

SEELEVEL II™
Tank Fluid Monitor

**MODEL 903-D4 MOD
COMMUNICATION BOARD
MANUAL**

GARNET

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Tank Fluid Monitor

MODEL 903-D4 MOD

Version 1.0.6

COMMUNICATIONS BOARD MANUAL

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The 903D4 MOD communication board uses a proprietary Garnet Instruments format for wireless communication and industry standard Modbus RTU communications for RS232, RS485, or RS422 hardware interfaces.

To enable communications from the 900D4 display to the communication board the serial data transfer in the 900D4 display must be turned on through the configuration menus using the 6 digit security code menu. ("SERoL" set to "On")

The communication settings used in all modes is 9600 baud, 8 bits, 1 stop bit, and parity set to None.

The hardware interface and slave address are configured in the 900D4 display through the configuration menus using the 4 digit security code menu. The right tank ID from the 900D4 sets the serial communication mode. ("t id" set to "8001" for the Modbus RS-232 communication mode with a Modbus Slave Address equal to "1").

Communication Mode	Right Tank ID	Modbus Slave Address
Wireless*	0-8000	
RS-232	8001-8255	1-255
RS-485/RS-422	9001-9255	1-255

* To conserve battery life, the wireless communication mode does not use Modbus communications, but rather uses a proprietary Garnet Instruments format which allows data updates to occur using Report by Exception (RBE). Report by Exception allows data update to occur whenever an inch, level, temperature, or an analog value changes. Scheduled data updates also occur on a regular timed interval. The Garnet Instruments Tank Monitoring software has been developed to be used with the 900D4 running in the wireless communication mode.

External power (6-24 VDC) must be supplied to power the 903D4 MOD communication board when using RS232, RS422, or RS485 communication modes. When using the Wireless communication mode, the 900D4 display and the 902D4 WIR Communication Board, will use battery power from four D cell batteries.

The following Modbus RTU functions are supported by the 903D4 WIR communication board.

Supported Modbus Function Codes

Description	Modbus RTU Function Code
Read coils	01
Read discrete inputs	02
Read holding registers	03
Read input registers	04
Write single coil	05
Write single register	06
Read exception status	07
Write multiple coils	15
Write multiple registers	16
Report slave id	17

Reading the input registers allows access to the complete set of 900D4 available data.

Supported Input Registers for Single

Description	Range	Units	Register
Software version	105	(example)	30001
Bit Packed Alarms (bits 1-4)	0-15		30002
Bit Packed Relays (bits 1-4)	0-15		30003
D4 Input 1	0-255		30004
D4 Input 2	0-255		30005
D4 Display Type	0=Single 1=Dual 3=Interface		30006
D4 Battery Level	1=Poor 2=Fair 3=Good		30007
Tank Identification Number	0-9999		30008
Sender Status	0=Good Light 2=No Light 3=Bad Light		30009
Sender Battery Level	1=Poor 2=Fair 3=Good		30010
Tank Temperature*	-40 to140 -40 to 90	Deg F Deg C	30011
Tank Level	0-7200 (0-60')	10 th of an Inch	30012
Tank Volume		D4 display value without decimal	30013
Tank Volume Decimal Position	0-4		30014
Reserved			30015
Reserved			30016
Reserved			30017
Reserved			30018
Reserved			30019
Reserved			30020
Reserved			30021
Reserved			30022
Reserved			30023
Reserved			30024

*Register values are stored as 16-bit signed integers.

Supported Input Registers for Dual

Description	Range	Units	Register
Software version	105	(example)	30001
Bit Packed Alarms (bits 1-4)	0-15		30002
Bit Packed Relays (bits 1-4)	0-15		30003
D4 Input 1	0-255		30004
D4 Input 2	0-255		30005
D4 Display Type	0=Single 1=Dual 3=Interface		30006
D4 Battery Level	1=Poor 2=Fair 3=Good		30007
Tank 1 Identification Number	0-9999		30008
Sender 1 Status	0=Good Light 2=No Light 3=Bad Light		30009
Sender 1 Battery Level	1=Poor 2=Fair 3=Good		30010
Tank Temperature 1*	-40 to 140 -40 to 90	Deg F Deg C	30011
Tank Level 1	0-7200 (0-60')	10 th of an Inch	30012
Tank Volume 1		D4 display value without decimal	30013
Tank Volume 1 Decimal Position	0-4		30014
Tank 2 Identification Number	0-9999		30015
Sender 2 Status	0=Good Light 2=No Light 3=Bad Light		30016
Sender 2 Battery Level	1=Poor 2=Fair 3=Good		30017
Tank Temperature 2*	-40 to 140 -40 to 90	Deg F Deg C	30018
Tank Level 2	0-7200 (0-60')	10 th of an Inch	30019
Tank Volume 2		D4 display value without decimal	30020
Tank Volume 2 Decimal Position	0-4		30021
Reserved			30022
Reserved			30023
Reserved			30024

*Register values are stored as 16-bit signed integers.

Supported Input Registers for Interface

Description	Range	Units	Register
Software version	105	(example)	30001
Bit Packed Alarms (bits 1-4)	0-15		30002
Reserved	0-15		30003
D4 Input 1	0-255		30004
D4 Input 2	0-255		30005
D4 Display Type	0=Single 1=Dual 3=Interface		30006
D4 Battery Level	1=Poor 2=Fair 3=Good		30007
Tank Identification Number	0-9999		30008
Sender Status	0=Good Light 2=No Light 3=Bad Light		30009
Sender Battery Level	1=Poor 2=Fair 3=Good		30010
Tank Temperature*	-40 to140 -40 to 90	Deg F Deg C	30011
Top Tank Level	0-7200 (0-60')	10 th of an Inch	30012
Top Tank Volume		D4 display value without decimal	30013
Volume Decimal Position	0-4		30014
Below Tank Level	0-7200 (0-60')	10 th of an Inch	30015
Below Tank Volume		D4 display value without decimal	30016
Above Tank Level	0-7200 (0-60')	10 th of an Inch	30017
Above Tank Volume		D4 display value without decimal	30018
Reserved			30019
Reserved			30020
Reserved			30021
Reserved			30022
Reserved			30023
Reserved			30024

*Register values are stored as 16-bit signed integers.

Holding registers 40001-40016 have been reserved for Garnet use.
Holding registers 40017-40064 are read only.

Supported Holding Registers

Description	Range	Units	Register
Reserved			40001
Reserved			40002
Reserved			40003
Reserved			40004
Reserved			40005
Reserved			40006
Reserved			40007
Reserved			40008
Reserved			40009
Reserved			40010
Reserved			40011
Reserved			40012
Reserved			40013
Reserved			40014
Reserved			40015
Reserved			40016
Software version	113	(example)	40017
Bit Packed Alarms (bits 1-4)	0-15		40018
Reserved			40019
Reserved			40020
Reserved			40021
D6 Display Type	0x10=Single 0x04=Dual 0x08=Triple 0x0C=Quad		40022
D6 Battery Level	1=Poor 2=Fair 3=Good		40023
Counter			40024
Tank 1 Identification high bytes			40025
Tank 1 Identification low bytes			40026
Tank 1 Level high bytes		10 th of an Inch	40027
Tank 1 Level low bytes		10 th of an Inch	40028

Tank 1 Volume high bytes		D6 display value without decimal	40029
Tank 1 Volume low bytes		D6 display value without decimal	40030
Tank 1 Volume Decimal Position	0-5		40031
Tank 1 Temperature*	-40 to 140 -40 to 90	Deg F Deg C	40032
Sender 1 Status	0=Good Light 2=No Light 3=Bad Light		40033
Sender 1 Battery Level	1=Poor 2=Fair 3=Good		40034
Tank 2 Identification high bytes			40035
Tank 2 Identification low bytes			40036
Tank 2 Level high bytes		10 th of an Inch	40037
Tank 2 Level low bytes		10 th of an Inch	40038
Tank 2 Volume high bytes		D6 display value without decimal	40039
Tank 2 Volume low bytes		D6 display value without decimal	40040
Tank 2 Volume Decimal Position	0-5		40041
Tank 2 Temperature*	-40 to 140 -40 to 90	Deg F Deg C	40042
Sender 2 Status	0=Good Light 2=No Light 3=Bad Light		40043
Sender 2 Battery Level	1=Poor 2=Fair 3=Good		40044
Tank 3 Identification high bytes			40045
Tank 3 Identification low bytes			40046
Tank 3 Level high bytes		10 th of an Inch	40047

Tank 3 Level low bytes		10 th of an Inch	40048
Tank 3 Volume high bytes		D6 display value without decimal	40049
Tank 3 Volume low bytes		D6 display value without decimal	40050
Tank 3 Volume Decimal Position	0-5		40051
Tank 3 Temperature*	-40 to 140 -40 to 90	Deg F Deg C	40052
Sender 3 Status	0=Good Light 2=No Light 3=Bad Light		40053
Sender 3 Battery Level	1=Poor 2=Fair 3=Good		40054
Tank 4 Identification high bytes			40055
Tank 4 Identification low bytes			40056
Tank 4 Level high bytes		10 th of an Inch	40057
Tank 4 Level low bytes		10 th of an Inch	40058
Tank 4 Volume high bytes		D6 display value without decimal	40059
Tank 4 Volume low bytes		D6 display value without decimal	40060
Tank 4 Volume Decimal Position	0-5		40061
Tank 4 Temperature*	-40 to 140 -40 to 90	Deg F Deg C	40062
Sender 4 Status	0=Good Light 2=No Light 3=Bad Light		40063
Sender 4 Battery Level	1=Poor 2=Fair 3=Good		40064

The coils 00001 to 00008 have been reserved for Garnet use.

Supported Coils

Description	Coil (1-4)
Reserved	00001
Reserved	00002
Reserved	00003
Reserved	00004
Reserved	00005
Reserved	00006
Reserved	00007
Reserved	00008

The status of the four alarms in the 900D4 can be read by reading the following discrete inputs. The remaining discrete inputs have been reserved for future use.

Supported Discrete Inputs

Description	Discrete Input (1-4)
Alarm 1	10001
Alarm 2	10002
Alarm 3	10003
Alarm 4	10004
Reserved	10005
Reserved	10006
Reserved	10007
Reserved	10008

