

VTFN Series

Thermal drain valves

Technical Data Sheet



Description

VTFN Series positive-action thermal drain valves are designed to drain water from heating systems when the setpoint temperature is reached, thus preventing overheating.

VTFN

TERMOFLUX.

Positive-action thermal drain valve with manual resetting and indicator light.
Protection rating IP40. Cable length: 1.2 m. Setpoint temperature: 95°C.
Drain capacity without filling:

DN 1.1/4" - 176,750 kcal/h equal to 7070 l/h.

DN 1.1/2" - 318,200 kcal/h equal to 12728 l/h.

INAIL approved.

Compliant with Directives LVD 2014/35/EU and EMC 2014/30/EU.

Compliant with Directive PED 2014/68/EU, Identification number CE0425.



Type	Part No.	DN	Weight (g)
VT32	0230232	1.1/4" x 1.1/4"	1300
VT40	0230240	1.1/2" x 1.1/2"	1350

Technical features		
Valve type	VTFN32	VTFN40
Connections	1.1/4" x 1.1/4"	1.1/2" x 1.1/2"
INAIL compliance certificate	VST/341	VST/342
PED certificate of CE type examination	PA035	PA035
t₀ - setpoint temperature fluid temperature at which the valve starts draining continuously	95°C	95°C
t₁ - drain temperature maximum fluid temperature at which, as the temperature rises, the control device reaches its maximum permitted aperture and the nominal flow rate reach its maximum accordingly	96°C	96°C
t₂ - closure temperature fluid temperature at which, as the temperature falls, the valve stops draining continuously	92°C	92°C
t_E - emergency actuation temperature temperature at which the valve starts to open in the event of failure of the thermostatic element	92°C	90°C
K_N - flow coefficient water drain flow rate in l/h, at the drain temperature t ₁ , with a differential pressure Δp = 0.98 bar	11,000	18,000
K_E - emergency flow coefficient water flow rate in l/h, at the drain temperature t ₁ , measured with a differential pressure Δp = 0.98 bar	10,000	18,700
P - drain capacity in kg/h, with partial or zero filling and with Δp = 0.5 kg/cm ²	176,775	318,200

The data quoted comes from the INAIL reports annexed to compliance certificates VST/341 and VST/342, and represent the average of the values obtained during the respective tests.

Design characteristics

Body and cover	pressed, shotblasted brass
VTFN/32 inlet connection	G 1"1/4 M (ISO 228/1)
VTFN/40 inlet connection	G 1"1/2 M (ISO 228/1)
VTFN/32 outlet connection	G 1"1/4 F (ISO 228/1)
VTFN/40 outlet connection	G 1"1/2 F (ISO 228/1)
Heat-sensitive element	wax
Springs	stainless steel
Protection cap	black polycarbonate
Microswitch	230V-50Hz, with manual reset pushbutton
red 'valve open'	indicator light

Application

The applied technical specifications of Italian Ministerial Decree 1.12.1975 included in the "R" regulations require the use of one or more thermal drain valves in the following cases:

1. Heating systems with closed expansion vessel.

1.1. Systems with a 4-way mixing valve

- where there is a single expansion vessel sized for the whole system, directly connected to the boiler (Fig.1).

1.2. Systems with a 3-way mixing valve fitted on the flow line

- where there is a single expansion vessel sized for the whole system, directly connected to the boiler (Fig.2);

- where there are several expansion vessels, one of which is directly connected to the boiler, if there is no check valve on the return line (Fig.3);

2. Systems with a 3-way mixing valve fitted on the return line

- where there are one or more expansion vessels, one of which is directly connected to the boiler (Fig.4).

3. Heating systems with an oversized expansion vessel

- if the capacity of the expansion vessel (or vessels) exceeds the theoretical calculation capacity by more than 10%, it is still necessary to fit one or more thermal drain valves.

N.B. The distance "L" of the thermal drain valve from the boiler must not be more than 1 metre.

NOTE:

Should you wish to fit a check valve on the return line, take care to position it correctly.

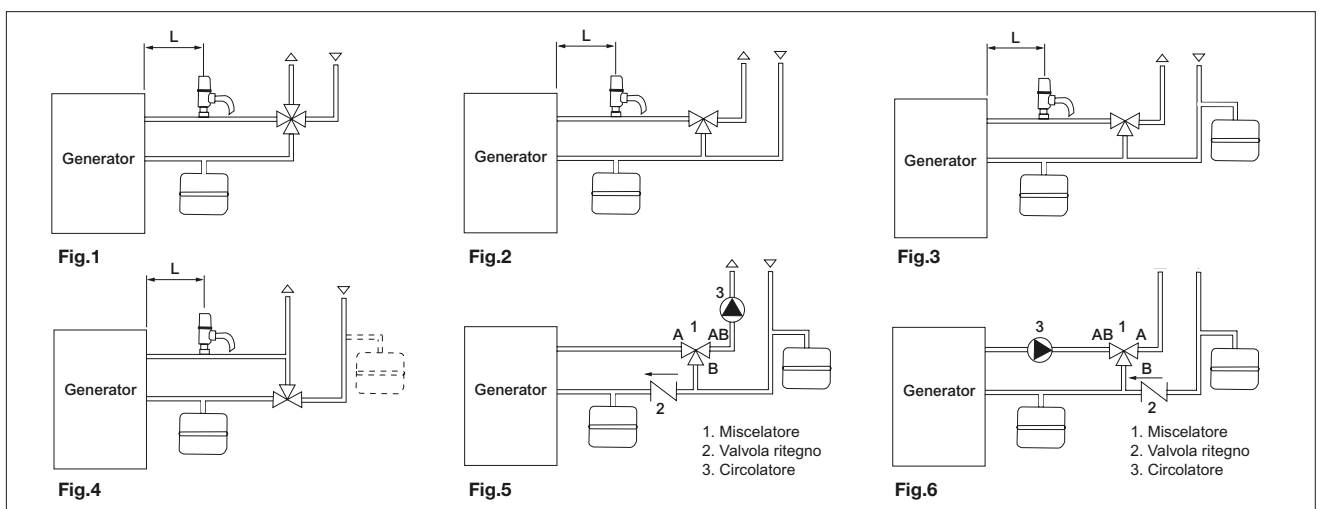
The three-way valve fitted on the flow line can act as either a mixing valve or a diverter valve.

1. If the three-way valve is used as a mixing valve, way AB (Fig.5) remains open at all times: the sector moves between way 1 and way B.

The check valve must be fitted in the boiler circuit.

2. If the 3-way valve is used as a diverter valve (Fig.6), the way AB remains open at all times: the sector moves between way A and way B.

The check valve must be fitted in the user circuit.



Operation

When the heat-sensitive element immersed in the heat-carrier fluid reaches the setpoint temperature, it operates the valve disc, enabling water to be drained from the system.

The movement of the disc controls an electric switch, which can power a contact that can be used, for example, to shut off the supply of fuel to the burner.

When the closure temperature is reached, the valve closes again automatically.

The valve also opens the drain outlet in the event of failure of the heat-sensitive element (positive action).

Sizing

A) Partial or zero filling

In the case of partial or zero filling, "R" regulations (Part R.2.A.) specify that the valve must have a drain flow rate of no less than:

$$G = \frac{P}{0.029}$$

where:

G = flow rate of water to be drained in l/h;

P = heat output of the boiler in kW, assuming that the hydrostatic pressure is 0.5 bar.

The drain flow rate G is linked with the hydrostatic pressure head (pressure difference acting on the valve) resulting from the following formula:

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

where:

K_v = flow coefficient; equal to the lesser of the 2 coefficients k_N and k_E

Δp = hydrostatic pressure acting on the valve in bar.

By inserting the known numerical values we obtain:

1. for VTF/N32: $G = K_v \cdot \sqrt{\Delta p} = 10,000 \cdot \sqrt{0.5} = 7,071 \text{ l/h}$
 $P = 0,029 \cdot G = 0,029 \cdot 7,071 = 205 \text{ kw}$

2. for VTF/N40: $G = K_v \cdot \sqrt{\Delta p} = 18,000 \cdot \sqrt{0.5} = 12,728 \text{ l/h}$
 $P = 0,029 \cdot G = 0,029 \cdot 12,728 = 369 \text{ kw}$

B) Total filling

In the case of total filling from the mains water supply, the flow rate to be drained at the effective operating pressure must be no less than:

$$G = \frac{P}{0.093}$$

where:

G = flow rate to be drained;

P = heat output of the boiler, which is still:

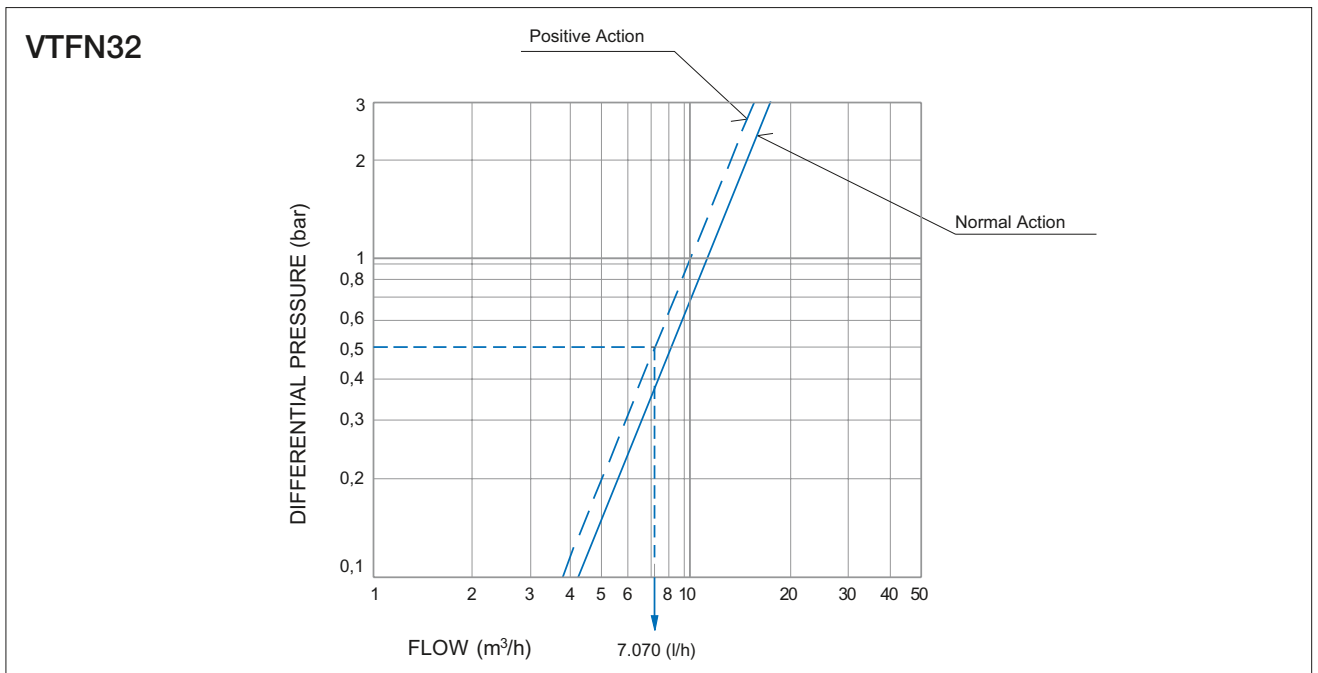
$$G = K_v \cdot \sqrt{\Delta p}$$

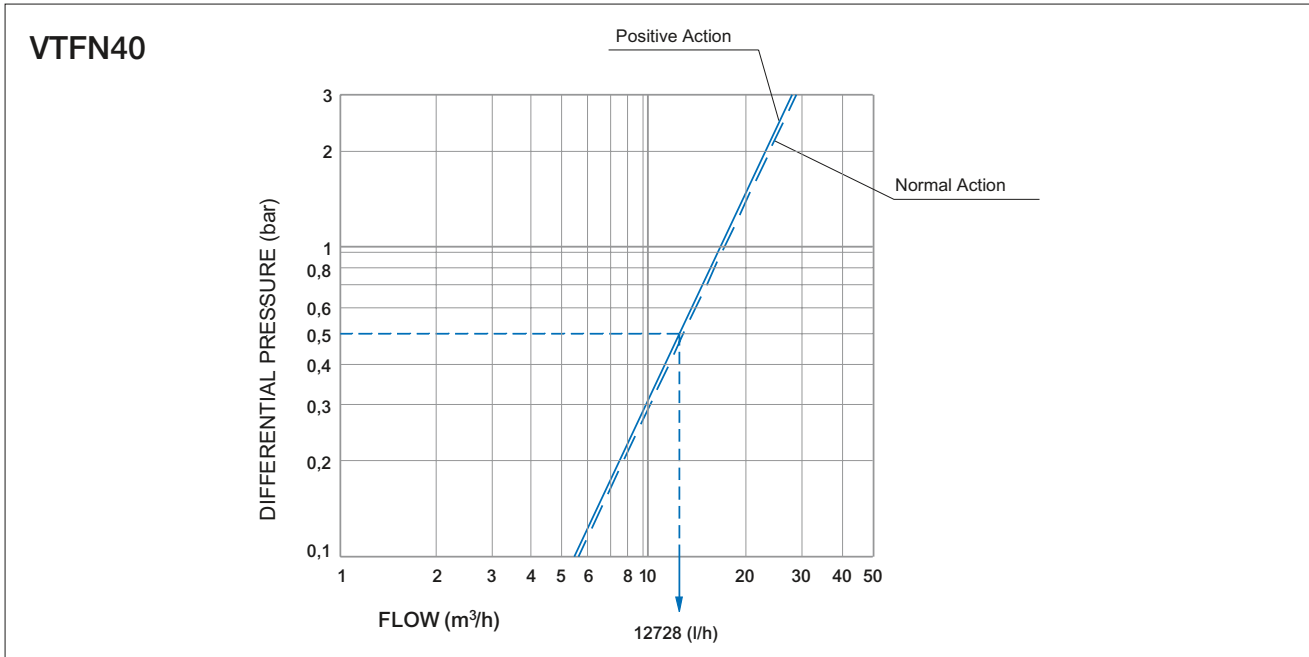
where: K_v = flow coefficient.

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

VTFN32				VTFN40			
		PARTIAL FILLING	TOTAL FILLING			PARTIAL FILLING	TOTAL FILLING
bar	G (l/h)	P (kcal/h)	P (kcal/h)	bar	G (l/h)	P (kcal/h)	P (kcal/h)
0.1	3162.28	91.71	294.09	0.10	5692.10	165.07	529.37
0.2	4472.14	129.69	415.91	0.20	8049.84	233.45	748.64
0.3	5477.23	158.84	509.38	0.30	9859.01	285.91	916.89
0.4	6324.56	183.41	588.18	0.40	11384.20	330.14	1058.73
0.5	7071.07	205.06	657.61	0.50	12727.92	369.11	1183.70
0.6	7745.97	224.63	720.37	0.60	13942.74	404.34	1296.67
0.7	8366.60	242.63	778.09	0.70	15059.88	436.74	1400.57
0.8	8944.27	259.38	831.82	0.80	16099.69	466.89	1497.27
0.9	9486.83	275.12	882.28	0.90	17076.30	495.21	1588.10
1.0	10000.00	290.00	930.00	1.00	18000.00	522.00	1674.00
1.1	10488.09	304.15	975.39	1.10	18878.56	547.48	1755.71
1.2	10954.45	317.68	1018.76	1.20	19718.01	571.82	1833.78
1.3	11401.75	330.65	1060.36	1.30	20523.16	595.17	1908.65
1.4	11832.16	343.13	1100.39	1.40	21297.89	617.64	1980.70
1.5	12247.45	355.18	1139.01	1.50	22045.41	639.32	2050.22
1.6	12649.11	366.82	1176.37	1.60	22768.40	660.28	2117.46
1.7	13038.40	378.11	1212.57	1.70	23469.13	680.60	2182.63
1.8	13416.41	389.08	1247.73	1.80	24149.53	700.34	2245.91
1.9	13784.05	399.74	1281.92	1.90	24811.29	719.53	2307.45
2.0	14142.14	410.12	1315.22	2.00	25455.84	738.22	2367.39
2.1	14491.38	420.25	1347.70	2.10	26084.48	756.45	2425.86
2.2	14832.40	430.14	1379.41	2.20	26698.31	774.25	2482.94
2.3	15165.75	439.81	1410.41	2.30	27298.35	791.65	2538.75
2.4	15491.93	449.27	1440.75	2.40	27885.48	808.68	2593.35
2.5	15811.39	458.53	1470.46	2.50	28460.50	825.35	2646.83
2.6	16124.52	467.61	1499.58	2.60	29024.13	841.70	2699.24
2.7	16431.68	476.52	1528.15	2.70	29577.02	857.73	2750.66
2.8	16733.20	485.26	1556.19	2.80	30119.76	873.47	2801.14
2.9	17029.39	493.85	1583.73	2.90	30652.90	888.93	2850.72
3.0	17320.51	502.29	1610.81	3.00	31176.91	904.13	2899.45

Flow curves

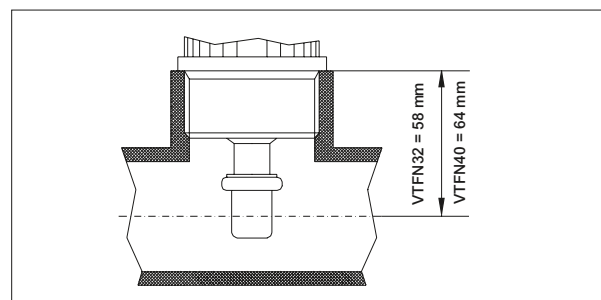
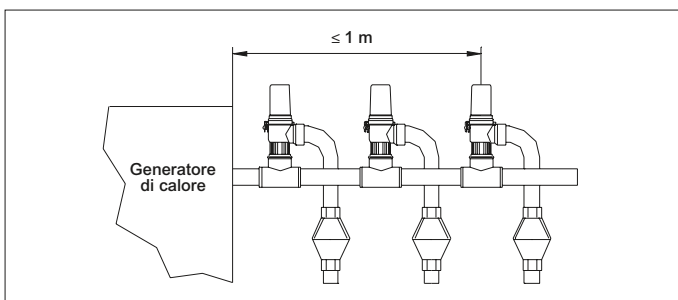




Installation

"R" regulations - 2009 Edition (Part R.3.B.1) stipulate the following:

- the thermal drain valves must be connected to the outlet pipe, within 1 m of the boiler, with the heat-sensitive element immersed in the outward flow of hot water (see drawing);
- for correct positioning of the heat-sensitive element in the flow of water, observe the measurement indicated between the bottom of the thread and the axis of the pipe (see drawing).

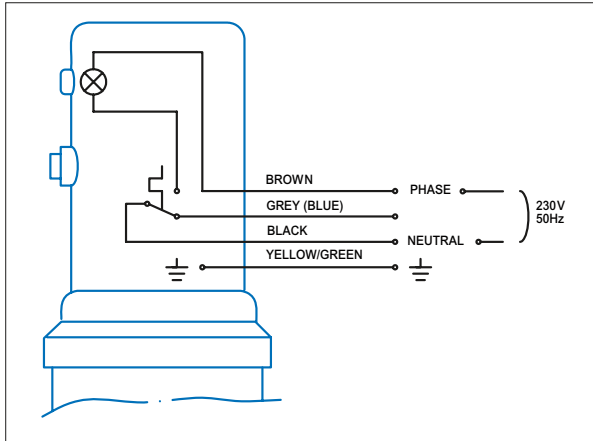


Maintenance

VTFN Series thermal drain valves are maintenance-free.
For further information contact the WATTS technical service.

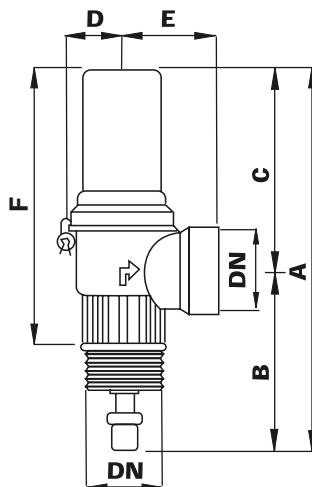
Electrical connections

For correct connection to the mains power supply (230V-50Hz), connect the various wires of the cable coming out of the valve as shown in the drawing.



Overall dimensions (mm)

VTFN



DN	A	B	C	D	E	F
1.1/4"	222	99	123	35	52	186
1.1/2"	242	114	128	38	60	201

Specification text

VTFN Series

TERMOFLUX thermal drain valve **VTFN Series** – WATTS brand – with positive action, manual resetting and indicator light. Protection rating IP40. Setting temperature 95°C. PN10. Drain capacity without filling: DN 1.1/4" - 205 kW equal to 7070 l/h and DN 1.1/2" - 369 kW equal to 12728 l/h. INAIL approved. Compliant with Directives LVD 2014/35/EU and EMC 2014/30/EU. Compliant with PED Directive 2014/68/EU



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