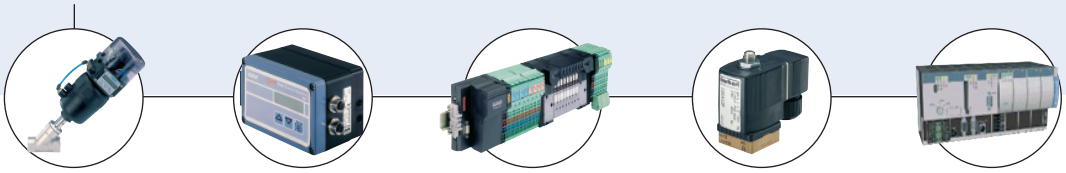
burkert
FLUID CONTROL SYSTEMS

DTS 1000011091 EN Version: K Status: RL (released I freigegeben I validé) printed: 25.09.2008

Paddle-wheel flow controller with optical principle for On/Off control

- Indication, monitoring, transmitting and On/Off control in one device.
- Programmable outputs (transistor or relay)
- Optical measurement principle:
  - Insensitive to magnetic fields
  - Flow sense detection
  - Insensitive to ferromagnetic particles in the fluid

Type 8039 can be combined with...



Type 2702 (8630)
Control valve with TopControl

Type 1067
Continuous SideControl

Type 8644-P AirLINE
Valve island with electronic I/O

Type 6014
Solenoid valve

PLC

This intelligent controller with an extra-large display is specially designed to switch a valve and to establish a monitoring system or an On/Off control loop.

Switching points can be programmed with the 3-key keypad under the display and the connection to the process in the piping is done with standard fittings.

The version with a frequency output makes it possible to transmit the paddle-wheel rotation speed (2 pulses/paddle-wheel rotation) directly to a PLC.

General data	
Compatibility	With fittings S039
Sensor element	Paddle-wheel without magnet
Materials	
Housing, cover	PC, +20% glass fibre reinforced
Front panel folio	Polyester
Cable plug	PA
Materials wetted parts	
Fitting / sensor holder	Brass / PVDF
Paddle-wheel	PVDF
Axis, bearings / Seal	Ceramics / FKM
Electrical connection	Cable plug: EN 175301-803 (provided) Steerable 5-pin M12 male fixed connector for female 5-pin M12 cable plug (not provided)
Connection cable	0.14 up to 0.5 mm² cross section; max. 100 m length

Complete device data (fitting + electronic module)	
Pipe diameter	DN 06 to 50
Measuring range	0.3 to 10 m/s
Fluid temperature	max. 100°C
Fluid pressure max.	PN10 at 20°C
Viscosity / **Solid particles rate**	300 cSt. max. / max. 1% (particle size max.: 0.5 mm)
Accuracy	
Teach-In	≤ ± 1% of F.S.* (at 10 m/s)[1)]
Standard K-factor	≤ ± (1% of F.S.* + 3% of Reading)[1)]
Linearity	≤ ± 0.5% of F.S.* (at 10 m/s)[1)]
Repeatability	≤ 0.4% of Reading[1)]

* FS. = Full scale (10 m/s)
1) Under reference conditions i.e. measuring fluid = water, ambient and water temperature = 20°C, applying the minimum inlet and outlet pipe straights, matched inside pipe dimensions.

Electrical data	
Power supply	12-30 V DC filtered and regulated
Current consumption	≤ 80 mA (no load)
Threshold programming mode	window or hysteresis
Outputs	
Transistor for threshold (programmable)	NPN and/or PNP, open collector, 5-30 V DC, max. 700 mA, protect against short circuit.
Relay (programmable)	3A/250 V AC or 3A/30 V DC.
Frequency	Transistor NPN, open collector, 5-30 V DC, max. 700 mA.
Reversed polarity of DC	Protected

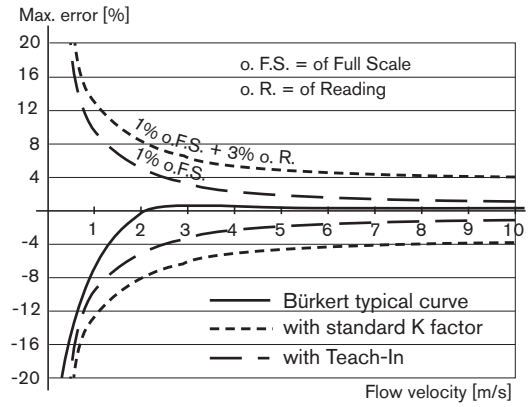
Environment	
Ambient temperature	0 up to + 60°C (operating and storage)
Relative humidity	≤ 80%, non condensated

Standards, directives and approvals	
Protection class	IP65 with connector plugged-in and tightened
Standards, directives	
EMC	EN 50081-1(1992), 50082-2 (1995)
Low voltage	EN 61010-1 (1995)
Pressure	Complying with article 3 of §3 from 97/23/CE directive.*
Vibration	EN 60068-2-6
Shock	EN 60068-2-27

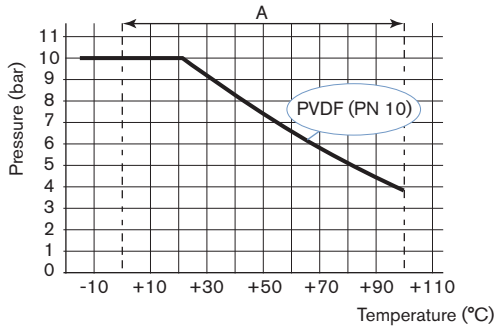
* For the 97/23/CE pressure directive, the device can only be used under following conditions (depend on max. pressure, pipe diameter and fluid).

Type of fluid	Conditions
Fluid group 1, §1.3.a	DN25 only
Fluid group 2, §1.3.a	PN*DN ≤1000
Fluid group 1, §1.3.b	PN*DN ≤2000
Fluid group 2, §1.3.b	DN≤200

Accuracy diagram

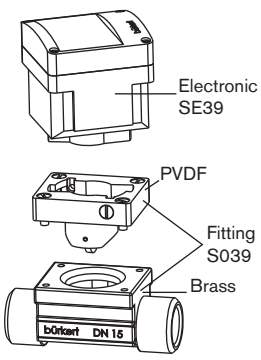


Pressure / temperature chart



A: Application range for complete device (fitting + controller)

Design and principle of operation



The flow controller 8039 is built up with an electronic module SE39 associated to a fitting S039 with integrated measurement paddle-wheel.
The output signal is provided via cable plug according to EN 175301-803 and/or a M12 multipin connector.

When liquid flows through the pipe, the paddle-wheel is set in rotation, producing a measuring signal (pulses) in the transducer. The frequency is proportional to the flow velocity of the fluid. A conversion coefficient (K factor, available in the instruction manual of the fitting), specific to each pipe (size and material) enables the conversion of this frequency into flow rate.

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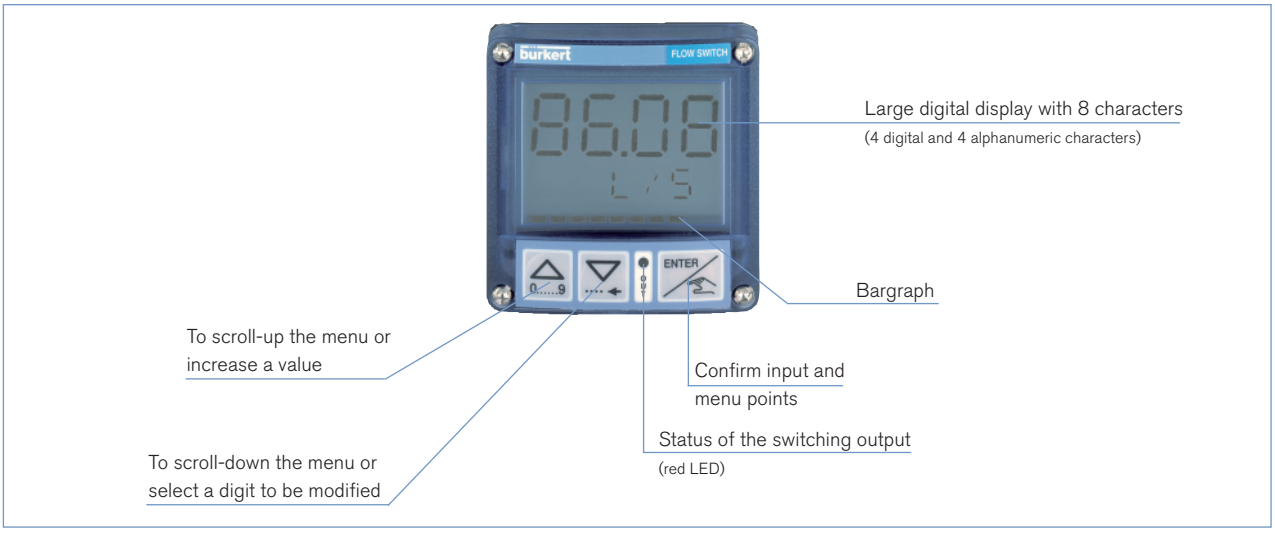
Display and operation



The device can be calibrated by means of the K-factor, or via the TEACH-IN function.
Customized adjustments, such as engineering units, output, filter, bargraph are carried out on site.

The operation is specified according to three levels:

Indication in operating mode / Display
- measured flow
- high threshold value
- low threshold value

Parameter definition
- engineering units (International mesuring units)
- K-factor / TEACH-IN function
- selection of switching mode[1] (window, hysteresis)
- selection of threshold value[1]
- filter
- 10-segment bargraph (select min. and max. value)

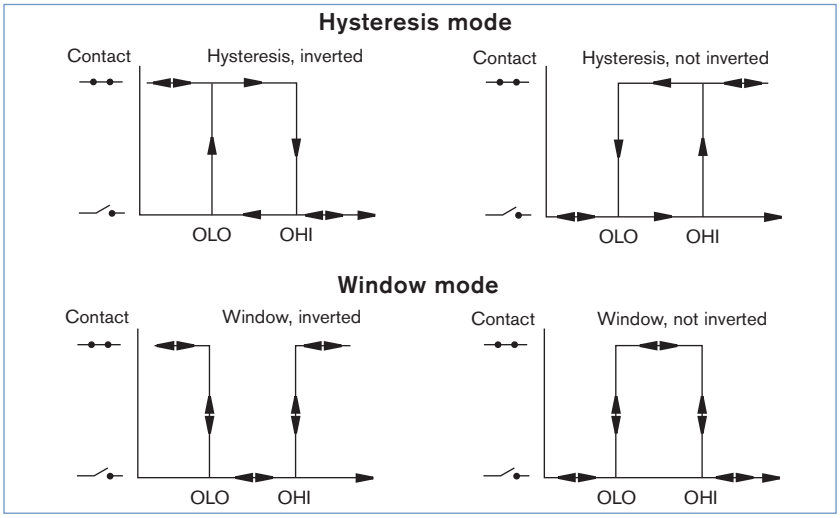
Test
- switching threshold test with flow simulation
(dry-run test operation)

[1] **8039 with standard On/Off output**

- 2 switching modes for the output, either
hysteresis or window,
inverted or not

- Programmable delay before switching

- Possible outputs depending on the version: relay, transistor NPN, transistor PNP, frequency



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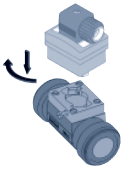
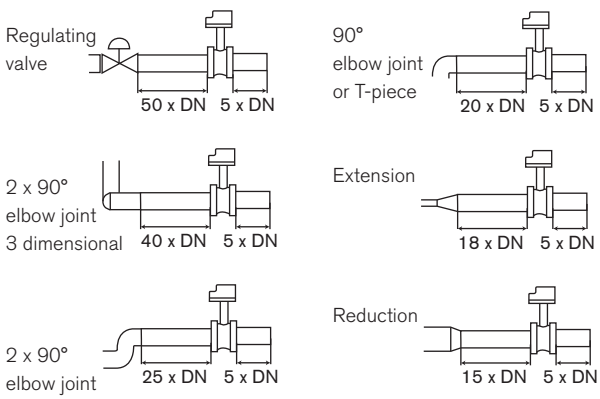
Installation

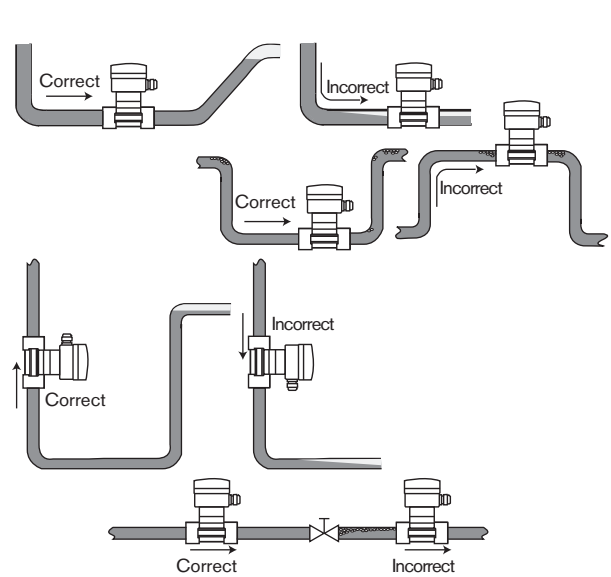


The 8039 flow controller can easily be installed into any Bürkert INLINE fitting system Type S039 by means of a Quarter-Turn. Minimum straight upstream and downstream distances must be observed. According to the pipe's design, necessary distances can be bigger or use a flow conditioner to obtain the best accuracy. For more information, please refer to EN ISO 5167-1.

EN ISO 5167-1 prescribes the straight inlet and outlet distances that must be complied with when installing fittings in pipe lines in order to achieve calm flow conditions. The most important layouts that could lead to turbulence in the flow are shown below, together with the associated prescribed minimum inlet and outlet distances. These ensure calm, problem-free measurement conditions at the measurement point.



The flow controller can be installed into either horizontal or vertical pipes.



Pressure and temperature ratings must be respected according to the selected fitting material.
The suitable pipe size is selected using the diagram Flow / Velocity / DN.

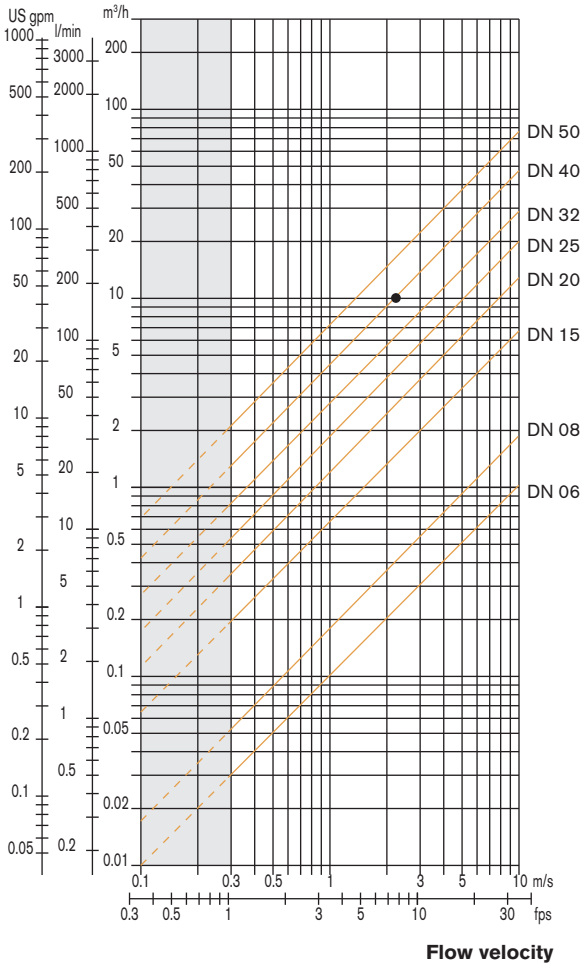
The controller is not designed for gas flow control.

Selection of fitting / pipe size

Example:

- Specification of nominal flow: 10 m^3/h
- Ideal flow velocity: 2...3 m/s
- For these specifications, the diagram indicates a pipe size of DN40

Flow rate



Flow velocity

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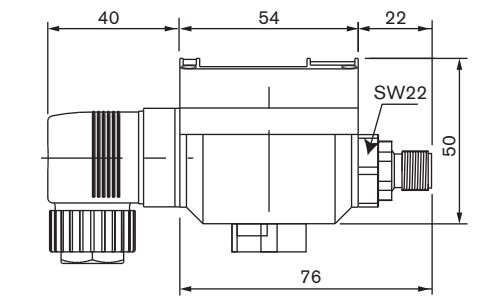
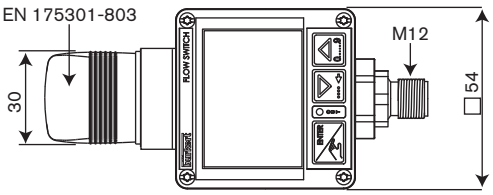
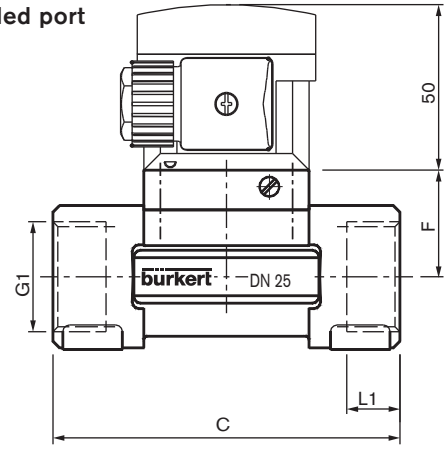
Dimensions [mm]

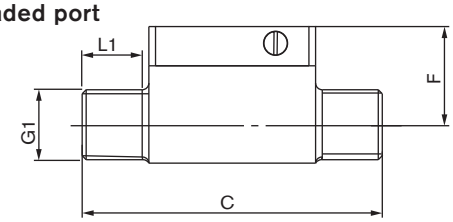




Internal threaded port



External threaded port (DN6 - DN8)



DN [mm]	F [mm]	C [mm]	G1 [inch]	G1 [inch]	G1 [mm]	L1 [mm]
06	29.7	90.0	G 1/4	G 1/2		14.0
08	29.7	90.0	G 1/2	NPT 1/2	M16x1.5	14.0
15	34.5	84.0	G 1/2	NPT 1/2		16.0
20	32.0	94.0	G 3/4	NPT 3/4		17.0
25	32.2	104.0	G 1	NPT 1		23.5
32	35.8	119.0	G 1 1/4	NPT 1 1/4		23.5
40	39.6	129.0	G 1 1/2	NPT 1 1/2		23.5
50	45.7	150.0	G 2	NPT 2		27.5

Ordering chart for Controller Type 8039

Controller Type SE39 - for fitting Type S039

Voltage supply	Output	Electrical connection	Item no.
12-30 V DC	NPN	Cable plug EN 175301-803	440 378
	PNP	Cable plug EN 175301-803	440 379
	NPN and PNP	Steerable 5-pin M12 male fixed connector	440 377
	Relay	Steerable 5-pin M12 male fixed connector and cable plug EN 175301-803	440 382
	Relay and frequency	Steerable 5-pin M12 male fixed connector and cable plug EN 175301-803	447 806

Note: A complete device Type 8039 consists of a fitting Type S039 and an electronic module Type SE39. Please order the two required units separately.
If a cable connector (M12) is needed please order that too.

Fitting Type S039 - Brass housing & PVDF paddle-wheel holder (to be ordered separately)

Description	Item no. DN 06* - 1/4"	Item no. DN 06* - 1/25"	Item no. DN 08* - 1/2"	Item no. DN 15 - 1/2"	Item no. DN 20 - 3/4"	Item no. DN 25 - 1"	Item no. DN 32 - 1 1/4"	Item no. DN 40 - 1 1/2"	Item no. DN 50 - 2"
G-port connection	552 558	552 525	444 670	440 645	440 646	440 647	440 648	440 649	440 650
NPT-port connection	-	-	444 671	444 672	444 673	444 674	444 675	444 676	444 677
M-port connection	16 x 1.5 552 414	-	-	-	-	-	-	-	-

* Only version with external thread

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Ordering chart for accessories (to be ordered separately)

Description	Item no.
5-pin M12 female cable connector with plastic threaded locking ring	917 116
5-pin M12 female connector moulded on cable (2 m, shielded)	438 680
Cable plug EN 175301-803 with cable gland (Type 2508)	438 811
Cable plug EN 175301-803 with NPT1/2 " reduction without cable gland (Type 2509)	162 673
Sensor holder with paddle-wheel for DN 06 and DN08	559 602
Sensor holder with paddle-wheel for DN ≥ 15	444 657

Interconnection possibilities with the sensor Type 8039