5.0 Special Purpose Transmitters

WIKA manufactures a variety of pressure transmitters for use in special applications.

5.1 3-A Sanitary Transmitters

Many pressure measurement applications in food processing, dairy, and pharmaceutical industries require pressure transmitters that meet "3-A" criteria as defined by the 3-A Sanitary Standards Administrative Council. These extensive criteria include the following:

3A Symbol

- There shall be no threads on product contact surfaces.
- All product contact surfaces can be sterilized by saturated steam or water at 250 °F.
- Product contact surfaces must be self draining.
- Product contact surfaces must be free of pits, folds, and crevices.
- Any pressure transmitting fill fluid must be edible.

The goal of 3-A criteria is to minimize areas where bacterial growth and contamination can occur, and allow for high temperature clean-in-place (CIP) procedures in order to maintain the highest possible standard of product quality.

WIKA 3-A pressure transmitters use Tri-clamp® quick release process connections with vegetable oil fill in industry standard 1.5" or 2.0" connection sizes. (Note the actual diameter of the 1.5" size is 1.984", and the 2" size is 2.490".) Other sizes and designs are available. These include 2.5 or 3" Tri-clamp connections and INLINE SEAL™ sanitary seals for Tri-clamp piping systems. Two models are available: the S-10-3A and the S-11-3A/S-11-3A-C for more critical low pressure applications. The differences are outlined below.

Specifications:	**S-10-3A**	**SA-11**
Accuracy (% of span):	0.5%	0.25%
Pressure ranges:	15 to 1000 psi	Vacuum, compound, and gauge ranges 50 InWC and up
Media Temperature Range:	14 °F to 248 °F	-40 °F to 257 °F (S-11-3A) -40 °F to 300 °F (S-11-3A-C)

NEMA 4 (IP 67) cable lead is available on both models for washdown protection
Part # 9744479

S-10-3A Sanitary

S-11-3A-C Sanitary with integral cooling extension

UT-10 on **981.22** INLINE SEAL™ for sanitary applications

5.2 Hazardous Area Pressure Transmitters

Hazardous area pressure transmitters are designed for use in potentially explosive, hazardous environments. WIKA offers explosion proof, non-incendive, and intrinsically safe pressure transmitters for hazardous environments. The type and degree of hazardous area protection and approval level is dependent on the application and installation requirements.

Hazardous environments may contain flammable or explosive gases, liquids, combustible dust, or ignitable fibers. These hazardous environments are defined in detail by the *National Electric Code* and are divided into **Class, Division**, and **Group:**

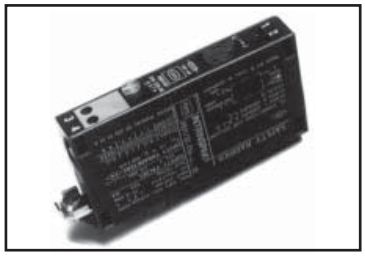
Class (type of fuel)	Division (possibility of fuel being present)	Group (specific type of fuel)
Class I gases and vapor	**Division 1** present or likely to be present in normal operation	**Group A** Acetylene **Group B** Hydrogen **Group C** Acetaldehyde, ethylene, methyl ether **Group D** Acetone, gasoline, methanol, propane **Group E** Metal dust **Group F** Carbon dust **Group G** Grain dust
Class II combustible dust	**Division 2** not present in normal operation	
Class III fibers		

Intrinsically Safe Pressure Transmitters

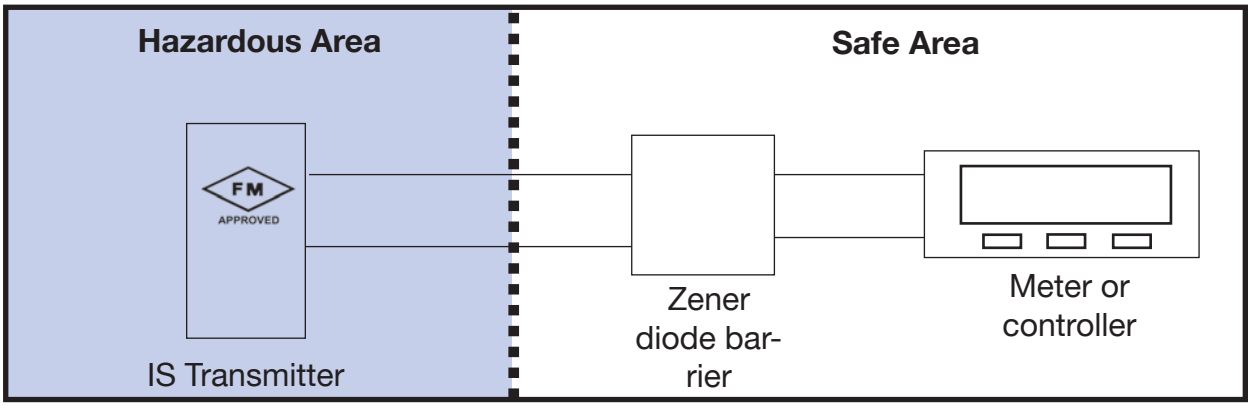
Factory Mutual (FM) is an independent testing organization that provides approvals for select industrial electronic equipment in hazardous environments. **ATEX and CSA** are similar organizations in Europe and Canada These organizations provide the **EX and CSA** approval marks. The IS-20 intrinsically safe transmitters are *entity approved* by Factory Mutual for use in the following locations:

Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III Division 1
Nonincendive for Class I, Division 2, Groups A,B,C,D

All intrinsically safe transmitters *must* be used with a **zener diode barrier** when used in hazardous locations. The barrier acts to limit the current going to the transmitter using current limiting resistors. Zener diodes in the barrier protect the hazardous area from any possible high voltages. Since WIKA transmitters are entity approved, they can be used with any other entity-approved component, such as barriers, power supplies, or controllers from other manufacturers. WIKA intrinsically safe transmitters are listed in the FM handbook by **model number**. Therefore, a barrier manufacturer can look up the specifications and match the transmitter with a barrier appropriate to the application and wiring requirements.



Typical intrinsically safe barrier



Typical intrinsically safe installation

Intrinsically Safe vs Explosion Proof

Intrinsically safe transmitters, by their design, limit the thermal and electrical energy to a point where ignition is not possible. In contrast, "explosion proof" transmitters work on the principle of containment, where the transmitter is enclosed in a housing that is designed to contain, control, cool and then vent any possible ignition. The housing does not prevent but instead controls internal combustion. This is accomplished by specially designed flanges, or more commonly with threaded joints. The hot gases must travel a specific distance along the threads before they are cool enough to be safe. Care must be taken not to cross thread the joints during assembly. In addition, conduit and sealoffs are needed to install and maintain an explosion proof system.

There are several advantages in using intrinsically safe transmitters. Intrinsically safe transmitters often feature a smaller design. Servicing explosion proof transmitters may require opening the housing and exposing the high energy levels to the hazardous environment. Opening an explosion proof housing requires a "hot permit" from the plant operator, indicating when it is safe to open the housing for maintenance. Intrinsically safe transmitters do not require a hot permit and can be tested or serviced when needed. This is an important consideration as the data circuit leading to the PLC are difficult to troubleshoot without power applied. Intrinsically safe circuits can be worked on while hot.

IS-20
Intrinsically
safe

IS-20-F
NEMA 4X
Intrinsically safe

5.3 Explosion-Proof Pressure Transmitters

Explosion proof transmitters work on the principle of containment, where the transmitter is enclosed in a housing that is designed to contain, control, cool and then vent any possible ignition. WIKA E-10 and E-11 explosion-proof transmitters are designed for applications in the oil and gas industry including wellhead monitoring, refining, pipelines, and natural gas compressors. The E-11 features a flush diaphragm process connection for use with viscous or crystallizing media that may clog the 1/8" pressure port in the standard NPT connection.

The wetted parts are NACE MR-01-75 compliant to provide additional resistance against sulfide stress cracking in gas applications where sulphur is present. They are FM-approved for Class I Division 1 locations. Installation requires using conduit and seal offs within 18" of the transmitter. A factory sealed-flying lead version that does not require an external conduit seal is available to allow simplified installation.

These transmitters must be installed to NEC and local codes in order to maintain the explosion proof rating.

E-10 and E-11 Explosion-Proof Ratings:

Factory Mutual (FM/CSA) Explosion-proof for:
Class I Division 1, Groups A, B, C and D
Dust ignition proof for:
Class II/III, Division 1, Groups E, F and G

FM standards according to Class numbers 3600, 3615, and 3810

E-10 NPT pressure transmitter with cable

E-11 flush diaphragm pressure transmitter with optional flying leads

5.4 Non-Incendive Pressure Transmitters

Non-incendive pressure transmitters also work on the principle of containment. WIKA N-10 and N-11 non-incendive transmitters are designed for applications in the oil and gas industry including wellhead monitoring, refining, pipelines, natural gas compressors, and general industrial applications.

While the E-10 and E-11 transmitters are rated for Class I Division 1 locations, the N-10 and N-11 are rated for Class I Division 2 non-incendive locations. As outlined on page 28, in a Division 1 location the fuel is normally present or likely to be present in normal operation. The fuel is not present in normal operation in a Division 2 location.

The N-11 features a flush diaphragm process connection for use with viscous or crystallizing media that may clog the 1/8" pressure port in the standard NPT connection.

The wetted parts of the N-10 and N-11 are NACE compliant to provide additional resistance against sulfide stress cracking in gas applications where sulphur is present.

N-10 and N-11 Non-Incendive Ratings:

Factory Mutual (FM) Non-incendive for:
Class I Division 2, Groups A, B, C and D
Dust ignition proof for:
Class II and III, Division 1, Groups E, F and G

FM standards according to FMRC Class numbers 3600, 3611, and 3810

N-10 NPT pressure transmitter with cable