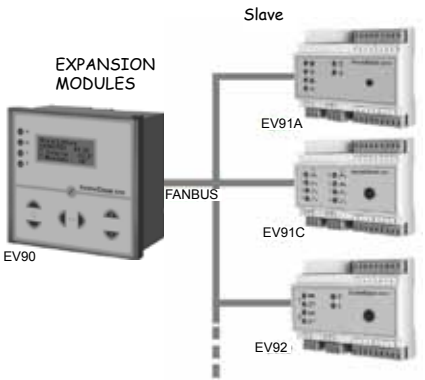
EV90 - MASTER

DIGITAL CONTROL UNIT FOR COMPLEX HEATING AND TECHNOLOGICAL PLANTS



USE

The EV90 control unit is used in particularly complex plants where several different devices are required to meet heat regulation requirements.
The system features a master device (EV90) and one or more slave modules connected to the master through a communication Bus called FANBUS.

OPERATION

The EV90 acts as central control unit. The parameters of the slave modules connected to the FANBUS can be displayed or modified through the EV90 display and keyboard. A probe measures the outside temperature value which is sent through the FANBUS to all relevant control units thereby avoiding pointless duplicates.
Date and time, including daylight-saving time, may be directly set on the front panel of the control unit and used by all devices connected to the BUS.
One modem (analogue or GSM) enables to manage and to modify remotely the parameters of the Master EV90 as well as the parameters of all other modules. Any alarm generated by a slave module is first transmitted to the master EV90 and then to a remote sta-

tion or to an enabled mobile phone.
The EV90 also controls boiler (1 or 2 stages) regulation in order to keep boiler temperature high enough to guarantee heat to all connected devices.

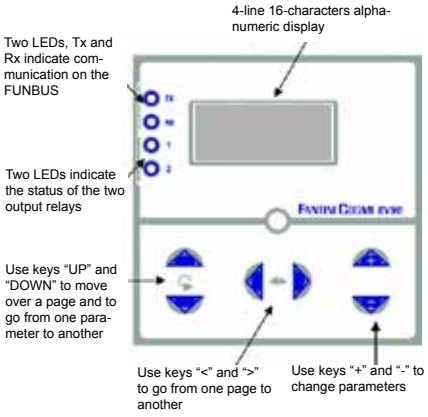
TO SELECT THE REQUIRED LANGUAGE

During installation the user can select the language required to display the Menu information. With the control unit off, keep the key + (see the figure below) pressed and then switch the control unit on. When the icon “CHOOSE LANGUAGE” is displayed release the key + and scroll the available languages using the keys + and -. Find the required language and then press key > to select it.
Menu info will be then displayed in the chosen language.

CHOOSE LANGUAGE:
ENGLISH

DESIGN CHARACTERISTICS

DIN 144x144 container, quick coupling control unit on base with FASTON connections, transparent protection cover. Wall, flush or rear panel mounting available. All parameters are displayed on 4-line/16 characters alphanumeric display. To facilitate reading under poor light conditions, press any key to light up the display that will go off automatically after about 60 seconds if no other key is pressed (no operation).



FANBUS

Up to 15 different types of controllers can be connected to the FANBUS, with max. 8 controllers of the same type (i.e.: 15 x 8 = max 120 controllers).
The FANBUS connection between master EV90 and slave is performed with a simple low voltage non-polarized twin cable (the two wires can therefore be inverted with each other without causing malfunction). Slaves shall be connected to the BUS through parallel connection.

CONTROL UNIT ADDRESS

Each control unit is identified by two digits that determine its address. The first digit represents the model and cannot be modified. The second one may be set through jumpers on each slave terminal board.
Example:

EV91A	first digit: 1
EV91C	first digit: 2
EV92	first digit: 3

If only one control unit per type is present on the BUS, no intervention is required.
Since the second digit is automatically set =0, control units shall have addresses 10, 20 and 30 respectively.
Should three EV91A control units be required on the same BUS then, set address 1 on the second control unit and address 2 on the third one.

The following situation is therefore obtained:
1 - EV91A address 10 (no jumper = address 0)
2 - EV91A address 11 (set address 1)
3 - EV91A address 12 (set address 2)
1 - EV91C address 20 (no jumper = address 0)
1 - EV92 address 30 (no jumper = address 0)

Every control unit shall therefore have an address that identifies it unambiguously.

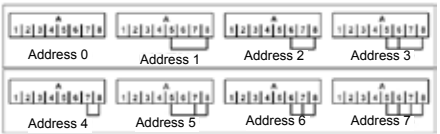
N.B. In order to communicate properly with the required device, every remote control command must be preceded by two digits that represents the address of the device.

EV90 CONTROL UNIT ADDRESS

The master control unit EV90 shall be considered like a slave with a fixed address: 00. To modify the current time it is therefore required to send the change command preceded by 00.

HOW TO SET ADDRESSES

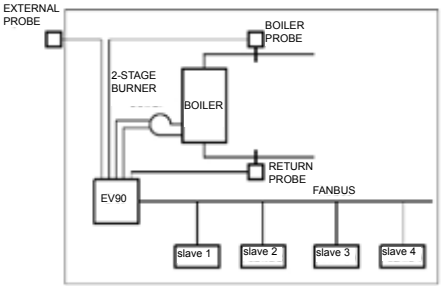
Connector “A” on each device is used to supply power and to set its address through jumpers.
This is particularly convenient when the device has to be replaced since instead of losing the address, it is “memorised” in the terminal board and therefore the new device will automatically take the address of the one replaced.
Here below are shown the jumpers required to obtain all combinations.



AUTOMATIC RECOGNITION

When a new device is connected to the BUS it will be recognised automatically. After about 60 seconds master EV90 is able to display and to communicate with it.

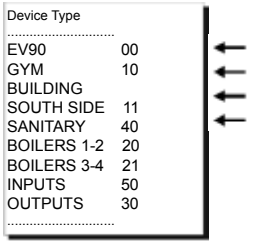
GENERAL LAYOUT



SYSTEM MANAGEMENT

Under normal operating conditions the EV90 control unit shows the list of connected slaves.
The first one on the list is EV90 itself, followed by a brief description of the devices and their address.
The description of every slave may be modified as required and it is useful to promptly identify the devices.
Use the “up” and “down” keys to position the cursor on the required slave then, press key “>” to communicate with the slave and to display and change its parameters.

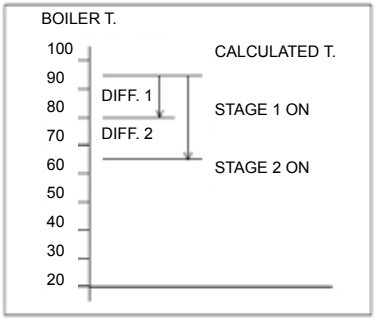
MAIN MENU



OPERATION AS BOILER CONTROL UNIT

In addition to be the system master controller, the EV90 can also be used as controller for a boiler, with either fixed or sliding temperature, by directly commanding the one- or two-stage burner.
The device detects through a measuring probe the boiler temperature value and if this drops below differential 1 the first stage is switched on. If it drops below differential 2 and stays there for a certain length of time, also the second stage will be switched on.
Relay control is shown on the device front panel.

The boiler can be switched on and off according to a weekly program that may be set on the control unit.



CALCULATED BOILER TEMPERATURE

The boiler temperature calculated by the control unit may be fixed or sliding. When it is fixed, the temperature value stays unvaried (i.e.: exactly like the set value), whereas when it is sliding, the value set is added to the highest temperature value required by the connected slaves. It is thereby possible to regulate the boiler with a temperature that constantly varies according to plant requirements.

N.B.: when setting the required boiler temperature value, take into account that with the fixed point regulation this will be the value used by the control unit whereas, with the sliding point regulation the value set will represent the increase with respect to the max. value established by the various control units of the plant.

LIMITS
The EV90 also enables to set min. and max. boiler temperature limits within which the calculated temperature may vary. The control unit will ensure that these values are not exceeded.

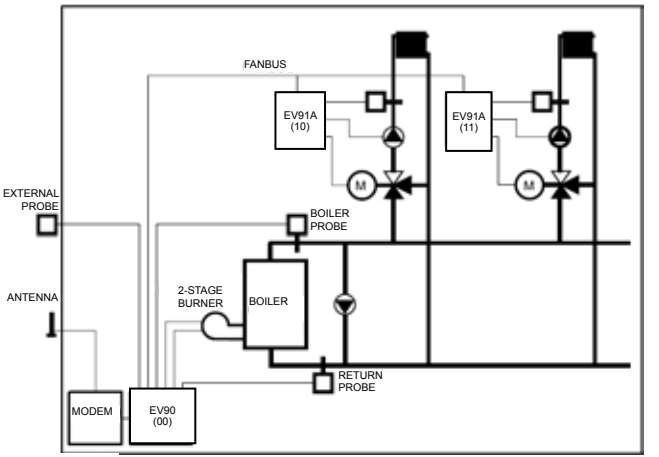
DIFFERENTIAL 1
First stage differential: it indicates the temperature difference, referred to the one calculated by the control unit, below which the first stage of the burner is switched on.

DIFFERENTIAL 2
Second stage differential: it indicates the temperature difference, always referred to the one calculated by the control unit, below which the second stage of the burner is switched on. To prevent pointless and untimely interventions, this situation has to persist for a certain length of time (to be set on the control unit).

EXAMPLES OF PLANTS

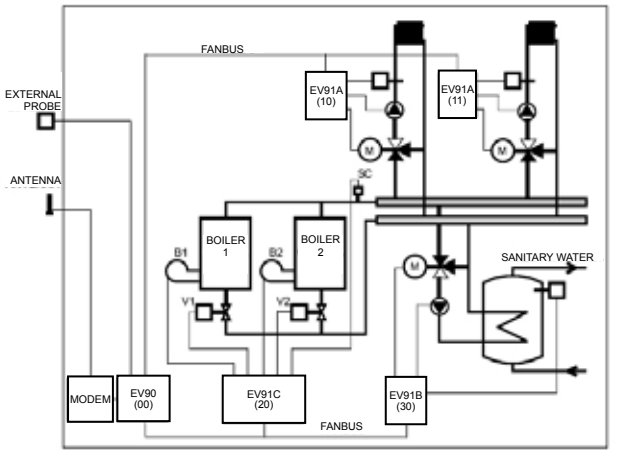
Plant 1:

- command of 2-stage boiler
- two independent heating circuits
- remote management with GSM modem
- in brackets are shown the addresses of the different devices



Plant 2:

- command of two cascaded boilers
- two heating circuits
- boiler regulation for sanitary hot water
- remote management with GSM modem

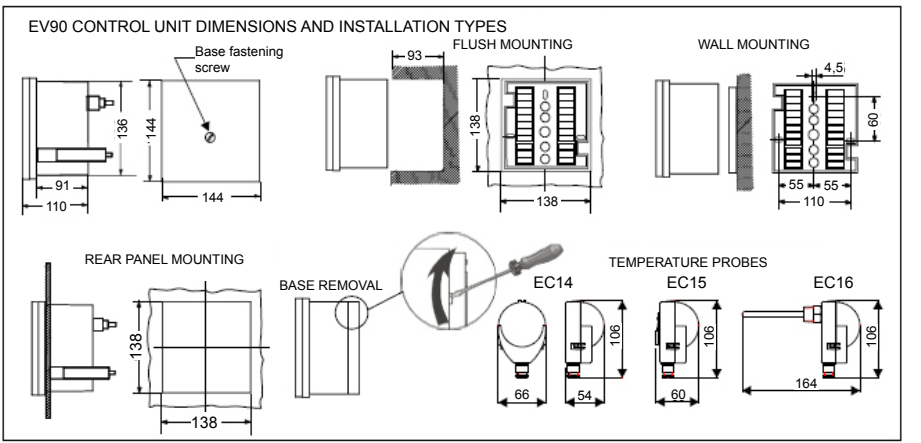


INSTALLATION

CONTROL UNIT INSTALLATION

Fully loosen the fastening bolt to release the base of the control unit.
Lever on the slots with a screwdriver to remove the base.

Make the electric connections and then press the FASTON connectors of the control unit into the base couplings until they are fully fitted.
Tighten the fastening bolt.



EXTERNAL PROBE EC14

Install the external probe in a vertical position on the north or north-west wall of the building at about 2.5 metres from the ground.
Install the probe far from heat sources (windows, aerators, flues, etc.) to detect a temperature material to the whole plant.

N.B. EV91A modules can always be fitted with their external probes. The device will automatically use the value measured by its probe instead of the one transmitted by EV90 through the FANBUS.

BOILER AND RETURN PROBE EC15-EC16

Install the contact probe EC15 onto the water pipe with the clamp provided for the purpose and with heat conducting paste interposed in order to guarantee correct heat conduction.
The immersion probe EC16 must be fitted in the elbow provided in the piping.

NB: The control unit also works with probes: EC81 (external probe) EC82 (contact probe) and EC83 (immersion probe); resistance values correspond to those tabulated on the right.

Resistance values based on temperature:

EXTERNAL PROBE EC14		DELIVERY PROBE EC15 EC16	
TEMPERATURE °C	RESISTANCE Ω	TEMPERATURE °C	RESISTANCE Ω
-20	5592	+20	12090
-15	4499	+30	8313
-10	3650	+40	5828
-5	2979	+50	4161
0	2449	+60	3021
+5	2024	+70	2229
+10	1684	+80	1660
+15	1408	+90	1266
+20	1184	+100	973

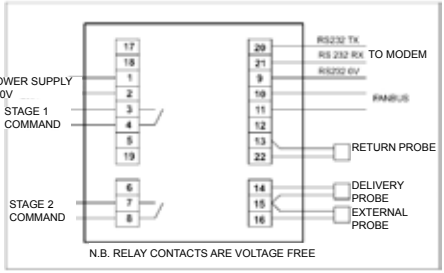
CONNECTION TO THE FANBUS

Connect the different controllers to the Master EV90 through the FANBUS. Bear in mind that the bus has low voltage and it is not polarised, terminals can therefore be inverted with each other without causing malfunction.

CONTROL UNIT ADDRESS

The control units must be addressed to work properly and to be queried by remote management.
Check for their proper configuration.

WIRING DIAGRAM



SETTINGS AND ADJUSTMENTS

FACTORY SETTINGS

The EV90 leaves the factory with all parameters set for standard operation. Should it be necessary to reset factory parameters (default data), turn off the power supply, then turn it on again while pressing key "+" on the front panel. All data entered will be lost, whereas factory parameters will be reset.

SETTINGS AND ADJUSTMENTS

Each time the EV90 control unit is powered, a configuration procedure starts for all devices connected to the bus.

After about 60 seconds it will be possible to communicate with the different devices for any modification or reading through the keyboard and display of the Master EV90 that will act like the display and the remote keyboard for all the slaves.

EV90 CONTROL UNIT MENUS

CONTROL KEYS FOR READING THE MENUS AND CHANGE DATA

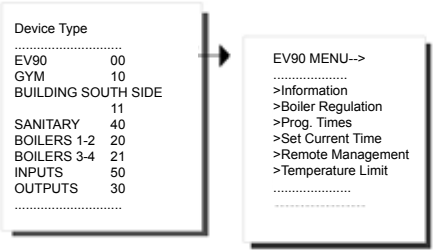
Use keys "UP" and "DOWN" to move over a page and to go from one parameter to another.

Use keys "<" and ">" to go from one page to another

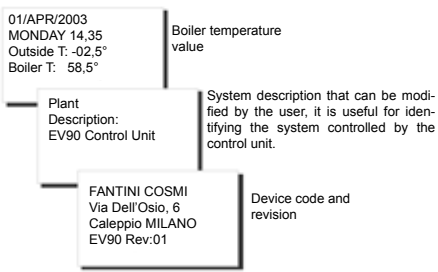
Use keys "+" and "-" to change parameters

MAIN MENU

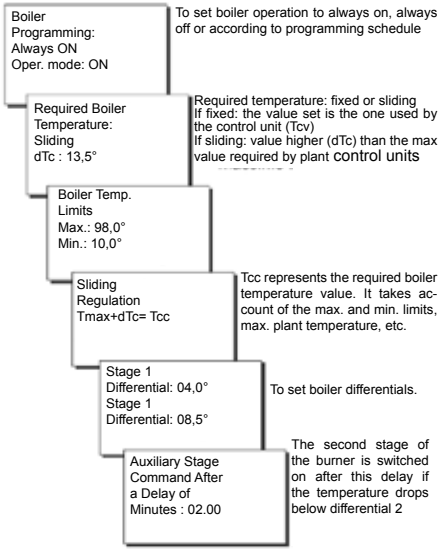
The main menu contains the list of available sub-menus. To enter a submenu press key



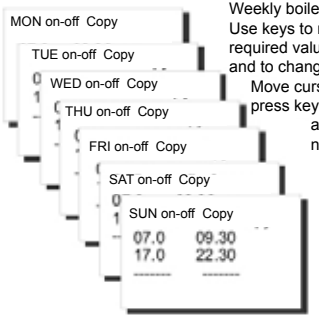
INFORMATION SUBMENU



BOILER REGULATION SUBMENU



PROGRAMMING TIMES SUBMENU



Weekly boiler programming
Use keys to move to the required value and to change it.

Move cursor to Copy and press key “+” to copy a program to the next day.

SET CURRENT TIME SUBMENU

Set Time
Day: Sunday
Time : 17.45
Date: 07/APR/2004

To set current time and date

DAYLIGHT-SAVING TIME
Start: 17/MAR
End: 28/OCT

To set the starting and ending date of daylight saving time. The control unit updates time automatically.

REMOTE MANAGEMENT SUBMENU

Alarmed
Device No.
Send Alarm
in: 00 minutes

It indicates the address of the current alarmed slave and the time lapse before next alarm call

Connection to Serial Bus with GSM Modem

To set the modem type: GSM (for management through SMS) or PSTN analog (for analog modem or GSM modem in data mode)

Operator No. 1
Phone Numb.
12345678890

Operator No. 2
Phone Numb.
12345678890

Operator No. 3
Phone Numb.
12345678890

To set the telephone numbers that shall receive the alarms. Delete digits not used.

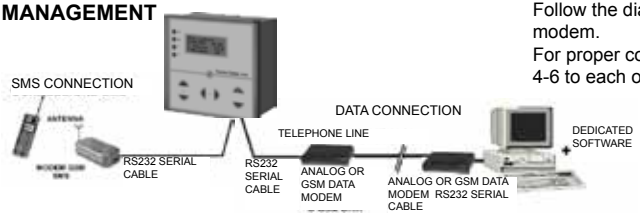
N.B. the alarm is first sent to operator No. 1, after 15 minutes to Nos. 1 and 2 and after another 15 minutes to Nos. 1, 2 and 3.

TEMPERATURE LIMIT SUBMENU

Min. Temperature Limit
Set : 45,5
Measured : 56,0

If temperature drops below the set limit, all SLAVEs connected to the FANBUS will reduce their heat demand.
To exclude this function, do not connect the limit probe.

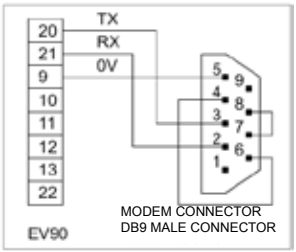
REMOTE CONTROL AND REMOTE MANAGEMENT



By connecting the EV90 controller to a GSM modem the significant parameters of the control unit can be set and read (See “Remote management SMS commands”).
To connect the control unit to an analog or GSM modem follow the instructions of the wiring diagram to connect the modem or use cable TCEV85.
N.B. The maximum distance between control unit and modem is 15 metres.
If management is via GSM modem, just use a mobile phone.
If an analog or GSM modem in data mode is used, use a PC with the dedicated software provided by Fantini Cosmi (only in Italian language) or download it from Internet.

CONNECTING THE MODEM

Follow the diagram below to connect the EV90 to the modem.
For proper communication also connect pins 7-8 and 4-6 to each other.



PREPARING THE MODEM

Both GSM and analog modems provided by Fantini-Cosmi are set for working yet; another modem may however be used provided the communication speed is 2400 bit/sec. To do this use command AT+IPR = 2400 and then save the new configuration with the command: AT&W.
If a GSM modem is used, use and memorise the command AT+CMGF=1 to set the SMS message format to text mode.

USING THE SIM CARD

The GSM modem works with any SIM card. Before using one with the Modem, however, we recommend that you test it in a mobile phone to see if it's working.

Particularly:

- Check that no PIN code has been set. If so, exclude it.
- Check the remaining credit
- Send an SMS message and check if it arrives.

After these checks, install the SIM card in the modem connector.

OPERATION

When a GSM or analogue modem is connected to the EV90 control unit, certain EV90 data and the data of all devices connected to the FANBUS can be read and changed remotely. To properly communicate with the required device, every command must be preceded by two digits identifying the device address. More particularly to address commands to the EV90 controller, first enter "00". Commands for each slave are listed in the instruction sheets relevant to each device.

Here below are described those relevant to EV90.

REMOTE MANAGEMENT SMS COMMANDS

These commands may be used through a mobile phone by sending an SMS message containing the command message to the system GSM modem that will answer with a reply SMS message to the phone number that requested the information.

To facilitate the reply message reading, the information is enclosed in a "<" and ">" sign and every reply message is preceded by a description of the EV90 control unit followed by a description of the slave module (if any) in order to promptly identify the sender.

- ???

- It is used to know the SMS commands that can be sent.
- Reply: list of available commands.

- ORA=?

- Reply: information about state of control unit such as temperatures read and set, current time and date

- ORA=12.33

To set current time

To set the required boiler temperature without changing the fixed or sliding temperature selection

- Reply: information about state of control unit

- TCALDAIA=82,5

To set the required boiler temperature without changing the fixed or sliding temperature selection

- Reply: information about state of control unit

– TCALDAIA=82,5F

To set the required FIXED boiler temperature.

- Reply: information about state of control unit

– TCALDAIA=82,5S

To set the required SLIDING boiler temperature

- Reply: information about state of control unit

– PROGx=?

To program the day “x”; where “x” represents the day of the week

1= Monday, 2= Tuesday, etc

- Reply: all 6 programming schedules for that day

– PROGx=07.00-09.30 17.30-22.00 --.-----.--

To set a program schedule for the day with 3 ON and 3 OFF periods and specifying hours and minutes. Unscheduled periods should be filled in with dashes. Leave a dash or a space between two periods.

- Reply: all 6 programming schedules for that day

– PAUT

To set the automatic time program

- Reply: information about state of control unit

– PON

To set the always on program

- Reply: information about state of control unit

– POFF

To set the always off program

- Reply: information about state of control unit

– RESET

To delete any alarm

- Reply: “ALARMS DELETED”

TECHNICAL DATA

Power supply	230V 50Hz
Consumption	5 VA
Contact rating	5A-230Va.c. (Ohmic charge) voltage free contacts
Ambient temperature	T50
Pollution degree	2
Impulse voltage	4000V
Micro-disconnection	1BU

Class A software

Weekly digital clock with 5 year charge and auto matic daylight-saving time setting

Compliance with Standards EN60730-1 Standard

Measuring probes:

- EC14 external probe
- EC15 contact probe
- EC16 immersion probe

ErP classification: ErP Class II; 2% (EU Reg. 811/2013 - 813/2013)

EXPANSION MODULES (SLAVE)

- Connection between Master EV90 and Slaves via 1 FANBUS communication channel
- All parameters modifiable and displayed through Master EV90
- Mounting on DIN rail, 6 modules - Power supply 230V 50Hz - Consumption 5 VA - Removable terminal boards to facilitate wiring

TYPE	CHARACTERISTICS	Input and output relays
TEMPERATURE REGULATION MODULE WITH OUTSIDE PROBE		
EV91A	- Broken regulation curve in 4 temperatures - Weekly programming with 6 on and off periods per day - Optimisation of switch-on time	4 relays 5A-250V a.c. (AC1). 1 analogic input for external temperature (optional) 1 analogic input for water delivery temperature
SANITARY WATER TEMPERATURE FIXED POINT REGULATION MODULE		
EV91B	- Weekly programming with 6 on and off periods per day -Water temperature regulation: 0÷100°C	3 relays: 5A-250V a.c. (Ac1). 1 analogic input for temperature measurement
MODULE FOR REGULATING TWO CASCADED BOILERS		
EV91C	- Water temperature regulation: 0÷100°C - Boiler temperature max. and min. limits - Max. 8 boilers connected	4 relays: 5A-250V a.c. (AC1). 2 analogic inputs for temperature measurement
GENERIC OUTPUT MODULE		
EV91D	- Configuration of the 4 relays: Relay ON - Relay OFF - Timed relay - Daily programming for all 8 outputs	4 relays: 5A-250V a.c. (Ac1).
DIGITAL INPUT MODULE		
EV92	- Setting of active state for all 8 inputs: opening- closing - Configuration for all 8 inputs: Failure ON-failure OFF-timed failure - Daily programming for each input	8 voltage free digital inputs

NOTES

DISPOSAL OF PRODUCTS

The crossed out wheeled dust bin symbol indicates that products must be collected and disposed of separately from household waste. Integrated batteries and accumulators can be disposed of with the product. They will be separated at the recycling centres. The black bar indicates that the product was placed on the market after August 13, 2005. By participating in separate collection of products and batteries, you will help to assure the proper disposal of products and batteries and thus help to prevent potential negative consequences for the environment and human health. For more detailed information about the collection and recycling programmes available in your country, please contact your local city office or the shop where you purchased the product.

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