

SIR-C

Feeder Protection and Recloser Control



MODBUS PROTOCOL MANUAL

1.	MODBUS PROTOCOL	3
1.1.	Modbus RTU package format.....	4
1.2.	Function Codes.....	5
1.3.	Exceptions Responses	5
1.4.	Data type.....	6
1.5.	General Memory Map	7
1.5.1.	Relay information Map	7
1.5.2.	Events Map	7
1.5.3.	States Map for FC03, 2 registers	8
1.5.4.	States Map for FC03, 1 registry	31
1.5.5.	States identifiers.....	54
1.5.6.	Measurements Map.....	55
1.5.7.	Fault reports Map	57
1.5.8.	Example of obtaining information from a Fault Report.....	57
1.5.8.1.	Ask for each event of a fault report	57
1.5.8.2.	Ask for the trip reason of a fault report.....	59
1.5.9.	Settings Map	61
1.6.	Counters	80
1.7.	Command List.....	81
1.8.	Setting-up the session: Password and access levels	82
1.9.	Example of Modbus Frames.....	82

1. MODBUS PROTOCOL

Communication parameters are:

Modbus RTU:

- Slave Address: 2 (by default)

Rear Serial COM:

- Baudrate: 19200 (by default)
- Serial Settings: 8-N-1 (by default)

Modbus TCP/IP:

- Slave Address: 2 (by default)
- Port: 502 (by default)

Description	Minimun	Maximun	Step	Unit	Default
Rear TCP Communications					
Protocol	-	-	Modbus TCP, IEC 60870-5-104 or DNP3.0 TCP	-	Modbus TCP
IP Address	1.0.0.1	223.255.255.254	-	-	192.168.200.100
Subnet	255.0.0.0	255.255.255.252	-	-	255.255.255.0
Gateway	1.0.0.1	223.255.255.254	-	-	192.168.200.1
DNS – 1	0.0.0.0	255.255.255.255	-	-	0.0.0.0
DNS – 2	0.0.0.0	255.255.255.255	-	-	0.0.0.0

Note: Retries number =10, confirmation time = 2000 ms

This document describes the steps to follow to read and write data on the SIR-C relay, as per the Modbus protocol. This memory map is only valid for one piece of equipment and one version of the memory. The positions of existing objects in the memory remain fixed from one version to the next, but new objects will naturally have new addresses which will, in turn, remain fixed in future versions. The memory map is described further on.

The standard Modbus protocol is used, so any program or PC can communicate easily with the equipment.

The SIR-C always acts as a slave, which means that it never initiates communications. The master is always responsible for initiating communications.

Only a subset of the Modbus functions is implemented:

- Reading function 3.
- Writing function 16.

The MODBUS/RTU protocol is independent from the hardware. Therefore, the physical layer can exist in different hardware configurations: RS232, RS485, fibre optic or Ethernet.

Specifically, the relay has a front RS232 port and, as an option, a rear RS485 port. The data stream in any of the configurations is “half-duplex”.

Each byte of data is transmitted asynchronously and consist of 1 start bit, 8 data bits, 1 stop bit and 1 parity bit, if this is how it is programmed. Therefore, the data has 10 or 11 bits, depending on whether it includes parity.

If the relay only offers with Modbus on the front port, the address (1 to 247) is configurable but the rest of the paarmeters are fixed and equal to: baudrate 19200, No parity and stop bit 1.

If the relay offers RS485 Modbus protocol, the address (1 to 247), baudrate (4800, 9600, 19200, 38400, 57600 or 115200) and the serial setting (8-N-1, 8-E-1, 8-O-1, 9-N-1, 8-N-2, 8-E-2, 8-O-2 or 9-N-2) can be changed by the user.

The master must know the address of the slave that it is going to communicate with. No unit will act on requests from the master if the message is not addressed to them. The exception is when the 0 address, or "broadcast" address, is used, in which case the relay will act but will not send an answer of any type.

Communications are made in packages or frames, which are groups of data that are sent asynchronously. The master transmits a frame to the slave, and the slave then replies with another frame (except in the case of "broadcast" messages).

The end of the frame is marked by a dead time or silence time in the communication medium. The length of this time of silence varies depending on the transmission speed, as it is equivalent to 3 characters.

The following table shows the generic package format that is valid for transmission and reception. However, each function has its own peculiarities, as will be described further on.

1.1. Modbus RTU package format

CUSTOMER ADDRESS	1 byte	Each device on a communication bus must have a unique address, otherwise two different units could reply simultaneously to the same request. All ports of the relay will use this address which can be set a value between 1 and 247. When the master transmits a frame with the slave address to 0 indicates a Broadcast. All the slaves in the communications bus will carry out the requested action, but no one will reply to the master. The Broadcast will only be accepted to write, as it makes no sense to make a read request in the Broadcast, as no one will reply this request.
FUNCTION CODE	1 byte	This is one of the function codes supported by the equipment. In this case, the only function codes supported are 3 to read and 16 to write. When the slave has to reply with an exception one of these frames, it is indicated by putting 1 in the most important bit of the correspondent function. Thus, an exception for the function 3, will be indicated with a 83 as a function code; and an exception for the function code 16 or 0x10 in hexadecimal, will be indicated with an 0x90.
DATA	N bytes	This part consists of a variable number of bytes, depending on the function code. It may include addresses, data lengths, settings, commands or exception codes sent by the user.
CRC	2 bytes	Control code of two bytes. The ModBus/RTU includes a 16-bit CRC in each frame, to detect errors. If the slave detects an erroneous frame, based on a CRC that is not correct, it won't take any action, nor will reply anything to the master. The management of the CRC is LSB-MSB.
DEAD TIME	Necessary time to transmit 3,5 Bytes	A frame is terminated when nothing is received for a period of 3,5 bytes. It means: 15 ms at 2400 bps 2 ms at 19200 bps ...etc.

1.2. Function Codes

HEX DEC CODE	MODBUS NAME	DEFINITION	COMMENT
0x03 3	Read Holding Registers	Reading of Any Value	This function allows the master to read 1 or more consecutive addresses of a relay. The registers always are of 16 bits, with the most important byte at first. The maximum number of registers to be read in a package are 60.
HEX DEC CODE	MODBUS NAME	DEFINITION	COMMENT
0x10 16	Preset Multiple Registers	Script	This function allows to write one or more registers that represent one or more settings. The registers are values of 2 bytes of length, transmitted with the most important byte at first. The maximum number of registers to be written in a package is 60.

1.3. Exceptions Responses

The error codes defined by the ModBus protocol are as follows:

01	ILLEGAL FUNCTION	The slave does not support any function with the function code received in this message.
02	ILLEGAL DATA ADDRESS	The master is trying to do an operation in a wrong address.
03	ILLEGAL DATA VALUE	The slave has detected that the value sent by the master is not valid.
04	SLAVE DEVICE FAILURE	Indicates an error occurred in the slave while trying to execute the request of the master.
05	ACKNOWLEDGE	Generic recognition.
06	SLAVE DEVICE BUSY	The slave is busy and unable to perform the required operation.
07	NEGATIVE ACKNOWLEDGE	Generic non-recognition.

When the data format takes up more than one BYTE, the most important BYTE is sent through the communications first, and the least important BYTE is sent last.

1.4. Data type

TYPE	LENGTH (Registers)	DESCRIPTION
ASCIIxx	xx/2	String: In length variable character chain. Final of String marked with '\0'. E. g.: "ABC" 0x41x42x43x00....
ASCII88	44	88 string character chain
ENUM	-	Each of the possible values of the integer will have a correspondence in the auxiliary list of the database. This list is the correspondence chain which must be shown for each of the values. Memory will only receive an integer value. E. g.: 0, 1 Correspondence to "CLOSED", "OPEN"
ENUM4	2	4 option ENUM (0-3)
ENUM8	2	8 option ENUM (0-7)
ENUM16	2	16 option ENUM (0-15)
ENUM80	2	80 option ENUM (0-79)
EVENT	9	Criteria Directory (UINT). Event Identifier (UINT). Value (UINT). Associated Measure (UINT).Date and Time(FH)
EVENTO2	11	Antiquity (UINT). Event (EVENT)
FH	5	<i>Year</i> (UINT). <i>month</i> (UCHAR). <i>day</i> (UCHAR). <i>hour</i> (UCHAR). <i>minutes</i> (UCHAR). <i>seconds</i> (UCHAR). <i>hundredth</i> (UCHAR). <i>thousandth</i> (UINT)
FLOAT INVERSE	2	Number in FLOAT INVERSEing decimal point "FLOAT INVERSE" of 4 bytes
IP	2	Unsigned Integer of 32 bit, in decimal point format.
TAP	2	Number in FLOAT INVERSE type with restrictions on the accepted values. See the user manual for more information in each specific case.
TEXT10	5	10 Character string
TEXT16	8	16 Character string
UINT32	2	Integer without sign of 16 bytes

When the data format takes up more than one BYTE, the most important BYTE is sent through the communications first, and the least important BYTE is sent last.

1.5. General Memory Map

1.5.1. Relay information Map

The function code implemented to **reading is 0x03 (Read Holding Registers)**.

The function code implemented to **writing is 0x16 (Write Holding Registers)**.

Function	Description	Start address	Number of registries	Format	Reference
16	Write access code	168	5	TEXT10	See Passwords and Access Levels
03	Read of Model and Version	100	44	ASCII88	
03 & 16	Date and Time	170	5	FH	
03	Serial number	252	2	UINT32	

1.5.2. Events Map

The function code implemented to **reading is 0x03 (Read Holding Registers)**.

The function code implemented to **writing is 0x16 (Write Holding Registers)**.

Function	Description	Start address	Number of registries	Format	Reference
16	Write event index	1	2	UINT	
03	One event reading	410	11	EVENTO2	See States map (Event Number)
16	Delete All Events	420	2		

1.5.3. States Map for FC03, 2 registers

The function code implemented to **State reading is 0x03 (Read Holding Registers)**.

Number of registries: 2.

Type: Bit string 32 bits, Most significant bit first (MSB-LSB)

Address	Description	Bit	Event NO	Status	SIR-C
602	Measurements	00	01	Measurement Error	✓
		01	02	Net Frequency 50 Hz	
		02	03	Line Frequency blocked	
		03	04	Bar Frequency Blocked	
		08	-	VA Zero Crossing	
		09	-	VB Zero Crossing	
		10	-	VC Zero Crossing	
		11	-	VLA Zero Crossing	
		12	-	VLB Zero Crossing	
		13	-	VLC Zero Crossing	

Address	Description	Bit	Event NO	Status	SIR-C
600	Self-diagnosis	00	01	Model Error	✓
		01	02	Hardware Error	
		12	04	Communication Error	
		13	03	Test State	
		14	05	Default Settings	
		15	06	Settings Error	
		16	07	Default Configuration	
		17	08	Configuration Error	
		18	09	Curves Error	

Address	Description	Bit	Event NO	Status	SIR-C
610	General	00	01	Trip	✓
		01	02	Ready	
		02	03	Wrong Password	
		03	04	Set date/time	
		04	05	Local Control	
		05	06	SER error	
		06	07	SER deleted	
		07	08	Wrong Access	
		08	09	Settings Change	
		09	10	Configuration Changed	
		10	11	LDP Deleted	
		12	13	New DFR	
		13	14	Phase Trip	
		14	15	Trip Block	
		15	16	General Pickup	
		16	17	Phase A Pickup	
		17	18	Phase B Pickup	
		18	19	Phase C Pickup	
		19	20	Neutral Pickup	
		20	21	Phase A Trip	
		21	22	Phase B Trip	
		22	23	Phase C Trip	
		23	24	Neutral Trip	
		24	25	Setttings Group 1	
		25	26	Settings Group 2	
		26	27	Setttings Group 3	
		27	28	Settings Group 4	
		28	29	Settings Group 5	
		29	30	Settings Group 6	
		30	-	Set to FALSE	
		31	-	Set to TRUE	

Address	Description	Bit	Event NO	Status	SIR-C
700	52	00	01	52 Start	✓
		01	02	52 Error	
		02	03	52 Open	
		03	04	52 Opening time	
		04	05	52 Opening error	
		05	06	52 Closed	
		06	07	52 Closing time	
		07	08	52 Closing error	
		08	09	52 Excessive total openings	
		09	10	52 Excessive accumulated amperes (I2t).	
		10	11	52 Excessive openings in a time window	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
702	79	00	01	Standby	-	✓
		01	02	Reclose Time	-	
		02	03	Is 52 Open?	-	
		03	04	Hold Time	-	
		04	05	Closing Time	-	
		05	06	Reset Time	-	
		06	07	Lockout	-	
		07	08	Safe Time	-	
		08	09	Blocked	-	
		09	-	Reclose NO.1	-	
		10	-	Reclose NO.2	-	
		11	-	Reclose NO.3	-	
		12	-	Reclose NO.4	-	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
728	SCM	00	01	Standby	-	✓
		01	02	Wait to open	-	
		02	03	Lockout	-	
		03	04	Wait to 79	-	
		04	05	Reset Time	-	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
730	SZM	00	01	Standby	-	✓
		01	02	Wait to open	-	
		02	03	Wait to Close	-	
		03	04	Reset Time	-	
		04	05	Open	-	
		05	06	Lockout	-	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
712	25	00	01	Syncrocheck	-	✓
		01	02	Dead Line & Dead Bar	-	
		02	03	Dead Line & Live Bar	-	
		03	04	Live Line & Dead Bar	-	
		04	05	Live Line & Live Bar	-	
		05	06	Voltage Diff.	V-B	
		06	07	Frequency Diff.	F (Hz)	
		07	08	Phase Diff.	Ang V-B (Deg)	

Address	Description	Bit	Event NO	Status	SIR-C
628	Inputs	00	01	Input 1	✓
		01	02	Input 2	
		02	03	Input 3	
		03	04	Input 4	
		04	05	Input 5	
		05	06	Input 6	
		06	07	Input 7	
		07	08	Input 8	
		08	09	Input 9	
		09	10	Input 10	
		10	11	Input 11	

Address	Description	Bit	Event NO	Status	SIR-C
630	Outputs	00	01	Output 1	✓
		01	02	Output 2	
		02	03	Output 3	
		03	04	Output 4	
		04	05	Output 5	
		05	06	Logic signal 06	
		06	07	Logic signal 07	
		07	08	Logic signal 08	
		08	09	Logic signal 09	
		09	10	Logic signal 10	
		10	11	Logic signal 11	
		11	12	Logic signal 12	
		12	13	Logic signal 13	
		13	14	Logic signal 14	
		14	15	Logic signal 15	
		15	16	Logic signal 16	
		16	17	Logic signal 17	
		17	18	Logic signal 18	
		18	19	Logic signal 19	
		19	20	Logic signal 20	
		20	21	Logic signal 21	
		21	22	Logic signal 22	
		22	23	Logic signal 23	
		23	24	Logic signal 24	
		24	25	Logic signal 25	
		25	26	Logic signal 26	
		26	27	Logic signal 27	
		27	28	Logic signal 28	
		28	29	Logic signal 29	
		29	30	Logic signal 30	
		30	31	Logic signal 31	
		31	32	Logic signal 32	

Address	Description	Bit	Event NO	Status	SIR-C
632	PGC	00	01	Open Breaker	✓
		01	02	Close Breaker	
		02	03	79 Block	
		03	04	79 Unblock	
		04	05	Local Control	
		05	06	Remote Control	
		06	07	52a	
		07	08	52b	
		08	09	Sett. Group x1	
		09	10	Sett. Group x2	
		10	11	Sett. Group x4	
		11	12	SZM Start	
		12	13	Hot Line Tag	
		13	14	79 Enable	
		14	15	79N1 Start	
		15	16	79N2 Start	
		16	17	79N3 Start	
		17	18	79N4 Start	
		18	19	DFR Start	
		19	20	50BF Start	
		20	21	SOTF Start	
		21	22	Thermal I. Reset	
		22	23	74TCS Coil A	
		23	24	74TCS Coil B	
		24	25	Neutral Block	
		25	26	Phase Block	
		26	27	External Trip	
		27	28	PGC 1	
		28	29	PGC 2	
		29	30	PGC 3	
		30	31	PGC 4	
		31	32	PGC 5	

Address	Description	Bit	Event NO	Status	SIR-C
742	Alarm LEDs	00	-	Alarm 1	✓
		01	-	Alarm 2	
		02	-	Alarm 3	
		03	-	Alarm 4	
		04	-	Alarm 5	
		05	-	Alarm 6	
		06	-	Alarm 7	
		07	-	Alarm 8	
		08	-	Logic Alarm 9	
		09	-	Logic Alarm 10	
		10	-	Logic Alarm 11	
		11	-	Logic Alarm 12	
		12	-	Logic Alarm 13	
		13	-	Logic Alarm 14	
		14	-	Logic Alarm 15	
		15	-	Logic Alarm16	
		16	-	Logic Alarm17	
		17	-	Logic Alarm 18	
		18	-	Logic Alarm 19	
		19	-	Logic Alarm 20	
		20	-	Logic Alarm 21	
		21	-	Logic Alarm 22	
		22	-	Logic Alarm 23	
		23	-	Logic Alarm 24	
		24	-	Logic Alarm 25	
		25	-	Logic Alarm 26	
		26	-	Logic Alarm 27	
		27	-	Logic Alarm 28	
		28	-	Logic Alarm 29	
		29	-	Logic Alarm 30	
		30	-	Logic Alarm 31	
		31	-	Logic Alarm 32	

Address	Description	Bit	Event NO	Status	SIR-C
752	Control LEDs	00	-	Local Control	✓
		01	-	79 Block	
		02	-	Close Breaker	
		03	-	Virtual LED-1	
		04	-	Virtual LED-2	
		05	-	Virtual LED-3	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
666	SHB	08	01	Phase A Block	I-A2H (A)	✓
		09	02	Phase B Block	I-B2H (A)	
		10	03	Phase C Block	I-C2H (A)	
		11	04	Phase Block	-	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
710	CLP	00	02	CLP Disable	I-Max (A)	✓
		01	03	52 Close	I-Max (A)	
		02	04	52 Open	I-Max (A)	
		03	05	52 Def. Open	I-Max (A)	
		04	06	Close CLP	I-Max (A)	
		05	07	Open CLP	I-Max (A)	
		11	01	CLP	I-Max (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
750	SOTF	00	01	Phase A Pickup	IA (A)	✓
		01	02	Phase B Pickup	IB (A)	
		02	03	Phase C Pickup	IC (A)	
		03	04	Phase Pickup	I _{max} (A)	
		08	05	Phase A Trip	IA (A)	
		09	06	Phase B Trip	IB (A)	
		10	07	Phase C Trip	IC (A)	
		11	08	Phase Trip	I _{max} (A)	
		16	09	SOFT	I _{max} (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
634	50-1	00	01	50-1 Phase A Pickup	IA (A)	✓
		01	02	50-1 Phase B Pickup	IB (A)	
		02	03	50-1 Phase C Pickup	IC (A)	
		03	04	50-1 Pickup	I _{max} (A)	
		08	05	50-1 Phase A Trip	IA (A)	
		09	06	50-1 Phase B Trip	IB (A)	
		10	07	50-1 Phase C Trip	IC (A)	
		11	08	50-1 Trip	I _{max} (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
636	50-2	00	01	50-2 Phase A Pickup	IA (A)	✓
		01	02	50-2 Phase B Pickup	IB (A)	
		02	03	50-2 Phase C Pickup	IC (A)	
		03	04	50-2 Pickup	I _{max} (A)	
		08	05	50-2 Phase A Trip	IA (A)	
		09	06	50-2 Phase B Trip	IB (A)	
		10	07	50-2 Phase C Trip	IC (A)	
		11	08	50-2 Trip	I _{max} (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
646	50G	04	01	50G Pickup	3I-0 (A)	✓
		12	02	50G Trip	3I-0 (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
648	50N	04	01	50N Pickup	IN (A)	✓
		12	02	50N Trip	IN (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
638	67-1	00	01	67-1 Phase A Pickup	IA (A)	✓
		01	02	67-1 Phase B Pickup	IB (A)	
		02	03	67-1 Phase C Pickup	IC (A)	
		03	04	67-1 Pickup	I _{max} (A)	
		08	05	67-1 Phase A Trip	IA (A)	
		09	06	67-1 Phase B Trip	IB (A)	
		10	07	67-1 Phase C Trip	IC (A)	
		11	08	67-1 Trip	I _{max} (A)	
		16	09	Direction A.	U-BC (V)	
		17	10	Direction B.	U-CA (V)	
		18	11	Direction C.	U-AB (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
640	67-2	00	01	67-2 Phase A Pickup	IA (A)	✓
		01	02	67-2 Phase B Pickup	IB (A)	
		02	03	67-2 Phase C Pickup	IC (A)	
		03	04	67-2 Pickup	I _{max} (A)	
		08	05	67-2 Phase A Trip	IA (A)	
		09	06	67-2 Phase B Trip	IB (A)	
		10	07	67-2 Phase C Trip	IC (A)	
		11	08	67-2 Trip	I _{max} (A)	
		16	09	Direction A.	U-BC (V)	
		17	10	Direction B.	U-CA (V)	
		18	11	Direction C.	U-AB (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
642	67-3	00	01	67-3 Phase A Pickup	IA (A)	✓
		01	02	67-3 Phase B Pickup	IB (A)	
		02	03	67-3 Phase C Pickup	IC (A)	
		03	04	67-3 Pickup	I _{max} (A)	
		08	05	67-3 Phase A Trip	IA (A)	
		09	06	67-3 Phase B Trip	IB (A)	
		10	07	67-3 Phase C Trip	IC (A)	
		11	08	67-3 Trip	I _{max} (A)	
		16	09	Direction A.	U-BC (V)	
		17	10	Direction B.	U-CA (V)	
		18	11	Direction C.	U-AB (V)	

Address	Description	Bit	Event NO	Status	SIR-C
644	67-4	00	01	67-4 Phase A Pickup	✓
		01	02	67-4 Phase B Pickup	
		02	03	67-4 Phase C Pickup	
		03	04	67-4 Pickup	
		08	05	67-4 Phase A Trip	
		09	06	67-4 Phase B Trip	
		10	07	67-4 Phase C Trip	
		11	08	67-4 Trip	
		16	09	Direction A.	
		17	10	Direction B.	
		18	11	Direction C.	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
650	67G-1	04	01	67G-1 Pickup	IN (A)	✓
		12	02	67G-1 Trip	IN (A)	
		19	03	67G-1 Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
652	67G-2	04	01	67G-2 Pickup	IN (A)	✓
		12	02	67G-2 Trip	IN (A)	
		19	03	67G-2 Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
654	67N-1	04	01	67N-1 Pickup	3I-0 (A)	✓
		12	02	67N-1 Trip	3I-0 (A)	
		19	03	67N-1 Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
656	67N-2	04	01	67N-2 Pickup	3I-0 (A)	✓
		12	02	67N-2 Trip	3I-0 (A)	
		19	03	67N-2 Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
732	67GI	04	01	67GI Pickup	IN (A)	✓
		12	02	67GI Trip	IN (A)	
		19	03	67GI Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
734	67NI	04	01	67NI Pickup	3I-0 (A)	✓
		12	02	67NI Trip	3I-0 (A)	
		19	03	67NI Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
660	46	03	01	46 Pickup	I2 (A)	✓
		11	02	46 Trip	I2 (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
742	46BC	03	01	46BC Pickup	I2/I1	✓
		11	02	46BC Trip	I2/I1	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
662	49	03	01	49 Alarm	Therm.I (%)	✓
		11	02	49 Trip	Therm.I (%)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
664	37	00	01	37 Phase A Pickup	IA (A)	✓
		01	02	37 Phase B Pickup	IB (A)	
		02	03	37 Phase C Pickup	IC (A)	
		03	04	37 Pickup	I _{max} (A)	
		08	05	37 Phase A Trip	IA (A)	
		09	06	37 Phase B Trip	IB (A)	
		10	07	37 Phase C Trip	IC (A)	
		11	08	37 Trip	I _{max} (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
668	27-1	00	01	27-1 Phase A Pickup	V-A (v)	✓
		01	02	27-1 Phase B Pickup	V-B (v)	
		02	03	27-1 Phase C Pickup	V-C (v)	
		03	04	27-1 Phase Pickup	V-max (v)	
		05	05	27-1 AB Pickup	U-AB (v)	
		06	06	27-1 BC Pickup	U-BC (v)	
		07	07	27-1 CA Pickup	U-CA (v)	
		08	08	27-1 Phase A Trip	V-A (v)	
		09	09	27-1 Phase B Trip	V-B (v)	
		10	10	27-1 Phase C Trip	V-C (v)	
		11	11	27-1 Phase Trip	V-max (v)	
		13	12	27-1 AB Trip	U-AB (v)	
		14	13	27-1 BC Trip	U-BC (v)	
		15	14	27-1 CA Trip	U-CA (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
670	27-2	00	01	27-2 Phase A Pickup	V-A (v)	✓
		01	02	27-2 Phase B Pickup	V-B (v)	
		02	03	27-2 Phase C Pickup	V-C (v)	
		03	04	27-2 Phase Pickup	V-max (v)	
		05	05	27-2 AB Pickup	U-AB (v)	
		06	06	27-2 BC Pickup	U-BC (v)	
		07	07	27-2 CA Pickup	U-CA (v)	
		08	08	27-2 Phase A Trip	V-A (v)	
		09	09	27-2 Phase B Trip	V-B (v)	
		10	10	27-2 Phase C Trip	V-C (v)	
		11	11	27-2 Phase Trip	V-max (v)	
		13	12	27-2 AB Trip	U-AB (v)	
		14	13	27-2 BC Trip	U-BC (v)	
		15	14	27-2 CA Trip	U-CA (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
738	27-L	00	01	27-L Phase A Pickup	VL-A (v)	✓
		01	02	27-L Phase B Pickup	VL-B (v)	
		02	03	27-L Phase C Pickup	VL-C (v)	
		03	04	27-L Phase Pickup	VL-max (v)	
		08	08	27-L Phase A Trip	VL-A (v)	
		09	09	27-L Phase B Trip	VL-B (v)	
		10	10	27-L Phase C Trip	VL-C (v)	
		11	11	27-L Phase Trip	VL-max (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
736	27V1	03	01	27V-1 Pickup	V-1 (v)	✓
		11	02	27V-1 Trip	V-1 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
724	27V1-L	03	01	27V1-L Pickup	V-1 (v)	✓
		11	02	27V1-L Trip	V-1 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
672	59-1	00	01	59-1 Phase A Pickup	V-A (v)	✓
		01	02	59-1 Phase B Pickup	V-B (v)	
		02	03	59-1 Phase C Pickup	V-C (v)	
		03	04	59-1 Phase Pickup	V-max (v)	
		05	05	59-1 AB Pickup	U-AB (v)	
		06	06	59-1 BC Pickup	U-BC (v)	
		07	07	59-1 CA Pickup	U-CA (v)	
		08	08	59-1 Phase A Trip	V-A (v)	
		09	09	59-1 Phase B Trip	V-B (v)	
		10	10	59-1 Phase C Trip	V-C (v)	
		11	11	59-1 Phase Trip	V-max (v)	
		13	12	59-1 AB Trip	U-AB (v)	
		14	13	59-1 BC Trip	U-BC (v)	
		15	14	59-1 CA Trip	U-CA (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
674	59-2	00	01	59-2 Phase A Pickup	V-A (v)	✓
		01	02	59-2 Phase B Pickup	V-B (v)	
		02	03	59-2 Phase C Pickup	V-C (v)	
		03	04	59-2 Phase Pickup	V-max (v)	
		05	05	59-2 AB Pickup	U-AB (v)	
		06	06	59-2 BC Pickup	U-BC (v)	
		07	07	59-2 CA Pickup	U-CA (v)	
		08	08	59-2 Phase A Trip	V-A (v)	
		09	09	59-2 Phase B Trip	V-B (v)	
		10	10	59-2 Phase C Trip	V-C (v)	
		11	11	59-2 Phase Trip	V-max (v)	
		13	12	59-2 AB Trip	U-AB (v)	
		14	13	59-2 BC Trip	U-BC (v)	
		15	14	59-2 CA Trip	U-CA (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
740	59-L	00	01	59-L Phase A Pickup	VL-A (v)	✓
		01	02	59-L Phase B Pickup	VL-B (v)	
		02	03	59-L Phase C Pickup	VL-C (v)	
		03	04	59-L Phase Pickup	VL-max (v)	
		08	08	59-L Phase A Trip	VL-A (v)	
		09	09	59-L Phase B Trip	VL-B (v)	
		10	10	59-L Phase C Trip	VL-C (v)	
		11	11	59-L Phase Trip	VL-max (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
676	59N-1	04	01	59N-1 Pickup	3V-0 (v)	✓
		12	02	59N-1 Trip	3V-0 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
678	59N-2	04	01	59N-2 Pickup	3V-0 (v)	✓
		12	02	59N-2 Trip	3V-0 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
726	59N-L	04	01	59N-L Pickup	3VL-0 (v)	✓
		12	02	59N-L Trip	3VL-0 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
720	47	03	01	47 Pickup	V-2 (v)	✓
		11	02	47 Trip	V-2 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
722	47-L	03	01	47-L Pickup	VL-2 (v)	✓
		11	02	47-L Trip	VL-2 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
762	64REF	03	01	64REF Pickup	I-N	✓
		11	02	64REF Trip	I-N	
		19	03	64REF IN SHB Block	I-N2H	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
680	32-1	00	01	32-1 Phase A Pickup	S-A (VA)	✓
		01	02	32-1 Phase B Pickup	S-B (VA)	
		02	03	32-1 Phase C Pickup	S-C (VA)	
		03	04	32-1 Phase Pickup	S-3P (VA)	
		08	05	32-1 Phase A Trip	S-A (VA)	
		09	06	32-1 Phase B Trip	S-B (VA)	
		10	07	32-1 Phase C Trip	S-C (VA)	
		11	08	32-1 Phase Trip	S-3P (VA)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
682	32-2	00	01	32-2 Phase A Pickup	S-A (VA)	✓
		01	02	32-2 Phase B Pickup	S-B (VA)	
		02	03	32-2 Phase C Pickup	S-C (VA)	
		03	04	32-2 Phase Pickup	S-3P (VA)	
		08	05	32-2 Phase A Trip	S-A (VA)	
		09	06	32-2 Phase B Trip	S-B (VA)	
		10	07	32-2 Phase C Trip	S-C (VA)	
		11	08	32-2 Phase Trip	S-3P (VA)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
684	32-3	00	01	32-3 Phase A Pickup	S-A (VA)	✓
		01	02	32-3 Phase B Pickup	S-B (VA)	
		02	03	32-3 Phase C Pickup	S-C (VA)	
		03	04	32-3 Phase Pickup	S-3P (VA)	
		08	05	32-3 Phase A Trip	S-A (VA)	
		09	06	32-3 Phase B Trip	S-B (VA)	
		10	07	32-3 Phase C Trip	S-C (VA)	
		11	08	32-3 Phase Trip	S-3P (VA)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
686	32-4	00	01	32-4 Phase A Pickup	S-A (VA)	✓
		01	02	32-4 Phase B Pickup	S-B (VA)	
		02	03	32-4 Phase C Pickup	S-C (VA)	
		03	04	32-4 Phase Pickup	S-3P (VA)	
		08	05	32-4 Phase A Trip	S-A (VA)	
		09	06	32-4 Phase B Trip	S-B (VA)	
		10	07	32-4 Phase C Trip	S-C (VA)	
		11	08	32-4 Phase Trip	S-3P (VA)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
688	81-1	03	01	81-1 Pickup	f (Hz)	✓
		11	02	81-1 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
690	81-2	03	01	81-2 Pickup	f (Hz)	✓
		11	02	81-2 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
692	81-3	03	01	81-3 Pickup	f (Hz)	✓
		11	02	81-3 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
694	81-4	03	01	81-4 Pickup	f (Hz)	✓
		11	02	81-4 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
696	81-5	03	01	81-5 Pickup	f (Hz)	✓
		11	02	81-5 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
698	81-6	03	01	81-6 Pickup	f (Hz)	✓
		11	02	81-6 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
714	81R-1	03	01	81R-1 Pickup	df/dt (Hz/s)	✓
		11	02	81R-1 Trip	df/dt (Hz/s)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
716	81R-2	03	01	81R-2 Pickup	df/dt (Hz/s)	✓
		11	02	81R-2 Trip	df/dt (Hz/s)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
718	78	11	01	78 Trip	-	✓

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
658	50BF	03	01	50BF Pickup	I-Max (A)	✓
		11	02	50BF Alarm	I-Max (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
704	74TCS	03	01	74TCS Pickup	I-Max (A)	✓
		11	02	74TCS Alarm	I-Max (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
706	60CTS	03	01	60CTS Pickup	I-Max (A)	✓
		11	02	60CTS Alarm	I-Max (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
708	60VTS	03	01	60VTS Pickup	V-2 (V)	✓
		08	02	60VTS Phase A Alarm	V-A (V)	
		09	03	60VTS Phase B Alarm	V-B (V)	
		10	04	60VTS Phase C Alarm	V-C (V)	
		11	05	60VTS Phase Alarm	V-2 (V)	

Address	Description	Bit	Event NO	Status	SIR-C
608	HMI	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
		16	21	User Command 4	
		17	22	User Command 5	
		18	23	User Command 6	
		25	15	Set Counter	
		27	11	Key Reset	
		29	12	Activity	
		30	13	Identification	
		31	14	Test State	

Address	Description	Bit	Event NO	Status	SIR-C
612	USB COM	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
		16	21	User Command 4	
		17	22	User Command 5	
		18	23	User Command 6	
		25	15	Set Counter	
		28	-	Activity	
		29	13	Identification	

Address	Description	Bit	Event NO	Status	SIR-C
620	MODBUS RTU	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
		16	21	User Command 4	
		17	22	User Command 5	
		18	23	User Command 6	
		25	15	Set Counter	
		28	-	Activity	
		29	13	Identification	

Address	Description	Bit	Event NO	Status	SIR-C
624	DNP3 Serial	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
		16	21	User Command 4	
		17	22	User Command 5	
		18	23	User Command 6	
		28	-	Activity	

Address	Description	Bit	Event NO	Status	SIR-C
626	IEC-103	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
		16	21	User Command 4	
		17	22	User Command 5	
		18	23	User Command 6	
		28	-	Activity	

Address	Description	Bit	Event NO	Status	SIR-C
622	MODBUS TCP	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
		16	21	User Command 4	
		17	22	User Command 5	
		18	23	User Command 6	
		25	15	Set Counter	
		28	-	Activity	
		29	13	Identification	

Address	Description	Bit	Event NO	Status	SIR-C
748	DNP3.0 TCP/IP	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
		16	21	User Command 4	
		17	22	User Command 5	
		18	23	User Command 6	
		28	-	Activity	

Address	Description	Bit	Event NO	Status	SIR-C
756	WEB	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
		16	21	User Command 4	
		17	22	User Command 5	
		18	23	User Command 6	
		28	-	Activity	

1.5.4. States Map for FC03, 1 registry

From firmware version M01.10.03 onwards, the function code to **State reading (0x03, Read Holding Registers)** admits request of **1 registry** instead of 2 registries.

Number of registries: 1

Type: Bit string 16 bits, Most significant bit first (MSB-LSB)

Address	Description	Bit	Event NO	Status	SIR-C
603	Measurements	00	01	Measurement Error	✓
		01	02	Net Frequency 50 Hz	
		02	03	Line Frequency blocked	
		03	04	Bar Frequency Blocked	
		08	-	VA Zero Crossing	
		09	-	VB Zero Crossing	
		10	-	VC Zero Crossing	
		11	-	VLA Zero Crossing	
		12	-	VLB Zero Crossing	
		13	-	VLC Zero Crossing	

Address	Description	Bit	Event NO	Status	SIR-C
601	Self-diagnosis	00	01	Model Error	✓
		01	02	Hardware Error	
		12	04	Communication Error	
		13	03	Test State	
		14	05	Default Settings	
		15	06	Settings Error	
600	Self-diagnosis	00	07	Default Configuration	
		01	08	Configuration Error	
		02	09	Curves Error	

Address	Description	Bit	Event NO	Status	SIR-C
611	General	00	01	Trip	✓
		01	02	Ready	
		02	03	Wrong Password	
		03	04	Set date/time	
		04	05	Local Control	
		05	06	SER error	
		06	07	SER deleted	
		07	08	Wrong Access	
		08	09	Settings Change	
		09	10	Configuration Changed	
		10	11	LDP Deleted	
		12	13	New DFR	
		13	14	Phase Trip	
		14	15	Trip Block	
		15	16	General Pickup	
610		00	17	Phase A Pickup	
		01	18	Phase B Pickup	
		02	19	Phase C Pickup	
		03	20	Neutral Pickup	
		04	21	Phase A Trip	
		05	22	Phase B Trip	
		06	23	Phase C Trip	
		07	24	Neutral Trip	
		08	25	Settings Group 1	
		09	26	Settings Group 2	
		10	27	Settings Group 3	
		11	28	Settings Group 4	
		12	29	Settings Group 5	
		13	30	Settings Group 6	
		14	-	Set to FALSE	
		15	-	Set to TRUE	

Address	Description	Bit	Event NO	Status	SIR-C
701	52	00	01	52 Start	✓
		01	02	52 Error	
		02	03	52 Open	
		03	04	52 Opening time	
		04	05	52 Opening error	
		05	06	52 Closed	
		06	07	52 Closing time	
		07	08	52 Closing error	
		08	09	52 Excessive total openings	
		09	10	52 Excessive accumulated amperes (I2t).	
		10	11	52 Excessive openings in a time window	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
703	79	00	01	Standby	-	✓
		01	02	Reclose Time	-	
		02	03	Is 52 Open?	-	
		03	04	Hold Time	-	
		04	05	Closing Time	-	
		05	06	Reset Time	-	
		06	07	Lockout	-	
		07	08	Safe Time	-	
		08	09	Blocked	-	
		09	-	Reclose NO.1	-	
		10	-	Reclose NO.2	-	
		11	-	Reclose NO.3	-	
		12	-	Reclose NO.4	-	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
729	SCM	00	01	Standby	-	✓
		01	02	Wait to open	-	
		02	03	Lockout	-	
		03	04	Wait to 79	-	
		04	05	Reset Time	-	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
731	SZM	00	01	Standby	-	✓
		01	02	Wait to open	-	
		02	03	Wait to Close	-	
		03	04	Reset Time	-	
		04	05	Open	-	
		05	06	Lockout	-	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
713	25	00	01	Syncrocheck	-	✓
		01	02	Dead Line & Dead Bar	-	
		02	03	Dead Line & Live Bar	-	
		03	04	Live Line & Dead Bar	-	
		04	05	Live Line & Live Bar	-	
		05	06	Voltage Diff.	V-B	
		06	07	Frequency Diff.	F (Hz)	
		07	08	Phase Diff.	Ang V-B (Deg)	

Address	Description	Bit	Event NO	Status	SIR-C
629	Inputs	00	01	Input 1	✓
		01	02	Input 2	
		02	03	Input 3	
		03	04	Input 4	
		04	05	Input 5	
		05	06	Input 6	
		06	07	Input 7	
		07	08	Input 8	
		08	09	Input 9	
		09	10	Input 10	
		10	11	Input 11	

Address	Description	Bit	Event NO	Status	SIR-C
631	Outputs	00	01	Output 1	✓
		01	02	Output 2	
		02	03	Output 3	
		03	04	Output 4	
		04	05	Output 5	
		05	06	Logic signal 06	
		06	07	Logic signal 07	
		07	08	Logic signal 08	
		08	09	Logic signal 09	
		09	10	Logic signal 10	
		10	11	Logic signal 11	
		11	12	Logic signal 12	
		12	13	Logic signal 13	
		13	14	Logic signal 14	
		14	15	Logic signal 15	
		15	16	Logic signal 16	
630	Outputs	00	17	Logic signal 17	
		01	18	Logic signal 18	
		02	19	Logic signal 19	
		03	20	Logic signal 20	
		04	21	Logic signal 21	
		05	22	Logic signal 22	
		06	23	Logic signal 23	
		07	24	Logic signal 24	
		08	25	Logic signal 25	
		09	26	Logic signal 26	
		10	27	Logic signal 27	
		11	28	Logic signal 28	
		12	29	Logic signal 29	
		13	30	Logic signal 30	
		14	31	Logic signal 31	
		15	32	Logic signal 32	

Address	Description	Bit	Event NO	Status	SIR-C
633	PGC	00	01	Open Breaker	✓
		01	02	Close Breaker	
		02	03	79 Block	
		03	04	79 Unblock	
		04	05	Local Control	
		05	06	Remote Control	
		06	07	52a	
		07	08	52b	
		08	09	Sett. Group x1	
		09	10	Sett. Group x2	
		10	11	Sett. Group x4	
		11	12	SZM Start	
		12	13	Hot Line Tag	
		13	14	79 Enable	
		14	15	79N1 Start	
		15	16	79N2 Start	
632	PGC	00	17	79N3 Start	
		01	18	79N4 Start	
		02	19	DFR Start	
		03	20	50BF Start	
		04	21	SOTF Start	
		05	22	Thermal I. Reset	
		06	23	74TCS Coil A	
		07	24	74TCS Coil B	
		08	25	Neutral Block	
		09	26	Phase Block	
		10	27	External Trip	
		11	28	PGC 1	
		12	29	PGC 2	
		13	30	PGC 3	
		14	31	PGC 4	
		15	32	PGC 5	

Address	Description	Bit	Event NO	Status	SIR-C
743	Alarm LEDs	00	-	Alarm 1	✓
		01	-	Alarm 2	
		02	-	Alarm 3	
		03	-	Alarm 4	
		04	-	Alarm 5	
		05	-	Alarm 6	
		06	-	Alarm 7	
		07	-	Alarm 8	
		08	-	Logic Alarm 9	
		09	-	Logic Alarm 10	
		10	-	Logic Alarm 11	
		11	-	Logic Alarm 12	
		12	-	Logic Alarm 13	
		13	-	Logic Alarm 14	
		14	-	Logic Alarm 15	
		15	-	Logic Alarm16	
742	Alarm LEDs	00	-	Logic Alarm17	
		01	-	Logic Alarm 18	
		02	-	Logic Alarm 19	
		03	-	Logic Alarm 20	
		04	-	Logic Alarm 21	
		05	-	Logic Alarm 22	
		06	-	Logic Alarm 23	
		07	-	Logic Alarm 24	
		08	-	Logic Alarm 25	
		09	-	Logic Alarm 26	
		10	-	Logic Alarm 27	
		11	-	Logic Alarm 28	
		12	-	Logic Alarm 29	
		13	-	Logic Alarm 30	
		14	-	Logic Alarm 31	
		15	-	Logic Alarm 32	

Address	Description	Bit	Event NO	Status	SIR-C
753	Control LEDs	00	-	Local Control	✓
		01	-	79 Block	
		02	-	Close Breaker	
		03	-	Virtual LED-1	
		04	-	Virtual LED-2	
		05	-	Virtual LED-3	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
667	SHB	08	01	Phase A Block	I-A2H (A)	✓
		09	02	Phase B Block	I-B2H (A)	
		10	03	Phase C Block	I-C2H (A)	
		11	04	Phase Block	-	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
711	CLP	00	02	CLP Disable	I-Max (A)	✓
		01	03	52 Close	I-Max (A)	
		02	04	52 Open	I-Max (A)	
		03	05	52 Def. Open	I-Max (A)	
		04	06	Close CLP	I-Max (A)	
		05	07	Open CLP	I-Max (A)	
		11	01	CLP	I-Max (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
751	SOTF	00	01	Phase A Pickup	IA (A)	✓
		01	02	Phase B Pickup	IB (A)	
		02	03	Phase C Pickup	IC (A)	
		03	04	Phase Pickup	I _{max} (A)	
		08	05	Phase A Trip	IA (A)	
		09	06	Phase B Trip	IB (A)	
		10	07	Phase C Trip	IC (A)	
		11	08	Phase Trip	I _{max} (A)	
750	SOTF	00	09	SOFT	I _{max} (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
635	50-1	00	01	50-1 Phase A Pickup	IA (A)	✓
		01	02	50-1 Phase B Pickup	IB (A)	
		02	03	50-1 Phase C Pickup	IC (A)	
		03	04	50-1 Pickup	I _{max} (A)	
		08	05	50-1 Phase A Trip	IA (A)	
		09	06	50-1 Phase B Trip	IB (A)	
		10	07	50-1 Phase C Trip	IC (A)	
		11	08	50-1 Trip	I _{max} (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
637	50-2	00	01	50-2 Phase A Pickup	IA (A)	✓
		01	02	50-2 Phase B Pickup	IB (A)	
		02	03	50-2 Phase C Pickup	IC (A)	
		03	04	50-2 Pickup	I _{max} (A)	
		08	05	50-2 Phase A Trip	IA (A)	
		09	06	50-2 Phase B Trip	IB (A)	
		10	07	50-2 Phase C Trip	IC (A)	
		11	08	50-2 Trip	I _{max} (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
647	50G	04	01	50G Pickup	3I-0 (A)	✓
		12	02	50G Trip	3I-0 (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
649	50N	04	01	50N Pickup	IN (A)	✓
		12	02	50N Trip	IN (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
639	67-1	00	01	67-1 Phase A Pickup	IA (A)	✓
		01	02	67-1 Phase B Pickup	IB (A)	
		02	03	67-1 Phase C Pickup	IC (A)	
		03	04	67-1 Pickup	I _{max} (A)	
		08	05	67-1 Phase A Trip	IA (A)	
		09	06	67-1 Phase B Trip	IB (A)	
		10	07	67-1 Phase C Trip	IC (A)	
		11	08	67-1 Trip	I _{max} (A)	
638	67-1	00	09	Direction A.	U-BC (V)	
		01	10	Direction B.	U-CA (V)	
		02	11	Direction C.	U-AB (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
641	67-2	00	01	67-2 Phase A Pickup	IA (A)	✓
		01	02	67-2 Phase B Pickup	IB (A)	
		02	03	67-2 Phase C Pickup	IC (A)	
		03	04	67-2 Pickup	I _{max} (A)	
		08	05	67-2 Phase A Trip	IA (A)	
		09	06	67-2 Phase B Trip	IB (A)	
		10	07	67-2 Phase C Trip	IC (A)	
		11	08	67-2 Trip	I _{max} (A)	
640	67-2	00	09	Direction A.	U-BC (V)	
		01	10	Direction B.	U-CA (V)	
		02	11	Direction C.	U-AB (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
643	67-3	00	01	67-3 Phase A Pickup	IA (A)	✓
		01	02	67-3 Phase B Pickup	IB (A)	
		02	03	67-3 Phase C Pickup	IC (A)	
		03	04	67-3 Pickup	I _{max} (A)	
		08	05	67-3 Phase A Trip	IA (A)	
		09	06	67-3 Phase B Trip	IB (A)	
		10	07	67-3 Phase C Trip	IC (A)	
		11	08	67-3 Trip	I _{max} (A)	
642	67-3	00	09	Direction A.	U-BC (V)	
		01	10	Direction B.	U-CA (V)	
		02	11	Direction C.	U-AB (V)	

Address	Description	Bit	Event NO	Status	SIR-C
645	67-4	00	01	67-4 Phase A Pickup	✓
		01	02	67-4 Phase B Pickup	
		02	03	67-4 Phase C Pickup	
		03	04	67-4 Pickup	
		08	05	67-4 Phase A Trip	
		09	06	67-4 Phase B Trip	
		10	07	67-4 Phase C Trip	
		11	08	67-4 Trip	
644	67-4	00	09	Direction A.	
		01	10	Direction B.	
		02	11	Direction C.	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
651	67G-1	04	01	67G-1 Pickup	IN (A)	✓
		12	02	67G-1 Trip	IN (A)	
650	67G-1	03	03	67G-1 Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
653	67G-2	04	01	67G-2 Pickup	IN (A)	✓
		12	02	67G-2 Trip	IN (A)	
652	67G-2	03	03	67G-2 Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
655	67N-1	04	01	67N-1 Pickup	3I-0 (A)	✓
		12	02	67N-1 Trip	3I-0 (A)	
654	67N-1	03	03	67N-1 Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
657	67N-2	04	01	67N-2 Pickup	3I-0 (A)	✓
		12	02	67N-2 Trip	3I-0 (A)	
656	67N-2	03	03	67N-2 Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
733	67GI	04	01	67GI Pickup	IN (A)	✓
		12	02	67GI Trip	IN (A)	
732	67GI	03	03	67GI Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
735	67NI	04	01	67NI Pickup	3I-0 (A)	✓
		12	02	67NI Trip	3I-0 (A)	
734	67NI	03	03	67NI Directionality	3V-0 (V)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
661	46	03	01	46 Pickup	I2 (A)	✓
		11	02	46 Trip	I2 (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
743	46BC	03	01	46BC Pickup	I2/I1	✓
		11	02	46BC Trip	I2/I1	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
663	49	03	01	49 Alarm	Therm.I (%)	✓
		11	02	49 Trip	Therm.I (%)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
665	37	00	01	37 Phase A Pickup	IA (A)	✓
		01	02	37 Phase B Pickup	IB (A)	
		02	03	37 Phase C Pickup	IC (A)	
		03	04	37 Pickup	I _{max} (A)	
		08	05	37 Phase A Trip	IA (A)	
		09	06	37 Phase B Trip	IB (A)	
		10	07	37 Phase C Trip	IC (A)	
		11	08	37 Trip	I _{max} (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
669	27-1	00	01	27-1 Phase A Pickup	V-A (v)	✓
		01	02	27-1 Phase B Pickup	V-B (v)	
		02	03	27-1 Phase C Pickup	V-C (v)	
		03	04	27-1 Phase Pickup	V-max (v)	
		05	05	27-1 AB Pickup	U-AB (v)	
		06	06	27-1 BC Pickup	U-BC (v)	
		07	07	27-1 CA Pickup	U-CA (v)	
		08	08	27-1 Phase A Trip	V-A (v)	
		09	09	27-1 Phase B Trip	V-B (v)	
		10	10	27-1 Phase C Trip	V-C (v)	
		11	11	27-1 Phase Trip	V-max (v)	
		13	12	27-1 AB Trip	U-AB (v)	
		14	13	27-1 BC Trip	U-BC (v)	
		15	14	27-1 CA Trip	U-CA (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
671	27-2	00	01	27-2 Phase A Pickup	V-A (v)	✓
		01	02	27-2 Phase B Pickup	V-B (v)	
		02	03	27-2 Phase C Pickup	V-C (v)	
		03	04	27-2 Phase Pickup	V-max (v)	
		05	05	27-2 AB Pickup	U-AB (v)	
		06	06	27-2 BC Pickup	U-BC (v)	
		07	07	27-2 CA Pickup	U-CA (v)	
		08	08	27-2 Phase A Trip	V-A (v)	
		09	09	27-2 Phase B Trip	V-B (v)	
		10	10	27-2 Phase C Trip	V-C (v)	
		11	11	27-2 Phase Trip	V-max (v)	
		13	12	27-2 AB Trip	U-AB (v)	
		14	13	27-2 BC Trip	U-BC (v)	
		15	14	27-2 CA Trip	U-CA (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
739	27-L	00	01	27-L Phase A Pickup	VL-A (v)	✓
		01	02	27-L Phase B Pickup	VL-B (v)	
		02	03	27-L Phase C Pickup	VL-C (v)	
		03	04	27-L Phase Pickup	VL-max (v)	
		08	08	27-L Phase A Trip	VL-A (v)	
		09	09	27-L Phase B Trip	VL-B (v)	
		10	10	27-L Phase C Trip	VL-C (v)	
		11	11	27-L Phase Trip	VL-max (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
737	27V1	03	01	27V-1 Pickup	V-1 (v)	✓
		11	02	27V-1 Trip	V-1 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
725	27V1-L	03	01	27V1-L Pickup	V-1 (v)	✓
		11	02	27V1-L Trip	V-1 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
673	59-1	00	01	59-1 Phase A Pickup	V-A (v)	✓
		01	02	59-1 Phase B Pickup	V-B (v)	
		02	03	59-1 Phase C Pickup	V-C (v)	
		03	04	59-1 Phase Pickup	V-max (v)	
		05	05	59-1 AB Pickup	U-AB (v)	
		06	06	59-1 BC Pickup	U-BC (v)	
		07	07	59-1 CA Pickup	U-CA (v)	
		08	08	59-1 Phase A Trip	V-A (v)	
		09	09	59-1 Phase B Trip	V-B (v)	
		10	10	59-1 Phase C Trip	V-C (v)	
		11	11	59-1 Phase Trip	V-max (v)	
		13	12	59-1 AB Trip	U-AB (v)	
		14	13	59-1 BC Trip	U-BC (v)	
		15	14	59-1 CA Trip	U-CA (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
675	59-2	00	01	59-2 Phase A Pickup	V-A (v)	✓
		01	02	59-2 Phase B Pickup	V-B (v)	
		02	03	59-2 Phase C Pickup	V-C (v)	
		03	04	59-2 Phase Pickup	V-max (v)	
		05	05	59-2 AB Pickup	U-AB (v)	
		06	06	59-2 BC Pickup	U-BC (v)	
		07	07	59-2 CA Pickup	U-CA (v)	
		08	08	59-2 Phase A Trip	V-A (v)	
		09	09	59-2 Phase B Trip	V-B (v)	
		10	10	59-2 Phase C Trip	V-C (v)	
		11	11	59-2 Phase Trip	V-max (v)	
		13	12	59-2 AB Trip	U-AB (v)	
		14	13	59-2 BC Trip	U-BC (v)	
		15	14	59-2 CA Trip	U-CA (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
741	59-L	00	01	59-L Phase A Pickup	VL-A (v)	✓
		01	02	59-L Phase B Pickup	VL-B (v)	
		02	03	59-L Phase C Pickup	VL-C (v)	
		03	04	59-L Phase Pickup	VL-max (v)	
		08	08	59-L Phase A Trip	VL-A (v)	
		09	09	59-L Phase B Trip	VL-B (v)	
		10	10	59-L Phase C Trip	VL-C (v)	
		11	11	59-L Phase Trip	VL-max (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
677	59N-1	04	01	59N-1 Pickup	3V-0 (v)	✓
		12	02	59N-1 Trip	3V-0 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
679	59N-2	04	01	59N-2 Pickup	3V-0 (v)	✓
		12	02	59N-2 Trip	3V-0 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
727	59N-L	04	01	59N-L Pickup	3VL-0 (v)	✓
		12	02	59N-L Trip	3VL-0 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
721	47	03	01	47 Pickup	V-2 (v)	✓
		11	02	47 Trip	V-2 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
723	47-L	03	01	47-L Pickup	VL-2 (v)	✓
		11	02	47-L Trip	VL-2 (v)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
763	64REF	03	01	64REF Pickup	I-N	✓
		11	02	64REF Trip	I-N	
		19	03	64REF IN SHB Block	I-N2H	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
681	32-1	00	01	32-1 Phase A Pickup	S-A (VA)	✓
		01	02	32-1 Phase B Pickup	S-B (VA)	
		02	03	32-1 Phase C Pickup	S-C (VA)	
		03	04	32-1 Phase Pickup	S-3P (VA)	
		08	05	32-1 Phase A Trip	S-A (VA)	
		09	06	32-1 Phase B Trip	S-B (VA)	
		10	07	32-1 Phase C Trip	S-C (VA)	
		11	08	32-1 Phase Trip	S-3P (VA)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
683	32-2	00	01	32-2 Phase A Pickup	S-A (VA)	✓
		01	02	32-2 Phase B Pickup	S-B (VA)	
		02	03	32-2 Phase C Pickup	S-C (VA)	
		03	04	32-2 Phase Pickup	S-3P (VA)	
		08	05	32-2 Phase A Trip	S-A (VA)	
		09	06	32-2 Phase B Trip	S-B (VA)	
		10	07	32-2 Phase C Trip	S-C (VA)	
		11	08	32-2 Phase Trip	S-3P (VA)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
685	32-3	00	01	32-3 Phase A Pickup	S-A (VA)	✓
		01	02	32-3 Phase B Pickup	S-B (VA)	
		02	03	32-3 Phase C Pickup	S-C (VA)	
		03	04	32-3 Phase Pickup	S-3P (VA)	
		08	05	32-3 Phase A Trip	S-A (VA)	
		09	06	32-3 Phase B Trip	S-B (VA)	
		10	07	32-3 Phase C Trip	S-C (VA)	
		11	08	32-3 Phase Trip	S-3P (VA)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
687	32-4	00	01	32-4 Phase A Pickup	S-A (VA)	✓
		01	02	32-4 Phase B Pickup	S-B (VA)	
		02	03	32-4 Phase C Pickup	S-C (VA)	
		03	04	32-4 Phase Pickup	S-3P (VA)	
		08	05	32-4 Phase A Trip	S-A (VA)	
		09	06	32-4 Phase B Trip	S-B (VA)	
		10	07	32-4 Phase C Trip	S-C (VA)	
		11	08	32-4 Phase Trip	S-3P (VA)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
689	81-1	03	01	81-1 Pickup	f (Hz)	✓
		11	02	81-1 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
691	81-2	03	01	81-2 Pickup	f (Hz)	✓
		11	02	81-2 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
693	81-3	03	01	81-3 Pickup	f (Hz)	✓
		11	02	81-3 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
695	81-4	03	01	81-4 Pickup	f (Hz)	✓
		11	02	81-4 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
697	81-5	03	01	81-5 Pickup	f (Hz)	✓
		11	02	81-5 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
699	81-6	03	01	81-6 Pickup	f (Hz)	✓
		11	02	81-6 Trip	f (Hz)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
715	81R-1	03	01	81R-1 Pickup	df/dt (Hz/s)	✓
		11	02	81R-1 Trip	df/dt (Hz/s)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
717	81R-2	03	01	81R-2 Pickup	df/dt (Hz/s)	✓
		11	02	81R-2 Trip	df/dt (Hz/s)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
719	78	11	01	78 Trip	-	✓

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
659	50BF	03	01	50BF Pickup	I-Max (A)	✓
		11	02	50BF Alarm	I-Max (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
705	74TCS	03	01	74TCS Pickup	I-Max (A)	✓
		11	02	74TCS Alarm	I-Max (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
707	60CTS	03	01	60CTS Pickup	I-Max (A)	✓
		11	02	60CTS Alarm	I-Max (A)	

Address	Description	Bit	Event NO	Status	Associated Measurement	SIR-C
709	60VTS	03	01	60VTS Pickup	V-2 (V)	✓
		08	02	60VTS Phase A Alarm	V-A (V)	
		09	03	60VTS Phase B Alarm	V-B (V)	
		10	04	60VTS Phase C Alarm	V-C (V)	
		11	05	60VTS Phase Alarm	V-2 (V)	

Address	Description	Bit	Event NO	Status	SIR-C
609	HMI	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
608	HMI	00	21	User Command 4	
		01	22	User Command 5	
		02	23	User Command 6	
		09	15	Set Counter	
		11	11	Key Reset	
		13	12	Activity	
		14	13	Identification	
		15	14	Test State	

Address	Description	Bit	Event NO	Status	SIR-C
613	USB COM	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
612	USB COM	00	21	User Command 4	
		01	22	User Command 5	
		02	23	User Command 6	
		09	15	Set Counter	
		12	-	Activity	
		13	13	Identification	

Address	Description	Bit	Event NO	Status	SIR-C
621	MODBUS RTU	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
620	MODBUS RTU	00	21	User Command 4	
		01	22	User Command 5	
		02	23	User Command 6	
		09	15	Set Counter	
		12	-	Activity	
		13	13	Identification	

Address	Description	Bit	Event NO	Status	SIR-C
625	DNP3 Serial	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
624	DNP3 Serial	00	21	User Command 4	
		01	22	User Command 5	
		02	23	User Command 6	
		12	-	Activity	

Address	Description	Bit	Event NO	Status	SIR-C
627	IEC-103	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
626	IEC-103	00	21	User Command 4	
		01	22	User Command 5	
		02	23	User Command 6	
		12	-	Activity	

Address	Description	Bit	Event NO	Status	SIR-C
623	MODBUS TCP	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
622	MODBUS TCP	00	21	User Command 4	
		01	22	User Command 5	
		02	23	User Command 6	
		09	15	Set Counter	
		12	-	Activity	
		13	13	Identification	

Address	Description	Bit	Event NO	Status	SIR-C
749	DNP3.0 TCP/IP	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
748	DNP3.0 TCP/IP	00	21	User Command 4	
		01	22	User Command 5	
		02	23	User Command 6	
		12	-	Activity	

Address	Description	Bit	Event NO	Status	SIR-C
757	WEB	01	02	Open breaker	✓
		02	03	Close breaker	
		03	04	79 Block	
		04	05	79 Unblock	
		05	06	Local Control	
		06	07	Remote Control	
		07	08	Reset	
		09	10	Thermal Image Reset	
		11	16	Hot Line Tag ON	
		12	17	Hot Line Tag OFF	
		13	18	User Command 1	
		14	19	User Command 2	
		15	20	User Command 3	
756	WEB	00	21	User Command 4	
		01	22	User Command 5	
		02	23	User Command 6	
		12	-	Activity	

1.5.5. States identifiers

CRITERIA	IDENTIFIER
MEASUREMENTS	65281
DFR	64513
LDP	61185
SELF DIAGNOSIS	51457
GENERAL	51201
52	13313
79	20225
SCM	20481
SZM	20993
25	6401
INPUTS	64769
OUTPUTS	65025
PGC	64001
Alarm LEDs	53505
Control LEDs	64257
SHB	51714
CLP	51969
SOTF	37889
64REF	41985
50-1	12833
50-2	12865
50G	38401
50N	38402
67-1	17185
67-2	17217
67-3	17249
67-4	17281
67G-1	42785
67G-2	42817
67N-1	42786
67N-2	42818
67GI	42755
67NI	42756
46	11777
46BC	11778
49	12545
37	9473

CRITERIA	IDENTIFIER
27-1	6945
27-2	6977
27-L	6915
27V1	32513
27V1-L	32514
59-1	15137
59-2	15169
59-L	15107
59N-1	40737
59N-2	40769
59N-L	40705
47	12033
47-L	12034
32-1	8225
32-2	8257
32-3	8289
32-4	8321
81-1	20769
81-2	20801
81-3	20833
81-4	20865
81-5	20897
81-6	20929
81R-1	46369
81R-2	46401
78	19969
50BF	38913
74TCS	18945
60CTS	44545
60VTS	15361
HMI	52481
USB COM	63745
REAR SERIAL COM	63489
MODBUS RTU	63746
DNP3 SERIAL	61698
IEC-103	61442
Rear TCP COM	63233

CRITERIA	IDENTIFIER
Modbus TCP	63748
DNP3 TCP	61700
WEB	63750

1.5.6. Measurements Map

The function code implemented to **State reading is 0x03 (Read Holding Registers)**.

Number of registries: 2.

Address	Description	Format	Number of registries	SIR-C
800	Phase A current IA	FLOAT	2	✓
802	Phase B current IB		2	✓
804	Phase C current IC		2	✓
806	Neutral current IN		2	✓
808	Phase-Neutral V-A		2	✓
810	Phase-Neutral V-B		2	✓
812	Phase-Neutral V-C		2	✓
814	3V-0		2	✓
816	VL-A		2	✓
818	VL-B		2	✓
820	VL-C		2	✓
822	3VL-0		2	✓
824	Phase A second harmonic current I-A2H		2	✓
826	Phase B second harmonic current I-B2H		2	✓
828	Phase C second harmonic current I-C2H		2	✓
830	Current 3I ₀		2	✓
832	Positive Sequence current I-1		2	✓
834	Negative Sequence current I-2		2	✓
836	I2/I1		2	✓
838	Maximum current I-Max		2	✓
840	V-1		2	✓
842	V-2		2	✓
844	VL-1		2	✓
846	VL-2		2	✓
848	Phase-Phase Voltage U-AB		2	✓
850	Phase-Phase Voltage U-BC		2	✓
852	Phase-Phase Voltage U-CA		2	✓
854	V-Max		2	✓
856	VL-Max		2	✓
858	Active Power P-3P		2	✓

860	Reactive Power Q-3P		2	✓
862	Apparent Power S-3P		2	✓
864	Active Power P-A		2	✓
866	Reactive Power Q-A		2	✓
868	Apparent Power S-A		2	✓
870	Active Power P-B		2	✓
872	Reactive Power Q-B		2	✓
874	Apparent Power S-B		2	✓
876	Active Power P-C		2	✓
878	Reactive Power Q-C		2	✓
880	Apparent Power S-C		2	✓
914	Bar Frequency f-Bar		2	✓
916	Line Frequency f-Line		2	✓
918	Df/dt		2	✓
920	Thermal image		2	✓
882	Ang I-A		2	✓
884	Ang I-B		2	✓
886	Ang I-C		2	✓
888	Ang I-N		2	✓
890	Ang 3I0		2	✓
892	Ang V-A		2	✓
894	Ang V-B		2	✓
896	Ang V-C		2	✓
898	Ang 3V0		2	✓
900	Ang L-A		2	✓
902	Ang L-B		2	✓
904	Ang L-C		2	✓
906	Ang 3VL-0		2	✓
908	Ang UAB		2	✓
910	Ang UBC		2	✓
912	Ang UCA		2	✓
922	I-N2H		2	✓
924	cosPhi A		2	✓
926	cosPhi B		2	✓
928	cosPhi C		2	✓
930	CosPhi		2	✓
932	THD I-A		2	✓
934	THD I-B		2	✓
936	THD I-C		2	✓

1.5.7. Fault reports Map

The function code implemented to **State reading is 0x03 (Read Holding Registers)**.

Address	Description	Format	Associated Measurement	Number of registries	SIR-C
8334	Trip reason (with date and time)	ASCII	-	16	✓
8350	Fault report Phase A current IA	FLOAT INVERSE	I-A (A)	2	✓
8352	Fault report Phase B current IB		I-B (A)	2	✓
8354	Fault report Phase C current IC		I-C (A)	2	✓
8356	Fault report Neutral current IN		I-N (A)	2	✓
8358	Fault report Phase A voltage		V-A (V)	2	✓
8360	Fault report Phase B Voltage		V-B (V)	2	✓
8362	Fault report Phase C Voltage		V-C (V)	2	✓
8364	Fault report Phase A Line voltage		VL-A (V)	2	✓
8366	Fault report Phase B Line Voltage		VL-B (V)	2	✓
8368	Fault report Phase C Line Voltage		VL-C (V)	2	✓

Addresses and functions related to fault reports are the following:

The function code implemented to **reading is 0x03 (Read Holding Registers)**.

The function code implemented to **writing is 0x03 (Write Holding Registers)**.

Function	Description	Start address	Number of registries
16	Write fault report index	8000	2
16	Write event index from a fault report	8002	2
03	Read event from a fault report	8123	11
16	Delete All DFR	8200	2
03	Read trip reason and date	8334	16

1.5.8. Example of obtaining information from a Fault Report

There are multiple ways to obtaining information from the fault report.

1.5.8.1. Ask for each event of a fault report

First start the session using the function 16 (write multiple registers) for entering the password at address 168.

Default password "Fanox/5555" entered in HEX, as in the image:

16: Write multiple registers (HEX)

Slave ID: 2

Address: 168

Quantity: 5

168 = 0x4661
169 = 0x6E6F
170 = 0x782F
171 = 0x3535
172 = 0x3535

Send
Cancel
Edit
Open
Save

Next, write the fault report index you want to read on the 8000 address. The newest fault report has the index number one, so for reading the last fault report:

16: Write multiple registers (HEX)

Slave ID: 2

Address: 8000

Quantity: 2

8000 = 0x0000
8001 = 0x0001

Send
Cancel
Edit
Open
Save

Then write the event index from which you want to start reading on the 8002 address. For reading the first event:

16: Write multiple registers (HEX)

Slave ID: 2

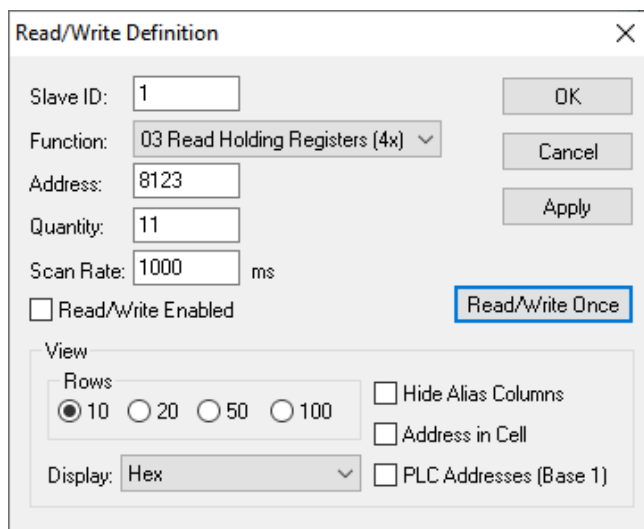
Address: 8002

Quantity: 2

8002 = 0x0000
8003 = 0x0001

Send
Cancel
Edit
Open
Save

To conclude, read the selected event with function 3 (read holding register) on address 8123 and 11 registers:



Read/Write Definition

Slave ID: 1

Function: 03 Read Holding Registers (4x)

Address: 8123

Quantity: 11

Scan Rate: 1000 ms

☐ Read/Write Enabled

View

Rows: ☒ 10 ☐ 20 ☐ 50 ☐ 100

Display: Hex

☐ Hide Alias Columns

☐ Address in Cell

☐ PLC Addresses (Base 1)

The response includes the identifier of the criteria, number of the event in that criteria (info available on the status map), status of the event (active/desactivate) and associated measurement and date:

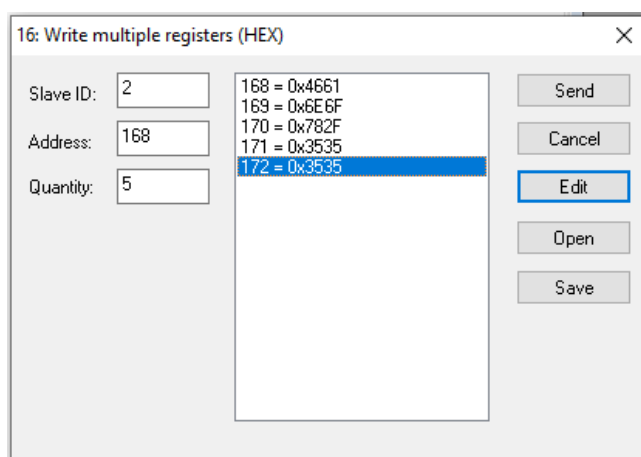
000214-Rx: 02	03	16	00 02	05 33	01 00	01 00	3F F2 6E 98	07 E4	02	19	09	30	3A	27	01 86	8A B1
Slave address	Function Code	Nº of Bytes	Index of the event	Size of criteria. In Big Endian 3305 is read, which refers to 13061 Identifier of 51P function	Event nº in criteria. Event nº1 in 51P concerns to IA	Status of the event 01 00 -> Activ. 00 00 -> Deactiv.	Associated measurement. from HEX to float: 1.89 A	Year	Month	Day	Hour	Minutes	Seconds	Hundred of seconds	Thousands of seconds	CRC

Continue reading in same 8123 direction for obtaining the nexts events of the report.

1.5.8.2. Ask for the trip reason of a fault report

First start the session using the function 16 (write multiple registers) for entering the password at address 168.

Default password "Fanox/5555" should be entered in HEX, as in the image:



16: Write multiple registers (HEX)

Slave ID: 2

Address: 168

Quantity: 5

168 = 0x4661
169 = 0x6E6F
170 = 0x782F
171 = 0x3535
172 = 0x3535

Next, write the fault report index you want to read on the 8000 address. The newest fault report has the index number one, so for reading the last fault report:

16: Write multiple registers (HEX) ✕

Slave ID:

Address:

Quantity:

8000 = 0x0000
8001 = 0x0001

Send
Cancel
Edit
Open
Save

And finally read 16 registers starting on address 8334. On the response the trip reason is given on ASCII format:

000004-Tx:02	03	20	8E	00	10	2F	DE																												
000005-Rx:02	03	20	07	E4	00	0B	00	0B	00	09	00	23	00	07	00	31	01	EB	47	45	4E	45	52	41	4C	00	00	00	00	00	00	00	00	A2	8D
			Year		Month		Day		Hour		Minutes		Seconds				Thousand of seconds		Trip Reason										CRC						
Slave Address	Nº of bytes																																		
Function Code																																			

1.5.9. Settings Map

The function code implemented to **State writing is 0x16 (Write Holding Registers)**.

Number of registries: 2.

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / Measurements	1018	Frequency	ENUM4	00 → 60 Hz 01 → 50 Hz	✓
	1020	P. Nominal current	ENUM4	00 → 5 A 01 → 1 A	✓
	1022	N. Nominal Current	ENUM4	00 → 5 A 01 → 1 A	✓
	1024	CT Phase Ratio	FLOAT INVERSE	-	✓
	1026	CT Neutral ratio	FLOAT INVERSE	-	✓
	1030	Nominal V. P-P	UINT32	-	✓
	1032	Volt. Sensor Ratio	FLOAT INVERSE	-	✓
	1036	V-A RCF	FLOAT INVERSE	-	✓
	1038	V-B RCF	FLOAT INVERSE	-	✓
	1040	V-C RCF	FLOAT INVERSE	-	✓
	1042	VL-A RCF	FLOAT INVERSE	-	✓
	1044	VL-B RCF	FLOAT INVERSE	-	✓
	1046	VL-C RCF	FLOAT INVERSE	-	✓
	1048	IA Deadband	TAP	-	✓
	1050	IB Deadband	TAP	-	✓
	1052	IC Deadband	TAP	-	✓
	1054	IN Deadband	TAP	-	✓
	1056	VA Deadband	TAP	-	✓
	1058	VB Deadband	TAP	-	✓
	1060	VC Deadband	TAP	-	✓
	1062	VN Deadband	TAP	-	✓
	1064	VA-L Deadband	TAP	-	✓
	1066	VB-L Deadband	TAP	-	✓
	1068	VC-L Deadband	TAP	-	✓
	1070	VN-L Deadband	TAP	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / DFR	1166	Num. Of Records	ENUM4	00 → 5 x 260 cycles 01 → 25 x 60 cycles 02 → 50 x 30 cycles 03 → 100 x 15 cycles	✓
	1168	Cycles Prefault	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / LDP	1170	Current Level	TAP	-	✓
	1172	Interval Time	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / General	1000	Identification	TEXT16*	-	✓
	1012	Language	ENUM4	00 → English 01 → Spanish 02 → German or Russian 03 → French or Turkish	✓
	1014	Active Setting Group	UINT32	01 → Set. Group 1 02 → Set. Group 2 03 → Set. Group 3 04 → Set. Group 4 05 → Set. Group 5 06 → Set. Group 6	✓
	1016	Clearing Time	FLOAT INVERSE	-	✓
	1764	Min. Response Time	FLOAT INVERSE	-	✓

*TEXT16 type needs 8 registers, 1 register for each 2 characters. For example, for writing "Fanox", the following hexadecimal values must be sent:

16: Write multiple registers (HEX)

Slave ID:	2	1000 = 0x4661 1001 = 0x6E6F 1002 = 0x7800 1003 = 0x0000 1004 = 0x0000 1005 = 0x0000 1006 = 0x0000 1007 = 0x0000
Address:	1000	
Quantity:	8	

Settings	Address	Description	Format	Enumeration	SIR-C
52	1182	Max Number of Openings	UINT32	-	✓
	1184	Max Accumulated Amperes	UINT32	-	✓
	1186	Excessive Repetitive Openings	UINT32	-	✓
	1188	Repetitive Openings/Time	UINT32	-	✓
	1190	Opening Time	FLOAT INVERSE	-	✓
	1192	Closing Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
79	1526	Reclose Number	ENUM8	00 → No Reclose 01 → 1 Shot 02 → 2 Shots 03 → 3 Shots 04 → 4 Shots	✓
	1528	Reset Time	FLOAT INVERSE	-	✓
	1530	Reclose 1 Time	FLOAT INVERSE	-	✓
	1532	Reclose 2 Time	FLOAT INVERSE	-	✓
	1534	Reclose 3 Time	FLOAT INVERSE	-	✓
	1536	Reclose 4 Time	FLOAT INVERSE	-	✓
	1538	Hold Enable	ENUM4	00 → No 01 → Yes 02 → No Time	✓
	1540	Hold Time	FLOAT INVERSE	-	✓
	1542	Safe Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
SCM	1662	Number of shots	ENUM8	00 → No Permitted 01 → 1 Shot 02 → 2 Shots 03 → 3 Shots 04 → 4 Shots	✓
	1664	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
SZM	1666	Number of shots	ENUM8	00 → No Permitted 01 → 1 Shot 02 → 2 Shots 03 → 3 Shots 04 → 4 Shots	✓
	1668	Reset Time	FLOAT INVERSE	-	✓
	1670	Max. Open Time	FLOAT INVERSE	-	✓
	1672	Max. Close Time	FLOAT INVERSE	-	✓
	1674	Current Tap	TAP	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
25	1568	Dead Tap	TAP	-	✓
	1570	Live Tap	TAP	-	✓
	1572	V. Supervis. Time	FLOAT INVERSE	-	✓
	1574	Voltage Diff	TAP	-	✓
	1576	Phase Diff.	UINT32	-	✓
	1578	Frequency Diff.	FLOAT INVERSE	-	✓
	1580	Synchrocheck Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
Inputs	1164	Debounce Time	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
SHB	1394	Function Enable	ENUM4	00 → No 01 → Yes	✓
	1396	Current Tap	UINT32	-	✓
	1398	Reset Time	FLOAT INVERSE	-	✓
	1400	Block Threshold	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
CLP	1174	Function Enable	ENUM4	00 → No 01 → Yes	✓
	1176	Settings Group	UINT32	-	✓
	1178	No Load Time	FLOAT INVERSE	-	✓
	1180	Cold Load Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
SOTF	1752	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1754	Current Tap	TAP	-	✓
	1756	Time Delay	FLOAT INVERSE	-	✓
	1758	Safe Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
50-1	1194	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1196	Current Tap	TAP	-	✓
	1198	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
50-2	1200	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1202	Current Tap	TAP	-	✓
	1204	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
50G	1278	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1280	Current Tap	TAP	-	✓
	1282	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
50N	1284	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1286	Current Tap	TAP	-	✓
	1288	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67-1	1206	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1208	Curve Type	ENUM16	(1)	✓
	1210	Time Dial (TMS)	FLOAT INVERSE	(2)	✓
	1212	Current Tap	TAP	-	✓
	1214	Time Delay	FLOAT INVERSE	-	✓

	1216	Directionality	FLOAT INVERSE	0 → No 01 → Direct 02 → Inverse	✓
	1218	Polarization V	TAP	-	✓
	1220	Operating angle	UINT32	-	✓
	1222	Halfcone Angle	UINT32	-	✓

(1) Definite time and 67 curves are included to be selected by the user following this numbering for all the 67 functions:

TYPE	Enumeration	TYPE	Enumeration	TYPE	Enumeration
DT	00 → Definite Time	SMU	23 → 125E	RC	46 → Z - 134
IEC	01 → Long Time Inverse		24 → 150E		47 → 1 - 102
	02 → Standard Inverse		25 → 175E		48 → 2 - 135
	03 → Very Inverse		26 → 200E		49 → 3 - 140
	04 → Extremely Inverse	RC	27 → A - 101		50 → 4 - 106
	05 → Short time Inverse		28 → B - 117		51 → 5 - 114
IEEE	06 → Moderately Inverse		29 → C - 133		52 → 6 - 136
	07 → Very Inverse		30 → D - 116		53 → 7 - 152
	08 → Extremely Inverse		31 → E - 132		54 → 8 - 113
U	09 → U1 - MI		32 → F - 163		55 → 8 - PLUS 111
	10 → U2 - I		33 → G - 121		56 → 9 - 131
	11 → U3 - VI		34 → H - 122		57 → KG - 165
	12 → U4 - EI		35 → J - 164		58 → 11 - 141
	13 → U5 - STI		36 → KP - 162		59 → 13 - 142
SMU	14 → 15E		37 → L - 107		60 → 14 - 119
	15 → 20E		38 → M - 118		61 → 15 - 112
	16 → 25E		39 → N - 104		62 → 16 - 139
	17 → 30E		40 → P - 115		63 → 17 - 103
	18 → 40E		41 → R - 105		64 → 18 - 151
	19 → 50E		42 → T - 161		65 → 200
	20 → 65E		43 → V - 137		66 → 201
	21 → 80E		44 → W - 138		67 → 202
	22 → 100E		45 → Y - 120		

(2) The range of the time Multiplier setting will depend on the curve. The range of this setting for each curve family is as follows for all the 67 functions:

TIME DIAL (TMS)						
	Description	Minimum	Maximum	Step	Unit	Default
IEC	Time Multiplier	0.05	1.00	0.01	-	1.00
IEEE	Time Multiplier	0.10	25.00	0.01	-	1.00
U	Time Multiplier	0.05	15	0.01	-	1.00

SMU20	n/a					
RC	Time Multiplier	0.10	2.00	0.01	-	1

Settings	Address	Description	Format	Enumeration	SIR-C
67-2	1224	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1226	Curve Type	ENUM16	(1)	✓
	1228	Time Dial (TMS)	FLOAT INVERSE	(2)	✓
	1230	Current Tap	TAP	-	✓
	1232	Time Delay	FLOAT INVERSE	-	✓
	1234	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1236	Polarization V	TAP	-	✓
	1238	Operating angle	UINT32	-	✓
	1240	Halfcone Angle	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67-3	1242	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1244	Curve Type	ENUM16	(1)	✓
	1246	Time Dial (TMS)	FLOAT INVERSE	(2)	✓
	1248	Current Tap	TAP	-	✓
	1250	Time Delay	FLOAT INVERSE	-	✓
	1252	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1254	Polarization V	TAP	-	✓
	1256	Operating angle	UINT32	-	✓
	1258	Halfcone Angle	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67-4	1260	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1262	Curve Type	ENUM16	(1)	✓
	1264	Time Dial (TMS)	FLOAT INVERSE	(2)	✓
	1266	Current Tap	TAP	-	✓
	1268	Time Delay	FLOAT INVERSE	-	✓
	1270	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1272	Polarization V	TAP	-	✓
	1274	Operating angle	UINT32	-	✓
	1276	Halfcone Angle	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67G-1	1290	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1292	Curve Type	ENUM16	(1)	✓
	1294	Time Dial (TMS)	FLOAT INVERSE	(2)	✓
	1296	Current Tap	TAP	-	✓
	1298	Time Delay	FLOAT INVERSE	-	✓
	1300	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1302	Polarization V	TAP	-	✓
	1304	Operating angle	UINT32	-	✓
	1306	Halfcone Angle	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67G-2	1308	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1310	Curve Type	ENUM16	(1)	✓
	1312	Time Dial (TMS)	FLOAT INVERSE	(2)	✓
	1314	Current Tap	TAP	-	✓
	1316	Time Delay	FLOAT INVERSE	-	✓
	1318	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1320	Polarization V	TAP	-	✓
	1322	Operating angle	UINT32	-	✓
	1324	Halfcone Angle	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67N-1	1326	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1328	Curve Type	ENUM16	(1)	✓
	1330	Time Dial (TMS)	FLOAT INVERSE	(2)	✓
	1332	Current Tap	TAP	-	✓
	1334	Time Delay	FLOAT INVERSE	-	✓
	1336	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1338	Polarization V	TAP	-	✓
	1340	Operating angle	UINT32	-	✓
	1342	Halfcone Angle	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67N-2	1344	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1346	Curve Type	ENUM16	(1)	✓
	1348	Time Dial (TMS)	FLOAT INVERSE	(2)	✓

	1350	Current Tap	TAP	-	✓
	1352	Time Delay	FLOAT INVERSE	-	✓
	1354	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1356	Polarization V	TAP	-	✓
	1358	Operating angle	UINT32	-	✓
	1360	Halfcone Angle	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67GI	1676	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1678	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1680	Low Tap	TAP	-	✓
	1682	Voltage Low Tap	TAP	-	✓
	1684	High Tap	TAP	-	✓
	1686	Voltage High Tap	TAP	-	✓
	1688	Time Delay	FLOAT INVERSE	-	✓
	1690	Operating angle	UINT32	-	✓
	1692	Halfcone Angle	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
67NI	1694	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1696	Directionality	ENUM4	0 → No 01 → Direct 02 → Inverse	✓
	1698	Low Tap	TAP	-	✓
	1700	Voltage Low Tap	TAP	-	✓
	1702	High Tap	TAP	-	✓
	1704	Voltage High Tap	TAP	-	✓
	1706	Time Delay	FLOAT INVERSE	-	✓
	1708	Operating angle	UINT32	-	✓

	1710	Halfcone Angle	UINT32	-	✓
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Settings	Address	Description	Format	Enumeration	SIR-C
46	1366	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1368	Curve Type	ENUM16	(1)	✓
	1370	Time Dial (TMS)	FLOAT INVERSE	(2)	✓
	1372	Current Tap	TAP	-	✓
	1374	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
46BC	1740	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1742	Current Tap	UINT32	-	✓
	1744	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
49	1376	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1378	Current Tap	TAP	-	✓
	1380	Heating Constant τ	UINT32	-	✓
	1382	Cooling Constant	UINT32	-	✓
	1384	Alarm Level	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
37	1386	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1388	Current Tap	TAP	-	✓
	1390	Minimum Level	TAP	-	✓
	1392	Time delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
27-1	1402	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1404	Voltage Tap	TAP	-	✓
	1406	Minimum Level	TAP	-	✓
	1408	Time delay	FLOAT INVERSE	-	✓
	1410	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
27-2	1412	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1414	Voltage Tap	TAP	-	✓
	1416	Minimum Level	TAP	-	✓
	1418	Time delay	FLOAT INVERSE	-	✓
	1420	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
27-L	1722	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1724	Tap	TAP	-	✓
	1726	Minimum Level	TAP	-	✓
	1728	Time delay	FLOAT INVERSE	-	✓
	1730	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
27V1	1712	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1714	Voltage Tap	TAP	-	✓
	1716	Minimum Level	TAP	-	✓
	1718	Time delay	FLOAT INVERSE	-	✓
	1720	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
27V1-L	1644	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1646	Voltage Tap	TAP	-	✓
	1648	Minimum Level	TAP	-	✓
	1650	Time delay	FLOAT INVERSE	-	✓
	1652	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
59-1	1422	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1424	Voltage Tap	TAP	-	✓
	1426	Time delay	FLOAT INVERSE	-	✓
	1428	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
59-2	1430	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1432	Voltage Tap	TAP	-	✓
	1434	Time delay	FLOAT INVERSE	-	✓
	1436	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
59-L	1732	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1734	Voltage Tap	TAP	-	✓
	1736	Time delay	FLOAT INVERSE	-	✓
	1738	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
59N-1	1438	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1440	Voltage Tap	TAP	-	✓
	1442	Time delay	FLOAT INVERSE	-	✓
	1444	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
59N-2	1446	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1448	Voltage Tap	TAP	-	✓
	1450	Time delay	FLOAT INVERSE	-	✓
	1452	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
59N-L	1654	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1656	Voltage Tap	TAP	-	✓
	1658	Time delay	FLOAT INVERSE	-	✓
	1660	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
47	1628	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1630	Voltage Tap	TAP	-	✓
	1632	Time delay	FLOAT INVERSE	-	✓
	1634	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
47-L	1636	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1638	Voltage Tap	TAP	-	✓
	1640	Time delay	FLOAT INVERSE	-	✓
	1642	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
32-1	1454	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1456	Activation level	TAP	-	✓
	1458	Operating angle	UINT32	-	✓
	1460	Time delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
32-2	1462	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1464	Activation level	TAP	-	✓
	1466	Operating angle	UINT32	-	✓
	1468	Time delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
32-3	1470	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1472	Activation level	TAP	-	✓
	1474	Operating angle	UINT32	-	✓
	1476	Time delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
32-4	1478	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1480	Activation level	TAP	-	✓
	1482	Operating angle	UINT32	-	✓
	1484	Time delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
81-1	1486	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1488	Type	ENUM4	00 → Over 01 → Under	✓
	1490	Activation Level	FLOAT INVERSE	-	✓
	1492	Time Delay	FLOAT INVERSE	-	✓

	1494	Reset Time	FLOAT INVERSE	-	✓
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Settings	Address	Description	Format	Enumeration	SIR-C
81-2	1496	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1498	Type	ENUM4	00 → Over 01 → Under	✓
	1500	Activation Level	FLOAT INVERSE	-	✓
	1502	Time Delay	FLOAT INVERSE		✓
	1504	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
81-3	1506	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1508	Type	ENUM4	00 → Over 01 → Under	✓
	1510	Activation Level	FLOAT INVERSE	-	✓
	1512	Time Delay	FLOAT INVERSE		✓
	1514	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
81-4	1516	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1518	Type	ENUM4	00 → Over 01 → Under	✓
	1520	Activation Level	FLOAT INVERSE	-	✓
	1522	Time Delay	FLOAT INVERSE	-	✓
	1524	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
81-5	1602	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1604	Type	ENUM4	00 → Over 01 → Under	✓
	1606	Activation Level	FLOAT INVERSE	-	✓

	1608	Time Delay	FLOAT INVERSE	-	✓
	1610	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
81-6	1612	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1614	Type	ENUM4	00 → Over 01 → Under	✓
	1616	Activation Level	FLOAT INVERSE	-	✓
	1618	Time Delay	FLOAT INVERSE	-	✓
	1620	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
81R-1	1582	Function Enable	ENUM4	00 → Disable 01 → Alarm 02 → Trip	✓
	1584	Type	ENUM4	00 → Increase 01 → Decrease	✓
	1586	Activation Level	FLOAT INVERSE	-	✓
	1588	Time Delay	FLOAT INVERSE	-	✓
	1590	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
81R-2	1592	Function Enable	ENUM4	00 → No 01 → Alarm 02 → Trip	✓
	1594	Type	ENUM4	00 → Increase 01 → Decrease	✓
	1596	Activation Level	FLOAT INVERSE	-	✓
	1598	Time Delay	FLOAT INVERSE	-	✓
	1600	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
78	1622	Function Enable	ENUM4	00 → No 01 → Alarm 02 → Trip	✓
	1624	Activation Level	UINT32	-	✓
	1626	Reset Time	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
50BF	1362	Function Enable	ENUM4	00 → No 01 → Ys	✓
	1364	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
74TCS	1544	Function Enable	ENUM4	00 → No 01 → Yes	✓
	1546	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
60CTS	1548	Function Enable	ENUM4	00 → No 01 → Yes	✓
	1550	Time Delay	FLOAT INVERSE	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
60VTS	1552	Function Enable	ENUM4	00 → No 01 → Yes	✓
	1554	Time Delay	FLOAT INVERSE	-	✓
	1556	V1 Tap	TAP	-	✓
	1558	V2 Tap	TAP	-	✓
	1560	VP Tap	TAP	-	✓
	1562	I1 Tap	TAP	-	✓
	1564	I2 Tap	TAP	-	✓
	1566	I30 Tap	TAP	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
64REF	1808	Function Enable	ENUM4	0 → Disable 01 → Alarm 02 → Trip 03 → SHB Trip	✓
	1810	Current Tap	FLOAT INVERSE	-	✓
	1812	Time Delay	FLOAT INVERSE	-	✓
	1814	IN SHB Tap	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / USB COM	1078	Slave Address	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / Rear Serial COM	1092	Protocol	ENUM4	00 → Modbus RTU 01 → DNP3 serial 02 → IEC-103	✓
	1094	Baudrate	ENUM8	00 → 4800 01 → 9600 02 → 19200 03 → 38400 04 → 57600 05 → 115200	✓
	1096	Serial setting	ENUM4	00 → 8-N-1 01 → 8-E-1 02 → 8-O-1 03 → 9-N-1 04 → 8-N-2 05 → 8-E-2 06 → 8-O-2 07 → 9-N-1	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / MODBUS RTU	1112	Slave Address	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / DNP3 SERIAL	1130	Slave Address	UINT32	-	✓
	1132	DNP3 Master Addrss	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / IEC-103	1152	Slave Address	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / Rear TCP COM	1098	Protocol	ENUM4	00 → Modbus TCP 01 → DNP3 TCP	✓
	1100	IP Address	IP	-	✓
	1102	Subnet	IP	-	✓
	1104	Gateway	IP	-	✓
	1760	DNS-1	IP	-	✓
	1762	DNS-2	IP	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / MODBUS TCP	1120	Slave Address	UINT32	-	✓
	1122	Port	UINT32	-	✓

Settings	Address	Description	Format	Enumeration	SIR-C
General settings / DNP3 TCP	1140	Slave Address	UINT32	-	✓
	1142	DNP3 Master Addrss	UINT32	-	✓
	1144	Port	UINT32	-	✓

1.6. Counters

The function code implemented to **State reading is 0x03 (Read Holding Registers)**.

The function code implemented to **State writing is 0x16 (Write Holding Registers)**.

Number of registries: 2.

Function	Description	Start address	Number of registries	Format
03 & 16	Opennings Number	500	2	FLOAT INVERSE
03 & 16	Recloses Number	502	2	
03 & 16	Accumulated Amps	504	2	
03 & 16	AE+	508	2	
03 & 16	AE-	510	2	
03 & 16	RE+	512	2	
03 & 16	RE-	514	2	

1.7. Command List

The function code implemented to **State writing is 0x16 (Write Holding Registers)**.

Number of registries: 2.

2 ways to execute commands are given:

- **Writing the same address for all the commands and changing the enumeration:**

Address	Description	Number of registries	Enumeration	Format	SIR-C
198	Open Breaker	2	01	UINT32	✓
	Close Breaker	2	02	UINT32	✓
	79 Block	2	03	UINT32	✓
	79 Unblock	2	04	UINT32	✓
	Local Control	2	05	UINT32	✓
	Remote Control	2	06	UINT32	✓
	Reset	2	07	UINT32	✓
	Reset Thermal Image	2	09	UINT32	✓
	Hot Line Tag ON	2	11	UINT32	✓
	Hot Line Tag OFF	2	12	UINT32	✓
	User Command 1	2	13	UINT32	✓
	User Command 2	2	14	UINT32	✓
	User Command 3	2	15	UINT32	✓
	User Command 4	2	16	UINT32	✓
	User Command 5	2	17	UINT32	✓
	User Command 6	2	18	UINT32	✓

- **Writing different command addresses:**

There is no need to start the session, these are direct operate commands.

Address	Description	Number of registries	Enumeration	Format	SIR-C
220	Open Breaker	2	0x00010000	UINT32	✓
	Close Breaker	2	0x00000000	UINT32	✓
222	79 Block	2	0x00010000	UINT32	✓
	79 Unblock	2	0x00000000	UINT32	✓
224	Local Control	2	0x00010000	UINT32	✓
	Remote Control	2	0x00000000	UINT32	✓
226	Reset	2	0x00010000	UINT32	✓
228	Reset Thermal Image	2	0x00010000	UINT32	✓

1.8. Setting-up the session: Password and access levels

The relay is provided with ten passwords associated to four access levels allowing the user to carry out different actions depending on the selected password.

The passwords and their associated levels of access can be set up using the Sicom program. The password must consist of 10 characters (passwords with more or less characters will not be accepted), and must include at least 1 number, 1 lowercase letter, 1 uppercase letter and 1 symbol.

By default, the relay is programmed with the following passwords and their associated levels:

ACCESS LEVEL	PASSWORD	Read-only permission: Status and measurements Settings Configuration Events/DFR	Permission to: Change settings	Permission to: Execute Commands Set Counters Delete Events Delete DFR	Permission to: Change user's Configuration	Permission to: Upgrade the FW (flashing process)	Permission to: Read and change access levels	Permission to: Change manufacturer's Configuration
0	Fanox/0000	YES	NO	NO	NO	NO	NO	NO
1	Fanox/1111 Fanox/2222 Fanox/3333 Fanox/6666 Fanox/7777 Fanox/8888	YES	YES	NO	NO	NO	NO	NO
2	Fanox/4444	YES	YES	YES	NO	NO	NO	NO
3	Fanox/5555 Fanox/9999	YES	YES	YES	YES	YES	YES	NO

1.9. Example of Modbus Frames

Writing the access password "Fanox/5555" to equipment address no. 2

Address	Function	H Pickup Address	L Pickup Address	Number of H Registers	Number of L Registers	Number of Bytes	Password	Checksum H	Checksum L
0x02	0x10	0x00	0xA8	0x00	0x05	0x0A	0x4661 0x6E6F 0x782F 0x3535 0x3535	0x30	0xF4

And the SIR-C will reply OK:

Address	Function	H Pickup Address	L Pickup Address	Number of H Registers	Number of L Registers	Checksum H	Checksum L
0x02	0x10	0x00	0xA8	0x00	0x05	0x81	0xD9



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