



Display and control unit Thermotronic TT-77

Changes in the viscosity of hydraulic oil and lubricants due to the temperature requires precisely monitoring and stabilising the operating temperature.

Carefully monitoring the temperature further also affects the service life of the oils. The oil tank is generally accepted as the control point for the oil temperature, which will usually provide helpful averages. It may further be helpful to also monitor segments or individual units within a system.

The values determined from the measuring points must be transferred to the system control according to standards. For safety reasons, it is advisable to at a minimum display the current oil temperature on the oil tank.

The Thermotronic TT-77F offers accurate oil temperature measurement and display in one and allows a variety of programming options for the display and signal output.

The Thermotronic TT-77W consists of a temperature sensor and the display unit for remote installation using the Easy Mount System and allows a variety of programming options for the display and signal outputs.

The large range of system-compatible temperature sensors is tailored for use in hydraulic and lubrication technology.

Electronic temperature switch

Up to four programmable switching outputs

Alternatively with IO-Link and 1 x programmable switching output

Alternatively with continuous temperature signal (current/voltage setting) plus one, two or four freely programmable switching outputs

Switching outputs characteristics configurable as window or hysteresis

Two switching outputs can be set as frequency output (1 to 100 Hz)

Directly mount display and control unit

LED display indicates switching outputs, swivels 270° when directly mounted

Standard menu structure based on VDMA standard sheet 24574 ff.

Min/max memory, logbook function

Sensor length up to 1 m (3.3 ft)



Technical Data TT-77F

Basic unit

Version	MS	VA
Operating pressure	max. 5 bar (72.5 psi)	max. 10 bar (145 psi)
Operating temperature	-40 °C to +100 °C (-40 °F to 212 °F)	-40 °C to +100 °C (-40 °F to 212 °F)
Lengths	280 (11), 370 (14.6), 500 (19.7) mm/inch (standard) variable from 70 (2.8) to max. 1000 mm (39.4 inch)	

Material / Version

Probe material (immersion tube)	Brass	1.4571
Connection (flange)	G 1/2	G 1/2
Weight at L=280 mm (11")	approx. 390 gr (0.9 lb)	approx. 390 gr (0.9 lb)
Each 100 mm (3.9") add	approx.15 gr (0.03 lb)	approx.15 gr (0.03 lb)
Degree of protection	IP65	IP65

Analysis Display Electronics

Display	4 character 7 segment LED
Operation	Via 3 keys
Memory	Min. / Max. Data memory
Starting current input	approx. 100 mA for 100 ms
Current input during operation	approx. 50 mA (without current- and switching outputs)
Supply voltage (U _B)	10 – 30 V DC (nominal voltage 24 V DC) / with IO-Link 18 – 30 V DC
Ambient temperature	-20 °C to +70°C
Display units	Temperature °C / °F
Display range	-20 °C to +120 °C (-4 °F to 248 °F)
Alarm setting range	0 °C to 100 °C (32 °F to 212 °F)
Display accuracy	± 1 % from end value

Measured variables

	Temperature
Principle of measurement	Pt 100 Class B, DIN EN 60751

Optional temperature switching outputs

Choose from the following switching outputs

	-1D1S	-2T	-4T
Plug (base)	M12 – 4-pin	M12 – 4-pin	M12 – 8-pin
Switching outputs	IO-Link and 1 x freely programmable with selectable level or temperature assignment	2 x freely programmable	4 x freely programmable
Alarm memory	with 1x assignable to alarm logbook		with 1x assignable to alarm logbook
max. switching current*	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected
Contact load	max. 1 A total	max. 1 A total	max. 1 A total

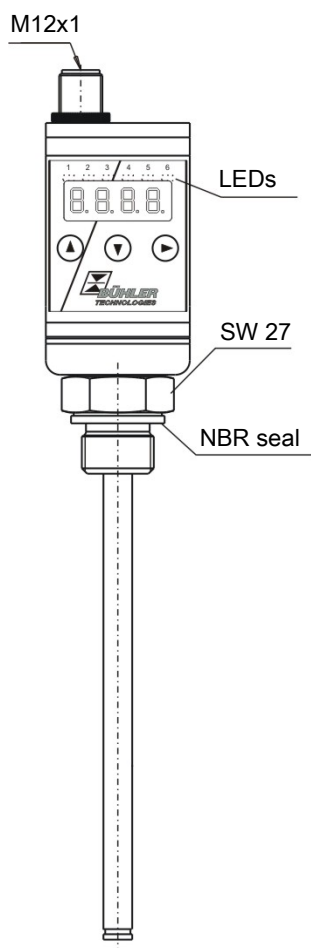
*Output 1 max. 0,2 A.

	-1T-KT	-2T-KT	-4T-KT
Plug (base)	M12 – 4-pin	M12 – 5-pin	M12 – 8-pin
Switching outputs	1 x freely programmable	2 x freely programmable	4 x freely programmable
Alarm memory	with 1x assignable to alarm logbook	with 1x assignable to alarm logbook	with 1x assignable to alarm logbook
max. switching current*	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected
Contact load	max. 1 A total	max. 1 A total	max. 1 A total
Analogue output	1 x 4 – 20 mA 2-10 V DC, 0-10 V DC, 0-5 V DC	1 x 4 – 20 mA 2-10 V DC, 0-10 V DC, 0-5 V DC	1 x 4 – 20 mA 2-10 V DC, 0-10 V DC, 0-5 V DC
Max. burden Ω as current output	$= (U_B - 8 \text{ V}) / 0.02 \text{ A}$	$= (U_B - 8 \text{ V}) / 0.02 \text{ A}$	$= (U_B - 8 \text{ V}) / 0.02 \text{ A}$
Min. input load as voltage output	10 k Ω	10 k Ω	10 k Ω

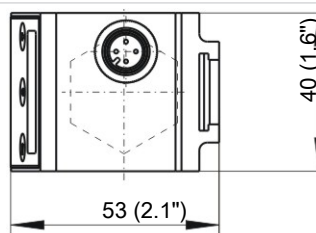
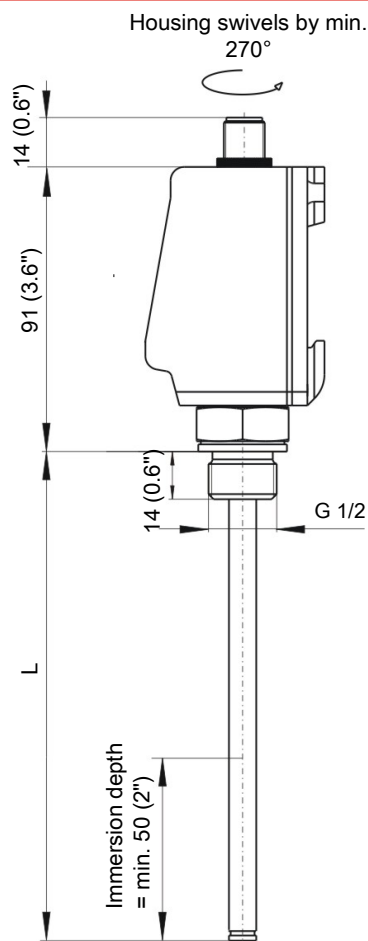
*Output 1 max. 0,2 A.

Dimensions TT-77F

Basic model



Side view



Ordering Instructions TT-77F

Model key

Model designation
TT-77F = tank mounted version

Version

MS Brass
VA Stainless steel

TT-77F-□□□□

Length(max. 1000 mm/39.4")

280 (11")
370 (14.6")
500 (19.7")
variable, please specify

Switching outputs

-1D1S 1 x IO-Link
1 x PNP output
-2T 2 x PNP output
-4T 4 x PNP output
-1T-K 1 x PNP output
1 x analogue output
-2T-K 2 x PNP output
1 x analogue output
-4T-K 4 x PNP output
1 x analogue output

Accessories

Item no. 4-pin	Item no. 5-pin	Item no. 8-pin	Description
9144 05 0010	9144 05 0016	9144 05 0048	Connecting cable M12x1, 1.5 m, angular coupling and straight plug
9144 05 0046	9144 05 0017	9144 05 0049	Connecting cable M12x1, 3.0 m, angular coupling and straight plug
9144 05 0047	9144 05 0018	9144 05 0033	Connecting cable M12x1, 5.0 m, angular coupling and strands

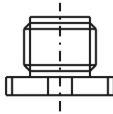
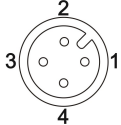
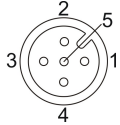
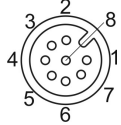
Ordering example

You require: Electronic contact thermometer for tank-top installation, brass, length L = 470 mm (18.5"), 1 temperature contact and analogue output

Order: Thermotronik TT-77F-MS-1T-KT / 470

Standard pin assignment TT-77F

Plug connection

Version	-1D1S	-2T	1T-KT	2T-KT	-4T	-4T-KT
	M12 (base)					
	4-pin	4-pin	4-pin	5-pin	8-pin	8-pin
						
Panel plug						
Pin						
1	+24 V DC	+24 V DC	+24 V DC	+24 V DC	+24 V DC	+24 V DC
2	T2 (PNP)	T2 (PNP)	Analogue	T2 (PNP)	T2 (PNP)	T2 (PNP)
3	GND	GND	GND	GND	GND	GND
4	C/Q (IO-Link)	T1 (PNP)	T1 (PNP)	T1 (PNP)	T1 (PNP)	T1 (PNP)
5				Analog out	T3 (PNP)	T3 (PNP)
6					T4 (PNP)	T4 (PNP)
7						Analog out

Technical Data TT-77W

PT100 temperature sensor

Version	MS	VA
Operating pressure	max. 5 bar (72.5 psi)	max. 10 bar (145 psi)
Operating temperature	-40 °C to +100 °C (-40 °F to 212 °F)	-40 °C to +100 °C (-40 °F to 212 °F)
Lengths	280 (11), 370 (14.6), 500 (19.7) mm/inch (standard) variable from 70 (2.8) to max. 1000 mm (39.4 inch)	

Material / Version

Probe material (immersion tube)	Brass	1.4571
Connection (flange)	G 1/2	G 1/2
Plug connection	M12 (base)	M12 (base)
Weight at L=280 mm	approx. 270 gr (0.6 lb)	approx. 270 gr (0.6 lb)
Each 100 mm add	approx. 15 gr (0.03 lb)	approx. 15 gr (0.03 lb)
Degree of protection	IP65	IP65

Analysis Display Electronics

Display	4 character 7 segment LED
Operation	Via 3 keys
Memory	Min. / Max. Data memory
Starting current input	approx. 100 mA for 100 ms
Current input during operation	approx. 50 mA (without current- and switching outputs)
Supply voltage (U _B)	10 – 30 V DC (nominal voltage 24 V DC) / with IO-Link 18 – 30 V DC
Ambient temperature	-20 °C to +70 °C
Display units	Temperature °C / °F
Display range	-20 °C to +120 °C (-4 °F to 248 °F)
Alarm setting range	0 °C to 100 °C (32 °F to 212 °F)
Display accuracy	± 1 % from end value

Measured variables

	Temperature
Principle of measurement	Pt 100 Class B, DIN EN 60751
Tolerance	± 0.8 °C (± 1.4 °F)

Optional temperature switching outputs

Choose from the following switching outputs

	-1D1S	-2T	-4T
Plug (base)	M12 – 4-pin	M12 – 4-pin	M12 – 8-pin
Switching outputs	IO-Link and 1 x freely programmable with selectable level or temperature assignment	2 x freely programmable*	4 x freely programmable*
Alarm memory	with 1x assignable to alarm logbook		with 1x assignable to alarm logbook
max. switching current**	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected
Contact load	max. 1 A total	max. 1 A total	max. 1 A total

*also programmable as frequency output.

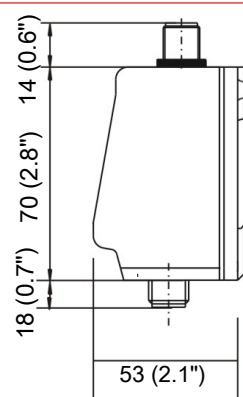
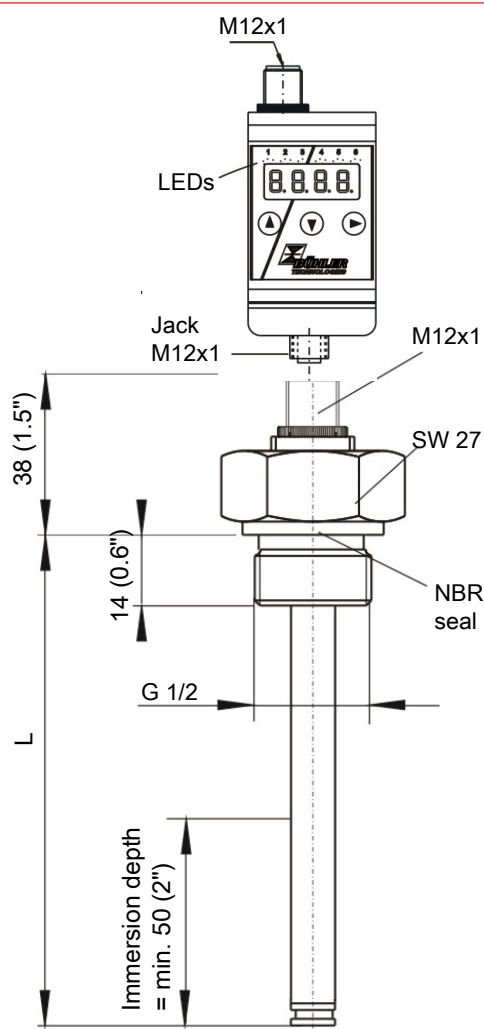
**Output 1 max. 0,2 A.

	-1T-KT	-2T-KT	-4T-KT
Plug (base)	M12 – 4-pin	M12 – 5-pin	M12 – 8-pin
Switching outputs	1 x freely programmable	2 x freely programmable	4 x freely programmable
Alarm memory	with 1x assignable to alarm logbook	with 1x assignable to alarm logbook	with 1x assignable to alarm logbook
max. switching current*	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected
Contact load	max. 1 A total	max. 1 A total	max. 1 A total
Analogue output	1 x 4 – 20 mA 2-10 V DC, 0-10 V DC, 0-5 V DC	1 x 4 – 20 mA 2-10 V DC, 0-10 V DC, 0-5 V DC	1 x 4 – 20 mA 2-10 V DC, 0-10 V DC, 0-5 V DC
Max. burden Ω as current output	$= (U_B - 8 \text{ V}) / 0.02 \text{ A}$	$= (U_B - 8 \text{ V}) / 0.02 \text{ A}$	$= (U_B - 8 \text{ V}) / 0.02 \text{ A}$
Min. input load as voltage output	10 k Ω	10 k Ω	10 k Ω

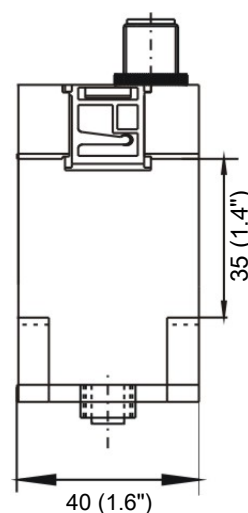
*Output 1 max. 0,2 A.

Dimensions TT-77W

Basic model



Back panel



Ordering Instructions TT-77W

Model key

Model designation
TT-77W = remote display version

Version

MS Brass
VA Stainless steel

TT-77W-□-□-□-□

Length (max. 1000 mm/39.4")

280 (11")
370 (14.6")
500 (19.7")
variable, please specify

Switching outputs

-1D1S 1 x IO-Link
1 x PNP output
-2T 2 x PNP output
-4T 4 x PNP output
-1T-KT 1 x PNP output
1 x analogue output
-2T-KT 2 x PNP output
1 x analogue output
-4T-KT 4 x PNP output
1 x analogue output

Accessories

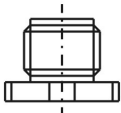
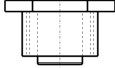
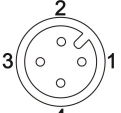
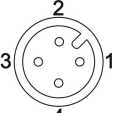
Item no. 4-pin	Item no. 5-pin	Item no. 8-pin	Description
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Ordering example

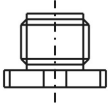
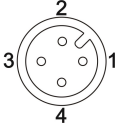
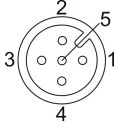
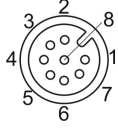
You require: Electronic contact thermometer, remote display version, brass, length L = 470 mm (18.5"), 1 temperature contact and analogue output

Order: Thermotronik TT-77W-MS-1T-KT / 470

Standard pin assignment TT-77W

	Pt100 temperature sensor M12x1 4-pin	Sensor input remote display M12x1 4-pin
		
Panel jack		
Pin		
1	Pt100	Pt100
2	Pt100	Pt100

Plug connection

Version	-1D1S	-2T	1T-KT	2T-KT	-4T	-4T-KT
	M12 (base)					
	4-pin	4-pin	4-pin	5-pin	8-pin	8-pin
						
Panel plug						
Pin						
1	+24 V DC	+24 V DC	+24 V DC	+24 V DC	+24 V DC	+24 V DC
2	T2 (PNP)	T2 (PNP)	Analogue	T2 (PNP)	T2 (PNP)	T2 (PNP)
3	GND	GND	GND	GND	GND	GND
4	C/Q (IO-Link)	T1 (PNP)	T1 (PNP)	T1 (PNP)	T1 (PNP)	T1 (PNP)
5				Analog out	T3 (PNP)	T3 (PNP)
6					T4 (PNP)	T4 (PNP)
7						Analog out