

Electronic gauge for level of diesel INTERNIV 590



USER MANUAL

BAMO INTERNATIONAL

22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL

Tel +33 (0)1 30 25 83 20 Web www.bamo.eu

Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Electronic gauge for level of
diesel

INTERNIV 590

15-02-2022

M-590.06-EN-AA

NIV

590-06 /1

SUMMARY

1.	SAFETY INSTRUCTIONS	3
1.1	Safety instructions and risk classes	3
1.2	Intended use	3
1.3	Predictable non-conforming use	3
1.4	Operator qualification	3
1.5	Individual protection equipment	3
1.6	Modification of the device	3
1.7	Transport and storage	3
2.	DESCRIPTION	4
2.1	Applications	4
2.2	Operating principle	4
2.3	Description	5
3.	TECHNICAL FEATURES	5
4.	MOUNTING	5
4.1	Atmospheric pressure compensation	5
4.2	Cable fixing	6
4.2.1	Attachment with cable tie or clamp	6
4.2.2	Fixing with PVC or stainless steel couplings	6
4.2.3	Attachment using the BJSC junction box	7
4.3	Positioning of the INTERNIV gauge	7
5.	ELECTRICAL CONNECTIONS: 2-wire sensor	8
6.	CALIBRATION	8
7.	MAINTENANCE	8
7.1	Routine check	8
7.2	Diaphragm cleaning	8
8.	FAULTS AND FAILURES	8

BAMO INTERNATIONAL

22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL

Tel +33 (0)1 30 25 83 20 Web www.bamo.eu

Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Electronic gauge for level of
diesel

INTERNIV 590

15-02-2022

M-590.06-EN-AA

NIV

590-06/2

IMPORTANT

Use the device only after reading and fully understanding the technical manual.
Make sure the technical manual is available for all operations
Transmit the technical manual to all users.

1. SAFETY INSTRUCTIONS

1.1 Safety instructions and risk classes

This technical manual contains safety instructions intended to draw attention to the dangers and risks.
In addition to the instructions in this technical manual, you must ensure that all regulations, standards and safety regulations in force at the place of installation of the device are observed.

1.2 Intended use

This device is intended exclusively for measuring the filling level in diesel tanks with a maximum height of 3 m.

Any other use is not intended.

Before using the device, make sure that it is suitable for the intended use.

1.3 Predictable non-conforming use

In particular, the device should not be used in the following cases:

- **In areas at risk of explosion (Hazardous area, ATEX area)**

1.4 Operator qualification

Only duly qualified personnel are authorized to work on and with the device and after having read and understood the content of this technical notice, as well as all the documentation forming part of the device.

All the regulations, standards and safety regulations in force at the installation site must be known to qualified personnel working on and with the device.

1.5 Individual protection equipment

Always use the required personal protective equipment. When working on and with the device, take into account the dangers that may arise at the installation site which do not emanate directly from the device.

1.6 Modification of the device

When working on and with the device, only carry out the operations described in this technical manual.

Do not make any modifications not described in this technical manual.

1.7 Transport and storage

Improper transportation and storage may cause damage to the device.

- Ensure that the specified conditions are met during transport and storage.
- Use the original packaging for transport.
- Store the device in a dry and clean place.
- Ensure that the device is protected from impact during transport and storage.

Failure to follow these instructions may result in damages.

BAMO INTERNATIONAL

22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL

Tel +33 (0)1 30 25 83 20 Web www.bamo.eu

Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Electronic gauge for level of
diesel

INTERNIV 590

15-02-2022

M-590.06-EN-AA

NIV

590-06/3

2. DESCRIPTION

2.1 Applications

The INTERNIV level gauge is used for continuous level measurement in ventilated tanks with a filling height of 0 to 3 meters. It is perfectly suited for monitoring and controlling the level of diesel in storage tanks.
The optional display module allows the user to view the level and set the level alarm thresholds.

2.2 Operating principle

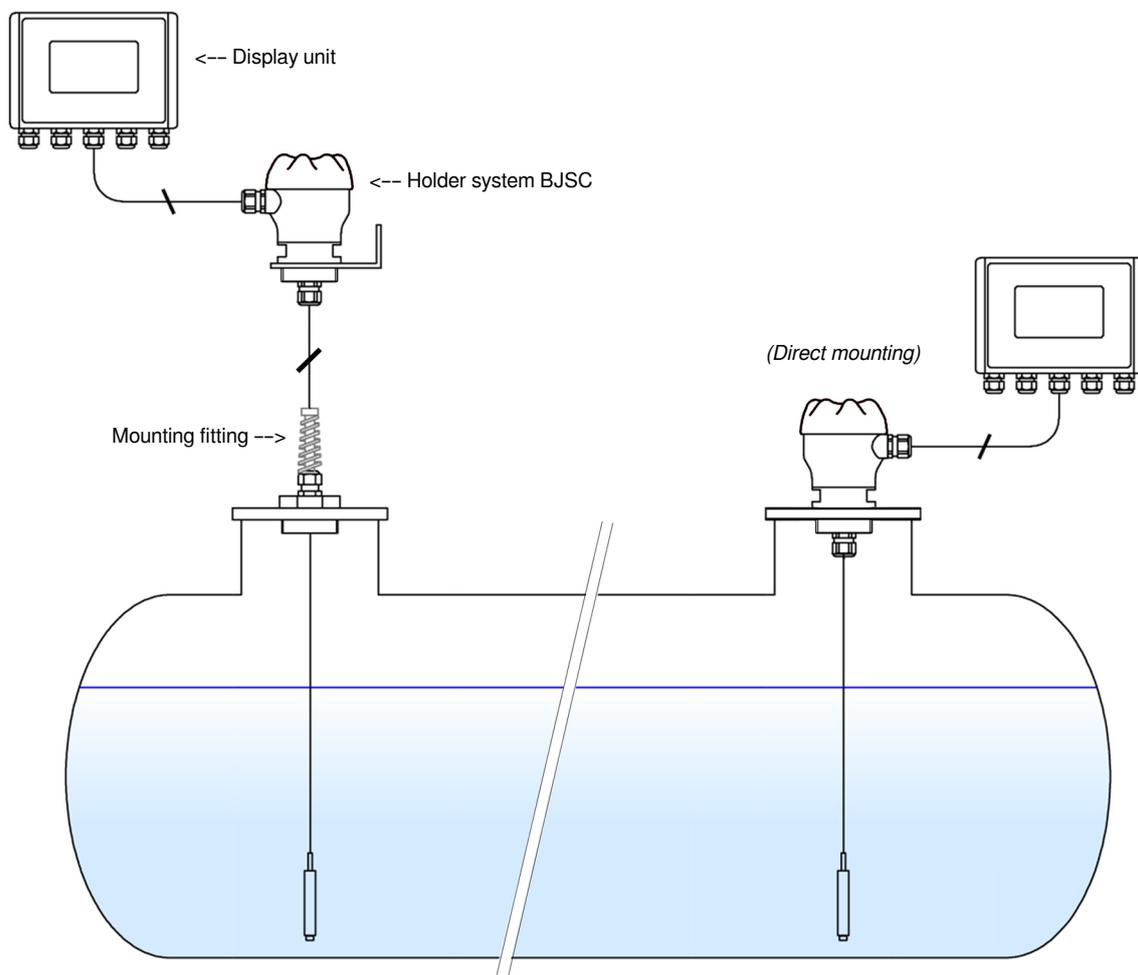
The INTERNIV 590 probe end is immersed in the liquid.

The hydrostatic pressure is proportional to the depth of immersion.

The integrated amplifier is equipped with a short-circuit protection circuit, as well as a protection against reverse polarity which guarantees maximum safety during commissioning.



Fig. A: Options for cable fixing



BAMO INTERNATIONAL

22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL

Tel +33 (0)1 30 25 83 20 Web www.bamo.eu

Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Electronic gauge for level of
diesel

INTERNIV 590

15-02-2022

M-590.06-EN-AA

NIV

590-06 /4

2.3 Description

The probe can hang freely at the end of the cable. The probe must not rest on the bottom of the tank to avoid any deposit on its diaphragm.

Caution: The black protective cap must not be removed from the probe.

Installation is simplified by the use of a fitting and fastening system and/or of a BJSC holder.

The junction box (BJSC) with integrated filter vent allows the probe to be fixed and to connect the input/output cables.

This holder also performs breathing and atmospheric pressure balancing thanks to a vent integrated in one of the cable glands. (See the data-sheet 590-04)

3. TECHNICAL FEATURES

Measuring range	1 m WC (1190 mm diesel)	1.6 m WC (1900 mm diesel)	2.5 m WC (2975 mm diesel)
Code number	590 850	590 852	590 854
Relative pressure	98 mbar	160 mbar	250 mbar
Overpressure limit	1 bar		
Accuracy	$\leq \pm 1\%$ F. S.		
Long term stability	$\leq \pm 0.2\%$ F.S./ year (standard operating conditions)		
Temperature limits	-10 ... +70 °C		
Temperature compensation	0... +70 °C		
Error due to temperature	$\leq \pm 0.3\%$ F.S. / 10 °C		
Output signal/ Power supply	Analogue 4-20mA, 2-wire; Power supply: 8 ... 32 V DC		
Response time	≤ 10 ms		
Protection	IP 68		
Materials	Body: AISI 304; Diaphragm: AISI 316L; Seal: FPM		
Cable	PVC (compatible with diesel) 6 m long		
EC conformity	Directive EMC: 2014/30/EU		

4. MOUNTING

4.1 Atmospheric pressure compensation

Each hydrostatic level probe from BAMO is equipped, inside the connection cable, with a capillary which allows atmospheric pressure to be balanced. This capillary tube which goes down inside the body of the probe must always be open outside. It must not be overwritten or blocked at the risk of creating an error in the measurement.

Filter at the top of the capillary:

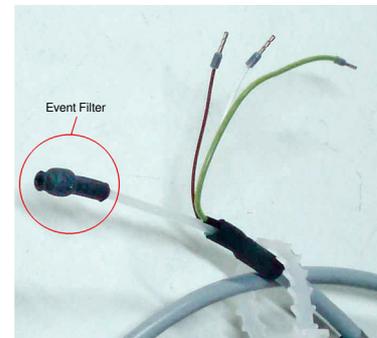
The capillary section must be kept clean, free of dust and water.

The end is therefore equipped with a filter composed of a micro-porous and waterproof diaphragm.

Condensation is minimized.

The filter provides a seal so that neither water nor moisture can migrate in the capillary.

During operations, the greatest care will be taken with the filter.



BAMO INTERNATIONAL

22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL

Tel +33 (0)1 30 25 83 20 Web www.bamo.eu

Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Electronic gauge for level of
diesel

INTERNIV 590

15-02-2022

M-590.06-EN-AA

NIV

590-06/5

4.2 Cable fixing

Recommendation:

The special cable for the level probe must be fixed in such a way that its pressure compensation device is not trapped. The end of the cable must end up in a dry place or in a humidity-free connection box. If possible, make a loop (Pigtail) to make a siphon to trap accidental condensation.

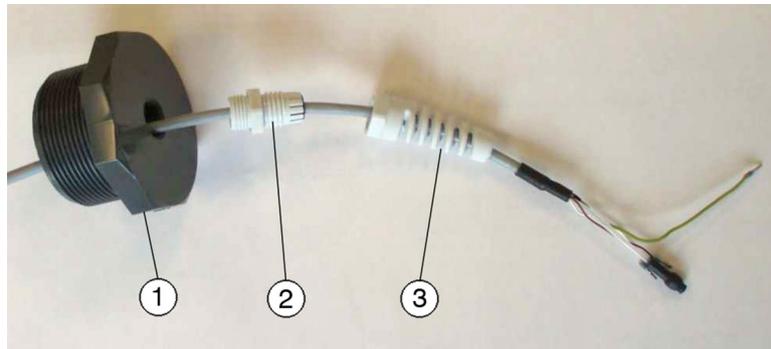
4.2.1 Attachment with cable tie or clamp

- Direct mounting without shortening the cable, without connection head
The two wires are connected to a terminal block in the display unit, protected from humidity.
The filter remains at the end of the capillary (Example: Below, photo of the terminal block of the BAMOWIZ unit)

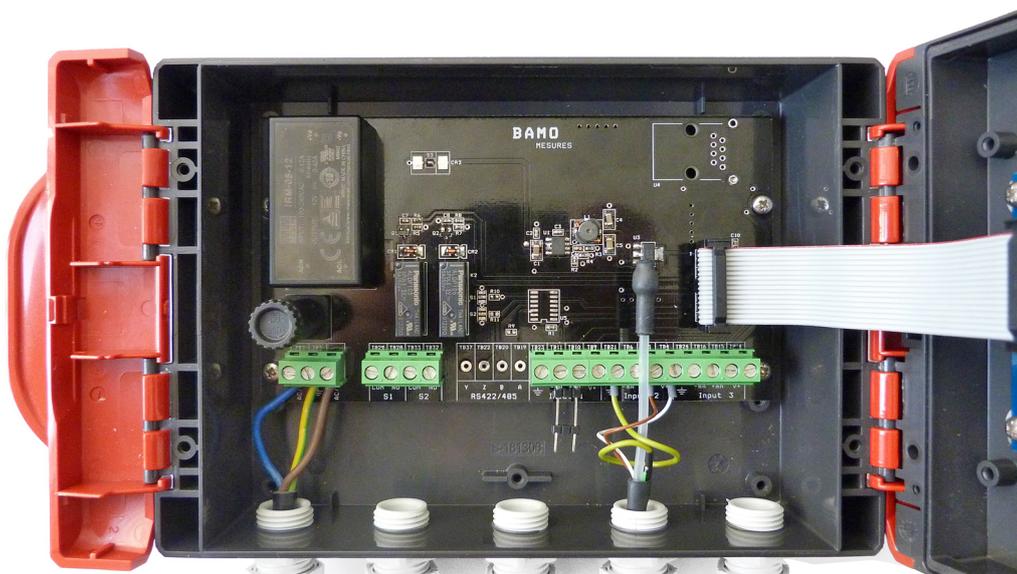
4.2.2 Fixing with PVC or stainless steel couplings

- Direct mounting without shortening the cable, without connection head
The two wires are connected to a terminal block in the display unit, protected from humidity.
The filter remains at the end of the capillary.

Dismantle the three parts of the fitting: PVC cap BSP 2" (1) - Cable gland (2) - Flexible sheath (3)
Pass the gauge cable through the parts according to picture below.
Screw the cable gland back onto the PVC cap.
Screw the flexible sheath back onto the cable gland.
When the probe is positioned at the correct height, carry out the final tightening of the cable gland.



Example: Cable connection on the BAMOWIZ terminal block



Note the presence of the filter in the BAMOWIZ housing

BAMO INTERNATIONAL

22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL
Tel +33 (0)1 30 25 83 20 Web www.bamo.eu
Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Electronic gauge for level of
diesel
INTERNIV 590

15-02-2022

M-590.06-EN-AA

NIV

590-06/6

4.2.3 Attachment using the BJSC junction box

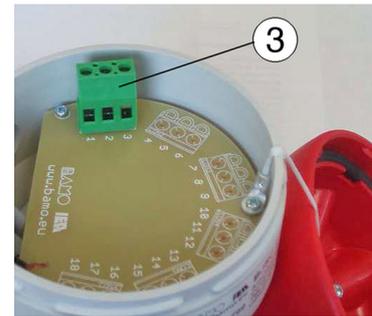
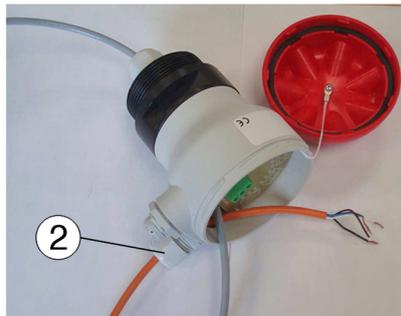
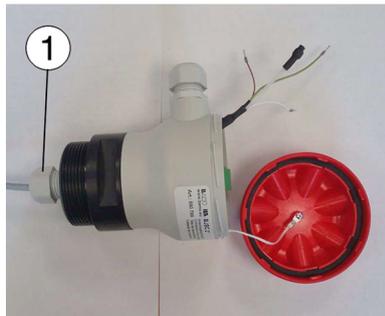
The use of an extension for measurement signal from BJSC to the display unit reduces costs and facilitates maintenance tasks.

The BJSC holder is specially designed for hydrostatic probes. It is equipped with a breathing vent with filter, positioned near the cable gland. It is possible to shorten the cable with the capillary open inside the housing (without filter).

If the cable is not shortened, this does not affect the quality of the installation. The sensor will be more protected against humidity.

Caution: It is imperative to tighten the cable glands well in order to avoid any introduction of humidity.

- Open the connection head by unscrewing the red cover
- Pass the probe cable through the input cable gland (1)
- Pass the extension cable through the outlet cable gland (2)
- Connect the wires to the terminal block located in the head (3)



BJSC head terminal block:

Terminal 1 = +

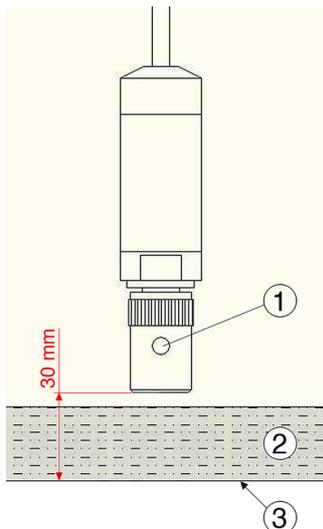
Terminal 2 = -

Terminal 3 = Green/yellow shield

4.3 Positioning of the INTERNIV gauge

- Pass the cable through the fixing system (PE, cable tie, BJSC, etc.).
- Check the direction of cable passage.
- Lower the probe into the tank.
- When the probe touches the bottom of the tank, raise it about 30mm
- Tighten the cable gland or the cable fixing system to prevent slipping of the cable, which would cause a measurement error.
- Validate the heights to carry out calibrations and adjustments.

Caution: The diaphragm of the probe must not be in the sludge which accumulates at the bottom of the tank. Take this into account when adjusting the level or volume.



- (1): Probe measurement hole
- (2): Sludge at the bottom of the tank
- (3): Bottom of the tank

BAMO INTERNATIONAL

22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL

Tel +33 (0)1 30 25 83 20 Web www.bamo.eu

Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Electronic gauge for level of
diesel

INTERNIV 590

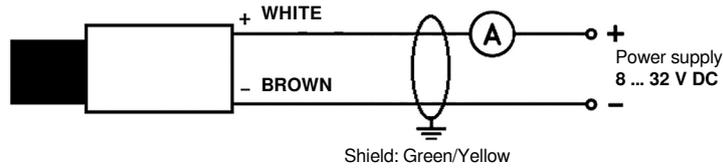
15-02-2022

M-590.06-EN-AA

NIV

590-06/7

5. ELECTRICAL CONNECTIONS: 2-wire sensor



The probe must be connected to earth. To avoid electrolysis, the shield of the cable must be at the same potential as that of other devices in the liquid, such as, for example, pump, detector, ...

6. CALIBRATION

The gauge is delivered with a measuring range corresponding to a 4-20 mA output. It has no access to adjustment.
(See also the manuals of associated devices -> BAMOWIZ, BMG 72, ITU ...)

7. MAINTENANCE

7.1 Routine check

Regular control must be carried out according to the rules specific to the establishment or application concerned.

The control will relate to the state of the instrument:

- Check that there is no apparent mechanical damage,
- Check the condition of the cable which must not show signs of elongation, twisting, bending,
- Check the condition of the cable gland.

Every two years minimum, or in accordance with the rules on the site, it is necessary to check the zero point (4 mA).

Checking the zero of the gauge:

Return the gauge to the atmosphere and read the current value (output signal).

In the event of an excessive drift in the zero reading (4 mA), return the gauge to your supplier for an instrument calibration, or, correct this deviation in the display unit.

7.2 Diaphragm cleaning

Do not use mechanic ways to clean the diaphragm. Impurities must be dissolved. Clogging or deposits on the diaphragme affect the response of the sensor:

After any cleaning, the parts in contact with the cleaning fluids will be thoroughly rinsed, respecting the rules and legislation on risks and safety concerning the handling of chemicals.

Do not use any chemical which could corrode the diaphragm.

8. FAULTS AND FAILURES

Type of failure	Possible cause	Corrective action
Output = 0 mA	Too low power	Check the power supply
	Incorrect wiring	Check cables and connections
	Damaged sensor	Return to factory *
	Damaged diaphragm	Return to factory *
Signal too small	Too low power	Check the power supply
	Load too high	Check the loop
Signal is constant	Sensor mechanically destroyed	Return to factory *
	Electronic damaged by an overvoltage	Return to factory *
4 mA (level zero) drifting	Abnormal operating temperatures	Return to factory *
	Damaged diaphragm	Return to factory *
	Humidity penetrates by capillary	Return to factory *
	Dirty diaphragm	Clean carefully - See chapter "Maintenance"
Non-linear output signal	Uncalibrated sensor	Return to factory *

* Return to factory: Refer to the service section of the website www.bamo.eu.

BAMO INTERNATIONAL

22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL

Tel +33 (0)1 30 25 83 20 Web www.bamo.eu

Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Electronic gauge for level of
diesel
INTERNIV 590

15-02-2022

M-590.06-EN-AA

NIV

590-06/8