STA, STA-D

Balancing valves

5-3-1

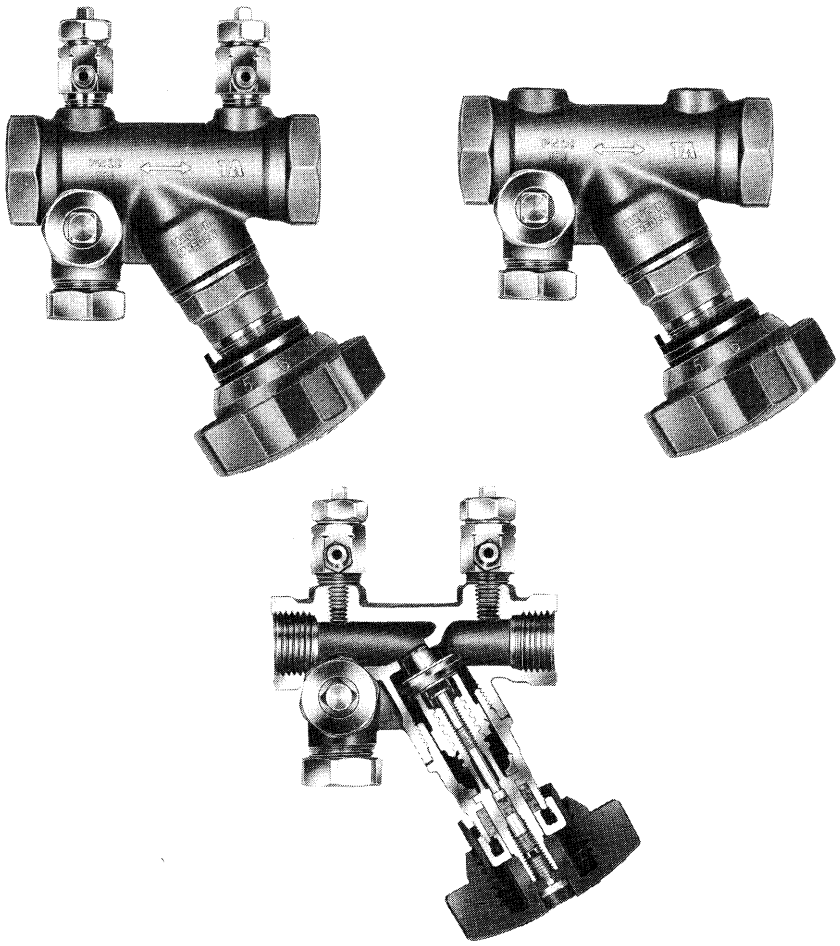
June 1983

STA, STA-D balancing valves have been designed to provide pre-determined flows in branches and headers. The balancing valves provide constant control of these flows.

- Concealed presetting.
- The preset value can be read off on the nonius graduation. The number of turns 1—4 is read off on the indicator sleeve and parts of turns 0—9 read off on the handwheel.
- A setting of four turns provides accurate presetting even in the case of small flows and a high K_V value for lower pressure drop in a dimensioned circuit.
- A Teflon seal to provide dependable shut-off function.
- The valve cone is designed as a restrictor cone for logarithmic function.

Accessories

Prefabricated insulation.
Differential pressure gauge.
Computer programme for balancing.
Form for balancing.
Fluorocarbon rubber O-ring.



STA — Three functions in one valve

1. BALANCING VALVE

Each branch line in a heating installation must be provided with a balancing valve to permit regulation of the water flow between the different branches.

2. SHUT-OFF VALVE

The branch lines must also be provided with shut-off valves.

3. DRAINING VALVE

There must also be provision for draining the branches, for which a drain valve with hose union is required.

Description	Type	TA.no
STA	Straight, female thread	52 170
STA-D	Straight, female thread measuring points	52 171
—	Measuring nipples	52 179
—	Prefab insulation	52 189

STA-D Four functions in one valve

Incorporating the three above-mentioned functions as well as:

4. WATER VOLUME MEASUREMENT

The valves have connections for pressure-drop measurement. By measuring the pressure-drop through the valve the water volume can easily be determined from the pressure-drop diagram.

TECHNICAL DESCRIPTION

Application: Heating installations, potable water installations.

Nominal pressure: PN 20

Max. working pressure: 20 bar = 2,0 MPa ≈ 225 psi.

Max. working temperature: 150°C

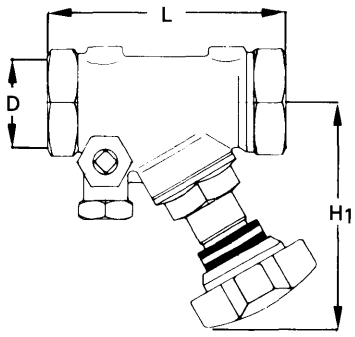
Material: The valves are made completely of AMETAL® and are fitted with a red nylon handwheel. Prefab insulation of polyurethane. In connection with condensation in-insulation, the insulating material must have its joints taped.

Draining: Drain unit suitable for hose socket (with washer) and wing nut. Valves supplied with protective cap but excluding hose socket.

Fittings: The pressure test points besides the metal seal also have stem seal of the O-ring type of EPDM-rubber. Changeable in service if the pressure test points are closed. O-rings of fluorocarbon rubber can be ordered for plants with continuous working temperature above 120°C.

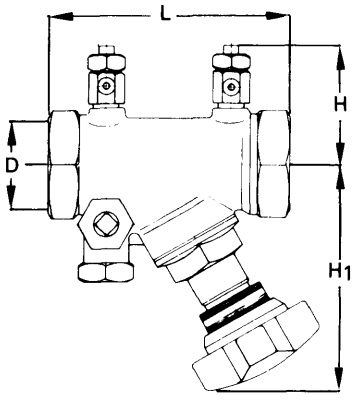
Testing: Each valve is individually tested before despatch, both for seat sealing and overall leak-tightness.

52 170 STA



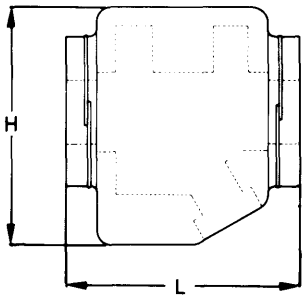
TA.No Drain 1/2"	TA.No Drain 3/4"	Size	L	H_1	D	K_{VS}*)	Weight kg
52 170–110	52 170–710	10	82	92	3/8	2.0	0.6
–015	–615	15	90	94	1/2	4.0	0.7
–020	–620	20	95	94	3/4	5.7	0.8
–025	–625	25	105	104	1	8.7	0.9
–032	–632	32	115	110	1 1/4	13.9	1.2
–040	–640	40	125	120	1 1/2	20	1.4
–050	–650	50	155	140	2	32	3.3

52 171 STA-D



TA.No Drain 1/2"	TA.No Drain 3/4"	Size	L	H	H_1	D	K_{VS}*)	Weight kg
52 171–110	52 171–710	10	82	50	92	3/8	2.0	0.7
–015	–615	15	90	53	94	1/2	4.0	0.8
–020	–620	20	95	56	94	3/4	5.7	0.9
–025	–625	25	105	59	104	1	8.7	1.0
–032	–632	32	115	63	110	1 1/4	13.9	1.3
–040	–640	40	125	66	120	1 1/2	20	1.5
–050	–650	50	155	84	140	2	32	3.4

52 189 Prefab insulation



TA.no	For size	L	H
52 189–015	10-15	135	146
–020	20	140	148
–025	25	150	160
–032	32	160	165
–040	40	170	185
–050	50	205	210

Fittings

Two O-rings of fluorocarbon rubber (Viton) in a plastic bag TA ref No 303 134–60.

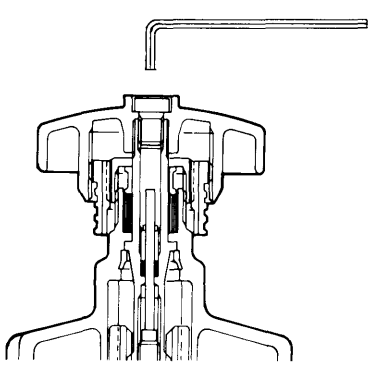
*)K_{VS} = m^3/h at a pressure drop of 1 bar and fully open valve.

D = Cylindrical pipe thread (BSP Female).

Presetting

Initial setting of a valve for a particular pressure drop, eg corresponding to 2.3 turns on the graph, is carried out as follows.

1. Close the valve fully (Fig. 1)
2. Open the valve to the preset value 2.3 turns (Fig. 2)
3. Remove the handwheel screw without changing the setting, by means of an Allen key (3 mm).

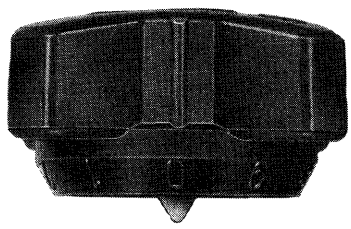


4. Turn the inner stem clockwise until the stop is reached with the same Allen key (long end), and refit the handwheel screw.
5. The valve is now preset.

To check the presetting of a valve, open it to the stop position; the indicator then shows the presetting number, in this case 2.3 (Fig. 2).

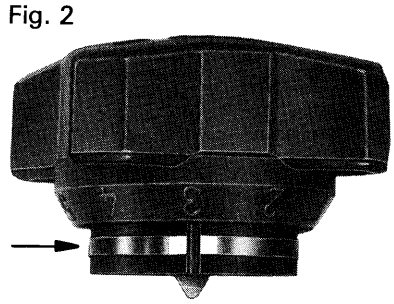
As a guide in determining the correct valve size and setting (pressure drop) there are graphs for each size of valve showing the pressure drop at different settings and water volumes.

Fig. 1



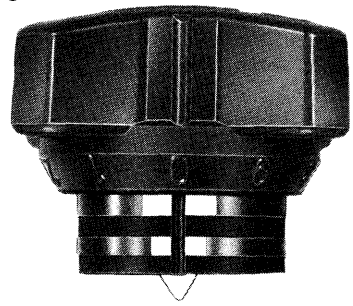
Valve closed

Fig. 2



The valve is preset 2.3

Fig. 3



Valve open

Reading off

If reading off is difficult at the indicator position set in the production plant, the handwheel and the indicator sleeve can be turned. The handwheel screw is loosened, the handwheel and indicator sleeve are removed, and then refitted on the stuffing box nut in such a way as to make reading off easier.

Regulation of water flows

The actual pressure drops in water distribution piping are difficult to establish by calculation. This means that the water flow and thereby also the caloric distribution, is often incorrect in practice, but with the STA-D valve it is easy to regulate the desired water flow. By measuring the pressure drop across the valve at a particular presetting value, the water flow for the size of valve concerned can be read off from the appropriate pressure drop graph.

Preparations for measuring

Valve

Open the valve to the desired presetting value, e g 2.3 by turning the handwheel until its indicator comes opposite 2.3 on the nonius scale.

Differential pressure gauge

1. Use a suitable range manometer or differential pressure gauge (eg TA-DTM) mercury manometer or TA-DTM-C electronic pattern.
2. Bleed air from the measuring line.
3. Note differential pressure reading.

Measuring

Checking water flow at specified presetting

If a particular presetting value has been specified, e g 2.3, turn the knob 2.3 turns. Measure the pressure drop as described above and read off the water flow through the valve at setting 2.3 on the pressure drop graph.

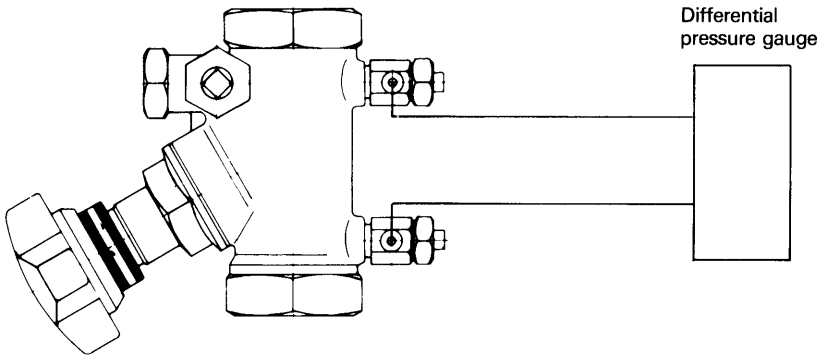
If the water flow does not conform with that specified, select another valve setting and repeat the measuring procedure until the correct water flow has been obtained.

Where no presetting is specified

Select a suitable valve opening, measure the pressure drop and determine the water flow. If this water flow does not conform with that specified, reset the valve and repeat the measuring procedure until the correct water flow has been obtained.

Pocket computer

In order to get a fast and correct flow as well as valve presetting TA has worked out a programme for the pocket computer Texas TI 59 (Programme E1). By giving the flow from two different presettings the pocket computer will present the K_V-value for the final setting.



THE PROPORTIONAL METHOD

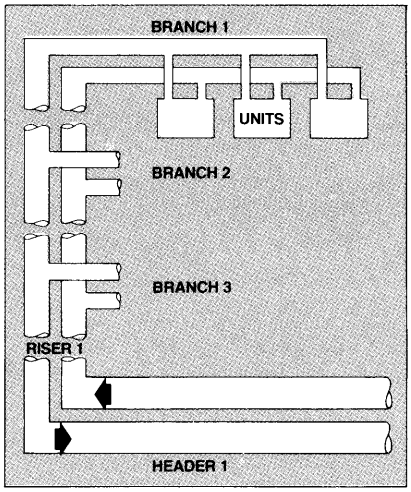
Before starting to balance an installation, detailed knowledge about the design of the installation is essential. For example drawings with connecting diagrams, flow information and pump data, are required.

You should also have one or two differential pressure gauges. (TA provides equipment of this type, for example a DTM gauge of the mercury type but also a convenient electronic model DTM-C). An assistant using a walkie-talkie can also facilitate the work.

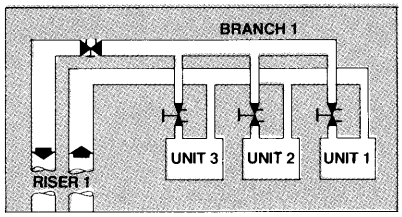
Start by opening all the valves. This is particularly important in the case of thermostat radiator valves and two-way motor valves. These types of valves operate with varying flow and the valves must be open while balancing work is being carried out.

The procedure is now to measure the pressure drop, read off the diagram and determine the flow. By applying the proportional method, the installation is balanced by working from one main line to another. Here is the procedure:

1. Set all the radiator and balancing valves according to the drawing or open them completely if no values are available.
2. First choose a branch that is rather close to the pump which can be expected to provide a high flow in proportion to the specified flow (to get high readings).



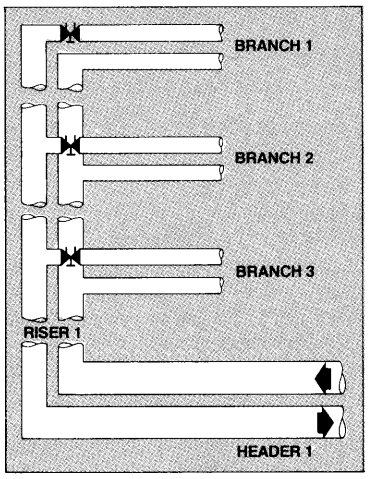
3. Measure the flow in each unit on this branch line and calculate the flow quota of each unit, that is to say the relationship between the flow concerned and the specified flow. For example if the flow concerned is 4.5 l/s and the specified flow is 3 l/s, then the flow quota is 1.5:1.
4. The unit with the lowest flow quota noted is now the reference unit for this branch. Remember that the quota for the lowest unit can increase slightly during balancing work and should therefore be checked now and then. If you have two pressure gauges, you should therefore leave one of them here as the reference unit. Never balance the lowest unit since this can cause extra high pump pressure throughout the system.



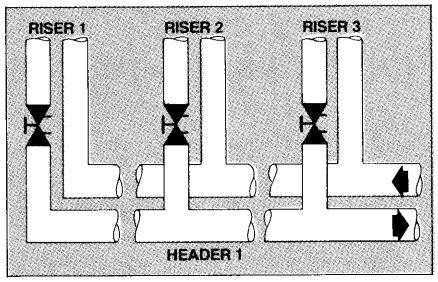
5. Now balance unit 2 in the figure to the same quota as the reference unit. You may discover that the reference unit has increased slightly in value. Check back and, if this is the case, adjust unit 2 until you obtain the same value on both units. Finally, pre-set the valve for unit 2.

(At this stage, it can be an advantage to have an assistant with a walkie-talkie to give you the correct values of the reference unit while you balance the others).

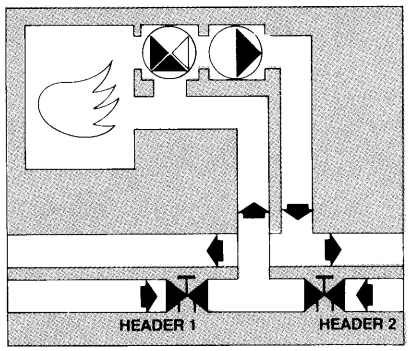
6. Now continue to balance units, 3, 4 and 5 in stages in the same way until the complete branch line is ready. When you have finished, the complete branch is balanced to the same proportional flow between all the units.



7. Continue balancing the branch lines on the risers. The working procedure and measuring methods are the same.
   - Find the branch line with the lowest flow quota.
   - Adjust the branch line with the second smallest flow quota to the same quota as the lowest flow quota measured.
   - Then continue with the other branch lines.
8. Now use the same procedure on the other risers. You can balance them in whichever order you choose.



9. Finally the headers if more than one, should be balanced using the same procedure as above.



10. When you have finished, the entire system has been proportionally balanced. The last thing to be done is to check the pump. If it provides too large a volume of water, it can be restricted with the aid of a regulating valve. If large differences occur then the pump specification should be examined with a view to adjustment of the unit or replacement.
11. All the STA-D valves are now balanced and preset. Finally all the values should be noted in a balancing report.