Load cell with one amplifier
KOSD-AX
KIMD-AX
Load cell with two amplifiers
KOSD-DAX
KIMD-DAX

Technical manual
General

KXXD-(D)AX is a line of load cells with a high degree of protection. They incorporate resistive strain gauges, measuring the shear force, and signal conditioning amplifier with current output. The –DAX version have two separate electrical circuits. Connection to indicator and power supply is made by two-wires in a separate cable or connector for each amplifier. These load cells are also approved for use in an explosive gas or dust area, provided that suitable intrinsic safety barriers or insulators are used to limit the power to the transducers.

Mechanical data

KXXD-(D)AX are often custom made for specific applications. For complete mechanical data on these load cells, refer to the detailed technical specification from Vishay Nobel AB.

Electrical data

Supply voltage: 10 to 30 VDC, any polarity. See also table below.
Supply voltage, maximum: 33 VDC.
Current output:
  - Zero to nominal load: 4–20 mA in 1000 ohms or less, see table below.
  - Minimum current: 3.5 mA.
  - Maximum current: 35 mA.
Noise: < 10 µA.
Bandwidth: 1 kHz.

Supply voltage and output load

A two-wire circuit is used to connect the load cell to a suitable power supply and measuring equipment. The amplifier in the load cell has a current loop output, calibrated to 4 mA at zero load and 20 mA at nominal load. It accepts output loads up to 1000 ohms, provided the supply voltage is high enough. See the table below.

<table>
<thead>
<tr>
<th>Output load</th>
<th>Min. supply voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Ω</td>
<td>10 V</td>
</tr>
<tr>
<td>100 Ω</td>
<td>12 V</td>
</tr>
<tr>
<td>250 Ω</td>
<td>15 V</td>
</tr>
<tr>
<td>500 Ω</td>
<td>20 V</td>
</tr>
<tr>
<td>700 Ω</td>
<td>24 V</td>
</tr>
<tr>
<td>1000 Ω</td>
<td>30 V</td>
</tr>
</tbody>
</table>
Intrinsic safety

All load cells KXXD-(D)AX can be approved for use in explosive gas or dust area. The last ‘X’ in the type code is a number to identify the specific model. They can be ordered, either with a cable connector, or with an integrated length of cable. The safety description is labeled on the end plate. For the –DAX version, the safety description is applicable to each circuit.

Load cell with cable connector.
Load cells with cable connector are intrinsically safe for Zone 0 (gas) and protected by enclosure for zone 10 (dust) with a safety description according to item 15 in the amended Baseefa certificates Baseefa06ATEX0107X and Baseefa06ATEX0107X/1. The ‘X’ condition is not applicable for the connector version. A mating connector type is indicated in the load cell data sheet. The internal capacitance and inductance are: \( C_i = 26 \, \text{nF} \) and \( L_i = 0 \, \text{mH} \).

Load cell with integrated cable.
Load cells with cable connector are intrinsically safe for Zone 0 (gas) and protected by enclosure for zone 10 (dust) with a safety description according to item 15 in the amended Baseefa certificates Baseefa06ATEX0107X and Baseefa06ATEX0107X/1. The ‘X’ conditions are listed in item 17 of the certificate.

1. If leakage current exceeds 5mA when testing is done with 500VAC voltage between all inputs and frame then this is noted in the individual data sheet of the load cell. This must be taken into account during installation.

2. The free end of the cable must be installed such that the terminations are afforded a degree of protection of at least IP20.

The internal capacitance and inductance are

<table>
<thead>
<tr>
<th>Cable length</th>
<th>( C_i )</th>
<th>( L_i )</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10 m</td>
<td>30 nF</td>
<td>10 ( \mu )H</td>
</tr>
<tr>
<td>&gt; 10m – 40m</td>
<td>40 nF</td>
<td>40 ( \mu )H</td>
</tr>
<tr>
<td>&gt; 40m – 68m</td>
<td>50 nF</td>
<td>70 ( \mu )H</td>
</tr>
<tr>
<td>&gt; 68m – 97m</td>
<td>60 nF</td>
<td>0.10 mH</td>
</tr>
<tr>
<td>&gt; 97m – 211m</td>
<td>100 nF</td>
<td>0.22 mH</td>
</tr>
<tr>
<td>&gt; 211m – 497m</td>
<td>200 nF</td>
<td>0.50 mH</td>
</tr>
<tr>
<td>&gt; 497m – 1068m</td>
<td>400 nF</td>
<td>1.07 mH</td>
</tr>
</tbody>
</table>

2
Load cell connection

Load cell connection is performed by a two-wire circuit in a shielded cable. For load cells with integrated cable, the cable shield is connected to the load cell body.

The connection cable should be routed at least 100 mm from other cables, so that electromagnetic interference is avoided.

For installation in an explosive gas/dust area, dimensioning of cables and barriers may only be performed by trained personnel. A descriptive system document should be prepared by the system designer.

Application examples:
Load cell KXXD-AX with 15 m of integrated cable (no cable connector), used in a non-hazardous area. The load cell cable parts can be connected to any polarity.

Load cell KOSD-AX with a cable connector, used in a hazardous area. A shielded cable is connected to the load cell. An isolating IS unit is used. The load cell cable parts can be connected to any polarity.

Load cell KIMD-AX with 100 m of integrated cable, used in a hazardous area. The load cell cable is connected by diode safety barriers, where the cable shield is not to be connected to ground. The load cell cable parts can be connected to any polarity.
**Mechanical installation**

Load cells of the line KXXD-(D)AX are designed to be supported at both ends and loaded at the middle of the cylindrical body. An arrow on one end plate defines the correct direction of the resulting force from the applied load.

At the cable/connector end of the load cell, a flat reference surface is provided. It should be used to prevent the cylindrical load cell body from rotating in the supports.

Standardised adapters for some load cell types are available, others can be custom designed and produced by Vishay Nobel. On request the mechanical shape of a load cell can also be altered to suit an existing structure.
EC - TYPE EXAMINATION CERTIFICATE

Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 94/9/EC

EC - Type Examination Certificate Number: Baseefa06ATEX0107X – Issue 2

Equipment or Protective System: Loadcells Type KXXD-(D)AX

Manufacturer: Vishay Nobel AB

Address: Box 423, SE-691 27 Karlskoga, Sweden

This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

Baseefa, Notified Body number 1180, in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No’s. See Schedule

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

EN 60079-0:2012 EN 60079-11:2012

except in respect of those requirements listed at item 18 of the Schedule.

If the sign “X” is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

The marking of the equipment or protective system shall include the following :

II 1 GD
I M1

See schedule for further information

Baseefa Customer Reference No. 2054

Project File No. 13/0709

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Registered in England No. 4305578.
Registered address: Rossmore Business Park, Ellesmere Port, Cheshire, CH65 3EN

R S SINCLAIR
GENERAL MANAGER
On behalf of SGS Baseefa Limited
15 **Description of Equipment or Protective System**

The Loadcells Type KXXD-DAX are designed to measure force. Each loadcell comprises a printed circuit board, four dual element strain gauges and either two or four modulus gauges, all housed in a stainless steel enclosure. External connections are made via a glanded integral cable, the termination of which is encapsulated on the internal printed circuit board, or a female multi-pole connector.

The Loadcells are adequately protected against dust ingress, the enclosures offering a degree of protection of not less than IP6X.

Types covered by this certificate are KIMD-AX, KIMD-DAX, KOSD-AX and KOSD-DAX where AX represents a single amplifier type with a single printed circuit board and DAX represents a twin amplifier type with two printed circuit boards, each connected independently to separate cables or connectors. X can be up to five characters to define accuracy and degree of temperature compensation.

The marking of the equipment depends upon input power and ambient temperature as follows:

**KIMD-AX, KOSD-AX**

| Ex ia IIC T4 Ga | Ex ia IIC T50°C T ≤64°C Da | Ex ia I Ma | (-40°C ≤Ta ≤40°C) | 1.3W |
| Ex ia IIC T4 Ga | Ex ia IIC T70°C T ≤84°C Da | Ex ia I Ma | (-40°C ≤Ta ≤60°C) | 1.2W |
| Ex ia IIC T4 Ga | Ex ia IIC T80°C T ≤94°C Da | Ex ia I Ma | (-40°C ≤Ta ≤70°C) | 1.1W |
| Ex ia IIC T4 Ga | Ex ia IIC T90°C T ≤104°C Da | Ex ia I Ma | (-40°C ≤Ta ≤80°C) | 1.0W |

**KIMD-DAX, KOSD-DAX**

| Ex ia IIC T4 Ga | Ex ia IIC T50°C T ≤82°C Da | Ex ia I Ma | (-40°C ≤Ta ≤40°C) | 1.3W |
| Ex ia IIC T4 Ga | Ex ia IIC T70°C T ≤102°C Da | Ex ia I Ma | (-40°C ≤Ta ≤60°C) | 1.2W |
| Ex ia IIC T4 Ga | Ex ia IIC T80°C T ≤112°C Da | Ex ia I Ma | (-40°C ≤Ta ≤70°C) | 1.1W |
| Ex ia IIC T4 Ga | Ex ia IIC T90°C T ≤122°C Da | Ex ia I Ma | (-40°C ≤Ta ≤80°C) | 1.0W |

NOTE: Group IIB for types with >97m of integral cable.

**Input Parameters**

In the case of the dual amplifier KXXD-DAX types, these parameters apply to each independent amplifier circuit.

**Connector version, no cable**

- \( U_i = 30V \)
- \( C_i = 26nF \)
- \( I_i = 120mA \)
- \( L_i = 0 \)
- \( P_i = 1.0W-1.3W^* \)

* - dependent on ambient temperature: 1.3W at 40°C, 1.2W at 60°C, 1.1W at 70°C, 1.0W at 80°C
Integral cable versions

$U_i$, $I_i$, and $P_i$ remain as above.

<table>
<thead>
<tr>
<th>Cable length</th>
<th>Capacitance Cable Total ($C_i$)</th>
<th>Inductance Cable Total ($L_i$)</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>None, connector only</td>
<td>0</td>
<td>26nF</td>
<td>0</td>
</tr>
<tr>
<td>&lt;10m</td>
<td>3.5nF</td>
<td>30nF</td>
<td>10μH</td>
</tr>
<tr>
<td>&gt;10m - 40m</td>
<td>14nF</td>
<td>40nF</td>
<td>40μH</td>
</tr>
<tr>
<td>&gt;40m - 68m</td>
<td>23.8nF</td>
<td>50nF</td>
<td>68μH</td>
</tr>
<tr>
<td>&gt;68m - 97m</td>
<td>33.9nF</td>
<td>60nF</td>
<td>97μH</td>
</tr>
<tr>
<td>&gt;97m - 211m</td>
<td>73.9nF</td>
<td>100nF</td>
<td>211μH</td>
</tr>
<tr>
<td>&gt;211m - 497m</td>
<td>173.9nF</td>
<td>200nF</td>
<td>497μH</td>
</tr>
<tr>
<td>&gt;497m - 1068m</td>
<td>373.8nF</td>
<td>400nF</td>
<td>1068μH</td>
</tr>
</tbody>
</table>

16 Report Number

GB/BAS/ExTR14.0154/00

17 Specific Conditions of Use

Types with integral cables only:

1. The leakage current may exceed 5mA when a test voltage of 500V is applied between all inputs and frame. Each unit is tested by the manufacturer and those units that do not meet the insulation test requirement will be clearly identified. This must be taken into account during installation.

2. The free end of the cable must be installed such that the terminations are afforded a degree of protection of at least IP20.

18 Essential Health and Safety Requirements

All relevant Essential Health and Safety Requirements are covered by the standards listed at item 9.

19 Drawings and Documents

New drawings submitted for this issue of certificate:

<table>
<thead>
<tr>
<th>Number</th>
<th>Sheet</th>
<th>Issue</th>
<th>Date</th>
<th>Description</th>
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<tr>
<td>500548</td>
<td>1 of 1</td>
<td>2</td>
<td>2005-12-15</td>
<td>PC-board TRANSAMP</td>
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<tr>
<td>600785</td>
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<td>2</td>
<td>2010-09-14</td>
<td>ATEX Label KIMD-AX-DAX and KOSD-AX-DAX</td>
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Current drawings also associated with this certificate:

<table>
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<th>Number</th>
<th>Sheet</th>
<th>Issue</th>
<th>Date</th>
<th>Description</th>
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</thead>
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<td>300429</td>
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<td>2010-09-14</td>
<td>KIMD Type. Single amp, connector or cable</td>
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<tr>
<td>300430</td>
<td>1 of 1</td>
<td>1</td>
<td>2010-09-14</td>
<td>KIMD Type. Double amp, connector or cable</td>
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<tr>
<td>300431</td>
<td>1 of 1</td>
<td>1</td>
<td>2010-09-14</td>
<td>KOSD Type. Single amp, connector or cable</td>
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<tr>
<td>300432</td>
<td>1 of 1</td>
<td>1</td>
<td>2010-09-14</td>
<td>KOSD Type. Double Amp, connector or cable</td>
</tr>
<tr>
<td>500653</td>
<td>1 of 1</td>
<td>-</td>
<td>00-03-08</td>
<td>PC assembly C-side TRANSAMP</td>
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<tr>
<td>500654</td>
<td>1 of 1</td>
<td>-</td>
<td>00-03-08</td>
<td>PC assembly S-side TRANSAMP</td>
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<tr>
<td>850073</td>
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<td>2</td>
<td>06-05-24</td>
<td>Parts list for ATEX Transamp</td>
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## Certificate History

<table>
<thead>
<tr>
<th>Certificate No.</th>
<th>Date</th>
<th>Comments</th>
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<tr>
<td>Baseefa06ATEX0107X</td>
<td>19 September 2006</td>
<td>The release of the prime certificate. The associated test and assessment is documented in Test Report No. 05(C)0502. Project File No. 05/0502.</td>
</tr>
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<td>Reissued 10 November 2006</td>
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<tr>
<td>Baseefa06ATEX0107X/1</td>
<td>1 June 2011</td>
<td>To permit minor drawing changes, confirm that the equipment covered by this certificate has been reviewed against the requirements of EN 60079-0:2009 and EN 60079-11:2007 in respect of the differences from EN 50014:1997 + Amds 1 &amp; 2 and EN 50020:2002 and to confirm that the equipment covered by this certificate has been additionally reviewed against the requirements of IEC 60079-31:2008 and may also therefore be coded:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☀ II 1D Ex t IIIC T<strong>C T</strong>C Da</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project File No. 10/0535.</td>
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<tr>
<td>Baseefa06ATEX0107X Issue 2</td>
<td>11 November 2014</td>
<td>This issue of the certificate incorporates previously issued primary &amp; supplementary certificates into one certificate and confirms the current design meets the requirements of EN 60079-0: 2012 &amp; EN 60079-11: 2012 including the revision of the marking in accordance with these standards. The equipment has been assessed against the requirements for Group I and may also therefore be additionally coded:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☀ I M1 Ex ia I Ma</td>
</tr>
</tbody>
</table>

For drawings applicable to each issue, see original of that issue.
EU Declaration of Conformity

We Vishay Nobel AB
P.O. Box 423, SE-691 27 KARLSKOGA
Skrantahöjdsvägen 40, SE-69146 KARLSKOGA
SWEDEN

declare under our sole responsibility that the products
Load Cells KXXD-(D)AX
(KOSD-AX, KOSD-DAX, KIMD-AX and KIMD-DAX)
to which this declaration relates are in conformity with the
following standards or other normative documents.

The essential requirements in the EMC Directive 2014/30/EU
EN 61326-1: 2013

1) EN 61326-1: 2013 was compared to EN 61326-0: 2006 that were used for the original
certification and no changes in the “state of art” apply to this equipment.

The essential requirements in the ATEX Directive 2014/34/EU
with later amendments
EN 60079-0: 2012 + A11: 2013
EN 60079-11: 2012

Group II Category 1 G, Ex ia IIC/B T4 Ga
Group II Category 1 D, Ex ia IIIC T**C T500**C Da
Group I Category M1, Ex ia I Ma

2) EN 60079-0 A11: 2013 was compared to EN 60079-0: 2012 that were used for the original
certification and no changes in the “state of art” apply to this equipment.
*) see certificate for values.


Notified body for EC type Examination: SGS Baseefa, NB No. 1180, Buxton UK.
Notified Body for production: SGS Baseefa, NB No.1180, Buxton UK.

The product is supplied by 30 VDC and is therefore not covered by
the requirements in the Low Voltage Directive 2014/35/EU.

On behalf of the above named company, I declare that, on the date the equipment accompanied
by this declaration is placed on the market, the equipment conforms with all technical and
regulatory requirements of the above listed directives.

KARLSKOGA 22 of August 2016

Lars Nilsson, Managing Director

Publication 200428R3
Vishay Nobel AB
IECEx Certificate

The IECEx certificate for the KXXD-(D)AX load cells can be found on the official IECEx website: [http://iecex.iec.ch](http://iecex.iec.ch)

Certificate number: IECEx BAS 14.0015X Issue No: 0.