



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services

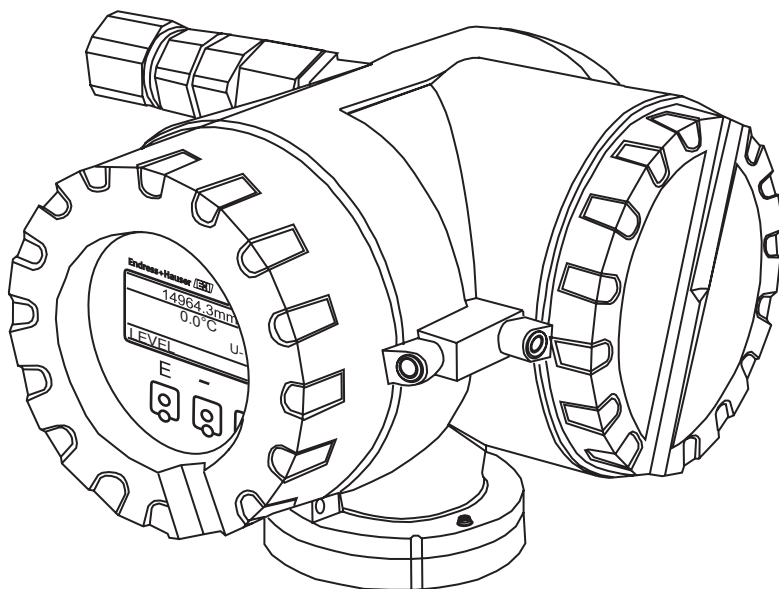


Solutions

Operating Instructions

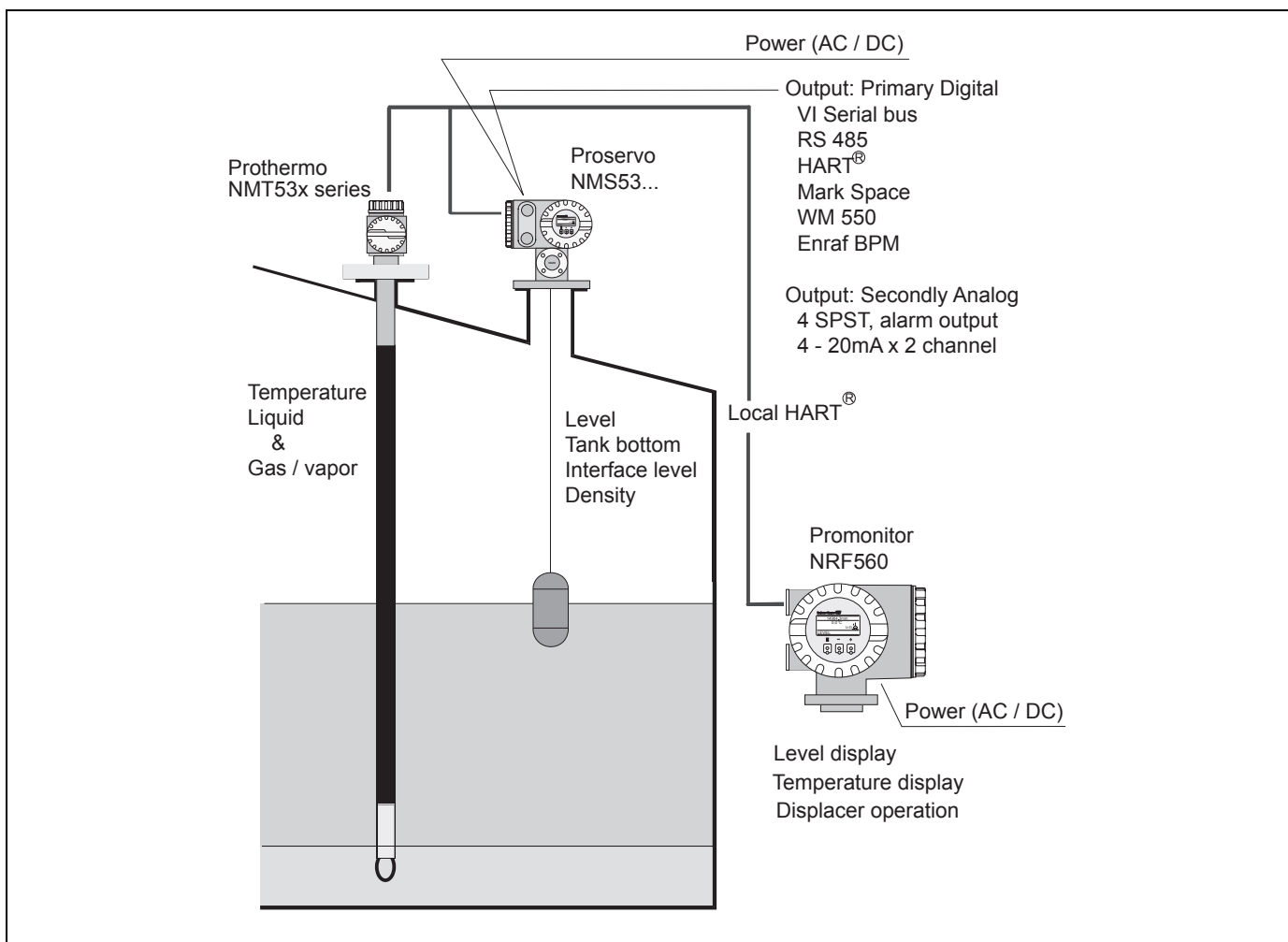
Promonitor NRF560

Tank side Monitor



Basic device layout of the Promonitor NRF560

Promonitor NRF560 with Proservo NMS5/7 configuration



Promonitor NRF560 is a monitoring unit for use with the Proservo series of tank gauges.

Mounted at the tank side or up to 1200 meters away (local HART connection).

Promonitor provides indication of measured level, temperature data and operating status, and can send operating commands to the Proservo NMS 5 from a convenient location.

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1 Safety instructions

1.1 Designated use

The PromonitorNRF 560 is a tank side monitor and control station for the Proservo NMS5 of intelligent tank gauges.

The Promonitor NRF560 is a simple low-cost tank site monitor for displaying interface level, tank bottom level, and temperature. Additionally, the Proservo NMS5 can be operated to measure the level, interface level, bottom level, or to hoist the displacer. The tank gauge is operated by three visual operating elements (itouch control). For the transmission between the Proservo NMS5 and the Promonitor NRF560, a two-wire HART protocol is utilized

1.2 Installation, commissioning and operation

- Mounting, electrical installation, start-up and maintenance of the instrument may only be carried out by trained personnel authorized by the operator of the facility.
- Personnel must absolutely and without fail read and understand this Operating Manual before carrying out its instructions.
- The instrument may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed without fail.
- The installer must make sure that the measuring system is correctly wired according to the wiring diagrams. The measuring system is to be grounded.
- Please observe all provisions valid for your country and pertaining to the opening and repairing of electrical devices.

1.3 Product Requirements

Power source

Check the voltage of the power supply before connecting it to the product. It should be the exact voltage required for proper operation of the product.

Use in hazardous areas

When using the product in the first or second-class hazard location (Zone 1 or Zone 2) be sure to use an intrinsically safe or pressure and explosion-proof apparatus. Take the utmost care during the installation, wiring, and piping of such apparatus to ensure the safety of the system. For safety reasons, maintenance or repairs on the product while it is being used with such apparatus should only be performed by qualified personnel.

External connection

When an external connection is required, the product should be protectively grounded before it is connected to a measurement object or an external control circuit.

1.4 Operational safety

Hazardous area

Measuring systems for use in hazardous environments are accompanied by separate "Ex documentation", which is an integral part of this Operating Instructions. Strict compliance with the installation instructions and ratings as stated in this supplementary documentation is mandatory.

- Please use the explosion-proof type for measurement in explosion-hazardous areas.
- Instruments used in explosion hazardous areas should be mounted and wired according to the explosion-proof regulations.

- Instruments mounted in explosion hazardous areas must not be opened when the power is on. Tighten the cable gland firmly.
- The maintenance and repair of the instrument is limited to fulfill the explosion proof regulations.
- Ensure that all personnel are suitably qualified.
- Observe the specifications in the certificate as well as national and local regulations.

Power supply

Check that voltage and frequency of the local power supply are in the range of the technical data of the instrument before turning on the power. Please refer to Sect. 11.

Grounding

- Do not remove the grounding of the instrument when the power supply is turned on. This may set the instrument in a dangerous condition.

Wiring



Make sure of the grounding of the instrument before connecting input and output to another system.

Caution!



Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.5 Return

The following procedures must be carried out before the instruments is sent to Endress+Hauser for repair:

- Always enclose a duly completed "Declaration of Contamination" form. Only then can Endress +Hauser transport, examine and repair a returned device.
- Enclose special handling instructions if necessary, for example, safety data sheet as per EN 91/155/EEC.
- Remove all residue which may be present. Pay special attention to the gasket grooves and crevices where fluid may be present. This is especially important if the fluid is dangerous to health, e.g. corrosive, poisonous, carcinogenic, radioactive, etc.

A copy of the "**Declaration of Contamination**" is included at the end of this operating manual.

Caution!



- No instrument should be sent back for repair without all dangerous material being completely removed first, e.g. in scratches or diffused through plastic.
- Incomplete cleaning of the instrument may result in waste disposal or cause harm to personnel (burns, etc.). Any costs arising from this will be charged to the operator of the instrument.

1.6 Disposal

In case of disposal, please separate the different components according to their material consistency.

1.7 Software history

Software version / Date	Software changes	Documentation changes
V.1.82 / 09.1997	Original software -	
V.1.92 / 09.2002	Add density profile operation	BA003N/08/en/11.04
V 1.94 / 01.2005	Change graphic LCD	BA1003N/08/en/08.06

1.8 Notes on safety conventions and symbols

In order to highlight safety-relevant or alternative operating procedures in the manual, the following conventions have been used, each indicated by a corresponding symbol in the margin.

Safety conventions	
	Warning! A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument
	Caution! Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instrument
	Note! A note highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned
Explosion protection	
	Device certified for use in explosion hazardous area If the device has this symbol embossed on its name plate, it can be installed in an explosion hazardous area
	Explosion hazardous areas Symbol used in drawings to indicate explosion hazardous areas. – Devices located in and wiring entering areas with the designation “explosion hazardous areas” must conform with the stated type of protection
	Safe area (non-explosion hazardous area) Symbol used in drawings to indicate, if necessary, non-explosion hazardous areas. – Devices located in safe areas still require a certificate if their outputs run into explosion hazardous areas
Explosion protection	
	Direct voltage A terminal to which or from which a direct current or voltage may be applied or supplied
	Alternating voltage A terminal to which or from which an alternating (sine-wave) current or voltage may be applied or supplied
	Grounded terminal A grounded terminal, which as far as the operator is concerned, is already grounded by means of an earth grounding system
	Protective grounding (earth) terminal A terminal which must be connected to earth ground prior to making any other connection to the equipment
	Equipotential connection (earth bonding) A connection made to the plant grounding system which may be of type e.g. neutral star or equipotential line according to national or company practice

2 Identification

2.1 Device designation

2.1.1 Nameplate

The following technical data are given on the instrument nameplate:

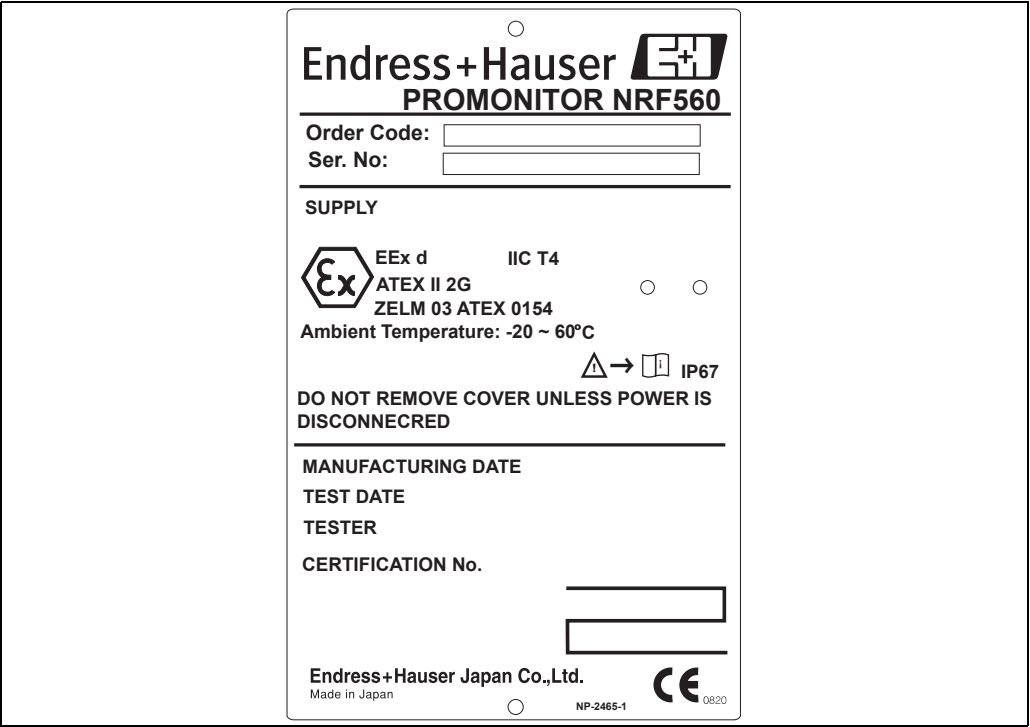


Fig 1: ATEX Approval Type EEx d

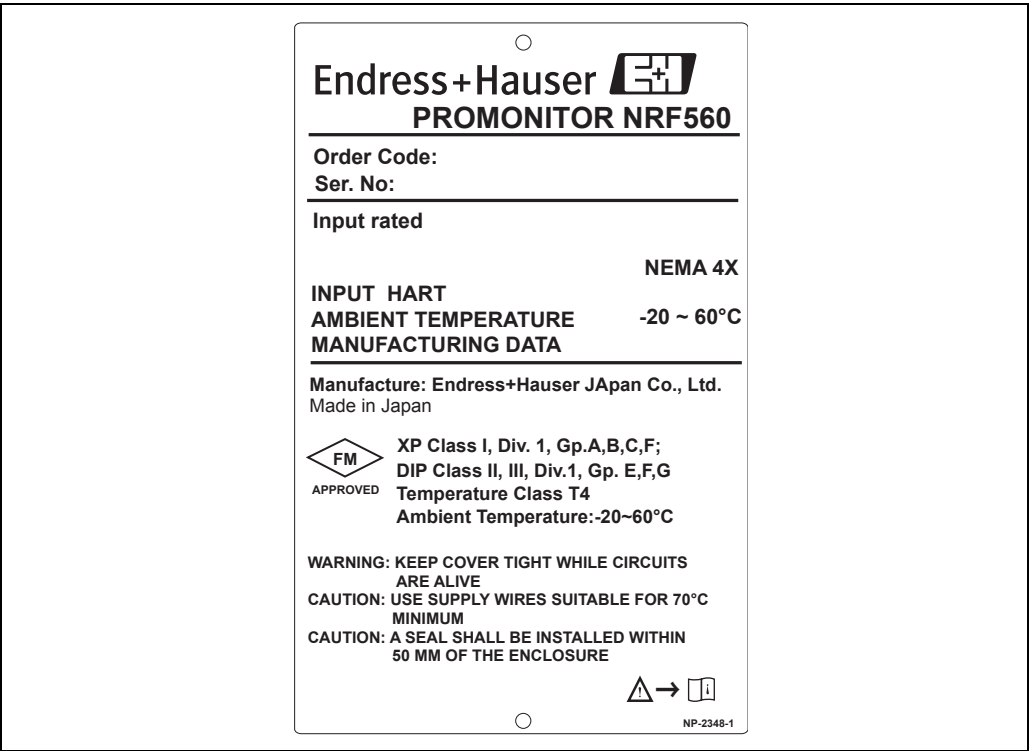


Fig 2: FM Approval

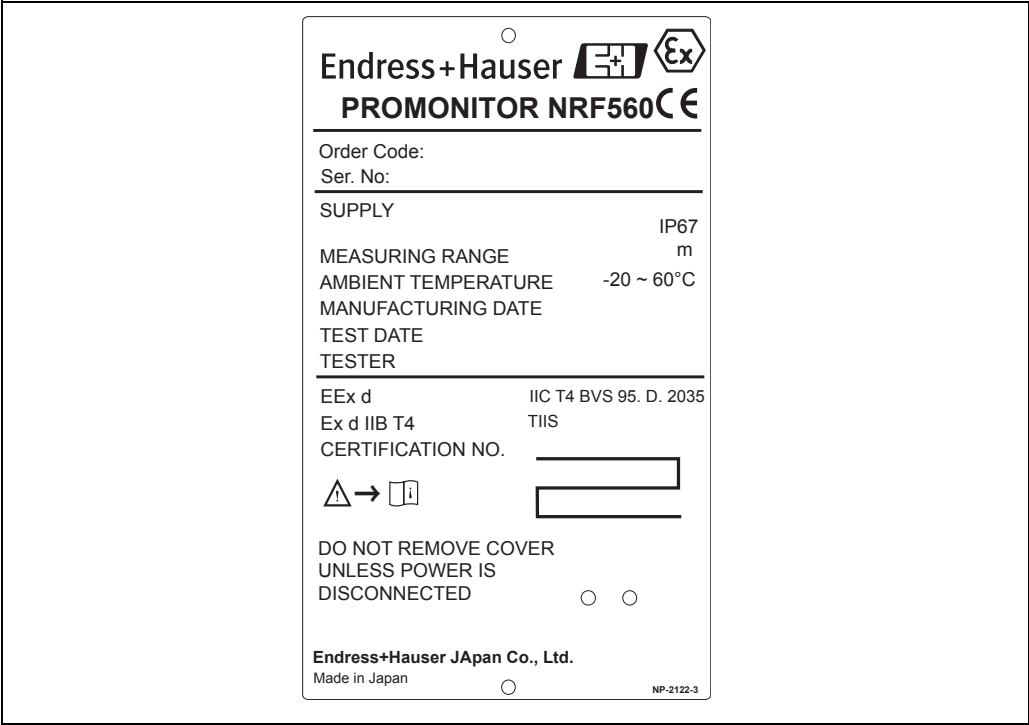


Fig 3: TIIS Approval

2.2 Product structure

2.2.1 Promonitor NRF560

[illegible]

2.3 Scope of delivery

- Instrument according to the version ordered
- Accessories (as ordered)

2.4 Supplied documentation

Document	Designation	Content/Remarks
BA 1003N	Operating manual	describes installation, commissioning operating and maintenance of the Promonitor NRF560.
XA 003N	Safety Instructions	only for instrument versions approved for use in explosion hazardous areas; the nameplate specifies, which of these documents is relevant for your instrument version

2.5 CE marks, declaration of conformity

The instrument is designed to meet state-of-the-art safety requirements, has been tested and left the factory in a condition in which it is safe to operate. The instrument complies with the applicable

standards and regulations in accordance with EN 50014 "Electrical apparatus for potentially explosive atmospheres-General requirements". The instrument described in this manual thus complies with the statutory requirements of the EG directives. Endress+Hauser confirms the successful testing of the instrument by affixing to it the CE mark.

2.6 Registered trademarks

HART®

Registered trademark of HART Communication Foundation, Austin, USA

3 Mounting

3.1 Incoming acceptance, transport, storage

3.1.1 Incoming acceptance

Check the packing and contents for any signs of damage.

Check the shipment, make sure nothing is missing and that the scope of supply matches your order.

3.1.2 Transport

Caution!



Follow the safety instructions and transport conditions for instruments of more than 18 kg. Do not lift the measuring instrument by its housing in order to transport it.

3.1.3 Storage

Pack the measuring instrument so that is protected against impacts for storage and transport. The original packing material provides the optimum protection for this. The permissible storage temperature $-20 \sim +60^{\circ}\text{C}$ ($-4 \sim 140^{\circ}\text{F}$).

3.2 Installation Condition

3.2.1 Dimensions

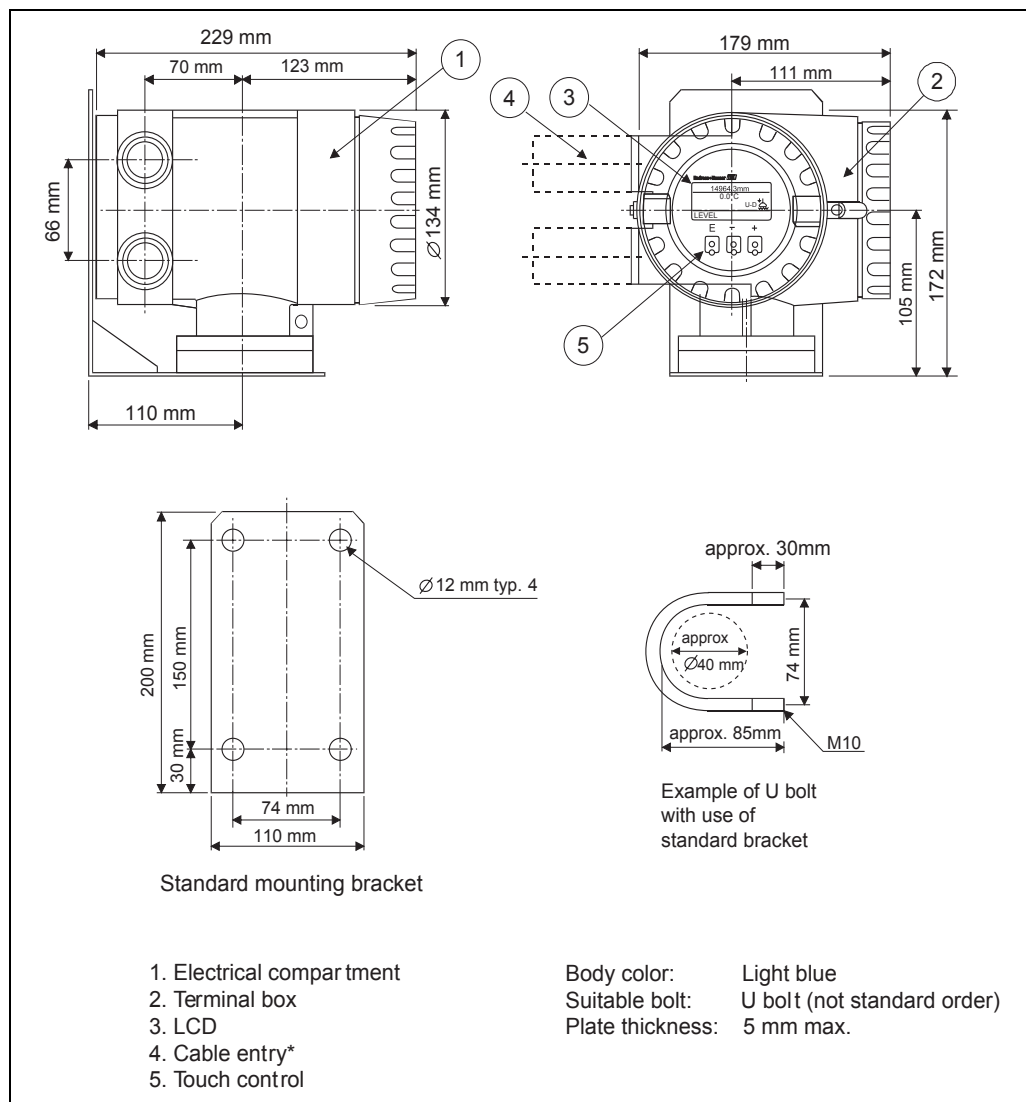


Fig.4: NRF560 dimension



Note!

For Ex d IIB T4 IIIS explosion-proof, the same class of cable gland is standard.
 For EExd IIC T4 CENELEC, EEx d IIC T4 ATEX explosion-proof, however, cable gland will not be supplied.



Caution!

Although the Promonitor NRF 560 is certified for use in explosion hazardous areas, the following guidelines should be followed:

- Keep the unit (Promonitor NRF 560) clean and be careful not to damage
- Tighten the bolts.
- Use a cable of the required size for wiring.
- Use the appropriate cable gland and tighten it firmly.



Warning!

For the mounting of the Promonitor NRF 560, make sure that the ambient temperature does not exceed the limit.

3.3 Types of Mounting

The following installation procedures are available for the Promonitor NRF560 with standard mounting bracket:

Mounting on the wall (see Fig. 5)

Mounting on a 2" (50mm) pipe (see Fig. 7.)

It is also possible to mount the Promonitor NRF 560 in a similar way without mounting bracket. When attaching and bending the flexible tube, the radius of curvature must be at least 300 mm (11.8") at any bend portion.

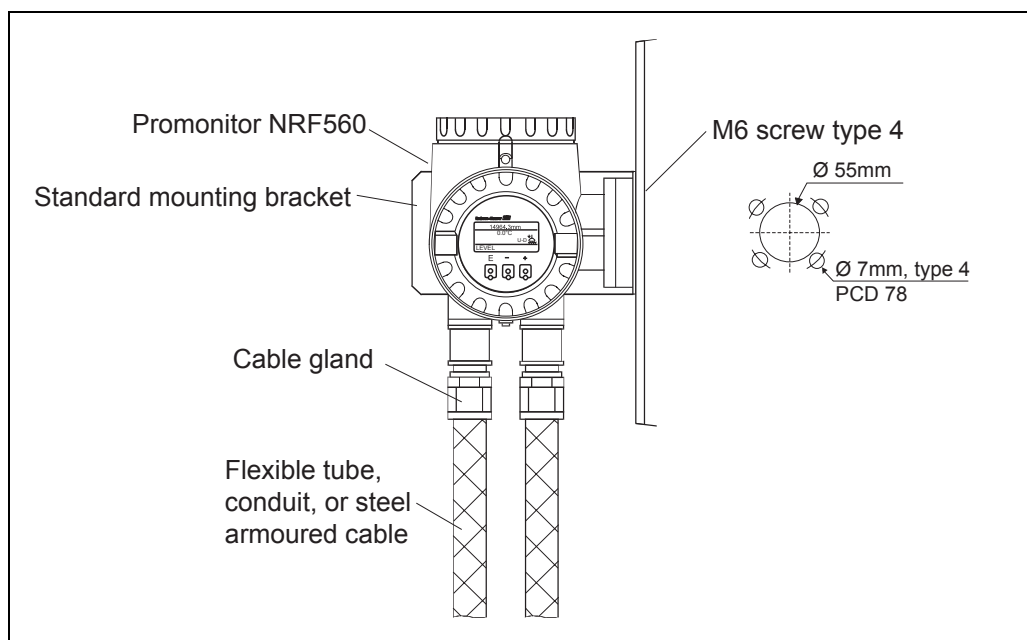


Fig.5: Mounting on the wall



Note!

After removal of the cover, the display and operating elements of the Promonitor NRF560 can be engaged in steps of 90° (see Fig.6).

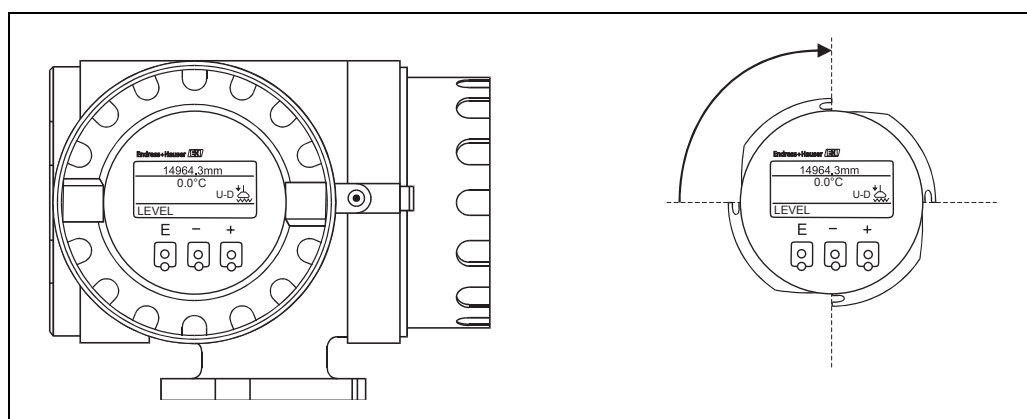


Fig.6: Engaging the display and operating elements

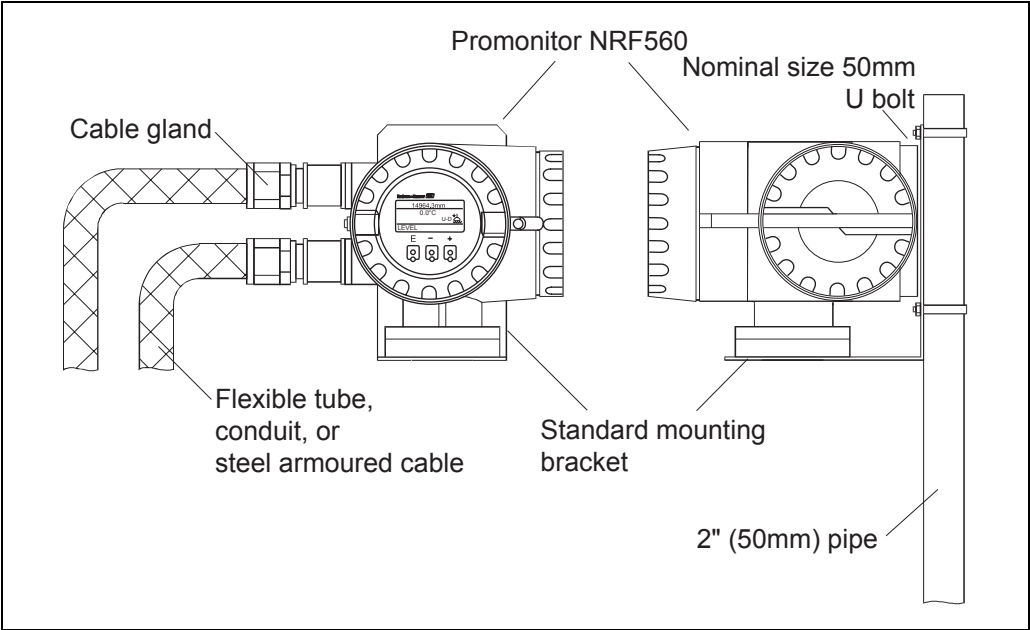


Fig.7: Mounting on a 2" (50mm) pipe

4 Wiring



Warning!

Shut off the power supply before mounting the Promonitor NRF560 or changing a wire. Check that voltage and frequency of the local power supply tally with the data written on the name plate of the Promonitor NRF560. Inspect the grounding of the Promonitor NRF560 before turning the power on.

4.1 Connection Procedure

The electrical connection of the Promonitor NRF560 is shown in Fig.8.

Check that the power supply of the Promonitor is turned off.

Insert AC power supply and signal cable from each side of the cable entries. Establish a grounding for the signal cable screen.

Connect cables to each terminal. We recommend a crimped connection.

After completing all electric connections, screw the terminal cover and hook its lock (shroud).

During the installation take care of mounting the conductor in such a way that selfloosening and corrosive effects will be prevented.

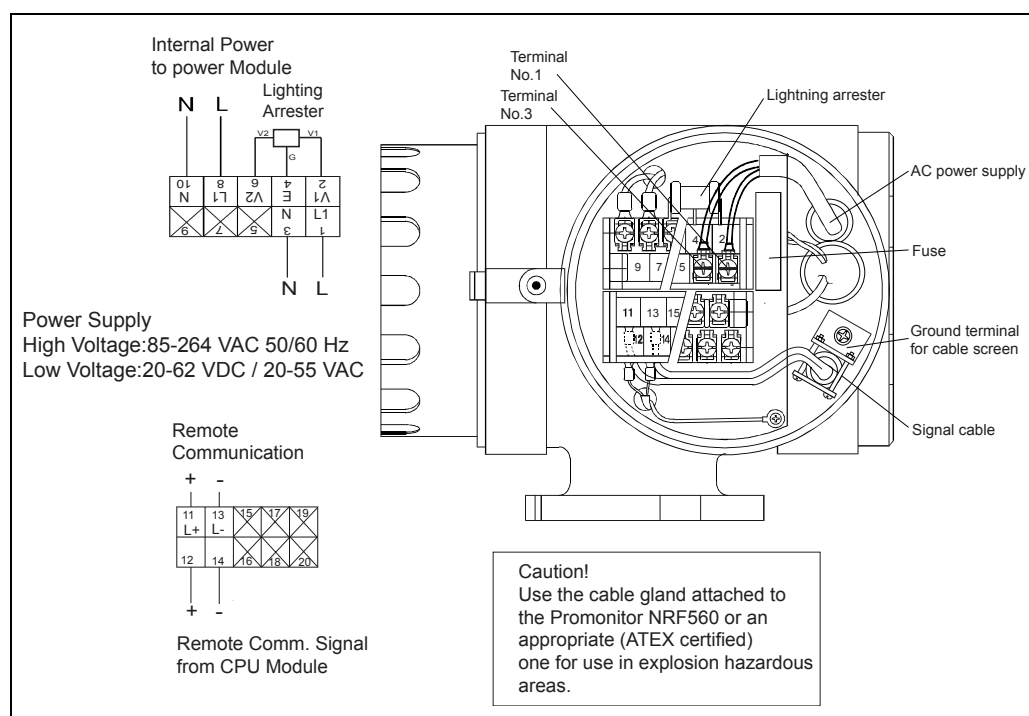


Fig.8 :Electrical connection of the Promonitor NRF560

4.2 Input

The local HART® communications allow establishing a data connection to and from the Proservo NMS5.



Warning!

The input cable must be shield and thicker than 24 A.W.G. (diameter of 0.51), or use a steel-armored cable designed for measurement equipment. For local HART® communications cable, use a shielded twisted-paired cable.

The number of cable cores is 2C for power supply, and 1P for local HART® communications.

4.3 Cable Gland

The Exd IIB T4 TIIIS explosion-proof cable is delivered with cable glands.



Warning!

If not all the cable entries (inlets) are needed, remove the unnecessary cable glands and plug the openings.

5 Operation

5.1 Display and Operating Elements

5.1.1 Display

The Promonitor NRF560 has an illuminated LCD that consists of 4 lines with 128 x 64 (pixels). During normal operation, it shows the level, the temperature, and the status of the device on the "HOME" position. For the display of the other data and the programming of the parameters for operation, the Promonitor NRF560 uses a convenient programming matrix.

5.1.2 Operating elements

The Promonitor NRF560 is operated by three visual operating elements, namely the keys "E", "-", and "+". They are activated when the appropriate field on the protective glass of the display is touched with the finger ("touch control"). The software and hardware installed in the Promonitor NRF560 rule out any malfunction that may be caused in this way. Even in explosion hazardous areas, the explosion-proof housing of the touch control ensures safe access to the data.

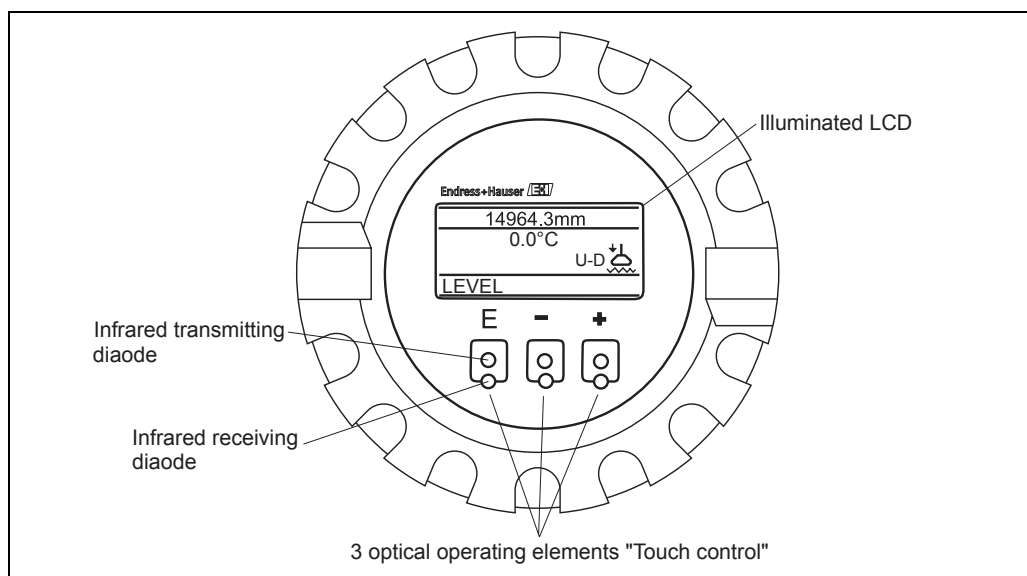


Fig.9:Display

5.2 Functions of the operating Elements

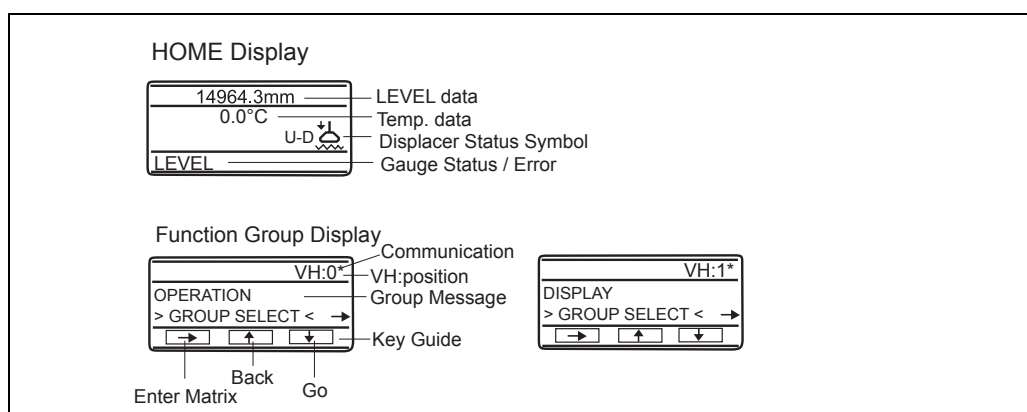


Fig.10: Display

Key	Function
E	■ Access to the programming matrix (touching the key for more than 3 s) ■ Return to the HOME position (touching the key for more than 3 s) ■ Moving horizontally within a function group to select functions ■ Saving parameters or access code
- +	■ Moving vertically to select function groups ■ Selecting or setting parameters ■ Setting access code

Note!
The LCD will return to the HOME position if no key is touched for more than 10 min. Digits are incremented or decremented by "+" or "-", respectively. If you touch "+" or "-" continuously, then the minimum digit will change first. After one cycle of the minimum, the second minimum will change. After one cycle of the second follows the third minimum, and so on. If you take off your finger from the touch control, then the procedure will start again from the minimum digit (Analogy of mechanical counter).

5.3 Programming Matrix

From the Promonitor NRF560, you can operate the Proservo NMS5.
The following Proservo NMS5 operations are available from the Promonitor NRF560:

- Level measurement
- Displacer hoist
- Interface level measurement
- Tank bottom measurement

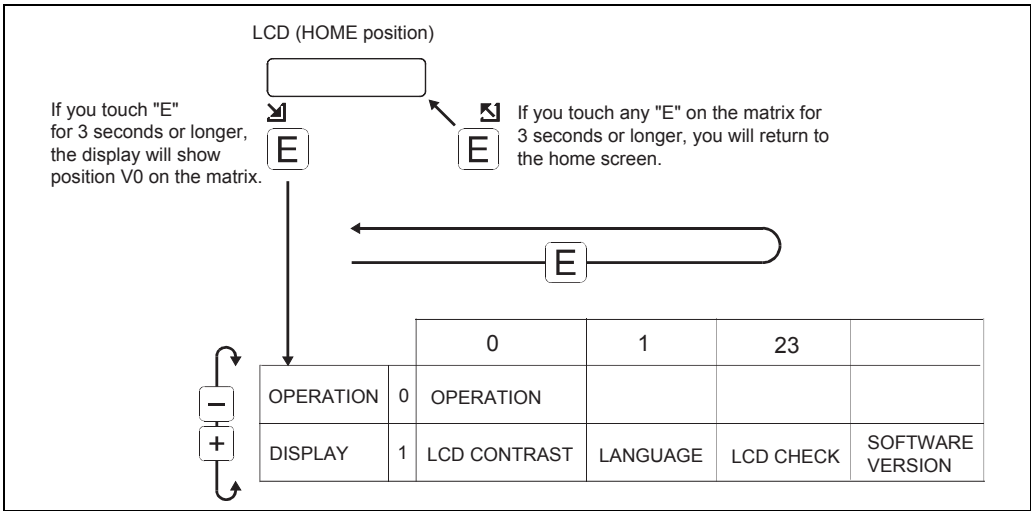


Fig.11:Selecting functions within the programming matrix

Caution!
Promonitor NRF560 access code is 50 only.

5.4 Access Code Setting

The access code is to ensure the confidentiality of the set up data. Two security levels are available, along with access codes.

Promonitor NRF560 Access Code

Security level		Access code
0	-	none
1	For Operator	50
	For Engineer	

Proservo NMS5 Access Code

Security level		Access code
0	-	none
1	For Operator	50
2	For Engineer	51

Caution!



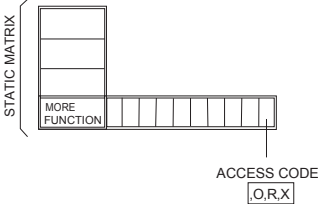
An access no. included all the functions of any access no. of lesser value. Selecting code 51 means selecting code 50 as well: functions the selection of 50 offers are also available. Inversely, if you select code 50, the available functions are limited.

5.5 Setting for Promonitor NRF560 Connections

The following settings are required at Proservo NMS5, in order to display Promonitor NRF560 data on Proservo NMS5 screens.

Item	Procedure	Remarks
MATRIX GROUP: SERVICE	1) In the static matrix "Switch and error/alarm", select GOV3H9 "ACCESS CODE." 2) The default value is "0". Keep touching "+" until you get to "50" or "51". 3) The first digit increases to 9, then the second digit increases. Stop touching "+" once you reach "50". 4) "50" is blinking. Gently touch "+" again to increase the second digit from 0 to 1. Now you have 51. 5) Here touch "E"; "EDITING ENABLED" will be displayed.	Note: 1. When you touch "E" while displaying an access code 0,50, or 51 "EDITING LOCKED" will appear. 2. If an access code has not been selected before performing any setting, the screen will automatically change to show "EDITING ENABLED." Select "50" or "51", according to the matrix table.

5.6 How to Select an Access Code

Item	Procedure	Remarks
STATIC MATRIX 	1) In the static matrix "Switch and error/alarm", select G0V3H9 "ACCESS CODE." 2) The default value is "0". Keep touching "+" until you get to "50" or "51". 3) The first digit increases to 9, then the second digit increases. Stop touching "+" once you reach "50". 4)"50" is blinking. Gently touch "+" again to increase the second digit from 0 to 1. Now you have 51. 5) Here touch "E"; "EDITING ENABLED" will be displayed.	Note: 1. When you touch "E" while displaying an access code 0,50, or 51,"EDITING LOCKED" will appear. 2. If an access code has not been selected before performing any setting, the screen will automatically change to show "EDITING ENABLED." Select "50" or "51", according to the matrix table.

5.7 HOME Position

After turning on the power supply, the LCD first shows the current data on the HOME position.

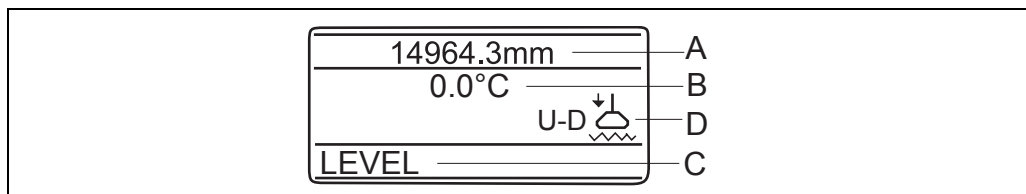


Fig.12: HOME position

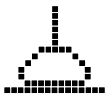
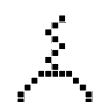
The letters A, B, and C stand for the areas where information on measured values and status of the device is displayed:

Area	Information
A	Current level
B	Current temperature
C	Gauge sign
D	Displacer status

The meanings of gauge status and displacer status are explained in the following tables.

Gauge status	Meaning
G - RE	The displacer is resting at the reference position.
UP	The UP command has been given.
STOP	The STOP command has been given.
LIQU	The Proservo NMS5/7 is measuring the surface level.
U - IF	The Proservo NMS5/7 is measuring the upper interface level.
LIF	The Proservo NMS5/7 is measuring the lower interface level.
BOTM	The Proservo NMS5/7 is measuring the tank bottom level.
U - DE	The Proservo NMS5/7 is measuring the upper liquid density.
M - DE	The Proservo NMS5/7 is measuring the middle liquid density.
B - DE	The Proservo NMS5/7 is measuring the bottom liquid density.
CAN	The RELE.OVER TENS command has been given.
TEAC	The Proservo NMS5/7 is carrying out calibration.
blank	The Proservo NMS5/7 cannot detect any level.

The definition of the each Displacer status is as follows:

Displacer status	Symbol	Meaning
BAL		Balance The displacer is resting on the liquid surface or interface and in balanced status.
T - B		Temporary Balance Automatic weight calibration is being carried out.
U - U		Unbalance Up The displacer is being hoisted and in unbalanced status.
U - D		Unbalance Down The displacer is being lowered and in unbalanced status.
R - U		Balance Up The displacer is being hoisted and in correction of balance.
R - D		Balance down The displacer is being lowered and in correction of balance.
LOW		The displacer is resting at the lower stop.

6 Promonitor NRF560 Programming Matrix

The Programming Matrix is a table in which messages appearing in the NRF560’s LCD screen are listed. When access code 50 is selected all the matrix functions are available. In the table, H stands for horizontal (row), and V for vertical (column).

Display Text Parameters, unit, etc

Mode (Code)

NRF560 Programming Matrix (Static Matrix)											
GROUP MESSAGE	H \ V	0	1	2	3	4	5	6	7	8	9
Operation	0	Operation									
Display		Display (50)									
	1	LCD CONTRAST	LANGUAGE	LCD CHECK	SOFTWARE VERSION						ACCESS CODE
		Display (50)	Select (50)	Select (50)	Display (50)						Set (50)
	2										
	3										

6.1 Description of the Programming Matrix

Matrix group	Function group	Item	Access code	Short description	Default value	Set Select Display	Possible settings, selection, or display	Index No, GVH
STATIC MATRIX (This word is not shown)	OPERATION	OPERATION	50	Selection of an operation of the Proservo NMS5's displacer; you may select an option from those listed in the column of "possible settings, selections, or displays" on the right hand side of this table, and store the selection by pressing "E" (Enter)	LEVEL	Select	LEVEL UP STOP BOTTOM LEVEL MIDD. INTERF. LEVEL UPPER DENSITY MIDDLE DENSITY DENSITY BOTTOM REPEATABILITY WATER DIP	000
		LCD CONTRAST	50	Varies the display contrast in 16 steps	Phase 16	Set	(The contrast can be adjusted with the "+", "-", "keys)	010
	Display	LANGUAGE	50	Checks if the LCD display is in good order.	English	Select	English Japanese Chinese	011
		LCD CHECK	50	Checks if the LCD display is in good order; if it is, it blackens for 3 seconds when selecting ON, and whitens for the same length of time when selecting OFF.	OFF	Select	ON OFF	012
		SOFTWARE VERSION	50	Shows the Promonitor NRF560's control software version.	V.1.94	Display		013
		ACCESS CODE	50	Set access code to view and change to matrix data.	0	Set	0, 50	019

7 Proservo NMS5 Programming Matrix

This section shows the programming matrix of the Proservo NMS5 (Necessary for Promonitor NRF560 only). Each matrix group appears on a separate page. The functions are described in the following way:

NMS5 Programming Matrix (Static Matrix)											Default Data Display Text Parameters, unit, etc Mode (Code)
GROUP MESSAGE	H V	0	1	2	3	4	5	6	7	8	9
MEASURED VALUE 1	0	16000.00mm MEASURED LEVEL Display	0.0 mm ULLAGE LEVEL Display	0.0 mm UPPER INTERF. LEV. Display	0.0 mm MIDD. INTERF. LEV. Display	0.0 mm BOTTOM LEVEL Display	1.000 g/ml UPPER DENSITY 0.000 - 3.000 Display/Set (50)	1.000 g/ml MIDDLE DENSITY 0.000 - 3.000 Display/Set (50)	1.000 g/ml DENSITY BOTTOM 0.000 - 3.000 Display/Set (50)	0.0 mm LEVEL DATA Display	
MEASURED VALUE 2	1	0.0°C LIQUID TEMP. Display	DEV(1) Display	DEV(2) Display	0.0°C GAS TEMPERATURE Display	0.0 mm WATER BOTTOM Display			0 mm ZERO POINT Display	16000.0 mm SPAN Display	mm LENGTH UNIT Display
OPERATION	2	STOP OPERATION 16000 See operation commands below Select (50)	STOP OPERATING STATUS See status table below Display	UNBALANCED BALANCING STATUS Display		LEVEL OPERAT.BY NRF Display	LEVEL OPERAT. BY HOST Display		0 DEVICE ID Display	8424 SOFTWARE VERSION Display	
MORE FUNCTION	3	CALIBRATION MATRIX OF 0-8 Select			98 627 8:21:00 CALENDER Current data Display	NO ALARM ALARM CONTACT 0 Current data Display	NO ALARM LA 0 0 0 Current data Display	NO ERROR DIAGNOSTIC CO 0 Current data Display	MPU:START ACT 98 627 752 0 0 Current data Display	OFF RESET ALM. DIAGNO. Current data Display	0 ACCESS CODE 0, 50, 51, 777 Set

NMS5 Programming Matrix (Dynamic Matrix, Service: G3)

GROUP MESSAGE	H V	0	1	2	3	4	5	6	7	8	9
MEAS. WIRE & DRUM	4	300.00 mm WIRE DRUM CIRC. 0 - 999.9 Set (51)	1.4g / 10m WIRE WEIGHT 0 - 999.9 Set (51)	255.0 g DISPLACER WEIGH 0 - 999.9 Set (51)	145.0 ml DISPLACER VOLUME 0 - 999.9 Set (51)	60 ml BALANCE VOLUME 0 - 999.9 Set (51)	1.0 ml VOLUME TOLERANCE 0 - 99.9 Set (51)		20 X 100 mS DELAY 0 - 99 Set (51)	0.00 mm/m DRUM CORRECTION 0 - 99.00 Set (51)	0 count DISPL. HUNT.COUNT 0 - 99 Set (51)
GAUGE DATA	5			OFF NON HYSTER. MODE ON Select (51)	OFF HLACCURACY MODE ON Select (51)	0 s HL. ACCR. OFE. TIME 0 - 600 Set (51)	50 mm HL. ACC. DISP. UP 0 - 300 Set (51)	999 °C GAUGE TEMP. Display (51)			
SYSTEM DATA	6	LOCAL : MASTER SENSOR DATA REMOTED COM. ON SOFTWARE = 04.24 HARDWARE = TCB 04 GEAR 1:36 NOT OVERSPILL	OFF CONNECTION NRF CONTACT 1 CONTACT 2 Select (51)	OFF CONNECTION NMT SPOT TEMP. AVERAGE TEMP. Select (51)						IF_LEVEL SELECT UP, IF LEVEL WATER BOTTOM WATER BOTTOM 2 Select (51)	OFF SOFT RESET Select (51)
SERVICE	7	0.0 g MEASURED WEIGHT Display Sa=21000 : A=21000 Sb=11000 : B=11000	OFF RELE. OVER TENS ON Select (51)	OFF DRUM SETTING ON Select (51)	OFF WEIGHT CALIBR. ON Select (51)					70 mm DISPL. REFERENCE Set (51)	0.0 g ZERO ADJ. WEIGHT Set (51)
SENSOR VALUE	8										
SENSOR DATA	9					0 WT. COUNT CAL A Display (51)	0 WT. COUNT CAL B Display (51)				

8 Maintenance and repairs

8.1 Exterior cleaning

When cleaning the exterior, always use cleaning agents that do not attack the surface of the housing and the seals.

8.2 Replacing seals

The seals of the sensors must be replaced periodically, particularly if molded seals (aseptic construction) are used. The period between changes depends on the frequency of cleaning and on the temperature of the measured substance and the cleaning temperature.

8.3 Repairs

The Endress+Hauser repair concept assumes that the measuring devices have a modular design and that customers are able to undertake repairs themselves.

Spare parts are contained in suitable kits. They contain the related replacement instructions.

All the spare parts kits which you can order from Endress+Hauser for repairs are listed with their order numbers in the section "Spare parts".

For more information on service and spare parts, contact the Service Department at Endress+Hauser.

8.4 Repairs to Ex-approved devices

When carrying out repairs to Ex-approved devices, please note the following:

- Repairs to Ex-approved devices may only be carried out by trained personnel or by Endress+Hauser Service
- Comply with the prevailing standards, national Ex-area regulations, safety instructions (XA) and certificates.
- Only use original spare parts from endress+Hauser.
- When ordering a spare part, please note the device designation on the nameplate. Only replace parts with identical parts.
- Carry out repairs according to the instructions. On completion of repairs, carry out the specified routine test on the device.
- Only Endress+Hauser Service may convert a certified device into a different certified variant.

9 Troubleshooting

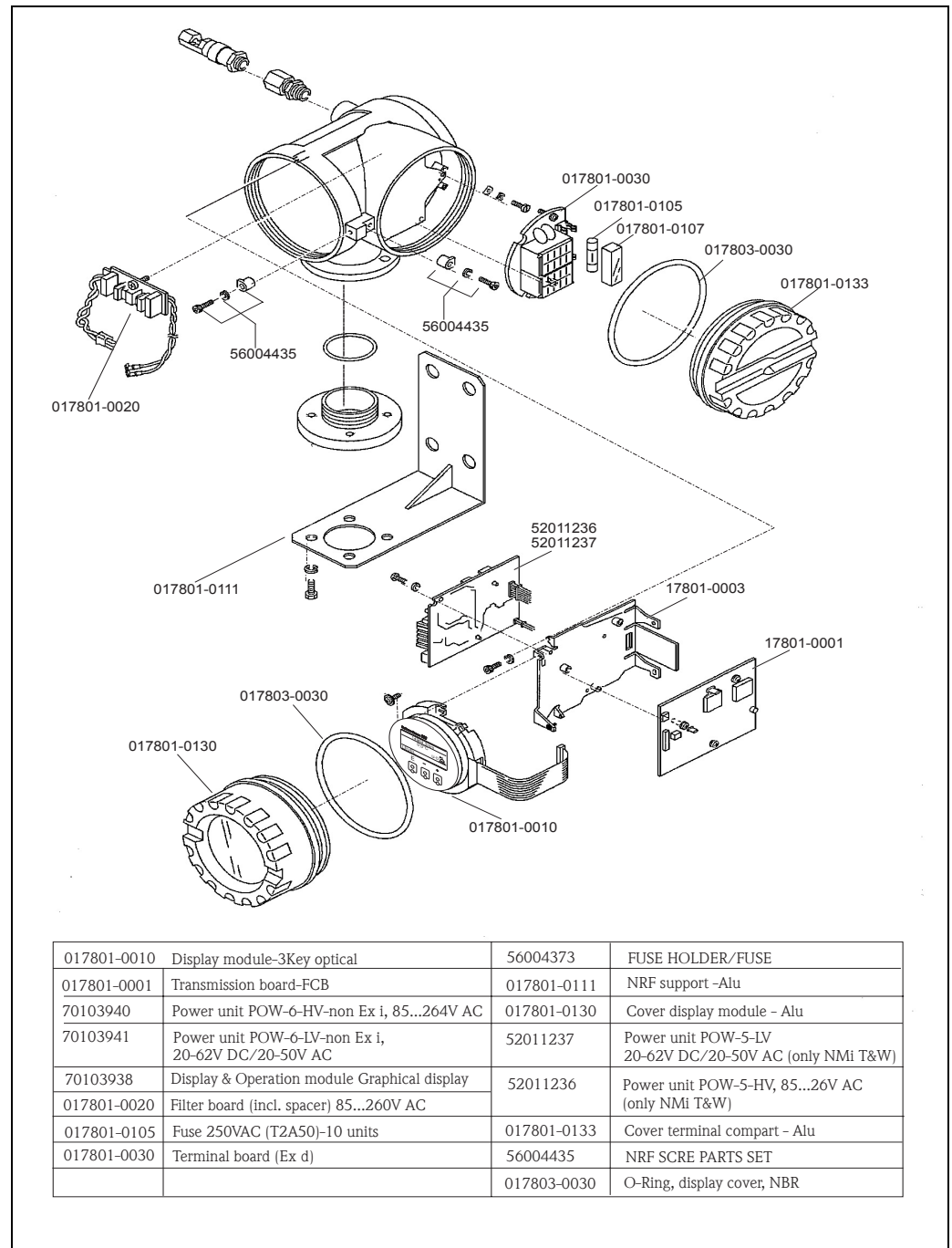
If an error occurs in the Proservo NMS5, or the Promonitor NRF560, your current matrix and error message will blink alternately in the Promonitor NRF560's LDC screen.

Controls relevant to the display are operative even while an error message is displayed.

Message	Cause	Remedy
NMS COMM ERR	No communication with the HART [®] device.	Check the connection and setting of the Proservo NMS5 to the Promonitor NRF560
LOCAL ERROR: NMT	No communication with the Promonitor NRF560, Prothermo NMT535/6 series.	Check the connection and setting of the Prothermo NMT535/6.
LOCAL ERROR: DEV1 (or 2)	No communication with the HART [®] device 1 (or 2).	Check the connection and setting of the HART [®] device 1 (or 2). Check the HART [®] device 1 (or 2).
DEVICE ERROR: NMS	The Proservo NMS5 gives an error signal.	Check the diagnosis of the Proservo NMS5.
DEVICE ERROR: NMT	The Prothermo NMT535/6 gives an error signal.	Check the diagnosis of the Prothermo NMT535/6
DEVICE ERROR: DEV 1 (or 2)	The HART [®] device 1 (or 2) gives an error signal.	Check the HART [®] device 1 (or 2).
OVER TENSION	The Proservo NMS5 gives over tension error.	Check if the displacer motion is blocked by clogging or sticking
UNDER WEIGHT	The Proservo NMS5 gives under tension error.	Check if the measuring wire is cut or the displacer is lost.
Z PHASE NO INPUT	The Proservo NMS5 gives Z phase no input error	Check the Proservo NMS5. Replace the detector unit of the Proservo NMS5.
SIFA ERROR	The Proservo NMS5 gives SIFA error.	Check the Proservo NMS5. Replace the CPU board of the Proservo NMS5.
ROM ERROR	Check data of EEPROM	Consult E+H Service.
POWER FAILURE	The supply voltage has dropped.	Check the power supply. (Tax & Weight spec. only)
RAM FAILURE	The data of the RAM are illegal.	Consult E+H Service.

9.1 Spare parts

Spare parts are contained in kits. Spare parts which you can order from Endress+Hauser for the Promonitor are shown with their order numbers in the diagram below. For more information on service and spare parts, contact Endress+Hauser.



10 Accessories

Mounting Bracket

Note!
U bolt is not attached to the mounting bracket. If you have need U bolt, please contact Endress+Hauser.

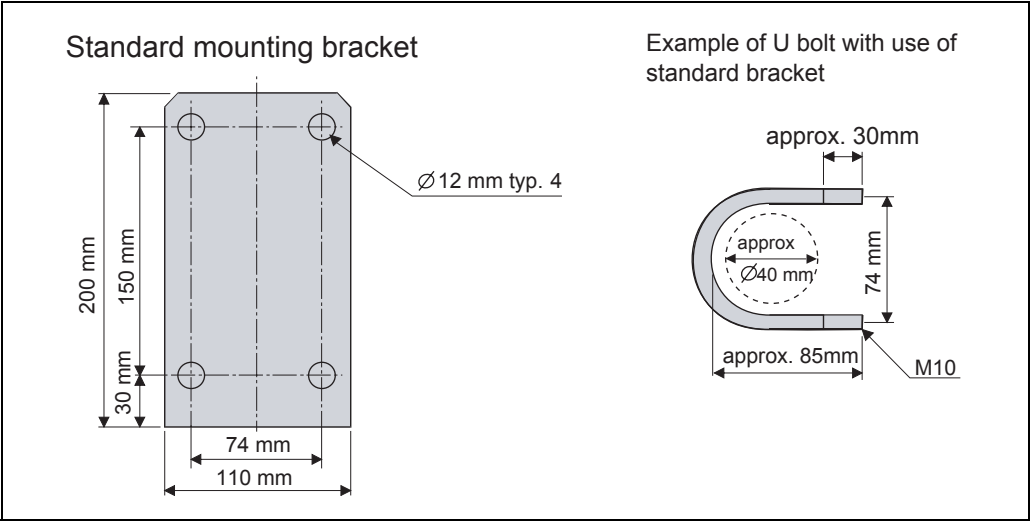


Fig.13 : Mounting bracket

11 Technical data

11.1 Technical data at a glance

Input	Multidrop local HART
Display (LCD)	4 line. 128 x 64 (pixels), illuminated Language selection: English, Chinese, Japanese,
Programming	3 visual operating elements for selection of matrix functions ("touch control")
Power supply	High Voltage: AC 85...264V 50/60 Hz Low Voltage: AC 20...55V 50/60Hz, DC 20...62V
Power consumption	Maximum 10 VA
Lightning Arrester	Standard equipment
Range of ambient temperature	-20...60°C (standard) Note!: the LCD could not be seen below -10°C
Weight	Approx. 6.5kg
Certification	Explosion-proof EEx d IIC T4 (CENELEC) XP Class 1.I, Dev.1, Gr.A-D (FM) Class 1.I, Dev.1, Gr.A-D (CSA) Ex d IIB T4 (TIIS) EEx d IIC T4 (ATEX)
Protection	IP67 with closed housing and cable glands of same protection type
Electromagnetic compatibility	Immunity and emission to EN 50081-1, EN 50082-2

Declaration of contamination

Dear customer,

Because of legal determinations and for the safety of our employees and operating equipment, we need this "Declaration of contamination" with your signature before your order can be handled. Please, include the completely filled in declaration with the device and the shipping documents in any case. Add also safety sheets and / or specific handling instructions if necessary.

Type of device / sensor:	_____	Serial no.:	_____
Medium / concentration:	_____	Temperature:	_____ Pressure: _____
Cleaned with:	_____	Conductivity:	_____ Viscosity: _____

Warning hints for medium used (mark the appropriate hints)



☐
radioactive



☐
explosive



☐
caustic



☐
poisonous



☐
harmful to
health



☐
biologically
hazardous



☐
inflammable



☐
safe

Reason for return

Company data

Company:	_____	Contact person:	_____
	_____		_____
	_____	Department:	_____
Address:	_____	Phone:	_____
	_____	Fax / e-mail:	_____
	_____	Your order no.:	_____

I hereby certify that the returned equipment has been cleaned and decontaminated acc. to good industrial practices and is in compliance with all regulations. This equipment poses no health or safety risks due to contamination.

(Place, date)

(Company stamp and legally binding signature)

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