

## NGX

### Maximum level switch



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## 1 Notes used and their meaning



### CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate physical injury or property damage.



### WARNING

Indicates a potentially hazardous situation that could result in serious injury or death.



### DANGER

Indicates an imminent danger that will result in serious physical injury or death.



### NOTE

Indicates an important note, the observance of which is important for the intended use and function of the product. Can be specified by a different symbol.

## 2 General



### NOTE



Please read the complete operating instructions carefully before working with the product described here.

Ensure that these operating instructions are known to any person who is in any way involved with the product and that they are always kept accessible in the immediate vicinity of the product.

This manual contains the internationally standardised SI units of measurement.

All information and instructions for the assembly, installation, operation and maintenance of this product are given to the best of our knowledge, taking into account our previous experience and knowledge.



### NOTE



The target group of this manual are all persons who interact directly or indirectly (e.g. when working on third-party products in the same room) with the product. This applies in particular to the personnel of refrigeration system manufacturers, system operators and service providers.



### Copyright

Nothing from this documentation may be reproduced without the prior written permission of TH. WITT Kältemaschinenfabrik GmbH, in the following called manufacturer, in any form (print, photocopy, microfilm or any other method). This restriction also applies to the drawings, diagrams and tables contained in the documentation.

## 2.1 Safety instructions

The commandments, precautions, warnings and prohibitions listed below are general instructions.

For each product, further instructions can be found in the respective chapters of this manual.

### 2.1.1 Commandments



#### NOTE



##### Observe regulations!

Observe all safety regulations regarding the handling of refrigerants, pressure-bearing devices and electrical machines to prevent personal injury and damage to property.

In particular the wearing of personal protective clothing (incl. breathing, eye and hand protection) is mandatory to avoid damage to health and/or impairment.



##### Use protective clothing!

Always wear protective clothing suitable for the working medium to avoid physical damage through possible contact with the medium.



##### Use eye and face protection!

Always wear eye and face protection (bonnet, glasses or face shield) according DIN EN ISO 4007.



##### Use protective gloves!

Use protective gloves that protect against mechanical and chemical hazards (see imprinted pictograms on the gloves).



##### Wear safety shoes!

Always wear safety shoes of at least class S3 according DIN EN ISO 20345.



##### Keep breathing protection always ready!

Respiratory protection equipment suitable for the working medium must be available at least in two independent versions and must be accessible without barriers.



##### Disconnect systems

Before starting any work on or in the immediate area of the product, secure machines and devices and switch off the power supply and secure it against being switched on again.



##### Regulations and environmental protection

- It is imperative that you comply with the local regulations for refrigerant systems, electrical circuits and environmental requirements.
- Please be aware that working with refrigerants of any kind can always have an impact on third parties and the environment, even with full personal protection.

## 2.1.2 Precautions



### CAUTION



#### Qualified staff

- All work on refrigeration products may only be carried out by competent personnel trained in handling refrigeration systems.
- Work on electrical installations or equipment may only be carried out by a qualified electrician.
- The operator of the overall system is responsible for compliance with the national and international work, safety and accident prevention regulations applicable to the specific application.



#### electrical voltages

Impairment of functionality or damage.

Adhere to the specified voltage on the type plate.



#### Avoid tripping hazards

Physical damage due to falling or tripping.

When working on the product, avoid tripping hazards caused by tools or working materials.

Install the product in such a way that no tripping hazards (e.g. caused by cables, drip pans, etc.) remain.

If they cannot be avoided, mark them with appropriate two-colour adhesive tape (warning bars).

## 2.1.3 Warnings



### WARNING



#### Presence and function of safety devices

- All work on the product may only be carried out when it is at a standstill.
- Ensure that all safety functions are connected and active in a possible manual operation.
- If the product was switched off by a safety device, the cause must be identified and documented before restarting.
- If safety devices are removed for other work, reinstall them after completion of the work and check the function of the safety device.



#### Pressure and temperature influences

- Never exceed or fall below the temperature and pressure specifications given on the type plate in order to protect the product from damage and ensure smooth operation.
- Make sure that a pressure relief device is installed and operational.
- Liquid refrigerant must not be locked up at any time. In this respect, observe the position of all upstream and downstream shut-off valves.
- Before starting any maintenance or disassembly work, the product must be depressurised and the refrigerant completely drained from the product.



#### Residual risks

Even if the product is used as intended, hazards to life and limb of the user or third parties or damage to the product and other material assets may occur.



### DANGER



#### Leakage test

Before starting any work on the product, make sure that all system components in your vicinity are leakproof.

## 2.1.4 Prohibitions



#### Fire, open light and fire protection

Open flames on and in the immediate vicinity of the product are prohibited. Take appropriate fire protection measures to prevent unauthorised heating of the product.



#### No smoking

Smoking on and in the immediate vicinity of the product is prohibited.

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## 2.2 Responsibility

### 2.2.1 Responsibilities of the manufacturer

The instructions given in this manual for maintaining the functional safety of the product, for avoiding potential hazards to man and machine during transport, installation and assembly, commissioning, operation and maintenance measures refer exclusively to the product.

The manufacturer's responsibility for the design of the product is documented according to EN 378-2 (design, manufacture and testing).

All materials used are designed to withstand the foreseeable mechanical, thermal and chemical stresses and are resistant to the working medium.

The working medium-carrying parts of the product are designed in such a way that they remain leak-proof, taking into account the foreseeable mechanical, thermal and chemical stresses, and can withstand the maximum permissible operating pressure.

All responsibility regarding the refrigerant system, in which the product is integrated, lies exclusively with the parties involved in the individual work steps.

### 2.2.2 Responsibilities of the installer of the refrigerant system

The responsibility of the installer of the refrigerant system is documented by the design of the system according to EN 378-2 (design, manufacture and testing).

### 2.2.3 Responsibilities of the operator of the refrigerant system

The responsibility of the installer of the refrigerant system is documented by the operation, maintenance and recovery of the entire system according to EN 378-4.

## 2.3 Structure of the manual and other applicable documents

The operating manual for the product include the following components:

- This manual
- Manual of the WITT BR-NWt limit switch relay
- Order-related documents

The order-related documents will be sent to you when the order is placed and contain the following information:

- the order-related delivery address
- the order-related "[Intended use](#)"
- the order-related scope of delivery
- the order-related technical data

The operating manual is part of the operating manual handbook for the system. This manual must be provided by the installer of the refrigerant system.



### NOTE

If you have not purchased the product directly from the manufacturer, you are obliged to request the order-related documents listed here from the seller.

## 2.4 Legal information

The contents of this manual must be followed without fail; any use other than that described here excludes any liability and warranty on the part of the manufacturer.

The German language manual is always the original manual.

Translations are carried out to the best of our knowledge with the involvement of native speakers. No liability whatsoever is accepted for translation errors.

We reserve the right to make technical changes of any kind to the illustrations and information in this manual.

In order to avoid accidents and to ensure optimum performance, no changes or modifications may be made to the product without the express written permission of the manufacturer.

When replacing parts or procuring spare parts, only original spare parts approved by the manufacturer must be used. Operating materials are to be used in accordance with the information in the manual.

Liability or warranty is excluded if:

- the instructions and notes in this manual are not observed,,
- the product including associated equipment is incorrectly operated or its handling does not comply with the prescribed procedure,
- the product is used contrary to its intended purpose,

- safety devices are not used or are put out of operation,
- functional changes of any kind are done without the written consent of the manufacturer,
- the intended performance limits of the product are exceeded due to system-side performance adjustments,
- the relevant safety regulations and accident prevention rules are not observed,
- when replacing parts or procuring spare parts, the original spare parts approved by the manufacturer are not used and professionally installed,
- the product, including associated components and safety devices, is improperly maintained. This includes the observance of intervals and the content of the maintenance.



### NOTE

The control of the BR-NWt limit contact relay is part of the type test. If the control unit is modified, the approval loses its validity.

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## 2.5 Standards and certificates

The product is manufactured in compliance with European standards.

Declarations of Incorporation and Declarations of Conformity for the following directives are available for you on the website [www.th-witt.com](http://www.th-witt.com):

- Manufacturer's certificate according to Directive on Pressure Equipment 2014/68/EU: Article 4, Para. 3

In addition, the NGX has a TÜV type approval (test report no. 968/EL 743.01/20 dated 10.06.2020). The following regulations were taken into account in the type test:

- TRAS 110:11/2008 Safety requirements for ammonia refrigeration systems
- EN 378-2:2008+A1:2009 Refrigerating systems and heat pumps - Safety and environmental requirements
- BGR 500, Chapter 2.35:03/2007 Employer's liability insurance association rules for safety and health at work: Operating work equipment - Operating refrigeration systems, heat pumps and cooling equipment
- EN ISO 13849-1:2008+AC:2009 (in extracts) Safety of machinery - Safety-related parts of control systems
- EN 61508, parts 1 to 7:2010 (in extracts) Functional safety of electrical/electronic/programmable electronic systems
- EN 50178:1997 Equipment of power installations with electrical equipment

This type test includes the maximum level switch NGX as well as the limit contact relay BR-NWt and the electrical circuit diagram.

A technical documentation as well as the type test report is available. The maximum level switch NGX achieves the performance level (PL) c /category 1 according to DIN EN ISO 13849-1 and the safety level SIL 1 according to IEC 61508.

## 2.6 Behaviour in an emergency



### WARNING

Before starting and during the work



- Read and understand the evacuation plan
- Block access to the product for unauthorised persons
- always comply with the "[Safety instructions](#)"



In case of an emergency situation



- compliance with the protective measures envisaged
- Shut down the product or entire system immediately
- Completely disconnect the product or entire system from the power supply
- Disconnect mains supply lines so that they cannot be switched on again
- Mark the mains supply lines so that they cannot be switched on again



The operator of the overall system must ensure that a disconnecting device, e.g. main switch with corresponding contact load and an integrated control display, is pre-installed in the mains supply line by the customer.



## 2.7 Intended use

WITT products as well as products distributed by WITT are exclusively intended for use in refrigeration or heat pump systems.

The NGX is used to protect the compressors against liquid hammer (e.g. according to TRAS 110).

It can be attached to separators or liquid receivers and can be used for all common refrigerants with a density  $\rho$  min. 600 kg/m<sup>3</sup>. The type-tested NGX is also required to shut down the compressors when using electrical level controllers.

The maximum level switch is not suitable as minimum level switch or level transmitter.



### WARNING

The NGX alone is not sufficient for personal protection.

A redundant component must also be installed to protect the compressors. For example, by installing an RTK probe.

## 3 technical informationen



### NOTE



The specified functions, typical values and materials refer to standard types of the product. Especially for special units the following applies: Please observe the information in the order-related papers.

### 3.1 Scope of delivery

Standard scope of delivery

- Limit switch NGX with terminal box
- Bracket for attaching the NGX to the 1" nozzle of the shut-off valve
- Shut-off valve EA 32 - G1"-I
- Limit contact relay BR-NWt (for installation in switch cabinet, see operating instructions W 4651-6.11- )

Optional scope of delivery

- Shut-off valve in stainless steel design
- Threaded cam G 1"-NGX



### CAUTION

Impairment of functionality or damage.

When using third-party valves, it is mandatory to use the threaded cam G 1"-NGX.

### 3.2 Design and function of the product



The switching point of the maximum level switch is located on its centre axis. Thus the centre of the maximum level switch is decisive for monitoring the refrigerant level in the separator.

Inside the housing of the NGX limit switch is a balance beam, one side of which is made of PTFE and the other side of which is fitted with a magnet (the only materials in contact with refrigerant). As the refrigerant rises inside the separator up to the NGX connector, the PTFE float dips into the liquid and floats. This causes the magnet on the other side of the balance beam to move downwards. A magnetic switch mounted outside the refrigerant chamber detects the position of the magnet and opens after a switching travel of the level float part of approx. 4 mm. The signal is transmitted to the compressor control via the BR-NWt limit contact relay and an auxiliary contactor in the control cabinet.

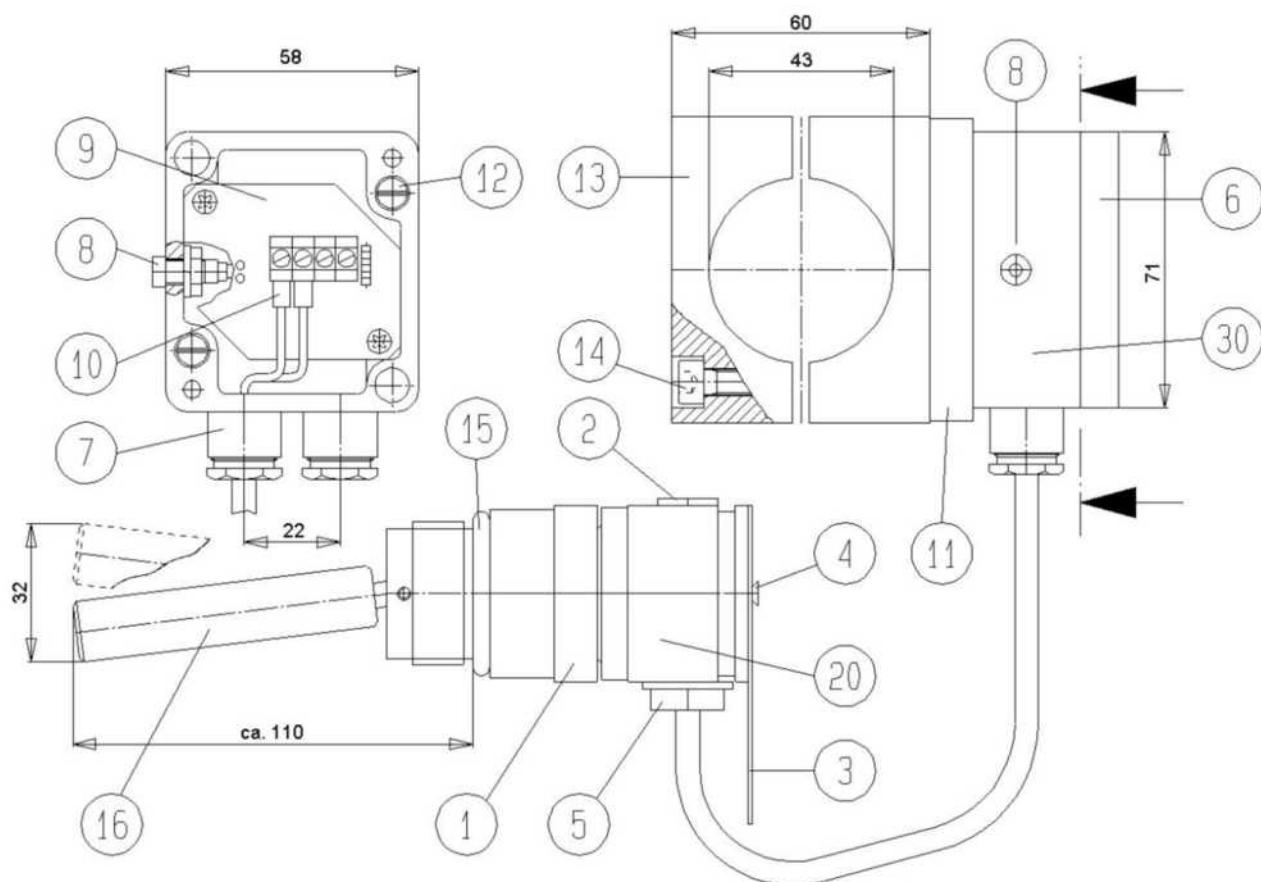
A light-emitting diode wired in series to the magnetic switch lights up during normal operation. If the LED does not light up, the following reasons may exist:

- The maximum level in the separator has been exceeded.
- The power supply has been interrupted (cable break or cable incorrectly connected).
- The reed switch is defective.
- Impurities (metal particles) have settled on the magnet.



### CAUTION

The limit value transmitter cannot be connected directly to a PLC control.



**Figure 1: Drawing of the NGX maximum level switch**

### 3.3 Used materials

Housing	1.4571
Contakt magnetic switch	Rhodium
Balance beam	PTFE
Junction box (terminal box)	Aluminium
Mounting	PP-black

**Table 1: Materials NGX**

### 3.4 technical data

Permissible operating overpressure limit switch	[bar]	25 (+80°C / -50°C)
Weight of limit switch incl. terminal box	[kg]	0,60 + 0,36
Protection class Junction box	[IP]	65
Connections Junction box		2 x M16 x 1,5
Dimension Bracket	[mm]	60 x 71 x 30, Borehole Ø ~42(for EA32/G 1" or EA 40/G 1")
Voltage magnetic switch	[V]	14 AC/DC
Current Magnetic switch	[A]	0,5 max.
Switching frequency Magnetic switch	[1/s]	1000

Table 2: technical data of the NGX maximum level switch

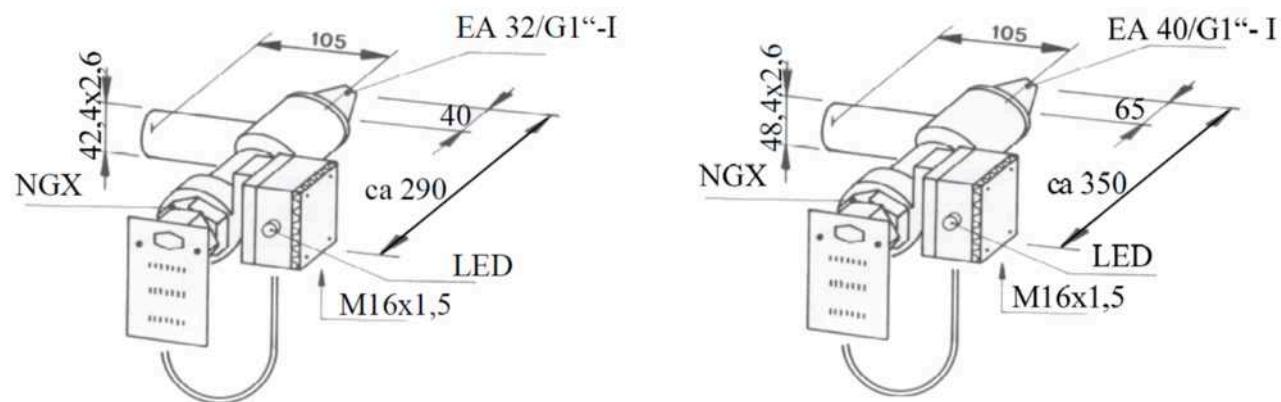


Figure 2: Dimensions of the NGX

### 3.5 spare parts

Part	Part-no.	dimension	amount	article no.
Limit value transmitter				
Threaded ring	1	G 1"	1	-----
Sealing plug	5	G 1"	1	5116.PM6630
Type plate	3	-----	1	-----
Blind rivet	4	3,0x6,0	1	-----
Level float part	16	-----	1	-----
Housing	20	-----	1	-----
Magnetic switch	2	Type MRS	1	4692000003
Junction box and cover	6; 30	-----	1	-----
Screw connection	7	M16x1,5	2	-----
Light emitting diode red	8	Type LD32	1	-----
Printed circuit board	9	-----	1	-----
Wire end sleeve	10	Type 0.75-14	2	-----
Mounting plate	11	-----	1	-----
cap screw	12	M4x16	2	-----
Pipe clamp	13	1 ¼"	1	-----
cap screw	14	M6x60	1	-----
O-ring	15	Ø 28x5	1	5642.ABCD01

NGX Limitation switch, junction box, brackets, 25 bar Version	4651.000013
NGX Limitation switch, junction box, brackets, 40 bar Version	4651.000113
N-Control unit BR-NWt, 220-240 V, 50-60 Hz	4681.000011
N-Control unit BR-NWt, 24 V, 50-60 Hz	4681.000012
N-Control unit BR-NWt, 110-120 V, 50-60 Hz	4681.000013
stop valve, PS 40, EA 32	4111.KA713B
stop valve, PS 40, stainless steel	4111.KA811E
threaded connection G1"	6435.AJ0F00
threaded connection - SS - DN 32	6435.AF0F01
threaded connection - SS - DN 40	6435.AF0F03

## 4 Logistics

### 4.1 Delivery

Upon receipt of the product / order, proceed as follows

- Check the packaging for external damage on receipt of the delivery.
- Unpack the goods and check for transport damage.
- Dispose of packaging material in accordance with local regulations.



#### NOTE

Report any damage to the packaging to the carrier immediately and refuse acceptance if necessary.

Report any transport damage to the product immediately to the manufacturer or its representative.

### 4.2 Packaging

Sides	Top
<ul style="list-style-type: none"><li>• Logo of the manufacturer</li><li>• Indication of the product type</li><li>• Top marking (arrows)</li></ul>	<ul style="list-style-type: none"><li>• "Top" marking</li><li>• Product designation</li><li>• Serial number</li><li>• Order number</li><li>• Self-adhesive label<ul style="list-style-type: none"><li>◦ Manufacturer's address and logo</li><li>◦ Order number</li><li>◦ Delivery address of the customer</li></ul></li></ul>

Table 3: Labelling of the cardboard box



#### NOTE

If the product is resold at a later date, the packaging shall be produced in a comparable manner.

## 4.3 Transport



### WARNING



- Always ensure proper transport and storage of the product in accordance with the accident prevention measures available to you.
- Transport the product carefully.
- Above all, avoid putting the product down hard.
- Ensure that all openings on the product are always protected against the entry of dirt and moisture with suitable plugs.
- Secure the product against slipping and mechanical damage.
- Protect the product from damage to the coating.



### CAUTION

No metal particles may penetrate into the housing of the product and weigh down the magnet there.

## 4.4 Storage



### WARNING



- Ensure that all openings on the product are always protected against the entry of dirt and moisture with suitable plugs.
- Secure the product against slipping and mechanical damage.
- Protect the product from damage to the coating.
- Store the product dry and protected from dirt.

## 5 Assembly and commissioning



### NOTE

Follow the rules for assembly and commissioning to ensure smooth operation of the product.



### WARNING



Observe at all times the present "[Safety instructions](#)" as well as the "[Behaviour in an emergency](#)" at the beginning of this document!

### 5.1 Preparing assembly

Before mounting the product, take the following measures:

- Unpack delivery and check for transport damage and completeness.
- Compare the product specifications from the order with those of the delivery.
- Remove all plastic protective caps or other seals from all connections immediately before installation.
- Expose the connections of the refrigeration system.
- Check that the dimensions of the pipelines match the connections of the product.
- Make sure that the pipelines are free of inner impurities.

### 5.2 Assembling the product

The type plate must be clearly legible.

#### 5.2.1 Alignment of the product

In the standard version, a DN 32 (42.4 x 3.2 mm) connection piece must be provided on the separator at the height of the level to be monitored, to which the EA 32 shut-off valve supplied is welded.

If a stainless steel valve is used, the connection piece on the separator must be DN 40 (48.3 x 3.2 mm).



### CAUTION

#### Influencing the function

Exceeding the maximum level and damage to other system components.

The limit value transmitter must not be mounted directly on the nozzle of the separator, as the balance beam can otherwise be influenced by boiling liquid.

If another shut-off valve is used, a threaded cam G 1"-NGX must also be ordered into which the limit value transmitter can be screwed. It must be ensured that the liquid can flow to the balance beam without obstruction and that the inner diameter of the connection socket is at least 35 mm. The socket for screwing in the limit value transmitter must be dimensioned in such a way that the balance beam does not touch the valve seat.

First, the lock nut must be screwed back as far as it will go so that the NGX can be screwed as far as possible into the seat socket of the EA 32 (do not damage the O-ring!). In the final position, the cable outlet must point vertically downwards. By tightening the lock nut, a gland-like seal is achieved. The terminal box can then be attached to the valve with the bracket, whereby the cable connections should point downwards. Make sure that the light emitting diode is clearly visible.

The electrical connections are made according to the electrical circuit diagram of the limit contact relay BR-NWt W 4651-6.11.

In addition to the limit contact relay supplied, an auxiliary contactor and a reset button are required. These are not included in the scope of delivery of the NGX. Furthermore, it makes sense to install a fault indicator light in the control cabinet.

If the maximum level switch NGX is used without the limit contact relay BR-NWt, only safety extra-low voltage (SELV or PELV) may be used to supply the magnetic switch, not mains voltage!



### CAUTION

#### **Malfunction**

Damage to the product.

The electrical connections may only be carried out by a specialist who is responsible for compliance with the relevant standards and regulations. In particular, BGV A2 (VBG 4), VDE 0100, VDE 0113 (EN 60204 T1) and VDE 0660 T5 (EN 60439 T1) must be observed.

## 5.2.2 Electrical connection



### NOTE

No warranty is given for damage caused by improper electrical connection to the product.



### CAUTION

#### **Malfunction of the power supply**

Malfunction or damage to the product

Carry out the entire installation in  
the IP protection class of at least IP54.



## 5.3 Preparing commissioning

Before the product may be put into operation, a safety analysis of the refrigerant system must be carried out.

This includes

- a thorough visual inspection of the entire piping system in accordance with the technical drawings.
- Retighten screw and flange connections.
- a holistic leak and pressure test with documentation.
- all safety devices are present and tested for function.

## 5.4 Commissioning



### CAUTION

Die Inbetriebnahme darf erst nach erfolgreicher "[Sicherheitsanalyse](#)" erfolgen.

Continuous operation is only possible when constant operating conditions have been established.

Do not operate the NGX maximum level limiter until you have made sure that all connections have been made properly and the function check described below has been carried out.

### 5.4.1 Function check

Turn the housing of the limit switch by 180° by carefully loosening the lock nut by approx. ¼ turn. The word "Prüfstellung" should be correctly legible on the type plate. If the balance beam is not obstructed, it will fall down and trigger the magnetic switch with the magnet. The red LED goes out.



Figure 3: Test position of the NGX for function control

#### 5.4.2 Setting the limit switch relay:

See manual for the limit switch relay BR-NWT W 4651-6-11.

#### 5.5 Operating the product

The product may only be operated within the range of its design data.

Der NGX arbeitet, wie in "[Design and function of the product](#)" beschrieben und schaltet den / die Verdichter beim Überschreiten des vorgesehenen Maximalstandes im Kältemittelabscheider ab.

The compressors must be switched off by hardware via the auxiliary contactor (K).

Other control variants are no longer permitted since 2020.



#### CAUTION

Check the NGX for function approx. 2 weeks and 4 weeks after commissioning.

## 6 Inspection, maintenance and servicing



### WARNING



Observe at all times the present "[Safety instructions](#)" as well as the at the "["Behaviour in an emergency"](#) at the beginning of this document!

Ensure complete documentation of all inspection, maintenance and servicing work.

### 6.1 Inspection

A functional check should be carried out at regular intervals (annually, or more frequently if necessary). Especially after a response of the product, a functional check is essential.



### CAUTION

The function check may only be carried out if the level has fallen below the maximum level.

### 6.2 Maintenance

If the solenoid is clogged with metal particles from the system, close the shut-off valve, carefully unscrew the limit value transmitter from the housing and clean it well.

## 7 Decommissioning and disposal



### NOTE

For temporary decommissioning of the product, the labelling requirement "out of service" must be observed.

The separate, environmentally sound disposal of materials promotes the recyclability of valuable materials. Therefore, at the end of the normal service life, the product itself and all individual parts belonging to it, e.g. auxiliary materials, packaging and wearing parts, must be taken to the recycling collection point.

Auxiliary materials and system residues (especially refrigerant residues) must be removed professionally from all individual parts.

Packaging, product and accessories are made of recyclable materials and should be disposed of accordingly. Ensure that a discarded product is rendered unusable before disposal.



### WARNING

If you do not have the necessary expertise, commission a specialist with the dismantling and disposal.

Always observe the regional disposal regulations.



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