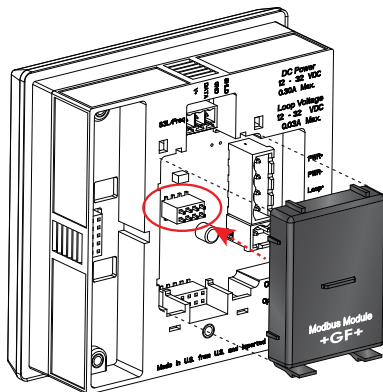


Signet 9900 Modbus Module



3-9900.270.090 Rev 3 02/19

Installation and Programming



Description

The Modbus Module 3-9900.270-MX allows the Signet 9900 SmartPro® Transmitter to connect to a Modbus master compatible device. The Modbus Module supports RTU or ASCII modes over serial RS485 communication links.

The Modbus Module has an internal programmable network termination for the communication link enabled by Modbus command.

System Overview

Installation

If the 9900 Base Unit will be mounted in a panel, plug-in modules may be installed either before or after the base unit is mounted.

If the 9900 Base Unit will be mounted using the accessory wall mount kit (3-9900.392), install plug-in modules first.

If the Direct Conductivity/Resistivity Module or Current Loop Module will be included in your unit, install the Modbus module first and then install Conductivity/Resistivity Module over the Modbus Module.

To install the Modbus module, carefully align the module pins into its plug (see illustration) and push the module straight in until the tabs on the bottom edge snap into place.

To uninstall, squeeze tabs, grasp the module and pull straight out.

Specifications

- Modbus RTU and ASCII modes, RTU is Default Mode.
- 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 Baud rates, 19200 is default Baud rate
- Parity can be selected as Even, Odd, or None, Even is default Parity
- Modbus Address 1 to 247, 34 is default Modbus Address
- Data Bits, automatically selected based on Mode. RTU Mode 8 Data bits, ASCII Mode 7 Data bits.
- Stop Bits, automatically selected based on Mode, RTU Mode 1 Stop bit, ASCII Mode 2 Stop bits.
- Power 12 to 24 VDC Nominal 10.6 to 32 VDC max regulated.



Important! Do not exceed 32 VDC or permanent damage to the Modbus Module will occur.

Start Up Communication Parameters

Start Up Communication Parameters

The Modbus communication parameters for 9900 Gen 1 through Gen 4 transmitters are set via Modbus. The Modbus module is shipped from the factory, and can be reset in the field, with the following communication parameters. See the Communication Setting Programming flow chart below.

Setting	Default Value
Modbus Address	34
Modbus Network Termination	Off
Modbus Mode	RTU
Baud Rate	19200
Parity	Even
Endian	Big



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Warranty Information

Refer to your local Georg Fischer Sales office for the most current warranty statement.

All warranty and non-warranty repairs being returned must include a fully completed Service Form and goods must be returned to your local GF Sales office or distributor. Product returned without a Service Form may not be warranty replaced or repaired.

Signet products with limited shelf-life (e.g. pH, ORP, chlorine electrodes, calibration solutions; e.g. pH buffers, turbidity standards or other solutions) are warranted out of box but not warranted against any damage, due to process or application failures (e.g. high temperature, chemical poisoning, dry-out) or mishandling (e.g. broken glass, damaged membrane, freezing and/or extreme temperatures).

Product Registration

Thank you for purchasing the Signet line of Georg Fischer measurement products.

If you would like to register your product(s), you can now register online in one of the following ways:

- Visit our website www.gfsignet.com. Under **Service and Support** click on **Product Registration Form**
- If this is a pdf manual (digital copy), [click here](#)

Safety Information



CAUTION

Exercise care when installing module.
Do not bend connecting pins.
Align pins and connectors then push module firmly into place.

Avoid Electrostatic Discharge (ESD)

- Minimize handling of module to reduce the possibility of damage due to ESD.
- Handle module by the edges.
- Never touch any exposed circuitry or contacts.
- Wear an anti-static wristband, stand on an anti-static mat, or keep one hand touching a properly grounded pipe or other properly grounded piece of metal when handling module.

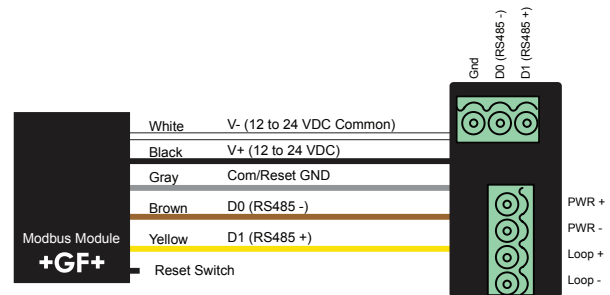
	Caution / Warning / Danger Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, injury, or death
	Electrostatic Discharge (ESD) / Electrocutation Danger Alerts user to risk of potential damage to product by ESD, and/or risk of potential of injury or death via electrocution.
	Personal Protective Equipment (PPE) Always utilize the most appropriate PPE during installation and service of Signet products.

Power and Output Wiring

Three versions of the Modbus module are available to accommodate installation site requirements.

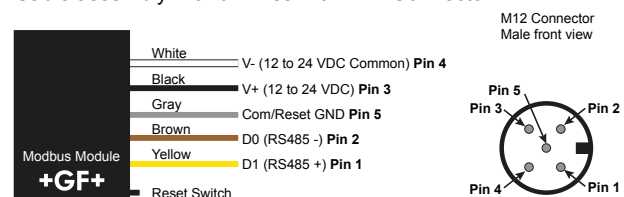
3-9900.270-M2 version: Terminal board (Panel Mount Only)

Cable assembly with 3" wires, inner-connect to board



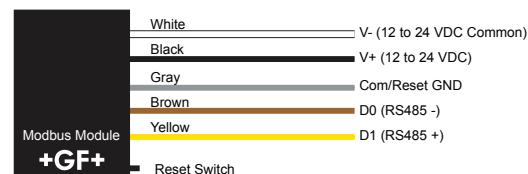
3-9900.270-M3 version: with M12 Connector (Field Mount Only)

Cable assembly with 6" wires with M12 Connector

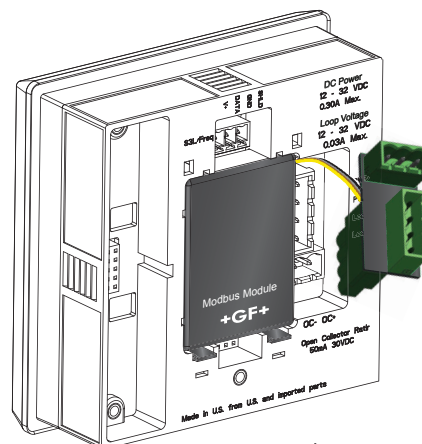


3-9900.270-M4 version: Wire Cable

Cable assembly with 6" Wires - pig tail



Example showing M2 version



3-9900
Panel Mount
Transmitter

Plug in Module,
directing wires
around Power/OC
terminals. **Do not
pinch wires!**



For M2 panel installation.
Restrain terminal block assembly
prior to shipping.

Reset

To Reset 3-9900.270-M1

Connect the orange wire to the gray wire as shown. Cycle power on the unit and then disconnect the orange and gray wires.

Note: cover the wire ends with an insulator such as electrical tape to prevent damage to the 9900 or other devices.

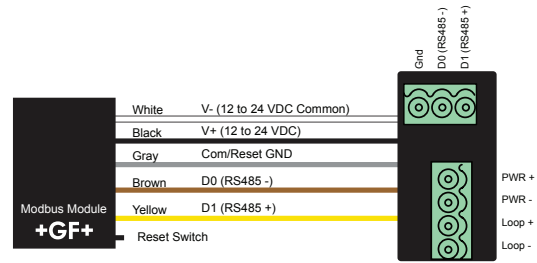
To Reset the 3-9900.270-M2, 3-9900.270-M3 and 3-9900.270-M4

1. Located on the Modbus Module, move the reset switch in down position, away from the Open Collector Terminals.
2. Cycle power on the unit.
This resets unit to factory settings.
Once reset, move the reset switch to the up position, toward the Open Collector Terminals.

IMPORTANT
For normal operation the reset switch must be up, near the Open Collector Terminals.

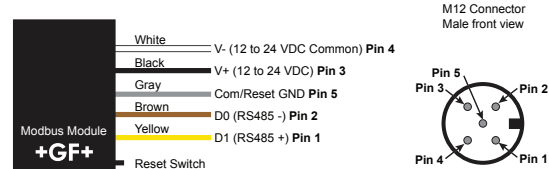
3-9900.270-M2 version: Terminal board (Panel Mount Only)

Cable assembly with 3" wires, inner-connect to board



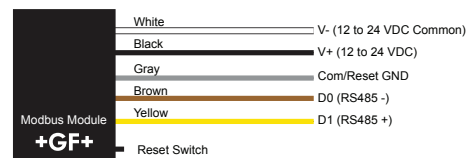
3-9900.270-M3 version: with M12 Connector (Field Mount Only)

Cable assembly with 6" wires with M12 Connector



3-9900.270-M4 version: Wire Cable

Cable assembly with 6" Wires - pig tail

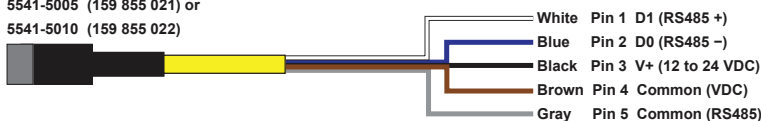


Installation

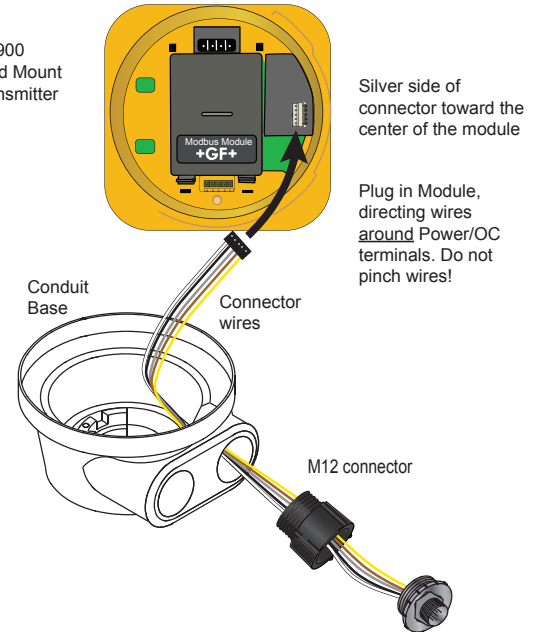
- If the 9900 Base Unit will be mounted in a panel, plug-in modules may be installed either before or after the base unit is mounted.
- If the 9900 Base Unit will be mounted using the accessory wall mount kit (3-9900.392), install plug-in modules first.
- If the Direct Conductivity/Resistivity Module or Current Loop Module will be included in your unit, install the Modbus module first and then install Conductivity/Resistivity Module over the Modbus Module.
- Attach the output connector to the terminal block on the Modbus Module prior to installing in the 9900. When inserting the Modbus module with the wiring connector ensure the wires are not pinched by the power or open collector terminal blocks of the 9900.
 1. Disconnect power from the 9900.
 2. Attach the wire harness prior to installing the module.
 3. Carefully align pins and connectors then push module firmly into place (see illustration).
 4. **Ensure the cable is not crimped between the module housing and the 9900 Power or OC terminals.**
 5. To uninstall, squeeze tabs, grasp the module and pull straight out.

M12 Cable Wiring Diagram

5541-5005 (159 855 021) or
5541-5010 (159 855 022)



3-9900
Field Mount
Transmitter



Example showing M3 version

Modbus Register Map

Live Reading

Register	Size	Read/Write	Data Type	Description
40001	2	Read	UINT	Status
40003	2	Read	Float	Primary Reading
40005	2	Read	Float	Secondary Reading
40007	1	Read	UINT	Measurement Type
40008	1	Read	UINT	Primary Units of Measure Code
40009	1	Read	UINT	Secondary Units of Measure Code

Communication Settings

Register	Size	Read/Write	Data Type	Description
49001	1	Read/Write	UINT	Modbus Address 1 to 247 (Default 34)
49002	1	Read/Write	UINT	Network Termination, 1 = ON 0 = Off (Default 0)
49003	1	Read/Write	UINT	Modbus Mode 0 Modbus RTU 1 Modbus ASCII (Default 0)
49004	1	Read/Write	UINT	Baud Rate 0 = 1200, 1 = 2400, 2 = 4800, 3 = 9600, 4 = 19200, 5 = 38400, 6 = 57600, 7 = 115200 (Default 4)
49005	1	Read/Write	UINT	Parity 0 = No Parity, 1 = Odd Parity, 2 = Even Parity (Default 2)
49006	1	Read/Write	UINT	Floating Point Little Endian = 0, Big Endian = 1 (Default 1)
49007	1	Read/Write	UINT	Write 0 (zero) to save registers, Write Modbus Address to save registers and reboot

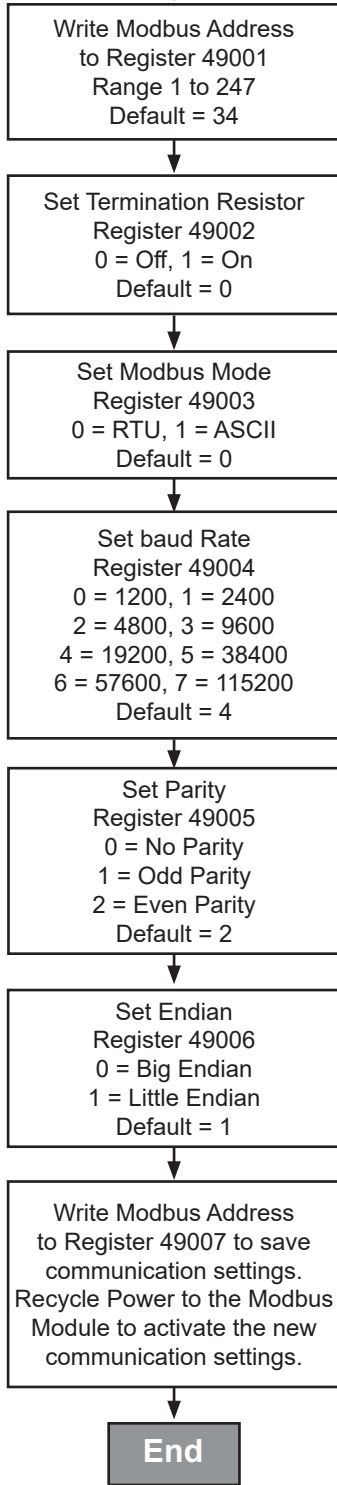
Communication Diagnostic Registers

Register	Size	Read/Write	Data Type	Description
49104	1	Read	UINT	9900 HSB Transactions
49105	1	Read	UINT	Second Counter
49106	1	Read	UINT	Bus Message Counter
49107	1	Read	UINT	Bus Message Error Counter
49108	1	Read	UINT	Slave Exception Counter
49109	1	Read	UINT	Slave Message Counter
49110	1	Read	UINT	Slave No Response Counter
49111	1	Read	UINT	Slave NAK Counter
49112	1	Read	UINT	Slave Busy Counter
49113	1	Read	UINT	Bus Character Overrun Counter

Device Identification

49501	15	Read	STR	Vendor Name "Georg Fischer Signet"
49516	10	Read	STR	Product Code "3-9900-1x"
49526	10	Read	STR	Major/Minor Revision 9900 Transmitter "xx-xxX"
49536	15	Read	STR	Vendor URL "www.gfps.com"
49551	10	Read	STR	Product Name "SmartPro"
49561	10	Read	STR	Model Name "9900"
49571	10	Read/Write	STR	User Application Name
49581	5	Read/Write	STR	Tag Name
49586	5	Read/Write	STR	Location
49591	5	Read	STR	9900 Serial Number "1204240438" Leading "6" dropped
49596	5	Read	STR	Modbus Module Serial Number "111317"
49601	1	Read	UINT	Manufacture Code 0x0032
49602	2	Read	UINT	Module Version 0x30010004 Version 1.00.04

Communication Settings Programming

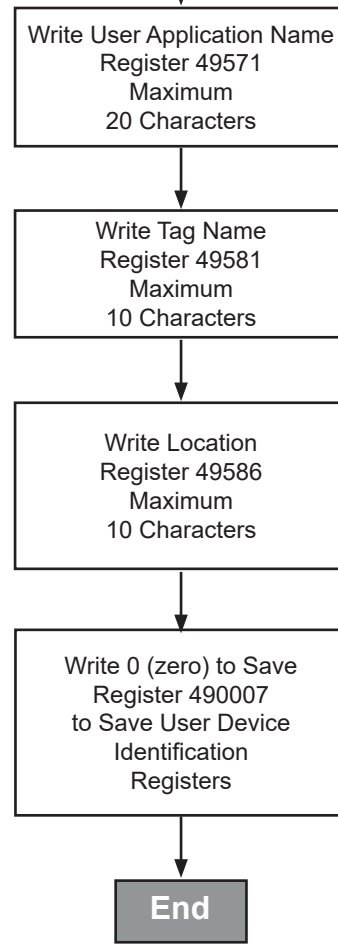


Note:

If RTU is selected
Data Bits = 8 and Stop Bits = 1

If ASCII Mode is selected
Data Bits = 7 and Stop Bits = 2

User Tag Programming



Programming Map

Readings / Sensors

Instrument Type	Measurement Type Reg 40007	Primary Reg 40003	Secondary Reg 40005
Factory ¹	0x0000	NA	NA
Flow	0x4201	Flow	Totalizer ²
pH	0x5102	pH	Temperature
ORP	0x5103	ORP	Raw mV
Cond/Res	0x5704	Cond/Res	Temperature
Pressure	0x4105	Pressure	NA
Level/Volume	0x5C06	Level	Volume
Temperature	0x4007	Temperature	NA
4 to 20 mA Input	0x0008	Scaled Input	Raw mA
Salinity	0x5A09	Salinity	Temperature
Dissolved Oxygen	0x510B	Dissolved Oxygen	Temperature
Batch	No Modbus Operation in Batch Mode		

1. Factory and Batch Instrument types do not update the Primary or Secondary readings.
2. Secondary readings for flow are only available in 9900 Generation 4 or greater transmitters.
In Generation 4 transmitters the user can set the secondary reading to be either the permanent or resettable Totalizer.

Status Register

Registers 40001 – 40002

Register.Bit	Description
40001.0	Sensor reading is Good, no errors
40001.1	Wrong Sensor Connected
40001.2	Check Sensor
40001.3	Missing Sensor
40001.4	Sensor Error
40001.5	Secondary Reading is Totalizer
40001.6	Secondary Reading not Available
40001.7	Reset to Default Jumper Active
40001.8	9900 Communication Active
40001.9	Manufacturing Area Protected
40001.10	Device using Default Communication Parameters
40001.11 – 40002.15	Not Used

Format (Byte Orders)

Floats

Register	Data	Bytes
IEEE754 Float	0x570A4318	
Result	152.34	
49006	0	Big Endian
40003	0x570A	C D
40004	0x4318	A B
49006	1	Little Endian
40003	0x4318	A B
40004	0x570A	C D

Programming Map

Unit of Measure	Code	Description
Flow (Primary)		
GPS	22	Gallons per Second
GPM	16	Gallons per Minute
GPH	136	Gallons per Hour
GPD	235	Gallon per Day
LPS	24	Liters per Second
LPM	17	Liters per Minute
LPH	138	Liters per Hour
M3/M	131	Cubic Meters per Minute
M3/H	19	Cubic Meters per Hour
M3/D	29	Cubic Meters per Day
FT3/M	15	Cubic Feet per Minute
FT3/H	130	Cubic Feet per Hour
FT3/D	27	Cubic Feet per Day
MG/D	23	Million Gallons per Day
ML/D	25	Million Liters per Day
BPM	133	Barrels per Minute
BPH	134 242	Barrels per Hour
BPD	135	Barrels per Day
FT/S	20	Feet per Second
M/S	21	Meters per Second
All Others	252	All other flow units
Flow Totalization (Secondary)		
All Units	240	
pH (Primary)		
pH	59	pH
pH Temperature (Secondary) Important Requires power cycle to update		
Temperature C	32	Degrees Celsius
Temperature F	33	Degrees Fahrenheit
ORP (Primary and Secondary)		
mV	36	Millivolts
Conductivity (Primary)		
uS	67	microSiemens
mS	66	milliSiemens
PPM	139	Parts per Million
PPB	169	Parts per Billion
KOhms	163	Kilo Ohms
MOhms	170	Mega Ohms
Conductivity Temperature (Secondary)		
Temperature C	32	Degrees Celsius
Temperature F	33	Degrees Fahrenheit
Pressure		
PSI	6	Pounds per Square Inch
Bar	7	Bars
KPa	12	Kilopascals

Programming Map

Unit of Measure	Code	Description
Level/Volume (Level)		
FT	44	Feet
IN	47	Inches
M	45	Meters
CM	48	Centimeters
Level/Volume (Volume)		
FT3	112	Cubic Feet
IN3	113	Cubic Inches
M3	43	Cubic Meters
CM3	240	Cubic Centimeters
GAL	40	Gallons
LIT	41	Liters
Lb	63	Pounds
KG	61	Kilograms
Temperature		
C	32	Degrees Celsius
F	33	Degrees Fahrenheit
4 to 20 mA Input		
Scaled Input	252	Scaled 4 – 20 mA Input
Raw mA	251	Raw 4 – 29 mA Input Current
Salinity (Primary)		
PPT	244	Parts per Thousand
Salinity Temperature (Secondary) Important requires power cycle to update		
C	32	Degrees Celsius
F	33	Degrees Fahrenheit
Dissolved Oxygen (Primary)		
PPM	139	Parts per Million
% SAT	57	Percent
TOR	13	Torr
Dissolved Oxygen Temperature (Secondary)		
C	32	Degrees Celsius
F	33	Degrees Fahrenheit

Ordering Information

Part Number	Code	Description
3-9900.270-M1	159 200 120	Modbus Module with Wire Cable Assembly
3-9900.270-M2	159 200 121	Modbus Module with Terminal Block Assembly
3-9900.270-M3	159 200 122	Modbus Module with M12 Connector Assembly
3-9900.270-M4	159 200 128	Modbus Module with Wire Cable Assembly
3-9900.270-CB1	159 200 123	Replacement Wire Cable Assembly for M1
3-9900.270-CB2	159 200 124	Replacement Terminal Block Assembly for M2
3-9900.270-CB3	159 200 125	Replacement M12 Connector Assembly for M3
3-9900.270-CB4	159 200 129	Replacement Cable Assembly for M4
5541-5005	159 855 021	5 meter (16 ft) M12 cable
5541-5010	159 855 022	10 meter (32 ft) M12 cable



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