**APPENDIX B • MODBUS™ COMMUNICATION**

***Introduction***

**General Overview**

An optional feature of the DGC-2020 performs Modbus™ communications by emulating a subset of the Modicon 984 Programmable Controller. This document describes the Modbus communications protocol employed by the DGC-2020 and how to exchange information with the DGC-2020 over a Modbus network.

The DGC-2020 maps all parameters into the Modicon 984 Holding Register address space (4XXXX). Refer to *MAPPING - DGC 2020 Parameters into MODICON ADDRESS SPACE* in this section. The 40XXX registers are identical to the data that was present in the DGC-500 and DGC-1000 products. This allows the DGC-2020 to work seamlessly in Modbus applications where it is replacing a DGC-500 or DGC-1000. The 42XXX registers contain all information included in the DGC-2020 and should be used for any new Modbus applications.

Intended Use of the Communications Protocol

This document provides the necessary information for 3rd party OEMs to develop in-house software to communicate with the DGC-2020 via Modbus protocol. This will allow the exchange of setup information and measured data between a Modbus Master Station and the DGC-2020.

The DGC-2020 data supported for remote access is listed in *MAPPING - DGC 2020 Parameters into MODICON ADDRESS SPACE* in this section.

***Detailed Description of DGC-2020 Modbus™ Protocol***

Modbus™ Protocol Overview

Modbus communications use a master-slave technique in which only the master can initiate a transaction, called a query. The slave addressed by the query will respond by either supplying the requested data to the master or by performing the requested action. A slave device never initiates communications on the Modbus, and will always generate a response to the query unless certain error conditions occur. The DGC-2020 is designed to communicate on the Modbus only as a slave device.

A master can query slaves individually or query all slaves collectively by initiating a broadcast message. A slave does not send a response message to a broadcast query.

If a query requests actions unable to be performed by the slave, the slave response message will contain an Exception Response Code defining the error detected.

Query and response messages share the same message structure. Each message is comprised of four message fields: the Device Address, the Function Code, the Data Block, and the Error Check field. Subsequent sections in this document detail each message field and the corresponding functionality supported by the DGC-2020.

Query / Response Message Structure:

* Device Address
* Function Code
* Eight-Bit Data Bytes
* Error Check

*Device Address Field*

The Device Address field contains the unique Modbus address of the slave being queried. The addressed slave will repeat its address in the Device Address field of the response message. This field is 1 byte.

*Function Code Field*

The Function Code field in the Query message defines the action to be taken by the addressed slave. This field is echoed in the Response message, and will be altered by setting the MSB of the field to "1" if the response is an error response. This field is 1 byte.

*Data Block Field*

The query Data block contains additional information needed by the slave to perform the requested function. The response Data block contains data collected by the slave for the queried function. An error response will substitute an Exception Response Code for the Data Block. The length of this field varies with each query.

*Error Check Field*

The Error Check field provides a method for the slave to validate the integrity of the query message contents and allows the master to confirm the validity of response message contents. This field is 2 bytes.

Serial Transmission Details

A standard Modbus network offers 2 transmission modes for communication: ASCII or RTU. The DGC- 2020 supports only the RTU (Remote Terminal Unit) mode.

Each 8-bit byte in a message contains two 4-bit hexadecimal characters. The message is transmitted in a continuous stream with the LSB of each byte of data transmitted first. Transmission of each 8-bit data byte occurs with 1 start bit and 1 stop bit. A ninth data bit is added when parity is selected. Parity checking is user-configurable to even, odd or none. The transmission baud rate is also user-configurable, and both parity and baud rate can be altered during real-time operation. If altered, the new baud rate and

/ or parity will not be enforced until the response message to the current query has completed. The DGC- 2020 supported baud rates are 9600, 4800, 2400, and 1200.

Message Framing / Timing Considerations

When receiving a message, the DGC-2020 will allow maximum inter-byte latency up to 3.5 - 4.0 character times before considering the message complete.

Once a valid query is received, the DGC-2020 waits 10 msec. before responding.

Error Handling and Exception Responses

Any query received that contains a non-existent device address, a framing error or CRC error will be ignored - no response will be transmitted. Queries addressed to a DGC-2020 with an unsupported function code, unsupported register references, or illegal values in the data block will result in an error response message with an Exception Response Code. The Exception Response codes supported by the DGC-2020 are listed in [Table B-1.](#_bookmark862)

*Table B-1. Exception Response Codes*

|  |  |  |
| --- | --- | --- |
| **Code** | **Name** | **Meaning** |
| 01 | Illegal Function | The query Function/Subfunction Code is unsupported; query read of  more than 125 registers; query preset of more than 100 registers |
| 02 | Illegal Data Address | A register referenced in the data block does not support queried  read/write; query preset of a subset of a numerical register group. |
| 03 | Illegal Data Value | A preset register data block contains an incorrect number of bytes or  one or more data values out of range. |

### Detailed DGC-2020 Message Definition

Device Address

The DGC-2020 Device Address can be any value in the Modbus protocol Device Address range (1 - 247). A query with a Device Address of 0 signifies a Broadcast message to all slaves - the connected DGC- 2020s will not respond to the broadcast query.

Function Code and Data Block

The DGC-2020 maps all parameters into the Modicon 984 Holding Register address space (4XXXX) and supports the following Function Codes:

* Function 03 - Read Holding Registers
* Function 6 - Preset Single Register, Non-Broadcast & Broadcast
* Function 08, Subfunction 00 - Diagnostics: Return Query Data
* Function 16 - Preset Multiple Registers, Non-Broadcast & Broadcast

The only Broadcast query supported by the DGC-2020 is the Preset Multiple Registers query.

*Read Holding Registers*

*Read Holding Registers - General*

QUERY:

This query message requests a register or block of registers to be read. The data block contains the starting register address and the quantity of registers to be read. A register address of N will read Holding Register N+1.

Device Address Function Code 03 (hex) Starting Address Hi Starting Address Lo

No. of Registers Hi No. of Registers Lo CRC Error Check

The number of registers cannot exceed 125 without causing an error response with Exception Code "Illegal Function".

Queries to read Write Only or unsupported registers result in an error response with Exception Code of “Illegal Data Address”.

RESPONSE:

The response message contains the data queried, respectively. The data block contains the block length in bytes followed by the data for each requested register. Attempting to read an unused register or a register which does not support read results in an error response with Exception Code of "Illegal Data Address".

Device Address

Function Code 03 (hex) Byte Count

Data Hi Data Lo

.

.

.

Data Hi Data Lo

CRC Error Check

*Return Query Data*

This query contains data to be returned (looped back) in the response. The response and query messages should be identical.

Device Address

Function Code 08 (hex)

Subfunction Hi 00 (hex)

Subfunction Lo 00 (hex) Data Hi

Data Lo

CRC Error Check

*Preset Multiple Registers, Non-Broadcast & Broadcast*

*Preset Multiple Registers - General*

QUERY:

This query message requests a register or block of registers to be written. The data block contains the starting address and the quantity of registers to be written, followed by the Data Block byte count and data. A device address is 0 for a broadcast query.

A register address of N will write Holding Register N+1.

No query data will be written (non-broadcast or broadcast) if any of the following exceptions occur:

* Queries writing to Read Only or unsupported registers result in an error response with Exception Code of “Illegal Data Address”.
* Queries attempting to write more than 100 registers cause an error response with Exception Code “Illegal Function”.
* An incorrect Byte Count will result in an error response with Exception Code of “Illegal Data Value”.
* There are several instances of registers that are grouped together (signified as DP or TP) to collectively represent a single numerical (vs. ASCII string) DGC-2020 parameter value. A query to write a subset of such a register group will result in an error response with Exception Code “Illegal Data Address”.
* A query to write an unacceptable value (out of range) to a register results in an error response with Exception Code of “Illegal Data Value”.

Device Address Function Code 10 (hex) Starting Address Hi Starting Address Lo

No. of Registers Hi No. of Registers Lo Byte Count

Data Hi Data Lo

.

.

.

Data Hi Data Lo

CRC Error Check

RESPONSE:

The response message echoes the starting address and the number of registers. There is no response message when the query is broadcast.

Device Address

Function Code 10 (hex) Starting Address Hi

Starting Address Lo No. of Registers Hi

No. of Registers Lo CRC Error Check

*Preset Single Register, Non-Broadcast & Broadcast*

QUERY:

This query message requests a register to be written. A device address is 0 for a broadcast query. No query data will be written (non-broadcast or broadcast) if any of the following exceptions occur:

* Queries writing to Read Only or unsupported registers result in an error response with Exception Code of “Illegal Data Address”.
* There are several instances of registers that are grouped together (signified as DP or TP) to collectively represent a single numerical (vs. ASCII string) DGC-2020 parameter value. A query to write a subset of such a register group will result in an error response with Exception Code “Illegal Data Address”.
* A query to write an unacceptable value (out of range) to a register results in an error response with Exception Code of “Illegal Data Value”.

Device Address

Function Code 06 (hex) Address Hi

Address Lo Data Hi Data Lo

CRC Error Check

RESPONSE:

The response message echoes the address and the value written. There is no response message when the query is broadcast.

Device Address

Function Code 06 (hex) Address Hi

Address Lo Data Hi Data Lo

CRC Error Check

### Data Formats

Short Integer Data Format (INT8)

The Modbus short integer data format uses a single holding register to represent an 8 bit data value. The holding register high byte will always be zero.

Example: The value 132 represented in short integer format is hexadecimal 0x84. This number will read from a holding register as follows:

Holding Register

Value

|  |  |  |
| --- | --- | --- |
| K | (Hi Byte) | hex 00 |
| K | (Lo Byte) | hex 84 |

The same byte alignments are required to write.

Integer Data Format (INT16)

The Modbus integer data format uses a single holding register to represent a 16-bit data value.

Example: The value 4660 represented in integer format is hexadecimal 0x1234. This number will read from a holding register as follows:

Holding Register

Value

|  |  |  |
| --- | --- | --- |
| K | (Hi Byte) | hex 12 |
| K | (Lo Byte) | hex 34 |

The same byte alignments are required to write.

Long Integer Data Format (INT32)

The Modbus long integer data format uses two consecutive holding registers to represent a 32-bit data value. The first register contains the low-order 16 bits and the second register contains the high-order 16 bits.

Example: The value 95,800 represented in long integer format is hexadecimal 0x00017638. This number will read from two consecutive holding registers as follows:

Holding Register

Value

K (Hi Byte) hex 76

K (Lo Byte) hex 38

K+1 (Hi Byte) hex 00

K+1 (Lo Byte) hex 01

The same byte alignments are required to write.

Floating Point Data Format

The Modbus floating point data format uses two consecutive holding registers to represent a data value. The first register contains the low-order 16 bits of the following 32-bit format:

* MSB is the sign bit for the floating-point value (0 = positive).
* The next 8 bits are the exponent biased by 127 decimal.
* The 23 LSBs comprise the normalized mantissa. The most-significant bit of the mantissa is always assumed to be 1 and is not explicitly stored, yielding an effective precision of 24 bits.

The value of the floating-point number is obtained by multiplying the binary mantissa times two raised to the power of the unbiased exponent. The assumed bit of the binary mantissa has the value of 1.0, with the remaining 23 bits providing a fractional value. [Table B-2](#_bookmark875) shows the floating-point format.

*Table B-2. Floating Point Format*

|  |  |  |
| --- | --- | --- |
| **Sign** | **Exponent + 127** | **Mantissa** |
| 1 bit | 8 bits | 23 bits |

The floating-point format allows for values ranging from approximately 8.43X10-37 to 3.38X1038. A floating- point value of all zeroes is the value zero. A floating-point value of all ones (not a number) signifies a value currently not applicable or disabled.

Example: The value 95,800 represented in floating point format is hexadecimal 47BB1C00. This number will read from two consecutive holding registers as follows:

Holding Register

Value

K (Hi Byte) hex 1C

K (Lo Byte) hex 00

K+1 (Hi Byte) hex 47

K+1 (Lo Byte) hex BB

The same byte alignments are required to write.

Double Precision Data Format (DP)

The Modbus Double Precision data format (DP) uses 2 consecutive registers to represent a data value. The first register contains the high-order 16 bits of double precision data, and is the actual data value / 10,000.

The second register contains the low-order 16 bits of double precision data, and is the actual data value modulus 10,000.

Triple Precision Data Format (TP)

The Modbus Triple Precision data format (TP) uses 3 consecutive registers to represent a data value. The first register contains the high-order 16 bits of triple precision data, and is the actual data value / 100,000,000. The modulus from this operation is divided by 10,000 to arrive at the value of the second register, and the modulus of this last operation is the value of the third register (the low-order 16 bits of triple precision).

Error Check

This field contains a 2-byte CRC value for transmission error detection. The master first calculates the CRC and appends it to the query message. The DGC-2020 recalculates the CRC value for the received query and performs a comparison to the query CRC value to determine if a transmission error has occurred. If so, no response message is generated. Otherwise, the slave calculates a new CRC value for the response message and appends it to the message for transmission.

Reference the "Modicon Modbus Protocol Reference Guide", PI-MBUS-300 Rev. E, pages 112 - 115 for an excellent explanation and implementation of the CRC-16 algorithm.

The CRC calculation is performed using all bytes of the Device Address, Function Code, and Data Block fields. A 16-bit CRC-register is initialized to all 1's. Then each 8-bit byte of the message is used in the following algorithm:

First, exclusive-OR the message byte with the low-order byte of the CRC-register. The result, stored in the CRC-register, will then be right-shifted 8 times. The CRC-register MSB is zero-filled with each shift. After each shift the CRC-register LSB is examined: if 1, the CRC-register is then exclusive-ORed with the fixed polynomial value A001 (hex) prior to the next shift. Once all bytes of the message have undergone the above algorithm, the CRC-register will contain the message CRC value to be placed in the Error Check field.

Interdependence of Preset Multiple Register Data

Preset Multiple Register data is collectively written only after the query has been determined to be legal, which includes a range-check of the entire data block. Therefore, data which must be written prior to other data must use a separate query. For example, a Preset Multiple Register Query of the entire Contiguous Write Block (40023-40055) to set the Battery Overvoltage Pre-alarm Threshold atop the 24V range and change the Battery Volts from 12V to 24V will fail. The change to 24V would occur simultaneously to setting the Pre-alarm Threshold, and the threshold value range-check will use the current 12V range.

### Mapping - DGC-2020 Parameters into Modicon Address Space

Table Conventions

Table B-3 uses the conventions outlined in this section.

The “Data Format” column uses the following abbreviations:

* DP - Double Precision
* TP - Triple Precision
* FP - Floating Point

Data formatted in Double Precision uses a 2-register group designated (a) and (b) and is defined as follows:

* Register (a) - 2 hi-order bytes
* Register (b) - 2 lo-order bytes

Data formatted in Triple Precision uses a 3 register group designated (a), (b) and (x). It is defined as follows:

* Register (a) - 2 hi-order bytes
* Register (b) - 2 mid-order bytes
* Register (x) - 2 lo-order bytes

Other register groups using the (a), (b), etc. designators are an ordered data group of consecutive ASCII characters or data bytes.

Current Parameter Table

The DGC-2020 maps all non-legacy parameters into the Holding Register address space (42000 and above). Query address N will access the Holding Register N+1.

*Breaker Management*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 42000 | Gen Breaker Configured | Int32 | N/A | N/A | R | 0 = Not Configured 1 = Configured |
| 42002 | Gen Breaker Open Pulse Time | Int32 | Centisecond | Centi | RW | 1 - 80 |
| 42004 | Gen Breaker Close Pulse Time | Int32 | Centisecond | Centi | RW | 1 - 80 |
| 42006 | Gen Breaker Contact Type | Int32 | N/A | N/A | RW | 0 = Pulse  1 = Continuous |
| 42008 | Gen Breaker Close Time | Int32 | Millisecond | N/A | RW | 0 - 800 |
| 42010 | RESERVED |  |  |  |  |  |
| 42012 | Mains Breaker Configured | Int32 | N/A | N/A | RW | 0 = Not Configured 1 = Configured |
| 42014 | Mains Breaker Open Pulse Time | Int32 | Centisecond | Centi | RW | 1 - 80 |
| 42016 | Mains Breaker Close Pulse Time | Int32 | Centisecond | Centi | RW | 1 - 80 |
| 42018 | Mains Breaker Output Continuous | Int32 | N/A | N/A | RW | 0 = Pulse  1 = Continuous |
| 42020 | Mains Breaker Close Time | Int32 | Millisecond | N/A | RW | 0 - 800 |
| 42022 | RESERVED |  |  |  |  |  |
| 42024 | Synchronizer Type | Int32 | N/A | N/A | RW | 1 = Anticipatory  2 = Phase Lock Loop |
| 42026 | Synchronizer Mode | Int32 | N/A | N/A | RW | 0 = Off Mode 1 = Auto Mode |
| 42028 | Slip Frequency | Int32 | CentiHertz | Centi | RW | 1 - 50 |
| 42030 | Breaker Closing Angle | Int32 | DeciDegree | Deci | RW | 30 - 200 |
| 42032 | Regulation Offset | Int32 | DeciPercent | Deci | RW | 20 - 150 |
| 42034 | Vgen > Vbus | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42036 | Fgen > Fbus | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42038-40 | RESERVED |  |  |  |  |  |
| 42042 | Breaker Close Wait Time | Int32 | Second | N/A | RW | 0.1 - 600 |
| 42044 | Sync Time Delay | Float | Second | N/A | RW | 0.1 - 0.8 |
| 42046 | Sync Fail Time Delay | Float | Second | N/A | RW | 0.1 - 600 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 42048 | Mains Fail Transfer Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42050 | Gen Breaker Status | Int32 | N/A | N/A | R | 0 = Open  1 = Closed |
| 42052 | Mains Breaker Status | Int32 | N/A | N/A | R | 0 = Open  1 = Closed |
| 42054 | Mains Fail Transfer Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 42056 | Mains Fail Return Delay | Int32 | Second | N/A | RW | 0 - 1800 |
| 42058 | Mains Fail Max Transfer Time | Int32 | Second | N/A | RW | 1 - 120 |
| 42060 | RESERVED |  |  |  |  |  |
| 42062 | Dead Bus Close Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42064 | Sync Speed Gain | Float | N/A | N/A | RW | 0.001 - 1000 |
| 42066 | Sync Voltage Gain | Float | N/A | N/A | RW | 0.001 - 1000 |
| 42068 | Max Parallel Time | Int32 | Second | Deci | RW | 1 - 100000 |
| 42070 | Mains Fail Transfer Type | Int32 | N/A | N/A | RW | 0 = Open  1 = Close |
| 42072 | In Phase Monitor Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42074 | Dead Gen Close Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42076 | RESERVED |  |  |  |  |  |
| 42078 | Min Slip Control Limit | Int32 | N/A | Centi | RW | 0 - 200 |
| 42080 | Max Slip Control Limit | Int32 | N/A | Centi | RW | 0 - 200 |
| 42082-248 | FUTURE USE |  |  |  |  |  |

*Bias Control Settings*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 42250 | AVR Kp Proportional Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42252 | AVR Ki Integral Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42254 | AVR Kd Derivative Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42256 | AVR Td Filter Constant | Float | N/A | N/A | RW | 0 - 1 |
| 42258 | AVR Kg Loop Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42260 | AVR Windup Limit | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42262 | AVR Integrator Limit Plus | Float | N/A | N/A | RW | 0 - 1000 |
| 42264 | AVR Integrator Limit Minus | Float | N/A | N/A | RW | (-1000) - 0 |
| 42266 | AVR Output Upper Limit | Float | N/A | N/A | RW | 0 - 1000 |
| 42268 | AVR Output Lower Limit | Float | N/A | N/A | RW | (-1000) - 0 |
| 42270 | RESERVED |  |  |  |  |  |
| 42272 | Governor Kp Proportional Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42274 | Governor Ki Integral Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42276 | Governor Kd Derivative Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42278 | Governor Td Filter Constant | Float | N/A | N/A | RW | 0 - 1 |
| 42280 | Governor Loop Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42282 | Governor Windup Limit | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42284 | Governor Integrator Limit Plus | Float | N/A | N/A | RW | 0 - 1000 |
| 42286 | Governor Integrator Limit Minus | Float | N/A | N/A | RW | (-1000) - 0 |
| 42288 | Governor Output Upper Limit | Float | N/A | N/A | RW | 0 - 1000 |
| 42290 | Governor Output Lower Limit | Float | N/A | N/A | RW | (-1000) - 0 |
| 42292 | RESERVED |  |  |  |  |  |
| 42294 | kvar Kp | Float | N/A | N/A | RW | 0 - 1000 |
| 42296 | kvar Ki | Float | N/A | N/A | RW | 0 - 1000 |
| 42298 | kvar Kd | Float | N/A | N/A | RW | 0 - 1000 |
| 42300 | kvar Td | Float | N/A | N/A | RW | 0 - 1 |
| 42302 | kvar Loop Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42304 | kvar Windup Limit | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42306 | kvar Integrator Limit Plus | Float | N/A | N/A | RW | 0 - 1000 |
| 42308 | kvar Integrator Limit Minus | Float | N//A | N/A | RW | (-1000) - 0 |

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| --- | --- | --- | --- | --- | --- | --- |
| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 42310 | kvar Output Upper Limit | Float | N/A | N/A | RW | 0 - 1000 |
| 42312 | kvar Output Lower Limit | Float | N/A | N/A | RW | (-1000) - 0 |
| 42314 | RESERVED |  |  |  |  |  |
| 42316 | kW Kp | Float | N/A | N/A | RW | 0 - 1000 |
| 42318 | kW Ki | Float | N/A | N/A | RW | 0 - 1000 |
| 42320 | kW Kd | Float | N/A | N/A | RW | 0 - 1000 |
| 42322 | kW Td | Float | N/A | N/A | RW | 0 - 1 |
| 42324 | kW Loop Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42326 | kW Windup Limit | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42328 | kW Integrator Limit Plus | Float | N/A | N/A | RW | 0 - 1000 |
| 42330 | kW Integrator Limit Minus | Float | N/A | N/A | RW | (-1000) - 0 |
| 42332 | kW Output Upper Limit | Float | N/A | N/A | RW | 0 - 1000 |
| 42334 | kW Output Lower Limit | Float | N/A | N/A | RW | (-1000) - 0 |
| 42336 | RESERVED |  |  |  |  |  |
| 42338 | Droop Percent | Float | Percent | N/A | RW | 0 - 10 |
| 42340 | Load Control | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42342 | kW Load Rate | Int32 | N/A | Deci | RW | 0 - 1000 |
| 42344 | Breaker Open Setpoint | Int32 | N/A | Deci | RW | 0 - 1000 |
| 42346 | AVR Bias Control Output Type | Int32 | N/A | N/A | RW | 0 = Contact  1 = Analog |
| 42348 | Governor Bias Control Output Type | Int32 | N/A | N/A | RW | 0 = Contact  1 = Analog |
| 42350 | Speed Droop Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42352 | Voltage Droop Gain | Float | N/A | N/A | RW | 0 - 1000 |
| 42354 | Speed Trim Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42356 | Voltage Trim Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42358 | Ramped Watt Demand Per Unit | Float | N/A | N/A | R | 0 - 100 |
| 42360 | Watt Demand Per Unit | Float | N/A | N/A | R | 0 - 100 |
| 42362 | Speed PID Output | Float | N/A | N/A | R | 0 - 100 |
| 42364 | kW PID Output | Float | N/A | N/A | R | 0 - 100 |
| 42366 | Volt PID Output | Float | N/A | N/A | R | 0 - 100 |
| 42368 | Speed Trim Setpoint | Uint32 | DeciHertz | Centi | RW | 4700 - 44000 |
| 42370 | var Control Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 42372 | kvar Load Rate | Uint32 | N/A | Deci | RW | 1 - 1000 |
| 42374 | Base Load Level Source | Uint32 | N/A | N/A | RW | 0 = User Setting  1 = LSM Analog Input 1  2 = AEM Analog Input 1  3 = AEM Analog Input 2  4 = AEM Analog Input 3  5 = AEM Analog Input 4  6 = AEM Analog Input 5  7 = AEM Analog Input 6  8 = AEM Analog Input 7  9 = AEM Analog Input 8 |
| 42376 | kVar Setpoint Source | Uint32 | N/A | N/A | RW | 0 = User Setting  1 = LSM Analog Input 1  2 = AEM Analog Input 1  3 = AEM Analog Input 2  4 = AEM Analog Input 3  5 = AEM Analog Input 4  6 = AEM Analog Input 5  7 = AEM Analog Input 6  8 = AEM Analog Input 7  9 = AEM Analog Input 8 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 42378 | PF Setpoint Source | Uint32 | N/A | N/A | RW | 0 = User Setting  1 = LSM Analog Input 1  2 = AEM Analog Input 1  3 = AEM Analog Input 2  4 = AEM Analog Input 3  5 = AEM Analog Input 4  6 = AEM Analog Input 5  7 = AEM Analog Input 6  8 = AEM Analog Input 7  9 = AEM Analog Input 8 |
| 42380-84 | RESERVED |  |  |  |  |  |
| 42386 | Baseload Analog Max | Int32 | Percent | Deci | RW | 0 - 1000 |
| 42388 | Baseload Analog Min | Int32 | Percent | Deci | RW | 0 - 1000 |
| 42390 | kvar Analog Max | Int32 | Percent | Deci | RW | (-1000) - 1000 |
| 42392 | kvar Analog Min | Int32 | Percent | Deci | RW | (-1000) - 1000 |
| 42394 | PF Analog Max | Int32 | N/A | Centi | RW | 160 - 240 |
| 42396 | PF Analog Min | Int32 | N/A | Centi | RW | 160 - 240 |
| 42398 | var Droop Percentage | Float | Percent | N/A | RW | 0 - 10 |
| 42400-06 | RESERVED |  |  |  |  |  |
| 42408 | Base Load Level | Float | Percent | N/A | RW | 0 - 100 |
| 42410 | kvar Setpoint | Float | Percent | N/A | RW | (-100) - 100 |
| 42412 | PF Setpoint | Int32 | N/A | Centi | RW | 160 - 240 |
| 42414 | var Control Mode | Int32 | N/A | N/A | RW | 0 = var Control 1 = PF Control |
| 42416-498 | FUTURE USE |  |  |  |  |  |

*Pulse Outputs*

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 42500 | AVR Correction Pulse Width | Int32 | Decisecond | Deci | RW | 0 - 999 |
| 42502 | AVR Correction Pulse Interval | Int32 | Decisecond | Deci | RW | 0 - 999 |
| 42504 | AVR Bias Contact Type | Int32 | N/A | N/A | RW | 0 = Continuous  1 = Proportional |
| 42506 | RESERVED |  |  |  |  |  |
| 42508 | Governor Correction Pulse Width | Int32 | Decisecond | Deci | RW | 0 - 999 |
| 42510 | Governor Correction Pulse Interval | Int32 | Decisecond | Deci | RW | 0 - 999 |
| 42512 | Governor Bias Contact Type | Int32 | Decisecond | Deci | RW | 0 = Continuous  1 = Proportional |
| 42514 | RESERVED |  |  |  |  |  |
| 42516-748 | FUTURE USE |  |  |  |  |  |

*Bus Condition Detection*

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 42750 | Gen Sensing Dead Bus Pickup | Int32 | Volt | N/A | RW | 0 - 4800 |
| 42752 | Gen Sensing Dead Bus Time Delay | Int32 | Decisecond | Deci | RW | 1 - 6000 |
| 42754 | RESERVED |  |  |  |  |  |
| 42756 | Gen Sensing Stable Undervoltage Pickup | Int32 | Volt | N/A | RW | 10 - 99999 |
| 42758 | Gen Sensing Stable Undervoltage Dropout | Int32 | Volt | N/A | RW | 10 - 99999 |
| 42760 | Gen Sensing Stable Overvoltage | Int32 | Volt | N/A | RW | 10 - 99999 |
| 42762 | Gen Sensing Stable Overvoltage Dropout | Int32 | Volt | N/A | RW | 10 - 99999 |
| 42764 | Gen Sensing Stable Underfrequency Pickup | Int32 | CentiHertz | Centi | RW | 4600 - 6400 |
| 42766 | Gen Sensing Stable Underfrequency Dropout | Int32 | CentiHertz | Centi | RW | 4600 - 6400 |
| 42768 | Gen Sensing Stable Overfrequency Pickup | Int32 | CentiHertz | Centi | RW | 4600 - 6400 |
| 42770 | Gen Sensing Stable Overfrequency Dropout | Int32 | CentiHertz | Centi | RW | 4600 - 6400 |
| 42772 | Gen Sensing Fail Time Delay | Int32 | Decisecond | Deci | RW | 1 - 6000 |
| 42774 | Gen Sensing Stable Time Delay | Int32 | Decisecond | Deci | RW | 1 - 6000 |
| 42776 | RESERVED |  |  |  |  |  |
| 42778 | Bus Sensing Dead Bus Pickup | Int32 | Volt | N/A | RW | 0 - 4800 |
| 42780 | Bus Sensing Dead Bus Time Delay | Int32 | Decisecond | Deci | RW | 1 - 6000 |
| 42782 | RESERVED |  |  |  |  |  |
| 42784 | Bus Sensing Stable Undervoltage Pickup | Int32 | Volt | N/A | RW | 10 - 9999 |
| 42786 | Bus Sensing Stable Undervoltage Dropout | Int32 | Volt | N/A | RW | 10 - 9999 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 42788 | Bus Sensing Stable Overvoltage Pickup | Int32 | Volt | N/A | RW | 10 - 9999 |
| 42790 | Bus Sensing Stable Overvoltage Dropout | Int32 | Volt | N/A | RW | 10 - 9999 |
| 42792 | Bus Sensing Stable Underfrequency Pickup | Int32 | CentiHertz | Centi | RW | 4600 - 6400 |
| 42794 | Bus Sensing Stable Underfrequency Dropout | Int32 | CentiHertz | Centi | RW | 4600 - 6400 |
| 42796 | Bus Sensing Stable Overfrequency Pickup | Int32 | CentiHertz | Centi | RW | 4600 - 6400 |
| 42798 | Bus Sensing Stable Overfrequency Dropout | Int32 | CentiHertz | Centi | RW | 4600 - 6400 |
| 42800 | Bus Sensing Fail Time Delay | Int32 | Decisecond | Deci | RW | 1 - 6000 |
| 42802 | Bus Sensing Stable Time Delay | Int32 | Decisecond | Deci | RW | 1 - 6000 |
| 42804 | RESERVED |  |  |  |  |  |
| 42806 | Gen Dead Status | Int32 | N/A | N/A | R | 0 - 1 |
| 42808 | Gen Stable Status | Int32 | N/A | N/A | R | 0 - 1 |
| 42810 | Gen Fail Status | Int32 | N/A | N/A | R | 0 - 1 |
| 42812 | Bus Dead Status | Int32 | N/A | N/A | R | 0 - 1 |
| 42814 | Bus Stable Status | Int32 | N/A | N/A | R | 0 - 1 |
| 42816 | Bus Fail Status | Int32 | N/A | N/A | R | 0 - 1 |
| 42818 | Gen Stable Low Line Scale Factor | Float | N/A | N/A | RW | 0.001 - 3 |
| 42820 | Bus Stable Low Line Scale Factor | Float | N/A | N/A | RW | 0.001 - 3 |
| 42822 | Gen Stable Alternate Frequency Scale Factor | Float | N/A | N/A | RW | 0.001 - 100 |
| 42824 | Bus Stable Alternate Frequency Scale Factor | Float | N/A | N/A | RW | 0.001 - 100 |
| 42826-3432 | FUTURE USE |  |  |  |  |  |

*Senders*

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 43434 | Coolant Temperature Sender Fail Configuration Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm |
| 43436 | Coolant Temperature Sender Fail Activation Delay | Int32 | Minute | N/A | RW | 5 - 30 |
| 43438 | Oil Pressure Sender Fail Configuration Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm |
| 43440 | Oil Pressure Sender Fail Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 43442 | Fuel Level Sender Fail Configuration Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm |
| 43444 | Fuel Level Sender Fail Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 43446 | Voltage Sensing Fail Configuration Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm |
| 43448 | Voltage Sensing Fail Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 43450-498 | FUTURE USE |  |  |  |  |  |

*System Configuration and Status*

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 43500 | Rated Volts | Float | Volt | N/A | RW | 1 - 99999 |
| 43502 | Pre-Start Contact Config | Int32 | N/A | N/A | RW | 0 = Open After Disconnect 1 = Closed While Running |
| 43504 | System Units | Int32 | N/A | N/A | RW | 0 = English  1 = Metric |
| 43506 | Battery Volts | Int32 | N/A | N/A | RW | 0 = 12V  1 = 24V |
| 43508 | Off Mode Status | Int32 | N/A | N/A | R | 0 = Disable  1 = Enable |
| 43510 | Run Mode Status | Int32 | N/A | N/A | R | 0 = Disable  1 = Enable |
| 43512 | Auto Mode Status | Int32 | N/A | N/A | R | 0 = Disable  1 = Enable |
| 43514 | Virtual Input 1 Status | Int32 | N/A | N/A | R | 0 = Disable  1 = Enable |
| 43516 | Virtual Input 2 Status | Int32 | N/A | N/A | R | 0 = Disable  1 = Enable |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 43518 | Virtual Input 3 Status | Int32 | N/A | N/A | R | 0 = Disable  1 = Enable |
| 43520 | Virtual Input 4 Status | Int32 | N/A | N/A | R | 0 = Disable  1 = Enable |
| 43522 | RTC Clock Hour | Int32 | Hour | N/A | RW | 0 - 23 |
| 43524 | RTC Minute | Int32 | Minute | N/A | RW | 0 - 59 |
| 43526 | RTC Second | Int32 | Second | N/A | RW | 0 - 59 |
| 43528 | RTC Month | Int32 | N/A | N/A | RW | 1 - 12 |
| 43530 | RTC Day | Int32 | N/A | N/A | RW | 1 - 31 |
| 43532 | RTC Year | Int32 | N/A | N/A | RW | 0 - 99 |
| 43534 | RTC DST Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43536 | Gen PT Primary | Int32 | Volt | N/A | RW | 1 - 99999 |
| 43538 | Gen PT Secondary | Int32 | Volt | N/A | RW | 1 - 480 |
| 43540 | Gen CT Primary | Int32 | Amp | N/A | RW | 1 - 9999 |
| 43542 | Bus PT Primary | Int32 | Volt | N/A | RW | 1 - 99999 |
| 43544 | Bus PT Secondary | Int32 | Volt | N/A | RW | 1 - 480 |
| 43546 | Cranking Style | Uint32 | N/A | N/A | RW | 0 = Continuous  1 = Cycle |
| 43548 | Number of Crank Cycles | Uint32 | N/A | N/A | RW | 1 - 7 |
| 43550 | Cycle Crank Time | Unit32 | Second | N/A | RW | 5 - 15 |
| 43552 | Continuous Crank Time | Unit32 | Second | N/A | RW | 5 - 60 |
| 43554 | Crank Disconnect Limit | Uint32 | Percent | N/A | RW | 10 - 100 |
| 43556 | Pre Crank Delay | Uint32 | Second | N/A | RW | 0 - 30 |
| 43558 | Configured Gen Connection | Uint32 | N/A | N/A | RW | 0 = Delta  1 = Wye  2 = 1-phase AB 3 = 1-phase AC  4 = Grounded Delta |
| 43560 | Gen Rated Frequency | Int32 | Hertz | N/A | RW | 0 = 50 Hz  1 = 60 Hz |
| 43562 | Rated kW | Uint32 | kiloWatt | N/A | RW | 5 - 9999 |
| 43564 | Rated Engine RPM | Uint32 | RPM | N/A | RW | 750 - 3600 |
| 43566 | No Load Cool Down Time | Uint32 | Minute | N/A | RW | 0 - 60 |
| 43568 | EPS Current Threshold | Int32 | PercentCTPri | N/A | RW | 3 - 10 |
| 43570 | Fuel Level Function | Uint32 | N/A | N/A | RW | 0 = Disable 1 = Fuel Lvl  2 = Natural Gas 3 = Propane |
| 43572 | Number Flywheel Teeth | Uint32 | N/A | N/A | RW | 50 - 500 |
| 43574 | Speed Signal Source | Uint32 | N/A | N/A | RW | 1 = MPU  2 = Gen Freq 3 = MPU Freq |
| 43576 | NFPA Level | Uint32 | N/A | N/A | RW | 0 = Zero  1 = One  2 = Two |
| 43578 | Horn Enable | Int32 | N/A | N/A | RW | 0 = Disabled  1 = Enabled |
| 43580 | Single Phase Override Sensing | Uint32 | N/A | N/A | RW | 0 = AB  1 = AC |
| 43582 | RESERVED |  |  |  |  |  |
| 43584 | LCD Contrast Value | Uint32 | N/A | N/A | RW | 0 - 100 |
| 43586 | Front Panel Sleep Mode | Uint32 | N/A | N/A | RW | 0 = Disabled  1 = Enabled |
| 43588 | RESERVED |  |  |  |  |  |
| 43590 | UTC Offset | Int32 | Minute | N/A | RW | (-1440) - 1440 |
| 43592 | DST Configuration | Int32 | N/A | N/A | RW | 0 = Disabled  1 = Floating  2 = Fixed |
| 43594 | Start/End Time Reference | Int32 | N/A | N/A | RW | 0 = Local Time 1 = UTC Time |
| 43596 | DST Bias Hours | Int32 | N/A | N/A | RW | 0 - 23 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 43598 | DSP Bias Minutes | Int32 | N/A | N/A | RW | 0 - 59 |
| 43600 | DST Start Month | Int32 | N/A | N/A | RW | 1 = January  2 = February  3 = March  4 = April  5 = May  6 = June  7 = July  8 = August  9 = September  10 = October  11 = November  12 = December |
| 43602 | DST Start Day | Int32 | N/A | N/A | RW | 1 - 31 |
| 43604 | DST Start Week of Month | In32 | N/A | N/A | RW | 0 = First  1 = Second  2 = Third  3 = Fourth  4 = Last |
| 43606 | DST Start Day of Week | Int32 | N/A | N/A | RW | 0 = Sunday  1 = Monday  2 = Tuesday  3 = Wednesday  4 = Thursday  5 = Friday  6 = Saturday |
| 43608 | DST Start Hour | Int32 | N/A | N/A | RW | 0 - 23 |
| 43610 | DST Start Minute | Int32 | N/A | N/A | RW | 0 - 59 |
| 43612 | DST End Month | Int32 | N/A | N/A | RW | 1 = January  2 = February  3 = March  4 = April  5 = May  6 = June  7 = July  8 = August  9 = September  10 = October  11 = November  12 = December |
| 43614 | DST End Day | Int32 | N/A | N/A | RW | 1 - 31 |
| 43616 | DST End Week of Month | Int32 | N/A | N/A | RW | 0 = First  1 = Second  2 = Third  3 = Fourth  4 = Last |
| 43618 | DST End Day of Week | Int32 | N/A | N/A | RW | 0 = Sunday  1 = Monday  2 = Tuesday  3 = Wednesday  4 = Thursday  5 = Friday  6 = Saturday |
| 43620 | DST End Hour | Int32 | N/A | N/A | RW | 0 - 23 |
| 43622 | DST End Minute | Int32 | N/A | N/A | RW | 0 - 59 |
| 43624 | EPS Low Line Scale Factor | Float | N/A | N/A | RW | 0.001 - 3 |
| 43626 | Rated Power Factor | Float | Power Factor | N/A | RW | (-1) - 1 |
| 43628 | Prestart Rest Configuration | Int32 | N/A | N/A | RW | 0 = Off During Rest 1 = On During Rest  2 = Preheat before Crank |
| 43630 | Oil Pressure Crank Disconnect | UInt32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43632 | Crank Disconnect Pressure | Uint32 | PSI | Deci | RW | 29 - 1500 |
| 43634 | Crank Disconnect Pressure in kPa | Uin32 | kPa | Deci | RW | 200 - 10345 |
| 43636 | Power Up Delay | Uint32 | Second | N/A | RW | 0 - 60 |
| 43638 | Auto Config Detect Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 43640 | Low Line Detect Threshold | Int32 | Volt | N/A | RW | 0 - 480 |
| 43642 | Single Phase Detect Threshold | Int32 | Volt | N/A | RW | 0 - 480 |
| 43644 | Start Relay Control | Uint32 | N/A | N/A | RW | 0 = Predefined  1 = Programmable |
| 43646 | Run Relay Control | Uint32 | N/A | N/A | RW | 0 = Predefined  1 = Programmable |
| 43648 | Prestart Relay Control | Uint32 | N/A | N/A | RW | 0 = Predefined  1 = Programmable |
| 43650 | Single Phase Connect Generator Detection | Int32 | N/A | N/A | RW | 0 = A-B  1 = A-C |
| 43652 | Off Mode Cool Down Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43654 | RESERVED |  |  |  |  |  |
| 43656 | Not In Auto Horn Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43658 | Clock Not Set Warning Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43660 | Alternate Frequency | Int32 | Hertz | Centi | RW | 1000 - 45000 |
| 43662 | Generator System Type | Int32 | N/A | N/A | RW | 0 = Single Generator 1 = Multiple Generator |
| 43664 | Gen CT Low Line Scale Factor | Float | N/A | N/A | RW | 0.001 - 3 |
| 43666 | Metric Pressure Units | Int32 | N/A | N/A | RW | 0 = Bar  1 = kPa |
| 43668 | System Units | Int32 | N/A | N/A | RW | 0 = English  1 = Metric |
| 43674 | RPM Bandwidth Data | Int32 | N/A | N/A | RW | 0 - 1000 |
| 43676 | Number Flywheel Teeth | Uint32 | N/A | Deci | RW | 10 - 5000 |
| 43678 | Phase Rotation | Int32 | N/A | N/A | RW | 0 = ACB  1 = ABC |
| 43680-748 | FUTURE USE |  |  |  |  |  |

*Control*

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 43750 | Emergency Stop: Writing a 1 will toggle emergency stop from off to on. Writing a 1 again will toggle emergency stop from on to off | Int32 | N/A | N/A | RW | 1 = Toggle On/Off |
| 43752 | Remote Start | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43754 | Remote Stop | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43756 | Run Mode | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43758 | Off Mode | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43760 | Auto Mode | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43762 | Alarm Reset | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43764 | Gen Breaker Open | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43766 | Gen Breaker Close | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43768 | Mains Breaker Open | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43770 | Mains Breaker Close | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43772 | FUTURE USE |  |  |  |  |  |
| 43774 | Virtual Input 1 Close | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43776 | Virtual Input 1 Open | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 43778 | Virtual Input 2 Close | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43780 | Virtual Input 2 Open | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43782 | Virtual Input 3 Close | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43784 | Virtual Input 3 Open | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43786 | Virtual Input 4 Close | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43788 | Virtual Input 4 Open | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 43790 | ESTOP Latch Status | Int32 | N/A | N/A | R | 0 = Disabled  1 = Enabled |
| 43792 | Gen Breaker Open | Int32 | N/A | N/A | RW | 1 = Operate (non-latching) |
| 43794 | Gen Breaker Close | Int32 | N/A | N/A | RW | 1 = Operate (non-latching) |
| 43796 | Mains Breaker Open | Int32 | N/A | N/A | RW | 1 = Operate (non-latching) |
| 43798 | Mains Breaker Close | Int32 | N/A | N/A | RW | 1 = Operate (non-latching) |
| 43800-4006 | FUTURE USE |  |  |  |  |  |

*Communication*

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44008 | RESERVED |  |  |  |  |  |
| 44010-16 | FUTURE USE |  |  |  |  |  |
| 44018 | Modem Inter Dialout Activation Delay | Int32 | Second | N/A | RW | 0 = 15  1 = 30  2 = 60  3 = 120 |
| 44020 | Modem Pager Buffer Limit | Int32 | N/A | N/A | RW | 0 = 80 Chars  1 = 120 Chars  2 = 160 Chars  3 = 200 Chars |
| 44022 | Modem Pager Coms Data Format | Int32 | N/A | N/A | RW | 0 = 8 bit, no parity  1 = 7 bit, even parity |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44024-25 | Modem Dialout Conditions 1 | Uint32 | N/A | N/A | RW | Bit 0 = Aux Input 5 Closed Bit 1 = Aux Input 4 Closed Bit 2 = Aux Input 3 Closed Bit 3 = Aux Input 2 Closed Bit 4 = Aux Input 1 Closed  Bit 5 = Cooldown Timer Active Bit 6 = Switch Not In Auto  Bit 7 = Scheduled Maintenance Pre- Alarm  Bit 8 = Weak Battery Voltage Pre-Alarm Bit 9 = Low Battery Voltage Pre-Alarm Bit 10 = Low Oil Pressure Pre-Alarm  Bit 11 = High Coolant Temp Pre-Alarm Bit 12 = kW Overload 1 Pre-Alarm  Bit 13 = Battery Overvoltage Pre-Alarm Bit 14 = Fuel Level Sender Fail Pre- Alarm  Bit 15 = Oil Pressure Sender Fail Pre- Alarm  Bit 16 = Coolant Temp Sender Fail Pre- Alarm  Bit 17 = Low Coolant Temp Pre-Alarm Bit 18 = High Fuel Pre-Alarm  Bit 19 = Low Fuel Pre-Alarm Bit 20 = Overspeed Alarm  Bit 21 = Emergency Stop Alarm Bit 22 = Overcrank Alarm  Bit 23 = Low Coolant Level Status Bit 24 = Low Fuel Alarm  Bit 25 = Loss of Gen Volt Sensing Alarm Bit 26 = MPU Speed Sender Fail Alarm Bit 27 = Fuel Level Sender Fail Alarm Bit 28 = Oil Pressure Sender Fail Alarm Bit 29 = Coolant Temp Sender Fail Alarm  Bit 30 = Low Oil Pressure Alarm Bit 31 = High Coolant Temp Alarm |
| 44026-27 | Modem Dialout Conditions 2 | Uint32 | N/A | N/A | RW | Bit 0 = 59-2 Trip Alarm  Bit 1 = 27-2 Trip Alarm  Bit 2 = 51-2 Trip Alarm Bit 3 = Engine Running  Bit 4 = Battery Charger Fail Status Bit 5 = Fuel Leak Detect Status Bit 6 = Transfer Fail Alarm  Bit 7 = 81U Trip Pre-Alarm Bit 8 = 81O Trip Pre-Alarm Bit 9 = 59-1 Trip Pre-Alarm  Bit 10 = 27-1 Trip Pre-Alarm  Bit 11 = 47 Trip Pre-Alarm  Bit 12 = 51-1 Trip Pre-Alarm Bit 13 = 81U Trip Alarm  Bit 14 = 81O Trip Alarm Bit 15 = 59-1 Trip Alarm  Bit 16 = 27-1 Trip Alarm  Bit 17 = 47 Trip Alarm  Bit 18 = 51-1 Trip Alarm  Bit 19 = Loss of ECU Coms Pre-Alarm Bit 20 = Loss of ECU Coms Alarm  Bit 21 = Aux Input 16 Closed Bit 22 = Aux Input 15 Closed Bit 23 = Aux Input 14 Closed Bit 24 = Aux Input 13 Closed Bit 25 = Aux Input 12 Closed Bit 26 = Aux Input 11 Closed Bit 27 = Aux Input 10 Closed Bit 28 = Aux Input 9 Closed Bit 29 = Aux Input 8 Closed Bit 30 = Aux Input 7 Closed Bit 31 = Aux Input 6 Closed |
| 44028-30 | RESERVED |  |  |  |  |  |
| 44032 | CANbus Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44034 | DTC Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44036 | Rings for Modem Answer | Int32 | N/A | N/A | RW | 1 - 9 |
| 44038 | Modem Offline Delay | Int32 | Minute | N/A | RW | 1 - 240 |
| 44040 | Modbus Baud Rate | Int32 | N/A | N/A | RW | 0 = 9600 Baud  1 = 4800 Baud  2 = 2400 Baud  3 = 1200 Baud |
| 44042 | Modbus Parity | Int32 | N/A | N/A | RW | 0 = No Parity 1 = Odd Parity  2 = Even Parity |
| 44044 | Modbus Address | Int32 | N/A | N/A | RW | 1 - 247 |
| 44046-47 | Modem Dialout Conditions 3 | Uint32 | N/A | N/A | RW | Bit 0 = 78 Vector Shift Trip Bit 1 = 51-3 Trip Pre-Alarm  Bit 2 = 51-3 Trip Alarm Bit 3 = Duplicate AEM  Bit 4 = AEM Comms Failure Bit 5 = Duplicate CEM  Bit 6 = CEM Comms Failure Bit 7 = Duplicate LSM  Bit 8 = Config Element 8 Status Bit 9 = Config Element 7 Status Bit 10 = Config Element 6 Status  Bit 11 = Config Element 5 Status Bit 12 = Config Element 4 Status Bit 13 = Config Element 3 Status Bit 14 = Config Element 2 Status Bit 15 = Config Element 1 Status Bit 16 = ID Repeat  Bit 17 = ID Missing  Bit 18 = LSM Comms Failure  Bit 19 = Intergenset Comms Failure Bit 20 = GOV Output Limit  Bit 21 = AVR Output Limit  Bit 22 = Auto Restart Fail Alarm Bit 23 = kW Overload 3 Pre-Alarm Bit 24 = kW Overload 2 Pre-Alarm Bit 25 = 40 Trip Pre-Alarm  Bit 26 = 32 Trip Pre-Alarm  Bit 27 = 59-2 Trip Pre-Alarm  Bit 28 = 27-2 Trip Pre-Alarm  Bit 29 = 51-2 Trip Pre-Alarm  Bit 30 = 40 Trip Alarm  Bit 31 = 32 Trip Alarm |
| 44048 | LSM-2020 Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44050 | DHCP Enabled | Uint32 | N/A | N/A | R | 0 = Disabled  1 = Enabled |
| 44052-56 | RESERVED |  |  |  |  |  |
| 44058 | CEM-2020 Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44060 | RESERVED |  |  |  |  |  |
| 44062 | AEM-2020 Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44064 | CEM Outputs | Int32 | N/A | N/A | RW | 0 = 18 Outputs  1 = 24 Outputs |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44066-67 | Modem Dialout Conditions 4 | Uint32 | N/A | N/A | RW | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used  Bit 28 = High Exhaust Temp Pre-Alarm Bit 29 = DPF Regeneration Inhibited Pre-Alarm  Bit 30 = DPF Regeneration Required Pre-Alarm  Bit 31 = 81 ROCOF DF/DT Trip |
| 44068 | Active IP Address | Uint32 | N/A | N/A | R | 0 - 4294967295 |
| 44070 | Gateway IP Address | Uint32 | N/A | N/A | R | 0 - 4294967295 |
| 44072 | Subnet Mask | Uint32 | N/A | N/A | R | 0 - 4294967295 |
| 44074-248 | FUTURE USE |  |  |  |  |  |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44250 | 3 Phase Overcurrent Pickup (51-1) | Uint32 | CentiAmp | Centi | RW | 18 - 775 |
| 44252 | 3 Phase Overcurrent Time Dial (51-1) | Uint32 | DeciUnit | Deci | RW | 0 - 72000 |
| 44254 | 3 Phase Overcurrent Curve (51-1) | Uint32 | N/A | N/A | RW | 0 = S1 Curve 1 = S2 Curve 2 = L1 Curve 3 = L2 Curve 4 = D Curve 5 = M Curve 6 = I1 Curve 7 = I2 Curve 8 = V1 Curve 9 = V2 Curve  10 = E1 Curve 11 = E2 Curve 12 = A Curve 13 = B Curve 14 = C Curve 15 = G Curve 16 = F Curve  17 = Programmable |
| 44256 | 3 Phase Overcurrent Alarm Configuration (51-1) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44258 | 1 Phase Overcurrent Pickup (51-1) | Uint32 | CentiAmp | Centi | RW | 18 - 775 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44260 | 1 Phase Overcurrent Time Dial (51-1) | Uint32 | DeciUnit | Deci | RW | 0 - 72000 |
| 44262 | 1 Phase Overcurrent Curve (51-1) | Uint32 | N/A | N/A | RW | 0 = S1 Curve 1 = S2 Curve 2 = L1 Curve 3 = L2 Curve 4 = D Curve 5 = M Curve 6 = I1 Curve 7 = I2 Curve 8 = V1 Curve 9 = V2 Curve  10 = E1 Curve 11 = E2 Curve 12 = A Curve 13 = B Curve 14 = C Curve 15 = G Curve 16 = F Curve  17 = Programmable |
| 44264 | 1 Phase Overcurrent Alarm Configuration (51-1) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44266 | Phase Imbalance Pickup | Uint32 | Volt | N/A | RW | 5 - 100 |
| 44268 | Phase Imbalance Activation Delay | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44270 | Phase Imbalance Alarm Configuration | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44272 | 3 Phase Undervoltage Pickup (27-1) | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44274 | 3 Phase Undervoltage Activation Delay (27-1) | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44276 | 3 Phase Undervoltage Inhibit Frequency (27-1) | Uint32 | Hertz | N/A | RW | 20 - 400 |
| 44278 | 3 Phase Undervoltage Alarm Configuration (27-1) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44280 | 1 Phase Undervoltage Pickup (27-1) | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44282 | 1 Phase Undervoltage Activation Delay (27-1) | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44284 | 1 Phase Undervoltage Inhibit Frequency (27-1) | Uint32 | Hertz | N/A | RW | 20 - 400 |
| 44286 | 1 Phase Undervoltage Alarm Configuration (27-1) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44288 | 3 Phase Overvoltage Pickup (59-1) | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44290 | 3 Phase Overvoltage Activation Delay (59-1) | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44292 | 3 Phase Overvoltage Alarm Configuration (59-1) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44294 | 1 Phase Overvoltage Pickup (59-1) | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44296 | 1 Phase Overvoltage Activation Delay (59-1) | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44298 | 1 Phase Overvoltage Alarm Configuration (59-1) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44300 | Underfrequency Pickup | Uint32 | DeciHertz | Deci | RW | 450 - 4400 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44302 | Underfrequency Activation Delay | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44304 | Underfrequency Inhibit Voltage | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44306 | Underfrequency Alarm Configuration | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44308 | Overfrequency Pickup | Uint32 | DeciHertz | Deci | RW | 450 - 4400 |
| 44310 | Overfrequency Activation Delay | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44312 | Overfrequency Alarm Configuration | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44314 | Overcurrent Low Line Scale Factor (51-1) | Float | N/A | N/A | RW | 0.001 - 3 |
| 44316 | Overvoltage Low Line Scale Factor (59-1) | Float | N/A | N/A | RW | 0.001 - 3 |
| 44318 | Undervoltage Low Line Scale Factor (27-1) | Float | N/A | N/A | RW | 0.001 - 3 |
| 44320 | 3 Phase Overcurrent Pickup (51-2) | Uint32 | CentiAmp | Centi | RW | 18 - 775 |
| 44322 | 3 Phase Overcurrent Time Dial (51-2) | Uint32 | DeciUnit | Deci | RW | 0 - 72000 |
| 44324 | 3 Phase Overcurrent Curve (51-2) | Uint32 | N/A | N/A | RW | 0 = S1 Curve 1 = S2 Curve 2 = L1 Curve 3 = L2 Curve 4 = D Curve 5 = M Curve 6 = I1 Curve 7 = I2 Curve 8 = V1 Curve 9 = V2 Curve  10 = E1 Curve 11 = E2 Curve 12 = A Curve 13 = B Curve 14 = C Curve 15 = G Curve 16 = F Curve  17 = Programmable |
| 44326 | 3 Phase Overcurrent Alarm Configuration (51-2) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44328 | 1 Phase Overcurrent Pickup (51-2) | Uint32 | CentiAmp | Centi | RW | 18 - 775 |
| 44330 | 1 Phase Overcurrent Time Dial (51-2) | Uint32 | DeciUnit | Deci | RW | 0 - 72000 |
| 44332 | 1 Phase Overcurrent Curve (51-2) | Uint32 | N/A | N/A | RW | 0 = S1 Curve 1 = S2 Curve 2 = L1 Curve 3 = L2 Curve 4 = D Curve 5 = M Curve 6 = I1 Curve 7 = I2 Curve 8 = V1 Curve 9 = V2 Curve  10 = E1 Curve 11 = E2 Curve 12 = A Curve  13 = B Curve  14 = C Curve 15 = G Curve 16 = F Curve  17 = Programmable |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44334 | 1 Phase Overcurrent Alarm Configuration (51-2) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44336 | 3 Phase Undervoltage Pickup (27-2) | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44338 | 3 Phase Undervoltage Activation Delay (27-2) | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44340 | 3 Phase Undervoltage Inhibit Frequency (27-2) | Uint32 | Hertz | N/A | RW | 20 - 400 |
| 44342 | 3 Phase Undervoltage Alarm Configuration (27-2) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44344 | 1 Phase Undervoltage Pickup (27-2) | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44346 | 1 Phase Undervoltage Activation Delay (27-2) | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44348 | 1 Phase Undervoltage Inhibit Frequency (27-2) | Uint32 | Hertz | N/A | RW | 20 - 400 |
| 44350 | 1 Phase Undervoltage Alarm Configuration (27-2) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44352 | 3 Phase Overvoltage Pickup (59-2) | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44354 | 3 Phase Overvoltage Activation Delay (59-2) | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44356 | 3 Phase Overvoltage Alarm Configuration (59-2) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44358 | 1 Phase Overvoltage Pickup (59-2) | Uint32 | Volt | N/A | RW | 70 - 576 |
| 44360 | 1 Phase Overvoltage Activation Delay (59-2) | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44362 | 1 Phase Overvoltage Alarm Configuration (59-2) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44364 | Overcurrent Low Line Scale Factor (51-2) | Float | N/A | N/A | RW | 0.001 - 3 |
| 44366 | Overvoltage Low Line Scale Factor (59-2) | Float | N/A | N/A | RW | 0.001 - 3 |
| 44368 | Undervoltage Low Line Scale Factor (27-2) | Float | N/A | N/A | RW | 0.001 - 3 |
| 44370 | Phase Imbalance Hysteresis | Uint32 | Volt | N/A | RW | 1 - 5 |
| 44372 | 3 Phase Undervoltage  Hysteresis (27-1) | Uint32 | Volt | N/A | RW | 1 - 60 |
| 44374 | 1 Phase Undervoltage  Hysteresis (27-1) | Uint32 | Volt | N/A | RW | 1 - 60 |
| 44376 | 3 Phase Overvoltage Hysteresis (59-1) | Uint32 | Volt | N/A | RW | 1 - 60 |
| 44378 | 1 Phase Overvoltage Hysteresis (59-1) | Uint32 | Volt | N/A | RW | 1 - 60 |
| 44380 | Underfrequency Hysteresis | Uint32 | DeciHertz | Deci | RW | 1 - 400 |
| 44382 | Overfrequency Hysteresis | Uint32 | DeciHertz | Deci | RW | 1 - 400 |
| 44384 | 3 Phase Undervoltage  Hysteresis (27-2) | Uint32 | Volt | N/A | RW | 1 - 60 |
| 44386 | 1 Phase Undervoltage  Hysteresis (27-2) | Uint32 | Volt | N/A | RW | 1 - 60 |
| 44388 | 3 Phase Overvoltage Hysteresis (59-2) | Uint32 | Volt | N/A | RW | 1 - 60 |
| 44390 | 1 Phase Overvoltage Hysteresis (59-2) | Uint32 | Volt | N/A | RW | 1 - 60 |
| 44392 | 3 Phase Reverse Power Pickup | Uint32 | DeciPercent | Deci | RW | (-500) - 50 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44394 | 3 Phase Reverse Power Activation Delay | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44396 | 3 Phase Reverse Power Alarm Configuration | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44398 | 3 Phase Reverse Power Hysteresis | Int32 | DeciPercent | Deci | RW | 10 - 100 |
| 44400 | 1 Phase Reverse Power Pickup | Uint32 | DeciPercent | Deci | RW | (-500) - 50 |
| 44402 | 1 Phase Reverse Power Activation Delay | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44404 | 1 Phase Reverse Power Alarm Configuration | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44406 | 1 Phase Reverse Power Hysteresis | Int32 | DeciPercent | Deci | RW | 10 - 100 |
| 44408 | 3 Phase Loss of Excitation Pickup | Uint32 | DeciPercent | Deci | RW | (-1500) - 0 |
| 44410 | 3 Phase Loss of Excitation Activation Delay | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44412 | 3 Phase Loss of Excitation Alarm Configuration | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44414 | 3 Phase Loss of Excitation Hysteresis | Int32 | DeciPercent | Deci | RW | 10 - 100 |
| 44416 | 1 Phase Loss of Excitation Pickup | Uint32 | DeciPercent | Deci | RW | (-1500) - 0 |
| 44418 | 1 Phase Loss of Excitation Activation Delay | Uint32 | Decisecond | Deci | RW | 0 - 300 |
| 44420 | 1 Phase Loss of Excitation Alarm Configuration | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44422 | 1 Phase Loss of Excitation Hysteresis | Int32 | DeciPercent | Deci | RW | 10 - 100 |
| 44424 | 3 Phase Overcurrent Reset Type (51-1) | Int32 | N/A | N/A | RW | 0 = Instantaneous  1 = Integrating |
| 44426 | 1 Phase Overcurrent Reset Type (51-1) | Int32 | N/A | N/A | RW | 0 = Instantaneous  1 = Integrating |
| 44428 | 3 Phase Overcurrent Reset Type (51-2) | Int32 | N/A | N/A | RW | 0 = Instantaneous  1 = Integrating |
| 44430 | 1 Phase Overcurrent Reset Type (51-2) | Int32 | N/A | N/A | RW | 0 = Instantaneous  1 = Integrating |
| 44432 | 51-1 Curve Constant A | Float | N/A | N/A | RW | 0 - 600 |
| 44434 | 51-1 Curve Constant B | Float | N/A | N/A | RW | 0 - 25 |
| 44436 | 51-1 Curve Constant C | Float | N/A | N/A | RW | 0 - 1 |
| 44438 | 51-1 Curve Constant N | Float | N/A | N/A | RW | 0.5 - 2.5 |
| 44440 | 51-1 Curve Constant R | Float | N/A | N/A | RW | 0 - 30 |
| 44442 | 51-2 Curve Constant A | Float | N/A | N/A | RW | 0 - 600 |
| 44444 | 51-2 Curve Constant B | Float | N/A | N/A | RW | 0 - 25 |
| 44446 | 51-2 Curve Constant C | Float | N/A | N/A | RW | 0 - 1 |
| 44448 | 51-2 Curve Constant N | Float | N/A | N/A | RW | 0.5 - 2.5 |
| 44450 | 51-2 Curve Constant R | Float | N/A | N/A | RW | 0 - 30 |
| 44452 | 3 Phase Overcurrent Pickup (51-3) | Uint32 | CentiAmp | Centi | RW | 18 - 775 |
| 44454 | 3 Phase Overcurrent Time Dial (51-3) | Uint32 | DeciUnit | Deci | RW | 0 - 72000 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44456 | 3 Phase Overcurrent Curve (51-3) | Uint32 | N/A | N/A | RW | 0 = S1 Curve 1 = S2 Curve 2 = L1 Curve 3 = L2 Curve 4 = D Curve 5 = M Curve 6 = I1 Curve 7 = I2 Curve 8 = V1 Curve 9 = V2 Curve  10 = E1 Curve 11 = E2 Curve 12 = A Curve 13 = B Curve 14 = C Curve 15 = G Curve 16 = F Curve  17 = Programmable |
| 44458 | 3 Phase Overcurrent Alarm Configuration (51-3) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44460 | 1 Phase Overcurrent Pickup (51-3) | Uint32 | CentiAmp | Centi | RW | 18 - 775 |
| 44462 | 1 Phase Overcurrent Time Dial (51-3) | Uint32 | DeciUnit | Deci | RW | 0 - 72000 |
| 44464 | 1 Phase Overcurrent Curve (51-3) | Uint32 | N/A | N/A | RW | 0 = S1 Curve 1 = S2 Curve 2 = L1 Curve 3 = L2 Curve 4 = D Curve 5 = M Curve 6 = I1 Curve 7 = I2 Curve 8 = V1 Curve 9 = V2 Curve  10 = E1 Curve 11 = E2 Curve 12 = A Curve 13 = B Curve 14 = C Curve 15 = G Curve 16 = F Curve  17 = Programmable |
| 44466 | 1 Phase Overcurrent Alarm Configuration (51-3) | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44468 | Overcurrent Low Line Scale Factor (51-3) | Float | N/A | N/A | RW | 0.001 - 3 |
| 44470 | 3 Phase Overcurrent Reset Type (51-3) | Int32 | N/A | N/A | RW | 0 = Instantaneous  1 = Integrating |
| 44472 | 1 Phase Overcurrent Reset Type (51-3) | Int32 | N/A | N/A | RW | 0 = Instantaneous  1 = Integrating |
| 44474 | 51-3 Curve Constant A | Float | N/A | N/A | RW | 0 - 600 |
| 44476 | 51-3 Curve Constant B | Float | N/A | N/A | RW | 0 - 25 |
| 44478 | 51-3 Curve Constant C | Float | N/A | N/A | RW | 0 - 1 |
| 44480 | 51-3 Curve Constant N | Float | N/A | N/A | RW | 0.5 - 2.5 |
| 44482 | 51-3 Curve Constant R | Float | N/A | N/A | RW | 0 - 30 |
| 44484 | 78 Vector Shift Alarm Config | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44486 | 78 Vector Shift Pickup | Int32 | Degree | N/A | RW | 2 - 90 |
| 44488 | 78 Open Mains Breaker on Trip | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44490 | 81 ROCOF Alarm Config | Uint32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 44492 | 81 ROCOF Pickup | Uint32 | Hz/Second | Deci | RW | 2 - 100 |
| 44494 | 81 ROCOF Activation Delay | Uint32 | Second | Milli | RW | 0 - 10000 |
| 44496 | 81 ROCOF Open Mains Breaker on Trip | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44498 | FUTURE USE |  |  |  |  |  |

*Alarms*

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44500 | High Coolant Temp Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44502 | High Coolant Temp Alarm Threshold | Uint32 | Deg F | N/A | RW | 100 - 280 |
| 44504 | Metric High Coolant Temp Alarm Threshold | Int32 | Deg C | N/A | RW | 38 - 138 |
| 44506 | High Coolant Temp Alarm Activation Delay | Uint32 | Second | N/A | RW | 0 - 150 |
| 44508 | Low Oil Press. Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44510 | Low Oil Press. Alarm Threshold | Uint32 | PSI | Deci | RW | 29 - 1500 |
| 44512 | Metric Low Oil Press. Alarm Threshold | Uint32 | kPa | Deci | RW | 200 - 10345 |
| 44514 | Low Oil Press. Alarm Arming Delay | Uint32 | Second | N/A | RW | 5 - 60 |
| 44516 | Overspeed Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44518 | Overspeed Alarm Threshold | Uint32 | Percent | N/A | RW | 105 - 140 |
| 44520 | Overspeed Alarm Activation Delay | Uint32 | Millisecond | Milli | RW | 0 - 500 |
| 44522 | Low Fuel Level Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44524 | Low Fuel Level Alarm Threshold | Uint32 | Percent | N/A | RW | 0 - 100 |
| 44526 | Low Fuel Level Alarm Activation Delay | Int32 | Second | N/A | RW | 0 - 30 |
| 44528 | High Coolant Temp Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44530 | High Coolant Temp Pre-Alarm Threshold | Uint32 | Deg F | N/A | RW | 100 - 280 |
| 44532 | Metric High Coolant Temp Pre- Alarm Threshold | Int32 | Deg C | N/A | RW | 38 - 138 |
| 44534 | Low Coolant Temp Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44536 | Low Coolant Temp Pre-Alarm Threshold | Uint32 | Deg F | N/A | RW | 35 - 151 |
| 44538 | Metric Low Coolant Temp Pre- Alarm Threshold | Int32 | Deg C | N/A | RW | 2 - 66 |
| 44540 | High Fuel Level Pre-Alarm Threshold | Int32 | Percent | N/A | RW | 0 - 150 |
| 44542 | High Fuel Level Pre-Alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44544 | High Fuel Level Pre-Alarm Activation Delay | Int32 | Second | N/A | RW | 0 - 30 |
| 44546 | Low Fuel Level Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44548 | Low Fuel Level Pre-Alarm Threshold | Uint32 | Percent | N/A | RW | 10 - 100 |
| 44550 | Low Battery Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44552 | Low Battery Pre-Alarm Threshold | Uint32 | DeciVolt | Deci | RW | 60 - 240 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44554 | Low Battery Pre-Alarm Activation Delay | Uint32 | Second | N/A | RW | 1 - 10 |
| 44556 | Weak Battery Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44558 | Weak Battery Pre-Alarm Threshold | Uint32 | DeciVolt | Deci | RW | 40 - 160 |
| 44560 | Weak Battery Pre-Alarm Activation Delay | Uint32 | Second | Deci | RW | 0 - 100 |
| 44562 | Battery Overvoltage Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44564 | Low Oil Press. Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44566 | Low Oil Press. Pre-Alarm Threshold | Uint32 | PSI | Deci | RW | 29 - 1500 |
| 44568 | Metric Low Oil Press. Pre-Alarm Threshold | Int32 | kPa | Deci | RW | 20 - 10345 |
| 44570 | Engine Overload 1 Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44572 | Engine Overload 1 Pre-Alarm Threshold | Int32 | Percent | N/A | RW | 0 - 200 |
| 44574 | ECU Comms Fail Pre-Alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44576 | Active DTC Pre-Alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44578 | Maintenance Interval Pre-Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44580 | Maintenance Interval Pre-Alarm Threshold | Uint32 | Hour | N/A | RW | 0 - 5000 |
| 44582 | Speed Sender Fail Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 44584 | ECU Low Coolant Level Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44586 | ECU Low Coolant Level Alarm Threshold | Uint32 | Percent | N/A | RW | 1 - 99 |
| 44588 | ECU Low Coolant Level Pre- Alarm Enable | Uint32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44590 | ECU Low Coolant Level Pre- Alarm Threshold | Uint32 | Percent | N/A | RW | 1 - 99 |
| 44592 | Battery Overvoltage Alarm Threshold | Int32 | DeciVolt | Deci | RW | 120 - 320 |
| 44594 | Engine Overload 1 Pre-Alarm 3 Phase Hysteresis | Int32 | DeciVolt | Deci | RW | 1 - 10 |
| 44596 | Engine Overload 1 Pre-Alarm 1 Phase Threshold | Int32 | Percent | N/A | RW | 0 - 200 |
| 44598 | Engine Overload 1 Pre-Alarm 1 Phase Hysteresis | Int32 | Percent | N/A | RW | 1 - 10 |
| 44600 | Engine Overload 1 Pre-Alarm 1 Phase Low Line Scale Factor | Float | N/A | N/A | RW | 0.001 - 3 |
| 44602 | Engine Overload 2 Pre-Alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44604 | Engine Overload 2 Pre-Alarm 3 Phase Threshold | Int32 | Percent | N/A | RW | 0 - 200 |
| 44606 | Engine Overload 2 Pre-Alarm 3 Phase Hysteresis | Int32 | Percent | N/A | RW | 1 - 10 |
| 44608 | Engine Overload 2 Pre-Alarm 1 Phase Threshold | Int32 | Percent | N/A | RW | 0 - 200 |
| 44610 | Engine Overload 2 Pre-Alarm 1 Phase Hysteresis | Int32 | Percent | N/A | RW | 1 - 10 |
| 44612 | Engine Overload 2 Pre-Alarm 1 Phase Low Line Scale Factor | Float | N/A | N/A | RW | 0.001 - 3 |
| 44614 | Engine Overload 3 Pre-Alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44616 | Engine Overload 3 Pre-Alarm 3 Phase Threshold | Int32 | Percent | N/A | RW | 0 - 200 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44618 | Engine Overload 3 Pre-Alarm 3 Phase Hysteresis | Int32 | Percent | N/A | RW | 1 - 10 |
| 44620 | Engine Overload 3 Pre-Alarm 1 Phase Threshold | Int32 | Percent | N/A | RW | 0 - 200 |
| 44622 | Engine Overload 3 Pre-Alarm 1 Phase Hysteresis | Int32 | Percent | N/A | RW | 1 - 10 |
| 44624 | Engine Overload 3 Pre-Alarm 1 Phase Low Line Scale Factor | Float | N/A | N/A | RW | 0.001 - 3 |
| 44626 | LSM Comm Failure Pre-alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44628 | Intergenset Comm Failure Pre- alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44630 | AVR Bias Output Limit Pre- alarm Activation Delay | Int32 | Second | N/A | RW | 1 - 15 |
| 44632 | AVR Bias Output Limit Pre- alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44634 | GOV Bias Output Limit Pre- alarm Activation Delay | Int32 | Second | N/A | RW | 1 - 15 |
| 44636 | GOV Bias Output Limit Pre- alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44638 | ID Missing Pre-alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44640 | ID Repeat Pre-alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44642 | CEM Comm Failure Pre-alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44644 | AEM Comm Failure Pre-alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44646 | Checksum Failure Pre-alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44648 | Low Oil Pressure Alarm (metric pressure units is Bar) | Int32 | Bar | Deci | RW | 2 - 103 |
| 44650 | Low Oil Pressure Pre-Alarm (metric pressure units is Bar) | Int32 | Bar | Deci | RW | 2 - 103 |
| 44652 | Sync Fail Pre-alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44654 | Breaker Close Fail Pre-Alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44656 | Breaker Open Fail Pre-Alarm Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 44658-748 | FUTURE USE |  |  |  |  |  |

*Metering*

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44750 | Gen VAB Metering | Int32 | Volt | N/A | R | (-2147483648) - 2147483647 |
| 44752 | Gen VBC Metering | Int32 | Volt | N/A | R | (-2147483648) - 2147483647 |
| 44754 | Gen VCA Metering | Int32 | Volt | N/A | R | (-2147483648) - 2147483647 |
| 44756 | Gen VAN Metering | Int32 | Volt | N/A | R | (-2147483648) - 2147483647 |
| 44758 | Gen VBN Metering | Int32 | Volt | N/A | R | (-2147483648) - 2147483647 |
| 44760 | Gen VCN Metering | Int32 | Volt | N/A | R | (-2147483648) - 2147483647 |
| 44762 | Bus Voltage Metering | Int32 | Volt | N/A | R | (-2147483648) - 2147483647 |
| 44764 | Gen IA Metering | Int32 | Amp | N/A | R | (-32768) - 32767 |
| 44766 | Gen IB Metering | Int32 | Amp | N/A | R | (-32768) - 32767 |
| 44768 | Gen IC Metering | Int32 | Amp | N/A | R | (-32768) - 32767 |
| 44770 | Gen kVA A Metering | Int32 | KiloVA | N/A | R | (-2147483648) - 2147483647 |
| 44772 | Gen kVA B Metering | Int32 | KiloVA | N/A | R | (-2147483648) - 2147483647 |
| 44774 | Gen kVA C Metering | Int32 | KiloVA | N/A | R | (-2147483648) - 2147483647 |
| 44776 | Gen kVA Total Metering | Int32 | KiloVA | N/A | R | (-2147483648) - 2147483647 |
| 44778 | Gen kW A Metering | Int32 | KiloWatt | N/A | R | (-2147483648) - 2147483647 |
| 44780 | Gen kW B Metering | Int32 | KiloWatt | N/A | R | (-2147483648) - 2147483647 |
| 44782 | Gen kW C Metering | Int32 | KiloWatt | N/A | R | (-2147483648) - 2147483647 |
| 44784 | Gen kW Total Metering | Int32 | KiloWatt | N/A | R | (-2147483648) - 2147483647 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44786 | Power Factor Metering | Float | N/A | N/A | R | (-1) - 1 |
| 44788 | Gen PF Lagging | Int32 | N/A | N/A | R | (-128) - 127 |
| 44790 | Gen Frequency Metering | Float | Hertz | N/A | R | 45 - 440 |
| 44792 | Bus Frequency Metering | Float | Hertz | N/A | R | 45 - 440 |
| 44794 | Active Speed Source | Uint32 | N/A | N/A | R | 0 - 255 |
| 44796 | Engine Speed Metering | Uint32 | RPM | N/A | R | 0 - 65535 |
| 44798 | Engine Load Metering | Int32 | Percent | N/A | R | (-32768) - 32767 |
| 44800 | Coolant Temp. Metering | Int32 | Deg F | N/A | R | (-32768) - 32767 |
| 44802 | Oil Pressure Metering | Int32 | PSI | N/A | R | (-32768) - 32767 |
| 44804 | Battery Voltage Metering | Int32 | DeciVolt | N/A | R | (-32768) - 32767 |
| 44806 | Fuel Level Metering | Int32 | N/A | N/A | R | (-32768) - 32767 |
| 44808 | ECU Coolant Level Metering | Uint32 | N/A | N/A | R | 0 - 255 |
| 44810 | Cool Down Time Remaining | Int32 | Minute | N/A | R | (-128) - 127 |
| 44812-13 | Alarm Metering | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used  Bit 17 = Global Alarm  Bit 18 = Auto Restart Failure Bit 19 = Fuel Leak Detect  Bit 20 = Battery Charger Failure Bit 21 = Transfer Fail  Bit 22 = Low Coolant Level Bit 23 = ECU Shutdown  Bit 24 = Emergency Shutdown Bit 25 = Overcrank  Bit 26 = Loss of ECU Comms Bit 27 = Global Sender Fail Bit 28 = Low Fuel Level  Bit 29 = Low Oil Pressure Bit 30 = Hi Coolant Temp Bit 31 = Overspeed |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44814-15 | Pre-Alarm Metering 1 | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = Serial Flash Read Failure Bit 3 = Checksum Fail  Bit 4 = Global Pre-Alarm Bit 5 = Fuel Filter 2 Leak Bit 6 = Fuel Filter 1 Leak  Bit 7 = Engine kW Overload 3 Bit 8 = Engine kW Overload 2 Bit 9 = MPU Fail  Bit 10 = Fuel Leak Detect  Bit 11 = Battery Charger Failure Bit 12 = Low Coolant Level  Bit 13 = Mains Brkr Fail to Open Bit 14 = Mains Brkr Fail to Close Bit 15 = Sync Fail at Mains Brkr Bit 16 = Gen Brkr Fail to Open Bit 17 = Gen Brkr Fail to Close Bit 18 = Sync Fail at Gen Brkr Bit 19 = High Fuel Level  Bit 20 = Loss of Rem. Mod. Com Bit 21 = Engine kW Overload  Bit 22 = Diagnostic Trouble Code Bit 23 = Loss of ECU Comms  Bit 24 = Maintenance Due Bit 25 = Battery Overvoltage Bit 26 = Weak Battery  Bit 27 = Low Battery Voltage Bit 28 = Low Coolant Temp Bit 29 = Low Fuel Level  Bit 30 = Low Oil Pressure Bit 31 = Hi Coolant Temp |
| 44816-17 | MTU Alarm Metering | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used  Bit 23 = High ECU Supply Bit 24 = Combined Red Bit 25 = Overspeed  Bit 26 = Low Oil Pressure  Bit 27 = Low Fuel Delivery Press. Bit 28 = Low Aftrcooler Cool. Level Bit 29 = High Coolant Temp  Bit 30 = High Oil Temp  Bit 31 = High Charge Air Temp |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44818-19 | MTU Pre-Alarm Metering | Int32 | N/A | N/A | R | Bit 0 = Low Storage Tank Bit 1 = High Storage Tank Bit 2 = Low Day Tank  Bit 3 = High Day Tank  Bit 4 = Alternator Winding Temp Bit 5 = Idle Speed Low  Bit 6 = Run Up Speed Low Bit 7 = Start Speed Low Bit 8 = Priming Fault  Bit 9 = Low Charge Air Coolant Level Bit 10 = High Fuel Temp.  Bit 11 = High Exhaust Temp. B Bit 12 = High Exhaust Temp. A Bit 13 = Low ECU Supply Voltage Bit 14 = Engine Speed Too Low Bit 15 = High Voltage Supply  Bit 16 = Low Voltage Supply Bit 17 = Speed Demand Fail Bit 18 = ECU Faulty  Bit 19 = Combined Yellow Bit 20 = Low Oil Press.  Bit 21 = Low Fuel Delivery Press. Bit 22 = Low Charge Air Press. Bit 23 = Low Coolant Level  Bit 24 = Low Fuel Rail Press. Bit 25 = High Fuel Rail Press. Bit 26 = Shutdown Override Bit 27 = High Coolant Temp.  Bit 28 = High Charge Air Temp. Bit 29 = High Intercooler Temp. Bit 30 = High Oil Temp.  Bit 31 = High ECU Temp. |
| 44820-21 | Sender Fail Alarm Metering | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used  Bit 27 = Generator Voltage Bit 28 = Fuel Level  Bit 29 = Coolant Temp Bit 30 = Oil Pressure Bit 31 = Speed |
| 44822-26 | RESERVED |  |  |  |  |  |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44828-29 | Local Input Metering | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Input 16  Bit 17 = Input 15  Bit 18 = Input 14  Bit 19 = Input 13  Bit 20 = Input 12  Bit 21 = Input 11  Bit 22 = Input 10  Bit 23 = Input 9  Bit 24 = Input 8  Bit 25 = Input 7  Bit 26 = Input 6  Bit 27 = Input 5  Bit 28 = Input 4  Bit 29 = Input 3  Bit 30 = Input 2  Bit 31 = Input 1 |
| 44830-31 | Local Output Metering | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used  Bit 17 = Pre Start Output Bit 18 = Run Output  Bit 19 = Start Output Bit 20 = Output 12  Bit 21 = Output 11  Bit 22 = Output 10  Bit 23 = Output 9  Bit 24 = Output 8  Bit 25 = Output 7  Bit 26 = Output 6  Bit 27 = Output 5  Bit 28 = Output 4  Bit 29 = Output 3  Bit 30 = Output 2  Bit 31 = Output 1 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44832-33 | Status Metering 1 | Int32 | N/A | N/A | R | Bit 0 = Idle Request Bit 1 = Lamp Test  Bit 2 = Alarm Silence Bit 3 = Reset  Bit 4 = Alternate Frequency Override Bit 5 = Start Delay Bypass  Bit 6 = Cooldown and Stop Request from Logic  Bit 7 = Cooldown Request from Logic Bit 8 = External Start Delay  Bit 9 = Off Mode Cooldown Bit 10 = PF Mode Active Bit 11 = Var Mode Active  Bit 12 = Cooldown Timer Active Bit 13 = Engine Running  Bit 14 = Fuel Leak Detect  Bit 15 = Battery Charger Failure Bit 16 = Low Coolant Level  Bit 17 = Gen Failed Bit 18 = Gen Stable Bit 19 = Gen Dead Bit 20 = Bus Failed Bit 21 = Bus Stable Bit 22 = Bus Dead  Bit 23 = Gen Breaker Closed Bit 24 = Mains Breaker Closed  Bit 25 = Grounded Delta Override  Bit 26 = Battle Override  Bit 27 = Auto Transfer Switch Bit 28 = Low Line Override  Bit 29 = Single Phase AC Override Bit 30 = Single Phase Override  Bit 31 = EPS Supplying Load |
| 44834 | Hours Until Maintenance | Int32 | N/A | N/A | RW | 0 - 5000 |
| 44836 | Cum. Total Engine Run Hrs. | Int32 | Hour | N/A | R | 0 - 99999 |
| 44838 | Cum. Total Engine Run Min. | Int32 | N/A | N/A | R | 0 - 59 |
| 44840 | Cum. Loaded Engine Run Hrs. | Int32 | N/A | N/A | R | 0 - 99999 |
| 44842 | Cum. Loaded Engine Run Min. | Int32 | N/A | N/A | R | 0 - 59 |
| 44844 | Cum. Unloaded Engine Run Hrs. | Int32 | Hour | N/A | R | 0 - 99999 |
| 44846 | Cum. Unloaded Engine Run Min. | Int32 | N/A | N/A | R | 0 - 59 |
| 44848 | Cum. Total kW-Hrs | Uint32 | KiloWattHour | N/A | R | 0 - 999999999 |
| 44850 | Cum. Total kW-Mins | Uint32 | KiloWattMinute | N/A | R | 0 - 4294967295 |
| 44852 | Commission Date Month | Uint32 | N/A | N/A | RW | 1 - 12 |
| 44854 | Commission Date Day | Uint32 | N/A | N/A | RW | 1 - 31 |
| 44856 | Commission Date Year | Uint32 | N/A | N/A | RW | 0 - 99 |
| 44858 | Session Total Engine Run Hrs. | Int32 | Hour | N/A | R | 0 - 99999 |
| 44860 | Session Total Engine Run Min. | Int32 | N/A | N/A | R | 0 - 59 |
| 44862 | Session Loaded Engine Run Hrs. | Int32 | Hour | N/A | R | 0 - 99999 |
| 44864 | Session Loaded Engine Run Min. | Int32 | N/A | N/A | R | 0 - 59 |
| 44866 | Session Unloaded Engine Run Hrs. | Int32 | Hour | N/A | R | 0 - 99999 |
| 44868 | Session Unloaded Engine Run Min. | Int32 | N/A | N/A | R | 0 - 59 |
| 44870 | Session kW-Hrs | Int32 | KiloWattHour | N/A | R | 0 - 999999999 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44872 | Cumulative Number of Engine Starts | Uint32 | N/A | N/A | RW | 0 - 65535 |
| 44874 | Session Start Date Month | Uint32 | N/A | N/A | RW | 1 - 12 |
| 44876 | Session Start Date Day | Uint32 | N/A | N/A | RW | 1 - 31 |
| 44878 | Session Start Date Year | Uint32 | N/A | N/A | RW | 0 - 99 |
| 44880 | Generator Status | Uint32 | N/A | N/A | R | 0 = RESET State 1 = READY State  2 = CRANKING State  3 = RESTING State  4 = RUNNING State  5 = ALARM State  6 = PRESTART State  7 = COOLING State  8 = CONNECTING State  9 = DISCONNECT State  10 = PULSING State  11 = UNLOADING State |
| 44882-918 | RESERVED |  |  |  |  |  |
| 44920-32 | FUTURE USE |  |  |  |  |  |
| 44934-35 | Protection Alarm Metering | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used  Bit 18 = 81 ROC DF/DT Trip Bit 19 = 78 Vector Shift Trip Bit 20 = 51-3 Overcurrent  Bit 21 = 40Q Loss of Excitation Bit 22 = 32 Reverse Power  Bit 23 = 59-2 Overvoltage  Bit 24 = 27-2 Undervoltage  Bit 25 = 51-2 Overcurrent  Bit 26 = 81 Underfrequency  Bit 27 = 81 Overfrequency  Bit 28 = 59-1 Overvoltage  Bit 29 = 27-1 Undervoltage  Bit 30 = 47 Phase Imbalance  Bit 31 = 51-1 Overcurrent |
| 44936 | Cumulative Stats - Total Run Hours | Uint32 | Hour | N/A | RW | 0 - 5999940 |
| 44938 | Cumulative Stats - Loaded Run Hours | Uint32 | Hour | N/A | RW | 0 - 5999940 |
| 44940 | Cumulative Stats - Unloaded Run Hours | Uint32 | Hour | N/A | RW | 0 - 5999940 |
| 44942 | Run Stats - Total Run Hours | Uint32 | Hour | N/A | RW | 0 - 5999940 |
| 44944 | Run Stats - Loaded Run Hours | Uint32 | Hour | N/A | RW | 0 - 5999940 |
| 44946 | Run Stats - Unloaded Run Hours | Uint32 | Hour | N/A | RW | 0 - 5999940 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44948-49 | LSM Alarm Bits | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used  Bit 25 = Duplicate LSM Bit 26 = ID Repeat  Bit 27 = ID Missing  Bit 28 = LSM Comms Failure  Bit 29 = Intergenset Comms Failure Bit 30 = GOV Output Limit  Bit 31 = AVR Output Limit |
| 44950 | Global Alarm | Uint32 | N/A | N/A | R | Bit 0 = No system alarms in effect Bit 1 = System alarm(s) in effect |
| 44952 | Global Pre-Alarm | Uint32 | N/A | N/A | R | Bit 0 = No system pre-alarms in effect Bit 1 = System pre-alarm(s) in effect |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44954-55 | Local Configurable Inputs Pre-Alarm Bits | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Input 16  Bit 17 = Input 15  Bit 18 = Input 14  Bit 19 = Input 13  Bit 20 = Input 12  Bit 21 = Input 11  Bit 22 = Input 10  Bit 23 = Input 9  Bit 24 = Input 8  Bit 25 = Input 7  Bit 26 = Input 6  Bit 27 = Input 5  Bit 28 = Input 4  Bit 29 = Input 3  Bit 30 = Input 2  Bit 31 = Input 1 |
| 44956-57 | Local Configurable Inputs Alarm Bits | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Input 16  Bit 17 = Input 15  Bit 18 = Input 14  Bit 19 = Input 13  Bit 20 = Input 12  Bit 21 = Input 11  Bit 22 = Input 10  Bit 23 = Input 9  Bit 24 = Input 8  Bit 25 = Input 7  Bit 26 = Input 6  Bit 27 = Input 5  Bit 28 = Input 4  Bit 29 = Input 3  Bit 30 = Input 2  Bit 31 = Input 1 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44958-59 | Configurable Elements Status Bits | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used  Bit 24 = Config Element 8  Bit 25 = Config Element 7  Bit 26 = Config Element 6  Bit 27 = Config Element 5  Bit 28 = Config Element 4  Bit 29 = Config Element 3  Bit 30 = Config Element 2  Bit 31 = Config Element 1 |
| 44960-61 | Configurable Elements Pre-Alarm Bits | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used  Bit 24 = Config Element 8  Bit 25 = Config Element 7  Bit 26 = Config Element 6  Bit 27 = Config Element 5  Bit 28 = Config Element 4  Bit 29 = Config Element 3  Bit 30 = Config Element 2  Bit 31 = Config Element 1 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44962-63 | Configurable Elements Alarm Bits | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used  Bit 24 = Config Element 8  Bit 25 = Config Element 7  Bit 26 = Config Element 6  Bit 27 = Config Element 5  Bit 28 = Config Element 4  Bit 29 = Config Element 3  Bit 30 = Config Element 2  Bit 31 = Config Element 1 |
| 44964-65 | Remote Inputs Status Bits | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used  Bit 22 = Remote Input 26  Bit 23 = Remote Input 25  Bit 24 = Remote Input 24  Bit 25 = Remote Input 23  Bit 26 = Remote Input 22  Bit 27 = Remote Input 21  Bit 28 = Remote Input 20  Bit 29 = Remote Input 19  Bit 30 = Remote Input 18  Bit 31 = Remote Input 17 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44966-67 | Remote Outputs Status Bits | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used  Bit 8 = Remote Output 36  Bit 9 = Remote Output 35  Bit 10 = Remote Output 34  Bit 11 = Remote Output 33  Bit 12 = Remote Output 32  Bit 13 = Remote Output 31  Bit 14 = Remote Output 30  Bit 15 = Remote Output 29  Bit 16 = Remote Output 28  Bit 17 = Remote Output 27  Bit 18 = Remote Output 26  Bit 19 = Remote Output 25  Bit 20 = Remote Output 24  Bit 21 = Remote Output 23  Bit 22 = Remote Output 22  Bit 23 = Remote Output 21  Bit 24 = Remote Output 20  Bit 25 = Remote Output 19  Bit 26 = Remote Output 18  Bit 27 = Remote Output 17  Bit 28 = Remote Output 16  Bit 29 = Remote Output 15  Bit 30 = Remote Output 14  Bit 31 = Remote Output 13 |
| 44968-69 | CEM Alarm Bits | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used Bit 28 = Not Used  Bit 29 = CEM Hardware Mismatch Bit 30 = Duplicate CEM  Bit 31 = CEM Comm Fail |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44970-71 | Remote Configurable Inputs Pre-Alarm Bits | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used  Bit 22 = Remote Input 26  Bit 23 = Remote Input 25  Bit 24 = Remote Input 24  Bit 25 = Remote Input 23  Bit 26 = Remote Input 22  Bit 27 = Remote Input 21  Bit 28 = Remote Input 20  Bit 29 = Remote Input 19  Bit 30 = Remote Input 18  Bit 31 = Remote Input 17 |
| 44972-73 | Remote Configurable Inputs Alarm Bits | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used  Bit 22 = Remote Input 26  Bit 23 = Remote Input 25  Bit 24 = Remote Input 24  Bit 25 = Remote Input 23  Bit 26 = Remote Input 22  Bit 27 = Remote Input 21  Bit 28 = Remote Input 20  Bit 29 = Remote Input 19  Bit 30 = Remote Input 18  Bit 31 = Remote Input 17 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44974-75 | AEM Alarm Bits | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used Bit 28 = Not Used Bit 29 = Not Used  Bit 30 = Duplicate AEM Bit 31 = AEM Comm Fail |
| 44976 | Slip Frequency | Int32 | Hertz | Centi | R | (-32768) - 32767 |
| 44978 | Slip Angle | Int32 | DeciUnit | Deci | R | (-32768) - 32767 |
| 44980 | Voltage Difference | Int32 | Volt | N/A | R | (-2147483648) - 2147483647 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44982-83 | MDEC Pre-Alarms | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used  Bit 24 = High Fuel Filter Diff Pressure Bit 25 = Overspeed Test On  Bit 26 = Ambient Temp Bit 27 = High Temp Coil 3 Bit 28 = High Temp Coil 2 Bit 29 = High Temp Coil 1  Bit 30 = High Pressure Input 2 Bit 31 = High Pressure Input 1 |
| 44984-85 | MTU Status | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used  Bit 20 = ECU Shutdown Bit 21 = Priming Pump ON  Bit 22 = CAN Mode Feedback  Bit 23 = Preheat Temp Not Reached Bit 24 = Load Gen On  Bit 25 = Cylinder Cutout Bit 26 = Engine Running Bit 27 = Speed Decrease Bit 28 = Speed Increase  Bit 29 = Speed Demand Fail Mode Bit 30 = External Stop Active  Bit 31 = ECU Override |
| 44986 | Generator Frequency | Int32 | Hertz | Deci | R | 0 - 4400 |
| 44988 | Bus Frequency | Int32 | Hertz | Deci | R | 0 - 4400 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 44990 | Power Factor | Int32 | N/A | Centi | R | (-100) - 100 |
| 44992 | Slip Frequency | Int32 | N/A | Milli | R | (-450000) -450000 |
| 44994-98 | FUTURE USE |  |  |  |  |  |
| 45000-01 | ECU Lamp Status | Int32 | N/A | N/A | R | Bit 0 = Protect Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Warning Bit 4 = Stop  Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Malfunction Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used Bit 28 = Not Used Bit 29 = Not Used Bit 30 = Not Used Bit 31 = Not Used |
| 45002 | Number of DTC’s | Int32 | N/A | N/A | R | (-32768) - 32767 |
| 45004-326 | RESERVED |  |  |  |  |  |
| 45328 | Engine Parameter Transmit Enable | Int32 | N/A | N/A | RW | 0 = Disable  1 = Enable |
| 45330-498 | RESERVED |  |  |  |  |  |
| 45500 | Analog Input 1 Metering Value | Int32 | DeciUnit | Deci | R | (-99990) - 99990 |
| 45502 | Analog Input 2 Metering Value | Int32 | DeciUnit | Deci | R | (-99990) - 99990 |
| 45504 | Analog Input 3 Metering Value | Int32 | DeciUnit | Deci | R | (-99990) - 99990 |
| 45506 | Analog Input 4 Metering Value | Int32 | DeciUnit | Deci | R | (-99990) - 99990 |
| 45508 | Analog Input 5 Metering Value | Int32 | DeciUnit | Deci | R | (-99990) - 99990 |
| 45510 | Analog Input 6 Metering Value | Int32 | DeciUnit | Deci | R | (-99990) - 99990 |
| 45512 | Analog Input 7 Metering Value | Int32 | DeciUnit | Deci | R | (-99990) - 99990 |
| 45514 | Analog Input 8 Metering Value | Int32 | DeciUnit | Deci | R | (-99990) - 99990 |
| 45516 | RTD Input 1 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45518 | RTD Input 2 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45520 | RTD Input 3 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45522 | RTD Input 4 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45524 | RTD Input 5 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45526 | RTD Input 6 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45528 | RTD Input 7 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45530 | RTD Input 8 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45532 | Thermocouple Input 1 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45534 | Thermocouple Input 2 Metering Value | Int32 | CentiDeg F | Centi | R | (-9999999) - 9999999 |
| 45536-37 | AEM Input Threshold Status Bits Reg 1 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = Analog Input 6 Under 2  Bit 3 = Analog Input 6 Under 1  Bit 4 = Analog Input 6 Over 2  Bit 5 = Analog Input 6 Over 1  Bit 6 = Analog Input 6 Out of Range Bit 7 = Analog Input 5 Under 2  Bit 8 = Analog Input 5 Under 1  Bit 9 = Analog Input 5 Over 2  Bit 10 = Analog Input 5 Over 1  Bit 11 = Analog Input 5 Out of Range Bit 12 = Analog Input 4 Under 2  Bit 13 = Analog Input 4 Under 1  Bit 14 = Analog Input 4 Over 2  Bit 15 = Analog Input 4 Over 1  Bit 16 = Analog Input 4 Out of Range Bit 17 = Analog Input 3 Under 2  Bit 18 = Analog Input 3 Under 1  Bit 19 = Analog Input 3 Over 2  Bit 20 = Analog Input 3 Over 1  Bit 21 = Analog Input 3 Out of Range Bit 22 = Analog Input 2 Under 2  Bit 23 = Analog Input 2 Under 1  Bit 24 = Analog Input 2 Over 2  Bit 25 = Analog Input 2 Over 1  Bit 26 = Analog Input 2 Out of Range Bit 27 = Analog Input 1 Under 2  Bit 28 = Analog Input 1 Under 1  Bit 29 = Analog Input 1 Over 2  Bit 30 = Analog Input 1 Over 1  Bit 31 = Analog Input 1 Out of Range |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45538-39 | AEM Input Threshold Status Bits Reg 2 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = RTD Input 4 Under 2  Bit 3 = RTD Input 4 Under 1  Bit 4 = RTD Input 4 Over 2  Bit 5 = RTD Input 4 Over 1  Bit 6 = RTD Input 4 Out of Range Bit 7 = RTD Input 3 Under 2  Bit 8 = RTD Input 3 Under 1  Bit 9 = RTD Input 3 Over 2  Bit 10 = RTD Input 3 Over 1  Bit 11 = RTD Input 3 Out of Range Bit 12 = RTD Input 2 Under 2  Bit 13 = RTD Input 2 Under 1  Bit 14 = RTD Input 2 Over 2  Bit 15 = RTD Input 2 Over 1  Bit 16 = RTD Input 2 Out of Range Bit 17 = RTD Input 1 Under 2  Bit 18 = RTD Input 1 Under 1  Bit 19 = RTD Input 1 Over 2  Bit 20 = RTD Input 1 Over 1  Bit 21 = RTD Input 1 Out of Range Bit 22 = Analog Input 8 Under 2  Bit 23 = Analog Input 8 Under 1  Bit 24 = Analog Input 8 Over 2  Bit 25 = Analog Input 8 Over 1  Bit 26 = Analog Input 8 Out of Range Bit 27 = Analog Input 7 Under 2  Bit 28 = Analog Input 7 Under 1  Bit 29 = Analog Input 7 Over 2  Bit 30 = Analog Input 7 Over 1  Bit 31 = Analog Input 7 Out of Range |
| 45540-41 | AEM Input Threshold Status Bits Reg 3 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = Thermocouple 2 Under 2  Bit 3 = Thermocouple 2 Under 1  Bit 4 = Thermocouple 2 Over 2  Bit 5 = Thermocouple 2 Over 1  Bit 6 = Thermocouple 2 Out of Range Bit 7 = Thermocouple 1 Under 2  Bit 8 = Thermocouple 1 Under 1  Bit 9 = Thermocouple 1 Over 2  Bit 10 = Thermocouple 1 Over 1  Bit 11 = Thermocouple 1 Out of Range Bit 12 = RTD Input 8 Under 2  Bit 13 = RTD Input 8 Under 1  Bit 14 = RTD Input 8 Over 2  Bit 15 = RTD Input 8 Over 1  Bit 16 = RTD Input 8 Out of Range Bit 17 = RTD Input 7 Under 2  Bit 18 = RTD Input 7 Under 1  Bit 19 = RTD Input 7 Over 2  Bit 20 = RTD Input 7 Over 1  Bit 21 = RTD Input 7 Out of Range Bit 22 = RTD Input 6 Under 2  Bit 23 = RTD Input 6 Under 1  Bit 24 = RTD Input 6 Over 2  Bit 25 = RTD Input 6 Over 1  Bit 26 = RTD Input 6 Out of Range Bit 27 = RTD Input 5 Under 2  Bit 28 = RTD Input 5 Under 1  Bit 29= RTD Input 5 Over 2  Bit 30 = RTD Input 5 Over 1  Bit 31 = RTD Input 5 Out of Range |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45542-43 | AEM Input Threshold Status Bits Reg 4 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used  Bit 28 = Analog Output 4 Out of Range Bit 29 = Analog Output 3 Out of Range Bit 30 = Analog Output 2 Out of Range Bit 31 = Analog Output 1 Out of Range |
| 45544-45 | AEM Input Threshold Alarm Bits Reg 1 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = Analog Input 6 Under 2  Bit 3 = Analog Input 6 Under 1  Bit 4 = Analog Input 6 Over 2  Bit 5 = Analog Input 6 Over 1  Bit 6 = Analog Input 6 Out of Range Bit 7 = Analog Input 5 Under 2  Bit 8 = Analog Input 5 Under 1  Bit 9 = Analog Input 5 Over 2  Bit 10 = Analog Input 5 Over 1  Bit 11 = Analog Input 5 Out of Range Bit 12 = Analog Input 4 Under 2  Bit 13 = Analog Input 4 Under 1  Bit 14 = Analog Input 4 Over 2  Bit 15 = Analog Input 4 Over 1  Bit 16 = Analog Input 4 Out of Range Bit 17 = Analog Input 3 Under 2  Bit 18 = Analog Input 3 Under 1  Bit 19 = Analog Input 3 Over 2  Bit 20 = Analog Input 3 Over 1  Bit 21 = Analog Input 3 Out of Range Bit 22 = Analog Input 2 Under 2  Bit 23 = Analog Input 2 Under 1  Bit 24 = Analog Input 2 Over 2  Bit 25 = Analog Input 2 Over 1  Bit 26 = Analog Input 2 Out of Range Bit 27 = Analog Input 1 Under 2  Bit 28 = Analog Input 1 Under 1  Bit 29 = Analog Input 1 Over 2  Bit 30 = Analog Input 1 Over 1  Bit 31 = Analog Input 1 Out of Range |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45546-47 | AEM Input Threshold Alarm Bits Reg 2 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = RTD Input 4 Under 2  Bit 3 = RTD Input 4 Under 1  Bit 4 = RTD Input 4 Over 2  Bit 5 = RTD Input 4 Over 1  Bit 6 = RTD Input 4 Out of Range Bit 7 = RTD Input 3 Under 2  Bit 8 = RTD Input 3 Under 1  Bit 9 = RTD Input 3 Over 2  Bit 10 = RTD Input 3 Over 1  Bit 11 = RTD Input 3 Out of Range Bit 12 = RTD Input 2 Under 2  Bit 13 = RTD Input 2 Under 1  Bit 14 = RTD Input 2 Over 2  Bit 15 = RTD Input 2 Over 1  Bit 16 = RTD Input 2 Out of Range Bit 17 = RTD Input 1 Under 2  Bit 18 = RTD Input 1 Under 1  Bit 19 = RTD Input 1 Over 2  Bit 20 = RTD Input 1 Over 1  Bit 21 = RTD Input 1 Out of Range Bit 22 = Analog Input 8 Under 2  Bit 23 = Analog Input 8 Under 1  Bit 24 = Analog Input 8 Over 2  Bit 25 = Analog Input 8 Over 1  Bit 26 = Analog Input 8 Out of Range Bit 27 = Analog Input 7 Under 2  Bit 28 = Analog Input 7 Under 1  Bit 29 = Analog Input 7 Over 2  Bit 30 = Analog Input 7 Over 1  Bit 31 = Analog Input 7 Out of Range |
| 45548-49 | AEM Input Threshold Alarm Bits Reg 3 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = Thermocouple 2 Under 2  Bit 3 = Thermocouple 2 Under 1  Bit 4 = Thermocouple 2 Over 2  Bit 5 = Thermocouple 2 Over 1  Bit 6 = Thermocouple 2 Out of Range Bit 7 = Thermocouple 1 Under 2  Bit 8 = Thermocouple 1 Under 1  Bit 9 = Thermocouple 1 Over 2  Bit 10 = Thermocouple 1 Over 1  Bit 11 = Thermocouple 1 Out of Range Bit 12 = RTD Input 8 Under 2  Bit 13 = RTD Input 8 Under 1  Bit 14 = RTD Input 8 Over 2  Bit 15 = RTD Input 8 Over 1  Bit 16 = RTD Input 8 Out of Range Bit 17 = RTD Input 7 Under 2  Bit 18 = RTD Input 7 Under 1  Bit 19 = RTD Input 7 Over 2  Bit 20 = RTD Input 7 Over 1  Bit 21 = RTD Input 7 Out of Range Bit 22 = RTD Input 6 Under 2  Bit 23 = RTD Input 6 Under 1  Bit 24 = RTD Input 6 Over 2  Bit 25 = RTD Input 6 Over 1  Bit 26 = RTD Input 6 Out of Range Bit 27 = RTD Input 5 Under 2  Bit 28 = RTD Input 5 Under 1  Bit 29= RTD Input 5 Over 2  Bit 30 = RTD Input 5 Over 1  Bit 31 = RTD Input 5 Out of Range |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45550-51 | AEM Input Threshold Alarm Bits Reg 4 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used  Bit 28 = Analog Output 4 Out of Range Bit 29 = Analog Output 3 Out of Range Bit 30 = Analog Output 2 Out of Range Bit 31 = Analog Output 1 Out of Range |
| 45552-53 | AEM Input Threshold Pre- Alarm Bits Reg 1 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = Analog Input 6 Under 2  Bit 3 = Analog Input 6 Under 1  Bit 4 = Analog Input 6 Over 2  Bit 5 = Analog Input 6 Over 1  Bit 6 = Analog Input 6 Out of Range Bit 7 = Analog Input 5 Under 2  Bit 8 = Analog Input 5 Under 1  Bit 9 = Analog Input 5 Over 2  Bit 10 = Analog Input 5 Over 1  Bit 11 = Analog Input 5 Out of Range Bit 12 = Analog Input 4 Under 2  Bit 13 = Analog Input 4 Under 1  Bit 14 = Analog Input 4 Over 2  Bit 15 = Analog Input 4 Over 1  Bit 16 = Analog Input 4 Out of Range Bit 17 = Analog Input 3 Under 2  Bit 18 = Analog Input 3 Under 1  Bit 19 = Analog Input 3 Over 2  Bit 20 = Analog Input 3 Over 1  Bit 21 = Analog Input 3 Out of Range Bit 22 = Analog Input 2 Under 2  Bit 23 = Analog Input 2 Under 1  Bit 24 = Analog Input 2 Over 2  Bit 25 = Analog Input 2 Over 1  Bit 26 = Analog Input 2 Out of Range Bit 27 = Analog Input 1 Under 2  Bit 28 = Analog Input 1 Under 1  Bit 29 = Analog Input 1 Over 2  Bit 30 = Analog Input 1 Over 1  Bit 31 = Analog Input 1 Out of Range |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45554-55 | AEM Input Threshold Pre- Alarm Bits Reg 2 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = RTD Input 4 Under 2  Bit 3 = RTD Input 4 Under 1  Bit 4 = RTD Input 4 Over 2  Bit 5 = RTD Input 4 Over 1  Bit 6 = RTD Input 4 Out of Range Bit 7 = RTD Input 3 Under 2  Bit 8 = RTD Input 3 Under 1  Bit 9 = RTD Input 3 Over 2  Bit 10 = RTD Input 3 Over 1  Bit 11 = RTD Input 3 Out of Range Bit 12 = RTD Input 2 Under 2  Bit 13 = RTD Input 2 Under 1  Bit 14 = RTD Input 2 Over 2  Bit 15 = RTD Input 2 Over 1  Bit 16 = RTD Input 2 Out of Range Bit 17 = RTD Input 1 Under 2  Bit 18 = RTD Input 1 Under 1  Bit 19 = RTD Input 1 Over 2  Bit 20 = RTD Input 1 Over 1  Bit 21 = RTD Input 1 Out of Range Bit 22 = Analog Input 8 Under 2  Bit 23 = Analog Input 8 Under 1  Bit 24 = Analog Input 8 Over 2  Bit 25 = Analog Input 8 Over 1  Bit 26 = Analog Input 8 Out of Range Bit 27 = Analog Input 7 Under 2  Bit 28 = Analog Input 7 Under 1  Bit 29 = Analog Input 7 Over 2  Bit 30 = Analog Input 7 Over 1  Bit 31 = Analog Input 7 Out of Range |
| 45556-57 | AEM Input Threshold Pre- Alarm Bits Reg 3 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used  Bit 2 = Thermocouple 2 Under 2  Bit 3 = Thermocouple 2 Under 1  Bit 4 = Thermocouple 2 Over 2  Bit 5 = Thermocouple 2 Over 1  Bit 6 = Thermocouple 2 Out of Range Bit 7 = Thermocouple 1 Under 2  Bit 8 = Thermocouple 1 Under 1  Bit 9 = Thermocouple 1 Over 2  Bit 10 = Thermocouple 1 Over 1  Bit 11 = Thermocouple 1 Out of Range Bit 12 = RTD Input 8 Under 2  Bit 13 = RTD Input 8 Under 1  Bit 14 = RTD Input 8 Over 2  Bit 15 = RTD Input 8 Over 1  Bit 16 = RTD Input 8 Out of Range Bit 17 = RTD Input 7 Under 2  Bit 18 = RTD Input 7 Under 1  Bit 19 = RTD Input 7 Over 2  Bit 20 = RTD Input 7 Over 1  Bit 21 = RTD Input 7 Out of Range Bit 22 = RTD Input 6 Under 2  Bit 23 = RTD Input 6 Under 1  Bit 24 = RTD Input 6 Over 2  Bit 25 = RTD Input 6 Over 1  Bit 26 = RTD Input 6 Out of Range Bit 27 = RTD Input 5 Under 2  Bit 28 = RTD Input 5 Under 1  Bit 29= RTD Input 5 Over 2  Bit 30 = RTD Input 5 Over 1  Bit 31 = RTD Input 5 Out of Range |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45558-59 | AEM Input Threshold Pre- Alarm Bits Reg 4 | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used  Bit 28 = Analog Output 4 Out of Range Bit 29 = Analog Output 3 Out of Range Bit 30 = Analog Output 2 Out of Range Bit 31 = Analog Output 1 Out of Range |
| 45560 | Analog Output 1 Metering Value | Int32 | CentiUnit | Centi | R | (-999990) - 999990 |
| 45562 | Analog Output 2 Metering Value | Int32 | CentiUnit | Centi | R | (-999990) - 999990 |
| 45564 | Analog Output 3 Metering Value | Int32 | CentiUnit | Centi | R | (-999990) - 999990 |
| 45566 | Analog Output 4 Metering Value | Int32 | CentiUnit | Centi | R | (-999990) - 999990 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45568-69 | Configurable Protection Threshold Status Bits | Uint32 | N/A | N/A | R | Bit 0 = Conf Protection 8 Under 2  Bit 1 = Conf Protection 8 Under 1  Bit 2 = Conf Protection 8 Over 2  Bit 3 = Conf Protection 8 Over 1  Bit 4 = Conf Protection 7 Under 2  Bit 5 = Conf Protection 7 Under 1  Bit 6 = Conf Protection 7 Over 2  Bit 7 = Conf Protection 7 Over 1  Bit 8 = Conf Protection 6 Under 2  Bit 9 = Conf Protection 6 Under 1  Bit 10 = Conf Protection 6 Over 2  Bit 11 = Conf Protection 6 Over 1  Bit 12 = Conf Protection 5 Under 2  Bit 13 = Conf Protection 5 Under 1  Bit 14 = Conf Protection 5 Over 2  Bit 15 = Conf Protection 5 Over 1  Bit 16 = Conf Protection 4 Under 2  Bit 17 = Conf Protection 4 Under 1  Bit 18 = Conf Protection 4 Over 2  Bit 19 = Conf Protection 4 Over 1  Bit 20 = Conf Protection 3 Under 2  Bit 21 = Conf Protection 3 Under 1  Bit 22 = Conf Protection 3 Over 2  Bit 23 = Conf Protection 3 Over 1  Bit 24 = Conf Protection 2 Under 2  Bit 25 = Conf Protection 2 Under 1  Bit 26 = Conf Protection 2 Over 2  Bit 27 = Conf Protection 2 Over 1  Bit 28 = Conf Protection 1 Under 2  Bit 29 = Conf Protection 1 Under 1  Bit 30 = Conf Protection 1 Over 2  Bit 31 = Conf Protection 1 Over 1 |
| 45570-71 | Configurable Protection Alarm Bits | Uint32 | N/A | N/A | R | Bit 0 = Conf Protection 8 Under 2  Bit 1 = Conf Protection 8 Under 1  Bit 2 = Conf Protection 8 Over 2  Bit 3 = Conf Protection 8 Over 1  Bit 4 = Conf Protection 7 Under 2  Bit 5 = Conf Protection 7 Under 1  Bit 6 = Conf Protection 7 Over 2  Bit 7 = Conf Protection 7 Over 1  Bit 8 = Conf Protection 6 Under 2  Bit 9 = Conf Protection 6 Under 1  Bit 10 = Conf Protection 6 Over 2  Bit 11 = Conf Protection 6 Over 1  Bit 12 = Conf Protection 5 Under 2  Bit 13 = Conf Protection 5 Under 1  Bit 14 = Conf Protection 5 Over 2  Bit 15 = Conf Protection 5 Over 1  Bit 16 = Conf Protection 4 Under 2  Bit 17 = Conf Protection 4 Under 1  Bit 18 = Conf Protection 4 Over 2  Bit 19 = Conf Protection 4 Over 1  Bit 20 = Conf Protection 3 Under 2  Bit 21 = Conf Protection 3 Under 1  Bit 22 = Conf Protection 3 Over 2  Bit 23 = Conf Protection 3 Over 1  Bit 24 = Conf Protection 2 Under 2  Bit 25 = Conf Protection 2 Under 1  Bit 26 = Conf Protection 2 Over 2  Bit 27 = Conf Protection 2 Over 1  Bit 28 = Conf Protection 1 Under 2  Bit 29 = Conf Protection 1 Under 1  Bit 30 = Conf Protection 1 Over 2  Bit 31 = Conf Protection 1 Over 1 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45572-73 | Configurable Protection Pre-Alarm Bits | Uint32 | N/A | N/A | R | Bit 0 = Conf Protection 8 Under 2  Bit 1 = Conf Protection 8 Under 1  Bit 2 = Conf Protection 8 Over 2  Bit 3 = Conf Protection 8 Over 1  Bit 4 = Conf Protection 7 Under 2  Bit 5 = Conf Protection 7 Under 1  Bit 6 = Conf Protection 7 Over 2  Bit 7 = Conf Protection 7 Over 1  Bit 8 = Conf Protection 6 Under 2  Bit 9 = Conf Protection 6 Under 1  Bit 10 = Conf Protection 6 Over 2  Bit 11 = Conf Protection 6 Over 1  Bit 12 = Conf Protection 5 Under 2  Bit 13 = Conf Protection 5 Under 1  Bit 14 = Conf Protection 5 Over 2  Bit 15 = Conf Protection 5 Over 1  Bit 16 = Conf Protection 4 Under 2  Bit 17 = Conf Protection 4 Under 1  Bit 18 = Conf Protection 4 Over 2  Bit 19 = Conf Protection 4 Over 1  Bit 20 = Conf Protection 3 Under 2  Bit 21 = Conf Protection 3 Under 1  Bit 22 = Conf Protection 3 Over 2  Bit 23 = Conf Protection 3 Over 1  Bit 24 = Conf Protection 2 Under 2  Bit 25 = Conf Protection 2 Under 1  Bit 26 = Conf Protection 2 Over 2  Bit 27 = Conf Protection 2 Over 1  Bit 28 = Conf Protection 1 Under 2  Bit 29 = Conf Protection 1 Under 1  Bit 30 = Conf Protection 1 Over 2  Bit 31 = Conf Protection 1 Over 1 |
| 45574 | Gen Kvar A | Int32 | kvar | N/A | R | (-2147483648) - 2147483647 |
| 45576 | Gen Kvar B | Int32 | kvar | N/A | R | (-2147483648) - 2147483647 |
| 45578 | Gen Kvar C | Int32 | kvar | N/A | R | (-2147483648) - 2147483647 |
| 45580 | Gen Kvar Total | Int32 | kvar | N/A | R | (-2147483648) - 2147483647 |
| 45582 | FUTURE USE |  |  |  |  |  |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45584-85 | Logic Control Relay Status | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used  Bit 16 = Logic Control Relay 16 Bit 17 = Logic Control Relay 15 Bit 18 = Logic Control Relay 14 Bit 19 = Logic Control Relay 13 Bit 20 = Logic Control Relay 12 Bit 21 = Logic Control Relay 11 Bit 22 = Logic Control Relay 10 Bit 23 = Logic Control Relay 9 Bit 24 = Logic Control Relay 8 Bit 25 = Logic Control Relay 7 Bit 26 = Logic Control Relay 6 Bit 27 = Logic Control Relay 5 Bit 28 = Logic Control Relay 4 Bit 29 = Logic Control Relay 3 Bit 30 = Logic Control Relay 2 Bit 31 = Logic Control Relay 1 |
| 45586-87 | I/O Modules Connected | Uint32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used Bit 28 = Not Used  Bit 29 = AEM Connected Bit 30 = CEM Connected Bit 31 = LSM Connected |
| 45588 | Max Vector Shift | Int32 | N/A | Centi | R | 0 - 100000 |
| 45590 | Max DF/DT | Int32 | N/A | Centi | R | 0 - 100000 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45592 | Current DF/DT | Int32 | N/A | Centi | R | 0 - 100000 |
| 45594-95 | Status Metering 2 | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used  Bit 24 = Synchronizer Break Close OK Bit 25 = Synchronizer Angle OK  Bit 26 = Synchronizer Slip Freq OK Bit 27 = Synchronizer Volt Match OK Bit 28 = Synchronizer Active  Bit 29 = Parallel To Mains Bit 30 = Mains Fail Test Bit 31 = Take Over Load |
| 45596-97 | Gen Protect Pre-Alarm Status | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used  Bit 18 = 81 ROC DF/DT Trip Bit 19 = 78 Vector Shift Trip Bit 20 = 51-3 Overcurrent Trip  Bit 21 = 40 Loss of Excitation Trip Bit 22 = 32 Reverse Overpower Trip Bit 23 = 59-2 Overvoltage Trip  Bit 24 = 27-2 Undervoltage Trip  Bit 25 = 51-2 Overcurrent Trip  Bit 26 = 81 Underfrequency Trip  Bit 27 = 81 Overfrequency Trip  Bit 28 = 59-1 Overvoltage Trip  Bit 29 = 27-1 Undervoltage Trip Bit 30 = 47 Phase Imbalance Trip Bit 31 = 51-1 Overcurrent Trip |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45598-99 | Gen Protect Alarm Status | Int32 | N/A | N/A | R | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used  Bit 18 = 81 ROC DF/DT Trip Bit 19 = 78 Vector Shift Trip Bit 20 = 51-3 Overcurrent Trip  Bit 21 = 40 Loss of Excitation Trip Bit 22 = 32 Reverse Overpower Trip Bit 23 = 59-2 Overvoltage Trip  Bit 24 = 27-2 Undervoltage Trip  Bit 25 = 51-2 Overcurrent Trip  Bit 26 = 81 Underfrequency Trip  Bit 27 = 81 Overfrequency Trip  Bit 28 = 59-1 Overvoltage Trip  Bit 29 = 27-1 Undervoltage Trip Bit 30 = 47 Phase Imbalance Trip Bit 31 = 51-1 Overcurrent Trip |
| 45600-01 | Pre-Alarm Metering 2 | Int32 | N/A | N/A |  | Bit 0 = Not Used Bit 1 = Not Used Bit 2 = Not Used Bit 3 = Not Used Bit 4 = Not Used Bit 5 = Not Used Bit 6 = Not Used Bit 7 = Not Used Bit 8 = Not Used Bit 9 = Not Used Bit 10 = Not Used Bit 11 = Not Used Bit 12 = Not Used Bit 13 = Not Used Bit 14 = Not Used Bit 15 = Not Used Bit 16 = Not Used Bit 17 = Not Used Bit 18 = Not Used Bit 19 = Not Used Bit 20 = Not Used Bit 21 = Not Used Bit 22 = Not Used Bit 23 = Not Used Bit 24 = Not Used Bit 25 = Not Used Bit 26 = Not Used Bit 27 = Not Used Bit 28 = Not Used  Bit 29 = High Exhaust Temperature Bit 30 = DPF Regenerate Disabled Bit 31 = DPF Regenerate Required |
| 45602-748 | FUTURE USE |  |  |  |  |  |
| 45750 | Device Address | Int32 | N/A | N/A | RW | (-128) - 127 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45752 | pc Emergency Stop | Uint32 | N/A | N/A | RW | 0 = Stop  1 = Start |
| 45754 | pc Relay Closed: Runs when in Auto mode | Uint32 | N/A | N/A | RW | 0 = Stop  1 = Start |
| 45756 | Test Buttons Image | Uint32 | N/A | N/A | RW | 0 - 255 |
| 45758-60 | RESERVED |  |  |  |  |  |
| 45762 | Embedded Code Version Number | Uint32 | N/A | N/A | R |  |
| 45764 | Boot Code Version Number | Int32 | N/A | N/A | R |  |
| 45766 | Model Number | Uint32 | N/A | N/A | R |  |
| 45768 | Embedded Code Part Number | Uint32 | N/A | N/A | R |  |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45770 | Conf Prot 1 Param Select | Unit32 | N/A | N/A | RW | 0 = Oil Pressure 1 = Coolant Temp 2 = Battery Volts 3 = RPM  4 = Fuel Level 5 = Gen VAB  6 = Gen VBC  7 = Gen VCA  8 = Gen VAN  9 = Gen VBN  10 = Gen VCN  11 = Bus Freq 12 = Bus Volts 13 = Gen Freq 14 = Gen PF  15 = Gen IA  16 = Gen IB  17 = Gen IC  18 = kW A  19 = kW B  20 = kW C  21 = kW Total 22 = kVA A  23 = kVA B  24 = kVA C  25 = kVA Total  26 = Analog Input 1  27 = Analog Input 2  28 = Analog Input 3  29 = Analog Input 4  30 = Analog Input 5  31 = Analog Input 6  32 = Analog Input 7  33 = Analog Input 8  34 = RTD Input 1  35 = RTD Input 2  36 = RTD Input 3  37 = RTD Input 4  38 = RTD Input 5  39 = RTD Input 6  40 = RTD Input 7  41 = RTD Input 8  42 = Thermocouple 1  43 = Thermocouple 2  44 = Fuel Delivery Pressure 45 = kvar A  46 = kvar B 47 = kvar C  48 = kvar Total  49 = Injector Metering Rail Pressure 50 = Total Fuel Used  51 = Fuel Temperature  52 = Engine Oil Temperature  53 = Engine Intercooler Temperature 54 = Coolant Pressure  55 = Fuel Rate  56 = Boost Pressure  57 = Intake Manifold Temperature 58 = Charge Air Temperature |
| 45772 | Conf Prot 1 Hysteresis | Int32 | Percent | Deci | RW | 0 - 1000 |
| 45774 | Conf Prot 1 Arming Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45776 | Conf Prot 1 Threshold 1 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45778 | Conf Prot 1 Threshold 2 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45780 | Conf Prot 1 Over 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45782 | Conf Prot 1 Over 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45784 | Conf Prot 1 Under 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45786 | Conf Prot 1 Under 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45788 | Conf Prot 1 Over 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45790 | Conf Prot 1 Over 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45792 | Conf Prot 1 Under 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45794 | Conf Prot 1 Under 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45796 | Conf Prot 2 Param Select | Unit32 | N/A | N/A | RW | 0 = Oil Pressure 1 = Coolant Temp 2 = Battery Volts 3 = RPM  4 = Fuel Level 5 = Gen VAB  6 = Gen VBC  7 = Gen VCA  8 = Gen VAN  9 = Gen VBN  10 = Gen VCN  11 = Bus Freq 12 = Bus Volts 13 = Gen Freq 14 = Gen PF  15 = Gen IA  16 = Gen IB  17 = Gen IC  18 = kW A  19 = kW B  20 = kW C  21 = kW Total 22 = kVA A  23 = kVA B  24 = kVA C  25 = kVA Total  26 = Analog Input 1  27 = Analog Input 2  28 = Analog Input 3  29 = Analog Input 4  30 = Analog Input 5  31 = Analog Input 6  32 = Analog Input 7  33 = Analog Input 8  34 = RTD Input 1  35 = RTD Input 2  36 = RTD Input 3  37 = RTD Input 4  38 = RTD Input 5  39 = RTD Input 6  40 = RTD Input 7  41 = RTD Input 8  42 = Thermocouple 1  43 = Thermocouple 2  44 = Fuel Delivery Pressure 45 = kvar A  46 = kvar B 47 = kvar C  48 = kvar Total  49 = Injector Metering Rail Pressure 50 = Total Fuel Used  51 = Fuel Temperature  52 = Engine Oil Temperature  53 = Engine Intercooler Temperature 54 = Coolant Pressure  55 = Fuel Rate  56 = Boost Pressure  57 = Intake Manifold Temperature 58 = Charge Air Temperature |
| 45798 | Conf Prot 2 Hysteresis | Int32 | Percent | Deci | RW | 0 - 1000 |
| 45800 | Conf Prot 2 Arming Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45802 | Conf Prot 2 Threshold 1 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45804 | Conf Prot 2 Threshold 2 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45806 | Conf Prot 2 Over 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45808 | Conf Prot 2 Over 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45810 | Conf Prot 2 Under 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45812 | Conf Prot 2 Under 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45814 | Conf Prot 2 Over 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45816 | Conf Prot 2 Over 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45818 | Conf Prot 2 Under 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45820 | Conf Prot 2 Under 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45822 | Conf Prot 3 Param Select | Uint32 | N/A | N/A | RW | 0 = Oil Pressure 1 = Coolant Temp 2 = Battery Volts 3 = RPM  4 = Fuel Level 5 = Gen VAB  6 = Gen VBC  7 = Gen VCA  8 = Gen VAN  9 = Gen VBN  10 = Gen VCN  11 = Bus Freq 12 = Bus Volts 13 = Gen Freq 14 = Gen PF  15 = Gen IA  16 = Gen IB  17 = Gen IC  18 = kW A  19 = kW B  20 = kW C  21 = kW Total 22 = kVA A  23 = kVA B  24 = kVA C  25 = kVA Total  26 = Analog Input 1  27 = Analog Input 2  28 = Analog Input 3  29 = Analog Input 4  30 = Analog Input 5  31 = Analog Input 6  32 = Analog Input 7  33 = Analog Input 8  34 = RTD Input 1  35 = RTD Input 2  36 = RTD Input 3  37 = RTD Input 4  38 = RTD Input 5  39 = RTD Input 6  40 = RTD Input 7  41 = RTD Input 8  42 = Thermocouple 1  43 = Thermocouple 2  44 = Fuel Delivery Pressure 45 = kvar A  46 = kvar B 47 = kvar C  48 = kvar Total  49 = Injector Metering Rail Pressure 50 = Total Fuel Used  51 = Fuel Temperature  52 = Engine Oil Temperature  53 = Engine Intercooler Temperature 54 = Coolant Pressure  55 = Fuel Rate  56 = Boost Pressure  57 = Intake Manifold Temperature 58 = Charge Air Temperature |
| 45824 | Conf Prot 3 Hysteresis | Int32 | Percent | Deci | RW | 1 - 1000 |
| 45826 | Conf Prot 3 Arming Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45828 | Conf Prot 3 Threshold 1 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45830 | Conf Prot 3 Threshold 2 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45832 | Conf Prot 3 Over 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45834 | Conf Prot 3 Over 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45836 | Conf Prot 3 Under 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45838 | Conf Prot 3 Under 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45840 | Conf Prot 3 Over 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45842 | Conf Prot 3 Over 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45844 | Conf Prot 3 Under 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45846 | Conf Prot 3 Under 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45848 | Conf Prot 4 Param Select | Uint32 | N/A | N/A | RW | 0 = Oil Pressure 1 = Coolant Temp 2 = Battery Volts 3 = RPM  4 = Fuel Level 5 = Gen VAB  6 = Gen VBC  7 = Gen VCA  8 = Gen VAN  9 = Gen VBN  10 = Gen VCN  11 = Bus Freq 12 = Bus Volts 13 = Gen Freq 14 = Gen PF  15 = Gen IA  16 = Gen IB  17 = Gen IC  18 = kW A  19 = kW B  20 = kW C  21 = kW Total 22 = kVA A  23 = kVA B  24 = kVA C  25 = kVA Total  26 = Analog Input 1  27 = Analog Input 2  28 = Analog Input 3  29 = Analog Input 4  30 = Analog Input 5  31 = Analog Input 6  32 = Analog Input 7  33 = Analog Input 8  34 = RTD Input 1  35 = RTD Input 2  36 = RTD Input 3  37 = RTD Input 4  38 = RTD Input 5  39 = RTD Input 6  40 = RTD Input 7  41 = RTD Input 8  42 = Thermocouple 1  43 = Thermocouple 2  44 = Fuel Delivery Pressure 45 = kvar A  46 = kvar B 47 = kvar C  48 = kvar Total  49 = Injector Metering Rail Pressure 50 = Total Fuel Used  51 = Fuel Temperature  52 = Engine Oil Temperature  53 = Engine Intercooler Temperature 54 = Coolant Pressure  55 = Fuel Rate  56 = Boost Pressure  57 = Intake Manifold Temperature 58 = Charge Air Temperature |
| 45850 | Conf Prot 4 Hysteresis | Int32 | Percent | Deci | RW | 1 - 1000 |
| 45852 | Conf Prot 4 Arming Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45854 | Conf Prot 4 Threshold 1 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45856 | Conf Prot 4 Threshold 2 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45858 | Conf Prot 4 Over 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45860 | Conf Prot 4 Over 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45862 | Conf Prot 4 Under 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45864 | Conf Prot 4 Under 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45866 | Conf Prot 4 Over 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45868 | Conf Prot 4 Over 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45870 | Conf Prot 4 Under 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45872 | Conf Prot 4 Under 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45874 | Conf Prot 5 Param Select | Uint32 | N/A | N/A | RW | 0 = Oil Pressure 1 = Coolant Temp 2 = Battery Volts 3 = RPM  4 = Fuel Level 5 = Gen VAB  6 = Gen VBC  7 = Gen VCA  8 = Gen VAN  9 = Gen VBN  10 = Gen VCN  11 = Bus Freq 12 = Bus Volts 13 = Gen Freq 14 = Gen PF  15 = Gen IA  16 = Gen IB  17 = Gen IC  18 = kW A  19 = kW B  20 = kW C  21 = kW Total 22 = kVA A  23 = kVA B  24 = kVA C  25 = kVA Total  26 = Analog Input 1  27 = Analog Input 2  28 = Analog Input 3  29 = Analog Input 4  30 = Analog Input 5  31 = Analog Input 6  32 = Analog Input 7  33 = Analog Input 8  34 = RTD Input 1  35 = RTD Input 2  36 = RTD Input 3  37 = RTD Input 4  38 = RTD Input 5  39 = RTD Input 6  40 = RTD Input 7  41 = RTD Input 8  42 = Thermocouple 1  43 = Thermocouple 2  44 = Fuel Delivery Pressure 45 = kvar A  46 = kvar B 47 = kvar C  48 = kvar Total  49 = Injector Metering Rail Pressure 50 = Total Fuel Used  51 = Fuel Temperature  52 = Engine Oil Temperature  53 = Engine Intercooler Temperature 54 = Coolant Pressure  55 = Fuel Rate  56 = Boost Pressure  57 = Intake Manifold Temperature 58 = Charge Air Temperature |
| 45876 | Conf Prot 5 Hysteresis | Int32 | Percent | Deci | RW | 1 - 1000 |
| 45878 | Conf Prot 5 Arming Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45880 | Conf Prot 5 Threshold 1 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45882 | Conf Prot 5 Threshold 2 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45884 | Conf Prot 5 Over 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45886 | Conf Prot 5 Over 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45888 | Conf Prot 5 Under 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45890 | Conf Prot 5 Under 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45892 | Conf Prot 5 Over 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45894 | Conf Prot 5 Over 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45896 | Conf Prot 5 Under 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45898 | Conf Prot 5 Under 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45900 | Conf Prot 6 Param Select | Uint32 | N/A | N/A | RW | 0 = Oil Pressure 1 = Coolant Temp 2 = Battery Volts 3 = RPM  4 = Fuel Level 5 = Gen VAB  6 = Gen VBC  7 = Gen VCA  8 = Gen VAN  9 = Gen VBN  10 = Gen VCN  11 = Bus Freq 12 = Bus Volts 13 = Gen Freq 14 = Gen PF  15 = Gen IA  16 = Gen IB  17 = Gen IC  18 = kW A  19 = kW B  20 = kW C  21 = kW Total 22 = kVA A  23 = kVA B  24 = kVA C  25 = kVA Total  26 = Analog Input 1  27 = Analog Input 2  28 = Analog Input 3  29 = Analog Input 4  30 = Analog Input 5  31 = Analog Input 6  32 = Analog Input 7  33 = Analog Input 8  34 = RTD Input 1  35 = RTD Input 2  36 = RTD Input 3  37 = RTD Input 4  38 = RTD Input 5  39 = RTD Input 6  40 = RTD Input 7  41 = RTD Input 8  42 = Thermocouple 1  43 = Thermocouple 2  44 = Fuel Delivery Pressure 45 = kvar A  46 = kvar B 47 = kvar C  48 = kvar Total  49 = Injector Metering Rail Pressure 50 = Total Fuel Used  51 = Fuel Temperature  52 = Engine Oil Temperature  53 = Engine Intercooler Temperature 54 = Coolant Pressure  55 = Fuel Rate  56 = Boost Pressure  57 = Intake Manifold Temperature 58 = Charge Air Temperature |
| 45902 | Conf Prot 6 Hysteresis | Int32 | Percent | Deci | RW | 1 - 1000 |
| 45904 | Conf Prot 6 Arming Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45906 | Conf Prot 6 Threshold 1 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45908 | Conf Prot 6 Threshold 2 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45910 | Conf Prot 6 Over 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45912 | Conf Prot 6 Over 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45914 | Conf Prot 6 Under 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45916 | Conf Prot 6 Under 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45918 | Conf Prot 6 Over 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45920 | Conf Prot 6 Over 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45922 | Conf Prot 6 Under 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45924 | Conf Prot 6 Under 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45926 | Conf Prot 7 Param Select | Uint32 | N/A | N/A | RW | 0 = Oil Pressure 1 = Coolant Temp 2 = Battery Volts 3 = RPM  4 = Fuel Level 5 = Gen VAB  6 = Gen VBC  7 = Gen VCA  8 = Gen VAN  9 = Gen VBN  10 = Gen VCN  11 = Bus Freq 12 = Bus Volts 13 = Gen Freq 14 = Gen PF  15 = Gen IA  16 = Gen IB  17 = Gen IC  18 = kW A  19 = kW B  20 = kW C  21 = kW Total 22 = kVA A  23 = kVA B  24 = kVA C  25 = kVA Total  26 = Analog Input 1  27 = Analog Input 2  28 = Analog Input 3  29 = Analog Input 4  30 = Analog Input 5  31 = Analog Input 6  32 = Analog Input 7  33 = Analog Input 8  34 = RTD Input 1  35 = RTD Input 2  36 = RTD Input 3  37 = RTD Input 4  38 = RTD Input 5  39 = RTD Input 6  40 = RTD Input 7  41 = RTD Input 8  42 = Thermocouple 1  43 = Thermocouple 2  44 = Fuel Delivery Pressure 45 = kvar A  46 = kvar B 47 = kvar C  48 = kvar Total  49 = Injector Metering Rail Pressure 50 = Total Fuel Used  51 = Fuel Temperature  52 = Engine Oil Temperature  53 = Engine Intercooler Temperature 54 = Coolant Pressure  55 = Fuel Rate  56 = Boost Pressure  57 = Intake Manifold Temperature 58 = Charge Air Temperature |
| 45928 | Conf Prot 7 Hysteresis | Int32 | Percent | Deci | RW | 1 - 1000 |
| 45930 | Conf Prot 7 Arming Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45932 | Conf Prot 7 Threshold 1 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45934 | Conf Prot 7 Threshold 2 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45936 | Conf Prot 7 Over 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45938 | Conf Prot 7 Over 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45940 | Conf Prot 7 Under 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45942 | Conf Prot 7 Under 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45944 | Conf Prot 7 Over 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45946 | Conf Prot 7 Over 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45948 | Conf Prot 7 Under 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45950 | Conf Prot 7 Under 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45952 | Conf Prot 8 Param Select | Uint32 | N/A | N/A | RW | 0 = Oil Pressure 1 = Coolant Temp 2 = Battery Volts 3 = RPM  4 = Fuel Level 5 = Gen VAB  6 = Gen VBC  7 = Gen VCA  8 = Gen VAN  9 = Gen VBN  10 = Gen VCN  11 = Bus Freq 12 = Bus Volts 13 = Gen Freq 14 = Gen PF  15 = Gen IA  16 = Gen IB  17 = Gen IC  18 = kW A  19 = kW B  20 = kW C  21 = kW Total 22 = kVA A  23 = kVA B  24 = kVA C  25 = kVA Total  26 = Analog Input 1  27 = Analog Input 2  28 = Analog Input 3  29 = Analog Input 4  30 = Analog Input 5  31 = Analog Input 6  32 = Analog Input 7  33 = Analog Input 8  34 = RTD Input 1  35 = RTD Input 2  36 = RTD Input 3  37 = RTD Input 4  38 = RTD Input 5  39 = RTD Input 6  40 = RTD Input 7  41 = RTD Input 8  42 = Thermocouple 1  43 = Thermocouple 2  44 = Fuel Delivery Pressure 45 = kvar A  46 = kvar B 47 = kvar C  48 = kvar Total  49 = Injector Metering Rail Pressure 50 = Total Fuel Used  51 = Fuel Temperature  52 = Engine Oil Temperature  53 = Engine Intercooler Temperature 54 = Coolant Pressure  55 = Fuel Rate  56 = Boost Pressure  57 = Intake Manifold Temperature 58 = Charge Air Temperature |
| 45954 | Conf Prot 8 Hysteresis | Int32 | Percent | Deci | RW | 1 - 1000 |
| 45956 | Conf Prot 8 Arming Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45958 | Conf Prot 8 Threshold 1 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |
| 45960 | Conf Prot 8 Threshold 2 Activation Delay | Int32 | Second | N/A | RW | 0 - 300 |

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| **Register** | **Description** | **Type** | **Units** | **Scaling Factor** | **R/W** | **Range** |
| 45962 | Conf Prot 8 Over 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45964 | Conf Prot 8 Over 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45966 | Conf Prot 8 Under 1 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45968 | Conf Prot 8 Under 2 Threshold | Int32 | N/A | Centi | RW | (-99999900) - 99999900 |
| 45970 | Conf Prot 8 Over 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45972 | Conf Prot 8 Over 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45974 | Conf Prot 8 Under 1 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45976 | Conf Prot 8 Under 2 Alarm Type | Int32 | N/A | N/A | RW | 0 = None  1 = Alarm  2 = Pre-Alarm 3 = Status Only |
| 45978-  6248 | FUTURE USE |  |  |  |  |  |
| 46250 | PLC Timer 1 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46252 | PLC Timer 2 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46254 | PLC Timer 3 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46256 | PLC Timer 4 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46258 | PLC Timer 5 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46260 | PLC Timer 6 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46262 | PLC Timer 7 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46264 | PLC Timer 8 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46266 | PLC Timer 9 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46268 | PLC Timer 10 Seconds | Int32 | Second | Deci | RW | 0 - 18000 |
| 46270 | PLC Timer 1 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46272 | PLC Timer 2 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46274 | PLC Timer 3 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46276 | PLC Timer 4 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46278 | PLC Timer 5 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46280 | PLC Timer 6 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46282 | PLC Timer 7 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46284 | PLC Timer 8 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46286 | PLC Timer 9 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46288 | PLC Timer 10 Minutes | Uint32 | Minute | N/A | RW | 0 - 250 |
| 46290 | PLC Timer 1 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46292 | PLC Timer 2 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46294 | PLC Timer 3 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46296 | PLC Timer 4 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46298 | PLC Timer 5 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46300 | PLC Timer 6 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46302 | PLC Timer 7 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46304 | PLC Timer 8 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46306 | PLC Timer 9 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |
| 46308 | PLC Timer 10 Hours | Uint32 | Hour | N/A | RW | 0 - 250 |

**Legacy Parameter Table**

The DGC-2020 maps all legacy parameters previously associated with the DGC-500 and DGC-1000 into the Holding Register address space (40000 to 41999). Query address N will access the Holding Register N+1. The Data Format is Integer type data unless identified otherwise in the Data Format column.

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40001-18 | RESERVED |  |  |  |  |
| **PARAMETER SETTINGS** | | | | | |
| 40019 | Emergency Stop | 0-1 | R W | 0 =Off  1 =Stop |  |
| 40020 | Remote Start / Stop: Runs when in Auto mode | 0-1 | R W | 0 =Stop  1 =Start |  |
| 40021-22 | RESERVED |  |  |  |  |
| **SYSTEM PARAMETERS** | | | | | |
| 40023 | Default Generator Connection | 0-2 | R W | 0=3ph L-L  1=3ph L-N  2=1ph A-B |  |
| 40024 | NFPA Level | 0-2 | R W | 0=Off 1=Level 1  2=Level 2 |  |
| 40025 | RESERVED |  |  |  |  |
| 40026 | Rated Engine RPM | 750-3600 | R W |  | RPM |
| 40027 | Number Flywheel Teeth | 50-500 | R W |  |  |
| 40028 | Genset kW Rating | 25-9999 | R W |  | KWatt |
| 40029 | No Load Cool Down Time | 0-60 | R W |  | Minutes |
| **GENERATOR PT PRIMARY** | | | | | |
| 40030 | Voltage(a) | 1-15000 | R W | DP | VoltsAC x10000 |
| 40031 | Voltage(b) |  | R W | DP | VoltsAC |
| **GENERATOR PT SECONDARY** | | | | | |
| 40032 | Voltage | 1-480 | R W |  | VoltsAC |
| **GENERATOR CT PRIMARY** | | | | | |
| 40033 | Current | 1-5000 | R W |  | AmpsAC |
| **LOW FUEL ALARM** | | | | | |
| 40034 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40035 | Threshold | 2-50 | R W |  | % Full Tank |
| **LOW FUEL PRE-ALARM** | | | | | |
| 40036 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40037 | Threshold | 10-100 | R W |  | % Full Tank |
| **LOW COOLANT TEMP PRE-ALARM** | | | | | |
| 40038 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40039 | Threshold | 32-150 | R W |  | Degrees F |
| **BATTERY OVERVOLTAGE PRE-ALARM** | | | | | |
| 40040 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40041 | RESERVED |  |  |  |  |
| **MAINTENANCE INTERVAL PRE-ALARM** | | | | | |
| 40042 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40043 | Threshold | 0-5000 | R W |  | Hours |
| **ENGINE KW OVERLOAD PRE-ALARM** | | | | | |
| 40044 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40045 | Threshold | 95-140 | R W |  | % of Rated |
| **HIGH COOLANT TEMP PRE-ALARM** | | | | | |
| 40046 | Enable | 0-1 | R W | 0 =Off  1 =On |  |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40047 | Threshold | 100-280 | R W |  | Degrees F |
| **LOW OIL PRESSURE PRE-ALARM** | | | | | |
| 40048 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40049 | Threshold | 3-100 | R W |  | PSI |
| **LOW BATTERY VOLTAGE PRE-ALARM** | | | | | |
| 40050 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40051 | Threshold | 60-120 (12V)  120-240 (24V) | R W |  | 0.1 Volts DC |
| 40052 | Pre-alarm Activation Time Delay | 1-10 | R W |  | Seconds |
| **WEAK BATTERY VOLTAGE PRE-ALARM** | | | | | |
| 40053 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40054 | Threshold | 40-80 (12V)  80-160 (24V) | R W |  | 0.1 VoltDC |
| 40055 | Pre-alarm Activation Time Delay | 1-10 | R W |  | Seconds |
| 40056-59 | RESERVED |  |  |  |  |
| **HIGH COOLANT TEMP ALARM** | | | | | |
| 40060 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40061 | Threshold | 100-280 | R W |  | Degrees F |
| 40062 | Arming Delay after Crank Disconnect | 60 | R W |  | Seconds |
| **LOW OIL PRESSURE ALARM** | | | | | |
| 40063 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40064 | Threshold | 3-100 | R W |  | PSI |
| 40065 | Arming Delay after Crank Disconnect | 5-15 | R W |  | Seconds |
| **OVERSPEED ALARM** | | | | | |
| 40066 | Enable | 0-1 | R W | 0 =Off  1 =On |  |
| 40067 | Threshold | 105-140 | R W |  | % of Rated |
| 40068 | Alarm Activation Time Delay | 0-500 | R W |  | MilliSec |
| 40069-71 | RESERVED |  |  |  |  |
| **CRANKING PARAMETERES** | | | | | |
| 40072 | Cranking Style | 0-1 | R W | 0=Contin. 1=Cycle |  |
| 40073 | Number of Crank Cycles | 1-7 | R W |  |  |
| 40074 | Cycle Crank Time | 5-15 | R W |  | Seconds |
| 40075 | Continuous Crank Time | 1-60 | R W |  | Seconds |
| 40076 | Crank Disconnect Limit | 10-100 | R W |  | % of Rated |
| 40077 | Pre-crank Delay | 0-30 | R W |  | Seconds |
| **SYSTEM MONITOR** | | | | | |
| 40078 | Remaining Cooldown Time | 0-60 | R |  | Minutes |
| 40079 | RESERVED |  |  |  |  |
| 40080 | Active Speed Signal Sources | 1-4 | R | 1=MPU  2=ALT  3=GEN  4=NONE | |
| 40081 | Sender Failure Alarm Code | individual bits are 0 or 1 | R | b0=High Coolant Temperature b1=Oil Pressure  b2 Fuel Level  b3=Generator Voltage Sensing b4=Magnetic Pick-up  b5-b7 not used | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40082 | Alarm Codes | individual bits are 0 or 1 | R | b0=High Coolant Temperature b1=Low Coolant Level b2=Low Fuel Level b3=Emergency Stop b4=Sender Failure  b5=Over Crank b6=Over Speed b7=Low Oil Pressure Rev. 3.04 Added:  b8 = CAN Fail | |
| 40083 | Pre-Alarm Codes | individual bits are 0 or 1 | R | b0=High Coolant Temperature b1=Low Coolant Temperature b2=Weak Battery  b3=Low Battery b4=Battery Overvoltage b5=Battery Charger Fail b6=Maintenance Interval b7=Engine Overload Rev. 3.04 Added:  b8 = DTC  b9 = CAN Fail | |
| 40084 | Pre-Alarm Codes, Group 2 | individual bits are 0 or 1 | R | b0=Low Oil Pressure b1=Low Fuel Level b2=Magnetic Pick-up Fail b3=Fuel Level Sender Fail b4=Aux Input 1  b5=Aux Input 2  b6=Aux Input 3  b7=Aux Input 4 | |
| 40085 | Engine Coolant Temperature |  | R |  | DegF |
| 40086 | Engine Oil Pressure |  | R |  | PSI |
| 40087 | Battery Voltage |  | R |  | 0.1 VoltsDC |
| 40088 | Fuel Level |  | R |  | % Full Tank |
| 40089 | Time Remaining until Maintenance |  | R |  | Hours |
| 40090 | Accumulated Engine Runtime(a) |  | R W | DP | Minutes x 10000 |
| 40091 | Accumulated Engine Runtime(b) |  | R W | DP | Minutes |
| 40092 | Not Currently Used |  | R W | DP |  |
| 40093 | Not Currently Used |  | R W | DP |  |
| 40094 | Engine Speed(a) |  | R | DP | RPM x10000 |
| 40095 | Engine Speed(b) |  | R | DP | RPM |
| 40096 | Engine Load(a) |  | R | DP |  |
| 40097 | Engine Load(b) |  | R | DP | % of Rated Load |
| **GENERATOR MONITOR** | | | | | |
| 40098 | Phase a-b RMS Voltage(a) |  | R | DP | RMS Volt x 10000 |
| 40099 | Phase a-b RMS Voltage(b) |  | R | DP | RMS Volt |
| 40100 | Phase b-c RMS Voltage(a) |  | R | DP | RMS Volt x 10000 |
| 40101 | Phase b-c RMS Voltage(b) |  | R | DP | RMS Volt |
| 40102 | Phase c-a RMS Voltage(a) |  | R | DP | RMS Volt x 10000 |
| 40103 | Phase c-a RMS Voltage(b) |  | R | DP | RMS Volt |
| 40104 | Phase a-n RMS Voltage(a) |  | R | DP | RMS Volt x 10000 |
| 40105 | Phase a-n RMS Voltage(b) |  | R | DP | RMS Volt |
| 40106 | Phase b-n RMS Voltage(a) |  | R | DP | RMS Volt x 10000 |
| 40107 | Phase b-n RMS Voltage(b) |  | R | DP | RMS Volt |
| 40108 | Phase c-n RMS Voltage(a) |  | R | DP | RMS Volt x 10000 |
| 40109 | Phase c-n RMS Voltage(b) |  | R | DP | RMS Volt |
| 40110 | Phase a RMS Current |  | R |  | RMS Amps |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40111 | Phase b RMS Current |  | R |  | RMS Amps |
| 40112 | Phase c RMS Current |  | R |  | RMS Amps |
| 40113 | Phase a Apparent Power(a) |  | R | DP | KVA x 10000 |
| 40114 | Phase a Apparent Power(b) |  | R | DP | KVA |
| 40115 | Phase b Apparent Power(a) |  | R | DP | KVA x 10000 |
| 40116 | Phase b Apparent Power(b) |  | R | DP | KVA |
| 40117 | Phase c Apparent Power(a) |  | R | DP | KVA x 10000 |
| 40118 | Phase c Apparent Power(b) |  | R | DP | KVA |
| 40119 | 3 Phase Apparent Power(a) |  | R | DP | KVA x 10000 |
| 40120 | 3 Phase Apparent Power(b) |  | R | DP | KVA |
| 40121 | Phase a Power(a) |  | R | DP | KWatt x 10000 |
| 40122 | Phase a Power(b) |  | R | DP | KWatt |
| 40123 | Phase b Power(a) |  | R | DP | KWatt x 10000 |
| 40124 | Phase b Power(b) |  | R | DP | KWatt |
| 40125 | Phase c Power(a) |  | R | DP | KWatt x 10000 |
| 40126 | Phase c Power(b) |  | R | DP | KWatt |
| 40127 | 3 Phase power(a) |  | R | DP | KWatt x 10000 |
| 40128 | 3 Phase power(b) |  | R | DP | KWatt |
| 40129 | 3 Phase Total kW-Hours(a) |  | R W | TP | KWH x 10000 x 10000 |
| 40130 | 3 Phase Total kW-Hours(b) |  | R W | TP | KWH x 10000 |
| 40131 | 3 Phase Total kW-Hours(x) |  | R W | TP | KWH |
| 40132 | Power Factor | 0-100 | R |  | 0.01 |
| 40133 | Frequency |  | R |  | 0.1 Hertz |
| 40134 | Present Total kW-minutes (a) |  | R W | TP | kWm x 10000 x 10000 |
| 40135 | Present Total kW-minutes (b) |  | R W | TP | kWm x 10000 |
| 40136 | Present Total kW-minutes (c) |  | R W | TP | kWm |
| 40137 | Generator Speed Mode | individual bits are 0 or 1 | R W | active spd signals:  b0 =mag. pick-up or CAN’s ECU engine’s speed.  b1 =generator | |
| 40138-39 | RESERVED |  |  |  | |
| 40140 | Power Factor State | 0-3 | R | 0= +LAG  1= -LEAD  2= -LAG  3= +LEAD | |
| 40141-272 | RESERVED |  |  |  | |
| 40273 | Input Contacts States | individual bits are 0 or 1 | R | b0 = coolant level, b1 = ATS,  b2 = E-stop,  b3 = charger failed, b4 = aux. input 1, b5 = aux. input 2, b6 = aux. input 3,  b7 = aux. input 4. /\* b7 = aux. input 4. \*/ | |
| 40274 | BESTCOMS*Plus*™ Test Buttons States | individual bits are 0 or 1 | R W | b0 = button #1, b1 = button #2, b2 = button #3, b3 = button #4,  b4-b7 are not used. | |
| 40275-80 | RESERVED |  |  |  | |
| 40281 | Embedded Code Version Number (a) | 0-99 | R |  | |
| 40282 | Embedded Code Version Number (b) | 0-9999 | R |  | |
| 40283 | Embedded Code Version Number (c) | 0-9999 | R |  | |
| 40287-97 | RESERVED |  |  |  | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40298 | Read Relay Image of both Main and Aux Output | individual bits are 0 or 1 | R | Main is in lower byte and Aux is in upper byte.  b0 = Aux Output 1, b1 = Aux Output 2, b2 = Aux Output 3, b3 = Aux Output 4, b4 = Aux Output 5, b5 = Aux Output 6, b6 = Aux Output 7, b7 = Aux Output 8.  b8 = Master Start Relay, b9 = Fuel Solenoid Relay,  b10 = PreHeat PreLube Relay, b11 = Alarm Relay,  b12 = UNASSIGNED,  b13 = Buzzer On,  b14 = EPS Loaded Relay, b15 = PreAlarm Relay, | |
| 40299 | RESERVED |  |  |  | |
| **J1939 DIAGNOSTIC TROUBLE CODES** | | | | | |
| 40300 | Active DTC Number 16 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40301 | Active DTC Number 16 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40302 | Active DTC Number 15 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40303 | Active DTC Number 15 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40304 | Active DTC Number 14 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40305 | Active DTC Number 14 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40306 | Active DTC Number 13 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40307 | Active DTC Number 13 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40308 | Active DTC Number 12 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40309 | Active DTC Number 12 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40310 | Active DTC Number 11 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40311 | Active DTC Number 11 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40312 | Active DTC Number 10 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40313 | Active DTC Number 10 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40314 | Active DTC Number 9 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40315 | Active DTC Number 9 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40316 | Active DTC Number 8 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40317 | Active DTC Number 8 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40318 | Active DTC Number 7 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40319 | Active DTC Number 7 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40320 | Active DTC Number 6 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40321 | Active DTC Number 6 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40322 | Active DTC Number 5 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40323 | Active DTC Number 5 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40324 | Active DTC Number 4 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40325 | Active DTC Number 4 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40326 | Active DTC Number 3 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40327 | Active DTC Number 3 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40328 | Active DTC Number 2 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40329 | Active DTC Number 2 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40330 | Active DTC Number 1 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40331 | Active DTC Number 1 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40332 | Previous DTC Number 1 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40333 | Previous DTC Number 1 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40334 | Previous DTC Number 2 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40335 | Previous DTC Number 2 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40336 | Previous DTC Number 3 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40337 | Previous DTC Number 3 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40338 | Previous DTC Number 4 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40339 | Previous DTC Number 4 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40340 | Previous DTC Number 5 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40341 | Previous DTC Number 5 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40342 | Previous DTC Number 6 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40343 | Previous DTC Number 6 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40344 | Previous DTC Number 7 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40345 | Previous DTC Number 7 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40346 | Previous DTC Number 8 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40347 | Previous DTC Number 8 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40348 | Previous DTC Number 9 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40349 | Previous DTC Number 9 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40350 | Previous DTC Number 10 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40351 | Previous DTC Number 10 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40352 | Previous DTC Number 11 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40353 | Previous DTC Number 11 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40354 | Previous DTC Number 12 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40355 | Previous DTC Number 12 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40356 | Previous DTC Number 13 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40357 | Previous DTC Number 13 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40358 | Previous DTC Number 14 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40359 | Previous DTC Number 14 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40360 | Previous DTC Number 15 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40361 | Previous DTC Number 15 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40362 | Previous DTC Number 16 – Lower Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40363 | Previous DTC Number 16 – Upper Two Bytes | 0-65535 | R | Half of a set of DTC data as defined in SAE J1939-73 | |
| 40364 | RESERVED |  |  |  | |
| 40365 | RESERVED |  |  |  | |
| 40366 | RESERVED |  |  |  | |
| 40367 | RESERVED |  |  |  | |
| 40368 | DTC Lamp Status  NOTE: Even bits are Always a Zero Value. | individual bits are 0 or 1 | R | Active stored in upper byte – Previous stored in lower byte.  b0 = 0,  b1 = Protect Lamp, b2 = 0,  b3 = Amber Warning Lamp, b4 = 0,  b5 = Red Stop Lamp, b6 = 0,  b7 = Malfunction Indicator Lamp, b8 = 0,  b9 = Protect Lamp, b10 = 0,  b11 = Amber Warning Lamp, b12 = 0,  b13 = Red Stop Lamp, b14 = 0,  b15 = Malfunction Indicator Lamp | |
| 40369 | Number of DTC’s | 0-65535 | R | Active stored in upper byte – Previous stored in lower byte. | |
| 40370 | CAN Bus Results Register | individual bits are 0 or 1 | R | b0 = CAN Comms. Fail,  b1 = Active DTC Clear Fail, b2 = Previous DTC Clear Fail, b3 = DTC Values Changed,  b4 = CAN Hardware Test Pass, b5 = UNASSIGNED,  b6 = UNASSIGNED, b7 = UNASSIGNED, | |
| 40371 | CAN Related Parameter: Percent Coolant Level | 0-100 | R | Percent | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40372 | CAN Communications Diagnostics for use when CAN is enabled. | individual bits are 0 or 1 | R | Bit 12 - .Engine Run Time  Bit 11 – Data Failure Status. Previous Active DTCs Cleared Bit 10 –Active DTCs Cleared Bit 9 -.Previous Active DTCs  Bit 8 -.Current Active DTCs  Bit 7 – Coolant Level Bit 6 -.Oil Pressure Bit 5 -.Coolant Temp  Bit 4 -.Engine Speed  Bit 3 –Can Error Status tx\_err\_passive Bit 2 – Can Error Status rx\_err\_passive  Bit 1 – Can Error Status driver sleep  status  Bit 0 – Can Error Status bus off | |
| 40373 | System Config | individual bits are 0 or 1 | R W | Bit 0 – RUN Bit 1 – OFF  Bit 2 – AUTO\_RUN Bit 3 – AUTO\_OFF Bit 4 – AUTO\_ANY | |
| 40374 | System Status | 0 - 10 | R | 0 = RESET  1 = READY  2 = CRANKING  3 = RESTING  4 = RUNNING  5 = ALARM  6 = PRESTART  7 = COOLING  8 = CONNECTING  9 = DISCONNECT  10 = PULSING  11 = UNLOADING | |
| 40375 | Used to display Value, NC, NS, NA, and SF |  | R | Bits 0-2: coolant level  Bits 3-5: coolant temperature Bits 6-8: oil pressure  Bits 9-11: engine speed Bits 12-14: engine run time  Bit 15: NOT USED  3-Bit Status Flag Values: 000 for Valid Data  001 for No Comms 010 for Not Sent 011 for Not Supp 100 for Sender Error | |
| 40380-81 | FUTURE USE |  |  |  | |
| 40382 | MTU module type | 1-4 | R W | 1 = module type 201  2 = module type 302  3 = module type 303  4 = module type 304 | |
| 40383 | MTU speed demand switch | 0-7 | R W | 0 = ANALOG\_CAN  1 = UP\_DN\_ECU  2 = UP\_DN\_CAN  3 = ANALOG\_ECU  5 = FREQUENCY  7 = NO\_CAN\_DEMAND | |
| 40384 | MTU RPM request for engine | 1400-2000 | R W |  | |
| 40385 | Volvo Accelerator Pedal Position (Trim) | 0-100 | R W | 0 = Rated speed – 120rpm; 50 = Rated speed;  100 = Rated speed + 120rpm. | |
| 40386 | Volvo Engine RPM Select | 0-1 | R W | 0 = Primary,  1 = Secondary. | |
| 40387 | J1939 source address for this unit | 0-253 | R W |  | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40388 | CANbus ECU Configuration | 0-65535 | R W | 0 = Not configured;  1 = Volvo Penta EDC3; 2 = MTU MDEC  3 = MTU ADEC | |
| 40395 | ECU Settling Time | 0-65535 | R W | milliseconds | |
| 40396 | ECU Pulse Cycle Time - The amount of time unit is to wait in OFF between Pulse Cycles. | 0-65535 | R W | minutes | |
| 40397 | ECU Disconnect Time - The amount of time ECU is kept powered off. | 0-65535 | R W | seconds | |
| 40398 | ECU Connect Time - The amount of time ECU is powered when connecting (unit tries to run). Also used for the Pulse duration time. | 0-65535 | R W | seconds | |
| 40399-420 | FUTURE USE |  |  |  | |
| **J1939 DATA** | | | | | |
| 40421 | Accelerator Pedal Position | 0 to 100% | R | 0.4%/bit gain, 0% offset | |
| 40422 | Percent Load At Current Speed | 0 to 125% | R | 1%/bit gain, 0% offset | |
| 40423 | Actual Engine Percent Torque | 0 to 125% | R | 1%/bit gain, -125% offset | |
| 40424 | Engine Speed | 0 to 8031.875 | R | RPM (0.125rpm/bit gain) | |
| 40425 | Injection Control Pressure2 |  | R |  | |
| 40426 | Injector Metering Rail Pressure2 | 0 to +251 MPa  (0 to 36 404 psi) | R | 1/256 MPa/bit gain, 0 MPa offset | |
| 40427 | Engine Run Time | 0 to +210,554,  060.75 h | R | 0.05 h/bit gain, 0 h offset | |
| 40428 | Engine Run Time |  | R |  | |
| 40429 | Engine Run Time |  | R |  | |
| 40430 | Trip Fuel | Data Range: 0  to +2,105,540,  608 L | R | 0.5 L per bit gain, 0 L offset | |
| 40431 | Trip Fuel |  | R |  | |
| 40432 | Trip Fuel |  | R |  | |
| 40433 | Total Fuel Used | Data Range: 0  to +2,105,540,  608 L | R | 0.5 L per bit gain, 0 L offset | |
| 40434 | Total Fuel Used |  | R |  | |
| 40435 | Total Fuel Used |  | R |  | |
| 40436 | Coolant Temperature | -40 to +210 °C  (-40 to 410 °F) | R | Raw ECU Parameter Data 1 °C/bit gain | |
| 40437 | Fuel Temperature | -40 to +210 °C  (-40 to 410 °F) | R | Raw ECU Parameter Data 1 °C/bit gain, -40 °C offset | |
| 40438 | Engine Oil Temperature | -273 to +1735.0  °C (-459.4 to  3155.0 °F) | R | Raw ECU Parameter Data 0.03125 °C/bit gain, -273 °C offset | |
| 40439 | Engine Intercooler Temperature | -40 to +210 °C  (-40 to 410 °F) | R | Raw ECU Parameter Data 1 °C/bit gain, -40 °C offset | |
| 40440 | Fuel Delivery Pressure | 0 to +1000 kPa  (0 to 145 psi) | R | Raw ECU Parameter Data 4 kPa/bit gain, 0 kPa offset | |
| 40441 | Engine Oil Level | 0 to +100 % | R | Raw ECU Parameter Data  0.4 %/bit gain, 0 % offset | |
| 40442 | Oil Pressure | 0 to +1000 kPa  (0 to 145 psi) | R | Raw ECU Parameter Data 4 kPa/bit gain, 0 kPa offset | |
| 40443 | Coolant Pressure | 0 to +500 kPa  (0 to 72.5 psi) | R | Raw ECU Parameter Data 4 kPa/bit gain, 0 kPa offset | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40444 | Coolant Level | 0 to +100 % | R | Raw ECU Parameter Data  0.4 %/bit gain, 0 % offset | |
| 40445 | Fuel Rate | 0 to +3212.75  L/h | R | Raw ECU Parameter Data  0.05 L/h per bit gain, 0 L/h offset (13.9 x 10-6 L/s per bit) | |
| 40446 | Barometric Pressure | 0 to +125 kPa  (0 to +18.1 psi) | R | Raw ECU Parameter Data  0.5 kPa/bit gain, 0 kPa offset | |
| 40447 | Ambient Air Temperature | -273 to +1735.0  °C (-459.4 to  3155.0 °F) | R | Raw ECU Parameter Data 0.03125 °C/bit gain, -273 °C offset | |
| 40448 | Air Inlet Temperature | -40 to +210 °C  (-40 to 410 °F) | R | Raw ECU Parameter Data 1 °C/bit gain, -40 °C offset | |
| 40449 | Boost Pressure | 0 to +500 kPa  (0 to 72.5 psi) | R | Raw ECU Parameter Data 2 kPa/bit gain, 0 kPa offset | |
| 40450 | Intake Manifold Temperature | -40 to +210 °C (-  40 to 410 °F) | R | Raw ECU Parameter Data 1 °C/bit gain, -40 °C offset | |
| 40451 | Air Filter Differential Pressure | 0 to +12.5 kPa  (0 to +1.8 psi) | R | Raw ECU Parameter Data  0.05 kPa/bit gain, 0 kPa offset | |
| 40452 | Exhaust Gas Temperature | -273 to +1735.0  °C (-459.4 to  3155.0 °F) | R | Raw ECU Parameter Data 0.03125 °C/bit gain, -273 °C offset | |
| 40453 | Electrical Potential Voltage | 0 to +3212.75 V | R | Raw ECU Parameter Data  0.05 V/bit gain, 0 V offset | |
| 40454 | Battery Potential Voltage Switched | Data Range: 0  to +3212.75 V | R | Raw ECU Parameter Data  0.05 V/bit gain, 0 V offset | |
| 40455 | Speed At Idle Point1 | 0 to 8031.875  rpm | R | Raw ECU Parameter Data  0.125 rpm/bit, 0 rpm offset | |
| 40456 | Torque At Idle Point1 | 0 to 125% | R | Raw ECU Parameter Data 1%/bit gain, -125% offset | |
| 40457 | Speed At Idle Point2 | 0 to 8031.875  rpm | R | Raw ECU Parameter Data  0.125 rpm/bit, 0 rpm offset | |
| 40458 | Torque At Idle Point2 | 0 to 125% | R | Raw ECU Parameter Data 1%/bit gain, -125% offset | |
| 40459 | Speed At Idle Point3 | 0 to 8031.875  rpm | R | Raw ECU Parameter Data  0.125 rpm/bit, 0 rpm offset | |
| 40460 | Torque At Idle Point3 | 0 to 125% | R | Raw ECU Parameter Data 1%/bit gain, -125% offset | |
| 40461 | Speed At Idle Point4 | 0 to 8031.875  rpm | R | Raw ECU Parameter Data  0.125 rpm/bit, 0 rpm offset | |
| 40462 | Torque At Idle Point4 | 0 to 125% | R | Raw ECU Parameter Data 1%/bit gain, -125% offset | |
| 40463 | Speed At Idle Point5 | 0 to 8031.875  rpm | R | Raw ECU Parameter Data  0.125 rpm/bit, 0 rpm offset | |
| 40464 | Torque At Idle Point5 | 0 to 125% | R | Raw ECU Parameter Data 1%/bit gain, -125% offset | |
| 40465 | Speed At High Idle Point6 | 0 to 8031.875  rpm | R | Raw ECU Parameter Data  0.125 rpm/bit, 0 rpm offset | |
| 40466 | Gain Of End speed governor | 0 to 50.2 %/rpm | R | Raw ECU Parameter Data 0.0007813 % engine reference torque/rpm per bit gain (normalized), 0 %/rpm per bit offset | |
| 40467 | Reference Engine Torque | 0 to 64 255 Nm | R | Raw ECU Parameter Data 1 Nm/bit gain, 0 Nm offset | |
| 40468 | Override Speed Point7 | 0 to 8031.875  rpm | R | Raw ECU Parameter Data  0.125 rpm/bit, 0 rpm offset | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40469 | Override Time Limit | 0 s to 25 s | R | Raw ECU Parameter Data  0.1 s/bit gain, 0 s offset | |
| 40470 | Speed Lower Limit | 0 to 2500 rpm | R | Raw ECU Parameter Data 10 rpm/bit gain, 0 rpm offset | |
| 40471 | Speed Upper Limit | 0 to 2500 rpm | R | Raw ECU Parameter Data 10 rpm/bit gain, 0 rpm offset | |
| 40472 | Torque Lower Limit | 0 to 125% | R | Raw ECU Parameter Data 1%/bit gain, -125% offset | |
| 40473 | Torque Upper Limit | 0 to 125% | R | Raw ECU Parameter Data 1%/bit gain, -125% offset | |
| 40474 | Crankcase Pressure | -250 to +251.99  kPa | R | Raw ECU Parameter Data 0.0078125 kPa/bit gain,  -250 kPa offset | |
| 40475 | Oil Filter Diff. Pressure | 0 to 125 kPa | R | Raw ECU Parameter Data  0.5 kPa/bit gain, 0 offset | |
| 40476 | Fuel Filter Diff. Pressure | 0 to 500 kPa | R | Raw ECU Parameter Data 2 kPa/bit gain, 0 offset | |
| 40477-82 | FUTURE USE |  |  |  | |
| 40493-99 | FUTURE USE |  |  |  | |
| 40500 | DGC-2020 product series identifier | 2020 | R |  | |
| 40501 | Firmware Part Number - 2nd most significant digit. NOTE: The most significant digit is always 9, but is not mapped. | 0 - 9 | R |  | |
| 40502 | Firmware Part Number - 3rd-6th most significant digits | 0000 - 9999 | R |  | |
| 40503 | Firmware Part Number - four least significant digits | 0000 - 9999 | R |  | |
| 40504 | LED Status | individual bits are 0 or 1 | R | Bits indicate status of LED’s: b0 = RUN  b1 = OFF b2 = AUTO  b3 = ALARM b4 = LOAD  b5 = NOT IN AUTO | |
| 40507 | Read Relay Image of both Main and Aux Output  (Duplicate of 40298) | individual bits are 0 or 1 | R | Main is in lower byte and Aux is in upper byte.  b0 = Aux Output 1, b1 = Aux Output 2, b2 = Aux Output 3, b3 = Aux Output 4, b4 = Aux Output 5, b5 = Aux Output 6, b6 = Aux Output 7, b7 = Aux Output 8.  b8 = Master Start Relay, b9 = Fuel Solenoid Relay,  b10 = PreHeat PreLube Relay, b11 = Alarm Relay,  b12 = UNASSIGNED,  b13 = Buzzer On,  b14 = EPS Loaded Relay, b15 = PreAlarm Relay, | |
| 40508 | Input Contacts States (Duplicate of 40273) | individual bits are 0 or 1 | R | b0 = coolant level, b1 = ATS,  b2 = E-stop,  b3 = charger failed, b4 = aux. input 1, b5 = aux. input 2, b6 = aux. input 3,  b7 = aux. input 4. /\* b7 = aux. input 4. \*/ | |
| 40509-604 | RESERVED |  |  |  | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| **OVERCURRENT** | | | | | |
| 40605 | 51 Pick-up – 3-phase | 18-118,  90-775 | R W | 0.18-1.18 Aac for 1A CTs, 0.90-7.75 Aac for 5A CTs | |
| 40606 | 51 Time Dial – 3-phase | 0-99,  0-300 | R W | 0.0-9.9 for 40607=0-15 (inverse), 0.0-30.0s for 40607=16 (fixed) | |
| 40607 | 51 Curve – 3-phase | 0-16 | R W | 0-15 for inverse, 16 for fixed | |
| 40608 | 51 Alarm Config. – 3-phase | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| 40609 | 51 Pick-up – 1-phase | 18-118,  90-775 | R W | 0.18-1.18 Aac for 1A CTs, 0.90-7.75 Aac for 5A CTs | |
| 40610 | 51 Time Dial – 1-phase | 0-99,  0-300 | R W | 0.0-9.9 for 40607=0-15 (inverse), 0.0-30.0s for 40607=16 (fixed) | |
| 40611 | 51 Curve – 1-phase | 0-16 | R W | 0-15 for inverse, 16 for fixed | |
| 40612 | 51 Alarm Config. – 1-phase | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| **PHASE IMBALANCE** | | | | | |
| 40613 | 47 Pick-up | 5-100 | R W | Volts AC | |
| 40614 | 47 Time Delay | 0-300 | R W | 0.0-30.0 seconds | |
| 40615 | 47 Alarm Configuration | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| **UNDERVOLTAGE** | | | | | |
| 40616 | 27 Pick-up – 3-phase | 70-576 | R W | Volts AC | |
| 40617 | 27 Time Delay – 3-phase | 0-300 | R W | 0.0-30.0 seconds | |
| 40618 | 27 Inhibit Frequency- 3-ph. | 20-400 | R W | Hertz | |
| 40619 | 27 Alarm Config. – 3-phase | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| 40620 | 27 Pick-up – 1-phase | 70-576 | R W | Volts AC | |
| 40621 | 27 Time Delay – 1-phase | 0-300 | R W | 0.0-30.0 seconds | |
| 40622 | 27 Inhibit Frequency – 1-ph. | 20-400 | R W | Hertz | |
| 40623 | 27 Alarm Config. – 1-phase | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| **OVERVOLTAGE** | | | | | |
| 40624 | 59 Pick-up – 3-phase | 70-576 | R W | Volts AC | |
| 40625 | 59 Time Delay – 3-phase | 0-300 | R W | 0.0-30.0 seconds | |
| 40626 | 59 Alarm Config. – 3-phase | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| 40627 | 59 Pick-up – 1-phase | 70-576 | R W | Volts AC | |
| 40628 | 59 Time Delay – 1-phase | 0-300 | R W | 0.0-30.0 seconds | |
| 40629 | 59 Alarm Config. – 1-phase | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| **UNDERFREQUENCY** | | | | | |
| 40630 | 81U Pick-up | 450-550,  550-650,  3600-4400 | R W | 45.0-55.0 Hz for 50-Hz config., 55.0-65.0 Hz for 60-Hz config., 360.0-440.0 Hz for 400-Hz unit | |
| 40631 | 81U Time Delay | 0-300 | R W | 0.0-30.0 seconds | |
| 40632 | 81U Inhibit Voltage | 70-576 | R W | Volts AC | |
| 40633 | 81U Alarm Configuration | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| **OVERFREQUENCY** | | | | | |
| 40634 | 81O Pick-up | 450-550,  550-650,  3600-4400 | R W | 45.0-55.0 Hz for 50-Hz config., 55.0-65.0 Hz for 60-Hz config., 360.0-440.0 Hz for 400-Hz unit | |
| 40635 | 81O Time Delay | 0-300 | R W | 0.0-30.0 seconds | |
| 40636 | 81O Alarm Configuration | 0-2 | R W | 0=None, 1=Pre-Alarm, 2=Alarm | |
| **GENERATOR PROTECTION STATUS** | | | | | |
| 40637 | Gen Protection Status (upper 16 bits) | 0-65535 | R | b16-b31 UNASSIGNED | |
| 40638 | Gen Protection Status (lower 16 bits) | 0-65535 | R | b0 = overvoltage trip, b1 = undervoltage trip, b2 = overfrequency trip,  b3 = underfrequency trip,  b4 = overcurrent trip,  b5 = phase imbalance trip, b6-b15 UNASSIGNED | |
| 40639 | Gen Protection Pre-Alarms (upper 16 bits) | 0-65535 | R | b16-b31 UNASSIGNED | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40640 | Gen Protection Pre-Alarms (lower 16 bits) | 0-65535 | R | b0 = overvoltage pre-alarm, b1 = undervoltage pre-alarm, b2 = overfrequency pre-alarm,  b3 = underfrequency pre-alarm, b4 = overcurrent pre-alarm,  b5 = phase imbalance pre-alarm, b6-b15 UNASSIGNED | |
| 40641 | Gen Protection Alarms (upper 16 bits) | 0-65535 | R | b16-b31 UNASSIGNED | |
| 40642 | Gen Protection Alarms (lower 16 bits) | 0-65535 | R | b0 = overvoltage alarm, b1 = undervoltage alarm, b2 = overfrequency alarm,  b3 = underfrequency alarm, b4 = overcurrent alarm,  b5 = phase imbalance alarm, b6-b15 UNASSIGNED | |
| **REAL TIME CLOCK** | | | | | |
| 40700 | Hours | 0-23 | R W |  | |
| 40701 | Minutes | 0-59 | R W |  | |
| 40702 | Seconds | 0-59 | R W |  | |
| 40703 | Month | 1-12 | R W |  | |
| 40704 | Day | 1-31 | R W |  | |
| 40705 | Year |  | R W |  | |
| 40706 | Daylight Savings Time Enable | 0-1 | R W | 0 = Off  1 = On | |
| 40707-33 | RESERVED |  |  |  | |
| **RUN STATISTICS** | | | | | |
| 40734 | Maintenance Interval Hours | 0-5000 | R W |  | hours |
| 40735 | Hours Until Maintenance | 0-5000 | R W |  | hours |
| 40737 | Commission Start Month | 1-12 | R W |  | month |
| 40738 | Commission Start Day | 1-31 | R W |  | day |
| 40739 | Commission Start Year | 0-99 | R W |  | year |
| 40740-41 | Cumulative Run Hours x 60 | 0-4294967295 | R W | DP | hours |
| 40742-43 | Cumulative Loaded Run Hours x 60 | 0-4294967295 | R W | DP | hours |
| 40744-45 | Cumulative Unloaded Run Hours x 60 | 0-4294967295 | R W | DP | hours |
| 40746 | Start Count | 0-65535 | R W |  |  |
| 40747 | Session Start Month | 1-12 | R W |  | month |
| 40748 | Session Start Day | 1-31 | R W |  | day |
| 40749 | Session Start Year | 0-99 | R W |  | year |
| 40750-51 | Session Run Hours x 60 | 0-4294967295 | R W | DP | hours |
| 40752-53 | Session Loaded Run Hours x 60 | 0-4294967295 | R W | DP | hours |
| 40754-55 | Session Unloaded Run Hours x 60 | 0-4294967295 | R W | DP | hours |
| **CANbus ECU** | | | | | |
| 40758 | ECU Control Output Select | 0-1 | R W | 0 = fuel solenoid relay, 1 = pre-start relay | |
| 40759 | ECU Pulsing Enable | 0-1 | R W | 0 = pulsing is enabled, 1 = pulsing is disabled | |
| 40760 | MDEC Alarms | 0-65535 | R | b0 = High Charge Air Temp, b1 = High Oil Temp,  b2 = High Coolant Temp, b3 = Low Aftercooler Level,  b4 = Low Fuel Delivery Press, b5 = Low Oil Press,  b6 = Overspeed,  b7 = Combined Red, b8-b15 UNASSIGNED | |

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| **Holding Register** | **Parameter** | **Range** | **Read/Write Supported** | **Data Format** | **Units** |
| 40761 | MTU Pre-alarms | 0-65535 | R | b0 = High ECU Temp, b1 = High Oil Temp,  b2 = High Intercooler Temp, b3 = High Charge Air Temp, b4 = High Coolant Temp, b5 = Shutdown Override,  b6 = High Fuel Rail Press, b7 = Low Fuel Rail Press, b8 = Low Coolant Level,  b9 = Low Charge Air Pressure, b10 = Low Fuel Deliv Pressure, b11 = Low Oil Pressure,  b12 = Combined Yellow, b13-b15 UNASSIGNED | |



