

Power-Block

Power distribution board

Manual



DC Version | Item number 72-00326



TB Version | Item numbers 72-00335 | 72-00336



HC Version | Item number 72-00346

Version: 2.1 | Status: 06/2024

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Printing the manual

The formatting is optimised for double-sided printing. The standard page size is DIN A5. If you prefer a larger display, printing on DIN A4 is recommended.

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1. Getting started

The instructions will help you step by step with the safe and proper assembly of the kit and installation and use of your Power-Block. Before you start to assemble the kit or put the Power-Block into operation, read this manual completely, especially the safety instructions and the section on possible errors and their elimination. You will then know what you have to pay attention to and thus avoid errors that sometimes can only be rectified with a lot of effort.

Keep the instructions in a safe place so that you can restore functionality later in the event of any malfunctions. If you pass the Power-Block on to another person, also give the instructions with it.

1.1. Contents of the package

- 1 ready-built and tested circuit board Power-Block version DC (item no. 72-00326-01) or
- 1 kit Power-Block version TB (item no. 72-00335-01), containing the components listed in the parts list (→ section 3.4.) and one PCB or
- 1 ready-built and tested circuit board Power-Block version TB (item no. 72-00336-01) or
- 1 ready-built and tested circuit board Power-Block version HC (item no. 72-00346-01)

1.2. Accessories

To assemble the kit you will need

- a soldering iron with temperature control and a thin tip and a deposit stand or a controlled soldering station
- a scraper, rag or sponge
- a heat-resistant pad
- a small pair of side cutters and wire strippers
- tweezers and flat-nose pliers if necessary
- electronic solder (preferably 0.5 to 0.8 mm diameter)

Connection cables

The use of stranded wire is recommended for making the connections. Stranded wires consist of several thin individual wires and are therefore more flexible than rigid wires with the same copper cross-section.

The required cross-sections depend on the load. Please observe the specifications of the manufacturers of the circuits and components that you connect to the Power-Block.

1.3. Intended use

The Power-Block is intended for use in model making and in model railway layouts as specified in the instructions. Any other use is not in accordance with the intended use and will result in the loss of the warranty claim. Intended use also includes reading, understanding and following all parts of the instructions. The Power-Block is not intended to be mounted, connected and used by children under the age of 14.

1.4. Safety instructions

Improper use and non-observance of the instructions can lead to incalculable hazards. Prevent these dangers by carrying out the following measures:

- Only use the Power-Block in closed, clean and dry rooms. Avoid moisture and splash water in the environment. After condensation has formed, wait two hours for acclimatisation before use.
- Disconnect the Power-Block from the power supply before carrying out wiring work.
- Supply the Power-Block only with extra-low voltage as specified in the technical data. Use only tested and approved transformers or power supply units.
- Only plug the mains plugs of transformers / power supply units into properly installed and fused earthed sockets.
- When making electrical connections, ensure that the cable cross-section is sufficient.
- Heating of the Power-Block during operation is normal and harmless.
- Do not expose the Power-Block to high ambient temperatures or direct sunlight. Observe the information on the maximum operating temperature in the technical data.
- Regularly check the operational safety of the Power-Block, e.g. for damage to the connection cables.
- If you notice damage or if malfunctions occur, disconnect the connection to the power supply immediately. Send the Power-Block in for inspection.

2. Operation overview

If a large number of electronic components are to be wired together with one connection, conventional cabling quickly becomes confusing and error-prone due to the large number of cables. Both the creation of the connections and the search for faults are therefore very time-consuming.

These problems can be solved with the Power-Block, the cabling remains clear and comprehensible even when connecting a large number of electronic components.

2.1. Versions

The TB, DC and HC versions of the Power-Block differ in terms of the design of the connection for the power supply on one narrow side. The opposite connection is designed as a 2-pole screw terminal in all versions, via which further distribution boards can be connected (cascaded).

TB Version



Connection of the power supply via a 2-pole screw terminal block

Suitable for use with any voltage source, connection via connection cables with open ends

Applications:

- Connection of several loads to a common power supply (transformer, power supply unit, booster)
- Connection of several loads to the output of a circuit or connection of several loads to the common return conductor of a circuit

DC Version



Connection for the power supply: 4-pin DC socket

Suitable for connection to switching power supply units with 4-pin device connection plug. The polarity of the power supply connection is not important.

Application:

Connection of several loads to one power supply unit

HC Version



Connection for the power supply: DC (hollow) socket

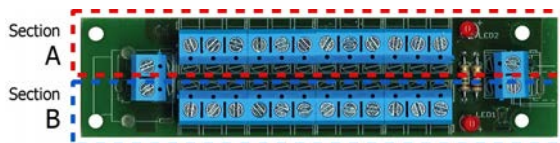
Suitable for connection to DC or AC power supply units with hollow plug (Ø 5.5 mm / 2.1 mm)

Application:

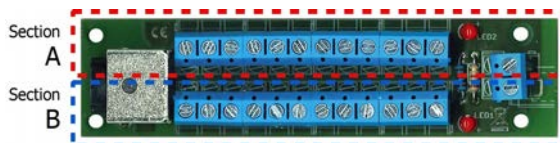
Connection of several consumers to one power supply unit

2.2. Subdivision into two sections

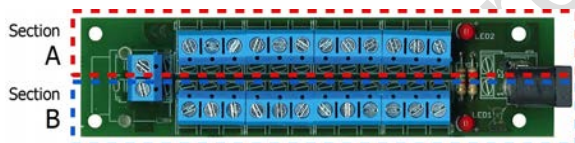
The Power-Block is electrically divided into 2 sections (A and B). The 13 or 14 connections in the two sections are connected to each other. In the TB version, the two sections can be electrically connected to form one section by bridging one of the two 2-pole terminal (blocks) on the narrow sides (→ section 4.2).



TB Version



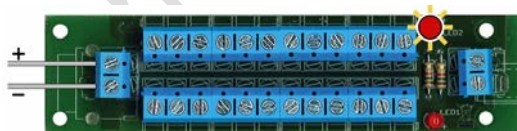
DC Version



HC Version

2.3. Indicator LEDs

When connected to a DC voltage source, one of the two LEDs on the circuit board lights up to indicate on which side the positive voltage (+) is present. This prevents consumers from being accidentally connected to a voltage source with the wrong polarity.



TB Version



DC Version



HC Version

Both LEDs light up when connected to an AC voltage source.



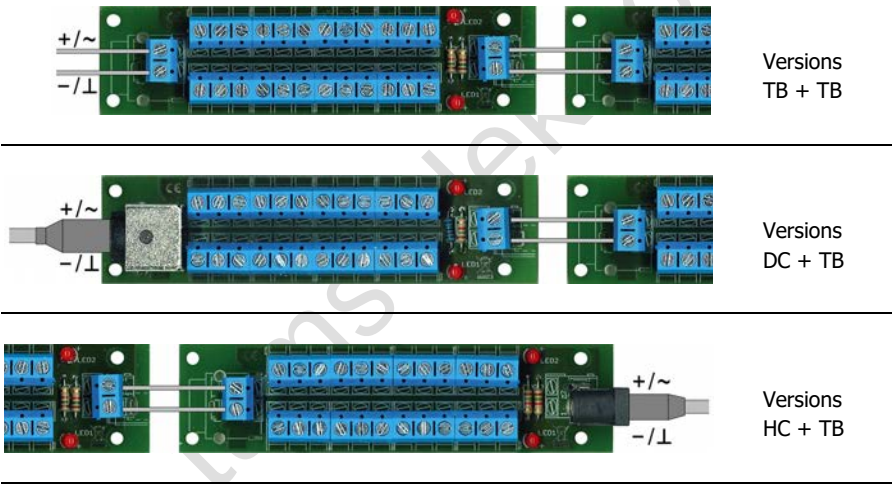
Example: TB version

The function of the DC and HC versions is identical when supplied with AC voltage.

2.4. Cascading several circuit boards

If the number of connections on one board is insufficient, several power distribution boards can be connected in series (cascaded). The maximum current consumption of all cascaded boards is 10 A.

All three versions (TB, DC and HC) are suitable for the first distribution board, which is connected directly to the power supply; the TB version is suitable for the subsequent distribution board.



3. Assembling the kit (TB version only)

You can skip this section if you have purchased a ready-built module.

3.1. Safety instructions

Mechanical hazards

Cut wires can have sharp ends and can cause serious injuries. Watch out for sharp edges when you pick up the PCB.

Visibly damaged parts can cause unpredictable danger. Do not use damaged parts: recycle and replace them with new ones.

Fire risk

Touching flammable material with a hot soldering iron can cause fire, which can result in injury or death through burns or suffocation. Connect your soldering iron or soldering station only when actually needed. Always keep the soldering iron away from inflammable materials. Use a suitable soldering iron stand. Never leave a hot soldering iron or station unattended.

Thermal danger

A hot soldering iron or liquid solder accidentally touching your skin can cause skin burns. As a precaution:

- use a heat-resistant mat during soldering,
- always put the hot soldering iron in the soldering iron stand,
- point the soldering iron tip carefully when soldering, and
- remove liquid solder with a thick wet rag or wet sponge from the soldering tip.

Dangerous environments

A working area that is too small or cramped is unsuitable and can cause accidents, fires and injury. Prevent this by working in a clean, dry room with enough freedom of movement.

Other dangers

Children can cause any of the accidents mentioned above because they are inattentive and not responsible enough. Children under the age of 14 should not be allowed to work with this kit or the ready-built module.



Caution:

Little children can swallow small components with sharp edges, with fatal results! Do not allow components to reach small children.

In schools, training centres, clubs and workshops, assembly must be supervised by qualified personnel. In industrial institutions, health and safety regulations applying to electronic work must be adhered to.

3.2. Soldering properly

- Use a soldering iron with temperature control, which you set to approx. 300 °C.
- Only use electronic solder with a flux.
- Never use soldering water or soldering grease when soldering electronic circuits. These contain an acid that destroys components and conductor paths.
- Insert the connecting wires of the components as far as possible through the holes of the board without using force. The body of the component should be close above the board.
- Make sure that the polarity of the components is correct before soldering them.
- Solder quickly: soldering for too long can cause pads or tracks to become detached or even destroy components.
- Hold the soldering tip on the soldering point in such a way that it touches the component wire and the pad at the same time. Add (not too much) solder simultaneously. As soon as the solder begins to flow, remove it from the soldering point. Then wait a moment for the solder to flow well before removing the soldering iron from the soldering joint.
- Do not move the component you have just soldered for about 5 seconds.
- A clean, non-oxidised (scale-free) soldering tip is essential for a perfect soldering joint and good soldering. Therefore, before each soldering, wipe off excess solder and dirt with a damp sponge, a thick damp cloth or a silicone wiper.
- After soldering, cut off the connecting wires directly above the soldering point with a side cutter.
- After assembly, always check each circuit again to ensure that all components are correctly inserted and polarised. Also check that no connections or tracks have been accidentally bridged with tin. This can lead not only to malfunction, but also to the destruction of expensive components. You can re-liquefy excess solder with the clean hot soldering tip. The solder then flows from the board to the soldering tip.

3.3. Preparation

Put the sorted components in front of you on your workbench.
The separate electronic components have the following special features you should take into account in assembling:

Resistors



Resistors reduce current.
The value of resistors for smaller power ratings is indicated through colour rings. Every colour stands for another figure. Carbon film resistors have 4 colour rings. The 4th ring (given in brackets here) indicates the tolerance of the resistor (gold = 5 %).
Value: Colour rings:
1,5 kΩ brown - green - red (gold))

Light emitting diodes (LEDs)



When operated in the forward direction the LEDs light. Light emitting diodes should always be connected via a series resistor which limits the current and prevents failure. With the Power-Block the series resistors are integrated on the circuit board.

Screw terminals

Screw terminals provide a solder-free and safe connection of the cables to the circuit, which can still be separated any time.
Modular terminals are designed, for example, as single-row terminals with 2 or 3 poles. Connections with any number of poles can be created by linking several terminal strips. In order to fix them the connecting cables are inserted and screwed (similar to a lustre terminal).

3.4. PCB layout and parts list

Resistors	R1, R2	1,5 kΩ
Light emitting diodes	LED1, LED2	3 mm, red
Modular terminals	X1, X2	2-pole
	X3 to X6 X7 to X10	4 × 3-pole or 6 × 2-pole

3.5. Assembly

Proceed according to the order given in the list below. First solder the components on the solder side of the PCB and then cut the excess wires with the side cutter. Follow the instructions on soldering in section 3.2.

**Caution:**
Several components have to be mounted according to their polarity. When soldering these components the wrong way round, they can be damaged when you connect the power. In the worst case the whole circuit can be damaged. At the best, a wrongly connected part will not function.

1.	Resistors	The mounting orientation is of no importance.
2.	Light emitting diodes (LEDs)	Observe the polarity! With wired LEDs the longer lead is always the anode (positive pole). Note: If you solder the LED with the wrong polarity, the polarity will be displayed incorrectly when connected to a DC voltage source.
3.	Modular terminals	Put together the terminals X3 to X6 and X7 to X10 before mounting them.

3.6. Performing a visual check

Perform a visual check after the assembly of the module and remove faults if necessary:

- Remove all loose parts, wire ends or drops of solder from the PCB. Remove all sharp wire ends.
- Check that solder contacts which are close to each other are not unintentionally connected to each other. Risk of short circuit!
- Check that all components are polarised correctly.

When you have remedied all faults, go on to the next part.

4. Connecting the Power-Block

4.1. Connection of loads to a power supply

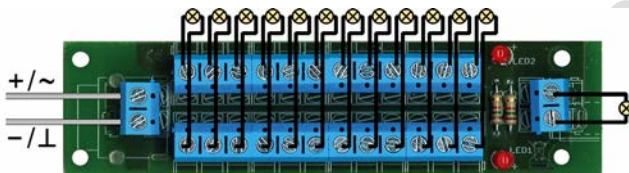
The connection examples show the common connection of numerous loads to a common power supply. The following can be used as a power supply:

- AC transformers
- DC or AC power supply units
- Boosters

Note: The TB version of the Power-Block is shown in the two connection examples. The examples apply analogously to the DC and HC versions.

Connection example 1

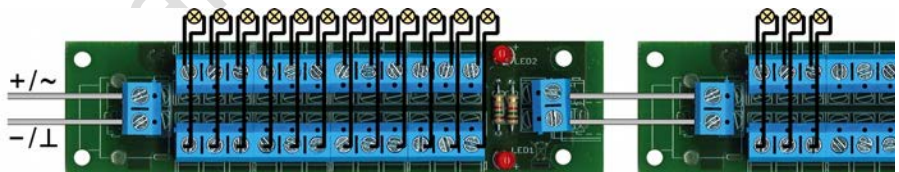
The free connection on the narrow side is used here to connect a 13th consumer.



Note: When connected to DC voltage, one of the two LEDs on the circuit board lights up to indicate which side has the positive voltage (+). When connected to AC voltage, both LEDs light up.

Connection example 2

To connect more than 13 loads to a common power supply, two or more Power-Blocks are cascaded. Depending on the type of voltage source, a Power-Block version TB, DC or HC is connected directly to the voltage source (version TB is shown). Version TB Power-Blocks are used as additional (cascaded) power distributors.



Please note:

The current consumption of all cascaded circuit boards must not exceed 10 A!

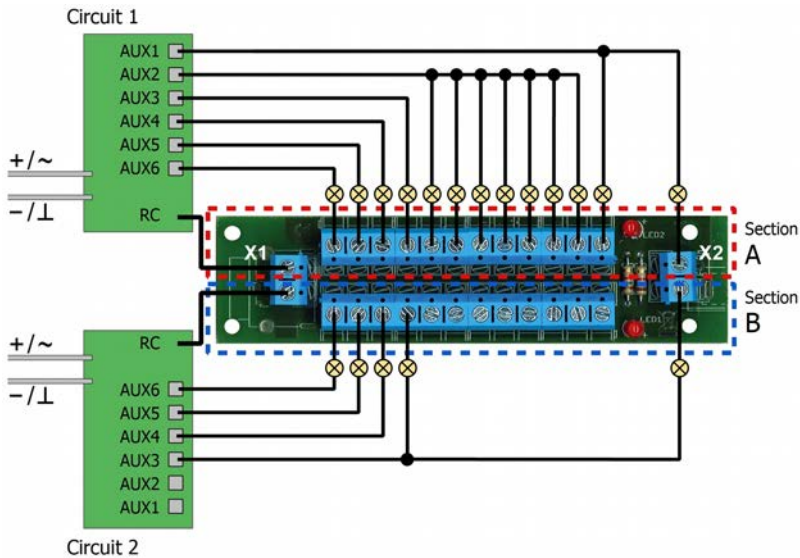
4.2. Connection of loads to circuits

Only the TB version of the Power-Block is suitable for connecting loads to the outputs of circuits. By using the Power-Block

- the wiring remains clear, even if several loads are connected to one output
- the consumers are fed back to the circuit via a common connection

Connection example 3

In the example, the loads and their return conductors from two different circuits are connected to the electrically separate sections A and B.



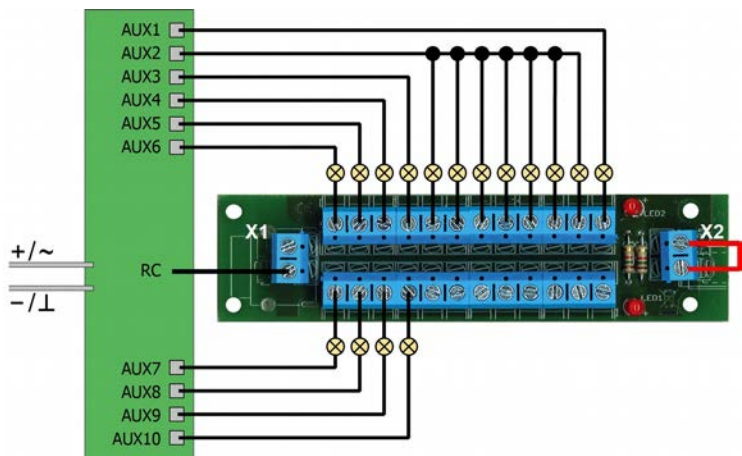
Please note:

You must never connect the loads and return conductors of different circuits together to the same section (A or B) of the Power-Block. Otherwise (possibly irreparable) damage may occur to the connected circuits.

Connection example 4

More than 12 loads are connected to the circuit in this example. Areas A and B of the Power-Block are therefore connected to each other at terminal (block) X2, thus cancelling the electrical separation of the two areas.

Note: Areas A and B can also be connected at terminal (block) X1, terminal X2 can then be used to connect another load.



Please note:

As soon as you have connected areas A and B of the Power-Block to each other, you may only connect the loads and return conductors of **one circuit** to the Power-Block. Otherwise (possibly irreparable) damage may occur to the connected circuit.

5. Checklist for troubleshooting and error correction



Warning:

If you notice a strong heat development, immediately disconnect the connection to the supply voltage. **Fire hazard!**

Possible causes:

- One or more connections are faulty. → Check the connections.
- "Kit" version: one or more components are soldered incorrectly. → Carry out a visual inspection (→ section 3.5.) and eliminate the faults, if necessary.
- The Power-Block is defective. → Send the Power-Block in for inspection.

When connected to DC voltage, one or both LEDs do not light according to polarity.

Possible cause:

- One or both LEDs are not soldered in accordance with the polarity shown on the board. → Change the installation direction.

5.1. Technical Hotline

If you have any questions about the use of the Power-Block, our technical hotline will help you (telephone number and e-mail address on the last page).

5.2. Repairs

You can send us a defective Power-Block for inspection / repair (address on the last page). Please do not send us your return freight collect. In the event of a warranty or guarantee claim, we will reimburse you for the regular shipping costs.

Please enclose the following with your shipment

- proof of purchase as evidence of any warranty or guarantee claim
- a brief description of the defect
- the address to which we should return the product(s)
- your email address and/or a telephone number where we can reach you in case of queries.

Costs

The inspection of returned products is free of charge for you. In the event of a warranty or guarantee claim, the repair and return are also free of charge for you.

If there is no warranty or guarantee case, we will charge you the costs of the repair and the costs of the return. We charge a maximum of 50% of the new price for the repair according to our valid price list.

Carrying out the repair(s)

By sending in the product(s), you give us the order to inspect and repair it. We reserve the right to refuse the repair if it is technically impossible or uneconomical. In the event of a warranty or guarantee claim, you will then receive a replacement free of charge.

Cost estimates

Repairs for which we charge less than € 25.00 per item plus shipping costs will be carried out without further consultation with you. If the repair costs are higher, we will contact you and carry out the repair only after you have confirmed the repair order.

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6. Technical data

Connections

TB Version	Number of connections: 28 Divided into 2 sections with 14 connections each Design: 28 screw terminals
DC Version	Number of connections: 27 divided into 2 sections with 13 connections each and one connection for a power supply unit Design: 26 screw terminals and one DC socket (4-pin)
HC Version	Number of connections: 27 divided into 2 sections with 13 connections each and one connection for a power supply unit Design: 26 screw terminals and one DC hollow socket for accommodating Ø 5.5 mm / 2.1 mm hollow plugs

Electrical characteristics

Maximum total current	10 A
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Protection

Protection class	IP 00 Meaning: No protection against foreign bodies, contact and water.
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Environment

	For use in closed rooms
Ambient temperature during operation	0 ~ + 30 °C
Permissible relative humidity during operation	10 ~ 85% (non-condensing)
Ambient temperature during storage	- 10 ~ + 40 °C
Permissible relative humidity during storage	10 ~ 85% (non-condensing)

Other features

Dimensions of the PCB	approx. 105 × 27 mm
Weight of the assembled board	TB Version: approx. 35 g DC Version: approx. 40 g HC Version: approx. 35 g

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7. Warranty, EU conformity & WEEE

7.1. Guarantee bond

For this product we issue voluntarily a guarantee of 2 years from the date of purchase by the first customer, but in maximum 3 years after the end of series production. The first customer is the consumer first purchasing the product from us, a dealer or another natural or juristic person reselling or mounting the product on the basis of self-employment. The guarantee exists supplementary to the legal warranty of merchantability due to the consumer by the seller.

The warranty includes the free correction of faults which can be proved to be due to material failure or factory flaw. With kits we guarantee the completeness and quality of the components as well as the function of the parts according to the parameters in not mounted state. We guarantee the adherence to the technical specifications when the kit has been assembled and the ready-built circuit connected according to the manual and when start and mode of operation follow the instructions.

We retain the right to repair, make improvements, to deliver spares or to return the purchase price. Other claims are excluded. Claims for secondary damages or product liability consist only according to legal requirements.

Condition for this guarantee to be valid, is the adherence to the manual. In addition, the guarantee claim is excluded in the following cases:

- if arbitrary changes in the circuit are made,
- if repair attempts have failed with a ready-made module or device,
- if damaged by other persons,
- if damaged by faulty operation or by careless use or abuse.

7.2. EU Declaration of Conformity



This product fulfils the requirements of the following EU directives and therefore bears the CE marking.

2001/95/EU Product Safety Directive

2015/863/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

2014/30/EU on electromagnetic compatibility (EMC Directive). Underlying standards:

DIN-EN 55014-1 and 55014-2: Electromagnetic compatibility - Requirements for household appliances, electric tools and similar electrical appliances. Part 1: Emitted interference, Part 2: Immunity to interference

To maintain electromagnetic compatibility during operation, observe the following measures:
Only connect the supply transformer to a professionally installed and fused earthed socket.
Do not make any changes to the original components and follow the instructions, connection and assembly diagrams in this manual exactly.
Only use original spare parts for repair work.

7.3. Declarations on the WEEE Directive

This product is subject to the requirements of the EU Directive 2012/19/EC on Waste Electrical and Electronic Equipment (WEEE), i.e. the manufacturer, distributor or seller of the product must contribute to the proper disposal and treatment of waste equipment in accordance with EU and national law. This obligation includes

- registration with the registering authorities ("registers") in the country where WEEE is distributed or sold
- the regular reporting of the amount of EEE sold
- the organisation or financing of collection, treatment, recycling and recovery of the products
- for distributors, the establishment of a take-back service where customers can return WEEE free of charge
- for producers, compliance with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive.



The "crossed-out wheeled bin" symbol means that you are legally obliged to recycle the marked equipment at the end of its life. The appliances must not be disposed of with (unsorted) household waste or packaging waste. Dispose of the appliances at special collection and return points, e.g. at recycling centres or at dealers who offer a corresponding take-back service.

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Further Information and Tips:
<http://www.tams-online.de>

Warranty and Service:
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