



## H250 M40 Supplementary instructions

Equipment in protection type intrinsic safety Ex i



1 Safety instructions	3
1.1 General notes .....	3
1.2 NEPSI conformity .....	3
1.3 Security information .....	3
2 Device description	4
2.1 Device description .....	4
2.2 Description code .....	4
2.3 Marking .....	5
2.4 Flammable products .....	6
2.5 Equipment category .....	6
2.6 Types of protection .....	6
2.7 Ambient temperature / temperature classes .....	7
2.8 Electrical data .....	14
3 Installation	15
3.1 Installation .....	15
4 Electrical connections	16
4.1 General notes .....	16
4.2 Power supply .....	16
4.3 Inputs/outputs .....	16
4.4 Grounding and equipotential bonding .....	16
5 Operation	17
5.1 Start-up .....	17
5.2 Operation .....	17
5.3 Electrostatic charge .....	17
6 Service	18
6.1 Maintenance .....	18
6.2 Dismantling .....	18
7 Attachment	19
8 Notes	22

## 1.1 General notes

These additional instructions apply to explosion-protected versions of variable area flowmeters with electrical built-ins and the marking Ex i. They complement the Installation and Operation Instructions for the non-explosion protected versions.

The information given in these Instructions contains only the data relevant to Category 2 explosion protection. The technical details given in the Installation and Operation Instructions for the non-explosion protected versions apply unchanged unless excluded or superseded by these Instructions.

## 1.2 NEPSI conformity

The H250/M40 variable-area flowmeters series has been approved by NEPSI (National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation in China) under Certification No.

**GYJ12.1041X**

This certification together with its boundary conditions is required to be observed without fail. The Ex marking is NOT acc. to the ATEX directive 94/9/EC (see also Attachment "Certificate"). Placing the product on the market of the EU for purpose of distribution and/or use in the EU is NOT permitted.

## 1.3 Security information

Assembly, installation, start-up and maintenance may only be performed by personnel trained in explosion protection!



**CAUTION!**

*The operator respectively his agent is responsible to follow further standards, directives or laws if required due to operating conditions or place of installation. This applies particularly for the use of easy detachable process connections such as SMS or Clamp when measuring flammable mediums.*

## 2.1 Device description

Variable area flowmeters measure and display the volume flow of flammable and non-flammable gases and liquids. Depending on the device version, electrical limit switch contacts and a 4...20 mA signal output with HART<sup>®</sup> communication, a Foundation Fieldbus interface or a Profibus PA interface can be installed in the display.

## 2.2 Description code

The safety description code \* consists of the following elements:

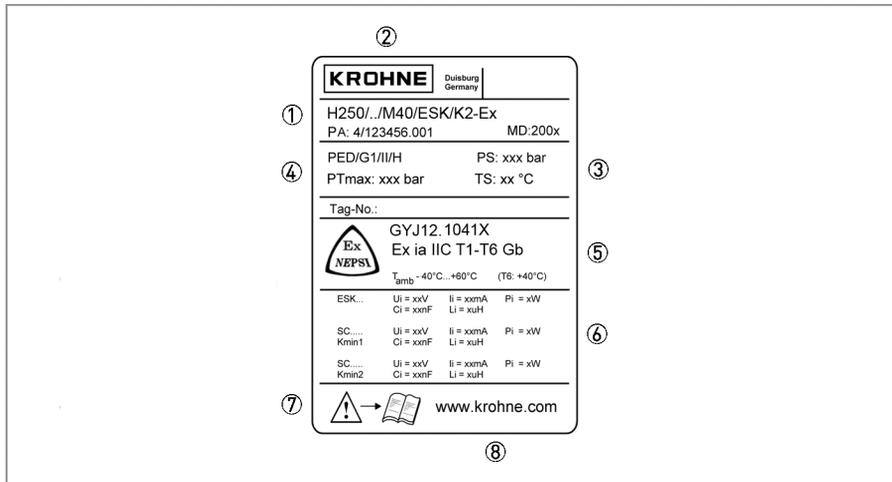
H	2	5	0	/		/		/	M	4	0	/		/		/		-	E	x	-		
①					②		③		④			⑤		⑥			⑦		⑧			⑨	

- ① Type series measuring unit H250  
H250 - standard version, vertical upwards  
H250H - horizontal orientation  
H250U - vertical downwards
- ② Measuring unit materials / versions  
RR - Stainless Steel  
C - PTFE or PTFE/ceramics  
HC - Hastelloy C  
Ti - Titanium  
F - Food
- ③ Heating jacket version  
blanc - without heating jacket  
B - with heating jacket
- ④ Signal converter version  
M40 - Aluminium housing, painted (standard)  
M40S - Aluminium housing with added corrosion protection  
M40R - Stainless steel housing  
M40T - Stainless steel housing with added corrosion protection
- ⑤ High temperature version  
blanc - without HT extension  
HT - with HT extension
- ⑥ Electrical signal output  
blanc - without transmitter  
ESK - Electrical signal output 4...20mA (ESK4)  
... - optionally available with counter, I/O module and display (ESK4-T) or  
... - Foundation Fieldbus (ESK4-FF) or  
... - Profibus PA (ESK4-PA)
- ⑦ Limit switches  
blanc - without limit switches  
K1 - One limit switch  
K2 - Two limit switches  
R1 - 1 reed switch  
R2 - 2 reed switches
- ⑧ Version  
Ex - Explosion-protected version
- ⑨ SIL Version  
SE - SIL compliant electronic signal output  
SK - SIL compliant limit switch

\* positions which are not needed are omitted (no blank positions)

## 2.3 Marking

Type designation of the complete unit is shown on the indicator with the nameplates reproduced below (see also description code).



- ① Device type
- ② Manufacturer
- ③ Sizing data: temperature & pressure rating
- ④ PED data
- ⑤ Ex data
- ⑥ Electrical connection data
- ⑦ Note on observing documentation
- ⑧ Manufacturer's website

### Additional markings on the housing cover:

- SN - serial number
- SO - sales order / item
- PA - order
- Vxxx - product configurator code
- AC - article code

### Additional plate

The association of the housing cover to the device is confirmed by an additional plate with the serial number on the interior of the indicator part.

## 2.4 Flammable products

### Atmospheric conditions:

An explosive atmosphere is a mixture of air and flammable gases, vapours, mists or dusts under atmospheric conditions. The following values define it

$$T_{\text{atm}} = -20\dots+60^{\circ}\text{C} / -4\dots+140^{\circ}\text{F} \text{ and } P_{\text{atm}} = 0.8\dots1.1 \text{ bar.}$$

Outside of this range, no key data are available as to ignition behaviour for most mixtures.

### Installation conditions:

Variable area flowmeters operate outside of atmospheric conditions, which means that explosion protection – regardless of the zone assignment – is fundamentally not applicable due to the lack of key safety data for the interior of the measuring section.



#### **WARNING!**

*Operation with flammable products is only permitted as long as no explosive fuel/air mixture builds up on the inside of the flowmeter under operating conditions. The operator is responsible for ensuring that the flowmeter is operated safely as regards the temperature and pressure of the products used. In case of operation with flammable products the measuring units must be included in the periodic pressure tests of the system. When using the device version H250/C... (PTFE-liner, nonconductive) the min. conductivity of the medium must be  $10^{-8}$  S/m, in order to avoid the electrostatic charge.*

## 2.5 Equipment category

The flowmeters are designed according to GB 3836.1-2010 and GB 3836.4-2010.



#### **INFORMATION!**

*Definition of zone 2 acc. to EN 1127-1, Appendix B:*

*An area in which an explosive atmosphere as a result of the mixture of flammable substances in the form of gas, steam or mist with air is not expected to occur under normal operation. If, however, such an atmosphere does occur it only lasts for a brief period of time.*

## 2.6 Types of protection

The variable-area flowmeter is designed with Intrinsic Safety type of protection, protection level “ia”.

The marking <b>Ex ia IIC T1-T6 Gb</b> contains the following information:	
<b>Ex ia</b>	Intrinsic Safety type, protection level “ia”
<b>IIC</b>	suitable for gas group IIC, IIB and IIA
<b>T1-T6</b>	suitable for temperature class T6 ... T1
<b>Gb</b>	EPL, suitable for zone 1

## 2.7 Ambient temperature / temperature classes

Due to the influence of the product temperature, variable area flowmeters with built-in electrical equipment (electric variants) are not assigned to any fixed temperature class. The temperature class of these devices is rather a function of the product temperature and ambient temperature that is present and the specific device version. The classification is outlined in the following tables.

The tables take into account the following parameters:

- Installed equipment
- Maximum values  $I_i$  and  $P_i$  for K1, K2
- Ambient temperature  $T_{amb}$ .
- Product temperature  $T_m$
- Nominal DN
- Standard or high temperature version (HT)
- Standard or heating jacket version
- Heat resistance of the connecting cable

When there is more than type of built-in equipment, the data of the most unfavourable equipment should be used.



### **INFORMATION!**

***The maximum permissible product temperatures listed in the tables are valid under the following conditions:***

- *The measuring device is installed and operated in accordance with the manufacturer's installation instructions.*
- *It must be ensured that the flowmeter is not heated by the effects of additional heat radiation (sunshine, neighbouring system components) and thus operated above the permissible ambient temperature range.*
- *Insulation must be limited to the piping. Unobstructed ventilation of the indicator part must be ensured. To do this, the variant with a projecting indicator (HT version) is preferable.*
- *For device versions with a heating jacket, that the temperature of the heating medium does not exceed the maximum permissible product temperature.*

For certain device version, lower values apply due to differing boundary conditions (e.g. lining materials). Here the user should consult the technical data sheet.

## Using a heat resistant connecting cable

Temperature table in °C					
Heating jacket			T <sub>m</sub> ①		
None	with	HT-version	T <sub>amb</sub> ≤ 40	T <sub>amb</sub> ≤ 60	T <sub>amb</sub> ≤ 65
DN15, DN25, DN50	DN15, DN25		220	105	75
		x	-	175	95
DN80, DN100	DN50, DN80		165	90	75
		x	-	155	90

Temperature table in °F					
Heating jacket			T <sub>m</sub> ①		
None	with	HT-version	T <sub>amb</sub> ≤ 104	T <sub>amb</sub> ≤ 140	T <sub>amb</sub> ≤ 149
DN15, DN25, DN50	DN15, DN25		428	221	167
		x	-	347	203
DN80, DN100	DN50, DN80		329	194	167
		x	-	311	194

① Maximum value of the product temperature for the use of a standard connecting cable. For higher product temperatures a connecting cable with a temperature resistance of 90°C / 194°F is required.

HT version - high-temperature version with projecting indicator

The permitted ambient temperature range is indicated on the nameplate; depending on the device version it is T<sub>amb</sub> = -40...+65°C / -40...+149°F or T<sub>amb</sub> = -25...+65°C / -13...+149°F.

The minimum product temperature is -40°C / -40°F.

## Maximum permitted product temperature in °C

				Maximum permitted product temperature $T_m$ [°C]										
Heating jacket			TK ▶	T6	T5		T4		T3			T2, T1		
None	with	HT version	$T_{amb}$ [°C] ▶	≤ 40	≤ 60	≤ 65	≤ 60	≤ 65	≤ 40	≤ 60	≤ 65	≤ 40	≤ 60	≤ 65
ESK4														
DN15	DN15			85	100	90	135	135	200	160	140	235	160	140
DN25	DN25			85	100	100	135	135	200	200	200	300	300	270
DN50	DN25	x												
DN80	DN50			85	100	85	135	130	200	150	130	220	150	130
DN100	DN80			85	100	100	135	135	200	200	200	300	300	255
DN100	DN80	x												
ESK4-T														
DN15	DN15			85	90	70	135	120	200	140	120	220	140	120
DN25	DN25			85	100	85	135	135	200	200	200	300	290	225
DN50	DN25	x												
DN80	DN50			85	85	70	130	115	200	130	115	200	130	115
DN100	DN80			85	100	80	135	135	200	200	200	300	270	215
DN100	DN80	x												
ESK4-FF / ESK4-PA														
DN15	DN15			70	60	not admissible	135	125	200	150	125	235	150	125
DN25	DN25			85	60	not admissible	135	135	200	200	200	300	300	240
DN50	DN25	x												
DN80	DN50			65	60	not admissible	135	120	200	140	120	220	140	120
DN100	DN80			85	60	not admissible	135	135	200	200	200	300	300	225
DN100	DN80	x												
K1/K2 - 64 mW														
DN15	DN15			85	100	100	135	135	200	200	180	290	205	180
DN25	DN25			85	100	100	135	135	200	200	200	300	300	300
DN50	DN25	x												
DN80	DN50			85	100	100	135	135	200	185	170	260	185	170
DN100	DN80			85	100	100	135	135	200	200	200	300	300	300
DN100	DN80	x												
K1/K2 (I7S23,5-N / SC3,5-N0-Y) - 169 mW														
DN15	DN15			not admissible			105	80	200	105	80	210	105	80
DN25	DN25			not admissible			135	115	200	200	115	300	200	115
DN50	DN25	x		not admissible										
DN80	DN50			not admissible			105	80	195	105	80	195	105	80
DN100	DN80			not admissible			135	110	200	190	110	300	190	110
DN100	DN80	x		not admissible										
K1/K2 (SJ3,5-SN or SJ3,5-S1N) - 169 mW														
DN15	DN15			not admissible			135	135	200	195	170	295	195	170
DN25	DN25			not admissible			135	135	200	200	200	300	300	300
DN50	DN25	x		not admissible										
DN80	DN50			not admissible			135	135	200	180	160	275	180	160
DN100	DN80			not admissible			135	135	200	200	200	300	300	300
DN100	DN80	x		not admissible										

Maximum permitted product temperature in °F

				Maximum permitted product temperature T <sub>m</sub> [°F]										
Heating jacket			TK ▶	T6	T5		T4		T3			T2, T1		
None	with	HT version	T <sub>amb</sub> [°F] ▶	≤ 104	≤ 140	≤ 149	≤ 140	≤ 149	≤ 104	≤ 140	≤ 149	≤ 104	≤ 140	≤ 149
ESK4														
DN15	DN15			185	212	194	275	275	392	320	284	455	320	284
DN25	DN25	x		185	212	212	275	275	392	392	392	572	572	518
DN50														
DN80	DN50			185	212	185	275	266	392	302	266	428	302	266
DN100	DN80	x		185	212	212	275	275	392	392	392	572	572	491
ESK4-T														
DN15	DN15			185	194	158	275	248	392	284	248	428	284	248
DN25	DN25	x		185	212	185	275	275	392	392	392	572	554	437
DN50														
DN80	DN50			185	185	158	266	239	392	266	239	392	266	239
DN100	DN80	x		185	212	176	275	275	392	392	392	572	518	419
ESK4-FF / ESK4-PA														
DN15	DN15			158	140	not admis- sible	275	257	392	302	257	455	302	257
DN25	DN25	x		185	140		275	275	392	392	392	572	572	464
DN50														
DN80	DN50			149	140		275	248	392	284	248	428	284	248
DN100	DN80	x		185	140		275	275	392	392	392	572	572	437
K1/K2 - 64 mW														
DN15	DN15			185	212	212	275	275	392	392	356	554	401	356
DN25	DN25	x		185	212	212	275	275	392	392	392	572	572	572
DN50														
DN80	DN50			185	212	212	275	275	392	365	338	500	365	338
DN100	DN80	x		185	212	212	275	275	392	392	392	572	572	572
K1/K2 (I7S23,5-N / SC3,5-N0-Y) - 169 mW														
DN15	DN15			not admissible			221	176	392	221	176	410	221	176
DN25	DN25	x					275	239	392	392	239	572	392	239
DN50														
DN80	DN50						221	176	383	221	176	383	221	176
DN100	DN80	x					275	230	392	374	230	572	374	230
K1/K2 (SJ3,5-SN or SJ3,5-S1N) - 169 mW														
DN15	DN15			not admissible			275	275	392	383	338	563	383	338
DN25	DN25	x					275	275	392	392	392	572	572	572
DN50														
DN80	DN50						275	275	392	356	320	527	356	320
DN100	DN80	x					275	275	392	392	392	572	572	572

## Maximum permitted product temperatures for painted measuring units in °C

Heating jacket			TK ▶	Maximum permitted product temperature T <sub>m</sub> [°C]				
None	with	HT version	T <sub>amb</sub> [°C] ▶	T6	T5		T4 ... T1	
DN15... DN100	DN15... DN80	With / none		≤ 40	≤ 60	≤ 65	≤ 60	≤ 65
ESK4 / ESK4-T				40	65	65	65	65
ESK4-FF / ESK4-PA				40	60	not admissible	65	65
K1/K2 - 64 mW				40	65	65	65	65
K1/K2 (I7S23,5-N / SC3,5-N0-Y) - 169 mW				not admissible	not admissible		65	65
K1/K2 (SJ3,5-SN or SJ3,5-S1N) - 169 mW				not admissible	not admissible		65	65

## Maximum permitted product temperatures for painted measuring units in °F

Heating jacket			TK ▶	Maximum permitted product temperature T <sub>m</sub> [°F]				
None	with	HT version	T <sub>amb</sub> [°F] ▶	T6	T5		T4 ... T1	
DN15... DN100	DN15... DN80	With / none		≤ 104	≤ 140	≤ 149	≤ 140	≤ 149
ESK4 / ESK4-T				104	149	149	149	149
ESK4-FF / ESK4-PA				104	140	not admissible	149	149
K1/K2 - 64 mW				104	149	149	149	149
K1/K2 (I7S23,5-N / SC3,5-N0-Y) - 169 mW				not admissible	not admissible		149	149
K1/K2 (SJ3,5-SN or SJ3,5-S1N) - 169 mW				not admissible	not admissible		149	149

### Reference point consideration

The permissible product and ambient temperatures may be exceeded or undershot as long as the permissible temperature range of the reference point of the display is not exceeded. The following table contains the permissible maximum values at the reference point. Note:

- Reference point is the connection of the equipotential bonding conductor of the M40 indicator.
- The temperatures at the reference point are to be determined in the most unfavourable operating situation.
- The required measuring uncertainty is max. 2K.
- Measuring conditions and results are to be permanently recorded in a suitable format.
- The measuring unit should be insulated properly.

### Maximum permitted temperatures at reference point of indicator in °C

Design of indicator	Component	Limit switch P <sub>i</sub> [mW]	Permitted temperature range at reference point T [°C] according to temperature class				
			TK ▶	T6	T5	T4 ... T1	
M40./../K.	SC3,5-NO-Y	64		-20 ... +65	-20 ... +80	-20 ... +90	
		169		-20 ... +37	-20 ... +52	-20 ... +72	
	SJ3,5-SN	64		-20 ... +66	-20 ... +81	-20 ... +90	
		169		-20 ... +42	-20 ... +57	-20 ... +86	
	SJ3,5-S1N	64		-20 ... +66	-20 ... +81	-20 ... +90	
		169		-20 ... +42	-20 ... +57	-20 ... +86	
	I7S23,5-N	64		-40 ... +70	-40 ... +85	-40 ... +90	
		169		-40 ... +52	-40 ... +67	-40 ... +90	
	M40./../ESK4/K.	SC3,5-NO-Y	64		-20 ... +55	-20 ... +70	-20 ... +80
			169		-20 ... +33	-20 ... +48	-20 ... +68
SJ3,5-SN		64		-20 ... +55	-20 ... +70	-20 ... +80	
		169		-20 ... +38	-20 ... +53	-20 ... +80	
SJ3,5-S1N		64		-20 ... +55	-20 ... +70	-20 ... +80	
		169		-20 ... +38	-20 ... +53	-20 ... +80	
I7S23,5-N		64		-40 ... +55	-40 ... +70	-40 ... +80	
		169		-40 ... +48	-40 ... +63	-40 ... +80	
M40./../ESK4		ESK4	---		-40 ... +55	-40 ... +70	-40 ... +80
M40./../ESK4-T		ESK4 and I/O modul	---		-40 ... +52	-40 ... +67	-40 ... +77
M40./../ESK4-FF	ESK4 and ESK4-FF	---		-40 ... +36	-40 ... +51	-40 ... +76	
M40./../ESK4-PA	ESK4 and ESK4-PA	---					

## Maximum permitted temperatures at reference point of indicator in °F

Design of indicator	Component	Limit switch P <sub>i</sub> [mW]	Permitted temperature range at reference point T [°F] according to temperature class				
			TK ▶	T6	T5	T4 ... T1	
M40./../K.	SC3,5-NO-Y	64		-4 ... +149	-4 ... +176	-4 ... +194	
		169		-4 ... +99	-4 ... +126	-4 ... +162	
	SJ3,5-SN	64		-4 ... +151	-4 ... +178	-4 ... +194	
		169		-4 ... +108	-4 ... +135	-4 ... +187	
	SJ3,5-S1N	64		-4 ... +151	-4 ... +178	-4 ... +194	
		169		-4 ... +108	-4 ... +135	-4 ... +187	
	I7S23,5-N	64		-40 ... +158	-40 ... +185	-40 ... +194	
		169		-40 ... +126	-40 ... +153	-40 ... +194	
	M40./../ESK4/K.	SC3,5-NO-Y	64		-4 ... +131	-4 ... +158	-4 ... +176
			169		-4 ... +91	-4 ... +118	-4 ... +154
SJ3,5-SN		64		-4 ... +131	-4 ... +158	-4 ... +176	
		169		-4 ... +100	-4 ... +127	-4 ... +176	
SJ3,5-S1N		64		-4 ... +131	-4 ... +158	-4 ... +176	
		169		-4 ... +100	-4 ... +127	-4 ... +176	
I7S23,5-N		64		-40 ... +131	-40 ... +158	-40 ... +176	
		169		-40 ... +118	-40 ... +145	-40 ... +176	
M40./../ESK4		ESK4	---		-40 ... +131	-40 ... +158	-40 ... +176
M40./../ESK4-T		ESK4 and I/O modul	---		-40 ... +126	-40 ... +153	-40 ... +171
M40./../ESK4-FF	ESK4 and ESK4-FF	---		-40 ... +97	-40 ... +124	-40 ... +169	
M40./../ESK4-PA	ESK4 and ESK4-PA	---					

## 2.8 Electrical data

Electrical equipment	Rated voltage	Nominal current
Limit switch K1 / K2	8 VDC	$\leq 1 / \geq 3$ mA
Signal output ESK4	14 - 30 VDC	4...20mA with HART <sup>®</sup> communication
Switching output ESK4-T OC output	8 - 30 VDC	1...100 mA
Switching output ESK4-T NAMUR output	8 VDC	$\leq 1 / \geq 3$ mA
Signal input ESK4-T input	8 - 30 VDC	$\leq 2$ mA
ESK4-FF Foundation Fieldbus transmitter ①	9 - 30 VDC	16 mA
ESK4-PA Profibus transmitter ②	9 - 30 VDC	16 mA

① Further information and instructions for operation of the ESK4-FF transmitter are provided in separate supplementary instructions.

② Further information and instructions for operation of the ESK4-PA Profibus transmitter are provided in separate supplementary instructions.

Built-in equipment for the variable area flowmeter may only be connected to separate intrinsically safe circuits with the following maximum values:

Built-in equipment	Maximum values				
	$U_i$ [V]	$I_i$ [mA]	$P_i$ [mW]	$C_i$ [nF]	$L_i$ [ $\mu$ H]
ESK4	30	130	1000	~ 0	10
ESK4-T (I/O-modul)	30	130	1000	10	~ 0
ESK4-PA / ESK4 FF ①	24	380	5320	~ 0	~ 0
I7S23,5-N / SC3,5-N0-Y	16	25	64	150	150
	16	52	169	150	150
SJ3,5-SN / SJ3,5-S1N	16	25	64	30	100
	16	52	169	30	100

① FISCO field device

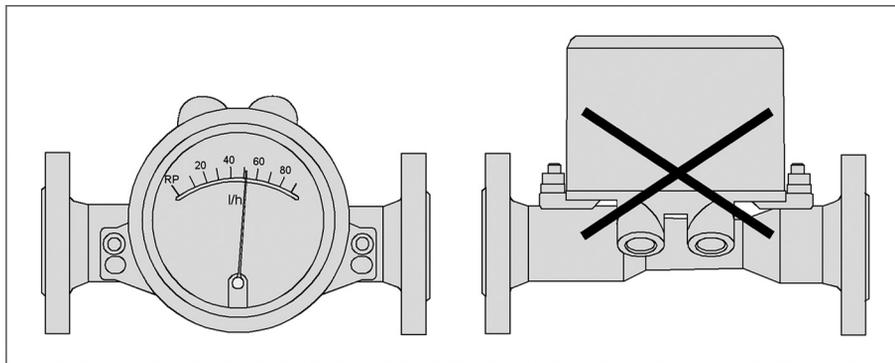
### 3.1 Installation

Installation and setup must be carried out according to the applicable installation standards by qualified personnel trained in explosion protection. The information given in the Installation and Operation Instructions and the Supplementary Installation and Operation Instructions must always be observed.

#### Variable area flowmeters must be installed in such a way that

- There is no danger from mechanical impact effects.
- There are no external forces affecting the indicator part.
- The device is accessible for any visual inspections that are necessary, and can be viewed from all sides.
- The nameplate is clearly visible.
- It can be operated from a location with secure footing.

Take special note of the installation position for the H250/H/... with horizontal flow direction:



In order to comply with thermal parameters and measuring accuracy, flowmeters for horizontal installation are to be installed in the pipeline so that the display is located on the side of the measuring tube. The maximum product and ambient temperatures indicated as well as the measuring accuracy are based on lateral installation of the display.



#### **CAUTION!**

*The manufacturer is not liable for any damage resulting from improper use or use other than the intended purpose. This applies in particular to hazards due to insufficient corrosion resistance and suitability of the materials in contact with product.*

## 4.1 General notes

The built-in equipment is connected electrically in the integrated terminal compartment of the display.

The connecting cables should be selected according to the applicable installation standards and the maximum operating temperature.

- Before connecting or disconnecting the electric connecting cable of the device, ensure that all of the cables leading to the signal converter are de-energised relative to each other and to the reference potential of the hazardous area. This also applies to earthing conductors (FE) and equipotential bonding conductors (PA).
- The connecting cables must be fixed and laid so they are sufficiently protected against damage.
- All cores that are not used must be securely connected to the earth potential of the hazardous area or carefully insulated against each other and against ground (test voltage  $\geq 500 V_{\text{eff}}$ ).
- Lay cables so as to ensure that there is sufficient distance between surfaces of the measuring unit and the connecting cable.
- Supplied blind plugs / cable entries guarantee protection against foreign bodies and water (protection category) IP66 / 67 in the temperature range  $T_{\text{amb}} = -40...+100^{\circ}\text{C} / -40...+212^{\circ}\text{F}$ .
- The outer diameter of the connecting cable must be within the sealing range of the cable entry (7...12 mm / 0.28...0.47").
- Unused cable entries are to be closed (>IP66 / 67). Supplied plugs should be replaced with suitable connecting cables.
- Tighten the signal circuit terminals with a tightening torque of 0.5 ... 0.6 Nm.

Ensure that the seals and cut seals are tight.

## 4.2 Power supply

The variable area flowmeter does not require a separate power supply. The required supply for the built-in electronics is provided via the 4...20mA current output and the bus connection.

## 4.3 Inputs/outputs

The terminal assignment of the built-in electrical equipment is described in the Standard Installation and Operation Instructions. The variable area flowmeter signal circuits may only be connected to certified intrinsically safe slave units or circuits. For more information see chapter "Electrical data"

## 4.4 Grounding and equipotential bonding

The variable area flowmeter must be included in the equipotential bonding of the hazardous area. It is connected to the PA terminal on the display. Alternatively, equipotential bonding can occur via grounded pipelines.

Any existing cable shields should be connected to earth according to applicable installation regulations. A terminal connection in the terminal compartment permits a short way earthing of the cable shields.

## 5.1 Start-up

**Start-up is only permitted when the variable-area flowmeter:**

- is correctly installed in the system and connected.
- has been checked for the proper state with regard to its installation and connection requirements.

The user of the system must have it checked before start-up in compliance with the national regulations for checks before start-up.

## 5.2 Operation

Variable area flowmeters must be operated in such a way that they remain within the maximum and minimum permissible temperatures and pressures and the electrical limit values.

Variable area flowmeters may only be operated if the equipment parts necessary for safety are effective in the long run, and are not rendered inoperable during operation.

Adjusting the limit switch and operating the display during operation is permitted. To do so, remove the housing cover. Close the housing cover immediately after the limit switches have been set or the display operated.

For more information see chapter "Dismantling"



***WARNING!***

*Ignition risks caused by pressure surges, impact or friction must particularly be avoided when titanium measuring units are used.*

## 5.3 Electrostatic charge

**In order to avoid ignition hazards due to electrostatic charge, variable area flowmeters may not be used in areas where the following appear:**

- processes that generate large charges,
- machines with friction and cutting processes,
- spraying of electrons (e.g. in the vicinity of electrostatic painting systems),

## 6.1 Maintenance

Maintenance work of a safety-relevant nature within the meaning of explosion protection may only be carried out by the manufacturer, his authorised representative or under the supervision of authorised inspectors.

To maintain proper condition, regular inspections are required for systems in hazardous areas.

### The following checks are recommended:

- Checking the housing, the cable entries and the feed lines for corrosion and/or damage.
- Checking the measuring unit and the piping connections for leakage.
- Checking the measuring unit and the indicator for dust deposits.
- Including the flowmeter in the regular pressure test of the process line.

## 6.2 Dismantling

### Exchanging the built-in equipment

Due to the modular structure of the variable area flowmeters, from a safety point of view it is possible to exchange the electrical equipment built into the indicator for identical spare parts.

Remove the housing cover to this purpose. The housing cover must be closed immediately after the spare parts are exchanged. Make sure that the cover seal is properly seated.



#### **CAUTION!**

*There may be a loss of measuring accuracy!*

### Exchanging the entire device

Removal and installation are the responsibility of the operator.

Before disconnecting the electric connecting cable of the device, make sure that all cables leading to the indication unit are isolated from the ground of the hazardous area. This also applies to functional earthing conductors (FE) and equipotential bonding conductors (PA).



#### **WARNING!**

- *Pressurized pipes have to be depressurized before removing the measuring unit.*
- *In the case of environmentally critical or hazardous products, appropriate safety precautions must be taken with regard to residual liquids in the measuring unit.*
- *New gaskets have to be used when re-installing the device in the piping.*



## EXPLOSION PROTECTION CERTIFICATE OF CONFORMITY

Cert NO.GYJ12.1041X

This is to certify that the product

**Variable area flow meter and indicator unit**

**manufactured by KROHNE Messtechnik GmbH**

(Address:Ludwig - Krohne Strasse 5, Duisburg, Germany)

**which model is H250 Series**

**Ex marking Ex ia IIC T1~T6 Gb**

**product standard /**

**drawing number APPR GD 821012-08**

**has been inspected and certified by NEPSI, and that it conforms  
to GB 3836.1-2010,GB 3836.4-2010**

**This Approval shall remain in force until 2017.05.12**

**Remarks** 1.Conditions for safe use are specified in the attachment to this certificate.  
2.Symbol "X" placed after the certification number denotes specific conditions of use:  
3.Model designation is specified in the attachment to this certificate.

**Director**



**National Supervision and Inspection Centre for  
Explosion Protection and Safety of Instrumentation**

**Issued Date 2012.05.13**

This Certificate is valid for products compatible with the documents and samples approved by NEPSI.

103 Cao Bao Road  
Shanghai 200233, China

<http://www.nepsi.org.cn>  
Email: info@nepsi.org.cn

Tel: +86 21 64368180  
Fax: +86 21 64844580

Edition 05

**国家级仪器仪表防爆安全监督检验站**  
**National Supervision and Inspection Centre for**  
**Explosion Protection and Safety of Instrumentation**

(GYJ12.1041X)

(Attachment I)

**Attachment I to GYJ12.1041X**

[Variation I]

H250 Series Variable area flow meter and indicator unit, manufactured by Krohne Messtechnik GmbH has been certified National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI).

Variable area flow meter and indicator unit accords with following standards:

GB 3836.1-2010 Explosive atmospheres Part 1: Equipment-General requirements

GB 3836.4-2010 Explosive atmospheres Part 4: Equipment protection by intrinsic safety"i"

Variable area flow meter and indicator unit has the Ex-marking Ex ia II C T1~T6 Gb.

Following products are covered by this certificate.

H250 **a b c d e f g** -Ex-**h**

**a**: Blank, H, U

**b**: RR, C, HC, Hi, F

**c**: Blank, B

**d**: M40, M40S, M40R, M40T

**e**: Blank, HT

**f**: ESK

**g**: K1, K2, R1, R2

**h**: SE, SK

**1. Special condition for safe use**

Symbol "X" denotes special condition for safe use: potential electrostatic charging hazard-see instructions; The earth connection shall be connected to the equipotential bonding system.

**2. Condition for safe use**

2.1 The ambient temperature of variable area flow meter and indicator unit is (-40~+65) °C。

2.2 The maximum temperature of process medium of variable area flow meter and indicator unit is (-40~+300)°C。

2.3 The relation among temperature class, ambient temperature and maximum temperature of process medium is listed in the instruction manual MA H250/M40-Ex-II2G-AD R01 en 08/2011.



(GYJ12.1041X)

(Attachment I)

2.4 Intrinsic safety parameters:

Type	Terminals	Safe parameters				
H250□□□□□ESK□-Ex-□	11, 12	$U_i=30V$	$I_i=130mA$	$P_i=1W$	$L_i=10 \mu H$	$C_i \approx 0$
	1, 2, 3	$U_i=30V$	$I_i=130mA$	$P_i=1W$	$L_i \approx 0$	$C_i=10nF$
	4, 5, 6 7, 8					
	D, D.L	$U_i=24V$	$I_i=380mA$	$P_i=5.32W$	$L_i \approx 0$	$C_i \approx 0$
H250□□□□□K□-Ex-□ (SC3.5-NO-Y)	1, 2	$U_i=16V$ 150nF	$I_i=25mA$	$P_i=64mW$	$L_i=150 \mu H$	$C_i=$
H250□□□□□K□-Ex-□ (I7S23.5-N)	1, 2	$U_i=16V$ 150nF	$I_i=52mA$	$P_i=169mW$	$L_i=150 \mu H$	$C_i=$
H250□□□□□K□-Ex-□ (SJ3.5-SN)	1, 2	$U_i=16V$ 100nF	$I_i=25mA$	$P_i=64mW$	$L_i=30 \mu H$	$C_i=$
H250□□□□□K□-Ex-□ (SJ3.5-S1N)	1, 2	$U_i=16V$ 100nF	$I_i=52mA$	$P_i=169mW$	$L_i=30 \mu H$	$C_i=$

2.5 During installation, cable gland or blanking element shall guarantee the degree of protection is not less than IP20.

2.6 End users is not permitted to change any components insides.

2.7 When installation, use and maintenance of variable area flow meter and indicator unit, observe following standards.

GB3836.13-1997 Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres

GB3836.15-2000 Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)

GB 3836.16-2006 Electrical apparatus for explosive gas atmospheres – Part 16: Inspection and maintenance of electrical installation in hazardous areas (other than mines)

GB 50257:1996 Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering

3. Manufacturer's Responsibility

3.1 Special condition for safe use specified above should be included in the instruction manual.

3.2 Manufacturing should be done according to the documentation approved by NEPSI.

3.3 Any modification with influence on the type of protection should be submitted to NEPSI before application.

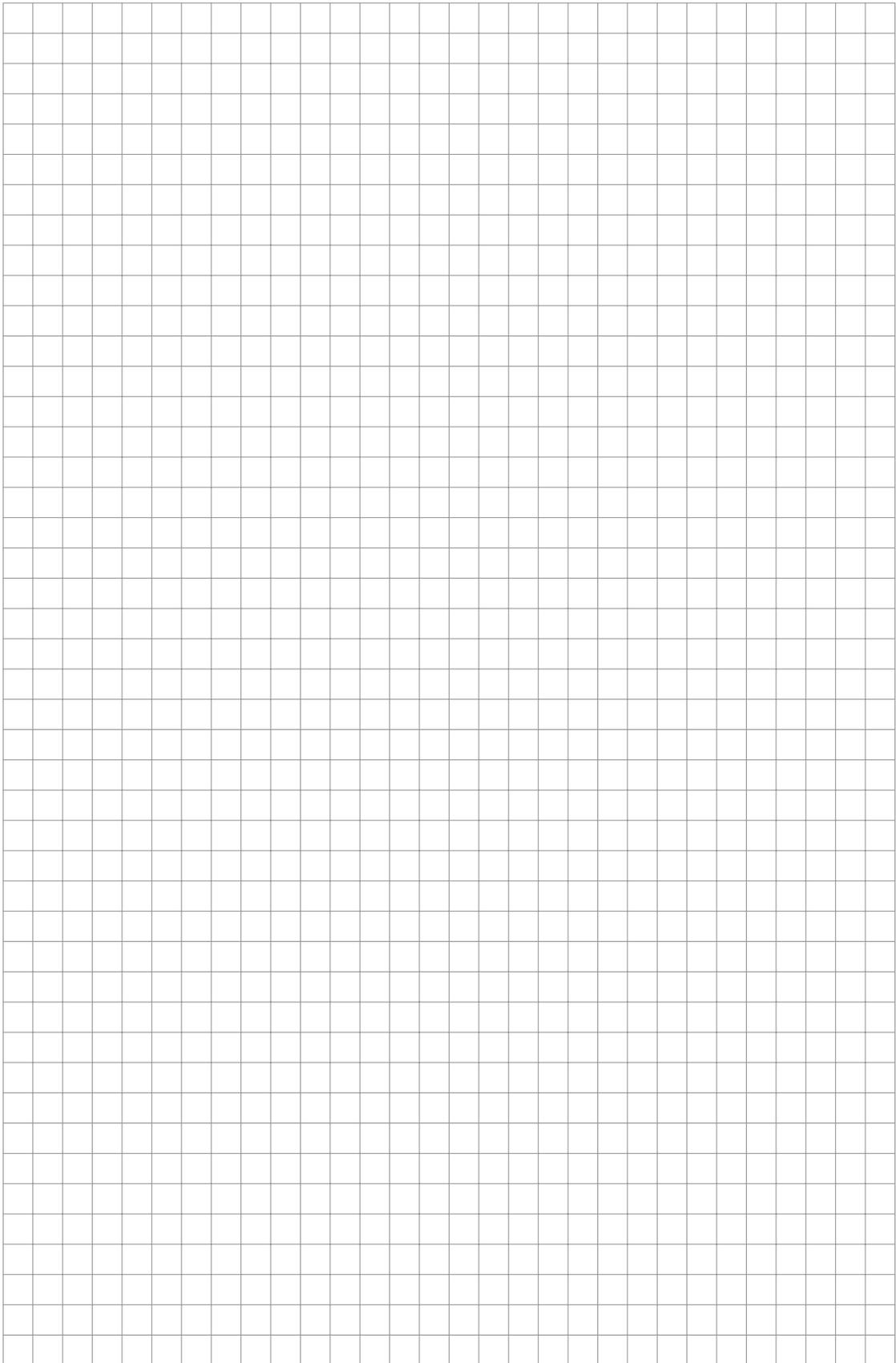
3.4 Following items should be added to the nameplate

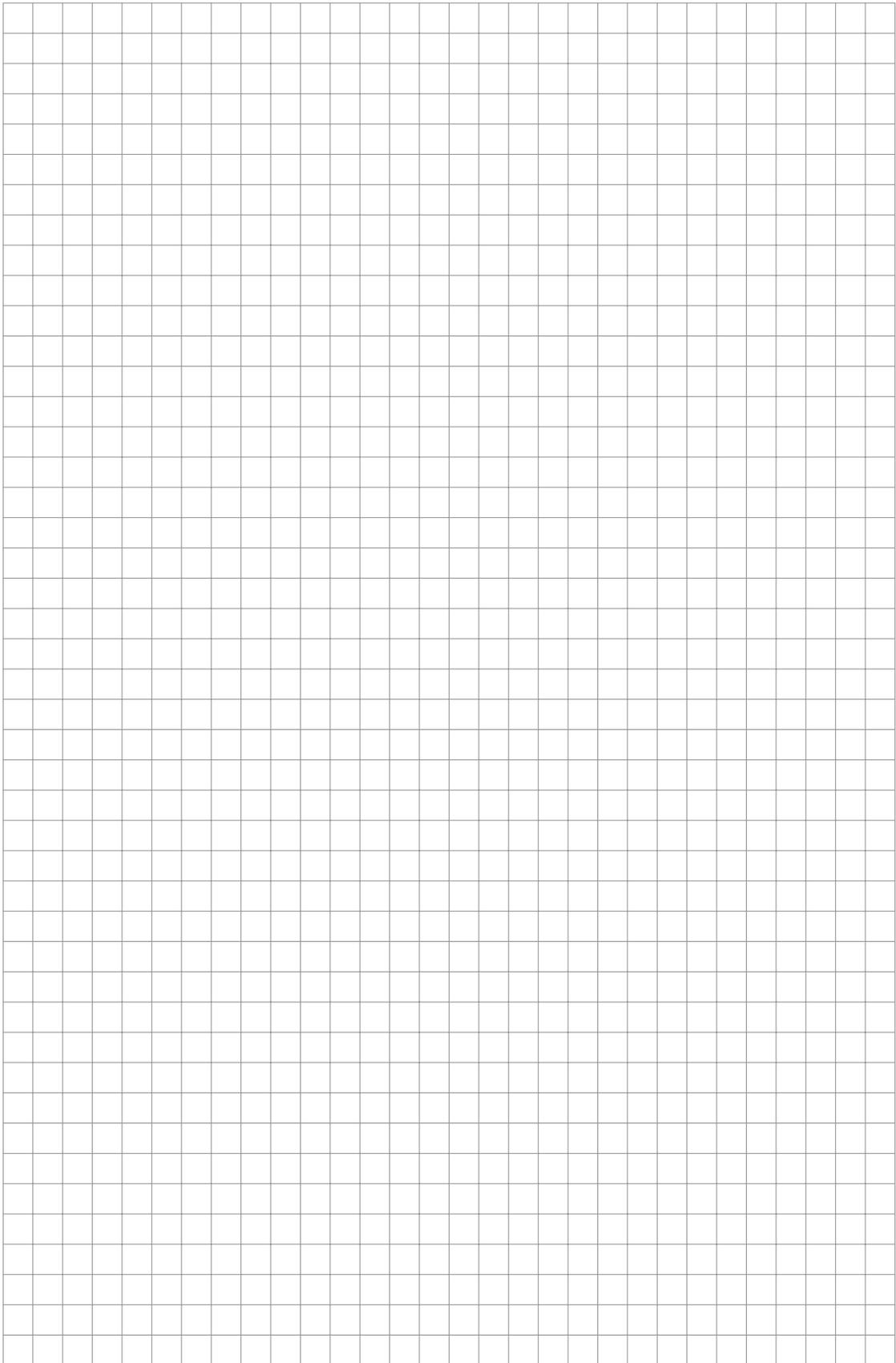
- a) NEPSI log 
- b) Ex marking
- c) Number of certificate
- d) Ambient temperature range
- e) Safe parameters

National Supervision and Inspection Center  
for Explosion Protection and Safety of Instrumentation

May 13th, 2012









### KROHNE product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature meters
- Pressure meters
- Analysis products
- Products and systems for the oil & gas industry
- Measuring systems for the marine industry

Head Office KROHNE Messtechnik GmbH  
Ludwig-Krohne-Str. 5  
47058 Duisburg (Germany)  
Tel.: +49 (0)203 301 0  
Fax: +49 (0)203 301 10389  
info@krohne.de

The current list of all KROHNE contacts and addresses can be found at:  
[www.krohne.com](http://www.krohne.com)

**KROHNE**