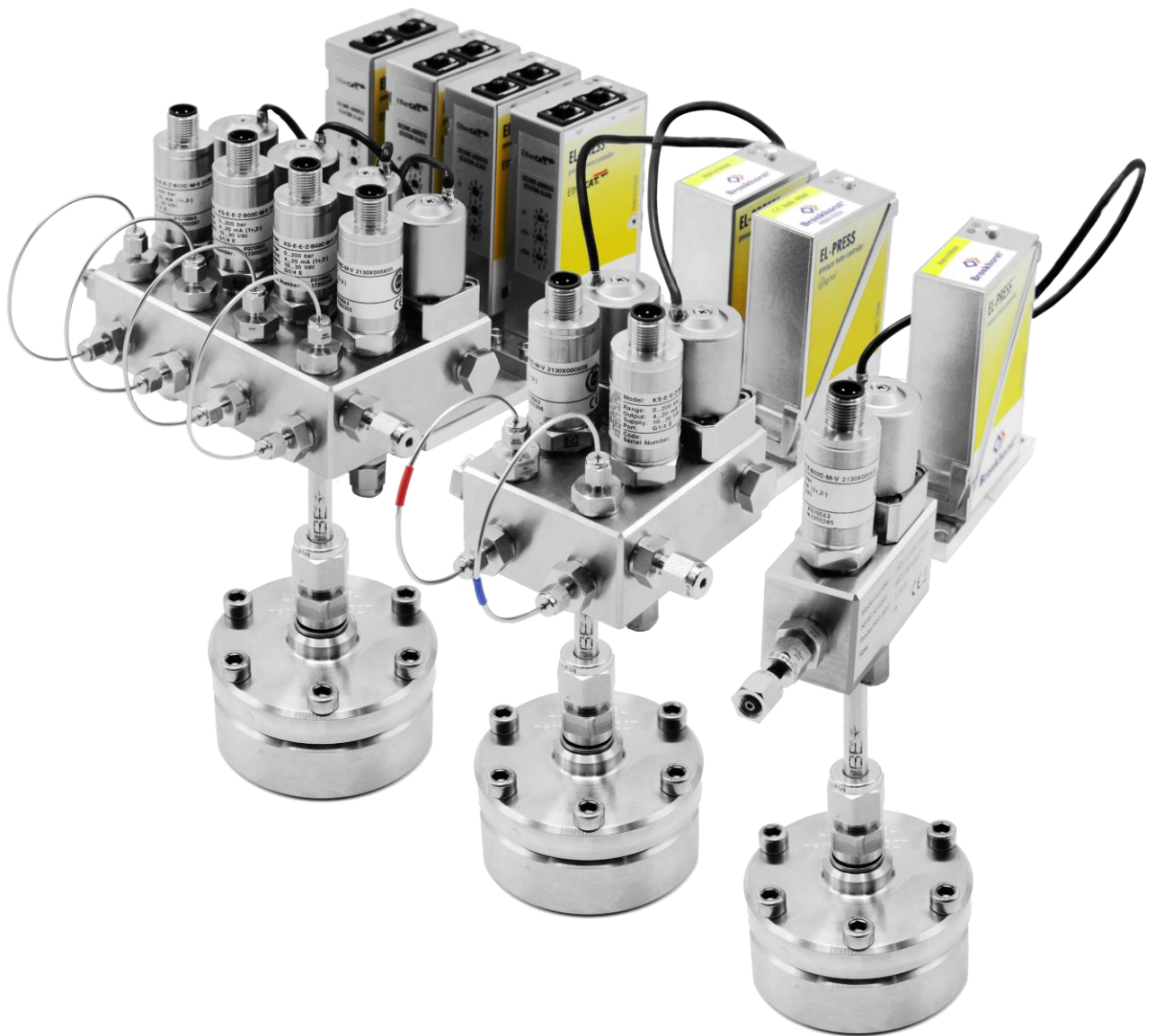


ERC Series

electronic pressure control



PRESSURE CONTROL
— SOLUTIONS —

ERC Series | electronic precision

1 | 2 | 4 | Multi-Channel Design

Originally intended for electronic reference control, this instrument now has a proven track record for many other applications. Whether or not combined with an Equilibar® back pressure regulator, an electronic pressure controller in the ERC Series enables stability and repeatability that is unparalleled in precision pressure control.

For applications with multiple identical systems we also developed special manifolds to facilitate 2- and 4-channel set-ups. This reduces the space and connections needed in compact pilot plant designs. Gas supply for 4 systems can be connected to just 1 multi-channel manifold. The 4-channel is commonly used in high throughput catalyst research.

Main Features & Specifications

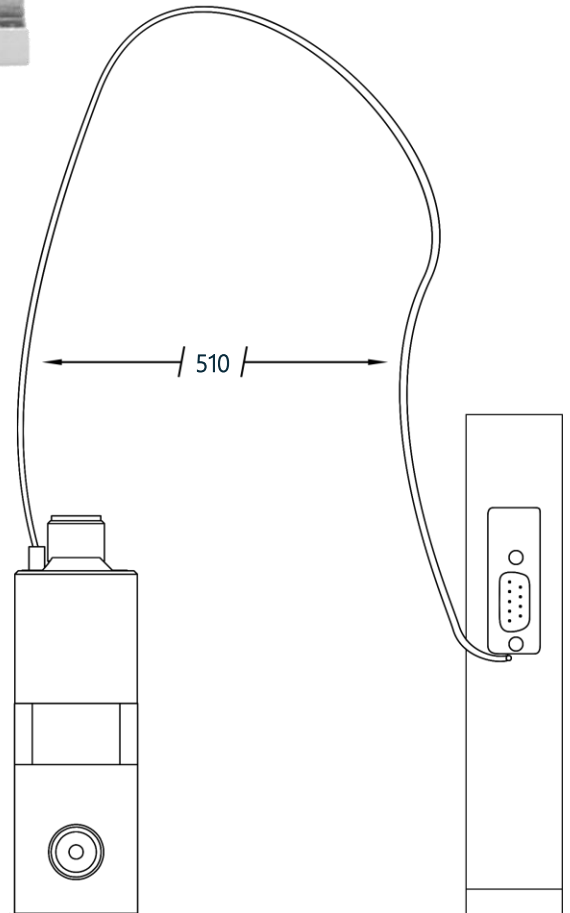
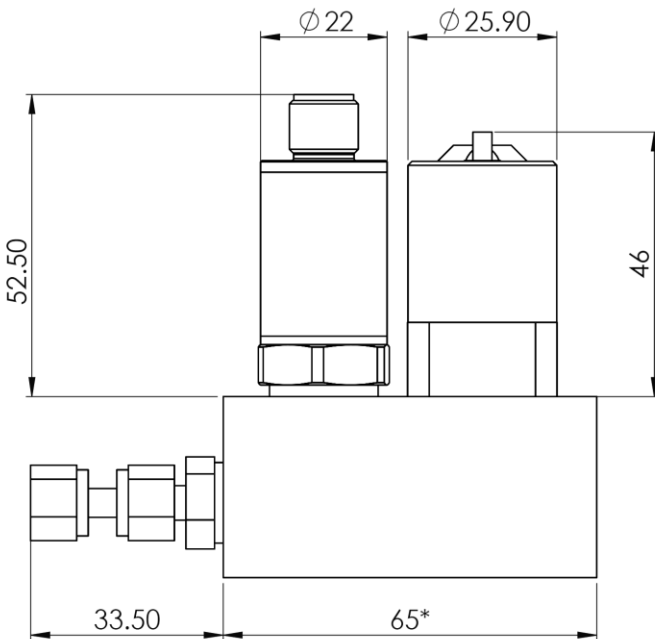
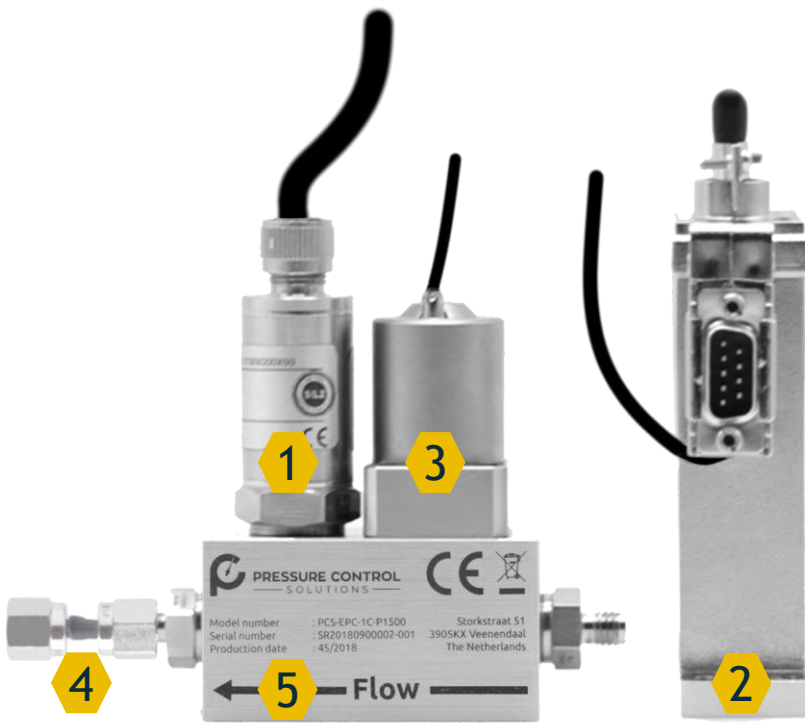
- Control stability of 0.01%
- Ultra low consumption rates
- Ranges: from -1...200 bar(g)
- 1, 2, 4 & multi-channel
- Compact design
- Fail safe: pressure release & full pressure

FEATURE	DETAILS
Control stability	0,01%
Repeatability	0,02%
Sensor accuracy	0,5 % Full Scale Optional: 0,25%, 0,125%, 0,1% or 0,05%
Pressure transmitter (max. pressure)	Multiple pressure ranges available up to 200 bar
Available manifolds	1-, 2-, 4- or multi-channel
Restriction size	10, 20, 30, 50 or 100 micron
Fail safe	Pressure release Full pressure
O-ring material	FKM, EPDM, FFKM
Tube fitting sizes	Imperial: 1/4" 1/8" 1/16" OD Metric: 3 mm 6 mm 9 mm OD
Valve pressure & orifice sizes	Low pressure up to 40 bar: orifice 0,05 up to 2,0 mm High pressure up to 200 bar: orifice 0,05 up to 0,3 mm
Analog communication	0-20 mA 4-20 mA 0-10 Vdc 0-5 Vdc
Digital communication	DeviceNet ProfiBus ProfiNet Ethercat FlowBus ModBus RTU ModBus TCP/IP CANopen



Design

1. Pressure transmitter
2. PID controller
3. Proportional valve
4. Flow restrictor
5. Manifold



*Sizes are different per manifold type.
Details for all available manifold types can be found on page 4.

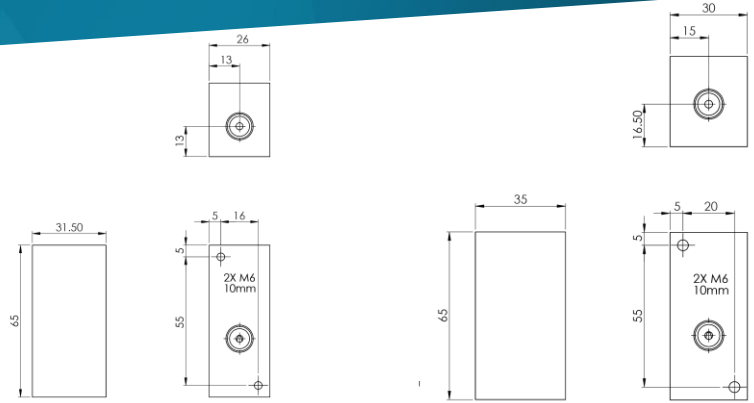
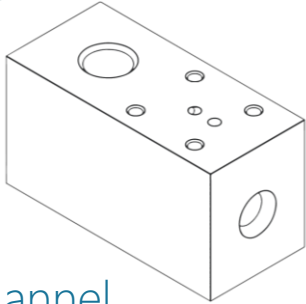


PRESSURE CONTROL
SOLUTIONS

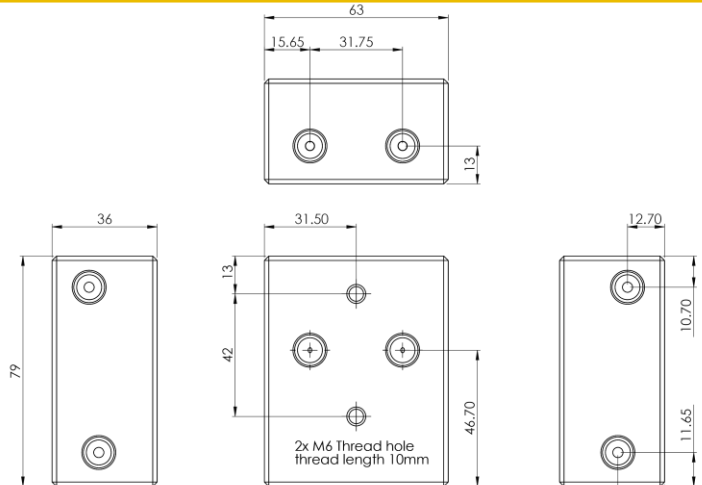
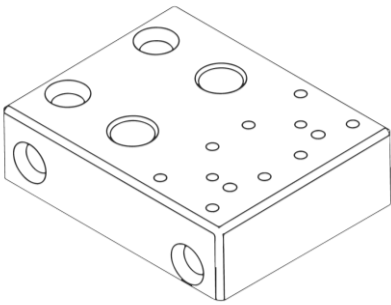
Manifold

The manifold is available in 1-, 2-, 4- and multi-channel designs. The outer dimensions are shown in the schematic drawings below. The width of the manifold and the number of mounting holes differ per model. The mounting holes can be used to connect the manifold on a construction rig. The ERC is equipped with a pressure sensor, proportional valve, flow restrictor, and PID-controller. Full height sizes of the ERC are listed on page 3.

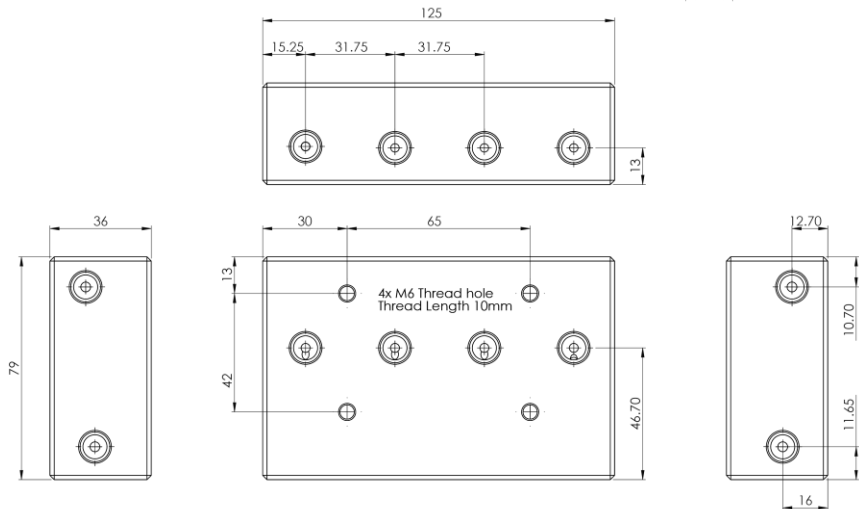
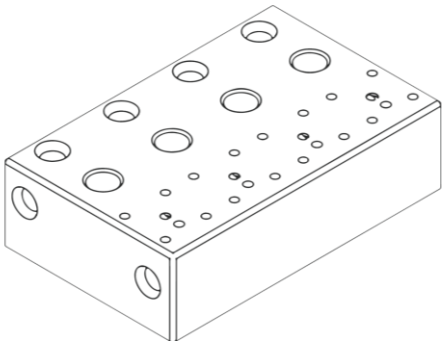
1-channel



2-channel



4-channel



ERC Series



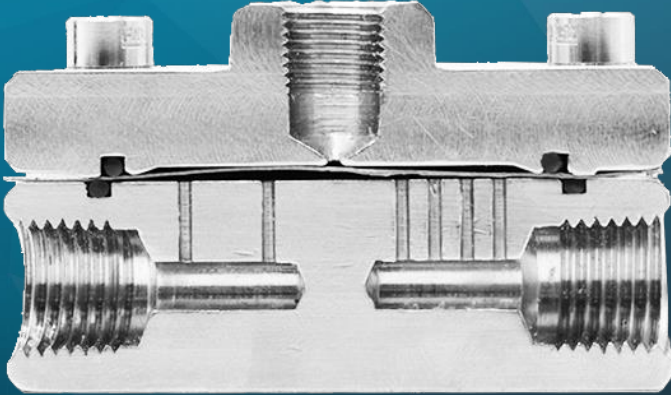
PRESSURE CONTROL
SOLUTIONS

ERC & Equilibar valves

Excellent Stability

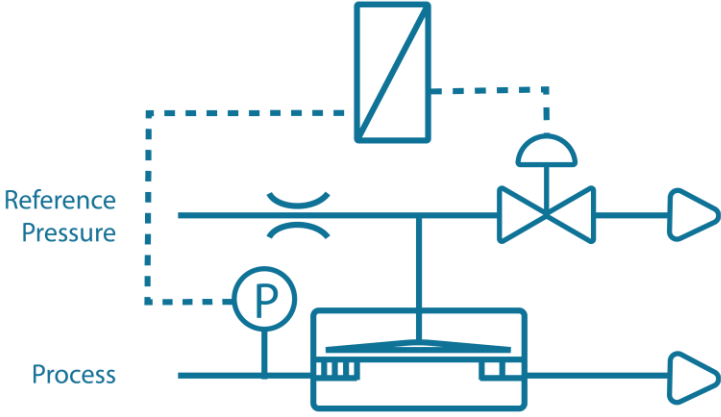
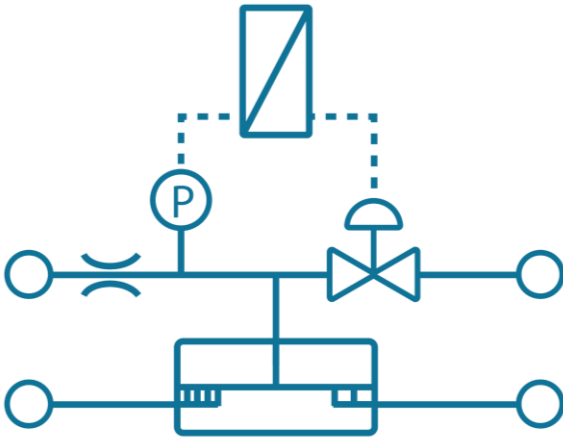
The Equilibar® back pressure regulator is a diaphragm sealed multiple orifice control valve being set by a reference pressure. When the upstream process pressure exceeds the set reference pressure, the diaphragm will lift from the orifices until the process pressure equals the reference pressure. Equilibar back pressure regulators operate over an unsurpassed Cv range of 1:100,000 or more.

Applying a stable pilot pressure is key to getting the most out of your Equilibar Back Pressure Regulator and the performance of your process. Our ERC is able to achieve **0.01% control stability**, through the placing of a flow restrictor upstream or downstream of a proportional control valve. The continuous bleed enables the proportional valve to operate constantly within its ideal bandwidth.



Open Loop Control

Closed Loop Control



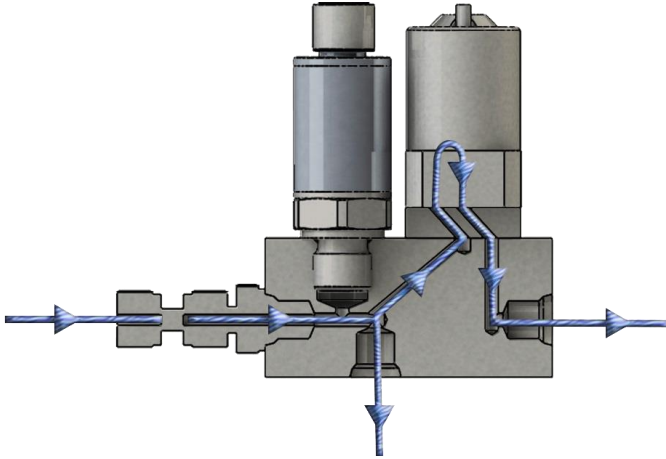
In an open loop system, the reference pressure is controlled allowing the process to follow the reference pressure with a 1:1 ratio. This is often used with regulators in the Equilibar Research Series, where the pressure drop is close to 0.

In a closed loop system, the reference pressure is altered to control the process pressure. This is often used for higher flows, vacuum or situations of pressure drop over the back pressure regulator.

Fail-Safe Configuration

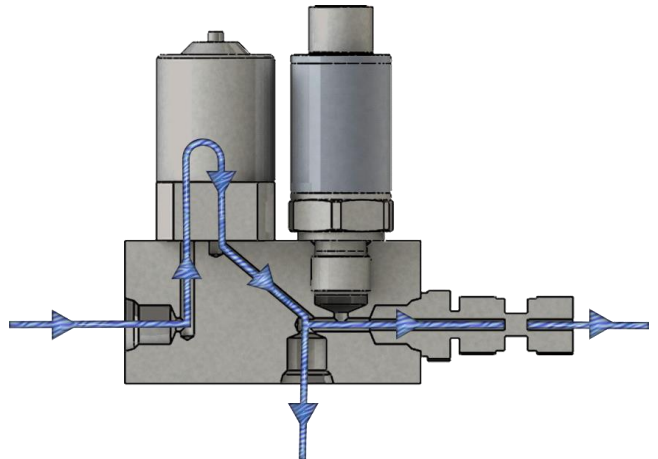
The ERC can be supplied in Pressure Release or Full Pressure configuration: In case of a power failure, the reference pressure will either increase or decrease. The fail-safe only applies to power failure. The ERC can only hold pressure when sufficient supply pressure is available.

Full Pressure

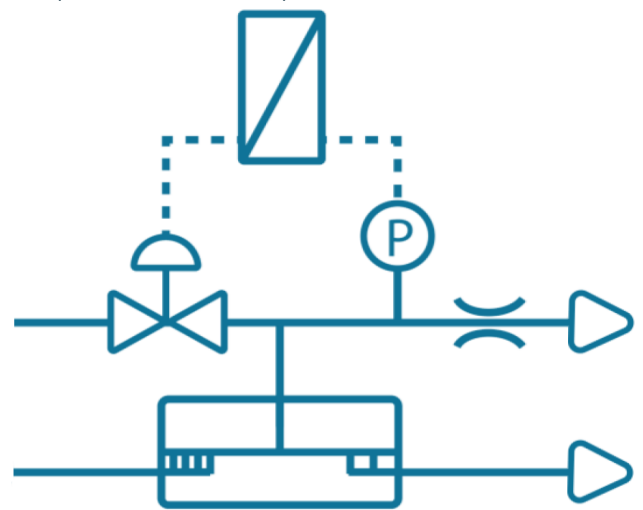
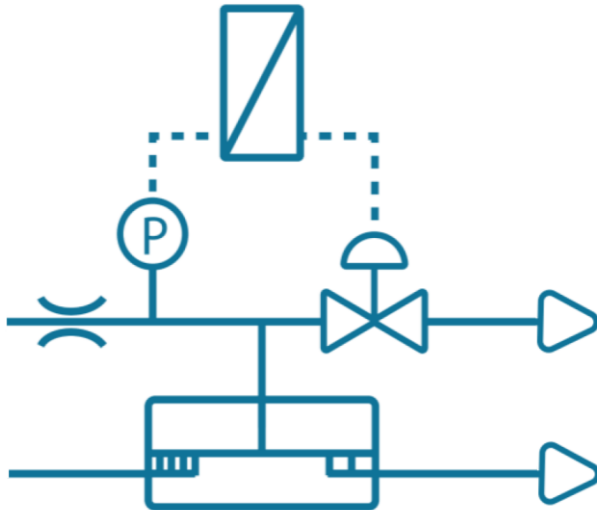


The blue arrows indicate the flow through the ERC. The restriction is placed on the inlet of the manifold. The restriction size determines the closing speed of the Equilibar valve.

Pressure Release



The blue arrows indicate the flow through the ERC. The restriction is placed on the outlet of the manifold. The restriction size determines the opening speed of the Equilibar valve.



These 2 schematics show the manifold connected to the Equilibar valve. Maximum pressure will be applied to the reference of the Equilibar valve upon power failure.



Exclusive Design

Engineered by PCS



Flow Restrictor

1. Minimal consumption
2. 10, 20, 30, 50 & 100 μm
3. Standard connectors
4. Custom designs upon request

The flow restrictor – designed and manufactured by PCS – is a key component in the ERC, available in 10, 20, 30, 50 and 100 μm \varnothing . The flow restrictor is placed to reduce the consumption of reference gas. The picture above shows an example flow restrictor in 100 micron, to be recognized by its yellow detail.

The ERC can well be used in a wide range of applications, and particularly (but not necessarily) also in combination with Equilibar® back pressure regulators: The ERC controls the reference pressure with only 1 proportional valve. When this valve opens, the flow will increase, and with the increased flow, the reference pressure changes. To hold the required pressure, the valve stays in control of the flow, facilitating a control stability up to **0,01%**.

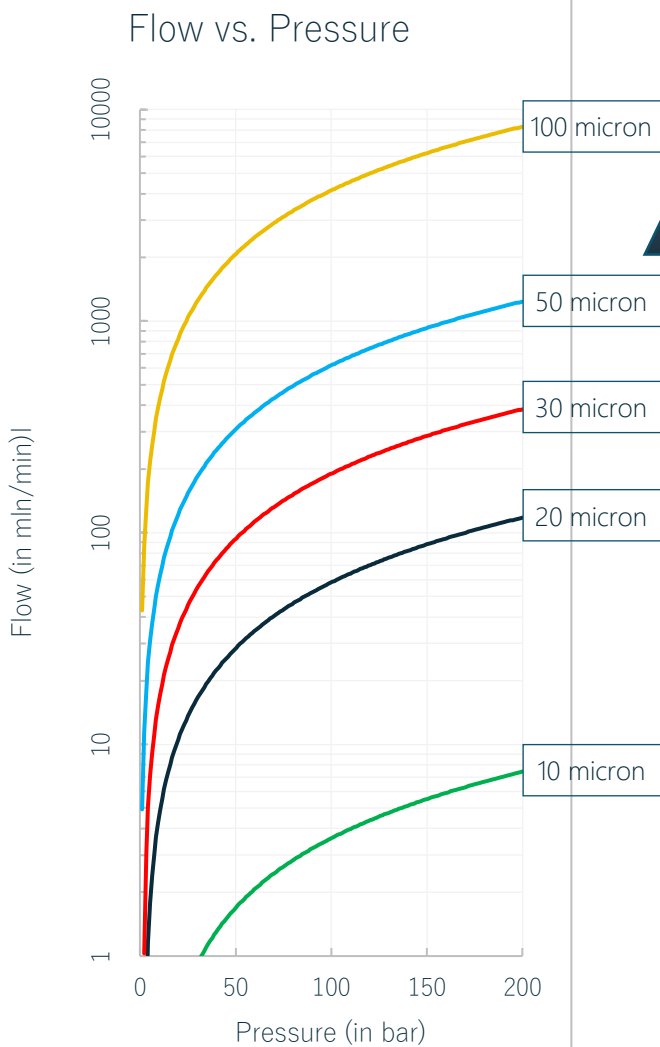
Response time of the ERC Series is the time needed to *adjust* to a new pressure setpoint, based on:

- Pressure controlled volume (varies per Equilibar valve model)
- Restriction size (in/out)
- Orifice size (in/out)
- Controlled pressure

When used as a reference controller on top of an Equilibar valve, the ERC is ideally operated with a minimal dead volume. We advise to use 1/8" tubing.



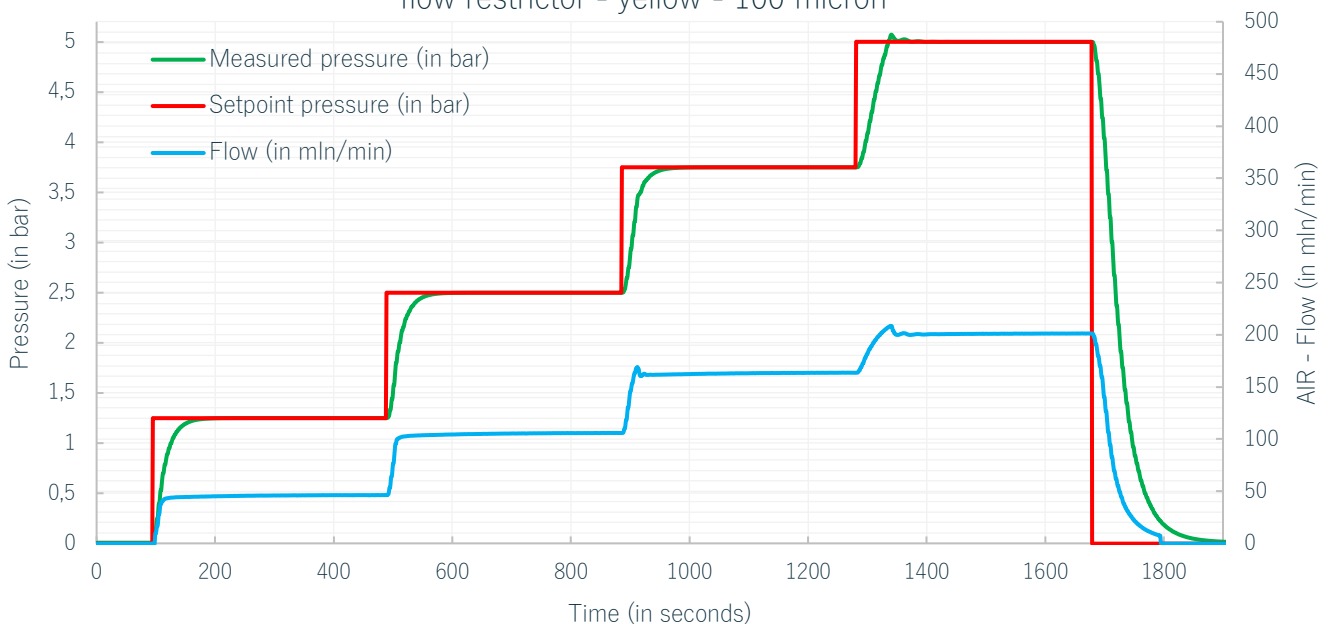
Flow Restrictor Consumption Data



The chart on the left side of this page demonstrates the ratio between controlled pressure and the consumption of reference gas for the different sizes of flow restrictors.

The chart below visualizes the speed and accuracy with which the measured pressure follows changes in the setpoint pressure, as well as the corresponding consumption of reference gas (the chart represents a test with a flow of *air*). More charts can be found on our [website](#).

flow restrictor - yellow - 100 micron



Product Parts

Brand	Pressure range	Precision	Signal
Gefran Wika	-1 ... 200 barg 0 ... 40 bara	VL 0,5% L 0,25% M 0,125% H 0,1% VH 0,05%	0...5 Vdc 0...10 Vdc 0...20 mA 4...20 mA



Pressure Sensors

The ERC is controlled by a Bronkhorst® El-Press. Bronkhorst is a well known supplier of precision mass flow controllers and well reputed for its quality and reliability. For more information we refer to the El-Press manual online. Software solutions for configuration and monitoring performance are available. Freeware can be downloaded [online](#).



PID Controller

Pressure	Orifice size
40 bar	0,05 mm <-> 2 mm
200 bar	0,05 mm <-> 0,3 mm



Valve

Cable type	Connection
Pressure Sensor	M12x1 <-> 9-pin subD
PID-Controller	9-pin subD (fe)male



Cables

Tube Imperial	Tube Metric	VCO	VCR
1/8" 1/4"	3 mm 6 mm	1/4" male	1/4" male

All three ports are 1/8" BSPP connections. One port is used for the flow restrictor. The table shows available connectors for the inlet and the outlet.

Connectors

Caps and Blind Stops

The manifold can be used with an external sensor for closed loop control. In that case, you will need blind plugs to close the ports. Also, any remaining slots should be sealed, when not all channels of the manifold are in use. For this purpose, we offer sealing kits containing a valve closing cap and the necessary 1/4" BSPP and 1/8" BSPP blind plugs.

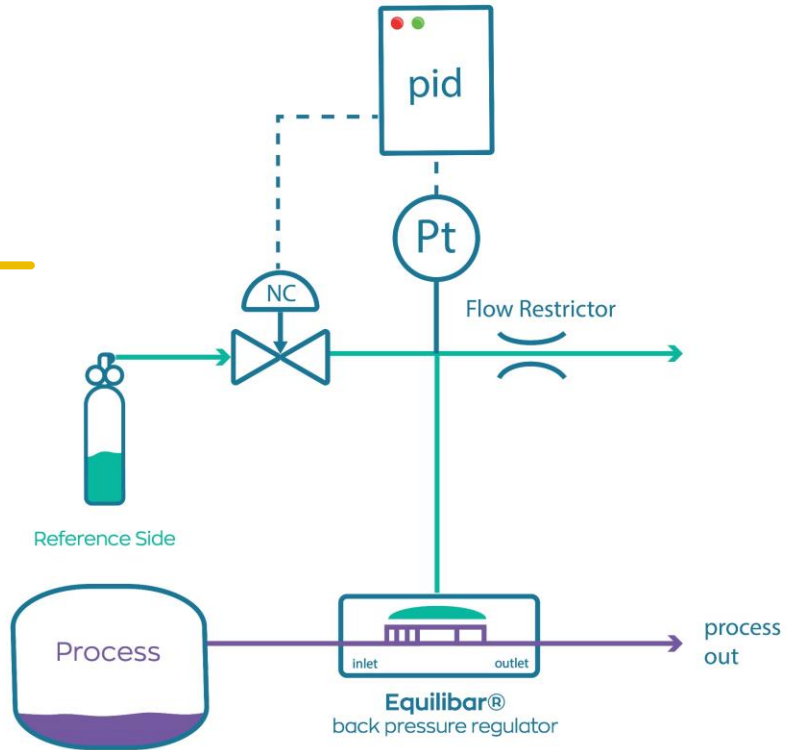
Applications

The ERC can be used in a wide variety of applications. From **vacuum applications** to process lines for **challenging fluids** and precision pressure applications **up to 200 bar** – thanks to its versatility and broad customization options, the ERC Series can do it all. Presented here are examples of applications in which the ERC has been successfully applied. As the ERC Series is truly an all-rounder, there are many more possibilities. Are you interested to find out what the ERC Series can do for you? [Contact us](#) for direct advice and expertise!

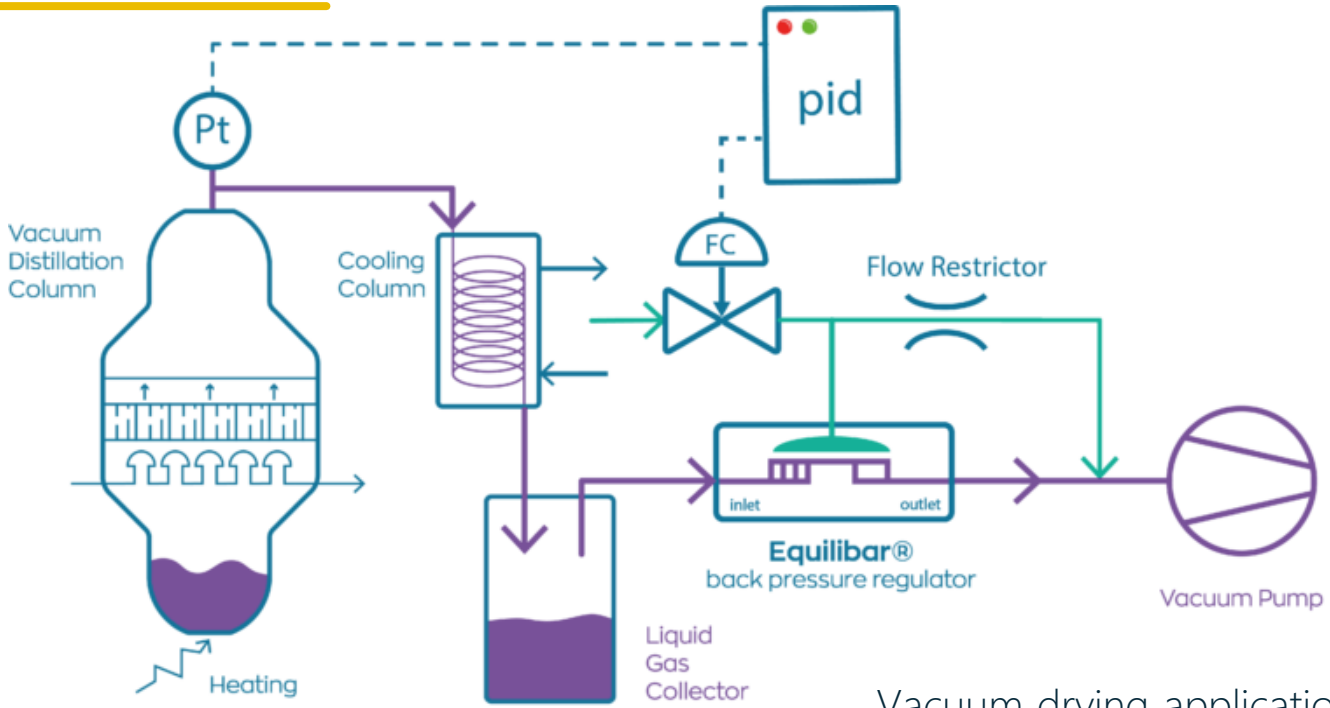
- Catalytic Research
- Controlled Depressurization
- High Pressure Calibration
- Vacuum Plasma Control
- Vacuum Distillation
- Altitude simulation
- Safely vent chemicals by means of (centralized) Captured Vent
- High Accuracy Sensor Calibration Chamber
- High Precision Control Ink Reservoir

Example Applications

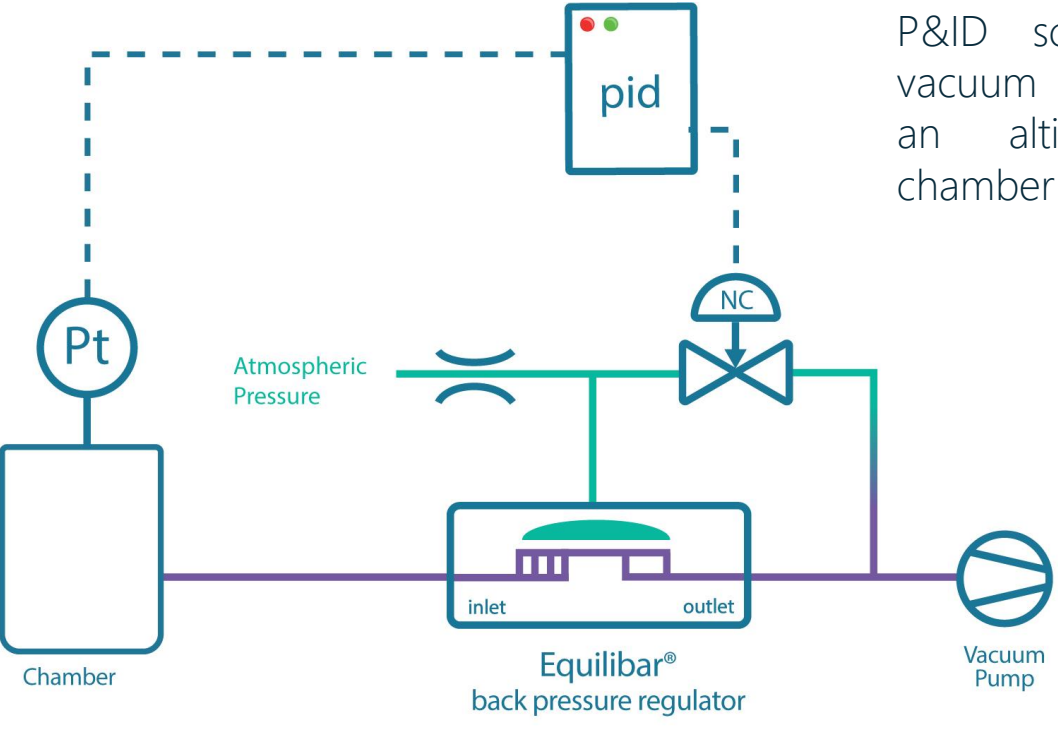
Schematic - example set-up ERC Series & Equilibar valve



Applications



Vacuum drying application using ERC Series



P&ID schematic of the vacuum control set-up in an altitude simulation chamber

Visit our [website](#) for more application notes and P&ID schematics of successful applications engineered by Pressure Control Solutions B.V.

Model Key

ERC	-	1C	-	001PG	-	001	V	-	A A	-	50	-	FP	10	-	W	-	VL	-	N	-	I11111	V
See:		1		2		3	4		5	6	7		8	9		10		11		12		13	14

1	Channels
1C	One channel
2C	Two channel
4C	Four channel

2	Controlled pressure range
001P	0 – 1 bar
XXXXP	0 – X bar*
200P	0 – 200 bar
*Any value between 0 and 200 is possible	
G	Gauge
A	Absolute

3	Valves
001	40 bar
021	200 bar

4	Valve wetted seals
<i>See table 14</i>	

5	Communication (Field bus)
A	Analog
P	Profibus
M	ModBus
R	FlowBus
D	DeviceNet™
T	EtherCat
V	Profinet

6	Analog setpoint
A	0 – 5 Vdc
B	0 – 10 Vdc
F	0 – 20 mA
G	4 – 20 mA

7	Orifice size
50	> 50 micron ...
2000	< up to 2000 micron

8	Fail safe
FP	Full pressure
PR	Pressure release

14	Connectors wetted seals
V	Viton® (FKM)
E	EPDM
K	Kalrez® (FFKM)
EV	Evolast
N	NBR
C	Custom

13	Fittings Inlet – Outlet – Reference
N	1/8" BSPP female
I0	1/16" OD compression type
I1	1/8" OD compression type
I2	1/4" OD compression type
M6	6 mm OD compression type
R2	1/4" VCR
O2	1/4" VCO

12	Sensor wetted seals
<i>See table 14</i>	

11	Accuracy
VL	0,500%
L	0,250%
M	0,125%
H	0,100%
VH	0,050%
N	None
C	Custom

10	Sensor brand
W	Gefran
G	Wika
N	None
C	Custom

9	Flow Restrictor size
10	10 micron
20	20 micron
30	30 micron
50	50 micron
100	100 micron

About us

Pressure Control Solutions specializes in the selection, assembly and manufacturing of precision process control products to facilitate process control and process engineers around the world. We are also the authorized distributor for Equilibar® products in Northwest Europe.

We provide products uniquely capable of fulfilling the most demanding application requirements. Products like the Equilibar back pressure regulators combined with electronic pressure controllers are a good example of high-value solutions.

As a result, we advise and facilitate users to push their process to its limits. Greater control dynamics, higher pressure, higher temperatures and exotic materials are part of the standard package.

Contact us

Pressure Control Solutions BV
Stationsstraat 72
3905JK VEENENDAAL
The Netherlands
+31 318 25 00 50
www.pressurecontrolsolutions.nl
info@pressurecontrolsolutions.nl



Armand Bergsma
+31 6 20 39 39 49

Mitch Spronck
+31 6 21 35 20 10

Matthias Bogar
+49 151 61 06 41 81

