

N-10,
N-11

Pressure transmitter



N-10



N-11

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Current terms and conditions apply.

Details are available on

www.wika.com

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.

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.

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 (NIFW) for Class I, Division 2, Groups A, B, C, D

Dust-Ignition-Proof for Class II, Division 1, Groups E, F, G hazardous (classified) locations, indoors and outdoors Type 4X.

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



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.: NEC 505, CEC) 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



- Tampering and replacement with non-factory components may adversely affect the safe use of the system.
- 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)

WIKAL			
Transmitter N-1x		<small>CSA Single Seal ANSI/ISA 12.27.01</small> <small>-30°C < Tprocess < 100°C</small>	
0 ... 10 bar	white+	green-	<small>N. Cl. 1, Div. 2, Grs. ABCD</small> <small>WFFI per inst. draw. 2245909</small> <small>D.P., G. II, Div. 1, Grs. EFG Type 4X</small> <small>with condit. assist</small> <small>Temp. = -30°C to + 80°C T5, T4</small>
→ 4 ... 20 mA	brown+	green-	
→ DC 10 ... 30 V	P # 0639080 S # 06391100		
<small>WIKAL Alexander Wiegand SE & Co. KG 63911 Klingenberg Made in Germany SN</small>			
	[] Coded manufacture date [] Pressure range [] Signal [] Power Supply [] Product No. [] Serial No. [] PIN assignment		

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 -Service



Warning

Protect the diaphragm against any contact with abrasive substances and pressure peaks and do not touch it with tools. If you damage the diaphragm, non-incendive can not be guaranteed (FM, CSA)!



Warning

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

Electrical connection



Warning

- Always connect the case to ground to protect the pressure transmitter against electromagnetic fields and electrostatic charges.



- Do not disconnect the electrical connection while under voltage.
- 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, 30 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).



- 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. Ensure that the cable gland of the mounted connector is positioned correctly and that the sealings are available and undamaged. Tighten the threaded connection and check the correct position of the sealings in order to ensure the ingress protection.
- Please make sure that the ends of cables with flying leads do not allow any ingress of moisture.



Power supply



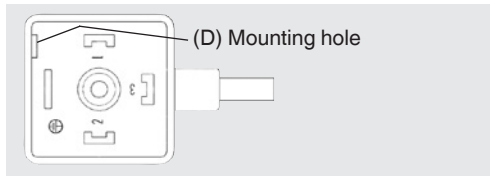
Load (e.g. display)

UB+/Sig+
OV/Sig-

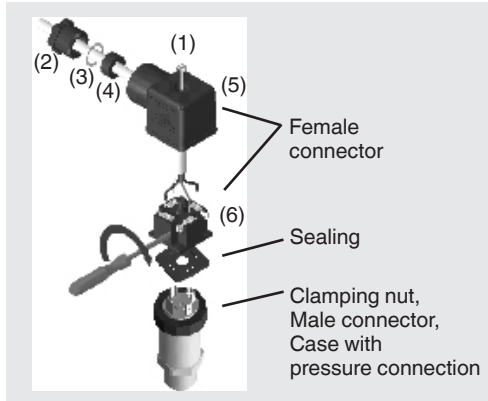
Positive supply / measurement connection
Negative supply / measurement connection

	2-wire	3-wire
L-Connector, DIN EN 175301-803, IP 65 (NEMA 4X) Order code: AX		
Cable with 1,6 m (6 foot) length, IP 67 (NEMA 4X) Order code: 2X		

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

Pressure ranges	psi	5	10	15	25	30	60	100	200	
Over pressure safety	psi	29	58	72	145	145	240	500	1160	
Burst pressure	psi	35	69	87	170	170	290	600	1390	
Pressure ranges	psi	300	500	1000	1500	2000	3000	5000		
Over pressure safety	psi	1160	1160	1740	2900	4600	7200	11,600		
Burst pressure	psi	1390	5800	7970	11,600	14,500	17,400	24,650 ²⁾		
Pressure ranges	psi	8000 ¹⁾	10000 ¹⁾	15000 ¹⁾						
Over pressure safety	psi	17,400	17,400	21,750						
Burst pressure	psi	34,800 ²⁾	34,800	43,500						
{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. 21,000 psi applies.										
Materials										
■ Wetted parts		(other materials see WIKA diaphragm seal program)								
» 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	RA in Ohm	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 %)	ms	≤ 1 (≤ 10 ms at medium temperatures below < -22 °F / -30 °C for pressure ranges up to 300 psi or with flush diaphragm)								

Specifications **Model N-10 / N-11**

Insulation voltage	VDC	500	
Accuracy	% of span	≤ 0.25 (BFSL)	
		≤ 0.5 ³⁾	
		³⁾ Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2). Adjusted in vertical mounting position with lower pressure connection.	
Non-linearity	% of span	≤ 0.2 (BFSL) according to IEC 61298-2	
Non-repeatability	% of span	≤ 0.1	
1-year stability	% of span	≤ 0.2 (at reference conditions)	
Permissible temperature of			
Medium		-30°C ... +80 °C	-22 ... +176 °F
Ambience		-30°C ... +80 °C	-22 ... +176 °F
Compensated temp range		0 ... +80 °C	32 ... +176 °F
Temperature coefficients within compensated temp range			
■ Mean TC of zero	% of span	≤ 0.2 / 10 K (\approx 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 Vmax = 30V, Imax = 30mA, Pi = 1W for 2 wire system: Ci = 22nF (flying leads: +0.2 nF/m) Li = 0mH (flying leads: +2 µH/m) for 3 wire system: Ci = 140nF (flying leads: +0.2 nF/m) Li = 0mH (flying leads: +2 µH/m)	
Shock resistance	g	1000 according to IEC 60068-2-27 (mechanical shock)	
Vibration resistance	g	20 according to IEC 60068-2-6 (vibration resonance)	

Specifications**Model N-10 / N-11**

Wiring protection		
■ Short-circuit proofness		Sig+ towards UB-
■ Reverse polarity protection		UB+ towards UB-
Weight	lb	Approx. 0.4

{ } Items in curved brackets are optional extras for additional price.

i 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

i 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 (only for pressure transmitter with clamping nut)



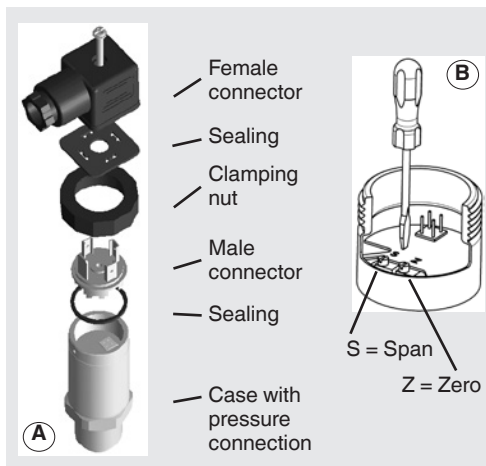
Warning

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 or contact our sales department.


10. Trouble shooting



Open pressure connections only after the system is without pressure!



- 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.

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

Please verify in advance if pressure is being applied (valves/ ball valve etc. open) and if the right voltage supply and the right type of wiring (2-wire/ 3-wire) has been chosen?

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/aggressive media; corrosion of diaphragm/pressure connector; transmission fluid missing.	Contact the manufacturer and replace the instrument
Signal span too small	Supply voltage too high/too low	Correct the power supply in line with the Operating Instructions
	Mechanical overload through overpressure	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).

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 dismantled 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



Warning

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.

WIKA Global

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