Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) # EU-TYPE EXAMINATION CERTIFICATE

(Translation)

(2) Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

PTB 11 ATEX 2012 X **Issue: 1**

(4) Product: Variable-area flowmeter, type H250.../M40...-Ex and indicator unit, type M40...-Ex

(5) Manufacturer: Krohne Messtechnik GmbH

(6) Address: Ludwig-Krohne-Straße 5, 47058 Duisburg, Germany

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

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the 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 Test Report PTB Ex 19-29093.

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

EN IEC 60079-0:2018 **EN IEC 60079-7:2015 + A1:2018** **EN 60079-11:2012**

(10) If the sign "X" 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 EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 2 G Ex ia IIC T6 ... T2 Gb **or** **II 3 G Ex ec IIC T6 ... T2 Gc** **or**

II 2 D Ex ia IIIC T70°C ... T300°C Db

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, September 19, 2019
On behalf of PTB:

Dr.-Ing. F. Lienesch
Direktor und Professor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 56

ZSEx001e c

(13) # SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 11 ATEX 2012 X, Issue: 1**

(15) Description of Product

The variable-area flowmeter, type H250.../M40...-Ex and the indicator unit, type M40...-Ex.. are used for the measurement of the volumetric flow of flammable and non-flammable gases and liquids. It consists of a measuring part of type series H250 and an indicator unit of type series M40. The measuring part can be operated in pipings running vertically or horizontally. The measurand is determined by a float reaching a specific position proportional to the volumetric flow. A follower magnet in the indicator unit converts this position into a rotation angle which is then transmitted to an indicator system.

The M40 indicator unit accommodates the electronic assemblies. It consists of an enclosure with built-in module carrier and a mechanical indicator with measuring element. The indicator unit can be equipped with several electronic modules for signal analysis.

Furthermore, a high temperature (HT) variant and different enclosure materials (aluminium / stainless steel) are available.

The signal circuits are designed either to type of protection Intrinsic Safety ia or ib, or to type of protection Increased Safety ec which enables the application as either category 2- or category 3- equipment.

Permissible range of the ambient temperature:	-40 (-25) °C up to +65 °C (depending on the design).
Permissible range of the medium temperature:	-40 °C up to +300 °C (depending on the design).
Permissible range of the temperature at the reference point:	-40 (-25) °C up to +90 °C (depending on the design).

For relationship between maximum permissible medium temperature, temperature class, maximum permissible ambient temperature and the design, reference is made to the tables given in the operating instructions manuals.

The electrical data depend on the type of protection and the installed electronic modules as follows:

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 11 ATEX 2012 X, Issue: 1

Electrical data

Application as category 2-equipment, EPL Gb and Db

Indicator unit M40/ESK/...

with 4...20 mA signal output (HART) ESK4A terminals 11, 12 or HAN 7D connector pins 5, 6	type of protection Intrinsic Safety Ex ia IIC or Ex ib IIC Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 30 V I_i = 130 mA P_i = 1 W L_i = 10 µH C_i negligibly low
optionally ESK4-T with ESK4-I/O module and display ESK4-I/O terminals 1, 2 or 4, 5 (NAMUR) ESK4-I/O terminals 1, 3 or 4, 6 (OC) or HAN 7D connector pins 1, 2 or 3, 4 ESK4-I/O terminals 7, 8 (input)	type of protection Intrinsic Safety Ex ia IIC or Ex ib IIC Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 30 V I_i = 130 mA P_i = 1 W L_i negligibly low C_i = 10 nF
or	
with Profibus PA interface FISCO field device ESK4-PA terminals D, D-	type of protection Intrinsic Safety Ex ia IIC or Ex ib IIC Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 24 V I_i = 380 mA P_i = 5.32 W L_i negligibly low C_i negligibly low or for connection to a bus circuit according to the FISCO-model

or

with Foundation Fieldbus interface
FISCO field device
ESK4-FF terminals D, D-

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
Only for connection to certified intrinsically safe circuits.

Maximum values:

U_i = 24 V
I_i = 380 mA
P_i = 5.32 W
L_i negligibly low
C_i negligibly low

or for connection to a bus circuit according to the FISCO-model

Indicator unit M40/.../K.
with NAMUR limit switch
terminals 1, 2 or 4, 5
HAN 7D connector pins 1, 2 or 3, 4

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
Only for connection to certified intrinsically safe circuits.

The maximum values per circuit depend on the limit switches used as specified in the following table:

Limit switch, type	U_i [V]	I_i [mA]	P_i [mW]	L_i [µH]	C_i [nF]
SC3,5-N0-Y....	16	25	64	150	150
I7S23,5-N	16	52	169	150	150
SJ3,5-SN	16	25	64	100	30
SJ3,5-S1N	16	52	169	100	30

Indicator unit M40/.../R.

with Reed switch
terminals 1, 3 or 4, 6 or
HAN 7D connector pins 1, 2 or 3, 4

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
Only for connection to certified intrinsically safe circuits.

Maximum values:

U_i = 30 V
I_i = 130 mA
P_i = 1 W
L_i negligibly low
C_i negligibly low

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 11 ATEX 2012 X, Issue: 1

Application as category 3-equipment, EPL Gc

Indicator unit M40/ESK/...

with 4...20 mA signal output (HART) ESK4A terminals 11, 12 or HAN 7D connector pins 5, 6	type of protection Increased Safety ec Nominal values: U = 14 – 30 V I = 4 – 20 mA
optionally ESK4-T with ESK4-I/O Modul and display	type of protection Increased Safety ec Nominal values:
ESK4-I/O terminals 1, 2 or 4, 5 (NAMUR)	U = 8 VDC I = 1 mA / 3 mA
ESK4-I/O terminals 1, 3 or 4, 6 (OC) or HAN 7D connector pins 1, 2 or 3, 4	U < 30 VDC I < 100 mA
ESK4-I/O terminals 7, 8 (input)	U < 30 VDC I < 2 mA
or	
with Profibus PA interface ESK4-PA terminals D, D-	U = 9 – 32 V I = 16 mA
or	
with Foundation Fieldbus interface ESK4-FF terminals D, D-	U = 9 – 32 V I = 16 mA

Indicator unit M40/.../K. with slot-type limit switch terminals 1, 2 or 4, 5 HAN 7D connector pins 1, 2 or 3, 4	type of protection Increased Safety ec Nominal values depend on type of limit switch U < 30 V I < 100 mA
Indicator unit M40/.../R. with Reed switch terminals 1, 3 or 4, 6 HAN 7D connector pins 1, 2 or 3, 4	type of protection Increased Safety ec Nominal values: U < 24 V I < 100 mA

Changes with respect to previous editions

- In the future type of protection "non-sparking device Ex nA" will be omitted
- Type of protection Increased Safety Ex ec is introduced
- In the future the marking for group IIB will be omitted
- Revision of the marking for the application in hazardous areas due to combustible dusts
- Revision of the terminal/connector designations in the electrical data
- Update of the „Special Conditions"
- Revision of the type labels and the documentation
- Adaption to the current state of standards
- Update of the operating instructions manual

(16) Test Report PTB Ex 19-29093

(17) Specific conditions of use

1. The connection facilities for the equipotential bonding conductor of the H250 measuring part or the M40 indicator unit shall be connected to the equipotential bonding system of the hazardous area.
2. When the material titanium is used for measuring parts the generation of sparks due to impact or friction between titanium and other materials shall be prevented (appropriately protected installation)
3. When the system is operated with flammable media the measuring parts shall be included in the recurring pressure test of the system.
4. The cable glands and blind plugs provided with the enclosure (or equivalent types) shall be used to ensure a sufficient degree of IP-protection and for sealing non-used openings.
5. To avoid the risk of electrostatic charge the variable-area flowmeter, type H250.../M40...-Ex and the indicator unit, type M40...-Ex shall not be used in areas where severely charge generating processes are to be assumed. The corresponding notes in the operating instructions manual shall be observed.
6. For permissible ambient and medium temperatures reference is made to the tables given in the operating instructions manual. All further specifications and notes shall be considered correspondingly.

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 11 ATEX 2012 X, Issue: 1

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

The standard EN IEC 60079-0:2018 is not yet listed as a harmonized European standard in the Official Journal of the EU. However, compliance with the essential safety and health requirements of Directive 2014/34/EU is guaranteed, since the standard provides at least the same safety level as its harmonized predecessor.

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, September 19, 2019
On behalf of PTB:

Dr.-Ing. F. Lienesch
Direktor und Professor

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 11 ATEX 2012 X

(4) Equipment: Variable-area flowmeter, type H250..././M40./../...../..-Ex-.. and indicator unit, type M40./../...../..-Ex-..

(5) Manufacturer: Krohne Messtechnik GmbH

(6) Address: Ludwig Krohne Straße 5, 47058 Duisburg, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment 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 the confidential assessment and test report PTB Ex 11-21108.

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

EN 60079-0:2009 **EN 60079-11:2007** **EN 60079-15:2010**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment 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, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

Ex ia IIC T6 Gb or **Ex ia IIB T6 Gb** or **Ex nA IIC T6 Gc** or **Ex nA IIB T6 Gc**

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, July 19, 2011

Dr.-Ing. U. Gerlach
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 56

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(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 11 ATEX 2012 X

(15) Description of equipment

The variable-area flowmeter, type H250..././M40./../……./..-Ex-.. and the indicator unit, type M40./../……./..-Ex-.. are used for the measurement of the volumetric flow of flammable and non-flammable gases and liquids. It consists of a measuring part of type series H250 and an indicator unit of type series M40. The measuring part can be operated in pipings running vertically or horizontally. The measurand is determined by a float reaching a specific position proportional to the volumetric flow. A follower magnet in the indicator unit converts this position into a rotation angle which is then transmitted to an indicator system.

The M40 indicator unit accommodates the electronic assemblies. It consists of an enclosure with built-in module carrier and a mechanical indicator with measuring element. The indicator unit can be equipped with several electronic modules for signal analysis.

Furthermore, a high temperature (HT) variant and different enclosure materials (aluminium / stainless steel) are available.

The signal circuits are designed either to type of protection Intrinsic Safety ia or ib, or to type of protection Non-sparking which enables the application as either category 2- or category 3-equipment.

Permissible range of the ambient temperature:	-40 (-25) °C up to +65 °C (depending on the design).
Permissible range of the medium temperature:	-40 °C up to +300 °C (depending on the design).
Permissible range of the temperature at the reference point:	-40 (-25) °C up to +90 °C (depending on the design).

For relationship between maximum permissible medium temperature, temperature class, maximum permissible ambient temperature and the design, reference is made to the tables given in the operating instructions manuals.

The electrical data depend on the type of protection and the installed electronic modules as follows:

Electrical data

Application as category 2-equipment, EPL Gb

Indicator unit M40 ESK4

with signal output ESK4...
(terminals 11, 12 / HAN pins 5, 6)

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
Only for connection to certified intrinsically safe circuits.

Maximum values:

U_i = 30 V
I_i = 130 mA
P_i = 1 W
L_i = 10 µH
C_i negligibly low

Indicator unit M40 ESK4-T

with signal output ESK4...
(terminals 11, 12 / HAN pins 5, 6)

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
Only for connection to certified intrinsically safe circuits.

Maximum values:

U_i = 30 V
I_i = 130 mA
P_i = 1 W
L_i = 10 µH
C_i negligibly low

and

Module I/O
(terminals 1, 2, 3 or 4, 5, 6 or 7, 8
HAN pins 1, 2 or 3, 4)

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
Only for connection to certified intrinsically safe circuits.

Maximum values per circuit:

U_i = 30 V
I_i = 130 mA
P_i = 1 W
L_i negligibly low
C_i = 10 nF

Indicator unit M40 ESK4-FF / ESK4-PA
(terminals D, D⊥)

Only for connection to a certified intrinsically safe circuit

Maximum values:

U_i = 24 V
I_i = 380 mA
P_i = 5.32 W
L_i negligibly low
C_i negligibly low

or for connection to a bus circuit according to the FISCO-model

Indicator unit M40 K.
(terminals 1, 2 or 4, 5
HAN pins 1, 2 or 3, 4)

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
Only for connection to certified intrinsically safe circuits.

The maximum values per circuit depend on the slot-type initiators used as specified in the following table:

Slot-type initiators types	U_i [V]	I_i [mA]	P_i [mW]	L_i [µH]	C_i [nF]
SC3,5-N0-Y....	16	25	64	150	150
I7S23,5-N	16	52	169	150	150
SJ3,5-SN	16	25	64	30	100
SJ3,5-S1N	16	52	169	30	100

Application as category 3-equipment, EPL Gc

Indicator unit M40 ESK4

with signal output ESK4...
(terminals 11, 12)

type of protection Non-sparking nA

Nominal values per circuit:

U = 14 – 32 V, I = 4 – 20 mA

Indicator unit M40 ESK4-T	
with signal output ESK4... (terminals 11, 12)	type of protection Non-sparking nA Nominal values per circuit: U = 14 – 32 V, I = 4 – 20 mA
and	
Module I/O (terminals 1, 3 (OC) or 4, 6 (OC) or 1, 2 (NAMUR) or 4, 5 (NAMUR) or 7, 8 (input))	type of protection Non-sparking nA Nominal values per circuit: U = 8 – 32 V, I = 1 mA – 100 mA U = 8 V, I ≤ 1 / ≥ 3 mA U = 8 – 32 V, I □ 2 mA
Indicator unit M40 ESK4-FF / ESK4-PA (terminals D, D⊥)	type of protection Non-sparking nA for connection to bus circuits Nominal values: U = 9 – 32 V, I = 16 mA
Indicator unit M40 K. (terminals 1, 2 or 4, 5)	type of protection Non-sparking nA Nominal values per circuit: U = 8 V, I ≤ 1 / ≥ 3 mA Slot-type initiator, type SJ3,5-SN SJ3,5-S1N SC3,5-N0-Y.... I7S23,5-N
Output signal	normalized current signal 4 – 20 mA with superimposed HART-communication signal in 2-wire connection U_N = 14 V – 32 V DC
Module-I/O	U_N = 12.7 V – 32 V DC I = 1 mA or 3 mA (depending on switch position) or open-collector-output
ESK4-FF, ESK4-PA	Manchester-coded current signal 10 ± 9 mA
Slot-type initiator	U_N = 8 V I = 1 mA or 3 mA (depending on switch position)

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 11 ATEX 2012 X

(16) Assessment and test report PTB Ex 11-21108

(17) Special conditions for safe use

1. The connection facilities for the equipotential bonding conductor of the H250 measuring part or the M40 indicator unit shall be connected to the equipotential bonding system of the hazardous area.
2. When the material titanium is used for measuring parts the generation of sparks due to impact or friction between titanium and other materials shall be prevented (appropriately protected installation)
3. When the system is operated with flammable media the measuring parts shall be included in the recurring pressure test of the system.
4. The cable glands and blind plugs provided with the enclosure (or equivalent types) shall be used to ensure a sufficient degree of IP-protection and for sealing non-used openings.
5. The variable-area flowmeter, type H250..././M40./../……./..-Ex-.. and the indicator unit, type M40./../……./..-Ex-.. are provided with a viewing window which can be charged electro-statically during cleaning. A warning label on the equipment and a note in the operating instructions manual shall point to this risc.
6. For permissible ambient and medium temperatures reference is made to the tables given in the operating instructions manual. All further specifications and notes shall be considered correspondingly.

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Dr.-Ing. U. Gerlach
Oberregierungsrat

Braunschweig, July 19, 2011

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 11 ATEX 2012 X

(Translation)

Equipment: Variable-area flowmeter, type H250..././M40./../...../..-Ex-..
and indicator unit, type M40./../...../..-Ex-..

Marking: Ⓔx **II 2 G Ex ia IIC T6 Gb or II 2 G Ex ia IIB T6 Gb or**
II 3 G Ex nA IIC T6 Gc or II 3 G Ex nA IIB T6 Gc

Manufacturer: Krohne Messtechnik GmbH

Address: Ludwig Krohne Straße 5, 47058 Duisburg, Germany

Description of supplements and modifications

In the future the variable-area flowmeter, type H250..././M40./../...../..-Ex-.. and the indicator unit, type M40./../...../..-Ex-.. may also be manufactured and operated according to the test documents listed in the test report. The modifications concern the adaption to the current state of the standards, the introduction of a new variant with reed switches, the extension and correction of the electrical data and the extension of the marking of the intrinsically safe variant regarding the temperature classes and for the future application in hazardous areas due to combustible dusts.
The built-in electronic assembly is no longer part of the documentation since it is separately certified (PTB 10 ATEX 2021 X).

The electrical data are corrected as follows:

Electrical data

Indicator unit M40 K.
(terminals 1, 2 or 4, 5
HAN pins 1, 2 or 3, 4)

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC

Only for connection to certified intrinsically safe circuits.

The maximum values per circuit depend on the slot-type initiators used as specified in the following table:

Slot-type initiators types	U_i [V]	I_i [mA]	P_i [mW]	L_i [µH]	C_i [nF]
SC3,5-N0-Y....	16	25	64	150	150
I7S23,5-N	16	52	169	150	150
SJ3,5-SN	16	25	64	100	30
SJ3,5-S1N	16	52	169	100	30

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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 11 ATEX 2012 X

The electrical data of the new variant read as follows:

Application as category-2 equipment, EPL Gb

Supply Reed switches (contact terminals "min" 1(+), 3(-) contact terminals "max" 4(+), 6(-))	type of protection Intrinsic Safety Ex ia IIC Only for connection to certified intrinsically safe circuits. Maximum values per circuit: U_i = 30 V I_i = 100 mA P_i = 1 W L_i negligibly low C_i negligibly low

The marking will read in future:

II 2 G Ex ia IIC T6...T2 Gb or II 2 G Ex ia IIB T6...T2 Gb or
II 3 G Ex nA IIC T6...T2 Gc or II 3 G Ex nA IIB T6...T2 Gc

For the application in hazardous areas due to combustible dusts the equipment shall be marked in future as follows:

II 2 D Ex ia IIIC T85 °C Db

The "Special conditions" as well as all further electrical data and specifications of the EC-type examination certificate apply without changes also to this 1st supplement.

Applied standards

EN 60079-0:2012 **EN 60079-11:2012** **EN 60079-15:2010**

Test report: PTB Ex 15-24150

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, February 9, 2014
On behalf of PTB:

Dr.-Ing. T. Horn
Regierungsrat