nipples, couplings or fittings being under any hydraulic pressure.



Avoid sharp bends and kinks when routing hydraulic hoses.



Never exceed the maximum working pressure of the hydraulic system.



If the hydraulic system is under pressure **DO NOT STAND IN LINE** with any fittings, connections or other moving parts i.e. piston-rods and/or any other parts mechanically or hydraulically connected to the hydraulic system.



All hoses, couplings and fittings connected to the hydraulic system, including the miniBOOSTER, must be kept clean and free from debris and contamination at all times. Follow all instructions provided in this manual whenever installing, running and/or repairing the miniBOOSTER.

This instruction does not override any local safety regulations or relevant hazardous, regulations, which must always take precedence.

Never exceed the specified maximum pressure ranges, temperatures and flows.

Never put the component into operation until the machine, into which it is assembled, complies with all relevant directives and regulations in EU and EFTA.

miniBOOSTER® A/S cannot be held responsible for damage or injury resulting from unsafe use of the product, lack of maintenance, or incorrect product and system application.

If you have any doubts about precautions or applications, contact your local distributor, the manufacturer or visit www.minibooster.com

1.2 - Warranty

Never attempt to disassemble the booster or any other component from the system where it is not specifically described to do so. Any attempt will void the warranty if no consulting has taken place with miniBOOSTER.

DECLARATION OF CONFORMITY

We the manufacturer:

miniBOOSTER Hydraulics A/S
Fynsgade 3
DK 6400 Sønderborg
DENMARK

Declare that:

Hydraulic Intensifiers all types, variants and accessories, are designed and manufactured in accordance with the below directives.

2006/42/EC Machinery Safety Directive
97/93/EC Pressure Equipment Directive where required (Max HPXVol >10,000)

The manufacturer miniBOOSTER® is ISO 9001 certified by Bureau Veritas (Certificate number DNKFRC10000046A). Each hydraulic intensifier has an identifiable serial number, stamped into its metal body. Year of manufacture and intensification factor are stamped into the metal body too. All technical documentation is drafted in accordance with the term "sound engineering practice", and in accordance with all of the processes and test procedures described in miniBOOSTER's process guides. All intensifiers are individually pressure tested prior to the EOL-approval.

1.3 - Serial Number and Identification Plate Location

Each individual pressure intensifier system can be identified by a unique serial number and its type code, which is stamped on the manifold housing.

The type number and the serial number are required when ordering repairs of the miniBOOSTER pressure intensifier systems.



The example specifies:

HC63-013-4.0-B-1	Model
XX-XX-XXX	Serial Number (week-year-number)
CERXXXXX	Material Certificates

Nomenclature:

HC63	Booster model
013	Function Diagram
4.0	Intensification Ratio
B	With dump valve
1	BSPP

1.4 - Material Certificate

All body parts of the pressure intensifier system are marked with a 3.1 material certificate specification number, which provides materials traceability.

A material certificate verifies the origin batch numbers, the compositions and the test results of the materials used for the individual body parts. It is possible to order the certificates on request.

1.5 - Technical Specification



Never exceed the below pressure, flow and temperature ranges, as this will damage the internal seals of the intensifier.

Model	HC63-013		
Weight	55.0 kg / 121.3 lbs.		
Pressure Ranges:			
Inlet	P	0 - 345 bar / 5,000 psi	
Outlet	H and M _H	0 - 700 bar / 10,000 psi	
Tank	T and Z	0 - 345 bar / 5,000 psi	
Flow Ranges:			
Inlet	P	0 - 300 l/min / 79.2 US gpm	
Outlet	H	0 - 300 l/min / 79.2 US gpm	
Tank	T and Z	0 - 300 l/min / 79.2 US gpm	
Temperature Ranges:			
-40°C to +100°C / -40°F to +212°F			
Materials of Construction:			
Manifold housing	Cast iron		
Boosters	Cast iron		
Check valves	Alloy steel		
Static seals standard	Nitrile NBR		
Threaded Connections:			
P, T, Z & H	1" BSPP		
M ₁ , M _P & M _H	¼" BSPP		
Media:			
Recognized hydraulic fluids			
Max. Tightening Torque:			
1 BSPP	330 Nm		
¼" BSPP	40 Nm		

Filtration Recommendations

		0-140 BAR (0-2,030 psi)		141-207 BAR (2,031-3,000 psi)		> 207 BAR (> 3,000 psi)	
Media		ISO 4406 Scale number	Micron rating	ISO 4406 Scale number	Micron ratings	ISO 4406 Scale number	Micron ratings
Oil	>5cSt	19/17/14	10	18/16/13	5	17/15/12	3



Medias not filtered in accordance with the recommendations provided in this chapter may cause severe damage to the pressure intensifier system.

2.1 - Product Description

The HC63-013 pressure intensifier system is a boosting unit designed to increase pump pressure up to either static or dynamic 700 bar / 10,000 psi. The system is connected between the pump and workload with hoses and/or tubing. The system can be mounted in any direction with twelve (12) provided M10x130 screws.

The system has three extended features in comparison to standalone boosters:

Automatic Pressure Intensification

(Sequence Valve #4)

When the backpressure (load on e.g. a cylinder) exceeds the pressure capability of the pump, the Sequence Valve directs the oil to the booster and increases the pressure beyond the pump specification. On the contrary, a high bypass flow to the workload is maintained for the time the Sequence Valve is not activated.

The setpoint of the Sequence Valve is adjustable from 10.5 - 345 bar / 152 - 5,000 psi. In general, it is recommended to adjust the valve to 90% of the pressure the pump can handle.

Example:

A setup consists of a pump which is connected to a 4/3 way directional control valve. The valve connects to the HC63-013 intensifier system, which is then connected to a cylinder.

The pump is capable of delivering a maximum pressure of 100 bar. The Sequence Valve is by recommendation set to 90 bar. When the pump pressure reaches 90 bar as a result of an increased load on the cylinder, the valve directs the oil to the booster which now increases the pressure beyond the capability of the pump. In the range of 0-90 bar pump-pressure, the cylinder is extended at full speed.

Inlet Pressure Control

(Pressure reducing valve #5)

A Pressure Reducing Valve enables the user to control the inlet pressure to the booster. Stand-alone boosters are normally limited to 207 bar / 3,000 psi of inlet pressure, but implementation of the reducing valve extends the allowed pump pressure up to 345 bar / 5,000 psi.

The valve is adjustable from 7 - 210 bar / 102 - 3,046 psi.

Safety

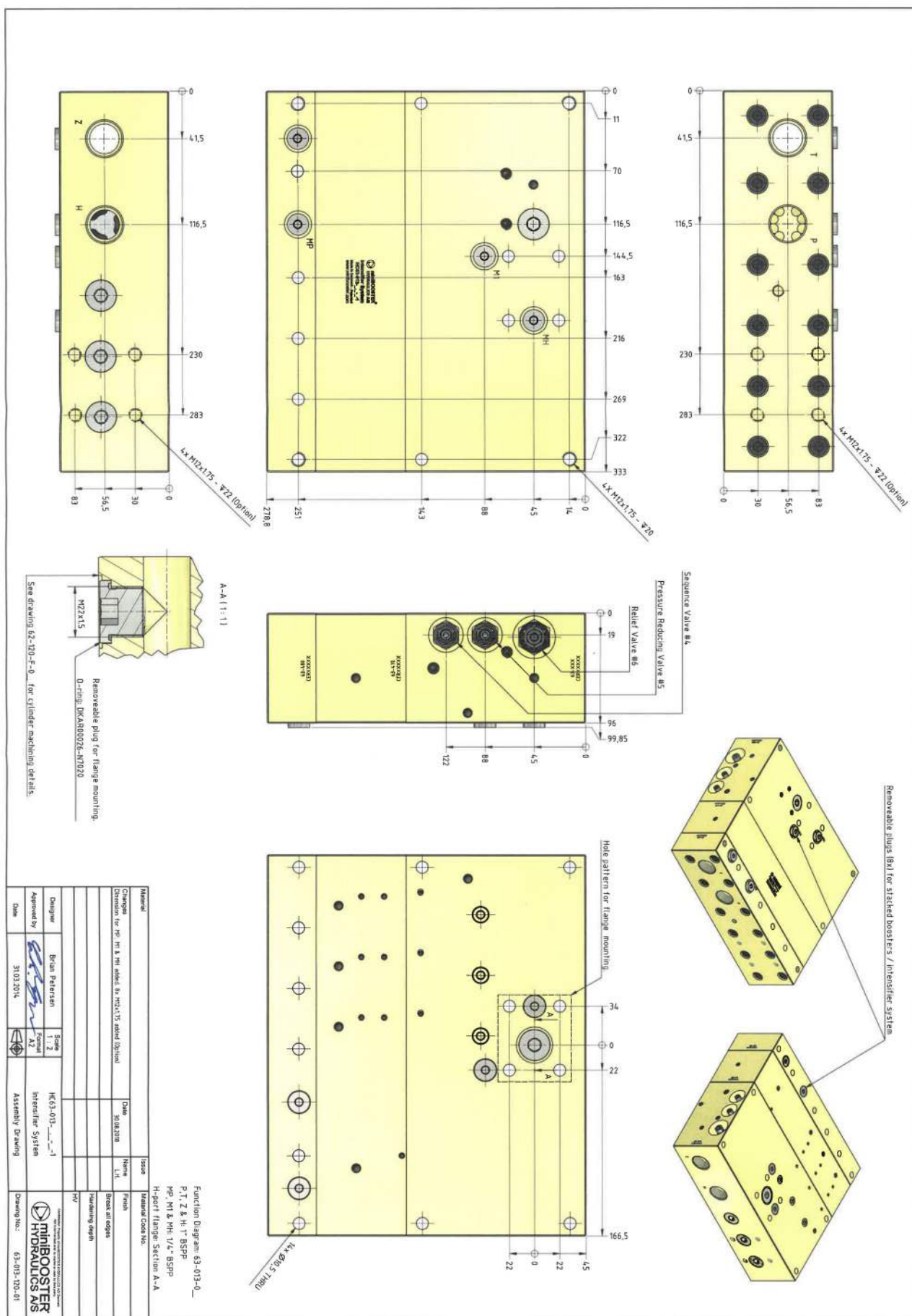
(Relief Valve #6)

The pressure intensifier system is equipped with a Relief Valve on the high pressure side. The valve controls the maximum outlet pressure of the H connection (To the A or B port of e.g. a cylinder). The pressure is adjustable up to 700 bar / 10,000 psi.

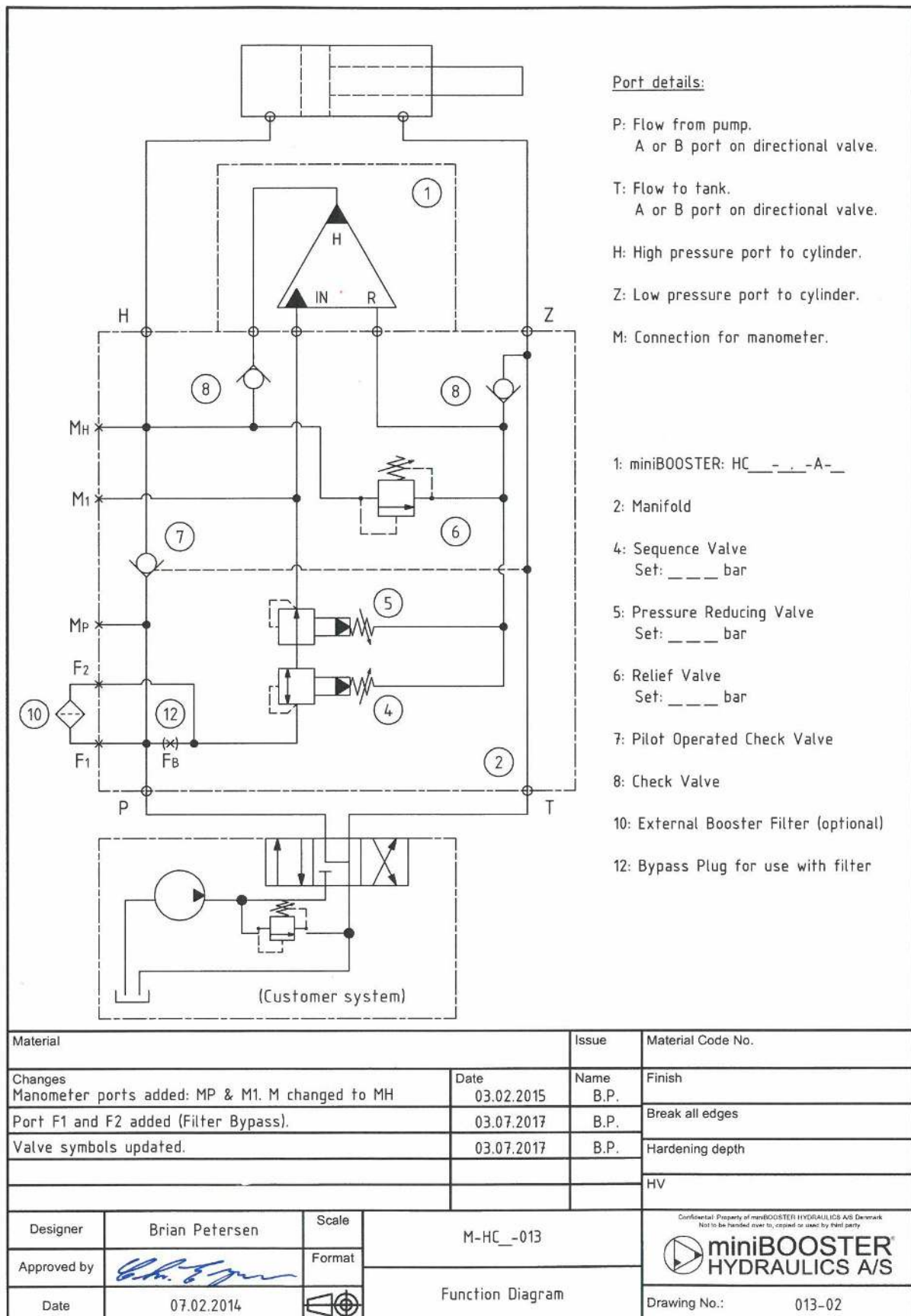
Key features of the pressure intensifier system:

- ▶ Adjustable sequence valve (#4) to automatically boost pressure and take full advantage of the available pump flow.
- ▶ Fine adjustment of outlet pressure and realization of 345 bar / 5,000 psi inlet pressure (#5).
- ▶ Adjustable high pressure Relief Valve (#6).
- ▶ Suitable for static and dynamic applications.

2.2 - Assembly Drawing

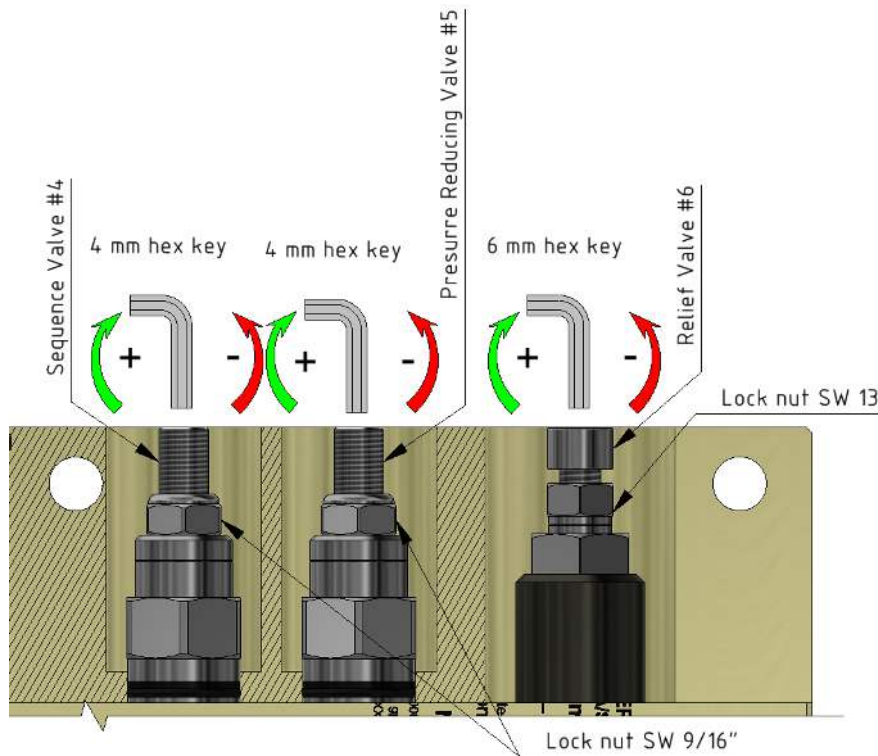


2.3 - Function Diagram



3.1 - Introduction

The sequence #4-, pressure reducing #5- and high pressure relief valves #6 are all adjusted from the factory to the settings required by the customer. If needed, sections 3.2 to 3.4 provide guidance for any needed re-adjustment or replacement. Section 3.5 provides guidance to adjust the valves from scratch.



3.2 - Sequence Control (Sequence Valve #4)

Tools:

4 mm or 5/32" hex key.
9/16" wrench.
7/8" torque wrench (*only required for replacing the valve*).

CW = Clockwise direction
CCW = Counterclockwise direction

3.2.1

Loosen the nut from the stem of the valve using the 9/16" wrench (CCW).

3.2.2

Use the 4 mm - 5/32" hex key to rotate the stem and adjust the sequence setpoint.

CCW = Increase sequence set point.

ΔP per one turn: 100 bar / 1,450 psi

CW = Decrease sequence set point.

3.2.3

Retighten the nut (do not use excessive force). Use the 4 mm hex key to prevent the stem from rotating.

Replacement

Use the 7/8" wrench to unscrew the valve (CCW). Before installing the new valve, check that the cavity is free from any remains of O-rings and other particles. The recommended installation torque is 45 Nm / 33 lbf.ft.

3.3 - Booster Inlet Pressure Control (pressure reducing valve #5)

Tools:

4 mm or 5/32" hex key.
9/16" wrench.
7/8" torque wrench (*only required for replacing the valve*).

CW = Clockwise direction
CCW = Counterclockwise direction

3.3.1

Loosen the nut from the stem of the valve using the 9/16" wrench (CCW).

3.3.2

Use the 4 mm - 5/32" hex key to rotate the stem and adjust the reducing pressure.

Note: it is recommended to read the pressure from the M1 connection of the manifold!

CW = Increase inlet pressure to the booster.

ΔP per one turn: 50 bar / 725 psi

CCW = Decrease inlet pressure to the booster

3.3.3

Retighten the nut (do not use excessive force). Use the hex key to prevent the stem from rotating.

Replacement

Use the SW 7/8" wrench to unscrew the valve (CCW). Before installing the new valve, check that the cavity is free from any remains of O-rings and other particles. The recommended installation torque is 45 Nm / 33 lbf.ft.

3.4 - Intensified Outlet Pressure Control (Relief Valve #6)

Tools:

13 mm wrench.
Screwdriver.
27 mm torque wrench (*only required for replacing the valve*).

CW = Clockwise direction
CCW = Counterclockwise direction

3.4.1

Loosen the nut from the stem of the valve using the 13 mm wrench (CCW).

3.4.2

Use the screwdriver to rotate the stem and adjust the outlet pressure.

Note: It is recommended to read the pressure from the M_H or H connection of the manifold!

CW = Increase outlet pressure of H connection.

ΔP per one turn: 195 bar / 2,828 psi

CCW = Decrease outlet pressure of H connection.

3.4.3

Retighten the nut (do not use excessive force). Use the screwdriver to prevent the stem from rotating.

Replacement:

Use the 27 mm wrench to unscrew the valve (CCW). Before installing the new valve, check that the cavity is free from any remains of O-rings and other particles. Recommended installation torque is 80 Nm / 59 lbf.ft.

3.5 - Adjustment from Scratch

Tools:

4 mm or 5/32" hex key.
9/16" wrench.
13 mm wrench.
Screwdriver

CW = Clockwise direction

CCW = Counterclockwise direction

3.5.1

Stop the pump.

3.5.2

Loosen the nut from the stem of the two valves (#4 and #5) using the 9/16" wrench (CCW).

3.5.3

Decrease the sequence valve #4 setting as much as possible using the 4 mm hex key (CCW).

3.5.4

Increase the pressure reducing valve #5 setting as much as possible using the 4 mm hex key (CW).

3.5.5

Loosen the nut from the stem of the high-pressure relief valve (#6) using the 13 mm wrench (CCW).

3.5.6

Increase the high-pressure relief valve #6 setting as much as possible using the screwdriver (CW).

3.5.7

Turn on the pump again. Slowly increase the pump pressure, while increasing the high-pressure relief valve #6 setting (CW) until the desired high pressure is reached. The pressure is measured in the M_H-port.

3.5.8

Use the locknut to lock the high-pressure relief valve #6 setting.

3.5.9

Slowly decrease the pressure reducing valve #5 setting (CCW), until the desired pressure is measured in the M₁-port.

3.5.10

Use the locknut to lock the pressure deducing valve #5 setting.

3.5.11

Release the high pressure from the system and then decrease the pump pressure as much as possible.

3.5.12

Pressuring P-port again and increase the sequence valve #4 setting (CW) until the desired point for the sequence valve to open has been reached, by slowly increasing the pump pressure to at least 207 bar.

The valve has been adjusted, when the sequence valve opens at the desired point (max. 90 % of the pump pressure) and the intensifier start building up pressure.

Follow the procedure three times to ensure the adjustment is set right.

3.5.13

Use the locknut to lock the sequence valve #4 setting.

3.5.14

The adjustments are now done, and the system is ready for use.

4.1 - General Use

All new or repaired intensifiers from miniBOOSTER have been hydraulically tested under full load conditions after assembly and are guaranteed full functionality and efficiency.

The pressure intensifier systems have been designed and manufactured to provide reliable service over a range of demanding applications. The intensifier does not require special maintenance, but should be kept free from dust, dirt and debris.

A visual inspection for oil escaping on any exterior part of the pressure intensifier system should be conducted on a regular basis.

4.2 - Installation

The pressure intensifier system can be installed in any position (vertical, horizontal, angled etc.) Use the four provided screws to firmly secure the system.



Regardless of how the pressure intensifier system is installed, it is important that the system is initially started-up in accordance with the below mentioned instructions. Incorrect initial start-up of the intensifier may cause severe damage to the internal components of the intensifier.

4.3 - Bleeding and Initial Start-Up

At the initial start-up the intensifier should be operated gently at a max LP-IN pressure of approximately 100 bar (1,450 psi) for 1 to 2 minutes, to ensure it is properly bled from trapped air. Hereafter the pressure intensifier system can be operated at its full capacity.



IMPORTANT! At no time should the intensifier be operated beyond the specifications listed in Section 1.5.

4.4 - Repair

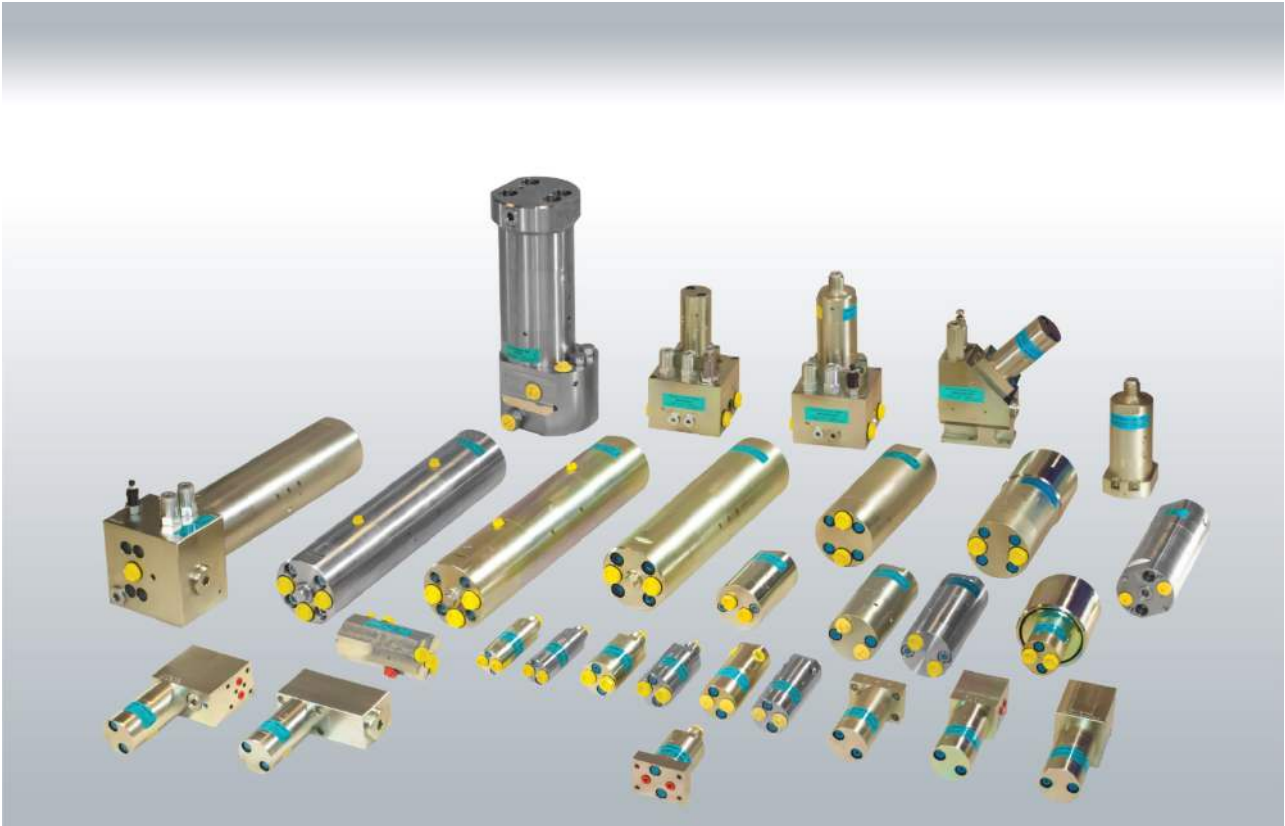
In case the intensifier should malfunction, all repairs of the product should be conducted by miniBOOSTER only i.e. since any intervention on the intensifier requires special tools and special testing equipment.

Before the pressure intensifier system is disconnected and sent for repair, the exterior should be thoroughly cleaned. Once the pressure intensifier system has been disconnected, all connection bores should immediately be plugged efficiently with plugs or tape, before the intensifier is sent to miniBOOSTER or to the miniBOOSTER distributor, since an internal contamination of the intensifier may obstruct the fault-finding process at the miniBOOSTER service department.

5.1 - Troubleshooting

Symptom	Possible Causes	Remedy
High pressure does not reach desired high pressure.	Pump pressure, PRV, HP Relief Valve or sequence valve.	Increase the pump pressure to max pressure. Adjust the Pressure Reducing valve setting. (See section 3.3) Adjust the HP Relief Valve setting. (See section 3.4).
High pressure is not building up. Booster does not oscillate when the cylinder has been filled.	Sequence Valve.	Adjust the Sequence Valve setting. (See section 3.2)
None of the above symptoms.		Consult miniBOOSTER.

The only full range of hydraulic intensifying solutions



Authorised distributor: