Operating instructions

N-10, N-11

Pressure Transmitter

WIKA Instrument Corporation
A1000 Wiegand Boulevard
Lawrenceville, GA 30043
Phone (770) 513 8200
Fax (770) 338 5118
E-Mail info@wika.com
www.wika.com
Operating instructions

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1. Important details for your information

Read these operating instructions before installing and starting the pressure transmitter. Keep the operating instructions in a place that is accessible to all users at any time.

The following installation and operating instructions have been compiled by us with great care but it is not feasible to take all possible applications into consideration. These installation and operation instructions should meet the needs of most pressure measurement applications. If questions remain regarding a specific application, you can obtain further information:

- Via our Internet address www.wika.de / www.wika.com
- The product data sheet is designated as APE N-10
- Contact WIKA for additional technical support (770) 513 8200

If the serial number and/or the 2D code on the hexagon gets illegible (e.g. by mechanical damage or repainting), the retraceability of the instrument is not possible any more.

WIKA pressure transmitters are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality and environmental inspection before assembly and each instrument is fully tested prior to shipment. Our environmental management system is certified to DIN EN ISO 14001.

**Certificate FM/CSA:**
Pressure transmitter for operation in hazardous areas in compliance with the respective certificate (see Control drawing No. 2245906, section 12).

FM / CSA Approval ratings: Non-incendive
Non-incendive for Class I Division 2 Groups A, B, C and D
Dust-ignitionproof for Class II, Division 1, Groups E, F, and G.

Use of the product in accordance with the intended use N-10, N-11:
Use the non-incendive pressure transmitter to transform the pressure into an electrical signal in hazardous areas.
Knowledge required
Install and start the pressure transmitter only if you are familiar with the relevant regulations and directives of your country and if you have the qualification required. You have to be acquainted with NEC. Depending on the operating conditions of your application you have to have the corresponding knowledge, e.g. of aggressive media.

2. A quick overview for you
If you want to get a quick overview, read Chapters 3, 5, 7 and 11. There you will get some short safety instructions and important information on your product and its starting. Read these chapters in any case.

3. Signs, symbols and abbreviations

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
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<tr>
<td>!</td>
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<td>!</td>
<td>Warning</td>
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<tr>
<td>!</td>
<td>Caution</td>
</tr>
<tr>
<td>±</td>
<td>Instruction</td>
</tr>
</tbody>
</table>

Potential danger of life or of severe injuries.

Instructions for hazardous areas: Potential danger of life or of severe injuries.

Potential danger of life or of severe injuries due to catapulting parts.

Potential danger of burns due to hot surfaces.

Notice, important information, malfunction.

FM Factory Mutual
The product was tested and certified by FM Approvals. It complies with the applicable US-American standards on safety (including explosion protection).

CSA Canadian Standard Association
The product was tested and certified by CSA International. It complies with the applicable Canadian and US-American standards on safety (including explosion protection).

2-wire
Two connection lines are intended for the voltage supply. The supply current is the measurement signal.

3-wire
Two connection lines are intended for the voltage supply. One connection line is intended for the measurement signal.

4. Function and accessories
N-10: Pressure connection (non-incendive) with internal diaphragm (standard version).
N-11: Pressure connection with flush diaphragm (non-incendive) for highly viscous or solids entrained media which might clog the pressure port.

Function: The pressure prevailing within the application is transformed into a standardised electrical signal through the deflection of the diaphragm, which acts on the sensor element with the power supply fed to the transmitter. This electric signal changes in proportion to the pressure and can be evaluated correspondingly.

5. For your safety

Select the appropriate pressure transmitter with regard to scale range, performance and specific measurement conditions prior to installing and starting the instrument.

Observe the relevant national regulations (e.g.: EN 50178) and observe the applicable standards and directives for special applications (e.g. with dangerous media such as acetylene, flammable gases or liquids and toxic gases or liquids and with refrigeration plants or compressors). If you do not observe the appropriate regulations, serious injuries and/or damage can occur!

Open pressure connections only after the system is without pressure!

Please make sure that the pressure transmitter is only used within the overload threshold limit all the time!

Observe the ambient and working conditions outlined in section 7 „Technical data“.

Ensure that the pressure transmitter is only operated in accordance with the provisions i.e. as described in the following instructions.
5. For your safety

- Do not interfere with or change the pressure transmitter in any other way than described in these operating instructions.
- Remove the pressure transmitter from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation.
- Take precautions with regard to remaining media in removed pressure transmitter. Remaining media in the pressure port may be hazardous or toxic!
- Have repairs performed by the manufacturer only.

6. Packaging

Has everything been supplied?

- Check the scope of supply:
  - Completely assembled pressure transmitters; with flush version N-11 including pre-assembled sealings and protection cap.
  - Inspect the pressure transmitter for possible damage during transportation. Should there be any obvious damage, inform the transport company and WIKA without delay.
  - Keep the packaging, as it offers optimal protection during transportation (e.g. changing installation location, shipment for repair).
  - Ensure that the pressure connection thread and the connection contacts will not be damaged.

In order to protect the diaphragm, the pressure connection of the instrument N-11 is provided with a special protection cap.

- Remove this protection cap only just before installing the pressure transmitter in order to prevent any damage to the diaphragm or the thread.
- Keep the protection cap of the pressure connection thread and the diaphragm for later storage or transport.
- Mount the protection cap when removing and transporting the instrument.

7. Starting, operation

Required tools: wrench (flats 27), screw driver

Diaphragm test for your safety

It is necessary that before starting the pressure transmitter you test the diaphragm, as this is a safety-relevant component.

- Pay attention to any liquid leaking out, for this points to a diaphragm damage.
- Check the diaphragm visually for any damage (N-11).
- Use the pressure transmitter only if the diaphragm is undamaged.
- Use the pressure transmitter only if it is in a faultless condition as far as the safety-relevant features are concerned.

Mechanical connection

Use to install the transmitter process connection

max. 50 Nm

Product label (example)

If there is no serial number on the product label, the number on the hexagon will apply.

Special instructions for non-incendive

- Remove the protection cap only just before installation and absolutely avoid any damage to the diaphragm during installation as well (N-11).
For Model N-10 you have to provide for a sealing element; exceptions are instruments with self-sealing threads (e.g. NPT thread). For Model N-11 the sealing ring is included in delivery.

Please refer to our data sheet “Pressure gauge sealing washers AC 09.08” in WIKA’s product catalog Pressure and Temperature Measurement or our website www.wika.de for details about sealing washers.

When mounting the instrument, ensure that the sealing faces of the instrument and the measuring point are clean and undamaged.

Screw in or unscrew the instrument only via the flats using a suitable tool and the prescribed torque. The appropriate torque depends on the dimension of the pressure connection and on the sealing element used (form/material). Do not use the case as working surface for screwing in or unscrewing the instrument.

When screwing the transmitter in, ensure that the threads are not jammed.

For tapped holes and welding sockets please see Technical Information IN 00.14 for download at www.wika.de.

Electrical connection

- Do not disconnect the electrical connection while under voltage.
- Always connect the case to ground to protect the pressure transmitter against electromagnetic fields and electrostatic charges.

Do not exceed the permissible surface temperatures applicable for this range according to the defined temperature classes.

Operate the pressure transmitter with a shielded cable and ground the shield at least on one side of the cable, if the cable is longer than 30m (2-wire) or 3m (3- or 4-wire), or if it is run outside of the building.

Ingress protection per IEC 60529 (The ingress protection classes specified only apply while the pressure transmitter is connected with female connectors that provide the corresponding ingress protection).

Ensure that the cable diameter you select fits to the cable gland of the connector.

Cover flying leads with fine wires by an end splice (cable preparation).

Electrical installation shall be prepared in accordance with the control drawing no. 2245906 (section 12).

Use a power supply not exceeding the non-incendive field wiring parameters (30 V DC max., 120 mA max.)

Attempting to remove the cable connection will damage the transmitter and void the factory warranty and FM + CSA approval.

The electrical connection provided on the transmitter should be used as originally supplied and not bypassed or modified (other than cable length). Improper installation or modification on the electrical connection will void the hazardous area approval rating.

Switch on the operating voltage only after establishing the electrical connection in order to avoid any spark formation.

Connect the cable screen to ground. Provide a potential equalization for long cables or where required by the installation conditions.

Cover flying leads with fine wires by an end splice (cable preparation).
7. Starting, operation

**Assembly of L-connector DIN EN 175301-803**

1. Loosen the screw (1).
2. Loosen the cable gland (2).
3. Pull the angle housing (5), with the terminal block (6) inside, away from the instrument.
4. Using the head of a small screwdriver in the mounting hole (D), lever the terminal block (6) out of the angle housing (5).
   - In order not to damage the sealing of the angle housing, do not try to push the terminal block (6) out using the screw hole (1) or the cable gland (2).
5. Ensure that the conductor outer diameter you select is matched to the angle housing’s cable gland. Slide the cable through the cable gland nut (2), washer (3), gland seal (4) and angle housing (5).
6. Connect the flying leads to the screw terminals on the terminal block (6) in accordance with the pin-assignment drawing.
7. Press the terminal block (6) back into the angle housing (5).
8. Tighten the cable gland (2) around the cable. Make sure that the sealing isn’t damaged and that the cable gland and seals are assembled correctly in order to ensure ingress protection.
9. Place the flat, square gasket over the connection pins on the top of the instrument housing.
10. Slide the terminal block (6) onto the connection pins.
11. Secure the angle housing (5) and terminal block (6) to the instrument with the screw (1).
### Specifications

#### Model N-10 / N-11

<table>
<thead>
<tr>
<th>Pressure ranges psi</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>25</th>
<th>30</th>
<th>60</th>
<th>100</th>
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<tr>
<td>Over pressure safety psi</td>
<td>29</td>
<td>58</td>
<td>72</td>
<td>145</td>
<td>145</td>
<td>240</td>
<td>500</td>
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<tr>
<td>Burst pressure psi</td>
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<td>69</td>
<td>87</td>
<td>170</td>
<td>170</td>
<td>290</td>
<td>600</td>
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<th>2000</th>
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<td>1160</td>
<td>1740</td>
<td>2900</td>
<td>4600</td>
<td>7200</td>
<td>11600</td>
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<tr>
<td>Burst pressure psi</td>
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<th>15000</th>
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</thead>
<tbody>
<tr>
<td>Over pressure safety psi</td>
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<td>21750</td>
</tr>
<tr>
<td>Burst pressure psi</td>
<td>34800</td>
<td>43500</td>
</tr>
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</table>

(Vacuum, gauge pressure, compound range, absolute pressure are available)

1) Only Model N-10.
2) For model N-11: the value specified in the table applies only when sealing is realised with the sealing ring underneath the hex. Otherwise max. 21000 psi applies.

#### Materials

- **Wetted parts**
  - Model N-10: Stainless steel (> 300 psi stainless steel and Elgiloy®)
  - Model N-11: Stainless steel

- **O-ring**: NBR {FPM/FKM}

- **Case**: Stainless steel

- **Internal transmission fluid**: Synthetic oil (not for N-10 with pressure ranges > 300 psi)

#### Power supply UB

- UB in VDC: 10 < UB ≤ 30 with signal output 4 ... 20 mA, 2-wire
- 6 < UB ≤ 30 with signal output 1 ... 5 V, 3-wire low power

#### Signal output and maximum ohmic load RA

- 4 ... 20 mA, 2-wire, RA ≤ (UB - 10 V) / 0.02 A
- 1 ... 5 V, 3-wire, RA > 10000
- ± 10 via potentiometers inside the instrument

#### Response time (10 ... 90 %)

- ≤ 1 (≤ 10 ms at medium temperatures below < -22 °F / -30 °C for pressure ranges up to 300 psi or with flush diaphragm)

#### Compensated temp range

<table>
<thead>
<tr>
<th>Temperature</th>
<th>0 °C ... +80 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desired temp</td>
<td>32 °C ... +176 °F</td>
</tr>
</tbody>
</table>

#### Temperature coefficients within compensated temp range

- Mean TC of zero: % of span ≤ 0.2 / 10 K (< 0.4 for pressure range ≤ 250 mbar)
- Mean TC of range: % of span ≤ 0.2 / 10 K

#### Approval

- FM, CSA: Non-incendive for Class I, Division 2, Groups A, B, C and D
- Dust ignitionproof for: Class II, Division 1, Groups E, F and G

- Maximum electrical ratings: 30 V, 20 mA

#### RF-immunity

- V/m: 10
- kV: 4

#### Shock resistance

- g: 1000 according to IEC 60068-2-27 (mechanical shock)

#### Vibration resistance

- g: 20 according to IEC 60068-2-6 (vibration resonance)
7. Starting, operation

Specifications

<table>
<thead>
<tr>
<th>Model N-10 / N-11</th>
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<tbody>
<tr>
<td>Wiring protection</td>
</tr>
<tr>
<td>Short-circuit proofness</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
</tr>
<tr>
<td>Weight</td>
</tr>
</tbody>
</table>

() Items in curved brackets are optional extras for additional price.

When designing your plant, take into account that the stated values (e.g. burst pressure, over pressure safety) apply depending on the material, thread and sealing element used.

Functional test

The output signal must be proportional to the pressure. If not, this might point to a damage of the diaphragm. In that case refer to chapter 10 „Troubleshooting“.

- Open pressure connections only after the system is without pressure!
- Observe the ambient and working conditions outlined in section 7 „Technical data."
- Please make sure that the pressure transmitter is only used within the over-load threshold limit at all times!

When touching the pressure transmitter, keep in mind that the surfaces of the instrument components might get hot during operation.

8. Adjustment of zero point / span

Do not open the instrument (e.g. for adjustment) in potentially explosive atmospheres!

We do not recommend to adjust the span potentiometer. It is used for adjustment ex factory and should not be adjusted by you unless you have adequate calibration equipment at your disposal (at least three times more accurate than the instrument being tested).

- Make sure wires are not cut or pinched during disassembly and reassembly of the connector.
- Remove the female connector. Open the pressure transmitter by detaching the clamping nut (see Fig. A). Carefully remove the male connector from the case.
- Adjust the zero point (Z) (see Fig. B) by generating the lower limit of the pressure range.
- Adjust the span (S) by generating the higher limit of the pressure range.
- Check the zero point.
- If the zero point is incorrect, repeat procedure as required.
- Reassemble the instrument carefully.
- Make sure all sealings and o-rings are not damaged and correctly installed to assure the rated moisture ingress protection.

Recommended recalibration cycle: 1 year

For further information (770) 513 8200

ShUTDOWN

1) Switch off the operating voltage.
2) Pull the connector or disconnect the cable.

9. Maintenance, accessories

WIKA pressure transmitters require no maintenance.
Have repairs performed by the manufacturer only.

Accessories

For details about the accessories (e.g. connectors), please refer to WIKA’s price list, WIKA’s product catalog on CD or contact our sales department.

10. Trouble shooting

Open pressure connections only after the system is without pressure!

WARNING

Take precautions with regard to remaining media in removed pressure transmitters. Remaining media in the pressure port may be hazardous or toxic!
Remove the pressure transmitter from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation.
Have repairs performed by the manufacturer only.

WARNING

Do not insert any pointed or hard objects into the pressure port for cleaning to prevent damage to the diaphragm of the pressure connection.

USA

USA

Failure Possible cause Procedure

No output signal No/incorrect voltage supply or current spike Adjust the voltage supply to correspond with the Operating Instructions *)

Cable break Check connections and cable

No/False output signal Incorrectly wired (e.g. Connected as 2-wire instead of 3-wire system) Follow pin assignment (see Instrument Label / Operating Instructions)

Output signal unchanged after change in pressure

Mechanical overload through overpressure Replace instrument; if failure reoccurs, consult the manufacturer *)

Output signal unchanged after change in pressure

Wrong supply voltage or current spike Replace instrument

Signal span dropping off/too small

Diaphragm is damaged, e.g. through impact, abrasive/agressive media; corrosion of diaphragm/pressure connector; transmission fluid missing. Contact the manufacturer and replace the instrument

Signal span too small

Power supply too high/too low Correct the power supply in line with the Operating Instructions

Mechanical overload through over-pressure Re-calibrate the instrument *)

Signal span drops off

Moisture present (e.g. at the cable tail) Install the cable correctly

Signal span erratic

Electromagnetic interference source in the vicinity, e.g. inverter drive Shield the device; shield the cables; remove the interference source.

Instrument not grounded Ground instrument

Strong fluctuations in the power supply Stabilise the power supply; smooth it (i.e., remove interferences)

Violent fluctuations in the process media pressure Damping; consult with manufacturer

In case of unjustified reclamation we charge the reclamation handling expenses.

*) Make sure that after the setting the unit is working properly. In case the error continues to exist send in the instrument for reparation (or replace the unit).

USA

Recommended recalibration cycle: 1 year

USA

For further information (770) 513 8200
10. Trouble shooting / 11. Storage, disposal

If the problem persists, contact our sales department.

USA, Canada
If the problem continues, contact WIKA or an authorized agent for assistance.
If the pressure transmitter must be returned obtain an RMA (return material authorization) number and shipping instructions from the place of purchase. Be sure to include detailed information about the problem. Pressure transmitters received by WIKA without a valid RMA number will not be accepted.

Process material certificate (Contamination declaration for returned goods)
Purge / clean dismounted instruments before returning them in order to protect our employees and the environment from any hazard caused by adherent remaining media.
Service of instruments can only take place safely when a Product Return Form has been submitted and fully filled-in. This Return Form contains information on all materials with which the instrument has come into contact, either through installation, test purposes, or cleaning.
You can find the Product Return Form on our internet site (www.wika.de / www.wika.com).

11. Storage, disposal

When storing or disposing of the pressure transmitter, take precautions with regard to remaining media in removed pressure transmitters.
We recommend cleaning the transmitter properly and carefully.
Remaining media in the pressure port may be hazardous or toxic!

Storage
Mount the protection cap when storing the pressure transmitter in order to prevent any damage to the diaphragm (N-11).

Disposal
Dispose of instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the instrument is supplied.

12. Control Drawing (FM, CSA)

美国，加拿大
如果问题仍然存在，请联系我们的销售部门。

过程材料证书（退回货物的污染声明）
在退还不下来的仪器之前，清洗拆卸的仪器以保护我们的员工和环境免受附着在仪器上的剩余介质的任何危害。
服务只能在安全的情况下进行，当产品退货表已经填写并提交时。
您可以在我们的互联网网站（www.wika.de / www.wika.com）上找到产品退货表。

11. 存储，处理

在存储或处理压力传感器时，应采取预防措施以避免剩余介质在移除的压力传感器中。
我们建议正确且小心地清洁传感器。
在压力端口剩余的介质可能有害或有毒！

存储
在存储压力传感器时，安装保护盖以防止任何对膜片的损坏（N-11）。

处置
按地区或国家的有关法规处理仪器组件和包装材料。

12. 控制图纸（FM，CSA）

此设备适合以下地点：

**HAZARDOUS LOCATION**

1. Class I, Division 2, Groups A, B, C, D
2. Class II, Division 1, Groups E, F, G

**NON-HAZARDOUS LOCATION**

1. Install per NATIONAL ELECTRICAL CODE and local codes, as applicable.
2. To maintain type 4X sealing of series N-10 / N-11-transmitter, use thread sealant when installing conduit.

WIKA保留更改这些技术规格的权利。
<table>
<thead>
<tr>
<th>Country</th>
<th>Company Name</th>
<th>Phone</th>
<th>E-Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>WIKA Argentina S.A.</td>
<td>(+54) 11/47 30 18 00</td>
<td><a href="mailto:info@wika.com.ar">info@wika.com.ar</a></td>
</tr>
<tr>
<td>Australia</td>
<td>WIKA Australia Pty. Ltd.</td>
<td>(+61) 2-88 45 52 22</td>
<td><a href="mailto:sales@wika.com.au">sales@wika.com.au</a></td>
</tr>
<tr>
<td>Austria</td>
<td>WIKA Messgerätevertrieb</td>
<td>(+43) 1/8 69 16 31</td>
<td><a href="mailto:info@wika.at">info@wika.at</a></td>
</tr>
<tr>
<td>Benelux</td>
<td>WIKA Benelux</td>
<td>(+31) 4 75/53 55 00</td>
<td><a href="mailto:info@wika.nl">info@wika.nl</a></td>
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<tr>
<td>Benelux,</td>
<td>Netherlands</td>
<td></td>
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</tr>
<tr>
<td>Brazil</td>
<td>WIKA do Brasil Ind. e Com. Ltda.</td>
<td>(+55) 15-32 66 16 55</td>
<td><a href="mailto:marketing@wika.com.br">marketing@wika.com.br</a></td>
</tr>
<tr>
<td>Canada</td>
<td>WIKA Instruments Ltd.</td>
<td>(+1) 780/463-7035</td>
<td><a href="mailto:info@wika.ca">info@wika.ca</a></td>
</tr>
<tr>
<td>China</td>
<td>WIKA International Trading (Shanghai)</td>
<td>(+86) 21 53 85 25 73</td>
<td><a href="mailto:info@wika.com.cn">info@wika.com.cn</a></td>
</tr>
<tr>
<td>Finland</td>
<td>WIKA Finland Oy</td>
<td>(+358) 9/6 82 49 20</td>
<td><a href="mailto:wika@wika.fi">wika@wika.fi</a></td>
</tr>
<tr>
<td>France</td>
<td>WIKA Instruments s.a.r.l.</td>
<td>(+33) 1/34 30 84 84</td>
<td><a href="mailto:info@wika.fr">info@wika.fr</a></td>
</tr>
<tr>
<td>Germany</td>
<td>WIKA Alexander Wiegand GmbH Co. KG</td>
<td>(+49) 93 72/13 20</td>
<td><a href="mailto:info@wika.de">info@wika.de</a></td>
</tr>
<tr>
<td>India</td>
<td>WIKA Instruments India Pvt. Ltd.</td>
<td>(+91) 20/ 6629 3200</td>
<td><a href="mailto:sales@wika.co.in">sales@wika.co.in</a></td>
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<tr>
<td>Italy</td>
<td>WIKA Italiana SRL</td>
<td>(+39) 02/93 86 11</td>
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<tr>
<td>Japan</td>
<td>WIKA JAPAN K. K.</td>
<td>(+81) 3/54 39-66 73</td>
<td><a href="mailto:t-shimane@wika.co.jp">t-shimane@wika.co.jp</a></td>
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<tr>
<td>Kazakhstan</td>
<td>TOO WIKA Kazakhstan</td>
<td>(+7) 32 72/33 08 48</td>
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<td>Korea</td>
<td>WIKA Korea Ltd.</td>
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<td>Malaysia</td>
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<td>Poland</td>
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<td>Russia</td>
<td>ZAO WIKA MERA</td>
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<tr>
<td>Serbia</td>
<td>WIKA Merna Tehnika d.o.o.</td>
<td>(+381) 11 2763 722</td>
<td><a href="mailto:info@wika.co.yu">info@wika.co.yu</a></td>
</tr>
<tr>
<td>Singapore</td>
<td>WIKA Instrumentation Pte. Ltd.</td>
<td>(+65) 68 44 55 06</td>
<td><a href="mailto:info@wika.com.sg">info@wika.com.sg</a></td>
</tr>
<tr>
<td>South Africa</td>
<td>WIKA Instruments (Pty.) Ltd.</td>
<td>(+27) 11/6 21 00 00</td>
<td><a href="mailto:sales@wika.co.za">sales@wika.co.za</a></td>
</tr>
<tr>
<td>Spain</td>
<td>Instrumentos WIKA S.A.</td>
<td>(+34) 902 902 577</td>
<td><a href="mailto:info@wika.es">info@wika.es</a></td>
</tr>
<tr>
<td>Switzerland</td>
<td>Manometer AG</td>
<td>(+41) 41/9 19 72 72</td>
<td><a href="mailto:info@manometer.ch">info@manometer.ch</a></td>
</tr>
<tr>
<td>Taiwan</td>
<td>WIKA Instrumentation Taiwan Ltd.</td>
<td>(+886) 34 20 60 52</td>
<td><a href="mailto:info@wika.com.tw">info@wika.com.tw</a></td>
</tr>
<tr>
<td>Ukraine</td>
<td>WIKA Pribor GmbH</td>
<td>(+38) 062 345 34 16</td>
<td><a href="mailto:info@wika.donetsk.ua">info@wika.donetsk.ua</a></td>
</tr>
<tr>
<td>United Arab</td>
<td>WIKA Middle East FZE</td>
<td>(+971) 4/883 90 90</td>
<td><a href="mailto:wikame@emirates.net.ae">wikame@emirates.net.ae</a></td>
</tr>
<tr>
<td>Emirates</td>
<td>WIKA Instruments Ltd</td>
<td>(+44) 1737 644 008</td>
<td><a href="mailto:info@wika.co.uk">info@wika.co.uk</a></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>WIKA Instrument Corporation</td>
<td>(+1) 770 / 5 13 82 00</td>
<td><a href="mailto:info@wika.com">info@wika.com</a></td>
</tr>
</tbody>
</table>

[www.wika.de](http://www.wika.de)