



USER MANUAL



'CALMATE' V4.1 CALIBRATION KIT

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SIGMA CONTROLS, INC.

1.0 CONTACT INFORMATION

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SIGMA CONTROLS, INC.

2.0 PRODUCT DESCRIPTION

PRODUCT OVERVIEW

The 'CALMATE' calibration kit is provided to enable field personnel to recalibrate Sigma Controls level transducer products (MFG. After January 2011 and previous units bearing the letter 'K' in the serial number).

This manual was written to accompany Version V4.1 of the software.

3.0 DESCRIPTION OF OPERATION

The 'CALMATE' system consists of two components: The software which is included on the enclosed CD and the local converter "dongle" which connects to the PC USB port and to the transducers' cable.

3.1 GETTING STARTED

- 1) Load the CD on the PC or laptop and make sure there is an available USB port.
- 2) Open the file identified as 'Sigma_Calmate_End_User' the software will open the 'End User' program page.

3.2 MAKING THE CONNECTIONS

Every Sigma Transducer has 4 conductors in the cable, Red + 24VDC, Black – 24 VDC, Blue and Yellow which are the Modbus connections.

The protocol converter "dongle" has 4 spring loaded connectors clearly marked with the color of the connection. Strip the wires back approx. 3/8" and insert into the dongle connectors.

Plug the USB cable into the dongle and then into the USB port on the computer.

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3.3 STARTING THE PROCESS

Version 4.1 was designed so that you can follow the steps in a descending direction. With the most common functions at the top. The advanced, riskier settings are kept at the bottom and are seldom used.

Sigma CalMate End User Program V4.1 10/31/2016 K-WW

Step 1: Find Cal'Mate
Step 2: Find Unit on ModBus
Step 3: Read Unit Data
CURRENT SETTINGS
Firmware Revision:
Unit Serial Number
Sensor Temperature
Engineering Units

Note:
To read current from non-Sigma sensors:
Use steps 1 and 4 only!

Step 4:

18.17 mA
[Normal Range 4.0mA - 20mA]
[Max Range 3.5mA - 20.5mA]

***** Customer Setup Options *****

Setting	Current Setting	Change Setting to	Click to Change	
4mA Point	.00		Change 4mA Point	Sets 4mA point [Number can have 2 decimals]
20mA Point	100.00		Change 20mA Point	Sets 20mA point [Number can have 2 decimals]
Current Reading	88.38	[Desired Reading]	Correct Reading	Change this ONLY if you know the current reading has drifted.
Offset Correction	.00	Remove Correction	<<< Use this to restore the uncorrected reading	

***** Caution: For Advanced Users Only *****

Setting	Current Setting	Change Setting to	Click to Change	
Sample Rate	Max Rate		Change Sample Rate	0=maximum, else ~ 1 to 127 sec delay
# Readings to Average [1 - 32]:	1		Change # Readings	Range is 1 - 32 readings to do a rolling average on
ModBus Node #	17		Change Node #	Valid Modbus node numbers are from 1 - 246 Use "Find Unit" to verify changed ModBus node #
Raw Sensor Counts	37937	For diagnostic use by Sigma Controls in case of unusual sensor operation		
Unit in Forced?	No			

Step 1 With the CalMate connected to the computer's USB port start the .EXE file, version 4.1, Click on Find CalMate. If the CalMate is not found, there is probably a problem with the USB driver. Go to the CD and look under the Dongle Driver folder click on CDM2080setup. Then try again to find the CalMate.

Step 1: Find Cal'Mate	COM5	Find Cal'Mate
Step 2: Find Unit on ModBus	Found Unit on ModBus	Find Unit
Step 3: Read Unit Data	Data read from unit	[Re]Read Unit

Step 2 Click on Find Unit, a confirmation will be seen on the screen, 'Found unit on ModBus'.

Step 3 Click on Read Unit, a confirmation will be displayed 'Data read from unit.'

Step 4 click on Read Loop Current. The loop current will be displayed as measured across the red and black wires of the CalMate. This measurement can be used on a non-Sigma product as a simple milliamp read out.

Step 4:	Read Loop Current	18.17 mA
		[Normal Range 4.0mA - 20mA] [Max Range 3.5mA - 20.5mA]

CURRENT SETTINGS.

These readings are not adjustable.

Firmware Revision. This is the revision level of the MP processor in the sensor.

Unit Serial Number. This is the sensors serial number as entered in the factory.

Sensor Temperature. This is the sensors internal temperature reading.

Engineering Units. This is the unit of measurement that was used when the unit was calibrated in the factory this is not adjustable.

CURRENT SETTINGS	
Firmware Revision:	4.1
Unit Serial Number	567468
Sensor Temperature	23.2
Engineering Units	PSI

3.4 Customer set up options.

***** Customer Setup Options *****				
Setting	Current Setting	Change Setting to	Click to Change	
4mA Point	.00		Change 4mA Point	Sets 4mA point [Number can have 2 decimals]
20mA Point	100.00		Change 20mA Point	Sets 20mA point [Number can have 2 decimals]
Current Reading	88.38	[Desired Reading]	Correct Reading	Change this ONLY if you know the current reading has drifted.
Offset Correction	.00	Remove Correction	<<< Use this to restore the uncorrected reading	

The white fields on the left are read only information obtained from the sensor. The yellow fields in the middle are where you enter values. The buttons on the right are how you enter those values.

4mA point

This is the value in engineering units, inches, feet, or psi that will equate to 4mA of current on the output.

20mA point

This is the value in engineering units, inches, feet, or psi that will equate to 20mA of current on the output.

Current Reading.

This is not a reading of milliamps. This is the present reading from the sensor in engineering units.

Offset Correction.

This is a display showing any corrective measures that have been taken since the unit was factory calibrated. It is a good practice to remove this correction using the Remove Correction Button prior to applying a new offset with the Correct Reading Button.

Example one: Changing the range of the sensor.

In this example we have a sensor range from 0 to 100 psi. We wish to change its range 0 to 200 psi. We enter 200 in the 20mA yellow field. And we press the change 20mA button.

Sensor Temperature	23.2	Step 4:	Read Loop Current	18.17 mA
Engineering Units	PSI			[Normal Range 4.0mA - 20mA] [Max Range 3.5mA - 20.5mA]
***** Customer Setup Options *****				
Setting	Current Setting	Change Setting to	Click to Change	
4mA Point	.00		Change 4mA Point	Sets 4mA point [Number can have 2 decimals]
20mA Point	100.00	200	Change 20mA Point	Sets 20mA point [Number can have 2 decimals]

Press the Read Loop Current button or the Read Unit button to refresh the readings. You can see that the milliamps have dropped to half of the original value.

Sensor Temperature	24.6	Step 4:	Read Loop Current	11.09 mA
Engineering Units	PSI			[Normal Range 4.0mA - 20mA] [Max Range 3.5mA - 20.5mA]
***** Customer Setup Options *****				
Setting	Current Setting	Change Setting to	Click to Change	
4mA Point	.00		Change 4mA Point	Sets 4mA point [Number can have 2 decimals]
20mA Point	200.00	200	Change 20mA Point	Sets 20mA point [Number can have 2 decimals]

Example 2: Offset Correction

After a sensor has been in the field for a number of years, drifting can occur. If the actual reading is known or you desire to offset the current reading to a different value, this function is very useful.

Current Reading	13.81	13.00	Correct Reading	Change this ONLY if you know the current reading has drifted.
		[Desired Reading]		
Offset Correction	.00	Remove Correction	<<< Use this to restore the uncorrected reading	

In this example the Current Reading is 13.81 we desire to have the reading at 13.00 as measured with a gauge. Enter 13.00 in the yellow field and press Correct Reading. Notice that the Offset Correction has changed to -.81 and the current reading has change to 13.01.

Current Reading	13.01	13.00	Correct Reading	Change this ONLY if you know the current reading has drifted.
		[Desired Reading]		
Offset Correction	-.81	Remove Correction	<<< Use this to restore the uncorrected reading	

3.5 Advanced Users Section.

The settings should not need to be changed in most cases. But these adjustments may come in handy in some cases. The white fields on the left are read only. The orange fields in the middle are for data entry. The buttons on the right are action buttons that enter the data from the orange fields.

***** Caution: For Advanced Users Only *****				
Setting	Current Setting	Change Setting to	Click to Change	
Sample Rate	Max Rate		Change Sample Rate	0=maximum, else ~ 1 to 127 sec delay
# Readings to Average [1 - 32]:	1		Change # Readings	Range is 1 - 32 readings to do a rolling average on
ModBus Node #	17		Change Node #	Valid Modbus node numbers are from 1 - 246 Use "Find Unit" to verify changed ModBus node #
Raw Sensor Counts	26191			
Unit in Forced?	No			
		For diagnostic use by Sigma Controls in case of unusual sensor operation		

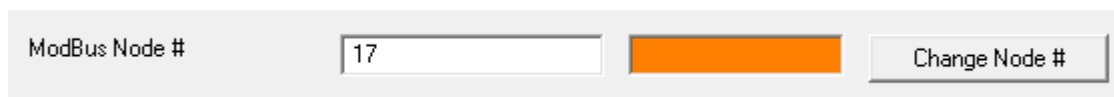
Sample Rate.

The sensor has an averaging function built inside to slow rapidly changing readings or to compensate for electrical noise. The sample rate sets how often a sample will be taken.

Readings to Average.

The averaging function has a number of readings that can be taken, from 1 to 32 readings. This can be set along with the sample rate, to mold a custom averager.

ModBus® Node.



Multiple ModBus® slaves can be put on to the same network. The way to address each slave is to give it a unique Node number. The MP sensor's default Node is 5.

Raw sensor counts.

This is used by Sigma controls to help diagnose the health of the sensing element.

Unit in Forced.

It is possible to force a sensor into a manual output mode. This Field assures that it is not in a fixed output mode.

Example 3: Changing the ModBus® Node.

The current ModBus® Node is 17. We enter a 5 in the orange field and press the button. Then press Read Unit or Read Loop Current buttons to refresh the node number. This changes our unit ID back to the default node of five.



To disconnect, simply click on the EXIT button.