

Model 2000 Programmer EnSonic Display & Control Unit

Document code: 10735.M2KCNF.001

Document	Model 2000 Progra	mmer: EnSonic Display & Control Ur	nit
Document code	10735.M2KCNF.00		
Date	January 25, 2004		
Publisher	Instromet Internation	nal N.V.	
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Revision History	<u>Revision</u> 001	<u>Remark</u> First release	<u>Date</u> 25-01-2004

Preface

This document covers the configuration software for the M2000 flow computer which can be used as display and control unit for the EnSonic.

For EnSonic applications the M2000 is configured using the 'Model 2000 Programmer' software. The version '*V3.81e*' described in this manual has been used throughout the development of the system and is likely to undergo minor changes. However, the main functionality of the program will not be altered.

Related documents:

'EnSonic Installation Manual'	code: 10735.M2KCNF.001	dd 20-01-2004
'EnSonic User Manual'	code: 10735.USER.002	dd 20-01-2004
'EnSonic Programmer'	code: 10735.ENSCNF.001	dd 25-01-2004
'Model 2000 Gas Flow Computer'	code: Model 2000 issue 6, 202/09-02	dd 16-09-2002



General requirements

The M2000 configuration program runs under the Windows operating systems 95, 98, ME, 2000 and XP. There are no special requirements for the amount of free memory or free hard disk space and the configuration program with sub-directories and related files requires about 32 MB of hard disk space.

The program requires a serial communication port (COM-port) to communicate with the M2000. Systems with USB-ports only can use USB- to COM-port converters. Positive experience has been gained with both programs running simultaneously under Windows-XP and -2000 using EdgePort/4 and Edgeport/8 converters.

The communication between the configuration software and the M2000 takes place via the USB port on the front of the M2000. The connection cable between M2000 and PC should be A to A USB port style.

<u>Startup</u>

The configuration program is started by double-clicking on the program icon, directly after startup a username and password must be entered, see fig 1.

Enter user name and	password: ?X
User name	OK
	Cancel
Password	
Language	
English	
	Build Date: December 5th 2003

Figure 1, Startup screen

Since all parameters determining the operation of the M2000 can be accessed when in the highest security mode dedicated user accounts may be generated to hide or allow read-only access to specific windows. The username and password may therefore be installation dependent.

After supplying a proper username and password a 'Unit Connection List' window is displayed with a list of configured devices. After setting the proper COM:-port a connection with the unit can be opened by selecting the reference 'EnSonic' and choosing the 'Connect' option is see fig 2. The COM:-port setting can be changed via <u>Options</u> in the program's main menu.

	tion List			
Connect	New	Modify Delete Edit Offline Aud	it Log	
Reference	Com	ms ID Computer Type	Serial No	Baud
EnSonic	0	1 Stream Gas Turbine.	Ö	38400
161	0	1 Stream Liquid Turbine.	0	38400
lt2	0	2 Stream Liquid Turbine.	0	38400
lt3	0	3 Stream Liquid Turbine.	0	38400
ltd	0	1 Stream Liquid Turbine Density.	0	38400
lu1	0	1 Stream Liquid QSonic.	0	38400
o1	0	1 Stream Gas Orifice.	0	38400
o2	0	2 Stream Gas Orifice.	0	38400
od1	0	 Stream Gas Orifice Density. 	0	38400
stn	0	Station Controller.	0	38400
t2	0	2 Stream Gas Turbine.	0	38400
t3	0	3 Stream Gas Turbine.	0	38400
td1	0	1 Stream Gas Turbine Density.	0	38400
u1	0	1 Stream Gas Qsonic.	0	38400
u2	0	2 Stream Gas Qsonic.	0	38400
u3	0	3 Stream Gas Qsonic.	0	38400
ud1	0	1 Stream Gas Qsonic Density.	0	38400
vt1	0	1 Stream Venturi Tube.	0	38400
vt2	0	2 Stream Venturi Tube.	0	38400

Figure 2, Unit Connection List

In certain situations it may be necessary to configure the unit offline, in this case the *Edit Offline* option must be selected. Keep in mind that when using the *Edit Offline* option the instrument's setup is not read from the unit and that overwriting the unit's setup may cause serious malfunctions. Also when using the *Connect*

option in which the setup is read from the unit prior to entering the edit mode, it is good practice to save the unit's current setup prior to making changes and to save modified setups using appropriate names prior to updating the unit's internal setup.

After establishing a connection with the M2000 a window is opened in which the unit's setup can be modified. By selecting the proper icon in the left part of the window a topic related page is opened in which the topic related data can be modified. Depending on the security level, certain pages may be hidden or read only.

After modifying specific parameters, the new setup must be downloaded to the unit by selecting the Update button. Setup's may be Saved and Loaded. The Undo option only operates on the currently selected page. When switching to a different page the modifications cannot be Undone.



Setup Pages

In the following sections the different setup pages are presented. Since the M2000 is used in many instruments and systems it can be configured in many ways and therefore only the pages relevant to the operation of the EnSonic are presented.

Boards Configured

On this page the boards currently installed in the M2000 are presented. The M2000 should be equipped with an input board and an output board. Normally the M2000 has been setup during manufacturing so no modifications need to be made to this page.

nit: EnSonic. Secu	rity: Open. (Offlin	e).			
	Boards Informatio	'n			
	Required Config	guration :			
Boards	Slot 1: Type :	Comms Board		Not Required 💌]
Configured	Slot 2: Type :	Input Board	•	Not Required]
112	Slot 3: Type :	No Board Present	•	Not Required	1
) ate & Time	Slot 4: Type :	No Board Present	-	Not Required	1
	Slot 5: Type :	Output Board		Not Required 💌	1
8 8	Current Unit C	onliguration :			-):
	Slot 1: Type :			Version :	
alogue Inputs	Slot 2: Type :			Version :	
	Slot 3: Type :			Version :	
	Slot 4: Type :			Version :	
Update unit	Slot 5: Type :	-		Version :	
Load setup	Compatability :	,			
Save setup	The unit is not	connected, no information	is available.		
Undo page					7
Cancel					Help

Date and Time

Used to set the clock and the contract time of the M2000. The battery back-up of the M2000 must be enabled otherwise the date and time information will be lost when the unit is switched off. The M2000 date and clock information is used to update the time and date of the EnSonic unit on a regular basis.

Ella View Options Llears	er - Unit: Enso <u>•[]= _ 2</u>
Unit: EnSonic, Security	/: Open. (Offlin 💶 🗖
Date & Time Boards Configured Date & Time Date & Time M 3 10 17 24 Analogue Inputs Update unit Load setup Save setup Undo page Cancel	and Time Pon't Send iend From PC's Clock iend The Following: rember 2003 : T W T F S S 1 2 4 5 6 7 8 9 11 12 13 14 15 16 18 19 20 21 22 23 25 26 27 28 29 30 16: 47: 47 T Hours Help

Analogue Inputs



Digital Inputs

Used to configure the digital inputs of the M2000. The function of the 'Status Inputs 1-3' can be selected via the pull down list, the relevant selections are: 'Ensonic Calibration' and 'Ensonic Reset'. When the specific input is activated for approx. 1 sec the calibration or reset command is recognised. The inputs can be Inverted. Normally the inputs are connected via a relay to the 24 VDC supply on the backside of the unit, see the M2000 hardware manual for details.

Unit: EnSonic.	Security: Open. (Offline).	-		
Analogue Inputs	Input Board In Slot 2	Gas Meter Inputs 1-2 Pulse count 1 Frequency 1 Pulse count 2 Frequency 2 Status Inputs 1-3 Input State 1 Ensonic Calibrati Invert	Input State 2 Ensonic Reset 💌	Input State 3
Update unit Load setup Save setup Undo page Cancel				Help

The three digital inputs are located on the back of the M2000: Output Board terminals A1, B3 and A3. Jumpers 6, 8 & 10 on the input board have to be fitted.

Hart Loops

Chromat

This page presents the parameters used to communicate with Chromatograph like equipment like the EnSonic.

Available items:

- Chromat type: EnSonic must be selected here.
- Chromat ID: identity number of unit, default: 1
- Chromat Time: time interval for polling the EnSonic, default: continuous
- Chromat Status: how to react on chromat status, default: Ignore
- Mode of Op Address: Modbus address where the mode of operation of the chromat device is presented, must match the Modbus setting of the EnSonic
- Gas Data Address: the Modbus start address where the measurement data is presented, the length of the data block is fixed and hard coded. This setting must match the Modbus setting of the EnSonic.

nit: EnSonic.	Security: Open.	(Offline).					
<u>⊢ ¶ ¶</u>	Chromat type	Ensonic	•	Ad	idress	Min	Мах
	Chromat ID	1		N2	41701	0.000	1,000
	Chromat Time	Continuous	-	C02	41901	0.000	5.000
A	Chromat Status	anore	- -	RD	42701	0.000	1.000
W V.		grioto	-	HS	42601	0.000	50.000
Chromat	L6+ code	108		HI	42801	0.000	40.000
8-	nhexane			٢	41801	0.000	100.000
SPACE] 0.000000		C2	42101	0.000	10.000
Global Units	nneptane	0.000000		Ca	41201	0.000	2.000
C. S. C. Sandardinan (S. S.	noctane	0.000000		i-C4	41301	0.000	1.000
4 a 🕰 🔳	nnonane	0.000000		n-C4	41401	0.000	1.000
Update unit	ndecane	0.000000		i-C5	41501	0.000	1.000
Load setup] 0.000000		n-C5	41601	0.000	1,000
Save setup	Mode of Op	1000		C6+	41101	0.000	0.500
Undo page	Gas Data Address	2000		Wobbe S	43101	0.000	60.000
Cancel	Analyser	1	🔽 Ch.Alive				Help

Global Units

This page is not used.

Station Units

This page is not used.

Station Pressure & Temperature 1 and 2

This page is not used.

Turbine 1

MT Pressure 1 This page is not used.

MT Temperature 1 This page is not used.

<u>Units 1</u> On this

On this page the number	of significant digits can be set for various parameters:
rd sig figs	: number of significant digits for the relative density
gasdata sig figs	: number of significant digits for the gasdata
Hs sig figs	: number of significant digits for the heating value

File View Options Use	rity: Open, (Offline),	(onnie).		
MT Temperature 1 Units 1	Pressure Units Units bar Abs/Gau absolute p atmos 0.000000 Temperature Units °C	Decimal Places Pressure Temperature	3 •	
Update unit Load setup Save setup Undo page Cancel	rd sig figs 8 ▼ gasdata sig figs 8 ▼ Hs sig figs 8 ▼			Help

Compressibility Equation 1

The only relevant parameter on this page is the 'Chromat Stream No'. If this parameter is not set the M2000 simply does not poll the EnSonic Modbus registers. Default value: 1.

Eile View Options Users	mer - Unit: EnSonic, Security: Oj s <u>H</u> elp	pen. (Offline).			_O×
🛄 Unit: EnSonic. Securi	ity: Open. (Offline).				<u>X</u>
	Equation	rd(Keypad) 0.600000	CO(Keypad) 0.000000	n-C4(Keypad)	0,100000
MT Temperature	Calorific conversion	Hs(Keypad) 38.000000	02(Keypad) 0.000000	i-C5(Keypad)	0.050000
	Hs.comb=25 Hs.base=0	Hi(Keypad) 9.000000	He(Keypad) 0.000000	mC5(Keypad)	0.030000
Bar -	Z Preset 5.000000	CO2(Keypad) 0.600000	Ar(Keypad) 0.000000	Neo-C5(Keypad)	0.000000
Units 1	Zn Preset 5.000000	N2(Keypad) 0.300000	C1(Keypad) 96.500000	n-C6(Keypad)	0.000000
H2 A	Zn hi 1.000000	H2(Keypad) 0.000000	C2(Keypad) 1.800000	n-C7(Keypad)	0.000000
Compressibility	Zn lo 0.900000	H20(Keypad) 0.000000	C3(Keypad) 0.450000	n-C8(Keypad)	0.000000
Equation 1	Chromat Stream No: 1	H2S(Keypad) 0.000000	i-C4(Keypad) 0.100000	n-C9(Keypad)	0.000000
Update unit	Gas Values (Normal):	Use Chromat		n-C10(Keypad)	0.000000
Load setup		Use Keypad 💽			
Save setup		Use Chromat Recieved 💌			
Undo page		☐ Use Rn			
Cancel					Help
For Help, press F1					

Gas Data Alarms 1

This page is not used.

Relative Density Meter 1

This page is not used.

Scaling Factors 1

This page is not used.

Preset Counters 1

This page is not used.

Base Conditions 1

This page is not used.

Mode Switch 1

Analogue Outputs

On this page the 4-20 mA current outputs of the M2000 can be configured. Each output is configured easily by dragging and dropping the required parameter in the Variable box and setting the upper and lower limit. Available items (per output):

- Variable: the selected output parameter
- Max / Min: upper and lower value of the range of the selected output parameter.
- Use Absolute: converts negative numbers to positive ones
- Calibration Min / Max mA: when calibrating output use min or max current.

The current output range (0-20 mA or 4-20 mA) is determined by jumper settings on the output board.

📟 Unit: EnSonic. :	Security: Open. (Offline).		<u>_ ×</u>
Mode Switch 1	Output Board In Slot 5	Analogue Output 1 Variable WOBBE S(Chromat Re Max. 55 Min. 40	Calibration Min mA C Max mA
	Equation ☐ — ☐ Gas Data ☐ — ☐ Gas Data(Used) ☐ — ☐ Chromat Gas Data F ☐ — ☐ Chromat ☐ — ○ WOBBE S(Chro	Analogue Output 2 Variable Max. 0.000000 Min. 0.000000	Calibration Min mA C Max mA
	Brillion Fillion Faces Brillion Fillion Faces Multiple Transmitters	Analogue Output 3 Variable Max. 0.000000 Min. 0.000000	Calibration Min mA Max mA
Update unit Load setup Save setup		Analogue Output 4 Variable Max. 0.000000 Min. 0.000000	Calibration Min mA Max mA
Cancel			Help

The analog outputs are located on the back of the M2000: Output Board terminals A13 / B13, A14 / B14, A15 / B15 and A16 / B16; terminal row A: positive (+), terminal row B: negative (-).

Digital outputs

On this page the settings of the digital ouputs are displayed. Each output board in the M2000 has 12 digital outputs which can be configured in many ways. The outputs are configured easily by selecting the proper function (: 'Alarm') and dragging and dropping the selected parameter to the output box.

Available items (per digital output):

- Output function: button to select between: 'Logic 0', 'Logic 1', 'Alarm', 'Pulse', 'Flow Dir', 'Swt Inp' and 'Valve'; for the EnSonic all outputs are set to 'Alarm'
- Output parameter: when the 'Alarm' function is selected a text box appears on the right side of the selection button and items from the tree structure in the left part of the page can be dragged to this text box. More than one item can be placed in a text box in which case the alarm conditions are OR-ed.
- Latch: -
- Invert: the state of the output is inverted

Details on how to connect the digital outputs are given in the M2000 manual.

Eile ⊻iew Options	Users Help	
Unit: EnSonic. S Mode Switch 1	Security: Open. (Offline).	Dutput Board In Slot 5 Digital Outputs Latch Invert Divider Frequency Duty Cycle Duration 1 Alarm >> Meas VOS High pres. (▼ □ □ Y Y □ 2 Logic 0 □ □ T □ Y Y □ 3 Logic 0 □ □ T □ Y Y □ 5 Logic 0 □ □ T □ Y Y □ 5 Logic 0 □ □ T □ Y Y □ 6 Logic 0 □ □ T □ Y Y □ 7 Logic 0 □ T □ Y Y □ 8 Logic 0 □ T □ Y Y □ 10 Logic 0 □ T □ Y Y □
Save setup Undo page	Meas VUS High	11 Logic 0
Cancel		Help

The digital outputs are located on the back of the M2000: Output Board terminals A1 / B1, ..., A12 / B12. Normally these outputs are used to drive external relays.

Logging

This page is not used.

<u>Modbus</u>

This page is not used.

Data To Print

This page is not used.

Print Jobs

Ports

On this page the settings of the communication ports can be changed. Available items:

- Port: the M2000 unit has 2 ports (SKT 1.1 MPU and SKT 1.2 MPU) which can be configured independently
- Function: selection of the various output modes, for the EnSonic 'Chromat RTU' should be selected

And per port the following items can be set:

- Baud rate: communication speed, default: 38400
- Parity: parity checking, default: none
- Stop bits: 1 or 2 stop bits, default: 1
- No bits: total number of bits, default 8
- RS232 / RS485: function select
- Enable handshaking: hardware handshake enabled when selected
- Interbyte time: time delay between successive bytes, default: 3
- Packet timeout: default 20
- Max. Retries: number of retries before alarm is raised.

Remarks:

- the settings of the port used for communication with the EnSonic must match the settings of the EnSonic Port
- the pin settings of the 9-pin sub-D connector for the RS232 protocol (pins 2, 3 and 5) are different from the pin setting for the RS485 protocol (pins 6 and 9), see the M2000 manual for details.
- the communication ports are located on the back of the M2000: MPU board SKT 1 and SKT 2

Unit: EnSonic, S	Security: Open, (Offline),	
Print Jobs	Port Function SKT 1.1 MPU Chromat RTU	3
Ports	Baud Rate Parity 38400 None Stop Bits No Bits	
Information Page		iout
Update unit Load setup	Interbyte Time	25
Save setup Undo page Cancel		Help

Information Page

The M2000 has 6 info pages on which various data can be displayed. Normally this page will be set during manufacturing but users can store their own data in these pages.

Available items:

- Info page 1 to 6: page selection
- Define bitmap: a range can be selected in which a bitmap can be loaded, when the range has been selected a 'Load Bitmap' button is displayed
- Clear Page: deletes all information on the current page
- Invert: invert page

🎟 Model 2000 Programmer - Unit: EnSonic, Security: Open, (Offline), 🔹 💿 📮 🗆 🗙				
Eile View Options Users Help				
💹 Unit: EnSonic. Security: Open. (Offline).				
Unit: EnSonic. Security: Open. (Offline). Info Page Ports Ports Info Page 1 EnSonic Display & Control Unit Define Bitmap V1.00 - Sept 10, 2003 Clear Page Invert Memory Stats Memory available: 3948 bytes. Update unit Load setup Save setup Undo page				
Cancel	Help			
For Help, press F1	1.			



Display Pages

On this page the output pages of the M2000 are configured. Since this page has been set during manufacturing and can by modified by experienced users only no detailed information is given on how to change the display pages of the M2000.

Ports Ports Page Display Pages Update unit Load setup Save setup Undo page Comments :	Sub Menu Item : Stream 1 Restore + Import Export Options + Replicate from Stream 1 Information : Number of Pages : 24 (Max 100) Size of Display Pages in bytes: 2438 (Max 30000 bytes)	<pre>> +Vbc1 > +Vbc1 > +E1 <</pre> Title "Main Totals" > +M1 > +Vbm1 > +Vbm1 > +Vbu1 Page End
---	---	--

Unit Security

Allows the supervisor of the system to make certain pages editable or read only. Names and Passwords for three operators can be set. Since this page is not intented to be used by the user, no additional information is presented.



Ethernet Access

Change ID Text

On this page the text labels belonging to the displayable items can be modified. Since this page is closely related to the 'Display Pages' page and has been set during manufacturing, it should not be modified.

🚟 Model 2000 Programmer - Unit: EnSonic. Se	• B _ D X	
Eile View Options Users Help		
Unit: EnSonic. Security: Open. (Offline).		
Preset Data	Original ID name	New ID name
Ethernet Access TD TEXT New Work of the New Work of th	rd(Chromat Rec).1 Hs(Chromat Rec).1 C(Chromat Rec).1 N2(Chromat Rec).1 C02(Chromat Rec).1 C2(Chromat Rec).1 C3(Chromat Rec).1 i-C4(Chromat Rec).1 n-C4(Chromat Rec).1 n-C5(Chromat Rec).1 n-C5(Chromat Rec).1 n-C6(Chromat Rec).1 n-C6(Chromat Rec).1 n-C8(Chromat Rec).1 He(Chromat Rec).1 He(Chromat Rec).1 WOBBE S(Chromat Rec).1 Chr.Read State Chr.Last Read State Chr.Analyser state Main Status Alarm Status	Rd Hs C1 N2 C02 Z V0S High V0S Low T Body P High P Low Vgas High Vgas Low T C02 P C02 Wobbe Read Last EnSonic Main Status Alarm Status
Save setup	Counter Prefix: Positive: +	Negative:
Undo page	NOTE: Tree will only	update after you change page
Cancel	Import Export	Help
For Help, press F1		

Monitored Preset Ids