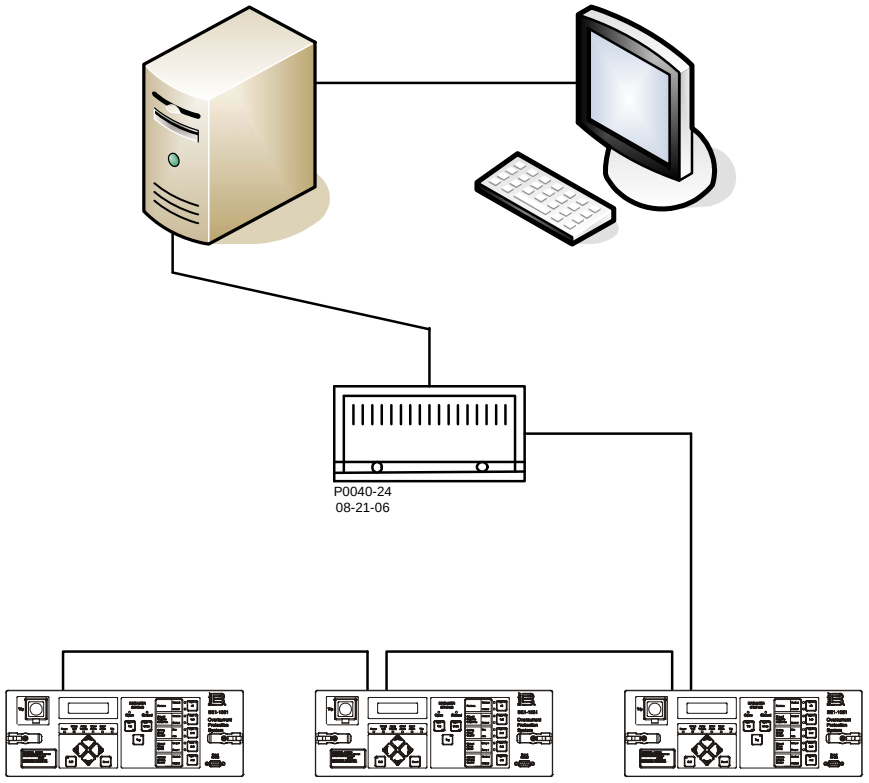
INSTRUCTION MANUAL

FOR

OVERCURRENT PROTECTION SYSTEM
BE1-1051

MODBUS™ PROTOCOL



Basler Electric

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INTRODUCTION

This instruction manual provides detailed information about the BE1-1051 Overcurrent Protection System with the Modbus™ Protocol.

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It is not the intention of this manual to cover all details and variations in equipment, nor does this manual provide data for every possible contingency regarding installation or operation. The availability and design of all features and options are subject to modification without notice. Should further information be required, contact Basler Electric.

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REVISION HISTORY

The following information provides a historical summary of the changes made to this instruction manual (9334800991). Revisions are listed in reverse chronological order.

Manual Revision and Date	Change
C, 09/09	• Added registers 40567 through 40590 for Inverse/Definite Timing settings for 27, 47, and 59 functions.
B, 03/08	• Added manual part number and revision to footers. • Split manual into sections.
A, 08/06	• Added Option 2 (# of Inputs/Outputs) to style number.
—, 08/02	• Initial release.

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SECTION 1 • GENERAL INFORMATION

INTRODUCTION

This document describes the Modbus™ communications protocol employed by BE1-1051 relays, and how to exchange information with BE1-1051 relays over a Modbus™ network. The BE1-1051 communicates by emulating a subset of the Modicon 984 Programmable Controller.

FUNCTIONAL DESCRIPTION

Modbus™ communications use a master-slave technique in which only the master can initiate a transaction. This transaction is called a query. When appropriate, a slave (BE1-1051) responds to the query. When a Modbus™ master communicates with a slave, information is provided or requested by the master. Information residing in the BE1-1051 is grouped categorically as follows:

Category

Session Parameters
Global Parameters
Control Parameters (Select Before Operate)
Setting Parameters
Report Parameters
Metering Parameters

All supported data can be read as specified in the register table. Abbreviations are used in the *Register Table* to indicate the register type. Register types are:

Read/Write = RW
Read Only = R -

Select Before Operate (SBO) functions are used to change active settings groups and control outputs. There are four settings groups in the BE1-1051, one of which may be selected as active using SBO commands.

When a slave receives a query, the slave responds by either supplying the requested data to the master or 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 BE1-1051 is designed to communicate on the Modbus™ only as a slave device.

A master can query slaves individually or universally. A universal (“broadcast”) query, when allowed, evokes no response from any slave device. If a query to an individual slave device requests actions unable to be performed by the slave, the slave response message contains an exception response code defining the error detected. Exception response codes are quite often enhanced by the information found in the “Error Details” block of holding registers.

Message Structure

Master initiated queries and BE1-1051 responses share the same message structure. Each message is comprised of four message fields. They are:

Device Address	(1 byte)
Function Code	(1 byte)
Data Block	(n bytes)
Error Check field	(2 bytes)

Device Address Field

The device address field contains the unique Modbus™ address of the slave being queried. The addressed slave repeats the address in the device address field of the response message. This field is 1 byte.

Although Modbus™ protocol limits a device address from 1 - 247, a BE1-1051 can be assigned a device address in the range of 1 - 65534. The address is user-selectable at installation, and can be altered during real-time operation.

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 is altered by setting the most significant bit (MSB) of the field to 1 if the response is an error response. This field is 1 byte.

The BE1-1051 maps all available data into the Modicon 984 holding register address space (4XXXX) and supports the following function codes.

- Function 03 (03 hex) - read holding registers
- Function 06 (06 hex) - preset single register (write single holding register)
- Function 08 (08 hex), subfunction 00 - diagnostics: return query data
- Function 08 (08 hex), subfunction 01 - diagnostics: restart communications option
- Function 08 (08 hex), subfunction 04 - diagnostics: force listen only mode
- Function 16 (10 hex) - preset multiple registers, non-broadcast and broadcast

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. See the paragraphs on *Register Definitions* in this manual for interpretation of data.

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 two transmission modes for communication: ASCII or remote terminal unit (RTU). The BE1-1051 supports only the RTU 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 one start bit and either one or two stop bits. Parity checking is performed, when enabled, and can be either odd or even. The transmission baud rate is user-selectable, and can be set at installation and altered during real-time operation. The BE1-1051 Modbus™ supported baud rates are 1200, 2400, 4800, 9600, and 19200. The factory default baud rate is 9600.

BE1-1051 supports both RS-232-C and RS-485 compatible serial interfaces. Both interfaces are accessible from the rear panel of the BE1-1051. The RS-232-C interfaces (front and rear) are configured for ASCII command mode while the RS-485 interface is configured for Modbus™ communication, when this option is installed. The sixth character (RS-485 port protocol) of the relay style number must be '1' for the relay to be configured for Modbus™.

Message Framing and Timing Considerations

When receiving a message, the BE1-1051 requires an inter-byte latency of 3.5 character times before considering the message complete.

Once a valid query is received, the BE1-1051 waits a specified amount of time before responding. This time delay is set in the remote delay time parameter with the SG-COM ASCII command. This parameter contains a value from 10 - 200 milliseconds. The default value is 10 milliseconds.

Table 1-1 provides the response message transmission time (in seconds) and 3.5 character times (in milliseconds) for various message lengths and baud rates.

Table 1-1. Timing Considerations

Baud Rate	3.5 character Time (msec)	Message Tx Time (Sec.)	
		128 Bytes	256 Bytes
2400	16.04	0.59	1.17
4800	8.021	0.29	0.59
9600	4.0104	0.15	0.29
19200	2.0052	0.07	0.15

Error Handling and Exception Responses

Any query received that contains a non-existent device address, a framing error, or CRC error is ignored. No response is transmitted. Queries addressed to a BE1-1051 with an unsupported function or illegal values in the data block result in an error response message with an exception response code. The exception response codes supported by the BE1-1051 are provided in Table 1-2.

Table 1-2. Supported 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.

COMMUNICATIONS HARDWARE REQUIREMENTS

The BE1-1051 RS-485 physical interface is three positions of a terminal strip with locations for Send/Receive A (A), Send/Receive B (B) and Signal Ground (C). Refer to the BE1-1051 Instruction Manual (9334800990) for further details.

DETAILED MESSAGE QUERY AND RESPONSE

A detailed description of BE1-1051 supported message queries and responses are provided in the following paragraphs.

Read Holding Registers

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. If the query is a broadcast (device address = 0), no response message is returned.

Device Address
Function Code = 03 (hex)
Starting Address Hi
Starting Address Lo
No. of Registers Hi
No. of Registers Lo
CRC Hi error check
CRC Lo error check

The number of registers cannot exceed 125 without causing an error response with the exception code for an illegal function.

Response

The response message contains the data queried. The data block contains the block length in bytes followed by the data (one Data Hi byte and one Data Lo byte) for each requested register.

Reading an unassigned holding register returns a value of zero.

Device Address
Function Code = 03 (hex)
Byte Count
Data Hi (For each requested register, there is one Data Hi and one Data Lo.)
Data Lo

.
.
Data Hi
Data Lo
CRC Hi error check
CRC Lo 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. If the query is a broadcast (device address = 0), no response message is returned.

Device Address	
Function Code =	08 (hex)
Subfunction Hi =	00 (hex)
Subfunction Lo =	00 (hex)
Data Hi =	xx (don't care)
Data Lo =	xx (don't care)
CRC Hi error check	
CRC Lo error check	

Restart Communications Option

This query causes the remote communications function of the BE1-1051 to restart, terminating an active listen only mode of operation. No effect is made upon primary relay operations. Only the remote communications function is affected. If the query is a broadcast (device address = 0), no response message is returned.

If the BE1-1051 receives this query while in the listen only mode, no response message is generated. Otherwise, a response message identical to the query message is transmitted prior to the communications restart.

Device Address	
Function Code =	08 (hex)
Subfunction Hi =	00 (hex)
Subfunction Lo =	01 (hex)
Data Hi =	xx (don't care)
Data Lo =	xx (don't care)
CRC Hi error check	
CRC Lo error check	

Listen Only Mode

This query forces the addressed BE1-1051 to the listen only mode for Modbus™ communications, isolating it from other devices on the network. No responses are returned.

While in the listen only mode, the BE1-1051 continues to monitor all queries. The BE1-1051 does not respond to any other query until the listen only mode is removed. All write requests with a query to Preset Multiple Registers (Function Code = 16) are also ignored. When the BE1-1051 receives the restart communications query, the listen only mode is removed.

Device Address	
Function Code =	08 (hex)
Subfunction Hi =	00 (hex)
Subfunction Lo =	04 (hex)
Data Hi =	xx (don't care)
Data Lo =	xx (don't care)
CRC Hi error check	
CRC Lo error check	

Preset Multiple Registers

A preset multiple registers query could address multiple registers in one slave or multiple slaves. If the query is a broadcast (device address = 0), no response message is returned.

Query

A Preset Multiple Register 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. The BE1-1051 will perform the write when the device address is the same as the BE1-1051's remote address or when the device address is 0. A device address is 0 for a broadcast query.

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

Data will cease to be written if any of the following exceptions occur.

- Queries to write to Read Only 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 to collectively represent a single numerical BE1-1051 data value (i.e., floating point data and 32-bit integer data). 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 unallowed 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 Hi error check
CRC Lo error check

Response

The response message echoes the starting address and the number of registers. There is no response message when the query is a broadcast (device address = 0).

Device Address
Function Code = 10 (hex)
Starting Address Hi
Starting Address Lo
No. of Registers Hi
No. of Registers Lo
CRC Hi Error Check
CRC Lo Error Check

Preset Single Register (Write Single Holding Register)

A Preset Single Register query message requests a single register to be written. The BE1-1051 will perform the write when the device address is the same as the BE1-1051's remote address.

Query

Data will cease to be written if any of the following exceptions occur.

- Queries to write to Read Only registers result in an error response with Exception Code of “Illegal Data Address”.
- A query to write an unallowed 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 Hi error check
CRC Lo error check

Response

The response message echoes the Query message after the register has been altered

DATA FORMATS

BE1-1051 data varies from one to four bytes in length. Single byte data resides in the holding register least-significant byte with the most-significant byte set to zero. Floating point data and long integer data (each 32-bit in length) place the two most-significant bytes in the higher holding register address of the associated register pair.

Floating Point Data Format (FP)

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 two's complement 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 1-3 shows the floating-point format.

Table 1-3. Floating Point Format

Sign	2's Complement Of (Exponent + 127)	Mantissa
1 Bit	8 Bits	23 Bits

The floating point format allows for values ranging from approximately $8.43X10^{-37}$ to $3.38X10^{38}$. 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.

Long Integer Data Format (LI)

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.

Integer Data Format (INT)

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.

Short Integer Data Format (SI)

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.

ASCII Character Data Format (ASC(1))

The Modbus™ ASCII character data format uses a single holding register to represent a single character value. The holding register high byte will always be zero with the ASCII character code in the low byte.

Example: The character 'D' represented in ASCII character format is hexadecimal 44. This number will read from a holding register as follows:

Holding Register		Value
K	(Hi Byte)	hex 00
K	(Lo Byte)	hex 44

The same byte alignments are required to write.

ASCII String Data Format (ASC(x))

The Modbus™ ASCII string data format uses one or more holding registers to represent a sequence, or string, of character values. If the string contains a single character, the holding register high byte will contain the ASCII character code and the low byte will be zero.

Example: The string "PASSWORD" represented in ASCII string format will read as follows:

Holding Register		Value
K	(Hi Byte)	'P'
K	(Lo Byte)	'A'
K+1	(Hi Byte)	'S'
K+1	(Lo Byte)	'S'
K+2	(Hi Byte)	'W'
K+2	(Lo Byte)	'O'
K+3	(Hi Byte)	'R'
K+3	(Lo Byte)	'D'

Example: If the above string is changed to “P”, the new string will read as follows:

Holding Register		Value
K	(Hi Byte)	‘P’
K	(Lo Byte)	hex 00
K+1	(Hi Byte)	hex 00
K+1	(Lo Byte)	hex 00
K+2	(Hi Byte)	hex 00
K+2	(Lo Byte)	hex 00
K+3	(Hi Byte)	hex 00
K+3	(Lo Byte)	hex 00

The same byte alignments are required to write.

Bit Mapped Data Format (BM(x))

The bit mapped data format uses two or more holding registers to represent a sequence of bit values. The Modbus™ Bit Map data format can represent an 8 bit, 16 bit, 32 bit or 64 bit value.

Example: The Bit Map value of the hexadecimal number 0x123456789ABCDEF0 using a BM64 format will read as follows:

Holding Register		Value
K	(Hi Byte)	0x12
K	(Lo Byte)	0x34
K+1	(Hi Byte)	0x56
K+1	(Lo Byte)	0x78
K+2	(Hi Byte)	0x9A
K+2	(Lo Byte)	0xBC
K+3	(Hi Byte)	0xDE
K+3	(Lo Byte)	0xF0

CRC Error Check

This field contains a two-byte CRC value for transmission error detection. The master first calculates the CRC and appends it to the query message. The BE1-1051 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. If no transmission error has occurred, the slave calculates a new CRC value for the response message and appends it to the message for transmission.

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 eight-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 eight times. The CRC-register MSB is zero-filled with each shift. After each shift, the CRC-register LSB is examined. If the LSB IS a 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.

Session Access Registers

The ACCESS REQUEST and the EXIT registers are used to access and release write privileges while changing relay settings, resetting report registers, or using control commands through the Modbus™ port. This feature is important because it prevents changes from being made concurrently from two areas. For example, a user cannot make changes from COM0 at the same time a remote user is making changes via Modbus™ from COM2.

Changing the settings through the Modbus™ port requires that the operator write to the ACCESS REQUEST register to obtain programming access. This must follow writing the ACCESS PASSWORD register(s) with a password to obtain access to change settings associated with the password. Different passwords give the ability or access to perform different operations. The relay will deny access if an invalid password is entered or if another user has already been granted programming access through another serial port or at the front panel. Only one user can have access at any one time.

If no password protection is used, it is still necessary to obtain access in order to protect against accidental changes. If password protection is disabled, then writing the ACCESS REQUEST register will

be accepted in place of a password. The relay will transmit a valid response message if the access query was received and executed. The relay will respond with an error message if the access query could not be executed.

Changing settings through a Modbus™ communication port consists of the following sequence:

Step 1. Preset Multiple Registers query to ACCESS PASSWORD register(s) to specify password.
Step 2. Preset Multiple Registers query to ACCESS REQUEST register to access write privileges.
Step 3. Preset Multiple Registers queries to change the current settings.
Step 4. Preset Multiple Registers query to EXIT register to clear access and save.

Changes are not made to the working settings but to a scratch-pad copy of the settings. After the change(s) are made, the new data will be copied to the working settings and saved to non-volatile memory when the EXIT register is written with a 'Y'. It is important to make all changes to relay parameters before writing the EXIT register. This prevents a partial or incomplete protection scheme from being implemented.

Template Registers

The BE1-1051 uses three templates. A template is a block of holding registers to which the user assigns one of a number of similar groups of parameters. Templates are used for settings groups, fault summaries, and report generation. Modbus Template Registers 40036 (Settings Group Selection), 40038 (Fault Number Selection), 40039 (Report Selection) and 40040 (Report Focus) DO NOT REQUIRE any Write Password Access level before they can be written to.

The BE1-1051 has four settings groups. The GRP template is assigned the parameters of a settings group. Therefore, before reading or writing settings group values, a user must first specify which settings group is to be associated with the template. This is accomplished by writing the desired settings group number (0-3) into the SETTINGS GROUP SELECTION Template holding register.

The BE1-1051 stores up to 16 faults. Each fault is accessed by its fault number which ranges from 1 to 255. The FLT template is assigned the parameters of a particular fault occurrence. Therefore, before reading fault summary values, a user must first specify which fault number is to be associated with the template. This is accomplished by writing the desired fault number (1-255) into the FAULT SELECTION Template holding register.

The BE1-1051 generates 10 ASCII reports. The RPT template is assigned the text of a report. Therefore, before reading report text, a user must first specify which report is to be associated with the template. This is accomplished by writing the desired report number into the REPORT SELECTION Template holding register along with the associated report identifier, if any, into the REPORT FOCUS Template holding register.

Fault Summary Registers

The user can enter any fault number (1 – 255) into the FAULT SELECTION Template holding register to associate summary parameters for that fault number with the FLT Template. The Fault Template Status register (47513) indicates whether or not that fault number specifies a recent fault (one of 12 stored faults). If so, the Fault Template Status register value is the fault number; otherwise, it is zero and all FLT template values will read zero.

The Fault Indicator register (47512) value is the fault number (1 – 255) of the most recent fault. The user may construct his front-end GUI to link this register value into the FAULT SELECTION Template holding register, thereby automatically associating the FLT template with the most recent fault occurrence.

Report Generation Registers

The BE1-1051 generates numerous ASCII reports available via serial commands. Several of these reports are available intact via the Modbus™ communication port. The desired report is first specified by writing the REPORT SELECTION holding register. If the report requires a number to be specified, such as a fault number or number of events, that number is written into the REPORT FOCUS holding register. The report is then available via the RPT template. The report can be read from 1 to 125 registers at a time, with each register containing 2 ASCII characters of information. The report read queries can be interspersed among other query types. The RPT template is continually re-read until the report has completed. Once the report is complete, reading from the RPT template will continually return the ASCII character code of 127 ("7F" hexadecimal). The report cannot be re-read or another report read until the REPORT SELECTION holding register is re-written.

Contiguous Poll Block Registers

The user may allocate up to 125 holding registers to the Contiguous Poll Block (49875-999). This allocation allows dispersed registers which are frequently read to be polled via a single read query. A register is assigned to a position in the Poll Block by writing its address value into the corresponding position in the Contiguous Poll Block Assignments registers (40746-870). Writing a zero value leaves that Poll Block position unassigned. Once assignments are made, the values of the assigned registers may be read by polling the Contiguous Poll Block. Polling an unassigned position will return a value of zero.

For example, if you wanted to continuously monitor the Date (47109), Time (47110-11), Fault Indicator (47512) and Breaker Status (47135) Holding Registers, you would first configure the **Contiguous Poll Block Registers by writing the desired register address values 7109, 7110, 7111, 7512 and 7135 into the** Contiguous Poll Block Assignment registers 40746 thru 40750, respectively. You may now begin monitoring the specified registers by reading the first 5 locations in the **Contiguous Poll Block; i.e., reading register 49875 for the Date (as specified in it's corresponding assignment register 40746), reading register 49876 and 77 for the Time (as specified in their corresponding assignment registers 40747 and 48), reading register 49878 for the Fault Indicator (as specified in it's corresponding assignment register 40749), and reading register 49879 for the Breaker Status (as specified in it's corresponding assignment register 40750).**

Exception Code Enhancement Registers

When a BE1-1051 responds to a Preset Multiple Register query with an error response message, additional information detailing the cause of the error may be available in the ERROR DETAILS block of holding registers (49835-54). The information is in ASCII format and available by reading the message string from the ERROR DETAILS block. The message remains available until the next Preset Multiple Register query is executed unless that query is to the FAULT SELECTION Template holding register. Since this register can be written automatically and randomly in time, the ERROR DETAILS block will not be updated

The ERROR DETAILS block will also contain the exit status following a Preset Multiple Register query to the EXIT (40001) register. You may clear the ERROR DETAILS message at any time without affecting system operation by sending a Preset Multiple Register query to any unassigned holding register.

SECTION 2 • REGISTER TABLE

MAPPING BE1-1051 PARAMETERS INTO MODICON HOLDING REGISTER ADDRESS SPACE

General

Parameters are mapped into the holding register address space (40001 – 49999) in blocks according to access type.

Any Holding Register not listed in the Register Table is an unassigned Holding Register. A value of zero always results when reading an unassigned Holding Register. Writes to unassigned Holding Registers are legal, but no action will be taken (the write is ignored).

Conventions

The Data Format column uses the following abbreviations.

ASC(x) - ASCII string, where x = the maximum defined string length
BM(x) - Bit-map, where x = the number of related bits
FP - Floating point
INT - Integer (16-bit integer)
LI - Long Integer (32-bit integer)
SI - Short Integer (8-bit integer)

The *Notes* column uses the following abbreviations:

GRP - Group Template Member
FLT - Fault Template Member
RPT - Report Template Member

NS - Not Supported
TS - Time Stamp format: MSEC of the day (0 to 86,400,000 msec) and DAYs since 01/01/1984.
NOPW - Password Access is not required

REGISTER TABLE – ORDERED BY REGISTER NUMBER

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
Session Parameters				
40001	Exit	R W	ASC(1)	NOPW
40002-05	Access Password	R W	ASC(8)	NOPW
40006	Access Request	R W	BM(16)	NOPW
Template Parameters				
40036	Settings Group Selection	R W	SI	NOPW
40038	Fault Selection	R W	SI	NOPW
40039	Report Selection	R W	SI	NOPW
40040	Report Focus	R W	INT	NOPW
Global Parameters				
40080-83	Global Password	R W	ASC(8)	
40084	Global Path	R W	BM(8)	
40085-88	Setting Password	R W	ASC(8)	
40089	Setting Path	R W	BM(8)	
40090-93	Control Password	R W	ASC(8)	
40094	Control Path	R W	BM(8)	
40095-98	Report Password	R W	ASC(8)	
40099	Report Path	R W	BM(8)	
40100	PW Timeout	RW	INT	
Control Parameters				
40117	Select Group	R W	ASC(1)	
40118	Operate Group	R W	ASC(1)	
40119	Select Virtual Selector Switch 43	R W	ASC(1)	
40120	Operate Virtual Selector Switch 43	R W	ASC(1)	
40121	Select Virtual Selector Switch 143	R W	ASC(1)	
40122	Operate Virtual Selector Switch 143	R W	ASC(1)	
40123	Select Virtual Selector Switch 243	R W	ASC(1)	
40124	Operate Virtual Selector Switch 243	R W	ASC(1)	
40125	Select Virtual Selector Switch 343	R W	ASC(1)	
40126	Operate Virtual Selector Switch 343	R W	ASC(1)	
40127	Select Virtual Selector Switch 443	R W	ASC(1)	
40128	Operate Virtual Selector Switch 443	R W	ASC(1)	
40135	Select 101 Virtual Breaker Control Switch	R W	ASC(1)	
40136	Operate 101 Virtual Breaker Control Switch	R W	ASC(1)	
40137	Select All Outputs	R W	ASC(1)	
40138	Operate All Outputs	R W	ASC(1)	
40139	Select Output A	R W	ASC(1)	
40140	Operate Output A	R W	ASC(1)	
40141	Select Output 1	R W	ASC(1)	
40142	Operate Output 1	R W	ASC(1)	
40143	Select Output 2	R W	ASC(1)	
40144	Operate Output 2	R W	ASC(1)	
40145	Select Output 3	R W	ASC(1)	
40146	Operate Output 3	R W	ASC(1)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
40147	Select Output 4	R W	ASC(1)	
40148	Operate Output 4	R W	ASC(1)	
40149	Select Output 5	R W	ASC(1)	
40150	Operate Output 5	R W	ASC(1)	
40151	Select Output 6	R W	ASC(1)	
40152	Operate Output 6	R W	ASC(1)	
40157	Select 43TAG	R W	ASC(1)	
40158	Operate 43TAG	R W	ASC(1)	
40159	Select 143TAG	R W	ASC(1)	
40160	Operate 143TAG	R W	ASC(1)	
40161	Select 243TAG	R W	ASC(1)	
40162	Operate 243TAG	R W	ASC(1)	
40163	Select 343TAG	R W	ASC(1)	
40164	Operate 343TAG	R W	ASC(1)	
40165	Select 443TAG	R W	ASC(1)	
40166	Operate 443TAG	R W	ASC(1)	
40171	Select Close Tag	R W	ASC(1)	
40172	Operate Close Tag	R W	ASC(1)	
40173	Select Trip Tag	R W	ASC(1)	
40174	Operate Trip Tag	R W	ASC(1)	
40175	Select VTS	R W	ASC(1)	
40176	Operate VTS	R W	ASC(1)	

Group Setting Parameters

The following is the Group Template (GRP)

40259-60	50TP Pickup	R W	FP	GRP
40261-62	50TP Time Delay	R W	LI	GRP
40263	50TP Directional Mode	R W	ASC(1)	GRP
40264-65	50TN Pickup	R W	FP	GRP
40266-67	50TN Time Delay	R W	LI	GRP
40268	50TN Directional Mode	R W	ASC(1)	GRP
40269-70	50TQ Pickup	R W	FP	GRP
40271-72	50TQ Time Delay	R W	LI	GRP
40273	50TQ Directional Mode	R W	ASC(1)	GRP
40274-75	150TP Pickup	R W	FP	GRP
40276-77	150TP Time Delay	R W	LI	GRP
40278	150TP Directional Mode	R W	ASC(1)	GRP
40279-80	150TN Pickup	R W	FP	GRP
40281-82	150TN Time Delay	R W	LI	GRP
40283	150TN Directional Mode	R W	ASC(1)	GRP
40284-85	150TQ Pickup	R W	FP	GRP
40286-87	150TQ Time Delay	R W	LI	GRP
40288	150TQ Directional Mode	R W	ASC(1)	GRP
40301-02	51P Pickup	R W	FP	GRP
40303-04	51P Time Dial	R W	FP	GRP
40305-06	51P Curve Type	R W	ASC(3)	GRP
40307	51P Directional Mode	R W	ASC(1)	GRP

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
40308-09	51N Pickup	R W	FP	GRP
40310-11	51N Time Dial	R W	FP	GRP
40312-13	51N Curve Type	R W	ASC(3)	GRP
40314	51N Directional Mode	R W	ASC(1)	GRP
40315-16	51Q Pickup	R W	FP	GRP
40317-18	51Q Time Dial	R W	FP	GRP
40319-20	51Q Curve Type	R W	ASC(3)	GRP
40321	51Q Directional Mode	R W	ASC(1)	GRP
40322-23	151N Pickup	R W	FP	GRP
40324-25	151N Time Dial	R W	FP	GRP
40326-27	151N Curve Type	R W	ASC(3)	GRP
40328	151N Directional Mode	R W	ASC(1)	GRP
40359-60	62 Time Delay 1	R W	LI	GRP
40361-62	62 Time Delay 2	R W	LI	GRP
40363-64	162 Time Delay 1	R W	LI	GRP
40365-66	162 Time Delay 2	R W	LI	GRP
40406-07	79 First Automatic Reclose Delay	R W	LI	GRP
40408-09	79 Second Automatic Reclose Delay	R W	LI	GRP
40410-11	79 Third Automatic Reclose Delay	R W	LI	GRP
40412-13	79 Fourth Automatic Reclose Delay	R W	LI	GRP
40414-15	79 Reset Time Delay	R W	LI	GRP
40416-17	79 Reclose Fail Time Delay	R W	LI	GRP
40418-19	79 Maximum Cycle Time Delay	R W	LI	GRP
40420-21	79 Pilot Time Delay	R W	LI	GRP
40422	79 Block Output	R W	BM(16)	GRP
40425-26	27R Pickup	R W	FP	GRP
40427	27R Control Mode	R W	ASC(1)	GRP
40428-29	47 Pickup	R W	FP	GRP
40430-31	47 Time Delay	R W	LI	GRP
40432-33	59 Pickup	R W	FP	GRP
40434-35	59 Time Delay	R W	LI	GRP
40436-37	59X Pickup	R W	FP	GRP
40438-39	59X Time Delay	R W	LI	GRP
40440-41	81 Pickup	R W	FP	GRP
40442-43	81 Time Delay	R W	LI	GRP
40444	81 Mode	R W	ASC(1)	GRP
40445-46	181 Pickup	R W	FP	GRP
40447-48	181 Time Delay	R W	LI	GRP
40449	181 Mode	R W	ASC(1)	GRP
40450-51	281 Pickup	R W	FP	GRP
40452-53	281 Time Delay	R W	LI	GRP
40454	281 Mode	R W	ASC(1)	GRP
40455-56	381 Pickup	R W	FP	GRP
40457-58	381 Time Delay	R W	LI	GRP
40459	381 Mode	R W	ASC(1)	GRP

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
40460-61	481 Pickup	R W	FP	GRP
40462-63	481 Time Delay	R W	LI	GRP
40464	481 Mode	R W	ASC(1)	GRP
40465-66	581 Pickup	R W	FP	GRP
40467-68	581 Time Delay	R W	LI	GRP
40469	581 Mode	R W	ASC(1)	GRP
40470-71	81 Inhibit Setting	R W	FP	GRP
40472-73	27P Pickup	R W	FP	GRP
40474-75	27P Time Delay	R W	LI	GRP
40476-77	27P Inhibit Voltage	R W	FP	GRP
40478-79	27X Pickup	R W	FP	GRP
40480-81	27X Time Delay	R W	LI	GRP
40482-83	27X Inhibit Voltage	R W	FP	GRP
40484-85	24 Pickup	R W	FP	GRP
40486-87	24 Time Delay	R W	FP	GRP
40488-89	24 Reset Delay	R W	FP	GRP
40490-91	25 Volts	R W	FP	GRP
40492-93	25 Angle	R W	FP	GRP
40494-95	25 Slip	R W	FP	GRP
40496	25 Mode	R W	INT	GRP
40497-98	25VM Live Volts	R W	FP	GRP
40499-500	25VM Dead Volts	R W	FP	GRP
40501-02	25VM Time Delay	R W	LI	GRP
40503-04	25VM Mode1	R W	ASC(3)	GRP
40505-06	25VM Mode2	R W	ASC(3)	GRP
40507-08	67 Neutral Polarizing Mode	R W	ASC(3)	GRP
40509-10	67 Neutral Polarizing Qty	R W	ASC(4)	GRP
40511-12	32 Pickup	R W	FP	GRP
40513-14	32 Time Delay	R W	LI	GRP
40515	32 Mode	R W	ASC(1)	GRP
40516-17	132 Pickup	R W	FP	GRP
40518-19	132 Time Delay	R W	LI	GRP
40520	132 Mode	R W	ASC(1)	GRP
40523-24	50BF Time Delay	R W	LI	GRP
40525-26	50BF Phase pu	R W	FP	GRP
40527-28	50BF Neutral pu	R W	FP	GRP
40529-30	50BF Ctrl Time Delay	R W	LI	GRP
40531-32	52BT 27P3PU	R W	FP	GRP
50533	EN_52B	R W	INT	GRP
50534	EN_27P3	R W	INT	GRP
40535-36	52BD Time Delay	R W	LI	GRP
40539-40	159X Pickup	R W	FP	GRP
40541-42	159X Time Delay	R W	LI	GRP

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
40545-46	P85Z3RBD Time	R W	LI	GRP
40547-48	P85EBD Time	R W	LI	GRP
40549-50	P85ETDPU Time	R W	LI	GRP
40551-52	P85EDU Time	R W	LI	GRP
40553-54	SOTF 50TP Pickup	R W	FP	GRP
40555-56	SOTF Time Delay	R W	LI	GRP
40557-58	Load Encroachment Mode	R W	FP	GRP
40559-60	Maximum Load PF Forward Power Leading	R W	FP	GRP
40561-62	Maximum Load PF Forward Power Lagging	R W	FP	GRP
40563-64	Maximum Load PF Reverse Power Leading	R W	FP	GRP
40565-66	Maximum Load PF Reverse Power Lagging	R W	FP	GRP
40567-68	27P Timing Mode	R W	ASC(3)	GRP
40569-70	27P Time Dial	R W	FP	GRP
40571-72	27X Timing Mode	R W	ASC(3)	GRP
40573-74	27X Time Dial	R W	FP	GRP
40575-76	47 Timing Mode	R W	ASC(3)	GRP
40577-78	47 Time Dial	R W	FP	GRP
40579-80	59P Timing Mode	R W	ASC(3)	GRP
40581-82	59P Time Dial	R W	FP	GRP
40583-84	59X Timing Mode	R W	ASC(3)	GRP
40585-86	59X Time Dial	R W	FP	GRP
40587-88	159X Timing Mode	R W	ASC(3)	GRP
40589-90	159X Time Dial	R W	FP	GRP
Global Setting Parameters				
40602-03	Power System Nominal Voltage	R W	FP	
40604-05	Power System Nominal Current	R W	FP	
40608-09	Programmable 51 Curve Constant A	R W	FP	
40610-11	Programmable 51 Curve Constant B	R W	FP	
40612-13	Programmable 51 Curve Constant C	R W	FP	
40614-15	Programmable 51 Curve Constant N	R W	FP	
40616-17	Programmable 51 Curve Constant R	R W	FP	
40618	Input 1 Contact Recognition Time Delay	R W	SI	
40619	Input 1 Contact Debounce Time Delay	R W	SI	
40620	Input 2 Contact Recognition Time Delay	R W	SI	
40621	Input 2 Contact Debounce Time Delay	R W	SI	
40622	Input 3 Contact Recognition Time Delay	R W	SI	
40623	Input 3 Contact Debounce Time Delay	R W	SI	
40624	Input 4 Contact Recognition Time Delay	R W	SI	
40625	Input 4 Contact Debounce Time Delay	R W	SI	
40626	Input 5 Contact Recognition Time Delay	R W	SI	
40627	Input 5 Contact Debounce Time Delay	R W	SI	
40628	Input 6 Contact Recognition Time Delay	R W	SI	
40629	Input 6 Contact Debounce Time Delay	R W	SI	
40630	Input 7 Contact Recognition Time Delay	R W	SI	
40631	Input 7 Contact Debounce Time Delay	R W	SI	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
40632	Input 8 Contact Recognition Time Delay	R W	SI	
40633	Input 8 Contact Debounce Time Delay	R W	SI	
40634	DSP Filter Type	R –	ASC(1)	
40635	Virtual Test Switch Timeout	RW	INT	
40746-870	Contiguous Poll Block Assignments	R W	INT	
40871	Setting Group Control On Time	R W	INT	
40872	Setting Group 1 Automatic Control Switch Time	R W	SI	
40873	Setting Group 1 Automatic Control Switch Level	R W	SI	
40874	Setting Group 1 Automatic Control Return Time	R W	SI	
40875	Setting Group 1 Automatic Control Return Leve	R W	SI	
40876	Setting Group 1 Tracking Element	R W	INT	
40877	Setting Group 2 Automatic Control Switch Time	R W	SI	
40878	Setting Group 2 Automatic Control Switch Level	R W	SI	
40879	Setting Group 2 Automatic Control Return Time	R W	SI	
40880	Setting Group 2 Automatic Control Return Level	R W	SI	
40881	Setting Group 2 Tracking Element	R W	INT	
40882	Setting Group 3 Automatic Control Switch Time	R W	SI	
40883	Setting Group 3 Automatic Control Switch Level	R W	SI	
40884	Setting Group 3 Automatic Control Return Time	R W	SI	
40885	Setting Group 3 Automatic Control Return Level	R W	SI	
40886	Setting Group 3 Tracking Element	R W	INT	
40887-92	79 Zone Sequence Logic Mask	R W	BM(128)	
40895-902	79 Zone Sequence Logic Term	R W	BM(128)	
40903-04	60FL Loss of Potential Current Auto Block Setting	R W	ASC(3)	
40905-06	60FL Loss of Potential Voltage Auto Block Setting	R W	ASC(3)	
Serial Port Setting Parameters				
40962	Serial Port 0 Baud Rate	R W	INT	
40964	Serial Port 0 Software Flow Control	R W	SI	
40965	Serial Port 0 Page Length	R W	SI	
40966	Serial Port 0 Acknowledgement Format	R W	SI	
40971	Serial Port 1 Baud Rate	R W	INT	
40972	Serial Port 1 Relay Address	R W	INT	
40973	Serial Port 1 Software Flow Control	R W	SI	
40974	Serial Port 1 Page Length	R W	SI	
40975	Serial Port 1 Acknowledgement Format	R W	SI	
40980	Serial Port 2 Baud Rate	R W	INT	
40981	Serial Port 2 Relay Address	R W	INT	
40986	Serial Port 2 Modbus™ Parity	R W	SI	
40987	Serial Port 2 Modbus™ Remote Delay	R W	SI	
40988	Serial Port 2 Modbus™ Stop Bits	R W	SI	
40989	Serial Port 2 Modbus™ Password Security	R W	SI	
System Data Setting Parameters				
41018	System Frequency	R W	SI	
41019-20	Phase Rotation	R W	ASC(3)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
41021	Phase CT Ratio	R W	INT	
41022	Ground CT Ratio	R W	INT	
41033-34	Phase VT Ratio	R W	FP	
41035-36	27/59 Voltage Sensing Mode	R W	ASC(3)	
41037-38	51/27R Voltage Sensing Mode	R W	ASC(3)	
41039-40	VT Connection	R W	ASC(3)	
41041-42	Auxiliary VT Ratio	R W	FP	
41043-44	VT Auxiliary Connection	R W	ASC(3)	
41045	Load Profile Interval	R W	INT	
41046-47	Power Line - Z1 Impedance	R W	FP	
41048-49	Power Line - Z1 Angle	R W	FP	
41050-51	Power Line - Z0 Impedance	R W	FP	
41052-53	Power Line - Z0 Angle	R W	FP	
41054-55	Power Line - Line Length	R W	FP	
41056	No of Oscillography Records	R W	INT	
Breaker Duty Setting Parameters				
41092-93	Breaker Duty Type	R W	SI	
41094-95	Maximum Breaker Duty	R W	FP	
41096	Programmable Breaker Alarm #1 Mode	R W	INT	
41097-98	Programmable Breaker Alarm #1 Limit	R W	FP	
41099	Programmable Breaker Alarm #2 Mode	R W	INT	
41100-01	Programmable Breaker Alarm #2 Limit	R W	FP	
41102	Programmable Breaker Alarm #3 Mode	R W	INT	
41103-04	Programmable Breaker Alarm #3 Limit	R W	FP	
41110-15	Breaker Block Logic Mask	R W	BM(128)	
41118-23	Breaker Block Logic Term	R W	BM(128)	
41126-31	Breaker Close Logic Mask	R W	BM(128)	
41134-39	Breaker Close Logic Term	R W	BM(128)	
Relay Data Setting Parameters				
41227	Volts / Hertz Alarm Setting	R W	INT	
41228	Under Voltage Alarm Setting	R W	INT	
41229	Over Voltage Alarm Setting	R W	INT	
41231-32	Forward Var Demand Alarm Level	R W	FP	
41233-34	Reverse Var Demand Alarm Level	R W	FP	
41235-36	Forward Watt Demand Alarm Level	R W	FP	
41237-38	Reverse Watt Demand Alarm Level	R W	FP	
41239	Phase Demand Alarm Level	R W	INT	
41240	Neutral Demand Alarm Level	R W	INT	
41241	Negative Sequence Demand Alarm Level	R W	INT	
41242	Ground Current Demand Alarm Level	R W	INT	
41243	Average Current Demand Alarm Level	R W	INT	
41245	Phase Voltage Max Demand Alarm Level	R W	INT	
41246	Neutral Voltage Max Demand Alarm Level	R W	INT	
41247	Average Voltage Max Demand Alarm Level	R W	INT	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
41248	Phase Voltage Min Demand Alarm Level	R W	INT	
41249	Neutral Voltage Min Demand Alarm Level	R W	INT	
41250	Average Voltage Min Demand Alarm Level	R W	INT	
41252	Clock Format – Date	R W	ASC(1)	
41253	Clock Format – Time	R W	SI	
41254	Clock Format – Daylight Savings	R W	SI	
41255	Phase Demand Interval	R W	SI	
41256	Neutral Demand Interval	R W	SI	
41257	Negative Sequence Demand Interval	R W	SI	
41258	Demand Calculation Method	R W	ASC(1)	
41264	Output Hold Mask	R W	BM(8)	
41267-70	Target Mask	R W	BM(64)	
41271-74	Programmable Screen #1	R W	ASC(7)	
41275-78	Programmable Screen #2	R W	ASC(7)	
41279-82	Programmable Screen #3	R W	ASC(7)	
41283-86	Programmable Screen #4	R W	ASC(7)	
41287-90	Programmable Screen #5	R W	ASC(7)	
41291-94	Programmable Screen #6	R W	ASC(7)	
41295-98	Programmable Screen #7	R W	ASC(7)	
41299-302	Programmable Screen #8	R W	ASC(7)	
41303-06	Programmable Screen #9	R W	ASC(7)	
41307-10	Programmable Screen #10	R W	ASC(7)	
41311-14	Programmable Screen #11	R W	ASC(7)	
41315-18	Programmable Screen #12	R W	ASC(7)	
41319-22	Programmable Screen #13	R W	ASC(7)	
41323-26	Programmable Screen #14	R W	ASC(7)	
41327-30	Programmable Screen #15	R W	ASC(7)	
41331-34	Programmable Screen #16	R W	ASC(7)	
41335-42	Fault Record Trigger (Trip) Logic Mask	R W	BM(128)	
41343-50	Fault Record Trigger (Trip) Logic Term	R W	BM(128)	
41351-58	Fault Record Trigger (Pickup) Logic Mask	R W	BM(128)	
41359-66	Fault Record Trigger (Pickup) Logic Term	R W	BM(128)	
41367-74	Fault Record Trigger (Logic) Logic Mask	R W	BM(128)	
41375-82	Fault Record Trigger (Logic) Logic Term	R W	BM(128)	
41383-90	Fault Record Trigger (Close) Logic Mask	R W	BM(128)	
41391-98	Fault Record Trigger (Close) Logic Term	R W	BM(128)	
41415-22	Reset Target Logic Mask	R W	BM(128)	
41423-30	Reset Target Logic Term	R W	BM(128)	
41431-38	Reset Alarm Logic Mask	R W	BM(128)	
41439-46	Reset Alarm Logic Term	R W	BM(128)	
41447-50	Major Alarm Mask	R W	BM(64)	
41451-54	Minor Alarm Mask	R W	BM(64)	
41455-58	Logic Alarm Mask	R W	BM(64)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
Custom Logic Setting Parameters				
41465-68	User Custom Logic Name	R W	ASC(8)	
41469-72	Current Active Logic Scheme	R –	ASC(8)	
41473-76	Custom Logic Name	R –	ASC(8)	
41477-80	Standard Logic #1 Name	R –	ASC(8)	
41481-84	Standard Logic #2 Name	R –	ASC(8)	
41485-88	Standard Logic #3 Name	R –	ASC(8)	
41489-92	Standard Logic #4 Name	R –	ASC(8)	
41493-96	Standard Logic #5 Name	R –	ASC(8)	
41497-500	Standard Logic #6 Name	R –	ASC(8)	
41501-04	Standard Logic #7 Name	R –	ASC(8)	
41505	Programmable 50TP Logic Mode	R W	INT	
41506-13	Programmable 50TP Block Logic Mask	R W	BM(128)	
41514-21	Programmable 50TP Block Logic Term	R W	BM(128)	
41522	Programmable 50TN Logic Mode	R W	INT	
41523-30	Programmable 50TN Block Logic Mask	R W	BM(128)	
41531-38	Programmable 50TN Block Logic Term	R W	BM(128)	
41539	Programmable 50TQ Logic Mode	R W	INT	
41540-47	Programmable 50TQ Block Logic Mask	R W	BM(128)	
41548-55	Programmable 50TQ Block Logic Term	R W	BM(128)	
41556	Programmable 150TP Logic Mode	R W	INT	
41557-64	Programmable 150TP Block Logic Mask	R W	BM(128)	
41565-72	Programmable 150TP Block Logic Term	R W	BM(128)	
41573	Programmable 150TN Logic Mode	R W	INT	
41574-81	Programmable 150TN Block Logic Mask	R W	BM(128)	
41582-89	Programmable 150TN Block Logic Term	R W	BM(128)	
41590	Programmable 150TQ Logic Mode	R W	INT	
41591-98	Programmable 150TQ Block Logic Mask	R W	BM(128)	
41599-606	Programmable 150TQ Block Logic Term	R W	BM(128)	
41607	Programmable SOTF Logic Mode	R W	INT	
41608-15	Programmable SOTF Trip Logic Mask	R W	BM(128)	
41616-23	Programmable SOTF Trip Logic Term	R W	BM(128)	
41624-31	Programmable SOTF Block Logic Mask	R W	BM(128)	
41632-39	Programmable SOTF Block Logic Term	R W	BM(128)	
41640	Programmable Breaker Fail Logic Mode	R W	INT	
41641-48	Programmable Breaker Fail Initiate Logic Mask	R W	BM(128)	
41644-56	Programmable Breaker Fail Initiate Logic Term	R W	BM(128)	
41657-64	Programmable Breaker Fail Block Logic Mask	R W	BM(128)	
41665-72	Programmable Breaker Fail Block Logic Term	R W	BM(128)	
41673-80	Programmable Breaker Fail 52 Initiate Logic Mask	R W	BM(128)	
41681-88	Programmable Breaker Fail 52 Initiate Logic Term	R W	BM(128)	
41689-96	Programmable Breaker Fail 52 Status Logic Mask	R W	BM(128)	
41697-704	Programmable Breaker Fail 52 Status Logic Term	R W	BM(128)	
41705	Programmable 51P Logic Mode	R W	INT	
41706-13	Programmable 51P Block Logic Mask	R W	BM(128)	
41714-21	Programmable 51P Block Logic Term	R W	BM(128)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
41722	Programmable 51N Logic Mode	R W	INT	
41723-30	Programmable 51N Block Logic Mask	R W	BM(128)	
41731-38	Programmable 51N Block Logic Term	R W	BM(128)	
41739	Programmable 51Q Logic Mode	R W	INT	
41740-47	Programmable 51Q Block Logic Mask	R W	BM(128)	
41748-55	Programmable 51Q Block Logic Term	R W	BM(128)	
41759	Programmable 151N Logic Mode	R W	INT	
41760-67	Programmable 151N Block Logic Mask	R W	BM(128)	
41768-75	Programmable 151N Block Logic Term	R W	BM(128)	
41844	Programmable 62 Timer Logic Mode	R W	INT	
41845-52	Programmable 62 Timer Start Logic Mask	R W	BM(128)	
41853-60	Programmable 62 Timer Start Logic Term	R W	BM(128)	
41861-68	Programmable 62 Timer Block Logic Mask	R W	BM(128)	
41869-76	Programmable 62 Timer Block Logic Term	R W	BM(128)	
41877	Programmable 162 Timer Logic Mode	R W	INT	
41878-85	Programmable 162 Timer Start Logic Mask	R W	BM(128)	
41886-93	Programmable 162 Timer Start Logic Term	R W	BM(128)	
41894-901	Programmable 162 Timer Block Logic Mask	R W	BM(128)	
41902-09	Programmable 162 Timer Block Logic Term	R W	BM(128)	
41910	Programmable 27P Logic Mode	R W	INT	
41911-18	Programmable 27P Block Logic Mask	R W	BM(128)	
41919-26	Programmable 27P Block Logic Term	R W	BM(128)	
41927	Programmable 27X Logic Mode	R W	INT	
41928-35	Programmable 27X Block Logic Mask	R W	BM(128)	
41936-43	Programmable 27X Block Logic Term	R W	BM(128)	
41944	Programmable 59P Logic Mode	R W	INT	
41945-52	Programmable 59P Block Logic Mask	R W	BM(128)	
41953-60	Programmable 59P Block Logic Term	R W	BM(128)	
41961	Programmable 59X Logic Mode	R W	INT	
41962-69	Programmable 59X Block Logic Mask	R W	BM(128)	
41970-77	Programmable 59X Block Logic Term	R W	BM(128)	
41978	Programmable 159X Logic Mode	R W	INT	
41979-86	Programmable 159X Block Logic Mask	R W	BM(128)	
41987-94	Programmable 159X Block Logic Term	R W	BM(128)	
42010	Programmable Settings Group Logic Mode	R W	INT	
42011-18	Programmable Settings Group Auto Logic Mask	R W	BM(128)	
42019-26	Programmable Settings Group Auto Logic Term	R W	BM(128)	
42027-34	Programmable Settings Group0 Select Logic Mask	R W	BM(128)	
42035-42	Programmable Settings Group0 Select Logic Term	R W	BM(128)	
42043-50	Programmable Settings Group1 Select Logic Mask	R W	BM(128)	
42051-58	Programmable Settings Group1 Select Logic Term	R W	BM(128)	
42059-66	Programmable Settings Group2 Select Logic Mask	R W	BM(128)	
42067-74	Programmable Settings Group2 Select Logic Term	R W	BM(128)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
42075-82	Programmable Settings Group3 Select Logic Mask	R W	BM(128)	
42083-90	Programmable Settings Group3 Select Logic Term	R W	BM(128)	
42091	Programmable 43 Virtual Switch Logic Mode	R W	INT	
42092	Programmable 143 Virtual Switch Logic Mode	R W	INT	
42093	Programmable 243 Virtual Switch Logic Mode	R W	INT	
42094	Programmable 343 Virtual Switch Logic Mode	R W	INT	
42095	Programmable 443 Virtual Switch Logic Mode	R W	INT	
42099	Programmable 101 Virtual Breaker Control Logic Mode	R W	INT	
42100	Programmable Circuit Monitor Logic Mode	R W	SI	
42101-08	Programmable Circuit Monitor Logic Mask	R W	BM(128)	
42109-16	Programmable Circuit Monitor Logic Term	R W	BM(128)	
42117-24	Programmable Circuit Monitor Status Logic Mask	R W	BM(128)	
42125-32	Programmable Circuit Monitor Status Logic Term	R W	BM(128)	
42149	Programmable Virtual Output A Term Count	R W	SI	
42150-57	Programmable Virtual Output A Logic Mask 1	R W	BM(128)	
42158-65	Programmable Virtual Output A Logic Term 1	R W	BM(128)	
42166-73	Programmable Virtual Output A Logic Mask 2	R W	BM(128)	
42174-81	Programmable Virtual Output A Logic Term 2	R W	BM(128)	
42182-89	Programmable Virtual Output A Logic Mask 3	R W	BM(128)	
42190-97	Programmable Virtual Output A Logic Term 3	R W	BM(128)	
42198-205	Programmable Virtual Output A Logic Mask 4	R W	BM(128)	
42206-13	Programmable Virtual Output A Logic Term 4	R W	BM(128)	
42214	Programmable Virtual Output 1 Term Count	R W	SI	
42215-22	Programmable Virtual Output 1 Logic Mask 1	R W	BM(128)	
42223-30	Programmable Virtual Output 1 Logic Term 1	R W	BM(128)	
42231-38	Programmable Virtual Output 1 Logic Mask 2	R W	BM(128)	
42239-46	Programmable Virtual Output 1 Logic Term 2	R W	BM(128)	
42247-54	Programmable Virtual Output 1 Logic Mask 3	R W	BM(128)	
42255-62	Programmable Virtual Output 1 Logic Term 3	R W	BM(128)	
42263-70	Programmable Virtual Output 1 Logic Mask 4	R W	BM(128)	
42271-78	Programmable Virtual Output 1 Logic Term 4	R W	BM(128)	
42279	Programmable Virtual Output 2 Term Count	R W	SI	
42280-87	Programmable Virtual Output 2 Logic Mask 1	R W	BM(128)	
42288-95	Programmable Virtual Output 2 Logic Term 1	R W	BM(128)	
42296-303	Programmable Virtual Output 2 Logic Mask 2	R W	BM(128)	
42304-11	Programmable Virtual Output 2 Logic Term 2	R W	BM(128)	
42312-19	Programmable Virtual Output 2 Logic Mask 3	R W	BM(128)	
42320-27	Programmable Virtual Output 2 Logic Term 3	R W	BM(128)	
42328-35	Programmable Virtual Output 2 Logic Mask 4	R W	BM(128)	
42336-43	Programmable Virtual Output 2 Logic Term 4	R W	BM(128)	
42344	Programmable Virtual Output 3 Term Count	R W	SI	
42345-52	Programmable Virtual Output 3 Logic Mask 1	R W	BM(128)	
42353-60	Programmable Virtual Output 3 Logic Term 1	R W	BM(128)	
42361-68	Programmable Virtual Output 3 Logic Mask 2	R W	BM(128)	
42369-76	Programmable Virtual Output 3 Logic Term 2	R W	BM(128)	
42377-84	Programmable Virtual Output 3 Logic Mask 3	R W	BM(128)	
42385-92	Programmable Virtual Output 3 Logic Term 3	R W	BM(128)	
42393-400	Programmable Virtual Output 3 Logic Mask 4	R W	BM(128)	
42401-08	Programmable Virtual Output 3 Logic Term 4	R W	BM(128)	
42409	Programmable Virtual Output 4 Term Count	R W	SI	
42410-17	Programmable Virtual Output 4 Logic Mask 1	R W	BM(128)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
42418-25	Programmable Virtual Output 4 Logic Term 1	R W	BM(128)	
42426-33	Programmable Virtual Output 4 Logic Mask 2	R W	BM(128)	
42434-41	Programmable Virtual Output 4 Logic Term 2	R W	BM(128)	
42442-49	Programmable Virtual Output 4 Logic Mask 3	R W	BM(128)	
42450-57	Programmable Virtual Output 4 Logic Term 3	R W	BM(128)	
42458-65	Programmable Virtual Output 4 Logic Mask 4	R W	BM(128)	
42466-73	Programmable Virtual Output 4 Logic Term 4	R W	BM(128)	
42474	Programmable Virtual Output 5 Term Count	R W	SI	
42475-82	Programmable Virtual Output 5 Logic Mask 1	R W	BM(128)	
42483-90	Programmable Virtual Output 5 Logic Term 1	R W	BM(128)	
42491-98	Programmable Virtual Output 5 Logic Mask 2	R W	BM(128)	
42499-506	Programmable Virtual Output 5 Logic Term 2	R W	BM(128)	
42507-14	Programmable Virtual Output 5 Logic Mask 3	R W	BM(128)	
42515-22	Programmable Virtual Output 5 Logic Term 3	R W	BM(128)	
42523-30	Programmable Virtual Output 5 Logic Mask 4	R W	BM(128)	
42531-38	Programmable Virtual Output 5 Logic Term 4	R W	BM(128)	
42539	Programmable Virtual Output 6 Term Count	R W	SI	
42540-47	Programmable Virtual Output 6 Logic Mask 1	R W	BM(128)	
42548-55	Programmable Virtual Output 6 Logic Term 1	R W	BM(128)	
42556-63	Programmable Virtual Output 6 Logic Mask 2	R W	BM(128)	
42564-71	Programmable Virtual Output 6 Logic Term 2	R W	BM(128)	
42572-79	Programmable Virtual Output 6 Logic Mask 3	R W	BM(128)	
42580-87	Programmable Virtual Output 6 Logic Term 3	R W	BM(128)	
42588-95	Programmable Virtual Output 6 Logic Mask 4	R W	BM(128)	
42596-603	Programmable Virtual Output 6 Logic Term 4	R W	BM(128)	
42604	Programmable Virtual Output 7 Term Count	R W	SI	
42605-12	Programmable Virtual Output 7 Logic Mask 1	R W	BM(128)	
42613-20	Programmable Virtual Output 7 Logic Term 1	R W	BM(128)	
42621-28	Programmable Virtual Output 7 Logic Mask 2	R W	BM(128)	
42629-36	Programmable Virtual Output 7 Logic Term 2	R W	BM(128)	
42637-44	Programmable Virtual Output 7 Logic Mask 3	R W	BM(128)	
42645-52	Programmable Virtual Output 7 Logic Term 3	R W	BM(128)	
42653-60	Programmable Virtual Output 7 Logic Mask 4	R W	BM(128)	
42661-68	Programmable Virtual Output 7 Logic Term 4	R W	BM(128)	
42669	Programmable Virtual Output 8 Term Count	R W	SI	
42670-77	Programmable Virtual Output 8 Logic Mask 1	R W	BM(128)	
42678-85	Programmable Virtual Output 8 Logic Term 1	R W	BM(128)	
42686-93	Programmable Virtual Output 8 Logic Mask 2	R W	BM(128)	
42694-701	Programmable Virtual Output 8 Logic Term 2	R W	BM(128)	
42702-09	Programmable Virtual Output 8 Logic Mask 3	R W	BM(128)	
42710-17	Programmable Virtual Output 8 Logic Term 3	R W	BM(128)	
42718-25	Programmable Virtual Output 8 Logic Mask 4	R W	BM(128)	
42726-33	Programmable Virtual Output 8 Logic Term 4	R W	BM(128)	
42734	Programmable Virtual Output 9 Term Count	R W	SI	
42735-42	Programmable Virtual Output 9 Logic Mask 1	R W	BM(128)	
42743-50	Programmable Virtual Output 9 Logic Term 1	R W	BM(128)	
42751-58	Programmable Virtual Output 9 Logic Mask 2	R W	BM(128)	
42759-66	Programmable Virtual Output 9 Logic Term 2	R W	BM(128)	
42767-74	Programmable Virtual Output 9 Logic Mask 3	R W	BM(128)	
42775-82	Programmable Virtual Output 9 Logic Term 3	R W	BM(128)	
42783-90	Programmable Virtual Output 9 Logic Mask 4	R W	BM(128)	
42791-98	Programmable Virtual Output 9 Logic Term 4	R W	BM(128)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
42799	Programmable Virtual Output 10 Term Count	R W	SI	
42800-807	Programmable Virtual Output 10 Logic Mask 1	R W	BM(128)	
42808-15	Programmable Virtual Output 10 Logic Term 1	R W	BM(128)	
42816-23	Programmable Virtual Output 10 Logic Mask 2	R W	BM(128)	
42824-31	Programmable Virtual Output 10 Logic Term 2	R W	BM(128)	
42832-39	Programmable Virtual Output 10 Logic Mask 3	R W	BM(128)	
42840-47	Programmable Virtual Output 10 Logic Term 3	R W	BM(128)	
42848-55	Programmable Virtual Output 10 Logic Mask 4	R W	BM(128)	
42856-63	Programmable Virtual Output 10 Logic Term 4	R W	BM(128)	
42864	Programmable Virtual Output 11 Term Count	R W	SI	
42865-72	Programmable Virtual Output 11 Logic Mask 1	R W	BM(128)	
42873-80	Programmable Virtual Output 11 Logic Term 1	R W	BM(128)	
42881-88	Programmable Virtual Output 11 Logic Mask 2	R W	BM(128)	
42889-96	Programmable Virtual Output 11 Logic Term 2	R W	BM(128)	
42897-904	Programmable Virtual Output 11 Logic Mask 3	R W	BM(128)	
42905-12	Programmable Virtual Output 11 Logic Term 3	R W	BM(128)	
42913-20	Programmable Virtual Output 11 Logic Mask 4	R W	BM(128)	
42921-28	Programmable Virtual Output 11 Logic Term 4	R W	BM(128)	
42929	Programmable Virtual Output 12 Term Count	R W	SI	
42930-37	Programmable Virtual Output 12 Logic Mask 1	R W	BM(128)	
42938-45	Programmable Virtual Output 12 Logic Term 1	R W	BM(128)	
42946-53	Programmable Virtual Output 12 Logic Mask 2	R W	BM(128)	
42954-61	Programmable Virtual Output 12 Logic Term 2	R W	BM(128)	
42962-69	Programmable Virtual Output 12 Logic Mask 3	R W	BM(128)	
42970-77	Programmable Virtual Output 12 Logic Term 3	R W	BM(128)	
42978-85	Programmable Virtual Output 12 Logic Mask 4	R W	BM(128)	
42986-93	Programmable Virtual Output 12 Logic Term 4	R W	BM(128)	
42994	Programmable Virtual Output 13 Term Count	R W	SI	
42995-3002	Programmable Virtual Output 13 Logic Mask 1	R W	BM(128)	
43003-10	Programmable Virtual Output 13 Logic Term 1	R W	BM(128)	
43011-18	Programmable Virtual Output 13 Logic Mask 2	R W	BM(128)	
43019-26	Programmable Virtual Output 13 Logic Term 2	R W	BM(128)	
43027-34	Programmable Virtual Output 13 Logic Mask 3	R W	BM(128)	
43035-42	Programmable Virtual Output 13 Logic Term 3	R W	BM(128)	
43043-50	Programmable Virtual Output 13 Logic Mask 4	R W	BM(128)	
43051-58	Programmable Virtual Output 13 Logic Term 4	R W	BM(128)	
43059	Programmable Virtual Output 14 Term Count	R W	SI	
43060-67	Programmable Virtual Output 14 Logic Mask 1	R W	BM(128)	
43068-75	Programmable Virtual Output 14 Logic Term 1	R W	BM(128)	
43076-83	Programmable Virtual Output 14 Logic Mask 2	R W	BM(128)	
43084-91	Programmable Virtual Output 14 Logic Term 2	R W	BM(128)	
43092-99	Programmable Virtual Output 14 Logic Mask 3	R W	BM(128)	
43100-107	Programmable Virtual Output 14 Logic Term 3	R W	BM(128)	
43108-15	Programmable Virtual Output 14 Logic Mask 4	R W	BM(128)	
43116-23	Programmable Virtual Output 14 Logic Term 4	R W	BM(128)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
43124	Programmable Virtual Output 15 Term Count	R W	SI	
43125-32	Programmable Virtual Output 15 Logic Mask 1	R W	BM(128)	
43133-40	Programmable Virtual Output 15 Logic Term 1	R W	BM(128)	
43141-48	Programmable Virtual Output 15 Logic Mask 2	R W	BM(128)	
43149-56	Programmable Virtual Output 15 Logic Term 2	R W	BM(128)	
43157-64	Programmable Virtual Output 15 Logic Mask 3	R W	BM(128)	
43165-72	Programmable Virtual Output 15 Logic Term 3	R W	BM(128)	
43173-80	Programmable Virtual Output 15 Logic Mask 4	R W	BM(128)	
43181-88	Programmable Virtual Output 15 Logic Term 4	R W	BM(128)	
43189	Programmable Virtual Output 16 Term Count	R W	SI	
43190-97	Programmable Virtual Output 16 Logic Mask 1	R W	BM(128)	
43198-205	Programmable Virtual Output 16 Logic Term 1	R W	BM(128)	
43206-13	Programmable Virtual Output 16 Logic Mask 2	R W	BM(128)	
43214-21	Programmable Virtual Output 16 Logic Term 2	R W	BM(128)	
43222-29	Programmable Virtual Output 16 Logic Mask 3	R W	BM(128)	
43230-37	Programmable Virtual Output 16 Logic Term 3	R W	BM(128)	
43238-45	Programmable Virtual Output 16 Logic Mask 4	R W	BM(128)	
43246-53	Programmable Virtual Output 16 Logic Term 4	R W	BM(128)	
43254	Programmable Virtual Output 17 Term Count	R W	SI	
43255-62	Programmable Virtual Output 17 Logic Mask 1	R W	BM(128)	
43263-70	Programmable Virtual Output 17 Logic Term 1	R W	BM(128)	
43271-78	Programmable Virtual Output 17 Logic Mask 2	R W	BM(128)	
43279-86	Programmable Virtual Output 17 Logic Term 2	R W	BM(128)	
43287-94	Programmable Virtual Output 17 Logic Mask 3	R W	BM(128)	
43295-02	Programmable Virtual Output 17 Logic Term 3	R W	BM(128)	
43303-10	Programmable Virtual Output 17 Logic Mask 4	R W	BM(128)	
43311-18	Programmable Virtual Output 17 Logic Term 4	R W	BM(128)	
43325	Programmable 79 Logic Mode	R W	INT	
43326-33	Programmable Reclose Initiate Logic Mask	R W	BM(128)	
43334-41	Programmable Reclose Initiate Logic Term	R W	BM(128)	
43342-49	Programmable Reclose Status Logic Mask	R W	BM(128)	
43350-57	Programmable Reclose Status Logic Term	R W	BM(128)	
43358-65	Programmable Reclose Wait Logic Mask	R W	BM(128)	
43366-73	Programmable Reclose Wait Logic Term	R W	BM(128)	
43374-81	Programmable Reclose Drive to Lockout Logic Mask	R W	BM(128)	
43382-89	Programmable Reclose Drive to Lockout Logic Term	R W	BM(128)	
43390-97	Programmable Reclose Pilot Logic Mask	R W	BM(128)	
43398-405	Programmable Reclose Pilot Logic Term	R W	BM(128)	
43406	Programmable 81 Logic Mode	R W	INT	
43407-14	Programmable 81 Block Logic Mask	R W	BM(128)	
43415-22	Programmable 81 Block Logic Term	R W	BM(128)	
43423	Programmable 181 Logic Mode	R W	INT	
43424-31	Programmable 181 Block Logic Mask	R W	BM(128)	
43432-39	Programmable 181 Block Logic Term	R W	BM(128)	
43440	Programmable 281 Logic Mode	R W	INT	
43441-48	Programmable 281 Block Logic Mask	R W	BM(128)	
43449-56	Programmable 281 Block Logic Term	R W	BM(128)	
43457	Programmable 381 Logic Mode	R W	INT	
43458-65	Programmable 381 Block Logic Mask	R W	BM(128)	
43466-73	Programmable 381 Block Logic Term	R W	BM(128)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
43474	Programmable 481 Logic Mode	R W	INT	
43475-82	Programmable 481 Block Logic Mask	R W	BM(128)	
43483-90	Programmable 481 Block Logic Term	R W	BM(128)	
43491	Programmable 581 Logic Mode	R W	INT	
43492-99	Programmable 581 Block Logic Mask	R W	BM(128)	
43500-07	Programmable 581 Block Logic Term	R W	BM(128)	
43508	Programmable 47 Logic Mode	R W	INT	
43509-16	Programmable 47 Block Logic Mask	R W	BM(128)	
43517-24	Programmable 47 Block Logic Term	R W	BM(128)	
43525	Programmable 24 Logic Mode	R W	INT	
43526-33	Programmable 24 Block Logic Mask	R W	BM(128)	
43534-41	Programmable 24 Block Logic Term	R W	BM(128)	
43542	Programmable 25 Logic Mode	R W	INT	
43543-50	Programmable 25 Block Logic Mask	R W	BM(128)	
43551-58	Programmable 25 Block Logic Term	R W	BM(128)	
43559	Programmable 32 Logic Mode	R W	INT	
43560-67	Programmable 32 Block Logic Mask	R W	BM(128)	
43568-75	Programmable 32 Block Logic Term	R W	BM(128)	
43576	Programmable 132 Logic Mode	R W	INT	
43577-84	Programmable 132 Block Logic Mask	R W	BM(128)	
43585-92	Programmable 132 Block Logic Term	R W	BM(128)	
43593	Programmable 86 Logic Mode	R W	INT	
43594-601	Programmable 86 Trip Logic Mask	R W	BM(128)	
43602-09	Programmable 86 Trip Logic Term	R W	BM(128)	
43610-17	Programmable 86 Reset Logic Mask	R W	BM(128)	
43618-25	Programmable 86 Reset Logic Term	R W	BM(128)	
43626	Programmable 186 Logic Mode	R W	INT	
43627-34	Programmable 186 Trip Logic Mask	R W	BM(128)	
43635-42	Programmable 186 Trip Logic Term	R W	BM(128)	
43643-50	Programmable 186 Reset Logic Mask	R W	BM(128)	
43651-58	Programmable 186 Reset Logic Term	R W	BM(128)	
43679	Programmable P85 Logic Mode	R W	INT	
43680-87	Programmable P85FWDTRIP Block Logic Mask	R W	BM(128)	
43688-95	Programmable P85FWDTRIP Logic Term	R W	BM(128)	
43696-703	Programmable P85RVSTRIP Logic Mask	R W	BM(128)	
43704-11	Programmable P85RVSTRIP Logic Term	R W	BM(128)	
43712-19	Programmable P85RX Logic Mask	R W	BM(128)	
43720-27	Programmable P85RX Logic Term	R W	BM(128)	
43728-35	Programmable P85WFC Logic Mask	R W	BM(128)	
43736-43	Programmable P85WFC Logic Term	R W	BM(128)	
43744	Programmable 43TAG Logic Mode	R W	INT	
43745-52	Programmable 43TAG ON Logic Mask	R W	BM(128)	
43753-60	Programmable 43TAG ON Logic Term	R W	BM(128)	
43761-68	Programmable 43TAG OFF Logic Mask	R W	BM(128)	
43769-76	Programmable 43TAG OFF Logic Term	R W	BM(128)	
43777-84	Programmable 43TAG BLK Logic Mask	R W	BM(128)	
43785-92	Programmable 43TAG BLK Logic Term	R W	BM(128)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
43793	Programmable 143TAG Logic Mode	R W	INT	
43794-801	Programmable 143TAG ON Logic Mask	R W	BM(128)	
43802-09	Programmable 143TAG ON Logic Term	R W	BM(128)	
43810-17	Programmable 143TAG OFF Logic Mask	R W	BM(128)	
43818-25	Programmable 143TAG OFF Logic Term	R W	BM(128)	
43826-33	Programmable 143TAG BLK Logic Mask	R W	BM(128)	
43834-41	Programmable 143TAG BLK Logic Term	R W	BM(128)	
43842	Programmable 243TAG Logic Mode	R W	INT	
43843-50	Programmable 243TAG ON Logic Mask	R W	BM(128)	
43851-58	Programmable 243TAG ON Logic Term	R W	BM(128)	
43859-66	Programmable 243TAG OFF Logic Mask	R W	BM(128)	
43867-74	Programmable 243TAG OFF Logic Term	R W	BM(128)	
43875-82	Programmable 243TAG BLK Logic Mask	R W	BM(128)	
43883-90	Programmable 243TAG BLK Logic Term	R W	BM(128)	
43891	Programmable 343TAG Logic Mode	R W	INT	
43892-99	Programmable 343TAG ON Logic Mask	R W	BM(128)	
43900-07	Programmable 343TAG ON Logic Term	R W	BM(128)	
43908-15	Programmable 343TAG OFF Logic Mask	R W	BM(128)	
43916-23	Programmable 343TAG OFF Logic Term	R W	BM(128)	
43924-31	Programmable 343TAG BLK Logic Mask	R W	BM(128)	
43932-39	Programmable 343TAG BLK Logic Term	R W	BM(128)	
43940	Programmable 443TAG Logic Mode	R W	INT	
43941-48	Programmable 443TAG ON Logic Mask	R W	BM(128)	
43949-56	Programmable 443TAG ON Logic Term	R W	BM(128)	
43957-64	Programmable 443TAG OFF Logic Mask	R W	BM(128)	
43965-72	Programmable 443TAG OFF Logic Term	R W	BM(128)	
43973-80	Programmable 443TAG BLK Logic Mask	R W	BM(128)	
43981-88	Programmable 443TAG BLK Logic Term	R W	BM(128)	
43989	Programmable CTRL Logic Mode	R W	INT	
43990-97	Programmable CTRL COM0 Logic Mask	R W	BM(128)	
43998-4005	Programmable CTRL COM0 Logic Term	R W	BM(128)	
44006-13	Programmable CTRL COM1 Logic Mask	R W	BM(128)	
44014-21	Programmable CTRL COM1 Logic Term	R W	BM(128)	
44022-29	Programmable CTRL COM2 Logic Mask	R W	BM(128)	
44030-37	Programmable CTRL COM2 Logic Term	R W	BM(128)	
44038	Virtual Test Mode	R W	INT	
44039-42	Virtual Test 1 Name	R W	ASC(8)	
44043-50	Virtual Test 1 Logic Mask	R W	BM(128)	
44051-54	Virtual Test 2 Name 2	R W	ASC(8)	
44055-62	Virtual Test 2 Logic Mask	R W	BM(128)	
44063-66	Virtual Test 3 Name	R W	ASC(8)	
44067-74	Virtual Test 3 Logic Mask	R W	BM(128)	
44075-78	Virtual Test 4 Name	R W	ASC(8)	
44079-86	Virtual Test 4 Logic Mask	R W	BM(128)	
System Labels and ID Setting Parameters				
44101-15	Relay ID	R W	ASC(30)	
44116-30	Station ID	R W	ASC(30)	
44131-45	User 1 ID	R W	ASC(30)	
44146-60	User 2 ID	R W	ASC(30)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
44161-68	Virtual Selector Switch 43 – Name Label	R W	ASC(16)	
44169-72	Virtual Selector Switch 43 – True Label	R W	ASC(7)	
44173-76	Virtual Selector Switch 43 – False Label	R W	ASC(7)	
44177-84	Virtual Selector Switch 143 – Name Label	R W	ASC(16)	
44185-88	Virtual Selector Switch 143 – True Label	R W	ASC(7)	
44189-92	Virtual Selector Switch 143 – False Label	R W	ASC(7)	
44193-200	Virtual Selector Switch 243 – Name Label	R W	ASC(16)	
44201-04	Virtual Selector Switch 243 – True Label	R W	ASC(7)	
44205-08	Virtual Selector Switch 243 – False Label	R W	ASC(7)	
44209-16	Virtual Selector Switch 343 – Name Label	R W	ASC(16)	
44217-20	Virtual Selector Switch 343 – True Label	R W	ASC(7)	
44221-24	Virtual Selector Switch 343 – False Label	R W	ASC(7)	
44225-32	Virtual Selector Switch 443 – Name Label	R W	ASC(16)	
44233-36	Virtual Selector Switch 443 – True Label	R W	ASC(7)	
44237-40	Virtual Selector Switch 443 – False Label	R W	ASC(7)	
44265-72	Virtual Output A – Name Label	R W	ASC(16)	
44273-76	Virtual Output A – True Label	R W	ASC(7)	
44277-80	Virtual Output A – False Label	R W	ASC(7)	
44281-88	Virtual Output 1 – Name Label	R W	ASC(16)	
44289-92	Virtual Output 1 - True Label	R W	ASC(7)	
44293-96	Virtual Output 1 – False Label	R W	ASC(7)	
44297-304	Virtual Output 2 – Name Label	R W	ASC(16))	
44305-08	Virtual Output 2 – True Label	R W	ASC(7)	
44309-12	Virtual Output 2 – False Label	R W	ASC(7)	
44313-20	Virtual Output 3 – Name Label	R W	ASC(16)	
44321-24	Virtual Output 3 – True Label	R W	ASC(7)	
44325-28	Virtual Output 3 – False Label	R W	ASC(7)	
44329-36	Virtual Output 4 – Name Label	R W	ASC(16)	
44337-40	Virtual Output 4 – True Label	R W	ASC(7)	
44341-44	Virtual Output 4 – False Label	R W	ASC(7)	
44345-52	Virtual Output 5 – Name Label	R W	ASC(16)	
44353-56	Virtual Output 5 – True Label	R W	ASC(7)	
44357-60	Virtual Output 5 – False Label	R W	ASC(7)	
44361-68	Virtual Output 6 – Name Label	R W	ASC(16)	
44369-72	Virtual Output 6 – True Label	R W	ASC(7)	
44373-76	Virtual Output 6 – False Label	R W	ASC(7)	
44377-84	Virtual Output 7 – Name Label	R W	ASC(16)	
44385-88	Virtual Output 7 – True Label	R W	ASC(7)	
44389-92	Virtual Output 7 – False Label	R W	ASC(7)	
44393-400	Virtual Output 8 – Name Label	R W	ASC(16)	
44401-04	Virtual Output 8 – True Label	R W	ASC(7)	
44405-08	Virtual Output 8 – False Label	R W	ASC(7)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
44409-16	Virtual Output 9 – Name Label	R W	ASC(16)	
44417-20	Virtual Output 9 – True Label	R W	ASC(7)	
44421-24	Virtual Output 9 – False Label	R W	ASC(7)	
44425-32	Virtual Output 10 – Name Label	R W	ASC(16)	
44433-36	Virtual Output 10 – True Label	R W	ASC(7)	
44437-40	Virtual Output 10 – False Label	R W	ASC(7)	
44441-48	Virtual Output 11 – Name Label	R W	ASC(16)	
44449-52	Virtual Output 11 – True Label	R W	ASC(7)	
44453-56	Virtual Output 11 – False Label	R W	ASC(7)	
44457-64	Virtual Output 12 – Name Label	R W	ASC(16)	
44465-68	Virtual Output 12 – True Label	R W	ASC(7)	
44469-72	Virtual Output 12 – False Label	R W	ASC(7)	
44473-80	Virtual Output 13 – Name Label	R W	ASC(16)	
44481-84	Virtual Output 13 – True Label	R W	ASC(7)	
44485-88	Virtual Output 13 – False Label	R W	ASC(7)	
44489-96	Virtual Output 14 – Name Label	R W	ASC(16)	
44497-500	Virtual Output 14 – True Label	R W	ASC(7)	
44501-04	Virtual Output 14 – False Label	R W	ASC(7)	
44505-12	Virtual Output 15 – Name Label	R W	ASC(16)	
44513-16	Virtual Output 15 – True Label	R W	ASC(7)	
44517-20	Virtual Output 15 – False Label	R W	ASC(7)	
44521-28	Virtual Output 16– Name Label	R W	ASC(16)	
44529-32	Virtual Output 16– True Label	R W	ASC(7)	
44533-36	Virtual Output 16 – False Label	R W	ASC(7)	
44537-44	Virtual Output 17–Name Label	R W	ASC(16)	
44545-48	Virtual Output 17– True Label	R W	ASC(7)	
44549-52	Virtual Output 17– False Label	R W	ASC(7)	
44593-600	Input 1 – Name Label	R W	ASC(16)	
44601-04	Input 1 – True Label	R W	ASC(7)	
44605-08	Input 1 – False Label	R W	ASC(7)	
44609-16	Input 2 – Name Label	R W	ASC(16)	
44617-20	Input 2 – True Label	R W	ASC(7)	
44621-24	Input 2 – False Label	R W	ASC(7)	
44625-32	Input 3 – Name Label	R W	ASC(16)	
44633-36	Input 3 – True Label	R W	ASC(7)	
44637-40	Input 3 – False Label	R W	ASC(7)	
44641-48	Input 4 – Name Label	R W	ASC(16)	
44649-52	Input 4 – True Label	R W	ASC(7)	
44653-56	Input 4 – False Label	R W	ASC(7)	
44657-64	Input 5– Name Label	R W	ASC(16)	
44665-68	Input 5– True Label	R W	ASC(7)	
44669-72	Input 5– False Label	R W	ASC(7)	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
44673-80	Input 6 – Name Label	R W	ASC(16)	
44681-84	Input 6 – True Label	R W	ASC(7)	
44685-88	Input 6 – False Label	R W	ASC(7)	
44689-96	Input 7 – Name Label	R W	ASC(16)	
44697-700	Input 7 – True Label	R W	ASC(7)	
44701-04	Input 7 – False Label	R W	ASC(7)	
44705-12	Input 8 – Name Label	R W	ASC(16)	
44713-16	Input 8 – True Label	R W	ASC(7)	
44717-20	Input 8 – False Label	R W	ASC(7)	
Report Parameters				
47030-34	Model Number	R –	ASC(10)	
47039-47	Application SW Version # / Date	R –	ASC(18)	
47053-61	Boot SW Version # / Date	R –	ASC(18)	
47067-73	Serial Number	R –	ASC(13)	
47081-91	Style Number	R –	ASC(21)	
47107	COM0 Serial Port Relay Address	R –	INT	
47108	COM1 Serial Port Relay Address	R W	INT	
47109	Date and Time – Day	R W	INT	TS
47110-11	Date and Time – Milliseconds	R W	LI	TS
47112-19	System Status	R –	BM(128)	
47120	Current Active Group Setting	R –	SI	
47121	Current Group Control Setting	R –	ASC(1)	
47122-23	Current Output Control Settings (OutputPulse)	R –	BM(32)	
47124-25	Current Output Control Settings (OutputLatch)	R –	BM(32)	
47126	Current Output Contact Status	R –	BM(16)	
47127-28	Active Alarm Flags (SumFlags)	R –	BM(32)	
47129-32	Active Alarm Flags (ProgAlarms)	R –	BM(64)	
47133-36	Target Status	R W	BM(64)	
47137	Current Breaker Status	R –	ASC(1)	
47141-42	Breaker Contact Duty Log – Phase A	R W	FP	
47143-44	Breaker Contact Duty Log – Phase B	R W	FP	
47145-46	Breaker Contact Duty Log – Phase C	R W	FP	
47147-48	Breaker Operation Counter	R W	LI	
47149-50	Recloser Success counts since 791	R W	LI	
47151-52	Recloser Success counts since 792	R W	LI	
47153-54	Recloser Success counts since 793	R W	LI	
47155-56	Recloser Success counts since 794	R W	LI	
47157-58	Recloser Success counts since 79LO	R W	LI	
47159-60	Yesterday's Peak Demand Current – Phase A	R –	FP	
47161	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47162-63	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
47164-65	Yesterday's Peak Demand Current – Phase B	R –	FP	
47166	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47167-68	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47169-70	Yesterday's Peak Demand Current – Phase C	R –	FP	
47171	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47172-73	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47174-75	Yesterday's Peak Demand Current – Average	R –	FP	
47176	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47177-78	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47179-80	Yesterday's Peak Demand Current – Neutral	R –	FP	
47181	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47182-83	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47184-85	Yesterday's Peak Demand Current – Negative Seq	R –	FP	
47186	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47187-88	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47189-90	Yesterday's Peak Demand Current – Ground	R –	FP	
47191	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47192-93	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47194-95	Today's Peak Demand Current – Phase A	R –	FP	
47196	Today's Peak Demand Timestamp - Day	R –	INT	TS
47197-98	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47199-200	Today's Peak Demand Current – Phase B	R –	FP	
47201	Today's Peak Demand Timestamp - Day	R –	INT	TS
47202-03	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47204-05	Today's Peak Demand Current – Phase C	R –	FP	
47206	Today's Peak Demand Timestamp - Day	R –	INT	TS
47207-08	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47209-10	Today's Peak Demand Current – Average	R –	FP	
47211	Today's Peak Demand Timestamp - Day	R –	INT	TS
47212-13	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47214-15	Today's Peak Demand Current – Neutral	R –	FP	
47216	Today's Peak Demand Timestamp - Day	R –	INT	TS
47217-18	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47219-20	Today's Peak Demand Current – Negative Seq	R –	FP	
47221	Today's Peak Demand Timestamp - Day	R –	INT	TS
47222-23	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47224-25	Today's Peak Demand Current – Ground	R –	FP	
47226	Today's Peak Demand Timestamp - Day	R –	INT	TS
47227-28	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47229-30	Peak Demand Current Since Reset – Phase A	R W	FP	
47231	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47232-33	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
47234-35	Peak Demand Current Since Reset – Phase B	R W	FP	
47236	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47237-38	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47239-40	Peak Demand Current Since Reset – Phase C	R W	FP	
47241	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47242-43	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47244-45	Peak Demand Current Since Reset – Average	R W	FP	
47246	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47247-48	Peak Demand Since Reset Timestamp – ms	R –	LI	TS
47249-50	Peak Demand Current Since Reset – Neutral	R W	FP	
47251	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47252-53	Peak Demand Since Reset Timestamp – ms	R –	LI	TS
47254-55	Peak Demand Current Since Reset – Negative Seq	R W	FP	
47256	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47257-58	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47259-60	Peak Demand Current Since Reset – Ground	R W	FP	
47261	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47262-63	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47265-65	Yesterday's Peak Demand Voltage – Phase A HI	R –	FP	
47266	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47267-68	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47269-70	Yesterday's Peak Demand Voltage – Phase A LO	R –	FP	
47271	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47272-73	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47274-75	Yesterday's Peak Demand Voltage – Phase B HI	R –	FP	
47276	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47277-78	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47279-80	Yesterday's Peak Demand Voltage – Phase B LO	R –	FP	
47281	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47282-83	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47284-85	Yesterday's Peak Demand Voltage – Phase C HI	R –	FP	
47286	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47287-88	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47289-90	Yesterday's Peak Demand Voltage – Phase C LO	R –	FP	
47291	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47292-93	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47294-95	Yesterday's Peak Demand Voltage – Average HI	R –	FP	
47296	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47297-98	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47299-300	Yesterday's Peak Demand Voltage – Average LO	R –	FP	
47301	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47302-03	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
47304-05	Yesterday's Peak Demand Voltage – Neutral HI	R –	FP	
47306	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47307-08	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47309-10	Yesterday's Peak Demand Voltage – Neutral LO	R –	FP	
47311	Yesterday's Peak Demand Timestamp - Day	R –	INT	TS
47312-13	Yesterday's Peak Demand Timestamp – Millisecond	R –	LI	TS
47314-15	Today's Peak Demand Voltage – Phase A HI	R –	FP	
47316	Today's Peak Demand Timestamp - Day	R –	INT	TS
47317-18	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47319-20	Today's Peak Demand Voltage – Phase A LO	R –	FP	
47321	Today's Peak Demand Timestamp - Day	R –	INT	TS
47322-23	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47324-25	Today's Peak Demand Voltage – Phase B HI	R –	FP	
47326	Today's Peak Demand Timestamp - Day	R –	INT	TS
47327-28	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47329-30	Today's Peak Demand Voltage – Phase B LO	R –	FP	
47331	Today's Peak Demand Timestamp - Day	R –	INT	TS
47332-33	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47334-35	Today's Peak Demand Voltage – Phase C HI	R –	FP	
47336	Today's Peak Demand Timestamp - Day	R –	INT	TS
47337-38	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47339-40	Today's Peak Demand Voltage – Phase C LO	R –	FP	
47341	Today's Peak Demand Timestamp - Day	R –	INT	TS
47342-43	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47344-45	Today's Peak Demand Voltage – Average HI	R –	FP	
47346	Today's Peak Demand Timestamp - Day	R –	INT	TS
47347-48	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47349-50	Today's Peak Demand Voltage – Average LO	R –	FP	
47351	Today's Peak Demand Timestamp - Day	R –	INT	TS
47352-53	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47354-55	Today's Peak Demand Voltage – Neutral HI	R –	FP	
47356	Today's Peak Demand Timestamp - Day	R –	INT	TS
47357-58	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47359-60	Today's Peak Demand Voltage – Neutral LO	R –	FP	
47361	Today's Peak Demand Timestamp - Day	R –	INT	TS
47362-63	Today's Peak Demand Timestamp – Millisecond	R –	LI	TS
47364-65	Peak Demand Since Reset Voltage – Phase A HI	R –	FP	
47366	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47367-68	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47369-70	Peak Demand Since Reset Voltage – Phase A LO	R –	FP	
47371	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47372-73	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
47374-75	Peak Demand Since Reset Voltage – Phase B HI	R –	FP	
47376	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47377-78	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47379-80	Peak Demand Since Reset Voltage – Phase B LO	R –	FP	
47381	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47382-83	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47384-85	Peak Demand Since Reset Voltage – Phase C HI	R –	FP	
47386	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47387-88	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47389-90	Peak Demand Since Reset Voltage – Phase C LO	R –	FP	
47391	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47392-93	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47394-95	Peak Demand Since Reset Voltage – Average HI	R –	FP	
47396	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47397-98	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47399-400	Peak Demand Since Reset Voltage – Average LO	R –	FP	
47401	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47402-03	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47404-05	Peak Demand Since Reset Voltage – Neutral HI	R –	FP	
47406	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47407-08	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47409-10	Peak Demand Since Reset Voltage – Neutral LO	R –	FP	
47411	Peak Demand Since Reset Timestamp - Day	R –	INT	TS
47412-13	Peak Demand Since Reset Timestamp – Millisecond	R –	LI	TS
47414-415	Peak Demand Vars	R W	FP	
47416	Peak Demand Vars Timestamp - Day	R –	INT	TS
47417-18	Peak Demand Vars Timestamp - Millisecond	R –	LI	TS
47419-20	Peak Demand Reverse Vars	R W	FP	
47421	Peak Demand Reverse Vars Timestamp - Day	R –	INT	TS
47422-23	Peak Demand Reverse Vars Timestamp - Millisecond	R –	LI	TS
47424-25	Peak Demand Watts	R W	FP	
47426	Peak Demand Watts Timestamp - Day	R –	INT	TS
47427-28	Peak Demand Watts Timestamp - Millisecond	R –	LI	TS
47429-30	Peak Demand Reverse Watts	R W	FP	
47431	Peak Demand Reverse Watts Timestamp - Day	R –	INT	TS
47432-33	Peak Demand Reverse Watts Timestamp - Millisecond	R –	LI	TS
47434-35	Today's Demand Vars	R –	FP	
47436	Today's Demand Vars Timestamp - Day	R –	INT	TS
47437-38	Today's Demand Vars Timestamp - Millisecond	R –	LI	TS
47439-40	Today's Demand Reverse Vars	R –	FP	
47441	Today's Demand Reverse Vars Timestamp - Day	R –	INT	TS
47442-43	Today's Demand Reverse Vars Timestamp – Millisecond	R –	LI	TS

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
47444-45	Today's Demand Watts	R –	FP	
47446	Today's Demand Watts Timestamp - Day	R –	INT	TS
47447-48	Today's Demand Watts Timestamp - Millisecond	R –	LI	TS
47449-50	Today's Demand Reverse Watts	R –	FP	
47451	Today's Demand Reverse Watts Timestamp - Day	R –	INT	TS
47452-53	Today's Demand Reverse Watts Timestamp – Millisecond	R –	LI	TS
47454-55	Yesterday's Demand Vars	R –	FP	
47456	Yesterday's Demand Vars Timestamp - Day	R –	INT	TS
47457-58	Yesterday's Demand Vars Timestamp – Millisecond	R –	LI	TS
47459-60	Yesterday's Demand Reverse Vars	R –	FP	
47461	Yesterday's Demand Reverse Vars Timestamp - Day	R –	INT	TS
47462-63	Yesterday's Demand Reverse Vars Timestamp – Millisecond	R –	LI	TS
47464-65	Yesterday's Demand Watts	R –	FP	
47466	Yesterday's Demand Watts Timestamp - Day	R –	INT	TS
47467-68	Yesterday's Demand Watts Timestamp - Millisecond	R –	LI	TS
47469-70	Yesterday's Demand Reverse Watts	R –	FP	
47471	Yesterday's Demand Reverse Watts Timestamp - Day	R –	INT	TS
47472-73	Yesterday's Demand Reverse Watts Timestamp – Millisecond	R –	LI	TS
47474-75	3 Phase Var Hours	R W	FP	
47476-77	3 Phase Reverse Var Hours	R W	FP	
47478-79	3 Phase Watt Hours	R W	FP	
47480-81	3 Phase Reverse Watt Hours	R W	FP	
47482-85	Current Active Logic	R –	ASC(8)	
47486	Reset Logic Alarm Information	R W	SI	
47487	Reset Major Alarm Information	R W	SI	
47488	Reset Minor Alarm Information	R W	SI	
47489	Reset Relay Alarm Information	R W	SI	
47490	Reset Load Profile	R W	SI	
47491	Clear Fault Log	R W	SI	
47492	Trigger Fault Record	R W	SI	
47493	Clear Events Report	R W	SI	
47512	Fault Indicator	R –	SI	
47513	Fault Template Status	R –	SI	
The following is the Fault Template (FLT)				
47514	Fault Date and Time – Day	R –	INT	FLT, TS
47515-16	Fault Date and Time – Milliseconds	R –	LI	FLT, TS
47517	Fault Event Type	R –	BM(16)	FLT
47518	Fault Active Group	R –	SI	FLT
47519-22	Fault Targets	R –	BM(64)	FLT
47524	Fault Clearing Time Status	R –	SI	FLT
47525-26	Fault Clearing Time	R –	FP	FLT
47527	Fault Breaker Operate Time Status	R –	SI	FLT
47528-29	Fault Breaker Operate Time	R –	FP	FLT
47530-31	Distance to Fault	R –	FP	FLT

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
47534-35	Fault Phase A Current Magnitude	R –	FP	FLT
47536	Fault Phase A Current Angle	R –	INT	FLT
47537-38	Fault Phase B Current Magnitude	R –	FP	FLT
47539	Fault Phase B Current Angle	R –	INT	FLT
47540-41	Fault Phase C Current Magnitude	R –	FP	FLT
47542	Fault Phase C Current Angle	R –	INT	FLT
47543-44	Fault Neutral Current Magnitude	R –	FP	FLT
47545	Fault Neutral Current Angle	R –	INT	FLT
47546-47	Fault Negative Seq. Current Magnitude	R –	FP	FLT
47548	Fault Negative Seq. Current Angle	R –	INT	FLT
47549-50	Fault Positive Seq. Current Magnitude	R –	FP	FLT
47551	Fault Positive Seq. Current Angle	R –	INT	FLT
47552-53	Fault Ground Current Magnitude	R –	FP	FLT
47554	Fault Ground Current Angle	R –	INT	FLT
47557-58	Fault Phase A Voltage Magnitude	R –	FP	FLT
47559	Fault Phase A Voltage Angle	R –	INT	FLT
47560-61	Fault Phase B Voltage Magnitude	R –	FP	FLT
47562	Fault Phase B Voltage Angle	R –	INT	FLT
47563-64	Fault Phase C Voltage Magnitude	R –	FP	FLT
47565	Fault Phase C Voltage Angle	R –	INT	FLT
47566-67	Fault Vx Voltage Magnitude	R –	FP	FLT
47568	Fault Vx Voltage Angle	R –	INT	FLT
47569-70	Fault 3VO Voltage Magnitude	R –	FP	FLT
47571	Fault 3VO Voltage Angle	R –	INT	FLT
47572-73	Fault Positive Seq Voltage Magnitude	R –	FP	FLT
47574	Fault Positive Seq Voltage Angle	R –	INT	FLT
47575-76	Fault Negative Seq Voltage Magnitude	R –	FP	FLT
47577	Fault Negative Seq Voltage Angle	R –	INT	FLT
47578-79	Fault Gen Frequency	R –	FP	FLT
47580-81	Fault Vx Frequency	R –	FP	FLT
47582-83	Fault Slip Frequency	R –	FP	FLT
47586-87	At Close Phase A Current Magnitude	R –	FP	FLT
47588	At Close Phase A Current Angle	R –	INT	FLT
47589-90	At Close Phase B Current Magnitude	R –	FP	FLT
47591	At Close Phase B Current Angle	R –	INT	FLT
47592-93	At Close Phase C Current Magnitude	R –	FP	FLT
47594	At Close Phase C Current Angle	R –	INT	FLT
47595-96	At Close Neutral Current Magnitude	R –	FP	FLT
47597	At Close Neutral Current Angle	R –	INT	FLT
47598-99	At Close Negative Seq. Current Magnitude	R –	FP	FLT
47600	At Close Negative Seq. Current Angle	R –	INT	FLT
47601-02	At Close Positive Seq. Current Magnitude	R –	FP	FLT
47603	At Close Positive Seq. Current Angle	R –	INT	FLT
47604-05	At Close Ground Current Magnitude	R –	FP	FLT
47606	At Close Ground Current Angle	R –	INT	FLT
47609-10	At Close Phase A Voltage Magnitude	R –	FP	FLT
47611	At Close Phase A Voltage Angle	R –	INT	FLT
47612-13	At Close Phase B Voltage Magnitude	R –	FP	FLT
47614	At Close Phase B Voltage Angle	R –	INT	FLT
47615-16	At Close Phase C Voltage Magnitude	R –	FP	FLT
47617	At Close Phase C Voltage Angle	R –	INT	FLT
47618-19	At Close Vx Voltage Magnitude	R –	FP	FLT
47620	At Close Vx Voltage Angle	R –	INT	FLT

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
47621-22	At Close 3VO Voltage Magnitude	R –	FP	FLT
47623	At Close 3VO Voltage Angle	R –	INT	FLT
47624-25	At Close Positive Seq Voltage Magnitude	R –	FP	FLT
47626	At Close Positive Seq Voltage Angle	R –	INT	FLT
47627-28	At Close Negative Seq Voltage Magnitude	R –	FP	FLT
47629	At Close Negative Seq Voltage Angle	R –	INT	FLT
47630-31	At Close Gen Frequency	R –	FP	FLT
47632-33	At Close Vx Frequency	R –	FP	FLT
47634-35	At Close Slip Frequency	R –	FP	FLT
47636-37	After Close Phase A Current Magnitude	R –	FP	FLT
47638	After Close Phase A Current Angle	R –	INT	FLT
47639-40	After Close Phase B Current Magnitude	R –	FP	FLT
47641	After Close Phase B Current Angle	R –	INT	FLT
47642-43	After Close Phase C Current Magnitude	R –	FP	FLT
47644	After Close Phase C Current Angle	R –	INT	FLT
47645-46	After Close Neutral Current Magnitude	R –	FP	FLT
47647	After Close Neutral Current Angle	R –	INT	FLT
47648-49	After Close Negative Seq. Current Magnitude	R –	FP	FLT
47650	After Close Negative Seq. Current Angle	R –	INT	FLT
47651-52	After Close Positive Seq. Current Magnitude	R –	FP	FLT
47653	After Close Positive Seq. Current Angle	R –	INT	FLT
47654-55	After Close Ground Current Magnitude	R –	FP	FLT
47656	After Close Ground Current Angle	R –	INT	FLT
47659-60	After Close Phase A Voltage Magnitude	R –	FP	FLT
47661	After Close Phase A Voltage Angle	R –	INT	FLT
47662-63	After Close Phase B Voltage Magnitude	R –	FP	FLT
47664	After Close Phase B Voltage Angle	R –	INT	FLT
47665-66	After Close Phase C Voltage Magnitude	R –	FP	FLT
47667	After Close Phase C Voltage Angle	R –	INT	FLT
47668-69	After Close Vx Voltage Magnitude	R –	FP	FLT
47670	After Close Vx Voltage Angle	R –	INT	FLT
47671-72	After Close 3VO Voltage Magnitude	R –	FP	FLT
47673	After Close 3VO Voltage Angle	R –	INT	FLT
47674-75	After Close Positive Seq Voltage Magnitude	R –	FP	FLT
47676	After Close Positive Seq Voltage Angle	R –	INT	FLT
47677-78	After Close Negative Seq Voltage Magnitude	R –	FP	FLT
47679	After Close Negative Seq Voltage Angle	R –	INT	FLT
47680-81	After Close Gen Frequency	R –	FP	FLT
47682-83	After Close Vx Frequency	R –	FP	FLT
47684-85	After Close Slip Frequency	R –	FP	FLT
The following is the Report Template (RPT)				
47695-819	Report Text	R –	ASC(250)	RPT
Metering Parameters				
49719	Part Number	R –	INT	
49720-21	Generator Frequency	R –	FP	
49722-23	Vx Frequency	R –	FP	
49724-25	Slip Frequency	R –	FP	
49726-27	Phase A Current Magnitude	R –	FP	
49728	Phase A Current Angle	R –	INT	

Holding Register	Parameter	Read/Write Supported	Data Format	Notes
49729-30	Phase B Current Magnitude	R –	FP	
49731	Phase B Current Angle	R –	INT	
49732-33	Phase C Current Magnitude	R –	FP	
49734	Phase C Current Angle	R –	INT	
49735-36	Negative Sequence Current Magnitude	R –	FP	
49737-38	Neutral Current Magnitude	R –	FP	
49739-40	Ground Current Magnitude	R –	FP	
49741-42	Positive Sequence Current Magnitude	R –	FP	
49743-44	Average Current Magnitude	R –	FP	
49747-48	Zero Sequence Voltage	R –	FP	
49749-50	Negative Sequence Voltage	R –	FP	
49751-52	Positive Sequence Voltage	R –	FP	
49753-54	Phase A Voltage	R –	FP	
49755	Phase A Voltage Angle	R –	INT	
49756-57	Phase B Voltage	R –	FP	
49758	Phase B Voltage Angle	R –	INT	
49759-60	Phase C Voltage	R –	FP	
49761	Phase C Voltage Angle	R –	INT	
49762-63	Phase A-B Voltage	R –	FP	
49764	Phase A-B Voltage Angle	R –	INT	
49765-66	Phase B-C Voltage	R –	FP	
49767	Phase B-C Voltage Angle	R –	INT	
49768-69	Phase C-A Voltage	R –	FP	
49770	Phase C-A Voltage Angle	R –	INT	
49771-72	V3x Voltage	R –	FP	
49773-74	Vx Voltage	R –	FP	
49775-76	Average Voltage Magnitude	R –	FP	
49777-78	Slip Angle	R –	FP	
49781-82	3 Phase Watts	R –	FP	
49783-84	3 Phase Power Factor	R –	FP	
49785-86	3 Phase Vars	R –	FP	
49787-88	3 Phase VA	R –	FP	
49789-90	Phase A Watts	R –	FP	
49791-92	Phase B Watts	R –	FP	
49793-94	Phase C Watts	R –	FP	
49795-96	Phase A Vars	R –	FP	
49797-98	Phase B Vars	R –	FP	
49799-100	Phase C Vars	R –	FP	
49835-74	Error Details	R –	ASC(40)	
49875-999	Contiguous Poll Block	R –	Mixed	

SECTION 3 • REGISTER DETAILS

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SECTION 3 • REGISTER DETAILS

INTRODUCTION

This section details the register formats and data ranges of the previous section. The two sections combined provide all information necessary to communicate with the BE1-1051 Modbus™ Holding Registers.

Any Holding Register not listed in the Register Table of Section 3.3 is an unassigned Holding Register. A value of zero always results when reading an unassigned Holding Register. Writes to unassigned Holding Registers are legal, but no action will be taken (the write is ignored).

LOGIC SETTINGS

Logic settings consist of a combination of modes, masks, terms, and term counts. Logic modes are specific to each logic set, while the masks, terms, and term counts have value definitions consistent throughout all logic sets. A single logic equation consists of a “mask” and “term” pair. The logic “term count” is used only in VOA, VO1-VO15 virtual output logic blocks.

The logic “mode” enables or disables the logic equation for that logic block.

The logic “mask” corresponds to the SystemStatus bits to be evaluated. These bits are referenced in the desired logic equation and are set to 1 (non-used bits masked out as 0‘s).

The logic “term” corresponds to the SystemStatus bit’s TRUE or FALSE state, referenced in the desired logic equation where only the TRUE bits in the equation are set to 1.

The logic “term count” may be of one of four logic types which are NONE (logic disabled), OR only (a + b + c), AND only (a*b*c) or MIXED (a*b + b*c).

The following defines all logic set parameters.

Logic Modes

41505	Programmable 50TP Logic Mode	INT
41539	Programmable 50TQ Logic Mode	INT
41556	Programmable 150TP Logic Mode	INT
41590	Programmable 150TQ Logic Mode	INT
41607	Programmable SOTF Logic Mode	INT
41705	Programmable 51P Logic Mode	INT
41739	Programmable 51Q Logic Mode	INT

Read and Write:
0 for disabled
1 for enabled

41522	Programmable 50TN Logic Mode	INT
41573	Programmable 150TN Logic Mode	INT
41722	Programmable 51N Logic Mode	INT
41759	Programmable 151N Logic Mode	INT

Read and Write:
0 for disabled
1 for enabled – 3 Phase Input Neutral
2 for enabled – Ground Input

41626	Programmable Breaker Fail Logic Mode	INT

Read and Write:
0 for disabled
1 for enabled

41844 Programmable 62 Timer Logic Mode INT
41877 Programmable 162 Timer Logic Mode INT

Read and Write:

0 for disabled
1 for Pickup / Dropout
2 for One-Shot Non-Retriggerable
3 for One-Shot Retriggerable
4 for Oscillator
5 for Integrating
6 for Edge Triggered Latch

41910 Programmable 27P Logic Mode INT
41944 Programmable 59P Logic Mode INT

Read and Write:

0 for disabled
1 for enabled – Undervoltage or overvoltage on one or more phases causes pickup.
2 for enabled – Undervoltage or overvoltage on two or more phases causes pickup.
3 for enabled – Undervoltage or overvoltage on all three phases causes pickup.

41927 Programmable 27X Logic Mode INT
41961 Programmable 59X Logic Mode INT
41978 Programmable 159X Logic Mode INT

Read and Write:

0 for disabled
1 for enabled – Fundamental Vx input
2 for enabled – 3Vo Phase input
3 for enabled – 3rd harmonic, Vx input

42010 Programmable Settings Group Logic Mode INT

Read and Write:

0 for all setting groups disabled except group 0
1 for selecting setting group via pulsed input logic
2 for selecting setting group via sustained input logic

42091 Programmable 43 Virtual Switch Logic Mode INT
42092 Programmable 143 Virtual Switch Logic Mode INT
42093 Programmable 243 Virtual Switch Logic Mode INT
42094 Programmable 343 Virtual Switch Logic Mode INT
42095 Programmable 443 Virtual Switch Logic Mode INT

Read and Write:

0 for disabled
1 for on / off / pulse (all)
2 for on / off
3 for pulse

42099 Programmable 101 Virtual Breaker Control Logic Mode INT
42100 Programmable CKTMON Logic Mode INT

Read and Write:

0 for disabled
1 for enabled

43325 Programmable 79 Logic Mode INT

Read and Write:

0 for Recloser disabled
1 for Recloser standard power-up operation
2 for Recloser power-up to close operation

43406 Programmable 81 Logic Mode INT
43423 Programmable 181 Logic Mode INT
43440 Programmable 281 Logic Mode INT
43457 Programmable 381 Logic Mode INT

43474	Programmable 481 Logic Mode	INT
43491	Programmable 581 Logic Mode	INT

Read and Write:
0 for disabled
1 for phase enabled
2 for Vx enabled

43508	Programmable 47 Logic Mode	INT

Read and Write:
0 for disabled
1 for enabled

43525	Programmable 24 Logic Mode	INT

Read and Write:
0 for disabled
1 for enabled

43542	Programmable 25 Logic Mode	INT

Read and Write:
0 for disabled
1 for enabled

43559	Programmable 32 Logic Mode	INT
43576	Programmable 132 Logic Mode	INT

43593	Programmable 86 Logic Mode	INT
43626	Programmable 186 Logic Mode	INT

43679	Programmable P85 Logic Mode	INT
43989	Programmable CTRL Logic Mode	INT

Read and Write:
0 for disabled
1 for enabled

43744	Programmable 43TAG Logic Mode	INT
43793	Programmable 143TAG Logic Mode	INT
43842	Programmable 243TAG Logic Mode	INT
43891	Programmable 343TAG Logic Mode	INT
43940	Programmable 443TAG Logic Mode	INT

Read and Write:
0 for disabled
1 and 2

44038	Programmable Virtual Test Mode	INT

Read and Write:
0 for Disabled
1 for Enabled

44039	Virtual Test 1 Name	ASC(8)
44051	Virtual Test 2 Name	ASC(8)
44063	Virtual Test 3 Name	ASC(8)
44075	Virtual Test 4 Name	ASC(8)

Read and Write:
User defined (MASK1 to MASK8 predefined).

Logic Mask and Terms

Each set bit in the "mask" parameter indicates a significant variable in the equation. A corresponding bit in the "term" parameter indicates that the variable must be TRUE / 1 if set or FALSE / 0 if not set.

Mask and Term – First Register (Logic Var 0 to 15) BM(16)

Read only:
Bit 15 - 50TQ picked-up
Bit 14 - 150T neutral picked-up
Bit 13 - 50T neutral picked-up
Bit 12 - 150T phase picked-up
Bit 11 - 50T phase picked-up
Bit 10 - 51Q tripped
Bit 9 - 151 neutral tripped
Bit 8 - 51 neutral tripped
Bit 7 - 51 phase tripped
Bit 6 - BF tripped
Bit 5 - 150TQ tripped
Bit 4 - 50TQ tripped
Bit 3 - 150T neutral tripped
Bit 2 - 50T neutral tripped
Bit 1 - 150T phase tripped
Bit 0 - 50T phase tripped

Mask and Term – First Register (Logic Var 16 to 31) BM(16)

Read only:
Bit 15 - Logic always false
Bit 14 - 79SCB
Bit 13 - 79RST
Bit 12 - 79LO
Bit 11 - 79RNG
Bit 10 - 79C
Bit 9 - 79P
Bit 8 - 52BT
Bit 7 - 186
Bit 6 - 86
Bit 5 - 51Q picked-up
Bit 4 - 151 neutral picked-up
Bit 3 - 51 neutral picked-up
Bit 2 - 51 phase picked-up
Bit 1 - BFRT
Bit 0 - 150TQ picked-up

Mask and Term – First Register (Logic Var 32 to 47) BM(16)

Read only:
Bit 15 - Virtual Output 15 status
Bit 14 - Virtual Output 14 status
Bit 13 - Virtual Output 13 status
Bit 12 - Virtual Output 12 status
Bit 11 - Virtual Output 11 status
Bit 10 - Virtual Output 10 status
Bit 9 - Virtual Output 9 status
Bit 8 - Virtual Output 8 status
Bit 7 - Virtual Output 7 status
Bit 6 - Virtual Output 6 status
Bit 5 - Virtual Output 5 status
Bit 4 - Virtual Output 4 status
Bit 3 - Virtual Output 3 status
Bit 2 - Virtual Output 2 status
Bit 1 - Virtual Output 1 status
Bit 0 - Virtual Output A status

Mask and Term – First Register (Logic Var 48 to 63) BM(16)

Read only:
Bit 15 - Alarm minor
Bit 14 - Alarm major
Bit 13 - Alarm logic

Bit 12 - 101 SC
Bit 11 - 101 C
Bit 10 - 101 T
Bit 9 - Input 8 status
Bit 8 - Input 7 status
Bit 7 - Input 6 status
Bit 6 - Input 5 status
Bit 5 - Input 4 status
Bit 4 - Input 3 status
Bit 3 - Input 2 status
Bit 2 - Input 1 status
Bit 1 - Virtual Output 17 Status
Bit 0 - Virtual Output 16 Status

Mask and Term – First Register (Logic Var 64 to 79) BM(16)

Read only:
Bit 15 - 59X tripped
Bit 14 - 159X tripped
Bit 13 - 59 phase tripped
Bit 12 - 24 picked-up
Bit 11 - 24 tripped
Bit 10 - 47 picked-up
Bit 9 - 47 tripped
Bit 8 - 27X picked-up
Bit 7 - 27P picked-up
Bit 6 - 27X tripped
Bit 5 - 27P tripped
Bit 4 - SPARE
Bit 3 - 132 picked-up
Bit 2 - 32 picked-up
Bit 1 - 132 tripped
Bit 0 - 32 tripped

Mask and Term – First Register (Logic Var 80 to 95) BM(16)

Read only:
Bit 15 - 60FL
Bit 14 - 25 tripped
Bit 13 - 25VM2
Bit 12 - 25VM1
Bit 11 - 162
Bit 10 - 62
Bit 9 - CKTMON
Bit 8 - 581 tripped
Bit 7 - 481 tripped
Bit 6 - 381 tripped
Bit 5 - 281 tripped
Bit 4 - 181 tripped
Bit 3 - 81 tripped
Bit 2 - 159X picked-up
Bit 1 - 59X picked-up
Bit 0 - 59P picked-up

Mask and Term – First Register (Logic Var 96 to 111) BM(16)

Read only:
Bit 15 - VIN16
Bit 14 - VIN15
Bit 13 - VIN14
Bit 12 - VIN13
Bit 11 - VIN12
Bit 10 - VIN11
Bit 9 - VIN10
Bit 8 - VIN9

Bit 7 - VIN8
Bit 6 - VIN7
Bit 5 - VIN6
Bit 4 - VIN5
Bit 3 - VIN4
Bit 2 - VIN3
Bit 1 - VIN2
Bit 0 - VIN1

Mask and Term – First Register (Logic Var 112 to 127) BM(16)

Read only:
Bit 15 - Settings Group 3
Bit 14 - Settings Group 2
Bit 13 - Settings Group 1
Bit 12 - Settings Group 0
Bit 11 - SOTF
Bit 10 - P85T
Bit 9 - P85TX
Bit 8 - P85ETX
Bit 7 - P85ET
Bit 6 - SWITCH 443
Bit 5 - SWITCH 343
Bit 4 - SWITCH 243
Bit 3 - SWITCH 143
Bit 2 - SWITCH 43
Bit 1 - TRSTKEY
Bit 0 - ARSTKEY

Logic Term Count

Term Count Register SI

Read and Write:
0 means the logic equation is disabled (NONE)
-1 means the logic equation consists of a single term of OR-ed variables
1 means the logic equation consists of a single term of AND-ed variables
2 means the logic equation consists of the OR-ing of 2 terms of AND-ed variables
3 means the logic equation consists of the OR-ing of 3 terms of AND-ed variables
4 means the logic equation consists of the OR-ing of 4 terms of AND-ed variables

Session Parameters

40001 Exit ASC(1)
Read: always the ASCII character '0' (zero)
Write: ASCII characters 'Y' or 'N' ('Y' to save changes, 'N' to ignore changes)
Note: ERROR DETAIL block (49835-54) contains Exit status message following a write.

40002-5 Access Password ASC(8)
Read: always the ASCII string of '*' characters.
Write: access password in ASCII string.
Note: If password written is less than 8 characters long, a binary zero value must be included following the final password character.

40006 Access Request BM(16)
Read: returns the current write access available to the Modbus™ user
Bit 3 is set for Global Access
Bit 2 is set for Setting Access
Bit 1 is set for Control Access
Bit 0 is set for Report Access
Zero value for Read Only Access
Write: To request write privileges using the password written into Access Password registers.
Value written into Access Request register is arbitrary (any value will initiate the request).
Note: If write access is denied, the response message will be an error response message with Illegal Function exception code.

Template Parameters

40036 Settings Group Selection SI

Read: returns the current value of Settings Group Selection.
Write: the desired value to assign a Settings Group to the Group (GRP) Template.
0 for Settings Group 0
1 for Settings Group 1
2 for Settings Group 2
3 for Settings Group 3

40038 Fault Selection SI

Read: returns the current value of Fault Selection.
Write: the desired value to assign a Fault Record to the Fault (FLT) Template.
Allowed values are 0 – 255. 0 for most recent fault.
Note: Refer to Fault Indicator (47512) and Fault Template Status (47513) Registers.

40039 Report Selection SI

Read: returns the current value of Report Selection.
Writing to Report Selection terminates previous report and initializes new report. See table for values.

40040 Report Focus INT

Read: returns the current value of Report Focus.
Write: see table for values.
Note: If an illegal Report Focus value is written, the user is not notified until a read of the Report Text is attempted.

Note: Write to Report Selection and Report Focus to specify the report which will be made available via the Report (RPT) Template. The template is the Report Text Block at 47695-819.

Table 3-1. Report

Report Text 47695-819	Report Selection 40039	Report Focus 40040
RA-LGC Report	0	Not used
RA-MAJ Report	1	Not used
RA-MIN Report	2	Not used
RA-REL Report	3	Not used
RF Report	4	Not used
RF-# Report	5	Value of # (1 – 255)
RF-NEW Report	6	Not used
RS Report	7	Not used
RS-# Report	8	Value of # (1 – 127)
RS-NEW Report	9	Not used
RS-F# Report	10	Value of # (1 – 255)
RS-ALM	11	Not used
RS-IO	12	Not used
RS-LGC	13	Not used

Global Parameters

40080-83 Global Password ASC(8)
40085-88 Setting Password ASC(8)
40090-93 Control Password ASC(8)
40095-98 Report Password ASC(8)

Read: If global access granted, password ASCII strings are read. Otherwise, The ASCII string of '*' characters is read.
Write: Password in ASCII string.
Note: If password written is less than 8 characters long, a binary zero value must be included following the final password character.

40084	Global Path	BM(8)
40089	Setting Path	BM(8)
40094	Control Path	BM(8)
40099	Report Path	BM(8)

Read: path associated with password.
Write: path associated with password.
Bit 2 is set for COM 2 access.
Bit 1 is set for COM1 access.
Bit 0 is set for COM0 / FP access.

40100	PW Timeout	INT

Read and Write 1 to 1440 min.

Control Parameters

All values read from and written to Select and Operate registers are ASCII characters. Select registers must be written first, followed by a write to the Operate register. A 30 second window starts after the first write to the Select register. If the second write to the Operate register is not received within the 30 second window, an error response will be returned.

Writes to Operate registers 40138, 40140 – 40150 with ASCII data 'E ' (Enable Output override control) or 'D' (Disable Output override control) requires an additional write of 'Y' to Exit register 40001 to allow these control settings to be saved to the relay's internal eeprom.

NOTE: All values read from and written to Select and Operate registers are ASCII characters.

40117 Select Group ASC(1)

Read: To read a value other than ASCII character 'X', the Select Group register must be the most recent control register written AND must have been written within the previous 30 seconds.
0 if Group 0 selection has been made.
1 if Group 1 selection has been made.
2 if Group 2 selection has been made.
3 if Group 3 selection has been made.
L if Logic selection has been made.
X if Group control not selected or control timer has expired
Write: the desired ASCII character.
0 to select Group 0.
1 to select Group 1.
2 to select Group 2.
3 to select Group 3.
L to select Logic.

40118 Operate Group ASC(1)

Read: Current control.
0 if Group 0.
1 if Group 1.
2 if Group 2.
3 if Group 3.
L if Logic.
Write: the desired ASCII character to alter control (corresponding Select register must contain same value, written within previous 30 seconds).
0 to select Group 0.
1 to select Group 1.
2 to select Group 2.
3 to select Group 3.
L to select Logic.

40119	Select Virtual Selector Switch 43	ASC(1)
40121	Select Virtual Selector Switch 143	ASC(1)
40123	Select Virtual Selector Switch 243	ASC(1)
40125	Select Virtual Selector Switch 343	ASC(1)
40127	Select Virtual Selector Switch 443	ASC(1)

Read: To read a value other than ASCII character ‘X’, the Select Virtual Selector Switch register must be the most recent control register written AND must have been written within the previous 30 seconds.
P if Pulse Switch selection has been made.
0 if Latch Switch at 0 selection has been made.
1 if Latch Switch at 1 selection has been made.
X if Virtual Selector Switch control not selected or control timer has expired
Write: the desired ASCII character.
P to select Pulsing the Switch.
0 to select Latching the Switch at 0.
1 to select Latching the Switch at 1.

40120	Operate Virtual Selector Switch 43	ASC(1)
40122	Operate Virtual Selector Switch 143	ASC(1)
40124	Operate Virtual Selector Switch 243	ASC(1)
40126	Operate Virtual Selector Switch 343	ASC(1)
40128	Operate Virtual Selector Switch 443	ASC(1)

Read: Current control.
P if Pulse Switch.
0 if Latch Switch at 0.
1 if Latch Switch at 1.
Write: the desired ASCII character to alter control (corresponding Select register must contain same value, written within previous 30 seconds).
P to Pulse Switch.
0 to Latch Switch at 0.
1 to Latch Switch at 1.

40135 Select 101 Virtual Breaker Control Switch ASC(1)

Read: To read a value other than ASCII character ‘X’, the Select 101 Virtual Breaker Control Switch register must be the most recent control register written AND must have been written within the previous 30 seconds.
C if Close selection has been made.
T if Trip selection has been made.
X if 101 Virtual Breaker Control Switch control not selected or control timer has expired
Write: the desired ASCII character.
C to select Closing the Switch.
T to select Tripping the Switch.

40136 Operate 101 Virtual Breaker Control Switch ASC(1)

Read: Current control.
C if Close Switch.
T if Trip Switch.
Write: the desired ASCII character to alter control (corresponding Select register must contain same value, written within previous 30 seconds).
C to Close Switch.
T to Trip Switch.

40137 Select All Outputs ASC(1)

Read: To read a value other than ASCII character ‘X’, the Select All Output register must be the most recent control register written AND must have been written within the previous 30 seconds.
P if Pulse All Outputs selection has been made.
0 if Latch All Outputs at 0 selection has been made.
1 if Latch All Outputs at 1 selection has been made.
L if programmable Logic selection has been made.
E if Enable All Outputs override control has been set.
D if Disable All Outputs override control has been set.
X if All Outputs control not selected or control timer has expired
Write: the desired ASCII character.
P to select Pulsing All Outputs.

0 to select Latching All Outputs at 0.
1 to select Latching All Outputs at 1.
L to select programmable Logic.
E to select Enabling All Outputs override control.
D to select Disabling All Outputs override control.

40138	Operate All Outputs	ASC(1)

Read: Current control.
E if All Outputs override control Enabled.
D if All Outputs override control Disabled.
Write: the desired ASCII character to alter control (corresponding Select register must contain same value, written within previous 30 seconds).
P to Pulse All Outputs.
0 to Latch All Outputs at 0.
1 to Latch All Outputs at 1.
L to select programmable Logic.
E to Enable All Outputs override control. *
D to Disable All Outputs override control. *

40139	Select Output A	ASC(1)
40141	Select Output 1	ASC(1)
40143	Select Output 2	ASC(1)
40145	Select Output 3	ASC(1)
40147	Select Output 4	ASC(1)
40149	Select Output 5	ASC(1)
40151	Select Output 6	ASC(1)
40153	Select Output 7	ASC(1)

Read: To read a value other than ASCII character 'X', the Select Output register must be the most recent control register written AND must have been written within the previous 30 seconds.
P if Pulse Output selection has been made.
0 if Latch Output at 0 selection has been made.
1 if Latch Output at 1 selection has been made.
L if programmable Logic selection has been made.
E if Enable All Outputs serial control has been made.
D if Disable All Outputs serial control has been made.
X if Output control not selected or control timer has expired
Write: the desired ASCII character.
P to select Pulsing Output.
0 to select Latching Output at 0.
1 to select Latching Output at 1.
L to select programmable Logic.
E to select Enabling All Outputs override control.
D to select Disabling All Outputs override control.

40140	Operate Output A	ASC(1)
40142	Operate Output 1	ASC(1)
40144	Operate Output 2	ASC(1)
40146	Operate Output 3	ASC(1)
40148	Operate Output 4	ASC(1)
40150	Operate Output 5	ASC(1)
40152	Operate Output 6	ASC(1)
40154	Operate Output 7	ASC(1)

Read: Current control.
P to Pulse Output.
0 to Latch Output at 0.
1 to Latch Output at 1.
L to select programmable Logic.
D if All Outputs override control Disabled
Write: the desired ASCII character to alter control (corresponding Select register must contain same value, written within previous 30 seconds).

P to Pulse Output.
0 to Latch Output at 0.
1 to Latch Output at 1.
L to select programmable Logic.
E to Enable All Outputs override control. *
D to Disable All Outputs override control. *

40157	Select Switch 43TAG	ASC(1)
40159	Select Switch 143TAG	ASC(1)
40161	Select Switch 243TAG	ASC(1)
40163	Select Switch 343TAG	ASC(1)
40165	Select Switch 443TAG	ASC(1)

Read: To read a value other than ASCII character 'X', the Select Switch register must be the most recent control register written AND must have been written within the previous 30 seconds.
0 if Latch Switch at 0 selection has been made.
1 if Latch Switch at 1 selection has been made.
X if Virtual Selector Switch control not selected or control timer has expired
Write: the desired ASCII character.
0 to select Latching the Switch at 0.
1 to select Latching the Switch at 1.

40158	Operate Switch 43TAG	ASC(1)
40160	Operate Switch 143TAG	ASC(1)
40162	Operate Switch 243TAG	ASC(1)
40164	Operate Switch 343TAG	ASC(1)
40166	Operate Switch 443TAG	ASC(1)

Read: Current control.
0 if Latch Switch at 0.
1 if Latch Switch at 1.
Write: the desired ASCII character to alter control (corresponding Select register must contain same value, written within previous 30 seconds).
0 to Latch Switch at 0.
1 to Latch Switch at 1.

40175	Select VTS Switch	ASC(1)

Read: to read a value other than ASCII character 'X', the Select Virtual Test Switch register must be the most recent control register written AND must have been written within the previous 30 seconds.
1, 2, 3 or 4 if enable selection has been made.
D if Disable selection has been made.
Write: the desired ASCII character.
1, 2, 3 or 4 to select Virtual Test Switch 1, 2, 3 or 4.
D to select Disabling the Switch.

40176	Operate VTS Switch	ASC(1)

Read: Current control.
E if Enable Switch.
D if Disable Switch.
Write: the desired ASCII character to alter control (corresponding Select register must contain same value, written within previous 30 seconds).
E to Enable Switch.
D to Disable Switch.

Requires an additional write of 'Y' to Exit register 40001 to allow these control settings to be saved to the relay's internal eeprom (if Modbus™ password security is enabled).

Group Setting Parameters

40259-60	50TP Pickup	FP
40264-65	50TN Pickup	FP
40269-70	50TQ Pickup	FP
40274-75	150TP Pickup	FP
40279-80	150TN Pickup	FP
40284-85	150TQ Pickup	FP
	Read and Write: 0.50 to 150.00 Amps	
40261-62	50TP Time Delay	LI
40266-67	50TN Time Delay	LI
40271-72	50TQ Time Delay	LI
40276-77	150TP Time Delay	LI
40281-82	150TN Time Delay	LI
40286-87	150TQ Time Delay	LI
	Read and Write: 0 to 60,000 milliseconds	
40263	50TP Directional Mode	ASC(1)
40268	50TN Directional Mode	ASC(1)
40273	50TQ Directional Mode	ASC(1)
40278	150TP Directional Mode	ASC(1)
40283	150TN Directional Mode	ASC(1)
40288	150TQ Directional Mode	ASC(1)
	Read and Write: R = Reverse N = Neutral F = Forward	
40301-02	51P Pickup	FP
40308-09	51N Pickup	FP
40315-16	51Q Pickup	FP
40322-23	151N Pickup	FP
	Read and Write: 0.50 to 16.00 Amps	
40303-04	51P Time Dial	FP
40310-11	51N Time Dial	FP
40317-18	51Q Time Dial	FP
40324-25	151N Time Dial	FP
	Read and Write: 0.0 to 9.9	
40305-06	51P Curve Type	ASC(3)
40312-13	51N Curve Type	ASC(3)
40319-20	51Q Curve Type	ASC(3)
40326-27	151N Curve Type	ASC(3)
	Read and Write: one of the following ASCII strings: S1, S2, L1, L2, D, M, I1, I2, V1, V2, E1, E2, S1R, S2R, L1R, L2R, DR, MR, I1R, I2R, V1R, V2R, E1R, E2R, A, B, C, G, F, P, AR, BR, CR, GR, FR, PR	
40307	51P Directional Mode	ASC(1)
40314	51N Directional Mode	ASC(1)
40321	51Q Directional Mode	ASC(1)
40328	151N Directional Mode	ASC(1)
	Read and Write: R = Reverse N = Neutral F = Forward	

40359-60	62 Time Delay 1	LI
40361-62	62 Time Delay 2	LI
40363-64	162 Time Delay 1	LI
40365-66	162 Time Delay 2	LI
	Read and Write: 0 to 9,999,000 Milliseconds	
40406-07	79 First Automatic Reclose Delay	LI
40408-09	79 Second Automatic Reclose Delay	LI
40410-11	79 Third Automatic Reclose Delay	LI
40412-13	79 Fourth Automatic Reclose Delay	LI
40414-15	79 Reset Time Delay	LI
40416-17	79 Reclose Fail Time Delay	LI
40418-19	79 Maximum Cycle Time Delay	LI
40420-21	79 Pilot Time Delay	LI
	Read and Write: 100 to 600,000 Milliseconds 0 to disable	
40422	79 Sequence Control Read and Write: Bit 0 to Block Shot #1 Bit 1 to Block Shot #2 Bit 2 to Block Shot #3 Bit 3 to Block Shot #4 Bit 4 to Block Shot #5	BM(16)
40425-26	27R Pickup Read and Write: 0 to disable 30.0 to 250	FP
40427	27R Control Mode Read and Write: R or C	ASC(1)
40428-29	47 Pickup Read and Write: 0 to disable 1 to 300	FP
40430-31	47 Time Delay Read and Write 50 to 600,000 Milliseconds	LI
40432-33	59 Pickup Read and Write: 0 to disable 10.0 to 300	FP
40436-37	59X Pickup Read and Write: 0 to disable 1.00 to 150	FP
40434-35	59 Time Delay	LI
40438-39	59X Time Delay Read and Write 50 to 600,000 Milliseconds	LI
40440-41	81 Pickup	FP
40445-46	181 Pickup	FP
40450-51	281 Pickup	FP
40455-56	381 Pickup	FP
40460-61	481 Pickup	FP
40465-66	581 Pickup Read and Write: 0 to disable 40.00 to 70.00 Hz	FP

40442-43	81 Time Delay	LI
40447-48	181 Time Delay	LI
40452-53	281 Time Delay	LI
40457-58	381 Time Delay	LI
40462-66	481 Time Delay	LI
40467-68	581 Time Delay	LI
	Read and Write: 0 to 600,000 Milliseconds	
40444	81 Mode	ASC(1)
40449	181 Mode	ASC(1)
40454	281 Mode	ASC(1)
40459	381 Mode	ASC(1)
40464	481 Mode	ASC(1)
40469	581 Mode	ASC(1)
	Read and Write: O = Over Frequency U = Under Frequency	
40470-71	81 Inhibit Setting	FP
	Read and Write: 0 to disable 15.0 to 150	
40472-73	27P Pickup	FP
40476-77	27P Voltage Inhibit	FP
	Read and Write: 0 to disable 10.0 to 300	
40478-79	27X Pickup	FP
40482-83	27X Voltage Inhibit	FP
	Read and Write: 0 to disable 1.00 to 150	
40474-75	27 Time Delay	LI
40480-81	27X Time Delay	LI
	Read and Write: 50 to 600,000 milliseconds	
40484-85	24 Pickup	FP
	Read and Write: 0 to disable 0.5 to 6.0	
40486-87	24 Time Delay	FP
40488-89	24 Reset Delay	FP
	Read and Write: 0 to 9.9	
40490-91	25 Delta Volts	FP
	Read and Write: 1.0 to 20.0	
40492-93	25 Phase Angle	FP
	Read and Write: 1.0 to 45.0 degrees	
40494-95	25 Slip Frequency	FP
	Read and Write: 0.01 to 0.50 Hz	
40496	25 Mode	LI
	Read and Write: 1 = GF>BF 0 = GF<>BF	
40497-98	25 VM Live Volts	FP
40499-500	25 VM Dead Volts	FP
	Read and Write: 10.0 to 150	
40501-02	25 VM Time Delay	LI
	Read and Write: 50 to 60,000 Milliseconds	

40503-04	25 VM Mode 1	ASC(3)
40505-06	25 VM Mode 2	ASC(3)
	Read and Write: 1, 2, 3, 12, 23, 31, 123, or DIS	
40507-08	67 Neutral Polarizing Mode	ASC(3)
	Read and Write: QVI,QV,QI,VI,Q,V,I	
40509-10	67 Neutral Polarizing Qty	ASC(4)
	Read and Write: V0IN,V0IG,VXIN,VXIG	
40511-12	32 Pickup	FP
40516-17	132 Pickup	FP
	Read and Write: 1.00 to 6000	
40513-14	32 Time Delay	LI
40518-19	132 Time Delay	LI
	Read and Write: 50 to 600,000 milliseconds	
40515	32 Mode	ASC(1)
40520	132 Mode	ASC(1)
	Read and Write : R or F	
40523-24	50BF Time Delay	LI
40529-30	50BF Ctrl Time Delay	LI
	Read and Write : 50 to 999 ms	
40525-26	50BF Phase PU	FP
40527-28	50BF Neutral PU	FP
	Read and Write : 0.5 to 1.99 Amps	
40531-32	52BT Undervoltage PU	FP
	Read and Write :0.00 to 300.00 volts	
40533	52BT Input Enable	INT
40534	27P3T Input Enable	INT
	Read and Write : 0 (disable), 1 (enable)	
40535-36	52BT Timer	LI
	Read and Write : 0 to 999 ms	
40539-40	159X Pick Up	FP
	Read and Write :10 to 300 Volts	
40541-42	159X Time Delay	LI
	Read and Write : 50 to 600000 ms	
40545-46	P85Z3RBD Time Delay	LI
40547-48	P85EBD Time Delay	LI
40549-50	P85ETDPU Time Delay	LI
40551-52	P85EDUR Time Delay	LI
	Read and Write : 0 to 999 ms	
40553-54	SOTF 50TP Pickup	FP
	Read and Write :0.5 to 150 A	
40555-56	SOTF Time Delay	LI
	Read and Write : 0 to 999 ms	
40557-58	Load Encroachment Mode	FP
	Read and Write :0 to 2.00	
40559-60	Maximum Load PF Forward Power Leading	FP
40561-62	Maximum Load PF Forward Power Lagging	FP
40563-64	Maximum Load PF Reverse Power Leading	FP
40565-66	Maximum Load PF Reverse Power Lagging	FP
	Read and Write :0 to 1.00	

40567-68	27P Timing Mode: DEF (definite) or INV (inverse)	ASC(3)
40569-70	27P Time Dial Read and Write: 0.0 to 9.9	FP
40571-72	27XP Timing Mode: DEF (definite) or INV (inverse)	ASC(3)
40573-74	27XP Time Dial Read and Write: 0.0 to 9.9	FP
40575-76	47 Timing Mode: DEF (definite) or INV (inverse)	ASC(3)
40577-78	47 Time Dial Read and Write: 0.0 to 9.9	FP
40579-80	59P Timing Mode: DEF (definite) or INV (inverse)	ASC(3)
40581-82	59P Time Dial Read and Write: 0.0 to 9.9	FP
40583-84	59X Timing Mode: DEF (definite) or INV (inverse)	ASC(3)
40585-86	59X Time Dial Read and Write: 0.0 to 9.9	FP
40587-88	159X Timing Mode: DEF (definite) or INV (inverse)	ASC(3)
40589-90	19X Time Dial Read and Write: 0.0 to 9.9	FP

Global Setting Parameters

40602-03	Power System Nominal Voltage Read and Write: 50 to 250	FP
40604-05	Power System Nominal Current Read and Write: 0.5 to 10.0	FP
40608-09	Programmable 51 Curve Constant A Delay Read and Write: 0.0000 to 600.0000	FP
40610-11	Programmable 51 Curve Constant B Delay Read and Write: 0.0000 to 25.0000	FP
40612-13	Programmable 51 Curve Constant C Delay Read and Write: 0.0000 to 1.0000	FP
40614-15	Programmable 51 Curve Constant N Delay Read and Write: 0.5000 to 2.5000	FP
40616-17	Programmable 51 Curve Constant R Delay Read and Write: 0.0000 to 30.0000	FP
40618	Input 1 Contact Recognition Time Delay	SI
40619	Input 1 Contact Debounce Time Delay	SI
40620	Input 2 Contact Recognition Time Delay	SI
40621	Input 2 Contact Debounce Time Delay	SI
40622	Input 3 Contact Recognition Time Delay	SI
40623	Input 3 Contact Debounce Time Delay	SI
40624	Input 4 Contact Recognition Time Delay	SI
40625	Input 4 Contact Debounce Time Delay	SI
40626	Input 5 Contact Recognition Time Delay	SI
40627	Input 5 Contact Debounce Time Delay	SI
40628	Input 6 Contact Recognition Time Delay	SI
40629	Input 6 Contact Debounce Time Delay	SI
40630	Input 7 Contact Recognition Time Delay	SI
40631	Input 7 Contact Debounce Time Delay	SI
40632	Input 8 Contact Recognition Time Delay	SI
40633	Input 8 Contact Debounce Time Delay Read and Write: 4 to 255 Milliseconds	SI

40634	DSP Filter Type Read only: F	ASC(1)
40635	Virtual Test Switch Timeout Read and write 1 to 1440 min.	
40746-870	Contiguous Poll Block Assignments Read and Write: 0 if Unassigned 1 to 9874: Holding Register 40001 to 49874 Note: To read the data from the registers programmed in this block, Contiguous Poll Block registers 49875-49999 must be read.	INT
40871	Setting Group Control On Time Read and Write: 0 to 10 Seconds	INT
40872	Setting Group 1 Automatic Control Switch Time	SI
40874	Setting Group 1 Automatic Control Return Time	SI
40877	Setting Group 2 Automatic Control Switch Time	SI
40879	Setting Group 2 Automatic Control Return Time	SI
40882	Setting Group 3 Automatic Control Switch Time	SI
40884	Setting Group 3 Automatic Control Return Time Read and Write: 0 to 60 Minutes	SI
40873	Setting Group 1 Automatic Control Switch Level	SI
40875	Setting Group 1 Automatic Control Return Level	SI
40878	Setting Group 2 Automatic Control Switch Level	SI
40880	Setting Group 2 Automatic Control Return Level	SI
40883	Setting Group 3 Automatic Control Switch Level	SI
40885	Setting Group 3 Automatic Control Return Level Read and Write: 0 to 150%	SI
40876	Setting Group 1 Tracking Element	INT
40881	Setting Group 2 Tracking Element	INT
40886	Setting Group 3 Tracking Element Read and Write: 0 to 7 (0 =51P, 1=51Q, 2=51N, 3=151N, 4=791, 5=792, 6=793, 7=794)	INT
40903-04	60FL Loss of Current Auto Block Setting Read and Write: ENA/DIS	ASC(3)
40905-06	60FL Loss of Voltage Auto Block Setting Read and Write: DIS/PNQ/PN/PQ/NQ/P/N/Q	ASC(3)

Serial Port Setting Parameters

40962	Serial Port 0 Baud Rate	INT
40971	Serial Port 1 Baud Rate	INT
40980	Serial Port 2 Baud Rate Read and Write: 0 – 300 Baud (Do not select for port 2 Modbus™ communications) 1 – 600 Baud (Do not select for port 2 Modbus™ communications) 2 – 1200 Baud (Do not select for port 2 Modbus™ communications) 3 – 2400 Baud 4 – 4800 Baud 5 – 9600 Baud 6 – 19K Baud 7 – 38K Baud	INT

40972 40981	Serial Port 1 Relay Address Serial Port 2 Relay Address Read and Write: 0 to 65,534	INT INT	
40964 40973	Serial Port 0 Software Flow Control Serial Port 1 Software Flow Control Read: 0 if XON / XOFF Control is disabled 1 if XON / XOFF Control is enabled Write: 0 to disable XON / XOFF Control 1 to 255 to enable XON / XOFF Control	SI SI	
40965 40974	Serial Port 0 Page Length Serial Port 1 Page Length Read and Write: 0 for disabled 1 to 40 for number of lines / page	SI SI	
40966 40975	Serial Port 0 Acknowledgement Format Serial Port 1 Acknowledgement Format Read: 0 if No acknowledge 1 if Acknowledge enabled Write: 0 for No acknowledge 1 to 255 to enable acknowledge	SI SI	
40986	Serial Port 2 Modbus™ Parity Read and Write: 0 for No parity 1 for Even parity 2 for Odd parity	SI	
40987	Serial Port 2 Modbus™ Remote Delay Read and Write: 1 to 20: 10 to 200 Milliseconds	SI	
40988	Serial Port 2 Modbus™ Stop Bits Read and Write: 1 for One stop bit 2 for Two stop bits		SI
40989	Serial Port 2 Modbus™ Password Security Read and Write: 0 for Disable Password 1 for Enable Password		SI

System Data Setting Parameters

41018	System Frequency Read and Write: 50 for 50 Hertz 60 for 60 Hertz	SI	
41019-20	Phase Rotation Read and Write: ABC for ABC rotation ACB for ACB rotation	ASC(3)	

41021	Phase CT Ratio		INT
41022	Ground CT Ratio Read and Write: 1 to 50,000		INT
41033-34	Phase VT Ratio		FP
41041-42	Auxiliary VT Ratio Read and Write: 1.00 to 10,000		FP
41035-36	27/59 Voltage Sensing Mode		ASC(3)
41037-38	51/27R Voltage Sensing Mode PP for Line PN for Phase		ASC(3)
41039-40	VT Connection Read and Write: 3W for 3W 4W for 4W AB for AB BC for BC CA for CA AN for AN BN for BN CN for CN		ASC(3)
41043-44	VT Auxiliary Connection Read and Write: AB for AB BC for BC CA for CA AN for AN BN for BN CN for CN GR for GR		ASC(3)
41045	Load Profile Interval Read and Write: 1 to 60 minutes	R W	INT
41046-47	Power Line - Z1 Impedance Read and Write: 0.05 to 200	R W	FP
41050-51	Power Line - Z0 Impedance Read and Write: 0.05 to 650	R W	FP
41048-49	Power Line - Z1 Angle	R W	FP
41052-53	Power Line - Z0 Angle Read and Write: 0.0 to 90	R W	FP
41054-55	Power Line - Line Length Read and Write: 0.01 to 650	R W	FP
41056	Number of Oscillography Records	R W	INT
41057	SER Records Time & Date Change	R W	INT

Breaker Duty Setting Parameters

41092-93	Breaker Duty Type Read and Write: 1.00 to 3.00		FP
41094-95	Maximum Breaker Duty Read and Write: 0 to any Amps		FP

41096	Programmable Breaker Alarm #1 Mode	INT
41099	Programmable Breaker Alarm #2 Mode	INT
41102	Programmable Breaker Alarm #3 Mode	INT
	Read and Write: 0 for Disabled 1 for Percent duty 2 for Breaker operations 3 for Clearing time	
41097-98	Programmable Breaker Alarm #1 Limit	FP
41100-01	Programmable Breaker Alarm #2 Limit	FP
41103-04	Programmable Breaker Alarm #3 Limit	FP
	Read and Write: If mode is 0: Reads 0, Any value writes 0 If mode is 1: 0.00 to 100.00% If mode is 2: 0 to 99,999 If mode is 3: 0, 20 to 1000 Milliseconds	

Relay Data Setting Parameters

41227	Volts / Hertz alarm settings Read and Write: 0 to 120 percent	INT
41228	Under Voltage alarm settings	INT
41229	Over Voltage alarm settings Read and Write: 0 to 300 Volts	INT
41231-32	Forward Var Demand Alarm	FP
41233-34	Reverse Var Demand Alarm Read and Write: 0.0 to 8500 Vars	FP
41235-36	Forward Watt Demand Alarm	FP
41237-38	Reverse Watt Demand Alarm Read and Write: 0.0 to 8500 Vars	FP
41239	Phase Demand Alarm Level	INT
41240	Neutral Demand Alarm Level	INT
41241	Negative Sequence Demand Alarm Level	INT
41242	Ground Current Demand Alarm Level	INT
41243	Average Current Demand Alarm Level Read and Write: 0 to 1600 centiAmps (10^{-3})	INT
41245	Phase Voltage Max Demand Alarm Level	INT
41246	Neutral Voltage Max Demand Alarm Level	INT
41247	Average Voltage Max Demand Alarm Level	INT
41248	Phase Voltage Min Demand Alarm Level	INT
41249	Neutral Voltage Min Demand Alarm Level	INT
41250	Average Voltage Min Demand Alarm Level Read and Write: 0 to 300 Volts	INT
41252	Clock Format – Date Read and Write: M for mm/dd/yy format D for dd/mm/yy format	ASC(1)
41253	Clock Format – Time Read and Write: 12 for 12 hour clock 24 for 24 hour clock	SI

41254	Clock Format – Daylight Savings Read and Write: 0 for disabling Daylight Savings 1 for enabling Daylight Savings	SI
41255	Phase Demand Interval	SI
41256	Neutral Demand Interval	SI
41257	Negative Sequence Demand Interval Read and Write: 1 to 60 minutes 0 to disable	SI
41258	Demand Calculation Method Read and Write: T - Thermal B - Block S – Sliding Block	ASC(1)
41264	Output Hold Mask Read and Write: Bit 7 - Spare Bit 6 - Output 6 Status Bit 5 - Output 5 Status Bit 4 - Output 4 Status Bit 3 - Output 3 Status Bit 2 - Output 2 Status Bit 1 - Output 1 Status Bit 0 - Output A Status	BM(8)
41267	Target Mask MSBs Read and Write: Bit 15 - 51Q Bit 14 - 151N Bit 13 - 51N Bit 12 - 51C Bit 11 - 51B Bit 10 - 51A Bit 9 - 150TQ Bit 8 - 50TQ Bit 7 - 150TN Bit 6 - 50TN Bit 5 - 150TC Bit 4 - 150TB Bit 3 - 150TA Bit 2 - 50TC Bit 1 - 50TB Bit 0 - 50TA	BM(16)
41268	Target Mask Second MSBs Read and Write: Bit 15 - BF Bit 14 - 52BT Bit 13 - 47 Bit 12 - SOTF Bit 11 - Spare Bit 10 - 132 Bit 9 - 32 Bit 8 - Spare Bit 7 - 27X Bit 6 - Spare Bit 5 - Spare Bit 4 - Spare Bit 3 - 27C Bit 2 - 27B	BM(16)

	Bit 1 - 27A Bit 0 - 24	
41269	Target Mask Third MSBs Read and Write: Bit 15 - 581 Bit 14 - 481 Bit 13 - 381 Bit 12 - 281 Bit 11 - 181 Bit 10 - 81 Bit 9 - 67TQ Bit 8 - 167TN Bit 7 - 67TN Bit 6 - 67TC Bit 5 - 67TB Bit 4 - 67TA Bit 3 - 167Q Bit 2 - 67Q Bit 1 - 167N Bit 0 - 67N	BM(16)
41270	Target Mask LSBs Read and Write: Bit 15 - 167C Bit 14 - 167B Bit 13 - 167A Bit 12 - 67C Bit 11 - 67B Bit 10 - 67A Bit 9 - P85E Bit 8 - P85 Bit 7 - 162 Bit 6 - 62 Bit 5 - 60FL Bit 4 - 159X Bit 3 - 59X Bit 2 - 59C Bit 1 - 59B Bit 0 - 59A	BM(16)
41271-74	Programmable Screen #1	ASC(7)
41275-78	Programmable Screen #2	ASC(7)
41279-82	Programmable Screen #3	ASC(7)
41283-86	Programmable Screen #4	ASC(7)
41287-90	Programmable Screen #5	ASC(7)
41291-94	Programmable Screen #6	ASC(7)
41295-98	Programmable Screen #7	ASC(7)
41299-302	Programmable Screen #8	ASC(7)
41303-06	Programmable Screen #9	ASC(7)
41307-10	Programmable Screen #10	ASC(7)
41311-14	Programmable Screen #11	ASC(7)
41315-18	Programmable Screen #12	ASC(7)
41319-22	Programmable Screen #13	ASC(7)
41323-26	Programmable Screen #14	ASC(7)
41327-30	Programmable Screen #15	ASC(7)
41331-34	Programmable Screen #16 Read and Write: screen identifier. For example, the Output Status Screen would be 1.5.2	ASC(7)
41447	Major Alarm Mask 0 MSBs	BM(16)
41451	Minor Alarm Mask 0 MSBs	BM(16)

41455	Logic Alarm Mask 0 MSBs Read and Write: Bit 15 - 27 Undervoltage Alarm Bit 14 - Volts per Hertz alarm Bit 13 - 60 Fuse Loss alarm Bit 12 - Changes Lost alarm Bit 11 - Freq Range alarm Bit 10 - Fwd Watt Demand alarm Bit 9 - Neg Var Demand alarm Bit 8 - Logic = None alarm Bit 7 - Flt Rpt Timeout alarm Bit 6 - Virtual Output 15 alarm Bit 5 - Virtual Output 14 alarm Bit 4 - Virtual Output 13 alarm Bit 3 - Setting Group Change Active alarm Bit 2 - Loss of IRIG-B sync or IRIG-B decode problem Bit 1 - An override is active in one or more outputs Bit 0 - EEPROM Non fatal error	BM(16)
41448	Major Alarm Mask 0 LSBs	BM(16)
41452	Minor Alarm Mask 0 LSBs	BM(16)
41456	Logic Alarm Mask 0 LSBs Read and Write: Bit 15 - User settings changed, ('EXIT' with 'Y') Bit 14 - Power reset alarm, hard reset of MPU Bit 13 - Clock problem, real time clock has not been set Bit 12 - Communicating failure alarm, read error on serial port Bit 11 - Operating System Overload detected alarm Bit 10 - Setting group override in effect Bit 9 - Q demand alarm, excessive negative sequence unbalance Bit 8 - Neutral demand alarm Bit 7 - Phase demand alarm Bit 6 - Breaker alarm #3 Bit 5 - Breaker alarm #2 Bit 4 - Breaker alarm #1 Bit 3 - Recloser Lockout Bit 2 - Recloser Fail Bit 1 - Breaker fail alarm Bit 0 - Out 1 CKT Open alarm	BM(16)
41449	Major Alarm Mask 1 LSBs	BM(16)
41453	Minor Alarm Mask 1 LSBs	BM(16)
41457	Logic Alarm Mask 1 LSBs Read and Write: Bit 0 - Bit 15 not used	BM(16)
41450	Major Alarm Mask 1 LSBs	BM(16)
41454	Minor Alarm Mask 1 LSBs	BM(16)
41458	Logic Alarm Mask 1 LSBs Read and Write: Bit 12 - Bit 15 not used Bit 11 - VN Min Demand Alarm Bit 10 - VN Max Demand Alarm Bit 9 - Vavg Min Demand Alarm Bit 8 - Vavg Max Demand Alarm Bit 7 - VP Min Demand Alarm Bit 6 - VP Max Demand Alarm Bit 5 - I Avg Demand Alarm Bit 4 - IG Demand Alarm Bit 3 - Rev Watt Demand Alarm Bit 2 - Neg Var Demand Alarm	BM(16)

Bit 1 - Virtual Test Switch Active
Bit 0 - 59 Over VoltageAlarm

Custom Logic Setting Parameters

41465-68	User Custom Logic Name Read: If programming, reads custom logic name Write: New custom logic name or standard logic name of logic scheme to be copied to custom scheme.	ASC(8)
41469-72	Current Active Logic Scheme Read: Current active logic name.	ASC(8)
41473-76	Custom Logic Name Read: Custom logic name.	ASC(8)
41477-80	Standard Logic #1 Name Read: Standard logic name #1.	ASC(8)
41481-84	Standard Logic #2 Name Read: Standard logic name #2.	ASC(8)
41485-88	Standard Logic #3 Name Read: Standard logic name #3.	ASC(8)
41489-92	Standard Logic #4 Name Read: Standard logic name #4.	ASC(8)
41493-96	Standard Logic #5 Name Read: Standard logic name #5.	ASC(8)
41497-500	Standard Logic #6 Name Read: Standard logic name #6.	ASC(8)
41501-04	Standard Logic #7 Name Read: Standard logic name #7.	ASC(8)

System Labels and ID Setting Parameters

All are Read and Write of ASCII strings.

Report Parameters

47030-34	Model Number	ASC(10)
47039-47	Application SW Version # / Date	ASC(18)
47053-61	Boot SW Version # / Date	ASC(18)
47067-73	Serial Number	ASC(13)
47081-91	Style Number Read Only: ASCII strings	ASC(21)
47107	COM0 Serial Port Relay Address Read Only: 0	INT
47108	COM1 Serial Port Relay Address Read and Write: 0 to 65,534	INT
47109	Date and Time – Day Read and Write: any value (days since 01/01/1984).	INT
47110-11	Date and Time – Milliseconds Read and Write: 0 to 86,399,999 Milliseconds	LI
47112	System Status (Logic Var 0 to 15) Read only: Bit 15 - 50TQ picked-up	BM(16)

	Bit 14 - 150T neutral picked-up Bit 13 - 50T neutral picked-up Bit 12 - 150T phase picked-up Bit 11 - 50T phase picked-up Bit 10 - 51Q tripped Bit 9 - 151 neutral tripped Bit 8 - 51 neutral tripped Bit 7 - 51 phase tripped Bit 6 - BF tripped Bit 5 - 150TQ tripped Bit 4 - 50TQ tripped Bit 3 - 150T neutral tripped Bit 2 - 50T neutral tripped Bit 1 - 150T phase tripped Bit 0 - 50T phase tripped	
47113	System Status (Logic Var 16 to 31) Read only: Bit 15 - Logic always false Bit 14 - 79SCB Bit 13 - 79RST Bit 12 - 79LO Bit 11 - 79RNG Bit 10 - 79C Bit 9 - 79P Bit 8 - 52BT Bit 7 - 186 Bit 6 - 86 Bit 5 - 51Q picked-up Bit 4 - 151 neutral picked-up Bit 3 - 51 neutral picked-up Bit 2 - 51 phase picked-up Bit 1 - BFRT Bit 0 - 150TQ picked-up	BM(16)
47114	System Status (Logic Var 32 to 47) Read only: Bit 15 - Virtual Output 15 status Bit 14 - Virtual Output 14 status Bit 13 - Virtual Output 13 status Bit 12 - Virtual Output 12 status Bit 11 - Virtual Output 11 status Bit 10 - Virtual Output 10 status Bit 9 - Virtual Output 9 status Bit 8 - Virtual Output 8 status Bit 7 - Virtual Output 7 status Bit 6 - Virtual Output 6 status Bit 5 - Virtual Output 5 status Bit 4 - Virtual Output 4 status Bit 3 - Virtual Output 3 status Bit 2 - Virtual Output 2 status Bit 1 - Virtual Output 1 status Bit 0 - Virtual Output A status	BM(16)
47115	System Status (Logic Var 48 to 63) Read only: Bit 15 - Alarm minor Bit 14 - Alarm major Bit 13 - Alarm logic Bit 12 - 101 SC Bit 11 - 101 C	BM(16)

	Bit 10 - 101 T Bit 9 - Input 8 status Bit 8 - Input 7 status Bit 7 - Input 6 status Bit 6 - Input 5 status Bit 5 - Input 4 status Bit 4 - Input 3 status Bit 3 - Input 2 status Bit 2 - Input 1 status Bit 1 - Virtual Output 17 Status Bit 0 - Virtual Output 16 Status	
47116	System Status (Logic Var 64 to 79) Read only: Bit 15 - 159X tripped Bit 14 - 59X tripped Bit 13 - 59 phase tripped Bit 12 - 24 picked-up Bit 11 - 24 tripped Bit 10 - 47 picked-up Bit 9 - 47 tripped Bit 8 - 27X picked-up Bit 7 - 27P picked-up Bit 6 - 27X tripped Bit 5 - 27P tripped Bit 4 - SPARE Bit 3 - 132 picked-up Bit 2 - 32 picked-up Bit 1 - 132 tripped Bit 0 - 32 tripped	BM(16)
47117	System Status (Logic Var 80 to 95) Read only: Bit 15 - 60FL Bit 14 - 25 tripped Bit 13 - 25VM2 Bit 12 - 25VM1 Bit 11 - 162 Bit 10 - 62 Bit 9 - CKTMON Bit 8 - 581 tripped Bit 7 - 481 tripped Bit 6 - 381 tripped Bit 5 - 281 tripped Bit 4 - 181 tripped Bit 3 - 81 tripped Bit 2 - 159X picked-up Bit 1 - 59X picked-up Bit 0 - 59P picked-up	BM(16)
47118	System Status (Logic Var 96 to 111) Read only: Bit 15 - VIN16 Bit 14 - VIN15 Bit 13 - VIN14 Bit 12 - VIN13 Bit 11 - VIN12 Bit 10 - VIN11 Bit 9 - VIN10 Bit 8 - VIN9 Bit 7 - VIN8	BM(16)

	Bit 6 - VIN7 Bit 5 - VIN6 Bit 4 - VIN5 Bit 3 - VIN4 Bit 2 - VIN3 Bit 1 - VIN2 Bit 0 - VIN1	
47119	System Status (Logic Var 112 to 127) Read only: Bit 15 - Settings Group 3 Bit 14 - Settings Group 2 Bit 13 - Settings Group 1 Bit 12 - Settings Group 0 Bit 11 - SOTF Bit 10 - P85T Bit 9 - P85TX Bit 8 - P85ETX Bit 7 - P85ET Bit 6 - SWITCH 443 Bit 5 - SWITCH 343 Bit 4 - SWITCH 243 Bit 3 - SWITCH 143 Bit 2 - SWITCH 43 Bit 1 - TRSTKEY Bit 0 - ARSTKEY	BM(16)
47120	Current Active Group Setting Read only: 0 to 3	SI
47121	Current Group Control Setting Read only: ASCII character 0, 1, 2, 3, L	ASC(1)
47122	Current Output Control Settings (OutputPulse0) MSBs Read only: Bits 15 to 7 - Spare Bit 6 - Output 6 pulse low Bit 5 - Output 5 pulse low Bit 4 - Output 4 pulse low Bit 3 - Output 3 pulse low Bit 2 - Output 2 pulse low Bit 1 - Output 1 pulse low Bit 0 - Output A pulse low	BM(16)
47123	Current Output Control Settings (OutputPulse1) LSBs Read only: Bits 15 to 7 - Spare Bit 6 - Output 6 pulse high Bit 5 - Output 5 pulse high Bit 4 - Output 4 pulse high Bit 3 - Output 3 pulse high Bit 2 - Output 2 pulse high Bit 1 - Output 1 pulse high Bit 0 - Output A pulse high	BM(16)
47124	Current Output Control Settings (OutputLatch0) MSBs Read only: Bits 15 to 7 - Spare Bit 6 - Output 6 latch low Bit 5 - Output 5 latch low Bit 4 - Output 4 latch low	BM(16)

Bit 3 - Output 3 latch low
Bit 2 - Output 2 latch low
Bit 1 - Output 1 latch low
Bit 0 - Output A latch low

47125 Current Output Control Settings (OutputLatch1) LSBs BM(16)
Read only:
Bits 15 to 7 - Spare
Bit 6 - Output 6 latch high
Bit 5 - Output 5 latch high
Bit 4 - Output 4 latch high
Bit 3 - Output 3 latch high
Bit 2 - Output 2 latch high
Bit 1 - Output 1 latch high
Bit 0 - Output A latch high

47126 Current Output Contact Status BM(16)
Read only:
Bits 15 to 7 - Spare
Bit 6 - Output 6
Bit 5 - Output 5
Bit 4 - Output 4
Bit 3 - Output 3
Bit 2 - Output 2
Bit 1 - Output 1
Bit 0 - Output A

47127 Active Alarm Flags (SumFlags) MSBs BM(16)
Read only:
Bits 15 to 0 - Spare

47128 Active Alarm Flags (SumFlags) LSBs BM(16)
Read only:
Bits 15 to 13 - Spare
Bit 12 - Burn-in test failure
Bit 11 - Defaults loaded on demand, via front panel or serial command
Bit 10 - Defaults loaded because of an READ error
Bit 9 - Calibration defaults loaded
Bit 8 - Setting defaults loaded
Bit 7 - Watchdog failure
Bit 6 - Power Supply error
Bit 5 - Calibration error
Bit 4 - Analog failure
Bit 3 - EEPROM Read / Write Fatal error
Bit 2 - MPU Self-test error
Bit 1 - ROM (flash) Failure detected
Bit 0 - RAM Failure detected

47129 Active Alarm Flags (ProgAlarms) MSBs BM(16)
Read only:
Bits 15 - 27 UnderVoltage Alarm
Bit 14 - Volts per Hertz alarm
Bit 13 - 60 Fuse Loss alarm
Bit 12 - Changes Lost alarm
Bit 11 - Freq Range alarm
Bit 10 - Watt Demand alarm
Bit 9 - Var Demand alarm
Bit 8 - Logic = None alarm
Bit 7 - Flt Rpt Timeout alarm
Bit 6 - Virtual Output 15 alarm
Bit 5 - Virtual Output 14 alarm

Bit 4 - Virtual Output 13 alarm
Bit 3 - Setting Group Change Active alarm
Bit 2 - Loss of IRIG-B sync or IRIG-B decode problem
Bit 1 - An override is active in one or more outputs
Bit 0 - EEPROM Non fatal error

47130	Active Alarm Flags (ProgAlarms) LSBs Read only: Bit 15 - User settings changed, ('EXIT' with 'Y') Bit 14 - Power reset alarm, hard reset of MPU Bit 13 - Clock problem, real time clock has not been set Bit 12 - Communicating failure alarm, read error on serial port Bit 11 - Operating System Overload detected alarm Bit 10 - Setting group override in effect Bit 9 - Q demand alarm, excessive negative sequence unbalance Bit 8 - Neutral demand alarm Bit 7 - Phase demand alarm Bit 6 - Breaker alarm #3 Bit 5 - Breaker alarm #2 Bit 4 - Breaker alarm #1 Bit 3 - Recloser Lockout Bit 2 - Recloser Fail Bit 1 - Breaker fail alarm Bit 0 - Out 1 CKT Open alarm	BM(16)
47131	Active Alarm Flags (ProgAlarms) LSBs Read only: Bit 0 - Bit 15 not used	BM(16)
47132	Active Alarm Flags (ProgAlarms) LSBs Read only: Bit 12 - Bit 15 not used Bit 11 - VN Min Demand Alarm Bit 10 - VN Max Demand Alarm Bit 9 - Vavg Min Demand Alarm Bit 8 - Vavg Max Demand Alarm Bit 7 - VP Min Demand Alarm Bit 6 - VP Max Demand Alarm Bit 5 - IAvg Demand Alarm Bit 4 - IG Demand Alarm Bit 3 - Rev Watt Demand Alarm Bit 2 - Neg Var Demand Alarm Bit 1 - Virtual Test Switch Active Bit 0 - 59 Over Voltage Alarm	BM(16)
47133	Target Status MSBs Read: Bit 15 - 51Q Bit 14 - 151N Bit 13 - 51N Bit 12 - 51C Bit 11 - 51B Bit 10 - 51A Bit 9 - 150TQ Bit 8 - 50TQ Bit 7 - 150TN Bit 6 - 50TN Bit 5 - 150TC Bit 4 - 150TB Bit 3 - 150TA Bit 2 - 50TC	BM(16)

	Bit 1 - 50TB Bit 0 - 50TA Write any value to any of 4 registers to reset all	
47134	Target Status Second MSBs Read: Bit 15 - BF Bit 14 - 52BT Bit 13 - 47 Bit 12 - SOTF Bit 11 - Spare Bit 10 - 132 Bit 9 - 32 Bit 8 - Spare Bit 7 - 27X Bit 6 - Spare Bit 5 - Spare Bit 4 - Spare Bit 3 - 27C Bit 2 - 27B Bit 1 - 27A Bit 0 - 24 Write any value to any of 4 registers to reset all	BM(16)
47135	Target Status Third MSBs Read: Bit 15 - 581 Bit 14 - 481 Bit 13 - 381 Bit 12 - 281 Bit 11 - 181 Bit 10 - 81 Bit 9 - 67TQ Bit 8 - 167TN Bit 7 - 67TN Bit 6 - 67TC Bit 5 - 67TB Bit 4 - 67TA Bit 3 - 167Q Bit 2 - 67Q Bit 1 - 167N Bit 0 - 67N Write any value to any of 4 registers to reset all	BM(16)
47136	Target Status LSBs Read: Bit 15 - 167C Bit 14 - 167B Bit 13 - 167A Bit 12 - 67C Bit 11 - 67B Bit 10 - 67A Bit 9 - P85E Bit 8 - P85 Bit 7 - 162 Bit 6 - 62 Bit 5 - 60FL Bit 4 - 159X Bit 3 - 59X Bit 2 - 59C Bit 1 - 59B	BM(16)

	Bit 0 - 59A Write: any value to any of 4 registers to reset all	
47137	Current Breaker Status Read only: O for Open C for Closed D for Disabled (off)	ASC(1)
47141-42	Breaker Contact Duty Log – Phase A	FP
47143-44	Breaker Contact Duty Log – Phase B	FP
47145-46	Breaker Contact Duty Log – Phase C Read: If Breaker Duty Type = Off or Maximum Breaker Duty = 0, reads undefined floating point value of 0xFFFFFFFF. Otherwise, reads 0.00 to 200.00%. Write: 0.00 to 200.00%.	FP
47147-48	Breaker Operation Counter Read and Write: 0 to 99,999	LI
47149-50	79 Recloser success counts since 79P	LI
47151-52	79 Recloser success counts since 791	LI
47153-54	79 Recloser success counts since 792	LI
47155-56	79 Recloser success counts since 793	LI
47157-58	79 Recloser success counts since 79LO Read and Write: 0 to 99,999	LI
47159-60	Yesterday's Peak Demand Current - Phase A	FP
47164-65	Yesterday's Peak Demand Current - Phase B	FP
47169-70	Yesterday's Peak Demand Current - Phase C	FP
47174-75	Yesterday's Peak Demand Current - Average	FP
47179-80	Yesterday's Peak Demand Current - Neutral	FP
47184-85	Yesterday's Peak Demand Current - Negative Seq	FP
47189-90	Yesterday's Peak Demand Current - Ground Read only: Any value (Amps)	FP
47161	Yesterday's Peak Demand Timestamp - Day	INT
47166	Yesterday's Peak Demand Timestamp - Day	INT
47171	Yesterday's Peak Demand Timestamp - Day	INT
47176	Yesterday's Peak Demand Timestamp - Day	INT
47181	Yesterday's Peak Demand Timestamp - Day	INT
47186	Yesterday's Peak Demand Timestamp - Day	INT
47191	Yesterday's Peak Demand Timestamp - Day Read only: any value (days since 01/01/1984).	INT
47162-63	Yesterday's Peak Demand Timestamp - Millisecond	LI
47167-68	Yesterday's Peak Demand Timestamp - Millisecond	LI
47172-73	Yesterday's Peak Demand Timestamp - Millisecond	LI
47177-78	Yesterday's Peak Demand Timestamp - Millisecond	LI
47182-83	Yesterday's Peak Demand Timestamp - Millisecond	LI
47187-88	Yesterday's Peak Demand Timestamp - Millisecond	LI
47192-93	Yesterday's Peak Demand Timestamp - Millisecond Read only: 0 to 86,399,999 Milliseconds	LI
47194-95	Today's Peak Demand Current - Phase A	FP
47199-200	Today's Peak Demand Current - Phase B	FP
47204-05	Today's Peak Demand Current - Phase C	FP
47209-10	Today's Peak Demand Current - Average	FP

47214-15	Today's Peak Demand Current - Neutral	FP
47219-20	Today's Peak Demand Current - Negative Seq	FP
47224-25	Today's Peak Demand Current - Ground	FP
	Read only: Any value (Amps)	
47196	Today's Peak Demand Timestamp - Day	INT
47201	Today's Peak Demand Timestamp - Day	INT
47206	Today's Peak Demand Timestamp - Day	INT
47211	Today's Peak Demand Timestamp - Day	INT
47216	Today's Peak Demand Timestamp - Day	INT
47221	Today's Peak Demand Timestamp - Day	INT
47226	Today's Peak Demand Timestamp - Day	INT
	Read only: any value (days since 01/01/1984).	
47197-98	Today's Peak Demand Timestamp - Millisecond	LI
47202-03	Today's Peak Demand Timestamp - Millisecond	LI
47207-08	Today's Peak Demand Timestamp - Millisecond	LI
47212-13	Today's Peak Demand Timestamp - Millisecond	LI
47217-18	Today's Peak Demand Timestamp - Millisecond	LI
47222-23	Today's Peak Demand Timestamp - Millisecond	LI
47227-28	Today's Peak Demand Timestamp - Millisecond	LI
	Read only: 0 to 86,399,999 Milliseconds	
47229-30	Peak Demand Current Since Reset - Phase A	FP
47234-35	Peak Demand Current Since Reset - Phase B	FP
47239-40	Peak Demand Current Since Reset - Phase C	FP
47244-45	Peak Demand Current Since Reset - Average	FP
47249-50	Peak Demand Current Since Reset - Neutral	FP
47254-55	Peak Demand Current Since Reset - Negative Seq	FP
47259-60	Peak Demand Current Since Reset - Ground	FP
	Read and Write: Any value (Amps)	
47231	Peak Demand Since Reset Timestamp - Day	INT
47236	Peak Demand Since Reset Timestamp - Day	INT
47241	Peak Demand Since Reset Timestamp - Day	INT
47246	Peak Demand Since Reset Timestamp - Day	INT
47251	Peak Demand Since Reset Timestamp - Day	INT
47256	Peak Demand Since Reset Timestamp - Day	INT
47261	Peak Demand Since Reset Timestamp - Day	INT
	Read only: any value (days since 01/01/1984).	
47232-33	Peak Demand Since Reset Timestamp - Millisecond	LI
47237-38	Peak Demand Since Reset Timestamp - Millisecond	LI
47242-43	Peak Demand Since Reset Timestamp - Millisecond	LI
47247-48	Peak Demand Since Reset Timestamp - Millisecond	LI
47252-53	Peak Demand Since Reset Timestamp - Millisecond	LI
47257-58	Peak Demand Since Reset Timestamp - Millisecond	LI
47262-63	Peak Demand Since Reset Timestamp - Millisecond	LI
	Read only: 0 to 86,399,999 Milliseconds	
47264-65	Yesterday's Peak Demand Voltage - Phase A HI	FP
47269-70	Yesterday's Peak Demand Voltage - Phase A LO	FP
47274-75	Yesterday's Peak Demand Voltage - Phase B HI	FP
47279-80	Yesterday's Peak Demand Voltage - Phase B LO	FP
47284-85	Yesterday's Peak Demand Voltage - Phase C HI	FP
47289-90	Yesterday's Peak Demand Voltage - Phase C LO	FP
47294-95	Yesterday's Peak Demand Voltage - Average HI	FP
47299-300	Yesterday's Peak Demand Voltage - Average LO	FP
47304-05	Yesterday's Peak Demand Voltage - Neutral HI	FP
47309-10	Yesterday's Peak Demand Voltage - Neutral LO	FP
	Read only: Any value (Volts)	

47266	Yesterday's Peak Demand Timestamp - Day	INT
47271	Yesterday's Peak Demand Timestamp - Day	INT
47276	Yesterday's Peak Demand Timestamp - Day	INT
47281	Yesterday's Peak Demand Timestamp - Day	INT
47286	Yesterday's Peak Demand Timestamp - Day	INT
47291	Yesterday's Peak Demand Timestamp - Day	INT
47296	Yesterday's Peak Demand Timestamp - Day	INT
47301	Yesterday's Peak Demand Timestamp - Day	INT
47306	Yesterday's Peak Demand Timestamp - Day	INT
47311	Yesterday's Peak Demand Timestamp - Day	INT
	Read only: any value (days since 01/01/1984).	
47267-68	Yesterday's Peak Demand Timestamp - Millisecond	LI
47272-73	Yesterday's Peak Demand Timestamp - Millisecond	LI
47277-78	Yesterday's Peak Demand Timestamp - Millisecond	LI
47282-83	Yesterday's Peak Demand Timestamp - Millisecond	LI
47287-88	Yesterday's Peak Demand Timestamp - Millisecond	LI
47292-93	Yesterday's Peak Demand Timestamp - Millisecond	LI
47297-98	Yesterday's Peak Demand Timestamp - Millisecond	LI
47302-03	Yesterday's Peak Demand Timestamp - Millisecond	LI
47307-08	Yesterday's Peak Demand Timestamp - Millisecond	LI
47312-13	Yesterday's Peak Demand Timestamp - Millisecond	LI
	Read only: 0 to 86,399,999 Milliseconds	
47314-15	Today's Peak Demand Voltage - Phase A HI	FP
47319-20	Today's Peak Demand Voltage - Phase A LO	FP
47324-25	Today's Peak Demand Voltage - Phase B HI	FP
47329-30	Today's Peak Demand Voltage - Phase B LO	FP
47334-35	Today's Peak Demand Voltage - Phase C HI	FP
47339-40	Today's Peak Demand Voltage - Phase C LO	FP
47344-45	Today's Peak Demand Voltage - Average HI	FP
47349-50	Today's Peak Demand Voltage - Average LO	FP
47354-55	Today's Peak Demand Voltage - Neutral HI	FP
47359-60	Today's Peak Demand Voltage - Neutral LO	FP
	Read only: Any value (Volts)	
47316	Today's Peak Demand Timestamp - Day	INT
47321	Today's Peak Demand Timestamp - Day	INT
47326	Today's Peak Demand Timestamp - Day	INT
47331	Today's Peak Demand Timestamp - Day	INT
47336	Today's Peak Demand Timestamp - Day	INT
47341	Today's Peak Demand Timestamp - Day	INT
47346	Today's Peak Demand Timestamp - Day	INT
47351	Today's Peak Demand Timestamp - Day	INT
47356	Today's Peak Demand Timestamp - Day	INT
47361	Today's Peak Demand Timestamp - Day	INT
	Read only: any value (days since 01/01/1984).	
47317-18	Today's Peak Demand Timestamp - Millisecond	LI
47322-23	Today's Peak Demand Timestamp - Millisecond	LI
47327-28	Today's Peak Demand Timestamp - Millisecond	LI
47332-33	Today's Peak Demand Timestamp - Millisecond	LI
47337-38	Today's Peak Demand Timestamp - Millisecond	LI
47342-43	Today's Peak Demand Timestamp - Millisecond	LI
47347-48	Today's Peak Demand Timestamp - Millisecond	LI
47352-53	Today's Peak Demand Timestamp - Millisecond	LI
47357-58	Today's Peak Demand Timestamp - Millisecond	LI
47362-63	Today's Peak Demand Timestamp - Millisecond	LI
	Read only: 0 to 86,399,999 Milliseconds	

47364-365	Peak Demand Voltage Since Reset - Phase A HI	FP
47369-70	Peak Demand Voltage Since Reset - Phase A LO	FP
47374-75	Peak Demand Voltage Since Reset - Phase B HI	FP
47379-80	Peak Demand Voltage Since Reset - Phase B LO	FP
47384-85	Peak Demand Voltage Since Reset - Phase C HI	FP
47389-90	Peak Demand Voltage Since Reset - Phase C LO	FP
47394-95	Peak Demand Voltage Since Reset - Average HI	FP
47399-400	Peak Demand Voltage Since Reset - Average LO	FP
47404-05	Peak Demand Voltage Since Reset - Neutral HI	FP
47409-10	Peak Demand Voltage Since Reset - Neutral LO	FP
	Read only: Any value (Volts)	
47366	Peak Demand Since Reset Timestamp - Day	INT
47371	Peak Demand Since Reset Timestamp - Day	INT
47376	Peak Demand Since Reset Timestamp - Day	INT
47381	Peak Demand Since Reset Timestamp - Day	INT
47386	Peak Demand Since Reset Timestamp - Day	INT
47391	Peak Demand Since Reset Timestamp - Day	INT
47396	Peak Demand Since Reset Timestamp - Day	INT
47401	Peak Demand Since Reset Timestamp - Day	INT
47406	Peak Demand Since Reset Timestamp - Day	INT
47411	Peak Demand Since Reset Timestamp - Day	INT
	Read only: any value (days since 01/01/1984).	
47367-68	Peak Demand Since Reset Timestamp - Millisecond	LI
47372-73	Peak Demand Since Reset Timestamp - Millisecond	LI
47377-78	Peak Demand Since Reset Timestamp - Millisecond	LI
47382-83	Peak Demand Since Reset Timestamp - Millisecond	LI
47387-88	Peak Demand Since Reset Timestamp - Millisecond	LI
47397-98	Peak Demand Since Reset Timestamp - Millisecond	LI
47402-03	Peak Demand Since Reset Timestamp - Millisecond	LI
47407-08	Peak Demand Since Reset Timestamp - Millisecond	LI
47412-13	Peak Demand Since Reset Timestamp - Millisecond	LI
	Read only: 0 to 86,399,999 Milliseconds	
47414-15	Peak Demand Vars	FP
47419-20	Peak Demand Reverse Vars	FP
47434-35	Today's Demand Vars	FP
47439-40	Today's Demand Reverse Vars	FP
47454-55	Yesterday's Demand Vars	FP
47459-60	Yesterday's Demand Reverse Vars	FP
	Read only: Any value (Vars)	
47424-25	Peak Demand Watts	FP
47429-30	Peak Demand Reverse Watts	FP
47444-45	Today's Demand Watts	FP
47449-50	Today's Demand Reverse Watts	FP
47464-65	Yesterday's Demand Watts	FP
47469-70	Yesterday's Demand Reverse Watts	FP
	Read only: Any value (Watts)	
47416	Peak Demand Vars Timestamp - Day	INT
47421	Peak Demand Reverse Vars Timestamp - Day	INT
47426	Peak Demand Watts Timestamp - Day	INT
47431	Peak Demand Reverse Watts Timestamp - Day	INT
47436	Today's Demand Vars Timestamp - Day	INT
47441	Today's Demand Reverse Vars Timestamp - Day	INT
47446	Today's Demand Watts Timestamp - Day	INT
47451	Today's Demand Reverse Watts Timestamp - Day	INT
47456	Yesterday's Demand Vars Timestamp - Day	INT
47461	Yesterday's Demand Reverse Vars Timestamp - Day	INT

47466	Yesterday's Demand Watts Timestamp - Day	INT
47471	Yesterday's Demand Reverse Watts Timestamp - Day Read only: Any value (days since 01/01/1984).	INT
47417-18	Peak Demand Vars Timestamp - Millisecond	LI
47422-23	Peak Demand Reverse Vars Timestamp - Millisecond	LI
47427-28	Peak Demand Watts Timestamp - Millisecond	LI
47432-33	Peak Demand Reverse Watts Timestamp - Millisecond	LI
47437-38	Today's Demand Vars Timestamp - Millisecond	LI
47442-43	Today's Demand Reverse Vars Timestamp - Millisecond	LI
47447-48	Today's Demand Watts Timestamp - Millisecond	LI
47452-53	Today's Demand Reverse Watts Timestamp - Millisecond	LI
47457-58	Yesterday's Demand Vars Timestamp - Millisecond	LI
47462-63	Yesterday's Demand Reverse Vars Timestamp - Millisecond	LI
47467-68	Yesterday's Demand Watts Timestamp - Millisecond	LI
47472-73	Yesterday's Demand Reverse Watts Timestamp - Millisecond Read only: 0 to 86,399,999 Milliseconds	LI
47474-75	3 Phase Var Hours	FP
47476-77	3 Phase Reverse Var Hours Read and Write: Any value (K-Var Hours)	FP
47478-79	3 Phase Watt Hours	FP
47480-81	3 Phase Reverse Watt Hours Read and Write: Any value (K-Watt Hours)	FP
47482-85	Current Active Logic Read only: Current active logic name	ASC(8)
47486	Reset Logic Alarm Information	SI
47487	Reset Major Alarm Information	SI
47488	Reset Minor Alarm Information	SI
47489	Reset Relay Alarm Information	SI
47490	Reset Load Profile	SI
47491	Clear Fault Log	SI
47492	Trigger Fault Record	SI
47493	Clear Events Report Read: 0 Write: Any value will perform reset / trigger / clear.	SI
47512	Fault Indicator Read only: Most recent Fault number (1 – 255)	SI
47513	Fault Template Status Read only: 0: Template not valid for current Fault Selection (Refer to Register 40038). All FLT template values will read 0. 1 to 255: Valid user selected Fault Number.	SI

The following is the Fault Template (FLT)

47514	Fault Date and Time – Day Read only: any value (days since 01/01/1984).	INT
47515-16	Fault Date and Time – Milliseconds Read only: 0 to 86,399,999 Milliseconds	LI
47517	Fault Event Type Read only: Bit 0 for Breaker Fail Bit 1 for Pickup	BM(16)

	Bit 2 for Trip Bit 3 for Logic Bit 4 for Fault Record Trigger (Refer to Register 47492) Bit 5 for Close Bit 6 for Close PU Bit 7 for Close Trip	
47518	Fault Active Group Read only: 0 to 3	SI
47519	Fault Targets MSBs Read only: Bit 15 - 51Q Bit 14 - 151N Bit 13 - 51N Bit 12 - 51C Bit 11 - 51B Bit 10 - 51A Bit 9 - 150TQ Bit 8 - 50TQ Bit 7 - 150TN Bit 6 - 50TN Bit 5 -150TC Bit 4 - 150TB Bit 3 - 150TA Bit 2 - 50TC Bit 1 - 50TB Bit 0 - 50TA	BM(16)
47520	Fault Targets Second MSBs Read only: Bit 15 - BF Bit 14 - Spare Bit 13 - 47 Bit 12 - Spare Bit 11 - Spare Bit 10 - 132 Bit 9 - 32 Bit 8 - Spare Bit 7 - 27X Bit 6 - Spare Bit 5 - Spare Bit 4 - Spare Bit 3 - 27C Bit 2 - 27B Bit 1 - 27A Bit 0 - 24	BM(16)
47521	Fault Targets Third MSBs Read only: Bit 15 - 581 Bit 14 - 481 Bit 13 - 381 Bit 12 - 281 Bit 11 - 181 Bit 10 - 81 Bit 9 - 67TQ Bit 8 - 167TN Bit 7 - 67TN Bit 6 - 67TC Bit 5 - 67TB Bit 4 - 67TA	BM(16)

	Bit 3 - 167Q Bit 2 - 67Q Bit 1 - 167N Bit 0 - 67N	
47522	Fault Targets LSBs Read only: Bit 15 - 167C Bit 14 - 167B Bit 13 - 167A Bit 12 - 67C Bit 11 - 67B Bit 10 - 67A Bit 9 - Spare Bit 8 - Spare Bit 7 - 162 Bit 6 - 62 Bit 5 - 60FL Bit 4 – 159X Bit 3 - 59X Bit 2 - 59C Bit 1 - 59B Bit 0 - 59A	BM(16)
47524	Fault Clearing Time Status Read only: 0 if Valid Fault Clearing Time (Registers 47525-26) value 1 if No pickup 2 if N/A; Out of range	SI
47525-26	Fault Clearing Time Read only: 0 if Fault Clearing Time Status is not 0 (not valid). Time (xxx.xxx) in Seconds if Fault Clearing Time Status is 0 (valid).	FP
47527	Fault Breaker Operate Time Status Read only: 0 if Valid Fault Breaker Operate Time (Registers 47528-29) value 1 if Unknown 2 if N/A; Out of range 3 if No operation 4 if Disabled	SI
47528-29	Fault Breaker Operate Time Read only: 0 if Fault Breaker Operate Time Status is not 0 (not valid). Time (xxx.xxx) in Seconds if Fault Breaker Operate Time Status is 0 (valid).	FP
47530-31	Distance to Fault Read only: Any value	FP
47534-35	Fault Phase A Current Magnitude	FP
47537-38	Fault Phase B Current Magnitude	FP
47540-41	Fault Phase C Current Magnitude	FP
47543-44	Fault Neutral Current Magnitude	FP
47546-47	Fault Negative Seq. Current Magnitude	FP
47549-50	Fault Positive Seq. Current Magnitude	FP
47552-53	Fault Ground Current Magnitude	FP
47586-87	At Close Phase A Current Magnitude	FP
47589-90	At Close Phase B Current Magnitude	FP

47592-93	At Close Phase C Current Magnitude	FP
47595-96	At Close Neutral Current Magnitude	FP
47598-99	At Close Negative Seq. Current Magnitude	FP
47601-02	At Close Positive Seq. Current Magnitude	FP
47604-05	At Close Ground Current Magnitude	FP
47636-37	After Close Phase A Current Magnitude	FP
47639-40	After Close Phase B Current Magnitude	FP
47642-43	After Close Phase C Current Magnitude	FP
47645-46	After Close Neutral Current Magnitude	FP
47648-49	After Close Negative Seq. Current Magnitude	FP
47651-52	After Close Positive Seq. Current Magnitude	FP
47654-55	After Close Ground Current Magnitude	FP
	Read only: Value in Amps	
47557-58	Fault Phase A Voltage Magnitude	FP
47560-61	Fault Phase B Voltage Magnitude	FP
47563-64	Fault Phase C Voltage Magnitude	FP
47566-67	Fault Vx Voltage Magnitude	FP
47569-70	Fault 3v0 Voltage Magnitude	FP
47572-73	Fault Positive Sequence Voltage Magnitude	FP
47575-76	Fault Negative Sequence Voltage Magnitude	FP
47609-10	At Close Phase A Voltage Magnitude	FP
47612-13	At Close Phase B Voltage Magnitude	FP
47615-16	At Close Phase C Voltage Magnitude	FP
47618-19	At Close Vx Voltage Magnitude	FP
47621-22	At Close 3v0 Voltage Magnitude	FP
47624-25	At Close Positive Sequence Voltage Magnitude	FP
47627-28	At Close Negative Sequence Voltage Magnitude	FP
47659-60	After Close Phase A Voltage Magnitude	FP
47662-63	After Close Phase B Voltage Magnitude	FP
47665-66	After Close Phase C Voltage Magnitude	FP
47668-69	After Close Vx Voltage Magnitude	FP
47671-72	After Close 3v0 Voltage Magnitude	FP
47674-75	After Close Positive Sequence Voltage Magnitude	FP
47677-78	After Close Negative Sequence Voltage Magnitude	FP
	Read only: Value in Volts	
47536	Fault Phase A Current Angle	INT
47539	Fault Phase B Current Angle	INT
47542	Fault Phase C Current Angle	INT
47545	Fault Neutral Current Angle	INT
47548	Fault Negative Seq. Current Angle	INT
47551	Fault Positive Seq. Current Angle	INT
47554	Fault Ground Current Angle	INT
47588	At Close Phase A Current Angle	INT
47591	At Close Phase B Current Angle	INT
47594	At Close Phase C Current Angle	INT
47597	At Close Neutral Current Angle	INT
47600	At Close Negative Seq. Current Angle	INT
47603	At Close Positive Seq. Current Angle	INT
47606	At Close Ground Current Angle	INT
47638	After Close Phase A Current Angle	INT
47641	After Close Phase B Current Angle	INT
47644	After Close Phase C Current Angle	INT
47647	After Close Neutral Current Angle	INT
47650	After Close Negative Seq. Current Angle	INT

47653	After Close Positive Seq. Current Angle	INT
47656	After Close Ground Current Angle	INT
47559	Fault Phase A Voltage Angle	INT
47562	Fault Phase B Voltage Angle	INT
47565	Fault Phase C Voltage Angle	INT
47568	Fault Vx Voltage Angle	INT
47571	Fault 3v0 Voltage Angle	INT
47574	Fault Positive Sequence Voltage Angle	INT
47577	Fault Negative Sequence Voltage Angle	INT
47611	At Close Phase A Voltage Angle	INT
47614	At Close Phase B Voltage Angle	INT
47617	At Close Phase C Voltage Angle	INT
47620	At Close Vx Voltage Angle	INT
47623	At Close 3v0 Voltage Angle	INT
47626	At Close Positive Sequence Voltage Angle	INT
47629	At Close Negative Sequence Voltage Angle	INT
47661	After Close Phase A Voltage Angle	INT
47664	After Close Phase B Voltage Angle	INT
47667	After Close Phase C Voltage Angle	INT
47670	After Close Vx Voltage Angle	INT
47673	After Close 3v0 Voltage Angle	INT
47676	After Close Positive Sequence Voltage Angle	INT
47679	After Close Negative Sequence Voltage Angle	INT
	Read Only : Value in Degrees	
47578-79	Fault Gen Frequency	FP
47580-81	Fault Vx Frequency	FP
47582-83	Fault Slip Frequency	FP
47630-31	At Close Gen Frequency	FP
47632-33	At Close Vx Frequency	FP
47634-35	At Close Slip Frequency	FP
47680-81	After Close Gen Frequency	FP
47682-83	After Close Vx Frequency	FP
47684-85	After Close Slip Frequency	FP
	Read Only: Value in Hertz	

The following is the Report Template (RPT)

47695-819	Report Text Read only: ASCII string (Illegal message response generated for invalid Report Focus value).	

Metering Parameters

49719	Part Number Read only: 0 to 999	INT
49720-21	Generator Frequency	FP
49722-23	Vx Frequency	FP
49724-25	Slip Frequency Read only: Value in Hertz	FP
49726-27	Phase A Current Magnitude	FP
49729-30	Phase B Current Magnitude	FP
49732-33	Phase C Current Magnitude	FP
49735-36	Negative Sequence Current Magnitude	FP
49737-38	Neutral Current Magnitude	FP
49739-40	Ground Current Magnitude	FP
49741-42	Positive Sequence Current Magnitude	FP

49743-44	Average Current Magnitude Read only: Value in Amps. If not applicable, reads undefined floating point value of 0xFFFFFFFF.	FP
49728	Phase A Current Angle	INT
49731	Phase B Current Angle	INT
49734	Phase C Current Angle Read only: Value in degrees.	INT
49747-48	Zero Sequence Voltage	FP
49749-50	Negative Sequence Voltage	FP
49751-52	Positive Sequence Voltage	FP
49753-54	Phase A Voltage	FP
49756-57	Phase B Voltage	FP
49759-60	Phase C Voltage	FP
49762-63	Phase A-B Voltage	FP
49765-66	Phase B-C Voltage	FP
49768-69	Phase C-A Voltage	FP
49771-72	V3x Voltage	FP
49773-74	Vx Voltage	FP
49775-76	Average Voltage Magnitude Read only: Value in Volts. If not applicable, reads undefined floating point value of 0xFFFFFFFF.	FP
49755	Phase A Voltage Angle	INT
49758	Phase B Voltage Angle	INT
49761	Phase C Voltage Angle	INT
49764	Phase A-B Voltage Angle	INT
49767	Phase B-C Voltage Angle	INT
49770	Phase C-A Voltage Angle Read only: Value in degrees.	INT
49777-78	Slip Angle Read only: Value in degrees	FP
49781-82	3 Phase Watts Read only: Value in Watts. If not applicable, reads undefined floating point value of 0xFFFFFFFF.	FP
49783-84	3 Phase Power Factor Read only: -1.00 to 1.00	FP
49785-86	3 Phase Vars Read only: Value in Vars. If not applicable, reads undefined floating point value of 0xFFFFFFFF.	FP
49787-88	3 Phase VA	FP
49789-90	Phase A Watts	FP
49791-92	Phase B Watts	FP
49793-94	Phase C Watts Read only: Value in (Watts)	FP
49795-96	Phase A Vars	FP
49797-98	Phase B Vars	FP
49799-800	Phase C Vars Read only: Value in (Vars)	FP
49835-74	Error Details Read only: ASCII string	ASC(40)
49875-999	Contiguous Poll Block Read Only: Mixed values.	Mixed

SECTION 4 • ASCII CROSS REFERENCE

ASCII COMMAND VERSUS MODBUS™ REGISTER CROSS REFERENCE

ASCII COMMAND	MODBUS™ REGISTERS
A=<password>	40002-40005,40006
CO-101	40136
CO-43	40120
CO-143	40122
CO-243	40124
CO-343	40126
CO-443	40128
CO-43TAG	40158
CO-143TAG	40160
CO-243TAG	40162
CO-343TAG	40164
CO-443TAG	40166
CO-GROUP=<settings group>	40118
CO-OUT1	40142
CO-OUT2	40144
CO-OUT3	40146
CO-OUT4	40148
CO-OUT5	40150
CO-OUTA	40140
CO-OUT	40138
CO-VTS	40176
CS-101	40135
CS-43	40119
CS-143	40121
CS-243	40123
CS-343	40125
CS-443	40127
CS-43TAG	40157
CS-143TAG	40159
CS-243TAG	40161
CS-343TAG	40163
CS-443TAG	40165
CS-GROUP=<settings group>	40117
CS-OUT1	40141
CS-OUT2	40143
CS-OUT3	40145
CS-OUT4	40147
CS-OUT5	40149
CS-OUT6	40151
CS-OUTA	40139
CS-OUT	40137
CS-VTS	40175
EXIT	40001
GS-PWC=<Control password>,<Control path>	40090-40093,40094
GS-PWG=<Global password>,<Global path>	40080-40083,40084
GS-PWR=<Report password>,<Report path>	40095-40098,40099
GS-PWS=<Settings password>,<Settings path>	40085-40088,40089
GS-PWTIME=<PW Timeout in min>	40100
M-IA	49726-49727, 49728
M-IB	49729-49730, 49731

ASCII COMMAND	MODBUS™ REGISTERS
M-IC	49732-49733, 49734
M-I1	49741-49742
M-IG	49739-49740
M-IQ	49735-49736
M-IN	49737-49738
M-I3	49743-49744
M-VA	49753-49754, 49755
M-VB	49756-49757, 49758
M-VC	49759-49760, 49761
M-VAB	49762-49763, 49764
M-VBC	49765-49466, 49967
M-VCA	49768-49769, 49970
M-V1	49751-49752
M-V2	49749-49750
M-V3	49775-49776
M-3V0	49747-49748
M-VX	49773-49774
M-V3X	49771-49772
M-WATT	49781-49782
M-WATTA	49789-49790
M-WATTB	49791-49792
M-WATTC	49793-49794
M-VAR	49785-49786
M-VARA	49795-49796
M-VARB	49797-49798
M-VARC	49799-49800
M-S	49787-49788
M-PF	49783-49784
M-FREQG	49720-49721
M-FREQB	49722-49723
M-FREQS	49724-49725
M-SYNC	49777-49778
RA-MAJ	47695-47819,40039
RA-MAJ=0	47487
RA-LGC	47695-47819,40039
RA-LGC=0	47486
RA-MIN	47695-47819,40039
RA-MIN=0	47488
RA-REL	47695-47819,40039
RA-REL=0	47489
RB-DUTYA=<% of duty>	47141-47142
RB-DUTYB=<% of duty>	47143-47144
RB-DUTYC=<% of duty>	47145-47146
RB-OPCNTR=<number of operations>	47147-47148
RB-79CNTR=<79P>,<791>,<792>,<793>,<79LO>	47148-47149,47150-47151, ,47152-47153,47154-47155,47156-47157
RD-PIA	47229-47230,47232-47233,47231
RD-PIB	47234-47235,47237-47238,47236
RD-PIC	47239-47240,47242-47243,47241
RD-PI3	47244-47245,47247-47248,47246
RD-PIN	47249-47250,47251,47252-47253
RD-PIQ	47254-47255,47256,47257-47258
RD-PIG	47259-47260,47261,47262-47263
RD-PVA	47364-47365,47366,47367-47368, 47369-47370,47371,47372-47373

ASCII COMMAND	MODBUS™ REGISTERS
RD-PVB	47374-47375,47376,47377-47378, 47379-47380,47381,47382-47383
RD-PVC	47384-47385,47386,47387-47388, 47389-47390,47391,47392-47393
RD-PV3	47394-47395,47396,47397-47398, 47399-47400,47401,47402-47403
RD-PVN	47404-47405,47406,47407-47408, 47409-47410,47411,47412-47413
RD-PVAR	47414-47415,47416,47417-47418,47419-47420,47421,47422-47423
RD-PWATT	47424-47425,47426,47427-47428,47429-47430,47431,47432-47433
RD-TIA	47194-47195,47197-47198,47196
RD-TIB	47199-47200,47202-47203,47201
RD-TIC	47204-47205,47207-47208,47206
RD-TI3	47209-47210,47212-47213,47211
RD-TIN	47214-47215,47217-47218,47216
RD-TIQ	47219-47220,47222-47223,47221
RD-TIG	47224-47226,47227-47228,47226
RD-TVA	47314-47315,47316,47317-47318,47319-47320,47321,47322-47323
RD-TVB	47324-47325,47326,47327-47328,47329-47330,47331,47332-47333
RD-TVC	47334-47335,47336,47337-47338,47339-47340,47341,47342-47343
RD-TV3	47344-47345,47346,47347-47348,47349-47350,47351,47352-47353
RD-TVN	47354-47355,47356,47357-47358,47359-47360,47361,47362-47363
RD-TVAR	47434-47435,47436,47437-47438,47439-47440,47441,47442-47443
RD-TWATT	47444-47445,47446,47447-47448,47449-47450,47451,47452- 47453
RD-YIA	47159-47160,47162-47163,47161
RD-YIB	47164-47165,47167-47168,47166
RD-YIC	47169-47170,47172-47173,47171
RD-YI3	47174-47175,47177-47178,47176
RD-YIN	47179-47180,47182-47183,47181
RD-YIQ	47184-47185,47187-47188,47186
RD-YIG	47189-47190,47192-47193,47191
RD-YVA	47264-47265,47266,47267-47268,47269-47270,47271,47272-47273
RD-YVB	47274-47275,47276,47277-47278,47279-47280,47281,47282-47283
RD-YVC	47284-47285,47286,47287-47288,47289-47290,47291,47292-47293
RD-YV3	47294-47295,47296,47297-47298,47299-47300,47301,47302-47303
RD-YVN	47304-47305,47306,47307-47308,47309-47310,47311,47312-47313
RD-YVAR	47454-47455,47456,47457-47458,47459-47460,47461,47462-47463
RD-YWATT	47464-47465,47466,47467-47468,47469-47470,47471,47472-47473
RE-KVARH	47459-47460,47461-47462
RE-KWH	47463-47464,47465-47466
RF	47695-47819,40039

ASCII COMMAND	MODBUS™ REGISTERS
RF-#	47695-47819,40039,40040
RF-NEW	47695-47819,40039
RF=0	47491
RF=TRIG	47492
RG-DATE=<date>	47109
RG-STAT	47112-19,47120,47121,47122-23,47124-25,47126,47127-28, 47129-32,47137,47138-40,47482-47485
RG-TARG	47131-47134
RG-TIME=<time>	47110-47111
RG-VER	47030-47034,47039-47047,47053-47061,47067-47073,47081-47091
RS	47695-47819,40039
RS-#	47695-47819,40039,40040
RS-F#	47695-47819,40039,40040
RS-NEW	47695-47819,40039
RS-ALM	47695-47819,40039
RS-IO	47695-47819,40039
RS=0	47493
S#-50TN=<pickup>,<time delay>,<direction>	40264-40265,40266-40267,40268
S#-50TP=<pickup>,<time delay>,<direction>	40259-40260,40261-40262,40263
S#-50TQ=<pickup>,<time delay>,<direction>	40269-40270,40271-40272,40273
S#-150TN=<pickup>,<time delay>,<direction>	40279-40280,40281-40282,40283
S#-150TP=<pickup>,<time delay>,<direction>	40274-40275,40276-40277,40278
S#-150TQ=<pickup>,<time delay>,<direction>	40284-40285,40286-40287,40288
S#-51N=<pickup>,<time dial>,<curve>,<direction>	40308-40309,40310-40311,40312-40313,40314
S#-51P=<pickup>,<time dial>,<curve>,<direction>	40301-40302,40303-40304,40305-40306,40307
S#-51Q=<pickup>,<time dial>.<curve>,<direction>	40315-40316,40317-40318,40319-40320,40321
S#-151N=<pickup>,<time dial>. <curve>, <direction>	40322-40323,40324-40325,40326-40327,40328
S#-27R=<pickup>,<mode>	40425-40426,40427
S#-27P=<pickup>,<time delay>,<inhibit voltage>, <timing mode>,<time dial>	40472-40473,40474-40475,40476-40477, 40567-70
S#-27X=<pickup>,<time delay>, <inhibit voltage >,<timing mode>,<time dial>	40478-40479,40480-40481,40482-40483, 40571-74
S#-59P=<pickup>,<time delay>,<timing mode>, <time dial>	40432-40433,40434-40435,40579-82
S#-59X=<pickup>,<time delay>,<timing mode>, <time dial>	40436-40437,40438-40439,40583-86
S#-159X=<pickup>,<time delay>,<timing mode>, <time dial>	40539-40540,40541-40542,40587-90
S#-47=<pickup>,< time delay >,<timing mode>, <time dial>	40428-40429,40430-40431,40575-78
S#-791=<first auto reclose delay>	40406-40407
S#-792=<second auto reclose delay>	40408-40409
S#-793=<third auto reclose delay>	40410-40411
S#-794=<fourth auto reclose delay>	40412-40413
S#-79R=<reset time delay>	40414-40415
S#-79F=<reclose fail time delay>	40416-40417
S#-79M=<max reclose time>	40418-40419
S#-79P=<pilot time delay)	40420-40421
S#-79SCB=<block control>	40422
S#-81=<pickup>,<time delay>,<mode>	40440-40441,40442-40443,40444
S#-181=<pickup>,<time delay>,<mode>	40445-40446,40447-40448,40449
S#-281=<pickup>,<time delay>,<mode>	40450-40451,40452-40453,40454
S#-381=<pickup>,<time delay>,<mode>	40455-40456,40457-40458,40459

ASCII COMMAND	MODBUS™ REGISTERS
S#-481=<pickup>,<time delay>,<mode>	40460-40461,40462-40463,40464
S#-581=<pickup>,<time delay>,<mode>	40465-40466,40467-40468,40469
S#-81INH=<inhibit setting>	40470-40471
S#-62=<time delay 1>,<time delay2>	40359-40360,40361-40362
S#-162=<time delay 1>,<time delay2>	40363-40364,40365-40366
S#-67N=<neutral polarizing mode>,<quantity>	40507-40508, 40509-40510
S#-24=<pickup>, <time delay>, <reset delay>	40484-40485, 40486-40487, 40488-40489
S#-25=<delta volts>, <phase angle>, <frequency>, <mode>	40490-40491, 40492-40493, 40494-40495, 40496
S#-25VM=<live volts>, <dead volts>, <time delay>, <mode1>, <mode2>	40497-40498, 40499-40500, 40501-40502, 40503-40504, 40505-40506
S#-32=<pick up>,<time delay>,<mode>	40511-40512, 40513-40514, 40515
S#-132=<pick up>,<time delay>,<mode>	40516-40517, 40518-40519, 40520
S#-50BF=<Time Delay>,<Phase pu>,<Neutral pu >,<Ctrl Time Delay>	40523-40524, 40525-40526, 40527-40528, 40529-40530
S#-52BT=<27P3U>,<EN_52B>, <EN_27P3>,<52BD>	40531-40532, 40533, 40534, 40535-40536
S#-P85=<P85Z3RBD>,<P85EBD>, <P85ETDPU>,<P85EDUR>	40545-40546, 40547-40548, 40549-40550, 40551-40552
S#-SOTF=<50TP Pickup>,<Time Delay>	40553-40554, 40555-40556
S#-51LE=<MOPle>,<FPLD>, <FPLG>,<RPLD>,<RPLG>	40557-40558, 40559-40560, 40561-40562, 40563-40564, 40565-40566
SA-BKR1=<mode>,<alarm limit>	41096,41097-41098
SA-BKR2=<mode>,<alarm limit>	41099,41100-41101
SA-BKR3=<mode>,<alarm limit>	41102,41103-41104
SA-DIN=<alarm level>	41240
SA-DIP=<alarm level>	41239
SA-DIQ=<alarm level>	41241
SA-DI3=<alarm level>	41242
SA-DIG=<alarm level>	41243
SA-LGC=<alarm number>	41455-41458
SA-MAJ=<alarm number>	41447-41450
SA-MIN=<alarm number>	41451-41454
SA-RESET=<reset Alarm Logic>	41431-41438,41439-41446
SA-DVAR=<fwd var alm level>, <rev var alm level>	41231-41232,41233-41234
SA-DWATT=<fwd watt alm level>, <rev watt alm level>	41235-41236,41237-41238
SA-24 = <volts / Hertz alarm level>	41227
SA-27 = <under voltage alarm level>	41228
SA-59 = <over voltage alarm level>	41229
SA-DVP = <VP Max demand alarm level>, <VP Min demand alarm level>,	41245,41248
SA-DVN = <VN Max demand alarm level>, <VN Min demand alarm level>,	41246,41249
SA-DV3 = <V3 Max demand alarm level>, <V3 Min demand alarm level>,	41247,41250
SB-DUTY=<mode>,<dmax.>,<blk bkr logic>	41092-41093,41094-41095,41110-41115,41118-41123
SB-LOGIC=<breaker close logic equation>	41126-41131,41134-41139
SG-CLK=<date format>,<time format><dst enable>	41252,41253,41254
SG-COM0=<baud rate>,<flow control>, <page length>,<ack>	40962,40964,40965,40966
SG-COM1=<baud rate>,<relay address>, <flow control>,<page length>,<ack>	40971,40972,40973,40974,40975

ASCII COMMAND	MODBUS™ REGISTERS
SG-COM2=<baud rate>,<relay address>,,,,,<parity>, <remote delay>,<stop bits>,<password security>	40980,40981,40986,40987,40988,40989
SG-CTP=<ratio>	41021
SG-CTG=<ratio>	41022
SG-VTP=<vt ratio>,<connection>, <27/59 mode>,<51/27R mode>	41033-41034, 41039-41040,41035-41036,41037-41038
SG-VTX=<aux vt ratio>,<connection>	41041-41042,41043-41044
SG-NOM=<Nom Volts>,<Nom Amps>	40602-40603,40604-40605
SG-DIN=<alarm interval>	41256
SG-DIP=<alarm interval>	41255
SG-DIQ=<alarm interval>	41257
SG-DM=<calculation method>	41258
SG-FREQ=<frequency>	41018
SG-HOLD=<output hold enable>	41264
SG-ID=<relay ID>,<station ID>,<User1 ID>, <User2 ID>	44101-44115,44116-44130,44131-44145,44146-44160
SG-IN1=<input recognition>,<input debounce >	40618,40619
SG-IN2=<input recognition>,<input debounce >	40620,40621
SG-IN3=<input recognition>,<input debounce >	40622,40623
SG-IN4=<input recognition>,<input debounce >	40624,40625
SG-IN5=<input recognition>,<input debounce >	40626,40627
SG-IN6=<input recognition>,<input debounce >	40628,40629
SG-IN7=<input recognition>,<input debounce >	40630,40631
SG-IN8=<input recognition>,<input debounce >	40632,40633
SG-DSP=<filter type>	40634
SG-VTS=<VTS timeout in min>	40635
SG-PHROT=<rotation sequence>	41019-41020
SG-SCREEN10=<menu screen>	41307-41300
SG-SCREEN11=<menu screen>	41311-41314
SG-SCREEN12=<menu screen>	41315-41318
SG-SCREEN13=<menu screen>	41319-41322
SG-SCREEN14=<menu screen>	41323-41326
SG-SCREEN15=<menu screen>	41327-41330
SG-SCREEN16=<menu screen>	41331-41334
SG-SCREEN1=<menu screen>	41271-41274
SG-SCREEN2=<menu screen>	41275-41278
SG-SCREEN3=<menu screen>	41279-41282
SG-SCREEN4=<menu screen>	41283-41286
SG-SCREEN5=<menu screen>	41287-41280
SG-SCREEN6=<menu screen>	41291-41294
SG-SCREEN7=<menu screen>	41295-41298
SG-SCREEN8=<menu screen>	41299-41302
SG-SCREEN9=<menu screen>	41303-41306
SG-SGCON=<time>	40871
SG-TARG=<target list>,<reset Targ Logic>	41267-41270,41383-41390,41391-41398
SG-TRIG=<trip trigger logic equation>,<pu trigger logic equation>,<logic trigger logic equation>, <close trigger logic equation>	41335-41342,41343-41350,41351-41358,41359-41366,41367-41374,41375-41382, 41383-41390,41391-41398
SG-LOG = <load profile interval>	41045
SG-LINE = <Z1 mag>, <Z1 Angle>, <Z0 mag>, <Z0 Angle>, <Line Length>	41046-41047,41048-41049, 41050-41051,41052-41053,41054-41055
SG-OSC = <no of osc records>	41056
SL-43=<mode>	42091
SL-143=<mode>	42092
SL-243=<mode>	42093

ASCII COMMAND	MODBUS™ REGISTERS
SL-343=<mode>	42094
SL-443=<mode>	42095
SL-43TAG=<mode>,<On Logic>,<Off Logic ,<Blk Logic>	43744,43745-43752,43753-43760,43761-43768,43769-43776, 43777-43784,43785-43792
SL-143TAG=<mode>,<On Logic>,<Off Logic ,<Blk Logic>	43793,43794-43801,43802-43809,43810-43817,43818-43825, 43826-43833,43834-43841
SL-243TAG=<mode>,<On Logic>,<Off Logic ,<Blk Logic>	43842,43843-43850,43851-43858,43859-43866,43867-43874, 43875-43882,43883-43890
SL-343TAG=<mode>,<On Logic>,<Off Logic ,<Blk Logic>	43891,43892-43899,43900-43907,43908-43015,43916- 43923, 43924-43931,43932-43939
SL-443TAG=<mode>,<On Logic>,<Off Logic ,<Blk Logic>	43940,43941-43948,43949-43956,43957-43964,43965-43972, 43973-43980,43981-43988
SL-101=<mode>	42099
SL-24 = <mode>, <block logic>	43525,43526-43533,43534-43541
SL-25 = <mode>, <block logic>	43542,43543-43550, 43551-43558
SL-32 = <mode>, <block logic>	43559,43560-43567,43568-43575
SL-132 = <mode>, <block logic>	43576,43577-43584,43585-43592
SL-150TN=<mode>,<block logic equation>	41573,41574-41581,41582-41589
SL-150TP=<mode>,<block logic equation>	41556,41557-41564,41565-41572
SL-150TQ=<mode>,<block logic equation>	41590,41591-41598,41599-41606
SL-162=<mode>,<ini logic equation>,<block logic equation>	41877,41878-41885,41886-41893,41894-901,41902-41909
SL-50BF=<mode>,<50INI Logic>,<52INI Logic>,<52Status Logic>,<BLK Logic>	41640,41641-41648,41649-41656,41657-41664,41665-41672, 41673-41680,41681-41688,41689-41696,41697-41704
SL-50TN=<mode>,<block logic equation>	41522,41525-41530,41531-41538
SL-50TP=<mode>,<block logic equation>	41505,41506-41513,41514-41521
SL-50TQ=<mode>,<block logic equation>	41539,41540-41547,41548-41555
SL-51N=<mode>,<block logic equation>	41722,41723-41730,41731-41738
SL-51P=<mode>,<block logic equation>	41705,41706-41713,41714-41721
SL-51Q=<mode>,<block logic equation>	41739,41740-41747,41748-41755
SL-151N=<mode>,<block logic equation>	41759,41760-41767,41768-41775
SL-27P=<mode>,<block logic equation>	41910,41911-41918,41919-41926
SL-27X=<mode>,<block logic equation>	41927,41928-41935,41936-41943
SL-59P=<mode>,<block logic equation>	41944,41945-41952,41953-41960
SL-59X=<mode>,<block logic equation>	41961,41962-41969,41970-41977
SL-159X=<mode>,<block logic equation>	41978,41979-41986,41987-41994
SL-47=<mode>,<block logic equation>	43508,43509-43516,43517-43524
SL-79=<mode>,<RI logic>,<Status logic>, <Wait logic>,<Lockout logic>,<PI Logic>	43325,43326-43333,43334-43341,43342-43349,43350-43357,43358-43365,43366-43373,43374-43381,43382-43391, 43390-43397,43398-43405
SL-81=<mode>,<block logic>	43406,43407-43414,43415-43422
SL-181=<mode>,<block logic>	43423,43424-43431,43432-43439
SL-281=<mode>,<block logic>	43440,43441-43448,43449-43456
SL-381=<mode>,<block logic>	43457,43458-43465,43466-43473
SL-481=<mode>,<block logic>	43474,43475-43482,43483-43490
SL-581=<mode>,<block logic>	43491,43492-43499,43500-43507
SL-62=<mode>,< ini logic equation>, <block logic equation>	41844,41845-41852,41853-41860,41861-41868,41869-41876

ASCII COMMAND	MODBUS™ REGISTERS
SL-86=<mode>,<Trip Logic>,<Reset Logic>	43593,43594-43601,43602-43609,43610-43617,43618-43625
SL-186=<mode>,<Trip Logic>,<Reset Logic>	43626,43627-43634,43635-43642,43643-43650,43651-43658
SL-CKTMON=<mode>,<monitor logic>,<status logic>	42100,42101-42108,42109-42116,42117-42124,42125-42132
SL-CTRL=<mode>,<Block COM0>,<Block COM1>,<Block COM2>	43989,43990-43997,43998-44005,44006-44013,44014-44021, 44022-44029,44030-44037
SL-GROUP=<mode>,<D0 logic equation>, <D1 logic equation>,<D2 logic equation>, <D3 logic equation>,<auto logic equation>	42010,42027-42034,42035-42042,42043-42050,42051-42058,42059-42066,42067-42074,42075-42082,42083-42090,42011-42018,42019-42026
SL-N=<name>	41465-41468
SL-P85=<mode>,<FWD_Trip>,<REVS_Blk>, <P85RX>,<WFC>	43679,43680-43687,43688-43695,43696-43703,43704-43711, 43712-43719,43720-43727,43728-43735,43736-43743
SL-VOA=<boolean logic equation>	42149,42150-42157,42158-42165,42166-42173,42174-42181,42182-42189,42190-42197,42198-42205,42206-42213
SL-VO1=<boolean logic equation>	42214,42215-42222,42223-42230,42231-42238,42239-42246,42247-42254,42255-42262,42263-42270,42271-42278
SL-VO2=<boolean logic equation>	42279,42280-42287,42288-42295,42296-42303,42304-42311,42312-42319,42320-42327,42328-42335,42336-42343
SL-VO3=<boolean logic equation>	42344,42345-42352,42353-42360,42361-42368,42369-42376,42377-42384,42385-42392,42393-42400,42401-42408
SL-VO4=<boolean logic equation>	42409,42410-42417,42418-42425,42426-42433,42434-42441,42442-42449,42450-42457,42458-42465,42466-42473
SL-VO5=<boolean logic equation>	42474,42475-42482,42483-42490,42491-42498,42499-42506,42507-42514,42515-42522,42523-42530,42531-42538
SL-VO6=<boolean logic equation>	42393,42540-42547,42548-42555,42556-42563,42564-42571,42572-42579,42580-42587,42588-42595,42596-42603
SL-VO7=<boolean logic equation>	42604,42605-42612,42613-42620,42621-42628,42629-42636,42637-42644,42645-42652,42653-42660,42661-42668
SL-VO8=<boolean logic equation>	42669,42670-42677,42678-42685,42686-42693,42694-42701,42702-42709,42710-42717,42718-42725,42726-42733
SL-VO9=<boolean logic equation>	42734,42735-42442,42743-42750,42751-42758,42759-42766,42767-42774,42775-42782,42783-42790,42791-42798
SL-VO10=<boolean logic equation>	42799,42800-42807,42808-42815,42816-42823,42824-42831,42832-42839,42840-42847,42848-42855,42856-42863
SL-VO11=<boolean logic equation>	42864,42865-42872,42873-42880,42881-42888,42889-42896,42897-42904,42905-42912,42913-42920,42921-42928
SL-VO12=<boolean logic equation>	42929,42930-42937,42938-42945,42946-42953,42954-42961,42962-42969,42970-42977,42978-42985,42986-42993

ASCII COMMAND	MODBUS™ REGISTERS
SL-VO13=<boolean logic equation>	42994,42995-43002,43003-43010,43011-43018,43019-43026,43027-43034,43035-43042,43043-43050,43051-43058
SL-VO14=<boolean logic equation>	43059,43060-43067,43068-43075,43076-43083,43084-43091,43092-43099,43100-43107,43108-43115,43116-43123
SL-VO15=<boolean logic equation>	43124,43125-43132,43133-43140,43141-43148,43149-43156,43157-43164,43165-43172,43173-43180,43181-43188
SL-VO16=<boolean logic equation>	43189,43190-43197,43198-43205,43206-43213,43214-43221,43222-43229,43230-43237,43238-43245,43246-43253
SL-VO17=<boolean logic equation>	43254,43255-43262,43263-43270,43271-43278,43279-43286,43287-43294,43295-43302,43303-43310,43311-43318
SL-SOTF=<mode>,<tripping logic>,<block logic>	41607,41608-41615,41616-41623, 41624-41631
SL: <custom logic>,<logic1>,<logic2>,<logic3>, <logic4>,<logic5>,<logic6>,<logic7>	41473-41476,41477-41480,41481-41484,41485-41488, 41489-41492,41493-41496,41497-41500,41501-41504
SL-VTS=<mode>,<name1>,<name2>,<name3>, <name4>,	44038,44039-44042,44051-44054,44063-44066,44075-44078
SL-VTSH / SL-VTSV=<VTS mask>	44043-44050
SN-43=<name>,<true label>,<false label>	44161-44168,44169-44172,44173-44176
SN-143=<name>,<true label>,<false label>	44177-44184,44185-44188,44189-44192
SN-243=<name>,<true label>,<false label>	44193-44200,44201-44204,44205-44208
SN-343=<name>,<true label>,<false label>	44209-44216,44217-44220,44221-44224
SN-443=<name>,<true label>,<false label>	44225-44232,44233-44236,44237-44240
SN-IN1=<name>,<true label>,<false label>	44593-44600,44601-44604,44605-44608
SN-IN2=<name>,<true label>,<false label>	44609-44616,44617-44620,44621-44624
SN-IN3=<name>,<true label>,<false label>	44625-44632,44633-44636,44637-44640
SN-IN4=<name>,<true label>,<false label>	44641-44648,44649-44652,44653-44656
SN-IN5=<name>,<true label>,<false label>	44657-44664,44665-44668,44669-44672
SN-IN6=<name>,<true label>,<false label>	44673-44680,44681-44684,44685-44688
SN-IN7=<name>,<true label>,<false label>	44689-44696,44697-44700,44701-44704
SN-IN8=<name>,<true label>,<false label>	44705-44712,44713-44716,44717-44720
SN-VOA=<name>,<true label>,<false label>	44265-44272,44273-44276,44277-44280
SN-VO1=<name>,<true label>,<false label>	44281-44288,44289-44292,44293-44296
SN-VO2=<name>,<true label>,<false label>	44297-44304,44305-44308,44309-44312
SN-VO3=<name>,<true label>,<false label>	44313-44320,44321-44324,44325-44328
SN-VO4=<name>,<true label>,<false label>	44329-44336,44337-44340,44341-44344
SN-VO5=<name>,<true label>,<false label>	44345-44352,44353-44356,44357-44360
SN-VO6=<name>,<true label>,<false label>	44361-44368,44369-44372,44373-44376
SN-VO7=<name>,<true label>,<false label>	44377-44384,44385-44388,44389-44392
SN-VO8=<name>,<true label>,<false label>	44393-44400,44401-44104,44405-44408
SN-VO9=<name>,<true label>,<false label>	44409-44416,44417-44420,44421-44424
SN-VO10=<name>,<true label>,<false label>	44425-44432,44433-44436,44437-44440
SN-VO11=<name>,<true label>,<false label>	44441-44448,44449-44452,44453-44456
SN-VO12=<name>,<true label>,<false label>	44457-44464,44465-44468,44469-44472
SN-VO13=<name>,<true label>,<false label>	44473-44480,44481-44484,44485-44488
SN-VO14=<name>,<true label>,<false label>	44489-44496,43497-44500,44501-44504
SN-VO15=<name>,<true label>,<false label>	44505-44512,44513-44516,44517-44520
SN-VO16=<name>,<true label>,<false label>	44521-44528,44529-44532,44533-44536
SN-VO17=<name>,<true label>,<false label>	44537-44544,44545-44548,44549-44552
SP-60FL=<I_Blk>,<V_Blk>	40903-40904,40905-40906

ASCII COMMAND	MODBUS™ REGISTERS
SP-79ZONE=<pickup logic>	40887-40894,40895-40902
SP-CURVE=<a>,<b>,<c>,<n>,<r>	40608-40609,40610-40611,40612-40613,40614-40615,40616-40617
SP-GROUP1=<switch time>,<switch level>,<return time>,<return level>,<prot element>	40872,40873,40874,40875,40876
SP-GROUP2=<switch time>,<switch evel>,<return time>,<return level>,,<prot element>	40877,40878,40879,40880,40881
SP-GROUP3=<switch time>,<switch evel>,<return time>,<return level>,<prot element>	40882,40883,40884,40885,40886

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