
BACnet Protocol Guide

TGR Series

Senva Sensors
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TGR Series

154-0048-0A

Rev.	Release Date	By	Description of Change	ECR
0A		NJS	Initial Release	---

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See Also:

152-0386 TGR Installation Guide



154-0048 TGR Modbus Protocol Guide



Protocol Implementation Conformance Statement

Date	5/13/2021
Vendor Name	Senva Sensors
Product Name	TGR Toxic Gas Resseed
Product Model Number	TGR-XXX (See catalog for model numbering)
Firmware Revision	VSHP 14.10
Application Software Version	1.1.x
BACnet Protocol Revision	14
Product Description	Low Voltage Toxic Gas Sensor
BACnet Standardized Device Profile	BACnet Application Specific Controller (B-ASC)
List of BACnet Interoperability Building Blocks Supported	DS-RP-B, DS-RPM-B, DS-WP-B, DM-DDB-B, DM-DOB-B DM-DCC-B, DM-RD-B
Segmentation Capability	No Support
Standard Object Types Supported	See following. Optional implementations are marked .
Data Link Layer Options	MS/TP Master
Device Address Binding	No Support
Networking Options	No Support
Character Sets Supported	ISO 10646 (UTF-8)
Communications Gateway	No Support
Network Security Options	Non-Secure Device

Configuration

Congratulations on installing your Senva Modbus TGR Series Toxic Gas monitor. The *BACnet Protocol Guide* assumes the first stage of installation is complete, with the TGR connected to your local RS485 network and powered.

See "TGR Installation Manual" for setup.



Device information can be configured or referenced using the below table.

Property	Min/Max	Default	Read	Functionality
OBJECT_IDENTIFIER (DEVICE INSTANCE)	0 / 4194302	655xxx	R/W	Set from factory to 655xxx where xxx is the last 3 digits of the serial number of the device.
OBJECT_NAME	N/A	Device Name	R/W	The device allocates 64 bytes for string values.
DESCRIPTION	N/A	Device Description	R/W	The device allocates 64 bytes for string values.
LOCATION	N/A	Device Location	R/W	The device allocates 64 bytes for string values.
PROFILIE_NAME	N/A	665-Device-TGR	read only	
MODEL_NAME	N/A	Varies	read only	Set from factory to complete part number.
VENDOR_NAME	N/A	Senva Inc.	read only	
APPLICATION_SOFTWARE_VERSION	N/A	Varies	read only	Set from factory.
FIRMWARE_REVISION	N/A	VSHP 14.10	read only	
MAX_MASTER	0 / 127	127	R/W	
VENDOR_IDENTIFIER	665	665	read only	
PROTOCOL_VERSION	1	1	read only	
PROTOCOL_REVISION	14	14	read only	

Analog Inputs

Register	Description	Read	Functionality
AI1	Sensor1Readings	R	Read the current instantaneous readings for sensor 1.
AI2	Sensor1TWA5Reading	R	Read the time weighted average of the past 5 minutes of sensor 1 readings.
AI3	Sensor1TWA15Reading	R	Read the time weighted average of the past 15 minutes of sensor 1 readings.
AI4	Sensor1TWA60Reading	R	Read the time weighted average of the past 60 minutes of sensor 1 readings.
AI5	Sensor1AirQuality	R	Reads the state of sensor 1. 0 = Normal; 1 = Trouble; 2 = Warning; 3 = Alarm; 4 = Extended Alarm (Buzzer and alarm relay active if not disabled)
AI6	Sensor1Status	R	Read the status of sensor 1. 1 = Sensor Never Present; 2 = EOL; 4 = Pulse Failure; 8 = Init failure; 16 = No Sensor Present; 32 = Other; 64 = Sensor detected; 128 = Sensor Ready
AI7	Sensor1CalDaysRemaining	R	Read the number of days remaining until sensor 1 needs to be recalibrated.
AI8	Sensor1LifeDaysRemaining	R	Read the number of days remaining on the sensor lifetime.
AI9	Sensor2Reading	R	Read the current instantaneous readings for sensor 2.
AI10	Sensor2TWA5Reading	R	Read the time weighted average of the past 5 minutes of sensor 2 readings.
AI11	Sensor2TWA15Reading	R	Read the time weighted average of the past 15 minutes of sensor 2 readings.
AI12	Sensor2TWA60Reading	R	Read the time weighted average of the past 60 minutes of sensor 2 readings.
AI13	Sensor2AirQuality	R	Reads the state of sensor 2. 0 = Normal; 1 = Trouble; 2 = Warning; 3 = Alarm; 4 = Extended Alarm (Buzzer and alarm relay active if not disabled)
AI14	Sensor2Status	R	Read the status of sensor 2. 1 = Sensor Never Present; 2 = EOL; 4 = Pulse Failure; 8 = Init failure; 16 = No Sensor Present; 32 = Other; 64 = Sensor detected; 128 = Sensor Ready

Register	Description	Read	Functionality
AI15	Sensor2CalDaysRemaining	R	Read the number of days remaining until sensor 2 needs to be recalibrated.
AI16	Sensor2LifeDaysRemaining	R	Read the number of days remaining on the sensor lifetime.
AI17	TroubleRelayState	R	Read the state of the Trouble relay.
AI18	AlarmRelayState	R	Read the state of the Alarm relay.
AI19	SystemStatus	R	1 = I2C error; 2 = CRC error; 4 = Write Error; 8 = Using Factory Defaults; 16 = Sensor error; 32 = sensor warning; 64 = nfc error; 128 = assert
AI20	AirQualityState	R	Gives the state of the overall device, read the individual sensor states to see which sensor is in which state. 0 = Normal; 1 = Trouble; 2 = Warning; 3 = Alarm; 4 = Extended Alarm (Buzzer and alarm relay active if not disabled).

Open = 0
Closed = 1

Analog Values

Register	Description	Read	Functionality
AV1	Sensor1GasType	R	Read the type of sensor 1.
AV2	Sensor1SpanMax	R	The maximum value that sensor 1 can detect. The sensor cannot detect above this value.
AV3	Sensor1SpanMin	R	The minimum value that sensor 1 can detect. The sensor cannot detect bellow this value.
AV4	Sensor1Warning	R/W	Warning relay setpoint for Sensor 1.
AV5	Sensor1Alarm	R/W	Alarm relay setpoint for Sensor 1.
AV6	Sensor1Hysteresis	R/W	Sets how far sensor 1's gas level must fall below a setpoint before the device will fall below the alarm or warning state.
AV7	Sensor1TWA5SP	R	Alarm setpoint for the 5-minute time weights average. When in fire safety mode device will alarm if sensor 1 is over this setpoint for 5 minutes.
AV8	Sensor1TWA15SP	R	Alarm setpoint for the 15-minute time weights average. When in fire safety mode device will alarm if sensor 1 is over this setpoint for 15 minutes.
AV9	Sensor1TWA60SP	R	Alarm setpoint for the 60-minute time weights average. When in fire safety mode device will alarm if sensor 1 is over this setpoint for 60 minutes.
AV10	Sensor1FactoryReset	R	Can use this point to reset the calibration of sensor 1 back to factory defaults.
AV11	Sensor2GasType	R	Read the type of sensor 2.
AV12	Sensor2SpanMax	R	The maximum value that sensor 2 can detect. The sensor cannot detect above this value.
AV13	Sensor2SpanMin	R	The minimum value that sensor 2 can detect. The sensor cannot detect bellow this value.
AV14	Sensor2Warning	R/W	Warning relay setpoint for Sensor 2.
AV15	Sensor2Alarm	R/W	Alarm relay setpoint for Sensor 2.

Register	Description	Read	Functionality
AV16	Sensor2Hysteresis	R/W	Sets how far sensor 2's gas level must fall below a setpoint before the device will fall below the alarm or warning state.
AV17	Sensor2TWA5SP	R	Alarm setpoint for the 5-minute time weights average. When in fire safety mode device will alarm if sensor 2 is over this setpoint for 5 minutes.
AV18	Sensor2TWA15SP	R	Alarm setpoint for the 15-minute time weights average. When in fire safety mode device will alarm if sensor 2 is over this setpoint for 15 minutes.
AV19	Sensor2TWA60SP	R	Alarm setpoint for the 60-minute time weights average. When in fire safety mode device will alarm if sensor 2 is over this setpoint for 60 minutes.
AV20	Sensor2CalReset	R/W	Can use this point to reset the calibration of sensor 2 back to factory defaults.
AV21	CO2Offset*	R/W	If the device has a CO2 sensor installed this can be used to set an offset.
AV22	CO2AutoCal*	R/W	Enables or disables the CO2 sensor auto calibration feature, for Dual channel sensor this should be disabled.
AV23	CO2AutoCalBaseline*	R/W	Sets the baseline PPM value for the CO2 auto calibration feature.
AV24	CO2AutoCalPeriod*	R/W	Sets the period in days for the CO2 auto calibration feature.
AV25	TroubleRelayPolarity	R/W	Sets the active Polarity of the trouble relay
AV26	TroubleRelayOnTime	R/W	Sets the minimum off time of the trouble relay.
AV27	TroubleRelayOffTime	R/W	Sets the maximum off time of the trouble relay.
AV28	AlarmRelayPolarity	R/W	Sets the active Polarity of the alarm relay
AV29	AlarmRelayOnTime	R/W	Sets the minimum off time of the alarm relay.
AV30	AlarmRelayOffTime	R/W	Sets the maximum off time of the alarm relay.
AV31	FactoryReset	R/W	Restore the device to its factory defaults.

Register	Description	Read	Functionality
AV32	Protocol	R/W	Shows the protocol set for the device communication.
AV33	MACAddress	R/W	Sets the device BACnet address.
AV35	BaudRate	R/W	Sets the baud rate of the device.
AV36	Data/Parity/Stop	R/W	Sets the BACnet Data/Parity/stop bit of the device.
AV37	SilenceEnable	R/W	Will silence the device alarm.
AV38	FireControlModeEnabled	R/W	Used to enable fire control mode.
AV39	Sensor 1 IDLH Setpoint	R/W	Immediate health and danger setpoint, device will immediately alarm when in fire safety mode if sensor 1 ever reads about this setpoint.
AV40	Sensor 2 IDLH Setpoint	R/W	Immediate health and danger setpoint, device will immediately alarm when in fire safety mode if sensor 2 ever reads about this setpoint.

*CO2 Sensor must be installed on the device for points AV21-24