GESTRA®

Measuring electrode NRG 16-19
Measuring electrode NRG 16-27
Measuring electrode NRG 16-28
Test set VKE 16-1
Test set VKE 16 A
Test set VKE 26

NRG 16-19
NRG 16-27
NRG 16-28
VKE 16-1
VKE 16 A
VKE 26

EN
English

Original Installation Instructions
818725-06

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Important Notes

Usage for the intended purpose

Use the electrodes NRG 16-19, NRG 16-27, NRG 16-28 and the test chambers VKE 16-1, VKE 16 A and VKE 26 in conjunction with a suitable detector (e. g. test station NRA 1-3) only for monitoring steam traps for banking-up of condensate and loss of live steam.

Safety note

The equipment must only be installed and commissioned by qualified and competent staff.

Retrofitting and maintenance work must only be performed by qualified personnel who – through adequate training – have achieved a recognised level of competence.

Danger

The measuring electrode, the test chamber and the steam trap are under pressure during operation.

When loosening the measuring electrode, flanged connections and sealing plugs steam or hot water might escape.
This presents the danger of severe scalds to the whole body.

Installation and maintenance work should only be carried out when the system is depressurized (0 bar).

The equipment must be isolated and vented from both upstream and downstream pressure.

The measuring electrode, test chamber and steam trap become hot during operation. Touching the hot equipment presents the risk of severe burns to hands and arms.

Installation and maintenance work should only be carried out when the system is cold.

Before servicing the equipment or undoing flanged connections or sealing plugs make sure that all connected lines are depressurized (0 bar) and cooled down to room temperature (20 °C).

Sharp edges on internal parts present the danger of cuts to hands.
Always wear industrial gloves when removing the strainer (steam trap).

Attention

The name plate specifies the technical features of the equipment. Note that any piece of equipment without its specific name plate must neither be commissioned nor operated.

Important Notes – continued –

PED (Pressure Equipment Directive)

The equipment fulfils the requirements of the Pressure Equipment Directive (PED).
Applicable with fluids of group 2.
With CE marking (except for equipment according to section 4.3 of the PED).

ATEX (Atmosphère Explosible)

According to the European Directive the equipment must **not** be used in explosion-risk areas.

Note on the Declaration of Conformity / Declaration by the Manufacturer CE

For details on the conformity of our equipment according to the European Directives see our Declaration of Conformity or our Declaration of Manufacturer.

The current Declaration of Conformity / Declaration of Manufacturer are available in the Internet under www.gestra.com/documents or can be requested from us.

Explanatory Notes

Scope of supply

NRG 16-19
1 Measuring electrode NRG 16-19
1 Joint ring D 17 x 21 to DIN 7603 (made from 1.4301), form D, bright annealed
1 Installation manual

NRG 16-27
1 Measuring electrode NRG 16-27
1 Joint ring D 17 x 21 to DIN 7603 (made from 1.4301), form D, bright annealed
1 Installation manual

NRG 16-28
1 Measuring electrode NRG 16-28
1 Joint ring D 24 x 29 to DIN 7603 (made from 1.4301), form D, bright annealed
1 Installation manual

VKE 16-1
1 Test chamber VKE 16-1
1 Installation manual

VKE 16 A
1 Test chamber VKE 16 A
1 Installation manual

VKE 26
1 Test chamber VKE 26
1 Installation manual

Explanatory Notes – continued –

Description

A faulty steam trap can cause banking-up of condensate or steam loss.

The measuring electrode, which is screwed into the steam trap or a test chamber, detects malfunctions in traps.

The test station NRA 1-3 evaluates the signals coming from the measuring electrodes and is designed for the connection of up to max. 16 measuring electrodes.

Function

The following electrodes can be used for monitoring steam traps:

- Measuring electrodes **NRG 16-27, NRG 16-28** for detecting loss of live steam (electrode exposed) and banking-up of condensate (by measuring the temperature of the condensate) or
- Measuring electrode **NRG 16-19** for detecting banking-up of condensate **or** loss of live steam (electrode exposed or immerged).

The measuring electrode **NRG 16-27, NRG 16-28** works according to the conductivity measurement principle and detects steam loss (electrode exposed). The equipment is also equipped with a temperature sensing element PT 1000 for measuring the temperature of the condensate. The measuring electrode is either screwed into the steam trap to be monitored or in the separate test chamber **VKE 16-1** or **VKE 16 A** mounted upstream of the steam trap.

The measuring electrode **NRG 16-19** works according to the conductivity measurement principle, too. Depending on the installation the electrode detects either loss of live steam or banking-up of condensate, see **Fig. 11** (top). The measuring electrode is screwed into the test chamber **VKE 16-1, VKE 16 A** (steam loss) or into the test chamber **VKE 26** (banking-up of condensate).

The test chamber **VKE 16-1, VKE 16 A** can be installed upstream of any type or make of steam trap.

With float traps the test chamber **VKE 26** is screwed on top into the vent hole. The air balance pipe is connected to the test chamber.

The test station NRA 1-3 evaluates the signals coming from the measuring electrodes and indicates banking-up of condensate, steam loss and malfunctions. The level switch NRS 1-2 can also be connected to the measuring electrode NRG 16-19.

Technical Data

Corrosion resistance

When used for its intended purpose the safe functioning of the electrode will not be impaired by corrosion.

Sizing

The body is not designed for pulsating loads. Dimensional allowances and anti-corrosive additives are in accordance with the latest state-of-the-art.

NRG 16-19, NRG 16-27, NRG 16-28

Service pressure
PN 40, max. 32 barg at 238 °C

Connection
NRG 16-19, NRG 16-27: screwed 3/8" to A ISO 228
NRG 16-28: screwed M 24 x 1.5

Materials
NRG 16-19
Screw-in body: 1.4301
Spacer disk: 1.4571
Electrode rod: 1.4571
Insulating disk: Gylon®

NRG 16-27, NRG 16-28
Screw-in body: 1.4571
Electrode rod: 1.4571
Insulation of electrode rod: PEEK

Sensitivity of response
> 1 µS/cm at 25 °C

Electrode voltage
12 V

Electrical connection
NRG 16-19: Connecting line made from PTFE, 2 m long, 2 x 1.5 mm^2
NRG 16-27, NRG 16-28: M 12 sensor connector, 5 poles, A coded

Protection
NRG 16-27, NRG 16-28: IP 65 to DIN EN 60529
NRG 16-19: IP 52 to DIN EN 60529

Ambient temperature at terminal box
Max. 80 °C

Weight
Approx. 0.3 kg

Technical Data – continued –

Test chamber VKE 16-1, VKE 16 A

Designs
Electrode connection in flow direction to the left or to the right. Please state when ordering.

Pressure / temperature ratings

Service pressure	barg	40	28.4	23.3	23.1
Related temperature	°C	20	250	385	400

Materials VKE 16-1
Enclosure 1.0619
Flanges 1.0460

Connections
Flanges: DIN, PN 40
Screwed sockets: R and NPT thread
Nominal sizes: DN 15, 20, 25, ½", ¾", 1"
Available on request: DN 40, 50; 1½", 2"

Connection of electrode
Screwed 3/8" to ISO 228-1

Materials VKE 16 A
Enclosure 1.4571
Flanges 1.4571

Connections
Flanges: DIN, PN 40
Screwed sockets: R and NPT thread
Nominal sizes: DN 15, 20, 25, ½", ¾", 1"
Available on request: DN 40, 50; 1½", 2"

Connection of electrode
Screwed 3/8" to ISO 228-1

Test chamber VKE 26

Pressure / temperature ratings

Service pressure	barg	40	28.4	23.3	23.1
Related temperature	°C	20	250	385	400

Materials
Flanges 1.0460

Connections
Threaded standpipe: 3/8" BSP
Air-balance pipe: 3/8" BSP

Connection of electrode
Screwed 3/8" to ISO 228-1

Technical Data – continued –

Name plate / marking

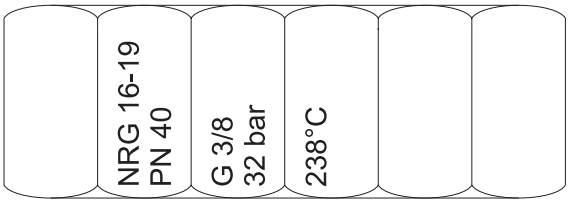


Fig. 1 Equipment designation on hexagon part of electrode

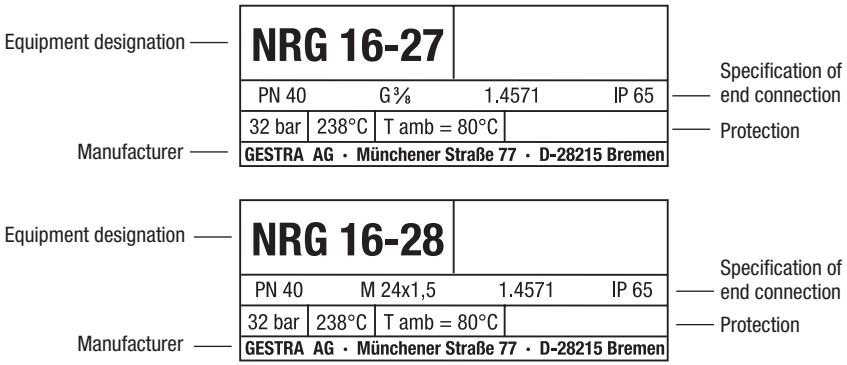


Fig. 2 Name plate of NRG 16-27, NRG 16-28

Fig. 3 Name plate of test station

Notice

The body of test chamber VKE 16 A bears the stamp:
equipment number,
PN = 30 bar,
TN = 230 °C.

Dimensions of NRG 16-19, NRG 16-27, NRG 16-28

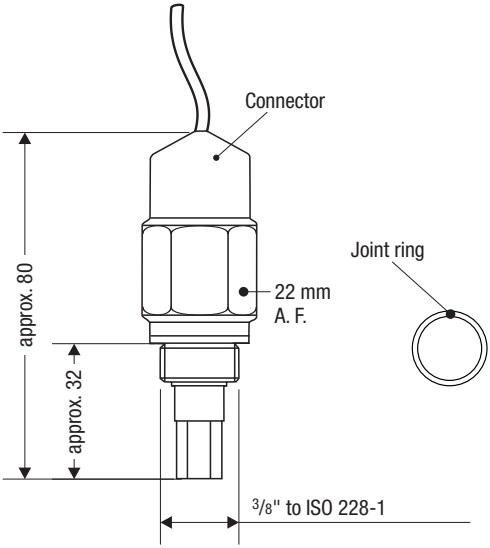
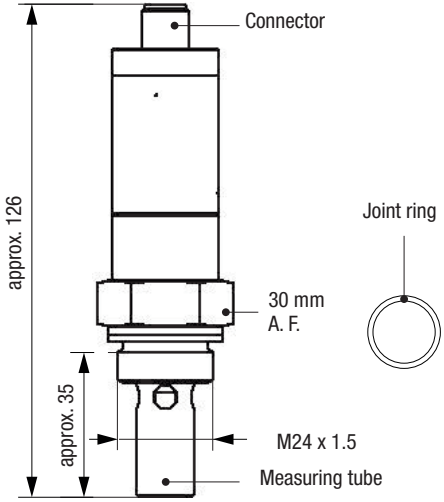


Fig. 5 NRG 16-19



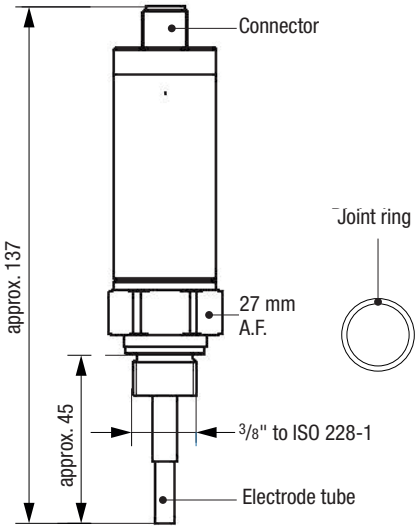


Fig. 6 NRG 16-27

NRG 16-28

Dimensions of test chamber VKE 16-1

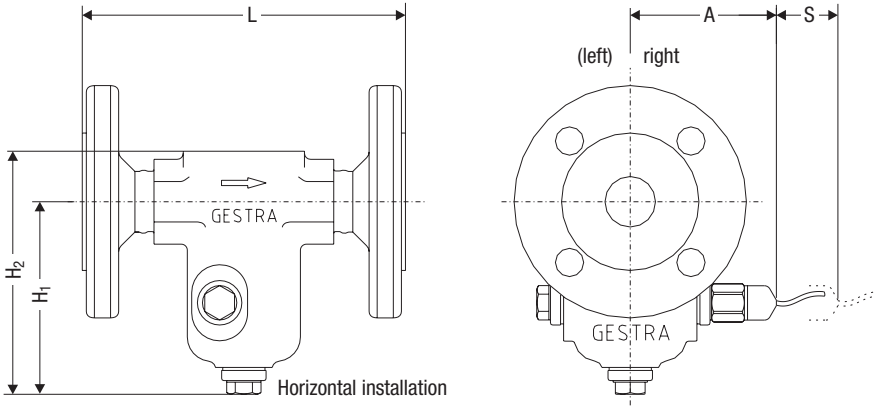


Fig. 7

Dimensions		Designs									
		Flanged to DIN					Screwed sockets				
Nominal size	[mm]	15	20	25	40	50	15	20	25	40	50
	[inch]	½	¾	1	1½	2	½	¾	1	1½	2
Length	L	150	150	160	on request		95			on request	
	A	~80 (NRG 16-19) ~130 (NRG 16-27)					~80 (NRG 16-19) ~130 (NRG 16-27)				
Space required for servicing	S	~40 (NRG 16-19) ~50 (NRG 16-27)					~40 (NRG 16-19) ~50 (NRG 16-27)				
Height	H_1	~93					~93				
	H_2	~118					~118				

Dimensions of test chamber VKE 16 A

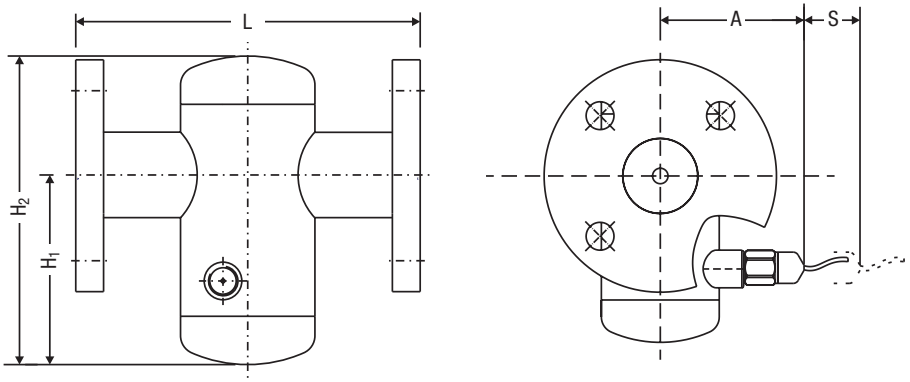


Fig. 8

Dimensions		Designs				
		Flanged to DIN				
Nominal size	[mm]	15	20	25	40	50
	[inch]	½	¾	1	1½	2
Length	L	160	160	160	200	230
	A	~90 (NRG 16-19) ~130 (NRG 16-27)			~100 ~150	
Space required for servicing	S	~40 (NRG 16-19) ~50 (NRG 16-27)				
Height	H_1	~90			~115	
	H_2	~143			~186	

Technical Data – continued –

Dimensions of test chamber VKE 26

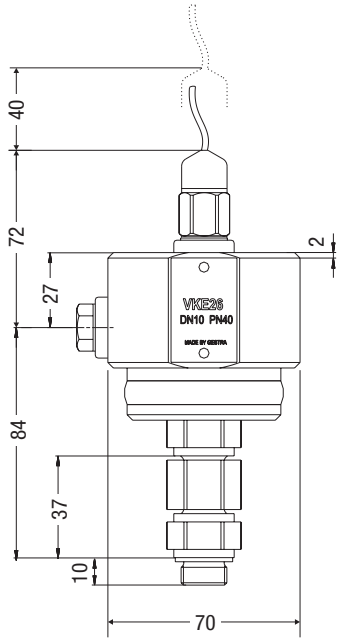


Fig. 9

Dimensions of NRG 16-28 for Rhombusline steam traps

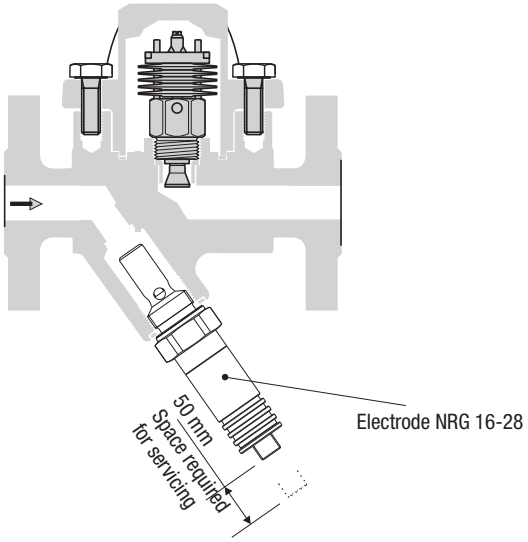


Fig. 10

Installation

VKE 16-1, VKE 16 A, VKE 26

Danger

Risk of death, severe injuries, damage or destruction caused by the explosion of explosive mixtures!
An electrically insulated installation between pipe flanges may result in electrostatic charges.
If the equipment is used in explosion-risk areas make sure that any electrostatic charges that may be generated will be discharged (earthing).

VKE 16-1, VKE 16 A

Install test chamber only in horizontal pipes, see **Fig. 7** and **Fig. 8**.

VKE 16-1, VKE 16 A Design with flanged ends

1. Observe correct position of installation.
2. Observe direction of flow. The flow arrow is on the trap body.
3. Consider space required for servicing. When the test chamber is installed a minimum space is required for removing the measuring electrode (see table for **Fig. 7** and **Fig. 8**).
4. Remove plastic plugs. They are only used as transit protection.
5. Clean seating surfaces of both flanges.
6. Install steam trap.

VKE 16-1 Design with screwed socket ends

1. Observe correct position of installation.
2. Observe direction of flow. The flow arrow is on the trap body.
3. Consider space required for servicing. When the test chamber is installed a minimum space is required for removing the measuring electrode (see table for **Fig. 7** and **Fig. 8**).
4. Remove plastic plugs. They are only used as transit protection.
5. Clean thread of screwed sockets.
6. Install steam trap.

Installation – continued –

VKE 16-1 Design with socket-weld ends

1. Observe correct position of installation.
2. Observe direction of flow. The flow arrow is on the trap body.
3. Consider space required for servicing. When the test chamber is installed a minimum space is required for removing the measuring electrode (see table for **Fig. 7** and **Fig. 8**).
4. Remove plastic plugs. They are only used as transit protection.
5. Clean socket-weld ends.
6. Apply arc welding processes 111 and 141 in accordance with ISO 4063.

VKE 16-1 Design with butt-weld ends

1. Observe correct position of installation.
2. Observe direction of flow. The flow arrow is on the trap body.
3. Consider space required for servicing. When the test chamber is installed a minimum space is required for removing the measuring electrode (see table for **Fig. 7** and **Fig. 8**).
4. Remove plastic plugs. They are only used as transit protection.
5. Clean butt-weld ends.
6. Apply arc welding processes 111 and 141 in accordance with ISO 4063 or gas welding process 3 to ISO 4063.

Attention

- Only qualified welders certified e. g. according to DIN EN 287 may weld the steam trap.
- Do **not** insulate the steam traps.

Heat treatment of welds

A subsequent heat treatment of the welds is not required.

VKE 26

1. Remove plastic plugs. They are only used as transit protection.
2. Screw test chamber into the vent hole of the float trap.
3. Connect the gas balance pipe laterally to the test chamber.
4. Make sure the gas balance pipe is ascending.
5. Consider space required for servicing. When the test chamber is installed a minimum space is required for removing the measuring electrode (see **Fig. 9)**.

Installation – continued –

NRG 16-19, NRG 16-27, NRG 16-28

The measuring electrode NRG 16-28 can be directly screwed into Rhombusline steam traps. For this purpose unscrew the sealing plug and remove the strainer (see **Fig. 10**). Remove any residual grease or lubricant.

The steam traps can be installed in horizontal pipes or in vertical pipes with downward flow.

Before screwing the measuring electrodes NRG 16-19, NRG 16-27 into the left or right side of the test chamber VKE 16-1, VKE 16 A remove the sealing plug.

For the test chamber VKE 26 remove the top sealing plug and screw in the measuring electrode.

1. Check sealing surfaces of the steam trap and the test chamber.
2. Put joint ring onto the seating surface of the electrode. Use only the joint ring supplied with the electrode.
3. Screw the measuring electrode into the steam trap or test chamber and tighten it.

   The torques required for tightening when cold are:
   NRG 16-19: 60 Nm,
   NRG 16-27: 60 Nm,
   NRG 16-28: 75 Nm.

Attention

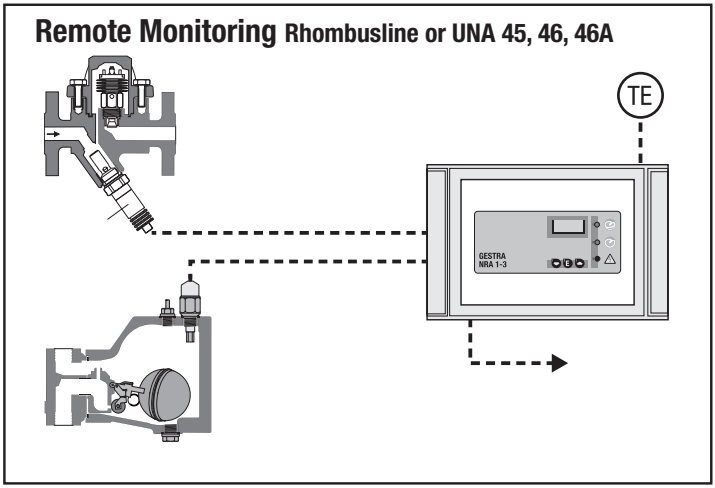
- The seating surfaces of the steam trap or the test chamber must be accurately machined.
- Do not insulate the electrode thread with hemp or PTFE tape.
- Observe the specified torques for tightening.

Tools

- Open-end spanner, 32 mm A. F.
- Open-end spanner, 30 mm A.F.
- Open-end spanner, 22 mm A. F.

Molykote® 111 is a registered trademark of DOW Corning Corp., Midland Michigan, USA

Examples of installation NRG 16-19, NRG 16-27, NRG 16-28



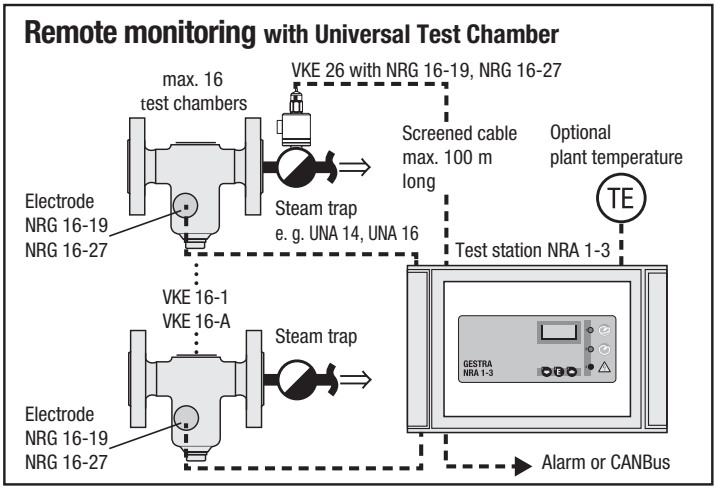


Fig. 11

Wiring

Connecting cables for measuring electrodes

NRG 16-19
The measuring electrode comes with a 2 m long connecting cable and can be directly connected to the test station NRA 1-3. To extend the cable use screened two-core cable, e. g. Ölflex 110 CH, manufactured by LAPP, 2 x 0.5 mm^2. Max. cable length between measuring electrode and test station NRA 1-3: 100 m.

NRG 16-27, NRG 16-28
Use screened five-core cable, e. g. Ölflex 110 CH, manufactured by LAPP, 5 x 0.5 mm^2. Max. cable length between measuring electrode and test station NRA 1-3: 100 m. Please connect the screen to the measuring electrode.

Pre-assembled connecting cables (with connector) of various lengths available as accessories.

Wiring

Connect the cables to the terminal strips of the test station according to the wiring diagram.

Tools

- Screwdriver, size 1 and 2
- Screwdriver, size 2.5, completely insulated to VDE 0680.

Measuring electrodes NRG 16-27, NRG 16-28 pin assignment

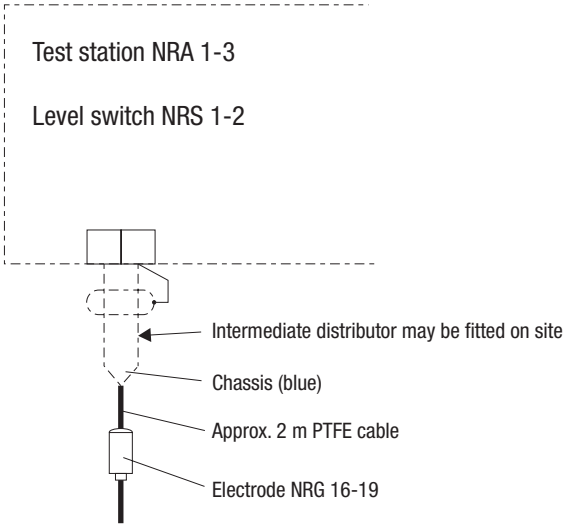


Fig. 12

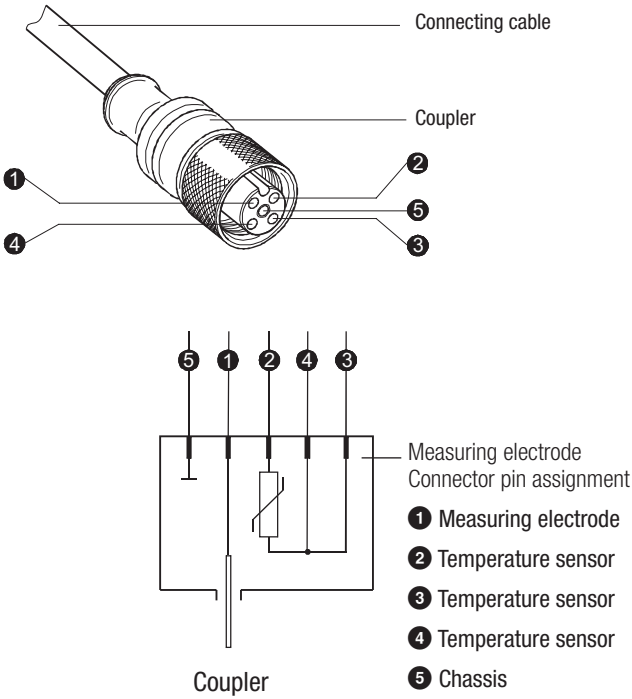


Fig. 13

Commissioning

VKE 16-1, VKE 16 A, VKE 26

Make sure that the flanged connections of the test chamber are firmly bolted together and leakproof.

NRG 16-19, NRG 16-27, NRG 16-28

Before commissioning please check:
Are the measuring electrodes /temperature sensors wired in accordance with the wiring diagram?

Applying mains voltage

Apply supply voltage to the test station.

Maintenance, removal and decommissioning

Danger

Measuring electrode, test chamber and steam trap are under pressure during operation.

When loosening the measuring electrode, flanged connections or sealing plugs steam or hot water might escape.

This presents the risk of severe scalding all over the body.

Do not install or service the equipment unless the plant pressure is verified to be zero.

Make sure that the lines upstream and downstream of the equipment are not under pressure.

The measuring electrode, test chamber and steam trap are hot during operation. This presents the danger of severe burns to hands and arms. Installation and maintenance work must only be carried out when the system is cold.

Before servicing the equipment or undoing flanged connections or sealing plugs make sure that all connected lines are depressurised (0 bar) and cooled down to room temperature (20 °C).

Sharp edges on internals present a danger of cuts to hands.

Always wear industrial gloves when removing the strainer in the steam trap.

Maintenance interval

We recommend to remove the measuring electrodes every 6 months and clean them with a wet cloth.

Maintenance, removal and decommissioning – continued –

Removing and disposing of measuring electrode NRG 16-19, NRG 16-27 and NRG 16-2

1. Detach measuring electrode (NRG 16-19) or remove the terminal box (NRG 16-27, NRG 16-28).
2. Before removing the equipment make sure that it is neither hot nor under pressure.

The equipment must be disposed of in accordance with statutory waste disposal provisions.

For your notes:

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