

MODEL 2000 Two-Wire Transmitter



INSTALLATION, OPERATION & MAINTENANCE MANUAL

USING THIS MANUAL

This manual is designed to assist in installing, operating, and maintaining the Model 2000 Two-Wire Transmitter used with the Aaliant Target Flowmeters.

SAFETY INFORMATION

Before installing the Model 2000, please read these instructions and those instructions for the flowmeter to which it will be attached. Familiarize yourself with the requirements and functions. If any questions or problems arise please contact Aaliant Applications at 1-800-778-9251.

Ensure that all personnel involved with operating this device are suitably qualified. Observe all local and national electrical codes for the wiring of this device.

NOTE: Manufacturer's instructions and the National Electrical Code (ANSI/NFPA 70) must be followed when installing this equipment. Tampering or replacement with non-factory components may adversely affect the safe use of the system.

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1.0 PRODUCT DESCRIPTION

1.1 Function

The Model 2000 is a smart, HART® compatible, isolated two-wire transmitter that accepts signals from any Aaliant Target Flowmeter. The Model 2000 is easy to configure and operate. It is a high performance analog transmitter with all the benefits of a smart transmitter included in its performance characteristics.

The Model 2000 has many advanced features, which are achieved through the use of digital signal processing and micro-controller technologies. Typical of these features are the custom, user settable linearization functions; independent zero and full-scale settings, digital filtering etc. Other advanced features such as automatic self-diagnostics and the exceptional temperature stability are transparent to the user and are continuously on.

The Model 2000 can be configured via a display mode configuration using the Two-line, Plug-in Display / keyboard. PC configuration is achieved by using a HART® Modem, such as a MACTeK Viator RS232 Interface for HART® (CE Approved), in conjunction with the Windows based Aaliant Smart Link software. The handheld HART® HC275 communicator can also be used to configure the Model 2000 (Model 2000 device description must be loaded in the HC275 memory module).

This manual is divided into several sections. After a brief introduction, section 2.0, HANDLING & STORAGE contains a lot of useful information for the first time installer. Section 5.2, SETTINGS AND ADJUSTMENTS explains how to set-up the transmitter using the DISPLAY MODE CONFIGURATION. For PC configuration, refer to SMART LINK Installation, Operation & Maintenance Manual (M752).

1.2 Technical Specifications

FUNCTIONAL SPECIFICATIONS

Ambient Temperature	Operating Temperature Range: -4° F to 170° F (-20° C to 75° C) Storage: -50° F to 200° F (-50° C to 95° C)
Humidity	0% to 90% relative humidity (non-condensing)
Power Input	12-42 VDC
Outputs	Signal 4-20mA, 2 wires HART® Operation Mode: Operates in continuous mode Digital Communications Protocol: HART®; LSK with standard unit
Display	2 line alphanumeric with bar graph
Low Flow Cutoff	Adjustable
Reverse Polarity Protection	42 VDC Minimum
Insulation Resistance Sensor	> 100 megohms
Max. Full Scale mv/V Input	0.8 to 2.5 mv/V
Max. Load Resistance	$RL = (V_{supply} - 12) * 43.33$
Bridge Excitation	0.8V @ 350 ohms
Module Stability	Less than +0.05% of reading plus 3.6 micro amps per year (will not drift due to internal references)
Power-up time	7 - 10 seconds (accuracy achieved in less than 30 seconds)
Input	Strain gage: 4 wires, 75 feet maximum (Belden 8424) Distance Compensation: 6 wires up to 250 feet (Belden 8426)
Adjustability	Span: 10% to 100% of range Zero: ±0.7 mv/V
Response Time	100 milliseconds
Damping	Minimum: 0 to 30 seconds
Diagnostics	Provided standard HART® diagnostics simulation. Provides over-range notification of flow. Senses open bridge, senses loss of excitation

PERFORMANCE SPECIFICATIONS

Accuracy	0.15% of electronics reading
Sensor Stability	<0.1% of Full Scale per year
Turndown	15:1 @ 2 mv/V Full-scale 10:1 @ 1 mv/V Full-scale
Thermal effects	Electronics modules: self-correcting for ambient effects over the operating range Module itself: corrects within 0.1% for ambient temperature effects on the strain gage assembly
Approvals	pending
Electromagnetic Compatibility	Test Standards: IEC1000 or ENC61000-4-(2-3-4-6) Electrostatic Discharge (ESD) Radio frequency electromagnetic field immunity(rfi) Electrical fast transient burst immunity (ftb) Lightning strike / surge immunity
Vibration	Meets ISA S-37.1, Level 1 & 2

PHYSICAL SPECIFICATIONS

Electronics Housing	Integral: NEMA 4X, dual cavity enclosure, aluminum, epoxy coated Remote: NEMA 4X, single cavity fiberglass
Connections	Integral: 3/4" NPT conduit Remote: dual 3/4" conduit opening (customer provides)

Two line Display option

Multifunction display for set-up, diagnostics, process variable readouts, with two integral buttons.

Language:	English
Process	Variables
Readout:	KG/M, GAL/M, L/M, IMPG/M, CU M/H, GAL/S, MGAL/D, L/S, CUFT/S, CU M/S, IMPG/H, IMPG/D, KG/H, LB/M, LB/H, STON/H, LTON/H, NCUM/H, NL/H, SCUF/M, CUFT/H, CU M/M, BBL/H, BBL/D, L/H, GAL/D, CUFT/M, PER FS
Zero (LRV)	
Span (URV)	
Sensor Trim	
Damping	
Sensor Failsafe	
Failsafe Reporting	
Trim 4mA	
Trim 20mA	

Windows based software (Available upon request)

SMART LINK provides windows based software for configuration, set-up, diagnostics, and sensor process information. See SMART LINK Installation, Operation and Maintenance manual (M752).

1.3 Dimensions

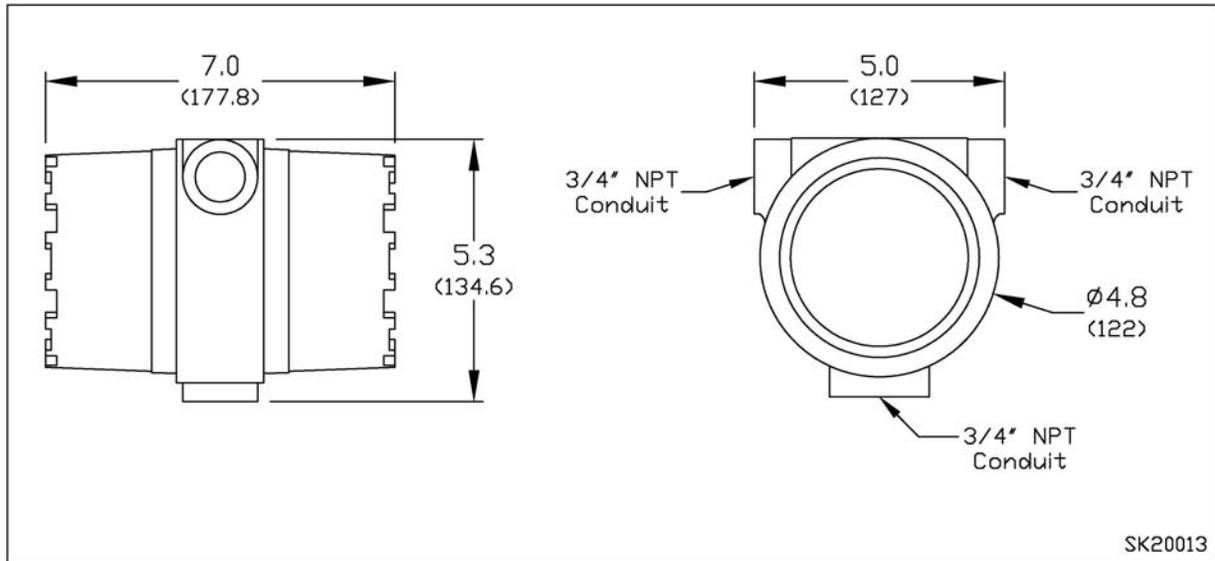


Figure 1. Integral Enclosure

in (mm)

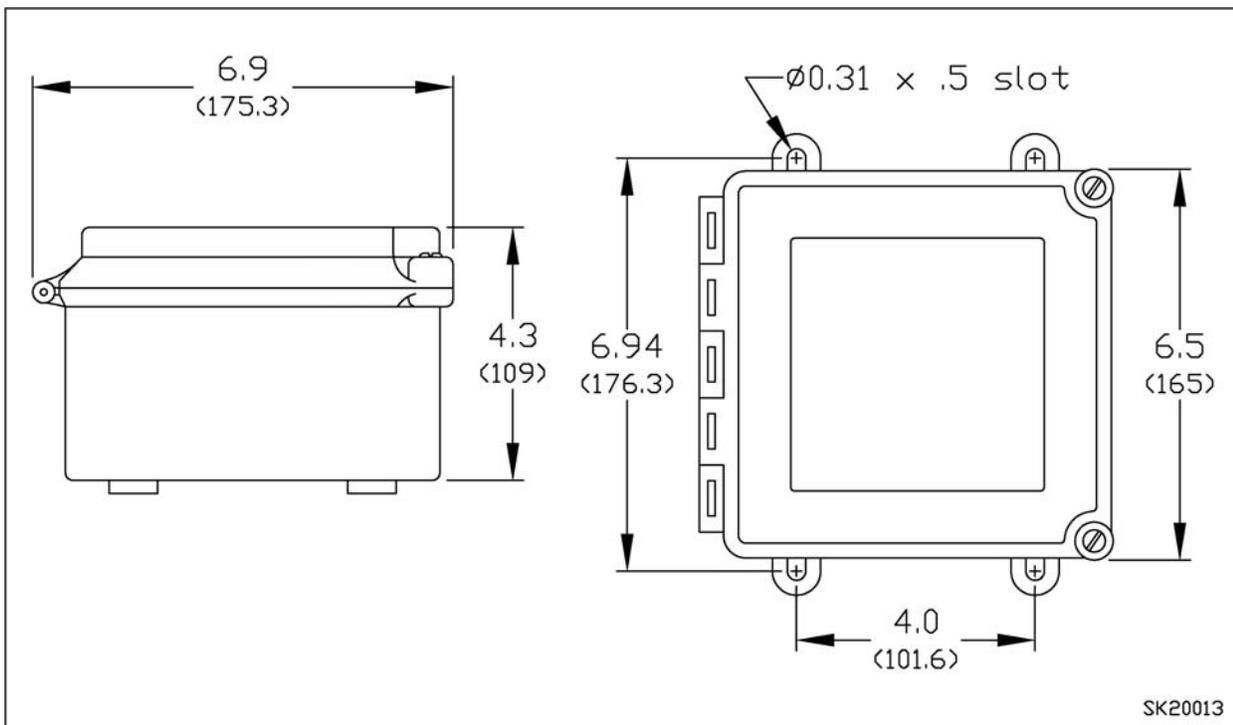


Figure 2. Remote Enclosure

in (mm)

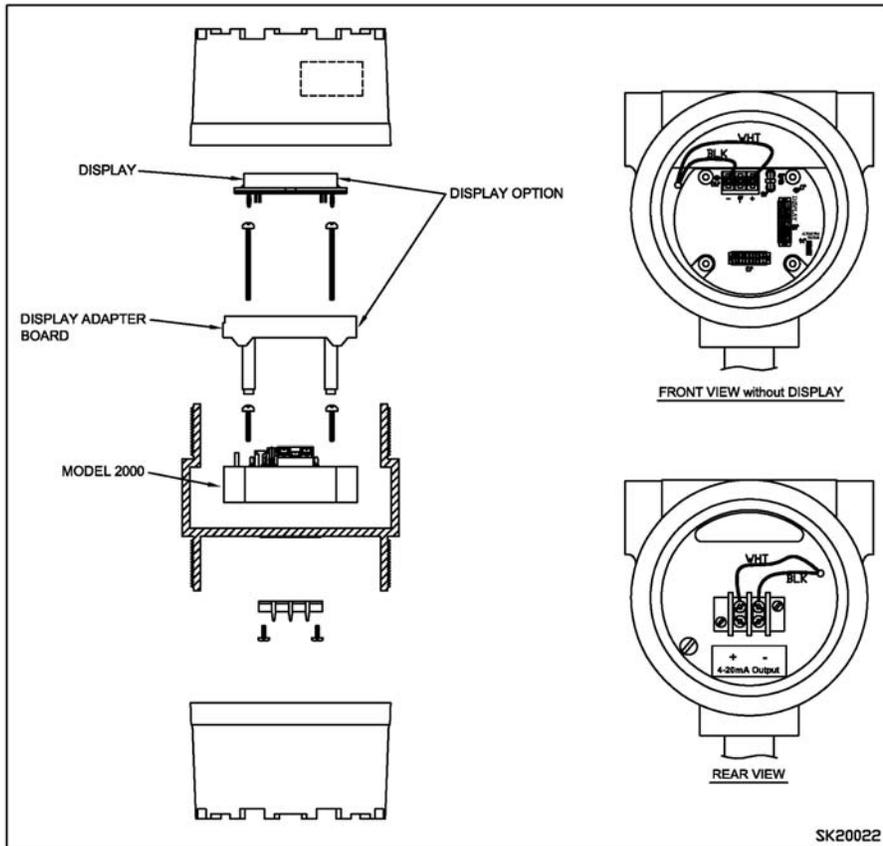


Figure 3. Integral Model 2000 Assembly

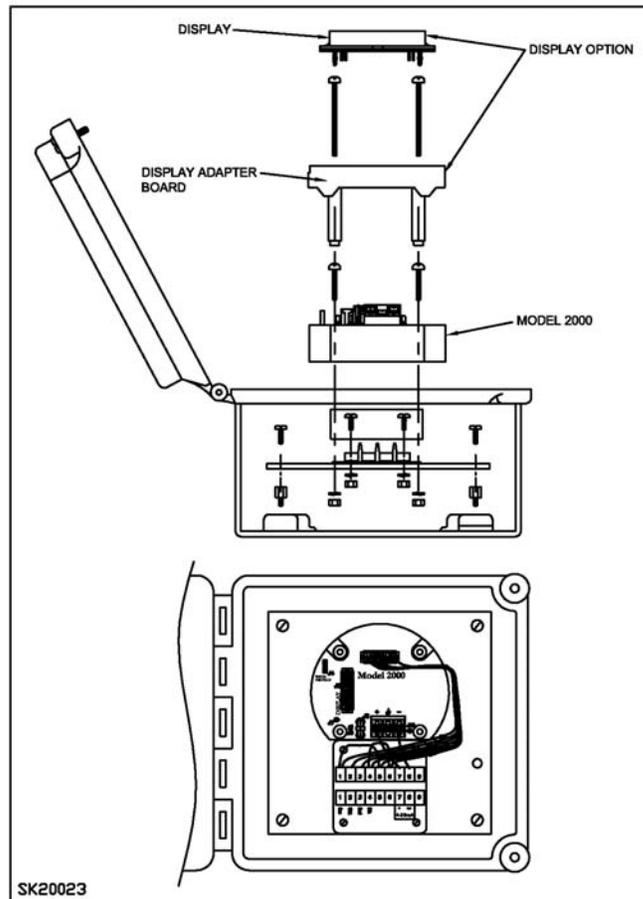


Figure 4. Remote Model 2000 Assembly

2.0 HANDLING & STORAGE

2.1 Inspection and Handling

Inspect the unit for any visual damage. Although the unit is Nema 4X rated when mounted in an enclosure, care should be taken to protect the unit from extreme environments such as extreme heat and cold. Use only adequate finger pressure when using the keyboard buttons. Never use sharp instruments or pencils to change values via the keyboard.

2.2 Storage

After receiving the Model 2000 two-wire transmitter, care should be taken to avoid damage. The unit must be stored in a non-condensing atmosphere less than 100% relative humidity. Store between -50° F and 200° F (-46° C and 93° C).

3.0 MECHANICAL INSTALLATION

If integral to the flowmeter, the Model 2000 is permanently mounted to an explosion proof type housing with a display window. In the standard transmitter assembly configuration, the transmitter electronics module is mounted in this housing making the assembly a complete flowmetering system.

Note: Because Model 2000 display reading does not compensate for flow changes due to pressure and temperature changes, reading will not correspond with a reading from a mass flow computer. Covers on the Model 2000 enclosure can be interchanged in order to blind the display when coupled with a mass flow computer.

For remote transmitter applications, there will be a remote housing with mounting ears. A shielded cable such as Belden 8424 (up to 75 feet) or Belden 8426 (up to 250 feet) needs to be run between the flowmeter and the Model 2000. The remote application capability allows the transmitter electronics to be mounted up to 250 feet away from the flowmeter; and mounted in a wall mounted NEMA 4X housing.

3.1 Guidelines

The units are calibrated at the factory to the end user's specifications. However, the actual application may require a somewhat different base calibration due to position of the meter and sensor offset trim, or changes made in the process parameters after the transmitter was specified. Calibration must be performed to the manufacturer's specification as outlined in the instruction manual.

Proper installation of the transmitter will assure highest performance and minimize error of the measured variable. The transmitter should be mounted in a location that minimizes temperature extremes, vibration and shock. It is important to survey the area to ascertain the best location for installation. Will the location be subject to flooding? Is the location directly above, below or in proximity to a known heat source? Does the location make the transmitter unserviceable?

The installation recommendations outlined in this section are provided to act as a guideline only and cannot cover all possible variations. The final installation must be made at the discretion and approval of the end user.

3.2 Mounting

INTEGRAL

If the Model 2000 is integral to the Target flowmeter, see the flowmeter installation, operation and maintenance manual.

REMOTE

Four (4) mounting holes are provided on the Model 2000 remote enclosure (See Figure 2).

4.0 ELECTRICAL WIRING

4.1 Guidelines

The National Electrical Code (ANSI/NFPA 70) must be followed when installing this equipment. Tampering or replacement with non-factory components may adversely affect the safe use of the system.

4.2 Connection Information/Wiring Diagram

Integral Model 2000 Wiring Diagram

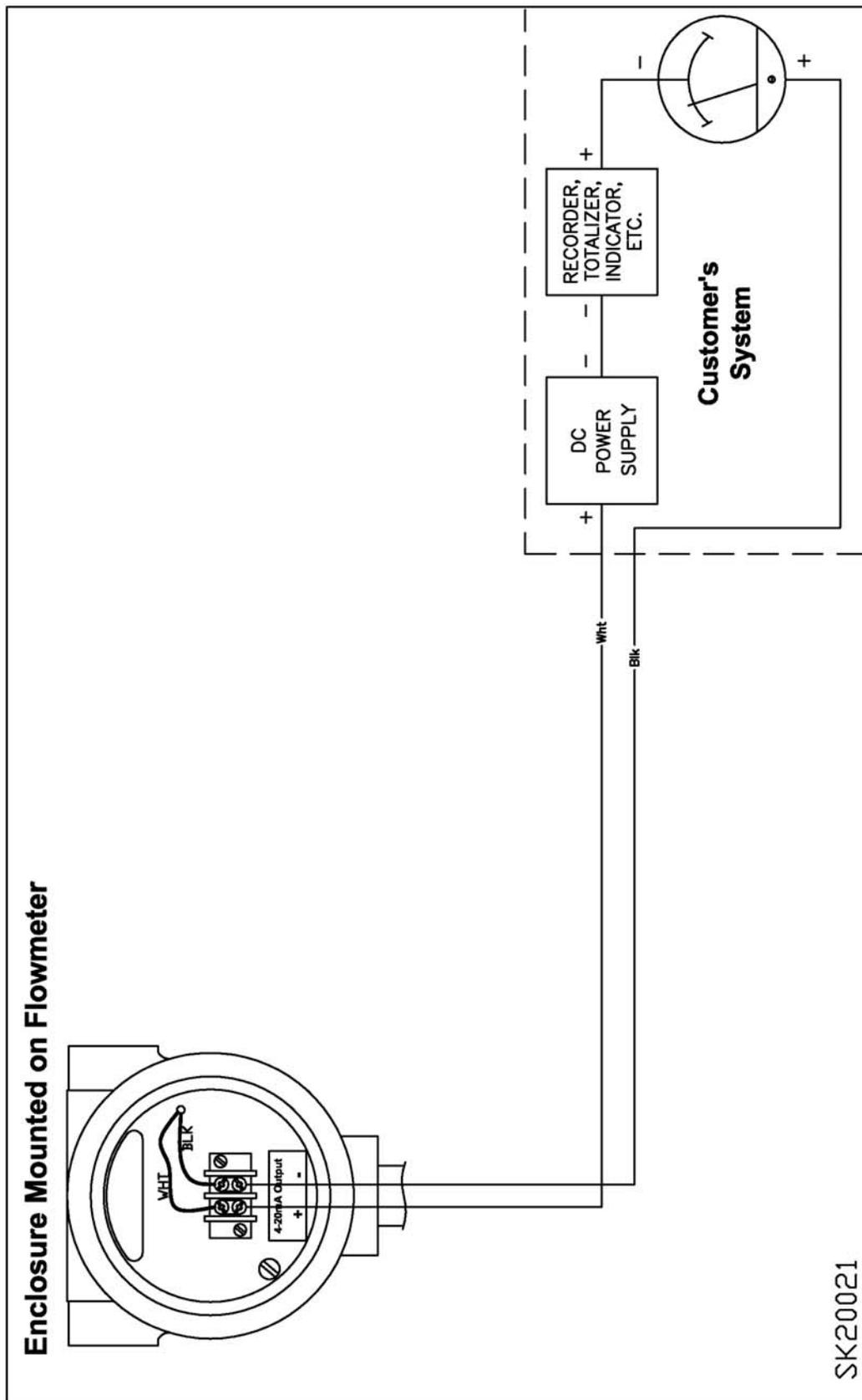
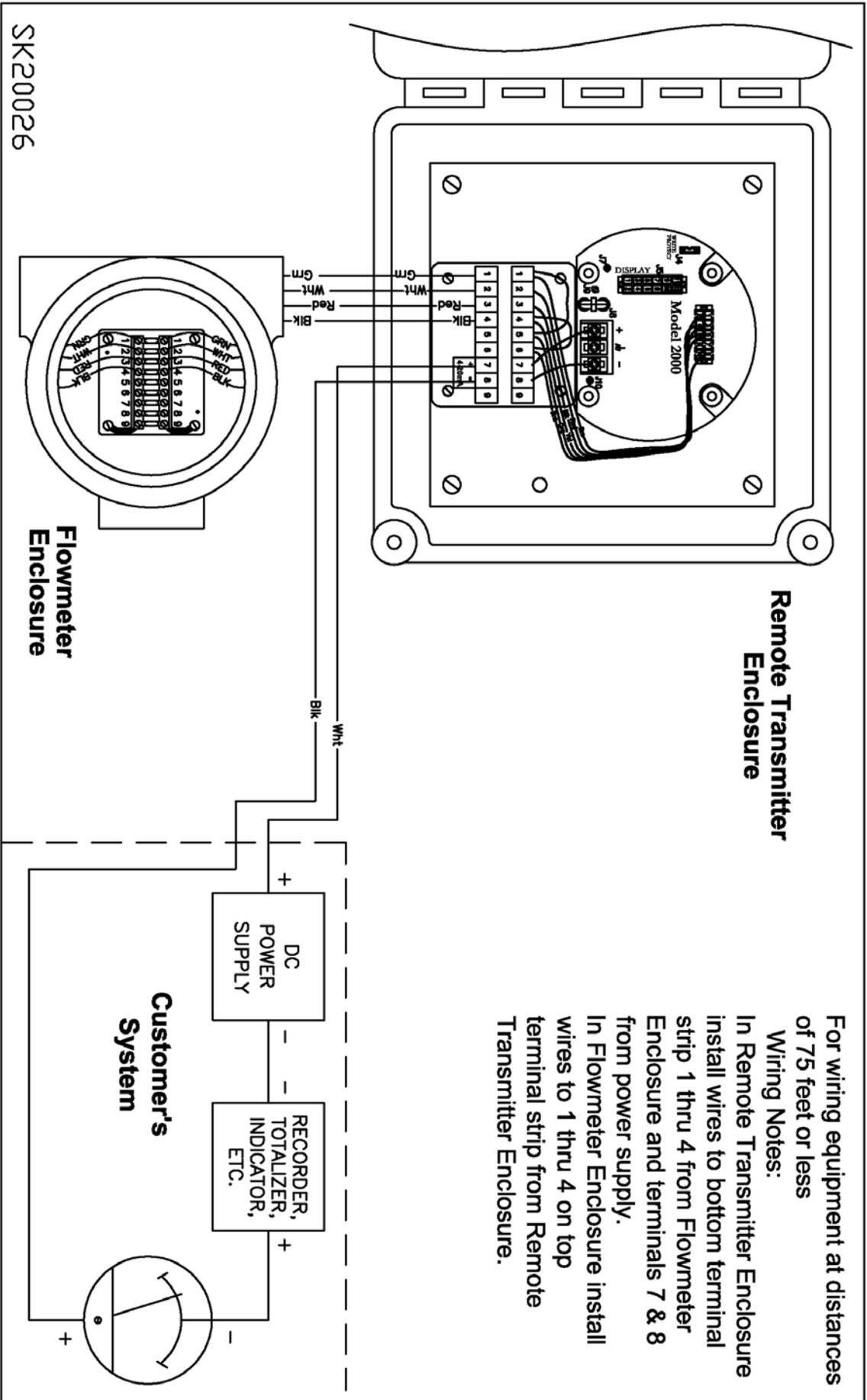


Figure 5. Integral Wiring

Remote Model 2000 Wiring Diagram for 4 Wire Hook-Up



Remote Transmitter Enclosure

For wiring equipment at distances of 75 feet or less

Wiring Notes:

- In Remote Transmitter Enclosure install wires to bottom terminal strip 1 thru 4 from Flowmeter Enclosure and terminals 7 & 8 from power supply.
- In Flowmeter Enclosure install wires to 1 thru 4 on top terminal strip from Remote Transmitter Enclosure.

Figure 6. Remote Wiring - 4 Wire Hook-Up

Remote Model 2000 Wiring Diagram for 6 Wire Hook-Up

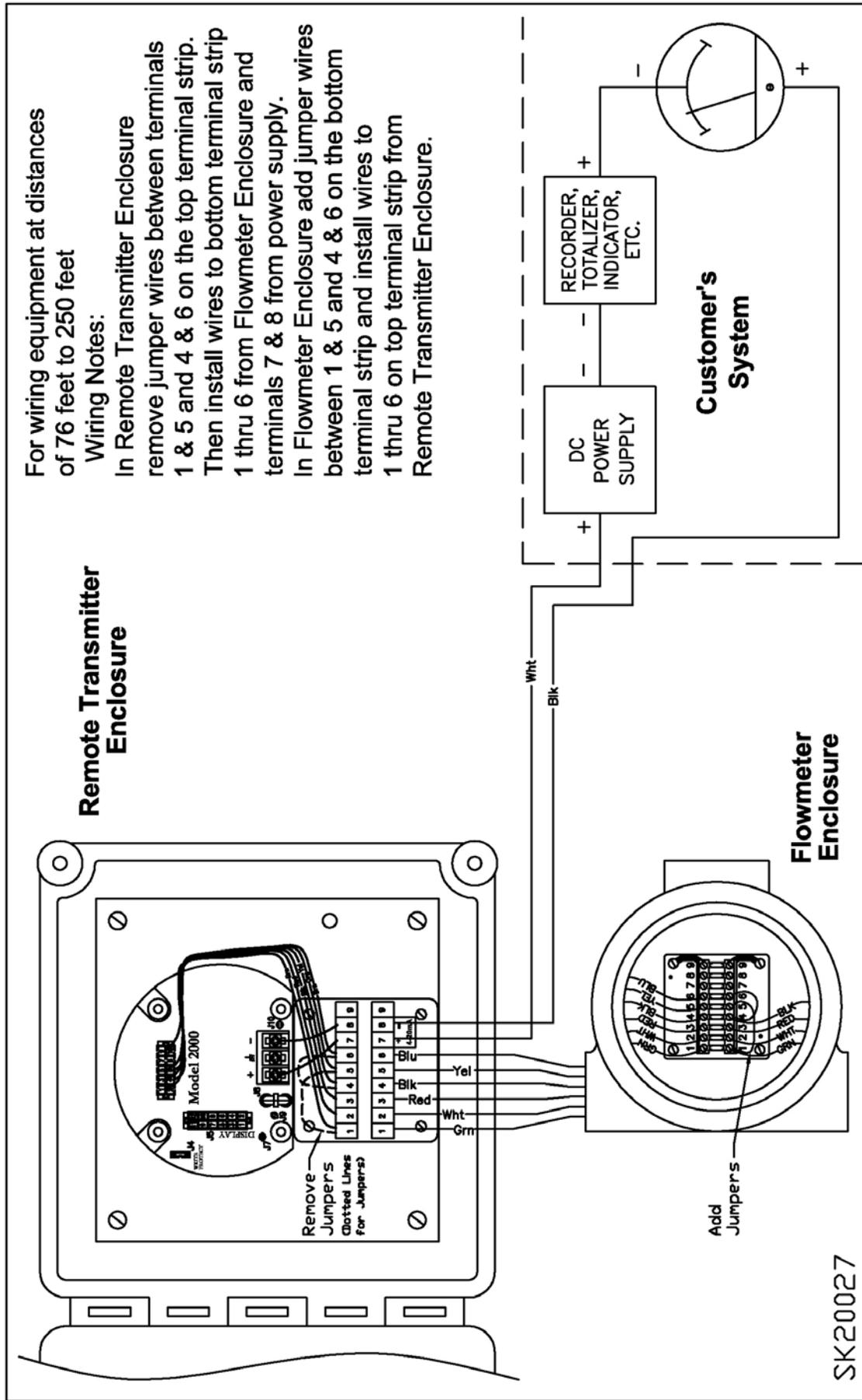


Figure 7. Remote Wiring Diagram - 6 Wire Hook-Up

The Model 2000 has screw terminals for its output loop and terminal connectors for the flowmeter. Plug in jacks are provided for the display. (Reference Figure 5, Figure 6, and Figure 7)

The output terminals marked + and -, are generally connected to a power supply that has a nominal 24 Volt DC voltage and is capable of supplying 100mA for the Model 2000. The + and - terminals of the transmitter are connected to the corresponding polarity terminals of the power supply. A load resistor, typically 250 ohms, may be connected in series with either terminal of the transmitter. For digital communications (HART®), 250 ohms must be connected in the loop.

The maximum series resistance in the circuit (including lead wire resistance) can be calculated from the formula: $RS = (V_{Supply} - 12) * 43.33$. The following chart gives maximum series resistance:

Maximum Series Resistance, Rs	Supply Voltage Vs
1300 ohms	42.0 VDC
520 ohms	24.0 VDC
416 ohms	21.6 VDC
260 ohms	18.0 VDC
0 ohms	12.0 VDC

5.0 SET-UP, CALIBRATION & PROGRAMMING

5.1 Operation

The units are calibrated at the factory to the end user's specifications. See the data sheet attached to this manual. The integral assembly configuration - transmitter mounted inside the housing on the meter - will have all the appropriate electrical connections made between the transmitter, flowmeter and display.

Note 1: Due to the sensor mounting position the flowmeter must be zeroed before taking any readings. This must be done. For best accuracy, the line should be full and at operating temperature without any flow going through the pipe. **ZERO ADJUST [SENSOR POSIT-N ADJUST] is typically only the user required setting.**

Input	Factory configured for the flowmeter sold with the transmitter
Output	Normally set proportional to flow. Can be selected as proportional to flow rate squared. 4.00mA: typically 0.00% of flow 20.00mA: 100.0% of flow
Engineering Units	As specified when ordering
Failsafe	Low 3.6mA: typical setting

Note 2: Use of the appropriate power supply is important. A 24 VDC supply having a current handling capacity of at least 100mA is commonly used. Always use a DC (direct current) supply, or suitable size battery.

Caution: Never connect the transmitter directly to 115 or 230 VAC.

Operation

The Two-line, Plug-in Display / keyboard gives indication of the process variables and allows local configuration, set-up and diagnostics of the Model 2000. In operation, the upper line displays the measurement value. There is a center-line bar graph indicating from 0% to 100% where the transmitter is operating within its 4-20mA range. The lower line shows a scrolling message, tag information and/or engineering units. See section titled DISPLAY MODE CONFIGURATION for complete details on the operation of the plug-in display for the Model 2000.

Operation with a PC

Configuration software available upon request but not required for system startup. The Aaliant SmartLink software, in conjunction with a HART® Modem, allows for remote communication with the Model 2000 transmitter for the purposes of configuration, set-up and diagnostics. See SMART LINK Installation, Operation & Maintenance Manual (M752) for complete details on the operation of remote communications with the Model 2000.

5.2 Settings & Adjustments

Caution: Changing configuration settings other than ZERO ADJUST [SENSOR POSIT-N ADJUST] will void factory calibration

Be sure the "WRITE PROTECT" jumper is in position on the top of the Model 2000 transmitter (See Figure 8).

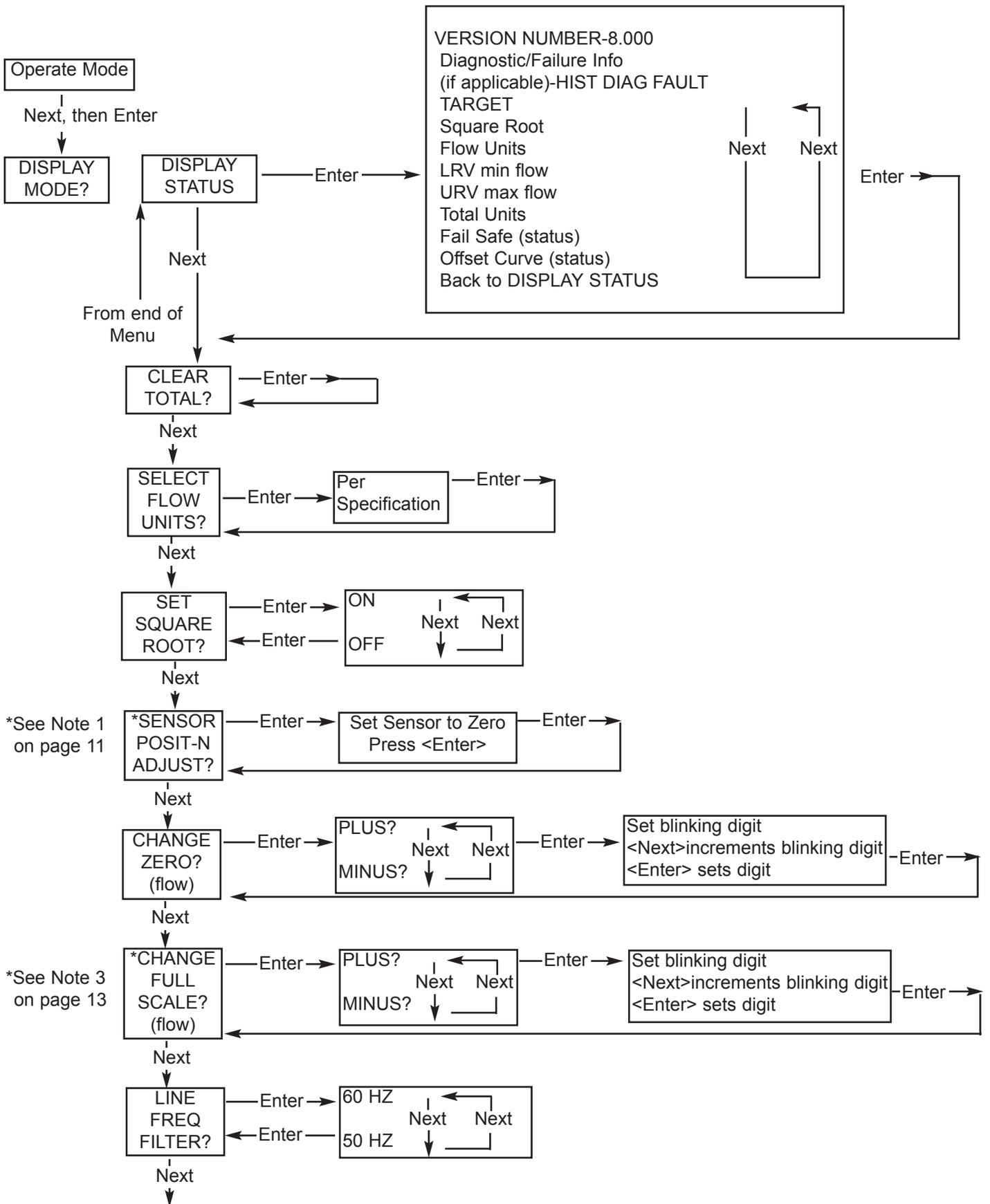
Adjustments can be made using several different techniques. The calibrations and adjustments can be made via the Two-line Plug-in Display, PC, or HC 275 communicator. Any one of these must be available in order to calibrate or adjust the meter.

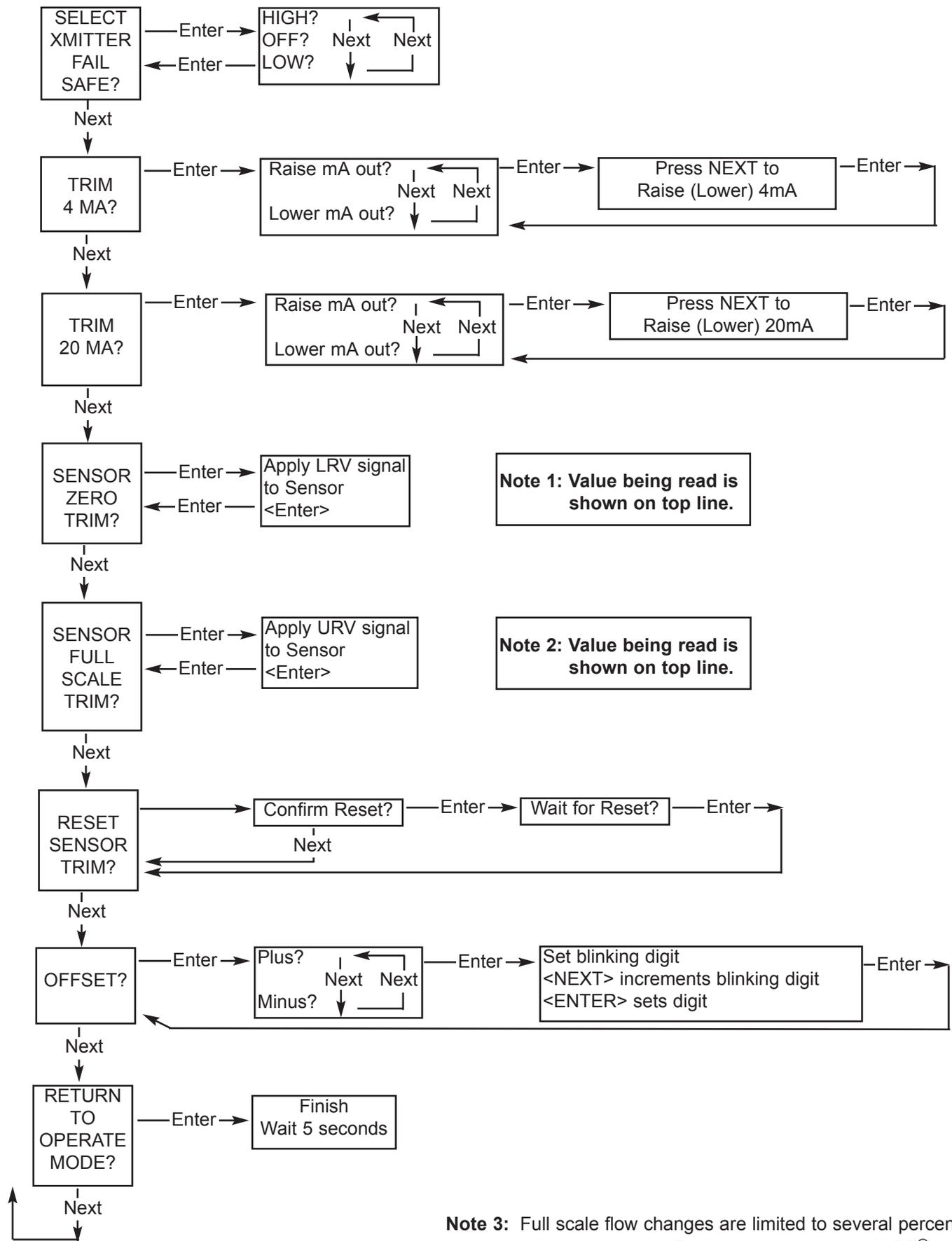
The plug-in display can be transported for use from meter to meter. It is recommended that at least one be purchased when procuring a meter with the Model 2000.

5.2.1 Display Flow Chart

To scroll through choices horizontally, use <Enter>

To scroll through choices vertically, use <Next>





Note 1: Value being read is shown on top line.

Note 2: Value being read is shown on top line.

Note 3: Full scale flow changes are limited to several percent using the display. For large changes, the HART® Model 275 Communicator or SMART LINK software PC & LSK HART® Modem must be used.

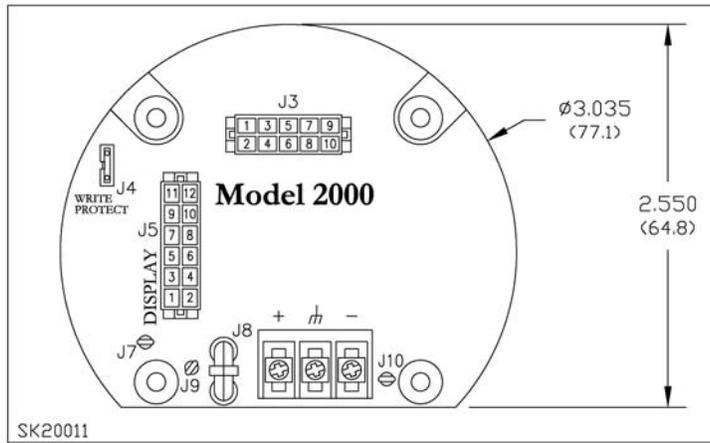


Figure 8. Model 2000

DISPLAY MODE CONFIGURATION

To configure the Model 2000 using the Display Mode, the Two-line, Plug-in Display / Keyboard is required (along with the Display Adapter Board). This makes reconfiguration or resetting the Model 2000 transmitter very simple. Without the use of a calibrator, or any other tools, the Model 2000 can be set up for new range limits and engineering units much like one would set a digital watch.

Caution: Other than ZERO ADJUST [SENSOR POSIT-N ADJUST], Sensor Zero Trim and Full-Scale Trim require special calibration equipment and procedures that should only be performed by factory qualified or trained personnel.

Note: When changing a setting in program mode, after approximately three (3) minutes without making another change, the Model 2000 will return to operate mode and save the change. If multiple changes are made, the Model 2000 will return to operate mode and save the changes after approximately three (3) minutes *per changed item*. For example, if two settings are changed, the unit will return to operate mode after approximately six (6) minutes.

Entering the Display Mode

To start the Display Mode, first connect the Model 2000 to an appropriate DC power supply. With a standard factory configuration, the display should read a value on the top line with the lower line scrolling information. If programmed for displaying both, the top line will scroll back and forth between rate and total, correspondingly indicating units of flow rate or total on the bottom line.

For Example

34.780	34.780	34.780	34.780
0%---100%	0%---100%	0%---100%	0%---100%
2000	Xmtr	GAL/M	GALLONS

Press the NEXT and then the ENTER key on the display board. The display should read:

DISPLAY	MODE?
---------	-------

To activate the NEXT and ENTER keys, a slow, deliberate push of the key is required! This prevents any casual, inadvertent activation of the transmitter into one of the configuration modes. The Display Mode 'rule-of-thumb' is if the answer to the question on the screen is 'NO' - press NEXT; and if the answer to the question on the screen is 'YES' - Press ENTER.

The answer to the 'Display Mode?' Question is 'YES' therefore press ENTER. A flow chart summarizing the operation of the Display Mode appears in on page 12.

Note: When more than seven characters are required to describe a function, the display keeps sequencing through two or more screens or may use common abbreviations. In this manual the sequencing of the display is indicated by placing the two or more parts of the message adjacently on the top line of the display in addition to the message on the lower display line.

Display Mode Configuration Menus

The display mode will allow the user to do the following:

- Review the Transmitter Set-up (DISPLAY STATUS?)
- Clear the Total (CLEAR TOTAL?) See Note 1.
- Select / Change Engineering Units (SELECT UNITS?)
- Select / Change Square Root (SET SQUARE ROOT?)
- Zero position adjustment of the sensor (SENSOR POSIT-N ADJUST?)
- Change the 4mA _Lower Range Value (CHANGE ZERO?)
- Change the 20mA _Upper Range Value (CHANGE FULL SCALE?)
- Set Line Frequency Filter (LINE FREQ FILTER?)
- Select Transmitter Failsafe (SELECT XMITTER FAIL SAFE?)
- Trim the 4mA Output Current (TRIM 4 MA?)
- Trim the 20mA Output Current (TRIM 20 MA?)
- Apply Zero (mv/V) No Flow Signal (ZERO SENSOR TRIM?)
- Apply Full Scale (mv/V) Flow Signal (SENSOR FULL SCALE TRIM?)
- Reset Applied Sensor to Original Factory Setting (RESET SENSOR TRIM?)
- Trim Display Value (OFFSET?)

Each of these functions is presented in sequence on the Two-line Display. If the indicated function need not be performed, press NEXT, and the next function is displayed on the screen. To perform any function press the ENTER key. This will cause additional screens to be displayed, which will enable you to perform the function. These are described in detail below and summarized on the flow chart found on page12.

Note 1: The integral two-line display has a maximum of six digits for the total displayed value. If exceeded, it will show a value to the right of the total: $E_1 = \times 10$; $E_2 = \times 100$; $E_3 = \times 1000$; etc. To see the exact total you can go to the setup mode in SmartLink and view the running totalized value. The total shown on the HART® Model 275 communicator also displays exact totalized value.

Note 2: SENSOR ZERO TRIM and SENSOR FULL SCALE TRIM are set at the factory. Changing these settings alters the meter's calibration. To return to factory settings use the RESET SENSOR TRIM. The SENSOR POSIT-N ADJUST procedure has to be performed to ensure any offset due to sensor position. If the factory settings are altered by continuously resetting the trim adjustments, the unit must be sent back to the factory for recalibration. This can be done in the field by trained personnel with the proper equipment.

Review Transmitter Set-up

Press NEXT then ENTER to get into the programming mode. Unit will display

DISPLAY MODE?

Press ENTER

DISPLAY MODE?

Press ENTER

The DISPLAY STATUS is the first function in the sequence. It displays the following information.

Press ENTER

DISPLAY STATUS

Press ENTER

VERSION NUMBER
(8 is displayed)

Press NEXT

NO DIAG FAULT
(Shows fault status no / yes) If faults have occurred, the unit will review the fault history.

Continuing to press NEXT takes you to the next parameter.

TARGET

SQ ROOT ON

(Shows square root math function as on or off)

GAL/M

(Shows units of measure)

Units of measure that can be selected include:

KG/M, GAL/M, L/M, IMPG/M, CU M/H, GAL/S, MGAL/D,
L/S, CUFT/S, CU M/S, IMPG/H, IMPG/D, KG/H, LB/M,
LB/H, STON/H, LTON/H, NCUM/H, NL/H, SCUFT/M, CUFT/H,
CU M/M, BBL/H, BBL/D, L/H, GAL/D, CUFT/M, PER FS

LRV

(Shows lower range value)

URV

(Shows upper range value)

TOTAL UNITS

GALLONS

(If TOTAL is to be displayed, engineering TOTAL UNITS based on flow rate units will appear)

FAIL SAFE

LOW

(Shows status of the fail safe selected HI, LO or OFF)

OFFSET CURVE

OFF

(Shows status of the offset curve ON or OFF. Up to 22 points for linearizing the output can be set into the unit.)

DISPLAY STATUS?

Press NEXT or unit will go back through the transmitter setup review. Press the next button until you get to

RETURN TO OPERATE MODE?

Press ENTER to return the unit to displaying data, press NEXT to go back to DISPLAY STATUS?

Press ENTER to go back through the Review Menu. Press NEXT to enter the transmitter setup menu.

5.2.2 Model 2000 Transmitter Setup (Quick Start)

Refer to the Display Flow Chart on page 12 or the SMART LINK software manual (M752).

Press NEXT then ENTER to get into the program mode.

Unit displays

DISPLAY MODE?

Press ENTER

Unit displays

DISPLAY STATUS?

Press NEXT

CLEAR TOTAL?

Press ENTER to reset the totalizer to zero. Press NEXT to go to the next menu sequence.

SELECT FLOW UNITS?

The SELECT FLOW UNITS? Function allows you to select the desired units of measure. Press NEXT to scroll and ENTER to use the selected units. Press NEXT to continue.

SQUARE ROOT?

Press ENTER to select. Press NEXT to select on or off. Press ENTER then NEXT to continue.

Sensor Zero Position Adjust (Quick Start)

Note: For greatest accuracy, there must be no flow in the line and the flowmeter at operating temperature when making the adjustment! The ZERO ADJUST [ZERO POSIT-N ADJUST] function allows you to adjust for sensor position after the meter is installed. The sensor in the flowmeter is sensitive to its mounting orientation.

SENSOR POSIT-N ADJUST?

Press ENTER The current value is read on the top line of the display. Several screens will scroll:

SET SENSOR TO ZERO ENTER TO CONT NEXT

Press ENTER and the transmitter will advise the user to wait approximately 30 seconds (if all settings are as specified to the factory, the equipment is ready for operation).

Note: When changing ZERO ADJUST [SENSOR POSIT-N ADJUST] in program mode, after approximately three (3) minutes without making another change, the Model 2000 will return to operate mode and save the change or scroll down until "Return to Operate?" - Press Enter.

Lower Range Value at 4mA

The CHANGE ZERO function allows the selection of the Lower Range Value (LRV).

0.00 0.00
CHANGE CHANGE?

Press ENTER

000.00
PLUS?

This indicates that the existing ZERO value is set to a 'plus' / positive value. The question mark '?' indicates that you must press ENTER to keep this value positive. Press NEXT to switch to a negative value and then press ENTER to accept. Repeatedly pressing NEXT will toggle between PLUS? and MINUS? After pressing ENTER to accept keeping the value positive, the display reads:

000.0
HUNDRD

The left most digit position will start blinking (shown here using a **different font**) asking if the Hundreds position needs to be changed. To change the 0 to a different value, press NEXT. The digit will increment 1 2 3 4 5 6 7 8 9 0. Stop pressing NEXT at the desired numeral and press ENTER to accept the numeral.

When the Hundreds numeral is selected, the Tens position will start blinking. Choose a desired numeral for the Tens position and the Ones position will start blinking. This process will continue until you have chosen a numeral for each choice. You will be returned to the CHANGE ZERO? prompt with the new 4mA value displayed on the top line.

The value choices are determined by the sensor full-scale value for a chosen engineering unit. Be certain to select your engineering units before changing the zero (4mA) value. In some cases, prompts for a 100K (One Hundred Thousand) will be displayed, while in the other case prompts for 1KTH (Thousandths) will be displayed.

Sensor - Change Full Scale; 20mA Value

Change Full Scale
100.00 100.00 100.00
CHANGE FULL SCALE?

Press ENTER to change the full-scale value. Changing the full-scale value utilizes the same procedure as Changing Zero - See above.

Note: Full scale flow changes are limited to several percent using the display. For large changes, the HART® Model 275 Communicator or SMART LINK software PC & LSK HART® Modem must be used.

Set Line Frequency Filter / Speed

The LINE FREQ FILTER function allows the user to set the 60 Hz / 50 Hz line filter. Press ENTER when prompted LINE FREQ FILTER? Press NEXT to scroll:

60 Hz?
50 Hz?

Press ENTER to select the desired filter mode.

Select Failsafe Report Value

The SELECT XMITTER FAILSAFE allows the user to choose the desired condition in case the transmitter is reporting a failure condition. Press ENTER when prompted SELECT XMITTER FAILSAFE? Press NEXT to scroll through:

HIGH? (23mA)
LOW? (3.6mA)
OFF?

Press ENTER to accept the desired failure mode.

Trim 4mA Output Current

TRIM 4 MA?

This allows trimming of the 4.00mA output current.

Note: This function is only for the purpose of adjusting the 4.00mA limit of the transmitter loop current to be exactly 4.00mA according to the plant's local standard. This is NOT for the purpose of ranging the transmitter.

If trimming the 4.00mA limit is desired, then press ENTER. The transmitter will now output a milliamp current equal to its internally set 4mA. This 4mA value should be read on an external meter and compared to a local standard. It is advisable to use a very good voltmeter to make these comparisons. It is very possible that the transmitter will be more accurate than a great many voltmeters. In this case, trimming will make the transmitter less accurate.

Once trimming the 4mA value has been selected, the display will alternate as follows:

RAISE MA OUT?

By pressing the NEXT key the display alternates:

LOWER MA OUT?

When it is decided whether to raise or lower the output current, press ENTER and the display will change to one of the following, depending on whether the raise or lower function has been selected.

NEXT=+ NEXT=-

Now, every time the NEXT key is pressed, the display blinks and the 4.0mA output limit decreases (-) or increases (+). The decrease or increase is approximately 3.5 micro ampere increments.

Note: The 4.00mA limit is factory calibrated to a precision standard. Using the Output Trim function voids the NIST trace ability of calibration. Do not arbitrarily trim the output unless a qualified and accurate local standard is available to measure the adjusted 4.00mA output. Also note that the 4.00mA limit should not be trimmed by more than about +50 μ A or transmitter operation may be impaired.

Once the desired trim is reached, pressing ENTER will return to one of the corresponding TRIM 4mA screens. At this point one may still go back and do further trimming of the 4.0mA limit by pressing the ENTER key or pressing the NEXT key changing to the next function.

Trim 20.0mA Output Current

TRIM 20 MA?

Trimming of the 20.00mA current limit is done exactly in the same manner as described for trimming the 4.0mA point. The same precautions apply. After completing the trim 20.0mA pressing the NEXT key brings up the display trim.

Apply Zero (Flow)

Note: The SENSOR ZERO TRIM has been set at the factory. **Do not attempt to change these values unless the proper equipment or factory trained personnel is available.** Changing these values can lead to inaccurate readings. If inadvertently changed, go to RESET SENSOR TRIM.

The SENSOR ZERO TRIM function allows the user to apply zero flow from the meter for determination of the 4mA output value. Press ENTER when prompted SENSOR ZERO TRIM? The value the transmitter is reading is displayed on the top line while APPLY LRV TO SENSOR THEN PRESS ENTER is scrolling on the lower line of the display. Press ENTER when the desired flow is applied or press NEXT to exit this function.

Apply Full Scale (Flow)

Note: The SENSOR FULL SCALE TRIM has been set at the factory. **Do not attempt to change these values unless the proper equipment or factory trained personnel is available.** Changing these values can lead to inaccurate readings. If inadvertently changed, go to RESET APPLIED FLOW SENSOR.

The SENSOR FULL SCALE TRIM function allows the user to apply flow for determination of the 20mA value. Press ENTER when prompted SENSOR FULL SCALE TRIM? The value the transmitter is reading is displayed on the top line while APPLY URV TO SENSOR THEN PRESS ENTER is scrolling on the lower line of the display. Press ENTER when the desired flow is applied or press NEXT to exit this function.

Reset Applied Flow Sensor

The RESET SENSOR TRIM function returns the 4mA and 20mA values applied through the SENSOR ZERO TRIM and SENSOR FULL SCALE TRIM back to the factory defaults. Press ENTER when prompted RESET SENSOR TRIM? Press ENTER to proceed when prompted CONFIRM RESET? Or press NEXT to exit this function.

Trim Display Value

The OFFSET function allows a zero shift offset to be entered into the transmitter. This shifts readings across the entire transmitter range by the amount entered. Press ENTER when prompted OFFSET? Choosing the offset value is done in the identical fashion as changing the zero and full scale values.

Return to OPERATE MODE?

Press ENTER to return to display.

6.0 MAINTENANCE / PARTS LIST

There is no required maintenance for the Model 2000 Two-Wire Transmitter. Replacement parts include:

Part #	Description
60527P015	Display Adapter
60527P016	Display
60380P600	Model 2000 without enclosure
60527G001	Model 2000 Integral for Standard
60527G002	Model 2000 Remote for Standard
60527G004	Model 2000 Integral for Gas *
60527G005	Model 2000 Remote for Gas *
60527G009	Software on CD
60527P017	LSK Modem RS232
60527P020	LSK Modem USB

* Applications require compensating 1530A computer.

7.0 TROUBLESHOOTING - ADDITIONAL WIRING INFORMATION

The Model 2000 two-wire transmitter is relatively maintenance free. The following are additional wiring diagrams that may further assist you in understanding the wiring of the transmitter. If you have problems or need assistance, please call Aaliant Repair at 800-778-9251.

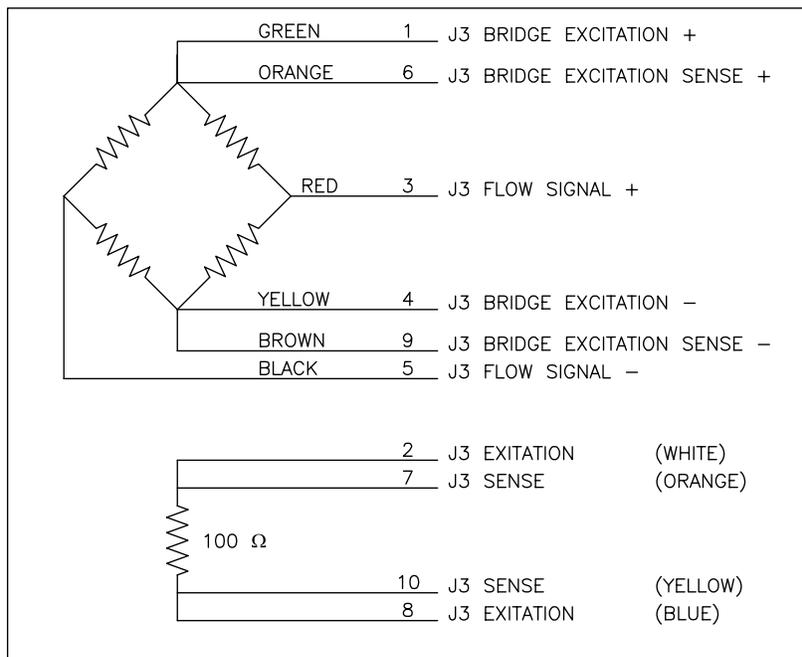


Figure 9. Connections to Flow Sensor

NOTES:



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