

Load cell with one amplifier

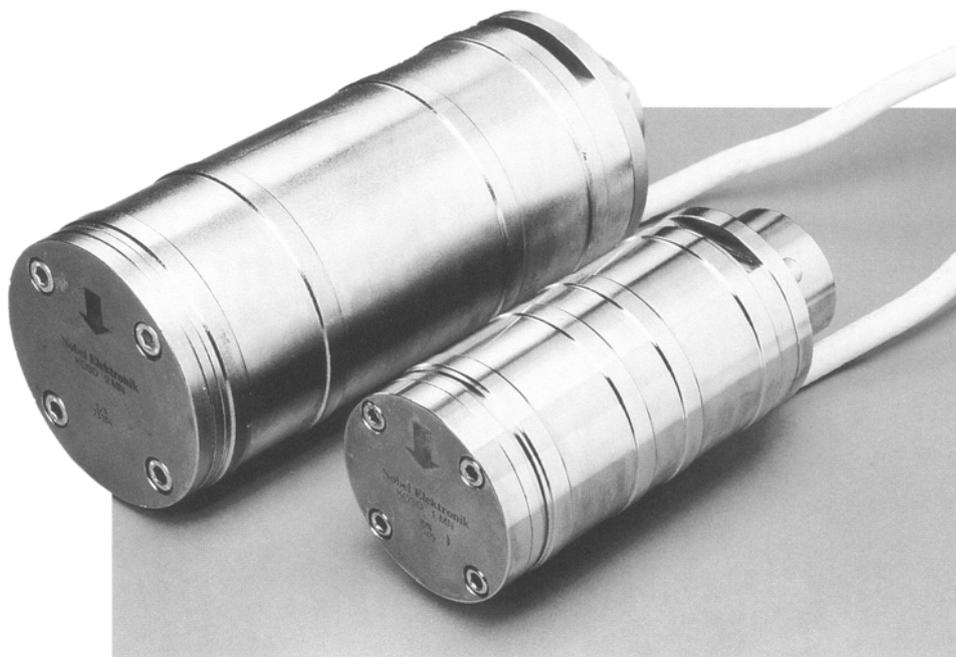
**KOSD-AX**

**KIMD-AX**

Load cell with two amplifiers

**KOSD-DAX**

**KIMD-DAX**



Technical manual



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Baseefa06ATEX0107X, Issue 2, 4 pages	
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## 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 $\mu$ A.
Bandwidth	1 kHz.
CE-marking	ATEX and EMC Directive. See appendix 2.

## 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.

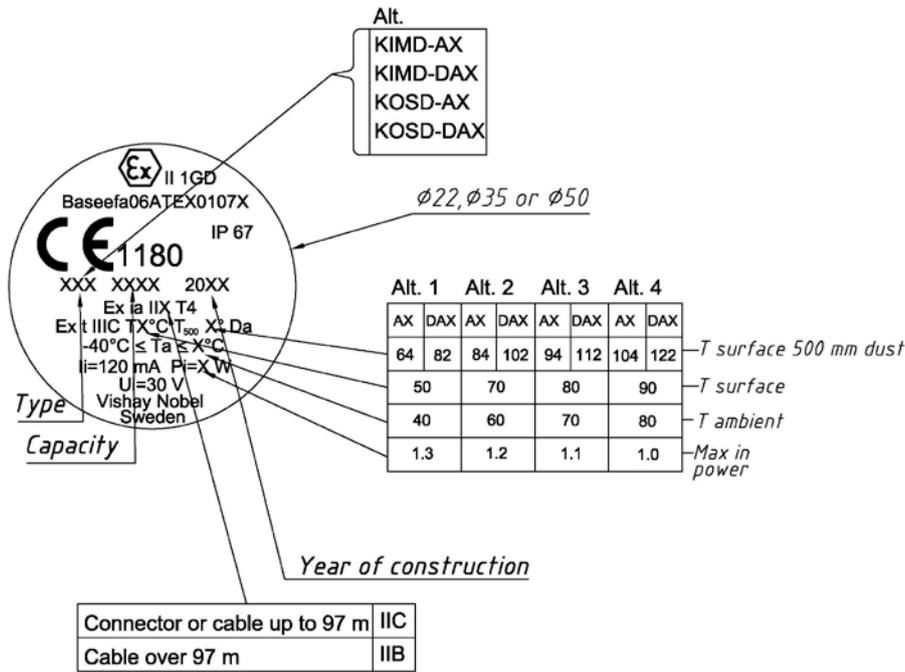
Output load	Min. supply voltage
0 $\Omega$	10 V
100 $\Omega$	12 V
250 $\Omega$	15 V
500 $\Omega$	20 V
700 $\Omega$	24 V
1000 $\Omega$	30 V

# 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.



Connector or cable up to 97 m	IIC
Cable over 97 m	IIB

## 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: Ci = 26 nF and Li = 0 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

Cable length	< 10 m	>10m – 40m	>40m – 68m	>68m – 97m	>97m – 211m	>211m – 497m	>497m – 1068m
Ci	30 nF	40 nF	50 nF	60 nF	100 nF	200 nF	400 nF
Li	10 µH	40 µH	70 µH	0.10 mH	0.22 mH	0.50 mH	1.07 mH

## Load cell connection

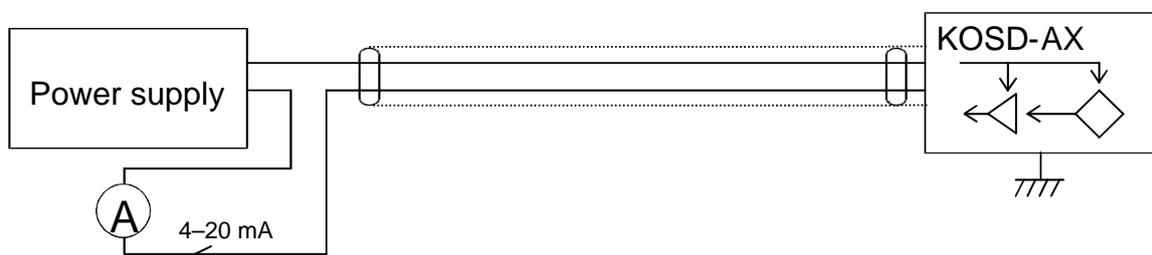
Load cell connection is performed by a two-wire circuit in a shielded cable. For load cells with integrated cable, the cable shield is connected to the load cell body.

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

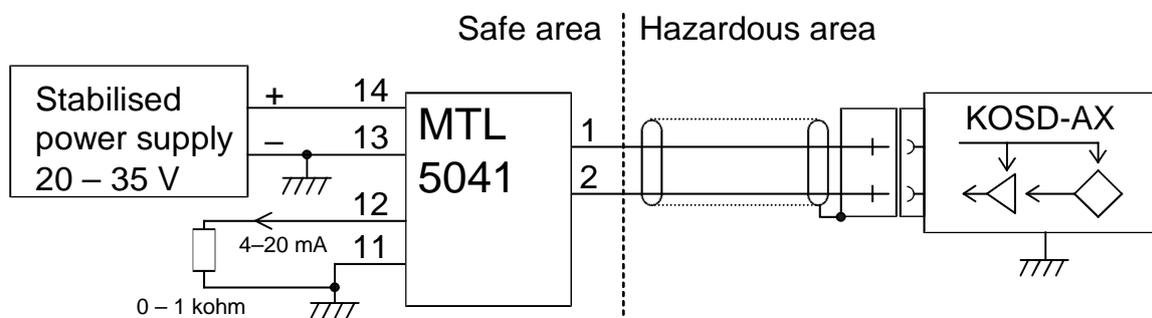
For installation in an explosive gas/dust area, dimensioning of cables and barriers may only be performed by trained personnel. A descriptive system document should be prepared by the system designer.

### Application examples:

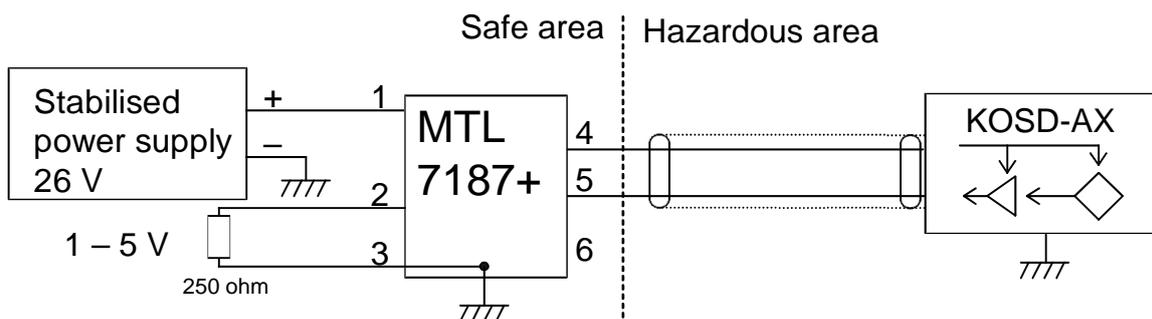
Load cell KXXD-AX with 15 m of integrated cable (no cable connector), used in a **non-hazardous** area. The load cell cable parts can be connected to any polarity.



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.

Certificate Number  
Baseefa06ATEX0107X  
Issue 2



Issued 11 November 2014  
Page 1 of 4

1 **EC - TYPE EXAMINATION CERTIFICATE**

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

3 EC - Type Examination Certificate Number: **Baseefa06ATEX0107X – Issue 2**

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

5 Manufacturer: **Vishay Nobel AB**

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

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

8 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

9 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.

10 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.

11 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.

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

 **II 1 GD** See schedule for further information  
**I M1**

Baseefa Customer Reference No. **2054**

Project File No. **13/0709**

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**R S SINCLAIR**  
**GENERAL MANAGER**

On behalf of SGS Baseefa Limited

13 **Schedule**

14 **Certificate Number Baseefa06ATEX0107X – Issue 2**

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 IIIC T50°C T <sub>500</sub> 64°C Da	Ex ia I Ma	(-40°C ≤Ta ≤40°C)	1.3W
Ex ia IIC T4 Ga	Ex ia IIIC T70°C T <sub>500</sub> 84°C Da	Ex ia I Ma	(-40°C ≤Ta ≤60°C)	1.2W
Ex ia IIC T4 Ga	Ex ia IIIC T80°C T <sub>500</sub> 94°C Da	Ex ia I Ma	(-40°C ≤Ta ≤70°C)	1.1W
Ex ia IIC T4 Ga	Ex ia IIIC T90°C T <sub>500</sub> 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 IIIC T50°C T <sub>500</sub> 82°C Da	Ex ia I Ma	(-40°C ≤Ta ≤40°C)	1.3W
Ex ia IIC T4 Ga	Ex ia IIIC T70°C T <sub>500</sub> 102°C Da	Ex ia I Ma	(-40°C ≤Ta ≤60°C)	1.2W
Ex ia IIC T4 Ga	Ex ia IIIC T80°C T <sub>500</sub> 112°C Da	Ex ia I Ma	(-40°C ≤Ta ≤70°C)	1.1W
Ex ia IIC T4 Ga	Ex ia IIIC T90°C T <sub>500</sub> 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.

Cable length	Capacitance		Inductance		Group
	Cable	Total ( $C_i$ )	Cable	Total ( $L_i$ )	
None, connector only	0	26nF	0	0 $\mu$ H	IIC
<10m	3.5nF	30nF	10 $\mu$ H	10 $\mu$ H	IIC
>10m – 40m	14nF	40nF	40 $\mu$ H	40 $\mu$ H	IIC
>40m – 68m	23.8nF	50nF	68 $\mu$ H	70 $\mu$ H	IIC
>68m – 97m	33.9nF	60nF	97 $\mu$ H	0.10mH	IIC
>97m – 211m	73.9nF	100nF	211 $\mu$ H	0.22mH	IIB
>211m – 497m	173.9nF	200nF	497 $\mu$ H	0.50mH	IIB
>497m – 1068m	373.8nF	400nF	1068 $\mu$ H	1.07mH	IIB

**16 Report Number**

GB/BAS/ExTR14.0154/00

**17 Specific Conditions of Use**

Types with integral cables only:

- 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.
- 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:

Number	Sheet	Issue	Date	Description
500548	1 of 1	2	2005-12-15	PC-board TRANSAMP
600785	1 of 1	2	2010-09-14	ATEX Label KIMD-AX-DAX and KOSD-AX-DAX

Current drawings also associated with this certificate:

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

20 Certificate History

Certificate No.	Date	Comments
Baseefa06ATEX0107X	19 September 2006 Reissued 10 November 2006	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.
Baseefa06ATEX0107X/1	1 June 2011	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 & 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:  ⊕ II 1D Ex t IIIC T**°C T <sub>500</sub> **°C Da  Project File No. 10/0535.
Baseefa06ATEX0107X Issue 2	11 November 2014	This issue of the certificate incorporates previously issued primary & supplementary certificates into one certificate and confirms the current design meets the requirements of EN 60079-0: 2012 & 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:  ⊕ I M1 Ex ia I Ma  Test Report No. GB/BAS/ExTR14.0154/00. Project File No. 13/0709.
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<sup>1</sup>

<sup>1</sup>) 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<sup>2</sup>  
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 T<sub>500</sub>\*°C Da  
Group I Category M1, Ex ia I Ma

<sup>2</sup>) 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.

EC – Type examination Certificate: Baseefa06ATEX0107X, Issue 2.

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

# IECEX Certificate

The IECEX certificate for the KXXD-(D)AX load cells can be found on the official IECEX web site: <http://iecex.iec.ch>

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



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