# HART-enabled MFT B-Series

The Kurz Instruments MFT B-Series v2.x thermal mass flow transmitter (MFTB) can be ordered with a HART interface. The HART Field Communications Protocol is widely recognized as the industry standard for digitally enhanced 4-20 mA smart instrument communication. This feature allows the MFTB Flow Meter to communicate its device data over the same wiring used to transmit the 4-20mA signals without disturbing the 4-20 mA analog signal.

HART is a master/slave protocol which means that a field device (slave) speaks only when spoken to by a master. Two masters (primary and secondary) can communicate with slave devices in a HART network. Secondary masters, such as handheld communicators, can be connected almost anywhere on the HART network and communicate with field devices without disturbing communication with the primary master. A primary master is typically a DCS, PLC or computer based central control or monitoring system.

The MFTB complies with HART Protocol Revision 7.0.

# **Connecting with a HART Master**

The HART Master can interface with the MFTB flow transmitter from the control room, at the flow transmitter, or any other wiring termination point in the 4-20mA loop, provided there is a minimum of 250 (ohm) between the connection and the power supply. Using the Device Descriptor (DD) files, the HART Master can fully configure the MFTB if it has the MFTB DD installed. If the HART Master does not have the DD for the MFTB, it will still communicate and configure the device using the HART Universal and Common Practice commands but cannot access the extra or device specific commands available in the MFTB (e.g. MFTB Flow Area Setup). Accessing device specific data and device specific commands requires the DD for the MFTB, as this provides the HART Master with the information needed to fully access all the MFTB capabilities.

# Handheld communicator as HART Master

The HART handheld communicators will typically have clip on leads to connect to the field device. A commonly used HART handheld communicator is the Emerson 375 (the Emerson 275 will not work with the MFTB).

### PC-based HART Master

A PC-based HART Master communicates with the MFTB through a HART modem. The HART modem typically uses the USB interface of the PC on one end of the modem and clips on the other end of the modem to connect to the MFTB flow transmitter. The ProComSol HM-USB is a recommended HART Foundation registered compliant HART Modem with a USB Interface.



The MFTB HART DD for the Emerson Handheld Communicator can be obtained from Emerson. The

HART Communication Foundation (HCF) also publishes a quarterly update of DDs for devices that have been certified by the HCF as HART compliant.

When the HART master is first turned on it will search for the flow transmitter on the 4-20mA loop to establish the connection and learn the device's identity. Once the HART master learns the identity of the MFTB, the HART master will locate the MFTB's DD (assuming it has been loaded in the memory module of the HART Master) and load it. If a DD for the MFTB is not present, the HART Master will generally load a generic DD.

The following sections provide the details unique to the MFT B-Series HART mass flow transmitter. The screen shots are the menus and displays using the Emerson 375 Handheld Communicator. It is assumed that the user is familiar with an Emerson 375/475 Field Communicator and how to connect to a HART loop or directly to a HART device.

When the HART Communicator is powered on and connected to a current loop, it automatically searches for a live HART device on the loop. If the MFTB is connected to the HART Communicator, the "Online" menu will display, as shown below.



Field Communicator Screen Layout

lcon	Meaning
$\heartsuit$	The Field Communicator is communicating with a live, online HART device.
۲	The Field Communicator is communicating with a HART loop with a device in burst mode.
茇	The Field Communicator is running in shout/deaf mode, which helps communicate with a device when it is on a noisy loop.
*	The Field Communicator is running in shout/deaf mode and communicating to a HART loop with a device in burst mode.
$\underline{\mathbf{H}}_{\mathrm{M}}$	Communication is not occurring. This is common when only non-dynamic parameters are listed.

HART Heartbeat Icon meanings



The "Online" menu contains four submenus through which the user can (1) Monitor the MFTB dynamic variables – Device Monitor menu, (2) Modify MFTB configuration parameters – Setup menu, (3) Perform various calibration, maintenance/diagnostic, and utility functions on the MFTB – Utilities menu, and (4) Review the MFTB process and configuration data – Review menu.

#### **DEVICE MONITOR Menu**

When the Device Monitor menu is expanded, the MFTB Dynamic Variables and the Loop Current are displayed as shown.

<b>←</b>		<b>&gt;&gt;&gt;</b>	X										
MFT B-Se	ries:KRZ H	IART											
Device Monitor													
1 PV 3035.4172 ft3/min													
2 SV		966.2042 ft/n	nin										
3 Tempera	ture	78.69 de	gF										
4 Totalized	Flow	65067.24 C	uft										
5 Loop cur	rent	13.737	nA										
HELP	SAVE	НОМЕ											

A single dynamic variable can be displayed by selecting it. For example, selecting PV will show the following screen on the handheld communicator.

MFT B-Sei P∨ 2987.2478	ries:KRZ HART ft3/min	]		X
HELP			EX	п

For the MFTB, the PV (Primary Variable) can be mapped to the MFTB measured flow rate or the MFTB measured velocity. This mapping is done by selecting the respective PV units as follows:

PV = Flow Rate	PV = Velocity
ft3/min	ft/min
ft3/h	m/s
L/min	
m3/h	
kg/min	
kg/h	
lb/min	
lb/h	

The flow meter actually measures and reports Standard Flow Rate and Standard Velocity referenced to the <u>Standard Temperature and Pressure programmed into the meter</u>. For a detailed discussion on Standard Volumetric Flow and Standard Velocity please reference the section on <u>Thermal Anemometer Measurements</u>.

When the PV units are changed and sent to the MFTB, the flow meter will make the associated changes to the analog output configuration to reflect the proper measured flow data being sent to the analog output channel. If Flow Rate is mapped to PV, then Velocity will be mapped to SV; and vice versa, if Velocity is mapped to PV, then Flow Rate is mapped to SV.

The MFTB TV (Tertiary Variable) and QV (Quaternary Variable) are mapped to temperature and totalized flow, respectively.

#### **SETUP** menu

The Setup menu contains several sub-menus used to change the flow meter's basic and advanced configuration parameters.

+	<b>H</b> /\/	<b>&gt;&gt;&gt;</b> 🖹 🗙
MFT	B-Series:KRZ H	ART
Onlin	e	
1 Dev	ice Monitor	
2 Set	up	
3 Utili	ties	
4 Rev	iew	
	SAVE	
_	and the second	

The following are the sub-menus available on the MFTB HART Setup Menu

+												
MFT B-Series:KRZ HART												
Setup												
1 Basi 2 Flov 3 Flov 4 Purg 5 Drift 6 Devi	c setup v Correc v Cal Da je Setuj Check ice infor	ction Coeffi Ita Setup Mation	cients									
		SAVE	HOME									

The Basic Setup sub-menu contains the parameters that setup the meter when it is first installed. The menu items are shown below.

-		<u><b>H</b></u> ///	<b>&gt;&gt;&gt;</b>		X
MFT B	-Sei	ries:KRZ H	IART		
Basic	setu	ıp			
1 Tag			K	rz hai	RT
2 Long	tag		KURZ 454FT	B FLO	
3 PV U	nits			ft3/m	in 🛛
4 Flow	Area	1	3.1	42 SQ	FT
5 Calcu	ılate	Flow Area			
6 Anal	og Or	utput			
HEL	Р	SAVE	HOME		

When you tap on "1 Tag" the following screen is displayed on the 375 communicator where you can enter the HART Short TAG. The HART Short TAG is mapped to the MFTB Tag Name which is displayed on the the MFTB local LCD display.

																)	>	X
MF	MFT B-Series:KRZ HART																	
Та	Tag																	
KR	KRZ HART																	
Γĸ	Ū	R	Z٨	٨F	TE	З												
¥₹	q	w	e	r	t	y	u	i	0	p	ŧ		*	1	7	8	9	5368 
Lock	a	s	d	f	g	h	j	k	I	,	@&	✦	-		4	5	6	FN
shift	z	x	С	۷	b	n	m	- 8	2 - 30	×	áü		+	0	1	2	3	
	HE	ELF	)			[	DEL	-			Ε	sc			E	П	EF	2

After entering the new HART Short Tag, tap "ENTER" to accept the entry. The change will be indicated with a HIGHLIGHT as shown below. The parameter name will also be marked with an asterisk. The highlight and asterisk indicate that the change has not been sent to the device. In order for the change to become permanent, you must tap on "SEND" to send the change(s) to the MFTB where the change(s) will be saved in the meter's nonvolatile memory so that it will be persistent even after power cycling the meter.



To change the PV Units, tap on "3 PV Units".

An advisory message is displayed that will remind you that a change in PV units may change the process variable (flow rate or velocity) assigned to PV.

<mark>∐∕</mark> \/∖ MFT B-Series:KRZ H	ART		<
A change in PV units wil variable assigned to the (PV)	ll change the Primary Var	e process iable	
	ABORT	ок	

The PV Units is selected from a list of supported flow units.



The list of supported PV units is shown in the Table below:

HART Menu List	Actual Meter Measurement
ft3/min	SCFM,
	Standard Cubic Feet per Minute
ft3/h	SCFH,
	Standard Cubic Feet per Hour
L/min	SLPM,
	Standard Liters per Minute
m3/h	SCMH,
	Standard Cubic Meter per Hour
kg/min	KGM,
	Kilograms per Minute
kg/h	KGH,
	Kilograms per Hour
lb/min	PPM,
	Pounds per Minute
lb/h	PPH,
	Pounds per Hour
ft/min	SFPM,
	Standard Feet per Minute
m/s	SMPS,
	Standard Meters per Second

The flow meter actually measures and reports Standard Flow Rate and Standard Velocity referenced to the <u>Standard Temperature and Pressure programmed into the meter</u>. For a

detailed discussion on Standard Volumetric Flow and Standard Velocity please reference the section on <u>Thermal Anemometer Measurements</u>.

The Flow Area is another menu item that can be changed under the Basic Setup sub-menu. The value of the Flow Area can be entered directly by tapping on "4 Flow Area". Alternatively, the method "Calculate Flow Area" can be used and guides you to enter the dimensions of your duct from which the Flow Area is automatically calculated. The Calculate Flow Area method is used, if you have a standard shaped duct or pipe that is either round or rectangular. For odd shaped ducts/pipe, you will need to calculate your flow area.

To enter your pre-calculated Flow Area, tap on "4 Flow Area".

← MFT B-Sei Basic setu	<u>₩′</u> \/\ ries:454 M ıp	FTB	
1 *Tag 2 Long tag 3 PV Units <mark>4 Flow Area</mark> 5 Calculate 6 Analog Ou	Flow Area utput	KU HART DD TI 3.14159	JRZMFTB EST 02 ft3/min 001 SQFT
HELP	SEND	HOME	

The following screen allows you to enter your flow area by using the keyboard on the display.

						H	Ŋ	$\setminus$						Γ		ו	>	X
MF	MFT B-Series:454 MFTB																	
Flo	Flow Area																	
3.1	3.1415901 SQFT																	
	3.1415901																	
_	_		_	_		200			_	_								_
¥.	q	w	e	r	t	y	u	i	0	р	+		*	1	7	8	9	
Lock	a	s	d	f	g	h	j	k	1	1	@&	◄	-		4	5	6	FN
shift	z	x	C	۷	b	n	m	- 8		5	áü		+	0	1	2	3	
	HE	ELF	>			[	)EL	-			E	sc			E	П	ĒF	2

To use the Flow Area calculation method, tap on "5 Calculate Flow Area".

← MFT B-Se	<u>₩</u> /// ries:454 M	IFTB		X
Basic setu	qr			
1 *Tag 2 Long tag 3 PV Units 4 Flow Ares	1 *TagKURZMFTB2 Long tagHART DD TEST 023 PV Unitsft3/min4 Flow Area3.1415901 SQFT			
5 Calculate 6 Analog O	Flow Area utput			
	SEND	HOME		

The method first prompts you to enter the profile of your duct or pipe.

<u><b>H</b></u> ∕\/			X
MFT B-Series:454 MF	тв		
Select the Duct Profile:			< >
1 Round			
2 Rectangular			
	ABORT	ENT	FER

For round profiles, you will enter the inside diameter of the pipe/duct. For rectangular profiles, you will enter the inside height and width of the pipe/duct.

ме																		
En (0.	Enter the Inside Diameter of the duct (inches):																	
2	4.	0																
¥₹	q	w	e	r	t	y	u	i	0	p	+	0	*	1	7	8	9	58—10
Lock	а	s	d	f	g	h	j	k	T	1	@&	₽	-		4	5	6	FN
shift	z	x	С	٧	b	n	m		2-34		áü	=	+	0	1	2	3	
						DEL				AB	OR	Г		E	TN	ĒF	2	

The method calculates the Flow Area from your input(s) and displays the value. You can choose to accept the calculated value by selecting "YES" and the new flow area will be sent to the MFTB.

<u><b>H</b></u> ///			X
MFT B-Series:454 M	-тв		
New Flow Area is: 3.142 SQFT			~ ~
1 No			
2 Yes			
	ABORT	EN	TER
$\mathbf{H}$			X
<u>H∕</u> \/∖ MFT B-Series:454 MF	тв		×
<u>H</u> ∕\/∖ MFT B-Series:454 MF Sending Elow Area to M	ТВ		×
<mark>₩</mark> /// MFT B-Series:454 MF Sending Flow Area to M	<b>-TB</b> FTB		×
<u>H</u> ∕\\ MFT B-Series:454 MF Sending Flow Area to M	<b>-ТВ</b> FTB		×
<u>₩</u> /// MFT B-Series:454 MF Sending Flow Area to M	тв FTB		×
<u>H</u> ⁄∖∕∖ MFT B-Series:454 MF Sending Flow Area to M	<b>-TB</b> FTB		×
H/// MFT B-Series:454 MF Sending Flow Area to M	<b>-ТВ</b> FTB		×
<u>H</u> ∕\\ MFT B-Series:454 MF Sending Flow Area to M	<b>-ТВ</b> FTB		×

The Analog Output sub-menu is where you set the analog output range of the 4-20 mA output.

←	<u><b>H</b></u>	<b>&gt;&gt;&gt;</b>		X		
MFT B-Sei	MFT B-Series:KRZ HART					
Basic setu	р					
1 Tag		К	RZ HAF	रा		
2 Long tag		KURZ 454FTB FLO				
3 PV Units		ft3/min				
4 Flow Area	1	3.1	42 SQ	-T		
5 Calculate	Flow Area					
6 Analog O	utput					
	SAVE	HOME				

The following items are available in the Analog Output sub-menu.

-		<b>H</b> /\/	[	<b>》</b>		X	
MFT B	MFT B-Series:KRZ HART						
Analog	Analog Output						
1 Loop	curr	ent mode			Enable	ed	
2 PV L	RV			0.00	0 ft3/m	in	
3 PV U	RV		5000.000 ft3/min				
4 Calib	rate	LRV					
5 Calib	rate	URV					
	_				1		
HEL	Р	SAVE	HO	ME			

The Analog Output (or PV) upper and lower range values can be entered directly or you can use the "Calibrate LRV" and "Calibrate URV" methods to re-range the flow meter. Note, these two methods are also available under the Common Utilities menu.

The following screens will guide you through the re-range procedure if the "Calibrate LRV" and "Calibrate URV" methods are used.

#### **Calibrate LRV**





<mark>∐∕</mark> \/ <sub>\</sub> MFT B-Series:454 MF	тв		X
NOTE-Loop may be returned to automatic control			
	ABORT	ок	

Calibrate URV

-	• <u>H</u> '// <b>&gt; </b>							
MFT B-Series:454 MFTB								
Comr	Common							
1 Res 2 Res 3 Loo 4 Cali 5 Cali <mark>6 Cali</mark>	et Con et Dev p test brate brate brate	ifig Changed ice 4-20mA Outp LRV URV	Flag ut					
HE	LP	SAVE	номе	Ξ				



<u><b>H</b></u> /\/		
MFT B-Series:454 Mi	тв	
Updating. Please wait		
	ABORT	
<u>₩</u> //\/ MFT B-Series:454 Mf	тв	
₩/// MFT B-Series:454 Mf NOTE-Loop may be returned to automatic control	тв	
H/// MFT B-Series:454 Mf NOTE-Loop may be returned to automatic control	-TB	

The remaining items in the Setup menu allow you to setup advanced features of the MFTB flow meter such as the Flow Correction Coefficients, Sensor Gas Purge Cleaning, and Drift Check.

The following sections discuss those advanced setup menus.

## **Flow Correction Coefficients**

The MFTB has various correction factors that are used to correct for velocity profile issues due to non-ideal installation effects on the measured flow. A sub-menu in the Setup menu contains all of the flow correction factors available for modification. The flow correction factors are obtained from the field calibration procedure (CAL-16) and may be entered into the flow meter using the Flow Correction Coefficients menu. Also available for display in the Flow Correction Coefficients menu is the Total CF (Total Correction Factor) which is the multiplicative

combination of all the flow correction factors. For a detailed explanation of the MFTB correction factors, see section AK - Variable CF Setup and Operation.

HFT B-Sei Flow Corr 1 Flow rate 2 Total CF 3 Correction 4 Number o 5 Correction	♥ ries:454 Ml ection Coe DAMP n Bias f Correcti n Data Sets	FTB efficients 0	.90000 sec 0.8173380 0.90000 5
HELP	SEND	HOME	
MFT B-Ser Correctior 1 VCF Data 2 VCF Data	<u>₩</u> /// ries:KRZ H n Data Sets Set 1 Set 2	IART s	
3 VCF Data 4 VCF Data	Set 3 Set 4		
	0.01/5	HOME	

← <u>H'</u> // ≫ È × MFT B-Series:KRZ HART VCF Data Set 1						
1 Reference	e value 1 1	0.5	00 ft/min			
		0.5				
HELP	SAVE	HOME				

The "Reference value" is the actual/true velocity or flow rate. The "Test Data" is the indicated velocity or flow rate as measured by the Kurz meter.

#### **Flow Cal Data**

The Flow Cal Data menu contains the Standard Reference Temperature and Pressure conditions of the process gas. If your temperature and pressure is different than the STP used for factory calibration of the meter, then the actual values should be entered in this menu.





## Purge Setup

The purge feature of the MFTB provides a method to clean the sensor with high velocity gas that blows off any build up of dirt on the sensor sting. The cleaning sequence can be initiated from the HART handheld communicator or it can be setup to be automatically triggered on a timer internal to the flow meter. The Purge setup menu is shown below.

← <u>H</u> /// ≫ È ★ MFT B-Series:454 MFTB Purge Setup						
1 Auto Pur 2 Interval 3 Width 4 Hold Tim 5 Start Pur	ge OnOff e ge		OFF 120 min 600 msec 1 sec			
HELP	SAVE	HOME				

In order to have the cleaning sequence automatically triggered, Auto Purge needs to be set to ON and (Purge) Interval needs to be defined. The "Width" and "Hold Time" define parameters of the actual cleaning cycle. The Purge Width is the length of time the purge solenoid is held open. The Hold Time allows the sensor to recover from the purge cleaning to minimize the large flow spike following the purge. The Hold Time is the total time for the entire purge cycle (e.g. a Hold Time of 1 second (1000 milliseconds) with a Purge Width of 600 milliseconds means that the purge relay will be pulsed for 600 milliseconds, followed by an additional 400

milliseconds of idle time to allow for sensor recovery). During the Hold Time, the AO value is frozen at the pre-purge value to minimize disruption of a control loop during the purge cleaning cycle.

#### Start Purge method

To initiate a purge cleaning, tap on "5 Start Purge" (this method is also available on the Device Specific Utilities Menu). The following warning message will be displayed followed by a confirmation message before a command is sent to the flow meter to start a purge cleaning cycle.

<u>₩′</u> \/\ MFT B-Series:KRZ H	ART		X
WARN -Loop should be removed from automatic control			<
	ABORT	0	к
		- Aleren	
<u><b>H</b></u> ///		A	X
<mark>∐∕</mark> \/∖ MFT B-Series:KRZ H	ART		×
<u>H</u> ∕∖∕γ MFT B-Series:KRZ H Confirm Start Purge	ART		×

<u>H</u>			X
MFT B-Series:KRZ H	IART		
Instructing MFTB to begi wait	in Purge. Pl	ease	< >
	ABORT	1	
<b>TT</b> A A			
<u>H′</u> V∨			X
MFT B-Series:KRZ H	IART		1
Purae in progress			
r arge in progress			

## **Drift Check Setup**

The Drift Check feature in the MFTB is a diagnostic test wherein an independent voltage source within the MFTB electronics is used to drive the 4-20 mA output so that the expected output can be compared against the actual loop current signal to verify proper calibration of the 4-20 mA output of the flow meter. This is also known as the EPA zero-span drift check and is used for emission monitoring system daily compliance with the EPA. The independent voltage source has a range of 0 to 3.3 Volts.

The Drift Check tests provide for three voltage test levels, a zero, middle and span check. For each Drift Check test level you must configure an amplitude of the output signal and a duration that the output signal is applied. The amplitude is given as a % of the full-scale of the independent voltage source (3.3V). For example, if you enter 10.0 for "% FS at Zero", this

means that 0.33V (10% of 3.3V) will be applied to the 4-20mA output for the Drift Check at Zero. The duration is the time the 4-20mA output is forced at the % level specified for the test.

The Drift Check setup parameters are shown below.



The Drift Check test can be configured to automatically initiate on a specified interval. This is done by setting the parameter "Auto Drift Check" to ON and specifying a drift test interval ("8 Interval"). Alternatively, you can initiate a Drift Check through the 375 communicator, by selecting "9 Run Drift Check". The Run Drift Check method is also available under the Device Specific Utilities menu.

#### **Run Drift Check**

When you select Run Drift Check, the following screen provides the option to run any of the Drift Checks individually or perform the entire cycle of drift check tests.

<mark>∐∕</mark> \/∖ MFT B-Series:KRZ H	ART							
Select desired Drift Check action: (Perform								
Perform Zero drift check Perform Mid drift check Perform Span drift check Perform drift check cycle	(							
	ABORT	ENTER						

Once a Drift Check test is selected, the following informational screen will be displayed while the 375 sends the appropriate command to the MFTB to initiate the test.

<u>₩</u> //\/ MFT B-Series:KRZ H	ART		X
Preparing the selected E Please wait	)rift Check (	action.	
			~
	ABORT		

Note, while a Drift Check is running, the 4-20mA output (loop current) will represent the percent of Full Scale (of 3.3V) that the Drift Check level was configured at, not the PV reading.

## **Device Information**

The Device Information Setup menu contains the HART universal and common variables, some of which can be modified in this Setup menu. The items included in this menu are shown below.

<b>←</b>	XX	<b>&gt;&gt;&gt;</b>		X								
MFT B-Series:KRZ HART												
Device information												
1 HART output												
2 Manufacturer Kurz Instruments												
4 Devid			425984	-5 10								
5 Cfq chnq o	count		68	5								
6 Tag		К	RZ HAR	т								
7 Long tag	K	JRZ 454FTB I	LOW									
8 Date		0	6/09/201 I	0 💌								
	SAVE	HOME										
-	ΤΤΛΑ											
←	<u>H</u> '\/\	<b>&gt;&gt;&gt;</b>		X								
← MFT B-Ser	<mark>₩</mark> /\/ ies:KRZ H	IART		×								
← MFT B-Ser Device info	<u>H∕</u> \/∖ ies:KRZ ⊢ ormation	IART		×								
← MFT B-Ser Device info 8 Date	<u>H∕</u> \/∖ ries:KRZ ⊢ ormation	IART 0	6/09/201	X								
← MFT B-Ser Device info 8 Date 9 Last Cal D	<u>H</u> ∕∖∖∖ ries:KRZ ⊢ ormation ate	IART 0	6/09/201 6/6/200									
← MFT B-Ser Device info 8 Date 9 Last Cal D Final asmb	<u>H</u> ∕∖∖∖ ries:KRZ H ormation ate oly num	IART 0	6/09/201 6/6/200	X								
MFT B-Ser Device info 8 Date 9 Last Cal D Final asmb Write prote	<u>H</u> ∕∖∖ ries:KRZ ⊢ ormation ate ate oly num act	IART 0	6/09/201 6/6/200 Non	X								
MFT B-Ser Device info 8 Date 9 Last Cal D Final asmb Write prote Descriptor	H//// ries:KRZ H ormation ate ate aly num	IART 0	6/09/201 6/6/200 Non	X								
MFT B-Ser Device info 8 Date 9 Last Cal D Final asmit Write prote Descriptor Message Revision #	<u>H</u> ∕∖∖ ries:KRZ ⊢ ormation ate oly num ect	IART 04	6/09/201 6/6/200 Non	X								
MFT B-Ser Device info 8 Date 9 Last Cal D Final asmit Write prote Descriptor Message Revision #	H/W ries:KRZ H ormation ate oly num act	IART 0	6/09/201 6/6/200 Non									



#### **UTILITIES Menu**

The Utilities menu contains various methods and MFTB diagnostic data used for maintenance and troubleshooting of the MFTB.

HFT B-S Online	<u>₩</u> /\\ Series:KRZ H	IART	X
1 Device 2 Setup <mark>3 Utilities</mark> 4 Review	Monitor S		
	SAVE		

The menu is divided into three categories as shown below.



The Common sub-menu contains the common methods that all HART registered devices are required to support. Those common methods are shown below.

-	<u><b>H</b>′</u> \/∖	<b>&gt;&gt;&gt;</b>						
MFT B-Ser	ies:KRZ H	IART						
Common								
1 Reset Con	fig Changed	Flag						
2 Reset Devi	ice							
3 Loop test								
4 Calibrate 4	I-20mA Outp	ut						
5 Calibrate	RV							
6 Calibrate	JRV							
	SAVE	номе						

#### Loop Test

The loop test allows you to verify the 4-20mA output of the flow meter. You will need a precision ampere meter or current meter to verify the output during the test.

←									
MFT B-Se	ries:454 M	FTB							
Common									
1 Reset Cor 2 Reset Dev	nfig Changed vice	Flag							
3 Loop test									
4 Calibrate	4-20mA Outp	ut							
5 Calibrate	LRV								
6 Calibrate URV									
HELP	SAVE	HOME							

When the loop test is selected, the 375 will display the following informational screen.

<mark>∐∕</mark> \/∖ MFT B-Series:454 MF	тв		X
WARN-Loop should be re automatic control	emoved fron	1	<
			$\sim$
	ABORT	0	К

The next screen allows you to select an analog output level.



If 4mA is selected, the 375 will display the following.



While this is being displayed you can verify the reading on your ampere meter or current meter that it is displaying 4.0 mA (if it is not, you may need to run the "Calibrate 4-20mA Output" method). You can select a mid-range output level by selecting "Other".

<u><b>H</b>′</u> ∖∕∖	Ð	X							
MFT B-Series:454 MFTB									
Choose analog output le	evel		<						
1 4mA 2 20mA									
3 Other 4 End									
	ABORT	ENT	rer						

The following screen will be displayed for you to enter an output level.

MF	H/V MFT B-Series:454 MFTB ▮																	
01	Output (10.000 mA)																	
1	2.		_	_		200			_	_								
÷,	q	W	e	r	t	y	u	i	0	р	+		*	1	7	8	9	
Lock	a	s	d	f	g	h	j	k	T		@&	┢	Ι		4	5	6	FN
shift	z	x	С	۷	b	n	m	- 8	-	5	áü		+	0	1	2	3	
HELP DEL ABORT ENTER									2									



To exit the loop test, select "End" and the 375 will command the MFTB to return to normal operating mode.

<u>H</u> ///			X
MFT B-Series:454 MF	тв		
Choose analog output le	vel		<
1 4mA 2 20mA 3 Other			
4 End			
	ABORT	EN	FER



### Calibrate 4-20mA Output

The 4-20 mA calibration refers to modifying the transmitter conversion of the digital signal to an analog signal through comparison and characterization of expected output values with values actually reported by a calibrated accurate output measurement device, in this case, an ampere meter or current meter. The calibration method in the MFTB DD guides the user through the steps to calibrate the 4-20 mA output channel. The calibration procedure is performed as follows:

- 1. From the Online menu, select "3 Utilities"
- 2. From the Utilities menu, select "1 Common"
- 3. From the Common (Utilities) menu, select "4 Calibrate 4-20 mA Output"

The following screen shots below show the step by step instructions using an Emerson handheld communicator to calibrate the 4-20mA otuput.







ABORT

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#### **Device Specific menu**

The Device Specific menu contains methods for features/functions that are unique to the MFTB.

← <u>H</u> /// ≫ È × MFT B-Series:KRZ HART Utilities					
1 Common <mark>2 Device Sp</mark> 3 Diagnostic	ecific : Measureme	ents			
	SAVE	HOME			

The following items are available in the Device Specific Utilities menu.

←		<b>H</b> /\/	<b>&gt;&gt;&gt;</b>		X	
MFT B-Series:KRZ HART						
Devic	e Sp	ecific				
1 Drift	t Chec	k				
2 Star	rt Purg	e				
J Res	et Dev	lizer				
4 Kes	errota	IIIZei				
				1		
		SAVE	HOME			

The Drift Check and Start Purge methods were discussed previously in the Setup Menu section since these methods are also available in sub-menus available under the Setup menu.

#### **Reset Totalizer**

The Reset Totalizer method allows you to reset the Totalized Flow accumulator. The following screens show the steps involved to reset the totalizer.



## **Reset Device**

The Reset Device method allows you to power cycle the meter through the 375 communicator. The following screens show the steps to perform the flow meter reset.

FT B-Se Device Sp 1 Drift Chec 2 Start Purg 3 Reset Dev 4 Reset Tot	<u>H</u> ∕∖∖ ries:KRZ H ecific k je ⁄ice alizer	IART	×
	SAVE	HOME	
MFT B-Se WARN -Loc removed fr automatic	H/// ries:KRZ H op should be om control	IART	×





#### **Diagnostic Measurements**

The Diagnostics Measurements sub-menu provides diagnostic data specific to the MFTB that is useful for field support technicians to diagnose and troubleshoot a malfunctioning flow meter.

₩ MFT B-Ser Utilities	♥ ries:KRZ H	IART	X
1 Common 2 Device Sp <mark>3 Diagnostic</mark>	ecific Measureme	ents	
	SAVE	HOME	

The following shows the MFTB data available in the Diagnostic Measurements menu.

-		沒		<b>&gt;&gt;&gt;</b>	Ð	X
MFT B-Series:KRZ HART						
Diagr	nostic	: Measurei	ment	S		
1 Tota	al CF				0.9	08
2 Inpu	ut Volt	age				
3 Sen	sor Ou	itput				
					1	
HE	LP	SAVE	НС	ME		

#### **REVIEW Menu**

The Review Menu provides a means to review the MFTB data without the risk of accidentally changing any value. This is a View-only menu.

+		<b>H</b> ///		<b>&gt;&gt;&gt;</b>	X
MFT	B-Ser	ies:KRZ ⊢	ART		
Onlin	e				
1 Dev	vice Mo	nitor			
2 Set	սթ				
3 Util	ities				_
4 Rev	iew				
					_
		SAVE			
		and the second se			
		HAA.			
┍╴		•••V V			പ
MFT	B-Ser	ries:KRZ I	IART		
Revie	ew				
1 HA	RT Dev	ice Data			^
2 Pro	cess V	ariables			
2 Pro 3 Dia	cess V gnosti	ariables c Measurem	ents		=
2 Pro 3 Dia 4 Dev	cess V gnostic /ice Sta	ariables c Measuremo atus	ents		=
2 Pro 3 Dia 4 Dev 5 Bas 6 Elec	cess V gnostic /ice Sta sic Setu	ariables c Measurem atus up action Cooff	ents		E
2 Pro 3 Dia 4 Dev 5 Bas 6 Flo 7 Elo	cess V gnostic vice Sta sic Setu w Corr	ariables c Measuremo atus up ection Coeff Data	ents icients	i	=
2 Pro 3 Dia 4 Dev 5 Bas 6 Flo 7 Flo 8 Pro	cess V gnostic vice Sta sic Setu w Corr w Corr w Cal I	ariables c Measuremo atus up ection Coeff Data up	ents icients	;	



MET R Sariaa:KR7	
Input Voltage	
anput voitage	0.2229705 Valta
4 VLeakSense	3.0407131 Volts
5 VRtch	2.2881086 Volts
6 VRtcl	0.6310058 Volts
7 VExtin 8 VTemp	0.0002144 Volts
9 VCal	0.0001072 Volts
HELP	EXIT
Nul. A	
← ☆	
MFT B-Series:KRZ	HART
Diagnostic Measure	ments
1 Total CF	0.908
2 Input Voltage	
3 Sensor Output	
1	EVIT
	EXI
	EXII
<u> <u> <u> </u> <u> </u></u></u>	
← <u>H′</u> /∖ MFT B-Series:KRZ	
← <u>₩</u> ⁄// MFT B-Series:KRZ Sensor Output	HART
← <u>H</u> ⁄/√ MFT B-Series:KRZ Sensor Output 1 Rp Current	HART 0.3272057 Ampere
MFT B-Series:KRZ Sensor Output	HART 0.3272057 Ampere 1.3972815 Watt
MFT B-Series:KRZ Sensor Output <u>1 Rp Current</u> 2 Rp Power 3 Rp Resistance 4 Btc Resistance	EXII EXII EXII ART 0.3272057 Ampere 1.3972815 Watt 13.0742016 Ohm 329 9585571 Ohm
MFT B-Series:KRZ Sensor Output I Rp Current 2 Rp Power 3 Rp Resistance 4 Rtc Resistance 5 Sensor Wire R	EXII EXII EXII EXII ACCOUNT INFORMATION
MFT B-Series:KRZ Sensor Output 1 Rp Current 2 Rp Power 3 Rp Resistance 4 Rtc Resistance 5 Sensor Wire R 6 Sensor Leak R	EXII EXII
MFT B-Series:KRZ Sensor Output Sensor Output <u>1 Rp Current</u> 2 Rp Power 3 Rp Resistance 4 Rtc Resistance 5 Sensor Wire R 6 Sensor Leak R	EXII EXII EXII EXII EXII C.3272057 Ampere 1.3972815 Watt 13.0742016 Ohm 329.9585571 Ohm 0.4342450 Ohm 287485.8437500 KOhm
MFT B-Series:KRZ Sensor Output 1 Rp Current 2 Rp Power 3 Rp Resistance 4 Rtc Resistance 5 Sensor Wire R 6 Sensor Leak R	EXII EXII EXII EXII 0.3272057 Ampere 1.3972815 Watt 13.0742016 Ohm 329.9585571 Ohm 0.4342450 Ohm 287485.8437500 KOhm



HFT B-S Device E	Series:KRZ HART Error Status		<
1 Rp resis	stance abov	OFF	^
2 Rp resis	stance belo	OFF	
3 Rtc resi	stance abov	OFF	
4 Rtc resi	stance belo	OFF	
5 Wire Re	esistance ab	OFF	
6 Sensor	RPS lead o	OFF	
7 High se	nsor or wire	OFF	
8 Flow ra	te above de	OFF	~
		EXIT	

← XX	
MFT B-Series:KRZ HART	
Device Error Status	
9 Reserved	OFF 🔼
Reserved	0FF
ADC failed to conve	OFF 📃
Sensor control stop	0FF
Sensor control cro	0FF
Sensor type does n	OFF
Abnormal sensor n	0FF
Unable to write ne	OFF 👱
	EXIT

← ☆ MFT B-Series:KRZ HART Device Error Status		<
Sensor Type Does	OFF	^
Reserved	OFF	
Reserved	OFF	
Reserved	0FF	
Reserved	0FF	
Reserved	OFF	
Reserved	OFF	
Reserved	0FF	~
	EXIT	



MFT B-Series:KRZ HART		
Device Error Status		
MFTB Alarm 1	0FF	^
MFTB Alarm 2	0FF	
Reserved	0FF	
Reserved	OFF	
Zero Drift Test in pr	OFF	
Mid-span Drift Test i	OFF	
Full-span Drift Test i	OFF	
Drift Check Cvcle Al	OFF	~
	EXIT	

← X ★ MFT B-Series:KRZ HART Device Error Status	
Mid-span Drift Test i	OFF 🔼
Full-span Drift Test i	OFF
Drift Check Cycle Al	OFF
Purge Start Flag	OFF
Unused	OFF
Unused	OFF
Unused	OFF 📃
	~
	EXIT

#### **HOT KEY Menu**

The MFTB DD contains a preconfigured Hot Key menu that contains menus that are frequently used. The Hot Key menu is invoked by pressing the >>> (triple arrow symbol) at the top right hand corner of the screen.

The following screen shows the menus available on the Hot Key menu.



← <u>H'</u> // ≫ È × MFT B-Series:KRZ HART Bapge values		
1 PV LRV 2 PV URV 3 PV 4 PV 5 PV		0.000 ft3/min 5000.000 ft3/min ft3/min 0.000 99999999.000
HELP		