



RECEIVER REFERENCE MANUAL

TorqueTrak 50

Binsfeld Engineering Inc.

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TORQUETRAK 50 SPM-ION

Receiver Reference Manual



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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of the RX50 reference guide document is to provide users with the information needed to communicate over Modbus and pull sample data from binary log files. Each Modbus register has a bit table describing how to configure the RX50 and TX50 over Modbus. Log files can be parsed using the byte format map which describes all the values included in the log file header.

1.2 DEFINITIONS

- **ADU:** Application Data Unit
- **PDU:** Protocol Data Unit
- **RTU:** Remote Terminal Unit
- **RX50:** TorqueTrak 50 Receiver
- **TX50:** TorqueTrak 50 Transmitter

1.3 REFERENCES

- [1] MODBUS Application Protocol Specification v1.1b3
- [2] MODBUS Over Serial Line Specification and Implementation Guide v1.02
- [3] MODBUS Messaging over TCP / IP Implementation Guide

2.0 MODBUS

The RX50 supports Modbus TCP and RTU interfaces so the user can configure and receive data from the TX50. The RX50 behaves as a slave to a host device and the RX50 slave address is configurable. The host device must send requests to the RX50 and receives a response or exception message. The Modbus registers supported by the RX50 are all located in the Analog Output Holding Register addresses, starting at 40001, and can be read / written.

Each Modbus message has an ADU, application data unit, and a PDU, protocol data unit. All Modbus data is encoded as Big-Endian. The ADU is transport specific which typically includes the PDU, which is common between the various types of transport. See [1] for additional details about the Modbus protocol.

2.1 MODBUS PDU

The PDU consists of a function code and the function data. The RX50 supports reading multiple registers, writing a signal register, and writing multiple registers.

2.1.1 Supported Function Codes

2.1.1.1 Read Multiple Holding Registers – 0x03

Read 1 or more registers, up to 125 registers, in a row at the same time.

Table 1: Read Holding Registers PDU

0x03	16-bit Address of First Register	16-bit Number of Registers to Read
------	----------------------------------	------------------------------------

2.1.1.2 Write Single Register- 0x06

Write a single 16-bit holding register.

Table 2: Write Single Register PDU

0x06	16-bit Register Address	16-bit Register Data
------	-------------------------	----------------------

2.1.1.3 Write Multiple Registers – 0x10

Write multiple holding registers, up to 123 registers, in a row at the same time.

Table 3: Write Multiple Registers PDU

0x10	16-bit Address of First Register	16-bit Number of Registers to Write	16-bit Register Data Bytes
------	----------------------------------	-------------------------------------	----------------------------

2.1.2 Response

Modbus response PDUs are similar to the requests. The response includes the function code from the request, the length of data in the response, and the register data.

Table 4: Modbus Response PDU

Function Code	Data Length	Register Data
1 Byte	2 Bytes	

2.1.3 Exceptions

If a request cannot be completed by the receiver, the RX50 sends a Modbus exception. Modbus exception PDUs include the function code added to 0x80, and an error code.

Table 5: Modbus Exception PDU

Function Code + 0x80	Error Code
----------------------	------------

The following error codes are supported by the RX50:

2.1.3.1 Illegal Function Error Code – 0x01

An illegal function exception is returned when the RX50 is not in the state to handle the request. For example, a write to the configuration is requested while the system is capturing data, an illegal function is returned.

2.1.3.2 Illegal Data Address Error Code – 0x02

An illegal data address exception is returned when a request is received with an invalid register address.

2.1.3.3 Illegal Data Value Error Code – 0x03

An illegal data value exception is returned when the data included in a request is invalid.

2.1.3.4 Slave Device Failure Error Code – 0x04

The slave has encountered an error that is not recoverable.

2.1.4 Serial RTU ADU

Modbus RTU includes the slave address at the beginning of the message, the PDU, and a CRC at the end. See [2] for timing specifics.

Table 6: Serial RTU ADU

Address	PDU	CRC
1 Byte		2 Bytes

2.1.4.1 Address

The slave address a request is being sent to or the slave address a response is being sent from. The address is 1 byte and can be values from 1-255. Address 0 is reserved for broadcast messages to all slaves on the bus.

2.1.4.2 CRC

Modbus RTU uses the CRC-16-ANSI algorithm, Polynomial: $x^{16} + x^{15} + x^2 + 1$, to calculate the message CRC.

2.1.5 TCP / IP ADU

Modbus over TCP / IP messages include a 7 byte MBAP header followed by the Modbus PDU. TCP / IP handles messaging integrity, so it does not include a CRC at the end like the RTU ADU.

Table 7: Modbus TCP / IP ADU

MBAP 7 Bytes				PDU	
Transaction ID 2 Bytes	Protocol ID 2 Bytes	Length 2 Bytes	Unit ID 1 Byte	Function Code 1 Byte	Data

2.1.5.1 MBAP Header – Transaction ID

The transaction ID is a unique number for each request provided by the master. The slave uses the same ID in its response.

2.1.5.2 MBAP Header – Protocol ID

The protocol ID for Modbus is always 0.

2.1.5.3 MBAP Header – Length

The length includes the size of the Unit ID, PDU function code, and the PDU data.

2.1.5.4 MBAP Header – Unit ID

The Modbus server address, like used in RTU, but is not commonly used in TCP. Default value is 255.

2.2 MODBUS REGISTER MAP

2.2.1 Register Overview

The following registers are supported by the RX50 over Modbus RTU and TCP:

Table 8: Supported Modbus Register Ranges

Address Range	Category
0x0000 - 0x000F	Receiver Information
0x0010 - 0x002F	Network Information
0x0030 - 0x007F	Transmitter Information
0x0080 - 0x008F	Transmitter Status
0x0090 - 0x01FF	Transmitter Data
0x0200 - 0x02FF	Receiver Configuration
0x0300 - 0x03FF	Transmitter Configuration
0x0400 - 0x07FF	Calculation Parameters
0x0800 - 0x081F	Commands

2.2.2 Receiver Information Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0000	40001	Receiver Product ID	1	Unsigned 16-bit	Read
0x0001	40002	Receiver Firmware Version	2	3 bytes	Read
0x0003	40004	Receiver Hardware Version	1	Unsigned 16-bit	Read
0x0004	40005	Receiver Serial Number	1	Unsigned 16-bit	Read

2.2.2.1 Receiver Product ID

The product ID for the receiver, 0x5101, as an unsigned 16-bit integer.

Table 9: Receiver Product ID Bytes

Parameter	Product ID															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1

2.2.2.2 Receiver Firmware Version

The firmware version for the receiver in the format major, minor, and patch number, MM.mm.pp. Major, minor, and patch numbers are unsigned 8-bit integers.

Table 10: Receiver Firmware Version Bytes

Parameter	Reserved								Major							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Parameter	Minor								Patch							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

2.2.2.3 Receiver Hardware Version

The hardware version of the receiver, as an unsigned 16-bit integer.

Table 11: Receiver Hardware Version

Parameter	Major								Minor							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Reset	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.2.4 Receiver Serial Number

The serial number of the receiver, as an unsigned 16-bit integer.

Table 12: Receiver Serial Number

Parameter	Receiver Serial Number															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Reset	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.3 Network Information Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0010	40017	Ethernet status state	1	Unsigned 16-bit	Read
0x0011	40018	Ethernet status IP address	2	Unsigned 32-bit	Read
0x0013	40020	Ethernet status network mask	2	Unsigned 32-bit	Read
0x0015	40022	Ethernet status gateway	2	Unsigned 32-bit	Read
0x0017	40024	Ethernet status MAC ID	3	6 bytes	Read
0x001A	40027	Wi-Fi status state	1	Unsigned 16-bit	Read
0x001B	40028	Wi-Fi status IP address	2	Unsigned 32-bit	Read
0x001D	40030	Wi-Fi status network mask	2	Unsigned 32-bit	Read
0x001F	40032	Wi-Fi status gateway	2	Unsigned 32-bit	Read
0x0021	40034	Wi-Fi status MAC ID	3	6 bytes	Read

2.2.3.1 Ethernet Status – State

The network manager Ethernet state, as an unsigned 16-bit integer.

Table 13: Ethernet Status Bytes

Parameters	State															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0

Table 14: Ethernet State Values**Value Network Device State**

0	UNKNOWN The network device state is unknown.
10	UNMANAGED The network device is recognized, but not managed by NetworkManager.
20	UNAVAILABLE The network device is managed by NetworkManager, but is not available for use. Reasons may include the Wi-Fi switched off, missing firmware, no ethernet carrier, missing supplicant or modem manager, etc.
30	DISCONNECTED The network device can be activated, but is currently idle and not connected to a network.
40	PREPARE The network device is preparing the connection to the network. This may include operations like changing the MAC address, setting physical link properties, and anything else required to connect to the requested network.
50	CONFIG The network device is connecting to the requested network. This may include operations like associating with the Wi-Fi AP, dialing the modem, connecting to the remote Bluetooth device, etc.
60	NEED_AUTH The network device requires more information to continue connecting to the requested network. This includes secrets like Wi-Fi passphrases, login passwords, PIN codes, etc.
70	IP_CONFIG The network device is requesting IPv4 and/or IPv6 addresses and routing information from the network.
80	IP_CHECK The network device is checking whether further action is required for the requested network connection. This may include checking whether only local network access is available, whether a captive portal is blocking access to the Internet, etc.
90	SECONDARIES The network device is waiting for a secondary connection (like a VPN) which must be activated before the device can be activated.
100	ACTIVATED The network device has a network connection, either local or global.
110	DEACTIVATING A disconnection from the current network connection was requested, and the network

device is cleaning up resources used for that connection. The network connection may still be valid.

120	FAILED
	The network device failed to connect to the requested network and is cleaning up the connection request

2.2.3.2 Ethernet Status – IP Address

Current Ethernet IP address, as 4 octets A.B.C.D.

Table 15: Ethernet IP Address Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.3.3 Ethernet Status – Network Mask

Current Ethernet network mask, as 4 octets A.B.C.D.

Table 16: Ethernet Network Mask Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.3.4 Ethernet Status – Gateway

Current Ethernet gateway, as 4 octets A.B.C.D.

Table 17: Ethernet Gateway Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.3.5 Ethernet Status – MAC ID

Ethernet MAC address ID, as 6 octets AA:BB:CC:DD:EE:FF.

Table 18: Ethernet MAC ID Bytes

Parameters	Octet A								Octet B							
Bit	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Parameters	Octet C								Octet D							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Parameters	Octet E								Octet F							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

2.2.3.6 Wi-Fi Status – State

The network manager Wi-Fi state, as an unsigned 16-bit integer.

Table 19: Wi-Fi State Bytes

Parameters	State															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0

See section 2.2.3.1 for the network manager state values.

2.2.3.7 Wi-Fi Status – IP Address

Current Wi-Fi IP address, as 4 octets A.B.C.D.

Table 20: Wi-Fi IP Address Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.3.8 Wi-Fi Status – Network Mask

Current Wi-Fi network mask, as 4 octets A.B.C.D.

Table 21: Wi-Fi Network Mask Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
----------------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

2.2.3.9 Wi-Fi Status – Gateway

Current Wi-Fi gateway, as 4 octets A.B.C.D.

Table 22: Wi-Fi Gateway Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.3.10 Wi-Fi Status – MAC ID

Wi-Fi MAC address ID, as 6 octets AA:BB:CC:DD:EE:FF.

Table 23: Wi-Fi MAC ID Bytes

Parameters	Octet A								Octet B							
Bit	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Parameters	Octet C								Octet D							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Parameters	Octet E								Octet F							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

2.2.4 Transmitter Information Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0030	40049	Transmitter 1: Product ID	1	Unsigned 16-bit	Read
0x0031	40050	Transmitter 1: Firmware Version	2	3 bytes	Read
0x0033	40052	Transmitter 1: Connection Status	1	Unsigned 16-bit	Read
0x0034	40053	Transmitter 2: Product ID	1	Unsigned 16-bit	Read
0x0035	40054	Transmitter 2: Firmware Version	2	3 bytes	Read
0x0037	40056	Transmitter 2: Connection Status	1	Unsigned 16-bit	Read
0x0038	40057	Transmitter 3: Product ID	1	Unsigned 16-bit	Read
0x0039	40058	Transmitter 3: Firmware Version	2	3 bytes	Read
0x003B	40060	Transmitter 3: Connection Status	1	Unsigned 16-bit	Read
0x003C	40061	Transmitter 4: Product ID	1	Unsigned 16-bit	Read
0x003D	40062	Transmitter 4: Firmware Version	2	3 bytes	Read
0x003F	40064	Transmitter 4: Connection Status	1	Unsigned 16-bit	Read

2.2.4.1 Transmitter X: Product ID

The product ID for transmitter X, as an unsigned 16-bit integer.

Table 24: Transmitter Product ID Bytes

Parameters	Product ID															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.4.2 Transmitter X: Firmware Version

The firmware version for transmitter X in the format major, minor, and patch number, MM.mm.pp.

Table 25: Transmitter X: Firmware Version Bytes

Parameters	Reserved								Major							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Minor								Patch							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.4.3 Transmitter X: Connection Status

The Bluetooth connection status for transmitter X.

Table 26: Transmitter X: Connection Status Bytes

Parameters	Reserved								Status							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 27: Connection Status Bits
Bit 1 Bit 0 Connection Status

0	0	Disconnected
0	1	Disconnecting
1	0	Connecting
1	1	Connected

2.2.5 Transmitter Status Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0080	40129	Transmitter 1: Signal Strength	1	Signed 16-bit	Read
0x0081	40130	Transmitter 1: Supply Voltage	1	Unsigned 16-bit	Read
0x0082	40131	Transmitter 1: Status Register 1	1	Unsigned 16-bit	Read
0x0083	40132	Transmitter 1: Status Register 2	1	Unsigned 16-bit	Read
0x0084	40133	Transmitter 2: Signal Strength	1	Signed 16-bit	Read
0x0085	40134	Transmitter 2: Supply Voltage	1	Unsigned 16-bit	Read
0x0086	40135	Transmitter 2: Status Register 1	1	Unsigned 16-bit	Read
0x0087	40136	Transmitter 2: Status Register 2	1	Unsigned 16-bit	Read
0x0088	40137	Transmitter 3: Signal Strength	1	Signed 16-bit	Read
0x0089	40138	Transmitter 3: Supply Voltage	1	Unsigned 16-bit	Read
0x008A	40139	Transmitter 3: Status Register 1	1	Unsigned 16-bit	Read
0x008B	40140	Transmitter 3: Status Register 2	1	Unsigned 16-bit	Read
0x008C	40141	Transmitter 4: Signal Strength	1	Signed 16-bit	Read
0x008D	40142	Transmitter 4: Supply Voltage	1	Unsigned 16-bit	Read
0x008E	40143	Transmitter 4: Status Register 1	1	Unsigned 16-bit	Read
0x008F	40144	Transmitter 4: Status Register 2	1	Unsigned 16-bit	Read

2.2.5.1 Transmitter X: Signal Strength

The signal strength for transmitter X as a signed byte. The receiver provides the signal strength before the transmitter is connected, but the transmitter provides the signal strength after connection.

Table 28: Transmitter Signal Strength Bytes

Parameters	Reserved								Signal Strength (dBm)							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.5.2 Transmitter X: Supply Voltage

The battery supply voltage in millivolts for transmitter X, as an unsigned 16-bit integer.

Table 29: Transmitter Supply Voltage Bytes

Parameters	Battery Voltage (mV)															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

2.2.5.3 Transmitter X: Status Register 1

The first transmitter status register.

Table 30: Transmitter Status Register 1 Bytes

Parameters	Reserved						Gage 2 Common Mode Exceeded	Gage 2 Under- range
Bit	15	14	13	12	11	10	9	8
Default	0	0	0	0	0	0	0	0
Parameters	Gage 2 Over- range	Gage 1 Common Mode Exceeded	Gage 1 Under- range	Gage 1 Over- range	Reserved	Signal Low Warning	Voltage Low Warning	Voltage Low Error
Bit	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0

2.2.5.4 Transmitter X: Status Register 2

The second transmitter status register. Reserved for future use.

Table 31: Transmitter Status Register 2 Bytes

Parameters	Reserved															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.6 Transmitter Data Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0090	40145	Transmitter 1: RPM	2	Signed 32-bit	Read
0x0092	40147	Transmitter 1 Gage1: Strain Value	1	Signed 16-bit	Read
0x0093	40148	Transmitter 1 Gage1: Calculated Torque / Thrust	2	Signed 32-bit	Read
0x0095	40150	Transmitter 1 Gage 1: Calculated Power	2	Signed 32-bit	Read
0x0097	40152	Transmitter 1 Gage 2: Strain Value	1	Signed 16-bit	Read
0x0098	40153	Transmitter 1 Gage 2: Calculated Torque / Thrust	2	Signed 32-bit	Read
0x009A	40155	Transmitter 1 Gage 2: Calculated Power	2	Signed 32-bit	Read
0x009C	40157	Reserved			
0x009C	40157	Transmitter 2: RPM	2	Signed 32-bit	Read
0x009E	40159	Transmitter 2 Gage1: Strain Value	1	Signed 16-bit	Read
0x009F	40160	Transmitter 2 Gage1: Calculated Torque / Thrust	2	Signed 32-bit	Read
0x00A1	40162	Transmitter 2 Gage 1: Calculated Power	2	Signed 32-bit	Read
0x00A3	40164	Transmitter 2 Gage 2: Strain Value	1	Signed 16-bit	Read
0x00A4	40165	Transmitter 2 Gage 2: Calculated Torque / Thrust	2	Signed 32-bit	Read
0x00A6	40167	Transmitter 2 Gage 2: Calculated Power	2	Signed 32-bit	Read
0x00A8	40169	Reserved			
0x00A8	40169	Transmitter 3: RPM	2	Signed 32-bit	Read
0x00AA	40171	Transmitter 3 Gage1: Strain Value	1	Signed 16-bit	Read
0x00AB	40172	Transmitter 3 Gage1: Calculated Torque / Thrust	2	Signed 32-bit	Read
0x00AD	40174	Transmitter 3 Gage 1: Calculated Power	2	Signed 32-bit	Read
0x00AF	40176	Transmitter 3 Gage 2: Strain Value	1	Signed 16-bit	Read
0x00B0	40177	Transmitter 3 Gage 2: Calculated Torque / Thrust	2	Signed 32-bit	Read
0x00B2	40179	Transmitter 3 Gage 2: Calculated Power	2	Signed 32-bit	Read
0x00B4	40181	Reserved			
0x00B4	40181	Transmitter 4: RPM	2	Signed 32-bit	Read
0x00B6	40183	Transmitter 4 Gage1: Strain Value	1	Signed 16-bit	Read
0x00B7	40184	Transmitter 4 Gage1: Calculated Torque / Thrust	2	Signed 32-bit	Read
0x00B9	40186	Transmitter 4 Gage 1: Calculated Power	2	Signed 32-bit	Read
0x00BB	40188	Transmitter 4 Gage 2: Strain Value	1	Signed 16-bit	Read
0x00BC	40189	Transmitter 4 Gage 2: Calculated Torque / Thrust	2	Signed 32-bit	Read
0x00BE	40191	Transmitter 4 Gage 2: Calculated Power	2	Signed 32-bit	Read

2.2.6.1 Transmitter X: RPM

The RPM reported by transmitter X as an unsigned 32-bit integer. If the transmitter is configured to use the gyroscope, the value is in tenths of an RPM. Otherwise, the value is in RPMs.

Table 32: Transmitter RPM Bytes

Parameters	RPM															
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Parameters	RPM															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.6.2 Transmitter X Gage N: Strain Values

Unitless strain value for gage N of transmitter X, as a signed 16-bit integer.

Table 33: Transmitter Gage Strain Values Bytes

Parameters	Strain															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.6.3 Transmitter X Gage N: Calculated Torque / Thrust

Calculated torque or thrust in engineering units, which are set in 0, as a signed 32-bit integer.

Table 34: Transmitter Gage Calculated Torque / Thrust Bytes

Parameters	Torque / Thrust															
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Parameters	Torque / Thrust															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.6.4 Transmitter X Gage N: Calculated Power

Calculated power in engineering units, which are set in 0, as a signed 32-bit integer.

Table 35: Transmitter Gage Calculated Power Bytes

Parameters	Power															
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Parameters	Power															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.7 Receiver Configuration Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0200	40513	Units	1	Unsigned 16-bit	Read / Write
0x0201	40514	Calculation Method	1	Unsigned 16-bit	Read / Write
0x0202	40515	Transmitter 1: Serial Number	1	Unsigned 16-bit	Read / Write
0x0203	40516	Transmitter 2: Serial Number	1	Unsigned 16-bit	Read / Write
0x0204	40517	Transmitter 3: Serial Number	1	Unsigned 16-bit	Read / Write
0x0205	40518	Transmitter 4: Serial Number	1	Unsigned 16-bit	Read / Write
0x0206	40519	Modbus RTU: Server Address	1	Unsigned 16-bit	Read / Write
0x0207	40520	Modbus RTU: RS-485 Baud Rate	1	Unsigned 16-bit	Read / Write
0x0208	40521	Modbus RTU: RS-485 Parity	1	Unsigned 16-bit	Read / Write
0x0209	40522	Modbus RTU: Stop Bits	1	Unsigned 16-bit	Read / Write
0x020A	40523	Ethernet Wired Config DHCP or Manual	1	Unsigned 16-bit	Read/Write
0x020B	40524	Modbus TCP Wired: IP Address	2	Unsigned 32-bit	Read/Write
0x020D	40526	Modbus TCP Wired: Subnet Mask	2	Unsigned 32-bit	Read/Write
0x020F	40528	Modbus TCP Wired: Gateway	2	Unsigned 32-bit	Read/Write
0x0211	40530	Ethernet Wi-Fi Config DHCP or Manual	1	Unsigned 16-bit	Read/Write
0x0212	40531	Modbus TCP Wi-Fi: IP Address	2	Unsigned 32-bit	Read/Write
0x0214	40533	Modbus TCP Wi-Fi: Subnet Mask	2	Unsigned 32-bit	Read/Write
0x0216	40535	Modbus TCP Wi-Fi: Gateway Address	2	Unsigned 32-bit	Read/Write
0x0218	40537	Wi-Fi SSID	16	32 bytes	Read / Write
0x0228	40553	Wi-Fi Passphrase	32	64 bytes	Write
0x0248	40585	Real Time Clock	2	Unsigned 32-bit	Read / Write

2.2.7.1 Units

Engineering units used to calculate the torque, thrust, and power.

Table 36: Unit Bytes

Parameters	Reserved															Units
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 37: Units Value
Bit 0 Units

0	Metric
1	English

2.2.7.2 Calculation Method

Method used to calculate torque, thrust, and power.

Table 38: Calculation Method Bytes

Parameters	Reserved															Method
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 39: Calculation Method Values
Bit 0 Calculation Method

0	Physical Parameters
1	Reference Calibration

2.2.7.3 Transmitter X: Serial Number

Transmitter serial number, as an unsigned 16-bit integer.

Table 40: Transmitter Serial Number Bytes

Parameters	Serial Number															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.7.4 Modbus RTU: Server Address

Modbus RTU server address, as an unsigned 16-bit integer. The default server address is 16.

Table 41: Modbus RTU Server Address Bytes

Parameters	Reserved								RTU Server Address							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

2.2.7.5 Modbus RTU: RS-485 Baud Rate

Modbus RTU baud rate, as an unsigned 16-bit integer. The default is 115200.

Table 42: Modbus RTU RS-485 Baud Rate Bytes

Parameters	Reserved													Baud Rate		
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 43: RTU Baud Rate Values

Bit 2	Bit 1	Bit 0	RTU Baud Rate
0	0	0	115200
0	0	1	57600
0	1	0	38400
0	1	1	19200
1	0	0	9600

2.2.7.6 Modbus RTU: RS-485 Parity

Modbus RTU parity bits, as an unsigned 16-bit integer. The default is none.

Table 44: Modbus RTU Parity Bytes

Parameters	Reserved														Parity	
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 45: Modbus RTU Parity Values

Bit 1	Bit 0	RTU Parity
0	0	None
0	1	Even
1	0	Odd

2.2.7.7 Modbus RTU: Stop Bits

Modbus RTU stop bits, as an unsigned 16-bit integer. The default is 1 stop bit.

Table 46: Modbus RTU Stop Bits Bytes

Parameters	Reserved														Stop Bits	
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 47: Modbus RTU Stop Bits Values

Bit 0	RTU Stop Bits
0	1 Stop Bit
1	2 Stop Bits

2.2.7.8 Ethernet Configuration DHCP or Manual

Bit to configure Ethernet to use DHCP network configuration or the manual network configuration defined in following registers. The default is manual configuration.

Table 48: Ethernet DHCP or Manual Bytes

Parameters	Reserved															DHCP or Manual
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 49: DHCP or Manual Bit

Bit 0	Configuration
0	DHCP
1	Manual

2.2.7.9 Modbus TCP Wired: IP address

Modbus wired TCP IP address, as a set of 4 octets in a 32-bit integer. The default is 192.168.0.100.

Table 50: Modbus TCP IP Address Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	1	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0

2.2.7.10 Modbus TCP Wired: Subnet Mask

Modbus wired TCP subnet mask as a set of 4 octets in a 32-bit integer. The user can write a static configuration, otherwise the DHCP assigned subnet mask is given. The default is 255.255.255.0.

Table 51: Modbus TCP Subnet Mask Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0

2.2.7.11 Modbus TCP Wired: Gateway Address

Modbus wired TCP gateway address is a set of 4 octets in a 32-bit integer. The user can write a static configuration, otherwise the DHCP assigned gateway address is given. The default is 192.168.0.1.

Table 52: Modbus TCP Gateway Address Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	1	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0

Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

2.2.7.12 Wireless Configuration DHCP or Manual

Bit to configure Wi-Fi to use DHCP network configuration or the manual network configuration defined in following registers. The default is manual configuration.

Table 53: Ethernet DHCP or Manual Bytes

Parameters	Reserved															DHCP or Manual
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 54: DHCP or Manual Bit
Bit 0 Configuration**

0	DHCP
1	Manual

2.2.7.13 Modbus TCP Wireless: IP address

Modbus wireless TCP IP address, as a set of 4 octets in a 32-bit integer.

Table 55: Modbus TCP IP Address Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Parameters	Octet C								Octet D							
------------	---------	--	--	--	--	--	--	--	---------	--	--	--	--	--	--	--

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.7.14 Modbus TCP Wireless: Subnet Mask

Modbus wireless TCP subnet mask as a set of 4 octets in a 32-bit integer. The user can write a static configuration, otherwise the DHCP assigned subnet mask is given.

Table 56: Modbus TCP Subnet Mask Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.7.15 Modbus TCP Wireless: Gateway Address

Modbus wireless TCP gateway address is a set of 4 octets in a 32-bit integer. The user can write a static configuration, otherwise the DHCP assigned gateway address is given.

Table 57: Modbus TCP Gateway Address Bytes

Parameters	Octet A								Octet B							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Octet C								Octet D							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.7.16 Wi-Fi SSID

Wi-Fi SSID of the receiver Wi-Fi configuration that is a null terminated ASCII string up to 64 bytes. The user can write the new SSID or the current SSID can be read.

2.2.7.17 Wi-Fi Passphrase

Wi-Fi WPA2 passphrase used in the Wi-Fi network configuration in an null terminated ASCII string up to 128 bytes. Registers are write-only and the bytes return as 0xFFFF if read.

2.2.7.18 Real Time Clock

Set the real time clock from the given epoch time, seconds elapsed since January 1, 1970 GMT.

Parameters	Epoch
------------	-------

Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters																
Epoch																
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.8 Transmitter Configuration Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0300	40769	Transmitter 1: RPM Sensor Type	1	Unsigned 16-bit	Read / Write
0x0301	40770	Transmitter 1: Hall Sensor PPR	1	Unsigned 16-bit	Read / Write
0x0302	40771	Transmitter 1: Zero RPM Threshold	1	Signed 16-bit	Read / Write
0x0303	40772	Reserved	13		
0x0310	40785	Transmitter 1 Gage 1: Sample Rate	1	Unsigned 16-bit	Read / Write
0x0311	40786	Transmitter 1 Gage 1: Measurement Source	1	Unsigned 16-bit	Read / Write
0x0312	40787	Transmitter 1 Gage 1: Gain	1	Unsigned 16-bit	Read / Write
0x0313	40788	Transmitter 1 Gage 1: Added Reference Shunt	1	Unsigned 16-bit	Read / Write
0x0314	40789	Transmitter 1 Gage 1: AutoZero Coarse (DAC) Offset	1	Unsigned 16-bit	Read / Write
0x0315	40790	Transmitter 1 Gage 1: AutoZero Fine (ADC) Offset	2	Signed 32-bit	Read / Write
0x0317	40792	Reserved	9		
0x0320	40801	Transmitter 1 Gage 2: Sample Rate	1	Unsigned 16-bit	Read / Write
0x0321	40802	Transmitter 1 Gage 2: Measurement Source	1	Unsigned 16-bit	Read / Write
0x0322	40803	Transmitter 1 Gage 2: Gain	1	Unsigned 16-bit	Read / Write
0x0323	40804	Transmitter 1 Gage 2: Added Reference Shunt	1	Unsigned 16-bit	Read / Write
0x0324	40805	Transmitter 1 Gage 2: AutoZero Coarse (DAC) Offset	1	Unsigned 16-bit	Read / Write
0x0325	40806	Transmitter 1 Gage 2: AutoZero Fine (ADC) Offset	2	Signed 32-bit	Read / Write
0x0327	40808	Reserved	25		
0x0340	40833	Transmitter 2: RPM Sensor Type	1	Unsigned 16-bit	Read / Write
0x0341	40834	Transmitter 2: Hall Sensor PPR	1	Unsigned 16-bit	Read / Write
0x0342	40835	Transmitter 2: Zero RPM Threshold	1	Signed	Read /

				16-bit	Write
0x0343	40836	Reserved	13		
0x0350	40849	Transmitter 2 Gage 1: Sample Rate	1	Unsigned 16-bit	Read / Write
0x0351	40850	Transmitter 2 Gage 1: Measurement Source	1	Unsigned 16-bit	Read / Write
0x0352	40851	Transmitter 2 Gage 1: Gain	1	Unsigned 16-bit	Read / Write
0x0353	40852	Transmitter 2 Gage 1: Added Reference Shunt	1	Unsigned 16-bit	Read / Write
0x0354	40853	Transmitter 2 Gage 1: AutoZero Coarse (DAC) Offset	1	Unsigned 16-bit	Read / Write
0x0355	40854	Transmitter 2 Gage 1: AutoZero Fine (ADC) Offset	2	Signed 32-bit	Read / Write
0x0357	40856	Reserved	9		
0x0360	40865	Transmitter 2 Gage 2: Sample Rate	1	Unsigned 16-bit	Read / Write
0x0361	40866	Transmitter 2 Gage 2: Measurement Source	1	Unsigned 16-bit	Read / Write
0x0362	40867	Transmitter 2 Gage 2: Gain	1	Unsigned 16-bit	Read / Write
0x0363	40868	Transmitter 2 Gage 2: Added Reference Shunt	1	Unsigned 16-bit	Read / Write
0x0364	40869	Transmitter 2 Gage 2: AutoZero Coarse (DAC) Offset	1	Unsigned 16-bit	Read / Write
0x0365	40870	Transmitter 2 Gage 2: AutoZero Fine (ADC) Offset	2	Signed 32-bit	Read / Write
0x0367	40872	Reserved	25		
0x0380	40897	Transmitter 3: RPM Sensor Type	1	Unsigned 16-bit	Read / Write
0x0381	40898	Transmitter 3: Hall Sensor PPR	1	Unsigned 16-bit	Read / Write
0x0382	40899	Transmitter 3: Zero RPM Threshold	1	Signed 16-bit	Read / Write
0x0383	40900	Reserved	13		
0x0390	40913	Transmitter 3 Gage 1: Sample Rate	1	Unsigned 16-bit	Read / Write
0x0391	40914	Transmitter 3 Gage 1: Measurement Source	1	Unsigned 16-bit	Read / Write
0x0392	40915	Transmitter 3 Gage 1: Gain	1	Unsigned 16-bit	Read / Write
0x0393	40916	Transmitter 3 Gage 1: Added Reference Shunt	1	Unsigned 16-bit	Read / Write

0x0394	40917	Transmitter 3 Gage 1: AutoZero Coarse (DAC) Offset	1	Unsigned 16-bit	Read / Write
0x0395	40918	Transmitter 3 Gage 1: AutoZero Fine (ADC) Offset	2	Signed 32-bit	Read / Write
0x0397	40920	Reserved	9		
0x03A0	40929	Transmitter 3 Gage 2: Sample Rate	1	Unsigned 16-bit	Read / Write
0x03A1	40930	Transmitter 3 Gage 2: Measurement Source	1	Unsigned 16-bit	Read / Write
0x03A2	40931	Transmitter 3 Gage 2: Gain	1	Unsigned 16-bit	Read / Write
0x03A3	40932	Transmitter 3 Gage 2: Added Reference Shunt	1	Unsigned 16-bit	Read / Write
0x03A4	40933	Transmitter 3 Gage 2: AutoZero Coarse (DAC) Offset	1	Unsigned 16-bit	Read / Write
0x03A5	40934	Transmitter 3 Gage 2: AutoZero Fine (ADC) Offset	2	Signed 32-bit	Read / Write
0x03A7	40936	Reserved	25		
0x03C0	40961	Transmitter 4: RPM Sensor Type	1	Unsigned 16-bit	Read / Write
0x03C1	40962	Transmitter 4: Hall Sensor PPR	1	Unsigned 16-bit	Read / Write
0x03C2	40963	Transmitter 4: Zero RPM Threshold	1	Signed 16-bit	Read / Write
0x03C3	40964	Reserved	13		
0x03D0	40977	Transmitter 4 Gage 1: Sample Rate	1	Unsigned 16-bit	Read / Write
0x03D1	40978	Transmitter 4 Gage 1: Measurement Source	1	Unsigned 16-bit	Read / Write
0x03D2	40979	Transmitter 4 Gage 1: Gain	1	Unsigned 16-bit	Read / Write
0x03D3	40980	Transmitter 4 Gage 1: Added Reference Shunt	1	Unsigned 16-bit	Read / Write
0x03D4	40981	Transmitter 4 Gage 1: AutoZero Coarse (DAC) Offset	1	Unsigned 16-bit	Read / Write
0x03D5	40982	Transmitter 4 Gage 1: AutoZero Fine (ADC) Offset	2	Signed 32-bit	Read / Write
0x03D7	40984	Reserved	9		
0x03E0	40993	Transmitter 4 Gage 2: Sample Rate	1	Unsigned 16-bit	Read / Write
0x03E1	40994	Transmitter 4 Gage 2: Measurement Source	1	Unsigned 16-bit	Read / Write
0x03E2	40995	Transmitter 4 Gage 2: Gain	1	Unsigned	Read /

				16-bit	Write
0x03E3	40996	Transmitter 4 Gage 2: Added Reference Shunt	1	Unsigned 16-bit	Read / Write
0x03E4	40997	Transmitter 4 Gage 2: AutoZero Coarse (DAC) Offset	1	Unsigned 16-bit	Read / Write
0x03E5	40998	Transmitter 4 Gage 2: AutoZero Fine (ADC) Offset	2	Signed 32-bit	Read / Write

2.2.8.1 Transmitter X: RPM Sensor Type

Type of sensor used by transmitter X to read the RPM. The default is to use the gyroscope.

Table 58: Transmitter RPM Sensor Type Bytes

Parameters	Reserved														RPM Sensor	
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 59: RPM Sensor Values

Bit 1	Bit 0	RPM Sensor
0	0	RPM Disabled
0	1	Gyro
1	0	Hall Sensor

2.2.8.2 Transmitter X: Hall Sensor Pulses Per Revolution (PPR)

Pulses per revolution used to calculate the RPM of transmitter X, when configured to use the hall sensor. PPR is an unsigned 16-bit integer.

Table 60: Hall Sensor PPR Bytes

Parameters	Pulses Per Revolution															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.8.3 Transmitter X: Zero RPM Threshold

Threshold used to determine that transmitter X is at 0 RPM. The threshold is a signed 16-bit integer.

Table 61: Zero RPM Threshold Bytes

Parameters	Zero RPM Threshold															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.8.4 Transmitter X Gage N: Sample Rate

Sample rate for transmitter X gage N. The default sample rate is 300.

Table 62: Transmitter Gage Sample Rate Bytes

Parameters	Reserved												Sample Rate			
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 63: Gage Sample Rate Values

Bit 2	Bit 1	Bit 0	Sample Rate
0	0	0	Disabled
0	0	1	300
0	1	0	600
0	1	1	1200
1	0	0	2400
1	0	1	1

2.2.8.5 Transmitter X Gage N: Measurement Source

Source for sensor measurement. The default source is the transmitter gage.

Table 64: Measurement Source Bytes

Parameters	Reserved															Source
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 65: Measurement Source Values

Bit 0	Source
0	Gage
1	Reference Signal

2.2.8.6 Transmitter X Gage N: Gain

Gain for transmitter X gage N. The default gain is 16x.

Table 66: Transmitter Gage Gain Bytes

Parameters	Reserved												Gain			
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Table 67: Transmitter Gage Gain Values

Bit 2	Bit 1	Bit 0	Gain
0	0	0	1

0	0	1	2
0	1	0	4
0	1	1	8
1	0	0	16
1	0	1	32
1	1	0	64
1	1	1	128

2.2.8.7 Transmitter X Gage N: Added Reference Shunt

Reference shunt setting for a transmitter gage. The default is no reference shunt.

Table 68: Transmitter Gage Reference Shunt Bytes

Parameters	Reserved												Reference Shunt			
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 69: Reference Shunt Values

Bit 2	Bit 1	Bit 0	Gain
0	0	0	No Reference
0	0	1	Reference 1: 0.125mV/V
0	1	0	Reference 2: 0.25mV/V
0	1	1	Reference 3: 0.5mV/V
1	0	0	Reference 4: 1mV/V
1	0	1	Reference 5: 1.924mV/V

2.2.8.8 Transmitter X Gage N: AutoZero Coarse (DAC) Offset

Offset for transmitter X gage N coarse autozero, as an unsigned 16-bit integer. The default is 8192.

Table 70: Transmitter Gage AutoZero Coarse Offset Bytes

Parameters	AutoZero Coarse Offset															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.8.9 Transmitter X Gage N: AutoZero Fine (ADC) Offset

Fine Offset for transmitter X gage N AutoZero, as a signed 32-bit integer.

Table 71: Transmitter Gage AutoZero Fine Offset

Parameters	AutoZero Fine Offset															
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	AutoZero Fine Offset															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.9 Calculation Parameter Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0400	41025	Transmitter 1: Shaft Outer Diameter	1	Unsigned 16-bit	Read / Write
0x0401	41026	Transmitter 1: Shaft Inner Diameter	1	Unsigned 16-bit	Read / Write
0x0402	41027	Transmitter 1: Modulus of Elasticity E	2	Unsigned 32-bit	Read / Write
0x0404	41029	Transmitter 1: Poisson's Ratio	1	Unsigned 16-bit	Read / Write
0x0405	41030	Transmitter 1: Positive Full Scale RPM	1	Signed 16-bit	Read / Write
0x0406	41031	Reserved	26		
0x0420	41057	Transmitter 1 Gage 1: Measurement Type	1	Unsigned 16-bit	Read / Write
0x0421	41058	Transmitter 1 Gage 1: Gage Factor	1	Unsigned 16-bit	Read / Write
0x0422	41059	Transmitter 1 Gage 1: Dead Weight Reference	2	Signed 32-bit	Read / Write
0x0424	41061	Transmitter 1 Gage 1: Dead Weight Normalized Reference Strain Gain	2	Signed 32-bit	Read / Write
0x0426	41063	Reserved	10		
0x0430	41073	Transmitter 1 Gage 2: Measurement Type	1	Unsigned 16-bit	Read / Write
0x0431	41074	Transmitter 1 Gage 2: Gage Factor	1	Unsigned 16-bit	Read / Write
0x0432	41075	Transmitter 1 Gage 2: Dead Weight Reference	2	Signed 32-bit	Read / Write
0x0434	41077	Transmitter 1 Gage 2: Dead Weight Normalized Reference Strain Gain	2	Signed 32-bit	Read / Write
0x0436	41079	Reserved	10		
0x0440	41089	Transmitter 2: Shaft Outer Diameter	1	Unsigned 16-bit	Read / Write
0x0441	41090	Transmitter 2: Shaft Inner Diameter	1	Unsigned 16-bit	Read / Write
0x0442	41091	Transmitter 2: Modulus of Elasticity E	2	Unsigned 32-bit	Read / Write
0x0444	41093	Transmitter 2: Poisson's Ratio	1	Unsigned 16-bit	Read / Write
0x0445	41094	Transmitter 2: Positive Full Scale RPM	1	Signed 16-bit	Read / Write
0x0446	41095	Reserved	26		
0x0460	41121	Transmitter 2 Gage 1: Measurement	1	Unsigned	Read / Write

		Type		16-bit	
0x0461	41122	Transmitter 2 Gage 1: Gage Factor	1	Unsigned 16-bit	Read / Write
0x0462	41123	Transmitter 2 Gage 1: Dead Weight Reference	2	Signed 32-bit	Read / Write
0x0464	41125	Transmitter 2 Gage 1: Dead Weight Normalized Reference Strain Gain	2	Signed 32-bit	Read / Write
0x0466	41127	Reserved	10		
0x0470	41137	Transmitter 2 Gage 2: Measurement Type	1	Unsigned 16-bit	Read / Write
0x0471	41138	Transmitter 2 Gage 2: Gage Factor	1	Unsigned 16-bit	Read / Write
0x0472	41139	Transmitter 2 Gage 2: Dead Weight Reference	2	Signed 32-bit	Read / Write
0x0474	41141	Transmitter 2 Gage 2: Dead Weight Normalized Reference Strain Gain	2	Signed 32-bit	Read / Write
0x0476	41143	Reserved	10		
0x0480	41153	Transmitter 3: Shaft Outer Diameter	1	Unsigned 16-bit	Read / Write
0x0481	41154	Transmitter 3: Shaft Inner Diameter	1	Unsigned 16-bit	Read / Write
0x0482	41155	Transmitter 3: Modulus of Elasticity E	2	Unsigned 32-bit	Read / Write
0x0484	41157	Transmitter 3: Poisson's Ratio	1	Unsigned 16-bit	Read / Write
0x0485	41158	Transmitter 3: Positive Full Scale RPM	1	Signed 16-bit	Read / Write
0x0486	41159	Reserved	26		
0x04A0	41185	Transmitter 3 Gage 1: Measurement Type	1	Unsigned 16-bit	Read / Write
0x04A1	41186	Transmitter 3 Gage 1: Gage Factor	1	Unsigned 16-bit	Read / Write
0x04A2	41187	Transmitter 3 Gage 1: Dead Weight Reference	2	Signed 32-bit	Read / Write
0x04A4	41189	Transmitter 3 Gage 1: Dead Weight Normalized Reference Strain Gain	2	Signed 32-bit	Read / Write
0x04A6	41191	Reserved	10		
0x04B0	41201	Transmitter 3 Gage 2: Measurement Type	1	Unsigned 16-bit	Read / Write
0x04B1	41202	Transmitter 3 Gage 2: Gage Factor	1	Unsigned 16-bit	Read / Write
0x04B2	41203	Transmitter 3 Gage 2: Dead Weight Reference	2	Signed 32-bit	Read / Write
0x04B4	41205	Transmitter 3 Gage 2: Dead Weight Normalized Reference Strain Gain	2	Signed 32-bit	Read / Write
0x04B6	41207	Reserved	10		

0x04C0	41217	Transmitter 4: Shaft Outer Diameter	1	Unsigned 16-bit	Read / Write
0x04C1	41218	Transmitter 4: Shaft Inner Diameter	1	Unsigned 16-bit	Read / Write
0x04C2	41219	Transmitter 4: Modulus of Elasticity E	2	Unsigned 32-bit	Read / Write
0x04C4	41221	Transmitter 4: Poisson's Ratio	1	Unsigned 16-bit	Read / Write
0x04C5	41222	Transmitter 4: Positive Full Scale RPM	1	Signed 16-bit	Read / Write
0x04C6	41223	Reserved	26		
0x04E0	41249	Transmitter 4 Gage 1: Measurement Type	1	Unsigned 16-bit	Read / Write
0x04E1	41250	Transmitter 4 Gage 1: Gage Factor	1	Unsigned 16-bit	Read / Write
0x04E2	41251	Transmitter 4 Gage 1: Dead Weight Reference	2	Signed 32-bit	Read / Write
0x04E4	41253	Transmitter 4 Gage 1: Dead Weight Normalized Reference Strain Gain	2	Signed 32-bit	Read / Write
0x04E6	41255	Reserved	10		
0x04F0	41265	Transmitter 4 Gage 2: Measurement Type	1	Unsigned 16-bit	Read / Write
0x04F1	41266	Transmitter 4 Gage 2: Gage Factor	1	Unsigned 16-bit	Read / Write
0x04F2	41267	Transmitter 4 Gage 2: Dead Weight Reference	2	Signed 32-bit	Read / Write
0x04F4	41269	Transmitter 4 Gage 2: Dead Weight Normalized Reference Strain Gain	2	Signed 32-bit	Read / Write

2.2.9.1 Transmitter X: Shaft Outer Diameter

Shaft outer diameter used in measurement calculations, as an unsigned 16-bit integer. Units are in tenths. The default is 150.

Table 72: Transmitter Gage Shaft Outer Diameter Bytes

Parameters	Shaft Outer Diameter															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	1	0	1	1	1	0	1	1	1	0	0

2.2.9.2 Transmitter X: Shaft Inner Diameter

Shaft inner diameter used in measurement calculations, as an unsigned 16-bit integer. Units are in tenths.

Table 73: Transmitter Gage Shaft Inner Diameter

Parameters	Shaft Inner Diameter															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.9.3 Transmitter X: Modulus of Elasticity E

Modulus of Elasticity E used in measurement calculations, as an unsigned 32-bit integer. The default is 214240.

Table 74: Transmitter Gage Modules of Elasticity E Bytes

Parameters	Modulus of Elasticity E															
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Parameters	Modulus of Elasticity E															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	1	0	0	0	1	0	0	1	1	1	0	0	0	0	0

2.2.9.4 Transmitter X: Poisson's Ratio

Poisson's ratio used in measurement calculations, as an unsigned 16-bit integer. Units are in thousandths. The default is 0.3.

Table 75: Transmitter Gage Poisson's Ratio Bytes

Parameters	Poisson's Ratio															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0

2.2.9.5 Transmitter X: Positive Full Scale RPM

Positive full-scale RPM used in measurement calculations, as a signed 16-bit integer. The default is 667.

Table 76: Transmitter Gage Positive Full Scale RPM Bytes

Parameters	Positive Full Scale RPM															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.9.6 Transmitter X Gage N: Measurement Type

Calculated measurement type, as an unsigned 16-bit integer. Torque is the default.

Table 77: Transmitter Gage Measurement Type Bytes

Parameters	Reserved															Type
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 78: Measurement Type Values

Bit 0 Measurement Type

0	Torque
1	Thrust

2.2.9.7 Transmitter X Gage N: Gage Factor

Gage factor used in measurement calculations, as an unsigned 16-bit integer. Units are in thousandths. The default is 2.

Table 79: Transmitter Gage Factor Bytes

Parameters	Gage Factor															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0

2.2.9.8 Transmitter X Gage N: Dead Weight Reference

Dead weight reference used in calculations, as a unsigned 32-bit integer.

Table 80: Transmitter Gage Dead Weight Reference Torque

Parameters	Dead Weight Reference Torque															
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Dead Weight Reference Torque															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.9.9 Transmitter X Gage N: Dead Weight Normalized Reference Strain Gain

Dead weight normalized reference strain gain used in calculations, as a signed 32-bit integer.

Table 81: Transmitter Gage Dead Weight Reference Strain Gain Bytes

Parameters	Dead Weight Reference Strain Gain															
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parameters	Dead Weight Reference Strain Gain															
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10 Command Registers

Register Address	Register Number	Register Name	Number of Registers	Data Type	Access
0x0800	42049	Execute AutoZero	1	Unsigned 16-bit	Read /Write
0x0801	42050	Execute Capture Reference	1	Unsigned 16-bit	Read /Write
0x0802	42051	Set Default Transmitter Configuration	1	Unsigned 16-bit	Read /Write
0x0803	42052	Set Default Receiver Configuration	1	Unsigned 16-bit	Read / Write
0x0804	42053	Execute Reset	1	Unsigned 16-bit	Read / Write
0x0805	42054	Receiver Shutdown	1	Unsigned 16-bit	Read / Write
0x0806	42055	Data Capture Control	1	Unsigned 16-bit	Read / Write
0x0807	42056	Enable AutoZero Correction	1	Unsigned 16-bit	Read / Write
0x0808	42057	Data Logging Control	1	Unsigned 16-bit	Read / Write
0x0809	42058	Ethernet Settings Commit	1	Unsigned 16-bit	Read / Write
0x080A	42059	Wi-Fi Settings Commit	1	Unsigned 16-bit	Read / Write

2.2.10.1 Execute AutoZero

Bitmap to start AutoZero calibration for the corresponding transmitter gage. Autozero the channel by setting the bit to 1. The bit clears when complete.

Table 82: Execute AutoZero Bytes

Parameters	Reserved								TX4 G2	TX3 G2	TX2 G2	TX1 G2	TX4 G1	TX3 G1	TX2 G1	TX1 G1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.2 Execute Capture Reference

Bitmap to start capturing the reference for the corresponding transmitter gage. Start the capture by setting the bit to 1. The bit clears when complete.

Table 83: Capture Reference Bytes

Parameters	Reserved								TX4 G2	TX3 G2	TX2 G2	TX1 G2	TX4 G1	TX3 G1	TX2 G1	TX1 G1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.3 Set Default Transmitter Configuration

Reset the configuration for the corresponding transmitter. Return the transmitter configuration to default by setting the bit to 1. The bit clears when complete.

Table 84: Default Transmitter Configuration Bytes

Parameters	Reserved								TX4	TX3	TX2	TX1
------------	----------	--	--	--	--	--	--	--	-----	-----	-----	-----

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.4 Set Default Receiver Configuration

Bitmap for resetting the receiver configuration for the corresponding transmitter gage. Set the bit to 1 clear the configuration. The bit clears after the configuration is set to default.

Table 85: Default Receiver Configuration Bytes

Parameters	Reserved								TX4 G2	TX3 G2	TX2 G2	TX1 G2	TX4 G1	TX3 G1	TX2 G1	TX1 G1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.5 Execute Transmitter Reset

Bitmap for resetting transmitters. Set the bit to 1 to reset the corresponding transmitter. The clears when the transmitter is confirmed to be reset.

Table 86: Execute Transmitter Reset Bytes

Parameters	Reserved												TX4	TX3	TX2	TX1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.6 Receiver Shutdown

Shutdown the receiver gracefully to preserve the integrity of the EMMC and file system. The bits clears when the receiver confirms the shutdown is started.

Table 87: Receiver Shutdown Bytes

Parameters	Reserved														Shutdown	
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 88: Receiver Shutdown Values

Bit 1	Bit 0	Source
0	0	No Shutdown
0	1	Shutdown
1	0	Reset

2.2.10.7 Data Capture Control

Bitmap for enabling transmitter data capture. Start transmitter data capture by setting the transmitter bits to 1. Stop data capture by setting the transmitter bits to 0. The register clears if conditions, such as disconnected transmitters, cause data capture to stop.

Table 89: Data Capture Control Bytes

Parameters	Reserved												TX4	TX3	TX2	TX1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.8 Enable AutoZero Correction

Bitmap used to enable AutoZero correction for the given gages. AutoZero correction is disabled by default.

Table 90: Enable AutoZero Bytes

Parameters	Reserved								TX4 G2	TX3 G2	TX2 G2	TX1 G2	TX4 G1	TX3 G1	TX2 G1	TX1 G1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.9 Data Logging Control

Set the enable bit to 1 to start data logging. Set the enable bit to 0 to stop data logging.

Table 91: Data Logging Control

Parameters	Reserved																Enable
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0
Reset	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.10 Ethernet Settings Commit

Set the commit bit to 1 to write all Ethernet settings. The bit clears when writing all settings is complete.

Table 92: Ethernet Settings Commit

Parameters	Reserved																Commit
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0
Reset	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2.10.11 Wi-Fi Settings Commit

Set the commit bit to 1 to write all Wi-Fi settings. The bit clears when writing all settings is complete.

Table 93: Wi-Fi Settings Commit

Parameters	Reserved																Commit
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0
Reset	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.0 LOG FILE FORMAT

Users can insert a mass storage device before enabling logging to get data capture logs. The logs are stored in the root directory of the mass storage device. The log files are in a binary format, which includes a header and sampled data. The following table lists the parameters in the log file header, which can be used to calculate the torque, thrust, and power from the raw samples. Parameters are all stored as little endian.

Table 94: Log File Address Map

File Byte Address	Parameter	Number of Byte	Data Bits	Signed / Unsigned
0x0000	Log Format Version	1	8	Unsigned
0x0001	Log Start Timestamp	4	32	Unsigned
0x0005	Units	2	16	Unsigned
0x0007	Transmitter 1 Serial Number	2	16	Unsigned
0x0009	Transmitter 2 Serial Number	2	16	Unsigned
0x000B	Transmitter 3 Serial Number	2	16	Unsigned
0x000D	Transmitter 4 Serial Number	2	16	Unsigned
0x000F	Transmitter 1: RPM Sensor Type	2	16	Unsigned
0x0011	Transmitter 1: Hall Sensor PPR	2	16	Unsigned
0x0013	Transmitter 1: Zero RPM Threshold	2	16	Signed
0x0015	Transmitter 1 Gage 1: Sample Rate	2	16	Unsigned
0x0017	Transmitter 1 Gage 1: Measurement Source	2	16	Unsigned
0x0019	Transmitter 1 Gage 1: Gain	2	16	Unsigned
0x001B	Transmitter 1 Gage 1: Added Reference Shunt	2	16	Unsigned
0x001D	Transmitter 1 Gage 1: AutoZero Coarse (DAC) Offset	2	16	Unsigned
0x001F	Transmitter 1 Gage 1: AutoZero Fine (ADC) Offset	4	32	Signed
0x0023	Transmitter 1 Gage 2: Sample Rate	2	16	Unsigned
0x0025	Transmitter 1 Gage 2: Measurement Source	2	16	Unsigned
0x0027	Transmitter 1 Gage 2: Gain	2	16	Unsigned
0x0029	Transmitter 1 Gage 2: Added Reference Shunt	2	16	Unsigned
0x002B	Transmitter 1 Gage 2: AutoZero Coarse (DAC) Offset	2	16	Unsigned
0x002D	Transmitter 1 Gage 2: AutoZero Fine (ADC) Offset	4	32	Signed
0x0031	Transmitter 2: RPM Sensor Type	2	16	Unsigned
0x0033	Transmitter 2: Hall Sensor PPR	2	16	Unsigned
0x0035	Transmitter 2: Zero RPM Threshold	2	16	Signed
0x0037	Transmitter 2 Gage 1: Sample Rate	2	16	Unsigned
0x0039	Transmitter 2 Gage 1: Measurement Source	2	16	Unsigned
0x003B	Transmitter 2 Gage 1: Gain	2	16	Unsigned

0x003D	Transmitter 2 Gage 1: Added Reference Shunt	2	16	Unsigned
0x003F	Transmitter 2 Gage 1: AutoZero Coarse (DAC) Offset	2	16	Unsigned
0x0041	Transmitter 2 Gage 1: AutoZero Fine (ADC) Offset	4	32	Signed
0x0045	Transmitter 2 Gage 2: Sample Rate	2	16	Unsigned
0x0047	Transmitter 2 Gage 2: Measurement Source	2	16	Unsigned
0x0049	Transmitter 2 Gage 2: Gain	2	16	Unsigned
0x004B	Transmitter 2 Gage 2: Added Reference Shunt	2	16	Unsigned
0x004D	Transmitter 2 Gage 2: AutoZero Coarse (DAC) Offset	2	16	Unsigned
0x004F	Transmitter 2 Gage 2: AutoZero Fine (ADC) Offset	4	32	Signed
0x0053	Transmitter 3: RPM Sensor Type	2	16	Unsigned
0x0055	Transmitter 3: Hall Sensor PPR	2	16	Unsigned
0x0057	Transmitter 3: Zero RPM Threshold	2	16	Signed
0x0059	Transmitter 3 Gage 1: Sample Rate	2	16	Unsigned
0x005B	Transmitter 3 Gage 1: Measurement Source	2	16	Unsigned
0x005D	Transmitter 3 Gage 1: Gain	2	16	Unsigned
0x005F	Transmitter 3 Gage 1: Added Reference Shunt	2	16	Unsigned
0x0061	Transmitter 3 Gage 1: AutoZero Coarse (DAC) Offset	2	16	Unsigned
0x0063	Transmitter 3 Gage 1: AutoZero Fine (ADC) Offset	4	32	Signed
0x0067	Transmitter 3 Gage 2: Sample Rate	2	16	Unsigned
0x0069	Transmitter 3 Gage 2: Measurement Source	2	16	Unsigned
0x006B	Transmitter 3 Gage 2: Gain	2	16	Unsigned
0x006D	Transmitter 3 Gage 2: Added Reference Shunt	2	16	Unsigned
0x006F	Transmitter 3 Gage 2: AutoZero Coarse (DAC) Offset	2	16	Unsigned
0x0071	Transmitter 3 Gage 2: AutoZero Fine (ADC) Offset	4	32	Signed
0x0075	Transmitter 4: RPM Sensor Type	2	16	Unsigned
0x0077	Transmitter 4: Hall Sensor PPR	2	16	Unsigned
0x0079	Transmitter 4: Zero RPM Threshold	2	16	Signed
0x007B	Transmitter 4 Gage 1: Sample Rate	2	16	Unsigned
0x007D	Transmitter 4 Gage 1: Measurement Source	2	16	Unsigned
0x007F	Transmitter 4 Gage 1: Gain	2	16	Unsigned
0x0081	Transmitter 4 Gage 1: Added Reference Shunt	2	16	Unsigned
0x0083	Transmitter 4 Gage 1: AutoZero Coarse (DAC) Offset	2	16	Unsigned
0x0085	Transmitter 4 Gage 1: AutoZero Fine (ADC) Offset	4	32	Signed
0x0089	Transmitter 4 Gage 2: Sample Rate	2	16	Unsigned
0x008B	Transmitter 4 Gage 2: Measurement Source	2	16	Unsigned
0x008D	Transmitter 4 Gage 2: Gain	2	16	Unsigned
0x008F	Transmitter 4 Gage 2: Added Reference Shunt	2	16	Unsigned
0x0091	Transmitter 4 Gage 2: AutoZero Coarse (DAC) Offset	2	16	Unsigned
0x0093	Transmitter 4 Gage 2: AutoZero Fine (ADC) Offset	4	32	Signed
0x0097	Transmitter 1: Shaft Outer Diameter	2	16	Unsigned

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0x0099	Transmitter 1: Shaft Inner Diameter	2	16	Unsigned
0x009B	Transmitter 1: Modulus of Elasticity E	4	32	Unsigned
0x009F	Transmitter 1: Poisson's Ratio	2	16	Unsigned
0x00A1	Transmitter 1: Positive Full Scale RPM	2	16	Signed
0x00A3	Transmitter 1 Gage 1: Measurement Type	2	16	Unsigned
0x00A5	Transmitter 1 Gage 1: Gage Factor	2	16	Unsigned
0x00A7	Transmitter 1 Gage 1: Dead Weight Reference	4	32	Signed
0x00AB	Transmitter 1 Gage 1: Dead Weight Normalized Reference Strain Gain	4	32	Signed
0x00AF	Transmitter 1 Gage 2: Measurement Type	2	16	Unsigned
0x00B1	Transmitter 1 Gage 2: Gage Factor	2	16	Unsigned
0x00B3	Transmitter 1 Gage 2: Dead Weight Reference	4	32	Signed
0x00B7	Transmitter 1 Gage 2: Dead Weight Normalized Reference Strain Gain	4	32	Signed
0x00BB	Transmitter 2: Shaft Outer Diameter	2	16	Unsigned
0x00BD	Transmitter 2: Shaft Inner Diameter	2	16	Unsigned
0x00BF	Transmitter 2: Modulus of Elasticity E	4	32	Unsigned
0x00C3	Transmitter 2: Poisson's Ratio	2	16	Unsigned
0x00C5	Transmitter 2: Positive Full Scale RPM	2	16	Signed
0x00C7	Transmitter 2 Gage 1: Measurement Type	2	16	Unsigned
0x00C9	Transmitter 2 Gage 1: Gage Factor	2	16	Unsigned
0x00CB	Transmitter 2 Gage 1: Dead Weight Reference	4	32	Signed
0x00CF	Transmitter 2 Gage 1: Dead Weight Normalized Reference Strain Gain	4	32	Signed
0x00D3	Transmitter 2 Gage 2: Measurement Type	2	16	Unsigned
0x00D5	Transmitter 2 Gage 2: Gage Factor	2	16	Unsigned
0x00D7	Transmitter 2 Gage 2: Dead Weight Reference	4	32	Signed
0x00DB	Transmitter 2 Gage 2: Dead Weight Normalized Reference Strain Gain	4	32	Signed
0x00DF	Transmitter 3: Shaft Outer Diameter	2	16	Unsigned
0x00E1	Transmitter 3: Shaft Inner Diameter	2	16	Unsigned
0x00E3	Transmitter 3: Modulus of Elasticity E	4	32	Unsigned
0x00E7	Transmitter 3: Poisson's Ratio	2	16	Unsigned
0x00E9	Transmitter 3: Positive Full Scale RPM	2	16	Signed
0x00EB	Transmitter 3 Gage 1: Measurement Type	2	16	Unsigned
0x00ED	Transmitter 3 Gage 1: Gage Factor	2	16	Unsigned
0x00EF	Transmitter 3 Gage 1: Dead Weight Reference	4	32	Signed
0x00F3	Transmitter 3 Gage 1: Dead Weight Normalized Reference Strain Gain	4	32	Signed
0x00F7	Transmitter 3 Gage 2: Measurement Type	2	16	Unsigned
0x00F9	Transmitter 3 Gage 2: Gage Factor	2	16	Unsigned

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0x00FB	Transmitter 3 Gage 2: Dead Weight Reference	4	32	Signed
0x00FF	Transmitter 3 Gage 2: Dead Weight Normalized Reference Strain Gain	4	32	Signed
0x0103	Transmitter 4: Shaft Outer Diameter	2	16	Unsigned
0x0105	Transmitter 4: Shaft Inner Diameter	2	16	Unsigned
0x0107	Transmitter 4: Modulus of Elasticity E	4	32	Unsigned
0x010B	Transmitter 4: Poisson's Ratio	2	16	Unsigned
0x010D	Transmitter 4: Positive Full Scale RPM	2	16	Signed
0x010F	Transmitter 4 Gage 1: Measurement Type	2	16	Unsigned
0x0111	Transmitter 4 Gage 1: Gage Factor	2	16	Unsigned
0x0113	Transmitter 4 Gage 1: Dead Weight Reference	4	32	Signed
0x0117	Transmitter 4 Gage 1: Dead Weight Normalized Reference Strain Gain	4	32	Signed
0x011B	Transmitter 4 Gage 2: Measurement Type	2	16	Unsigned
0x011D	Transmitter 4 Gage 2: Gage Factor	2	16	Unsigned
0x011F	Transmitter 4 Gage 2: Dead Weight Reference	4	32	Signed
0x0123	Transmitter 4 Gage 2: Dead Weight Normalized Reference Strain Gain	4	32	Signed
0x0127	Padding with 0x00	217	1736	
0x0200	Transmitter Serial Number for Sequence A	2	16	Unsigned
0x0202	Sequence A – Sequence Number	2	16	Unsigned
0x0204	Sequence A – Sample Counts	3	24	Unsigned
0x0207	Sequence A – Sample Data	74	16 * 37	Signed
0x0251	Transmitter Serial Number for Sequence B	2	16	Unsigned
0x0253	Sequence B – Sequence Number	2	16	Unsigned
0x0255	Sequence B – Sample Counts	3	24	Unsigned
0x0258	Sequence B – Sample Data	74	16*37	Signed
...	...	...	...	
	Any log entry with a Transmitter Serial Number greater than 0xFFEF is a special record with its own predefined format.			
	Timestamps added hourly to the log with format:			
	Transmitter Serial Number 0xFFFF0	2	16	Unsigned
	Timestamp data	4	32	Unsigned