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 behavior 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:
2 1/2” - 8”

Pressure class:
Class 150

Max. differential pressure (ΔpV):
174 psi

Setting range:
1* - 7 psi
4* - 21 psi
12* - 58 psi
*) Delivery settings

Leakage rate:
Tight sealing

Temperature:
Max. working temperature:
- with measuring points, standard: 248 °F
- with measuring points, double secured: 302 °F

Min. working temperature: 14 °F

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

Material:
Valve body: Ductile iron EN-GJS-400-15
Pilot extension 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

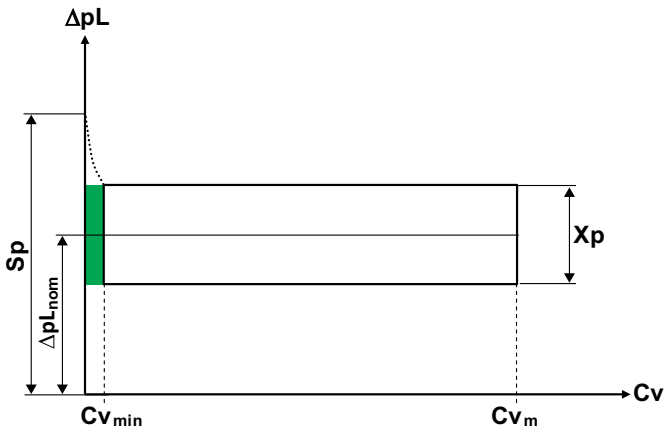
AMETAL® is the dezincification resistant alloy of IMI.

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

Marking:
TA, IMI, Size, Class, Cvm, $T_{min/max}$, serial number, valve body material and flow direction arrow, label, ΔpL range.
Colour identification on top of the pilot:
1 - 7 psi: Blue
4 - 21 psi: Orange
12 - 58 psi: Grey
CE-marking:
2 1/2” - 5”: CE
6” - 8”: CE 1370 *
*) Notified body.

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

Working range



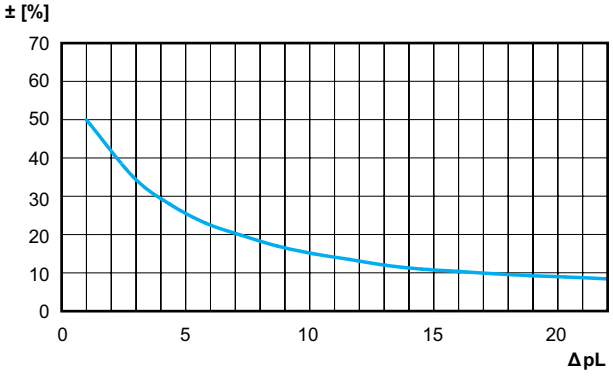
Sp = Sealing pressure, the increase of ΔpL in psi when a Δp controller controls ΔpL from Cv_{min} down to zero flow.
Cv_{min} = gpm at a pressure drop of 1 psi and minimum opening corresponding to the p-band.
Cv_m = gpm at a pressure drop of 1 psi and maximum opening corresponding to the p-band.
q_{max}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

Size		2 1/2”	3”	4”	5”	6”	8”
Sp [psi]	ΔH = 0-58 psi	6.5					
	ΔH = 58-174 psi	9.4					
Cv_{min}		5					
Cv_m		87	127	208	312	462	694
q_{max} [gpm]		233	343	559	841	1246	1867

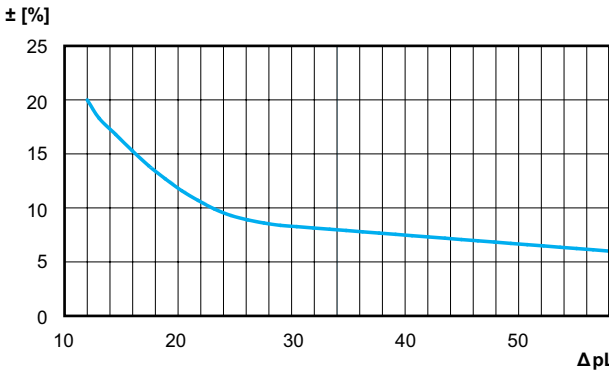
NOTE: Below Cv_{min} use expansion vessel for stable control. If Sp is within the p-band, the p-band is valid down to Cv = 0.

Maximum p-band in ±% of ΔpL_{nom}

Setting range
1 - 7 psi / 4 - 21 psi



12 - 58 psi

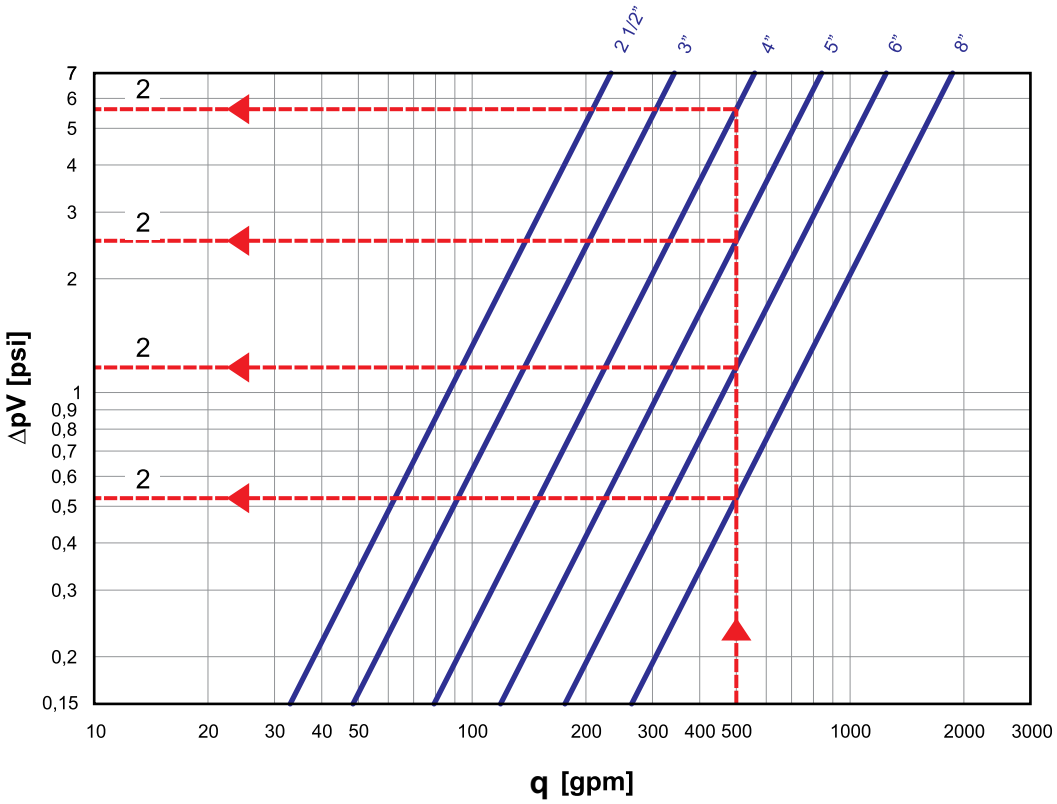


Noise

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 500 gpm, ΔpL = 8.7 psi and available differential pressure ΔH = 11.6 psi.

1. Design flow (q) 500 gpm.

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

Size 4" ΔpV_{min} = 5.5 psi
Size 5" ΔpV_{min} = 2.6 psi
Size 6" ΔpV_{min} = 1.2 psi
Size 8" ΔpV_{min} = 0.5 psi

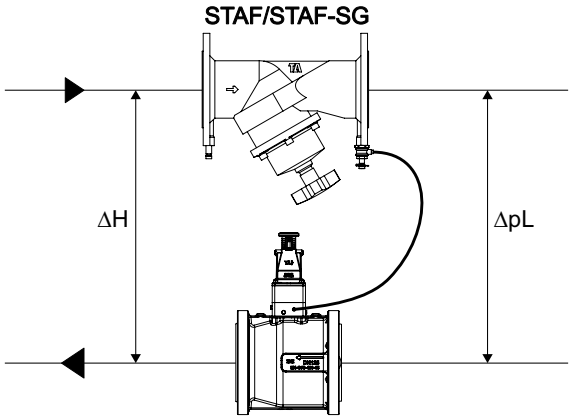
3. Check that the ΔpL is within the setting range for these sizes.

4. Calculate the minimum needed available differential pressure ΔH_{min}.
Pressure drop over fully open STAF and 500 gpm, size 4" = 5.2 psi, size 5" = 2.1 psi, size 6" = 1.1 psi and size 8" = 0.3 psi.

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

Size 4": ΔH_{min} = 5.2 + 8.7 + 5.5 = 19.4 psi
Size 5": ΔH_{min} = 2.1 + 8.7 + 2.6 = 13.4 psi
Size 6": ΔH_{min} = 1.1 + 8.7 + 1.2 = 11.0 psi
Size 8": ΔH_{min} = 0.3 + 8.7 + 0.5 = 9.5 psi

5. In order to optimise the control function of the TA-PILOT-R select the smallest possible valve, in this case size 6".
(Size 4" and 5" are not suitable since ΔH_{min} = 19.4 psi and 13.4 psi and the available differential pressure only 11.6 psi.)



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} = 26.4 gpm
Design pressure drop of the load ΔpL = 29 psi
Available differential pressure at minimum flow ΔH_{max} = 43.5 psi

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

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

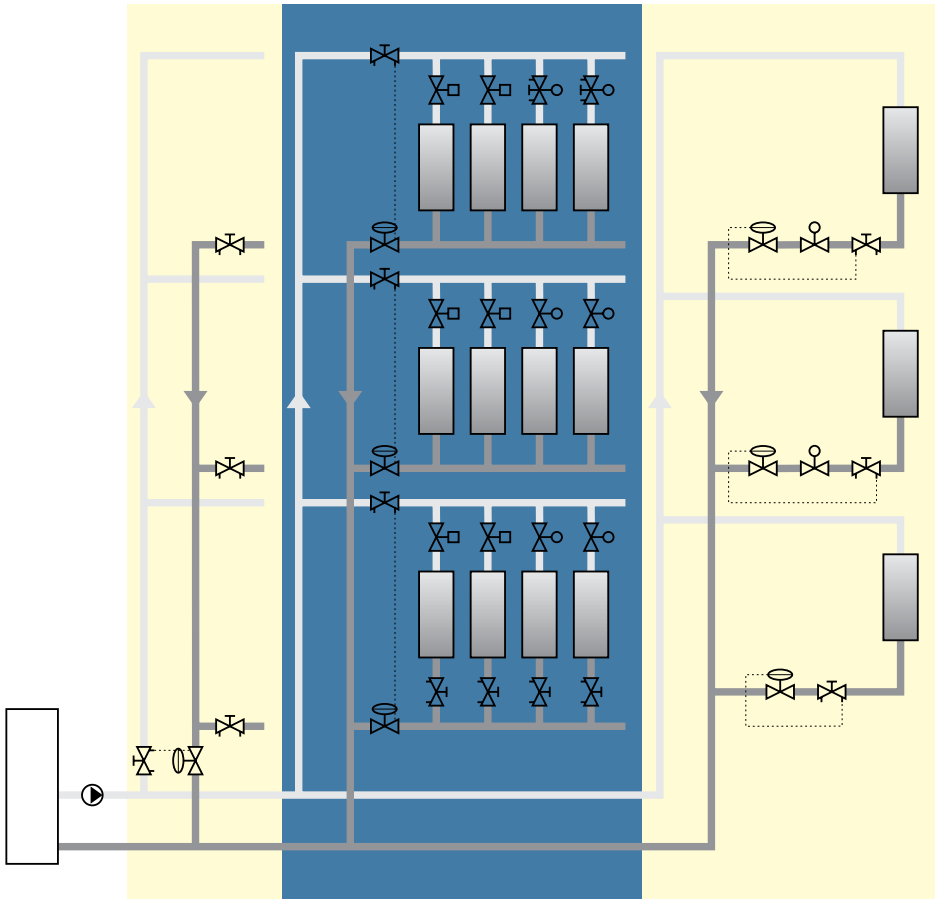
$$Cv_{min} = 26.4/\sqrt{(43.5-29)} = 6.9$$

Cv_{min} is **above 5**.
Expansion vessel is **not** needed.

$$Cv = \frac{q}{\sqrt{\Delta p}}$$ (q [gpm]; Δp [psi])

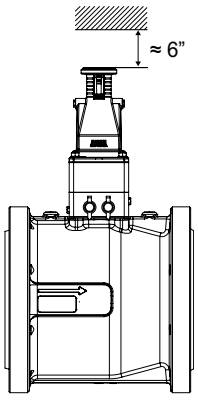
Installation

Application examples

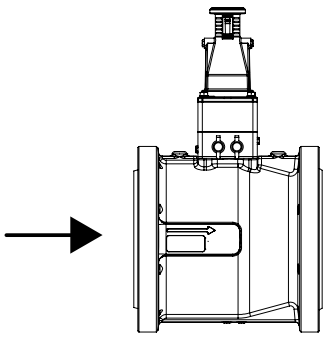


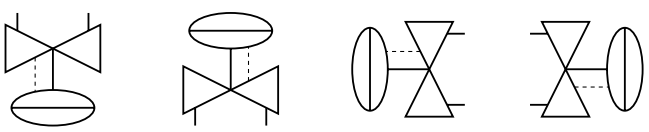
Installation of valve

Approx. 6 in. free space is required above the pilot.



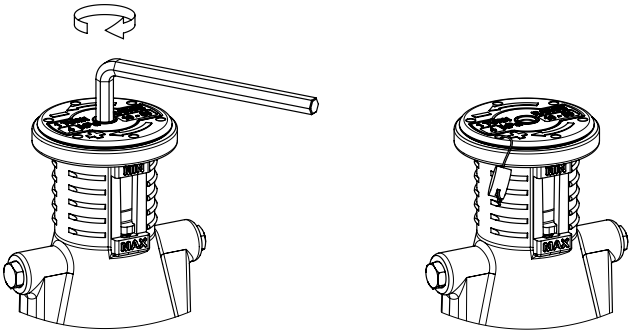
Flow direction





Operating function

Setting



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

Setting table

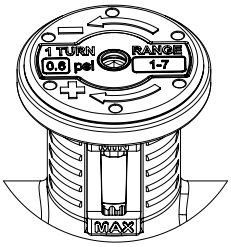
	↻	[psi]		
		1-7	4-21	12-58
MIN	0	1*	4*	12*
–	2.5	2.5	8.3	23.5
–	5	4	12.5	35
–	7.5	5.5	16.8	46.5
MAX	10	7	21	58

*) Delivery setting.

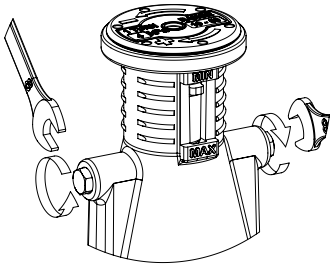
psi/turn

1-7 psi	4-21 psi	12-58 psi
0.6 psi	1.7 psi	4.6 psi

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

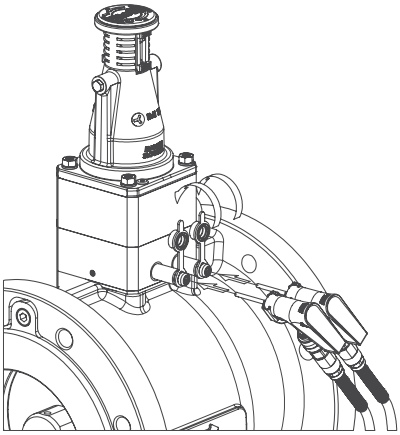


Venting



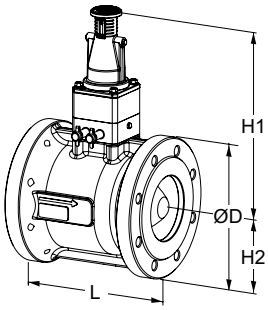
To vent the valve, open the topmost venting screw. **NOTE!** Max. 2 turns opening.

Measuring ΔpL



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

Articles – Max. 248 °F



Flanges

Flanges according ASME/ANSI B16.42 Class 150.
3.3 ft capillary pipe (Ø0.25”), capillary pipe connection Ø0.25” x R1/4” (separate part) + Ø0.25” x R1/8” (mounted on valve) and capillary pipe connection with shut-off Ø0.25” x G3/8” are included.

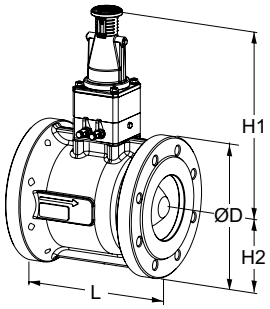
Class 150

Size	Number of bolt holes	ØD [in]	L [in]	H1 [in]	H2 [in]	Cv_m	q_{max} [gpm]	lb.	Article No ** North America	Article No International
1 - 7 psi										
2 1/2”	4	7.09	7.48	10.7	3.54	87	233	39.7	23121-2411-065	23121-2311-065
3”	4	7.52	7.99	11.1	3.78	127	343	46.3	23121-2411-080	23121-2311-080
4”	8	9.02	9.02	11.9	4.53	208	559	75.0	23121-2411-100	23121-2311-100
5”	8	10	10	12.3	5	312	841	99.2	23121-2411-125	23121-2311-125
6”	8	11	10.5	13	5.51	462	1246	126	23121-2411-150	23121-2311-150
8”	8	13.5	11.5	14.2	6.77	694	1867	183	23121-2411-200	23121-2311-200
4 - 21 psi										
2 1/2”	4	7.09	7.48	10.7	3.54	87	233	39.7	23121-2421-065	23121-2321-065
3”	4	7.52	7.99	11.1	3.78	127	343	46.3	23121-2421-080	23121-2321-080
4”	8	9.02	9.02	11.9	4.53	208	559	75.0	23121-2421-100	23121-2321-100
5”	8	10	10	12.3	5	312	841	99.2	23121-2421-125	23121-2321-125
6”	8	11	10.5	13	5.51	462	1246	126	23121-2421-150	23121-2321-150
8”	8	13.5	11.5	14.2	6.77	694	1867	183	23121-2421-200	23121-2321-200
12 - 58 psi										
2 1/2”	4	7.09	7.48	10.7	3.54	87	233	39.7	23121-2431-065	23121-2331-065
3”	4	7.52	7.99	11.1	3.78	127	343	46.3	23121-2431-080	23121-2331-080
4”	8	9.02	9.02	11.9	4.53	208	559	75.0	23121-2431-100	23121-2331-100
5”	8	10	10	12.3	5	312	841	99.2	23121-2431-125	23121-2331-125
6”	8	11	10.5	13	5.51	462	1246	126	23121-2431-150	23121-2331-150
8”	8	13.5	11.5	14.2	6.77	694	1867	183	23121-2431-200	23121-2331-200

**) Distributed by Victaulic.

Cv_m = gpm at a pressure drop of 1 psi and maximum opening corresponding to the p-band.

Articles – Max. 302 °F (double secured measuring points)



Flanges

Flanges according ASME/ANSI B16.42 Class 150.
3.3 ft capillary pipe (Ø0.25”), capillary pipe connection Ø0.25” x R1/4” (separate part) + Ø0.25” x R1/8” (mounted on valve) and capillary pipe connection with shut-off Ø0.25” x G3/8” are included.

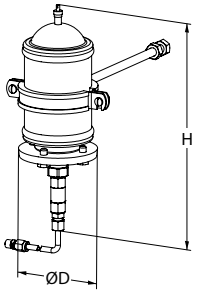
Class 150

Size	Number of bolt holes	ØD [in]	L [in]	H1 [in]	H2 [in]	Cv_m	q_{max} [gpm]	lb.	Article No ** North America	Article No International
1 - 7 psi										
2 1/2”	4	7.09	7.48	10.7	3.54	87	233	39.7	23121-2412-065	23121-2312-065
3”	4	7.52	7.99	11.1	3.78	127	343	46.3	23121-2412-080	23121-2312-080
4”	8	9.02	9.02	11.9	4.53	208	559	75.0	23121-2412-100	23121-2312-100
5”	8	10	10	12.3	5	312	841	99.2	23121-2412-125	23121-2312-125
6”	8	11	10.5	13	5.51	462	1246	126	23121-2412-150	23121-2312-150
8”	8	13.5	11.5	14.2	6.77	694	1867	183	23121-2412-200	23121-2312-200
4 - 21 psi										
2 1/2”	4	7.09	7.48	10.7	3.54	87	233	39.7	23121-2422-065	23121-2322-065
3”	4	7.52	7.99	11.1	3.78	127	343	46.3	23121-2422-080	23121-2322-080
4”	8	9.02	9.02	11.9	4.53	208	559	75.0	23121-2422-100	23121-2322-100
5”	8	10	10	12.3	5	312	841	99.2	23121-2422-125	23121-2322-125
6”	8	11	10.5	13	5.51	462	1246	126	23121-2422-150	23121-2322-150
8”	8	13.5	11.5	14.2	6.77	694	1867	183	23121-2422-200	23121-2322-200
12 - 58 psi										
2 1/2”	4	7.09	7.48	10.7	3.54	87	233	39.7	23121-2432-065	23121-2332-065
3”	4	7.52	7.99	11.1	3.78	127	343	46.3	23121-2432-080	23121-2332-080
4”	8	9.02	9.02	11.9	4.53	208	559	75.0	23121-2432-100	23121-2332-100
5”	8	10	10	12.3	5	312	841	99.2	23121-2432-125	23121-2332-125
6”	8	11	10.5	13	5.51	462	1246	126	23121-2432-150	23121-2332-150
8”	8	13.5	11.5	14.2	6.77	694	1867	183	23121-2432-200	23121-2332-200

**) Distributed by Victaulic.

Cv_m = gpm at a pressure drop of 1 psi and maximum opening corresponding to the p-band.

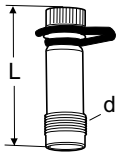
Additional equipment



Expansion vessel
For working area less than Cv = 5.
3.3 ft capillary pipe (Ø0.25”), capillary pipe connection Ø0.25” x R1/4” and capillary pipe connection with shut-off Ø0.25” x G3/8” are included.
Factory set at 43.5 psi (3 bar).

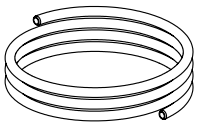
H [in]	ØD [in]	Article No
10.8	3.5	23124-2542-001

Accessories



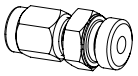
Measuring point
Max 248°F (intermittent 302°F)
AMETAL®/EPDM

d	L [in]	Article No
M14x1	1.7	52 179-014
M14x1	4.1	52 179-015



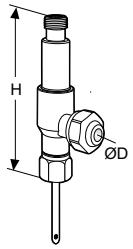
Capillary pipe
Ø0.25 in.
1 pc included in TA-PILOT-R.

L [ft]	Article No
3.3	52 759-221



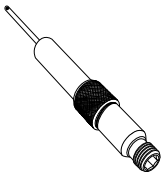
Capillary pipe connection
For capillary pipe Ø0.25 in. with R1/4 connection.
1 pc 0.25xR1/4 included in TA-PILOT-R as a separate part. (0.25xR1/8 mounted on valve).

	Article No
0.25” x R1/4”	52 759-222



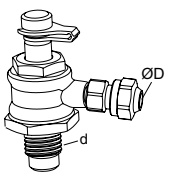
Measuring point, two-way
For connection of capillary pipe while permitting simultaneous use of our balancing instrument.
For connection to existing measuring point on STAF/STAF-SG.
Can be installed during operation.

D	H [in]	Article No
0.25”	2.7	52 179-207



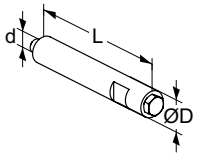
Measuring point, extension 2.36 in.
Can be installed without draining of the system.
AMETAL®/Stainless steel/EPDM

L [in]	Article No
2.36	52 179-006



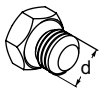
Capillary pipe connection with shut-off
For replacement of existing measuring point on STAF/STAF-SG.
52 266-208: 1 pc G3/8 included in TA-PILOT-R (2 1/2”-16”).

d	D	For size	Article No
G3/8	0.25 in	2 1/2” - 16”	52 265-266



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

d	D [in]	L [in]	Article No
M6	0.47	2.76	52 759-220



Venting screw
Brass/EPDM

d	Article No
M6	52 759-211