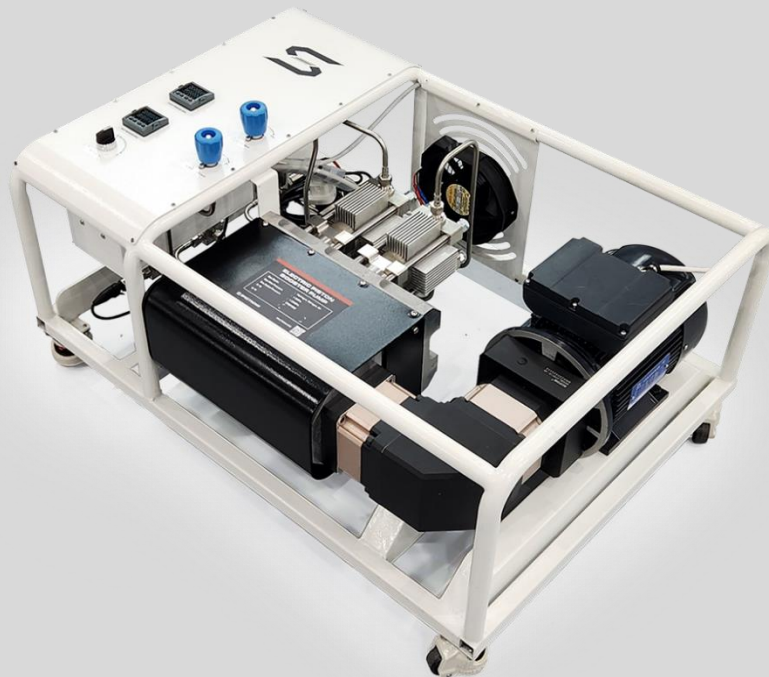


**S SPECTRONIK**

# **GAS BOOSTER PUMP (GBP)**

HCEP-T35X20-02

**USER GUIDE**



# 1 OVERVIEW

## Introduction

The Gas Booster Pump is a double acting, two-stage, electric driven system ideal for compressing Hydrogen gas from lower pressure source into high pressure cylinder. It has no belts and pulleys, enabling low noise electric pumping operation. It also has an integrated cooling fan to dissipate the heat of compression to ensure long seal life.

The Gas Booster Pump is very compact - measuring less than 100 x 60 x 30 cm, and has 4 heavy duty caster wheels to allow a single user to easily move it around. It also comes in a robust flight case to protect the equipment during storage and transportation.

Features:

- User configurable High-Pressure Limit to automatically stop the Gas Booster Pump when the desired target pressure is reached
- User configurable Drop-Off Pressure to automatically restart the Gas Booster Pump when the target pressure drops by a preset value
- Manual Start and Stop switch
- Inlet and Outlet Pressure digital display meters
- Inlet Shutoff Valve (needle type)
- Pressure Relief Valve (needle type)
- Inlet and Outlet 10-Micron filters
- Integrated cooling fan
- 6-digit hour meter

# 1 OVERVIEW

## Gas Booster Pump (GBP) System Overview

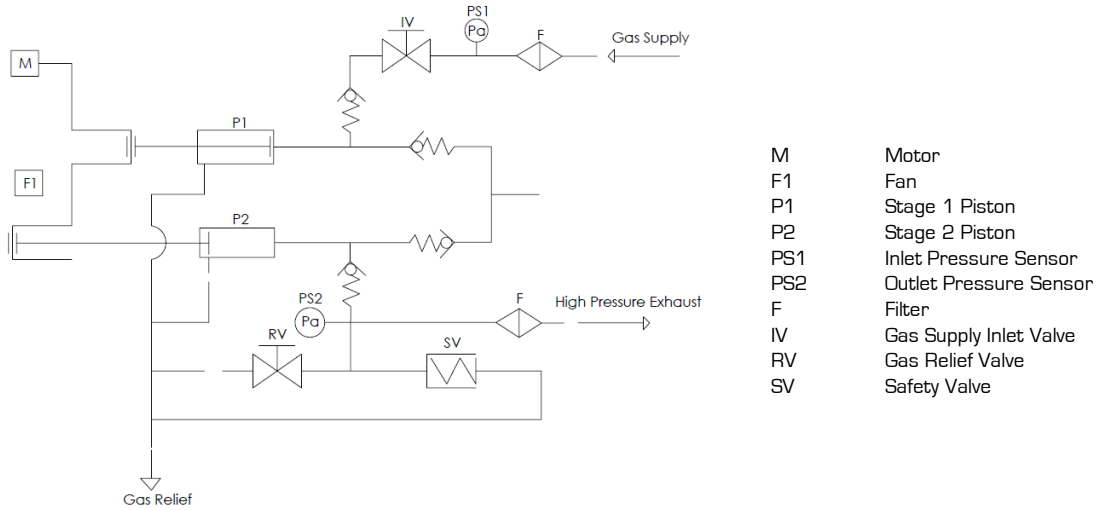


Figure 1.1: Electric Piston Booster Pump Mechanical Schematic Diagram

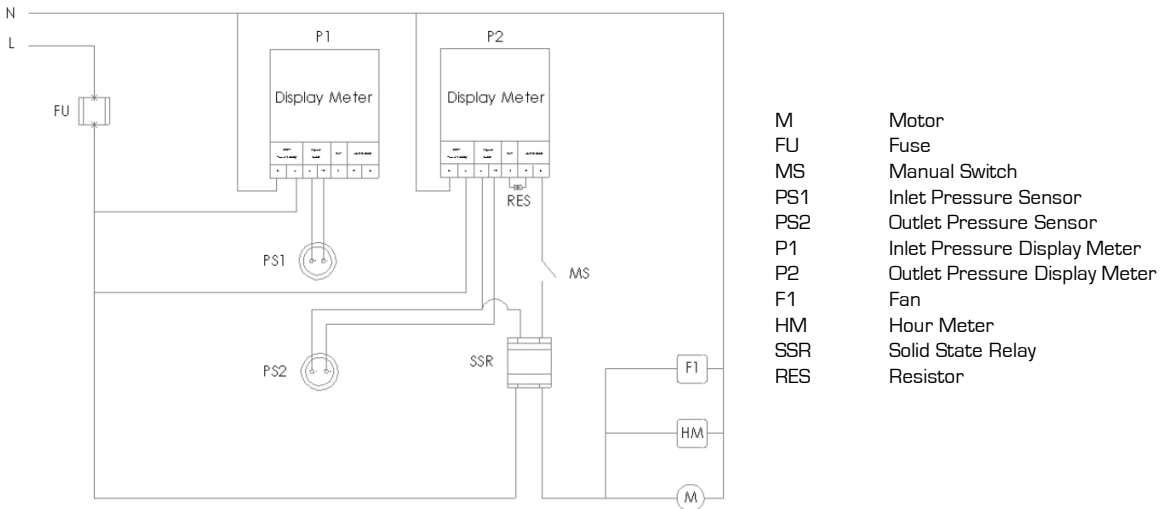


Figure 1.2: Electric Piston Booster Pump Electrical Schematic Diagram

## Gas Booster Pump (GBP) System Overview

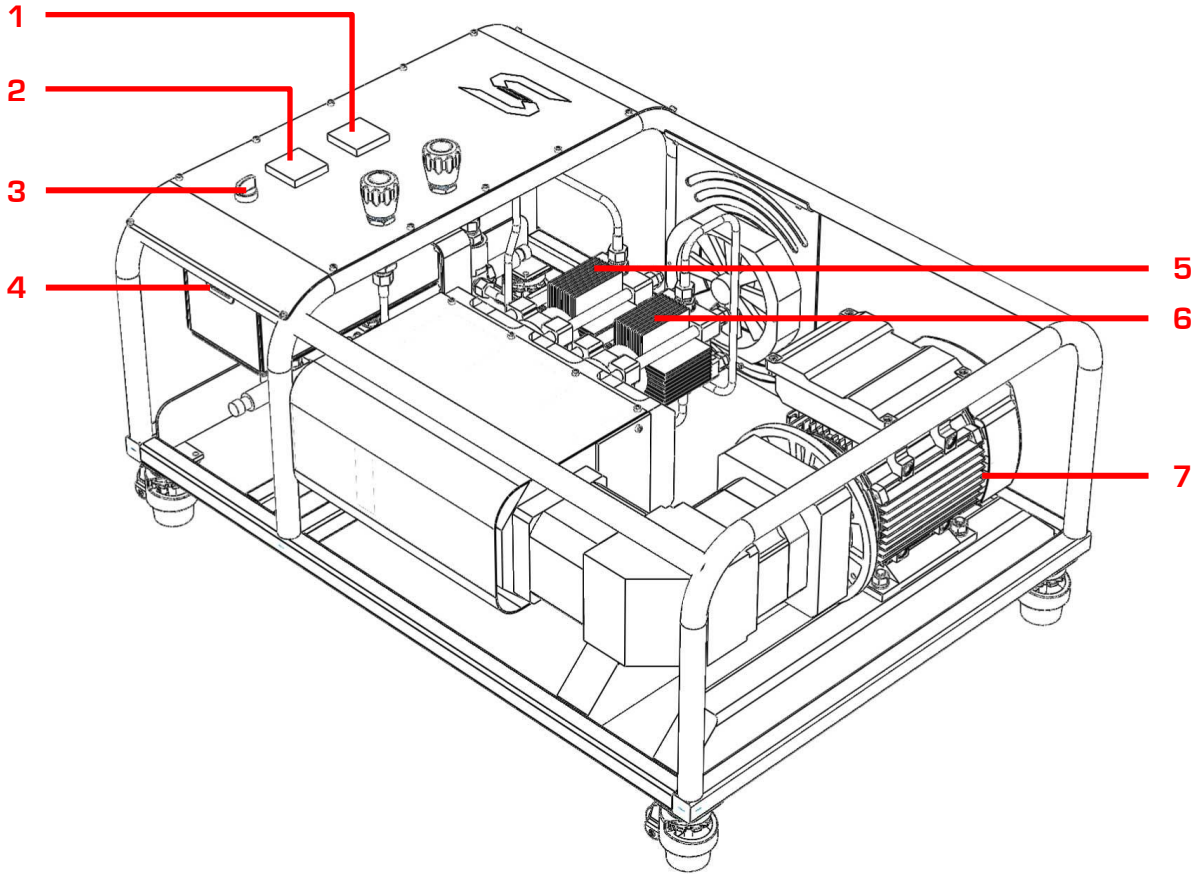


Figure 1.3 Isometric view of Gas Booster Pump (GBP)

ITEM DESCRIPTION	
1. Outlet Pressure Display Meter	8. Gas Relief Valve
2. Inlet Pressure Display meter	9. Gas Supply Inlet Valve
3. Power Switch	10. High Pressure Outlet Port
4. Hour Meter	11. Gas Relief Port
5. Stage 1 Piston	12. Gas Supply Inlet Port
6. Stage 2 Piston	13. Cooling Fan
7. Motor	14. Caster Wheel [x4]

## Gas Booster Pump (GBP) System Overview

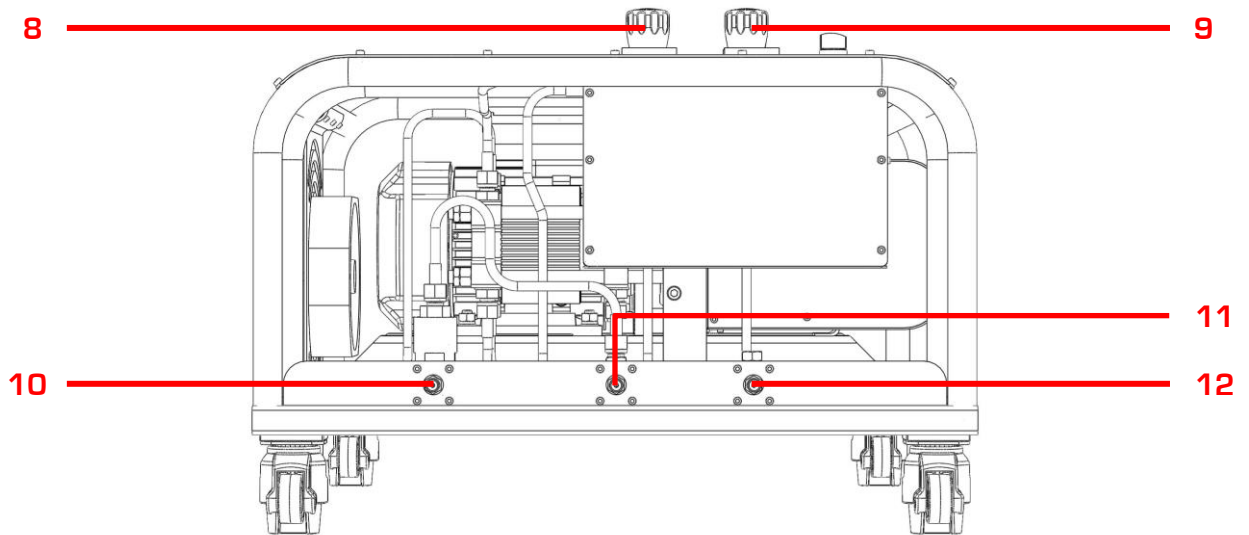


Figure 1.4 Left side view of Gas Booster Pump (GBP)

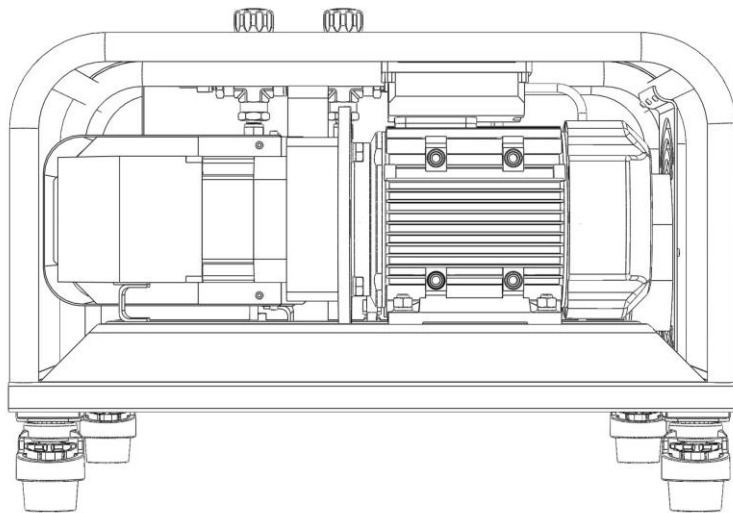
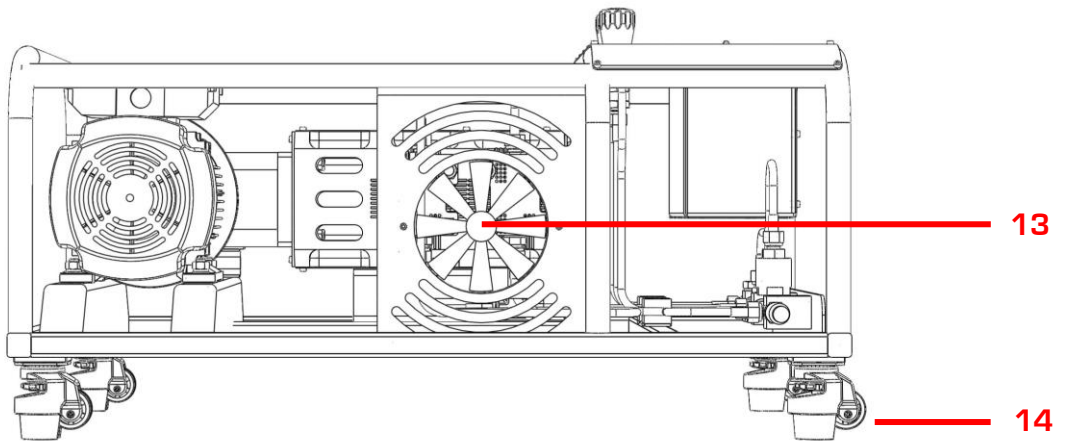


Figure 1.5 Right side view of Gas Booster Pump (GBP)

### ITEM DESCRIPTION

1.	Outlet Pressure Display Meter	8.	Gas Relief Valve
2.	Inlet Pressure Display meter	9.	Gas Supply Inlet Valve
3.	Power Switch	10.	High Pressure Outlet Port
4.	Hour Meter	11.	Gas Relief Port
5.	Stage 1 Piston	12.	Gas Supply Inlet Port
6.	Stage 2 Piston	13.	Cooling Fan
7.	Motor	14.	Caster Wheel [x4]



*Figure 1.6 Back side view of Gas Booster Pump (GBP)*

ITEM DESCRIPTION	
1. Outlet Pressure Display Meter	8. Gas Relief Valve
2. Inlet Pressure Display meter	9. Gas Supply Inlet Valve
3. Power Switch	10. High Pressure Outlet Port
4. Hour Meter	11. Gas Relief Port
5. Stage 1 Piston	12. Gas Supply Inlet Port
6. Stage 2 Piston	13. Cooling Fan
7. Motor	14. Caster Wheel [x4]

## Gas Booster Pump (GBP) System Overview



Figure 1.7 Control Panel



Figure 1.8 Hour Meter

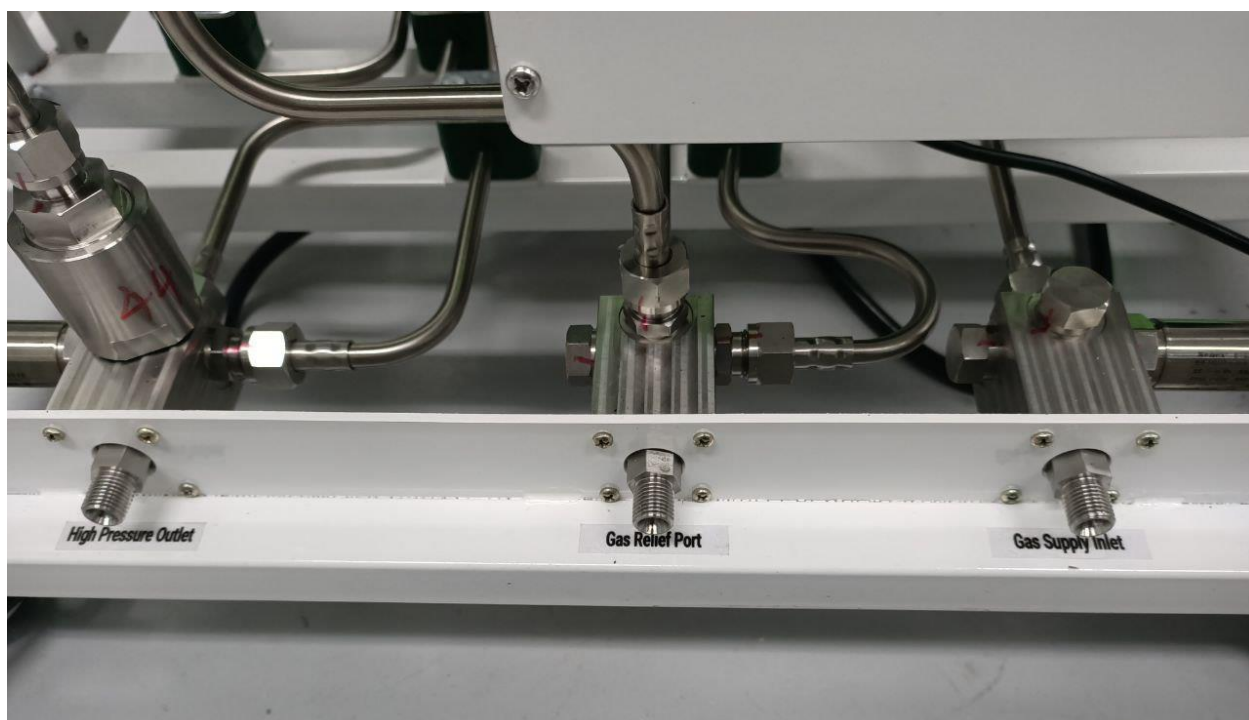


Figure 1.9 High Pressure Outlet, Gas Relief and Gas Supply Inlet Ports

# 2 SPECIFICATIONS

## Gas Booster Pump (GBP)

Gas media	Hydrogen, Nitrogen, Air
Min inlet pressure	30bar
Max outlet pressure	350bar
Flowrate	120L/min
Noise	<70dB
Power requirement	220VAC, 50Hz, 1.5kW
Dimension	940 x 292 x 559 mm
Weight	80kg
Gas inlet/outlet/relief port connection	M12 x 1.25
Cooling	Air cooled with integrated cooling fans
Lifetime	2000h without maintenance (integrated mileage hour-meter)
Smart control	Configurable outlet pressure with automatic stop

## What's In The Box

Electric piston Gas Booster Pump (GBP) with control panel

Stainless steel gas inlet and outlet flexible hose

Storage and transportation flight case with caster wheels





# 3 OPERATING PROCEDURES

## Setting Up The Gas Booster Pump (GBP)

1. Connect the gas source to the Gas Supply Inlet port of the GBP using a high-pressure tube. Connect the carbon fiber gas tank, with sufficient capacity for the compressed gas, to the High Pressure Outlet port of the GBP using another high-pressure tube. Connect a high-pressure tube to the Gas Relief Port of the GBP for exhaust gas to be purged out of the GBP after compression has been completed. Ensure all connections are secure.
2. Connect GBP to a 220V 50Hz single-phase power supply, and observe that both Inlet and Outlet Pressure Display Meters give a reading of 0 MPa (readings may fluctuate a little).
3. Check that the Gas Supply Inlet Valve and the Gas Relief Valve are closed, then turn on the gas source. The Inlet Pressure Display Meter should reflect the pressure of the gas source.
4. Set the desired output pressure by pressing the left button on the Outlet Pressure Display Meter. Toggle to AL1 and use the up and down buttons to set the desired pressure accordingly. Long press the left button to save the desired pressure and exit.
5. Set the desired drop-off pressure by pressing the left button on the Outlet Pressure Display Meter. Toggle to AH1 and use the up and down buttons to set the drop-off pressure accordingly. Long press the left button to save the drop-off pressure and exit. (If outlet pressure falls by drop-off pressure, GBP will automatically start compression again to return pressure back to desired pressure.)
6. Open the valve on the carbon fiber gas tank and the Outlet Pressure Display Meter will reflect the gas tank's pressure.
7. Slowly open the Gas Supply Inlet Valve by turning it anti-clockwise, gas will flow through the High Pressure Outlet line into the carbon fiber gas tank. The Outlet Pressure Display Meter's reading will increase while the Inlet Pressure Display Meter's reading will decrease, until they converge in equilibrium.

## Switching On The Gas Booster Pump (GBP)

1. After achieving equilibrium, let the system rest and gas in the carbon fiber gas tank to cool down to about room temperature before starting compression.
2. Switch on the GBP by turning the Power Switch clockwise. Now, the GBP will start compressing the gas to the pre-set output pressure.
3. Once the desired output pressure has been reached, the GBP will stop compression automatically. If pressure in the carbon fiber gas tank drops by more than the drop-off pressure, the GBP will restart compression automatically to restore it to the pre-set output pressure.

## Switching Off The Gas Booster Pump (GBP)

1. Switch off the GBP by turning the Power Switch anti-clockwise.
2. Turn off the gas source and close the valve of the carbon fiber gas tank.
3. Leave the Gas Inlet Supply Valve open and slowly open the Gas Relief Valve by turning it anti-clockwise to purge the remaining gas in the GBP through the Gas Relief Port.
4. Both the Inlet and Outlet Pressure Display Meters' readings will return to 0 MPa, then close the gas inlet supply valve and gas relief valve.
5. Disconnect all the tubes from the GBP.

# 4 SAFETY PRECAUTIONS

## Take Note:

1. Please adhere to the instructions in this user manual to prevent damaging the GBP.
2. If hydrogen gas is to be used in operations, please conduct all operations in a room equipped with a hydrogen-sensor and an alarm, or in a well-ventilated open environment.
3. Handle the GBP with care. Be careful when connecting high-pressure tubes and ensure tubes are fully connected to the ports before use.
4. When operating the GBP, ensure the carbon fiber gas tank used downstream has sufficient capacity (This is to prevent pumping too quickly which can damage the booster pump).
5. When operating the GBP, it will produce motor noise accompanied by a mild high frequency noise. If you notice that the noise becomes louder or any abnormal noise, immediately switch off the GBP and turn off the gas supply. Contact Spectronik for assistance at [support@spectronik.com](mailto:support@spectronik.com)
6. The GBP has safety valve that will purge gas if either meter's reading reaches 47 MPa. The GBP also has an electronic control valve that will stop compression once the Outlet Pressure Display Meter reaches 35 MPa.
7. After switching off the GBP, please wait at least 3 minutes before switching it on again if you wish to continue using it.