OPERATING INSTRUCTIONS

AutoComp 100-A

45-6600

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Contents

Introduction

1.1 This ruggedly constructed machine eliminates the laborious process of hand compaction and so results in a very even degree of compaction. The unit incorporates a compaction pedestal, constructed to satisfy BS 598, EN 12697-30, comprising a laminated hardwood block secured to a concrete base by a 300 mm sq x 25 mm thick steel plate. The drive mechanism lifts the 4.53 kg compaction weight to the correct height of 457 mm (18 inches) and allows free fall. The unit complies fully with agreed changes to EN 12697-30.

1.2 The conveniently positioned control fascia panel comprises a mains light, start and stop buttons, and a push-key electronic counter, to set the required number of blows which, during operation, automatically counts down to zero. In order to make the machine more reliable, dual rammer pick-ups have been incorporated, thereby reducing stress on the machine's internal mechanism.

1.3 The compactor has several built-in safety features which include: the enclosure of all working parts within a cabinet, a safety lever which ensures that the rammer cannot fall when the sample is being inserted or removed, a safety switch which will prevent the machine operating if the safety lever is engaged and/or the cabinet door is open, a device which prevents the rammer from striking the baseplate, thereby avoiding serious injury should the rammer be released without the mould in position.

2 Specification

Dimensions (approx)	Height x width x depth 1880 x 535 x 535 mm
Rammer diameter	98.5 mm
Rammer weight	4.535 kg ± 25 g
Height of drop	457 mm ± 5 mm
Number of blows	50 in 55-60 secs
Pedestal laminated wood	Height x width x depth 450 x 200 x 200 mm
Pedestal tie rod tension	10 ± 1 Nm on an M10 thread
Concrete density (min)	2200 kg/m^3

2.1 Electrical Supply

Safety

Whilst the test is in operation do not remove any covers or attempt to adjust any part of the machine.

Ensure all moving parts are thoroughly secured before attempting any maintenance.

Ensure all appropriate measures are taken to protect the operator from excessive noise.

See noise certificate (when supplied).

Electrical safety
Warning: Before removing any covers or performing maintenance repair and service, isolate from electrical supply by removing mains plug. Where mains supply is required during these activities, only competent persons should perform the work.

Check that the power supply is compatible with the requirements stated on the label and connect in accordance with IEE regulations or to local requirements.

Local isolation to machine is required.

It is advised that this machine be connected via a residual current device (not supplied) and it should operate if earth leakage current exceeds 0.03 amps.

The power cable is coded as follows:

Brown wire	L	Live or Power
Blue wire	N	Neutral
Green/Yellow wire	E	Earth or Ground

Note: exercise extreme caution when using the machine with wet hands. Dry hands before operating machine.

Portable Appliance Tests (PAT)

All ELE designed products are tested for electrical safety prior to sale.

An electrical safety test label is fitted (usually adjacent to the mains input socket).

Should no label be found, please contact ELE Service Department quoting the serial number of the equipment.

Organisations have an obligation to ensure equipment is maintained and is safe for use. Regular PAT testing is one means of ensuring equipment continues to be electrically safe.

Important: do not connect PAT leads to sensitive components such as PCBs, control switches and the like.

DO NOT FLASH TEST ELECTRONIC EQUIPMENT.

If in doubt as to the most suitable connection point (which will usually be an earth stud or an external earth connection), contact ELE Service Department for assistance.

3 Description

3.1 Rammer assembly (Figure 2)

3.1.1 The rammer assembly is supported on a rigid steel spine (1) extending up from the concrete base.

3.1.2 The rammer (8) which includes a trip, is lifted alternately by one of two pawls (5) that are chain driven and guided by a guide rail (6), that incorporates a trigger (2) to operate the rammer trip.

3.1.3 Attached to the lower end of the guide rail is the rammer foot (9) incorporating a spring and an anvil to accept the force of the free falling rammer.

3.1.4 A microswitch (3) is arranged to record each lift of the rammer to operate the automatic stop mechanism at the completion of each compaction sequence.

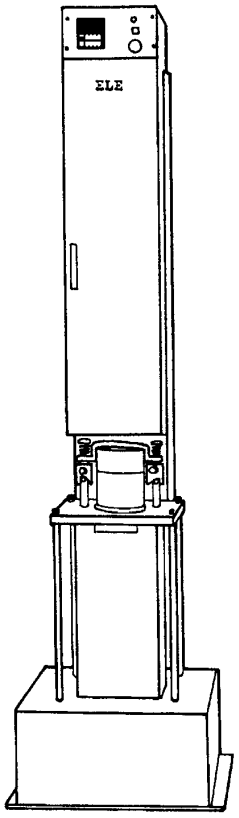

Figure 1 Automatic Bitumen Compactor

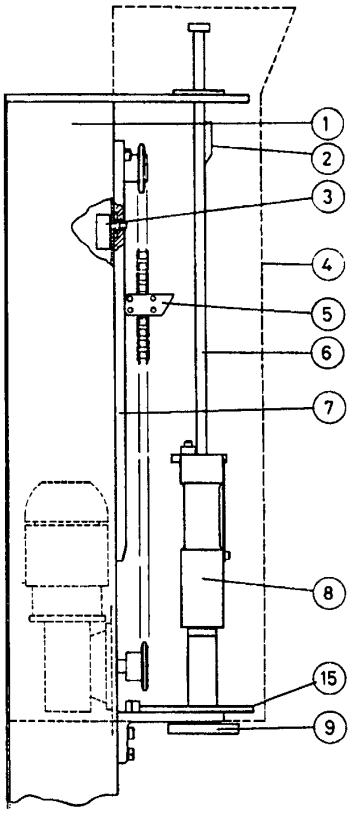

Figure 2 Rammer Assembly

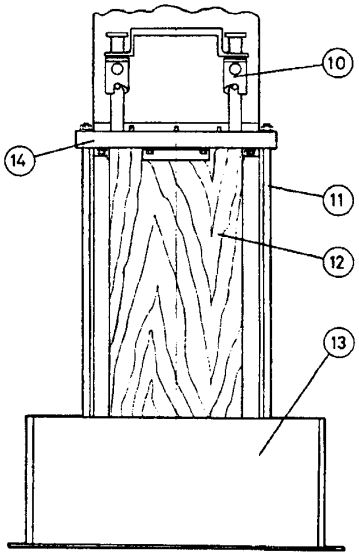

Figure 3 Base and Pedestal Assembly

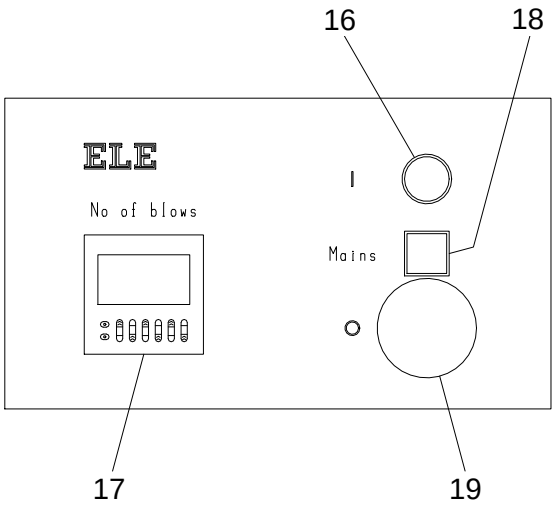

Figure 4 Controls

3.1.5 A safety device (15) is incorporated to prevent the rammer assembly dropping when the mould is being positioned or removed.

3.2 Base and pedestal assembly (Figure 3)

3.2.1 An important feature of Marshall compaction is the wooden pedestal (12) placed between the mould and rammer and the reaction mass.

3.2.2 The pedestal is placed under a small compressive force using 4 tie rods (11) between the concrete base and the 25 mm thick steel mould baseplate (14).

3.2.3 The mould baseplate incorporates a clamp arrangement (10) to lock the mould into an aligned position before compacting of the specimen is undertaken.

3.2.4 The concrete base is designed to give a consistent mass to absorb the energy of compaction.

3.3 Controls (Figure 4)

3.3.1 Above the rammer assembly the controls are conveniently positioned and include:

(a) mains on indicator (18)
(b) start button (16)
(c) blow set and counter unit (17)
(d) Emergency stop button (19)

3.3.2 The blow set and counter unit sets the number of blows per compaction, counts down the blow sequence, automatically stops the sequence when the correct number of blows has been applied, and includes a device for reselecting a preset blow sequence.

3.4 Safety gates (Figure 2)

3.4.1 The unit is provided with a gate (4) enclosing the rammer assembly which incorporates a magnetic switch to prevent operation of the rammer mechanism when the gate is open.

3.4.2 Two windows are provided to measure the upper and lower limits of rammer travel during operation.

4 Installation

4.1 The machine must be installed on a concrete base preferably at ground level. If it is necessary to install the unit on an upper floor this must be concrete and the unit must be set over, or as near as possible, to a rigid structural support.

4.2 Place a spirit level on the steel mould baseplate and adjust the machine until it is level.

Note: If not level this may cause friction between the rammer and guide.

4.3 The machine may be bolted down using 4 x 12 mm grouted bolts. The centres for the bolt holes are 490 mm wide x 360 mm deep.

4.4 Where possible, the location should offer easy access to the oven and mixer used as part of the technique.

4.5 Before connecting the electrical supply, clean all surfaces with white spirit or kerosene to remove protective wax. Coat all surfaces with a light machine oil.

5 Operation

5.1 Counter

5.1.1 Omron H7CX

The preset value (Green display) is set by pressing the up keys (numbered 1 – 6).

The reset key (RST) returns the count value (Red display) to Zero.

5.1.2 Omron H7CL

The counter provides nine push-keys for programming and operating. Eight of the keys on the right hand side are marked with either up or down arrows for incrementing the set value. The ninth key on the extreme left, labelled RST, is used for resetting the preset value.

Each of the eight digit-increment keys is associated with the digit immediately above it in the four-digit subsidiary display.

Digit increment keys

This push-key allows the user to set the value of the digit immediately above it in the subsidiary display. When the top push-key is operated repetitively the digit being set will step upwards in value from 0 – 9. The lower key will step downwards in value from 9 – 0.

Reset

This push-key allows the user to reset the instrument's main display and output relay.

Note: the counter is protected by a 50 mA type 'T' fuse on 220-240V models and a 100 mA type 'T' fuse on 110-120V models.

5.1.3 Autonics CT6S

Counting down from the number displayed at the start of a test the counter will automatically monitor the number of blows applied to the sample and will stop the machine at the required number set by the user.

After test conclusion press the (RST) to reset the counter back to the maximum required number of blows.

To change the previous set number of blows first press the ($\langle$) key then, using the same key, move flashing curser along to the digit to be changed.
Then use the ($\vee$ $\wedge$) keys to adjust the digits to the correct blow requirement.
When the overall number of blows showing is correct, press the (MD) key to set ready for use.

5.2 Preheating the rammer head

5.2.1 The British Standard technique includes a steel block 100 mm dia x 50 mm thick which is heated to the specimen temperature.

5.2.2 Before commencing a sequence of compactions the heated block is placed on the steel baseplate and the rammer lowered onto it to obtain a preheat of the rammer head.

5.3 Loading the mould assembly for compaction

5.3.1 Open the safety door and lift the rammer assembly using the guide rod (6) until it can be locked up using the lever (15).

5.3.2 Lift the mould clamp using the levers (10).

5.3.3 Place the prepared mould and sample onto the baseplate (14) and locate using the guide pins (23 Fig 5).

5.3.4 **Note:** the machine is designed to accept compaction moulds to two sizes. If using mould to EN 12697-30, fit the three adaptors (supplied loose) over the guide pins (23 Fig 5).

5.3.5 Lower the mould clamp using levers (10) and lower the rammer head onto the sample in the mould by holding the rammer and releasing the safety lock (15).

5.3.6 **Note:** to operate the machine the safety lock must be fully retracted and the safety door closed.

5.4 Compaction

5.4.1 The time for the loading and compaction sequence for the sample should be as short as possible to minimise heat loss.

5.4.2 When ready and the blow sequence set (see Section 5.1) press the start button (16) to start compaction of the sample.

Note: the stop button (19) will override the count and immediately stop compaction.

6 Height of Rammer Drop

6.1 The British Standard requires the height of drop to be measured during operation. Two windows are provided for this in the safety door.

6.2 Suggested procedure

6.2.1 Prepare a sample in the normal manner and assemble as detailed in Section 5.

6.2.2 Select 50 blows on the counter and operate the machine to complete the first compaction sequence.

6.2.3 Invert the specimen and mould body and proceed to the second compaction sequence.

6.2.4 After the first 10 blows record the upper and lower limits of travel of the registering on a suitable datum.

6.2.5 **Note:** defining the lower limit will be difficult due to the bounce that occurs from impact.

6.2.6 The design is such that adjustment should not be necessary.

7 Maintenance (Figure 2)

7.1 Daily

7.1.1 According to the work load, the rammer guide (6) and rammer (8) should be cleaned and dried.

7.1.2 Check that the rammer head is tight on the guide assembly.

7.2 Periodically (according to workload) see Figure 3.

7.2.1 Check the tightness of the base assembly tie rods (11).

7.2.2 **Note:** the British Standard BS 598 states that the tension on each rod should be equivalent to a torque of 10 ± 1 Nm on an M10 thread.

7.2.3 Check the tension of the lift chain. If the slack is more than 15 mm this should be tightened as detailed below.

7.2.4 Open the safety door. The top chain sprocket is mounted on a bracket (26) with an adjuster (25).

7.2.5 To adjust the chain tension slacken the three bolts (27) and, using a hexagon wrench on the adjuster (25), move the sprocket plate to achieve the required tension of the chain.

7.2.6 Lubricate all moving parts.

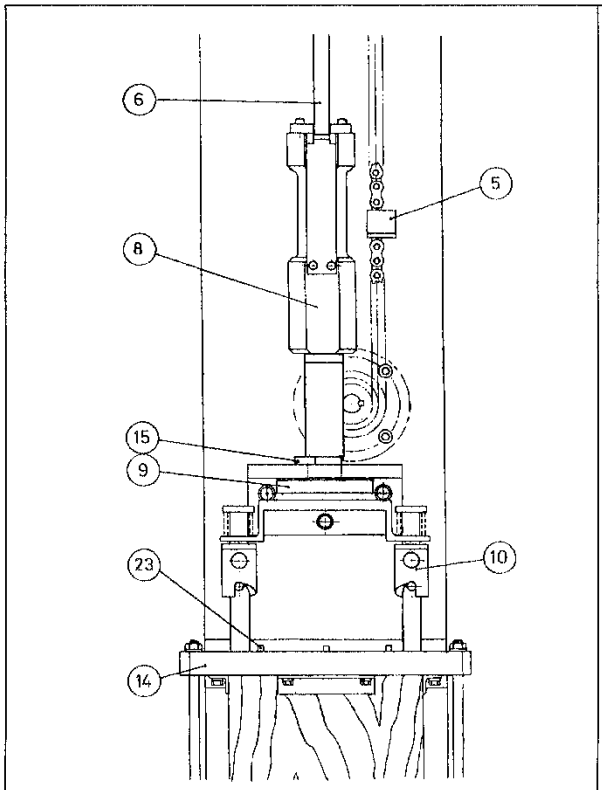

Figure 5 Load Sequence

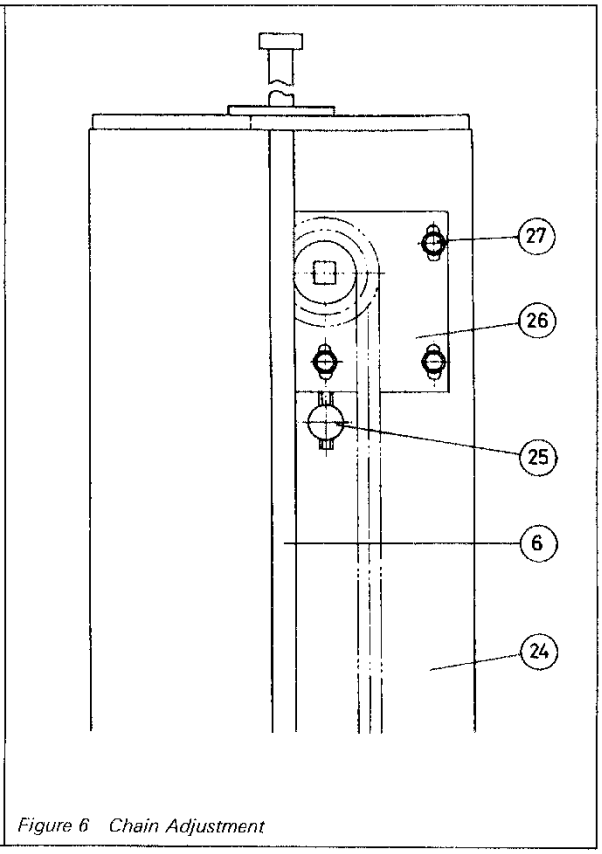

Figure 6 Chain Adjustment

Declaration of Conformity

Issued By: **ELE International**

Date of Issue: 1 January 1998 ELE doc ref: 9901X0041

ELE International

Approved Signatory

We, ELE International, Chartmoor Road, Chartwell Business Park, Leighton Buzzard, Beds LU7 4WG, England, declare under sole responsibility that the following product(s) to which this declaration relates is (are) in conformity with the provisions of:

73/23/EEC Electrical Equipment Directive implemented in the UK by S1728/1989 amended by 93/68/EEC 1/1/1997.

Electrical Safety tested to BS EN 60204-1.

89/392/EEC, 91/368/EEC, 93/44/EEC and 93/68/EEC Machinery Directive implemented in the UK by S13073/1992 and S12063/1994.

89/336/EEC, 91/263/EEC, 92/31/EEC (the EMC Directive) amended by 93/68/EEC and implemented in the UK by SI/2372/1992 and SI/3080/1994.

Emissions tested to BS EN 50081-1 Domestic/Light Industrial.
Immunity tested to prEN 50082-2 Industrial.

Product Description		Serial No.
45-6600 series	AutoComp 100-A Bitumen Compactor	(See details on product identification plate)

BS EN ISP9001: 1994 approved
Certificate number 860461

Responsible person's/approved signatory
M Green, Managing Director

This Declaration of Conformity complies with BS 7514 (EN 45014), General Criteria for suppliers' Declaration of Conformity

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ELE International, a division of Danaher UK Industries Ltd

Noise Test Certificate

Issued By: **ELE International**

Date of Issue: 1 January 1995 ELE doc ref: 9901X0041

Date of Test: 1 January 1995

ELE International

Approved Signatory

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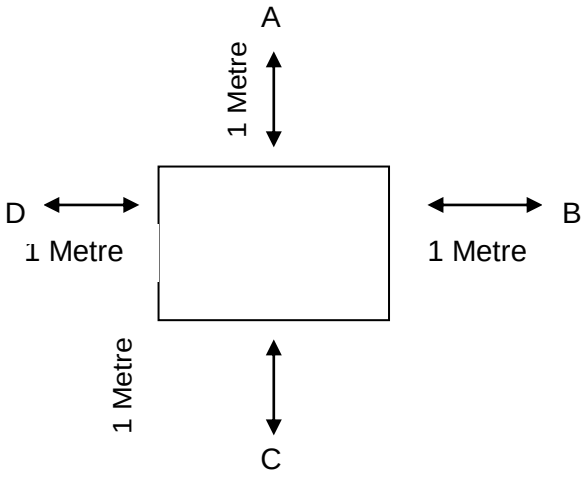

Measurements/recorded noise level

Position A	83	dB
Position B	82	dB
Position C	84	dB
Position D	84	dB
Position E	88	dB

(Normal operator position)

Background Noise level 56 dB

Notes:

BS EN ISP9001: 1994 approved
Certificate number 860461

Noise tests were carried out using Test Meter, serial No.

N30863

which has been calibrated using calibrated standards traceable to national standards of measurement.

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DIRECTIVE ON WASTE ELECTRICAL & ELECTRONIC EQUIPMENT (WEEE)

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.