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. 945/EL 404/96) is designed to protect compressors within a refrigeration plant against liquid hammer (e.g. to conform with § 11 VGB 20). 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 paricularly 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.

3. TERMS OF WARRENTY

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 Kälemaschinenfabrik 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 4 are not adhered to (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.

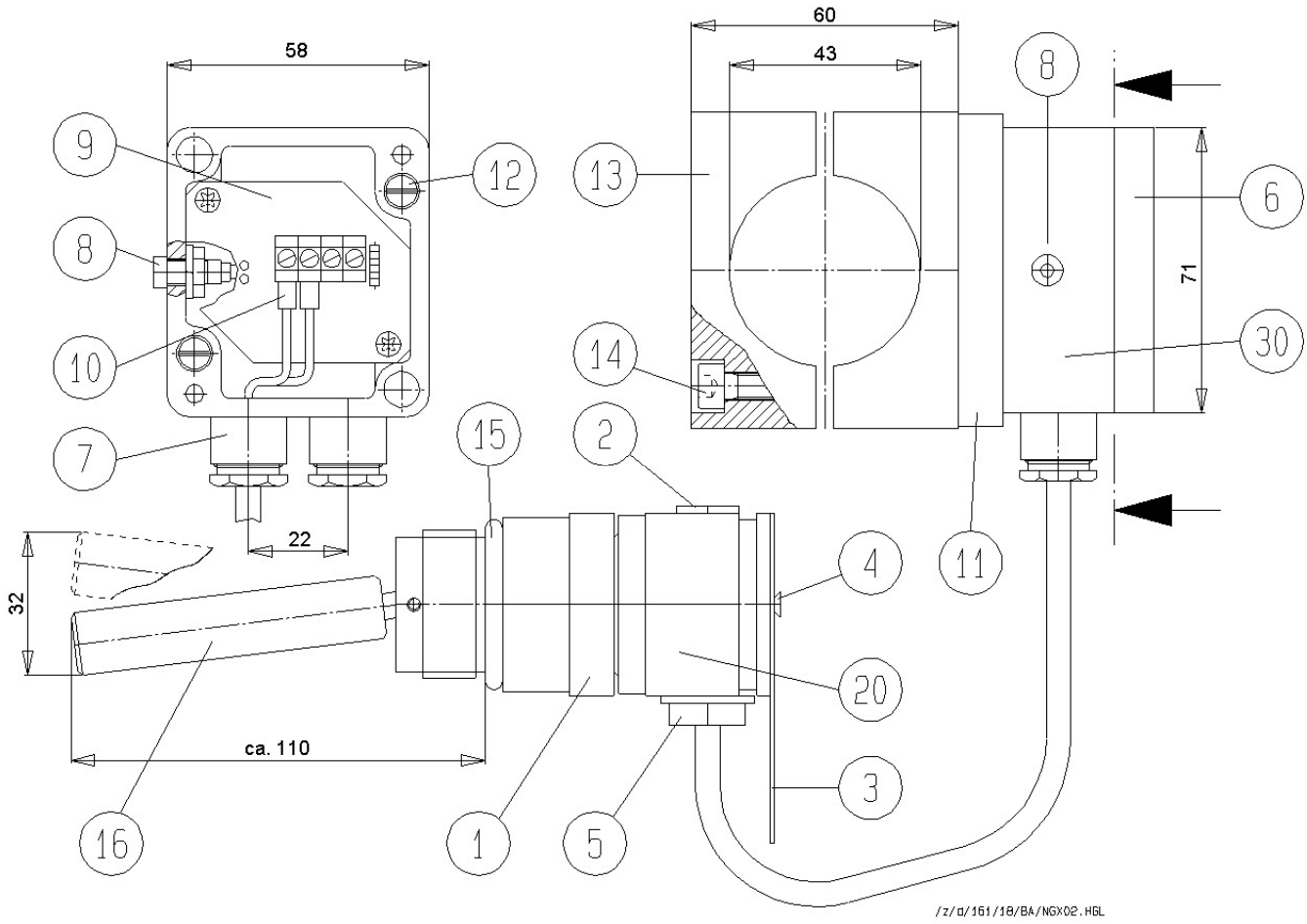
5. SCOPE OF DELIVERY

- 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)

Optional

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

6. TECHNICAL DATA



NGX- Part list	Part-No.	Dimension	Amount	Artikelnumber
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 MSR	1	4692.000003
junction box complete	6	----------	1	4651.000005
screw joint	7	PG 9	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 1/4"	1	5831.000002
cylinder head screw	14	M6x60	1	5112.000041
o - seal	15	ø 28 x 5	1	5642.000014
balancing bar	16	----------	1	----------
NGX – complete replacement assemblies				
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 connection without valves with BNRt	--	------	--	4651.000031
NGX with stainless steel connection without valves and without 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 exeeution	--	------	--	4651.000113

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

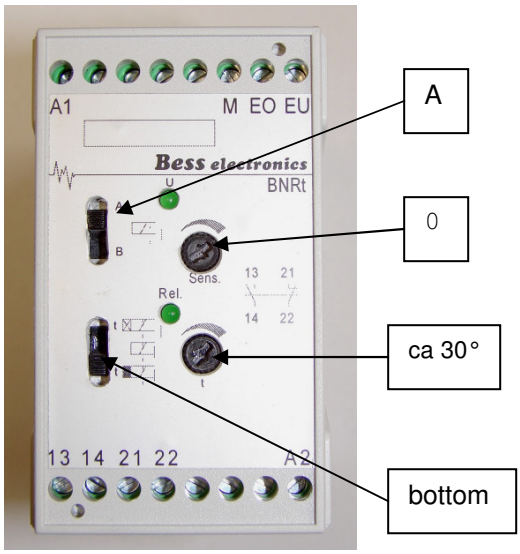
Material	PP - black
Dimensions	60 x 71 x 30 mm, hole approximately ø 42 mm With EA 32 /G1” or EA 40/G1” valve

D) Reed-Contact

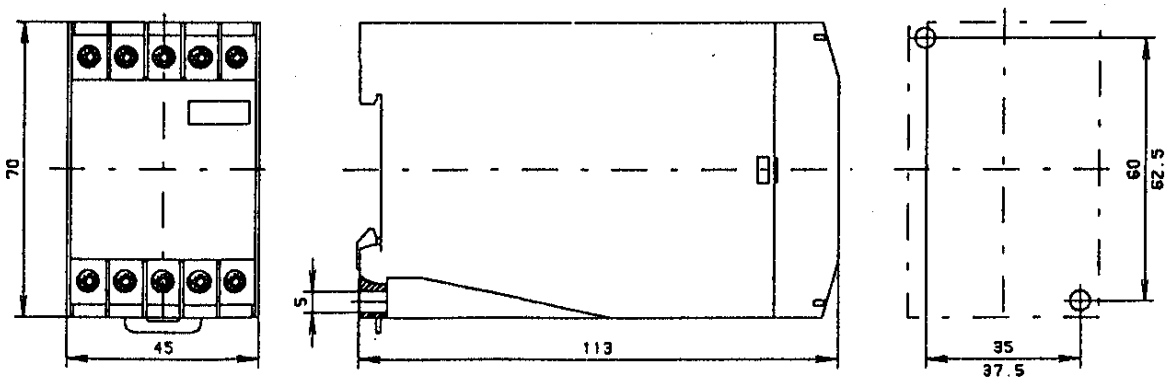
Voltage:	14 V AC/DC
Current:	max. 0,5 A
Cycles:	1000 / s
Contact:	Rhodium

E) Relais BNRt

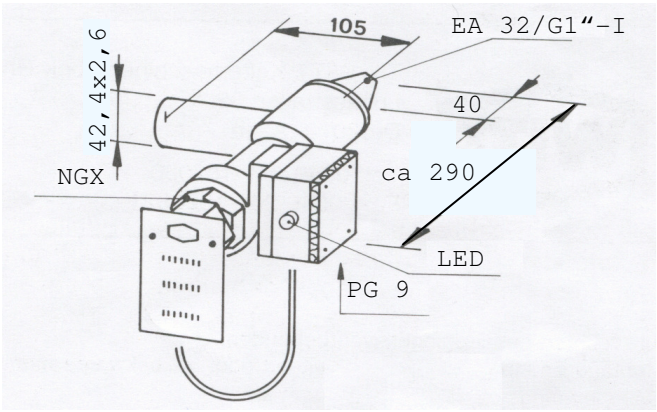
Voltage:	220 ... 240 V AC
Measuring circuit:	14 V AC
Frequency:	50 ... 60 Hz
Switch currency, max.:	2,5 A
Operating mode:	A = Operating mode (B = Reversion, not allowed!)
Allowable Temp. Range:	20°C to +60°C
Operating delay:	from 100 ms to 10 s
Top green LED display	system voltage existing
Bottom green LED display	Relay on
Weight:	approx. 0,24 kg



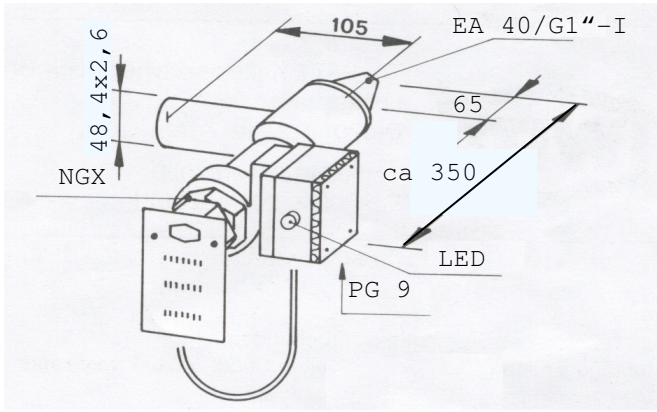
Dimensions



Relais BNRt



a) standard execution



b) SS execution

Main dimension NGX

7. DESCRIPTION OF OPERATION

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 as soon as the magnet is in the bottom position. The signal will be transferred through the relay BNRt 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
- 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 4 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 foreign 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 showed 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 simular 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 at the end:

In addition to the limit-contact-relaisBNRt you will require an auxiliary contactor and a reset switch. Furthermore it is recommended to install a fault signal indication.

All electrical connections must we 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 BE-NWt
Set the switch on the top left side to position A for normal operation and the switch below to the lowest point for the operating delay. (See also manual for the BNRt). Then adjust the delay time to approximately 1 s (turn the lower potentiometer approximately 30° to the right). The LED U and R_{el} will be illuminated, if the device has been installed properly.

11. OPERATION

The NGX operates as explained before and will switch off the compressor(s) if the relevant maximum level has been exceeded. The shut off of the compressors should be executed per hardware by mans of an auxiliary contactor (K). Any other wiring or control scheme is only possible in areas where the 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.

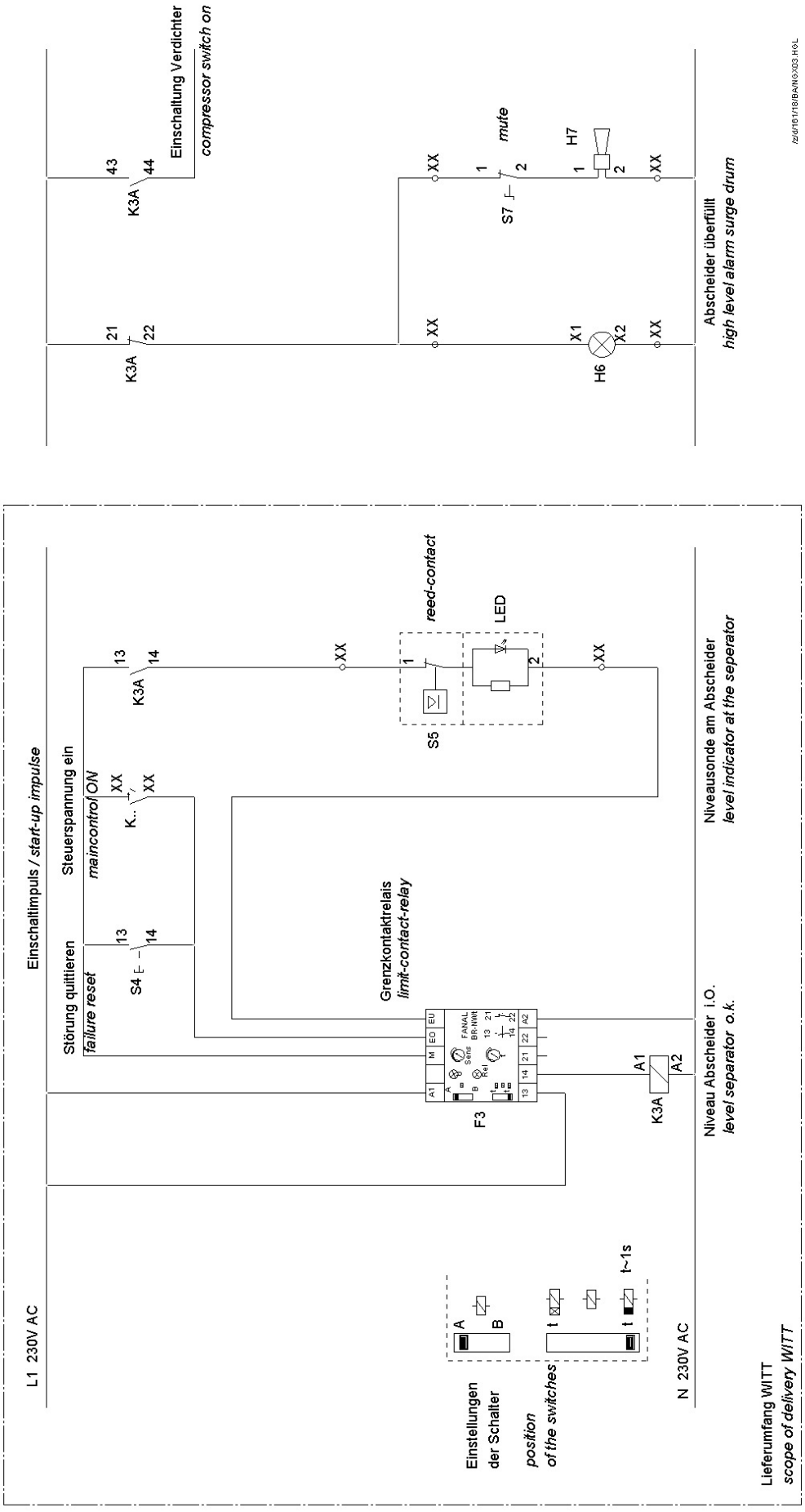
When removing the NGX or during the functioning check you should always wear protective clothing as per codes of practise, e.g. EN 378.

13. APPROVALS / REGULATIONS

Design Approval
The maximum level switch has passed a design test by TÜV Rheinland and has received certificate No. 945/EL 304/96. The design test includes sensor and relay in conjunction with the wiring diagram shown on page 4.

EU-Conformity declaration
We declare that we have conformed with the relevant European regulations 89/336/EWG (EMV-Regulation) and 73/23/EWG (low-voltage-regulation).
The following standards were adhered to: VGB 20 in the version from 1.1.1993, §7 and 11, DIN 8975 part 2/02.89 chapter 7.5.11, DIN VDE 0160/05.88 with modifications A1/04.89, EN60204-1, EN 50081-2 and 50082-2.
Relevant technical documentation and test certificates exist.

Aachen,	15.1.2001	Monika Witt – managing director -	
location	Date	signatory	signature


Einschaltimpuls / start-up impulse
Steuerspannung ein
maincontrol ON
Störung quittieren
failure reset
S4
K3A
K...
reed-contact
LED
S5
Grenzkontaktrelais
limit-contact-relay
F3
Niveausonde am Abscheider
level indicator at the seperator
Niveau Abscheider i.O.
level separator o.k.
L1 230V AC
N 230V AC
Einstellungen der Schalter
position of the switches
Lieferumfang WITT
scope of delivery WITT
Einschaltung Verdichter
compressor switch on
mute
S7
H7
H6
Abscheider überfüllt
high level alarm surge drum