Climate
Control

IMI TA

TA-PILOT-R – ANSI flanges

Differential pressure controllers

Pilot operated differential pressure controller with adjustable set-point

Breakthrough
engineering for
a better world

TA-PILOT-R – ANSI flanges

The TA-PILOT-R is a high performing differential pressure controller designed to keep a stable differential pressure over the load. With unrivaled accuracy TA-PILOT-R assists in delivering accurate and stable conditions to provide superior control valve authority for modulating control valves, additionally it can limit noise and simplify the balancing procedure. TA-PILOT-R is a differential pressure controller for use in return pipes. Measuring points enable pressure measurements for diagnostics.

Key features

Easy handling and installation
Very low weight and small overall proportions.

Precise and stable differential pressure control
Unrivaled accuracy thanks to the new PILOT technology.

Measuring and system diagnostics
Unique features to validate and better understand system behaviour to minimize energy consumption.

Technical description

Application:
Heating and cooling systems.
Installation in the return pipe.

Functions:
Differential pressure control
Pre-setting Δp over the load (ΔpL)
Measuring (ΔpL)

Dimensions:
DN 65-200

Pressure class:
Class 150

Max. differential pressure (ΔpV):
1200 kPa

Setting range:
10* - 50 kPa
30* - 150 kPa
80* - 400 kPa
*) Delivery settings

Leakage rate:
Tight sealing

Temperature:
Max. working temperature:
- with measuring points, standard: 120°C
- with measuring points, double secured: 150°C

Min. working temperature: -10°C

Media:
Water or neutral fluids, water-glycol mixtures (0-57%).

Material:
Valve body: Ductile iron EN-GJS-400-15
Pilot extention body: Brass
Pilot body: AMETAL®
O-rings: EDPM rubber
Seat seal: EPDM/Stainless steel
Plug mechanism: Stainless steel and brass
Membrane: EPDM rubber
Springs: Stainless steel
Screws and nuts: Stainless steel

AMETAL® is the dezincification resistant alloy of IMI.

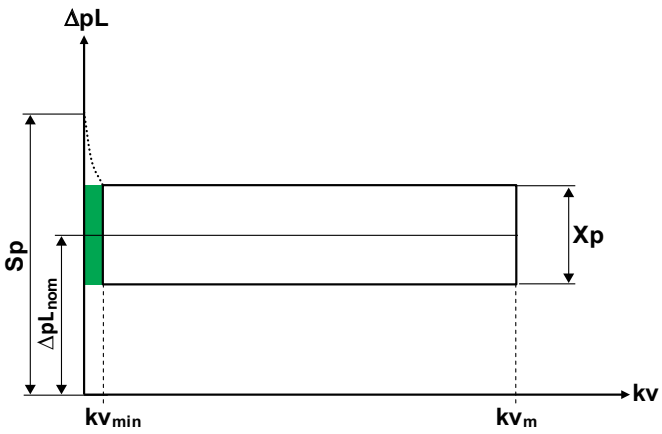
Surface treatment:
Pilot body: Non treated
Valve body: Electrophoretic painting.

Marking:
IMI TA, IMI, DN, Class, Kvs, $T_{min/max}$, serial number, valve body material and flow direction arrow, label, ΔpL range.
Colour identification on top of the pilot:
10 - 50 kPa: Blue
30 - 150 kPa: Orange
80 - 400 kPa: Grey
CE-marking:
DN 65 - 150: CE
DN 200: CE 0409 *

*) Notified body.

Flanges:
According to ASME/ANSI B16.42 Class 150.

Working range



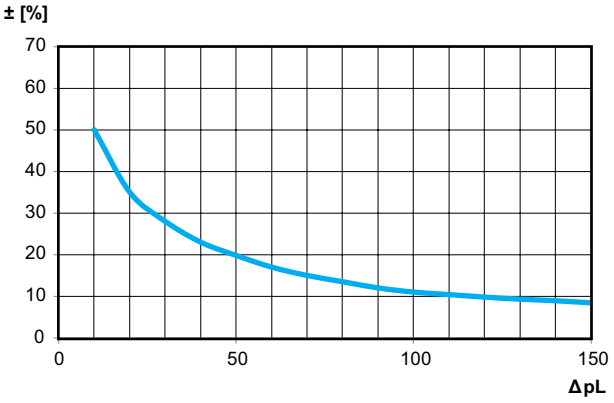
Sp = Sealing pressure, the increase of ΔpL in kPa when a Δp controller controls ΔpL from Kv_{min} down to zero flow.
Kv_{min} = m^3/h at a pressure drop of 1 bar and minimum opening corresponding to the p-band.
Kv_m = m^3/h at a pressure drop of 1 bar and maximum opening corresponding to the p-band.
q_{max} = The maximum recommended flow through a Δp controller.
ΔpL_{nom} = Middle value of ΔpL in the p-band.
Xp = The p-band in kPa for ΔpL.
ΔH = Available differential pressure.
Δp = Pressure drop accross the valve.
q = Actual measured flow.

DN		65	80	100	125	150	200
Sp [kPa]	ΔH = 0-400 kPa	45					
	ΔH = 400-1200 kPa	65					
Kv_{min}		4					
Kv_m		75	110	180	270	400	600
q_{max} [m^3/h]		53	78	127	191	283	424

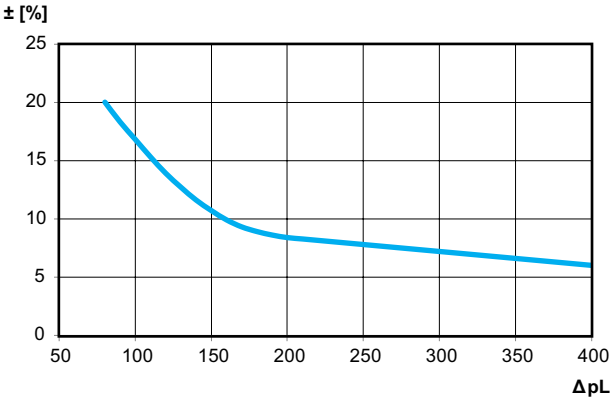
NOTE: Below Kv_{min} use expansion vessel for stable control. If Sp is within the p-band, the p-band is valid down to Kv = 0.

Maximum p-band in ±% of ΔpL_{nom}

Setting range
10-50 / 30-150 kPa



80-400 kPa

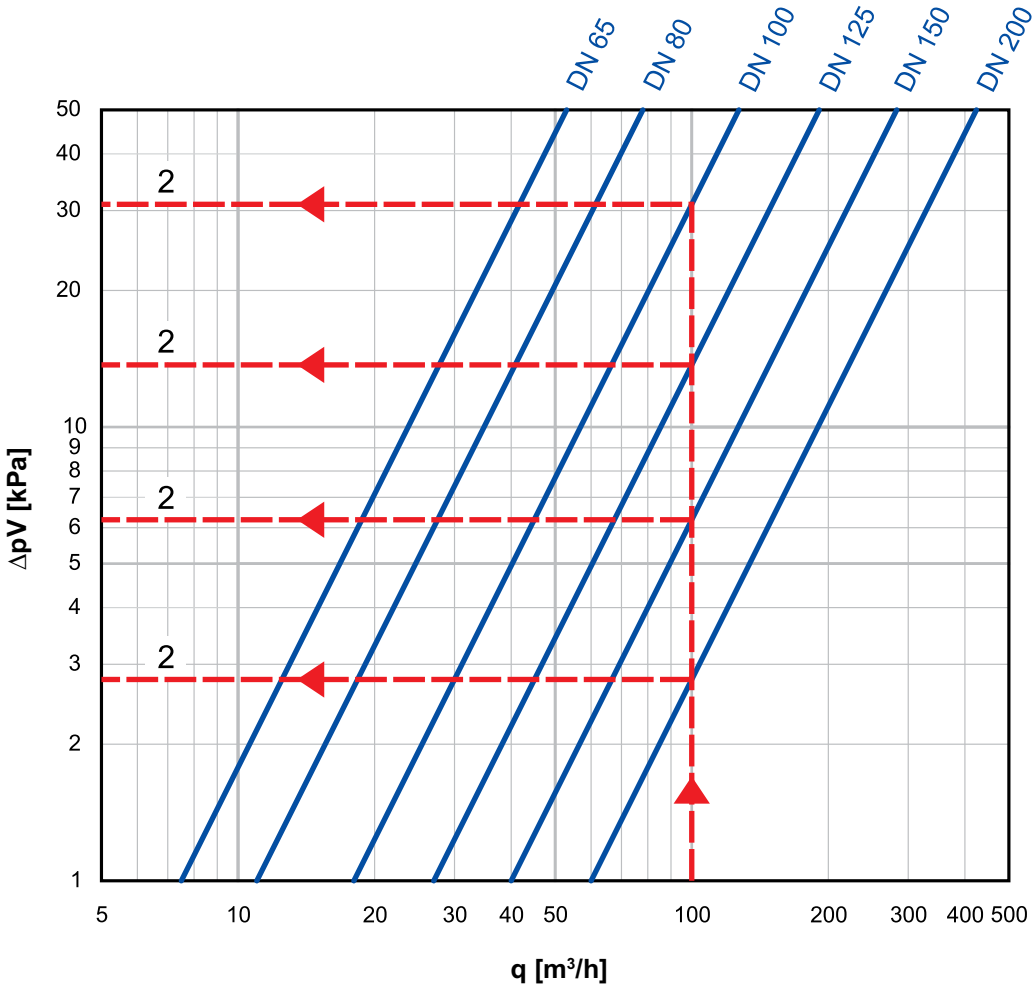


Noise

In order to avoid noise in the installation, the valve must be correctly installed and the water de-aerated.

Sizing

The diagram shows the lowest pressure drop required for the TA-PILOT-R valve to be within its working range at different flows.



Example
Design flow 100 m³/h, ΔpL = 60 kPa and available differential pressure ΔH = 80 kPa.

1. Design flow (q) 100 m³/h.

2. Read the minimum needed pressure drop for TA-PILOT-R ΔpV_{min} from the diagram.

DN 100 ΔpV_{min} = 31 kPa
DN 125 ΔpV_{min} = 14 kPa
DN 150 ΔpV_{min} = 6 kPa
DN 200 ΔpV_{min} = 2,8 kPa

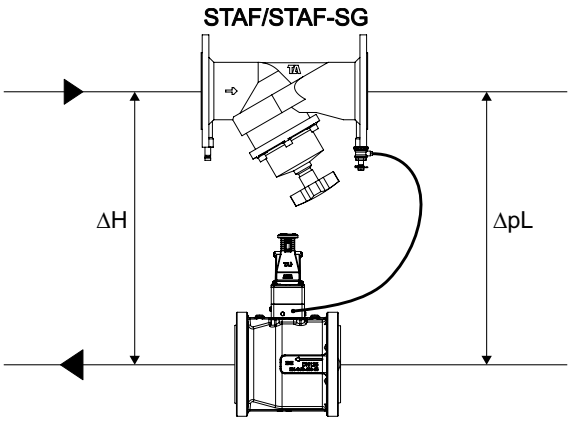
3. Check that the ΔpL is within the setting range for these sizes.

4. Calculate the minimum needed available differential pressure ΔH_{min}.
Pressure drop over fully open STAF and 100 m³/h, DN 100 = 28 kPa, DN 125 = 11 kPa, DN 150 = 6 kPa and DN 200 = 2 kPa.

$$\Delta H_{min} = \Delta pV_{STAF} + \Delta pL + \Delta pV_{min}$$

DN 100: ΔH_{min} = 28 + 60 + 31 = 119 kPa
DN 125: ΔH_{min} = 11 + 60 + 14 = 85 kPa
DN 150: ΔH_{min} = 6 + 60 + 6 = 72 kPa
DN 200: ΔH_{min} = 2 + 60 + 2,8 = 64,8 kPa

5. In order to optimise the control function of the TA-PILOT-R select the smallest possible valve, in this case DN 150. (DN 100 and DN 125 are not suitable since ΔH_{min} = 119 and 85 kPa and the available differential pressure only 80 kPa.)



TA-PILOT-R

IMI recommends the software HySelect for calculating the valve size. HySelect can be downloaded from climatecontrol.imiplc.com.

When to use expansion vessel

Example
Given:
Minimum flow q_{min} = 6 m³/h
Design pressure drop of the load ΔpL = 200 kPa
Available differential pressure at minimum flow ΔH_{max} = 300 kPa

1. Calculate Kv_{min} for q_{min} at ΔH_{max}.

$$Kv_{min} = 10 \cdot q_{min} / \sqrt{(\Delta H_{max} - \Delta pL)}$$

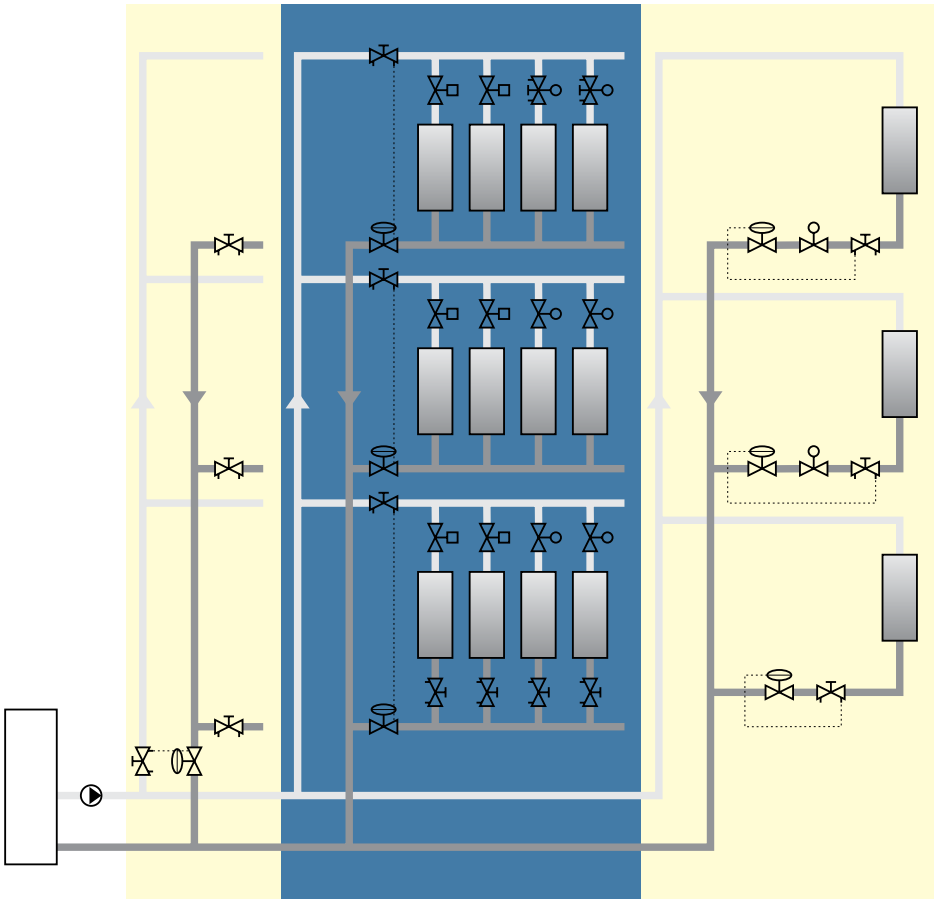
$$Kv_{min} = 10 \cdot 6 / \sqrt{(300-200)} = 6$$

Kv_{min} is **above 4**.
Expansion vessel is **not** needed.

$$Kv = 10 \cdot \frac{q}{\sqrt{\Delta p}}$$ (q [m³/h]; Δp [kPa])

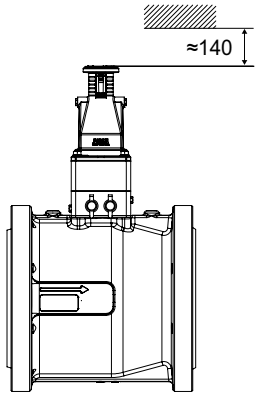
Installation

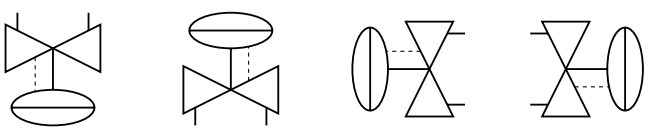
Application examples



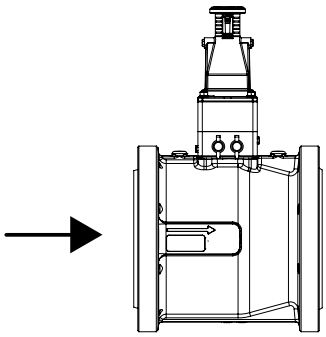
Installation of valve

Approx. 140 mm free space is required above the pilot.



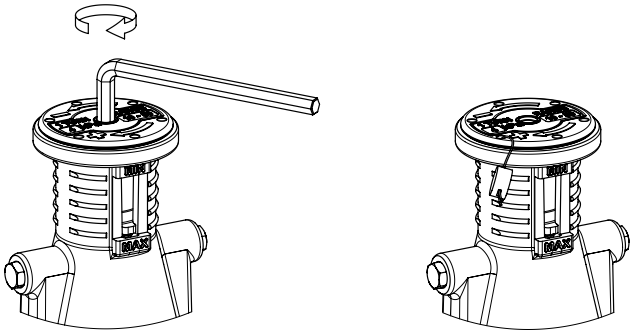


Flow direction



Operating function

Setting



1. Use a 5 mm allen key for setting. Turn clockwise to increase the setting, see table “Setting table” and “kPa/turn”. Each rib on the pilot correspond to the different settings in the “Setting table”.
2. Tamper proof the setting if necessary.

Setting table

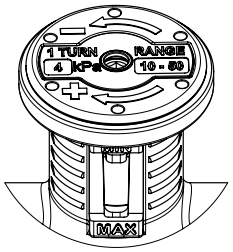
	↻	[kPa]		
		10-50	30-150	80-400
MIN	0	10*	30*	80*
–	2,5	20	60	160
–	5	30	90	240
–	7,5	40	120	320
MAX	10	50	150	400

*) Delivery setting.

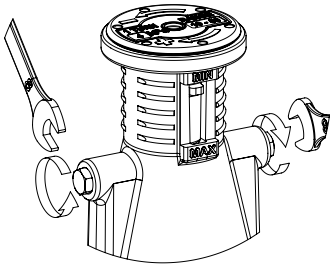
kPa/turn

10-50	30-150	80-400
4 kPa	12 kPa	32 kPa

kPa/turn is also marked on the top of the pilot.

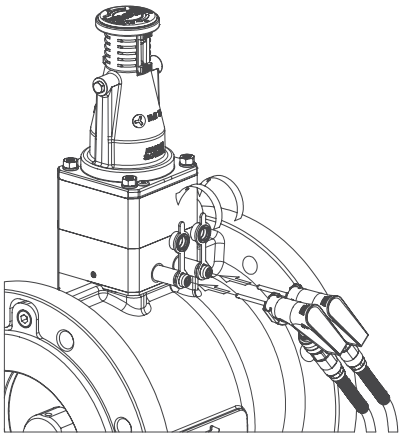


Venting



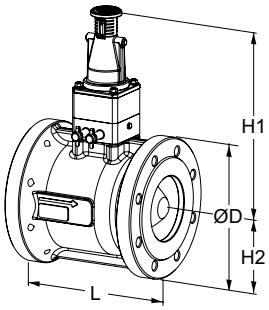
To vent the valve, open the topmost venting screw.
NOTE! Max. 2 turns opening.

Measuring ΔpL



Connect IMI TA balancing instrument to the measuring points and measure ΔpL.

Articles – Max. 120°C



Flanged

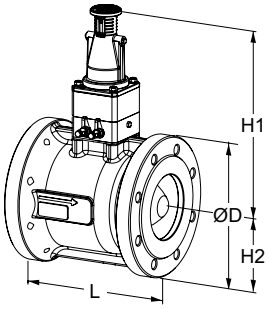
Flanges according ASME/ANSI B16.42 Class 150.
1,2 m capillary pipe (Ø6 mm), capillary pipe connection Ø6xR1/4 (separate part) + Ø6xR1/8 (mounted on valve) and capillary pipe connection with shut-off Ø6xG3/8 are included.

Class 150

DN	(size)	Number of bolt holes	ØD	L	H1	H2	Kv_m	q_{max} [m^3/h]	Kg	EAN	Article No
10-50 kPa											
65	2 1/2”	4	180	190	274	90	75	53	18	3831112530201	23121-2311-065
80	3”	4	191	203	281	96	110	78	21	3831112530294	23121-2311-080
100	4”	8	229	229	303	115	180	127	34	3831112530560	23121-2311-100
125	5”	8	254	254	313	127	270	191	45	3831112530652	23121-2311-125
150	6”	8	280	267	331	140	400	283	57	3831112530751	23121-2311-150
200	8”	8	343	292	361	172	600	424	88	3831112530980	23121-2311-200
30-150 kPa											
65	2 1/2”	4	180	190	274	90	75	53	18	3831112530218	23121-2321-065
80	3”	4	191	203	281	96	110	78	21	3831112530300	23121-2321-080
100	4”	8	229	229	303	115	180	127	34	3831112530577	23121-2321-100
125	5”	8	254	254	313	127	270	191	45	3831112530676	23121-2321-125
150	6”	8	280	267	331	140	400	283	57	3831112530768	23121-2321-150
200	8”	8	343	292	361	172	600	424	88	3831112530997	23121-2321-200
80-400 kPa											
65	2 1/2”	4	180	190	274	90	75	53	18	3831112530225	23121-2331-065
80	3”	4	191	203	281	96	110	78	21	3831112530317	23121-2331-080
100	4”	8	229	229	303	115	180	127	34	3831112530584	23121-2331-100
125	5”	8	254	254	313	127	270	191	45	3831112530683	23121-2331-125
150	6”	8	280	267	331	140	400	283	57	3831112530775	23121-2331-150
200	8”	8	343	292	361	172	600	424	88	3831112531000	23121-2331-200

Kv_m = m^3/h at a pressure drop of 1 bar and maximum opening corresponding to the p-band.

Articles – Max. 150°C (double secured measuring points)



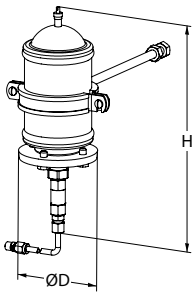
Flanged
Flanges according ASME/ANSI B16.42 Class 150.
1,2 m capillary pipe (Ø6 mm), capillary pipe connection Ø6xR1/4 (separate part) + Ø6xR1/8 (mounted on valve) and capillary pipe connection with shut-off Ø6xG3/8 are included.

Class 150

DN	(size)	Number of bolt holes	ØD	L	H1	H2	Kv_m	q_{max} [m^3/h]	Kg	EAN	Article No
10-50 kPa											
65	2 1/2”	4	180	190	274	90	75	53	18	3831112531079	23121-2312-065
80	3”	4	191	203	281	96	110	78	21	3831112531154	23121-2312-080
100	4”	8	229	229	303	115	180	127	34	3831112531246	23121-2312-100
125	5”	8	254	254	313	127	270	191	45	3831112531345	23121-2312-125
150	6”	8	280	267	331	140	400	283	57	3831112531437	23121-2312-150
200	8”	8	343	292	361	172	600	424	88	3831112531529	23121-2312-200
30-150 kPa											
65	2 1/2”	4	180	190	274	90	75	53	18	3831112531086	23121-2322-065
80	3”	4	191	203	281	96	110	78	21	3831112531178	23121-2322-080
100	4”	8	229	229	303	115	180	127	34	3831112531253	23121-2322-100
125	5”	8	254	254	313	127	270	191	45	3831112531352	23121-2322-125
150	6”	8	280	267	331	140	400	283	57	3831112531444	23121-2322-150
200	8”	8	343	292	361	172	600	424	88	3831112531536	23121-2322-200
80-400 kPa											
65	2 1/2”	4	180	190	274	90	75	53	18	3831112531093	23121-2332-065
80	3”	4	191	203	281	96	110	78	21	3831112531185	23121-2332-080
100	4”	8	229	229	303	115	180	127	34	3831112531260	23121-2332-100
125	5”	8	254	254	313	127	270	191	45	3831112531369	23121-2332-125
150	6”	8	280	267	331	140	400	283	57	3831112531451	23121-2332-150
200	8”	8	343	292	361	172	600	424	88	3831112531543	23121-2332-200

Kv_m = m^3/h at a pressure drop of 1 bar and maximum opening corresponding to the p-band.

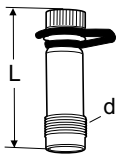
Additional equipment



Expansion vessel
For working area less than Kv = 4.
1,2 m capillary pipe (Ø6 mm), capillary pipe connection Ø6xR1/4 and capillary pipe connection with shut-off Ø6xG3/8 are included.
Factory set at 3 bar.

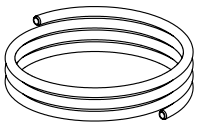
H	D	EAN	Article No
266	90	3831112532052	23124-2542-001

Accessories



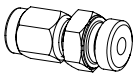
Measuring point
Max 120°C (intermittent 150°C)
AMETAL®/EPDM

d	L	EAN	Article No
M14x1	44	7318792813207	52 179-014
M14x1	103	7318793858108	52 179-015



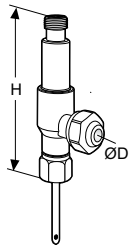
Capillary pipe
Ø6 mm
1 pc included in TA-PILOT-R.

L [m]	EAN	Article No
1,2	3831112527157	52 759-215



Capillary pipe connection
For capillary pipe Ø6 mm with R1/4 or R1/8 connection.
1 pc 6xR1/4 included in TA-PILOT-R as a separate part. (Ø6xR1/8 mounted on valve).

	EAN	Article No
6xR1/4	3831112527355	52 759-201
6xR1/8	3831112533868	52 759-213

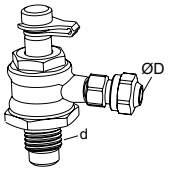


Measuring point, two-way
For connection of capillary pipe while permitting simultaneous use of our balancing instrument.
For connection to existing measuring point on STAF/STAF-SG.
Can be installed during operation.

D	H	EAN	Article No
6	68	7318793848703	52 179-206

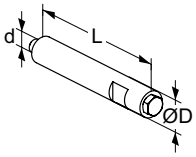
Measuring point, extension 60 mm
Can be installed without draining of the system.
AMETAL®/Stainless steel/EPDM

L	EAN	Article No
60	7318792812804	52 179-006



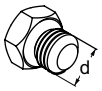
Capillary pipe connection with shut-off
For replacement of existing measuring point on STAF/STAF-SG.
1 pc G3/8 included in TA-PILOT-R.

d	D	For DN	EAN	Article No
G1/4	6	20-50	7318793999504	52 265-209
G3/8	6	65-400	7318793999405	52 265-208



Venting extension
Suitable when insulation is used.
Stainless steel/EPDM/Brass.

d	D	L	EAN	Article No
M6	12	70	3831112531727	52 759-220



Venting screw
Brass/EPDM

d	EAN	Article No
M6	3831112527980	52 759-211

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