

# STAP – ANSI flanges



## Differential pressure controllers

Size 2 1/2" - 4", adjustable set-point and shut-off function

# STAP – Flange ANSI

The flanged STAP is a high-performing differential pressure controller that keeps the differential pressure over the load constant. This delivers accurate and stable modulating control, ensures less risk of noise from control valves, and results in easy balancing and commissioning. STAP's unrivalled accuracy and compact size make it particularly suitable for use on the secondary side of heating and cooling systems.



## Key features

- > **Adjustable set-point**  
Delivers desired differential pressure ensuring accurate balancing.
- > **Measuring points**  
Simplifies the balancing procedure, and increases its accuracy.
- > **Shut-off function**  
Shut-off function makes maintenance easy and straightforward.

## Technical description

### Application:

Heating (not steam) and cooling systems.

### Function:

Differential pressure control  
Adjustable  $\Delta p$   
Measuring points  
Shut-off

### Dimensions:

2 1/2" - 4"

### Pressure class:

Class 150  
Temperature / Max. pressure:  
-4 to 100 °F / 250 psi  
200 °F / 235 psi  
248 °F / 225 psi

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

117 ft H<sub>2</sub>O / 51 psi

### Setting range:

6.69\*-26.8 ft H<sub>2</sub>O / 2.90\*-11.6 psi resp  
13.4\*-53.5 ft H<sub>2</sub>O / 5.80\*-23.2 psi  
) Delivery setting

### Temperature:

Max. working temperature: 248°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 (~ASTM A536 Grade 60-40-18, ISO 1083 Grade 400-15)  
Bonnet: AMETAL®  
Cone: PTFE coated AMETAL®  
Spindles: AMETAL®  
O-rings: EPDM rubber  
Seat seal: Plug with EPDM O-ring  
Membrane: Reinforced EPDM rubber  
Spring: Stainless steel  
Handwheel: Polyamide

AMETAL® is the dezincification resistant alloy of IMI Hydronic Engineering.

### Surface treatment:

Valve body: Epoxy painting.

### Marking:

Body: TA, Class 150, DN, CE, ASTM 60-40-18, flow direction arrow and casting date (year, month, day).  
Bonnet and handwheel: Label with STAP, DN, PN,  $\Delta p_L$  in ft H<sub>2</sub>O, psi and kPa, and bar code.

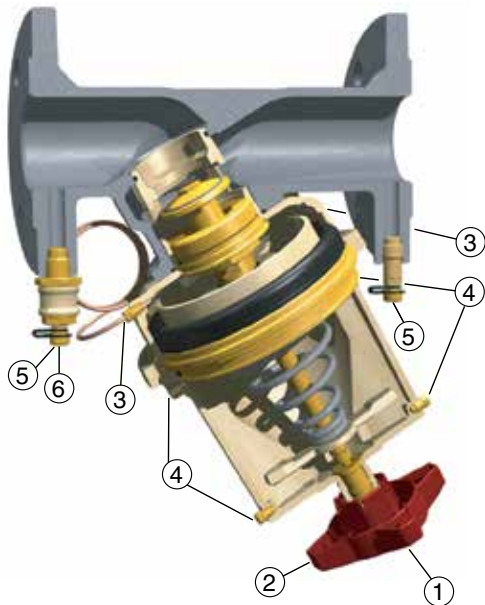
### Face to face:

ISO 5752 series 1 and EN 558-1 series 1.

### Flanges:

Class 150 according to ASME/ANSI B16.42 (~ PN 20 according to ISO 7005-2).

## Operating instruction



1. Setting  $\Delta p_L$  (5 mm allen key)
2. Shut-off
3. Connection capillary pipe, low pressure.
4. Venting. Connection measuring point STAF. Connection capillary pipe, high pressure.
5. Measuring point
6. Opening/closing of measure signal for the low pressure side

### Measuring point

Remove the cover and then insert the probe through the self-sealed measuring point. Measuring point STAF (accessory) can be connected to the venting if the STAF valve is out of reach when measuring the differential pressure.

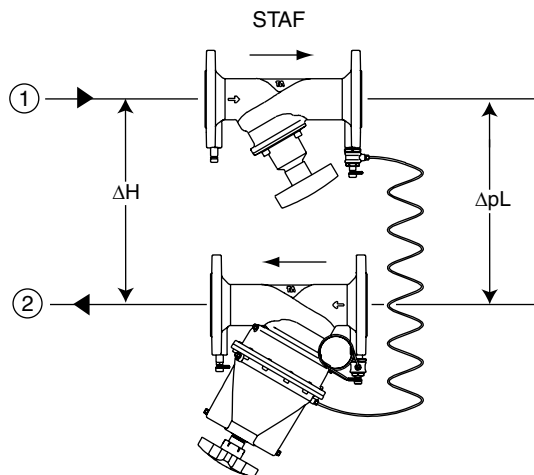
### Capillary pipe

When extending the capillary pipe, use e.g. 6 mm copper pipe and extension kit (accessory).

**Note!** The supplied capillary pipe must be included.

## Installation

**Note!** The STAF must be placed in the return pipe and with correct flow direction.

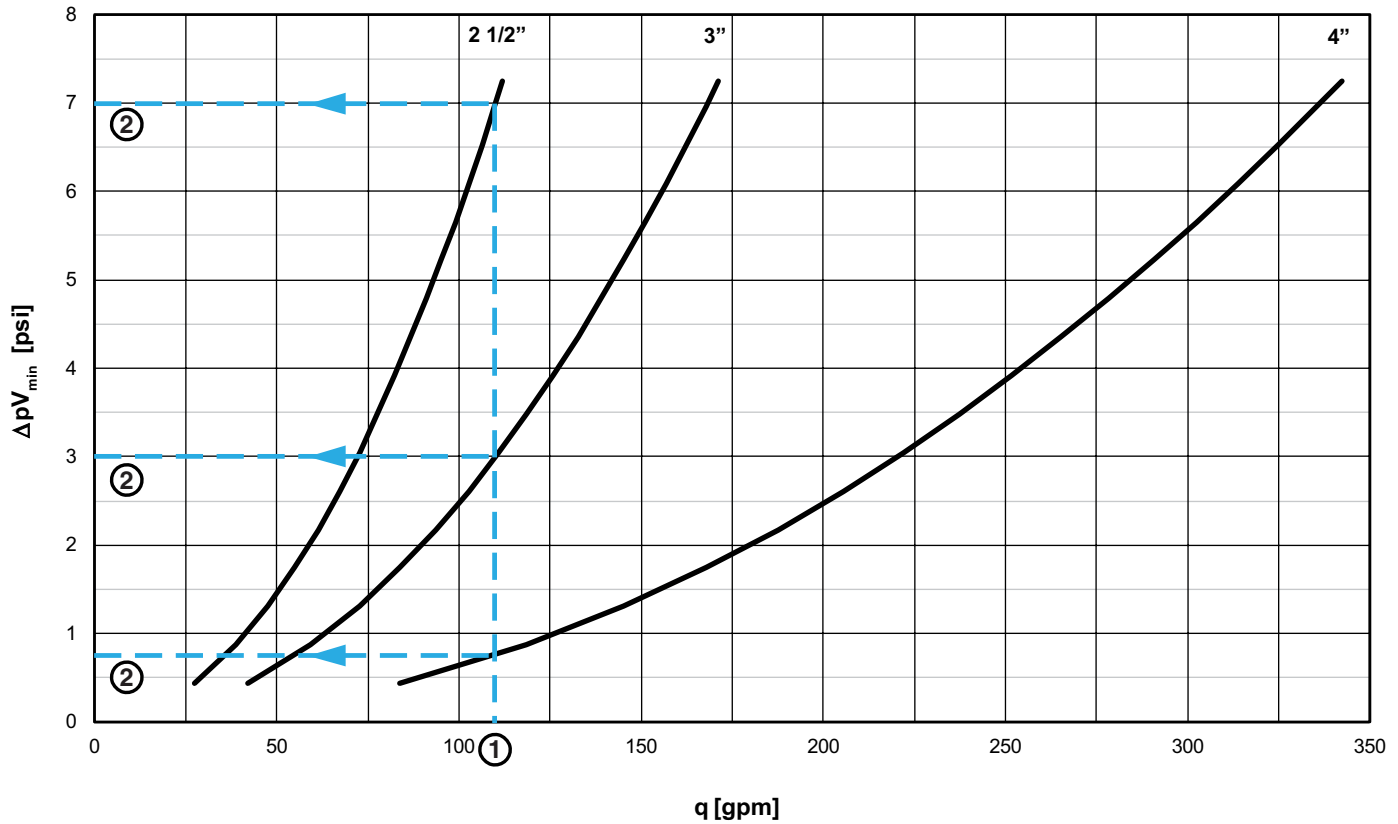


1. Inlet
2. Return

For installation examples, see Handbook No 4 - Hydronic balancing with differential pressure controllers. STAF – see catalogue leaflet “STAF, STAF-SG”.

## Sizing

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



### Example:

Design flow 110 gpm,  $\Delta pL = 4.9$  psi and available differential pressure  $\Delta H = 12.3$  psi.

- Design flow (q) 110 gpm.
- Read the pressure drop  $\Delta pV_{\min}$  from the diagram.

Size 2 1/2"	$\Delta pV_{\min} = 7$ psi
Size 3"	$\Delta pV_{\min} = 3$ psi
Size 4"	$\Delta pV_{\min} = 0.7$ psi

- Check that the  $\Delta pL$  is within the setting range for these sizes.

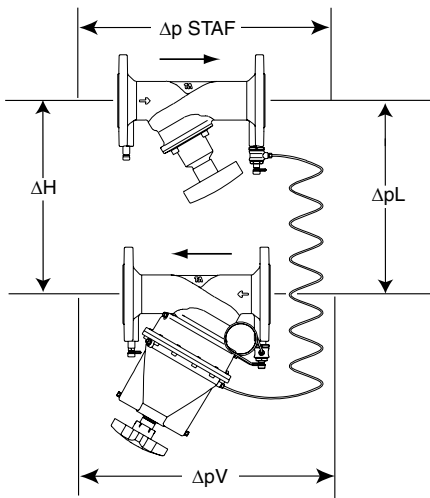
- Calculate required available differential pressure  $\Delta H_{\min}$ .

At 110 gpm and fully open STAF the pressure drop is, size 2 1/2" = 1.3 psi, size 3" = 0.6 psi and size 4" = 0.3 psi.

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

Size 2 1/2":	$\Delta H_{\min} = 1.3 + 4.9 + 7 = 13.2$ psi
Size 3":	$\Delta H_{\min} = 0.6 + 4.9 + 3 = 8.5$ psi
Size 4":	$\Delta H_{\min} = 0.3 + 4.9 + 0.75 = 5.95$ psi

- In order to optimize the control function of the STAP select the smallest possible valve, in this case size 3". (size 2 1/2" is not suitable since  $\Delta H_{\min} = 13.2$  psi and available differential pressure 12.3 psi only).



$$\Delta H = \Delta pV_{STAF} + \Delta pL + \Delta pV$$

IMI Hydronic Engineering recommends the software HySelect for calculating the STAP size. HySelect can be downloaded from [www.imi-hydronic.com](http://www.imi-hydronic.com).

## Working range

Size	Cv <sub>min</sub>	Cv <sub>nom</sub>	Cv <sub>m</sub>	q <sub>max</sub> [gpm]
2 1/2"	1.6	29	42	112.2
3"	2.6	44	64	171.2
4"	5.1	89	128	342.3

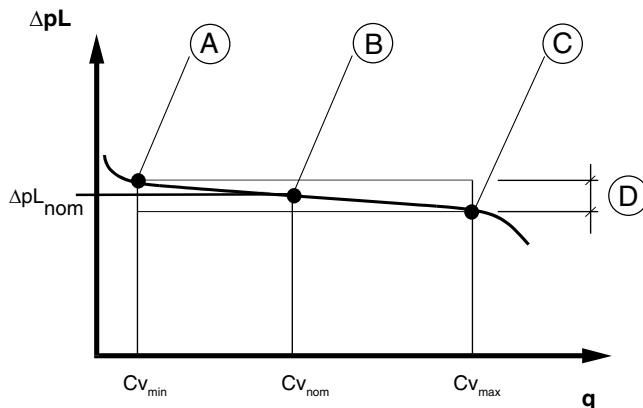
Cv<sub>min</sub> = gpm at a pressure drop of 1 psi and minimum opening corresponding to the p-band (+25%).

Cv<sub>nom</sub> = gpm at a pressure drop of 1 psi and opening corresponding to the middle of the p-band (ΔpL<sub>nom</sub>).

Cv<sub>m</sub> = gpm at a pressure drop of 1 psi and maximum opening corresponding to the p-band (-25%).

**Note!** The flow in the circuit is determined by its resistance, i.e. Cv<sub>c</sub>:

$$q_c = Cv_c \sqrt{\Delta p_l}$$



- A. Cv<sub>min</sub>
- B. Cv<sub>nom</sub> (Delivery setting)
- C. Cv<sub>m</sub>
- D. Working range ΔpL<sub>nom</sub> ±25%

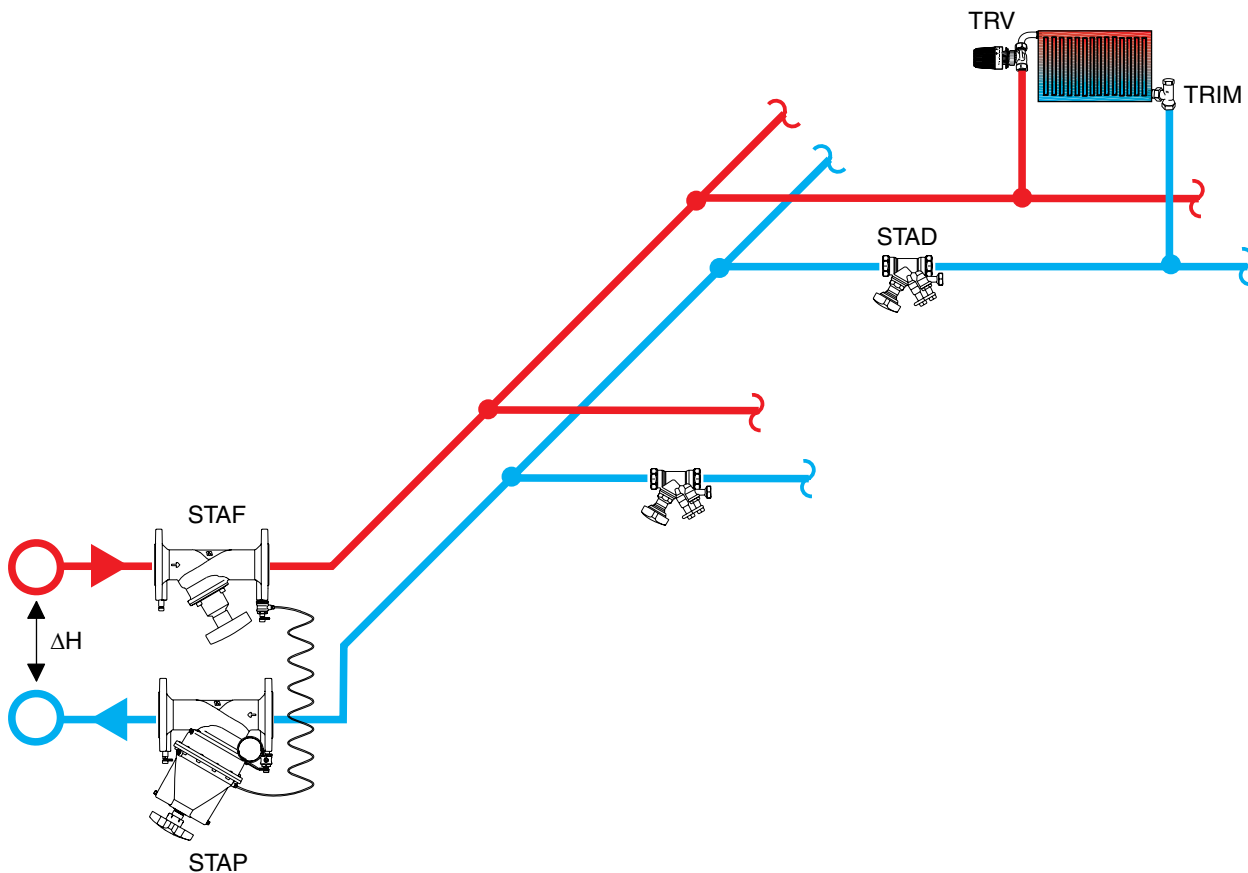
## Application examples

### Stabilizing the differential pressure across a riser with balancing valves (“Modular valve method”)

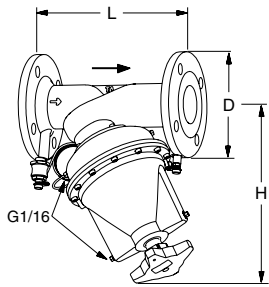
The “Modular valve method” is suitable when a plant is put into operation phase by phase. Install one differential pressure controller on every riser, so that each STAP controls one module.

STAP keeps the differential pressure from the main pipe at a stable value out to the risers and circuits. STAD(STAF) downstream on the circuits guarantees that overflows do not occur. With STAP working as a modular valve, the whole plant does not need to be re-balanced when a new module is taken into operation. There is no need for balancing valves on the main pipes (except for diagnostic purposes), since the modular valves distribute the pressure out to the risers.

- STAP reduces a big and variable  $\Delta H$  to a suitable and stable  $\Delta p_L$ .
- The set Cv-value in STAD(STAF) limits the flow in each circuit.
- STAF is used for flow measuring, shut-off and connection of the capillary pipe.



## Articles



### Flanged

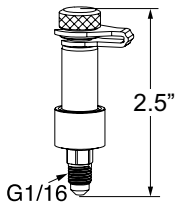
3.28 ft (1 m) capillary pipe and transition nipple with shut-off are included.

Size	Number of bolt holes	D [in]	L [in]	H [in]	Cv <sub>m</sub>	q <sub>max</sub> [gpm]	lb	Article No
<b>2.90-11.6 psi</b>								
2 1/2"	4	7.1	11.4	12.6	41.8	112.2	47.4	52 266-065
3"	4	7.5	12.2	13.3	63.8	171.2	52.9	52 266-080
4"	8	9.1	13.8	13.8	127.6	342.3	63.9	52 266-090
<b>5.80-23.2 psi</b>								
2 1/2"	4	7.1	11.4	12.6	41.8	112.2	47.4	52 266-165
3"	4	7.5	12.2	13.3	63.8	171.2	52.9	52 266-180
4"	8	9.1	13.8	13.8	127.2	342.3	63.9	52 266-190

→ = Flow direction

Cv<sub>m</sub> = gpm at a pressure drop of 1 psi and maximum opening corresponding to the p-band (-25%).

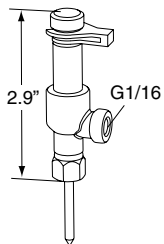
## Accessories



### Measuring point STAP

Article No

52 265-205

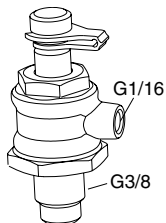


### Measuring point, two-way

For connection of capillary pipe while permitting simultaneous use of our balancing instrument.

Article No

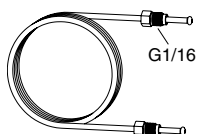
52 179-200



### Capillary pipe connection with shut-off

Article No

52 265-206



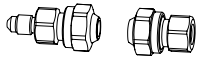
### Capillary pipe

L

3.28 ft (1 m)

Article No

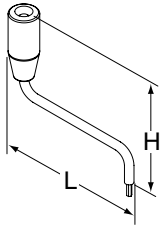
52 265-301



**Extension kit for capillary pipe**

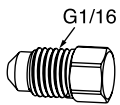
Complete with connections for 6 mm pipe.

			<b>Article No</b>
6 mm			52 265-212



**Setting tool  $\Delta p_L$**

<b>L [in]</b>	<b>H [in]</b>	<b>Article No</b>	
8.15	2.83	5 mm	52 265-304



**Plug**

Venting

			<b>Article No</b>
			52 265-302

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