

INSTRUCTION MANUAL

HYDRAULIC BOOSTER

HC225



MINIMUM SIZE – MAXIMUM POWER

Index

1.0 General information

1.1	Safety precautions - IMPORTANT	4
1.2	Warranty	5
1.3	Serial number and identification plate location	5
1.4	Material certificate	6
1.5	Technical specification	6

2.0 Product overview

2.1	Product description	7
2.2	Assembly drawings	8
2.3	Function diagrams	10

3.0 Valve adjustment

3.1	Introduction	12
3.2	Oscillating control	12
3.3	Booster inlet pressure control	13
3.4	Adjustment from scratch	13

4.0 Installation and maintenance

4.1	General use	14
4.2	Installation	14
4.3	Bleeding and initial start-up	14
4.4	Repair	14

5.0 Troubleshooting

5.1	Troubleshooting	15
-----	-----------------------	----

1.1 - Safety precautions - IMPORTANT -

Although the miniBOOSTER hydraulic booster 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. 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 boosters 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 booster 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 boosters are individually pressure tested prior to the EOL-approval.

1.3 - Serial number and identification plate location

Each individual hydraulic booster 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 is required when ordering repairs of the miniBOOSTER hydraulic booster.



The example specifies:

HC225	Model
06-20-024	Serial number (week-year-number)
CERXXXXX	Materials certificate

Nomenclature:

HC225	Booster model
4.0	$i = 4.0 : 1$
B	With dump valve
1	BSPP port
2	With one side-port

1.4 - Material certificate

All body parts of the hydraulic booster 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 booster.

Model	HC225	
Versions	A or B	
Weight		
Without side-port	max. 3.0 kg / 6.6 lbs	
With side-port	max. 3.3 kg / 7.3 lbs	
Pressure ranges		
Inlet	IN and R	0 - 207 bar / 3,000 psi
Outlet	H	0 - 800 bar / 11,600 psi
Flow ranges		
Inlet	IN and R	0 - 15 l/min / 4.0 US gpm
Outlet	H	0 - 4.2 l/min / 1.1 US gpm
Threaded connections		
1: H1, IN/R, H2, H3	1/4" BSPP	
2: H1, H2 and H3	9/16-18" UNF	
2: IN and R	7/16-20" UNF	
Temperature ranges		
Media oil	-40°C to +120°C / -40°F to +248°F	
Materials of construction		
Boosters	Cast iron	
Check valves	Alloy steel	
Static seals standard	Nitrile NBR	
Max. tightening torque		
1/4" BSPP	4.0 Nm	
9/16-18" UNF	3.5 Nm	
7/16-20" UNF	2.0 Nm	
Fluids		
Recognized hydraulic fluids.		

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 given in this chapter may be the reason to severe damage of the hydraulic booster.

2.1 - Product description

The HC225 incorporates pressure reducing valve and a counterbalance valve.

The pressure reducing valve protects both booster and high-pressure tool against too high pressure. It secures a stable high pressure regardless of changes in the tank line pressure by controlling the inlet pressure to the booster section, and an optional orifice to reduce inlet flow to the maximum allowed for the intensification ratio selected.

The counterbalance valve allows fast-forward movement of a cylinder by directing the full inlet flow to pass directly through the booster section until the set pressure has been reached. Then the counterbalance valve opens, and the booster starts oscillating.

Inlet pressure adjustment

(Pressure reducing valve #5)

A Pressure Reducing valve enables the user to make fine adjustment of the output pressure. It also raises the maximum permissible inlet pressure for stand-alone boosters of 207 bar / 3,000 psi up to 350 bar / 5,076 psi.

Oscillating adjustment

(Counterbalance valve #13)

To increase the oil flow to the workload and to prevent the booster from oscillating at low pressure, the booster is equipped with a Counterbalance Valve in the R-line.

This valve opens the R-port at a preadjusted set pressure and directs automatically the oil through the R-port to allow the booster to start oscillating and increases the pressure as necessary. The setpoint of the counterbalance valve is adjustable from 0 - 77 bar / 0 - 1,120 psi.

(If a higher setpoint is needed, please contact miniBOOSTER.)

Example:

A setup consists of a pump which is connected to a 4/3 way directional control valve. The valve connects to the HC225 booster which is then connected to a cylinder.

The pump is capable of delivering a maximum pressure of 100 bar / 1500 psi. The Counterbalance Valve is by recommendation set to 50 bar / 725 psi. When the pump pressure reaches 50 bar as a result of a load on the cylinder, the valve directs the oil through the R-port and the booster starts to oscillate, increasing the pressure.

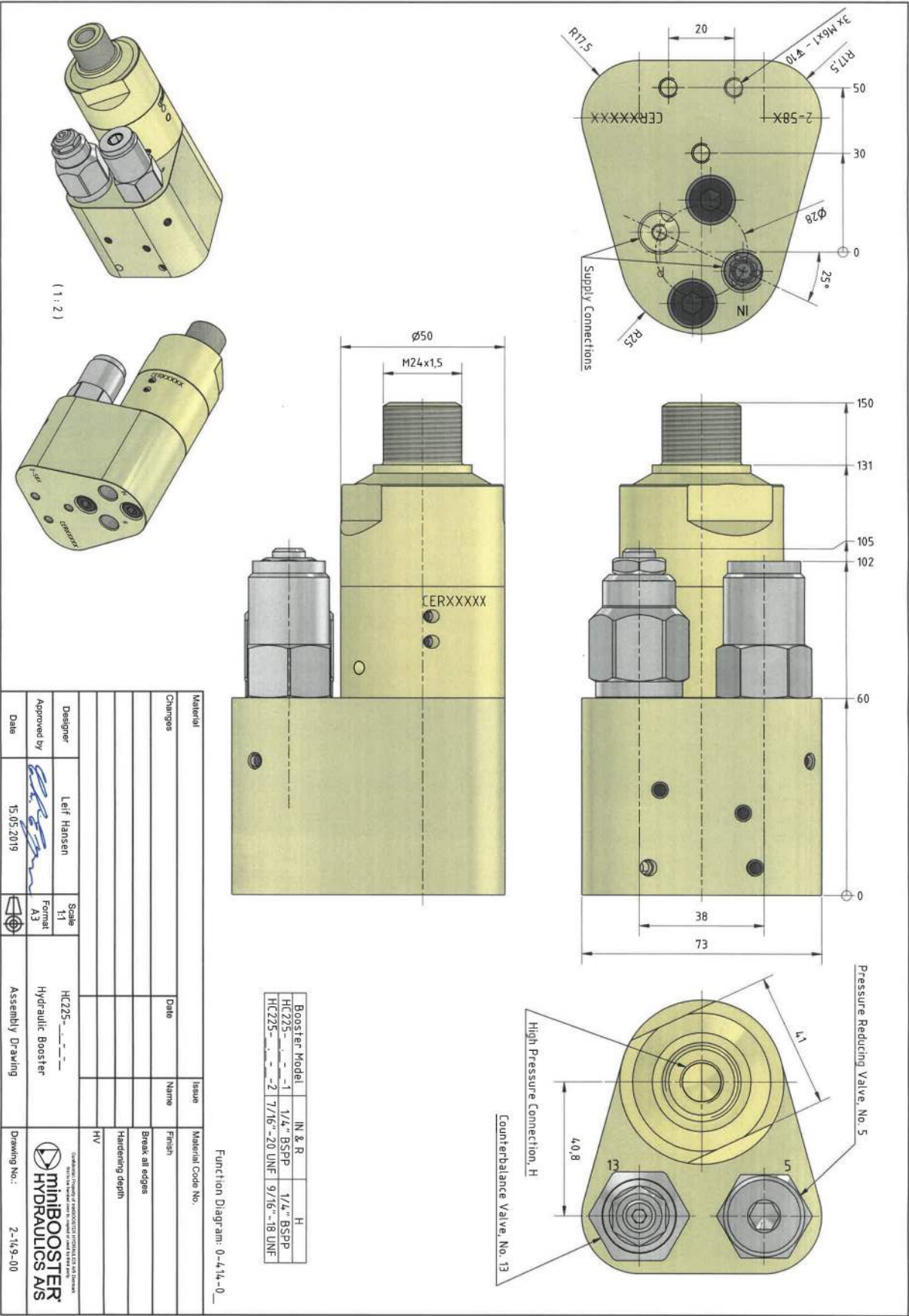
In the range of 0-50 bar the cylinder will take full advantage of the pump flow.

Key features of the hydraulic booster:

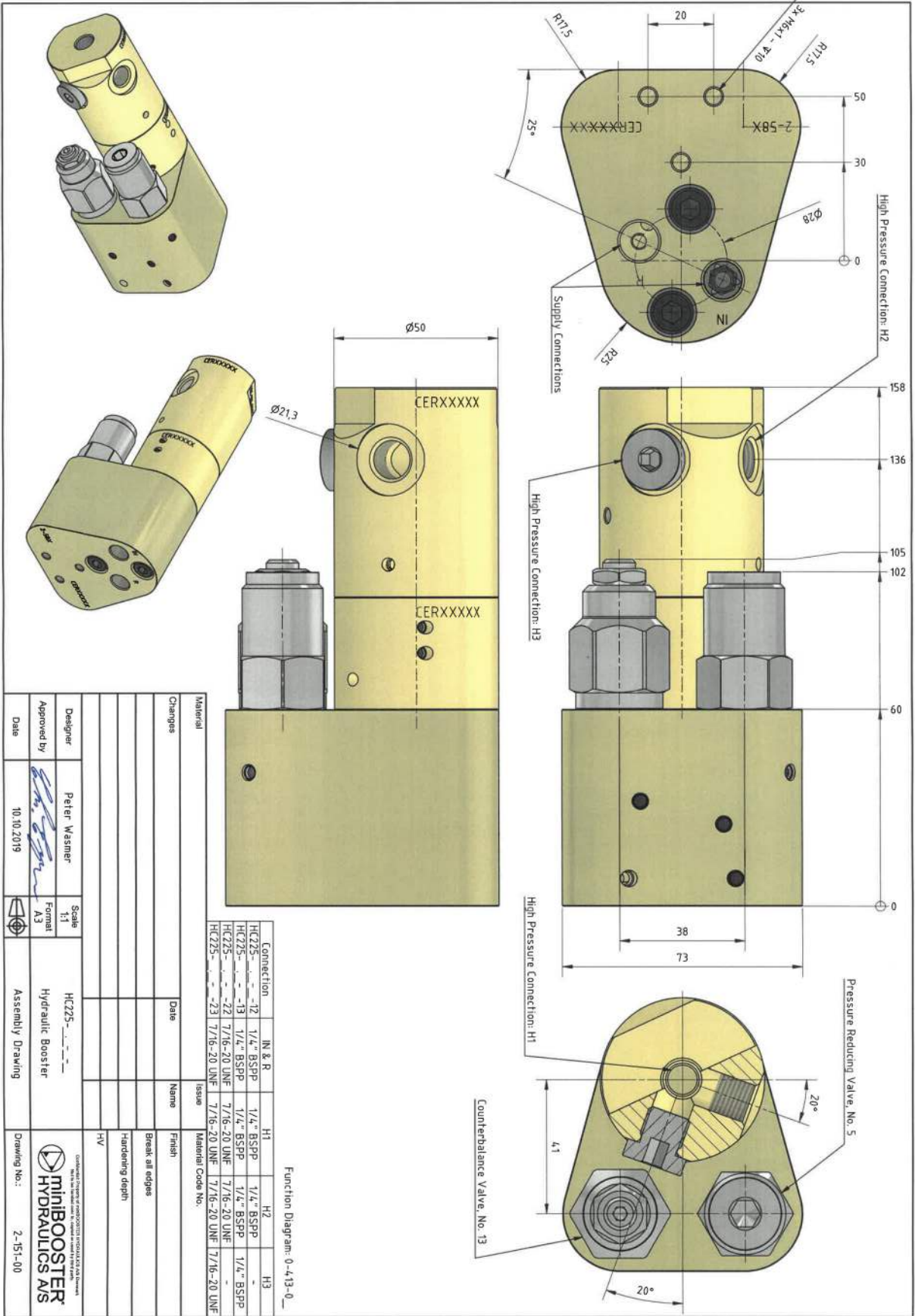
- ▶ Adjustable oscillating setting to take full advantage of the available pump flow.
- ▶ Adjustable inlet pressure setting to protects both booster and high-pressure tool.
- ▶ Wide range of intensification factors:
1.2 / 1.5 / 2.0 / 2.2 / 2.5 / 2.8 / 3.2 / 4.0 / 5.0 / 6.6 / 9.0 / 13.0 / 20.0

2.2 - Assembly drawings

Without side-port

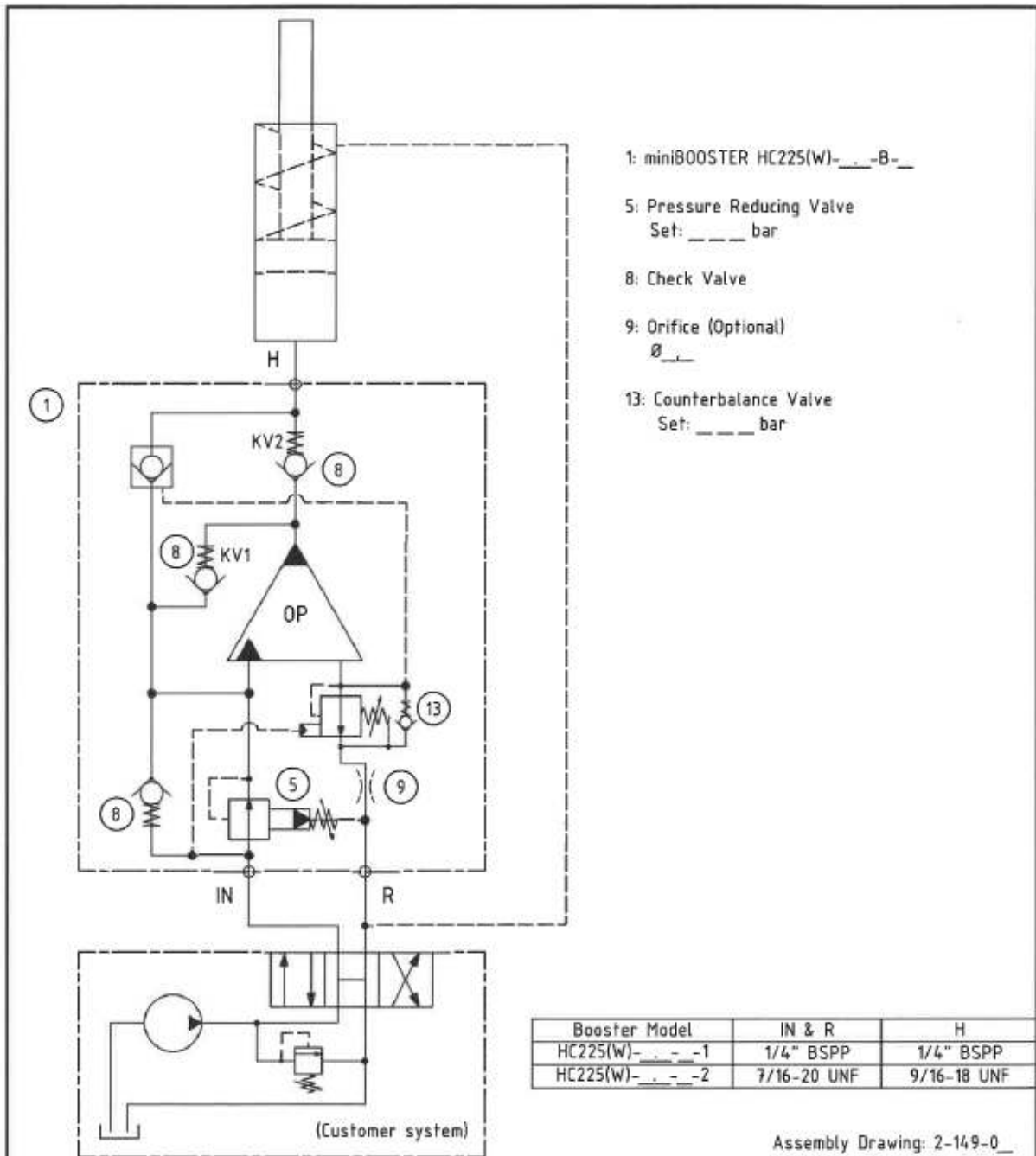


With side-port

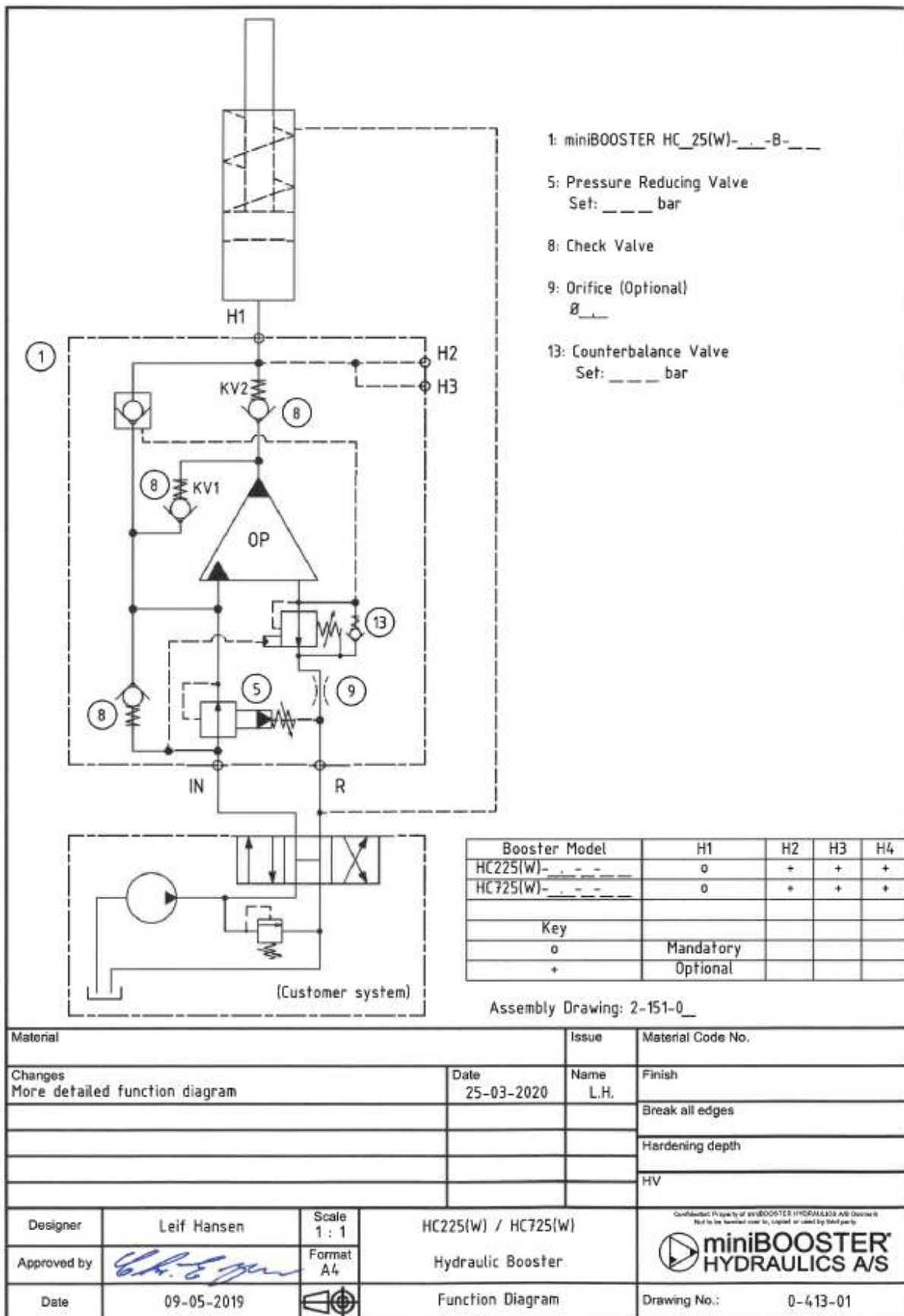


2.3 - Function diagrams

Without side-port



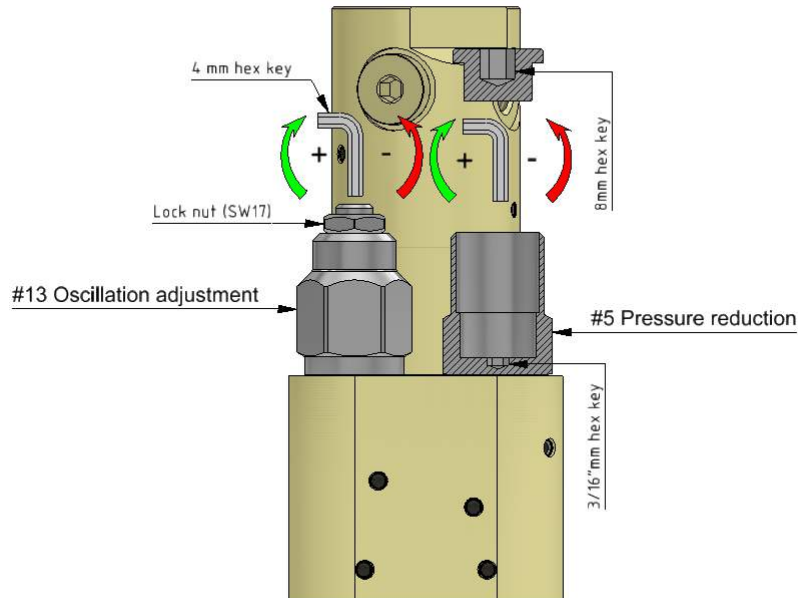
Material		Issue	Material Code No.
Changes More detailed function diagram		Date 25-03-2020	Name L.H.
			Finish
			Break all edges
			Hardening depth
			HV
Designer	Leif Hansen	Scale 1 : 1	Confidential: Property of miniBOOSTER HYDRAULICS A/S Denmark Not to be traded over to, copied or used by third party  miniBOOSTER [®] HYDRAULICS A/S
Approved by		Format A4	
Date	10-10-2019		
		HC225(W)	
		Hydraulic Booster	
		Function Diagram	Drawing No.: 0-414-01

With side-port

3.1 - Introduction

The counterbalance valve is pre-adjusted to customer specific settings. If needed, the following section provides guidance for any needed re-adjustment. A guide to adjust the booster from scratch is also included.

Note: The appearance of the valves in the manual may vary from the received product.



3.2 - Booster inlet pressure control (pressure reducing valve #5)

Tools:

8 mm hex key

3/16" hex key

26 mm torque wrench (*only required for replacing the valve*).

CW = Clockwise direction

CCW = Counter Clockwise direction

3.2.1

Loosen the closure plug from the top of the valve (CCW) by using the 8 mm hex key.

3.2.2

Use the 3/16" hex key to rotate the internal screw and adjust the pressure setting. (explanation in section 2.1).

CW = Increase pressure setting.

CCW = Decrease pressure setting.

3.2.3

Retighten the nut. Use the hex key to prevent the stem from rotating.

Replacement

Use the 26 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 73 Nm / 54 lbf-ft.

3.3 - Oscillating control (counterbalance valve #13)

Tools:

5/32" or 4 mm hex key

17 mm wrench or adjustable spanner.

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

CW = Clockwise direction

CCW = Counter Clockwise direction

3.3.1

Loosen the 17 mm lock nut from the stem of the valve (CCW).

3.3.2

Use the hex key to rotate the stem and adjust the counterbalance setting. (explanation in section 2.1).

CW = Decrease counterbalance setting.

CCW = Increase counterbalance setting.

3.3.3

Retighten the nut. Use the hex key 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 47 Nm / 34 lbf-ft.

3.4 - Adjustment from scratch

Preliminary steps:

- Stop the pump.
- Decrease the pressure reducing valve set pressure as much as possible (CCW).
- Decrease the counterbalance valve set pressure as much as possible (CW).

3.4.1

Turn on the pump and increase the pump pressure to the desired operating pressure.

3.4.2

Slowly increase the pressure reducing valve setting to desired booster inlet pressure.

The pressure reducing valve setting is now ok.

3.4.3

Turn on the pump and increase the pump pressure to the desired counterbalance setpoint.

3.4.4

Slowly increase the Counterbalance valve set pressure until the booster starts to oscillate (CCW). Use your hand and hearing to sense the oscillation.

The counterbalance setting is now ok.

4.1 - General use

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

The hydraulic booster has been designed and manufactured to provide reliable service over a range of demanding applications. The booster 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 hydraulic booster should be conducted on a regular basis.

4.2 - Installation

The hydraulic booster could be installed in any position (vertical, horizontal, angled etc.) Use the four provided screws to firmly secure the booster.



Either way the hydraulic booster is installed, it is important that it is initially started-up in accordance to the below mentioned instructions. Incorrect initial start-up of the booster may cause severe damages to the internal components of the booster.

4.3 - Bleeding and initial start-up

At the initial start-up the booster should be operated gently at a max LP-IN pressure of approximately 10 bar above setpoint for 30 to 60 seconds, as to ensure it is properly bled from trapped air. Hereafter the hydraulic booster could be operated at its full capacity.



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

4.4 - Repair

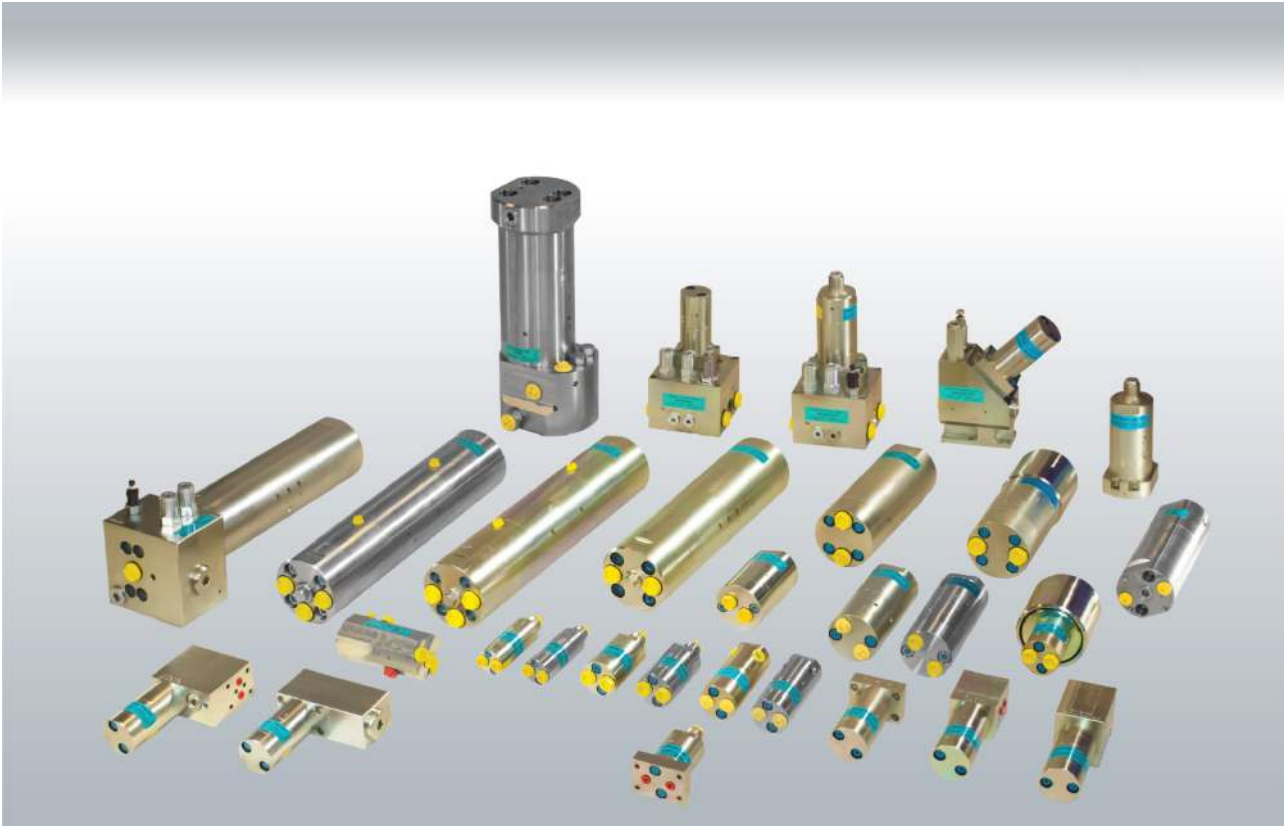
In case the booster should malfunction, all repairs of the product should be conducted by miniBOOSTER only i.e. since any intervention on the booster requires special tools and special testing equipment.

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

5.1 - Troubleshooting

Symptom	Possible causes	Remedy
Booster does not oscillate when the cylinder has been filled.	Counterbalance valve setting is too high.	Adjust the counterbalance valve setting.
Booster does not reach high pressure.	Pressure reducing valve setting is too low.	Adjust the inlet pressure control valve setting (section 3.2).
None of the above symptoms		Consult miniBOOSTER

The only full range of hydraulic intensifying solutions



Authorised distributor: