Modbus RTU Map for STU Trip Unit - ABW

Series: Trip relay ABW

Language: English

Document: / 00

Model: AU, AH, AD, PS

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1. ACB Smart Trip Unit

1.1 Overview

SMART TRIP RELAY device is the ACB Controller with function of monitoring status of ACB, control, communication for precise measurement and diverse relay elements protecting safety and property of clients.

1.2 Product characteristics

- Supports measurement accuracy of voltage 0.5%, current 0.5%, Power classes 1 (IEC 62053 - 21, 22 standard) and frequency 0.1% (10 ~ 200Hz) (N/A type supports current measurement only, 50Hz or 60Hz frequency only).
- P/S type contains VDM module for voltage measurement inside ACB. It works stably for measurement and relay at the site where frequency varies between 10Hz and 200Hz.
- P/S type supports power generation protection element including current, voltage, power and frequency relay element. Particularly, S type can respond quickly to various conditions such as parallel power supply since it can additionally store 29 relay elements at group A/B each and another 6 relay elements at ERMS
- A type provides Segment LCD while P/S type provides 3.5" Wide Color Graphic LCD and Touch Panel.
- Provides real - time voltage and current waveform. At P/S type, they can be monitored at LCD.
- Contact configuration is possible to enable introduction and opening of circuit breaker via remote(communication) without TRIO (Remote control equipment).
- A/P/S type supports long distance RS485 communication.
  Particularly, S type supports wireless communication Bluetooth and Near Field communication. By NFC, most recent incident history can be checked with mobile phone without external control power.
- All the N/A/P/S device can accurately analyze cause of incident by saving the setting, system event (255ea)about DO alteration, incident event (127ea) and incident waveform (6ea) at internal memory.(Self Power device cannot save incident waveform).
- A/P/S type supports ERMS (Energy Reduction Maintenance Setting) function using device and communication. It also secures safety of electricity technician or on - site operator by alleviating ARC Energy. In case ERMS is On, the relay setting changes so that S, I, G relay

elements operate with the highest sensitivity and quickest response time.

- USB interface for site operator is provided so that all the functions of Smart Trip Unit can be monitored and controlled. Besides, bus bar can be updated into latest F/W safely without power failure even when live, and device setting and update is possible even at the status of no power supply (N/A/P/S).

1.3 Major function

#		N type	A type	P type	S type
Exterior					
Current relay		· L(N), S, I, G, PTA	· L(N), S, I, G, PTA, Gext	· L(N), S, I, G, PTA, Gext · D, S(V), IU	· L(N), S1, S2, I, G, PTA, Gext · D, S(V)1, S(V)2
Voltage relay				· UV, OV, RV, VU	· UV1, UV2, OV1, OV2, RV, VU
Frequency relay				· UF, OF, ROCOF	· UF1, UF2, OF1, OF2, ROCOF
Power relay				· RP, RQ, OP, OQ, UP	· RP, RQ1, RQ2, OP, OQ, UP
Group control					· A,B (Can be switched by communication)
Relay fine tuning				· L, S, I Pickup Current	· Can be controlled freely by touch
ERMS			· Control by DI and communication	· Control by DI and communication	· Control by DI and communication
IDMTL support		· Supports L relay element Thermal (N type)	· Supports L relay element Thermal (N type)	· Supports L relay element Thermal (N type)	· Supports L relay element Thermal (N type)
Trip information maintenance LED		· L, S, I, G/PTA, SP	· L, S, I, G/Gext/PTA, SP	· L, S, I, G/Gext/PTA, SP	· L, S, I, G/Gext/PTA, SP
Incident record	Screen		· Display of 32 incident events [Incident zero sequence/ current/time]	· Display of 127 incident events [Incident zero sequence/current/time]	· Display of 127 incident events [Incident zero sequence/current/time]
	Memory	· Saves 127 incident events [Incident zero sequence/ current/time]	· Saves 127 incident events · Saves 6 incident waveforms [In case of operation by Self Power, incident waveform is not saved]	· Saves 127 incident events · Saves 6 incident waveforms [In case of operation by Self Power, incident waveform is not saved]	· Saves 127 incident events · Saves 6 incident waveforms [In case of operation by Self Power, incident waveform is not saved]

#		N type	A type	P type	S type
Measuring function		• Current [R/S/T/N] • Current phase (A phase current standard) • Vector Sum zero sequence current • Positive sequence, Negative sequence current • Imbalance negative sequence current • Previous current demand for each phase	• Current [R/S/T/N] • External CT current • Current phase (A phase current standard) • Vector Sum zero sequence current • Positive sequence, Negative sequence current • Imbalance negative sequence current • Previous current demand for each phase	• 3 phase voltage, line - to - line voltage • Current [R/S/T/N] • Frequency • External CT current • Voltage/Current phase (A phase voltage standard) • Total/Each phase power [P, Q, S] • Total/Each phase power factor • Positive/Negative, Effective/ Reactive/Apparent energy • Vector Sum zero sequence Voltage • Vector Sum zero sequence Current • Positive, Negative sequence voltage • Steady, Negative sequence current • Imbalance negative sequence voltage • Imbalance negative sequence current • Previous current demand for each phase • Previous apparent, reactive and active power demand	• 3 phase voltage, line - to - line voltage • Current [R/S/T/N] • Frequency • External CT current • Voltage/Current phase (A phase voltage standard) • Total/Each phase power [P, Q, S] • Total/Each phase power factor • Positive/Negative, Effective/ Reactive/Apparent energy • Vector Sum zero sequence Voltage • Vector Sum zero sequence Current • Positive, Negative sequence voltage • Steady, Negative sequence current • Imbalance negative sequence voltage • Imbalance negative sequence current • Previous current demand for each phase • Previous apparent, reactive and active power demand
Accuracy degree of measurement	Current	• 0.5%	• 0.5%	• 0.5%	• 0.5%
	Voltage			• 0.5%	• 0.5%
	Power			• Classes 1 (IEC 62053 - 21, 22)	• Classes 1 (IEC 62053 - 21, 22)
	Frequency	• 50Hz or 60Hz	• 50Hz or 60Hz	• 0.1% (10 ~ 200Hz)	• 0.1% (10 ~ 200Hz)
PQ function		• Current harmonics harmonics 63rd • Current THD, TDD, K - Factor	• Current harmonics harmonics 63rd • Current THD, TDD, K - Factor	• Voltage/Current harmonics harmonics 63rd • Voltage THD • Current THD, TDD, K - Factor	• Voltage/Current harmonics harmonics 63rd • Voltage THD • Current THD, TDD, K - Factor
Measurement record		• Max Current Demand • Max Io • Max In • Max internal temperature	• Max Current Demand • Max Io • Max Ext Io • Max In • Max internal temperature	• Max Current demand • Demand for max apparent, reactive and active power • Max active power • Max Vo • Max Io • Max Ext Io • Max In • Max internal temperature	• Max Current demand • Demand for max apparent, reactive and active power • Max active power • Max Vo • Max Io • Max Ext Io • Max In • Max internal temperature
Real time waveform		• Using USB communication	• Using USB/RS485 communication	• Using USB/RS485 communication • Using LCD screen	• Using USB/RS485 communication • Using LCD screen

2. Communication and setting

2.1 Modbus RS485 communication

Communication of SMART TRIP UNIT(A/P/S) supports Modbus RTU communication using RS485. The communication specifications and connection method are as follows, and when connecting the communication line, be sure to use a shield line.

- Maximum number of connectable units: 32 units
- Maximum communication distance: 1.2km
- Communication speed and specification: 9600/19200/38400bps, None Parity, 8 Data bit, 1 stop bit
- COMM LED: LED blinks in response to communication

2.2 Communication settings

- Device address setting: You can set the device address (or station number) in the range from 1 to 247.
- Communication speed setting: Set the communication speed of the device. The range is 9600/19200/38400.

1) SMART TRIP UNIT P/S Type

Item	Range	Default
Address	1 ~ 247	1
Baud Rate	9600/19200/38400/57600	38400
SWAP	ON/OFF	OFF
MAP	NEW/OLD	NEW

2) SMART TRIP UNIT A Type

Screen			Button	Contents
Comm. address	View		M×2	1. If Menu (M) button is pressed 2 times at measurement display, screen is switched to communication address view screen.
	Setting		↵	1. If Enter is pressed once at Address view screen, screen is switched to Address setting mode. 2. Address blinks in one second interval.
			∧ ∨	1. Communication Address value can be set between 1 and 247. 2. If Up button is pressed shortly, increases by 1. If pressed long, increases by 20. 3. If Down button is pressed shortly, Decreases by 1. If pressed long, decreases by 20.
			↵	1. If you want to save after setting, press Enter. After showing "SAVE" message, screen is switched to measurement screen. 2. If you do not want to save, press Reset/ESC button. Then screen switched to measurement display right away. Data is not saved.
Comm. speed	View		M×3	1. If Menu (M) button is pressed 3 times at measurement screen, screen is switched to communication speed view mode.
	Setting		↵	1. If Enter is pressed one time at communication speed view mode, screen is switched to communication speed setting mode. 2. Baud rate blinks in one second interval.
			∧ ∨	1. Communication speed can be set up at Baud rate of 9600/19200/38400/57600. 2. Baud rate value is rolled over and indicated when Up/Down button is pressed.
			↵	1. Press Enter button if you want to save after setting. "SAVE" message appears and screen switches to measurement mode. 2. If you do not want to save, press Reset/ESC button. Then screen switched to measurement display right away. Data is not saved.

3. Modbus protocol

3.1 Modbus communication

Modbus is an internationally used protocol for data transfer between devices. All measurements, messages and parameters are stored in virtual register addresses. Data can be read with a read command to the register address. The write command allows data to be written to a register address.

Setting items	Setting range	Initial value
Address	1 ~ 247	1
Baud rate	9600, 19200, 38400bps	38400bps

Communication status can be checked through the COMM LED (Green), and the LED blinks only during transmission.

	Up to 32 devices can be used simultaneously.
	To parameterize the device externally via Modbus, you need to set the "Remote" Mode

3.2 Modbus function

Function Code	Function name	Explanation
03(0x03)	Read Holding Registers	
04(0x04)	Read Input Registers	
05(0x05)	Force Single Coil	
16(0x10)	Preset Multiple Registers	
43(0x2B) / 14(0x0E)	Common Information	Device common information
43(0x2B) / 15(0x0F)	Time Read	
43(0x2B) / 16(0x10)	Time Write	
100(0x64)	Request System Event	Read File Record
101(0x65)	Request Alarm Event	Read File Record

3.3 Data link layer

When Master sends request frame to Slave, Slave sends response frame, and each frame is distinguished by dead time. Here is the general format for sending and receiving frames.

Function Code	Size	Explanation
Slave Address	1 Byte	
Function Code	1 Byte	
Data	N Byte	
CRC	2 Byte	
Dead Time	3.5 bytes transmission time	

1) Request

Master	Request	Explanation
Slave Address	Device Address	
Slave action definition	Function Code	
Additional information required for the slave to perform the requested action	Data	
CRC	Error check	

2) Response

Response	Slave	설명
Device Address	own address	
Function Code	Echo or MSB=1	
Data	Requested data or Exception code	
Error check	CRC	

3.3.1 CRC(C source)

It is used as an error checking method, and the CRC16 application section is from Address to Data. The method to obtain this CRC is the same as the C language source below.

CRC Generation Function

```
uint16_t CRC16(0xffff, const uint8_t *pBuf, uint8_t DataLen)
{
    uint8_t  hi, lo, count;
    uint16_t index;
    uint16_t result;

    hi = (uint8_t)(crc_pre >> 8);
    lo = (uint8_t)crc_pre;

    for(count=0; count < DataLen; count++)
    {
        index = hi ^ *(pBuf + count);
        hi = lo ^ CRCHI[index];
        lo = CRCLO[index];
    }

    result = (uint16_t)hi << 8;
    result |= lo;

    return(result);
}
```

CRC Table : High

```
const uint8_t CRCHI[256] = {
  0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,
  0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
  0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01,
  0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
  0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81,
  0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
  0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01,
  0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
  0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,
  0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
  0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01,
  0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
  0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,
  0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
  0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01,
  0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
  0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,
  0x40 };
```

CRC Table : Low

```
const uint8_t CRCLO[256] = {
  0x00, 0xc0, 0xc1, 0x01, 0xc3, 0x03, 0x02, 0xc2, 0xc6, 0x06, 0x07, 0xc7, 0x05, 0xc5, 0xc4,
  0x04, 0xcc, 0x0c, 0x0d, 0xcd, 0x0f, 0xcf, 0xce, 0x0e, 0x0a, 0xca, 0xcb, 0x0b, 0xc9, 0x09,
  0x08, 0xc8, 0xd8, 0x18, 0x19, 0xd9, 0x1b, 0xdb, 0xDA, 0x1A, 0x1E, 0xDE, 0xDF, 0x1F, 0xDD,
  0x1D, 0x1C, 0xDC, 0x14, 0xD4, 0xD5, 0x15, 0xD7, 0x17, 0x16, 0xD6, 0xD2, 0x12, 0x13, 0xD3,
  0x11, 0xD1, 0xD0, 0x10, 0xF0, 0x30, 0x31, 0xF1, 0x33, 0xF3, 0xF2, 0x32, 0x36, 0xF6, 0xF7,
  0x37, 0xF5, 0x35, 0x34, 0xF4, 0x3C, 0xFC, 0xFD, 0x3D, 0xFF, 0x3F, 0x3E, 0xFE, 0xFA, 0x3A,
  0x3B, 0xFB, 0x39, 0xF9, 0xF8, 0x38, 0x28, 0xE8, 0xE9, 0x29, 0xEB, 0x2B, 0x2A, 0xEA, 0xEE,
  0x2E, 0x2F, 0xEF, 0x2D, 0xED, 0xEC, 0x2C, 0xE4, 0x24, 0x25, 0xE5, 0x27, 0xE7, 0xE6, 0x26,
  0x22, 0xE2, 0xE3, 0x23, 0xE1, 0x21, 0x20, 0xE0, 0xA0, 0x60, 0x61, 0xA1, 0x63, 0xA3, 0xA2,
  0x62, 0x66, 0xA6, 0xA7, 0x67, 0xA5, 0x65, 0x64, 0xA4, 0x6C, 0xAC, 0xAD, 0x6D, 0xAF, 0x6F,
  0x6E, 0xAE, 0xAA, 0x6A, 0x6B, 0xAB, 0x69, 0xA9, 0xA8, 0x68, 0x78, 0xB8, 0xB9, 0x79, 0xBB,
  0x7B, 0x7A, 0xBA, 0xBE, 0x7E, 0x7F, 0xBF, 0x7D, 0xBD, 0xBC, 0x7C, 0xB4, 0x74, 0x75, 0xB5,
  0x77, 0xB7, 0xB6, 0x76, 0x72, 0xB2, 0xB3, 0x73, 0xB1, 0x71, 0x70, 0xB0, 0x50, 0x90, 0x91,
  0x51, 0x93, 0x53, 0x52, 0x92, 0x96, 0x56, 0x57, 0x97, 0x55, 0x95, 0x94, 0x54, 0x9C, 0x5C,
  0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E, 0x5A, 0x9A, 0x9B, 0x5B, 0x99, 0x59, 0x58, 0x98, 0x88,
  0x48, 0x49, 0x89, 0x4B, 0x8B, 0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F, 0x8D, 0x4D, 0x4C, 0x8C,
  0x44, 0x84, 0x85, 0x45, 0x87, 0x47, 0x46, 0x86, 0x82, 0x42, 0x43, 0x83, 0x41, 0x81, 0x80,
  0x40 };
```

3.3.2 Dead time

- After the last character is received, the frame must have a silent interval of 3.5 charter time or longer to end the frame.

3.4 Exception codes

When a function code or address not supported by SMART TRIP UNIT is requested in the wrong form, it responds in the form of an error. The error code is as below.

Exception Code	Justice	Explanation
01h	ILLEGAL FUNCTION	Unsupported FC request
02h	ILLEGAL DATA ADDRESS	Invalid Register Request
03h	ILLEGAL DATA VALUE	Request to write invalid data
04h	SLAVE DEVICE FAILURE	An abnormality occurs in the operation of the device.
11h	SBO TIME OUT	Operate command timed out after Select
12h	ILLEGAL ADU LENGTH	Received frame of invalid length
13h	LOCAL MODE	Write request in local state
14h	MAIN NAK	Requested FC unable to perform

3.5 Modbus protocol examples

3.5.1 03(0x03) Read Holding Registers

It is used to read a number of device setting registers, alarm setting registers, and trend data registers (40001 ~) as Read Holding Registers.

Ex) 40001~40002 Request/response frame to read registers (in case of Slave Address: '1')

Request	
Field Name	Hex
Slave Address	01
Function	03
Starting Address Hi	00
Starting Address Lo	00
Quantity of Inputs Hi	00
Quantity of Inputs Lo	02
CRC Hi	-
CRC Lo	-

Response	
Field Name	Hex
Slave Address	01
Function	03
Byte Count	04
Register value Hi(40001)	42
Register value Lo(40001)	DC
Register value Hi(40002)	00
Register value Lo(40002)	00
CRC Hi	-
CRC Lo	-

3.5.2 04(0x04) Read Input Registers

It is used to read multiple device status registers (30001 ~) as Read Input Registers.

Ex) 30210~30211 Request/response frame to read register (in case of Slave Address: '1')

Request	
Field Name	Hex
Slave Address	01
Function	04
Starting Address Hi	00
Starting Address Lo	D1
Quantity of Inputs Hi	00
Quantity of Inputs Lo	02
CRC Hi	-
CRC Lo	-

Response	
Field Name	Hex
Slave Address	01
Function	04
Byte Count	04
Register value Hi(30210)	00
Register value Lo(30210)	00
Register value Hi(30211)	00
Register value Lo(30211)	00
CRC Hi	-
CRC Lo	-

3.5.3 05(0x05) Write Single Coil

Write Single Coil: Used to control one coil (00001 ~), 0xFF00 indicates ON, 0x0000 indicates OFF.

Ex) 0 Request/response frame to give ON command to register (in case of Slave Address: '1')

Request	
Field Name	Hex
Slave Address	01
Function	05
Starting Address Hi	00
Starting Address Lo	00
Force Data Hi	FF
Force Data Lo	00
CRC Hi	-
CRC Lo	-

Response	
Field Name	Hex
Slave Address	01
Function	05
Starting Address Hi	00
Starting Address Lo	00
Force Data Hi	FF
Force Data Lo	00
CRC Hi	-
CRC Lo	-

3.5.4 16(0x10) Write Multiple Registers

Write Multiple Registers: Used to write multiple device setting and alarm setting registers (40001 ~).

Ex) Request/response frame to write 0x0001, 0x0001, 0x0000, 0x1027, 0x0000, 0x1000, 0x0000 to 40040~40046 register (in case of Slave Address: '1')

Request	
Field Name	Hex
Slave Address	01
Function	10
Starting Address Hi	**00**
Starting Address Lo	**27**
Number of Registers Hi	00
Number of Registers Lo	07
Byte Count	0E
Data Hi	00
Data Lo	01
Data Hi	00
Data Lo	01
Data Hi	00
Data Lo	00
Data Hi	10
Data Lo	27
Data Hi	00
Data Lo	00
Data Hi	10
Data Lo	00
Data Hi	00
Data Lo	00
CRC Hi	-
CRC Lo	-

Response	
Field Name	Hex
Slave Address	01
Function	10
Starting Address Hi	**00**
Starting Address Lo	**27**
Number of Registers Hi	00
Number of Registers Lo	07
CRC Hi	-
CRC Lo	-

3.5.5 43(0x2B) Read Date and Time

Read Date and Time: Used to read the current time of the device.

- Time Request (Read): Sub-function code 15 (0x0F)

Ex) Request/response frame when the current time of the device is 16:19: 1.260 on July 12, 2021

Request	
Field Name	(Hex)
Slave Address	01
Function	2B
Sub-function	0F
RESERVED	-
CRC Hi	-
CRC Lo	-

Response	
Field Name	(Hex)
Slave Address	01
Function	2B
Sub-function	0F
RESERVED	FF
RESERVED	FF
Year[0~99]	15
Month[1~12]	07
Day[1~31]	0C
Hour[0~23]	10
Minute[0~59]	13
mSecond[0~60,000] - High Byte	04
mSecond[0~60,000] - Low Byte	EC
CRC Hi	-
CRC Lo	-

3.5.6 43(0x2B) Write Date and Time

Read Date and Time: Used to write the current time of the device.

- Time Request (Write): Sub-function code 16 (0x10)

Ex) Request/response frame for writing at 16:19:1.260 on July 12, 2021

Request	
Field Name	(Hex)
Slave Address	01
Function	2B
Sub-function	10
RESERVED	FF
RESERVED	FF
Year[0~99]	15
Month[1~12]	07
Day[1~31]	0C
Hour[0~23]	10
Minute[0~59]	13
mSecond[0~60,000] - High Byte	04
mSecond[0~60,000] - Low Byte	EC
CRC Hi	-
CRC Lo	-

Response	
Field Name	(Hex)
Slave Address	01
Function	2B
Sub-function	10
RESERVED	FF
RESERVED	FF
Year[0~99]	15
Month[1~12]	07
Day[1~31]	0C
Hour[0~23]	10
Minute[0~59]	13
mSecond[0~60,000] - High Byte	04
mSecond[0~60,000] - Low Byte	EC
CRC Hi	-
CRC Lo	-

3.5.7 Exception codes

Exception Codes: When the received request frame is not normal or cannot be performed, the device responds with a frame in the following format.

Response	
Field Name	Hex
Slave Address	01
Function	0x80 + Function Code
Starting Address Hi	Exception Code
CRC Hi	-
CRC Lo	-

Ex) if the 30501 register is not defined in the device's register map and the master tries to read the 30501 register value, the device (slave) responds with ILLEGAL DATA ADDRESS (02).

Request	
Field Name	Hex
Slave Address	01
Function	04
Starting Address Hi	77
Starting Address Lo	24
Quantity of Inputs Hi	00
Quantity of Inputs Lo	01
CRC Hi	-
CRC Lo	-

Response	
Field Name	Hex
Slave Address	01
Function	**84**
Exception Code	**02**
CRC Hi	-
CRC Lo	-

3.6 Modbus map

3.6.1 Control (F/C: 0x05)

3.6.1.1 DO control

DO control can be controlled through Select and Operation, and the Op command must be executed 5 seconds before Select execution to achieve Relay control.

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
1	0	DO#1 ON select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
2	1	DO#1 ON op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5second	A, P, S
3	2	DO#1 OFF select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
4	3	DO#1 OFF op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5 second	A, P, S
5	4	DO#2 ON select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
6	5	DO#2 ON op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5 second	A, P, S
7	6	DO#2 OFF select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
8	7	DO#2 OFF op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5 second	A, P, S
9	8	DO#3 ON select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
10	9	DO#3 ON op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5 second	A, P, S
11	10	DO#3 OFF select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
12	11	DO#3 OFF op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5 second	A, P, S
13	12	CB_DO On Select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
14	13	CB_DO On Op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5 second	A, P, S
15	14	CB_DO OFF Select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
16	15	CB_DO OFF Op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5 second	A, P, S

3.6.1.2 ERMS control

ERMS control remotely executes ERMS command. Same as DO control, commands are executed through Select and Operation. After Select execution, Op command must be executed 5 seconds before relay control.

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
17	16	ERMS On Select	W	UINT16	-	-	0xFF00: Execution (Select)	A, P, S
18	17	ERMS On Op	W	UINT16	-	-	0xFF00: Execution (Operation), Timeout 5second	A, P, S
19	18	ERMS OFF Select	W	UINT16			0xFF00: Execution (Select)	A, P, S
20	19	ERMS OFF Op	W	UINT16			0xFF00: Execution (Operation), Timeout 5second	A, P, S

3.6.1.3 Data clear

The Data Clear part is a command to reset or clear the event or alarm data stored in the product.

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
101	100	Fault reset	W	UINT16	-	-	0xFF00: Execution	A, P, S
102	101	System event buffer clear	W	UINT16	-	-	0xFF00: Execution	A, P, S
103	102	Fault event buffer clear	W	UINT16	-	-	0xFF00: Execution	A, P, S
104	103	Energy reset (Wh, Varh, rWh, rVarh)	W	UINT16	-	-	0xFF00: Execution	P, S
105	104	Max Demand reset	W	UINT16	-	-	0xFF00: Execution	A, P, S
106	105	Max Watt reset	W	UINT16	-	-	0xFF00: Execution	P, S
107	106	Max Internal Temperature reset	W	UINT16	-	-	0xFF00: Execution	A, P, S
108	107	Max Vo reset	W	UINT16	-	-	0xFF00: Execution	P, S
109	108	Max Io reset	W	UINT16	-	-	0xFF00: Execution	A, P, S
110	109	Max External CT Current reset	W	UINT16	-	-	0xFF00: Execution	A, P, S
111	110	Max In Current reset	W	UINT16	-	-	0xFF00: Execution	A, P, S
112	111	Reserved	W	UINT16	-	-	0xFF00: Execution	-
113	112	Reserved	W	UINT16	-	-	0xFF00: Execution	-
114	113	SMART TRIP UNIT Working Time [Hour] Clear	W	UINT16	-	-	0xFF00: Execution	A, P, S
115	114	ACB On Time [Hour] Clear	W	UINT16	-	-	0xFF00: Execution	A, P, S

3.6.2 Device status (F/C: 0x04)

3.6.2.1 SMART TRIP UNIT Operation Status

This area shows the operating status information of SMART TRIP UNIT

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
30194	193	Event Rollover Count	R	UINT16	0~31	-	Bit[15-8]: System Event Buffer Rollover Count ; 0: not overlap Bit[7-0]: Fault Event Buffer Rollover Count ; 0: not overlap	A, P, S
30195	194	Last System Event Index	R	UINT16	0~255	-	0: no event	A, P, S
30196	195	Last Fault Event Index	R	UINT16	1~127	-	0: no event	A, P, S
30197	196	Last Trip Wave File Number	R	UINT16	0~6 0~255	-	Bit[15-9]: Last Trip Wave File Number ; 0: no trip wave Bit[8-0]: Available Trip Wave Record Count ; 0: no trip wave record	A, P, S
30198	197	Demand Number	R	UINT16	0~255		Bit[15-8]: Demand Update Number ; 0: no demand update Bit[7-0]: Reserved	A, P, S
30199	198	Setting Count	R	UINT16	0~255		Bit[15-8]: System Setting Number ; 0: no system setting Bit[7-0]: Relay Setting Number ; 0: no relay setting	A, P, S
30200	199	Poles	R	UINT16	3~4		Bit[15-8]: ACB poles 3p or 4p ; 3: 3p, 4 = 4p Bit[7-0]: Reserved	A, P, S
30201	200	Knob Status	R	UINT16	1~9		Bit[15-12]: tg knob position Bit[11-8]: Ig knob position Bit[7-4]: Ii knob position Bit[3-0]: ts knob position	A A A, P A, P
30202	201		R	UINT16	1~9		Bit[15-12]: Is knob position Bit[11-8]: tr knob position	A, P A, P

							Bit[7-4]: Ir knob position Bit[3-0]: Iu knob position	A, P A
30203	202	Ir	R	UINT16	80~6,300	A	Overload Ir Setting Value ; (0.4 ~ 1)*In(200~6300)	A, P, S
30204	203	DO1 Setting | DO2 Setting	R	UINT16	0~3		Bit[15-8]: DO1 Setting Value ; 0: Not Use, 1: Relay, 2: CB Close, 3: CB Open Bit[7-0]: DO2 Setting Value ; 0: Not Use, 1: Relay, 2: CB Close, 3: CB Open	A, P, S
30205	204	DO3 Setting	R	UINT16	0~3		Bit[15-8]: DO3 Setting Value ; 0: Not Use, 1: Relay, 2: CB Close, 3: CB Open Bit[7-0]: Reserved	A, P, S
30206	205	SMART TRIP UNIT Internal Operation Status	R	UINT16	0~1		Bit[15]: Local/Remote Status ; 0: Local, 1: Remote Bit[14]: Group Setting Status ; 0: A, 1: B Bit[13]: SMART TRIP UNIT Restart ; 0: working, 1: Restart – keep 10 Sec Bit[12]: Self Protection ; 0: not occur, 1: occur Bit[11]: Current Direction ; 0: Forward, 1: Reverse Bit[10]: current direction 0: Positive Phase Sequence 1: Negative Phase Sequence Bit[9]: Over PF Status ; 0: not occur, 1: occur Bit[8]: Under PF ; 0: not occur, 1: occur Bit[7]: Reserved Bit[6]: Reserved Bit[5]: Reserved Bit[4]: Demand Update Alarm ; 0: not occur, 1: occur – keep 60 Sec Bit[3]: Need Time synchronous ; 0: not need, 1: need Bit[2]: Reserved Bit[1]: Reserved Bit[0]: Reserved	*A, *P, S
30207	206	SMART TRIP UNIT DI Status	R	UINT16	0~1		Bit[15]: ZSI DI ; 0: not entered, 1: entered Bit[14]: ERMS DI ; 0: off, 1:on Bit[13]: Reserved Bit[12]: CB Status ; 0: open, 1: close Bit[11]: Reserved Bit[10]: Reserved Bit[9]: Reserved Bit[8]: Reserved Bit[7]: Reserved Bit[6]: Reserved Bit[5]: Reserved Bit[4]: Reserved Bit[3]: Reserved Bit[2]: Reserved Bit[1]: Reserved Bit[0]: Reserved	A, P, S
30208	207	SMART TRIP UNIT DO Status	R	UINT16	0~1		Bit[15]: ZSI DO ; 0: normal, 1: output(very fast) Bit[14]: TRIP DO ; 0: normal, 1: output(Pulse Type) Bit[13]: Reserved Bit[12]: Reserved	A, P, S

							Bit[11]: Reserved Bit[10]: CB Status Mode ; 0: not use, 1: use Bit[9~8]: CB Status ; 0x00: open, 0x01: close Bit[7]: Reserved Bit[6]: Reserved Bit[5]: Reserved Bit[4]: Reserved Bit[3]: Reserved Bit[2]: DO #3 Status ; 0: open, 1: close Bit[1]: DO #2 Status ; 0: open, 1: close Bit[0]: DO #1 Status ; 0: open, 1: close	
30209	208	ST Self Diagnosis Status	R	UINT16	0~1		Bit[15]: Reserved Bit[14]: Reserved Bit[13]: UL_CPU Register Error ; 0: not occur, 1: occur Bit[12]: UL_Program Counter Error ; 0: not occur, 1: occur Bit[11]: UL_Watchdog Error ; 0: not occur, 1: occur Bit[10]: UL_Clock Error ; 0: not occur, 1: occur Bit[9]: UL_RAM Error ; 0: not occur, 1: occur Bit[8]: UL_ROM Error ; 0: not occur, 1: occur Bit[7]: Reserved Bit[6]: Reserved Bit[5]: Reserved Bit[4]: Reserved Bit[3]: N Phase CT Status ; 0: normal, 1: broken Bit[2]: C Phase CT Status ; 0: normal, 1: broken Bit[1]: B Phase CT Status ; 0: normal, 1: broken Bit[0]: A Phase CT Status ; 0: normal, 1: broken	A, P, S
30210	209		R	UINT16	0~1		Bit[15]: Reserved Bit[14] RTC Battery Status ; 0: normal, 1: Low battery Bit[13]: Rating Plug Error ; 0: normal, 1: occur Bit[12]: AF Error ; 0: normal, 1: occur Bit[11]: MTD Status ; 0: normal, 1: circuit fault Bit[10]: Factory CFG Error ; 0: normal, 1: setting error Bit[9]: Device Type Error ; 0: normal, 1: setting error Bit[8]: Reserved Bit[7]: Reserved Bit[6]: Internal Temperature Status ; 0: normal, 1: over setting value Bit[5]: Contact Life Alarm ; 0: normal, 1: over setting value Bit[4]: Electrical Open and Close Count Alarm ; 0: normal, 1: over setting count Bit[3]: Mechanical Open and Close Count Alarm ; 0: normal, 1: over setting count	A, P, S

							Bit[2]: Measuring Calibration Status ; 0: normal, 1: error Bit[1]: RTC Status ; 0: normal, 1: fault Bit[0]: External Memory Status ; 0: normal, 1: fault	
30211	210	Current Relay Operation Status	R	UINT16	0~1		Bit[15]: Reserved Bit[14]: S2 C Phase relay ; 0: normal, 1: trip Bit[13]: S2 B Phase relay ; 0: normal, 1: trip Bit[12]: S2 C Phase relay ; 0: normal, 1: trip Bit[11]: S1 C Phase relay ; 0: normal, 1: trip Bit[10]: S1 B Phase relay ; 0: normal, 1: trip Bit[9]: S1 A Phase relay ; 0: normal, 1: trip Bit[8]: L N Phase relay ; 0: normal, 1: trip Bit[7]: L C Phase relay ; 0: normal, 1: trip Bit[6]: L B Phase relay ; 0: normal, 1: trip Bit[5]: L A Phase relay ; 0: normal, 1: trip Bit[4]: PTA C Phase relay ; 0: normal, 1: trip Bit[3]: PTA B Phase relay ; 0: normal, 1: trip Bit[2]: PTA A Phase relay ; 0: normal, 1: trip Bit[1~0]: Pre Alarm Information ; 0x00: normal load, 0x01: 90%~105% load, 0x10: over 105% load	(A,) P, S
30212	211		R	UINT16	0~1		Bit[15]: Reserved Bit[14]: Reserved Bit[13]: S(V)2 C Phase relay ; 0: normal, 1: trip Bit[12]: S(V)2 B Phase relay ; 0: normal, 1: trip Bit[11]: S(V)2 A Phase relay ; 0: normal, 1: trip Bit[10]: S(V)1 C Phase relay ; 0: normal, 1: trip Bit[9]: S(V)1 B Phase relay ; 0: normal, 1: trip Bit[8]: S(V)1 A Phase relay ; 0: normal, 1: trip Bit[7]: D C Phase relay ; 0: normal, 1: trip Bit[6]: D B Phase relay ; 0: normal, 1: trip Bit[5]: D A Phase relay ; 0: normal, 1: trip Bit[4]: Earth fault on External relay ; 0: normal, 1: trip Bit[3]: Earth fault relay ; 0: normal, 1: trip Bit[2]: I C Phase relay ; 0: normal, 1: trip Bit[1]: I B Phase relay ; 0: normal, 1: trip Bit[0]: I A Phase relay ; 0: normal, 1: trip	*A, P, S
30213	212	Complex Relay Operation Status	R	UINT16	0~1		Bit[15]: Reserved	P, S

							Bit[14]: Reserved Bit[13]: Reserved Bit[12]: Reserved Bit[11]: Reserved Bit[10]: Reserved Bit[9]: RV relay ; 0: normal, 1: trip Bit[8]: ROCOF relay ; 0: normal, 1: trip Bit[7]: UP relay ; 0: normal, 1: trip Bit[6]: OQ relay ; 0: normal, 1: trip Bit[5]: RQ 2 relay ; 0: normal, 1: trip Bit[4]: RQ 1 relay ; 0: normal, 1: trip Bit[3]: UF 2 relay ; 0: normal, 1: trip Bit[2]: UF 1 relay ; 0: normal, 1: trip Bit[1]: OF 2 relay ; 0: normal, 1: trip Bit[0]: OF 1 relay ; 0: normal, 1: trip	
30214	213		R	UINT16	0~1		Bit[15]: OP relay ; 0: normal, 1: trip Bit[14]: RP relay ; 0: normal, 1: trip Bit[13]: IU relay ; 0: normal, 1: trip Bit[12]: VU relay ; 0: normal, 1: trip Bit[11]: UV2 C relay ; 0: normal, 1: trip Bit[10]: UV2 B relay ; 0: normal, 1: trip Bit[9]: UV2 A relay ; 0: normal, 1: trip Bit[8]: UV1 C relay ; 0: normal, 1: trip Bit[7]: UV1 B relay ; 0: normal, 1: trip Bit[6]: UV1 A relay ; 0: normal, 1: trip Bit[5]: OV2 C relay ; 0: normal, 1: trip Bit[4]: OV2 B relay ; 0: normal, 1: trip Bit[3]: OV2 A relay ; 0: normal, 1: trip Bit[2]: OV1 C relay ; 0: normal, 1: trip Bit[1]: OV1 B relay ; 0: normal, 1: trip Bit[0]: OV1 A relay ; 0: normal, 1: trip	P, S

*A,*P means that SMART TRIP UNIT A type or P type partially supported

3.6.2.2 SMART TRIP UNIT Measuring Data

This area shows the measured data (Current, Voltage, Power Factor, Harmonics, etc.) of SMART TRIP UNIT

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
30215	214	A Phase Current	R	FLOAT32		A		A, P, S
30217	216	B Phase Current	R	FLOAT32		A		A, P, S
30219	218	C Phase Current	R	FLOAT32		A		A, P, S
30221	220	N Phase Current	R	FLOAT32		A		A, P, S
30223	222	3*Zero Current(internal)	R	FLOAT32		A		A, P, S
30225	224	3*Zero Current(external ZCT)	R	FLOAT32		A		A, P, S
30227	226	Normal Current	R	FLOAT32		A		A, P, S
30229	228	Reverse Current	R	FLOAT32		A		A, P, S
30231	230	A Phase Voltage (phase voltage)	R	FLOAT32		V		P, S
30233	232	B Phase Voltage (phase voltage)	R	FLOAT32		V		P, S
30235	234	C Phase Voltage (phase voltage)	R	FLOAT32		V		P, S
30237	236	AB Phase Voltage(line voltage)	R	FLOAT32		V		P, S
30239	238	BC Phase Voltage(line voltage)	R	FLOAT32		V		P, S
30241	240	CA Phase Voltage(line voltage)	R	FLOAT32		V		P, S
30243	242	3*Zero Voltage(internal)	R	FLOAT32		V		P, S
30245	244	Normal Voltage(3phase)	R	FLOAT32		V		P, S
30247	246	Reverse Voltage(3phase)	R	FLOAT32		V		P, S
30249	248	Total Power Factor	R	FLOAT32		%		P, S
30251	250	Total Active Power	R	FLOAT32		W		P, S
30253	252	Total Reactive Power	R	FLOAT32		VAR		P, S
30255	254	Total Apparent Power	R	FLOAT32		VA		P, S
30257	256	Frequency	R	FLOAT32		Hz		A, P, S
30259	258	Voltage Unbalance Factor	R	FLOAT32		%		P, S
30261	260	Current Unbalance Factor	R	FLOAT32		%		A, P, S
30263	262	Reserved	R	FLOAT32				-
30265	264	Forward Active Power(Giga Unit below)	R	FLOAT32		Wh		P, S
30267	266	Forward Active Power(Giga Unit over)	R	UINT32		-		P, S
30269	268	Forward Reactive Power(Giga Unit below)	R	FLOAT32		VARh		P, S
30271	270	Forward Reactive Power(Giga Unit over)	R	UINT32		-		P, S
30273	272	Reverse Active Power(Giga Unit below)	R	FLOAT32		Wh		P, S
30275	274	Reverse Active Power(Giga Unit over)	R	UINT32		-		P, S
30277	276	Reverse Reactive Power(Giga Unit below)	R	FLOAT32		VARh		P, S
30279	278	Reverse Reactive Power(Giga Unit over)	R	UINT32		-		P, S
30281	280	Apparent Power(Giga Unit below)	R	FLOAT32		VAh		P, S
30283	282	Apparent Power(Giga Unit over)	R	UINT32		-		P, S

30285	284	A Phase Power Factor	R	FLOAT32		%		P, S
30287	286	B Phase Power Factor	R	FLOAT32		%		P, S
30289	288	C Phase Power Factor	R	FLOAT32		%		P, S
30291	290	A Phase Active Power	R	FLOAT32		W		P, S
30293	292	B Phase Active Power	R	FLOAT32		W		P, S
30295	294	C Phase Active Power	R	FLOAT32		W		P, S
30297	296	A Phase Reactive Power	R	FLOAT32		Var		P, S
30299	298	B Phase Reactive Power	R	FLOAT32		Var		P, S
30301	300	C Phase Reactive Power	R	FLOAT32		Var		P, S
30303	302	A Phase Apparent power	R	FLOAT32		VA		P, S
30305	304	B Phase Apparent power	R	FLOAT32		VA		P, S
30307	306	C Phase Apparent power	R	FLOAT32		VA		P, S
30309	308	Last Demand Ia	R	FLOAT32		A		A, P, S
30311	310	Last Demand Ib	R	FLOAT32		A		A, P, S
30313	312	Last Demand Ic	R	FLOAT32		A		A, P, S
30315	314	Last Demand W	R	FLOAT32		W		P, S
30317	316	Last Demand Var	R	FLOAT32		VAR		P, S
30319	318	Last Demand VA	R	FLOAT32		VA		P, S
30321	320	A Phase(3P4W) Voltage THD	R	FLOAT32		%		P, S
30323	322	B Phase(3P4W) Voltage THD	R	FLOAT32		%		P, S
30325	324	C Phase(3P4W) Voltage THD	R	FLOAT32		%		P, S
30327	326	AB Phase(3P3W) Voltage THD	R	FLOAT32		%		P, S
30329	328	BC Phase(3P3W) Voltage THD	R	FLOAT32		%		P, S
30331	330	CA Phase(3P3W) Voltage THD	R	FLOAT32		%		P, S
30333	332	A Phase Current THD	R	FLOAT32		%		A, P, S
30335	334	B Phase Current THD	R	FLOAT32		%		A, P, S
30337	336	C Phase Current THD	R	FLOAT32		%		A, P, S
30339	338	A Phase Current TDD	R	FLOAT32		%		A, P, S
30341	340	B Phase Current TDD	R	FLOAT32		%		A, P, S
30343	342	C Phase Current TDD	R	FLOAT32		%		A, P, S
30345	344	A Phase Voltage Phase	R	FLOAT32		°		P, S
30347	346	B Phase Voltage Phase	R	FLOAT32		°		P, S
30349	348	C Phase Voltage Phase	R	FLOAT32		°		P, S
30351	350	AB Phase Voltage Phase	R	FLOAT32		°		P, S
30353	352	BC Phase Voltage Phase	R	FLOAT32		°		P, S
30355	354	CA Phase Voltage Phase	R	FLOAT32		°		P, S
30357	356	A Phase Current Phase	R	FLOAT32		°		A, P, S
30359	358	B Phase Current Phase	R	FLOAT32		°		A, P, S
30361	360	C Phase Current Phase	R	FLOAT32		°		A, P, S
30363	362	N Phase Current Phase	R	FLOAT32		°		A, P, S
30365	364	A Phase Current Kfactor	R	FLOAT32				A, P, S

30367	366	B Phase Current Kfactor	R	FLOAT32				A, P, S
30369	368	C Phase Current Kfactor	R	FLOAT32				A, P, S
30371	370	A Phase Voltage Fundamental	R	FLOAT32		V		P, S
30373	372	A Phase Voltage 2 Harmonic	R	FLOAT32		V		P, S
30375	374	A Phase Voltage 3 Harmonic	R	FLOAT32		V		P, S
30377	376	A Phase Voltage 4 Harmonic	R	FLOAT32		V		P, S
30379	378	A Phase Voltage 5 Harmonic	R	FLOAT32		V		P, S
30381	380	A Phase Voltage 6 Harmonic	R	FLOAT32		V		P, S
30383	382	A Phase Voltage 7 Harmonic	R	FLOAT32		V		P, S
30385	384	A Phase Voltage 8 Harmonic	R	FLOAT32		V		P, S
30387	386	A Phase Voltage 9 Harmonic	R	FLOAT32		V		P, S
30389	388	A Phase Voltage 10 Harmonic	R	FLOAT32		V		P, S
30391	390	A Phase Voltage 11 Harmonic	R	FLOAT32		V		P, S
30393	392	A Phase Voltage 12 Harmonic	R	FLOAT32		V		P, S
30395	394	A Phase Voltage 13 Harmonic	R	FLOAT32		V		P, S
30397	396	A Phase Voltage 14 Harmonic	R	FLOAT32		V		P, S
30399	398	A Phase Voltage 15 Harmonic	R	FLOAT32		V		P, S
30401	400	A Phase Voltage 16 Harmonic	R	FLOAT32		V		P, S
30403	402	A Phase Voltage 17 Harmonic	R	FLOAT32		V		P, S
30405	404	A Phase Voltage 18 Harmonic	R	FLOAT32		V		P, S
30407	406	A Phase Voltage 19 Harmonic	R	FLOAT32		V		P, S
30409	408	A Phase Voltage 20 Harmonic	R	FLOAT32		V		P, S
30411	410	A Phase Voltage 21 Harmonic	R	FLOAT32		V		P, S
30413	412	A Phase Voltage 22 Harmonic	R	FLOAT32		V		P, S
30415	414	A Phase Voltage 23 Harmonic	R	FLOAT32		V		P, S
30417	416	A Phase Voltage 24 Harmonic	R	FLOAT32		V		P, S
30419	418	A Phase Voltage 25 Harmonic	R	FLOAT32		V		P, S
30421	420	A Phase Voltage 26 Harmonic	R	FLOAT32		V		P, S
30423	422	A Phase Voltage 27 Harmonic	R	FLOAT32		V		P, S
30425	424	A Phase Voltage 28 Harmonic	R	FLOAT32		V		P, S
30427	426	A Phase Voltage 29 Harmonic	R	FLOAT32		V		P, S
30429	428	A Phase Voltage 30 Harmonic	R	FLOAT32		V		P, S
30431	430	A Phase Voltage 31 Harmonic	R	FLOAT32		V		P, S
30433	432	A Phase Voltage 32 Harmonic	R	FLOAT32		V		P, S
30435	434	A Phase Voltage 33 Harmonic	R	FLOAT32		V		P, S
30437	436	A Phase Voltage 34 Harmonic	R	FLOAT32		V		P, S
30439	438	A Phase Voltage 35 Harmonic	R	FLOAT32		V		P, S
30441	440	A Phase Voltage 36 Harmonic	R	FLOAT32		V		P, S
30443	442	A Phase Voltage 37 Harmonic	R	FLOAT32		V		P, S
30445	444	A Phase Voltage 38 Harmonic	R	FLOAT32		V		P, S
30447	446	A Phase Voltage 39 Harmonic	R	FLOAT32		V		P, S

30449	448	A Phase Voltage 40 Harmonic	R	FLOAT32		V		P, S
30451	450	A Phase Voltage 41 Harmonic	R	FLOAT32		V		P, S
30453	452	A Phase Voltage 42 Harmonic	R	FLOAT32		V		P, S
30455	454	A Phase Voltage 43 Harmonic	R	FLOAT32		V		P, S
30457	456	A Phase Voltage 44 Harmonic	R	FLOAT32		V		P, S
30459	458	A Phase Voltage 45 Harmonic	R	FLOAT32		V		P, S
30461	460	A Phase Voltage 46 Harmonic	R	FLOAT32		V		P, S
30463	462	A Phase Voltage 47 Harmonic	R	FLOAT32		V		P, S
30465	464	A Phase Voltage 48 Harmonic	R	FLOAT32		V		P, S
30467	466	A Phase Voltage 49 Harmonic	R	FLOAT32		V		P, S
30469	468	A Phase Voltage 50 Harmonic	R	FLOAT32		V		P, S
30471	470	A Phase Voltage 51 Harmonic	R	FLOAT32		V		P, S
30473	472	A Phase Voltage 52 Harmonic	R	FLOAT32		V		P, S
30475	474	A Phase Voltage 53 Harmonic	R	FLOAT32		V		P, S
30477	476	A Phase Voltage 54 Harmonic	R	FLOAT32		V		P, S
30479	478	A Phase Voltage 55 Harmonic	R	FLOAT32		V		P, S
30481	480	A Phase Voltage 56 Harmonic	R	FLOAT32		V		P, S
30483	482	A Phase Voltage 57 Harmonic	R	FLOAT32		V		P, S
30485	484	A Phase Voltage 58 Harmonic	R	FLOAT32		V		P, S
30487	486	A Phase Voltage 59 Harmonic	R	FLOAT32		V		P, S
30489	488	A Phase Voltage 60 Harmonic	R	FLOAT32		V		P, S
30491	490	A Phase Voltage 61 Harmonic	R	FLOAT32		V		P, S
30493	492	A Phase Voltage 62 Harmonic	R	FLOAT32		V		P, S
30495	494	A Phase Voltage 63 Harmonic	R	FLOAT32		V		P, S
30497	496	B Phase Voltage Fundamental	R	FLOAT32		V		P, S
30499	498	B Phase Voltage 2 Harmonic	R	FLOAT32		V		P, S
30501	500	B Phase Voltage 3 Harmonic	R	FLOAT32		V		P, S
30503	502	B Phase Voltage 4 Harmonic	R	FLOAT32		V		P, S
30505	504	B Phase Voltage 5 Harmonic	R	FLOAT32		V		P, S
30507	506	B Phase Voltage 6 Harmonic	R	FLOAT32		V		P, S
30509	508	B Phase Voltage 7 Harmonic	R	FLOAT32		V		P, S
30511	510	B Phase Voltage 8 Harmonic	R	FLOAT32		V		P, S
30513	512	B Phase Voltage 9 Harmonic	R	FLOAT32		V		P, S
30515	514	B Phase Voltage 10 Harmonic	R	FLOAT32		V		P, S
30517	516	B Phase Voltage 11 Harmonic	R	FLOAT32		V		P, S
30519	518	B Phase Voltage 12 Harmonic	R	FLOAT32		V		P, S
30521	520	B Phase Voltage 13 Harmonic	R	FLOAT32		V		P, S
30523	522	B Phase Voltage 14 Harmonic	R	FLOAT32		V		P, S
30525	524	B Phase Voltage 15 Harmonic	R	FLOAT32		V		P, S
30527	526	B Phase Voltage 16 Harmonic	R	FLOAT32		V		P, S
30529	528	B Phase Voltage 17 Harmonic	R	FLOAT32		V		P, S

30531	530	B Phase Voltage 18 Harmonic	R	FLOAT32		V		P, S
30533	532	B Phase Voltage 19 Harmonic	R	FLOAT32		V		P, S
30535	534	B Phase Voltage 20 Harmonic	R	FLOAT32		V		P, S
30537	536	B Phase Voltage 21 Harmonic	R	FLOAT32		V		P, S
30539	538	B Phase Voltage 22 Harmonic	R	FLOAT32		V		P, S
30541	540	B Phase Voltage 23 Harmonic	R	FLOAT32		V		P, S
30543	542	B Phase Voltage 24 Harmonic	R	FLOAT32		V		P, S
30545	544	B Phase Voltage 25 Harmonic	R	FLOAT32		V		P, S
30547	546	B Phase Voltage 26 Harmonic	R	FLOAT32		V		P, S
30549	548	B Phase Voltage 27 Harmonic	R	FLOAT32		V		P, S
30551	550	B Phase Voltage 28 Harmonic	R	FLOAT32		V		P, S
30553	552	B Phase Voltage 29 Harmonic	R	FLOAT32		V		P, S
30555	554	B Phase Voltage 30 Harmonic	R	FLOAT32		V		P, S
30557	556	B Phase Voltage 31 Harmonic	R	FLOAT32		V		P, S
30559	558	B Phase Voltage 32 Harmonic	R	FLOAT32		V		P, S
30561	560	B Phase Voltage 33 Harmonic	R	FLOAT32		V		P, S
30563	562	B Phase Voltage 34 Harmonic	R	FLOAT32		V		P, S
30565	564	B Phase Voltage 35 Harmonic	R	FLOAT32		V		P, S
30567	566	B Phase Voltage 36 Harmonic	R	FLOAT32		V		P, S
30569	568	B Phase Voltage 37 Harmonic	R	FLOAT32		V		P, S
30571	570	B Phase Voltage 38 Harmonic	R	FLOAT32		V		P, S
30573	572	B Phase Voltage 39 Harmonic	R	FLOAT32		V		P, S
30575	574	B Phase Voltage 40 Harmonic	R	FLOAT32		V		P, S
30577	576	B Phase Voltage 41 Harmonic	R	FLOAT32		V		P, S
30579	578	B Phase Voltage 42 Harmonic	R	FLOAT32		V		P, S
30581	580	B Phase Voltage 43 Harmonic	R	FLOAT32		V		P, S
30583	582	B Phase Voltage 44 Harmonic	R	FLOAT32		V		P, S
30585	584	B Phase Voltage 45 Harmonic	R	FLOAT32		V		P, S
30587	586	B Phase Voltage 46 Harmonic	R	FLOAT32		V		P, S
30589	588	B Phase Voltage 47 Harmonic	R	FLOAT32		V		P, S
30591	590	B Phase Voltage 48 Harmonic	R	FLOAT32		V		P, S
30593	592	B Phase Voltage 49 Harmonic	R	FLOAT32		V		P, S
30595	594	B Phase Voltage 50 Harmonic	R	FLOAT32		V		P, S
30597	596	B Phase Voltage 51 Harmonic	R	FLOAT32		V		P, S
30599	598	B Phase Voltage 52 Harmonic	R	FLOAT32		V		P, S
30601	600	B Phase Voltage 53 Harmonic	R	FLOAT32		V		P, S
30603	602	B Phase Voltage 54 Harmonic	R	FLOAT32		V		P, S
30605	604	B Phase Voltage 55 Harmonic	R	FLOAT32		V		P, S
30607	606	B Phase Voltage 56 Harmonic	R	FLOAT32		V		P, S
30609	608	B Phase Voltage 57 Harmonic	R	FLOAT32		V		P, S
30611	610	B Phase Voltage 58 Harmonic	R	FLOAT32		V		P, S

30613	612	B Phase Voltage 59 Harmonic	R	FLOAT32		V		P, S
30615	614	B Phase Voltage 60 Harmonic	R	FLOAT32		V		P, S
30617	616	B Phase Voltage 61 Harmonic	R	FLOAT32		V		P, S
30619	618	B Phase Voltage 62 Harmonic	R	FLOAT32		V		P, S
30621	620	B Phase Voltage 63 Harmonic	R	FLOAT32		V		P, S
30623	622	C Phase Voltage Fundamental	R	FLOAT32		V		P, S
30625	624	C Phase Voltage 2 Harmonic	R	FLOAT32		V		P, S
30627	626	C Phase Voltage 3 Harmonic	R	FLOAT32		V		P, S
30629	628	C Phase Voltage 4 Harmonic	R	FLOAT32		V		P, S
30631	630	C Phase Voltage 5 Harmonic	R	FLOAT32		V		P, S
30633	632	C Phase Voltage 6 Harmonic	R	FLOAT32		V		P, S
30635	634	C Phase Voltage 7 Harmonic	R	FLOAT32		V		P, S
30637	636	C Phase Voltage 8 Harmonic	R	FLOAT32		V		P, S
30639	638	C Phase Voltage 9 Harmonic	R	FLOAT32		V		P, S
30641	640	C Phase Voltage 10 Harmonic	R	FLOAT32		V		P, S
30643	642	C Phase Voltage 11 Harmonic	R	FLOAT32		V		P, S
30645	644	C Phase Voltage 12 Harmonic	R	FLOAT32		V		P, S
30647	646	C Phase Voltage 13 Harmonic	R	FLOAT32		V		P, S
30649	648	C Phase Voltage 14 Harmonic	R	FLOAT32		V		P, S
30651	650	C Phase Voltage 15 Harmonic	R	FLOAT32		V		P, S
30653	652	C Phase Voltage 16 Harmonic	R	FLOAT32		V		P, S
30655	654	C Phase Voltage 17 Harmonic	R	FLOAT32		V		P, S
30657	656	C Phase Voltage 18 Harmonic	R	FLOAT32		V		P, S
30659	658	C Phase Voltage 19 Harmonic	R	FLOAT32		V		P, S
30661	660	C Phase Voltage 20 Harmonic	R	FLOAT32		V		P, S
30663	662	C Phase Voltage 21 Harmonic	R	FLOAT32		V		P, S
30665	664	C Phase Voltage 22 Harmonic	R	FLOAT32		V		P, S
30667	666	C Phase Voltage 23 Harmonic	R	FLOAT32		V		P, S
30669	668	C Phase Voltage 24 Harmonic	R	FLOAT32		V		P, S
30671	670	C Phase Voltage 25 Harmonic	R	FLOAT32		V		P, S
30673	672	C Phase Voltage 26 Harmonic	R	FLOAT32		V		P, S
30675	674	C Phase Voltage 27 Harmonic	R	FLOAT32		V		P, S
30677	676	C Phase Voltage 28 Harmonic	R	FLOAT32		V		P, S
30679	678	C Phase Voltage 29 Harmonic	R	FLOAT32		V		P, S
30681	680	C Phase Voltage 30 Harmonic	R	FLOAT32		V		P, S
30683	682	C Phase Voltage 31 Harmonic	R	FLOAT32		V		P, S
30685	684	C Phase Voltage 32 Harmonic	R	FLOAT32		V		P, S
30687	686	C Phase Voltage 33 Harmonic	R	FLOAT32		V		P, S
30689	688	C Phase Voltage 34 Harmonic	R	FLOAT32		V		P, S
30691	690	C Phase Voltage 35 Harmonic	R	FLOAT32		V		P, S
30693	692	C Phase Voltage 36 Harmonic	R	FLOAT32		V		P, S

30695	694	C Phase Voltage 37 Harmonic	R	FLOAT32		V		P, S
30697	696	C Phase Voltage 38 Harmonic	R	FLOAT32		V		P, S
30699	698	C Phase Voltage 39 Harmonic	R	FLOAT32		V		P, S
30701	700	C Phase Voltage 40 Harmonic	R	FLOAT32		V		P, S
30703	702	C Phase Voltage 41 Harmonic	R	FLOAT32		V		P, S
30705	704	C Phase Voltage 42 Harmonic	R	FLOAT32		V		P, S
30707	706	C Phase Voltage 43 Harmonic	R	FLOAT32		V		P, S
30709	708	C Phase Voltage 44 Harmonic	R	FLOAT32		V		P, S
30711	710	C Phase Voltage 45 Harmonic	R	FLOAT32		V		P, S
30713	712	C Phase Voltage 46 Harmonic	R	FLOAT32		V		P, S
30715	714	C Phase Voltage 47 Harmonic	R	FLOAT32		V		P, S
30717	716	C Phase Voltage 48 Harmonic	R	FLOAT32		V		P, S
30719	718	C Phase Voltage 49 Harmonic	R	FLOAT32		V		P, S
30721	720	C Phase Voltage 50 Harmonic	R	FLOAT32		V		P, S
30723	722	C Phase Voltage 51 Harmonic	R	FLOAT32		V		P, S
30725	724	C Phase Voltage 52 Harmonic	R	FLOAT32		V		P, S
30727	726	C Phase Voltage 53 Harmonic	R	FLOAT32		V		P, S
30729	728	C Phase Voltage 54 Harmonic	R	FLOAT32		V		P, S
30731	730	C Phase Voltage 55 Harmonic	R	FLOAT32		V		P, S
30733	732	C Phase Voltage 56 Harmonic	R	FLOAT32		V		P, S
30735	734	C Phase Voltage 57 Harmonic	R	FLOAT32		V		P, S
30737	736	C Phase Voltage 58 Harmonic	R	FLOAT32		V		P, S
30739	738	C Phase Voltage 59 Harmonic	R	FLOAT32		V		P, S
30741	740	C Phase Voltage 60 Harmonic	R	FLOAT32		V		P, S
30743	742	C Phase Voltage 61 Harmonic	R	FLOAT32		V		P, S
30745	744	C Phase Voltage 62 Harmonic	R	FLOAT32		V		P, S
30747	746	C Phase Voltage 63 Harmonic	R	FLOAT32		V		P, S
30749	748	AB Phase Voltage Fundamental	R	FLOAT32		V		P, S
30751	750	AB Phase Voltage 2 Harmonic	R	FLOAT32		V		P, S
30753	752	AB Phase Voltage 3 Harmonic	R	FLOAT32		V		P, S
30755	754	AB Phase Voltage 4 Harmonic	R	FLOAT32		V		P, S
30757	756	AB Phase Voltage 5 Harmonic	R	FLOAT32		V		P, S
30759	758	AB Phase Voltage 6 Harmonic	R	FLOAT32		V		P, S
30761	760	AB Phase Voltage 7 Harmonic	R	FLOAT32		V		P, S
30763	762	AB Phase Voltage 8 Harmonic	R	FLOAT32		V		P, S
30765	764	AB Phase Voltage 9 Harmonic	R	FLOAT32		V		P, S
30767	766	AB Phase Voltage 10 Harmonic	R	FLOAT32		V		P, S
30769	768	AB Phase Voltage 11 Harmonic	R	FLOAT32		V		P, S
30771	770	AB Phase Voltage 12 Harmonic	R	FLOAT32		V		P, S
30773	772	AB Phase Voltage 13 Harmonic	R	FLOAT32		V		P, S
30775	774	AB Phase Voltage 14 Harmonic	R	FLOAT32		V		P, S

30777	776	AB Phase Voltage 15 Harmonic	R	FLOAT32		V		P, S
30779	778	AB Phase Voltage 16 Harmonic	R	FLOAT32		V		P, S
30781	780	AB Phase Voltage 17 Harmonic	R	FLOAT32		V		P, S
30783	782	AB Phase Voltage 18 Harmonic	R	FLOAT32		V		P, S
30785	784	AB Phase Voltage 19 Harmonic	R	FLOAT32		V		P, S
30787	786	AB Phase Voltage 20 Harmonic	R	FLOAT32		V		P, S
30789	788	AB Phase Voltage 21 Harmonic	R	FLOAT32		V		P, S
30791	790	AB Phase Voltage 22 Harmonic	R	FLOAT32		V		P, S
30793	792	AB Phase Voltage 23 Harmonic	R	FLOAT32		V		P, S
30795	794	AB Phase Voltage 24 Harmonic	R	FLOAT32		V		P, S
30797	796	AB Phase Voltage 25 Harmonic	R	FLOAT32		V		P, S
30799	798	AB Phase Voltage 26 Harmonic	R	FLOAT32		V		P, S
30801	800	AB Phase Voltage 27 Harmonic	R	FLOAT32		V		P, S
30803	802	AB Phase Voltage 28 Harmonic	R	FLOAT32		V		P, S
30805	804	AB Phase Voltage 29 Harmonic	R	FLOAT32		V		P, S
30807	806	AB Phase Voltage 30 Harmonic	R	FLOAT32		V		P, S
30809	808	AB Phase Voltage 31 Harmonic	R	FLOAT32		V		P, S
30811	810	AB Phase Voltage 32 Harmonic	R	FLOAT32		V		P, S
30813	812	AB Phase Voltage 33 Harmonic	R	FLOAT32		V		P, S
30815	814	AB Phase Voltage 34 Harmonic	R	FLOAT32		V		P, S
30817	816	AB Phase Voltage 35 Harmonic	R	FLOAT32		V		P, S
30819	818	AB Phase Voltage 36 Harmonic	R	FLOAT32		V		P, S
30821	820	AB Phase Voltage 37 Harmonic	R	FLOAT32		V		P, S
30823	822	AB Phase Voltage 38 Harmonic	R	FLOAT32		V		P, S
30825	824	AB Phase Voltage 39 Harmonic	R	FLOAT32		V		P, S
30827	826	AB Phase Voltage 40 Harmonic	R	FLOAT32		V		P, S
30829	828	AB Phase Voltage 41 Harmonic	R	FLOAT32		V		P, S
30831	830	AB Phase Voltage 42 Harmonic	R	FLOAT32		V		P, S
30833	832	AB Phase Voltage 43 Harmonic	R	FLOAT32		V		P, S
30835	834	AB Phase Voltage 44 Harmonic	R	FLOAT32		V		P, S
30837	836	AB Phase Voltage 45 Harmonic	R	FLOAT32		V		P, S
30839	838	AB Phase Voltage 46 Harmonic	R	FLOAT32		V		P, S
30841	840	AB Phase Voltage 47 Harmonic	R	FLOAT32		V		P, S
30843	842	AB Phase Voltage 48 Harmonic	R	FLOAT32		V		P, S
30845	844	AB Phase Voltage 49 Harmonic	R	FLOAT32		V		P, S
30847	846	AB Phase Voltage 50 Harmonic	R	FLOAT32		V		P, S
30849	848	AB Phase Voltage 51 Harmonic	R	FLOAT32		V		P, S
30851	850	AB Phase Voltage 52 Harmonic	R	FLOAT32		V		P, S
30853	852	AB Phase Voltage 53 Harmonic	R	FLOAT32		V		P, S
30855	854	AB Phase Voltage 54 Harmonic	R	FLOAT32		V		P, S
30857	856	AB Phase Voltage 55 Harmonic	R	FLOAT32		V		P, S

30859	858	AB Phase Voltage 56 Harmonic	R	FLOAT32		V		P, S
30861	860	AB Phase Voltage 57 Harmonic	R	FLOAT32		V		P, S
30863	862	AB Phase Voltage 58 Harmonic	R	FLOAT32		V		P, S
30865	864	AB Phase Voltage 59 Harmonic	R	FLOAT32		V		P, S
30867	866	AB Phase Voltage 60 Harmonic	R	FLOAT32		V		P, S
30869	868	AB Phase Voltage 61 Harmonic	R	FLOAT32		V		P, S
30871	870	AB Phase Voltage 62 Harmonic	R	FLOAT32		V		P, S
30873	872	AB Phase Voltage 63 Harmonic	R	FLOAT32		V		P, S
30875	874	BC Phase Voltage Fundamental	R	FLOAT32		V		P, S
30877	876	BC Phase Voltage 2 Harmonic	R	FLOAT32		V		P, S
30879	878	BC Phase Voltage 3 Harmonic	R	FLOAT32		V		P, S
30881	880	BC Phase Voltage 4 Harmonic	R	FLOAT32		V		P, S
30883	882	BC Phase Voltage 5 Harmonic	R	FLOAT32		V		P, S
30885	884	BC Phase Voltage 6 Harmonic	R	FLOAT32		V		P, S
30887	886	BC Phase Voltage 7 Harmonic	R	FLOAT32		V		P, S
30889	888	BC Phase Voltage 8 Harmonic	R	FLOAT32		V		P, S
30891	890	BC Phase Voltage 9 Harmonic	R	FLOAT32		V		P, S
30893	892	BC Phase Voltage 10 Harmonic	R	FLOAT32		V		P, S
30895	894	BC Phase Voltage 11 Harmonic	R	FLOAT32		V		P, S
30897	896	BC Phase Voltage 12 Harmonic	R	FLOAT32		V		P, S
30899	898	BC Phase Voltage 13 Harmonic	R	FLOAT32		V		P, S
30901	900	BC Phase Voltage 14 Harmonic	R	FLOAT32		V		P, S
30903	902	BC Phase Voltage 15 Harmonic	R	FLOAT32		V		P, S
30905	904	BC Phase Voltage 16 Harmonic	R	FLOAT32		V		P, S
30907	906	BC Phase Voltage 17 Harmonic	R	FLOAT32		V		P, S
30909	908	BC Phase Voltage 18 Harmonic	R	FLOAT32		V		P, S
30911	910	BC Phase Voltage 19 Harmonic	R	FLOAT32		V		P, S
30913	912	BC Phase Voltage 20 Harmonic	R	FLOAT32		V		P, S
30915	914	BC Phase Voltage 21 Harmonic	R	FLOAT32		V		P, S
30917	916	BC Phase Voltage 22 Harmonic	R	FLOAT32		V		P, S
30919	918	BC Phase Voltage 23 Harmonic	R	FLOAT32		V		P, S
30921	920	BC Phase Voltage 24 Harmonic	R	FLOAT32		V		P, S
30923	922	BC Phase Voltage 25 Harmonic	R	FLOAT32		V		P, S
30925	924	BC Phase Voltage 26 Harmonic	R	FLOAT32		V		P, S
30927	926	BC Phase Voltage 27 Harmonic	R	FLOAT32		V		P, S
30929	928	BC Phase Voltage 28 Harmonic	R	FLOAT32		V		P, S
30931	930	BC Phase Voltage 29 Harmonic	R	FLOAT32		V		P, S
30933	932	BC Phase Voltage 30 Harmonic	R	FLOAT32		V		P, S
30935	934	BC Phase Voltage 31 Harmonic	R	FLOAT32		V		P, S
30937	936	BC Phase Voltage 32 Harmonic	R	FLOAT32		V		P, S
30939	938	BC Phase Voltage 33 Harmonic	R	FLOAT32		V		P, S

30941	940	BC Phase Voltage 34 Harmonic	R	FLOAT32		V		P, S
30943	942	BC Phase Voltage 35 Harmonic	R	FLOAT32		V		P, S
30945	944	BC Phase Voltage 36 Harmonic	R	FLOAT32		V		P, S
30947	946	BC Phase Voltage 37 Harmonic	R	FLOAT32		V		P, S
30949	948	BC Phase Voltage 38 Harmonic	R	FLOAT32		V		P, S
30951	950	BC Phase Voltage 39 Harmonic	R	FLOAT32		V		P, S
30953	952	BC Phase Voltage 40 Harmonic	R	FLOAT32		V		P, S
30955	954	BC Phase Voltage 41 Harmonic	R	FLOAT32		V		P, S
30957	956	BC Phase Voltage 42 Harmonic	R	FLOAT32		V		P, S
30959	958	BC Phase Voltage 43 Harmonic	R	FLOAT32		V		P, S
30961	960	BC Phase Voltage 44 Harmonic	R	FLOAT32		V		P, S
30963	962	BC Phase Voltage 45 Harmonic	R	FLOAT32		V		P, S
30965	964	BC Phase Voltage 46 Harmonic	R	FLOAT32		V		P, S
30967	966	BC Phase Voltage 47 Harmonic	R	FLOAT32		V		P, S
30969	968	BC Phase Voltage 48 Harmonic	R	FLOAT32		V		P, S
30971	970	BC Phase Voltage 49 Harmonic	R	FLOAT32		V		P, S
30973	972	BC Phase Voltage 50 Harmonic	R	FLOAT32		V		P, S
30975	974	BC Phase Voltage 51 Harmonic	R	FLOAT32		V		P, S
30977	976	BC Phase Voltage 52 Harmonic	R	FLOAT32		V		P, S
30979	978	BC Phase Voltage 53 Harmonic	R	FLOAT32		V		P, S
30981	980	BC Phase Voltage 54 Harmonic	R	FLOAT32		V		P, S
30983	982	BC Phase Voltage 55 Harmonic	R	FLOAT32		V		P, S
30985	984	BC Phase Voltage 56 Harmonic	R	FLOAT32		V		P, S
30987	986	BC Phase Voltage 57 Harmonic	R	FLOAT32		V		P, S
30989	988	BC Phase Voltage 58 Harmonic	R	FLOAT32		V		P, S
30991	990	BC Phase Voltage 59 Harmonic	R	FLOAT32		V		P, S
30993	992	BC Phase Voltage 60 Harmonic	R	FLOAT32		V		P, S
30995	994	BC Phase Voltage 61 Harmonic	R	FLOAT32		V		P, S
30997	996	BC Phase Voltage 62 Harmonic	R	FLOAT32		V		P, S
30999	998	BC Phase Voltage 63 Harmonic	R	FLOAT32		V		P, S
31001	1000	CA Phase Voltage Fundamental	R	FLOAT32		V		P, S
31003	1002	CA Phase Voltage 2 Harmonic	R	FLOAT32		V		P, S
31005	1004	CA Phase Voltage 3 Harmonic	R	FLOAT32		V		P, S
31007	1006	CA Phase Voltage 4 Harmonic	R	FLOAT32		V		P, S
31009	1008	CA Phase Voltage 5 Harmonic	R	FLOAT32		V		P, S
31011	1010	CA Phase Voltage 6 Harmonic	R	FLOAT32		V		P, S
31013	1012	CA Phase Voltage 7 Harmonic	R	FLOAT32		V		P, S
31015	1014	CA Phase Voltage 8 Harmonic	R	FLOAT32		V		P, S
31017	1016	CA Phase Voltage 9 Harmonic	R	FLOAT32		V		P, S
31019	1018	CA Phase Voltage 10 Harmonic	R	FLOAT32		V		P, S
31021	1020	CA Phase Voltage 11 Harmonic	R	FLOAT32		V		P, S

31023	1022	CA Phase Voltage 12 Harmonic	R	FLOAT32		V		P, S
31025	1024	CA Phase Voltage 13 Harmonic	R	FLOAT32		V		P, S
31027	1026	CA Phase Voltage 14 Harmonic	R	FLOAT32		V		P, S
31029	1028	CA Phase Voltage 15 Harmonic	R	FLOAT32		V		P, S
31031	1030	CA Phase Voltage 16 Harmonic	R	FLOAT32		V		P, S
31033	1032	CA Phase Voltage 17 Harmonic	R	FLOAT32		V		P, S
31035	1034	CA Phase Voltage 18 Harmonic	R	FLOAT32		V		P, S
31037	1036	CA Phase Voltage 19 Harmonic	R	FLOAT32		V		P, S
31039	1038	CA Phase Voltage 20 Harmonic	R	FLOAT32		V		P, S
31041	1040	CA Phase Voltage 21 Harmonic	R	FLOAT32		V		P, S
31043	1042	CA Phase Voltage 22 Harmonic	R	FLOAT32		V		P, S
31045	1044	CA Phase Voltage 23 Harmonic	R	FLOAT32		V		P, S
31047	1046	CA Phase Voltage 24 Harmonic	R	FLOAT32		V		P, S
31049	1048	CA Phase Voltage 25 Harmonic	R	FLOAT32		V		P, S
31051	1050	CA Phase Voltage 26 Harmonic	R	FLOAT32		V		P, S
31053	1052	CA Phase Voltage 27 Harmonic	R	FLOAT32		V		P, S
31055	1054	CA Phase Voltage 28 Harmonic	R	FLOAT32		V		P, S
31057	1056	CA Phase Voltage 29 Harmonic	R	FLOAT32		V		P, S
31059	1058	CA Phase Voltage 30 Harmonic	R	FLOAT32		V		P, S
31061	1060	CA Phase Voltage 31 Harmonic	R	FLOAT32		V		P, S
31063	1062	CA Phase Voltage 32 Harmonic	R	FLOAT32		V		P, S
31065	1064	CA Phase Voltage 33 Harmonic	R	FLOAT32		V		P, S
31067	1066	CA Phase Voltage 34 Harmonic	R	FLOAT32		V		P, S
31069	1068	CA Phase Voltage 35 Harmonic	R	FLOAT32		V		P, S
31071	1070	CA Phase Voltage 36 Harmonic	R	FLOAT32		V		P, S
31073	1072	CA Phase Voltage 37 Harmonic	R	FLOAT32		V		P, S
31075	1074	CA Phase Voltage 38 Harmonic	R	FLOAT32		V		P, S
31077	1076	CA Phase Voltage 39 Harmonic	R	FLOAT32		V		P, S
31079	1078	CA Phase Voltage 40 Harmonic	R	FLOAT32		V		P, S
31081	1080	CA Phase Voltage 41 Harmonic	R	FLOAT32		V		P, S
31083	1082	CA Phase Voltage 42 Harmonic	R	FLOAT32		V		P, S
31085	1084	CA Phase Voltage 43 Harmonic	R	FLOAT32		V		P, S
31087	1086	CA Phase Voltage 44 Harmonic	R	FLOAT32		V		P, S
31089	1088	CA Phase Voltage 45 Harmonic	R	FLOAT32		V		P, S
31091	1090	CA Phase Voltage 46 Harmonic	R	FLOAT32		V		P, S
31093	1092	CA Phase Voltage 47 Harmonic	R	FLOAT32		V		P, S
31095	1094	CA Phase Voltage 48 Harmonic	R	FLOAT32		V		P, S
31097	1096	CA Phase Voltage 49 Harmonic	R	FLOAT32		V		P, S
31099	1098	CA Phase Voltage 50 Harmonic	R	FLOAT32		V		P, S
31101	1100	CA Phase Voltage 51 Harmonic	R	FLOAT32		V		P, S
31103	1102	CA Phase Voltage 52 Harmonic	R	FLOAT32		V		P, S

31105	1104	CA Phase Voltage 53 Harmonic	R	FLOAT32		V		P, S
31107	1106	CA Phase Voltage 54 Harmonic	R	FLOAT32		V		P, S
31109	1108	CA Phase Voltage 55 Harmonic	R	FLOAT32		V		P, S
31111	1110	CA Phase Voltage 56 Harmonic	R	FLOAT32		V		P, S
31113	1112	CA Phase Voltage 57 Harmonic	R	FLOAT32		V		P, S
31115	1114	CA Phase Voltage 58 Harmonic	R	FLOAT32		V		P, S
31117	1116	CA Phase Voltage 59 Harmonic	R	FLOAT32		V		P, S
31119	1118	CA Phase Voltage 60 Harmonic	R	FLOAT32		V		P, S
31121	1120	CA Phase Voltage 61 Harmonic	R	FLOAT32		V		P, S
31123	1122	CA Phase Voltage 62 Harmonic	R	FLOAT32		V		P, S
31125	1124	CA Phase Voltage 63 Harmonic	R	FLOAT32		V		P, S
31127	1126	A Phase Current Fundamental	R	FLOAT32		A		A, P, S
31129	1128	A Phase Current 2 Harmonic	R	FLOAT32		A		A, P, S
31131	1130	A Phase Current 3 Harmonic	R	FLOAT32		A		A, P, S
31133	1132	A Phase Current 4 Harmonic	R	FLOAT32		A		A, P, S
31135	1134	A Phase Current 5 Harmonic	R	FLOAT32		A		A, P, S
31137	1136	A Phase Current 6 Harmonic	R	FLOAT32		A		A, P, S
31139	1138	A Phase Current 7 Harmonic	R	FLOAT32		A		A, P, S
31141	1140	A Phase Current 8 Harmonic	R	FLOAT32		A		A, P, S
31143	1142	A Phase Current 9 Harmonic	R	FLOAT32		A		A, P, S
31145	1144	A Phase Current 10 Harmonic	R	FLOAT32		A		A, P, S
31147	1146	A Phase Current 11 Harmonic	R	FLOAT32		A		A, P, S
31149	1148	A Phase Current 12 Harmonic	R	FLOAT32		A		A, P, S
31151	1150	A Phase Current 13 Harmonic	R	FLOAT32		A		A, P, S
31153	1152	A Phase Current 14 Harmonic	R	FLOAT32		A		A, P, S
31155	1154	A Phase Current 15 Harmonic	R	FLOAT32		A		A, P, S
31157	1156	A Phase Current 16 Harmonic	R	FLOAT32		A		A, P, S
31159	1158	A Phase Current 17 Harmonic	R	FLOAT32		A		A, P, S
31161	1160	A Phase Current 18 Harmonic	R	FLOAT32		A		A, P, S
31163	1162	A Phase Current 19 Harmonic	R	FLOAT32		A		A, P, S
31165	1164	A Phase Current 20 Harmonic	R	FLOAT32		A		A, P, S
31167	1166	A Phase Current 21 Harmonic	R	FLOAT32		A		A, P, S
31169	1168	A Phase Current 22 Harmonic	R	FLOAT32		A		A, P, S
31171	1170	A Phase Current 23 Harmonic	R	FLOAT32		A		A, P, S
31173	1172	A Phase Current 24 Harmonic	R	FLOAT32		A		A, P, S
31175	1174	A Phase Current 25 Harmonic	R	FLOAT32		A		A, P, S
31177	1176	A Phase Current 26 Harmonic	R	FLOAT32		A		A, P, S
31179	1178	A Phase Current 27 Harmonic	R	FLOAT32		A		A, P, S
31181	1180	A Phase Current 28 Harmonic	R	FLOAT32		A		A, P, S
31183	1182	A Phase Current 29 Harmonic	R	FLOAT32		A		A, P, S
31185	1184	A Phase Current 30 Harmonic	R	FLOAT32		A		A, P, S

31187	1186	A Phase Current 31 Harmonic	R	FLOAT32		A		A, P, S
31189	1188	A Phase Current 32 Harmonic	R	FLOAT32		A		A, P, S
31191	1190	A Phase Current 33 Harmonic	R	FLOAT32		A		A, P, S
31193	1192	A Phase Current 34 Harmonic	R	FLOAT32		A		A, P, S
31195	1194	A Phase Current 35 Harmonic	R	FLOAT32		A		A, P, S
31197	1196	A Phase Current 36 Harmonic	R	FLOAT32		A		A, P, S
31199	1198	A Phase Current 37 Harmonic	R	FLOAT32		A		A, P, S
31201	1200	A Phase Current 38 Harmonic	R	FLOAT32		A		A, P, S
31203	1202	A Phase Current 39 Harmonic	R	FLOAT32		A		A, P, S
31205	1204	A Phase Current 40 Harmonic	R	FLOAT32		A		A, P, S
31207	1206	A Phase Current 41 Harmonic	R	FLOAT32		A		A, P, S
31209	1208	A Phase Current 42 Harmonic	R	FLOAT32		A		A, P, S
31211	1210	A Phase Current 43 Harmonic	R	FLOAT32		A		A, P, S
31213	1212	A Phase Current 44 Harmonic	R	FLOAT32		A		A, P, S
31215	1214	A Phase Current 45 Harmonic	R	FLOAT32		A		A, P, S
31217	1216	A Phase Current 46 Harmonic	R	FLOAT32		A		A, P, S
31219	1218	A Phase Current 47 Harmonic	R	FLOAT32		A		A, P, S
31221	1220	A Phase Current 48 Harmonic	R	FLOAT32		A		A, P, S
31223	1222	A Phase Current 49 Harmonic	R	FLOAT32		A		A, P, S
31225	1224	A Phase Current 50 Harmonic	R	FLOAT32		A		A, P, S
31227	1226	A Phase Current 51 Harmonic	R	FLOAT32		A		A, P, S
31229	1228	A Phase Current 52 Harmonic	R	FLOAT32		A		A, P, S
31231	1230	A Phase Current 53 Harmonic	R	FLOAT32		A		A, P, S
31233	1232	A Phase Current 54 Harmonic	R	FLOAT32		A		A, P, S
31235	1234	A Phase Current 55 Harmonic	R	FLOAT32		A		A, P, S
31237	1236	A Phase Current 56 Harmonic	R	FLOAT32		A		A, P, S
31239	1238	A Phase Current 57 Harmonic	R	FLOAT32		A		A, P, S
31241	1240	A Phase Current 58 Harmonic	R	FLOAT32		A		A, P, S
31243	1242	A Phase Current 59 Harmonic	R	FLOAT32		A		A, P, S
31245	1244	A Phase Current 60 Harmonic	R	FLOAT32		A		A, P, S
31247	1246	A Phase Current 61 Harmonic	R	FLOAT32		A		A, P, S
31249	1248	A Phase Current 62 Harmonic	R	FLOAT32		A		A, P, S
31251	1250	A Phase Current 63 Harmonic	R	FLOAT32		A		A, P, S
31253	1252	B Phase Current Fundamental	R	FLOAT32		A		A, P, S
31255	1254	B Phase Current 2 Harmonic	R	FLOAT32		A		A, P, S
31257	1256	B Phase Current 3 Harmonic	R	FLOAT32		A		A, P, S
31259	1258	B Phase Current 4 Harmonic	R	FLOAT32		A		A, P, S
31261	1260	B Phase Current 5 Harmonic	R	FLOAT32		A		A, P, S
31263	1262	B Phase Current 6 Harmonic	R	FLOAT32		A		A, P, S
31265	1264	B Phase Current 7 Harmonic	R	FLOAT32		A		A, P, S
31267	1266	B Phase Current 8 Harmonic	R	FLOAT32		A		A, P, S

31269	1268	B Phase Current 9 Harmonic	R	FLOAT32		A		A, P, S
31271	1270	B Phase Current 10 Harmonic	R	FLOAT32		A		A, P, S
31273	1272	B Phase Current 11 Harmonic	R	FLOAT32		A		A, P, S
31275	1274	B Phase Current 12 Harmonic	R	FLOAT32		A		A, P, S
31277	1276	B Phase Current 13 Harmonic	R	FLOAT32		A		A, P, S
31279	1278	B Phase Current 14 Harmonic	R	FLOAT32		A		A, P, S
31281	1280	B Phase Current 15 Harmonic	R	FLOAT32		A		A, P, S
31283	1282	B Phase Current 16 Harmonic	R	FLOAT32		A		A, P, S
31285	1284	B Phase Current 17 Harmonic	R	FLOAT32		A		A, P, S
31287	1286	B Phase Current 18 Harmonic	R	FLOAT32		A		A, P, S
31289	1288	B Phase Current 19 Harmonic	R	FLOAT32		A		A, P, S
31291	1290	B Phase Current 20 Harmonic	R	FLOAT32		A		A, P, S
31293	1292	B Phase Current 21 Harmonic	R	FLOAT32		A		A, P, S
31295	1294	B Phase Current 22 Harmonic	R	FLOAT32		A		A, P, S
31297	1296	B Phase Current 23 Harmonic	R	FLOAT32		A		A, P, S
31299	1298	B Phase Current 24 Harmonic	R	FLOAT32		A		A, P, S
31301	1300	B Phase Current 25 Harmonic	R	FLOAT32		A		A, P, S
31303	1302	B Phase Current 26 Harmonic	R	FLOAT32		A		A, P, S
31305	1304	B Phase Current 27 Harmonic	R	FLOAT32		A		A, P, S
31307	1306	B Phase Current 28 Harmonic	R	FLOAT32		A		A, P, S
31309	1308	B Phase Current 29 Harmonic	R	FLOAT32		A		A, P, S
31311	1310	B Phase Current 30 Harmonic	R	FLOAT32		A		A, P, S
31313	1312	B Phase Current 31 Harmonic	R	FLOAT32		A		A, P, S
31315	1314	B Phase Current 32 Harmonic	R	FLOAT32		A		A, P, S
31317	1316	B Phase Current 33 Harmonic	R	FLOAT32		A		A, P, S
31319	1318	B Phase Current 34 Harmonic	R	FLOAT32		A		A, P, S
31321	1320	B Phase Current 35 Harmonic	R	FLOAT32		A		A, P, S
31323	1322	B Phase Current 36 Harmonic	R	FLOAT32		A		A, P, S
31325	1324	B Phase Current 37 Harmonic	R	FLOAT32		A		A, P, S
31327	1326	B Phase Current 38 Harmonic	R	FLOAT32		A		A, P, S
31329	1328	B Phase Current 39 Harmonic	R	FLOAT32		A		A, P, S
31331	1330	B Phase Current 40 Harmonic	R	FLOAT32		A		A, P, S
31333	1332	B Phase Current 41 Harmonic	R	FLOAT32		A		A, P, S
31335	1334	B Phase Current 42 Harmonic	R	FLOAT32		A		A, P, S
31337	1336	B Phase Current 43 Harmonic	R	FLOAT32		A		A, P, S
31339	1338	B Phase Current 44 Harmonic	R	FLOAT32		A		A, P, S
31341	1340	B Phase Current 45 Harmonic	R	FLOAT32		A		A, P, S
31343	1342	B Phase Current 46 Harmonic	R	FLOAT32		A		A, P, S
31345	1344	B Phase Current 47 Harmonic	R	FLOAT32		A		A, P, S
31347	1346	B Phase Current 48 Harmonic	R	FLOAT32		A		A, P, S
31349	1348	B Phase Current 49 Harmonic	R	FLOAT32		A		A, P, S

31351	1350	B Phase Current 50 Harmonic	R	FLOAT32		A		A, P, S
31353	1352	B Phase Current 51 Harmonic	R	FLOAT32		A		A, P, S
31355	1354	B Phase Current 52 Harmonic	R	FLOAT32		A		A, P, S
31357	1356	B Phase Current 53 Harmonic	R	FLOAT32		A		A, P, S
31359	1358	B Phase Current 54 Harmonic	R	FLOAT32		A		A, P, S
31361	1360	B Phase Current 55 Harmonic	R	FLOAT32		A		A, P, S
31363	1362	B Phase Current 56 Harmonic	R	FLOAT32		A		A, P, S
31365	1364	B Phase Current 57 Harmonic	R	FLOAT32		A		A, P, S
31367	1366	B Phase Current 58 Harmonic	R	FLOAT32		A		A, P, S
31369	1368	B Phase Current 59 Harmonic	R	FLOAT32		A		A, P, S
31371	1370	B Phase Current 60 Harmonic	R	FLOAT32		A		A, P, S
31373	1372	B Phase Current 61 Harmonic	R	FLOAT32		A		A, P, S
31375	1374	B Phase Current 62 Harmonic	R	FLOAT32		A		A, P, S
31377	1376	B Phase Current 63 Harmonic	R	FLOAT32		A		A, P, S
31379	1378	C Phase Current Fundamental	R	FLOAT32		A		A, P, S
31381	1380	C Phase Current 2 Harmonic	R	FLOAT32		A		A, P, S
31383	1382	C Phase Current 3 Harmonic	R	FLOAT32		A		A, P, S
31385	1384	C Phase Current 4 Harmonic	R	FLOAT32		A		A, P, S
31387	1386	C Phase Current 5 Harmonic	R	FLOAT32		A		A, P, S
31389	1388	C Phase Current 6 Harmonic	R	FLOAT32		A		A, P, S
31391	1390	C Phase Current 7 Harmonic	R	FLOAT32		A		A, P, S
31393	1392	C Phase Current 8 Harmonic	R	FLOAT32		A		A, P, S
31395	1394	C Phase Current 9 Harmonic	R	FLOAT32		A		A, P, S
31397	1396	C Phase Current 10 Harmonic	R	FLOAT32		A		A, P, S
31399	1398	C Phase Current 11 Harmonic	R	FLOAT32		A		A, P, S
31401	1400	C Phase Current 12 Harmonic	R	FLOAT32		A		A, P, S
31403	1402	C Phase Current 13 Harmonic	R	FLOAT32		A		A, P, S
31405	1404	C Phase Current 14 Harmonic	R	FLOAT32		A		A, P, S
31407	1406	C Phase Current 15 Harmonic	R	FLOAT32		A		A, P, S
31409	1408	C Phase Current 16 Harmonic	R	FLOAT32		A		A, P, S
31411	1410	C Phase Current 17 Harmonic	R	FLOAT32		A		A, P, S
31413	1412	C Phase Current 18 Harmonic	R	FLOAT32		A		A, P, S
31415	1414	C Phase Current 19 Harmonic	R	FLOAT32		A		A, P, S
31417	1416	C Phase Current 20 Harmonic	R	FLOAT32		A		A, P, S
31419	1418	C Phase Current 21 Harmonic	R	FLOAT32		A		A, P, S
31421	1420	C Phase Current 22 Harmonic	R	FLOAT32		A		A, P, S
31423	1422	C Phase Current 23 Harmonic	R	FLOAT32		A		A, P, S
31425	1424	C Phase Current 24 Harmonic	R	FLOAT32		A		A, P, S
31427	1426	C Phase Current 25 Harmonic	R	FLOAT32		A		A, P, S
31429	1428	C Phase Current 26 Harmonic	R	FLOAT32		A		A, P, S
31431	1430	C Phase Current 27 Harmonic	R	FLOAT32		A		A, P, S

31433	1432	C Phase Current 28 Harmonic	R	FLOAT32		A		A, P, S
31435	1434	C Phase Current 29 Harmonic	R	FLOAT32		A		A, P, S
31437	1436	C Phase Current 30 Harmonic	R	FLOAT32		A		A, P, S
31439	1438	C Phase Current 31 Harmonic	R	FLOAT32		A		A, P, S
31441	1440	C Phase Current 32 Harmonic	R	FLOAT32		A		A, P, S
31443	1442	C Phase Current 33 Harmonic	R	FLOAT32		A		A, P, S
31445	1444	C Phase Current 34 Harmonic	R	FLOAT32		A		A, P, S
31447	1446	C Phase Current 35 Harmonic	R	FLOAT32		A		A, P, S
31449	1448	C Phase Current 36 Harmonic	R	FLOAT32		A		A, P, S
31451	1450	C Phase Current 37 Harmonic	R	FLOAT32		A		A, P, S
31453	1452	C Phase Current 38 Harmonic	R	FLOAT32		A		A, P, S
31455	1454	C Phase Current 39 Harmonic	R	FLOAT32		A		A, P, S
31457	1456	C Phase Current 40 Harmonic	R	FLOAT32		A		A, P, S
31459	1458	C Phase Current 41 Harmonic	R	FLOAT32		A		A, P, S
31461	1460	C Phase Current 42 Harmonic	R	FLOAT32		A		A, P, S
31463	1462	C Phase Current 43 Harmonic	R	FLOAT32		A		A, P, S
31465	1464	C Phase Current 44 Harmonic	R	FLOAT32		A		A, P, S
31467	1466	C Phase Current 45 Harmonic	R	FLOAT32		A		A, P, S
31469	1468	C Phase Current 46 Harmonic	R	FLOAT32		A		A, P, S
31471	1470	C Phase Current 47 Harmonic	R	FLOAT32		A		A, P, S
31473	1472	C Phase Current 48 Harmonic	R	FLOAT32		A		A, P, S
31475	1474	C Phase Current 49 Harmonic	R	FLOAT32		A		A, P, S
31477	1476	C Phase Current 50 Harmonic	R	FLOAT32		A		A, P, S
31479	1478	C Phase Current 51 Harmonic	R	FLOAT32		A		A, P, S
31481	1480	C Phase Current 52 Harmonic	R	FLOAT32		A		A, P, S
31483	1482	C Phase Current 53 Harmonic	R	FLOAT32		A		A, P, S
31485	1484	C Phase Current 54 Harmonic	R	FLOAT32		A		A, P, S
31487	1486	C Phase Current 55 Harmonic	R	FLOAT32		A		A, P, S
31489	1488	C Phase Current 56 Harmonic	R	FLOAT32		A		A, P, S
31491	1490	C Phase Current 57 Harmonic	R	FLOAT32		A		A, P, S
31493	1492	C Phase Current 58 Harmonic	R	FLOAT32		A		A, P, S
31495	1494	C Phase Current 59 Harmonic	R	FLOAT32		A		A, P, S
31497	1496	C Phase Current 60 Harmonic	R	FLOAT32		A		A, P, S
31499	1498	C Phase Current 61 Harmonic	R	FLOAT32		A		A, P, S
31501	1500	C Phase Current 62 Harmonic	R	FLOAT32		A		A, P, S
31503	1502	C Phase Current 63 Harmonic	R	FLOAT32		A		A, P, S
31505	1504	N Phase Current Fundamental	R	FLOAT32		A		A, P, S
31507	1506	N Phase Current 2 Harmonic	R	FLOAT32		A		A, P, S
31509	1508	N Phase Current 3 Harmonic	R	FLOAT32		A		A, P, S
31511	1510	N Phase Current 4 Harmonic	R	FLOAT32		A		A, P, S
31513	1512	N Phase Current 5 Harmonic	R	FLOAT32		A		A, P, S

31515	1514	N Phase Current 6 Harmonic	R	FLOAT32		A		A, P, S
31517	1516	N Phase Current 7 Harmonic	R	FLOAT32		A		A, P, S
31519	1518	N Phase Current 8 Harmonic	R	FLOAT32		A		A, P, S
31521	1520	N Phase Current 9 Harmonic	R	FLOAT32		A		A, P, S
31523	1522	N Phase Current 10 Harmonic	R	FLOAT32		A		A, P, S
31525	1524	N Phase Current 11 Harmonic	R	FLOAT32		A		A, P, S
31527	1526	N Phase Current 12 Harmonic	R	FLOAT32		A		A, P, S
31529	1528	N Phase Current 13 Harmonic	R	FLOAT32		A		A, P, S
31531	1530	N Phase Current 14 Harmonic	R	FLOAT32		A		A, P, S
31533	1532	N Phase Current 15 Harmonic	R	FLOAT32		A		A, P, S
31535	1534	N Phase Current 16 Harmonic	R	FLOAT32		A		A, P, S
31537	1536	N Phase Current 17 Harmonic	R	FLOAT32		A		A, P, S
31539	1538	N Phase Current 18 Harmonic	R	FLOAT32		A		A, P, S
31541	1540	N Phase Current 19 Harmonic	R	FLOAT32		A		A, P, S
31543	1542	N Phase Current 20 Harmonic	R	FLOAT32		A		A, P, S
31545	1544	N Phase Current 21 Harmonic	R	FLOAT32		A		A, P, S
31547	1546	N Phase Current 22 Harmonic	R	FLOAT32		A		A, P, S
31549	1548	N Phase Current 23 Harmonic	R	FLOAT32		A		A, P, S
31551	1550	N Phase Current 24 Harmonic	R	FLOAT32		A		A, P, S
31553	1552	N Phase Current 25 Harmonic	R	FLOAT32		A		A, P, S
31555	1554	N Phase Current 26 Harmonic	R	FLOAT32		A		A, P, S
31557	1556	N Phase Current 27 Harmonic	R	FLOAT32		A		A, P, S
31559	1558	N Phase Current 28 Harmonic	R	FLOAT32		A		A, P, S
31561	1560	N Phase Current 29 Harmonic	R	FLOAT32		A		A, P, S
31563	1562	N Phase Current 30 Harmonic	R	FLOAT32		A		A, P, S
31565	1564	N Phase Current 31 Harmonic	R	FLOAT32		A		A, P, S
31567	1566	N Phase Current 32 Harmonic	R	FLOAT32		A		A, P, S
31569	1568	N Phase Current 33 Harmonic	R	FLOAT32		A		A, P, S
31571	1570	N Phase Current 34 Harmonic	R	FLOAT32		A		A, P, S
31573	1572	N Phase Current 35 Harmonic	R	FLOAT32		A		A, P, S
31575	1574	N Phase Current 36 Harmonic	R	FLOAT32		A		A, P, S
31577	1576	N Phase Current 37 Harmonic	R	FLOAT32		A		A, P, S
31579	1578	N Phase Current 38 Harmonic	R	FLOAT32		A		A, P, S
31581	1580	N Phase Current 39 Harmonic	R	FLOAT32		A		A, P, S
31583	1582	N Phase Current 40 Harmonic	R	FLOAT32		A		A, P, S
31585	1584	N Phase Current 41 Harmonic	R	FLOAT32		A		A, P, S
31587	1586	N Phase Current 42 Harmonic	R	FLOAT32		A		A, P, S
31589	1588	N Phase Current 43 Harmonic	R	FLOAT32		A		A, P, S
31591	1590	N Phase Current 44 Harmonic	R	FLOAT32		A		A, P, S
31593	1592	N Phase Current 45 Harmonic	R	FLOAT32		A		A, P, S
31595	1594	N Phase Current 46 Harmonic	R	FLOAT32		A		A, P, S

31597	1596	N Phase Current 47 Harmonic	R	FLOAT32		A		A, P, S
31599	1598	N Phase Current 48 Harmonic	R	FLOAT32		A		A, P, S
31601	1600	N Phase Current 49 Harmonic	R	FLOAT32		A		A, P, S
31603	1602	N Phase Current 50 Harmonic	R	FLOAT32		A		A, P, S
31605	1604	N Phase Current 51 Harmonic	R	FLOAT32		A		A, P, S
31607	1606	N Phase Current 52 Harmonic	R	FLOAT32		A		A, P, S
31609	1608	N Phase Current 53 Harmonic	R	FLOAT32		A		A, P, S
31611	1610	N Phase Current 54 Harmonic	R	FLOAT32		A		A, P, S
31613	1612	N Phase Current 55 Harmonic	R	FLOAT32		A		A, P, S
31615	1614	N Phase Current 56 Harmonic	R	FLOAT32		A		A, P, S
31617	1616	N Phase Current 57 Harmonic	R	FLOAT32		A		A, P, S
31619	1618	N Phase Current 58 Harmonic	R	FLOAT32		A		A, P, S
31621	1620	N Phase Current 59 Harmonic	R	FLOAT32		A		A, P, S
31623	1622	N Phase Current 60 Harmonic	R	FLOAT32		A		A, P, S
31625	1624	N Phase Current 61 Harmonic	R	FLOAT32		A		A, P, S
31627	1626	N Phase Current 62 Harmonic	R	FLOAT32		A		A, P, S
31629	1628	N Phase Current 63 Harmonic	R	FLOAT32		A		A, P, S
31631	1630	External CT Current Fundamental	R	FLOAT32		A		A, P, S
31633	1632	External CT Current 2 Harmonic	R	FLOAT32		A		A, P, S
31635	1634	External CT Current 3 Harmonic	R	FLOAT32		A		A, P, S
31637	1636	External CT Current 4 Harmonic	R	FLOAT32		A		A, P, S
31639	1638	External CT Current 5 Harmonic	R	FLOAT32		A		A, P, S
31641	1640	External CT Current 6 Harmonic	R	FLOAT32		A		A, P, S
31643	1642	External CT Current 7 Harmonic	R	FLOAT32		A		A, P, S
31645	1644	External CT Current 8 Harmonic	R	FLOAT32		A		A, P, S
31647	1646	External CT Current 9 Harmonic	R	FLOAT32		A		A, P, S
31649	1648	External CT Current 10 Harmonic	R	FLOAT32		A		A, P, S
31651	1650	External CT Current 11 Harmonic	R	FLOAT32		A		A, P, S
31653	1652	External CT Current 12 Harmonic	R	FLOAT32		A		A, P, S
31655	1654	External CT Current 13 Harmonic	R	FLOAT32		A		A, P, S
31657	1656	External CT Current 14 Harmonic	R	FLOAT32		A		A, P, S
31659	1658	External CT Current 15 Harmonic	R	FLOAT32		A		A, P, S
31661	1660	External CT Current 16 Harmonic	R	FLOAT32		A		A, P, S
31663	1662	External CT Current 17 Harmonic	R	FLOAT32		A		A, P, S
31665	1664	External CT Current 18 Harmonic	R	FLOAT32		A		A, P, S
31667	1666	External CT Current 19 Harmonic	R	FLOAT32		A		A, P, S
31669	1668	External CT Current 20 Harmonic	R	FLOAT32		A		A, P, S
31671	1670	External CT Current 21 Harmonic	R	FLOAT32		A		A, P, S
31673	1672	External CT Current 22 Harmonic	R	FLOAT32		A		A, P, S
31675	1674	External CT Current 23 Harmonic	R	FLOAT32		A		A, P, S
31677	1676	External CT Current 24 Harmonic	R	FLOAT32		A		A, P, S

31679	1678	External CT Current 25 Harmonic	R	FLOAT32		A		A, P, S
31681	1680	External CT Current 26 Harmonic	R	FLOAT32		A		A, P, S
31683	1682	External CT Current 27 Harmonic	R	FLOAT32		A		A, P, S
31685	1684	External CT Current 28 Harmonic	R	FLOAT32		A		A, P, S
31687	1686	External CT Current 29 Harmonic	R	FLOAT32		A		A, P, S
31689	1688	External CT Current 30 Harmonic	R	FLOAT32		A		A, P, S
31691	1690	External CT Current 31 Harmonic	R	FLOAT32		A		A, P, S
31693	1692	External CT Current 32 Harmonic	R	FLOAT32		A		A, P, S
31695	1694	External CT Current 33 Harmonic	R	FLOAT32		A		A, P, S
31697	1696	External CT Current 34 Harmonic	R	FLOAT32		A		A, P, S
31699	1698	External CT Current 35 Harmonic	R	FLOAT32		A		A, P, S
31701	1700	External CT Current 36 Harmonic	R	FLOAT32		A		A, P, S
31703	1702	External CT Current 37 Harmonic	R	FLOAT32		A		A, P, S
31705	1704	External CT Current 38 Harmonic	R	FLOAT32		A		A, P, S
31707	1706	External CT Current 39 Harmonic	R	FLOAT32		A		A, P, S
31709	1708	External CT Current 40 Harmonic	R	FLOAT32		A		A, P, S
31711	1710	External CT Current 41 Harmonic	R	FLOAT32		A		A, P, S
31713	1712	External CT Current 42 Harmonic	R	FLOAT32		A		A, P, S
31715	1714	External CT Current 43 Harmonic	R	FLOAT32		A		A, P, S
31717	1716	External CT Current 44 Harmonic	R	FLOAT32		A		A, P, S
31719	1718	External CT Current 45 Harmonic	R	FLOAT32		A		A, P, S
31721	1720	External CT Current 46 Harmonic	R	FLOAT32		A		A, P, S
31723	1722	External CT Current 47 Harmonic	R	FLOAT32		A		A, P, S
31725	1724	External CT Current 48 Harmonic	R	FLOAT32		A		A, P, S
31727	1726	External CT Current 49 Harmonic	R	FLOAT32		A		A, P, S
31729	1728	External CT Current 50 Harmonic	R	FLOAT32		A		A, P, S
31731	1730	External CT Current 51 Harmonic	R	FLOAT32		A		A, P, S
31733	1732	External CT Current 52 Harmonic	R	FLOAT32		A		A, P, S
31735	1734	External CT Current 53 Harmonic	R	FLOAT32		A		A, P, S
31737	1736	External CT Current 54 Harmonic	R	FLOAT32		A		A, P, S
31739	1738	External CT Current 55 Harmonic	R	FLOAT32		A		A, P, S
31741	1740	External CT Current 56 Harmonic	R	FLOAT32		A		A, P, S
31743	1742	External CT Current 57 Harmonic	R	FLOAT32		A		A, P, S
31745	1744	External CT Current 58 Harmonic	R	FLOAT32		A		A, P, S
31747	1746	External CT Current 59 Harmonic	R	FLOAT32		A		A, P, S
31749	1748	External CT Current 60 Harmonic	R	FLOAT32		A		A, P, S
31751	1750	External CT Current 61 Harmonic	R	FLOAT32		A		A, P, S
31753	1752	External CT Current 62 Harmonic	R	FLOAT32		A		A, P, S
31755	1754	External CT Current 63 Harmonic	R	FLOAT32		A		A, P, S
31757	1756	Internal Temperature	R	FLOAT32		℃		A, P, S

3.6.2.3 SMART TRIP UNIT Operation Information Data

This area shows the SMART TRIP UNIT measured data (Current, Voltage, Power Factor, Harmonics, etc.)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
31759	1758	Operating time	R	UINT32	0~4,294,967,295(2^{32}-1	Hour		A, P, S
31761	1760	Circuit break on time	R	UINT32	0~4,294,967,295(2^{32}-1	Hour		
31763	1762	Circuit break electrical off count	R	UINT32	0~4,294,967,295(2^{32}-1			
31765	1764	Circuit break mechanical off count	R	UINT32	0~4,294,967,295(2^{32}-1			
31767	1766	Trip count	R	UINT32	0~4,294,967,295(2^{32}-1			
31769	1768	Circuit break Contact Wear	R	UINT16	0~100	%	0% if not used, approaches 100% if used	
31770	1769	Not used	R	UINT16	-	-		
31771	1770	MAX DEMAND Ia	R	FLOAT32		A		A, P, S
31773	1772	MAX DEMAND Ia Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31774	1773		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31775	1774		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31776	1775		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31777	1776	Not used	R	UINT16	-	-		
31778	1777	MAX DEMAND Ib	R	FLOAT32		A		A, P, S
31780	1779	MAX DEMAND Ib Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31781	1780		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31782	1781		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31783	1782		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31784	1783	Not used	R	UINT16	-	-		
31785	1784	MAX DEMAND Ic	R	FLOAT32		A		A, P, S
31787	1786	MAX DEMAND Ic Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31788	1787		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31789	1788		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31790	1789		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31791	1790	Not used	R	UINT16	-	-		
31792	1791	MAX DEMAND W	R	FLOAT32		W		P, S

31794	1793	MAX DEMAND W Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31795	1794		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31796	1795		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31797	1796		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31798	1797	Not used	R	UINT16	-	-		
31799	1798	MAX DEMAND Var	R	FLOAT32		Var		P, S
31801	1800	MAX DEMAND Var Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31802	1801		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31803	1802		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31804	1803		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31805	1804	Not used	R	UINT16	-	-		
31806	1805	MAX DEMAND VA	R	FLOAT32		A		P, S
31808	1807	MAX DEMAND VA Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31809	1808		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31810	1809		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31811	1810		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31812	1811	Not used	R	UINT16	-	-		
31813	1812	MAX W	R	FLOAT32		W		P, S
31815	1814	MAX W Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31816	1815		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31817	1816		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31818	1817		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31819	1818	Not used	R	UINT16	-	-		
31820	1819	MAX 3Vo	R	FLOAT32		V		P, S
31822	1821	MAX 3VoTime	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31823	1822		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31824	1823		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31825	1824		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31826	1825	Not used	R	UINT16	-	-		
31827	1826	MAX 3Io	R	FLOAT32		A		A, P, S
31829	1828	MAX 3IoTime	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31830	1829		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31831	1830		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31832	1831		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31833	1832	Not used	R	UINT16	-	-		
31834	1833	MAX External CT Current	R	FLOAT32		A		A, P, S
31836	1835	MAX External CT Current Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31837	1836		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31838	1837		R	UINT16	0~23		Bit[15-8]: Hour	

					0~59		Bit[7-0]: Minute	
31839	1838		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31840	1839	Not used	R	UINT16	-	-		
31841	1840	MAX IN	R	FLOAT32		A		A, P, S
31843	1842	MAX IN Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	
31844	1843		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	
31845	1844		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	
31846	1845		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	
31847	1846	Not used	R	UINT16	-	-		
31848	1847	MAX Internal Temperature	R	FLOAT32		℃		A, P, S
31850	1849	MAX Internal Temperature Time	R	UINT16	0~1 0~99	*F014	Bit[15-8]: time Invalid ; 0: normal, 1: invalid Bit[7-0]: Year	A, P, S
31851	1850		R	UINT16	1~12 1~31		Bit[15-8]: Month Bit[7-0]: Day	A, P, S
31852	1851		R	UINT16	0~23 0~59		Bit[15-8]: Hour Bit[7-0]: Minute	A, P, S
31853	1852		R	UINT16			Bit[15-8]: mSec High byte Bit[7-0]: mSec Low Byte	A, P, S
31854	1853	Not used	R	UINT16	-	-		A, P, S

*F014: time format

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Time Invaild	Year[0~99]	Month[1~12]	Day[1~31]	Hour[0~23]	Minute[0~59]	mSecond[0~59,999]	

3.6.3 Device setting (F/C: 0x03, 0x10)

Device setting Write command supports only 16 (0x10) Function command (Multiple) to check the integrity of the data being written.

3.6.3.1 Device description

This area is the area where the user writes and reads the panel and name where the device will be installed.

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40001~ 40016	0~15	Device Description Name	RW	STRING	-	-	Panel name, customer use, customer-specified name	A, P, S
40017	16	Not used	R	UINT16	-	-		

3.6.3.2 Factory Configuration Settings

The factory configuration setting part is for setting the mode for the SMART TRIP UNIT

operation.

The 0x10 F/C is not supported.

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40018	17	Device Type | NFC Support	R	UINT16	0~4 | 0~1	-	Bit[15-8]: Device Type ; 0: S Type, 1: P Type, 2: A Type, 3: N Type, 4: ECONOMIC N Type Bit[7-0]: NFC Support 0: Not Supported, 1: Supported	A, P, S | S
40019	18	Poles | Reserved	R	UINT16	0~4 | -	-	Bit[15-8]: Poles ; 0: Reserved, 1: Reserved, 2: Reserved, 3: 3P(default), 4: 4P Bit[7-0]: Reserved	A, P, S
40020	19	IEC/UL Select | Frame Size	R	UINT16	0~1 | 1~6	-	Bit[15-8]: IEC/UL Select ; 0: IEC, 1: UL (Default: 0) Bit[7-0]: Frame Size ; 1: C(Compact & TS1600 ; 630 ~ 1600AF), 2: D-02(200A_CT : 630 or 800AF), 3: D-04((400A_CT : 630 ~ 2000AF), 4: E(400A_CT : 630 ~ 4000AF), 5: F(400A_CT : 3200 ~ 5000AF), 6: G(400A_CT : 3200 ~ 6300AF)	A, P, S
40021	20	AF(Ampere Frame)	R	UINT16	200~6,300	-	200~6,300	A, P, S
40022	21	Rating Plug	R	UINT16	200~6,300	A	200~6,300	A, P, S
40023	22	Fine tuning In factor	R	UINT16	400~1,000	-	400~1,000	A
40024	23	Adjusted rated current In	R	UINT16	200~6,300	A	200~6,300	A, P, S
40025	24	Max CB Mechanical Off count	R	UINT16	2,000~45,000		2,000~45,000 (Default: 5,000)	A, P, S
40026	25	Max CB Electrical Off count	R	UINT16	200~2,000		200~20,000 (Default: 1,000)	A, P, S
40027	26	Max Contact Wear	R	UINT64	0~793,800,000,000			A, P, S
40031	30	Short circuit current 1(415V below)	R	UINT16	10~200	kA	10kA ~ 200kA	A, P, S
40032	31	Short circuit current 2(500V below)	R	UINT16	10~200	kA	10kA ~ 200kA	A, P, S
40033	32	Short circuit current 3(500V over)	R	UINT16	10~200	kA	10kA ~ 200kA	A, P, S
40034	33	Option 1 setting (SMPS/Comm Select)	R	UINT16	0~2		0: Self Power, 1: SMPS/DO, 2: SMPS/DO+Comm	A, P, S
40035	34	Option 2 setting (Knob Function Select)	R	UINT16	0~5		0: None, 1: G(Default), 2: PTA, 3: Gext, 4: G-NCT, 5: PTA-NCT	A, P, S
40036	35	Option 3 setting (Relay Function Select)	R	UINT16	1~4		1: Vessel, 2: Normal(Default), 3: Reserved, 4: Reserved	A, P, S
40037	36	Not used	R	UINT16	-	-		A, P, S

3.6.3.2 System Configuration Settings

The system configuration setting part is for setting the mode for the SMART TRIP UNIT operation. For writing, the register area 40038~40056 must be written at once using Multiple F/C 16 (0x10).

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40038	37	Network Set	EACH R/BLOCK W	UINT16	1~2	-	1: Y Wiring, 2: Delta Wiring	A, P, S
40039	38	Rated Voltage		UINT16	100~1,250	V	Line Voltage	P, S
40040	39	Current Direction		UINT16	1~2-	hour	1: Forward, 2: Reverse	A, P, S
40041	40	Address		UINT16	1~247	-	Dialing (Default: 1)	A, P, S
40042	41	Baud rate		UINT16	1~2	bps	1: 9,600, 2: 19,200, 3: 38,400, 4: 57,600 (Default: 3)	A, P, S
40043	42	DO1 Setting | DO2 Setting		UINT16	0~4 | 0~4	-	Bit[15-8]: DO 1 Setting ; 0: Not Use, 1: Relay, 2: CB Close, 3: CB Open, 4: ERMS (Default: 1) Bit[7-0]: DO 2 Setting ; 0: Not Use, 1: Relay, 2: CB Close, 3: CB Open, 4: ERMS (Default: 1)	A, P, S
40044	43	DO3 Setting | DI Select Mode Setting		UINT16	0~4 | 0~3	-	- Bit[15-8]: DO 3 Setting ; 0: Not Use, 1: Relay, 2: CB Close, 3: CB Open, 4: ERMS (Default: 1) Bit[7-0]: DI Select Mode Setting ;0: None(Default), 1: ERMS, 2: Group A/B, 3: Local/Remote (Default: 0)	A, P, S
40045	44	Demand Time		UINT16	1~6	Minute	1: 5, 2: 10, 3: 15, 4: 20, 5: 30, 6: 60 (Default: 3)	A, P, S
40046	45	Local / Remote Control		UINT16	1~2	-	1: Local, 2: Remote (Default: 2)	A, P, S
40047	46	Frequency		UINT16	50, 60	Hz	50 or 60	A, P, S
40048	47	Language		UINT16	1~3	-	1: English, 2: Chinese , 3: Russian (Default: 1)	P, S
40049	48	Over Temperature Trip		UINT16	0~1		0: No trip, 1: trip (Default: 0)	A, P, S
40050	49	Group Control		UINT16	0~1		0: A, 1: B (Default: 0)	S
40051	50	User Define Display 0		UINT16	0~8		0.None, 1.Load Current(Default), 2.Metering Overview, 3.Voltage & Current, 4.Power& Energy, 5.V/I Harmonic, 6.SYS Info, 7.Device Status, 8.Relay Status	P, S
40052	51	User Define Display 1		UINT16	0~8		0.None, 1.Load Current(Default), 2.Metering Overview, 3.Voltage & Current, 4.Power& Energy, 5.V/I Harmonic, 6.SYS Info, 7.Device Status, 8.Relay Status	P, S
40053	52	User Define Display 2		UINT16	0~8		0.None, 1.Load Current(Default), 2.Metering Overview, 3.Voltage & Current, 4.Power& Energy, 5.V/I Harmonic, 6.SYS Info, 7.Device Status, 8.Relay Status	P, S
40054	53	PF Display		UINT16	1~3		1: WEG, 2: IEC, 3: IEEE (Default: 2)	P, S
40055	54	Under PF Alarm Value		UINT16	0~90	%	Default: 0	P, S
40056	55	Over PF Alarm Value		UINT16	60~100	%	Default: 100	P, S
40057	56	Not used	R	UINT16	-	-		A, P, S

3.6.4 Relay setting (F/C: 0x03, 0x10)

Relay setting Write command supports only 16 (0x10) Function command (Multiple) to check the integrity of the data being written.

3.6.4.1 L(Overload)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40061	60	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 1) => N/A/P Type is not set(Knob First) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	A, P, S
40062	61	OP Mode | IDMTL Select		UINT16	0~2 | 0~6	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: 0: 49-Thermal, 1: DT, 2: SIT(I0.5t), 3: VIT(It), 4: EIT(It^2), 5: EIT50, 6:AV (Default: 0)	
40063	62	Hot/Cold Start Select | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 0: None, 1: Hot, 2: Cold (Default: 2) Bit[7-0]: Reserved	
40064	63	Pick-up(Ir)		UINT16	80~6,300	A	(0.4~1)*In(200~6,300) => N/A Type is not set(Knob First) => P type is fine-tunable	
40065	64	Time Delay		UINT16	50~2,400	0.01sec	50~2,400 @ 6Ir => N/A/P Type is not set(Knob First)	
40066	65	Not used	R	UINT16	-	-		

3.6.4.2 S(Time-delayed overcurrent) Stage1(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40067	66	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 1) => N/A/P Type is not set(Knob First) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	A, P, S
40068	67	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: Reserved	
40069	68	I^2T On/Off | ZSI Enable/Disable		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Off, 1: On (Default: 0) => N/A/P Type is not set(Knob First) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40070	69	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40071	70	Pick-up(Isd Statge1)		UINT16	120~63,000	A	(1.5~10)*Ir(80~6,300) => N/A Type is not set(Knob First) => P type is fine-tunable	
40072	71	Time Delay		UINT16	5~80	0.01sec	=> N/A/P Type is not set(Knob First)	
40073	72	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40074	73	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= (Pick-up [A]*1.2)/10	
40075	74	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40076	75	Not used	R	UINT16	-	-		

3.6.4.3 S(Time-delayed overcurrent) Stage2(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40077	76	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) => N/A/P Type is not set(Knob First) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	A, P, S
40078	77	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40079	78	Reserved | Reserved		UINT16	-	-	Bit[15-8]: Reserved Bit[7-0]: Reserved	
40080	79	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40081	80	Pick-up(Isd Statge2)		UINT16	120~63,000	A	(1.5~10)*Ir(80~6,300)	
40082	81	Time Delay		UINT16	5~80	0.01sec	=> N/A/P Type is not set(Knob First)	
40083	82	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40084	83	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= (Pick-up [A]*1.2)/10	
40085	84	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40086	85	Not used	R	UINT16	-	-		

3.6.4.4 I(Instantaneous overcurrent)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40087	86	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 1) => N/A/P Type is not set(Knob First) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	A, P, S
40088	87	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: Reserved	
40089	88	Start Up Enable/Disable | Reserved		UINT16	0~1 | -	-	Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40090	89	Pick-up(Ii)		UINT16	40~1,0080	10A	(2~16)*In(200~6,300)/10 => N/A/P Type is not set(Knob First)	
40091	90	Start Up Pick-up		UINT16	Min ~65,535	10A	Min : >= Pick-up [10A]*1.2	
40092	91	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40093	92	Not used	R	UINT16	-	-		

3.6.4.5 G(Earth fault)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40094	93	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) => N/A/P Type is not set(Knob First) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	A, P, S
40095	94	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40096	95	I^2T On/Off | ZSI Enable/Disable		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Off, 1: On (Default: 0) => N/A Type is not set(Knob First) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40097	96	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40098	97	Pick-up(Ig)		UINT16	equation	A	IEC: (0.2~1.0)*In(200~6,300), UL: (0.2~1.0)*In(200~6,300) <= 1,200	
40099	98	Time Delay		UINT16	5~80	0.01sec	=> N/A/P Type is not set(Knob First)	
40100	99	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40101	100	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= Pick-up [A]*1.2)/10	
40102	101	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40103	102	Not used	R	UINT16	-	-		

3.6.4.6 Gext(Earth fault on External CT)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40107	106	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) => N/A Type is not set(Knob First) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	A, P, S
40108	107	OP Mode | I^2T On/Off		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Off, 1: On (Default: 0)	
40109	108	Start Up Enable/Disable | ZSI Enable/Disable		UINT16	0~1 | 0~1		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40110	109	Pick-up(I△n)		UINT16	1~300	0.1A	=> N/A Type is not set(Knob First)	
40111	110	Time Delay		UINT16	10~100	0.01sec	=> N/A Type is not set(Knob First)	
40112	111	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40113	112	Start Up Pick-up		UINT16	Min~65,535	0.1A	Min >= Pick-up [0.1A]*1.2	
40114	113	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40115	114	Not used	R	UINT16	-	-		

3.6.4.7 LN(Neutral protection)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40116	115	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0) * The read value is the same as the value of L(Overload)(Group A) * The Write must be executed in L(Overload)(Group A)	A,P,S
40117	116	OP Mode | IDMTL Select		UINT16	0~2 | 0~6	-	Bit[15-8]: 1: No Trip, 2: Trip (Default 1) Bit[7-0]: 0: 49-Thermal, 1: DT, 2: SIT(I0.5t), 3: VIT(It), 4: EIT(It^2), 5: EIT50, 6:AV (Default 0) * The read value is the same as the value of L(Overload)(Group A) * The Write must be executed in L(Overload)(Group A)	
40118	117	Hot/Cold Start Select | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 0: None, 1: Hot, 2: Cold (Default 2) Bit[7-0]: Reserved * The read value is the same as the value of L(Overload)(Group A) * The Write must be executed in L(Overload)(Group A)	
40119	118	Percentage		UINT16	40~200	%		
40120	119	Time Delay		UINT16	50~2,400	0.01sec	50 ~ 2,400 @ 6Ir * The read value is the same as the value of L(Overload)(Group A) * The Write must be executed in L(Overload)(Group A)	
40121	120	Not used	R	UINT16	-	-		

3.6.4.8 PTA(Pre Trip Alarm)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40122	121	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) => N/A Type is not set(Knob First) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	A,P,S
40123	122	OP Mode | I^2T On/Off		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Off, 1: On (Default: 0)	
40124	123	Pick-up(Ip)		UINT16	48~6,300	0.1A	(0.6 ~1.0)*Ir(80~6,300) => N/A Type is not set(Knob First)	
40125	124	Time Delay		UINT16	100~4,500	[0.01sec]	100~4,500 at 1*Ip => N/A Type is not set(Knob First)	
40126	125	Not used	R	UINT16	-	-		

3.6.4.9 UV(Undervoltage) Stage1(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40127	126	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40128	127	OP Mode | Auto Fault Delay Time | Auto Fault Reset		UINT16	0~2 | 0~15 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-4]: 0~15 (Default: 0) => 0: Immediately Bit[3-0]: 0: Not Use, 1: Use (Default: 0)	
40129	128	No Message | Dead Voltage Block		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Not Use, 1: Use (Default: 0) Bit[7-0]: 0: Not Use, 1: Use (Default: 0)	
40130	129	Phase Mode | CB Off OP		UINT16	0~1 | 0~1		Bit[15-8]: 0: Single, 1: 3 Phase (Default: 1) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40131	130	Pick-up		UINT16	500~7,073 or 500~12,250	0.1V	1. Network Set. is 1(Y Wiring) in case : (5~9.8)*Vn(100~1,250)/sqrt(3) 2. Network Set. is 2(Delta Wiring) in case : (5~9.8)*Vn(100~1,250)	
40132	131	Time Delay		UINT16	10~1,2000	0.01sec		
40133	132	Not used	R	UINT16	-	-		

3.6.4.10 UV(Undervoltage) Stage2(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40134	133	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40135	134	OP Mode | Auto Fault Delay Time | Auto Fault Reset		UINT16	0~2 | 0~15 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-4]: 0~15 (Default: 0) => 0: Immediately Bit[3-0]: 0: Not Use, 1: Use (Default: 0)	
40136	135	No Message | Dead Voltage Block		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Not Use, 1: Use (Default: 0) Bit[7-0]: 0: Not Use, 1: Use (Default: 0)	
40137	136	Phase Mode | CB Off OP		UINT16	0~1 | 0~1		Bit[15-8]: 0: Single, 1: 3 Phase (Default: 1) Bit[7-0]: 0: Disable, 1: Enable(Default: 0)	
40138	137	Pick-up		UINT16	500~7,073 or 500~12,250	0.1V	1. Network Set. is 1(Y Wiring) in case : (5~9.8)*Vn(100~1,250)/sqrt(3) 2. Network Set. is 2(Delta Wiring) in case : (5~9.8)*Vn(100~1,250)	
40139	138	Time Delay		UINT16	10~1,2000	0.01sec		
40140	139	Not used	R	UINT16	-	-		

3.6.4.11 OV(Overvoltage) Stage1(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40141	140	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40142	141	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40143	142	Pick-up		UINT16	589~9,382 or 1,020~16,250	0.1V	1. Network Set.is 1(Y Wiring) in case : (10.2~15.0)*Vn(100~1,250)/sqrt(3) 2. Network Set. is 2(Delta Wiring) in case : (10.2~15.0)*Vn(100~1,250)	
40144	143	Time Delay		UINT16	10~1,2000	0.01sec		
40145	144	Not used	R	UINT16	-	-		

3.6.4.12 OV(Overvoltage) Stage2(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40146	145	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40147	146	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40148	147	Pick-up		UINT16	589~9,382 or 1,020~16,250	0.1V	1. Network Set.is 1(Y Wiring) in case : (10.2~15.0)*Vn(100~1,250)/sqrt(3) 2. Network Set. is 2(Delta 결선) in case : (10.2~15.0)*Vn(100~1,250)	
40149	148	Time Delay		UINT16	10~1,2000	0.01sec		
40150	149	Not used	R	UINT16	-	-		

3.6.4.13 RV(Residual overvoltage)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40151	150	Use/Not Use | DO Select	EAC	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S

40152	151	OP Mode | Reserved	H R / B L O C K W	UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40153	152	Pick-up		UINT16	200~3,608 or 200~6,250	0.1V	1. Network Set.is 1(Y Wiring) in case : 200V ~ 5*Vn(100~1,250)/Sqrt(3) 2. Network Set. is 2(Delta Wiring) in case : 200V ~ 5*Vn(100~1,250)	
40154	153	Time Delay		UINT16	10~1,2000	0.01sec		
40155	154	Not used	R	UINT16	-	-		

3.6.4.14 D(Directional overcurrent)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40156	155	Use/Not Use | DO Select	E A C H R / B L O C K W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40157	156	OP Mode | ZSI Enable/Disable		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40158	157	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40159	158	Pick-up		UINT16	120~63,000	A	(0.6~10.0)*In(200~6,300)	
40160	159	Time Delay		UINT16	20~80	0.01sec		
40161	160	Characteristic Angle		UINT16	0~359	°	Default: 45°	
40162	161	ZSI Time Delay		UINT16	13~50	0.01sec		
40163	162	Start Up Pick-up		UINT16	Min~65,535	10A	Min : >= Pick-up [A]*1.2/10	
40164	163	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40165	164	Not used	R	UINT16	-	-		

3.6.4.15 SV(Voltage controlled overcurrent protection) Stage1(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40166	165	Use/Not Use | DO Select	E A C H R / B L O	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40167	166	OP Mode | Mode Select		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Step mode, 1: Linear Mode (Default: 1)	
40168	167	Pick-up [VL]		UINT16	500~12,500	0.1V	(2~10)*Vn(100~1,250)	
40169	168	Pick-up [VH]		UINT16	500~12,500	0.1V	(2~10)*Vn(100~1,250) => VH must be greater than VL	

40170	169	Pick-up	CKW	UINT16	120~63,000	A	(0.6~10.0)*In(200~6,300)	
40171	170	Time Delay		UINT16	5~3,000	0.01sec		
40172	171	ks(decay rate)		UINT16	1~10	0.1ks		
40173	172	Not used	R	UINT16	-	-		

3.6.4.16 SV(Voltage controlled overcurrent protection) Stage2(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40174	173	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40175	174	OP Mode | Mode Select		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Step mode, 1: Linear Mode (Default: 1)	
40176	175	Pick-up [VL]		UINT16	500~12,500	0.1V	(2~10)*Vn(100~1,250)	
40177	176	Pick-up [VH]		UINT16	500~12500	0.1V	(2~10)*Vn(100~1,250) => VH must be greater than VL	
40178	177	Pick-up		UINT16	120~63000	A	(0.6~10.0)*In(200~6,300)	
40179	178	Time Delay		UINT16	5~3,000	0.01sec		
40180	179	ks(decay rate)		UINT16	1~10	0.1ks		
40181	180	Not used	R	UINT16	-	-		

3.6.4.17 IU(Current unbalance)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40182	181	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40183	182	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40184	183	Pick-up		UINT16	5~90	%	5~90	
40185	184	Time Delay		UINT16	50~6,000	0.01sec		
40186	185	Not used	R	UINT16	-	-		

3.6.4.18 VU(Voltage unbalance)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40187	186	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P,S
40188	187	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40189	188	Pick-up		UINT16	5~90	%	5~90	
40190	189	Time Delay		UINT16	50~6,000	0.01sec		
40191	190	Not used	R	UINT16	-	-		

3.6.4.19 UF(Underfrequency) Stage1(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40192	191	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P,S
40193	192	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40194	193	Under Voltage Block		UINT16	50	V		
40195	194	Pick-up		UINT16	12 ~ 150	Hz		
40196	195	Time Delay		UINT16	20~12,000	0.01sec		
40197	196	Not used	R	UINT16	-	-		

3.6.4.20 UF(Underfrequency) Stage2(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART

40198	197	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40199	198	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40200	199	Under Voltage Block		UINT16	50	V		
40201	200	Pick-up		UINT16	12 ~ 150	Hz		
40202	201	Time Delay		UINT16	20~12,000	0.01sec		
40203	202	Not used	R	UINT16	-	-		

3.6.4.21 OF(Over frequency) Stage1(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40204	203	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40205	204	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40206	205	Under Voltage Block		UINT16	50	V		
40207	206	Pick-up		UINT16	20 ~ 200	Hz		
40208	207	Time Delay		UINT16	20~1,200	0.01sec		
40209	208	Not used	R	UINT16	-	-		

3.6.4.22 OF(Over frequency) Stage2(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40210	209	Use/Not Use | DO Select	EACH R/B	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40211	210	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40212	211	Under Voltage Block		UINT16	50	V		
40213	212	Pick-up		UINT16	20~200	Hz		

40214	213	Time Delay	LOCK W	UINT16	20~12,000	0.01sec		
40215	214	Not used	R	UINT16	-	-		

3.6.4.23 ROCOF(Rate of Change of Frequency)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40216	215	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40217	216	OP Mode | ROCOF Frequency		UINT16	0~2 | 15~120	- Hz	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Default: 60	
40218	217	Under Voltage Block		UINT16	95	V		
40219	218	Pick-up		UINT16	40~1,000	0.01Hz		
40220	219	Time Delay		UINT16	50~1,000	0.01sec		
40221	220	Not used	R	UINT16	-	-		

3.6.4.24 RP(Reverse Active Power)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40222	221	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40223	222	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40224	223	Pick-up		UINT16	equation	-W	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40226	225	Time Delay		UINT16	50~10,000	0.01sec		
40227	226	Not used	R	UINT16	-	-		

3.6.4.25 RQ(Loss of field or reverse reactive power) Stage1(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40228	227	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40229	228	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40230	229	Pick-up		UINT16	equation	-Var	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40232	231	Time Delay		UINT16	50~10,000	0.01sec		
40233	232	Not used	R	UINT16	-	-		

3.6.4.26 RQ(Loss of field or reverse reactive power) Stage2(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40234	233	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40235	234	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default 1) Bit[7-0]: Reserved	
40236	235	Pick-up		UINT16	equation	-Var	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40238	237	Time Delay		UINT16	50~10,000	0.01sec		
40239	238	Not used	R	UINT16	-	-		

3.6.4.27 OP(Active Overpower)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40240	239	Use/Not Use | DO Select	EAC	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S

40241	240	OP Mode | Reserved	HR/BLOCK W	UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40242	241	Pick-up		UINT16	equation	-Var	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40244	243	Time Delay		UINT16	50~10,000	0.01sec		
40245	244	Not used	R	UINT16	-	-		

3.6.4.28 OQ(Reactive Overpower)(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40246	245	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40247	246	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40248	247	Pick-up		UINT16	equation	Var	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40250	249	Time Delay		UINT16	50~10,000	0.01sec		
40251	250	Not used	R	UINT16	-	-		

3.6.4.29 UP(Active Underpower(Group A)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40252	251	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40253	252	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40254	253	Reserved		UINT16			Reserved	

40255	254	Pick-up		UINT16	equation	W	(Vn*In*0.1)/sqrt(3) ~ Vn*In*0.9*sqrt(3)	
40257	256	Time Delay		UINT16	50~10,000	0.01sec		
40258	257	Not used	R	UINT16	-	-		

3.6.4.31 L(Overload)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40061	60	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 1) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40062	61	OP Mode | IDMTL Select		UINT16	0~2 | 0~6	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: 0: 49-Thermal, 1: DT, 2: SIT(I0.5t), 3: VIT(It), 4: EIT(It^2), 5: EIT50, 6:AV (Default: 0)	
40063	62	Hot/Cold Start Select | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 0: None, 1: Hot, 2: Cold (Default: 2) Bit[7-0]: Reserved	
40064	63	Pick-up(Ir)		UINT16	80~6,300	A	(0.4~1)*In(200~6,300)	
40065	64	Time Delay		UINT16	50~2,400	0.01sec	50~2,400 @ 6Ir	
40066	65	Not used	R	UINT16	-	-		

3.6.4.32 S(Time-delayed overcurrent) Stage1(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40067	66	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 1) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40068	67	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: Reserved	
40069	68	I^2T On/Off | ZSI Enable/Disable		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Off, 1: On (Default: 0) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40070	69	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40071	70	Pick-up(Isd Statge1)		UINT16	120~63,000	A	(1.5~10)*Ir(80~6,300)	
40072	71	Time Delay		UINT16	5~80	0.01sec		
40073	72	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40074	73	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= (Pick-up [A]*1.2)/10	
40075	74	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40076	75	Not used	R	UINT16	-	-		

3.6.4.33 S(Time-delayed overcurrent) Stage2(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40077	76	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40078	77	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40079	78	Reserved | Reserved		UINT16	-	-	Bit[15-8]: Reserved Bit[7-0]: Reserved	
40080	79	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40081	80	Pick-up(Isd Statge2)		UINT16	120~63,000	A	(1.5~10)*Ir(80~6,300)	
40082	81	Time Delay		UINT16	5~80	0.01sec		
40083	82	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40084	83	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= (Pick-up [A]*1.2)/10	
40085	84	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40086	85	Not used	R	UINT16	-	-		

3.6.4.34 I(Instantaneous overcurrent)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40087	86	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 1) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40088	87	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: Reserved	
40089	88	Start Up Enable/Disable | Reserved		UINT16	0~1 | -	-	Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40090	89	Pick-up(Ii)		UINT16	40~1,0080	10A	(2~16)*In(200~6,300)/10	
40091	90	Start Up Pick-up		UINT16	Min ~65,535	10A	Min : >= Pick-up [10A]*1.2	
40092	91	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40093	92	Not used	R	UINT16	-	-		

3.6.4.35 G(Earth fault)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40094	93	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40095	94	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40096	95	I^2T On/Off | ZSI Enable/Disable		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Off, 1: On (Default: 0) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40097	96	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40098	97	Pick-up(Ig)		UINT16	equation	A	IEC: (0.2~1.0)*In(200~6,300), UL: (0.2~1.0)*In(200~6,300) <= 1,200	
40099	98	Time Delay		UINT16	5~80	0.01sec		
40100	99	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40101	100	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= Pick-up [A]*1.2)/10	
40102	101	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40103	102	Not used	R	UINT16	-	-		

3.6.4.36 Gext(Earth fault on External CT)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40107	106	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40108	107	OP Mode | I^2T On/Off		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Off, 1: On (Default: 0)	
40109	108	Start Up Enable/Disable | ZSI Enable/Disable		UINT16	0~1 | 0~1		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40110	109	Pick-up(I△n)		UINT16	1~300	0.1A		
40111	110	Time Delay		UINT16	10~100	0.01sec		
40112	111	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40113	112	Start Up Pick-up		UINT16	Min~65,535	0.1A	Min >= Pick-up [0.1A]*1.2	
40114	113	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40115	114	Not used	R	UINT16	-	-		

3.6.4.37 LN(Neutral protection)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40116	115	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0) * The read value is the same as the value of L(Overload)(Group B) * The Write must be executed in L(Overload)(Group B)	S
40117	116	OP Mode | IDMTL Select		UINT16	0~2 | 0~6	-	Bit[15-8]: 1: No Trip, 2: Trip (Default 1) Bit[7-0]: 0: 49-Thermal, 1: DT, 2: SIT(I0.5t), 3: VIT(It), 4: EIT(It^2), 5: EIT50, 6:AV (Default 0) * The read value is the same as the value of L(Overload)(Group B) * The Write must be executed in L(Overload)(Group B)	
40118	117	Hot/Cold Start Select | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 0: None, 1: Hot, 2: Cold (Default 2) Bit[7-0]: Reserved * The read value is the same as the value of L(Overload)(Group B) * The Write must be executed in L(Overload)(Group B)	
40119	118	Percentage		UINT16	40~200	%		
40120	119	Time Delay		UINT16	50~2,400	0.01sec	50 ~ 2,400 @ 6Ir * The read value is the same as the value of L(Overload)(Group B) * The Write must be executed in L(Overload)(Group B)	
40121	120	Not used	R	UINT16	-	-		

3.6.4.38 PTA(Pre Trip Alarm)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40122	121	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40123	122	OP Mode | I^2T On/Off		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Off, 1: On (Default: 0)	
40124	123	Pick-up(Ip)		UINT16	48~6,300	0.1A	(0.6 ~1.0)*Ir(80~6,300)	
40125	124	Time Delay		UINT16	100~4,500	[0.01sec]	100~4,500 at 1*Ip	
40126	125	Not used	R	UINT16	-	-		

3.6.4.39 UV(Undervoltage) Stage1(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40127	126	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40128	127	OP Mode | Auto Fault Delay Time | Auto Fault Reset		UINT16	0~2 | 0~15 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-4]: 0~15 (Default: 0) => 0: Immediately Bit[3-0]: 0: Not Use, 1: Use (Default: 0)	
40129	128	No Message | Dead Voltage Block		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Not Use, 1: Use (Default: 0) Bit[7-0]: 0: Not Use, 1: Use (Default: 0)	
40130	129	Phase Mode | CB Off OP		UINT16	0~1 | 0~1		Bit[15-8]: 0: Single, 1: 3 Phase (Default: 1) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40131	130	Pick-up		UINT16	500~7,073 or 500~12,250	0.1V	1. Network Set. is 1(Y Wiring) in case : (5~9.8)*Vn(100~1,250)/sqrt(3) 2. Network Set. is 2(Delta Wiring) in case : (5~9.8)*Vn(100~1,250)	
40132	131	Time Delay		UINT16	10~1,2000	0.01sec		
40133	132	Not used	R	UINT16	-	-		

3.6.4.40 UV(Undervoltage) Stage2(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40134	133	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40135	134	OP Mode | Auto Fault Delay Time | Auto Fault Reset		UINT16	0~2 | 0~15 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-4]: 0~15 (Default: 0) => 0: Immediately Bit[3-0]: 0: Not Use, 1: Use (Default: 0)	
40136	135	No Message | Dead Voltage Block		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Not Use, 1: Use (Default: 0) Bit[7-0]: 0: Not Use, 1: Use (Default: 0)	
40137	136	Phase Mode | CB Off OP		UINT16	0~1 | 0~1		Bit[15-8]: 0: Single, 1: 3 Phase (Default: 1) Bit[7-0]: 0: Disable, 1: Enable(Default: 0)	
40138	137	Pick-up		UINT16	500~7,073 or 500~12,250	0.1V	1. Network Set. is 1(Y Wiring) in case : (5~9.8)*Vn(100~1,250)/sqrt(3) 2. Network Set. is 2(Delta Wiring) in case : (5~9.8)*Vn(100~1,250)	
40139	138	Time Delay		UINT16	10~1,2000	0.01sec		
40140	139	Not used	R	UINT16	-	-		

3.6.4.41 OV(Overvoltage) Stage1(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40141	140	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40142	141	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40143	142	Pick-up		UINT16	589~9,382 or 1,020~16,250	0.1V	1. Network Set.is 1(Y Wiring) in case : (10.2~15.0)*Vn(100~1,250)/sqrt(3) 2. Network Set. is 2(Delta Wiring) in case : (10.2~15.0)*Vn(100~1,250)	
40144	143	Time Delay		UINT16	10~1,2000	0.01sec		
40145	144	Not used	R	UINT16	-	-		

3.6.4.42 OV(Overvoltage) Stage2(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40146	145	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40147	146	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40148	147	Pick-up		UINT16	589~9,382 or 1,020~16,250	0.1V	1. Network Set.is 1(Y Wiring) in case : (10.2~15.0)*Vn(100~1,250)/sqrt(3) 2. Network Set. is 2(Delta 결선) in case : (10.2~15.0)*Vn(100~1,250)	
40149	148	Time Delay		UINT16	10~1,2000	0.01sec		
40150	149	Not used	R	UINT16	-	-		

3.6.4.43 RV(Residual overvoltage)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40151	150	Use/Not Use | DO Select	EAC	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S

40152	151	OP Mode | Reserved	H R / B L O C K W	UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40153	152	Pick-up		UINT16	200~3,608 or 200~6,250	0.1V	1. Network Set.is 1(Y Wiring) in case : 200V ~ 5*Vn(100~1,250)/Sqrt(3) 2. Network Set. is 2(Delta Wiring) in case : 200V ~ 5*Vn(100~1,250)	
40154	153	Time Delay		UINT16	10~1,2000	0.01sec		
40155	154	Not used	R	UINT16	-	-		

3.6.4.44 D(Directional overcurrent)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40156	155	Use/Not Use | DO Select	E A C H R / B L O C K W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40157	156	OP Mode | ZSI Enable/Disable		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40158	157	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40159	158	Pick-up		UINT16	120~63,000	A	(0.6~10.0)*In(200~6,300)	
40160	159	Time Delay		UINT16	20~80	0.01sec		
40161	160	Characteristic Angle		UINT16	0~359	°	Default: 45°	
40162	161	ZSI Time Delay		UINT16	13~50	0.01sec		
40163	162	Start Up Pick-up		UINT16	Min~65,535	10A	Min : >= Pick-up [A]*1.2/10	
40164	163	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40165	164	Not used	R	UINT16	-	-		

3.6.4.45 SV(Voltage controlled overcurrent protection) Stage1(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40166	165	Use/Not Use | DO Select	E A C H R / B L O	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40167	166	OP Mode | Mode Select		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Step mode, 1: Linear Mode (Default: 1)	
40168	167	Pick-up [VL]		UINT16	500~12,500	0.1V	(2~10)*Vn(100~1,250)	
40169	168	Pick-up [VH]		UINT16	500~12,500	0.1V	(2~10)*Vn(100~1,250) => VH must be greater than VL	

40170	169	Pick-up	CKW	UINT16	120~63,000	A	(0.6~10.0)*In(200~6,300)	
40171	170	Time Delay		UINT16	5~3,000	0.01sec		
40172	171	ks(decay rate)		UINT16	1~10	0.1ks		
40173	172	Not used	R	UINT16	-	-		

3.6.4.46 SV(Voltage controlled overcurrent protection) Stage2(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40174	173	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40175	174	OP Mode | Mode Select		UINT16	0~2 | 0~1	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Step mode, 1: Linear Mode (Default: 1)	
40176	175	Pick-up [VL]		UINT16	500~12,500	0.1V	(2~10)*Vn(100~1,250)	
40177	176	Pick-up [VH]		UINT16	500~12500	0.1V	(2~10)*Vn(100~1,250) => VH must be greater than VL	
40178	177	Pick-up		UINT16	120~63000	A	(0.6~10.0)*In(200~6,300)	
40179	178	Time Delay		UINT16	5~3,000	0.01sec		
40180	179	ks(decay rate)		UINT16	1~10	0.1ks		
40181	180	Not used	R	UINT16	-	-		

3.6.4.47 IU(Current unbalance)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40182	181	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40183	182	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40184	183	Pick-up		UINT16	5~90	%	5~90	
40185	184	Time Delay		UINT16	50~6,000	0.01sec		
40186	185	Not used	R	UINT16	-	-		

3.6.4.48 VU(Voltage unbalance)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40187	186	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40188	187	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40189	188	Pick-up		UINT16	5~90	%	5~90	
40190	189	Time Delay		UINT16	50~6,000	0.01sec		
40191	190	Not used	R	UINT16	-	-		

3.6.4.49 UF(Underfrequency) Stage1(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40192	191	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40193	192	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40194	193	Under Voltage Block		UINT16	50	V		
40195	194	Pick-up		UINT16	12 ~ 150	Hz		
40196	195	Time Delay		UINT16	20~12,000	0.01sec		
40197	196	Not used	R	UINT16	-	-		

3.6.4.50 UF(Underfrequency) Stage2(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART

40198	197	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40199	198	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40200	199	Under Voltage Block		UINT16	50	V		
40201	200	Pick-up		UINT16	12 ~ 150	Hz		
40202	201	Time Delay		UINT16	20~12,000	0.01sec		
40203	202	Not used	R	UINT16	-	-		

3.6.4.51 OF(Over frequency) Stage1(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40204	203	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40205	204	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40206	205	Under Voltage Block		UINT16	50	V		
40207	206	Pick-up		UINT16	20 ~ 200	Hz		
40208	207	Time Delay		UINT16	20~1,200	0.01sec		
40209	208	Not used	R	UINT16	-	-		

3.6.4.52 OF(Over frequency) Stage2(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40210	209	Use/Not Use | DO Select	EACH R/B	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40211	210	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: 0: Reserved	
40212	211	Under Voltage Block		UINT16	50	V		
40213	212	Pick-up		UINT16	20~200	Hz		

40214	213	Time Delay	LOCK W	UINT16	20~12,000	0.01sec		
40215	214	Not used	R	UINT16	-	-		

3.6.4.53 ROCOF(Rate of Change of Frequency)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40216	215	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40217	216	OP Mode | ROCOF Frequency		UINT16	0~2 | 15~120	- Hz	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Default: 60	
40218	217	Under Voltage Block		UINT16	95	V		
40219	218	Pick-up		UINT16	40~1,000	0.01Hz		
40220	219	Time Delay		UINT16	50~1,000	0.01sec		
40221	220	Not used	R	UINT16	-	-		

3.6.4.54 RP(Reverse Active Power)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40222	221	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40223	222	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40224	223	Pick-up		UINT16	equation	-W	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40226	225	Time Delay		UINT16	50~10,000	0.01sec		
40227	226	Not used	R	UINT16	-	-		

3.6.4.55 RQ(Loss of field or reverse reactive power) Stage1(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40228	227	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40229	228	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40230	229	Pick-up		UINT16	equation	-Var	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40232	231	Time Delay		UINT16	50~10,000	0.01sec		
40233	232	Not used	R	UINT16	-	-		

3.6.4.56 RQ(Loss of field or reverse reactive power) Stage2(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40234	233	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40235	234	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default 1) Bit[7-0]: Reserved	
40236	235	Pick-up		UINT16	equation	-Var	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40238	237	Time Delay		UINT16	50~10,000	0.01sec		
40239	238	Not used	R	UINT16	-	-		

3.6.4.57 OP(Active Overpower)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40240	239	Use/Not Use | DO Select	EAC	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S

40241	240	OP Mode | Reserved	HR/BLOCKW	UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40242	241	Pick-up		UINT16	equation	-Var	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40244	243	Time Delay		UINT16	50~10,000	0.01sec		
40245	244	Not used	R	UINT16	-	-		

3.6.4.58 OQ(Reactive Overpower)(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40246	245	Use/Not Use | DO Select	EACHR/BLOCKW	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40247	246	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40248	247	Pick-up		UINT16	equation	Var	(Vn*In*0.1)/sqrt(3) ~ Vn*In*1.2*sqrt(3)	
40250	249	Time Delay		UINT16	50~10,000	0.01sec		
40251	250	Not used	R	UINT16	-	-		

3.6.4.59 UP(Active Underpower(Group B)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40252	251	Use/Not Use | DO Select	EACHR/BLOCKW	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	S
40253	252	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40254	253	Reserved		UINT16			Reserved	

40255	254	Pick-up		UINT16	equation	W	(Vn*In*0.1)/sqrt(3) ~ Vn*In*0.9*sqrt(3)	
40257	256	Time Delay		UINT16	50~10,000	0.01sec		
40258	257	Not used	R	UINT16	-	-		

3.6.5 ERMS Relay setting (F/C: 0x03, 0x10)

ERMS Relay setting Write command supports only 16 (0x10) Function command (Multiple) to check the integrity of the data being written.

3.6.5.1 L(Overload)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40061	60	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40062	61	OP Mode | IDMTL Select		UINT16	0~2 | 0~6	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: 0: 49-Thermal, 1: DT, 2: SIT(I0.5t), 3: VIT(It), 4: EIT(It^2), 5: EIT50, 6:AV (Default: 0)	
40063	62	Hot/Cold Start Select | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 0: None, 1: Hot, 2: Cold (Default: 2) Bit[7-0]: Reserved	
40064	63	Pick-up(Ir)		UINT16	80~6,300	A	(0.4 ~ 1)*In(200~6,300)	
40065	64	Time Delay		UINT16	50~2,400	0.01sec	50 ~ 2,400 @ 6Ir	
40066	65	Not used	R	UINT16	-	-		

3.6.5.2 S(Time-delayed overcurrent) Stage1

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40067	66	Use/Not Use | DO Select	EACH R/BLOC	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 1) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40068	67	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: Reserved	
40069	68	I^2T On/Off | ZSI Enable/Disable		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Off, 1: On (Default: 0) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40070	69	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40071	70	Pick-up(Isd Statge1)		UINT16	120~63,000	A	(1.5~10)*Ir(80~6,300)	

40072	71	Time Delay	K W	UINT16	5~40	0.01sec		
40073	72	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40074	73	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= (Pick-up [A]*1.2)/10	
40075	74	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40076	75	Not used	R	UINT16	-	-		

3.6.5.3 S(Time-delayed overcurrent) Stage2

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40077	76	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40078	77	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40079	78	Reserved | Reserved		UINT16	-	-	Bit[15-8]: Reserved Bit[7-0]: Reserved	
40080	79	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40081	80	Pick-up(Isd Statge2)		UINT16	120~63,000	A	(1.5~10)*Ir(80~6,300)	
40082	81	Time Delay		UINT16	5~40	0.01sec		
40083	82	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40084	83	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= (Pick-up [A]*1.2)/10	
40085	84	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40086	85	Not used	R	UINT16	-	-		

3.6.5.4 I(Instantaneous overcurrent)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40087	86	Use/Not Use | DO Select	EACH R/BLOC	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 1) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40088	87	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 2) Bit[7-0]: Reserved	
40089	88	Start Up Enable/Disable | Reserved		UINT16	0~1 | -	-	Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40090	89	Pick-up(Ii)		UINT16	40~1,0080	10A	(2~16)*In(200~6,300)/10	
40091	90	Start Up Pick-up		UINT16	Min ~65,535	10A	Min : >= Pick-up [10A]*1.2	

40092	91	Start Up Time Delay	K W	UINT16	10~3,000	0.01sec		
40093	92	Not used	R	UINT16	-	-		

3.6.5.5 G(Earth fault)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40094	93	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0)	P, S
40095	94	OP Mode | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 1: No Trip, 2: Trip (Default: 1) Bit[7-0]: Reserved	
40096	95	I^2T On/Off | ZSI Enable/Disable		UINT16	0~1 | 0~1	-	Bit[15-8]: 0: Off, 1: On (Default: 0) Bit[7-0]: 0: Disable, 1: Enable (Default: 0)	
40097	96	Start Up Enable/Disable | Reserved		UINT16	0~1 | -		Bit[15-8]: 0: Disable, 1: Enable (Default: 0) Bit[7-0]: Reserved	
40098	97	Pick-up(Ig)		UINT16	equation	A	IEC: (0.2~1.0)*In(200~6,300), UL: (0.2~1.0)*In(200~6,300) <= 1,200	
40099	98	Time Delay		UINT16	5~40	0.01sec		
40100	99	ZSI Time Delay		UINT16	4~20	0.01sec	Default: 20	
40101	100	Start Up Pick-up		UINT16	Min~65,535	10A	Min >= Pick-up [A]*1.2)/10	
40102	101	Start Up Time Delay		UINT16	10~3,000	0.01sec		
40103	102	Not used	R	UINT16	-	-		

3.6.5.6 LN(Neutral protection)

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40116	115	Use/Not Use | DO Select	EACH R/BLOCK W	UINT16	1,5 | 0~3	-	Bit[15-8]: 1: Use, 5: Not Use (Default: 5) Bit[7-0]: 0: None, 1: DO1, 2: DO2, 3: DO3 (Default: 0) * The read value is the same as the value of ERMS L(Overload) * The Write must be executed in ERMS L(Overload)	P, S
40117	116	OP Mode | IDMTL Select		UINT16	0~2 | 0~6	-	Bit[15-8]: 1: No Trip, 2: Trip (Default 1) Bit[7-0]: 0: 49-Thermal, 1: DT, 2: SIT(I0.5t), 3: VIT(It), 4: EIT(It^2), 5: EIT50, 6:AV (Default 0) * The read value is the same as the value of ERMS L(Overload) * The Write must be executed in ERMS L(Overload)	
40118	117	Hot/Cold Start Select | Reserved		UINT16	0~2 | -	-	Bit[15-8]: 0: None, 1: Hot, 2: Cold (Default 2)	

							Bit[7-0]: Reserved * The read value is the same as the value of ERMS L(Overload) * The Write must be executed in ERMS L(Overload)	
40119	118	Percentage		UINT16	40~200	%		
40120	119	Time Delay		UINT16	50~2,400	0.01sec	50 ~ 2,400 @ 6Ir * The read value is the same as the value of ERMS L(Overload) * The Write must be executed in ERMS L(Overload)	
40121	120	Not used	R	UINT16	-	-		

3.6.6 Max Event Buffer Size (F/C: 0x03)

This area shows max event buffer size.

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40461	460	Trip Wave Max Count	R	UINT16	6	byte		A, P, S
40462	461	Trip Wave Comtrade Length	R	UINT16	188	byte		
40463	462	Trip Wave Save Cycle	R	UINT16	8	byte		
40464	463	Real Wave Save Cycle	R	UINT16	1	byte		
40465	464	Trip Wave 1Cycle Sampling Number	R	UINT16	32	byte		
40466	465	Real Wave 1Cycle Sampling Number	R	UINT16	32	byte		
40467	466	System Event Max Count	R	UINT16	255	byte		
40468	467	Fault Event Max Count	R	UINT16	127	byte		
40469	468	System Event Single Record Byte Length	R	UINT16	16	byte		
40470	469	Fault Event Single Record Byte Length	R	UINT16	50	byte		
40471	470	Trip Wave Single Record Byte Length	R	UINT16	20	byte		
40472	471	Real Wave Single Record Byte Length	R	UINT16	20	byte		
40473	472	Not used						

3.6.7 Relay Use Status (F/C: 0x03)

This area shows relay use information status

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
40590	589	Relay Group A Status	R	UINT16	0~1	Bit	Bit[15]: L(Overload) ; 0: not use 1: use	P, S

							Bit[14]: S(Time-delayed overcurrent) Stage1 ; 0: not use 1: use Bit[13]: S(Time-delayed overcurrent) Stage2 ; 0: not use 1: use Bit[12]: I(Instantaneous overcurrent) ; 0: not use 1: use Bit[11]: G(Earth fault) ; 0: not use 1: use Bit[10]: Reserved ; 0: not use 1: use Bit[9]: Gext(Earth fault on External CT) ; 0: not use 1: use Bit[8]: LN(Neutral protection) ; 0: not use 1: use Bit[7]: PTA(Pre Trip Alarm) ; 0: not use 1: use Bit[6]: UV(Undervoltage) Stage1 ; 0: not use 1: use Bit[5]: UV(Undervoltage) Stage2 ; 0: not use 1: use Bit[4]: OV(Overvoltage) Stage1 ; 0: not use 1: use Bit[3]: OV(Overvoltage) Stage2 ; 0: not use 1: use Bit[2]: RV(Residual overvoltage) ; 0: not use 1: use Bit[1]: D(Directional overcurrent) ; 0: not use 1: use Bit[0]: SV(Voltage controlled overcurrent protection) Stage1 ; 0: not use 1: use	
40591	590		R	UINT16	0~1	Bit	Bit[15]: SV(Voltage controlled overcurrent protection) Stage2 ; 0: not use 1: use Bit[14]: IU(Current unbalance) ; 0: not use 1: use Bit[13]: VU(Voltage unbalance) ; 0: not use 1: use Bit[12]: UF(Underfrequency) Stage1 ; 0: not use 1: use Bit[11]: UF(Underfrequency) Stage2 ; 0: not use 1: use Bit[10]: OF(Overfrequency) Stage1 ; 0: not use 1: use Bit[9]: OF(Overfrequency) Stage2 ; 0: not use 1: use Bit[8]: ROCOF(Rate of Change of Frequency) ; 0: not use 1: use Bit[7]: RP(Reverse Active Power) ; 0: not use 1: use Bit[6]: RQ(Loss of field or reverse reactive power) Stage1; 0: not use 1: use Bit[5]: RQ(Loss of field or reverse reactive power) Stage2 ; 0: not use 1: use Bit[4]: OP(Active Overpower) ; 0: not use 1: use Bit[3]: OQ(Reactive Overpower) ; 0: not use 1: use Bit[2]: UP(Active Underpower) ; 0: not use 1: use Bit[1]: xx ; 0: not use 1: use Bit[0]: xx ; 0: not use 1: use	

40592	591		R	UINT16			Reserved	
40593	592	Relay Group B Status	R	UINT16	0~1	Bit	Bit[15]: L(Overload) ; 0: not use 1: use Bit[14]: S(Time-delayed overcurrent) Stage1 ; 0: not use 1: use Bit[13]: S(Time-delayed overcurrent) Stage2 ; 0: not use 1: use Bit[12]: I(Instantaneous overcurrent) ; 0: not use 1: use Bit[11]: G(Earth fault) ; 0: not use 1: use Bit[10]: Reserved ; 0: not use 1: use Bit[9]: Gext(Earth fault on External CT) ; 0: not use 1: use Bit[8]: LN(Neutral protection) ; 0: not use 1: use Bit[7]: PTA(Pre Trip Alarm) ; 0: not use 1: use Bit[6]: UV(Undervoltage) Stage1 ; 0: not use 1: use Bit[5]: UV(Undervoltage) Stage2 ; 0: not use 1: use Bit[4]: OV(Overvoltage) Stage1 ; 0: not use 1: use Bit[3]: OV(Overvoltage) Stage2 ; 0: not use 1: use Bit[2]: RV(Residual overvoltage) ; 0: not use 1: use Bit[1]: D(Directional overcurrent) ; 0: not use 1: use Bit[0]: SV(Voltage controlled overcurrent protection) Stage1 ; 0: not use 1: use	
40594	593		R	UINT16	0~1	Bit	Bit[15]: SV(Voltage controlled overcurrent protection) Stage2 ; 0: not use 1: use Bit[14]: IU(Current unbalance) ; 0: not use 1: use Bit[13]: VU(Voltage unbalance) ; 0: not use 1: use Bit[12]: UF(Underfrequency) Stage1 ; 0: not use 1: use Bit[11]: UF(Underfrequency) Stage2 ; 0: not use 1: use Bit[10]: OF(Overfrequency) Stage1 ; 0: not use 1: use Bit[9]: OF(Overfrequency) Stage2 ; 0: not use 1: use Bit[8]: ROCOF(Rate of Change of Frequency) ; 0: not use 1: use Bit[7]: RP(Reverse Active Power) ; 0: not use 1: use Bit[6]: RQ(Loss of field or reverse reactive power) Stage1; 0: not use 1: use Bit[5]: RQ(Loss of field or reverse reactive power) Stage2 ; 0: not use 1: use Bit[4]: OP(Active Overpower) ; 0: not use 1: use Bit[3]: OQ(Reactive Overpower) ; 0: not use 1: use Bit[2]: UP(Active Underpower) ; 0: not use 1: use Bit[1]: Reserved	

							Bit[0]: Reserved	
40595	594		R	UINT16			Reserved	
40596	595	ERMS Relay Status	R	UINT16	0~1	Bit	Bit[15]: L(Overload) ; 0: not use 1: use Bit[14]: S(Time-delayed overcurrent) Stage1 ; 0: not use 1: use Bit[13]: S(Time-delayed overcurrent) Stage2 ; 0: not use 1: use Bit[12]: I(Instantaneous overcurrent) ; 0: not use 1: use Bit[11]: G(Earth fault) ; 0: not use 1: use Bit[10]: Reserved Bit[9]: Reserved Bit[8]: LN(Neutral protection) ; 0: not use 1: use Bit[7]: Reserved Bit[6]: Reserved Bit[5]: Reserved Bit[4]: Reserved Bit[3]: Reserved Bit[2]: Reserved Bit[1]: Reserved Bit[0]: Reserved	
40597	596	Reserved	R	UINT16			Reserved	

3.6.8 Time Synchronous Command (F/C: 0x03, 0x10)

Time can be read and written using the memory map.

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
46001	6000	TIME Sync(Old Type)	R	UINT16	6	byte	*F012	A, P, S
46011	6010	TIME Sync(New Type)	R	UINT16	188	byte	*F013(1st, 2nd)	
46013	6012	TIME Sync(New Type)	R	UINT16	8	byte	*F013(3rd, 4th)	

*F012: time format

[Y][M][D][H][M][S] is BCD, [mS] is unsigned integer, and writes 7 words to Register at once

1st word	2nd word	3rd word	4th word	5th word	6th word	7th word
BCD	BCD	BCD	BCD	BCD	BCD	unsigned integer
Year	Month	Day	Hour	Minute	Second	Milisecond[0~999]

Example) When setting February 20, 2004 12:26:26 503[ms], the frame is as follows.

Packet: 01 10 17 70 00 07 0E 20 04 00 02 00 20 00 12 00 26 00 26 01 F7 49 05

Address : 6000(Hex : 1770)

※ Can be set as Broad Casting (address: 0)

* F013: time format

Set [Y][M][D][H][M][S][mS] to 4word (F002 format) BCD and unsigned integer type

1st	2nd	3rd	4th
BCD	BCD	BCD	unsigned integer
Year	Month/Day	Hour/Minute	milisecond[0~59,999]

Example) When setting February 20, 2010 12:26:35 503[ms], the frame is as follows.

Packet: 01 10 17 7A 00 04 08 20 10 02 20 12 26 8A AF 8A 99

Address : 6010(Hex : 177A), 6012(Hex : 177C)

Note 1) It is possible to set in units of 4 words, or in units of 2 words, 1-2 words or 3-4 words.

Note 2) In case of 2-word unit setting, 3-4 word setting must be done within 5 seconds after setting 1-2 word.

Note 3) In case of 2-word unit setting, 1-2 words should be set first, followed by 3-4 words.

※ Can be set as Broad Casting (address: 0)

3.6.8 latitude/longitude information (F/C: 0x03, 0x10)

Latitude/longitude can be read and written using the memory map.

Reg.	Addr	Name	RW	Type	Range	Unit	Description	SMART TRIP UNIT Type
47001	7000	Use/Not Use | RESERVED	EACH R/BLOCK W	UINT16	6			A,P,S
47002	7001	latitude		DOUBLE	188	°		
47006	7005	longitude				°		
47010	7009	Not used	R	byte	8			

3.7 Time read/write (F/C: 0x2B)

3.7.1 Time Read: F/C 43(0x2B), Sub F/C 15(0x0F)

(1) Request

Field Name	(Hex)	Explanation
Slave Address	XX	Address(dialing)
Function	2B	Function Code
Sub-function	0F	Sub-function Code
Reserved	-	
CRC Hi	-	
CRC Lo	-	

(2) Response

Field Name	(Hex)	Explanation
Slave Address	XX	Address(dialing)
Function	2B	Function Code
Sub-function	0F	Sub-function Code
Reserved	-	
Reserved	-	
Year	0 ~ 99	Year
Month	1 ~12	Month
Day	1 ~31	Day
Hour	0 ~ 23	Hour
Minute	0 ~ 59	Minute
M Second	0 ~ 60,000	Second(ms) High Byte
M Second	0 ~ 60,000	Second(ms) Low Byte
CRC Hi	-	
CRC Lo	-	

3.7.2 Time Write: F/C 43(0x2B), Sub F/C 16(0x10)

(1) Request

Field Name	(Hex)	Explanation
Slave Address	XX	Address(dialing)
Function	2B	Function Code
Sub-function	10	Sub-function Code

Reserved	-	
Reserved	-	
Year	0 ~ 99	Year
Month	1 ~12	Month
Day	1 ~31	Day
Hour	0 ~ 23	Hour
Minute	0 ~ 59	Minute
M Second	0 ~ 60,000	Second(ms) High Byte
M Second	0 ~ 60,000	Second(ms) Low Byte
CRC Hi	-	
CRC Lo	-	

(2) Response

Field Name	(Hex)	Explanation
Slave Address	XX	Address(dialing)
Function	2B	Function Code
Sub-function	0F	Sub-function Code
Reserved	-	
Reserved	-	
Year	0 ~ 99	Year
Month	1 ~12	Month
Day	1 ~31	Day
Hour	0 ~ 23	Hour
Minute	0 ~ 59	Minute
M Second	0 ~ 60,000	Second(ms) High Byte
M Second	0 ~ 60,000	Second(ms) Low Byte
CRC Hi	-	
CRC Lo	-	

3.8 Read file record F/C: (0x64)

Using Function Code (0x64), you can directly request the record of the file without going through the memory map.

Service	File Number	Record			
		Number	Length	Max Size	One Record
System Event	100(0x64)	1~255	1~15	15	16byte
Fault Event	101(0x65)	1~127	1~4	4	50byte
Trip Wave Comtrade	1~6(0x0~06)	1	1	1	188byte
Trip Wave Data	1~6(0x0~06)	256	1~12	12	20byte
Real Wave	250(OxFA)	32	1~12	12	20byte

3.8.1 System Event: File Number 100(0x64)

The system event can directly request the record of the file without going through the memory map by using the function code (0x64) (Ref. Type: 0x06).

Service	File Number	Record			
		Number	Length	Max Size	One Record
System Event	100(0x64)	1~255	1~15	15	16byte

(1) Request

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Byte Count	XX	Sub-Req. number of bytes
Sub-Req. 1. Ref. Type	06	Ref. Type
Sub-Req. 1. File Number Hi	00	File Number : System Event(0x64)
Sub-Req. 1. File Number Lo	64	
Sub-Req. 1. Starting Record Number Hi	-	
Sub-Req. 1. Starting Record Number Lo	-	
Sub-Req. 1. Record Length Hi	-	up to 15
Sub-Req. 1. Record Length Lo	-	
CRC Hi	-	
CRC Lo	-	

(2) Response

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Resp. Data length	XX	Response data length
Sub-Req. 1. File resp. length	XX	
Sub-Req. 1. Ref. Type	06	Ref. Type
Sub-Req. 1. Record. Data #1	XX	16 bytes each
Sub-Req. 1. Record. Data #2	XX	
Sub-Req. 1. Record. Data #n	XX	
CRC Hi	-	
CRC Lo	-	

3.8.1.1 System Event Record Format

System Event consists of 8 words (16 bytes) in the form of event classification, count, occurrence time, and occurrence source.

Event classification consists of major/middle and small categories. Count indicates the Rollover Count and Index number indicating the event storage location, and the occurrence time consists of year/month/day/hour/minute/second. And it consists of the occurrence source that informs the source that caused the event when it occurs.

16bit	Explanation	Unit	Length

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
Event category				Event middle classification						Event sub-category						Classification	UINT16	1
Event Rollover Count								System Event Index								Count	UINT16	1
Time Invalid								Year(Hex)								time of occurrence	UINT16	1
Month(Hex)								Day(Hex)									UINT16	1
Month(Hex)								Minute(Hex)									UINT16	1
mSec_High byte(Hex)								mSec_Low byte (Hex)									UINT16	1
Event Source 0:None, 1.OCR, 2.HOST, 3:RELAY, 4:TESTER, 5: USB, 6:USER(A Type, P/S Type : HMI), 7:PC MANAGER								Group 0:A, 1:B		Reserved						Event Status 0: Off, 1: On	source of occurrence	UINT16	1
Reserved																-	UINT16	1

1) Event Classification

Event classification is as follows.

16bit																Event status	Upper system
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
Event category				Event middle classification						Event sub-category						-	
0: Nothing				0						0						-	
1: Reserved				0						0						-	
2: state change				0: Internal operation of the device						3: Time synchronization required						1: need	time setting
										8: Under PF						1: occur	
										9: Over PF						1: occur	
										10: Positive phase sequence / Negative phase sequence						0: positive, 1: negative	
										11: Current direction						0: forward, 1: reverse	
										12: Self protection						1: occur	
										13: Device restart						1: restart	
										14: Group setting status						0: group A, 1: group B	
										15: Local/Remote						0: Local -> Remote, 1: Remote -> Local	
										20: ERMS						0: Off, 1: On	
				1: Device DI status						6: Local/Remote DI						0: off(Local), 1: on(Remote)	
										10: Local reset status						1: occur	
										11: Remote reset status						1: occur	
										12: CB Status						0: off, 1: on	
										13: Group DI						0: group A, 1: group B	
										14: ERMS DI						0: off, 1: on	
										15: ZSI DI						0: off, 1: on	
				2: Device DO status						0: DO#1 status						0: off, 1: on	
										1: DO#2 status						0: off, 1: on	
										2: DO#3 status						0: off, 1: on	
										14: TRIP						0: off, 1: on	
										15: ZSI DO						0: off, 1: on	

	2: Self-diagnosis	External memory fault	1: fault	
		RTC abnormal alarm	0:normal, 1: fault	
		Measuring calibration	0:normal, 1: error	
		Mechanical opening/closing alarm	1: over setting value	
		Electrical open/close cycle alarm	1: over setting value	
		Contact life alarm	1: end of life	
		Overheating inside the machine	1: over setting value	
		Device type error	1: occur	
		Factory CFG error	1: occur	
		MTD status	0:normal, 1: fault	
		AF error	1: occur	
		Rating plug error	1: occur	
		Battery status	0:normal, 1:low bat	
		A phase CT broken	1: occur	
		B phase CT broken	1: occur	
		C phase CT broken	1: occur	
		N phase CT broken	1: occur	
		UL ROM error	1: occur	
		UL RAM error	1: occur	
		UL Clock error	1: occur	
		UL Watchdog error	1: occur	
		UL Program counter error	1: occur	
		UL CPU register error	1: occur	
3: Change settings	0: system settings	0: Device description name	1: Changed	
		1: Factory configuration	1: Changed	
		2: System configuration	1: Changed	
		3: Time setting	1: Changed	
		4: Device H/W Profile	1: Changed	
		5: Device S/W Profile	1: Changed	
		7: Device Life	1: Changed	
		8: DO Setting of HW2	1: Changed	
	5: Relay setting	0: L(Overload)	1: Changed	
		1: S(Time-delayed overcurrent) Stage1	1: Changed	
		2: S(Time-delayed overcurrent) Stage2	1: Changed	
		3: I(Instantaneous overcurrent)	1: Changed	
		4: G(Earth fault)	1: Changed	
		5: RESERVED(N phase protection MCCB Only)	1: Changed	
		6: Gext(Earth fault on External CT)	1: Changed	
		7: LN(Neutral protection)	1: Changed	
		8: PTA(Pre Trip Alarm)	1: Changed	
		9: UV(Undervoltage) Stage1	1: Changed	
		10: UV(Undervoltage) Stage2	1: Changed	
		11: OV(Overvoltage) Stage1	1: Changed	
		12: OV(Overvoltage) Stage2	1: Changed	
		13: RV(Residual overvoltage)	1: Changed	
		14:D(Directional overcurrent)	1: Changed	
		15: S(Voltage controlled	1: Changed	

		overcurrent protection) Stage1		
		16: S(Voltage controlled overcurrent protection) Stage2	1: Changed	
		17: IU(Current unbalance)	1: Changed	
		18: VU(Voltage unbalance)	1: Changed	
		19: UF(Under frequency) Stage1	1: Changed	
		20: UF(Under frequency) Stage2	1: Changed	
		21: OF(Over frequency) Stage1	1: Changed	
		22: OF(Over frequency) Stage2	1: Changed	
		23: ROCOF(Rate of Change of Frequency)	1: Changed	
		24:RP(Reverse Active Power)	1: Changed	
		25: RQ(Loss of field or reverse reactive power) Stage1	1: Changed	
		26: RQ(Loss of field or reverse reactive power) Stage2	1: Changed	
		27: OP(Active Overpower)	1: Changed	
		28: OQ(Reactive Overpower)	1: Changed	
		29: UP(Active Underpower)	1: Changed	
		51: ERMS L(Overload)	1: Changed	
		52: ERMS S_Stage1(Time-delayed overcurrent)	1: Changed	
		53: ERMS S Stage2(Time-delayed overcurrent)	1: Changed	
		54: ERMS I(Instantaneous overcurrent)	1: Changed	
		55: ERMS G(Earth fault)	1: Changed	
		56: ERMS LN(Neutral protection)	1: Changed	
6: System control	0: Data Clear	0: Fault reset	1: processed	
		1: System event buffer clear	1: processed	
		2: Fault event buffer clear	1: processed	
		3: Energy reset (Wh, Varh, rWh, rVarh)	1: processed	
		4: Max Demand reset	1: processed	
		5: Max Watt reset	1: processed	
		6: Max Internal Temperature reset	1: processed	
		7: Max Vo reset	1: processed	
		8: Max Io reset	1: processed	
		9: Max ext Io reset	1: processed	
		10: Max IN reset	1: processed	
		11. Operating time [Hour] reset	1: processed	
		12. CB On time [Hour] reset	1: processed	
	1: Device DO or CB Control	0: DO#1 control	0: off, 1: on	
		1: DO#2 control	0: off, 1: on	
		2: DO#3 control	0: off, 1: on	
		3: CB ON control	0: Off, 1: On	
		4: CB OFF control	1: processed	

2) Event Count

1) Rollover Count: 0= not overlap, 1~31: overlap

If overlap occurs, '1' second overlap '2'... Increase sequentially (0->1->2->..... ->31->1)

2) Index: 0~255(latest event location)

: 0 = no event, 1 = 1 event.... Increase sequentially (0->1->2->.....255->1->2)

16bit																UNIT	Length
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
Event Rollover Count					System Event Index											-	-
0= not overlap 1~31: overlap					0 = event none 1~255 = number of events											UINT16	1

3) Event time of occurrence

Event occurrence time consists of year/month/day/hour/minute/second, and is expressed as a hex value.

3) Year: 0 to 99, in the case of 2021, the 21 (0x15) expression of the year excluding the year 2000

4) Month : 1 ~ 12

5) Day: 1 ~ 31

6) Hour: 0 ~ 23

7) Minute: 0 ~ 59

8) mSec: It is expressed as 0 ~ 59,999, and the second is the value of mSec value divided by 1000.

D15~0																UNIT	Length
15			12	11	10	9	8	7	6	5	4	3	2	1	0		
Time Invalid								Year(Hex)								UINT16	1
Month(Hex)								Day(Hex)								UINT16	1
Hour(Hex)								Minute(Hex)								UINT16	1
mSec_High byte(Hex)								mSec_Low byte (Hex)								UINT16	1

3.8.2 Fault Event: File Number 101(0x65)

The fault event can directly request the record of the file without going through the memory map by using the function code (0x65) (Ref. Type: 0x06).

Service	File Number	Record			
		Number	Length	Max Size	One Record
Fault Event	101(0x65)	1~127	1~4	4	50byte

(1) Request

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code

Byte Count	XX	Sub-Req. number of bytes
Sub-Req. 1. Ref. Type	06	Ref. Type
Sub-Req. 1. File Number Hi	00	File Number : Fault Event(0x65)
Sub-Req. 1. File Number Lo	65	
Sub-Req. 1. Starting Record Number Hi	-	
Sub-Req. 1. Starting Record Number Lo	-	
Sub-Req. 1. Record Length Hi	-	up to 4
Sub-Req. 1. Record Length Lo	-	
CRC Hi	-	
CRC Lo	-	

(2) Response

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Resp. Data length	XX	Response data length
Sub-Req. 1. File resp. length	XX	
Sub-Req. 1. Ref. Type	06	Ref. Type
Sub-Req. 1. Record. Data #1	XX	50 bytes each
Sub-Req. 1. Record. Data #2	XX	
Sub-Req. 1. Record. Data #n	XX	
CRC Hi	-	
CRC Lo	-	

3.8.2.1 Fault Event Record Format

Fault Event consists of event classification, occurrence time, event status and event classification consists of major/middle and small categories.

16bit																Explanation	Unit	Length
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
Event category				Event middle classification						Event sub-category						Classification	UINT16	1
Alarm Rollover Count					Alarm Event Index											Count	UINT16	1
Time Invalid								Year(Hex)								Time of occurrence	UINT16	1
Month(Hex)								Day(Hex)									UINT16	1
Month(Hex)								Minute(Hex)									UINT16	1
mSec_High byte(Hex)								mSec_Low byte (Hex)									UINT16	1
Total	Unbalance	Inner	Gext	Fault occurrence phase 0:None , 1: A, 2: B, 3: AB, 4: C, 5:CA, 6:BC, 8: N				Group 0: A, 1: B	-	Occurrence source 0: Other 1: Tester	OP Value unit 1 : A, 2 : V, 3 : W, 4 : Var, 5 : %, 6 : Hz, 7 : Hz/sec					Information	UINT16	1
Alarm occurrence value																	FLOAT32	2
Fault value Ia																	FLOAT32	2
Fault value Ib																	FLOAT32	2
Fault value Ic																	FLOAT32	2
Fault value In																	FLOAT32	2

Fault value Iext		FLOAT32	2
Fault value Va		FLOAT32	2
Fault value Vb		FLOAT32	2
Fault value Vc		FLOAT32	2

1) Event Classification

Event classification is as follows.

16bit																Upper system
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Event category			Event middle classification							Event sub-category						
0: Nothing			0													
1: Fault			0: L(Overload)							0: None, 2: OP, 3: Drop out						
			1: S(Time-delayed overcurrent) Stage1							0: None, 2: OP, 3: Drop out						
			2: S(Time-delayed overcurrent) Stage2							0: None, 2: OP, 3: Drop out						
			3: I(Instantaneous overcurrent)							0: None, 2: OP, 3: Drop out						
			4: G(Earth fault)							0: None, 2: OP, 3: Drop out						
			5: RESERVED							0: None, 2: OP, 3: Drop out						
			6: Gext(Earth fault on External CT)							0: None, 2: OP, 3: Drop out						
			7: LN(Neutral protection)							0: None, 2: OP, 3: Drop out						
			8: PTA(Pre Trip Alarm)							0: None, 2: OP, 3: Drop out						
			9: UV(Undervoltage) Stage1							0: None, 2: OP, 3: Drop out						
			10: UV(Undervoltage) Stage2							0: None, 2: OP, 3: Drop out						
			11: OV(Overvoltage) Stage1							0: None, 2: OP, 3: Drop out						
			12: OV(Overvoltage) Stage2							0: None, 2: OP, 3: Drop out						
			13: RV(Residual overvoltage)							0: None, 2: OP, 3: Drop out						
			14:D(Directional overcurrent)							0: None, 2: OP, 3: Drop out						
			15: S(Voltage controlled overcurrent protection) Stage1							0: None, 2: OP, 3: Drop out						
			16: S(Voltage controlled overcurrent protection) Stage2							0: None, 2: OP, 3: Drop out						
			17: IU(Current unbalance)							0: None, 2: OP, 3: Drop out						
			18: VU(Voltage unbalance)							0: None, 2: OP, 3: Drop out						
			19: UF(Under frequency) Stage1							0: None, 2: OP, 3: Drop out						
			20: UF(Under frequency) Stage2							0: None, 2: OP, 3: Drop out						
			21: OF(Over frequency) Stage1							0: None, 2: OP, 3: Drop out						
			22: OF(Over frequency) Stage2							0: None, 2: OP, 3: Drop out						
			23: ROCOF(Rate of Change of Frequency)							0: None, 2: OP, 3: Drop out						
			24: RP(Reverse Active Power)							0: None, 2: OP, 3: Drop out						
			25: RQ(Loss of field or reverse reactive power) Stage1							0: None, 2: OP, 3: Drop out						
			26: RQ(Loss of field or reverse reactive power) Stage2							0: None, 2: OP, 3: Drop out						
			27: OP(Active Overpower)							0: None, 2: OP, 3: Drop out						
			28: OQ(Reactive Overpower)							0: None, 2: OP, 3: Drop out						
			29: UP(Active Underpower)							0: None, 2: OP, 3: Drop out						
			51: ERMS L(Overload)							0: None, 2: OP, 3: Drop out						
			52: ERMS S_Stage1(Time-delayed overcurrent)							0: None, 2: OP, 3: Drop out						
			53: ERMS S Stage2(Time-delayed overcurrent)							0: None, 2: OP, 3: Drop out						
			54: ERMS I(Instantaneous overcurrent)							0: None, 2: OP, 3: Drop out						
			55: ERMS G(Earth fault)							0: None, 2: OP, 3: Drop out						

	56: ERMS LN(Neutral protection)	0: None, 2: OP, 3: Drop out	

3.8.3 Trip Wave Comtrade: File Number 1~6(0x01~06)

The Trip Wave Comtrade can directly request the record of the file without going through the memory map by using the function code (0x01~06) (Ref. Type: 0x07).

Service	File Number	Record			
		Number	Length	Max Size	One Record
Trip Wave Comtrade	1~6(0x01~06)	1	1	1	188byte

(1) Request

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Byte Count	XX	Sub-Req. number of bytes
Sub-Req. 1. Ref. Type	07	Ref. Type
Sub-Req. 1. File Number Hi	00	File Number : 1~6
Sub-Req. 1. File Number Lo	01~06	
Sub-Req. 1. Starting Record Number Hi	-	1
Sub-Req. 1. Starting Record Number Lo	-	
Sub-Req. 1. Record Length Hi	-	1
Sub-Req. 1. Record Length Lo	-	
CRC Hi	-	
CRC Lo	-	

(2) Response

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Resp. Data length	XX	Response data length
Sub-Req. 1. File resp. length	XX	
Sub-Req. 1. Ref. Type	07	Ref. Type
Sub-Req. 1. Record. Data #1	XX	50 bytes each
Sub-Req. 1. Record. Data #2	XX	
Sub-Req. 1. Record. Data #n	XX	
CRC Hi	-	
CRC Lo	-	

3.8.2.1 Trip Wave Comtrade Record Format

16bit																Explanation	Unit	Length
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
Total number of channels(Analog channels + Digital								Analog number of channels :				Digital number				channel	UINT16	1

channels) (Default: 8)	8	of channels : 0	used		
Channel #1 Ia Information				F117-1	10
Channel #2 Ib Information				F117-1	10
Channel #3 Ic Information				F117-1	10
Channel #4 In Information				F117-1	10
Channel #5 Izct Information				F117-1	10
Channel #6 Va Information				F117-1	10
Channel #7 Vb Information				F117-1	10
Channel #8 Vc Information				F117-1	10
Frequency			Frequency	UINT16	1
Max Sample Size			Max Sampling Count: 256(8cycle x 32 Sample)	UINT16	1
Last Sample Number			유효 Sampling 개수	UINT16	1
Reserved	Reserved		Sampling Start Time(Not used)	UINT16	1
Reserved	Reserved			UINT16	1
Reserved	Reserved			UINT16	1
Reserved	Reserved			UINT16	1
Time Invalid	Year(Hex)		Triger Time : Relay Trip 시간	UINT16	1
Month(Hex)	Day(Hex)			UINT16	1
Month(Hex)	Minute(Hex)			UINT16	1
mSec_High byte(Hex)	mSec_Low byte (Hex)			UINT16	1
Data File Type 0: Binary, 1: ASCII (Default: 0)	Fault Event Position Index			UINT16	1
32			Sample Count 1Hz	UINT16	1

1) Channel #1~#8 details of Trip Wave Cnfg[F117-1]

In the upper level, the actual measured value (y) can be obtained by applying the equation y (measured value) = a (multiplier) x (Wave Data) + b (Offset). (y = ax + b)

16bit																Explanation	Unit	Length
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
Channel Name #1~8 : IA, IB, IC, IN, IZCT, VA, VB, VC																Channel name	UINT16	1
단위 #1~8: A, V																Display unit	UINT16	1
Channel #1~8 multiplier : a																correction value: multiplier	UINT16	1
Channel #1~8 Offset : b																correction value: Offset	UINT16	1
Channel #1~8 Transformer ratio factor : 1																	UINT16	1

3.8.4 Trip Wave: File Number 1~6(0x01~06)

The Trip Wave can directly request the record of the file without going through the memory map by using the function code (0x01~06) (Ref. Type: 0x06).

Service	File Number	Record			
		Number	Length	Max Size	One Record
Trip Wave	1~6(0x01~06)	1~256	1~12	12	20byte

(1) Request

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Byte Count	XX	Sub-Req. number of bytes
Sub-Req. 1. Ref. Type	06	Ref. Type
Sub-Req. 1. File Number Hi	00	File Number : 1~6
Sub-Req. 1. File Number Lo	01~06	
Sub-Req. 1. Starting Record Number Hi	-	
Sub-Req. 1. Starting Record Number Lo	-	
Sub-Req. 1. Record Length Hi	-	up to 12
Sub-Req. 1. Record Length Lo	-	
CRC Hi	-	
CRC Lo	-	

(2) Response

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Resp. Data length	XX	Response data length
Sub-Req. 1. File resp. length	XX	
Sub-Req. 1. Ref. Type	06	Ref. Type
Sub-Req. 1. Record. Data #1	XX	20 bytes each
Sub-Req. 1. Record. Data #2	XX	
Sub-Req. 1. Record. Data #n	XX	
CRC Hi	-	
CRC Lo	-	

3.8.2.1 Trip Wave Record Format

. 8 cycles (4 cycles before the accident + 4 cycles after the accident) are stored, and 1 cycle has 32 sampling (record) numbers.

. Therefore, 8 cycles of Fault Wave have up to 256 sampling (record) numbers.

16bit	Explanation	Unit	Length

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
Fault / Trip Wave #1~256 Ia value																	INT16	1
Fault / Trip Wave #1~256 Ib value																	INT16	1
Fault / Trip Wave #1~256 Ic value																	INT16	1
Fault / Trip Wave #1~256 In value																	INT16	1
Fault / Trip Wave #1~256 External IZCT value																	INT16	1
Fault / Trip Wave #1~256 Va value																	INT16	1
Fault / Trip Wave #1~256 Vb value																	INT16	1
Fault / Trip Wave #1~256 Vc value																	INT16	1
Reserved																	INT16	1
Reserved																	INT16	1

3.8.5 Real Wave: File Number 250(0xFA)

The Real Wave(1Cycle) can directly request the record of the file without going through the memory map by using the function code (0xFA) (Ref. Type: 0x06).

Service	File Number	Record			
		Number	Length	Max Size	One Record
Real Wave	250(0xFA)	1~32	1~12	12	20byte

(1) Request

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Byte Count	XX	Sub-Req. number of bytes
Sub-Req. 1. Ref. Type	06	Ref. Type
Sub-Req. 1. File Number Hi	00	File Number : 250(0xFA)
Sub-Req. 1. File Number Lo	FA	
Sub-Req. 1. Starting Record Number Hi	-	
Sub-Req. 1. Starting Record Number Lo	-	
Sub-Req. 1. Record Length Hi	-	up to 12
Sub-Req. 1. Record Length Lo	-	
CRC Hi	-	
CRC Lo	-	

(2) Response

Field Name	(Hex)	Explanation
Slave Address	XX	Addr(dialing)
Function	64	Function Code
Resp. Data length	XX	Response data length
Sub-Req. 1. File resp. length	XX	
Sub-Req. 1. Ref. Type	06	Ref. Type
Sub-Req. 1. Record. Data #1	XX	20 bytes each

Sub-Req. 1. Record. Data #2	XX	
Sub-Req. 1. Record. Data #n	XX	
CRC Hi	-	
CRC Lo	-	

3.8.2.1 Real Wave Record Format

Real wave(1Cycle) has 32 Sampling(Record) numbers.

16bit																Explanation	Unit	Length
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
Real Wave #1~32 Ia value																	INT16	1
Real Wave #1~32 Ib value																	INT16	1
Real Wave #1~32 Ic value																	INT16	1
Real Wave #1~32 In value																	INT16	1
Real Wave #1~32 External IZCT value																	INT16	1
Real Wave #1~32 Va value																	INT16	1
Real Wave #1~32 Vb value																	INT16	1
F Real Wave #1~32 Vc value																	INT16	1
Reserved																	INT16	1
Reserved																	INT16	1