

Technical Datasheet



D Series SMART Temperature Transmitter

Model: D72

Key Features

- Output signal 4...20mA with Hart protocol
- Galvanic insulation (In, Out)
- Programmable sensor type
- Programmable measuring range
- Thermoresistance line compensation
- Compensation of thermocouple cold junction
- Autodiagnostic system
- Intrinsic safety certificate (ATEX, IECEx)
- Explosion proof certificate (ATEX, IECEx)

Product Overview

The D72 Temperature Transmitter is applicable for converting the resistance of temperature or voltage of thermocouple sensor to standard current signal 4-20mA. The transmitter has two separate channels enabling:

- The measurement of the average temperature difference
- The average with redundancy, maximum or minimum temperature

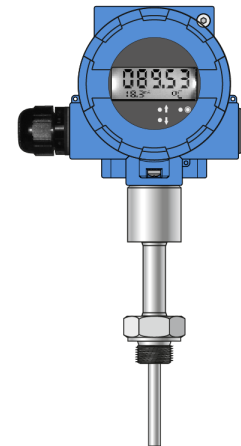
Series Overview

The D-Series pressure, differential pressure and temperature transmitters offer customers cost-effective and accurate solutions to their individual process requirements.

Available with a wide range of process connections and easily configurable via the D-Soft software, the D-Series can be used for a variety of applications when pressure, differential pressure, temperature, level or flow measurements are needed.

Other products in the series include:

- SMART Differential Pressure Transmitter
- SMART Pressure Transmitter
- SMART Differential Pressure Transmitter with chemical seals



Product applications

The D72 D-Series temperature transmitter is suitable for a wide range of applications for measuring including:

- Oil & Gas
- Petrochemical
- Water & Wastewater
- Power

The choice of models available ensures that the D72 D-Series is:

- Suitable for use in corrosive atmospheres
- Resistant to chemical attack

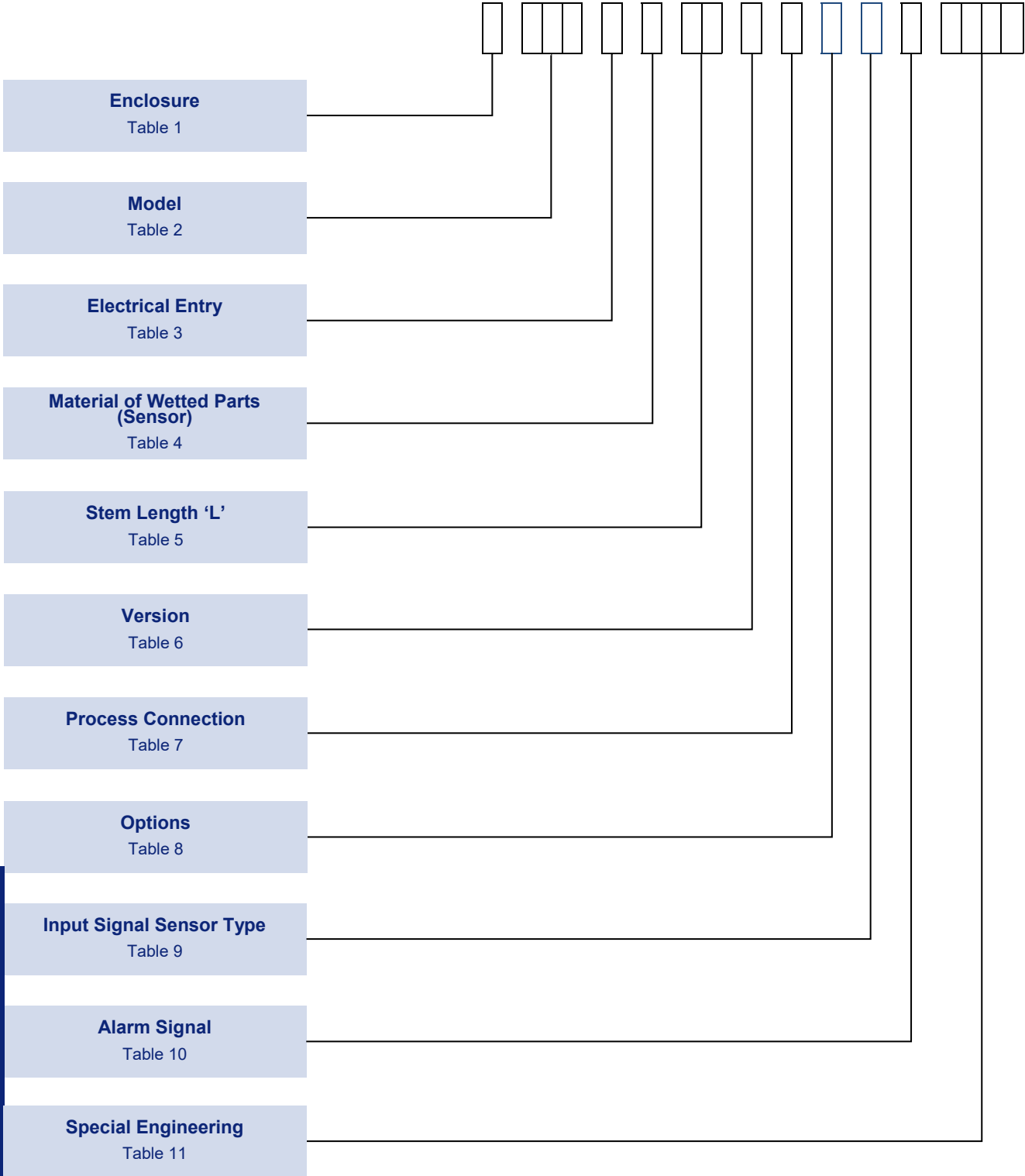
How can we help you?

Delta Mobrey offers fast, efficient and knowledgeable support when and where you need it. Please visit our website at www.delta-mobrey.com to find your local support centre or call us on:

+44 (0) 1252 729140

How to order

Transmitters can be configured by selecting codes representing the desired features from the tables that follow. The chart below, describes how the model code is built up. For assistance in configuring a transmitter that best suits your needs, please contact your local sales office.



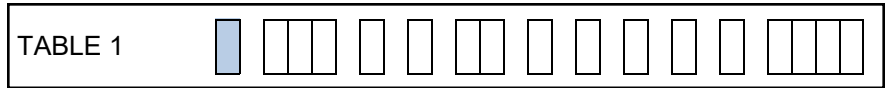
D-Series
Model: D72

NOTE 1: Only the most common options are shown in this datasheet. Should you require a feature that is not shown, please contact your local sales office for further details.

NOTE 2: The non-standard option code is shown by "X" in the part number. Should you require any clarification on this codes please contact your local sales office.

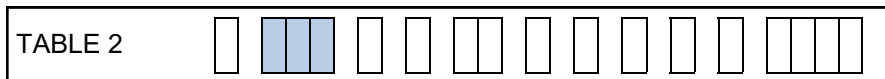
Enclosure

Refer to the 'Approvals' section for details about the certification on Intrinsically Safe model.



ENCLOSURES TYPES	Code
WEATHERPROOF ENCLOSURE	
General Purpose, Aluminum housing, IP66, with display.	W
For Aggressive Atmosphere, 316 Stainless steel housing, IP66, with display.	A
FLAMEPROOF ENCLOSURES	
General Purpose, Aluminum housing, IP66, with display. (Ex d)	H
For Aggressive Atmosphere 316 Stainless steel housing, IP66, with display. (Ex d)	R
INTRINSICALLY SAFE ENCLOSURES	
General Purpose. Aluminum housing, IP66, with display. (Ex ia)	5
For Aggressive Atmosphere 316 Stainless steel housing, IP66 with display. (Ex ia)	4

Model

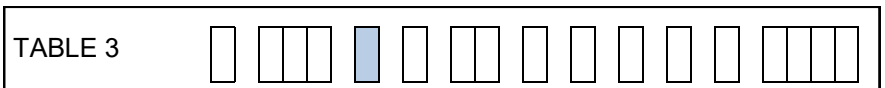


	Code
D72 SMART Temperature Transmitter For applications up to 1820°C Minimum range span 10°C	D72

Electrical Entry

NOTE: Code 0
Available on Enclosure code H & R as standard.

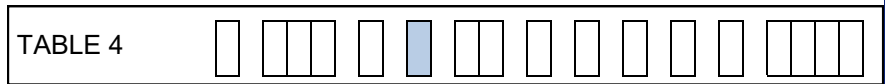
NOTE: Code 1
Available on Enclosure code W, A, 5 & 4 as standard.



	Code
M20x1.5 thread	0
Packing gland M20x1.5	1
Electrical connection with thread 1/2NPT Female (adaptor)	2

Wetted Parts

NOTE 1:
See 'Dimension' section for sensor's dimensional details.



	Code
Applies when no sensor is required	0
Direct mounted welded sensor, with 'S' length, type WS (welded Sensor with extension). Material 304SS.	A
Direct mounted welded sensor, with 'S' length, type WS (welded Sensor with extension). Material 316L SS.	B
Direct mounted welded sensor, type WN (welded Sensor Standard assembly). Material 304SS.	C

D-Series
Model: D72

(Table 4 continued...)	Code
Direct mounted welded sensor, type WN (welded Sensor Standard assembly). Material 316L SS.	D
Direct mounted spring loaded sensor, with 'S' length, type LS (Loaded Sensor with extension). Material 304SS.	E
Direct mounted spring loaded sensor, with 'S' length, type LS (Loaded Sensor with extension).Material 316L SS.	F
Direct mounted spring loaded sensor, type LN (Loaded Sensor Standard assembly).Material 304SS.	G
Direct mounted spring loaded sensor, type LN (Loaded Sensor Standard assembly). Material 316L SS.	H

Stem Length 'L'

NOTE 1:
Various length options available on request.

NOTE 2:
Combination of first and second digit corresponds to different stem lengths. (e.g. 350mm will be code '35').

NOTE 3:
For stem type E, F, G, H (spring loaded) please suggest a total stem length = total thermowell length
For stem type A, B, C, D (fixed stem) please suggest a total stem length = total thermowell length less 16mm

TABLE 5

	Code
Applies when no sensor is required	00
100mm	10
200mm	20
300mm	30
400mm	40
500mm	50
Non standard length (please specify)	XX

Version

TABLE 6

	Code
Applies when no version is required	0
Protection class IP67	6
Other option on request	X

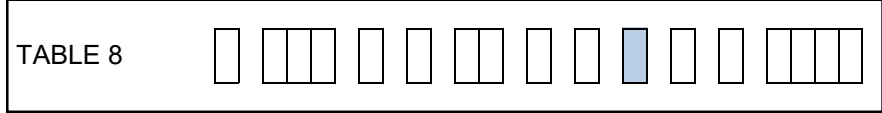
Process Connection

TABLE 7

	Code
Applies when no process connection is required.	0
M20 X 1.5 (male) thread connection	P
G1/2" (male) thread connection	M
1/2" NPT (male) thread connection	N

Options

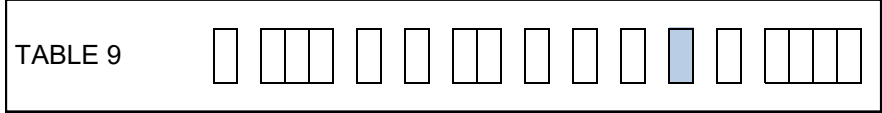
Combination of more than one option is available.



	Code
Applies when no option is required.	0
Stainless Steel rating label riveted to the housing	2
Stainless Steel tag plate mounted on wire	3

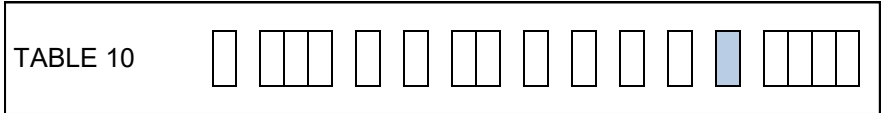
Input Signal Sensor Type

Other input signal sensor type is available, see Table A & 'Electrical Diagram' for more details.



	Code
Applies when no sensor is required	0
Sensor type Pt100, 2 wires.	1
Sensor type Pt100, 3 wires.	2
Sensor type Pt100, 4 wires.	3
Sensor type 2xPt100, 2 wires.	4
Sensor type 2xPt100, 3 wires.	5
Sensor type Pt10, 2 wires.	6
Sensor type Pt1000, 2 wires.	7

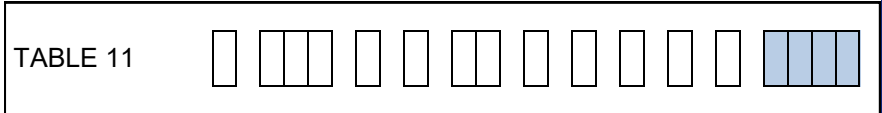
Alarm Signal



	Code
Alarm signal 3.75mA	C
Alarm signal 21.5mA	D
Alarm signal 3.4mA (NAMUR NE89)	E
Alarm signal 21mA (NAMUR NE89)	F

Special Engineering

Last 4 digits of model code only used when special engineering is required.



	Code
Please consult our sales engineering for special requirements	TBA

D-Series
Model: D72

Application & Construction

The Transmitter has compensation of ambient temperature influence and compensation of thermocouple cold junction using internal/external (Pt100) sensor or constant temperature. Most parameters such as: sensor type, measuring range, current alarm signal when the electric circuit is broken, output characteristic correction, user characteristic (60 points) are programmed using a PC with HART/USB converter and **D SOFT** configuration software.

On request, DELTA MOBREY can set the temperature transmitter's parameters such as measuring range and the type of sensor (Their values will be printed on the label).

The Transmitter D72, is designed for field use, and can be used with temperature sensors mounted directly in the transmitter's casing or with external sensors connected with a cable.

The standard version (not SIL) for Safe area and Hazardous area, can be fully programmable in field also using the front button, whilst the SAFETY version (SIL Certificate will be available soon) can be adjusted only via the Hart protocol and the local front button allows only to change the display settings.

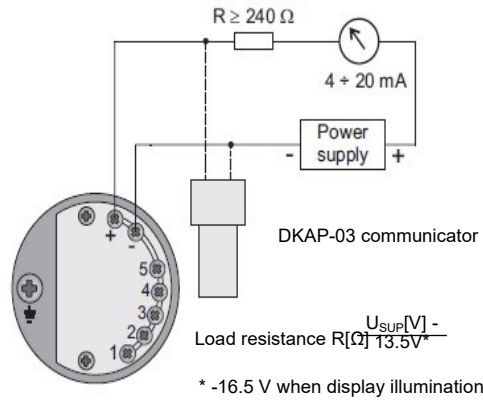
Technical Data

Input signal (see table A)	K, J, S, B, N, T, R, E, voltage Pt100, Ni100 resistance	
Limit process	-10mV < E < 100mV or -100mV < E < 1000mV 0Ω < R < 400Ω or 0Ω < R < 2000Ω	
Min. measuring range	10mV or 10Ω or 10K	
Output signal	4 - 20 mA + Hart 5	
Power supply	Standard Safe area construction:	13.5...55VDC
	Intrinsically Safe Exia construction:	13.5...30VDC
	Flameproof Exd construction:	13.5...45VDC
Max. wires resistance	500Ω	
Alarm signal	3.75mA / 21.5mA (NORMAL) or 3.6 mA / 21 mA (NAMUR NE89) or setting by user	
Sensor current	0.42mA	
Galvanic insulation	Optoelectrical	
Accuracy	See Table B , C	
Time constant	0.3s	
Additional electronic damping	0..30s	
Ambient temperature	Standard Safe Area construction:	-40...+80°C
	Intrinsically Safe Exia construction:	-40...+75°C
	Flameproof construction Exd :	-40...+75°C

Note : The instrument is freely programmable on site.

If a calibration certificate is required without specifying the required input signal, this will be in mV

Electrical Diagrams



Electrical Diagrams

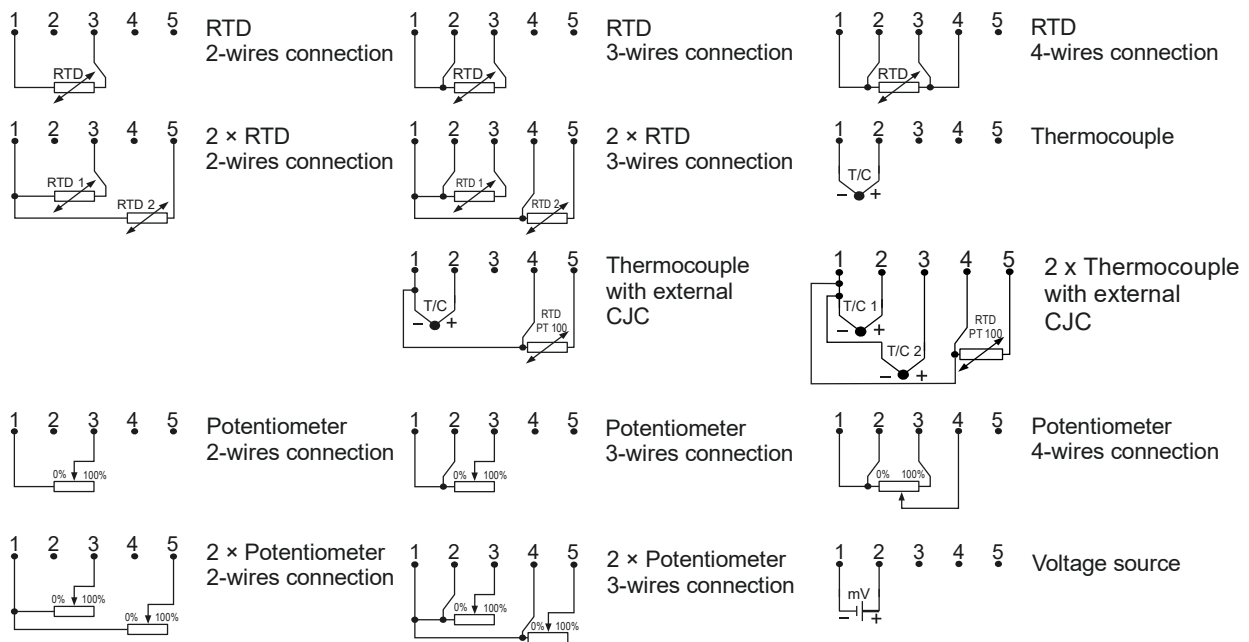


Table A - Type of input signals and metrological parameters

RTD sensors			Thermocouples		
Thermal resistance sensors	2, 3 or 4 wires connection		Input impedance	>10MΩ	
Sensor current	~250 μA		Maximum wires resistance	500 Ω (wires + thermocouple)	
Maximum wires resistance	25 Ω		Cold junctions compensation (CJC)	Internal sensor, external sensor Pt100, constant value	
Sensor type	Basic range (FSO)	Min. range span	Sensor type	Basic range (FSO)	Min. range span
	°C	K		°C	K
Pt100	-200÷850	10	B	500÷1820	50
Pt200	-200÷850	10	E	-150÷1000	50
Pt500	-200÷850	10	J	-210÷1200	50
Pt1000	-200÷266	10	K	-150÷1372	50
Ni100	-60÷180	10	N	-150÷1300	50
Cu100	-50÷180	10	R	50÷1768	50
			S	50÷1768	50
			T	-150÷400	50
			Internal Sensor CJC	-25÷75	-
Resistance (resistor, potentiometer)			Voltage		
	Ω	Ω		mV	mV
Measuring range No.1	0÷400	10	Measuring range No.1	-10÷100	10
Measuring range No. 2	0÷2000	10	Measuring range No. 2	-100÷1000	10

D-Series
Model: D72

Table B - metrological parameters with resistance type sensors

RTD sensor connected with 2, 3 or 4 wires						
Input – RTD		2, 3 or 4 wires connection				
Thermal resistance sensors		~420 µA				
Sensor current		25 Ω				
Maximum wires resistance						
Sensor type	Standard	Basic range	Min. range span	Processing error Δp	Temperature processing error	Analogue output error
		[°C]	[°C]	[K]	[K/K]	[%]
1	2	3	4	5	6	7
Pt10 (α=0.003850)	PN-EN 60751+A2, IEC751, DIN43760, JISC 1604-97, BS 1904	-200+850	10	±0.8	±0.035	Analogue output error is 0.05% FSO (Full Scale Output) over the operating temperature range.
Pt50 (α=0.003850)		-200+850	10	±0.2	±0.0070	
Pt100 (α=0.003850)		-200+850	10	±0.07	±0.0035	
Pt200 (α=0.003850)		-200+850	10	±0.2	±0.0020	
Pt500 (α=0.003850)		-200+850	10	±0.05	±0.0007	
Pt1000 (α=0.003850)		-200+266	10	±0.03	±0.0003	
Pt 98 (α=0.003923)	SAMA RC-4-1966	-200+650	10	±0.07	±0.0035	
Ni100 (W100=1.617)	PN-83/M-53952	-60+180	10	±0.07	±0.0030	
Cu100 (W100=1.426)		-50+180	10	±0.07	±0.0030	
Pt10 (α=0.003916)	JIS C1604-81	-200+630	10	±0.8	±0.035	
Pt50 (α=0.003916)		-200+630	10	±0.2	±0.0070	
Pt100 (α=0.003916)		-200+630	10	±0.07	±0.0035	
Pt10 (W100=1.3910)	GOST 6651-94	-200+1100	10	±0.8	±0.035	
Pt50 (W100=1.3910)		-200+1100	10	±0.2	±0.0070	
Pt100 (W100=1.3910)		-200+1100	10	±0.07	±0.0035	
Pt500 (W100=1.3910)		-200+900	10	±0.05	±0.00070	
Cu50 (W100=1.426)		-50+200	10	±0.2	±0.0070	
Cu100 (W100=1.426)		-50+200	10	±0.07	±0.0030	
Cu50 (W100=1.428)		-185+200	10	±0.2	±0.0070	
Cu100 (W100=1.428)		-185+200	10	±0.07	±0.0030	
Ni100 (W100=1.617)		-60+180	10	±0.07	±0.0030	
Resistance (resistor, potentiometer)						
		[Ω]	[Ω]	[mΩ]	[mΩ/K]	As above
Measuring range 1		0...400	10	±30	±2	
Measuring range 2		0...2000	10	±120	±2	
1	2	3	4	5	6	7

Table C - metrological parameters with thermocouple type sensors

Thermocouples						
Input – Thermocouples		>10 MΩ				
Input impedance		500 Ω (wires + thermocouple)				
Maximum wires resistance		internal sensor, external sensor Pt100, temperature constant of the cold junctions				
Cold junctions compensation						
Sensor type	Standard	Basic range	Min. range span	Processing error Δp	Temperature processing error	Analogue output error
		[°C]	[°C]	[K]	[K/K]	[%]
1	2	3	4	5	6	7
B (Pt30Rh-Pt6Rh)	PN-EN 60751+A2, IEC584, NIST MN175, DIN43710, BS4937, ANSI MC96.1, JIS C1602, NF C42-321	500+1820	50	±0.55	<±0.001	Analogue output error is 0.05% FSO (Full Scale Output) over the operating temperature range
E (Ni10Cr-Cu45Ni)		-150+1000	50	±0.15	<±0.001	
J (Fe-Cu45Ni)		-210+1200	50	±0.20	<±0.001	
K (Ni10Cr-Ni5)		-150+1372	50	±0.30	<±0.001	
N(Ni14CrSi-NiSi)		-150+1300	50	±0.25	<±0.001	
R(Pt13Rh-Pt)		50+1768	50	±0.35	<±0.001	
S(Pt10Rh-Pt)		50+1768	50	±0.40	<±0.001	
T(Cu-Cu45Ni)		-150+400	50	±0.15	<±0.001	
TC Typ L	GOST P 8.585-2001	-200+800	50	±0.20	<±0.001	
Internal CJC sensor	-	-40+80	-	± [0.35+0.007 (T-273)]	<±0.009	
Voltage						
		[mV]	[mV]	[µV]	[µV/K]	As above
Measuring range 1		-10...100	10	±6	<±0.06	
Measuring range 2		-100...1000	10	±50	<±0.5	
1	2	3	4	5	6	7

D-Series
Model: D72

Approvals

GLOBAL CERTIFICATION



IECEX Certified

INTRINSICALLY SAFE: & FLAMEPROOF

Certificate No.: IECEX KDB 19.0005X

IEC 60079-0, IEC 60079-11, IEC 60079-1, IEC 60079-31

INTRINSICALLY SAFE: **both construction : remotely mounted from sensor and directly mounted to sensor**

For Zone 0 models **Enclosure code 5**, refer Table 1

Ex ia IIC T4 Gb

Ex ia T105°C

T. amb. -40...+75°C

For Zone 0/20 models **Enclosure code 4**, refer Table 1

Ex ia IIC T4 Gb

Ex ia T105°C

Ex ia I Ma

T. amb. -40...+75°C

FLAMEPROOF, **remotely mounted from sensor**

For Zone 1 models **Enclosure code H**, refer Table 1)

Ex db IIC T5/T6 Gb

Ex tb IIIC T100°C /T85°C Db

T. amb. -40...+75°C

For Zone 1/21 models **Enclosure code R**, refer Table 1)

Ex db IIC T5/T6 Gb

Ex tb IIIC T100°C /T85°C Db

Ex db I Mb

T. amb. -40...+75°C

FLAMEPROOF, **directly mounted to sensor**

For Zone 1 models **Enclosure code H**, refer Table 1)

Ex db IIC T**/T5/T6 Gb

Ex tb IIIC T*/T100°C /T85°C Db

T. amb. -40...+75°C

For Zone 1 models **Enclosure code R**, refer Table 1)

Ex db IIC T**/T5/T6 Gb

Ex tb IIIC T*/T100°C /T85°C Db

Ex db I Mb

T. amb. -40...+75°C

EUROPEAN DIRECTIVES



ATEX Directive 2014/34/EU

INTRINSICALLY SAFE: & FLAMEPROOF

Certificate No.: KDB 22ATEX0021X

EN 60079-0, EN 60079-1, EN 60079-11, EN 60079-31, EN 50303

INTRINSICALLY SAFE: **both construction : remotely mounted from sensor and directly mounted to sensor**

For Zone 0/20 models **Enclosure code 5**, refer Table 1

II 2 (1) Ex ia IIC T4 Gb

II 1D Ex ia T105°C Da

T. amb. -40...+75°C

For Zone 0/20 models **Enclosure code 4**, refer Table 1

II 2 (1) Ex ia IIC T4 G

II 1D Ex ia T105°C Da

I M1 Ex ia I Ma

T. amb. -40...+75°C

FLAMEPROOF, **remotely mounted from sensor**

For Zone 1 models **Enclosure code H**, refer Table 1)

II 2 (1) G Ex db IIC T5/T6 Gb

II 2 (1) D Ex tb IIIC T100°C /T85°C Db

T. amb. -40...+75°C

For Zone 1/21 models **Enclosure code R**, refer Table 1)

II 2 (1) G Ex db IIC T5/T6 Gb

II 2 (1) D Ex tb IIIC T100°C /T85°C Db

I M2 Ex db Mb

T. amb. -40...+75°C

FLAMEPROOF, **directly mounted to sensor**

For Zone 1 models **Enclosure code H**, refer Table 1)

II 2G Ex db IIC T**/T5/T6 Gb

II 2D Ex tb IIIC T*/T100°C /T85°C Db

T. amb. -40...+75°C

For Zone 1 models **Enclosure code R**, refer Table 1)

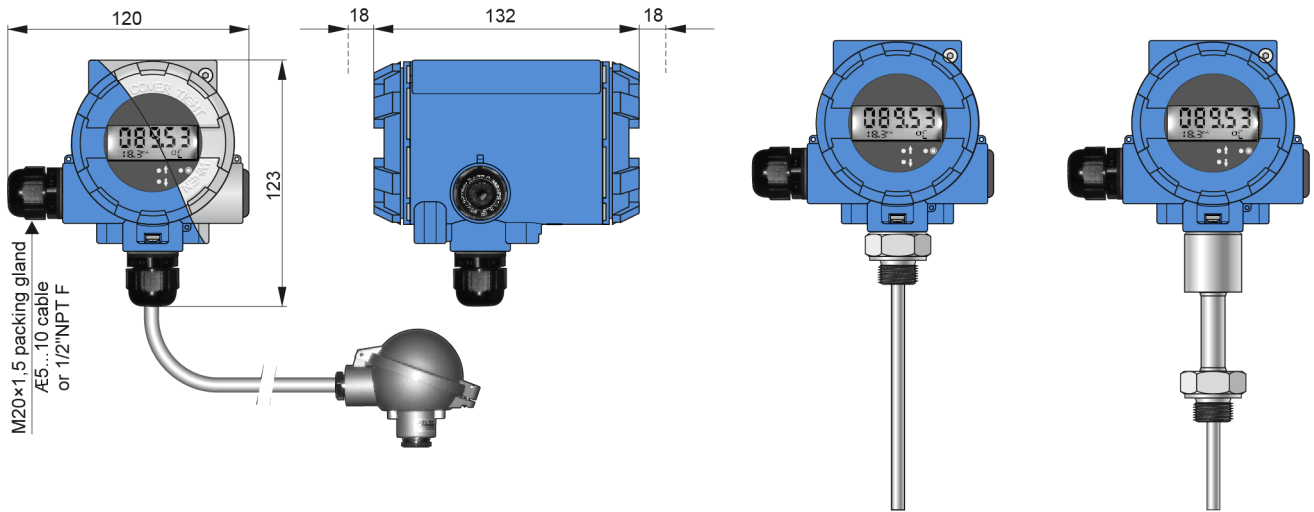
II 2G Ex db IIC T**/T5/T6 Gb

II 2D Ex tb IIIC T*/T100°C /T85°C Db

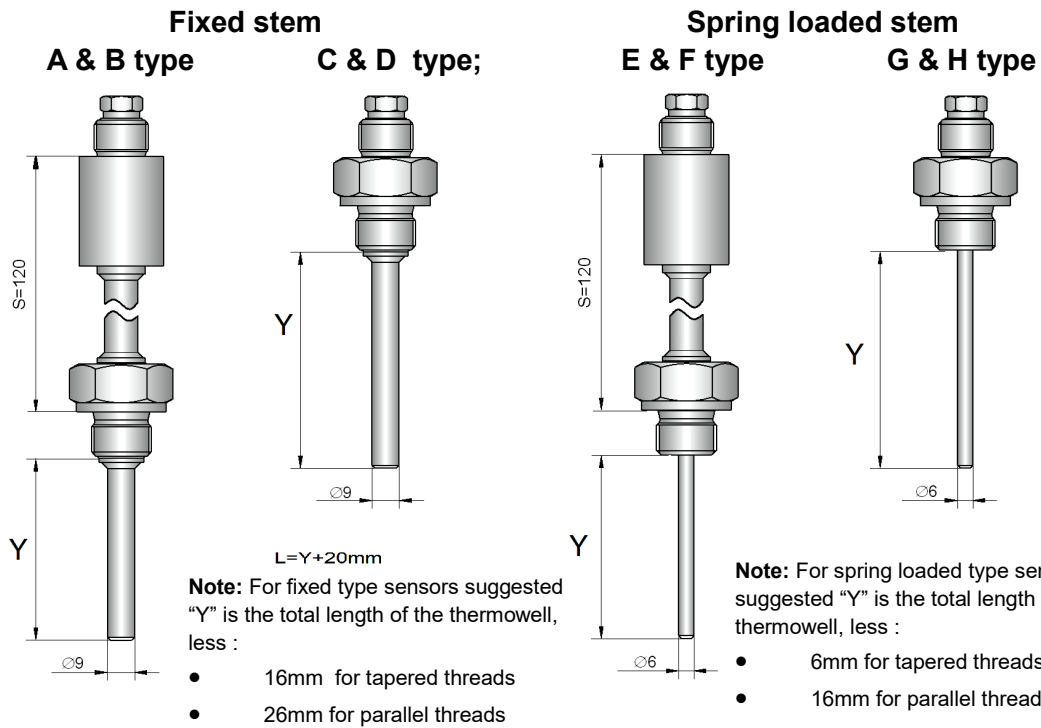
I M2 Ex db Mb

T. amb. -40...+75°C

Dimensions



Remote & Direct mounted sensors



Sensor type	Standard dimensions of sensor			Sensor material	Available process connection
	Ø[mm]	L[mm]	S[mm]		
Type "A" & "B" code	9	100, 160, 250, 400	120	316Lss	M20x1,5, G½", ½"NPT
Type "C" & "D" code	9	100, 160, 250, 400	-	316Lss	M20x1,5, G½", ½"NPT
Type "E" & "F" code	6	100, 160, 250, 400	120	316Lss	M20x1,5, G½", ½"NPT
Type "G" & "H" code	6	100, 160, 250, 400	-	316Lss	M20x1,5, G½", ½"NPT

WS, WN - welded sensors; LS, LN - spring loaded sensors (to use with additional thermowell)

In the interest of development and improvement Delta Mobrey Ltd, reserves the right to amend, without notice, details contained in this publication. No legal liability will be accepted by Delta Mobrey Ltd for any errors, omissions or amendments.

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