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International

# OPERATING INSTRUCTIONS
## GDU
## 27-1500

CONTENTS

## 1    Introduction and Specification

The GDU is a versatile instrument designed to accommodate the general logging requirements of geotechnical engineers and scientists. Its intelligent interface allows the user to work with a range of transducers that are common requirements for a range of geotechnical tests. The GDU itself may be connected to any standard personal computer via an RS232 or via an appropriate route using an Ethernet interface

### 1.1    Use of this Manual

This manual has not been written with the technical user in mind, that is, someone who intends to write their own software to control the GDU and therefore needs to know about the GDU Data acquisition Operating System command set (GDOS commands). This user should refer to the GDU/GDOS Technical Manual 9901X0264.

Where appropriate, symbols are used to indicate the significance of any particular point in the manual. The following symbols are used:

| | |
|---|---|
| ☞ | This symbol indicates that YOU have to do something. |
| ⓘ | This symbol indicates that whatever follows is for information only. |
| ⚠ | This symbol indicates that whatever follows should be noted. It could be a warning. |

**WARNING** : The GDU is only designed for use as a data acquisition system for recording geotechnical data. The safety of the system may be compromised if used for any other purposes.

**NOTE** : The GDU has no maintenance requirements. A build up of dust on the unit may be removed by using a clean damp cloth.

**WARNING** : The GDU case should only be opened by trained service personnel. It may contain hazardous voltages and hot surfaces.

### 1.1.1 Electrical Safety

⚠ Warning : With the exception of the slot in CPU and Analogue Input Modules, the unit does not contain any user-serviceable parts.

- Do NOT attempt to open the case as dangerous voltages are present internally.

- Do NOT operate the unit if the supply cord appears damaged.

- Only connect the unit to a polarised earthed power socket.

- Switch off and unplug the unit before cleaning.

## 1.2 The GDU Operating System

The GDU Data acquisition Operating System (GDOS) is the GDU control software that runs in the GDU's CPU. It is able to interpret the English-like commands (GDOS commands) sent from a computer. These GDOS commands are used to configure the GDU for data acquisition and control and additionally may be used to interrogate the operating conditions of the GDU and recall logged data. Refer to the GDU Technical Manual for details on the command syntax.

### 1.2.1 CPU Module

The GDU mainframe accepts one CPU module with its communications interfaces. The module contains a microprocessor with the GDU operating system GDOS. The on-board clock provides a 24 hour clock and calendar. It resides in the $5^{th}$ slot to the far right-hand side of the chassis. It should not be inserted in any other positions. There are two versions of this module, one with a RS232 interface and the more recent version with both RS232 and Ethernet interfaces. Refer to section 4 for details.

### 1.2.2 Analogue Input Modules

The GDU mainframe has four slots (slots 1 to 4) which can accept one of two types of analogue input modules. MK1 and MK2 modules cannot be mixed in the same GDU chassis. Refer to section 3 for details of the Analogue Input Modules.

The system can address up to 32 individual input channels where one channel normally corresponds to one analogue input.

Each input module accepts up to eight analogue inputs. It also has a dedicated analogue to digital converter (ADC) that converts the analogue input signal to digital data. This data is transferred to the CPU for processing by the GDU system. Each module also contains a precision instrumentation amplifier with 11 programmable gain ranges (x1 to x1024).

The GDU input module covers a wide range of transducer types. Full details are given in sections 3 and 4. The following is a brief description of the facilities available.

The range provides for the connections of differential and single ended voltage sources, with sensitivities ranging from +/-5V full scale to +/-10mV full scale. A 10V supply is available for those sensors requiring excitation such as pressure transducers and LVDT's.

## 1.2.3 Physical Specification

| | |
|---|---|
| Power Requirements | 230VAC 115VAC $\pm$10% 50/60Hz |
| Power Consumption | 115VA |
| Temperature Range | Operational +5$^o$C to +40$^o$C |
| Size (W x D x H) | 365 x 320 x 160mm |
| Weight (max configuration) | 6.4 Kg |

## 1.2.4 Replacement Parts

The user replaceable parts include the AC inlet fuses, analogue input modules and CPU module.

See section 2.4 for details on fuse replacement.

Replacement CPU modules have the part number 1914B0050 (RS232 only) or 1914B0065 (Ethernet and RS232)

Replacement/additional Analogue Input modules have the part number 1914B0046 or 27-1505.

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**2      Installation and Connection**

2.1    Inspection

Before shipping, the GDU was fully tested and any additional input modules that were ordered with the unit will have been fitted. Carefully check that all modules are in place and that there are no signs of damage.

2.2    Pre-Installation Checks

Before connecting power to the GDU, check that the voltage selection switch is correctly set, the plug-in modules are correctly inserted and their retaining screws are tightened.

2.3    Installing Additional Input Modules

The basic GDU consists of the chassis with a CPU with RS232 interface.

For systems with one analogue input module, this is inserted in slot 1 as default.

Modules must not be plugged in or removed whilst the system power is on.

If additional modules are ordered with the GDU chassis, these will be fitted and tested so that no installation will be necessary. When input modules are removed or supplied separately, the installation details are given in the data sheet located in section 3.3.

2.4    Power Connections

The power connections for your GDU depend which model GDU you have.

If your GDU is designed to operate on 230V then you will have been supplied with a fully moulded cable set fitted with a 5A fuse. A UK approved cable set is provided. If the GDU is designed to operate on 115V then a US style moulded cable set fitted with a 10A fuse is supplied.

No other lead is supplied to connect the GDU to any of the alternative input power supplies supported by GDU.

The GDU must be operated from a clean power supply or UPS (uninterrupted power supply) or you may incur power down errors.

ⓘ The GDU has two anti-surge (T) fuses that that are used to protect the unit in the case of over-current conditions. There are 2.5A fuses. If these fuses are to be replaced use a 250V rated, UL/CSA certified part and fit in the positions shown below.
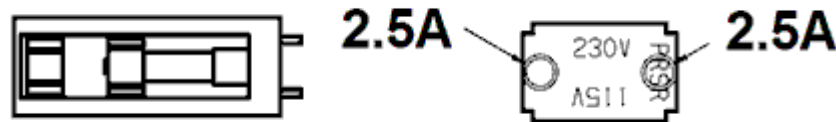


## 2.5 Construction

### 2.5.1 Dimensions

The GDU physical dimensions are as follows:

| | |
|---|---|
| Height | 3U (160mm) |
| Width | 365 mm |
| Depth | 320 mm |

### 2.5.2 Mainframe Chassis

The mainframe chassis is of a modular construction that will enable you to upgrade your GDU to satisfy further demands you may place on the unit. The backplane PCB has 5 DIN 41612 type C sockets for easy module insertion.

There are 4 slots of which you may insert up to 4 analogue input module cards (slots 1 through to 4) dependent on the tasks you require the GDU to perform.

### 2.5.3 Internal Power Supply

The internal power supply provides all the necessary voltages to drive all the modules that may be fitted.

### 2.5.4 Rear Panel

ⓘ Situated on the rear panel you will find the power on switch/filter that provides AC input for the unit. This is fitted with 2.5A anti-surge fuses.

The rear panel also has the output connectors to your computer, a 9 D-type connector plug for RS232 communication. Chassis that support an Ethernet connection also have an RJ45 socket.

A USB connector which may be used for future firmware updates is also on the rear panel. This connection MUST NOT be left connected to a PC or the GDU will not communicate via it's Ethernet or RS232 interface.

## 2.6 Computer Communications Interfaces

The GDU is available with an RS232 interface and (from 2015 onwards) an Ethernet connection, for communication with the host computer. Both interface connectors are located on the rear panel of the GDU. The connection is a 9 way D fixed plug for the RS232 interface. The Ethernet connector is a standard 8 way RJ45 socket.

Before connecting the GDU to the computer system it is recommended that the following precautions be observed:

❖ All peripheral devices should be turned off

❖ Plug each peripheral and the host into the mains supply

❖ All devices must have their grounds connected to the mains earth.

2.7 Configuring the RS232 Interface

The RS232 interface does not need configuring as it has a fixed baud rate/protocol. The host computer must be able to support the following configuration.

2.7.1 Baud Rates and Word Formats

The rate at which devices can communicate is specified by a "Baud rate" or the number of BITS/second. It is important that both transmitting and receiving devices operate at the same rate. Data is transmitted as a burst of pulses comprising an initial START BIT, followed by a number of BITS that constitutes a word.

Baud rate is 9600, Word size is 8 BITS with no PARITY check, and finally 1 STOP BIT.

2.7.2 XON/XOFF protocol

This legacy mode where the host has no "listen" or input buffer for temporarily storing data, eg. Apple or Hewlett Packard microcomputers, is not supported.

2.7.3 RS232 Interface Connections

The standard 9 way 'D' RS232 interface connector is located on the GDU rear panel and has the following pin connections:

| Pin | Signal |
|---|---|
| 1 | Protective Earth |
| 2 | TxD (from GDU) |
| 3 | RxD (to GDU) |
| 4 | Not connected |
| 5 | Signal 0v |
| 6 | Not connected |
| 7 | Not connected |
| 8 | Not connected |
| 9 | Not connected |

*Table 6 RS232 Interface Connections*

The GDU uses a form of software handshaking to control the data interchange between it and the host computer and therefore does not use the interface handshake lines. RTS and DTR are not driven by GDU. Before connecting to the host computer consult the computer's manual for details of its RS232 interface connections and what handshake lines (if any) are used. Only three connections between the GDU and the computer are necessary, TxD, RxD and Signal 0V. Take care to ensure that the data transmitter at the computer end is connected to the data receiver at the GDU end and vice versa.

## 2.7.4 Ethernet Interface

The optional Ethernet interface is on an RJ45 connector on the rear panel of the GDU. It supports a 10BASE-T transfer.

## 2.8 Configuring the Ethernet Interface

The use of the Ethernet interface to connect the GDU to the PC running the DS7 application will probably require the assistance of local IT support. The Ethernet RJ45 connection connects to the local router and then on to the PC. The default configuration for the unit is for an automatically assigned IP address, with a device name of ELE-GDU00. If multiple GDUs are to run on the same network or IP addresses have to be assigned manually, refer to Section 5 for details.

## 2.9 Switching On

The memory in the GDU is stored in one of two ways depending on what CPU module is used. The module 1914B0050 has memory backed up with a battery to prevent loss of data in the case of a short power outage. The module 1914B0065 uses non-volatile memory that does not need a battery. When powered up in the GDU the two types of module may be differentiated by the colour of the power LED.

The module 1914B0050 has a red LED.

The module 1914B0065 has a blue LED.

Both modules have circuitry to detect a power failure.

On power up the system checks the power status and the integrity of any test data in the memory. Both the POWER and red PWR FAIL indicators on the front panel of the CPU module will be lit. If the memory check fails the red ERROR indicator will also be on.

Unless there is a problem with the CPU the GDU should always power up on with the PWR FAIL indicator on. Failure to do so may indicate that the battery back-up or power fail circuitry is faulty.

## 2.10 Power Failure Recovery

The GDU's data storage memory is either powered by a battery in the absence of a mains supply or uses non-volatile memory. The battery back-up design preserves data acquired previously during tests for a period in the case of short power outages.

If the mains supply voltage drops below 200 VAC (or approximately 100 VAC in 110 VAC regions) the CPU is liable to go into random states. However, special memory protection is triggered if the supply drops below this level. If the supply continues to fall the memory and RTC power is switched to the battery supply. When the mains power returns to normal, the protection circuit waits momentarily for the power supplies to stabilize and then allows the CPU to start operating. If the memory fails on power up the GDU indicates this with the ERROR LED.

The PWR FAIL indicator is used as direct indication that a power-failure has occurred. This is important if the GDU is to be left unattended for long periods of time, when this indicator can act as "tell-tale".

Tests can continue after a PWR FAIL has been acknowledged. However, the validity of the test data needs to be confirmed as the power failure may have affected the readings presented by the sensors.

## 3 Analogue Input Module with Transducer Excitation

### 3.1 General Description

The Analogue Input Module acts as general purpose input scanner capable of accepting up to 8 separate signal sources.

Type 1 has the part number 1914B0046 or 27-1505, its SCAN LED is green in colour.

The input signals can range from +/-5 volts full scale when used with a system gain of 1, to +/-9.76 m.volts full scale when used with a system gain of 1024. The input channels are connected to the system analogue to digital conversion module by an 8 channel 2 pole solid state multiplexer.

The module features a 10 volt stabilised power supply for transducer excitation, thus simplifying the tasks of connecting many types of sensor, and has input overvoltage protection to prevent system damage in the event of incorrect connections being made.

The module has built-in gain, offset circuitry and an ADC. On the front of the module are 9 status LEDs. Type 1 modules use a 16 bit ADC and offset circuits. Type 2 modules use a 22 bit ADC.

The top left LED, green or blue (the SCAN LED) shows the module has been correctly recognised by the CPU. The other vertical 8 LEDs down the centre of the module indicate the channel selection status. These LEDs are on when a particular channel has been 'SET'.

The top LED is for channel 1, going down to the channel 8 LED at the bottom.
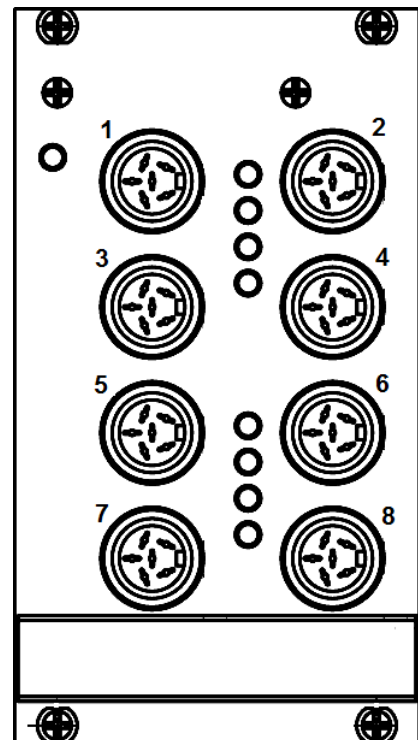
3.2    Specification

|  |  |
|---|---|
| Number of input channels | 8 Differential |
| Signal Range | +/-10 Volts Full Scale (x1 system gain) to |
|  | +/-9.76mV Full Scale (x1024 system gain) |
| Cross Talk Immunity @ DC | 120 dB |
| Cross Talk Immunity @ 10 kHz | 80 dB |
| Leakage Current | 10 nA |
| Transducer Supply | 10 Volts +/-10 mV |
| Stability | 50 ppm/dgC |
| Maximum current per module | 500 mA |
| Maximum Input Voltage | ± 14 Volts |

3.3    Installation

Before installing the input module in the mainframe the 2 address switches (S1) on the card must be set so that the module's input channels correspond to those required. In the following table the switches are numbered 1 and 2. The channels are set in blocks of 8.

| S1-1 | S1-2 | Ch. Range |
|------|------|-----------|
| DOWN | DOWN | 1 to 8 |
| UP | DOWN | 9 to 16 |
| DOWN | UP | 17 to 24 |
| UP | UP | 25 to 32 |

*Table 1  Module Address Selection*

Having set the channel range, turn off the system power and insert the module into the required I/O slot. The module can be plugged into any of the 4 I/O slots regardless of the channel range selected but it is recommended that the left-most slot is used for channels 1 to 8, the next slot for channels 9 to 16 and so on. Care must be taken not to set up different modules with the same channel range.

3.4    Signal Input Configurations

Signals within the input module are switched to the input of a programmable gain instrumentation amplifier. This amplifier will accept differential signals within a ± 14 volt range of the system common (Signal 0v). For single ended inputs connect Signal 0v to the –ve signal input. Ideally this should be done at the signal source. If this is not possible then make the link on the input module connector.

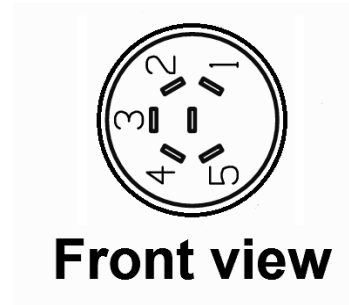| Pin | Signal |
|-----|--------|
| 1 | -ve Channel Input |
| 2 | +ve Channel Input |
| 3 | Signal 0v |
| 4 | -5v  Supply |
| 5 | +5v Supply |

**Front view**

*Table 2   5 Way Din Connectors and Screw Terminal Connections*

## 4 CPU Module

4.1 General Description

The GDU CPU consists of a microprocessor, low power memory, Micro SD card and various interfaces.

There are five status LEDs that indicate the current condition of the CPU.

POWER : a red or blue LED indicating that the 5V power is active.

SCAN : a green LED indicating the ADC cards are being sampled.

ERROR : a red LED indicating error conditions, see below.

COMMS : green LED indicating comms traffic between the GDU and host PC.

PWR FAIL : a red LED indicating a power fail has occurred since the last system RESET.

Error LED

Flashes if there is no valid program in the SD card or program space. Stays on for invalid data in battery backed RAM. Is on if there is an invalid comms message, then cleared when the host PC sends an ERROR message.

4.2 Switch Settings and Jumper

There are two eight bank DIP switches (S1 and S2) on the GDU CPU.

Switch S1 is used for test mode and Ethernet setup (where applicable, see section 5 below).

Switch S2 is reserved for development use.

The CPU module 1914B0050 has a jumper J1 on the battery back-up link. It should be removed if the unit is to be left un-powered for more than a few days.

4.3 Firmware Updates

The CPU contains a flash memory device that holds the firmware for the GDU. This device will appear as a memory device when connected to a PC via the USB connection on the rear panel. The green COMMS LED on the CPU front panel should be on continuously when this occurs. The firmware can then be updated by copying (over-writing) the latest GDU_BOOT.BIN file to the memory device. Once this has been done, do not eject the device, instead remove the USB cable. The SCAN, ERROR, COMMS and PWR FAIL LEDs should then flash as the programming sequence completes.
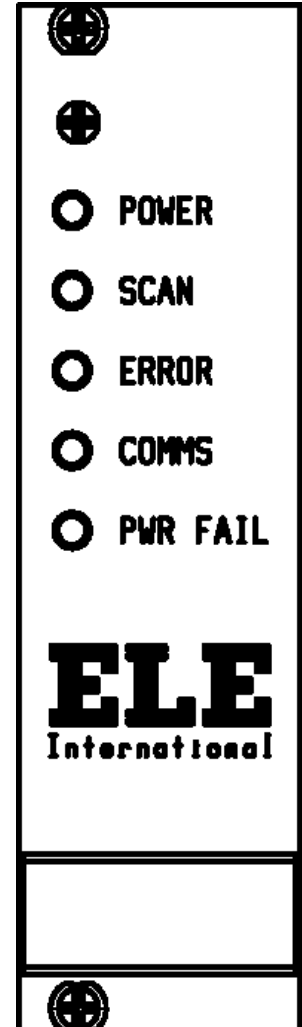
## 5 Ethernet Interface

The default device name of the GDU can be set via switch S1 on the CPU module 1914B0065. Switch S1-5 must be OFF.

| S1-1 | S1-2 | S1-3 | S1-4 | GDU Name |
|------|------|------|------|----------|
| Off | Off | Off | Off | ELE-GDU00 |
| On | Off | Off | Off | ELE-GDU01 |
| Off | On | Off | Off | ELE-GDU02 |
| On | On | Off | Off | ELE-GDU03 |
| Off | Off | On | Off | ELE-GDU04 |
| On | Off | On | Off | ELE-GDU05 |
| Off | On | On | Off | ELE-GDU06 |
| On | On | On | Off | ELE-GDU07 |
| Off | Off | Off | On | ELE-GDU08 |
| On | Off | Off | On | ELE-GDU09 |
| Off | On | Off | On | ELE-GDU10 |
| On | On | Off | On | ELE-GDU11 |
| Off | Off | On | On | ELE-GDU12 |
| On | Off | On | On | ELE-GDU13 |
| Off | On | On | On | ELE-GDU14 |
| On | On | On | On | ELE-GDU15 |

The GDU can be set to a static IP address by setting switch S1-5 to On. By using the RS232 port a command is sent to configure the IP address. Refer to section 2.7 on the RS232 comms protocol.

The command format is :-

IPCFG <IP address> <gateway address> <subnet mask>

For example IPCFG 192.168.1.10 192.168.1.254 255.255.255.0

If the IPCFG command is sent with no parameters, the unit responds with the current IP configuration.

# EC DECLARATION OF CONFORMITY

**ELE**
**International**

This Original Declaration of Conformity is suitable to Decision No 768/2008/EC of the European Parliament and the Council of 9 July 2008 on a common framework for the marketing of products and contains the elements specified in the relevant modules set out in Annex II of that Decision for the applicable Directives.
This declaration relates exclusively to the equipment in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

## Applied Council Directives(s)

The fulfilment of all relevant provisions specified in Council Directive(s)

| | |
|---|---|
| 2014/30/EU | Electromagnetic Compatibility (EMC) |
| 2014/35/EU | Low Voltage Directive (LVD) |
| 2011/65/EU | RoHS2 Directive and Commission Delegated Directive (EU)2015/863 |

have been demonstrated

We, the Manufacturer:

**ELE International,** Chartmoor Road, Chartwell Business Park, Leighton Buzzard, Bedfordshire LU7 4WG, UK

declare under our sole responsibility that the following equipment

| | |
|---|---|
| **Product :** | **GDU 1914C0001 revision 4** |
| **Catalogue Number :** | **27-1500/nn** |
| **Description :** | **Data acquisition unit for geotechnical sample testing** |

The object of the declaration described above, is in conformity with the relevant Union Harmonisation Decision and the provisions of the following standard(s) or other normative document(s) when installed in conformance with the installation instructions contained in the product documentation

**EMC**

| | | |
|---|---|---|
| Emissions: | EN61326-1:2013 | Group 1, Class B |
| Immunity: | EN61326-1:2013 | Basic Immunity |

Clauses pertinent to the Low Voltage Directive of

| | |
|---|---|
| EN61010-1:2010 | Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1 General requirements |
| RoHS2: | EN 50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances. |

The technical file's authorised compiler (named below) is at the address above.
We, the undersigned, hereby declare that the product(s) specified above conform to the listed directive(s) and Standard(s)

| | |
|---|---|
| Date of issue : | 23.6.16 |
| Signed : | |
| Name : | Tony Power |
| Position : | Managing Director |

BS EN ISO9001: 2008 approved
Certificate number 860461

9901X0263 Issue 3

# DIRECTIVE ON WASTE ELECTRICAL & ELECTRONIC EQUIPMENT

 Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August of 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the Producer for disposal at no charge to the user.

*Note: For return for recycling, please contact the equipment producer or supplier for instructions on how to return end-of-life equipment for proper disposal.*

**Important document. Retain with product records.**

## GERMAN

Elektrogeräte, die mit diesem Symbol gekennzeichnet sind, dürfen in Europa nach dem 12. August 2005 nicht mehr über die öffentliche Abfallentsorgung entsorgt werden. In Übereinstimmung mit lokalen und nationalen europäischen Bestimmungen (EU-Richtlinie 2002/96/EC), müssen Benutzer von Elektrogeräten in Europa ab diesem Zeitpunkt alte bzw. zu verschrottende Geräte zur Entsorgung kostenfrei an den Hersteller zurückgeben.

*Hinweis: Bitte wenden Sie sich an den Hersteller bzw. an den Händler, von dem Sie das Gerät bezogen haben, um Informationen zur Rückgabe des Altgeräts zur ordnungsgemäßen Entsorgung zu erhalten.*

**Wichtige Informationen. Bitte zusammen mit den Produktinformationen aufbewahren.**

## FRENCH

A partir du 12 août 2005, il est interdit de mettre au rebut le matériel électrique marqué de ce symbole par les voies habituelles de déchetterie publique. Conformément à la réglementation européenne (directive UE 2002/96/EC), les utilisateurs de matériel électrique en Europe doivent désormais retourner le matériel usé ou périmé au fabricant pour élimination, sans frais pour l'utilisateur.

*Remarque : Veuillez vous adresser au fabricant ou au fournisseur du matériel pour les instructions de retour du matériel usé ou périmé aux fins d'élimination conforme.*

**Ce document est important. Conservez-le dans le dossier du produit.**

## ITALIAN

Le apparecchiature elettriche con apposto questo simbolo non possono essere smaltite nelle discariche pubbliche europee successivamente al 12 agosto 2005. In conformità alle normative europee locali e nazionali (Direttiva UE 2002/96/EC), gli utilizzatori europei di apparecchiature elettriche devono restituire al produttore le apparecchiature vecchie o a fine vita per lo smaltimento senza alcun costo a carico dell'utilizzatore.

*Nota: Per conoscere le modalità di restituzione delle apparecchiature a fine vita da riciclare, contattare il produttore o il fornitore dell'apparecchiatura per un corretto smaltimento.*

**Documento importante. Conservare con la documentazione del prodotto.**

## DANISH

Elektriske apparater, der er mærket med dette symbol, må ikke bortskaffes i europæiske offentlige affaldssystemer efter den 12. august 2005. I henhold til europæiske lokale og nationale regler (EU-direktiv 2002/96/EF) skal europæiske brugere af elektriske apparater nu returnere gamle eller udtjente apparater til producenten med henblik på bortskaffelse uden omkostninger for brugeren.

*Bemærk: I forbindelse med returnering til genbrug skal du kontakte producenten eller leverandøren af apparatet for at få instruktioner om, hvordan udtjente apparater bortskaffes korrekt.*

**Vigtigt dokument. Opbevares sammen med produktdokumenterne.**

## SWEDISH

Elektronikutrustning som är märkt med denna symbol kanske inte kan lämnas in på europeiska offentliga sopstationer efter 2005-08-12. Enligt europeiska lokala och nationella föreskrifter (EU-direktiv 2002/96/EC) måste användare av elektronikutrustning i Europa nu återlämna gammal eller utrangerad utrustning till tillverkaren för kassering utan kostnad för användaren.

*Obs! Om du ska återlämna utrustning för återvinning ska du kontakta tillverkaren av utrustningen eller återförsäljaren för att få anvisningar om hur du återlämnar kasserad utrustning för att den ska bortskaffas på rätt sätt.*

**Viktigt dokument. Spara tillsammans med dina produktbeskrivningar.**

## SPANISH

A partir del 12 de agosto de 2005, los equipos eléctricos que lleven este símbolo no deberán ser desechados en los puntos limpios europeos. De conformidad con las normativas europeas locales y nacionales (Directiva de la UE 2002/96/EC), a partir de esa fecha, los usuarios europeos de equipos eléctricos deberán devolver los equipos usados u obsoletos al fabricante de los mismos para su reciclado, sin coste alguno para el usuario.

*Nota: Sírvase ponerse en contacto con el fabricante o proveedor de los equipos para solicitar instrucciones sobre cómo devolver los equipos obsoletos para su correcto reciclado.*

**Documento importante. Guardar junto con los registros de los equipos.**

## DUTCH

Elektrische apparatuur die is voorzien van dit symbool mag na 12 augustus 2005 niet meer worden afgevoerd naar Europese openbare afvalsystemen. Conform Europese lokale en nationale wetgegeving (EU-richtlijn 2002/96/EC) dienen gebruikers van elektrische apparaten voortaan hun oude of afgedankte apparatuur kosteloos voor recycling of vernietiging naar de producent terug te brengen.

*Nota: Als u apparatuur voor recycling terugbrengt, moet u contact opnemen met de producent of leverancier voor instructies voor het terugbrengen van de afgedankte apparatuur voor een juiste verwerking.*

**Belangrijk document. Bewaar het bij de productpapieren.**

## POLISH

Sprzęt elektryczny oznaczony takim symbolem nie może być likwidowany w europejskich systemach utylizacji po dniu 12 sierpnia 2005. Zgodnie z europejskimi, lokalnymi i państwowymi przepisami prawa (Dyrektywa Unii Europejskiej 2002/96/EC), użytkownicy sprzętu elektrycznego w Europie muszą obecnie przekazywać Producentowi stary sprzęt lub sprzęt po okresie użytkowania do bezpłatnej utylizacji.

*Uwaga: Aby przekazać sprzęt do recyklingu, należy zwrócić się do producenta lub dostawcy sprzętu w celu uzyskania instrukcji dotyczących procedur przekazywania do utylizacji sprzętu po okresie użytkowania.*

**Ważny dokument. Zachować z dokumentacją produktu.**

## PORTUGESE

Qualquer equipamento eléctrico que ostente este símbolo não poderá ser eliminado através dos sistemas públicos europeus de tratamento de resíduos sólidos a partir de 12 de Agosto de 2005. De acordo com as normas locais e europeias (Directiva Europeia 2002/96/EC), os utilizadores europeus de equipamentos eléctricos deverão agora devolver os seus equipamentos velhos ou em fim de vida ao produtor para o respectivo tratamento sem quaisquer custos para o utilizador.

*Nota: No que toca à devolução para reciclagem, por favor, contacte o produtor ou fornecedor do equipamento para instruções de devolução de equipamento em fim de vida para a sua correcta eliminação.*

**Documento importante. Mantenha junto dos registos do produto.**