SERIES 200XXX4
INSTALLATION & OPERATING MANUAL

Microframe Corporation
604 South 12th Street
Broken Arrow, OK 74012

Local: 918-258-4839
Toll Free: 800-635-3811
Website: **www.microframecorp.com**
E-mail: **support@microframecorp.com**

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D0200XXX4-7010
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D0200XXX4-7010

Limited Warranty Agreement
Your Microframe System is warranted against failure due to defects in workmanship or material for a period of one (1) year from the date of purchase. Microframe Corporation will repair or replace any defective unit. Obvious abuse or mishandling of the unit is NOT covered by this warranty.

Merchandise Return
If your Unit does not work satisfactorily, please give us a call. We may be able to clear up the problem by phone. If it becomes necessary to return your Unit to the factory, please observe the following:
1. Call Microframe for an RMA number. This number authorizes you to return the product.
2. Place Unit in a sturdy box with sufficient packing material. Be sure the RMA number is on the outside of the box.
3. If requested, include the AC power adapter. It is not necessary to return the cable and connectors unless they are the problem.
4. Return the system insured and prepaid. Microframe is not responsible for shipping damages and losses on returned Units.

Warranty Service
For warranty service, please contact Microframe toll-free at 800-635-3811. One of our technicians will be glad to assist you.

Assistance
For any product assistance or maintenance help, contact Microframe by either calling 800-635-3811 or e-mailing us at: support@microframecorp.com.

Safety
Do not install substitute parts or perform any modification to the product without first contacting Microframe.

Disclaimer
We constantly strive to improve our products. Specifications are subject to change without notice.

Warning
All power adapters, line cords, and electrical equipment should be kept out of the reach of children and away from water. (If you are installing cable in an air plenum area, such as a drop ceiling used for air return, you must use plenum-rated cable. The cable supplied from Microframe is rated CL2 and is approved for indoor installation everywhere except plenum areas.)

Life Support Policy
Microframe's products are not authorized for use as components in life support devices or systems without the express written approval of the President of Microframe Corporation. As used herein:
1. Life support devices or systems are defined as systems which support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user or any one depending on the system.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

FCC Notice (for wireless products only)
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
— Reorient or relocate the receiving antenna.
— Increase the separation between the equipment and receiver.
— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.

Series 200XXX4
Installation and Specification Guide

Table of Contents

Overview
Series 200XXX4 displays are 0-20mA current loop displays. A typical application will use the range 4-20mA.

Installation
We recommend configuring the display on a bench before installing it permanently.

Power
Connect the supplied 24VAC adapter to the VIN terminals.

Signal
Connect the positive side of your current loop to the 20mA + side. Connect the negative side of your current loop to the – side.

Power Up
Plug in the power adapter. You will see the display power light flash in the bottom right corner. In about 10 seconds, the display will show the current loop value.

Self-Test Modes
Tap the mode button to select the following test modes:
- 8's
- 8's fullbrite (factory burn in)
- Firmware revision

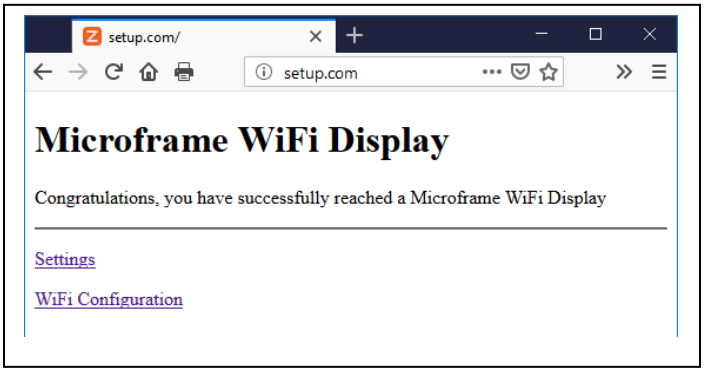
Configuration
Follow the instructions in Configuration (next page) to configure the module.

Mounting
- The indoor version of these displays may be placed on a counter top, or wall mounted using the keyhole cutouts on the back of the display.
- The weather resistant case option for this display has flanges on either side with screw holes for wall mounting.
- The weatherproof version of this display (265XXX4) comes in a ruggedized case with mounting brackets.

Configuration

Configuration on these displays is done via a web-page. See Appendix B if you want to configure these via a console.

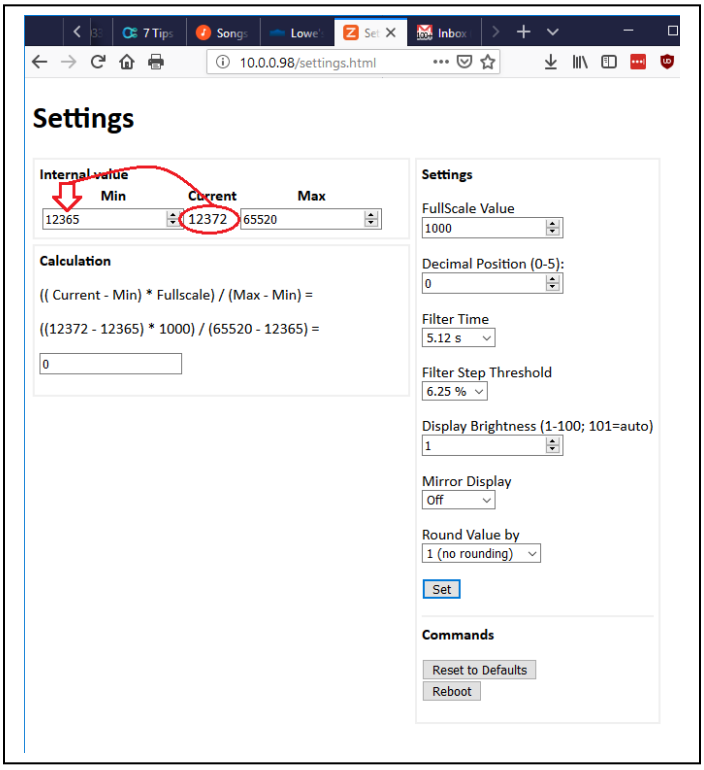
By default, the display generates its own hotspot for configuration. Using a phone, tablet, or laptop, connect to the WiFi network name that starts with “SoftAP”. Your device may automatically take you to a setup page. If not, open the website “setup.com”.



[Tip: some cell phones will recognize this WiFi has no internet, and automatically turn on mobile data. You may need to disable mobile data while configuring this device.]

Click on “Settings”.

You can also join this display to a WiFi network, if desired. It is up to the user to find the new IP address once it’s on a network.



Calibrate zero point

To set the minimum display value, have your sensor output the minimum value (typically 4mA). On the settings webpage, set the Min value to match the Current value.

20mA module calibration (optional)
The 20mA onboard module is calibrated at the factory and should not need adjustment.
If you'd like to adjust the calibration, here is the procedure.

Set the following options on the webpage:

- Min 0
- Max 65520
- FullScale Value 65520
- Decimal Position 0
- Filter Time 1.28s
- Filter Step Threshold 1.56%
- Display Brightness 5 (or as desired)
- Mirror Display Off
- Round Value by 1

Remove the back panel from the display. Find the pots on the 20mA onboard module.

Place a short jumper wire across the module's input terminals (left side). Turn the zero pot (top left) until the value on the display front shows 0. Do not go too low as the display cannot show negative values here.

Remove the jumper wire. Connect a precision, low noise 20.00mA source to the module. Turn the span pot (top right) until the display shows 65520. Do not go too high as the display cannot show more than 65520.

Programmable Options – Web Page

- Min – The zero point for your current loop input. This is the internal value corresponding to 0mA or 4mA.
- Max – The internal value corresponding to your current loop max value, typically 20mA. This value is typically left at 65520.
- Decimal Position – Inserts a decimal point into the displayed value.
- FullScale Value – Value to display at full input range (20mA).
- Filter Time – This is a rolling average over the time window specified. Larger values yield a more stable display but have slower response times.
- Filter Step Threshold – This setting is useful to speed up the response time when the input changes significantly. If the input value changes sharply by more than this percentage, then the display will immediately go to the new value.
- Round Value by – Round the displayed value to hide small variations.
- Display Brightness – Set the brightness manually or let it auto-adjust.
- Mirror Display – Reverse the display so that is shows properly in a mirror.
- [Reset to Defaults] – press this to reset the settings on this page to the defaults.
- [Reboot] – Reset the WiFi module. If in SoftAP mode, you will temporarily lose the WiFi connection.

Factory Reset

To reset the display hardware to Factory Defaults, press and hold the mode button until the display counts down to “rst”.

Appendix A – Troubleshooting

TROUBLESHOOTING CHART		
SYMPTOM	**POSSIBLE CAUSE**	**SOLUTION**
Display is blank and no Processor LED	No power to unit	Make sure the unit is plugged in and the outlet is working.
	Unit is dead	Return unit to Microframe for servicing.
Display is blank but power light is flashing	Normal operation	Display takes about 10 seconds to startup, after which it should display the current loop value.
Display is showing a lower bar "_____" symbol.	Broken current loop	Check all connections in current loop.
	Input current is below the programmed "Min" value.	Check that your sensor is still calibrated correctly. Change the "Min" setting using the website or console.
Display is showing an upper bar "~~~~~" symbol	Value to display is larger than the display can show.	Change the multiplier "Fullscale Value" using the website or console.

Appendix B – Configuration via Console

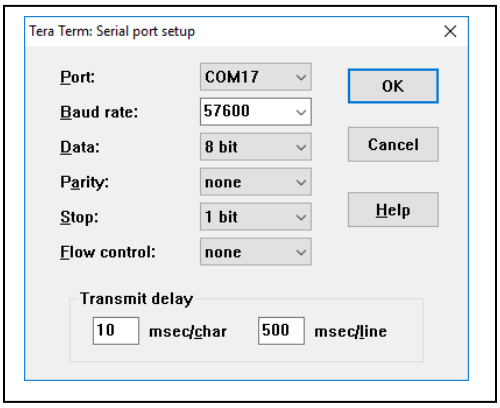
Intro

If you are unable to use the WiFi interface to configure this device, all settings can also be done with a computer connected to the USB port.

Caution – ground loop isolation

The display achieves ground isolation via the AC transformer. The 4-20mA module on this display is not isolated. If you plug in the USB cord to configure this device (alternate configuration), you are connecting the computer ground to the current loop ground (- side). If the current loop ground potential is significantly higher than the computer ground, then damage may occur. If you are unsure about ground loop potentials, then don't connect the current loop until after you have configured the module and unplugged the USB cable.

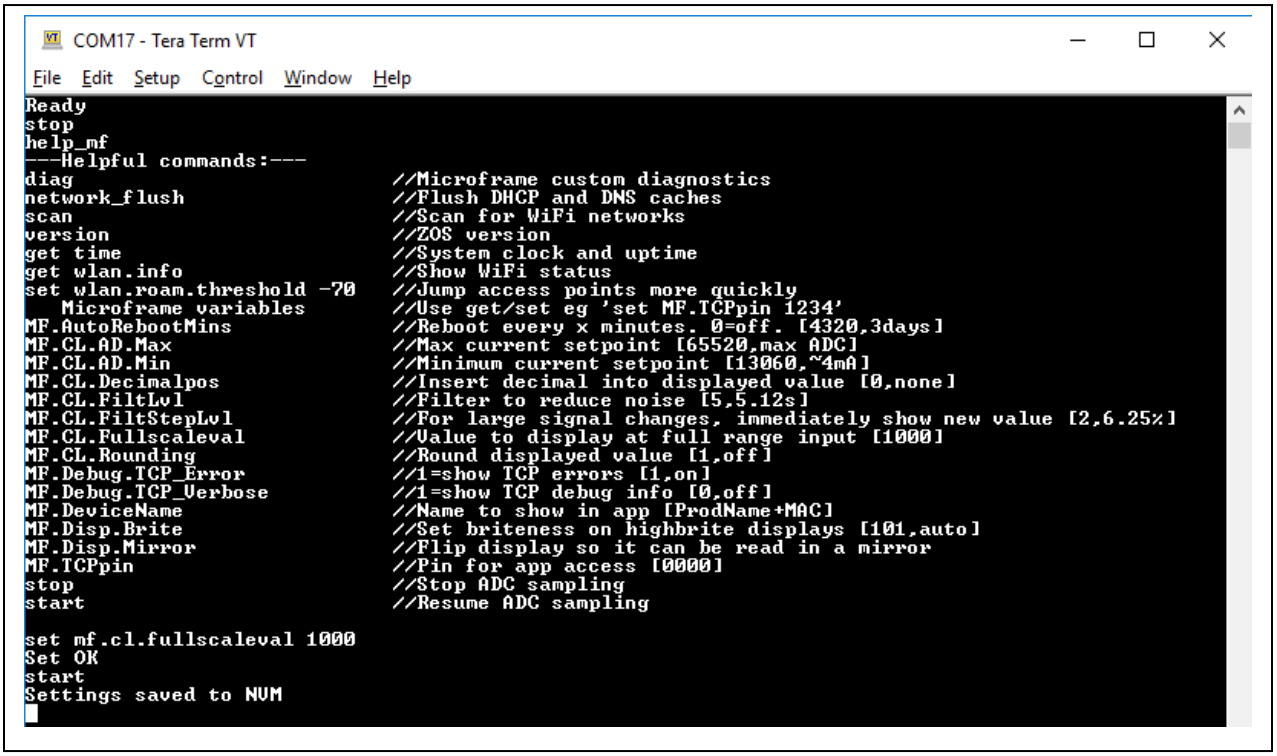
Setup



Connect a USB A/B cable (such as used with a printer) from your computer to the display. Open a serial port console program, such as Tera Term.

Select your com port (typically the highest number), and set the following options: Baud 57600, 8 Data bits, no parity, 1 stop bit, flow control none.

Click OK to open the connection. At the command line, press enter. The display should respond with "Ready".



Calibrate zero point
To set the minimum display value, have your sensor output the minimum value (typically 4mA). Type “get_cl_adc” [Enter], “set MF.CL.AD.Min [ADC value from previous step]”.

Stopping display updates
The internal display updates can occasionally interfere with the console output. To pause the updates, type “stop”. Make your changes, then type “start” to resume display updates.

Help
For a list of the available Microframe options, type “help_mf”.

Programmable Options – Console

- MF.CL.AD.Min - The zero point for your current loop input. This is the internal value corresponding to 0mA or 4mA. e.g. “set mf.cl.ad.min 13060”.

- MF.CL.AD.Max - The internal value corresponding to your current loop max value, typically 20mA. This value is typically left at 65520. e.g. “set mf.cl.ad.min 65520”.

- MF.CL.Decimalpos – Inserts a decimal into the displayed value. Values: 0-5. e.g. “set mf.cl.decimalpos 1”.

- MF.CL.Fullscaleval – Value to display at full input range (20mA). e.g. “set mf.cl.fullscaleval 100”.

- MF.CL.FiltLvl - This is a rolling average over the time window specified. Larger values yield a more stable display but have slower response times. Values 0-10. e.g. “set mf.cl.filtlvl 5”.

Setting	0	1	2	3	4	5	6	7	8	9	10
Samples	1	2	4	8	16	32	64	128	256	512	1024
Settling Time (seconds)	0.16	0.32	0.64	1.28	2.56	5.12	10.24	20.48	40.96	81.92	163.84

- MF.CL.FiltStepLvl - This setting is useful to speed up the response time when the input changes significantly. If the input value changes sharply by more than this percentage, then the display will immediately go to the new value. Values 0-4. e.g. “set mf.cl.filtsteplvl 2”.

Setting	0	1	2	3	4
Step Size (out of 65520)	1024	2048	4096	8192	16384
Change (%)	1.56	3.13	6.25	12.50	25.00

- MF.CL.Rounding - Round the displayed value to hide small variations. Values 0-5. e.g. “set mf.cl.rounding 2”.

Setting	0	1	2	3	4	5
Round by	1	2	5	10	20	50

- MF.Disp.Brite - Set the brightness manually or let it auto-adjust. Values 1-100,101 for auto. e.g. “set mf.disp.brite 10”.

- MF.Disp.Mirror - Reverse the display for viewing in a mirror. 0=off, 1=mirrored. e.g. “set mf.disp.mirror 1”.

- set_cl_defs – Reset current loop options to defaults. e.g. “set_cl_defs”.

- get_cl_adc – Gets the current (filtered) ADC value. e.g. “get_cl_adc”.

- Start – Start ADC and update display. e.g. “start”.

- Stop – Stop ADC. Prevents display update collisions with console commands. e.g. “stop”.

- misc – the console offers additional commands to configure the WiFi module. Call us for more info.

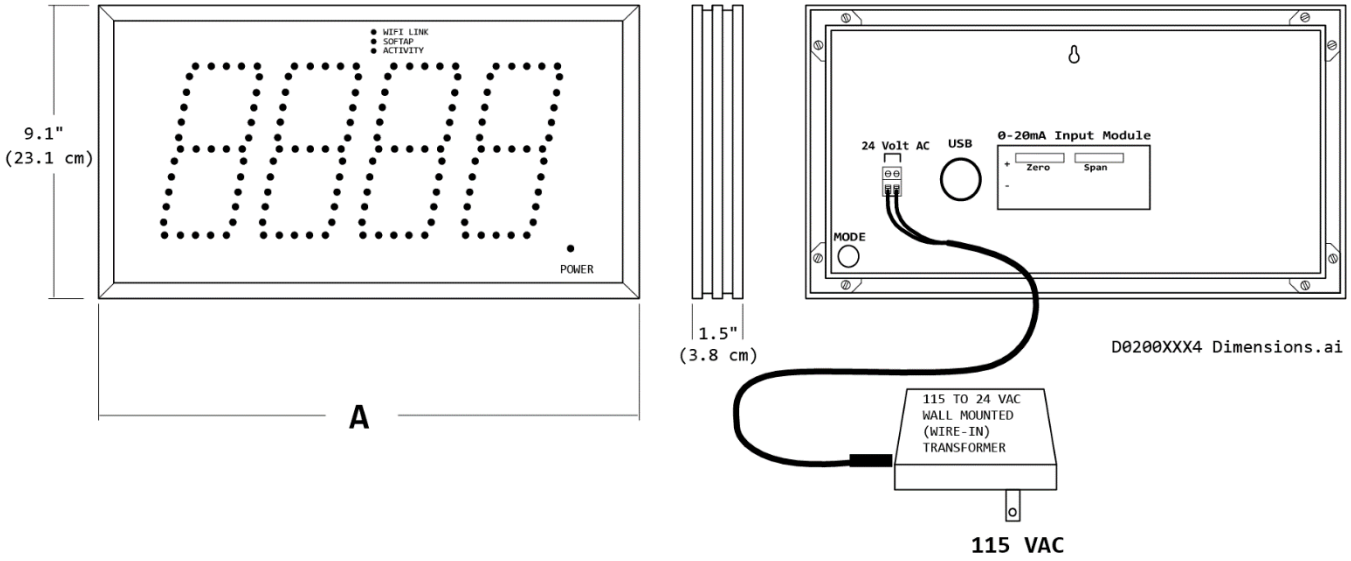
Model 200XXX4 Specifications

Features

- 0 to 20mA current loop input. Typically used for 4-20mA
- Ultrabright LEDs
- Ground loop isolation when using the 24VAC adapter
- Passive device: does not inject voltage into loop
- Configuration via WiFi or USB

Box Contents

(1) Display w/ internal antenna
(1) 24VAC power adapter
(1) Manual, (1) Microframe Screwdriver



Model 200XXX4 Specifications				
Voltage Input Requirements……	14-24 VAC, 16-28VDC			
Character Height……	5.5 inches, viewable up to 125 feet			
Operating Temperature……	-20ºC to 60ºC (-4ºF to 140ºF)			
Casing……	Aluminum extrusion			
Color……	Black frame with dark red acrylic faceplate			
Environment……	Indoor use (Outdoor cases available)			
WiFi……..	802.11n			
Display Size	**2-Digit**	**3-Digit**	**4-Digit**	**6-Digit**
Power Requirements	13 watts	17 watts	20 watts	25 watts
Display Weight, w/o adapter	2.5 lbs (1.1 kg)	3.0 lbs (1.4 kg)	3.5 lbs (1.6 kg)	5.25 lbs (2.4 kg)
Width "A" Dimension	9.8" (24.9 cm)	13.2" (33.5 cm)	16.8" (42.7 cm)	24" (61.4 cm)