

**FCTechnik**

# **flox[control]**

**Gas Control Units  
for Aluminium Production**



FC Technik is a company with headquarters in Winterthur, Switzerland and activities all around the world. We offer our customers the advantages which accrue from many years of experience in gas measuring and control technology. For over five years, we have specialized in serving the metallurgic industry. FC Technik develops and produces the flox[on] mass flow controller. Our company's collective passion is the control of flowing gases.



In the tradition of legendary Swiss perfectionism we guarantee the precision and robustness, as well as the long and dependable operating lifetime of our machines. FC Technik has a wide range of know-how in the production of metals like steel production or aluminium and copper metallurgy.

FC Technik offers quick and responsive world-wide service to ensure that meeting the customers' needs is always the first priority. Our qualified and competent employees develop innovative solutions for innovative clients. And of course, we implement special client-specific wishes quickly and dependably.

Our product portfolio includes mass flow controllers, the flox[on] series, as well as taylor-made gas control units, the flox[control] series, for direct or indirect injection of inert gases.

### The flox[on] series

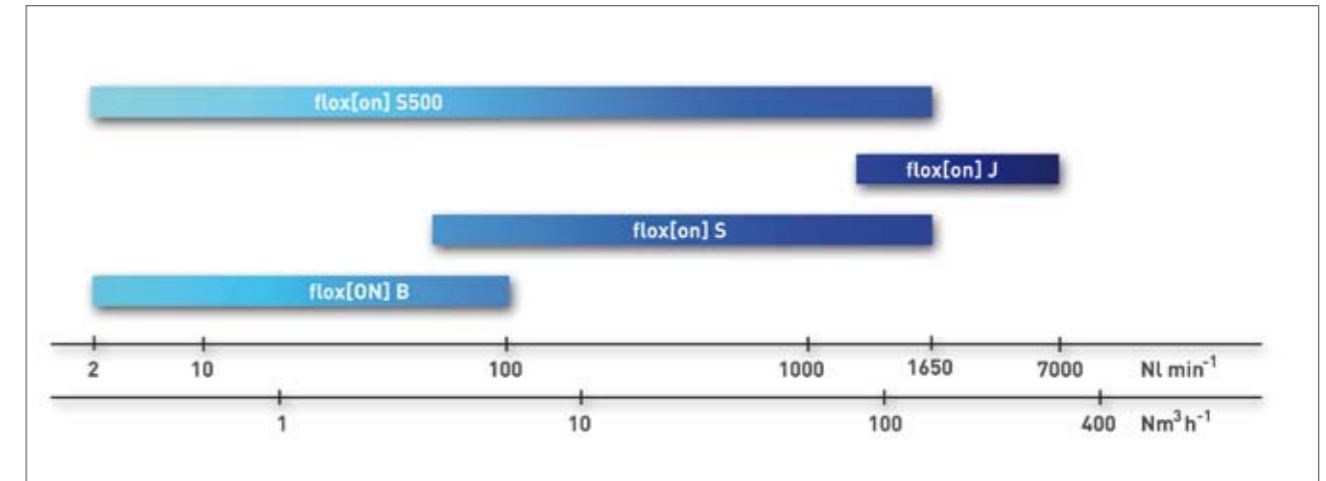
Our flox[on] series of mass flow controllers has a long history of successful application in these fields. The measurement of the flox[on] mass flow controller is temperature and pressure compensated with a very high control accuracy in the lower and upper flow ranges. The adjustment control of the flox[on] mass flow controller uses a pressure compensated proportional valve of the most recent design, which makes it unsusceptible to pressure fluctuations in the in- and outlet.

### The flox[control] series

In all phases of modern aluminium production, gases are used for shielding, stirring or homogenizing or chemical reactions. As an alternative to the use of single mass flow controllers FC Technik offers complete solutions to handle gasflows easily, with high efficiency and economy. flox[control] units are successfully tested in actual practice. They are easy to install and maintenance free. Heart of the flox[control] units are the mass flow controllers of the flox[on] series, developed by engineers of FC Technik and well tested for years in the steel industry.



Gas flow of the flox[on] series



FC Technik guarantees for every flox[on]:

- Integrated metered bypass as standard equipment
- Individual calibration
- Extremely high accuracy in lower flow range
- Pressure insensitive from 0-16 bar (in- and outlet)
- IP classification
- Electrical connections guard against reverse polarization
- Vibration insensitive
- Filter elements at in- and outlet
- Components are replaceable in situ after installation
- Electrical connection with fuse
- Installation possible in any position, in and out lines need not be straight
- Factory guarantee 24 months



## flox[control] PS AL

**Gas purging of Aluminium to reduce Hydrogen, improve homogenization and for chlorination is a standard process step today for Aluminium production and recycling. Beside the plug, lance or impeller the gas control system is a key component of the installation. Our gas control systems provide the most important characteristics for such a process:**

- reliability
- process control
- process reproducibility
- high level of automation
- a safe process

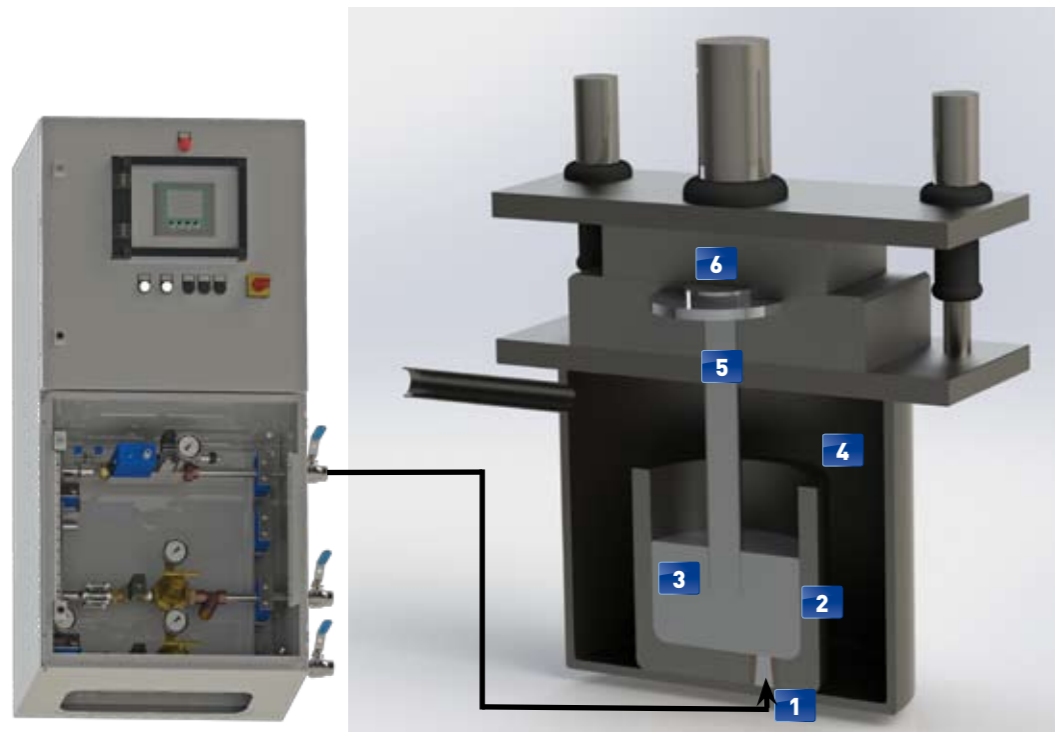
The design of the gas control systems is according to the customers needs, mainly depending on the number of purging elements, Aluminium Purging II small process gases and the preferred kind of automation. To control inert gases like Argon and Nitrogen we use our Flox[on] mass flow controllers, they are very well approved for applications in the metallurgical industry.

FC Technik AG is an experienced manufacturer of Argon and Nitrogen purging systems as well as Chlorine systems.



### Technical Features

- Standard control system: Siemens SIMATIC S7-300 PLC.
- Visualization panel: Siemens TP270.
- Minimum inlet gas pressure required: 6 bar.
- Maximum number of gas outlets per GCU: 10.
- Individual adjustment of flow rates for each plug throughout the metallurgical operation.
- Reproducible gas flow conditions independent of process conditions.
- Individual on/off function for each line.
- Automatic blending of the required gas mixtures.
- Continuous temperature monitoring of each purging plug.
- Integrated wear alarm system.
- Emergency bypass in case of power failure.
- Bypass function in case of increasing back pressure.
- Option for recording and storing gas flowrate, temperature and pressure.
- Inert purging gas: nitrogen, argon, or carbon dioxide.
- Reactive purging gas: air, hydrogen, or natural gas.



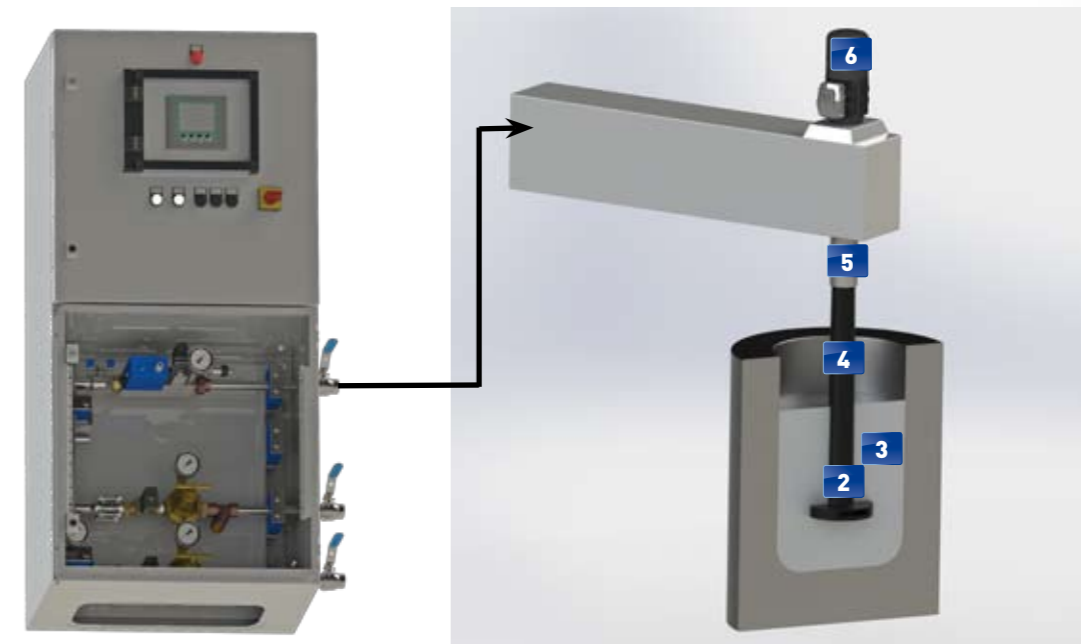
## flox[control] LPDC

The low pressure die cast system uses a gas at low pressure, usually between 0.2 and 0.5 bar to push the molten metal into the mold cavity.

An additional bottom purging system in the furnace may improve or stabilize the quality of the liquid aluminium and the casted end product.

Target is to reduce the dissolved hydrogen, improve the density index and to bind oxides-kin at the gas bubbles.

Low Pressure Permanent Mold Casting	
1	Purging Plug
2	Ladle
3	Liquid Metal
4	Air-tight Chamber
5	Purging Tube
6	Molds



## flox[control] IS

Impeller systems provide a high mixing efficiency and very fine gas bubbles for increased activity.

During a very short treatment time dissolved hydrogen, density index and oxides can be reduced to target values.

Impeller systems are used often for a last treatment of the liquid aluminium before casting.

Impeller System	
1	Ladle
2	Rotor Head
3	Liquid Melt
4	Rotor Shaft (Sleeve)
5	Quick Coupling
6	Engine



Gas Regulation Unit	
1	1 <sup>st</sup> Gas-inlet (e.g. Argon)
2	2 <sup>nd</sup> Gas-inlet (e.g. Nitrogen)
3	Pressure Control
4	Gas-outlet
5	Mass Flow Controller flox[on] B
6	Touch Screen



DATA FLOX[ON] B		
Maximum flow	Nlmin <sup>-1</sup>	250
Minimum flow	Nlmin <sup>-1</sup>	0.5
Maximum operating pressure	bar	16
Regualtion ratio		1 : 40
Accuracy		± 3%
Step response (10% - 90%)	s	1 to 5
Operating temperature	°C	from -10 to +60

The gas regulation based on our Mass Flow Controller flox[on] B guarantees process control through fast and repeatable flow regulation also under difficult conditions. Flow and pressure through the Impeller or the Porous Plug are monitored continuously, so that critical process conditions could be indicated early. The level of automatization enables an automatic or semi-automatic treatment of the liquid aluminium.

Advantages:

- repeatable treatment process
- reliable process
- early failure indication
- accuracy in temperature distribution
- increase of homogenisation
- increased aluminium quality
- process automatization

Before delivery, the measuring cell in every flox[on] B is calibrated with atmospheric air. There are correction factors for applications using other gases. In individual cases, if desired by the client, the calibration can be made directly with the specific gas intended for use.

The measuring cell does not require a recalibration for the rest of its operating life.

If a mixed gas such as air or natural gas is used, it should be noted that a change in the composition of the gas can occur during operation.

In such cases, and for all other questions about calibration, please contact our service center.

GAS		CORRECTION FACTOR
Hydrogen*	H <sub>2</sub>	0,7
Argon	Ar	0,95
Nitrogen	N <sub>2</sub>	1,0
Oxygen	O <sub>2</sub>	1,0
Methane	CH <sub>4</sub>	1,1
Carbon dioxide	CO <sub>2</sub>	1,35

\* For applications using hydrogen gas, we recommend that the flox[on] B be calibrated directly with hydrogen by FC Technik

#### NOTES ON INSTALLATION

To ensure trouble-free operation, the flox[on] B should be installed in a horizontal position. If installed vertically, the device could produce faulty measurements under certain conditions.

#### MAINTENANCE AND REPAIR

The flox[on] B is maintenance-free even under harsh conditions. In case of a fault or failure of the measuring cell, please contact the service center.

#### IMPORTANT NOTICES

##### WARNING NOTICES

- The flox[on] B is intended solely for use with gases.
- Liquids will ruin the measuring cell. This includes gas condensation, for example, if temperatures during operation drop below the condensation point.
- Particulate matter in the form of gas impurities may clog the filter discs and decrease the performance of the flox[on] B.
- Incorrect wiring can destroy the electronics.

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