Model 10C

MODEL 10 FACILITIES MODULE (FM)

Operator's Installation and Instruction Manual

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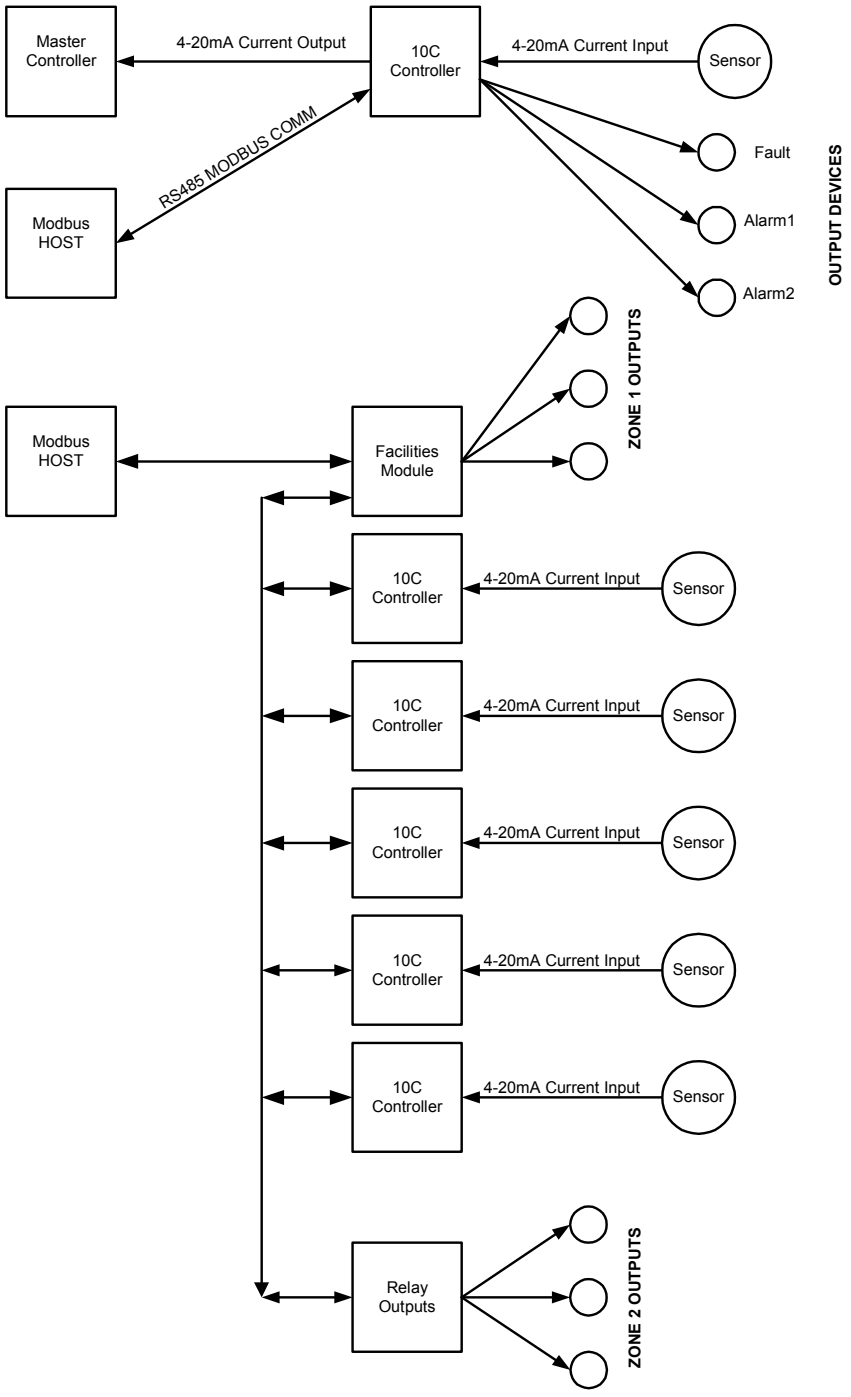

Figure 1 System Application Diagrams

1.0 Description

Physically, the Detcon Model 10 Facilities Module (FM) is a Model 10C board assembly with some slight variation in board component population[1] and with different firmware, compared to the Mod 10C Single Sensor Controller (SSC) board.

The Detcon Model 10 Facilities Module is designed to be used primarily for gathering data from multiple Mod10 Single Sensor Control modules. With the data from a group of sensors being available in the Facilities Module, the Modbus Master only needs to talk to the FM in order to get the data from the group of sensors. Another important function of the FM is to provide a final output for alarms, to represent the alarms for the whole group. These alarms are provided as output through the relays on the FM module.

The Figure 1 System Application Diagram exemplifies how the FM is used to connect to a multitude of SSC modules. The FM communicates with the SSC modules through the Modbus RS485 signal bus that runs through the mother board backplane. The FM is limited to polling 32 Modbus Slave devices and so a maximum installation might appear as: the FM board seated in the first slot of one card rack with the rest of the slots occupied by 15 SSC boards, and with the Modbus jumpered to a second card rack filled with 16 SSC boards. The FM has a second RS485 port for the purpose of interfacing to the Modbus Master Host. Since analog inputs and outputs are not needed and are not used on the FM, the analog signal terminations on the backplane for the FM slot are utilized for RS485 to the Host. The backplane board marks the terminal "SENSOR MA" for the RS485+ signal (or "A" signal) and marks the terminal "4-20 OUT +" for the RS485- signal (or "B" signal), these being the two signal wires for RS485 to the Modbus Master Host for the system.

The Operator Interface, or "Human Machine Interface" (HMI) is provided on the FM Front Panel Bracket. A pushbutton switch located on the Front Panel provides access to retrieve and set information within the Facilities Module, and to provide the "Alarm Reset" and "Alarm Silence" functions. The pushbuttons allow the user to navigate through an interactive menu to access programming of the FM's configuration. The pushbutton layout, the display, and the navigation methods are modeled after the Mod 10C SSC. Given familiarity with the SSC, the FM user interface is one that should be quickly mastered. The pushbuttons are labeled:
Upper left button: "RESET" and [up-arrow symbol]
Lower left button: "SLNC" and [down-arrow symbol]
Upper right button: "ESC"
Lower right button: "ENT"

The single LED annunciators on the Front Panel Bracket are labeled ALM2, ALM1 and FAULT.

1.1 Display Function

The 4-character display on the front panel is provided the user to monitor and modify the configuration settings of the FM and to see the status of communications between the FM and SSC modules. While idle, this display shows the Modbus Address or ID of the FM module. The user can quickly see if a prevailing Fault alarm is due to communications faults with any one or more SSC modules through this display. The FM's display does not allow the user to see individual SSC data; for that, the user should go to the SSC module and access such data from the individual module.

1.2 Alarm Functions

The alarm configuration for each SSC can be individually set through the front panel of the individual SSC module. Instructions for settings of the Mod10C are in the Instruction Manual for the Mod10C.

[1] Components F1 and F4 are removed from the Mod10C assembly to make an FM assembly.

The SSC settings cannot be monitored nor can they be changed through the FM operator interface. The FM has its own Alarm configuration and function. The FM takes the alarm conditions from its group of slave SSC modules and performs a logical-OR to accumulate a residual alarm state. That is, if any alarm state is ON, the logical-OR of alarms will result in that alarm being ON in the FM. The FM only evaluates the alarm status given by each SSC. The FM does not evaluate the concentration value – the SSC module compares concentrations values against Setpoint thresholds and reports the alarm state via Modbus. The FM local alarm state, being the logical-OR of the SSC alarm states, is displayed on the individual LED annunciators on the FM front panel.

The Modbus Communications between the FM and each SSC whose Modbus Address is less than or equal to the Number of Slaves, must be valid or a communications fault will result. SSC Communications Faults are also Logical-ORed with all the other SSC alarms.

Given the logical-OR result, the resultant alarms can be configured for application to the local on-board relays (on-board the FM board) to be either enabled or disabled for each of: latching, energized or silenceable.

1.2.1 Latching or Non-Latching Relays

All alarm relays: Alarm 1, Alarm 2, and Fault, can be programmed as Latching or Non-Latching. If an alarm is programmed to Latch, its corresponding relay and LED Indicator, once activated, will stay activated, until reset, even if the alarm report from the SSC Slave "clears". If an alarm is programmed as Non-Latching, the alarm will not remain activated if the alarm report from the SSC Slave clears.

To configure an FM alarm relay, note that this is a separate configuration from the individual SSC alarm relay configurations, which may be individually set per SSC module.

Latched alarms do not automatically reset when the alarm clears. The function of resetting latched alarms is described in the section on Alarm Reset.

1.2.2 Energized or Non-Energized Relay Coils

All alarm relays (Alarm 1, Alarm 2, and Fault) can be programmed as normally Energized or normally De-Energized. The standard setting for alarms is De-Energized but a relay can be programmed as Energized to provide application-specific features. For De-Energized relays, the coil will energize in an alarm state so that a Normally Open contact on the relay will close upon alarm. The opposite is true for Energized relays. The utility of Energized relay coils is that, if power is lost, the normally closed contact having been held open by the energized coil, will close. Therefore, loss of power or an unplugged card is distinguishable from lack of alarm.

To configure an FM alarm relay, note that this is a separate configuration from the individual SSC alarm relay configurations which may be individually set per SSC module.

The default setting for the Fault alarm relay is Energized and is so for the purpose of wiring the Normally Closed contact of the Fault alarm relay into a Fault Circuit that will indicate a fault if power is lost to the FM or if the FM is unplugged from its slot.

1.2.3 Silenceable or Non-Silenceable

The terminology "to acknowledge an alarm" is synonymous with the terminology "to silence an alarm". All Alarms (Alarm1, Alarm 2, and Fault) can be programmed as Silenceable or Non-Silenceable. When an alarm is programmed as Silenceable, the setting allows the alarm(s) to be silenced even during an alarm condition.

To silence an FM alarm relay, note that this is a separate configuration from the individual SSC alarm relay configurations which may be individually set per SSC module.

An alarm relay output may be silenced if it is Silenceable and by following the Alarm Acknowledge or Alarm Silence procedure described under the Alarm Acknowledge section that follows.

1.2.4 Alarm Reset

There is a Reset pushbutton on the FM front panel and there is also a signal input to the FM via the backplane where an external switch can be connected. The switch should be a dry contact to Mod 10 DC common. When the Reset pushbutton or the external reset signal is momentarily activated the FM accepts the reset to be evaluated before turning off any latched alarms. For the case of a Reset being issued from the FM's front panel pushbutton, if any latching alarms are Latched, the front panel display will scroll the text: "**Reset Alarms?"** In response to this query, the "ENT" pushbutton should be pressed to acknowledge the reset. In response to the acknowledgement, the front panel display scrolls the text: **"Reset DONE".** The latched relay does not turn off unless the alarm condition reported from the SSC Slave has cleared.

The external reset does not have a displayed-acknowledge feature and when the FM senses that the external reset signal is momentarily activated, the FM scrolls a text message on its front panel display: **"Ext Alm Rst".**

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Alarm Acknowledge (Silence)

Alarms that are configured as Silenceable may be silenced or acknowledged. That means that the relay output on the FM for the alarm may be made to de-activate even though the alarm condition is still present. If an alarm goes away and comes back, the relay will activate again. Acknowledgement only silences the relay output for the duration until the alarm reappears.

There is a front panel pushbutton on the FM that is provided for two functions: one is that the pushbutton is the Down Arrow button; the other function is to silence alarms. The button has a legend for the down arrow and also with "SLNC". When an alarm occurs, the "SLNC" pushbutton can be pressed, followed by the acknowledging the **"Silence Alarms?"** scrolling display by pressing the "ENT" pushbutton.

1.3 Fault Circuit Functions

The FM Fault relay output is, as are the FM Alarm relay outputs, independent of the individual SSC relay outputs. The FM Fault state is the Logical-OR of all the SSC modules being scanned, that is up to and including slave Modbus address "Number of Slaves".

The Fault state is the Logical-OR of the reported fault state from the SSC module and the Communications Fault state of the same module. If the SSC module fails to communicate, the Communications Fault state becomes true and the FM Fault will go true to indicate that an SSC module is not communicating. The FM allows for a certain amount of communications message failures before setting the Communications Fault but one good communications with the SSC module will reset the Communications Fault state.

The description of the cause of SSC Fault state (other than Communications Fault) is to be found in the 10C instruction manual.

1.4 RS-485 Modbus to SSC Slaves

Reference Modbus Register assignments per 10B/10C

The 10C Modbus register definition defined per legacy of the 10B Modbus registers. The following table defines the five 16-bit Modbus registers of data available, using function code 3. There are no other functions or registers available on the Model 10 at this time of writing and for the purposes of this specification; this is the sum of all Model 10 data available to the facilities module.

Register	FC	Name
40000	3	RANGE
40001	3	CONCENTRATION READING
40002	3	ALARM1 SETPOINT
40003	3	ALARM2 SETPOINT
40004	3	(not used – ignore)
40005	3	STATUS BITS

REGISTER 40005 STATUS IN UPPER BYTE							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**
			Test Mode				

REGISTER 40005 STATUS BITS IN LOWER BYTE							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
A2=Desc	A2=Latchg	Alarm2	A1=Desc	A1=Latchg	Alarm1	F=Latchg	Fault

1.5 RS-485 Modbus to Host

The Modbus Register assignment as available to the Modbus Master Host communicating with the FM on serial channel 2 is given in this section.

The first 64 registers provide the state of each Mod10 SSC module's concentration reading and status. The Host can get the whole group of data from one poll of the FM by getting these registers 40000 through 40063.

Modbus Register assignment.

Register	FC	Name	Description
40000 40001	3	Concentration Status bits	Slave 1: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40002 40003	3	Concentration Status bits	Slave 2: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40004 40005	3	Concentration Status bits	Slave 3: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40006 40007	3	Concentration Status bits	Slave 4: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40008 40009	3	Concentration Status bits	Slave 5: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40010 40011	3	Concentration Status bits	Slave 6: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40012 40013	3	Concentration Status bits	Slave 7: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40014 40015	3	Concentration Status bits	Slave 8: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40016 40017	3	Concentration Status bits	Slave 9: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40018 40019	3	Concentration Status bits	Slave 10: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40020 40021	3	Concentration Status bits	Slave 11: Concentration and Status (Fault, Alarm 1, Alarm 2 status)

40022 40023	3	Concentration Status bits	Slave 12: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40024 40025	3	Concentration Status bits	Slave 13: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40026 40027	3	Concentration Status bits	Slave 14: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40028 40029	3	Concentration Status bits	Slave 15: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40030 40031	3	Concentration Status bits	Slave 16: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40032 40033	3	Concentration Status bits	Slave 17: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40034 40035	3	Concentration Status bits	Slave 18: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40036 40037	3	Concentration Status bits	Slave 19: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40038 40039	3	Concentration Status bits	Slave 20: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40040 40041	3	Concentration Status bits	Slave 21: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40042 40043	3	Concentration Status bits	Slave 22: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40044 40045	3	Concentration Status bits	Slave 23: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40046 40047	3	Concentration Status bits	Slave 24: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40048 40049	3	Concentration Status bits	Slave 25: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40050 40051	3	Concentration Status bits	Slave 26: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40052 40053	3	Concentration Status bits	Slave 27: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40054 40055	3	Concentration Status bits	Slave 28: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40056 40057	3	Concentration Status bits	Slave 29: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40058 40059	3	Concentration Status bits	Slave 30: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40060 40061	3	Concentration Status bits	Slave 31: Concentration and Status (Fault, Alarm 1, Alarm 2 status)
40062 40063	3	Concentration Status bits	Slave 32: Concentration and Status (Fault, Alarm 1, Alarm 2 status)

The Modbus Master Host should obtain the Number of Slaves from register 41001 so that it only polls registers up to the last Slave in the FM's group of SSC modules.

In large configurations, to get the best reporting time at the expense of more complex programming in the Host, the FM offers a Report By Exception (RBE) scheme.

The RBE scheme does not have to be implemented or it can be implemented at a couple of complexity levels. The least complex RBE scheme is to poll COS registers 41002 and 41003 and only poll registers at 40000 if

the COS registers indicate a change, and then poll for all the 40000 data registers. Then write zero to the COS registers.

A more complex RBE scheme is to only poll the registers, in response to COS bit indications, that have changed since they probably change only one at a time. Then acknowledge by writing the COS image back to the respective COS register; ie: a bit is set to 1 in the bit position where it is desired to reset an existing 1 bit.

This method reduces the Modbus traffic between the Host and an FM to be only a request for COS registers and occasional read and acknowledge of changed data values. It is important that the Deadband value is set reasonably. If set to 1, any change in concentration will register a COS bit =1. If set to 3, the concentration will have to change by 3 counts to cause a COS bit = 1.

41001	3	Number Of Slaves	Read the number of Mod10 Slaves (0 – 32) (set through Operator Interface)
41002	3/6	COS Word 1-16	Read Change of State on first 16 slaves. Acknowledge COS on first 16 slaves.
41003	3/6	COS Word 17-32	Change of State on next 16 slaves. Acknowledge COS on next 16 slaves
41004	3/6	Global Deadband	Concentration change from Last Reported Value for COS, global for all 32 slaves.
41005	3	Local Alarm/Fault Status	The FM produces a Logical-OR of the alarm/fault status of each slave for the FM relays and annunciators except from those in Test Mode.

REGISTER 41005 STATUS BITS							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	A2=Latchg	Alarm2		A1=Latchg	Alarm1	F=Latchg	Fault

2.0 Operator Interface

The Operator Interface to the FM consists of the Front Panel bracket indicators, display and pushbuttons.

The default state of the character display is called “Normal Operation” and consists only of indicating the FM’s Modbus Address on the serial channel 2 Modbus line to a Modbus Master Host. While in the Normal Operation Mode and by pressing the ESC pushbutton, a report of any bad communications with slaves will be displayed. By pressing the ENT key momentarily a list of set parameters shall be presented on the display. The display of the status of programmed parameters is called “Program Status”.

To go to Program Mode, whereupon configurations can be monitored or changed, the ENT key must be pressed and held down for at least three seconds, and upon release, the Program Mode begins.

While in the Normal Operation mode, and while there are alarms to be reset or silenced, the pushbuttons labeled “RESET” and “SLNC” may be used for such purpose.

2.1 Normal Operation

While in Normal Operation of the Operator Interface, on the character display of the front panel is visible the RTU ID, also known as Modbus Address, of this FM.

If the Fault LED indicator is lit on the front panel, there may be some SSC modules that are not communicating if the fault is not due to a fault on any individual SSC module. To see if there exists a communications fault or faults, press the ESC pushbutton. In response to pressing the button, the display will scroll "**Comm Faults:**" and then this will be followed by further scrolling either a list of Slave IDs of SSC slaves that are not communicating, or will be followed with **"None.".**

If there is a list of Communications Faults that indicate several bad SSC modules, check to make sure that the Number of Slaves is not set to a number larger than the number of SSC modules to be grouped with this FM. Other reasons for Communications Faults could be that the individual SSC Modbus Addresses are not unique or are not within the range of numbers between 1 and "Number Of Slaves", or that the Channel 1 serial port Modbus A and B signals are not wired to all of the SSC modules.

While in the Normal Operation mode, and in response to momentarily pressing the ENT pushbutton, the FM will list off the status of programmed values. This is called "Program Status" and is evident in response to the pushbutton when the display scrolls the text "PR STATUS" and if the ENT pushbutton is momentarily pressed again, the FM will list off the status of programmed items.

2.2 Program Mode

Program Mode is accessed while in the Normal Operation Mode by pressing the ENT pushbutton and holding it down for a few seconds. Upon release, the display should indicate that the FM is in Program Mode by displaying the first setting option "NUM SENSORS SET". The variables that can be set are explained in the section on Program Mode. Return to the Normal Mode is automatic given a timeout due to inactivity, or may be explicitly accessed through repeated pressing of the ESC pushbutton.

3.0 Normal Operation

3.1 Display Modbus Address

Normally, the FM displays its Modbus Address. This is the hexadecimal number used for the RTU ID by the Modbus Master to address this particular FM Slave on serial channel 2.

3.2 Display Slave Addresses in Fault

Prompted by a momentary press of the ESC pushbutton, the FM will display which SSC modules are not communicating, if any. This display will show "Comm Faults:" followed either by the word "None" or by a list of Slave ID numbers in Hexadecimal, one at a time, for each non-reporting SSC. The end of the list is indicated with "****" on the display before it returns to showing the Modbus Address of this FM

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3.3 Display Program Status Summary

While in the Normal Operation mode, and in response to momentarily pressing the ENT pushbutton twice, the FM will list off the status of programmed values. This is called "Program Status" and is evident in response to the pushbutton when the display scrolls the text "PR STATUS" and if the ENT pushbutton is momentarily pressed again, the FM will list off the status of programmed items.

Lamp Test
Number of Sensors
Alarm 1
LT= 0/1
EN=0/1
SL=0/1
Alarm 2
LT= 0/1
EN=0/1
SL=0/1
Fault
LT= 0/1
EN=0/1
SL=0/1
Modbus Address = 01 – FF
F/W Version Vx.xx
Checksum CS=xxxx
Code Top CT=xxxx

4.0 Program Mode

Press the ENT pushbutton, hold it in for at least three seconds and release it. This puts the FM operator's interface in the "Program Mode". The display will scroll the first item in the list of programmable items: "Num of Sensors Set" and the desired item may be acquired using the UP and DOWN pushbuttons. Navigation through the Program Mode is achieved through use of the ENT pushbutton, the ESC pushbutton, and the UP and DOWN pushbuttons.

4.1 Set Number of SSC Slaves

The display scrolls "Num Sensors Set" to indicate it is ready to show or change the setting. Press ENT again and the display will indicate a flash a number on and off indicating a value between 01 and 32. The flashing indicates the value can be changed with the UP and DOWN pushbuttons. Using the UP and DOWN pushbuttons, a value can be set between 1 and 32. If the ESC key is pressed or if too much time goes by before pressing the ENT pushbutton, the value is not changed. To change the value, the ENT pushbutton must be pressed while the value is flashing.

The Number of Sensors should be equal to the number of SSC modules to be scanned by the SSC and there should be that many plugged onto the backplane and receiving Modbus signals from the FM. The individual Modbus Addresses must be uniquely set within this range of numbers.

The FM polls the Slave SSC modules from 01 up to Number Of Sensors in ascending order and any SSC that does not properly respond will cause a Fault indication on the FM.

4.2 Alarm 1, 2 and Fault Set

The Alarm 1 Set, Alarm 2 Set and Fault Set items in the Program Mode all act the same. By pressing the ENT pushbutton, the choices of Latching, Energized, Silenceable may be selected and with use of the arrow keys, the selection may be changed. The ESC pushbutton may be used to go back or abort and the ENT key is used to accept the flashing selection so that it is the new set value.

4.2.1 Latching

The Latching selection is indicated with "LT=x" in the display where "LT=0" for Latching is OFF and "LT=1" for Latching is ON.

4.2.2 Energized

The Energized selection is indicated with "EN=x" in the display where "EN=0" for Energized is OFF and "EN=1" for Energized is ON.

4.2.3 Silenceable

The Silenceable selection is indicated with "SL=x" in the display where "SL=0" for Silenceable is OFF and "SL=1" for Silenceable is ON.

4.3 Modbus Address Set

The Modbus Master communicates with the FM on serial channel 2 for which the FM needs to have assigned an RTU ID or Modbus Address. The display shows "MODBUS SET" for this item. If the ENT pushbutton is pressed, the display shows the Modbus Address for example: "_01_". The value is flashing to indicate it may be changed and by using the up and down arrow keys, followed by pressing the ENT pushbutton while the value is flashing, the new value can be set. Notice that the Modbus in given in Hexadecimal or base-16 numbers. For instance, address 15 in base 10 is indicated with "_0F_" in the display. The ESC pushbutton can be used to escape, backup, or abort or with no further action the display will timeout.

5.0 Default Settings

Settings are saved in non-volatile flash memory but are initially set to the following values.

Number of Sensors = 1
Alarm 1, Alarm2 = Non-Latching, Non-Silenceable, Non-Energized
Fault = Non-Latching, Non-Silenceable, Energized
Modbus ID = 01
Channel 1 Settings = 9600 Baud, 8, N, 1 (not adjustable)
Channel 2 Settings = 9600 Baud, 8, N, 1 (not adjustable)

6.0 Specifications

Input Power	9VDC to 28VDC, 100mA maximum (TBD)
Operating Temperature	-40deg to +70degC
Humidity:	10 to 95% Non-condensing
Inputs/Outputs:	Channel 1 Serial Communications RS485 Modbus Channel 2 Serial Communications RS485 Modbus
Relays	
Relay Contact Terminations:	Common, Normally Open, and Normally Closed Three Relays on board
Relay Contact	Specification per Manufacturer:
Resistive Load:	5A, 250VAC; 2A, 30VDC
Inductive Load:	2A, 250VAC; 2A, 30VDC
Maximum Operating Current:	5A
Alarm/Fault Alarm Timing:	Alarms are reported to relays and LED annunciators as soon as they appear over Modbus from the Slave SSCs. Report time for all Mod10C slaves is about 32 Slaves per second.
Warranty:	One year. Five year fixed fee service policy.

7.0 Model 10C Backplane Pinouts

Note that the RS485 Channel 1 is used for the Model 10 Single Sensor Controller to communicate as a Slave to a Master Host. If the Facilities Module is used, then the Master Host is the Facilities Module, connected from its Channel 1 RS485 to the SSC Channel 1 RS485.

MODEL 10C BACKPLANE PINOUT			
A1	ALARM 1 N.O. CONTACT	C1	ALARM 2 CONTACT COMMON
A2	ALARM 1 N.C. CONTACT	C2	ALARM 2 CONTACT N.C.
A3	ALARM 1 CONTACT COMMON	C3	ALARM 2 CONTACT N.O.
A4	FAULT OPEN COLLECTOR	C4	FAULT CONTACT COMMON
A5	RS485-A, CHANNEL 1	C5	FAULT CONTACT N.C.
A6	RESET INPUT ACTIVE LOW	C6	FAULT CONTACT N.O.
A7	RS485 SHIELD	C7	CURRENT LOOP (4-20MA) OUT
A8	RS485-B, CHANNEL 1	C8	CURRENT IN (4-20MA) IN
A9	ALARM 1 OPEN COLLECTOR	C9	(NOT CONNECTED)
A10	SENSOR POWER RETURN	C10	SENSOR POWER +
A11	SENSOR POWER RETURN	C11	SENSOR POWER +
A12	SENSOR POWER RETURN	C12	SENSOR POWER +
A13	ALARM 2 OPEN COLLECTOR	C13	(NOT CONNECTED)
A14	POWER IN RETURN	C14	POWER IN +
A15	POWER IN RETURN	C15	POWER IN +
A16	POWER IN RETURN	C16	POWER IN +

8.0 Model 10 Facilities Module Backplane Pinouts

Note that the RS485 Channel 1 is used by the FM to communicate to Modbus Slave devices: namely, MOD 10 SSC modules. Note that RS485 Channel 2 is wired to pins C7 and C8, for RS485 signals A and B, respectively. This second channel is the connection to the Master Host for the Facilities Module, on which the FM is a Modbus Slave device.

The hardware difference between an FM and a 10C module is that the FM has removed the fuse components that connect the Current Loop Input and Current Loop Output to the connector pin (note components F1 and F4 are removed), and also the front panel for the FM has installed a mini-USB connector.

MODEL 10C BACKPLANE PINOUT			
A1	ALARM 1 N.O. CONTACT	C1	ALARM 2 CONTACT COMMON
A2	ALARM 1 N.C. CONTACT	C2	ALARM 2 CONTACT N.C.
A3	ALARM 1 CONTACT COMMON	C3	ALARM 2 CONTACT N.O.
A4	FAULT OPEN COLLECTOR	C4	FAULT CONTACT COMMON
A5	RS485-A, CHANNEL 1	C5	FAULT CONTACT N.C.
A6	RESET INPUT ACTIVE LOW	C6	FAULT CONTACT N.O.
A7	RS485 SHIELD	C7	RS485-A, CHANNEL 2
A8	RS485-B, CHANNEL 1	C8	RS485-B, CHANNEL 2
A9	ALARM 1 OPEN COLLECTOR	C9	(NOT CONNECTED)
A10	SENSOR POWER RETURN	C10	SENSOR POWER +
A11	SENSOR POWER RETURN	C11	SENSOR POWER +
A12	SENSOR POWER RETURN	C12	SENSOR POWER +
A13	ALARM 2 OPEN COLLECTOR	C13	(NOT CONNECTED)
A14	POWER IN RETURN	C14	POWER IN +
A15	POWER IN RETURN	C15	POWER IN +
A16	POWER IN RETURN	C16	POWER IN +

Appendix C

Revision History

Revision	Date	Changes made
0.0	05/15/10	Original Release.