

76 with NB 220

Level detector with measuring transducer



Art. No.	Version	Edition
207070	11	2026-01

Contents

1	Overview	1
2	Safety instructions	2
3	System application	3
3.1	Application as overflow prevention device.....	3
3.2	Application as limit signal controller.....	3
3.3	Application as dry-run protection.....	3
4	Appendix	4
4.1	EU Declaration of Conformity for level detector 76.....	4
4.2	EU Declaration of Conformity for measuring transducer NB 220.....	5
4.3	UK Declaration of Conformity for level detector 76.....	6
4.4	UK Declaration of Conformity for measuring transducer NB 220.....	7
4.5	Appendix 1 of the approval guidelines for overflow prevention devices Notes on correct adjustment for overflow prevention devices for containers	8
1	General.....	8
2	Permissible filling ratio	8
3	Determining the shutdown volume following response of the overflow prevention device	9
4	Defining the response level for the overflow prevention device	9
4.6	Appendix 2 of the approval guidelines for overflow prevention devices Installation and operating guideline overflow prevention devices	11
1	Scope.....	11
2	Definitions	11
3	Design of overflow prevention devices (see Figure 1 of the approval guidelines for overflow prevention devices or Appendix 1 of the German general construction approval DIBt)	11
4	Installation and operation	12
5	Tests.....	13
4.7	Overflow prevention device with level limit switch for use in stationary containers for the storage of water-polluting liquids.....	14
1	Design of the overflow prevention device.....	14
2	Material of level detectors.....	22
3	Range of application	23
4	Fault and failure notifications.....	23
5	Installation notes.....	24

6	Notes for correct adjustment.....	25
7	Operating instructions.....	27
8	Repeat testing.....	27
4.8	German general construction approval (DIBT).....	28
4.9	Wiring diagrams.....	35
5	Maintenance	37
5.1	Servicing.....	37
5.2	Return Shipment.....	37
6	List of figures	38
7	List of tables	38

© Copyright:

Reproduction and translation is permitted only with the written consent of the FAFNIR GmbH. FAFNIR GmbH reserves the right to carry out product alterations without prior notice.

1 Overview

The **Overfill prevention device** with level detector 76 ... and measuring transducer NB 220 ..., which has been approved in accordance with the German Water Resources Act (Wasserhaushaltsgesetz, WHG), is a complete safety device designed to offer continuous monitoring as a means of preventing the overfilling of tanks and process containers.

The system comprises a level detector installed inside the container and a wall-mountable measuring transducer with alarm system and output terminal.

The alarm system comprises a visual and an audible alarm.

The alarm unit integrated in the measuring transducer issues visual and audible signals, depending on the operating state, e.g. violation of the defined fill level.

The level detector can be customised easily to the respective container size. The system is maintenance free.

The **limit signal controller** with level detector 76 ... and measuring transducer NB 220 ... is a control device for monitoring a defined level in tanks and process containers.

The **dry-run protection** with level detector 76 ... and measuring transducer NB 220 ... T is a complete safety device designed to offer continuous monitoring as a means of preventing the tanks and process containers from running dry.

2 Safety instructions

System 76/NB 220 is designed to monitor liquids in tanks and process containers. The system must be used exclusively for this purpose. The manufacturer accepts no liability for any form of damage resulting from improper use!

The system has been developed, manufactured and tested in accordance with state-of-the-art technology and accepted safety standards. Nevertheless, hazards may still arise. For this reason, the following safety instructions must be observed:

- Do not change or modify the system or add any equipment without the prior consent of the manufacturer.
- The installation, operation and maintenance of the system must be carried out only by expert personnel. Specialised knowledge must be acquired by regular training.
- Users, installers, and service technicians must comply with all the current safety rules and regulations. This also applies to any local safety and accident prevention regulations which are not stated in this technical documentation.
- During level detector installation, the probe must not be sited in a position exposed to powerful vapour flow unless it is equipped with a suitably dimensioned protective sleeve.
- The measuring transducer must be installed in an enclosed room or in a housing complying with protection type IP54.
- Following completion of the installation and in the event of a change of liquid stored in the container, the system must be checked for correct installation and tested for correct operation by an expert of a specialist company.
- The operability of electrical circuits for sirens and lamps that cannot operate in accordance with the closed-circuit principle must be easy to inspect.
- Before commissioning, all system devices must be checked to determine that they are correctly connected and working properly. Electrical supply, including that for downstream equipment, must be checked.
- When used as overfill protection device, untested system parts must comply with the requirements of the approval guidelines for overfill protection devices.

In the event of a failure of the auxiliary power (no longer within maximum and minimum limit values) or an interruption in the connecting lines between system parts, overfill prevention devices are required to report this fault or display the maximum fill level.

The safety instructions in this manual are marked as follows:



If these safety instructions are not observed, it may result in the risk of accident or damages to the 76 / NB 220 system.



Useful information designed to ensure continued and correct operation of the system and to make your work easier.

3 System application

3.1 Application as overflow prevention device

For details on the use of level detector 76 ... with measuring transducer NB 220 ... as overflow prevention device see Appendix, Chapter Overflow prevention device with level limit switch for use in stationary containers for the storage of water-polluting liquids, Page 14.

3.2 Application as limit signal controller

For details on the use of level detector 76 ... with measuring transducer NB 220 ... as limit signal controller, see Appendix, Chapter Overflow prevention device with level limit switch for use in stationary containers for the storage of water-polluting liquids, Page 14.



The limit signal controller is no substitute for the overflow prevention device. If an overflow prevention device has been prescribed, it must be set up in addition.

3.3 Application as dry-run protection

For details on the use of level detector 76 ... with measuring transducer NB 220 ... T as dry-run protection, see Appendix, Chapter Overflow prevention with limit signal controller for stationary containers for the storage of water-polluting liquids, Function description, Page 15.

Function description of measuring transducer NB 220 ... T

A relay de-energize occurs as soon as the level detector tip is heated up or in the event of a power failure, short circuit or line break in the connection between the level detector and measuring transducer. In the event of blown device fuses or a power failure, the green power LED on the measuring transducer goes out and the changeover relay contact is de-energized. The power ON state of the measuring transducer is indicated by a green LED.

Measuring transducer NB 220 H T

A relay de-energize is indicated on the measuring transducer by the extinguishing of a yellow LED.

Measuring transducer NB 220 QS T

A heated-up tip of the level detector is indicated on the measuring transducer by an audible and visual alarm. The audible signal can be stopped by pressing the acknowledge button; the visual signal is permanently active and indicated in the form of a red signal lamp (a relay de-energize is additionally indicated by the extinguishing of a yellow LED). As soon as the level detector is immersed, the visual signal is extinguished and the system reverts to being on alert. In addition, the alarm signalling devices above support external connections.

Measuring transducer NB 220 QSF T

A heated-up tip of the level detector is indicated on the measuring transducer by an audible and visual alarm. The audible signal can be stopped by pressing the acknowledge button; the visual signal is permanently active and indicated in the form of a red signal lamp. As soon as the level detector is immersed, the visual signal is extinguished and the system reverts to being on alert. The power ON state of the measuring transducer is indicated by a green LED. In addition, the alarm signalling devices above support external connections.



Additional information is available in the Appendix under "Technical description".



**EU-Konformitätserklärung
EU Declaration of Conformity
Déclaration UE de Conformité
Dichiarazione di Conformità UE**



FAFNIR GmbH, Deutschland / Germany / Allemagne / Germania

erklärt als Hersteller in alleiniger Verantwortung, dass die Produkte
declares as manufacturer under sole responsibility that the products
déclare sous sa seule responsabilité en qualité de fabricant que les produits
dichiara sotto la sola responsabilità del produttore, che i prodotti sono

**Grenzwertgeber bzw. Standaufnehmer bzw. Aufstausensor /
Overfill Prevention Sensor resp. Level Detector resp. High Level Sensor /
Capteurs de valeur limite resp. Détecteur de niveau resp. Capteur de niveau haut /
Sensore di troppo pieno o rivelatore di livello o sensore di alto livello
81 D-Ex ... & 83 UV ... / 76 ... & LS 300 ... / SEPARIX-T ...**

den Vorschriften der europäischen Richtlinien
comply with the regulations of the European directives
sont conformes aux réglementations des directives européennes suivantes
rispetta i regolamenti delle direttive europee

2011/65/EU	Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten	RoHS
2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment	RoHS
2011/65/UE	Limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques	RoHS
2011/65/UE	Restrizione dell'uso di determinate sostanze pericolose nelle apparecchiature elettriche ed elettroniche	RoHS
2014/34/EU	Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen	ATEX
2014/34/EU	Equipment and protective systems intended for use in potentially explosive atmospheres	ATEX
2014/34/UE	Appareils et systèmes de protection destinés à être utilisés en atmosphères explosibles	ATEX
2014/34/UE	Apparecchi e sistemi di protezione destinati a essere utilizzati in atmosfera potenzialmente esplosiva	ATEX

durch die Anwendung folgender harmonisierter Normen entsprechen
by applying the harmonised standards
par l'application des normes
applicando le norme armonizzate

**RoHS / RoHS / RoHS / RoHS
ATEX / ATEX / ATEX / ATEX**

**EN IEC 63000:2018
EN IEC 60079-0:2018/AC:2020-02
EN 60079-11:2012
EN 60079-26:2015**

Die Produkte entsprechen der RoHS-Kategorie und wenden RoHS-Ausnahmen an
The products comply with the RoHS category and apply RoHS exemptions
Les produits sont conformes à la norme RoHS et bénéficient d'exemptions RoHS applicables
I prodotti sono conformi alla categoria RoHS e applicano le esenzioni RoHS

Kategorie / Category / Catégorie / Categoria

**Überwachungs- und Kontrollinstrumenten in der Industrie /
Industrial Monitoring and Control Instruments /
Instruments de contrôle et de surveillance industriels /
Strumenti di monitoraggio e controllo industriali**

81 D-Ex ... & 83 UV ... / 76 ... & LS 300 ...

Anhang III 6c. / Annex III 6(c) / Annexe III 6 c) / Allegato III 6 c)

81 D-Ex ... & 83 UV ... / 76 ... & LS 300 ... / SEPARIX-T ...

Anhang III 7c. VI / Annex III 7(c)-VI / Annexe III 7 c)-VI / Allegato III 7 c)-VI

Die notifizierte Stelle TÜV NORD CERT GmbH, 0044 hat eine EU-Baumusterprüfung durchgeführt und folgende Bescheinigung ausgestellt
The notified body TÜV NORD CERT GmbH, 0044 performed a EU-type examination and issued the certificate
L'organisme notifié TÜV NORD CERT GmbH, 0044 a effectué examen UE de type et a établi l'attestation
L'organismo notificato TÜV NORD CERT GmbH, 0044 ha effettuato esame UE del tipo e rilasciato il certificato

81 D-Ex ... & 83 UV ... / LS 300 ... / SEPARIX-T ...

TÜV 00 ATEX 1656 X

Hamburg, 2026-01-26

Ort, Datum / Place, Date / Lieu, Date / Luogo, data

Geschäftsführer / Managing Director / Gérant / Direttore Generale: René Albrecht



**EU-Konformitätserklärung
EU Declaration of Conformity
Déclaration UE de Conformité
Dichiarazione di Conformità UE**



FAFNIR GmbH, Deutschland / Germany / Allemagne / Germania

erklärt als Hersteller in alleiniger Verantwortung, dass das Produkt
declares as manufacturer under sole responsibility that the product
déclare sous sa seule responsabilité en qualité de fabricant que le produit
dichiara sotto la sola responsabilità del produttore, che il prodotto

**Messumformer / Measuring Transducer / Transducteur de mesure / Trasduttore di misura
NB 220 ...**

den Vorschriften der europäischen Richtlinien
complies with the regulations of the European directives
est conforme aux réglementations des directives européennes suivantes
è conforme ai regolamenti delle direttive europee

2011/65/EU	Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten	RoHS
2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment	RoHS
2011/65/UE	Limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques	RoHS
2011/65/UE	Restrizione dell'uso di determinate sostanze pericolose nelle apparecchiature elettriche ed elettroniche	RoHS
2014/30/EU	Elektromagnetische Verträglichkeit	EMV
2014/30/EU	Electromagnetic compatibility	EMC
2014/30/UE	Compatibilité électromagnétique	CEM
2014/30/UE	Compatibilità elettromagnetica	CEM
2014/35/EU	Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt	NSRL
2014/35/EU	Making available on the market of electrical equipment designed for use within certain voltage limits	LVD
2014/35/UE	Mise à disposition sur le marché du matériel électrique destiné à être employé dans certaines limites de tension	DBT
2014/35/UE	Messa a disposizione sul mercato del materiale elettrico destinato a essere adoperato entro taluni limiti di tensione	LVD

durch die Anwendung folgender harmonisierter Normen entspricht
by applying the harmonised standards
par l'application des normes
applicando le norme armonizzate

**RoHS / RoHS / RoHS / RoHS
EMV / EMC / CEM / CEM
NSRL / LVD / DBT / LVD**

**EN IEC 63000:2018
EN 61326-1:2013
EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019**

Das Produkt ist bestimmt als Elektro- und Elektronikgerät der RoHS-
The product is determined as electrical and electronic equipment of RoHS
Le produit est déterminé comme des équipements électriques et électroniques de RoHS
Il prodotto è determinato come apparecchiatura elettrica ed elettronica di RoHS

Kategorie / Category / Catégorie / Categoria

**Überwachungs- und Kontrollinstrumenten in der Industrie /
Industrial Monitoring and Control Instruments /
Instruments de contrôle et de surveillance industriels /
Strumenti di monitoraggio e controllo industriali**

Das Produkt entspricht den EMV-Anforderungen
The product complies with the EMC requirements
Le produit est conforme aux exigences CEM
Il prodotto è conforme ai requisiti CEM

**Störaussendung / Emission / Émission / L'emissione
Störfestigkeit / Immunity / D'immunité / Immunità**

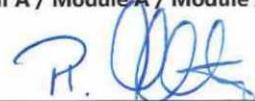
**Klasse B / Class B / Classe B / Classe B
Industrielle elektromagnetische Umgebung /
Industrial electromagnetic environment /
Environnement électromagnétique industriel /
Ambiente elettromagnetico industriale**

Das Produkt entspricht dem NSRL-Konformitätsbewertungsverfahren
The product complies with the LVD conformity assessment procedure
Le produit est conforme avec la procédure d'évaluation de conformité DBT
Il prodotto è conforme alla procedura di valutazione della conformità LVD

NB 220 ...

Modul A / Module A / Module A / Modulo A

Hamburg, 2022-12-22
Ort, Datum / Place, Date / Lieu, Date / Luogo, data


Geschäftsführer / Managing Director / Gérant / Direttore Generale: René Albrecht

FAFNIR GmbH, Germany

declares as manufacturer under sole responsibility that the product

Level Detector**76 ...**

is in conformity with relevant statutory requirements and take full responsibility for product compliance

SI No. 3032	Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
-------------	--

as amended by

SI No. 696	Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019
------------	---

by applying the designated standards

Restriction of Hazardous Substances (RoHS)**EN IEC 63000:2018**

The product is determined as electrical and electronic equipment of RoHS

Category**Industrial Monitoring and Control Instruments**

Hamburg, 2021-03-19

Place, Date



Managing Director: René Albrecht

FAFNIR GmbH, Germany

declares as manufacturer under sole responsibility that the product

**Measuring Transducer
NB 220 ...**

is in conformity with relevant statutory requirements and take full responsibility for product compliance

SI No. 3032	Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
SI No. 1091	Electromagnetic Compatibility Regulations 2016
SI No. 1101	Electrical Equipment (Safety) Regulations 2016

as amended by

SI No. 696	Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019
-------------------	--

by applying the designated standards

Restriction of Hazardous Substances (RoHS)	EN IEC 63000:2018
Electromagnetic Compatibility (EMC)	EN 61326-1:2013
Low Voltage (LV)	EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019

The product is determined as electrical and electronic equipment of RoHS

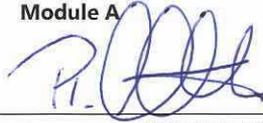
Category **Industrial Monitoring and Control Instruments**

The product complies with the EMC requirements

Emission **Class B**
Immunity **Industrial electromagnetic environment**

The product complies with the Electrical Equipment (Safety) Regulations conformity assessment procedure

NB 220 ... **Module A**



Hamburg, 2021-03-19
Place, Date

Managing Director: René Albrecht

4.5 Appendix 1 of the approval guidelines for overfill prevention devices

Notes on correct adjustment for overfill prevention devices for containers

1 General

The following requirements are prerequisites to the correct adjustment of the overfill prevention device:

- Knowledge of the fill level at 100 % of the fill level of the container according to the nominal volume on the type plate of the container
- Knowledge of the filling curve
- Knowledge of the fill level that corresponds to the permissible filling ratio
- Knowledge of the change in fill level that corresponds to the shutdown volume to be expected.

2 Permissible filling ratio

- (1) The permissible filling ratio of containers is to be so dimensioned that the container cannot overflow and that excess pressures, which can impair the leak-proof tightness or solidity of the container, does not arise.
- (2) When defining the permissible filling ratio, the cubic expansion coefficient of the liquid relevant for the filling of a container and the possible rise in temperature during storage and a resultant increase in the volume of the liquid is to be taken into consideration.
- (3) For the storage of liquids in stationary containers without additional hazardous characteristics, the permissible filling ratio at filling temperature is to be defined as follows:

1. For above-ground and below-ground containers that are embedded less than 0.8 m below ground level

$$\text{Filling ratio} = \frac{100}{1+\alpha \cdot 35} \text{ in \% of the volumetric capacity}$$

2. For below-ground containers at a depth of at least 0.8 m

$$\text{Filling ratio} = \frac{100}{1+\alpha \cdot 20} \text{ in \% of the volumetric capacity}$$

3. The average cubic expansion coefficient α can be determined as follows:

$$\alpha = \frac{d_{15} - d_{50}}{35 \cdot d_{50}}$$

Here d_{15} or d_{50} means the density of the fluid at 15 °C or 50 °C.

- (4) Paragraph (1) can also be considered as having been met for liquids independent of a flash point without additional hazardous characteristics and whose cubic expansion coefficient does not exceed $150 \cdot 10^{-5}/\text{K}$, if the filling ratio at filling temperature
 - a) for above-ground and below-ground containers which lie less than 0.8 m below ground level does not exceed 95 %, and
 - b) for below-ground containers which lie at a depth of at least 0.8 m does not exceed 97 % of its volumetric capacity.
- (5) If the fluid is heated to above 50 °C during storage, or it is filled in a cooled-down state, also the related expansions need to be considered when defining the filling ratio.
- (6) In the case of containers used for storing fluids with toxic or corrosive characteristics, a filling ratio of 3 % less than that according to section (3) to (5) should be adhered to.

3 Determining the shutdown volume following response of the overflow prevention device

3.1 Maximum volumetric flow rate of delivery pump

The maximum volumetric flow rate can either be determined by gauging (recirculating a defined liquid volume) or referenced from the pump characteristic curve. On containers conforming to DIN 4119, the permissible volumetric flow rate is stated on the container information plate.

3.2 Shutdown delay times

- (1) To the extent that the response times, switching times and operating times of individual parts are not stated on the associated data sheets, these times shall be measured.
- (2) Where valves require manual operation to interrupt the filling process, the time between the response of the overflow prevention device and the interruption of the filling process shall be estimated under consideration of local conditions.

3.3 Shutdown volume

The sum of individual shutdown delays times gives the overall shutdown delay time. The shutdown volume is obtained by multiplying the overall shutdown delay time by the volumetric flow rate determined in accordance with section 3.1 and adding the capacity of the pipes that would be drained following the response of the overflow prevention device.

4 Defining the response level for the overflow prevention device

The shutdown volume determined in accordance with section 3.3 is subtracted from the volume of liquid that corresponds to the permissible filling ratio. The response level is determined from the difference and the aid of the filling curve by means of calculation or gauging the capacity of the container in litres. The determination is to be documented.

Calculating the response level for overfill prevention devices

Operating location: _____
 Container no.: _____ Nominal volume: _____ (m³)
 Overfill prevention device: Manufacturer / Type: **FAFNIR GmbH / 76** **with NB 220**
 License no.: **Z-65.11-185**

1 Maximum volumetric flow rate (Q_{max}): _____ (m³/h)

2 Shutdown delay times

2.1 Level detector according to measurement / data sheet: _____ (s)

2.2 Switches / relays and similar: _____ (s)

2.3 Cycle times for bus devices and control instrumentation: _____ (s)

2.4 Delivery pump, run-out time: _____ (s)

2.5 Shutoff valve

Mechanically, manually actuated

- Time from alarm / to start of shutdown: _____ (s)

- Shutdown time: _____ (s)

Electrically, pneumatically or hydraulically operated

- Shutdown time: _____ (s)

Overall shutdown delay time (t_{total}): _____ (s)

3 Shutdown volume (V_{total})

3.1 Shutdown volume from overall shutdown delay time:

$$V_1 = Q_{max} \cdot \frac{t_{ges}}{3.600} = \text{_____} \text{ (m}^3\text{)}$$

3.2 Shutdown volume from pipes:

$$V_2 = \frac{\pi}{4} \cdot d^2 \cdot L = \text{_____} \text{ (m}^3\text{)}$$

Total shutdown volume (V_{total}=V₁+V₂): _____ (m³)

4 Response level

4.1 Volume at permissible filling ratio: _____ (m³)

4.2 Shutdown volume: _____ (m³)

Volume at response level (difference between 4.1 and 4.2): _____ (m³)

The response level results from the filling curve by means of calculation or gauging the capacity of the container in litres: _____ (mm)

4.6 Appendix 2 of the approval guidelines for overflow prevention devices Installation and operating guideline overflow prevention devices

1 Scope

This installation and operating guideline applies to the setup and operation of overflow prevention devices comprising multiple parts.

2 Definitions

- (1) Overflow prevention devices are designed to interrupt the filling process or trigger an audible and visual alarm promptly before the permissible filling ratio in the container is reached (for calculating the response level see Appendix 1).
- (2) Overflow prevention devices include all parts needed to effect the interruption of the filling process respectively trigger the alarm.
- (3) Aside from parts with German general construction approval (DIBT), overflow prevention devices can also include parts with without this approval. Figure 1 shows the parts requiring approval (parts on the left of the dividing line).
- (4) Atmospheric conditions are considered to be total pressures of 0.08 MPa to 0.11 MPa = 0.8 bar to 1.1 bar and temperatures of -20 °C to +60 °C.

3 Design of overflow prevention devices (see Figure 1 of the approval guidelines for overflow prevention devices or Appendix 1 of the German general construction approval DIBt)

- (1) Level detector (1) records the liquid level in the container.
- (2) The liquid level is converted to a proportional output signal by a continuous level gauging device in the associated measuring transducer (2), e.g. to an industry-standard signal (e.g. pneumatic 0.02 MPa to 0.10 MPa = 0.2 bar to 1.0 bar or electrical 4 - 20 mA or 2 - 10 V or digital via a suitable bus interface). The proportional output signal is supplied to a limit signal sensor (3), which compares the signal to the adjustable limit values and delivers binary output signals.
- (3) At level limit switches, the liquid level is converted to a binary output signal in the level detector (1) or in the associated measuring transducer (2) or transmitted as digital signals to a suitable bus interface.
- (4) Signals can be conducted, for example, via pneumatic or electric contacts (switches, electronic switching circuits, initiator circuits) or as digital signals for bus interfaces.
- (5) The binary output signal of the measuring transducer (2) or of limit signal sensor (3) or the bus communication signals of the measuring transducer (2) can be supplied to signalling device (5a) or to control device (5b) with actuator (5c) either directly or via suitable evaluation devices / signal amplifier (4).
- (6) The proportional (analogue) or binary output signal can also be evaluated via suitable electronic switching circuits (e.g. PLC, process control systems).

4 Installation and operation

4.1 Fault monitoring

- (1) In the event of a failure of the auxiliary power or an interruption in the connecting lines between parts or failure of the bus communication, overfill prevention devices must interrupt the filling process or trigger an audible or visual alarm.

In the case of overfill prevention devices in accordance with the approval guidelines, this can be achieved by the measures defined according to sections (2) to (4), in which case the conditions for monitoring of operability are also fulfilled.

- (2) Overfill prevention devices shall as a rule be safeguarded in accordance with the closed-circuit principle or other measures appropriate to fault monitoring.
- (3) Overfill prevention devices with level limit switch of which the binary output constitutes an initiator circuit with standardised interface shall be connected to a repeater in accordance with DIN EN 60947-5-6. The direction of action of the repeater shall be selected such that, in the event of an auxiliary power failure or a line break in the control circuit, its output signal interrupts the filling process or triggers an audible or visual signal.
- (4) Electric circuits for audible and visual alarms that cannot operate in accordance with the closed-circuit principle must be easy to inspect.

4.2 Control air

The control air required as auxiliary power must not contain contamination with a particle size of $> 100 \mu\text{m}$ and must have a humidity corresponding to a dew point of $-25 \text{ }^\circ\text{C}$.

4.3 Specialist companies

Only companies that satisfy the definition of a company specialised in the installation, servicing, repair and cleaning of the overfill prevention devices according to water right shall be entrusted with these tasks, unless the tasks are exempted from the specialist company obligation according to the law concerning water or the manufacturer of the level detectors and measuring transducers has the tasks undertaken by its own expert personnel.

5 Tests

5.1 Test prior to initial commissioning and re-commissioning after shutdown

Following the completion of the installation of the overfill prevention device or re-commissioning of the container after shutdown, the system must be checked for correct installation and tested for correct operation by an expert of the specialist company according to section 4.3 or, if there is no specialist company obligation, by the owner operator.

If a change in the settings is expected during a change in the liquid stored, such as the response level or the function, a new function check is to be carried out.

A certificate with confirmation of the correct function is to be issued by the expert and submitted to the operator about the setting of the overfill prevention device.

5.2 Repeat testing

(1) The proper condition and operability of the overfill prevention device must be tested at reasonable intervals, but at least once a year by an expert of the specialist company according to section 4.3, or by the operator if there is no specialist company obligation. The owner operator shall be responsible for the type and frequency of inspection within the specified period. The test must be conducted in such a way that proof is obtained of correct operation of the overfill prevention device with all components interacting.

- This condition can be satisfied by allowing the liquid to reach the response level during a filling process.
- If filling to the response level is not practicable,
 - the level detector should be caused to respond through simulation of the fill level or physical measuring effect or
 - if the operability of the level detector / measuring transducer is demonstrable by other means (exclusion of function-impairing faults), the test can also be carried out by simulating the corresponding output signal.

(2) If functional impairment of the overfill prevention device due to corrosion cannot be prevented and this malfunction is not self-reporting, all parts that are at risk of corrosion shall also be inspected regularly at reasonable intervals.

(3) There can be a deviation from the specifications up to repeat testing with regard to operability in case of fail-safe parts of overfill prevention devices if

- components with special reliability (safe against failure) or safety relevant facilities with regard to VDI/VDE 2180 (fail-safe-system) are used or this has been proved by means of an equivalent standard
- and this is expressly stated for the tested parts in the general approval granted by the supervising authority.

5.3 Documentation

The results in accordance with no. 5.1 and 5.2 shall be documented and stored.

5.4 Maintenance

The owner operator shall service the overfill prevention device regularly to the extent that this is necessary to maintaining its operability. The recommendations of the manufacturer in this respect shall be observed.

4.7 Overfill prevention device with level limit switch for use in stationary containers for the storage of water-polluting liquids

Technical description

Z-65.11-185

Level detector 76 ... and measuring transducer NB 220 ...

Edition: 04.2013

1 Design of the overfill prevention device

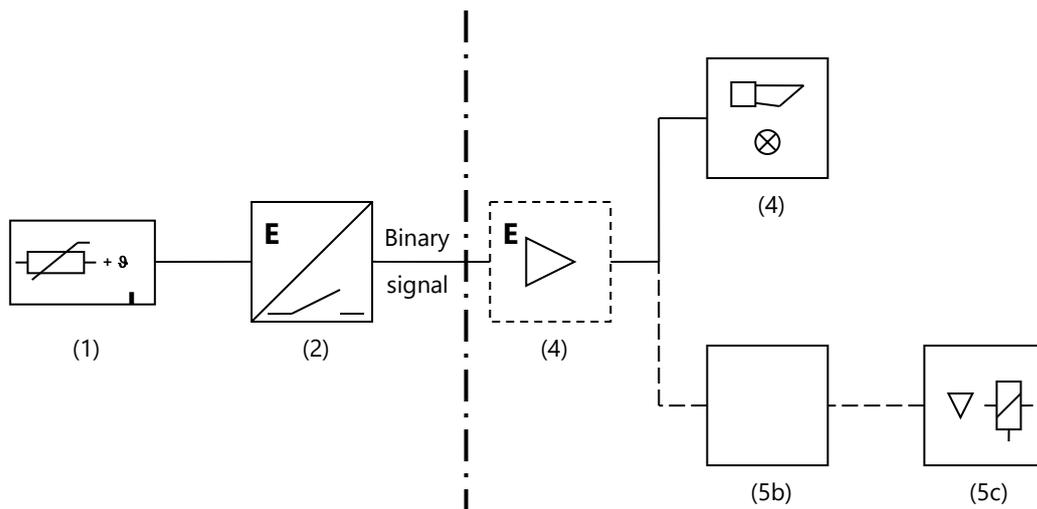
The overfill prevention device comprises a level detector (1) and a measuring transducer (2) with output (relay contact).

The switching signal is supplied to signalling device (5a) or to control device (5b) with actuator (5c) either directly or, where necessary, by way of a signal amplifier (4).

Unchecked parts of the overfill prevention device, such as signalling device (5a), control device (5b), actuator (5c) and signal amplifier (4) must satisfy the requirements of sections 3 and 4 of the German approval guidelines for overfill prevention devices.

1.1 Concept of the overfill prevention device

Overfill prevention device with level limit switch.



- 1 Level detector 76 ...
- 2 Measuring transducer NB 220 ...
- 4 Signal amplifier
- 5a Signalling device
- 5b Control device
- 5c Actuator

1.2 Function description

Level detector 76 ...

The operating principle of the level detector exploits the difference in thermal conductivity between gases and liquids. A PTC resistor encapsulated in the tip of the level detector is heated by the signal current of the measuring transducer to the point at which a sudden increase in its electrical resistance occurs. As soon as this tip becomes immersed in a liquid, the resulting drop in temperature causes a drop in resistance to the original value. The signal current is limited in such a way that, in this condition (immersed), the resistor cannot be reheated. In a gaseous environment, the PTC resistor takes between 15 seconds (at +60 °C ambient temperature) and 2 minutes (at -20 °C ambient temperature) to heat up.

Measuring transducers NB 220 ...

In the measuring transducer, the changes in resistance of the PTC resistor are converted to relay switching signals with binary signal output. The PTC resistor operation is continuously monitored by a scanner integrated in the measuring transducer. The characteristics of the PTC resistor (heating and cooling behaviour) are checked several times each second without effect on the measuring process. This ensures that any PTC resistor that is no longer operationally reliable, e.g. due to external causes (corroded probe sleeve), can be detected instantly and signalled by a response of the overfill prevention device's alarm system. Accurate regulation of the energy supplied to the PTC resistor by the scanner guarantees optimum reliability of operation and the maximum possible service life.

A relay de-energize occurs as soon as the level detector tip is cooled or in the event of a power failure, short circuit or line break in the connection between the level detector and measuring transducer. The power ON state of the measuring transducer is indicated by a green LED.

Measuring transducer NB 220 H

A relay de-energize is indicated on the measuring transducer by the extinguishing of a yellow LED.

Measuring transducer NB 220 QS

A cooled-down tip of the level detector is indicated on the measuring transducer by an audible and visual alarm. The audible signal can be stopped by pressing the acknowledge button; the visual signal is permanently active and indicated in form of a red signal lamp (a relay de-energize is additionally indicated by the extinguishing of a yellow LED). As soon as the liquid level drops and exposes the level detector to gas, the visual signal is extinguished and the system reverts to being on alert. In addition, the alarm signalling devices above support external connections.

Measuring transducer NB 220 QSF

A cooled-down tip of the level detector is indicated on the measuring transducer by an audible and visual alarm. The audible signal can be stopped by pressing the acknowledge button; the visual signal is permanently active and indicated in form of a red signal lamp. As soon as the liquid level drops and exposes the level detector to gas, the visual signal is extinguished and the system reverts to being on alert. The power ON state of the measuring transducer is indicated by a green LED. In addition, the alarm signalling devices above support external connections.

In the event of blown device fuses or a power failure, the green power LED on the measuring transducer goes out and the changeover relay contact is de-energized.

1.3 Model codes

Level detector 76 ...

Type	Version 1	Temperature range	Version 2
			Duo 1 Process connection G 1 ¹ / ₂ ; both welded
			Duo 2 Process connection G 2; both adjustable
			Duo 3 Process connection G 2; one welded, one adjustable
			Trio 1 Process connection G 2; all welded
			Trio 3 Process connection G 2; two welded, one adjustable
			F Process connection flange; at least DN 25
			X Special process connection , e.g. dairy fitting
			Liquid temperature -25 °C to +50 °C
		H	Liquid temperature -25 °C to +80 °C
	A		With connection housing
	B _n		Cable end 1 m long (standard); without process connection; n = probe diameter, e.g. B6 = Ø 6 mm
	C		Cable end 3 m long (standard); with brass fitting
	E		Cable end 3 m long (standard); with plastic fitting
	M		Cable end 3 m long (standard); with fixed response length
	MA		Connection housing and fixed response length
	N		All wetted parts are made of stainless steel
76			Calorimetric level detector; standard probe diameter 16 mm and process connection G ³ / ₄

Measuring transducers NB 220 ...

NB 220 H	Visual alarm, one floating changeover contact
NB 220 QS	Visual and audible alarm, acknowledge button, external connections joined to auxiliary power
NB 220 QSF	Visual and audible alarm, acknowledge and test button, two floating changeover contacts

1.4 Dimension sheets and technical data

Level detector76 ...

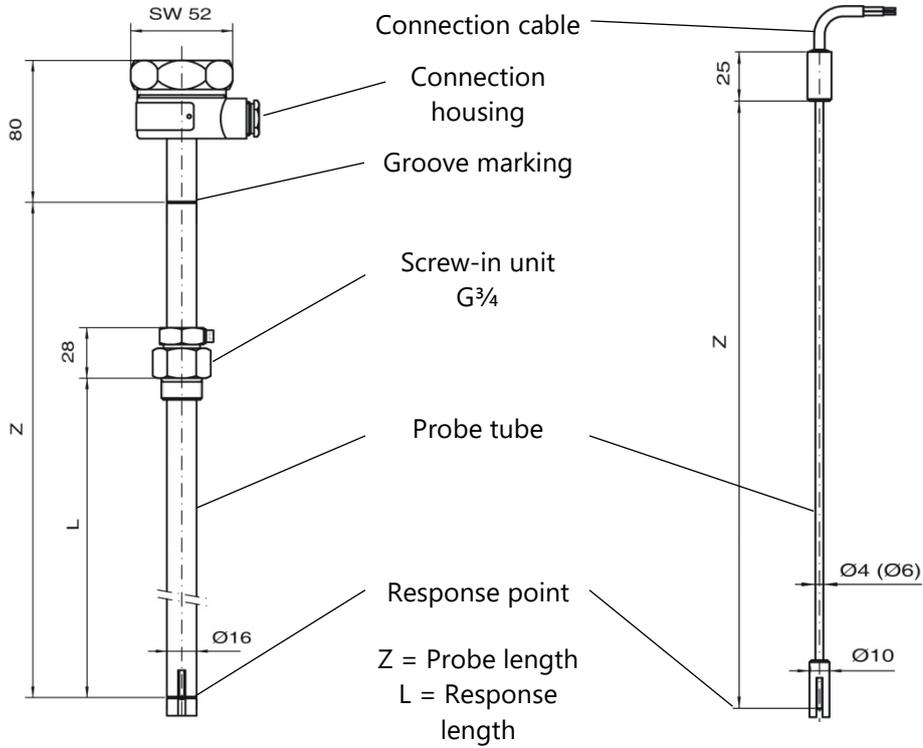


Figure 1: 76 A

Figure 2: 76 B...

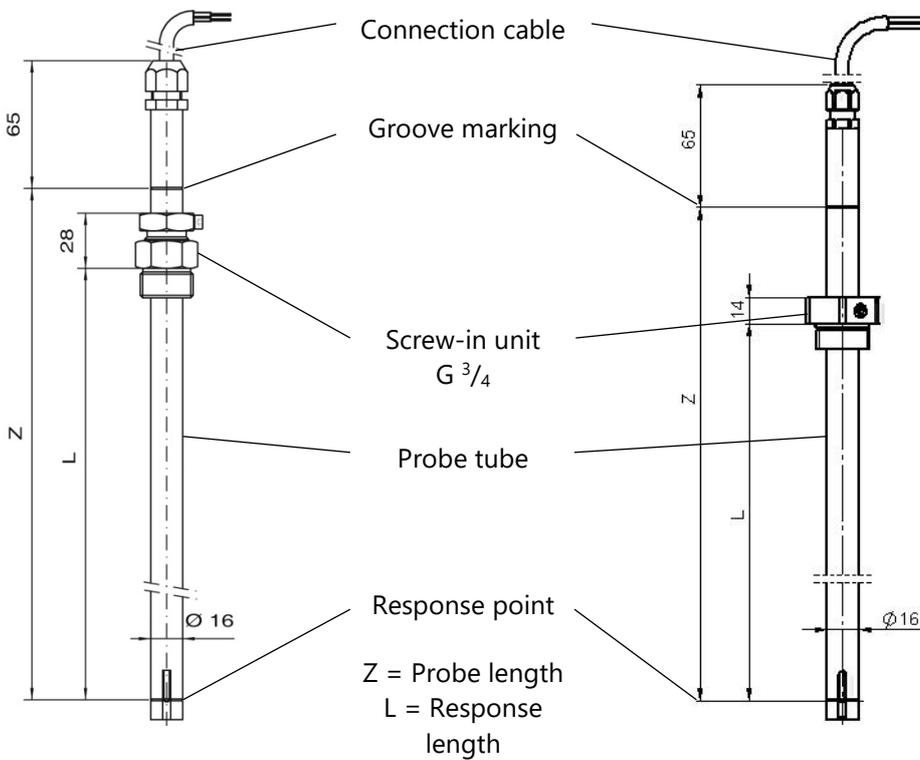


Figure 3: 76 C

Figure 4: 76 E

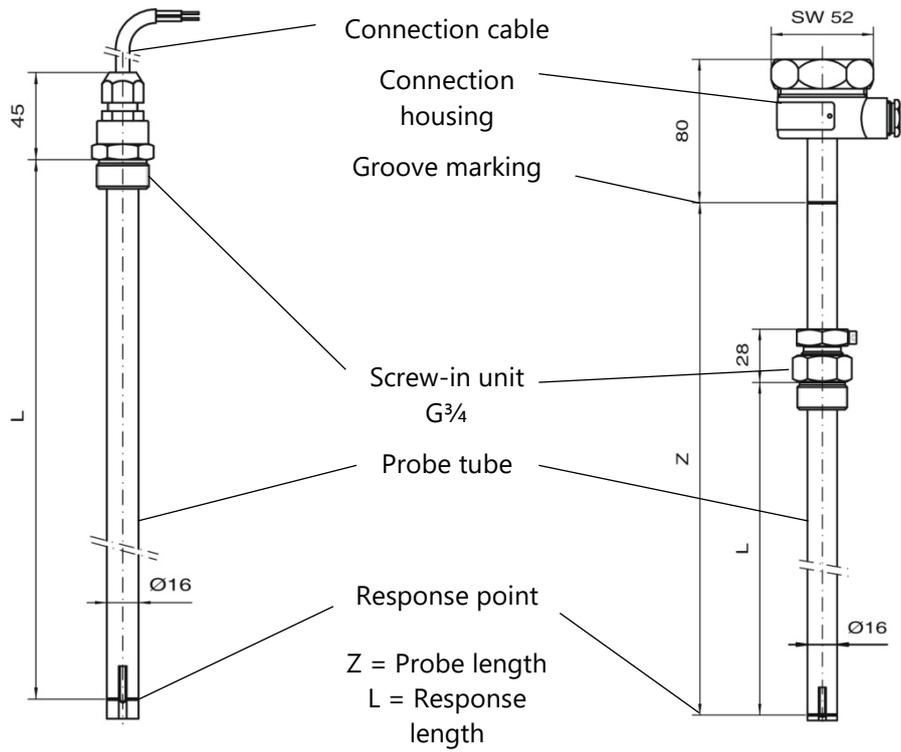


Figure 5: 76 M

Figure 6: 76 N

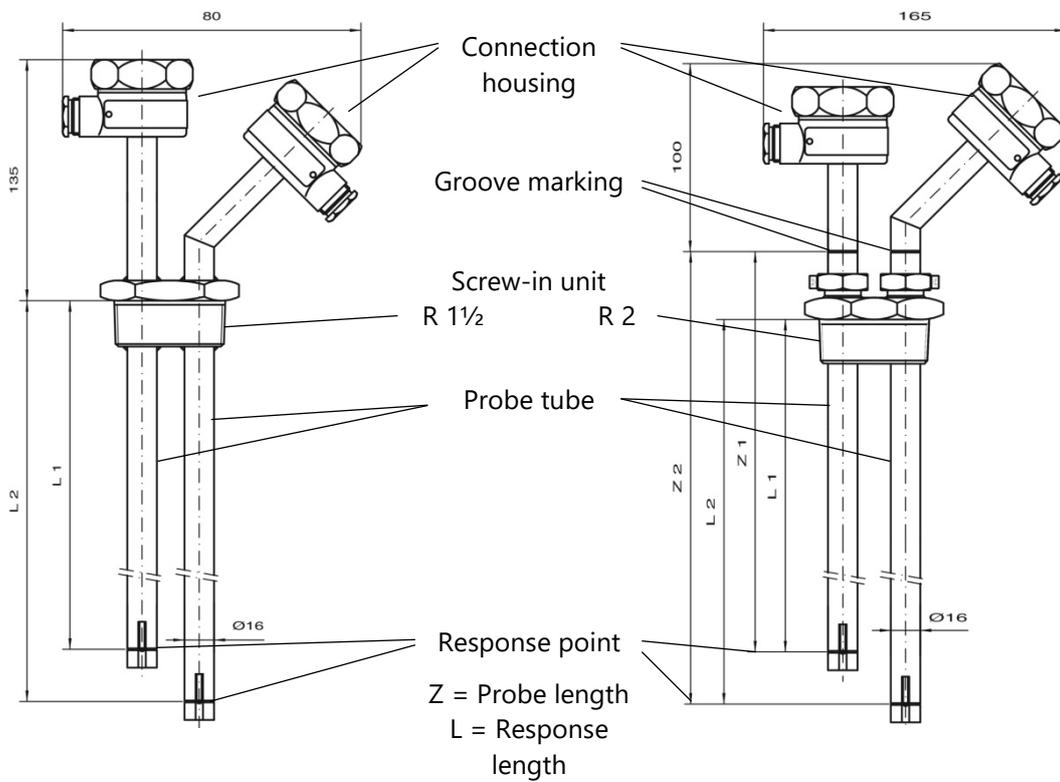


Figure 7: 76 A Duo 1

Figure 8: 76 A Duo 2

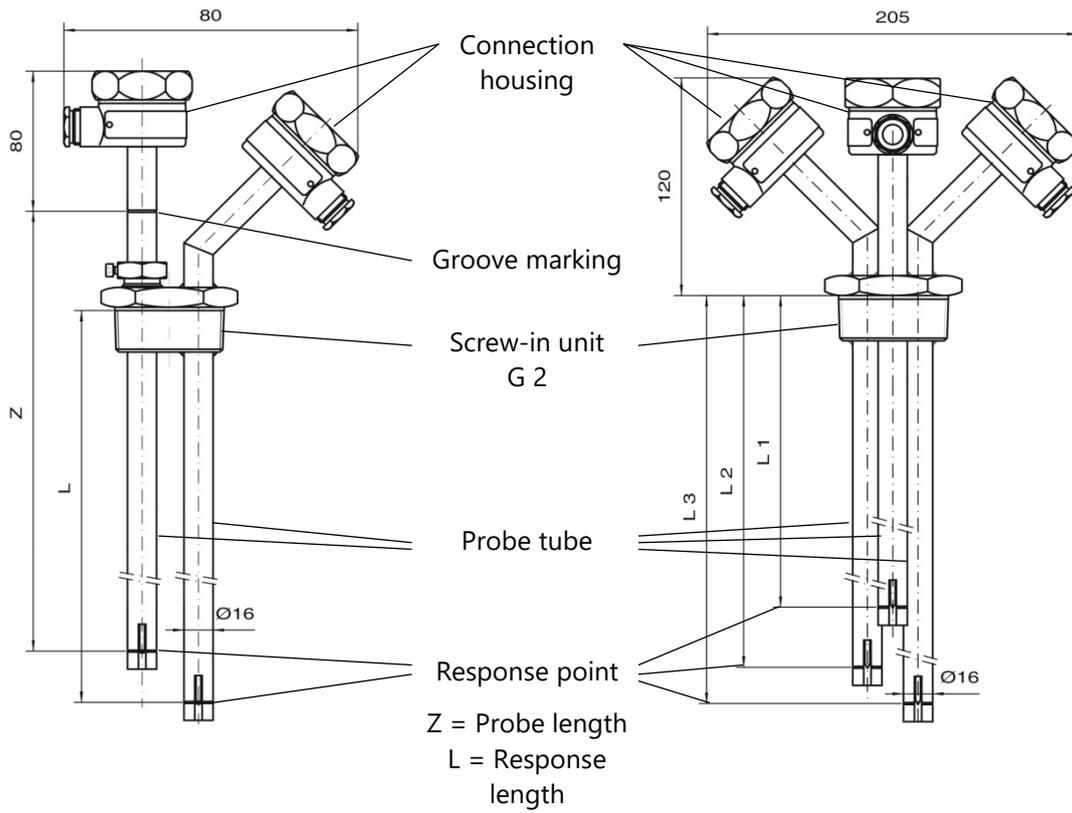


Figure 9: 76 A Duo 3

Figure 10: 76 A Trio 1

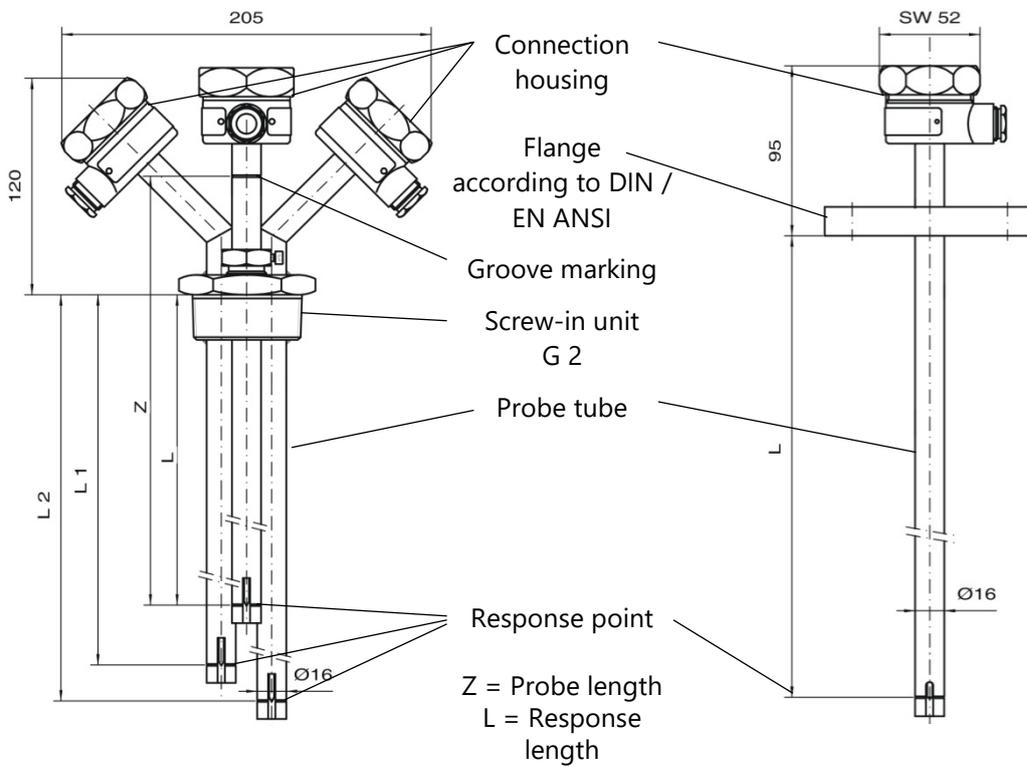


Figure 11: 76 A Trio 3

Figure 12: 76 A F

Temperatures

Ambient	-25 °C to +80 °C
Medium, standard	-25 °C to +50 °C
Medium, H-sensor	-25 °C to +80 °C

Pressures

Process pressure	0 bar to 2 bar
------------------	----------------

Heat-up times

at $T_a = -20\text{ °C}$	< 2 minutes
at $T_a = +60\text{ °C}$	< 15 seconds

Casing protection (according to EN 60529:1991 + A1:2000 + A2:2013)

76 ...	IP67
--------	------

Measuring transducers NB 220 ...

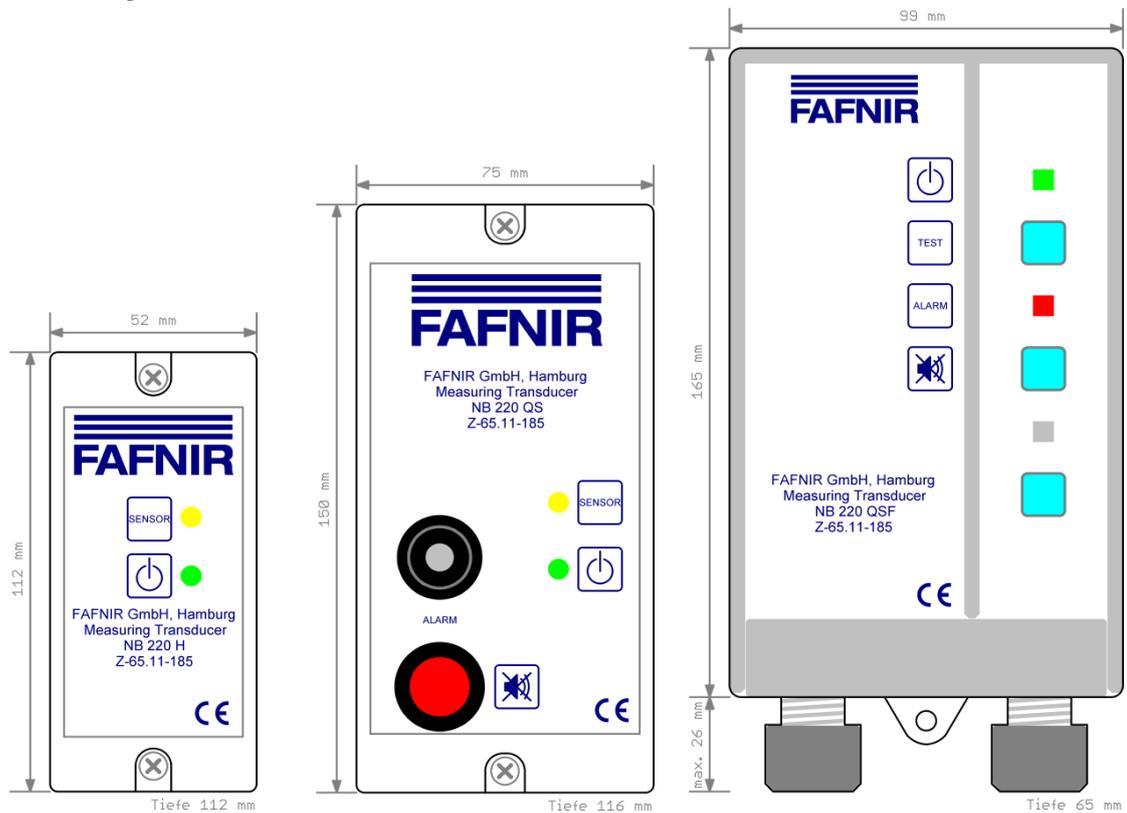


Figure 13: NB 220 H

Figure 14: NB 220 QS

Figure 15: NB 220 QSF

Auxiliary power

Voltage	24 V AC/DC or 230 V AC, 50 Hz	
Input power (max)	NB 220 H:	2.2 W or 3.9 VA
	NB 220 QS:*	4.1 W or 7.2 VA
	NB 220 QSF:	2.1 W or 3.7 VA

Level detector circuit

Voltage	< 22 V
Current	< 130 mA
Power	< 650 mW

Acknowledgement circuit

Voltage	NB 220 H:	Not available
	NB 220 QS:	= Auxiliary power
	NB 220 QSF:	5 V
Current	< 20 mA	

Output circuits NB 220 H

Changeover contact	1, floating, not acknowledgeable
AC	$U_{AC} \leq 250 \text{ V}$, $I_{AC} \leq 4 \text{ A}$, $\cos \varphi \geq 0.7$, $P_{AC} \leq 500 \text{ VA}$
DC	$U_{DC} \leq 250 \text{ V}$, $I_{DC} \leq 250 \text{ mA}$, $P_{DC} \leq 50 \text{ W}$

Output circuits NB 220 QS

Changeover contact	1, potential of auxiliary power, not acknowledgeable
Normally open contact	1, potential of auxiliary power, acknowledgeable
All outputs are protected with one 2 A fuse (slow, but faster ones can also be used).	

Output circuits NB 220 QSF

Changeover contact	2, floating, one is acknowledgeable and one is not
AC	$U_{AC} \leq 250 \text{ V}$, $I_{AC} \leq 4 \text{ A}$, $\cos \varphi \geq 0.7$, $P_{AC} \leq 500 \text{ VA}$
DC	$U_{DC} \leq 250 \text{ V}$, $I_{DC} \leq 250 \text{ mA}$, $P_{DC} \leq 50 \text{ W}$

Temperatures

Ambient temperature	-25 °C to +60 °C
---------------------	------------------

Casing protection (according to EN 60529:1991 + A1:2000)

NB 220 H	IP40
NB 220 QS	IP40
NB 220 QSF	IP40

*Without outputs

2 Material of level detectors

Version	Material	Designation
76 A 76 C	Stainless steel Elastomer Elastomer (seal in screw-in unit) Spring steel Plastic Brass (screw-in unit)	1.4301 to 1.4571 Viton Vulkollan 1.1248, zinc-plated POM GF 25 % 2.0380
76 AF 76 A Duo 1 76 A Trio 1	Stainless steel Elastomer Spring steel Plastic	1.4301 to 1.4571 Viton 1.1248, zinc-plated POM GF 25 %
76 A Duo 2 76 A Duo 3 76 A Trio 3	Stainless steel Elastomer Elastomer (seal in screw-in unit) Spring steel Plastic	1.4301 to 1.4571 Viton Vulkollan 1.1248, zinc-plated POM GF 25 %
76 B... 76 NF 76 N Duo 1 76 N Trio 1	Stainless steel	1.4301 to 1.4571
76 E	Stainless steel Elastomer Elastomer (seal in screw-in unit) Plastic Plastic (screw-in unit)	1.4301 to 1.4571 Viton NBR POM GF 25 % PE-HD
76 M	Elastomer Spring steel Plastic Brass	Viton 1.1248, zinc-plated POM GF 25 % 2.0380
76 N 76 N Duo 2 76 N Duo 3 76 N Trio 3	Stainless steel Elastomer (seal in screw-in unit)	1.4301 to 1.4571 Vulkollan

Table 1: Material of level detectors (parts which come in contact with media)

3 Range of application

The level limit switches, which comprise the 76 ... level detector and the NB 220 ... measuring transducer, are suitable for use in stationary containers or containers that are stationary during use for storage of the following liquids. The pressures and temperatures listed under 1.4 Dimension sheets and technical data, must not fall below or exceed those specified.

The 76 N level detector can be used with liquids to which stainless steel (1.4301) is resistant.

The 76 N and 76 E level detectors are particularly suitable for urea solutions of 32.5 %.

Flammable water-polluting liquids

Fuel oil EI (DIN 51 603) and diesel according to DIN EN 590 (DIN 51601), biodiesel according to DIN EN 14214 (DIN 51606), diesel / biodiesel mixtures (DIN 51628), used transmission and engine oils.

The level limit switch must **not** be used with potentially explosive liquids.

Hexanol 1	Nitrobenzene
Ethyl acetoacetate (acetoacetic ester)	1.2-Dichlorobenzene
Acrylic acid-2-Ethylhexyl ester (2-Ethylhexyl acrylate)	2.4-Dimethylaniline (N,N-Dimethylaniline)
Cyclohexyl acetate	n-Octanol (n-Octyl-alcohol)
Benzaldehyde	Diethyl oxalate
Methyl acetate	Aniline

and all similar flammable water-polluting liquids with equivalent thermal conductivity.

Non-flammable water-polluting liquids

Unused engine, transmission and hydraulic oils	Transformer oils
Vegetable oils (also according to DIN EN 51605)	Anti-freeze
Oil and water mixtures (e.g. drilling and lubricating oils)	Cleaning agent and water mixtures
Per- and trichloroethylene	Urea solution (32.5 %)

and all similar non-flammable water-polluting liquids with equivalent thermal conductivity.

4 Fault and failure notifications

In the event of a power failure or failure of device fuses, non-functioning sensor element, interruption or short circuit in the signal line between the level detector and the measuring transducer, or a malfunction of the measuring transducer, it switches to the state "Response level reached".

The signal "Response level reached" is indicated on the measuring transducer (except NB 220 H) by means of an audible or visual alarm, unless a power supply failure or device fuse failure is responsible for it (the green power LED on the measuring transducer is inactive).

External signalling and control devices for monitoring the operability according to ZG-ÜS, Section 4.1 must be connected on measuring transducer NB 220 QS between terminals 4 and 8.

5 Installation notes

During all work on the container, all applicable technical safety regulations must be observed. The level limit switch is not suitable for use with potentially explosive liquids.

The level detector must be installed in the container in a position where no liquid splashes or strong vapour flows would cause the overflow prevention device to respond prematurely. The level detectors should be installed as vertically as possible so that residual liquid can drip easily from the probe. At an installation length of over 3,000 mm the level detector is to be secured against being bent and to be equipped with a supporting device every 3,000 mm.

Connection diagram

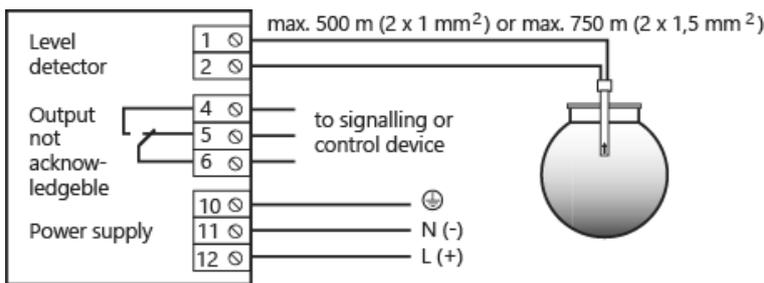
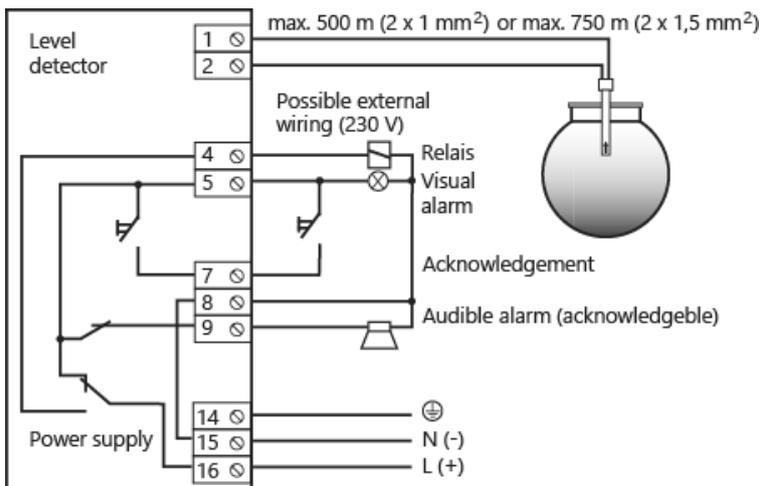


Figure 16: NB 220 H connection diagram



 *Relay outputs under mains voltage. No external power connection possible.*

Figure 17: NB 220 QS connection diagram

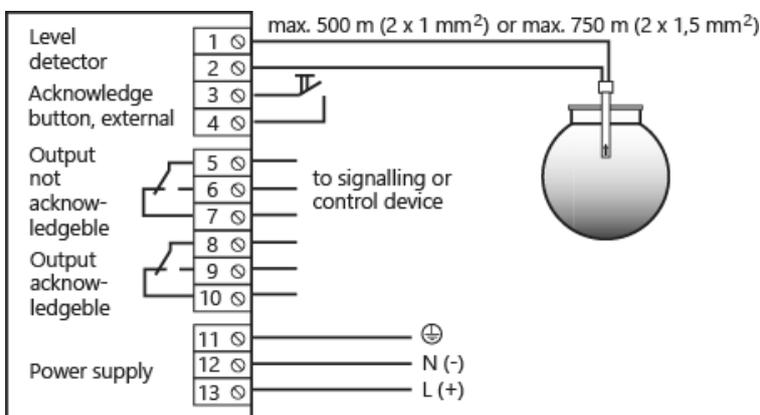


Figure 18: NB 220 QSF connection diagram

6 Notes for correct adjustment

Based on the permissible filling ratio in the container, the response level (A) of the overfill prevention device must be determined in accordance with Appendix 1 of the approval guidelines for overfill prevention devices. The switch delay time of 2 seconds must be taken into consideration here.

Probe length permanently imprinted

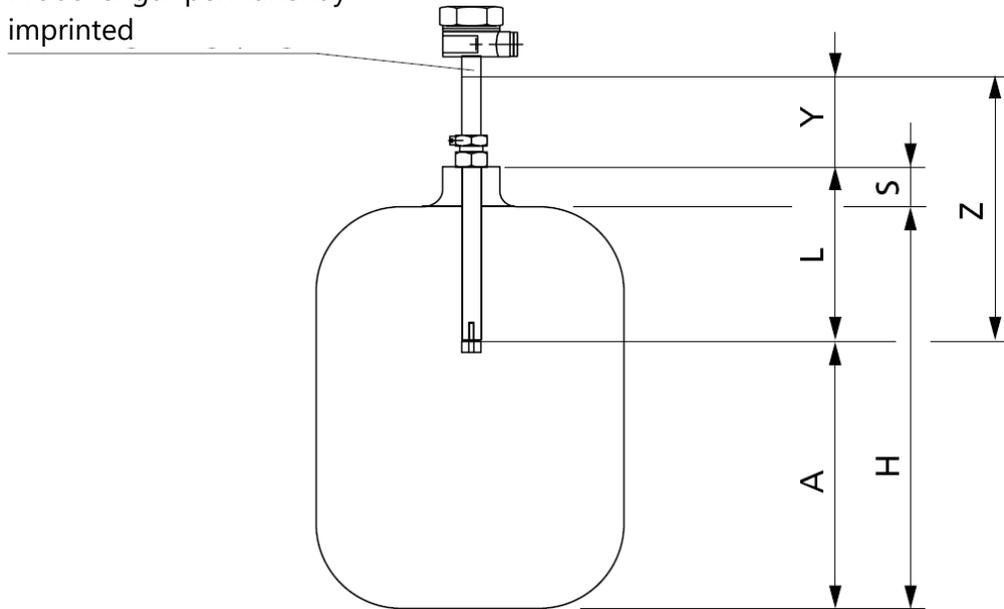


Figure 19: Notes for correct adjustment

- | | |
|----------------------|---------------------------|
| A = Response level | S = Spigot or muff height |
| L = Response length | Y = Check dimension |
| H = Container height | Z = Probe length |

The response length (L) is calculated with

$$L = (H - A) + S$$

For a check, response length (L) can be calculated without removing the level detector

$$L = Z - Y$$

Level detector 76 ...

The level detector comprises a probe tube, which projects into the container and, at the bottom end, is equipped with a probe with protection against mechanical damage.

At level detectors with variable response length the respective probe length is permanently marked. The probe length is a measure of the distance between the groove marking on the top end of the probe tube and the response point of the level detector.

On level detectors with fixed response length, the length is permanently imprinted and specifies the distance between the hexagon nut seat or flange underside to the groove marking on the protective sleeve of the probe at the bottom end of the level detector.

The response length L is calculated from the container dimensions and the response level. With the probe tube fitted, correct adjustment of the response level can be checked by means of check dimension Y . Check dimension Y is measured as distance between the groove marking on the top end of the probe tube and the hexagon nut seat of the screw-in unit. Subtracting check dimension Y from the imprinted probe length gives response length L .

Level detectors with screw-in unit (adjustable) 76 ... / 76 A Duo 2

The response length is determined from the tank data and adjusted accordingly. To fix the probe tube, it is necessary to tighten the upper gland screw and the locking screw of the screw-in unit. The screw-in thread must then be provided with a suitable resistant sealing material and screwed into the existing tank coupling.

Level detectors with fixed screw-in unit 76 M...

As the response length L of the level detector is invariable (probe tube rigidly connected to the screw-in unit), this dimension must be accurately determined from the container dimensions and specified before the device is ordered. The screw-in thread must be provided with a suitable resistant sealing material and screwed into the existing tank coupling.

Level detectors with flange 76 AF

As the response length L of the level detector is invariable (probe tube rigidly connected to the flange), this dimension must be accurately determined from the container dimensions and specified before the device is ordered.

Level detectors 76 A (N) Duo 1 / 76 A Trio 1

As the response lengths of the level detectors are invariable (probe tubes rigidly connected to the screw-in unit), this dimension must be accurately determined from the container dimensions and specified before the device is ordered. The response lengths are permanently imprinted on each level detector. The screw-in thread must be provided with a suitable resistant sealing material and screwed into the existing tank coupling.

Level detectors 76 A Duo 3 / 76 A Trio 3

The response length for the adjustable level detector is determined from the tank data and adjusted accordingly. To fix the probe tube, it is necessary to tighten the upper gland bolt and the retaining screw of the screw-in unit. The response lengths of the other level detectors are invariable (probe tubes rigidly connected to the screw-in unit) and must be accurately determined from the container dimensions and specified before the device is ordered. The response lengths are permanently imprinted on each level detector. The screw-in thread must be provided with a suitable resistant sealing material and screwed into the existing tank coupling.

7 Operating instructions

The level limit switch is generally maintenance-free provided it is installed and operated in accordance with its intended purpose. The signalling and control device is to be connected downstream from the approved system parts, next to the signal amplifier, if necessary. The general operating instructions for the devices being used must be observed in accordance with the installation and operating guideline for overflow prevention devices according to Appendix 2 of the ZG-ÜS.

Before commissioning, all system parts of the overflow prevention device must be checked to determine that they are correctly connected and working properly. The system and downstream devices must be checked for correct operation.

8 Repeat testing

The operability of the overflow prevention device must be tested at reasonable intervals, but at least once a year. The operator shall be responsible for the type and frequency of inspection within the specified period.

The test must be conducted in such a way that proof is obtained of correct operation of the overflow prevention device with all components interacting. This condition can be satisfied by allowing the liquid to reach the response level during a controlled filling process. If filling to the response level is not practicable, the level detector should be caused to respond through simulation of the fill level or physical measuring effect by suitable means.

For the level detectors, the function test can be performed as follows:

- a) Remove the level detector and immerse it in the stored liquid.
Shortly after the immersion (≤ 2 s) the relays in the measuring transducer must de-energize and thereby activate the signalling device.
- b) By filling the container up to response level A.
The filling process must be very closely monitored! The overflow prevention device and the downstream signalling devices must respond.

The test to determine whether the alarm system of the overflow prevention device works in accordance with the closed-circuit principle or whether the monitoring of the sensor element functions, can be performed as follows:

- a) Interrupt the auxiliary power supply of the measuring transducer.
The green LED of the measuring transducer must go out and the downstream signalling devices must respond.
- b) Interrupt or short-circuit the signal line between the level detector and measuring transducer.
The level limit switch and the downstream signalling devices must respond.

Measuring transducer NB 220 QSF

The entire overflow prevention device can be checked using the test button. Whenever this button is pressed, the heat output of the PTC resistor is reduced to such an extent that the resistor cools (equivalent of an immersed sensor) and the alarm system is triggered. The alarm must occur no more than 2 seconds after the button has been pressed. As soon as the test button is released, the PTC resistor continues to be heated. Once the resistor has heated up (> 5 seconds), the overflow prevention device is back on alert. If no alarm occurs after the test button has been pressed or immediately after its release, the overflow prevention device must be checked immediately.

The selected test method and the result must be documented.

**Allgemeine
bauaufsichtliche
Zulassung/
Allgemeine
Bauartgenehmigung**

Eine vom Bund und den Ländern gemeinsam
getragene Anstalt des öffentlichen Rechts

**Zulassungs- und Genehmigungsstelle
für Bauprodukte und Bauarten**

Datum: 04.09.2023 Geschäftszeichen: I 65-1.65.11-18/23

**Nummer:
Z-65.11-185**

Antragsteller:
FAFNIR GmbH
Schnackenburgallee 149c
22525 Hamburg

Geltungsdauer
vom: **3. Oktober 2023**
bis: **3. Oktober 2028**

Gegenstand dieses Bescheides:

**Standaufnehmer (Kaltleiterelemente) vom Typ 76 . . . und Messumformer Typ NB 220 . . . als
Standgrenzschalter von Überfüllsicherungen**

Der oben genannte Regelungsgegenstand wird hiermit allgemein bauaufsichtlich
zugelassen/genehmigt.
Dieser Bescheid umfasst sechs Seiten und eine Anlage.

DIBt

I ALLGEMEINE BESTIMMUNGEN

- 1 Mit diesem Bescheid ist die Verwendbarkeit bzw. Anwendbarkeit des Regelungsgegenstandes im Sinne der Landesbauordnungen nachgewiesen.
- 2 Dieser Bescheid ersetzt nicht die für die Durchführung von Bauvorhaben gesetzlich vorgeschriebenen Genehmigungen, Zustimmungen und Bescheinigungen.
- 3 Dieser Bescheid wird unbeschadet der Rechte Dritter, insbesondere privater Schutzrechte, erteilt.
- 4 Dem Verwender bzw. Anwender des Regelungsgegenstandes sind, unbeschadet weitergehender Regelungen in den "Besonderen Bestimmungen", Kopien dieses Bescheides zur Verfügung zu stellen. Zudem ist der Verwender bzw. Anwender des Regelungsgegenstandes darauf hinzuweisen, dass dieser Bescheid an der Verwendungs- bzw. Anwendungsstelle vorliegen muss. Auf Anforderung sind den beteiligten Behörden ebenfalls Kopien zur Verfügung zu stellen.
- 5 Dieser Bescheid darf nur vollständig vervielfältigt werden. Eine auszugsweise Veröffentlichung bedarf der Zustimmung des Deutschen Instituts für Bautechnik. Texte und Zeichnungen von Werbeschriften dürfen diesem Bescheid nicht widersprechen, Übersetzungen müssen den Hinweis "Vom Deutschen Institut für Bautechnik nicht geprüfte Übersetzung der deutschen Originalfassung" enthalten.
- 6 Dieser Bescheid wird widerruflich erteilt. Die Bestimmungen können nachträglich ergänzt und geändert werden, insbesondere, wenn neue technische Erkenntnisse dies erfordern.
- 7 Dieser Bescheid bezieht sich auf die von dem Antragsteller gemachten Angaben und vorgelegten Dokumente. Eine Änderung dieser Grundlagen wird von diesem Bescheid nicht erfasst und ist dem Deutschen Institut für Bautechnik unverzüglich offenzulegen.

II BESONDERE BESTIMMUNGEN

1 Regelungsgegenstand und Verwendungs- bzw. Anwendungsbereich

(1) Gegenstand dieses Bescheides ist ein Standgrenzschalter, der als Bauteil einer Überfüllsicherung (siehe Anlage 1) dazu dient, bei der Lagerung wassergefährdender Flüssigkeiten Überfüllungen von Behältern zu verhindern. In der Spitze des Standaufnehmers ist ein gekapselter Kaltleiter eingebaut, der elektrisch aufgeheizt wird, beim Eintauchen in die Lagerflüssigkeit abkühlt und dadurch den elektrischen Widerstand verändert. Diese Widerstandsänderung löst im Messumformer ein binäres, elektrisches Signal aus, mit dem rechtzeitig vor Erreichen des zulässigen Füllungsgrades der Füllvorgang unterbrochen oder akustisch und optisch Alarm ausgelöst wird. Die für die Melde- oder Steuerungseinrichtung erforderlichen Teile und der Signalverstärker sind nicht Gegenstand dieses Bescheides.

(2) Die mit der wassergefährdenden Flüssigkeit, deren Kondensat oder Dämpfen in Berührung kommenden Teile des Standaufnehmers bestehen aus nichtrostendem Stahl sowie aus Messing. Den unteren Abschluss bilden Buchsen aus Polyoxymethylen (POM) bzw. nichtrostendem Stahl und eine Kaltleiterkapselung aus nichtrostendem Stahl sowie ein Zackenring aus Federstahl bzw. nichtrostendem Stahl.

(3) Der Standaufnehmer darf für Behälter unter Drücken bis 2 bar und je nach Ausführung bei Temperaturen der Lagerflüssigkeit von -25 °C bis +50 °C bzw. -25 °C bis +80 °C verwendet werden. Die Umgebungstemperatur am Messumformer muss zwischen -25 °C und +60 °C liegen.

(4) Mit diesem Bescheid wird der Nachweis der Funktionssicherheit des Regelungsgegenstandes im Sinne von Absatz (1) erbracht.

(5) Der Bescheid wird unbeschadet der Bestimmungen und der Prüf- oder Genehmigungsvorbehalte anderer Rechtsbereiche erteilt.

(6) Dieser Bescheid berücksichtigt die wasserrechtlichen Anforderungen an den Regelungsgegenstand. Gemäß § 63 Abs. 4 Nr. 2 und 3 WHG¹ gilt der Regelungsgegenstand damit wasserrechtlich als geeignet.

(7) Die Geltungsdauer dieses Bescheides (siehe Seite 1) bezieht sich auf die Verwendung im Sinne von Einbau des Regelungsgegenstandes und nicht auf die Verwendung im Sinne der späteren Nutzung.

2 Bestimmungen für das Bauprodukt

2.1 Allgemeines

Der Standgrenzschalter und seine Teile müssen den Besonderen Bestimmungen und der Anlage dieses Bescheides sowie den beim Deutschen Institut für Bautechnik hinterlegten Angaben entsprechen.

2.2 Eigenschaften und Zusammensetzung

(1) Der Regelungsgegenstand setzt sich aus folgenden Einzelteilen zusammen (Nummerierung siehe Anlage 1):

(1) Standaufnehmer (Niveaustandgeber): Typ 76 . . .

(2) Messumformer (Niveaubegrenzer): Typ NB 220 . . .

Die vollständige Typenbezeichnung entspricht dem Typenschlüssel gemäß der Technischen Beschreibung².

¹ Wasserhaushaltsgesetz vom 31. Juli 2009 (BGBl. I S. 2585), das zuletzt durch Artikel 5 des Gesetzes vom 3. Juli 2023 (BGBl. 2023 I Nr. 176) geändert worden ist

² Technische Beschreibung des Antragstellers vom Juni 2018 auf Grundlage der von der TÜV NORD CERT GmbH geprüften Technischen Beschreibung vom April 2013 für den Standaufnehmer 76 . . . und Messumformer NB 220 . . .

(2) Die Teile der Überfüllsicherung, die nicht Gegenstand der von dem Bescheid erfassten allgemeinen bauaufsichtlichen Zulassung sind, dürfen nur verwendet werden, wenn sie den Anforderungen des Abschnitts 3 "Allgemeine Baugrundsätze" und des Abschnitts 4 "Besondere Baugrundsätze" der ZG-ÜS³ entsprechen. Sie brauchen jedoch keine Bescheidnummer zu haben.

2.3 Herstellung und Kennzeichnung

2.3.1 Herstellung

Der Standgrenzschalter darf nur im Werk des Antragstellers, FAFNIR GmbH in 22525 Hamburg, hergestellt werden. Er muss hinsichtlich Bauart, Abmessungen und Werkstoffen den in der im DIBt hinterlegten Liste aufgeführten Unterlagen entsprechen.

2.3.2 Kennzeichnung

Der Standgrenzschalter, dessen Verpackung oder dessen Lieferschein muss vom Hersteller mit dem Übereinstimmungszeichen (Ü-Zeichen) nach den Übereinstimmungszeichen-Verordnungen der Länder gekennzeichnet werden. Die Kennzeichnung darf nur erfolgen, wenn die Voraussetzungen nach Abschnitt 2.4 erfüllt sind.

Zusätzlich sind die zulassungspflichtigen Bauteile selbst mit folgenden Angaben zu kennzeichnen:

- Hersteller oder Herstellerzeichen^{*)},
- Typenbezeichnung,
- Serien- oder Chargennummer bzw. Identnummer bzw. Herstelldatum,
- Bescheidnummer^{*)}.

^{*)} Bestandteil des Ü-Zeichens, das Bauteil ist nur wiederholt mit diesen Angaben zu kennzeichnen, wenn das Ü-Zeichen nicht direkt auf dem Bauteil aufgebracht wird.

2.4 Übereinstimmungsbestätigung

2.4.1 Allgemeines

Die Bestätigung der Übereinstimmung des Standgrenzschalters mit den Bestimmungen der von dem Bescheid erfassten allgemeinen bauaufsichtlichen Zulassung muss für das Herstellwerk mit einer Übereinstimmungserklärung des Herstellers auf der Grundlage einer werkseigenen Produktionskontrolle und einer Erstprüfung des Standgrenzschalters durch eine hierfür anerkannte Prüfstelle erfolgen. Die Übereinstimmungserklärung hat der Hersteller durch Kennzeichnung der Bauprodukte mit dem Übereinstimmungszeichen (Ü-Zeichen) unter Hinweis auf den Verwendungszweck abzugeben.

2.4.2 Werkseigene Produktionskontrolle

(1) Im Herstellwerk ist eine werkseigene Produktionskontrolle einzurichten und durchzuführen. Unter werkseigener Produktionskontrolle wird die vom Hersteller vorzunehmende kontinuierliche Überwachung der Produktion verstanden, mit der dieser sicherstellt, dass die von ihm hergestellten Bauprodukte den Bestimmungen der von dem Bescheid erfassten allgemeinen bauaufsichtlichen Zulassung entsprechen. Im Rahmen der werkseigenen Produktionskontrolle ist eine Stückprüfung jedes Standgrenzschalters oder seiner Einzelteile durchzuführen. Durch die Stückprüfung hat der Hersteller zu gewährleisten, dass die Werkstoffe und Maße sowie das fertiggestellte Bauprodukt dem geprüften Baumuster entsprechen und der Standgrenzschalter funktionssicher ist.

(2) Die Ergebnisse der werkseigenen Produktionskontrolle sind aufzuzeichnen und auszuwerten. Die Aufzeichnungen müssen mindestens folgende Angaben enthalten:

- Bezeichnung des Standgrenzschalters,
- Art der Kontrolle oder Prüfung,
- Datum der Herstellung und der Prüfung,

³ ZG-ÜS:2012-07 Zulassungsgrundsätze für Überfüllsicherungen des Deutschen Instituts für Bautechnik

- Ergebnisse der Kontrollen oder Prüfungen,
 - Unterschrift des für die werkseigene Produktionskontrolle Verantwortlichen.
- (3) Die Aufzeichnungen sind mindestens fünf Jahre aufzubewahren. Sie sind dem Deutschen Institut für Bautechnik und der zuständigen obersten Bauaufsichtsbehörde auf Verlangen vorzulegen.
- (4) Bei ungenügendem Prüfergebnis sind vom Hersteller unverzüglich die erforderlichen Maßnahmen zur Abstellung des Mangels zu treffen. Standaufnehmer und Messumformer, die den Anforderungen nicht entsprechen, sind so zu handhaben, dass eine Verwechslung mit übereinstimmenden ausgeschlossen ist. Nach Abstellung des Mangels ist - soweit technisch möglich und zum Nachweis der Mängelbeseitigung erforderlich - die betreffende Prüfung unverzüglich zu wiederholen.

2.4.3 Erstprüfung durch eine anerkannte Prüfstelle

Im Rahmen der Erstprüfung sind die in den ZG-ÜS aufgeführten Funktionsprüfungen durchzuführen. Wenn die diesem Bescheid zugrunde liegenden Nachweise an Proben aus der laufenden Produktion erbracht wurden, ersetzen diese Prüfungen die Erstprüfung.

3 Bestimmungen für Planung und Ausführung

3.1 Planung

- (1) Vom Hersteller oder vom Betreiber des Standgrenzschafters ist der Nachweis der hinreichenden chemischen Beständigkeit der unter Abschnitt 1 (2) genannten Werkstoffe gegenüber den wassergefährdenden Flüssigkeiten und deren Dämpfen oder Kondensat zu führen. Zur Nachweisführung können Angaben der Werkstoffhersteller, Veröffentlichungen in der Fachliteratur, eigene Erfahrungswerte oder entsprechende Prüfergebnisse herangezogen werden.
- (2) Für die in Abschnitt 3 der Technischen Beschreibung genannten Flüssigkeiten darf die Überfüllsicherung ohne weitere Beständigkeitsnachweise verwendet werden.

3.2 Ausführung

- (1) Die Überfüllsicherung mit einem Standgrenzschafter nach diesem Bescheid muss entsprechend Abschnitt 1.1 der Technischen Beschreibung angeordnet bzw. entsprechend deren Abschnitten 5 und 6 eingebaut und eingestellt werden. Nach Abschluss der Montage der Überfüllsicherung muss durch einen Sachkundigen des einbauenden Betriebes eine Prüfung auf ordnungsgemäßen Einbau und einwandfreie Funktion durchgeführt werden. Über die Einstellung der Überfüllsicherung und die ordnungsgemäße Funktion ist eine Bescheinigung auszustellen und dem Betreiber zu übergeben.
- (2) Standaufnehmer vom Typ 76 H sind auch zum Einsatz in Lagerbehältern geeignet, deren Betriebstemperatur maximal 80 °C beträgt.
- (3) Wird ein Messumformer (2) nach Abschnitt 2.2 (1) nicht in trockenen Räumen betrieben, muss er in einem Schutzgehäuse angeordnet werden, das mindestens der Schutzart IP54 nach DIN EN 60529⁴ entspricht.

4 Bestimmungen für Nutzung, Unterhalt, Wartung und wiederkehrende Prüfungen

- (1) Die Überfüllsicherung mit einem Standgrenzschafter nach diesem Bescheid muss nach den ZG-ÜS Anhang 1 "Einstellhinweise für Überfüllsicherungen von Behältern" und den ZG-ÜS Anhang 2 "Einbau- und Betriebsrichtlinie für Überfüllsicherungen" betrieben werden. Die Anhänge und die Technische Beschreibung sind vom Hersteller mitzuliefern. Die Anhänge 1 und 2 der ZG-ÜS dürfen zu diesem Zweck kopiert werden.

⁴ DIN EN 60529:2014-09 Schutzarten durch Gehäuse (IP-Code)

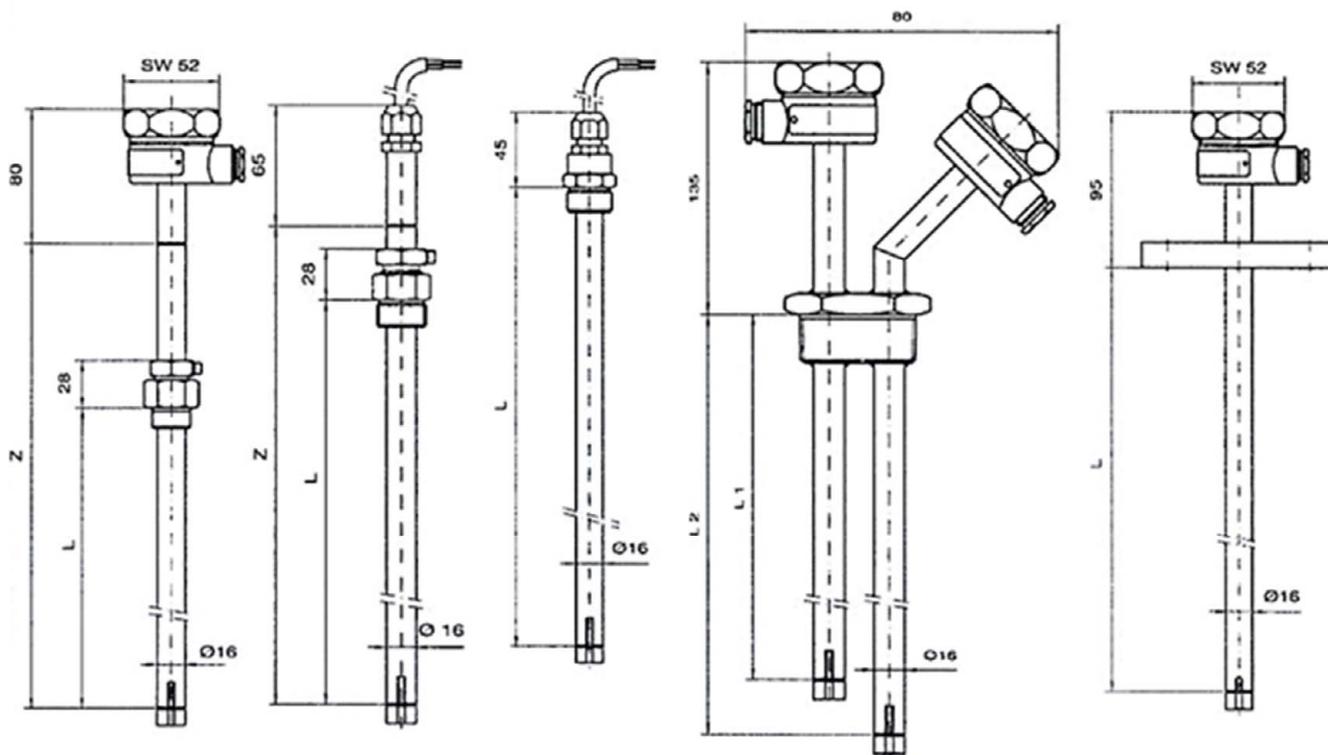
(2) Die Funktionsfähigkeit der Überfüllsicherung mit einem Standgrenzschalter nach diesem Bescheid muss in angemessenen Zeitabständen, mindestens aber einmal im Jahr, nach Abschnitt 8 der Technischen Beschreibung und entsprechend den Anforderungen des Abschnitts 5.2 von Anhang 2 der ZG-ÜS geprüft werden.

(3) Stör- und Fehlermeldungen sind in Abschnitt 4 der Technischen Beschreibung beschrieben.

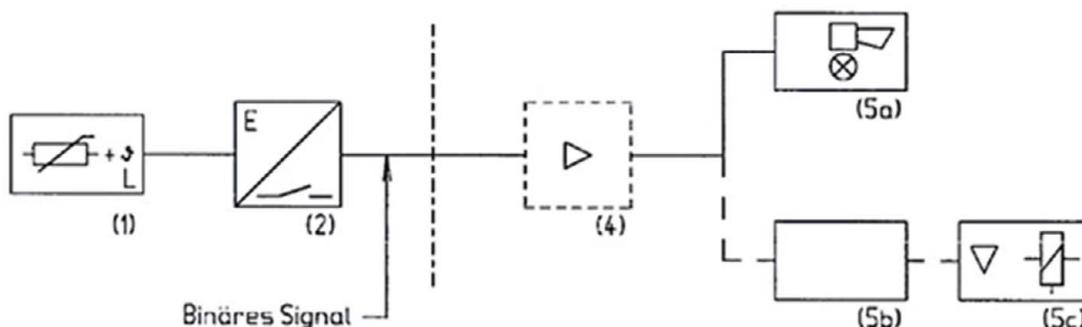
(4) Bei Wiederinbetriebnahme des Behälters nach Stilllegung oder bei Wechsel der wassergefährdenden Flüssigkeit, bei dem mit einer Änderung der Einstellungen oder der Funktion der Überfüllsicherung zu rechnen ist, ist eine erneute Funktionsprüfung, siehe Abschnitt 3.2 (1), durchzuführen.

Holger Eggert
Referatsleiter

Beglaubigt
Gnamou



Schematische Darstellung der Überfüllsicherung



- | | |
|-------------------------------|--------------------------|
| 1 Standaufnehmer Typ 76 ... | 5a Meldeeinrichtung |
| 2 Messumformer Typ NB 220 ... | 5b Steuerungseinrichtung |
| 4 Signalverstärker | 5c Stellglied |

(4) bis (5c) nicht Gegenstand dieser allgemeinen bauaufsichtlichen Zulassung

Standaufnehmer (Kaltleiterelemente) vom Typ 76 ... und Messumformer Typ NB 220 ...
als Standgrenzschafter von Überfüllsicherungen

Übersicht

Anlage 1

4.9 Wiring diagrams

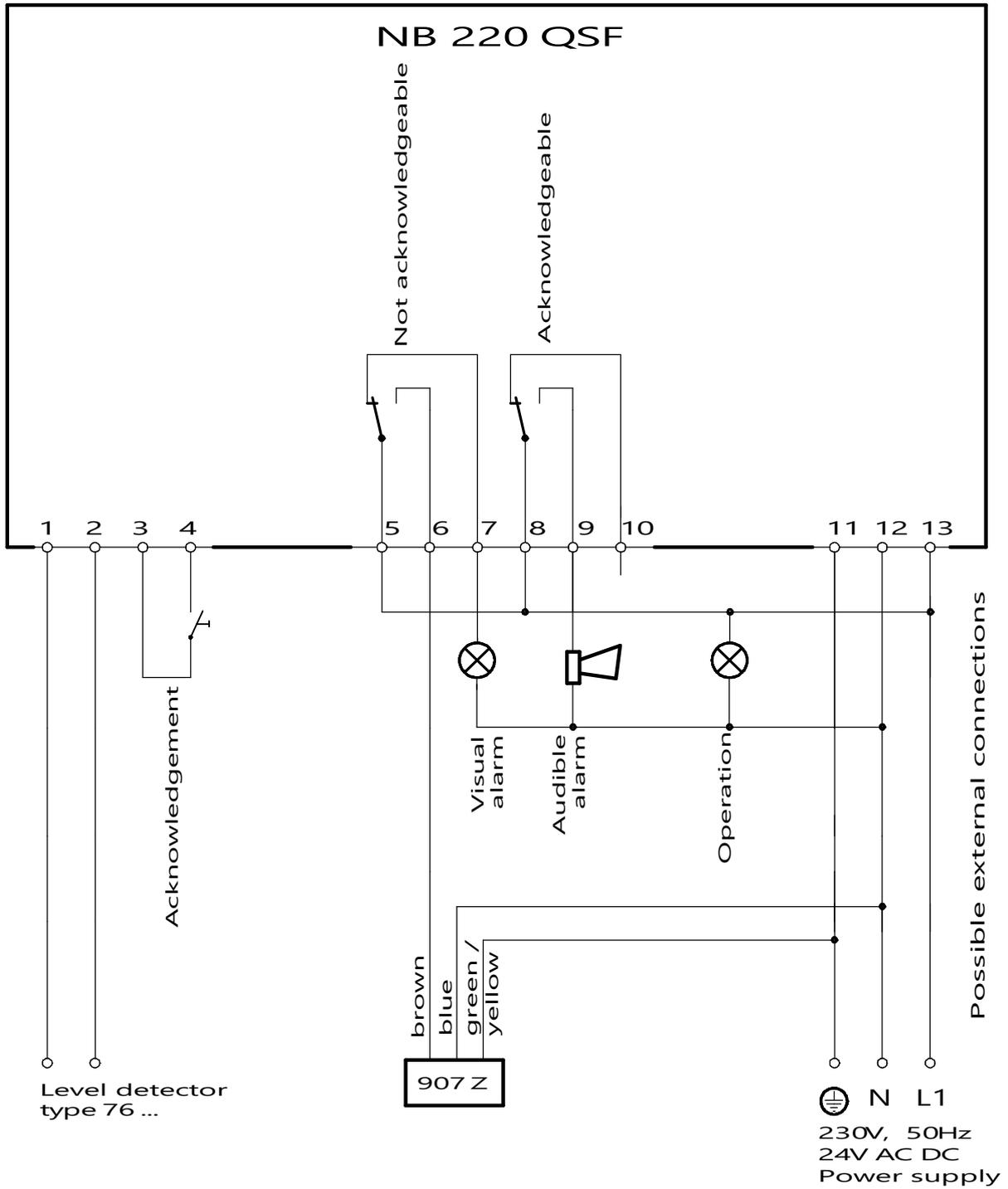


Figure 20: Wiring diagram NB220 QSF with 907-Z

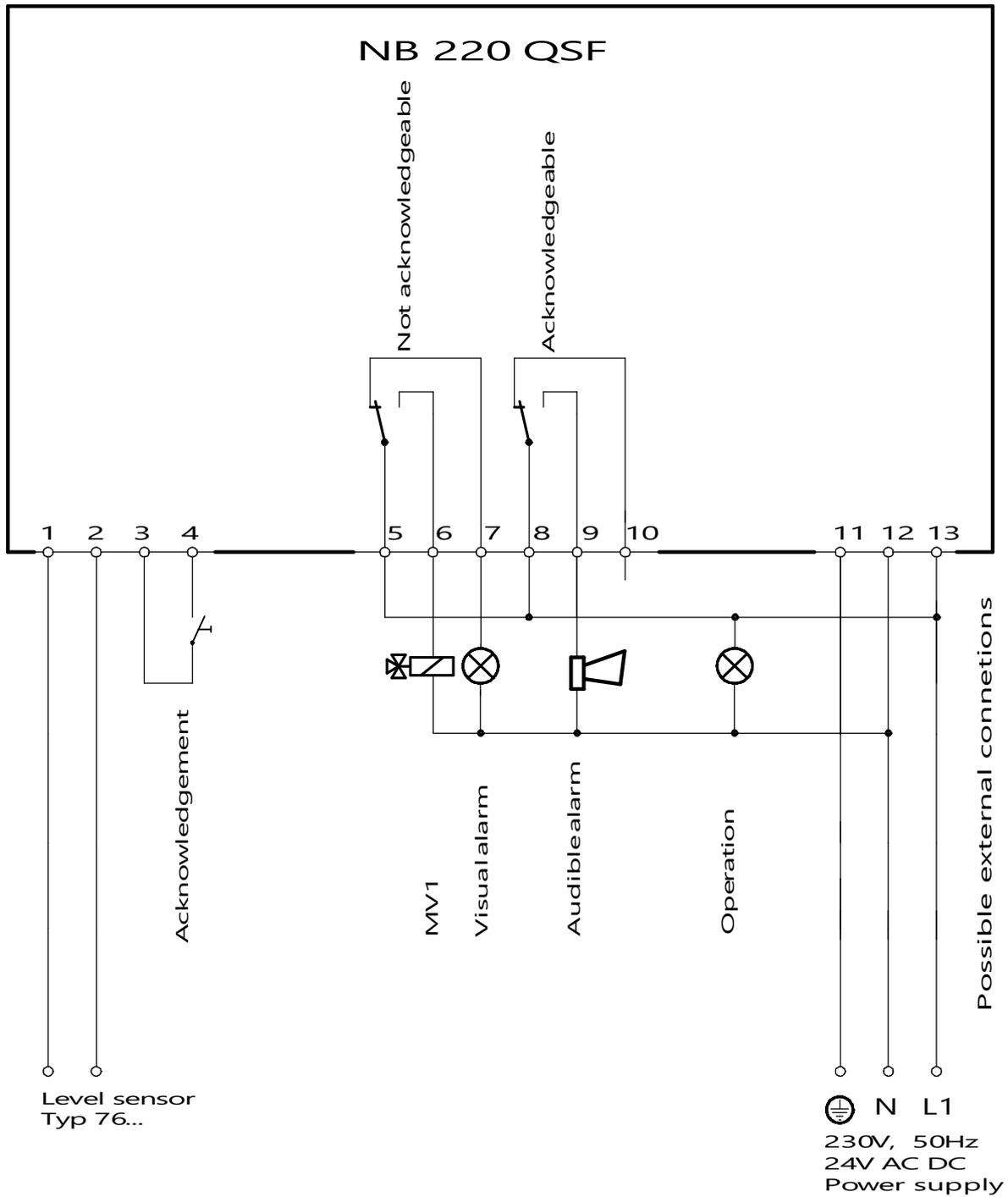


Figure 21: Wiring diagram NB220 QSF with MV1

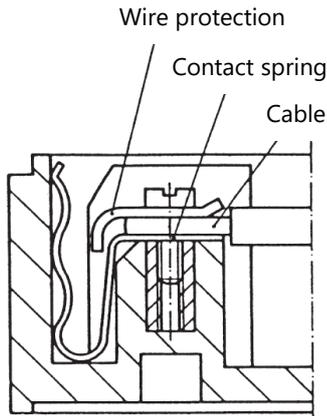


Figure 22: Cable fanning

The wiring of the level detector to the measuring transducer must be done with a cable in blue or blue marked colour. The maximum admissible cable length with a cross-section of 0.5 mm² is 250 m, with 1 mm² a maximum of 500 m and with 1.5 mm² a maximum of 750 m. Deviating cross-sections result in a different maximum cable length.

5 Maintenance

5.1 Servicing

FAFNIR devices are generally maintenance-free.

5.2 Return Shipment

Before returning any FAFNIR device, the Return Material Authorization (RMA) is required. Please contact your sales consultant or the technical support team, who will inform you about the details of the return.

Telephone	+49/40/39 82 07-0
Open (CET)	Mon. to Thu. 07:00 a.m. to 05:00 p.m., Fri. 07:00 a.m. to 04:00 p.m.



The return of devices is only possible with authorization (RMA) by FAFNIR.

6 List of figures

Figure 1: 76 A	17
Figure 2: 76 B.....	17
Figure 3: 76 C	17
Figure 4: 76 E.....	17
Figure 5: 76 M.....	18
Figure 6: 76 N.....	18
Figure 7: 76 A Duo 1.....	18
Figure 8: 76 A Duo 2.....	18
Figure 9: 76 A Duo 3.....	19
Figure 10: 76 A Trio 1	19
Figure 11: 76 A Trio 3.....	19
Figure 12: 76 A F	19
Figure 13: NB 220 H.....	20
Figure 14: NB 220 QS.....	20
Figure 15: NB 220 QSF.....	20
Figure 16: NB 220 H connection diagram.....	24
Figure 17: NB 220 QS connection diagram	24
Figure 18: NB 220 QSF connection diagram	24
Figure 19: Notes for correct adjustment.....	25
Figure 20: Wiring diagram NB220 QSF with 907-Z	35
Figure 21: Wiring diagram NB220 QSF with MV1	36
Figure 22: Cable fanning.....	37

7 List of tables

Table 1: Material of level detectors (parts which come in contact with media).....	22
--	----

Blank Page

Blank Page



QR code to access the
technical documentation website



FAFNIR GmbH
Schnackenburgallee 149 c
22525 Hamburg, Germany
Tel.: +49 / 40 / 39 82 07-0
E-mail: info@fafnir.com
Web: www.fafnir.com
