

UBN30

DIN Rail LCD Power Meter

UBN310

DIN 96x96 & ANSI 4" Power Meter

UBN3060

DIN 144x144 & ANSI 4" LCD Power Meter

Universal Berg Netzbaustein

STANDARD Protocol Manual
English

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1. INTRODUCTION

This manual provides information on the STANDARD communication protocol. The publication is not intended for general use, but for qualified technicians.

This term indicates a professional and skilled technician, authorised to act in accordance with the safety standards relating to the dangers posed by electric current.

This person must also have basic first-aid training and be in possession of suitable Personal Protective Equipment.



WARNING!

It is strictly forbidden, for anyone who does not have the above-mentioned features, to install or use the device.

The device is made in compliance with the European Union directives in force, as well as in compliance with the technical standards implementing these requirements, as certified by the CE mark on the device and in this manual.

It is strictly forbidden to use the instrument for purposes other than those intended, which can be deduced from the manual content.

The Manufacturer reserves the right to make changes on the device or in the device specifications identified in this manual without notice.

The Manufacturer declines all liability for any use of the instrument which is different from that described in this manual and in the instrument manual, or for the lack/incorrect application of the reported instructions.

The information, contained in this manual, may not be divulged to third parties. Any copy of this manual, either partial or total, by photocopying, or by other means, also electronically, without written authorization from the Manufacturer, violates the copyright and is punishable by law.

The information contained in this document is believed to be accurate at the time of publication, however, the Manufacturer assumes no responsibility for any errors which may appear here and reserves the right to make changes without notice.

Any brands mentioned in the publication are property of their respective owners.

2. GRAPHIC SYMBOLS

In the manual and on the device, some instructions are highlighted by symbols to draw the reader's attention to the operational dangers.

These symbols are the following:



DANGER!

This warning indicates the possible presence of voltage exceeding 1kV on the marked terminals (even for short periods).



WARNING!

This warning indicates the possible occurrence of an event which may cause a serious accident or considerable damage to the device if suitable precautionary countermeasures are not taken.



ATTENTION!

This warning indicates the possible occurrence of an event which may cause a light accident or damage to the device if suitable precautionary countermeasures are not taken.



NOTE

This warning indicates important information which must be read carefully.

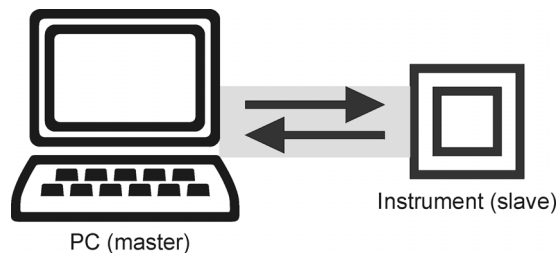
3. DESCRIPTION

3.1 Communication

The protocol specifications define the data sequence, the programming sequence and the check codes, necessary for a proper data communication.

This protocol allows the communication between the PC (master) and the instrument (slave).

The protocol uses an half duplex connection on a single line. In this way, the communication messages move on a single line in two opposite directions.



It is not possible a communication between instruments, without PC, as they cannot send commands; instruments are limited to reply. All the trasmitted characters are part of the ASCII code (see chapter 5).

3.2 Identification Code

In a multi-point type connection, a code allows to identify each instrument during the communication. This code, the Serial Number, is assigned to each instrument by the manufacturer. It is made of 9 characters (numbers and letters), printed on the instrument label.

A second identification code, the Logical Number, can be assigned by the user. As it is made up of 2 ASCII characters (\$01...\$FF), it allows a faster communication.

The Logical Number can be changed at any time using the specific command (see section 4.3). The instrument is supplied with a \$01 Logical Number.



NOTE

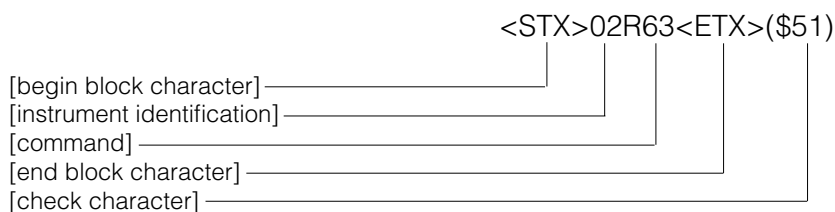
The \$00 Logical Number is used for broadcast commands. A command with the \$00 Logical number is received by all the instruments connected in the network.

**WARNING!**

In an instruments network, the \$00 code can be used only for sending write commands. An interrogation would generate a simultaneous response from all of the instruments, with the possibility of malfunctions.

3.3 Data Request Sequence

By the master, a data request sequence is sent to the instrument (slave) to read information on the device (measured values, programmed parameters,...). This interrogation cannot change instrument configuration. The following description shows the correct sequence of characters for a proper interrogation:

**[begin block character]**

It is always <STX> (\$02) character.

[instrument identification]

It is usually represented by the Logical Number (\$01...\$FF). The character S (\$53) can also be used followed by the instrument Serial Number (9 alphanumeric characters).

[command]

It is always R (\$52) character followed by the variable number to be read (see section 4.1), expressed in hexadecimal.

[end block character]

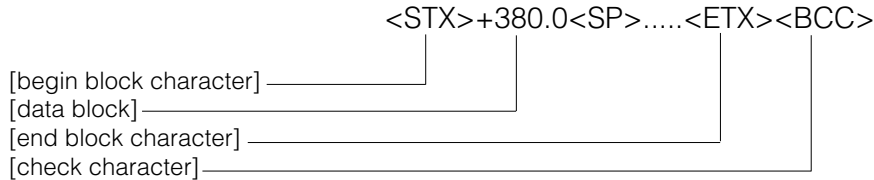
It is always <ETX> (\$03) character.

[check character]

It is a single character which results from EXCLUSIVE OR (XOR) of all the characters from <STX> up to and including <ETX>. It is used to check the transmitted data.

3.3.1 Response Sequence

When the instrument, with the corresponding Serial Number or Logical Number, received a read command, it replies with the following message.



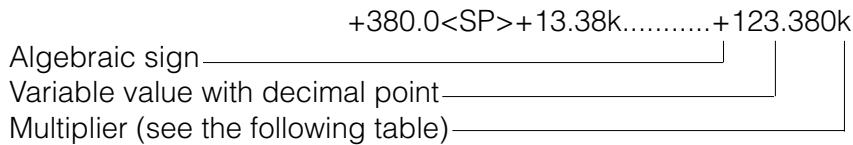
[begin block character]

It is always <STX> (\$02) character.

[data block]

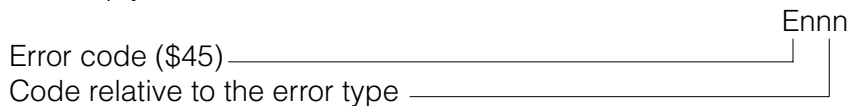
The data block format changes according to the sent command.

1. Data block of a variables group.



Character	Meaning	Multiplier
<SP>	space	1
k	kilo	1000
M	Mega	1000000
G	Giga	1000000000

4. Error reply.



[end block character]

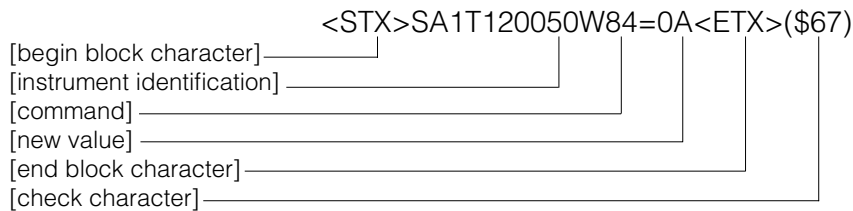
It is always <ETX> (\$03) character.

[check character]

It is a single character which results from EXCLUSIVE OR (XOR) of all the characters from <STX> up to and including <ETX>. It is used to check the transmitted data.

3.4 Parameter Setting Sequence

By the master, a programming sequence is sent to the instrument (slave) to change specific parameters (instrument configuration). The following description shows the correct sequence of characters for a proper command.



[begin block character]

It is always <STX> (\$02) character.

[instrument identification]

It is usually represented by the Logical Number (\$01...\$FF). The S (\$53) character can also be used followed by the instrument Serial Number (9 alphanumeric characters).

[command]

It is always W (\$57) character followed by the variable number to be changed (see section 4.3) expressed in hexadecimal by two alphanumeric characters and always followed by the character =(\$3D).

[new value]

It is a series of alphanumeric characters which express the new value, according to the assigned parameter (see section 2.3).

[end block character]

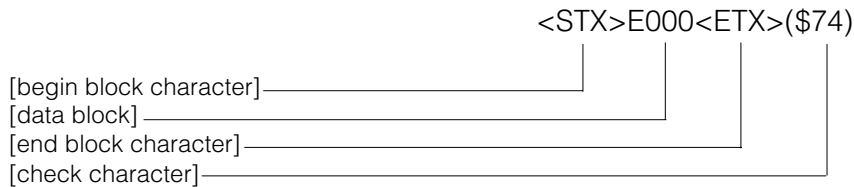
It is always <ETX> (\$03) character.

[check character]

It is a single character resulting from EXCLUSIVE OR (XOR) of all the characters from <STX> up to and including <ETX>. It is used to check the transmitted data.

3.4.1 Response Sequence

When the instrument, with the corresponding Serial Number or Logical Number, received a write command, it replies with the following message.



[begin block character]

It is always <STX> (\$02) character.

[data block]

It is made up of E (\$45) character followed by 3 numerical characters which indicate the code relative to the error. The E000 code specifies that the operation has been completed correctly.

[end block character]

It is always <ETX> (\$03) character.

[check character]

It is a single character resulting from EXCLUSIVE OR (XOR) of all of the characters from <STX> up to and including <ETX>, used to check the transmitted data.

3.5 Check Characters

The used check characters are the following:

<STX> Start of text (\$02)

Start of text character. Precedes the data in all frames.

<ETX> End of text (\$03)

End block character.

<BCC> Block check character

It is represented by 2 digit number, obtained by the operation of EXCLUSIVE OR (XOR) carried out on the transmitted data, as shown in the preceding examples.

4. COMMANDS



NOTE

The * symbol indicates a parameter available only when the instrument includes the relevant option.

4.1 Measured Values (codes valid for read only)

UBN310 UBN3060	UBN30	Command	Description
	☑	R3D R3D.01	<p>MEASURED INSTANTANEOUS VARIABLES In case of wiring mode: 3Ph-4W/3CT Answer format: <STX> VΣ V1 V2 V3 V12 V23 V31 AΣ A1 A2 A3 THDA1 THDA2 THDA3 AN PFΣ PF1 PF2 PF3 NUL COSφ1* COSφ2* COSφ3* VAΣ VA1 VA2 VA3 WΣ W1 W2 W3 varΣ var1 var2 var3 IN1 IN2 IN3 IN4 +Wh +varhI +varhC +VAh -Wh -varhI -varhC -VAh F THDV1 THDV2 THDV3 NUL RST <ETX><BCC></p> <p>Value format:</p> <ul style="list-style-type: none"> • Instantaneous values sign (space, +, -) + value on 4 digits with decimal point (5 characters) + multiplier (space, m, k, M, G, T, ...) • Energy counters sign (space, +, -) + value on 6 digits with decimal point (7 characters) + multiplier (space, m, k, M, G, T, ...) • Digital inputs sign (space, +, -) + value on 8 digits with decimal point (9 characters) + multiplier (space, m, k, M, G, T, ...) • Phase reversal sign (space, +, -) + value on 3 digits with decimal point (4 characters) + multiplier (space, m, k, M, G, T, ...) <p>In case of wiring mode: 3Ph-3W/2CT Answer format: <STX> VΣ NUL NUL NUL V12 V23 V31 AΣ A1 A2 A3 THDA1 NUL THDA3 NUL PFΣ NUL NUL NUL NUL NUL NUL VAΣ NUL NUL NUL WΣ NUL NUL NUL varΣ NUL NUL NUL IN1 IN2 IN3 IN4 +Wh +varhI +varhC +VAh -Wh -varhI -varhC -VAh F NUL NUL NUL NUL RST <ETX><BCC></p> <p>In case of wiring mode: 1Phase Answer format: <STX> NUL V1 NUL NUL NUL NUL NUL A1 NUL NUL THDA1 NUL NUL NUL NUL PF1 NUL NUL NUL COSφ1* NUL NUL NUL VA1 NUL NUL NUL W1 NUL NUL NUL var1 NUL NUL IN1 IN2 IN3 IN4 +Wh +varhI +varhC +VAh -Wh -varhI -varhC -VAh F THDV1 NUL NUL NUL RST <ETX><BCC></p>

UBN310 UBN3060	UBN30	Command	Description
☑		R3D.01	<p>MEASURED INSTANTANEOUS VARIABLES In case of wiring mode: 3Ph-4W/3CT Answer format: <STX> VΣ V1 V2 V3 V12 V23 V31 AΣ A1 A2 A3 THDA1 THDA2 THDA3 AN PFΣ PF1 PF2 PF3 COSφ1* COSφ2* COSφ3* VAΣ VA1 VA2 VA3 WΣ W1 W2 W3 varΣ var1 var2 var3 +Wh +varhI +varhC +VAh -Wh -varhI -varhC -VAh F THDV1 THDV2 THDV3 WDMD VADMD ADMD RST <ETX><BCC></p> <p>Value format:</p> <ul style="list-style-type: none"> Instantaneous values, parameters always positive value on 4 digits with decimal point (5 characters) + multiplier (space, m, k, M, G, T, ...) Instantaneous values, parameters with sign (+ or -) sign + value on 4 digits with decimal point (5 characters) + multiplier (space, m, k, M, G, T, ...) Energy counters sign + value on 8 digits with decimal point (9 characters) + multiplier (space, m, k, M, G, T, ...) Phase reversal sign (space, +, -) + value on 3 digits with decimal point (4 characters) + multiplier (space, m, k, M, G, T, ...) <p>In case of wiring mode: 3Ph-3W/2CT Answer format: <STX>VΣ NUL NUL NUL V12 V23 V31 AΣ A1 A2 A3 THDA1 NUL THDA3 NUL PFΣ NUL NUL NUL NUL NUL VAΣ NUL NUL NUL WΣ NUL NUL NUL varΣ NUL NUL NUL +Wh +varhI +varhC +VAh -Wh -varhI -varhC -VAh F NUL NUL NUL WDMD VADMD ADMD RST<ETX> <BCC></p> <p>In case of wiring mode: 1Ph-3W/2CT Answer format: <STX> VΣ V1 V2 NUL V12 NUL NUL AΣ A1 A2 NUL THDA1 THDA2 NUL AN PFΣ PF1 PF2 NUL COSφ1* COSφ2* NUL VAΣ VA1 VA2 NUL WΣ W1 W2 NUL varΣ var1 var2 NUL +Wh +varhI +varhC +VAh -Wh -varhI -varhC -VAh F THDV1 THDV2 NUL WDMD VADMD ADMD RST <ETX><BCC></p> <p>In case of wiring mode: 1Phase Answer format: <STX> NUL V1 NUL NUL NUL NUL NUL A1 NUL NUL THDA1 NUL NUL NUL NUL PF1 NUL NUL COSφ1* NUL NUL NUL VA1 NUL NUL NUL W1 NUL NUL NUL var1 NUL NUL +Wh +varhI +varhC +VAh -Wh -varhI -varhC -VAh F THDV1 NUL NUL WDMD VADMD ADMD RST <ETX><BCC></p>
☑		R3D	<p>UPM 300A (NEW VERSION) COMPATIBLE ANSWER FORMAT In case of wiring mode:3Ph-4W/3CT Answer format: <STX> VΣ V1 V2 V3 V12 V23 V31 AΣ A1 A2 A3 PFΣ PF1 PF2 PF3 VAΣ VA1 VA2 VA3 WΣ W1 W2 W3 varΣ var1 var2 var3 +Wh +varhI F WDMD ADMD RST NUL <ETX><BCC></p> <p>Value format: see R3D</p>
☑		R3E	<p>UPM 300 (OLD VERSION) COMPATIBLE ANSWER FORMAT In case of wiring mode: 3Ph-4W/3CT Answer format: <STX> VΣ V1 V2 V3 V12 V23 V31 AΣ A1 A2 A3 PFΣ PF1 PF2 PF3 VAΣ VA1 VA2 VA3 WΣ W1 W2 W3 varΣ var1 var2 var3 +Wh +varhI F WDMD ADMD<ETX><BCC></p> <p>Value format: see R3D</p>

UBN310 UBN3060	UBN30	Command	Description
<input checked="" type="checkbox"/>		R3F	DIGITAL INPUT VALUES * Answer format: <STX>DI1 DI2 DI3 DI4<ETX><BCC> Value format: See R3D.01
	<input checked="" type="checkbox"/>	R64	ALL DEMAND VALUES Answer format: <STX> WDMD VADMD ADMD <ETX> <BCC>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R61	ALL MAXIMUM AND MAXIMUM DEMAND VALUES Answer format: <STX> A1max A2max A3max AmaxDMD VmaxDMD WmaxDMD <ETX><BCC>
<h2>4.2 Programmed Parameters & Other Info</h2>			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R5F	ALL PROGRAMMED PARAMETERS Answer format: <STX>W80;W81;W82;W84;W89;W90;W92;W98;W9B;WDA;WDB;WA1;WB1;WDE; <ETX><BCC> NOTE: the W81 field is not available in case of UBN30.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R63	SERIAL NUMBER
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R70	DATE (YY/MM/DD)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R71	TIME (HH:MM:SS)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R72	DAY OF THE WEEK Answer format: <STX>10 characters<ETX><BCC>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R78	INSTRUMENT FIRMWARE VERSION AND CONFIGURATION <STX>V.VVXY<ETX><BCC> V.VV - Firmware version X - Reserved Y - Harmonics: N=not provided, H=provided
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R76.1	PHASE 1 VOLTAGE SAMPLES Answer format: <STX><SP>512 characters (128 samples per wave)<ETX><BCC>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R76.2	PHASE 2 VOLTAGE SAMPLES Answer format: <STX><SP>512 characters (128 samples per wave)<ETX><BCC>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R76.3	PHASE 3 VOLTAGE SAMPLES Answer format: <STX><SP>512 characters (128 samples per wave)<ETX><BCC>

UBN310 UBN3060	UBN30	Command	Description
☑	☑	R77.1	PHASE 1 CURRENT SAMPLES Answer format: <STX><SP>514 characters** (128 samples per wave)<ETX><BCC> **: The last two characters are reserved
☑	☑	R77.2	PHASE 2 CURRENT SAMPLES Answer format: <STX><SP>514 characters** (128 samples per wave)<ETX><BCC> **: The last two characters are reserved
☑	☑	R77.3	PHASE 3 CURRENT SAMPLES Answer format: <STX><SP>514 characters** (128 samples per wave)<ETX><BCC> **: The last two characters are reserved
☑	☑	R79	PHASE 1 VOLTAGE HARMONICS Answer format: <STX><SP>155 characters (31 x 5 characters)<ETX><BCC>
☑	☑	R7A	PHASE 2 VOLTAGE HARMONICS Answer format: <STX><SP>155 characters (31 x 5 characters)<ETX><BCC>
☑	☑	R7B	PHASE 3 VOLTAGE HARMONICS Answer format: <STX><SP>155 characters (31 x 5 characters)<ETX><BCC>
☑	☑	R7C	PHASE 1 CURRENT HARMONICS Answer format: <STX><SP>155 characters (31 x 5 characters)<ETX><BCC>
☑	☑	R7D	PHASE 2 CURRENT HARMONICS Answer format: <STX><SP>155 characters (31 x 5 characters)<ETX><BCC>
☑	☑	R7E	PHASE 3 CURRENT HARMONICS Answer format: <STX><SP>155 characters (31 x 5 characters)<ETX><BCC>
☑	☑	R7F.001	INSTRUMENT CONFIGURATION Answer format: <STX>OA=02;OD=02;ID=04;RAM=0128k;COM1<ETX><BCC> OA number of analog outputs * OD number of digital outputs ID number of digital inputs * RAM detected memory COMx used communication port (in the instrument)
☑	☑	R7F.002	FULLSCALE INFORMATION Answer format: <STX>KTA=0001;KTV=0001.000;FSV=433;FSV3=750;FSW=0433;FSW3=1299;MSA=12;MSA3=12;MSN=12;MSV=1000;MSV3=1000;MSW=12000;MSW3=12000;FA=01;CSDO=1320;<ETX><BCC>=72h>

UBN310 UBN3060	UBN30	Command	Description
☑	☑	R7F.008	<p>INFORMATION ON R3D ANSWER FORMAT</p> <p>Answer format: UBN310, UBN3060 <STX> 00,10 01,10 02,10 03,10 04,10 05,10 06,10 08,20 09,20 0A,20 0B,20 10,13 11,13 12,13 13,13 18,21 19,21 1A,21 1B,21 20,22 21,22 22,22 23,22 28,23 29,23 2A,23 2B,23 30,24 31,25 34,11 39,22 3A,20 3B,10 3C,10<ETX><BCC=23h></p> <p>UBN30, UBN315, UBN3080 <STX> 00,10 01,10 02,10 03,10 04,10 05,10 06,10 08,20 09,20 0A,20 0B,20 0C,12 0D,12 0E,12 0F,20 10,13 11,13 12,13 13,13 FF,-- 15,13 16,13 17,13 18,21 19,21 1A,21 1B,21 20,22 21,22 22,22 23,22 28,23 29,23 2A,23 2B,23 2C,24 2D,24 1E,24 1F,24 30,24 31,25 33,25 1C,26 32,24 2E,25 2F,25 1D,26 34,11 36,12 37,12 38,12 FF,-- 3B,- - <ETX><BCC=54h></p> <p>Where: 00 system voltage variable , separator between variable and measurement unit 10 measurement unit</p> <p>single word: 10 Volt 11 dHz 12 dperc 13 COSφ</p> <p>double word: 20 mA 21 VA 22 W 23 var 24 Wh 25 varh 26 VAh</p> <p><space> separator between two fields</p>
☑	☑	R80.0	<p>MIN / AVG / MAX RECORDING SETUP & STATUS</p> <p>Answer format: <STX>V1,V2,V3,V4,V5,V6,V7,V8,MM,TT,HHMM(on1),HHMM(off1),HHMM(on2),HHMM(off2), DD<ETX><BCC></p> <p>V1,V2,...V8 selected variable (see section 4.4) MM recording mode:00=NONE; 01=FILL; 02=RING TT integration time to calculate the DMD: 01, 05, 10, 15, 30, 60 min HHMM(on1) recording start time of the first period HHMM(off1) recording stop time of the first period HHMM(on2) recording start time of the second period HHMM(off2) recording stop time of the second period DD downloading data: 00=not available; 01=available</p> <p>Example: <STX>01,02,03,09,0A,0B,FF,FF,01,60,0830,1230,1400,1700,01<ETX><BCC></p>
☑	☑	R80.7	<p>RECORDINGS SIZE</p> <p>Answer format: <STX>E E E M M M M M M M M M <ETX><BCC></p> <p>E E E E energy recording size M M M M M M M M min/avg/max recording size</p>

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☑	☑	R80.1	MIN/AVG/MAX RECORDING DOWNLOAD - FIRST DATA BLOCK
☑	☑	R80.2	MIN/AVG/MAX RECORDING DOWNLOAD - NEXT DATA BLOCK
☑	☑	R80.3	<p>MIN/AVG/MAX RECORDING DOWNLOAD - REPEAT LAST DATA BLOCK</p> <p>Answer format (R80.1, R80.2, R80.3): <STX>00010106106418010542053A053602290227022700160016001600160016001600000000000004A00458031F3206320031F8...<ETX><BCC></p> <p>0001 progressive number of block transmitted 0106 total number of characters transmitted in this block 10641801....31F8 datablock:YYMMDDHHMMSS+minimum,average,maximum of selected variables expressed with a word, as a fraction of the fullscale.Conversion is carried out by the program on the PC during transfer</p> <p>Data conversion:</p> <p>1064 0001000001100100(BIN)00010(BIN)=year:00000=2000; 00001=2001;00010=2002;.....11111=2031 00001100100(BIN)=day:100(DEC)-31(january)-28(february)-31(march)=10april</p> <p>1801 time (HHMM)</p> <p>0542 maxV1=(data*FS*PT)/32768[FS=1000]=0542(HEX)=1346(DEC)=(1346*1000)/32768=41.08V</p> <p>0229 maxA1=(data*FS*PT)/32768[FS=12]=0229(HEX)=553(DEC)=(553*12)/32768=0.205A</p> <p>0016 maxP1=(data*FS*PT)/32768[FS=12000]=0016(HEX)=(DEC)=(22*12)/32768=8.057kW</p> <p>0016 maxS1=(data*FS*PT)/32768[FS=12000]=0016(HEX)=22(DEC)=(22*12)/32768=8.057kVA</p> <p>0000 maxQ1=(data*FS*PT)/32768[FS=12000]=0000(HEX)=00(DEC)=(00*12)/32768=0kvar</p> <p>04A0 maxPF1=(7FFF-data*FS)/32768[FS=1.000]=7B5F(HEX)=31583(DEC)=(31583)/32768=0.9638inductive</p> <p>3206 maxF=(data)/128=3206(HEX)=12806(DEC)=(12806)/256=50.02Hz</p> <p>06B2 maxTHD=(data)/128=06B2(HEX)=1714(DEC)=(1714)/128=13.39%</p> <p>0369 maxHarm3=(data)/128=0369(HEX)=873(DEC)=(873)/128=6.82%</p> <p>The parameters with sign should be preconverted as follows:</p> <ul style="list-style-type: none"> • if (data)>\$7FFF, means that the value is negative, and should be converted in complement of 2: data new = 0 - data • for PF parameters, if (data) > \$7FFF => INDUCTIVE PF => the formula is: (data-7FFF)/32768 • for PF parameters, if (data) <= \$7FFF => CAPACITIVE PF => the formula is: (7FFF-data)/32768

UBN310 UBN3060	UBN30	Command	Description
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R80.4	DAILY COUNTERS RECORDING DOWNLOAD - FIRST DATA BLOCK
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R80.5	DAILY COUNTERS RECORDING DOWNLOAD - NEXT DATA BLOCK
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	R80.6	<p>DAILY COUNTERS RECORDING DOWNLOAD - REPEAT LAST DATA BLOCK</p> <p>Answer format (R80.4, R80.5, R80.6): <STX>000100CC106100000164...<ETX><BCC></p> <p>0001 progressive number of the transmitted block 00CC total number of characters transmitted in this block 1061 date 00000164... data block: energy counters expressed in mWh, mvarh, mVAh (with two words). In order: +Wh,+varhI,+varhC,+VAh, -Wh,-varhI,-varhC,-VAh</p> <p>Data conversion: En value = decimal data*CT*PT</p>

4.3 Programmable Parameters (codes valid for write only)

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	W80	<p>SERIAL COMMUNICATION (COM1) Format: W80=Baud rate, Parity, Bit, Stop Baud Rate 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 Parity None, Even, Odd Bit 8 Stop 1 Example: W80=38400,N,8,1</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	W81	<p>SERIAL COMMUNICATION (COM2) Format: see W80</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	W84	<p>LOGICAL NUMBER Format: W84=XX Available values: \$01 ... \$FF Example: W84=01</p>
	<input checked="" type="checkbox"/>	W87.1	<p>PROTOCOL SWITCHING (COM1) Format: W87.1=Baud rate, Parity, Bit, Stop Baud Rate 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 Parity None, Even, Odd Bit 7, 8 Stop 1, 2 Example: W87.1=38400,N,8,1</p>
	<input checked="" type="checkbox"/>	W87.2	<p>PROTOCOL SWITCHING (COM2) Format: see W87.1</p>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	W89	<p>DATE/TIME/DAY Format: W89=YYMMDDHHMMSSd d=day of the week: 1...7->Mon...Sun Example: W89=0501211030005</p>

UBN310 UBN3060	UBN30	Command	Description
☑	☑	W90	CT RATIO Format: W90=XXXX Available values: 0001...9999 Example: W90=0001
☑	☑	W92	PT RATIO Format: W92=XXXX.YYY Available values: 0001.000...9999.999 Example: W92=1234.567
☑	☑	WDA	WIRING MODE Format: WDA=XX Available values: 01=1phase 02=1phase-3wires / 2CT (only 310) 3phase-3wires / 3CT (only 30) 03=3phase-3wires / 2CT 04=3phase-4wires / 3CT
☑	☑	WDB	CURRENT INPUT FULLSCALE Format: WDB=XX Available values: 01=1 A 05=5 A Example: WDB=01
☑	☑	W95	MIN/AVG/MAX RECORDING SETUP Format: W95=V1,V2,V3,V4,V5,V6,V7,V8,MM,TT,HHMM(on1),HHMM(off1),HHMM(on2),HHMM(off2) <ETX> <BCC> V1,V2,..V8 selected variable (see section 4.4) MM recording mode: 0=NONE; 1=FILL; 2=RING TT integration time to calculate the DMD: 01, 05, 10, 15, 30, 60 min HHMM(on1) recording start time of the first period HHMM(off1) recording stop time of the first period HHMM(on2) recording start time of the second period HHMM(off2) recording stop time of the second period To record continuously, without start and stop time, set all fields "HHMM" to 0000. Example: W95=00,01,02,03,04,05,06,34,01,60,0830,1230,1400,1700
☑	☑	W96	CLEAR RECORDINGS Format: W96=X Available values: 0=clear min/avg/max recordings 1=clear daily counter recordings 2=clear all recordings 3=clear min/avg/max recordings setup Example: W96=0
☑	☑	W98	DMD INTEGRATION TIME Format: W98=XX Available values: 01,05,10,15,30,60 minutes Example: W98=01
	☑	W9B	DISPLAY BACKLIGHT ON TIME Format: W9B=XXX Available values: 0...999 Example: W9B=001

UBN310 UBN3060	UBN30	Command	Description
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	W9F	CLEAR COUNTERS & SET DEFAULT Format: W9F=XXXXX Available values: 43000=clear energy counters 53000=clear digital input counters * 75430=clear all counters 65000=set default instrument parameters
	<input checked="" type="checkbox"/>	WDE	LANGUAGE Format: WDE=XX Available values: 00=English 01=Deutsch 02=Français 03=Italiano 04=Español Example: WDE=00
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WA0	DIGITAL OUTPUT 1 PULSE Format: WA0=XX,YYY.Y,ZZZ XX associated variable (see section 4.4) YYY.Y pulse coefficient (ex. Wh/pulse) ZZZ pulse duration time (msec.) Example: WA0=30,150.0,250
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WA1	THRESHOLD Format: WA1=XX,Y,ZZZ.ZZ,JJ,KKK XX associated variable (see section 4.4) Y threshold mode L=low threshold mode H=high threshold mode ZZZ.ZZ tripping value referring to the fullscale JJ hysteresis percentage value referring to the tripping value KKK delay time on threshold tripping Example: WA1=20,H,050.00,15,030
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WB0	DIGITAL OUTPUT 2 PULSE (see WA0)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WB1	THRESHOLD (see WA1)
			DIGITAL OUTPUT 3 *
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WA4	PULSE (see WA0)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WA5	THRESHOLD (see WA1)
			DIGITAL OUTPUT 4 *
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WB4	PULSE (see WA0)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WB5	THRESHOLD (see WA1)
			DIGITAL OUTPUT 5 *
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WA8	PULSE (see WA0)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WA9	THRESHOLD (see WA1)
			DIGITAL OUTPUT 6 *
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WB8	PULSE (see WA0)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WB9	THRESHOLD (see WA1)

UBN310 UBN3060	UBN30	Command	Description
☑	☑	WA2	<p>DIGITAL INPUT 1 * Format: WA2=X,YY.YY,ZZZZ</p> <p>X I=input identifier YY.YY tripping value referring to the fullscale ZZZZ 00000=none 00001=kWh 00002=kVAh 00003=kvarh 00004=MWh 00005=MVAh 00006=Mvarh 00007=GWh 00008=GVAh 00009=Gvarh 00010=m3 00011=l 00012=N,h'F8 00013=yd3 00014=ft3 00015=in3 00016=gal 00017=oz</p> <p>Example: WA2=l,01.00,00001</p>
☑	☑	WB2	<p>DIGITAL INPUT 2 * Format: see WA2</p>
☑	☑	WA6	<p>DIGITAL INPUT 3 * Format: see WA2</p>
☑	☑	WB6	<p>DIGITAL INPUT 4 * Format: see WA2</p>
☑	☑	WA3	<p>ANALOG OUTPUT 1 * Format: WA3=XX,Y,ZZZ.ZZ,JJJ.JJ</p> <p>XX associated variable (see section 4.4) Y 0=mono-directional output 0-20mA 4=mono-directional output 4-20mA. The output is linear from the minimum limit value to the maximum limit value A=bi-directional output 0-20mA (10mA=Val.0) C=bi-directional output 4-20mA (12mA=Val.0). The output is linear from the minimum limit value (maximum negative) to zero and from zero to the maximum limit value</p> <p>ZZZ.ZZ minimum limit value percentage referring to the fullscale or negative maximum limit value in the case of bi-directional output (it is also possible to use ZZ.ZZ format)</p> <p>JJJ.JJ maximum limit value percentage referring to fullscale (it is also possible to use JJ.JJ format)</p> <p>Example: WA3=00,0,000.00,020.00</p>
☑	☑	WB3	<p>ANALOG OUTPUT 2 * Format: see WA3</p>
☑	☑	WA7	<p>ANALOG OUTPUT 3 * Format: see WA3</p>

		Command	Description
UBN310 UBN3060	UBN30		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WB7	ANALOG OUTPUT 4 * Format: see WA3
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WCE	CLEAR MIN/MAX AND MAXIMUM DEMAND VALUES Format: WCE=XX Available values: 00=clear all max values 01=clear max WDMD and max VADMD 02=clear max ADMD Example: WCE=00

4.4 Variables List

The code and the symbol, assigned to each variable, are described in the following list.

Code	Description	Symbol
00	System voltage	$V\Sigma$
01	L-N voltage phase 1	V1
02	L-N voltage phase 2	V2
03	L-N voltage phase 3	V3
04	L-L voltage line 12	V12
05	L-L voltage line 23	V23
06	L-L voltage line 31	V31
08	System current	$A\Sigma$
09	Phase 1 current	A1
0A	Phase 2 current	A2
0B	Phase 3 current	A3
0C	Phase 1 current THD	THDA1
0D	Phase 2 current THD	THDA2
0E	Phase 3 current THD	THDA3
0F	Neutral current	AN
10	System power factor	$PF\Sigma$
11	Phase 1 power factor	PF1
12	Phase 2 power factor	PF2
13	Phase 3 power factor	PF3
15	Phase 1 $\text{COS}\varphi^*$	$\text{COS}\varphi1$
16	Phase 2 $\text{COS}\varphi^*$	$\text{COS}\varphi2$
17	Phase 3 $\text{COS}\varphi^*$	$\text{COS}\varphi3$
18	System apparent power	$VA\Sigma$
19	Phase 1 apparent power	VA1
1A	Phase 2 apparent power	VA2
1B	Phase 3 apparent power	VA3
20	System active power	$W\Sigma$
21	Phase 1 active power	W1
22	Phase 2 active power	W2
23	Phase 3 active power	W3
28	System reactive power	$\text{var}\Sigma$
29	Phase 1 reactive power	var1
2A	Phase 2 reactive power	var2
2B	Phase 3 reactive power	var3
34	Line frequency	F
36	Phase 1 voltage THD	THDV1
37	Phase 2 voltage THD	THDV2
38	Phase 3 voltage THD	THDV3
39	System active power demand	WDMD
3B	Phase order	RST
FF	None variable selected	
40 ... 5E	Harmonic (H1 ... H31) L-N voltage phase 1 *	
5F ... 7D	Harmonic (H1 ... H31) L-N voltage phase 2 *	
7E ... 9C	Harmonic (H1 ... H31) L-N voltage phase 3 *	
9D ... BB	Harmonic (H1 ... H31) phase 1 current *	
BC ... DA	Harmonic (H1 ... H31) phase 2 current *	
DB ... F9	Harmonic (H1 ... H31) phase 3 current *	

Code	Description	Symbol
30	Imported active energy	+Wh
31	Imported reactive inductive energy	+varhI
33	Imported reactive capacitive energy	+varhC
1C	Imported apparent energy	+VAh
32	Exported active energy	-Wh
2E	Exported reactive inductive energy	-varhI
2F	Exported reactive capacitive energy	-varhC
1D	Exported apparent energy	-VAh

4.5 Error Messages

Nr	Description
E000	COMMAND ACKNOWLEDGE (NO ERROR) Reception of a correct command.
E011	ERROR COMMAND Reception of an incorrect command.
E101	RECORDING DOWNLOAD ERROR1 Empty file.
E102	RECORDING DOWNLOAD ERROR2 End of file.



NOTE

A verification error on BCC is not indicated; the reception of a complete message but with incorrect BCC is completely ignored by the instrument.

5. ASCII CHARACTERS TABLE

DEC	HEX	CHAR.	DEC	HEX	CHAR.	DEC	HEX	CHAR.	DEC	HEX	CHAR.
000	00	<nul>	016	10	>	032	20	<sp>	048	30	0
001	01	<soh>	017	11	<	033	21	!	049	31	1
002	02	<stx>	018	12	&	034	22	"	050	32	2
003	03	<etx>	019	13	!!	035	23	#	051	33	3
004	04	<eot>	020	14	¶	036	24	\$	052	34	4
005	05	<enq>	021	15	§	037	25	%	053	35	5
006	06	<ack>	022	16	■	038	26	&	054	36	6
007	07	<bel>	023	17	‡	039	27	'	055	37	7
008	08	<bs>	024	18	↑	040	28	(	056	38	8
009	09	<tab>	025	19	↓	041	29)	057	39	9
010	0A	<lf>	026	1A	→	042	2A	*	058	3A	:
011	0B	<vt>	027	1B	←	043	2B	+	059	3B	;
012	0C	<np>	028	1C	└	044	2C	,	060	3C	<
013	0D	<cr>	029	1D	⊕	045	2D	-	061	3D	=
014	0E	<so>	030	1E	▲	046	2E	.	062	3E	>
015	0F	<si>	031	1F	▼	047	2F	/	063	3F	?

DEC	HEX	CHAR.	DEC	HEX	CHAR.	DEC	HEX	CHAR.	DEC	HEX	CHAR.
064	40	@	080	50	P	096	60	`	112	70	p
065	41	A	081	51	Q	097	61	a	113	71	q
066	42	B	082	52	R	098	62	b	114	72	r
067	43	C	083	53	S	099	63	c	115	73	s
068	44	D	084	54	T	100	64	d	116	74	t
069	45	E	085	55	U	101	65	e	117	75	u
070	46	F	086	56	V	102	66	f	118	76	v
071	47	G	087	57	W	103	67	g	119	77	w
072	48	H	088	58	X	104	68	h	120	78	x
073	49	I	089	59	Y	105	69	i	121	79	y
074	4A	J	090	5A	Z	106	6A	j	122	7A	z
075	4B	K	091	5B	[	107	6B	k	123	7B	{
076	4C	L	092	5C	\	108	6C	l	124	7C	|
077	4D	M	093	5D	]	109	6D	m	125	7D	}
078	4E	N	094	5E	^	110	6E	n	126	7E	~
079	4F	O	095	5F	_	111	6F	o	127	7F	Δ

DEC	HEX	CHAR.	DEC	HEX	CHAR.	DEC	HEX	CHAR.	DEC	HEX	CHAR.
128	80	Ç	144	90	É	160	A0	á	176	B0	⋮
129	81	ü	145	91	æ	161	A1	í	177	B1	⋮
130	82	é	146	92	ff	162	A2	ó	178	B2	⋮
131	83	â	147	93	ô	163	A3	ú	179	B3	⋮
132	84	ä	148	94	ö	164	A4	ñ	180	B4	⋮
133	85	à	149	95	ò	165	A5	Ñ	181	B5	⋮
134	86	ã	150	96	û	166	A6	ª	182	B6	⋮
135	87	ç	151	97	ù	167	A7	º	183	B7	⋮
136	88	ê	152	98	ÿ	168	A8	¿	184	B8	⋮
137	89	ë	153	99	ÿ	169	A9	ƒ	185	B9	⋮
138	8A	è	154	9A	Û	170	AA	ƒ	186	BA	⋮
139	8B	ï	155	9B	ç	171	AB	½	187	BB	⋮
140	8C	î	156	9C	£	172	AC	¼	188	BC	⋮
141	8D	ì	157	9D	¥	173	AD	↓	189	BD	⋮
142	8E	Å	158	9E	℞	174	AE	«	190	BE	⋮
143	8F	Å	159	9F	f	175	AF	»	191	BF	⋮

DEC	HEX	CHAR.	DEC	HEX	CHAR.	DEC	HEX	CHAR.	DEC	HEX	CHAR.
192	C0	Ł	208	D0	⋮	224	E0	α	240	F0	≡
193	C1	ł	209	D1	⋮	225	E1	β	241	F1	±
194	C2	⋮	210	D2	⋮	226	E2	Γ	242	F2	≥
195	C3	⋮	211	D3	⋮	227	E3	π	243	F3	≤
196	C4	—	212	D4	⋮	228	E4	Σ	244	F4	∫
197	C5	⋮	213	D5	⋮	229	E5	σ	245	F5	∫
198	C6	⋮	214	D6	⋮	230	E6	μ	246	F6	÷
199	C7	⋮	215	D7	⋮	231	E7	τ	247	F7	≈
200	C8	⋮	216	D8	⋮	232	E8	ϖ	248	F8	°
201	C9	⋮	217	D9	⋮	233	E9	θ	249	F9	.
202	CA	⋮	218	DA	⋮	234	EA	Ω	250	FA	.
203	CB	⋮	219	DB	⋮	235	EB	δ	251	FB	√
204	CC	⋮	220	DC	⋮	236	EC	ω	252	FC	∞
205	CD	=	221	DD	⋮	237	ED	∅	253	FD	z
206	CE	⋮	222	DE	⋮	238	EE	€	254	FE	■
207	CF	⋮	223	DF	⋮	239	EF	∏	255	FF	



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