

NAMUR (Y0 and Y1) Output

NAMUR sensors are 2-wire sensing devices used with switching amplifiers. Because of the small amount of energy needed to operate NAMUR sensors, they can be used in intrinsically safe applications.

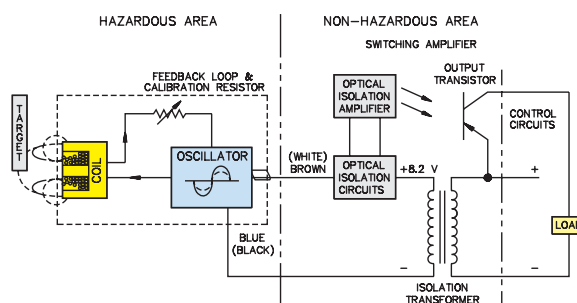
The operation of this sensor is similar to that of a variable resistor with a change in impedance as a target approaches the sensor. When no metal is being sensed, the inductive sensor is in a low impedance state and draws a current of more than 2.2 mA. When a metal target enters the high-frequency field radiated from the sensor head, the impedance increases as the target approaches. When fully damped, the sensor draws less than 1.0 mA. *Note: For capacitive and inductive magnet operated sensors, the current change characteristics are opposite.*

The current differential from the undamped to the damped (metal present) state is used to trigger an amplifier at a defined switching point. These sensors contain a relatively small number of components, which allows the construction of small devices and also assures a high degree of reliability.

In the undamped and damped state, the devices have fairly low impedance and are therefore, unaffected by most transients. NAMUR sensor circuits operate on direct current. Therefore, cable runs of several sensors may be run parallel to one another without mutual interference.

Figure 1

The NAMUR (Y0 and Y1) sensor behaves like a variable resistor when a target approaches. The impedance increases or decreases between 1 kΩ and 8 kΩ.



Typical Output Curves

Figure 2

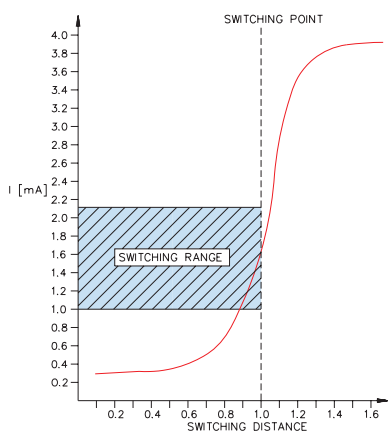
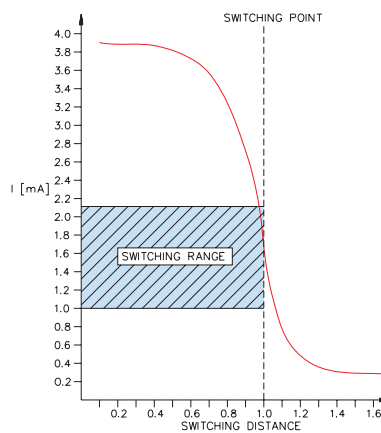


Figure 3

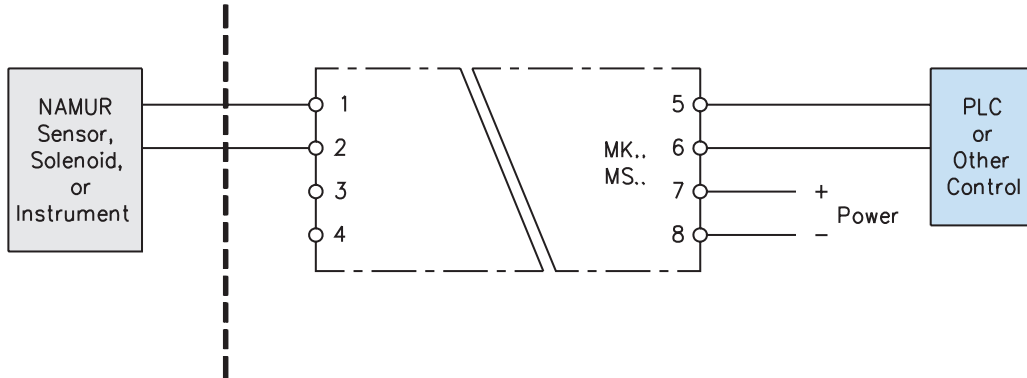


Note:
 The typical curve of current versus sensing distance with 8.2 V DC supply and 1 kΩ source impedance. All NAMUR (Y0 and Y1) sensors are calibrated to pass through 1.55 mA at nominal sensing range ±10%.

Typical Intrinsically Safe Installation

Specs

Figure 4



For guidance on installation of **TURCK** intrinsically safe systems, refer to the Instrument Society of America publication ISA-RP12.6-1995, "Wiring Practices for Hazardous (Classified) Locations Instrumentation".

The complete line of Intrinsically Safe and Associated Apparatus is featured in the **TURCK** "Isolated Barriers and Amplifiers" catalog.

Custom Interface Circuits

Figure 5

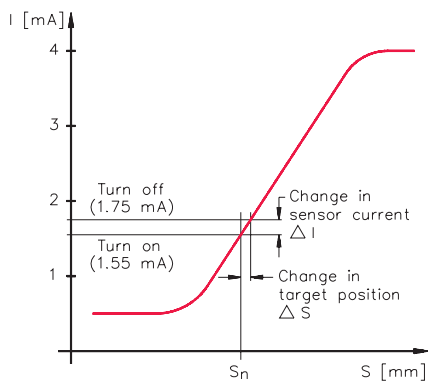
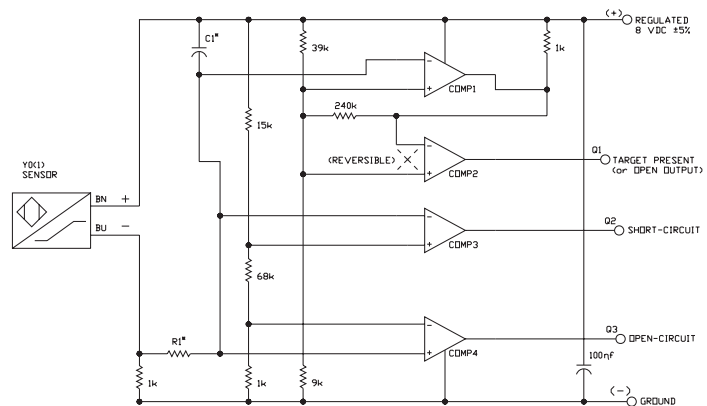


Figure 6



NAMUR sensors can operate outside the nominal operating values when the sensor is used in a nonhazardous area.

The supply voltage limits are: $V_{min} = 5 \text{ VDC}$; $V_{max} = 30 \text{ VDC}$

Within this voltage range the load resistance R_l must be adjusted for the supply voltage.

The following table gives typical values:

$V_{supply} \text{ (DC)}$	$R_l \text{ (k}\Omega\text{)}$	$I_{sn} \text{ (mA)}$	$\Delta I \text{ (mA)}$
5	0.39	≈ 0.7	≈ 0.1
12	1.8	≈ 2.3	≈ 0.3
15	2.2	≈ 2.9	≈ 0.4
24	3.9	≈ 3.8	≈ 0.5

If these values are used, the current I_{sn} corresponds to the rated operating distance (S_n) of the sensor.

NAMUR sensors are short-circuit protected up to 15 VDC and reverse polarity protected up to 10 VDC.