

TA-PILOT-R



Differential pressure controllers

Pilot operated differential pressure controller with adjustable set-point



Engineering
GREAT Solutions

TA-PILOT-R

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 (Δp_L)
Measuring (Δp_L)

Dimensions:

DN 65-200

Pressure class:

PN 16 and PN 25

Max. differential pressure (Δp_V):

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: -20°C

Media:

Water and neutral fluids, water-glycol mixtures.
(For other media contact IMI Hydronic Engineering.)

Material:

Valve body: Ductile iron EN-GJS-400
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 Hydronic Engineering.

Surface treatment:

Pilot body: Non treated
Valve body: Electrophoretic painting.

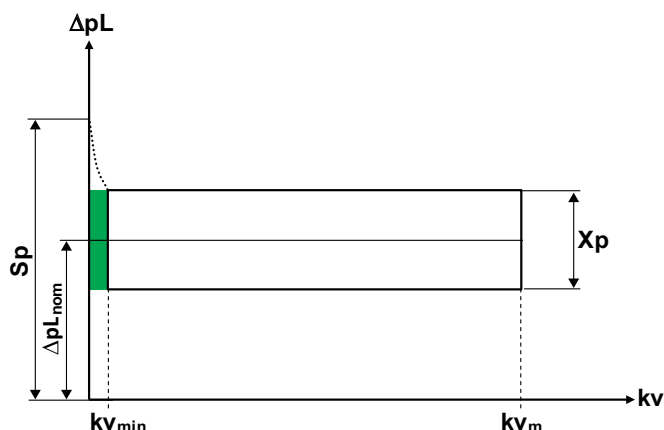
Marking:

TA, IMI, DN, PN, Kvs, $T_{min/max}$, serial number, valve body material and flow direction arrow, label, Δp_L range.
Colour identification on top of the pilot:
10-50 kPa: Blue
30-150 kPa: Orange
80-400 kPa: Grey
CE-marking:
DN 65-125: CE
DN 150-200: CE 1370 *
*) Notified body.

Flanges:

PN 16, PN 25: According to EN-1092-2, type 21.
Face to face length according to EN 558 series 3.

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 across the valve.
 q = Actual measured flow.

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

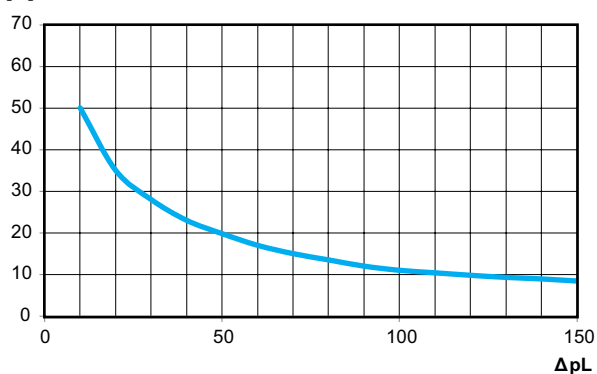
NOTE: Below Kv_{min} use expansion vessel for stable control. If Sp is within the p-band, the p-band is valid down to $Kv = 0$.

Maximum p-band in $\pm\%$ of ΔpL_{nom}

Setting range

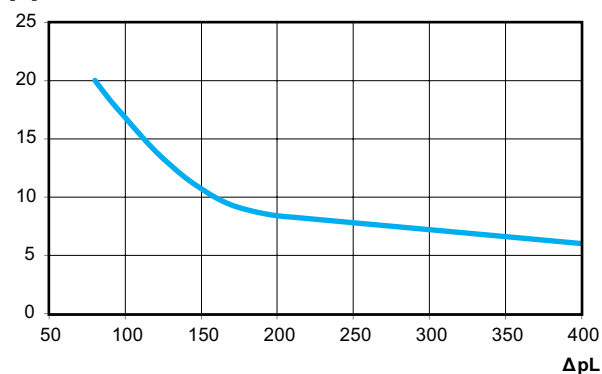
10-50 / 30-150 kPa

$\pm$ [%]



80-400 kPa

$\pm$ [%]

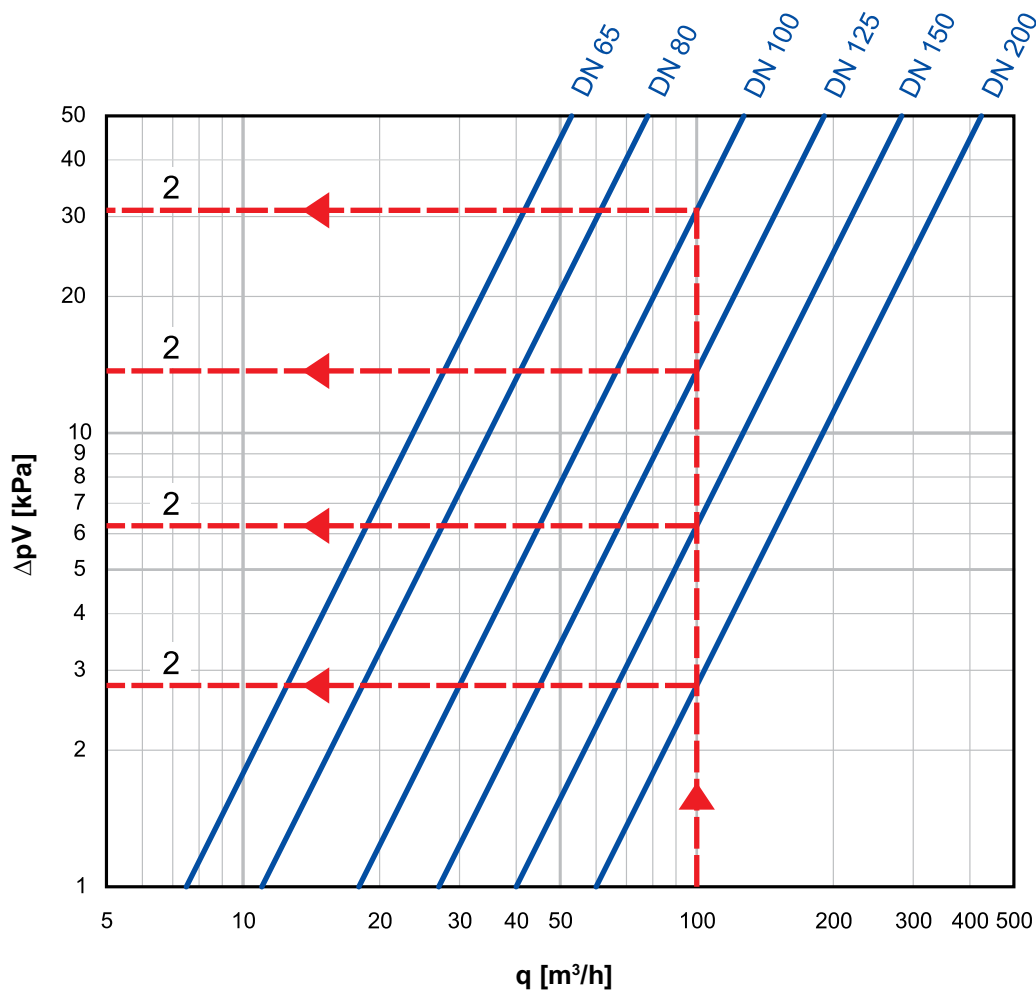


Noise

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, $\Delta p_L = 60$ kPa and available differential pressure $\Delta H = 80$ kPa.

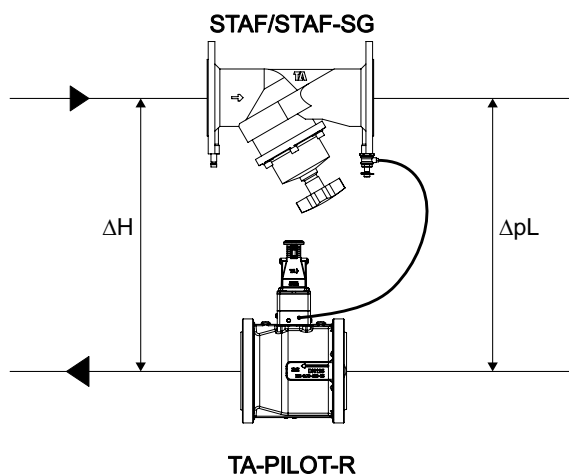
1. Design flow (q) 100 m³/h.
2. Read the minimum needed pressure drop for TA-PILOT-R ΔpV_{min} from the diagram.

 DN 100 $\Delta pV_{min} = 31$ kPa
 DN 125 $\Delta pV_{min} = 14$ kPa
 DN 150 $\Delta pV_{min} = 6$ kPa
 DN 200 $\Delta pV_{min} = 2,8$ kPa
3. Check that the Δp_L 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.

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

$$\begin{aligned} \text{DN 100: } \Delta H_{min} &= 28 + 60 + 31 = 119 \text{ kPa} \\ \text{DN 125: } \Delta H_{min} &= 11 + 60 + 14 = 85 \text{ kPa} \\ \text{DN 150: } \Delta H_{min} &= 6 + 60 + 6 = 72 \text{ kPa} \\ \text{DN 200: } \Delta H_{min} &= 2 + 60 + 2,8 = 64,8 \text{ kPa} \end{aligned}$$

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 $\Delta H_{min} = 119$ and 85 kPa and the available differential pressure only 80 kPa.)



IMI Hydronic Engineering recommends the software HySelect for calculating the valve size. HySelect can be downloaded from www.imi-hydronic.com.

When to use expansion vessel

Example

Given:

Minimum flow $q_{min} = 6$ m³/h

Design pressure drop of the load $\Delta p_L = 200$ kPa

Available differential pressure at minimum flow $\Delta H_{max} = 300$ kPa

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

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

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

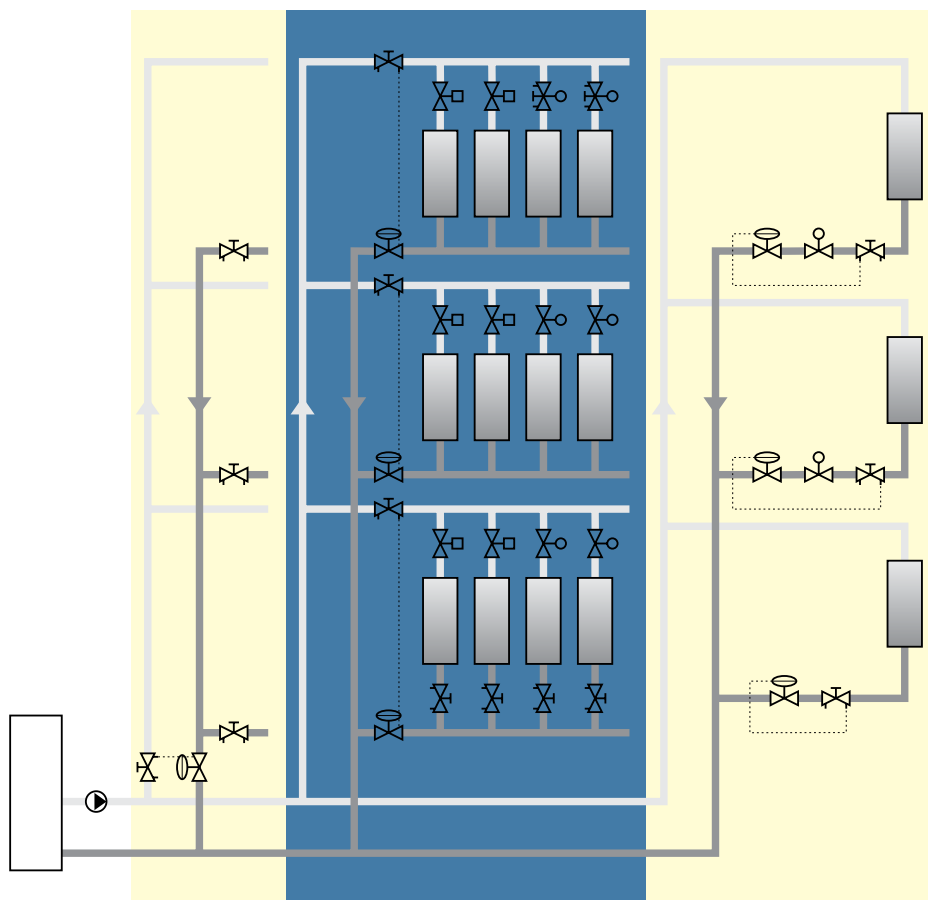
Kv_{min} is **above 4**.

Expansion vessel is **not** needed.

$$Kv = 10 \cdot \frac{q}{\sqrt{\Delta p}} \quad (q \text{ [m}^3\text{/h]}; \Delta p \text{ [kPa]})$$

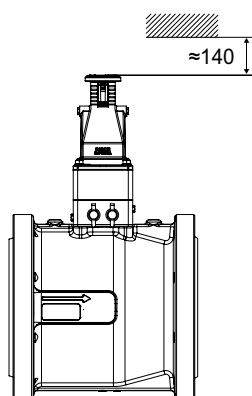
Installation

Application examples

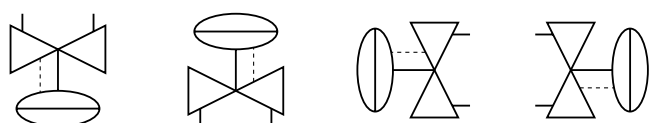
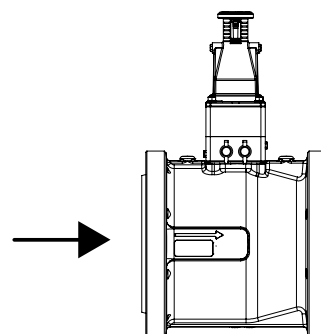


Installation of valve

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

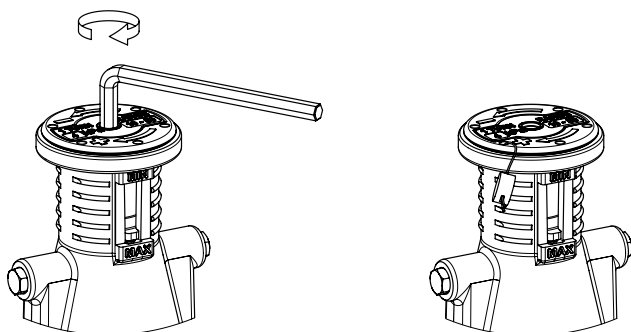


Flow direction



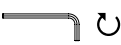
Operating function

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

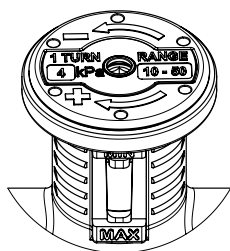
		[kPa]		
		10-50	30-150	80-400
MIN	0	10*	30*	80*
–	2,5	20	60	160
–	5	30	90	240
–	7,5	40	120	320
MAX	10	50	150	400

*) Delivery setting.

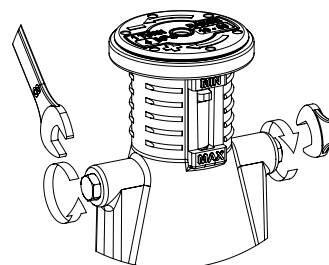
kPa/turn

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

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



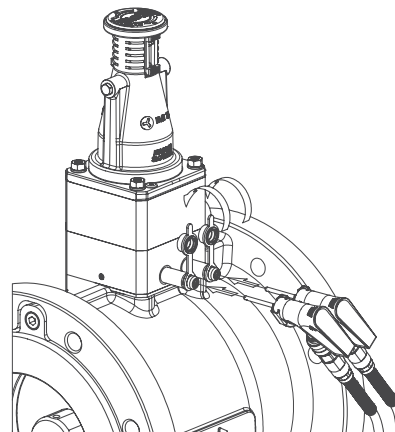
Venting



To vent the valve, open the topmost venting screw.

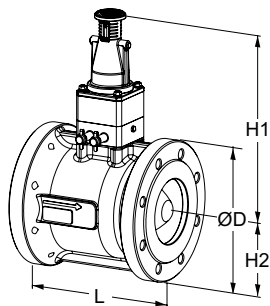
NOTE! Max. 2 turns opening.

Measuring Δp_L



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

Articles – Max. 120°C

**Flanged**

Flanges according to EN-1092-2, type 21.

1,2 m capillary pipe (Ø6 mm), capillary pipe connection Ø6xR1/4 and capillary pipe connection with shut-off Ø6xG3/8 are included.

PN 16

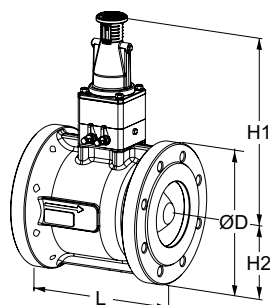
DN	Number of bolt holes	D	L	H1	H2	Kv _m	q _{max} [m³/h]	Kg	EAN	Article No
10-50 kPa										
65	4	185	190	274	93	75	53	18	3831112530140	23121-2111-065
80	8	200	203	281	100	110	78	21	3831112530232	23121-2111-080
100	8	220	229	303	110	180	127	32	3831112530508	23121-2111-100
125	8	250	254	313	125	270	191	42	3831112530591	23121-2111-125
150	8	285	267	331	143	400	283	56	3831112530690	23121-2111-150
200	12	340	292	361	170	600	424	83	3831112530782	23121-2111-200
30-150 kPa										
65	4	185	190	274	93	75	53	18	3831112530157	23121-2121-065
80	8	200	203	281	100	110	78	21	3831112530249	23121-2121-080
100	8	220	229	303	110	180	127	32	3831112530515	23121-2121-100
125	8	250	254	313	125	270	191	42	3831112530607	23121-2121-125
150	8	285	267	331	143	400	283	56	3831112530706	23121-2121-150
200	12	340	292	361	170	600	424	83	3831112530935	23121-2121-200
80-400 kPa										
65	4	185	190	274	93	75	53	18	3831112530164	23121-2131-065
80	8	200	203	281	100	110	78	21	3831112530256	23121-2131-080
100	8	220	229	303	110	180	127	32	3831112530522	23121-2131-100
125	8	250	254	313	125	270	191	42	3831112530614	23121-2131-125
150	8	285	267	331	143	400	283	56	3831112530713	23121-2131-150
200	12	340	292	361	170	600	424	83	3831112530942	23121-2131-200

PN 25

DN	Number of bolt holes	D	L	H1	H2	Kv _m	q _{max} [m³/h]	Kg	EAN	Article No
10-50 kPa										
65	8	185	190	274	93	75	53	18	3831112530171	23121-2211-065
80	8	200	203	281	100	110	78	21	3831112530263	23121-2211-080
100	8	235	229	303	118	180	127	34	3831112530539	23121-2211-100
125	8	270	254	313	135	270	191	45	3831112530621	23121-2211-125
150	8	300	267	331	150	400	283	59	3831112530720	23121-2211-150
200	12	360	292	361	180	600	424	87	3831112530959	23121-2211-200
30-150 kPa										
65	8	185	190	274	93	75	53	18	3831112530195	23121-2221-065
80	8	200	203	281	100	110	78	21	3831112530270	23121-2221-080
100	8	235	229	303	118	180	127	34	3831112530546	23121-2221-100
125	8	270	254	313	135	270	191	45	3831112530638	23121-2221-125
150	8	300	267	331	150	400	283	59	3831112530737	23121-2221-150
200	12	360	292	361	180	600	424	87	3831112530966	23121-2221-200
80-400 kPa										
65	8	185	190	274	93	75	53	18	3831112530188	23121-2231-065
80	8	200	203	281	100	110	78	21	3831112530287	23121-2231-080
100	8	235	229	303	118	180	127	34	3831112530553	23121-2231-100
125	8	270	254	313	135	270	191	45	3831112530645	23121-2231-125
150	8	300	267	331	150	400	283	59	3831112530744	23121-2231-150
200	12	360	292	361	180	600	424	87	3831112530973	23121-2231-200

Kv_m = m³/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 to EN-1092-2, type 21.

1,2 m capillary pipe (Ø6 mm), capillary pipe connection Ø6xR1/4 and capillary pipe connection with shut-off Ø6xG3/8 are included.

PN 16

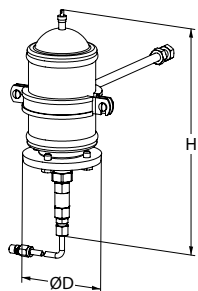
DN	Number of bolt holes	D	L	H1	H2	Kv _m	q _{max} [m³/h]	Kg	EAN	Article No
10-50 kPa										
65	4	185	190	274	93	75	53	18	3831112531017	23121-2112-065
80	8	200	203	281	100	110	78	21	3831112531109	23121-2112-080
100	8	220	229	303	110	180	127	32	3831112531192	23121-2112-100
125	8	250	254	313	125	270	191	42	3831112531284	23121-2112-125
150	8	285	267	331	143	400	283	56	3831112531376	23121-2112-150
200	12	340	292	361	170	600	424	83	3831112531468	23121-2112-200
30-150 kPa										
65	4	185	190	274	93	75	53	18	3831112531024	23121-2122-065
80	8	200	203	281	100	110	78	21	3831112531116	23121-2122-080
100	8	220	229	303	110	180	127	32	3831112531208	23121-2122-100
125	8	250	254	313	125	270	191	42	3831112531291	23121-2122-125
150	8	285	267	331	143	400	283	56	3831112531383	23121-2122-150
200	12	340	292	361	170	600	424	83	3831112531475	23121-2122-200
80-400 kPa										
65	4	185	190	274	93	75	53	18	3831112531031	23121-2132-065
80	8	200	203	281	100	110	78	21	3831112531123	23121-2132-080
100	8	220	229	303	110	180	127	32	3831112531277	23121-2132-100
125	8	250	254	313	125	270	191	42	3831112531307	23121-2132-125
150	8	285	267	331	143	400	283	56	3831112531390	23121-2132-150
200	12	340	292	361	170	600	424	83	3831112531482	23121-2132-200

PN 25

DN	Number of bolt holes	D	L	H1	H2	Kv _m	q _{max} [m³/h]	Kg	EAN	Article No
10-50 kPa										
65	8	185	190	274	93	75	53	18	3831112531055	23121-2212-065
80	8	200	203	281	100	110	78	21	3831112531130	23121-2212-080
100	8	235	229	303	118	180	127	34	3831112531215	23121-2212-100
125	8	270	254	313	135	270	191	45	3831112531314	23121-2212-125
150	8	300	267	331	150	400	283	59	3831112531406	23121-2212-150
200	12	360	292	361	180	600	424	87	3831112531499	23121-2212-200
30-150 kPa										
65	8	185	190	274	93	75	53	18	3831112531048	23121-2222-065
80	8	200	203	281	100	110	78	21	3831112531147	23121-2222-080
100	8	235	229	303	118	180	127	34	3831112531222	23121-2222-100
125	8	270	254	313	135	270	191	45	3831112531321	23121-2222-125
150	8	300	267	331	150	400	283	59	3831112531413	23121-2222-150
200	12	360	292	361	180	600	424	87	3831112531505	23121-2222-200
80-400 kPa										
65	8	185	190	274	93	75	53	18	3831112531062	23121-2232-065
80	8	200	203	281	100	110	78	21	3831112531161	23121-2232-080
100	8	235	229	303	118	180	127	34	3831112531239	23121-2232-100
125	8	270	254	313	135	270	191	45	3831112531338	23121-2232-125
150	8	300	267	331	150	400	283	59	3831112531420	23121-2232-150
200	12	360	292	361	180	600	424	87	3831112531512	23121-2232-200

Kv_m = m³/h at a pressure drop of 1 bar and maximum opening corresponding to the p-band.

Additional equipment

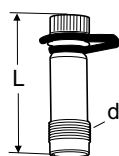


Expansion vessel

For working area less than $K_v = 4$.
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

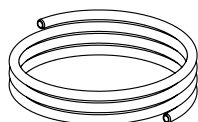
Accessories



Measuring point

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

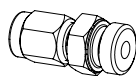
d	L	EAN	Article No
M14x1	44	7318792813207	52 179-014
M14x1	103	7318793858108	52 179-015



Capillary pipe

Ø6 mm
1 pc included in TA-PILOT-R.

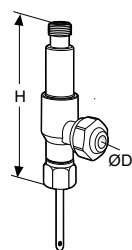
L [m]	EAN	Article No
1,2	3831112527157	52 759-215



Capillary pipe connection

For capillary pipe Ø6 mm with R1/4 or R1/8 connection.
1 pc 6xR1/4 included in TA-PILOT-R.

	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.

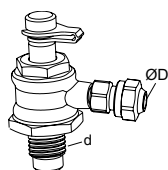
D	H	EAN	Article No
6	68	7318793848703	52 179-206



Measuring point, extension 60 mm

Can be installed without draining of the system.
AMETAL®/Stainless steel/EPDM

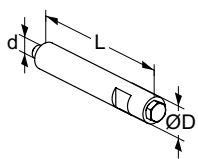
L	EAN	Article No
60	7318792812804	52 179-006



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.

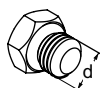
d	D	For DN	EAN	Article No
G1/4	6	20-50	7318793999504	52 265-209
G3/8	6	65-400	7318793999405	52 265-208



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

