STAP – ANSI flanges

Differential pressure controllers

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

Hydronic Engineering

Breakthrough Engineering

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.
- **Shut-off function**
  Shut-off function makes maintenance easy and straightforward.
- **Measuring points**
  Simplifies the balancing procedure, and increases its accuracy.

Technical description

Application:
Heating (not steam) and cooling systems.

Function:
Differential pressure control
Adjustable Δp
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 (ΔpV):
117 ft H_2O / 51 psi

Setting range:
6.69*-26.8 ft H_2O / 2.90*-11.6 psi resp
13.4*-53.5 ft H_2O / 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: EDPM 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.

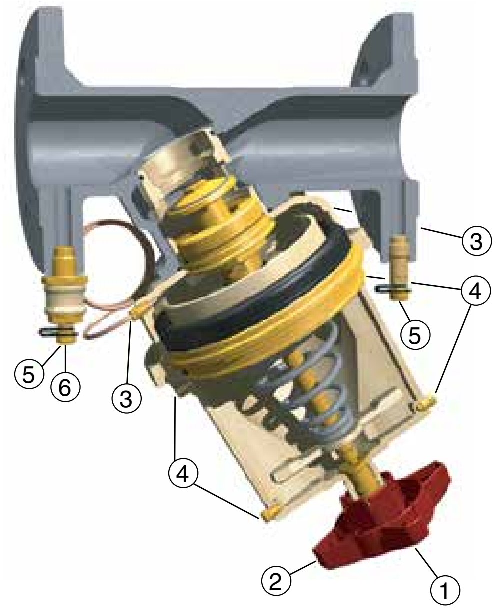
Surface treatment:
Valve body: Epoxy painting.

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, Δp_L in ft H_2O, 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



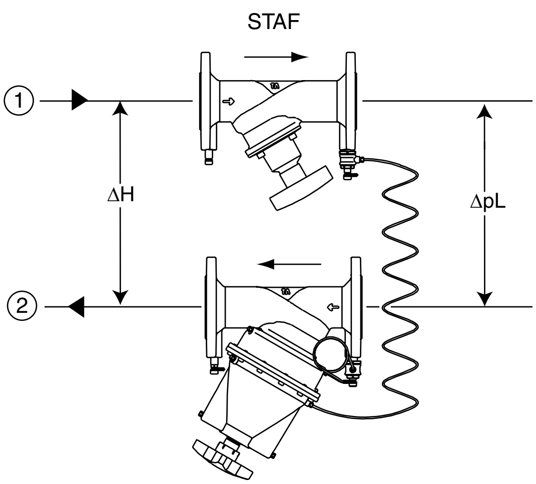
1. Setting ΔpL (5 mm allen key)
2. Shut-off
3. Connection capillary pipe, low pressure.
4. Venting. Connection measuring point STAP. Connection capillary pipe, high pressure.
5. Measuring point
6. Opening/closing of measure signal for the low pressure side

Measuring point
Remove the cover and then insert the probe through the self-sealed measuring point.
Measuring point STAP (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 STAP must be placed in the return pipe and with correct flow direction.

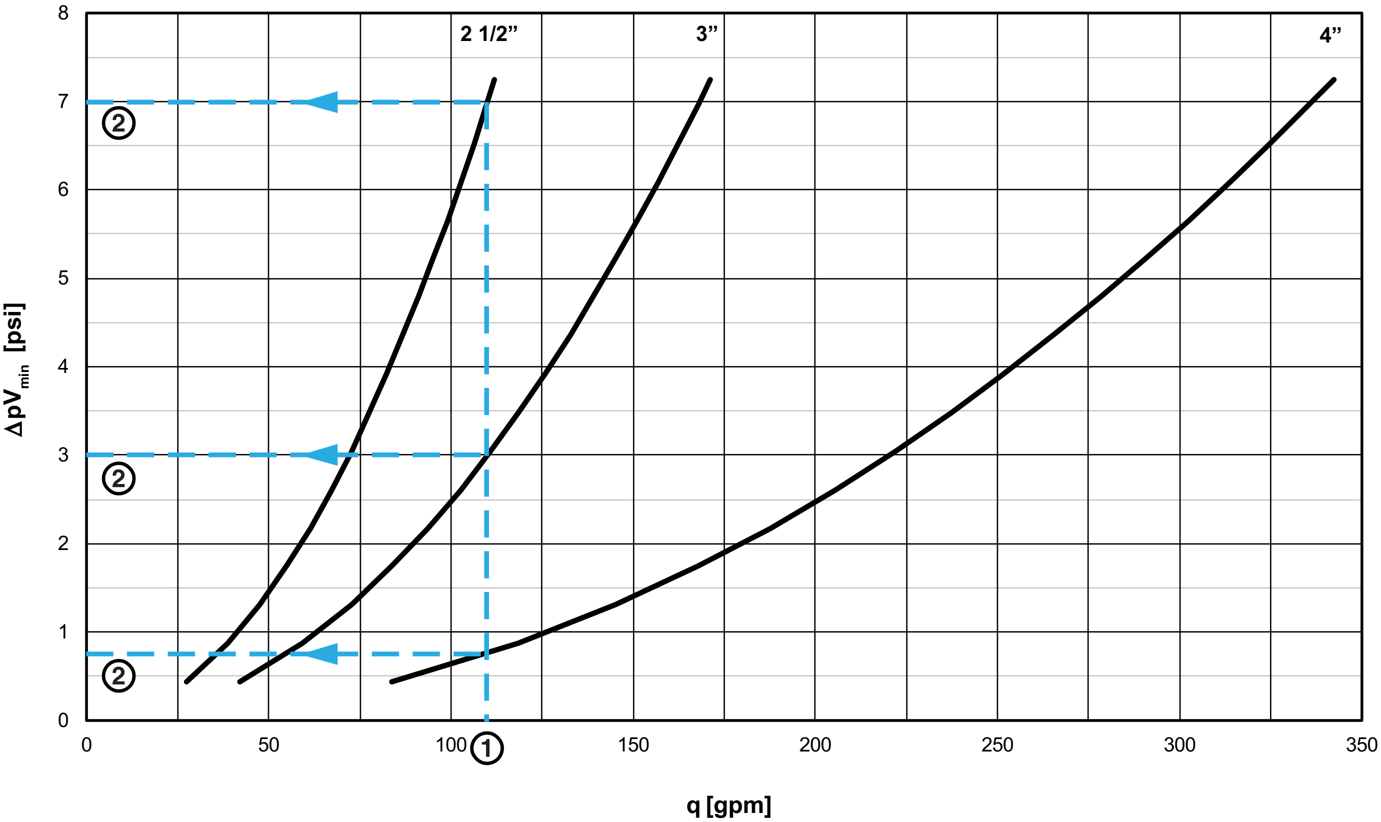


1. Inlet
2. Return

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, ΔpL = 4.9 psi and available differential pressure ΔH = 12.3 psi.

1. Design flow (q) 110 gpm.

2. Read the pressure drop ΔpV_{min} from the diagram.

Size 2 1/2"	ΔpV_{min} = 7 psi
Size 3"	ΔpV_{min} = 3 psi
Size 4"	ΔpV_{min} = 0.7 psi

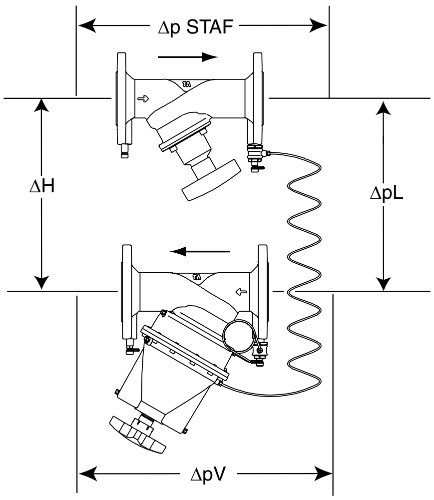
3. Check that the ΔpL is within the setting range for these sizes.

4. Calculate required available differential pressure ΔH_{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.

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

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

5. 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 ΔH_{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.

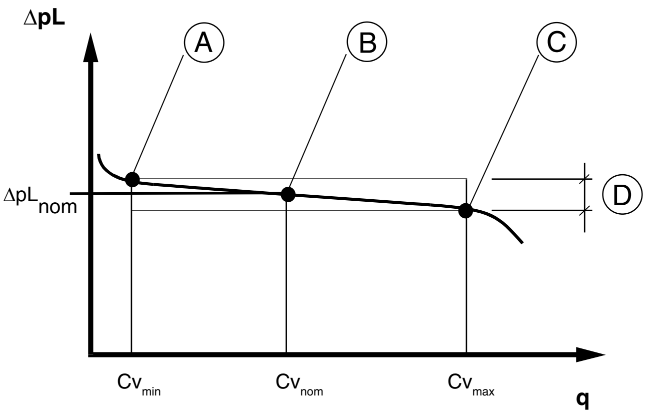
Working range

Size	Cv_{min}	Cv_{nom}	Cv_m	q_{max} [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_{min} = gpm at a pressure drop of 1 psi and minimum opening corresponding to the p-band (+25%).
Cv_{nom} = gpm at a pressure drop of 1 psi and opening corresponding to the middle of the p-band (ΔpL_{nom}).
Cv_m = 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_C:

$q_C = Cv_C \sqrt{\Delta pL}$

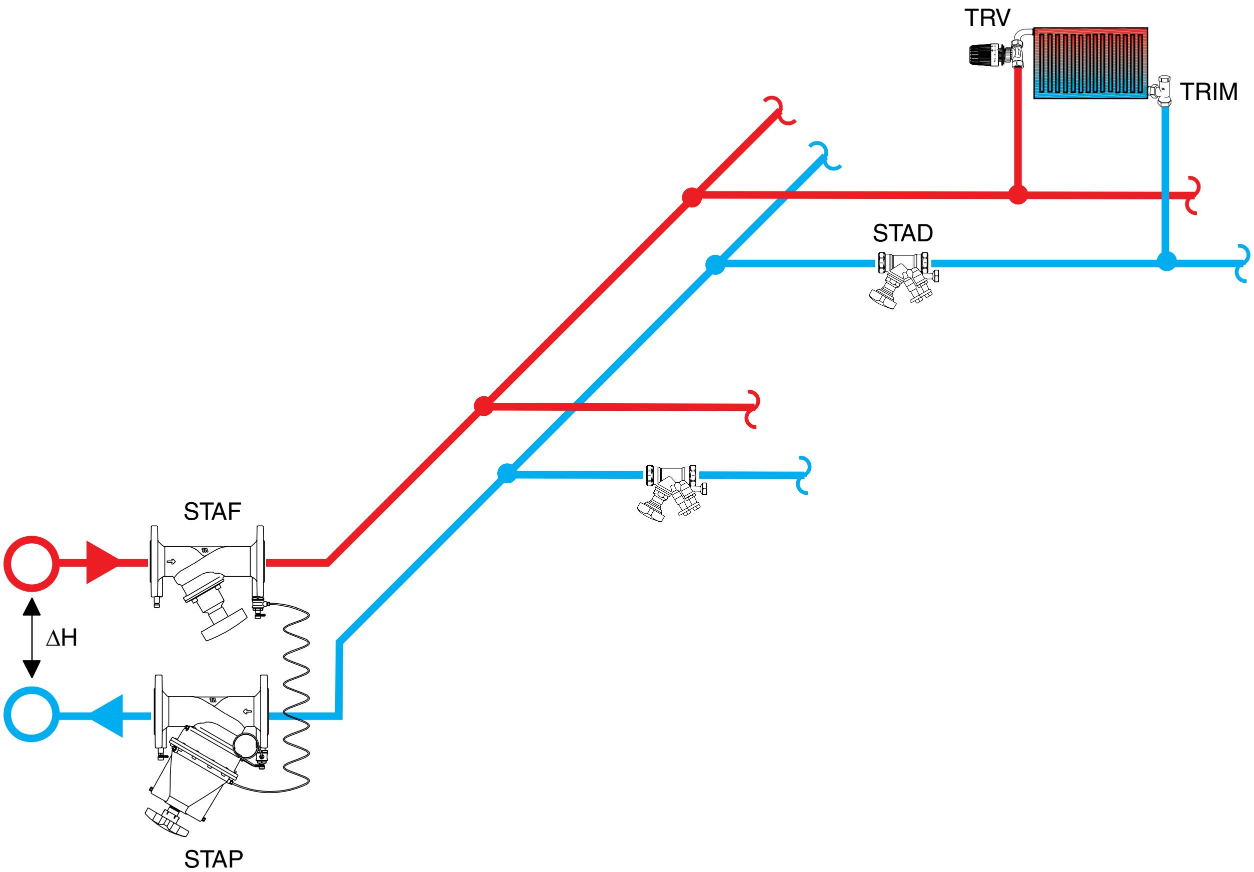


A. Cv_{min}
B. Cv_{nom} (Delivery setting)
C. Cv_m
D. Working range ΔpL_{nom} ±25%

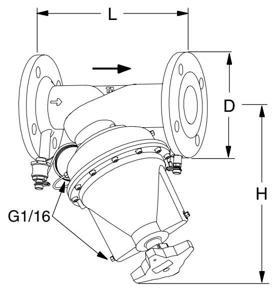
Application examples

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 ΔH to a suitable and stable ΔpL.
- 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

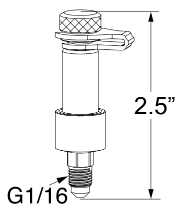


Flanged
3.28 ft (1 m) capillary pipe and transition nipple with shut-off are included.

Size	Number of bolt holes	D [in]	L [in]	H [in]	Cv_m	q_{max} [gpm]	lb	Article No
2.90-11.6 psi								
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
5.80-23.2 psi								
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

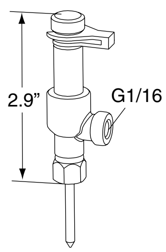
→ = Flow direction
Cv_m = gpm at a pressure drop of 1 psi and maximum opening corresponding to the p-band (-25%).

Accessories



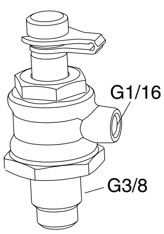
Measuring point STAP

Article No
52 265-205



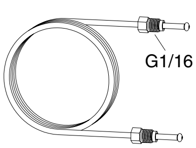
Measuring point, two-way
For connection of capillary pipe while permitting simultaneous use of our balancing instrument.

Article No
52 179-200



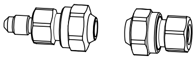
Capillary pipe connection with shut-off

Article No
52 265-206



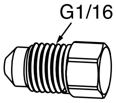
Capillary pipe

L	Article No
3.28 ft (1 m)	52 265-301



Extension kit for capillary pipe
Complete with connections for 6 mm pipe.

	Article No
6 mm	52 265-212



Plug
Venting

	Article No
	52 265-302