Jbus/Modbus Serial Link

DELPHYS MX / MP / ELITE

Installation and operating manual (GB)

socomec

Innovative Power Solutions **UPS**

FOREWORD

We thank you for the trust you have in our Uninterruptible Power Systems.

This equipment is fitted with up to date technology. Rectifier and inverter subsets are provided with power semiconductors (IGBT) including a digital micro-controller.

Our equipment complies with IEC EN 62040-2 standard.

CAUTION : "This is a product for restricted sales distribution to informed partners. Installation restrictions or additional measures may be needed to prevent disturbances".

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

SAVETY REQUIREMNENT

Using conditions:
Do read carefully these operation instructions before using the JBUS/MODBUS interface.

Whatever the repairs, they must be made only by authorised staffs, which have been suitably trained. It is recommended that the ambient temperature and humidity of the UPS environment are maintained below the values specified by the manufacturer.

UPS operating reference
Respect the safety requirements.

Do read carefully the operation instructions of DELPHYS MX / MP.

For an optimal operation, it is recommended to maintain the ambient temperature and humidity of the UPS environment below the values specified by the manufacturer.

This equipment meets the requirements of the European directives applied to this product. As a consequence it is labelled as follows:

$$C \, \epsilon$$

ENVIRONMENT

Recycling of electrical products and equipment.
Provision is made in European countries to break up and recycle materials making up the system. The various components must be disposed of in accordance with the legal provisions in force in the country where the system is installed.

INTRODUCTION

General purpose

This document provides required information of the JBUS/MODBUS protocol serial link.

Before connecting a supervision equipment or BMS system (Building management system) to the UPS, it is necessary to install and set up the serial interface.

This interface is located in the **DELPHYS MX / MP** « com-slot », and should be set through the control panel or via the graphic touch screen (optional).

DELPHYS MX / MP is able to manage up to 2 independent JBUS/MODBUS serial links.

JBUS/MODBUS protocol

This document does not explain the JBUS/MODBUS protocol management. Please refer on www.modbus.org web site for more information.

The **DELPHYS MX / MP** JBUS/MODBUS uses the following functions :
- function 3 for reading *Input Registers* (16 bits),
- function 6 for writing *single Registers (to control UPS)*.

The data field is composed of words, defined by a MSB (most significant byte) and a LSB (lowest significant byte), and displayed in the following order on the serial link.

1 WORD DATA					
b_7	MSB	b_0	b_7	LSB	b_0
b_{15}					b_0

Data decoding

Status and alarms Information
This information are coding in bit. This means that 1 word defines 16 information. If the related bit is set to 1, this information is active or true.

Measurements and counters data
1 word defines a measurement or a counter. Some values are numeric decimal signed or unsigned (0 to 65535 or from -32767 to 32767), or in hexadecimal (0x0000 to 0xFFFF).

Compatibility with other SOCOMEC UPS products

In order to be fully compatible with other SOCOMEC UPSproducts such as MASTERYS, *DELPHYS DS* and *DELPHYS DS elite*, **DELPHYS MX / MP** proposes the same JBUS/MODBUS tables.

JBUS/MODBUS SERIAL INTERFACE INSTALLATION INSIDE *DELPHYS* MX / MP

'Com-Slots' localisation
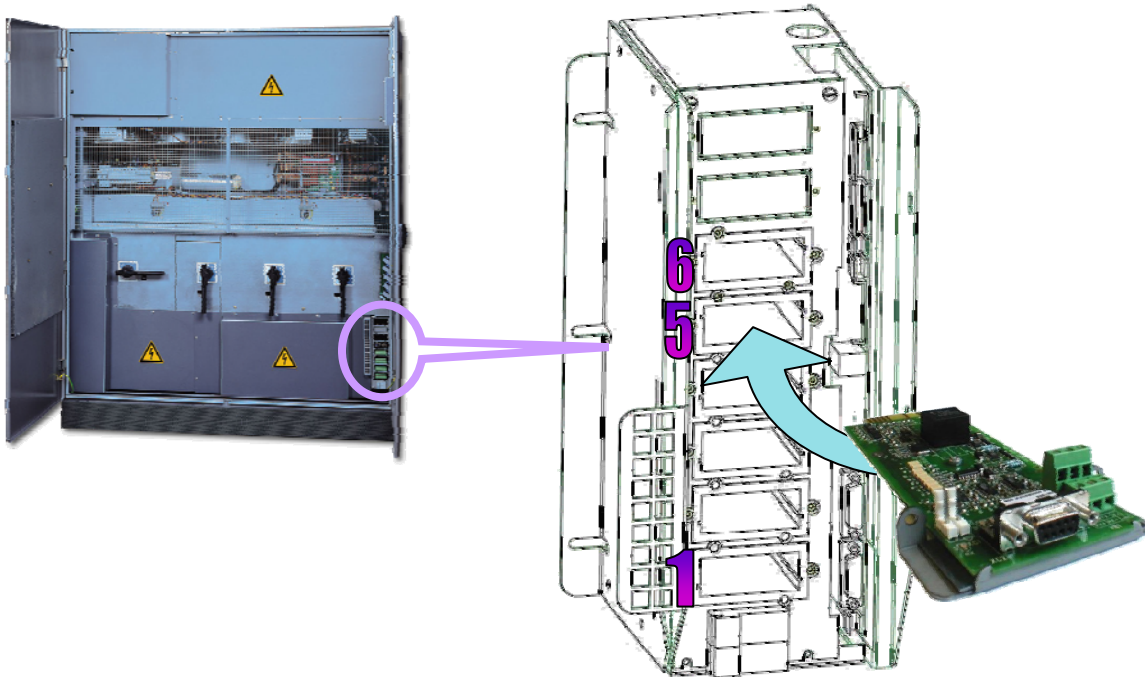
The « C*om-Slots* » integrates all communication interfaces, and it is located at the bottom of the UPS, on the right side.

Slots 5 and 6 are dedicated to JBUS/MODBUS serial interfaces.

Slots 1 to 4 are used for the alarm report boards, 3 inputs and 4 programmable relays (ADC).

JBUS/MODBUS serial interface plug in

The serial interface should be plugged in the corresponding slot, and fixed with 2 crews.

DELPHYS **MX / MP** is able to manage up to 2 independent JBUS/MODBUS interfaces. Each interface can be set differently, like the slave numbers.

JBUS interface in parallel system configuration

⚠️ There is only one JBUS/MODBUS serial link interface for a parallel system configuration. One serial interface is used for the whole installation. The access to the data of the UPS module or unit is managed by the table addressing[1].

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[1] See chapter 5

Connections and cablings

NOTE : there is only one connection per interface (RS232 or RS422 or RS485)

✓ *RS232 connection*

☞ Standard PC connection
☞ Sub-D 9 pins connector
☞ Pin 2 :   Rx
☞ Pin 3 :   Tx
☞ Pin 5 :   GND
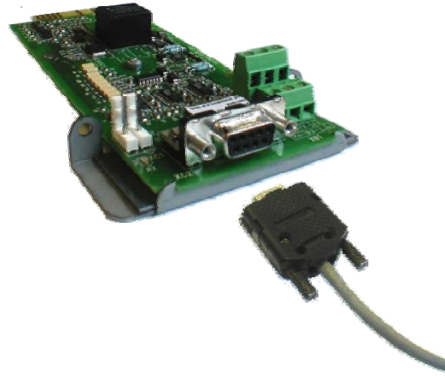
✓ *Isolated RS485 connection*

☞ 2 wires connection
☞ « dip-switch ① » allows connecting the terminal resistor
☞ Isolation via "opto-coupler"
☞ 2 polarization resistors could be removed easily (if needed).

RTX−

RTX+
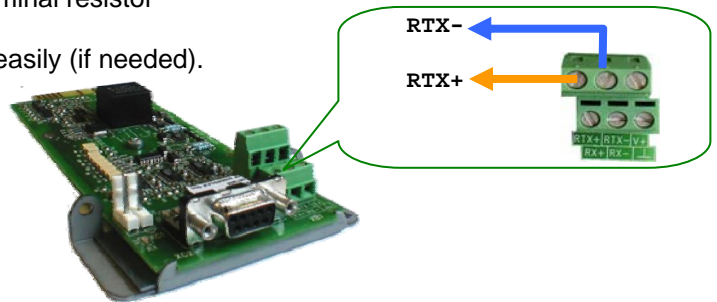
✓ *Isolated RS422 connection*

☞ 4 wires connection
☞ « dip-switch ① and ② » allows connecting the terminal resistors
☞ Isolation via "opto-coupler"
☞ 4 polarization resistors could be removed easily (if needed).

TX−

TX+

RX+

RX−
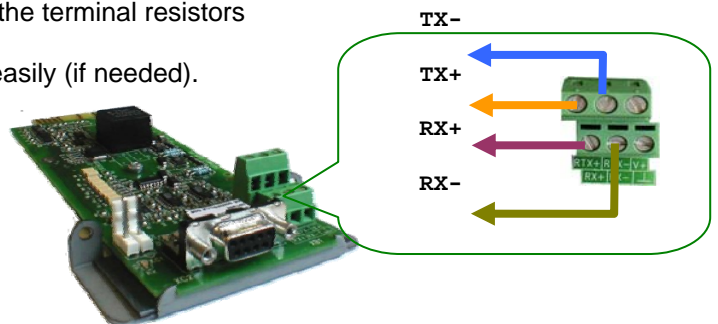
⚠ *RECOMMENDATIONS*
Before making any connection, please check the cabling. A wrong connection or cabling can damage the serial link interface.

JBUS/MODBUS LINK

Serial link 1 and 2 default settings

Baud rate: 9600 bauds
Parity: NONE
Data: 8 bits
Stop: 1 bit
Slave: 1

The serial link settings can be set from the control panel or from the graphic touch screen.

How to change the serial link settings ?

Available baud rate: 1200 - 2400 - 4800 - 9600 - 19200 bauds
Parity: EVEN - ODD - NONE
Slave number: 1 to 32

Settings screen of the control panel (last menu)

```
                                    S E T T I N G   1

                                    b a u d s     :      9 6 0 0

                                    p a r i t y   :      N O N E

                                    s l a v e     :      0 0 1
        J B U S   L I N K                                            ↓
```
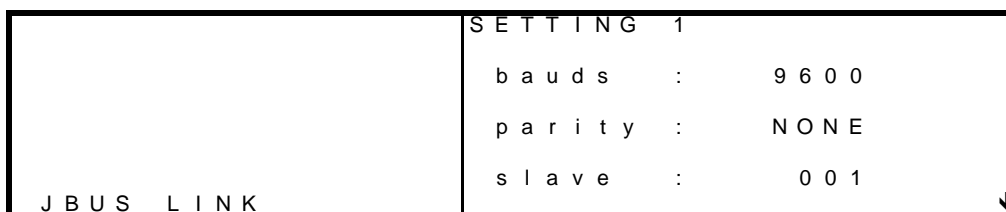
Select the settings with   **ENTER**
Change the value with   ∧ and ∨

Graphic touch screen:

| 🏠 | 1 | ℹ | ON INVERTER | Normal Mode | 14:38:43 21/06/05 | ❓ |

JBus Slot1 | JBus Slot2 | NetWork

Control
Config.
Options
Service

Baud Rate ➤ **4800**

Parity:
None ●   Even ●   Odd ●

stop bit:
1 bit ●   2 bits ●

Control enable:
Yes ●   No ●

Slave: ➤ **10**

X   OK
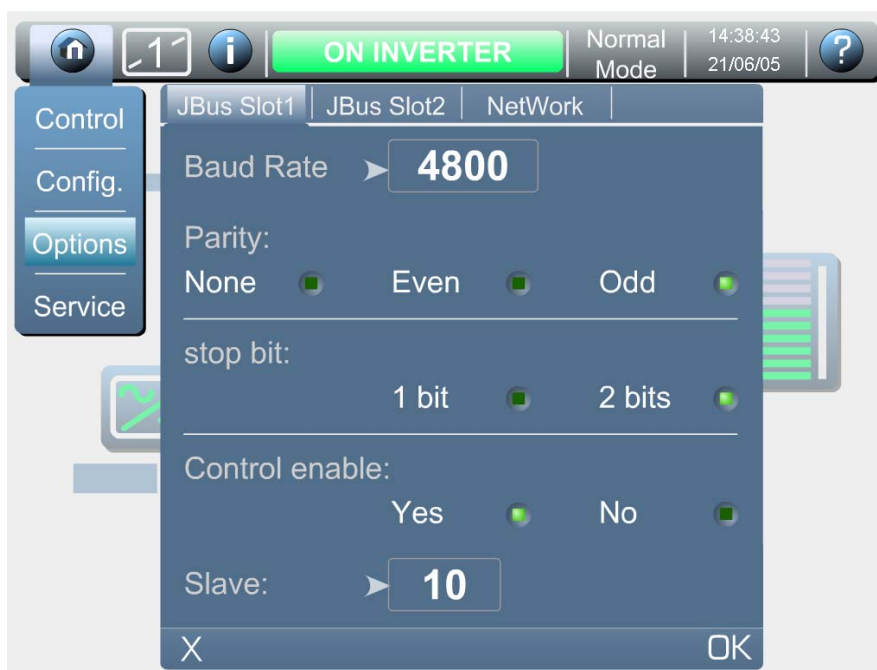
JBUS/MODBUS 1 settings are linked to the interface located in slot 5.
JBUS/MODBUS 2 settings are linked to the interface located in slot 6.

⚠ The serial interface should be activated by the CIM or the factory during the UPS commissioning.

Reminder:
The JBUS/MODBUS protocol available on *DELPHYS MX / MP* is slave and in RTU mode.
It uses the function 3 as 'read registers' and the function 6 as 'write register'.
The slave number is set via the control panel or via the graphic touch screen.

Conventions
The table addresses are written in hexadecimal, beginning with '0x'.
Some PLC systems request a relative address starting from 400 (0x0190) or 40001 (0x9C41), on this address it's necessary to add the first address of the JBUS/MODBUS table.

Frame errors management:
In case of wrong data request, the UPS 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

SINGLE UNIT UPS JBUS/MODBUS TABLES

JBUS/MODBUS tables

§	TABLE	Start addresses	Table length in words	JBUS/MODBUS FUNCTION
1	UPS Identification	0x1000	12	3 READ
2	Date and hours	0x1360	4	3 READ
3	UPS Configurations	0x10E0	32	3 READ
4	Status (96 bits)	0x1020	6	3 READ
5	Alarms (64 bits)	0x1040	4	3 READ
6	Measurements	0x1060	48	3 READ
7	Controls permission	0x15C0	2	3 READ
8	UPS Controls	0x15B0	1	6 WRITE

How to read data:
The identification, status and alarms tables should be read completely (this means the number of word to read is equal to the table length).
The measurements table could be read word by word or per group, without exceed the length of the table. (from 0x1060 to 0x108F).

Incoming data structure:

Example of 6 words											
1	2	3	4	5	6	7	8	9	10	11	12
MSB 0	LSB 0	MSB 1	LSB 1	MSB 2	LSB 2	MSB 3	LSB 3	MSB 4	LSB 4	MSB 5	LSB 5
WORD 0		WORD 1		WORD 2		WORD 3		WORD 4		WORD 5	
b_{15}	b_0	b_{15}	b_0	b_{15}	b_0	b_{15}	b_0	b_{15}	b_0	b_{15}	b_0
S15	S00	S31	S16	S47	S32	S63	S48	S79	S64	S95	S80
A15	A00	A31	A16	A47	A32	A63	A48				
M00		M01		M02		M03		M04		M05	

'Concentrator mode' in parallel system configuration

The above JBUS/MODBUS table can be used in case of a parallel system configuration. The TOR data from all units or modules are managed in order to create a 'virtual single unit'. The logic combination 'OR' is used to create the single unit data base, except following states and alarms :

Information	Combination if **redundant UPS**	Combination if **not redundant UPS**
S00	OR	AND
S05	AND	OR
S15	AND	OR
A02	AND	OR
A07	AND	OR
A31	AND	OR

1. UPS IDENTIFICATION: Address 0x1000, 12 words

CODE	DESCRIPTION	Number of WORDS	ADDRESS	Type	Remarks
I00	UPS CODE	1 WORD	0x1000	Numeric value	515 = DELPHYS MX 516 = DELPHYS MX elite
I01	UPS Power	1 WORD	0x1001	Numeric value	In kVA * 10 5000 = 500kVA
I02	Module number	1 WORD	0x1002	Numeric value	1
I03	Serial number	5 WORDS	0x1003	1 word = 2 ASCII codes	LSB = 1. char MSB = 2. char UPS Code:CCCCCCAaYYYYXXXXXXNNn Code read :aXXXXXXXXn
I04	Reserved	1 WORD	0x1008	0	
I05	Reserved	1 WORD	0x1009	0	
I06	Reserved	1 WORD	0x100A	0	
I07	Reserved	1 WORD	0x100B	0	

2. DATE & HOURS: Address 0x1360, 4 words

CODE	DESCRIPTION	Number of words	Addresses	Type	Remarks
D00	Minutes / seconds	1	0x1360	Byte value	MSB = minutes LSB = seconds
D01	Hours / day	1	0x1361	Byte value	MSB = day LSB = hours
D02	Month / day of week	1	0x1362	Byte value	MSB = month LSB = day of the week 1=Monday 7=Sunday
D03	year	1	0x1363		00 = 2000

3. *UPS CONFIGURATION: Address 0x10E0, 32 words*

Code	Measurements	Unit	Address	REMARKS
T00	Nominal start input voltage	V	0x10E0	
T01	Nominal start output voltage	V	0x10E1	
T02	Nominal input frequency	Hz	0x10E2	
T03	Nominal output frequency	Hz	0x10E3	
T04	Version	value * 100	0x10E4	100 = V1.00
T05			0x10E5	
T06			0x10E6	
TO7			0x10E7	
T08	Nominal battery capacity	Ah * 10	0x10E8	3000 = 300Ah
T09	Number of battery elements		0x10E9	
T10	Reserved		0x10EA	Set to 0xFFFF (-1)
T11	Reserved		0x10EB	Set to 0xFFFF (-1)
T12	Reserved		0x10EC	
T13	Working mode	Bits field	0x10ED	b0 not used b1 = with battery b2 = Gen Set present b3 = 'energy saver' enabled
T14	Redundancy level (only in //)	value	0x10EE	0 = without 1 = N+1
T15	Reserved		0x10EF	100
T16 .. T31	Reserved		0x10F0 0x10FF	Set to 0xFFFF (-1)

4. STATUS: Address 0x1020, 6 words

CODE	DESCRIPTION	BIT	ADDRESS	REMARKS
S00	Rectifier Input supply present	0	0x1020	
S01	Inverter ON	1	0x1020	
S02	Rectifier ON	2	0x1020	
S03	Load protected by inverter	3	0x1020	
S04	Load on automatic bypass	4	0x1020	
S05	Load on battery	5	0x1020	
S06	Remote controls disable	6	0x1020	0 = controls enabled
S07	Eco-mode ON	7	0x1020	If this function is available
S08		8	0x1020	
S09		9	0x1020	
S10		10	0x1020	
S11		11	0x1020	
S12		12	0x1020	
S13		13	0x1020	
S14	Battery test failed	14	0x1020	
S15	Battery near end of backup time	15	0x1020	IMMINENT STOP and end of backup time
S16	Battery discharged	0	0x1021	
S17	Battery OK	1	0x1021	No alarm and battery circuit closed
S18		2	0x1021	
S19		3	0x1021	
S20		4	0x1021	
S21		5	0x1021	
S22		6	0x1021	
S23		7	0x1021	
S24		8	0x1021	
S25		9	0x1021	
S26	Bypass input supply present	10	0x1021	
S27	Battery charging	11	0x1021	
S28	Bypass input frequency out of tolerance	12	0x1021	
S29		13	0x1021	Set to 1
S30	UPS on parallel system	14	0x1021	= 0 for single unit
S31		15	0x1021	
S32	Unit operating (available or coupled)	0	0x1022	
S33		1	0x1022	
S34		2	0x1022	
S35		3	0x1022	
S36		4	0x1022	
S37		5	0x1022	
S38	External Input 1	6	0x1022	IN1 ADC slot 1 or 2
S39	External Input 2	7	0x1022	IN2 ADC slot 1 or 2
S40	External Input 3	8	0x1022	IN3 ADC slot 1 or 2
S41	External Input 4	9	0x1022	IN1 ADC slot 3
S42	Controls permission table manage	10	0x1022	Set to 1
S43		11	0x1022	
S44		12	0x1022	
S45		13	0x1022	
S46	Operating on Gen Set	14	0x1022	
S47		15	0x1022	
S48	Maintenance mode active	0	0x1023	
S49	End of the fist maintenance period	1	0x1023	
S50		2	0x1023	
S51		3	0x1023	
S52		4	0x1023	
S53		5	0x1023	
S54		6	0x1023	
S55		7	0x1023	
S56		8	0x1023	
S57		9	0x1023	
S58		10	0x1023	
S59		11	0x1023	
S60		12	0x1023	
S61		13	0x1023	
S62		14	0x1023	
S63		15	0x1023	

…/…

CODE	DESCRIPTION	BIT	ADRESSE	REMARQUES
S64	Boost charge ON	0	0x1024	
S65		1	0x1024	
S66	Inverter switch closed	2	0x1024	
S67	Bypass breaker closed	3	0x1024	
S68	Maintenance bypass breaker closed (Q5)	4	0x1024	
S69	Remote maintenance bypass breaker closed	5	0x1024	
S70	Output breaker closed (Q3)	6	0x1024	
S71	Q21 closed	7	0x1024	
S72	Q22 closed	8	0x1024	
S73	Unit working	9	0x1024	On inverter or on bypass
S74		10	0x1024	
S75		11	0x1024	
S76	normal mode active	12	0x1024	No Eco-mode No 'energy-saver' active
S77		13	0x1024	
S78		14	0x1024	
S79		15	0x1024	
S80		0	0x1025	
S81		1	0x1025	
S82		2	0x1025	
S83		3	0x1025	
S84		4	0x1025	
S85		5	0x1025	
S86		6	0x1025	
S87		7	0x1025	
S88		8	0x1025	
S89		9	0x1025	
S90		10	0x1025	
S91		11	0x1025	
S92		12	0x1025	
S93		13	0x1025	
S94		14	0x1025	
S95		15	0x1025	

Status without description are not managed by **DELPHYS MX / MP**.

5. ALARMS: Address 0x1040, 4 words

CODE	DESCRIPTION	BIT	ADRESSE	REMARQUES
A00	General Alarm	0	0x1040	Activated if one alarm active
A01	Battery failure	1	0x1040	Battery fault, room and circuit open synthesis
A02	UPS overload	2	0x1040	
A03				
A04	**Control failure (com, internal supply…)**	**4**	**0x1040**	**Ctrl board critical alarm**
A05	Rectifier input supply out of tolerance	5	0x1040	
A06	Bypass input supply out of tolerance	6	0x1040	
A07	Over temperature alarm	7	0x1040	
A08	Maintenance bypass closed	8	0x1040	Q5 closed
A09		9	0x1040	
A10	Battery charger fault	10	0x1040	
A11		11	0x1040	
A12		12	0x1040	
A13		13	0x1040	
A14		14	0x1040	
A15		15	0x1040	
A16		0	0x1041	
A17	Improper condition of use (Q3 and Q5 closed)	1	0x1041	Maintenance bypass alarm
A18	Inverter stopped for overload (or bypass transfer)	2	0x1041	Imminent stop and overload
A19	**Microprocessor control system**	**3**	**0x1041**	**Ctrl board preventive Al.**
A20		4	0x1041	
A21	Synchronisation fault (PLL fault)	5	0x1041	ACS source fault
A22	Rectifier input supply fault	6	0x1041	
A23	**Rectifier preventive alarm**	**7**	**0x1041**	
A24		8	0x1041	
A25	**Inverter preventive alarm**	**9**	**0x1041**	
A26	Charger general alarm	10	0x1041	
A27		11	0x1041	
A28		12	0x1041	
A29	**Bypass preventive alarm**	**13**	**0x1041**	
A30		14	0x1041	
A31	Imminent STOP	15	0x1041	
A32	Unit 1 general alarm	0	0x1042	
A33		1	0x1042	
A34		2	0x1042	
A35		3	0x1042	
A36		4	0x1042	
A37		5	0x1042	
A38	External alarm	6	0x1042	To configure
A39		7	0x1042	
A40		8	0x1042	
A41		9	0x1042	
A42	e-Service	10	0x1042	NOT AVAILABLE
A43		11	0x1042	
A44	Servicing alarm	12	0x1042	
A45	Automatic and manual transfer disable	13	0x1042	
A46	Automatic transfer disable	14	0x1042	
A47	Battery room alarm	15	0x1042	
A48	Maintenance bypass alarm	0	0x1043	
A49	Battery discharged	1	0x1043	
A50		2	0x1043	
A51	Synoptic alarm	3	0x1043	
A52	**Rectifier fault**	**4**	**0x1043**	**Critical alarm**
A53		5	0x1043	
A54	**Inverter fault**	**6**	**0x1043**	**Critical alarm**
A55		7	0x1043	
A56		8	0x1043	
A57		9	0x1043	
A58	ESD activated	10	0x1043	
A59	Battery circuit open	11	0x1043	
A60		12	0x1043	
A61		13	0x1043	
A62	**Bypass critical alarm**	**14**	**0x1043**	
A63		15	0x1043	

Alarms without description are not managed by **DELPHYS MX / MP**.

6. MEASUREMENTS: Address 0x1060, up to 48 words

Code	Description	Unit	ADDRESSES	REMARKS
M00	Load rate phase1	%	0x1060	
M01	Load rate phase 2	%	0x1061	Set to 0xFFFF if one phase
M02	Load rate phase 3	%	0x1062	Set to 0xFFFF if one phase
M03	UPS load rate	%	0x1063	
M04	Battery Capacity	%	0x1064	
M05	Battery Capacity	Ah*10	0x1065	
M06	Input bypass voltage phase 1	V	0x1066	
M07	Input bypass voltage phase 2	V	0x1067	Set to 0xFFFF if one phase
M08	Input bypass voltage phase 3	V	0x1068	Set to 0xFFFF if one phase
M09	Output voltage phase 1	V	0x1069	
M10	Output voltage phase 2	V	0x106A	Set to 0xFFFF if one phase
M11	Output voltage phase 3	V	0x106B	Set to 0xFFFF if one phase
M12			0x106C	Set to 0xFFFF (-1)
M13			0x106D	Set to 0xFFFF (-1)
M14			0x106E	Set to 0xFFFF (-1)
M15	Output current phase 1	A*10	0x106F	
M16	Output current phase 2	A*10	0x1070	Set to 0xFFFF if one phase
M17	Output current phase 3	A*10	0x1071	Set to 0xFFFF if one phase
M18	Input bypass frequency	Hz*10	0x1072	
M19	Output frequency	Hz*10	0x1073	
M20	Battery voltage (+)	V*10	0x1074	
M21	Battery voltage (-)	V*10	0x1075	Set to 0
M22	Ambient Temperature	°C	0x1076	
M23	Remaining backup time	Minutes	0x1077	Set when the load is on battery
M24	Battery current	A*10	0x1078	
M25			0x1079	Set to 0xFFFF (-1)
M26			0x107A	Set to 0xFFFF (-1)
M27			0x107B	Set to 0xFFFF (-1)
M28	Rectifier voltage (+)	V	0x107C	
M29	Rectifier voltage (-)	V	0x107D	Set to 0
M30			0x107E	Set to 0xFFFF (-1)
M31			0x107F	Set to 0xFFFF (-1)
M32			0x1080	Set to 0xFFFF (-1)
M33	Rectifier input voltage phase 1	V	0x1081	
M34	Rectifier input voltage phase 2	V	0x1082	
M35	Rectifier input voltage phase 3	V	0x1083	
M36	UPS output power	kW*10	0x1084	
M37	Output power phase 1	kVA*10	0x1085	
M38	Output power phase 2	kVA*10	0x1086	Set to 0xFFFF if one phase
M39	Output power phase 3	kVA*10	0x1087	Set to 0xFFFF if one phase
M40			0x1088	Set to 0xFFFF (-1)
M41			0x1089	Set to 0xFFFF (-1)
M42			0x108A	Set to 0xFFFF (-1)
M43			0x108B	
M44			0x108C	
M45			0x108D	
M46			0x108E	
M47			0x108F	

7. ENABLED CONTROLS TABLE: Address 0x15C0, 2 words

CODE	DESCRIPTION	BIT	ADDRESSES	REMARKS
C00		0		
C01		1		
C02		2		
C03	Eco-mode enabled	3	0x15C0	
C04	normal Mode enabled	4	0x15C0	
C05		5		
C06		6		
C07		7		
C08		8		
C09		9		
C10	Automatic Bypass transfer enabled	10	0x15C0	
C11	Inverter transfer enabled	11	0x15C0	
C12		12		
C13		13		
C14		14		
C15		15		
C16	Battery test enabled	0	0x15C1	
C17		1		
C18		2		
C19		3		
C20		4		
C21		5		
C22		6		
C23		7		
C24		8		
C25		9		
C26		10		
C27		11		
C28		12		
C29		13		
C30		14		
C31		15		

8. CONTROLS SEND TO UPS: Address 0x15B0, write 1 words

For a remote UPS control, it is necessary to set the serial interface in "remote" mode using the Human Machine Interface.
Local controls of the control panel or graphic touch screen are no more available.

The control table below shows if the selected control is allowed or not. If the control sent to the UPS is not allowed, the function will be ignored.

Controls available by JBUS/MODBUS connection:

Code	Controls	Value to write	ADDRESS	REMARKS
C03	Eco-mode	0x0003	0x15B0	
C04	Normal mode	0x0004	0x15B0	
C10	Automatic bypass transfer	0x000A	0x15B0	
C11	Inverter transfer	0x000B	0x15B0	
C16	Battery test	0x0010	0x15B0	

JBUS/MODBUS TABLES IN PARALLEL SYSTEM CONFIGURATION

Reminder

In UPS parallel system configuration, there is only one JBUS/MODBUS interface. The addresses mapping gives the possibility to read data from each module and common bypass. There is no link between the JBUS/MODBUS salve number and the UPS unit or module one.

The interface is plugged in the '*com-slots*' of the common cabinet is case of central bypass installation or in the UPS unit 1 "com slots" in case of modular system (see bellow).
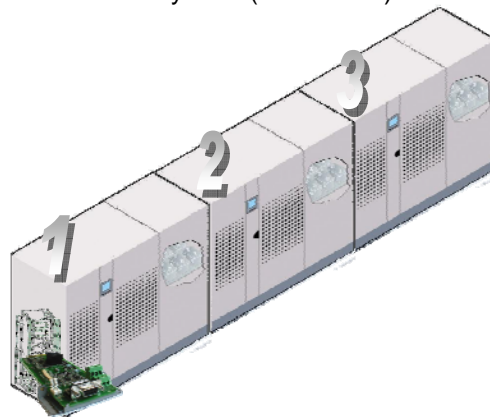
How to read data:

The identifications, status and alarms tables should be read completely in one JBUS/MODBUS frame; this means the number of word to read is equal to the table length.

The measurements table could be read word by word, without exceed the length of the table. (from 0x1060 to 0x108F).

Incoming data structure:

Example of 6 words											
1	2	3	4	5	6	7	8	9	10	11	12
MSB 0	LSB 0	MSB 1	LSB 1	MSB 2	LSB 2	MSB 3	LSB 3	MSB 4	LSB 4	MSB 5	LSB 5
WORD 0		WORD 1		WORD 2		WORD 3		WORD 4		WORD 5	
b_{15}	b_0	b_{15}	b_0	b_{15}	b_0	b_{15}	b_0	b_{15}	b_0	b_{15}	b_0
S15	S00	S31	S16	S47	S32	S63	S48	S79	S64	S95	S80
A15	A00	A31	A16	A47	A32	A63	A48				
M00		M01		M02		M03		M04		M05	

JBUS/MODBUS link setting

The setting of the link is made from the control panel or from the graphic touch screen of the common cabinet or of the UPS unit 1.

JBUS/MODBUS tables in parallel system configuration with central bypass (AC)

TABLE	Start addresses	Table length in words	JBUS/MODBUS FUNCTION
Identification	0x8000	12	3 READ
Configurations	0x80E0	32	3 READ
Date and hours	0x8360	4	3 READ
States CC (96 bits)	0x8020	6	3 READ
Alarms CC (64 bits)	0x8040	4	3 READ
Measurements CC	0x8060	48	3 READ
States module 1 (96 bits)	0x2020	6	3 READ
Alarms module 1 (64 bits)	0x2040	4	3 READ
Measurements module 1	0x2060	48	3 READ
States module 2 (96 bits)	0x3020	6	3 READ
Alarms module 2 (64 bits)	0x3040	4	3 READ
Measurements module 2	0x3060	48	3 READ
States module 3 (96 bits)	0x4020	6	3 READ
Alarms module 3 (64 bits)	0x4040	4	3 READ
Measurements module 3	0x4060	48	3 READ
States module 4 (96 bits)	0x5020	6	3 READ
Alarms module 4 (64 bits)	0x5040	4	3 READ
Measurements module 4	0x5060	48	3 READ
States module 5 (96 bits)	0x6020	6	3 READ
Alarms module 5 (64 bits)	0x6040	4	3 READ
Measurements module 5	0x6060	48	3 READ
States module 6 (96 bits)	0x7020	6	3 READ
Alarms module 6 (64 bits)	0x7040	4	3 READ
Measurements module 6	0x7060	48	3 READ
Controls permission	0x15C0	2	3 READ
UPS Controls	0x15B0	1	6 WRITE

JBUS/MODBUS table in modular parallel system

TABLE	Start addresses	Table length in words	JBUS/MODBUS FUNCTION
Identification	0x1000	12	3 READ
Configurations UPS	0x10E0	32	3 READ
Date and hours	0x1360	4	3 READ
Output UPS Measurements	0x8060	48	3 READ
States unit 1 (96 bits)	0x2020	6	3 READ
Alarms unit 1 (64 bits)	0x2040	4	3 READ
Measurements unit 1	0x2060	48	3 READ
States unit 2 (96 bits)	0x3020	6	3 READ
Alarms unit 2 (64 bits)	0x3040	4	3 READ
Measurements unit 2	0x3060	48	3 READ
States unit 3 (96 bits)	0x4020	6	3 READ
Alarms unit 3 (64 bits)	0x4040	4	3 READ
Measurements unit 3	0x4060	48	3 READ
States unit 4 (96 bits)	0x5020	6	3 READ
Alarms unit 4 (64 bits)	0x5040	4	3 READ
Measurements unit 4	0x5060	48	3 READ
States unit 5 (96 bits)	0x6020	6	3 READ
Alarms unit 5 (64 bits)	0x6040	4	3 READ
Measurements unit 5	0x6060	48	3 READ
States unit 6 (96 bits)	0x7020	6	3 READ
Alarms unit 6 (64 bits)	0x7040	4	3 READ
Measurements unit 6	0x7060	48	3 READ

1. UPS IDENTIFICATION: Address 0x1000 or 0x8000, 12 words

CODE	DESCRIPTION	Number of WORDS	ADDRESS	Type	Remarks

I00	UPS CODE	1 WORD	0x1000	Numeric value	1018 = DELPHYS MX MODULAIRE
					1019 = DELPHYS MX // common by-pass
					1020 = DELPHYS MX elite modular
					1021 = DELPHYS MX elite // by-pass

I01	UPS Power	1 WORD	0x1001	Numeric value	In kVA * 10 5000 = 500kVA
I02	Module number	1 WORD	0x1002	Numeric value	1
I03	Serial number	5 WORDS	0x1003	1 word = 2 ASCII codes	LSB = 1. char MSB = 2. char UPS Code:CCCCCCAaYXXXXXXXXXNNn Code read :aXXXXXXXXn
I04	Reserved	1 WORD	0x1008	0	
I05	Reserved	1 WORD	0x1009	0	
I06	Reserved	1 WORD	0x100A	0	
I07	Reserved	1 WORD	0x100B	0	

2. DATE & HOURS: Address 0x1360 or 0x8360, 4 words

CODE	DESCRIPTION	Number of words	Addresses	Type	Remarks
D00	Minutes / seconds	1	0x1360	Byte value	MSB = minutes LSB = seconds
D01	Hours / day	1	0x1361	Byte value	MSB = day LSB = hours
D02	Month / day of week	1	0x1362	Byte value	MSB = month LSB = day of the week 1=Monday 7=Sunday
D03	year	1	0x1363		00 = 2000

3. USP CONFIGURATION: Address 0x10E0 or 0x80E0, 32 words

Code	Measurements	Unit	Address	REMARKS
T00	Nominal start input voltage	V	0x10E0	
T01	Nominal start output voltage	V	0x10E1	
T02	Nominal input frequency	Hz	0x10E2	
T03	Nominal output frequency	Hz	0x10E3	
T04	Version	value * 100	0x10E4	100 = V1.00
T05			0x10E5	
T06			0x10E6	
TO7			0x10E7	
T08	Nominal battery capacity	Ah * 10	0x10E8	3000 = 300Ah
T09	Number of battery elements		0x10E9	
T10	Reserved		0x10EA	Set to 0xFFFF (-1)
T11	Reserved		0x10EB	Set to 0xFFFF (-1)
T12	Reserved		0x10EC	
T13	Working mode	Bits field	0x10ED	b0 not used b1 = with battery b2 = Gen Set present b3 = 'energy saver' enabled
T14	Redundancy level	value	0x10EE	0 = without 1 = N+1
T15	Reserved		0x10EF	100
T16 .. T31	Reserved		0x10F0 0x10FF	Set to 0xFFFF (-1)

Preliminary remarks

⚠️ The following JBUS/MODBUS addresses tables only indicate the LSB byte, the MSB depends of the module number requested.

An '**x**' in the 'CC' (central bypass), 'Module' or 'Unit' column means that this information is available on this equipment.
Please refer to § 4.4 for more details.

4. STATUS : Address 0x20, 6 words

CODE	DESCRIPTION	BIT	ADDRESS LSB byte	CC	Module	Unit
S00	Rectifier Input supply present	0	0x20		X	X
S01	Inverter ON	1	0x20		X	X
S02	Rectifier ON	2	0x20		X	X
S03	Load protected by inverter	3	0x20	X	X	X
S04	Load on automatic bypass	4	0x20	X		X
S05	Load on battery / Battery discharging	5	0x20		X	X
S06	Remote controls disable	6	0x20			X
S07	Eco-mode ON	7	0x20	X	X	X
S08		8	0x20			
S09		9	0x20			
S10		10	0x20		X	X
S11		11	0x20			
S12		12	0x20			
S13		13	0x20			
S14	Battery test failed	14	0x20		X	X
S15	Battery near end of backup time	15	0x20		X	X
S16	Battery discharged	0	0x21		X	X
S17	Battery OK	1	0x21		X	X
S18		2	0x21			
S19		3	0x21			
S20		4	0x21			
S21		5	0x21			
S22		6	0x21			
S23		7	0x21	X		X
S24		8	0x21		X	X
S25		9	0x21			
S26	Bypass input supply present	10	0x21	X		X
S27	Battery charging	11	0x21		X	X
S28	Bypass input frequency out of tolerance	12	0x21		X	X
S29		13	0x21			
S30	UPS on parallel system	14	0x21	X	X	X
S31		15	0x21			
S32	Unit 1 operating	0	0x22	X		X
S33	Unit 2 operating	1	0x22	X		X
S34	Unit 3 operating	2	0x22	X		X
S35	Unit 4 operating	3	0x22	X		X
S36	Unit 5 operating	4	0x22	X		X
S37	Unit 6 operating	5	0x22	X		X
S38	External Input 1	6	0x22	X	X	X
S39	External Input 2	7	0x22	X	X	X
S40	External Input 3	8	0x22	X	X	X
S41	External Input 4	9	0x22			
S42	Controls permission table manage	10	0x22	X	X	X
S43		11	0x22			
S44		12	0x22			
S45		13	0x22			
S46	Operating on Gen Set	14	0x22	X	X	X
S47		15	0x22			

…/…

CODE	DESCRIPTION	BIT	ADDRESS LSB byte	CC	Module	Unit
S48	Maintenance mode active	0	0x23	X	X	X
S49	End of the fist maintenance period	1	0x23			
S50		2	0x23			
S51		3	0x23			
S52		4	0x23			
S53		5	0x23			
S54		6	0x23			
S55		7	0x23			
S56		8	0x23			
S57		9	0x23			
S58		10	0x23			
S59		11	0x23			
S60		12	0x23			
S61		13	0x23			
S62		14	0x23			
S63		15	0x23			
S64	Boost charge ON	0	0x24		X	X
S65		1	0x24	X		X
S66	Inverter switch closed	2	0x24		X	X
S67	Bypass breaker closed	3	0x24			
S68	Maintenance bypass breaker closed (Q5)	4	0x24	X		X
S69	Remote maintenance bypass breaker closed	5	0x24	X		X
S70	Output breaker closed (Q3)	6	0x24	X	X	X
S71	Q21 closed	7	0x24		X	X
S72	Q22 closed	8	0x24		X	X
S73	Unit working	9	0x24		X	X
S74	Energy saver activated	10	0x24	X	X	X
S75		11	0x24			
S76	normal mode active	12	0x24	X	X	X
S77		13	0x24			
S78		14	0x24			
S79		15	0x24			
S80		0	0x25			
S81		1	0x25			
S82		2	0x25			
S83		3	0x25			
S84		4	0x25			
S85		5	0x25			
S86		6	0x25			
S87		7	0x25			
S88		8	0x25			
S89		9	0x25			
S90		10	0x25			
S91		11	0x25			
S92		12	0x25			
S93		13	0x25			
S94		14	0x25			
S95		15	0x25			

5. ALARMS: Address 0x40, 4 words

CODE	DESCRIPTION	BIT	ADRESSE basse	AC	Module	Unite
A00	General Alarm	0	0x40	X	X	X
A01	Battery failure	1	0x40		X	X
A02	UPS overload	2	0x40	X	X	X
A03						
A04	**Control failure - critical alarm**	**4**	**0x40**			
A05	Rectifier input supply out of tolerance	5	0x40	X	X	X
A06	Bypass input supply out of tolerance	6	0x40	X		X
A07	Over temperature alarm	7	0x40	X	X	X
A08	Maintenance bypass closed	8	0x40	X		X
A09						
A10	Battery charger fault				X	X
A11						
A12						
A13						
A14						
A15						
A16						
A17	Improper condition of use (Q3 and Q5 closed)	1	0x41	X		X
A18	Inverter stopped for overload (or bypass transfer)	2	0x41		X	X
A19	**Microprocessor control system - preventive al.**	**3**	**0x41**	X	X	X
A20						
A21	PLL fault	5	0x41	X		X
A22	Rectifier input supply fault	6	0x41	X		X
A23	**Rectifier preventive alarm**	**7**	**0x41**		X	X
A24						
A25	**Inverter preventive alarm**	**9**	**0x41**		X	X
A26	Charger general alarm	10	0x41		X	X
A27						
A28						
A29	**Bypass preventive alarm**	**13**	**0x41**	X	X	X
A30						
A31	Imminent STOP	15	0x41	X	X	X
A32	Unit 1 general alarm	0	0x42	X		X
A33	Unit 2 general alarm	1	0x42	X		X
A34	Unit 3 general alarm	2	0x42	X		X
A35	Unit 4 general alarm	3	0x42	X		X
A36	Unit 5 general alarm	4	0x42	X		X
A37	Unit 6 general alarm	5	0x42	X		X
A38	External alarm	6	0x42	X	X	X
A39						
A40						
A41						
A42	e-Service	10	0x42			
A43	redundancy loss	11	0x42	X		X
A44	Servicing alarm	12	0x42	X		
A45	Automatic and manual transfer disable	13	0x42	X		X
A45	Automatic transfer disable	14	0x42	X		X
A47	Battery room alarm	15	0x42		X	X
A48	Maintenance bypass alarm	0	0x43	X		X
A49	Battery discharged	1	0x43		X	X
A50		2	0x43	X		X
A51	Synoptic alarm	3	0x43			
A52	**Rectifier fault - critical alarm**	**4**	**0x43**		X	X
A53						
A54	**Inverter fault - critical alarm**	**6**	**0x43**		X	X
A55						
A56						
A57						
A58	ESD activated	10	0x43	X	X	X
A59	Battery circuit open	11	0x43		X	X
A62	**Bypass critical alarm**	**14**	**0x43**	X	X	X

For more detail, please refer to the single unit UPS table §1.5

6. MEASUREMENTS: Address 0x60, 48 words

Code	Measurements	Units	ADDRESS LSB byte	REMARKS
MO0	Load rate phase1	%	0x60	
M01	Load rate phase 2	%	0x61	Set to 0xFFFF if one phase
M02	Load rate phase 3	%	0x62	Set to 0xFFFF if one phase
M03	UPS load rate	%	0x63	
M04	Battery Capacity	%	0x64	
M05	Battery Capacity	Ah*10	0x65	
M06	Input bypass voltage phase 1	V	0x66	
M07	Input bypass voltage phase 2	V	0x67	Set to 0xFFFF if one phase
M08	Input bypass voltage phase 3	V	0x68	Set to 0xFFFF if one phase
M09	Output voltage phase 1	V	0x69	
M10	Output voltage phase 2	V	0x6A	Set to 0xFFFF if one phase
M11	Output voltage phase 3	V	0x6B	Set to 0xFFFF if one phase
M12			0x6C	Set to 0xFFFF (-1)
M13			0x6D	Set to 0xFFFF (-1)
M14			0x6E	Set to 0xFFFF (-1)
M15	Output current phase 1	A*10	0x6F	
M16	Output current phase 2	A*10	0x70	Set to 0xFFFF if one phase
M17	Output current phase 3	A*10	0x71	Set to 0xFFFF if one phase
M18	Input bypass frequency	Hz*10	0x72	
M19	Output frequency	Hz*10	0x73	
M20	Battery voltage (+)	V*10	0x74	
M21	Battery voltage (-)	V*10	0x75	Set to 0
M22	Ambient Temperature	°C	0x76	
M23	Remaining backup time	Minutes	0x77	Set when the load is on battery
M24	Battery current	A*10	0x78	
M25			0x79	Set to 0xFFFF (-1)
M26			0x7A	Set to 0xFFFF (-1)
M27			0x7B	Set to 0xFFFF (-1)
M28	Rectifier voltage (+)	V	0x7C	
M29	Rectifier voltage (-)	V	0x7D	Set to 0
M30		V	0x7E	Set to 0xFFFF (-1)
M31		V	0x7F	Set to 0xFFFF (-1)
M32			0x80	Set to 0xFFFF (-1)
M33	Rectifier input voltage phase 1	V	0x81	
M34	Rectifier input voltage phase 2	V	0x82	
M35	Rectifier input voltage phase 3	V	0x83	
M36	UPS output power	kW*10	0x84	
M37	Output power phase 1	kVA*10	0x85	
M38	Output power phase 2	kVA*10	0x86	Set to 0xFFFF if one phase
M39	Output power phase 3	kVA*10	0x87	Set to 0xFFFF if one phase
M40			0x88	Set to 0xFFFF (-1)
M41			0x89	Set to 0xFFFF (-1)
M42			0x8A	Set to 0xFFFF (-1)
M43			0x8B	
M44			0x8C	
M45			0x8D	
M46			0x8E	
M47			0x8F	

Rectifier and battery measurements are not available in the 'CC' table (common bypass)

7. ENABLED CONTROLS TABLE: Address 0x15C0, 2 words

CODE	DESCRIPTION	BIT	ADDRESS	REMARKS
C00		0		
C01		1		
C02		2		
C03	Eco-mode enabled	3	0x15C0	
C04	Mode normal enabled	4	0x15C0	
C05		5		
C06		6		
C07		7		
C08		8		
C09		9		
C10	Automatic Bypass transfer enabled	10	0x15C0	
C11	Inverter transfer enabled	11	0x15C0	
C12		12		
C13		13		
C14		14		
C15		15		
C16	Battery test enabled module 1	0	0x25C1	
C16	Battery test enabled module 2	0	0x35C1	
C16	Battery test enabled module 3	0	0x45C1	
C16	Battery test enabled module 4	0	0x55C1	
C16	Battery test enabled module 5	0	0x65C1	
C16	Battery test enabled module 5	0	0x75C1	

Remark: A bit set to 0 means that the control is disabled by the UPS. The control will be not executed.

8. TO SEND CONTROL TO UPS: Address 0x15B0, write 1 words

For a remote UPS control, it is necessary to set the serial interface in "remote" mode using the Human Machine Interface.
Local controls of the control panel or graphic touch screen are no more available.

The control table below shows if the selected control is allowed or not. If the control sent to the UPS is not allowed, the function will be ignored.

Controls available by JBUS/MODBUS connection:

Code	Control	Value to write	ADDRESS	REMARKS
C03	Eco-mode	0x0003	0x15B0	
C04	Normal mode	0x0004	0x15B0	
C10	Automatic bypass transfer	0x000A	0x15B0	
C11	Inverter transfer	0x000B	0x15B0	
C16	Battery Test module 1	0x0010	0x25B0	
C16	Battery Test module 2	0x0010	0x35B0	
C16	Battery Test module 3	0x0010	0x45B0	
C16	Battery Test module 4	0x0010	0x55B0	
C16	Battery Test module 5	0x0010	0x65B0	
C16	battery Test module 6	0x0010	0x75B0	

ANNEX: SPECIFIC JBUS/MODBUS TABLES

For specific needs

To optimize the data traffic between the UPS and the remote equipment, **DELPHYS MX / MP** is able to sent in one frame all information, including states and alarms, and also measurements.
The addressing map is absolute; this means that the first address defines the complete table. The next address defines an other data table.

To use this specific mapping, you need to check if your remote system is able to manage the address mapping independently of the length of it.

Specific JBUS/MODBUS Tables

TABLE	Absolute address	length	Function
Common UPS DATA	0x038**7**	11 (176 bits)	3 READ
Common Measurements	0x039**7**	64	3 READ
DATA unit 1	0x038**1**	11	3 READ
Measurements unit 1	0x039**1**	64	3 READ
DATA unit 2	0x038**2**	11	3 READ
Measurements unit 2	0x039**2**	64	3 READ
DATA unit 3	0x038**3**	11	3 READ
Measurements unit 3	0x039**3**	64	3 READ
DATA unit 4	0x038**4**	11	3 READ
Measurements unit 4	0x039**4**	64	3 READ
DATA unit 5	0x038**5**	11	3 READ
Measurements unit 5	0x039**5**	64	3 READ
DATA unit 6	0x038**6**	11	3 READ
Measurements unit 6	0x039**6**	64	3 READ

DATA fields detail

The data list and measurements are available on request, please contact the factory.