

**Loop Powered
Transmitters
Controller
& Displays For:**

- ⇒ **Explosion Proof**
- ⇒ **Sanitary Nema4X**
- ⇒ **Commercial Grade**

**SERIES
900**
U.S. Pat.#6,285,094 B1

SANITARY NEMA 4X (IP66)



(Up To 3 Units Can Be Installed)

PANEL, CHASSIS, PIPE, DIN
RAIL OR WALL MOUNT



U.L. File #E208346

EXPLOSION PROOF



Inputs:

- pH
- ORP
- 4-20mA & VDC
- V/A RMS
- RTD
- TC
- (RH)Humidity
- Strain-Gage
- Frequency
- Vibration/Shock
- Conductivity
- Moisture

Outputs:

- 4-20mA for Proportional Control
- Opto Isolated Transistors for On-Off Control
- Hysteresis & Delay
- Alarm LEDs

Description:

The *Series 900* is the Industry's First Loop Powered Controller, that requires no power supply to give you on-off & proportional control of your process. The *900 Series* can be ordered as a 4-20mA *Transmitter Only*; *Transmitter with Display*; *Transmitter with Controller*; *Display only*; *Controller Only*, *Controller with Display* or as *Transmitter with Display & Controller*. They are all Loop Powered in one small package, which is available in three grades: Explosion Proof; Sanitary (IP65) or Industrial.

Mounting:

You can mount the *900 Commercial Case* virtually anywhere such as chassis, panel (front or behind), pipe (use "U" bracket), Din Rail (specify DIN Rail mounting) or just stick it to the wall. The Sanitary Nema 4X (IP65) option can be mounted on a wall, panel or pipe (use 2ea 2¼" U bracket).

Power Supply Considerations:

You can add as many "Loads" in series with the current loop, limited by the min-max compliance voltage. IE: Transmitter Only: 8-36V, Transmitter-Controller: 14-42V, Transmitter-Cont. & Display: 16-44V. See Specifications.

Controller:

Two opto-isolated open collector transistors controlled by dual comparators with hysteresis and delay (0.5 sec. to avoid noise) will control on-off your process. Limits' adjustment is via the 12 turn potentiometers labeled LL & HL, the LEDs give you visual indication (yellow & red) of set point status.

Transmitter:

The 900 Series has two adjustments for the current loop output, zero & span with 12 turn potentiometers labeled 4 & 20 (mA). The analog signal conditioner's output is used to drive the high accuracy monolithic current loop (4-20mA Transmitter).

Display:

The optional built-in display has 3½ digits (1999 max) with 0.5" LCD digits and it's loop driven as well. There are two adjustments for the display, zero & span (Z & S). Decimal points must be specified at time of ordering.

Protection:

The *900 Series* is double zener protected (at the current loop inputs) for reversed input & up to 40VDC & 100mADC.

Isolation:

Input signals must be electrically isolated from the loop's power by at least, 1 Mega Ohm.

Specifications @25°C & Compliance Supply

Controller:

Burden (VC) (Controller Only or

With Display) 6V Max.
Accuracy & Repeatability ±0.5% of F.S.
Hysteresis ±1% of Setting
Response Time 0.5 Second (Delay)
Set Point Range 100% of Range
Min-Max Loop Current 3-40mA
O.C.T. Ratings 28VDC/30mA

Display: (Option Model 901 Only)

Voltage Drop (Burden)(VC) 4VDC
Display LCD, 3½ Digits, 0.5”
Decimal Points Specify with Order
Min-Max Loop’s Current 2-40mA
Accuracy & Linearity ±0.5% of F.S.
Zero & Span Range ±50% of Range

Transmitter: (Common to All Xmtr Models)

*Compliance Range (VC):

Transmitter Only: 8-36;
Transmitter with Display: 12-40;
Transmitter with Controller with or
w/o Display: 16-40VDC

Min-Max Current Output 3.6-36mADC
Accuracy ±0.1% of F.S.
*28VDC Max. For I.S. Models

Overall Specifications: (@25°C) (Common to All Models)

Warm Up to Specs 15 Minutes
Operating/Storage Temp. 0-60/-10-70°C
Temperature Coefficient ±0.01%/°C
Calculated MTBF 100,000 Hours
Connections Screw Terminals
Max. (Worst Case) Burden(VC) 16VDC
Compliance Range for Fully Loaded

Power Supply (p/n 75-2405):

O TEK offers a plug-In P.S. for household mounting and 120VAC input, 34V@ no load & 28VDC@50mA output. Size: 2x2, 25x1.7”. It is NOT intrinsically safe, but UL approved. Order separately.

ANALOG INPUTS

pH (Acidity) (Option 02)**

pH: Interfaces to your pH probe and has a 10¹⁵Ohm Zin Amplifier & diff OPAMP to condition the signal for the transmitter.

Input Impedance 10¹⁵ Ohms
Range 0-14pH (±413mV)
Accuracy ±0.05pH
*Standard Calibration 0.00-14.00
Applications Automatic pH Balance &
..... Alarming of Chemical Solutions

ORP (Oxygen Reduction Potential)

(Option 03)**

ORP: Converts your ORP probe mV output to engineering units to be transmitted, controlled and displayed.

Input Impedance 10⁹ Ohms
Range 2000mV
Accuracy ±1mV
*Standard Calibration 0-100.0%

Applications Automatic Local & Remote Control/Alarming of Oxygen Demand on Chemical Solutions

**BNC Connector On Request

4-20mA (Current Loop) (Option 04)

4-20mA: Retransmits the input and changes the scale & offset factors with its 4 & 20 potentiometer adjustments.

Input Impedance 100 Ohms
Open Loop Protection 50V/50mADC
Accuracy ±0.01mA
*Standard Calibration ... 4-20mA=0-100.0%

Applications Hazardous to Non-Hazardous area Current
..... Loop (4-20mA)
..... Wireless(RF) Communication

mV/mA True RMS (Op.05)

RMS: An ASIC converts the RMS input signal to VDC for the transmitter to power the controller & display and transmit the 4-20mA.

Frequency Input Range DC-20Khz
Measuring Technique True RMS
Accuracy (Sine Wave) ±0.1% of F.S.
Input Impedance 200mV:100KΩ

..... 2mA:100KΩ
..... Other Ranges (Not I.S.) on Request

*Standard Calibration ... 100mV/1mA=1000

Applications: Motor, Transformer Load Control/Monitor/Alarming for Local/Remote Preventive Maintenance

Note: Contact OTEK for Other Voltages/Current & Frequency Input Ranges

RTD (Temperature) (Option 06)

RTD: The 906 excites your RTD with 500µA and converts the microvolt drop across the RTD to mVDC to be transmitted.

Sensor Type Accepted PT100
Input Range Same as RTD
Accuracy ±0.2°C or °F
*Stand. Calib. -200 to 600°C= -200-600

Applications Over/Under Temperature
..... Monitor/Control in Hazardous Locations

Thermocouple (TC) Temperature(Op.07)

TC: Converts the μV output from types “J,K, or T” thermocouples to mV for transmission of 4-20mA after compensating for ambient temperature (cold junction compensation).

Accuracy.. $\pm 0.1\%$ of Thermocouple’s Output
 Linearization None
 Cold Junction Compensation 0-50°C
 Open TC Detection ..Burn Up (+Over-range)
 TCs Accepted J, K, T
 *Standard Calibration & Type:
 J, 0-760°C=0-760 (Others on Request)

RH - Humidity (Hygrometer) (Option 08)

This conditioner is designed to interface to a typical (capacitance type) 2-3pF/% of **RH** made by several manufacturers. Use Option “09” and contact **OTEK** to specify your sensor’s specifications.

Accuracy: $\pm 2\%$ RH of signal input.

Custom (Option 09)

Option 09: Custom: Use this option to describe any custom input, scale or modification to the **900** and contact us for feasibility and cost.

Accuracy: To Be Determined

Strain-Gage (Load Cells) (Option 10)

Strain-Gage: Your S-G (load cell or other transducer) is internally excited with highly accurate constant current & its differential μV output converted to 4-20mA for transmission.

Internal Excitation..... 5VDC Ratiometric
 Sensitivity/Full Scale 10 Microvolts/
 10 Millivolts
 Accuracy Linearity..... $\pm 0.1\%$ of F.S.
 Bridge Impedance Range 1-4K Ohms
 *Standard Calibration 0-10mVin=0-100.0

Note: Lower Impedance S-G Can Be Used If Externally Powered, Contact OTEK.

Applications: Pressure, Vacuum, Volume, Weight, Depth, Height, Expansion, Contraction.

***Standard Calibrations:**

Unless Otherwise Noted or Specified with Order. Output is 4-20mA=0-F.S. Input. (Field Configurable)

Frequency (40-10K Hz) (Option 11)

Frequency: This conditioner accepts frequency and converts it to VDC for the V-I converted to transmit it over the 2 Wires.

Input Impedance..... 1Meg Ohms
 Voltage Range Dry Contact to 300VAC
 For IS Grade..... Dry Contact to 5VRMS
 Accuracy and Linearity..... $\pm 0.2\%$ of F.S.
 *Standard Calibration..... 40-100Hz
 =4-20mA
 Other Ranges..... On Request
 Applications Flow, Volume, RPM,
 AC Line Frequency, Speed

Vibration-Acceleration-Shock-Position (VASP) (Option 12)

VASP: The internal monolithic sensor converts the changes on the earth’s magnetic field to mV & transmits them via the 4-20mA current loop.

Built-In Sensor(External On Request)
 Frequency Bandwidth 5KHz
 Range $\pm 10g$, Overload:x20
 Sensor Type..... Monolithic, Micro-machined
 *Standard Calibration 0- $\pm 10g$ =500 \pm 500
 =12mA \pm 8mA
 Applications... Vibration Shock, Alarming of Motors, Trucks, Ships, Pumps, Seismic

V/mADC (Option 13)

VASP: This signal conditioner converts the 0-500mV or 0-5mA to its 4-20mA equivalent, specify other ranges and calibration next to part number.

Input Range 0-500mVDC or 0-5mADC
 Input Impedance..... 10M for V, 100 Ω for I
 Specify Input Type & Range!

Moisture & Conductivity (Option 14 & 15)

Conductivity: Uses the natural electrical conductivity of most liquids (water, chemical solutions) and excites its electrodes with 1nA (for I.S. applications) of current to convert it to 4-20mA for your control. Also use it as a “Low” or “High” level “On-Off” controller.

Current Source 1nA Max.
 Open Circuit Voltage..... 5VDC
 Response Time 0.1sec. 0-100%
 Sensor..... Any Two Wires
 Application: Level Detector (Any Conductive Liquid) in Chemical Baths, Fruit, Paper, Meat, Wood Drying, Soil (agricultural) Water, etc.

Specifications Mechanical

Industrial Case

- 94V0 UL Approved ABS Black
- Mounting: Chassis, Panel, Pipe, Wall & DIN Rail (Optional)
- Weight: 56g (2 ounces)
- Size: 3x1.5x1" max.

Note: Specify DIN Rail Mount if required

Sanitary Case

- NEMA 4X (IP65) Aluminum Powder Painted with Gasketed Window and up to 3ea. 3/4" Ports for Power/Signal I/O
- Up to 3 Units Can Be Installed Inside. Specify if required
- Steam Temperature: Up to 250°F (121°C)
- Size: 5x5x3"; Weight: 1Lb (450g)
- Mounting: Wall, Pipe, Panel

Explosion Proof:

- Material: Aluminum Casting & Machined
- Window: 1/4" Thick Tempered Glass
- Mounting Position: Any (the 900 Rotates in 90° Increments)
- Ports: 2ea. 3/4" NPT
- Finish: Epoxy Painted
- Weight: 950G (2 pounds)
- Size: 4x5x5"

Certifications:

- Explosion Proof FM & CSA: Class I, Div. 1
GPS. B-G EX & 1 ECex: IM2, Exd1

CONNECTOR (REAR VIEW)

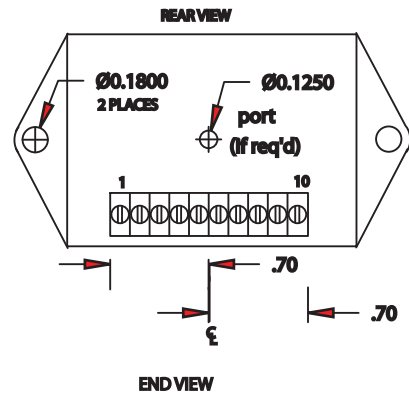
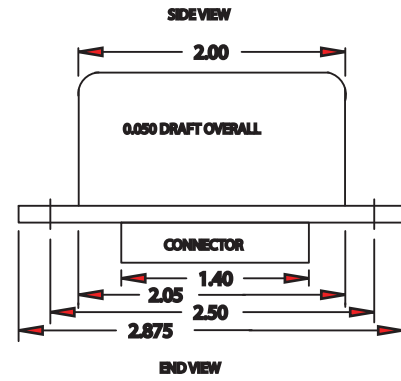
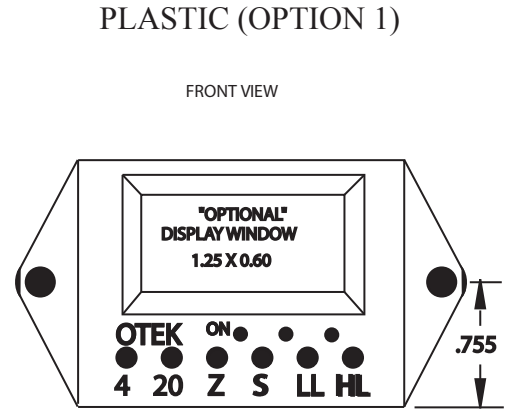
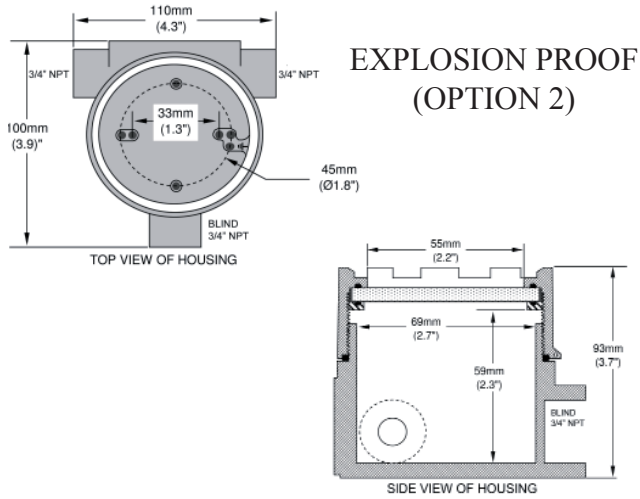
	+ LOOP IN	- LOOP OUT	- SIGNAL INPUT *	+ SIGNAL INPUT *	+ EXCITATION	- EXCITATION	COLLECTOR LOW	EMITTER LOW	COLLECTOR HIGH	EMITTER HIGH
PIN #	1	2	3	4	5	6	7	8	9	10



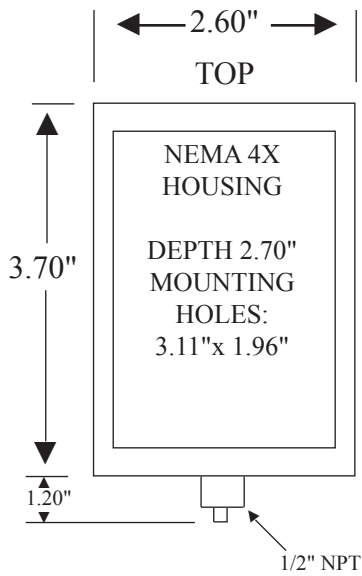
IF YOU
DIDN'T
SEE IT,
ASK FOR
IT!



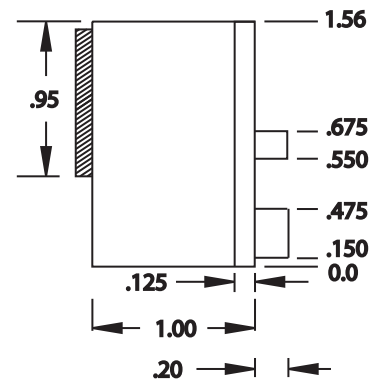
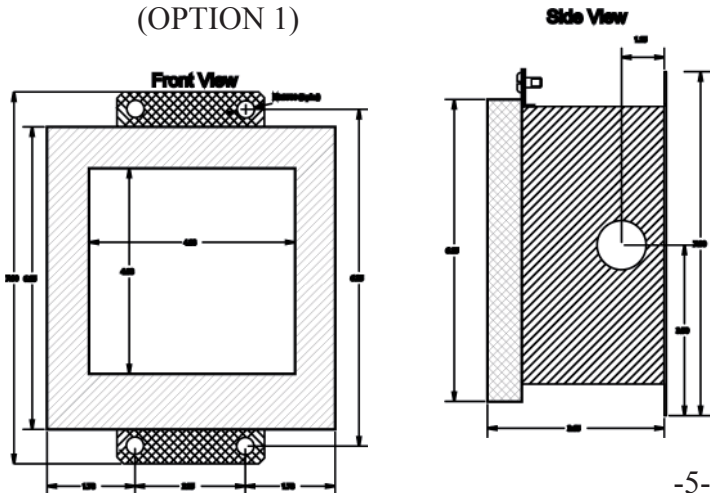
HOUSING MECHANICAL INFORMATION



NEMA 4X (OPTION 4)



SANITARY (OPTION 1)



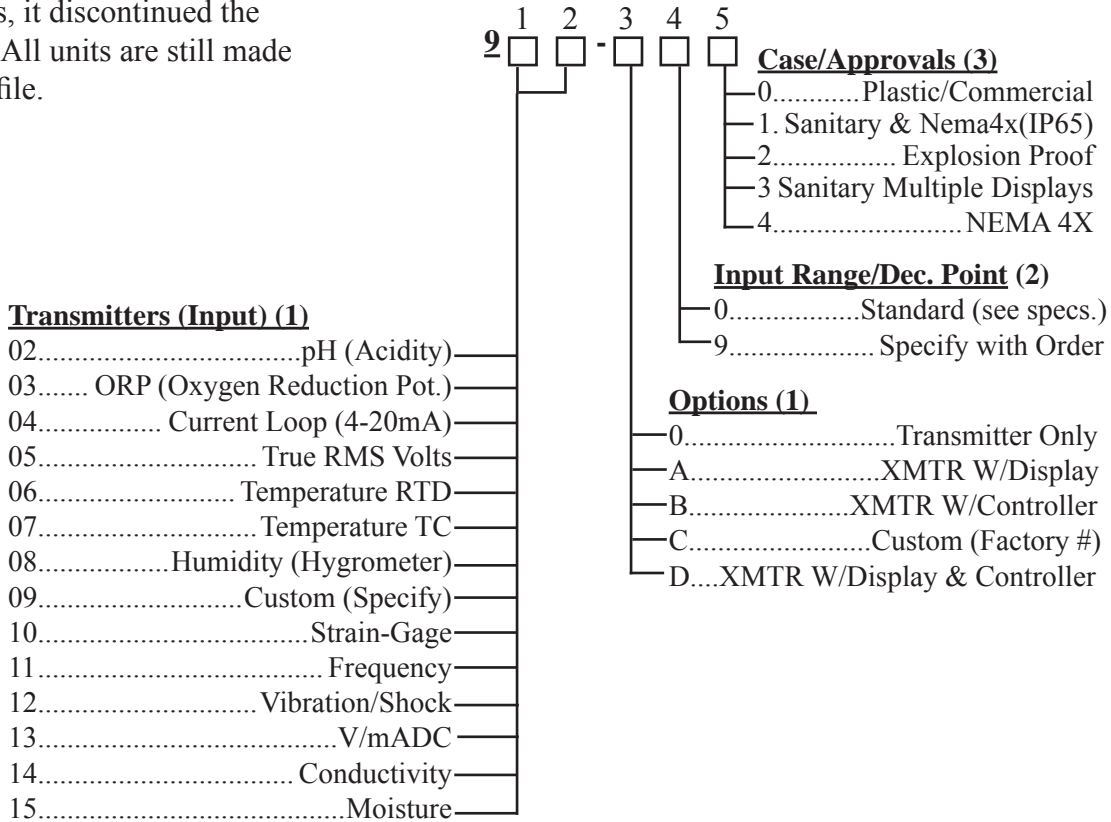
NOTE: For rear panel mount, make panel cutout 2.015" x 1.515". The unit will protrude 0.25" from the front of the panel.

Series 900 Ordering Information 6/8/11

NOTE: Intrinsically Safe
 OTEK had received I.S. approval (UL File #E208346), but due to the ever increasing UL fees, it discontinued the listing. All units are still made to that file.

NOTE: Ordering information changed 3/18/11 contact Otek for a replacement. Options 00 and 01 deleted.

**Visa & Master
Cards Accepted**



Note:

1. The 900 series can be a Loop Powered receiver with retransmission and display (i.e. 904-AXX), Controller (i.e. 904-BXX) or Display/Controller (i.e. 904-DXX). If other than a 4-20mA C. L. (Option 04) input is selected (9XX-XXX), it becomes a 4-20mA transmitter with or without display (Option A) or with or without Controller (Option B) or fully loaded (Option D).
2. Unless specified when ordering, units will be shipped with standard range and decimal point per specification section. Alarms are set (Adjustable) at 8mA (Lo) & 16mA (Hi).
3. Sanitary Case can include 1, 2 or 3 units inside. Option 1 is for one unit, Option 3 is for up to 3 units. Specify # of units inside.