



## Series NML – Float Level Transducer Installation and Operating Instructions

KOBOLD Instruments, Inc. 1801 Parkway View Drive, Pittsburgh, PA 15205  
Telephone: (412) 788-2830 FAX: (412) 788-4890 www.koboldusa.com

### Precautions

**User's Responsibility for Safety:** KOBOLD manufactures a wide range of process sensors and technologies. While each of these technologies are designed to operate in a wide variety of applications, it is the user's responsibility to select a technology that is appropriate for the application, to install it properly, to perform tests of the installed system, and to maintain all components. The failure to do so could result in property damage or serious injury.

**Proper Installation and Handling:** Use a proper sealant with all installations. Never over tighten the sensor within its fittings. Always check for leaks prior to system start-up.

**Wiring and Electrical:** This is an electrically operated device and only properly trained personnel should install and maintain this product. Be sure that the power supplied to the sensor is appropriate for the electronics supplied. Electrical wiring should be performed in accordance with all applicable national, state and local codes.

**Temperature and Pressure:** Temperature and pressure maximums vary depending upon the material selected. Operation outside these limitations will cause damage to the unit.

**Material Compatibility:** Make sure that the material of construction is chemically compatible with the application liquids. While the sensor's outer housing is liquid resistant when installed properly, it is not designed to be immersed. It should be mounted in such a way that it does not normally come into contact with fluid.

**Flammable, Explosive and Hazardous Applications:** This unit is not an explosion-proof design. It should not be used in applications where an explosion-proof design is required.

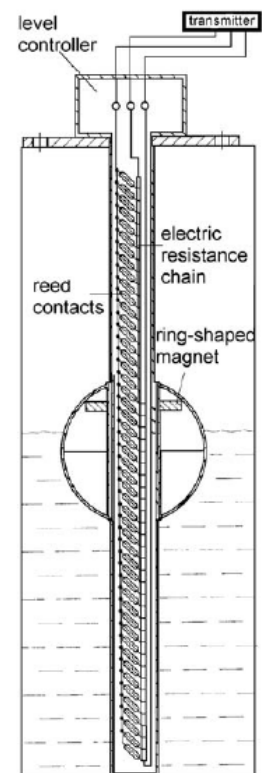
**Make a Fail-Safe System:** Design a fail-safe system that accommodates the possibility of sensor or power failure. In critical applications, KOBOLD recommends the use of redundant backup systems and alarms in addition to the primary system

### Description:

Float level transducers are still one of the simplest and most reliable means of measuring the level of non-coating, low viscosity liquids. Factors such as foaming, vapors, and liquid dielectric which can cause other type of level sensing technologies to malfunction will not affect the NML series. The NML is available with all stainless steel wetted parts which gives the sensor a maximum possible pressure rating of 800 PSIG and maximum media temperature rating of 250°F. The NML provides a resistive output (0-5000  $\Omega$ ) which varies linearly as level changes. An integral 4-20 mA transmitter is available as an option. The NML series is available with either NPT or flanged fittings.

### Operating Principle

The NML level transducer consists of a guide tube (stem) onto which a float with an imbedded permanent magnet is installed. As liquid level changes, the float will rise and fall following liquid level. The magnet inside the float activates a network of reed switches attached to a series of precision resistors placed in the stem. The system acts as a 3-wire potentiometer with resistance that varies between 0-5000  $\Omega$  as liquid level changes. Measuring resolution is a function of reed switch placement and is typically  $\pm 0.25$  inch.



## Liquid Density

When specifying the NML series, the specific gravity of the liquid to be measured must be known. The float selected must have a lower minimum specific gravity limit than the specific gravity of the liquid. A variety of float types are available which can accommodate liquids with specific gravity down to 0.47.

## Mechanical Connection:

Mount the NML as appropriate into a flange, cap or the tank top from the outside or inside of the tank. For inside mounting, the wiring must be routed through the opening prior to mounting and protected as appropriate for the installation. Sealing of the process connection threads should be done using PTFE tape or other appropriate product. If the mating connection is not threaded, the transducer may simply be inserted through a bored hole and then secured with a suitable locknut.

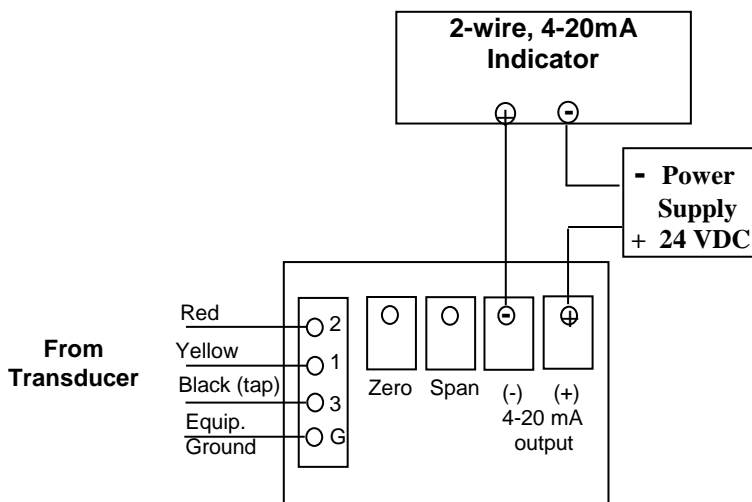
**Note:** Some fitting/float combinations will require access to the inside of the tank for installation due the diameter of the float versus the fitting. Review your desired float/fitting combination carefully to insure installation in your tank is indeed possible and appropriate access to the inside of the tank is possible.

For tanks with agitation, the NML should be secured with a clamp or bracket at the tip of the stem prevent damage from excessive flexing.

## Electrical Connection:

- Ensure that the supply wires are de-energized.
- To reduce the possibility of interference from other electric circuits, NML wiring must be routed separately.
- Please pay attention to the potentially detrimental operating conditions regarding the placement of the cable.
- Connect the level transducer to the electronics in accordance with the connection diagram shown below.

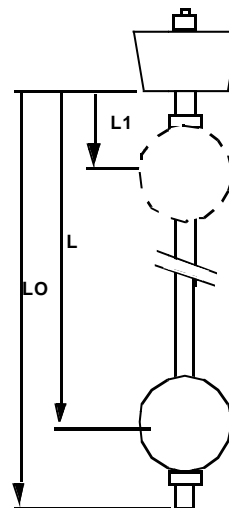
## Electrical Wiring



-RT output wiring ... Shown Above  
 -W output wiring ... Red, Yellow & Black Wires:

**Red** = Bottom of resistor stack  
**Yellow** = Top of resistor stack  
**Black** = Tap

## Dimensions



L = User specified measuring length  
 LO = Overall length of measuring stem  
 L1 = Upper stem deadband

Float Code	L1	LO
FBN	1-1/2"	L+ 2"
FS2	1-1/2"	L+ 2"
FS26	1-5/8"	L+ 2-1/4"
FS3	2"	L+ 2-1/4"