EN

MODBUS RTU / MODBUS TCP via NET VISION Option Box

For DELPHYS MX Elite+ UPS range

Socomec Resource Center
To download, brochures, catalogues
and technical manuals

socomec
Innovative Power Solutions

CONTENTS

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

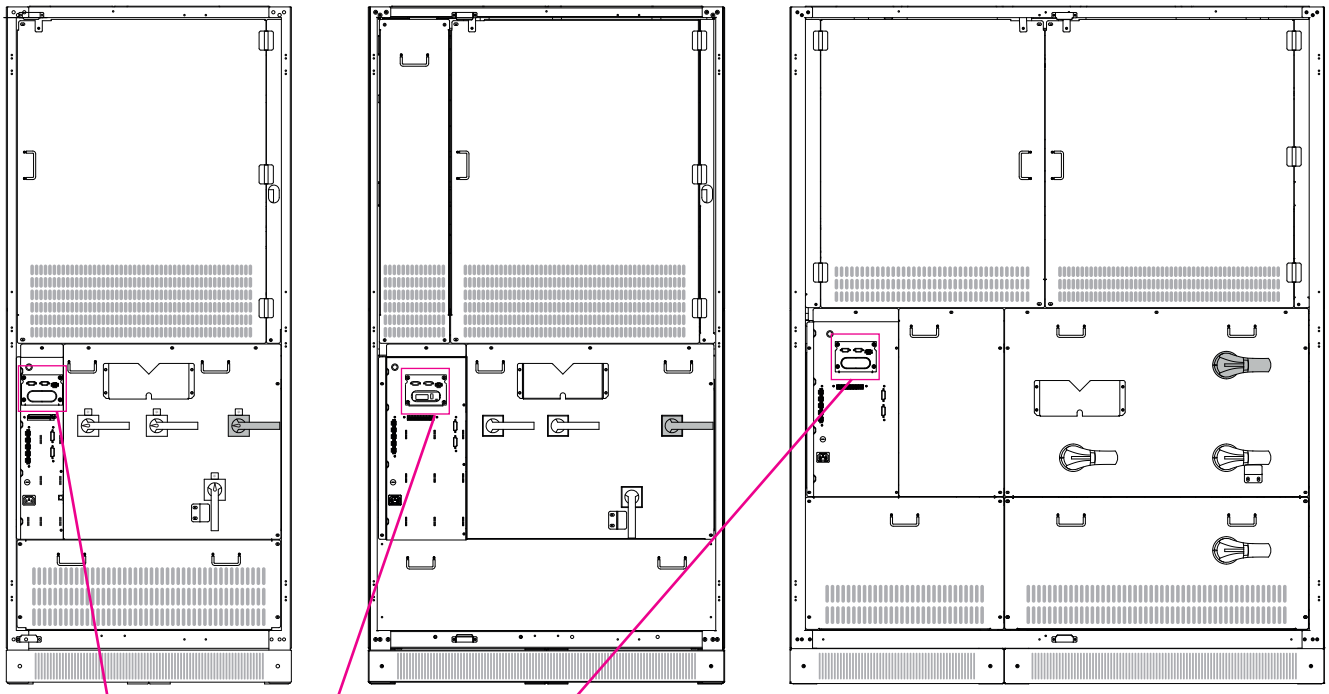
UPS Operating Reference Standard
Comply with safety requirements.
Read the UPS operating instructions carefully.

2. GENERAL AIM

This document provides information on the MODBUS protocol serial link or Ethernet network for:
• DELPHYS XM Elite+

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 card.

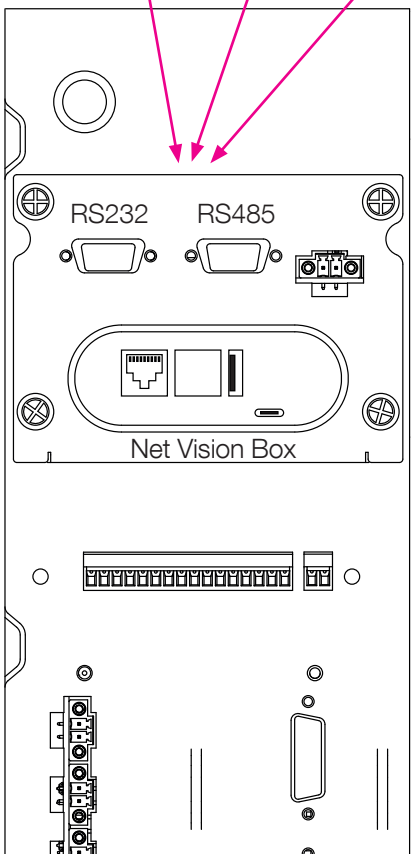
3. LOCATION

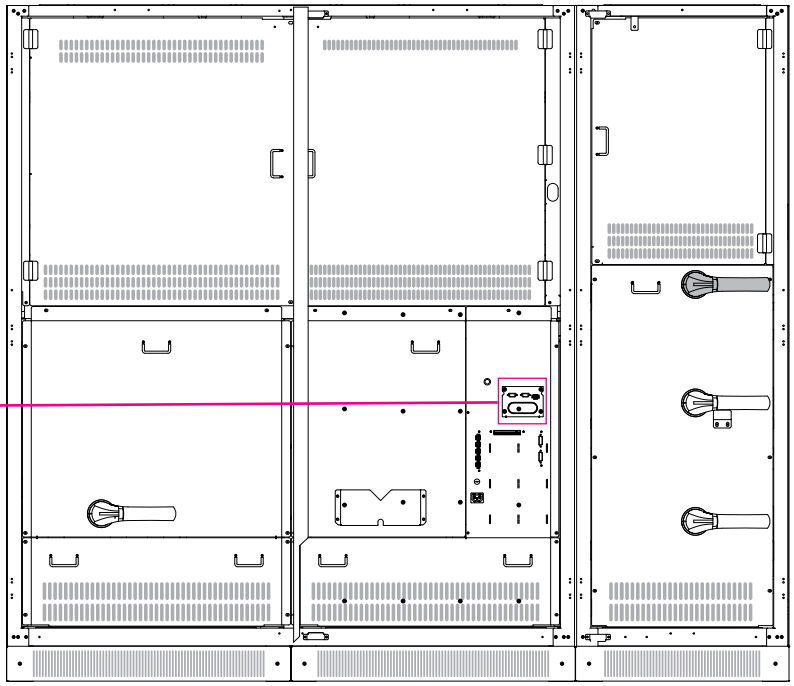


60-120 kVA

160-250 kVA

300-400 kVA

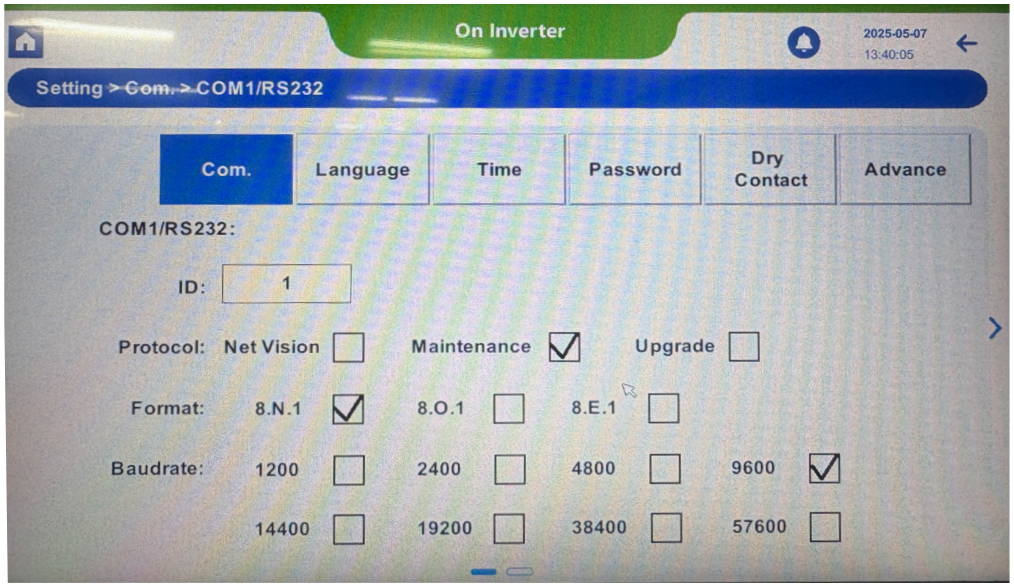




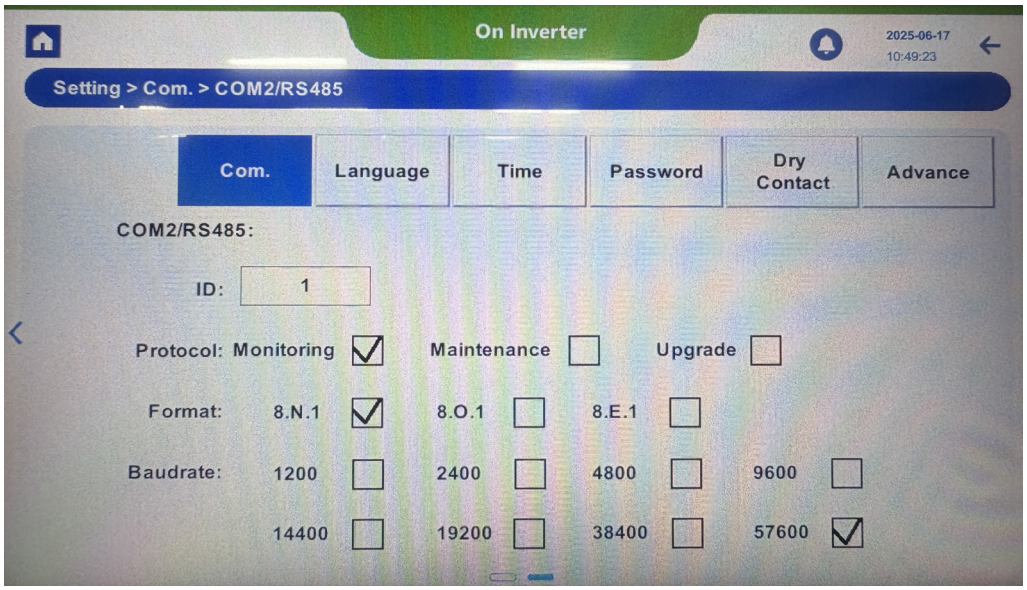
500-600 kVA

4. MODBUS RTU – RS485 or RS232

The selection of COM port and serial link setting must be done through the local control panel of the UPS:

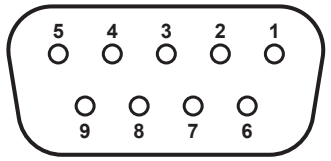


Select the 2nd page for RS485 settings.



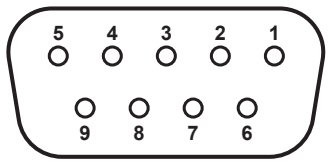
⚠	NOTE! RS232 serial port is no more available when NET VISION BOX option is installed.

RS232 pin assignment cabling



1.	-	4.	-	7.	-
2.	RS232-TX	5.	GND	8.	-
3.	RS232-RX	6.	-	9.	-

RS485 Sub-D9 pin assignment cabling



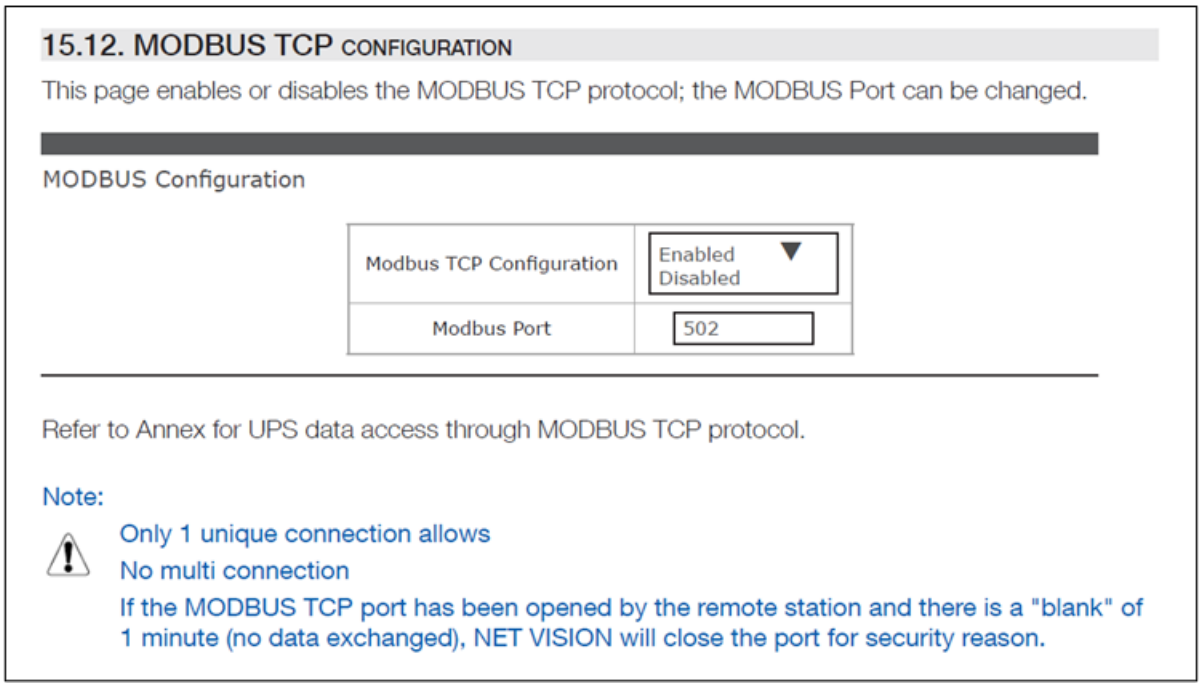
1.		4.	RS485+A	7.	
2.		5.		8.	
3.		6.	RS485-B	9.	

	NOTE! End Line impedance is not existing for RS 485.
	NOTE! Respect state of art when cabling and routing communication cable.
	NOTE! 2 polarization resistors could be removed easily (if needed).
	NOTE! The shield should be earthing at one point.

5. MODBUS TCP – NET VISION BOX

The NET VISION BOX offers also MODBUS TCP protocol.

This protocol needs to be enabled via NET VISION web user interface.



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

MODBUS TCP

Port: 502 by default

⚠	NOTE! Refer to NET VISION user manual for more details.

6. MODBUS UPS DATA ACCESS

6.1 MODBUS global table

Address	Table	Data Type	Description	Length in words	Acronym	Access
0x0001	UPS Configuration	Integer bit field	List of configurations	15	T001 – T015	Read
0x0010	Serial Number	char	String	10	R000	Read
0x001A	Socomec ref	char	Socomec range name	10	R001	Read
0x0030	Status	bit	Bits field	8	S000-S127	Read
0x0038	Alarms	bit	Bits field	8	A000-A127	Read
0x0040	Measurements	signed int unsigned int	List of values	80	M000-M079	Read
0x00C0	Measurements Control Management	bit	Bits field: 1 = measure. available	7	D000-D006	Read
0x00CB	UPS clock	integer	MSB/lsb format	5	K000-K004	R / W

6.2 Detail of data type

Word - unsigned or signed **integer** format															
b15	b14	b13	b12	b11	b10	b09	b08	b07	b06	b05	b04	b03	b02	b01	b00
16bits value 0 … 65535 -32768 … 32768															

Word - **ASCII** format															
b15	b14	b13	b12	b11	b10	b09	b08	b07	b06	b05	b04	b03	b02	b01	b00
MSB								lsb							
Char 1								Char 2							

Word - 16 **bits** field															
b15	b14	b13	b12	b11	b10	b09	b08	b07	b06	b05	b04	b03	b02	b01	b00
A015	Alarms bit														A000
S015	Status bit														S000

7. MODBUS TABLE FOR DELPHYS MX Elite+

7.1 UPS configuration MODBUS table

(0x0001 – 15 words)

Address	Acronym	Description	MSB: UPS installation Code	LSB: Device type
0x0001	T001	UPS ID Code	1	1
0x0002	T002	Number of units	1	
0x0003	T003	Position of Units	1	
0x0004	T004	Device number	1	
0x0005	T005	Nominal kVA		
0x0006	T006	Nominal kW		
0x0007	T007	Phases number	Input phases 1 – 3	Output phases 1 - 3
0x0008	T008	N/A		
0x0009	T009	Reserved		
0x000A	T010	UPS Backup	b00 = 1 if battery present	
0x000B	T011	Reserved		
0x000C	T012	N/A		
0x000D	T013	Reserved		
0x000E	T014	Measurements factor	0 = no factor 1 = factor 10 (reading 500, real value to display = 50.0)	
0x000F	T015	Device reference code	0xF000	DELPHYS MX Elite+

7.2 UPS status MODBUS table

(0x30) – 6 words

Address	Bits	Acronym	Description	Group
0x30	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		
	b08	S008		
	b09	S009		
	b10	S010	Line-Interactive mode	
	b11	S011	Operating	DEVICE STATUS
	b12	S012	Available	
	b13	S013	On Standby	
	b14	S014	Isolated	
	b15	S015	Maintenance Alert	

Address	Bits	Acronym	Description	Group
0x31	b00	S016	Output Breaker closed	DEVICE ENVIRONMENT
	b01	S017	Maintenance Bypass Breaker closed	
	b02	S018	External Output Breaker closed	
	b03	S019		
	b04	S020	Rectifier Input Breaker	
	b05	S021	Bypass Input Breaker	
	b06	S022	External Output Breaker closed	
	b07	S023	Genset ON	
	b08	S024		
	b09	S025		
	b10	S026	Automatic Start in progress	
	b11	S027		
	b12	S028		
	b13	S029		
	b14	S030		
	b15	S031	Alarm Ack request	
0x32	b00	S032	Battery OK	BATTERY
	b01	S033	Battery charged	
	b02	S034	Battery Test in progress	
	b03	S035		
	b04	S036	Battery charging	
	b05	S037	Battery test interrupted	
	b06	S038		
	b07	S039		
	b08	S040		DC STORAGE
	b09	S041		
	b10	S042		
	b11	S043		
	b12	S044		
	b13	S045		
	b14	S046		
	b15	S047		
0x33	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	Bypass Static Switch closed	
	b10	S058	Bypass Input & Inverter	
	b11	S059		
	b12	S060		
	b13	S061		
	b14	S062		
	b15	S063		

Address	Bits	Acronym	Description	Group
0x34	b00	S064		
	b01	S065		
	b02	S066		
	b03	S067		
	b04	S068		
	b05	S069		
	b06	S070		
	b07	S071		
	b08	S072		
	b09	S073		
	b10	S074		
	b11	S075		
	b12	S076		
	b13	S077		
	b14	S078		
	b15	S079		
0x35	b00	S080		MISC.
	b01	S081		
	b02	S082	UPS in Line-Interactive operation	
	b03	S083		
	b04	S084	Backfeed protection open	
	b05	S085		
	b06	S086		
	b07	S087		
	b08	S088		
	b09	S089		
	b10	S090		
	b11	S091		
	b12	S092		
	b13	S093		
	b14	S094		
	b15	S095		

7.3 UPS alarms MODBUS table

(0x38) – 6 words

Address	Bits	Acronym	Description	Group
0x38	b00	A000	Imminent Stop	LOAD
	b01	A001	Overload	
	b02	A002	Ambient Temperature Alarm	
	b03	A003		
	b04	A004	Transfer impossible	
	b05	A005		
	b06	A006		
	b07	A007	Output short circuit detection	
	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	
0x39	b00	A016	Battery disconnected	BATTERY
	b01	A017	Battery discharged	
	b02	A018	End of Backup Time - Battery Low	
	b03	A019	Battery discharging	
	b04	A020	Battery Temperature Alarm	
	b05	A021		
	b06	A022		
	b07	A023		
	b08	A024		
	b09	A025		
	b10	A026		
	b11	A027	Battery Alarm	
	b12	A028	Battery Preventive Alarm	
	b13	A029		DC BACKUP
	b14	A030		
	b15	A031		
0x3A	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		
	b10	A042		
	b11	A043		
	b12	A044		
	b13	A045		
	b14	A046		
	b15	A047		

Address	Bits	Acronym	Description	Group
0x3B	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		
	b08	A056	Maintenance Bypass Alarm	
	b09	A057		
	b10	A058		OPTION
	b11	A059	UPS Power OFF	
	b12	A060	Wrong Configuration	
	b13	A061	Internal / Communication failure	
	b14	A062		
	b15	A063		
0x3C	b00	A064		
	b01	A065		
	b02	A066		
	b03	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		
0x3D				

7.4 UPS Measurements table

(0x40 – 80 words)

Acronym	Lsb	Measurements		Format No factor (T014 = 0)	Format Factor 10 (T014 = 1)	MCMT[1]
M000	0x40	Output load rate	%	###	###	0xC0b00
M001	0x41	Output load rate L1	%	###	###	0xC0b01
M002	0x42	Output load rate L2	%	###	###	0xC0b02
M003	0x43	Output load rate L3	%	###	###	0xC0b03
M004	0x44	Output	kVA	## ###	# ###.#	0xC0b04
M005	0x45	Output	kW	## ###	# ###.#	0xC0b05
M006	0x46	Output current L1	A	## ###	# ###.#	0xC0b06
M007	0x47	Output current L2	A	## ###	# ###.#	0xC0b07
M008	0x48	Output current L3	A	## ###	# ###.#	0xC0b08
M009	0x49					
M010	0x4A	Output voltage L1	V	###	###	0xC0b10
M011	0x4B	Output voltage L2	V	###	###	0xC0b11
M012	0x4C	Output voltage L3	V	###	###	0xC0b12
M013	0x4D	Output frequency	x10Hz	##.#	##.#	0xC0b13
M014	0x4E	Output Crest Factor		#.#	#.#	0xC0b14
M015	0x4F	Ambient T°	°C	##.#	##.#	0xC0b15
M016	0x50	Battery voltage string +	V	# ###	###.#	0xC1b00
M017	0x51					
M018	0x52	Battery current string -	A	## ###	# ###.#	0xC1b02
M019	0x53					
M020	0x54					
M021	0x55	Battery minSOH (Step Of Health)		###	###	0xC1b05
M022	0x56	Battery capacity	%	###	###	0xC1b06
M023	0x57	Battery capacity	Ah	## ###	# ###.#	0xC1b07
M024	0x58	Bat. remaining backup time	mn	###	###	0xC1b08
M025	0x59	Time on battery	s	###	###	0xC1b09
M026	0x5A	Battery temperature		##.#	##.#	0xC1b10
M027	0x5B	Battery temperature average		##.#	##.#	0xC1b11
M028	0x5C					
M029	0x5D					
M030	0x5E					
M031	0x5F					
M032	0x60	Rect. input supply volt. L1	V	###	###	0xC2b00
M033	0x61	Rect. input supply volt. L2	V	###	###	0xC2b01
M034	0x62	Rect. input supply volt. L3	V	###	###	0xC2b02
M035	0x63	Rect. input supply freq.	x10Hz	##.#	##.#	0xC2b03
M036	0x64	Rect. input supply volt. U12	V	###	###	0xC2b04
M037	0x65	Rect. input supply volt. U23	V	###	###	0xC2b05
M038	0x66	Rect. input supply volt. U31	V	###	###	0xC2b06

Acronym	Lsb	Measurements		Format No factor (T014 = 0)	Format Factor 10 (T014 = 1)	MCMT[1]
M039	0x67	Bypass input supply voltage	L1	###	###	0xC2b07
M040	0x68	Bypass input supply voltage	L2	###	###	0xC2b08
M041	0x69	Bypass input supply voltage	L3	###	###	0xC2b09
M042	0x6A	Bypass input supply freq.	x10Hz	##.#	##.#	0xC2b10
M043	0x6B	Bypass input supply volt U12	V	###	###	0xC2b11
M044	0x6C	Bypass input supply volt U23	V	###	###	0xC2b12
M045	0x6D	Bypass input supply volt U31	V	###	###	0xC2b13
M046	0x6E					
M047	0x6F					
M048	0x70	Output Apparent P. L1	KVA	## ###	# ###.#	0xC3b00
M049	0x71	Output Apparent P. L2	KVA	## ###	# ###.#	0xC3b01
M050	0x72	Output Apparent P. L3	KVA	## ###	# ###.#	0xC3b02
M051	0x73	Output Active Power L1	KW	## ###	# ###.#	0xC3b03
M052	0x74	Output Active Power L2	KW	## ###	# ###.#	0xC3b04
M053	0x75	Output Active Power L3	KW	## ###	# ###.#	0xC3b05
M054	0x76	Output voltage U12	V	###	###	0xC3b06
M055	0x77	Output voltage U23	V	###	###	0xC3b07
M056	0x78	Output voltage U31	V	###	###	0xC3b08
M057	0x79	Output Power factor L1 (*)		#.##	#.##	0xC3b09
M058	0x7A	Output Power factor L2 (*)		#.##	#.##	0xC3b10
M059	0x7B	Output Power factor L3 (*)		#.##	#.##	0xC3b11
M060	0x7C	Output Crest factor L1		#.#	#.#	0xC3b11
M061	0x7D	Output Crest factor L2		#.#	#.#	0xC3b12
M062	0x7E	Output Crest factor L3		#.#	#.#	0xC3b13
M063	0x7F					
M064	0x80	Rect. Input Current L1	A	## ###	# ###.#	0xC4b00
M065	0x81	Rect. Input Current L2	A	## ###	# ###.#	0xC4b01
M066	0x82	Rect. Input Current L3	A	## ###	# ###.#	0xC4b02
M067	0x83	Rect. Active Power L1	KW	+/-## ###	+/-# ###.#	0xC4b03
M068	0x84	Rect. Active Power L2	KW	+/-## ###	+/-# ###.#	0xC4b04
M069	0x85	Rect. Active Power L3	KW	+/-## ###	+/-# ###.#	0xC4b05
M070	0x86	Bypass Input Current L1	A	## ###	# ###.#	0xC4b06
M071	0x87	Bypass Input Current L2	A	## ###	# ###.#	0xC4b07
M072	0x88	Bypass Input Current L3	A	## ###	# ###.#	0xC4b08
M073	0x89					
M074	0x8A					
M075	0x8B					
M076-79		reserved				

(*) to check the availability with MCMT bits

[1] Measurements Control Management Table

7.5 UPS date and time MODBUS table

(0x00CB – 4 Words)

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

Date and hours frame detail:

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

8. MODBUS PROTOCOL

8.1 Functions used

0x03	READ data
0x10	Set UPS Clock - WRITE several words

8.2 Summary of MODBUS frame format

Function 0x03: bytes frame description

Slave	Function	Address		Length		CRC	
1	0x03	MSB	lsb	MSB	lsb	MSB	lsb
By default		Address		Number of words		Compute	

UPS slave answer

Slave	Function	Nb bytes	Data Word0		Word1 …	CRC	
1	0x03	2 * nb of words	MSB	lsb		MSB	lsb
			Values		….	Compute	

Function 0x10: bytes frame description

Slave	Function	Address		Length word		Length	Data		CRC	
1	0x10	MSB	lsb	MSB	lsb		MSB	lsb	MSB	lsb
By default		Address		Number of words to write		Number of bytes	Values to write		Compute	

UPS slave answer

Slave	Function	Address		Length		CRC	
1	0x10	MSB	lsb	MSB	lsb	MSB	lsb
		Address		Nb of words written		Compute	

8.3 Frame errors management:

In case of wrong data request, the DELPHYS answers with the following frame error:

Error function code	Error code	Cause
80 + code function	1	Function error
80 + code function	2	Addresses error
80 + code function	3	Wrong data
80 + code function	6	busy
80 + code function	8	Write register error

9. 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.

Socomec: our innovations supporting your energy performance

1 independent manufacturer

4,400 employees worldwide

8 % of sales revenue dedicated to R&D

400 experts dedicated to service provision

Your power management expert

POWER SWITCHING

POWER MONITORING

POWER CONVERSION

ENERGY STORAGE

EXPERT SERVICES

The specialist for critical applications

- Control, command of LV facilities
- Safety of persons and assets
- Measurement of electrical parameters
- Energy management
- Energy quality
- Energy availability
- Energy storage
- Prevention and repairs
- Measurement and analysis
- Optimisation
- Consultancy, commissioning and training

A worldwide presence

12 **production sites**
- France (x3)
- Italy (x2)
- Tunisia
- India
- China (x2)
- USA (x2)
- Canada

30 **subsidiaries and commercial locations**
- Algeria • Australia • Austria • Belgium • China • Canada
- Dubai (United Arab Emirates) • France • Germany
- India • Indonesia • Italy • Ivory Coast • Malaysia
- Netherlands • Poland • Portugal • Romania • Serbia
- Singapore • Slovenia • South Africa • Spain • Sweden
- Switzerland • Thailand • Tunisia • Turkey • UK • USA

80 **countries**
where our brand is distributed

553643A

HEAD OFFICE

SOCOMEC GROUP
SAS SOCOMEC capital 10 568 020 €
R.C.S. Strasbourg B 548 500 149
B.P. 60010 - 1, rue de Westhouse
F-67235 Benfeld Cedex
Tel. +33 3 88 57 41 41 - Fax +33 3 88 57 78 78
info.scp.isd@socomec.com

UK OFFICE

SOCOMEC U.K. Limited
Power Conversion (UPS)
7-9 Lakeside Business Park,
Broadway Lane, South Cerney,
Gloucestershire, GL7 5XL.
Tel. +44 (0) 333 015 3002
info.uk@socomec.com

YOUR DISTRIBUTOR / PARTNER

www.socomec.com

100 years OF SHARED ENERGY

socomec Innovative Power Solutions