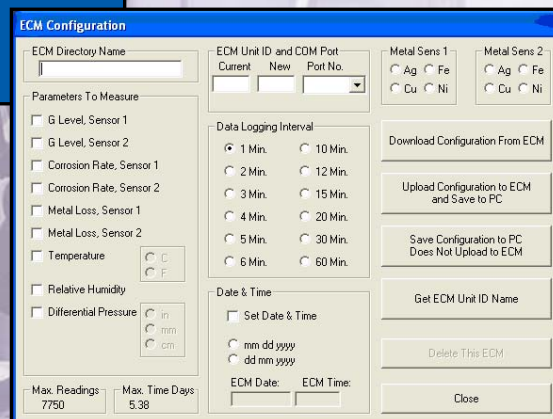


ECMTM

Environmental Condition Monitoring System

Reference Manual



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Chapter 1

Introduction

The ECM™ (Environmental Condition Monitoring System) is a multi-parameter monitoring system providing constant surveillance of the atmospheric environment and rapid detection of any deterioration that could result in damage to expensive equipment and valuable assets. Early detection of humidity, high temperature, and/or corrosive conditions will permit corrective action to be taken before substantial damage occurs to sensitive computer and instrumentation systems or electrical equipment.

The ECM is particularly useful for environmental monitoring in refineries, chemical plants, pulp and paper plants, control rooms, computer rooms, museums, and clean rooms. The ECM has many more features and benefits than its predecessor, the ECMS-2.

The system measures:

- The corrosive attack on two replaceable thin film sensors (usually pure copper and pure silver)
- Relative Humidity
- Temperature
- Differential Pressure (optional)

Data Output Options

- Five (5) user-selectable 4-20mA output channels, jumper selectable current sourcing (power supplied from the ECM) or current sinking (power supplied from the external power source).
- RS-232 or RS-485 (jumper selectable). Consult factory for RS-485 applications.

Instrument Display

Corrosion

Two corrosion sensors of the same or different metallurgy are used in the unit. The corrosion severity level is shown by indicator lights that correspond to the Instrument Society of America's Standard ISA-S71.04-1985 (levels G1 through GX). This standard relates the corrosion rate of the thin film of copper over a normalized 30 day period to the aggressiveness of the surrounding environment. The color coded lights allow for quick and easy determination of the severity level. The ISA Standard is only used on copper sensors and does not apply to other metallurgy's. There is under consideration by ISA the addition of silver sensors to the standard along with changes in the G levels.

A numerical display shows the corrosion rate in Angstroms per month. The thinning of the sensor, also known as metal loss, is displayed (in Angstroms) from the time the sensor is set or the thickness initialized. The metallurgy of the sensor is displayed as its two letter scientific abbreviation.

Relative Humidity

The relative humidity is displayed as a percentage (%) on the front panel.

Temperature

The temperature display can be configured to show the reading in either degrees Fahrenheit or Celsius through the front panel interface.

Differential Pressure (optional)

As an option, an ECM may be supplied with a differential pressure transmitter whose display can be set for inches, centimeters or millimeters water gauge through the front panel interface.

Alarms

An audible alarm helps assure fast response when severe conditions develop that could result in rapid equipment failure. The alarm can be set for any of the measurable parameters. An external alarm may be connected through the set point relay for all of the measurable parameters. Additionally, information from any of the measurable parameters can be accessed by remote mounted systems via 4-20mA loop outputs. These outputs are user selectable to be either current sourcing (power supplied from the ECM) or current sinking (power supplied from an external power source).

Data Logger

The ECM has an integrated on board data logger that may be accessed only through the RS-232 connector using the ECM Data Collector Software. While the data logger is integrated, it operates independently from the ECM itself and cannot be accessed through the front panel. This feature is not available when RS-485 communications is used.

Chapter 2 Specifications

Measured Parameters

Parameter Number	Operational Parameter	Unit of Measure	Range/Levels
1	Sensor 1 ISA G Severity Level	N/A	G1, G2, G3, G4, GX
2	Sensor 1 Corrosion Rate	Å	0-30, 0-300 or 0-3,000 Å per month
3	Sensor 1 Metal Loss	Å	0 to 3000 Å
4	Sensor 2 ISA G Severity Level	N/A	G1, G2, G3, G4, GX
5	Sensor 2 Corrosion Rate	Å	0-30, 0-300 or 0-3,000 Å per month
6	Sensor 2 Metal Loss	Å	0 to 3000 Å
7	Ambient Temperature	°C or °F	0 to +50°C or +32 to +122°F
8	Ambient Relative Humidity	% RH	10 to 95%
9	Differential Pressure	In., mm or cm WG	0.1 to 99.9 in., 1 to 9,999 mm or 0.1 to 99.9 cm WG

Sensors

Sensors have 2,500 nominal span (life). One copper and one silver sensor provided with instrument, other materials available by special order.

Displays

LCD displays corrosion (metal loss in angstroms) and corrosion rate (angstroms per month) for each channel, relative humidity (%), temperature (Degrees F/C), and room loss differential pressure (WG). LED indicators are set to correspond to ISA environmental classifications.

Alarms

Alarms may be set for corrosion rate (2 channels), low temperature, high temperature, low RH, high RH, differential pressure, and ISA environmental classification (2 channels).

Outputs

Analog

Five 4-20mA outputs (current sinking or current sourcing) that are user assignable to desired parameters.

Digital

RS-232 or RS-485 serial output of all nine measured and calculated parameters. Multiple units can be connected on RS-485 multi-drop (daisy chain).

Data Logger

Internal data logger accessed by ECM Data Collector Software directly from PC with an RS-232 serial connection. Data logger functions independent of the ECM.

Power Requirements

24 VDC, 0.4 amps.

Operating Temperature Range

+32 °F to +122 °F (0 °C to +50 °C)

Weight

5 lbs. (2.3 kg)

Chapter 3 Installation

NOTE: Each ECM instrument is carefully tested, inspected and packaged prior to shipment. Before unpacking the instruments, please inspect the packaged materials for shipping damage and retain damaged packaging materials to support any claim against the freight carrier should this become necessary.

Mounting

The ECM is designed to be mounted on a wall or any vertical surface. The mounting is achieved by using the four ears on the back of the enclosure. Figure 3-1 provides dimensional information for mounting the ECM.

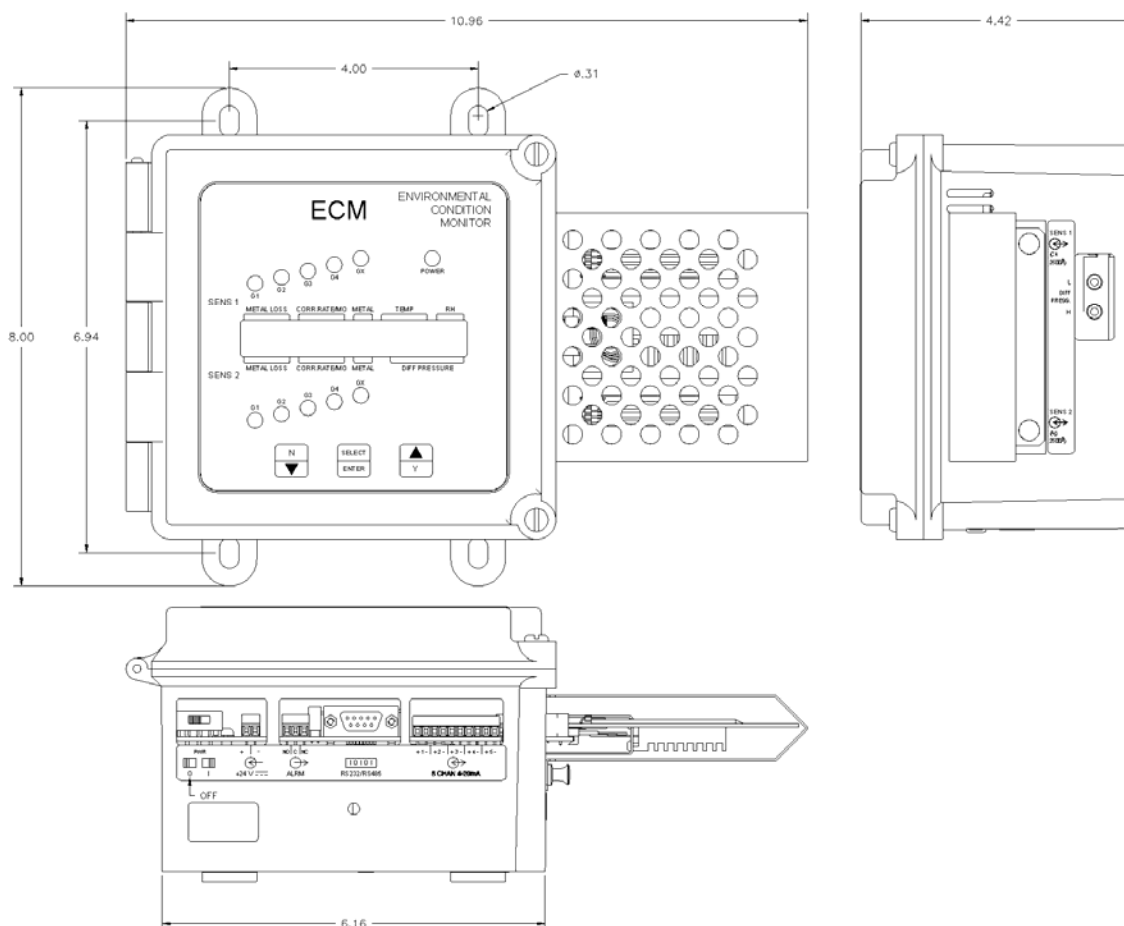


Figure 3.1 Dimensional Information for Unit Installation

For optimal performance, it is recommended that the ECM be positioned where the concentration of airborne contaminants is expected to be at a maximum. Likely mounting locations would be near vents, ducts or any other potential source of contaminant gas.

Power

The instrument requires a 24 VDC power supply to operate. A terminal strip is accessed through the bottom of the ECM. An optional wall mount 115 or 230 VAC adapter is available. Figure 3.2 shows the location of the terminal strip that is accessed through the bottom of the ECM. Connect the positive and negative to the leads from the power supply to terminal block.

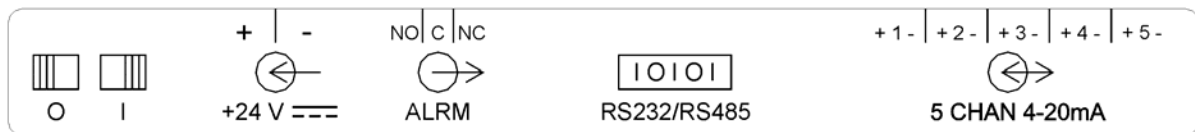


Figure 3.2 Terminal Strip and On/Off Switch

Atmospheric Sensors

Corrosion

The ECM is shipped with one copper and one silver atmospheric sensor (Figure 3.3). As shipped, the sensitive measurement surface of the sensor is protected from the environment by a sealed polycarbonate vial containing a desiccant capsule. The sensors should be kept in the sealed container until installation.

WARNING! Do not perform the installation procedure for atmospheric sensors until the unit is completely operational and the entire manual has been read. Premature sensor exposure may result in a decrease in the sensor life span.

CAUTION: While installing the sensors, the sensor element must not be touched. During any subsequent handling of the sensor, great care should be taken so that the sensor element remains uncontaminated.

The sensors are installed on the right side of the instrument. A stainless steel shield with many holes is used to protect the sensors from physical damage, while allowing airflow.

To remove the protective shield, reach behind the shield on the top and bottom at the point it connects to the ECM enclosure. Pull the small round plastic fasteners out from the ECM enclosure. Gently squeeze the shield at the center and remove it away from the ECM.

Two slots, approximately 1 1/4" in length are now accessible. Each slot is for a corrosion sensor, usually the upper slot (Sensor 1) is for the copper sensor and the lower slot (Sensor 2) is for the silver sensor. Any Model 610 sensor of any metallurgy can be used in either channel. Each sensor should be inserted so that the measurement element is facing opposite the mounting side (back panel) of the ECM. The connector end (notched end), in its respective slot should be pushed in firmly until the sensor locks in place. The sensors are keyed to the internal connectors so that they cannot be installed with the wrong orientation.

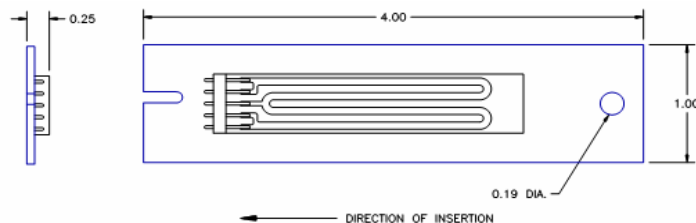


Figure 3.3 Corrosion Sensors

Relative Humidity

The ECM is shipped with a relative humidity sensor already installed and is located inside a secondary stainless steel shield. Should a new relative humidity sensor be required, the unit must be returned to the factory for installation. Contact the factory for a quote and a returned goods number prior to returning the unit.

Temperature

The ECM is shipped with a temperature sensor already installed and is located inside a secondary stainless steel shield and heat sink. The heat sink is required to ensure accurate measurement of temperature. Should a new temperature sensor be required, please contact the factory.

The temperature sensor may be replaced by performing the following:

1. Switch off the ECM and unplug the power connection.
2. Open the ECM enclosure by removing the screws located at the top right and lower right of the enclosure.
3. The enclosure door will open on a hinge to the left. Remove the two screws holding the secondary shield / temperature heat sink assembly on the right side of the printed circuit board assembly and slide it away to the right carefully. The temperature sensor (lower sensor) needs to be disconnected from its circuit board mounted connector.
4. Remove the temperature sensor / heat sink assembly from the secondary shield by unfastening the two screws inside the secondary shield.
5. The replacement temperature sensor is already installed in a new heat sink. Mount the new heat sink assembly onto the secondary shield using the two original screws.
Note: The temperature sensor is an integral part of the heat sink and should not be removed from it.
6. Replace the secondary shield / temperature heat sink assembly connecting the temperature sensor to its printed circuit board mounted connector. Fasten the secondary shield in place using the two original screws.
7. Install primary shield.
8. Close door and fasten shut using original screws.

Differential Pressure

When ordered as an option, a 4-20mA pressure differential transmitter is installed in the ECM enclosure and is wired for operation. Tubing should be connected to at least one, if not both of the airports, and run to the areas to be monitored for pressure differential.

If necessary, an external differential pressure transmitter can be connected, **consult factory for more details.**

Analog Output

CAUTION: Be sure to read this section in its entirety, and have the jumpers set properly before powering the unit with wired 4-20mA output.

The five (5) 4-20mA outputs for the ECM can be configured for any 5 of the 9 parameters measured. The 4-20mA loops can either be powered externally by an end-user supplied voltage of 24 VDC at 600 ohm maximum or internally via the power to the ECM. This is selectable via internal jumpers on the circuit board. See Main PCB Assembly Jumper Map in Appendix B for precise location. External power is often referred to as current sinking while internally supplied power is current sourcing. Each 4-20mA channel can be set independently. For example, two channels could be current sourcing and the remaining three channels current sinking.

Each channel has three jumpers in a vertical column with each jumper having three pins. Appendix B has a detailed jumper map.

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Channels 1 and 2 are called high accuracy or high resolution. These channels have an output at 10 bit resolution with an un-calibrated accuracy of $\pm 0.2\%$. It is recommended that these channels be used for **metal loss** and **corrosion rate**.

Channels 3, 4, and 5 are standard accuracy or resolution. These channels have an output at 10 bit resolution with an un-calibrated accuracy of $\pm 0.9\%$. It is recommended that these channels be used for **ISA G Level, Relative Humidity, Temperature and Pressure**.

Connection to a recorder or 4-20mA receiver should be via a pair of twisted #14 or smaller wires from the terminal strip.

The ISA G level is provided by stair-step loop outputs for the severity level of the silver and/or copper sensors. The corresponding G levels for the current outputs are as follows:

- 6 mA = G1
- 8 mA = G2
- 10 mA = G3
- 12 mA = G4 (currently non-active – reserved for proposed amendments to ISA standards)
- 14 mA = GX

Other parameters are scaled to the 4-20mA according to the range set in the front panel interface. To set the 4-20mA outputs channels parameters, follow the procedure below, a command flow chart is attached in Appendix A:

1. With the instrument turned on, hold the **SELECT/ENTER** key down for approximately 5 seconds.
2. The display will read **“Configure Sensors?”**
Press the left key marked **“N”** for no.
3. Next the display will read **“Reset Sensors?”**
Press **“N”** again for no.
4. The display will read **“Configure 4-20mA outputs?”**
Press the right key marked **“Y”** for yes.
5. Next the display will read **“Output to Configure: 1 High Accuracy”**
Press the **“▼”** (down) or **“▲”** (up) arrow keys to scroll to the channel you wish to set and then press the **“Enter”** key.
6. The screen will read **“Parameter for Output Channel”**
Use the **“▼”** and **“▲”** keys to select parameter and press the **“Enter”** key.
7. The screen will read **“Configure another Output?”**
If it is desired to configure another channel, press **“Y”** and repeat the above two steps. Press **“N”** when done.
8. Continue pressing **“N”** until the screen reads **“Return to Operation?”**
Press **“Y”** to return to normal operation.



Figure 3.4 Optional Analog Outputs Located on Bottom Circuit Board

Alarm Relay

An alarm relay can be wired up from the bottom to activate external alarms. Both Normally Closed and Normally Open configurations can be accommodated. Access the terminal strip on the bottom of the unit in the same manner as the 4-20mA output. Alarm settings are set through the front panel. See Appendix A for flow chart.

NOTE: Contact rating 0.5 amps at 125 volts AC and 1.0 amp at 24 volts DC.

Chapter 4 Operation

General

The ECM provides continuous monitoring of the corrosive severity of gaseous environments. The metal loss on thin films of copper and silver is measured every minute and stored in short term memory. Concurrently, the average corrosion rate is computed for the previous 8 to 99 hour period as specified by the user. This rate is then normalized to yield a theoretical corrosion rate in Angstroms per month in accordance with the characteristics specified in the ISA Standard. The severity level for this corrosion rate is then alternately displayed for each sensor until the next reading.

Severity	LED	Rate A°/Month
G1	Green	0-299
G2	Yellow	300-999
G3	Orange	1000-2000
G4	Red #1	Reserved For Proposed Amendments to ISA Standard
GX	Red #2	=>2000

Table 4.1

Startup

When power is supplied to the ECM by sliding the power switch to the right (located on the left-side-bottom of the unit), the ECM will go through a self test and display the firmware version. It will then initialize the system and display the data. The LED G1 Level will continue to flash on and off until enough data is collected to determine the corrosion rate and G Level, this will take approximately 1 to 2 hours. The front panel display will illuminate with the temperature and relative humidity data. If the ECM is unsuccessful at passing the self test, contact the factory immediately for troubleshooting.

NOTE: Corrosion rates are always high on newly exposed metal surfaces, therefore, it is more difficult for the ECM to distinguish between the different severity levels in the first 24 to 48 hours of operation after installation of a new sensor. Consequently, a 24 to 48 hour period of stabilization is recommended before taking actions as a result of an indicated severity level.

Alarms

Once the alarm levels are configured, if a severity level of GX is encountered, an audible alarm will sound until it is acknowledged. Press the **Select/Enter** button on the front of the instrument when an alarm is active to acknowledge. See the **Configure Alarm Settings Menu** section for alarm setup details.

User Interface

The ECM relies on configuration settings set by the user and program values, both stored in system memory, to establish measurement and alarm parameters. To program the configuration settings the ECM provides a set of control functions via its 48 (forty-eight) character alpha, numeric and symbolic display and 3 (three) button switches, referred to as the Man-Machine-Interface (MMI). The MMI permits the user to select the sensor metal type, input initial sensor metal span, enable and/or set alarm limits, clear alarms, enable/disable the audible alarm, set temperature display units to degrees “F” or “C”, execute independent sensor reset function upon depletion and/or change of sensor, configure the 5 (five) 4-20mA outputs and set the differential pressure display units to “in” (inches), “mm” (millimeters) or “cm” (centimeters) WG.

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The 3 (three) button switches have dual purpose functions depending on the current operating state of the ECM. These buttons are labeled left to right, top to bottom as; N / ▼, SELECT / ENTER and ▲ / Y.

The definitions of these labels are:

- “N” → No
- “▼” → Down (decrement)
- “SELECT” → Select
- “ENTER” → Enter
- “▲” → Up (increment)
- “Y” → Yes

To enter the programming mode (Command Menu Mode of Operation) of the ECM, hold the **SELECT/ENTER** button of the front panel down for a period of 5 seconds. Once any of the menu functions are selected, the system will suspend measurement operations. While in any menu function, if no button activity occurs for 2 (two) minutes, the ECM will automatically abort and discard all changes made during the edit session and return to normal operation mode utilizing all pre-existing values.

Command Menu Selection

To enter or exit the Command Menu, hold down the **SELECT/ENTER** button for 5 (five) seconds at any time. When navigating to any sub-menu from the Command Menu, it is possible to exit the sub-menu and return to the Command Menu by holding down the **SELECT/ENTER** button for 5 (five) seconds, any configuration changes made while in the sub-menu will be discarded and not stored in memory.

The Command Menu Mode of Operation sequence is listed below:

Display	Possible Button(s)	Comments/Response to Button Activity
CONFIGURE SENSORS? NO / YES	N (No)	▪ Advances to the next menu item.
	Y (Yes)	▪ “Configure Sensors” menu.
RESET SENSORS? NO / YES	N	▪ Advances to the next menu item.
	Y	▪ “Reset Sensors” menu.
CONFIGURE 4-20mA OUTPUTS? NO / YES	N	▪ Advances to the next menu item.
	Y	▪ “Configure 4-20mA Outputs” menu.
SET DISPLAY UNITS/ RANGE? NO / YES	N	▪ Advances to the next menu item.
	Y	▪ “Set Display Units/Range” menu.
SET RATE PERIOD? NO / YES	N	▪ Advances to the next menu item.
	Y	▪ “Set Rate Period” menu.
CONFIGURE ALARM SETTINGS? NO / YES	N	▪ Advances to the next menu item.
	Y	▪ “Configure Alarm Settings” menu.
RETURN TO OPERATION? NO / YES	N	▪ Advances to the next menu item (back to the top of this menu).
	Y	▪ The ECM will return to normal Operation Mode.

Configure Sensors Menu

The following sequence will occur while the ECM is in the “Configure Sensors” menu.

Display	Possible Button(s)	Comments/Response to Button Activity
SENSOR TO CONFIGURE: 1	▼ ▲	<ul style="list-style-type: none"> Choose the sensor to configure by pressing Up and Down buttons. The sensor number changes between 1 and 2.
	SELECT /ENTER	<ul style="list-style-type: none"> Advances to the next menu item.
SET SENSOR 1 METAL TYPE: COPPER (Cu)	▼ ▲	<ul style="list-style-type: none"> The Up and Down buttons will cause the sensor Metal Type to cycle through the 5 (five) available choices; COPPER (Cu), SILVER (Ag), NICKEL (Ni), IRON (Fe) and OFF. Choose OFF to disable the selected sensor channel. The words “SENSOR 1 (or 2) OFF” will appear in place of the sensor measurements on the LCD Display. Use this setting when a sensor will not be used in that channel. The default value for sensor 1 (SENS 1) is COPPER (Cu) and for sensor 2 (SENS 2) is SILVER (Ag). Choose sensor Metal Type.
	SELECT /ENTER	<ul style="list-style-type: none"> Advances to the next menu item. Note: If OFF was selected, the next menu item is bypassed and the following menu item is presented.
SET SENSOR 1 SPAN: 2500 Å	▼ ▲	<ul style="list-style-type: none"> The Up and Down buttons will cause the sensor Span Metal Thickness to change by 1 Å (angstrom). Pressing and holding the Up or Down buttons will cause the value to change at one of three rates of speed dependent on the length of time the button is held. To stop, release the button The acceptable range of values for sensor Span is 200 to 3000. The default value for both sensors is set at <u>Span 2500</u>. Choose the sensor Span.
	SELECT /ENTER	<ul style="list-style-type: none"> Advances to the next menu item.
ACTIVATE SENSOR 1 LEDS: ON	▼ ▲	<ul style="list-style-type: none"> The Up and Down buttons will cause the sensor's LED status to cycle back and forth between ON and OFF. The default value for both sensors is <u>ON</u>. Choose sensor's LED status.
	SELECT /ENTER	<ul style="list-style-type: none"> The next display is presented.
SENSOR 1 VALUES STORED SENSOR DATA AUTO RESET	NONE	<ul style="list-style-type: none"> This message displays for 3 (three) seconds and the sensor information set in the preceding steps will be stored into system memory. Any running data calculations for the old (previous) sensor are reset and monitoring of the new sensor is started. Advances to the next menu item.
CONFIGURE ANOTHER SENSOR? NO / YES	N	<ul style="list-style-type: none"> The ECM will return to the “Command Menu.”
	Y	<ul style="list-style-type: none"> Advances to the next menu item (back to the top of this menu).

Reset Sensors Menu

The following sequence will occur while the ECM is in the “Reset Sensors” menu.

Display	Possible Button(s)	Comments/Response to Button Activity
SENSOR TO RESET: 1	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the sensor number to cycle between 1 and 2. ▪ Choose the sensor to reset. Note: Press and hold the SELECT/ENTER button for 3 (three) seconds to escape this menu and return to the “Command Menu.”
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
RESETTING SENSOR 1 ARE YOU SURE? NO / YES	N	<ul style="list-style-type: none"> ▪ Returns to the previous menu item.
	Y	<ul style="list-style-type: none"> ▪ The next display is presented.
SENSOR 1 VALUES ARE BEING RESET	NONE	<ul style="list-style-type: none"> ▪ This message displays for 3 (three) seconds. Any running data calculations for the existing sensor are reset. ▪ Advances to the next menu item.
RESET ANOTHER SENSOR? NO / YES	N	<ul style="list-style-type: none"> ▪ The ECM will return to the “Command Menu.”
	Y	<ul style="list-style-type: none"> ▪ Advances to the next menu item (back to the top of this menu).

Configure 4-20mA Outputs Menu

The following sequence will occur while the ECM is in the “Configure 4-20mA Outputs” menu.

Display	Possible Button(s)	Comments/Response to Button Activity
OUTPUT TO CONFIGURE: 1 HIGH ACCURACY	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the output number/accuracy to cycle through the 5 (five) available choices; 1 HIGH, 2 HIGH, 3 STD, 4 STD and 5 STD. ▪ Choose the desired output number/accuracy.
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
PARAMETER FOR OUTPUT 1: OFF	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the measurement parameter to cycle through the 10 (ten) available choices. ▪ The 10 (ten) available measurement parameter choices are; SENSOR 1 G LEVEL, SENSOR 2 G LEVEL, SENSOR 1 CORROSION RATE, SENSOR 2 CORROSION RATE, SENSOR 1 METAL LOSS, SENSOR 2 METAL LOSS, TEMPERATURE, RELATIVE HUMIDITY, DIFFERENTIAL PRESSURE and OFF. ▪ The default value for all 5 (five) outputs is <u>OFF</u>. ▪ Choose the measurement parameter. <p>Note: Whatever parameter that may have been previously set for the selected output will automatically be displayed as the default choice.</p>
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
SENSOR 1 CORROSION RATE RANGE: 0-300	▼ ▲	<p><u>Only when SENSOR 1 (or 2) CORROSION RATE is selected in the preceding menu is this menu item presented, otherwise the next menu item is presented.</u></p> <ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the corrosion rate range to cycle through the 2 (two) available choices depending on the setting of the sensor span. ▪ The system software automatically presents the choices applicable to the span previously set for the sensor selected. ▪ When the sensor span is nearest to 250, the corrosion rate range choices are 0-30 and 0-300 and when span nearest to 2500, the corrosion rate range choices are 0-300 and 0-3000. ▪ The default value is 0-300 for both. ▪ Choose the corrosion rate range.
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
CONFIGURE ANOTHER OUTPUT? NO / YES	N	<ul style="list-style-type: none"> ▪ The ECM will return to the “Command Menu.”
	Y	<ul style="list-style-type: none"> ▪ Advances to the next menu item (back to the top of this menu).

Set Display Units/Range Menu

The following sequence will occur while the ECM is in the “Set Display Units Range” menu.

Display	Possible Button(s)	Comments/Response to Button Activity
SET TEMPERATURE DISPLAY UNITS: F	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the temperature display units to cycle back and forth between F and C. ▪ The default value is <u>F</u>. ▪ Choose the appropriate temperature display units.
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
SET DIFFERENTIAL PRESS. DISPLAY UNITS: in	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the differential pressure display units to cycle through the 3 (three) available choices of in (inches), mm (millimeters) and cm (centimeters). ▪ The default value is set for <u>inches</u>. ▪ Choose the appropriate differential pressure display units.
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
SET DIFFERENTIAL PRESS. RANGE: 2.0	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the differential pressure range to increment and decrement respectively by a single unit. ▪ Pressing and holding the Up or Down button will cause the value to increase or decrease at one of three rates of speed dependent on the length of time the button is held. Release the button to come to a stop. ▪ There are 2 (two) possible differential pressure range choices and the system software automatically presents the choice applicable to the differential pressure display units set in the preceding menu item. ▪ When “in” or “cm” is selected, the acceptable range of values is 0.1 to 99.9 in 0.1 in/cm increments. The default value is <u>2.0</u>. When “mm” is selected, the acceptable range of values is 1 to 9999 in 1 mm increments. The default value is <u>50</u>. ▪ Choose the differential pressure range.
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
CHANGE DISPLAY UNITS/ RANGE? NO / YES	N	<ul style="list-style-type: none"> ▪ The ECM will return to the “Command Menu.”
	Y	<ul style="list-style-type: none"> ▪ Advances to the next menu item (back to the top of this menu).

Set Rate Period Menu

The following sequence will occur while the ECM is in the “Set Rate Period” Menu.

Display	Possible Button(s)	Comments/Response to Button Activity
SET RATE PERIOD: 24 HOURS	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the rate period time to increment and decrement respectively by 1 hour. ▪ Pressing and holding the Up or Down button will cause the value to increase or decrease at one of three rates of speed dependent on the length of time the button is held. Release the button to come to a stop. ▪ The acceptable range of values for the rate period time is <u>8 to 99</u>. The default value is <u>24</u>. ▪ Choose the rate period time.
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
CHANGE RATE PERIOD? NO / YES	N	<ul style="list-style-type: none"> ▪ The ECM will return to the “Command Menu.”
	Y	<ul style="list-style-type: none"> ▪ Advances to the next menu item (back to the top of this menu).

Configure Alarm Settings Menu

The following sequence will occur while the ECM is in the “Configure Alarm Settings” menu.

NOTE: For an alarm to be activated, the alarm limit setting defined in the following table must be violated continuously (equal to or exceeding the limit) for at least the duration of the Alarm Delay setting. Once an alarm occurs, the system will display the associated Alarm Message on the LCD Display. Alarm settings are applied equally to both Sensor 1 and 2.

Display	Possible Button(s)	Comments/Response to Button Activity
ENABLE SYSTEM ALARM FUNCTIONS? NO / YES	N	<ul style="list-style-type: none"> The ECM will return to the “Command Menu.” Note: The system software automatically presents either the ENABLE or DISABLE message based on the current setting of the alarm functions. If the current setting is at disabled, the ENABLE message will be presented. The default status is set at <u>DISABLED</u>.
	Y	<ul style="list-style-type: none"> The menu item “SET ISA G LEVEL ALARM LIMIT” is presented.
OR		
DISABLE SYSTEM ALARM FUNCTIONS? NO / YES	Y	<ul style="list-style-type: none"> The ECM will return to the “Command Menu.” Note: The system software automatically presents either the ENABLE or DISABLE message based on the current setting of the alarm functions. If the current setting is at enabled, the DISABLE message will be presented.
	N	<ul style="list-style-type: none"> Advances to the next menu item.
SET ISA G LEVEL ALARM LIMIT: OFF	▼ ▲	<ul style="list-style-type: none"> The Up and Down buttons will cause the G level alarm limit to cycle through the 4 (four) available choices; G2, G3, GX and OFF. The default value is set at <u>OFF</u>. Choose the G level alarm limit.
	SELECT /ENTER	<ul style="list-style-type: none"> Advances to the next menu item.
SET CORROSION RATE ALARM LIMIT: OFF	▼ ▲	<ul style="list-style-type: none"> The Up and Down buttons will cause the corrosion rate alarm limit to increment or decrement in 10 Å (angstrom) respectively. Pressing and holding the Up or Down button will cause the value to increase or decrease at one of three rates of speed dependent on the length of time the button is held. Release the button to come to a stop. The acceptable range of values for the corrosion rate alarm limit is <u>10 to 300 and OFF</u>. The default value is <u>OFF</u>. Choose the corrosion rate alarm limit.
	SELECT /ENTER	<ul style="list-style-type: none"> Advances to the next menu item.
SET HI TEMPERATURE ALARM LIMIT: OFF °F	▼ ▲	<ul style="list-style-type: none"> The Up and Down buttons will cause the HI temperature alarm limit to increment or decrement by 1° (degree). Pressing and holding the Up or Down button will cause the value to increase or decrease at one of three rates of speed dependent on the length of time the button is held. Release the button to come to a stop. The acceptable range of values for the HI temperature alarm limit is <u>+32 °F to +122 °F (0 °C to +50 °C) and OFF</u>. The default value is <u>OFF</u>. Choose the HI temperature alarm limit. Note: The value displayed and set is based on the temperature display units setting (refer to Set Display Units/Range Menu).
	SELECT /ENTER	<ul style="list-style-type: none"> Advances to the next menu item.

Display	Possible Button(s)	Comments/Response to Button Activity
SET LO TEMPERATURE ALARM LIMIT: OFF °F	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the LO temperature alarm limit to increment or decrement by 1° (degree). ▪ Pressing and holding the Up or Down button will cause the value to increase or decrease at one of three rates of speed dependent on the length of time the button is held. Release the button to come to a stop. ▪ The acceptable range of values for the LO temperature alarm limit is <u>+32 °F to +122 °F (0 °C to +50 °C) and OFF.</u> ▪ The default value is <u>OFF.</u> ▪ Choose the LO temperature alarm limit. <p>Note: The value displayed and set is based on the temperature display units setting (refer to Set Display Units/Range Menu).</p>
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
SET HI RELATIVE HUMIDITY ALARM LIMIT: OFF %	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the HI relative humidity alarm limit to increment or decrement by 1% (percent). ▪ Pressing and holding the Up or Down button will cause the value to increase or decrease at one of three rates of speed dependent on the length of time the button is held. Release the button to come to a stop. ▪ The acceptable range of values for the HI relative humidity alarm limit is <u>10 to 95 and OFF.</u> ▪ The default value is <u>OFF.</u> ▪ Choose the HI relative humidity alarm limit.
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
SET LO RELATIVE HUMIDITY ALARM LIMIT: OFF %	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the LO relative humidity alarm limit to increment or decrement by 1% (percent). ▪ Pressing and holding the Up or Down button will cause the value to increase or decrease at one of three rates of speed dependent on the length of time the button is held. Release the button to come to a stop. ▪ The acceptable range of values for the LO relative humidity alarm limit is <u>10 to 95 and OFF.</u> ▪ The default value is <u>OFF.</u> ▪ Choose the LO relative humidity alarm limit.
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.
SET DIFFERENTIAL PRESS. ALARM LIMIT: OFF in WG	▼ ▲	<ul style="list-style-type: none"> ▪ The Up and Down buttons will cause the differential pressure alarm limit to increment or decrement by 0.1 in (inches) or 2.0 mm (millimeters). ▪ The acceptable range of values for the differential pressure alarm limit is <u>0.1 to 99.9 in/cm or 1 to 9999 mm and OFF.</u> ▪ The default value is <u>OFF.</u> ▪ Choose the differential pressure alarm limit. <p>Note: The value displayed and set is based on the differential pressure display units setting (refer to Set Display Units/Range Menu).</p>
	SELECT /ENTER	<ul style="list-style-type: none"> ▪ Advances to the next menu item.

Display	Possible Button(s)	Comments/Response to Button Activity
SET ALARM DELAY: 10 MINUTES	▼ ▲	<ul style="list-style-type: none"> The Up and Down buttons will cause the alarm delay limit to increment or decrement by 1 minute. Pressing and holding the Up or Down button will cause the value to increase or decrease at one of three rates of speed dependent on the length of time the button is held. Release the button to come to a stop. The acceptable range of values for the alarm delay limit is <u>1 to 99</u>. The default value is <u>10</u>. Choose the alarm delay limit.
	SELECT /ENTER	<ul style="list-style-type: none"> Advances to the next menu item.
SET AUDIBLE ALARM: OFF	▼ ▲	<ul style="list-style-type: none"> The Up and Down buttons will cause the audible alarm status to cycle back and forth between ON and OFF. The default value is <u>OFF</u>. Choose audible alarm status.
	SELECT /ENTER	<ul style="list-style-type: none"> Advances to the next menu item.
CHANGE ALARM LIMITS? NO / YES	N	<ul style="list-style-type: none"> The ECM will return to the “Command Menu.”
	Y	<ul style="list-style-type: none"> Advances to the next menu item (back to the top of this menu at “SET ISA G LEVEL ALARM LIMIT”, the first menu item is bypassed).

Review of Front Panel Configuration

The ECM provides an easy to use 3-key user interface which is located on the front panel. Functionality of each key is listed below:

<p><u>N</u> ▼</p>	<ul style="list-style-type: none"> This key is used to select NO, to scroll down the menu, or for numerical setting. The menu item is always shown on the second line of the display.
<p>SELECT /ENTER</p>	<ul style="list-style-type: none"> This key is used to select an item from a menu, to enter a value that is displayed on the screen or to enter the programming mode (Command Menu Mode of Operation) of the ECM. To enter the programming mode, hold down this button continuously down for 5 seconds. The interface screens depicted in Appendix A will now be available. To exit the Command Menu without saving any changes that were made, hold down this button continuously for 5 seconds and the ECM will return to normal operation. <p>Note: Alternatively, do not press any keys for a period of two minutes, and the ECM will return to normal operation.</p>
<p>▲ <u>Y</u></p>	<ul style="list-style-type: none"> This key is used to select YES, to scroll up the menu, or for numerical setting. The menu item is always shown on the second line of the display.

Parameters set by the Front Panel Interface

The following parameters can be set using the front panel interface:

- **Configure Sensors**

Allows the user to select;

- The metallurgy of the sensor.
- The span or useful life of the sensor in Angstroms (located on the sensor package).
- The display of G series for each channel.

- **Reset Sensors**

Allows the user to reset the sensor with a new sensor life and restart the calculations for corrosion rate. IF ENTERED INTO THIS MENU UNINTENTIONALLY, WAIT TWO MINUTES WITHOUT PRESSING ANY KEYS AND THE UNIT WILL RETURN TO NORMAL OPERATION.

- **Configure 4-20mA Outputs**

Allows the user to select the parameter to be put on the channel identified.

- **Set Display Units Range**

Allows the user to select;

- Fahrenheit or Celsius for the temperature units.
- Inches, centimeters or millimeters for the differential pressure unit.
- The maximum input on the differential pressure transmitter by scrolling through the numbers.

- **Set Rate Period**

Allows the user to enter the period at which the corrosion rate in Angstroms per month will be calculated (from a minimum of 8 hours to a maximum of 99 hours).

- **Configure Alarm Settings**

Allows the user to enable or disable the alarm function. Once inside this menu, the user can turn ON/OFF and set limits for:

- ISA G Level
- Corrosion Rate
- Temperature (High and Low)
- Relative Humidity (High and Low)
- Differential Pressure
- Audible Alarm (On or Off)
- Alarm Delay (1 to 99 minutes). The alarm condition must be continually in effect for the set period of time before the alarm will sound.

NOTE: The OFF selection is located between the highest and the lowest values allowed, therefore, scroll through the numerical sequence pass the highest value to select OFF.

Refer to [APPENDIX A](#) for the flow chart of the user interface.

Chapter 5 Maintenance

General

Routine maintenance on the ECM is not required. There is no initial calibration or periodic calibration required by the user.

Calibration

If a calibration check is requested, the unit must be returned to the factory for proper calibration and resetting. The suggested calibration interval (upon customer request) is 2 years. Prior to returning the unit(s) for calibration, contact the factory for a quote and a returned goods number.

Sensor Replacement

The sensors used on the ECM will require periodic replacement. When the sensor has reached its end-of-life (~2500 Å of metal loss) or can not be read by the measurement electronics, the display will notify the user. Refer to Chapter 3 for sensor replacement.

NOTE: Factory recommends that a spare set of copper and silver sensors be kept on hand in the event of an unexpected sensor failure.

Chapter 6

Data Logger and Software Operation

Data Logger

The ECM has a finite memory capacity when storing logged data. If the memory capacity is exceeded (due to lack of downloading the stored data) then the ECM will begin to overwrite the data beginning from the oldest stored data forward.

The number of data parameters selected and the frequency at which they are logged will determine the maximum length of time that data can be stored in the system memory. Changing the **Parameters to Measure** and/or **Data Logging Interval** settings of the ECM Data Collector Software will change the length of time accordingly. The ECM Data Collector Software will display the maximum possible time length and number of readings during the data logger configuration process on the bottom of the ECM Configuration screen, shown below:

THE ECM DATA LOGGER IS ONLY ACCESSIBLE THROUGH THE SERIAL PORT, AND OPERATES INDEPENDENTLY FROM THE FRONT PANEL!

Connection from PC to ECM

The data logger is accessed through a 9-pin D-Sub connector on the bottom of the ECM via a RS-232 communication. To use the data logger, connect a standard serial cable from a personal computer serial port to the ECM and make note of the communications port number (this is needed to establish the connection with the software).

The RS-485 communication is for specialty operation. Contact the factory for information on online multi-drop applications.

Software Installation

The ECM Data Collector Software is developed to monitor, collect, save and transfer data from ECM data loggers to

the computer with ease. Additionally, the software allows easy data logger configuration and data collection. The software is supported on Windows XP Professional and Windows Vista Business and Ultimate versions of operating systems.

The Environmental Condition Monitoring System CD comes with the ECM Data Collector Software, ECM System Reference Manual and Datasheets.

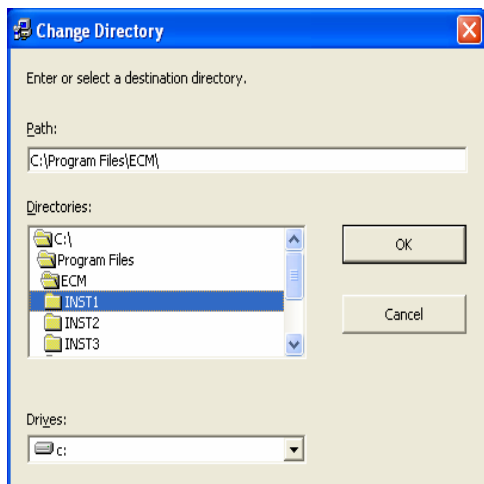
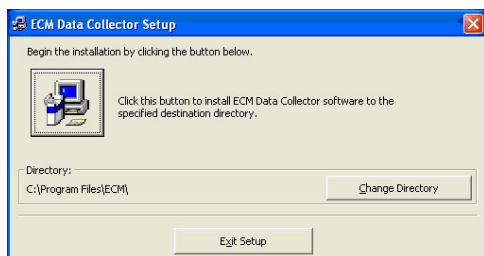
Uninstall any previous versions of the ECM Data Collector Software before installing a newer version.

To install the software, insert the CD in the CD-ROM drive and the AutoPlay feature will open the welcome page which will provide the necessary links for the installation. If the AutoPlay feature is disabled, browse to the **ECM.exe** file on the CD and double-click, then follow the onscreen wizard instructions to finish the install.

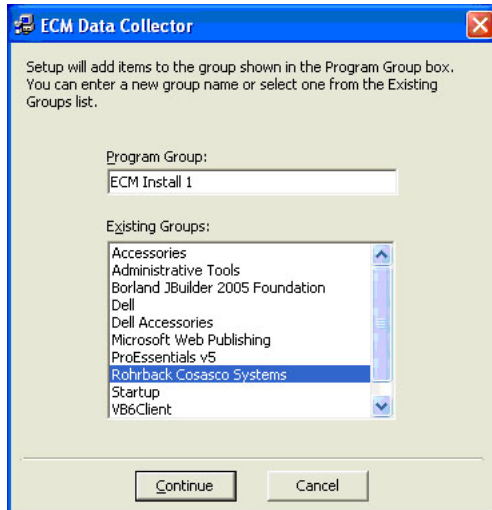
If the default installation settings are kept when installing the software, all associated files will be installed in the **C:\Program Files\ECM** directory.

It is permitted to install multiple instances of the software if each instance is installed in a separate directory. Each instance MUST be installed in a different directory and each instance MUST have a unique Program Group. The recommended procedure is listed below and should be followed to successfully complete multiple installations:

1. Create new directories (one per each intended installation) in the **C:\Program Files\ECM** directory. Suggested naming convention is as follows;
 - **C:\Program Files\ECM\Inst1**
 - **C:\Program Files\ECM\Inst2**, etc...
2. Change the installation directory by pressing the **Change Directory** command button at the time of each installation. See images below:



- If more than one instance of the ECM Data Collector will be installed, select a different Program Group for each install, such as ECM Install 1, ECM Install 2, etc... as shown below. If multiple instances are installed on one Program Group, each new install will overwrite the previous link and only one instance will be opened when the program is run.

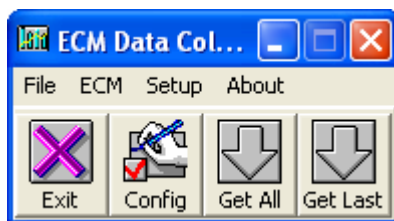


ECM Data Collector Software Operation

Open the ECM Data Collector Software by navigating to **Start → All Programs** and selecting the *Program Group* → **ECM Data Collector** (shown below):



The following application screen will appear:



Configuring the Software Application

Site/Area Name

The ECM Data Collector Software allows the user to specify and display a site or area name. This allows for easy recognition of each instance when multiple sessions of the application are running. The area name can be changed by navigating to **File → Set Area Name** and entering the desired name. The chosen name should allow for easy identification of the instance as well as the group of ECM data loggers that will be managed by this instance. To enable the view of the area name, navigate to and click **File → Display Area**.

Excel Format

Users can customize the output data files with one of two options. The data logger collected data can be saved either with an **Excel Serial Date** or **ASCII Date** formats. Configure the date format by clicking on **Setup** → **Excel Format** and choosing **Excel Serial Date** or **ASCII Date** format.

ECM Configuration

ECM data loggers can be configured and saved by either pressing the **Config** button on the main screen of the application or navigating through the pull down menus to **ECM** → **Configure** → **== Add ECM ==**. The following screen will appear:

This screen allows the user to interface with the data logger to configure, upload, download and save. See below for a description of the **ECM Configuration** screen functions.

ECM Unit ID and COM Port

Prior to any configuration changes, the communications port number associated with the serial cable connection to the computer must be chosen on the **Port No.** drop down menu of the **ECM Unit ID and COM Port** section. If the correct communications port is not selected, the ECM Data Collector application will not communicate with the ECM.

Each ECM has a unique name or identifier (ECM Unit ID). The factory default is RCS. The ID may be changed to any combination of 3 letters and/or numbers. When changing the ID on a previously configured ECM, press the **Download Configuration From ECM** command button first to populate the selection boxes with the currently configured values. Then add the new 3 alpha-numeric ID on the **New** text box and press the **Upload Configuration to ECM and Save To PC** command button.

ECM Directory Name

The **ECM Directory Name** is intended to identify an ECM within the ECM Data Collector application. This can be any combination of 12 letters and/or numbers. The software application will create a subdirectory with this ECM Directory Name on the **ExcelFiles** of the installation directory. Once an ECM is configured and enabled for data collection, all data that is transferred to the computer for that ECM will be stored under this ECM Directory Name (see the Data Directory section for details on viewing the data). It is recommended that each ECM Directory Name be meaningful and easily identify the ECM with which it is associated.

Parameters to Measure

The ECM can be configured to measure all or any of the following parameters;

- G Level of Sensor 1
- G Level of Sensor 2
- Corrosion Rate Sensor 1
- Corrosion Rate Sensor 2
- Metal Loss Sensor 2
- Metal Loss Sensor 2
- Temperature (Degrees F/C)
- Relative Humidity
- Differential Pressure (in, cm, mm)

The ECM Data Collector Software will display the maximum possible time length and number of readings during the data logger configuration. Selecting and deselecting parameters will change the duration and number of readings. The ECM will monitor all the parameters but will store only the selected parameters in permanent memory.

Data Logging Interval

ECM offers 12 frequency settings from one (1) minute to one (1) hour and allows for choosing a logging frequency that will best suit the situation. The maximum possible time length (in days) will display on the bottom of the screen and will adjust when the frequency is changed.

Maximum Readings and Time (in Days)

These fields show how long the data will be in memory before the oldest data is overwritten by new data. These fields are a function of the parameters measured and data logging frequency. It is recommended that a combination of frequency and parameters be chosen to allow the data to be retrieved before it is overwritten.

Date & Time

Date and Time can be set on the internal clock of the ECM. Date can be set in mm/dd/yyyy or dd/mm/yyyy formats and the time will be from the computer.

Metal Sensors 1 & 2

The Data Logger can access the metallurgy entered on the front panel of the ECM. Select the metallurgy that corresponds to the identified sensor when configuring the data logger.

Download Configuration from ECM

When properly connected and the correct communications port is selected, the configuration of any ECM can be downloaded simply by pressing the **Download Configuration From ECM** command button. This will populate the **ECM Configuration** screen with the existing configuration of that ECM.

Upload Configuration to ECM and Save to PC

The ECM can be programmed with the selected parameters and values by pressing the **Upload Configuration to ECM and Save to PC** command button. This will store and activate the ECM data logger and the ECM will be stored on the PC by the **ECM Directory Name**.

Save Configuration to PC, Does Not Upload to ECM

An ECM configuration with its selected parameters and values can be stored on the PC (under the **ECM Directory Name**) by pressing the **Save Configuration to PC, Does Not Upload to ECM** command button. This will not configure, update, store or activate any values on the ECM data logger.

Get ECM Unit ID Name

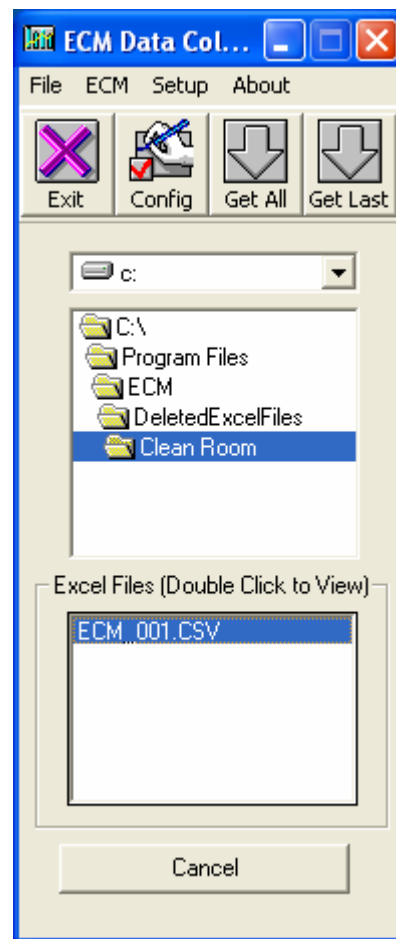
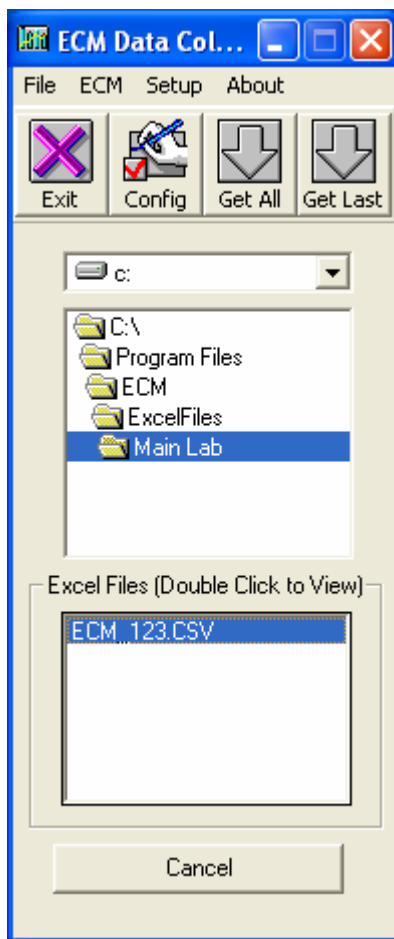
When properly connected and the correct communications port is selected, the ECM unit ID may be interrogated by pressing the **Get ECM Unit ID Name** command button. This is convenient if it is necessary to determine ECM name.

Data Directory

The data is stored as a Comma Separated Variable (CSV) format file. To view the data, select **File → Data Directory** from the menu bar. The default location of the data will be **C:\Program Files\ECM\ExcelFiles** (if only one instance exists).

If multiple installations exist, browse to each installation directory corresponding to each name specified earlier to find its **ExcelFiles** directory with the data.

Double-click on the desired ECM to view the data file. Double-click on the data file to open and view the data. To view deleted ECM data, click on the ECM and choose **DeletedExcelFiles** directory. See the displays below.



Status (Configuration)

ECM Data Collector application offers a global view of all ECM units that are configured and saved. By navigating to **ECM → Status (Configuration)**, it is possible to view each ECM unit's, communications ports used, selected parameters, logging interval, sensor metal types, date format and the ECM Data Directory name.

Configuration Status															
Unit ID & Comm Port		G Lev.		Rate		ML		Environment			Data	Metal		Date Format	Directory
ID	Port	S1	S2	S1	S2	S1	S2	TP	RH	DP	Log Int	S1	S2		
RCS	COMM 7	X	X	X	X	X	X	X	X	X	1 min	Cu	Fe	mm dd yyyy	ECM 7
CB1	COMM 2	X	X	X	X	X	X	X	X		15 min	Cu	Ag	mm dd yyyy	CleanArea B1
CB7	COMM 1	X	X	X	X	X	X	X	X	X	10 min	Fe	Ni	mm dd yyyy	CA - B7
SR1	COMM 3	X	X	X	X	X	X	X	X	X	30 min	Cu	Ag	mm dd yyyy	Server R 1
SR2	COMM 4	X	X	X	X	X	X				60 min	Cu	Ag	mm dd yyyy	Server R 2
CA1	COMM 8	X	X	X	X	X	X	X	X	X	4 min	Ag	Cu	mm dd yyyy	CleanR A1

Display Last Readings

ECM Data Collector allows the user to view the most current downloaded data reading via the **ECM Front Panel** or on a **Spread Sheet**. The **ECM Front Panel** is an emulation of the actual ECM unit front panel. Navigate to **ECM** → **Display Last Readings** to select the display type, shown below:

Select Display Type

Select Display Type

ECM Front Panel

Spread Sheet

Choose either the **ECM Front Panel** or the **Spread Sheet** to display the last reading. Each selection is shown below:

ECM Front Panel

ECM

G1

G2

G3

G4

GX

METAL LOSS	CORR. RATE/MO	METAL	TEMP	RH
0A	0A	Cu	75F	48%
A	1A	Fe		in

G1

G2

G3

G4

GX

ECM 7

CleanArea B1

CA - B7

Spread Sheet

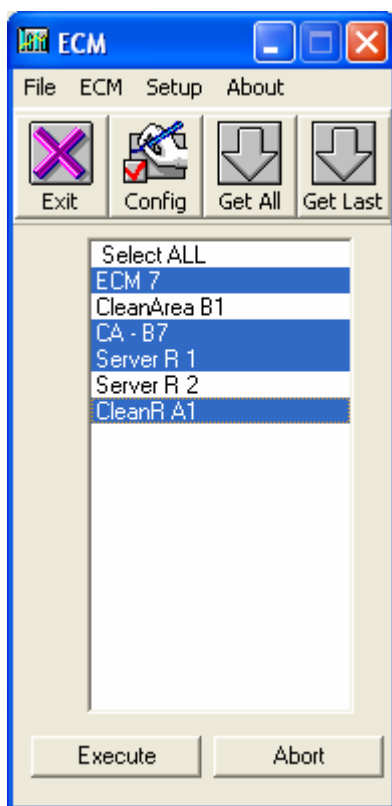
Display Last Readings														
Unit ID & Comm Port		Sensor One				Sensor Two				Environment				
ID	Port	G	Metal Loss	Rate/Mo	Metal	G	Metal Loss	Rate/Mo	Metal	Temp	RH	DP		
RCS	COMM 7	G1	0A	0A	Cu	G1	A	1A	Fe	75F	48%	in		
CB1	COMM 2	G1	0A	0A	Cu	G1	1A	1A	Ag	75F	43%	in		
CB7	COMM 1	G1	0A	0A	Fe	G1	0A	0A	Ni	75F	44%	in		
SR1	COMM 3	G1	0A	0A	Cu	G1	1A	0A	Ag	72F	48%	in		
SR2	COMM 4	G1	1A	1A	Cu	G1	2A	0A	Ag	77F	49%	in		
CA1	COMM 8	G1	0A	0A	Ag	G1	0A	0A	Cu	77F	44%	in		

The **Spread Sheet** will show most-current downloaded data readings for all configured ECM units (systems that are online and offline).

Download All Readings

The ECM has a finite memory capacity when storing logged data. If the memory capacity is exceeded (due to lack of downloading the stored data) then the ECM will begin to overwrite the data beginning from the oldest stored data forward. The data collected on the ECM data logger should be regularly downloaded to avoid data overwrite.

Press the **Get All** button on the main screen of the application or navigating through the pull down menus to **ECM → Download All Readings** to download and save the readings from the ECM data logger. Click on each ECM name to download data or **Select All** for a batch download. The image below shows four (4) ECM data loggers chosen to download data from:



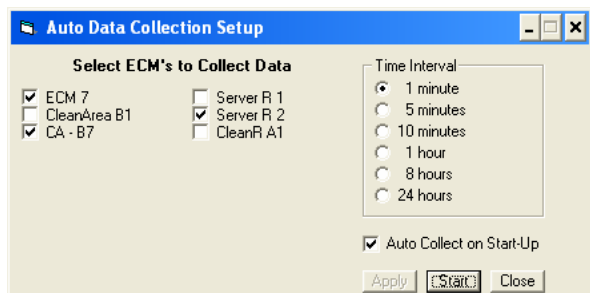
Download Last Reading

To download just the most recent reading, press the **Get Last** button on the main screen of the application or navigating through the pull down menus to **ECM → Download Last Reading** to download and save the reading from the ECM data logger. Click on each ECM name or **Select All** for a batch download of the last reading.

Display Auto Collection Control Panel

The ECM Data Collector application allows collecting and storing data from multiple ECM units via online connection with minimal configuration. Prior to online data collection, the ECM must be connected to the computer with a serial cable (the communications (COM) port number is needed to establish the connection with the software). Online data collection can be achieved by navigating to **ECM → Display Auto Collection Control Panel** and making the selections as needed. One or more ECM units may be selected along with the **Time Interval** and **Auto Collect on Start-Up** option. **Apply** the settings and press **Start** to begin online, automatic data collection of the

selected ECM unit(s). There is an imposed limit of 20 online data collecting ECM units per minute to allow adequate communication time between ECM units and the ECM Data Collector application. If the situation requires having 21 - 100 ECM units, the minimum configurable **Time Interval** is 5 minutes.



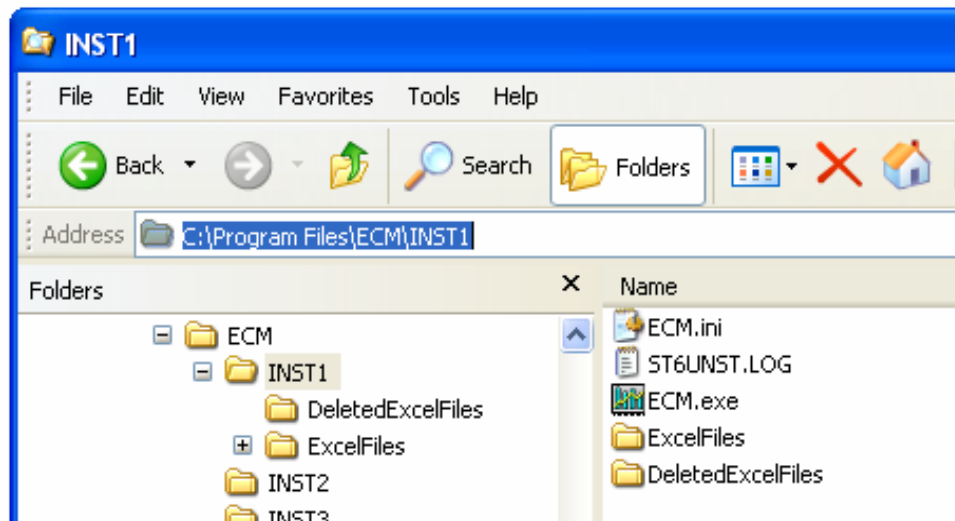
Display On

The **Display On** feature is similar to the **Display Last Readings** feature and users may choose the **ECM Front Panel** or the **Spread Sheet** as the viewer screen. The most-current downloaded data reading may be viewed by choosing an ECM on the **ECM Front Panel** screen. When used in conjunction with the **Auto Data Collection** feature, the ECM Data Collector application will download data automatically and update the **ECM Front Panel** and **Spread Sheet** to display the newest downloaded readings. The **ECM Front Panel** emulation will rotate through each online ECM and display the new values as it is updated. The **Spread Sheet** will display values for all ECM units that are online and dynamically update values upon new readings. The **Spread Sheet** will only display data for online ECM units; allow sufficient time for each ECM to make a reading prior to it being displayed.

NOTE: The **Spread Sheet** will display readings for each ECM after the **Auto Data Collection** is started and sufficient time is allotted for each ECM to make a reading.

Backup Configuration and Data Files

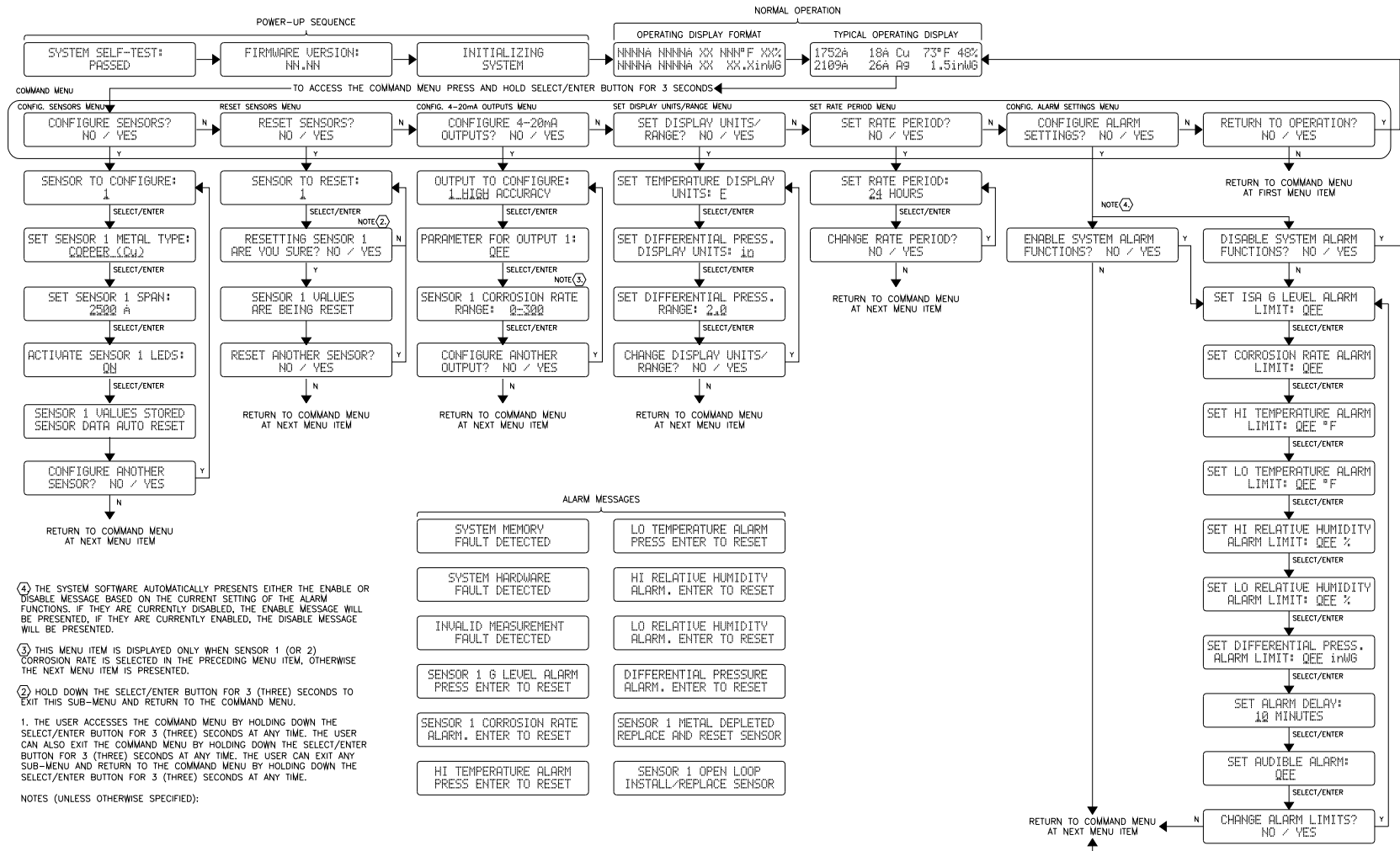
The ECM Data Collector offers a convenient method to backup and save configuration settings and data files. The **ECM.ini** file contains all the configuration settings while the **ExcelFiles** directory saves all the stored data. When an ECM is deleted from the **ECM Configuration** screen, the data file in the **ExcelFiles** is moved to the **DeletedExcelFiles** and kept there. To backup configuration files and data, navigate to **C:\Program Files\ECM** and copy the **ECM.ini** file and **ExcelFiles** directory (if the default installation path was changed, browse to the new installation directory) to the backup location. The **DeletedExcelFiles** directory may be backed up using the same procedure as above.



Restore Configuration and Data Files

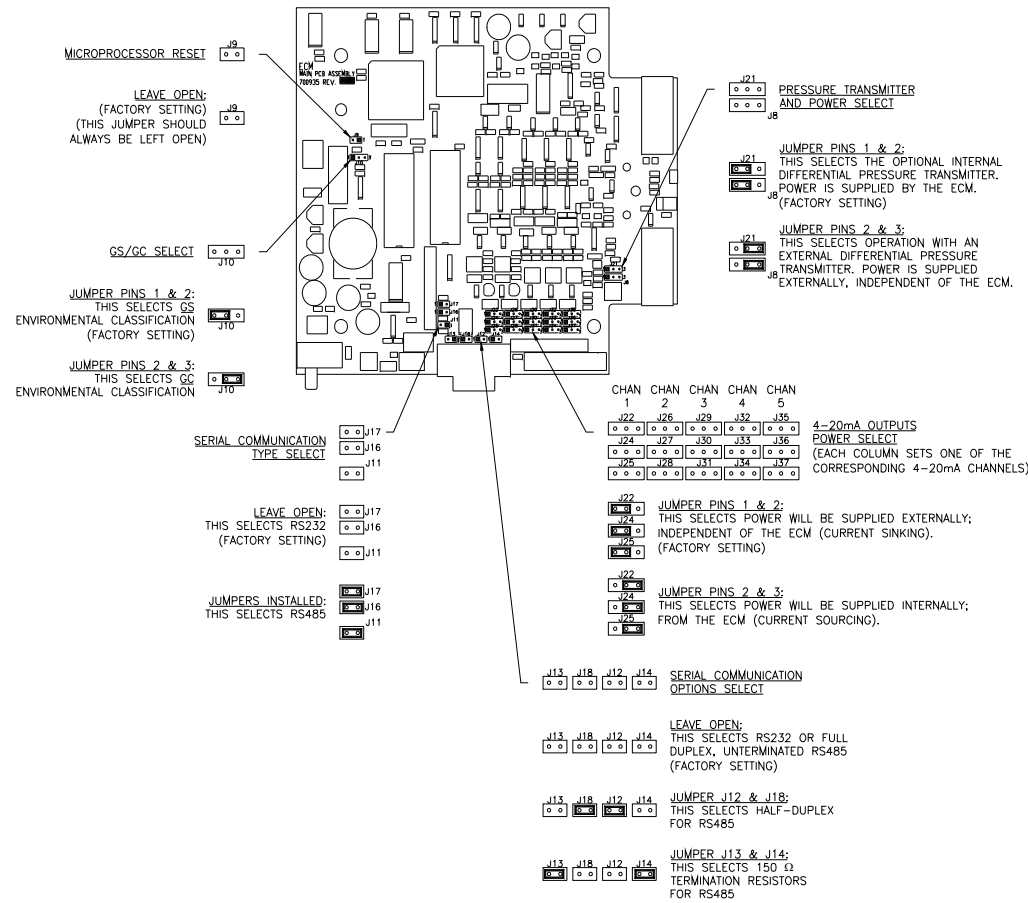
To restore configuration and data files, first install the ECM Data Collector to a desired directory. When the installation is complete, the installation directory will contain an **ECM.exe** file and a log file. Paste the **ECM.ini** file, the **ExcelFiles** data directory and **DeletedExcelFiles** when available in the installation directory. Open the ECM Data Collector application with the restored configuration and data files.

Appendix A ECM Display Menu Tree



Appendix B Main PCB Assembly Jumper Map

MAIN PCB ASSEMBLY
JUMPER MAP



NOTICE:
SOURCING CURRENT FROM THE 24V POWER SUPPLY WITHIN THE ECM EXPOSES BOTH THE SUPPLY AND THE UNIT TO POTENTIAL DAMAGE IF INSUFFICIENT ISOLATION IS PROVIDED FROM THE EXTERNAL INSTRUMENT.