

COMMUNICATIONS GUIDE

Zenith MX350

Microprocessor Controller for ZTE series Automatic Transfer Switches



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ABB MX350 Automatic Transfer Control System Communications Guide for revision 1.2x.

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MX350 Automatic Transfer Control System

Communications Guide

Communications interfaces

The MX350 supports two communications interfaces:

- Modbus RTU via RS485
- Modbus TCP/IP via 10/100Base-T Ethernet

In addition, a USB interface is provided on the front of the interface panel. It is configured to be used in conjunction with a virtual serial port on a Windows-based PC.



Setpoint changes related to communication parameters require a power cycle of the controller to be activated.



For full details, please refer to the MX350 Communications Guide to be found at <http://www.gedigitalenergy.com/app/Resources.aspx?prod=zte&type=3>.

RS485 interface (Modbus RTU)

The RS485 interface is a serial two-wire port intended for use as a Modbus RTU slave. The RS485 port has the following characteristics.

- Address: 1 to 254, default 254
- Baud rate: 9600 to 115200 bps, default 115200
- Parity: None
- Data bits: 8
- Stop bits: 1
- Supported Modbus function codes: 1, 3, 4, 5, 6, 7, 8, 16

Modbus Protocol

The MX350 implements a subset of the Modicon Modbus RTU serial communication standard. The Modbus protocol is hardware-independent. That is, the physical layer can be any of a variety of standard hardware configurations. This includes RS232, RS422, RS485, fibre optics, etc. Modbus is a single master / multiple slave type of protocol suitable for a multi-drop configuration as provided by RS485 hardware. The MX350 Modbus implementation employs two-wire RS485 hardware. Using RS485, up to 32 MX350s can be daisy-chained together on a single communication channel.

The MX350 is always a Modbus slave. It can not be programmed as a Modbus master. Computers or PLCs are commonly programmed as masters.

Both monitoring and control are possible using read and write register commands. Other commands are supported to provide additional functions.

Electrical Interface

The hardware or electrical interface in the MX350 is two-wire RS485. In a two-wire link, data is transmitted and received over the same two wires. Although RS485 two wire communication is bi-directional, the data is never transmitted and received at the same time. This means that the data flow is half duplex.

RS485 lines should be connected in a daisy chain configuration with terminating networks installed at each end of the link (i.e. at the master end and at the slave farthest from the master). The terminating network should consist of a 120 Ω resistor in series with a 1 nF ceramic capacitor when used with Belden 9841 RS485 wire. Shielded wire should always be used to minimize noise. The shield should be connected to all of the MX350s as well as the master, then grounded at one location only. This keeps the ground potential at the same level for all of the devices on the serial link.



Polarity is important in RS485 communications. The '+' (positive) terminals of every device must be connected together.

Data Frame Format and Data Rate

One data frame of an asynchronous transmission to or from a MX350 typically consists of 1 start bit, 8 data bits, and 1 stop bit. This produces a 10 bit data frame. This is important for transmission through modems at high bit rates (11 bit data frames are not supported by Hayes modems at bit rates of greater than 300 bps).

Modbus protocol can be implemented at any standard communication speed. The MX350 supports operation at 9600, 19200, 38400, 57600, and 115200 baud.

Data Packet Format

A complete request/response sequence consists of the following bytes (transmitted as separate data frames):

Master Request Transmission:

SLAVE ADDRESS: 1 byte

FUNCTION CODE: 1 byte

DATA: variable number of bytes depending on FUNCTION CODE

CRC: 2 bytes

Slave Response Transmission:

SLAVE ADDRESS: 1 byte

FUNCTION CODE: 1 byte

DATA: variable number of bytes depending on FUNCTION CODE

CRC: 2 bytes

SLAVE ADDRESS: This is the first byte of every transmission. This byte represents the user-assigned address of the slave device that is to receive the message sent by the master. Each slave device must be assigned a unique address and only the addressed slave will respond to a transmission that starts with its address. In a master request transmission the SLAVE ADDRESS represents the address of the slave to which the request is being sent. In a slave response transmission the SLAVE ADDRESS represents the address of the slave that is sending the response.

FUNCTION CODE: This is the second byte of every transmission. Modbus defines function codes of 1 to 127.

DATA: This will be a variable number of bytes depending on the FUNCTION CODE. This may be Actual Values, Setpoints, or addresses sent by the master to the slave or by the slave to the master.

CRC: This is a two byte error checking code.

Error Checking

The RTU version of Modbus includes a two byte CRC-16 (16 bit cyclic redundancy check) with every transmission. The CRC-16 algorithm essentially treats the entire data stream (data bits only; start, stop and parity ignored) as one continuous binary number. This number is first shifted left 16 bits and then divided by a characteristic polynomial (11000000000000101B). The 16 bit remainder of the division is appended to the end of the transmission, MSByte first. The resulting message including CRC, when divided by the same polynomial at the receiver will give a zero remainder if no transmission errors have occurred.

If a MX350 Modbus slave device receives a transmission in which an error is indicated by the CRC-16 calculation, the slave device will not respond to the transmission. A CRC-16 error indicates that one or more bytes of the transmission were received incorrectly and thus the entire transmission should be ignored in order to avoid the MX350 performing any incorrect operation.

The CRC-16 calculation is an industry standard method used for error detection. An algorithm is included here to assist programmers in situations where no standard CRC-16 calculation routines are available.

CRC-16 Algorithm

Once the following algorithm is complete, the working register "A" will contain the CRC value to be transmitted. Note that this algorithm requires the characteristic polynomial to be reverse bit ordered. The MSBit of the characteristic polynomial is dropped since it does not affect the value of the remainder. The following symbols are used in the algorithm:

—>: data transfer

A: 16 bit working register

AL: low order byte of A

AH: high order byte of A

CRC: 16 bit CRC-16 value

i, j: loop counters

(+): logical exclusive or operator

Di: i-th data byte (i = 0 to N-1)

G: 16 bit characteristic polynomial = 1010000000000001 with MSbit dropped and bit order reversed

shr(x): shift right (the LSbit of the low order byte of x shifts into a carry flag, a '0' is shifted into the MSbit of the high order byte of x, all other bits shift right one location

The algorithm is:

1. FFFF hex → A
2. 0 → i
3. 0 → j
4. Di (+) AL → AL
5. j+1 → j
6. shr(A)
7. is there a carry? No: go to 8. Yes: G (+) A → A
8. is j = 8? No: go to 5. Yes: go to 9.
9. i+1 → i
10. is i = N? No: go to 3. Yes: go to 11.
11. A → CRC

Timing

Data packet synchronization is maintained by timing constraints. The receiving device must measure the time between the reception of characters. If 3.5 character times elapse without a new character or completion of the packet, then the communication link must be reset (i.e. all slaves start listening for a new transmission from the master). Thus at 9600 baud a delay of greater than $3.5 \times 1 / 9600 \times 10^3 = 3.65 \text{ ms}$ will cause the communication link to be reset.

MX350 supported functions

The following functions are supported by the MX350:

- FUNCTION CODE 01 - Read Input Status
- FUNCTION CODE 03 - Read Setpoints and Actual Values
- FUNCTION CODE 04 - Read Setpoints and Actual Values
- FUNCTION CODE 05 - Execute Operation
- FUNCTION CODE 06 - Store Single Setpoint
- FUNCTION CODE 07 - Read Device Status
- FUNCTION CODE 08 - Loopback Test
- FUNCTION CODE 10 - Store Multiple Setpoints

Modbus Functions

Function Code 01H

Modbus implementation: Read Input Status

MX350 implementation: Read Net Control Status

This function code is supported for a selective range of commands for MX350 for net control functionality. This function reads the ON/OFF status for each net control command. The query message specifies the starting command and number of commands status to be read. Commands are addressed starting at zero.

The master/slave packets have the following format:

Table 1: MASTER/SLAVE PACKET FORMAT FOR FUNCTION CODE 03H

MASTER TRANSMISSION	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message for slave 17
FUNCTION CODE	1	02	read net control status
STARTING ADDRESS	2	00 C4	starting command address
NUMBER OF POINTS	2	00 02	number of status bits
CRC	1		CRC error code

SLAVE RESPONSE	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message from slave 17
FUNCTION CODE	1	02	read net control status
BYTE COUNT	1	01	number of status bytes
DATA	1	1	bytes of net control status
CRC	1		CRC error code

Each returned data bit is an ON/OFF status. The number of returned data bytes will change according to the number of points requested.

The following table lists the supported command addresses for this function code:

Command Number	Description
196	Reset Time S2 Available Counter
197	Alarm Silence
198	Control to bypass W-timer
199	Control to bypass T-timer
200	Net Ctrl Test on No load
201	Fast Load Test Control
202	Regular Load Test Control
203	Auto/Manual retransfer to S1
204	Auto/Manual transfer to S1/S2
205	Net Ctrl Load Shed for S1
206	Net Ctrl Inhibit Transfer to S2
207	Net Ctrl Inhibit Transfer to S1
208	Net Ctrl Transition Mode Selector
209	Command to Bypass R50
210	Confirm Bypass R50
211	Cancel Bypass R50
212	Bypass Pending Exerciser
213	Cancel Exerciser Bypass
214	Net Ctrl Auto Transfer Inhibit
215	Net Ctrl Auto Transfer Relay
216	Net Ctrl Bypass Active ATS Timer
217	Net Ctrl Exerciser Cancel
218	Net Ctrl Generator Start
219	Net Ctrl Generator Stop
220	Net Ctrl Load Shed for S2
221	Net Ctrl Prime Source Selection
222	Net Ctrl Test Mode Cancel
223	Net Ctrl Test On Load
224	Net Ctrl Transfer Commit

Function Code 03H

Modbus implementation: Read Holding Registers

MX350 implementation: Read Setpoints

For the MX350 implementation of Modbus, this function code can be used to read any setpoints ("holding registers"). Holding registers are 16 bit (two byte) values transmitted high order byte first. Thus all MX350Setpoints are sent as two bytes. The maximum number of registers that can be read in one transmission is 125.

The slave response to this function code is the slave address, function code, a count of the number of data bytes to follow, the data itself and the CRC. Each data item is sent as a two byte number with the high order byte sent first.

For example, consider a request for slave 17 to respond with 3 registers starting at address 006B. For this example the register data in these addresses is as follows:

Address	Data
006B	022B
006C	0000
006D	0064

The master/slave packets have the following format:

Table 2: MASTER/SLAVE PACKET FORMAT FOR FUNCTION CODE 03H

MASTER TRANSMISSION	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message for slave 17
FUNCTION CODE	1	03	read registers
DATA STARTING ADDRESS	2	00 6B	data starting at 006B
NUMBER OF SETPOINTS	2	00 03	3 registers = 6 bytes total
CRC	2	76 87	CRC error code

SLAVE RESPONSE	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message from slave 17
FUNCTION CODE	1	03	read registers
BYTE COUNT	1	06	3 registers = 6 bytes
DATA 1 (see definition above)	2	02 2B	value in address 006B
DATA 2 (see definition above)	2	00 00	value in address 006C
DATA 3 (see definition above)	2	00 64	value in address 006D
CRC	2	54 83	CRC error code

Function Code 04H

Modbus Implementation: Read Input Registers

MX350 Implementation: Read Actual Values

For the MX350 implementation of Modbus, this function code can be used to read any actual values ("input registers"). Input registers are 16 bit (two byte) values transmitted high order byte first. Thus all MX350 Actual Values are sent as two bytes. The maximum number of registers that can be read in one transmission is 125.

The slave response to this function code is the slave address, function code, a count of the data bytes to follow, the data itself and the CRC. Each data item is sent as a two byte number with the high order byte sent first.

For example, request slave 17 to respond with 1 register starting at address 0008. For this example the value in this register (0008) is 0000.

Table 3: MASTER/SLAVE PACKET FORMAT FOR FUNCTION CODE 04H

MASTER TRANSMISSION	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message for slave 17
FUNCTION CODE	1	04	read registers
DATA STARTING ADDRESS	2	00 08	data starting at 0008
NUMBER OF ACTUAL VALUES	2	00 01	1 register = 2 bytes
CRC	2	B2 98	CRC error code

SLAVE RESPONSE	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message from slave 17
FUNCTION CODE	1	04	read registers
BYTE COUNT	1	02	1 register = 2 bytes
DATA (see definition above)	2	00 00	value in address 0008
CRC	2	78 F3	CRC error code

Function Code 05H

Modbus Implementation: Force Single Coil

MX350 Implementation: Execute Operation

This function code allows the master to request a MX350 to perform specific command operations.

For example, to request slave 17 to execute operation code 1 (reset), we have the following master/slave packet format:

Table 4: MASTER/SLAVE PACKET FORMAT FOR FUNCTION CODE 05H

MASTER TRANSMISSION	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message for slave 17
FUNCTION CODE	1	05	execute operation
OPERATION CODE	2	00 01	operation code 1
CODE VALUE	2	FF 00	perform function
CRC	2	DF 6A	CRC error code

SLAVE RESPONSE	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message from slave 17
FUNCTION CODE	1	05	execute operation
OPERATION CODE	2	00 01	operation code 1
CODE VALUE	2	FF 00	perform function
CRC	2	DF 6A	CRC error code

The following commands that can be performed by the MX350 using function code 05, can also be initiated using function code 10H.

Operation Code	Description
1	Reset
96	Clear Last Fault Data Prompt
97	Reset MWh and Mvarh Meters
99	Clear Trip Counters
100	Clear Event Records
102	Clear Maintenance Timer
120	Trigger Waveform Capture
161	Reload Factory Setpoints 2
162	Reload Factory Setpoints 1
163	Restore to setpoint access only
181	MX350 Test
182	MX350 Test - Fast Test
183	MX350 Test - Xfer Load
184	MX350 Test - No Xfer
185	MX350 Test - Bypass Exerciser
186	MX350 Test - Cancel Exerciser Bypass
188	MX350 Test - Cancel Bypass
189	MX350 Message - Bypass
190	MX350 Message - Yes
191	MX350 Message - No
192	MX350 Message - Escape
193	MX350 Message - Cancel
194	MX350 Message - Silence
195	MX350 Message - Reset
The following commands can only be performed using function code 05H	
196	Reset Time S2 Available Counter
197	Alarm Silence
198	Control to bypass W-timer
199	Control to bypass T-timer
200	Net Ctrl Test on No load
201	Fast Load Test Control
202	Regular Load Test Control
203	Auto/Manual retransfer to S1
204	Auto/Manual transfer to S1/S2
205	Net Ctrl Load Shed for S1
206	Net Ctrl Inhibit Transfer to S2
207	Net Ctrl Inhibit Transfer to S1
208	Net Ctrl Transition Mode Selector
209	Command to Bypass R50
210	Confirm Bypass R50
211	Cancel Bypass R50
223	Net Ctrl Test on Load
224	Net Ctrl Transfer Commit

Function Code 06H **Modbus Implementation:** Preset Single Register**MX350 Implementation:** Store Single Setpoint

This command allows the master to store a single setpoint into the memory of a MX350. The slave response to this function code is to echo the entire master transmission.

For example, request slave 17 to store the value 2 in setpoint address 04 5C. After the transmission in this example is complete, setpoints address 04 5C will contain the value 01F4. The master/slave packet format is shown below:

Table 5: MASTER/SLAVE PACKET FORMAT FOR FUNCTION CODE 06H

MASTER TRANSMISSION	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message for slave 17
FUNCTION CODE	1	06	store single setpoint
DATA STARTING ADDRESS	2	04 5C	setpoint address 04 5C
DATA	2	00 02	data for setpoint address 04 5C
CRC	2	CB B9	CRC error code

SLAVE RESPONSE	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message from slave 17
FUNCTION CODE	1	06	store single setpoint
DATA STARTING ADDRESS	2	04 5C	setpoint address 04 5C
DATA	2	00 02	data stored in setpoint address 04 5C
CRC	2	CB B9	CRC error code

Function Code 08H **Modbus Implementation:** Loopback**Test MX350 Implementation:** Loopback Test

This function is used to test the integrity of the communication link. The MX350 will echo the request.

For example, consider a loopback test from slave 17:

Table 6: MASTER/SLAVE PACKET FORMAT FOR FUNCTION CODE 08H

MASTER TRANSMISSION	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message for slave 17
FUNCTION CODE	1	08	loopback test
DIAG CODE	2	00 00	must be 00 00
DATA	2	00 00	must be 00 00
CRC	2	E0 0B	CRC error code

SLAVE RESPONSE	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message from slave 17
FUNCTION CODE	1	08	loopback test
DIAG CODE	2	00 00	must be 00 00
DATA	2	00 00	must be 00 00
CRC	2	E0 0B	CRC error code

Function Code 10H**Modbus Implementation:** Preset Multiple Registers**MX350 Implementation:** Store Multiple Setpoints

This function code allows multiple Setpoints to be stored into the MX350 memory. Modbus "registers" are 16-bit (two byte) values transmitted high order byte first. Thus all MX350 setpoints are sent as two bytes. The maximum number of Setpoints that can be stored in one transmission is dependent on the slave device. Modbus allows up to a maximum of 60 holding registers to be stored. The MX350 response to this function code is to echo the slave address, function code, starting address, the number of Setpoints stored, and the CRC.

For example, consider a request for slave 17 to store the value 00 02 to setpoint address 04 5C and the value 01 F4 to setpoint address 04 5D. After the transmission in this example is complete, MX350 slave 17 will have the following setpoints information stored:

Address	Data
04 5C	00 02
04 5D	01 F4

The master/slave packets have the following format:

Table 7: MASTER/SLAVE PACKET FORMAT FOR FUNCTION CODE 10H

MASTER TRANSMISSION	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message for slave 17
FUNCTION CODE	1	10	store setpoints
DATA STARTING ADDRESS	2	04 5C	setpoint address 04 5C
NUMBER OF SETPOINTS	2	00 02	2 setpoints = 4 bytes total
BYTE COUNT	1	04	4 bytes of data
DATA 1	2	00 02	data for setpoint address 04 5C
DATA 2	2	01 F4	data for setpoint address 04 5D
CRC	2	31 11	CRC error code

SLAVE RESPONSE	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message from slave 17
FUNCTION CODE	1	10	store setpoints
DATA STARTING ADDRESS	2	04 5C	setpoint address 04 5C
NUMBER OF SETPOINTS	2	00 02	2 setpoints
CRC	2	82 7A	CRC error code

Error Responses

When a MX350 detects an error other than a CRC error, a response will be sent to the master. The MSBit of the FUNCTION CODE byte will be set to 1 (i.e. the function code sent from the slave will be equal to the function code sent from the master plus 128). The following byte will be an exception code indicating the type of error that occurred.

Transmissions received from the master with CRC errors will be ignored by the MX350.

The slave response to an error (other than CRC error) will be:

SLAVE ADDRESS: 1 byte

FUNCTION CODE: 1 byte (with MSbit set to 1)

EXCEPTION CODE: 1 byte

CRC: 2 bytes

The MX350 implements the following exception response codes:

01 - ILLEGAL FUNCTION

The function code transmitted is not one of the functions supported by the MX350.

02 - ILLEGAL DATA ADDRESS

The address referenced in the data field transmitted by the master is not an allowable address for the MX350.

03 - ILLEGAL DATA VALUE

The value referenced in the data field transmitted by the master is not within range for the selected data address.

Performing commands using Function Code 10H

All commands other than net control commands can be performed using function code 16 as well as function code 5. When using FUNCTION CODE 16, the Command Function register must be written with a value of 5. The Command Operation register must be written with a valid command operation number. The Command Data registers must be written with valid data; this is dependent upon the command operation.

For example, consider a request for slave 17 to perform command operation 1 (RESET): The master/slave packets have the following format:

Table 8: MASTER/SLAVE PACKET FORMAT FOR PERFORMING COMMANDS

MASTER TRANSMISSION	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message for slave 17
FUNCTION CODE	1	10	store multiple setpoints
DATA STARTING ADDRESS	2	00 80	setpoint address 00 80
NUMBER OF SETPOINTS	2	00 02	2 setpoints = 4 bytes total
BYTE COUNT	1	04	4 bytes of data
DATA 1	2	00 05	data for address 00 80
DATA 2	2	00 01	data for address 00 81
CRC	2	7E CE	CRC error code

SLAVE RESPONSE	BYTES	EXAMPLE	DESCRIPTION
SLAVE ADDRESS	1	11	message from slave 17
FUNCTION CODE	1	10	store multiple setpoints
DATA STARTING ADDRESS	2	00 80	setpoint address 00 80
NUMBER OF SETPOINTS	2	00 02	2 setpoints
CRC	2	42 80	CRC error code

Using the User Definable Memory Map

The MX350 contains a User Definable area in the memory map. This area allows re-mapping of the addresses of any Actual Values or Setpoints registers. The User Definable area has two sections:

1. A Register Index area (memory map addresses 020BH-0287H) that contains 125 Actual Values or Setpoints register addresses.
2. A Register area (memory map addresses 020BH-0287H) that contains the data at the addresses in the Register Index.

Register data that is separated in the rest of the memory map may be re-mapped to adjacent register addresses in the User Definable Registers area. This is accomplished by writing to register addresses in the User Definable Register Index area. This allows for improved throughput of data and can eliminate the need for multiple read command sequences. The User Definable Register Index is stored as a setpoint and therefore it is "remembered" even when the power is removed.

For example, if the values of ATS STATUS (register address 013FH; modbus address 30320) and EXERCISER STATUS (register address 0838H; modbus address 32105) are required to be read from a MX350, their addresses may be re-mapped as follows:

1. Write 30320 to address 020BH (40524) (User Definable Register Index 0000) using function code 06 or 16.
2. Write 32105 to address 020CH (40525) (User Definable Register Index 0001) using function code 06 or 16.

The MX350PC software can be used to write these locations to the User Definable Register Index using the Setpoints > Modbus Memory Map > User Map screen.

It is now possible to read these two data registers with one read, at addresses 020BH, 020CH. Address 020BH will contain ATS STATUS. Address 020CH will contain EXERCISER STATUS.

Modbus memory map

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
--------	-----	-------------	-----	-----	------	-------	--------	---------	---------------

ACTUAL VALUES

PRODUCT INFORMATION									
30001	0000	Product Device Code	---	---	---	---	F22	N/A	1
30002	0001	Hardware Revision	---	---	---	---	F15	N/A	1
30003	0002	Firmware Version	---	---	---	---	F3	N/A	1
30004	0003	Display Software Version	---	---	---	---	F3	N/A	1
30005	0004	Modification Number	---	---	---	---	F1	N/A	1
30006	0005	Boot Version	---	---	---	---	F3	N/A	1
30007	0006	Boot Modification #	---	---	---	---	F1	N/A	1
30008	0007	Serial Number	---	---	---	---	F22	N/A	6
30014	000D	Order Code	---	---	---	---	F22	N/A	16
30030	001D	MAC Address	---	---	---	---	F22	N/A	6
30036	0023	Reserved	---	---	---	---	---	---	1
30037	0024	Build Date	---	---	---	---	F22	N/A	6
30043	002A	Build Time	---	---	---	---	F22	N/A	4
30047	002E	Original Calibration Date	---	---	---	---	F18	N/A	2
30049	0030	Last Calibration Date	---	---	---	---	F18	N/A	2
30051	0032	Communications Build Date	---	---	---	---	F22	N/A	6
30057	0038	Communications Build Time	---	---	---	---	F22	N/A	4
30061	003C	Communications Revision	---	---	---	---	F3	N/A	1
30062	003D	Platform Version	---	---	---	---	F3	N/A	1
30063	003E	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30185	00B8	Reserved	---	---	---	---	---	---	1
LAST FAULT DATA									
30186	00B9	Reserved	---	---	---	---	---	---	1
30187	00BA	Reserved	---	---	---	---	---	---	2
30189	00BC	Reserved	---	---	---	---	---	---	2
30191	00BE	Reserved	---	---	---	---	---	---	1
30192	00BF	Reserved	---	---	---	---	---	---	2
30194	00C1	Reserved	---	---	---	---	---	---	2
30196	00C3	Reserved	---	---	---	---	---	---	2
30198	00C5	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30201	00C8	Reserved	---	---	---	---	---	---	1
30202	00C9	Reserved	---	---	---	---	---	---	1
30203	00CA	Reserved	---	---	---	---	---	---	2
30205	00CC	Reserved	---	---	---	---	---	---	1
30206	00CD	Reserved	---	---	---	---	---	---	1
30207	00CE	Reserved	---	---	---	---	---	---	1
30208	00CF	Reserved	---	---	---	---	---	---	1
30209	00D0	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
30210	00D1	Reserved	---	---	---	---	---	---	1
30211	00D2	Reserved	---	---	---	---	---	---	1
30212	00D3	Reserved	---	---	---	---	---	---	2
30214	00D5	Reserved	---	---	---	---	---	---	2
30216	00D7	Reserved	---	---	---	---	---	---	1
30217	00D8	Reserved	---	---	---	---	---	---	1
30218	00D9	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30222	00DD	Reserved	---	---	---	---	---	---	1
REAL-TIME CLOCK									
30223	00DE	Weekday	---	---	---	---	FC171	N/A	1
30224	00DF	Date Read Only	---	---	---	---	F18	N/A	2
30226	00E1	Time Read Only	---	---	---	---	F19	N/A	2
30228	00E3	Daylight Savings Active	---	---	---	---	FC126	N/A	1
30229	00E4	Reserved	---	---	---	---	---	---	1
30230	00E5	Total Number of Trips	---	---	---	---	F1	N/A	1
30231	00E6	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30282	0119	Reserved	---	---	---	---	---	---	1
CONTACT/VIRTUAL INPUTS/OUTPUTS STATUS									
30283	011A	Contact Input 64-33 (Bit Field)	---	---	---	---	FC168	N/A	2
30285	011C	Contact Input 32-1 (Bit Field)	---	---	---	---	FC167	N/A	2
30287	011E	Reserved	---	---	---	---	---	---	1
30288	011F	Virtual Input 32-1 (Bit Field)	---	---	---	---	FC167	N/A	2
30290	0121	Virtual Output 32-1 (Bit Field)	---	---	---	---	FC167	N/A	2
30292	0123	Reserved	---	---	---	---	---	---	2
to	to	Reserved	---	---	---	---	---	---	1
30297	0128	Reserved	---	---	---	---	---	---	1
30298	0129	Contact Output 32-1 (Bit Field)	---	---	---	---	FC167	N/A	2
30300	012B	Reserved	---	---	---	---	---	---	1
30301	012C	Reserved	---	---	---	---	---	---	1
SECURITY									
30302	012D	Current Security Access Level	---	---	---	---	F1	N/A	1
30303	012E	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30317	013C	Reserved	---	---	---	---	---	---	1
STATUS - ATS									
30318	013D	Source Status	---	---	---	---	FC158	---	
30319	013E	Source 2 Status	---	---	---	---	FC158	---	
30320	013F	ATS Status	---	---	---	---	FC315	---	
30321	0140	Reserved	---	---	---	---	---	---	1
30322	0141	Reserved	---	---	---	---	---	---	1
NET CONTROL STATUS									
30323	0142	Net Control	---	---	---	---	FC321	---	
30325	0144	Reserved	---	---	---	---	---	---	1
CURRENT METERING									

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
30326	0145	In	---	---	---	A	F10	N/A	2
30328	0147	Ia	---	---	---	A	F10	N/A	2
30330	0149	Ib	---	---	---	A	F10	N/A	2
30332	014B	Ic	---	---	---	A	F10	N/A	2
30334	014D	Iavg	---	---	---	A	F10	N/A	2
30336	014E	Reserved	---	---	---	---	---	N/A	1
30337	0150	Current Unbalance	---	---	---	%Ub	F1	N/A	1
30338	0151	In	---	---	---	A	F10	N/A	2
VOLTAGE METERING									
30340	0153	Va1 Angle	---	---	---	°	F1	N/A	1
30341	0154	Vb1 Angle	---	---	---	°	F1	N/A	1
30342	0155	Vc1 Angle	---	---	---	°	F1	N/A	1
30343	0156	Reserved	---	---	---	---	---	---	1
30344	0157	Reserved	---	---	---	---	---	---	1
30345	0158	Reserved	---	---	---	---	---	---	1
30346	0159	Va2 Angle	---	---	---	°	F1	N/A	1
30347	015A	Vb2 Angle	---	---	---	°	F1	N/A	1
30348	015B	Vc2 Angle	---	---	---	°	F1	N/A	1
30349	015C	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30357	0164	Reserved							1
30358	0165	Vab	---	---	---	V	F1	N/A	1
30359	0166	Vbc	---	---	---	V	F1	N/A	1
30360	0167	Vca	---	---	---	V	F1	N/A	1
30361	0168	Average Line Voltage	---	---	---	V	F1	N/A	1
30362	0169	Van	---	---	---	V	F1	N/A	1
30363	016A	Vbn	---	---	---	V	F1	N/A	1
30364	016B	Vcn	---	---	---	V	F1	N/A	1
30365	016C	Reserved	---	---	---	---	---	---	1
30366	016D	Freq	---	---	---	Hz	F3	N/A	1
30367	016E	Vab S2	---	---	---	V	F1	N/A	1
30368	016F	Vbc S2	---	---	---	V	F1	N/A	1
30369	0170	Vca S2	---	---	---	V	F1	N/A	1
30370	0171	Average Line Voltage S2	---	---	---	V	F1	N/A	1
30371	0172	Van S2	---	---	---	V	F1	N/A	1
30372	0173	Vbn S2	---	---	---	V	F1	N/A	1
30373	0174	Vcn S2	---	---	---	V	F1	N/A	1
30374	0175	Average Phase Voltage S2	---	---	---	V	F1	N/A	1
30375	0176	Freq S2	---	---	---	Hz	F3	N/A	1
30376	0177	Reserved	---	---	---	---	---	---	1
30377	0178	Reserved	---	---	---	---	---	---	1
30378	0179	Reserved	---	---	---	---	---	---	1
30379	017A	Voltage Unbalance S2	---	---	---	%Ub	F1	N/A	1
30380	017B	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30383	017E	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
POWER METERING									
30384	017F	Power Factor	---	---	---	---	F21	N/A	1
30385	0180	Real Power	---	---	---	kW	F13	N/A	2
30387	0182	Reserved	---	---	---	---	---	---	1
30388	0183	Reserved	---	---	---	---	---	---	1
30389	0184	Reactive Power	---	---	---	kvar	F13	N/A	2
30391	0186	Apparent Power	---	---	---	kVA	F2	N/A	1
30392	0187	MWh Consumption	---	---	---	MWh	F17	N/A	2
30394	0189	Mvarh Consumption	---	---	---	Mvarh	F17	N/A	2
30396	018B	Reserved	---	---	---	---	---	---	2
30398	018D	Apparent Power	---	---	---	kVA	F10	N/A	2
30400	018F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30504	01F7	Reserved	---	---	---	---	---	---	1
LED STATUS FOR GRAPHICAL AND BASIC CONTROL PANEL									
30505	01F8	LED Status	---	---	---	---	FC144	N/A	2
30507	01FA	Reserved	---	---	---	---	---	---	1
30508	01FB	Reserved	---	---	---	---	---	---	1
GCP FACTORY TEST									
30509	01FC	LCD Test Color	---	---	---	---	FC212	N/A	1
30510	01FD	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30523	020A	Reserved	---	---	---	---	---	---	1
USER MAP VALUES									
30524	020B	User Map Value 1	---	---	---	---	F1	N/A	1
30525	020C	User Map Value 2	---	---	---	---	F1	N/A	1
30526	020D	User Map Value 3	---	---	---	---	F1	N/A	1
30527	020E	User Map Value 4	---	---	---	---	F1	N/A	1
to	to	Reserved	---	---	---	---	---	---	1
30645	0284	User Map Value 122	---	---	---	---	F1	N/A	1
30646	0285	User Map Value 123	---	---	---	---	F1	N/A	1
30647	0286	User Map Value 124	---	---	---	---	F1	N/A	1
30648	0287	User Map Value 125	---	---	---	---	F1	N/A	1
30649	0288	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30656	028F	Reserved	---	---	---	---	---	---	1
SELF TEST									
30657	0290	Internal Fault Cause	---	---	---	---	FC188	N/A	2
EVENT RECORDER									
30659	0292	Event Recorder Last Reset 2 words	---	---	---	---	F18	N/A	2
30661	0294	Total Number of Events Since Last Clear	---	---	---	---	F1	N/A	1
30662	0295	Cause	---	---	---	---	FC134	N/A	1
30663	0296	Load On	---	---	---	---	FC202	N/A	1
30664	0297	Time	---	---	---	---	F19	N/A	2
30666	0299	Date	---	---	---	---	F18	N/A	2

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
30668	029B	Ia	---	---	---	A	F10	N/A	2
30670	029D	Ib	---	---	---	A	F10	N/A	2
30672	029F	Ic	---	---	---	A	F10	N/A	2
30674	02A1	In State	---	---	---	---	FC200	N/A	1
30675	02A2	Iunb	---	---	---	%	F1	N/A	1
30676	02A3	Ig	---	---	---	A	F10	N/A	2
30678	02A5	Vab	---	---	---	V	F1	N/A	1
30679	02A6	Vbc	---	---	---	V	F1	N/A	1
30680	02A7	Vca	---	---	---	V	F1	N/A	1
30681	02A8	Van	---	---	---	V	F1	N/A	1
30682	02A9	Vbn	---	---	---	V	F1	N/A	1
30683	02AA	Vcn	---	---	---	V	F1	N/A	1
30684	02AB	Freq	---	---	---	Hz	F3	N/A	1
30685	02AC	Power Factor	---	---	---	---	F21	N/A	1
30686	02AD	Real Power	---	---	---	kW	F13	N/A	2
30688	02AF	Reactive Power	---	---	---	kvar	F13	N/A	2
30690	02B1	Apparent Power	---	---	---	kVA	F2	N/A	1
30691	02B2	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30709	02C4	Reserved	---	---	---	---	---	---	1
TRACE MEMORY									
30710	02C5	Trigger Date	---	---	---	---	F18	N/A	2
30712	02C7	Trigger Time	---	---	---	---	F19	N/A	2
30714	02C9	Trigger Cause	---	---	---	---	FC133	N/A	1
30715	02CA	Trigger Frequency	---	---	---	Hz	F3	N/A	1
30716	02CB	Total Triggers	---	---	---	---	F1	N/A	1
30717	02CC	Reserved	---	---	---	---	---	---	1
30718	02CD	Trigger Position	---	---	---	---	F1	N/A	1
30719	02CE	Trace Memory Start Index	---	---	---	---	F1	N/A	1
TRACE MEMORY SAMPLES									
30720	02CF	Sample Index + Trace Memory Sample 1	---	---	---	---	F4	N/A	1
30721	02D0	Sample Index + Trace Memory Sample 2	---	---	---	---	F4	N/A	1
30722	02D1	Sample Index + Trace Memory Sample 3	---	---	---	---	F4	N/A	1
30723	02D2	Sample Index + Trace Memory Sample 4	---	---	---	---	F4	N/A	1
to	to	Reserved	---	---	---	---	---	---	1
30844	034B	Sample Index + Trace Memory Sample 125	---	---	---	---	F4	N/A	1
30845	034C	Sample Index + Trace Memory Sample 126	---	---	---	---	F4	N/A	1
30846	034D	Sample Index + Trace Memory Sample 127	---	---	---	---	F4	N/A	1
30847	034E	Sample Index + Trace Memory Sample 128	---	---	---	---	F4	N/A	1
30848	034F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
30859	035A	Reserved	---	---	---	---	---	---	1
DATA LOG INFORMATION									
30860	035B	# of Triggers Since Clear	---	---	---	---	F4	N/A	1
30861	035C	# of Data Log Samples Stored	---	---	---	---	F4	N/A	1
30862	035D	Data Log Start Index	---	---	---	---	F4	N/A	1
30863	035E	Data Log Trigger Index	---	---	---	---	F4	N/A	1
30864	035F	Trigger Cause	---	---	---	---	FC133	N/A	1
30865	0360	Trigger Date	---	---	---	---	F18	N/A	2
30867	036A	Trigger Time	---	---	---	---	F19	N/A	2
30869	036B	Data Log Status	---	---	---	---	F75	N/A	1
30870	036C	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
30951	03B6	Reserved	---	---	---	---	---	---	1
STATUS BUFFER									
30952	03B7	Alarm Status 4	---	---	---	---	FC182	N/A	2
30954	03B9	Alarm Status 3	---	---	---	---	FC181	N/A	2
30956	03BB	Alarm Status 2	---	---	---	---	FC180	N/A	2
30958	03BD	Alarm Status 1	---	---	---	---	FC179	N/A	2
30960	03BF	Trip Status 4	---	---	---	---	FC186	N/A	2
30962	03C1	Trip Status 3	---	---	---	---	FC185	N/A	2
30964	03C3	Trip Status 2	---	---	---	---	FC184	N/A	2
30966	03C5	Trip Status 1	---	---	---	---	FC183	N/A	2
30968	03C7	Message Status 4	---	---	---	---	FC190	N/A	2
30970	03C9	Message Status 3	---	---	---	---	FC189	N/A	2
30972	03CB	Message Status 2	---	---	---	---	FC188	N/A	2
30974	03CD	Message Status 1	---	---	---	---	FC187	N/A	2
30976	03CF	Ctrl Element Status 4	---	---	---	---	FC194	N/A	2
30978	03D1	Ctrl Element Status 3	---	---	---	---	FC193	N/A	2
30980	03D3	Ctrl Element Status 2	---	---	---	---	FC192	N/A	2
30982	03D5	Ctrl Element Status 1	---	---	---	---	FC191	N/A	2
30984	03D7	Reserved	---	---	---	---	---	---	1
30985	03D8	Reserved	---	---	---	---	---	---	1
30986	03D9	Reserved	---	---	---	---	---	---	1
FLEXLOGIC									
30987	03DA	Element Flag	---	---	---	---	FC145	N/A	384
31371	055A	Program Status	---	---	---	---	FC109	N/A	1
31372	055B	Flex Lines Used	---	---	---	---	F1	N/A	1
31373	055C	Error Line	---	---	---	---	F1	N/A	1
31374	055D	Reserved	---	---	---	---	---	---	1
31375	055E	Reserved	---	---	---	---	---	---	1
31376	055F	Reserved	---	---	---	---	---	---	1
31377	0560	Reserved	---	---	---	---	---	---	1
COMMUNICATION									
31378	0561	Serial Status	---	---	---	---	FC112	N/A	1
31379	0562	Ethernet Status	---	---	---	---	FC112	N/A	1
31380	0563	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
to	to	Reserved	---	---	---	---	---	---	1
31395	0572	Reserved	---	---	---	---	---	---	1
TOTAL HARMONIC DISTORTION									
31396	0573	Ia THD	---	---	---	%	F2	N/A	1
31397	0574	Ib THD	---	---	---	%	F2	N/A	1
31398	0575	Ic THD	---	---	---	%	F2	N/A	1
31399	0576	In THD	---	---	---	%	F2	N/A	1
31400	0577	Va THD	---	---	---	%	F2	N/A	1
31401	0578	Vb THD	---	---	---	%	F2	N/A	1
31402	0579	Vc THD	---	---	---	%	F2	N/A	1
31403	057A	S2 Va THD	---	---	---	%	F2	N/A	1
31404	057B	S2 Vb THD	---	---	---	%	F2	N/A	1
31405	057C	S2 Vc THD	---	---	---	%	F2	N/A	1
31406	057D	Reserved	---	---	---	%	F2	N/A	1
to	to	Reserved	---	---	---	---	---	---	1
31415	0586	Reserved	---	---	---	---	---	---	1
31416	0587	Avg I THD	---	---	---	%	F2	N/A	1
31417	0588	Avg V THD	---	---	---	%	F2	N/A	1
31418	0589	Avg S2 V THD	---	---	---	%	F2	N/A	1
31419	058A	Reserved	---	---	---	---	---	---	1
31420	058B	V1a 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31421	058C	V1a 3rd Harm. Distortion	---	---	---	%	F2	N/A	1
31422	058D	V1a 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31423	058E	V1a 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31424	058F	V1a 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31425	0590	V1a 7th Harm. Distortion	---	---	---	%	F2	N/A	1
31426	0591	V1a 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31427	0592	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
31433	0598	Reserved	---	---	---	---	---	---	1
31434	0599	V1b 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31435	059A	V1b 3rd Harm. Distortion	---	---	---	%	F2	N/A	1
31436	059B	V1b 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31437	059C	V1b 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31438	058D	V1b 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31439	059E	V1b 7th Harm. Distortion	---	---	---	%	F2	N/A	1
31440	059F	V1b 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31441	05A0	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
31447	05A6	Reserved	---	---	---	---	---	---	1
31448	05A7	V1c 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31449	05A8	V1c 3rd Harm. Distortion	---	---	---	%	F2	N/A	1
31450	05A9	V1c 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31451	05AA	V1c 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31452	05AB	V1c 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31453	05AC	V1c 7th Harm. Distortion	---	---	---	%	F2	N/A	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
31454	05AD	V1c 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31455	05AE	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
31461	05B4	Reserved	---	---	---	--	---	---	1
31462	05B5	V2a 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31463	05B6	V2a 3rd Harm. Distortion	---	---	---	%	F2	N/A	1
31464	05B7	V2a 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31465	05B8	V2a 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31466	05B9	V2a 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31467	05BA	V2a 7th Harm. Distortion	---	---	---	%	F2	N/A	1
31468	05BB	V2a 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31469	05BC	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
31475	05C2	Reserved	---	---	---	---	---	---	1
31476	05C3	V2b 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31477	05C4	V2b 3rd Harm. Distortion	---	---	---	%	F2	N/A	1
31478	05C5	V2b 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31479	05C6	V2b 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31480	05C7	V2b 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31481	05C8	V2b 7th Harm. Distortion	---	---	---	%	F2	N/A	1
31482	05C9	V2b 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31483	05CA	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
31489	05D0	Reserved	---	---	---	---	---	---	1
31490	05D1	V2c 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31491	05D2	V2c 3rd Harm. Distortion	---	---	---	%	F2	N/A	1
31492	05D3	V2c 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31493	05D4	V2c 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31494	05D5	V2c 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31495	05D6	V2c 7th Harm. Distortion	---	---	---	%	F2	N/A	1
31496	05D7	V2c 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31497	05D8	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
31503	05DE	Reserved	---	---	---	---	---	---	1
31504	05DF	1a 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31505	05E0	1a 3rd Harm. Distortion	---	---	---	%	F2	N/A	1
31506	05E1	1a 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31507	05E2	1a 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31508	05E3	1a 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31509	05E4	1a 7th Harm. Distortion	---	---	---	%	F2	N/A	1
31510	05E5	1a 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31511	05E6	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
31517	05EC	Reserved	---	---	---	---	---	---	1
31518	05ED	1b 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31519	05EE	1b 3rd Harm. Distortion	---	---	---	%	F2	N/A	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
31520	05EF	1b 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31521	05F0	1b 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31522	05F1	1b 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31523	05F2	1b 7th Harm. Distortion	---	---	---	%	F2	N/A	1
31524	05F3	1b 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31525	05F4	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
31531	05FA	Reserved	---	---	---	---	---	---	1
31532	05FB	1c 2nd Harm. Distortion	---	---	---	%	F2	N/A	1
31533	05FC	1c 3rd Harm. Distortion	---	---	---	%	F2	N/A	1
31534	05FD	1c 4th Harm. Distortion	---	---	---	%	F2	N/A	1
31535	05FE	1c 5th Harm. Distortion	---	---	---	%	F2	N/A	1
31536	05FF	1c 6th Harm. Distortion	---	---	---	%	F2	N/A	1
31537	0600	1c 7th Harm. Distortion	---	---	---	%	F2	N/A	1
31538	0601	1c 8th Harm. Distortion	---	---	---	%	F2	N/A	1
31539	0602	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
32036	07F3	Reserved	---	---	---	---	---	---	1
ATS TRANSFER COUNTERS									
32037	07F4	Reserved	---	---	---	---	---	---	1
32038	07F5	Reserved	---	---	---	---	---	---	1
32040	07F7	# of Xfers Open-S2	---	---	---	---	F1	N/A	1
32041	07F8	Reserved	---	---	---	---	---	---	1
32043	07FA	# of Xfers S1-S2	---	---	---	---	F1	N/A	1
32044	07FB	Reserved	---	---	---	---	---	---	1
32045	07FC	# of Xfers S2-Open	---	---	---	---	F1	N/A	1
32046	07FD	# of Xfers S2-S1	---	---	---	---	F1	N/A	1
32047	07FE	Xfer Time Open-S1 New	---	---	---	ms	F1	N/A	1
32048	07FF	Xfer Time Open-S1 Prev	---	---	---	ms	F1	N/A	1
32049	0800	Xfer Time Open-S2 New	---	---	---	ms	F1	N/A	1
32050	0801	Xfer Time Open-S2 Prev	---	---	---	ms	F1	N/A	1
32051	0802	Xfer Time S1-Open New	---	---	---	ms	F1	N/A	1
32052	0803	Xfer Time S1-Open Prev	---	---	---	ms	F1	N/A	1
32053	0804	Xfer Time S1-S2 New	---	---	---	ms	F1	N/A	1
32054	0805	Xfer Time S1-S2 Prev	---	---	---	ms	F1	N/A	1
32055	0806	Xfer Time S2-Open New	---	---	---	ms	F1	N/A	1
32056	0807	Xfer Time S2-Open Prev	---	---	---	ms	F1	N/A	1
32057	0808	Xfer Time S2-S1 New	---	---	---	ms	F1	N/A	1
32058	0809	Xfer Time S2-S1 Prev	---	---	---	ms	F1	N/A	1
32059	080A	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
32063	080E	Reserved	---	---	---	---	---	---	1
REPORT									
32064	080F	Last Transfer Reason	---	---	---	---	FC318	N/A	1
32066	0811	Last Transfer Start Date	---	---	---	---	F18	N/A	2
32068	0813	Last Transfer Start Time	---	---	---	---	F19	N/A	2

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
32070	0815	Last Transfer Over Date	---	---	---	---	F18	N/A	2
32072	0817	Last Transfer Over Time	---	---	---	---	F19	N/A	2
32074	0819	Last Transfer To	---	---	---	---	FC199	N/A	1
32075	081A	Last Transfer From	---	---	---	---	FC199	N/A	1
32076	081B	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
32079	081E	Reserved	---	---	---	---	---	---	1
ATS OPERATION COUNTERS									
32081	0820	Total Time On S1	---	---	---	hrs	F9	N/A	2
32083	0822	Total Time On S2	---	---	---	hrs	F9	N/A	2
32085	0824	Total Time Load w/o Power	---	---	---	s	F9	N/A	2
32087	0826	Total Transfers (S1 > S2 > S1)	---	---	---	---	F1	N/A	1
32088	0827	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
32092	082B	Reserved	---	---	---	---	---	---	1
ATS CONTROL									
32093	082C	ATS Active State	---	---	---	---	FC200	N/A	1
32094	082D	ATS Operating Mode	---	---	---	---	FC201	N/A	1
32095	082E	CT Extended Parallel Time	---	---	---	cycles	F1	N/A	1
32096	082F	Switch Position	---	---	---	---	FC202	N/A	1
32097	0830	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
32104	0837	Reserved	---	---	---	---	---	---	1
ATS EXERCISER									
32105	0838	Exerciser Status	---	---	---	---	FC302	N/A	1
32106	0839	Last Exerciser Date	---	---	---	---	F18	N/A	2
32108	083B	Last Exerciser Time	---	---	---	---	F19	N/A	2
32110	083D	Next Exerciser Date	---	---	---	---	F18	N/A	2
32112	083F	Next Exerciser Time	---	---	---	---	F19	N/A	2
32114	0841	Reserved	---	---	---	---	---	---	1
32115	0842	Reserved	---	---	---	---	---	---	1
32116	0843	Reserved	---	---	---	---	---	---	1
ATS TEST									
32117	0844	Reserved	---	---	---	---	---	---	1
32118	0845	Reserved	---	---	---	---	---	---	1
ATS PREFERRED SRC									
32119	0846	Preferred SRC	---	---	---	---	FC161	N/A	1
32120	0847	Reserved	---	---	---	---	---	---	1
ATS GEN									
32121	0848	Avg. Alt Source pF	---	---	---	---	F21	N/A	1
32122	0849	Avg. Alt Source kW	---	---	---	kW	F1	N/A	1
32123	084A	Max Alt Source Current	---	---	---	A	F1	N/A	1
32124	084B	Max Alt Source Voltage Dips	---	---	---	%	F2	N/A	1
32125	084C	Max Alt Source Freq Dip	---	---	---	Hz	F2	N/A	1
32126	084D	Gen Shutdown Date	---	---	---	---	F18	N/A	2
32128	084F	Gen Shutdown Time	---	---	---	---	F19	N/A	2

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
32130	0851	Time To ShutDown Gen	---	---	---	---	F24	N/A	1
32131	0852	Date Gen Start Sent	---	---	---	---	F18	N/A	2
32133	0854	Time Gen Start Sent	---	---	---	---	F19	N/A	2
32135	0856	Date Gen Stop Sent	---	---	---	---	F18	N/A	2
32137	0858	Time Gen Start Stop	---	---	---	---	F19	N/A	2
32139	085A	Gen Supply OK Date	---	---	---	---	F18	N/A	2
32141	085C	Gen Supply OK Time	---	---	---	---	F19	N/A	2
32143	085E	Alt Source Startup Time	---	---	---	s	F1	N/A	1
32144	085F	Max Alt Source Volt THD	---	---	---	%	F1	N/A	1
32145	0860	Time Gen Start Removed	---	---	---	---	F19	N/A	2
32147	0862	Reserved	---	---	---	---	---	---	1
ATS R50									
32148	0863	In Phase Monitor Status	---	---	---	---	FC306	N/A	1
32149	0864	Reserved	---	---	---	---	---	---	1
32150	0865	S1 S2 Phase A Difference	---	---	---	°	F16	N/A	1
32151	0866	Reserved	---	---	---	---	---	---	1
32152	0867	Reserved	---	---	---	---	---	---	1
32153	0868	Reserved	---	---	---	---	---	---	2
32155	086A	Reserved	---	---	---	---	---	---	1
32156	086B	Reserved	---	---	---	---	---	---	1
32157	086C	Reserved	---	---	---	---	---	---	1
32158	086D	Reserved	---	---	---	---	---	---	1
ATS S1 COUNTERS									
32159	086E	Total Primary Source Failures	---	---	---	---	F1	N/A	1
32160	086F	S1 Accum. Avail.	---	---	---	hrs	F9	N/A	2
32162	0871	S1 Accum. Unavail.	---	---	---	hrs	F9	N/A	2
32164	0873	S1 Avail. Since Last Restore	---	---	---	hrs	F9	N/A	2
32166	0875	S1 Last Unavail. Time	---	---	---	hrs	F9	N/A	2
32168	0877	Last Primary Source Fail Date	---	---	---	---	F18	N/A	2
32170	0879	Last Primary Source Fail Time	---	---	---	---	F19	N/A	2
32172	087B	S1 Date Stamp Last Restore	---	---	---	---	F18	N/A	2
32174	087D	Time Primary Ret (or Test Reset)	---	---	---	---	F19	N/A	2
32176	087F	Last Transfer to S1 Date	---	---	---	---	F18	N/A	2
32178	0881	Last Transfer to S1 Time	---	---	---	---	F19	N/A	2
32180	0883	Reserved	---	---	---	---	---	---	1
32181	0884	Reserved	---	---	---	---	---	---	1
ATS S2 COUNTERS									
32182	0885	Number of S2 Failures	---	---	---	---	F1	N/A	1
32183	0886	S2 Accum. Avail.	---	---	---	hrs	F9	N/A	2
32185	0888	S2 Accum. Unavail.	---	---	---	hrs	F9	N/A	2
32187	088A	S2 Avail. Since Last Restore	---	---	---	hrs	F9	N/A	2
32189	088C	S2 Last Unavail. Time	---	---	---	hrs	F9	N/A	2
32191	088E	S2 Date Stamp Last Fail	---	---	---	---	F18	N/A	2
32193	0890	S2 Time Stamp Last Fail	---	---	---	---	F19	N/A	2
32195	0892	S2 Date Stamp Last Restore	---	---	---	---	F18	N/A	2

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
32197	0894	S2 Time Stamp Last Restore	---	---	---	---	F19	N/A	2
32199	0896	Last Transfer to S2 Date	---	---	---	---	F18	N/A	2
32201	0898	Last Transfer to S2 Time	---	---	---	---	F19	N/A	2
32203	089A	Total Time on Alt. Source	---	---	---	min	F1	N/A	1
32204	089B	Reserved	---	---	---	---	---	---	1
ATS S1 STATUS									
32205	089C	Reserved	---	---	---	---	---	---	1
32206	089D	Reserved	---	---	---	---	---	---	1
32207	089E	Reserved	---	---	---	---	---	---	1
32208	089F	Reserved	---	---	---	---	---	---	1
32209	08A0	Reserved	---	---	---	---	---	---	1
32210	08A1	Reserved	---	---	---	---	---	---	1
32211	08A2	S1 Phase Rotation	---	---	---	---	FC311	N/A	1
32212	08A3	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
32220	08AB	Reserved	---	---	---	---	---	---	1
ATS S2 STATUS									
32221	08AC	Reserved	---	---	---	---	---	---	1
32222	08AD	Reserved	---	---	---	---	---	---	1
32223	08AE	Reserved	---	---	---	---	---	---	1
32224	08AF	Reserved	---	---	---	---	---	---	1
32225	08B0	Reserved	---	---	---	---	---	---	1
32226	08B1	Reserved	---	---	---	---	---	---	1
32227	08B2	S2 Phase Rotation	---	---	---	---	FC311	N/A	1
32228	08B3	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
32236	08BB	Reserved	---	---	---	---	---	---	1
ATS TIMERS									
32237	08BC	Active ATS Timer - Time Remaining	---	---	---	---	F24	N/A	1
32238	08BD	ATS Timer Active	---	---	---	---	FC300	N/A	1
32239	08BE	Active Elevator Timer	---	---	---	---	FC301	N/A	1
32240	08BF	DT Timer Countdown	---	---	---	---	F24	N/A	1
32241	08C0	DW Timer Countdown	---	---	---	---	F24	N/A	1
32242	08C1	EX-Parallel Timer Countdown	---	---	---	---	F24	N/A	1
32243	08C2	Gen Run Timer Countdown	---	---	---	---	F24	N/A	1
32244	08C3	Gen Sag Timer Countdown	---	---	---	---	F24	N/A	1
32245	08C4	OLC Timer Countdown	---	---	---	---	F24	N/A	1
32246	08C5	P1 Timer Countdown	---	---	---	---	F24	N/A	1
32247	08C6	Reserved	---	---	---	---	---	---	1
32248	08C7	Sol Save Timer Countdown	---	---	---	---	F24	N/A	1
32249	08C8	Src Qual Timer Countdown	---	---	---	---	F24	N/A	1
32250	08C9	Sync Timer Countdown	---	---	---	---	F24	N/A	1
32251	08CA	to Timer Countdown	---	---	---	---	F24	N/A	1
32252	08CB	U1Timer Countdown	---	---	---	---	F24	N/A	1
32253	08CC	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
32254	08CD	VI Timer Countdown	---	---	---	---	F24	N/A	1
32255	08CE	W Timer Countdown	---	---	---	---	F24	N/A	1
LOAD CONTROL TIMERS									
32256	08CF	Pre LC1 Timer Countdown	---	---	---	---	F24	N/A	1
32257	08D0	Pre LC2 Timer Countdown	---	---	---	---	F24	N/A	1
32258	08D1	Pre LC3 Timer Countdown	---	---	---	---	F24	N/A	1
32259	08D2	Pre LC4 Timer Countdown	---	---	---	---	F24	N/A	1
32260	08D3	Pre LC5 Timer Countdown	---	---	---	---	F24	N/A	1
32261	08D4	Pre LC6 Timer Countdown	---	---	---	---	F24	N/A	1
32262	08D5	Post LC1 Timer Countdown	---	---	---	---	F24	N/A	1
32263	08D6	Post LC2 Timer Countdown	---	---	---	---	F24	N/A	1
32264	08D7	Post LC3 Timer Countdown	---	---	---	---	F24	N/A	1
32265	08D8	Post LC4 Timer Countdown	---	---	---	---	F24	N/A	1
32266	08D9	Post LC5 Timer Countdown	---	---	---	---	F24	N/A	1
32267	08DA	Post LC6 Timer Countdown	---	---	---	---	F24	N/A	1
32268	08DB	Reserved	---	---	---	---	---	---	1
32269	08DC	Reserved	---	---	---	---	---	---	1
32270	08DD	Reserved	---	---	---	---	---	---	1
32271	08DE	Reserved	---	---	---	---	---	---	1
32272	08DF	Reserved	---	---	---	---	---	---	1

SETPPOINTS

COMMANDS

40001	0000	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40128	007F	Reserved	---	---	---	---	---	---	1
40129	0080	Command address	0	65535	0	---	F1	0	1
40130	0081	Command Function	0	65535	0	---	F1	0	1
40131	0082	Command Data 1	0	65535	0	---	F1	0	1
40132	0083	Command Data 2	0	65535	0	---	F1	0	1
40133	0084	Command Data 3	0	65535	0	---	F1	0	1
40134	0085	Command Data 4	0	65535	0	---	F1	0	1
40135	0086	Command Data 5	0	65535	0	---	F1	0	1
40136	0087	Command Data 6	0	65535	0	---	F1	0	1
40137	0088	Command Data 7	0	65535	0	---	F1	0	1
40138	0089	Command Data 8	0	65535	0	---	F1	0	1
40139	008A	Command Data 9	0	65535	0	---	F1	0	1
40140	008B	Command Data 10	0	65535	0	---	F1	0	1
40141	008C	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40171	00AA	Reserved	---	---	---	---	---	---	1

COMMUNICATION SETTINGS

40172	00AB	Slave Address	1	254	1	---	F1	254	1
40173	00AC	RS485 Baud Rate	0	4	1	---	FC101	4	1
40174	00AD	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
to	to	Reserved	---	---	---	---	---	---	1
40180	00B3	Reserved	---	---	---	---	---	---	1
40181	00B4	NTP IP Address	0	0xFFFFFFFF	1	---	FC150	0	2
40183	00B6	Ethernet IP address	0	0xFFFFFFFF	1	---	FC150	0	2
40185	00B8	Ethernet subnet mask	0	0xFFFFFFFF	1	---	FC150	0xFFFFFFFFC00	2
40187	00BA	Ethernet gateway address	0	0xFFFFFFFF	1	---	FC150	0	2
40189	00BC	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40227	00E2	Reserved	---	---	---	---	---	---	1
REAL-TIME CLOCK/DAYLIGHT SAVINGS									
40228	00E3	Set Date	0	0x0C1F082E	0	---	F18	0	2
40230	00E5	Set Time	0	0x173B3B63	0	---	F19	0	2
40232	00E7	Time Offset From UTC	-2400	2400	25	hrs	F6	0	1
40233	00E8	Reserved	---	---	---	---	---	---	1
40234	00E9	Daylight Savings	0	1	1	---	FC126	0	1
40235	00EA	DST Start Month	0	12	1	---	FC169	0	1
40236	00EB	DST Start Week	0	5	1	---	FC170	0	1
40237	00EC	DST Start Weekday	0	7	1	---	FC171	0	1
40238	00ED	DST End Month	0	12	1	---	FC169	0	1
40239	00EE	DST End Week	0	5	1	---	FC170	0	1
40240	00EF	DST End Weekday	0	7	1	---	FC171	0	1
40241	00F0	Time (broadcast)	0	389757795	0	---	F19	0	2
40243	00F2	Date (broadcast)	0	203360302	0	---	F18	0	2
40245	00F4	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40261	0104	Reserved	---	---	---	---	---	---	1
VIRTUAL INPUT									
40262	0105	Virtual Input 32-1 (Bit Field)	0	0xFFFFFFFF	1	---	FC167	0	2
40264	0107	Reserved	---	---	---	---	---	---	1
40265	0108	Reserved	---	---	---	---	---	---	1
CURRENT SENSING									
40266	0109	Phase CT Type	0	2	1	---	FC105	0	1
40267	010A	CT Primary	40	1000	1	A	F1	40	1
40268	010B	Ground CT Type	0	2	1	---	FC104	1	1
40269	010C	Reserved	---	---	---	---	---	---	1
40270	010D	CT Primary Turns	1	10	1	---	F1	1	1
40271	010E	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40275	0112	Reserved	---	---	---	---	---	---	1
VOLTAGE SENSING									
40276	0113	3 Phase Voltage Connection	0	1	1	---	FC106	0	1
40277	0114	Aux VT Connection	0	8	1	---	FC176	0	1
40278	0115	Aux VT Primary	110	690	1	V	F1	415	1
40279	0116	Aux VT Secondary	110	300	1	V	F1	110	1
40280	0117	3-phase Voltage Connect. S2	0	1	1	---	FC106	0	1
40281	0118	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
40282	0119	Reserved	---	---	---	---	---	---	1
40283	011A	Reserved	---	---	---	---	---	---	1
CONTROLLER SETUP									
40284	011B	Supply Frequency	0	1	1	Hz	FC107	0	1
40285	011C	Reserved	---	---	---	---	---	---	10
to	to	Reserved	---	---	---	---	---	---	1
40316	013B	Reserved	---	---	---	---	---	---	1
PROCESS INTERLOCK									
40317	013C	Reserved	---	---	---	---	---	---	1
40318	013D	IL A Name	0	10	1	---	F22	4	10
40328	0147	IL A Function	0	3	1	---	FC140	0	1
40329	0148	IL A Inst Alarm	0	1	1	---	FC126	0	1
40330	0149	Reserved	---	---	---	---	---	---	---
40331	014A	IL A Override	---	---	---	---	---	---	---
40332	014B	IL A Healthy State	0	1	1	---	FC116	1	1
40333	014C	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40337	0150	Reserved	---	---	---	---	---	---	1
40338	0151	IL B Name	0	10	1	---	F22	5	10
40348	015B	IL B Function	0	3	1	---	FC140	0	1
40349	015C	IL B Inst Alarm	0	1	1	---	FC126	0	1
40350	015D	Reserved	---	---	---	---	---	---	---
40351	015E	IL B Override	---	---	---	---	---	---	---
40352	015F	IL B Healthy State	0	1	1	---	FC116	1	1
40353	0160	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40357	0164	Reserved	---	---	---	---	---	---	1
40358	0165	IL C Name	0	10	1	---	F22	6	10
40368	016F	IL C Function	0	3	1	---	FC140	0	1
40369	0170	IL C Inst Alarm	0	1	1	---	FC126	0	1
40370	0171	Reserved	---	---	---	---	---	---	---
40371	0172	IL C Override	---	---	---	---	---	---	---
40372	0173	IL C Healthy State	0	1	1	---	FC116	1	1
40373	0174	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40377	0178	Reserved	---	---	---	---	---	---	1
40378	0179	IL D Name	0	10	1	---	F22	7	10
40388	0183	IL D Function	0	3	1	---	FC140	0	1
40389	0184	IL D Inst Alarm	0	1	1	---	FC126	0	1
40390	0185	Reserved	---	---	---	---	---	---	---
40391	0186	IL D Override	---	---	---	---	---	---	---
40392	0187	IL D Healthy State	0	1	1	---	FC116	1	1
40393	0188	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40397	018C	Reserved	---	---	---	---	---	---	1
40398	018D	IL E Name	0	10	1	---	F22	8	10

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
40408	0197	IL E Function	0	3	1	---	FC140	0	1
40409	0198	IL E Inst Alarm	0	1	1	---	FC126	0	1
40410	0199	Reserved	---	---	---	---	---	---	---
40411	019A	IL E Override	---	---	---	---	---	---	---
40412	019B	IL E Healthy State	0	1	1	---	FC116	1	1
40413	019C	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40417	01A0	Reserved	---	---	---	---	---	---	1
40418	01A1	IL F Name	0	10	1	---	F22	9	10
40428	01AB	IL F Function	0	3	1	---	FC140	0	1
40429	01AC	IL F Inst Alarm	0	1	1	---	FC126	0	1
40430	01AD	Reserved	---	---	---	---	---	---	---
40431	01AE	IL F Override	---	---	---	---	---	---	---
40432	01AF	IL F Healthy State	0	1	1	---	FC116	1	1
40433	01B0	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40437	01B4	Reserved	---	---	---	---	---	---	1
40438	01B5	IL G Name	0	10	1	---	F22	10	10
40448	01BF	IL G Function	0	3	1	---	FC140	0	1
40449	01C0	IL G Inst Alarm	0	1	1	---	FC126	0	1
40450	01C1	Reserved	---	---	---	---	---	---	---
40451	01C2	IL G Override	---	---	---	---	---	---	---
40452	01C3	IL G Healthy State	0	1	1	---	FC116	1	1
40453	01C4	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40457	01C8	Reserved	---	---	---	---	---	---	1
40458	01C9	IL H Name	0	10	1	---	F22	11	10
40468	01D3	IL H Function	0	3	1	---	FC140	0	1
40469	01D4	IL H Inst Alarm	0	1	1	---	FC126	0	1
40470	01D5	Reserved	---	---	---	---	---	---	---
40471	01D6	IL H Override	---	---	---	---	---	---	---
40472	01D7	IL H Healthy State	0	1	1	---	FC116	1	1
40473	01D8	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40477	01DC	Reserved	---	---	---	---	---	---	1
40478	01DD	IL I Name	0	10	1	---	F22	12	10
40488	01E7	IL I Function	0	3	1	---	FC140	0	1
40489	01E8	IL I Inst Alarm	0	1	1	---	FC126	0	1
40490	01E9	Reserved	---	---	---	---	---	---	---
40491	01EA	IL I Override	---	---	---	---	---	---	---
40492	01EB	IL I Healthy State	0	1	1	---	FC116	1	1
40493	01EC	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40497	01F0	Reserved	---	---	---	---	---	---	1
40498	01F1	IL J Name	0	10	1	---	F22	13	10
40508	01FB	IL J Function	0	3	1	---	FC140	0	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
40509	01FC	IL J Inst Alarm	0	1	1	---	FC126	0	1
40510	01FD	Reserved	---	---	---	---	---	---	---
40511	01FE	IL J Override	---	---	---	---	---	---	---
40512	01FF	IL J Healthy State	0	1	1	---	FC116	1	1
40513	0200	Reserved	---	---	---	---	---	---	1
40514	0201	Reserved	---	---	---	---	---	---	1
40515	0202	Reserved	---	---	---	---	---	---	1
40516	0203	Reserved	---	---	---	---	---	---	1
COMMUNICATION SETUP									
40517	0204	Comms OK Evaluation	0	8	1	---	FC131A	1	1
40518	0205	Reserved	---	---	---	---	---	---	1
40519	0206	Comm Failure Fault	5	30	5	s	F1*	30	1
40520	0207	Comm Failure Alarm	5	30	5	s	F1*	30	1
40521	0208	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40523	020A	Reserved	---	---	---	---	---	---	1
USER MAP ADDRESSES									
40524	020B	User Map Address 1	30001	43763	1	---	F1	30001	1
40525	020C	User Map Address 2	30001	43763	1	---	F1	30001	1
40526	020D	User Map Address 3	30001	43763	1	---	F1	30001	1
40527	020E	User Map Address 4	30001	43763	1	---	F1	30001	1
to	to	Reserved	---	---	---	---	---	---	1
40645	0284	User Map Address 122	30001	43763	1	---	F1	30001	1
40646	0285	User Map Address 123	30001	43763	1	---	F1	30001	1
40647	0286	User Map Address 124	30001	43763	1	---	F1	30001	1
40648	0287	User Map Address 125	30001	43763	1	---	F1	30001	1
40649	0288	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40658	0291	Reserved	---	---	---	---	---	---	1
EVENT RECORDER									
40659	0292	Event Recorder Function	0	1	1	---	FC126	1	1
40660	0293	Recording of Fault Events	0	1	1	---	FC126	1	1
40661	0294	Recording of Alarm Events	0	1	1	---	FC126	1	1
40662	0295	Recording of Control Events	0	1	1	---	FC126	1	1
40663	0296	Reserved	---	---	---	---	---	---	1
40664	0297	Reserved	---	---	---	---	---	---	1
40665	0298	Reserved	---	---	---	---	---	---	1
40666	0299	Recording of Set Time/Date Events	0	1	1	---	FC126	0	1
40667	029A	Event Record Selector	1	65535	1	---	F1	1	1
40668	029B	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40671	029D	Reserved	---	---	---	---	---	---	1
MEMORY									
40672	029F	Trace Memory Channel Selector	0	11	1	---	F26	0	1
40673	02A0	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
40674	02A1	Trace Memory Sample Index	0	2048	1	---	F1	0	1
40675	02A2	Trigger Source	1	40964	1	---	FC132	1	1
40676	02A3	Trigger Position	0	100	1	%	F1	0	1
40677	02A4	Trigger Mode	0	1	1	---	FC148	0	1
40678	02A5	Reserved	---	---	---	---	---	---	1
DATA LOGGER									
40679	02A6	Data Log Number Selector	0	65535	1	---	F1	0	1
40680	02A7	Data Log Channel Selector	-32767	32767	1	---	F4	0	1
40681	02A8	Data Log Sample Selector (DLSS)	-32767	32767	1	---	F4	0	1
40682	02A9	Sample Rate	0	3	1	---	F74	1	1
40683	02AA	Continuous Mode	0	1	1	---	FC126	0	1
40684	02AB	Buffer Organization	0	1	1	---	F1	0	1
40685	02AC	Trigger Position	0	100	1	%	F1	25	1
40686	02AD	Trigger Source	0	40962	1	---	FC132	0	1
40687	02AE	Channel 1 Source	0	26	1	---	F77	1	1
40688	02AF	Channel 2 Source	0	26	1	---	F77	2	1
40689	02B0	Channel 3 Source	0	26	1	---	F77	3	1
40690	02B1	Channel 4 Source	0	26	1	---	F77	0	1
40691	02B2	Channel 5 Source	0	26	1	---	F77	0	1
40692	02B3	Channel 6 Source	0	26	1	---	F77	0	1
40693	02B4	Channel 7 Source	0	26	1	---	F77	0	1
40694	02B5	Channel 8 Source	0	26	1	---	F77	0	1
40695	02B6	Channel 9 Source	0	26	1	---	F77	0	1
40696	02B7	Channel 10 Source	0	26	1	---	F77	0	1
40697	02B8	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
40856	0357	Reserved	---	---	---	---	---	---	1
CURRENT UNBALANCE (REQUIRED=IO_A)									
40857	0358	Current Unbalance Alarm Level	4	41	1	%	F1*	15	1
40858	0359	Current Unbalance Alarm Delay	1	60	1	s	F1	1	1
40859	035A	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41039	040E	Reserved	---	---	---	---	---	---	1
CALIBRATION									
41040	040F	Calibration Date	0	0X0C1F082E	1	---	F18	0	2
41042	0411	Calibration Time	0	0X173B3B63	1	---	F19	0	2
41044	0413	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41105	0450	Reserved							1
SECURITY									
41106	0451	Passcode Level 1	11111	55556	1	---	F1*	11111	1
41107	0452	Passcode Level 2	11111	55556	1	---	F1*	22222	1
41108	0453	Reserved	---	---	---	---	---	---	1
41109	0454	Access Switch Level	1	3	1	---	F1	1	1
41110	0455	Comms Security	0	1	1	---	FC126	0	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
41111	0456	MCC Setpoint Access	0	1	1	---	FC126	1	1
41112	0457	Passcode Entry	0	55555	1	---	F1	0	1
41113	0458	Reserved	---	---	---	---	---	---	1
41114	0459	Reserved	---	---	---	---	---	---	1
41115	045A	Reserved	---	---	---	---	---	---	1
41116	045B	Reserved	---	---	---	---	---	---	1
FLEXLOGIC TIMERS									
41117	045C	Timer 1 Type	0	2	1	---	FC141	0	1
41118	045D	Timer 1 Pickup Delay	0	1000	1	---	F1	1	1
41119	045E	Timer 1 Dropout Delay	0	1000	1	---	F1	1	1
41120	045F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41124	0463	Reserved	---	---	---	---	---	---	1
41125	0464	Timer 2 Type	0	2	1	---	FC141	0	1
41126	0465	Timer 2 Pickup Delay	0	1000	1	---	F1	1	1
41127	0466	Timer 2 Dropout Delay	0	1000	1	---	F1	1	1
41128	0467	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41132	046B	Reserved	---	---	---	---	---	---	1
41133	046C	Timer 3 Type	0	2	1	---	FC141	0	1
41134	046D	Timer 3 Pickup Delay	0	1000	1	---	F1	1	1
41135	046E	Timer 3 Dropout Delay	0	1000	1	---	F1	1	1
41136	046F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41140	0473	Reserved	---	---	---	---	---	---	1
41141	0474	Timer 4 Type	0	2	1	---	FC141	0	1
41142	0475	Timer 4 Pickup Delay	0	1000	1	---	F1	1	1
41143	0476	Timer 4 Dropout Delay	0	1000	1	---	F1	1	1
41144	0477	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41148	047B	Reserved	---	---	---	---	---	---	1
41149	047C	Timer 5 Type	0	2	1	---	FC141	0	1
41150	047D	Timer 5 Pickup Delay	0	1000	1	---	F1	1	1
41151	047E	Timer 5 Dropout Delay	0	1000	1	---	F1	1	1
41152	047F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41156	0483	Reserved	---	---	---	---	---	---	1
41157	0484	Timer 6 Type	0	2	1	---	FC141	0	1
41158	0485	Timer 6 Pickup Delay	0	1000	1	---	F1	1	1
41159	0486	Timer 6 Dropout Delay	0	1000	1	---	F1	1	1
41160	0487	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41164	048B	Reserved	---	---	---	---	---	---	1
41165	048C	Timer 7 Type	0	2	1	---	FC141	0	1
41166	048D	Timer 7 Pickup Delay	0	1000	1	---	F1	1	1
41167	048E	Timer 7 Dropout Delay	0	1000	1	---	F1	1	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
41168	048F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41172	0493	Reserved	---	---	---	---	---	---	1
41173	0494	Timer 8 Type	0	2	1	---	FC141	0	1
41174	0495	Timer 8 Pickup Delay	0	1000	1	---	F1	1	1
41175	0496	Timer 8 Dropout Delay	0	1000	1	---	F1	1	1
41176	0497	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41180	049B	Reserved	---	---	---	---	---	---	1
41181	049C	Timer 9 Type	0	2	1	---	FC141	0	1
41182	049D	Timer 9 Pickup Delay	0	1000	1	---	F1	1	1
41183	049E	Timer 9 Dropout Delay	0	1000	1	---	F1	1	1
41184	049F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41188	04A3	Reserved	---	---	---	---	---	---	1
41189	04A4	Timer 10 Type	0	2	1	---	FC141	0	1
41190	04A5	Timer 10 Pickup Delay	0	1000	1	---	F1	1	1
41191	04A6	Timer 10 Dropout Delay	0	1000	1	---	F1	1	1
41192	04A7	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41196	04AB	Reserved	---	---	---	---	---	---	1
41197	04AC	Timer 11 Type	0	2	1	---	FC141	0	1
41198	04AD	Timer 11 Pickup Delay	0	1000	1	---	F1	1	1
41199	04AE	Timer 11 Dropout Delay	0	1000	1	---	F1	1	1
41200	04AF	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41204	04B3	Reserved	---	---	---	---	---	---	1
41205	04B4	Timer 12 Type	0	2	1	---	FC141	0	1
41206	04B5	Timer 12 Pickup Delay	0	1000	1	---	F1	1	1
41207	04B6	Timer 12 Dropout Delay	0	1000	1	---	F1	1	1
41208	04B7	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41212	04BB	Reserved	---	---	---	---	---	---	1
41213	04BC	Timer 13 Type	0	2	1	---	FC141	0	1
41214	04BD	Timer 13 Pickup Delay	0	1000	1	---	F1	1	1
41215	04BE	Timer 13 Dropout Delay	0	1000	1	---	F1	1	1
41216	04BF	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41220	04C3	Reserved	---	---	---	---	---	---	1
41221	04C4	Timer 14 Type	0	2	1	---	FC141	0	1
41222	04C5	Timer 14 Pickup Delay	0	1000	1	---	F1	1	1
41223	04C6	Timer 14 Dropout Delay	0	1000	1	---	F1	1	1
41224	04C7	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41228	04CB	Reserved	---	---	---	---	---	---	1
41229	04CC	Timer 15 Type	0	2	1	---	FC141	0	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
41230	04CD	Timer 15 Pickup Delay	0	1000	1	---	F1	1	1
41231	04CE	Timer 15 Dropout Delay	0	1000	1	---	F1	1	1
41232	04CF	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41236	04D3	Reserved	---	---	---	---	---	---	1
41237	04D4	Timer 16 Type	0	2	1	---	FC141	0	1
41238	04D5	Timer 16 Pickup Delay	0	1000	1	---	F1	1	1
41239	04D6	Timer 16 Dropout Delay	0	1000	1	---	F1	1	1
41240	04D7	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41244	04DB	Reserved	---	---	---	---	---	---	1
41245	04DC	Timer 17 Type	0	2	1	---	FC141	0	1
41246	04DD	Timer 17 Pickup Delay	0	1000	1	---	F1	1	1
41247	04DE	Timer 17 Dropout Delay	0	1000	1	---	F1	1	1
41248	04DF	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41252	04E3	Reserved	---	---	---	---	---	---	1
41253	04E4	Timer 18 Type	0	2	1	---	FC141	0	1
41254	04E5	Timer 18 Pickup Delay	0	1000	1	---	F1	1	1
41255	04E6	Timer 18 Dropout Delay	0	1000	1	---	F1	1	1
41256	04E7	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41260	04EB	Reserved	---	---	---	---	---	---	1
41261	04EC	Timer 19 Type	0	2	1	---	FC141	0	1
41262	04ED	Timer 19 Pickup Delay	0	1000	1	---	F1	1	1
41263	04EE	Timer 19 Dropout Delay	0	1000	1	---	F1	1	1
41264	04EF	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41268	04F3	Reserved	---	---	---	---	---	---	1
41269	04F4	Timer 20 Type	0	2	1	---	FC141	0	1
41270	04F5	Timer 20 Pickup Delay	0	1000	1	---	F1	1	1
41271	04F6	Timer 20 Dropout Delay	0	1000	1	---	F1	1	1
41272	04F7	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41276	04FB	Reserved	---	---	---	---	---	---	1
41277	04FC	Timer 21 Type	0	2	1	---	FC141	0	1
41278	04FD	Timer 21 Pickup Delay	0	1000	1	---	F1	1	1
41279	04FE	Timer 21 Dropout Delay	0	1000	1	---	F1	1	1
41280	04FF	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41284	0503	Reserved	---	---	---	---	---	---	1
41285	0504	Timer 22 Type	0	2	1	---	FC141	0	1
41286	0505	Timer 22 Pickup Delay	0	1000	1	---	F1	1	1
41287	0506	Timer 22 Dropout Delay	0	1000	1	---	F1	1	1
41288	0507	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
41292	050B	Reserved	---	---	---	---	---	---	1
41293	050C	Timer 23 Type	0	2	1	---	FC141	0	1
41294	050D	Timer 23 Pickup Delay	0	1000	1	---	F1	1	1
41295	050E	Timer 23 Dropout Delay	0	1000	1	---	F1	1	1
41296	050F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41300	0513	Reserved	---	---	---	---	---	---	1
41301	0514	Timer 24 Type	0	2	1	---	FC141	0	1
41302	0515	Timer 24 Pickup Delay	0	1000	1	---	F1	1	1
41303	0516	Timer 24 Dropout Delay	0	1000	1	---	F1	1	1
41304	0517	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41308	051B	Reserved	---	---	---	---	---	---	1
41309	051C	Timer 25 Type	0	2	1	---	FC141	0	1
41310	051D	Timer 25 Pickup Delay	0	1000	1	---	F1	1	1
41311	051E	Timer 25 Dropout Delay	0	1000	1	---	F1	1	1
41312	051F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41316	0523	Reserved	---	---	---	---	---	---	1
41317	0524	Timer 26 Type	0	2	1	---	FC141	0	1
41318	0525	Timer 26 Pickup Delay	0	1000	1	---	F1	1	1
41319	0526	Timer 26 Dropout Delay	0	1000	1	---	F1	1	1
41320	0527	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41324	052B	Reserved	---	---	---	---	---	---	1
41325	052C	Timer 27 Type	0	2	1	---	FC141	0	1
41326	052D	Timer 27 Pickup Delay	0	1000	1	---	F1	1	1
41327	052E	Timer 27 Dropout Delay	0	1000	1	---	F1	1	1
41328	052F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41332	0533	Reserved	---	---	---	---	---	---	1
41333	0534	Timer 28 Type	0	2	1	---	FC141	0	1
41334	0535	Timer 28 Pickup Delay	0	1000	1	---	F1	1	1
41335	0536	Timer 28 Dropout Delay	0	1000	1	---	F1	1	1
41336	0537	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41340	053B	Reserved	---	---	---	---	---	---	1
41341	053C	Timer 29 Type	0	2	1	---	FC141	0	1
41342	053D	Timer 29 Pickup Delay	0	1000	1	---	F1	1	1
41343	053E	Timer 29 Dropout Delay	0	1000	1	---	F1	1	1
41344	053F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41348	0543	Reserved	---	---	---	---	---	---	1
41349	0544	Timer 30 Type	0	2	1	---	FC141	0	1
41350	0545	Timer 30 Pickup Delay	0	1000	1	---	F1	1	1
41351	0546	Timer 30 Dropout Delay	0	1000	1	---	F1	1	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
41352	0547	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41356	054B	Reserved	---	---	---	---	---	---	1
41357	054C	Timer 31 Type	0	2	1	---	FC141	0	1
41358	054D	Timer 31 Pickup Delay	0	1000	1	---	F1	1	1
41359	054E	Timer 31 Dropout Delay	0	1000	1	---	F1	1	1
41360	054F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41364	0553	Reserved	---	---	---	---	---	---	1
41365	0554	Timer 32 Type	0	2	1	---	FC141	0	1
41366	0555	Timer 32 Pickup Delay	0	1000	1	---	F1	1	1
41367	0556	Timer 32 Dropout Delay	0	1000	1	---	F1	1	1
41368	0557	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41374	055D	Reserved	---	---	---	---	---	---	1
CONTACT INPUT ASSIGNMENT									
41375	055E	Access Switch	0	57344	0	---	FC142	0	1
41376	055F	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41393	0570	Reserved	---	---	---	---	---	---	1
41394	0571	Process Interlock A	0	57344	0	---	FC142	0	1
41395	0572	Process Interlock B	0	57344	0	---	FC142	0	1
41396	0573	Process Interlock C	0	57344	0	---	FC142	0	1
41397	0574	Process Interlock D	0	57344	0	---	FC142	0	1
41398	0575	Process Interlock E	0	57344	0	---	FC142	0	1
41399	0576	Process Interlock F	0	57344	0	---	FC142	0	1
41400	0577	Process Interlock G	0	57344	0	---	FC142	0	1
41401	0578	Process Interlock H	0	57344	0	---	FC142	0	1
41402	0579	Process Interlock I	0	57344	0	---	FC142	0	1
41403	057A	Process Interlock J	0	57344	0	---	FC142	0	1
41404	057B	SE Limit Switch	0	57344	0	---	FC142	0	1
41405	057C	SEO Limit Switch	0	57344	0	---	FC142	0	1
41406	057D	SN Limit Switch	0	57344	0	---	FC142	0	1
41407	057E	SNO Limit Switch	0	57344	0	---	FC142	0	1
41408	057F	Disconnect Switch (DS)	0	57344	0	---	FC142	0	1
41409	0580	Test with Load (TSL/Q2)	0	57344	0	---	FC142	0	1
41410	0581	Inhibit Xfer to S2 (Q3)	0	57344	0	---	FC142	0	1
41411	0582	Inhibit Xfer to S1 (Q7)	0	57344	0	---	FC142	0	1
41412	0583	Load Shed from S2 (R15)	0	57344	0	---	FC142	0	1
41413	0584	Reserved	---	---	---	---	---	---	1
41414	0585	Engine Start (SW1)	0	57344	0	---	FC142	0	1
41415	0586	Manual X'fer S1-2, S2-1 (S12)	0	57344	0	---	FC142	0	1
41416	0587	Commit X'fer to S2 (S13)	0	57344	0	---	FC142	0	1
41417	0588	Manual X'fer S2-S1 (S5)	0	57344	0	---	FC142	0	1
41418	0589	Preferred Source Select (SW3)	0	57344	0	---	FC142	0	1
41419	058A	Transition Mode Select (TMS)	0	57344	0	---	FC142	0	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
41420	058B	Test Without Load (TSNL)	0	57344	0	---	FC142	0	1
41421	058C	Manual Xfer to S2 (YE)	0	57344	0	---	FC142	0	1
41422	058D	Manual Xfer to S1 (YN)	0	57344	0	---	FC142	0	1
41423	058E	Bypass Xfer Time Delay to S1	0	57344	0	---	FC142	0	1
41424	058F	Bypass Xfer Time Delay to S2	0	57344	0	---	FC142	0	1
41425	0590	Auto Load Shed Reset	0	57344	0	---	FC142	0	1
41426	0591	Auto X'fer Rly (ATR)	0	57344	0	---	FC142	0	1
41427	0592	S1 Breaker Lockout	0	57344	0	---	FC142	0	1
41428	0593	S2 Breaker Lockout	0	57344	0	---	FC142	0	1
41429	0594	S1 Breaker Racked Out	0	57344	0	---	FC142	0	1
41430	0595	S2 Breaker Racked Out	0	57344	0	---	FC142	0	1
41431	0596	CB Light Test	0	57344	0	---	FC142	0	1
41432	0597	CB Reset	0	57344	0	---	FC142	0	1
41433	0598	Auto Load Shed Bypass	0	57344	0	---	FC142	0	1
41434	0599	Auto Load Shed Mode	0	57344	0	---	FC142	0	1
41435	059A	Bypass Connected to S2 (AB3)	0	57344	0	---	FC142	0	1
41436	059B	Bypass Connected to S1 (AB4)	0	57344	0	---	FC142	0	1
41437	059C	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41470	05BD	Reserved	---	---	---	---	---	---	1
SELF TEST									
41471	05BE	Self Test Action	0	1	1	---	FC111	0	1
41472	05BF	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41475	05C2	Reserved	---	---	---	---	---	---	1
LEDs									
41476	05C3	Reserved	---	---	---	---	---	---	1
41477	05C4	Green LED Intensity	0	15	1	---	FC147	0	1
41478	05C5	Red LED Intensity	0	15	1	---	FC147	0	1
41479	05C6	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41514	05E9	Reserved	---	---	---	---	---	---	1
CONTACT OUTPUTS									
41515	05EA	Contact Output 1	0	57344	0	---	FC142	0	1
41516	05EB	Contact Output 2	0	57344	0	---	FC142	0	1
41517	05EC	Contact Output 3	0	57344	0	---	FC142	0	1
41518	05ED	Contact Output 4	0	57344	0	---	FC142	0	1
to	to	Reserved	---	---	---	---	---	---	1
41543	0606	Contact Output 29	0	57344	0	---	FC142	0	1
41544	0607	Contact Output 30	0	57344	0	---	FC142	0	1
41545	0608	Contact Output 31	0	57344	0	---	FC142	0	1
41546	0609	Contact Output 32	0	57344	0	---	FC142	0	1
41547	060A	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
41696	069F	Reserved							1
FLEXLOGIC EQUATION									

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
41697	06A0	Flex Equation	0	65535	1	---	FC142	1024	512
42209	08A0	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43118	0C2D	Reserved	---	---	---	---	---	---	2
ATS									
43119	0C2E	Switch Option	0	2	1	---	FC325	1	1
43120	0C2F	Auto / Manual Select	0	3	1	---	FC317	0	1
43121	0C30	Load Control 1 (LC1) Type	0	2	1	---	FC319	0	1
43122	0C31	Load Control 2 (LC2) Type	0	2	1	---	FC319	0	1
43123	0C32	Load Control 3 (LC3) Type	0	2	1	---	FC319	0	1
43124	0C33	Load Control 4 (LC4) Type	0	2	1	---	FC319	0	1
43125	0C34	Load Control 5 (LC5) Type	0	2	1	---	FC319	0	1
43126	0C35	Load Control 6 (LC6) Type	0	2	1	---	FC319	0	1
43127	0C36	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43133	0C3C	Reserved	---	---	---	---	---	---	1
43134	0C3D	R15	0	1	0	---	FC329	0	1
43135	0C3E	ATS Amps	0	16	1	A	FC165	0	1
43136	0C3F	CTAP	0	1	1	---	FC103	0	1
43137	0C40	ATS Name	0	10	1	---	F22	22	10
43147	0C4A	ATS Number of Poles	0	2	1	---	FC197	0	1
43148	0C4B	ATS Type	0	7	1	---	FC159	0	1
43149	0C4C	ATS Voltage	0	13	1	V	FC166	0	1
43150	0C4D	S1 Number of Phases	1	2	1	---	FC312	0	1
43151	0C4E	S1 Type	1	2	1	---	FC313	0	1
43152	0C4F	S2 Number of Phases	1	2	1	---	FC312	0	1
43153	0C50	S2 Type	1	2	1	---	FC313	0	1
43154	0C51	Solenoid Pulse	0	1500	1	ms	F1	500	1
43155	0C52	Reserved	---	---	---	---	---	---	1
43156	0C53	Coil Control Delay Timer Value	0	3600	1	---	F24	0	1
43157	0C54	CT Parallel Timer Value	0	20	1	10ms	F1	0	1
43158	0C55	Reserved	---	---	---	---	---	---	1
43159	0C56	Open Last Close Time (OLC)	0	3600	1	---	F24	100	1
43160	0C57	Sol Saver Time Value	1	3600	1	---	F24	3	1
43161	0C58	Source Qualification Time	1	3600	1	---	F24	20	1
43162	0C59	Sync. Timer Value	0	3600	1	---	F24	10	1
43163	0C5A	CT Voltage Differential Limit	0	10	1	%	F1	5	1
43164	0C5B	Reserved	---	---	---	---	---	---	1
43165	0C5C	Reserved	---	---	---	---	---	---	1
43166	0C5D	Reserved	---	---	---	---	---	---	1
43167	0C5E	Reserved	---	---	---	---	---	---	1
ATS CONTROL									
43168	0C5F	Preferred Source	0	1	1	---	FC161	0	1
43169	0C60	Commit X'fer to S2 (S13)	0	1	1	---	FC126	0	1
43170	0C61	Transition Mode Select	0	1	1	---	FC117	0	1
43171	0C62	Auto Mode Shed Mode	0	1	1	---	FC326	1	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
43172	0C63	Auto Mode Shed kW Bypass	0	1	1	---	FC126	0	1
43173	0C64	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43178	0C69	Reserved	---	---	---	---	---	---	1
ATS CONTROL TIMERS									
43179	0C6A	Time Delay to Preferred Source	0	600	1	---	F24	5	1
43180	0C6B	Time Delay to Alternate Source	0	600	1	---	F24	5	1
43181	0C6C	Gen Run Timer Value	0	3600	1	---	F24	0	1
43182	0C6D	Time Delay for Gen Sag	0	30	1	---	F24	0	1
43183	0C6E	Delay for Generator Start	0	15541	1	---	F24	3	1
43184	0C6F	S2 Failure Response Delay (P2)	0	15540	1	---	F24	3	1
43185	0C70	Time Delay to Preferred Source	0	15540	1	---	F24	1800	1
43186	0C71	Reserved	---	---	---	---	---	---	1
43187	0C72	Delay for Engine Cooldown	0	3600	1	---	F24	300	1
43188	0C73	U2 Timer Value	0	3600	1	---	F24	600	1
43189	0C74	Time Delay to Alternate Source	0	15540	1	---	F24	3	1
43190	0C75	Pre Load Control 1 (LC1) Timer	0	3600	1	---	F24	0	1
43191	0C76	Pre Load Control 2 (LC2) Timer	0	3600	1	---	F24	0	1
43192	0C77	Pre Load Control 3 (LC3) Timer	0	3600	1	---	F24	0	1
43193	0C78	Pre Load Control 4 (LC4) Timer	0	3600	1	---	F24	0	1
43194	0C79	Pre Load Control 5 (LC5) Timer	0	3600	1	---	F24	0	1
43195	0C7A	Pre Load Control 6 (LC6) Timer	0	3600	1	---	F24	0	1
43196	0C7B	Post Load Control 1 (LC1) Timer	0	3600	1	---	F24	0	1
43197	0C7C	Post Load Control 2 (LC2) Timer	0	3600	1	---	F24	0	1
43198	0C7D	Post Load Control 3 (LC3) Timer	0	3600	1	---	F24	0	1
43199	0C7E	Post Load Control 4 (LC4) Timer	0	3600	1	---	F24	0	1
43200	0C7F	Post Load Control 5 (LC5) Timer	0	3600	1	---	F24	0	1
43201	0C80	Post Load Control 6 (LC6) Timer	0	3600	1	---	F24	0	1
43202	0C81	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43207	0C86	Reserved	---	---	---	---	---	---	1
ATS R50									
43208	0C87	Max Frequency Difference	0	500	1	Hz	F3	500	1
43209	0C88	Sync Phase Angle Limit	0	21	1	°	F1*	10	1
43210	0C89	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43233	0CA0	Reserved	---	---	---	---	---	---	1
ATS SOURCE 1 CONFIGURATION									
43234	0CA1	S1 Overfreq Fail	501	631	1	Hz	F2*	631	1
43235	0CA2	S1 Overfreq Restore	500	629	1	Hz	F2	629	1
43236	0CA3	S1 Overvolt Fail	105	111	1	%	F1*	110	1
43237	0CA4	S1 Overvolt Restore	103	108	1	%	F1	105	1
43238	0CA5	S1 Underfreq Fail	450	599	1	Hz	F2	590	1
43239	0CA6	S1 Underfreq Restore	451	600	1	Hz	F2	595	1
43240	0CA7	S1 Undervolt Fail	75	99	1	%	F1	80	1
43241	0CA8	S1 Undervolt Restore	85	100	1	%	F1	90	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
43242	OCA9	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43252	OCB3	Reserved	---	---	---	---	---	---	1
ATS SOURCE 2 CONFIGURATION									
43253	OCB4	S2 Auto LS Underfreq Set	450	601	1	Hz	F2*	601	1
43254	OCB5	S2 Auto LS Underfreq Delay	0	3600	1	---	F24	0	1
43255	OCB6	S2 Auto LS Overpower Set	50	111	1	%	F1*	111	1
43256	OCB7	S2 Auto LS Overpower Delay	0	3600	1	---	F24	0	1
43257	OCB8	S2 Auto LS Undervolt Set	0	101	1	%	F1*	101	1
43258	OCB9	S2 Auto LS Undervolt Delay	0	3600	1	---	F24	0	1
43259	OCBA	S2 Overfreq Fail	501	631	1	Hz	F2*	631	1
43260	OCBB	S2 Overfreq Restore	500	629	1	Hz	F2	629	1
43261	OCBC	S2 Overvolt Fail	105	111	1	%	F1*	111	1
43262	OCBD	S2 Overvolt Restore	103	108	1	%	F1	105	1
43263	OCBE	S2 Underfreq Fail	450	599	1	Hz	F2	540	1
43264	OCBF	S2 Underfreq Restore	451	600	1	Hz	F2	570	1
43265	OCC0	S2 Undervolt Fail	75	99	1	%	F1	80	1
43266	OCC1	S2 Undervolt Restore	85	100	1	%	F1	90	1
43267	OCC2	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43275	OCCA	Reserved	---	---	---	---	---	---	1
VOLTAGE IMBALANCE									
43276	OCCB	Phase Rotation Match	0	1	1	---	FC126	0	1
43277	OCCC	Voltage Imbalance Failure	5	21	1	%	F1*	21	1
43278	OCCD	Voltage Imbalance Restore	3	18	1	%	F1	8	1
43279	OCC E	Voltage Alarm Delay	10	30	1	s	F1	30	1
43280	OCCF	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43285	OCD4	Reserved	---	---	---	---	---	---	1
ATS EXERCISER									
43286	OCD5	Exerciser Type	0	5	1	---	FC163	0	1
43287	OCD6	CDT Event 1 Start Time	0	0X173B3B63	1	---	F19	0	2
43289	OCD8	CDT Event 1 Duration	0	3600	1	---	F24	0	1
43290	OCD9	CDT Event 1 Wkday	0	7	1	---	FC171	0	1
43291	OCDA	CDT Event 1 Date	0	0X0C1F082E	1	---	FC316	0	2
43293	OCD C	CDT Event 1 Load	0	1	1	---	FC303	0	1
43294	OCD D	CDT Event 2 Start Time	0	0X173B3B63	1	---	F19	0	2
43296	OCD F	CDT Event 2 Duration	0	3600	1	---	F24	0	1
43297	OCE0	CDT Event 2 Wkday	0	7	1	---	FC171	0	1
43298	OCE1	CDT Event 2 Date	0	0X0C1F082E	1	---	FC316	0	2
43300	OCE3	CDT Event 2 Load	0	1	1	---	FC303	0	1
43301	OCE4	CDT Event 3 Start Time	0	0X173B3B63	1	---	F19	0	2
43303	OCE6	CDT Event 3 Duration	0	3600	1	---	F24	0	1
43304	OCE7	CDT Event 3 Wkday	0	7	1	---	FC171	0	1
43305	OCE8	CDT Event 3 Date	0	0X0C1F082E	1	---	FC316	0	2
43307	OCEA	CDT Event 3 Load	0	1	1	---	FC303	0	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
43308	0CEB	CDT Event 4 Start Time	0	0X173B3B63	1	---	F19	0	2
43310	0CED	CDT Event 4 Duration	0	3600	1	---	F24	0	1
43311	0CEE	CDT Event 4 Wkday	0	7	1	---	FC171	0	1
43312	0CEF	CDT Event 4 Date	0	0X0C1F082E	1	---	FC316	0	2
43314	0CF1	CDT Event 4 Load	0	1	1	---	FC303	0	1
43315	0CF2	CDT Event 5 Start Time	0	0X173B3B63	1	---	F19	0	2
43317	0CF4	CDT Event 5 Duration	0	3600	1	---	F24	0	1
43318	0CF5	CDT Event 5 Wkday	0	7	1	---	FC171	0	1
43319	0CF6	CDT Event 5 Date	0	0X0C1F082E	1	---	FC316	0	2
43321	0CF8	CDT Event 5 Load	0	1	1	---	FC303	0	1
43322	0CF9	CDT Event 6 Start Time	0	0X173B3B63	1	---	F19	0	2
43324	0CFB	CDT Event 6 Duration	0	3600	1	---	F24	0	1
43325	0CFC	CDT Event 6 Wkday	0	7	1	---	FC171	0	1
43326	0CFD	CDT Event 6 Date	0	0X0C1F082E	1	---	FC316	0	2
43328	0CFF	CDT Event 6 Load	0	1	1	---	FC303	0	1
43329	0D00	CDT Event 7 Start Time	0	0X173B3B63	1	---	F19	0	2
43331	0D02	CDT Event 7 Duration	0	3600	1	---	F24	0	1
43332	0D03	CDT Event 7 Wkday	0	7	1	---	FC171	0	1
43333	0D04	CDT Event 7 Date	0	0X0C1F082E	1	---	FC316	0	2
43335	0D06	CDT Event 7 Load	0	1	1	---	FC303	0	1
43336	0D07	CDT Event 8 Start Time	0	0X173B3B63	1	---	F19	0	2
43338	0D09	CDT Event 8 Duration	0	3600	1	---	F24	0	1
43339	0D0A	Reserved	---	---	---	---	---	---	1
43340	0D0B	CDT Event 8 Date	0	0X0C1F082E	1	---	FC316	0	2
43342	0D0D	CDT Event 8 Load	0	1	1	---	FC303	0	1
43343	0D0E	CDT Event 9 Start Time	0	0X173B3B63	1	---	F19	0	2
43345	0D10	CDT Event 9 Duration	0	3600	1	---	F24	0	1
43346	0D11	Reserved	---	---	---	---	---	---	1
43347	0D12	CDT Event 9 Date	0	0X0C1F082E	1	---	FC316	0	2
43349	0D14	CDT Event 10 Load	0	1	1	---	FC303	0	1
43350	0D15	CDT Event 10 Start Time	0	0X173B3B63	1	---	F19	0	2
43352	0D17	CDT Event 10 Duration	0	3600	1	---	F24	0	1
43353	0D18	Reserved	---	---	---	---	---	---	1
43354	0D19	CDT Event 10 Date	0	0X0C1F082E	1	---	FC316	0	2
43356	0D1B	CDT Event 10 Load	0	1	1	---	FC303	0	1
43357	0D1C	CDT Event 11 Start Time	0	0X173B3B63	1	---	F19	0	2
43359	0D1E	CDT Event 11 Duration	0	3600	1	---	F24	0	1
43360	0D1F	Reserved	---	---	---	---	---	---	1
43361	0D20	CDT Event 11 Date	0	0X0C1F082E	1	---	FC316	0	2
43363	0D22	CDT Event 11 Load	0	1	1	---	FC303	0	1
43364	0D23	CDT Event 12 Start Time	0	0X173B3B63	1	---	F19	0	2
43366	0D25	CDT Event 12 Duration	0	3600	1	---	F24	0	1
43367	0D26	Reserved	---	---	---	---	---	---	1
43368	0D27	CDT Event 12 Date	0	0X0C1F082E	1	---	FC316	0	2
43370	0D29	CDT Event 12 Load	0	1	1	---	FC303	0	1
43371	0D2A	CDT Event 13 Start Time	0	0X173B3B63	1	---	F19	0	2

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
43373	0D2C	CDT Event 13 Duration	0	3600	1	---	F24	0	1
43374	0D2D	Reserved	---	---	---	---	---	---	1
43375	0D2E	CDT Event 13 Date	0	0X0C1F082E	1	---	FC316	0	2
43377	0D30	CDT Event 13 Load	0	1	1	---	FC303	0	1
43378	0D31	CDT Event 14 Start Time	0	0X173B3B63	1	---	F19	0	2
43380	0D33	CDT Event 14 Duration	0	3600	1	---	F24	0	1
43381	0D34	Reserved	---	---	---	---	---	---	1
43382	0D35	CDT Event 14 Date	0	0X0C1F082E	1	---	FC316	0	2
43384	0D37	CDT Event 14 Load	0	1	1	---	FC303	0	1
43385	0D38	CDT Event 15 Start Time	0	0X173B3B63	1	---	F19	0	2
43387	0D3A	CDT Event 15 Duration	0	3600	1	---	F24	0	1
43388	0D3B	Reserved	---	---	---	---	---	---	1
43389	0D3C	CDT Event 15 Date	0	0X0C1F082E	1	---	FC316	0	2
43391	0D3E	CDT Event 15 Load	0	1	1	---	FC303	0	1
43392	0D3F	CDT Event 16 Start Time	0	0X173B3B63	1	---	F19	0	2
43394	0D41	CDT Event 16 Duration	0	3600	1	---	F24	0	1
43395	0D42	Reserved	---	---	---	---	---	---	1
43396	0D43	CDT Event 16 Date	0	0X0C1F082E	1	---	FC316	0	2
43398	0D45	CDT Event 16 Load	0	1	1	---	FC303	0	1
43399	0D46	CDT Event 17 Start Time	0	0X173B3B63	1	---	F19	0	2
43401	0D48	CDT Event 17 Duration	0	3600	1	---	F24	0	1
43402	0D49	Reserved	---	---	---	---	---	---	1
43403	0D4A	CDT Event 17 Date	0	0X0C1F082E	1	---	FC316	0	2
43405	0D4C	CDT Event 17 Load	0	1	1	---	FC303	0	1
43406	0D4D	CDT Event 18 Start Time	0	0X173B3B63	1	---	F19	0	2
43408	0D4F	CDT Event 18 Duration	0	3600	1	---	F24	0	1
43409	0D50	Reserved	---	---	---	---	---	---	1
43410	0D51	CDT Event 18 Date	0	0X0C1F082E	1	---	FC316	0	2
43412	0D53	CDT Event 18 Load	0	1	1	---	FC303	0	1
43413	0D54	CDT Event 19 Start Time	0	0X173B3B63	1	---	F19	0	2
43415	0D56	CDT Event 19 Duration	0	3600	1	---	F24	0	1
43416	0D57	Reserved	---	---	---	---	---	---	1
43417	0D58	CDT Event 19 Date	0	0X0C1F082E	1	---	FC316	0	2
43419	0D5A	CDT Event 19 Load	0	1	1	---	FC303	0	1
43420	0D5B	CDT Event 20 Start Time	0	0X173B3B63	1	---	F19	0	2
43422	0D5D	CDT Event 20 Duration	0	3600	1	---	F24	0	1
43423	0D5E	Reserved	---	---	---	---	---	---	1
43424	0D5F	CDT Event 20 Date	0	0X0C1F082E	1	---	FC316	0	2
43426	0D61	CDT Event 20 Load	0	1	1	---	FC303	0	1
43427	0D62	CDT Event 21 Start Time	0	0X173B3B63	1	---	F19	0	2
43429	0D64	CDT Event 21 Duration	0	3600	1	---	F24	0	1
43430	0D65	Reserved	---	---	---	---	---	---	1
43431	0D66	CDT Event 21 Date	0	0X0C1F082E	1	---	FC316	0	2
43433	0D68	CDT Event 21 Load	0	1	1	---	FC303	0	1
43434	0D69	CDT Event 22 Start Time	0	0X173B3B63	1	---	F19	0	2
43436	0D6B	CDT Event 22 Duration	0	3600	1	---	F24	0	1

Modbus	Hex	Description	Min	Max	Step	Units	Format	Default	Size in Words
43437	0D6C	Reserved	---	---	---	---	---	---	1
43438	0D6D	CDT Event 22 Date	0	0X0C1F082E	1	---	FC316	0	2
43440	0D6F	CDT Event 22 Load	0	1	1	---	FC303	0	1
43441	0D70	CDT Event 23 Start Time	0	0X173B3B63	1	---	F19	0	2
43443	0D72	CDT Event 23 Duration	0	3600	1	---	F24	0	1
43444	0D73	Reserved	---	---	---	---	---	---	1
43445	0D74	CDT Event 23 Date	0	0X0C1F082E	1	---	FC316	0	2
43447	0D76	CDT Event 23 Load	0	1	1	---	FC303	0	1
43448	0D77	CDT Event 24 Start Time	0	0X173B3B63	1	---	F19	0	2
43450	0D79	CDT Event 24 Duration	0	3600	1	---	F24	0	1
43451	0D7A	Reserved	---	---	---	---	---	---	1
43452	0D7B	CDT Event 24 Date	0	0X0C1F082E	1	---	FC316	0	2
43454	0D7D	CDT Event 24 Load	0	1	1	---	FC303	0	1
43455	0D7E	Reserved	---	---	---	---	---	---	1
to	to	Reserved	---	---	---	---	---	---	1
43462	0D85	Reserved	---	---	---	---	---	---	1

ANALOG ALARM SETTINGS

43463	0D86	Voltage THD Alarm Level	1	1001	1	%	F2*	1001	1
43464	0D87	Voltage THD Alarm Delay	0	65535	1	s	F1	0	1
43465	0D88	Current THD Alarm Level	1	1001	1	%	F2*	1001	1
43466	0D89	Current THD Alarm Delay	0	65535	1	s	F1	0	1
43467	0D8A	Low PF Lag Alarm Level	0	100	1	---	F3*	100	1
43468	0D8B	Low PF Alarm Delay	0	65535	1	s	F1	0	1
43469	0D8C	Overpower Alarm Level	1	50001	1	kW	F2*	50001	1
43470	0D8D	Overpower Alarm Delay	0	65535	1	s	F1	0	1
43471	0D8E	Phase A Overcurrent Level	1	201	1	%FLA	F1*	201	1
43472	0D8F	Phase A Overcurrent Delay	0	65535	1	s	F1	0	1
43473	0D90	Phase B Overcurrent Level	1	201	1	%FLA	F1*	201	1
43474	0D91	Phase B Overcurrent Delay	0	65535	1	s	F1	0	1
43475	0D92	Phase C Overcurrent Level	1	201	1	%FLA	F1*	201	1
43476	0D93	Phase C Overcurrent Delay	0	65535	1	s	F1	0	1
43477	0D94	Neutral Overcurrent Level	1	201	1	%FLA	F1*	201	1
43478	0D95	Neutral Overcurrent Delay	0	65535	1	s	F1	0	1
43479	0D96	Low PF Lead Alarm Level	0	100	1	---	F3*	100	1

*Maximum setpoint values represent OFF.

Format codes

Code	Type	Definition
F1	16 bits	UNSIGNED VALUE
Example: 1234 stored as 1234		
F2	16 bits	UNSIGNED VALUE, 1 DECIMAL PLACE
Example: 123.4 stored as 1234		
F3	16 bits	UNSIGNED VALUE, 2 DECIMAL PLACES
Example: 12.34 stored as 1234		
F4	16 bits	2's COMPLEMENT SIGNED VALUE
Example: -1234 stored as -1234 i.e. 64302		
F6	16 bits	2's COMPLEMENT SIGNED VALUE, 2 DECIMAL PLACES
Example: -12.34 stored as -1234 i.e. 64302		
F9	32 bits	UNSIGNED LONG VALUE
1st 16 bits		High Order Word of Long Value
2nd 16 bits		Low Order Word of Long Value
Example: 123456 stored as 123456		
i.e. 1st word: 0001 hex, 2nd word: E240 hex		
F10	32 bits	UNSIGNED LONG VALUE, 1 DECIMAL PLACE
1st 16 bits		High Order Word of Long Value
2nd 16 bits		Low Order Word of Long Value
Example: 12345.6 stored as 123456		
i.e. 1st word: 0001 hex, 2nd word: E240 hex		
F13	32 bits	2's COMPLEMENT SIGNED LONG VALUE, 1 DECIMAL PLACE
1st 16 bits		High Order Word of Long Value
2nd 16 bits		Low Order Word of Long Value
Example: -12345.6 stored as -123456		
i.e. 1st word: FFFE hex, 2nd word: 1DC0 hex		
F15	16 bits	HARDWARE REVISION
0		Prototype
1		A
2		B
3		C
4		D
5		E
6		F
7		G
8		H
9		I
10		J
11		K
12		L
13		M
14		N
15		O
16		P
17		Q

Code	Type	Definition
18		R
19		S
20		T
21		U
22		V
23		W
24		X
25		Y
26		Z
F16	16 bits	2's COMPLEMENT SIGNED VALUE, 1 DECIMAL PLACE
<0		S2 Leads S1
>0		S1 Leads S2
F17	32 bits	UNSIGNED LONG VALUE, 3 DECIMAL PLACES
1st 16 bits		High Order Word of Long Value
2nd 16 bits		Low Order Word of Long Value
Example: 123456 stored as 123456		
i.e. 1st word: 0001 hex, 2nd word: E240 hex		
F18	32 bits	DATE MM/DD/YYYY
1st byte		Month 1 to 12
2nd byte		Day 1 to 31
3rd and 4th byte		Year 1995 to 2094
Example: Feb 20, 1995 stored as 34867147		
i.e. 1st word: 0214, 2nd word 07CB		
F19	32 bits	TIME HH:MM:SS:hh
1st byte		Hours 0 to 23
2nd byte		Minutes 0 to 59
3rd byte		Seconds 0 to 59
4th byte		Hundredths of seconds 0 to 99
Example: 2:05pm stored as 235208704		
i.e. 1st word: 0E05, 2nd word 0000		
F21	16 bits	2's COMPLEMENT SIGNED VALUE, 2 DECIMAL PLACES Power Factor
< 0		Leading Power Factor - Negative
> 0		Lagging Power Factor - Positive
Example: Power Factor of 0.87 lag is used as 87		
i.e. 0057		
F22	16 bits	TWO 8-BIT CHARACTERS PACKED INTO 16-BIT UNSIGNED
MSB		First Character
LSB		Second Character
Example: String 'AB' stored as 4142 hex		
F24	16 bits	UNSIGNED VALUE AS SECONDS SHOW AS Duration, MAX VALUE = OFF
Example: 1234 stored as 1234, and displayed as 20 Mins		
F25	16 bits	Trace Memory Channel Data
0		Leading
1		Lagging

Code	Type	Definition
F26	16 bits	Trace Memory Channel Data
0		Va
1		Vb
2		Vc
3		Va2
4		Vb2
5		Vc2
6		Ia
7		Ib
8		Ic
9		Ig
10		Inputs 1 to 16
11		Outputs 1 to 16
F27	32 bits	UNSIGNED LONG VALUE AS MINUTES SHOW AS LongHoursMinutes
Example: 1234 stored as 1234, and displayed as 20		
F74	16 bits	Data Logger Sample Rate
0		1 Cycle
1		1 Second
2		1 Minute
3		1 Hour
F75	16 bits	Data Logger Status
0		Stopped
1		Started
2		Triggered
3		Pretrigger
4		PostTrigger
F77	16 bits	Data Logger Channel Data
0		Disabled
1		Phase A Current
2		Phase B Current
3		Phase C Current
4		Average Phase Current
5		Current THD
6		Current Unbalance
7		Neutral Current
8		System Frequency
9		Vab
10		Vbc
11		Vca
12		Van
13		Vbn
14		Vcn
15		Power Factor
16		Real Power (kW)
17		Reactive Power (kvar)
18		Apparent Power (kVA)

Code	Type	Definition
19		Positive Watthours
20		Positive Varhours
21		VabS2
22		VbcS2
23		VcaS2
24		VanS2
25		VbnS2
26		VcnS2
FC101	16 bits	RS 485 Baud Rate
0		9600 baud
1		19200 baud
2		38400 baud
3		57600 baud
4		115200 baud
FC103	16 bits	Off / On or No / Yes Selection
0		OFF / NO
1		ON / YES
FC104	16 bits	Ground CT Type
0		None
1		Residual
2		CBCT 2000:1
FC105	16 bits	Differential CT Type
0		None
1		1 A Secondary
2		5 A Secondary
FC106	16 bits	Voltage Transformer Connection Type
0		Wye
1		Delta
FC107	16 bits	Supply Frequency
0		60
1		50
FC109	16 bits	Flex Logic Status
0		OK
1		Unknown Token
2		Too Many Latches
3		Too Many Timers
4		Too Many + OneShots
5		Too Many - OneShots
6		Too Many Duel OneShots
7		Stack Overflow
8		Stack Underflow
9		Program Too Long
FC111	16 bits	Fault Relays
0		Fault
1		Alarm

Code	Type	Definition
FC112	16 bits	Communication Status
0		Error
1		OK
FC116	16 bits	Switch Type
0		Open
1		Closed
FC117	16 bits	Switch Type
0		Delayed
1		Closed
FC126	16 bits	Disabled / Enabled Selection
0		Disabled
1		Enabled
FC130	16 bits	LED Flash
Bit 0		Running
Bit 1		Stopped
Bit 2		Faulted
Bit 3		Alarm
Bit 4		Comms OK
Bit 5		Auto
Bit 6		Manual
Bit 7		USER1
Bit 8		USER2
Bit 9		USER3
Bit 10		50%
Bit 11		80%
Bit 12		100%
Bit 13		Right Top LED
Bit 14		Right Bottom LED
FC131A	16 bits	Comm Fail Mode
1		Serial
2		Serial & Ethernet
8		Ethernet
FC132	16 bits	Cause of Waveform/Data Log Trigger
0		None
1		Command
0xC0		VO 1
0xC1		VO 2
0xC2		VO 3
0xC3		VO 4
0xC4		VO 5
0xC5		VO 6
0xC6		VO 7
0xC7		VO 8
0xC8		VO 9
0xC9		VO 10
0xCA		VO 11
0xCB		VO 12

Code	Type	Definition
0xCC		VO 13
0xCD		VO 14
0xCE		VO 15
0xCF		VO 16
0xD0		VO 17
0xD1		VO 18
0xD2		VO 19
0xD3		VO 20
0xD4		VO 21
0xD5		VO 22
0xD6		VO 23
0xD7		VO 24
0xD8		VO 25
0xD9		VO 26
0xDA		VO 27
0xDB		VO 28
0xDC		VO 29
0xDD		VO 30
0xDE		VO 31
0xDF		VO 32
0xA002		Any Alarm
FC134	16 bits	Cause of Event
0		No Event/Fault To Date
1		Control Power Lost
2		Control Power Applied
3		Date or Time Set
4		Reset
5		Dual Source Fail State
6		Dual Source Fail State Clear
0x8002		Any Fault
0x8442		Comm Fail Fault
0x84C2		Process ILock A Fault
0x8502		Process ILock B Fault
0x8542		Process ILock C Fault
0x8582		Process ILock D Fault
0x85C2		Process ILock E Fault
0x8602		Process ILock F Fault
0x8642		Process ILock G Fault
0x8682		Process ILock H Fault
0x86C2		Process ILock I Fault
0x8702		Process ILock J Fault
0x9A02		ATS Lockout
0x9A42		S1 Failure to Disconnect
0x9A82		S2 Failure to Disconnect
0x9AC2		S1 Failure to Connect
0x9B02		S2 Failure to Connect
0x9B42		S1 & S2 Fail to Disconnect

Code	Type	Definition
0x9B82		Phase Rotation Error
0x9BC2		Sources Out of Phase
0x9C02		S1 Lmt Sw Not Closed
0x9C42		S1 Lmt Sw Not Opened
0x9C82		S2 Lmt Sw Not Closed
0x9CC2		S2 Lmt Sw Not Opened
0x9D02		S1 Del Lmt Sw Not Cl
0x9D42		S1 Del Lmt Sw Not Op
0x9D82		S2 Del Lmt Sw Not Cl
0x9DC2		S2 Del Lmt Sw Not Op
0xA002		Any Alarm
0xA4C2		Process ILock A Alarm
0xA502		Process ILock B Alarm
0xA542		Process ILock C Alarm
0xA582		Process ILock D Alarm
0xA5C2		Process ILock E Alarm
0xA602		Process ILock F Alarm
0xA642		Process ILock G Alarm
0xA682		Process ILock H Alarm
0xA6C2		Process ILock I Alarm
0xA702		Process ILock J Alarm
0xAC42		Self Test Alarm
0xAC82		Comm Fail Alarm
0xB342		Bypass ATS on S2
0xB382		Bypass ATS on S1
0xB3C2		S1 OK
0xB402		S2 OK
0xB442		Voltage Diff > 5%
0xB482		Low Power Factor
0xB4C2		Overpower kW
0xB502		Phase A Overcurrent
0xB542		Phase B Overcurrent
0xB582		Phase C Overcurrent
0xB5C2		Neutral Overcurrent
0xB602		S1 to S2 Manual Xfer
0xB642		S2 to S1 Manual Xfer
0xB682		S1 Volt THD
0xB6C2		S2 Volt THD
0xB782		Current THD
0xB802		CTAP Audible Alarm
0xB842		S2 Shunt Fault
0xB882		S1 Undervoltage
0xB8C2		S1 Overvoltage
0xB902		S1 Underfrequency
0xB942		S1 Overfrequency
0xB982		S2 Undervoltage
0xB9C2		S2 Overvoltage

Code	Type	Definition
0xBA02		S2 Underfrequency
0xBA42		S2 Overfrequency
0xBA82		S1 Volt Imbalance Alarm
0xBAC2		S2 Volt Imbalance Alarm
0xBB02		Inhibited via Disconnect Switch
0xBB42		Switch Exercising
0xBB82		Neutral Position
0xBBC2		Xfer to Alternate Source
0xBC02		S1 to S2 Auto Xfer Alert
0xBC42		S2 to S1 Auto Xfer Alert
0xBC82		S1 to S2 Inhibit
0xBCC2		S2 to S1 Inhibit
0xBD02		Engine Start
0xBD42		Auto Load Shed Active
0xBD82		Not in Auto
0xBDC2		S1 Failure
0xBE02		Alternate Source Fail to Start
0xBEC2		S1 Connected
0xBF02		S2 Connected
0xBE42		S1 Disconnected
0xBE82		S2 Disconnected
0xBF42		Freqs Differ > 0.2Hz
0xBF82		Test Initiated
0xC802		Access Switch Closed
0xD802		S2 Sol Relay
0xD842		S2 Sol Delay Relay
0xD882		S1 Sol Relay
0xD8C2		S1 Sol Delay Relay
0xD902		Engine Start Signal (Open=ON)
0xD942		Bypass ATS On S2
0xD982		Bypass ATS On S1
0xDA42		Load Control 1
0xDA82		Load Control 2
0xDAC2		Load Control 3
0xDB02		Load Control 4
0xDB42		Load Control 5
0xDB82		Load Control 6
0xDBC2		S2 Set as Pref Source
0xDC02		S1 CB Fail to Close
0xDC42		S2 CB Fail to Close
0xDC82		Remove S1 from MX350
0xDCC2		Remove S2 from MX350
0xDD02		S1 CB Closed
0xDD42		S1 CB Open
0xDD82		S1 CB Relay Lockout

Code	Type	Definition
0xDDC2		S2 CB Closed
0xDE02		S2 CB Open
0xDE42		S2 CB Relay Lockout
0xDEC2		S2 Remote Load Shed
0xDE82		Remote Timer Bypassed
FC140	16 bits	Interlock Function
0		Disabled
1		Fault
2		Alarm
FC141	16 bits	Timer Type
0		Millisecond
1		Second
2		Minute
FC142	16 bits	FlexLogic Bit Field EEETTTTTTSSSSSS S-Bits denotes the element state or Operator specific data Number of inputs T-Bits denote Flex logic Operands and Parameters or when one of the E bits are set they denote specific details for the Element Type E-Bits
0x0000		OFF
0x0001		ON
0x0040		Contact Inputs
0x0080		Virtual Inputs
0x00C0		Virtual Outputs
0x01C0		Remote Inputs
0x0380		Insert
0x0400		End
0x0440		NOT
0x0480		XOR
0x04C0		LATCH
0x0500		OR
0x0540		AND
0x0580		NOR
0x05C0		NAND
0x0600		TIMER
0x0640		ASSIGN
0x8000		Fault
0xA000		Alarm
0xC000		Control
FC144	32 bits	LED Status
Bit 0		Alarm Red
Bit 2		TD Active Red
Bit 4		Xfer Inhibit Red
Bit 9		S1 Available Green
Bit 15		S1 Connected Green
Bit 26		S2 Available Red
Bit 28		S2 Connected Red
FC145	16 bits	Element Status 1
Bit 0		Level

Code	Type	Definition
Bit 1		Operated
Bit 2		Latched
FC147	16 bits	LED Intensity
0		Level 1
3		Level 2
6		Level 3
9		Level 4
12		Level 5
15		Level 6
FC148	16 bits	Trigger Mode
0		Retrigger
1		One-Shot
FC150	32 bits	IP Address
IP address, subnet mask or default gateway Each byte in this register represents one octet of an IP address For example: 0x015EDA1F represents address 19421831		
FC158	16 bits	ATS Source Status
0		Not Accepted
1		Accepted
FC159	16 bits	ATS Type
0		Std (Open) Trans
1		Std (Open) Bypass
2		Delayed Trans
3		Delayed Bypass
4		Closed Trans
5		Closed Trans Bypass
6		Delayed CB Type
7		Closed CB Type
FC161	16 bits	ATS Source
0		S1
1		S2
FC163	16 bits	Exerciser Period
0		OFF
1		Daily
2		Weekly
3		14 Days
4		28 Days
5		365 Days
FC165	16 bits	ATS Rated Amperage
0		40 A
1		80 A
2		100 A
3		150 A
4		200 A
5		225 A
6		260 A
7		400 A
8		600 A

Code	Type	Definition
9		800 A
10		1000 A
11		1200 A
12		1600 A
13		2000 A
14		2600 A
15		3000 A
16		4000 A
FC166	16 bits	ATS Rated Voltage
0		120 V
1		208 V
2		220 V
3		230 V
4		240 V
5		277 V
6		380 V
7		400 V
8		416 V
9		440 V
10		460 V
11		480 V
12		575 V
13		600 V
FC167	32 bits	Contact/Virtual Input/Output Status
Bit 0		Input/Output 1
Bit 1		Input/Output 2
Bit 2		Input/Output 3
Bit 3		Input/Output 4
Bit 4		Input/Output 5
Bit 5		Input/Output 6
Bit 6		Input/Output 7
Bit 7		Input/Output 8
Bit 8		Input/Output 9
Bit 9		Input/Output 10
Bit 10		Input/Output 11
Bit 11		Input/Output 12
Bit 12		Input/Output 13
Bit 13		Input/Output 14
Bit 14		Input/Output 15
Bit 15		Input/Output 16
Bit 16		Input/Output 17
Bit 17		Input/Output 18
Bit 18		Input/Output 19
Bit 19		Input/Output 20
Bit 20		Input/Output 21
Bit 21		Input/Output 22
Bit 22		Input/Output 23

Code	Type	Definition
Bit 23		Input/Output 24
Bit 24		Input/Output 25
Bit 25		Input/Output 26
Bit 26		Input/Output 27
Bit 27		Input/Output 28
Bit 28		Input/Output 29
Bit 29		Input/Output 30
Bit 30		Input/Output 31
Bit 31		Input/Output 32
FC168	32 bits	Contact/Virtual Input/Output Status
Bit 0		Input/Output 33
Bit 1		Input/Output 34
Bit 2		Input/Output 35
Bit 3		Input/Output 36
Bit 4		Input/Output 37
Bit 5		Input/Output 38
Bit 6		Input/Output 39
Bit 7		Input/Output 40
Bit 8		Input/Output 41
Bit 9		Input/Output 42
Bit 10		Input/Output 43
Bit 11		Input/Output 44
Bit 12		Input/Output 45
Bit 13		Input/Output 46
Bit 14		Input/Output 47
Bit 15		Input/Output 48
Bit 16		Input/Output 49
Bit 17		Input/Output 50
Bit 18		Input/Output 51
Bit 19		Input/Output 52
Bit 20		Input/Output 53
Bit 21		Input/Output 54
Bit 22		Input/Output 55
Bit 23		Input/Output 56
Bit 24		Input/Output 57
Bit 25		Input/Output 58
Bit 26		Input/Output 59
Bit 27		Input/Output 60
Bit 28		Input/Output 61
Bit 29		Input/Output 62
Bit 30		Input/Output 63
Bit 31		Input/Output 64
FC169	16 bits	Month
0		Not Set
1		January
2		February
3		March

Code	Type	Definition
4		April
5		May
6		June
7		July
8		August
9		September
10		October
11		November
12		December
FC170	16 bits	Count of Week
0		Not Set
1		1st
2		2nd
3		3rd
4		4th
5		Last
FC171	16 bits	Weekdays
0		Not Set
1		SUN
2		MON
3		TUE
4		WED
5		THU
6		FRI
7		SAT
FC176	16 bits	Auxiliary VT Connection
0		Vab VT
1		Vbc VT
2		Vca VT
3		Van VT
4		Vbn VT
5		Vcn VT
6		Van Direct
7		Vbn Direct
8		Vcn Direct
FC179	32 bits	Alarm Status 1
Bit 0		Any Alarm
Bit 10		Current Imbalance Alarm
Bit 19		Process ILock A Alarm
Bit 20		Process ILock B Alarm
Bit 21		Process ILock C Alarm
Bit 22		Process ILock D Alarm
Bit 23		Process ILock E Alarm
Bit 24		Process ILock F Alarm
Bit 25		Process ILock G Alarm
Bit 26		Process ILock H Alarm
Bit 27		Process ILock I Alarm

Code	Type	Definition
Bit 28		Process I Lock J Alarm
FC180	32 bits	Alarm Status 2
Bit 17		Self Test Alarm
Bit 18		Comm Fail Alarm
FC181	32 bits	Alarm Status 3
Bit 13		Bypass ATS on S2
Bit 14		Bypass ATS on S1
Bit 15		S1 OK
Bit 16		S2 OK
Bit 17		Voltage Diff > 5%
Bit 18		Low Power Factor
Bit 19		Overpower kW
Bit 20		Phase A Overcurrent
Bit 21		Phase B Overcurrent
Bit 22		Phase C Overcurrent
Bit 23		Neutral Overcurrent
Bit 20		S1 to S2 Manual Xfer
Bit 21		S2 to S1 Manual Xfer
Bit 22		S1 Volt THD
Bit 23		S2 Volt THD
Bit 26		Current THD
FC182	32 bits	Alarm Status 4
Bit 0		CTAP Audible Alarm
Bit 1		S2 Shunt Fault
Bit 2		S1 Undervoltage
Bit 3		S1 Overvoltage
Bit 4		S1 Underfrequency
Bit 5		S1 Overfrequency
Bit 6		S2 Undervoltage
Bit 7		S2 Overvoltage
Bit 8		S2 Underfrequency
Bit 9		S2 Overfrequency
Bit 10		S1 Volt Imbalance Alarm
Bit 11		S2 Volt Imbalance Alarm
Bit 12		Inhibited via Disconnect Switch
Bit 13		Switch Exercising
Bit 14		Neutral Position
Bit 15		Xfer to Alternate Source
Bit 16		S1 to S2 Auto Xfer Alert
Bit 17		S2 to S1 Auto Xfer Alert
Bit 18		S1 to S2 Inhibit
Bit 19		S2 to S1 Inhibit
Bit 20		Engine Start
Bit 21		Auto Load Shed Active
Bit 22		Not in Auto
Bit 23		S1 Failure
Bit 24		Alternate Source Fail to Start

Code	Type	Definition
Bit 25		S1 Disconnected
Bit 26		S2 Disconnected
Bit 27		S1 Connected
Bit 28		S2 Connected
Bit 29		Freqs Differ > 0.2Hz
Bit 30		Test Initiated
Bit 31		R15 / Disconnect from S2
FC183	32 bits	Fault Status 1
Bit 0		Any Fault
Bit 17		Comm Fail Fault
Bit 18		Relay Not Configured
Bit 19		Process ILock A Fault
Bit 20		Process ILock B Fault
Bit 21		Process ILock C Fault
Bit 22		Process ILock D Fault
Bit 23		Process ILock E Fault
Bit 24		Process ILock F Fault
Bit 25		Process ILock G Fault
Bit 26		Process ILock H Fault
Bit 27		Process ILock I Fault
Bit 28		Process ILock J Fault
FC184	32 bits	Fault Status 2
Bit 13		S1 & S2 Fail to Open
Bit 14		Phase Rotation Error
Bit 15		Sources Out of Phase
Bit 16		S1 Lmt Sw Not Closed
Bit 17		S1 Lmt Sw Not Opened
Bit 18		S2 Lmt Sw Not Closed
Bit 19		S2 Lmt Sw Not Opened
Bit 20		S1 Del Lmt Sw Not Closed
Bit 21		S1 Del Lmt Sw Not Opened
Bit 22		S2 Del Lmt Sw Not Closed
Bit 23		S2 Del Lmt Sw Not Opened
FC185	32 bits	Fault Status 3
Bit 8		ATS Lockout
Bit 9		S1 Failure to Disconnect
Bit 10		S2 Failure to Disconnect
Bit 11		S1 Failure to Connect
Bit 12		S2 Failure to Connect
Bit 13		S1 & S2 Fail to Disconnect
Bit 14		Phase Rotation Error
Bit 15		Sources Out of Phase
Bit 16		S1 Lmt Sw Not Closed
Bit 17		S1 Lmt Sw Not Opened
Bit 18		S2 Lmt Sw Not Closed
Bit 19		S2 Lmt Sw Not Opened
Bit 20		S1 Del Lmt Sw Not Closed

Code	Type	Definition
Bit 21		S1 Del Lmt Sw Not Opened
Bit 22		S2 Del Lmt Sw Not Closed
FC186	32 bits	Fault Status 4 (Reserved)
FC187	32 bits	Message Status 1
Bit 0		Any Messages
Bit 1		Transfer Timer
Bit 5		No Control Source
Bit 6		Clock Not Set
FC188	32 bits	Message Status 2
Bit 1		IO Communication Failure
Bit 2		Metering Failure
Bit 3		Order Code Error
Bit 4		Clock Error
Bit 5		Calibration Error
Bit 6		EEPROM Error
Bit 7		IO Input Read Error
Bit 8		IO 3.3V Error
Bit 9		IO 5V Error
Bit 10		IO -5V Error
Bit 11		IO Input Overvoltage
Bit 12		IO Frequency Error
Bit 13		DPRAM Error
Bit 14		System Health Error
FC189	32 bits	Message Status 3
Bit 25		Disconnect Switch in Inhibit
Bit 26		Post Load Disconnect Delay LC1
Bit 27		Post Load Disconnect Delay LC2
Bit 28		Post Load Disconnect Delay LC3
Bit 29		Post Load Disconnect Delay LC4
Bit 30		Post Load Disconnect Delay LC5
Bit 31		Post Load Disconnect Delay LC6
FC190	32 bits	Message Status 4
Bit 0		System Test
Bit 1		Fast Test
Bit 2		LC1 Output Inactive
Bit 3		LC2 Output Inactive
Bit 4		LC3 Output Inactive
Bit 5		LC4 Output Inactive
Bit 6		LC5 Output Inactive
Bit 7		LC6 Output Inactive
Bit 8		Manual Transfer to S1
Bit 9		Manual Transfer to S2
Bit 10		Open Transition Xfer?
Bit 11		Lockout Reset?
Bit 12		ATS Lockout - Check ATS Drive
Bit 13		Generator Start Delay (P)
Bit 14		S1 to S2 Transfer Delay (W)

Code	Type	Definition
Bit 15		S2 to S1 Transfer Delay (T)
Bit 16		Engine CoolDown Delay (U)
Bit 17		ATS Open Delay (DW)
Bit 18		ATS Open Delay (DT)
Bit 19		Gen Run Timer Countdown
Bit 20		Load Disconnect Delay (LC1)
Bit 21		Load Disconnect Delay (LC2)
Bit 22		Load Disconnect Delay (LC3)
Bit 23		Load Disconnect Delay (LC4)
Bit 24		Load Disconnect Delay (LC5)
Bit 25		Load Disconnect Delay (LC6)
Bit 26		CT Differential Too Great
Bit 27		Fail Restore Entry Invalid
FC191	32 bits	Ctrl Element Status 1
Bit 12		Level 1 Access
Bit 13		Level 2 Access
Bit 14		Level 3 Access
FC192	32 bits	Ctrl Element Status 2
FC193	32 bits	Ctrl Status 3 (Reserved)
FC194	32 bits	Ctrl Status 4
Bit 0		S2 Sol Relay
Bit 1		S2 Sol Delay Relay
Bit 2		S1 Sol Relay
Bit 3		S1 Sol Delay Relay
Bit 4		Engine Start Signal (Open=ON)
Bit 5		Bypass ATS On S2
Bit 6		Bypass ATS On S1
Bit 9		Load Control 1
Bit 10		Load Control 2
Bit 11		Load Control 3
Bit 12		Load Control 4
Bit 13		Load Control 5
Bit 14		Load Control 6
Bit 15		Preferred Source Changed
Bit 16		S1 CB Fail to Close
Bit 17		S2 CB Fail to Close
Bit 18		Remove S1 from MX350
Bit 19		Remove S2 from MX350
Bit 20		S1 CB Closed
Bit 21		S1 CB Open
Bit 22		S1 CB Relay Lockout
Bit 23		S2 CB Closed
Bit 24		S2 CB Open

Code	Type	Definition
Bit 25		S2 CB Relay Lockout
Bit 26		Remote Timer Bypassed
Bit 27		S2 Remote Loadshed
FC197	16 bits	Number of Poles
0		Two Poles
1		Three Poles
2		Four Poles
FC198	16 bits	ATS Transfer Sequence
0		None
1		S1 to S2
2		S2 to S1
FC199	16 bits	ATS Transfer
0		None
1		S1
2		S1 Open
3		S2
4		S2 Open
5		Neutral
FC200	16 bits	ATS Present State
0		Load Connected to S1
1		Waiting to Start Gen
2		Starting Generator
3		Waiting for S2 OK
4		Waiting to Conn S2
5		Transferring to S2
6		Load Connected to S2
7		Waiting to Start Gen
8		Starting Generator
9		Load Connected to S2
10		Waiting to Conn S1
11		Transferring to S1
12		Waiting to Stop Gen
13		Stopping Gen
14		Test in Progress
15		S1 Failed. Checking S2
16		Waiting for In Phase
17		Sync Fail-Bypass Wait
18		Exerciser Count Down
19		Transferring to Center
20		Transferring to Center
21		Delayed Close on S1
22		Delayed Close on S2
23		Waiting to Conn S2
24		Waiting to Conn S1
25		Waiting to Close to S2
26		CT Open S1 after Xfer
27		Waiting to Close to S1

Code	Type	Definition
28		CT Open S2 after Xfer
29		Waiting for Reset key
FC201	16 bits	ATS Operating Mode
0		None
1		Normal
2		Test On Load
3		Test No Load
4		Exerciser On Load
5		Exerciser No Load
6		Fast Test
FC202	16 bits	Switch Position
0		On Generator
1		On Normal Src
FC212	16 bits	LCD Test Paint Color
0		None
1		Red
2		Green
3		Blue
FC300	16 bits	ATS Transfer Timer
0		None
1		P1Timer
2		P2 Timer
3		W Timer
4		T Timer
5		DW Timer
6		DT Timer
7		U1 Timer
8		U2 Timer
FC301	16 bits	ATS Elevator Timer
0		None
1		W3
2		T3
FC302	16 bits	Exerciser Status
0		None
1		In Progress
2		Pending
3		Bypass
4		Cancel
5		Over
FC303	16 bits	Load Type
0		Gen Start And Xfer
1		Gen Start Only
FC306	16 bits	R50 Status
0		No Sync Status
1		Synchronized
2		Phasing In
3		Phasing Out

Code	Type	Definition
FC308	16 bits	Frequency Status
0		None
1		Within Limit
2		Under Frequency Fail
3		Under Frequency Restore
4		Over Frequency Fail
5		Over Frequency Restore
FC309	16 bits	Voltage Status
0		None
1		Within Limit
2		Under Voltage Fail
3		Under Voltage Restore
4		Over Voltage Fail
5		Over Voltage Restore
FC311	16 bits	Phase Rotation Seq
0		1 Ph
1		ABC
2		ACB
3		--
FC312	16 bits	Src No Of Phases
1		Single Phase
2		Three Phase
FC313	16 bits	Src Type
1		Utility
2		Generator
FC315	16 bits	ATS Status In Transfer Mode
0		None
1		S1 Failed
2		S2 Failed
3		Fast Test Load Xfer
4		Fast Test No Load Xfer
5		Test Load Xfer
6		Test No Load Xfer
7		Exerciser Running
8		Exerciser Bypassed
9		Exerciser Load Test
10		Exerciser No Load
11		ATS Lockout State
12		Shunt Fault Failure
FC316	32 bits	DATE MM/DD
1st byte		Month 1 to 12
2nd byte		Day 1 to 31
FC317	16 bits	Transfer type
0		Auto
1		Manual S1 to S2, S2 to S1 (S5)
2		Manual S2 to S1 Only (S5)

Code	Type	Definition
FC318	16 bits	Transfer Reason
0		Outage
1		Test with Load
FC319	16 bits	Load Control Contact Type
0		Not Set
1		Elevator PreSignal (T3/W3)
2		Load Disconnect
FC320	16 bits	Load Test Status
0		Load Test in Progress
1		No Load Test in Progress
2		Load Exerciser in Progress
3		No Load Exerciser in Progress
4		Cannot Accept Test Request
5		To Exit Test Mode: Press Cancel
6		To Abort Exerciser: Press Cancel
7		Select Test Type (Load/No Load)
FC321	32 bits	Net Control
Bit 0		Reset Time S2 Available Counter
Bit 1		Alarm Silence
Bit 2		YE Control
Bit 3		YN Control
Bit 4		No Load Test Control
Bit 5		Fast Load Test Control
Bit 6		Regular Load Test Control
Bit 7		S5 Control
Bit 8		S12 Control
Bit 9		LS Control
Bit 10		Q3 Control
Bit 11		Q7 Control
Bit 12		TMS_Ctrl
Bit 13		Command to Bypass R50
Bit 14		Confirm Bypass R50
Bit 15		Cancel Bypass R50
Bit 16		Pending Exerciser
Bit 17		Cancel Exerciser Bypass
Bit 18		Net Ctrl Auto Transfer Inhibit
Bit 19		Net Ctrl Auto Transfer Relay
Bit 20		Net Ctrl Bypass Active ATS Timer
Bit 21		Net Ctrl Exerciser Cancel
Bit 22		Net Ctrl Generator Start
Bit 23		Net Ctrl Generator Stop
Bit 24		Net Ctrl Load Shed for S2
Bit 25		Net Ctrl Prime Source Selection
Bit 26		Net Ctrl Test Mode Cancel
Bit 27		Net Ctrl Test On Load
Bit 28		Net Ctrl Transfer Commit

Code	Type	Definition
FC325	16 bits	Switch Option
0		Automatic Only
1		Automatic/Manual
2		Manual Only
FC326	16 bits	Auto Load Shed Mode
0		Local / Shed ATS
1		Remote Load Shed
FC329	16 bits	Installed / Not Installed Selection
0		Not Installed
1		Installed

Ethernet interface

The 10/100Base-T Ethernet interface is configured as a Modbus RTU slave. The Ethernet port has the following characteristics.

- Configuration: setup using IP address, subnet mask, and gateway address.
- Supported Modbus function codes: 1, 3, 4, 5, 6, and 16.
- Supports time/date synchronization via the Network Time Protocol (NTP).
- Ethernet port 502.
- Supports a maximum of 5 virtual connections.

The Ethernet interface has the same memory map layout as the serial Modbus RTU interface.

Network Time Protocol is enabled if the NTP address is non-zero and the source is detected.

Once connected to the source, the clock is updated every 30 seconds.



If the IP address of the relay is changed for any reason, the relay must be powered down then restarted in order for the new IP address to take effect.

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