

Instructions: Intrinsic Safety, Increased Safety, and Non-Sparking RTDs & Assemblies

 II 1 G Ex ia IIC T... or ... °C Ga
IECEX Ex ia IIC T... or ... °C Ga

 II 2 G Ex eb IIC T... or ... °C Gb
IECEX Ex eb IIC T... or ... °C Gb

 II 3 G Ex nA IIC T... or ... °C Gc
IECEX Ex nA IIC T... or ... °C Gc

SPI 00-0974 Rev C (Document 2307139)

1. Description

The Resistance Temperature Detectors (RTDs) and Assemblies, conforming to the requirements of Minco Design Definition B215602, are intended to be installed in various locations, typically a bearing with a bore, but are suitable for use in many different configurations. This RTD/Assembly is designed to be installed in locations with types of protection Ex ia, Ex be, or Ex nA.

- Models are available for 2-, 3-, or 4-wire measurement circuits and single or dual RTD elements.
- Optional accessories are compression fitting, shrink tubing, probe cap, and connection head.
- Ambient temperature in service - Process side: -55°C to 200°C for “All-stainless” and “Tip-sensitive” constructions, -55°C to 550°C for “MgO” construction (reduced to 200°C/260°C when the shrink tubing and/or probe cap option is selected, depending on shrink tubing/cap material).
- Ambient temperature in service is reduced to -40°C to 100°C for connection head parts (when used).

2. EU Declaration of Conformity

This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

RTDs and Assemblies types:

B215602-A1A0, B215602-A1B1, B215602-A1B2, B215602-A1C1, B215602-A1C2, B215602-A1D1, B215602-A1D2, B215602-A2A0, B215602-A2B1, B215602-A2B2, B215602-A2C1, B215602-A2C2, B215602-A2D1, B215602-A2D2, B215602-A3A0, B215602-A3B1, B215602-A3B2, B215602-A3C1, B215602-A3C2, B215602-A3D1, B215602-A3D2, B215602-B1A0, B215602-B1B1, B215602-B1B2, B215602-B1C1, B215602-B1C2, B215602-B1D1, B215602-B1D2, B215602-B2A0, B215602-B2B1, B215602-B2B2, B215602-B2C1, B215602-B2C2, B215602-B2D1, B215602-B2D2, B215602-B3A0, B215602-B3B1, B215602-B3B2, B215602-B3C1, B215602-B3C2, B215602-B3D1, B215602-B3D2.

The product defined above is in conformity with the following relevant legislation:

ATEX Directive 2014/34/EU

EN 60079-0:2012+A11:2013* Explosive atmospheres - Part 0: Equipment - General requirements

EN 60079-7:2007* Explosive atmospheres - Part 7: Equipment protection by increased safety “e”

EN 60079-11:2012 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”

EN 60079-15:2010 Explosive atmospheres - Part 15: Equipment protection by type of protection “n”

IEC 60079-0:2011* Explosive atmospheres - Part 0: Equipment - General requirements

IEC 60079-7:2006* Explosive atmospheres - Part 7: Equipment protection by increased safety “e”

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”

IEC 60079-15:2010* Explosive atmospheres - Part 15: Equipment protection by type of protection “n”

*NOTE: The harmonized standards EN IEC 60079-0:2018 and EN 60079-7:2015+A1:2018 have been compared to the standard used for certification purposes and no changes in the “state of the art” apply to the product. The standards IEC 60079-0:2017/COR1:2020 and IEC 60079-7:2015+AMD1:2017 CSV have been compared to the standards used for certification purposes and no changes in the “state of the art” apply to the product.

Certificate LCIE 16 ATEX 3034 X

Q.A. N.B.: DEKRA Certification B.V. (0344)

Certificate LCIE 16 ATEX 1017 X

Certificate IECEx LCIE 15.0053 X

LCIE Bureau Veritas (0081)

33, avenue du Général Leclerc

92260 Fontenay-aux-Roses, FRANCE

 06 Mar 2023

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7300 Commerce Lane

Minneapolis, MN 55432

3. Type Designation

Type designation scheme is as follow:

B215602-A1B2

With B215602: General type

- A: A: with connection head
B: without connection head

- 1: 1: all-stainless construction
2: tip-sensitive construction
3: MgO construction

- B: A: no shrink-tubing, no cap option
B: shrink-tubing option
C: cap option
D: shrink-tubing and cap option

- 2: 0: no shrink-tubing, no cap option
1: FEP shrink-tubing/cap material
2: PFA shrink-tubing/cap material

4. Installation Instructions

The RTD probe is designed to be installed in many different configurations, typically into a dry bore. The RTD probe with a compression fitting may be immersed in a fluid at pressures no greater than 50 psi.

The compression fitting is intended to be adjusted on the RTD probe by sliding probe up or down through the fitting. Set the probe location to desired depth of hole, and lock the fitting onto the probe by tightening the fitting sealing nut.

Care should be taken to prevent the RTD probe tip end from being immersed in conductive liquids, unless the probe cap is installed. The tip of the probe must be protected against mechanical danger. Installation within a bearing or other rigid bore completes the enclosure and provides sufficient protection from mechanical impact.

In case of assemblies provided with connection head (types B215602-Axxx), a cable gland is supplied on models with G1/2", M20x1.5 or Pg16 conduit thread. Those cable glands suit to cables with outer diameter within the 5.5mm – 7.5mm range. Recommended torque value for cable glands is 20 Nm.

Optional terminal blocks can be supplied on assemblies with connection head. Those can accept up to 6 terminals (screwing method), for wires with 1.2mm maximum diameter. Torque value is 0.79 Nm.

The equipment is certified according to several protection modes for being used in different zones. Because of the different protection modes available, the user must check the appropriate box on the marking label (See §9. Marking examples).

5. Electrical Data

Maximum Input Voltage U_i : 30V
Maximum Input Power P_i : 0.40W
Cable: $C_i = 0.028$ nF/m $L_i = 1.33$ μ H/m $R_i = 0.16$ Ω /m

6. Special Conditions for Safe Use

For all types of protection:

For models with connection head (types B215602-Axxx), do not open cover when an explosive atmosphere is present.

The equipment shall be earthed in accordance with clause 15 of EN 60079-0:2012 standard.

The equipment shall be installed in accordance with the EN 60079-14:2013 standard.

The cable used shall have an operating temperature greater than 103°C.

Ambient temperature:

For installation, the user shall ensure that the ambient temperature is as per the table below.

Ambient temperature of connective parts shall not be impacted by the measured temperature.

Types designation	Ambient temperature range	
	Process side	Connective parts
B215601-A1xx B215602-A2xx	-55°C / +200°C	-40°C / +100°C
B215602-A3B1 B215602-A3C1 B215602-A3D1		
B215602-A3A0		
B215602-A3B2 B215602-A3C2 B215602-A3D2		
B215602-B1xx B215602-B2xx	-55°C / +200°C	
B215602-B3B1 B215602-B3C1 B215602-B3D1		
B215602-B3A0		
B215602-B3B2 B215602-B3C2 B215602-B3D2	-55°C / +260°C *	

*Maximum temperature is de-rated to +200°C for the cable and the first 50mm of the probe.

Intrinsic Safety installations only “ia”:

The apparatus must be only connected to certified associated intrinsically safe equipment and this combination must be compatible as regards to intrinsic safety rules.

Types B215602-Axxx (with connection head) contain more than 15% of aluminum and should then be handled in such a manner to eliminate the risk of sparks caused by friction or impact.

Increased safety installations only “eb”:

For types B215602-Axxx (with connection head), the user shall ensure efficient adequate clamping of the cables against pulling and twisting.

Non-Sparking installations only “n”:

Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment.

For types B215602-Axxx (with connection head), the user shall ensure efficient adequate clamping of the cables against pulling and twisting.

7. Temperature Class Tables

For installation, the user shall ensure that the ambient temperature of connective parts is respected. It shall not be impacted by the measured temperature.

The temperature class rating of the equipment is determined according to the ambient temperature (process side) and the dissipated power in the sensor.

1. Types of construction “All-stainless” and “Tip-sensitive” – types designation B215602-x1xx and B215602-x2xx

Temperature class	Dissipated power					
	100 mW		200 mW		400 mW	
	Connection head	Probe	Connection head	Probe	Connection head	Probe
T6	Ta ≤ 78°C	Ta ≤ 60°C	Ta ≤ 78°C	Ta ≤ 48°C	Ta ≤ 78°C	Ta ≤ 20°C
T5	Ta ≤ 93°C	Ta ≤ 75°C	Ta ≤ 93°C	Ta ≤ 63°C	Ta ≤ 93°C	Ta ≤ 35°C
T4	Ta ≤ 100°C	Ta ≤ 110°C	Ta ≤ 100°C	Ta ≤ 98°C	Ta ≤ 100°C	Ta ≤ 70°C
T3	/	Ta ≤ 175°C	/	Ta ≤ 163°C	/	Ta ≤ 135°C
T2	/	Ta ≤ 200°C	/	Ta ≤ 200°C	/	Ta ≤ 200°C

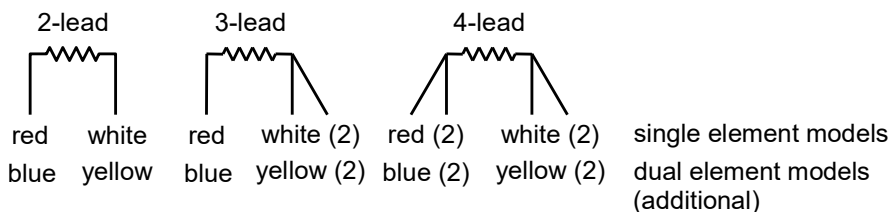
2. Type of construction “MgO” – types designation B215602-x3xx

Temperature class	Dissipated power					
	100 mW		200 mW		400 mW	
	Connection head	Probe	Connection head	Probe	Connection head	Probe
T6	Ta ≤ 78°C	Ta ≤ 60°C	Ta ≤ 78°C	Ta ≤ 48°C	Ta ≤ 78°C	Ta ≤ 20°C
T5	Ta ≤ 93°C	Ta ≤ 75°C	Ta ≤ 93°C	Ta ≤ 63°C	Ta ≤ 93°C	Ta ≤ 35°C
T4	Ta ≤ 100°C	Ta ≤ 110°C	Ta ≤ 100°C	Ta ≤ 98°C	Ta ≤ 100°C	Ta ≤ 70°C
T3	/	Ta ≤ 175°C	/	Ta ≤ 163°C	/	Ta ≤ 135°C
T2*	/	Ta ≤ 260°C	/	Ta ≤ 258°C	/	Ta ≤ 230°C
T1**	/	Ta ≤ 420°C	/	Ta ≤ 408°C	/	Ta ≤ 380°C
570°C**	/	Ta ≤ 550°C	/	/	/	/
582°C**	/	/	/	Ta ≤ 550°C	/	/
610°C**	/	/	/	/	/	Ta ≤ 550°C

*Types B215602-x3B1, B215602-x3C1 and B215602-x3D1 types that feature the FEP shrink tubing/cap option(s) should not be used for T2 temperature class applications.

**Types B215602-x3B1, B215602-x3C1 and B215602-x3D1, B215602-x3B2, B215602-x3C2 and B215602-x3D2 that feature the FEP or PFA shrink tubing/cap option(s) should not be used on T1 temperature class or higher applications.

8. Electrical Connections



The above color code is Minco's standard, but alternative can be used. Refer to the model specification drawing for the actual color code.





9. Marking Examples

Temperature detectors may be manufactured in our facilities in the United States or France. Below are examples of identification of manufacturing facility location.

Important: On the marking label, the user must check the box (☐) corresponding to the selected protection mode.





- Type designation:

B215602-A1A0, B215602-A1B1, B215602-A1B2, B215602-A1C1, B215602-A1C2, B215602-A1D1, B215602-A1D2, B215602-A2A0, B215602-A2B1, B215602-A2B2, B215602-A2C1, B215602-A2C2, B215602-A2D1, B215602-A2D2

Front Side	Rear Side
MINCO S.A.S. Z.I. – 09310 ASTON – France Mfg site: Minneapolis, MN USA Model: xxxxxx Type: <i>B215602-A1A0</i> Batch number: <i>123456-**-001</i> LCIE 16 ATEX 3034 X LCIE 16 ATEX 1017 X IECEx LCIE 15.0053X 	<input type="checkbox"/>  II 1 G Ex ia IIC T6...T2 Ga <input type="checkbox"/>  II 2 G Ex eb IIC T6...T2 Gb <input type="checkbox"/>  II 3 G Ex nA IIC T6...T2 Gc DO NOT OPEN COVER WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT SEE SPI 00-0974 FOR MORE DETAILS





- Type designation:

B215602-A3A0, B215602-A3B1, B215602-A3B2, B215602-A3C1, B215602-A3C2, B215602-A3D1, B215602-A3D2

Front Side	Rear Side
MINCO S.A.S. Z.I. – 09310 ASTON – France Mfg site: Minneapolis, MN USA Model: xxxxxx Type: <i>B215602-A3A0</i> Batch number: <i>123456-**-001</i> LCIE 16 ATEX 3034 X LCIE 16 ATEX 1017 X IECEx LCIE 15.0053X 	<input type="checkbox"/>  II 1 G Ex ia IIC T6...T610°C Ga <input type="checkbox"/>  II 2 G Ex eb IIC T6...T610°C Gb <input type="checkbox"/>  II 3 G Ex nA IIC T6...T610°C Gc DO NOT OPEN COVER WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT SEE SPI 00-0974 FOR MORE DETAILS





- Type designation:

B215602-B1A0, B215602-B1B1, B215602-B1B2, B215602-B1C1, B215602-B1C2, B215602-B1D1, B215602-B1D2, B215602-B2A0, B215602-B2B1, B215602-B2B2, B215602-B2C1, B215602-B2C2, B215602-B2D1, B215602-B2D2

Front Side	Rear Side
MINCO S.A.S. Z.I. – 09310 ASTON – France Mfg site: Minneapolis, MN USA Model: xxxxxx Type: <i>B215602-B1A0</i> Batch number: <i>123456-**-001</i> LCIE 16 ATEX 3034 X LCIE 16 ATEX 1017 X IECEx LCIE 15.0053X 	<input type="checkbox"/>  II 1 G Ex ia IIC T6...T2 Ga <input type="checkbox"/>  II 2 G Ex eb IIC T6...T2 Gb <input type="checkbox"/>  II 3 G Ex nA IIC T6...T2 Gc SEE SPI 00-0974 FOR MORE DETAILS

- Type designation:

B215602-B3A0, B215602-B3B1, B215602-B3B2, B215602-B3C1, B215602-B3C2, B215602-B3D1, B215602-B3D2

Front Side	Rear Side
MINCO S.A.S. Z.I. – 09310 ASTON – France Mfg site: Minneapolis, MN USA Model: xxxxxx Type: <i>B215602-B3A0</i> Batch number: <i>123456-**-001</i> LCIE 16 ATEX 3034 X LCIE 16 ATEX 1017 X IECEx LCIE 15.0053X 	<input type="checkbox"/>  II 1 G Ex ia IIC T6...T610°C Ga <input type="checkbox"/>  II 2 G Ex eb IIC T6...T610°C Gb <input type="checkbox"/>  II 3 G Ex nA IIC T6...T610°C Gc SEE SPI 00-0974 FOR MORE DETAILS

With XXXX (Notified Body Identification Number) and Mfg site:

0344 and **Minneapolis, MN USA** for parts manufactured in USA

0081 and **Aston - France** for parts manufactured in France