Operating instructions

N-10 / N-11

Pressure Transmitter

USA

N-10

N-11

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Part of your business

Operating instructions

N-10, N-11

Pressure transmitter

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Current terms and conditions apply.
Details are available on www.wika.com

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FM APPROVED

C SA US

N-10

N-11

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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 (data sheets, instructions, etc.) via our Internet address (www.wika.com/www.wika.de) or contact WIKA for additional technical support (see section7 „Starting, Operation“/Further information).
The product data sheet is designated as APE N-10.
WIKA pressure transmitters are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality inspection before assembly and each instrument is fully tested prior to shipment.

Use of the product in accordance with the intended use N-10, N-11:
Use the non-incendive pressure transmitter for pressure measurement 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 11).
FM / CSA Approval ratings: Non-incendive
Dust-ignitionproof for Class II and III, Division 1, Groups E, F, and G.
Non-incendive for Class I Division 2 Groups A, B, C and D
FM standards according to FMRC 3600, 3611, 3810
CSA Standard C22.2 No. 0-M1991, 0.4-M1982, 25-M1966, 94-M1991, 142-M1987, 213-M1987, UL 50, UL 508, UL 1203, UL 1604

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 10**. There you will get some short safety instructions and important information on your product and its starting.

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Read these chapters in any case. Get some more detailed information on this product in Chapters 4 „Function and accessories” and 6 „Packaging”. Read Chapter 8 for „Maintenance”. In the case of failures please refer to Chapter 9.

3. Abbreviations, signs and symbols

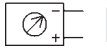
Potential danger of life or of severe injuries.

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

Potential danger of burns due to hot surfaces.

Notice, important information, malfunction.

Power supply



Load (e.g. display)

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

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.
UB+/Sig+	Positive supply / measurement connection
OV/Sig-	Negative supply / measurement connection
CSA	Canadian Standard Association
FM	Factory Mutual

4. Function and accessories

N-10: Standard pressure connection (non-incendive).
N-11: Pressure connection with flush diaphragm (non-incendive) for highly viscous or solids entrained media which might clog the pressure port.

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Function: With the pressure transmitter you measure the pressure of your application, which is trans-formed into an electric signal. This electric signal changes in proportion to the pressure and can be evaluated correspondingly.

Accessories: For details about the accessories, please refer to WIKA‘s price list, WIKA‘s product catalog on CD or WIKA’s web site www.wika.de. Please refer to our data sheet “Pressure gauge sealing washers AC 09.08” in WIKA’s product catalog Pressure and Temperature Measurement or our web site www.wika.de for details about sealing washers.

5. For your safety

Warning

- 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, CEC) and observe the applicable standards and directives for special applications (e.g. with dangerous media such as oxygen, 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 times!
- 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.
- 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.

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Special advice for hazardous environments

Warning

- Consider the details given in the respective specifications for explosion hazard use of the country concerned (e.g.: NEC, CEC).
  If you do not observe these stipulations, serious injuries and/or damage can occur.
- Observe the technical data for the use of the pressure transmitter in connection with aggressive / corrosive media and for the avoidance of mechanical hazards.
- Protect the diaphragm against any contact with abrasive substances and pressure peaks and do not touch it with tools. If you damage the diaphragm, the approval ratings are not longer valid (FM, CSA)!
- Ensure that the pressure transmitter is mounted in a shielded section and protect it against shocks.
- Use a supply voltage with power limitation $P \leq 1W$.
- Ensure that the power supply is limited to $U<42$ V DC even in the case of malfunction.
- Do **not** open the instrument (e. g. for adjustment) in potentially explosive atmospheres!
- Observe the permissible surface temperatures applicable for this range according to the defined temperature classes.
- Do not exceed the nominal pressure range for a prolonged period of time, because this can lead to an inadmissible heating of the case.
- Do not disconnect the electrical connection while under voltage!

Special wiring advice

Warning

- Attempting to remove the cable connection will damage the transmitter and void the factory warranty and FM 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 of the electrical connection will void the hazardous area approval rating.
- Always connect the case to earth to protect the pressure transmitter against electromagnetic fields and electrostatic charges.

Special wiring advice

Warning

- Connect the shield to ground exclusively in safe (i.e. non-hazardous) areas in accordance with NEC, CEC. Ensure that with flying leads the shield is always connected to ground on the instrument side by the manufacturer.
- Cover flying leads with fine wires by an end splice (cable preparation).

6. Packaging

- 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).

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.
- Mount the protection cap when removing and transporting the instrument.

7. Starting, operation

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.

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**.

Warning

- Pay attention to any liquid leaking out, for this points to a diaphragm damage.
- Check the diaphragm visually for any damage.
- 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.

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Installation

- Remove the protection cap only just before installation and absolutely avoid any damage to the diaphragm during installation as well.
- Ensure that the cablediameter 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.
- When mounting the instrument, ensure that the sealing faces of the instrument and the measuring point are clean and undamaged.
- When screwing the transmitter in, ensure that the threads are not jammed.
- Screw in or unscrew the instrument only via the flats using a suitable tool and and the prescribed torque. Do not use the case as working surface for screwing in or unscrewing the instrument.
- Please observe the following when selecting **the cable:** when selecting the cable length, ensure that it is 3x longer than the cable length required, so that the cable can be pulled to different locations.

Warning

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

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

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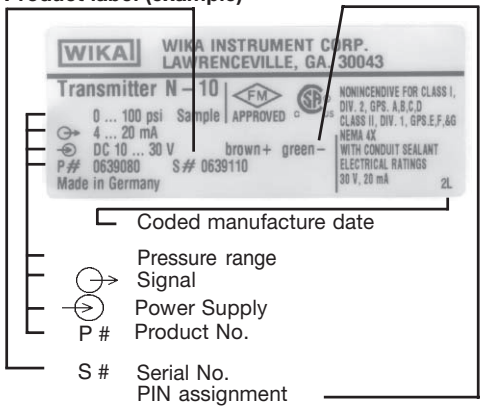
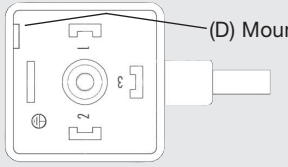
For Model N-10 you have to provide for a sealing element; exceptions are instruments with self-sealing threads (e.g. NPT thread).
For Model N-11 the sealing ring is included in delivery.

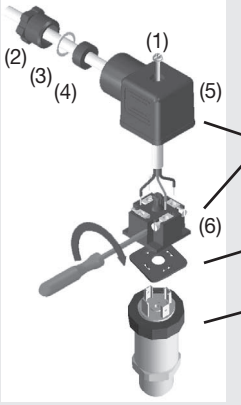
Product label (example)



Wiring

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).
Please make sure that the ends of cables with flying leads do not allow any ingress of moisture.





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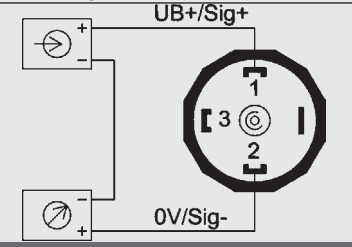
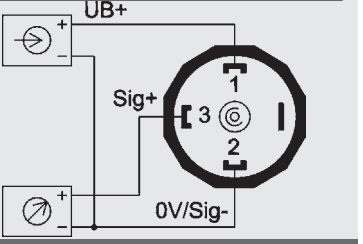
1. Loosen the screw (1).
2. Loosen the cable gland (2).
3. Pull the angle housing (5), with the terminal block (6) inside, away from the instrument.
4. Using the head of a small screwdriver in the mounting hole (D), lever the terminal block (6) out of the angle housing (5). In order not to damage the 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).

	2-wire	3-wire
L-connector DIN EN 175301-803 / IP 65 (NEMA 5) / Order code: AX		

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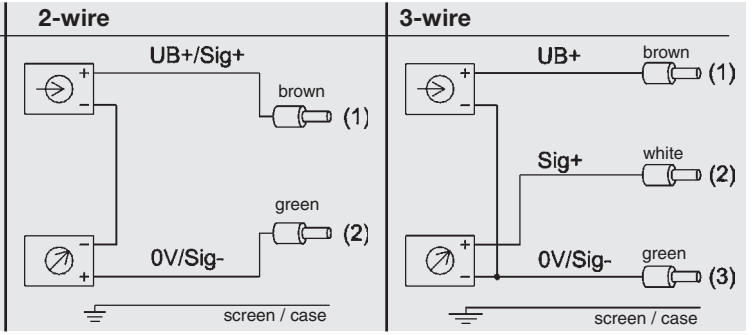
Cable with 1,6 m (6 foot) length, IP 67 (NEMA 4x) / Order code: 2X



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	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 {Hastelloy C4}							
		O-ring: NBR {FPM/FKM}							

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7. Starting, operation USA

Specifications		Model N-10, N-11		
■ Case		Stainless steel		
Internal transmission fluid		Synthetic oil (not for N-10 with pressure ranges > 300 psi)		
Power supply U_B	U_B in DC V	$10 < U_B \leq 30$ with signal output 4 ... 20 mA, 2-wire		
		$6 < U_B < 30$ with signal output 1 ... 5 V, 3-wire low power		
Signal output and		4 … 20 mA, 2-wire, $R_A \leq (U_B – 10\ V) / 0.02\ A$		
maximum load R_A	R_A in Ohm	1 … 5 V, 3-wire, $R_A > 10000$		
Adjustability zero/span	%	± 10 via potentiometers inside the instrument		
Response time (10 ... 90 %)	ms	≤ 1 (≤ 10 ms at medium temperaturs below < -22 °F / -30 °C		
		for pressure ranges up to 300 psi or with flush diaphragm)		
Dielectric strength	DC V	500		
Accuracy	% of span	≤ 0.25 (BFSL)		
	% of span	≤ 0.5 [3]		
	[3] Including non-linearity, hysteresis, non-repeatability, zero signal 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		
1-year stability	% of span	≤ 0.2 (at reference conditions)		
Permissible temperature of				
■ Medium [4]		-22 ... +212 °F {-40…+221 °F}	-30 ... +100 °C {-40…+105°C}	
■ Ambience [4]		-22 ... +212 °F {-40…+221 °F}	-30 ... +100 °C {-40…+105°C}	
■ Storage [4]		-40 ... +221 °F {-58…+221 °F}	-40 ... +105 °C {-50…+105°C}	
	[4] Also complies with EN 50178, Tab. 7, Operation (C) 4K4H, Storage (D) 1K4, Transport (E) 2K3			
Compensated temp range		0 ... +80 °C	32 ... +176 °F	
Temperature coefficients in 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 authority		■ Factory mutual (FM / CSA) non-incendive with entity		
		Approval for: Class 1, Division 2, Groups A, B, C and D		

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Specifications		Model N-10, N-11
		■ Dust ignitionproof for:
		Class II and III, Division 1, Groups E, F and G
		Maximum electrical ratings 30 V, 20 mA
		FM standards according to FMRC 3600, 3611 and 3811
HF-immunity	V/m	10
BURST	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)
Wiring protection		Protected against reverse polarity and short circuiting
		on the instrument side
Mass	lb	Approx. 0.4

{ } 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.
- With all pressure ranges, except for those mentioned above, the technical specifications are subject to change.

Functional test

Warning

- 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 overload threshold limit at all times!

Caution

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

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 9„Troubleshooting“.

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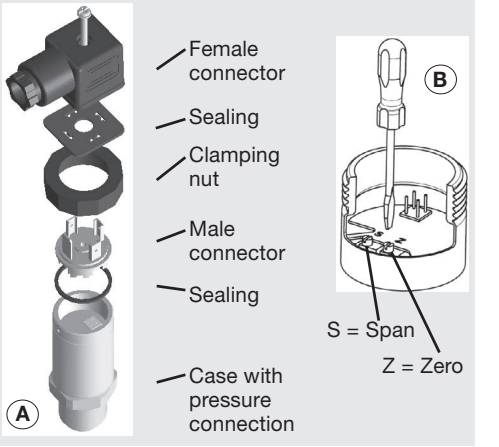
Adjustment of zero point / span (only for pressure transmitter with clamping)

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. Ⓐ). Carefully remove the male connector from the case.
- Adjust the zero point (**Z**) (see Fig. Ⓑ) 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.

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8. Maintenance, spare parts:

WIKA pressure transmitters require no maintenance!

- 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.

Spare parts: For spare part details refer to our current stock price list, the CD catalog or contact our sales department.

9. Trouble shooting

Problem	Possible cause	Remedy
No output	Power supply failure	Check power supply
	Open wiring	Check continuity
	Wiring reversed	Correct polarity
	No pressure or port blocked	Check pressure port
	Transmitter failure due to wrong	
	Supply voltage or power surge	Replace transmitter
Output steady as pressure	Pressure port blocked	Check pressure port
changes	Transmitter over-pressurized	Replace transmitter
	Transmitter failure due to wrong	
	Supply voltage or power surge	Replace Transmitter
Full span output low	Supply voltage too low	Check supply voltage
	Load impedance too high or too low	Adjust load or supply voltage
	Transmitter over-pressurized	Recalibrate Transmitter
		Replace Transmitter *)

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Problem	Possible cause	Remedy
Zero signal too low or too high	Transmitter over-pressurized	Recalibrate Transmitter
		Replace Transmitter *)
Non-linear output	Transmitter over-pressurized	Replace Transmitter

*) Test the system for proper operation after adjustments are made. An excessive change in the output signal that cannot be corrected by calibration indicates possible transmitter damage. This may cause the output to be non-linear, requiring transmitter replacement.

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.
Service of instruments can only take place safely when a contamination declaration has been submitted and fully filled-in. This declaration contains information on **all** materials with which the instrument has come into contact, either through installation, test purposes, or cleaning. You can find a contamination declaration on our internet site (www.wika.de / www.wika.com).

10. Storage, disposal

When storing or disposing of the pressure transmitter, take precautions with regard to remaining media in removed pressure transmitters. 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.

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.

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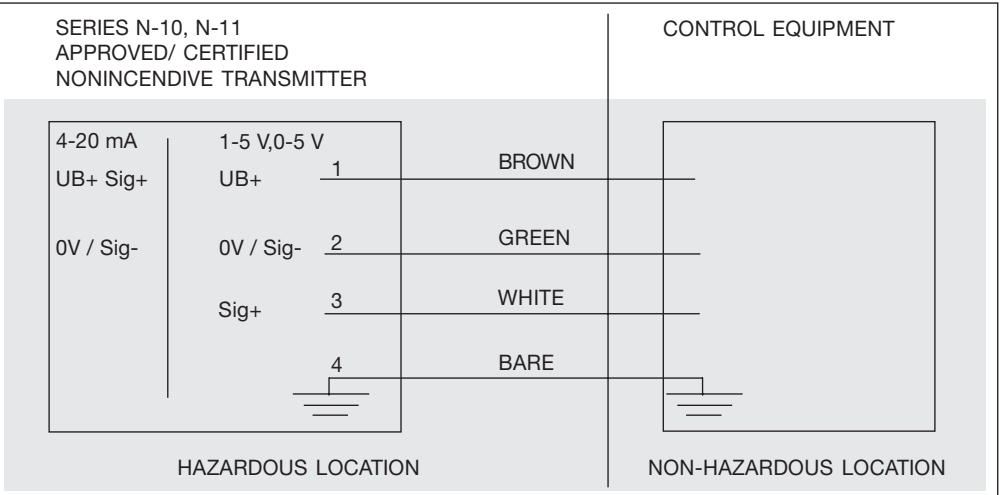
11. Control Drawing (FM, CSA)

Control drawing S-No. 2245906.03



This Equipment is suitable for Locations:	Notes	U.S. Installations
Class I, Division 2, Groups A, B, C, D Class II, Division 1, Group E, F, G	1	Install per NATIONAL ELECTRICAL CODE and local, as applicable.
	2	To maintain type 4X sealing of series N-10 / N-11-transmitter use thread sealant when installing conduit.

WIKA reserves the right to alter these technical specifications.

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