SOCIETÀ COOPERATIVA
BILANCIAI

D400 Terminal

$C \in$

Advanced user manual

Index

9. FOREWORD TO THE ADVANCED USER MANUAL

This manual describes the procedures for terminal personalization in order to adapt it to the specific weighing system in which it is installed.

It contains the software commands used to interface the terminal with a PC, PLC and host computers in general.

✋ WARNING ✋

The personalization operations described herein do not in any way influence weighing functions but, unless correctly performed, they may compromise the operation of the system as a whole. The operations described in this section of the manual should only be entrusted to qualified technicians with specialised experience in this field.

10. PROGRAMMING OF SERIAL LINE COMMUNICATION

10.1 Symbols used

The following conventions are used to describe the characters used in serial line communication characters.

✔ Normal characters are indicated with their usual symbols.

✔ Control characters appear in brackets and are written in uppercase.
For example:
<CR> indicates the carriage return character.
<SP> indicates the space character.

✔ Where necessary, the hexadecimal value of the character is given in numbers and upppercase letters.
For example: <CR>(0DH) o $(24H).

✔ Variables are written in lower case between brackets.
For example:
<um>= unit of measurement.
This may assume the following values:
Kg = kilogrammes
<SP>g = grammes
lb = pounds
<SP>t = tonnes

✔ Numeric fields are indicated with n and y, and may include initial spaces, a decimal point and a minus sign.

10.2 Strings

The terminal has two serial output ports which may be used for the connection of external devices, such as printers, personal computers, PLCs, etc.. The user can choose the type of transmission protocol to be used from among those already present on the terminal. The user may also personalize the serial transmission parameters using the specific menu (see *par. 11.6.7 on page 2-36*).

10.2.1 Cb (or Bilanciai) string

1st character	$(24H)	string start character
2nd character	<s>	s=stability s=0 weight stable s=1 weight not stable s=3 weight not valid (negative or overload)
3rd-7th character		net weight if the weight comprises more than 5 digits, the least significant digits are not transmitted
8th character	<CR>(ODH)	end string character

The following protocols are available: Cyclic (see *par. 10.3.2 on page 2-13*), On request (see *par. 10.3.3 on page 2-13*), ACK-NAK (see *par. 10.3.1 on page 2-13*).

10.2.2 Extended string

1st character	$(24H)	start string character
2nd-10th character		net weight with sign and decimal point (if present)
11th character	<SP>(20H)	space
12th-20th character		tare with sign and decimal point (if present)
21st character	<SP>(20H)	space
22nd-23rd character	<um>	unit of measurement
24th character	<SP>(20H)	space
25th character	<s1>	scale status
26th character	<s2>	scale status
27th character	<s3>	scale status
28th character	<s4>	scale status
29th character	<CR>(0DH)	
30th character	<LF>(0AH)	

The characters <s1>, <s2>, <s3>, <s4> are ASCII characters that must be interpreted as hexadecimal values. Each character represents 4 bits of difference significance; for example, the incoming ASCII character "A" must be interpreted as the hexadecimal digit "A";

1	0	1	0
bit3	bit2	bit1	bit0

When a bit assumes the value "1", this means that the corresponding signal is true; the significance of the signals is as follows:

<s1>	bit 0	minimum weighment signal
	bit 1	tare locked signal
	bit 2	preset tare signal
	bit 3	centre zero signal
<s2>	bit 0	not utilised
	bit 1	weight stable signal
	bit 2	overload signal
	bit 3	not utilised
<s3>	bit 0	not utilised
	bit 1	not utilised
	bit 2	weight not valid
	bit 3	printing in progress
<s4>	bit 0	approved instrument
	bit 1	converter fault
	bit 2	scale configuration parameters error
	bit 3	calibration error

The following protocols are available: Cyclic (see *par. 10.3.2 on page 2-13*), On request (see *par. 10.3.3 on page 2-13*), ACK-NAK (see *par. 10.3.1 on page 2-13*), Remote commands (see *par. 10.4 on page 2-14*).

10.2.3 Extraction string

In the case of loading or unloading extraction operation, the net weight and tare (2nd to 10th characters and 12th to 20th characters in the Extended string) are replaced respectively by the extracted weight and gross weight.

1st character	$(24H)	start string character
2nd-10th character	0(30H)	extracted weight with sign and decimal point (if present)
11th character	<SP>(20H)	space
12th-20th character		gross weight with sign and decimal point (if present)
21st character	<SP>(20H)	space
22nd-23rd character	<um>	unit of measurement
24th character	<SP>(20H)	space
25th character	<s1>	scale status (see note)
26th character	<s2>	scale status (see note)
27th character	<s3>	scale status (see note)
28th character	<s4>	scale status (see note)
29th character	<CR>(0DH)	
30th character	<LF>(0AH)	

10.2.4 Visual string

1st character	$(24H)	start string character
2nd character	0(30H)	fixed zero character
3rd character	<s>	s=stability s=0 weight stable s=1 weight not stable s=3 weight not valid (negative or overload)
4th-8th character		net weight with sign; if the weight consists of more than 5 digits, the least significant digits will not be transmitted; if the value includes a decimal point, the length of the string will be increased by 1 character
9th character	<CR>(0DH)	end string character

10.2.5 Idea string

1st character	<cis>	cis=@(40H) Start string character on pressing ⊡ cis=$(24H) Start string character in other cases
2nd character	<s>	s=stability s=0 weight stable s=1 weight not stable s=3 weight not valid (negative or overload)
3rd-7th character		net weight if the weight consists of more than 5 digits, the least significant digits will not be transmitted;
8th character	<CR>(ODH)	end string character

10.2.6 Cma

Reserved string, not to be used. Further information supplied on ordering.

10.2.7 On request with address

Selecting this option disables the transmission of cyclic strings.

Uses remote commands followed by terminal identification number (see *par. 10.4.29 on page 2-22*).

10.3 Protocols for cyclic strings

10.3.1 ACK-NAK protocol

The string is only sent on request of the user via the request

transmission key ⊡ or from an external input (see *par. 11.6.8 on page 2-37*). After transmission of the weight, the terminal behaves as follows:

✔ if it receives the "ACK" character (06H) , it awaits a new transmission request;

✔ if it receives the "NAK" character (15H), it transmits the string again because the previous transmission was not completed successfully;

✔ if it receives three "NAK" characters in succession, the terminal displays the "NO ACK" message (transmission error).

10.3.2 Cyclic protocol

The selected string (see *par. 10.2 on page 2-7*) is transmitted cyclically at a rate of 3 times per second.
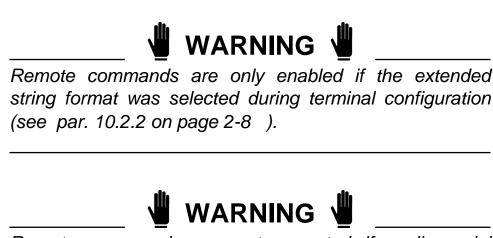
10.3.3 On request protocol

The selected string is transmitted:

✔ either on pressing the request transmission key ⊡ ;
✔ or on the activation of an input (see *par. 11.6.8 on page 2-37*).

10.4 Remote commands protocol

There are a number of serial line commands with which various operations can be commanded from a remote device (PC, PLC etc.).

✋ **WARNING** ✋

Remote commands are only enabled if the extended string format was selected during terminal configuration (see par. 10.2.2 on page 2-8).

✋ **WARNING** ✋

Remote commands are not executed if cyclic serial transmission is in progress; in this case cyclic transmission must be suspended with the command "EX<CR>" before giving any other remote commands.

✋ **WARNING** ✋

Insert a delay of a few ms between the reply to a command and the next command.

10.4.1 Reply to an incorrect command

??<CR><LF>

This reply string is sent:

✔ if the command syntax is incorrect;
✔ if the command cannot be executed.

10.4.2 Reply to a correct command

In the case of the command being accepted, if the command requests the transmission of information, the reply will consist of the transmission of the requested data item; in other cases the reply will consist of the following string:

OK<CR><LF>

10.4.3 Suspension of cyclic transmission

This command is not available with the RS485 protocol, in which transmission is on request only

EX<CR>

10.4.4 Resumption of cyclic transmission

This command is not available with the RS485 protocol, in which transmission is on request only

SX<CR>

10.4.5 Request for gross weight

XB<CR>
The terminal responds with the following string:
n<SP><um><SP>B<CR><LF>

10.4.6 Request for net weight

XN<CR>
The terminal responds with the following string:
n<SP><um><SP>NT<CR><LF>

10.4.7 Request transmission of tare

XT<CR>

The terminal responds with the following string:

n<SP><um><SP>TE<CR><LF>

if the tare has been entered manually;

n<SP><um><SP>TR<CR><LF>

if the tare has been acquired.

10.4.8 Request transmission of scale status

XZ<CR>

The terminal responds with the following string:

<s1><s2><s3><s4><CR><LF>

The characters s1, s2, s3 and s4 are ASCII characters which must be interpreted as hexadecimal values. Each character represents 4 bits of different significance; for example, the incoming ASCII character "A" must be interpreted as the hexadecimal digit "A";

1	0	1	0
bit3	bit2	bit1	bit0

When a bit assumes the value "1" the corresponding signal is "true"; the significance of the signals is as follows:

<s1>	bit 0	minimum weighment signal
	bit 1	tare locked signal
	bit 2	preset tare entered signal
	bit 3	centre zero signal
<s2>	bit 0	not utilised
	bit 1	weight stable signal
	bit 2	overload signal
	bit 3	not utilised
<s3>	bit 0	not utilised
	bit 1	not utilised
	bit 2	weight not valid
	bit 3	printing in progress
<s4>	bit 0	approved instrument
	bit 1	converter fault
	bit 2	scale configuration parameters error
	bit 3	calibration error

10.4.9 Request transmision of scale status (version EV2001)

XS<CR>

In the case of a positive reply, the terminal responds with the following string:

<s1><s2><CR><LF>

The characters s1 and s2 are ASCII characters that must be interpreted as hexadecimal values.

The bits indicate the scale status as follows.

<s1>	bit 0	in range
	bit 1	weight stable
	bit 2	centre zero
	bit 3	displayed net weight
<s2>	bit 0	not utilised
	bit 1	not utilised
	bit 2	not utilised
	bit 3	print request: the print key has been pressed or input n° 3 is activated.

10.4.10 Scale zeroing

AZ<CR>

10.4.11 Tare acquisition

AT<CR>

10.4.12 Tare entering

nAT<CR>

The command AT must be preceded by a weight expressed in a maximum of 7 characters comprising the decimal point, if present.

10.4.13 Cancellation of an entered tare

CT<CR>

This command cancels any tare value in memory.

10.4.14 Request transmission of general data table

ND<CR>

The terminal responds to this command with a sequence of strings terminating in <CR><LF> each containing the number of the data item and its description; the following is an example data table:

1 Date
2 Time
3 Extracted
4 Gross
5 Tare
6 Net
7 Status

10.4.15 Request for general data item "n"

XIn<CR>

With this command it is possible to read the current value of any of the general data.

10.4.16 Request to enter the value "y" in the general data item "n"

yXIn<CR>

where "y" is the value you wish to assign to the data item "n". Obviously the value to be entered must conform to the format of the data item.

Only certain terminal models (see special programs) allow use of this command.

10.4.17 Request for transmission of the net weight and the scale status

Xn<CR>

N.B.: the command sent is comprised of an uppercase X and lowercase n (not to be confused with genric significance assigned to the lowercase described in *par. 10.1 on page 2-6*).

In the case of a positive reply, the terminal responds with the following string:

n<SP><um><SP><s1><s2><s3><s4><CR><LF>

The characters s1, s2, s3 and s4 are ASCII characters as explained in *par. 10.4.8 on page 2-16* .

10.4.18 Print request

PR<CR>

On receipt of this command, the terminal responds with the following string:

OK<CR><LF>

Any "printing not performed" message will be signalled only on the display.

10.4.19 Read last weight acquired

PA<CR>

The terminal responds by sending the last net weight to be acquired by pressing the print key or in reponse to the remote command PR; the reply string is as follows:

n<SP><um><SP>PA<CR><LF>

10.4.20 Cancel last acquired weight

CP<CR>

10.4.21 Request division value

Xe<CR>

The terminal responds with the string:

e= n<SP><um><CR><LF>

10.4.22 Request for net weight in high resolution

YN<CR>

The reply string is:

n<SP>y<SP><um><s1><s2><s3><s4><CR><LF>

n= net weight

y= net weight in high resolution

s1,s2,s3,s4=see STATUS in extended string (*par. 10.2.2 on page 2-8*).

10.4.23 Request for maximum capacity value

XM<CR>

The reply string is:

Max= n<SP><um><CR><LF>

10.4.24 Request for net weight without unit of measurement

YP<CR>

The reply string is:

n<CR><LF>

where:

n= significant digits of weight only

This string does not include the unit of measurement and insignificant leading zeroes are not transmitted.

10.4.25 Lock keypad and display

LD<CR>

The message " *DISPLOCK* " is displayed in place of the weight and all keys are disabled.

10.4.26 Unlock keypad and display

UD<CR>

The keypad and display are re-enabled.

10.4.27 Lock keypad

LK<CR>

Only the keypad is locked and the terminal displays the message "*KEYLOCK* ".

10.4.28 Unlock keypad

UK<CR>

The keypad is unlocked.

10.4.29 Remote commands with addressing

When using the string "On request with address" or if the RS485 communication interface is selected, the remote commands described in *par. 10.4 on page 2-14* will have to include also the number of the terminal to be interrogated.

The system is comprised of one Master terminal (e.g. a PC) and a number of Slave terminals (e.g. weighing terminals).

Each weighing terminal is identified by a unique "terminal number" (see *par. 11.6.6 on page 2-35*).

In this way you can create a network of weighing terminals that can be interrogated by the Master terminal.

The syntax of the remote commands has to be modified by the addition of the two characters of the terminal number.

For example, the gross weight transmission command XB <CR> becomes XB 01 <CR> to indicate that the request from the Master terminal is addressed to the terminal with number 01.

10.5 Communication in MPP operation

10.5.1 Operation

Terminals equipped with the MPP option can operate in the four different modes described in the following paragraphs.

The operating mode used for MPP memory operation is selected during installation (*par. 11.6.5 on page 2-34*).

10.5.2 Weighing request from keypad with data transmission on completion of operation

After having enabled the MPP memory (see par. 6.6.2 on page 1-56), load the weight onto the scale, wait for weight stable signal, then

press ⊙ .

The terminal will save the weight data in memory and then transmit them:

1st character	$(24H)	
2nd character	M(4DH)	
3rd character	P(50H)	
4th-10th character		MPP identification code or scale status indications: NO<SP>STAB weight not stable NO<SP>VAL<SP> weight not valid ERRMEM<SP> weight memorisation error
11th-18th character		Weight with sign and decimal point, if present
19th-20th character	<um>	Unit of measurement
21st-22nd character	<CRC>	String check field; calculated by performing an XOR operation (exclusive OR) of all the preceding characters. The value calculated is expressed in two hexadecimal characters, e.g. if the result is 62H, the two checksum characters are "6" (36H) and "2" (32H).

The computer replies with:

✔ <ACK> if the string has arrived correctly;

✔ <NAK> if the string has not arrived correctly; in which case the terminal retransmits the data packet. After three negative replies or no reply, the terminal displays an error message.

Any characters other than <ACK> and <NAK> are interpreted as <NAK>.

✋ WARNING ✋

The ACK/NACK protocol (see par. 10.3.1 on page 2-13) is automatically enabled in MPP operation.

10.5.3 Weighing request from serial command with transmission on completion of operation

After having loaded the weight on the scale, send the memorisation and data request command via the computer:

MP<CR>

The terminal responds by communicating acceptance or otherwise of the command :

OK<CR><LF> affirmative reply;

??<CR><LF> incorrect command.

In the case of an affirmative reply, the terminal transmits the string described previously in *par. 10.5.2 on page 2-23* following the same procedure.

10.5.4 Weighing request from keypad and transmission request from serial command

After loading the weight on the scale, wait for the weight stable

indication and then press ⌷; the terminal will memorise the data. The computer may request the weight data from the terminal with the command:

MP<CR>

The weighing terminal replies:

✔ with the string described in *par. 10.5.2 on page 2-23* ;

✔ **NP<CR><LF>**

   if no weight has been memorised;

✔ **??<CR><LF>**

   if the command is incorrect.

The data may requested more than once with the command
MP<CR>.
The terminal responds with one of the following messages:
OK<CR><LF> affirmative replay;
??<CR><LF> incorrect command.

10.5.5 Weighing and transmission request from serial command

After loading the weight on the scale, send the memorisation command from the computer:
MP<CR>
The terminal responds with one of the following messages:
OK<CR><LF> affirmative reply;
??<CR><LF> incorrect command.

Once the weight validity conditions are satisfied, the terminal memorises the data.
The external computer must then transmit the data request command:
MP<CR>
The terminal responds with the string described in *par. 10.5.2 on page 2-23*   .

11. PERSONALIZATION

11.1 Foreword

✋ WARNING ✋

Personalization procedures are strictly reserved for specialised personnel only.

However, the user is permitted to modify certain of the terminal operating parameters.

We recommend that extreme care is taken when modifying these parameters to prevent possible malfunctions caused by incorrect settings.

The only parameters that may be modified are those directly related to the program installed on the terminal.

11.2 Accessing the parameter configuration function

To access non-metrological parameters only:

✔ press [>] on switching on the terminal.

11.3 Language

On entering setup, you can select the language in which you want the menu to be displayed.

After selecting the setup menu language, the following infomation is briefly displayed:

✔ program code

✔ version

✔ serial number of terminal (if other than zero, it will match the s/n (serial number) on the data plate).

11.4 Setup Menu

The personalization parameters menu is a tree structure which can be followed from the roots to the branches using the navigation keys described in par. 5.1.1 on page 1-35 .

11.4.1 Conditioned menu

During the parameter personalization procedure, the menu adapts according to the selections made. Some parameters will therefore not be displayed as they are not required in the selected configuration.

For example:

if in the Setup/Scale/Metrological Configurations/Fields menu you choose:

Field = single

the menu will not display the fields

1st field capacity

and

2nd field capacity

11.4.2 Entering numeric data

See "Entering numeric data (Editor)" in par. 5.1.2 on page 1-35 .

11.4.3 Validating input data

All data enters are validated and if they do not fall within the permitted ranges, an error message is displayed and you are asked to enter the data again.

11.4.4 NOT MODIFIABLE parameter or menu

The message "not modifiable" indicates that the parameter displayed cannot be modified if the setup menu was accessed by pressing the relative key on power up.

11.4.5 NOT AVAILABLE parameter or menu

The message "not available" indicates that the parameter will only be available in future versions.

11.5 Overview of the menu tree

The menu tree expanded to the third level is reported below. For details, refer to the specific paragraphs in this section or the installation section of the manual.

1. Scale
    1.1 Configurations
        1.1.1 Metrological
        1.1.2 General
    1.2 Analogue scale parameters
        1.2.1 Conversion rate
    1.3 Sampling
        1.3.1 Execute
        1.3.2 Display data
        1.3.3 Correction
    1.4 Test
        1.4.1 Display points
        1.4.2 Display weight
        1.4.3 Converter test

2. Personalizations
    2.1 Operating modes
        2.1.1 Terminal language
        2.1.2 Decimal separator
        2.1.3 Operation
        2.1.4 Printer
        2.1.5 MPP operation
        2.1.6 Connection to external processor
    2.2 Outputs
        2.2.1 Seriale
        2.2.2 Input/Output
        2.2.3 Analogue output

3. Terminal test
    3.1 Serial ports
        3.1.1 Serial communication ports
        3.1.2 Com01
        3.1.3 Com02
    3.2 Inputs/outputs
        3.2.1 Manual
        3.2.2 Automatic
    3.3 Keypad
    3.4 Terminal configuration report
    3.5 Analogue output
        3.5.1 Voltage calibration
        3.5.2 Current calibration
    3.6 Battery

4. Upgrade
    4.1 Upgrade via serial port
    4.2 Upgrade board

5. Maintenance
    5.1 Test report
    5.2 Reserved

11.6 Descriptions of the main menus and parameters

11.6.1 Setup/Scale/Configurations/General menu

Digital filter	**no, 4, 8, 16, 32**
	Serves to enable/disable a digital filter. Switches on or off a software filter on the output from analogue/digital converter. The higher the number, the higher the degree of filtration.
Stability signalling	**very fast, fast, slow, very slow**
	Speed at which the weight stable indication appears. This parameter is also linked to the setting of digital filter parameter.
Tare lock	Defines tare management on unloading the scale.
	no
	Any entered or acquired tares will be automatically cancelled when the scale returns to zero, i.e. when the gross weight = 0
	yes
	Any entered or acquired tares will remian in memory also when the scale is unloaded, i.e. when the gross weight = 0
Initial zero-setting	Defines the terminal operating mode on power up.
	calibrated zero
	On power up, the terminal performs the calibrated zero procedure, i.e. it indicates the weight on the scale relative to the zero value programmed during calibration.

	autozero
	On power up, the terminal performs the autozero procedure. In the case of a legal intrument, the autozero will be within a range of -5% to +15% of the full-scale value around the calibrated zero. In the case of a non-legal weighing instrument, the range is -50% to +50%.

11.6.2 Setup/Scale/Calibration/Data display

Calibration data (Zero, Full-scale, 1st intermediate point, 2nd intermediate point) are displayed both as weight values in the current unit of measurement and in internal conversion points.

11.6.3 Setup/Scale/Test

Display points	displays internal converter points
Display weight	displays the weight currently present on the scale. On pressing the High Res. key, the display switches to high resolution for 5 seconds. On com2, cyclic transmission of the string containing the weight in high resolution is enabled with the protocol 9600 8-N-1.
Converter test	on inserting the optional accessory board 404031, the test 0..20000div. is performed
temperature (*)	load cell temperature in °C
excitation (*)	excitation voltage at load cell input
angular coefficient cell n (*)	correction coefficient for cell n
serial number of cell n (*)	indicates the serial number of the load cell n

(*) With digital load cells only.

11.6.4 Setup/Personalizations/Operating modes

Terminal language	**Italian, English, Français, Deutsch, Español, Portugues**
	The language used during normal operation (may differ from the menu display language)
Decimal separator	**Point, Comma**
Operation	Standard, Sum weighing, Unloading extraction, Loading extraction (see par. 5.3 on page 1-40)
Printer	**NO, Com2**
	Serves to configure a serial port for connection of a printer in text mode.
MPP operation	See par. 6.6.2 on page 1-56
Connection to external processor	This function is to be used in conjunction with the personalization program supplied by the Manufacturer.

11.6.5 Setup/Personalizations/Operating modes/MPP operation

Weighing request	**from keypad, from serial command**
Data transmission	**at end of weighing, from serial command**
PC commun. port	**NO, com1**
	if you select NO, it will not be possible to enable MPP operation
Memorise tare	**YES, NO**

11.6.6 Setup/Personalizations/Outputs/Serial/Com xy

Com xy	string, not utilised
string	Extended, Cb, Visual, Idea, Cma, On request with address
terminal number	editor
protocol	Cyclic, On request, Ack-Nak, Remote commands
Configuration	For the hardware characteristics of the serial port see *par. 11.6.7 on page 2-36*

11.6.7 Setup / Personalizations / Outputs / Serial / String /.../ Com xy configuration

After having selected the string type, you access the menu for configuration of the hardware characteristics of the serial port, which contains the following parameters

Baud rate	**600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200**
	serial line transmission rate
Number of bits	**7, 8**
Number of stop bits	**1, 2**
Parity	**Even, Odd, None**
Communication interface	**rs232, rs422, rs485**
Serial com check	**Hardware, Software, None**
	Hardware : uses the CTS and RTS signals. The CTS input signal must be set to +12V to enable transmission on the TX pin. The terminal sets the RTS output to +12V to signal that it is ready to receive. Software : transmission of the character <XON>(11H) enables transmission; <XOFF>(13H) suspends transmission.

11.6.8 Setup/Personalizations/Outputs/Input-Output

status at rest	Norm. open (normally open)
	Norm. closed (normally closed)
operation (input)	Disab. (disabled)
	Zero-set scale
	Acquire tare
	Cancel tare
	Acq./Canc. tare (acquire/cancel tare)
	print weight
	Disab. weigh (disables weighing)
	Transmit (executes a transmission)
	Disab. sett. (disables settings)
operation (output)	Disab. (disabled)
	Set point
	Range
	Set point E
	Range E
	Print ok
	Transmiss. ok (transmission ok)

11.6.9 Setup/Personalizations/Outputs/Analogue output

Output data	Gross, Net
Output type	Voltage 0-10 V Current 0-20 mA Current 4-20 mA

11.6.10 Setup/Personalizations/Outputs/BCD

updating time	editor
	expresses updating time of the port in hundreths of a second
data not valid time	editor
	expresses time in ms
Status	high, low
	Select active status of DATA VALID
negative	HIGH, LOW
output data	GROSS, NET
terminal number	editor
	The outputs assume tree-state when the terminal cannot be selected. To select the terminal number n, set the CALC0...5 inouts to positive logic. See also par. 6.3 on page 1-49.

11.7 Test procedures

To access the terminal functionality tests, press ▷ on power and follow the pathway:

select language>Terminal Tests>select test

11.7.1 Terminal Tests/Serial Ports

✔ Connect the "blind" connector to the ports.
The term "blind" connector denotes a connector that connects the inputs to the outputs.
For RS232, TX with RX and CTS withRTS.
For RS422, TX+ with RX+, TX- with RX-.
(See figs 3.4 on page 1-22, 3.5 on page 1-23, 3.6 on page 1-24)

11.7.2 Terminal Tests/Inputs-Outputs

As in the serial port tests, you will need to prepare blind connectors that connect the inputs directly to the outputs of the same number.
For example, connect input 01 with output 01. For these connections refer to Fig. 3.9 on page 1-27 and Fig. 6.2 on page 1-46.

11.7.3 Terminal Tests/Keypad

Follow the instructions given on the display.

11.7.4 Terminal Tests/Terminal Configuration Report

Connect a printer to the COM2 serial port with the fixed configuration 9600,8,N,1.
The printer will print the terminal configuration report.

11.7.5 Terminal Tests/Analogue output

To calibrate the output voltage, connect a teste with 10V capacity to the terminals. Adjust the output using the keys indicated on the

display to obtain a voltage reading between 0 and 10V.
To calibrate the output current, proceed in the same way using an ammeter.

11.7.6 Terminal Tests/Battery

Indicates the voltage of the internal lithium battery.

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