



MS 40 Supplementary instructions (Addendum)

Limit Switch for the BM 26 A Bypass Level Indicator

Supplementary instructions for Non-Ex devices

Supplementary instructions for ATEX-approved devices



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1 INTRODUCTION

1.1 Scope of the document

These supplementary instructions supply installation and commissioning data about the optional limit switch for bypass level indicators.

1.2 Revision history

Edition	Date	Description
1	October 27 th , 2009	First issue.
2	July 20 th , 2016	Update of data for EU directives

1.3 Certification



In accordance with KROHNE's commitment to customer service and safety, the limit switches described in this addendum meet the following safety requirements:

- EMC Directive 2014/30/EU in conjunction with EN 61326-1: 2013
- Low Voltage Directive 2014/35/EU in conjunction with EN 60947-5-1:2004 +A1:2009
- ATEX Directive 2014/34/EU in conjunction with EN 60079-0:2012, EN 60079-11:2012, EN 60079-26:2015*

* The limit switches are approved for use in potentially explosive atmospheres when equipped with the appropriate options.

1.4 Electromagnetic compatibility

The design of the device agrees with European Standard EN 61326-1 and Immunity and Emissions requirements for industrial environments.

1.5 Safety instructions from the manufacturer

1.5.1 Copyright and data protection

The contents of this document have been created with great care. Nevertheless, we provide no guarantee that the contents are correct, complete or up-to-date.

The contents and works in this document are subject to copyright. Contributions from third parties are identified as such. Reproduction, processing, dissemination and any type of use beyond what is permitted under copyright requires written authorisation from the respective author and/or the manufacturer.

The manufacturer tries always to observe the copyrights of others, and to draw on works created in-house or works in the public domain.

The collection of personal data (such as names, street addresses or e-mail addresses) in the manufacturer's documents is always on a voluntary basis whenever possible. Whenever feasible, it is always possible to make use of the offerings and services without providing any personal data.

We draw your attention to the fact that data transmission over the Internet (e.g. when communicating by e-mail) may involve gaps in security. It is not possible to protect such data completely against access by third parties.

We hereby expressly prohibit the use of the contact data published as part of our duty to publish an imprint for the purpose of sending us any advertising or informational materials that we have not expressly requested.

1.5.2 Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect, incidental, punitive and consequential damages.

This disclaimer does not apply in case the manufacturer has acted on purpose or with gross negligence. In the event any applicable law does not allow such limitations on implied warranties or the exclusion of limitation of certain damages, you may, if such law applies to you, not be subject to some or all of the above disclaimer, exclusions or limitations.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.

1.5.3 Product liability and warranty

The operator shall bear responsibility for the suitability of the device for the specific purpose.

The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation and operation of the devices (systems) will cause the warranty to be void. The respective "Standard Terms and Conditions" which form the basis for the sales contract shall also apply.

1.5.4 Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements and accident prevention regulations.

If this document is not in your native language and if you have any problems understanding the text, we advise you to contact your local office for assistance. The manufacturer can not accept responsibility for any damage or injury caused by misunderstanding of the information in this document.

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appear in the form of icons as shown below.

1.5.5 Display conventions

Safety warnings are indicated by the following symbols.



DANGER!

This information refers to the immediate danger when working with electricity.



DANGER!

This warning refers to the immediate danger of burns caused by heat or hot surfaces.



DANGER!

This warning refers to the immediate danger when using this device in a hazardous atmosphere.



DANGER!

These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator's plant.



WARNING!

Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator's plant.



CAUTION!

Disregarding these instructions can result in damage to the device or to parts of the operator's plant.



INFORMATION!

These instructions contain important information for the handling of the device.



LEGAL NOTICE!

This note contains information on statutory directives and standards.



- **HANDLING**

This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.



- ➔ **RESULT**

This symbol refers to all important consequences of the previous actions.

1.6 Safety instructions for the operator



WARNING!

In general, devices from the manufacturer may only be installed, commissioned, operated and maintained by properly trained and authorized personnel. This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device.

2 DEVICE DESCRIPTION

2.1 Scope of Delivery



INFORMATION!

Check the packing list to see if you have received all that you require.

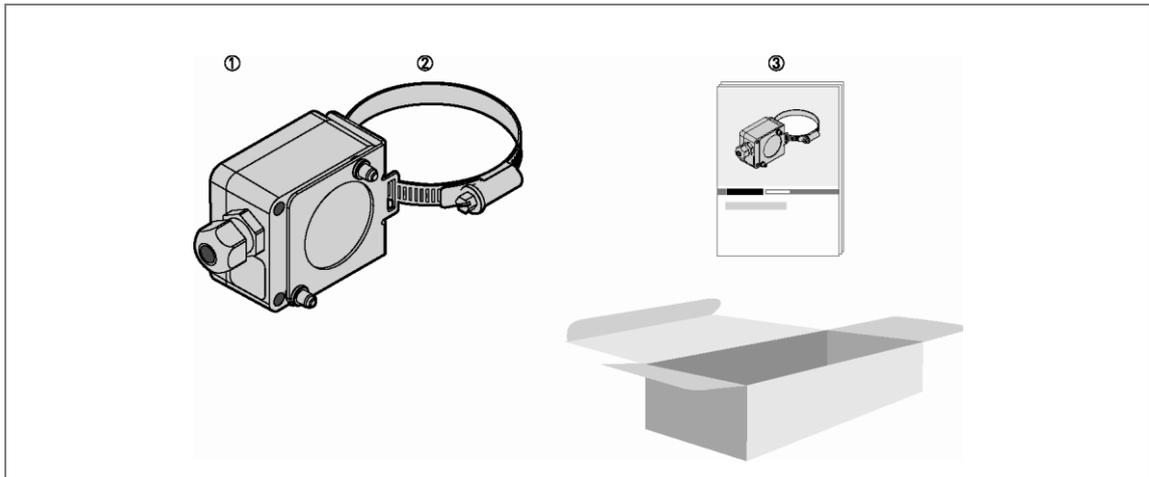


Figure 2-1 Scope of delivery

- ① Limit switch
- ② Screw clamp
- ③ Supplement

2.2 Device description

The limit switch uses a bi-stable reed switch to monitor important measurement limits. For example, the limit switches can be used to indicate error conditions (float failure, level detection etc.)

It is attached adjacent to the measuring chamber of the BM 26 A magnetic level indicator.

This accessory is approved for use in potentially explosive atmospheres when equipped with the appropriate options.

2.3 Visual check



INFORMATION!

Inspect the cartons carefully for damage or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

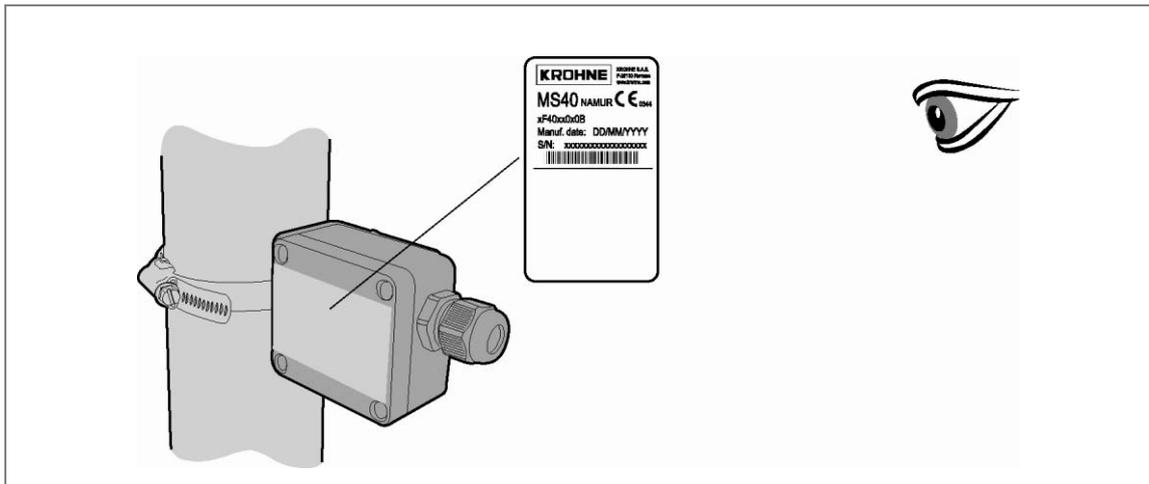


Figure 2-2 Visual check

**INFORMATION!**

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

2.4 Nameplates

**INFORMATION!**

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

2.4.1 Non-Ex nameplates

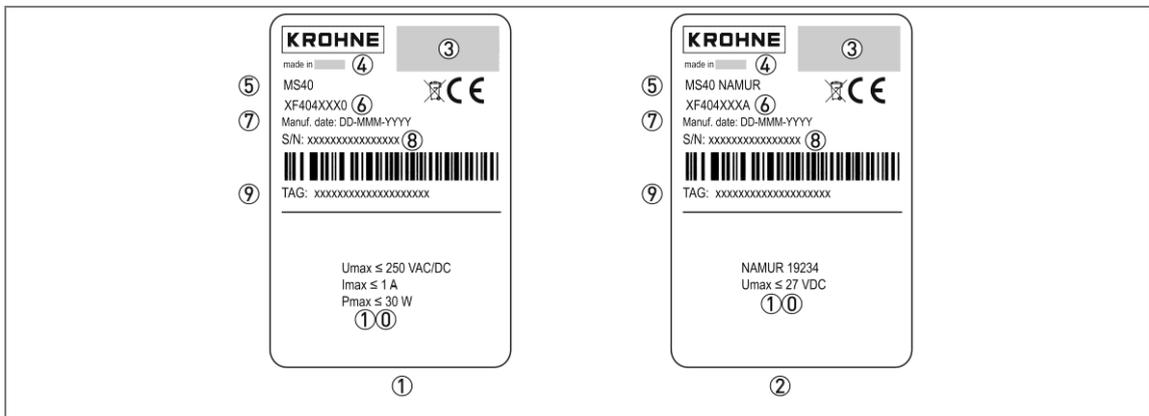


Figure 2-3 Limit switch: Non-Ex nameplates (housing cover)

- ① Non-NAMUR option
- ② NAMUR option
- ③ Company name and postal address
- ④ Country of manufacture
- ⑤ Model name and number
- ⑥ Designation code (VF code given in the order)
- ⑦ Date of manufacture
- ⑧ Factory serial number and bar code
- ⑨ Customer tag number
- ⑩ Electrical data

3 INSTALLATION

3.1 Notes on installation

**INFORMATION!**

Inspect the cartons carefully for damage or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

**INFORMATION!**

Check the packing list to check if you received completely all that you ordered.

**INFORMATION!**

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.2 Storage

- Store the device in a dry and dust-free location
- Keep the housing out of the sunlight
- Store the device in its original packing.
- Storage temperature range: -40...+120°C / -40...+250°F

3.3 General installation notes

**INFORMATION!**

The level switches are not attached to the device before delivery. Remove the switches from the packing and obey the installation instructions.

**WARNING!**

Too much heat can cause damage to the limit switch. If you put insulation around the bypass level indicator, do not cover the limit switch housing. Make sure that there is a minimum of 15 mm / 0.6" of empty space between the limit switch and the insulation.

**CAUTION!**

*The switching point of the switch when the level increases is not the same as the switching point of the switch when the level decreases. Does the limit switch have to be closed when the level of the liquid increases or decreases? For more data, refer to **Switching point offset**.*

**CAUTION!**

If liquid density changes, the switch will not detect level correctly. Recalculate the position of the switch according to the true liquid density and repeat the installation procedure that follows.

3.4 How to attach a limit switch to the measuring chamber

3.4.1 Definition of the switching point offset

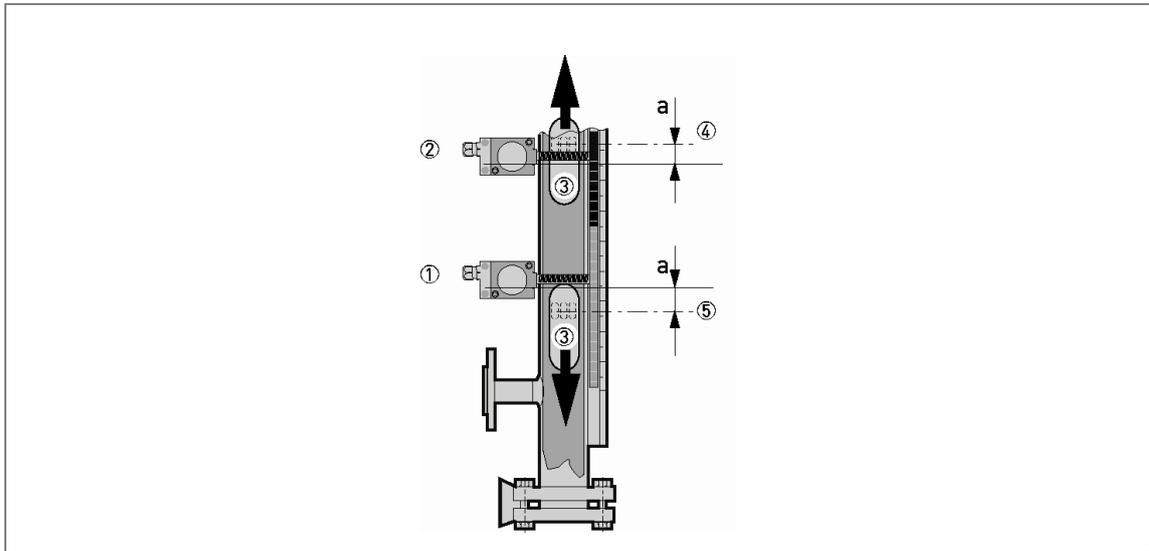


Figure 3-1 Switching point offset

- ① Zero point of the limit switch
- ② Zero point of the limit switch
- ③ Float and float magnet (switching point is in relation to the centre of the magnet)
- ④ True switching point above a limit switch (the switch is closed when the liquid level goes above this point - a HIGH level switch)
- ⑤ True switching point below the limit switch (the switch is closed when the liquid level goes below this point - a LOW level switch)



INFORMATION!

For more data about the switch condition (open / closed), refer to "Electrical connection".

3.4.2 Switching point offset values

Conditions	Switching point offset, a	
	mm	inches
When the switch must be closed above the switching point (a HIGH level switch), move the switch below the switching point:	28	1.1
When the switch must be closed below the switching point (a LOW level switch), move the switch above the switching point:	28	1.1

3.4.3 How to attach a HIGH level or LOW level limit switch

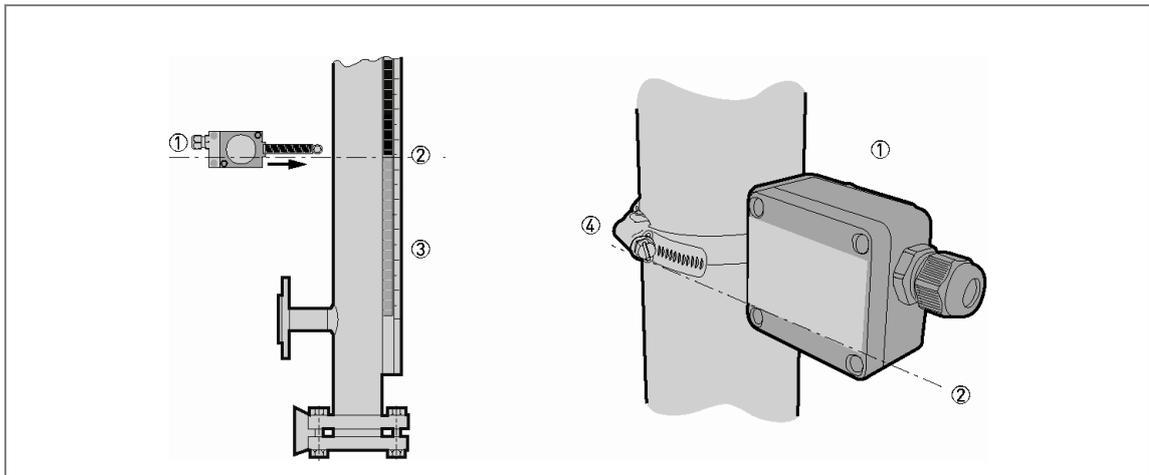


Figure 3-2 How to attach a HIGH level or LOW level limit switch

- ① Limit switch
- ② Switching point centreline
- ③ Level indicator and measuring scale
- ④ Screw clamp for the limit switch

Equipment needed:

- Large slotted tip screwdriver, 7 mm hex screwdriver or 7 mm wrench (not supplied)



CAUTION!

If you must loosen the indicator tube (measuring scale) screw clamp to put the limit switch screw clamp behind the indicator tube, do not change the position of the indicator tube. If you change the position of the indicator tube, the indicator will be incorrect.



INFORMATION!

Liquid level offset: For more data about liquid level offset, refer to the Handbook for the BM 26 A Bypass Level Indicator. For the graphs and other correction data, refer to the Handbook for the BM 26 A Bypass Level Indicator.



Installation procedure

- Use the clamp to attach the limit switch to the measuring chamber. Do not tighten the clamp.
 - Move the limit switch until the switching point centerline is at the level required. Refer to the level indicator scale to help you position the limit switch.
- ➡ If the indicator column does not have the scale option, it will be necessary to calculate the vertical offset of the float magnet in relation to the level of the liquid (depends on the liquid density). Adjust the switch position for the float magnet offset. For the vertical offset (liquid level offset) tables, refer to the Handbook for the BM 26 A Bypass Level Indicator.

- *If the measuring chamber has an indicator tube (with 1 of the 2 indicator options: a column of rotating flaps or floating index), you must loosen the bottom screw clamp so that you can put the limit switch screw clamp behind the indicator tube. Do not change the position of the indicator tube!*
- *Adjust the switch position for the switching point offset.*
- ➡ *If the limit switch is set to **LOW level** (the switch is **closed** when the float is below the switching point), move the switch up a small distance to adjust for the offset. If the limit switch is set to **HIGH level** (the switch is **closed** when the float is above the switching point), move the switch down a small distance to adjust for the offset. For more data, refer to “Definition of switching point offset” and “Switching point offset values”.*
- *Tighten the limit switch clamp.*
- ➡ *End of the procedure.*

3.4.4 How to install a limit switch for float failure detection



INFORMATION!

The float will go to the bottom of the measuring chamber for the reasons that follow:

- *damaged or corroded float (float failure),*
- *liquid density that does not correspond to the specifications received with the order and*
- *draining the measuring chamber*



Installation procedure

- *Make sure the measuring chamber is empty and the float is in the chamber.*
- *Attach a limit switch to the bottom of the measuring chamber. Do not tighten the clamp.*
- *Connect the limit switch to the electrical circuit. Make sure that it is set to **LOW level**. For more data, refer to “Electrical connections” in this supplement.*
- *Energize the electrical circuit.*
- *Lift the limit switch up the measuring chamber until the limit switch status changes to **closed**.*
- *Hold the limit switch tightly in this position and tighten the clamp.*
- ➡ *The limit switch is in the correct position. End of the procedure.*

For more data, refer to “Error handling” in this supplement.

3.4.5 Limit switches and insulation for the measuring chamber



WARNING!

Too much heat can cause damage to the limit switch. If you put insulation around the bypass level indicator, do not cover the limit switch housing. Make sure that there is a minimum of 15 mm / 0.6" of empty space between the limit switch and the insulation.

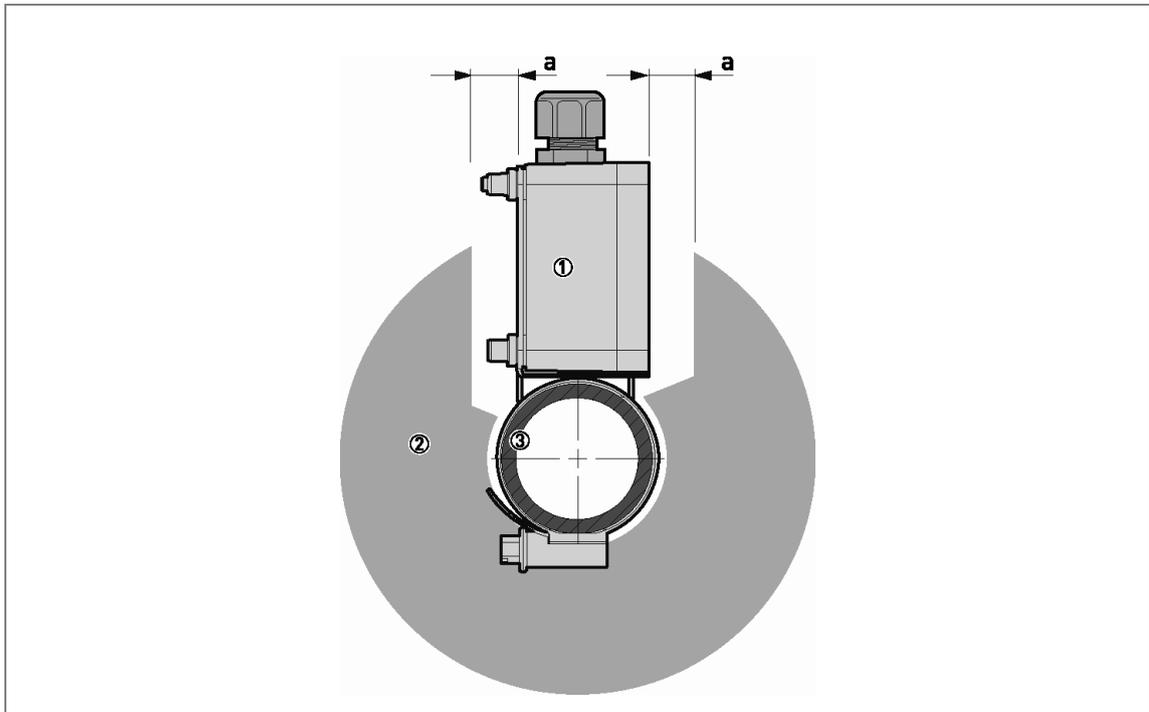


Figure 3-3 Limit switches and insulation for the measuring chamber

- ① Limit switch housing
- ② Insulation around the measuring chamber (cross-section)
- ③ Measuring chamber (cross-section)
- Empty space between the limit switch and the insulation for the measuring chamber, $a \geq 15 \text{ mm} / 0.6''$

4 ELECTRICAL CONNECTIONS

4.1 Safety instructions



DANGER!

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!



DANGER!

Observe the national regulations for electrical installations!



DANGER!

For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.



WARNING!

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

4.2 How to connect the limit switch to an electrical circuit

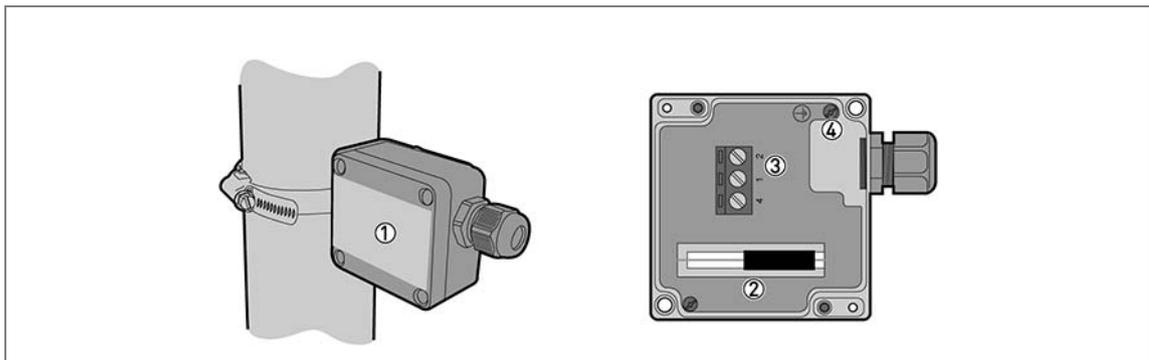


Figure 4-1 Terminal compartment

- ① Terminal compartment cover
- ② Bistable reed switch
- ③ Output terminal
- ④ Grounding terminal

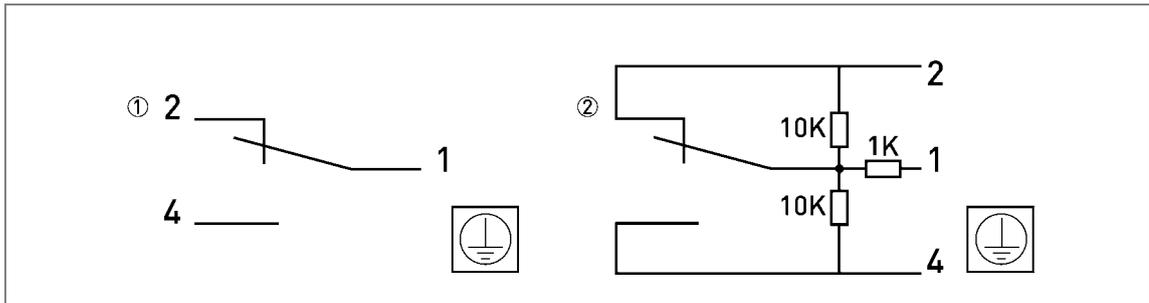


Figure 4-2 Electrical schema

- ① Non-Namur version (in its closed position)
 ② Namur version (in its closed position)

Equipment needed:

Medium-sized Phillips / crosshead or slotted tip screwdriver (not supplied)



CAUTION!

If the switch is set to LOW level, make sure that switch is closed when the float is below the switch position.

If the switch is set to HIGH level, make sure that switch is closed when the float is above the switch position.



Electrical connection procedure

- Use a screwdriver to remove the terminal compartment cover.
 - Connect the device to the electrical circuit. Obey the national electrical codes.
- ➡ End of the procedure.

For more data, refer to “Technical data” in this supplement.

4.3 Protection category

The device fulfils all requirements per protection class IP6X.



DANGER!

Make sure the cable gland is watertight.

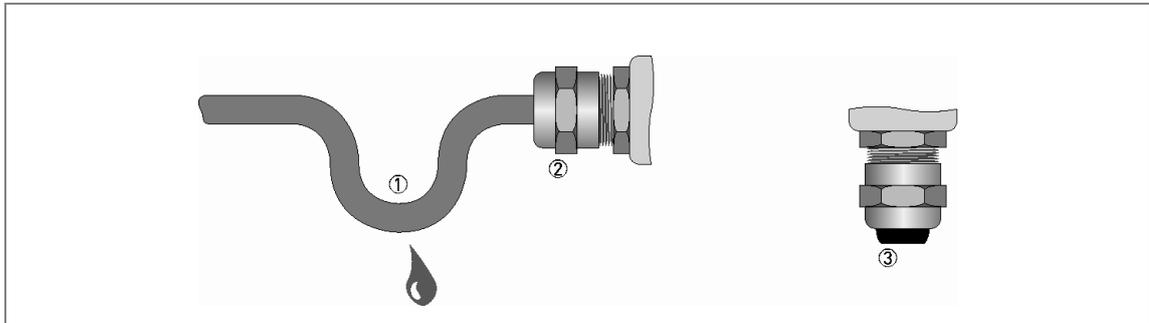


Figure 4-3 Protection category



How to make sure that the electrical installation agrees with the protection class

- *Make sure that the gaskets are not damaged.*
 - *Make sure that the electrical cables are not damaged.*
 - *Make sure that the electrical cables agree with the national electrical code.*
 - *The cables are in a loop in front of the instrument (1) so water cannot enter the housing.*
 - *Tighten the cable glands (2).*
 - *Close unused cable glands with dummy plugs (3).*
- ➡ *End of the procedure.*

5 START-UP

5.1 Start-up checklist

**DANGER!**

Make sure that the limit switch and the installation agrees with the requirements of the Ex certificate of compliance.

Check these points before you use the instrument:

- Does the information on the nameplate agree with the operating data?
- Did you correctly install the device on the bypass chamber?
- Do the electrical connections agree with the national electrical codes?

5.2 Operating concept

Level is detected by limit switches installed at important points adjacent to the measuring chamber.

**CAUTION!**

Customer order data is used to calibrate the device. If liquid density changes, the device will not measure correctly. For more data, refer to "Error handling" in this supplement.

6 OPERATION

6.1 Error indication

Limit switches can be used to indicate error conditions (Float failure, level detection etc.). For more data, refer to “How to attach a limit switch to the measuring chamber” in this supplement.

6.2 Error handling

Error	Description	Corrective action
The limit switch is in high-high (maximum) position and set to HIGH level . Status CLOSED .	Overflow? The level of the liquid is at or above the maximum limit (if the indicator is configured for level indication).	Lower the level of liquid below the maximum limit.
The limit switch is in low-low (minimum) position and set to LOW level . Status CLOSED .	Tank empty? The level of the liquid is at or below the minimum limit (if the indicator is configured for level indication).	Increase the level of liquid until it is above the minimum limit.
The limit switch is in the float failure position and set to LOW level . Status CLOSED .	Float failure. The float has sunk to the bottom of the measuring chamber.	It is necessary to replace the float. Order a new float from your local sales office. Isolate the measuring chamber and drain the liquid. Remove the bottom plate flange and the float.
The level switch does not detect the minimum limit correctly.	The limit switch (set to LOW level) is on, but the level of the liquid is still above the minimum limit. The density of the liquid is lower than the value given in the customer order data.	Make sure that the density of the liquid is stable. Recalculate the liquid density and repeat the installation procedure for the limit switch.
	The limit switch (set to LOW level) is not yet on, but the level of the liquid is at or below the minimum limit. The density of the liquid is higher than the value given in the customer order data.	

Error	Description	Corrective action
The level switch does not detect the maximum limit correctly.	The level of the liquid is at or above the maximum level, but the limit switch (set to HIGH level) is not yet closed. The density of the liquid is lower than the value given in the customer order data.	Make sure that the density of the liquid is stable. Recalculate the liquid density and repeat the installation procedure for the limit switch.
	The level of the liquid is below the maximum level, but the limit switch (set to HIGH level) is closed. The density of the liquid is higher than the value given in the customer order data.	

7 SERVICE

7.1 Periodic maintenance

This accessory does not need maintenance.

7.2 Keep the device clean

If dirt collects on the device, clean it.

7.3 Service warranty

Maintenance is not necessary for most applications.

Servicing by the customer is limited by warranty to the removal, replacement and installation of switches. For more data, refer to "Installation" in this supplement.



DANGER!

High-temperature versions of the bypass level indicator: risk of burns. Do not go too near to the bypass level indicator.

Limit switches can be removed from the measuring chamber under process corrections.

Use only KROHNE-authorized service staff to repair the instrument.

7.4 Spare parts availability

The manufacturer adheres to the basic principle that functionally adequate spare parts for each device or each important accessory part will be kept available for a period of 3 years after delivery of the last production run for the device.

This regulation only applies to spare parts which are under normal operating conditions subjects to wear and tear.

7.5 Availability of services

The manufacturer offers a range of services to support the customer after expiration of the warranty. These include repair, technical support and training.



INFORMATION!

For more precise information, please contact your local representative.

7.6 Returning the device to the manufacturer

7.6.1 General information

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems.



CAUTION!

Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:

- *Due to statutory regulations on environmental protection and safeguarding the health and safety of our personnel, manufacturer may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.*
- *This means that the manufacturer can only service this device if it is accompanied by the following certificate (see next section) confirming that the device is safe to handle.*



CAUTION!

If the device has been operated with toxic, caustic, radioactive, flammable or water-endangering products, you are kindly requested:

- *to check and ensure, if necessary by rinsing or neutralizing, that all cavities are free from such dangerous substances,*
- *to enclose a certificate with the device confirming that is safe to handle and stating the product used.*

7.6.2 Form (for copying) to accompany a returned device



CAUTION!

To avoid any risk for our service personnel, this form has to be accessible from outside of the packaging with the returned device.

Company:		Address:	
Department:		Name:	
Tel. no.:		Fax no. and/or Email address:	
Manufacturer's order no. or serial no.			
The device has been operated with the following medium:			
This medium is:	<input type="checkbox"/>	radioactive	
	<input type="checkbox"/>	water hazardous	
	<input type="checkbox"/>	toxic	
	<input type="checkbox"/>	caustic	
	<input type="checkbox"/>	flammable	
	<input type="checkbox"/>	We checked that all cavities in the device are free from such substances.	
	<input type="checkbox"/>	We have flushed out and neutralized all cavities in the device.	
We hereby confirm that there is no risk to persons or the environment through any residual media contained in the device when it is returned.			
Date:		Signature:	
Stamp:			

7.7 Disposal



CAUTION!

Disposal must be carried out in accordance with legislation applicable in your country.

Separate collection of WEEE (Waste Electrical and Electronic Equipment) in the European Union:



According to the directive 2012/19/EU, the monitoring and control instruments marked with the WEEE symbol and reaching their end-of-life **must not be disposed of with other waste**. The user must dispose of the WEEE to a designated collection point for the recycling of WEEE or send them back to our local organisation or authorised representative.

8 TECHNICAL DATA

8.1 Technical data



INFORMATION!

- The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local representative.
- Additional information (certificates, special tools, software...) and complete product documentation can be downloaded free of charge from the website (Download Centre).

Version	MS 40	MS 40 NAMUR
Function		
Description	Limit switch attached adjacent to the measuring chamber of the bypass level indicator.	
Function	Level detection. It is a bi-stable reed switch that is magnetically actuated by the float in the measuring chamber.	
Measurement accuracy		
Hysteresis	28 mm / 1.1"	
Operating conditions		
Temperature		
Storage temperature	-40...+120°C / -40...+250°F	
Operating temperature	-40...+120°C / -40...+250°F, if there is insulation around the measuring chamber, specify the temperature in the order. Do not put insulation around the switch housing.	
Other conditions		
Protection category	IP6X	
Installation conditions		
Installation	The switch is not attached to the measuring chamber before delivery	
Limit switch position	Adjust the switch position for hysteresis and liquid density	
Dimensions and weights	Refer to "Technical data: Dimensions and weights"	
Material		
Switch housing	Aluminium with epoxy powder paint	
Bracket	Stainless steel	
Clamp	Stainless steel	
Input and output		
Switching capacity	$P_{\max} = 60 \text{ VA/W};$ $V_{\max} = 250 \text{ VAC/VDC};$ $I_{\max} = 1 \text{ A};$	According to NAMUR 19234
Intrinsically-safe circuit data	$U_i \leq 250 \text{ VAC/VDC}, I_i \leq 1 \text{ A},$ $P_i \leq 60 \text{ VA/W}, C_i \approx 0 \text{ nF},$ $L_i = 0 \text{ } \mu\text{H} (1)$	$U_i \leq 24 \text{ V}, I_i \leq 0.1 \text{ A},$ $P_i \leq 0.21 \text{ W}, C_i \approx 0 \text{ nF},$ $L_i = 0 \text{ } \mu\text{H}$
Electrical characteristics of switching elements according to EN 60947-5-1		
Rated insulation voltage, U_i	250 V	
Rated impulse-withstand voltage, U_{imp}	2.8 kV	

Version	MS 40	MS 40 NAMUR
Overvoltage category	II	
Pollution degree	3	
Fuse rating for short-circuit protection	1 A gG	
Cable entry	M16×1.5 (cable diameter: 7...9 mm / 0.27...0.35")	
Cable entry capacity (max.)	1.5 mm ² / AWG 14	

Approvals and certifications

CE	This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.
----	--

Explosion protection

ATEX	II 1 GD Ex ia IIC T4...T6 Ga Ex ia IIIC T135°C...T85°C Da
------	---

① use an intrinsically-safe power supply

8.2 Dimensions and weights

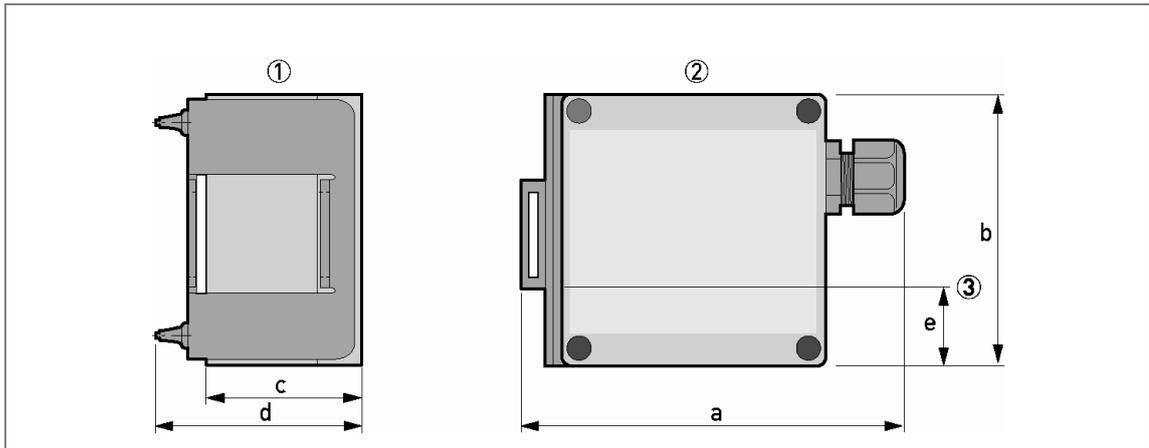


Figure 8-1 Switch housing

- ① Limit switch (front view)
- ② Limit switch (left side)
- ③ Nominal switching point



INFORMATION!

The limit switch is delivered with:

- a M16 x 1.5 cable gland and
- a screw clamp (not shown - to attach the limit switch to the measuring chamber)

Dimensions and weights in mm and kg

Version	Dimensions [mm]					Weights [kg]
	a	b	c	d	e	
MS40 Non-NAMUR	98	58	34	46.5	20	0.24 (1)
MS40 NAMUR	98	58	34	46.5	20	0.24 (1)

- ① This includes the weight of the screw clamp

Dimensions and weights in inches and lbs

Version	Dimensions [inches]					Weights [lbs]
	a	b	c	d	e	
MS40 Non-NAMUR	3.8	2.3	1.3	1.8	0.8	0.53 (1)
MS40 NAMUR	3.8	2.3	1.3	1.8	0.8	0.53 (1)

- ① This includes the weight of the screw clamp

9 ATEX SUPPLEMENTARY INSTRUCTIONS

9.1 General safety information

9.1.1 Scope

These instructions are applicable only to the explosion-protection version of the bistable limit switch. For all other data, use the Quick Start and Handbook for the magnetic level indicator. If you do not have these documents, please contact the nearest sales office or download them from our website.

**WARNING!**

Installation, commissioning and maintenance may only be carried out by "Personnel trained in explosion protection".

**WARNING!**

The information in this chapter only contains Ex data applicable to the limit switch.

**INFORMATION!**

The information in this ATEX supplement only contains the data applicable to explosion protection. The technical data in this document for the non-Ex version shall be valid in its current version, provided that they are not rendered invalid or are replaced by these ATEX supplementary instructions.

9.1.2 Device description

The limit switch uses a bistable reed switch to detect the level of the liquid. It is attached adjacent to the measuring chamber of the magnetic level indicator.

This accessory is approved for use in potentially explosive atmospheres when equipped with the appropriate options.

9.1.3 Standards and approvals

**DANGER!**

In compliance with European Directive 2014/34/EU, the ATEX versions of the limit switch described in these Supplementary Instructions conform to European Standards EN 60079-0:2012, EN 60079-11:2012, EN 60079-26:2015. The Ex ia version is certified for use in hazardous areas by INERIS under INERIS 08ATEX0045 X.

**WARNING!**

Carefully read the ATEX approval certificate for the limit switch. Obey the boundary conditions.

9.1.4 Categories

The Ex ia-approved device has the markings that follow:

II 1 GD

Ex ia IIC T4...T6* Ga

Ex ia IIIC T135°C...T85°C* Da

* The ambient temperature for the device must agree with the temperature class data on page 31.

The limit switch is designed for ATEX applications when the appropriate options are selected (type code *F40**1**). The limit switch is suitable for use in potentially explosive atmospheres of all flammable substances in Gas Group IIA, IIB and IIC. It is certified for applications requiring Category 1 G (gases, vapours or mists) and EPL Ga or Category 2 G and EPL Gb equipment. It also agrees with temperature class T3, T2 and T1 (Gas Groups) if the temperature limits are obeyed. For more data, refer to Operating conditions on page 24.

Category 1 G equipment is used in zone 0. Category 2 G equipment is used in zone 1.

The Ex ia-approved device is suitable for use in potentially explosive atmospheres of all flammable substances in Dust Groups IIIA, IIIB and IIIC. It is certified for applications requiring Category 1 D (dust) and EPL Da or Category 2 D and EPL Db equipment, when fitted with the appropriate options. The surface temperature of the housing (without a layer of dust) cannot be more than +85°C / +185°F if no other heat is supplied from the measured process.

Category 1 D equipment is used in zone 20. Category 2 D equipment is used in zone 21.

The limit switch agrees with protection category IP6X for dust. The housing has an M16×1.5 plastic cable gland.

9.1.5 ATEX nameplates



Figure 9-1 Ex I nameplate for the level switch (non-Namur)



Figure 9-2 Ex I nameplate for the level switch (Namur)

- ① ATEX certification agency code. Refer also to temperature classes.
- ② Equipment approval
- ③ Intrinsically-safe circuit data

9.2 Installation

9.2.1 Precautions

General notes

**WARNING!**

When you install the device, obey the conditions in the EC-Type Examination certificate. These conditions include:

- The special conditions for safe use.
- The Essential Health and Safety Requirements.

You can download the certificate from our internet site.

**DANGER!**

This installation must agree with EN 60079-14: Electrical installations in hazardous areas.

Special conditions

**WARNING!**

Equipment category 1 G only: The housing of the device is a possible source of ignition in a potentially explosive atmosphere. It is made of aluminium.

Install the device in an applicable location to make sure that iron/steel objects do not hit or rub against aluminium parts.

Equipment category 1 D: Do not put the equipment fully into dust.

Make sure that:

- you can get access to the device,
- there is sufficient space around the device for inspections,
- you can see the device nameplate, and
- there are no external forces applied on the device.

9.2.2 Operating conditions

The ATEX equipment category and temperature class give the ambient temperature range for the limit switch. This data is marked on the nameplate of the limit switch.

Equipment category II 1 G or 1 D (Ex i applications and non-Namur devices only)

Temperature class		Ambient temperature	
Gas	Dust	[°C]	[°F]
T6	T85°C	-40...+80	-40...+176
T5	T100°C	-40...+95	-40...+203
T4	T135°C	-40...+130	-40...+266

Equipment category II 1 G or 1 D (Ex i applications and Namur devices only)

Temperature class		Ambient temperature	
Gas	Dust	[°C]	[°F]
T6	T85°C	-40...+70	-40...+158
T5	T100°C	-40...+85	-40...+185
T4	T135°C	-40...+120	-40...+248

9.3 Electrical connections



Procedure for ATEX-approved devices:

- *Electrical wires must agree with applicable standards (e.g. EN 60079-14).*
- *Use the electrical connection procedure in the Handbook.*
- *Put the electrical wires down, set them in position, and safely attach them to prevent damage.*
- *The electrical wires must also be a sufficient distance from hot surfaces.*
- *Make sure that unused electrical wires are safely connected to the earth of the hazardous area. If this is not possible, make sure that each of the unused electrical wires are safely isolated (other electrical wires, ground etc.).*
- *If it is necessary, make sure that the electrical wire insulation gives good protection from corrosion.*
- *If possible, use galvanically-isolated equipment.*
- *Supply the Ex i equipment connected to the limit switch. Use only certified intrinsically-safe equipment.*
- *Do not remove more than 6 mm / 0.2" of insulation from the wire.*



DANGER!

Non-NAMUR limit switches: *The power supply must be intrinsically safe.*

Connect only to separate certified, intrinsically-safe circuits. Make sure that the electrical circuit characteristics are not more than the values that follow:

Non-NAMUR limit switches: Maximum intrinsically-safe values for the electrical circuit

- $U_i \leq 250 \text{ VAC/DC}$
- $I_i \leq 1 \text{ A}$
- $P_i \leq 60 \text{ VA/W}$
- $C_i \approx 0 \text{ nF}$
- $L_i = 0 \text{ } \mu\text{H}$

NAMUR limit switches: Maximum intrinsically-safe values for the electrical circuit

- $U_i \leq 24 \text{ V}$
- $I_i \leq 0.1 \text{ A}$

- $P_i \leq 0.21 \text{ W}$
- $C_i \approx 0 \text{ nF}$
- $L_i = 0 \text{ }\mu\text{H}$

**INFORMATION!**

The electrical parts are isolated from the metallic parts of the device with a rating of 500 V_{rms} .

9.4 Start-up

**Do a start-up check:**

- Does the information given on the nameplate agree with the application?
- **Ex i applications:** Are you using an intrinsically-safe barrier within the correct parameters? For further data, refer to "ATEX supplementary instructions; Electrical connections". The electrical circuit characteristics must not be more than the maximum intrinsically-safe values.
- Is the terminal compartment correctly sealed?

9.5 ATEX approval certificate




(2) Equipment and protective systems intended for use in potentially explosive atmospheres
Directive 94/9/EC

(1) **EC-TYPE EXAMINATION CERTIFICATE**

(3) Number of the EC type examination certificate: **INERIS 08ATEX0045X**

(4) Equipment or protective system:
LIMIT SWITCH TYPE MS40 .F40..1..

(5) Manufacturer: **KROHNE S.A.S**

(6) Address: **Les Ors
F - 26103 ROMANS SUR ISERE**

(7) This equipment or protective system and any other acceptable alternative of this one are described in the annex of this certificate and the descriptive documents quoted in this annex.

(8) INERIS, notified body and identified under number 0080, in accordance with article 9 of Council Directive 94/9/EC of the 23rd March 1994, certifies that this equipment or protective system fulfils the Essential of Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, described in annex II of the Directive.

The examinations and the tests are consigned in report No 021105/08.

(9) The respect of the Essential Health and Safety Requirements is ensured by :

- compliance with:
 - EN 60079-0 : 2006
 - EN 60079-11 : 2007
 - EN 60079-26 : 2004
- specific solutions adopted by the manufacturer to meet the Essential Health and Safety Requirements described in the descriptive documents.

Only the entire document including annexes may be reprinted. IM1337AC Sheet 1 / 4

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 tél + 33(0)3 44 55 66 77 fax + 33(0)3 44 55 66 99 internet www.ineris.fr
 Institut national de l'environnement industriel et des risques
 Etablissement public à caractère industriel et commercial - RCS Senlis B 381 984 921 - Siret 381 984 921 00019 - APE 743B

Figure 9-3 ATEX certificate for the MS40 limit switch, page 1 of 4

EC-Type Examination Certificate N° INERIS 08ATEX0045X

(10) The sign X, when it is placed after the Number of the EC type examination certificate, indicates that this equipment and protective system is subjected to the special conditions for safe use, mentioned in the annex of this certificate.

(11) This EC type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. 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 the protective system shall contain:



Verneuil-en-Halatte, 2008 12 11




Director of the Certifying Body,
By delegation
T.HOUEIX
Certification Officer
Certification Division

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Figure 9-4 ATEX certificate for the MS40 limit switch, page 2 of 4

EC-Type Examination Certificate N° INERIS 08ATEX0045X

(13)

ANNEX

(14)

EC TYPE EXAMINATION CERTIFICATE N° INERIS 08ATEX0045X

(15) DESCRIPTION OF THE EQUIPMENT OR THE PROTECTIVE SYSTEM

The apparatus type MS40 is designed to the liquids detection and declined in two models protected by intrinsic safety.

The apparatus MS40 .F40..1.B is composed of resistors and a reed switch (NAMUR).

The apparatus MS40 .F40..1.1 is composed of a reed switch (NON-NAMUR).

The apparatus's enclosure has a IP66 protection degree according to the EN 60529 standard.

PARAMETERS RELATING TO THE SAFETY

Maximum input characteristics of MS40 .F40..1.1 apparatus

Ui (V _{AC/DC})	Ii (A)	Pi (VA/W)	Ci (nF)	Li (μH)
250	1	60	≈ 0	0

Maximum input characteristics of MS40 .F40..1.B apparatus

Ui (V _{DC})	Ii (A)	Pi (W)	Ci (nF)	Li (μH)
24	0.1	0.21	≈ 0	0

MARKING

Marking has to be readable and indelible; it has to include the following indications:

KROHNE S.A.S

F - 26103 ROMANS SUR ISERE

MS40 .F40..1.. *

INERIS 08ATEX0045X

(Serial number)

(Year of construction)

⊕ Ex II 1 G

Ex ia IIC T4...T6**

WARNING - POTENTIAL DANGER OF ELECTROSTATIC DISCHARGE - SEE INSTRUCTIONS

* Dots are replaced by letters or numbers defining the apparatus model

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Figure 9-5 ATEX certificate for the MS40 limit switch, page 3 of 4

EC-Type Examination Certificate N° INERIS 08ATEX0045X

** Temperature classification of the apparatus depends on ambient temperature following the limits defined below :

Temperature classification of MS40	MS40 .F40..1.B ambient temperature	MS40 .F40..1.1 ambient temperature
T6	-40°C to +70°C	-40°C to +80°C
T5	-40°C to +85°C	-40°C to +95°C
T4	-40°C to +120°C	-40°C to +130°C

Marking may be carried out in the language of the country of use.

The protective system or equipment has also to carry the marking normally stipulated by its construction standards.

ROUTINE EXAMINATIONS AND TESTS

- None

(16) DESCRIPTIVE DOCUMENTS

The descriptive documents quoted hereafter constitute the technical documentation of the equipment, subject of this certificate.

- Descriptive notice (14 rubrics) rev.1 dated on 2008.10.01
- Instructions note (36 pages) dated on 2008.12.03

These documents were signed on 03 december 2008

(17) SPECIAL CONDITIONS FOR SAFE USE

- The limit switch type MS40 must be connected to a voltage source of a certified type for use in explosive atmosphere from IIC, IIB or IIA group and its output circuit approved as being as intrinsically safe.
The output characteristics of this voltage source must be inferior or equals to the input characteristics defined in paragraph 15.
- The materials compositions are not in accordance with the standard EN 60079-0, the user will have to read the instructions.

The other conditions are stipulated in the instructions.

(18) ESSENTIAL SAFETY AND HEALTH REQUIREMENTS

The observance of the Essential Health and Safety Requirements is ensured by:

- Conformity to the standards quoted in clause (9).
- All provisions adopted by the manufacturer and defined in the descriptive documents.

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Figure 9-6 ATEX certificate for the MS40 limit switch, page 4 of 4

I
ADDITION
(3) INERIS 08ATEX0045X/01
(4) LIMIT SWITCH TYPE TYPE MS40 .F40..1.. * *Dots are replaced by figures defining the mechanical apparatus variant
(5) Made by KROHNE S.A.S
(15) <u>PURPOSE OF THE ADDITION</u>
<ul style="list-style-type: none"> - Application of EN 60079-0 :2012 + A11 :2013 , EN 60079-11 :2012 and EN 60079 26 :2015 standards. - Possible using of the apparatus in dust explosive atmosphere from IIIC group. - Updating of descriptive documents.
<u>PARAMETERS RELATING TO THE SAFETY</u>
The parameters relating to the safety are unchanged.
<u>MARKING</u>
The marking is modified as follows:
KROHNE S.A.S F - 26103 ROMANS SUR ISERE MS40 .F40..1..* INERIS 08ATEX0045X (Serial number) (Year of construction)
 II 1 GD
Ex ia IIC T4...T6 Ga**
Ex ia IIIC T135°C...T85°C Da**
WARNING - POTENTIAL DANGER OF ELECTROSTATICS CHARGES - SEE INSTRUCTIONS
*Dots are replaced by figures defining the mechanical apparatus variant
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Figure 9-7 Addition No 0 to the ATEX certificate for the MS40 limit switch, page 1 of 2

Addition No 0 to the EC-type examination certificate INERIS 08ATEX0045X

** Temperature class of the apparatus depends on ambient temperature according to the limitation defined below:

Temperature classification of MS40		Ambient temperature	
		MS40 .F40..1.B	MS40 .F40..1.1
Gas	Dust		
T6	T85°C	-40°C to +70°C	-40°C to +80°C
T5	T100°C	-40°C to +85°C	-40°C to +95°C
T4	T135°C	-40°C to +120°C	-40°C to +130°C

Marking may be carried out in the language of the country of use.

The protective system or equipment has also to carry the marking normally stipulated by its construction standards.

ROUTINE EXAMINATIONS AND TESTS

The routine examinations and tests are unchanged.

(16) DESCRIPTIVE DOCUMENTS

The descriptive documents quoted hereafter constitute the technical documentation describing the modification of the equipment, subject of this present addition.

- Certification file revision 2 dated on 2015.12
- Instructions dated on 2015.11

These documents were signed on 2015.12.16

(17) SPECIAL CONDITIONS FOR SAFE USE

The special conditions for safe use are unchanged.

(18) ESSENTIAL SAFETY AND HEALTH REQUIREMENTS

The respect of the Essential Health and Safety Requirements is modified as follows:

- Conformity to the standards quoted in clause (15).
- All provisions adopted by the manufacturer and defined in the descriptive documents.



Verneuil-en-Halatte, 2016.03.04

Thierry HOUËIX
Délégué Certification ATEX
Ex Certification Officer

Thierry Houeix
The Chief Executive Officer of INERIS
By delegation

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Figure 9-8 Addition No 0 to the ATEX certificate for the MS40 limit switch, page 2 of 2



KROHNE – Process instrumentation and measurement solutions

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www.krohne.com

