# Operation

This section of the manual describes the basic operation of the unit. Configuration of the parameters such as duct area, analog output range, correction factors, meter identification or tags, etc. are covered elsewhere.

The unit turns on with a scrolling display showing flow, temperature, totalization, elapsed time and meter ID tags (see section below). This scroll allows viewing of the principle variables without removing the threaded cover to access the keypad. If you remove the



cover as shown below, you can monitor or change most parameters of interest. The **D** key accesses the display menus. Once in a menu area, you can also use the **^v** keys to navigate the menus. A screen can be held by pressing **H**. To clear the hold press **C**. The following sections describe this in more detail.

A small finger or pencil eraser works best to hit the membrane keypad in the center of each key. This display will mount on any 90 ° angle within the enclosure. The Keypad/LCD shown here with the flow body on the top and power/signal conduit ports on the bottom left and right.

Figure B-1. Optional Keypad/LCD.

## *Power-On Sequence*

For units with the optional LCD display, you will see:

1. The green back light at power on.
2. The display will show for short time:

```
KURZ INSTRUMENTS
DISP DRIVER V4.1
```

3.  It will clear then show:

```
KURZ INSTRUMENTS
SERIES MFT-B
```

4.  Start scrolling the "executive state" which is defined later.  This includes the basic mode command buttons and the meter summaries.  The analog output becomes active as soon as the executive state is reached which takes about 20 seconds for the whole boot process under flow.  For a full description of this and flow rate dependent boot times see this section. The parameters you need to configure or setup your mass flow transmitter are available via the keypad and 2x16 LCD.  This section of the manual presents the material to configure the Kurz MFT B-Series units.

## *Overview of the User Interface*

After boot up or power on, the unit will scroll the display showing some of the principal keys to launch operation.  The scrolling screens show the meter ID's, Rate, Totalization and some of the help screens.  This permits viewing of the flow and temperature data through a glass window without opening the cover or using any special tools.  This power up state is known as the *executive mode*.  The following is a sample of the typical displays in *executive mode*.

```
KURZ INSTRUMENTS
SERIES MFT-B
```

```
PRESS H FOR HOLD
HH FOR HELP
```

```
METER #1, FLOW
ID: FLOW RATE
```

```
224.8586    SCFM
3.014788     MSCF
```

```
METER #2, TEMP
ID: TEMPERATURE
```

```
75.97        DEGF

```

If you access the keypad and press the **D** function key, this will permit viewing of the meter data for flow or temperature. Pressing the **P** function key accesses the programming mode. The user view-only code is "123456" followed by the **E** key to accept this code. If either mode is selected and there is no keypad action within two minutes, it will revert to the *executive mode.*

All of the above menus may be accessed via the USB port using a terminal emulator program (HyperTerminal) with the baud rate set to 9600. The primary difference is that the new displays scroll up the previous displays instead of over writing in place like the LCD does. The function keys in terminal mode are the same as the 4x5 keypad but in lower case. There is also a command which will turn off the display or echo of the display characters to the serial ports. This is accomplished by pressing the **+** key, (shift +). Pressing this again will toggle it back on. The unit still responds to the keyboard commands (q, l, ?, +, esc xxxx) when the echo is off. The up arrow **^** (shift 6, above the 6 key) is the same as **"YES"** and will move you from one screen to another. Alternately you can use the down arrow **v** (small v) or **"NO"** to move from one screen to another in the opposite direction. A summary of these single key commands can be found by pressing **?** from the terminal keyboard or **HH** from the keypad.

## *Navigating the Menus*

Pressing **P** or **D** will advance the menu categories forward one screen at a time without making changes. If you continue pressing the keys, you will end up back where you started. If you overshoot the menu category of interest, you can backup with the **v** key. Alternately, you can also move forward with the **^** key. Once you enter a menu category within program or display mode you can only advance the screens with the **D** or **P** key depending on the mode you are in. The **^v** keys within the menu categories are used to change entries or selections.

## **Selecting Menus**

You select a menu category of interest by pressing the **E** key or enter. Sometimes you have the option of choosing more than one meter, or output before entering a menu. At these screens the **^v** keys will change the sub-menu. To deselect or step out of a menu

you press the **C** key once or twice depending on the menu.

## Entering Data

Program menus can only be changed if you use the change tech code "654321" after pressing the **P** key.  You enter data into a menu by typing the number directly from the keypad, including any decimal points.  The **^v** arrow keys will also change values.  When you first enter a menu, the most significant digit is changed by the **^v** keys.  If you press a number it automatically is entered starting at the most significant digit then it moves the entry point to the right one character.  At any time you may change the last entered value with the **^ v** keys.

For menus with multiple selections, the **^v** keys are needed to change the selection.

Once you have entered the number or selected the parameter of interest, the value is accepted by pressing the **E** or enter key.

Note:  When entering meter IDs or other text using a remote terminal, you must use upper case characters only.  The lower case characters are used for the keyboard commands.

## Clearing Data, Editing Data or Exiting Menus

The **D** or backspace key will clear one character to the left, similar to the backspace key on a computer.  The **C** key will clear the whole value in a menu.  Pressing the **C** key a second time will exit the menu without any change.

## Holding a Menu For Display

You may freeze or hold any menu beyond the two minute auto-exit interval to view the information like flow rate or temperature by simply pressing the **H** key.  This mode is cleared by pressing the **C** key.

## *Help Display*

A list of local commands can be found by pressing the **H** key twice or **HH**.  The help screens list the firmware revision level, Kurz telephone and FAX numbers and the website address.


## *Flow Meter Time Constant*

Different factors are involved with controlling the speed of the MFT B-series.

- Sensor Response Time (see Brochure)
- Meter Filter time constant (see *configuration changes* section for adjustments)

Depending on the various settings, you can have a response time which is sensor limited or over damped using the Meter Filter.  The net response is the cascade of all the above.  So even if the Meter Filter is at 0 seconds, the response time will still be limited by the sensor.


## *Configuration Data Storage*

The configuration data is stored in EEPROM on the MFT B- Series board.    All information about the flow meter is stored in this memory.  In addition, the original Factory configuration of the sensor data and 4-20 mA calibration is stored in the EEPROM of the unit.

When making changes in program mode, you are asked to save the changes or not.  If the changes are not saved, they will still be in force until the next power cycle where it will revert to the configuration stored in EEPROM memory.

An external method of saving the configuration is available with the upload/download process via a PC terminal emulator program described next or KZCOMM.


### Configuration, Upload/Download using Xmodem

The upload/download process allows you to save not only the Factory data but your field customization in a remote file. This is done one of two ways, by uploading it to a PC running a terminal emulator program with Xmodem or using the Kurz program KZCOMM which ships with all meters.  See the KZCOMM documentation for instructions on how to use the program to transfer configuration files.  The configuration file will transfer a binary file of about 4 kbytes in 5 seconds at 9600 baud.  To initiate this using a terminal

emulator, you enter the command:

*Esc***upload***Ret*

That is the "esc" or escape key on your keyboard followed by the text "upload" then the enter key or return key.  You will be prompted that it is ready to start the Xmodem receive on the PC.  Using HyperTerminal, select Transfer, Receive File and then select the file location and name in which you want the binary configuration stored.  If you spend too much time (more than 30 seconds) getting started, you will have to issue the command again.

To copy this configuration back into a unit or transfer it to another MFT B-Series with the same configuration file format, you use the command:

*Esc***download***Ret*

That is the "esc" or escape key on your keyboard followed by the text "download" then the enter key or return key.  You will be prompted that it is ready to start the Xmodem transmit file on the PC.  Again you have 30 seconds before it times out.  Using HyperTerminal select Transfer, Send File and then select the binary configuration file to be transferred to the MFT B-Series Unit.

The above commands are effective only when the MFT B-Series is in the *Executive Mode*.  It is recommended to turn OFF the terminal echo during this process to avoid dumping character strings on the terminal screen. Refer to the section *Overview of the user Interface* on how to turn the terminal echo ON and OFF.

## *Calibration of the Analog Output*

Operates similarly to the Series 155 Mass Flow Computer and the MFT series.  You enter the menu and must use an external meter to "dial in" the 4.0 mA Zero and then the 20.0 mA Span.  The **^v** keys are used to raise or lower the output until it matches the two conditions listed.  Once they are in agreement, you press the **E** key to accept this value.  See the Configuration section of the manual for step-by-step instructions.

## *Calibration of the Analog Input*

There is no user calibration of the inputs.  This is a Factory process only.  If your transmitter is reading the ambient temperature within a few degrees when the flow rate is

higher than 100 SFPM (0.5 SMPS), then the input is properly calibrated and your sensor is most likely working also.  You can also test the independent calibrator under the zero-span menu to confirm the accuracy of the calibration

## *Alarms: Flow, Pulsed Totalization and NE-43*

The MFT B-Series has two types of alarms.  The basic alarms from the meter value will trip high, low, or high/low with flow or temperature.  Two solid state relays are used for this function.  These relays are shared with the pulsed totalizer output and purge output.  You assign the alarm relays for meter, totalizer, or purge operation.

Meter failures can also be indicated with the solid state relays or the NE-43 alarm.  The NE-43 alarm is activated by the low or high value kick-out.  Normal signals are clipped to stay between 3.8 and 20.5 mA.  Figure B-2 shows the NE-43 implementation.  See the diagnostics section for a full description of the conditions which will set the NE-43 alarm.

Figure B-2.  NE-43 Alarm signaling on the 4-20 mA outputs.

NE-43
Alarm                   Saturate                          Saturate            NE-43
                                                                              Alarm

| Normal Operation |

0          3.6  3.8                                          20.5  21       mA