

Translation

EU-Type Examination Certificate

Equipment intended for use in potentially explosive atmospheres
Directive 2014/34/EU

EU-Type Examination Certificate Number: **BVS 17 ATEX E 110 X**

Product: **Temperature sensors** (Details see next pages)

Manufacturer: **RECKMANN GMBH**

Address: **Werkzeugstr. 19 - 23, 58093 Hagen, Germany**

This product and any acceptable variations thereto are specified in the appendix to this certificate and the documents referred to therein.

DEKRA EXAM GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential Report No. BVS PP 17.2182 EU.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012 + A11:2013
EN 60079-11:2012
EN 60079-26:2015


General requirements
Intrinsic Safety "i"
Equipment with equipment protection level (EPL) Ga

If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

The marking of the product shall include the following:

II 1G Ex ia IIC T1 ... T6 Ga
II 1/2G Ex ia IIC T1 ... T6 Ga/Gb
II 2G Ex ia IIC T1 ... T6 Gb

 **II 1D Ex ia IIIC T135°C Da**
II 1/2D Ex ia IIIC T135°C Da/Db
II 2D Ex ia IIIC T135°C Db

I M2 Ex ia I Mb

Details see table section 15.1

DEKRA EXAM GmbH
Bochum, 2017-11-24

Signed: Jörg Koch

Certifier

Signed: Dr Michael Wittler

Approver

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 15 Product description
 15.1 Subject and type

Temperature sensors type	Marking
BWR15-****-**-*	I M2 Ex ia I Mb
WR15-B****-**-*, WR15-C****-**-*, WR15-D****-**-*, WR15-E****-**-*, WR15-F****-**-*, WR15-G****-**-*, WR15-H****-**-*, WR15-J****-**-*, TR15-B****-**-*, TR15-C****-**-*, TR15-D****-**-*, TR15-E****-**-*, TR15-F****-**-*, TR15-G****-**-*, TR15-H****-**-*, TR15-J****-**-*	II 1/2G Ex ia IIC T1 ... T6 Ga/Gb II 1/2D Ex ia IIC T135°C Da/Db
WR15-K****-**-*, WR15-L****-**-*, WR15-CX****-**-*, WR15-EX****-**-*, TR15-K****-**-*, TR15-L****-**-*, TR15-CX****-**-*, TR15-EX****-**-*, WR14-J-****-**-*, TR14-J-****-**-*, WR14-X-****-**-*, TR14-X-****-**-*	II 2G Ex ia IIC T1 ... T6 Gb II 2D Ex ia IIC T135°C Db
WR14-O*-****, TR14-O*-****, WR14-P*-****, TR14-P*-****, WR14-M*-****, TR14-M*-****, RKW-8*-****, RKW-9*-****	II 1G Ex ia IIC T1 ... T6 Ga II 1D Ex ia IIC T135°C Da

Type codes

Temperature sensors for use in potentially explosive atmospheres (mining)							
Resistance temperature detector	BWR15	-*	*	*	*	-*	-*
Protection fitting type							
Model 2 with coupling nut		B					
Model 8 (2GoH)		C					
Model 2G		D					
Number of sensors							
Single			1				
Double			2				
Sensor							
PT100				PT100			
PT1000				PT1000			
Type R14 measuring insert							
R144					D		
Measuring insert diameter							
3.00 mm						300	
6.00 mm						600	
8.00 mm						800	
Cable connection							
Cable gland							X
M12 built-in plug VA							A
M12 built-in socket VA							B

Temperature sensors for use in potentially explosive gas or dust atmospheres							
Resistance temperature detector	WR15	_*	*	*		*	_*
Mineral insulated thermocouple	TR15	_*	*	*		*	_*
Protection fitting type							
Model 2		B					
Model 8 (2GoH)		C					
Model 2G		D					
Model 2F		E					
Model 3		F					
Model 3GoH		G					
Model 3G		H					
Model 3F		J					
Model 4 without protection tube		K					
Model 4F without protection tube		L					
Model 2GoH without protection tube		CX					
Model 2F without protection tube		EX					
Number of sensors							
Single			1				
Double			2				
Sensor							
PT100	WR15			PT100			
PT1000	WR15			PT1000			
Ni100	WR15			Ni100			
Cu-CuNi type T	TR15			T			
Fe-CuNi type J	TR15			J			
NiCr-CuNi type E	TR15			E			
NiCr-Ni type K	TR15			K			
NiCrSi-NiSi type N	TR15			N			
Pt13%Rh-Pt type R	TR15			R			
Pt10%Rh-Pt type S	TR15			S			
Measuring insert type							
R144					D		
R149					Q		
Measuring insert diameter							
3.00 mm						300	
6.00 mm						600	
8.00 mm						800	
Cable connection							
Cable gland							X
M12 built-in plug							A
M12 built-in socket							B

Measuring inserts for use in potentially explosive gas or dust atmospheres							
Resistance temperature detector	WR14	_*	_*	*	*	*	_*
Mineral insulated thermocouple	TR14	_*	_*	*	*	*	_*
Measuring insert type							
Model B		J					
without connection head		X					
Model R144			D				
Model R149 free-ended			Q				
Measuring insert diameter							
3.00 mm				300			
6.00 mm				600			
8.00 mm				800			
Number of sensors							
Single					1		
Double					2		
Sensor							
PT100	WR14					PT100	
PT1000	WR14					PT1000	
Ni100	WR14					Ni100	
Cu-CuNi type T	TR14					T	
Fe-CuNi type J	TR14					J	
NiCr-CuNi type E	TR14					E	
NiCr-Ni type K	TR14					K	
NiCrSi-NiSi type N	TR14					N	
Pt13%Rh-Pt type R	TR14					R	
Pt10%Rh-Pt type S	TR14					S	
Cable connection							
without (for ME) / cable gland							X
M12 built-in plug							A
M12 built-in socket							B

Temperature sensors with cable (Lmax = 50 m) for use in potentially explosive gas or dust atmospheres							
Resistance temperature detector	WR14	-*	*	-*	*	*	*
Mineral insulated thermocouple	TR14	-*	*	-*	*	*	*
Measuring insert type							
Model D		O					
Model DST (D with plug connector)		P					
Measuring insert diameter							
1.50 mm (only single sensor)			150				
2.00 mm (only single sensor)			200				
3.00 mm			300				
6.00 mm			600				
8.00 mm			800				
Number of sensors							
Single				1			
Double				2			
Sensor							
PT100	WR14				PT100		
PT1000	WR14				PT1000		
Ni100	WR14				Ni100		
Cu-CuNi type T	TR14				T		
Fe-CuNi type J	TR14				J		
NiCr-CuNi type E	TR14				E		
NiCr-Ni type K	TR14				K		
NiCrSi-NiSi type N	TR14				N		
Pt13%Rh-Pt type R	TR14				R		
Pt10%Rh-Pt type S	TR14				S		
Connection cables							
PVC/PVC						A	
PVC/shielding/PVC						B	
Glass silk/silicone						C	
Glass silk/silicone/glass silk/shielding						D	
Silicone/silicone/FEP						E	
Siliconeon/silicone/shielding/FEP						F	
Cable connection							
Free-ended cables							X
Mini compensation plug connector							A
Lemo plug connector							B
M12 / M8 plug connector							C

Temperature sensors with plug connector for use in potentially explosive gas or dust atmospheres						
Resistance temperature detector	WR14	_*	*	_*	*	*
Mineral insulated thermocouple	TR14	_*	*	_*	*	*
Measuring insert type						
Model L		M				
Measuring insert diameter						
1.50 mm (only single sensor)			150			
2.00 mm (only single sensor)			200			
3.00 mm			300			
6.00 mm (only with Lemo plug connector)			600			
8.00 mm (only with Lemo plug connector)			800			
Number of sensors						
Single				1		
Double				2		
Sensor						
PT100	WR14				PT100	
PT1000	WR14				PT1000	
Ni100	WR14				Ni100	
Cu-CuNi type T	TR14				T	
Fe-CuNi type J	TR14				J	
NiCr-CuNi type E	TR14				E	
NiCr-Ni type K	TR14				K	
NiCrSi-NiSi type N	TR14				N	
Pt13%Rh-Pt type R	TR14				R	
Pt10%Rh-Pt type S	TR14				S	
Cable connection						
Mini compensation plug connector						A
Lemo plug connector						B

Cable sensors (Lmax = 50 m) for use in potentially explosive gas or dust atmospheres							
Resistance temperature detector	RKW	_*	_*	_*	*	*	*
Cable sensor type							
without pipe clip		8					
with pipe clip		9					
Sensor diameter							
3.00 mm			300				
4.00 mm			400				
6.00 mm			600				
8.00 mm			800				
Number of sensors							
Single				1			
Double				2			
Sensor							
PT100					PT100		
PT1000					PT1000		
Ni100					Ni100		
Connection cables							
PVC/PVC							A
PVC/shielding/PVC							B
Glass silk/silicone							C
Glass silk/silicone/lass silk/shielding							D
Silicone/silicone/FEP							E
Silicone/silicone/shielding/FEP							F
Cable connection							
Free-ended cables							X
Lemo plug connectors							B
M12 / M8 plug connectors							C

15.2 Description

The temperature sensors respectively the measuring inserts respectively the cable sensors serve the function of recording process temperatures in areas of explosion hazards.

The sensor elements (resistance elements or thermocouples) are placed on the tip of a metal tube with a length of up to 8000 mm.

Up to 2 sensor elements are installed in the temperature sensors respectively the measuring inserts respectively the cable sensors, each in 2-, 3- or 4-wire-technology.

The temperature sensors respectively the measuring inserts respectively the cable sensors have to be connected only to one intrinsically safe circuit.

15.3 Parameters

The temperature sensors respectively the measuring inserts respectively the cable sensors have to be connected only to one intrinsically safe circuit independent on the number of wires.

Minimum permissible process temperature for all sensors: -40 °C

15.3.1 Temperature sensor type BWR15-****-*, I M2 Ex ia I Mb (mining)

Maximum input voltage	U_i	DC	15	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		see table	
Maximum internal capacitance	C_i		negligible	
Maximum internal inductance	L_i		negligible	

Permissible process temperature in °C depends on P_i and the measuring insert diameter

type	20 mW	50 mW	250 mW	500 mW	750 mW
BWR15-****-300-*	146	140	104	58	12
BWR15-****-600-*	147	144	123	97	71
BWR15-****-800-*	147	144	123	97	71

Ambient temperature range of the connection head: -40 °C up to +80 °C

15.3.2 Temperature sensor type WR15-B****-*, WR15-C****-*, WR15-D****-*, WR15-E****-*, WR15-F****-*, WR15-G****-*, WR15-H****-*, WR15-J****-*, TR15-B****-*, TR15-C****-*, TR15-D****-*, TR15-E****-*, TR15-F****-*, TR15-G****-*, TR15-H****-*, TR15-J****-*

II 1/2G Ex ia IIC T1 ... T6 Ga/Gb (with partition wall)

Maximum input voltage	U_i	DC	30	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		see table	
Maximum internal capacitance	C_i		negligible	
Maximum internal inductance	L_i		negligible	

Permissible process temperature in °C depends on P_i and the temperature class.

For types WR15 and measuring insert diameter 3 mm:

temperature class	20 mW	50 mW	250 mW	500 mW	750 mW
T1	438	435	417	394	371
T2	288	285	267	244	221
T3	193	190	172	149	126
T4	128	125	107	84	61
T5	93	90	72	49	26
T6	78	75	57	34	11

For types WR15 and measuring insert diameter 6 mm and 8 mm:

temperature class	20 mW	50 mW	250 mW	500 mW	750 mW
T1	439	437	427	414	401
T2	289	287	277	264	251
T3	194	192	182	169	156
T4	129	127	117	104	91
T5	94	92	82	69	56
T6	79	77	67	54	41

For types TR15 and measuring insert diameter 3 mm, 6 mm and 8 mm:

temperature class	750 mW
T1	435
T2	285
T3	190
T4	125
T5	90
T6	75

Ambient temperature range of the connection head: -40 °C up to +80 °C for T5 ... T6
-40 °C up to +100 °C for T1 ... T4

Note: If replacing the cable gland with a built-in M12 plug connector,
the ambient temperature range is reduced to -40 °C to +80 °C for T1...T6.

II 1/2D Ex ia IIIC T135°C Da/Db (with partition wall)

Maximum input voltage	U_i	DC	30	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		see table	
Maximum internal capacitance	C_i		negligible	
Maximum internal inductance	L_i		negligible	

Permissible ambient-/process temperature range in °C depend on P_i

P_i	Ambient-/Process temperature range
750 mW	-40 °C bis +40 °C
650 mW	-40 °C bis +70 °C
550 mW	-40 °C bis +100 °C

Note: If replacing the cable gland with a built-in M12 plug connector,
the ambient temperature range is reduced to -40 °C to +80 °C

- 15.3.3 Temperature sensor type WR15-K***-*, WR15-L***-*, WR15-CX***-*, WR15-EX***-*,
TR15-K***-*, TR15-L***-*, TR15-CX***-*, TR15-EX***-*, and measuring insert
Typ WR14-J-****-*, TR14-J-****-*, WR14-X-****-*, TR14-X-****-*

II 2G Ex ia IIC T1 ... T6 Gb

Maximum input voltage	U_i	DC	30	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		see table	
Maximum internal capacitance	C_i		negligible	
Maximum internal inductance	L_i		negligible	

Permissible process temperature in °C depends on P_i and the temperature class.

For types WR15 and measuring insert diameter 3 mm:

temperature class	20 mW	50 mW	250 mW	500 mW	750 mW
T1	436	430	394	348	302
T2	286	280	244	198	152
T3	191	185	149	103	57
T4	126	120	84	38	/
T5	91	85	49	3	/
T6	76	70	34	/	/

For types WR15 and measuring insert diameter 6 mm and 8 mm:

temperature class	20 mW	50 mW	250 mW	500 mW	750 mW
T1	437	434	413	387	361
T2	287	284	263	237	211
T3	192	189	168	142	116
T4	127	124	103	77	51
T5	92	89	68	42	16
T6	77	74	53	27	1

For types TR15 and measuring insert diameter 3 mm, 6 mm and 8 mm:

temperature class	750 mW
T1	430
T2	280
T3	185
T4	120
T5	85
T6	70

Ambient temperature range of the connection head: -40 °C up to +80 °C for T5 ... T6
-40 °C up to +100 °C for T1 ... T4

Note: If replacing the cable gland with a built-in M12 plug connector,
the ambient temperature range is reduced to -40 °C to +80 °C for T1...T6.

II 2D Ex ia IIIC T135°C Db

Maximum input voltage	U_i	DC	30	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		see table	
Maximum internal capacitance	C_i		negligible	
Maximum internal inductance	L_i		negligible	

Permissible ambient-/process temperature range in °C depend on P_i

P_i	Ambient-/Process temperature range
750 mW	-40 °C bis +40 °C
650 mW	-40 °C bis +70 °C
550 mW	-40 °C bis +100 °C

Note: If replacing the cable gland with a built-in M12 plug connector,
the ambient temperature range is reduced to -40 °C to +80 °C

15.3.4 Temperature sensor type WR14-O*-****, TR14-O*-****, WR14-P*-****, TR14-P*-****, WR14-M*-***, TR14-M*-***

II 1G Ex ia IIC T1 ... T6 Ga

Maximum input voltage	U_i	DC	30	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		see table	
For type WR14-M*-***, TR14-M*-***:				
Maximum internal capacitance	C_i		negligible	
Maximum internal inductance	L_i		negligible	
For type WR14-O*-****, TR14-O*-****, WR14-P*-****, TR14-P*-**** (cable length max. 50m):				
Maximum internal capacitance	C_i		0.2 nF/m	
Maximum internal inductance	L_i		1 µH/m	

Permissible process temperature in °C depends on P_i and the temperature class.

For types WR14 and measuring insert diameter 1.5 mm and 2 mm:

temperature class	20 mW	50 mW	250 mW	500 mW	750 mW
T1	434	426	369	300	229
T2	284	276	219	150	79
T3	189	181	124	55	/
T4	124	116	59	/	/
T5	89	81	24	/	/
T6	74	66	9	/	/

For types WR14 and measuring insert diameter 3 mm:

temperature class	20 mW	50 mW	250 mW	500 mW	750 mW
T1	436	430	394	348	302
T2	286	280	244	198	152
T3	191	185	149	103	57
T4	126	120	84	38	/
T5	91	85	49	3	/
T6	76	70	34	/	/

For types WR14 and measuring insert diameter 6 mm and 8 mm:

temperature class	20 mW	50 mW	250 mW	500 mW	750 mW
T1	437	434	413	387	361
T2	287	284	263	237	211
T3	192	189	168	142	116
T4	127	124	103	77	51
T5	92	89	68	42	16
T6	77	74	53	27	1

For types TR14 and measuring insert diameter 1.5 mm, 2 mm, 3 mm, 6 mm and 8 mm:

temperature class	750 mW
T1	430
T2	280
T3	185
T4	120
T5	85
T6	70

Ambient temperature range of the sleeve, connection cable and plug connector for type WR14-O*-****, TR14-O*-****, WR14-P*-****, TR14-P*-****:

-40 °C up to +75 °C for T5 ... T6

-40 °C up to +100 °C for T1 ... T4

Ambient temperature range of the plug connector for type WR14-M*-****, TR14-M*-****:

-40 °C up to +80 °C for T5 ... T6

-40 °C up to +100 °C for T1 ... T4

II 1D Ex ia IIIC T135°C Da

Maximum input voltage	U_i	DC	30	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		see table	

For type WR14-M*-****, TR14-M*-****:

Maximum internal capacitance	C_i		negligible	
Maximum internal inductance	L_i		negligible	

For type WR14-O*-****, TR14-O*-****, WR14-P*-****, TR14-P*-**** (cable length max. 50 m)

Maximum internal capacitance C_i 0.2 nF/m
 Maximum internal inductance L_i 1 μ H/m

Permissible ambient-/process temperature range in °C depend on P_i

P_i	Ambient-/Process temperature range
750 mW	-40 °C bis +40 °C
650 mW	-40 °C bis +70 °C
550 mW	-40 °C bis +100 °C

15.3.5 Cable sensor type RKW-8*-****, RKW-9*-****

II 1G Ex ia IIC T1 ... T6 Ga

Maximum input voltage U_i DC 30 V
 Maximum input current I_i 100 mA
 Maximum input power P_i see table
 (cable length max. 50m)
 Maximum internal capacitance C_i 0.2 nF/m
 Maximum internal inductance L_i 1 μ H/m

Permissible process temperature in °C depends on P_i and the temperature class..

For types RKW and sensor diameter 3 mm, 4 mm, 6 mm und 8 mm:

temperature class	20 mW	50 mW	250 mW	500 mW	750 mW
T1	434	425	367	294	221
T2	284	275	217	144	71
T3	184	175	117	44	/
T4	124	115	57	/	/
T5	89	80	22	/	/
T6	74	65	7	/	/

Ambient temperature range of the connection cable and plug connector for type RKW-8*-****, RKW-9*-****:

-40 °C bis +75 °C für T5 ... T6
 -40 °C bis +100 °C für T1 ... T4

II 1D Ex ia IIIC T135°C Da

Maximum input voltage U_i DC 30 V
 Maximum input current I_i 100 mA
 Maximum input power P_i see table
 (cable length max. 50m)
 Maximum internal capacitance C_i 0.2 nF/m
 Maximum internal inductance L_i 1 μ H/m

Permissible ambient-/process temperature range in °C depend on P_i

P_i	Ambient-/Process temperature range
750 mW	-40 °C bis +40 °C
650 mW	-40 °C bis +70 °C
550 mW	-40 °C bis +100 °C

16 **Report Number**

BVS PP 17.2182 EU, as of 2017-11-24

17 **Special Conditions for Use**

17.1 The temperature sensors respectively the measuring inserts respectively the cable sensors are suitable for use within the following ambient temperature range: see parameters

In case that process temperatures measured deviate from these parameters, the ambient temperature range and the temperature class defined refer only to the connection head or the sleeve, connection cable and plug connector depending on type. The impact of the process temperature on the temperature of the neck tube has to be considered separately in use of the temperature sensors respectively the measuring inserts respectively the cable sensors.

Appropriate measures, e.g. an adequate choice of neck tube length, shall assure that, depending on type, the temperature of the connection head or the sleeve, connection cable and plug connector is decoupled from the process temperature as such.

17.2 The manufacturer's instructions regarding admissible process conditions shall be adhered to.

17.3 For the measuring inserts type WR14-X-****-* and TR14-X-****-* valid:

The measuring insert has to be installed into an enclosure that guarantees at least the type of protection IP20.

The internal wiring has to meet the requirements of clause 6.3.12 of EN 60079-11:2012.

The installation has to be carried out in a manner that the air gaps between blank parts of intrinsically safe circuits and metallic enclosure parts are at least 3 mm.

17.4 For the sensors with marking II 1/2G Ex ia IIC T1 ... T6 Ga/Gb and II 1/2D Ex ia IIIC T135°C Da/Db valid:

The separation wall (stainless steel tube) has a wall thickness ≥ 1 mm.

The installation into a separation wall between areas with 1G/2G- resp. 1D/2D-requirements has to be done in such a way, that all metallic parts are conductively connected to the metal container wall; or, if the container is made of plastic, that all insulated metal parts are connected to equipotential bonding.

The sensors have to be installed into the separation wall with standardized connections. At the place of installation, technical tightness has to be ensured.

17.5 For the sensors type WR14-O*-****, TR14-O*-****, WR14-P*-****, TR14-P*-****, RKW-8*-****, RKW-9*-**** valid:

In gas-explosive areas, the sensors have to be installed in such a way, that electrostatic charging is excluded.

17.6 For the sensors type WR14-O*-****, TR14-O*-****, WR14-P*-****, TR14-P*-****, WR14-M*-****, TR14-M*-****, RKW-8*-****, RKW-9*-**** valid:

The metallic parts of the sensors have to be included into the potential equalization.

17.7 The intrinsically safe circuit of the sensors with diameter 3 mm and more than 4 internal wires, sensors with diameter < 3 mm and sensors with diameter > 3 mm and more than 6 internal wires has to be regarded as earthed. Along the intrinsically safe circuit potential equalisation has to be provided.

18 **Essential Health and Safety Requirements**

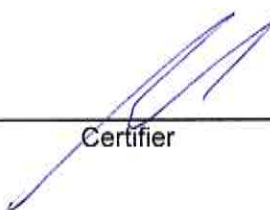
The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 **Drawings and Documents**

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH
Bochum, dated 2017-11-24
BVS-Rip/Nu A 20150459



Certifier



Approver