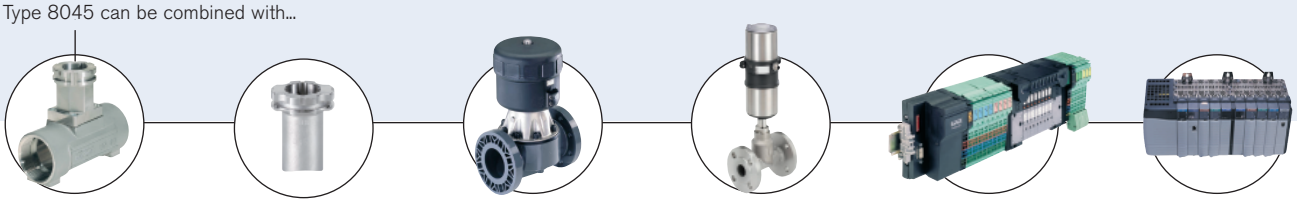
bürkert
FLUID CONTROL SYSTEMS

Electromagnetic Flowmeter

- Sensor in solid state technology
- Shows both flow rate and volume
- Simulation of all output signals
- Clean in place (CIP), FDA or KTW approved
- Version with Alloy C22 electrodes

Type 8045 can be combined with...



Type S020
INSERTION
T-fitting

Type S020
Spigot

Type 2030
Diaphragm valve

Type 8802-GD
TopControl System

Type 8644
Valve islands with electronic I/O

PLC

The electromagnetic flowmeter Type 8045 is designed for pipes with diameter sizes ranging from DN06 to DN400 and is intended exclusively to measure flow rate in liquids having a conductivity > 20 µS/cm.

The flowmeter has a backlit display, a keyboard and is equipped with a 4... 20 mA current output, a digital output (pulse output by default) and two totalizers. Some versions are equipped with two relay outputs and one digital input.

The version with a stainless steel sensor has been designed for applications with high pressures (PN16) and high temperatures (up to 110°C).

The version with Alloy C22 electrodes has been designed for applications with aggressive fluids (chemicals) and especially sea water applications.

Technical data	
General data	
Compatibility	with fittings S020 (see corresponding data sheet)
Materials	
Housing, cover, nut / seal	
PVDF sensor version	PC (glass fibre reinforced for housing) / NBR
Stainless steel sensor version	Black PPA (glass fibre reinforced) / NBR
Front panel foil	Polyester
Protection lid / seal	
PVDF sensor version	PC / silicone
Stainless steel sensor version	PSU / silicone
Screws / Cable glands / Seal	Stainless steel / PA / Neoprene
Wetted parts materials	
Sensor holder	PVDF or Stainless steel 1.4404/316L
Electrodes	Stainless steel 1.4404/316L or Alloy C22
Seal	FKM (FDA agreements) [EPDM (KTW agreements)]
Earth ring (PVDF sensor version)	Stainless steel 1.4404/316L or Alloy C22
Electrode holder (St. St. sensor version)	PEEK (FDA agreements)
Electrical connections	2 cable glands M20 x 1.5
Recommended cable	0.5 to 1.5 mm² cross-section, shielded cable, 6... 12 mm diameter (if only one cable is used per cable gland) or 4 mm diameter (if two cables are used per cable gland with using the supplied multi-way seal)
Environment	
Ambient temperature	-10 to +60°C *(14 to 140°F)* (operating) -20 to +60°C *(-4 to 140°F)* (storage)
Relative humidity	< 85%, without condensation
Height above sea level	max. 2000 m

DTS 1000011093 EN Version: V Status: RL (released | freigegeben | validé) printed: 05.11.2012

Complete device data (Fitting S020 + flowmeter)	
Pipe diameter	DN06 to DN400
Measuring range	0.2 to 10 m/s
Sensor element	Electrodes
Medium temperature PVDF sensor version Stainless steel sensor version	see Pressure/Temperature diagram 0 to 80°C *(32 to 176°F)* (depends on fitting) -15 to 110°C *(5 to 230°F)* (depends on fitting)
Medium pressure max. PVDF sensor version Stainless steel sensor version	see Pressure/Temperature diagram PN10 *(145.1 PSI)* PN10 *(145.1 PSI)* (with plastic fitting) - PN16 *(232.16 PSI)* (with metal fitting)
Conductivity	min. 20 µS/cm
Measurement error Teach-In Standard K-factor	(for measured value from 1 to 10 m/s) ±0.5% of Reading[1)] ±4% of Reading[1)]
Linearity	±0.5% of F.S.*[1)]
Repeatability	±0.25% of Reading[1)]

Electrical data	
Operating voltage	18 - 36 V DC filtered and regulated (3 wires) oscillation rate: ±0.5%
Reversed polarity of DC	protected
Current consumption	≤ 300 mA
Digital input DI1	Supply voltage: 18 - 36 V DC, input impedance 15 kΩ min. pulse duration: 200 ms Galvanic insulation, protected against polarity reversals of DC and voltage spikes
Digital outputs Transistor (DO1) Relay (DO2 and DO3)	 Type: NPN or PNP (wiring dependent), open collector Function: pulse output (by default), user configurable 0 - 250 Hz, 5 - 36 V DC, 100 mA max., duty cycle if frequency > 2 Hz: 1/2; min. pulse duration if frequency < 2 Hz: 250 ms Galvanic insulation, protected against polarity reversals of DC and short-circuits 2 normally open relays, freely adjustable (hysteresis by default), 250 V AC/3 A or 30 V DC/3 A (resistive load), max. cutting power of 750 VA (resistive load); life span of min. 100000 cycles
Analogue output Current (AO1)	 4... 20 mA, sink or source (wiring dependent), 22 mA to indicate a fault max. loop impedance: 1300 Ω at 36 V DC, 1000 Ω at 30 V DC, 700 Ω at 24 V DC, 450 Ω at 18 V DC

Standards, directives and approvals	
Protection class	IP65, device wired and cable glands tightened and lid screwed tight
Standards and directives EMC Low voltage Pressure Vibration Shock **Approvals**	 EN 61000-6-2, EN 61000-6-3 EN 61010-1 Complying with article 3 of §3 from 97/23/CE directive.* EN 60068-2-6 EN 60068-2-27 FDA (only for device with FKM seal and PEEK electrode holder) KTW (only for device with EPDM seal and PVDF sensor holder) CSA-Approved for US and Canada (on request)

[1)] Under reference conditions i.e. measuring fluid=water, ambient and water temperature = 20°C *(68°F)*, applying the minimum inlet and outlet pipe straights, matched inside pipe dimensions.

* F.S.= of Full scale (10 m/s)

* 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	Forbidden
Fluid group 2, §1.3.a	DN ≤ 32, or DN > 32 and PN*DN ≤ 1000
Fluid group 1, §1.3.b	PN*DN ≤ 2000
Fluid group 2, §1.3.b	DN ≤ 200 or DN ≤ 10 or PN*DN ≤ 5000

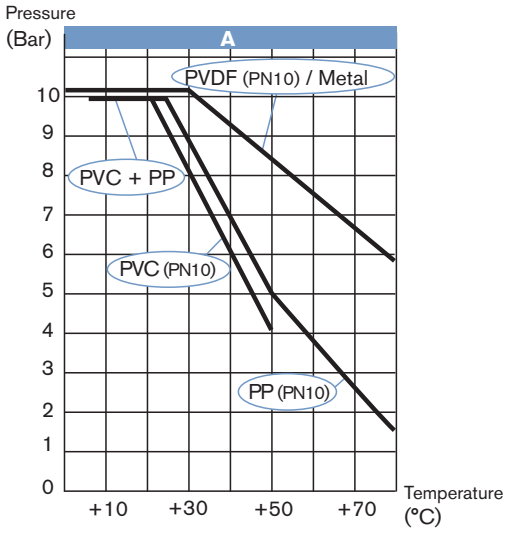
DTS 1000011093 EN Version: V Status: RL (released | freigegeben | validé) printed: 05.11.2012

Pressure/Temperature diagram

Please be aware of the fluid pressure/temperature dependence according to the respective fitting + flowmeter material as shown in the diagrams.

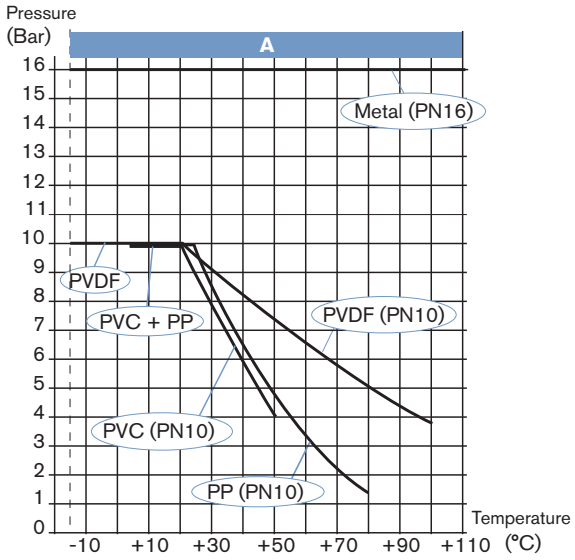
8045 with a PVDF sensor

(depending on the fitting material)



8045 with a stainless steel sensor

(depending on the fitting material)



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

Sofware main features

- Choice of the display language
- International measuring units
- Teach-In for a better accuracy, or K-factor setting
- 4... 20 mA current output (AO1)
- Transistor output (DO1)
- 2 relays (DO2 and DO3 - if equipped)
- Detection of flow direction possible
- ON/OFF digital input (DI1 - if equipped)
- Filter function
- Reset both totalizers (main and daily)
- Low flow "Cut-Off"
- Brightness of the display
- Password for parameter settings
- Warning and fault messages generating
- Simulation mode to adjust Zero and Span and simulate flow in dry-run condition

Possible applications

Flow control of fluids, contaminated or not:

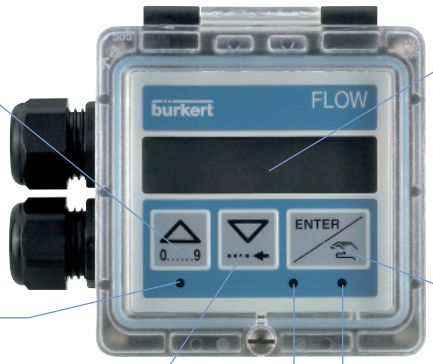
- Waste water treatment
- Flow control of drinking water (FDA approval)
- Laundries: measurement and control of the water consumption
- Swimming pools: pump protection and flow control
- Food-processing industry: monitoring of the cleaning cycles (FDA approval)
- Irrigation
- Application with sea water: desalination, fish farms

Design

The magnetic system inside the sensor induces a magnetic field into the fluid, which is perpendicular to the direction of flow. Two electrodes are in galvanic contact with the liquid. Based on the Faraday law a voltage can be measured between these electrodes once a liquid (min. conductivity of 20 µS/cm) flows along the pipe.
This voltage is proportional to the flow velocity.
Using the K-factor for the individual pipe diameter the speed of flow is converted into volume per time.

DTS 1000011093 EN Version: V Status: RL (released | freigegeben | validé) printed: 05.11.2012

Description of the navigation keys and the status LEDs



- Scrolling up the parameters within a level or a menu
- increase the figure selected

Large digital display with 8 characters
(4 digital characters and 4 alphanumeric characters)
indicating:
- the measured flow
- the value of the current output
- the value of the main totalizer
- the value of the daily totalizer

Device status LED:
see following table

- Selecting the displayed parameters
- Validating the settings

- Scrolling down the parameters within a level or a menu
- Selecting the figure on the left
- Reading the messages in the information menu

Status LED of relay DO3
(LED ON = contact closed)

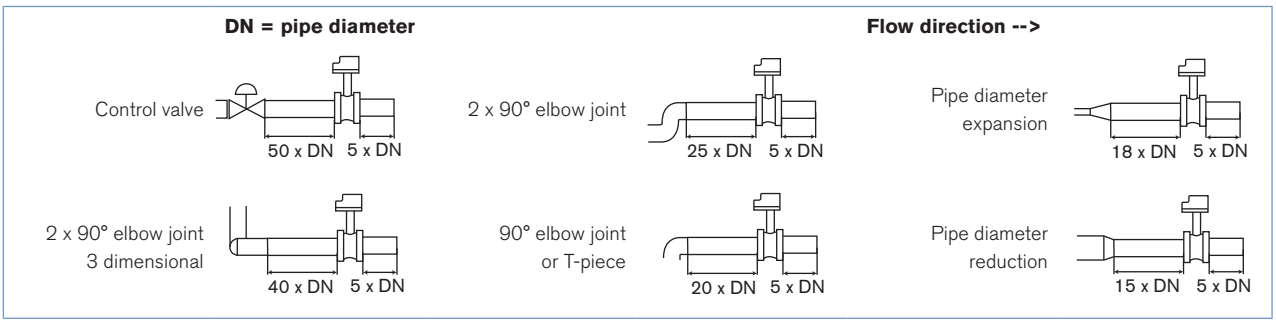
Status LED of relay DO2
(LED ON = contact closed)

Device status LED	Status of the device
Green	The device operates correctly
Orange	A warning messages is generated in the information menu.
Red	A fault message is generated and a 22 mA current is sent on the current output.
Blinking, whatever the colour	▪ The DI1 digital input is active ▪ or a check for the correct behaviour of the outputs is running ▪ or a flow zero point calibration procedure is running ▪ or the daily totalizer is kept at zero

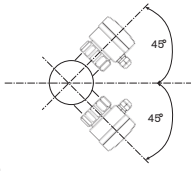
Installation

The 8045 can easily be installed into any Bürkert INSERTION fitting system (S020) by just fixing the main nut.
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.



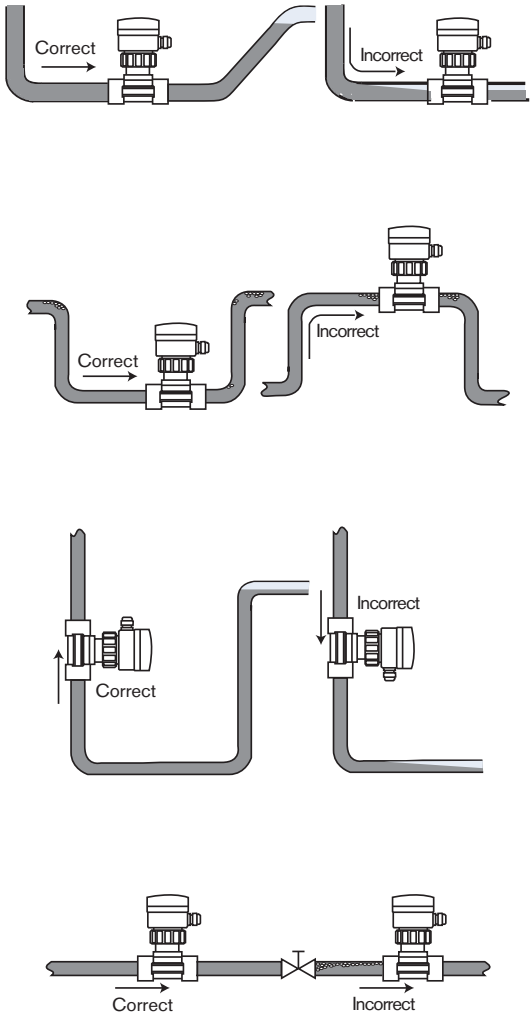
It is advisable to mount the flowmeter at a 45° angle to the horizontal centre of the pipe to avoid having deposits on the electrodes and false measurements due to air bubbles



DTS 1000011093 EN Version: V Status: RL (released | freigegeben | validé) printed: 05.11.2012

Installation (continued)

The device can be installed into either horizontal or vertical pipes. Mount the 8045 in these correct ways to obtain an accurate flow measurement.



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

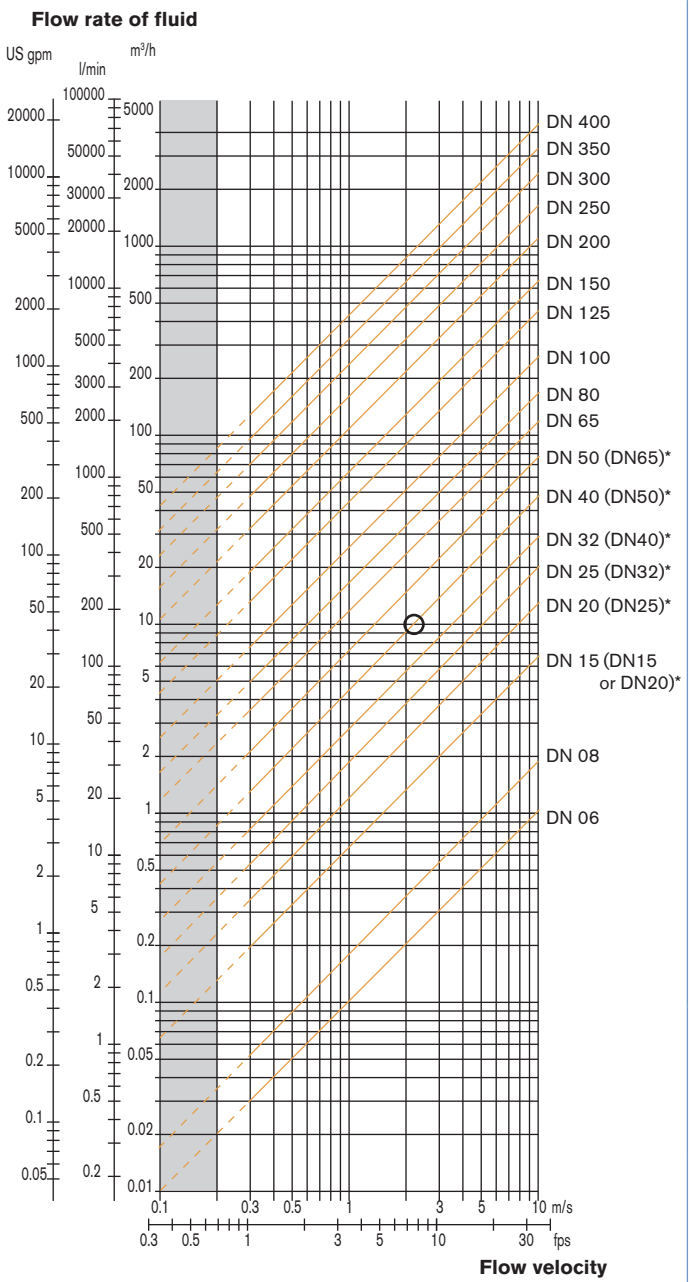
The flowmeter is not designed for gas flow measurement.

Diagram Flow/Velocity/DN

Example:

- Flow: 10 m³/h
- Ideal flow velocity: 2... 3 m/s

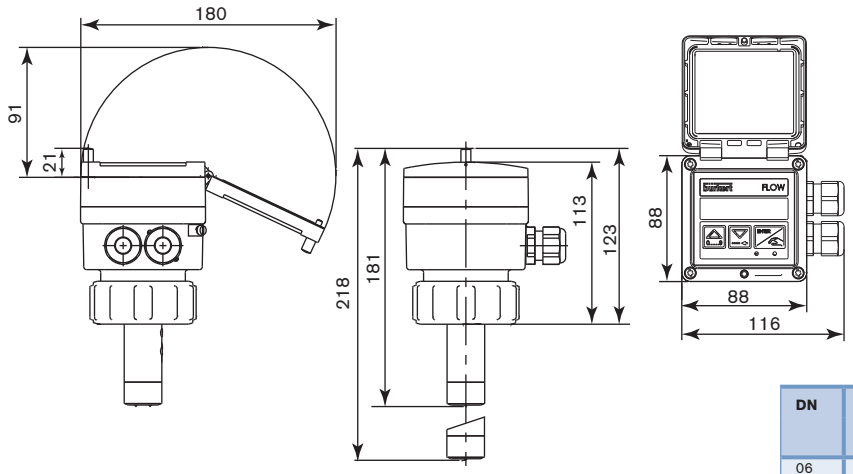
For these specifications, the diagram indicates a pipe size of DN40 [or DN50 for (*) mentioned fittings]



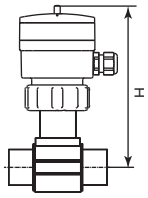
*** for following fittings with:**
- **external thread acc. to SMS 1145**
- **weld end acc. to SMS 3008, BS 4825/ASME BPE or DIN 11850 Series 2**
- **Clamp acc. to SMS 3017/ISO 2852, BS 4825/ASME BPE or DIN 32676**

DTS 1000011093 EN Version: V Status: RL (released | freigegeben | validé) printed: 05.11.2012

Dimensions [mm]



Note: The length of the sensor finger depends on the fitting used.
See data sheet Type S020 or available fitting DN diagram on next page.



DN	H			
	T-Fitting	Saddle	Plastic spigot	Metal spigot
06	182			
08	182			
15	187			
20	185			
25	185			
32	188			
40	192			188
50	198	223		193
65	198	222	206	199
80		226	212	204
100		231	219	214
110		227		
125		234	254	225
150		244	261	236
180		268		
200		280	282	257
250			300	317
300			312	336
350			325	348
400			340	

Ordering chart for flowmeter Type 8045 - for fitting S020 (see corresponding data sheet)

All these versions have as minimum
- a 4... 20 mA current output (AO1) and
- a digital output (DO1)

Operating voltage	Digital input	Relay output	Housing material	Seal	Sensor version	Electrode material	Electrical connection	Item no.
18 - 36 V DC	No	No	PC	FKM	Short, PVDF	Stainless steel	2 cable glands M20 x 1.5	426 498
					Long, PVDF	Stainless steel	2 cable glands M20 x 1.5	426 499
	1 (DI1)	2 (DO2, DO3)	PC	FKM	Short, PVDF	Stainless steel	2 cable glands M20 x 1.5	426 506
					Long, PVDF	Stainless steel	2 cable glands M20 x 1.5	426 507
	No	No	PPA	FKM	Short, st. steel (FDA)	Stainless steel	2 cable glands M20 x 1.5	449 670
					Long, st. steel (FDA)	Stainless steel	2 cable glands M20 x 1.5	449 672
	1 (DI1)	2 (DO2, DO3)	PPA	FKM	Short, st. steel (FDA)	Stainless steel	2 cable glands M20 x 1.5	449 671
					Long, st. steel (FDA)	Stainless steel	2 cable glands M20 x 1.5	449 673
	No	No	PC	FKM	Short, PVDF	Alloy C22	2 cable glands M20 x 1.5	558 675
					Long, PVDF	Alloy C22	2 cable glands M20 x 1.5	558 676

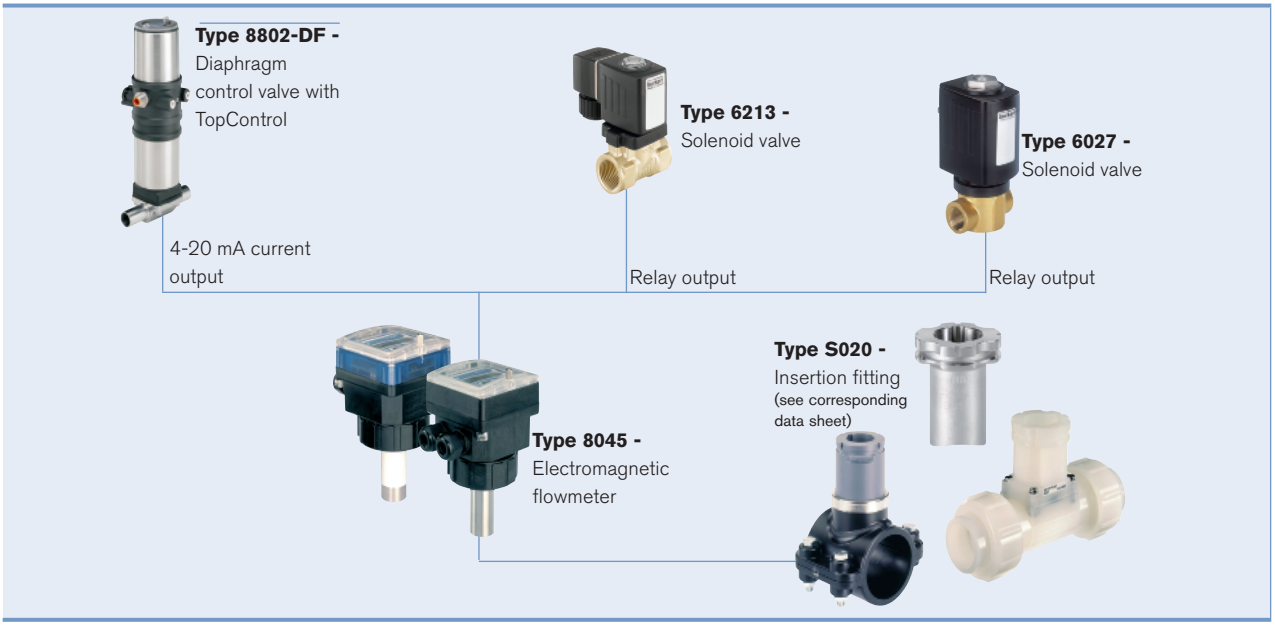
Note: 1 Kit 558 102 and 1 EPDM seal are supplied with each flowmeter.

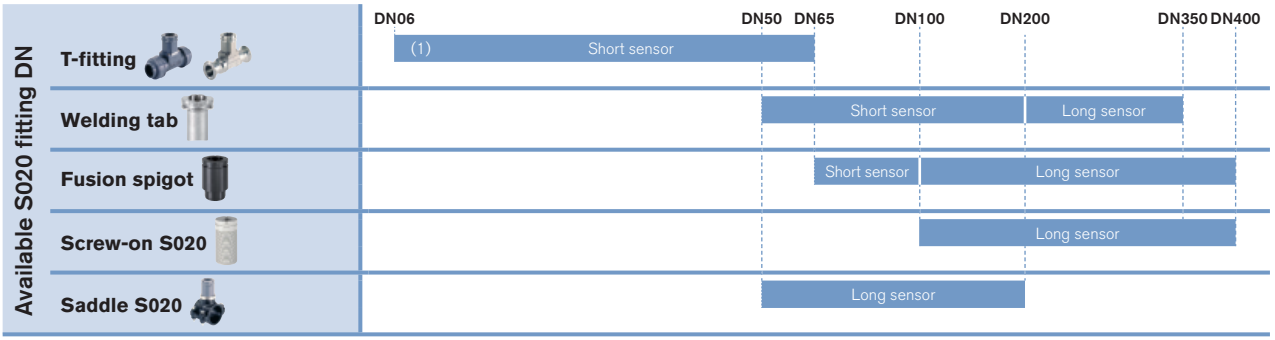
DTS 1000011093 EN Version: V Status: RL (released | freigegeben | validé) printed: 05.11.2012

Ordering chart - accessories for flowmeter Type 8045 (has to be ordered separately)

Specifications	Item no.
Set with 2 cable glands M20 x 1.5 + 2 neoprene flat seals for cable gland or plug + 2 screw-plugs M20 x 1.5 + 2 multiway seals 2 x 6 mm	449 755
Set with 2 reductions M20 x 1.5 /NPT1/2" + 2 neoprene flat seals for cable gland or plug + 2 screw-plugs M20 x 1.5	551 782
Set with 1 stopper for unused cable gland M20 x 1.5 +1 multiway seal 2 x 6 mm for cable gland + 1 green FKM seal for the sensor + 1 mounting instruction sheet	558 102
Snap ring	619 205
PC union nut	619 204
PPA union nut	440 229
Set with 1 green FKM + 1 black EPDM seals	552 111
3 points calibration certificate (device combined with a S020 fitting, only for DN ≤ 200)	550 676
FDA - Approval (only stainless steel sensor version)	449 788

Interconnection possibilities with other Bürkert flow sensors





(1) DN06 and DN08 in stainless steel S020 only, 8045 with stainless steel sensor recommended

To find your nearest Bürkert office, click on the orange box → **www.burkert.com**

In case of special application conditions, please consult for advice.

Subject to alteration.

1211/15_EU-en_00891790

DTS 1000011093 EN Version: V Status: RL (released | freigegeben | validé) printed: 05.11.2012