[1] TYPE EXAMINATION CERTIFICATE - Translation

[2] for non-electrical products of equipment-groups I and II,
equipment-categories M2 and 2 plus products of equipment-category 3

[3] Type examination certificate number **IBExU05ATEXB002 X** | Issue 1

[4] Product (equipment / component):

RADEX® - NC and RADEX® - NC * HT
Servo laminae couplings
designs DK and EK
each in sizes up to 42 or up to 61 (**RADEX® - NC * HAT** only)

a) Hubs with feather keyway or clamping ring hubs

- 1.0	Hub with feather keyway and locking screw
- 2.6	Clamping hub double-slotted with feather keyway
- 3.6	Clamping hub triple-slotted with feather keyway (**RADEX® - NC * HAT** only)
- 6.0 and 6.5	Hub with clamping ring

b) Hubs without feather keyway

- 2.5	Clamping hub double-slotted without feather keyway
- 3.5	Clamping hub triple-slotted without feather keyway (**RADEX® - NC * HAT** only)

In place of the star * in RADEX® - NC * HT the size is indicated.

[5] Manufacturer: KTR Systems GmbH

[6] Address: Carl-Zeiss-Straße 25
48432 Rheine
GERMANY

[7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] IBExU Institut für Sicherheitstechnik GmbH 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 Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014.

The examination and test results are recorded in the confidential test report IB-18-2-0020.

[9] Compliance with the essential health and safety requirements has been assured by compliance with:
EN ISO 80079-36:2016 EN ISO 80079-37:2016 EN ISO/IEC 80079-38:2017
except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" or "U" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.

[11] This type examination certificate relates only to the design of the specified equipment and not to specific items of equipment subsequently manufactured or supplied.

[12] The marking of the product shall include the following:

Hubs without aluminium, hubs with feather keyway

Ⓔx I M2 Ex h I Mb -30°C ≤ Ta ≤ +130°C
Ⓔx II 2G Ex h IIC T6 ... T3 Gb
Ⓔx II 2D Ex h IIIC T80°C ... T195°C Db
-30°C ≤ Ta ≤ +60°C ... +175°C

Hubs without aluminium, hubs without feather keyway

Ⓔx I M2 Ex h I Mb -30°C ≤ Ta ≤ +130°C
Ⓔx II 3G Ex h IIC T6 ... T3 Gc
Ⓔx II 3D Ex h IIIC T80°C ... T195°C Dc
-30°C ≤ Ta ≤ +60°C ... +175°C

Hubs of aluminium, hubs with feather keyway

Ⓔx II 2G Ex h IIC T6 ... T3 Gb
Ⓔx II 2D Ex h IIIC T80°C ... T195°C Db
-30°C ≤ Ta ≤ +60°C ... +175°C

Hubs of aluminium, hubs without feather keyway

Ⓔx II 3G Ex h IIC T6 ... T3 Gc
Ⓔx II 3D Ex h IIIC T80°C ... T195°C Dc
-30°C ≤ Ta ≤ +60°C ... +175°C

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By order

Dipl.-Ing. Willamowski

-Stamp-
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Certificates without signature and stamp are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Freiberg, 2020-03-18

[13] **Schedule**

[14] **Certificate number IBExU05ATEXB002 X** | Issue 1

[15] **Description of product**

The RADEX® - NC Servo laminae couplings mentioned in [4] are backlash-free and torsionally-stiff couplings. One laminae packing made of stainless spring steel (EK design) or, with insertion of a spacer, two laminae packings made of stainless spring steel (DK design) is/are fixed between two flange hubs made of semi-finished aluminium (EN AW 6023 T6) or steel so that axial, radial and angular displacements between input and output can be compensated within the specified limits. According to [4], the hubs constructed with or without feather keyway are available in the designs "hub with feather keyway and locking screw" (design 1.0), "clamping hub" (designs 2.5 and 2.6) and "clamping ring hub" (designs 6.0 and 6.5).

The RADEX® - NC * HT Servo laminae couplings are intended for the transmission of higher torques. In contrast to the RADEX® - NC Servo laminae couplings, the bushes for fixing the laminae packings are conical instead of cylindrical. In addition to the hub designs mentioned, the RADEX® NC * HT Servo laminae couplings can be manufactured with the hub designs "clamping hub triple-slotted with feather keyway" (3.6) and "clamping hub triple-slotted without feather keyway" (3.5).

Details on the design of the equipment or components can be found in the manufacturer's documentation and the test reports IB-04-4-016/2, IB-06-4-008 and IB-18-2-0020.

Variations compared to issue 0 of this certificate:

Variation 1
Name and address of the manufacturer have changed.

Variation 2
The couplings were checked for compliance with the requirements of current standards.

Variation 3
The RADEX® - NC * HT Servo laminae couplings were added.

[16] **Test report**

The test results are recorded in the confidential test report IB-18-2-0020 of 12.03.2020.

The test documents are part of the test report and they are listed there.

Summary of the test results
The equipment or components mentioned in [4] meet(s) the requirements of explosion protection for equipment of Equipment Group II, Categories 2D or 2G or 3D or 3G or M2 in type of protection "c" (constructional safety, marking with "Ex h") for use with explosive dust and gas atmospheres and for underground use.

[17] **Specific conditions of use**

1. The temperature marking indicates that for determining the maximum surface temperature occurring on the coupling a temperature increase ΔT to the ambient or operating temperature T_a must be considered. The temperature increase ΔT is stated in the operating instructions.

2. The RADEX® - NC Servo laminae couplings may only be used, if their materials resist, under the respective operating conditions, the mechanical and/or chemical effects and corrosion, so that the explosion protection is always maintained.

3. The users must provide the RADEX® - NC Servo laminae couplings with fixed covers in order to protect the couplings against falling objects. The covers can have openings for the necessary heat dissipation. When used in the mining industry (Equipment Group I), the covers of the couplings must be able to withstand higher mechanical loads than for use in other industries (Equipment Group II). Detailed information on the cover design is given in the operating / assembly instructions.
   The covers must be electrically conductive and included in the equipotential bonding.

4. When using the couplings in potentially explosive dust atmospheres, the users must make sure that no dust in dangerous quantities accumulates between cover and coupling. The coupling must not run in a dust accumulation.

5. Only screws specified by the manufacturer may be used for the screw connections. When tightening the screws, the torque specified by the manufacturer must be observed.

6. All screw connections for mounting the hub onto the shafts must be secured against self-loosening.

7. For use of the couplings in the mining industry, the requirements of the national mining regulations valid for the respective area of application must be observed.

[18] **Essential health and safety requirements**
In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report:

Clause	*Subject*
-	-

[19] **Drawings and Documents**

Number	*Sheet*	*Issue*	*Date*	*Description*
-	-	-	-	-

The documents are listed in the test report.

IBExU Institut für Sicherheitstechnik GmbH
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09599 Freiberg, GERMANY

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Dipl.-Ing. Willamowski

Freiberg, 2020-03-18