



LEADING IN PRODUCTION EFFICIENCY

EcoFlow HPR High Pressure Regulator Return

Operating instructions

MRE00005EN, V01



1 Product overview

1.1 At a glance

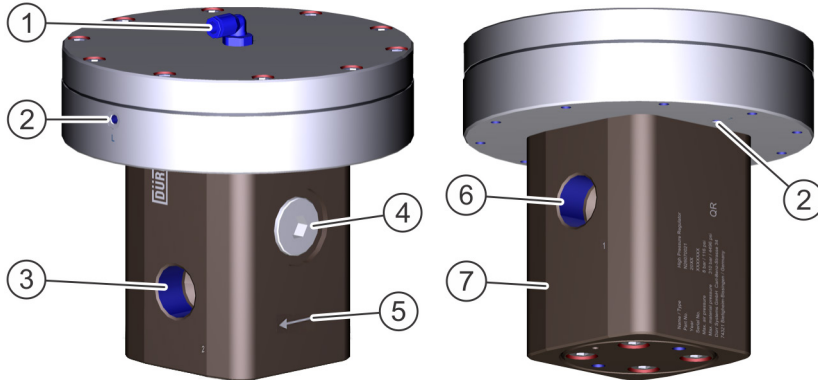


Fig. 1: Product overview

- | | | | |
|---|--|---|--------------------------|
| 1 | Control air connection | 5 | Flow direction indicator |
| 2 | Leakage bore | 6 | Material inlet |
| 3 | Material outlet | 7 | Regulator housing |
| 4 | Pressure gauge connection with sealing screw | | |

1.2 Short description

The high pressure regulator ("regulator") uses control air to control the material pressure in the return line of the application. It ensures the pressure at the sampling point and simultaneously ensures constant flow rate to prevent material hardening.

An optional pressure gauge displays the set material pressure.

- » Keep the manual readily accessible and close to the place of use for use in the future.
- » Always include the manual if the product is transferred.
- » Images are there to help general understanding and can differ from the actual product.

2 About this Instructions Manual

2.1 Purpose of the Instruction Manual

This manual facilitates safe handling of the product.

- » Read the manual before beginning any work.
- » Always follow specifications such as instructions for use and safety tips.

2.2 Explanation of symbols

This manual contains the following notes:



DANGER!

High risk situation that can lead to serious injuries or death.



WARNING!

Medium risk situation that can lead to serious injuries or death.



CAUTION!

Low risk situation that can lead to minor injuries.



NOTICE!

Situations that can lead to material damage.



ENVIRONMENT!

Situations that can lead to environmental damage.



Further information and recommendations.

2.3 Hotline and Contact

If you have queries or would like technical information, please contact your dealer or sales partner.

2.4 Material numbers

This manual describes the products with the following material numbers.

Material number	Product name
N26240001	EcoFlow HPR P 310 20 G3/4" ALU

3 Safety

3.1 Intended application

Use

The **EcoFlow HPR** regulator is used exclusively for pressure control in the return line of application stations.

The **EcoFlow HPR** regulator may only be operated with substances of the Group 2 in conformance with the pressure devices guideline 2014/68/EU.

Wrong Use

If the regulator is improperly installed, there is a risk of injury!

- » Do not use in potentially explosive atmospheres.
- » Do not use along with hand guided atomizer.
- » Only use approved materials. Observe the safety data sheets.
- » Do not attempt to make conversions or changes on your own.

3.2 Staff qualification

Inadequate qualification



WARNING!

Risk of injury in the event of inadequate qualification!

If inadequately qualified staff does not estimate the danger of risk correctly, there can be danger to life!

- All activities must be conducted exclusively by people who possess the qualifications below:

Qualified personnel

This manual is intended for qualified personnel in the industry possessing at least the following knowledge:

- » Safe operation of application stations
- » Safe handling of the material used

- » Knowledge of the danger linked to the material
- » Fundamentals of electrical and hydraulic engineering
- » Training for operation, servicing, and troubleshooting

Training

We offer the following training for acquiring / consolidating the said knowledge ↪ 2.3 “Hotline and Contact”.

3.3 Personal protective equipment

Wear the following personal protective equipment when working:



3.4 Basic dangers

Material



WARNING!

Danger from harmful or irritant substances

If you come in contact with hazardous liquids or vapors, it can cause serious injury or death can result.

- Observe the safety data sheets.
- Wear protective clothing, gloves, eye protection, and respiratory protection.

Pressure



WARNING!

Risk of injury due to escaping material

Material escaping uncontrollably at high pressure can penetrate the body. This can result in death or serious injury and amputations.

- Before maintenance and repair work on the system in which the product is installed, disconnect from compressed air and material supply and secure against reconnection.

Material penetrating the skin causes serious injury, even when the injury appears to be a harmless cut.

- Seek medical attention immediately.
- Do not try to seal leakages using body parts, gloves or towels.

4 Transport, packaging and storage

4.1 Transport inspection

Inspect delivery on receipt for completeness and integrity.

Report defects immediately ↪ 2.3 “Hotline and Contact”.

4.2 Handling of packaging material



ENVIRONMENT!

Environmental damage due to wrong disposal

Wrongly disposed packaging material may not be re-used or recycled. It harms the environment.

- Dispose of material no longer required in an environment-friendly manner.
- Observe local disposal specifications.

4.3 Storage

Requirements for the warehouse:

- » Do not store outdoors.
- » Store in a dry and dust-free place.
- » Do not expose to aggressive media.
- » Protect from solar radiation.
- » Avoid mechanical vibrations.
- » Temperature: 10 °C to 40 °C
- » Relative humidity: 35 % to 90 %

5 Assembly

5.1 Requirements for the installation point

- » It should be possible to disconnect the energy supply to the regulator and secure it from being switched back on.
- » Lines, seals and screw connections must be designed to conform to the regulator requirements ↪ 10.4 "Operating values".
- » The control air supply must be adjustable.

5.2 Assembly

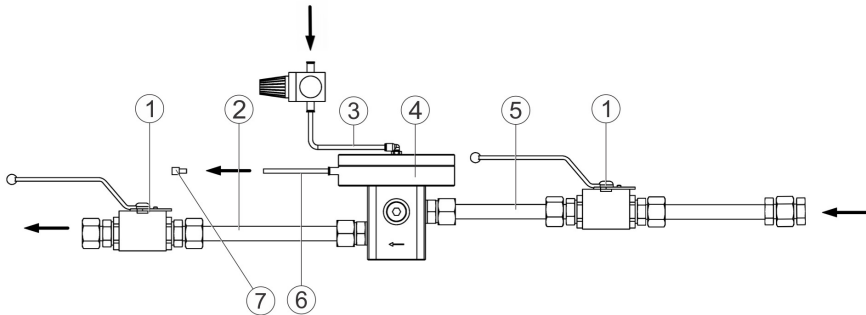


Fig. 2: Assembly drawing

Observe the following at assembly:

- » Install the regulator on the return line between the applicator and the reservoir.
 - » Alignment: Lid at the top, valve casing at the bottom.
 - » Flow direction
 - » Provide cutoff valves (1).
 - » Provide pressure switch (7) if necessary. The pressure switch is integrated in the control and issues a pressure message to the control if leakage occurs. In the event of leakage, the control switches off the station.
 - » Observe the tightening torques of the screw connections.
 - » Maximum tightening torque for material inlet, material outlet and pressure gauge: 270 Nm.
 - » Nominal diameter of material inlet and material outlet: G3/4"
1. Screw-in material discharge line (2) into the material outlet.
 2. Screw-in material supply line (5) into the material inlet.
 3. Screw-in the leakage line (6) into the Leakage bore.



The leakage line prevents dirt from entering the regulator housing through the leakage bore.

4. Ground the regulator (4) over the material connection lines.
5. Connect the control air (3) ↪ 10.4 "Operating values".

5.3 Install pressure gauge

A pressure gauge can be installed for checking the material pressure.

1.



WARNING!

The material used may be harmful to health.

Rinsing ↪ 6.2 "Rinsing".

2.

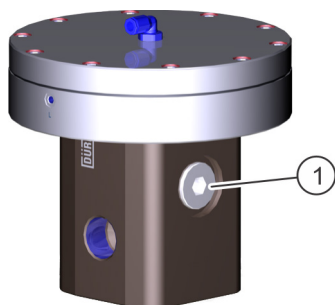


WARNING!

Uncontrolled leaking under high pressure material is extremely dangerous!

Relieve pressure ↪ 6.3 "Pressure release".

3. Disconnect the material feed and secure it from being switched on again.



3. Open ball valves in the supply lines.
4. Open the sampling point.
5. Decrease control air pressure slowly until material starts flowing.
6. Leave the sampling point opened until the material escapes without air.
7. Set control air pressure using the following characteristic curve until the required material pressure is attained.

Fig. 3: Installing the pressure gauge

4. Unscrew the sealing screw (1) on the pressure gauge.
5. Slide the sealing ring over the pressure gauge threads.
6. Screw in the pressure gauge into the valve housing.
7. Align pressure gauge such that it can be read easily.
8. Test the function and tightness of the pressure gauge.

6 Operation

6.1 Commissioning

! NOTICE!

Material damage due to dry air!

If the regulator is operated without material, it wears out faster.

- Always operate a regulator with material.

1. Set control air pressure to 6 bar.
2. Adjust the input pressure such that it is at least 20 bar above the desired material pressure.

Characteristic curves

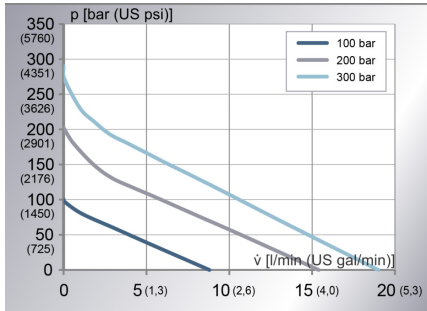


Fig. 4: Characteristic curve of dynamic pressure to flow rate

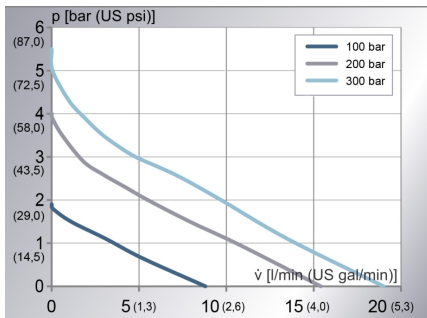


Fig. 5: Characteristic curve of control air pressure to flow rate

Specification of the characteristic curves:

- » Material: Mobil DTE24
- » Viscosity: 32 mPa S
- » Input pressure:
 - » $p_1 = 100$ bar
 - » $p_1 = 200$ bar
 - » $p_1 = 300$ bar

6.2 Rinsing

! NOTICE!

Material damage due to unsuitable rinsing agent

If the rinsing agent reacts chemically with the components or the material, components get damaged.

- Use only the rinsing agents that are compatible with the components and the material.
- Refer to safety data sheet of material manufacturer.

The regulator must be flushed:

- » After end of work
- » Before every change of material
- » Prior to cleaning
- » After dismantling
- » Before a long time of non-use
- » Before placing in storage

Rinsing intervals depend on the material used.

1. Rinse regulator keeping the pressure as low as possible. Use a flushing equipment if necessary.

6.3 Pressure release

1. Rinse regulator ↪ 6.2 “Rinsing”.
2. Close the ball valve on the material supply line.
3. Open the sampling point.
4. Set control air pressure to 0 bar.
 - ⇒ Regulator opens.
5. Set control air pressure to 4 bar.
 - ⇒ Regulator closes.
6. Disassembling the regulator.

7 Maintenance

7.1 Maintenance schedule

The maintenance intervals given below are based on experiential values. Adjust maintenance intervals individually if necessary.

Interval	Maintenance work
Daily	Clean ↪ 7.2 "Cleaning"
	Check condition and tightness of the connections and lines.
	Check fastening
	Check leakage of air and liquids
Every six months	Check needle and needle seat ↪ 7.3 "Dismantling"
Annually	Replace O-rings ↪ 7.3 "Dismantling"
	Replace rod seal ↪ 7.3 "Dismantling"
	Check membrane ↪ 7.3 "Dismantling"

7.2 Cleaning

Cleaning agents



WARNING!

Danger from harmful or irritant substances

If you come in contact with hazardous liquids or vapors, it can cause serious injury or death can result.

- Observe the safety data sheets.
- Wear protective clothing, gloves, eye protection, and respiratory protection.



WARNING!

Danger of fire and explosion due to explosive atmosphere

Flammable materials can cause a fire or an explosion.

- Pay attention to the explosion group of the material, cleaning and rinsing agent.
- Ensure that ventilation and fire protection equipment are in operation.
- Do not use any sources of ignition and no open light.
- Do not smoke.
- Do not use flammable cleaning agents.
- Observe the safety data sheets.

! NOTICE!

Material damage due to unsuitable cleaning agent!

Unsuitable cleaning agents can clog the regulator and lines.

- Only use cleaning agents that have been approved for the materials by the material manufacturer.

Cleaning

! NOTICE!

Material damage due to unsuitable cleaning tools!

Unsuitable cleaning tools can damage the surface of the regulator.

- Only use cloths, soft brushes and paint-brushes.
- Do not use any thinner spray guns.
- Do not use high pressure for cleaning agents.
- Do not use abrasive cleaning tools.

1. Rinse regulator ↻ 6.2 “Rinsing”.
2. Clean regulator carefully.

7.3 Dismantling

You must dismantle the regulator to be able to perform maintenance work and replace components. The requirement is a clean working place in a workshop.

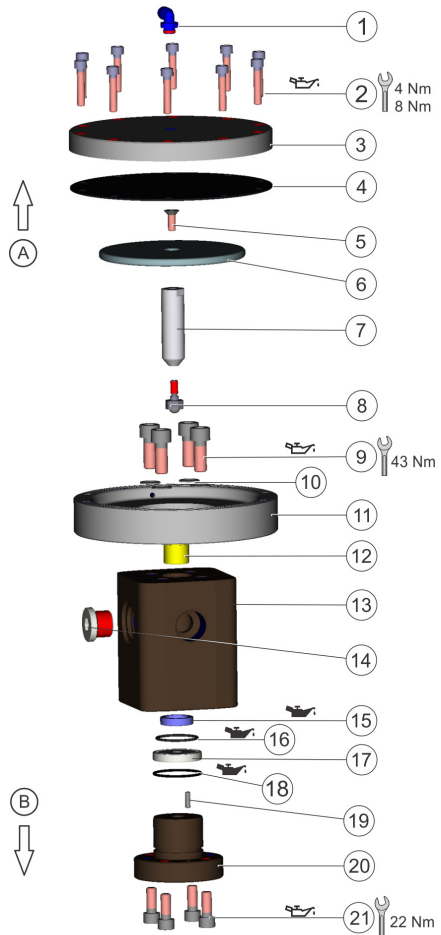




Fig. 6: Exploded view

- Molykote D paste
- Klüber Syntheso GLEP1


1.  **WARNING!**
The material used may be harmful to health.

Rinsing ↪ 6.2 “Rinsing”.


2.  **WARNING!**
Uncontrolled leaking under high pressure material is extremely dangerous!

Relieve pressure ↪ 6.3 “Pressure release”.


3. Disconnect the material feed and secure it from being switched on again.
4. Remove the regulator.
5. Unscrew the control air connection (1) from the lid (3).
6. Clamp the regulator with the control side (A) upward into a vise.

 Use protective jaws.

7. Remove screws (2) from the lid (3).
8. Remove lid (3).
9. Mark the top side of the membrane (4).
10. Remove the membrane (4).
11. Remove the regulator from the vise and clamp it again with the material side (B) facing upwards.
12. Remove the screws (21) from the regulator lid (20).

13.  **NOTICE!**
Regulator cover, O-ring and tool may be damaged if the proper procedure is not followed.


Screw-in 2 screws uniformly into the pull-off thread and pull off the regulator lid (20).

 Do not tilt.




14. Remove the needle seat (17) with O-rings (16), (18).
15. Remove the regulator from the vise and clamp it again with the control side (B) facing upwards.
16. Remove screw (5) from the plate (6).
17. Remove plate (6) with guide rod (7) and needle (8).
18. Unscrew needle (8) from the guide rod (7) using a wrench.
19. Loosen the screws (9).
20. Remove screws (9) und safety washers (10).
21. Remove the flange (11).
22. Remove the plain bearing (12) from the regulator housing (13).
23. Remove the regulator housing (13) from the vise and clamp it again with the material side (B) facing up.
24. Remove the rod seal (15) from the bore.
25. Clean all components, check and replace if damaged. Always replace all seals.

7.4 Assembly

1. Clamp the regulator housing (13) with the material side (B) upwards into a vise.

 Use protective jaws.

2. Grease the new rod seal (15).

3. **! NOTICE!**
If the alignment is wrong, the rod seal will be damaged.
- Push the rod seal (15) into the bore on the underside of the regulator housing with your fingers until it is over the edge of the material feed bore. Do not tilt and ensure that the rod seal seat is centered.
-  We recommend using the auxiliary tool (W02020244) ↪ 11.2 "Accessories".
- » Guide the auxiliary tool into the bore on the underside of the valve casing.
 - » Press the auxiliary tool into the bore hole until flange of the auxiliary tool fits.
4. Remove the regulator from the vise and clamp it again with the control side (B) facing upwards.
5. Insert the plain bearing (12) into the regulator housing (13).
6. Set the flange (11) and align with the bore hole of the regulator housing (13).
7. Insert safety washers (10) and screws (9), tightening crosswise at the same time.
- » Tightening torque: 43 Nm
-  While doing so, do not move the flange.
8. Hand-tighten the needle (8) to the guide rod (7). While doing so, secure it on the opposite-placed plate (6) with an Allen key socket screwdriver.
9. Insert plate (6) with guide rod (7) and needle (8) and press.
10. Inspect the opposite side to see whether the rod seal (15) is correctly applied at the base of the bore after assembly of the guide rod (7).
11. Remove the regulator from the vise and clamp it again with the material side (B) facing upwards.
12. Lightly grease new O-ring (16) and fit it into the needle seat (17).
13. Fit needle seat (17) with the O-ring facing up into the regulator housing (13).
14. Carefully turn the plate (6) and guide rod (7) with needle (8) from side to side.
- ⇒ The needle seat and the needle will mutually center.
15. Lightly grease the new O-Ring (18) and insert it in the needle seat (17).
16. Align and insert the regulator lid (20) on the alignment pin (19).
17. Insert screws (21), tightening cross-wise at the same time.
- » Tightening torque: 22 Nm
18. Remove the regulator from the vise and clamp it again with the control side (B) facing upwards.
19. Check the membrane (4) for damage and replace it if necessary.
-  If the membrane is not replaced, assembly the membrane again with the marking upward. The membrane has been stretched out on one side during operation.
20. **! NOTICE!**
Particles on the membrane damage it.

Position and place membrane (4) on the hole pattern. Ensure cleanliness.

21. Position and place the cover (3) on the hole pattern.
22. Insert screws (2) and tighten then evenly crosswise.
 - » Tightening torque: 4 Nm
23. Insert screws (2) and tighten then evenly crosswise.
 - » Tightening torque: 8 Nm

8 Troubleshooting

Fault description	Cause	Remedy
Poor control	Needle worn out.	Replace needle.
	Needle seat worn out.	Replace needle seat.
	Needle seat not centered.	Assemble needle seat again.
	Needle seat incorrectly inserted.	Assemble needle seat again.
	Membrane damaged.	Replace membrane.
	Leakage in the rod seal.	Replace guide rod and rod seal.
	Air supply fluctuates.	Test and, if necessary, repair air regulation.
Air leak at flange	Membrane damaged.	Replace membrane.
Material leak at flange	Guide rod and rod seal worn out.	Replace guide rod and rod seal.

For troubleshooting you have to (partly) dismantle the regulator ↪ 7.3 “Dismantling”. If faults cannot be remedied:
↪ 2.3 “Hotline and Contact”.

9 Disposal



ENVIRONMENT!

Environmental damage due to improper waste disposal!

Improper waste disposal threatens the environment and prevents re-use and recycling.

- Always dispose of components in accordance with their characteristic.
- Collect leaked out operating and auxiliary materials completely.
- Dispose of operating and auxiliary materials according to the disposal provisions in force.
- In case of doubt, refer to the local disposal authorities.

Materials used

Component	Material
Valve casing, Cover	Aluminum
Membrane	EPDM
Materials in contact with material	Aluminum
Needle, needle seat	Hard metal

10 Technical data

10.1 Dimensions und weight

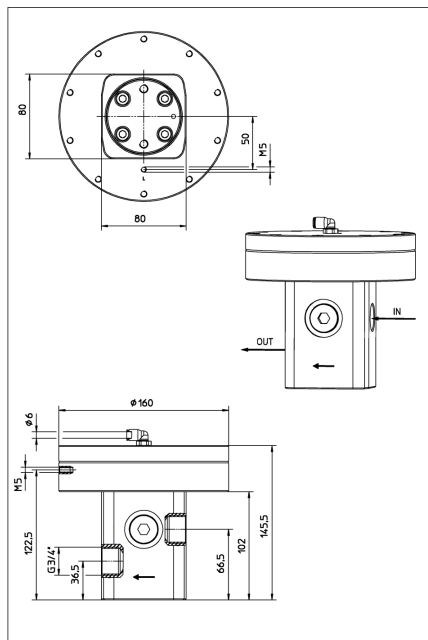


Fig. 7: Dimensions

Detail	Value
Total Length	145.5 mm
Diameter	160 mm
Weight	3.6 kg

10.2 Material specification

Material

PVC Plastisol:

- » Flashpoint > 100 °C
- » Solvent-free
- » Highly viscous

Viscosity

Indication	Value
Viscosity min.	2 Pa S
Viscosity max.	45 Pa S
Viscosity max. (Adhesive bonding)	5000 Pa S

10.3 Operating conditions

Detail	Value
Operating temperature, min.	10 °C
Operating temperature, max.	100 °C
Ambient temperature, min.	15 °C
Ambient temperature, max.	40 °C

10.4 Operating values

Detail	Value
Control air pressure, min.	0 bar
Control air pressure, max.	8 bar
Input pressure, max.	350 bar
Control range	20 to 310 bar
Flow rate, max.	20 l/min

10.5 Compressed air

Quality of compressed air

- » Purity classes ISO 8573-1:2010 1:4:1
- » Limitations for purity class 4 (pressure dew point max.):
 - » ≤ -3 °C @ 7 bar absolute
 - » ≤ +1 °C @ 9 bar absolute
 - » ≤ +3 °C @ 11 bar absolute

10.6 Tightening torques

Detail	Value
Material inlet	270 Nm
Material outlet	270 Nm
Pressure gauge	270 Nm
Valve cap	22 Nm
Flange	43 Nm
Cheese head screws 1st stage	4 Nm
Cheese head screws 2nd stage	8 Nm

10.7 Operating and auxiliary materials

Material	Specification
Screw connection lubricant	Molykote D paste
Seal lubricant	Klüber Syntheso GLEP1

10.8 Type plate

The type plate is on the regulator housing and features the following data:

- » Product name
- » Material number
- » Year of manufacture
- » Serial number
- » Maximum air pressure
- » Maximum material pressure
- » Manufacturer

11 Replacement parts and accessories

11.1 Replacement parts list

Item numbers relate to Fig. 6.

Item	Name	Quantity	Material #
1	Plug-in connection G1/8"	1	
2	Cheese-head screw M6x30 DIN912 8.8	10	
3	Lid	1	
4	Membrane	1	M08510051
5	Countersunk-head screw M6x16 DIN7991 8.8	1	
6	Plate	1	
7	Guide rod	1	
8	Needle	1	Wear kit: N26960006
9	Cheese-head screws M10x25 DIN912 8.8	4	
10	Safety washer d10.5 Type:S10	4	
11	Flange	1	
12	Plain bearing	1	Wear kit: N26960001
13	Regulator housing	1	
14	Sealing screw G1/2"	1	
15	Rod seal	1	Wear kit: N26960001
16	O-ring 30x2	1	
17	Needle seat	1	Wear kit: N26960006
18	O-ring 35x2	1	
19	Alignment pin 4m6x12	1	
20	Regulator cap	1	
21	Cheese-head screw M8x20 DIN912 8.8	4	

11.2 Accessories



Fig. 8: Accessories

Item	Name	Quantity	Material #
1	Auxiliary tool for assembly of the rod seal	1	W02020244
-	Pressure gauge with sealing ring	1	W07010302

11.3 Order replacement parts and accessories



WARNING!

Risk of injury from unsuitable replacement parts

Third party replacement parts may not withstand the full operational loads. There is a risk of injury!

- Only use original replacement parts.

Order for replacement parts and accessories as well as information on replacement parts that are listed without order number ↪ 2.3 “Hotline and Contact”.

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