MODBUS RTU / MODBUS TCP

for Modulys GP 2.0 range
Modulys XM range
Masterys GP4 UPS range
Masterys BC+ UPS range
Modulys XS range

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1. FOREWORD

Thank you for choosing a SOCOMEC product.

SOCOMEC reserves the right to modify their specifications at any time as far as this contributes to technical progress.

Conditions of use:

Read these operating instructions carefully before using the MODBUS interface.

Repairs must only be carried out by suitably qualified, authorised staff.

It is advisable to keep the UPS environment below manufacturer-specified values for optimum operation.

UPS Operating Reference Standard:

Comply with safety requirements.

Read the UPS operating instructions carefully.

2. GENERAL AIM

This document provides information on the MODBUS protocol serial link or Ethernet network for:

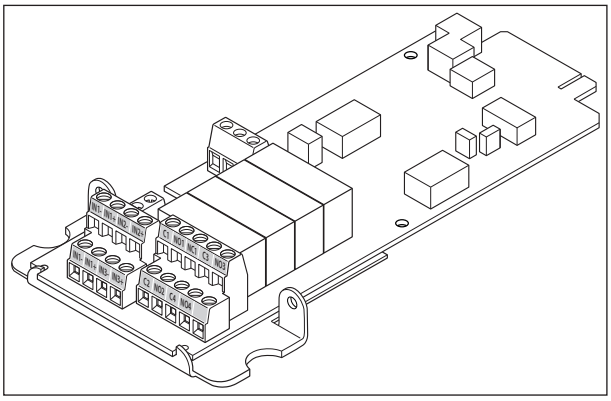
- MODULYS GP 2.0
- MODULYS XM
- MASTERYS BC+
- MASTERYS GP4
- MODULYS XS

Before connecting monitoring equipment or a BMS system (building management system) to the UPS, it is necessary to install and set up the serial interface or network configurations in the case of a network connection.

3. MODBUS RTU – RS485 INTERFACE (ADC+SL CARD)

3.1 Installation of the RTU card

The interface must first be installed in the appropriate slot and fastened to the com slots using 2 screws.



USING ADC+SL OPTION

This board includes RS485 insulated serial link and advanced dry input and output contacts.

Installation

- Slot 1 or slot 2
- Screws for fixing

Cabling:

- RTX+ / RTX- connector
- Terminal resistor

MODBUS RTU serial setting via HMI:

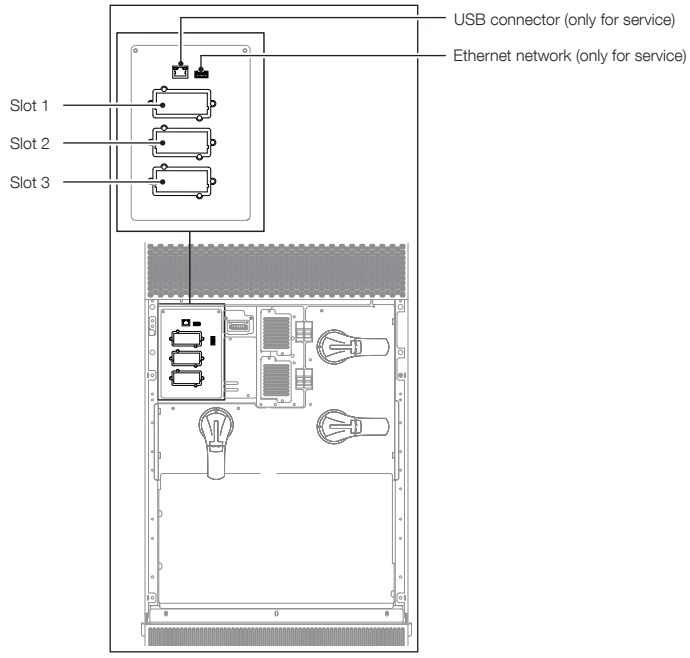
- Slave number
- Baud rate (2400 / 9600 / 19200)
- Parity (none, even, odd)
- N bit (8)
- Stop bit set to 1 by default

⚠	NOTE! Refers to ADC+SL user's manual.

3.2 COM-Slot location

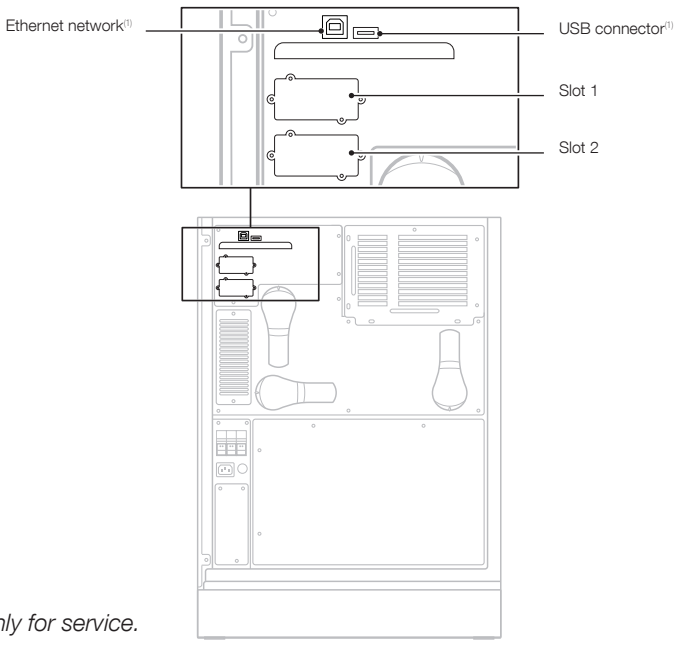
MODULYS XM
communication slots

1



MODULYS GP
communication slots

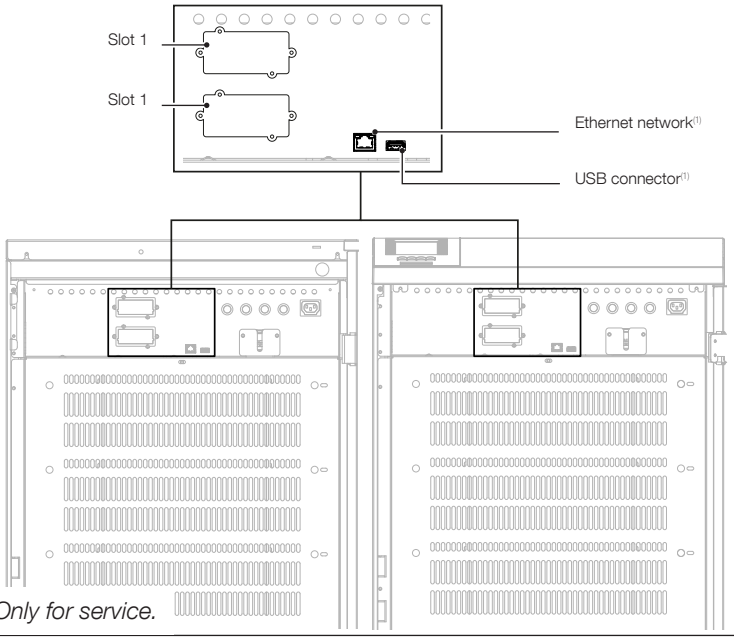
2



1. Only for service.

MASTERYS BC+ / GP4
communication slots

3

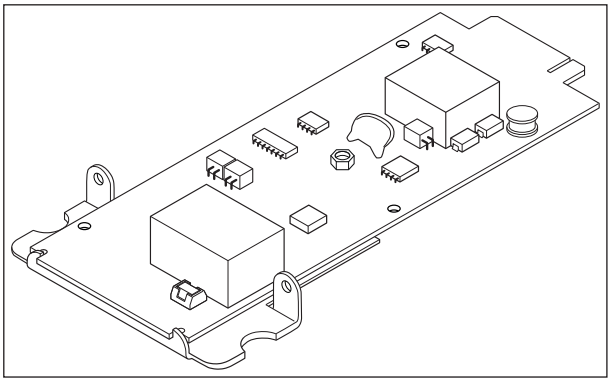


1. Only for service.

4. MODBUS TCP – IDA INTERFACE (MODBUS TCP CARD)

4.1 Installation of the MODBUS TCP Card

The interface must first be installed in the appropriate slot and fastened to the com slots using 2 screws.



4.2 Serial connection default setting

Serial connection parameters are set by an auto baud rate procedure with a timeout of 40 seconds.

4.3 Features and led description

Standard supported:

IEEE 802.3

Mode supported:

10/100Base-T

10/100Mbps (auto sensing)

Half-duplex & Full-duplex mode (auto sensing)

Connector type:

RJ-45

LED type	Color	Meaning
RJ45	Yellow	Line detected
	Yellow flashing	Searching line
	Off	No Ethernet line
RJ45	Green	ON
	Green flashing	MODBUS TCP Traffic
	Off	No traffic
Interface LED TX ON	Green	When transmitting data
Interface LED RX ON	Green	When receiving data
5V ISO		

NOTE!
Refers to Appendix 1.

4.4 MODBUS TCP v2

Refer to user manual of this card.

5. MODBUS UPS DATA ACCESS

5.1 Modbus generic table

Generic address	Length (in 16 bits word)	Table	Description	Type	Access
0x0001	15	CONFIGURATIONS	LIST OF CONFIG	Values	Read
0x0010	10	SERIAL NUMBER	STRING	ASCII	Read
0x001A	10	SOCOMEC REF	SOCOMEC RANGE NAME	ASCII	Read
0x0024	6	USER DEVICE REF	CUSTOMER REF	ASCII	Read
0x002A	6	USER DEVICE LOCATION	CUSTOMER LOCATION	ASCII	Read
0x0030	6+2 (for parallel system)	STATUS	UPS STATUS	Bits	Read
0x0038	6+2 (for parallel system)	ALARMS	UPS ALARMS	Bits	Read
0x0040	80	MEASUREMENTS	LIST OF VALUES	Values	Read
0x00C0	7	MEASUR. CTRL MGNT	BIT = 1 = MEAS. MANAGED	Bits	Read
0x00C7	2	PERMISSONS	BIT = 1 CONTROL ENABLED	Bits	Read
0x00C9	2	CONTROLS	1 BIT = 1 CONTROL	Bits	Write
0x00CB	4	UPS CLOCK	MSB/LSB FORMAT	Values	Read/ write

Detail of data type:

Values: 1 word = 16 bit integer: value range: 0 to 65535 or -32768 to +32768
format of values is described in the measurements table.

ASCII: 1 word = 2 characters: MSB = 1st character ASCII code, LSB = 2nd character ASCII code

Bits: 1 words = 16 binary info (Status or Alarms) bit = 1 means info ON/YES, 0 = OFF/NO
Bit 0 = 1st data (S000 or A000, according to address)

6. MODBUS TABLE MODULYS XS

6.1 Modulys XS configuration table, starting from 0x0001

NOTE!
Fields or bit fields not described must be considered as reserved/unused.

Address	Acronym	Description	Value		Default values
0x0001	T000	UPS installation code and Device type	MSB = UPS installation Code (1 byte)	lsb = Device type (1 byte)	(0x08)(0x01)
0x0002	T001	Number of devices in level -1	1 to 15		1 unit
0x0003	T002	Position of devices present	1		1 first position by default
0x0004	T003	Device number	1 to 15		1
0x0005	T004	Nominal kVA	*10 if 0x000E = 1		depends on the number of modules/ units
0x0006	T005	Nominal kW	*10 if 0x000E = 1		depends on the number of modules/ units
0x0007	T006	Phase number	MSB = Input phases 1 – 3	LSB = Output phases 1 - 3	(0x01)(0x01)
0x0008	T007	Function	b00	eco mode enabled	
			b01		
			b02		
			b03	genset present	
			b04		
			b05		
			b06	Standby schedule	
			b07		
			b08		
0x0009	T008	Environment	b00		
			b01		
			b02		
			b03		
			b04		
			b05		
			b06	Without bypass	
0x000A	T009	DC storage	b00	battery present	
			b01		
0x000B	T010	Power share	Nb of plugs		
0x000C	T011	free	free		
0x000D	T012	free	free		
0x000E	T013	measurements factor	0 = no factor / 1 = factor * 10		set to 1
0x000F	T014	Device reference code			0x8180: Modulys XS MC 0x8188: Modulys XS RM 0x818A: Modulys XS TC

Address	Acronym	Description	Value		Remarks
0x1001	T000	UPS installation code and Device type	MSB = 8 for modular	lsb = 1 for Unit	
0x1002	T001	Number of devices in level -1	1 to 15		1 to 6 modules
0x1003	T002	Position of present devices	b00	Module 1 present	
			b01	Module 2 present	
			b02	Module 3 present	
			b03	Module 4 present	
			b04	Module 5 present	
			b05	Module 6 present	
			b06		
			b07		
			b08		
			b09		
			b10		
			b11		
			b12		
			b13		
			b14		
			b15		
0x1004	T003	Device number	1 to 15		1 to 8

6.2 UPS reference table, starting from 0x0010

Address	Acronym	Description	Value		Remarks
			Length	Number of ASCII char.	
0x0010	I000	SERIAL NUMBER	10	20	MSB = first char of string
0x001A	I001	SOCOMEC REFERENCE	10	20	MSB = first char of string
0x0024	I002	USER DEVICE REFERENCE	6	12	MSB = first char of string
0x002A	I003	USER DEVICE LOCATION	6	12	MSB = first char of string

6.3 UPS status table, starting from 0x0030

For Modular Units the Unit table (0x10nn) and UPS table (0x00nn) have the same data.

MODULYS XS STATUS				
Address	Bits	Acronym	Description	
0x0030	b00	S000	Load protected by Inverter	OUTPUT STATUS
	b01	S001		
	b02	S002	Load supplied by automatic Bypass	
	b03	S003	Load supplied by Maintenance Bypass	
	b04	S004		
	b05	S005		
	b06	S006	In eco mode	FUNCTIONING MODE
	b07	S007		
	b08	S008		
	b09	S009	Service Mode	
	b10	S010		
	b11	S011		DEVICE STATUS
	b12	S012		
	b13	S013	On Standby	
	b14	S014		
	b15	S015	Maintenance Alert	
0x0031	b00	S016		DEVICE ENVIRONMENT
	b01	S017		
	b02	S018		
	b03	S019		
	b04	S020		
	b05	S021		
	b06	S022		
	b07	S023	Gen set ON	
	b08	S024		
	b09	S025		
	b10	S026		PROCEDURES
	b11	S027		
	b12	S028		
	b13	S029		
	b14	S030		
	b15	S031	Alarm Ack. request	
0x0032	b00	S032	Battery OK	BATTERY
	b01	S033		
	b02	S034	Battery Test in progress	
	b03	S035	Battery Test scheduled	
	b04	S036	Battery charging	
	b05	S037	Battery Test interrupted	
	b06	S038		
	b07	S039		
	b08	S040		DC STORAGE SYSTEM
	b09	S041		
	b10	S042		
	b11	S043		
	b12	S044		
	b13	S045		
	b14	S046		
	b15	S047		

MODULYS XS STATUS				
Address	Bits	Acronym	Description	
0x0033	b00	S048	Rectifier Input Supply present	RECTIFIER
	b01	S049	Rectifier ON	
	b02	S050	Charger ON	
	b03	S051		
	b04	S052	Inverter ON	INVERTER
	b05	S053		
	b06	S054		
	b07	S055		
	b08	S056	Bypass Input Supply present	BYPASS
	b09	S057		
	b10	S058		
	b11	S059		
	b12	S060		POWER SHARE
	b13	S061		
	b14	S062		
	b15	S063		

6.4 Additional UPS status table, starting from 0x0034

MODULYS XS STATUS				
Generic address	Bits	Acronym	Description	
0x0034	b00	S064	Board Slot 1 present	OPTIONS
	b01	S065	Board Slot 2 present	
	b02	S066		
	b03	S067		
	b04	S068		
	b05	S069		
	b06	S070		
	b07	S071		
	b08	S072	Programmable S072	CUSTOM IN / OUT
	b09	S073	Programmable S073	
	b10	S074	Programmable S074	
	b11	S075	Programmable S075	
	b12	S076		
	b13	S077		
	b14	S078		
	b15	S079		
0x0035	b00	S080		CUSTOM IN / OUT
	b01	S081		
	b02	S082		
	b03	S083		
	b04	S084		
	b05	S085		
	b06	S086		
	b07	S087		
	b08	S088		
	b09	S089		
	b10	S090		
	b11	S091		
	b12	S092		
	b13	S093		
	b14	S094		
	b15	S095		

These bits can be programmed for specific use. The combination to activate bits considers the standard Modbus status and alarms, and also external inputs or output position of relays.

Each bit can be programmed through the Maintenance Software.

6.5 Module summary table, starting from 0x0036

MODBUS makes it possible to view the module status from the Unit level through following table:

MODULYS XS STATUS				
Unit address	Bits	Acronym	Description	
0x1036	b00	S096	Module 1 Operating	MODULES
	b01	S097	Module 2 Operating	
	b02	S098	Module 3 Operating	
	b03	S099	Module 4 Operating	
	b04	S100	Module 5 Operating	
	b05	S101	Module 6 Operating	
	b06	S102		
	b07	S103		
	b08	S104		
	b09	S105		
	b10	S106		
	b11	S107		
	b12	S108		
	b13	S109		
	b14	S110		
	b15	S111		
0x1037	b00	S112		MODULES
	b01	S113		
	b02	S114		
	b03	S115		
	b04	S116		
	b05	S117		
	b06	S118		
	b07	S119		
	b08	S120		
	b09	S121		
	b10	S122		
	b11	S123		
	b12	S124		
	b13	S125		
	b14	S126		
	b15	S127		

6.6 UPS alarms table, starting from 0x0038

MODULYS XS ALARMS				
Generic address	Bits	Acronym	Description	
0x0038	b00	A000	Imminent Stop	LOAD
	b01	A001	Overload	
	b02	A002	Ambient Temperature Alarm	
	b03	A003		
	b04	A004	Transfer impossible	
	b05	A005		
	b06	A006	Redundancy lost	
	b07	A007		
	b08	A008		MODE
	b09	A009		
	b10	A010		
	b11	A011		
	b12	A012	Maintenance Alarm	SERVICE
	b13	A013	Remote Service Alarm	
	b14	A014		
	b15	A015	General Alarm	
0x0039	b00	A016		BATTERY
	b01	A017	Battery discharged	
	b02	A018		
	b03	A019	Operating on Battery	
	b04	A020		
	b05	A021		
	b06	A022	Battery Test failed	
	b07	A023		
	b08	A024		
	b09	A025		
	b10	A026		
	b11	A027	Battery Alarm	
	b12	A028		
	b13	A029		DC STORAGE
	b14	A030		
	b15	A031		
0x003A	b00	A032	Rectifier Critical Alarm	RECTIFIER
	b01	A033	Rectifier Preventive Alarm	
	b02	A034		
	b03	A035	Rectifier Input Supply not OK	
	b04	A036	Gen Set Alarm	
	b05	A037	Charger Critical Alarm	
	b06	A038	Charger Preventive Alarm	
	b07	A039		
	b08	A040	Inverter Critical Alarm	INVERTER
	b09	A041	Inverter Preventive Alarm	
	b10	A042		
	b11	A043		
	b12	A044		
	b13	A045		
	b14	A046		
	b15	A047		

MODULYS XS ALARMS				
Generic address	Bits	Acronym	Description	
0x003B	b00	A048	Bypass Critical Alarm	BYPASS
	b01	A049	Bypass Preventive Alarm	
	b02	A050	Bypass Input Supply not OK	
	b03	A051	Phase Rotation fault	
	b04	A052		
	b05	A053		
	b06	A054	Fan failure	
	b07	A055		ENVIRONMENT
	b08	A056	Maintenance Bypass Alarm	
	b09	A057		
	b10	A058		
	b11	A059	UPS Power OFF[2]	
	b12	A060	Wrong Configuration	INTERNAL
	b13	A061	Internal / Communication failure	
	b14	A062	Option Board Alarm	
	b15	A063		

1. If ACS board option present.

2. External input.

6.7 Additional alarms table, starting from 0x003C

MODULYS XS ALARMS				
Generic address	Bits	Acronym	Description	
0x003C	b00	A064	Programmable A064	CUSTOM IN / OUT
	b01	A065	Programmable A065	
	b02	A066	Programmable A066	
	b03	A067	Programmable A067	
	b04	A068		
	b05	A069		
	b06	A070		
	b07	A071		
	b08	A072		
	b09	A073		
	b10	A074		
	b11	A075		
	b12	A076		
	b13	A077		
	b14	A078		
	b15	A079		
0x003D	b00	A080		CUSTOM IN / OUT
	b01	A081		
	b02	A082		
	b03	A083		
	b04	A084		
	b05	A085		
	b06	A086		
	b07	A087		
	b08	A088		
	b09	A089		
	b10	A090		
	b11	A091		
	b12	A092		
	b13	A093		
	b14	A094		
	b15	A095		

These bits can be programmed for specific use. The combination to activate bits considers a standard Modbus status and alarms, and also external inputs or output position of relays.

Each bit can be programmed through the Maintenance Software.

6.8 Module alarms synthesis table, starting from 0x103E

MODULYS XS ALARMS				
Unit address	Bits	Acronym	Description	
0x103E	b00	A096	Module 1 General Alarm	MODULE SUMMARY
	b01	A097	Module 2 General Alarm	
	b02	A098	Module 3 General Alarm	
	b03	A099	Module 4 General Alarm	
	b04	A100	Module 5 General Alarm	
	b05	A101	Module 6 General Alarm	
	b06	A102		
	b07	A103		
	b08	A104		
	b09	A105		
	b10	A106		
	b11	A107		
	b12	A108		
	b13	A109		
	b14	A110		
	b15	A111		
0x103F	b00	A112		NOT USED
	b01	A113		
	b02	A114		
	b03	A115		
	b04	A116		
	b05	A117		
	b06	A118		
	b07	A119		
	b08	A120		
	b09	A121		
	b10	A122		
	b11	A123		
	b12	A124		
	b13	A125		
	b14	A126		
	b15	A127		

6.9 UPS measurements table, starting from 0x0040

NOTE!
In order to see if a measurement is supported/managed, use the addresses between 0x00C0-0x00C5 in read access.

For example: if the bit 9 of 0x00C0 = 0, this means that M009 is not managed by the UPS

MODULYS XS Measurement				Formats			Check availability
Generic address	Acronym	Description	Units	0x000E = 0	0x000E = 1		
0x0040	M000	Output load rate	%	###	###	OUTPUT	0x00C0
0x0041	M001	Output load rate L1	%	###	###		
0x0042	M002						
0x0043	M003						
0x0044	M004						
0x0045	M005	Output Active Power	kW	## ###	# ###.#		
0x0046	M006	Output current L1	A	## ###	# ###.#		
0x0047	M007						
0x0048	M008						
0x0049	M009						
0x004A	M010	Output voltage L1	V	###	###		
0x004B	M011						
0x004C	M012						
0x004D	M013	Output frequency	Hz	##.#	##.#		
0x004E	M014						
0x004F	M015	Ambient Temperature	°C	##.#	##.#		
0x0050	M016	Battery voltage string +	V	# ###	###.#	BATTERY	0x00C1
0x0051	M017						
0x0052	M018						
0x0053	M019						
0x0054	M020						
0x0055	M021						
0x0056	M022	Battery capacity	%	###	###		
0x0057	M023						
0x0058	M024	Bat. remaining backup time	Mn	###	###		
0x0059	M025						
0x005A	M026						
0x005B	M027						
0x005C	M028						
0x005D	M029						
0x005E	M030						
0x005F	M031						
0x0060	M032	Rect. input supply volt. L1	V	###	###	RECT.	0x00C2
0x0061	M033	Rect. input supply volt. L2	V	###	###		
0x0062	M034	Rect. input supply volt. L3	V	###	###		
0x0063	M035	Rect. input supply freq.	Hz	##.#	##.#		
0x0064	M036						
0x0065	M037						
0x0066	M038						

MODULYS XS Measurement				Formats			Check availability
Generic address	Acronym	Description	Units	0x000E = 0	0x000E = 1		
0x0067	M039	Bypass input supply voltage L1	V	###	###	BYPASS	0x00C2
0x0068	M040	Bypass input supply voltage L2	V	###	###		
0x0069	M041	Bypass input supply voltage L3	V	###	###		
0x006A	M042	Bypass input supply freq	Hz	##.#	##.#		
0x006B	M043						
0x006C	M044						
0x006D	M045						
0x006E	M046						
0x006F	M047						
0x0070	M048	Output Apparent P. L1	kVA	## ###	# ###.#	OUTPUT DETAIL	0x00C3
0x0071	M049						
0x0072	M050						
0x0073	M051						
0x0074	M052						
0x0075	M053						
0x0076	M054						
0x0077	M055						
0x0078	M056						
0x0079	M057						
0x007A	M058						
0x007B	M059						
0x007C	M060						
0x007D	M061						
0x007E	M062						
0x007F	M063			#.#	#.#		
0x0080	M064	Rectifier Input Current L1	A	## ###	# ###.#	ADD. INPUT	0x00C4
0x0081	M065	Rectifier Input Current L2	A	## ###	# ###.#		
0x0082	M066	Rectifier Input Current L3	A	## ###	# ###.#		
0x0083	M067						
0x0084	M068						
0x0085	M069						
0x0086	M070						
0x0087	M071						
0x0088	M072						
0x0089	M073						
0x008A	M074						
0x008B	M075						
0x008C	M076						
0x008D	M077	Reserved					
0x008E	M078	Reserved					
0x008F	M079	Reserved					

6.10 Commands table, starting from 0x00C9

To send a command bit, write to the 0x00C9 or 0x00CA address using the function code '0x06'. See 'Functions used' and 'Summary of frame format paragraphs for Modbus frame description.

Each bit defines a command to be executed by the UPS.

It is necessary to change the parameter 'REMOTE CONTROL' to 'enabled' on the mimic-panel to allow the command to be received; then the related permission P000 switches to 1.

P000 set to 0 means that remote commands are not permitted.

Address to write Only for SYSTEM/UPS view	Bit	Acronym	Description	Permission address to read	
0x00C9	b00	C000	Reserved	0x00C7	P000
	b01	C001			P001
	b02	C002			P002
	b03	C003			P003
	b04	C004			P004
	b05	C005			P005
	b06	C006			P006
	b07	C007			P007
	b08	C008			P008
	b09	C009			P009
	b10	C010			P010
	b11	C011			P011
	b12	C012			P012
	b13	C013			P013
	b14	C014			P014
	b15	C015			P015
0x00CA	b00	C016	eco mode On	0x00C8	P016
	b01	C017	eco mode Off		P017
	b02	C018			P018
	b03	C019			P019
	b04	C020			P020
	b05	C021			P021
	b06	C022			P022
	b07	C023			P023
	b08	C024			P024
	b09	C025			P025
	b10	C026			P026
	b11	C027			P027
	b12	C028	Battery Test		P028
	b13	C029			P029
	b14	C030			P030
	b15	C031	Reset Alarm		P031

If the bit associated with commands is set to 1, this means the command is enabled by the UPS, and available to run.

6.11 UPS clock table, starting from 0x00CB

To send a command bit time update frame, write the addresses 0x00CB to 0x00CE unsing as a 'Function' the code '0x10'. See 'Functions used' and 'Summary of frame format' paragraphs for Modbus frame description.

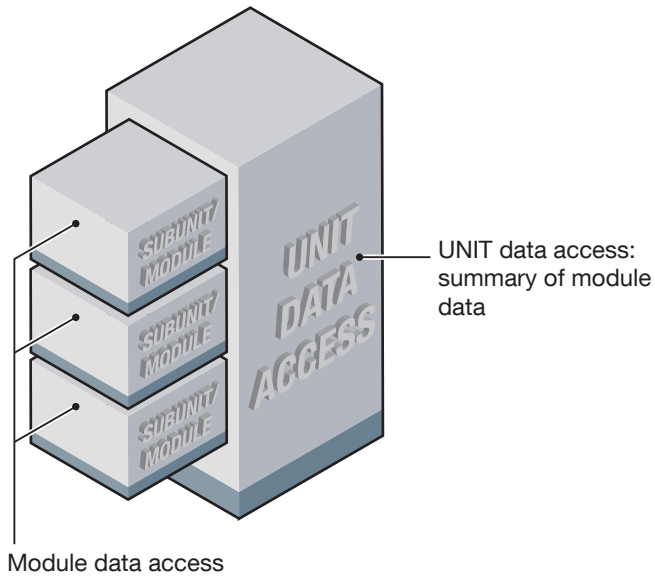
Generic address	Acronym	Description	Value		Remarks
			MSB	LSB	
0x00CB	K000	Minutes & Seconds	Minute: 0 - 59	Seconds: 0 - 59	read / write
0x00CC	K001	Day & hours	Day: 1 - 31	Hours: 0-23	read / write
0x00CD	K002	Month & day of the week	Month: 1 - 12	1 = Monday - 7 = Sunday	read / write
0x00CE	K003	Year	year = value + 2000		read / write

7. MODBUS TABLE MODULYS GP

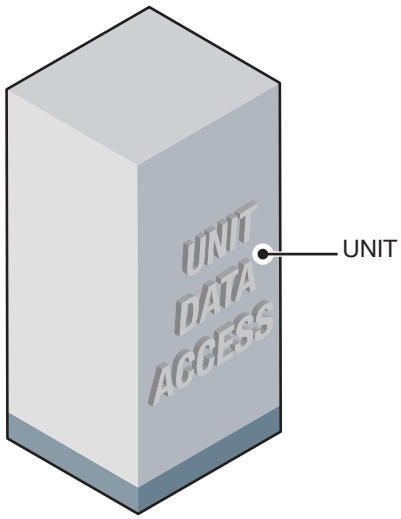
7.1 UPS architecture

The modular Unit has 1 unit, and up to 8 modules plus 1 bypass. MODBUS allows access to UPS / Unit data and module data.

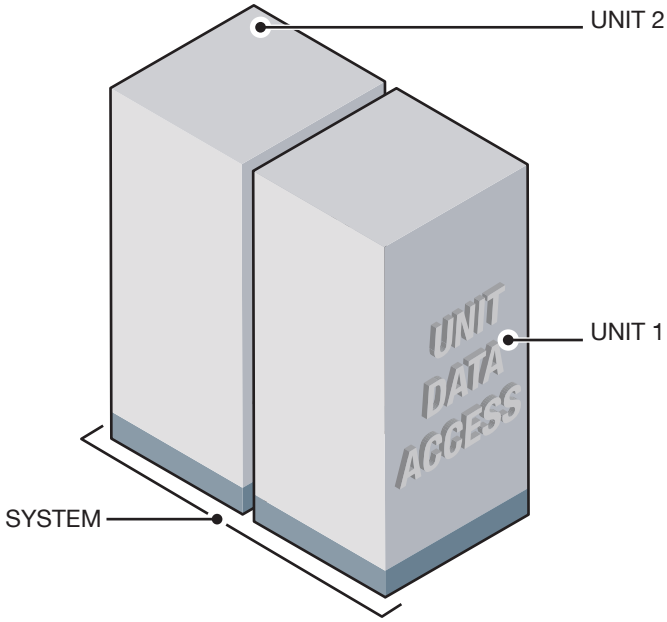
Modular Unit detail view



Modulys Unit



Modulys parallel system



7.2 UPS access data table mapping

For MODULYS GP2 UNIT :
0x10nn read the Unit Data
For MODULYS GP2 SYSTEM :
0x00nn read the System data
0x(u)0nn read the Unit data (u= 1 to 3)
0x(u)(m)nn read the Module (m) of Unit (u)

7.3 Module access data table mapping

7.3.1 Modular Unit

Module data access	
UPS address = UNIT address	0x00nn = 0x10nn
UNIT / Module 1 address	0x11nn
UNIT / Module 2 address	0x12nn
UNIT / Module 3 address	0x13nn
UNIT / Module 4 address	0x14nn
UNIT / Module 5 address	0x15nn
UNIT / Module 6 address	0x16nn
UNIT / Module 7 address	0x17nn
UNIT / Module 8 address	0x18nn
UNIT / Bypass address	0x1Dnn

7.3.2 Modular parallel system

Module data access for Unit (u)[1]	
UNIT (u) / Module 1 address	0x(u)1nn
UNIT (u) / Module 2 address	0x(u)2nn
UNIT (u) / Module 3 address	0x(u)3nn
UNIT (u) / Module 4 address	0x(u)4nn
UNIT (u) / Module 5 address	0x(u)5nn
UNIT (u) / Module 6 address	0x(u)6nn
UNIT (u) / Module 7 address	0x(u)7nn
UNIT (u) / Module 8 address	0x(u)8nn
UNIT (u) / Bypass address	0x(u)Dnn

(1) with u = Unit number 1 to 3.

7.4 UPS configuration table, starting from 0x0001

NOTE!
Fields or bit fields not described must be considered as reserved/unused.

Address	Acronym	Description	Value		Default values
0x0001	T000	UPS installation code and Device type	MSB = UPS installation Code (1 byte)	lsb = Device type (1 byte)	(0x08)(0x01)
0x0002	T001	Number of devices in level -1	1 to 15		1 unit
0x0003	T002	Position of devices present	1		1 first position by default
0x0004	T003	Device number	1 to 15		1
0x0005	T004	Nominal kVA	*10 if 0x000E = 1		depends on the number of modules/ units
0x0006	T005	Nominal kW	*10 if 0x000E = 1		depends on the number of modules/ units
0x0007	T006	Phase number	MSB = Input phases 1 – 3	LSB = Output phases 1 - 3	(0x03)(0x03)
0x0008	T007	Function	b00	eco mode enabled	
			b01	energy saver enabled	
			b02		
			b03	genset present	
			b04		
			b05		
			b06	Standby schedule	
			b07		
			b08		
0x0009	T008	Environment	b00		
			b01		
			b02		
			b03		
			b04		
			b05		
			b06	Without bypass	
0x000A	T009	DC storage	b00	battery present	
			b01		
0x000B	T010	Power share	Nb of plugs		
0x000C	T011	free	free		
0x000D	T012	free	free		
0x000E	T013	measurements factor	0 = no factor / 1 = factor * 10		set to 1
0x000F	T014	Device reference code			0x8001 = MODGP2.0

7.5 UPS status MODBUS table: (MSB)(0x30) – 6 words

How to read the table:

The lsb has to be added to the MSB to build the MODBUS address according the level and the table to read.

MODBUS address = level + table = **MSB + lsb**.

MODULYS GP STATUS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System	Unit 1 to 3	Mod. 1 to 8 u = unit number	
				0x00	0x01 to 0x03	0xu1 to 0xu8	
0x30	b00	S000	Load protected by Inverter	X	X	X	OUTPUT STATUS
	b01	S001					
	b02	S002	Load supplied by automatic Bypass	X	X		
	b03	S003	Load supplied by Maintenance Bypass	X	X		
	b04	S004	Load OFF	X	X	X	
	b05	S005					
	b06	S006	In eco mode (**)	X	X		FUNCTIONING MODE
	b07	S007	energy saver (**)	X	X		
	b08	S008					
	b09	S009	In Service mode	X	X	X	
	b10	S010					
	b11	S011	Operating	X	X	X	DEVICE STATUS
	b12	S012	Available	X	X	X	
	b13	S013	On Standby	X	X	X	
	b14	S014	Isolated	X	X		
	b15	S015	Maintenance Alert	X	X		
0x31	b00	S016	Output Breaker closed	X	X		DEVICE ENVIRONMENT
	b01	S017	Maintenance Bypass closed	X	X		
	b02	S018					
	b03	S019					
	b04	S020					
	b05	S021					
	b06	S022					
	b07	S023	Gen set ON (*)				
	b08	S024					
	b09	S025					
	b10	S026	Automatic Start in progress	X	X		PROCEDURES
	b11	S027	Maint. Bypass procedure in progress	X	X		
	b12	S028	UPS OFF procedure in progress				
	b13	S029					
	b14	S030	Auto-test Procedure in progress		X		
	b15	S031	Alarm Ack. request	X	X		
0x32	b00	S032	Battery OK	X	X		BATTERY
	b01	S033	Battery charged	X	X		
	b02	S034	Battery Test in progress	X	X		
	b03	S035	Battery Test programmed	X	X		
	b04	S036	Battery charging	X	X		
	b05	S037	Battery Test interrupted	X	X		
	b06	S038	Floating Voltage reduced	X	X		
	b07	S039					
	b08	S040					DC STORAGE
	b09	S041					
	b10	S042					
	b11	S043					
	b12	S044					
	b13	S045					
	b14	S046					
	b15	S047					

MODULYS GP STATUS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System	Unit 1 to 3	Mod. 1 to 8 u = unit number	
				0x00	0x01 to 0x03	0xu1 to 0xu8	
0x33	b00	S048	Rectifier Input Supply present	X	X	X	RECTIFIER
	b01	S049	Rectifier ON	X	X	X	
	b02	S050	Charger ON	X	X	X	
	b03	S051					
	b04	S052	Inverter ON	X	X	X	INVERTER
	b05	S053	Inverter Switch ON	X	X	X	
	b06	S054					
	b07	S055					
	b08	S056	Bypass Input Supply present	X	X		BYPASS
	b09	S057	Bypass Static Switch closed	X	X		
	b10	S058	Bypass Input & Inverter synchronised	X	X		
	b11	S059		X	X		
	b12	S060					
	b13	S061					
	b14	S062					
	b15	S063					
0x34	b00	S064	Card in Slot 1 present (*)	X	X		OPTIONS
	b01	S065	Card in Slot 2 present (*)	X	X		
	b02	S066		X	X		
	b03	S067		X	X		
	b04	S068		X	X		
	b05	S069					
	b06	S070	Profile login 1(**)				
	b07	S071	Profile login 2 (**)				
	b08	S072	Programmable S072 (*)	X	X		ADC Card IN/OUT
	b09	S073	Programmable S073 (*)	X	X		
	b10	S074	Programmable S074 (*)	X	X		
	b11	S075	Programmable S075 (*)	X	X		
	b12	S076	Programmable S076 (*)	X	X		
	b13	S077	Programmable S077 (*)	X	X		
	b14	S078	Programmable S078 (*)	X	X		
	b15	S079	Programmable S079 (*)	X	X		
0x35	b00	S080					MISC.
	b01	S081					
	b02	S082					
	b03	S083					
	b04	S084					
	b05	S085					
	b06	S086					
	b07	S087					
	b08	S088					
	b09	S089					
	b10	S090					
	b11	S091					
	b12	S092					
	b13	S093					
	b14	S094					
	b15	S095					

(*) available if the option is present or linked to additional info coming from ADC+SL Option card.

(**) available if the function is enabled.

7.6 Units or modules synthesis table: (MSB)(0x36) – 2 Words

UNITS OR MODULES SYNTHESIS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System	Unit 1 to 3	Mod. 1 to 8 u = unit number	
				0x00	0x01 to 0x03	0xu1 to 0xu8	
0x36	b00	S096	1 Operating	Unit 1	Module 1		UNITS or MODULES SYNTHESIS
	b01	S097	2 Operating	Unit 2	Module 2		
	b02	S098	3 Operating	Unit 3	Module 3		
	b03	S099	4 Operating		Module 4		
	b04	S100	5 Operating		Module 5		
	b05	S101	6 Operating		Module 6		
	b06	S102	7 Operating		Module 7		
	b07	S103	8 Operating		Module 8		
	b08	S104					
	b09	S105					
	b10	S106					
	b11	S107					
	b12	S108					
	b13	S109	Bypass Operating				
	b14	S110					
	b15	S111					
0x37	b00	S112	1 Available	Unit 1	Module 1		UNITS or MODULES SYNTHESIS
	b01	S113	2 Available	Unit 2	Module 2		
	b02	S114	3 Available	Unit 3	Module 3		
	b03	S115	4 Available		Module 4		
	b04	S116	5 Available		Module 5		
	b05	S117	6 Available		Module 6		
	b06	S118	7 Available		Module 7		
	b07	S119	8 Available		Module 8		
	b08	S120					
	b09	S121					
	b10	S122					
	b11	S123					
	b12	S124					
	b13	S125	Bypass Available				
	b14	S126					
	b15	S127					

7.7 UPS alarms MODBUS table: (MSB)(0x38) – 6 words

UNITS OR MODULES SYNTHESIS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System	Unit 1 to 3	Mod. 1 to 8 u = unit number	
				0x00	0x01 to 0x03	0xu1 to 0xu8	
0x38	b00	A000	Imminent Stop	X	X	X	LOAD
	b01	A001	Overload	X	X	X	
	b02	A002	Ambient Temperature Alarm	X	X	X	
	b03	A003	Transfer locked	X	X		
	b04	A004	Transfer impossible	X	X		
	b05	A005	Insufficient Resources	X	X		
	b06	A006	Redundancy loss	X	X		
	b07	A007					
	b08	A008	eco mode disabled by UPS	X	X		MODE
	b09	A009	energy saver disabled by UPS	X	X		
	b10	A010	On bypass for 1 hour	X	X		
	b11	A011	Wrong password entered(**)				
	b12	A012	Maintenance Alarm	X	X		SERVICE
	b13	A013	Remote Service Alarm	X	X		
	b14	A014	Remote Service Preventive Alarm	X	X		
	b15	A015	General Alarm	X	X	X	
0x39	b00	A016	Battery disconnected	X	X		BATTERY
	b01	A017	Battery discharged	X	X		
	b02	A018					
	b03	A019	Battery discharging	X	X		
	b04	A020	Battery Temperature Alarm (*)	X	X		
	b05	A021	Battery Room Alarm (*)	X	X		
	b06	A022	Battery Test failed	X	X		
	b07	A023					
	b08	A024					
	b09	A025					
	b10	A026	Insulation fault	X	X		
	b11	A027	Battery Alarm	X	X		
	b12	A028					
	b13	A029					DC BACKUP
	b14	A030					
	b15	A031					
0x3A	b00	A032	Rectifier Critical Alarm	X	X	X	RECTIFIER
	b01	A033	Rectifier Preventive Alarm	X	X	X	
	b02	A034					
	b03	A035	Rectifier Input Supply not OK	X	X	X	
	b04	A036	Gen Set Alarm (*)				
	b05	A037	Charger Critical Alarm	X	X	X	
	b06	A038	Charger Preventive Alarm	X	X	X	
	b07	A039					
	b08	A040	Inverter Critical Alarm	X	X	X	INVERTER
	b09	A041	Inverter Preventive Alarm	X	X	X	
	b10	A042	Inverter redundancy Alarm				
	b11	A043					
	b12	A044	Consumable alarm	X	X		
	b13	A045					
	b14	A046					
	b15	A047					

UNITS OR MODULES SYNTHESIS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System	Unit 1 to 3	Mod. 1 to 8 u = unit number	
				0x00	0x01 to 0x03	0xu1 to 0xu8	
0x3B	b00	A048	Bypass Critical Alarm	X	X		BYPASS
	b01	A049	Bypass Preventive Alarm	X	X		
	b02	A050	Bypass Input Supply not OK	X	X		
	b03	A051	Phase Rotation fault	X	X		
	b04	A052	Bypass Backfeed detection	X	X		
	b05	A053					
	b06	A054	Fan Failure	X	X		
	b07	A055	ACS Alarm (**)	X	X		
	b08	A056	Maintenance Bypass Alarm	X	X		
	b09	A057		X	X		
	b10	A058					OPTION
	b11	A059	UPS Power OFF	X	X		
	b12	A060	Wrong Configuration	X	X		
	b13	A061	Internal / Communication failure	X	X		
	b14	A062	Option Board Alarm (*)	X	X		
	b15	A063	Spare part not compatible	X	X		
0x3C	b00	A064	Programmable A064 (*)	X	X		ADC Card IN/OUT
	b01	A065	Programmable A065(*)	X	X		
	b02	A066	Programmable A066 (*)	X	X		
	b03	A067	Programmable A067 (*)	X	X		
	b04	A068	Programmable A068 (*)	X	X		
	b05	A069	Programmable A069 (*)	X	X		
	b06	A070	Programmable A070 (*)	X	X		
	b07	A071	Programmable A071 (*)	X	X		
	b08	A072					
	b09	A073					
	b10	A074					
	b11	A075					
	b12	A076					
	b13	A077					
	b14	A078					
	b15	A079					
0x3D	b00	A080					MISC.
	b01	A081					
	b02	A082					
	b03	A083					
	b04	A084					
	b05	A085					
	b06	A086					
	b07	A087					
	b08	A088					
	b09	A089					
	b10	A090					
	b11	A091					
	b12	A092					
	b13	A093					
	b14	A094					
	b15	A095					

(*) available if the option is present or linked to additional info coming from ADC+SL Option card.

(**) available if the function is enabled.

(***) info updated from Battery management system in case of Li-ion batteries for example

7.8 Units or modules synthesis table: (MSB)(0x3E) – 2 Words

UNITS OR MODULES SYNTHESIS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System	Unit 1 to 3	Mod. 1 to 8 u = unit number	
				0x00	0x01 to 0x03	0xu1 to 0xu8	
0x3E	b00	A096	1 General Alarm	Unit 1	Module 1		UNITS or MODULES SYNTHESIS
	b01	A097	2 General Alarm	Unit 2	Module 2		
	b02	A098	3 General Alarm	Unit 3	Module 3		
	b03	A099	4 General Alarm		Module 4		
	b04	A100	5 General Alarm		Module 5		
	b05	A101	6 General Alarm		Module 6		
	b06	A102					
	b07	A103					
	b08	A104					
	b09	A105					
	b10	A106					
	b11	A107					
	b12	A108					
	b13	A109	Bypass General Alarm				
	b14	A110					
	b15	A111					
0x3F	b00	A112	1 Imminent STOP	Unit 1	Module 1		UNITS or MODULES SYNTHESIS
	b01	A113	2 Imminent STOP	Unit 2	Module 2		
	b02	A114	3 Imminent STOP	Unit 3	Module 3		
	b03	A115	4 Imminent STOP		Module 4		
	b04	A116	5 Imminent STOP		Module 5		
	b05	A117	6 Imminent STOP		Module 6		
	b06	A118					
	b07	A119					
	b08	A120					
	b09	A121					
	b10	A122					
	b11	A123					
	b12	A124					
	b13	A125	Bypass Imminent STOP				
	b14	A126					
	b15	A127					

7.9 Measurements table: (MSB) (0x40) – 80 words

The MSB of the MODBUS address is managed in the same manner as for other tables. For System the MSB=0x00, for Unit the MSB=0xu0 (u=Unit number) and for Module the MSB=0xum (m=module number)

MODULYS GP MEASUREMENT				Formats		MCMT**	System Unit	Module
Acron.	Lsb	Measurements	Units	0x000E = 0	0x000E = 1			
M000	0x40	Output load rate	%	###	###	0xC0b00	X	X
M001	0x41	Output load rate L1	%	###	###	0xC0b01	X	X
M002	0x42	Output load rate L2	%	###	###	0xC0b02	X	X
M003	0x43	Output load rate L3	%	###	###	0xC0b03	X	X
M004	0x44	Output apparent power	kVA	## ###	# ###.#	0xC0b04	X	X
M005	0x45	Output active power	kW	## ###	# ###.#	0xC0b05	X	X
M006	0x46	Output current L1	A	## ###	# ###.#	0xC0b06	X	X
M007	0x47	Output current L2	A	## ###	# ###.#	0xC0b07	X	X
M008	0x48	Output current L3	A	## ###	# ###.#	0xC0b08	X	X
M009	0x49							
M010	0x4A	Output voltage L1	V	###	###	0xC0b10	X	X
M011	0x4B	Output voltage L2	V	###	###	0xC0b11	X	X
M012	0x4C	Output voltage L3	V	###	###	0xC0b12	X	X
M013	0x4D	Output frequency	Hz*10	##.#	##.#	0xC0b13	X	X
M014	0x4E							
M015	0x4F	Ambient T°	°C	##.#	##.#	0xC0b15	X	
M016	0x50	Battery voltage string + (*)	V	# ###	###.#	0xC1b00	X	
M017	0x51	Battery voltage string - (*)	V	# ###	###.#	0xC1b01	X	
M018	0x52	Battery current string + (*)	A	## ###	# ###.#	0xC1b02	X	
M019	0x53	Battery current string - (*)	A	## ###	# ###.#	0xC1b03	X	
M020	0x54							
M021	0x55							
M022	0x56	Battery capacity	%	###	###	0xC1b06	X	
M023	0x57	Battery capacity	Ah	## ###	# ###.#	0xC1b07	X	
M024	0x58	Bat. remaining backup time mn	Mn	###	###	0xC1b08	X	
M025	0x59	Time on battery (*)	S	###	###	0xC1b09	X	
M026	0x5A	Battery temperature (*)	°C	##.#	##.#	0xC1b10	X	
M027	0x5B	Battery temperature average	°C	##.#	##.#	0xC1b11	X	
M028	0x5C							
M029	0x5D							
M030	0x5E							
M031	0x5F							
M032	0x60	Rect. input supply volt. L1	V	###	###	0xC2b00	X	X
M033	0x61	Rect. input supply volt. L2	V	###	###	0xC2b01	X	X
M034	0x62	Rect. input supply volt. L3	V	###	###	0xC2b02	X	X
M035	0x63	Rect. input supply freq.	Hz*10	##.#	##.#	0xC2b03	X	X
M036	0x64	Rect. input supply volt. U12	V	###	###	0xC2b04	X	X
M037	0x65	Rect. input supply volt. U23	V	###	###	0xC2b05	X	X
M038	0x66	Rect. input supply volt. U31	V	###	###	0xC2b06	X	X
M039	0x67	Bypass input supply voltage L1	V	###	###	0xC2b07	X	
M040	0x68	Bypass input supply voltage L2	V	###	###	0xC2b08	X	
M041	0x69	Bypass input supply voltage L3	V	###	###	0xC2b09	X	
M042	0x6A	Bypass input supply freq	Hz*10	##.#	##.#	0xC2b10	X	
M043	0x6B	Bypass input supply volt U12	V	###	###	0xC2b11	X	
M044	0x6C	Bypass input supply volt U23	V	###	###	0xC2b12	X	
M045	0x6D	Bypass input supply volt U31	V	###	###	0xC2b13	X	
M046	0x6E					0xC2b14		
M047	0x6F					0xC2b15		

MODULYS GP MEASUREMENT				Formats		MCMT**	System Unit	Module
Acron.	Lsb	Measurements	Units	0x000E = 0	0x000E = 1			
M048	0x70	Output Apparent P. L1	kVA	## ###	# ###.#	0xC3b00	X	X
M049	0x71	Output Apparent P. L2	kVA	## ###	# ###.#	0xC3b01	X	X
M050	0x72	Output Apparent P. L3	kVA	## ###	# ###.#	0xC3b02	X	X
M051	0x73	Output Active Power L1	kW	## ###	# ###.#	0xC3b03	X	X
M052	0x74	Output Active Power L2	kW	## ###	# ###.#	0xC3b04	X	X
M053	0x75	Output Active Power L3	kW	## ###	# ###.#	0xC3b05	X	X
M054	0x76	Output voltage U12	V	###	###	0xC3b06	X	X
M055	0x77	Output voltage U23	V	###	###	0xC3b07	X	X
M056	0x78	Output voltage U31	V	###	###	0xC3b08	X	X
M057	0x79							
M058	0x7A							
M059	0x7B							
M060	0x7C							
M061	0x7D							
M062	0x7E							
M063	0x7F							
M064	0x80	Rect. Input Current L1	A	## ###	# ###.#	0xC4b00	X	X
M065	0x81	Rect. Input Current L2	A	## ###	# ###.#	0xC4b01	X	X
M066	0x82	Rect. Input Current L3	A	## ###	# ###.#	0xC4b02	X	X
M067	0x83	Rect. Active Power L1	kW	## ###	# ###.#	0xC4b03	X	X
M068	0x84	Rect. Active Power L2	kW	## ###	# ###.#	0xC4b04	X	X
M069	0x85	Rect. Active Power L3	kW	## ###	# ###.#	0xC4b05	X	X
M070	0x86	Bypass Input Current L1	A	## ###	# ###.#	0xC4b06	X	
M071	0x87	Bypass Input Current L2	A	## ###	# ###.#	0xC4b07	X	
M072	0x88	Bypass Input Current L3	A	## ###	# ###.#	0xC4b08	X	
M073	0x89	Bypass Power L1	kW	## ###	# ###.#	0xC4b09	X	
M074	0x8A	Bypass Power L2	kW	## ###	# ###.#	0xC4b10	X	
M075	0x8B	Bypass Power L3	kW	## ###	# ###.#	0xC4b11	X	
M076		reserved						
M077								
M078								
M079								

(*) measurements updated from Battery management system in case of Li-ion batteries for example

(**) Measurements Control Management Table

7.10 UPS controls MODBUS table

To send a command bit, write to the 0xC9 or 0xCA address using the function code '0x06'. See 'Functions used' and 'Summary of frame format paragraphs for Modbus frame description.

Each bit defines a command to be executed by the UPS.

It is necessary to change the parameter 'REMOTE CONTROL' to 'enabled' on the mimic-panel to allow the command to be received; then the related permission P000 switches to 1.

P000 set to 0 means that remote commands are not permitted.

Address to write	Bit to set	Acronym	UPS CONTROLS	Permission	Address to read	Bit to check
0xC9	b00	C000	If P000 = 0 the controls are not permitted	P000	0x00C7	b00
	b01	C001				b01
	b02	C002				b02
	b03	C003				b03
	b04	C004				b04
	b05	C005				b05
	b06	C006				b06
	b07	C007				b07
	b08	C008				b08
	b09	C009				b09
	b10	C010				b10
	b11	C011				b11
	b12	C012				b12
	b13	C013				b13
	b14	C014				b14
	b15	C015				b15
0xCA	b00	C016	eco mode On	P016	0x00C8	b00
	b01	C017	eco mode Off	P017		b01
	b02	C018				b02
	b03	C019				b03
	b04	C020				b04
	b05	C021				b05
	b06	C022				b06
	b07	C023				b07
	b08	C024				b08
	b09	C025				b09
	b10	C026				b10
	b11	C027				b11
	b12	C028	Battery test	P028		b12
	b13	C029				b13
	b14	C030				b14
	b15	C031	Reset Alarm	P031		b15

7.11 UPS date & time MODBUS table (0x00CB – 4 Words)

To update UPS date and time, write to addresses 0x00CB to 0x00CE using as a 'Function' the code '0x10'.
See 'Functions used' and 'Summary' of frame format' paragraphs for Modbus frame description.

Address	Description	Value		Remarks
		MSB	LSB	
0x00CB	Minutes & Seconds	Minute: 0 - 59	Seconds: 0 - 59	read / write
0x00CC	Day & hours	Day: 1 - 31	Hours: 0-23	read / write
0x00CD	Month & day of the week	Month: 1 - 12	1 = Monday - 7 = Sunday	read / write
0x00CE	Year	year = value + 2000		read / write

Date and hours frame detail

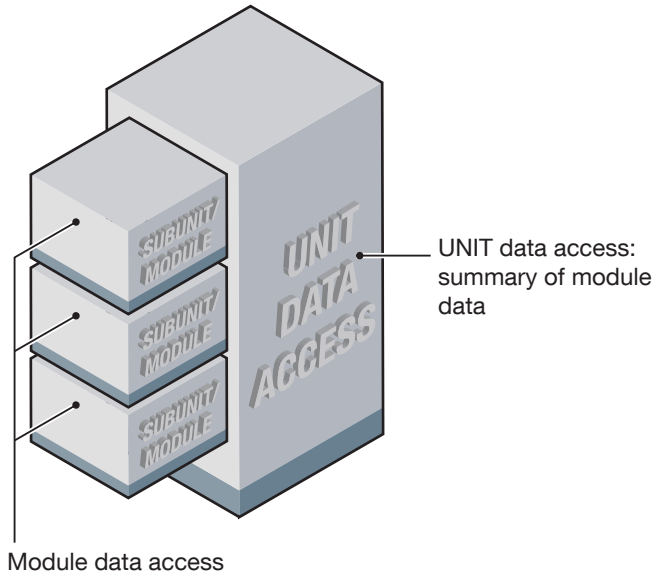
0x00CB		0x00CC		0x00CD		0x00CE
Minutes	Second	Day	Hours	Month	day/week	Year + 2000

8. MODBUS TABLE MODULYS XM

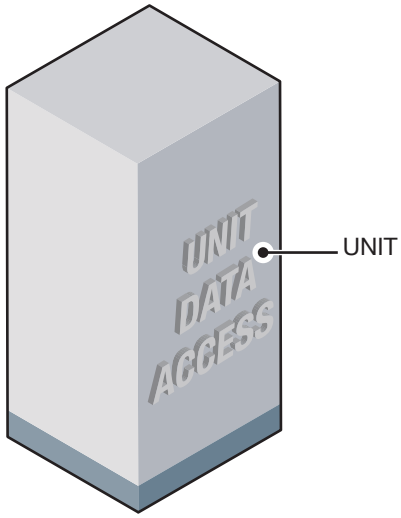
8.1 UPS architecture

The modular Unit has 1 unit, and up to 8 modules plus 1 bypass. MODBUS allows access to UPS / Unit data and module data.

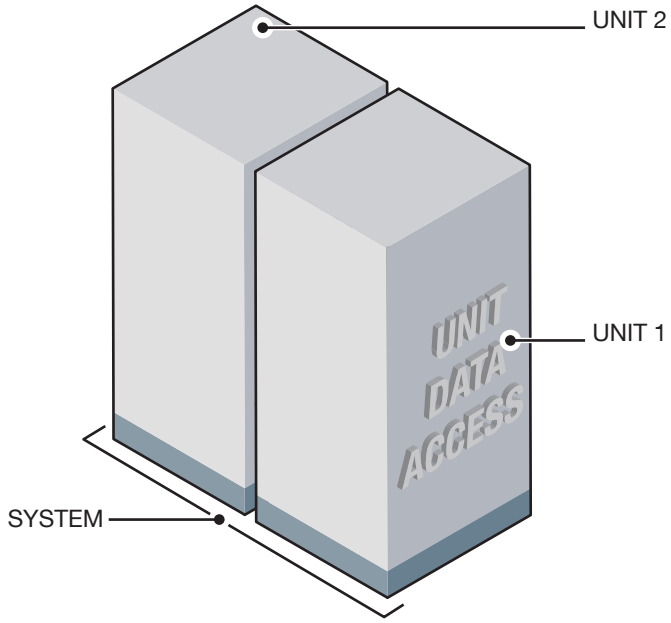
Modular Unit detail view



Modulys Unit



Modulys parallel system



8.2 UPS access data table mapping

For MODULYS XM 300-500 kW UNIT :

0x10nn to read the Unit data

For MODULYS XM 300-500 kW Units SYSTEM :

0x00nn to read the System data

0x(u)0nn to read the Unit data (u= 1 to 3)

0x(u)(m)nn to read the Module (m) of Unit (u)

For MODULYS XM 650 kW UNIT :

0x01nn to read the Unit data

8.3 Module access data table mapping (only for 300-500 kW Unit)

8.3.1 Modular Unit

Module data access	
UPS address = UNIT address	0x00nn = 0x10nn
UNIT / Module 1 address	0x11nn
UNIT / Module 2 address	0x12nn
UNIT / Module 3 address	0x13nn
UNIT / Module 4 address	0x14nn
UNIT / Module 5 address	0x15nn
UNIT / Module 6 address	0x16nn
UNIT / Module 7 address	0x17nn
UNIT / Module 8 address	0x18nn
UNIT / Module 9 address	0x19nn
UNIT / Module 10 address	0x1A00

8.3.2 Modular parallel system

Module data access for Unit (u)[1]	
UNIT (u) / Module 1 address	0x(u)1nn
UNIT (u) / Module 2 address	0x(u)2nn
UNIT (u) / Module 3 address	0x(u)3nn
UNIT (u) / Module 4 address	0x(u)4nn
UNIT (u) / Module 5 address	0x(u)5nn
UNIT (u) / Module 6 address	0x(u)6nn
UNIT (u) / Module 7 address	0x(u)7nn
UNIT (u) / Module 8 address	0x(u)8nn
UNIT (u) / Module 9 address	0x(u)9nn
UNIT (u) / Module 10 address	0x(u)Ann

(1) with u = Unit number 1 to 3.

8.4 UPS configuration table, starting from 0x0001

NOTE!
Fields or bit fields not described must be considered as reserved/unused.

Address	Acronym	Description	Value		Default values
0x0001	T000	UPS installation code and Device type	MSB = UPS installation Code (1 byte)	lsb = Device type (1 byte)	(0x08)(0x01) for 300-500 kW unit (0x81)(0x01) for 650 kW unit
0x0002	T001	Number of devices in level -1	1 to 15		1 unit
0x0003	T002	Position of devices present	1		1 first position by default
0x0004	T003	Device number	1 to 15		1
0x0005	T004	Nominal kVA	*10 if 0x000E = 1		depends on the number of modules/ units
0x0006	T005	Nominal kW	*10 if 0x000E = 1		depends on the number of modules/ units
0x0007	T006	Phase number	MSB = Input phases 1 – 3	LSB = Output phases 1 - 3	(0x03)(0x03)
0x0008	T007	Function	b00	eco mode enabled	
			b01	energy saver enabled	
			b02		
			b03	genset present	
			b04		
			b05		
			b06	Standby schedule	
			b07		
			b08		
0x0009	T008	Environment	b00		
			b01		
			b02		
			b03		
			b04		
			b05		
			b06	Without bypass	
0x000A	T009	DC storage	b00	battery present	
			b01		
0x000B	T010	Power share	Nb of plugs		
0x000C	T011	free	free		
0x000D	T012	free	free		
0x000E	T013	measurements factor	0 = no factor / 1 = factor * 10		set to 1
0x000F	T014	Device reference code			0x8140 = MODXM

8.5 UPS status MODBUS table: (MSB)(0x30) – 6 words

How to read the table:
The lsb has to be added to the MSB to build the MODBUS address according the level and the table to read.
MODBUS address = level + table = **MSB + lsb**.

MODULYS XM STATUS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System for 300-500kW 0x00 650kW unit 0x01	300-500kW Unit 1 to 3 0x10 to 0x30	Unit (u) Modules 0x(u)1 to 0x(u)A	
0x30	b00	S000	Load protected by Inverter	X	X	X	OUTPUT STATUS
	b01	S001					
	b02	S002	Load supplied by automatic Bypass	X	X		
	b03	S003	Load supplied by Maintenance Bypass	X	X		
	b04	S004	Load OFF	X	X	X	
	b05	S005					
	b06	S006	In eco mode (**)	X	X		FUNCTIONING MODE
	b07	S007	energy saver (**)	X	X		
	b08	S008					
	b09	S009	In Service mode	X	X	X	
	b10	S010					
	b11	S011	Operating	X	X	X	DEVICE STATUS
	b12	S012	Available	X	X	X	
	b13	S013	On Standby	X	X	X	
	b14	S014	Isolated	X	X		
	b15	S015	Maintenance Alert	X	X		
0x31	b00	S016	Output Breaker closed	X	X		DEVICE ENVIRONMENT
	b01	S017	Maintenance Bypass closed	X	X		
	b02	S018					
	b03	S019					
	b04	S020					
	b05	S021					
	b06	S022					
	b07	S023	Gen set ON (*)				
	b08	S024					
	b09	S025					
	b10	S026	Automatic Start in progress	X	X		PROCEDURES
	b11	S027	Maint. Bypass procedure in progress	X	X		
	b12	S028	UPS OFF procedure in progress				
	b13	S029					
	b14	S030	Auto-test Procedure in progress		X		
	b15	S031	Alarm Ack. request	X	X		
0x32	b00	S032	Battery OK	X	X		BATTERY
	b01	S033	Battery charged	X	X		
	b02	S034	Battery Test in progress	X	X		
	b03	S035	Battery Test programmed	X	X		
	b04	S036	Battery charging	X	X		
	b05	S037	Battery Test interrupted	X	X		
	b06	S038	Floating Voltage reduced	X	X		
	b07	S039					
	b08	S040					DC STORAGE
	b09	S041					
	b10	S042					
	b11	S043					
	b12	S044					
	b13	S045					
	b14	S046					
	b15	S047					

MODULYS XM STATUS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System for 300-500kW 0x00 650kW unit 0x01	300-500kW Unit 1 to 3 0x10 to 0x30	Unit (u) Modules 0x(u)1 to 0x(u)A	
0x33	b00	S048	Rectifier Input Supply present	X	X	X	RECTIFIER
	b01	S049	Rectifier ON	X	X	X	
	b02	S050	Charger ON	X	X	X	
	b03	S051					
	b04	S052	Inverter ON	X	X	X	INVERTER
	b05	S053	Inverter Switch ON	X	X	X	
	b06	S054					
	b07	S055					
	b08	S056	Bypass Input Supply present	X	X		BYPASS
	b09	S057	Bypass Static Switch closed	X	X		
	b10	S058	Bypass Input & Inverter synchronised	X	X		
	b11	S059		X	X		
	b12	S060					
	b13	S061					
	b14	S062					
	b15	S063					
0x34	b00	S064	Card in Slot 1 present (*)	X	X		OPTIONS
	b01	S065	Card in Slot 2 present (*)	X	X		
	b02	S066		X	X		
	b03	S067		X	X		
	b04	S068		X	X		
	b05	S069					
	b06	S070	Profile login 1(**)				
	b07	S071	Profile login 2 (**)				
	b08	S072	Programmable S072 (*)	X	X		ADC Card IN/OUT
	b09	S073	Programmable S073 (*)	X	X		
	b10	S074	Programmable S074 (*)	X	X		
	b11	S075	Programmable S075 (*)	X	X		
	b12	S076	Programmable S076 (*)	X	X		
	b13	S077	Programmable S077 (*)	X	X		
	b14	S078	Programmable S078 (*)	X	X		
	b15	S079	Programmable S079 (*)	X	X		
0x35	b00	S080					MISC.
	b01	S081					
	b02	S082					
	b03	S083					
	b04	S084					
	b05	S085					
	b06	S086					
	b07	S087					
	b08	S088					
	b09	S089					
	b10	S090					
	b11	S091					
	b12	S092					
	b13	S093					
	b14	S094					
	b15	S095					

(*) available if the option is present or linked to additional info coming from ADC+SL Option card.

(**) available if the function is enabled.

8.6 Units or modules synthesis table: (MSB)(0x36) – 2 Words

UNITS OR MODULES SYNTHESIS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System for 300-500kW 0x00 650kW unit 0x01(*)	300-500kW Unit 1 to 3 0x10 to 0x30	Unit (u) Modules 0x(u)1 to 0x(u)A	
0x36	b00	S096	1 Operating	Unit 1 / Module 1	Module 1		UNITS or MODULES SYNTHESIS
	b01	S097	2 Operating	Unit 2 / Module 2	Module 2		
	b02	S098	3 Operating	Unit 3 / Module 3	Module 3		
	b03	S099	4 Operating	Module 4	Module 4		
	b04	S100	5 Operating	Module 5	Module 5		
	b05	S101	6 Operating	Module 6	Module 6		
	b06	S102	7 Operating	Module 7	Module 7		
	b07	S103	8 Operating	Module 8	Module 8		
	b08	S104	9 Operating	Module 9	Module 9		
	b09	S105	10 Operating	Module 10	Module 10		
	b10	S106	11 Operating	Module 11			
	b11	S107	12 Operating	Module 12			
	b12	S108	13 Operating	Module 13			
	b13	S109	Bypass Operating				
	b14	S110					
	b15	S111					
0x37	b00	S112	1 Available	Unit 1 / Module 1	Module 1		UNITS or MODULES SYNTHESIS
	b01	S113	2 Available	Unit 2 / Module 2	Module 2		
	b02	S114	3 Available	Unit 3 / Module 3	Module 3		
	b03	S115	4 Available	Module 4	Module 4		
	b04	S116	5 Available	Module 5	Module 5		
	b05	S117	6 Available	Module 6	Module 6		
	b06	S118	7 Available	Module 7	Module 7		
	b07	S119	8 Available	Module 8	Module 8		
	b08	S120	9 Available	Module 9	Module 9		
	b09	S121	10 Available	Module 10	Module 10		
	b10	S122	11 Available	Module 11			
	b11	S123	12 Available	Module 12			
	b12	S124	13 Available	Module 13			
	b13	S125	Bypass Available				
	b14	S126					
	b15	S127					

(*) module status for XM 650kW

8.7 UPS alarms MODBUS table: (MSB)(0x38) – 6 words

UNITS OR MODULES SYNTHESIS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System for 300-500kW 0x00 650kW unit 0x01	300-500kW Unit 1 to 3 0x10 to 0x30	Unit (u) Modules 0x(u)1 to 0x(u)A	
0x38	b00	A000	Imminent Stop	X	X	X	LOAD
	b01	A001	Overload	X	X	X	
	b02	A002	Ambient Temperature Alarm	X	X	X	
	b03	A003	Transfer locked	X	X		
	b04	A004	Transfer impossible	X	X		
	b05	A005	Insufficient Resources	X	X		
	b06	A006	Redundancy loss	X	X		
	b07	A007					
	b08	A008	eco mode disabled by UPS	X	X		MODE
	b09	A009	energy saver disabled by UPS	X	X		
	b10	A010	On bypass for 1 hour	X	X		
	b11	A011	Wrong password entered(**)				
	b12	A012	Maintenance Alarm	X	X		SERVICE
	b13	A013	Remote Service Alarm	X	X		
	b14	A014	Remote Service Preventive Alarm	X	X		
	b15	A015	General Alarm	X	X	X	
0x39	b00	A016	Battery disconnected	X	X		BATTERY
	b01	A017	Battery discharged	X	X		
	b02	A018					
	b03	A019	Battery discharging	X	X		
	b04	A020	Battery Temperature Alarm (*)	X	X		
	b05	A021	Battery Room Alarm (*)	X	X		
	b06	A022	Battery Test failed	X	X		
	b07	A023					
	b08	A024					
	b09	A025					
	b10	A026	Insulation fault	X	X		
	b11	A027	Battery Alarm	X	X		
	b12	A028					
	b13	A029					DC BACKUP
	b14	A030					
	b15	A031					
0x3A	b00	A032	Rectifier Critical Alarm	X	X	X	RECTIFIER
	b01	A033	Rectifier Preventive Alarm	X	X	X	
	b02	A034					
	b03	A035	Rectifier Input Supply not OK	X	X	X	
	b04	A036	Gen Set Alarm (*)				
	b05	A037	Charger Critical Alarm	X	X	X	
	b06	A038	Charger Preventive Alarm	X	X	X	
	b07	A039					
	b08	A040	Inverter Critical Alarm	X	X	X	INVERTER
	b09	A041	Inverter Preventive Alarm	X	X	X	
	b10	A042	Inverter redundancy Alarm				
	b11	A043					
	b12	A044	Consumable alarm	X	X		
	b13	A045					
	b14	A046					
	b15	A047					

UNITS OR MODULES SYNTHESIS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System for 300-500kW 0x00 650kW unit 0x01	300-500kW Unit 1 to 3 0x10 to 0x30	Unit (u) Modules 0x(u)1 to 0x(u)A	
0x3B	b00	A048	Bypass Critical Alarm	X	X		BYPASS
	b01	A049	Bypass Preventive Alarm	X	X		
	b02	A050	Bypass Input Supply not OK	X	X		
	b03	A051	Phase Rotation fault	X	X		
	b04	A052	Bypass Backfeed detection	X	X		
	b05	A053					
	b06	A054	Fan Failure	X	X		
	b07	A055	ACS Alarm (**)	X	X		
	b08	A056	Maintenance Bypass Alarm	X	X		
	b09	A057		X	X		
	b10	A058					OPTION
	b11	A059	UPS Power OFF	X	X		
	b12	A060	Wrong Configuration	X	X		
	b13	A061	Internal / Communication failure	X	X		
	b14	A062	Option Board Alarm (*)	X	X		
	b15	A063	Spare part not compatible	X	X		
0x3C	b00	A064	Programmable A064 (*)	X	X		ADC Card IN/OUT
	b01	A065	Programmable A065(*)	X	X		
	b02	A066	Programmable A066 (*)	X	X		
	b03	A067	Programmable A067 (*)	X	X		
	b04	A068	Programmable A068 (*)	X	X		
	b05	A069	Programmable A069 (*)	X	X		
	b06	A070	Programmable A070 (*)	X	X		
	b07	A071	Programmable A071 (*)	X	X		
	b08	A072					
	b09	A073					
	b10	A074					
	b11	A075					
	b12	A076					
	b13	A077					
	b14	A078					
	b15	A079					
0x3D	b00	A080					MISC.
	b01	A081					
	b02	A082					
	b03	A083					
	b04	A084					
	b05	A085					
	b06	A086					
	b07	A087					
	b08	A088					
	b09	A089					
	b10	A090					
	b11	A091					
	b12	A092					
	b13	A093					
	b14	A094					
	b15	A095					

(*) available if the option is present or linked to additional info coming from ADC+SL Option card.

(**) available if the function is enabled.

(***) info updated from Battery management system in case of Li-ion batteries for example

8.8 Units or modules synthesis table: (MSB)(0x3E) – 2 Words

UNITS OR MODULES SYNTHESIS				**MSB** of MODBUS Address			Group
Lsb Address	Bits	Acronym	Description	System for 300-500kW 0x00 650kW unit 0x01(*)	300-500kW Unit 1 to 3 0x10 to 0x30	Unit (u) Modules 0x(u)1 to 0x(u)A	
0x3E	b00	A096	1 General Alarm	Unit 1 / Module 1	Module 1		UNITS or MODULES SYNTHESIS
	b01	A097	2 General Alarm	Unit 2 / Module 2	Module 2		
	b02	A098	3 General Alarm	Unit 3 / Module 3	Module 3		
	b03	A099	4 General Alarm	Module 4	Module 4		
	b04	A100	5 General Alarm	Module 5	Module 5		
	b05	A101	6 General Alarm	Module 6	Module 6		
	b06	A102	7 General Alarm	Module 7	Module 7		
	b07	A103	8 General Alarm	Module 8	Module 8		
	b08	A104	9 General Alarm	Module 9	Module 9		
	b09	A105	10 General Alarm	Module 10	Module 10		
	b10	A106	11 General Alarm	Module 11			
	b11	A107	12 General Alarm	Module 12			
	b12	A108	13 General Alarm	Module 13			
	b13	A109	Bypass General Alarm				
	b14	A110					
	b15	A111					
0x3F	b00	A112	1 Imminent STOP	Unit 1 / Module 1	Module 1		UNITS or MODULES SYNTHESIS
	b01	A113	2 Imminent STOP	Unit 2 / Module 2	Module 2		
	b02	A114	3 Imminent STOP	Unit 3 / Module 3	Module 3		
	b03	A115	4 Imminent STOP	Module 4	Module 4		
	b04	A116	5 Imminent STOP	Module 5	Module 5		
	b05	A117	6 Imminent STOP	Module 6	Module 6		
	b06	A118	7 Imminent STOP	Module 7	Module 7		
	b07	A119	8 Imminent STOP	Module 8	Module 8		
	b08	A120	9 Imminent STOP	Module 9	Module 9		
	b09	A121	10 Imminent STOP	Module 10	Module 10		
	b10	A122	11 Imminent STOP	Module 11			
	b11	A123	12 Imminent STOP	Module 12			
	b12	A124	13 Imminent STOP	Module 13			
	b13	A125	Bypass Imminent STOP				
	b14	A126					
	b15	A127					

(*) Module alarm for DXM 650 kW unit

8.9 Measurements table: (MSB) (0x40) – 80 words

The MSB of the MODBUS address is managed in the same manner as for other tables. For System the MSB=0x00, for Unit the MSB=0xu0 (u=Unit number) and for Module the MSB=0xum (m=module number)

MODULYS XM MEASUREMENT				Formats		MCMT**	System Unit	Module
Acron.	Lsb	Measurements	Units	0x000E = 0	0x000E = 1			
M000	0x40	Output load rate	%	###	###	0xC0b00	X	X
M001	0x41	Output load rate L1	%	###	###	0xC0b01	X	X
M002	0x42	Output load rate L2	%	###	###	0xC0b02	X	X
M003	0x43	Output load rate L3	%	###	###	0xC0b03	X	X
M004	0x44	Output apparent power	kVA	## ###	# ###.#	0xC0b04	X	X
M005	0x45	Output active power	kW	## ###	# ###.#	0xC0b05	X	X
M006	0x46	Output current L1	A	## ###	# ###.#	0xC0b06	X	X
M007	0x47	Output current L2	A	## ###	# ###.#	0xC0b07	X	X
M008	0x48	Output current L3	A	## ###	# ###.#	0xC0b08	X	X
M009	0x49							
M010	0x4A	Output voltage L1	V	###	###	0xC0b10	X	X
M011	0x4B	Output voltage L2	V	###	###	0xC0b11	X	X
M012	0x4C	Output voltage L3	V	###	###	0xC0b12	X	X
M013	0x4D	Output frequency	Hz*10	##.#	##.#	0xC0b13	X	X
M014	0x4E							
M015	0x4F	Ambient T°	°C	##.#	##.#	0xC0b15	X	
M016	0x50	Battery voltage string + (*)	V	# ###	###.#	0xC1b00	X	
M017	0x51	Battery voltage string - (*)	V	# ###	###.#	0xC1b01	X	
M018	0x52	Battery current string + (*)	A	## ###	# ###.#	0xC1b02	X	
M019	0x53	Battery current string - (*)	A	## ###	# ###.#	0xC1b03	X	
M020	0x54							
M021	0x55							
M022	0x56	Battery capacity	%	###	###	0xC1b06	X	
M023	0x57	Battery capacity	Ah	## ###	# ###.#	0xC1b07	X	
M024	0x58	Bat. remaining backup time mn	Mn	###	###	0xC1b08	X	
M025	0x59	Time on battery (*)	S	###	###	0xC1b09	X	
M026	0x5A	Battery temperature (*)	°C	##.#	##.#	0xC1b10	X	
M027	0x5B	Battery temperature average	°C	##.#	##.#	0xC1b11	X	
M028	0x5C							
M029	0x5D							
M030	0x5E							
M031	0x5F							
M032	0x60	Rect. input supply volt. L1	V	###	###	0xC2b00	X	X
M033	0x61	Rect. input supply volt. L2	V	###	###	0xC2b01	X	X
M034	0x62	Rect. input supply volt. L3	V	###	###	0xC2b02	X	X
M035	0x63	Rect. input supply freq.	Hz*10	##.#	##.#	0xC2b03	X	X
M036	0x64	Rect. input supply volt. U12	V	###	###	0xC2b04	X	X
M037	0x65	Rect. input supply volt. U23	V	###	###	0xC2b05	X	X
M038	0x66	Rect. input supply volt. U31	V	###	###	0xC2b06	X	X
M039	0x67	Bypass input supply voltage L1	V	###	###	0xC2b07	X	
M040	0x68	Bypass input supply voltage L2	V	###	###	0xC2b08	X	
M041	0x69	Bypass input supply voltage L3	V	###	###	0xC2b09	X	
M042	0x6A	Bypass input supply freq	Hz*10	##.#	##.#	0xC2b10	X	
M043	0x6B	Bypass input supply volt U12	V	###	###	0xC2b11	X	
M044	0x6C	Bypass input supply volt U23	V	###	###	0xC2b12	X	
M045	0x6D	Bypass input supply volt U31	V	###	###	0xC2b13	X	
M046	0x6E					0xC2b14		
M047	0x6F					0xC2b15		

MODULYS XM MEASUREMENT				Formats		MCMT**	System Unit	Module
Acron.	Lsb	Measurements	Units	0x000E = 0	0x000E = 1			
M048	0x70	Output Apparent P. L1	kVA	## ###	# ###.#	0xC3b00	X	X
M049	0x71	Output Apparent P. L2	kVA	## ###	# ###.#	0xC3b01	X	X
M050	0x72	Output Apparent P. L3	kVA	## ###	# ###.#	0xC3b02	X	X
M051	0x73	Output Active Power L1	kW	## ###	# ###.#	0xC3b03	X	X
M052	0x74	Output Active Power L2	kW	## ###	# ###.#	0xC3b04	X	X
M053	0x75	Output Active Power L3	kW	## ###	# ###.#	0xC3b05	X	X
M054	0x76	Output voltage U12	V	###	###	0xC3b06	X	X
M055	0x77	Output voltage U23	V	###	###	0xC3b07	X	X
M056	0x78	Output voltage U31	V	###	###	0xC3b08	X	X
M057	0x79							
M058	0x7A							
M059	0x7B							
M060	0x7C							
M061	0x7D							
M062	0x7E							
M063	0x7F							
M064	0x80	Rect. Input Current L1	A	## ###	# ###.#	0xC4b00	X	X
M065	0x81	Rect. Input Current L2	A	## ###	# ###.#	0xC4b01	X	X
M066	0x82	Rect. Input Current L3	A	## ###	# ###.#	0xC4b02	X	X
M067	0x83	Rect. Active Power L1	kW	## ###	# ###.#	0xC4b03	X	X
M068	0x84	Rect. Active Power L2	kW	## ###	# ###.#	0xC4b04	X	X
M069	0x85	Rect. Active Power L3	kW	## ###	# ###.#	0xC4b05	X	X
M070	0x86	Bypass Input Current L1	A	## ###	# ###.#	0xC4b06	X	
M071	0x87	Bypass Input Current L2	A	## ###	# ###.#	0xC4b07	X	
M072	0x88	Bypass Input Current L3	A	## ###	# ###.#	0xC4b08	X	
M073	0x89	Bypass Power L1	kW	## ###	# ###.#	0xC4b09	X	
M074	0x8A	Bypass Power L2	kW	## ###	# ###.#	0xC4b10	X	
M075	0x8B	Bypass Power L3	kW	## ###	# ###.#	0xC4b11	X	
M076		reserved						
M077								
M078								
M079								

(*) measurements updated from Battery management system in case of Li-ion batteries for example

(**) Measurements Control Management Table

8.10 UPS controls MODBUS table

To send a command bit, write to the 0xC9 or 0xCA address using the function code '0x06'. See 'Functions used' and 'Summary of frame format paragraphs for Modbus frame description.

Each bit defines a command to be executed by the UPS.

It is necessary to change the parameter 'REMOTE CONTROL' to 'enabled' on the mimic-panel to allow the command to be received; then the related permission P000 switches to 1.

P000 set to 0 means that remote commands are not permitted.

Address to write	Bit to set	Acronym	UPS CONTROLS	Permission	Address to read	Bit to check
0xC9	b00	C000	If P000 = 0 the controls are not permitted	P000	0x00C7	b00
	b01	C001				b01
	b02	C002				b02
	b03	C003				b03
	b04	C004				b04
	b05	C005				b05
	b06	C006				b06
	b07	C007				b07
	b08	C008				b08
	b09	C009				b09
	b10	C010				b10
	b11	C011				b11
	b12	C012				b12
	b13	C013				b13
	b14	C014				b14
	b15	C015				b15
0xCA	b00	C016	eco mode On	P016	0x00C8	b00
	b01	C017	eco mode Off	P017		b01
	b02	C018				b02
	b03	C019				b03
	b04	C020				b04
	b05	C021				b05
	b06	C022				b06
	b07	C023				b07
	b08	C024				b08
	b09	C025				b09
	b10	C026				b10
	b11	C027				b11
	b12	C028	Battery test	P028		b12
	b13	C029				b13
	b14	C030				b14
	b15	C031	Reset Alarm	P031		b15

8.11 UPS date & time MODBUS table (0x00CB – 4 Words)

To update UPS date and time, write to addresses 0x00CB to 0x00CE using as a 'Function' the code '0x10'.
See 'Functions used' and 'Summary' of frame format' paragraphs for Modbus frame description.

Address	Description	Value		Remarks
		MSB	LSB	
0x00CB	Minutes & Seconds	Minute: 0 - 59	Seconds: 0 - 59	read / write
0x00CC	Day & hours	Day: 1 - 31	Hours: 0-23	read / write
0x00CD	Month & day of the week	Month: 1 - 12	1 = Monday - 7 = Sunday	read / write
0x00CE	Year	year = value + 2000		read / write

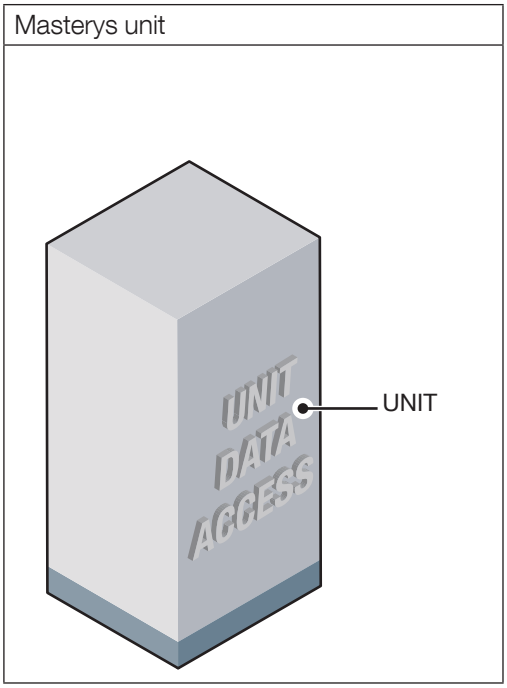
Date and hours frame detail

0x00CB		0x00CC		0x00CD		0x00CE
Minutes	Second	Day	Hours	Month	day/week	Year + 2000

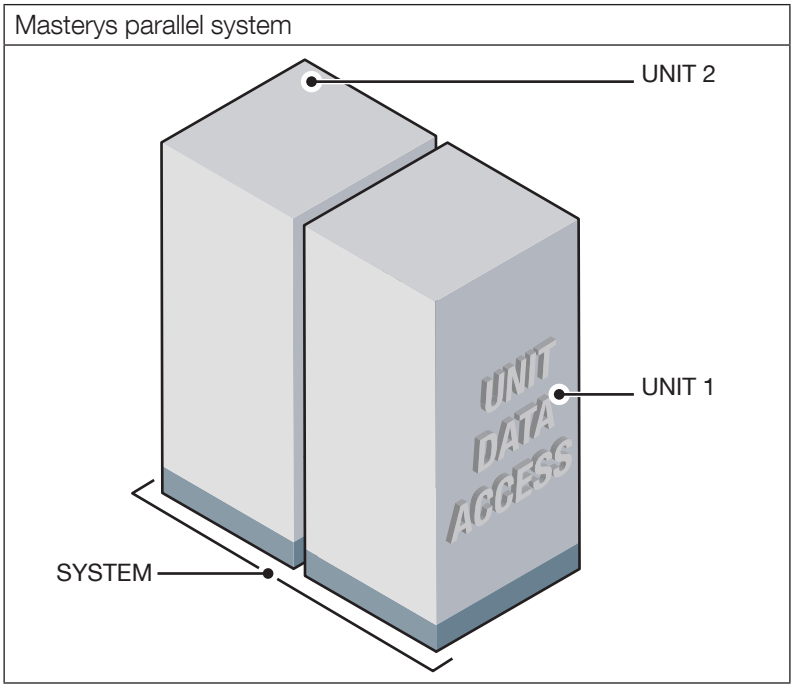
9. MODBUS TABLE MASTERYS BC+ & GP4

9.1 UPS architecture

Masterys unit



Masterys parallel system



9.2 Unit access data table mapping

0x0000 or 0x1000 for SINGLE UNIT

0x0000 for SYSTEM data access

0x(u)000 fur UNIT data access with (u) = unit number

9.3 UPS configuration table, starting from 0x0001

NOTE!
Fields or bit fields not described must be considered as reserved/unused.

Address	Acronym	Description	Value		Default values
0x0001	T000	UPS installation code and Device type	MSB = UPS installation Code (1 byte)	lsb = Device type (1 byte)	(0x01(0x01) unit (0x06)(0x01) parallel
0x0002	T001	Number of devices in level -1	1 to 8 (only for parallel system)		1 unit
0x0003	T002	Position of devices present	each unit present is set by a bit. If unit 1 present b00 = 1		1 first position by default
0x0004	T003	Device number	1 to 8		1 o 8
0x0005	T004	Nominal kVA	*10 if 0x000E = 1		depends on the number of units
0x0006	T005	Nominal kW	*10 if 0x000E = 1		depends on the number of units
0x0007	T006	Phase number	MSB = Input phases 1 – 3	LSB = Output phases 1 - 3	(0x03)(0x03)
0x0008	T007	Function	b00	eco mode enabled	
			b01	energy saver enabled	
			b02		
			b03	genset present	
			b04		
			b05		
			b06		
			b07		
			b08		
0x0009	T008	Environment	b00		
			b01		
			b02		
			b03		
			b04		
			b05		
			b06	Without bypass	
0x000A	T009	DC storage	b00	battery present	
			b01		
0x000B	T010	Power share			
0x000D	T012	free	free		
0x000E	T013	measurements factor	0 = no factor / 1 = factor * 10		set to 1
0x000F	T014	Device reference code			0x8200 = BC+ 0x8300 = GP4

9.4 UPS reference table, starting from 0x0010

Address	Acronym	Description	Value		Remarks
			Length	Number of ASCII char.	
0x0010	I000	SERIAL NUMBER	10	20	MSB = first char of string
0x001A	I001	SOCOMEC REFERENCE	10	20	MSB = first char of string
0x0024	I002	USER DEVICE REFERENCE	6	12	MSB = first char of string
0x002A	I003	USER DEVICE LOCATION	6	12	MSB = first char of string

Same reference can be read from each unit from address 0x(u)010, with (u) = unit number.

9.5 UPS status table, starting from 0x0030 or 0x(u)030

MASTERYS BC+ & GP4 STATUS				
Address	Bits	Acronym	Description	
0x0030	b00	S000	Load protected by Inverter	OUTPUT STATUS
	b01	S001		
	b02	S002	Load supplied by automatic Bypass	
	b03	S003	Load supplied by Maintenance Bypass	
	b04	S004	Load OFF	
	b05	S005		
	b06	S006	In eco mode	FUNCTIONING MODE
	b07	S007	Energy saver	
	b08	S008		
	b09	S009	Service Mode	
	b10	S010		
	b11	S011	Operating	DEVICE STATUS
	b12	S012	Available	
	b13	S013	On Standby	
	b14	S014	Isolated	
	b15	S015	Maintenance Alert	
0x0031	b00	S016	Output Breaker closed	DEVICE ENVIRONMENT
	b01	S017	External maintenance bypass close[1]	
	b02	S018		
	b03	S019		
	b04	S020		
	b05	S021		
	b06	S022		
	b07	S023	Gen set ON	
	b08	S024		
	b09	S025		
	b10	S026	Auto-test procedure in progress	PROCEDURES
	b11	S027	Maint. Bypass procedure in progress	
	b12	S028	UPS OFF procedure in progress	
	b13	S029		
	b14	S030		
	b15	S031	Alarm Ack. request	
0x0032	b00	S032	Battery OK	BATTERY
	b01	S033	Battery charged	
	b02	S034	Battery Test in progress	
	b03	S035	Battery Test scheduled	
	b04	S036	Battery charging	
	b05	S037	Battery Test interrupted	
	b06	S038		
	b07	S039		
	b08	S040		DC STORAGE SYSTEM
	b09	S041		
	b10	S042		
	b11	S043		
	b12	S044		
	b13	S045		
	b14	S046		
	b15	S047		

1. If option present

MASTERYS BC+ & GP4 STATUS				
Address	Bits	Acronym	Description	
0x0033	b00	S048	Rectifier Input Supply present	RECTIFIER
	b01	S049	Rectifier ON	
	b02	S050	Charger ON	
	b03	S051		
	b04	S052	Inverter ON	INVERTER
	b05	S053	Inverter Switch ON	
	b06	S054		
	b07	S055		
	b08	S056	Bypass Input Supply present	BYPASS
	b09	S057	Bypass Static Switch closed	
	b10	S058	Bypass Input & Inverter synchronised	
	b11	S059		
	b12	S060		POWER SHARE
	b13	S061		
	b14	S062		
	b15	S063		

9.6 Additional UPS status table, starting from 0x0034 or 0x(u)034

MASTERYS BC+ & GP4 STATUS				
Generic address	Bits	Acronym	Description	
0x0034	b00	S064	Board Slot 1 present	OPTIONS
	b01	S065	Board Slot 2 present	
	b02	S066		
	b03	S067		
	b04	S068		
	b05	S069		
	b06	S070		
	b07	S071		
	b08	S072	Programmable S072	CUSTOM IN / OUT
	b09	S073	Programmable S073	
	b10	S074	Programmable S074	
	b11	S075	Programmable S075	
	b12	S076	Programmable S076	
	b13	S077	Programmable S077	
	b14	S078	Programmable S078	
	b15	S079	Programmable S079	
0x0035	b00	S080	Programmable S080	CUSTOM IN / OUT
	b01	S081	Programmable S081	
	b02	S082	Programmable S082	
	b03	S083	Programmable S083	
	b04	S084	Programmable S084	
	b05	S085	Programmable S085	
	b06	S086	Programmable S086	
	b07	S087	Programmable S087	
	b08	S088	Programmable S088	
	b09	S089	Programmable S089	
	b10	S090	Programmable S090	
	b11	S091	Programmable S091	
	b12	S092	Programmable S092	
	b13	S093	Programmable S093	
	b14	S094	Programmable S094	
	b15	S095	Programmable S095	

These bits can be programmed for specific use. The combination to activate bits considers the standard Modbus status and alarms, and also external inputs or output position of relays.

Each bit can be programmed through the Maintenance Software.

9.7 System summary table, starting from 0x0036

MODBUS makes it possible to view the units status from the System level through following table:

MASTERYS BC+ & GP4 STATUS				
Unit address	Bits	Acronym	Description	
0x1036	b00	S096	Unit 1 Operating	
	b01	S097	Unit 2 Operating	
	b02	S098	Unit 3 Operating	
	b03	S099	Unit 4 Operating	
	b04	S100	Unit 5 Operating	
	b05	S101	Unit 6 Operating	
	b06	S102	Unit 7 Operating	
	b07	S103	Unit 8 Operating	
	b08	S104		
	b09	S105		
	b10	S106		
	b11	S107		
	b12	S108		
	b13	S109		
	b14	S110		
	b15	S111		
0x1037	b00	S112	Unit 1 Available	
	b01	S113	Unit 2 Available	
	b02	S114	Unit 3 Available	
	b03	S115	Unit 4 Available	
	b04	S116	Unit 5 Available	
	b05	S117	Unit 6 Available	
	b06	S118	Unit 7 Available	
	b07	S119	Unit 8 Available	
	b08	S120		
	b09	S121		
	b10	S122		
	b11	S123		
	b12	S124		
	b13	S125		
	b14	S126		
	b15	S127		

9.8 UPS alarms table, starting from 0x0038 or 0x(u)038

MASTERYS BC+ & GP4 ALARMS				
Generic address	Bits	Acronym	Description	
0x0038	b00	A000	Imminent Stop	LOAD
	b01	A001	Overload	
	b02	A002	Ambient Temperature Alarm	
	b03	A003	Transfer locked	
	b04	A004	Transfer impossible	
	b05	A005	Insufficient Resources	
	b06	A006	Redundancy lost	
	b07	A007		
	b08	A008	Eco mode disabled by UPS	MODE
	b09	A009		
	b10	A010	On Bypass for 1 hour	
	b11	A011		
	b12	A012	Maintenance Alarm	SERVICE
	b13	A013	Remote Service Alarm	
	b14	A014	Remote Service Preventive Alarm	
	b15	A015	General Alarm	
0x0039	b00	A016	Battery disconnected	BATTERY
	b01	A017	Battery discharged	
	b02	A018		
	b03	A019	Operating on Battery	
	b04	A020	Battery Temperature Alarm	
	b05	A021		
	b06	A022	Battery Test failed	
	b07	A023		
	b08	A024		
	b09	A025		
	b10	A026	Insulation Failure	
	b11	A027	Battery Alarm	
	b12	A028		
	b13	A029		DC STORAGE
	b14	A030		
	b15	A031		
0x003A	b00	A032	Rectifier Critical Alarm	RECTIFIER
	b01	A033	Rectifier Preventive Alarm	
	b02	A034		
	b03	A035	Rectifier Input Supply not OK	
	b04	A036	Gen Set Alarm	
	b05	A037	Charger Critical Alarm	
	b06	A038	Charger Preventive Alarm	
	b07	A039		
	b08	A040	Inverter Critical Alarm	INVERTER
	b09	A041	Inverter Preventive Alarm	
	b10	A042		
	b11	A043	Imminent redundancy lost	
	b12	A044	Consumable alarm	
	b13	A045		
	b14	A046	Parallel board Critical alarm	
	b15	A047	Parallel board Preventive alarm	

MASTERYS BC+ & GP4 ALARMS				
Generic address	Bits	Acronym	Description	
0x003B	b00	A048	Bypass Critical Alarm	BYPASS
	b01	A049	Bypass Preventive Alarm	
	b02	A050	Bypass Input Supply not OK	
	b03	A051	Phase Rotation fault	
	b04	A052	Bypass Backfeed detection	
	b05	A053	Transformer Alarm	
	b06	A054	Fan failure	
	b07	A055	ACS Alarm[1]	ENVIRONMENT
	b08	A056	Maintenance Bypass Alarm	
	b09	A057	Internal Backfeed detection	
	b10	A058		
	b11	A059	UPS Power OFF[2]	
	b12	A060	Wrong Configuration	INTERNAL
	b13	A061	Internal / Communication failure	
	b14	A062	Option Board Alarm	
	b15	A063	Spare part not compatible	

1. If ACS board option present.

2. External input.

9.9 Additional alarms table, starting from 0x003C or 0x(u)03C

MASTERYS BC+ & GP4 ALARMS				
Generic address	Bits	Acronym	Description	
0x003C	b00	A064	Programmable A064	CUSTOM IN / OUT
	b01	A065	Programmable A065	
	b02	A066	Programmable A066	
	b03	A067	Programmable A067	
	b04	A068	Programmable A068	
	b05	A069	Programmable A069	
	b06	A070	Programmable A070	
	b07	A071	Programmable A071	
	b08	A072	Programmable A072	
	b09	A073	Programmable A073	
	b10	A074	Programmable A074	
	b11	A075	Programmable A075	
	b12	A076	Programmable A076	
	b13	A077	Programmable A077	
	b14	A078	Programmable A078	
	b15	A079	Programmable A079	
0x003D	b00	A080	Programmable A080	CUSTOM IN / OUT
	b01	A081	Programmable A081	
	b02	A082	Programmable A082	
	b03	A083	Programmable A083	
	b04	A084	Programmable A084	
	b05	A085	Programmable A085	
	b06	A086	Programmable A086	
	b07	A087	Programmable A087	
	b08	A088	Programmable A088	
	b09	A089	Programmable A089	
	b10	A090	Programmable A090	
	b11	A091	Programmable A091	
	b12	A092	Programmable A092	
	b13	A093	Programmable A093	
	b14	A094	Programmable A094	
	b15	A095	Programmable A095	

These bits can be programmed for specific use. The combination to activate bits considers a standard Modbus status and alarms, and also external inputs or output position of relays.

Each bit can be programmed through the Maintenance Software.

9.10 Units alarms synthesis table, starting from 0x003E

MASTERYS BC+ & GP4 ALARMS				
Generic address	Bits	Acronym	Description	
0x003E	b00	A096	Unit 1 General Alarm	PARALLEL SYSTEM Unit / Module
	b01	A097	Unit 2 General Alarm	
	b02	A098	Unit 3 General Alarm	
	b03	A099	Unit 4 General Alarm	
	b04	A100	Unit 5 General Alarm	
	b05	A101	Unit 6 General Alarm	
	b06	A102	Unit 7 General Alarm	
	b07	A103	Unit 8 General Alarm	
	b08	A104		
	b09	A105		
	b10	A106		
	b11	A107		
	b12	A108		
	b13	A109		
	b14	A110		
	b15	A111		
0x003F	b00	A112	Unit 1 Imminent STOP	UNITS IMMINENT STOP SYNTHESIS
	b01	A113	Unit 2 Imminent STOP	
	b02	A114	Unit 3 Imminent STOP	
	b03	A115	Unit 4 Imminent STOP	
	b04	A116	Unit 5 Imminent STOP	
	b05	A117	Unit 6 Imminent STOP	
	b06	A118	Unit 7 Imminent STOP	
	b07	A119	Unit 8 Imminent STOP	
	b08	A120		
	b09	A121		
	b10	A122		
	b11	A123		
	b12	A124		
	b13	A125		
	b14	A126		
	b15	A127		

9.11 UPS measurements table, starting from 0x0040 or 0x(u)040

> **NOTE!**
> **In order to see if a measurement is supported/managed, use the addresses between 0x00C0-0x00C5 in read access.**

For example: if the bit 9 of 0x00C0 = 0, this means that M009 is not managed by the UPS

MASTERYS BC+ & GP4 Measurement				Formats			Check availability
Generic address	Acronym	Description	Units	0x000E = 0	0x000E = 1		
0x0040	M000	Output load rate	%	###	###	OUTPUT	0x00C0 b09 = 0
0x0041	M001	Output load rate L1	%	###	###		
0x0042	M002	Output load rate L2	%	###	###		
0x0043	M003	Output load rate L3	%	###	###		
0x0044	M004	Output Apparent Power	kVA	## ###	# ###.#		
0x0045	M005	Output Active Power	kW	## ###	# ###.#		
0x0046	M006	Output current L1	A	## ###	# ###.#		
0x0047	M007	Output current L2	A	## ###	# ###.#		
0x0048	M008	Output current L3	A	## ###	# ###.#		
0x0049	M009						
0x004A	M010	Output voltage L1	V	###	###		
0x004B	M011	Output voltage L2	V	###	###		
0x004C	M012	Output voltage L3	V	###	###		
0x004D	M013	Output frequency	Hz	##.#	##.#		
0x004E	M014						
0x004F	M015	Ambient Temperature	°C	##.#	##.#		
0x0050	M016	Battery voltage string +	V	# ###	###.#	BATTERY	0x00C1
0x0051	M017	Battery voltage string -	V	# ###	###.#		
0x0052	M018	Battery current string +	A	## ###	# ###.#		
0x0053	M019	Battery current string -	A	## ###	# ###.#		
0x0054	M020						
0x0055	M021						
0x0056	M022	Battery capacity	%	###	###		
0x0057	M023	Battery capacity	Ah	## ###	# ###.#		
0x0058	M024	Bat. remaining backup time	Mn	###	###		
0x0059	M025	Time on battery	s	###	###		
0x005A	M026	Battery temperature	°C	##.#	##.#		
0x005B	M027						
0x005C	M028						
0x005D	M029						
0x005E	M030						
0x005F	M031						
0x0060	M032	Rect. input supply volt. L1	V	###	###	RECT.	0x00C2
0x0061	M033	Rect. input supply volt. L2	V	###	###		
0x0062	M034	Rect. input supply volt. L3	V	###	###		
0x0063	M035	Rect. input supply freq.	Hz	##.#	##.#		
0x0064	M036	Rect. input supply volt. U12	V	###	###		
0x0065	M037	Rect. input supply volt. U23	V	###	###		
0x0066	M038	Rect. input supply volt. U31	V	###	###		

MASTERYS BC+ & GP4 Measurement				Formats			Check availability
Generic address	Acronym	Description	Units	0x000E = 0	0x000E = 1		
0x0067	M039	Bypass input supply voltage L1	V	###	###	BYPASS	0x00C2
0x0068	M040	Bypass input supply voltage L2	V	###	###		
0x0069	M041	Bypass input supply voltage L3	V	###	###		
0x006A	M042	Bypass input supply freq	Hz	##.#	##.#		
0x006B	M043	Bypass input supply volt U12	V	###	###		
0x006C	M044	Bypass input supply volt U23	V	###	###		
0x006D	M045	Bypass input supply volt U31	V	###	###		
0x006E	M046						
0x006F	M047						
0x0070	M048	Output Apparent P. L1	kVA	## ###	# ###.#	OUTPUT DETAIL	0x00C3
0x0071	M049	Output Apparent P. L2	kVA	## ###	# ###.#		
0x0072	M050	Output Apparent P. L3	kVA	## ###	# ###.#		
0x0073	M051	Output Active Power L1	kW	## ###	# ###.#		
0x0074	M052	Output Active Power L2	kW	## ###	# ###.#		
0x0075	M053	Output Active Power L3	kW	## ###	# ###.#		
0x0076	M054	Output voltage U12	V	###	###		
0x0077	M055	Output voltage U23	V	###	###		
0x0078	M056	Output voltage U31	V	###	###		
0x0079	M057						
0x007A	M058						
0x007B	M059						
0x007C	M060						
0x007D	M061						
0x007E	M062						
0x007F	M063			#.#	#.#		
0x0080	M064	Rectifier Input Current L1	A	## ###	# ###.#	ADD. INPUT	0x00C4
0x0081	M065	Rectifier Input Current L2	A	## ###	# ###.#		
0x0082	M066	Rectifier Input Current L3	A	## ###	# ###.#		
0x0083	M067	Rectifier Active Power L1	kW	## ###	# ###.#		
0x0084	M068	Rectifier Active Power L2	kW	## ###	# ###.#		
0x0085	M069	Rectifier Active Power L3	kW	## ###	# ###.#		
0x0086	M070						
0x008C	M076						
0x008D	M077	Reserved					
0x008E	M078	Reserved					
0x008F	M079	Reserved					

9.12 Commands table, starting from 0x00C9

To send a command bit, write to the 0x00C9 or 0x00CA address using the function code '0x06'. See 'Functions used' and 'Summary of frame format paragraphs for Modbus frame description.

Each bit defines a command to be executed by the UPS.

It is necessary to change the parameter 'REMOTE CONTROL' to 'enabled' on the mimic-panel to allow the command to be received; then the related permission P000 switches to 1.

P000 set to 0 means that remote commands are not permitted.

Address Only for SYSTEM/UPS view	Bit	Acronym	Description	Permission	
0x00C9	b00	C000	Reserved	0x00C7	P000
	b01	C001			P001
	b02	C002			P002
	b03	C003			P003
	b04	C004			P004
	b05	C005			P005
	b06	C006			P006
	b07	C007			P007
	b08	C008			P008
	b09	C009			P009
	b10	C010			P010
	b11	C011			P011
	b12	C012			P012
	b13	C013			P013
	b14	C014			P014
	b15	C015			P015
0x00CA	b00	C016	eco mode On	0x00C8	P016
	b01	C017	eco mode Off		P017
	b02	C018			P018
	b03	C019			P019
	b04	C020			P020
	b05	C021			P021
	b06	C022			P022
	b07	C023			P023
	b08	C024			P024
	b09	C025			P025
	b10	C026			P026
	b11	C027			P027
	b12	C028	Battery Test		P028
	b13	C029			P029
	b14	C030			P030
	b15	C031	Reset Alarm		P031

If the bit associated with commands is set to 1, this means the command is enabled by the UPS, and available to run.

9.13 UPS clock table, starting from 0x00CB

To send a command bit time update frame, write the addresses 0x00CB to 0x00CE unsing as a 'Function' the code '0x10'. See 'Functions used' and 'Summary of frame format' paragraphs for Modbus frame description.

Generic address	Acronym	Description	Value		Remarks
			MSB	LSB	
0x00CB	K000	Minutes & Seconds	Minute: 0 - 59	Seconds: 0 - 59	read / write
0x00CC	K001	Day & hours	Day: 1 - 31	Hours: 0-23	read / write
0x00CD	K002	Month & day of the week	Month: 1 - 12	1 = Monday - 7 = Sunday	read / write
0x00CE	K003	Year	year = value + 2000		read / write

10. MODBUS PROTOCOL

10.1 Functions used

0x03 READ data
0x06 WRITE command or one word
0x10 Set UPS Clock – write several words

10.2 Summary of frame format

Function 0x03: bytes frame description

Slave	Function	Address		Length		CRC	
1	0x03	MSB	LSB	MSB	LSB	MSB	LSB
By default		MODBUS TABLE		Number of words		Computed	

Answer

Slave	Function	Nb bytes	Data			CRC	
1	0x03	2 * nb of words	MSB	LSB		MSB	LSB
			Values		….	Computed	

Function 0x06: bytes frame description

Slave	Function	Address		Data		CRC	
1	0x06	MSB	LSB	MSB	LSB	MSB	LSB
By default		MODBUS TABLE		Value to write		Computed	

Answer

Slave	Function	Address		Data		CRC	
1	0x06	MSB	LSB	MSB	LSB	MSB	LSB
		MODBUS TABLE		Value to write		Computed	

Function 0x10: bytes frame description

Slave	Function	Address		Length		Length	Data		CRC	
1	0x10	MSB	LSB	MSB	LSB		MSB	LSB	MSB	LSB
By default		MODBUS TABLE		Number of words to write		Number of bytes	Values to write		Computed	

Answer

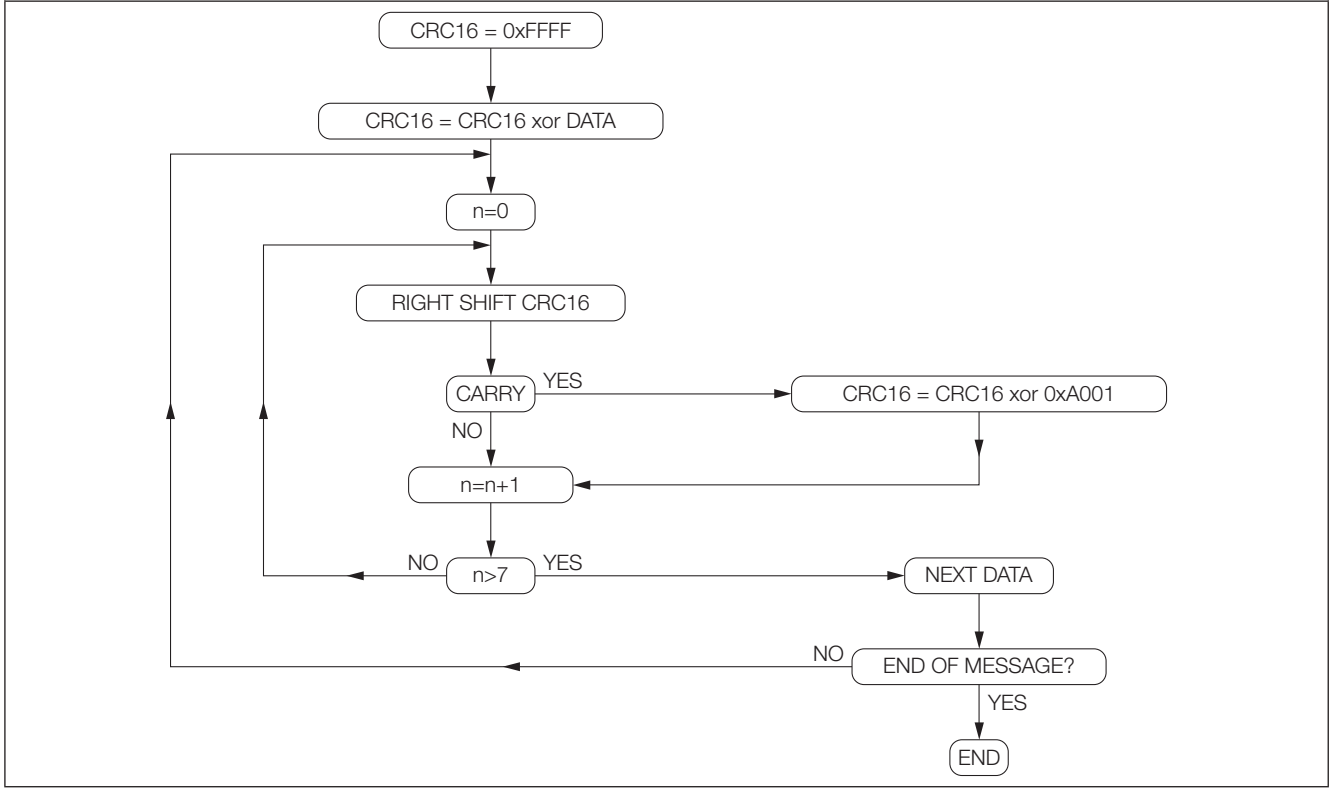
Slave	Function	Address		Length		CRC	
1	0x10	MSB	LSB	MSB	LSB	MSB	LSB
		MODBUS TABLE		Nb of words written		Computed	

10.3 Error code management

Function error	Code error	Description	Condition	Specific address
0x83	0x01	Bad function	- Access to write only area - Data reserved	
0x83	0x02	Bad address	- Too many words - The starting address + nb of words > table length	SUBUNIT / UNIT not present
0x86	0x01	Bad function	- Data in read only area - Data reserved.	
0x86	0x02	Bad address	- Bad address event.	
0x90	0x01	Bad function	- Data in read only area - Data reserved.	
0x90	0x02	Bad address	- Too many words. - The starting address + nb of words > table length	

10.4 CRC calculation

CRC-16-CC-ITT with polynomial 0x-21



11. APPENDIX 1: MODBUS TCP IDA SPECIFICATION

The frames below are only examples:

REQUEST FROM MASTER MODBUS TCP

Original frame: 01 03 1034 0003 40C5

Encapsulated frame: 0046 0000 0006 01 03 1034 0003

where:

0046 corresponds to the transaction number

0000 corresponds to the protocol identifier

0006 corresponds to the number of bytes (length of the message)

Note: the CRC is removed in the encapsulated MODBUS frame.

REPLY FROM THE UPS MODBUS TCP:

Original frame: 01 03 06 0002 0184 0000 1960

Encapsulated frame: 0046 0000 0009 01 03 06 0002 0184 0000

where:

0046 corresponds to the transaction number

0000 corresponds to the protocol identifier

0006 corresponds to the number of bytes (length of the message)

Note: the CRC is removed in the encapsulated MODBUS frame.

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