

WE420 NETWORKING & DATA LOGGING



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NETHiX



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

WE420 is a wireless remote control device based on SMS messaging.

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, store the sampled data inside its non-volatile memory and forward them to an HTTP server through a GPRS data connection. Sample data are stored inside a "circular buffer" that may contain more than 15.000 records. For very intensive datalogging applications the WE420 can also save sampled data into a common USB memory stick, using the optional memory expander XM100.

The GPRS 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.

An internal WEB/http server is also available.



For further detail about **SMS based remote control** features, please read the user manuals provided with the device.

Datalogger

WE420 can operate in datalogger mode and periodically store digital and analog input values into a "circular buffer" that may contain more than 10.000 records.

All I/Os can be logged with an individually configurable sampling period.

- ▶ Analog inputs and integrals.
- ▶ Digital inputs and outputs.
- ▶ Counters, totalizers and differentiators configured on digital inputs.

Datalogging is automatically enabled at device startup but can be started/stopped at user's request.

Network connectivity and data retrieval

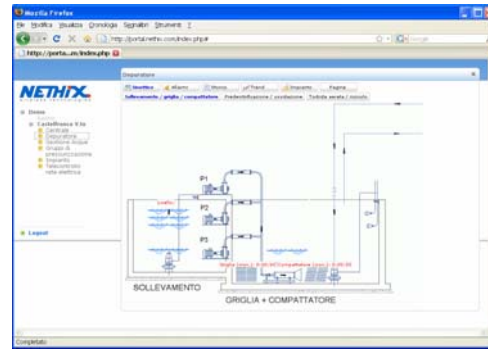
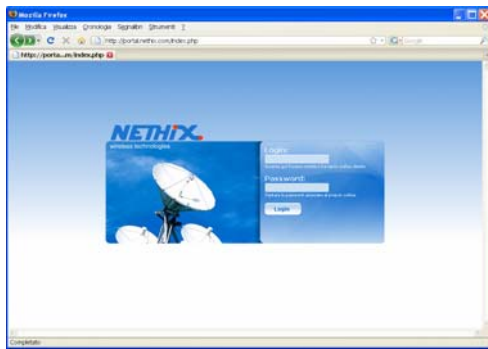
All data stored inside the device's memory can be retrieved using one of the two following modes.

- ▶ **CLIENT/SERVER** – The device automatically forwards all stored data to a WEB/HTTP server. Data can be sent **periodically** or **immediately** when logged or available, depending on the configuration, on a TCP/IP connection over **GPRS** or **ETHERNET** (with the optional ET100 interface module). When data reception is confirmed by the server, all data sent are deleted from the device's memory. Long term storage of large amounts of sampled data is demanded to the server.

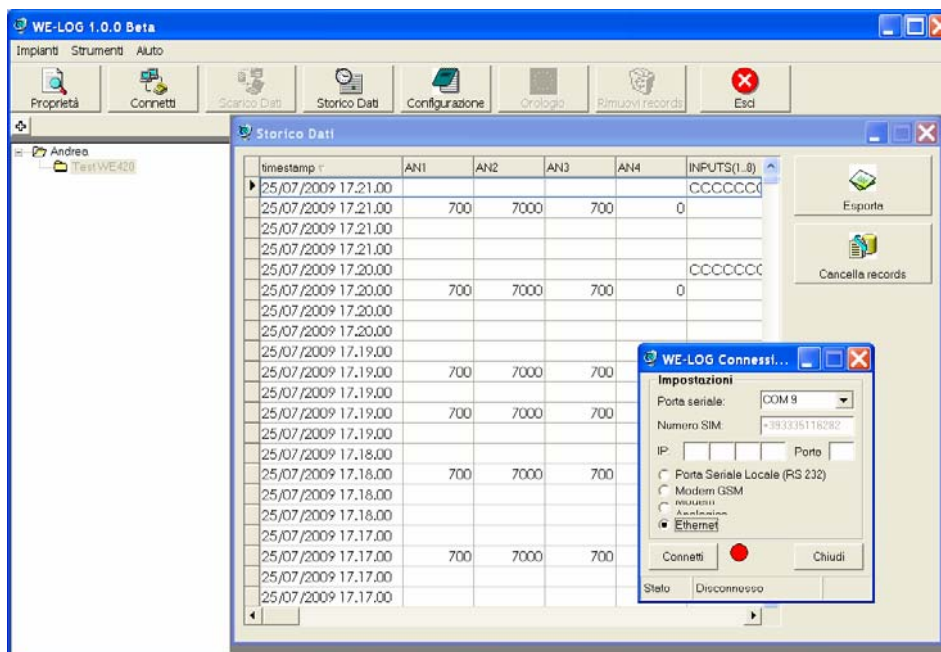


NOTE – Data communication uses common and widespread HTTP internet protocols (GET method) so that it can be easily implemented in custom applications. Contact NETHIX for details about the communication protocol.

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.



- ▶ **POINT TO POINT** – If this operating mode is selected, data have to be downloaded manually from the device by an operator, using a specific download software, called **WE-Log**, provided by NETHIX. Data transfer can be carried out using an RS232 serial cable directly connected to the WE420 (local mode) or using a GSM-CSD wireless data connection (remote mode, a modem is required). A network mode data transfer is also available when using the optional ET100 network adapter. In all the described situations the data download process is managed in the same way by the WE-Log software. Please note that the device's memory is never deleted in this operating mode. Long term storage of large amounts of sampled data is actually performed by the device, while the download software receives only the new records at each connection.



NOTE – The user must decide which data download mode is preferred when designing his/her application. Changing the download mode later when the device is in operation is not suggested and could cause data loss.

USB Datalogger

Using the optional XM100 expansion module the device can send and store logged data to a standard USB memory key.



Thanks to the huge memory size of this kind of memory devices the datalogging capabilities of the WE420 become virtually infinite. A standard 1GBytes USB memory key can store digital and analog samples for more than one year with no operator intervention.

No configuration is required to operate. Just connect the XM100 device to the WE420 as described later and select the signals to be logged. Every logged sample is stored both in internal memory and into the USB memory key.

A text file is opened and data appended to it.

"DAT_aamm.txt"

Where:

mm – current month

aa – current year

For example the file named:

"DAT_0907.txt"

will contain all data sampled during July 2009.

The file can be easily imported in Windows based systems and read by programs as text editors, Microsoft Word, Excel, etc...

Every row in the file contains sampled data together with a timestamp.

Example

```
ts=200907111553 UFFICIO=26.2 CASA=33.4 livello=100.0 AI4=1023
ts=200907111553 I_UFFICIO=62309
ts=200907111553 DI=00000000 DO=10000001
ts=200907111553 test=0
ts=200907111553 Misura=0
ts=200907111553 Volume=110
ts=200907111555 UFFICIO=26.2 CASA=33.5 livello=100.0 AI4=1023
ts=200907111555 I_UFFICIO=65453
ts=200907111555 DI=00000000 DO=10000001
ts=200907111555 test=0
ts=200907111555 Misura=0
ts=200907111555 Volume=110
ts=200907111557 UFFICIO=26.3 CASA=33.6 livello=100.0 AI4=1023
ts=200907111557 I_UFFICIO=68604
ts=200907111557 DI=00000000 DO=10000001
[...]
```



WARNING – to avoid data loss USB mode must be disabled before removing an USB memory key.

The XM100 device can be disabled locally, when connected by serial cable, or sending a SMS message.

Internal WEB server

An internal web server is available and can be activated on request (see command section). The server can operate over Ethernet (if ET100 optional network adapter is used) or GPRS (“always-on” mode).

- ▶ **ETHERNET** – The ET100 network adapter has to be properly configured and connected to the WE420. An IP address, a port number and a gateway address are required for operation. The device can be configured using the “ETConfig.EXE” software provided by NETHIX. Refer to the ET100 manual for details.
- ▶ **GPRS** – When operating in GPRS always-on mode the network operators assigns an IP address (that can be static or dynamic) to the SIM card used by the WE420. The device listens to connections to port 80 at the assigned IP address.

Stato I/O

- Ingressi analogici
- Ingressi digitali
- Uscite digitali

Ingresso Analogico	Valore
AI1 - EEE	70.0 C
AI2 - AI2	70.00 hhh
AI3 - AI3	70.0 C
AI4 - AI4	0.0 ee

Ingresso Digitale	Stato
DI1 - cont	0
DI2 - ww	yy
DI3 - t3	
DI4 - Contatore	6
DI5 - DI5	Off
DI6 - DI6	Off
DI7 - DI7	Off
DI8 - DI8	Off

Uscita Digitale	Stato
RL1 - EEE	On
RL2 - AI3	Off
RL3 - DO3	On
RL4 - DO4	Off
RL5 - DO5	On
RL6 - DO6	Off
RL7 - DO7	Off
RL8 - DO8	On

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info@nethix.com

Completato



For easy operation NETHIX suggests to use a SIM card with static IP address provided by the network operator. If a dynamic IP is used the user must keep track of the assigned IP address in some way.

The screenshot shows the NETHIX WE420 HTTP Commander web interface in Mozilla Firefox. The browser address bar shows the URL <http://95.75.18.186/ai.html>. The page title is "NETHIX WE420 HTTP Co...". The NETHIX logo and "wireless technologies" are visible at the top right. On the left, there is a navigation menu with "Stato I/O" selected, and sub-items "Ingressi analogici", "Ingressi digitali", and "Uscite digitali". The main content area displays a table of analog input status.

Ingresso Analogico	Valore	Integrale
AI1 - EEE	70.0 C	
AI2 - AI2	70.0 hhh	
AI3 - AI3	70.0 C	
AI4 - AI4	0.0 ee	

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The screenshot shows the NETHIX WE420 HTTP Commander web interface in Mozilla Firefox. The browser address bar shows the URL <http://95.75.18.186/d.html>. The page title is "NETHIX WE420 HTTP Co...". The NETHIX logo and "wireless technologies" are visible at the top right. On the left, there is a navigation menu with "Stato I/O" selected, and sub-items "Ingressi analogici", "Ingressi digitali", and "Uscite digitali". The main content area displays a table of digital input status.

Ingresso Digitale	Stato
DI1 - cont	0
DI2 - wwv	yy
DI3 - t3	
DI4 - Contatore	6
DI5 - DI5	Off
DI6 - DI6	Off
DI7 - DI7	Off
DI8 - DI8	Off


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NETHIX WE420 HTTP Commander - Mozilla Firefox

File Modifica Visualizza Cronologia Segnalibri Strumenti 2

http://95.75.18.186/do.html

NETHIX WE420 HTTP Co...



Stato I/O

- Ingressi analogici
- Ingressi digitali
- Uscite digitali

Uscita Digitale	Stato	Tempo ON
RL1 - EEE	On	46:26:43
RL2 - AI3	Off	00:00:00
RL3 - DO3	On	08:28:17
RL4 - DO4	Off	00:00:00
RL5 - DO5	On	25:41:25
RL6 - DO6	Off	00:00:00
RL7 - DO7	Off	00:00:00
RL8 - DO8	Off	00:00:00

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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.

Sample Sessions

The following examples show typical use of the device in networking and datalogging modes. All the available commands are explained in detail in chapter four of this manual.

Datalogger setup and programming

- ▶ Temporarily disable the datalogger

```
LOG 0000 OFF
```

- ▶ Delete log memory

```
LOG 0000 DELETE
```

- ▶ Select and configure the input signals that have to be sampled and logged. As an example, the analog input channels have to be logged every 5 minutes and digital inputs every 10 minutes.

```
LOG 0000 1 15 5  
LOG 0000 0 255 10
```

- ▶ Start the datalogger

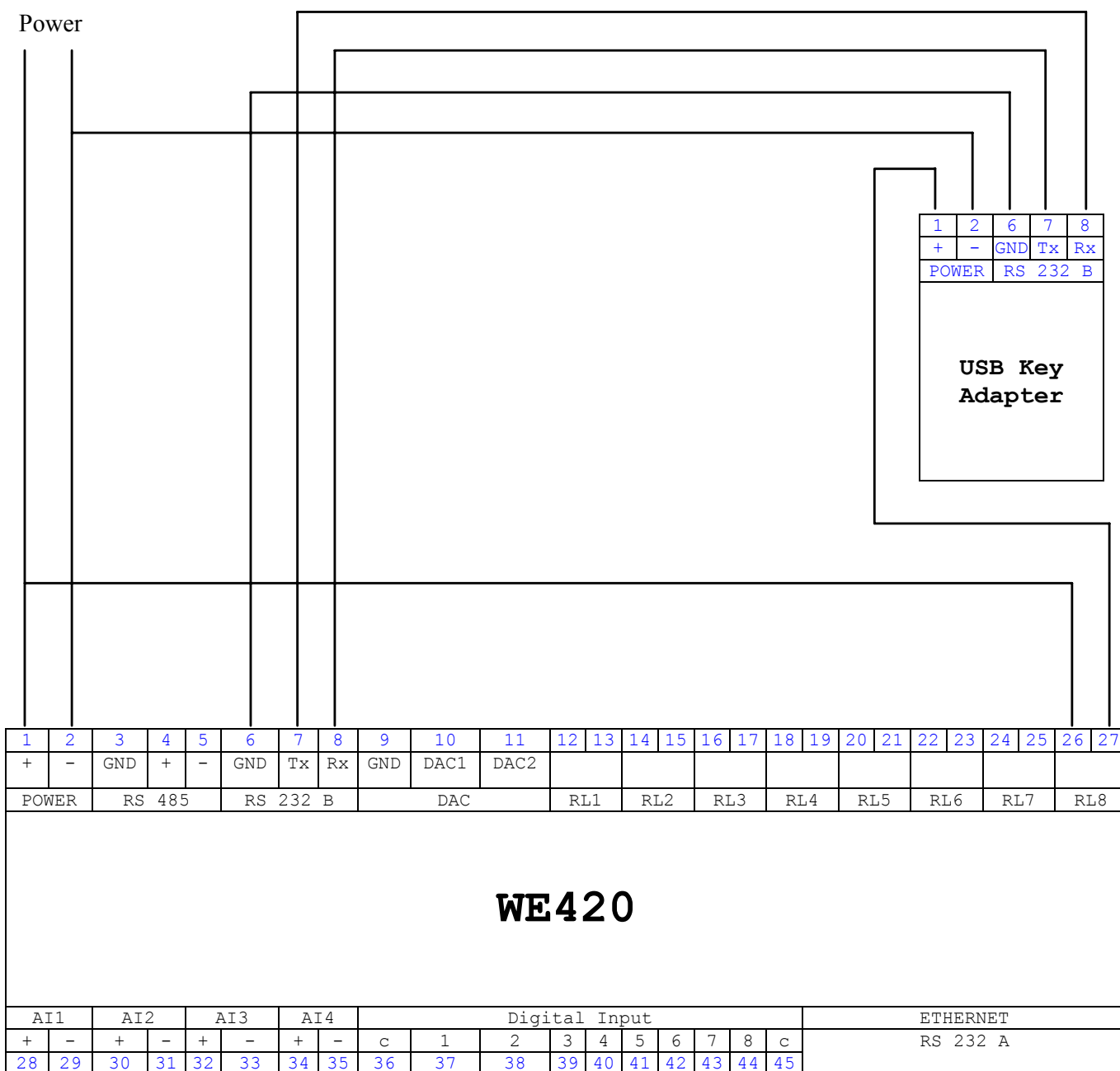
```
LOG 0000 ON
```

- ▶ For debugging purposes it's possible to sample and store some data with the DOLOG command. For example, to log counters, totalizers and differentiators configured on digital input 1

```
DOLOG 0000 CNT 1
```

USB memory key datalogging

Connect XM100 module to a WE420 as shown in the following figure.



The XM100 is powered through relay 8 of the WE420. When XM100 is used is not possible to use relay output 8 for other applications.

To enable datalogging over USB:

-
- ▶ Configure datalogging as described in the previous example, select signals to be sampled and sample time
 - ▶ Connect XM100 to WE420 as detailed
 - ▶ Insert a USB memory key in the XM100 usb connector
 - ▶ Type the following

```
USB 0000 ON
```

- ▶ Sampled data are automatically stored into the USB memory key until the device is disabled with the following command

```
USB 0000 OFF
```



WARNING – to avoid data loss USB mode must be disabled before removing an USB memory key.

Networking setup

To configure automatic sending of logged data to an HTTP server:

- ▶ Set GPRS connection parameters
- ▶ Set server address and data
- ▶ Select network type (GPRS / Ethernet)

Type the following commands.

- ▶ Temporarily disable networking, if previously enabled.

```
NET 0000 OFF
```

- ▶ Set communication parameters with the SETVAR command. For the details of the communication parameters refer to the table in the next chapter. Request the proper communication parameters to your network operator.

```
SETVAR 0000 APN ibox.tim.it
SETVAR 0000 USERNAME
SETVAR 0000 PASS
```

- ▶ Set server data with the SETVAR command. The following sample refers to a NETHIX portal installation (replace 000.000.000.000 with your server IP address).

```
SETVAR 0000 IP 000.000.000.000
SETVAR 0000 HOST portal.nethix.com
SETVAR 0000 PORT 80
SETVAR 0000 DATAURL /we420.php
SETVAR 0000 ID 1111
```

- ▶ Enable data sending to server.

```
NET 0000 DATA ON
```

- ▶ Connect to GPRS network

```
NET 0000 GPRS
```

- ▶ To connect alternatively through Ethernet type the following command. The WE420 has to be previously connected to the network with the optional interface ET100.

```
NET 0000 ETH
```

- ▶ To switch off networking type the following.

```
NET 0000 OFF
```

Internal WEB Server

To enable the internal web server of the WE420:

- ▶ Temporarily disable networking, if previously enabled:

```
NET 0000 OFF
```

- ▶ Enable the web server.

```
NET 0000 LISTEN ON
```

- ▶ Connect to GPRS or Ethernet network.

```
NET 0000 GPRS
```

```
NET 0000 ETH
```

4

Command description

Datalogger

Command	Description
LOG	Configure datalogger operating mode
LOG START	Start data logging
LOG STOP	Stop data logging
LOG DELETE	Clear log memory
DOLOG	Immediately sample and log inputs
USB	Enable XM100 module (USB Key Adapter)

Networking & GPRS

Command	Description
NET	Enable/disable IP connection (over GPRS or Ethernet)
NET DATA	Enable/disable data sending to a WEB/HTTP server
NET LISTEN	Enable/disable internal WEB/HTTP server
NET SEND	Immediately send stored data to server
GETVAR	Read configuration data for IP connection
SETVAR	Write configuration data for IP connection

Advanced commands

Command	Description

Example:

CMD: LOG 0000 0 0 10

Start logging of analog channels every 10 minutes.

CMD: LOG 0000 0 0 0

Stop logging analog channels.

CMD: LOG 0000 2 5 30

Start logging counter and totalizers configured on inputs 1 and 3

(<I/O selection> = 5 = 2⁰ + 2²)

LOG <password> DELETE

Clear LOG memory. All stored records are lost and cannot be recovered.

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

Example:

CMD: LOG 0000 DELETE

LOG <password> STOP

Stop data logging.

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

Example:

CMD: LOG 0000 STOP

LOG <password> START

Start data logging.

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

Example:

CMD: LOG 0000 START

Note:

Data logging is automatically started at every device startup. The command LOG START is useful when datalogging has previously been stopped, i.e. for maintenance purposes.

DOLOG <password> <type> <I/O number>

Immediately sample and log selected inputs

<password>	Administrator password
<type>	Select the type of input to sample and log: DI – digital I/O AI – analog I/O INT - integrators CNT – counters, differentiators and totalizers
<I/O number>	Select the number of the input to sample and log. Applies only to counters, totalizers, differentiators, integrals. When AI or DI/DO are selected, all channels are sampled simultaneously.

Example:

CMD: DOLOG 0000 AI

Immediately sample and store analog inputs values.

CMD: DOLOG 0000 CNT 3

Immediately sample and store counter configured on input 3.

USB <password> <on/off>

Enable XM100 module (USB Key Adapter), if properly connected to the WE420. When enabled all data sampled are sent to the XM100 module for storing in the USB memory key.

<password>	Administrator password
<on/off>	on – enable XM100 module and store sampled data to USB memory key also off – disable XM100

Example:

CMD: USB 0000 OFF

Warning: to avoid data loss USB mode must be disabled before removing an USB memory key.

Networking

NET <password> <ETH/GPRS/off>

Enable/disable IP connection (over GPRS or Ethernet).

<password>	Administrator password
<eth/gprs/off>	ETH – enable IP connection over ethernet (ET100 expansion module has to be properly connected to the WE420 and configured) GPRS – enable IP connection over GPRS (a SIM card with GPRS data capability is required) OFF – disable IP connection When no parameter is specified, the command replies with the connection status.

Example:

CMD: NET 0000 OFF

Disable IP connection

CMD: NET 0000 ETH

Enable IP connection over ethernet

CMD: NET 0000 GPRS

Enable IP connection over GPRS

CMD: NET 0000

Read connection status, i.e.:

ETH:LISTEN-LD

IP: 192.168.1.220

Uptime: 2:00:40

NET <password> DATA <on/off>

Enable/disable data sending to a WEB/HTTP server

<password>	Administrator password
<on/off>	on – enable off – disable

Example:

CMD: NET 0000 DATA ON

NET <password> LISTEN <on/off>

Enable/disable internal WEB/HTTP server

<password>	Administrator password
<on/off>	on – enable off – disable

Example:

CMD: NET 0000 LISTEN ON

NET <password> SEND

Immediately send stored data to server

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

Example:

CMD: NET 0000 SEND

GETVAR <password>

Read configuration data for IP connection

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

Example:

CMD: GETVAR 0000

APN:ibox.tim.it

USERNAME:

PASS:

HOST:webcontrol.nethix.com

IP:195.110.111.111

PORT:80

DATAURL:/data.php

SENDDTIME:0

ID:9999

SETVAR <password> <variabile> <valore>

Write configuration data for IP connection

<password>	Administrator password
<variabile>	Variable name
<valore>	Value to assign to the selected variable

Example:

CMD: SETVAR 0000 APN ibox.tim.it

Configuration variables for Networking

Variable	Description
APN	Network operator's APN name, for example "ibox.tim.it" for Italy-TIM (type the name without quotes)
USERNAME	User name for GPRS connection, leave empty if not used by the network operator
PASS	Password for GPRS connection, leave empty if not used by the network operator
HOST	Host name of the server. For example "portal.nethix.com" (type the name without quotes)
IP	IP address of the server, for example 195.110.111.111
PORT	Port number of the server, usually port 80
DATAURL	URL to be used for data sending, for example "we420.php"
SENDTIME	Period in minutes for data sending. When zero, data are sent to the server as soon as they become available.
ID	Unique ID for the WE420 (4 numerical digits), to be assigned by the server administrator.

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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