Section ZC
LED Display/Keypad Interface for Model MPPU – Level 3
Operators Manual

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ZC.1 Introduction

The SCAN-A-LINE™ Multi-Purpose Processing Unit-Model MPPU Level 3 incorporates an LED display and keypad customer interface{Figure ZC.1-1}. This processing unit is set up and adjusted from the front panel or from a remote installation of the display [Level 3/50 Option – Section ZC.14]. All commands and functions are available from the Level 3 display via the data entry keypad.

This manual covers only the commands and the operation of this Level 3 interface. Other information pertaining to the Model MPPU, such as analog outputs, installation, and sensor connections, are located in the main body of the manual [Section Z]. For information on other customer interfaces, refer to Sections ZA and ZD (if applicable). For information on custom Model MPPUs, refer to EVO documentation.

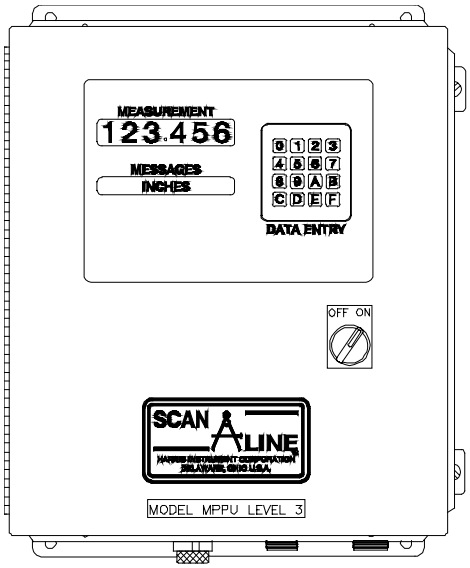


Figure ZC.1-1: Model MPPU Level 3

ZC.1.a Manual Conventions

Throughout this section, there are many keypad functions that are used to signify command entries. Different fonts will be used for the keypad entries and the display text. The following table describes these commands and keystrokes.

Key	Description
F	*Alpha keystrokes on Keypad*
1	*Numeric keystrokes on Keypad*
123456	*Measurement window readout*
SETUP	*Messages window readout*

Table ZC.1-1: Manual Conventions

ZC.1.b Functional Description

The Model MPPU Level 3 consists of two display windows and a data entry keypad built into an aluminum bezel. The customer interface is mounted on the front panel of the processing unit {Figure ZC.1-1} or may be mounted remotely (Level 3/50 Option). The Model MPPU can also be configured with up to two separate customer interfaces. If a second customer interface is installed, the RS-232-1 port will be used to connect to the remote display (or host computer).

ZC.1.c Operational Considerations

The Level 3 interface is designed to operate in an industrial environment and can readily tolerate average factory conditions. Commonsense considerations for protection and maintenance of the Model MPPU Level 3 will ensure it's operation for years to come.

Operational temperatures should fall in the range from 32°F to 122°F [0°C to 50°C]. Temperatures above 140°F [60°C] for prolonged periods of operation or storage can lead to the degradation of the integrated circuits in the Level 3 interface. If temperatures outside the specified range are expected, special provisions should be made to protect the equipment.

SCAN-A-LINE™ processing units can tolerate reasonable amounts of shock and vibration. The major problem with vibration is the increase in probability of loose hardware and/or connectors. Mount the processing unit to a solid, fixed mounting where vibration is minimum. When high levels of vibration or shock are likely, shock absorbing mounts may reduce any problems.

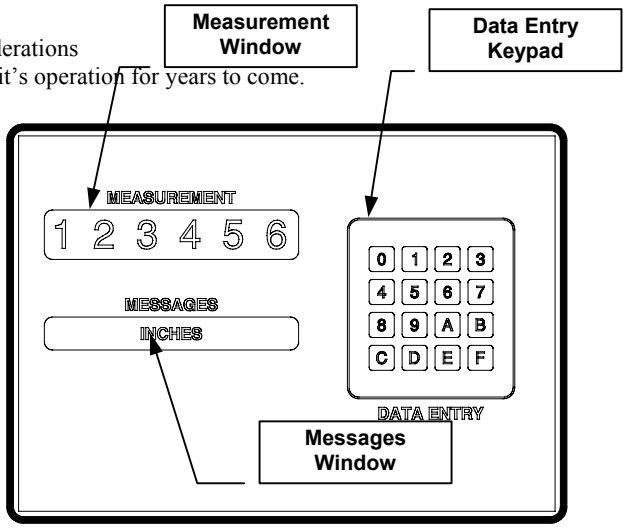


Figure ZC.1-2: Model MPPU Level 3 Display

ZC.1.d Display Windows

The Model MPPU Level 3 has two display windows {Figure ZC.1-2}. The top window is the Measurement window where measurement readings are displayed in the *Readings Mode* [Section ZC.2.a] and where data entry is displayed in the *Setup Mode* [Section ZC.2.b].

The bottom window is for messages pertaining to the current operation. Upon power up, the Messages window displays:

POWER UP COMPLETE !

in the Messages window. This informs the operator that the system power up routine was performed without problems. The power up message will be replaced by the current unit of measure or the SYS DEFAULTS message within a few seconds.

When in the *Setup Mode*, the Messages window is used to prompt the operator for the various data values that are required for the particular set-up routine. When in the *Readings Mode*, the Messages window displays the current unit of measurement of the system and if the sensor(s) are faulted [see Section ZC.2 for information on the modes of operation and Section Z.7 for fault].

ZC.1.e Keypad Entry

To the right of the two display windows is the Data Entry Keypad {Figure ZC.1-2}. This alpha-numeric keypad uses 16 keys, 0 through 9 and A through F. All data entry in the *Setup Mode* is entered with this keypad.

Prior to any keypad data entry, the current value in the Measurement window must be cleared by pressing the "C" key. Decimal values (i.e. 0.5) MUST be preceded by a zero and the "F" key pressed for the decimal point. Once the value is entered, the "D" must be pressed to accept the entry. For example, to enter the value of ½ (0.5), perform the following procedure:

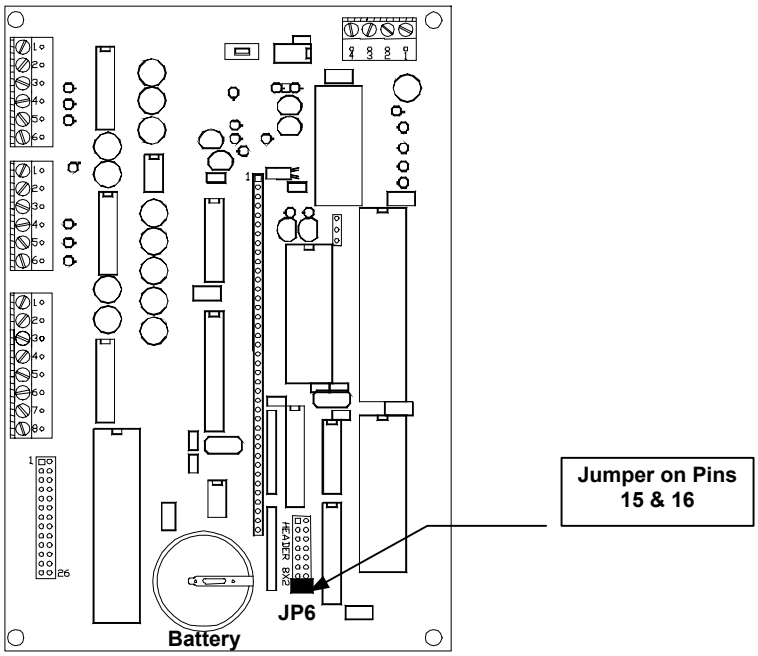
C 0 F 5 D

NOTE:

When in the Readings Mode, pressing any key (except the "F" key) will cause the unit to enter the Setup Mode and stop displaying readings.

ZC.1.f Display Jumpers

The Model MPPU Level 3 requires a jumper to be set when the display is installed [a second jumper is required for a secondary display – see Section ZC.14]. This jumper is typically set from the factory, though a unit installed in the field may need to have the jumper set.



The jumper for the Model MPPU Level 3 customer interface should be located on pins 15 and 16 {Figure ZC.1-3) of the Model MPPU micro-controller board (Part # 3695172 Rev. C).

ZC.2 Modes of Operation

There are two main modes of operation, that also include several sub-routines, for the Model MPPU Level 3 interface.

ZC.2.a Readings Mode

In this mode the Measurement window will show the measurement readings from the Model MPPU and the Messages window will show the units of measure label, as well as various operational messages (such as FAULT status). This mode is automatically entered when the unit is powered up.

The *Readings Mode* has one sub-routine:

Date/Time Routine: Accessed when in the *Readings Mode* by pressing the "F" key. The current date and time will display for three seconds in the Messages window and then return to the *Readings Mode*. See Section ZC.5.b for information on the Date/Time sub-routine.

ZC.2.b Setup Mode

In this mode the Model MPPU Level 3 is set up and adjusted for operation with the sensors, calibration of the unit, limits, analog scaling, etc. Press any key except the "F" key while in *Readings Mode* to enter the *Setup Mode*. The Measurement window will display blank lines and the Messages window will display:

SETUP MODE !!!!

The *Setup Mode* has several sub-routines:

a) Calibration Routine: The calibration routine is used for calibrating the sensors to the systems current product passline for the existing installation. See Section ZC.8 for information on the system calibration routine.
b) Data Entry Routine: All of the *Setup Mode* functions require data entry via the keypad. The Messages window will prompt the operator for the appropriate data for the function being run.
c) Factory Default Routine: The factory defaults can be loaded into memory to reset the system variables. See Section ZC.15.d for more information on the Factory Defaults.

ZC.2.c Lock Out Codes

Many of the Model MPPU Level 3 interface functions and routines in *Setup Mode* have a lock out code to prevent the unauthorized access to the system commands. This command code can be optionally customized.

When accessing Model MPPU Level 3 interface functions that have a lock out code, the default lock out code is:

9876

Be sure to press the "D" key to accept the lock out code. An improper lock out code will display the following message in the Messages window:

Invalid Lockout Code

Simply clear the Measurement window with the "C" key and re-enter the lock out code.

ZC.3 Command Keys Listing

The Model MPPU Level 3 interface commands are entered via the keypad on the display bezel. Individual keys have different commands dependent upon the *Setup Mode* routine being used. The Level 3 interface commands are as follows:

Key	Mode	Description	Lockout Code	
Any but [F]	*Readings*	*Begin Set-up Mode.*	*N*	-
[0]	*Calibration*	*Enter Calibration Routine.*	*Y*	**9876**
[1]	*Data Entry*	*Baud Setting.*	*Y*	**9876**
[2]	*Data Entry*	*Target Setting.*	*N*	-
[3]	*Data Entry*	*Lower Limit Setting.*	*N*	-
[4]	*Data Entry*	*Upper Limit Setting.*	*N*	-
[5]	*Data Entry*	*Set High Absolute Analog Scaling.* *Set Low Absolute Analog Scaling.*	*Y* *Y*	**9876**
[6]	*Data Entry*	*Set Deviation Analog Scaling.*	*Y*	**9876**
[7]	*Data Entry*	*Set Sensor Size.*	*Y*	**9876**
[8]	*Data Entry*	*Set Digital Filter Snap tolerance band and Exponential Averaging value.*	*Y*	**9876**
[9]	*Data Entry*	*Set Sensor Type.*	*Y*	**9876**
[A]	*Data Entry*	*Set Decimal Point Position.*	*Y*	**9876**
[B]	*Data Entry*	*Factory Default System Settings.*	*Y*	**9876**
[C]	*Readings,* *Data Entry*	*Exit Setup.* *Clears the current values.*	*N* *N*	- -
[D]	*Data Entry* *Calibration*	*ENTER - Accept current values.* *Tachometer Scaling See Section ZJ.*	*N* *Y*	- N/A
[E]	*Data Entry* *Calibration*	*Minus sign (negative value).* *Manual Calibration Routine.*	*N* *Y*	 **9876**
[F]	*Data Entry* *Readings* *Setup*	*Decimal point during data entry.* *Display Date/Time.* *Change Hour.*	*N* *N* *Y*	 - **9876**

Table ZC.3-1: Command Sequence Listing

All data entered via the keypad (Lower Limit, Target, Deviation Analog, etc.) may be entered as 1 to 6 digit positive numbers with a decimal point if necessary.

The position of the decimal point in the Measurement window display is selectable by the customer with the Set Decimal Point position function [Section ZC.5.d]. All displayed values in the Measurement window will use the position set by this function.

ZC.3.a Factory Default System Settings

The Model MPPU contains the factory default system settings in the on-board EPROM. These settings are available via the customer interface [Section ZC.15.d].

NOTE:

It is generally not necessary to restore factory default system settings unless:

a) The EPROM has been replaced,
b) The battery-backed RAM chip has been replaced,
c) The sensor type or size has been changed.

The factory default system settings ([B] key during Setup) for the Model MPPU are as follows:

Baud rate: 9600
Filter Snap tolerance band: 0.05
Exponential Averaging value: 0.025
Upper Limit: 80.00
Target: 50.00
Lower Limit: 20.00
Unit of Measure: INCHES
Absolute Analog: 30.00=10 volts
Target Deviation: 4.00=10 volts
Sensor setup is: Single-Sensor 10XAS-Series
Emitter size is: 10000 (for ten-inch sensor).

ZC.4 System Startup

If the Model MPPU is correctly configured with the Level 3 interface, when power is applied to the Model MPPU, the Messages window should display:

POWER UP COMPLETE !

The Model MPPU then enters *Readings Mode* and the Measurement window will display the current measurement from the sensor(s). These readings may not be valid if the system has not yet been completely configured. If there is no material in the sensor window, the Model MPPU will output “0.00”, or the last good reading, in the Measurement window and “FAULT A” in the Messages window (if operating with a dual-sensor system, the Messages window will display “FAULT A & B”).

NOTE:

System may be configured at the factory if ordered as a complete system (including sensors).

ZC.5 System Settings

Customer selectable settings include baud rate, Upper and Lower limits, target, analog outputs and sensor size and type. The following sub-sections show how to select these settings.

The Model MPPU contains the factory default settings for the system in the on-board EPROM [Section ZC.15.d]. These settings area available via the customer interface. See Trouble Shooting for more information.

ZC.5.a Retrieving System Date & Time

The Model MPPU internal clock/calendar values can be retrieved by the Date/Time function while in the *Readings Mode*.

1) Press the "F" key to review the date and time while in *Readings Mode*. Note that while in the *Readings Mode* the "F" key is used to display the date and time, but while in *Setup Mode* the "F" key is used to change the hour setting.

F

MM/DD/YY HH:MM:SSXM

The current date and time will display in the Messages window for approximately three seconds and then return to the *Readings Mode*.

ZC.5.b Changing Hour Setting

The system time may have to be set when the Model MPPU first arrives. The date and time are usually set at the factory, but if the processing unit is not powered for over thirty days, the battery-backed RAM may not be valid because of current drain. The time is kept in military standard time (i.e. 15:00:00 is 3:00PM) but displayed in standard time.

Note that the date and the time in minutes cannot currently be set from the Level 3 interface. Use a host computer and Level 1 [Section ZA] terminal software to reset the system date and time if necessary. The Set System Time function in this interface will only allows for the setting of the hour to reflect Daylight Savings Time changes. To set the system hour:

1) Enter the *Setup Mode*.

C

SETUP MODE !!!!

2) Start the Set Time routine.

F

Notice that the Set Time routine has a lock out code.

0.00

LOCK OUT CODE

3) Press "C" to clear the Measurement window.

C

0.

4) Enter the lock out code.

9 8 7 6

9876

5) Be sure to press "D" after the lock out code to accept the code.

D

The Messages window prompts the operator to change the hour or to accept the current time.

PRESS 'A' TO ADVANCE HOUR, PRESS 'D' TO STEP BACK

The Messages window now displays the current date and time.

07/26/96 11:01:00AM

6) Press the "A" key while watching the Messages window until the correct hour appears.

A

07/26/96 12:01:00PM

7) Press the "D" key to exit the Set Time routine and the "C" key to exit *Setup Mode*.

D

SETUP MODE !!!!

C

EXIT SETUP

The Measurement window will return to displaying measurement readings. Verify the time is correct time by pressing the "F" key.

F

07/26/96 12:01:15PM

The time and date will display in the Messages window for approximately three seconds and then return to displaying the units of measure.

ZC.5.c Setting the Decimal Point Position

The Model MPPU Level 3 interface has a six-digit display that can have a decimal point in almost any location. The decimal point is set by the following routine:

1) Enter the *Setup Mode*.

C

SETUP MODE !!!!

2) Press the "A" key to begin the Set Decimal Point Position routine.

A

0.00

LOCK OUT CODE

3) Clear the Measurement window of the current value.

C

0.

4) Enter the Lock Out Code of "9876".

9 8 7 6

9876

5) Press the "D" key to accept.

D

The following message scrolls across the Messages window.

SELECT THE DECIMAL LOCATION FOR DISPLAY

The Measurement window shows the current decimal point position.

0.00

The Messages window prompts the operator for the decimal point position.

DECIMAL LOCATION

6) Press the “C” key to cycle through the selections for the decimal point location.

C

The Measurement window displays the next decimal point position.

0.000

DECIMAL LOCATION

7) Press the “D” key to accept the decimal point location shown in the Measurement window and quit the Set Decimal Point Position routine.

D

SETUP MODE !!!!

8) Exit *Setup Mode*.

C

EXIT SETUP

The decimal point location has been selected to display three decimal places. The Measurement window will return to displaying measurement readings.

ZC.5.d Data Entry & Data Display Resolution

When outputting data on the Model MPPU Level 3 Customer Interface, the resolution of the data output or display is set by the Decimal Point Position function [Section ZC.5.c]. This does not mean that the data entered has to have the same decimal point position. The serial communications output will be rounded from four down and from five up to the output set with the Decimal Point Position. The data entered, no matter what the resolution (number of decimal places), is left intact. This means that if the Decimal Point Position is set to two places (XX.XX), the output of the value 12.345 would be 12.35 but the entry of the value 12.345 would remain constant. This allows for greater resolution to be entered while maintaining the output characteristics defined by the operator.

ZC.6 Serial Communications Output

The serial communications for the Model MPPU Level 3 is based upon the *DEC VT-100 (ANSI) terminal emulation for the IBM PC*® for RS-232 communications. The RS-232 output communications port operates as the DCE, with the host computer as the DTE. Any ANSI terminal emulator will probably function with the Model MPPU as a terminal emulator, as well as many commercial communications software packages (such as PROCOMM®).

Whenever the Model MPPU is in the *Readings Mode*, the RS-232-2 port is sending measurement readings (similar to the Measurement window). When in the *Setup Mode*, the serial communications output is stopped until the unit is returned to *Readings Mode*.

Communications protocol for the serial output are RS-232C ASCII, six-characters with a decimal point, space padded with a carriage-return and line feed in a **10-bit frame** running:

No Parity, Eight Data Bits and One Stop Bit (N,8,1)
with One Start Bit.

The communications can be set for a baud rates of (underlined is factory default):

1200bps, 2400bps, 4800bps, 9600bps, 19200bps.

The baud rate for the RS-232-2 communications port is from **1200bps to 19200bps with 8N1** configuration and is selectable with the Set System Baud Rate function in the *Setup Mode*.

Serial communications port RS-232-1 and RS-232-2 are available via an Engineering Variance Order (EVO) for various protocols, output formats and devices (such as a serial printer). Contact Harris Instrument Corporation Sales or Engineering for more information.

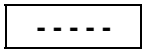
ZC.6.a Setting System Baud Rate

The Model MPPU Level 3 interface can communicate with a host computer (or other serial device) at several baud rates ranging from 1200bps to 19200bps. The Level 3 interface (and the Level 4 LCD Touchscreen) operate at 57600bps and cannot be changed. The Set System Baud function only affects the host computer communications port (RS-232-2).

To set the system baud rate:

1) Enter *Setup Mode*.

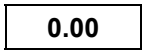
[C]



SETUP MODE !!!!

2) Start the Set System Baud Routine by pressing the "1" key.

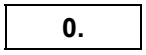
[1]



LOCK OUT CODE

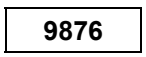
3) Clear the Measurement window of the current values by pressing the "C" key.

[C]



4) Enter the Lock Out Code of "9876".

[9] [8] [7] [6]



5) Press the “D” key to accept the Lock Out Code.

[D]

The following message will scroll across the Messages window, showing the variables applicable to setting the baud.

ENTER THE COM PORT BAUD RATE: 1200, 2400, 4800, 9600, OR 19200

The current baud rate is displayed in the Measurement window.

9600

The Messages window prompts the operator for the baud.

BAUD RATE

6) Press “C” to clear the Measurement window

[C]

0.

7) Enter a baud rate of “19200”.

[1] [9] [2] [0] [0]

19200

8) Press the “D” key to accept

[D]

SETUP MODE !!!!

9) Exit *Setup Mode*.

[C]

EXIT SETUP

The communications port is now set for operation at 19200bps. The Measurement window will return to the *Readings Mode,* displaying measurement readings.

ZC.6.b Extended Serial Communications

Typically, all Model MPPU serial communications are limited to fifty linear cable feet [15.2m] from the Model MPPU. Operations greater than fifty linear cable feet [15.2m] (up to 3000 linear cable feet [914.4m]) require the installation of two short-haul modems [MSH Option – Section ZG], one at the processing unit end and one at the host computer. Contact Harris Instrument Corporation Sales or Engineering for more information.

ZC.7 Sensor Setup

The Model MPPU Level 3 can operate with 10XAS-Series or 10XBR-Series sensors in single- or dual-sensor configurations. The sensor sizes are from ten inches [254mm] to forty inches [1016mm]. Both the sensor type and size are operator adjustable in the Model MPPU.

NOTE:

The Setup Procedure for dual-sensor 10XBR-Series systems is slightly different and is covered in Section ZC.7.c. It requires the separation between the outside-end emitter LEDs of the sensors {Figure ZC.7-1}.

The Model MPPU must also be calibrated to the current product passline. See Section ZC.8 for more information on calibration. It is important to determine the specific sensor size and type BEFORE proceeding with the setup procedure. Refer to the sensor manual shipped with the sensors [10XAS-Series – Section C, 10XBR-Series – Section G].

ZC.7.a Setting Sensor Type

To set the sensor type:

1) Start the *Setup Mode*.

[C]

SETUP MODE !!!!

2) Begin the Set Sensor Type routine.

[9]

0.000

LOCK OUT CODE

3) Clear the current Measurement window value.

[C]

0.

4) Enter the Lock Out Code of "9876".

[9] [8] [7] [6]

9876

5) Press the "D" key to accept.

[D]

The following text scrolls across the Messages window:

ENTER THE SENSOR CONFIG: 1=SINGLE BR, 2=SINGLE AS, 3=DUAL BR, 4=DUAL AS

The current Sensor Type in system memory is displayed in the Measurement window and the Messages window prompts the operator for the Sensor Setup value.

2.000

SENSOR SETUP

6) Clear the current value in the Measurement window.

[C]

0.

7) Enter the proper sensor type (for this example, enter “2” for a single 10XAS-Series sensor).

[2]

2.

8) Press the “D” key to accept the current sensor type value in the Measurement window.

[D]

SETUP MODE !!!

9) The sensor type is set. Exit *Setup Mode*.

[C]

EXIT SETUP

The sensor type has been set to a single 10XAS-Series. The Measurement window will return to displaying measurement readings.

ZC.7.b Setting Sensor Size

The Model MPPU can operate with either 10XAS-Series or 10XBR-Series sensors. Either sensor can be configured for single- or dual-sensor operation.

To set the sensor size:

1) Start the *Setup Mode*.

[C]

SETUP MODE !!!!

2) Begin the Set Sensor Size routine.

[7]

0.000

LOCK OUT CODE

3) Clear the current Measurement window value.

[C]

0.

4) Enter the Lock Out Code of “9876”.

[9] [8] [7] [6]

9876

5) Press the “D” key to accept.

[D]

The following text scrolls across the Messages window:

ENTER THE EMITTER SIZE: 10000, 20000, 30000, OR 40000

The Measurement window displays the current sensor size in system memory.

10000

The Messages window prompts the operator for the sensor size.

EMITTER SIZE

6) Clear the current value in the Measurement window.

C

0.

7) Enter the proper sensor size (enter "20000" for a single Model 10XAAS-20 sensor).

2 0 0 0 0

20000.

8) Press the "D" key to accept the current sensor size value in the Measurement window.

D

SETUP MODE !!!

9) The sensor size is set. Exit *Setup Mode*.

C

EXIT SETUP

The emitter size has been set to 10X-20 twenty-inch [508mm] emitter. The Measurement window will start displaying measurement readings.

ZC.7.c Setting Dual-Sensor 10XBR-Series Type & Size

When setting the Model MPPU Level 3 for operation with dual-sensor 10XBR-Series sensors, the processing unit must be given the spacing between the outside-end emitter LEDs {Figure ZC.7-1}. This value is used in the calculations required for operation with a variable product passline for Passline Independent or Thickness Independent Measurement. The spacing value is entered immediately after the entry of the sensor size.

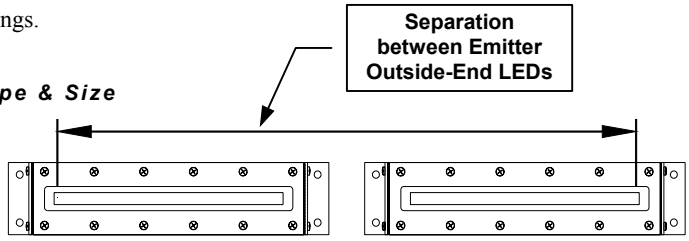


Figure ZC.7-1: Outside-End Emitter LED Separation

To set the dual-sensor 10XBR-Series as sensor type:

1) Start the *Setup Mode*.

C

SETUP MODE !!!!

2) Begin the Set Sensor Type routine.

9

0.000

LOCK OUT CODE

3) Clear the current Measurement window value.

C

0.

4) Enter the Lock Out Code of “9876”.

9 8 7 6

9876

5) Press the “D” key to accept.

D

The following text scrolls across the Messages window:

ENTER THE SENSOR CONFIG: 1=SINGLE BR, 2=SINGLE AS, 3=DUAL BR, 4=DUAL AS

The current Sensor Type in system memory is displayed in the Measurement window and the Messages window prompts the operator for the Sensor Setup value.

2.00

SENSOR SETUP

6) Clear the current value in the Measurement window.

C

0.

7) Enter the 10XBR-Series dual-sensor type (for this example, enter “3” for a dual-sensor 10XBR-Series sensor).

3

3

8) Press the “D” key to accept the current sensor type value in the Measurement window.

D

SETUP MODE !!!!

Once the sensor type has been set to dual-sensor 10XBR-Series, enter the sensor size. The value for the spacing between the outside-end LEDs in the emitter is entered as a variable immediately after the type.

9) Begin the Set Sensor Size routine.

7

0.000

LOCK OUT CODE

10) Clear the current Measurement window value.

C

0.

11) Enter the Lock Out Code of “9876”.

9 8 7 6

9876

12) Press the “D” key to accept.

[D]

The following text scrolls across the Messages window:

ENTER THE EMITTER SIZE: 10000, 20000, 30000, OR 40000

The Measurement window displays the current sensor size in system memory.

10000

The Messages window prompts the operator for the sensor size.

EMITTER SIZE

13) Clear the current value in the Measurement window.

[C]

0.

14) Enter the proper sensor size (enter “30000” for a dual-sensor Model 10XABR-30 system).

[3] [0] [0] [0] [0]

30000.

15) Press the “D” key to accept the current sensor size value in the Measurement window.

[D]

The Messages window will now display the following message:

ENTER THE EMITTER OUTSIDE SPACING IN INCHES

ROUGH MEASUREMENT END LED TO END LED

100.00

EMITTER SPACING

16) Clear the current value in the Measurement window.

[C]

0.

17) Input the emitter outside-end LEDs spacing value in inches. This value MUST be entered in inches, no matter what unit of measure will be displayed on the system. Use a value with up to two decimal places of accuracy.

[X] [X] [.] [X] [X]

XX.XX

18) Press the “D” key to accept the new emitter outside-end LED spacing value in the Measurement window.

[D]

SETUP MODE !!!

19) The sensor type is set. Exit *Setup Mode*.

C

EXIT SETUP

The sensor type has been set to a dual-sensor 10XBR-Series sensor system with the emitter spacing entered with the sensor size. The Measurement window will return to displaying measurement readings.

ZC.7.d Sensor FAULT Warnings

The Model MPPU has a fault detection circuit to alert the operator of a sensor VIDEO or SYNC FAULT condition. FAULTs can be caused by a number of reasons which are detailed in Section Z.7 of the Main Section Model MPPU manual. VIDEO FAULT warning for a single-sensor system will show as FAULT A, while VIDEO FAULT warning for a dual-sensor system will display FAULT A or FAULT B (or both warnings if both sensors are faulted). These warnings will be displayed in the Messages window.

The Level 3 interface will display even if the sensors are experiencing a FAULT condition. Transient FAULTs are displayed as they occur. After 100 scans, if the condition still persists:

1) The Measurement window will display the last good reading;
2) The Measurement window reading will alternately flash;
3) HI/LO/GO relays will open;
4) FAULT warnings will be displayed in the Messages window;
5) The Open Collector TB3-6 [Model MPPU Main Section Z.4.c] switch to ON;
6) The second communications port will output:
    a) Sensor Fault: A;
    b) Sensor Fault: B;
    c) Sensor Fault: SYNC;
    d) or a combination of the three.

NOTE:

It is VERY IMPORTANT for operators of closed loop control systems to monitor the HI/GO/LO relays, Open Collector TB3-6 and/or the second communications port output for warnings about VIDEO and/or SYNC FAULT conditions.

The sensor SYNC signal informs the processing unit of the beginning of a sensor scan. If SYNC is not relayed to the processing unit, a malfunction of the sensor (or its associated cables) may have occurred. The Level 3 interface will display a SYNC warning label in the Messages window if a SYNC FAULT is detected and the RS-232 output will read Sensor Fault: SYNC.

ZC.8 System Calibration

The calibration procedure varies for the Model MPPU depending upon which customer interface was purchased (Level 1, 3 or 4). The following calibration procedure pertains only to the Model MPPU Level 3 interface. For information on calibrating the other Model MPPU interfaces, please refer to Sections ZA and ZD (if applicable to this processing unit).

ZC.8.a Why Calibrate?

Calibration of the Model MPPU determines the sensor height correction factor (HCF) and the sensor offset (SO). Generally, two "standards", of which the width (or length) *in inches* is known, are used to calculate the HCF and SO. These standards are typically samples of the widest and the narrowest (or longest and shortest) materials that will be run on the process line where the Model MPPU is installed. These samples should be carefully and accurately *measured in inches* for the calibration routine.

When measuring materials with SCAN-A-LINE™ 10XAS-Series sensors, the emitter-to-product spacing (product passline) *will* affect the detected measurement value. The greater the product is spaced from the emitter calibrated position, the greater the detected measurement appears from the actual measurement {Figure ZC.8-1}.

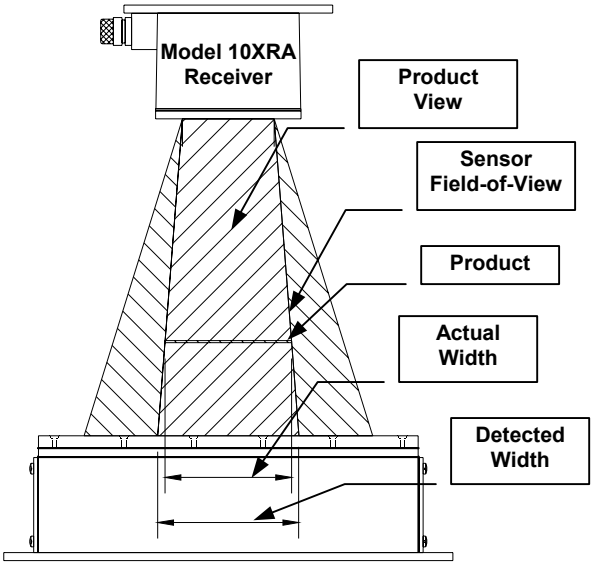


Figure ZC.8-1: Sensor and Product Views with Model 10XAAS-10 Sensor

NOTE:

If the emitter-to-receiver spacing or the emitter-to-product spacing (product passline) changes anytime after calibration, calibration must be performed again to take into account the changes in spacing.

With 10XAS-Series single-sensor systems, the calibration routine detects and calculates the height correction factor (HCF – sometimes referred to as sensor gain). The HCF is calculated from the results of the detected measurement of the sample materials and the actual measurement values entered during calibration of the sensor with those materials.

Especially with 10XAS-Series dual-sensor systems, the calibration routine not only determines the HCF but also calculates the sensor offset (SO). This is the value, calculated from the sample material dimensions and the sensor positioning determined by the calibration scans, that the Model MPPU uses to determine the actual material width.

NOTE:

The accurate measurement of the sample materials and the steady position of the product passline ensures the accuracy of the Model MPPU height correction factor and sensor separation offset.

Calibration standards are available from Harris Instrument Corporation (CS Option) that are traceable to the National Bureau of Standards.

See the Sensor Section of this manual [Section C for 10XAS-Series sensors or Section G for 10XBR-Series sensors] for more information on the product passline and its effect on the entire measurement system.

ZC.8.b Measurement Calibration Procedure

Prepare for the calibration by obtaining two material samples (or calibration standards) that closely represent the maximum and minimum of the materials that will be measured by the SCAN-A-LINE™ system. These samples should be premeasured as accurately as possible for the Model MPPU Level 3 calibration.

Be sure to have the SCAN-A-LINE™ system completely installed, fully fixtured on-line and operational up to the point of calibration (sensors and processing unit functioning properly, power on to the system, etc.).

All system and sensor setup procedures except analog scaling [Section ZC.11 & ZC.12] and Limit Sensing [Section ZC.9] should be finished before calibrating the Model MPPU (i.e. sensor size, sensor type, decimal point position and date & time should all be set prior to calibration).

1) Apply power to the Model MPPU.

00.000

POWER UP COMPLETE!

00.000

SYS DEFAULTS

2) Enter the *Setup Mode*.

C

SETUP MODE !!!!

3) Start the Calibration routine.

0

LOCK OUT CODE

4) Clear the current value in the Measurement window.

0.000

C

0.

5) Enter the Lock Out Code of "9876".

9 8 7 6

9876

6) Press the "D" key to accept.

D

The Measurement window will show blanks.

The Messages window scrolls the following message, prompting the operator for the first material sample. Generally, the maximum material sample is calibrated first.

PLACE THE FIRST MEASUREMENT STANDARD ON THE SCAN*A*LINE MEASUREMENT AREA

7) Place the maximum material sample in the sensor measurement area.

The Measurement window is currently displaying the "raw" counts from the sensors. The "raw" counts are then calculated with the large measurement standard size to calibrate the Model MPPU. This value is the same as the RAW ONE value in the Manual Calibration Routine.

XXXXX

The Messages window is prompting the operator to press a key once the maximum material sample in located in the sensor measurement area.

PRESS KEY WHEN READY

8) Press the "C" key to continue Calibration routine with the maximum material sample.

C

The Model MPPU will take twenty readings of the sensors edge detection of the maximum material sample while counting down.

0 1 2 3 4 5 6 7 8 9) ! @ # $ % ^ & * (

The Messages window prompts the operator for the size of the maximum material sample.

STANDARD 1

0.000

9) Clear the current value in the Measurement window.

C

0.

10) Enter the size of the maximum material sample. This value is the same as the CAL ONE value in the Manual Calibration Routine.

X X F X X X

Notice the use of the "F" key in the above command. This tells the Model MPPU where the decimal point is for this size standard.

XX.XXX

11) Press the "D" key to accept the size value of the maximum material sample.

D

The second phase of the Calibration routine begins with the Measurement window showing blank spaces again.

- - - - -

The following message scrolls across the Messages window.

PLACE SECOND MEASUREMENT STANDARD ON THE SCAN*A*LINE MEASUREMENT AREA

12) Replace the maximum material sample with the minimum material sample in the sensor measurement area.

The Measurement window begins showing "raw" counts again, this time based upon the minimum material sample in the measurement area. This value is the same as the RAW TWO value in the Manual Calibration Routine.

XXXXX

The Messages window prompts the operator to press a key when the minimum material sample is located in the sensor measurement area.

PRESS KEY WHEN READY

13) Press the "C" key to continue Calibration routine with the minimum material sample.

C

The Model MPPU will again take twenty readings of the sensors edge detection of the small standard while counting down.

0 1 2 3 4 5 6 7 8 9) ! @ # $ % ^ & * (

0.00

STANDARD 2

14) Clear the current value in the Measurement window. This value is the same as the CAL TWO value in the Manual Calibration Routine.

C

0.

15) Enter the size of the minimum material sample.

X X F X X X

Notice the use of the "F" key in the above command. This tells the Model MPPU where the decimal point is for this size standard.

XX.XXX

16) Press the "D" key to accept the size value of the minimum material sample.

D

17) The last phase of the Calibration routine continues with the setting of the Unit of Measure Label. This label is displayed in the Messages window when measurement readings are being displayed in the Measurement window.

```
-----
```

ENTER THE UNIT OF MEASURE LABEL

The Model MPPU now requests what type of measurement label to use. The default label is SYS DEFAULTS which was set when the system defaults were loaded. The various standard measurement labels are:

INCHES, MILLIMETERS, FEET, METERS, YARDS, and CENTIMETERS

18) Press the "A" key to scroll through the various unit of measure labels until the proper label is displayed. Select INCHES for this example.

A

INCHES

19) Press the "D" key to accept inches as the Unit of Measure Label.

D

```
-----
```

SETUP MODE !!!!

20) Exit the *Setup Mode*.

C

```
-----
```

EXIT SETUP

The Model MPPU is now calibrated for measurement with the product passline of the current sensors. Any change in product passline (or the sensors position) may affect the calibration (except with 10XBR-Series sensors). The Measurement window will return to displaying measurement readings.

ZC.8.c Recording Calibration Values Procedure

Once the Model MPPU Level 3 has been set up and configured for the first time, the settings can be recorded for later manual calibration entry. Such a manual calibration procedure would be used in situations where:

a) The Model MPPU has been powered down for thirty days or more, causing the battery-backed RAM to be lost;
b) The EPROM chip has been replaced;
c) Any major component in the Model MPPU has been replaced.

At no time should the manual calibration values be used if the sensors have been moved or repositioned! The calibration values would be inappropriate if the sensor have been repositioned.

The calibration values available for manual entry are the Calibration values (CAL ONE and CAL TWO) and their corresponding raw sensor count values (RAW ONE and RAW TWO), as well as the units of measure.

To record the values used later to perform a manual calibration [record the Manual Calibration Information on the Configuration Form found in Section ZC.16]:

1) Apply power to the Model MPPU.

```
00.000
```

POWER UP COMPLETE!

```
00.000
```

SYS DEFAULTS

2) Enter the *Setup Mode*.

C

SETUP MODE !!!!

3) Start the Calibration routine.

E

LOCK OUT CODE

4) Clear the current value in the Measurement window.

0.000

C

0.

5) Enter the Lock Out Code of "9876".

9 8 7 6

9876

6) Press the "D" key to accept.

D

The Measurement window will show blanks.

The Messages window will prompt the operator for the first calibration value. The current CAL ONE value is displayed in the Measurement window with the title of the value shown in the Messages window.

ENTER THE CAL ONE VALUE.....

XX.XXX

CAL ONE

7) Record the value of CAL ONE on the configuration form [Section ZC.16]. Press the "D" key so as not to change the CAL ONE value.

D

The Messages window will prompt the operator for the first emitter raw count value. The current RAW ONE value is displayed in the Measurement window with the title of the value shown in the Messages window.

ENTER THE RAW ONE VALUE.....

XX.XXX

RAW ONE

8) Record the value of RAW ONE on the configuration form [Section ZC.16]. Press the "D" key so as not to change the RAW ONE value.

D

The Messages window will prompt the operator for the second calibration value. The current CAL TWO value is displayed in the Measurement window with the title of the value shown in the Messages window.

ENTER THE CAL TWO VALUE.....

XX.XXX

CAL TWO

9) Record the value of CAL TWO on the configuration form [Section ZC.16]. Press the "D" key so as not to change the CAL TWO value.

D

The Messages window will prompt the operator for the second emitter raw count value. The current RAW TWO value is displayed in the Measurement window with the title of the value shown in the Messages window.

ENTER THE RAW TWO VALUE.....

XX.XXX

RAW ONE

10) Record the value of RAW TWO on the configuration form [Section ZC.16]. Press the "D" key so as not to change the RAW TWO value.

D

The Messages window will prompt the operator for the units of measure label. The current unit of measure label is displayed in the Messages window.

ENTER THE UNIT OF MEASURE LABEL

SYS DEFAULTS

11) Record the unit of measure used and press the "D" key to end the manual calibration recording routine.

The Manual Calibration Routine can now be used with the recorded values to re-calibrate the Model MPPU Level 3 [Section ZC.8.d].

ZC.8.d Manual Calibration Routine

To perform the Manual Calibration Routine, the values recorded on the Configuration Form found in Section ZC.16 are entered as follows:

1) Apply power to the Model MPPU.

00.000

POWER UP COMPLETE!

00.000

SYS DEFAULTS

2) Enter the *Setup Mode*.

C

SETUP MODE !!!!

3) Start the Manual Calibration routine.

E

LOCK OUT CODE

4) Clear the current value in the Measurement window.

0.000

C

0.

5) Enter the Lock Out Code of "9876".

9 8 7 6

9876

6) Press the "D" key to accept.

D

The Measurement window will show blanks.

The Messages window will prompt the operator for the first calibration value. The current CAL ONE value is displayed in the Measurement window with the title of the value shown in the Messages window.

ENTER THE CAL ONE VALUE.....

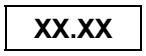
CAL ONE

7) Press the "C" key to clear the current CAL ONE value in the Measurement window.

C

8) Enter the CAL ONE value recorded on the Configuration Form.

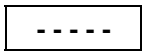
X X F X X



9) Press the "D" key to accept the new CAL ONE value and continue with the Manual Calibration Routine.

D

The Measurement window will show blanks.



The Messages window will prompt the operator for the first emitter raw count value. The current RAW ONE value is displayed in the Measurement window with the title of the value shown in the Messages window.

ENTER THE RAW ONE VALUE.....

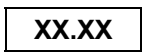
RAW ONE

10) Press the "C" key to clear the current RAW ONE value in the Measurement window.

C

11) Enter the RAW ONE value recorded on the Configuration Form.

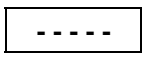
X X F X X



12) Press the "D" key to accept the new RAW ONE value and continue with the Manual Calibration Routine.

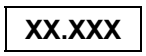
D

The Measurement window will show blanks.



The Messages window will prompt the operator for the second calibration value. The current CAL TWO value is displayed in the Measurement window with the title of the value shown in the Messages window.

ENTER THE CAL TWO VALUE.....



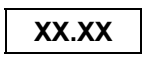
CAL TWO

13) Press the "C" key to clear the current CAL TWO value in the Measurement window.

C

14) Enter the CAL TWO value recorded on the Configuration Form.

X X F X X



15) Press the "D" key to accept the new CAL TWO value and continue with the Manual Calibration Routine.

D

The Measurement window will show blanks.

```
-----
```

The Messages window will prompt the operator for the second emitter raw count value. The current RAW TWO value is displayed in the Measurement window with the title of the value shown in the Messages window.

ENTER THE RAW TWO VALUE.....

```
XX.XXX
```

RAW TWO

16) Press the "C" key to clear the current RAW TWO value in the Measurement window.

C

17) Enter the RAW TWO value recorded on the Configuration Form.

X X F X X

```
XX.XX
```

18) Press the "D" key to accept the new RAW TWO value and continue with the Manual Calibration Routine.

D

The Messages window will prompt the operator for the units of measure label. The current unit of measure label is displayed in the Messages window.

ENTER THE UNIT OF MEASURE LABEL

```
------
```

SYS DEFAULTS

19) Press the "C" key to step through the various units of measure available for display on the Model MPPU Level 3. Once the proper units of measure as recorded on the Configuration Form is displayed in the Messages window, press the "D" key to accept that displayed unit of measure. The Manual Calibration Routine is now complete. The display will return to the system Setup Mode.

D

```
-----
```

SETUP MODE !!!!

20) Press "C" to exit the *Setup Mode*.

The Manual Calibration Procedure is completed.

ZC.9 Setting Limit Sensing

Once the system has been calibrated, the measurement limits can be set. There are two measurement limit settings for the Model MPPU (UPPER limit–HI and LOWER limit–LO). These settings tell the Model MPPU when to activate the HI and LO relay contact closures.

ZC.9.a Setting the UPPER (HI) Limit

To set the UPPER (HI) measurement limit:

1) Press "C" to enter the *Setup Mode*.

C

```
-----
SETUP MODE !!!!
```

2) Press "4" to begin the Set UPPER Limit routine.

4

Note that there are no Lock Out Codes for setting the Limits.

```
-----
```

The Messages window scrolls the following message, prompting the operator to enter the UPPER Limit value.

```
ENTER THE HIGH LIMIT VALUE
```

The UPPER limit value currently in memory is displayed in the Measurement window.

```
XX.XX
HIGH LIMIT
```

3) Press the "D" key to accept the current UPPER limit value or press the "C" key to clear the Measurement window.

C

```
0.
```

4) Enter in a new UPPER limit value

X X F X X X

The new UPPER limit value is displayed in the Measurement window.

```
XX.XXX
```

5) Press the "D" key to accept, or if necessary, press the "C" key to clear the Measurement window and re-enter a new value.

D

```
-----
SETUP MODE !!!!
```

6) Press "C" to exit the *Setup Mode*.

C

```
-----
EXIT SETUP
```

The UPPER Limit is now set. The Measurement window will return to displaying the current measurement readings.

ZC.9.b Setting the LOWER (LO) Limit

To set the LOWER (LO) measurement limit:

1) Start the *Setup Mode*.

C

```
-----
```

SETUP MODE !!!!

2) Press "3" to begin the Set LOWER Limit routine.

3

The Messages window scrolls the following message, prompting the operator to enter the LOWER Limit value.

ENTER THE LOW LIMIT VALUE

The LOWER limit value currently in memory is displayed in the Measurement window.

```
XX.XX
```

LOW LIMIT

3) Press the "D" key to accept the current LOWER limit value or press the "C" key to clear the Measurement window.

C

```
0.
```

4) Enter in a new LOWER limit value

X X F X X X

The new LOWER limit value is displayed in the Measurement window.

```
XX.XXX
```

5) Press the "D" key to accept, or if necessary, press the "C" key to clear the Measurement window and re-enter a new value.

D

```
-----
```

SETUP MODE !!!!

6) Press "C" to exit the *Setup Mode*.

C

```
-----
```

EXIT SETUP

The Lower LIMIT is now set. The Measurement will return to displaying measurement readings.

ZC.10 Scaling the Deviation Analog Output

The Model MPPU has two analog outputs available as standard. One is deviation bipolar and one is absolute unipolar [Section ZC.11]. These outputs must be "scaled" to reflect customer material and voltage output preferences. Refer to Section Z.4.d and Z.11 in the Model MPPU Main Manual Section for more information on the analog outputs of the Model MPPU and any EVO documentation for specific configuration information on the other types of analog outputs optionally available with this processing unit. The Deviation Analog Output provides a bipolar analog voltage (-10VDC to +10VDC) proportional to the deviation of the detected measurement from the target value. The target and scaling factor value is set with the Level 3 Customer Interface. The maximum analog output voltage will be ±10 volts for a deviation of X inches (user entered value) from the target value.

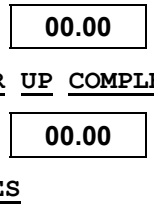
The following instructions are a basic guide for scaling deviation analog output to the target value and the deviation from target value. The values entered are not constant, but are dependent upon the application. Size values and voltages will vary from application to application. Be sure that the entire SCAN-A-LINE™ system (sensors and Model MPPU) is completely installed and fully functioning. Perform the set-up routines for sensor size, type [Section ZC.7] and decimal point position [ZC.5.d] BEFORE beginning the setting of the deviation analog scaling value. Also perform the system calibration [Section ZC.8] BEFORE setting the deviation analog scaling value.

Immediately following the setting of the Target the Model MPPU Level 3 will request a "Product ID" number. This number must be entered as numeric values (no alpha characters) and is 6 digits in length.

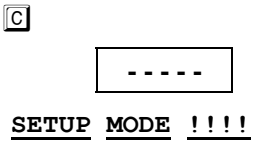
ZC.10.a Setting the Target Value

The first procedure in scaling the deviation analog is to set the target value. The target value is the size value of the target material that the deviation analog function uses as a base point to determine the deviation value.

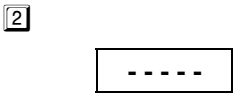
1) Apply power to the measurement system.



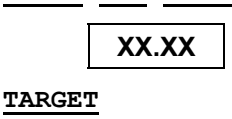
2) Enter the *Setup Mode*.



3) Begin the Set Target routine.

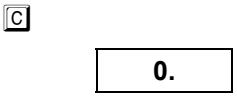


The Message window scrolls the following message, prompting the operator to enter the Target Value.



The target value currently in memory is displayed in the Measurement window.

4) Press the "C" key to clear the Measurement window and enter in the target value.



X X F X X

XX.XX

The target value is displayed in the Measurement window.

5) Press the "D" key to accept, or if necessary, press the "C" key to clear the Measurement window and re-enter the value. When accepted, the system will continue to the entry of a Product ID number.

D

ENTER THE PRODUCT ID….

123456.

PRODUCT ID

6) Press the "D" key to accept, or if necessary, press the "C" key to clear the Measurement window and enter a new product identification number.

C

0.

X X X X X X

XXXXXX

D

Once accepted the system returns to the *Setup Mode*.

SETUP MODE !!!!

ZC10.b Deviation Analog Scaling Function

Once the target value is set, the scaling of the deviation analog output can be performed.

1) Start the Deviation Analog Setup routine.

6

0.00

LOCK OUT CODE

2) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

The following message scrolls across the Messages window.

ENTER THE DEVIATION ANALOG, DEVIATION x=10 VOLTS OUT

The current deviation analog setting in the Model MPPU memory is displayed in the Measurement window.

X.XX

DEVIATION ANALOG

3) Enter the deviation value (the value that represents the difference between the target value and the maximum size material - i.e. four inches of deviation from target equals 10VDC). This value corresponds to the maximum deviation analog output (10VDC) for that difference. Press "D" to accept the value and return the system to the *Setup Mode*.

[C]

0.

[X] [X] [F] [X] [X]

XX.XX

[D]

SETUP MODE !!!!

4) Exit the *Setup Mode*.

[C]

EXIT SETUP

The Measurement window will return to *Readings Mode*. The deviation analog output scaling value is set.

ZC.11 Scaling the Absolute Analog Output

The Model MPPU has two analog outputs available as standard. One is deviation bipolar [Section ZC.10] and one is absolute unipolar. These outputs must be "scaled" to reflect customer material and voltage output preferences. Refer to Section Z.4.d and Z.11 in the Model MPPU Main Manual Section for more information on the analog outputs of the Model MPPU and any EVO documentation for specific configuration information on the other types of analog outputs optionally available with this processing unit.

The Absolute Analog Output provides a unipolar analog voltage (0VDC to 10VDC) of the absolute measurement of the strip material. The following instructions are a basic guide for scaling the absolute analog output. They will allow the operator to set the width value to be represented by 0VDC output and the width value to be represented by 10VDC output.

Be sure that the entire SCAN-A-LINE™ system (sensors and Model MPPU) is installed and fully functioning. Perform the set-up routines for sensor size, type [Section ZC.7], decimal position [ZC.5.d], etc. before beginning the scaling of the absolute analog. Perform the system calibration in Section ZC.8 BEFORE proceeding with the absolute analog scaling.

1) Apply power to the measurement system.

00.00

POWER UP COMPLETE!

00.00

INCHES

2) Enter the *Setup Mode*.

C

SETUP MODE !!!!

3) Start the Absolute Analog Setup routine.

5

0.00

LOCK OUT CODE

4) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

The Message window scrolls the following message, prompting the operator to enter the Absolute Analog value.

ENTER THE ABSOLUTE ANALOG VALUE, x=10 VOLTS OUT

The current absolute analog setting in the Model MPPU memory is displayed in the Measurement window.

XX.XX

ABSOLUTE ANALOG

5) Enter the maximum size value that you wish to be represented by 10VDC. This value corresponds to the maximum absolute analog output (10VDC). Press "D" to accept the value.

C

0.

X X F X X X

XX.XXX

D

The Message window scrolls the following message, prompting the operator to enter the Absolute Analog value.

ENTER THE ABSOLUTE ANALOG VALUE, x=0 VOLTS OUT

The current absolute analog setting in the Model MPPU memory is displayed in the Measurement window.

XX.XX

ABSOLUTE ANALOG

6) The routine now requests the entry of the minimum size value that you wish to be represented by 0VDC. This value corresponds to the minimum absolute analog output (0VDC).

C

0.

X X F X X X

XX.XXX

7) Press "D" to accept the value.

D

- - - - -

SETUP MODE !!!!

8) Exit the *Setup Mode*.

C

- - - - -

EXIT SETUP

The Measurement window will return to displaying measurement readings. The absolute analog output has been scaled.

ZC.12 Setting the Digital Filter Snap

The Model MPPU contains a resolution enhancing feature called a Digital Filter Snap. The Digital Filter Snap is a self-adjusting, exponential averaging tolerance system that takes averages of the sensor readings and creates a tolerance factor for the sensor video signals. This helps the system display a steady output on the LED Display/Keypad customer interface and the Level 1 measurement readings serial output. The Filter Snap is a useful tool to fine-tune the display and serial communications output.

NOTE:

The Digital Filter Snap should be adjusted when the Model MPPU is dithering measurement readings of a known size material. Adjusting the Filter Snap too low may cause fluctuating measurements on materials. Care should be taken in adjusting the Filter Snap. Please contact Harris Instrument Service for assistance in setting the Filter Snap.

The Filter Snap and Exponential Averaging value are customer adjustable. The Filter Snap can be set as zero (0) for no filtering or any inch or millimeter tolerance band for fifty readings filtering. The Exponential Averaging value must be a positive number. Refer to the Section Z.8 in the Model MPPU Main Manual Section for more information on the functionality and requirements for the Filter Snap and Exponential Averaging value.

To set the Digital Filter Snap:

1) Enter *Setup Mode*.

[C]

```
-----
```

SETUP MODE !!!!

2) Begin the Set Digital Filter Snap routine with the "8" key.

[8]

```
-----
```

LOCK OUT CODE

3) Enter the Lock Out Code of "9876".

[C]

```
0.
```

[9] [8] [7] [6]

```
9876
```

[D]

The following prompt will scroll across the Messages window.

```
-----
```

ENTER THE FILTER SNAP VALUE

The current Filter Snap value in memory is displayed in the Measurement window.

```
0.050
```

FILTER SNAP

4) Enter a Filter Snap of ±0.025 inches [0.635mm] to represent an overall tolerance band of 0.05 inches [1.3mm].

[C]

```
0.
```

[0] [F] [0] [2] [5]

0.025

D

After pressing the D key, the display will again switch to blanks and the following message will scroll across the Messages window

- - - - -

ENTER THE K CONSTANT FOR FILTER

0.025

K CONSTANT

The K constant is the Exponential Averaging value [see Section Z.8 for more information]. The smaller the K constant, the more stable the display output in the Measurements window.

5) Enter a K constant for the Exponential Averaging of the Filter Snap of 0.01.

C

0.

0 F 0 1

0.01

D

SETUP MODE !!!!

6) Exit the *Setup Mode*.

C

- - - - -

EXIT SETUP

The Digital Filter Snap and Exponential Averaging value are set. The Measurement window will return to displaying Measurement readings.

The setting of the Snap Filter and the associated Exponential Averaging value are dependent upon the display requirements of the system operators. The Factory Default System Settings for the Snap Filter is ±0.05 inches [1.3mm] for an overall tolerance band of 0.1 inch [2.5mm] and for the Exponential Averaging value is 0.025 (displayed as 0.03 for units that have the decimal point position set to two places – XX.XX).

This completes all the functions available from the standard Model MPPU Level 3. Custom configurations of the Model MPPU may apply. Refer to any EVO documentation, if applicable.

ZC.13 Example Setup Procedure

The following is an example of the FIRST TIME setup procedure for the Model MPPU Level 3. This procedure assumes that the Model MPPU processing unit and a single 10XAS-Series sensor have been correctly installed and system power attached. It also assumes that the Level 3 interface is installed locally and is fully operational.

This example is typical of the procedure performed *when the system is first installed*. The sensor used for this example is a single 10XAS-Series Sensor (Model 10XAAS-20) at a 30 inch [762mm] emitter-to-receiver spacing and a two-inch [51mm] product passline.

Two material samples are needed for sensor calibration:

10 inches [254mm] is the minimum size material sample,
19 inches [483mm] is the maximum size material sample,
14.5 inches [368mm] is the target size.

The Model MPPU for this example is configured with a deviation bipolar analog output and an absolute unipolar analog output.

ZC.13.a Preliminary Setup Procedure

1) Apply power to the Model MPPU with the ON/OFF switch on the front panel [Section ZC.4].

00.00

POWER UP COMPLETE!

00.00

SYS DEFAULTS

Note that the readings that display right after power up, but before set-up and calibration, may not be valid readings. If there is no material in the sensor viewing area, the Measurement window will read "00.00" and the Messages window will display:

FAULT A

2) Review the current system time and date [Section ZC.5.b]. The time and date will display in the messages window for approximately three seconds and then return to the SYS DEFAULTS message.

F

MM/DD/YY HH:MM:SSXM

3) Set the system time up by one hour. This is generally performed when the time changes during Daylight Savings Time [Section ZC.5.c]. Begin by entering *Setup Mode*.

C

SETUP MODE !!!!

F

0.00

LOCK OUT CODE

4) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

The following prompt scrolls across the Messages Window.

PRESS 'A' TO ADVANCE HOUR PRESS 'D' TO STEP BACK

5) Pressing the "D" key first will return to the *Setup Mode*. Pressing the "A" key will advance the hour forward one hour per press.

MM/DD/YY HH:MM:SSXM

A

6) Press the "D" key to accept the changed time.

D

SETUP MODE !!!!

The communications baud rate can be set higher, or lower, as necessary for communications with a host computer Level 1 RS-232 Customer Interface. The Level 1 interface supports the Model MPPU factory standard 9600bps and can communicate at a baud rate up to 19200bps.

7) Begin the Set Baud Rate routine [Section ZC.6.a].

1

0.00

LOCK OUT CODE

8) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

The following prompt scrolls across the Messages window.

ENTER THE COM PORT BAUD RATE: 1200, 2400, 4800, 9600, OR 19200

The current baud rate in system memory is displayed in the Measurement window.

9600.

BAUD RATE

9) Enter a baud rate of 19200.

C

0.

1 9 2 0 0

19200

10) Press “D” to accept the entered baud rate.

D

SETUP MODE !!!!

Now any commands sent by the Level 1 RS-232 Customer Interface must operate at 19200bps if the communications cabling and connections used to connect the Model MPPU to the host computer can handle 19200bps.

Begin the Set Decimal Point Position routine [Section ZC.5.d].

11) Set the decimal point position for the readings from the Model MPPU to read with two decimal places (XXX.XX).

A

0.00

LOCK OUT CODE

12) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

The following message scrolls across the Messages window.

SELECT THE DECIMAL LOCATION FOR DISPLAY

The current decimal position is displayed in the Measurement window.

0.00

DECIMAL LOCATION

13) Press the “C” key to cycle through the selections for the decimal point location. For this example, press the “D” key to accept the decimal point location required of two positions (XXX.XX) and return to *Setup Mode*.

D

SETUP MODE !!!!

ZC.13.b Sensor Setup

Select the size and type of sensors that are connected to the Model MPPU [Section ZC.7].

1) Begin the Set the Sensor Size routine [Section ZC.7.b].

7

0.00

LOCK OUT CODE

2) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

The following emitter size information will scroll across the Messages window.

ENTER THE EMITTER SIZE: 10000, 20000, 30000, 40000

The current emitter size in memory is displayed in the Measurement window.

20000

EMITTER SIZE

3) Set sensor size to twenty inches [508mm] for a single Model 10XAAS-20 sensor.

C

0.

2 0 0 0 0

The entered emitter size is displayed in the Measurement window.

20000

4) Press "D" to accept the new emitter size.

D

SETUP MODE !!!!

5) Continue the sensor setup by performing the Set the Sensor Type routine [Section ZC.7.a].

9

0.00

LOCK OUT CODE

6) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

The variables for the sensor type scroll across the Messages window.

ENTER THE SENSOR CONFIG: 1=SINGLE BR, 2=SINGLE AS, 3=DUAL BR, 4=DUAL AS

Then the Measurement window displays the current sensor setting.

2.00

SENSOR SETUP

7) Enter the variable for a single Model 10XAAS sensor.

C

0.

2

2.

8) Press the "D" key to accept the new emitter type and return to *Setup Mode*.

D

- - - - -

SETUP MODE !!!!

ZC.13.c System Calibration

The system is ready to calibrate to the current product passline, processing unit and sensor size. Prepare for the calibration with the minimum and maximum material samples that closely represent the maximum and minimum dimensions that will be measured by the SCAN-A-LINE™ system (for this example, 19 inches [483mm] is the maximum material sample and 10 inches [254mm] is the minimum material sample). These two samples should be premeasured as accurately as possible, as they are used as "standards" for the Model MPPU Level 3 calibration procedure [Section ZC.8].

NOTE:

The units of measurement used with the Model MPPU Level 3 interface is set immediately following the system calibration routine.

1) Start the Calibration routine.

0

0.00

LOCK OUT CODE

2) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

- - - - -

The Messages window scrolls the following message, prompting the operator to place the maximum material sample in the measurement area of the sensors.

PLACE THE FIRST MEASUREMENT STANDARD ON THE SCAN*A*LINE MEASUREMENT AREA

3) Place the maximum material sample in the sensor viewing area.

XXXXX

The Measurement window is showing the "raw" counts from the sensors of the measurement of the maximum material sample.

PRESS ANY KEY WHEN READY

4) Press the "C" key to continue the calibration.

C

The Model MPPU will take twenty readings of the sensors edge detection of the maximum material sample while counting down in the Messages window.

XXXXX

0 1 2 3 4 5 6 7 8 9) ! @ # $ % ^ & * (

The Messages window then prompts for the size of the maximum material sample.

0.00

STANDARD 1

5) Enter the size of the maximum material sample (19 inches [483mm]).

C

0.

1 9

19.

6) Press the "D" key to accept the maximum material sample size.

D

XXXXX

The Messages window scrolls the following message, prompting the operator to place the minimum material sample in the measurement area of the sensor.

PLACE SECOND MEASUREMENT STANDARD ON THE SCAN*A*LINE MEASUREMENT AREA

7) Replace the maximum material sample with the minimum material sample in the sensor measurement area.

XXXXX

PRESS ANY KEY WHEN READY

C

The Model MPPU will again count from 0 to 9 while taking readings of the sensors edge detection of the minimum material sample.

XXXXX

0 1 2 3 4 5 6 7 8 9) ! @ # $ % ^ & * (

0.00

STANDARD 2

8) Enter the size of the minimum material sample (ten inches [254mm]).

C

0.

1 0

10.

9) Press the "D" key to accept the minimum sample material size.

D

The Model MPPU now requests what type of measurement label to use.

ENTER THE UNIT OF MEASURE LABEL

The default label is SYS DEFAULTS which was set when the system defaults were loaded.

```
-----
SYS DEFAULTS
```

The various standard measurement labels are:

INCHES, MILLIMETERS, FEET, METERS, YARDS, and CENTIMETERS

10) Press the "A" key to scroll through the various unit of measure labels until the proper label is displayed.

[A]

```
-----
INCHES
```

11) Press the "D" key to accept the new label

[D]

```
-----
SETUP MODE !!!!
```

The Model MPPU is now calibrated for measurement with the product passline of the current sensors with the material samples as minimum and maximum material sizes. Any change in product passline (or the sensors position) may affect the calibration (except with Model 10XABR sensors).

ZC.13.d Limit Sensing

The UPPER limit (*HI*) and LOWER limit (*LO*) relay contact closures need values set for when to close. The *GO* relay will be closed whenever the *HI* and *LO* relays are open. For this example, the UPPER limit is 19.5 inches [495mm] and the LOWER limit is 8.5 inches [216mm].

1) Press "4" to begin the Set UPPER Limit routine [Section ZC.9.a].

[4]

```
-----
ENTER THE HIGH LIMIT VALUE
```

The UPPER limit value currently in memory is displayed in the Measurement window.

```
80.00
HIGH LIMIT
```

2) Press the "D" key to accept the current UPPER limit value or press the "C" key to clear the Measurement window and enter in a new UPPER limit value (19.00).

[C]

```
0.
```

[1] [9] [F] [5]

```
19.5
HIGH LIMIT
```

The new UPPER limit value is displayed in the Measurement window.

3) Press the "D" key to accept, or if necessary, press the "C" key to clear the Measurement window and re-enter a new value.

[D]

```
-----
SETUP MODE !!!!
```

4) Press "3" to begin the Set LOWER Limit routine [Section ZC.9.b].

3

ENTER THE LOW LIMIT VALUE

The LOWER limit value currently in memory is displayed in the Measurement window.

30.00

LOW LIMIT

5) Press the "D" key to accept the current LOWER limit value or press the "C" key to clear the Measurement window and enter in a new LOWER limit value (9.50).

C

0.

9 F 5

9.5

LOW LIMIT

The new LOWER limit value is displayed in the Measurement window.

6) Press the "D" key to accept, or if necessary, press the "C" key to clear the Measurement window and re-enter a new value.

D

SETUP MODE !!!!

ZC.13.e Digital Filter Snap

The Digital Filter Snap and Exponential Averaging value should be adjusted when the Model MPPU is dithering measurement readings of a known size material. Adjusting the Filter Snap too low may cause fluctuating measurements on materials [Section ZC.12].

1) Begin the Set Filter Snap routine.

8

0.00

LOCK OUT CODE

2) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

The following prompt is displayed in the Messages window.

ENTER THE FILTER SNAP VALUE

The current Filter Snap value in memory is displayed in the Measurement window.

0.05

FILTER SNAP

3) Enter a Filter Snap of ±0.07 to represent a total tolerance value of 0.14 inches [3.6mm].

C

0.

0 F 0 7

The new Digital Filter Snap value is displayed in the Measurement window.

0.07

4) Press the "D" key to accept the displayed Digital Filter Snap value.

D

- - - - -

ENTER THE K CONSTANT FOR FILTER

0.03

K CONSTANT

The K constant is the Exponential Averaging value [see Section Z.8 for more information]. The smaller the K constant, the more stable the display output in the Measurements window.

5) Enter a K constant for the Exponential Averaging of the Filter Snap of 0.015.

C

0.

0 F 0 1 5

0.02

Notice how the display reads 0.02 for the Exponential Averaging value. This is because the display is set for only two decimal places. The 0.015 that was entered is the valid value for the Exponential Averaging, but because of the two decimal places, the value was rounded up to 0.02.

D

SETUP MODE !!!!

- - - - -

SETUP MODE !!!!

The setting of the Filter Snap and Exponential Averaging are dependent upon the display requirements of the system operators.

ZC.13.f Deviation Analog Output

To scale the Deviation Analog Output [Section ZC.10], first enter the Target value:

1) Begin the Set Target routine.

2

0.00

The Message window scrolls the following message, prompting the operator to enter in the Target value.

ENTER THE TARGET VALUE

The current Target value in the Model MPPU memory is displayed in the Measurement window.

20.00

TARGET

2) Enter the target value of 14.5 inches.

C

0.

1 4 F 5

14.50

3) Press the "D" key to accept.

D

The Message window scrolls the following message, prompting the operator to enter in the Product ID number.

ENTER THE PRODUCT ID….

The current Product ID value is displayed in the Measurement window.

123456.

PRODUCT ID

4) Enter a Product ID of 223344.

C

0.

2 2 3 3 4 4

223344

5) Press the "D" key to accept.

D

- - - - -

SETUP MODE !!!!

6) Start the Deviation Analog Setup routine.

6

0.00

LOCK OUT CODE

7) Enter the Lock Out Code.

C

0.

9 8 7 6

D

- - - - -

The Message window scrolls the following message, prompting the operator to enter in the deviation analog value.

ENTER THE DEVIATION ANALOG, DEVIATION x=10 VOLTS OUT

The current deviation analog scaling value in the Model MPPU memory is displayed in the Measurement window.

4.00

DEVIATION ANALOG

8) Enter the deviation value (the value that represents the difference between the target value and the maximum size material required). This value corresponds to the maximum deviation analog output (10VDC) for that difference. For this example, the deviation value is "4.5" (19 - 14.5 = 4.5 deviation).

C

0.

4 F 5

4.5

9) Press the “D” key to accept the displayed deviation analog value.

D

- - - - -

SETUP MODE !!!!

10) Exit the *Setup Mode*.

C

- - - - -

EXIT SETUP

The Measurement window should display “19.00” for the maximum material sample that is currently in the sensor measurement area.

19.00

INCHES

The deviation analog output is scaled for a deviation from target of 4.5 inches [114mm] equals 10VDC.

ZC.13.g Absolute Analog Output

To scale the Absolute Analog Output [Section ZC.11]:

1) Enter the *Setup Mode*.

C

- - - - -

SETUP MODE !!!!

2) Start the Absolute Analog Setup routine.

5

0.00

LOCK OUT CODE

3) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

- - - - -

The Messages window scrolls the following message, prompting the operator to enter the absolute analog value of “x”. This value represents the maximum or high material sample size (19.00).

ENTER THE ABSOLUTE ANALOG VALUE, x=10 VOLTS OUT

The current high absolute analog setting in the Model MPPU memory is displayed in the Measurement window.

30.00

ABSOLUTE ANALOG

4) Enter the known width of the maximum material that will be run on the line. This value corresponds to the maximum absolute analog output (10VDC). For this example, the value is "19".

C

0.

1 9

19.

5) Press the "D" key to accept the displayed high absolute analog value.

D

The Messages window scrolls the following message, prompting the operator to enter the low absolute analog value of "x". This value represents the minimum or low material sample size (9.00).

ENTER THE ABSOLUTE ANALOG VALUE, x=0 VOLTS OUT

The current low absolute analog setting in the Model MPPU memory is displayed in the Measurement window.

15.00

ABSOLUTE ANALOG

6) Enter the known width of the minimum material that will be run on the line. This value corresponds to the minimum absolute analog output (0VDC). For this example, the value is "9".

C

0.

9

9.

7) Press the "D" key to accept the displayed low absolute analog value.

D

- - - - -

SETUP MODE !!!!

8) Exit the *Setup Mode*.

C

- - - - -

EXIT SETUP

The absolute analog is scaled to a maximum size of 19 equals 10VDC or 0.52VDC per inch.

ZC.14 Remote Operation

The Model MPPU Level 3 interface is optionally available as a remote interface (Level 3/50 Option). The Level 3 interface is provided with a template drawing in Section ZC.13 (Drawing # 1396175 Rev. A) for mounting the remote interface. The cable connection for the Level 3 interface is detailed in the cable drawing in Section ZC.16 (Drawing # 3496175 Rev. A).

Remote operation of the Level 3 interface is applicable *up to fifty linear cable feet [15.2m]* from the Model MPPU processing unit. If operating one remote display, the DB-25 connector attaches to the RS-232-0 communications port. Cable access to communication ports is available through the spare access hole in the bottom panel of the processing unit.

ZC.14.a Secondary Interface

The Level 3/50 Option also provides operation with a local Level 3 display in conjunction with a secondary, remote-mounted Level 3 display. If a local Level 3 interface is to be used in conjunction with a remote-mounted secondary Level 3 interface, the local display attaches to RS-232-0 communications port and the secondary display attaches to RS-232-1 communications port. The JP6 jumper pins 13 and 14 must be closed for proper operation of the secondary display.

ZC.14.b Remote Display Cable

The Level 3/50 Option cable (Drawing # 3496175 Rev. A) has a DB-25 serial communications connector on the end that attaches to the RS-232-0 or RS-232-1 communications port in the processing unit. The end that attaches to the Level 3 interface can be one of two configurations:

Configuration 1: A DB-9 serial communications connector that attaches to the DB-9 port on the back of the display board. This configuration is found in early versions of the Model MPPU processing unit.

Configuration 2: A 6-pin connector attached to a 6-pin machined socket on the back of the display board with direct wire connections. This configuration is found in later versions of the Model MPPU processing unit.

The power for the Remote Display Cable is +4.8VDC to 5.2VDC 0.5Amps Max continuous with a ±5% Maximum Line or Load. Be sure to utilize 18 gauge shielded wire if running both the power and the communications lines in one cable. The data wires are 24 gauge. A sample cable for testing and demonstration purposes is supplied by Harris Instrument Corporation (Harris Instrument Part #3496175).

See Section ZC.6.b for information on extended serial communications (i.e. communications over distances greater than the RS-232 standard fifty linear cable feet [15.2m].

ZC.15 Trouble Shooting

The Model MPPU Level 3 interface has two routines for verifying the analog outputs. There is limited trouble shooting that can be performed on the Level 3 interface.

ZC.15.a Verify the Deviation Analog Output

To verify the deviation analog output, be sure that the entire SCAN-A-LINE™ system (sensors and Model MPPU) is completely installed, fully functioning and powered on. Perform the set-up routines for sensor type [Section ZC.7.a] & size [Section ZC.7.b] and system calibration [Section ZC.8] BEFORE beginning the verification of the deviation analog output voltage.

Make sure the material currently on the line is at full line tension and at the proper product passline for the system calibration [Section ZC.8] and that the unit is powered up and reading.

To verify the deviation analog output:

1) Attach the digital voltmeter PLUS VOLTS lead to the ANALOG OUT 1 terminal (Y4-2) and the COMMON lead to the COM terminal (Y4-1).

2) Check the measurement of the material currently on the line using the Model MPPU measurements in the Measurement window. For this example, the material on the line is 14.5 inches in width. The Measurement window should read 14.5.

14.5

3) Enter the *Setup Mode*.

[C]

- - - - -

SETUP MODE !!!!

4) Begin the Set Target routine.

[2]

- - - - -

ENTER THE TARGET VALUE

XX.XX

TARGET

The target value currently in memory is displayed in the Measurement window.

5) Press the “C” key to clear the Measurement window and enter in the target value.

[C]

0.

6) Enter the size of the material currently on the line as the target value (for example, 14.5 inches [368mm]).

[1] [4] [F] [5]

14.5

The target value of 14.5 is displayed in the Measurement window.

7) Press the "D" key to accept. Once accepted, the display returns to the *Setup Mode*.

D

- - - - -

SETUP MODE !!!!

8) Press "C" to exit the *Setup Mode*.

C

- - - - -

EXIT SETUP

14.5

INCHES

The Target is now set to the material currently on the process line.

9) Check the voltmeter for its current reading. The voltmeter should read 0VDC ±0.025VDC. If the voltmeter is off more than ±0.025VDC, the bipolar DAC must be adjusted:

a) Locate potentiometer R5 on the main board inside the Model MPPU [Section Z.6.d].

b) With a small blade screwdriver, turn the potentiometer adjustment screw clockwise and view the reading on the voltmeter. Adjust the screw in the direction necessary to cause the bipolar analog voltage to read 0VDC with the target material.

Once the voltmeter reads 0VDC ±0.025VDC, set the deviation scaling value.

10) Enter the *Setup Mode*.

C

- - - - -

SETUP MODE !!!!

11) Start the Deviation Analog Setup routine.

6

0.00

LOCK OUT CODE

12) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

- - - - -

The following message scrolls across the Messages window.

ENTER THE DEVIATION ANALOG, DEVIATION x=10 VOLTS OUT

The current deviation analog setting in the Model MPPU memory is displayed in the Measurement window.

X.XX

DEVIATION ANALOG

13) Enter a deviation scaling value (for example, 4.5 inches [114mm]for 10VDC).

C

0.

4 F 5

4.5

D

- - - - -

SETUP MODE !!!!

14) Exit the *Setup Mode*.

C

- - - - -

EXIT SETUP

14.5

The Measurement window will return to *Readings Mode*. The deviation analog output scaling value is set. Now, reset the Target value to verify the full operation of the deviation analog output.

15) Enter the *Setup Mode*.

C

- - - - -

SETUP MODE !!!!

16) Begin the Set Target routine.

2

- - - - -

ENTER THE TARGET VALUE

14.5

TARGET

The target value currently in memory (14.5) is displayed in the Measurement window.

17) Press the "C" key to clear the Measurement window.

C

0.

18) Enter a new target value that is one unit (i.e. inch, centimeter, etc.) larger that the previous target value (for example, 15.5 inches [394mm]).

1 5 F 5

15.5

The target value of 15.5 is displayed in the Measurement window.

19) Press the "D" key to accept. Once accepted, the display returns to the *Setup Mode*.

D

- - - - -

SETUP MODE !!!!

20) Press "C" to exit the *Setup Mode*.

C

- - - - -

EXIT SETUP

14.5

INCHES

21) Check the voltmeter for a change in reading from 0VDC. The reading should be lower by a value equal to the volts per inch of deviation (For example, since the current material on the line is 14.5 inches and the deviation scaling value is 4.5 inches equals 10VDC and the current target value is 15.5 inches, the current material deviates from target minus one inch or -2.2VDC.).

Repeat this procedure with a target value smaller than the current material on the line to verify if necessary.

If the voltages are correct, the deviation analog output is verified. If the voltages are not correct, repeat the setup procedure [Section ZC.10.b] and re-verify the voltages. If the voltages are still not correct, contact Harris Instrument Corporation Service for assistance.

ZC.13.b Verify the Absolute Analog Output

To verify the absolute analog output, be sure that the entire SCAN-A-LINE™ system (sensors and Model MPPU) is completely installed, fully functioning and powered on. Perform the set-up routines for sensor type [Section ZC.7.a] & type [Section ZC.7.b] and system calibration [Section ZC.8] BEFORE beginning the verification of the absolute analog output voltage. Make sure the material currently on the line is at full line tension and at the proper product passline for the system calibration [Section ZC.8].

To verify the absolute unipolar analog output voltages:

1) Attach the digital voltmeter PLUS VOLTS lead to the ANALOG OUT 5 ABS terminal (Y4-5) and the COMMON lead to the COM terminal (Y4-6).

2) Check the Measurement window on the Readings Screen for the current measurement of the material on the line. For example, the material on the line is 14.5 inches.

14.5

INCHES

Use the current measurement value of the material on the line as a basis for the scaling of the absolute analog (for example, the current measurement of the material on the line is 14.5 inches).

3) Enter the *Setup Mode*.

C

- - - - -

SETUP MODE !!!!

4) Start the Absolute Analog Setup routine.

5

0.00

LOCK OUT CODE

5) Enter the Lock Out Code.

C

0.

9 8 7 6

9876

D

ENTER THE ABSOLUTE ANALOG VALUE, x=10 VOLTS OUT

The current high absolute analog setting in the Model MPPU memory is displayed in the Measurement window.

XX.XX

ABSOLUTE ANALOG

Since the absolute analog output is 0VDC to 10VDC, the maximum size to be run on the line should be used to scale the absolute analog (for example, the maximum material to be run on this line is 19 inches)

6) Enter the maximum size value that you wish to be represented by 10VDC. This value corresponds to the maximum absolute analog output (10VDC) and is the high absolute scaling value. Enter an absolute scaling value of 19.00. Press "D" to accept the value.

C

0.

1 9 F 0 0

19.00

D

ENTER THE ABSOLUTE ANALOG VALUE, x=0 VOLTS OUT

The current low absolute analog setting in the Model MPPU memory is displayed in the Measurement window.

XX.XX

ABSOLUTE ANALOG

Since the absolute analog output is 0VDC to 10VDC, the minimum size to be run on the line should be used to scale the low absolute analog (for example, the minimum material to be run on this line is 9 inches)

6) Enter the minimum size value that you wish to be represented by 0VDC. This value corresponds to the minimum absolute analog output (0VDC) and is the low absolute scaling value. Enter a low absolute scaling value of 9.00. Press "D" to accept the value.

C

```
0.
```

9 F 0 0

```
9.00
```

D

```
-----
SETUP MODE !!!!
```

7) Exit the *Setup Mode*.

C

```
-----
EXIT SETUP
14.5
INCHES
```

The Measurement window will return to displaying measurement readings. The absolute analog output has been scaled.

8) Check the voltmeter for its current reading. The voltmeter should read the result of the volts per unit multiplied by the size of the current material on the line (For example, since 19 inches equals 10VDC and 9 inches equals 0VDC, absolute voltage output is approximately 1VDC per inch. Since the current material on the line is 14.5 inches, the absolute voltage output should be 5.5VDC±0.025VDC.).

If the voltages are correct, the absolute analog is verified. If the voltages are not correct, repeat the setup procedure [Section ZC.11] and re-verify. If the voltages are still not correct, contact Harris Instrument Corporation Service for assistance.

ZC.15.c LED Keypad/Display Operation

The Level 3 LED Keypad/Display operation can be verified by checking for power to the unit. On the back of the display, locate the 6-position miniature terminal block. The top position is pin 6 and the bottom is pin 1 {Figure ZC.15-1}. With a digital voltmeter, this pin should read +5VDC ±0.25VDC when power is applied to the unit.

6-PIN CONNECTOR

PIN	DESCRIPTION
6	GROUND
5	+5VDC
4	NO CONNECT
3	RX
2	TX
1	CTS

Figure ZC.15-1: LED Keypad/Display Connections

ZC.15.d Restoring Factory Default System Settings

NOTE:

It is generally not necessary to restore factory default settings unless:

a) The EPROM have been replaced,
b) The battery-backed RAM has been lost due to a loss of power for more than 30 days
c) The battery-backed RAM chip has been replaced,
d) The sensor type or size has been changed.

To restore the EPROM-based Factory Default System Settings:

1) Start the *Setup Mode* from the *Readings Mode* by pressing "C":

C

- - - - -

SETUP MODE !!!!

Pressing any key other than the "F" key will force the Model MPPU into *Setup Mode*.

2) Load the Factory Defaults by pressing the "B" key.

B

0.00

LOCK OUT CODE

The Lock Out Code routine is started.

3) Clear the Measurement window of the current display by pressing the "C" key.

C

0.

4) Enter the lock out code and press the "D" key to accept.

9 8 7 6

9876

If during the entry of the Lock Out Code, the numbers entered are incorrect, just press the "C" key to clear the Measurement window and re-enter the numbers. Once the lock out code is entered properly, press the "D" key to accept it and continue.

D

- - - - -

The Messages window will display:

ARE YOU SURE YOU WANT TO CLEAR SYSTEM SETTINGS??

PRESS D TO CONFIRM

5) Press the "D" key to confirm the restoration of the default system settings, any other key to return to *Setup Mode*.

D

SYSTEM IS NOW RESETTING, PLEASE WAIT.....

Wait a short period of time for the system to reset the Factory Default System Settings.

POWER UP COMPLETE!

The system returns to the *Setup Mode*.

- - - - -

SETUP MODE !!!!

6) Press "C" to exit the *Setup Mode*.

C

- - - - -

EXIT SETUP

XX.XX

SYS DEFAULTS

The "SYS DEFAULTS" message informs the operator that the factory default system settings have been loaded into battery-backed RAM and the customer selected system settings have been lost. The Model MPPU must be set up and configured again before operations can continue. This message also appears when the system battery is low or when the system RAM is lost due to power failure.

ZC.16 Configuration Form

This form is to be filled out by the operator to record the system settings for the Model MPPU, no matter which customer interface is installed. Many of the system settings of the Model MPPU can be entered manually, bypassing the need for re-calibration of the system.

Once a complete installation of the Model MPPU is performed and the unit is functioning properly, record here the system settings via the Level 1 RS-232 Customer Interface or the Level 3 Customer Interface *Manual Calibration Routine* [Section ZC.8.c]. Currently, the Level 3 LED Display/Keypad does not display complete diagnostic information. Recording of some of the values listed below must occur during the setup of the system. Note that the values in parentheses are the Factory Default System Settings that are stored in the EPROM. Software versions are available on the inside of the door of the unit.

Units of Measure (INCHES):__ Decimal Point Position (XX.XX):___.

Baud Rate (9600bps):_____ Filter Snap (0.05):_____ Exponent Average (0.025): _____.

Upper Limit (80):_____ Lower Limit (20):_____ Target (50):__.

Absolute Analog (100=10VDC):_____ Deviation Analog (4 = 10VDC):___.

Sensor Size (10):_____. Sensor Type (AS):_____.

Dual 10XABR Sensor Separation (100.00 Inches):_____.

RAW ONE:_____. CAL ONE:__.

RAW TWO:_____. CAL TWO:__.

EPROM Software Version:_____.

Display Software Version:_____.

PIC Software Version:_____.

ZC.17 Related Drawings

The following pages contain various drawings for the components used in and with the Model MPPU Level 3. For drawings of other configurations, please contact Harris Instrument Corporation Engineering. All mechanical drawings are available as AutoCAD® .DWG files (AutoCAD® LT Version 2.0) for a minimal charge. Please contact Harris Instrument Corporation Sales for more information.

Drawing #	Description	Drawing Format
1298178	*Model MPPU Level 3 Exterior Dimensions*	*AutoCAD LT Rel. 3*
1398178 Rev. D Pg. 1	*Model MPPU Level 3 Interior View*	*AutoCAD LT Rel. 3*
1398178 Rev. D Pg. 2	*Interior View Legend*	*AutoCAD LT Rel. 3*
1296175 Pg. 1	*Remote Mount Panel Cutout Dimensions*	*AutoCAD LT Rel. 3*
3496175 Rev. B	*Remote Mount Cable Wire Diagram*	*AutoCAD LT Rel. 3*
3696064	*Level 3 LED Display/Keypad Board Assembly*	*AutoCAD LT Rel. 3*

Table ZC.17-1: Drawing Information