PARAGON CONTROLS INCORPORATED

RPM-2000

Guardian Remote Pressure Monitor

Operation & Maintenance Manual

Engineered for accuracy, applicability, durability and simplicity

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1. INTRODUCTION

1.1. BASIC OPERATION

The RPM is a remote pressure monitor and alarm display panel designed for monitoring differential pressure and alarm data from up to 24 Micro Guardian and or Guardian Infinity units. The RPM communicates to all 24 devices through a dedicated RS-485 port using BACnet® protocol. This user manual provides information on product features and guides you through all the basic functionality of the RPM.

1.2. SAFETY

1.2.1. Electrical Connections

Before any electrical connections are made, ensure the **POWER SWITCH** is in the **OFF** position.

1.2.2. Static Electricity

The circuit board contains components which are susceptible to damage caused by static electrical discharge. Should it be necessary to remove the circuit board from the enclosure, appropriate precautions must first be taken to ensure that the operator and the circuit board are at the same electrical potential.

2. HARDWARE CONFIGURATION

The Remote Pressure Monitor has a Graphical LCD display and LED board to indicate the alarm status of up to 24 Rooms. The RPM and Guardian Infinity have the same PCB design. Only the components that are used for the RPM are installed.

2.1. RPM FRONT PANEL & PCB OVERVIEW

2.1.1. Front Panel and Wall Box Dimensions

Refer to the below table and Figures 2.0 and 2.1 for the RPM front panel and wall box dimensions.

Dimension	1 to 6 Rooms		7 to 12 Rooms		13 to 18 Rooms		19 to 27 Rooms	
	in	mm	in	mm	in	mm	in	mm
A	11.5000	292.1000	11.5000	292.1000	11.5000	292.1000	11.5000	292.1000
B	13.6250	346.0750	13.6250	346.0750	13.6250	346.0750	13.6250	346.0750
C	9.5000	241.3000	11.5000	292.1000	13.5000	342.9000	15.5000	393.7000
D	11.6250	295.2750	13.6250	346.0750	15.6250	396.8750	17.6250	447.6750
E	10.6875	271.4625	12.6875	322.2625	14.6875	373.0625	16.6875	423.8625
F	3.3125	84.1375	3.3125	84.1375	3.3125	84.1375	3.3125	84.1375
G	5.3750	136.5250	5.3750	136.5250	5.3750	136.5250	5.3750	136.5250
H	5.3750	136.5250	5.3750	136.5250	5.3750	136.5250	5.3750	136.5250
I	0.1875	4.7625	0.1875	4.7625	0.1875	4.7625	0.1875	4.7625
J	12.5625	319.0875	12.5625	319.0875	12.5625	319.0875	12.5625	319.0875

RPM FRONT PANEL

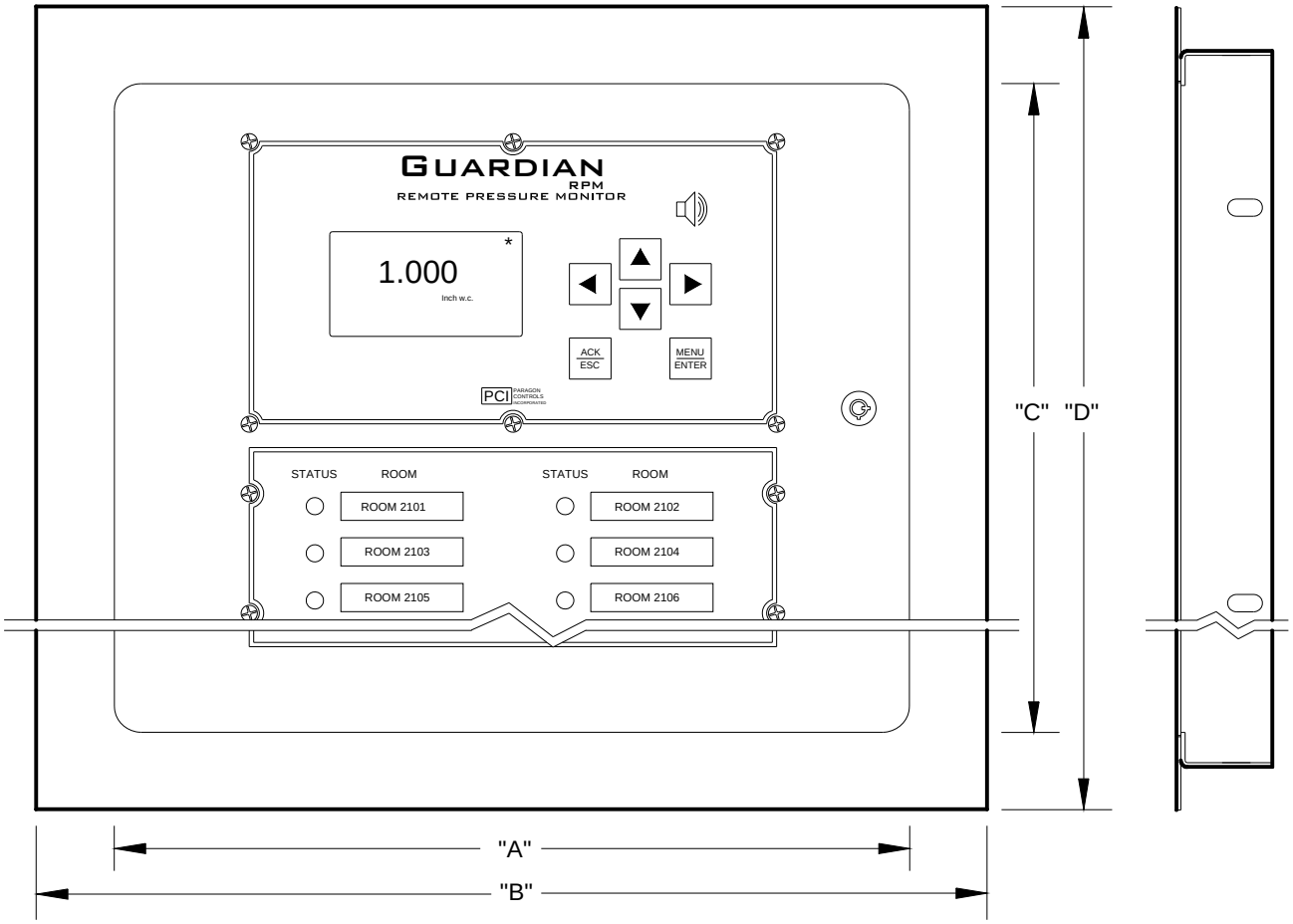


FIGURE 2.0

FLUSH MOUNT ELECTRICAL BOX

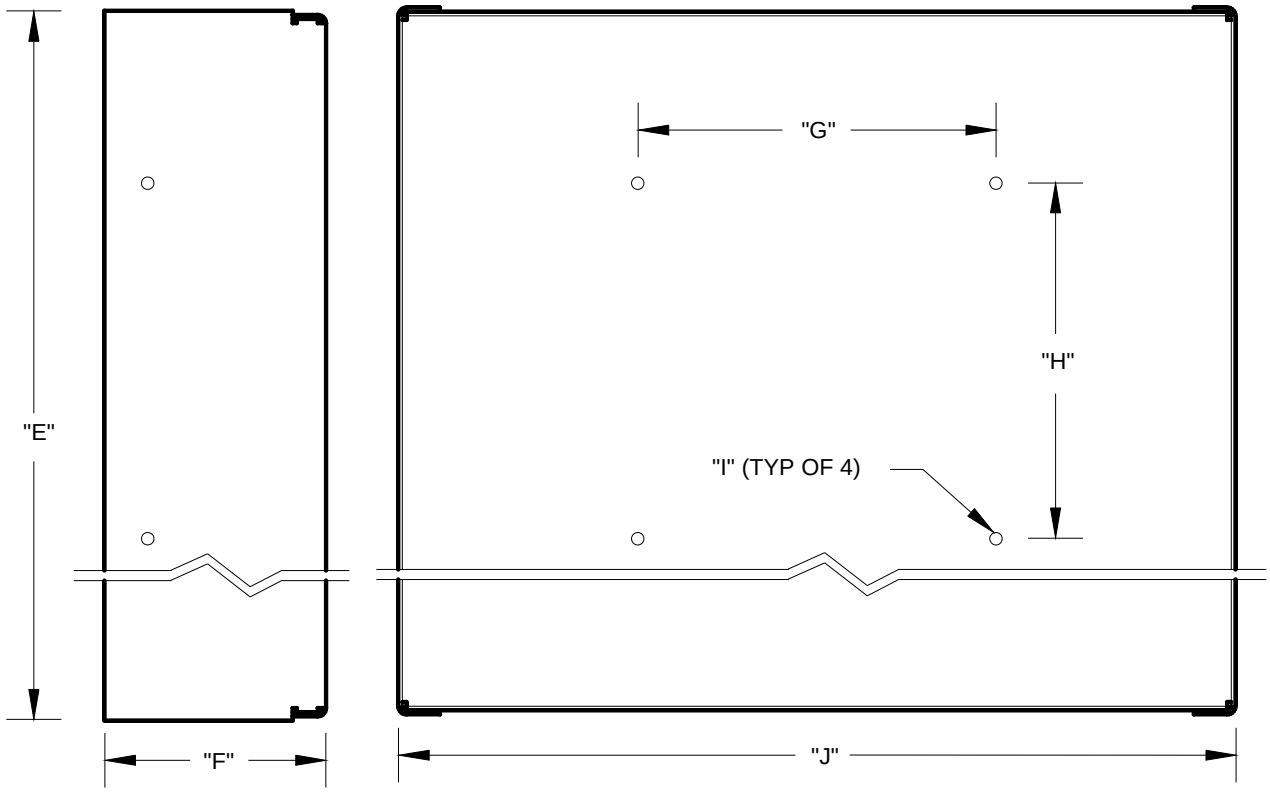


FIGURE 2.1

2.2. RPM / SPM-3000 / SPM-4000 BOARD LALYOUT & CONNECTION

2.2.1. RPM_2000 BOARD LAYOUT & CONNECTION CODE

To connect the RPM-2000 to a device (SPM-3000 or SPM-4000), attach the network wires to J3 Pin 37 (Data B+) and Pin 38 (Data A-). Refer to the drawing below for connector location.

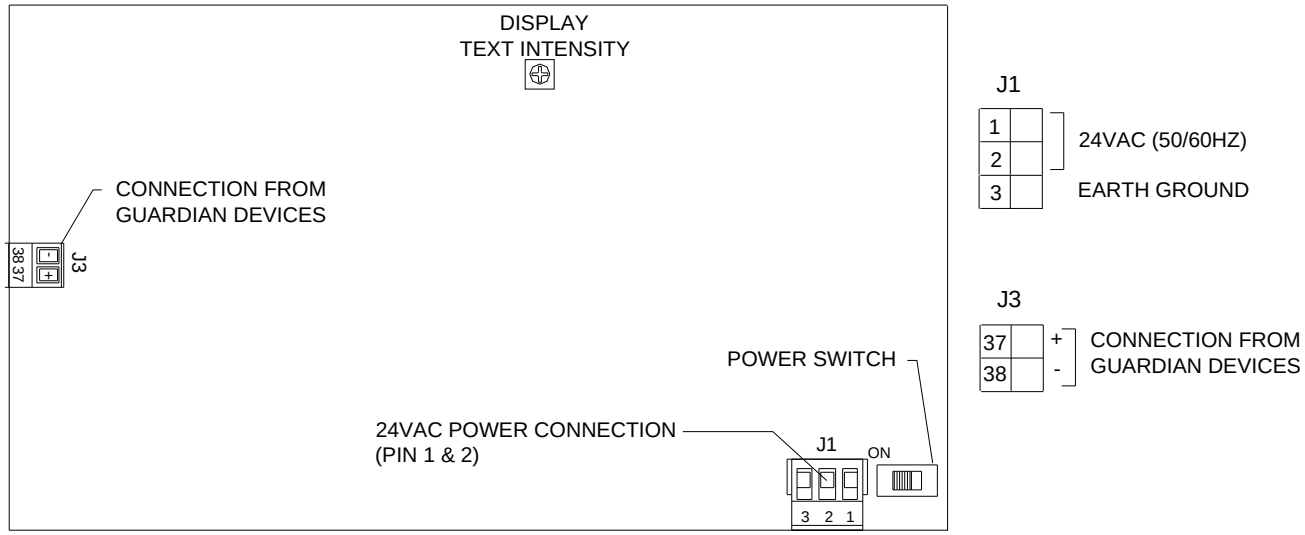
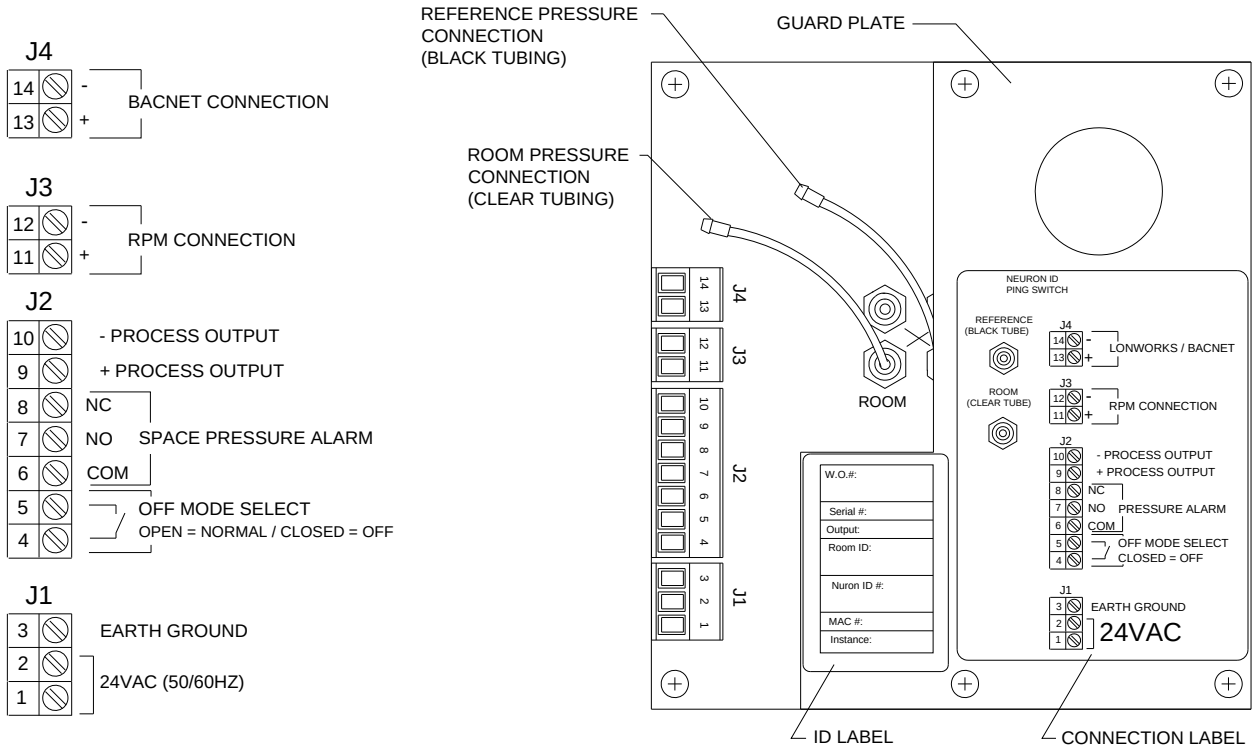


FIGURE 2.2

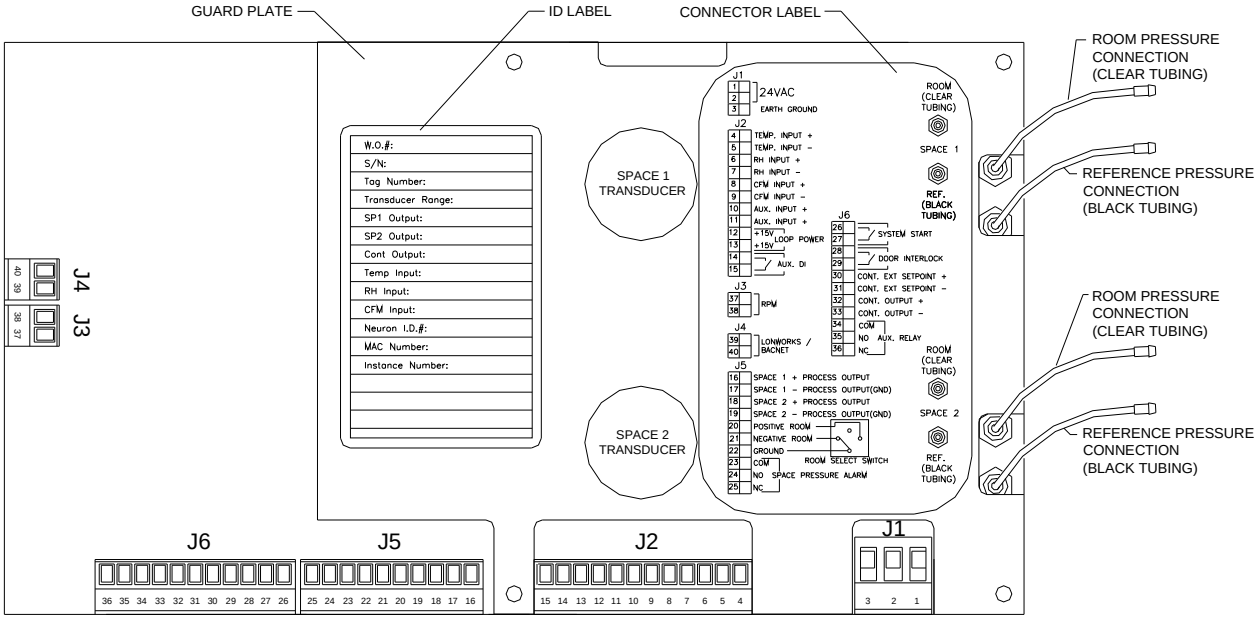
2.3. SPM-3000 MICRO GUARDAIN BOARD LAYOUT & CONNECTION

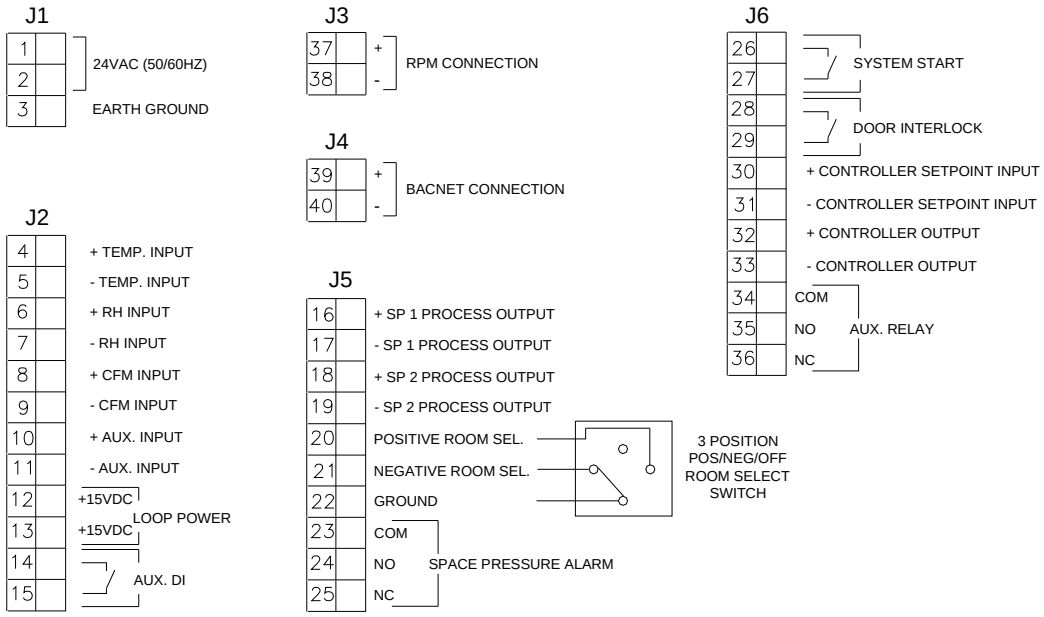
To connect the Micro Guardian to the RPM-2000, attach the network wires to J3 Pin 11 (Data B+) and Pin 12 (Data A-). Refer to the drawing below for connector location.



2.4. SPM-4000 GUARDIAN INFINITY BOARD LAYOUT & CONNECTION

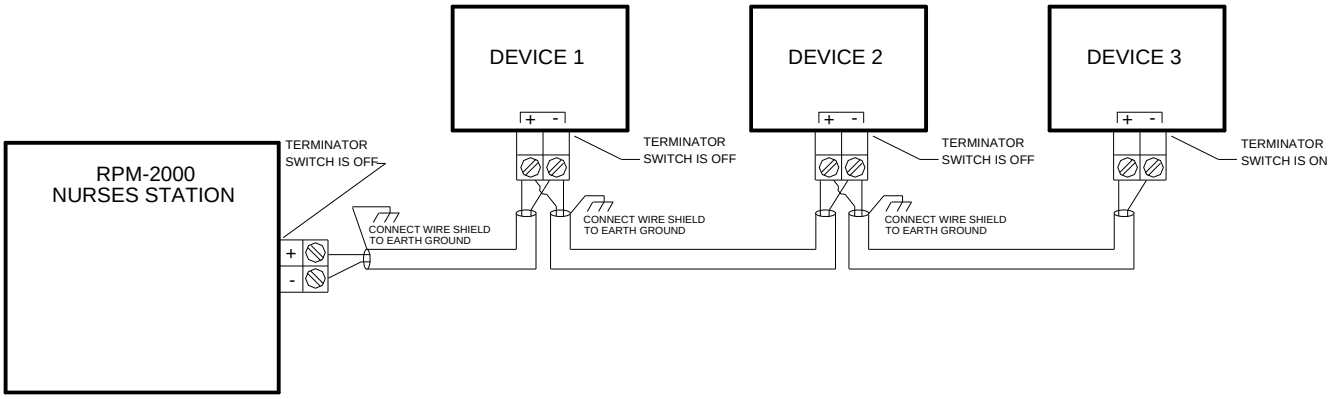
To connect the Guardian Infinity to the RPM-2000, attach the network wires to J3 Pin 37 (Data B+) and Pin 38 (Data A-). Refer to the drawing below for connector location.





2.5. RPM-2000 & DEVICE NETWORK CONNECTIONS

(Note: Recommended network wire should be low capacitance, shielded 22 or 24 AWG twisted pair with PVC jacket such as Belden Part numbers 9841, 3105A or equivalent).

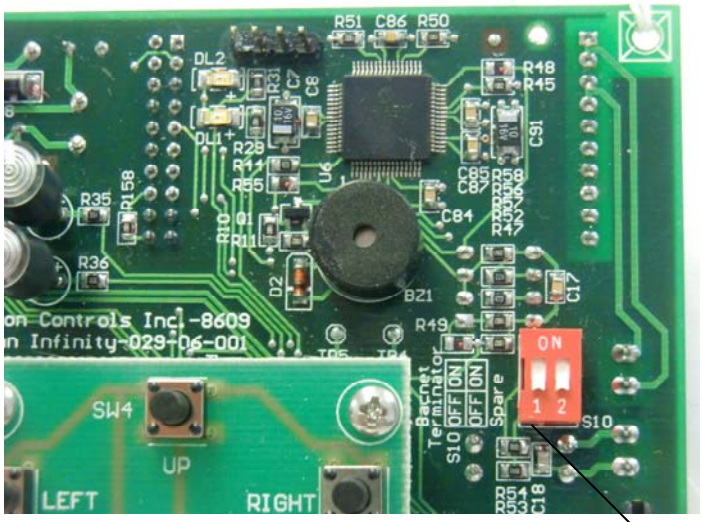


2.6. RPM-2000 & DEVICE TERMINATOR SWITCH LOCATIONS

For proper RPM-2000 operation, the last device (SPM-3000 or SPM-4000) on the trunk should have the terminator switch in the ON position. All other devices should have the terminator switch in the OFF position. The terminator switch is located on the front side of all devices. See pictures below for SPM-3000, SPM-4000 and RPM-2000 termination switch location.

SPM-3000 terminator switch location (S1 / 2)

SPM-4000 & RPM-2000 terminator switch location (S10 / 1)



S10 / 1

2.7. HARDWARE SPECIFICATIONS OF INPUTS AND OUTPUTS

2.7.1. Power Input

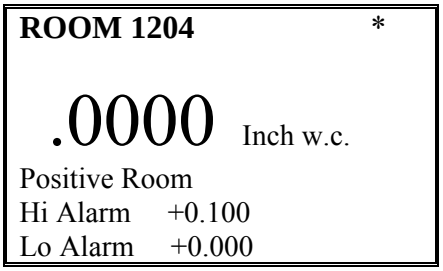
The power input requirement is 20-28VAC at 50-60Hz. Line power is connected to input socket (J1). The unit has an isolated DC-DC converter, which creates electrical isolation between the power input and the unit.

2.7.2. Guardian Device Network Input

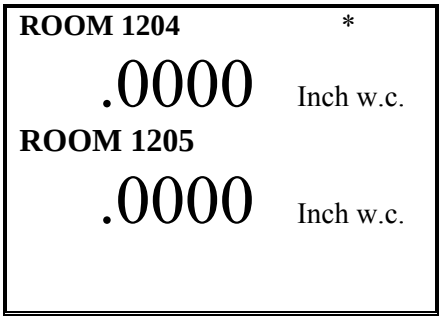
The RPM utilizes BACnet® protocol to communicate with up to 24 Micro Guardians and or Guardian Infinities.

2.7.3. LCD

The 128x64 Graphical LCD display used in the RPM indicates pressure, engineering units, operating mode, alarm setpoints and setup menus.



Single Room Display



Dual Room Display

2.7.4. Buzzer

An 85dB (max), 40mA buzzer is used to provide an audible alarm. The audible alarm has three sound options, continuous (ON), interval (Beep) and OFF. They are selected through the Audible Alarm menu (see Sections 3.4 or 3.12).

2.7.5. LED's

The RPM has individual bi-color LED's indicating each room's alarm status. A green LED indicates normal room pressure and a red LED indicates an alarm condition.

Note: Pressing the Alarm Acknowledge (ACK) button changes the status LED from blinking to a steady ON state.

LED State	Operation State
Green On	Room in normal operation
Green Blink	Room goes into Alarm and returns to normal without pressing the ACK button
Red On	Room in Alarm state and user pressed the ACK button
Red Blink	Room in Alarm state without pressing the ACK button

2.7.6. Buttons & Switches

The RPM unit has a 6 button keypad that is used for menu navigation, data entering and alarm acknowledge. The Unit also has 4 switches and 3 jumpers. The functions are shown below:

2.2.6.1 Button Main Functions

Button	Button Function
UP	Menu Browser / Parameter Setting
DOWN	Menu Browser / Parameter Setting
LEFT	Parameter Setting
RIGHT	Parameter Setting
MENU/ENTER	Menu Browser / Parameter Setting
ESC/ACK	Menu Browser / Alarm Acknowledge

2.2.6.2 Switch Functions

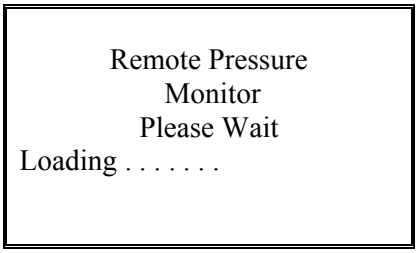
Switch	Function
S2 (Slide switch)	Unit Power On/Off
S1.1(Dip switch)	BACnet® RS-485 Termination On/Off
S1.2(Dip switch)	Not Used

(Note: Switch S1.1 in the ON position adds a 200 ohm resistor across the BACnet® terminal for noise suppression when long wire lengths are required).

3. DISPLAY MENUS

3.1. POWER UP DISPLAY

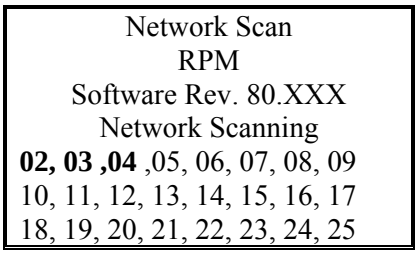
Power Up menu displays identifies the software loading process.



3.2. POWER UP DEVICE POLLING

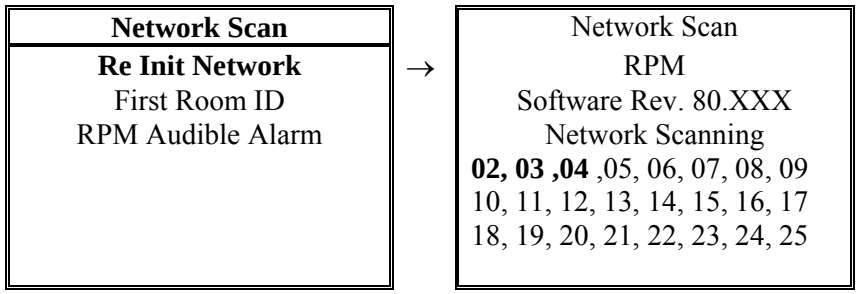
After displaying the software revision, the RPM will automatically poll the network and determine how many devices are attached and whether they are Micro Guardian and or Guardian Infinity. The RPM can acknowledge up to 24 devices. The devices that are acknowledged by the RPM will be shown in **bold**.

Pressing the ENTER button at any time will stop the polling process. The devices already acknowledged will be available for monitoring.



3.3. MANUAL DEVICE POLLING

Network device polling can be performed by depressing the MENU/ENTER button for 3 seconds. Press the ENTER button again to activate the scan sequence. While polling, pressing the ENTER button at any time will stop the polling process. The devices already acknowledged will be available for monitoring.



3.4. FIRST ROOM ID

The user can enter the starting MAC address number for the devices attached to the network. Each device attached to the RPM must have a unique MAC address otherwise conflicts will occur during polling.

Network Scan
Re Init Network **First Room ID** RPM Audible Alarm

→

First Room ID
(Range from 2 to 254) (2)

3.5. RPM AUDIBLE ALARM

The RPM Audible Alarm menu allows the user to disable the audible alarm without entering a password.

Network Scan
Re Init Network First Room ID **RPM Audible Alarm**

→

RPM Audible Alarm
(OFF/ON/BEEP) (OFF) Press Enter

3.6. ROOM SELECTION

To display and select a specific room, press and hold either the down (▼) arrow button or up (▲) arrow button for 3 seconds. Use the up (▲) and down (▼) buttons to select the room to display and press the ENTER button. The user can also display the next room in line by pressing the left (◄) or right (►) button.

Network Device Menu
Room 201
Room 202
Room 203
Room 204

3.7. FIELD SETUP & INITIAL PASSWORD MENU

To enter the Field Setup menu from the process display, the user will need to depress the UP (▲) / DOWN (▼) buttons simultaneously. The Field Setup password menu will appear. The initial password shipped from the factory is 00000.

Field Setup
Password (00000)

3.8. ENGINEERING UNITS

A list of engineering units are available for the user to select for display purposes to meet customer requirements. If the engineering units are changed, the change will effect all of the devices attached to the network.

Field Setup Menu		**Engineering Units**
Engineering Units	→	Inch w.c.
Field Password		Pa
Factory Password		KPa
Password Timeout		mm w.c.
Backlite Timer		
RPM Audible Alarm		
More Options <down>		

3.9. FIELD PASSWORD

The Field Password menu allows the user to enter a unique 5 digit numeric password. An error message will appear if the user does not enter the same password both times. The initial factory set password is 00000.

Field Setup Menu		**Field Password**		**Field Password**
Engineering Units				
Field Password	→	Enter Password	→	Verify Password
Factory Password		(00000)		(00000)
Password Timeout				
Backlite Timer		Press Enter		Press Enter
RPM Audible Alarm				
More Options <down>				

3.10. FACTORY PASSWORD

The Factory Password allows factory personal access to the factory menu.

Field Setup Menu
Engineering Units
Field Password
Factory Password
Password Timeout
Backlite Timer
RPM Audible Alarm
More Options <down>

→

Factory Password
Enter Password
(00000)
Press Enter

3.11. PASSWORD TIMEOUT

Password Timeout is the amount of time a user has after the last key stroke to make changes before the device will again request a Password to be entered. The default is 15 Minutes.

Field Setup Menu
Engineering Units
Field Password
Factory Password
Password Timeout
Backlite Timer
RPM Audible Alarm
More Options <down>

→

Password Timeout
(minutes)
(15)
Press Enter

3.12. BACKLITE TIMER

The Backlite Timer menu allows the user to control how long the backlite will remain on after a keypad button is pressed. Selection options will be 0 to 30 (0 = backlite on all the time and 1 to 30 represents the number of seconds until the backlite is turned off). The default is 0.

Field Setup Menu
Engineering Units
Field Password
Factory Password
Password Timeout
Backlite Timer
RPM Audible Alarm
More Options <down>

→

Backlite Timer
(0=On /30=Max.)
(00) sec.
Press Enter

3.13. RPM AUDIBLE ALARM

The RPM Audible Alarm menu allows the user to manually turn the audible alarm ON or OFF and select the audible alarm to be continuous or interval.

Field Setup Menu
Engineering Units
Field Password
Factory Password
Password Timeout
Backlite Timer
RPM Audible Alarm
More Options <down>

→

RPM Audible Alarm
(OFF/ON/BEEP)
(OFF)
Press Enter

3.14. OPERATING MODE SELECTION

The Operating Mode Selection menu allows the user to change the room being monitored from an Off room to a Positive room or a Negative room. Selection of an OFF room disables alarm status lights, process display alarm text, audible alarm and remote alarm relay.

Field Setup Menu	→	Room 1 Menu	→	Operating Mode
More Options <up>		**Operating Mode**		(OFF/POS/NEG)
Room 201		Audible Alarm		
Room 202		Alarm Values		(POS)
Room 203		Alarm Delay		
Room 204		Room Identifiers		

3.15. AUDIBLE ALARM

This Audible Alarm menu allows the user to manually turn the corresponding Guardian Infinity or Micro Guardian audible alarm ON or OFF.

Field Setup Menu	→	Room 1 Menu	→	Audible Alarm
More Options <up>		Operating Mode		(OFF/ON)
Room 201		**Audible Alarm**		
Room 202		Alarm Values		(OFF)
Room 203		Alarm Delay		
Room 204		Room Identifiers		

3.16. ALARM VALUES (NEGATIVE & POSITIVE)

The Alarm value menu allows the user to enter new negative or positive room alarm values. Menus shown below are for negative alarm value changes. For positive alarm value changes, select Space 1 Pos in the Alarm Values menu.

Field Setup Menu	→	Room 1 Menu	→	Alarm Values	→	Space 1 Negative
More Options <up>		Operating Mode				(Inch w.c.)
Room 201		Audible Alarm		**Space 1 Neg.**		
Room 202		**Alarm Values**		Space 1 Pos.		Low Alarm (+0.0000)
Room 203		Alarm Delay				
Room 204		Room Identifiers				High Alarm (-0.1000)

3.17. ALARM DELAY

The Alarm Delay menu allows a user to adjust the delay alarm time on an individual device from 0 to 9999 seconds.

Field Setup Menu	→	Room 1 Menu	→	Alarm Delay
More Options <up>		Operating Mode		0 to 9999 seconds
Room 201		Audible Alarm		
Room 202		Alarm Values		Space 1
Room 203		**Alarm Delay**		(30)
Room 204		Room Identifiers		

3.18. ROOM IDENTIFIER

Allows a user to add or modify a devices room identifier. The user has the option of entering up to 16 upper case alpha and numeric characters to identify Space 1 or optional Space 2. One character at a time will be entered, starting with the far left character.

Field Setup Menu	→	Room 1 Menu	→	Room Identifier	→	Room Identifier
More Options <up>		Operating Mode		**Space 1**		Space 1
Room 201		Audible Alarm				Identifier
Room 202		Alarm Values				
Room 203		Alarm Delay				(ROOM 201)
Room 204		**Room Identifiers**				Press Enter

4. RPM ROOM LABELS

4.1. LABEL MATERIAL

If additional labels are required, the recommended label material is 110lb heavy card stock. The color used by the factory is Ivory.

4.2. LABEL TEMPLATE

The individual label size for the RPM is: Label Area = 1.7" X 0.35 / Tab Area = 0.44" X 0.35".

Template

Label Area	Tab	Label Area	Tab	Label Area	Tab

5. TROUBLESHOOTING GUIDE

TROUBLESHOOTING TABLE	
SYMPTOM	**SOLUTION**
1. Status LED is not illuminated/LCD Display is Blank	1. Verify ON/OFF switch is in ON position (see Section 2.1.3).
	2. Verify correct input power and connection at connector J1 (see Section 2.1.3).
	3. Verify input power wire insulation has been properly removed and the wire fully inserted into the J1 power plug.
	4. Contact Factory Service Department.
2. Display characters are too dim or too dark	1. Open the access door and adjust Display Text Intensity potentiometer located at the top of the board (see Section 2.1.3).
	2. Contact Factory Service Department.
3. RPM display is reading incorrect pressure	1. Verify correct pressure at the corresponding Guardian.
	2. Verify the correct room is selected on the RPM.
	3. Contact Factory Service Department.
4. Audible Alarm not functioning but Red Alarm Status LED on the front panel is flashing	1. Verify Audible Alarm is turned ON in Audible Alarm Menu (see Sections 3.4 and 3.12).
	2. Contact Factory Service Department.
5. Red Alarm LED remains ON	1. Verify correct set up on corresponding Guardian
	2. Contact Factory Service Department.
8. Alarm Mode not functioning	1. Verify correct Operating Mode on corresponding Guardian (see Section 3.13).
	2. Verify alarm values on corresponding Guardian (see Section 3.15).
	3. Verify correct set up on corresponding Guardian
	4. Contact Factory Service Department.

TROUBLESHOOTING TABLE	
SYMPTOM	**SOLUTION**
10. RPM not communicating with any of the Guardian devices	1. Go to the "First Room ID" menu (see section 3.4) and verify default value is 2. If not, change value to 2 and perform a Manual Device Polling sequence (see section 3.3).
	2. Verify Guardian's do not have the same Instance Number and MAC code. Change to an unused Instance Number and MAC code.
	3. Swap wires on J3 pins 37 & 38 on the RPM.
	4. Contact Factory Service Department.
11. RPM is communicating with some Guardian's but not others.	1. Verify Guardian's do not have the same Instance Number and MAC code. Change to an unused Instance Number and MAC code.
	2. Swap wires on J3 pins 37 & 38 of the Guardian's that are not communicating.
	3. Verify BACnet terminator switch S10 on back of RPM board is in the ON position.
	4. Verify BACnet terminator switch S10 on the last device in the communication chain is in the ON position.
	5. Contact Factory Service Department.
12. Field Setup Password is rejected	1. Incorrect password was entered. Verify password accuracy.
	2. Contact Factory Service Department.

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Revision Level 002