

# TA-PILOT-R



## **Differential pressure controllers**

Pilot operated differential pressure controller with adjustable set-point

# 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  $\Delta p$  over the load ( $\Delta p_L$ )  
Measuring ( $\Delta p_L$ )

### Dimensions:

DN 65-200

### Pressure class:

PN 16 and PN 25

### Max. differential pressure ( $\Delta p_V$ ):

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: -10°C

### 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: EPDM 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,  $\Delta p_L$  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 \*

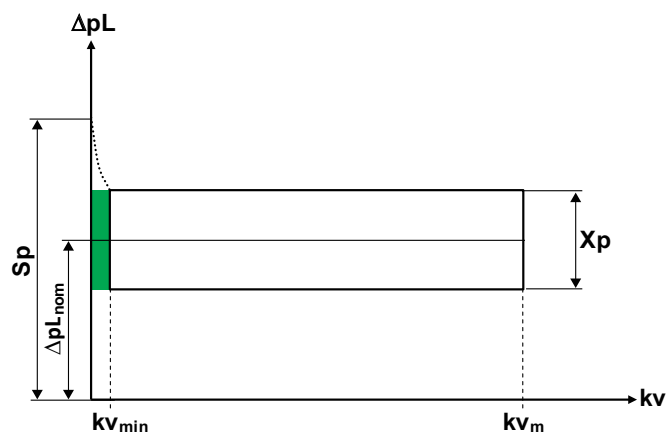
\*) Notified body.

### 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  $\Delta pL$  in kPa when a  $\Delta p$  controller controls  $\Delta pL$  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  $\Delta p$  controller.  
 $\Delta pL_{nom}$  = Middle value of  $\Delta pL$  in the p-band.  
 $Xp$  = The p-band in kPa for  $\Delta pL$ .  
 $\Delta H$  = Available differential pressure.  
 $\Delta p$  = 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	

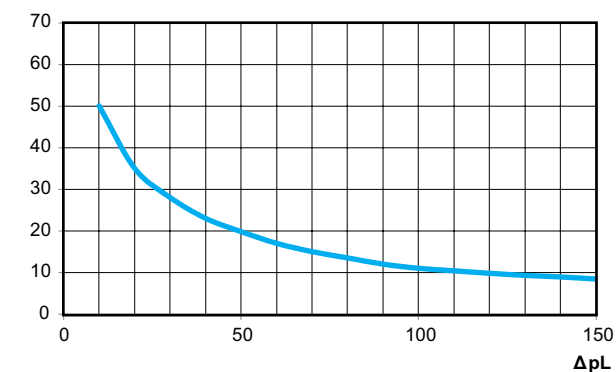
**NOTE:** Below  $Kv_{min}$  use expansion vessel for stable control. If Sp is within the p-band, the p-band is valid down to  $Kv = 0$ .

### Maximum p-band in $\pm\%$ of $\Delta pL_{nom}$

#### Setting range

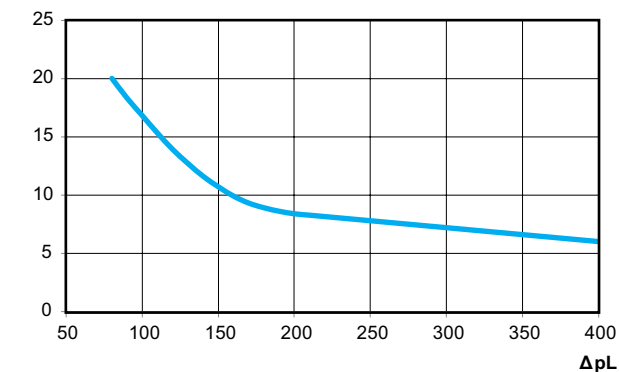
10-50 / 30-150 kPa

$\pm$  [%]



80-400 kPa

$\pm$  [%]

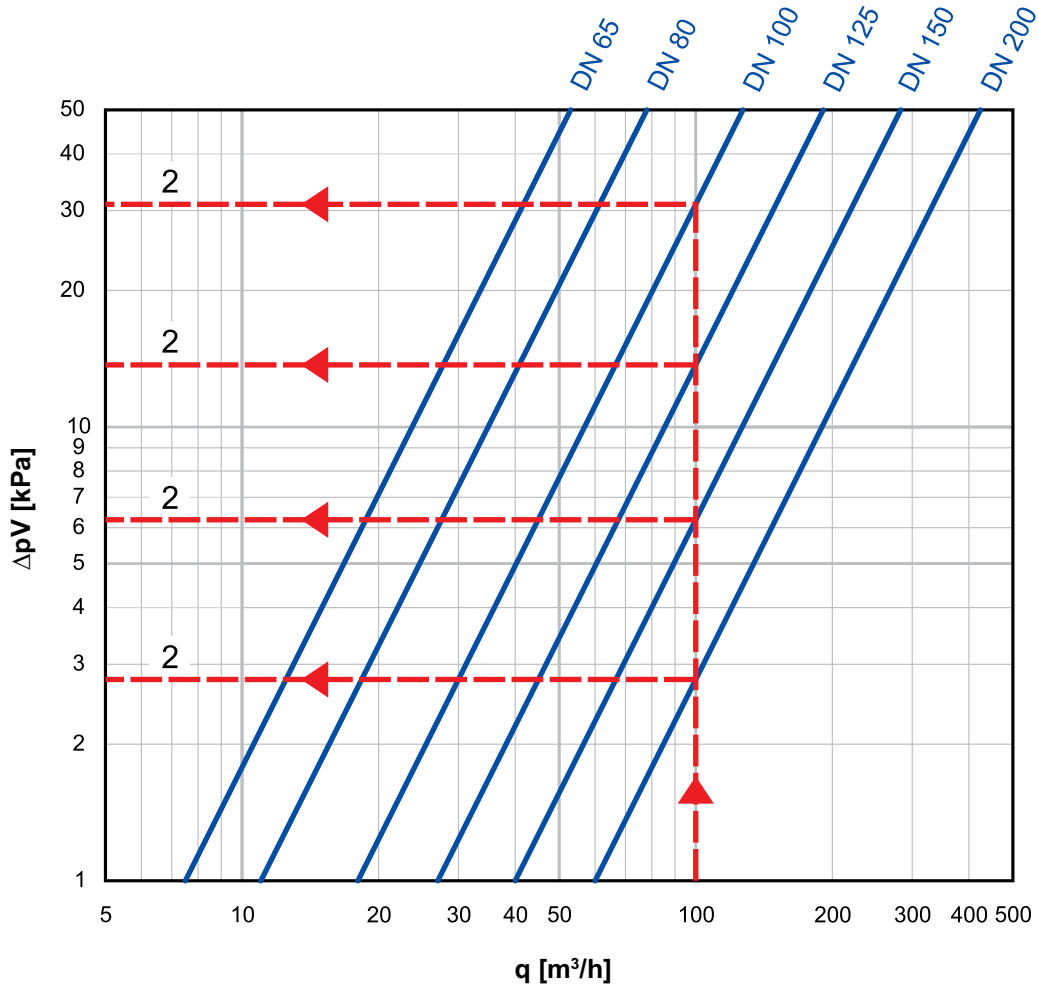


## Noise

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 m<sup>3</sup>/h, ΔpL = 60 kPa and available differential pressure ΔH = 80 kPa.

1. Design flow (q) 100 m<sup>3</sup>/h.
2. Read the minimum needed pressure drop for TA-PILOT-R ΔpV<sub>min</sub> from the diagram.

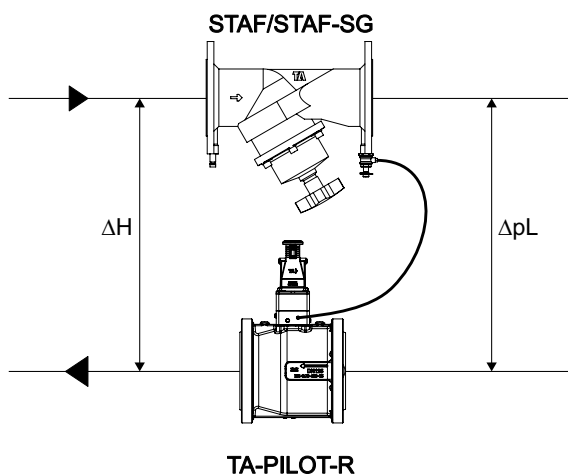
DN 100 ΔpV<sub>min</sub> = 31 kPa  
 DN 125 ΔpV<sub>min</sub> = 14 kPa  
 DN 150 ΔpV<sub>min</sub> = 6 kPa  
 DN 200 ΔpV<sub>min</sub> = 2,8 kPa

3. Check that the ΔpL is within the setting range for these sizes.
4. Calculate the minimum needed available differential pressure ΔH<sub>min</sub>.  
 Pressure drop over fully open STAF and 100 m<sup>3</sup>/h,  
 DN 100 = 28 kPa, DN 125 = 11 kPa, DN 150 = 6 kPa and  
 DN 200 = 2 kPa.

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

DN 100: ΔH<sub>min</sub> = 28 + 60 + 31 = 119 kPa  
 DN 125: ΔH<sub>min</sub> = 11 + 60 + 14 = 85 kPa  
 DN 150: ΔH<sub>min</sub> = 6 + 60 + 6 = 72 kPa  
 DN 200: ΔH<sub>min</sub> = 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<sub>min</sub> = 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](http://www.imi-hydronic.com).

### When to use expansion vessel

#### Example

Given:

Minimum flow q<sub>min</sub> = 6 m<sup>3</sup>/h

Design pressure drop of the load ΔpL = 200 kPa

Available differential pressure at minimum flow ΔH<sub>max</sub> = 300 kPa

1. Calculate Kv<sub>min</sub> for q<sub>min</sub> at ΔH<sub>max</sub>.

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

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

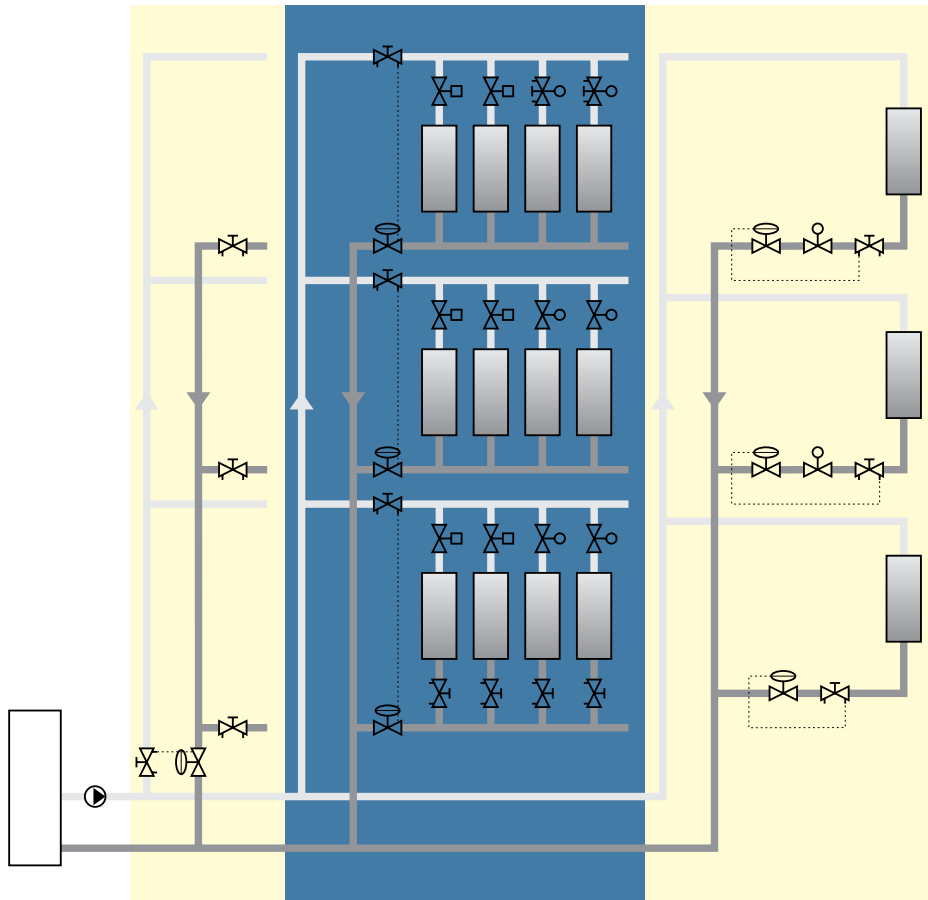
Kv<sub>min</sub> is **above 4**.

Expansion vessel is **not** needed.

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

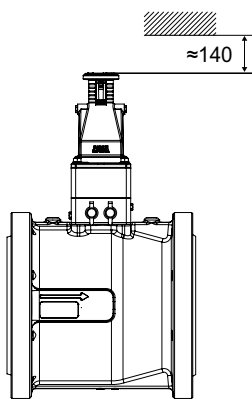
## Installation

### Application examples

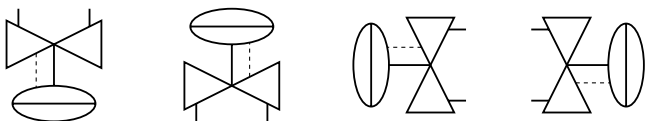
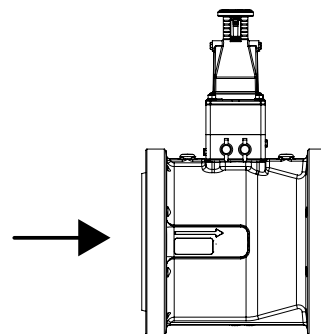


### Installation of valve

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

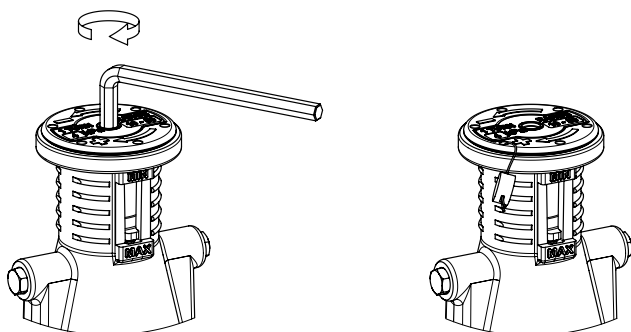


### Flow direction



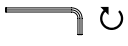
## Operating function

### 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

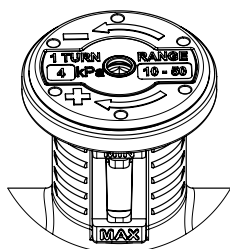
		[kPa]		
		10-50	30-150	80-400
MIN	0	10*	30*	80*
-	2,5	20	60	160
-	5	30	90	240
-	7,5	40	120	320
MAX	10	50	150	400

\*) Delivery setting.

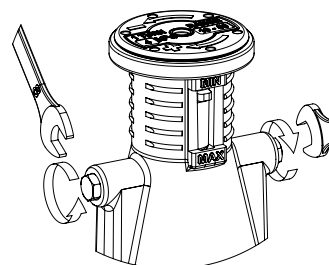
### kPa/turn

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

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

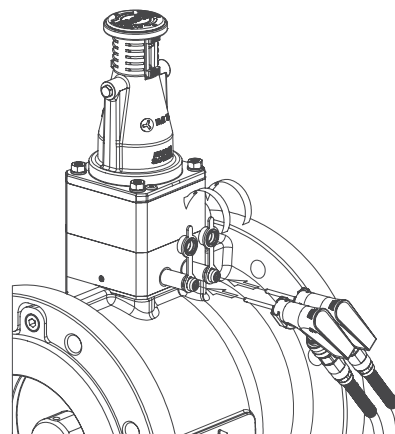


### Venting



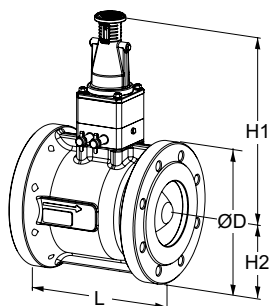
To vent the valve, open the topmost venting screw.  
**NOTE!** Max. 2 turns opening.

### Measuring $\Delta p_L$



Connect IMI TA balancing instrument to the measuring points and measure  $\Delta p_L$ .

## 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 (separate part) + Ø6xR1/8 (mounted on valve) and capillary pipe connection with shut-off Ø6xG3/8 are included.

**PN 16**

DN	Number of bolt holes	D	L	H1	H2	Kv <sub>m</sub>	q <sub>max</sub> [m <sup>3</sup> /h]	Kg	EAN	Article No
<b>10-50 kPa</b>										
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	55	3831112530690	23121-2111-150
200	12	340	292	361	170	600	424	84	3831112530782	23121-2111-200
<b>30-150 kPa</b>										
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	55	3831112530706	23121-2121-150
200	12	340	292	361	170	600	424	84	3831112530935	23121-2121-200
<b>80-400 kPa</b>										
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	55	3831112530713	23121-2131-150
200	12	340	292	361	170	600	424	84	3831112530942	23121-2131-200

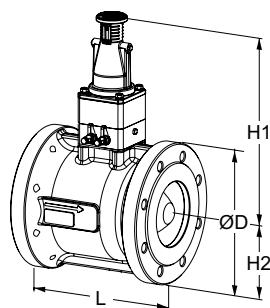
**PN 25**

DN	Number of bolt holes	D	L	H1	H2	Kv <sub>m</sub>	q <sub>max</sub> [m <sup>3</sup> /h]	Kg	EAN	Article No
<b>10-50 kPa</b>										
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	57	3831112530720	23121-2211-150
200	12	360	292	361	180	600	424	88	3831112530959	23121-2211-200
<b>30-150 kPa</b>										
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	57	3831112530737	23121-2221-150
200	12	360	292	361	180	600	424	88	3831112530966	23121-2221-200
<b>80-400 kPa</b>										
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	57	3831112530744	23121-2231-150
200	12	360	292	361	180	600	424	88	3831112530973	23121-2231-200

Kv<sub>m</sub> = m<sup>3</sup>/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 (separate part) + Ø6xR1/8 (mounted on valve) and capillary pipe connection with shut-off Ø6xG3/8 are included.

### PN 16

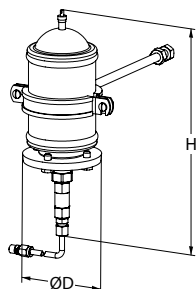
DN	Number of bolt holes	D	L	H1	H2	Kv <sub>m</sub>	q <sub>max</sub> [m <sup>3</sup> /h]	Kg	EAN	Article No
<b>10-50 kPa</b>										
65	4	185	190	274	93	75	53	18	3831112531017	23121-2112-065
80	8	200	203	281	100	110	78	21	3831112531109	23121-2112-080
100	8	220	229	303	110	180	127	32	3831112531192	23121-2112-100
125	8	250	254	313	125	270	191	42	3831112531284	23121-2112-125
150	8	285	267	331	143	400	283	55	3831112531376	23121-2112-150
200	12	340	292	361	170	600	424	84	3831112531468	23121-2112-200
<b>30-150 kPa</b>										
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	55	3831112531383	23121-2122-150
200	12	340	292	361	170	600	424	84	3831112531475	23121-2122-200
<b>80-400 kPa</b>										
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	55	3831112531390	23121-2132-150
200	12	340	292	361	170	600	424	84	3831112531482	23121-2132-200

### PN 25

DN	Number of bolt holes	D	L	H1	H2	Kv <sub>m</sub>	q <sub>max</sub> [m <sup>3</sup> /h]	Kg	EAN	Article No
<b>10-50 kPa</b>										
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	57	3831112531406	23121-2212-150
200	12	360	292	361	180	600	424	88	3831112531499	23121-2212-200
<b>30-150 kPa</b>										
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	57	3831112531413	23121-2222-150
200	12	360	292	361	180	600	424	88	3831112531505	23121-2222-200
<b>80-400 kPa</b>										
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	57	3831112531420	23121-2232-150
200	12	360	292	361	180	600	424	88	3831112531512	23121-2232-200

Kv<sub>m</sub> = m<sup>3</sup>/h at a pressure drop of 1 bar and maximum opening corresponding to the p-band.

## Additional equipment

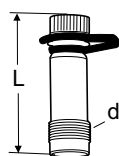


### Expansion vessel

For working area less than  $K_v = 4$ .  
1,2 m capillary pipe ( $\varnothing 6$  mm), capillary pipe connection  $\varnothing 6 \times R1/4$  and capillary pipe connection with shut-off  $\varnothing 6 \times G3/8$  are included.  
Factory set at 3 bar.

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

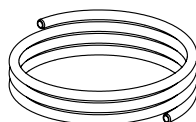
## Accessories



### Measuring point

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

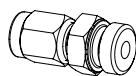
d	L	EAN	Article No
M14x1	44	7318792813207	52 179-014
M14x1	103	7318793858108	52 179-015



### Capillary pipe

$\varnothing 6$  mm  
1 pc included in TA-PILOT-R.

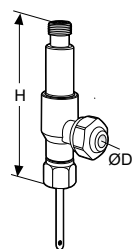
L [m]	EAN	Article No
1,2	3831112527157	52 759-215



### Capillary pipe connection

For capillary pipe  $\varnothing 6$  mm with R1/4 or R1/8 connection.  
1 pc 6xR1/4 included in TA-PILOT-R as a separate part. ( $\varnothing 6 \times R1/8$  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.

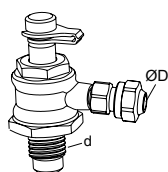
D	H	EAN	Article No
6	68	7318793848703	52 179-206



### Measuring point, extension 60 mm

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

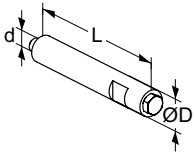
L	EAN	Article No
60	7318792812804	52 179-006



### 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.

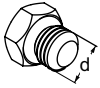
d	D	For DN	EAN	Article No
G1/4	6	20-50	7318793999504	52 265-209
G3/8	6	65-400	7318793999405	52 265-208



**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

