



제12-699호

안 전 인 증 서

KROHNE Messtechnik GmbH

Ludwig-Krohne-Str.5, 47058 Duisburg, Germany

위 사업장에서 제조하는 아래의 품목이 「산업안전보건법」 제34조 및 같은 법 시행규칙 제58조의4제4항에 따른 안전인증 심사 결과 안전·보건기준에 적합하므로 안전인증표시의 사용을 인증합니다.

품 목

Variable area flow meter and indicator

형식 · 모델 / 용량 · 등급 / 인증번호

형식·모델	용량 · 등급	인증번호
H250./.../M40./.../... -Ex-.. and M40./.../.../...-Ex-..	첨부 인증조건(12-0699) 참조 Ex ia IIC T6, Ex ia IIB T6 Ex nA IIC T6, Ex nA IIB T6	12-GA4BO-0699X

인 증 기 준

방호장치 의무안전인증 고시(고용노동부고시 제2010-36호)

인 증 조 건

첨부 인증조건 (12-0699) 참조

2012 년 11 월 21 일

한국가스안전공사 사장





인 증 조 건

1. 제조공장:

Ludwig-Krohne-Str.5, 47058 Duisburg, Germany에 위치한 KROHNE Messtechnik GmbH
공장에서 생산한 제품 중 아래 인증범위의 제품에 한함.

2. 제품개요

The variable-area flowmeter, type H250./../M40./../..-Ex-.. and 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 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.

For further information as well as the thermal and electrical specifications, reference is made to the annex.

3. 인증범위: 본 인증서는 아래의 형식번호에 한하여 유효함

품목 명 Variable area indicator, 모델 명 Type H250./../M40./../..-Ex-.. and M40./../..-Ex-..에 한하여
인증함.

첨부 인증조건(12-0699) 참조.

4. 안전한 사용을 위한 조건

첨부 인증조건(12-0699) 참조.

5. 인증(변경)사항

6. 그 밖의 사항

안전인증품의 품질관리, 확인심사 수검, 변경사항 신고 등 인증 받은 자의 의무 준수



[첨 부]

인 증 조 건(12-0699)

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 in hazardous locations of either zone 1 or zone 2.

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.



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인 증 조 건(12-0699)

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:

$U_i = 30 \text{ V}$
 $I_i = 130 \text{ mA}$
 $P_i = 1 \text{ W}$
 $L_i = 10 \text{ }\mu\text{H}$
 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:

$U_i = 30 \text{ V}$
 $I_i = 130 \text{ mA}$
 $P_i = 1 \text{ W}$
 $L_i = 10 \text{ }\mu\text{H}$
 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:

$U_i = 30 \text{ V}$
 $I_i = 130 \text{ mA}$
 $P_i = 1 \text{ W}$
 L_i negligibly low
 $C_i = 10 \text{ nF}$



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인 증 조 건(12-0699)

Indicator unit M40 ESK4-FF / ESK4-PA
(terminals D, D₁)

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 FISCO

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



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인 증 조 건(12-0699)

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

type of protection Non-sparking nA
for connection to bus circuits

Nominal values:

$U = 9 - 32 \text{ V}$, $I = 16 \text{ mA}$

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

type of protection Non-sparking nA

Nominal values per circuit:

$U = 8 \text{ V}$, $I \leq 1 / \geq 3 \text{ mA}$

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

$U_N = 14 \text{ V} - 32 \text{ V DC}$

Module-I/O

$U_N = 12.7 \text{ V} - 32 \text{ V DC}$

$I = 1 \text{ mA}$ or 3 mA (depending on switch
position)

or open-collector-output

ESK4-FF, ESK4-PA

Manchester-coded current signal

$10 \pm 9 \text{ mA}$

Slot-type initiator

$U_N = 8 \text{ V}$

$I = 1 \text{ mA}$ or 3 mA (depending on switch
position)

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.



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인 증 조 건(12-0699)

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 electrostatically 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.