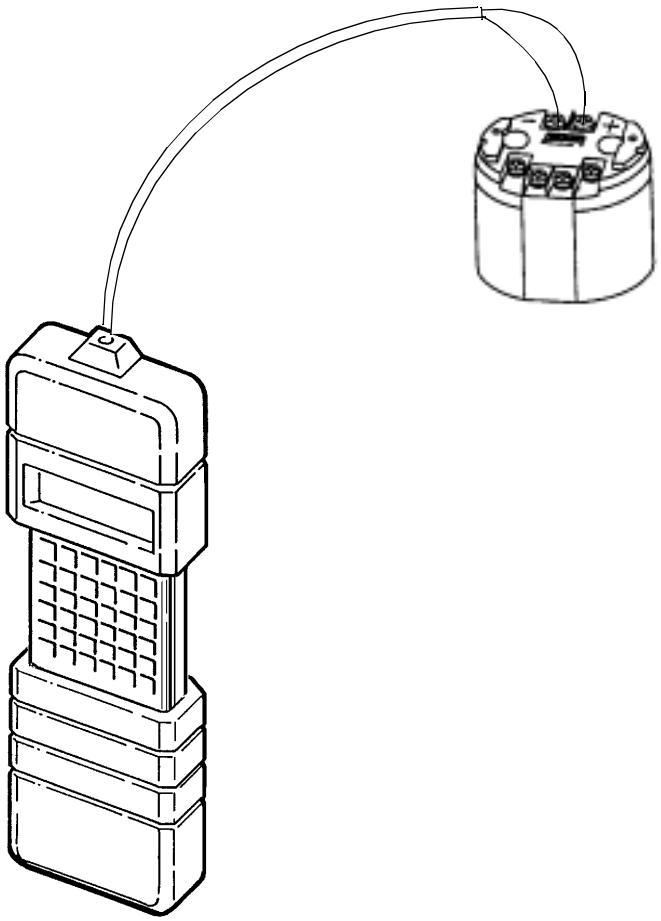
FOXBORO®

Instruction

MI 020-469
March 1998

I/A Series® Temperature Transmitter Model RTT20

Operation, Calibration, and Configuration Using Model HHT Hand-Held Terminal



MODEL HHT HAND-HELD TERMINAL

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1. Introduction

Revision Information

This document is based on Program Pak Part Number L0122EV, Revision D. The Part Number is shown on the Program Pak located in the upper slot on the back of the Model HHT Hand-Held Terminal (HHT). The revision letter is displayed whenever the HHT is turned on (e.g., *Universal HHT, Revision: D*).

The HHT can be used with other Foxboro Intelligent Transmitters such as Magnetic Flow, Pressure, and Mass Flow. Some of the menu items displayed on the HHT do not apply to the RTT20 I/A Series Temperature Transmitter. The applicable menu items are shown in Figure 1 and Figure 2.

This version of HHT software includes support for the IMT25, RTT20, and Sanitary Vortex transmitters as well as pressure transmitter "swap measurement" and "ReRange" changes.

In order to improve the speed of response between the transmitter and the HHT, the verification of the transmitter Tag Number and the uploading of the transmitter database upon entry into almost every HHT application has been eliminated. The verification of the transmitter Tag Number now occurs on only three occasions:

- Upon battery change or HHT Reset, forcing an initial read of a pak
- Before a "Write Data to Transmitter"
- The entry into any application after a "Reconnect" operation

Likewise, an upload from the transmitter to the HHT is performed on only three occasions:

- Upon battery change or HHT Reset, forcing an initial read of a pak
- Entry into any application after a "Write Data to Transmitter"
- Entry into any application after a "Reconnect" operation

CAUTION: With the elimination of the frequent verification steps, a new main menu option "Reconnect" has been added. If you connect the HHT to a new transmitter, or if you put the HHT down for two hours, two days, or two weeks, upon turning the HHT back on, the HHT still thinks it is connected to the previous transmitter! Therefore, it is essential that whenever the HHT is connected to a new transmitter, the "Reconnect" function be invoked in order to force a Tag Number verification and an upload from the transmitter.

Reference Documents

Additional information about the transmitter and the HHT are contained in the documents listed below:

- MI 020-466, *I/A Series Model HHT Hand-Held Terminal*
- MI 020-400, *I/A Series Model HHT Hand-Held Terminal Reference Operating Guide*
- MI 020-453, *RTT20 I/A Series Temperature Transmitter*
- MI 020-350, *Wiring Guidelines for Foxboro Intelligent Transmitters*

Functional Overview

Figure 1 shows the basic Hand-Held Terminal (HHT) menu structure for the RTT20 Temperature Transmitter. These menus give access to the procedures defined in Figure 2. A list of most commonly used standard functions that can be performed with the HHT appears on page 5, followed by a list of advanced functions.

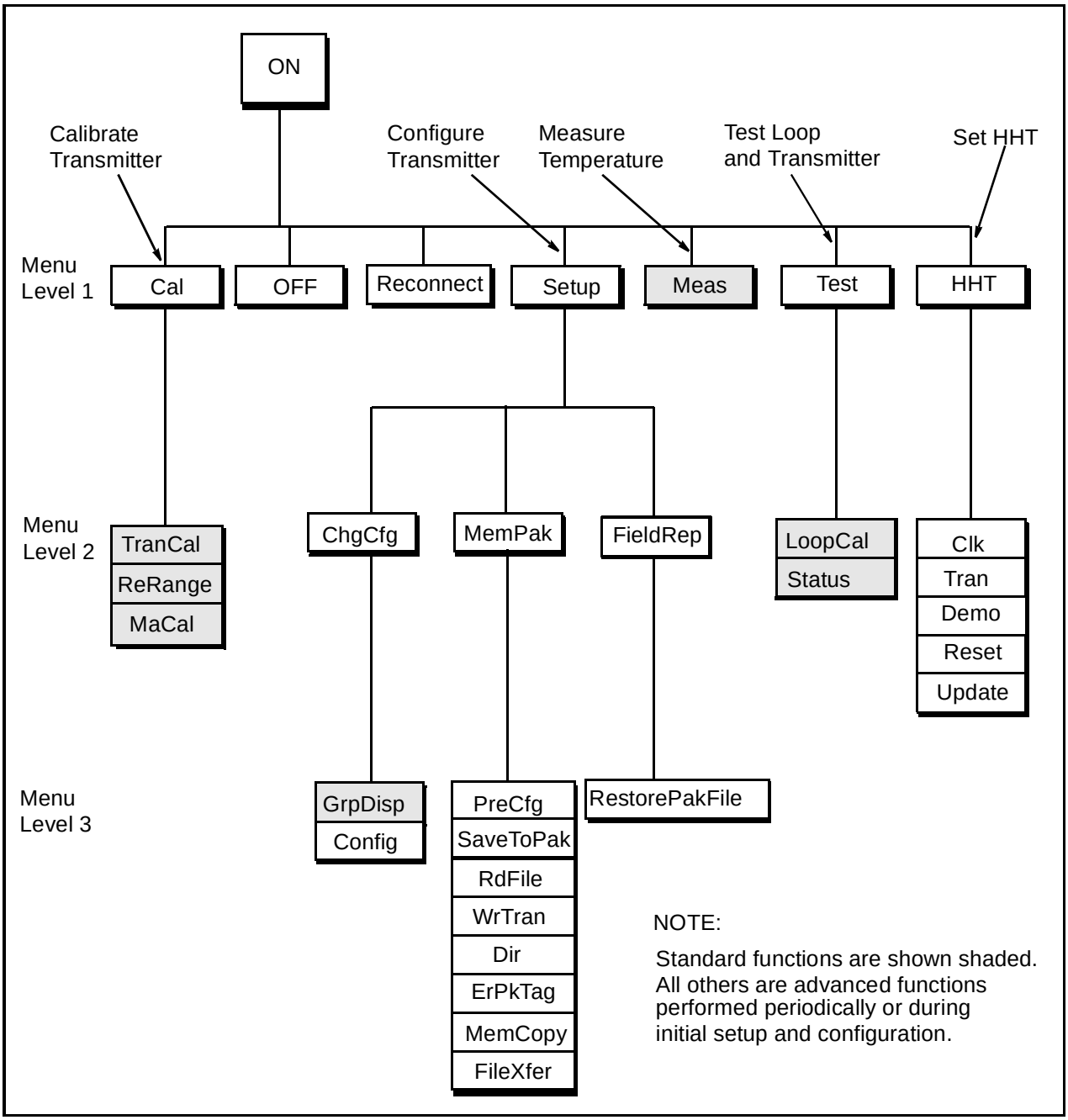

Figure 1. HHT Menu Structure for RTT20 Temperature Transmitters

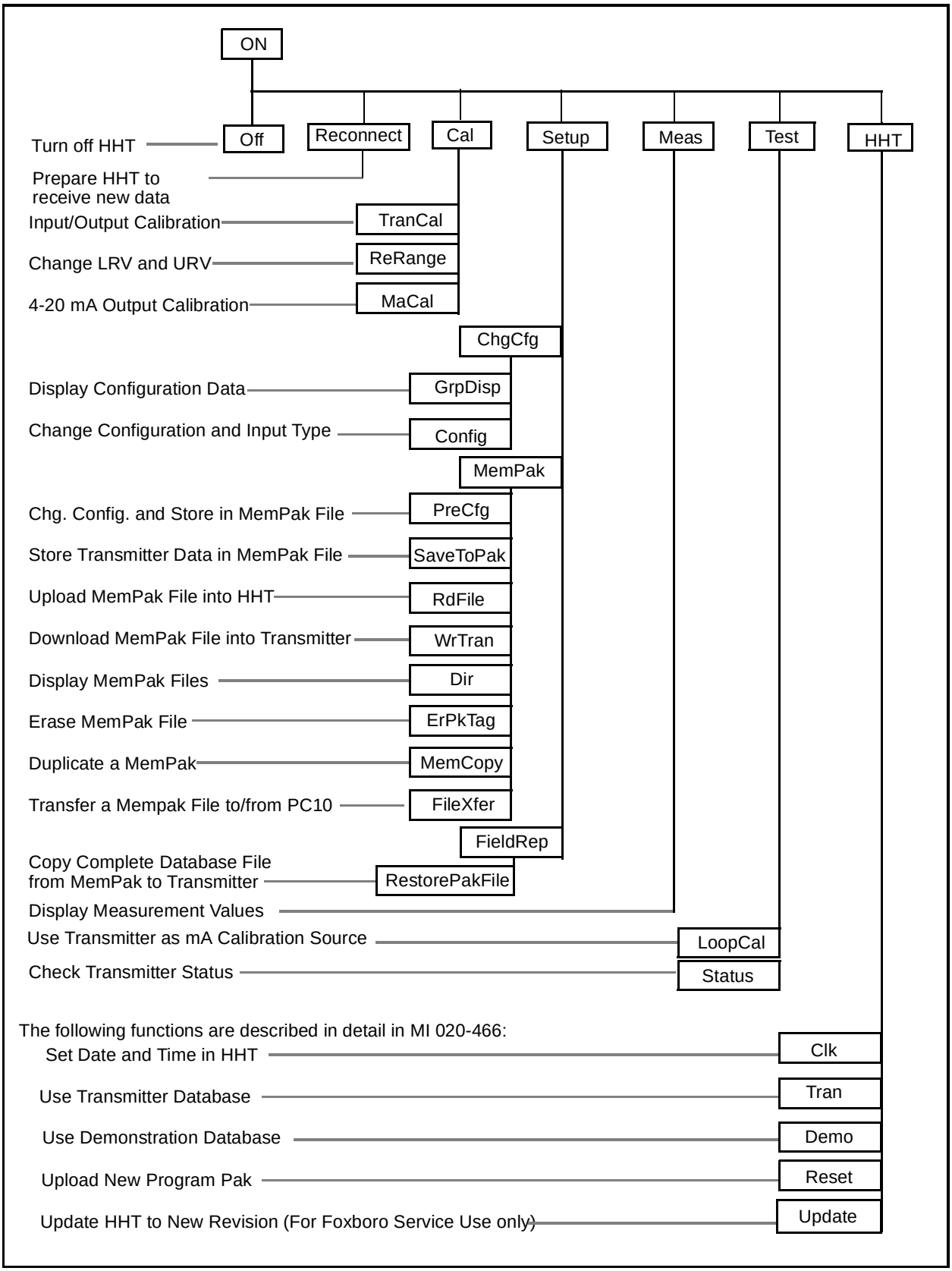

Figure 2. RTT20 Temperature Transmitter Procedures Accessed through the HHT Menu Structure

Standard Functions

Standard transmitter functions that can be performed using the HHT are listed here. Refer to Figure 2 for menu paths to these functions.

- Display process measurement, equivalent 4 to 20 mA output (when configured for 4 to 20 mA output) and transmitter temperature (cold junction).
- Rerange transmitter.
- Transmitter input calibration.
- Transmitter 4 to 20 mA analog output calibration.
- Check for transmitter diagnostic messages.
- Calibrate instruments in the loop using transmitter as mA calibration source.
- Display configuration data.

Advanced Functions

Advanced transmitter functions can be performed using the HHT. These functions are normally only performed periodically during initial setup and configuration. See Figure 2 for menu paths to these functions.

- Configure transmitter functions.
  - Tag Data (Number, Name, Location, Device Name)
  - Input Type (RTD, T/C, Other)
  - Linear Mode
  - Measurement Units (°F, °C, °R, °K, mV, Ohms)
  - mA Output Range (ReRange)
  - Output Mode (4 to 20 mA or Digital)
  - Failsafe Mode
  - Sensor Fault Detection (On or Off)
  - Electronic Damping
  - Sensor Validation
  - Intelligent Smoothing
  - Supply Frequency and Filtering
  - Local Display

- Perform Memory Pak functions.
  - Configure transmitter database for later downloading into transmitter (preconfiguration)
  - Store transmitter data (either user data or complete database) into Memory Pak
  - Display Memory Pak files
  - Load user backup data from Memory Pak into transmitter
  - Erase Memory Pak
  - Duplicate a Memory Pak
  - Load entire backup database from Memory Pak into transmitter (*RestorePakFile* function)
  - Transfer a file to a PC10 (not available for RTT20)

Connecting the HHT to the Transmitter

Figure 3 shows the HHT/transmitter connections. When using a 4 to 20 mA output, the total control loop resistance must be at least 200 Ω. If the resistance is less than 200 Ω, the HHT may not function correctly due to communication failures. The load resistor can be placed in either the positive or negative wiring leg.

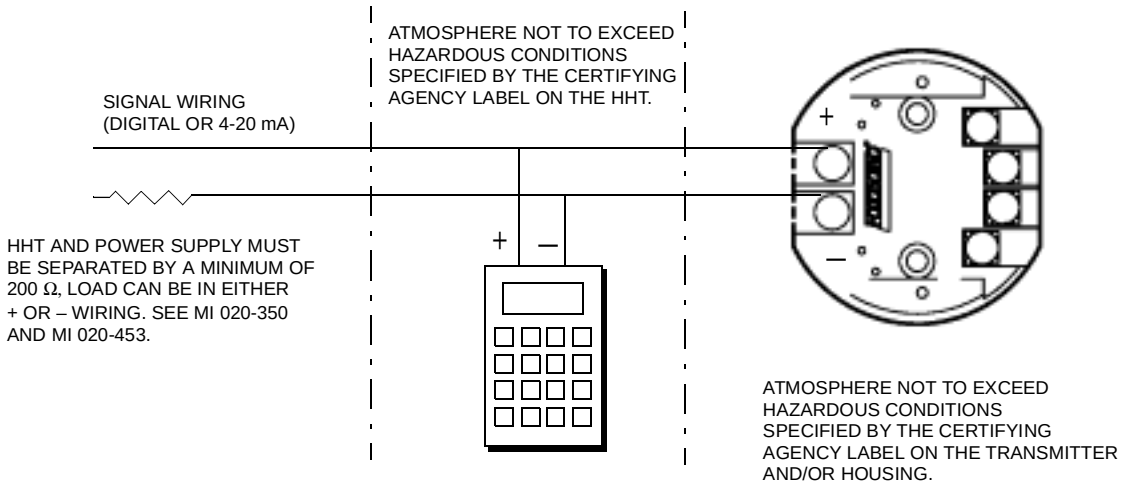

Figure 3. HHT Connections to the Transmitter

DANGER: Do not locate the Hand-Held Terminal (HHT) in a hazardous atmosphere for which it is not certified. SUCH ACTION CAN CAUSE AN EXPLOSION. The HHT is certified as specified on the agency plate attached to each HHT.

Common HHT Displays

HHT displays common to more than one procedure are described in Table 1. Additional displays that appear during a particular procedure are given with the description of that procedure.

Table 1. Common Displays

HHT Display	Meaning of Display	Required Action
Communicating Please Wait	The HHT is establishing communication with the transmitter.	None.
Demo Mode Y to Continue	HHT is informing you that you are operating in the demonstration mode.	Acknowledge by pressing Y. (To enter Demo mode from top-level menu, press H and then D.)
Initializing Data	Data required to perform the operation is being uploaded into the HHT.	None.
Is Loop in Man? Y=Cont / Q=Quit	*CAUTION: Put control loop in manual before continuing. Transmitter output is not being updated by the sensor. Leaving control loop in automatic may cause a process upset.*	*Make certain that control loop is in manual***.** Then, press Y to continue the procedure. Press Q if you want to discontinue the procedure.
INTELLIGENT XMTR RTT20 Rev: 1	Transmitter model and revision level of transmitter software.	None.
Put Loop in Auto Y to Continue	The control loop was put in manual mode during the procedure and can now be returned to auto control.	Put the control loop in automatic. Then, press Y to continue the procedure.
Uploading Xmtr Please Wait	Data is being uploaded from the transmitter into the HHT.	None.
Tag:TT102A Tag Correct? Y/Q	Before continuing, verify that the HHT is displaying the tag number of the desired transmitter.	Press Y to continue the procedure. Press Q to discontinue the procedure.
Xmtr Going Online	Transmitter is returning to online status after completing an operation.	None.
Xmtr Status is: Calibrate	Transmitter status is being set to perform transmitter calibration.	None.
Transmitter Mode Only	Operation is valid only when connected to a transmitter (not in Demo mode).	None.
HHT Database Cleared	HHT is ready for connection to a new transmitter.	None.
HHT Values May Differ from Xmtr	Values displayed during GrpDisp or Config may not be the current value in the transmitter	None.
Input Changed Check LRV/URV	Input sensor type or linearization mode changed and LRV/URV were reset.	Check LRV/URV.

2. Standard Procedures

Measurement Readings (Meas)

To display process measurement values on the HHT, select *Meas* from the menu. If the transmitter has been configured for a dual RTD with two sensors, both values will be displayed. The display alternates between:

1. A display of computed value (average, difference, or dual redundant) and mA output of the transmitter, and
2. The measurement values for both sensors. If the transmitter is configured for digital output, the first display shows the word *Digital* instead of the mA output.

NOTE: If the Failsafe feature is configured On and a fault occurs, the mA value shown is the failsafe output value.

If the transmitter is configured in single mode, the measured value and mA output value (or *Digital* if configured for digital output) are displayed together. The display alternates with a display of transmitter temperature in °C and °F.

Table 2 shows a measurement example for a transmitter configured to measure the average temperature measured by two DIN-type RTD 2-wire sensors. Note that only 2-wire RTDs can be configured for dual mode operation (transmitter cannot be configured for dual thermocouple).

Display Details

The HHT is not an ammeter and does not display the actual milliampere output value. The displayed value is calculated from the digital signal of the transmitter. The range is limited to 3 to 22 mA.

If the measured value exceeds the Upper Range Limit (URL) or if the transmitter has a status error, the HHT indicates this condition by inserting an asterisk between the measurement value and the measurement units as shown below

*200.00 *C*
*22.1*mA*

In all menu displays, the presently configured output mode of the transmitter is indicated by the symbols *mT* or *dT* on the bottom right corner of the display. *mT* indicates analog output mode (4 to 20 mA) and *dT* indicates digital output mode.

Table 2. Measurement Example

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of Selectable Options.	Press M to display measurement values or move the cursor to *Meas* with the arrow keys and then press EXE.
RTD1 = 200.00 C RTD2 = 215.00 C	*Top Line:* Measured value of Sensor 1. *Bottom Line:* Measured value of Sensor 2. Display alternates with next display.	To hold display on a desired measurement, press H. To continue alternating displays, press H again. Press Q when done.
207.50 C 10.2 mA	*Top Line:* Computed average of both sensors. *Bottom Line:* Transmitter Output in mA.	

Calibration Procedures (Cal)

The following standard calibration procedures can be performed with the Hand-Held Terminal:

- *ReRanging the Transmitter (ReRange)*
  This procedure is used to change the Lower Range Value (LRV) and Upper Range Value (URV) of the transmitter.
- *Input Device Error Compensation (TranCal)*
  This procedure is used to correct any inaccuracies in the measuring element.
- *4 to 20 mA Output Calibration (MaCal)*
  This procedure is normally not required as the transmitter has been accurately calibrated at the factory. The mA output can be trimmed, however, with this procedure if it is necessary to match the output to the output of a specific receiving device.

Select the desired procedure from the sections that follow.

Reranging the Transmitter (ReRange)

Use *ReRange* for changing the Lower Range Value (LRV) and Upper Range Value (URV) of the transmitter. Table 3 is an example of such a change. Table 4 lists the possible error messages that you may observe.

If you are also changing engineering units, change the units before performing ReRange.

Table 3. Rerange Example

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of Options.	Press C for *Calibrate*.
2T Quit TranCal Zero ReRange A=MaCal Default B=Zero Total Empty Pipe Detect Meas mT	Menu of *Setup* options. (Not all selections are applicable to the RTT20)	Press R for *ReRange*.
Chg LRV? Y/Q -200.00 C	Do you want to change the LRV?	Press Y to change LRV. Press Q if LRV is correct.
-200.00 C LRV=	Enter the new LRV.	Key in the new LRV. Press EXE.
Chg URV? Y/Q 850.00 C	Do you want to change the URV?	Press Y to change URV. Press Q if URV is correct.
850.00 C URV=	Enter the new URV.	Key in the new URV. Then press EXE.
Write Data? Y=Cont / Q=Quit	Option to Download Data into transmitter.	Press Y to download data into transmitter. Press Q to omit data download.
Is Loop in Man? Y-Cont / Q=Quit	*CAUTION: Put control loop in manual before continuing. Transmitter output is not being updated by the sensor. Leaving control loop in Automatic will cause a process upset.*	*Make certain that control loop is in manual*. Press Y to continue the procedure. Press Q to discontinue the procedure.
Xmtr going onLine	Indicates that the transmitter is going online in preparation for being placed in Auto mode.	None.
Put Loop in Auto Y to Continue	Reminder to return the control loop on Auto mode.	Place the loop in Auto mode. Then press Y to continue.
2T Quit TranCal Zero ReRange A=MaCal Default B=Zero Total Meas mT	Procedure completed. Returned to next higher level menu.	None.

Table 4. Rerange Error Messages

Error Message	Meaning of Message	Corrective Action
Err:Out of Range ReEnter Value	The value you entered is outside the limits of the sensor.	Enter a new value within the range limits of the sensor.
Span too Small ReEnter LRV/URV	The values entered for LRV/URV result in a span that is too small for the sensor.	Change LRV and/or URV as needed to give a span within the limits of the sensor.

Input Device Error Compensation (TranCal)

This procedure can be used to correct for inaccuracies in a measuring element. The transmitter input characteristics are based on the standard curve for the particular type of measuring element connected to the transmitter. If the characteristics of this device deviate from the standard curve, the TranCal function can add compensation to correct for this deviation.

You can retrieve standard input characteristics at any time by selecting the Disable calibration function from Menu level 3. Enable Calibration retrieves the adjusted characteristics and allows you to make additional adjustments.

The general procedure is as follows:

1. Enter the total number of points to be corrected (2 to 22).
   Enter calibration points starting at the low value and ending at the high value.
2. Enter the actual (observed) measurement value for the first point (LowPt).
3. Enter the desired reading for the first point (LowCor).
4. Repeat Steps 2 and 3 for all points to be corrected.
5. Download all sets of points into the transmitter.

A calibration example is shown in Table 5. The example below shows an example of steps 2-4 above:

If a transmitter needs to be calibrated at five points from 0 to 100°C (0, 25, 50, 75, and 100°C) and the actual measured values at these points were 0.23, 25.5, 50.6, 75.4, and 100.4, then the values to enter in the TranCal locations would be:

	Actual (Observed) Measurement	Desired Reading
Low Pt	0.23°C	0°C
2nd Pt	25.5°C	25°C
3rd Pt	50.6°C	50°C
4th Pt	75.4°C	75°C
5th Pt	100.4°C	100°C

For information on use of universal calibrators, RTD simulators and T/C simulators, please refer to Chapter 5 of MI 020-453.

Table 5. Transmitter Calibration Example

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press C for *Calibrate*.
2T Quit TranCal Zero ReRange A=MaCal Default B=Zero Total Empty Pipe Detect Meas mT	Menu of *Cal* options. (Not all selections are applicable to the RTT20)	Press T for *TranCal*.
3T Quit Enable Disable mT	Menu of selectable options.	Press E to enable calibration.
Enter Number of Points (1-22):	Prompt to enter the number of points you plan to use to define the calibration curve.	Enter the number of points needed to define the calibration curve you are using. For this example, press 2 and then press EXE.)
Chg LowPt? Y/Q 0	Do you want to change the value of the low point of the curve?	Press Y to change value. Press Q to leave it unchanged.
0 LowPt=	Shows present value of low point and prompt to enter new value.	Key in the desired value and press EXE.
Chg LowPt? Y/Q 0	Confirmation of the value you keyed in.	Press Q to accept the value. Press Y to change it.
Chg LowCor? Y/Q	Do you want to enter a corrected value?	Press Y to enter LowCor. Press Q if no correction needed.
0 LowCor=	Present value of low point correction and prompt to enter new value.	Key in new value (for this example, key in 1.5) and press EXE.
Chg LowPt? Y/Q 1.5	Confirmation of the value you keyed in.	Press Q to accept the value. Press Y to change it.
Chg 2ndPt? Y/Q 10.0	Same procedure as for changing low point values. Example: true measurement of 10 °C and transmitter reading of 9.5 °C.	Same procedure as for changing low point values.
10.0 2ndPt=		
Chg 2ndPt? Y/Q 10.0		
Chg 2ndCor? Y/Q		
10.0 2ndCor=		
Chg 2ndCor? Y/Q 9.5		

Table 5. Transmitter Calibration Example (Continued)

HHT Display	Meaning of Display	Required Action
Write Data? Y=Cont / Q=Quit	Prompt to store the data you entered in the steps above. Appears after the last point has been entered.	Press Y to write data and continue. Press Q to quit and return to menu.
Data Not Written Write Data? Y/Q	Appears if you press Q in the previous step.	Press Y to write data and continue. Press Q to quit and return to menu.
Is Loop in Man? Y=Cont / Q=Quit	*CAUTION: Put control loop in manual before continuing. Transmitter output is not being updated by the sensor. Leaving control loop in automatic will cause a process upset.*	*Make certain that control loop is in manual*. Press Y to continue the procedure. Press Q to discontinue the procedure.
Writing Data	Indicates that HHT is writing data into memory.	None.
writing Set 2 [4, 5, 8, 10. . .]]]	A series of messages that indicate the progress of the write procedure.	None.
Xmtr Going OnLine	Indicates that data has been stored and that transmitter is now going online.	None.
Put Loop in Auto Y to Continue	Prompt to place the loop in Auto mode.	Press Y to place loop in Auto mode and continue.
2T Quit TranCal Zero ReRange A=MaCal Default B=Zero Total Empty Pipe Detect Meas mT	Indicates the procedure is complete and that you have returned to the next higher level menu.	None.

4 to 20 mA Output Calibration (MaCal)

Since the 4 to 20 mA output signal has been accurately calibrated at the factory, recalibration is normally not required. The mA output can be trimmed, however, with this procedure if it is necessary to match the output to the output of a specific receiving device.

Connect a digital voltmeter and precision resistor in the output loop (see Calibration section of MI 020-453) and adjust the output per the example in Table 6 of this instruction.

Table 6. 4 to 20 mA Output Calibration Example

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of Options.	Press C for *Calibrate*.
2T Quit TranCal Zero ReRange A=MaCal Default B=Zero Total Empty Pipe Detect Meas mT	Menu of *Cal* options.	Press A for *mA Output Calibration*.
mA Meter Req'd Y=Cont / Q=Quit	4 to 20 mA ammeter must be connected to the transmitter. Do you want to continue?	To continue, connect 4 to 20 mA ammeter to transmitter output. Press Y. To discontinue procedure, press Q.
Is Loop in Man? Y=Cont / Q=Quit	*CAUTION: Put control loop in manual before continuing. Transmitter output is not being updated by the sensor. Leaving control loop in automatic will cause a process upset.*	*Make certain that control loop is in manual.* Then, press Y to continue the procedure. Press Q to discontinue the procedure.
Calibrate 4mA Output? Y/Q	Do you want to calibrate the 4 mA output signal?	Press Y to calibrate 4 mA output signal. Press Q to continue without calibrating 4 mA output signal.
Setting Output to 4mA	Output is being adjusted to corresponding value.	None.
3T Quit Inc Dec Small Med Lge mT	Output can be changed in following steps: Small (S)= ±0.0056 mA Med (M) = ±0.05 mA Lge (L) = ±0.5 mA	Press S, M, or L for desired step size. Press I to increase output or D to decrease output. Repeat until output is at desired accuracy. Press Q.
4mA Calib Complete	Calibration of 4 mA output signal has been completed.	None.
Calibrate 20mA Output? Y/Q	Do you want to calibrate the 20 mA output signal?	The steps for 20 mA output calibration are the same as those for 4 mA output calibration.

Table 6. 4 to 20 mA Output Calibration Example (Continued)

HHT Display	Meaning of Display	Required Action
Save Calibration Y=Cont / Q=Quit	Do you want to load the calibration data into the transmitter?	Press Y to load data into transmitter. Press Q to continue without loading data.
Writing CalData Writing CalDate	Digital and analog zero data; calibration date are being loaded into the transmitter.	None.

Standard Loop Test Procedures (Test)

The following standard tests can be performed using the HHT:

- Check for transmitter diagnostic messages (Status).
- Calibrate analog instruments in the loop (LoopCal).

Select the desired procedure from the following.

Check for Transmitter Diagnostic Messages (Status)

This procedure checks for transmitter diagnostic messages. Table 7 is an example of a correctly functioning transmitter. A complete list of diagnostic messages and their meanings is given in Chapter 6.

Table 7. Transmitter Diagnostic Messages Example

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options	Press T for *Test*.
2T Quit LoopCal Status XmtrPar Frequency A=SerialNo B=SelfTest mT	Menu of *Test* options.	Press S for *Status*.
Transmitter: OK	The transmitter is functioning correctly.	None. If a status error exists, it appears here.

Calibrating Analog Instruments in the Loop (LoopCal/mA)

This procedure is used with a transmitter configured for 4 to 20 mA output. The transmitter itself is used as a 4 to 20 mA calibration source for other instruments in the control loop, such as indicators, controllers, and recorders. The output signal displayed on the HHT can be in mA, engineering units, or percent of calibrated span. Table 8 shows an example where the transmitter is configured for -200.00°C to +850.00°C.

In this type of procedure the transmitter must be configured for 4 to 20 mA output. If the procedure is attempted with a transmitter with digital output configuration, “For Analog Only” will be displayed on the HHT.

Because the transmitter output signal is manually changed during this procedure, the control loop must first be put in manual. However, it is not necessary to isolate the transmitter from the process. The LoopCal procedure does not affect the calibration of the transmitter.

Table 8. Loop Calibration with 4 to 20 mA Output

HHT Display	Meaning of Display.	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press T for *Test*.
2T Quit LoopCal Status XmtrPar Frequency A=SerialNo B=SelfTest mT	Menu of *Test* options.	Press L for *LoopCal*.
3T Quit mA Digital mT	Option to select mA or digital output calibration.	Press M for *mA* output.
4T Quit EGU mA Percent mT	Option to select output in engineering units (EGU), mA, or Percent of Span.	Press E for output in EGU. Press M for mA. Press P for percent.
-200.00 to +850.00 C New Value=	*Top Line:* Present output value. *Bottom Line:* Prompt to enter desired output value.	Key in desired output value and press EXE.
Output = 0.000 C Q=Quit	Transmitter is outputting mA equivalent of 0 °C (7.04 mA).	Press Q to select another output value or end the procedure.

Displaying All Configuration Data (GrpDisp)

This procedure will sequentially scroll all transmitter configuration data. An example is shown in Table 9. To hold the display (stop scrolling) on a particular parameter, press H. To continue scrolling, press H again.

Table 9. Configured Data Display Example

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of Options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press G for Group Display. The displays scrolls through the last parameter.
Tag Number: TT102A	Transmitter Tag Number.	None. Press H to hold display. Press H again to continue.
Tag Name: Boiler Temp	Tag Name.	
Geo Location: Plant 3A West	Transmitter Location.	
Device Name: IAS124	Name of device or letterbug, if connected to I/A Series system. The default is *DevNam.*	
Transmitter: RTT20	Transmitter type is RTT20.	
Module Number: 960601.999	Electronic numbering system for Foxboro use only.	
Serial No./Date: Foxboro Use Only	Serial number of transmitter.	
Manufacture: 9/11/96	Date of manufacture.	
Last Cal Date: 9/11/96	Last calibration date.	
Calibrator: CALINT	Initials of calibrator.	
Input Type: PT100 DIN 751 RTD	Transmitter input type.	
Configured As: 4 Wire RTD	Current sensor configuration.	
Linear Mode: EGU	Output linear with temperature, mV, or ohms (*EGU*) or *Dewpoint* when using dewpoint sensor.	

Table 9. Configured Data Display Example (Continued)

HHT Display	Meaning of Display	Required Action
Lower Range Limit: –200.00 C	Lower limit of measurement range of the presently configured sensor.	None. Press H to hold display. Press H again to continue.
Lo Rng Value: -200.00	Low range value of measurement as presently configured, 4 mA.	
Up Rng Value: 850.00	Upper range value of measurement as presently configured, 20 mA.	
Upper Rng Limit: 850.00 C	Upper limit of measurement range of the presently configured sensor.	
Output Mode: 4-20 mA	Transmitter output mode is 4 to 20 mA. For digital output mode, display shows *Digital*.	
Sensor Fault Det OFF	Indicates whether output will be driven to a failsafe value if a sensor fault occurs.	
mA Failsafe: On	Indicates whether mA output will be driven to a failsafe value if an internal or sensor fault occurs.	
mA Failsafe Dir: DnScale	Indicates whether output will be driven upscale or downscale if a fault occurs.	
mA Failsafe Val: 3.60	Indicates the output value under fail-safe conditions.	
Electronic Damp: 0.5 Sec	Electronic damping as presently configured.	
Sensor Validatn 0.50 Sec	The lag time the microprocessor holds and compares the input to past inputs.	
Intel Smooth: 10.00 Sec	Digital filtering algorithm. None at 0, maximum at 30 seconds.	
Power Frequency: 60 Hz	Power frequency (50 or 60 Hz).	
Power Sply Filtr High	*High* indicates maximum filtering; *Standard* indicates fast response.	
Display Installd Three Line	Indicates which optional indicator (if any) is installed on the transmitter.	
Push Buttons: Enabled	Indicates whether configuration is enabled via the indicator pushbuttons.	

Table 9. Configured Data Display Example (Continued)

HHT Display	Meaning of Display	Required Action
Language: English	Language used in obtaining status and during configuration with optional indicator.	None. Press H to hold display. Press H again to continue.
Top Line Display EGU	Type of output units displayed in the optional indicator.	
Bottom Line Labl FOXBORO	Tag or other message on bottom line of 3-Line Indicator.	
Secondary EGU: C	Cold junction engineering units (°C or °F).	
3T Quit GrpDisp Config mT	Indicates procedure is complete and that you have returned to the previous menu.	None.

3. Advanced Procedures

The procedures described in this chapter are normally performed only periodically or during initial setup and configuration.

Changing Transmitter Configuration (Config)

The *Config* function permits you to change transmitter parameters such as tag data, output mode, input sensor type, measurement units, output range, damping factor, and failsafe mode.

When you select *Config* on the HHT, the following options are displayed:

- **Chg** — Change the configuration of the displayed parameter.
- **Next** —Display the next parameter.
- **Pre** — Display the previous parameter.
- **End** — End the configuration procedure.

The procedures described in this chapter are presented in the same sequence as they appear on the HHT display.

When the message “Is Loop in Man?” appears on the display, make certain that the control loop is in manual mode before pressing Y. When you press Y, the transmitter output is not being updated by the sensor while the configuration changes are downloaded to the transmitter.

CAUTION: Downloading while the control loop is in automatic mode may cause a process upset.

Changing Tag Data

This function permits you to change tag data such as tag number, tag name, geographic location, and device name. Table 10 shows an example of the procedure for changing tag data.

Table 10. Procedure for Changing Tag Data

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press C for *Config*.

Table 10. Procedure for Changing Tag Data (Continued)

HHT Display	Meaning of Display	Required Action
Transmitter Tags Chg Next Pre End	Options to change tag configuration.	Press C to change configuration. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.
TagNo: Chg? Y/Q TT103A	Do you want change the displayed tag number?	Press Y to change the tag. Press Q to leave it unchanged.
TagNo: TT103A	Displayed if you pressed Y in previous step. Enter the new tag number.	Key in new tag number and press EXE to execute the entry.
TagNam: Chg? Y/Q Boiler Temp	Do you want change the displayed tag name?	Press Y to change the tag name. Press Q to leave it unchanged.
TagNam: Boiler Temp	Displayed if you pressed Y in previous step. Enter the new tag name.	Key in new tag name and press EXE.
GeoLoc: Chg? Y/Q Plant 3A West	Do you want change the displayed geographic location?	Press Y to change the location. Press Q to leave it unchanged.
GeoLoc: Plant 3A West	Displayed if you pressed Y in previous step. Enter the new geographic location.	Key in location and press EXE.
DevName: Chg? Y/Q IAS382	Do you want change the displayed device name?	Press Y to change the device name. Press Q to leave it unchanged.
DevName: IAS382	Displayed if you pressed Y in previous step. Enter the new device name.	Key in new device name and press EXE. If connected to an I/A Series system, the DevName should be the letterbug of the connected channel or *DevNam*.
Transmitter Tags Chg Next Pre End	Indicates procedure complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing the Input Type

This function permits you to select the type of sensor to be used with the transmitter:

- RTD (single 2-, 3-, or 4-wire; dual 2-wire)
- Thermocouple
- mV
- Ohms
- Dewpoint

Table 11 shows an example of the procedure for changing transmitter input type.

Table 11. Procedure for Changing Input Type

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Pres S for *Setup.*
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N and *Input Type* appears.
Input Type Chg Next Pre End	Option to change Input Type.	Press C for *Chg*.
PT100 Din751 RTD Chg? Y/Q	Display of currently configured input type.	Press Y to change or Q to quit.
4T Quit RTD T/C Other mT	Menu of options for selecting input type.	Press R for RTD. Press T for thermocouple. Press O for mV or Ohms input. Press Q to quit.

Changing to an RTD

Table 12 shows an example of the procedure for configuring an RTD as the input type.

Table 12. Procedure for configuring an RTD as the input type

HHT Display	Meaning of Display	Required Action
5T Quit PT100 Din751 RTD A=PT100 Sama RTD NI100DIN43760RTD B=NINR226/227RTD CU10NR228/229RTD D=Nickel 120 RTD Special mT	If you pressed R in previous step, this menu of RTD types will appear.	Press P, A, N, B, C, D, or S. For this example, press P. If a special RTD was not ordered, the Special option is invalid.
Configured as 4 Wire RTD	Shows present configuration and asks if you want to reconfigure.	Press Y to change or Q to quit.
4 Wire RTD Chg? Y/Q		
6T Quit A=2 Wire B=3 Wire C=4 Wire	Menu of other options.	Press A for 2 Wire. Press B for 3 Wire. Press C for 4 Wire. Press Q to quit.
Input Changed Check LRV/URV	Warning message that the input mode has changed and that you should now check the values for LRV and URV.	Since your operating range may have changed, verify that LRV, URV, and mode are correct.
Check LRV/URV Check Linear Mode		
PT100 Din751 RTD Chg? Y/Q	Shows present configuration.	Press Y to make another selection. Press Q to accept present selection.

Changing to a T/C

Table 13 shows an example of the procedure for configuring a thermocouple as the input type.

Table 13. Procedure for configuring a T/C as the Input Type

HHT Display	**Meaning of Display**	**Required Action**
5T Quit B T/C C T/C E T/C J T/C K T/C N T/C R T/C S T/C T T/C A=Special T/C mT	If you pressed T in previous step, this menu of T/C types will appear.	To select thermocouple Types B, C, E, J, or K, press the corresponding button on the HHT (B, C, E, J, or K). For Type N, press R; for R, press S; for S, press T; and for T, press Q. For Types L, U, and Special, refer to Note 1.
Configured as 2 Wire	Shows present configuration.	None.

Table 13. Procedure for configuring a T/C as the Input Type (Continued)

HHT Display	Meaning of Display	Required Action
Input Changed Check LRV/URV	Warning message that the input mode has changed and that you should now check the LRV, URV, and mode.	Since your operating range may have changed, verify that LRV, URV, and mode are correct.
Check LRV/URV Check Linear Mode		
J T/C Chg? Y/Q	Confirmation of your current selection.	Press Q to quit, Y to repeat procedure.
Input Type Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

NOTE 1: Software L0122EV Rev D cannot make these selections. Use the –L1 (one-line indicator), –L3 (3-line indicator), or PC10 Configurator (Version 4.0.1)) to make these selections. For selections not available with the local indicators, use the PC10 Configurator. If the transmitter is digitally integrated into an I/A Series System, the correct T/C can also be selected via the ITMW (Version 4.2 or later) or IFDC (Version 6.0 or later).

Changing to a mV Signal

Table 14 shows an example of the procedure for configuring a mV signal as the input type..

Table 14. Procedure for configuring a mV Signal as the Input Type

HHT Display	Meaning of Display	Required Action
5T Quit MV Input Ohms Input mT	If you pressed Other in previous step, this menu will appear.	Press M to select mV input.
Configured as 2 Wire mV	Shows present configuration.	None
Input Changed Check LRV/URV	Warning message that the input mode has changed and that you should now check the values for LRV and URV.	Since your operating range may have changed, verify that LRV and URV are correct.
Selected Input: mV	Display of currently selected input type.	Press Q to quit or Y to repeat procedure.
mV Chg? Y/Q		
Input Type Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing to an Ohms Signal

Table 14 shows an example of the procedure for configuring an ohms signal as the input type.

Table 15. Procedure for configuring an Ohms Signal as the Input Type

HHT Display	Meaning of Display	Required Action
5T Quit MV Input Ohms Input mT	If you pressed Other in previous step, this menu will appear.	Press O to select Ohms input.
Configured as 2 Wire Ohms	Shows present configuration and asks if you want to reconfigure.	Press Y to change or Q to quit.
2 Wire Ohms Chg? Y/Q		
6T Quit A=2 Wire Ohms B=3 Wire Ohms C=4 Wire Ohms mT	Menu of selections.	Press A, B, or C to make a change.
Input Changed Check LRV/URV	Warning message that the input mode has changed and that you should now check the values for LRV and URV.	Since your operating range may have changed, verify that LRV and URV are correct.
Selected Input: Ohms	Display of currently selected input type.	Press Q to quit or Y to repeat procedure.
Ohms Chg? Y/Q		
Input Type Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing Linear Mode

This function permits you to make the output of your transmitter linear with temperature or with dewpoint (for example when using a Foxboro 2781 Dewpoint sensor). Table 17 shows an example of the procedure for changing linear mode.

Table 16. Procedure for Changing Linear Mode

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *Linear Mode* appears.

Table 16. Procedure for Changing Linear Mode (Continued)

HHT Display	Meaning of Display	Required Action
Linear Mode Chg Next Pre End	Option to change linear mode.	Press: C for *Chg*.
Linear Mode: EGU	Shows present configuration and asks if you want to change it.	Press Y to change or Q to leave it unchanged.
EGU Chg? Y/Q		
4T Quit EGU Dewpoint mT	Do you want output to be linear with temperature (EGU) or with dewpoint?	Press E for EGU, D for Dewpoint, or Q to quit.
Linear Mode: EGU	Confirmation of your current selection.	Press Q to quit. Press Y to repeat procedure.
EGU Chg? Y/Q		
Linear Mode Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing Measurement Units

This function permits you to change the units in which measurement data is displayed and transmitted. Table 17 shows an example of the procedure for changing measurement units.

Table 17. Procedure for Changing Measurement Units

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *Measurement Units* appears.
Measuremnt Units Chg Next Pre End	Option to change measurement units.	Press: C for *Chg*.
EGU = C Change? Y/Q	Shows present configuration and asks if you want to change it.	Press Y to change or Q to leave it unchanged.
Secondary EGU: C Chg? Y/Q		

Table 17. Procedure for Changing Measurement Units (Continued)

HHT Display	Meaning of Display	Required Action
4T Quit A=degC B=degF C=degR D=degK mT	Options for changing measurement units.	Press: A for Celsius, B for Fahrenheit, C for Rankine, D for Kelvin, or Q to quit.
Measuremnt Units Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing mA Output Range (ReRange)

Table 18 shows an example of the procedure for changing the 4 to 20 mA output range. The term LRV (Lower Range Value) refers to the 4 mA point; URV (Upper Range Value) refers to the 20 mA point.

*Table 18. **Procedure for Changing** mA Output Range*

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Pres S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *ReRange* appears.
ReRange Chg Next Pre End	Option to change output range.	Press: C for *Chg*.
Chg LRV? Y/Q -200.00 C	Do you want to change the present value of LRV?	Press Y to change or Q to quit.
-200.00 C LRV=	If you pressed Y, this screen prompts you to enter a new value for LRV.	Key in new value and press EXE.
Chg LRV? Y/Q -100.00 C	Confirmation of the value you keyed in.	Press Q to accept the value. Press Y to change it.
Chg URV? Y/Q 850.00 C	Do you want to change the present value of URV?	Press Y to change or Q to quit.
850.00 C URV=_	If you pressed Y, this screen prompts you to enter a new value for URV.	Key in new value and press EXE.
Chg URV? Y/Q 800.00 C	Confirmation of the value you keyed in.	Press Q to accept the value. Press Y to change it.

*Table 18. **Procedure for Changing** mA Output Range (Continued)*

HHT Display	Meaning of Display	Required Action
ReRange Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing the Output Mode

This function permits you to change the output mode of the transmitter from an analog 4 to 20 mA to a digital signal and vice versa. The digital output is used for transmitters connected to an I/A Series system.

Table 19 shows an example of the procedure for changing a 4 to 20 mA output to a digital output.

Table 19. Procedure for Changing Output Mode

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	*Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	*ChgCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configurations.	Press N repeatedly until *Output Mode* appears.
Output Mode Chg Next Pre End	Option to change output mode.	Press C for *Change*.
Output:4-20 mA Y=Digital/Q=Quit	Shows present configuration and give you the opportunity to change it.	Press Y to change mode. Press Q to keep the same mode.
Output Mode Chg Next Pre End	Indicates procedure complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing FailSafe Mode

This function permits you to change the default output of the transmitter if the transmitter fails to function. If set to UpScale, the mA output will default to the maximum value when the transmitter fails. If set to DnScale, it defaults to minimum value.

Table 20 shows an example of the procedure for changing the Failsafe Mode.

Table 20. ***Procedure for Changing*** *FailSafe Mode*

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *Config* options	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *FailSafe Mode* appears.
FailSafe Mode Chg Next Pre End	Option to change failsafe mode.	Press: C for *Chg*.
Failsafe:On Y=Off/Q=Quit	Shows present configuration and gives you the opportunity to change it.	Press Y to change mode. Press Q to leave mode as configured.
Failsafe Direction Downscale	Shows present configuration and asks if you want to change it.	Press Y to change failsafe direction. Press Q to leave direction as configured.
Downscale Chg? Y/Q		
4T Quit Downscale Upscale mT	Menu of options for a change.	Press D for Downscale. Press U for Upscale. Press Q to quit.
Chg FailVal? Y/Q 3.6000 mA	Display of present FailVal. Do you want to change it?.	Press Y to change FailVal. Press Q to leave it as shown.
3.6000 mA FailVal=	Display of current FailVal. Prompt to enter new value.	Key in new value and press EXE.
Chg FailVal? Y/Q 3.7000 mA	Confirmation of value you keyed in. Is it correct?	Press Q to accept the value. Press Y to change it.
FailSafe Mode Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Turning Sensor Fault Detection On or Off

This function permits you to turn the sensor fault detection feature On or Off..

Table 21. Procedure for Changing Measurement Units

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *Sensor Fault Det* appears.
Sensor Fault Det Chg Next Pre End	Option to turn Sensor Fault Detection feature On or Off.	Press: C for *Chg*.
Fault Det: ON Y = Off / Q = Quit	Shows present configuration and gives you the opportunity to change it.	Press Y to change or Q to leave it unchanged.
Sensor Fault Det Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing Electronic Damping

This function permits you to set and modify the response of the transmitter output to a change in the measurement input. The response is expressed as a damping factor time constant in seconds, where 0.00 seconds means no damping. Settings of 0.25, 0.5, 1, 2, 4, 8, 16, or 32 seconds may be selected. If the transmitter is connected to an I/A Series system, use a setting of 0.00 seconds, as the I/A Series system has its own damping factor. Table 22 shows the procedure for displaying and setting the transmitter damping.

*Table 22. **Procedure for Changing** Electronic Damping*

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ConCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *Electronic Damp* appears.

*Table 22. **Procedure for Changing** Electronic Damping (Continued)*

HHT Display	Meaning of Display	Required Action
Electronic Damp Chg Next Pre End	Option to change damping.	Press C for *Chg*.
Damp=0.5 Sec New Value? Y/Q	Display of current damping factor. Do you want to change it?	Press Y to change or Q to leave it unchanged.
4T Quit A=0.0 B=.25 C=.5 D=1 E=2 G=4 H=8 I=16 J=32 mT	Options for selecting damping factor.	Press A to J to select the desired damping factor in seconds.
Damp=0.5 Sec New Value? Y/Q	Confirmation of the factor selected.	Press Q to accept the value. Press Y to change it.
Electronic Damp Chg Next Pre End	Indication that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing Sensor Validation

This function permits you to set the lag time that the microprocessor holds and compares the input to past inputs.

*Table 23. **Procedure for Changing** Sensor Validation*

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ConCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *Sensor Validatn* appears.
Sensor Validatn Chg Next Pre End	Option to change sensor validation time.	Press C for *Chg*.
Chg ValTime? Y/Q 0.50000000 sec	Shows present configuration and asks if you want to change it.	Press Y to change or Q to leave it unchanged.
0.5000000 sec ValTime =	If you pressed Y, this screen prompts you to enter a new ValTime.	Key in new value and press EXE.
Sensor Validatn Chg Next Pre End	Indication that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing Intelligent Smoothing

This function permits you to set the time period the input is averaged over during digital filtering of process or electrical noise.

Table 24. ***Procedure for Changing*** *Intelligent Smoothing Time*

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ConCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *Intel Smooth* appears.
Intel Smooth Chg Next Pre End	Option to change Intelligent Smoothing time.	Press C for *Chg*.
Chg Smooth? Y/Q 10.000 sec	Shows present configuration and asks if you want to change it.	Press Y to change or Q to leave it unchanged.
10.000 sec Smooth=	If you pressed Y, this screen prompts you to enter a new Smooth time.	Key in new value and press EXE.
Chg Smooth? Y/Q 10.000 sec	Confirmation of the value you keyed in.	Press Q to accept the value. Press Y to change it.
Intel Smooth Chg Next Pre End	Indication that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Changing Power Supply Frequency and Filtering

This function permits you to change the configuration of your transmitter to the frequency of the power supply being used. It also allows you to set amount of electronic filtering of noise from your power supply.

Table 25. Procedure for Changing Power Supply Frequency and Filtering

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Option to change tag configuration.	Press N repeatedly until *Power Supply* appears.
Power Supply Chg Next Pre End	Option to change power supply parameters.	Press C for *Chg*.
Power Frequency: 60 Hz Chg? Y/Q	Shows present configuration of frequency. Do you want to change it?	Press Y to change or Q to leave it unchanged.
4T Quit A=50 Hz B=60 Hz mT	If you pressed Y, shows menu of options.	Press A for 50 Hz. Press B for 60 Hz. Press Q to quit.
Power Sply Filtr High Speed	Shows present configuration of power supply filter. Do you want to change it?	Press Y to change or Q to leave it unchanged.
High Speed Chg? Y/Q		
4T Quit Standard Speed High Speed mT	If you pressed Y, shows menu of options.	Press S for Standard Speed. Press H for High Speed. Press Q to quit.
Power Supply Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Configuring Local Display

This function permits you to configure the features of your local display.

Table 26. Procedure for Changing Local Display

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg Mempak FieldRep mT	Menu of *Setup* options.	Press C for *ChgCfg*.
3T Quit GrpDisp Config mT	Menu of *ChgCfg* options.	Press C for *Config*.
Transmitter Tags Chg Next Pre End	Options to change tag configuration.	Press N repeatedly until *Local Display* appears.
Local Display Chg Next Pre End	Option to change local display parameters.	Press C for *Chg*.
Display Installd Three Line	Shows which display, if any, is installed.	None.
Push Buttons: Enabled Chg Y/Q	Shows present configuration of push buttons. Do you want to change it?	Press Y to change or Q to leave it unchanged.
4T Quit Enabled Disabled mT	If you pressed Y, shows menu of options.	Press E for Enabled. Press D for Disabled. Press Q to quit.
Chg Push Buttons? Y/Q Enabled	Confirmation of the configuration you selected.	Press Q to accept configuration. Press Y to change it.
Language: English Chg? Y/Q	Shows present configuration of language. Do you want to change it?	Press Y to change or Q to leave it unchanged.
4T Quit English German French Spanish mT	If you pressed Y, shows menu of options.	Press E for English. Press G for German. Press F for French. Press S for Spanish. Press Q to quit.
Chg Language? Y/Q English	Confirmation of the configuration you selected.	Press Q to accept configuration or Y to further change it.
Top Line Display EGU Chg? Y/Q	Shows present configuration of top line display. Do you want to change it?	Press Y to change or Q to leave it unchanged.
4T Quit EGU A=% Range B=mA Output C=EGU & mA D=% & mA mT	If you pressed Y, shows menu of options.	Press E for EGU, A through D as indicated, or Q to quit.

Table 26. Procedure for Changing Local Display (Continued)

HHT Display	Meaning of Display	Required Action
Top Line Display EGU Chg? Y/Q	Confirmation of the configuration you selected.	Press Q to accept configuration. Press Y to change it.
Bottom Line Labl FOXBORO Chg? Y/Q	Shows present configuration of top line display. Do you want to change it?	Press Y to change or Q to leave it unchanged.
Bottom Line Labl Labl=	If you pressed Y, this screen prompts you to enter a new label.	Key in new label (alpha/numeric characters only) and press EXE.
Bottom Line Labl FOXBORO Chg? Y/Q	Confirmation of the configuration you selected.	Press Q to accept configuration or Y to change it.
Local Display Chg Next Pre End	Indicates that procedure is complete.	Press C to change configuration again. Press N to select next parameter. Press P to select previous parameter. Press E to end procedure.

Memory Pak Functions

This section describes the functions associated with the Memory Pak. The functions are:

- **PreCfg** — Configure Intelligent Transmitter Databases and store in Memory Pak for later loading into transmitter.
- **SaveToPak** — Store transmitter data in Memory Pak.
- **RdFile** — Upload file from Memory Pak into HHT.
- **WrTran** — Download Memory Pak file into transmitter. (In order to download, the file should first have been uploaded with a *RdFile* operation.)
- **Dir** — Display list of Memory Pak files.
- **MemCopy** — Copy files from one Memory Pak to another.
- ErPakTag — Erasing Memory Pak Files.
- FileXfer — Transferring a file to a PC10 (not available for RTT20).

Pre-Configuration of Transmitters (PreCfg)

The following procedures allow you to configure transmitter databases for downloading to transmitters at a later time. Each time the HHT displays a new parameter, There are four options:

- **Chg** — Change the configuration of the displayed parameter
- **Next** — Display the next parameter.
- **Pre** — Display the previous parameter.
- **End** — End the configuration procedure.

Table 27 shows an example of the procedure for changing preconfiguration parameters for the transmitter. Refer to Table 10 through Table 20 for *ChgCfg* examples. To use the *PreCfg* option, install a Memory Pak in the lower slot in the back of the HHT.

Table 27. ***Procedure for Changing*** *Preconfiguration of Transmitters*

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press M for *MemPak*.
3T Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Menu of *MemPak* options.	Press P for *PreCfg*.
Insert MemPak Y=Cont / Q=Quit	Prompt to insert MemPak into HHT.	After inserting MemPak, press Y to continue or Q to quit.
Use Demo Data for PreCfg? Y/Q	Do you want to use demonstration data (default data) for configuration?	If you have already loaded transmitter database, press Q. Otherwise, press Y to load default database.
3T Quit Pressure Temp Mag Cor Vor mT	Menu of transmitter options.	Press T for temperature.
4T Quit RTT10 A=RTT20 mT	Option for selection RTT10 or RTT20	Press R for RTT10. Press A for RTT20.
WAIT: Setting Default Data	Setting default data.	None.

Table 27. ***Procedure for Changing*** *Preconfiguration of Transmitters (Continued)*

HHT Display	Meaning of Display	Required Action
Transmitter Tags Chg Next Pre End	Option to change transmitter tags.	Press C to change, N to go to next parameter, P to go to previous parameter, E to go to end of configuration. See Config section for details of configuration procedure.
Input Type Chg Next Pre End	Option to change Input Type.	
Linear Mode Chg Next Pre End	Option to change Linear Mode (*EGU* or *Dewpoint*).	
Measurement Units Chg Next Pre End	Options to change Measurement Units.	
ReRange Chg Next Pre End	Option to change output range (LRV and URV).	
Output Mode Chg Next Pre End	Option to change Output Mode.	
FailSafe Mode Chg Next Pre End	Option to change failsafe mode.	
Sensor Fault Det Chg Next Pre End	Option to turn sensor fault detection feature on or off.	
Electronic Damp Chg Next Pre End	Option to change electronic damping.	
Sensor Validatn Chg Next Pre End	Option to change sensor validation time.	
Intel Smooth Chg Next Pre End	Option to change intelligent smoothing time.	
Power Supply Chg Next Pre End	Option to change power supply parameters.	
Local Display Chg Next Pre End	Option to change local display parameters.	
Checking MemPak	HHT is verifying MemPak files.	None.
File Exists Overwrite Y/Q	That file already exists in the MemPak. Do you want to overwrite the file?	To overwrite the existing file, press Y. To end the procedure without storing data in the MemPak, press Q.
TT102A to MemPak? Y/Q	OK to write TT102A file to MemPak?	Press Y to write data or Q to quit.
Writing MemPak TT102A	Writing file to MemPak.	None.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPakTag MemCopy FileXfer mT	Indicates data has been written and procedure is complete.	Press Q to return to menu.

*Table 27. **Procedure for Changing** Preconfiguration of Transmitters (Continued)*

HHT Display	Meaning of Display	Required Action
2T Quit ChgCfg MemPak FieldRep mT	Menu of options.	Press Q to return to menu.

Storing Transmitter Data in a Memory Pak (SaveToPak)

You can either store user data only (UserData) or the entire transmitter database (SaveAlltoPak) in a Memory Pak. UserData consists of configuration parameters only. SaveAlltoPak includes configuration data and calibration constants and provides archival backup for use if the transmitter database is damaged. Table 28 shows an example of the procedure for storing transmitter data in a Memory Pak. Possible error messages are listed in Table 34 on page 45.

Table 28. Procedure for Storing Transmitter Data in a Memory Pak

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press M for *MemPak*.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Menu of *MemPak* options.	Press S for *SaveToPak*.
4M Quit UserData SaveAlltoPak mT	Menu of *SaveToPak* options.	Press U to store user-entered transmitter data in Memory Pak. Press S to store entire transmitter database in Memory Pak.
Searching for TT102A	HHT searches for file and finds that the file already exists. Do you want to overwrite the existing file?	Press Y to overwrite or Q to quit.
File Exists Overwrite Y/Q		
TT102A to MemPak? Y/Q	If you pressed Y in the previous step, this message asks you to confirm that you want to overwrite the existing file.	Press Y to continue or Q to quit.
Writing MemPak TT102A	Indicates that the file in being written.	None.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Indicates that procedure is complete.	Press Q to return to higher level menu.

Uploading Files from a Memory Pak into the HHT (RdFile)

To use this function, first insert a Memory Pak with the desired file into the HHT. If you do not know which files reside in a Memory Pak, select *Dir* and review a directory of all resident files.

Table 29 shows an example of the procedure for uploading files from a Memory Pak into the HHT. Error messages are listed in Table 34 on page 45.

CAUTION: A +bk at the end of a filename indicates that all data (including calibration constants) for that transmitter has been downloaded to the file. The +bk is NOT part of the filename and should not be used for uploading the file. If you do use it, the HHT will not find the file in the Memory Pak.

Table 29. Procedure for Uploading Files from a Memory Pak to the HHT

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press M for *MemPak*.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Menu of *MemPak* options.	Press R for *RdFile*.
Select TagNumber from list? Y/Q	Do you want to select a tag number from a list?	Press Y to select or Q to quit.
To Select, press EXE on TagNumber	If you pressed Y, tag numbers are displayed in sequence.	Press EXE when the desired tag appears.
TT102A+bk -EXE to Select-	Display of Tag No. TT102A. The *+bk* indicates that it is a backup file.	To select, press EXE. Otherwise, do nothing and wait for the desired tag to appear. To hold the display, press H. To continue, press H again.
Searching for TT123B	Unit is searching for the tag number selected. Appears only if you did not select a tag from the displayed list.	None.
Display Data Y=Cont / Q=Quit	Do you want to display the data stored on the MemPak?	Press Y to continue or Q to quit.
Data is displayed in the same order as shown in “Displaying All Configuration Data (GrpDisp)” on page 18.		

Table 29. Procedure for Uploading Files from a Memory Pak to the HHT (Continued)

HHT Display	Meaning of Display	Required Action
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Indicates that procedure is complete.	Press Q to return to higher level menu.

Downloading Data into a Transmitter (WrTran)

After you have uploaded data from the Memory Pak into the HHT by using the RdFile function, you can then download the data to the transmitter as shown in Table 30. Error messages are listed at the end of this chapter on Table 34 on page 45.

Table 30. Procedure for Downloading Data into a Transmitter

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press M for *Mempak*.
3M Quit PreCfg Save To Pak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Menu of *MemPak* options.	Press W for *WrTran*.
Write Data? Y=Cont / Q=Quit	Prompt to write data.	Press Y to continue or Q to quit.
Is Loop in Man? Y=Cont / Q=Quit	If you pressed Y in previous step, this screen asks if you have placed the loop in manual control mode. *To avoid causing a process upset, you should always place the loop in manual before downloading to a transmitter.*	Place loop in manual and press Y to continue or Q to quit.
Writing Data	HHT is writing data.	None.
Xmtr going onLine	Indicates that the transmitter is now going online.	None.
Put Loop in Auto Y to Continue	After writing data, you should place the loop in automatic mode.	Place loop in auto mode and press Y to continue.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Indicates procedure is complete.	Press Q to return to higher level menu.

Displaying Memory Pak Files (Dir)

This procedure is used for displaying names of files stored in a Memory Pak. Table 31 shows an example of the procedure for displaying Memory Pak Files. Error messages are listed in Table 34 on page 45.

A *+bk* at the end of a filename indicates that all backup data for that transmitter has been downloaded to the file.

A Memory Pak can store approximately 130 user data files or 80 complete database files.

Table 31. Procedure for Displaying Memory Pak Files

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press M for *Mempak*.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Menu of *MemPak* options.	Press D for *Dir*.
# of Files=10	Indicates that 10 files reside in the Memory Pak.	None.
SearchString= Blank=All Files	Prompt to enter a search string for files. If you press EXE without entering a string, it will list all files.	Key in a string and press EXE or press EXE without keying in anything.
TT102A+bk CC41A+bk TT123B LT104+BK ... ... *****END***** Free Space=55322	Display of filenames in sequence. ***END*** indicates that all filenames searched have been displayed. Free Space shows the number of bytes left on the MemPak.	None.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Procedure is complete.	Press Q to return to higher level menu.

Erasing Memory Pak Files (ErPkTag)

You may use this procedure for removing filenames only from a Memory Pak. Although the files then become inactive, data is still stored and still occupies space in the Memory Pak.

You can regain storage space by copying files (only active files are copied) from the erased Memory Pak to an unused Memory Pak by using the *MemCopy* function and erasing the original Memory Pak by exposing the chip inside the Memory Pak to ultraviolet light.

CAUTION: Memory Paks can be completely erased by exposing the chip inside the Memory Pak to ultraviolet light.

Table 32 shows an example of the procedure for erasing Memory Pak Files. Error messages are listed at the end of this chapter on page 45.

Table 32. Procedure for Erasing Memory Pak Files

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press M for *Mempak*.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Menu of *MemPak* options.	Press E for *ErPkTag*.
TagNo to Erase=	Prompt to specify file to be erased.	Key in TagNo of file to be erased. Then press EXE.
Erase File? Y/Q TT102A	Confirmation prompt to erase file.	Press Y to erase or Q to quit.
Searching For: TT102A	Searching for the specified file.	None.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Indicates that file has been erased and procedure is complete.	Press Q to return to higher level menu.

Copying Memory Pak Files to Another Memory Pak (MemCopy)

You can use this procedure to copy all files from one Memory Pak into another. This allows you to carry the second Memory Pak into the field while the original memory pack is safely stored in an archive.

MemCopy an also be used to gain storage space in the Memory Pak. Only active files (not erased files) are copied from the original Memory Pak. You can therefore recover storage space in the original Memory Pak by exposing the chip to ultraviolet light and erasing stored data. Table 33 shows an example of the procedure for copying Memory Pak files to another Memory Pak. Error messages are listed at the end of this chapter Table 34 on page 45.

CAUTION: Install a new battery before executing this procedure. It requires a lot of battery power and you want to avoid corrupting any files because of a low battery. Foxboro also recommends that you always copy to a blank Memory Pak.

Table 33. Procedure for Copying Memory Pak Files to Another Memory Pak

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press M for *Mempak*.
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Menu of *MemPak* options.	Press M for *MemCopy*.
Place Source MemPak in lower slot	Prompt to place the source Memory Pak in the lower slot of the HHT.	Insert source Mem Pak into HHT lower slot.
Place Blank Pak in upper slot	Prompt to remove Program Pak and insert blank Memory Pak into upper slot of HHT.	Remove Program Pak and insert blank Mem Pak into upper slot.
Copy Mempak? Y=Cont / Q=Quit	Do you want to copy the source Memory Pak to the blank Memory Pak?	Press Y to continue or Q to quit.
Checking Freespace	HHT is verifying that there is enough space on target Memory Pak to copy the source.	None.
Copying . . . C: B:	HHT is copying files.	None.
Reinsert ProgPak in upper slot Y to Continue	Prompt to reinsert Program Pak.	Press Y to continue.

Table 33. Procedure for Copying Memory Pak Files to Another Memory Pak (Continued)

HHT Display	Meaning of Display	Required Action
3M Quit PreCfg SaveToPak RdFile WrTran Dir ErPkTag MemCopy FileXfer mT	Procedure is complete.	Press Q to return to higher level menu.

Memory Pak Error Messages

Table 34 lists the error messages associated with the Memory Pak functions.

Table 34. Memory Pak Error Messages

Error Message	Meaning of Message	Corrective Action
ERR: TT102A no backup file	The displayed file does not have the complete database stored in it. The procedure has been terminated.	None.
ERR: No MemPak	No Memory Pak has been installed in the HHT.	Install a Memory Pak in the lower slot of the HHT.
No Tag No. Specified	You did not enter a tag number.	If repeating the procedure, enter the tag number.
File Exists Overwrite Y/Q	That file already exists in the Memory Pak. Do you want to overwrite the file?	To overwrite the file, press Y. To end pre-configuration without storing the data, press Q.
TT106B Not on MemPak	The displayed tag number is not in the Memory Pak.	Verify that you have the correct tag number and Memory Pak. Do not enter *+BK* as part of the tag number. To list Memory Pak files, press D.
WARNING Invalid HHT Data	An attempt to perform a *WrTran* was unsuccessful —data was not first uploaded with *RdFile*.	Use *RdFile* to upload data before performing *WrTran*.
MemPak Full Y to Continue	The Memory Pak is out of storage space.	Change the Memory Pak in the lower slot in the back of the HHT. Then press Y.
Program Pak in Upper Slot	During MemCopy, you left a Program Pak in the upper slot.	

4. Maintenance Procedures (FieldRep)

Restoring the Entire Database in a Transmitter (RestorePakFile)

The *RestorePakFile* procedure retrieves the entire database (configuration data and calibration constants) from a Memory Pak and downloads it into the transmitter. The complete database must have been previously stored in the Memory Pak as indicated by *+bk* when the file (Tag Number) is displayed on the HHT.

An example of restoring the entire database in the transmitter is shown in Table 35. Error messages are listed in Table 34 on page 45.

Table 35. Example of Restoring Entire Database in Transmitter

HHT Display	Meaning of Display	Required Action
1T Off Reconnect Cal Setup Meas Test HHT mT	Menu of options.	Press S for *Setup*.
2T Quit ChgCfg MemPak FieldRep mT	Menu of *Setup* options.	Press F for *FieldRep*.
3T Quit Convert RestorePakFile mT	*Menu of Field Rep* options.	Press R for *RestorePakFile*.
Tag No: Chg? Y/Q TT102A	Enter the name of the Memory Pak file you want to restore to the transmitter.	To enter a new tag number, press Y. If the correct tag number is displayed, press Q.
TagNo: TT102A	If you pressed Y, enter the new transmitter tag number.	Key in the new tag number and then press EXE.
Reading Setup Data	The Memory Pak file is being loaded into the HHT.	None.
Write Data? Y=Cont/Q=Quit	*CAUTION: Put loop in manual before continuing. Transmitter output is not being updated by the sensor. Leaving control loop in automatic will cause a process upset.*	First, make certain that control loop is in manual. Then, press Y to continue the procedure or Q to discontinue the procedure.
Writing Data	Data is being loaded into the transmitter.	None.
2T Quit ChgCfg memPak FieldRep mT	Procedure is complete.	Press Q to return to higher level menu.

5. Diagnostic Displays

Table 36 lists the displayed diagnostic messages, the meaning of each message, and the corrective action to be taken.

Table 36. Diagnostic Messages

Displayed Message	Meaning of Message	Corrective Action
ERR: Bad Sensor #1	Sensor #1 is bad.	Check wiring and/or Replace Sensor #1.
ERR: Bad Sensor #2	Sensor #2 is bad.	Check wiring and/or Replace Sensor #2.
ERR: Temperature Standards Fail	Internal check on temperature tables invalid.	Replace transmitter.
Bad mA: URV=LRV Y to Continue	Operator entered same value for both LRV and URV	Press Y and enter correct values.
Battery Too Low Y to Continue	Battery voltage is low.	Install new battery in HHT. Check date/time and reset if necessary.
Data Not Written WrDat? Y/Q	Data has been changed in HHT but has not been downloaded into transmitter.	To download data, press Y. To continue procedure without downloading data, press Q.
Demo Mode Y=Cont / Q=Quit	Reminder that procedure is being performed in the Demonstration Communication Mode and that data in transmitter will not be changed.	To continue the procedure, press Y. To end procedure, press Q.
ERR: Comm Failure Y to Continue	HHT is in Transmitter Communication Mode, but is not connected to a transmitter.	If using HHT for tutorial purposes, put HHT in Demonstration Communication Mode. Otherwise, connect HHT to transmitter. Press Y to establish communication.
	HHT communications cable is making a poor contact.	Check connections at both ends of communications cable. Repair poor contact. Press Y to establish communication.
	Power is not being supplied to transmitter.	Supply transmitter with specified power. Press Y to establish communication.
	Battery voltage is low.	Install new battery in HHT. Check date/time and reset if necessary.
	4 to 20 mode and no 200 Ω load minimum.	Install minimum 200 Ω load between HHT and power supply.

Table 36. Diagnostic Messages (Continued)

Displayed Message	Meaning of Message	Corrective Action
ERR: HHT Fail XXX Y to Continue	The HHT is not functioning.	To clear a failure message, press Y. Check the HHT by setting it in the Demonstration Communication Mode (Demo Mode) and repeating the last operation. If you cannot clear the failure message, reset the HHT by removing the battery, press ON twice, reinstall the battery, and then press ON. If this does not clear the fault, replace the HHT. After reinstalling the battery, check date/time and reset if necessary.
ERR: MemPak Full Y to Continue	Storage space in Memory Pak is fully occupied.	For additional storage space, install a new Memory Pak in the HHT.
ERR: MemPak XXX Y to Continue	Memory Pak is installed in wrong location or is defective.	Install Memory Pak in correct location or install new Memory Pak in HHT. If you cannot clear the failure message, reset the HHT by removing the battery, press ON twice, reinstall the battery, and then press ON. If this does not clear the fault, replace the HHT. After reinstalling the battery, check date/time and reset if necessary.
ERR: No MemPak	Memory Pak is not installed or is installed in wrong slot.	Install a Memory Pak in the correct slot in the HHT.
ERR: Numbers Only	Enter numerals only.	Enter desired number.
ERR: Write Fail Y to Continue	Attempt to download data into transmitter was unsuccessful.	Repeat download procedure. If data is still not downloaded, check that power supply voltage is within specified limits.
ERR: Xmtr Offline Y to Continue	The transmitter did not go online. Measurement cannot be read.	1. Check for additional error messages and take the corresponding corrective action. 2. Reset transmitter by pressing Y and proceeding as prompted on HHT display. If message is redisplayed, refer to diagnostics diagram in transmitter maintenance MI.
ERR: Xmtr Online Y to Continue	The transmitter did not go off-line.	Verify that the power supply voltage is within specified limits.
Not Applicable	The selected menu item does not apply to this transmitter model.	No corrective action is required.

Table 36. Diagnostic Messages (Continued)

Displayed Message	Meaning of Message	Corrective Action
Repeat Previous Operation	Fault occurred while performing a procedure.	To ensure that the previously entered data will be stored, repeat the procedure that was being performed when the error message was displayed.
Set Xmtr Online? Y=Cont / Q=Quit	Prompt to reset transmitter. (Transmitter was offline while you tried to read measurements.)	To reset transmitter, press Y.
Span too Small ReEnter LRV/URV	Transmitter will not accept value; refer to MI 020-453 for span and range limit specifications.	Adjust LRV and URV so that maximum span of transmitter is no greater than the limits specified in MI 020-453.
TRAP	Prompt to reset HHT.	To reset HHT, perform the following steps: 1. Remove battery from HHT. 2. Press ON twice. 3. Reinstall battery in HHT. If this does not clear *Trap* display, remove Program Pak; reinstall it; then repeat Steps 1through 3. If display still does not clear, contact Foxboro. 4. Check date/time and reset as necessary.
WARNING Xmtr Stat: XXXX	Transmitter Status fault. Numbers and letters that accompany this message are a code for use by Foxboro service personnel. (*Transmitter Status is* defined in the *Glossary of Terms* section.)	See Tables 37, 38, 39, and 40.
ERR: HHT Fail 192 Y to Continue.	Data cannot be downloaded.	Check cable and connections between HHT and transmitter. Press Y to continue.
ERR: HHT Fail 193 Y to Continue.	Data cannot be uploaded.	Check cable and connections between HHT and transmitter. Press Y to continue.
ERR: HHT Fail: 194 Y to Continue	Battery voltage is low.	Install new battery in the HHT. Then press Y to continue. Check date/time and reset if necessary.

Table 36. Diagnostic Messages (Continued)

Displayed Message	Meaning of Message	Corrective Action
ERR: HHT Fail: 195	Integer overflow detected during upload of transmitter to HHT.	Perform a RestorePakFile function or preconfigure and download new transmitter database to transmitter. Clear HHT transmitter data by pressing Reconnect in the top level menu, then retry transmitter upload to the HHT. If problem remains, contact Foxboro.
ERR: HHT Fail 203: 204 (a) Y to Continue.	New Program Pak was installed without resetting HHT.	From top level menu, press H, R, Y, and Y. If that does not clear problem, perform following steps: 1. Remove battery from HHT. 2. Press ON twice. 3. Reinstall battery in HHT. If number is still displayed, remove Program Pak, reinstall it, and then repeat Steps 1 through 3. If display still does not clear, contact Foxboro. 4. Check date/time and reset if necessary.
ERR: HHT Fail 220: 225 (a) Y to Continue.	Transmitter is being identified with an invalid Model Number.	Check transmitter configuration (*Setup, ChgCfg, GrpDisp*). Note the Model Number displayed (e.g., RTT20). Contact Foxboro and give the Model Number.
ERR: HHT Fail 196, 198-201, 232 - 246 (a) Y to Continue.	Memory Pak is installed in wrong location or is defective.	Install Memory Pak in correct location or install new Memory Pak in HHT.
ERR: HHT Fail 247 (a) Y to Continue.	Program Pak needs to be updated.	Install a new Program Pak per instructions in MI 020-466.
ERR: HHT Fail 251 (a) Y to Continue.	Division by zero.	Check data that was entered into HHT. If incorrect, enter correct data. If error message is displayed after entering correct data, contact Foxboro.

Table 36. Diagnostic Messages (Continued)

Displayed Message	Meaning of Message	Corrective Action
Any number not listed in this table(a).	New Program Pak was installed without resetting HHT.	From top level menu, press H, R, Y, and Y. If that does not clear problem, perform following steps: 1. Remove battery from HHT. 2. Press ON twice. 3. Reinstall battery in HHT. If number is still displayed, remove Program Pak; reinstall it; then repeat Steps 1through 3. If display still does not clear, contact Foxboro. 4. Check date/time and reset if necessary.

Status/Error Codes

The status/error code consists of two characters, a space, and two more characters as follows:

XY AB

Generally, the first pair of characters (XY) indicates the status of the transmitter, i.e., the function it is currently performing. The second pair of characters (AB) indicates what error or errors, if any, are present. If only one digit of a pair is present, the first digit of the pair is 0 (X=0 or A=0).

In each character location, a status or error is identified. For example, the status/error code 40 20 represents a “Bad Sensor #1”.

Table 37 lists status codes for the X character location:

Table 37. Status Codes for X Location

X Value	Status	Description
0	Normal operation.	Normal operation.
1	Initialization Required.	Same as *Busy* status.
2	Diagnostic Error.	Diagnostic errors are transmitter type specific. Refer to the list of diagnostic errors for descriptions and user actions. The RTT20 does not generate diagnostic codes. If an RTT20 has a diagnostic, replace the electronic module.
3	Combination of X=1 and X=2.	---
4	Secondary Status Error.	Secondary status errors are transmitter type specific. Refer to the list of secondary status errors for descriptions and user actions. The secondary status errors are defined by character pair AB.
5	Combination of X=1 and X=4.	---

Table 37. Status Codes for X Location (Continued)

X Value	Status	Description
6	Combination of X=2 and X=4.	---
7	Combination of X=1, X=2, and X=4.	---

Table 38 lists the status codes for the Y character location.

Table 38. Status Codes for Y Location

Y Value	Status	Description
0	Online	Transmitter is making measurements and returning values when requested.
1	Local Mode	Transmitter is in loop calibration mode. This status should be seen on the HHT only if the transmitter was interrupted while in a loop calibration mode. Set transmitter online by completing the calibration cycle using the HHT.
2	Calibrate Mode	Transmitter is in transmitter calibration mode. This status should be seen on the HHT only if the transmitter was interrupted while in a transmitter calibration mode. Set transmitter online by completing the calibration cycle using the HHT.
3	Offline Mode	Transmitter is performing data download. This status should be seen only if the transmitter was interrupted while downloading. Set transmitter online by completing a download.
4	Transmitter is “Busy”.	“Busy” means that the transmitter is performing its initialization routine. This status should only be seen immediately after a power-up or download.
5	Combination of Y=1 and “Busy”.	---
6	Combination of Y=2 and “Busy”.	---
7	Combination of Y=3 and “Busy”.	---

Table 39 lists the status codes for the A character location for an RTT20.

Table 39. Status Codes for A Location

A Value	Status	Description
0	Normal operation.	Normal operation.
2	Bad Sensor #1	Transmitter has detected a faulty Sensor #1. Check the sensor wiring to the transmitter. Check the sensor with an ohmmeter. Also, since the sensor is more difficult to replace than the electronic module, it may be useful to confirm this error by replacing the electronic module.
4	Bad Sensor #2	Transmitter has detected a faulty Sensor #2. The transmitter is configured for two sensors. Make sure that two sensors are connected. Check the sensor wiring to the transmitter. Check the sensor with a ohmmeter. Also, since the sensor is more difficult to replace than the electronic module, it may be useful to confirm this error by replacing the electronic module.
6	Combination of A=2 and A=4.	---
8	Standards Fail	Self-checking of internal reference standards has failed. Replace the electronic module.
A	Combination of A=2 and A=8.	Replace the electronic module.
C	Combination of A=4 and A=8.	Replace the electronic module.
E	Combination of A=2, A=4, and A=8.	Replace the electronic module.

Table 40 lists all status codes for the B character location for an RTT20.

Table 40. Status Codes for B Location

B Value	Status	Description
0	No error.	
2	Programming EEPROM.	Transmitter is writing to EEPROM. This status message should never be seen on an HHT.
4	Bad Message.	Transmitter has received illegal data. Try downloading a good database. If this fails to clear the error, replace the electronic module.
6	Combination of B=2 and B=4.	---
8	Bad Function.	Transmitter has received an illegal function command. Try downloading a good database. If this fails to clear the error, replace the electronic module.
A	Combination of B=2 and B=8.	---

Table 40. Status Codes for B Location (Continued)

B Value	Status	Description
C	Combination of B=4 and B=8.	---
E	Combination of B=1, B=4, and B=8.	---

Glossary of Terms

The following list defines terms used in this document. For a description of menu items, see Figure 2.

Term	Definition
Calibrate	The transmitter status when a calibration is being performed. The control loop must be in manual
Coefficients	Constant values in the equation that define the input/output relationship of the transmitter.
Communication Mode	Determines the data source for the HHT. The user can set the HHT in either the Transmitter, MemPak, or the Demonstration Communication Mode.
Database	Collection of data stored in the HHT, a transmitter and/or a Memory Pak.
Demonstration Mode	The HHT uses demonstration data. The Demo (Demo Mode) Mode allows the HHT to be used as a tutorial device.
Demonstration Data	Data permanently stored in the HHT memory that can be used to simulate the performance of procedures.
Digital Output Mode	The transmitter signal is digital for use by an I/A Series System.
Download	Data is copied from the HHT memory into a transmitter or Memory Pak.
Engineering Units (EGU)	Same as *Measurement Units*.
Failsafe	A transmitter setting that causes the transmitter output to default to its minimum (downscale) or maximum (upscale) output value if the transmitter fails.
HHT	Hand-Held Terminal.
Lower Range Value	The lowest value that the transmitter is adjusted to measure (the 4 mA point).
LRV	See *Lower Range Value*.
mA Output Mode	The transmitter output signal is 4 to 20 mA.
Measurement Units	The chosen unit of measurement, such as °C, °F, °R, °K.
Memory Pak	A small device that plugs into the HHT and is used for storing transmitter data (e.g., engineering units, span, transmitter coefficients) for backup or for later downloading.
Memory Pak Mode	Data uploads from a Memory Pak.

Menu	A list of functions displayed on the HHT in abbreviated form.
Offline Transmitter Status	The transmitter status when data is being downloaded from an HHT or an I/A Series system, or during a diagnostic error. The process is not monitored. For data downloads, the control loop should be in manual.
Online Transmitter Status	The normal transmitter status. If monitoring a process, the Transmitter Status must be Online and the control loop should be in automatic.
Program Pak	A small device that plugs into upper slot in the rear of the HHT. Contains the programs that run the HHT. Should not be removed from the HHT unless you are performing a MemCopy operation or updating the software.
Transmitter Mode (Tran)	Data uploads are from a transmitter.
Transmitter Status	Defines the functional states of the transmitter at the present time. For example, the transmitter can be either online or offline, active or inactive, and the sensing element can be either operative or defective. If the transmitter diagnostics detect an incorrect state, a Transmitter Status Error message is issued. This is displayed on the HHT as *WARNING Xmtr Stat*: XXXX. (Refer to Table 36 through Table 40 for detailed information.)
Transmitter Output Mode	The transmitter output mode can be mA or Digital.
Upload	Data is copied from a transmitter, Memory Pak, or the Demonstration database into HHT memory.
Upper Range Limit	The highest value that the transmitter can be adjusted to measure.
Upper Range Value	The highest value that the transmitter is adjusted to measure (the 20 mA point).
URL	See *Upper Range Limit*.
URV	See *Upper Range Value*.

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33 Commercial Street
Foxboro, MA 02035-2099
United States of America
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