

PRESSFLOW GAS CONTROLLER BPC

for dependable and reproducible hydrogenation with precise gas consumption measurements



BÜCHI – THE WAY TO GET RESULTS!

DON'T LEAVE HYDROGENATION TO CHANCE



The «pressflow gas controller bpc» provides the user with an instrument for unexcelled accuracy in hydrogenation. The «bpc» very rapidly provides the necessary data to scale up laboratory hydrogenation processes to pilotplant or production.

THE OUTSTANDING FEATURES OF THE «BPC» ARE:

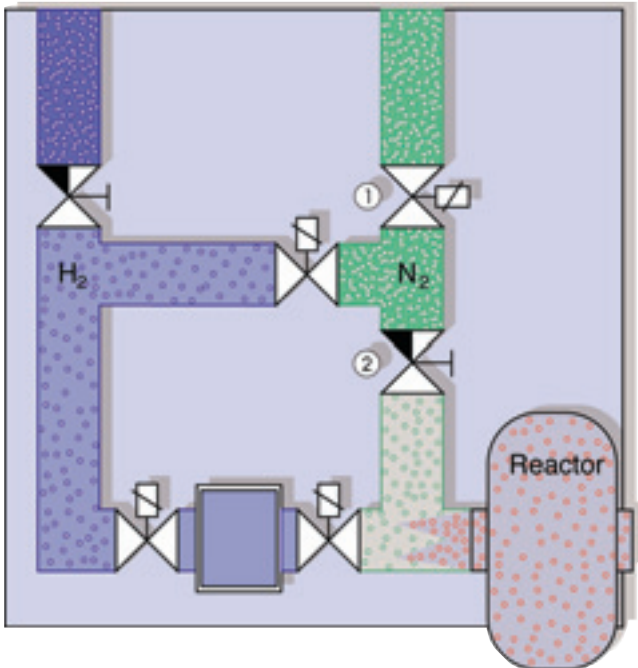
- Hydrogenations in the 1 to 400 bar pressure range (depending on the type) can be fully automated.
- The consumed quantity of active gas (usually H₂) is indicated in ml or mol. The measuring system precisely logs the consumption of the most minute quantities of gas.
- The desired gas quantity can be preselected. The «bpc» automatically shuts off the active gas supply when the set value is reached.
- The preselected reaction pressure is maintained accurately during the entire experiment.
- The easy-to-read LCD on the control module provides the user with all key data.
- The «bpc» has several good safety features. The user purges the supply lines and the reactor with nitrogen before starting the experiment. During this operation the pressure is reduced for safety reasons.
- An automatic leak detector is integrated in the «bpc» gas controller. This detector immediately turns off the unit if explosive gases are detected.
- The gas module contains the entire valve control assembly. Two pressure gauges indicate the active gas pressures before and after the reservoir. The «bpc» requires only three lines: one supply line each for the «inert» and «active» gas and a connection line to the reactor.



BPC IS SAFE AND EASY TO OPERATE

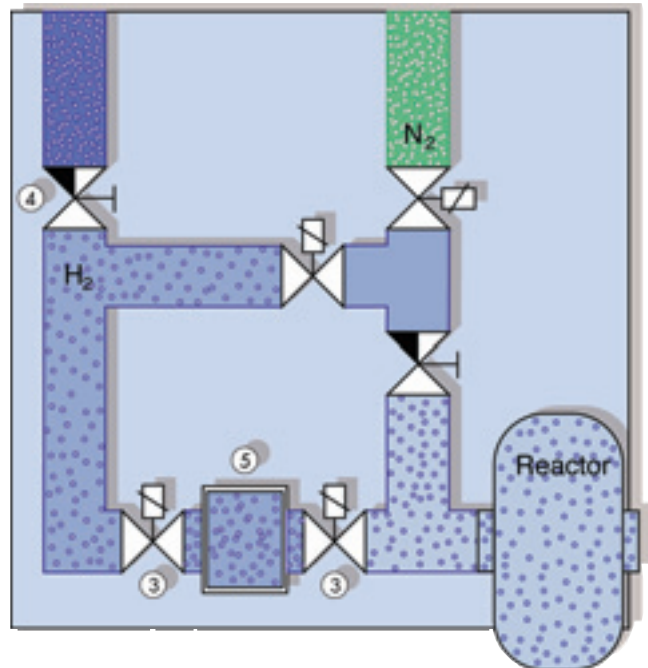
1. The purging process starts.

The engineered valve control system guarantees safe preparation for the laboratory test.



2. The preparation phase is over.

The exact volume measurement during the experiment with respect to P and T is guaranteed.



The lines and reactor are flushed with N₂. The logically designed system prevents dangerous pressure build up in the lines and in the reactor during the purging operation.

Solenoid valve ① for the N₂-purging operation is controlled manually by the user. The purging mode is activated via the «purge» and «inert» control module buttons. Pressure-reducing valve ② reduces the N₂ delivery pressure.

Filters and check valves provide additional safety.

The entire system is filled with H₂ during the second purging phase. The instrument is ready for the experiment.

The «bpc» is ready for the experiment.

The user selects the desired reaction pressure and then checks to ensure that there will be an adequate gas flow rate.

The consumed gas volume is calculated from the numbers of solenoid valve cycles, pressure, temperature and volume of the calibrated reservoir ⑤, using the gas laws.

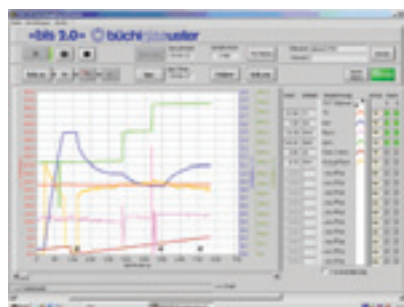
To protect the instruments, both reservoir solenoid valves ③ are never open at the same time. This prevents the occurrence of a pressure shock to the reactor.

Software bls 2.0 for bpc

Process documentation data recording and export e.g. Excel
bpc-control

minimum requirement:

Win. 98



EVERYTHING ABOUT THE GAS MODULE

The gas module with its valves and measuring sensors forms the «mechanical» section of the «bpc». The gases are delivered via two connections:

- purging gas (N₂) and
- active gas (H₂)

There is only one line leading to the reactor.

Function

If the desired pressure of the active gas drops below the set value due to the chemical reaction, the consumed quantity of active gas is replenished. The volume is measured and displayed on the LCD of the control module.

The volume of gas released from the reservoir each time depends on the size of the reservoir and the difference between the feed and outlet pressures.

The maximum gas flow rate is determined by:

- Valve switching frequency
- Reservoir volume
- Feed/outlet pressure difference

The temperature is accounted for in the computation to guarantee an absolutely accurate measurement.

Safety

If a leak should occur in the «bpc», a detector in the gas module becomes active. All electrical systems are immediately disabled.

The segregation of the units allows the progress of the reaction to be monitored and influenced from outside hazardous areas.

Technical data

Operating range: 1 to 400 bar

Dimensions: HxWxD = 540 x 210 x 450 mm

Weight: Approx. 20 kg



EVERYTHING ABOUT THE CONTROL MODULE

The control module contains the LCDs, the data entry keyboard and the various interfaces for a PC, stirrer, reactor heater, recorder, etc. The gas-volume is displayed in ml/s under standard atmospheric conditions or in mol mass.

Data display

- Actual and preset reaction pressure
- Pressure of controlled gas
- Maximum gas flowrate
- Gas volume used
- Maximum gas volume
- Actual gas flow rate

Special features

- Fully automatic monitoring and control of reaction over extended periods of time.
- Continuous gas flow, no volume limit.
- Hazardous free operation even when reaction is pressurized.
- No gas containers in laboratory.
- Accurate monitoring and control of reaction pressure.
- Control unit can be interrupted via an external alarm contact and switched to a standby mode.
- Gas is turned off when a preset volume is reached, if desired.
- Internal temperature compensation for accurate gas-volume measurement.

Options

- Data logging and remote control via PC with our optional software «bls 995»
- 4...20mA signal input for external pressure setpoint
- Special software for non linear gases (ethylene, propylene, oxygene) e.g. for polymerisation, oxydation
- LabVIEW driver

Technical data

Accuracy of pressure measurement: ± 0.4% BSL

Rating: 230 V, 500 mA / 115 V, 1 A

Dimensions: HxWxD = 180 x 290 x 250 mm

Weight: Approx. 6 kg

Outputs

	Accuracy	
	± 0.25%	± 0.4%
Gas consumption	0 to 10 V	4 to 20 mA
Flowrate	0 to 10 V	4 to 20 mA
Delivery pressure	0 to 10 V	4 to 20 mA
RS 232		



Types	«bpc...» «bhpc...»	1202	1210	6002	6010	9901	20001	40001
Max. delivery pressure	[bar]	12	12	60	60	100	200	400
Max. regulated pressure	[bar]	25	25	90	90	160	205	405
Max. flowrate at:								
-1 bar pressure difference	[l/min.]	0.312	1.56	0.312	1.56	0.312	0.312	0.312
-50% pressure difference of max. delivery pressure	[l/min.]	1.872	9.36	9.36	46.8	15.6	31.2	62.4
Min. recommended pressure difference	[bar]	0.5	1	2.5	5	4	10	20
Max. recommended pressure difference	[bar]	6	6	30	30	50	100	200
Accuracy of 1 gas pulse at 25°C in %								
within recommended pressure range	[%]	+/-1.5	+/-2	+/-1.5	+/-2	+/-2	+/-2	+/-2
Max. supply pressure	[bar]	200	200	1.5	200	200	415	415