

CPFM 8800 Coriolis Flowmeter Software Installation & User's Guide



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1 Cautions

This guide must be carefully read by all individuals who have or will have the responsibility of using, maintaining, or servicing this product. The product will perform as designed only if it is used, maintained, and serviced in accordance with the manufacturer's instructions. The user should understand how to set the correct parameters and interpret the obtained results.

Warning!

Be sure to operate any instrument under control of this software within the manufacturer's specified ranges for fluid pressure and temperature. If this product is used in process control all necessary safety precautions should be followed to avoid any critical safety problems.

Caution!

Use this product only with specified industrial instruments.

2 Standard Contents of Kit

- CD-ROM of Malema CPFM 8800 software
- Installation/User's Guide

2.1 If Parts Are Missing Or Damaged

If any parts are missing or damaged, contact your Malema representative for replacement instructions. **Note:** All returned materials require an RMA (return materials authorization) in advance.

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4 General Information

This user's guide includes information on configuration and use of the CPFM 8800 software, designed to work in conjunction with Malema Sensors' High Purity Coriolis Flow Meter.

Consult the product data sheet or your Malema distributor for information on other applications or sensors.

5 Preparation For Software Installation & Use

Follow all instructions for unpacking, checking, and installing the CPFM 8800 sensor before installing and using this software.

5.1 Mass Flow Sensor & Transmitter Installation

Follow the instructions for installation of the Malema 8800 Series Coriolis Mass Flow Meter, which consists of the sensor and transmitter. Once the sensor and transmitter are wired for power and tested for functionality, use a USB cable to connect the transmitter to the computer that will be using the software for configuration and control.

6 Installing Software

Installation and operation of this software requires the following:

PC running Microsoft Windows XP or Windows 7 500MB of RAM 50MB of hard disc space (more if multiple sensors and sessions are recorded)

Insert the CD-ROM with the software, or download it from Malema's website.

If Autorun is enabled, a screen dialog pops up, asking you to accept the licenses. If Autorun is not activated, navigate to the CD drive and double-click on the installation icon:



Note: You may receive a security warning from your computer. Dismiss it, and continue the installation.

 Malema C100 Installation program

 Image: Second Se

The installation program's main window appears:

Make sure "Re-create default passwords?" is checked.

Optionally, click "Add link to desktop?" to create a shortcut to the program on your desktop.

Click "Accept" to perform the installation.



Installation is fast. In a few seconds, a confirmation appears, telling you that installation is complete:

Information						
(į)	Installation complete!					
	ОК					

Click "OK" to dismiss the installation window and the confirmation.

The program is now ready to run.

Note: This icon appears on your screen's desktop, and the Malema folder on your C: drive is open to show you the program:



7 Running The Program For The First Time

When running the program for the first time, it is necessary to set access passwords and to make sure communication between the computer/software and the flow meter is established.

7.1 Before Starting The Software

It is not necessary to have a flow meter and the computer connected to start the program, but other than setting the passwords, there is very little you can do without the connection. Therefore, it is recommended that you connect a flow meter before starting the program.

7.2 Starting The Program

Connect the USB cable from the flow meter to the computer.

Turn the computer on.

Start the program by double-clicking the icon on the desktop.



The main screen is shown:

					ining co	ip. 20	10		
iew	Help								
Value 1 2 3 4 d 5		 Reset flor Measu Flow below Shows sys Shows sys 	w data Sir re M Dr v low flow cut them uptime them state	mulate status easure ON A river ON off setting Data fil	uto Zero Sta	ate onnect rerwrite file	Collect dat	a 1 Seconds Clear Graphs Password level 3	NOT CONNECTED
Calibration	HW configuration	Techiez sheet	More graphs	Errors and warn	ings Coil pow	ver graphs			
P .00000					00:00:0				
Р				-	otal mass flov	v			
0									
	Value Value 1 2 3 4 4 5 Calibration P .00000 P 0	ew Help	ew Help Value 1 2 3 4 4 4 4 4 4 5 Shows sys Shows sys Shows sys Calibration HW configuration Techiez sheet P 0 0 0 0 0 0 0 0 0 0 0 0 0	ew Help Value Reset flow data 1 Measure 1 Measure 3 Measure 4 Measure 4 Measure 4 Measure 5 Stows system uptime Shows system state Calibration HW configuration Techiez sheet More graphs	ew Heip Value Reset flow data 1 Measure 2 Measure 3 Measure 4 Measure 4 Measure 4 Measure 65 Shows system uptime Shows system state Data fil Calibration HW configuration Techiez sheet More graphs Errors and warr	ew Heip Value Value Auto Zero Sta Auto Zero Sta Biow below low flow cut off setting Auto Zero Sta Biows system uptime Shows system uptime Shows system state Data file name Calibration HW configuration Techiez sheet More graphs Errors and warnings Col pow P Instant flow 00:00:00 P Total mass flow 00:00:00 00:00:00 00:00:00 00:00:00 00:00:	ew Help	Image: Second	ev Heip Value Value Reset flow data Simulate status Collect data Seconds Prover ON Connect Save data Clear Graphs Connect

The default password level is 3. If you want to change the password or other parameters, you must input the password. Refer to the next section for details.

Important! If the computer and flow meter are physically connected via cable, but the name and serial number of the flow meter do not appear in the window at the upper right, check the connections and make sure that the cable is not damaged.

7.3 Passwords And Access Levels

Because it is not usually desirable to let everyone change settings, clear files, or make other modifications, you can set passwords that establish different access levels. This requires inputting passwords that must be matched in subsequent sessions whenever anyone accesses the program.

There are four access levels. Three are set by passwords:

Password Level 0	Super User	All Access
Password Level 1	Assistant	Restricted Access
Password Level 2	Daily User	More Restricted Access
No Password	All others	View-Only Access

Password Level 0 has complete access to view and change all settings (except those set at that factory that are not user-changeable).

7.3.1 Setting Passwords

It is required that you set passwords the first time you start the software.

Pull down the "Passwords" menu and select "Enter password":

Coriolis flowmeter control program.						
File	Passwords Vi	ew	Help			
Para	Enter pass	word	~			
Inst	Change pa	sswords				
Total mass flow		2				
Aver	age mass flow	3				
Meas	s. elapsed time	4		Flow belov		
Temp く	o, sensor on board	5	>	Shows sys Shows sys		
Graphs						

Enter the password into the field:

Enter password		
Password is between 6 and 32 characters	ОК	Cancel

Important! Use the default password this first time:

coriolis1234

Type the password and click "OK."

Note: Passwords are case-sensitive.

It is easy to tell if the password is accepted. A dialog box appears, telling you that passwords have not been set yet:

Warning 🔀						
1	Passwords are not setup yet Please enter passwords for all three levels OK					

Click "OK" to view the password management page:

Passwords	
Password level 0	Passwords are defined for three levels: Level 0 (Superuser) is the top level, meant for the administrator of the coriolis flowmeter.
Password level 1	Level 1 (Assiatant) is the medium leve. The priveliges are limited.
Password level 2	Level 2 (Daily user) is the lowest level, and is more restricted.
The passwords must be between 6 and 32 characters and are case sensitive.	No password entered: Level 3 is the level where you only can monitor. Beware: The different passwords are totally independant from your PC/net passwords.
Show passwords	Cancel Save passwords and close

To prevent inputting a password incorrectly, click the "Show passwords" box. The passwords in the fields are readable (instead of a string of asterisks). When you are done, you may want to click the "Show passwords" box again to hide the passwords.

Type the three passwords into the fields. Each password must be between 6 and 32 characters.

When you are satisfied with the passwords, click "Save passwords and close." The new passwords are saved.

If you must exit without saving the changes, click "Cancel."

Important: You should store a list of the passwords in a safe location. If passwords are lost and cannot be remembered, you must reinstall the program. Unless you save the parameters that are stored in your computer, they will be overwritten, too. Consult the Troubleshooting section of this manual for details on saving the parameters and reinstalling the software.

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In addition to saving the passwords and closing the dialog box, the program now is set for "Password level 0," and the window shows all possible options, plus a message that says "NOT CONNECTED."

Reset flow data Simulate status	Collect data 1 Seconds
Measure Measure ON Auto	Zero State
Driver Driver ON	Connect Save data Clear Graphs
Flow below low flow cut off setting	Overwrite file? Password level 0
Shows system uptime Shows system state Data file na	NOT CONNECTED
chiez sheet More graphs Errors and warnings	Coil power graphs

7.3.2 Changing Passwords

To change your passwords after they have been set, pull down the "Passwords" menu and select "Change passwords":

🛤 C	oriolis flo	wmeter o	control pr	ogram.
File	Passwords Vie	W.	Help	
Para	Enter passv	vord	~	
Inst	Change pas	sswords		
Total mass flow 2		2		
Aver	age mass flow	3		
Meas	s. elapsed time	4		Flow belov
Tem;	o. sensor on board	5	>	Shows sys Shows sys
Graph	ıs			

The program must be set to an access level of 0 if you want to change passwords. No other access level allows changing passwords.

7.3.3 Using Passwords To Change Access Levels

Change the password access level to 1, 2, or 3 (depending on how restricted you want access) before you leave.

File Passwords View Help Parameter Value Resct flow data Simulate status Collect data 1 seconds Instant mass flow 1 Total mass flow 1 Total mass flow 1 Average mass flow 3 Diver ON Connect Save data Clear Graphs Mess.elapsed line 4 Diver ON Connect Save data Image: Clear Graphs Parameters Calloration HW configuration Techicz sheet More graphs Shows system uptime Shows system state Data file name Image: Clear Graphs Organise flow Calloration HW configuration Techicz sheet More graphs Organise Instant flow Sins flow: [g/s] Image: Clear Graphs Opensity Jonation Mass flow: [g/s] Object flow Jonation Jonation Jonation Output Jonation	🚰 Cori	iolis flo	owmet	er control	program	. Malem	a Engin	eering	Corp. 20	010			
Parameter Value Reset flow data Simulate status Callect data 1 Seconds Instant mass flow 1 Image mass flow 3 Image mass flow 1 Value gap mass flow 3 Image mass flow 1 Image mass flow 1 Meas. elapsed time 4 Image mass flow 1 Image mass flow 1 Image mass flow 1 Meas. elapsed time 4 Image mass flow 1 Image mass flow	File Pa	sswords V	/iew	Help									
Sensor temp. Density Auto scale Scale max. DOO Scale min. LIDOO Scale mi	Paramete Instant m Total mas Average I Meas, ela Temp, se Caphs F	er mass flow mass flow mass flow apsed time nsor on boa Parameters nt flow	Value 1 2 3 4 rd 5 Calibration P	HW configuration	Reset flo Measu Flow belo Shows sy: Shows sy: Techiez sheet	w data Si ure M Dr w low flow cut stem uptime stem state More graphs	mulate status leasure ON river ON off setting Data Errors and w	Auto Ze a file name arnings C Mass flo	ro State Connect Overwrite file oil power graphs w. [g/s]	Collect data	Clear Graphs Password level 3	Malema_Flowmeter284f	F964D0:
O COLOG	 Senso Densi ✓ Auto Y-axi Scale mai 3000 Scale mir -1000 	scale s.x.	.00000										
Ortal mass flow. [g]			D					(Tatal	0:00:00				
	 Total Senso 	mass flow or frq.						rotar mass	now. [9]				
00.00.00	V Y-axi Scale ma 1000 Scale mir -1000	Scare S IX.	0					00-	00:00				

When the Malema Flow Meter window appears, the screen informs you that the flow meter and computer are not connected with red text that says, "NOT CONNECTED":

Collect data 1 Seconds	Malema_Flowmeter284F964D0:
Auto Zero State	
Connect Save data Clear Graphs	
Overwrite file? Password level 0	
Data file name	NOT CONNECTED

This does not tell you whether the computer is not connected to the flow meter. Instead, it informs you that a data connection has not been initiated. In fact, if a flow meter's name and serial number are shown in the window above the "NOT CONNECTED" message,

then there is a physical connection between the computer and flow meter, and data transfer is possible.

7.4 Establishing A Connection

Establish the connection between the flow meter and the computer in the following way.

Click the name of the flow meter in the upper right corner of the screen to highlight it.

Note: With this program, you can control multiple sensors. You can only view and make changes to parameters for one sensor at a time, however.

Collect data	1 Seconds Malema_Flowmeter284F964D01
Auto Zero State	
Connect Save data	Clear Graphs
Overwrite file? Pas	ssword level 0
Data file name	NOT CONNECTED

Important! If you click "Connect" without first selecting a flow meter, a connection will not be opened. Always make sure that the flow meter's name is highlighted.

Click "Connect."



The "Data file name" field is automatically populated with a name for a .csv file in which all data will be stored during the time the system is live and connected.

By default, the program uses the name of the meter and its serial number, followed by the .csv suffix. You may change this by typing another name.

					_ 7 🛛
		Collect data	1 Seconds	Malema_Flowmeter_	284F964D02
	Connect	Save data	Clear Graphs		
Data filo pamo	Overwrite file	? P	assword level u		
vata file name	Malema_Flowmel	ter284F964D0	12000056.csv	NOT CO	VNECTED

Note: If a file was saved previously with that name, you see this warning:

Warn	ing 🔀
⚠	File "Malema_Flowmeter284F964D02000056.csv" already exists Overwrite it?
	Yes No

You have two options:

- If you do not want to overwrite the file (which erases all previous data), click "No" and type a new name in the "Data file name" field.
- If you want to overwrite the old data and continue connection, click "Yes."

When connection is successful, the red message "NOT CONNECTED" changes to a green message of "CONNECTED":

	- 7 🛛
Collect data 1 Seconds	Malema_Flowmeter284F964D0;
Connect Save data Clear Graphs	
Data file name Malema_Flowmeter284F964D02000056.csv	CONNECTED

Important! If connection does not occur, check the cable connecting the computer to the flow meter. Also, check that the computer is recognizing the port on which the connection is supposed to occur.

Note: If you click "Connect" again, you see this reminder message, informing you that a connection is already established:

Information 🛛 🔀						
į)	Malema sensor [Malema_Flowmeter] is already connected					
	ОК					

7.5 Collecting Data

Note: It is a good idea to allow the system to stabilize for one hour before collecting data. This ensures that the sensor, flow rate, and temperature are optimized, resulting in more accurate data with fewer anomalies.

To collect data, you must start by making sure that a file is ready to store the data. The first step is to provide the file with a name. In the field labeled "Data file name," use the automatically generated name, or give it a name that you would like. Since the file will be a text file with its data separated by commas (ideal for opening in spreadsheet programs, such as MicrosoftTM Excel), make sure it has the ".csv" suffix (which stands for "comma-separated value").

	Connect Save data Clear Graphs	
	Overwrite file? Password level 0	
Data file name	PrimaryFeedSystem_20101014.csv	NOT CONNECTED

To commence data transfer from the flow meter to the file, click the checkbox labeled "Collect data."

Collect data	1	Seconds	Malema_Flowmeter_	_284F964D0

Data collection starts. Notice that "Uptime" is shown (which is the amount of time since the flow meter was last powered up). "Normal State" indicates that the flow meter is operational and is not being calibrated (the message changes to "Zero State" when calibration is occurring; access to this is via the Calibration tab). When the flow is below the low-flow cutoff point, the message "Flow below low flow cut off setting" appears. When the flow exceeds the cutoff point, a message in blue appears, saying, "Flow above low flow cut off setting."

Reset flow data		V	Collect data 1	Seconds	Malema_Flowmeter_	_284F964D03
 ✓ Measure ✓ Driver ✓ Driver 	e ON Auto zer N	roing	Save data	lear Graphs		
Flow below low flow cut off set	ting	Overwrite file?	Passv	word level 0		
NORMAL STATE	Data file name	Malema_Flowmeter	284F964D0200	00056.csv	CONN	ECTED

7.6 Disconnecting

To disconnect the flow meter from the program, click the button that says "CONNECTED." This dialog box appears:

Warnin	e 🔀
 ♪	Are you sure you want to disconnect?
	Yes No
!	

Note: If you choose to disconnect, you can lose data. Therefore, always save your data before disconnecting.

Important: Data is not lost in the sensor, but it can be lost in the computer. If a file is open, it is not automatically closed. When disconnecting from one sensor or when shutting down, make sure all changes have been saved. If another sensor is selected from a list of sensors and the file has not been saved, data from the subsequent sensor(s) can inadvertently be mixed with data from the previous sensor(s).

8 Menus

Three groups of pull-down menus are located along the top of the program window. These include:

- File
- Passwords
- View

There is also a fourth choice, Help, which provides access to help.

8.1 File

The File pull-down menu provides access to file-related activities. There are seven options:

er C	oriolis flow	meter co	ntrol program.
File	Passwords	View	Hel
L	oad paramete	er file	1
9	Save paramete	er file	
9	ietup printer		
Print parameters			
E	Back up system		
F	lestore syster		
E	xit		
Grap	hs Coil powe	er graphs	

Load parameter file

Previously saved parameter files containing configuration data can be loaded here. This file has a .param suffix to identify it as a parameter file.

The default location file is System (C:) >>Malema >> CPFM8800 >> filename.param

Caution! Loading a stored parameter file into the program overwrites the existing parameters. This cannot be undone. Be sure to save your current parameters before loading another set.

8.1.1 Save parameter file

When you save your parameters, they are stored by default in the folder with the program. You can change this by selecting another folder. Perhaps most important is to save the parameters with a name you recognize, and which you copy and save elsewhere (such as on a CD-ROM, online storage site, etc.) in case you need to use them in the future.

The parameter file has a .param suffix to identify it as a parameter file. There is also a text file with the same information; it has a .txt suffix and contains an ASCII text file.

The default location file is System (C:) >>Malema >> CPFM8800 >> filename.param

Note: If you edit parameters and want to reload earlier parameter sets, you can use a stored parameter file. You can also save and load different parameter settings for different jobs.

8.1.2 Setup printer...

This invokes a Print Setup dialog box that allows you which printer to direct the output to. The settings are like others in a Windows environment, including page size.

8.1.3 Print parameters

This sends the current parameters from your system to your selected printer.

8.1.4 Back up system

This backs up the data for the selected sensor. This backs up all parameters and passwords. This also stores current graphs and other data so that when you open the program later, they are immediately accessed.

Note: The flow meter must be connected and a connection established before attempting to back up your system. Otherwise, you receive an error message that says, "No Malema flow system is connected!"

Important!

You should back up your system before disconnecting the sensor and/or turning off its power. Until you perform a backup, the data is not saved and can be lost.

8.1.5 Restore system

If you believe the system data has become corrupted, or if you have made unwanted changes and do not want to retrace your steps, you can simply restore the system from one that was stored previously.

Note: The flow meter must be connected and a connection established before attempting to back up your system. Otherwise, you receive an error message that says, "No Malema flow system is connected!"

8.1.6 Exit

Use this to exit the program. It is always a good idea to save your parameters and settings if you made changes during the sessions and want to resume with them later or keep them for future reference/loading.

Important! When you exit the program, the flow meter does not stop working. Monitoring via the software ceases and data is no longer captured, but flow continues unchanged.

8.2 Passwords

There are three levels of passwords, plus an additional level that requires no password. See page 16 for information on setting and changing passwords.

🚰 Coriolis flowmeter control program					
File	Passwords	View	H		
Para	Enter password				
Inst	Change				
Tota	al mass flow	2			

Two options are available:

- Enter password
- Change passwords

Note: If you do not enter a password, the greatest restriction is imposed. That means that you cannot make any changes, and you can only read a limited set of data.

Enter the password into the field (passwords are case-sensitive):

Enter password		X
Password is between 6 and 32 characters	ОК	Cancel

Type the password and click "OK."

8.3 View

The primary option under "View" is "Show gauges." It opens a window with four gauges that represent the most important monitoring functions.

🚰 Coriolis flowmeter control progran					
File Passwords	View		ł		
Devenator	Show gauges				
Parameter	_				
Instant mass flow	1	1			
Total mass flow		2			
Average mass flo	w	3			

If you are using this program on a computer that is used for other operations, you can minimize the main window and leave the gauges visible to provide "at a glance" monitoring information. In a single window, it shows:

- Mass Flow
- Density
- Sensor Frequency (in Hz)
- Sensor Temperature

Click "Show gauges." This window appears:



This window can be minimized, but minimizing it doesn't allow constant viewing. Therefore, a "selectable transparency" feature is available.

8.3.1 Setting Gauge Window Transparency

Gauges can be visible without being obtrusive by setting their transparency.

To change the window's opacity:

1. Click the box labeled "Transparent window?"



2. Adjust the slide control to the right of that box until you find the amount of transparency that suits you.



That's all you have to do. You may change the transparency at any time. **Note:** You can also minimize the window (instead of keeping it on the screen at all times) by clicking the "minimize" (the leftmost button in the trio at the upper right of the window).

8.3.2 Setting Thresholds For The Gauges

Each gauge has several settings to make it more useful. You can set minimum and maximum values for the range it covers, the number of increments indicated on the dial, and Maximum, Mid, and Minimum zones (each individually color-codeable).

Click on any gauge.

This dialog box appears, containing parameters for that gauge:

📽 Setup of gauges 📃 🗖 🔀					
-40	Gauge Min	-0.200000	00029802: Limit 1		
40	Gauge Max	38	Limit 2		
4 Number of Number of 20 -40 Test settings	main ticks	ax color id Color in color OK	Visible indicators Maximum Mid Minimum Cancel		

Here you can set the following:

- Gauge Min
- Gauge Max
- Limit 1
- Limit 2
- Number of main ticks
- Max color
- Mid Color
- Min Color
- Visible indicators (Maximum, Mid, Minimum)

There are three more buttons:

- Test settings. When you make changes, you can test them as you go.
- OK. This commits the changes.
- Cancel. This cancels the changes you have made and tells the program to continue using the existing settings.

8.3.3 Gauge Min

This sets the lowest point on the gauge (for example, -40). The increments used correspond to increments that you set elsewhere.

Note: Do not set the Gauge Min value above the Gauge Max value.

8.3.4 Gauge Max

This sets the highest point on the gauge (for example, 40). The increments used correspond to increments that you set elsewhere.

Note: Do not set the Gauge Max value below the Gauge Min value.

8.3.5 Limit 1

This is the setpoint for the lower threshold of where the Mid color occurs on the gauge.

Note: Do not set the Limit 1 value above the Limit 2 value.

8.3.6 Limit 2

This is the setpoint for the lower threshold of where the Max color occurs on the gauge.

Note: Do not set the Limit 2 value below the Limit 1 value.

8.3.7 Number of main ticks

Set the number of increments ("ticks") shown on each gauge. Use the up and down arrows to step to higher or lower numbers.

Note: Adding increments can enhance the level of detail, but too many can cause clutter.

Note: Changing the increments does not affect the digital readout or data that is saved.

8.3.8 Max Color/Mid Color/MinColor

Click on any of the three color buttons (Max color, Mid color, or Min color). This dialog box appears:

Color	?	×					
Basic colors:							
Custom colors:	Custom colors:						
Define Curtery Colors							
Define Custom Colors >>							
OK Cancel							

The current color for this value is surrounded by a dotted line (if no color has been selected previously, no color is surrounded).

You can now select a color from the main palette labeled "Basic colors" or blend your own Custom color. To create a custom color:

- 1. Click Define Custom Colors.
- 2. Select a color by clicking in the rainbow-colored box or set the color using Hue/Saturation/Luminance values or Red/Green/Blue values.
- 3. When you are satisfied with the color, click "Add to Custom Colors."

If you want to create another custom color for your palette, click in the rainbow-colored box and select a color. Then click "Add to Custom Colors."

Note: If you want to replace a color, click the box with the custom color you would like to replace. Then choose a color and click "Add to Custom Colors." The new color replaces the old one.

Color	? 🔀
Basic colors:	
Custom colors:	
	Hue: 10 Red: 223
	Sat: 180 Green: 80
Define Custom Colors >>	Color/Solid Lum: 120 Blue: 32
OK Cancel	Add to Custom Colors

Once you close the color controls dialog box, the gauge reflects the color change:

When you click "Add to Custom Colors," an available box in the "Custom colors" area now contains your selected color.

Color	? 🔀
Basic colors:	
Define Custom Colors >>	Hue: 10 Red: 223 Sat: 180 Green: 80 ColorlSolid Lum: 120 Blue: 32
OK Cancel	Add to Custom Colors

When you are done setting colors, click "OK" to close the dialog box.

8.3.9 Visible Indicators

The colors you selected for minimum, mid, and maximum values for the gauge only appear if you select the appropriate check boxes for the Visual indicators to "turn them on." You can use any of the three, all three, or none, depending on how much visual prompting you require.

lor or or	Visible indicators Maximum Mid Minimum
	Cancel

A gauge with all three Visible indicators turned on is shown here:



Note: You can view the Min. value and Max. value settings by mousing over a gauge. A small window appears with these values:

Gauges and indicated and in		
-40 g/s 40 Min. va	La participanti de la participan	Mass flow rate Average mass flow rate Total mass
0.0 Density 2.0		Percent air (Volume)

9 Main Screen

The following section explains each of the program's screens and their functions. Refer to page 14 for information on establishing connections and setting passwords.

After startup, the main screen is visible:

🚰 Malema_I	Flown	neter284F	964D020000	56			
File Passwords	View	Help)				
Parameter Instant mass flow Total mass flow Average mass flow Meas, elapsed time Temp, sensor on bo	Value 4.177 0.000 0.000 4.99 oard 45	2E-003 0E+000 0E+000	 Reset flow data Measure Flow below low flu Uptime : 0d 00h the state NORMAL STATE 	Measure ON A Driver ON ow cut off setting 58 m 25s Data file	uto zeroing Connect Overwrite file? e name Malema_Flowmete	2 Collect data 1 Seconds Save data Clear Graphs Password level 0 er_284F964D02000056.csv	Malema_Flowmeter284F964D0
Graphs Parameter	s Calibrat	tion HW configuration	Techiez sheet More	graphs Errors and warn	ings Coil power graphs		
 Instant flow Sensor temp. Density Auto scale Y-axis	P .0100 .0080 .0060 .0040 .0040 .0020 .0000 0020	10 10 10 10 10 10 10 10 10		N	lass flow. [g/s]		
Scale max. 60 Scale min. -60	0040 0060 0080 0100 0120	0 0 0 0 0 0 0 21:40:05	21:40:10 21:40:	15 21:40:20	21:40:25 21:40	0:30 21:40:35 21	140:40 21:40:45
 Total mass flow Sensor frq. 				Tot	tal mass flow. [g]		
Auto scale Y-axis Scale max. 1000 Scale min. -1000		21:40:05 21:40	0:10 21:40:15	21:40:20	21:40:25 21:40:3	0 21:40:35 21:	40:40 21:40:45

The main screen consists of two major sections, with global information at the top and specific information, arranged by tabs, on the bottom portion. The upper part allows you to control whether the software is "live," check the uptime and system status, and whether flow is being detected. It also provides a means of setting the collection interval, saving data, and clearing graphs.

9.1.1 Parameter/Value

This is a small control panel that provides a quick view of parameters and values. The parameters include:

- Instant mass flow
- Total mass flow
- Average mass flow
- Measured elapsed time
- Temperature sensor on board

Note: Numerical values after each parameter's name are expressed in units set elsewhere.

9.1.2 Reset flow data

Clicking this button sets the flow counters to zero. This is useful when you want to perform a specific measurement (for example, filling a container with a specific amount of liquid to create a time/volume or other reference) or multiple measurements in which you want to control the start and stop times and attendant data. Click the button, and the flow data resets to zero.

9.1.3 Measure

When the box is checked, measurement occurs and is indicated with a text message to its right that says, "Measure ON" and measurements are performed. When the box is unchecked, measurement does not take place, and the message is "Measure OFF."

Auto Zeroing. This allows setting a zero point that occurs at each measurement when it is turned on. This zero point is related to the low-flow cutoff point. When it is active, the message "Auto zeroing" is shown. When the function is not active, the display shows "Not auto zeroing."

Note: If air bubbles are expected during measurement, it is recommended that you turn Auto Zeroing off.

9.1.4 Flow below low flow cutoff setting

This is the low threshold for detecting flow through the sensor. Below this point, no data is collected.

9.1.5 Uptime

This tells you how long the flow meter has been in operation since power was applied to the sensor.
9.1.6 NORMAL STATE

This is the state in which data can be collected (Calibration mode is no longer enabled).

9.1.7 Collect Data

This initiates data collection from the flow meter. Values in the Parameters window are updated at the collection interval, and the graphs reflect the incoming data.

9.1.8 Seconds

This sets the data collection interval, in seconds. Click the box and input a number to represent how often you want a data point to be captured.

Note: This only accepts whole numbers, and large numbers of data points require more storage space on your hard drive for data.

9.1.9 Connect

Clicking this button initiates the connection between the flow meter and the program. Until this button is clicked, no data can flow.

Important! The Connect button is exclusively for connecting. If you click it again once connection is established, this error message appears:

Information 🛛 🔀					
Malema sensor [Malema_Flowmeter] is already connected					
	ОК				

If you want to disconnect, you must click the box that says "CONNECTED" in green letters.

9.1.10 Save Data

Whenever the program is monitoring a flow meter and data has been coming in, you may save the data that has been collected. You can name the data in the field labeled "Data file name" and give it a specific name (such as a process batch ID, shift number, or in the case of this example, something simple such as TodaysData). Errors, warnings, and a log

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file accompany the comma-separated-value file (.csv), all bearing the same name, but with different suffixes.

This data can be opened in a spreadsheet program such as Microsoft Excel and extracted, manipulated, etc.



9.1.11 Clear Graphs

This resets the graphs, removing all representations of data. However, the file remains open. If you want to stop collecting data in the current file, you must save it and create a new file.

To save data without losing the information you want, save the file, and then clear the graph and start a new file with a new file name.

9.1.12 Overwrite File

If you want to overwrite a file (for example, after a false start), simply write a new file with the same name as another file.

Note: There is capacity for 10,000 data points per file. After 10,000 data points have been collected, a file is closed and a new one with the same name plus extra characters (to differentiate it) is created. This process repeats (closing one file, opening a new one) as long as another 10,000 data points are collected. The naming convention for these files is as follows:

filename.csv filename_1.csv filename_2.csv etc. Also, automatic backups of data occur every 50 samples and 15 minutes, to prevent data loss if power is lost or connections are interrupted.

9.1.13 Password Level

The current password level is shown here as "Password level 0" through "Password level 3." You can change the password level at any time (and increase or decrease access) by pulling down the menu item "Passwords" and selecting "Enter password." Depending on the password you input, access to the program will change. If you do not input a password (or input an incorrect password), then the password level changes to 3, which has the most restricted access.

Note: The password is stored in encrypted form in a file called password.psw. Even if this file is opened in a text editor or other program, it is unreadable. It can only be parsed by the CPFM 8800 program.

Important!

It is a good idea to back up the .psw file. If the program must be reinstalled, you can simply drag the .psw file into the program's folder, replacing the default file and installing your saved password data.

9.1.14 Data File Name

By default, when you start up the program and then select a flow meter for data collection, the field labeled "Data file name" is automatically populated. However, you may want to name the file containing your data something that is more specific to a process run, batch, date, etc. Type that name in this field, and when you click "Collect data," files with that name (including error, log, and global data stored in .csv form) are all stored in the folder for the program.

9.1.15 Flowmeter Name & Serial Number

Each flow meter has a name and unique serial number. Whenever the program and the flow meter connect, the name and serial number are passed automatically to the program. This information is stored along with other data for later correlation.

9.1.16 CONNECTED/NOT CONNECTED

When the computer/software are connected to the flow meter and data transmission is possible, then the word "CONNECTED" is shown in green letters. When the connection is disrupted or intentionally turned off, then "NOT CONNECTED" is shown in bold red letters.

10 Tab-Accessed Screens

The bottom section of the screen provides access to a total of eight screens' worth of data and settings information, all accessed by clicking on tabs. The eight tabs are labeled:

- Graphs
- Parameters
- Calibration
- HW Configuration
- Techies Sheet
- More Graphs
- Errors & Warnings
- Coil Power Graphs

The top section of the screen remains a constant "dashboard" into the overarching system information and does not change, even when different tabs are selected.

🖴 Malema_Fl	owmeter	284F96	4D02000056				
File Passwords Vi	ew	Help					
Parameter Instant mass flow Total mass flow Average mass flow Meas, elapsed time Terms, sensor on board	Value 2.5843E-002 0.0000E+000 0.0000E+000 0.00 4.4.9375		Reset flow data	asure ON Auto zer iver ON off setting	Collect o	ta Clear Graphs Password level 0	Malema_Flowmeter284F964D01
<	1,10,0	>	NORMAL STATE	Data file name		64D02000056.csv	CONNECTED

The following sections cover the tabs' functions and organization.

10.1 Graphs

Two graphs can be viewed simultaneously, and you can choose them by clicking the buttons along the left side of each graph.

The top graph can show one of the following:

- Instant flow
- Sensor temperature
- Density

The bottom graph can show one of the following:

- Total mass flow
- Sensor frequency

Selector buttons along the left side of each graph allow you click to a different data view.

Note: Along the bottom of each graph are time increments, which correspond to the number of seconds you set in the box at the top of the screen (directly to the right of the "Collect data" check box).





Click a different screen's button, and your selected graph is shown instantly:

Note: A simple shortcut for printing graphs is included. Click on the bold letter **P**, at the upper left of either graph, to print that graph.

10.1.1 Instant Flow

Selecting this option tells the program to show the flow rate in the upper graph.

10.1.2 Sensor temp.

This shows the temperature of the sensor in the upper graph. This data is useful when stabilizing a system; more accurate flow rate measurements are made when the temperature is as close to constant as possible.

Note: Temperatures are shown in Fahrenheit, Celsius, or Kelvin units, depending upon your settings.

Important! Temperature units can be changed while live data is being captured and displayed on the graph. However, this may cause confusion, so therefore it is advised that you only change the units before a measurement session.

10.1.3 Density

This tells you the current density of the mass being measured in the sensor.

10.1.4 Auto scale Y-axis

Because there can be large swings in data values expressed in the graphs (especially while adjusting settings, stabilizing, etc.), it is sometimes useful to allow the program to automatically set the Y-axis scale. Click the "Auto scale Y-axis" box to turn this feature on. If you do not want auto scaling turned on, uncheck the box and set your own maximum and minimum vales for scaling.

Important! The scaling for these graphs only affects what you see in the display. Whether you use auto scaling or set your own minimum and maximum values, the data collected and stored is the same.

10.1.5 Scale max.

If you choose not to use the Y-axis auto scaling, you can set a maximum Y-axis value. Set any number and then make sure the "Auto scale Y-axis" box is unchecked.

10.1.6 Scale min.

If you choose not to use the Y-axis auto scaling, you can set a minimum Y-axis value. Set any number and then make sure the "Auto scale Y-axis" box is unchecked.

The bottom graph provides two options, Total mass flow and Sensor frequency.

10.1.7 Total mass flow

This shows the total mass flow through the sensor.

10.1.8 Sensor frq.

This shows the sensor's frequency. Ideally, the frequency is constant (the sensor's resonant frequency). However, the sensor is temperature sensitive. Extreme or sudden fluctuations in the sensor frequency may be an indicator of unwanted or sudden environmental temperature changes (such as opening and closing doors in temperature-controlled rooms).

10.1.9 Auto scale Y-axis

Because there can be large swings in data values expressed in the graphs (especially while adjusting settings, stabilizing, etc.), it is sometimes useful to allow the program to automatically set the Y-axis scale. Click the "Auto scale Y-axis" box to turn this feature on. If you do not want auto scaling turned on, uncheck the box and set your own maximum and minimum vales for scaling.

Important! The scaling for these graphs only affects what you see in the display. Whether you use auto scaling or set your own minimum and maximum values, the data collected and stored is the same

10.1.10 Scale max.

If you choose not to use the Y-axis auto scaling, you can set a maximum Y-axis value. Set any number and then make sure the "Auto scale Y-axis" box is unchecked.

10.1.11 Scale min.

If you choose not to use the Y-axis auto scaling, you can set a minimum Y-axis value. Set any number and then make sure the "Auto scale Y-axis" box is unchecked.

10.2 Parameters

The parameters shown here are a combination of read-only, changeable, and factory-set parameters of the sensor. Because there are many parameters, they are organized into groups and "collapsed" (in standard hierarchical fashion).

Malema_Flowmeter_	284F964D02000056			
File Passwords View	Help			
Parameter Value Instant mass flow -9.1472E-004 Total mass flow 0.0000E+000 Average mass flow 0.0000E+000 Meas. elapsed time 4.99 Temp. sensor on board 50.875 Graphs Parameters Calibration HW colibration	Reset flow data Measure Me Driver Driv Flow below low flow cut o Uptime : 0d 00h 22 m 59s NORMAL STATE onfiguration Techiez sheet More graphs	asure ON Auto zeroir ver ON f fisetting Data file name Mu Errors and warnings Coll p	Connect Save data Clear Graphs Overwrite file? Password level 0 alema_Flowmeter_284F964D02000056.csv bower graphs	Malema_Flowmeter_284F964D03
Brief description can go here.				
				<u> </u>
Parameter	Value Lower limit	Upper limit Description		
Filename	default.xml			
E Calibration parameters				
Measurement parameters				1
Enclosure temperature settings				
Display units				
Libi 🚰 Misc				
		Save to non-		>
Get Parameters Set Parameters	Auto save to non-volatile memory	volatile memory	Firmware	version 20100419

When you click the "+" to the left of one of the expandable items, the item expands to show details of parameters that are organized within it. Clicking on the "-" to the left of an expanded parameter set reduces it. Double-clicking on parameters allows you to change parameters that can be modified.

Important!

Some parameters are set at the factory and should not be altered unless you are instructed by a technician at Malema.

Parameter	Value	Lower limit	Upper limit	Description
- 🔚 Filename	default.xml			
Calibration parameters				
🗈 🖆 Measurement parameters				
🗉 🖆 Enclosure temperature settings				
🗉 📑 Display units				
🗈 🖆 Misc				

When the parameters are shown, an icon to the left is included, telling the type of parameter information that is included/used for that parameter.

Malema_Flowmeter_	_284F964D02000	056			
File Passwords View	Help				
Parameter Value Instant mass flow 2.8076E-003 Total mass flow 0.0000E+000 Average mass flow 0.0000E+000 Meas. elapsed time 0.00 Temp. sensor on board 45	Reset flow d Measure Driver Flow below lo Uptime : 0d 0 NORMAL STA	Mea Driv w flow cut of 1h 36 m 22s TE	i sure ON er ON f setting Data	Collect data 1 Seconds Malema Flowmeter 284F964D0 Connect Save data Clear Graphs Overwrite file? Password level 0 a file name Malema_Flowmeter_284F964D02000056.csv CONNECTED CONNECTED	
Graphs Parameters Calibration HW co	onfiguration Techiez sheet Mo	ore graphs E	Frors and wa	arnings Coil power graphs	
Brief description can go here.					
Parameter	Value	Lower limit	Upper limit	Description	
- Filename	default.xml		- 3 AS		
Calibration parameters					
F Zero calibration value (Elec	. 0	-5	5	Factory setting. Do not change without consulting the factory	
F Zero calibration value (Sen	0.718333065509796	-200	200	Factory setting. Do not change without consulting the factory	
📕 F Zero set sum counter	139518.21875	30000	300000	Factory setting. Do not change	
F Slope sum counter	0.313912570476532	0	1	Factory setting. Do not change	
F Constant sum counter	38038.81640625	500	100000	Factory setting. Do not change	
F Forward calibration factor	1	0	1000	Use the 'Calibration' tab to calibrate max forward mass flow	
F Reverse calibration factor	1	0	1000	Use the 'Calibration' tab to calibrate max reverse mass flow	
F Natural frequency	62.8008499145508	0	200	Sensor measured frequency. Do not change	
🛛 F Calibration density	0.998000025749207	0	10	Usually water at 20C, 0.998	
F Density calibration factor	8000	0	200000	Use the 'Calibration' tab to calibrate density factor	
F Calibration temperature	29.2433395385742	0	100	Use the 'Calibration' tab to calibrate density factor	
🗆 📑 Measurement parameters					
I System sample time	1000	1	6000	Value in 0.1 seconds	
I Flow response time	1000	0	10000	Value in milliseconds	
F Filter factor	0.5	0	1	Affects the flow response time	
<	_			> v	
Get Parameters Set Parameters	Auto save to non-vola	tile memory	Save to volatile	e memory Firmware version 20100419	

Here are the names of the four icons and their meanings:

- I Integer
- F Floating Point
- L Look-up Table
- Bla Text

Note: When you right-click on any of the lines or parameters, you are given a choice to "Expand All" or "Collapse All," a convenient way of opening or closing all the items and exposing/hiding all parameters simultaneously.

Each Parameter can include a Value, Lower limit, Upper limit, and Description. In "Display Units," Value and Description are the only columns filled with explanatory information.

10.2.1 Parameters Screen Buttons & Information

Along the bottom of the Parameters screen are three buttons, a check box, and an information box. They are described here:

10.2.2 Get Parameters

Clicking this button tells the software to get the parameters from the system.

10.2.3 Set Parameters

Clicking this button sets parameters to the system. Unless you click this button, changes you make to the parameters will not be sent to the system.

10.2.4 Auto save to non-volatile memory.

This saves parameter changes automatically and does not require using "Set Parameters" to commit them.

10.2.5 Save to non-volatile memory

You can save parameters here and use "Set Parameters" to test changes without commiting them.

10.2.6 Firmware version

This tells you the version of the firmware currently running. Check with Malema for updates to the firmware, which can change/improve functionality.

11 Calibration

This tab contains parameters and controls for calibrating the sensor. That is, it is a hardware calibration, or tuning, rather than a calibration of the program itself. The sensor has two transducers (indicated as "Left" and "Right"), which must be set separately for optimum sensitivity and selectivity.

Malema_Flowmeter284	964D02000056				
File Passwords View Hel	p				
Parameter Value Instant mass flow 6,4705E-005 Total mass flow 0,0000E+000 Average mass flow 0,0000E+000 Meas. elapsed time 0,00 Temps. sensor on board 45	Reset flow data Measure Measure Driver Drive How below low flow cut of Uptime : 0d 01h 43 m 58s NORMAL STATE	asure ON A ver ON ff setting Data fi	Auto zeroing Conr Overv le name Malema_	Collect data 1 Second ect Save data Clear Graph write file? Password level Flowmeter_284F964D02000056.csv	Malema_Flowmeter_284F964D01 S CONNECTED
Graphs Parameters Calibration HW configuratio	Techiez sheet More graphs	Errors and warr	nings Coil power	graphs	
Get attenuation parameters Store attenuation parameters	zero point	Cal. table	'Raw' flow rate	Cal. factor 1.00000	
Attenuation 0 Left Right 1 758 760 1 Left Calc. forw	Scale reading, forward flow Calibration factor Density vard cal. factor	~10% ~15% ~20% ~25% ~30% ~35% ~40%	0.06000 0.06000 0.10000 0.12000 0.14000 0.16000	1.00000 1.00000 1.00000 1.00000 1.00000 1.00000	
		~50%	0.20000	1.00000	
. in Sim	late flow	~60% ~65% ~70% ~75% ~80% ~85% ~90% ~95% ~100%	0.24000 0.26000 0.28000 0.30000 0.32000 0.34000 0.36000 0.38000 0.38000	1.00000 1.00000 1.00000 1.00000 1.00000 1.00000 1.00000 1.00000	

11.1.1 Get Attenuation Parameters

Click this to get and display attenuation parameters from the active sensor.

11.1.2 Store Attenuation Parameters

Click this button to store attenuation parameters on the sensor.

11.1.3 Attenuation

Attenuation is typically unnecessary, but it affects either the left or right transducer in the sensor. It is designed to compensate for differences in the two transducers. However, it should not be adjusted unless the sensor is replaced.

11.1.4 Left

Compensation for the sensor's left transducer is set here.

11.1.5 Right

Compensation for the sensor's right transducer is set here.

11.1.6 Set Zero Point

This establishes the zero point reference for measurements by setting an offset. Click this to set a new zero point for the sensor.

Note: Once you click the button, it takes approximately four minutes for the new zero point to appear. During this time, the message "ZERO STATE SENSOR" is shown in red. When the new zero point is set, the message returns to "NORMAL STATE."

Malema_Flowmeter	r284F964D02000056				
File Passwords View	Help				
Parameter Value Instant mass flow 9.8947E-004 Total mass flow 0.0000E+000 Average mass flow 0.0000E+000 Meas. elapsed time 0.00 Temp. sensor on board 45 Graphs Parameters Calibration	Reset flow data Measure Measure Driv Flow below low flow cut of Uptime : 0d 03h 05 m 36s ZERO STATE SENSOR / configuration Techiez sheet More graphs E	sure ON A er ON f setting Data file irrors and warn	uto zeroing Conr Overv e name Malema_ ings Coil power	Collect data 1 Second ect Save data Clear Graph write file? Password level I Flowmeter_284F964D02000056.csv graphs	Is Malema Flowmeter 284F964D01
Get attenuation parameters	Cost and a stirt	Cal. table	'Raw' flow rate	Cal. factor	
	Set zero point	~5%	0.02000	1.00000	
Store attenuation parameters		~10%	0.04000	1.00000	
Attenuation	O Scale reading, forward flow	~15%	0.06000	1.00000	
Left Right		~20%	0.08000	1.00000	
758 760	1 Calibration factor	~25%	0.10000	1.00000	
	1 Density	~30%	0.12000	1.00000	
		~35%	0.14000	1.00000	
	Calc, forward cal, factor	~40%	0.16000	1.00000	
		~45%	0.18000	1.00000	
		~50%	0.20000	1.00000	
		~55%	0.22000	1.00000	
		~60%	0.24000	1.00000	
		~65%	0.26000	1.00000	
		~70%	0.28000	1.00000	
		~75%	0.30000	1.00000	
	Simulate flow	~80%	0.32000	1.00000	
8.8		~85%	0.34000	1.00000	
		~90%	0.36000	1.00000	
		~95%	0.38000	1.00000	
		~100%	0.40000	1.00000	

11.1.7 Scale reading, forward flow

Use this field when setting a calibration factor to improve sensor accuracy.

11.1.8 Calc. forward cal factor

After you set the zero point, start the flow with one liter of water. Use a scale to weigh the water. It should weigh 1 kilogram. Set the Scale reading forward flow to 1000. Then press Calc. forward cal. factor. If you have a low flow rate, it will take a longer time to collect 1 kilogram. If the flow rate is faster, 1 kilogram will be collected faster. In either case, you use the same number.

To increase the accuracy, you can copy the calibration factor for each of the ranges you desire (5%, 10%, etc.) and place it in the Calibration factor field and press Calc. forward cal. factor each time.

Next, measure 1 kilogram of water. Put 1000 gm in your Scale-reading Forward Flow. Press Calculate Forward Calibration Factor, and a calibration factor is calculated.

11.1.9 Calibration factor

The calculated calibration factor is shown here.

11.1.10 Density

Place a value in here if you want to change the density value. Note that a value of 1 is approximately equal to the density of water.

11.1.11 Simulate flow

If you do not have a flow established but want to simulate it, this button starts a simulation equivalent to 30 grams per second. When you click the "Simulate flow" button, simulation starts, and the words "SIMULATE MODE" appear in bright red letters (instead of "MEASURE ON" in black letters) to alert you that live data from a flow meter is not being received or monitored, although graphs and other data indicate a flow.

Malema_Flowmeter	284F964D02000056	
File Passwords View	Help	
Parameter Value Instant mass flow -1.0244E-002 Total mass flow 0.0000E+000 Average mass flow 0.0000E+000 Meas. elapsed time 0.00 Temp. sensor on board 44,9375	Reset flow data SIMULATE MODE Collect data 1 Seconds Malema_Flowmeter_28 Malema_Flow Malema_Flow Connect Save data Clear Graphs Flow below low flow cut off setting Overwrite file? Password level 0 Uptime: 0d 03h 06 m 45s Data file name Malema_Flowmeter_284#964D02000056.csv COINECT	#F964D0] ED
Graphs Parameters Calibration HW	/ configuration Techiez sheet More graphs Errors and warnings Coil power graphs	
Get attenuation parameters Store attenuation parameters Attenuation Left Right 758 760	Set zero point Cal. table Raw' flow rate Cal. factor 0 Scale reading, forward flow 1.00000 1.00000 1 Calibration factor 0.02000 1.00000 1 Calibration factor 0.03000 1.00000 20% 0.10000 1.00000 ~25% 0.10000 1.00000 ~25% 0.10000 1.00000 ~25% 0.10000 1.00000 ~25% 0.10000 1.00000 ~30% 0.12000 1.00000 ~35% 0.14000 1.00000 ~40% 0.16000 1.00000 ~55% 0.20000 1.00000 ~50% 0.20000 1.00000 ~50% 0.20000 1.00000 ~55% 0.20000 1.00000 ~55% 0.20000 1.00000 ~55% 0.20000 1.00000 ~55% 0.20000 1.00000 ~55% 0.30000 1.00000 ~85% 0.34000	

11.1.12 Calibration Table

This is labeled with the headings Cal table/"Raw" flow rate/Cal. Factor.

The % column is the percentage of full flow, as defined for the actual sensor type.

"Raw" flow rate refers to the read flow rate that needs to be adjusted with the calibration factor.

11.2 HW Configuration

This section is for configuring various aspects of the analog main board associated with a sensor.

Malema_Flowmeter284F9	64D02000056			
File Passwords View Help				
Parameter Value Instant mass flow -6.9869E-004 Total mass flow 0.0000E+000 Average mass flow 0.0000E+000 Meas. elapsed time 0.00 Temp. sensor on board 45 Image: Calibration Graphs Parameters Calibration	Reset flow data Measure Driver Flow below low flow cut of Uptime: 0d 01h 45 m 12s ZERO STATE SENSOR Techiez sheet More graphs E	rer ON Auto zero (er ON (f setting Data file name (Errors and warnings) Col	Connect Save data Cle Connect Passwo Valema_Flowmeter_284F964D02000 I power graphs	Seconds Malema_Flowmeter_284F964D03 ar Graphs ard level 0 056.csv CONNECTED
			Slot number : 1 Type : 0 Version : 0	
Slot 1 Empty	Slot 2 Digital I/O	Slot 3 Empty	Slot number : 2 Type : 1 Version : 1	
		Slot 6 Empty	Slot number : 3 Type : 0 Version : 0	
Malema Engineering Corp Digital interface board			Slot number : 4 Type : 2 Version : 1	
Slot 7, Ar Analo	a log main board g main board		Slot number : 5 Type : 0 Version : 0	
			Slot number : 6 Type : 0 Version : 0	
			Slot number : 7 Type : 15 Version : 1	
Empty Slot 5	<u>Cur</u> Slo	rent loop t 4	System serial # : 28.4F.96 sensor serial # : 28.47.17 	5.4D.02.00.00.56 .06.02.00.00.85
1				

11.2.1 Left Window

This shows information about the analog main board that is between the sensor and the computer. It drives the left and right signals for the sensor. Up to five slots can be used on the board, and in most cases locations used by plugged-in modules are interchangeable.

Note: Slot 1 is permanently empty. Various optional modules are available from Malema. In addition, Slot 6 can accommodate a display. Digital I/O boards, analog boards, etc., can be placed in any slot; there are not location restrictions.

Slot 1	Slot 2	Slot 3
Empty	<u>Digital I/O</u>	Empty
		Slot 6
		Empty
Malema Engineering Corp Digital interface board		
Sk	ot 7, Analog main board	
	Analog main board	
		Summer Learn
Empty	<u>(</u>	urrent loop
Slot 5	5	lot 4

11.2.2 Right Window

This window gives you more detailed reference information about each board located in a slot on the main analog board. It also tells you the system's serial number and sensor's serial number.

Slot number : 1 Type : 0 Version : 0
Slot number : 2 Type : 1 Version : 1
Slot number : 3 Type : 0 Version : 0
Slot number : 4 Type : 2 Version : 1
Slot number : 5 Type : 0 Version : 0
Slot number : 6 Type : 0 Version : 0
Slot number : 7 Type : 15 Version : 1
System serial # : 28.4F.96.4D.02.00.00.56 sensor serial # : 28.47.17.06.02.00.00.85

11.2.3 Viewing Details

Click on any highlighted text attached to any slot for details and parameters that you can view and set. For example, clicking on Slot 2 brings up this window:

Digital I/O module. Slot	:# 2 🛛 🔀
Digital I/O setting Digital I/O test	
Output 1 Select output mode OHz equals : 0 10kHz equals : 0	Output 2 Select output mode
Input 1 Select input mode	Input 2 Select input mode
Get settings Set sett	ings Module activated

This window is actually two windows, organized and accessed by two tabs, labeled "Digital I/O setting" and "Digital I/O test." The Digital I/O board has two inputs and two outputs.

11.2.4 Digital I/O Setting

Output 1 and Output 2 offer three options, selected via the pulldown menus:

- Frequency Mass flow rate
- Unit per pulse
- Pulse per unit

Directly below Output 1's selector are two boxes for setting frequency scaling. They are labeled "0 Hz equals" and "10kHz equals."

Input 1 and Input 2 offer the same options, selected via the pull-down menus:

- Reset flow counters active low
- Reset flow counters active high
- Start/stop measurement active low
- Start/stop measurement active hi

Along the bottom of the dialog box are two buttons, "Get settings" and "Set settings," plus a checkbox labeled "Module activated."

Digital I/O mod	ule. Slot	:# 2	
Digital I/O setting Digital I/	0 test		
Output 1 Select output mode Select output mode Frequency - Mass flow ra Unit per pulse <=> Pulse per unit Tokn2 Equals : 0	ate	Output 2 Select output mode	~
Input 1 Select input mode	~	Input 2 Select input mode	~
Get settings	Set sett	ings Module acti	vated

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Output 1 offers three options, selected via the pull-down menu:

- Frequency Mass flow rate
- Unit per pulse
- Pulse per unit

Output 2 has three different options:

- No flow/flow (measures no-flow or flow above cutoff)
- Total mass flow reached (can send output when threshold is reached)
- Measurement time reached (can send output when measurement time is reached)

Digital I/O	module.	Slot	# 2	×
Digital I/O setting	Digital I/O test			
Output 1 Select output m OHz equals : 0 10kHz equals : 0	oode <=>	*	Output 2 Select output mode Select output mode No flow Total mass flow reached Measurement time reached	
Input 1 Select input mo	de	~	Input 2 Select input mode	
Get settings	2	Set setti	ngs 🗌 Module activated	

Input 1 and Input 2 offer identical options, selected via the pull-down menus:

Reset flow counters – active low Reset flow counters – active high Start/stop measurement – active low Start/stop measurement – active hi

Input 1:

Digital I/O module. S	lot# 2 🛛 🔀
Digital I/O setting Digital I/O test	
Output 1 Select output mode OHz equals : 0 <=> 10kHz equals : 0	✓ Select output mode ✓
Input 1 Select input mode Select input mode Reset flow counters - active low Reset flow counters - active high Start / stop measurement - active Start / stop measurement - active Get settings Set	Input 2 Select input mode

Input 2:

Digital I/O	module.	Slot	# 2	
Digital I/O setting	Digital I/O test			
Output 1			Output 2	
Select output m	node	*	Select output mode	~
0Hz equals : 0 10kHz equals : 0	<=>			
Input 1			Input 2	
Select input mo	de	~	Select input mode Select input mode Reset flow counters - active low Reset flow counters - active high	✓
Get settings		Set setti	Start / stop measurement - activ Start / stop measurement - activ ngs Module activated	e lo e hi

11.2.5 Get settings

Click this button to get current settings from the module for display.

11.2.6 Set settings

This commits any changes you make to the module's settings to the module.

11.2.7 Module activated

Click this checkbox to activate the module. When the checkbox is not clicked, the module is not active. Note: If you have made changes, click "Set settings" before you check the box labeled "Module activated."

11.2.8 Digital I/O Test

The main purpose of Digital I/O Test is for factory calibration and recalibration by systems administrators.

Digital I/O mod	lule. Slot# 2	
Digital I/O setting Digital I	/O test	
Module type D Serial # 10	igital I/O	IN 1
- 11		Get module information
	Calculate calibration factor	
10000	Set frequency [Hz]	Transfer to module
0	Read frequency [Hz]	Test @ 5kHz
0.998402535915375	Frequency calibration factor	Test @ 100Hz
0.998402535915375	Current factor stored in flash	Store in flash
		ОК

11.2.9 Module type

This tells what type of module is being represented by this configuration window.

11.2.10 Serial

This is the module's unique serial number.

11.2.11 LEDs

The LEDs represent the LEDs on the physical module.

11.2.12 IN 1 (LED)

Indicates a signal is being received from input 1.

11.2.13 IN 2 (LED)

Indicates a signal is being received from input 2.

11.2.14 OUT 1

Output 1 can be used as a simple digital port or as a frequency output. So, for example, when a threshold of a certain amount of fluid is measured, it can give an output for process control (starting or stopping a process, opening or closing a valve, etc.).

11.2.15 OUT 2

Output 2 can also be used as a simple digital port for controlling processes, etc.

11.2.16 Use OUTPUT 1 as frequency output

Check this box to change Output 1 from a digital (fixed-frequency) output to a frequency output that is proportional to input data.

11.2.17 Set frequency (Hz)

Input an operational frequency here.

11.2.18 Read frequency (Hz)

Input a reading from a frequency counter here. See next section for details.

11.2.19 Frequency calibration factor

This is the frequency calibration factor that is produced as a result of computation by the software after you input a set frequency and read frequency. See next section for details.

11.2.20 Current factor stored in flash

This displays the current Frequency calibration factor stored in flash memory.

11.2.21 Get module information

Clicking this button collects the module's current information and displays it in this dialog box.

11.2.22 Calculate calibration factor

Click this button after inputting a Set frequency value and a read frequency value (derived from a frequency counter; see next section).

11.2.23 Transfer to module

Clicking this button transfers the selected settings to the module. **Caution!** This overwrites any previous settings for the module.

11.2.24 Test @ 5kHz

A frequency output of 5kHz is produced when you click this button.

11.2.25 Test @ 100 Hz

A frequency output of 100 Hz is produced when you click this button.

11.2.26 Store in flash

This stores your selected settings to flash memory.

11.2.27 **OK**

Clicking OK closes this dialog box.

11.3 Performing A Test On The Digital I/O Module

C	Digital I/O r	nodule. Slot# 2	X	
	igital I/O setting	igital I/O test		
	Module type Serial #	e Digital I/O 10909002	IN 1	
	оит 1 оит 2	Use OUTPUT 1 as frequency output	Get module information Calculate calibration factor	4
1	10000 0	Set frequency [Hz] Read frequency [Hz]	Transfer to module Test @ 5kHz	5
	0.99840253591	Frequency calibration factor	Test @ 100Hz	6
	0.99840253591	5375 Current factor stored in flash	Store in flash	7

The Digital I/O module is designed for performing diagnoses and tests.

Connect a frequency counter to the output and set it to a range close to the desired frequency.

- 1. Input the desired reference frequency.
- 2. Read the frequency at your frequency counter.
- 3. Input that frequency.
- 4. Click Calculate Calibration Factor.
- 5. Click Test @ 5kHz.
- 6. Click Test @ 100Hz.
- 7. If you are satisfied with the results, click Store In Flash.
- 8. When you are done, click OK.

11.4 Analog Main Board

Slot 7 in this case is an analog board. It allows for control of frequency and amplitude of the sensor in three different ways.

Note: Typically, it is not necessary to make any changes to the analog board.

The sensor drive circuit can be controlled in several ways. For example, a free- "tuning fork" oscillator, an active phase-controlled mode, (where the sine wave is generated internally in the u-controller), and a fixed-frequency mode.

In the phase-controlled mode, the u-controller needs to know a starting frequency and a minimum and a maximum frequency at which the sensor type is allowed to vibrate. The u-controller "hunts" for the right frequency in a standard PID loop, with gain settings from the Frq gain block.

The Amp gain block refers to the amplitude of the vibration, and is controlled by the Driverlevel and the PID loop.

The filter Res. Frq (filter resonant frequency) controls a digital filter.

	Gain mode refers to	either closed loop	o (RMS or Peak) or openloop	(no feedback).
--	---------------------	--------------------	----------------	---------------	----------------

Slot# 7			
Module typeAnaloSerial #3338133381831New \$	og main board 1831 serial number	Store params to Flash	
25.00000 Frq P Gain 0.05000 Frq I Gain 0.10000 Frq D Gain	200.00000 Amp P Gain 0.000 10 Amp I Gain 0.00000 Amp D Gain		
10.00000 Frq Min 30.00000 Frq Start	1.82500 Driverlevel 5600 Filter Res. Frq	Osc. mode	
100.00000 Frq Max	Gain mode RMS Peak No feedback	 Free running Phase controlled Fixed frequency 	
Get Params. OK Cancel			

11.5 Current Loop

A current loop module allows connection with process automation and warning equipment that operates with standard 4-20mA current. This dialog box includes what you need to set equivalent units for the 4mA and 20mA values, set the current loop mode, and activate/deactivate the module.

Current loop r	nodule. Slot#	4	
Current loop setting Cur	rent loop test		
Range • 4mA to 20mA • 0mA to 20mA	Scale settings 4mA equals: 0.000	20mA equals: 0.000	CL units
Select current loop mo	de 🗸		
Get settings	Set settings	Module activ	vated

There are two tabs: "Current loop setting" and "Current loop test."

11.5.1 Current loop setting

This is where you select the range and equivalent values for the current loop, which can be used for connection with external process automation or alarm systems.

11.5.2 Range

This sets the current range for the output. Select either 4ma to 20mA or 0mA to 20mA by clicking on the appropriate button.

11.5.3 Scale settings

These two values for 4mA and 20mA correspond to the minimum and maximum flow, expressed in CL units (current loop units), which are the minimum and maximum flow values. These can be grams or other units.

In the box labeled "4mA equals," input a minimum flow value.

In the box labeled "20mA equals," input a maximum flow value.

Note: Do not set a value for the 4mA point that is higher than the 20mA point. Likewise, do not set a 20mA value that is lower than the 4mA value.

11.5.4 Select current loop mode

This pull-down menu is for selecting either mass flow rate or density for the current loop mode.

Current loop	module. Slot#	4	
Current loop setting Cu	rrent loop test		
Range 4mA to 20mA 0mA to 20mA	Scale settings 4mA equals 0.000	20mA equals: 0.000	CL units
Select current loop mo Select current loop mo Instant mass flow rate Instant density	ide 🗸		
Get settings	Set settings	Module activa	ted

Use the pull-down menu to select "Instant mass flow rate" or "Instant density."

11.5.5 Get settings

Click this button to get the current (active) settings from the module.

11.5.6 Set settings

Click this button to send the settings shown on the screen to the module and use them.

11.5.7 Module activated

Click this to activate the module.

11.6 Current loop test – Current Selected As Output

The Current loop module must be calibrated. You can test the current output from the current loop using an ammeter.

Module type	Current loop	Output type
Serial #	NoSerial 🔴 LEDs	 Current
NoSerial	New serial number	🔘 Voltage
O mA 20 mA	○ 4 mA ○ 10 mA	Get module information
)	Test current [mA]	Calculate calibration
)	Read current at 20 mA	factors
)	Read current at 4 mA	Transfer
1.1034483909606	9 Slope factor	to module
0.1750001907348	363 Offset	Test
1.1034483909606	59 Slope stored in flash	Store in
0 1750001007349	263 Officet stored in flash	flash

Connect an ammeter to the output and set it to read milliamps. Also click the Output Type option for "Current."

- 1. Set the Test current value to either 4mA or 20mA. The selected value is then automatically shown in the "Test current [mA]" field.
- 2. Read the ammeter's measurement.
- 3. Input that value into the "Read current at 20mA" or "Read current at 4mA" field (depending on the value you selected before).
- 4. Click Calculate Calibration Factors. It automatically calculates the values for the Slope factor and Offset.
- 5. You can transfer this calibration factor data to the module by clicking "Transfer to module."
- 6. Click Test.

- 7. If you are satisfied with the results, click Store In Flash.
- 8. When you are done, click OK.

Current loop	module.	Slot# 4
Current loop setting	Current loop test	
Module type	Current loop	
Serial #	NoSerial	
NoSerial	New serial numbe	r

11.6.1 Module type

The type of module (current loop, digital, etc.)

11.6.2 Serial

If the module has a serial number, it is displayed (this example is for a prototype, so there is no serial number).

11.6.3 LEDs

The LEDs shown here are representations of the LEDs on the Current loop module. When an LED glows on the module, it is shown in bright red or green (depending on its state) here.

11.6.4 Set test current

This sets the value for the test current when you run a test to determine the slope factor, offset, etc.

Select one of the following:

- 0mA
- 4mA
- 20mA
- 10mA

Nuscriai	
Set test current	
🔘 0 mA	◯ 4 mA
🔘 20 mA	🔘 10 mA
0	Test current [mA]
0	Read current at 20 mA
0	Read current at 4 mA
1.10344839096069	Slope factor
-0.17500019073486	3 Offset

11.6.5 Test current (mA)

With an ammeter attached to the output of the module, check the reading and input the value here.

11.6.6 Read current at 20mA

With an ammeter attached to the output of the module, check the reading after 20mA is selected and input the value here.

11.6.7 Read current at 4mA

With an ammeter attached to the output of the module, check the reading after 4mA is selected and input the value here.

11.6.8 Slope factor

When you click Get Module Information or Calculate Calibration Factors, this slope value is provided.

11.6.9 Offset

When you click Get Module Information or Calculate Calibration Factors, this offset value is provided.

11.6.10 Slope stored in flash

This is the slope value that is currently stored in the flash memory.

11.6.11 Offset stored in flash

This is the offset value currently stored in the flash memory.

11.6.12 Closed loop circuit

When a closed-loop circuit is established, the words "Closed loop circuit" appear in large green letters to indicate the connection. If there is no such connection, then the box remains blank.

11.6.13 Output type

The output can be set so that to accommodate the needs of connected equipment (some require data via voltage, while others require it via current changes). Click one of the two buttons to make your selection:

- Current
- Voltage

11.6.14 Get module information

Click this to get the module's information and populate this window.

11.6.15 Calculate calibration factors

After testing and providing settings, click this to calculate calibration factors. See page 65 for details.

11.6.16 Transfer to module

Click this to transfer the currently viewed data to the module.

11.6.17 Test

Click this to test the module with the current settings.

11.6.18 Store in flash

Click to store the module's parameter data in the flash memory.

11.6.19 **OK**

Click "OK" to exit, closing the Current loop module's setup page.

11.7 Current loop test – Voltage Selected As Output Type

When the Current loop test is set with an output type "Voltage," different options are available than when "Current" is selected:

rrent loop	o module. Slo	t# 4	
rent loop setting	Current loop test		
Module type	Current loon		Output type
Serial #	NoSerial	LEDs	O Current
NoSerial	New serial number	500 Nom	Voltage
Set test voltage 0 V 10.0 V	○ 2.0 V ○ 5.0 V	Nominal voltage range 0V to 10.0	Get module information
0	Test current [mA] Read voltage at 10	.0 V	Calculate calibration factors
0 1.1034483909606	Read voltage at 2.0	V V	Transfer to module
-0.175000190734	863 Offset		Test
1.10344839096069 Slope stored in flash			Store in flash
-0.175000190734	863 Offset stored in fla	sh	
Closed loop circuit OK			

11.7.1 Module type

The type of module (current loop, digital, etc.)

11.7.2 Serial

If the module has a serial number, it is displayed (this example is for a prototype, so there is no serial number).

11.7.3 LEDs

The LEDs shown here are representations of the LEDs on the Current loop module. When an LED glows on the module, it is shown in bright red or green (depending on its state) here.

11.7.4 New serial number

You can input up to 8 digits to create a new serial number.

11.7.5 Nom R

If the desired output is a voltage instead of a current, a resistor must be inserted between the current loop's output terminals.

Note: The maximum resistor value should not exceed 500 ohms.

11.7.6 Set test voltage

Use a voltmeter to read the voltage across the resistor and

Select one of the following:

- 0 V
- 2.0 V
- 10 V
- 5.0 V

11.7.7 Test current (mA)

Shows the necessary current to generate the desired voltage.

11.7.8 Read voltage at 10.0 V

Note the reading on the voltmeter, and enter the value here.

11.7.9 Read voltage at 2.0 V

Note the reading on the voltmeter, and enter the value here.

11.7.10 Calculate calibration factors

After testing and providing settings, click this to calculate calibration factors. See page 65 for detail

11.7.11 Slope factor

When you click Calculate Calibration Factors, this slope value is calculated, as well as the offset.

The next step is to transfer the calculated value to the system by clicking "Transfer to module"

11.7.12 Offset

When you click Get Module Information or Calculate Calibration Factors, this offset value is provided.

11.7.13 Slope stored in flash

This is the slope value that is currently stored in the flash memory.

11.7.14 Offset stored in flash

This is the offset value currently stored in the flash memory.

11.7.15 Closed loop circuit

When a closed-loop circuit is established, the words "Closed loop circuit" appear in large green letters to indicate the connection. If there is no such connection, then the box remains blank.

11.7.16 Output type

The output can be set so that to accommodate the needs of connected equipment (some require data via voltage, while others require it via current changes). Click one of the two buttons to make your selection:

- Current
- Voltage

11.7.17 Get module information

Click this to get the module's information and populate this window.

11.7.18 Transfer to module

Click this to transfer the currently viewed data to the module.

11.7.19 Test

Click this to test the module with the current settings.

11.7.20 Store in flash

Click to store the module's parameter data in the flash memory.

11.7.21 **OK**

Click "OK" to exit, closing the Current loop module's setup page.

11.8 Techiez Sheet

The Techiez Sheet is a combination control center for an administrator and a good place to get troubleshooting data. The top portion of the window has check boxes that set various parameters and toggle functionality, while the bottom panes provide readouts of data from the sensor.

Important! Use caution when making changes here.

Alema_Flo	wmeter284F	964D02000056
File Passwords View	w Help	
Parameter Instant mass flow Total mass flow Average mass flow Meas. elapsed time Temp. sensor on board Graphs Parameters Co	Value 3.0751E-002 0.0000E+000 0.0000E+000 0.00 45 alibration HW configuration	Reset flow data Collect data 1 Seconds Malema Flowmeter 284#964 Overwrite file? Password level 0 Uptime : 0d 02h 10 m 21s NORMAL STATE Data file name Malema_Flowmeter _284F964D02000056.csv CONNECTED Techiez sheet More graphs Errors and warnings Coll power graphs V Use temperature Temperature compensation is ON V Use passwords Separator in CSV data-file V Disable dialogs Auto reset and save data
Parameter Left sensor amplitude Right sensor amplitude Positive current amplitu	Value 471 446 de 403	/2010 9:39:39 PM : Malema flow meter detected : Malema_Flowmeter_284F964D02000056 /2010 9:40:03 PM : Selection of Malema_Flowmeter_284F964D02000056 /2010 9:45:33 PM : Selection of Malema_Flowmeter_284F964D02000056 /2010 10:27:21 PM : Simulation toggled
Negative current ampliti Pulses sent [debug only Diff. counter	ude 259] 0.00000 6 2.2921E+004	/2010 10:27:24 FM : Simulation toggled
Sum counter IC temperature AGC Left sum	1.1759E+005 37.7 10 535	
Right sum Mass flow wo. low flow	1042 cutoff 3.0751E-002	
<	>	

The settings that you can control are in one section:

Use temperature	Use Auto Zero function		
Temperature compensation is ON	Auto zero function is ON		
 Use passwords Disable dialogs Log USB messages 	Separator in CSV data-file Auto reset and save data		
11.8.1 Use temperature

Click "Use temperature" to include temperature compensation.



11.8.2 Use Auto Zero function

Click "Use Auto Zero function" to activate the auto-zeroing function that looks for the low point between flow upswings and sets a new zero point each time it occurs.

Use Auto Zero function Auto zero function is OFF

11.8.3 Use passwords

Click this to ensure that password protection is in place. If you do not need password protection, leave this unclicked.

11.8.4 Disable dialogs

Dialogs, also known as "dialog boxes" or "pop-up boxes," are alerts or prompts that act as gatekeepers or confirmation points when you perform an action. A typical one says, "Are you sure you want to exit?" As its name implies, dialog boxes are disabled when you click this. If you perform a lot of parameter changes and exits, then disabling the dialog boxes can save you time.

11.8.5 Log USB messages

When this is clicked, USB traffic is monitored and messages are recorded. All transactions that occur via the USB port are captured. The lower right pane in this image shows how the data appears in raw form on the screen.

Malema_Flowme	eter284F9	64D02000056	
File Passwords View	Help		
Parameter Value Instant mass flow -8.7546 Total mass flow 0.0000E	E-003	Reset flow data Collect data 1 Seconds	Malema_Flowmeter284F964D03
Average mass flow 0.0000E	:+000	Connect Save data Clear Graphs	
Temp sensor on hoard 45		Overwrite file? Password level 0	
<	>	NORMAL STATE Data file name Malema_Flowmeter284F964D02000056.csv	CONNECTED
Graphs Parameters Calibration	n HW configuration	Techiez sheet More graphs Errors and warnings Coil power graphs	
		Vise temperature Temperature compensation is ON	Use Auto Zero function Auto zero function is ON
		✓ Use passwords	, Separator in CSV data-file
		✓ Disable dialogs	Auto reset and save data
		✓ Log USB messages	
Parameter	Value	6 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 5	7 58 59 60 61 62 63 📩
Left sensor amplitude	585	1 91 01 68 00 E8 01 78 3C 04 9B E1 02 24 04 27 42 75 B3 E9 3E 3	2 75 D9 48 08 3F 8E
Right sensor amplitude	636	E 01 03 3F 8B 59 89 40 42 2A 46 41 A4 01 EC 42 78 C9 14 C1 11 5	C CB D9 48 08 3F 8E
Positive current amplitude	557	6 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 5	7 58 59 60 61 62 63
Negative current amplitude	330		0 00 00 00 00 00 00 🔳
Pulses sent [debug only]	0.00000	1 FC 01 C2 01 1A 01 78 BC 56 0E FD 02 29 04 2D 42 75 B1 74 3E 3	1 48 04 48 08 3F 8E
	6	6 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 5	7 58 59 60 61 62 63
Diff. counter	2.1159E+004	1 FC 01 C2 01 1A 01 78 BC 56 0E FD 02 29 04 2D 42 75 B1 74 3E 3	1 48 04 48 08 3F 8E
Sum counter	1.2038E+005	T 01 03 3F 8B 59 87 40 42 28 D6 41 33 F6 4C 42 78 B5 93 C1 11 5	C B2 04 48 08 3F 8F
IC temperature	36.8	5 01 05 01 05 07 40 42 20 50 41 R5 10 40 42 70 50 5R 01 11 0	
AGC	10	0 5/ 50 59 40 41 42 45 44 45 40 4/ 46 49 50 51 52 55 54 55 56 5	7 35 39 60 61 62 63
Left sum	571		
Right sum	1124	2 7C 02 2D 01 4A 01 78 BC 0F 6F 72 02 3B 04 64 42 75 B1 75 3E 3	0 67 EA 48 08 3F 8E
Mass flow wo. low flow cutoff	-8.7546E-003	6 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 5	7 58 59 60 61 62 63
		2 7C 02 2D 01 4A 01 78 BC 0F 6F 72 02 3B 04 64 42 75 B1 75 3E 3	0 67 EA 48 08 3F 8E
		E 01 03 3F 8B 59 73 40 42 4D E8 41 A3 F8 31 42 78 E7 F7 C1 11 5	B B8 EA 48 08 3F 8E
		6 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 5	7 58 59 60 61 62 63 🥃
	>		2

11.8.6 Separator in CSV data-file

You may choose a comma, tab, or period (or any other symbol supported by your spreadsheet or word-processing file) to separate data from column to column.

11.8.7 Auto reset and save data

Click this to activate an automatic resetting of data capture and storing of each event in its own file. When the flow rate exceeds the low-flow cutoff point, a new file is generated and stays open until the flow rate drops below that low-flow condition again. This is useful if you are frequently starting and stopping flow measurement and want to collect data. When this is active, you do not need to manually create new files for each start.

Note: This file is saved separately from the normal data files and contains a limited set of data specific to temperature and frequency conditions at the sensor. The format is comma-separated value (CSV).

11.9 More Graphs

The graphs on this screen are primarily for diagnostic use when troubleshooting, providing fast insight into the overall "health" of the system.

Note: Each graph can be printed separately by clicking the "P" in the upper left corner of the graph.

Malema_Flowmeter284F964D02000056	
File Passwords View Help	
Parameter Value Reset flow data Instant mass flow 3.1870E-002 Image: Measure on the second sec	Collect data 1 Seconds Malema_Flowmeter_284F964D01 Connect Save data Clear Graphs Overwrite file? Password level 0 ta file name Malema_Flowmeter_284F964D02000056.csv CONNECTED
Graphs Parameters Calibration HW configuration Techiez sheet More graphs Errors and	warnings Coil power graphs
P V_F Sum counts 190,000 180,000 170,000 160,000 160,000 150,000 10,000 10,000 10,000 10,000 10,000 110,000 121:45:00 22:00:00 22:15:00 22:45:00 23:45:00 23:15:00 23	P Zero offset variations
P V_F Diff. counts 120,000 110,000 90,000 90,000 60,000 50,000 50,000 20,000 40,000 20,000 40,000	P

11.9.1 V_F Sum Counts

This graph contains data that is used in conjunction with the data included in V_F Diff Counts to monitor the frequency of the sensor.

11.9.2 Zero offset variations

Shows the zero offset variation when Auto Zero is activated

11.9.3 V_F Diff Counts

This graph contains data that is used in conjunction with the data included in V_F Sum Counts to monitor the frequency of the sensor.

11.9.4 Temperature Data

Temperature data from the PC board, as well as the left and right transducers is overlaid on this graph, and temperature scale is indicated along the Y axis in your user-configured temperature units.

11.10 Errors And Warnings

This window is another diagnostic tool, keeping track of errors that are detected in the system. When a session is active, the data collects, but with each new session, the panes are emptied. Therefore, the data represented is only from the current session.

Note: The messages and errors are saved in session-specific files, along with other CPFM 8800 files. In addition, text in either pane can be copied and pasted into documents if further review is necessary.

The top pane is for warnings, while the bottom pane is for error messages.



11.11 Power Coil Graphs

These graphs monitor coil voltage, coil current (milliamps), and coil power (milliwatts) for the transducers in the sensor. Data comes from the analog module through the digital board and then into the computer.

Note: You can print any graph on the screen by clicking "P" next to its upper left corner.

Malema_Flowmeter284F964D02000056	
File Passwords View Help	
Parameter Value Instant mass flow 3.3632E-002 Total mass flow 0.0000E+000 Average mass flow 0.0000E+000 Measure Measure ON Driver Driver ON Flow below low flow cut off setting Temp, sensor on board 45	Collect data 1 Seconds Auto zeroing Connect Save data Clear Graphs Overwrite file? Password level 0 ta file name Malema_Flowmeter_284F964D02000056.csv CONNECTED
Grands Parameters Calibration HW configuration Techiez sheet More grands Errors and	warpings Coll power graphs
P Coil Voltage [V]	P Coil Current [mA]
3.04 3.03 3.03 3.03 3.03 3.03 3.03 3.02	300 250 200 150 100 50 21:45:00 22:00:00 22:15:00 22:45:00 23:00:00 23:15:00 23:00:00
P Coil Power [mW]	
900 800 700 600 500 200 200 2145:00 22:00:00 22:15:00 22:30:00 22:45:00 23:00:00 23:15:00 23:30:00	

12 Troubleshooting

When power to the flow meter is disrupted, the system goes offline. Several indicators tell you this. Here are some examples of what the screen tells you:

- Measure OFF
- Driver OFF
- RESET STATE
- Uptime: 0d 00h 00 m 33s
- NOT CONNECTED

Notice that the window where the name and serial number of the flow meter is blank, indicating not just a failure, but a total disconnection.

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Another indication of a problem is if the graphs either are flat or very erratic, compared to your standard baselines. In addition, check for messages in red type that alert you to specific problems or changes of status.

🚰 Coriolis fl	owmete	r control p	orogram. Ma	lema Eng	ineering	Corp. 201	0			
File Passwords \	/iew	Help								
Parameter Instant mass flow Total mass flow Average mass flow Meas, elapsed time Temp, sensor on boa	Value 0.0000E+0 0.0000E+0 0.0000E+0 0.0000E+0 0.0000E+0 0.000 ard	00 00 00 00	Reset flow data Measure Driver Flow above low fl Uptime : 0d 00h 0 RESET STATE	Measure 0 Driver OFF ow cut off settin 0 m 00s	9 Data file name	ro function is OFI Connect Overwrite file? Malema_Flowmete	Collect data 1 Save data (Pass r284F964D020	Seconds Clear Graphs word level 0 00056.csv	NOT C	ONNECTED
Graphs Parameters	Calibration	HW configuration	Techiez sheet More g	raphs Errors a	nd warnings C	oil power graphs				
 Instant flow Sensor temp. Density Auto scale Y-axis Scale max. So Scale min. -60 	P .01500 .00500 .00500 00500				Mass flo	w. [g/s]			N M	
	21: P	17:00 21:18:	00 21:19:00	21:20:00	21:21:00	21:22:00	21:23:00	21:24:00	21:25:00	21:26:00
Total mass flow Sensor frq. Auto scale Y-axis Scale max. 1000 Scale min. -1000	0									
	21:17:00	21:18:00	21:19:00	21:20:00	21:21:00	21:22:00	21:23:00	21:24:00	21:25:00	21:26:00

Check all connections, including power to the flow meter and all cabling from the flow meter and the computer. Restart the program and reinitiate data collection.

Once measurement starts, several indicators tell you that the system is running. The name of the flow meter should be in the pane on the far right, and the word "Connected" should be clearly visible.

Reset flow data			Collect data	1 Seconds	Malema_Fl	owmeter_	284F964D0
Measure Measure	ON Auto zeroin	g					
Driver Driver ON	' [Connect	Save data	Clear Graphs			
Flow below low flow cut off setti	ng 🗌	Overwrite file?	Pz	assword level 0			
Uptime : 0d 02h 53 m 54s NORMAL STATE	Data file name Mal	ema_Flowmete	er284F964D0	2000056.csv		CONNE	CTED

Important!

If negative flow readings are shown, it means that the fluid inlet and outlet are reversed. Stop the system and correct the connections before starting measurement again.

13 Backing Up Parameter Data

In the event of a hard drive crash in your computer, or in case a flow meter requires replacement, it is a good idea to copy all of your data to another hard drive or other storage. The easiest approach is to copy the entire folder containing the various files (by default labeled CPFM8800). If necessary, these files can be used later.

🗢 CPFM8800							
File Edit View Favorites Tools Help			A				
🚱 Back 🝷 🕥 🕤 🏂 🔎 Search 🌔 Fold	ders 🕼	» 🗙 🖌 🛄 -					
Address 🛅 C:\Malema\CPFM8800			🖌 🄁 Go				
Name 🔺	Size	Туре	Date Modified				
CPFM8800.exe	3,227 KB	Application	5/5/2010 11:23 PM				
强 CSystem.ini	4 KB	Configuration Settings	5/13/2010 8:53 PM				
🖏 data_subset.csv	1 KB	Microsoft Excel Comma	5/12/2010 3:41 PM				
🔮 default.xml	6 KB	XML Document	5/5/2010 11:23 PM				
Malema_Flowmeter284F964D02000056.csv	179 KB	Microsoft Excel Comma	5/13/2010 10:46 PM				
🖬 Malema_Flowmeter284F964D02000056.err	0 KB	ERR File	5/13/2010 10:46 PM				
Malema_Flowmeter284F964D02000056.log	2 KB	Text Document	5/13/2010 10:46 PM				
🖬 Malema_Flowmeter284F964D02000056.wrn	0 KB	WRN File	5/13/2010 10:46 PM				
🖬 password.psw	3 KB	Password Backup	5/6/2010 12:02 AM				
Sampledata.csv	2 KB	Microsoft Excel Comma	5/6/2010 12:07 AM				
🖬 sampledata.err	0 KB	ERR File	5/6/2010 12:07 AM				
🗐 sampledata.log	0 KB	Text Document	5/6/2010 12:07 AM				
📾 sampledata.wrn	0 KB	WRN File	5/6/2010 12:07 AM				

The file labeled "Csystem.ini" can be opened in a text processor such as Notepad and read directly or printed. It contains a great deal about the look and feel of the program and its settings.

🖻 CSystem.ini - Notepad 📃 🗖	×
File Edit Format View Help	
<pre>[Filenames] File Name=default.xml File Name=default.xml [MassFlowGauge] Left=16 Top=8 Width=161 Height=113 Hint=Min. value = 0.002CMax. value = 0.007 MinColor=32768 Midcolor=65535 FaceColor=13828094 TicksColor=0 ValueColor=0 CaptionColor=0 ArrowColor=0 MarginColor=0 CenterColor=8421504 Circlecolor=16711680 CenterRadius=8 CircleRadius=3 Angle=120 Margin=10 Style=2 ArrowWidth=1 NumberMainTicks=15 LengthWainTicks=15 LengthWainTicks=5 LengthWainTicks=5 LengthWainTicks=5 ScaleMin=-40 IndMaximum=38 Topdwinimum=0 20000002980232</pre>	
110/11/11/10/1 01/20000002500252	×

The log file (".log"), can be read in a text processor, as well. Files with a .csv extension (for "comma-separated value) are intended for reading in spreadsheet programs that parse the data into columns (Microsoft Excel, for example).

Note: For security reasons, the password file (extension: ".psw") cannot be read directly. It is encrypted and can only be used in the program, but none of its data is "human-readable."

14 Reinstalling Software

If the software ever needs reinstallation, or if a newer version is available for installation, you do not have to delete the earlier version. However, it is a good idea to copy all of the files from the current installation into a backup on another drive before performing a new installation.

Refer to instructions on page 12 for complete installation details.

15 Warranty

Malema Sensors warrants to the buyer that its products are free from defects in materials and workmanship at the time of shipment and during the warranty period. Malema Sensors obligation under this warranty is limited to the replacement of the product(s) by same product(s) manufactured by Malema Sensors or repair of the product(s) at the Malema Sensors facility.

Malema Sensors products are sold with the understanding that the buyer has determined the applicability of the product to its intended use. It is the responsibility of the buyer to verify acceptability of performance to the actual conditions of use. Performance may vary depending upon these actual conditions.

WARRANTY PERIOD:

This warranty is in effect for twelve (12) months from the date of shipment from Malema Sensors place of business.

WARRANTY CLAIMS:

If Malema Sensors products are found to be defective in materials or workmanship within twelve (12) months of the date of shipment, they will be repaired or replaced with same product at the discretion of Malema Sensors at its place of business at no charge to the buyer.

16 Service and Repair

To return Malema Sensors products, please obtain an RMA (return materials authorization) number for the product before returning it, by contacting Malema Sensors (Corporate Office), Boca Raton, Florida, at (800) 637-6418 or (561) 995-0595

All returned equipment must be shipped to the following address:

Malema Sensors, 1060 S. Rogers Circle, Boca Raton, FL 33487 USA

17 Contacts

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