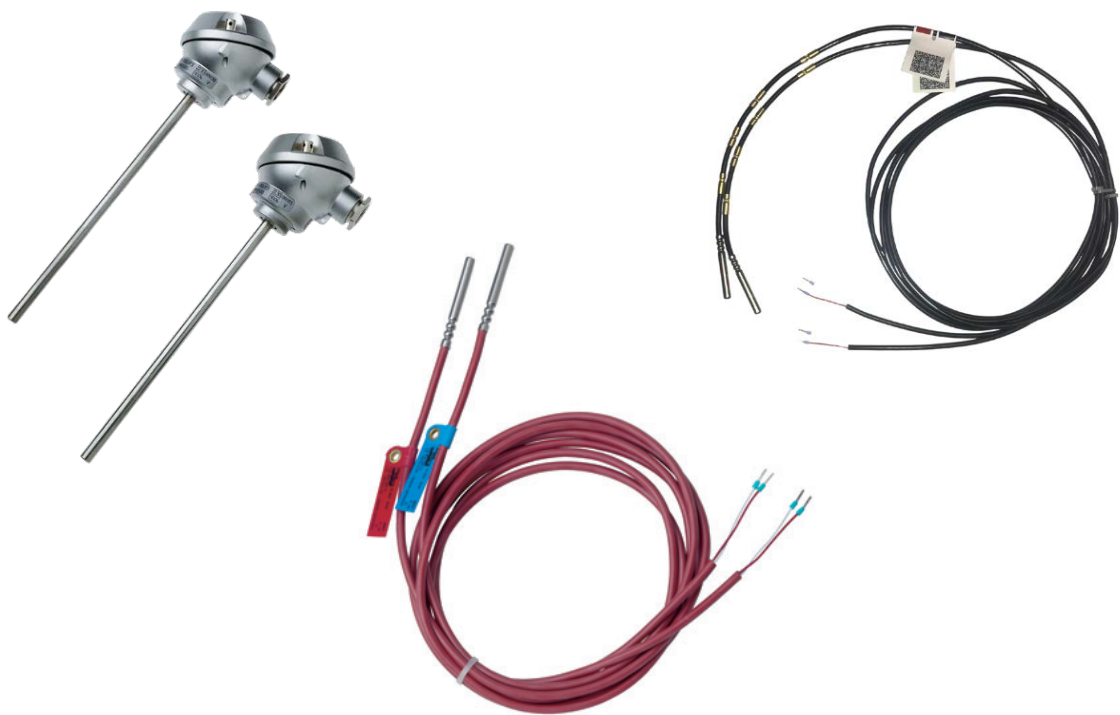


Temperature sensors and accessories for heat and cooling measurement points

Applications

Temperature sensors are metrological components for heat or cold measuring points. They are used in pairs and measure the flow and return temperature of the heating or cooling system. The difference between the temperatures is used to measure energy consumption.



Features

- A wide range of platinum resistance temperature sensors (as cable or head sensors) in different lengths for direct or sensor pocket mounting.
- With Pt 100 or Pt 500 temperature sensors
- Type approvals according to 2004/22/EC and PTB K 7.2 (cooling, combined heating and cooling)
- Matching accessories for direct mounting in the heating or cooling medium
- Customised sensor pocket in various sizes

Benefits

- Matching hot and cold measurement components from INTEGRA Metering ensuring high accuracy over long periods of time.
- Low inventory management with the same temperature sensors used for direct or sensor pocket measurement (DS/PSC)

DS/PSC Temperature sensors



Description

- Cable temperature sensors for direct (Direct Short) and pocket (Pocket Short Cable) mounting with Pt 100 and Pt 500, sensor diameter 5 mm, sensor length 45/55 mm
- Brass sensor pockets
- Ball valves for temperature sensors
- T-piece adapter
- Universally applicable for measuring heat or cold (Type approvals according to 2004/22/EC (MID) and PTB K7.2 (cooling))

Applications

- Recommended for pipelines up to DN 50 mm for direct installation and installation in immersion sleeves.
- Can be used, e.g. for INTEGRA metering calculators of the product families AMTRON® and CALEC®, for pipelines up to DN 50 mm
- For nominal pipe diameters up to and including DN 25 (R 1"), the temperature sensors should preferably be installed directly in the heating or cooling medium in new systems. In some countries (e.g. Germany*) this is required by calibration law, please refer to the respective national regulations. For nominal pipe diameters from DN 15 (R 1/2") to DN 40, suitable ball valves with temperature sensor receptacles or T-piece adapters are available (see following page).

* In Germany, direct-immersion temperature sensors are mandatory up to QP 6 m³/h regardless of the nominal pipe size.

Note

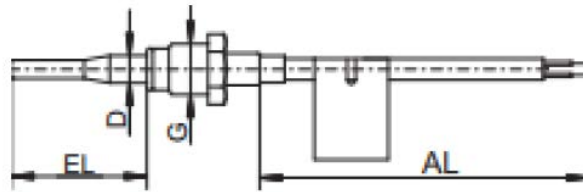
- It is essential to ensure symmetrical installation conditions for both temperature sensors, i.e. both temperature sensors are identical, (and not one sensor in an immersion sleeve and the other sensor in direct installation in a ball valve or a T-piece).
- For direct installing of temperature sensors, only matching T-pieces are to be used. This ensures that no unnecessary measurement errors occur due to unequal immersion depths.

Technical data

	Sensor type	Two-wire / four-wire connection, Pt 100 and Pt 500
	Protective tube	Stainless steel
	Temperature range	0 to 150 °C
	Connector	Silicon
	Matched pairs	at 10 °C, 65 °C, 120 °C
	Tolerance class to IEC 751	Class B
	Diameter of protective tube (1)	5 mm
	Material of protective tube	1.4571
	Length of sensor (2)	45/55 mm
	Immersion depth with direct mounting	≈27.5 mm / 38 mm
	Connection wire terminals	Terminal sleeves to DIN 46 228 Part 4
	Connection wire lengths (3)	approx. 2.5 m/10 m
	Type approval	according to 2004/22/EC (MID) and PTB K 7.2 (cooling)
Permissible range for ΔT	3...150 K	

Part	Description	Quantity and packaging	Art. No.
DS/PSC 500/45/2.5 m 2-wire CE M/D cold	Pair of cable sensors Pt 500, sensor length 45 mm, connecting cable 2.5 m	Paired, bag-packed, with screw adapters 80205 for direct mounting and installation instructions	80579
DS/PSC 500/45/10 m 2-wire CE M/D cold	Pair of cable sensors PT 500, sensor length 45 mm, connecting cable 10 m	Paired, bag-packed, with screw adapters 80205 for direct mounting and installation instructions	80765
DS/PSC 100/45/2.5 m 2-wire CE M/D cold	Pair of cable sensors Pt 100, sensor length 45 mm, connecting cable 2.5 m	Paired, bag-packed, with screw adapters 80205 for direct mounting and installation instructions	80580
DS/PSC 100/45/10 m 4-wire CE M/D cold	Pair of cable sensors PT 100, sensor length 45 mm, connecting cable 10 m	Paired, bag-packed, with screw adapters 80205 for direct mounting and installation instructions	80764

DS 100/500 EL 38 mm

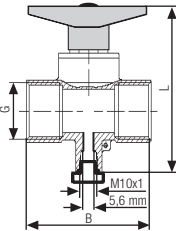


Designation	Description	Quantity and delivery condition	Art. No.
DS/PSC 500/55/2.5 m CE M/D cold	Pair of cable probes Pt 500, probe length 55 mm, connection cable 2.5 m	In pairs, packed in bag, with screw-in adapters 80205 for direct installation and assembly instructions	81070
DS/PSC 500/55/10 m 2 fils CE M/D cold	Pair of cable probes Pt 500, probe length 55 mm, connection cable 10 m	In pairs, packed in bag, with screw-in adapters 80205 for direct installation and assembly instructions	81071
DS/PSC 100/55/2,5 m CE M/D cold	Pair of cable probes Pt 100, probe length 55 mm, connection cable 2.5 m	In pairs, packed in bag, with screw-in adapters 80205 for direct installation and assembly instructions	81072
DS/PSC 100/55/10 m 4 fils CE M/D cold	Pair of cable probes Pt 100, probe length 55 mm, connection cable 10 m	In pairs, packed in bag, with screw-in adapters 80205 for direct installation and assembly instructions	81073

Accessories for DS/PSC temperature sensors

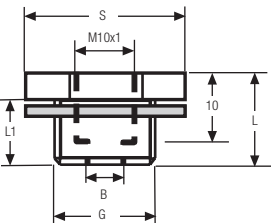
Direct mounting

Ball valve with CEN sensor holder (M10x1) for temperature sensor

	Thread	Internal thread G 1/2", G 3/4", G 1", G1" 1/4 oder G1" 1/2				
	Temperature sensor socket	M10x1 to EN 1434				
	Material	Nickel-plated brass				
	Maximum media temperature	150 °C				
	Pressure rating	PN 16				
	Dimensions	(G)	G 1/2"	G 3/4"	G 1"	G1" 1/4
	(L)	72 mm	73 mm	84 mm	110 mm	122 mm
	(B)	47 mm	53 mm	66 mm	87 mm	98 mm

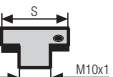
Part	Description	Quantity and packaging	Art. No.
KGH ISO 228 M10x1 IG 1/2"	Ball valve 1/2" for direct mounting of sensor	Loose with locking top	2505
KGH ISO 228 M10x1 IG 3/4"	Ball valve 3/4" for direct mounting of sensor	Loose with locking top	2504
KGH ISO 228 M10x1 IG 1"	Ball valve 1" for direct mounting of sensor	Loose with locking top	2507
KGH ISO 228 M10x1 IG 1 1/4"	Ball valve 1/4" for direct mounting of sensor	Loose with locking top	80534
KGH ISO 228 M10x1 IG 1 1/2"	Ball valve 1/2" for direct mounting of sensor	Loose with locking top	80535

T-piece adapter with CEN sensor holder (M10x1) for temperature sensor, mounting in the T-piece

	Thread	External thread G 3/8", G 1/2", G 3/4" or G 1"				
	Connection piece	M10x1 to EN 1434				
	Material	Brass				
	Dimensions	(G)	G 3/8"	G 1/2"	G 3/4"	G 1"
	Width (AF)	(S)	20 mm	30 mm	32 mm	41 mm
		(L)	19 mm	16.5 mm	20 mm	20 mm
(L1)		11 mm	11.5 mm	14 mm	14 mm	
	(B)	Ø 5.7 mm (5.4 mm)				

Part	Description	Quantity and packaging	Art. No.
T-piece adapter G 3/8" / M10x1	Adapter for 3/8" T-piece for sensor mounting, M10x1	Loose without seal ring or locking top	19406
T-piece adapter G 1/2" / M10x1	Adapter for 1/2" T-piece for sensor mounting, M10x1	Loose, bag-packed with copper seal ring, without locking top	80072
T-piece adapter G 3/4" / M10x1	Adapter for 3/4" T-piece for sensor mounting, M10x1	Loose, bag-packed with copper seal ring, without locking top	80073
T-piece adapter G 1" / M10x1	Adapter for 1" T-piece for sensor mounting, M10x1	Loose, bag-packed with copper seal ring, without locking top	80074

Locking top M10x1

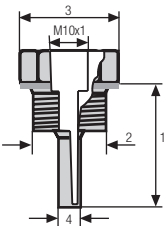
	Connection piece	M10x1 to EN 1434
	Material	Brass
	Width (S)	12 mm

Part	Description	Quantity and packaging	Art. No.
Locking top set M10x1	Locking top for T-piece adapter (G3/8" ... 1")	Bag-packed	80207

Sensor pockets mounting

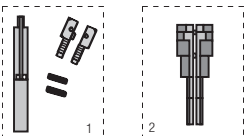
Note: For nominal pipe sizes 15, 20 and 25 (up to Qp 6 in DE), only direct-immersion probes may be used for CE MID-compliant measuring points.

Sensor pockets with CEN holder (M10x1) and straight protective tube

	Face-to-face length (1)	40 mm, 60 mm and 85 mm
	Process connection (2)	External thread G 1/2"
	Width (AF) (3)	24 mm
	Material	Brass
	Maximum media temperature	130 °C
	Pressure rating	PN 16
	External diameter (4)	6.6 mm
	Internal diameter of protective tube	5 mm
	Sensor mounting	with synthetic threads

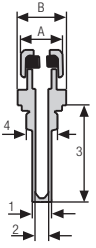
Part	Description	Quantity and packaging	Art. No.
SP-M 40, single	Brass thermowell, ET 40 mm, G 1/2"	Individually, packed in bag, with copper seal sensor plastic fitting and mounting instructions	80490
SP-M 40, SET	Brass thermowell, ET 40 mm, G 1/2"	2 pieces, packed in bag, with copper seal sensor plastic fitting and mounting instructions	80488
SP-M 60, single	Brass thermowell, ET 60 mm, G 1/2"	Individually, packed in bag, with copper seal sensor plastic fitting and mounting instructions	80491
SP-M 60, SET	Brass thermowell, ET 60 mm, G 1/2"	2 pieces, packed in bag, with copper seal sensor plastic fitting and mounting instructions	80489
SP-M 80, single	Brass thermowell, ET 85 mm, G 1/2"	Individually, packed in bag, with copper seal sensor plastic fitting and mounting instructions	81074
SP-M 80, SET	Brass thermowell, ET 85 mm, G 1/2"	2 pieces, packed in bag, with copper seal sensor plastic fitting and mounting instructions	81075

Accessories for immersion sleeve / and direct installation of DS/PSC - Probes with CEN receptacle (M10x1)

	Process connection	M10x1
	Mounting set for DS/PSC sensor (1)	Direct sensor mounting or in sensor pocket SP-M 40
	Coupling parts for SP-M 60 (2)	Mounting in sensor pocket SP-M 60 only

Part	Description	Quantity and packaging	Art. No.
Mounting set for DS/PSC sensors	Mounting components for direct mounting or in sensor pocket SP-M 40	1 pair of threaded coupling units (brown), 2 O-rings (4.3 x 2.4), tools and installation instructions	80205
Coupling for SP-M 60 (grey)	Mounting components for direct mounting or in sensor pocket SP-M 60	One threaded coupling unit (grey), folding	20040

Special versions: sensor pockets

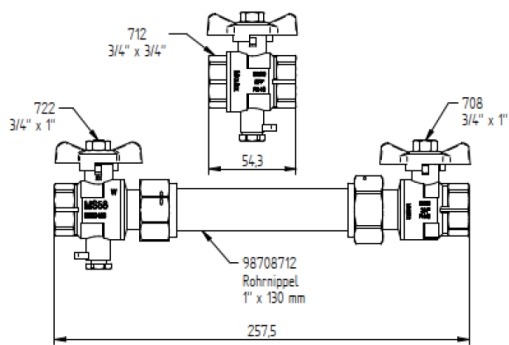
	Face-to-face length (3)	33 mm
	Process connection (4)	External thread G 3/8"
	Width (AF)	A = 17 mm, B = 14 mm and C = 22 mm
	Material	Brass
	Maximum media temperature	130 °C
	Pressure rating	PN 16
	External diameter (1)	6.6 mm
	Internal diameter of protective tube (2)	5 mm
	Sensor mounting	with cap nut

Part	Description	Quantity and packaging	Art. No.
ATH-33	Brass thermowell, ET 33 mm, G 3/8"	Single, loose	81568

Kits

Part	Art. Nr.
Kit	97651
Kit	97652
Kit	97653

Kit 97652



PSC temperature sensors



Short description

- Cable temperature sensor for installation in pockets (Pocket Long Cable) in Pt 100 and Pt 500, sensor diameter 6 mm, 1 version for pockets 85,120,155 + 210 mm (do not fit in SP-EVS)
- Special designs for high absolute temperatures up to 150° C
- Universally usable for heat or cold metering only SP-E + SP-EV (approval according to 2004/22/EC (MID) and PTB K 7.2 (cold metering))

Application

- For plants with pipe diameters from approx. DN 50
- Particularly good thermal properties due to low radiation
- Intended for two-wire technology, can be converted to four-wire technology by means of sealable extension box (VD-30).
- Mounting with immersion sleeves type SP-E (see accessories for temperature sensors type PLC and type PLH).

Technical data

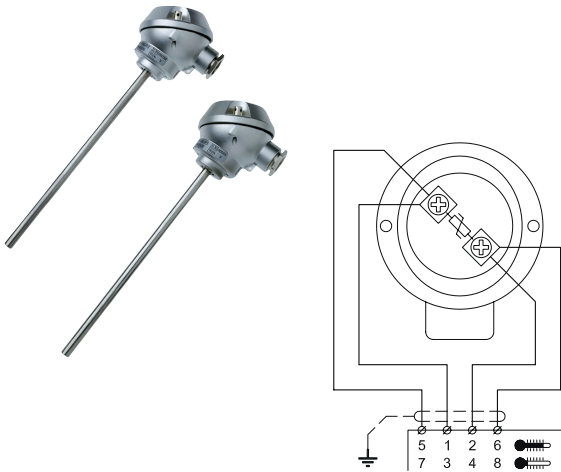
	Sensor type	Two-wire / four-wire connection, Pt 100 and Pt 500
	Protective tube	Stainless steel
	Temperature range	0 to 150 °C
	Connector	Silicon
	Matched pairs (standard 150 °C)	at 10 °C, 65 °C, 120 °C
	Tolerance class to 751	Class B
	Diameter of protective tube (1)	6 mm
	Material of protective tube	1.4571
	Length of sensor (2)	50 mm
	Connection wire terminals	Terminal sleeves to DIN 46 228 Part 4
	Connection wire lengths (4)	2.5 m / 10 m
	Type approval	according to 2004/22/EC (MID) and PTB K 7.2 (cooling)
Permissible range for ΔT	3...150 K	

Not to be used with weld-in dip sleeves

PLC - Pt 500 sensor

Part	Description	Quantity and packaging	Art. No.
PLC 100/50/6/2.5 m CE MID cold	Pair of cable sensors Pt 100, connecting cable 2.5 m	Paired, bag-packed	97647
PLC 500/50/6/2.5 m CE MID cold	Pair of cable sensors Pt 500, connecting cable 2.5 m	Paired, bag-packed	97648
PLC 100/50/6/10 m 4-wire CE MID cold	Pair of cable sensors Pt 100, connecting cable 10 m	Paired, bag-packed	97649
PLC 500/50/6/10 m CE MID cold	Pair of cable sensors Pt 500, connecting cable 10 m	Paired, bag-packed	97650

PLH temperature sensors



Description

- Head temperature sensor for installation in thermowells (Pocket Long Head) in Pt 100, sensor diameter 6 mm, sensor lengths 105, 140, 175 and 230 mm
- Special versions for low temperature differences (e.g. for refrigeration measurements) and high absolute temperatures up to 180 °C
- Approved connection cable length to CALEC® ST and AMTRON® X-50 calculators: 15 m.
Permissible connection cable length to CALEC® ST II and CALEC® ST III calculators: 100 m

Applications

- For systems with pipe diameters from approx. DN 50 upwards
- Particularly good thermal properties due to low radiation
- Two-wire technology is converted directly in the sensor head into four-wire technology at the head connections
- Mounting with thermowells type SP-E, SP-EV and SP-EVS (see accessories for temperature probes type PLH)
- No influence of the ohmic resistance of the connecting cable to the calculator on the temperature measurement

Technical data

	Sensor type	Two-wire connection Pt 100 and Pt 500
	Protective tube	Stainless steel
	Temperature range	0 to 180 °C
	Connector	Metal, version PL
	Matched pairs (180 °C)	at 10 °C, 80 °C, 180 °C
	Tolerance class to IEC 751	Class B
	Diameter of protective tube (1)	6 mm
	Material of protective tube	1.4571
	Length of sensor (2)	105, 140, 175 and 230 mm
	Height of sensor head (3)	44.5 mm
	Connection head (4)	33 mm
	Type approval	EN 1434 for Switzerland and Germany, 2004/22/EC (MID)
	Permissible range for ΔT	3...150 K
	Declaration of Conformity	MI004

PLH - Pt 100 sensor

Part	Description	Quantity and packaging	Art. No.
PLH 100/105 CE M	Pair of head sensors Pt 100, sensor length 105 mm	Paired, bag-packed	80360
PLH 100/140 CE M	Pair of head sensors Pt 100, sensor length 140 mm	Paired, bag-packed	80361
PLH 100/175 CE M	Pair of head sensors Pt 100, sensor length 175 mm	Paired, bag-packed	80362
PLH 100/230 CE M	Pair of head sensors Pt 100, sensor length 230 mm	Paired, bag-packed	80363

Accessories for PSC and PLH temperature sensors

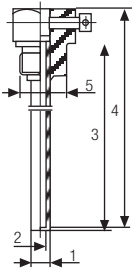
Description

- Stainless steel sensor pockets, face-to-face lengths 85 mm, 120 mm, 155 mm and 210 mm for PN 40
- Enhanced sensor wells for higher flow rates (EV)
- Steel or stainless steel welded sleeve
- Distributor box VD-30 converting from two- to four-wire connections
- Extension cable for distributor box

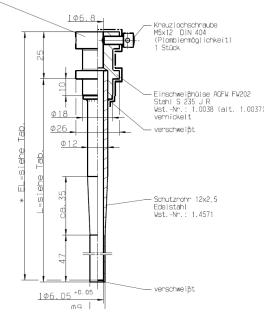
Note

The face-to-face sensor pocket length for PSC and PLH sensors must be 20 mm shorter than the length of the sensor itself. This is shown in the table below

SP-E (SP-EV) sensor pocket

	External diameter (1)	8 mm, reinforced 12 mm
	Internal diameter of protective tube (2)	6 mm
	Material of protective tube	1.4571
	With sealing screw	
	Maximum media temperature	180 °C
	Pressure rating	PN 40
	Thread (5)	G 1/2"
	Length (4)	98, 133, 168 and 223 mm
	Face-to-face length (3)	85, 120, 155 and 210 mm

SP-EVS sensor pocket

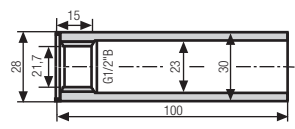
	Outside diameter	12 mm tapered to 9 mm		
	Inner diameter	6 mm		
	Protection tube material	1.4571 Stainless steel		
	Welding collar	Steel nickel plated		
	Pressure stage	PN 40		
	Temperature	max. 180°C		
		L	EL	
	Art. 80266	97 mm	122 mm	
	Art. 80267	130 mm	155 mm	
Art. 80268	187 mm	212 mm		

Product range

Part	Description	Quantity and packaging	Permissible flow velocity*	Art. No.
SP-E 85 / 105	Stainless steel sensor pocket G1/2", face-to-face length 85 mm, PN 40, for sensor PLH105/PSC	Single, with copper seal ring, bag-packed	5.0 m/s	80059
SP-E 120 / 140	Stainless steel sensor pocket G1/2", face-to-face length 120 mm, PN 40, for sensor PLH140/PSC	Single, with copper seal ring, bag-packed	3.1 m/s	80060
SP-EV 120 / 140	Stainless steel sensor pocket G1/2", reinforced face-to-face length 120 mm PN 40, for sensor PLH140/PSC	Single, with copper seal ring, bag-packed	5.4 m/s	80790
SP-E 155 / 175	Stainless steel sensor pocket G1/2", face-to-face length 155 mm, PN 40, for sensor PLH175/PSC	Single, with copper seal ring, bag-packed	2.5m/s	80062
SP-EV 155 / 175	Stainless steel sensor pocket G1/2", reinforced face-to-face length 155 mm PN 40, for sensor PLH175/PSC	Single, with copper seal ring, bag-packed	4.5m/s	80791
SP-E 210 / 230	Stainless steel sensor pocket G1/2", face-to-face length 210 mm, PN 40, for sensor PLH230/PSC	Single, with copper seal ring, bag-packed	1.7 m/s	80064
SP-EV 210 / 230	Stainless steel sensor pocket G1/2", reinforced face-to-face length 210 mm PN 40, for sensor PLH230/PSC	Single, with copper seal ring, bag-packed	2.9 m/s	80077
SP-EVS 107 / 140	Stainless steel sensor pocket, reinforced for welding face-to-face length 122 mm PN 40, for sensor PLH140	Single, bag-packed	5.4 m/s	80266
SP-EVS 140 / 175	Stainless steel sensor pocket, face-to-face length 155 mm PN 40, for sensor PLH175	Single, bag-packed	4.5 m/s	80267
SP-EVS 200 / 230	Stainless steel sensor pocket, reinforced face-to-face length 212 mm PN 40, for sensor PLH230	Single, bag-packed	2.9 m/s	80268

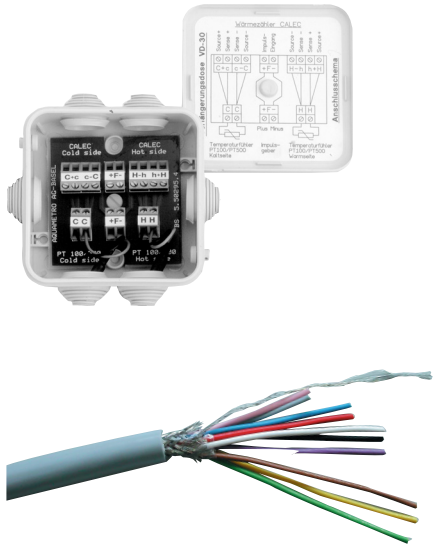
* The specified values are calculated for reference only with certain specified conditions. The information is only valid for laminar flows. Additional local factors influencing such as turbulence, pressure surges, pulsations or vibrations caused by motors, pumps, valves, etc., can lead to increased stress and damage the protective tube. These factors have to be considered by the user.

Welded sleeve

	External diameter	30 mm
	Pressure rating	PN 40
	Thread	Internal thread G 1/2"
	Length	100 mm
	Material of protective tube	Steel / stainless steel

Part	Description	Quantity and packaging	Art. No.
SWM-11	Steel welded sleeve for the face-to-face length of the sensor pocket	Single, with copper seal ring, bag-packed	81551
SWM-12	Stainless steel welded sleeve for the face-to-face length of the sensor pocket	Single, with copper seal ring, bag-packed	81552

Connection box (VD-30), extension cable (10x0.5 mm)



Description

The VD-30 extension socket enables the extension of temperature sensor cables with 4 conductors.

This avoids measuring errors that occur when extending with 2 conductors (cable resistance adds to measuring resistance).

Please observe the respective national approval regulations with regard to usability.

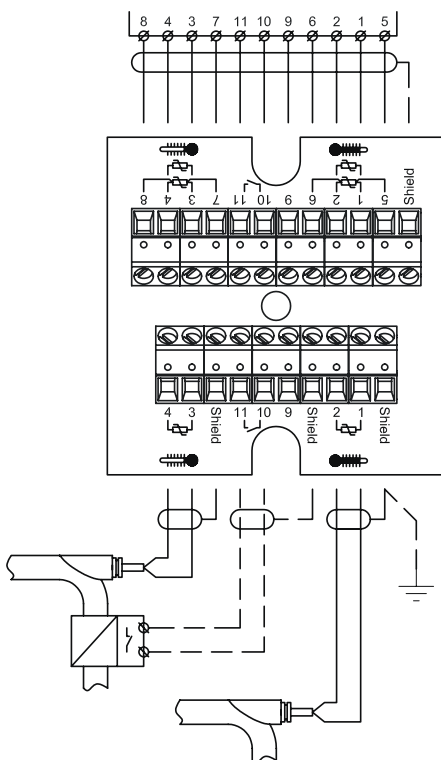
Features of VD-30:

- Conversion of cable sensors with 2-wire measurement technology (resistance measurement) to 4-wire measurement technology (loss voltage measurement).
- Neglectability of the cable resistance. Thus smaller cable cross-section possible.
- Professional extension of cable probes (PLC and DS/PSC) additional possibility of connecting a passive pulse generator
- Clean installation appearance
- Access protection by sealing possibility

Extension cable recommended

- 10-core, flexible, 0.5 mm²
- Screened
- Cable designation LiYCY

Part	Description	Quantity and packaging	Art. No.
VD-30	Distributor box for temperature sensor and pulse transmitter	Single, bag-packed with installation instructions	93331
Cable 10x0.5 mm screened	Cable for cable sensor and pulse transmitter extension with VD-30	Per meter	20042
Cable 4x0.5 mm screened	LiYCY, for the wiring of the head sensors PLH	Per meter	95423



Recommendations for installation

Mechanical considerations

The location of the installation point of the temperature sensors and the flow sensor in the heating/cooling circuit is determined by the measurement itself. The two temperature measurement points form the limits for which the energy flow is calculated. (The supplier, for example, bears all pipe losses, which occur upstream, and the consumer all those downstream from the temperature measurement points.)

Both sensors for differential temperature measurement must be installed in an identical way. This also applies to the pipe diameter and the thermal insulation of the sensor surroundings. The aim is to ensure the same flow rates and thermal conditions for both measurement points. If, for example, one of the sensors is installed in non-insulated pipe, then the second should/must also be installed in non-insulated pipe (principle of equality).

The sensors should be preferably installed so that the first 10 mm of the one upstream (active measuring length) is in the middle third of the pipe cross-section.

Adjusting the face-to-face length is done with welded sleeves. These also ensure that the sensor locking screw is still accessible after attaching the insulation. Welded sleeves are made to a standard length of 100 mm. They must be adjusted to the pipe in both length and position.

Sensor pockets and head sensors must be installed so that there is sufficient room to replace them. (The sensors or measuring inserts must be in a position to be removed easily without the use of force).

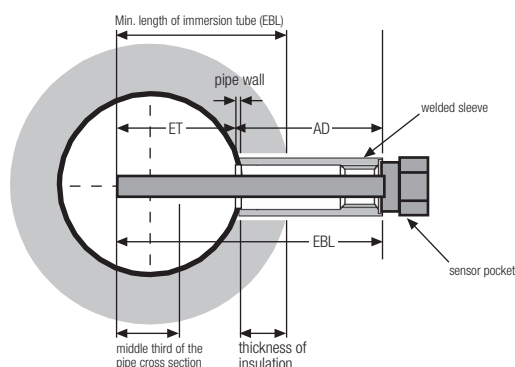
The type of sensors used must be suitable for the temperature, pressure and flow speed of the application. Sensors, especially those with long immersion lengths, may be subject to considerable forces created by the flow.

The standard sensors today ensure maximum heat transfer with the sensor fitting snugly in the sensor pocket. Any dirt in the immersion tube will prevent the sensor from being properly seated in the pocket, and thus falsifying the results. The pockets are therefore mounted either from the side or from below. This is especially important for cooling systems as otherwise condensation or ice can build up in the pocket.

Immersion lengths for INTEGRA Metering for sensor pockets and temperature sensors

Recommendations for heating systems

Insulation in heating circuits; heating system ordinance (D)

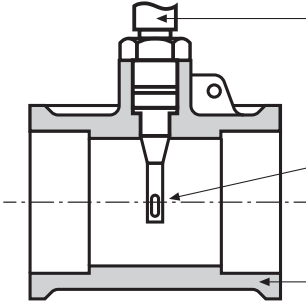
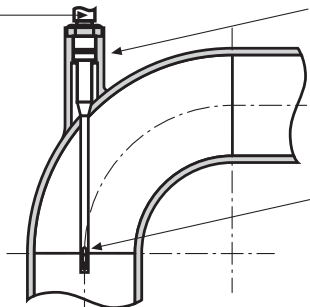
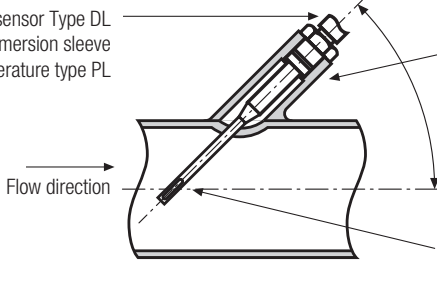
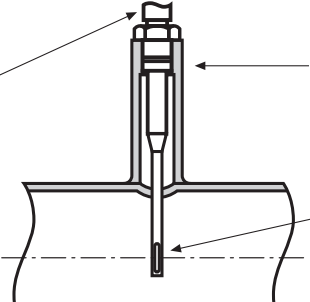


Pipe cross-section (mm)	Thickness of insulation (ID)
up to DN 20	20 mm
from DN 20 to DN 35	30 mm
from DN 40 to DN 100	same ID as width
from DN 100	100 mm

Note: For meters up to QP 6 m³/h only direct immersion probes may be used for CE MID compliant measuring points.

Nominal width of pipe DN	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Thickness of insulation (mm)	20	20	30	30	40	50	65	80	100	100	100	100	100	100
Immersion depth ET (mm)	10	15	20	25	30	38	45	60	70	83	95	120	145	170
Face-to-face length EBL (mm)	30	35	50	55	70	88	110	140	170	183	195	220	245	270
External length for sensor pockets in relation to immersion depth														
3/8" / ATH-33	23	18	13											
1/2" / SP-M 40	30	25	20											
1/2" / SP-M 60		45	40											
1/2" / SP-E 85/105				60	55	47	40	25	15					
1/2" / SP-E 120/140					90	82	75	60	50	37	25			
1/2" / SP-E 155/175						117	110	95	85	72	60	35	10	
1/2" / SP-E 210/230							165	150	140	127	115	90	65	40

Recommendations for installation of EN 1434-2

Installation Type of the temperature sensor	Tube size	
In threaded sleeve	DN 15 DN 20 DN 25	 <p>Only for temperature sensor type DS</p> <p>Temperature-measuring element immersed up to the middle axis of the threaded sleeve or more.</p> <p>Threaded sleeve</p>
In tube sheed	\leq DN 50	 <p>Either temperature sensor Type DL or temperature immersion sleeve with temperature type PL</p> <p>Welded sleeve</p> <p>Flow direction</p> <p>Temperature sensor axis coincident with the axis of the tube</p>
Diagonally to the flow direction	\leq DN 50	 <p>Either temperature sensor Type DL or temperature immersion sleeve with temperature type PL</p> <p>Welded sleeve</p> <p>Flow direction</p> <p>Temperature sensor immersed in the tube or above</p>
Vertical to the flow direction	DN 65 to DN 250	 <p>Either temperature sensor Type DL or temperature immersion sleeve with temperature type PL</p> <p>Welded sleeve</p> <p>Temperature sensor immersed in the tube or above</p> <p>Temperature sensor vertical to the tube axis and in the same plane</p>

Recommendations for cooling systems

Remarks

- Larger insulation thickness
- Condensate run-out: mounting from below

