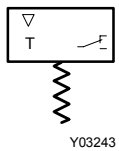
TFL: Frost-protection monitor/limiter with capillary-tube sensor

Used for the monitoring of freezing temperatures in large-surfaced equipment such as air heaters, water pipes and air ducts.
Compact unit for wall mounting. Transparent, impact-proof, thermoplastic cover. Setpoint-adjustment knob with scale for the lower switching point, sealable. Micro-switch with single-pole change-over, gold-plated silver contacts. Capillary-tube sensor of copper with grommet and 3 tube holders. Housing-mounted plug with female cable connector (included in delivery). Fixing bracket (included in delivery). Touch protection as per EN 60730. For flexible cable of 6 - 10 mm external diameter. Standard version has 3 metres of capillary tubing.

T09304

Type	Function	Setting range [°C]	Switching difference (Average values) [K]	Permissible sensor temp. [°C]	Weight [kg]
TFL 201 F001	X_{Sd} = fixed	–5...15	2.0	–20...200	0.47
TFL 201 F011	X_{Sd} = variable	–5...15	2...6	–20...200	0.47
TFL 201 F021	limiter	–5...15	2.0	–20...200	0.47



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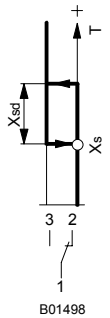
Contact rating		Factory setting	5 °C
as silver contacts [1]	10(3) A, 250 V~	Tolerance of switching difference	max. ± 1 K
	50 W, 250 V=	Perm. temp. at head of instrument [4]	–5...70 °C
min.	100 mA, 24 V	Degree of protection	IP 65 (EN 60529)
as gold contacts [2]	160 mA, 50 V	Protection class	I (IEC 60730)
min.	4 mA, 6 V		
Time constant		Wiring diagram, monitor	A01497
in air 0.3 m/s	35 s	limiter	A05218
in water 0.5 m/s	2 s	Dimension drawing	M09981
		Fitting instructions	MV 505752
Active length of capillary tube [3]	min. 10 cm	Declaration on materials	MD 22.030



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Variants (otherwise as standard version)
TFL 201 F101 Capillary tube, 1.5 m long; with 3 holders, X_{sd} = fixed
TFL 201 F601 Capillary tube, 6.0 m long; with 5 holders, X_{sd} = fixed

Accessories

0296936 000* Bracket for rail: top-hat rail EN 50022, 35 × 7.5 or 35 × 15
0303167 000* Five additional holders for capillary tube

*) Dimension drawing or wiring diagram are available under the same number

1) If under inductive load, take RC circuit into account.
2) If the contacts are ever loaded higher than 160 mA, 50 V, the gold plating will be damaged. The contacts are then classed only as silver contacts, since they lose the characteristics of gold contacts.
3) The monitor always reacts to the coldest place (minimum length is 10 cm).
4) The head of the instrument must be fitted at a place which is warmer than that of the sensor.

Operation

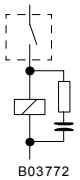
Normally, contacts 1-3 are closed. Whenever the temperature falls below the lower switching point (set value), the contacts switch over from 1-3 to 1-2. When the temperature exceeds the upper switching point, the contacts switch back from 1-2 to 1-3.
F021 limiter with mechanical lock
When the temperature has again risen by the switching difference X_{Sd}, the contacts can be reset manually from 1-2 to 1-3 (reset button).

Additional technical data

Complies with:-	
Directive 73/23/EEC	EN 60730-1/ EN 60730-2-9
EMC directive 89/336/EEC	EN 61000-6-1/ EN 61000-6-2
	EN 61000-6-3/ EN 61000-6-4

Technical notes

RC circuit under inductive load
For the optimum RC circuitry, refer to the specifications supplied by the manufacturers of the relays, contactors etc. If these are not available, the inductive load can be reduced by applying the following rule of thumb (not binding):-
- Capacity of the RC circuitry (µF) ≥ operating current (A)
- Resistance of the RC circuitry (Ω) ≈ coil resistance (Ω)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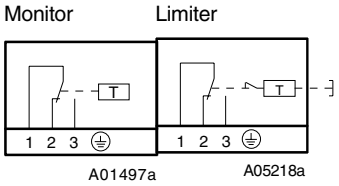
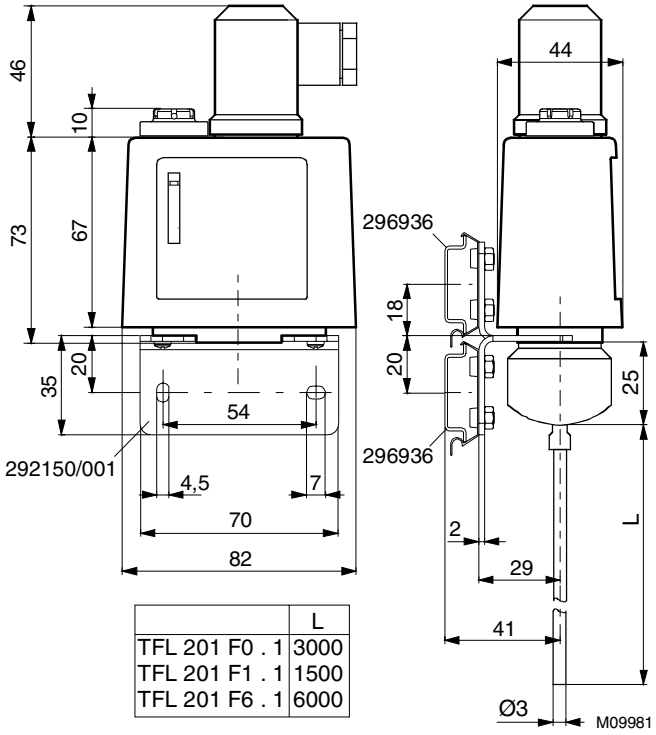
Influence on switching difference
The switching difference is slightly dependent on the setpoint. The switching differences stated in the PDS sheet are typical values at the start of the range. The setpoint's influence on the switching difference increases the switching difference by: ΔX_{Sd} = (setpoint X_S – start of range) × 0.04

Wiring diagram



Dimension drawing



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TFL 201 F0 . 1	3000
TFL 201 F1 . 1	1500
TFL 201 F6 . 1	6000

Accessories