

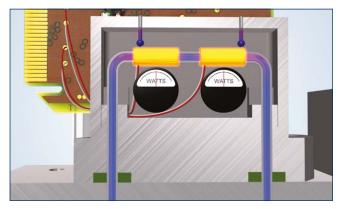
# **EL-FLOW**<sup>®</sup> Prestige

# World's most versatile Mass Flow Meters / Controllers for Gases



### > Cutting edge technology

EL-FLOW Prestige is the latest generation of Bronkhorst® Mass Flow Meters/ Controllers for gases. Nearly all core components have been redesigned and many improvements and innovations have been incorporated. With this series, Bronkhorst introduced the 'Differential Temperature Balancing' technology, ensuring a superb sensor stability. Power efficient microprocessors with innovative multistage control loops have been applied to achieve enhanced dynamic behavior. The metal housing is of robust yet compact design.



Differential Temperature Balancing technology

#### > Adaptable to your process

The control performance of EL-FLOW Prestige Mass Flow Controllers is factory adjusted to swiftly respond to setpoint changes, without overshoot. If the upstream pressure of the system's gas supply is not constant, for example due to a drop in pressure in gas cylinders or due to cross-talk between different flow controllers, it is possible to perform a static and/or dynamic pressure correction. Moreover, the MFCs can be tuned for extra fast response (settling times T<sub>98%</sub> down to 500 msec) or extra smooth control, depending on the requirements of the user's process. The dynamic behavior can also be tuned on site easily, by adjusting the controller speed settings via FlowTune™, or by using our software tool FlowSuite™. This free tool can also be used for device diagnostics or alarm and counter settings.

#### > Select the I/O options of your preference

Numerous input/output options can be offered through the programmable sub-D 9-pin connector. In addition to the various analog signal options and the standard RS232 communication, there are such options as RS485 communication, digital frequency/pulse output, alarm output/reset, valve purge/close and analog valve output. Furthermore Bronkhorst offers various integrated fieldbus options: DeviceNet<sup>™</sup>, CANopen<sup>®</sup>, PROFIBUS DP, PROFINET, Modbus-RTU/ASCII, EtherCAT<sup>®</sup>, EtherNet/IP, Modbus-TCP and FLOW-BUS. The latter is an RS485 based fieldbus, specifically designed by Bronkhorst for their mass flow metering and control solutions. For the convenience of customers working with LabVIEW<sup>™</sup> (graphical software by National Instruments) Bronkhorst provides a certified plug & play instrument driver for instruments with FLOW-BUS<sup>™</sup> interface.

#### > Customise your flow device

- User configurable control characteristics
- 100 unique gases selectable from embedded database
- Analog I/O or digital communication (RS232 / RS485 / fieldbus)
- Various on-board alarm and counter functions
- Wide choice of seals and process adapters
- Normally Closed / Normally Opened control valve function
- Optional, integrated shut-off valve

#### > Enjoy the benefits!

- Innovative sensor: gradient insensitive, accurate temperature correction, high linearity
- Pressure insensitive: static and dynamic pressure correction (option)
- Ingenious laminar flow element: perfect flow split
- Improved control valve: reliable, reproducible, outstanding dynamic behavior
- Upgraded electronics: versatile flow control algorithms, embedded intelligence

#### Reduce your cost of ownership

The mass flow meters and controllers can be supplied in full scale ranges from 0,7 ml<sub>n</sub>/min up to 100 l<sub>n</sub>/min Air-equivalent at max. 64 or 100 bar (1000 or 1500 psi) pressure rating. Like previous Bronkhorst instruments, EL-FLOW Prestige offers high flexibility due to the multi-gas/multi-range functionality. This functionality, now extended to 100 gases, is easily accessible via the FlowTune<sup>™</sup> software or PLC; there is no need to disconnect the instrument from your system. For additional gas types the user can calculate accurate fluid properties for conversion by means of our free, online software tool Fluidat<sup>®</sup> on the Net. Users of EL-FLOW Prestige instruments can rescale their instruments on site, saving time and money for dismounting and recalibration. Furthermore, original equipment manufacturers (OEMs) are able to drastically reduce the variety of spare instruments kept on stock and thus reduce the cost of ownership.



# > Technical specifications

#### Measurement / control system

Accuracy (incl. linearity)	standard: ±0,5% Rd plus ±0,1% FS			
(based on actual calibration,	(±0,8% Rd plus ±0,2% FS for ranges $35$ ml <sub>n</sub> /min;			
according SEMI E69)	±1% Rd plus	±1% FS for ra	nges < 3 ml <sub>n</sub> /min)	
Repeatability	0-20% 20-100%	< ± 0,04% FS < ± 0,2% Rd	.;;	
Turndown	1:150; in ana	log mode 1:50	)	
Multi Gas/Multi Range gases	(see FAQ sec		0 unique gases ebsite) plus any mixture ses.	
Settling time	fast: standard: slow:	< 500 msec < 1 sec < 2 sec		
Operating temperature	-1070°C			
Temperature sensitivity	zero: span:	< 0,02% FS/° < 0,025% Rd	- 1	
Pressure sensitivity	standard: with pressur	e correction:	$<$ 0,15% Rd/bar typical $N_{\rm 2}$ $<$ 0,02% Rd typical $N_{\rm 2}$	
Accuracy of integrated pressure sensor (PI option)	$\pm$ 0,25% FS at ambient temperature			
Leak integrity, outboard	tested < 2 x 10 <sup>-9</sup> mbar l/s He			
Attitude sensitivity	max. error at 90° off horizontal 0,07% FS at 1 bar, typical $N_2$			
Warm-up time	30 min. for o	ptimum accur	асу	

# > Models and flow ranges (based on N<sub>2</sub>)

Mass Flow Meters						
Model	Flow range (N <sub>2</sub> )		Pressure rating			
FG-110C	0,0140,7 ml <sub>n</sub> /min	up to 0,189 ml <sub>n</sub> /min	100 bar(g)/1500 psi(g)			
FG-110CP	0,0140,7 ml <sub>n</sub> /min	up to 0,189 ml_n/min	100 bar(g)/1500 psi(g)			
FG-111B	0,147 ml <sub>n</sub> /min	up to 0,420 l <sub>n</sub> /min	100 bar(g)/1500 psi(g)			
FG-111BP	0,147 ml <sub>n</sub> /min	up to 0,420 $I_{\rm n}/{\rm min}$	100 bar(g)/1500 psi(g)			
FG-111AC	0,210 l <sub>n</sub> /min	up to 2100 l <sub>n</sub> /min	100 bar(g)/1500 psi(g)			

Mass Flow Controllers						
Model	Flow range (N <sub>2</sub> )		Pressure rating			
FG-200CV	0,0140,7 ml <sub>n</sub> /min	up to 0,189 ml <sub>n</sub> /min	64 bar(g)/1000 psi(g)			
FG-200CVP	0,0140,7 ml <sub>n</sub> /min	up to 0,189 $ml_n/min$	10 bar(g)/150 psi(g)			
FG-210CV	0,0140,7 ml <sub>n</sub> /min	up to 0,189 ml <sub>n</sub> /min	100 bar(g)/1500 psi(g)			
FG-210CVP	0,0140,7 ml <sub>n</sub> /min	up to 0,189 ml_n/min	100 bar(g)/1500 psi(g)			
FG-201CV	0,147 ml <sub>n</sub> /min	up to 0,420 l <sub>n</sub> /min	64 bar(g)/1000 psi(g)			
FG-201CVP	0,147 ml <sub>n</sub> /min	up to 0,420 $I_{\rm n}/{\rm min}$	10 bar(g)/150 psi(g)			
FG-211CV	0,147 ml <sub>n</sub> /min	up to 0,420 $I_{\rm n}/{\rm min}$	100 bar(g)/1500 psi(g)			
FG-211CVP	0,147 ml <sub>n</sub> /min	up to 0,420 $I_{\rm n}/{\rm min}$	100 bar(g)/1500 psi(g)			
FG-201AV	0,210 l <sub>n</sub> /min	up to $2100 \text{ l}_{n}/\text{min}$	64 bar(g)/1000 psi(g)			
FG-211AV	0,210 l <sub>n</sub> /min	up to $2100 \text{ l}_{n}/\text{min}$	100 bar(g)/1500 psi(g)			

#### Mechanical parts

Material (wetted parts)	stainless steel 316L or comparable, degreased for use on oxygen ( $O_2$ )
Process connections	compression type or face seal couplings
Seals	standard: Viton®; options: EPDM, Kalrez® (FFKM), FDA and USP Class VI approved compounds (model FG-201CS excluded)

#### **Electrical properties**

Power supply	+1524	Vdc			
Max. power consumption (controllers	based on i	normally	y closed valve	e, pin	5 not used)
	Supply	at \	/oltage I/O	at	current I/O
Meter	15 V		69 mA		92 mA
	24 V		45 mA		63 mA
Controller	15 V		202 mA		225 mA
	24 V		128 mA		146 mA
Extra power consumption for fieldbus	s (if aplicab	le)			
Meter/Controller	15 V < 75 24 V < 50				
Analog output/command	05 (10)	) Vdc or	0 (4)20 mA	A (sou	ircing output)
Digital communication	standard options:	Device Modbu		FLOV	PROFIBUS DP, V-BUS, EtherCAT®, EtherNet/IP

#### **Electrical connection**

Analog, RS232	9-pin D-connector (male);		
PROFIBUS DP	bus: 9-pin D-connector (female); power: 9-pin D-connector (male);		
DeviceNet™, CANopen®	5-pin M12-connector (male);		
EtherCAT®, Modbus-TCP, PROFINET, EtherNet/IP	2 x RJ45 modular jack (in/out)		
FLOW-BUS, Modbus-RTU/ASCII	RJ45 modular jack		
CE	EMC 2014/30/EU, RoHS 2011/65/EU,		
IEC 61010-1	2010		
Ingress protection (housing)	IP40		

Technical specifications and dimensions subject to change without notice.

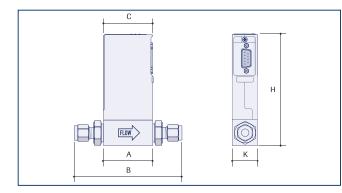
#### Mass Flow Controller with integrated shut-off valve

FG-201CS	0,147 ml <sub>n</sub> /min	up to 0,420 l <sub>n</sub> /min	10 bar(g)/150 psi(g)
FG-201CSP	0,147 ml <sub>n</sub> /min	up to 0,420 l <sub>n</sub> /min	10 bar(g)/150 psi(g)

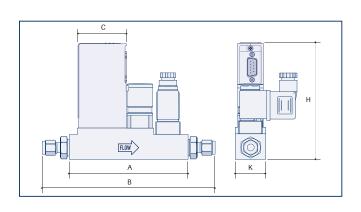


FG-111AC Mass Flow Meter

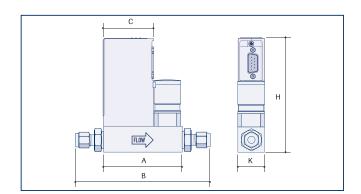
# > Dimensions (in mm) and weights (in kg)



Model	Α	В	с	н	к	Weight (kg)
FG-110C (1/8"OD)	47	98	50	112	25	0,5
FG-111B (¼"OD)	69	126	50	112	25	0,6
FG-111AC (¼"OD)	69	126	50	124	25	0,7
FG-110CP (1/8" OD)	47	98	50	130	25	0,6
FG-111BP (¼" OD)	69	126	50	130	25	0,7



Model	Α	В	с	н	к	Weight (kg)
FG-201CS (¼"OD)	120	177	50	118	30	1,3
FG-201CSP (¼"OD)	120	177	50	136	30	1,5



Model	Α	В	с	н	к	Weight (kg)
FG-200CV / FG-210CV (1%"OD)	77	128	50	112	25	0,7
FG-201CV / FG-211CV (¼″OD)	77	134	50	112	25	0,7
FG-201AV / FG-211AV (¼″ OD)	77	134	50	124	25	0,9
FG-200CVP / FG-210CVP (½"OD)	77	128	50	130	25	0,8
FG-201CVP / FG-211CVP (¼"OD)	77	134	50	130	25	0,8



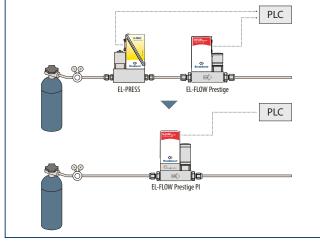
FG-201CS Mass Flow Controller with integrated shut-off valve

#### > Real-time temperature and pressure compensation

Efficiency and yield in a process require a stable gas flow. This gas flow can be accurately measured and controlled by EL-FLOW Prestige Mass Flow Controllers (MFCs). Various external factors can have influence on the measurement accuracy and control stability of MFCs, e.g. temperature fluctuations and line-pressure fluctuations. EL-FLOW Prestige instruments feature accurate temperature compensation, correcting the flow measurement for temperature changes. Compensation of pressure changes can either be achieved by an external pressure transmitter in combination with customized IO option 'H1P' (via Pin 5), or by using the new 'Pressure Insensitive' option.

#### > Static pressure compensation

By static pressure compensation we refer to the correction for slow pressure changes, for example the slowly reduced pressure from a gas cylinder. By integrating a pressure sensor to the mass flow controller or by using an external pressure transmitter in combination with the above mentioned H1P function, the on-board conversion algorithm will perform real-time calculation of the actual fluid properties. For thermal mass flow measurement as applied by Bronkhorst, the density, viscosity, thermal conductivity and heat capacity are used in the calculation. Under influence of pressure and temperature, these properties change. An extensive, physical properties database is stored on the instrument's pc-board. Using actual process temperature and pressure, the instrument applies the best available information for signal processing, resulting in highest accuracy of flow measurement, no matter the exact operating conditions. The yield of your process will benefit from the stability of the compensated flow control.



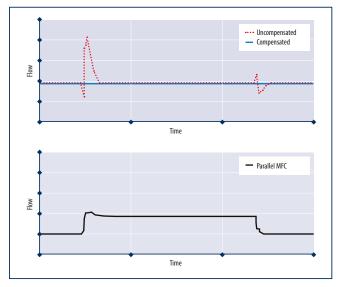
Simplified setup





#### > Dynamic pressure compensation

This optional functionality compensates flow controllers for rapid pressure changes. These can occur when a higher-flow mass flow controller on the same supply line changes setpoint, resulting in an undesired effect which is also known as 'cross-talk'. The moment that these rapid pressure changes are identified by the pressure sensor, the valve control will be adjusted accordingly so that the flow remains stable. The picture below visualizes the cross-talk effect of two parallel MFCs.



Dynamic compensation, insensitive to pressure changes

#### > Benefits of on-board pressure compensation

- Higher yield due to improvement of accuracy and control stability
- Ease of installation since there is no need for exactly providing/meeting the process conditions the instrument was ordered for
- Cost and/or space savings; high performance pressure regulators are no longer required

FG-201CVP Pressure Insensitive Mass Flow Controller

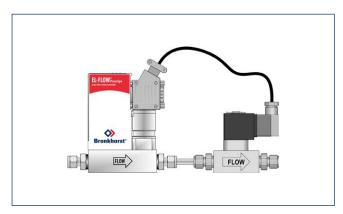
#### > Customized Input/Output configurations

Besides the obvious I/O-options for measured and setpoint values via analog signals, RS232 or fieldbus communication, EL-FLOW Prestige features a programmable pin (pin 5) at the 9-pin sub-D connector for customized I/O configurations.

This functionality can be used for advanced operations such as digital frequency/pulse output, alarm output/reset, processing an external setpoint signal, valve purge/close and analog valve output. Some options are specified in the model number identification, however, numerous other settings can be programmed on request. Please contact your local distributor to discuss your requirements.

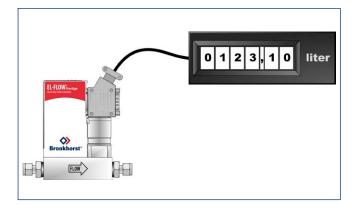
# > The following typical examples give an impression of the possibilities for customized I/O solutions

#### Shut-off valve activation



The digital output of the programmable pin 5 (9-pin sub-D connector) can be used to activate a shut-off valve. For instance, a shut-off valve can be programmed to close when the MFC's setpoint is zero, to ensure that the gas line is absolutely closed. Alternatively the valve may be activated upon a certain alarm value or when a preset counter value has been reached. This functionality makes the use of valve terminals superfluous.

## Digital pulse output



The programmable pin 5 (9-pin sub-D connector) can be set for a pulse output per quantity, as defined by the user. This pulse can be fed directly to remote totalizing counters, digital readout devices or control instrumentation.

# External reset counter



EL-FLOW Prestige instruments offer alarm and counter functions as a standard feature. To reset the counter value, e.g. locally displayed by a BRIGHT R/C-module, the user should operate the push-buttons. Alternatively, using the digital input option of the programmable pin 5, an external input signal can be sent to the instrument to reset the counter.



# > Model number identification

Meter       Controller         controller       8         escure rating       000         100 barg() / 150 parg()       010 Vkic         64 barg() / 1000 parg()       020 mA sourcing         64 barg() / 1000 parg()       010 Vkic         100 barg()	FG - N	N NAA - P - A A A - NN - A	A A AAA
Matter       Controller         controller       B       010 V/c         essure rating       0.00       Distalight / 150 parkght         10 barght / 150 parkght       Supply voltage       All 010 V/c         64 barght / 150 parkght       Supply voltage       All 010 V/c         64 barght / 150 parkght       Supply voltage       Blit 420 mA sourcing         67 L/CS and CSP models       Connections       Blit 420 mA sourcing         7/W       0.01407 r0.189 mL/min       D       Hill 524 V/c         8       WirDo Compression type       D       Hill 524 V/c         9       WirDo Compression type       D       Digital odgat, control for shute of water water water transmitter 3         8       WirDo Compression type       Si WirDo Compression type       Digital odgat, control for shute of water water transmitter 3         8       Wire Cost Mile       Digital odgat, control       D         8			$\top$ $\top$ $\top$ $\top$
Matter       Controller         controller       B       010 V/c         essure rating       0.00       Distalight / 150 parkght         10 barght / 150 parkght       Supply voltage       All 010 V/c         64 barght / 150 parkght       Supply voltage       All 010 V/c         64 barght / 150 parkght       Supply voltage       Blit 420 mA sourcing         67 L/CS and CSP models       Connections       Blit 420 mA sourcing         7/W       0.01407 r0.189 mL/min       D       Hill 524 V/c         8       WirDo Compression type       D       Hill 524 V/c         9       WirDo Compression type       D       Digital odgat, control for shute of water water water transmitter 3         8       WirDo Compression type       Si WirDo Compression type       Digital odgat, control for shute of water water transmitter 3         8       Wire Cost Mile       Digital odgat, control       D         8			
Matter       Controller         controller       B       010 V/c         essure rating       0.00       Distalight / 150 parkght         10 barght / 150 parkght       Supply voltage       All 010 V/c         64 barght / 150 parkght       Supply voltage       All 010 V/c         64 barght / 150 parkght       Supply voltage       Blit 420 mA sourcing         67 L/CS and CSP models       Connections       Blit 420 mA sourcing         7/W       0.01407 r0.189 mL/min       D       Hill 524 V/c         8       WirDo Compression type       D       Hill 524 V/c         9       WirDo Compression type       D       Digital odgat, control for shute of water water water transmitter 3         8       WirDo Compression type       Si WirDo Compression type       Digital odgat, control for shute of water water transmitter 3         8       Wire Cost Mile       Digital odgat, control       D         8	ase	Analog output	Customized IQ options
Controller       B       010 Vdc       Bit alloc (difficulty of the controller Analog signal for purp or external value stee (control signal only)         10 bur(g) / 150 ps/(g)	····		
# 020 mA sourcing         essure rating         10 bar(g) / 150 psi(g)**         #4 bar(g) / 100 psi(g)         10 bar(g) / 150 psi(g)**         #4 bar(g) / 100 psi(g)         10 bar(g) / 150 psi(g)**         #4 bar(g) / 100 psi(g)         10 bar(g) / 150 psi(g)**         #4 bar(g) / 100 psi(g)         10 bar(g) / 150 psi(g)**         #5 bar(g) / 100 psi(g)         10 bar(g) / 150 psi(g)**         #5 bar(g) / 100 psi(g)         10 bar(g) / 150 psi(g)**         #6 control         #1524 Vide         #1524 Vide         #1524 Vide         #1 M*CO compression type         #1 M*CO compression type         3 for mOD compression type         3 for mOD compression type         4 12 mm OD compression type         5 16/00 compression type         7 M*Co control         R522 + DeviceNet (n/c control)         R522 + PROFIBUS (n/c control)			
essure rating       Analog signal for pump or external value state (assisted signal only)         i Ob bar(g) / 150 psi(g)       i		F 020 mA sourcing	
ID Barg() / 150 ps(g):       is barg() / 150 ps(g):         i D0 Barg() / 150 ps(g):       i         i D1 Barg() / 150 ps(g):       i         i D0 Barg() / 150 ps(g):       i         i D1 Barg() / 150 ps	<b>v</b>	G 420 mA sourcing	Analog signal for pump or external valve ste
100 bar(g) / 1500 psi(g)       p       +1524 Vdc         0x 0x 014027 (0.189 ml/min       0       None         1       % 00 compression type       0         0x14027 (0.189 ml/min       0       None         1       % 00 compression type       0         2       % 00 compression type       0       0         2       % 00 compression type       0       0         3       6 mm 00 compression type       0       0         4       12 mm 00 compression type       0       0         9       Other       0       0       0         8       % Face Seal Male       9       0       0       0       0         85224 + analog       (n/c control)       8       % Face Seal Male       0			B1V 420 mA output, controller
Libertal (J) / 1500 (Js0)       Libertal (J) / 1500 (Js0)         Libertal (J) / 1500 (Js0)       Libertal (Js0)         More CPC (Stand (SP models)       Libertal (Js0)         More CPC (Stand (SP models)       D			
w range         ////////////////////////////////////		D +1524 Vdc	
001407/0.189ml/min       0       None         0/407/0.189ml/min/04201/min       0       None         0/1407/ml/min/04201/min       1       W*OD compression type         2       W*OD compression type       0       Other         2       W*OD compression type       0       Digital output, enabled by septoint (for shut: control)         Pressure Insensitive =       0       None       0       Digital output, enabled by septoint (for shut: control)         R5232 + analog       (r/c control)       8       W*Face Seal Male       0       Digital output, enabled by septoint (for shut: control)         R5232 + analog       (r/c control)       8       W*face seal Male       0       Digital output, enabled by septoint (for shut: control)         R5232 + beviceNet       (r/c control)       8       W*face seal Male       0       Digital output, enabled by septoint (for shut: control)         R5232 + beviceNet       (r/c control)       8       W*face seal Male       0       Digital output, instructure end to face and gital weak within gital motion to 40kd exits another to weak within gital motion to 40kd exits another to weak within gital motion to weak within gital motion to 00kd exits and gital motion to 00kd exits and gital motion to weak within gital motion to weak weak within gital motion to weak weak within gital motion to weak weak within gital motion to wake weak weak weak within gital motion to within gital motion to wa		Connections	
001       0.014001/01.019 Mitchini         0.147 mitchini / 047 mitchini / 04201/mini         V/1CS       0.147 mitchini / 04201/mini         V/1CS       0.147 mitchini / 04201/mini         C/1AV       0.2101/min / 04201/mini         V/1CS       0.147 mitchini / 04201/mini         Perssue Insensitive #       4         Perssue Insensitive #       9         Other       9         Perssue Insensitive #       9         V/1CS       0.47 mitchini / 04201/min         mmunication       9         RS232 + analog       (n/c control)         RS232 + analog       (n/c control)         RS232 + analog       (n/c control)         RS232 + beviceNet	<u> </u>	0 None	
<ul> <li>b) Number of Nume</li></ul>			During a min/max alarm, pin 5 is pulled dow
3       6 mm OD compression type         4       12 mm OD compression type         4       12 mm OD compression type         5       16'O O compression type         6       12 mm OD compression type         7       5         9       Other         8       16' Tace Seal Male         9       Other         10       Nith and a control         10       R5232 + analog       (n/c control)         11       K Kalrez* (FKM)         12       EPDM         1232 + DeviceNet       (n/c control)         11       A         1232 + DeviceNet       (n/c control)         12       Digital control         13       Sizal + caloe on tol         14       A nalog control         16       Digital input, control			
4       12 mm OD compression type         5       12 mm OD compression type         5       12 mm OD compression type         8       14" Face Seal Male         9       Other         8       14" Tace Seal Male         9       Other         11       10         11       10         12       10         12       10         12       10         12       10         12       10         12       10         13       10         14       1		3 6 mm OD compression type	During a counter alarm, pin 5 is pulled dow
itional functionality       5       M* OD compression type         Pressure Insensitive -*       8       W* Face Seal Male         9       Other         mmunication       9       Other         R5232 + analog       (n/c control)       Seals       V         R5232 + analog       (n/c control)       E       EPDM         R5232 + DeviceNet       (n/c control)       E       EPDM         R5232 + DeviceNet       (n/c control)       E       EPDM         R5232 + CANopen       (n/c control)       E       EDM         R5232 + CANopen       (n/c control)       A       Analog control         R5232 + CANopen       (n/c control)       A       Analog control         R5232 + Modbus       (n/c control)       A       Analog control         R5232 + Modbus       (n/c control)       A       Analog control         R5232 + ROFIBUS       (n/c control)       A       R5232 - ProPar(default)         R5232 + PROFIBUS       (n/c control)       B       R5848 - HOdbus ASCII         R5232 + ROFIBUS       (n/c control)       B       R5848 - Hodbus ASCII         R5232 + ROFIBUS       (n/c control)       B       R5485 - Modbus ASCII         R5232 + ROFIBUS       (n/c con	_/ TAV 0,210 I <sub>n</sub> / min / 2100 I <sub>n</sub> / min	4 12 mm OD compression type	
Pressure Insensitive *       8       Wf Face Seal Male       setpoint, e.g. for shut-off valve activation         Pressure Insensitive *       9       Other       Digital output, high/low switch via remote valvation)         R5232 + analog       (n/c control)       V       Viton* (factory standard)       Pin 5 is pulled down to 0Vdc when writing via the of by writing value '0'         R5232 + DeviceNet       (n/c control)       E       EPDM       Pin 5 is pulled down to 0Vdc when a given by set ranslated to a frequer within given frequency output, measure         R5232 + DeviceNet       (n/c control)       E       EPDM         R5232 + DeviceNet       (n/c control)       E       EPDM         R5232 + EtherNet/IP       (n/c control)       Controller mode       For size pulled down to 0Vdc when a given by set ranslated to a frequer within given frequency output, measure         R5232 + EtherNet/IP       (n/c control)       0       Disabled       A analog control         R5232 + CANopen       (n/c control)       A       Analog control       BC         R5232 + Modbus       (n/c control)       A       Asalog control       BC         R5232 + Modbus       (n/c control)       A       Asalog control       BC         R5232 + PROFIBUS       (n/c control)       A       R5232 - ProPar (default)       BC       Digital input, co	tional functionality	5 ½" OD compression type	control)
waliable for models up to 201,/min       9       Other         mmunication       Seals       C01       Digital output, high/low switch via remote parameter (eg. for shut-off valve activation)         R5232 + analog       (n/o control)       R5232 + banice       V       Viton* (factory standard)         R5232 + DeviceNet       (n/o control)       E       EPDM         R5232 + DeviceNet       (n/o control)       E       EPDM         R5232 + EtherNet/IP       (n/o control)       E       EPDM         R5232 + EtherNet/IP       (n/o control)       D       Disabled         R5232 + CANopen       (n/o control)       D       Disabled         R5232 + Modbus       (n/o control)       A       Analog control         R5232 + Modbus       (n/o control)       D       Digital communication via         Ps232 + ProFiBUS       (n/o control)       A       Aslog control         R5232 + PROFIBUS       (n/o control)       A       R5232 - ProPar (default)         R5232 + PROFIBUS       (n/o control)       B       R5485 - FLOW-BUS       Digital input, reset airm         R5232 + FLOW-BUS       (n/o control)       B       R5485 - Modbus ASCII       Digital input, reset airm         R5232 + FLOW-BUS       (n/o control)       B       R5485	Pressure Insensitive 2)	8 1/4" Face Seal Male	
mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	available for models up to 20 l,,/min	9 Other	
Seals       V       Seals       V       Viton* (factory standard)       Device Net       (n'recontrol)       Writing value '0'         RS232 + analog       (n/o control)       E       EPDM       E       Digital frequency output, measure         RS232 + DeviceNet       (n/o control)       E       EPDM       Measurement value is translated to a frequency writing value '0'         RS232 + DeviceNet       (n/o control)       E       EPDM       Measurement value is translated to a frequency writing value '0'         RS232 + EtherNet/IP       (n/o control)       Controller mode       F9B       Digital frequency output, measure         RS232 + CANopen       (n/o control)       A       Analog control       F9B       Digital output, batch counter         RS232 + Modbus       (n/o control)       A       Analog control       B       E       Digital control         RS232 + PROFIBUS       (n/o control)       A       RS232 - ProPar (default)       B       RS485 - FLOW-BUS       B       Digital input, controller mode valve purge Valve for Valve closes when pin 5 is connected to 0/Vdc         RS232 + PROFIBUS       (n/o control)       B       RS485 - FLOW-BUS       In       Digital input, reset alarm       The counter resets when pin 5 is connected to 0/Vdc         RS232 + PROFIBUS       (n/o control)       B       R	mmunication		
R5232 + analog       (n/o control)         R5232 + DeviceNet       (n/c control)         R5232 + DeviceNet       (n/o control)         R5232 + DeviceNet       (n/o control)         R5232 + DeviceNet       (n/o control)         R5232 + EtherNet/IP       (n/c control)         R5232 + EtherNet/IP       (n/c control)         R5232 + EtherNet/IP       (n/o control)         R5232 + EtherNet/IP       (n/o control)         R5232 + CANopen       (n/c control)         R5232 + CANopen       (n/o control)         R5232 + Modbus       (n/o control)         R5232 + Modbus       (n/o control)         R5232 + PROFIBUS       (n/o control)         R5232 + PROFIBUS       (n/o control)         R5232 + FLOW-BUS       (n/o control)         R5232 +	V	V	
R5232 + DeviceNet       (n/c control)         R5232 + DeviceNet       (n/o control)         R5232 + DeviceNet       (n/o control)         R5232 + EtherNet/IP       (n/c control)         R5232 + CANopen       (n/c control)         R5232 + CANopen       (n/c control)         R5232 + Modbus       (n/c control)         R5232 + Modbus       (n/c control)         R5232 + Modbus       (n/c control)         R5232 + PROFIBUS       (n/c control)         R5232 + PROFIBUS       (n/c control)         R5232 + PROFIBUS       (n/c control)         R5232 + FLOW-BUS       (n/c control)         R523			
R5232 + DeviceNet       (n/o control)         R5232 + DeviceNet       (n/o control)         R5232 + EtherNet/IP       (n/o control)         R5232 + CANopen       (n/o control)         R5232 + Modbus       (n/o control)         R5232 + Modbus       (n/o control)         R5232 + PROFIBUS       (n/o control)         R5232 + FLOW-BUS       (n/o control)         R5232 + E			Measurement value is translated to a freque
R5232 + EtherNet/IP       (n/c control)         R5232 + CANopen       (n/c control)         R5232 + Modbus       (n/c control)         R5232 + Modbus       (n/c control)         R5232 + Modbus       (n/c control)         R5232 + PROFIBUS       (n/c control)         R5232 + PROFIBUS       (n/c control)         R5232 + PROFIBUS       (n/c control)         R5232 + FLOW-BUS       (n/c control)         R5232 + FLOW-		K Kalrez <sup>#</sup> (FFKM)	
RS232 + EtherNet/IP       (n/o control)         RS232 + EtherNet/IP       (n/o control)         RS232 + CANopen       (n/c control)         RS232 + CANopen       (n/o control)         RS232 + Modbus       (n/o control)         RS232 + Modbus       (n/o control)         RS232 + Modbus       (n/o control)         RS232 + PROFIBUS       (n/o control)         RS232 + FLOW-BUS       (n/o control)         RS232 + EtherCAT       (n/o control)         RS232 + EtherCAT       (n/o control)         RS232 + EtherCAT       (n/o control)         RS232 + PROFINET       (n/o control)         RS232 + PROFINET       (n/o control)		Controller mode	Pin 5 is pulled down to 0 Vdc when a given
RS232 + CANopen       (n/c control)         RS232 + CANopen       (n/o control)         RS232 + CANopen       (n/o control)         D       Digital control         RS232 + Modbus       (n/o control)         RS232 + Modbus       (n/o control)         RS232 + Modbus       (n/o control)         RS232 + PROFIBUS       (n/o control)         RS232 + PROFIBUS       (n/o control)         RS232 + PROFIBUS       (n/c control)         RS232 + PROFIBUS       (n/o control)         RS232 + FLOW-BUS       (n/o		0 Disabled	
RS232 + CANopen       (n/o control)         RS232 + Modbus       (n/c control)         RS232 + PROFIBUS       (n/c control)         RS232 + FLOW-BUS       (n/c control)         RS232 + EtherCAT       (n/c control)         RS232 + PROFINET       (n/c control)         RS232 + PROFINET       (n/c control)		A Analog control	
RS232 + Modbus       (n/c control)         RS232 + Modbus       (n/c control)         RS232 + Modbus       (n/o control)         RS232 + Modbus       (n/o control)         RS232 + PROFIBUS       (n/c control)         RS232 + PROFIBUS       (n/c control)         RS232 + PROFIBUS       (n/c control)         RS232 + FLOW-BUS       (n/c control)         RS232 + EtherCAT       (n/c control)         RS232 + EtherCAT       (n/c control)         RS232 + PROFINET       (n/c control)			
RS232 + Modbus       (n/o control)         RS232 + PROFIBUS       (n/o control)         RS232 + PROFIBUS       (n/c control)         RS232 + PROFIBUS       (n/c control)         RS232 + PROFIBUS       (n/c control)         RS232 + FLOW-BUS       (n/c control)         RS232 + EtherCAT       (n/c control)         RS232 + EtherCAT       (n/c control)         RS232 + PROFINET       (n/c control)			
RS232 + PROFIBUS       (n/c control)       A       RS232 - ProPar (default)       IIR       Digital input, reset counter The counter resets when pin 5 is connected of 0 Vdc         RS232 + FLOW-BUS       (n/c control)       C       RS485 - Modbus RTU       I2R       Digital input, reset alarm The alarm resets when pin 5 is connected to 0 Vdc         RS232 + FLOW-BUS       (n/c control)       D       RS485 - Modbus ASCII       I2R       Digital input, reset alarm The alarm resets when pin 5 is connected to 0 Vdc         RS232 + FLOW-BUS       (n/c control)       D       RS485 - Modbus ASCII       I2R       Digital input, reset alarm The alarm resets when pin 5 is connected to 0 Vdc         RS232 + EtherCAT       (n/c control)       RS232 + EtherCAT       (n/c control)       I2R       Digital input, reset alarm The alarm resets when pin 5 is connected to The alarm resets when pin 5 is connected to         RS232 + PROFINET       (n/c control)       I2R       Digital input, reset alarm The alarm resets when pin 5 is connected to			Valve is fully opened when pin 5 is connect
RS232 + PROFIBUS       (n/o control)       B       RS485 - FLOW-BUS       INA       Digital input, test counter         RS232 + FLOW-BUS       (n/o control)       C       RS485 - Modbus RTU       IIA       Digital input, reset alarm         RS232 + FLOW-BUS       (n/o control)       D       RS485 - Modbus ASCII       IIA       Digital input, reset alarm         RS232 + EtherCAT       (n/o control)       D       RS485 - Modbus ASCII       IIA       Digital input, reset alarm         RS232 + EtherCAT       (n/o control)       D       RS485 - Modbus ASCII       IIA       Digital input, reset alarm         RS232 + EtherCAT       (n/o control)       D       RS485 - Modbus ASCII       IIA       Digital input, reset alarm         RS232 + EtherCAT       (n/o control)       D       RS485 - Modbus ASCII       IIA       Digital input, reset alarm         RS232 + PROFINET       (n/o control)       IIA       IIA       Digital input, reset alarm       The alarm resets when pin 5 is connected to         RS232 + PROFINET       (n/o control)       IIA       IIA       IIIA       IIIA       IIIA			
RS232 + FLOW-BUS     (n/c control)     C     RS485 - Modbus RTU     I2R     Digital input, reset alarm     Digital input, reset alarm       RS232 + EtherCAT     (n/c control)     D     RS485 - Modbus ASCII     I2R     Digital input, reset alarm       RS232 + EtherCAT     (n/c control)     I2R     I2R     Digital input, reset alarm     I2R       RS232 + EtherCAT     (n/c control)     I2R     I2R     I2R     I2R			The counter resets when pin 5 is connected
RS232 + FLOW-BUS     (n/o control)       RS232 + EtherCAT     (n/c control)       RS232 + EtherCAT     (n/o control)       RS232 + PROFINET     (n/c control)			
RS232 + EtherCAT     (n/c control)       RS232 + EtherCAT     (n/o control)       RS232 + PROFINET     (n/c control)			
RS232 + EtherCAT       (n/o control)         RS232 + PROFINET       (n/c control)			
RS232 + PROFINET (n/c control)			
	RS232 + PROFINET (n/o control)		

# **>** Warranty

X Y

All instruments and accessories are warranted for a period of 3 years from delivery date.

# > Round the clock support

RS232 + Modbus-TCP (n/c control)

RS232 + Modbus-TCP (n/o control)

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