OMEGA ENGINEERING, INC.

HX80 SERIES
OPERATORS MANUAL

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MADE IN USA

1 YEAR WARRANTY

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HX80 SERIES

QUICK STARTUP GUIDE – Page 1

STARTUP

WHEN USING PROBE ONLY:

1. **Mount the Probe in position to measure the desired gas.**

2. **Connect Probe wiring by cutting off connector or using a mating connector, as shown below:**

ITEM	RIBBON CABLE WIRE #
Power Supply – Pos.	7
Power Supply – Neg.	1 (blue tracer)
Output 1 – Pos.	2
Output 2 – Pos.	6
Output 3 – Pos.	8
Output Common	4
Serial Output – TX	5
Serial Output – RX	3

Notes: Connect only the Outputs desired. See drawing in the HTPB Manual for further connection details.

Do not apply DC Power until all wiring is completed.

HX80 SERIES

QUICK STARTUP GUIDE – Page 2

WHEN USING PROBE WITH ELECTRONICS UNIT:

1. **Mount the Probe and Electronics Unit.**
2. **Connect cable from Probe to Electronics Unit (if applicable).**
3. **Connect Power Supply to Electronics Unit.**
4. **Connect Analog Outputs of Electronics Unit.**
5. **Connect Digital Output of Electronics Unit.**
6. **Connect Alarm Relays of Electronics Unit.**
7. **Connect RS-232 Serial Port of Electronics Unit.**

ITEM	CONN.	TERM.
Power Supply (+)	J8	2
Power Supply (-)	J8	1
Analog Out 1 (+)	J9	1
Analog Out 1 (-)	J9	2
Analog Out 2 (+)	J9	3
Analog Out 2 (-)	J9	4
Analog Out 3 (+)	J9	5
Analog Out 3 (-)	J9	6
Alarm Relay 1	J2	1
Alarm Relay 1	J2	2
Alarm Relay 2	J2	3
Alarm Relay 2	J2	4
RS-232 TX	J6	2
RS-232 RX	J6	3
RS-232 RTN	J6	5

Notes:
Connect only the Outputs desired. See the HX80 Manual for details.
Do not apply DC Power until all wiring is completed.

TABLE OF CONTENTS Page

LIST OF ILLUSTRATIONS Page

LIST OF TABLES Page

2.0 INTRODUCTION

2.1 GENERAL DESCRIPTION

The HX80 Series is a family of humidity probes and electronic modules that offer a variety of measurement parameters with high accuracy. In addition to Percent Relative Humidity (%RH), probes are available to also measure Temperature and Pressure. Electrical analog and digital outputs are provided for not only these measured parameters, but may be provided for microprocessor- computed parameters as well. These include parts-per-million by volume (ppmv), parts-per-million by weight (ppmw), grains of water per pound of dry gas (gr/lb), and others.

The HX80 system is designed for ease of installation and operation. Field-replaceable sensor modules have standardized outputs for interchangeability without recalibration. The power requirement is a common unregulated DC power supply. User-available electrical outputs include linear analog voltage (or optional current), a digital bi-directional serial port, and alarm relays. Mounting options include Wall Mount, Remote Mount, and Duct Mount configurations. Additional options include high temperature and high pressure probes. A remote or local Display Unit (Type DIS) is available, with a two-line LCD display, alarm relays, and three 4 to 20 mA electrical outputs.

Figure 3-1 Some of the Available HX80 Configurations

a. Stand-alone Probe

b. Remote Mount with Display Option

2.2 SPECIFICATIONS SUMMARY

(See Specifications for additional information)

2.2.1 STAND-ALONE PROBE

Analog Outputs: 0 – 10 Vdc (X3)

Digital Output: RS-232C

Power Supply: 18 to 30 Vdc, unregulated, 50 mA max.

RH Accuracy: +/- 1% nominal

Temp. Accuracy: +/- 0.5°C

Mounting: Cable Length: 6 feet

Fitting: ¾ inch stainless steel
NPT thermocouple fitting

Dimensions: Length: 8 inches
Diameter: ¾ inch

Materials: Housing: Stainless Steel
Filter: Sintered Stainless Steel (removable)

2.2.2 PROBE WITH ELECTRONICS UNIT

Analog Outputs: 4 to 20 mA (X3)

Digital Output: RS-232C, bi-directional

Alarm Relays: Form A (SPST, NO) X2

Power Supply: 18 to 30 Vdc unregulated, 50 mA max.

RH Accuracy: +/- 1% nominal

Temp. Accuracy: +/- 0.5°C

Electronics Housing Protection:
IP66 (NEMA 4X) Dust tight and moisture resistant

Table 2-1 HX80 Series, Standard Available Configurations

MODEL NO.	SENSOR ONLY	SENSOR WITH ELECTRONICS MODULE
HX85	**X**	
HXB85	**X**	
HXP85	**X**	
HX86		**X**
HXB86		**X**
HXP86		**X**
HX86N	**x**	
HX85A	**x**	
HX85BA	**x**	
HX85PA	**x**	
HX86A		**x**
HX86BA		**x**
HX86PA		**x**

2.3 HX80 SERIES MODEL DESCRIPTIONS

HX85 – A Humidity/Temperature probe providing RH, Dew Point, and Temperature outputs.

HXB85 – A Humidity/Temperature/Barometric Pressure probe providing RH, Temperature, and Pressure outputs.

HXP85 – A Humidity/Temperature/High Pressure probe providing RH, Temperature, and Pressure outputs.

HX86 – A Humidity/ High Temperature probe providing RH, Temperature, and Dew Point outputs, with remote Electronics Unit including Digital Display.

HXB86 – A Humidity/High Temperature/Barometric Pressure probe providing RH, Temperature, and Pressure outputs, with remote Electronics Unit including Digital Display.

HXP86 – A Humidity/High Temperature/High Pressure probe providing RH, Temperature, and Pressure outputs, with remote Electronics Unit including Digital Display.

HX86N – Identical to HX86, with Remote Electronics Unit, but with no Digital Display.

HX85A – A Humidity/Temperature probe providing RH, Dew Point, and Temperature outputs with an operating temperature up to 120C.

HX85BA – A Humidity/Temperature/Ba rometric Pressure probe providing RH, Temperature, and Pressure outputs with an operating temperature up to 120C.

HX85PA – A Humidity/Temperature/High Pressure probe providing RH, Temperature, and Pressure outputs with an operating temperature up to 120C.

HX86A – A Humidity/ High Temperature probe providing RH, Temperature, and Dew Point outputs, with remote Electronics Unit including Digital Display with an operating temperature up to 120C.

HX86BA – A Humidity/High Temperature/Barometric Pressure probe providing RH, Temperature, and Pressure outputs, with remote Electronics Unit including Digital Display with an operating temperature up to 120C.

HX86PA – A Humidity/High Temperature/High Pressure probe providing RH, Temperature, and Pressure outputs, with remote Electronics Unit including Digital Display with an operating temperature up to 120C

2.4 AVAILABLE OPTIONS

HX80-DIS – Remote electronics module with two-line LCD digital display, three 4 to 20 mA analog outputs, RS-232C, and two programmable alarm relays. This unit can be added to existing Probes in the field.

HX80-NDIS – Similar to HX80-DIS but without Digital Display

HX80- SENSOR – Field-replaceable sensor module for RH/Temperature. Interchangeability accurate to published specification.

HXP80-SENSOR – Field-replaceable sensor module for RH/Temperature/Pressure. Interchangeability accurate to published specification.

HXB80-SENSOR – Field-replaceable sensor module for RH/Temperature/Barometric Pressure. Interchangeability accurate to published specification.

HX80-CHAMBER – Sample chamber with inlet and outlet fittings.

Table 2-2 HX80 Series Sensor Actual Measurement Ranges.

MODEL NO.	OUTPUT 1	OUTPUT 2	OUTPUT 3
HX85	PERCENT RH	AIR TEMP.	DEW POINT
MEASUREMENT RANGE	5 to 95%	-20 to +70ºC	-60 to +30ºC
HXB85	PERCENT RH	AIR TEMP.	BAR. PRESSURE

MEASUREMENT RANGE	5 to +95%	-20 to +75ºC	10 to 1100 MB
HXP85	PERCENT RH	AIR TEMP.	ABS. PRESSURE
MEASUREMENT RANGE	5 to +95%	-20 to + 75ºC	0 to 200 psia
HX86	PERCENT RH	AIR TEMP.	DEW POINT
MEASUREMENT RANGE	5 to 95%	-20 to +115ºC	-40 to +60ºC
HXB86	PERCENT RH	AIR TEMP.	BAR. PRESSURE
MEASUREMENT RANGE	5 TO 95%	-20 to +115ºC	10 to 1100 MB
HXP86	PERCENT RH	AIR TEMP.	ABS. PRESSURE
MEASUREMENT RANGE	5 TO 95%	-20 to +115ºC	0 to 200 psia
HX85A	PERCENT RH	AIR TEMP.	DEW POINT
MEASUREMENT RANGE	5 TO 95%	-20 to +120ºC	-60 to +40ºC
HX85BA	PERCENT RH	AIR TEMP.	BAR. PRESSURE
MEASUREMENT RANGE	5 TO 95%	-20 to +120ºC	10 to 1100 MB
HX85PA	PERCENT RH	AIR TEMP.	ABS. PRESSURE
MEASUREMENT RANGE	5 TO 95%	-20 to +120ºC	0 to 200 psia
HX86A	PERCENT RH	AIR TEMP.	DEW POINT
MEASUREMENT RANGE	5 TO 95%	-20 to +120ºC	-60 to +40ºC
HX86BA	PERCENT RH	AIR TEMP.	BAR. PRESSURE
MEASUREMENT RANGE	5 TO 95%	-20 to +120ºC	10 to 1100 MB
HX86PA	PERCENT RH	AIR TEMP.	ABS. PRESSURE
MEASUREMENT RANGE	5 TO 95%	-20 to +120ºC	0 to 200 psia

NOTES: 1. THE STANDARD RANGES ARE FIELD PROGRAMMABLE VIA THE RS-232 PORT.

2. SEE TABLE 5-1 FOR STANDARD FACTORY SCALING.

3.0 INSTALLATION

3.1 MOUNTING THE PROBE

The Probe includes a stainless steel mounting sleeve, commonly called a thermocouple mount. It has a tapered male ¾-inch NPT pipe thread. The female mating fitting, user-supplied, should be mounted in a gas-tight manner to a flat surface of a duct or chamber wall containing the gas to be measured.

To install the mount and Probe:

1. Separate the two parts of the mounting sleeve.

2. Screw the front portion of the mounting sleeve (the tapered NPT fitting) into the pre-mounted mating fitting. Teflon™ tape may be used for a good seal. Do not over-tighten.

3. Insert the Probe into the rear portion, and screw this part of the mount into the previously mounted front portion, so that the Probe is gripped snugly. Do not over-tighten. As much of the Probe as possible should protrude inside the area to be measured, to avoid possible laminar flow errors.

If the optional sample chamber is to be used, simply screw it down to any flat surface, and connect ¼ inch OD tubing to the inlet and outlet compression fittings.

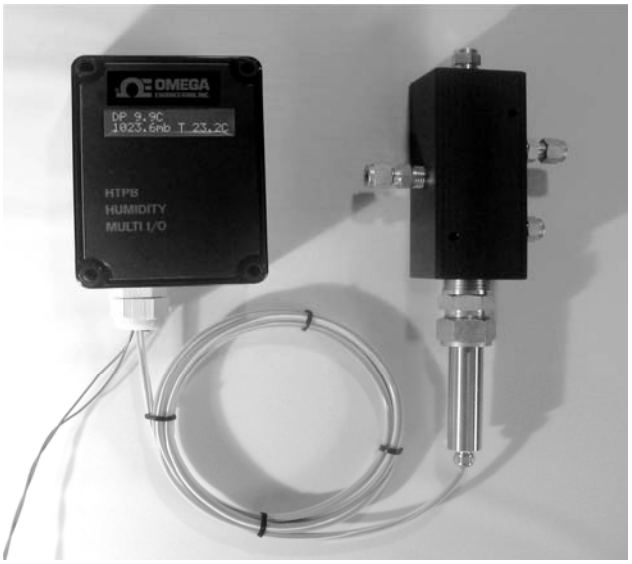


Figure 3-1, System with Sample Cell, ready for mounting

3.2 MOUNTING THE REMOTE ELECTRONICS MODULE

MOUNTING CONSIDERATIONS

1. If the Digital Display has been provided, is it easily visible?
2. Is the location convenient for routing electrical wiring?
3. Is the module within 6 feet (1.8 meters) of the Sensor location?

Use a small hammer to tap in the pins that hold the four corner mounting lugs in place. See Figure 3-2 below. Mount the box to a flat surface with screws or bolts through the 4 mounting holes.

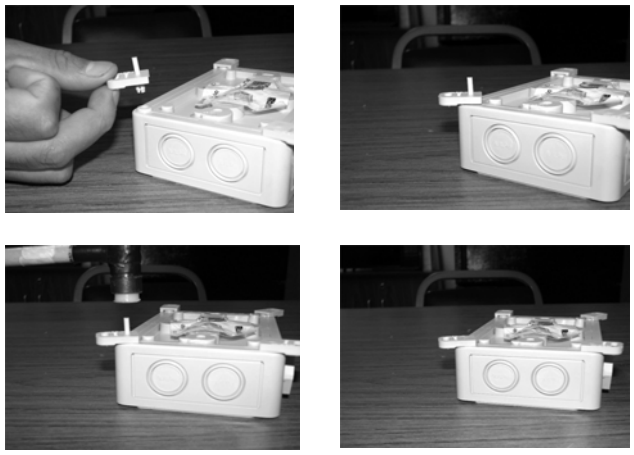


Figure 3-2 a,b,c,d
Installing Mounting Lugs

3.3 ELECTRICAL WIRING

3.3.1 PROBE ONLY

See Wiring Table 3-1 and Figure 3-3 below.

1. Connect Power Supply wiring as shown.

2. Connect the Analog Output wiring as shown. Three 0 to 10Vdc outputs are available. Connect Outputs 1, 2, and 3 as required.

3. Connect the RS-232 Serial Output if desired. Only 2 wires are required if the output is needed for transmitting information only. A third wire is added for bi-directional communications with the serial port.

4. Table 3-1 Hx80 Series Probe (with Ribbon Cable) Wiring Table

ITEM	RIBBON CABLE WIRE #
Power Supply – Pos.	7
Power Supply – Neg.	1 (blue tracer)
Output 1 – Pos.	2
Output 2 – Pos.	6
Output 3 – Pos.	8
Output Common	4
Serial Output – TX	5
Serial Output – RX	3

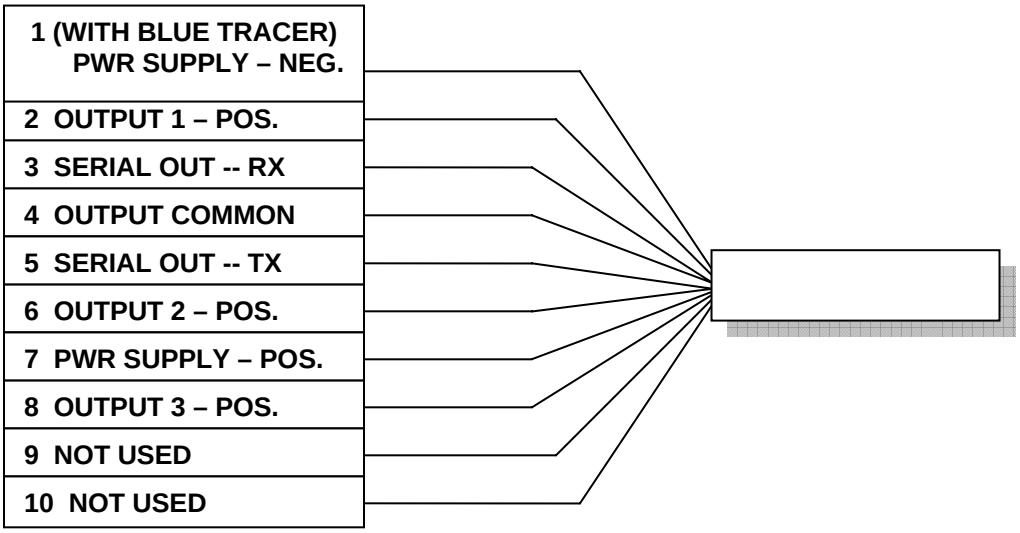


Figure 3-3 HX80 Series Probe (with Ribbon Cable) Wiring Diagram

Table 3-1a HX80 Series Probe (with Discrete Wires) Wiring Table

ITEM	COLOR CODE
Power Supply – Pos.	Yellow
Power Supply – Neg.	Green
Output 1 – Pos.	Brown
Output 2 – Pos.	Red
Output 3 – Pos.	Orange
Output Common	Black
Serial Output – TX	Blue
Serial Output – RX	White
Serial Common	Green

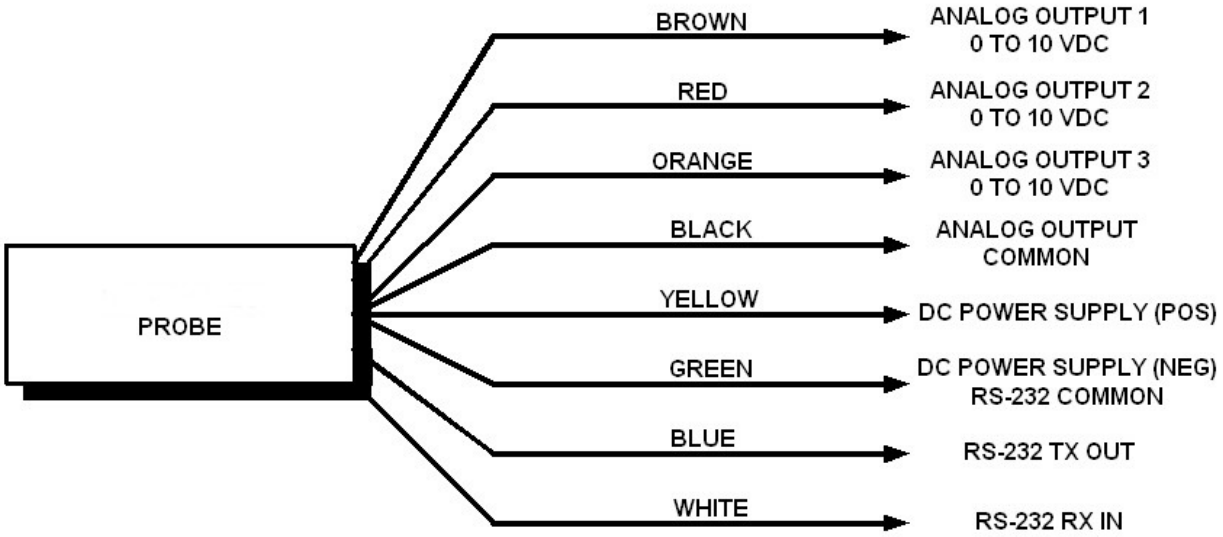


Figure 3-3a HX80 Series Probe (with Discrete Wires) Wiring Diagram

3.3.2 PROBE WITH ELECTRONICS MODULE

See Tables 3-2, 3-3, and Figure 3-4 below.

Notes:

1. **Cable bushings are shipped separately. Carefully tap out the desired knockouts, and mount the bushings.**

2. **We recommend that you route the Probe Cable through a bushing on the left. Route all other wiring through the bushing on the right.**

1. Run the cable from the Probe to the connector labeled Probe Input.

2. Wire the Power Supply as shown in Table 3-2.

3. Wire the three 4 to 20 mA Analog Outputs and Alarm Relays as shown in Table 3-2 if desired.

4. Connect to the RS-232C Serial Port at J6 if desired.

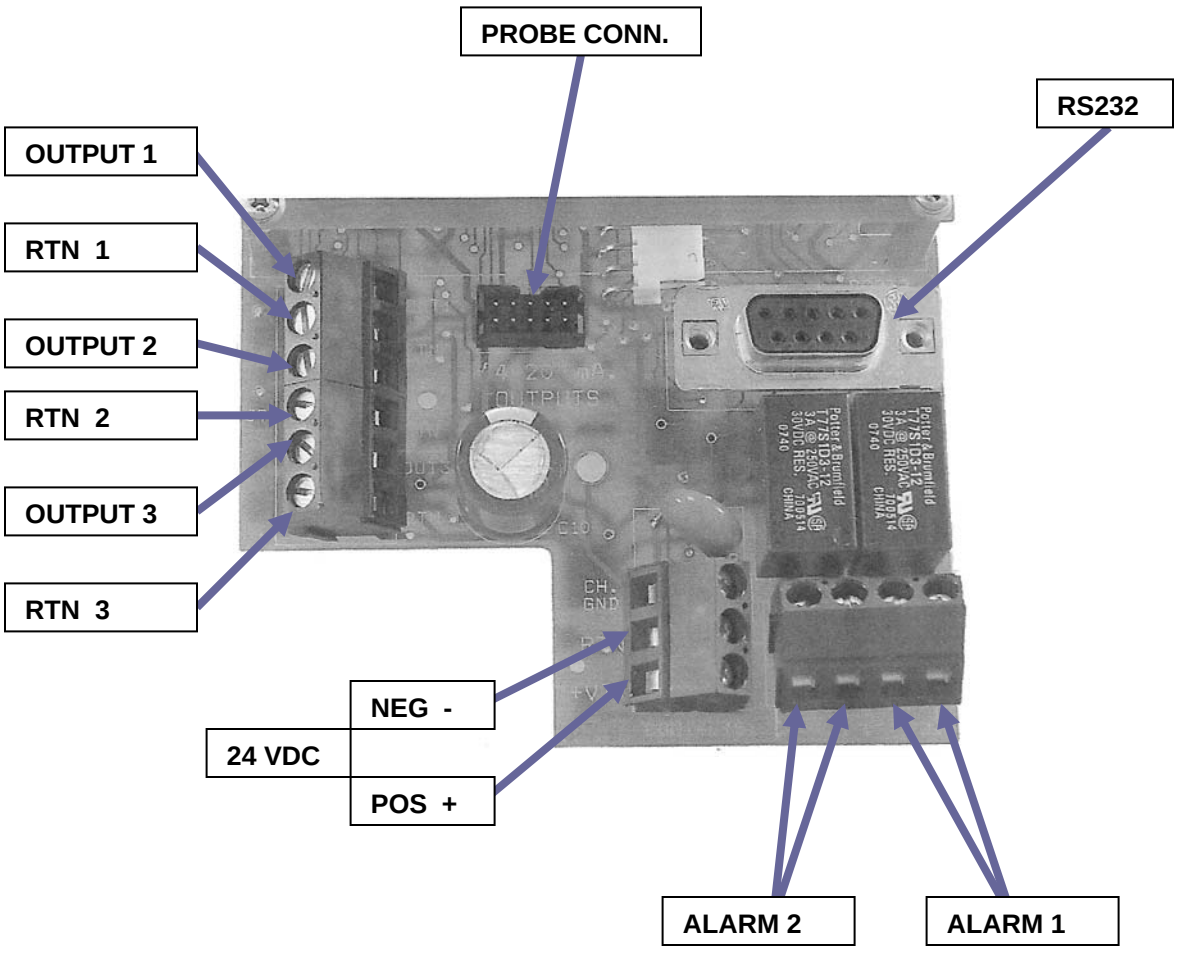
Table 3-2 Electronics Unit Wiring Table

ITEM	CONN.	TERM.
Power Supply (+)	J8	2
Power Supply (-)	J8	1
Analog Out 1 (+)	J9	1
Analog Out 1 (-)	J9	2
Analog Out 2 (+)	J9	3
Analog Out 2 (-)	J9	4
Analog Out 3 (+)	J9	5
Analog Out 3 (-)	J9	6
Alarm Relay 1	J2	1
Alarm Relay 1	J2	2
Alarm Relay 2	J2	3
Alarm Relay 2	J2	4

Table 3-3 J6 Wiring Table

DB-9 SERIAL CONNECTOR	ITEM
Pin 2	TX
Pin 3	RX
Pin 5	RTN

Figure 3-4 Electronics Unit Wiring



4.0 BASIC BLOCK DIAGRAM THEORY OF OPERATION

4.1 PROBE ASSEMBLY

See Figure 4-1, the Probe Assy. Basic Block Diagram.

The Probe Assembly is a stand-alone, completely self-contained measuring system. All units include the RH and Temperature Sensors, and some optional probes include a Pressure Sensor as well. The field-replaceable Sensor Circuit Board has standardized output levels for all three measured parameters. Therefore, boards may be quickly replaced while in operation without the need for recalibration, maintaining full system accuracy. The Microprocessor performs the system control, parameter calculation, and serial digital communications. Digital-to-Analog (D-A) conversion provides three 0 to 10 Vdc linear Analog Outputs corresponding to the measured and/or calculated parameters.

The serial digital RS-232 interface is bi-directional, allowing the user to not only receive and record measured information, but to remotely control output scaling, alarm relay setpoints, and other functions as well.

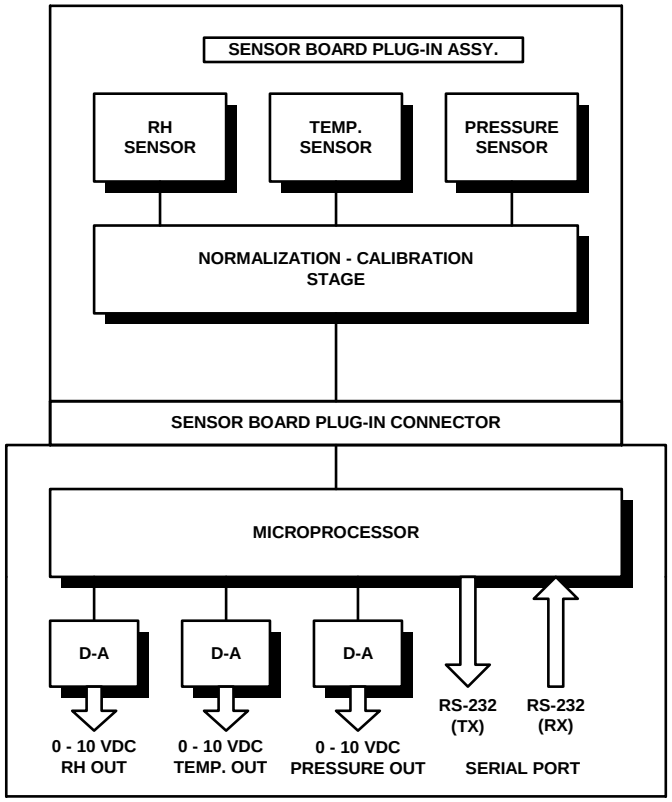


Figure 4-1 Basic Block Diagram, Probe Assy

4.2 HX80-DIS ELECTRONICS MODULE

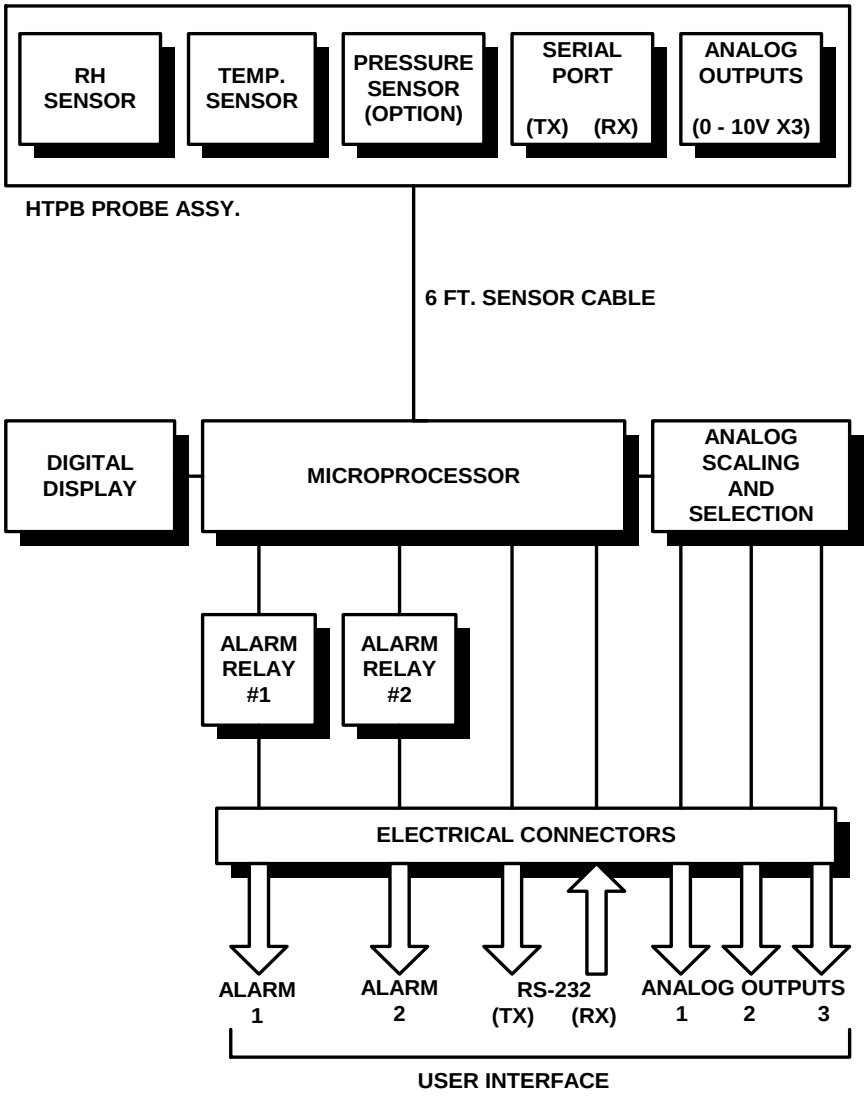
Although the Probe may be used as a stand-alone measuring device (HX85), it also may be connected to the type DIS remote display unit, for additional capability. This combination is called the HX86. A complete HX86 system consists of the Probe, the interconnecting 6 foot (1.8 meter) cable, and the electronics module. Outputs of the unit include a Serial Port, two Alarm Relays and three 4 to 20 mA Analog Outputs. A two-line LCD Digital Display is also included.

4.3 THE COMPLETE HX86 SYSTEM

Figure 4-2 is a basic block diagram of the complete Humidity, Temperature and Pressure measuring system. The remote Probe is connected, via the attached cable, to the electronics module. The system is completely controlled by the microprocessor in this module.

The three sets of analog voltage outputs from the Probe are routed through the Analog Scaling and Selection stage. The scaling of these output signals may be programmed by the user to any desired range by using the RS-232 Serial Port. The bi-directional RS-232 is brought out to a connector in the electronics module. The user can also program the two Alarm Relay set points via this digital interface. The built-in LCD Digital Display, which provides information on all measured parameters, is also controlled by the microprocessor. In addition, the microprocessor is used to calculate other parameters than those directly measured by the sensors in the Probe. These may be shown on the Digital Display, and they are also available on both the analog and digital (RS-232) outputs. The Alarm Relays may also be set for these calculated values.

Figure 4-2 System Basic Block Diagram



5.0 OPERATION

5.1 INITIAL BENCH TESTING

New units may be tested on the bench before installation, if desired.

For units consisting of the Probe only –

1. Connect a proper Power Supply to the correct wires.
   Caution: Observe polarity!

2. Using a DC Voltmeter, measure the 0 to 10 Vdc Output and confirm that it corresponds to the room condition. (Humidity, Temperature, etc.)

For systems consisting of the Probe and the Electronics Unit –

1. Connect the Probe to the Electronics Module.

2. Connect a proper Power Supply to the correct terminals.
   Caution: Observe polarity!

3. Measure the 4 to 20 mA Output as above, or read the Digital Display. Confirm that the reading corresponds to the room condition. (Humidity, Temperature, etc.)

5.2 NORMAL OPERATION

Note:

This section assumes that all required electrical wiring and mounting has been completed. See the Installation section for further information if necessary.

Use of the HX80 series of probes is extremely simple. There are no controls to operate during normal use, as these devices are designed for long-term unattended operation. With the Analog Outputs, Digital Outputs, and/or Alarm Relays connected to a Data Acquisition System, Recorder, Process Controller, Computer, or Terminal, the user has only to periodically monitor the system for normal operation.

5.3 FACTORY DEFAULT RANGES

The scaling of the default measurement ranges may be changed in the field via the Serial Port if required. See Section 5.4 below for range-changing instructions.

The following ranges are set at the Factory. They correspond to the three separate 0 to 10 Vdc analog outputs that are provided. The scaling of these ranges may be changed in the field via the Serial Port if required.

Table 5-1 Standard Output Scaling

MODEL	R.H.	TEMP.	PRESSURE	DEW POINT
HX85/HX85A	0 to 100%	-20 to 80°C/120 °C	N/A	-60 to 40˚C
HXB85/HX85BA	0 to 100%	-20 to 80°C/120 °C	750 to 1100 mb	
HXP85/HX85PA	0 to 100%	-20 to 80°C/120 °C	0 to 200 psia	
HX86/HX86A	0 to 100%	-20 to 120°C	N/A	-60 to -40˚C
HXB86/HX86BA	0 to 100%	-20 to 120°C	750 to 1100 mb	
HXP86/HX86PA	0 to 100%	-20 to 120°C	0 to 200 psia	
HX86N	0 to 100%	-20 to 120 °C	N/A	-60 to -40˚C

Notes:

1. Although the Factory default range for the HXB85, HX85BA, HXB86 and the HX86BA is 750 to 1100 mb, it can be reprogrammed in the field over a range of 10 to 1100 mb.

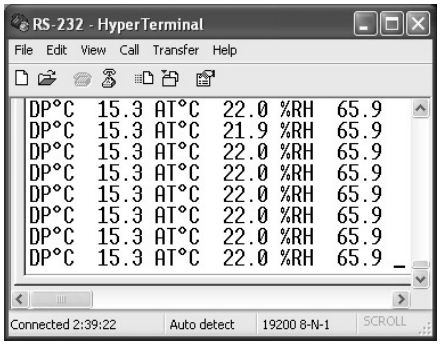
2. If you have the Type DIS Humidity Multi-I/O accessory, the Analog Outputs are 4 to 20 mA.

5.4 USING THE RS-232C SERIAL PORT TO PROGRAM YOUR SETTINGS

5.4.1 SERIAL PORT SETUP

Plug a standard RS-232 cable into the DB-9 connector on the circuit board in the Type DIS Humidity Multi I/O Electronics Unit. Plug the other end into your terminal or computer. Use a Terminal Emulation program such as Hyperterminal. Program the Hyperterminal settings as follows:

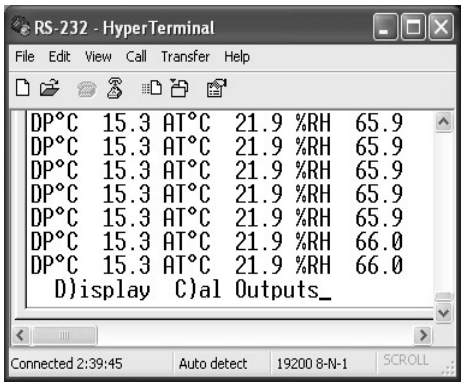
- Baud Rate: 19.2K
- Data Bits: 8
- Parity None
- Stop Bit 1
- Flow Control None



You should now see flowing data on your monitor, displaying the same information as the Multi I/O front panel Digital Display, with a rapid update rate. If you do not, check your serial port settings and connections.

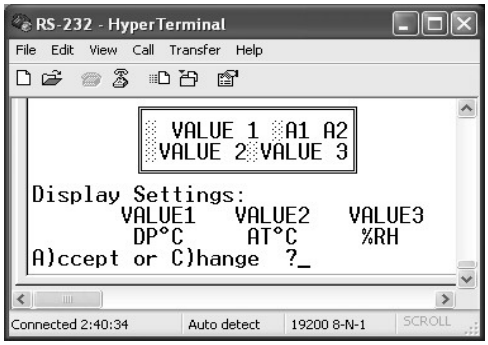
NOTE: WHEN PROGRAMMING ALPHABETIC CHARACTERS, USE UPPER CASE ONLY.

5.4.2 CHANGING THE DIGITAL DISPLAY



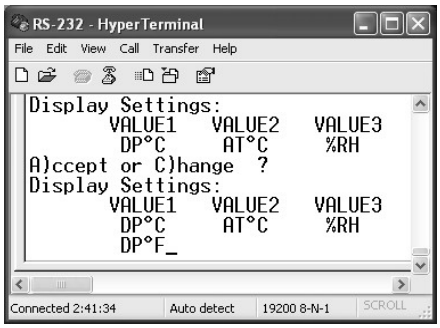
You can select any measured or calculated parameters to appear on the front panel Digital Display. Proceed as follows:

Press the "Escape" key on your keyboard. You will see "D)isplay C)al Outputs" as shown here.

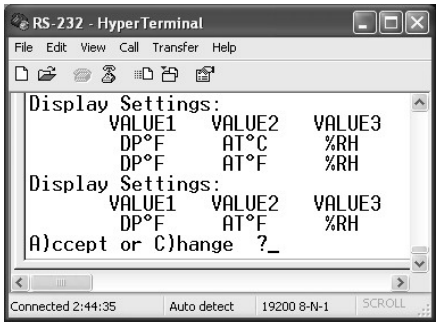


Press "D", selecting to change the Display. (We will C)alibrate the Outputs later.) You will then be given a choice whether to keep the present settings or to change them. For this example, we will C)hange them. Press

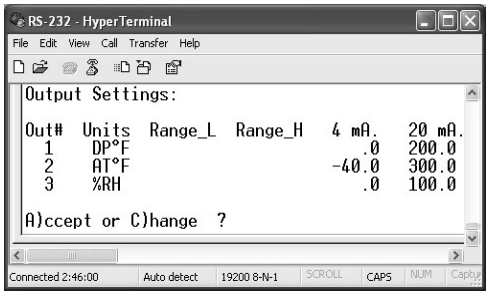
"C". You can then select the parameter to insert by cycling through the options using the Space Bar. In this case, we will change VALUE 1, the Dew Point reading, from DP°C to DP°F. Press Enter to save your change and advance to the next value. Next, do the same for Air Temperature. When completed, press Enter again to save and advance. For this example, we will choose not to change the %RH value. Instead, press "X" for eX)it.



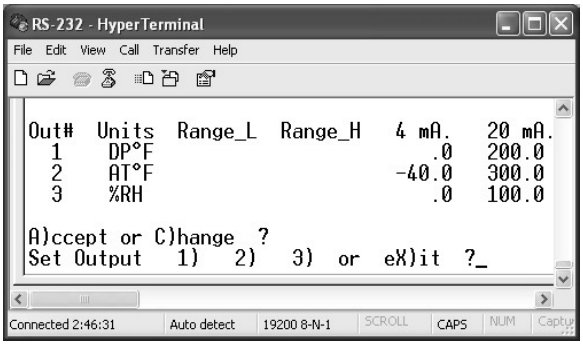
When programming is completed, press "A" to accept the changes.

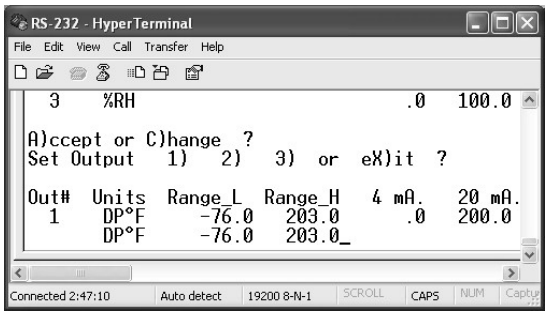


5.4.3 CHANGING THE OUTPUT RANGES



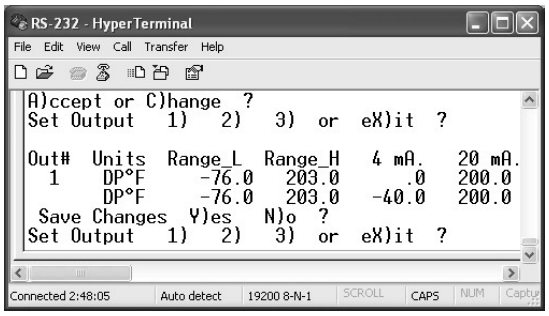
The next window to be seen will be the Output Settings screen. Here, you can modify the 4 to 20 mA Analog Output ranges. To enter this mode, press "C" for C)hange. You will see the Set Output screen shown here.

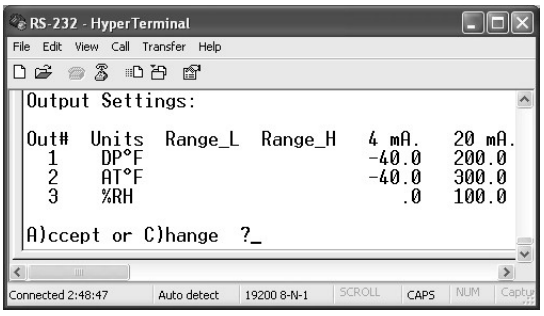




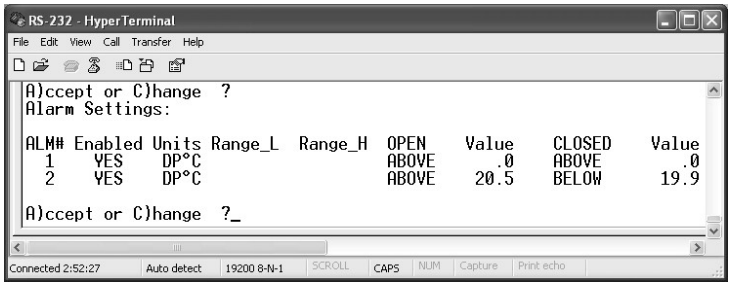
To change Output 1, select "1". You will see this screen, which shows the present settings for Output 1.

Example: We would like to change DP°F to a range of -40 to 200 °F. Press Enter. Enter -40. Press Enter again. Enter 200. Press Enter again. To Save the Changes, press “Y” for Y)es. To accept the changes, press “A” for A)ccept.





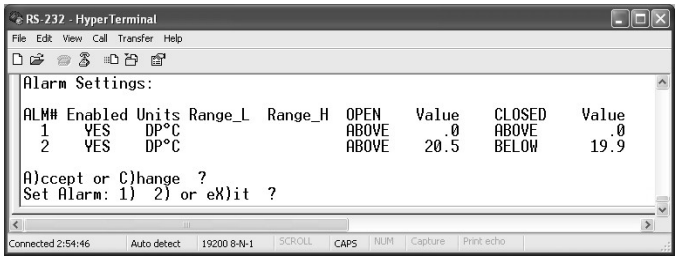
5.4.4 PROGRAMMING THE ALARM RELAYS



The system will then step to the Alarm Relay mode. The two relays are Form A, (single-pole, single-throw), normally open. You can independently program the “ON” point and the “OFF” point for each relay. To enter the menu, press “C” for C)hange.

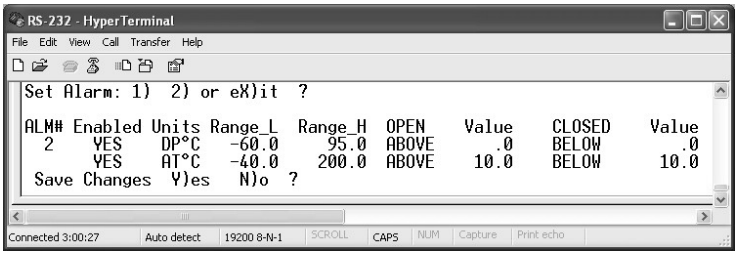
We would like to change Alarm 2 to these parameters:

Open > a reading of 10 °C
Close < a reading of 10 °C

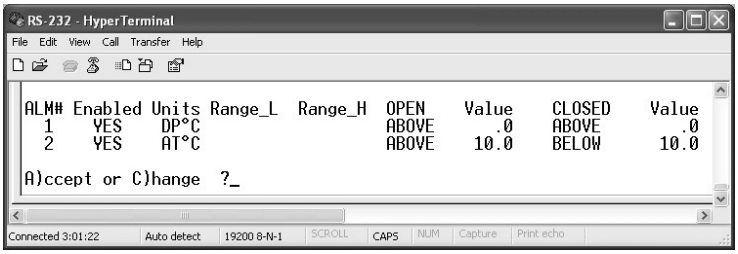


NOTE: IN ACTUAL OPERATION YOU SHOULD PROGAM IN A SMALL OVERLAP, SO THAT THE RELAY DOES NOT CHATTER WHEN THE MEASURED READING IS EXACTLY AT THE SETPOINT. THIS IS CALLED “HYSTERESIS.”

Press “2” to set Alarm 2. You will note that Alarm 2 is set for Air Temperature, AT°C. Under OPEN, insert 10 and press “Enter.” Under CLOSED, insert 10 and press “Enter.”



You will be asked to Save the Changes. Press “Y” for Y)es.



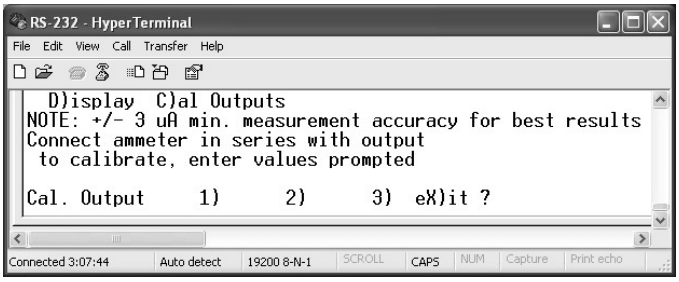
Then, press “A” for A)ccept.

The program will then automatically return to the normal mode, displaying data that is continuously updated.

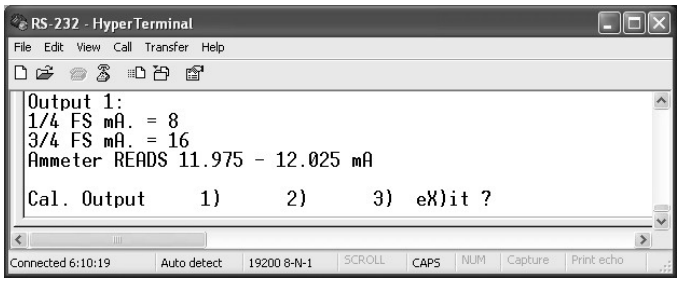
5.4.5 CALIBRATING THE ANALOG OUTPUTS

If you have a precise milliammeter, you can easily calibrate the three 4 to 20 mA analog outputs. In order to utilize this convenient capability, connect the meter in series with one of the analog outputs and the load.

Press the “Escape” key on your keyboard, which will interrupt the data stream and give you the choice of D)isplay or C)al Outputs. Select “C”.



In order to calibrate Output 1, press “1”. You will then be able to insert the desired current value at the ¼ FS (25% of Full Scale) point and at the 3/4FS (75% of Full Scale) point. For 4 to 20 mA, 1/4FS is 8 mA, and 3/4FS is 16mA.



Insert these values, pressing “Enter” after each one. You will then see a range of what the milliammeter should read in order to attain the desired accuracy.

Then select “X” for eX)it. The system will now return to the normal data reading mode.

6.0 MAINTENANCE

6.1 SENSOR CIRCUIT BOARD

Inside the barrel of the Sensor probe, mounted directly at the tip, is the plug-in sensor circuit board. This board has been calibrated at the Factory for a standard output level. Since all boards have been calibrated for the same normalized level, they may be replaced in the field without the requirement for recalibration, while maintaining the full published system accuracy specification.

6.1.1 REPLACING THE SENSOR CIRCUIT BOARD

See Figure 6-1. For the HX85 and the HX86 series only, at the tip of the Sensor probe is a snap-ring, or retaining ring **(for the HX85A and HX86A series the filter cover is a scew on cover)**. It must be removed in order to gain access to the Sensor board. There is a groove at one end of the ring. Using a very small screwdriver or a small knife blade inserted into the groove in the retaining ring, lift it out of the machined groove in the inside of the sensor shield barrel. The ring can then be removed, allowing access to the interior of the sensor assembly.

Figure 6-1 Removing the Retaining Ring

6.1.2 REMOVING THE RETAINING COMPONENTS

Figure 6-2 shows the sequence of parts that must be removed in order to gain access to the sensor board. All are easily removed once the retaining ring is out. Store them carefully for re-installation later in the proper sequence.

The final item to be removed in the sequence is the plug-in sensor circuit board, which can be seen through the slot in the sensor shield. There is a small hole near the tip of the board to aid in removal. Inserting a small screwdriver in this hole and pulling upward gently, unplug the board from the socket built into the probe.

Note: The small humidity sensor can be seen mounted near the tip of the board. This is fragile. Take care not to break it during board removal or installation.

6.1.3 SENSOR REASSEMBLY

Carefully plug the new sensor circuit board into the socket, noting that it is installed at the correct angle and properly aligned. Using a small screwdriver in the hole near the tip, press it down sufficiently so that it is fully inserted in the socket.

Install the bushing in the direction shown in Figure 6-2. Then install the spring, O-ring, and the sintered filter. Finally, while pressing on the end of the sintered filter to compress the spring, snap the retaining ring back into the slot on the inside of the sensor shield. Be sure that it is inserted completely, so that it will securely retain the sensor components in place.

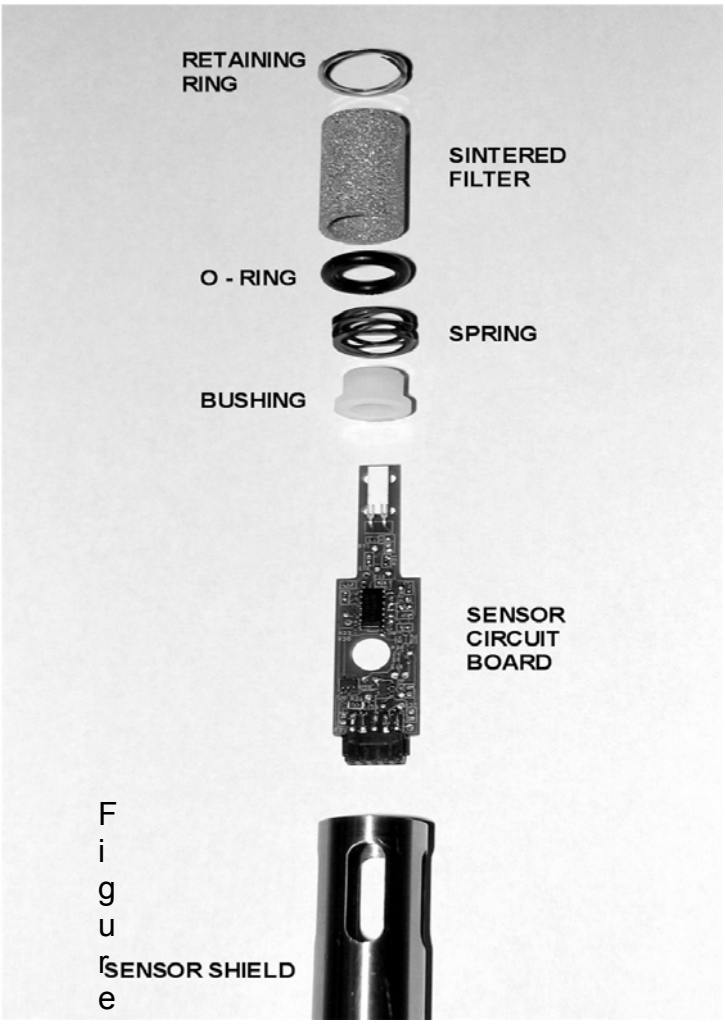
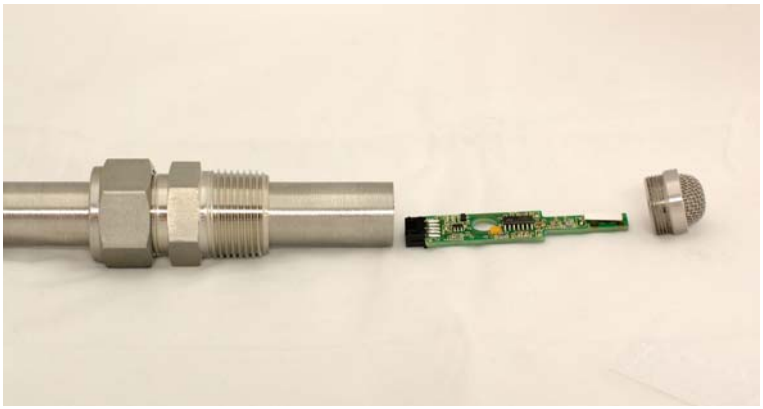


Figure 6-2 Sensor Exploded View
For the HX85 and HX86 series only, not for the HX85A or HX86A series



Sensor exploded view for the
HX85A or HX86A series

7.0 SPECIFICATIONS

Note: See Table 2-2 for <u>actual measurement ranges.</u>

HX85 and the HX85A (Sensor Only)
Measured Parameters – RH/Temp.
RH Accuracy – +/- 1% RH
Temp. Accuracy – +/- 0.5^{o}C
Output Information – RH, Temp., DP
Electrical Outputs – 0 to 10 Vdc (X3)
RS-232C

HXB85 and the HX85BA (Sensor Only)
Measured Parameters – RH/Temp./Barometric Pressure
RH Accuracy – +/- 1% RH
Temp. Accuracy – +/- 0.5^{o}C
Pressure Accuracy – +/- 5 mb
Output Information – RH, Temp., Pressure
Electrical Outputs – 0 to 10 Vdc (X3)
RS-232C

HXP85 and the HX85PA(Sensor Only)
Measured Parameters – RH/Temp./Pressure
RH Accuracy – +/- 1% RH
Temp. Accuracy – +/- 0.5^{o}C
Pressure Accuracy – +/- 0.75 psi
Output Information – RH, Temp., Pressure
Electrical Outputs – 0 to 10 Vdc (X3)
RS-232C

HX86 and the HX86A (Sensor with Electronics Module)
Measured Parameters – RH/Temp.
RH Accuracy – +/- 1% RH
Temp. Accuracy – +/- 0.5°C
Output Information – RH, Temp., DP
Electrical Outputs – 4 to 20 mA (X3)
RS-232C
Alarm Relays (X2)
Digital Display – LCD, 2-line

HXB86 and the HX86BA (Sensor with Electronics Module)
Measured Parameters – RH/Temp./Barometric Pressure
RH Accuracy – +/- 1% RH
Temp. Accuracy – +/- 0.5°C
Pressure Accuracy – +/- 5 mb
Output Information – RH, Temp., Pressure
Electrical Outputs – 4 to 20 mA (X3)
RS-232C
Alarm Relays (X2)
Digital Display – LCD, 2-line

HXP86 and the HX86PA (Sensor with Electronics Module)
Measured Parameters – RH/Temp./ Pressure
RH Accuracy – +/- 1% RH
Temp. Accuracy – +/- 0.5°C
Pressure Accuracy – +/- 0.75 psi
Output Information – RH, Temp., Pressure
Electrical Outputs – 4 to 20 mA (X3)
RS-232C
Alarm Relays (X2)
Digital Display – LCD, 2-line

Electrical Outputs
Systems with Probe only –
0 to 10 Vdc (X 3) @ 10 mA max.
RS-232C (bi-directional)

Systems with Probe and Electronics Unit—
4 to 20 mA (X3) into 500 Ω max.
Alarm Relay (X2) Form A (SPST, NO) rated at 3A/250 Vac
RS-232C (bi-directional)

Serial Output (All Units)
RS-232C to DTE device. 19.2 kilobaud, 8 bits data, 1 stop bit, no parity

Power Requirements

18 to 30 Vdc unregulated, 50 mA max.

Dimensions

Remote Sensor – Diameter: ¾ in. OD (1.9 cm)
Length: 8 inches (20.3 cm)

Cable Length – 6 feet (1.8 meters)
Consult Factory for longer lengths.

Electronics Module –

Outside Dimensions (HWD)

5.1 X 3.7 X 2.2 inches (13 X 9.4 X 5.6 cm)

Mounting Centers

4.52 X 3.11 inches (11.5 X 7.9 cm)

Sensor Pressure Rating

200 psia maximum

Sensor Sintered Filter

Material – Stainless Steel
Porosity – 40 microns

Notes