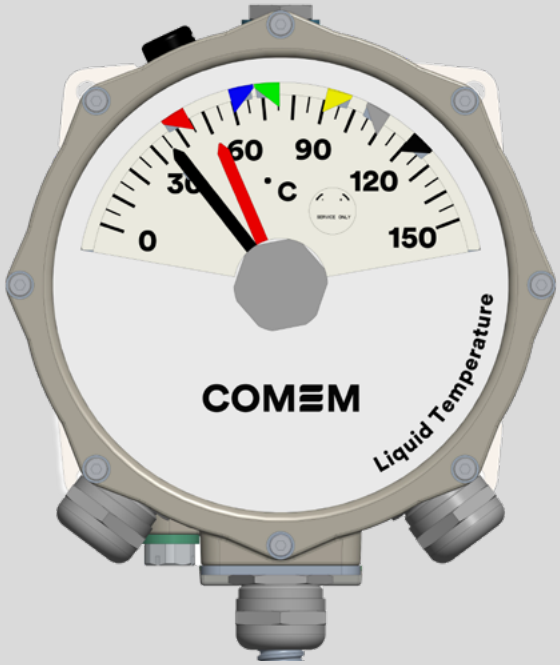
TECHNICAL GUIDE

Liquid & Winding temperature indicators



Content index

Application

Temperature indicators in oil / IEC

	Features	Liquid temperature indicators	Winding temperature indicators
Standard configuration	Type	OTI / eOTI / OTI-C / eOTI-C	WTI / eWTI/ WTI-C / eWTI-C
	Scale	-50 °C / +150 °C, -20 °C / +140 °C, 0 °C / +150 °C, 0 °C / +160 °C	
	Dial protection	Polycarbonate	Polycarbonate
	CT nominal current	-	1, 2, and 5A
	Ventilation System	YES	YES
	Micro switches	2 (CO), 4(CO) or 6 (NO)	2 (CO), 4(CO) or 6 (NO)
	Capillary length	up to 16 m	up to 16 m
	Max pointer	Yes	Yes
Options	PT100	Up to 2 (up to 1 for eOTI/eOTI-C)	Up to 2 (up to 1 for eWTI/eWTI-C)
	Vibration damping	Available	Available
	MBO contacts(1)	Available (OTI-eOTI) (up to 4)	Available (WTI-eWTI) (up to 4)
	Analog output 4-20 mA	Embedded (eOTI/eOTI-C) or external transducer	Embedded (eWTI/eWTI-C) or external transducer
	Digital output Modbus RTU	Embedded (eOTI)	Embedded (eWTI)
	Dial protection	Glass	Glass
	Thermal well	Available	Available

(1) Only for OTI/eOTI/WTI/eWTI with old design

Temperature indicators in air / ANSI

	Features	Liquid temperature indicators	Winding temperature indicators
Standard configuration	Type	ATI/eATI/ATIw/ATI-C/eATI-C/ ATIw-C/eATIw-C	AWTI/eAWTI/AWTI-C/eAWTI-C
	Scale	From 0°C up to +120°C	From 0°C up to +180°C
	Dial protection	Polycarbonate	Polycarbonate
	CT nominal current	-	1, 2, and 5A
	Ventilation System	YES	YES
	Micro switches	2 (CO), 4(CO) or 6 (NO)	2 (CO), 4(CO) or 6 (NO)
	Capillary length	up to 394" (10 m)	up to 394" (10 m)
	Max pointer	Yes	Yes
Options	PT100	Up to 2 (up to 1 for eATI/eATI-C)	Up to 2 (up to 1 for eAWTI/eAWTI-C/eATIw/eATIw-C)
	Vibration damping	Available	Available
	Analog output 4-20 mA	Embedded or external transducer	Embedded or external transducer
	Digital output Modbus RTU	Embedded (eATI/ eATIw)	Embedded (eAWTI)
	Dial protection	Glass	Glass
	Thermal well	Available	Available

Technical data

Temperature Indicators	Technical data
Material	
Housing	C4-MEDIUM: Aluminum casting, RAL 7032, powder coated (standard); C5-MEDIUM: Coastal area model, surface treatment, not painted (on request) CX: Off shore model, RAL 7035 (on request)
Dial protection	Polycarbonate (standard) / Glass (optional)
Max pointer	Standard
Temperature sensor	Brass
Temperature sensor protection	Brass
Capillary tube (in oil / IEC)	Copper capillary tube with Rilsan protection (standard) or stainless steel protection (optional)
Cable gland (in oil / IEC)	3; M25x1,5 made of nickel-planted brass (C4/C5) or plastic (CX)
Capillary tube (in air / ANSI)	Stainless steel protection (standard) or copper capillary tube with Rilsan protection (optional)
Cable gland (in air / ANSI)	3 NPT

Characteristics data	
Standard	IEC 60076-22-1
Installation	Indoors and outdoors, tropical proof
Ambient temperature	-40 °C to 80 °C (-40 °F to 176 °F) (for lower temperature range please contact COMEM)
Winding temperature indicator with internal heating element	Standard for all except ATIw
Nominal current availability	1A, 2A and 5A
Degree of protection	IP66 in accordance with EN60529
Measuring range in oil / IEC	-50 °C / +150 °C, -20 °C / +140 °C, 0 °C / +150 °C, 0 °C / +160 °C
Measuring range in air / ANSI	0 °C / +120 °C for ATI, eATI and 0 °C / +180 °C for ATIw, eATIw, AWTI, eAWTI
Measuring accuracy	1.5 % of Full Scale
Ventilation	Ventilation system to prevent condensation (C4/CX plastic valve; C5 stainless steel valve)
Wires	Min 0.25 mm² / Max 2.5 mm²
Vibration damping	Optional anti-vibration supports available
Sinusoidal (EN 60721-3-4)	cl 4M4: 2-9 Hz (6 mm peak to peak), 9-200 Hz (1g) - All axis
Shock	cl 4M4: 10g (11 ms) in all the directions (EN 60721-3-4)

Standard micro switches	
Number and types	2 or 4 adjustable change over switches, 6 adjustable normal open switches
Contact load	ac: 250V / 5A / cosΦ=1, dc: 250V / 0.25A, 125V / 0.5A, 50V / 1A, 30V / 5A (non-inductive) (On customers request can be provide contacts with higher performances see pag. 3)
Minimum switching distance	4% Full Scale
Rated insulation voltage	2.5 kV ac/1 min, terminals to ground
Switching accurancy	2% of Full Scale
Commutation differential	4% of Full Scale
Rated insulation voltage	2.5 kV ac 1 min between contacts and earth, 1.0 kV ac 1 min between open contacts
PT100	Max no. 2 ; 3 wires

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Technical data

Higher performances micro switches

Number and types	2 or 4 adjustable change over switches, 6 adjustable normal open switches
Contact load	ac: 250V / 10A / cosΦ=1 dc: 250V / 0.25A, 125V / 0.5A, 50V / 3A, 30V / 10A (non-inductive)
Measuring accuracy	1.5% of Full Scale
Switching accuracy	2% of Full Scale
Commutation differential	According to IEC 60076-22-1
PT100	Max no. 2 ; 3 wires

MBO contact (for IEC only)(1)

Number and types	2 or 4 adjustable change over switches
Contact load	ac/dc: 250V / 3A, 125V / 10A (non-inductive)
Measuring accuracy	±3 °C between 30-150 °C
Switching accuracy	±4 °C between the range 30-150 °C
Resetting tolerance	10 ±2 °C
PT100	Max no. 2 ; 3 wires

(1) Only for OTI/eOTI/WTI/eWTI with old design

Analog output (embedded in the eDevice)

Supply voltage	24V ±10 % dc polarized (protected against pole reversal) Active passive loop
Output signal	4 - 20 mA
Measure Accuracy	1.5 % of Full Scale
Measuring range	In agreement with the indicator scale
Rated insulation voltage	2 kV ac, 1 min, terminals to ground
Maximum resistance	700 Ω at 24V dc
Power consumption	0.5 W
Max distance for analogical output	Max 30 m / 98 ft (for different request contact COMEM)
Wires	Max 2.5 mm^2 – advised 4x1 mm^2 o 6x1 mm^2 shielded twisted pair cable for analog/digital output

Analog and digital output (embedded in the eDevice)

Supply voltage	24V ±10 % dc polarized (protected against pole reversal) Active current loop
Output signal	4 - 20 mA and RS485 Modbus RTU
Measure Accuracy	1.5 % of Full Scale
Measuring range	In agreement with the indicator scale (only for analog output)
Rated insulation voltage	2 kV ac, 1 min, terminals to ground
Maximum resistance	450 Ω at 24 V dc
Power consumption	0.5 W
Max distance for analogical output	Max 30 m / 98 ft (for different request contact COMEM)
Wires	Max 2.5 mm^2 – advised 4x1 mm^2 o 6x1 mm^2 shielded twisted pair cable for analog/digital output

External trasducer MP88800

Supply voltage	24V dc ±10 % Passive current loop
Output signal	4-20 mA
Measuring range	In agreement with the indicator scale (only for analog output)
Rated insulation voltage	2kV ac, 1 min, terminals to ground
Maximum resistance	700 Ω at 24V dc
Power consumption	0.5 W

External transducer RTC685 (galvanic insulation):

Supply voltage	24V dc ±15 % Active current loop
Output signal	0-20 mA, 4-20 mA, 0-5V, 0-10V
Measuring range	In agreement with the indicator scale (only for analog output)
Rated insulation voltage	1kV ac, 1 min, terminals to ground
Maximum resistance	600 Ω at 24 V dc
Power consumption	< 1.5 W

Temperature display for remote visualization: C40

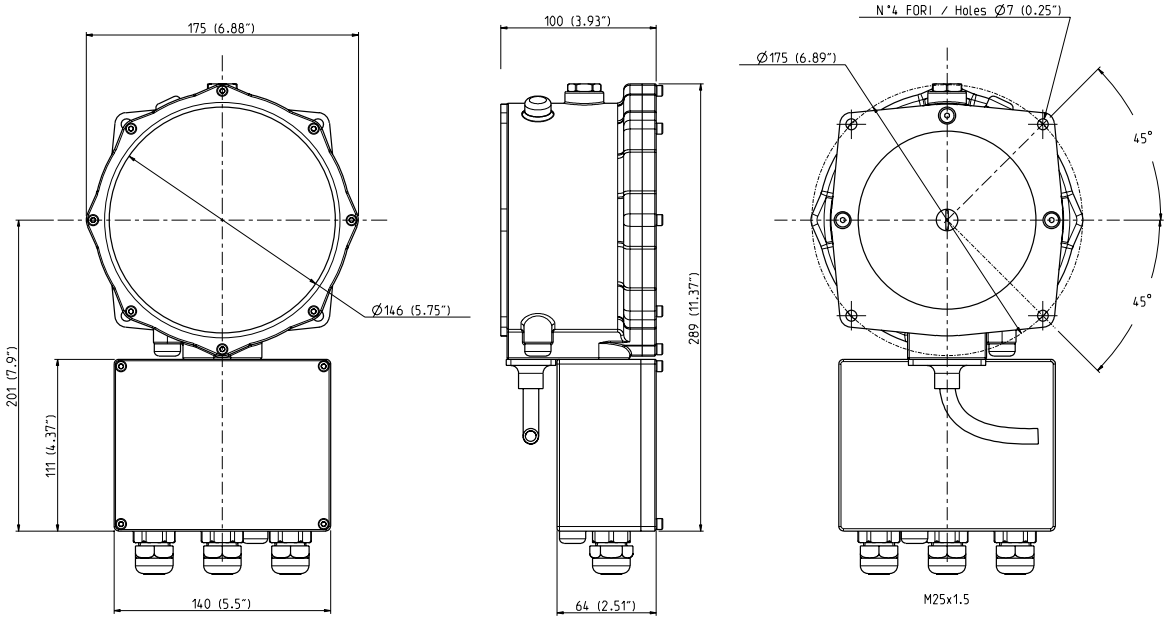
Supply voltage	18 to 265V ac/dc
Input	4-20 mA
Power consumption	<1.5 W

Power supply: DRA 18

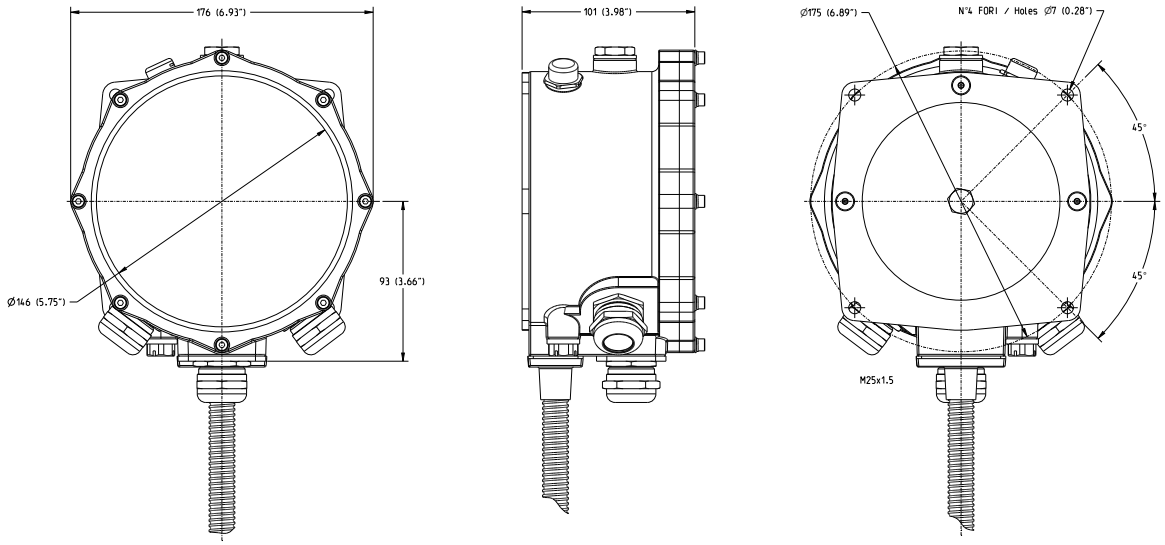
Input supply voltage	90 to 260V ac/dc
Output voltage	24V dc
Power consumption	18W
Assembly	DIN RAIL

Dimensions

Liquid and winding temperarure indicators

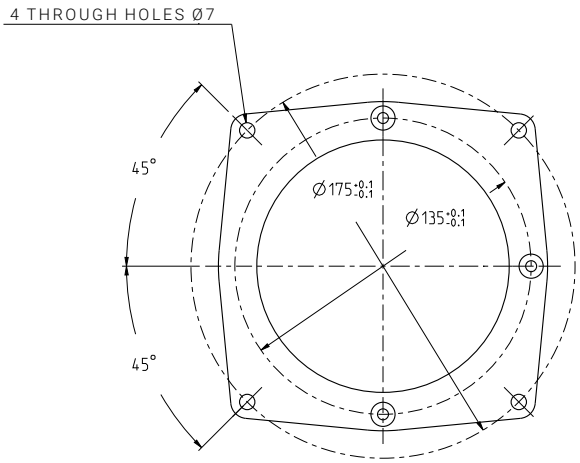


Liquid and winding temperature indicators (compact type)

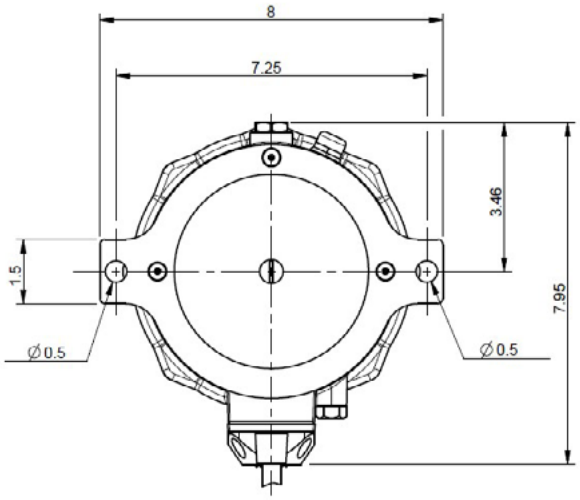


Mounting type

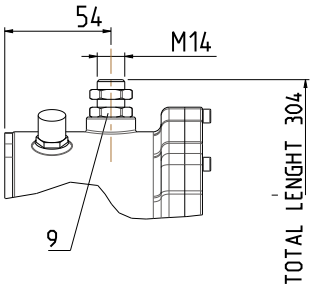
Flange connection (Type F)



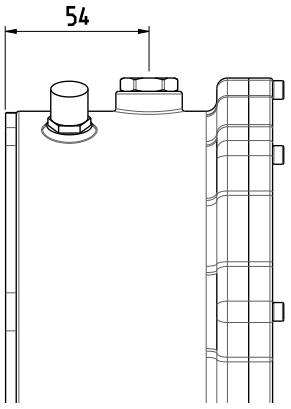
Flange connection (Type Q)



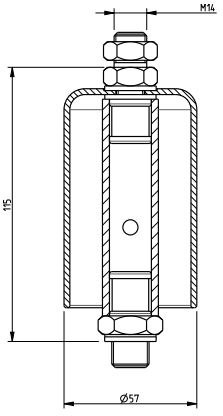
Rigid screw (Type R)



Elastic suspension (Type ES)



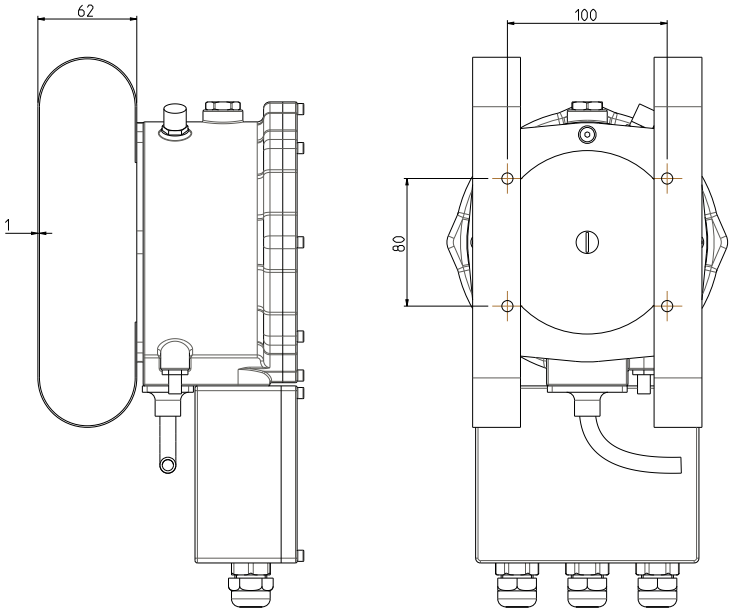
Unscrew the upper rigid locking M14 screw located. on the top of the thermometer



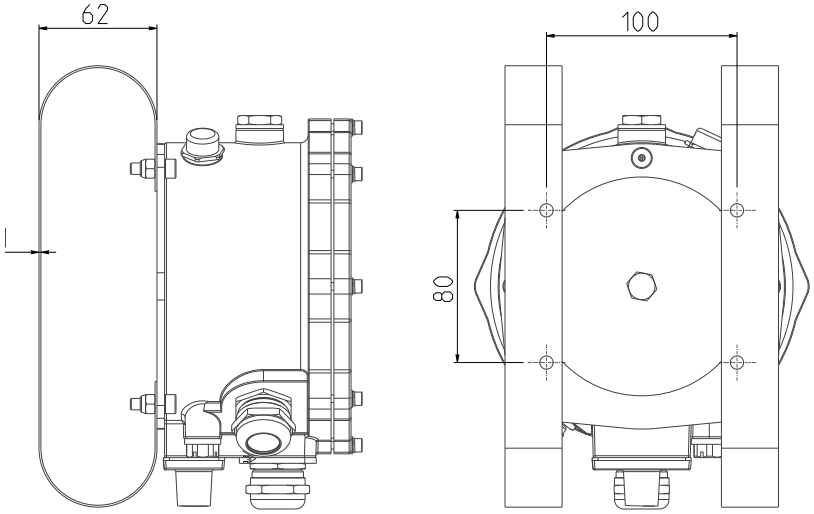
Assembly the elastic suspension on the top of the thermometer with a M14 screw that let install the instrument in the plant

Mounting type

Back metallic sheets (Type V) for non compact temperature indicators

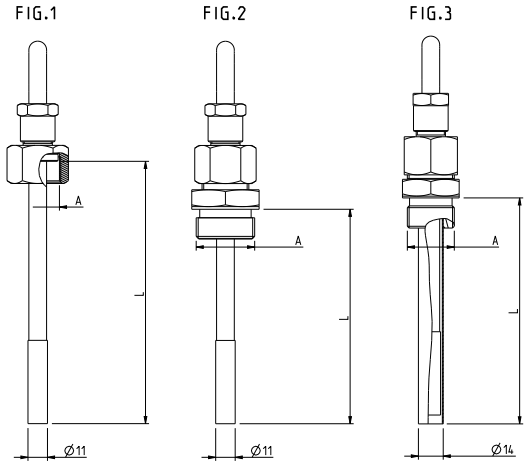


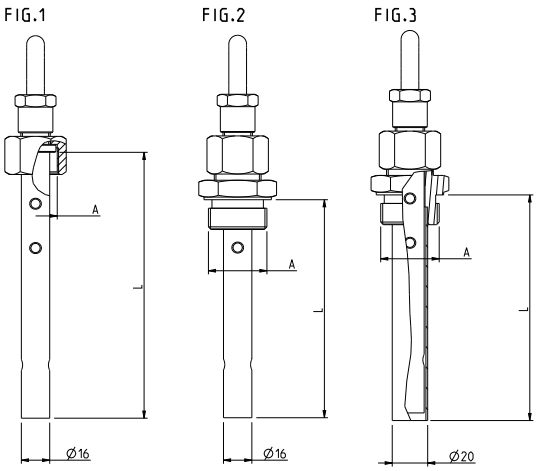
Back metallic sheets (Type V) for compact temperature indicators



Bulbs for types in oil / IEC

Liquid temperature indicator OTI/eOTI





OTI/eOTI

	Fig. 1				
A	¾" BSP	1/2" BSP			
L	Min 80 mm / Std. 150 mm				
A	**Fig. 2/3**				
	¾" BSP	1/2" BSP	1" BSP	M27x2	M22x1.5
L	Min 80 mm / Std. 150 mm				

OTI/eOTI equipped with PT100 sensor

	Fig. 1			
A	¾" BSP			
L	Min 150 mm / Std. 150 mm			
A	**Fig. 2/3**			
	¾" BSP	1" BSP	M27x2	M22x1.5
L	Min 120 mm / Std. 150 mm			

Winding temperature indicator WTI/eWTI

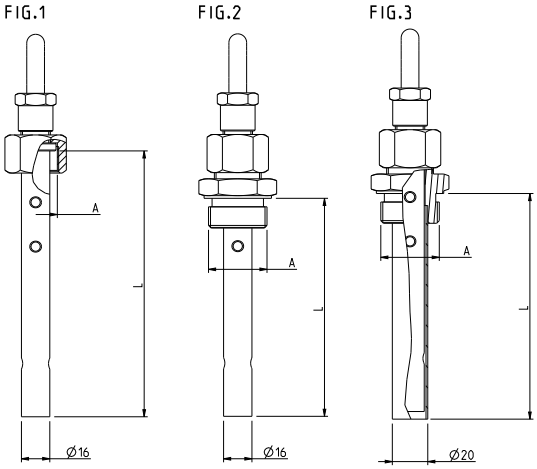


	Fig. 1			
A	¾" BSP			
L	Std. 150 mm			
A	**Fig. 2/3**			
	¾" BSP	1" BSP	M27x2	M22x1.5
L	Min 120 mm / Std. 150 mm			

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Bulbs for types in air / ANSI

Fig. A

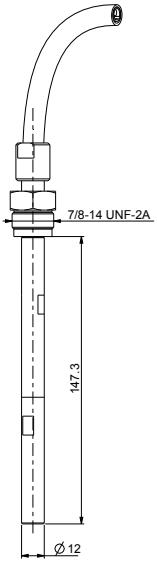


Fig. B

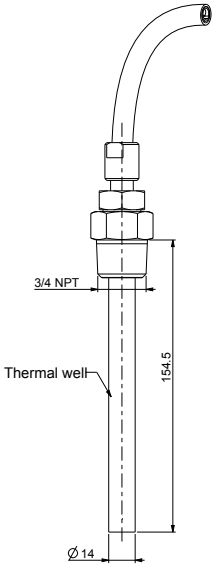


Fig. C

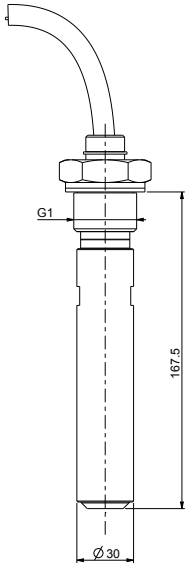


Fig. D

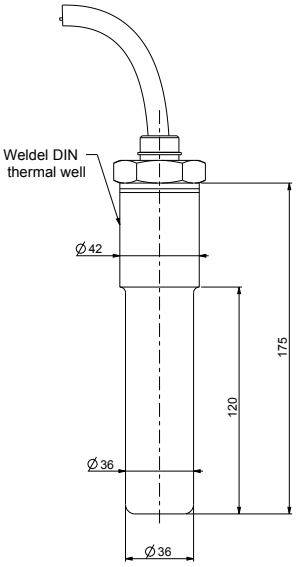
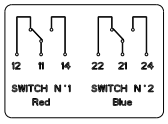


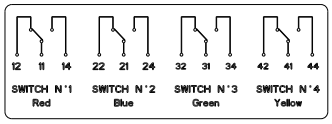
Fig.	Temperature indicator type	PT100 sensors
A	ATI / eATI / ATIw /eATIw (bulb)	max n. 1
B	ATI / eATI / ATIw /eATIw (bulb + thermal well)	max n. 1
C	ATI / eATI with PT100 sensors / AWTI / eAWTI (bulb)	max n. 2
D	ATI / eATI with PT100 sensors / AWTI / eAWTI (bulb + thermal well)	max n. 2

Electrical scheme

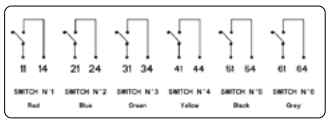
Liquid temperature indicator with cable box



2 contacts

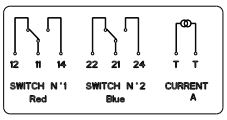


4 contacts

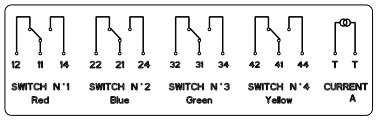


6 contacts

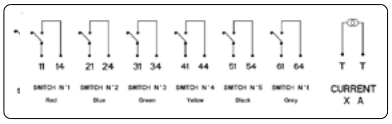
Winding temperature indicator with cable box



2 contacts

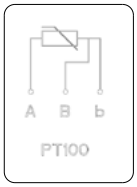


4 contacts

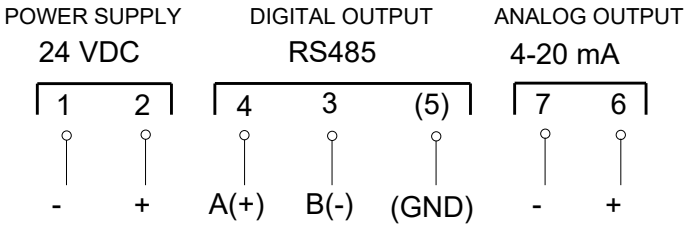


6 contacts

PT100

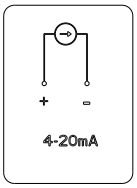


Liquid and winding temperture indicator with cable box with embedded analog and digital output

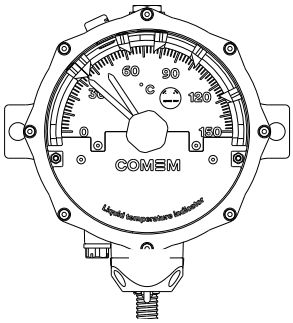


Terminals number	
Supply Voltage 24 V dc	1(-) / 2(+)
Analog output 4-20 mA	6(+) / 7(-)
Modbus RTU (RS485 gate)	4 (A+) / 3 (B-)
Optional PT100	A, B, b

Liquid and winding temperature indicators with embedded analog output with passive current loop



Plug-in connection



Liquid temperature indicator with plug-in connection (type ANSI)

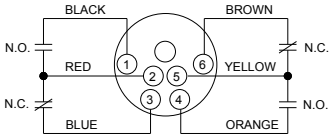


Fig.1

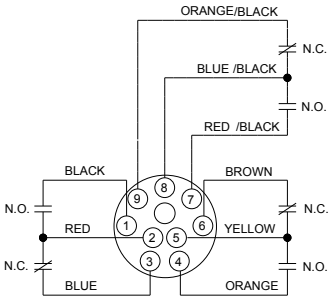


Fig.2

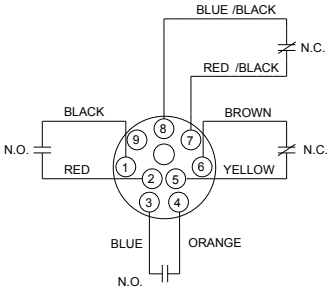


Fig.3

For further information or clarification, please contact our support team. E-mail address: customerservice@it.comem.com

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Order sheet

Temperature indicators in oil / IEC

	Date	
	Rev.	
	Customer reference	

Type

	OTI (Liquid temperature indicator)
	WTI (Winding temperature indicator)
	eOTI (Liquid temperature indicator - eDevice)
	eWTI (Winding temperature indicator - eDevice)
	OTI-C (Compact liquid temperature indicator)
	WTI-C (Compact winding temperature indicator)
	eOTI-C (Compact liquid temperature indicator - eDevice)
	eWTI-C (Compact winding temperature indicator - eDevice)

Output: relevant only for eDevice (eOTI and eWTI)

	Analog output (4 - 20mA)
	Analog and digital output (4 - 20mA and Modbus RTU) (1)

(1) For non compact temperature indicators only

	Mounting type	Reference page 8-9
	Flange	Type F
	Rigid screw	Type R
	Elastic suspension	Type ES
	Back metallic sheets	Type V
	Flange	Type Q

Scale

	-50 °C/+150 °C		0 °C/+150 °C
	-20 °C/+140 °C		0 °C/+160 °C

Dial minimum division

	5° (standard)
	2° (special)

Terminal board type

	Cable box
	Plug-in

Number of micro switches (cable box; see page 13)(2)

	2
	4
	6 (NO)

(2) Overlapping switches; see page 19

Number of micro switches (plug-in; see page 14)

	2
	3
	4

	Type of micro switches	Contact load
	Standard	AC: 250 V/5A / cosΦ=1, DC: 250 V/0.25A, 125 V/0.5A, 50 V/1A, 30 V/5A
	High performances	AC: 250 V/10A / cosΦ=1, DC: 250 V/0.25A, 125 V/0.5A, 50 V/3A, 30 V/10A
	MBO(3)	AC/DC: 250 V/3A, 125 V/10A

(3) Only for OTI/eOTI/WTI/eWTI with old design

PT100

	N. 1 (3 wires) (4)
	N. 2 (3 wires) (4)

(4) For eOTI/eWTI possible to choose max. 1 additional PT100 sensor

Capillary tube protection

	RILSAN (standard)
	Stainless steel AISI 304 (optional)(5)

(5) For CX only stainless steel

Capillary length

	2 m
	6 m
	8 m
	10 m
	12 m
	16 m

	Bulb type (page 10)	Note
	Fig.1	Female
	Fig.2	Male
	Fig.3	Male with well

	Bulb thread (page 10)	Note
	½”BSP	Not for WTI, PT100, eOTI, eOTI-C, eWTI, eWTI-C
	¾”BSP	
	M22x1.5	Male only; without PT100
	M27x2	Male only
	1”BSP	Male only

Special Bulb length (thread included)

	.....mm Without PT100 (min 80 mm)
	.....mm With PT100 (min 150 mm)

Corrosion protection

	C4 acc. to ISO 12944 (standard)
	C5-M acc. to ISO 12944 (not paintable)
	CX acc. to ISO 12944 (RAL 7035)

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Date	
Rev.	
Customer reference	

Dial protection

	Polycarbonate (standard - not available for CX offshore corrosion protection class)
	Glass (optional)

Accessories

	Temperature display for remote visualization C40
	External transducer MP88800 (only for OTI/WTI)
	External transducer RTC685 (only for OTI/WTI)
	Power supply: DRA 18 (IN 110/230 V ac/dc, OUT 24 V dc)

WTI/ eWTI – CT nominal current

	1A
	2A
	5A

WTI /eWTI– optional values

	..... °C	Specify set thermal gradient (with thermowell thickness between 2,5 and 4 mm)
	.....A	Specify set nominal current for WTI & eWTI

Order sheet

Temperature indicators in air / ANSI

Date	
Rev.	
Customer reference	

	Type
	ATI (Liquid temperature indicator)
	ATIw (Liquid temperature indicator for winding)
	AWTI (Winding temperature indicator)
	eATI (Liquid temperature indicator - eDevice)
	eATIw (liquid temperature indicator for winding - eDevice)
	eAWTI (Winding temperature indicator - eDevice)
	ATI-C (Compact liquid temperature indicator)
	ATIw-C (Compact liquid temperature indicator for winding)
	AWTI-C (Compact winding temperature indicator)
	eATI-C (Compact liquid temperature indicator - eDevice)
	eATIw-C (Compact liquid temperature indicator for winding - eDevice)
	eAWTI-C (Compact winding temperature indicator - eDevice)

	Output: relevant only for eDevice
	Analog output (4 - 20mA)
	Analog and digital output (4 - 20mA and Modbus RTU) (1)

(1) For non compact temperature indicators only

	Mounting type	Reference page 8-9
	Flange	Type F
	Rigid screw	Type R
	Elastic suspension	Type ES
	Back metallic sheets	Type V
	Flange	Type Q

	Terminal board type
	Cable box
	Plug-in

	Number of micro switches (cable box; see page 13)(2)
	2
	4
	6 (NO)

(2) Overlapping switches; see page 19

	Number of micro switches (plug-in; see page 14)
	2
	3
	4

	Type of micro switches	Contact load
	Standard	AC: 250V / 5A / cosΦ=1, DC: 250V / 0.25A, 125V / 0.5A, 50V / 1A, 30V / 5A
	High performances	AC: 250V / 10A / cosΦ=1, DC: 250V / 0.25A, 125V / 0.5A, 50V / 3A, 30V / 10A

	Dial minimum scale division
	5° (standard)
	2° (special)

	PT100
	No. 1 (3 wires) (3)
	No. 2 (3 wires) (3)

(3) For eATI/ eATI-C/ eAWTI/ eWTI-C/ eATIw/ eATIw-C possible to choose max. 1 additional PT100 sensor

	Capillary tube protection
	RILSAN (standard)
	Stainless steel AISI 304 (optional)(4)

(4) For CX only stainless steel

	Capillary length
	157" (4 m)
	236" (6 m)
	394" (10 m)

	Bulb thread (page 11)		
	Fig.A	7/8"-14 UNF-2A	only for type ATI / ATIw
	Fig.C	G1"	not applicable for type ATIw

	Thermal well - optional (Page 11)		
	Fig.B	3/4" NPT	only for type ATI / ATIw
	Fig.D	Welded DIN well	not applicable for type ATIw

	Corrosion protection
	C4 acc. to ISO 12944 (standard)
	C5-M coastal area acc. to ISO 12944 (not paintable)
	CX acc. to ISO 12944 (RAL 7035)

For further information or clarification, please contact our support team. E-mail address: customerservice@it.comem.com

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	Dial protection
	Polycarbonate (standard - not available for CX offshore corrosion protection class)
	Glass (optional)

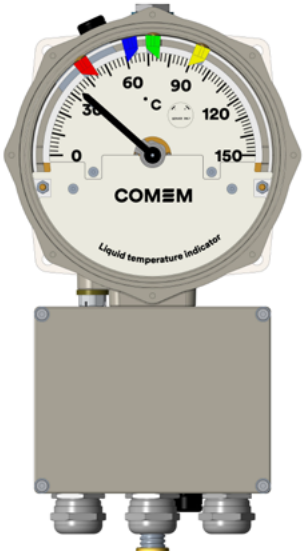
	Accessories
	Temperature display for remote visualization C40
	External transducer MP88800 (only for ATI/ATIW)
	External transducer RTC685 (only for ATI/ATIW)
	Power supply: DRA 18 (IN 110/230 V ac/dc, OUT 24 V dc)

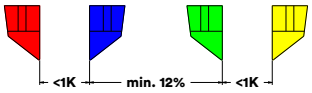
	AWTI/ eAWTI – CT nominal current
	1A
	2A
	5A

	AWTI /eAWTI– optional values
	..... °C Specify set thermal gradient (with thermowell thickness between 2,5 and 4 mm)
	.....A Specify set nominal current

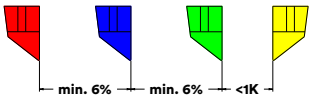
Date	
Rev.	
Customer reference	

Four contacts

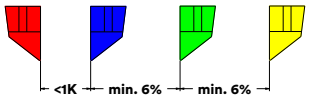




Scheme A (standard) ☐

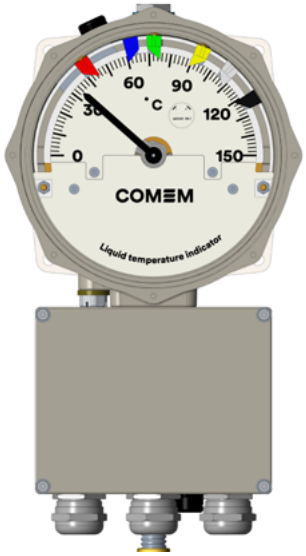


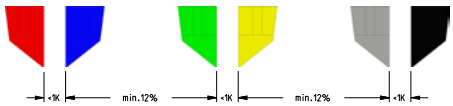
Scheme B ☐



Scheme C ☐

Six contacts





Scheme A (standard) ☐

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