

WE420 USER MANUAL



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NETIX



Safety information

- *Do not use WE420 near medical equipment without requesting permission. The device may affect the operation of cardiac pacemakers, hearing aids and other implanted equipments.*
- *WE420 cannot be used inside aircrafts and airplanes.*
- *Do not use WE420 in an area where a potentially explosive atmosphere exists.*
- *WE420 could interfere with PC, TV or other electronic equipment if used close to these devices.*



SIM card information

- *To be fully functional the WE420 requires a SIM card, not included with the product. The SIM card must be enabled for SMS messaging and data communication over the GSM network. The user must ensure that the chosen network provides the necessary communication services.*
- *The product has been tested with many different SIM cards of the most important italian GSM/GPRS operators. Because of the wide range of different SIM cards available on the market there is no guarantee that the product will function properly with every SIM card. In case of doubt please contact Nethix for support.*



1

Overview

WE420 is a dual band (900/1800 Mhz) GSM/GPRS MODEM with advanced features for remote control and monitoring, that allows both the standard data communication over the GSM/GPRS network and the remote activation of electronic devices and systems. WE420 is designed to be integrated into M2M (machine-to-machine or man-to-machine) communications and remote datalogging applications.

- ▶ *Relay outputs and digital/analog inputs can be set and read sending a SMS with a standard GSM cell phone.*
- ▶ *WE420 can send a SMS to one or more registered users every time an input changes state or crosses a preset threshold.*
- ▶ *The outputs can also be remotely activated with just a voice call (ring) at no cost from a mobile or fixed phone.*
- ▶ *As a GPRS datalogger the WE420 is capable to store sampled analog data and send them to an HTTP server with a GPRS data connection.*

WE420 can be easily configured with SMS messages. Thanks to its flexibility WE420 can be used in several industrial and home applications.

This document contains the technical information required for installation and use of the WE420. Please read this manual thoroughly before use, and keep it handy for future reference. The information in this manual is subject to change without information. This document is provided "as is" without any warranty of any kind, either express or implied, including any implied warranties of merchantability or fitness for a particular purpose.

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Features

GSM/GPRS Modem

The product includes a standard and full featured GSM/GPRS modem that can be used for the following applications:

- ▶ sending and receiving SMS messages
- ▶ CSD and GPRS data communication
- ▶ caller ID

The modem functions are implemented by issuing standard AT commands over its RS232 serial port. The AT Commands programming manual is available upon request.

GSM/SMS remote control

WE420 is a wireless remote control device based on SMS messaging. It can be configured both with SMS and from a command line interpreter available at the RS232 input port.

Through proper configuration the device can be effectively operated in all its modes of use. The user can:

- ▶ define the behaviour of the output relays: level mode (normally open or normally close) or pulse mode (pulse to close or pulse to open)
- ▶ define the active state of all digital inputs: normally open or normally close
- ▶ control outputs with a SMS message

-
- ▶ activate outputs with voice call (or “ring”)
 - ▶ program the device to send an unsolicited SMS message when a digital input changes its state or an analog signal crosses a preset threshold
 - ▶ read the status of all digital and analog input/outputs with a SMS
 - ▶ periodically receive a SMS with the counting value of the inputs programmed as “counters”
 - ▶ use the device as a “remote controlled thermostat” in heating or air conditioning systems
 - ▶ restrict the use of the device to registered use only, thanks to an internal list of authorized users and to “caller ID” feature
 - ▶ use of passwords for both programming and use of the device
 - ▶ give a unique name to every WE420 to recognize it in a multi device application.

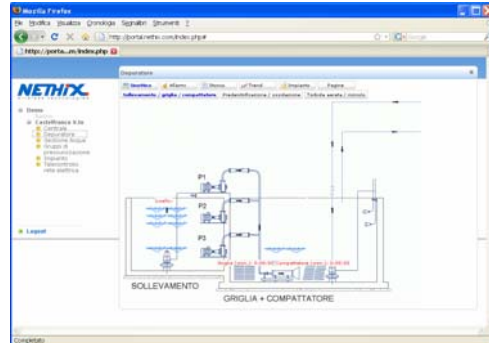
GPRS datalogger

The main feature of the WE420 device, that makes it different from other similar products available on the market today, is the capability to operate in datalogger mode, storing the sampled data inside its non-volatile memory and forwarding them to an HTTP server through a GPRS data connection.

Sample data are store inside a “circular buffer” that may contain more than 10.000 records. For very intensive datalogging application the WE420 can also store sampled data in a common USB memory stick, using the optional memory expander XM100.

The data connection can be “always-on” or “on-request”, depending on the application, and uses standard HTTP protocols that can easily be implemented in every WEB server.

Customer's application can also be hosted in NETHIX portal portal.nethix.com on request. Please contact Nethix at support@nethix.com for more information.



For further detail about **DATALOGGING** and **WEB/HTTP PORTAL** programming and use, please read the manuals provided.

I/O expansion

Several I/O expanders are optionally available, that can be connected to the WE420 through a MODBUS based RS485 network. All expanded inputs and outputs are operated exactly as those included in the WE420 device.

I/O expanders available include:

- ▶ 16 optoisolated digital inputs
- ▶ 6 optoisolated digital inputs and 6 relay output
- ▶ 4 analog inputs
- ▶ 4 temperature inputs (PT100/NTC/KTY81)

Diagnostics and firmware upgrade

Diagnostic features are implemented by the device:

- ▶ A SMS message can be automatically sent at device startup. This feature can be used to monitor supply shortouts.
- ▶ A SMS can be sent periodically to one or more registered users (keepalive).
- ▶ The device can read and send to the user the GSM field strength.

The firmware of the device can be easily upgraded.



See our web site www.nethix.com for firmware upgrades availability.

Applications

WE420 can be used in a wide range of applications, including:

- ▶ Home automation
- ▶ Heating and air-conditioning systems
- ▶ Remote control of plants
- ▶ M2M applications
- ▶ Wireless meter reading
- ▶ Data acquisition
- ▶ Water treatment plants
- ▶ Remote pump control
- ▶ Cathodic protection
- ▶ Access control
- ▶ Remote diagnostics
- ▶ SMS gate opening systems
- ▶ Remote datalogging (WEB, GPRS and HTTP)

... and more.

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Technical Data

General

- ▶ Embedded Dual band GSM900/1800 Mhz Modem
- ▶ Embedded SIM card reader
- ▶ GSM Antenna
- ▶ DIN rail mounting
- ▶ Approx. Weight 300 g.
- ▶ Size 157x86x58 mm
- ▶ Temperature range -15°C +50°C
- ▶ Humidity 95%
- ▶ Storage temperature -40°C +85°C

Electrical

- ▶ Supply 9-32VDC/12-24VAC
- ▶ Power consumption:
 - Average 200mA
 - TX peaks 400mA
 - TX peak average 2A
- ▶ N. 8 isolated digital inputs
 - Normal mode (ON/OFF)
 - Counter mode
 - Totalizer mode
- ▶ N. 4 analog inputs (factory presettable)
 - 0÷5V / 0÷10V / 0÷20mA / PTC/NTC
- ▶ N. 4 analog integrators
- ▶ N. 8 relay output 1A 24V

-
- ▶ N. 2 RS232 serial ports
 - Tx, Rx, Gnd, female DB9 connector
 - Tx, Rx, Gnd, terminal block
 - ▶ N.1 RS485 serial port
 - ▶ Output power: Class 4 (2W) GSM900
 - ▶ Output power: Class 1 (1W) GSM1900
 - ▶ GSM RX sensitivity: better than -102 dBm
 - ▶ GPRS multi-slot class 10
 - ▶ Real Time clock
 - ▶ Ethernet interface (optional)


GSM services


- ▶ RING
- ▶ SMS
- ▶ CSD
- ▶ GPRS



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
+	-	GND	A	B	GND	Tx	Rx	GND	AO1	AO2																
Power		Rs485			Rs232 B			Analog Output			RL1	RL2	RL3	RL4	RL5	RL6	RL7	RL8								


P	S	1	2	3	4	5	CD	Tx	Rx	MB	I	1	2	3	4	5	6	7	8
Status							Comm					Digital I/O Status							





WE 420




Analog Input										Digital Input									
AI1	GND	AI2	GND	AI3	GND	AI4	GND	C		1	2	3	4	5	6	7	8	C	
28	29	30	31	32	33	34	35	36		37	38	39	40	41	42	43	44	45	

LAN  **Rs232 A**

Terminal	Description
1.	Supply, DC positive (+) or AC
2.	Supply, DC negative (-) or AC
3.	RS485 common/ground
4.	RS485 A (+)
5.	RS485 B (-)
6.	RS232 common/ground
7.	RS232 TX
8.	RS232 RX
9.	Analog output common/ground
10.	Analog output 1 (not available)
11.	Analog output 2 (not available)
12.	Relay n. 1 output
13.	Relay n. 1 output
14.	Relay n. 2 output
15.	Relay n. 2 output
16.	Relay n. 3 output
17.	Relay n. 3 output
18.	Relay n. 4 output
19.	Relay n. 4 output
20.	Relay n. 5 output
21.	Relay n. 5 output
22.	Relay n. 6 output
23.	Relay n. 6 output
24.	Relay n. 7 output
25.	Relay n. 7 output
26.	Relay n. 8 output
27.	Relay n. 8 output

28.	Analog input AI1 -
29.	Analog input AI1+
30.	Analog input AI2 -
31.	Analog input AI2+
32.	Analog input AI3 -
33.	Analog input AI3+
34.	Analog input AI4 -
35.	Analog input AI4+
36.	Digital inputs common
37.	Digital input n. 1
38.	Digital input n. 2
39.	Digital input n. 3
40.	Digital input n. 4
41.	Digital input n. 5
42.	Digital input n. 6
43.	Digital input n. 7
44.	Digital input n. 8
45.	Digital inputs common

Electrical connections

Power supply	<p>WE420 can be powered with a DC or an AC supply.</p> <ul style="list-style-type: none">▶ Range DC: 10 - 32 V =▶ Range AC: 12 - 24 V ≈
Analog inputs	<p>Analog inputs can be factory preset in one of 4 different modes:</p> <ul style="list-style-type: none">▶ 0-20mA▶ 0-5 V▶ 0-10V▶ PTC/NTC <p> Please note <i>Analog inputs configuration have to be specified when ordering the device.</i></p>
Digital inputs	<p>“Dry contact” compatible low voltage digital inputs.</p> <p> Warning <i>The digital inputs are designed to be operated in low voltage circuits. Avoid direct connection to 230VAC mains.</i></p>
Relay output	<p>Contact rating: 1A @ 24V.</p> <p> Warning <i>The digital outputs are designed to be operated in low voltage circuits. Avoid direct connection to 230VAC mains.</i></p>
Serial ports	<p>PIN OUT RS232 – DB9F connector</p> <ul style="list-style-type: none">▶ Pin 2 - RX▶ Pin 3 - TX▶ Pin 5 - GND

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Installation and setup

Scope of delivery

- ▶ WE420 - wireless remote control device
- ▶ GSM Dual Band antenna
- ▶ User manual
- ▶ Networking & Datalogging Manual

A proper power supply is required to operate the device (for example: NETHIX PS100 24VDC 500mA output). A SIM card enabled to SMS messaging and data connection over the GSM and GPRS network is also required.

Installation

- ▶ Insert the SIM card in the card holder as described in the following.
- ▶ Mount the device on a standard DIN rail, paying attention to the accessibility of SIM card. Also, be sure that GSM network is available with sufficient signal strength (verify with a mobile phone).
- ▶ Connect to the "Digital input" terminals a "dry" contact, like a relay, a switch or similar. Do not connect live voltages in order not to damage WE420.
- ▶ Connect to the "RL" terminals the load that has to be activated/controlled (warning – low voltage only – max 24V) by the WE420.

-
- ▶ Connect analog signals to the AI1, AI2, AI3, AI4 terminals.
 - ▶ Connect to the + and – terminals the required power source.
 - ▶ Insert the GSM antenna included in the delivery.

Using a SIM Card

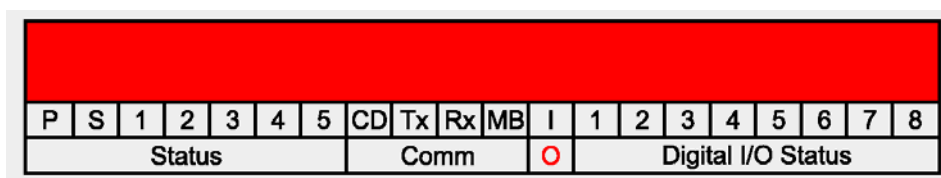
- ▶ Insert the SIM Card to be used for the WE420 into a GSM mobile phone in order to disable the PIN code.
- ▶ No further operation is required for the SIM card. It's not necessary to add users to the SIM phonebook as the WE420 can manage them automatically.
- ▶ Insert the SIM card into the WE420. The cut corner of the card has to be positioned to the upper right, as shown below.



CAUTION – When handling SIM cards use proper precautions to avoid electrostatic discharges.

Switching on the WE420

- ▶ Be sure that the WE420 is properly connected as described above.
- ▶ Supply the system.
- ▶ Switch on the WE420.
- ▶ The device needs some time for initialization. During this phase the STATUS (S) and POWER (P) LEDs blink. All the LEDs of the status bar switch on sequentially as initialization progresses, then the GSM signal level is shown.



Warning – Always be sure that the GSM signal strength is sufficient for proper device operation of the device

After the startup and initialization phase has completed, the STATUS (S) and POWER (P) LEDs keep on blinking to show normal system activity while the status bar LEDs show the status of the digital inputs and outputs.

It is now possible to interact with the device through SMS or command line as described in the following chapter

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Configuration and use

Configuring the device

The WE420 can be configured and programmed sending commands and parameters using one of two available modes:

- ▶ Through SMS messages sent from a mobile phone, with the commands and parameters required. The device will send back replies and/or acknowledge messages after command execution.
- ▶ With a personal computer and a RS232 terminal program (for example "Hyperterminal", available in every Windows operating system). A programming and configuration software, called "Genesys", is also available. Please contact Nethix for more information and refer to the software user manual.

How to program the device with SMS

The command required has to be typed as a standard SMS message, followed by its parameters. Commands and parameters must be separated by spaces. Maximum message length is 160 characters spaces included.

As an example, the following SMS:

```
THERM 1 ON 22
```

can be sent to the device to activate the "thermostat" mode using the first analog input to measure room temperature and setting the thermostat threshold to 22°C.

How to program the device with a computer

To program the device with a computer:

- ▶ Connect the WE420 to a COM port using a RS232 serial cable DB9M/DB9F
- ▶ Start the terminal program, for example "Hyperterminal.exe" in Windows systems
- ▶ Set communication parameters to 9600,N,8,1
- ▶ Type "COMMAND" at the terminal, a command prompt "CMD:" will show up
- ▶ Type one or more commands, as required, each followed by its parameters and terminated with ENTER key
- ▶ To quit the command mode and go back to standard device operation, press the ESC key.

Note – The WE420 automatically goes back to standard operation after 30 seconds from the last command sent.

Example session – SMS

This example shows a typical configuration session that can help to familiarize with the device. All the available commands are explained in the following sections of this manual.

The text has to be sent with an SMS to the SIM card inserted into the WE420.

- ▶ Clear the device's memory and restore the factory settings ("0000" is the default password at first startup):

```
DEFAULT 0000
```

- ▶ Set the SMS Service Center number (Vodafone-Italy in the following example). Contact operator for information.

```
CENTER 0000 +393492000200
```

- ▶ Add a new “administrator” user that will receive unsolicited messages and alarms sent from the device

```
ADD 0000 +3493213213 Admin 3 1
```

The WE420 is now configured and ready for normal use. Send the following commands from the administrator number to verify proper operation.

- ▶ Send the following message to close relay n. 1. See the status leds changing.

```
ON 1
```

- ▶ Send the following message to open relay n. 1. See the status leds changing.

```
OFF 1
```

- ▶ Read WE420 status. The device sends an SMS with all I/O status information.

```
STAT
```

- ▶ Request the users list. The device replies sending a SMS including the requested information.

```
USERS
```

Example session – Hyperterminal

The following figure shows a similar sample session with Hyperterminal.

```
COM3_9600 - HyperTerminal
File Modifica Visualizza Chiama Trasferimento ?
[Icons]

CMD:ADD 0000 +3934912312312 ADMIN 3 1

CMD:USERS
Tel:+3934912312312 Name:ADMIN Lev:3 Serv:10 Loop:0

CMD:STAT
DI1: Off
DI2: Off
DI3: Off
DI4: Off
D01: Off
D02: Off
AI1: 0
AI2: 0

CMD:

Connesso a 0.00.46 ANSIW 9600 8-N-1 SCORR MAIUSC NUM Acquisisci Eco star
```

How to configure and use I/O expansions

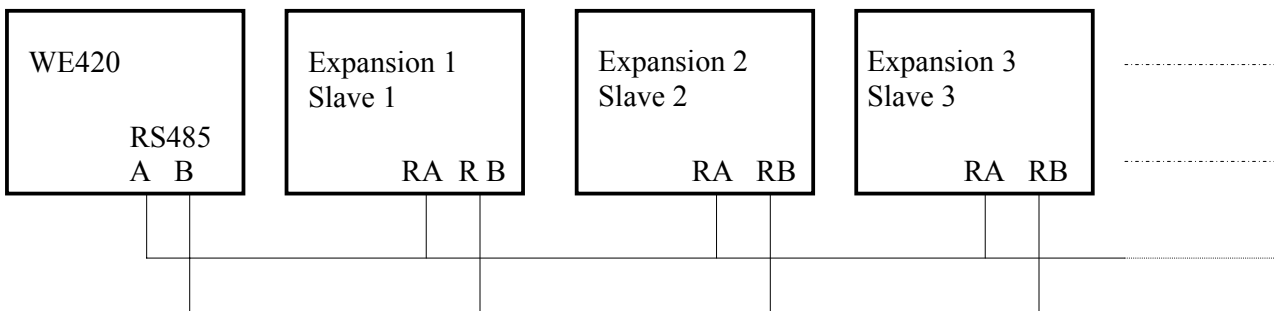
The I/O space of the device can be expanded up to:

- 64 digital inputs
- 64 relay outputs
- 48 analog inputs

using the I/O expanders that can be optionally connected to the RS485 bus.

P/N	Type	Description
90.10.004	16DI	16 optoisolated digital inputs
90.10.005	8DO	8 relay outputs
90.10.006	8DI4DO	8 digital inputs and 4 relay outputs
90.10.007	16DO	16 relay outputs
90.10.008	4AI	4 analog inputs 0-10V 10 bit
90.10.009	4SOND	4 temperature inputs NTC/PTC/Pt100

WE420 behaves as a modbus master over RS485. I/O expanders are modbus slaves with an address that has to be properly configured. The connection of the slaves to the bus must be done with a shielded twisted pair for optimum noise immunity, as shown below. The RS485 bus must also be properly terminated at the ends. Please refer to the I/O expanders user manuals.



To register a new I/O expansion to the WE420 use the command EXPADD. To delete all I/O expansions use the command EXPDEL. See the following sections for all the details about the commands.

Device reset

The factory settings can be restored with the following procedure. All users, numbers, messages and configuration stored in the device memory will be permanently erased.

- ▶ Switch off WE420
- ▶ Remove the SIM Card e insert it into a mobile phone
- ▶ Remove all telephone numbers from the SIM phonebook and

-
- ▶ add just one entry with the name "DEFAULT"
 - ▶ Insert the SIM card into the WE420 and switch on the system. The device will be restored to the factory settings.

Firmware update

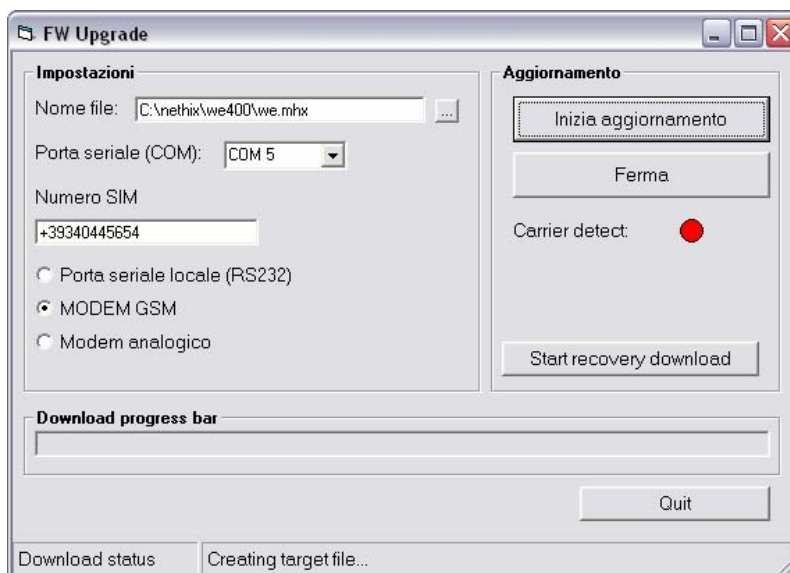
- ▶ Install the software "WeLoader.exe" provided by Nethix upon request.
- ▶ Copy the file "WE420.mhx" (the name may be different) on the same folder containing "weloader.exe"
- ▶ Switch off power supply to the WE420 and connect it to a PC serial port. Use of standard RS232 serial ports is recommended. The upgrade is not guaranteed to function properly with USB to serial converters.
- ▶ Launch "WeLoader.exe".
- ▶ Select the serial port to be used. Select the proper kind of device (WE420, WE400 o WE20).
- ▶ Press "Browse" and select the file "WE420.mhx".
- ▶ Press "Start download" to start the update process.
- ▶ Wait for the message "Waiting device power supply..." before switching on the device.
- ▶ Wait for upgrade completion.



Remote firmware update

The device can also be upgraded from a remote site using a GSM/CSD data connection. Please note that the update process can take several minutes. A strong GSM signal and a reliable network connection is required for the update to succeed.

- ▶ Install the software “RemoteLoader.exe” , provided by NETHIX upon request.
- ▶ Copy the file “WE420.mhx” (the name may be different) on the same folder containing “RemoteLoader.exe”
- ▶ Launch “RemoteLoader.exe”.
- ▶ Select the serial port to be used. A modem must be attached to the same serial port.
- ▶ Input the phone number of the SIM used in the WE420 to be upgraded.
- ▶ Select the file “WE420.mhx” (or equivalent).
- ▶ Press “Start Update”.



NOTE - The update process can be aborted if the GSM connection is unstable or with insufficient signal strength. In such a case the process can be repeated after some time starting with the “Start Recovery Download” button. Please note that the device may remain inoperative when an update is aborted.

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Command description

Status and configuration

Command	Description
STAT	Send the status of the device
CONFIG	Send the device configuration
VERSION	Read hardware and firmware versions
NAME	Set the device name
NUMBER	Set the device telephone number
PIN	Set the PIN for the SIM card
PASSWORD	Change administrator password
ALARM	Enable/disable sending of alarms on input change
RESETALARM	Enable/disable sending of periodic alarms
CONFIRM	Enable confirm messages
HELP	Send the command list

User Management

Command	Description
USERS	Send the list of registered users
ADD	Add a new registered user
DELETE	Delete a user
ALL	Allow all users/numbers to access and program the device
PROPERTIES	Read user properties

Analog inputs

Command	Description
CONF AI	Configure analog inputs
ALARMAI	Enable/disable analog inputs alarms
STAT AI	Read analog inputs status
CONF INT	Configure analog integrators
INTEGRAL	Read analog integrators

Thermostat

Command	Description
SETTHERM	Configure thermostat mode
THERM	Enable/disable thermostat
MESSTHERM	Configure a message related to thermostat
STATTHERM	Read thermostat status

Digital inputs

Command	Description
CONF DI	Configure digital inputs
ALARMDI	Enable/disable digital inputs alarms
STAT DI	Read digital inputs status
COUNTER	Enable counter mode
START	Start counter
STOP	Stop counter
TOTALIZER	Configure totalizers
DIFFERENCE	Configure differentiators
TIME DI	Read total on-time of inputs

Digital outputs

Command	Description
CONF DO	Configure digital outputs
ON	Switch on outputs
OFF	Switch off outputs
SET	Switch on outputs
RESET	Switch off outputs
ONRING	Enable outputs with a voice call ("ring")
TIME DO	Read total on-time of outputs

I/O Expansion

Command	Description
EXPADD	Add I/O expander
EXPDEL	Delete all I/O expanders

Diagnostics

Command	Description
LOOP	Send periodically the I/O status
RING	Enable status sending with a voice call ("ring")
SIGNAL	Read GSM signal strenght
BOOT	Send device status at startup

Advanced Commands

Command	Description
SETPORT	Set serial port communication parameters
MODEMONLY	Disable all remote control functions
RUN	Run a command after alarm occurred
DEFAULT	Restore factory defaults
TIMEDATE	Read/Set system clock

Configuration and status

STAT <I/O type> <I/O number>

<I/O type>	DI (digital input), DO (digital output) or AI (analog input) [optional]
------------	--

<I/O number>	Number of the input/output selected [optional]
--------------	---

Send the status of all the device's I/O (digital inputs, relay outputs, analog inputs) or the status of the selected I/O channels

Example:

```
CMD: STAT
ALARM:OFF DI3:Off DI4:Off MOTOR:ON
D02:On TEMPERATURE:-1,0 C LEVEL:0,0 M
```

```
CMD: STAT DI
ALARM:OFF DI3:Off DI4:Off
```

```
CMD: STAT AI 1
TEMPERATURE:9,5 C
```

NAME <password> <name>

Give a name to the WE420. The name will appear at the top of every alarm or status message sent by the device.

<password>	Administrator password
------------	------------------------

<name>	The name assigned to the device
--------	---------------------------------

Example:

```
CMD:name 0000 CITY1
```

Give the name "CITY1" to the WE420.

NUMBER <password> <tel. nr.>

Store the telephone number of the SIM used

<password>	Administrator password
------------	------------------------

<tel. nr.>	Telephone number of the WE420 SIM card
------------	--

Example:

```
CMD:number 0000 +393491234567
```

CONFIG

Show the device configuration

Example::

Example:

CMD:config

Number: PIN: SMS Center.:

Alarm:1 Confirm:0 Users:1

AI:4 DI:8 DO:8

ESP: 0

DI0 DI1 m=2 0 1 dH=0 dL=0 al=00

DI1 DI2 m=0 Off On dH=0 dL=0 al=00

DI2 DI3 m=2 0 1 dH=2 dL=3 al=03

DI3 DI4 m=0 Off On dH=0 dL=0 al=00

DI4 DI5 m=2 0 1 dH=0 dL=0 al=00

DI5 DI6 m=0 Off On dH=0 dL=0 al=00

DI6 DI7 m=2 0 1 dH=2 dL=3 al=03

DI7 DI8 m=0 Off On dH=0 dL=0 al=00

DO0 DO1 m=0 Off On act=0 delay=0

DO1 DO2 m=0 Off On act=0 delay=0

DO2 DO3 m=0 Off On act=0 delay=0

DO3 DO4 m=0 Off On act=0 delay=0

DO4 DO5 m=0 Off On act=0 delay=0

DO5 DO6 m=0 Off On act=0 delay=0

DO6 DO7 m=0 Off On act=0 delay=0

DO7 DO8 m=0 Off On act=0 delay=0

AN0 AI1 min=0 max=1024 dec=0 um: alrm1=0 alrm2=0 del1=0 del2=0 al:00 in:0 out:0

AN1 AI2 min=0 max=1024 dec=0 um: alrm1=0 alrm2=0 del1=0 del2=0 al:00 in:2 out:1

AN2 AI3 min=0 max=1024 dec=0 um: alrm1=0 alrm2=0 del1=0 del2=0 al:00 in:0 out:0

AN3 AI4 min=0 max=1024 dec=0 um: alrm1=0 alrm2=0 del1=0 del2=0 al:00 in:0 out:0

LEGEND:

m : mode – dH : delay to send alarm "high" – dL : delay to send alarm "low"

min : minimum value – max : maximum value

dec : number of decimal digits – um : unit of measure

alrm1 : enable alarme1 - del1 : delay to send alarm 1

alrm2 : enable alarme2 - del2 : delay to send alarm 2

VERSION

Show hardware and firmware version numbers

Example:

CMD:version

Version Fw:1.0.5 Hw:1.0

PIN <password> <PIN>

Set the PIN number of the SIM card used

<PIN>

PIN code of SIM card

Example:

CMD:pin 0000 1234

PASSWORD <old password> <new password>

Change the administrator password

< old password>

Administrator password

< new password>

New administrator password

Example:

CMD:password 0000 1234

ALARM <password> <ON/OFF>

Globally enable/disable sending of alarm messages

<password>

Administrator password

<ON/OFF>

Enable/disable

Example

CMD: ALARM 0000 ON

RESETALARM <password> <ON/OFF> <period>

Resend alarm messages every <period> seconds if alarm active

<password>

Administrator password

<ON/OFF>

Enable/disable

<period>

Delay for resetting alarms, in seconds

Example:

CMD: Resetalarm 0000 on 60

Send alarm messages every 60 seconds (if alarms still active)

CMD:Resetalarm 0000 off

Disable alarm reset

CONFIRM <password> <ON/OFF>

Send back a confirmation message every time the WE420 receives a command

<password>	Administrator password
------------	------------------------

<ON/OFF>	Enable/disable
----------	----------------

Example:

```
CMD:confirm 0000 on  
COMMAND [CONFIRM] EXECUTED  
Enable confirm message.
```

HELP

List all the available commands

Example:

```
CMD:help
```

<command list follows...>

User management

USERS

Send the list of all the users stored inside WE420. This command is available only for administrators

Example:

```
CMD:users
```

```
Tel:+393331234567 Name:USER1 Lev:3
```

```
Tel:+393359876543 Name:ADMINISTRATOR Lev:3
```

```
Tel:+39XXXXXXXXXX Name:SUPERVISOR Lev:2
```

ADD <password> <tel.number> <user name> <level> <alarms> <enable>

Add a new user. The user list can contain up to 30 registered users.

<password>	Administrator password
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<tel.number>	User telephone number
--------------	-----------------------

<user name>	User name
-------------	-----------

<level>	User level 3: administrator 2: standard user 1: "read only" user
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<alarms>	Alarm mode 0: no alarm 1: notify alarms through SMS 2: notify alarms through voice call (ring) 3: notify alarms through SMS and voice call (ring)
<enable>	List of the I/O enabled for the specified user. For example: DI1,2,5 DO1 AI2

Example:

CMD:add 0000 +393331111111 Admin 3 3

Store a new user called "Admin" as administrator (all I/O has been automatically enabled for this user). The user receives the alarms through SMS and voice calls.

CMD:add 0000 +39333888888888 User2 2 1 DI1,3

Insert a new user called "User2" as a standard user. This user receives the alarms through SMS, and has the capability to control DI1 and DI3.

CMD:users

```
+393331234567 USER1 3 1
+393359876543 ADMINISTRATOR 3 0
+39XXXXXXXXXX SUPERVISOR 2 3
+393331234567 USER2 2 2
```

DELETE <password> <user name / tel. number>

Delete an entry from the users list

<password>	Administrator password
<user name / tel. number>	Name or telephone number of the user to delete from the list

Example:

CMD:delete 0000 supervisor

Delete "supervisor" user

CMD:delete 0000 +39333888888888

Delete user with tel. no. +39333888888888

CMD:users

```
+393331234567 USER1 3
+393359876543 ADMINISTRATOR 3
+393331111111 ADMIN 3
```

PROPERTIES <password> <user name / tel. number >

Send back a list containing all the inputs/outputs enabled for the user specified

<password>	Administrator password
<user name / tel. number>	Name or telephone number of the user

Example:

PROPERTIES 0000 Mario

Send the list of the input and outputs enabled for the user "Mario"

ALL <password> <ON/OFF>

Allow every user or every telephone number to configure and program the device, even if not included in the registered users list.

<password>	Administrator password
------------	------------------------

Example:

CMD:ALL 0000 ON

Everybody is allowed to configure and control the device.

CMD:ALL 0000 OFF

Only registered users, included in the user list, can send and receive SMS messages to/from the device

Analog inputs

CONF AI <password> <n> <label> <min> <max> <decimals> <UM>

<password>	Administrator password
<n>	Number of the analog input
<label>	Name to assign to the selected analog input
<range min>	Minimum value, i.e. the value that corresponds to 0V or 0mA at the input – Insert a value without decimal point
<range max>	Maximum value, i.e. the value that corresponds to full scale (5V/10V or 20mA) at the input- Insert a value without decimal point
<decimals>	Number of decimal places to consider
<UM>	Unit of measure

Example:

CMD: conf ai 0000 1 level 0 1000 1 cm

Set analog input 1, named "level", ranging from 0 to 1000 cm., with 1 decimal digit.

CMD: conf ai 0000 2 temp -2000 10000 2 C

Set analog input 2, named "temp" with a range between -20,00 and 100,00 °C.

STAT AI <n>

Read status of selected analog input, or all analog inputs if no input channel specified.

<n>	Analog input number (optional)
-----	--------------------------------

Example:

CMD: stat ai

AI:345 AI2:23,00

CMD: stat ai 2

AI2:23,00

ALARMAI <password> <n> <A/B> <value> <H/L> <delay> <out> <mode> <message>

Set an alarm on specified AI

<password>	Administrator password
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<n>	Analog input number
-----	---------------------

<A/B>	Two alarms can be set for every analog input: A (first alarm) and B (second alarm)
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<value>	Value of the alarm threshold
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<H/L>	H if alarm has to occur when AI is above the threshold L if alarm has to occur when AI is below the threshold
-------	--

<delay>	Delay in seconds after which the alarm is send through SMS
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<out>	Digital output to activate in case of alarm 0: none 1: DO1 2: DO2 n: DOn for output n, included I/O expansions
-------	--

<mode>	1: turn on the input 2: turn off the input 3: turn on when alarm condition met, off if not met
--------	--

<message>	Text for the alarm SMS
-----------	------------------------

Example:

CMD:alarm ai 0000 1 A 500 H 5 1 3 Hi value alarm

Set the first alarm (A) on AI1, when its value goes above 50.0 for at least 5 seconds.

CMD:alarm ai 0000 1 B 100 L 15 0 1 Normal value

Set the second alarm (B) on AI1, when its value goes lower than 10.0 for at least 15 seconds. No output is affected.

CONF INT <password> <n> <period> <UM>

<password>	Administrator password
<n>	Analog input number
<period>	Integration period in seconds (max. 4000) - for example, integrating "liters/minute" with a period of 60 seconds, the integral will be computed in "liters" - similarly, when integrating "liters/hour" with a period of 3600 seconds, the integral will be computed in "liters"
<UM>	Unit of measure

Example:

CMD:conf ai 0000 4 water 0 1000 l/min

Set analog input 4 with name "water" in the range from 0 to 1000 liters per minute

CMD:conf int 0000 4 60 liters

Enable integrator on input 4 with a period of 60 seconds. The output value will be in "liters".

INTEGRAL <n/name>

Read the computed integral value for the specified input

<n/name>	Name or number of the analog input
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Example:

CMD:integral 4

INTEGRAL Power: 151 KW

Please note:

- The integral value is computed once per second.
- For proper operation and to avoid loss of computed data on long term acquisition the unit must be operated with a battery backup supply.

Thermostat

SETTHERM <password> <n> <label> <min> <max> <thr> <out> <input>

Configure an analog input for the thermostat feature

<password>	Administrator password
<n>	Analog input number
<label>	Name assigned to the thermostat
<range min>	Minimum value – specify with decimal digits but without decimal point
<range max>	Minimum value – specify with decimal digits but without decimal point
<thr>	Threshold value for thermostat operation
<out>	Digital output selected
<input>	Digital input that allows local disable of thermostat feature

Example:

CMD:SETTHERM 0000 1 HOME 700 -80 200 1 1

Set AI1 as a thermostat named "HOME" ranging between -8 and 70 °C, with a threshold at 20 °C. The thermostat may be disabled through input 1.

CMD:SETTHERM 0000 2 BEDROOM 700 -80 190 1 3

Set AI2 as a thermostat named "BEDROOM" ranging between -8 and 70 °C, with a threshold at 19°C. The thermostat may be disabled through input 3.

THERM <n/name> <ON/OFF> <temp>

Enable/disable the selected thermostat

<n/name>	Analog input number or thermostat name
ON/OFF	ON enable OFF disable
Temp	Optional temperature threshold

Example:

CMD:THERMOSTAT 1 ON 22

CMD:THERMOSTAT home ON

CMD:THERMOSTAT bedroom OFF

MESSTHERM <n/name> <ON/OFF>

Enable/disable sending of a SMS when the thermostat is activated

<n/name>	Input number or thermostat name
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ON/OFF	ON enable OFF disable
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Example:

CMD: MESSTHERM 1 ON

CMD: MESSTHERM home ON

CMD: MESSTHERM bedroom OFF

STATTHERM

Send thermostat status, if configured

Example:

CMD: settherm 0000 1 term1 700 -80 200 1 1

CMD: stattherm

TERM1:25,0 C

Heater:OFF Threshold:20,0 Thermostat:DISABLED

Digital inputs

CONF DI <password> <n> <label> <mode> <mnem0> <mnem1>

Configure digital input <n>

<password>	Administrator password
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<n>	Digital input number
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<label>	Name assigned to the digital input
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<mode>	NORMAL, COUNTER, TOTALIZER, DIFFERENCE, RESET (when input active reset all outputs)
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<mnem 0>	Label assigned to 0 state, i.e. "Idle"
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<mnem 1>	Label assigned to 1 state, i.e. "Alarm"
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Example:

CMD:conf di 0000 1 alarm normal idleactive

Set input 1 working in normal mode, named "alarm", possible states: "idle" and "active"

CMD:stat

ALARM:IDLE DI2:Off DI3:Off DI4:Off DO1:Off DO2:On AI1:0 AI2:0

CMD:conf di 0000 2 termic normal OK Alarm

Set input 2 in normal mode, named "termic", states: "OK", "Alarm"

CMD:conf di 0000 3 flow counter

Set input 3 as a counter, named "flow"

CMD:stat

ALARM:IDLE TERMIC:OK FLOW:Off DI4:Off DO1:Off DO2:On AI1:0 AI2:0

CMD:conf di 0000 4 clear reset

Set input 4 in reset mode (no other parameters required)
When input 4 goes high, all outputs are cleared.

STAT DI <n>

Read status of selected digital input, or all digital inputs if no input channel specified.

<n>	Digital Input number (optional)
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Example:

CMD:stat di

MOTOR:IDLE ALARM:OFF DI3:Off DI4:Off

CMD:stat di 1

MOTOR:IDLE

ALARMDI <password> <n> <H/L> <delay> <message>

Set an alarm on a digital input

<password>	Administrator password
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<n>	Digital input number
-----	----------------------

<H/L>	H if the alarm has to occur when input is closed L if the alarm has to occur when input is open
<delay>	Delay in seconds before sending the SMS message
<message>	Text that will be contained in the alarm SMS
<p><i>Example:</i> CMD:alarmdi 0000 1 H 5 Warning: alarm!! Set an alarm when input 1 goes high for at least 5 seconds. Send the SMS "Warning: alarm!!"</p>	

COUNTER <password> <n> <start> <send> <end> <out>	
Configure a digital input to operate as a counter	
<password>	Administrator password
<n>	Digital input number
<start>	Counter start value
<send>	Frequency of SMS notify of counter value. Write 0 to disable.
<end>	Counter limit. When reached the device starts counting from 0 and sends an SMS
<out>	Digital output to set when the counter reaches its programmed limit (optional)
<p><i>Example:</i> CMD:conf di 0000 3 flow counter Set digital input 3 in counter mode CMD:counter 0000 3 1000 24 15000 2 Configure the counter on DI3 to start counting from 1000, send an SMS containing its value every 24 hours, then stop at 15000 and send an SMS to all the enabled users; then restart from 0.</p>	

START <n>	
Start counter	
<n>	Digital input number
<p><i>Example:</i> CMD:start 0000 1</p>	

STOP <n>

Stop counter

<n>	Digital input number
-----	----------------------

Example:

CMD:stop 0000 1

TOTALIZER <password> <n> <quantity> <u.m.>

Configure a digital input as a totalizer

<password>	Administrator password
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<n>	Number of digital input
-----	-------------------------

<quantity>	Value to add to totalizer at every signal change 0->1->0
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<u.m.>	unit of measure
--------	-----------------

Example:

CMD:totalizer 0000 1 10 LITERS

Configure digital input n. 1 to operate as a totalizer. Its value is incremented by 10 every signal change 0->1->0.

TOTALIZER <password> <n> SET <initial value>

Set starting value and increment quantity for a digital input configured as a totalizer

<password>	Administrator password
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<n>	Digital input number
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<initial value>	Initial totalizer value
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Example:

CMD:totalizer 0000 1 SET 1200

TOTALIZER <password> <n>

Read value and configuration of a digital input, when configured as a totalizer

<password>	Administrator password
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<n>	Digital input number
-----	----------------------

Example:

CMD:totalizer 0000 1

TOT CFG: water 10

TOT VAL: 170

Input n. 1 is set as a totalizer with name "water" and its value is incremented by 10 every time the input signal changes its state (0->1->0). The totalizer value read is 170.

DIFFERENCE <password> <n> <quantity> <u.m.>

Configure a digital input as a differentiator. A differentiator value is computed as the reference quantity divided by the number of seconds between two consecutive pulses on the signal.

<password>	Administrator password
<n>	Digital input number
<quantity>	Reference quantity
<u.m.>	unit of measure

Example:

```
CMD:conf di 0000 1 water DIFFERENTIAL
```

```
CMD:difference 0000 1 10000 Liters/s
```

Configure input n. 1 to operate as a differentiator with unit "liters/s". Every pulse (0->1->0) at the input a new value is computed dividing the reference quantity by the number of seconds passed from the previous signal pulse.

As an example, if 20 seconds have passed between two pulses, the new computed value is $10000/20=500$ liters per second. This feature can be used to measure analog values from "pulse output" sensors and counters.

TIME DI <n/name>

Read total on-time, measured starting at device startup, of the selected digital input.

<n/name>	n: digital input number, name: input name
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Example:

```
CMD:time di motor
```

```
motor: 12:15:30
```

Digital outputs

CONF DO <password> <n> <label> <mode> <mnem 0> <mnem 1> <delay> <pulse>

Configure digital output <n>

<password>	Administrator password
<n>	Output number
<label>	Name of the digital output
<mode>	Operating mode: OPEN, CLOSE, PULSE0, PULSE1
<mnem 0>	Label of the output at state 0, i.e. "Idle"
<mnem 1>	Label of the output at state 1, i.e. "Alarm"

<delay>	Activation delay in seconds
<pulse>	Pulse width in seconds, when in pulse modes (optional)
<i>Example:</i>	
<p><i>CMD:conf do 0000 1 motor open 5</i> Set DO1 as a normally open digital output that closes after 5 seconds</p> <p><i>CMD:conf do 0000 2 pump pulseo 3 2</i> Set DO2 as impulsive (normally open) digital output that closes after 3 seconds and reopens after 2 seconds.</p>	

ON <n/name>	
Turn on relay/output <n/name>	
<n/name>	n: output number nome: output name
<i>Example:</i>	
<p><i>CMD:on 1</i> Switch on output 1</p>	

SET <n/name>	
Turn on relay/output <n/name>	
<n/name>	n: output number nome: output name
<i>Example:</i>	
<p><i>CMD:set 1</i> Switch on output 1</p>	

OFF <n/name>	
Turn off relay/output <n/name>	
<n/name>	n: output number nome: output name
<i>Example:</i>	
<p><i>CMD:off motor</i> Switch off the output named "motor"</p>	

RESET <n/name>	
Turn off relay/output <n/name>	
<n/nome>	n: output number nome: output name

Example:

CMD:reset motor

Switch off the output named "motor"

ONRING <password> <n> <user> <mode>

Set the specified user to turn on the specified output with a voice call (RING)

<password>	Administrator password
<n>	Output number
<user>	User name or phone number
<mode>	0: disable this feature 1: switch on with a RING 2: switch off with a RING 3: toggle output with a RING

Example:

CMD:onring 0000 1 admin 1

User "admin" can switch on output 1 with a ring.

CMD:onring 0000 2 +393471234567 3

Specified user (that must be registered in users list) can toggle output 2 with a ring.

TIME DO <n/name>

Read total on-time, measured starting at device startup, of the selected digital output.

<n/name>	n: output number. name: output name
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Example:

CMD:time do motor

Motor: 12:15:30

I/O Expansions

EXPADD <password> <type> <address>

Add an I/O expansion device to WE420 RS485 bus

<password>	Administrator password
<type>	1: 16 DI 2: 8 DO 3: 8 DI 4 DO 4: 16 DO 5: 4 AN 6: 4T
<address>	ModBus address assigned to I/O expander

Example:

CMD: expadd 0000 2 1

Enable WE420 to manage an 8DO ModBus expansion at address 1

EXPDEL <password>

Disable all expansions

<password>	Administrator password
------------	------------------------

Example:

CMD: expdel 0000

Disable all expansions

Diagnostics Commands

LOOP <password> <user> <send>

Configure the device to periodically send its status to the specified user

<password>	Administrator password
<user>	User's name or telephone number
<send>	Sending period, given in minutes. Set to 0 to disable this feature.

Example:

CMD: loop 0000 admin 60

Set WE420 to send the state SMS to the user "admin" every hour

CMD: loop 0000 +393471234567 1440

Set WE420 to send the state SMS to the user with number +393472134567 once a day

SIGNAL

Send back the quality of GSM signal (from 1 to 30)

Example:

CMD: signal

GSM signal: 7 [Too low GSM signal]

CMD: signal

GSM signal: 30 [Very good GSM signal]

BOOT <password> <ON/OFF>

Configure the device to send its state at startup to all administrator users

<password>	Administrator password
------------	------------------------

<ON/OFF>	ON - enable OFF - disable
----------	------------------------------

Example:

CMD: boot 0000 ON

Enable all the administrators to receive the state SMS after every system boot

RING <password> <user> <ON/OFF>

Set the specified user to receive the SMS state after a voice call to WE420

<password>	Administrator password
------------	------------------------

<user>	User's name or telephone number
--------	---------------------------------

<ON/OFF>	ON - enable OFF - disable
----------	------------------------------

Advanced Commands

CENTER <password> <nr. tel.>

Set SMS service center number (Network operator dependent)

<password>	Administrator Password
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<nr. tel.>	SMS center number
------------	-------------------

Example:

CMD:center 0000 +393492000200

DEFAULT <password>

Restore factory configuration and reset device

< password>	Administrator password
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Example:

CMD:default 0000

MODEMONLY <password> <ON/OFF>

Disable all WE420 remote control features and enable GSM modem only.

< password>	Administrator password
-------------	------------------------

<ON/OFF>	ON – enable OFF – disable
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Example:

CMD:modemonly 0000 ON

Disable remote control features

CMD:modemonly 0000 OFF

Re-enable remote control features

SETPORT <password> <port> <baudrate> <parity> <data bits> <stop bits>

Set the communication parameters of the specified port

<password>	Administrator password
------------	------------------------

<port>	Serial port (232 or 485)
--------	--------------------------

<baudrate>	Baud rate (4800, 9600, 38400, 57600, 115200)
------------	--

<parity>	Parity (N=none, E=even, O=odd)
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<data bits>	Data bits
-------------	-----------

<stop bits>	Stop bits
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Example:

CMD:setport 0000 232 9600 N 8 1

Set WE420 RS232 serial port to 9600 baud, no parity, 8 data bits and 1 stop bit

CMD:setport 0000 485 19200 E 8 1

Set WE420 RS485 serial port to 19200 baud, even-parity, 8 data bits and 1 stop bit

RUN <password> <n> <H/L> <user> <command>

Configure the device to execute the specified command every time the input <n> is in alarm condition <H/L>. The reply of the command is forwarded to the specified user.

<password>	Administrator password
<n>	Digital input number
<H/L>	H – condition is true when input is high L – condition is true when input is low
<utente>	User's name or phone number
<comando>	Command string

Example:

CMD:run 0000 1 h admin stat ai

Enable WE420 to send the output of command "stat ai" to "admin" user.

CMD:run 0000

Disable the previously programmed automatic execution.

NOTE: the specified digital input must be enabled with ALARMDI command

DATETIME <password> <dd mm yyyy hh mm>

Set/Read system clock. With no parameter set the command replies with current date and time.

<password>	Administrator password
<dd mm yyy hh mm>	Date/time to be set

Example:

CMD:datetime 0000 28 05 2009 15 32

CMD:datetime

28/05/2009 15:33

7

Precautions and warning



The device cannot operate if power supply is not available



The device cannot receive/send messages/data nor make a voice call if the SIM card cannot connect to the operator network or credit is not available (if a prepaid card is used).



Always verify that the device is operated in an area that is covered by a GSM network with sufficient signal strength for proper operation.



The product shall not be treated as household waste. Instead it shall be handed over to an appropriate collection point for the recycling of electrical and electronic products. For more information about recycling of this product, please contact the local city office and/or the local waste disposal service.

Consult your network operator regarding the cost of the services you are using.

WARNING

Nethix products are designed for typical use in industrial automation and/or home applications.

If you plan to use Nethix products in special applications where anomalies and discontinuity of service can have serious effect on the human life or can cause physical or material damages, or where extremely high levels of reliability are required, please contact Nethix for support to your particular application. Nethix is not responsible of damages caused from its products if these applications are not previously authorized.

8

Service and Support

Nethix warrants to the buyer that the product will be defect-free within two years (24 months) from the date of purchase. During this period, with the proper proof, the product will be repaired or substituted without any cost for the buyer.

Warranty will be voided if the product has not been used properly.

In case of technical problems, the user should:

- Contact the reseller;
- Send to info@nethix.com an email describing the problems.

Nethix suggests to frequently visit www.nethix.com in order to have the latest news and documentation about WE420.

Return and repair

Product return to NETHIX must be previously authorized. To request a RMA number send the following information by email or fax:

- Customer's name and address
- Distributor or reseller name
- Date of purchase
- Product P/N and S/N as displayed on the product or the package
- Detailed description of fault and/or reason for return

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