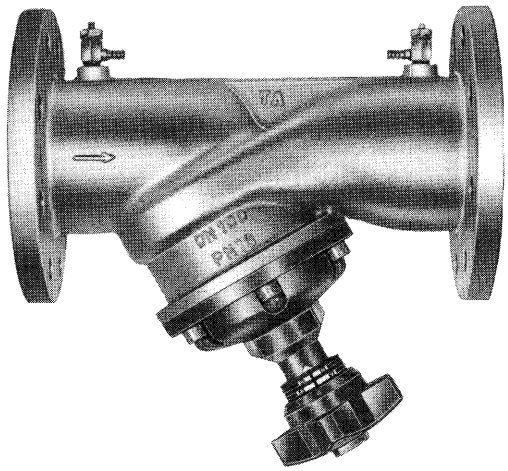
STA-F

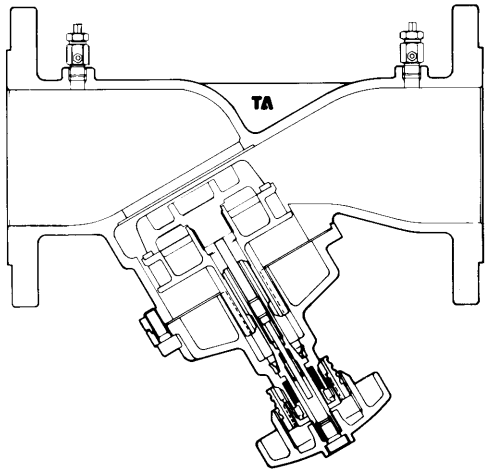
Balancing valves

5-5-15

April 1984

STA-F is a flanged balancing valve available in sizes DN 65—300 (2½"—12"), and has been designed with an oblique seat in order to give low resistance and large flows when the valve is fully open. There are eight turns (DN 65—150) twelve turns (DN 200—250) and sixteen turns (DN 300) of the handwheel between completely open and closed position; this together with a carefully designed valve cone gives a large and exact preset balancing range.





■ **Isolating feature**
PTFE seat ring for positive shut-off

■ **Balancing feature**
Balancing and regulation of water flow.

■ **Pressure test point**
Pressure test points for measuring the water volume. By measuring the pressure drop over the valve the flow through the valve can be determined from the graphs. With DTM-C the flow can be read off directly, see page 3 and section 9.

■ The pre-setting value is readable on the nonius scale. Number of turns is read on the indication collar and parts of turn are read on the handwheel.

■ Concealed pre-setting.

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

Description	Type	TA No
STA-F	Flange PN 16	52 180

TECHNICAL DESCRIPTION

Applications: Cooling and heating hydraulic systems.

Face to face dimensions:
ISO 5752 series 1.

Nominal pressure: PN 16.

Max working pressure: 1,6 MPa = 16 bar = 232 psi.

Max working temperature: Valve +150°C, seals in the P/T points stands 120°C. (On special request +150°C).

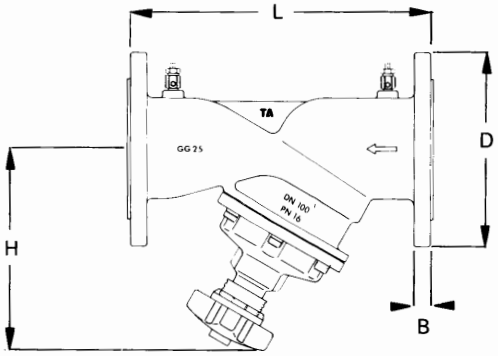
Material: Valve body: cast iron BS 1452: Grade 260. Bonnet, valve cone and spindle: AMETAL®. Bonnet bolts: stainless steel. Valves provided with aluminium handwheel (red).
DN 200—300 has bonnet and cone holder in cast iron as above. The cone is in bronze LG2. Stem AMETAL .

Flanges: Conform to ISO 2084 and fit BS 4504:1969 table 16.

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 fluorine rubber can be ordered for plants with continuous working temperatures above 120°C.

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

52 180 STA-F



TA-No	Size DN	Number of bolt holes	L	H	D	B	K_{VS}*)	Weight kg
52 180—065	65	4	290	200	185	20	85	13.0
—080	80	8	310	215	200	22	120	17.5
—090	100	8	350	230	220	22	190	22.5
—091	125	8	400	265	250	24	300	33.5
—092	150	8	480	285	285	24	420	46.0
—093	200	12	600	450	340	30	765	110.0
—094	250	12	730	470	405	32	1185	148.0
—095	300	12	850	520	460	32	1700	210.0

Fittings:
2 pcs O-rings of fluorine 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.

PRE-SETTING STA-F

DN 65—150

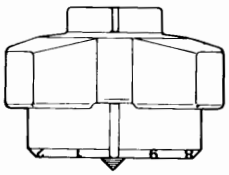


Fig. 1

Valve closed

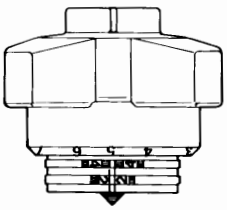
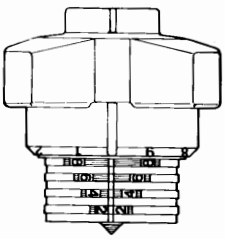


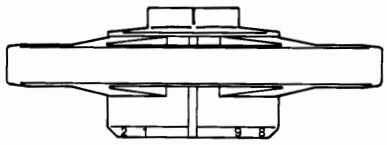
Fig. 2

The valve is pre-set 4.5

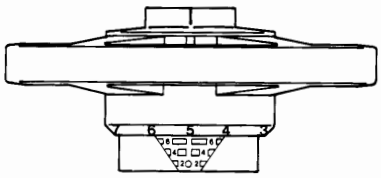


Valve open (8 turns)

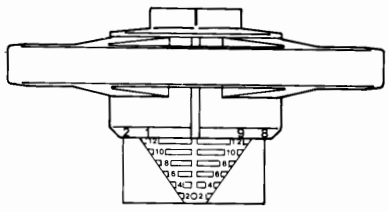
DN 200—250



Valve closed

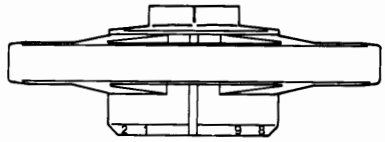


The valve is pre-set 6.5

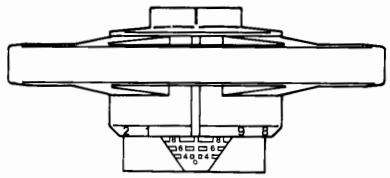


Valve open (12 turns)

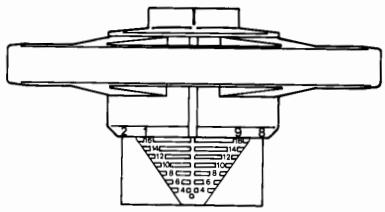
DN 300



Valve closed



The valve is pre-set 8



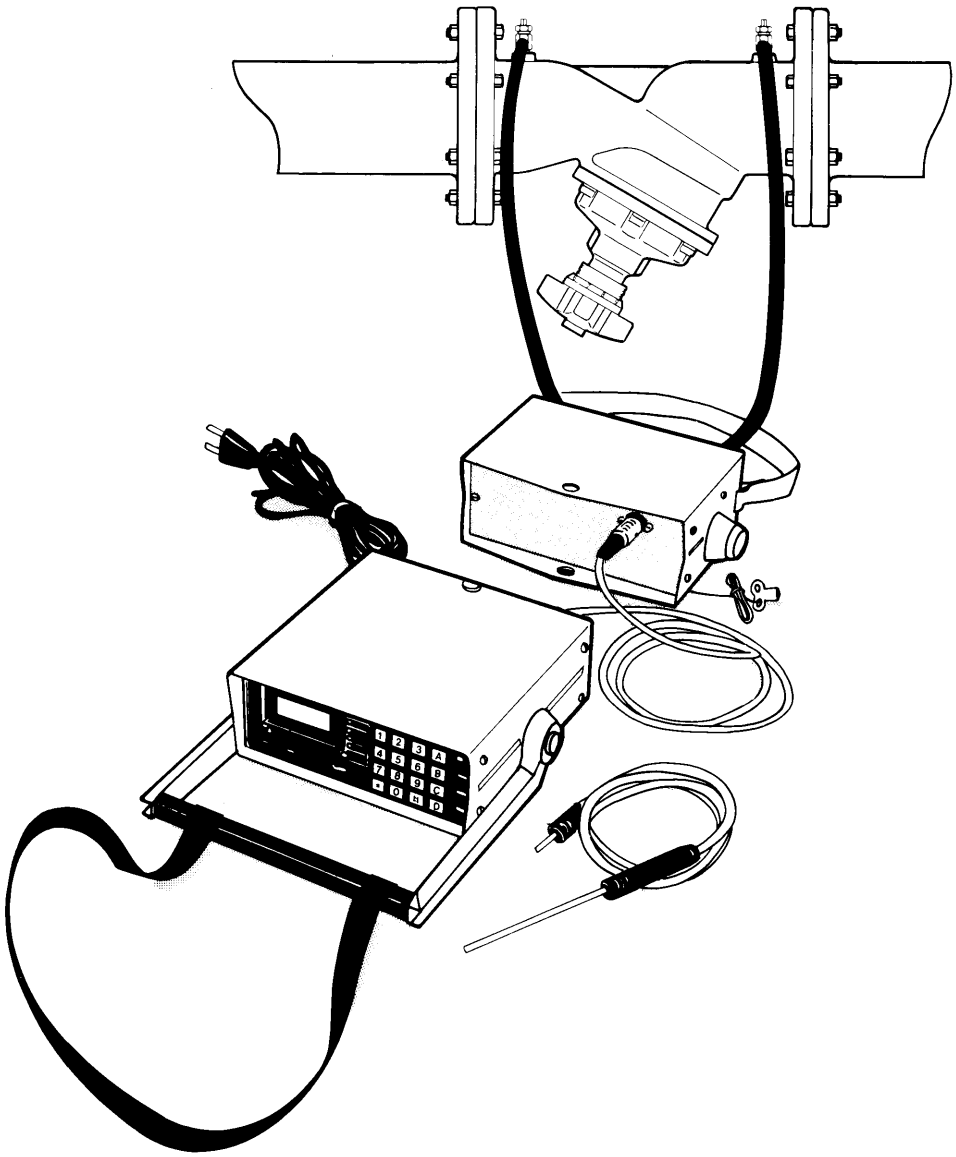
Valve open (16 turns)

Initial setting of a valve for a particular pressure drop, eg corresponding to 4.5 turns on the graph, is carried out as follows.

1. Close the valve fully (Fig. 1)
2. Open the valve in this case to the pre-set value 4.5 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). For DN 200—300 use a screw driver. Refit the handwheel screw.
5. The valve is now preset.

To check the pre-setting of a valve, open it to the stop position; the indicator then shows the pre-setting number, in this case 4.5 (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.



REGULATION OF WATER FLOWS

The actual pressure drops in water distribution pipework are difficult to establish by calculation. Meaning that the water flow and thereby also the caloric distribution, is often incorrect in practice, but with the STA-F valve it is easy to regulate the desired water flow. By measuring the pressure drop across the valve at a particular pre-setting 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 pre-setting value, eg 4.5 by turning the handwheel until its indicator comes opposite 4.5 on the nonius scale.

Gauge

Use DTM-C electronic differential pressure gauge. DTM-C is pre-programmed with duty curves for TA valves STA-D (4 turns), STA-F and STA-T (1 turn) and with a conversion formula for K_V so that the measured differential pressure can be read off directly as flow. More information about DTM-C, see section 9.

BALANCING — WORKING PRESSURE

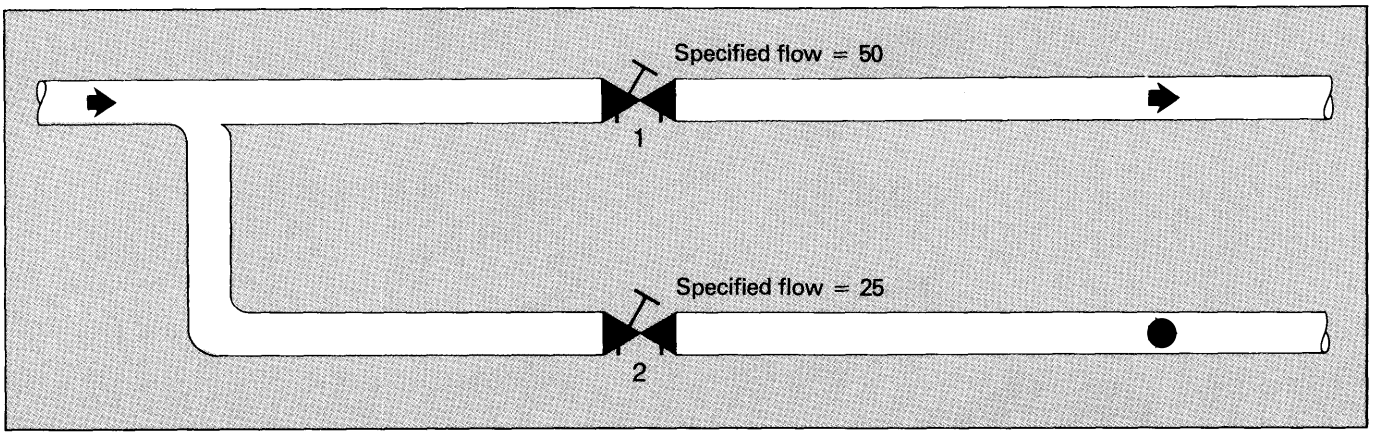
1. Pre-set all valves at the set values that have been calculated and are shown on the drawing.
2. Make sure that two-way balancing valves and radiator/thermostatic valves are open. (Lower the feed temperature so that self-actuating valves open).
3. Measure all the flows but do not re-set any flow at this stage.
4. If the individual deviations are large (more than ± 10% of the specified flow), adjustment of the flow should be carried out.
5. In the case of medium individual deviations or when it can be expected that the flow in the main pump is quite sufficient then the DTM-C *computer method* can be used and the valves can be adjusted in the desired order.
6. If the individual flow deviations are very large, the flow in the valves that have been set varies a great deal while the work is being done. The final result shows deviations that are too high for the individual valves. In such cases you can expect to balance the installation at least once more and the proportional method is most suitable. This method also means the minimum of pump work.
7. When using the *proportional method,* choose the valve with the lowest flow quotient (flow quotient = relationship between the measured flow and the specified flow) as a reference unit. Then adjust the valves in the desired order and set them at the same flow quotient as the reference unit concerned in this case. When the installation has been finally balanced, all the valves have the same flow quotient. If this should happen to bee too high (higher than 1), the pump should be run at a slower speed or a restriction should be introduced. At the quotient 1 all valves have the specified flow.

THE PROPORTIONAL METHOD

The proportional method is based on two parallel flows which, having once been set in a certain proportion to each other, maintain this proportion even when the flow is changed.

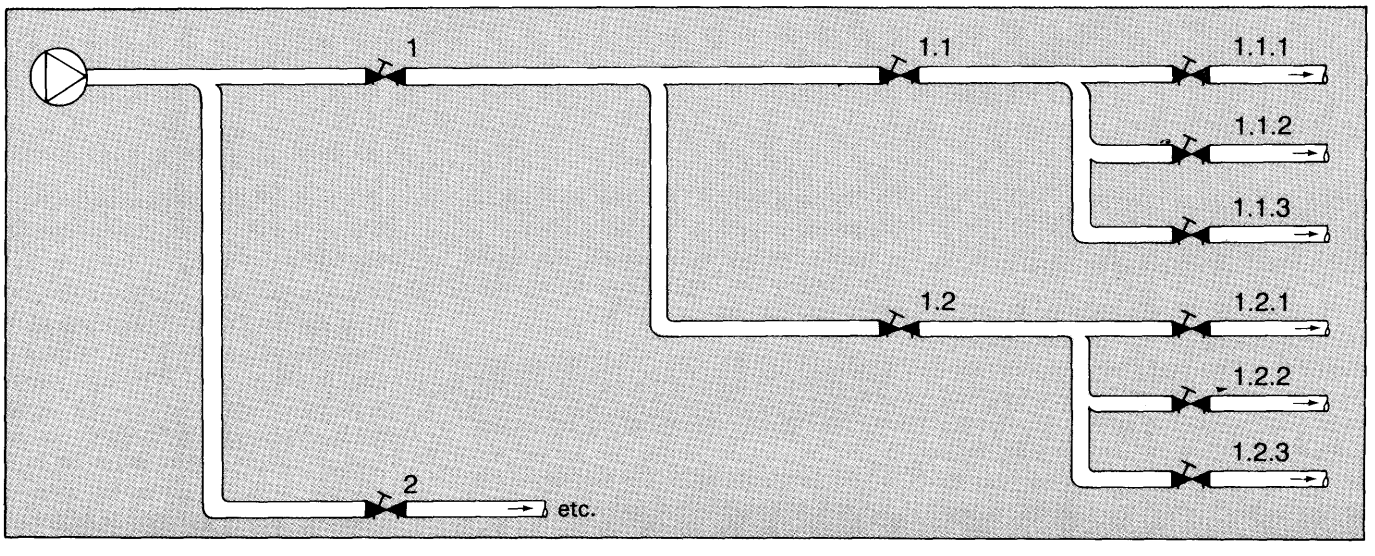
If the flow in valve 1 in the figure is measured and found to be 100 and in valve 2 is found to be 50, then the valves are correctly set with respect to each other with a flow quota of 2 but with different flows.

The DTM-C has been specially adapted to facilitate balancing according to the proportional method in the easiest possible way. For example pressure readings over the valve are converted directly into a flow quota. Continuous reading off of the reference valve (see below) flow quota is also possible.



The working procedure

You start with the smallest units and first adjust the radiator valve pre-setting. Then the system is divided up into sections so that the balancing valves that are at the same level can be balanced starting with the lowest level, i.e. the 1.1.1 level.



There, all the valves are measured after, for example: valve 1.1. The flow quota for each valve is noted.

The valve with the lowest flow quota is known as the reference unit.

Then you go on to one of the other valves in the same sub-system (at the same level) and balance it until it gives the same quota as the reference valve. Since the flow, and thereby the quota of the reference valve is changed as the work goes on, it may sometimes be advisable to have a DTM-C located at it. This applies particularly at branches on extensive systems with a few (2—5) branches at each riser.

If the number of units connected in parallel is large, it is generally enough to check the quota concerned at the reference unit in the case of major changes in flow.

When all the valves after valve 1.1 have the same quota, then riser 1.1 is ready for the time being. You then go on to riser 1.2 and carry on the same way as at 1.1. When all the valves at this level are finished, you go on to the next higher level and proceed in the same way.

This means that balancing can be carried out even if the complete installation is not ready for use. The supplementary sections are balanced in the same way as above with respect to the main systems as soon as they are completed.

When balancing has come this far, the main valve at the pump is balanced or pump speed is reduced (or other measures carried out) so that the installation has flow quota 1. This means that all valves obtain the stipulated flow.

Quota calculation and flow calculation are programmed into the DTM-C.

Björsell, Borås