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**INDUSTRIAL CONTROL COMMUNICATIONS, INC.**

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# **Macurco Modbus Monitor Driver Manual**

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# 1 Macurco Modbus Monitor

## 1.1 Overview

This driver supports the Macurco Modbus Monitor protocol. Some notes of interest are:

- Enables non-intrusive monitoring of gas reading and alarm information for a Macurco Modbus RTU gas detector network in conjunction with a DVP-120M exhaust fan controller.
- Compatible with all Macurco 6-Series type detectors equipped with a MRS-485 adapter.
- Allows monitoring up to 99 remote gas detectors connected on a single bus.
- No configuration necessary: data is automatically mapped into the database upon selection of the protocol. Refer to section 1.2 for more information.
- Network characteristics default to 19200 baud, 8 data bits, 1 start bit, 1 stop bit and even parity to match gas detector default values.
- Gas reading values are automatically scaled for each detector type to a normalized value using a 0.1 scaler.
- The driver continuously monitors communications on the network and can separately detect when individual gas detectors are unresponsive or go offline and when the DVP-120M itself is no longer making requests or goes offline.

## 1.2 Data Mapping

This section describes the non-configurable data mapping for the Macurco Modbus Monitor protocol. Each parameter is a 16-bit word containing either data values or bit-wise data. Note that for all bit-wise parameters, bits not described in the parameter's bit mapping are to be considered reserved. Table 1 describes the layout of this information in the internal database.

**Table 1: Macurco Modbus Database Mapping**

Database Address	+0	+2	+4	+6
0	S1 Sensor ID Type & Gas ID Type	S1 MRS-485 Status & Settings	S1 Registration Status	S1 Normalized Reading
16	S2 Sensor ID Type & Gas ID Type	S2 MRS-485 Status & Settings	S2 Registration Status	S2 Normalized Reading
1360	S98 Sensor ID Type & Gas ID Type	S98 MRS-485 Status & Settings	S98 Registration Status	S98 Normalized Reading
1376	S99 Sensor ID Type & Gas ID Type	S99 MRS-485 Status & Settings	S99 Registration Status	S99 Normalized Reading



### **Sensor ID Type & Gas ID Type**

This parameter is the numerical encoding of the sensor ID type and gas ID type. The sensor ID type is stored in the least-significant byte of this value and is determined during the detector's registration procedure. The possible values are enumerated in Table 2 below.

The gas ID type is stored in the most-significant byte of this value. The gas ID type is not currently used and will always read 0.

**Table 2: Macurco Sensor ID Definitions**

Sensor ID Type	Detector	Sensor ID Type	Detector
1	CM-6	6	RD-6
2	TX-6 ND	7	CD-6
3	GD-6	8	OX-6
4	TX-6 AM	9	CD-6H
5	TX-6 HS		

### **MRS-485 Status & Settings**

This parameter provides status and setting information for the MRS-485 adapter installed on the detector. This is a bit-wise parameter with the following bit mapping:

#### *MRS-485 Status:*

- Bit 0 – Current EEPROM settings not initialized
- Bit 1 – Current EEPROM settings have a bad checksum
- Bit 2 – Factory EEPROM settings not initialized
- Bit 3 – Factory EEPROM settings have bad checksum
- Bit 4 – Unknown sensor exponent value
- Bit 5 – Watchdog reset
- Bit 6 – Factory EEPROM settings are loaded in current EEPROM settings
- Bit 7 – Latched sensor type different than registered sensor type
- Bit 8 – Unknown sensor type

#### *MRS-485 Settings:*

- Bit 9 to Bit 14 – Latched sensor type
- Bit 15 – Registration latch enabled

### **Registration Status**

This parameter corresponds to the current registration status of the detector. This is a bit-wise parameter with the following bit mapping:

- Bit 10 – MRS-485 status not zero
- Bit 11 – Startup (set during the first 60 seconds after a reset)
- Bit 12 – Over range
- Bit 13 – Trouble
- Bit 14 – Registration in progress
- Bit 15 – New registration detected

### **Normalized Reading**

This parameter is the current gas reading of the corresponding detector, normalized using a scaler of 0.1. For example, if the current gas reading is 15.7, the value of the normalized reading is 157.

The driver will set this value to 0xFFFF (65535) if a detector's reading is unreliable. Possible causes of an unreliable reading include:

- Invalid sensor ID type
- Registration status is non-zero
- The reading is under or over range
- A successful request/response has not been detected for the reading (i.e. a timeout occurred or a detector does not exist)
- The DVP-120M is no longer making requests on the network



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