

# INSTALLATION & OPERATION MANUAL

## SP712-2 REV. B Loop Powered 4-20mA Transmitter

DOC#: MN-712-B



***LIQUID CONTROLS SPONSLE, INC.***

**FLOW MEASURING DEVICES AND CONTROLS**

**A Unit of the IDEX Corporation**

105 Albrecht Drive • Lake Bluff, IL 60044

(847) 295- 1050 • [www.sponsler.com](http://www.sponsler.com)



## SPECIFICATIONS

<b>Temperature:</b>	Operating -40 to 85°C Storage -65 to 125°C
<b>Input Voltage:</b>	Minimum = 7 V + (20mA X RL) Maximum = 28 V + (4mA X RL) Protected against polarity reversal
<b>Signal Input:</b>	Frequency 0-10 KHz Amplitude 50 mV – 35 V sine or square wave Sensitivity field adjustable Impedance 50K
<b>Analog Output</b>	4mA @ 0 Hz, 20mA @ desired full scale frequency Full scale range -- 100 Hz-10 KHz selectable Response time -- 95% of change in 1 second Linearity -- .3% F/S Tempco -- < 2% of reading over entire temperature range
<b>Features:</b>	Mounts directly on flowmeter
<b>Enclosure:</b>	FM Approved, CSA Certified Class I Groups B, C, D Class II Groups E, F, G Weight 1.7 lbs.

The SP712-2 is a 2-wire loop powered analog transmitter designed to linearly convert a frequency input to an equivalent 4-20mA current output. When it incorporates with a turbine flowmeter a current representation proportional to flow is obtainable. Data transmission in a current format exhibits excellent noise immunity and the capability of long distance transmission.

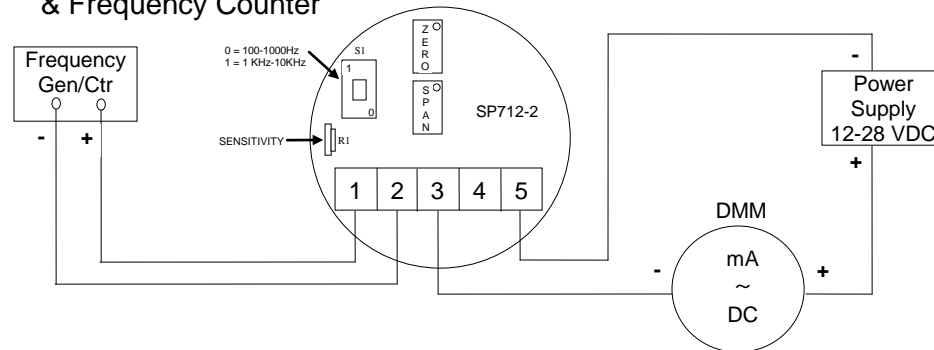
A full-scale frequency range of 100 Hz-10 KHz is selectable, via S1. The span adjustment establishes the frequency point at which a 20mA output is achieved. The sensitivity adjustment permits the SP712-2 to discriminate between a signal input and noise by increasing (CCW) or decreasing (CW) the input signal amplitude necessary to process a valid signal. 'Test' S2 when depressed, illuminates D1 if loop voltage and input signal both are present. D1 will appear constantly illuminated @ higher frequencies.

Installation of the SP712-2 requires only 2 wires because it is a true 2-wire transmitter: input power and signal output utilizes the same wires.

## BENCH TEST CALIBRATION PROCEDURE

**Required Equipment:** Power Supply 12-28v, Digital Multimeter (DMM), Frequency Generator, & Frequency Counter

### Test Procedure:



- A) Connect DMM positive lead to power supply positive, connect DMM negative lead to J1-3, set DMM function to mA DC
- B) Connect power supply negative lead to J1-5
- C) Connect frequency generator positive & negative leads to J1-1,2; respectively. Set output to sinewave & amplitude to zero
- D) Set S1 for desired frequency range
- E) Turn power supply & frequency generator 'ON', DMM should indicate approximately 4.00mA
- F) Adjust 'ZERO' (R25) for 4.00mA DMM indication (record data)
- G) Set 'Sensitivity' adjust (R1) fully clockwise
- H) Adjust signal amplitude of frequency generator to 50mv & frequency to maximum desired point (full scale frequency) (record data)
  - I) Adjust 'SPAN' (R19) for 20.00mA DMM indication (record data)
- J) Reduce signal amplitude of frequency generator to zero, adjust 'ZERO' (R25) for 4.00mA DMM indication if necessary
- K) Adjust signal amplitude of frequency generator to 50mv, adjust 'SPAN' (R19) for 20.00mA DMM indication if necessary
- L) Adjust frequency of frequency generator to exactly 50% of maximum frequency point in step H, DMM should indicate 12.00mA  $\pm$  .06. Repeat for 25% & 75% full scale frequencies(record data)

To check linearity @ any frequency point, incorporate the following formula:

$$(F/F_{\max} \times 16) + 4 = \text{mA}$$

(Where F = Flowrate frequency in Hz)

(F<sub>max</sub> = Frequency in Hz at which 20mA is set)

EX. Assume maximum frequency point = 2000 Hz (20.00mA)

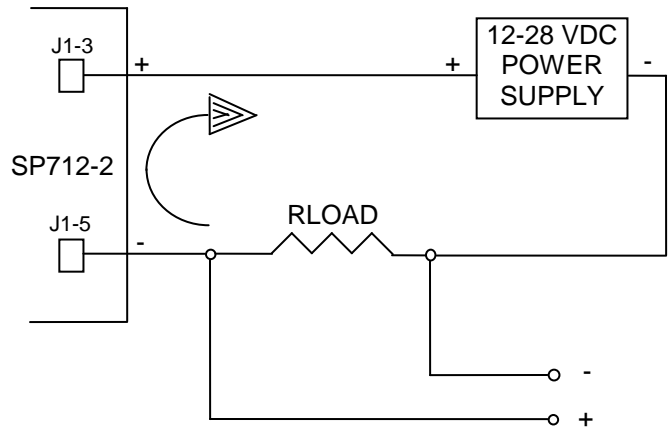
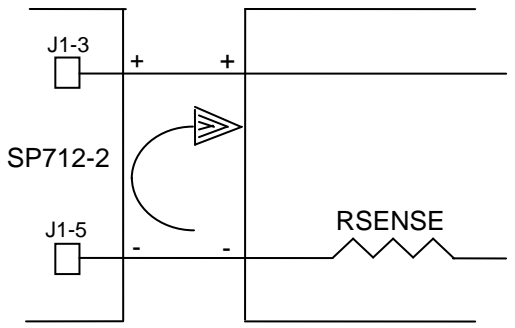
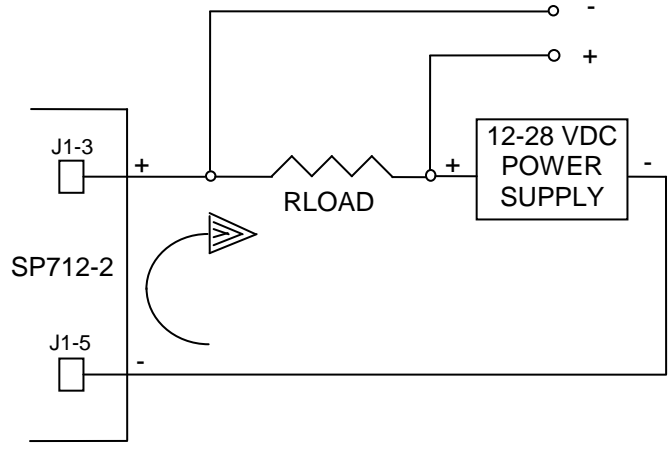
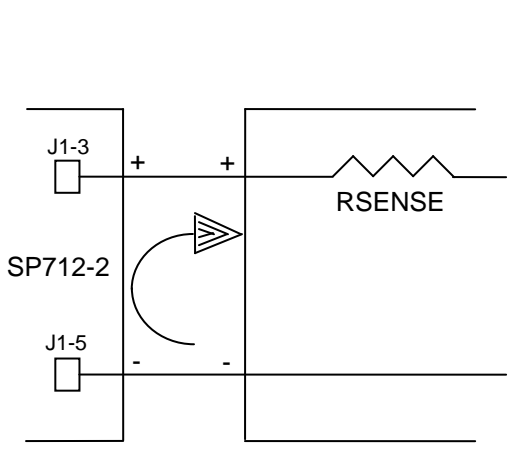
Check for linearity @ 750 Hz point

$$750/2000 = .375$$

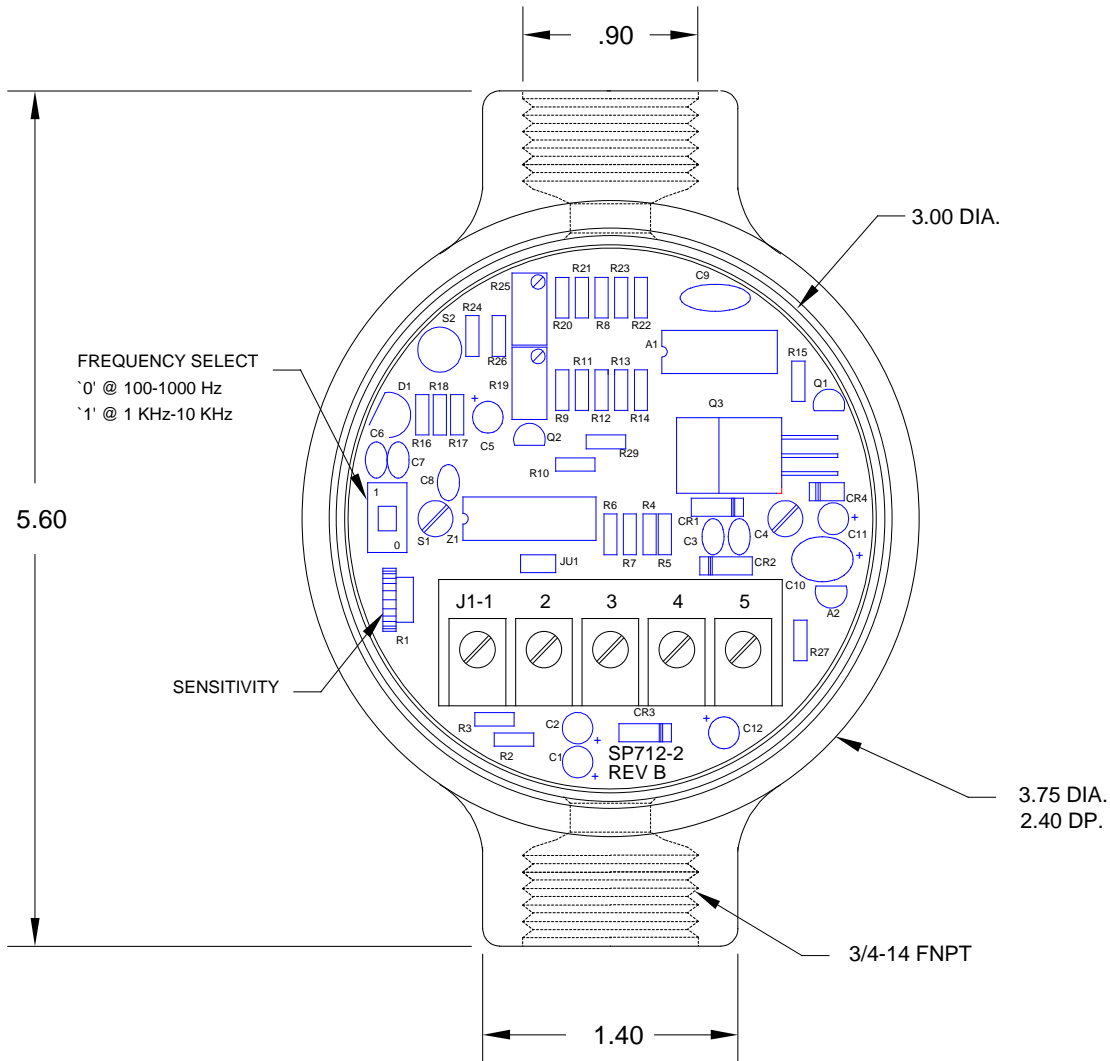
$$16 \times .375 = 6$$

$$6 + 4 = 10; \text{ DMM should indicate } 10.00\text{mA @ } 750 \text{ Hz input}$$

# TYPICAL LOOP CONFIGURATIONS



DATE	REV	REVISION RECORD	AUTH	DR	CK



**TERMINAL LOCATION**

- 1 SIGNAL IN +
- 2 SIGNAL IN -
- 3 LOOP IN +
- 4 N/C
- 5 LOOP IN -

NOTE: DIMENSIONS ARE IN INCHES

<b>SPONSLER, INC.</b>			
FILE	SELECT\SP712.DWG		
DESCRIPTION	SP712-2 LOOP POWERED 4-20mA TRANSMITTER	DRAWN BY	TN
		DATE	5-5-97
MATERIAL		SCALE	REVIEWED B
		NONE	DATE
COD	DRAWING NUMBER	REV. #	APPR. BY
EM	SP712-2		DATE





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**LIQUID CONTROLS**

105 Albrecht Drive  
Lake Bluff, IL 60044  
(847) 295-1050

**TOPTECH SYSTEMS**

280 Hunt Park Cove  
Longwood, FL 32750  
(407) 332-1774

**CORKEN**

3805 Northwest 36<sup>th</sup> St.  
Oklahoma City, OK 73112  
(405) 946-5576

**LIQUID CONTROLS EUROPE/SAMPI**

Via Amerigo Vespucci 1  
55011 Altopascio (Lucca), Italy  
+39 0583 24751

Nateus Business Park  
Nieuwe Weg 1-Haven 1053  
B-2070 Zwijndrecht (Antwerp), Belgium  
+32 (0)3 250 60 60

**FAURE HERMAN**

Route de Bonnetable  
B.P. 20154  
72406 La Ferté-Bernard Cedex, France  
+33 (0)2 43 60 28 60

**LIQUID CONTROLS INDIA**

808 VCCI Complex  
GIDC Makarpura  
Vadodara-390 101  
Gujarat, India  
+91 265 2631855

6961 Brookhollow West Drive  
Houston, TX 77040  
(713) 623-0808

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105 Albrecht Drive  
Lake Bluff, IL 60044  
(847) 295-1050