Thermal drain valves Series VTFN

Main features

The thermal drain valves have been approved and factory calibrated in the Watts Industries Workshops in accordance with the technical specification of Body R.

WATTS®
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Technology by nature

VTFN

THERMOFLUX
Positive action thermal drain valve, with manual resetting and optical signal.
Protection class : IP40. Set temperature : 95°C. Drain capacity without filling :
VTF 1.1/4" - 176.775 kcal/h equal to 7070 l/h
VTF 1.1/2" - 318.200 kcal/h equal to 12728 l/h.

ISPESL approved. According to EEC 89/336, EEC 73/23, PED 97/23/CE. Identification number CE1115.

Tipo	Codice	Dn	Weight (g)
VTFN	0230232	1.1/4" x 1.1/4"	1300
VTFN	0230240	1.1/2" x 1.1/2"	1350

Dimensioning

A) Partial or zero filling
It should be pointed out that Body R (Dossier R.2.A.) specifies that, in the case of partial or zero filling, the valve should have a drain capacity not less than :

$$G = \frac{P}{25}$$

where :

G = flow rate of water to be drained in kg/h
P = thermal capacity of the boiler in kcal/h, assuming the hydrostatic pressure to be 0,5 kg/cm^2.
The value of drain capacity G depends on the value of the water head hydrostatic pressure (pressure difference acting on the valve) by the relation :

$$G = K_v \cdot \sqrt{\Delta p}$$

where :

Kv = flow coefficient
Δp = hydrostatic pressure acting on the valve in kg/cm^2.
By inserting known numeric values we obtain :

1. for VTF/N32: $G = K_V \cdot \sqrt{\Delta p} = 10.000 \cdot \sqrt{0,5} = 7.071$ kg/h
$P = 25 \cdot G = 25 \cdot 7.071 = 176.775$ kcal/h

2. for VTF/N40: $G = K_V \cdot \sqrt{\Delta p} = 18.000 \cdot \sqrt{0,5} = 12.728$ kg/h
$P = 25 \cdot G = 25 \cdot 12.728 = 318.200$ kcal/h

B) Total filling
In the case of total filling from the water main, the flow to be drained at the effective operating pressure should not be less than:

$$G = \frac{P}{80}$$

where :

G = flow rate of water to be drained
P = thermal capacity of the boiler, being on the other side always : $G = K_v \cdot \sqrt{\Delta p}$

where : Kv = flow rate coefficient.

The flow rate G depends on the hydrostatic pressure Δp acting on the valve.

VTFN32			VTFN40		
Δ (bar)	G (l/h)	P (kcal/h)	Δ (bar)	G (l/h)	P (kcal/h)
0,1	3.162	252.982	0,1	5.692	455.368
0,2	4.472	357.770	0,2	8.050	643.988
0,3	5.477	438.178	0,3	9.859	788.720
0,4	6.324	505.964	0,4	11.384	910.736
0,5	7.071	565.680	0,5	12.728	1.018.234
0,6	7.746	619.677	0,6	13.943	1.115.419
0,7	8.366	669.328	0,7	15.060	1.204.790
0,8	8.944	715.541	0,8	16.100	1.287.975
0,9	9.486	758.946	0,9	17.076	1.366.104
1,0	10.000	800.000	1,0	18.000	1.440.000
1,1	10.488	839.047	1,1	18.879	1.510.285
1,2	10.954	876.356	1,2	19.718	1.577.441
1,3	11.401	912.140	1,3	20.523	1.641.853
1,4	11.832	946.572	1,4	21.298	1.703.831
1,5	12.247	979.795	1,5	22.045	1.763.633
1,6	12.649	1.011.928	1,6	22.768	1.821.472
1,7	13.038	1.043.072	1,7	23.469	1.877.530
1,8	13.416	1.073.312	1,8	24.150	1.931.963
1,9	13.784	1.102.724	1,9	24.811	1.984.903
2,0	14.142	1.131.370	2,0	25.456	2.036.468
2,1	14.491	1.159.310	2,1	26.084	2.086.758
2,2	14.832	1.186.591	2,2	26.698	2.135.865
2,3	15.165	1.213.260	2,3	27.298	2.183.868
2,4	15.492	1.239.354	2,4	27.885	2.230.838
2,5	15.811	1.264.911	2,5	28.460	2.276.840
2,6	16.124	1.289.961	2,6	29.024	2.321.930
2,7	16.431	1.314.584	2,7	29.577	2.366.161
2,8	16.733	1.338.656	2,8	30.120	2.409.581
2,9	17.029	1.362.350	2,9	30.653	2.452.232
3,0	17.320	1.385.640	3,0	31.177	2.494.153

Technical features		
Valve type	**VTFN32**	**VTFN40**
Connections	1.1/4" x 1.1/4"	1.1/2" x 1.1/2"
Certificate of ISPEL conformity	VST/341/90	VST/342/90
t0 - calibration temperature fluid temperature at which the valve starts to drain continuously	95 °C	95 °C
t1 - drain temperature max. fluid temperature at which, during the temperature rise phase, there is maximum opening allowed by the control device, consequently the nominal flow rate	96 °C	96 °C
t2 - closing temperature fluid temperature at which, during the temperature lowering phase, the valve stops draining continuously.	92 °C	90 °C
tE - emergency operating temperature temperature at which opening of the valve starts in case of damage to the thermostatic element.	90 °C	92 °C
Kv - flow coefficient water flow rate in kg/h at drain temperature t1 with differential pressure Δp = 1 kg/cm^2	11.000	20.000
KVE - emergency flow coefficient water flow rate in kg/h at drain temperature t1 with differential pressure Δp = 1 kg/cm^2	10.000	18.000
P = Drain capacity in kg/h, with partial or zero filling and with Δp = 0,5 kg/cm^2	176.775	318.200

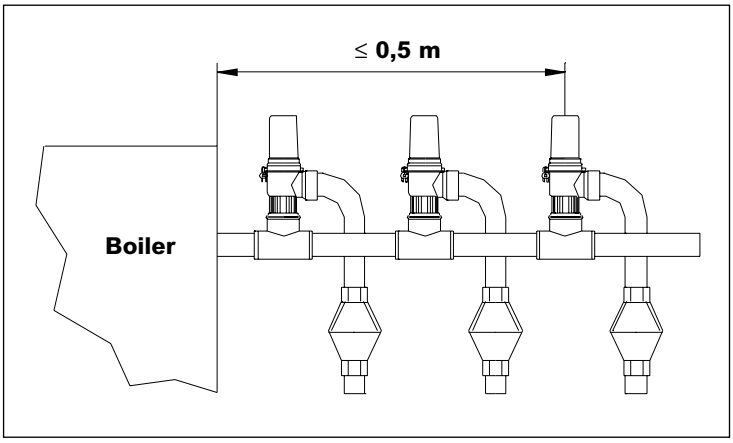
The above values are taken from the I.S.P.E.S.L. reports enclosed with the certificates of conformity N° VST/341/90 and VST/342/90 and represent the average of the values obtained during the inspection tests.

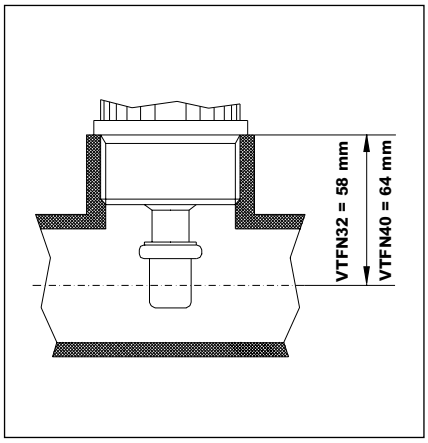
Design features	
Body and cover	Shot-blasted stamped brass
Inlet connection VTF/N32	G 1”1/4 M (ISO 228/1)
Inlet connection VTF/N40	G 1”1/2 M (ISO 228/1)
Outlet connection VTF/N32	G 1”1/4 F (ISO 228/1)
Outlet connection VTF/N40	G 1”1/2 F (ISO 228/1)
Thermal sensitive element	Wax
Springs	Stainless steel
Protective cap	Black polycarbonate
Microswitch	220V-50Hz, with manual resetting button
Optical indicator	red signalling valve opening

Mounting

Technical specification of Body R ed. 82 (R.3B.1.2) required as follow:

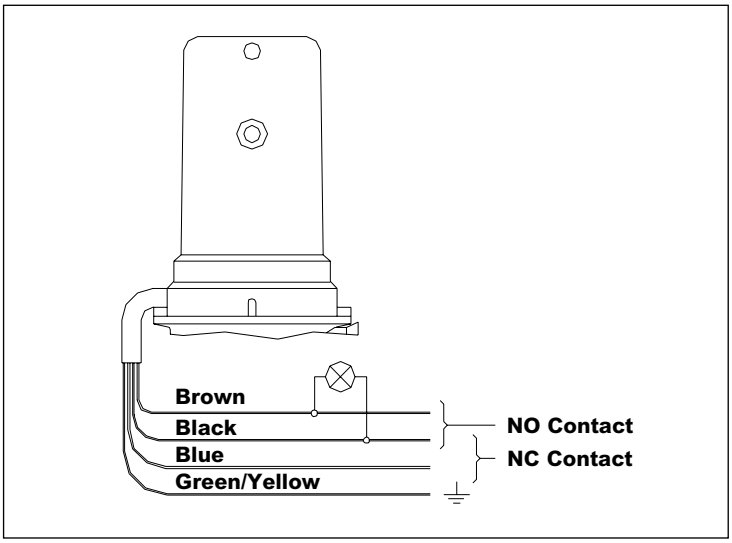
- Thermal drain valve has to be connected to the outlet pipe within 0,5 m from boiler, with the bulb sensing element into the hot water flow rate (see drawing).
- For correct positioning of the bulb sensing element into the hot water flow rate, respect the measure showed between end of the threaded and the axis of the pipe (see drawing).





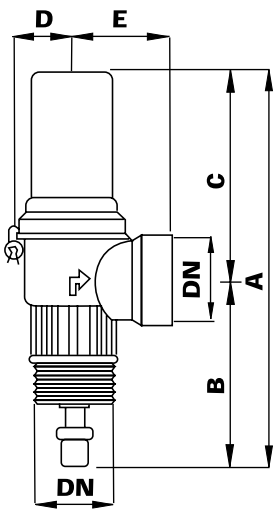
Wiring diagram

For correct connection to the supply (220-50Hz), follow the drawing.



Overall dimensions (mm)

VTFN



Size	A	B	C	D	E
1.1/4”	222	99	123	35	52
1.1/2”	242	114	128	38	60

Maintenance

No maintenance foreseen for VTFN valves; in case of failure please to dismantle the valve and send to Watts Industries Italia.

Safety regulations

The applicable technical specification of Italian Decree DM 1.12.1975 contained in Body R prescribes the use of one or more thermal drain valves in the following cases:

1. **Hot water heating systems, with open expansion vessel**
   when the inner diameter of the safety piping is less than the minimum permissible diameter in relation to the boiler capacity and the virtual length of the safety piping (R.3.A.3.1. tab. 2).

N.B. The minimum permissible inner diameter of the safety piping is equal to 18 mm; under this size, it is not sufficient to install a thermal drain valve, rather the piping must be replaced as well.

2. **Heating systems with closed expansion vessel**

2.1. System with 4-way mixing valve
in the case of a single expansion vessel dimensioned for the entire system and in direct connection with the boiler (Pic. 1)

2.2. System with 3-way mixing valve installed on the delivery line
in the case of a single expansion vessel dimensioned for the entire system and in direct connection with the boiler (Pic. 2)

a) in the case of two or more expansion vessels, of which one is connected directly to the boiler, if no check valve is provided on the return line (Pic. 3);

3. **System with 3-way mixing valve installed on the return line**
   in the case of one or more expansion vessels of which one is in direct connection with the boiler (Pic. 4).

4. **System with overdimensioned expansion vessel**
   when the capacity of the expansion vessel (or vessels) exceeds the theoretical calculated capacity by more than 10% it will always be necessary to install one or more thermal drain valves.

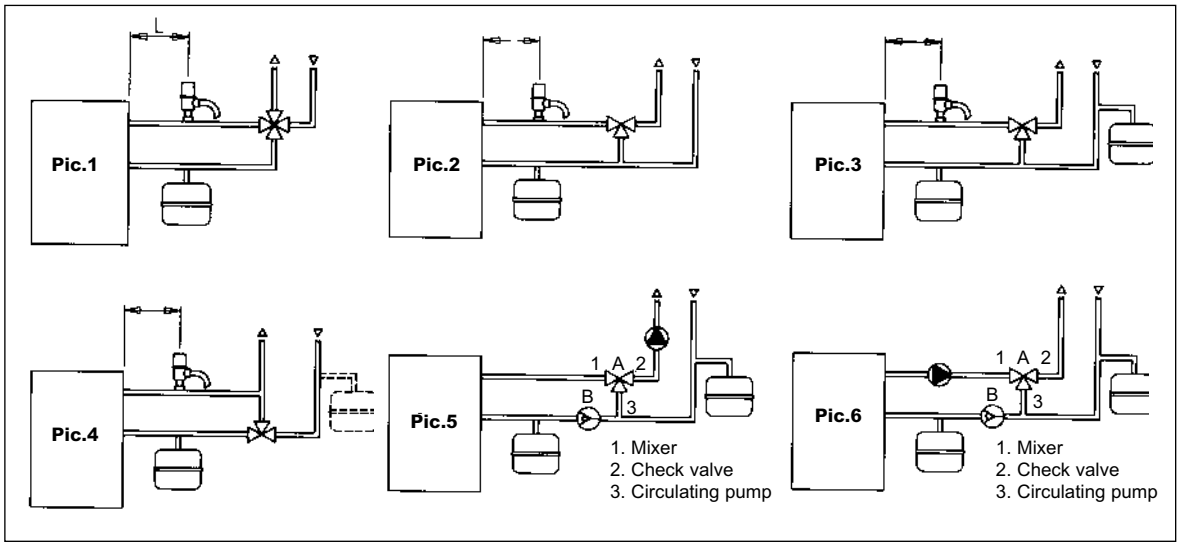
N.B. The distance "L" of the thermal drain valve from the boiler should not exceed 0.5 metres.

NOTE

If a check (non return) valve is to be installed in the return piping, make sure that it is correctly positioned.

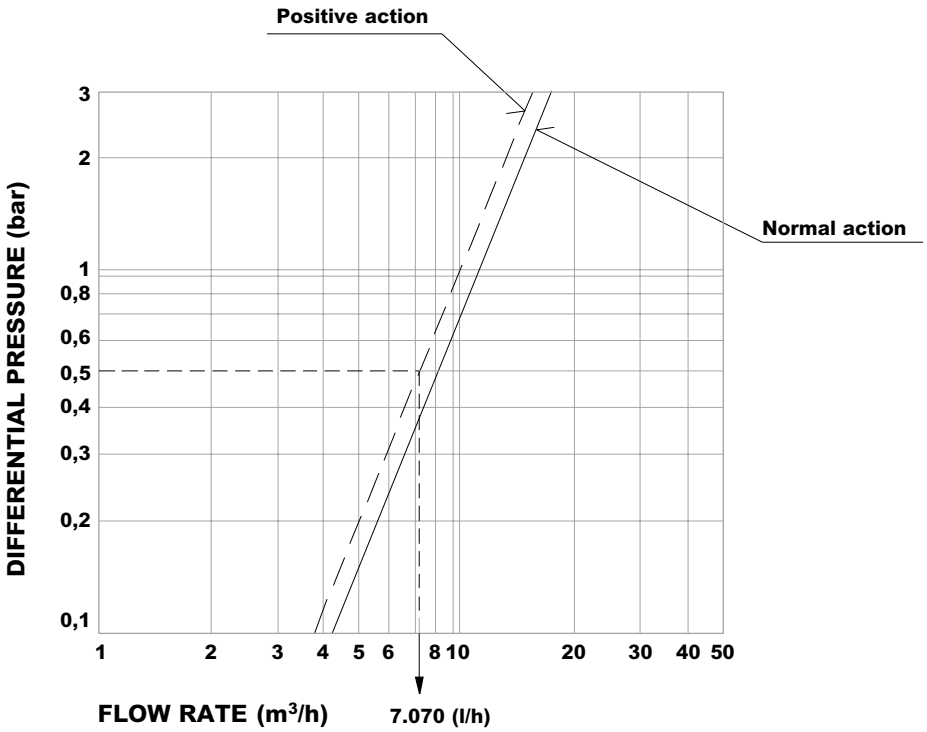
The three-way valve, installed in the delivery line, can act as a mixer or diverter.

1. In the case of the three-way valve acting as a mixer valve, way 2 (Pic. 5) always remains open; the sector shifts from way 1 to way 3. The check valve should be inserted in the boiler circuit (Pic. 5)
2. In the case of the three-way valve acting as a diverter valve (Pic. 6) , way 1 always remains open; the sector shifts from way 2 to way 3. The check valve should be inserted in the user circuit (Pic.6).

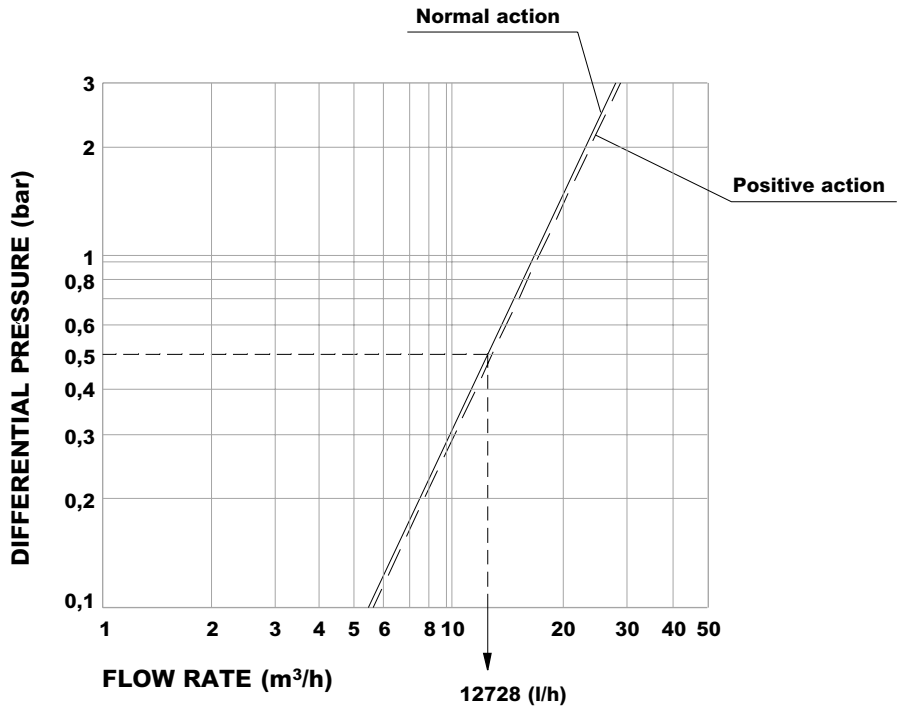


Flow rate against differential pressure

VTFN32



VTFN40



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