



INSTRUCTIONS

Maximum level switch NGX

Date: 02/2018

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Please read the entire manual carefully before installing or operating a maximum level switch!



1. INTENDED USE

The maximum level switch NGX with TÜV design approval (certificate No. 968/EL 743.00/11) is designed to protect compressors within a refrigeration plant against liquid hammer (e.g. to conform with TRAS110). The maximum level switch is not suitable to be used as a minimum level switch or level switch.

2. SAFETY REQUIREMENTS

Trained and knowledgeable personnel experienced in installation and service of refrigeration systems must carry all of the work within refrigeration plants out. All safety regulations and codes of practice concerning the use of refrigerants must be adhered to. Regulation EN 378 must be followed.



Frequently (once a year, or with contaminated plants even more often) you should check whether debris or metal chips from the plant have connected to the float of the NGX. Check particularly 2 weeks and 4 weeks after start-up and upon each acting of the NGX.



When installing the maximum level switch you should ensure that the execution is at least IP54.



Special attention should be paid to protection clothing and wearing of safety glasses, especially when checking the functioning and when disassembling the NGX.

A functioning check is only permitted when the level is below the maximum level in the pressure vessel!

3. TERMS OF WARRANTY

To avoid accidents and for your safety you should operate the maximum level switch solely for the intended use. No modifications or conversions may be carried out to the NGX without the explicit written approval of TH. WITT Kältemaschinenfabrik GmbH.

Our liability of warranty is void if:

- The instructions were not followed
- The NGX is operated incorrectly or is installed contrary to these installation instructions
- The NGX is used for applications other than that for which it was intended
- There have been modifications made without written approval
- Safety regulations or codes of practice have been ignored
- The wiring diagram as per page 3 of the instructions for the relay BR-NWt W 4651-6.11 are not adhered to (as this is part of the design approval)

4. RANGE OF OPERATION

The mechanical operated NGX can be used on surge drums and liquid receivers and is suitable for all common refrigerants with a density ρ of at least 600 kg/m³. Even when electrical level switches are installed, the use of the design-approved NGX, to switch off the compressors, is mandatory.

5. SCOPE OF DELIVERY (STANDARD)

- Sensor NGX with junction box
- Brackets to connect the NGX to the 1" connection of the stop valve
- Stop valve EA 32 - G1"-I
- Relay BNrt (for installation in the switch gear, see installation instructions **W 4651-6.11-**)

Optional

- Stop valve in stainless steel
- Socket connection G 1"-NGX (when used with foreign valves)



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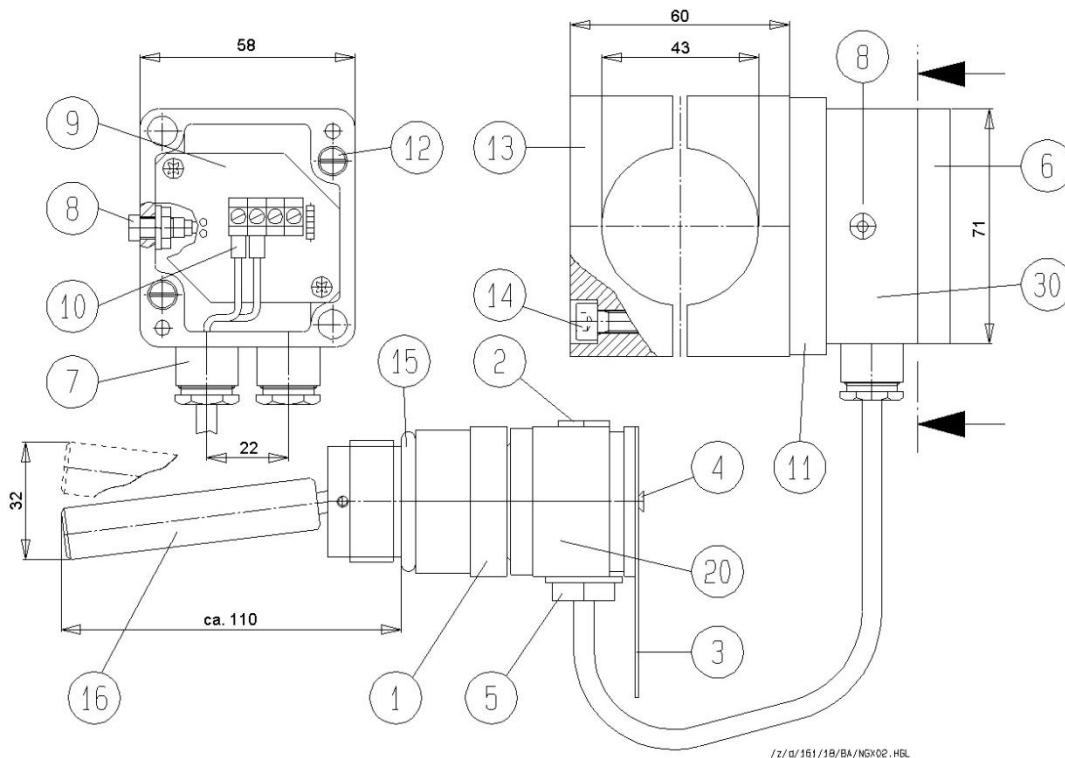
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6. TECHN. DATA



NGX- part list	Part no.	Dimension	Amount	Part no.
switch	1	NGX	1	4651.000006
crew cap	2	Ø 10,7	1	-----
name plate	3	-----	1	-----
blind rivet	4	3,0x6,0	1	-----
solenoid switch	5	Typ MRS	1	4692.000003
junction box complete	6	-----	1	4651.000005
screw joint	7	M16x1,5	2	-----
light emitting diode (LED)	8	Typ LD32	1	-----
circuit board	9	-----	1	-----
sleeve	10	Typ 0.75-14	2	-----
mounting plate	11	-----	1	-----
cylinder head screw	12	M4x16	2	-----
tube clamp (Brocket)	13	1 ¼"	1	5831.000002
cylinder head screw	14	M6x60	1	5112.000041
o - seal	15	Ø 28x5	1	5642.000014
balancing bar	16	-----	1	-----
NGX- replacement parts				
NGX without valve and without BNRt	--	-----	--	4651.000013
NGX complete with valve + BNRt	--	-----	--	4651.000015
NGX complete with valve without BNRt	--	-----	--	4651.000016
NGX complete without valve + BNRt	--	-----	--	4651.000017
NGX with stainless steel connection, without valves + BNRt	--	-----	--	4651.000019
NGX with stainless steel connection, without valves or BNRt	--	-----	--	4651.000020
NGX with stainless steel connection + valves + BNRt	--	-----	--	4651.000026
NGX with stainless steel valves without BNRt	--	-----	--	4651.000027
NGX with stainless steel conn. without valves with BNRt	--	-----	--	4651.000031
NGX with stainless steel conn. without valves and BR-NWt	--	-----	--	4651.000032
All NGX complete replacement assemblies are also available in a 40 bar execution. The last 0 in the article number should then be replaced by a 1, e.g.				
NGX without valve and without BNRt, 40 bar execution	--	-----	--	4651.000113



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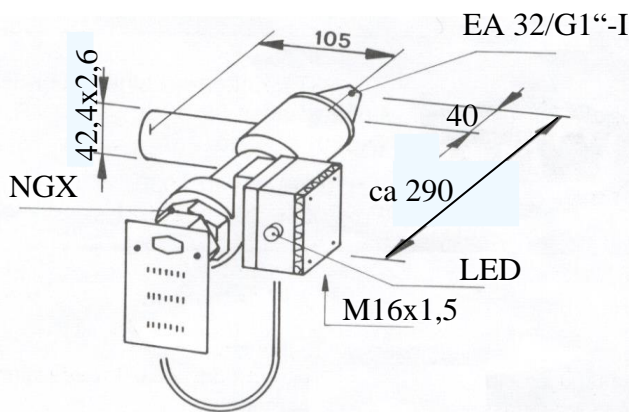
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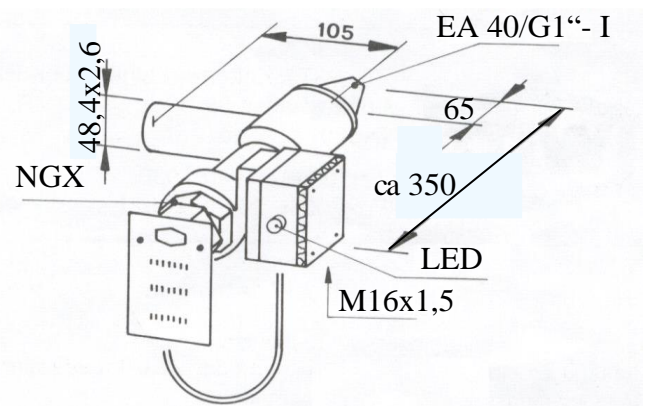
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- A) Switch**
Housing material: 1.4571
Balancing bar: PTFE/
Connection: G 1" outer thread
Pressure- / Temp.-Range: PB 25 bar / +80°C to -50°C
Weight: 0,6 kg
- B) Junction box**
Material: Aluminium
Dimensions: 63 x 58 x 40 mm
Protection Class: IP 65
Connections: 2 x PG 9
Weight: 0.36 kg (Junction box with brackets)
- C) Brackets**
Material: PP - black
Dimensions: 60 x 71 x 30 mm, hole approximately \varnothing 42 mm
With EA 32 /G1" or EA 40/G1" valve
- D) Reed-Contact**
Voltage: 14 V AC/DC
Current: max. 0.5 A
Cycles: 1000 / s
Contact: Rhodium



a) Standard execution



b) Stainless Steel execution

7. DESCRIPTION OF OPERATION

The switching activating point is located in the center line. Therefore the center line of the maximum level switch determines the maximum level in the vessel that is used for the control. In the NGX housing there is a balancing bar, which consists on one side of PTFE and on the other side there is a magnet fitted (these are the only materials in contact with refrigerant). When the refrigerant level rises within the surge drum to the connection of the NGX, the PTFE float will get in contact with refrigerant and start to drift up. The magnet on the other side of the balancing bar will move downwards. A reed-contact that is installed outside of the refrigerant surrounding will recognize the position of the magnet and will open when about 4mm are passed in the bottom position. The signal will be transferred through the relay BR-NWt and an auxiliary contactor within the switchgear to the compressor control.

An LED display connected in series with the reed-switch is illuminated during normal operation. If the LED is not illuminated the following reasons might occur:

- The maximum level in the surge drum has been exceeded
- The power supply was interrupted (cable breakage or misconnected cable)
- The reed-contact is defect



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- The magnet has been contaminated (with metal particles).



The NGX cannot be connected directly to a SPS control. (If the wiring diagram as shown on page 3 of the installation instructions of the BR-NWt **W 4651-6.11** is modified, the design approval is void)

8. TRANSPORT AND STORAGE

All openings (connections, etc.) are covered with yellow protection caps to prevent the intake of moisture or dirt. Storage or transportation of sensor and relay should be dry at all times. Pay special attention that no metal particles can enter the NGX housing to prevent the magnet may get weight down.

9. INSTALLATION

If the standard NGX is ordered there should be a DN 32 (42,4 x 3,2 mm) connection at the surge drum at the height of the desired level, to weld on the supplied stop valve EA 32.

When a stainless steel execution has been ordered a DN 40 (48,3 x 3,2 mm) connection has to be fitted to the surge drum at the relevant height of the maximum allowable level.



The sensor should not be fitted directly into the connection of the surge drum, because the balancing bar would interfere with the boiling refrigerant.

If a different brand valve should be used, a threaded connection G1"-NGX should be ordered, in which the NGX can be screwed. Please ensure that the liquid refrigerant can reach the balancing bar unhindered and the inner diameter of the connection to the surge drum is at least 35 mm. The connection to screw in the NGX should be sized in such a way that the balancing bar cannot touch the valve seat.

Screw back the counter nut to the end position so you can install the NGX into the seat connection of the EA 32 (take care that the O-ring will not get damaged!). When the installation is finished the cable outlet should face vertical down. When tightening the counter nut you will achieve a seal similar to a packing box. With the bracket you may connect the junction box to the valve, whereas the cable connections should face downwards. **Pay attention that the LED is visible at all times!**

The electrical connections should be executed according to the wiring diagram as shown in the installation instructions of the relay BR-NWt **W 4651-6.11**:

In addition to the limit-contact-relay BR-NWt you will require an auxiliary contactor and a reset switch, which are not within the scope of delivery. Furthermore it is recommended to install a fault signal indication.

When the maximum level switch NGX shall be used without the relay BR-NWt, only safety **extra low voltage (SELV oder PELV) should be provided to activate the magnet switch.**



All electrical connections must be executed by a certified electrician familiar with the system, who is familiar with the standards and local regulations, e.g. BGV A2 (VBG 4), VDE 0100, VDE 0113 (EN 60204 T1) und VDE 0660 T5 (EN 60439 T1) or equivalent.

10. COMMISSIONING AND START-UP

Operate the maximum level switch NGX only when you are sure that all connections have been installed properly and the following tests have been executed.

Functioning check:

Turn the housing of the NGX 180°, by carefully loosening the counter nut ¼ turn. On the nameplate you should be able to read the word "Prüfstellung" in the proper position. If the balancing bar is not obstructed it will fall down and the magnet will release the reed contact. The red LED will switch off.

Adjusting the limit-contact-relay BR-NWt

See installation instructions for the relay BR-NWt W 4651-6-11.



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11. OPERATION

The NGX operates as explained before and will switch off the compressor(s) if the relevant maximum level has been exceeded. The cutout of the compressors should be executed per hardware by means of an auxiliary contactor (K). Any other wiring or control scheme is only possible in areas where BGR 500 (formerly VGB 20), or equivalent codes, must not be adhered to.

12. MAINTENANCE AND INSPECTION



A functioning check, as described above, should be executed frequently (once a year or if required more often), particularly when the NGX has been activated.

If the magnet has become contaminated with metal particles from the system, close the stop valve EA 32 and remove the sensor by carefully screwing the unit out in order to clean the balancing bar with the magnet thoroughly. We recommend sending in the sensor back to the manufacturer for repair and proper adjustment.



When removing the NGX or during the functioning check you should always wear protective clothing as per codes of practise, e.g. EN 378.

13. APPROVALS / REGULATIONS

Design Approval

The maximum level switch has passed a design test by TÜV Rheinland and has received certificate No. 968/EL 743.00/11. The design approval includes maximum level switch NGX and relay BR-NWt in conjunction with the wiring diagram shown (page 3 of the BR-NWt instructions W 4651-6.11).

EU-Conformity declaration

We declare that we have conformed with the relevant European regulations 2004/108/EG (EMV-directive) and 2006/95/EG (low-voltage-directive), provided the NGX is operated according to the intended use.

The following standards were considered for the design approval:

TRAS 110:11/2008 safety requirements for ammonia refrigeration systems
EN 378-2:2008+A1:2009 refrigerant systems and heat pumps
BGR 500, chapter 2.35:03/2007 codes of the employers mutual insurance association regarding safety and health – operation of refrigeration and heat pump systems
EN ISO 13849-1:2008+AC:2009 (extracts) safety of machinery – safety relevant parts of control systems
EN 61508, part 1 to 7:2010 (extracts) functional safety of safety relevant electrical/electronic programmed systems
EN 50178:1997 equipment of high voltage systems

A technical documentation as well as the report of the design approval is available.

The maximum level switch NGX achieves performance level (PL) c/category 1 per DIN EN ISO 13849-1 and safety level SIL 1 according to IEC 61508. The maximum level switch is a device to protect machinery; it is not intended for the safety of personnel.

Aachen, 14.04.2011
Ort Datum

Monika Witt - Geschäftsführerin -
Unterschrift

Unterschrift