

MICROTRANS^{EQ}
MICROTRANS^{II}
SPM-3000
SPM-4000

Modbus Communication
Operation & Maintenance Manual

*Engineered for accuracy, applicability,
durability and simplicity*

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1. INTRODUCTION

1.1. DESCRIPTION

The MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 and SPM-4000 utilize the Modbus – RTU slave protocol using the EIA-485 signaling standards through a shielded twisted pair wire operating at a baud rate of 9.6Kbps to 115.2Kbps. Each device has a unique Modbus ID ranging from 1 to 254.

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.

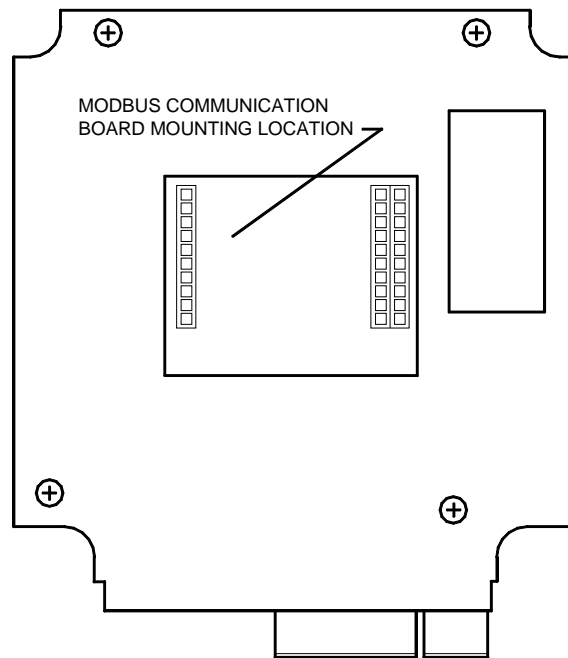
2. MODBUS FIELD INSTALLATION

If a Modbus board is being added or replaced, follow the appropriate product installation instructions shown below.

2.1. MICROTRANS^{EQ} MODBUS INSTALLATION INSTRUCTIONS

- Step 1. Remove the 4 cover screws
- Step 2. Verify MicroTrans^{EQ} power switch is in the OFF position.
- Step 3. Remove the 2 removable wiring plugs from the MicroTrans^{EQ} board.
- Step 4. Remove the 4 MicroTrans^{EQ} board mounting screws and carefully flip the board over to view the back side.
- Step 5. Install the Modbus communication board making sure the connectors are aligned correctly and not offset (see drawing below).
- Step 6. Reinstall the MicroTrans^{EQ} board using the 4 mounting screws
- Step 7. Set MicroTrans^{EQ} power switch to the ON position.

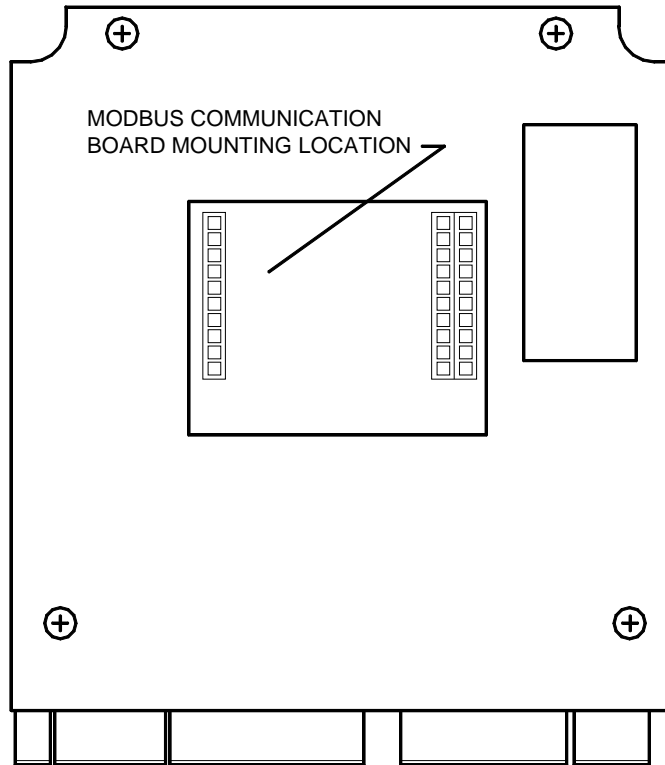
BACK SIDE OF MICROTRANS^{EQ} BOARD



2.2. MICROTRANS^{II} MODBUS INSTALLATION INSTRUCTIONS

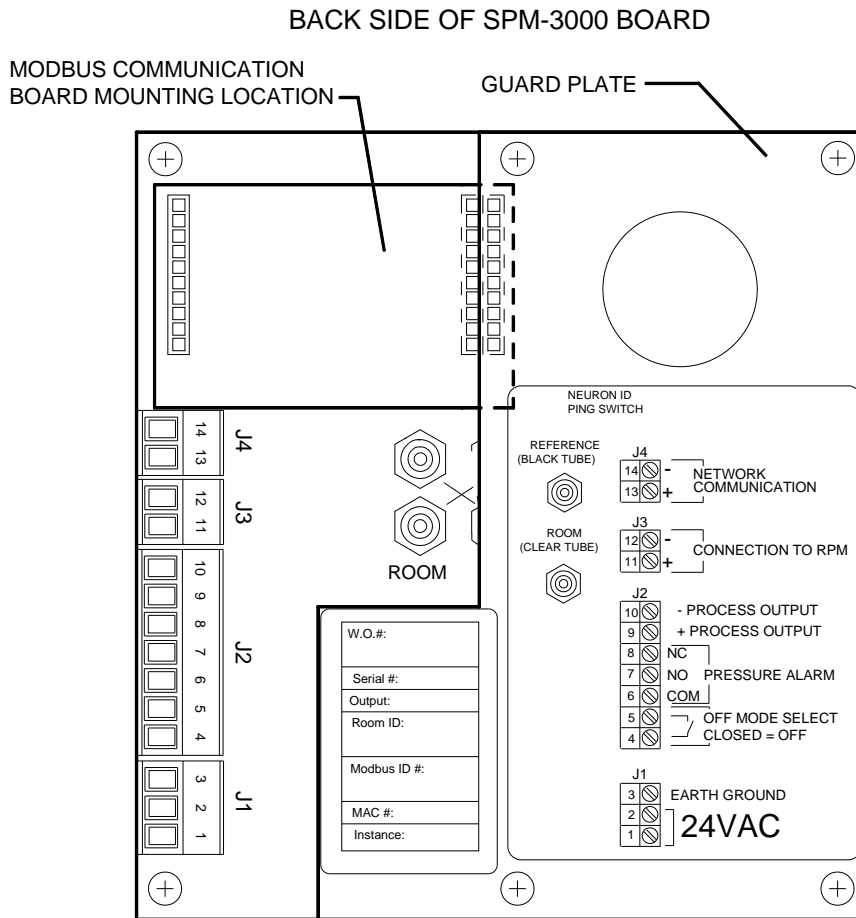
- Step 1. Remove the 4 cover screws
- Step 2. Verify MicroTrans^{II} power switch is in the OFF position.
- Step 3. Remove all removable wiring plugs from the MicroTrans^{II} board.
- Step 4. Remove the 4 MicroTrans^{II} board mounting screws and carefully flip the board over to view the back side.
- Step 5. Install the Modbus communication board making sure the connectors are aligned correctly and not offset (see drawing below).
- Step 6. Reinstall the MicroTrans^{II} board using the 4 mounting screws
- Step 7. Set MicroTrans^{II} power switch to the ON position.

BACK SIDE OF MICROTRANS^{II} BOARD



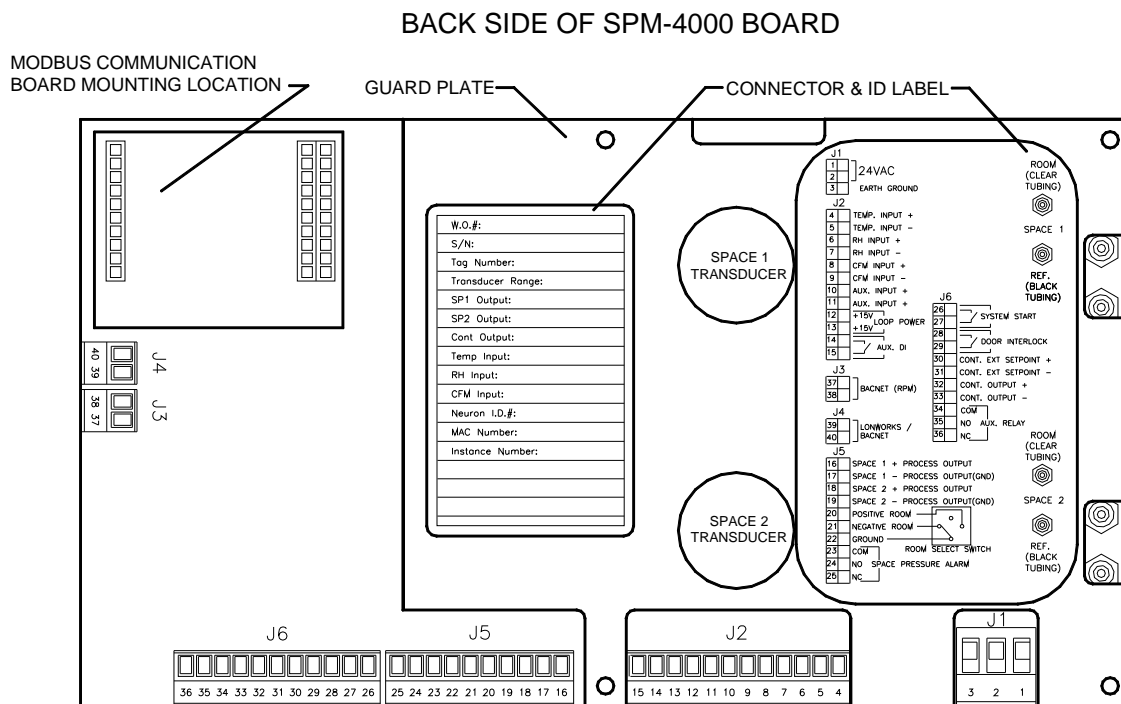
2.3. SPM-3000 MODBUS INSTALLATION INSTRUCTIONS

- Step 1. Remove the 4 cover screws
- Step 2. Verify SPM-3000 power switch is in the OFF position.
- Step 3. Remove the 4 countersink screws securing the SPM-3000 to the wall box.
- Step 4. Remove the SPM-3000 board and carefully flip the board over to view the back side.
- Step 5. Remove the 4 guard plate mounting screws and guard plate.
- Step 6. Install the Modbus communication board making sure the connectors are aligned correctly and not offset (see drawing below).
- Step 7. Reinstall the guard plate using the 4 mounting screws.
- Step 8. Reinstall the SPM-3000 board into the wall box using the 4 countersink mounting screws
- Step 9. Set SPM-3000 power switch to the ON position.



2.4. SPM-4000 MODBUS INSTALLATION INSTRUCTIONS

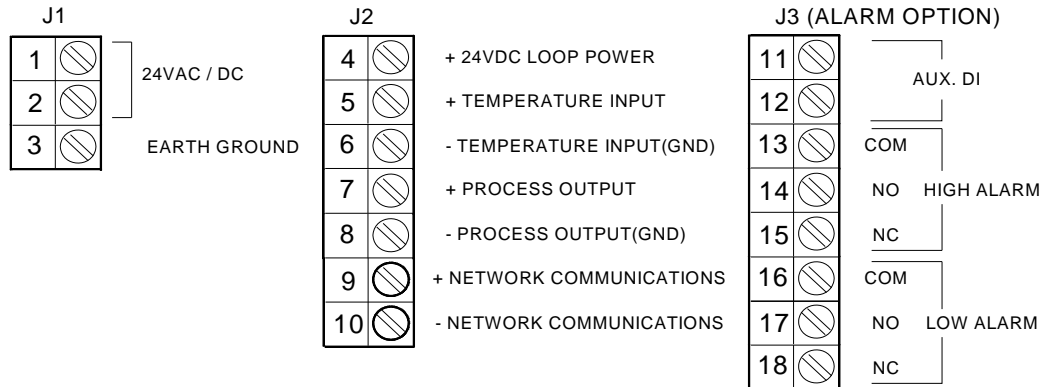
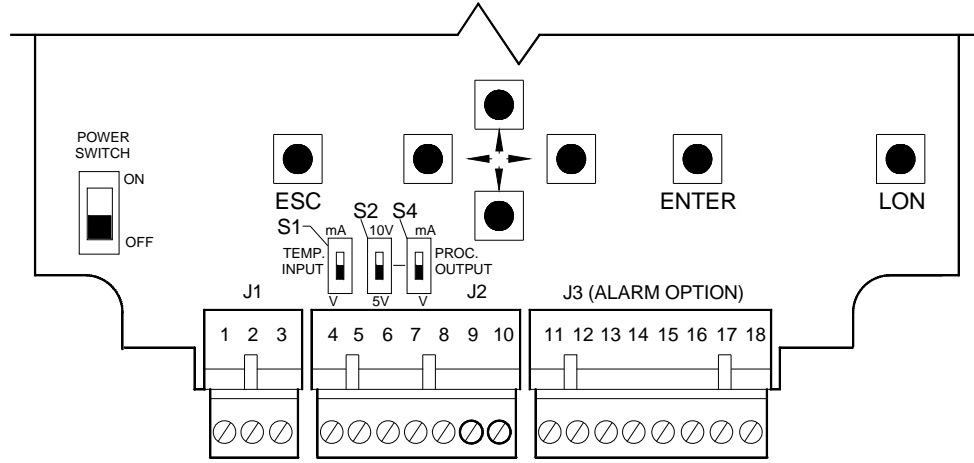
- Step 1. Remove the 6 cover screws
- Step 2. Verify SPM-4000 power switch is in the OFF position.
- Step 3. Remove the 6 countersink screws securing the SPM-4000 to the wall box.
- Step 4. Remove the SPM-4000 board and carefully flip the board over to view the back side.
- Step 5. Install the Modbus communication board making sure the connectors are aligned correctly and not offset (see drawing below).
- Step 6. Reinstall the SPM-4000 board into the wall box using the 6 countersink mounting screws
- Step 7. Set SPM-4000 power switch to the ON position.



3. MODBUS FIELD CONNECTIONS

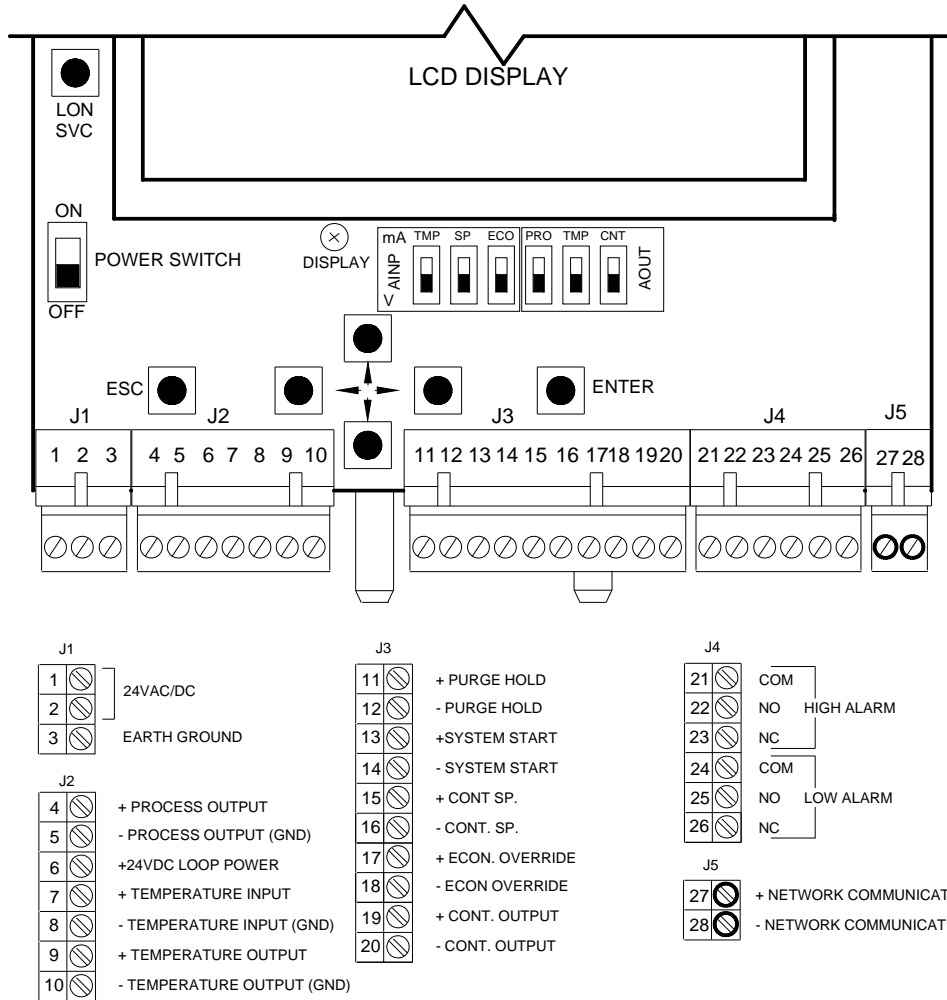
3.1. MICROTRANS^{EQ} MODBUS CONNECTION

Attach the Modbus network to MicroTrans^{EQ} connector J2 pin 9 (Data +) and pin 10 (Data -).



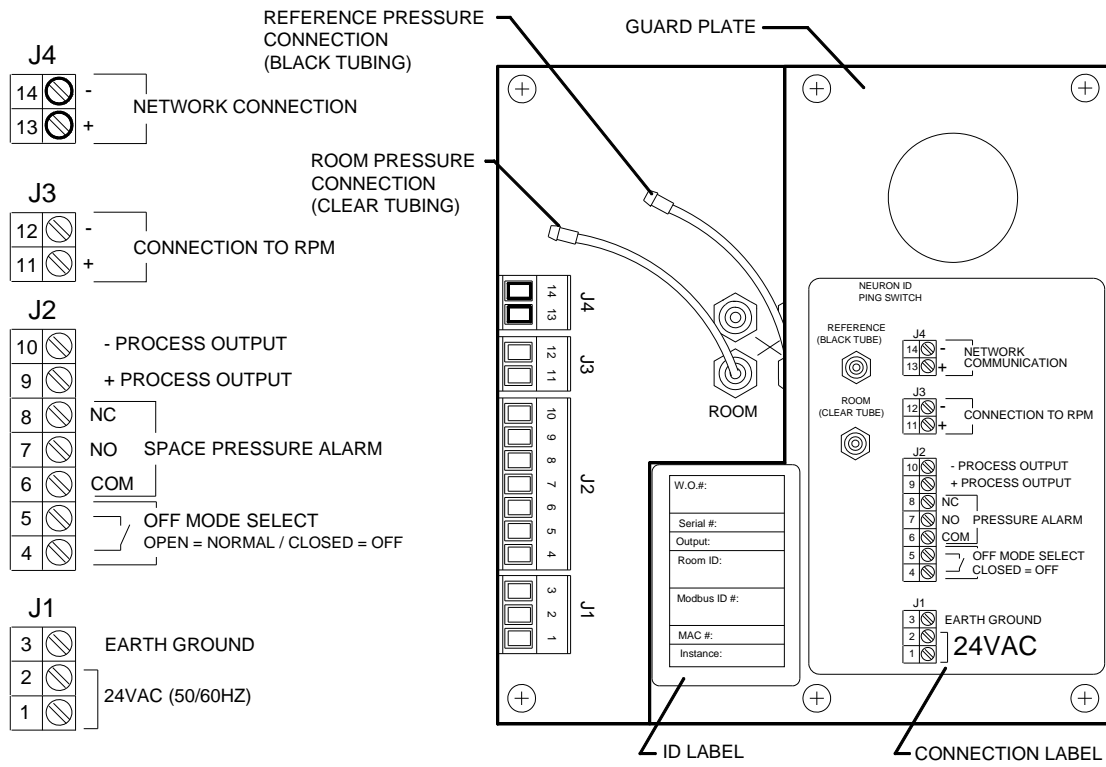
3.2. MICROTRANS^{II} MODBUS CONNECTION

Attach the Modbus network to MicroTrans^{II} connector J5 pin 27(Data +) and pin 28 (Data -).



3.3. SPM-3000 MODBUS CONNECTION

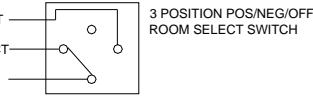
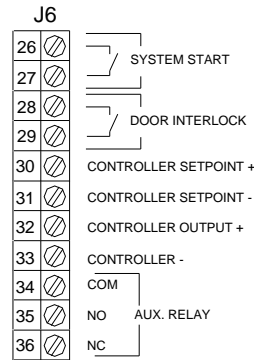
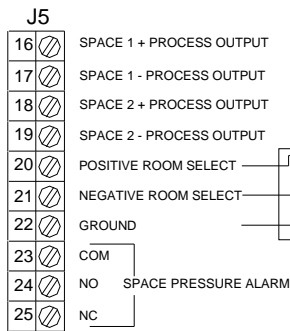
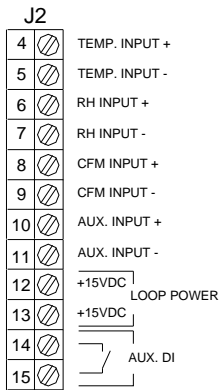
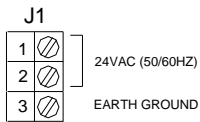
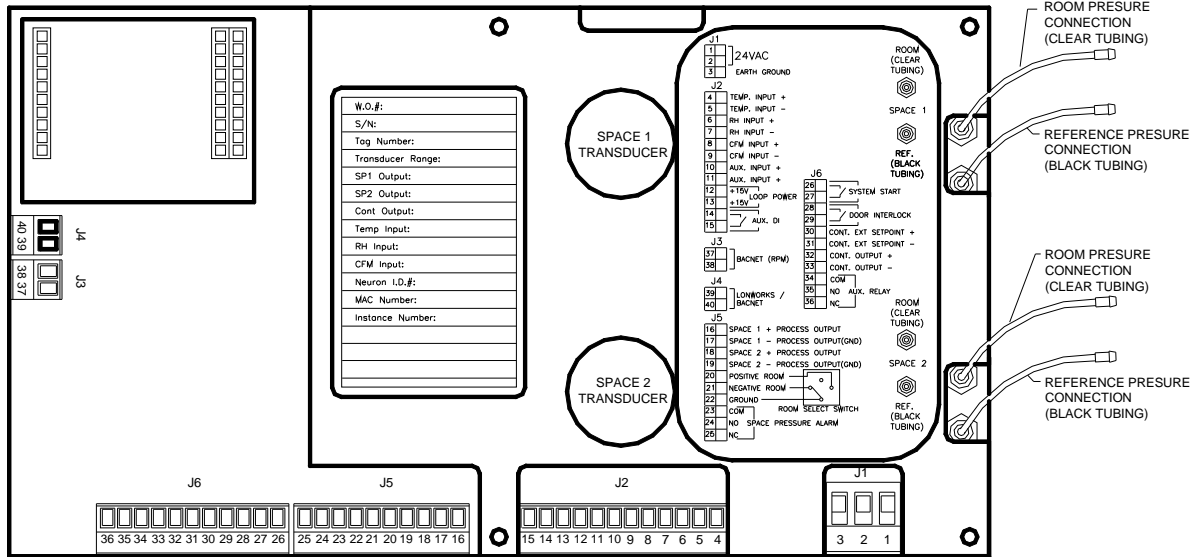
Attach the Modbus network to SPM-3000 connector J4 pin 13 (Data +) and pin 14 (Data -).



3.4. SPM-4000 MODBUS CONNECTION

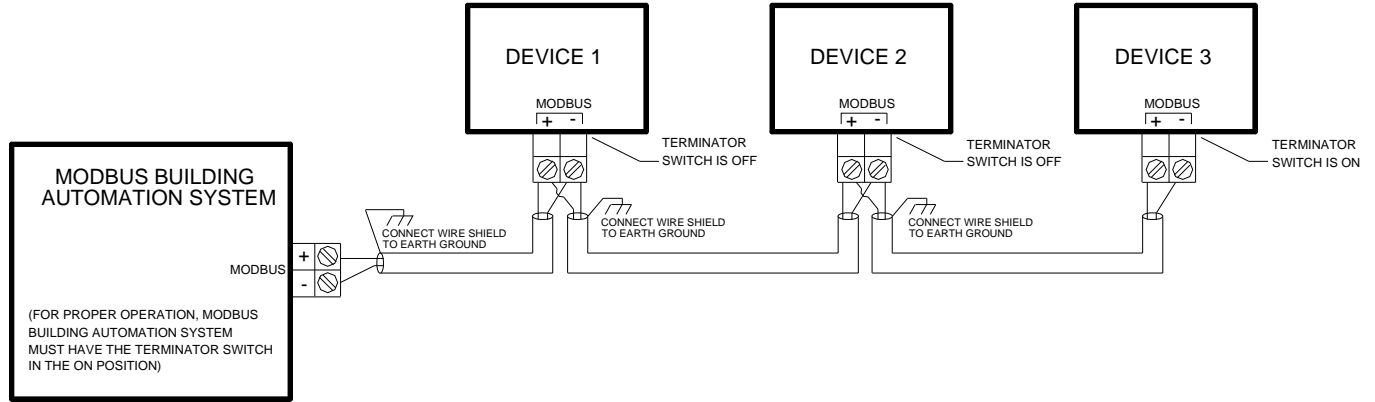
Attach the Modbus network to SPM-4000 connector J4 pin 39 (Data +) and pin 40 (Data -).

BACK SIDE OF SPM-4000 BOARD



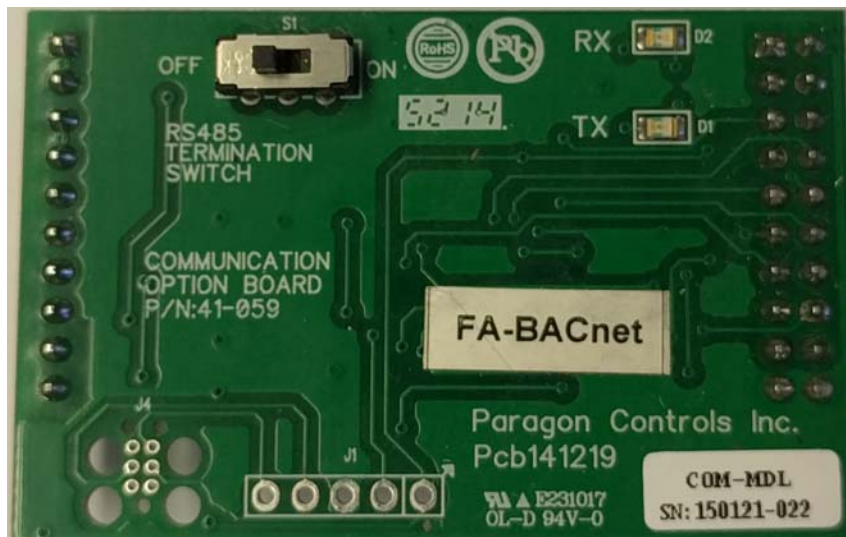
3.5. DEVICE NETWORK CONNECTIONS

(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).



3.6. MODBUS COMMUNICATION BOARD & TERMINATOR SWITCH

For proper Modbus operation, the device that is electrically installed at the end of the network may require the Terminator switch be moved to the ON position to prevent line and data reflection. If Terminator is required, it must be applied to both physical ends of the network at the two end devices. All other devices should have the terminator switch in the OFF position. The communication board is located on the back side of the main board. See picture below for jumper location.



3.7. MODBUS SOFTWARE CONFIGURATION PARAMETERS

Communication type: Serial

Protocol: RTU - Slave

EQ Modbus ID: First device starts at 1 and increments up to 254

Baud Rate: 9.6K, 19.2k, 38.4K(Default), 57.6K & 115.2K

Data bits: 8

Parity: None

Stop bit: 1

Flow Control: None

Time Out: 150msec (minimum)

Poll time: 100msec (minimum)

Address Type: Decimal 40000 – 40999 (Holding Register address)

Byte order: Motorola (Default) High Byte bits 15 - 8, Low Byte bits 7 - 0

Start Address: 0-based

Max. block size: (Holding registers): 8

Function Code: (03X) Read registers, (06X) Write single register, (10X) Write multiple register

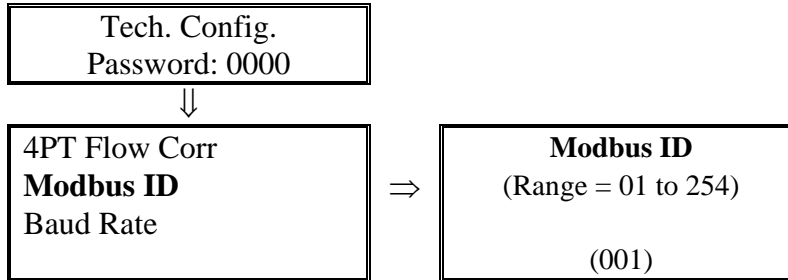
(Note 1: When using a USB to RS-485 converter, make sure to set Echo to OFF)

(Note 2: The MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 and SPM-4000 Modbus protocol supports the “Broadcasting Address” function – This function allows for writing to multiple devices at one time).

4. MICROTRANS^{EQ} TECH MENUS

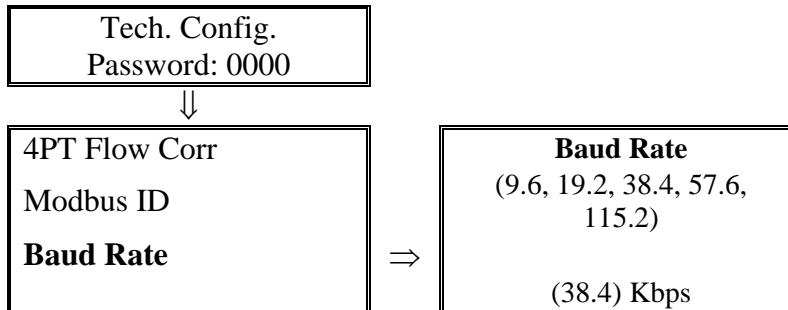
4.1. MICROTRANS^{EQ} MODBUS ID

The Modbus ID menu allows the user to set a unique device address when connecting to a Modbus network. To verify Modbus ID value or make a value change, enter the Tech Menu by depressing the up/down buttons for 3 seconds (reference section 3.1 MicroTrans^{EQ} Modbus Connections drawing). Enter 01000 for the password and scroll down the menus until Modbus ID is highlighted and press the ENTER button. Use the up/down/right/left buttons to enter the Modbus ID. Press the Enter button and then the ESC button to exit the menu.



4.2. MICROTRANS^{EQ} BAUD RATE

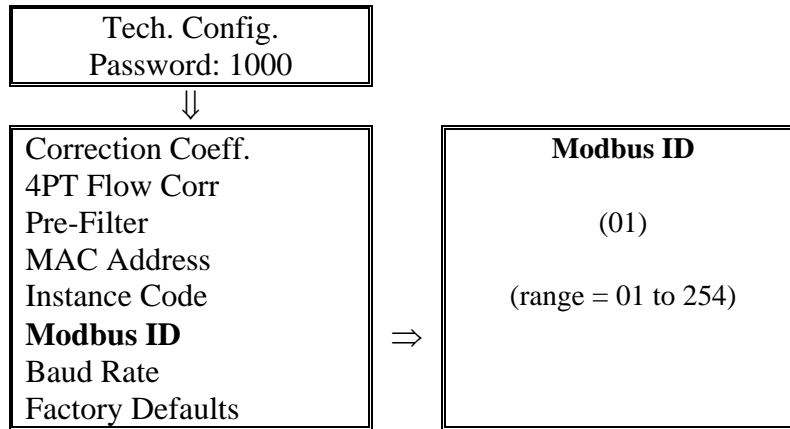
The Baud Rate menu allows the user to set a unique network baud rate. The Modbus Baud rates are: 9.6K / 19.2K / 38.4K / 57.6K / 115.2K. The default is 38.4K.



5. MICROTRANS^{II} TECH MENUS

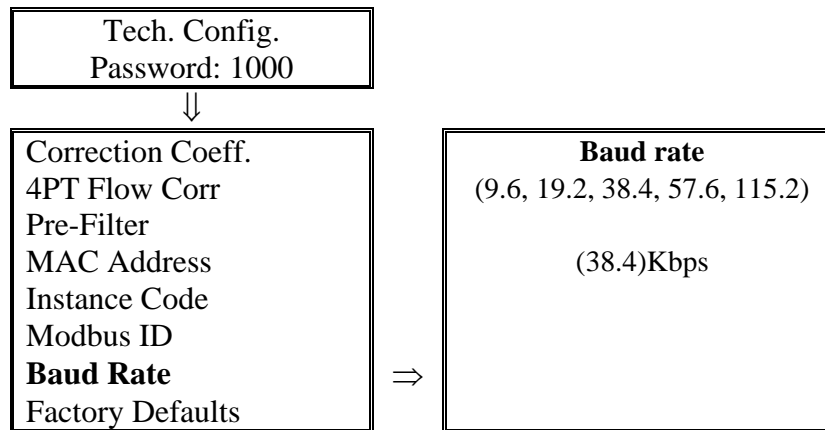
5.1. MICROTRANS^{II} MODBUS ID

The Modbus ID menu allows the user to set a unique device address when connecting to a Modbus network. To verify Modbus ID value or make a value change, enter the Tech Menu by depressing the up/down buttons for 3 seconds (reference section 3.2 MicroTrans^{II} Modbus Connections drawing). Enter 01000 for the password and scroll down the menus until Modbus ID is highlighted and press the ENTER button. Use the up/down/right/left buttons to enter the Modbus ID. Press the Enter button and then the ESC button to exit the menu.



5.2. MICROTRANS^{II} BAUD RATE

The Baud Rate menu allows the user to set a unique Modbus network baud rate of 9.6K/38.4K, 57.6K & 115.2Kbps. The default is 38.4K.



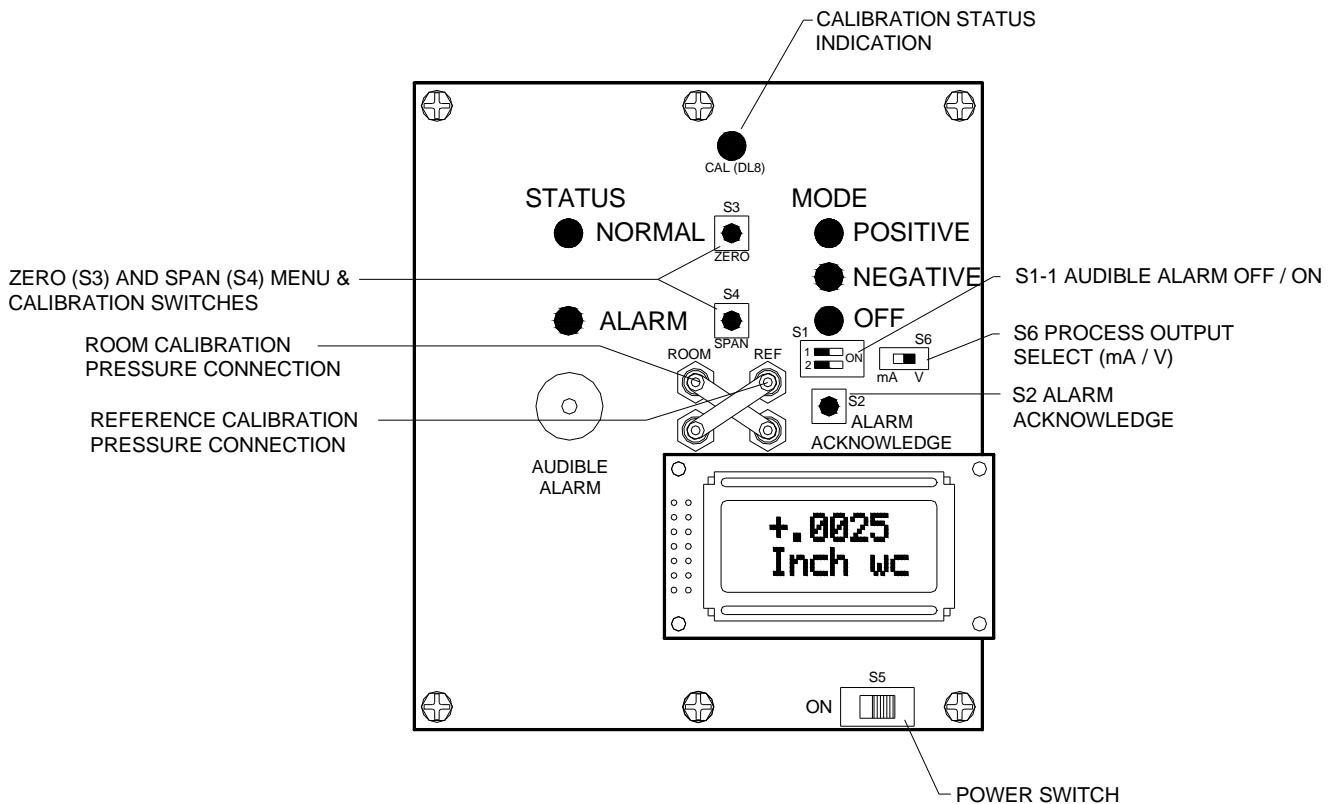
6. SPM-3000 FIELD MENUS

6.1. ACCESSING FIELD MENUS

Perform the following steps to enter the Field Menus and make changes. Refer to Figure 1 below for component locations.

- 3.1.1 Depress and hold the **ZERO** (S3) button for 3 seconds.
- 3.1.2 Depress the **ZERO** button repeatedly to scroll up through the Field Menus or repeatedly depress the **SPAN** (S4) button will scroll down through the menus (see section 6.2).
- 3.1.3 To enter a specific Field Menu, depress the **ACKNOWLEDGE** (S2) button.
- 3.1.4 To make a change to a value or selection, depress the **ACKNOWLEDGE** button repeatedly to select the digit you want to change and then depress the **ZERO** button to increment the value or the **SPAN** button to decrement the value. Each button depression will change the value by 1 count.
- 3.1.5 Once the change is made, depress and hold the **ACKNOWLEDGE** button for 3 seconds. The new value or selection will be saved, the text <OK> will be displayed and the display will return to the menu.
- 3.1.6 To return to the process display, depress and hold the **ZERO** and **SPAN** buttons for 3 seconds. If the SPM-3000 senses no button activity for 2 minutes it will return to the process display.

Figure 1



6.2. SPM-3000 FIELD MENUS

Field Menus
Low Alarm Value
High Alarm Value
Alarm Delay
Audible Alarm
Display Filter
Operation Mode
MAC Code
Instance
Baud Rate

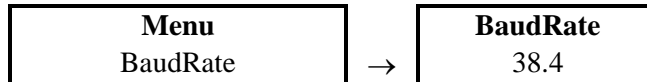
6.3. SPM-3000 MODBUS ID

The MAC Code menu allows the user to set a unique device address (001-254) when connecting to a communication network.



6.4. SPM-3000 BAUD RATE

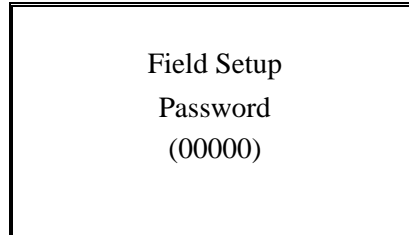
The Baud Rate menu allows the user to select between the following Baud Rates: 9.6K, 19.2K, 38.4K, 57.6K & 115.2K. The default is 38.4K.



7. SPM-4000 FIELD MENUS

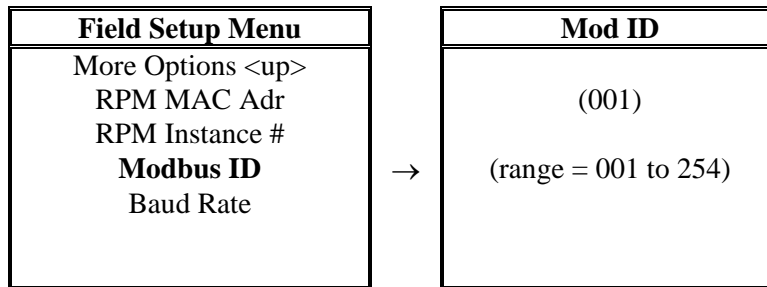
7.1. FIELD SETUP & INITIAL PASSWORD MENU

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.



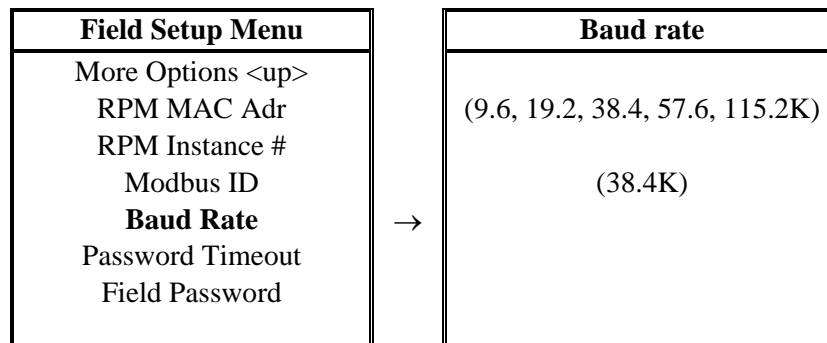
7.2. SPM-4000 MODBUS ID

The Modbus ID menu allows the user to set a unique device address when connecting an SPM-4000 to a Modbus communication network.



7.3. SPM-4000 BAUD RATE

The Baud Rate menu allows the user to set a unique Network Baud Rate of 9.6K, 19.2K, 38.4K, 57.6K & 115.2Kbps. The default is 38.4K.



8. DEVICE OBJECTS

8.1. MICROTRANS^{EQ}

(Note: In the CC column, an "R" denotes a read only object and a "W" denotes a Read/Write object)

Item	Description	Register Number	CC	Data Type	Data Value Descriptions
1*	Pressure Input	40369	R	Signed Short	
2	Flow Input	40370	R	Signed Long	
3	Temperature Value	40459	W	Signed Short	To write a temperature value from the network, set "Temperature Source" data value to 2 (Network). See item 20 below.
4	Temp. Fixed Value	40457	W	Signed Short	
5*	Pressure Operating Range	40359	R	Signed Short	
6*	Pressure High Alarm Value	40424	W	Signed Short	
7*	Pressure Low Alarm Value	40425	W	Signed Short	
8	Flow Operating Range	40362	R	Signed Long	
9	Flow High Alarm Value	40416	W	Signed Long	
10	Flow Low Alarm Value	40418	W	Signed Long	
11	Process Type	40150	R	Word	0=Flow, 1=Pressure
12	High Alarm Enable	40430	W	Word	0=Off, 1=On
13	High Alarm Delay	40428	W	Word	0 to 999 seconds
14	High Alarm Out	40081	R	Word	0=No Alarm, 1=Alarm
15	Low Alarm Enable	40431	W	Word	0=Off, 1=On
16	Low Alarm Delay	40429	W	Word	0 to 999 seconds
17	Low Alarm Out	40080	R	Word	0=No Alarm, 1=Alarm
18	Engineering Unit	40128	R	Word	See Table 1 below
19	Temperature Unit	40450	W	Word	0=°F, 1=°C
20	Temperature Source	40455	W	Word	0=Variable, 1=Fixed, 2=Network
21	Decimal Point	40133	R	Word	4 = .XXXX / 3 = X.XXX 2 = XX.XX / 1 = XXX.X

* MicroTrans^{EQ} responds to a read request from the master for these parameters by sending the value of these parameters without any decimal points. So it is important that the Modbus software that reads these parameters must also read the decimal point information or the programmer must set it manually in the software to display the value correctly (See example on next page).

Table 1

Engineering Unit Data Value descriptions									
Unit Value	Actual Flow Unit	Unit Value	Standard Flow Unit	Unit Value	Actual Velocity Unit	Unit Value	Standard Velocity Unit	Unit Value	Pressure Unit
0	ACFM	0	SCFM	0	AFPM	0	SFPM	0	Inch w.c.
1	L/S	1	SCFH	1	Am/S	1	Sm/S	1	Pa
2	Am3/S	2	SL/S	2	%	2	%	2	KPa
3	%	3	Sm3/S					3	mm w.c.
		4	Sm3/HR					4	%
		5	%						

8.2. MICROTRANS^{II}

(Note: In the CC column, an "R" denotes a read only object and a "W" denotes a Read/Write object)

Item	Description	Register Number	CC	Data Type	Data Value Descriptions
1*	Pressure Input	40402	R	Signed Short	
2	Flow Input	40403	R	Signed Long	
3	Temperature	40603	R/W	Signed Short	To write a temperature value from the network, set "Temperature Source" data value to 2 (Network). See item 20 below.
4*	Pressure Operating Range	40377	R/W	Signed Short	
5*	Pressure High Alarm	40457	R/W	Signed Short	
6*	Pressure Low Alarm	40458	R/W	Signed Short	
7	Flow Operating Range	40380	R/W	Signed Long	
8	Flow High Alarm	40449	R/W	Signed Long	
9	Flow Low Alarm	40451	R/W	Signed Long	
10	High Alarm Enable	40463	R/W	Word	0=Off, 1=On
11	High Alarm Delay	40461	R/W	Word	0 to 999 seconds
12	Low Alarm Enable	40464	R/W	Word	0=Off, 1=On
13	Low Alarm Delay	40462	R/W	Word	0 to 999 seconds
14	Engineering Unit	40641	R/W	Word	See Table 2 below
15	Temp Engineering Unit	40594	R/W	Word	0=°F, 1=°C
16	Temperature Source	40599	R/W	Word	0=Variable, 1=Fixed, 2=Network
17	Decimal Point	40646	R/W	Word	4 = .XXXX / 3 = X.XXX 2 = XX.XX / 1 = XXX.X
18	Process Type	40673	R/W	Word	0=Flow, 1=Pressure
19	Temperature Fixed Value	40601	R/W	Word	
19	Process Unit	40674	R/W	Word	0=Flow, 1=Velocity
20	Flow Type	40675	R/W	Word	0=Actual, 1=Standard
21	Controller Output Value	40562	R	Word	
22	Controller System Start	40065	R	Word	0=Off, 1=Run
23	Purge Hold	40058	R	Word	0=No Purge, 1=Purge Hold
24	Controller Pressure Setpoint	40524	R/W	Signed Short	
25	Controller Flow Setpoint	40525	R/W	Signed Long	
26	Controller Proportional Band	40514	R/W	Word	
27	Controller Integrator Time	40515	R/W	Word	
28	Controller Derivative Time	40516	R/W	Word	
29	Economizer In Value	40577	R/W	Word	

* MicroTrans^{II} responds to a read request from the master for these parameters by sending the value of these parameters without any decimal points. So it is important that the Modbus software that reads these parameters must also read the decimal point information or the programmer must set it manually in the software to display the value correctly (See example on next page).

Table 2

Engineering Unit Data Value descriptions									
Unit Value	Actual Flow Unit	Unit Value	Standard Flow Unit	Unit Value	Actual Velocity Unit	Unit Value	Standard Velocity Unit	Unit Value	Pressure Unit
0	ACFM	0	SCFM	0	AFPM	0	SFPM	0	Inch w.c.
1	L/S	1	SCFH	1	Am/S	1	Sm/S	1	Pa
2	Am3/S	2	SL/S	2	%	2	%	2	KPa
3	Am3/M	3	Sm3/S					3	mm w.c.
4	Am3/HR	4	Sm3/M					4	%
5	%	5	Sm3/HR						
		6	%						

8.3. SPM-3000

(Note: In the CC column, an "R" denotes a read only object and a "W" denotes a Read/Write object)

Item	Parameter Name	Modbus ID	CC	Data Type	Data Value Descriptions
\	Process Value	40037	R	Signed Short	
2	Room Identifier	40019	R/W	Char String	
3*	Operating Range	40038	R	Signed Short	
4*	Pos. High Alarm	40040	R/W	Signed Short	
5*	Pos. Low Alarm	40041	R/W	Signed Short	
6*	Neg. High Alarm	40042	R/W	Signed Short	
7*	Neg. Low Alarm	40043	R/W	Signed Short	
8	Audible Alarm Enable	40035	R/W	Word	0=Off, 1=On
9	Operation Mode	40036	R/W	Word	0=Off, 1=Pos., 2=Neg.
10	Alarm Status	40044	R	Word	0=No Alarm, 1=High Alarm, 2=Low Alarm
11	Alarm Delay	40045	R/W	Word	0 to 999 seconds
12	Engineering Unit	40033	R/W	Word	0=Inch w.c., 1=Pa, 2=KPa, 3=mm w.c.
13	Field Password	40047	R/W	Word	
14	Process Filter	40048	R/W	Word	0 to 100 seconds
15	Decimal Point	40034	R/W	Word	4 = .XXXX / 3 = X.XXX 2 = XX.XX / 1 = XXX.X

* SPM-3000 responds to a read request from the master for these parameters by sending the value of these parameters without any decimal points. So it is important that the Modbus software that reads these parameters must also read the decimal point information or the programmer must set it manually in the software to display the value correctly.

Example:

Decimal point = 3

Pressure Input 0.100 Inch w.c. will be read as 100.

Pressure Input 1.000 Inch w.c. will be read as 1000.

Pressure Input 32.000 inch w.c. will be read as 32000. (This is the max Inch w.c. value that Modbus can send with Decimal point = 3)

Decimal point = 4

Pressure Input 0.1000 Inch w.c. will be read as 1000.

Pressure Input 1.0000 Inch w.c. will be read as 10000.

Pressure Input 3.2000 inch w.c. will be read as 32000. (This is the max Inch w.c. value that Modbus can send with Decimal point = 4)

8.4. SPM-4000

(Note: In the CC column, an "R" denotes a read only object and a "W" denotes a Read/Write object)

Item	Description	Register Number	CC	Data Type	Data Value Descriptions
1*	Space1 Process Value	40338	R	Signed Short	
2	Space1 Room Identifier	40497	R/W	Signed Long	
3*	Space2 Process Value	40594	R	Signed Short	
4	Space2 Room Identifier	40753	R/W	Signed Long	
5	Temperature	40822	R	Signed Short	
6	Humidity	40842	R	Word	
7	Flow	41033	R	Unsigned Long	
8	Controller Output (%)	40065	R	Word	0 to 100%
9*	Space1 Operating Range	40261	R/W	Signed Short	
10*	Space1 Pos. High Alarm	40273	R/W	Signed Short	
11*	Space1 Pos. Low Alarm	40274	R/W	Signed Short	
12*	Space1 Neg. High Alarm	40275	R/W	Signed Short	
13*	Space1 Neg. Low Alarm	40276	R/W	Signed Short	
14*	Space2 Operating Range	40517	R/W	Signed Short	
15*	Space2 Pos. High Alarm	40529	R/W	Signed Short	
16*	Space2 Pos. Low Alarm	40530	R/W	Signed Short	
17*	Space2 Neg. High Alarm	40531	R/W	Signed Short	
18*	Space2 Neg. Low Alarm	40532	R/W	Signed Short	
19*	Controller SetPoint Positive	40643	R/W	Signed Short	
20*	Controller SetPoint Negative	40644	R/W	Signed Short	
21*	Controller SetPoint Off	40645	R/W	Signed Short	
22	Controller P Value	40651	R/W	Word	0 to 100%
23	Controller I Value	40652	R/W	Word	0 to 100 Seconds
24	Controller D Value	40653	R/W	Word	0 to 100 Seconds
25	ACH Value	40794	R	Word	Air Changes Per Hour
26	System Start	40132	R	Word	0=Off, 1=On
27	System Hold	40133	R	Word	0=Off, 1=On
28	Audible Alarm Enable	40038	R/W	Word	0=Disable, 1=Enable
29	Space1 Operation Mode	40281	R/W	Word	0=Off, 1=Positive, 2=Negative
30	Space1 Alarm Status	40045	R	Word	0=No Alarm, 1=High Alarm, 2=Low Alarm
31	Space1 Alarm Delay	40353	R/W	Word	0 to 9999 Seconds
32	Space2 Operation Mode	40519	R/W	Word	0=Off, 1=Positive, 2=Negative
33	Space2 Alarm Status	40046	R	Word	0=No Alarm, 1=High Alarm, 2=Low Alarm
34	Space2 Alarm Delay	40521	R/W	Word	0 to 9999 seconds
35	Engineering Unit	40017	R/W	Word	0=Inch w.c., 1=Pa, 2=KPa, 3=mmw.c.
36	Temperature Eng Unit	40810	R/W	Word	0=°F, 1=°C
37	Process Filter	40049	R/W	Word	0 to 100 Seconds
38	Decimal Point	40022	R/W	Word	4 = .XXXX / 3 = X.XXX 2 = XX.XX / 1 = XXX.X

* SPM4000 responds to a read request from the master for these parameters by sending the value of these parameters without any decimal points. So it is important that the Modbus software that reads these parameters must also read the decimal point information or the programmer must set it manually in the software to display the value correctly.

Example:

Decimal point = 3

Pressure Input 0.100 Inch w.c. will be read as 100.

Pressure Input 1.000 Inch w.c. will be read as 1000.

Pressure Input 32.000 Inch w.c. will be read as 32000. (This is the max Inch w.c. value that Modbus can send with Decimal point = 3)

Decimal point = 4

Pressure Input 0.1000 Inch w.c. will be read as 1000.

Pressure Input 1.0000 Inch w.c. will be read as 10000.

Pressure Input 3.2000 Inch w.c. will be read as 32000. (This is the max Inch w.c. value that Modbus can send with Decimal point = 4)

8.5. MODBUS EXCEPTION CODES

If the query sent by the Master host has errors in it, the MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 OR SPM-4000 will respond with these error codes.

Error Code	Contents
01H	<u>Function code error</u> A function code other than 03H, 06H, or 10H has been set by the master.
02H	<u>Invalid register number error</u> The register address you are attempting to access is not allowed in EQ.
03H	<u>Invalid quantity error</u> The number of data packets (Blocks) being read or written is larger than 8.
21H	<u>Data Setting Error</u> <u>Attempted to write beyond register's data limits</u>
22H	<u>Write-in Error</u> <u>Register is Read Only</u>

MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 or SPM-4000 Not Responding

In the following cases, the slave will ignore the query from the Master host.

- When a communication error (overrun, framing, parity, or CRC-16) is detected in the command message.
- When the slave address in the command message and the slave address in the MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 or SPM-4000 EQ do not agree.
- When the command message data length is invalid.

9. TROUBLESHOOTING GUIDE

TROUBLESHOOTING TABLE	
SYMPTOM	SOLUTION
<p>1. Building Management System not communicating with any of the MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 or SPM-4000 devices</p>	<p>1. Verify each MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 or SPM-4000 has a unique Modbus ID number (See sections 4.1, 5.1, 6.3 or 7.2).</p>
	<p>2. Verify the MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 or SPM-4000 baud rate matches the Building Management System baud rate requirement (See sections 4.2, 5.2, 6.4 or 7.3).</p>
	<p>3. Verify Modbus software configuration parameters (See section 3.7).</p>
	<p>4. Verify data +&- connections on all MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 or SPM-4000 devices are wired correctly to the Building Management System (See sections 3.1, 3.2, 3.3 or 3.4).</p>
	<p>5. Check Exception code table (see section 8.4)</p>
	<p>6. Contact Factory Service Department.</p>
<p>2. Building Management System communicating with some MicroTrans^{EQ}'s, MicroTrans^{II}'s, SPM-3000's or SPM-4000's, but not others.</p>	<p>1. Verify each MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 or SPM-4000 has a unique Modbus ID number (See sections 4.1, 5.1, 6.3 or 7.2).</p>
	<p>2. Verify the MicroTrans^{EQ}, MicroTrans^{II}, SPM-3000 or SPM-4000 baud rate matches the Building Management System baud rate requirement (See sections 4.2, 5.2, 6.4 or 7.3).</p>
	<p>3. Verify data +&- wires are connected correctly on those devices not communicating (See sections 3.1, 3.2, 3.3 or 3.4).</p>
	<p>4. Try setting the terminator switch (located on the Modbus communication board) on the last device in the communication chain to the ON position. (See section 3.6)</p>
	<p>5. Check Exception code table (see section 8.4)</p>
	<p>6. Verify Modbus board is installed and seated correctly. Modbus board is located on the back side of the main board.</p>

TROUBLESHOOTING TABLE	
SYMPTOM	SOLUTION
2. Continued	7. Contact Factory Service Department.

