



TEMPO High Frequency Battery Charger



Instruction Manual



READ THESE INSTRUCTIONS CAREFULLY BEFORE CONNECTING THE DEVICE TO THE MAINS VOLTAGE AND/OR TO THE BATTERY. MAKE SURE THAT THE SIZE OF THE DEVICE IS ADEQUATE FOR THE BATTERY CONNECTED TO IT.



The battery chargers provided by Curtis Instruments (UK) LTD offer many unique features which are comprehensively described in this manual.

Please read these instructions carefully before use to ensure safe and optimum performance.

For further information, technical details, brochures or illustrative material visit contact us at info@curtisinst.co.uk or visit our website www.curtisinst.co.uk.

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1. SAFETY & RISKS

1.1. Proper use of the product and general suggestions

The product is built by following high qualitative standards to guarantee its reliability and

safety. **Incorrect** use of the device can cause:



- Wounds or death to the user and/or to third party
- Damage to the device and/or to other materials or real or personal goods
- Damage to the environment near the device
- Inadequate and inefficient operations compared to the standard working state of the device

The personnel involved with the use of the device must:



- Have a qualification degree in the use of electrical / electronic devices
- Carefully read the manual to understand the proper and correct **use** of the device
- Respect the rules mentioned in this manual
- Use only the correct tools when doing standard maintenance or when repairing a fault on the device

All warnings and/or safety signs displayed on/near to the device must:

- Be in a legible and comprehensible state for everyone
- Not to be damaged
- Not to be removed
- Not cover existing signs and/or indication
- Not to be covered with other signs/stickers or painted with paint or color of any kind

The use of the device **requires**:

- A carefully reading of the manual and following **of** the instructions
- Perform periodical maintenance to maintain the device in an optimal state
- **ALWAYS** follow the **manufacturers** instructions



This device must be used **EXCLUSIVELY** to fulfill its purpose. Every other non-compliant use of the device will be reputed inadequate and **the warranty will be void**.

Damage caused to the device, persons, real and personal property by an **incorrect/inappropriate** use of the device cannot be **the liability of the manufacturer/provider**.

The device **MUST** be used only in networks with ground connection and with fuse or magnetic protection in the plug..

Curtis (UK) declares that the device has a protection degree **IP21**.

Before **each use**, perform a quick visual inspection to make sure that there is no **obvious** damage that could compromise the correct functioning of its operations.

Do not remove, cut off or modify in any way, any of the many safety devices installed inside and/or outside the charger.

Before starting a normal charging cycle, also check the battery conditions:



- Make sure that there is no dirt or foreign objects on top of the battery.
- Make sure the battery is in good condition.
- Make sure that there are no short circuits or faulty cells.
- Check the water level of the battery before any charge.
- Check the condition of the connectors (make sure that the contacts inside the plug are in optimal condition).

In case of suspected or ascertained damage to the battery or charger, do not start the charging cycle and contact a technician.



1.2. Risks caused by the network and charging current

Incorrect use of the device can leave the operator open to many risks: for example risks of electrocution or risks of electromagnetic fields that could cause cardiac problems to pacemaker users. An electric shock can be fatal. **To avoid electric shocks** during the usage of the device:



- Do not touch any live wires inside the device or directly connected to it.
- **NEVER** touch the battery poles connected to the device.
- Do not short circuit the cables of the device or the charging plug.



All the cables must be checked to make sure that there is no damage, they are insulated and well sized for the device. Loose cable connections, burn marks, **or other damage** must be IMMEDIATELY addressed.

1.3. Risks caused by Acid, Gas and toxic vapors



The batteries charged by **this** device contain acid which can be dangerous for health and can cause serious problems to the eyes and/or the skin in **the event** of direct contact.

In **the event** of direct contact with acid, use water to wash it away and seek medical advice.

Curtis (UK) advises **users** to always wear personal protective equipment when carrying out maintenance operations to both the battery and chargers.



During the standard operations of the device, gases and vapors are released from the battery which can cause health problems. These gases and vapors are also highly explosive.

The correct use of the device requires the use of a well-ventilated environment to prevent the accumulation of such gases and avoid risks of explosions.

Charging rooms with less than 4% of Hydrogen in the air are reputed safe against explosions caused by gases. Good ventilation provides a safe and reliable working environment for charging operations.



During the charge, **Curtis (UK)** advises to keep **AT LEAST** an 80cm distance between the charger and the battery and to keep well away from any object that could cause or could be the origin of sparks and/or flames. **NEVER** smoke in the vicinity.

To avoid problems or damage caused by gas, vapor or acid, **Curtis (UK)** suggests:

- **Do not remove the charging plug during the charging cycle.**
- **Do not inhale the gas or vapor released by the battery during the charge.**
- **Make sure that the battery being charged is in a well-ventilated area.**
- **Avoid and prevent short circuit in the battery cells.**
- **Do not leave any foreign objects on top of the battery during the charge.**

1.4. Protecting third parties

Whilst the device is **operating**, it is advised to keep all non-authorized personnel away from the charger. In **the event** of personnel requiring access to the area during the charging cycle, **Curtis (UK)** suggests:



- To warn them about the dangers caused by the device while in function (gas, dangers of electrocution and charging currents, electromagnetic fields, etc.).
- Provide the necessary PPE (gloves, helmets, etc.).
- Try to avoid direct contact between the device and non-authorized personnel.



1.5. **Safety devices**



The charger is equipped with many different safety devices to guarantee a reliable and safe use.

The inbuilt safety features ensure good condition of the battery, the charger and of the near environment.

The control card offers safety on the charging cycle, it monitors the different charging phases making sure that the value recorded and read are always inside the range of optimal values for the connected battery.

The fuse installed inside the device offers protection against short circuit and reverse polarity.

All **Curtis (UK)** devices have many safety timers to offer reliability during night charges or during the weekends when the battery is left attached to the charger for the equalisation cycle.

1.6. **Device serial code label**

Attached **to** the side of every device **supplied** by **Curtis (UK)** is a label with a unique serial code number belonging to the device and some useful information.

The label is anti-tamper and **provides** information regarding the period of time when the device was **manufactured**.

If the label is damaged or tampered with, the warranty will be considered void.

- 1) Unique serial number of the device
- 2) Supply Voltage information
- 3) Output information (volt and current range)
- 4) Date of production (mm/yy)

	1		
	S/N	K2000143	04.17
2	AC Input	230 V~ 1ph A 4,5	50/60 Hz VA 1050
3	DC Output	12 - 24 V	3 - 30 A
			4

1.7. **Certifications**



We declare under our exclusive responsibility that the product is compliant to the European standards 2006/95/EU, 2004/108/EU, 2011/65/EU D. LgIs n°27/2014 (RoHS), 2002/96/EU e 2003/108/EU (RAEE) and to their relative documentation.



2. INSTALLATION

IMPORTANT: Dedicated section for the technician and qualified personnel

2.1. Connection of the device to the network



To connect the charger to the mains voltage network, use the outgoing cable from the device to install a suitable plug with ground pin (in some models the power cord is supplied with the power plug already installed).

AVOID THE USE OF POWER CORD EXTENSIONS.

The mains voltage plug where the charger will be connected to the network must be proportionally sized for the power consumption of the device and must have fuses and/or other safety devices compliant to the **relevant** country standards.

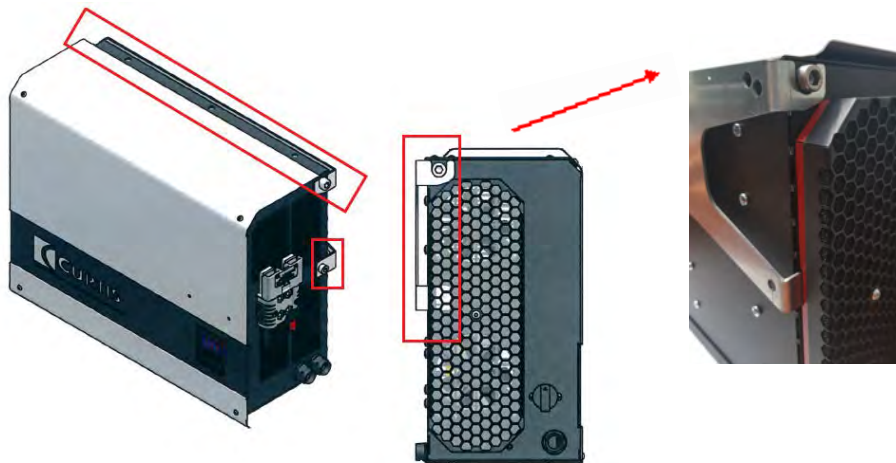


Before connecting the charger to the network, check the information mentioned on the serial number label to make sure that the device is suitable for the network voltage.

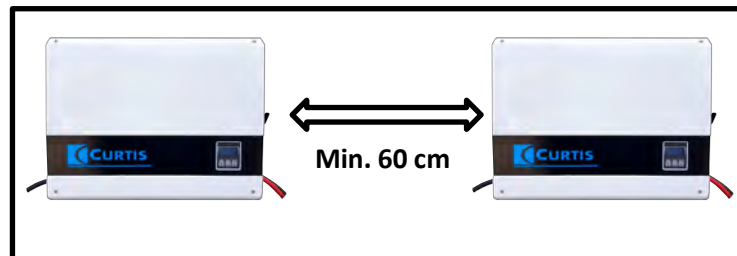
Make also sure of the correct grounding of the mains plug.

The replacement of the power cord is possible only and exclusively if made by competent and authorised personnel. The new power cord must be compatible with the same size of the cable supplied by the factory.

To guarantee optimal operations of the **TEMPO** Series, it is suggested to attach the device to the wall by using the integrated support on the back of the device.



IMPORTANT: Do not attach the devices in close proximity to each other when using a series format because it may create a hot air channel that will lead to unsuitable ventilation of the chargers.





3. OPERATION AND CHARGING VISUALS

Before connecting the charger to the battery, make sure that:

- The device is correctly set for the battery connected**
- The charging cables (red and black) are properly connected and tightened in the charging plug
- The charging plug is in an optimal state

3.1. Operation



** If the device is not set properly, it could cause serious damage to the battery. In particular, it is suggested to make sure that the charger output voltage matches the nominal voltage of the battery and that the nominal charging current of the charger is ideal for the capacity of the battery connected to it.

Once the charger is connected to the battery, the charging cycle will automatically begin.

If, for any given reason, there is the need to **interrupt a charge cycle**, it will interrupt the connection between the charger and the battery. The charging cycle will stop immediately.

IMPORTANT

In **the** case of both forced interruption or **at** the completion of a regular charging cycle, the device requires a period of time to cool off the internal components. **Cooling times will vary.** During this period, the aeration fans will remain on and will automatically turn off when the required internal temperature **is reached**.

Once the cooling phase is over, the fans will turn off and **it** will be possible to unplug the charger from the mains voltage network plug.

It is not advised to interfere with this cooling cycle, so always leave the device connected to the mains voltage network to allow adequate cooling to occur. Reducing this cooling phase may lead to a shorter lifespan of the device.

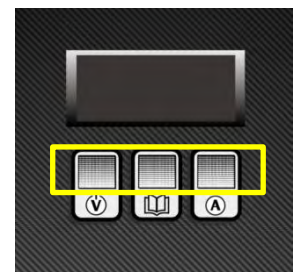
3.2. Operating Icons

The entire **TEMPO range**, from the smallest to the biggest model, is supplied with a touch display with 3 buttons. **This display** supplies useful information regarding the charging cycle.



The touch buttons are located under the small squares. If you press on the symbol of the button, there won't be the desired effect. **There are 4 charging icons:**

- 1) Charging current (Ampere - A)
- 2) Battery voltage of the battery connected (Volt - V)
- 3) Ampere delivered to the battery (Ah)
- 4) Percentage of charge of the battery (%)





4. CHARGING PARAMETERS

All TEMPO chargers allow the user to choose between different voltage, current and preset charge curve options for different types of batteries to enable use on a wide range of products. In addition to this, the TEMPO charger has two special functions:



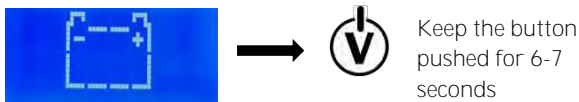
- Desulphation mode
- Power supply mode

Selecting either the desulphation or power supply mode and/or changing the charging parameters is quick and simple with the touch buttons and easy to read icons on the display.

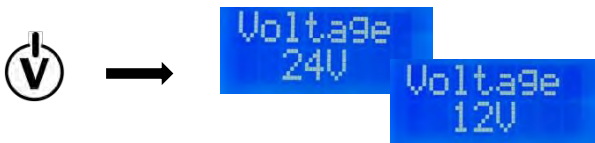
4.1. Setting Charging Parameters

PLEASE NOTE: Before attempting to change any TEMPO default parameters, it is recommended you consult a Curtis Technician and/or refer to manual section 7.2 Charge Curves to ensure the charge curve intended for use is compatible with the battery to be charged.

When the display shows a flashing battery symbol, press the “V” button for approximately 6-7 seconds to access to the special parameters section.



Release the “V” button when the charger emits a buzzing noise. To select the new charging voltage, push the “V” button.



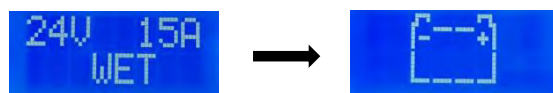
Select the “A” button to choose the new charging current.



Use the central button to select the charge curve (check the Charge Curve description for further information).



To confirm the new parameters, simply wait for 3 seconds and the charger will memorise the newly selected parameters. When the selection is complete, the main display will show a battery symbol, indicating the charger is ready for use.





4.2. Special functions

The DESULPHATION mode is one of the special functions of the TEMPO Charger, enabling it to perform as a proper desulphator or power supply. For further details, refer to section 5.1.



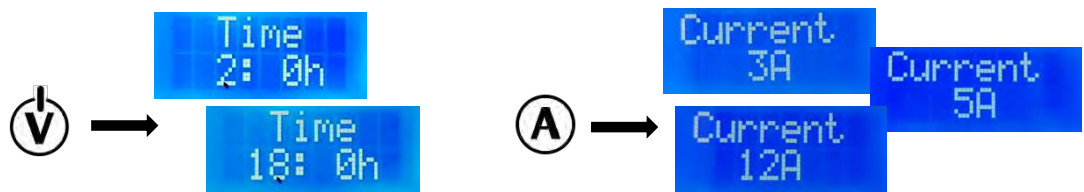
DESULPHATION MODE



When the DESULPHATION mode is selected, the purpose of the “V” button will change and be used for setting the duration of the desulphation cycle.

The desulphation cycle can last from a minimum of 2 hours, to a maximum of 18 hours. If necessary, the charging cycle can be repeated.

The function of the “A” button remains the same, making it always possible to choose the constant charging current between the parameters offered by the unit.



Once you have selected the desired parameters, simply leave the charger in standby for a few seconds and it will automatically memorise the new configuration.

To begin the cycle, simply connect the battery (or single cell) to the device. The cycle will begin automatically. To interrupt the desulphation cycle, keep the “V” button pushed for 3 seconds.

If a change to charge curve or charger functions is required, disconnect the battery from the charger and wait for the flashing battery symbol to appear on the display.

IMPORTANT: the desulphation mode has 2 limits:

- (a) The battery connected (or single cell) must register with at least 1 volt.
- (b) Charging voltage cannot exceed the maximum voltage allowed by the the condensers inside the charger. (For a battery charger of 80V, the maximum voltage that the device can reach in desulphation mode is 126v)



POWER SUPPLY MODE



ATTENTION: when the device is in Power Supply mode, pay the careful attention to the positive and negative poles. REMEMBER TO ALWAYS INTERRUPT THE FUNCTION BEFORE DISCONNECTING THE ELECTRICAL DEVICE FROM THE CHARGER. THE FUNCTION WORKS EVEN IF THERE ISN'T A RESISTANCE CONNECTED TO THE CHARGER.

When the “Power Supply” mode is selected, you can change the voltage range to power any electrical device.

Select the desired voltage, then leave the battery charger in standby mode for a few seconds until it automatically memorises the new parameters. To start to power the chosen device, connect it to the cables and push/hold down the “A” button for 3 seconds.

Push/hold down button “A” for 3 seconds



To interrupt the function, push/hold down button “A” for 3 seconds.

If you need to change the device function, simply push/hold down button “V” button for 6-7 seconds. (check section 5.1. for more information on how to change parameters).





5. MAINTENANCE

IMPORTANT: This section is provided for authorised technical personnel and should be read carefully.

5.1. Periodic Maintenance



To guarantee the best and lasting performance of your TEMPO charger, Curtis (UK) suggests periodic maintenance tasks are carried out. Depending on the chargers location/working environment, the frequency will vary. (i.e. in dusty environments, it is recommended more frequent maintenance is performed.

Maintenance should only be performed by competent and authorised personnel. Always ensure the charge is disconnected from both the battery and mains supply before commencing maintenance procedures.

The maintenance steps are as follows:

- Perform a visual check both inside and outside to verify the condition of the charger.
- Blow away any visible dust inside the charger with compressed air through the slits located on either side of the device. Also try to remove visible dust from the internal heatsinks.
- Check the cable and cable connectors for visible signs of wear or burn damage due to bad contact.
- Make sure that the fuse is in good condition.
- Make sure that the charging plugs are in good condition.
- Check the condition of both the outgoing and ingoing cables and their plugs.

If problems are identified during the periodical maintenance, contact Curtis (UK) or a specialist service provider for advice. Suspend use of the charger until issues are resolved.

6. TECHNICAL INFORMATION

6.1. Charge Curve Information



The TEMPO charger allows users to select different charge curves quickly and easily to suit different batteries.

	Final V/Cell	V/Cell during maintenance charge
WET	2,4	2,20
WET – DEEP	2,68	2,20
AGM1	2,38	2,22
AGM2	2,45	2,28
GEL	2,35	2,20

6.2. Model Selection Chart



Model	Supply	Voltage Range	Current Range
K10	220-240 Vac	12 / 24 V	3 – 20 A
K20	220-240 Vac	12 / 24 V	3 – 35 A
K30	220-240 Vac	36 / 48 V	3 – 7 A
K40	220-240 Vac	36 / 48 V	3 – 15 A
K50	220-240 Vac	12 / 24 V	3 – 50 A
K60	220-240 Vac	12 / 24 V	3 – 100 A
K70	220-240 Vac	36 / 48 V	3 – 30 A
K75 (pfc)	220-240 Vac	36 / 48 V	3 – 35 A
K80	220-240 Vac	36 / 48 V	3 – 60 A
K85 (pfc)	220-240 Vac	36 / 48 V	3 – 60 A
K90	220-240 Vac	72 / 80 V	3 – 20 A
K95	220-240 Vac	72 / 80 V	3 – 35 A
K900	400 Vac	24 V	10 – 140 A
K950	400 Vac	36 / 48 V	10 – 130 A
K980	400 Vac	72 / 80 V	10 – 80 A
K1280	400 Vac	12 – 80 V	10 – 80 A
K1236	220-240 Vac	12 – 36 V	3 – 40 A
K1248	220-240 Vac	12 – 48 V	3 – 25 A



6.3. Charge Time Data Table



Current	8h charge	10h charge	12h charge
5A	40 Ah	50 Ah	60 Ah
10A	80 Ah	100 Ah	120 Ah
15A	120 Ah	150 Ah	180 Ah
20A	160 Ah	200 Ah	240 Ah
25A	200 Ah	250 Ah	300 Ah
30A	240 Ah	300 Ah	360 Ah
35A	280 Ah	350 Ah	420 Ah
40A	320 Ah	400 Ah	480 Ah
50A	400 Ah	500 Ah	600 Ah
60A	480 Ah	600 Ah	720 Ah
70A	560 Ah	700 Ah	840 Ah
80A	640 Ah	800 Ah	960 Ah
90A	720 Ah	900 Ah	1080 Ah
100A	800 Ah	1000 Ah	1200 Ah
110A	880 Ah	1100 Ah	1320 Ah
120A	960 Ah	1200 Ah	1440 Ah
130A	1040 Ah	1300 Ah	1560 Ah
140A	1120 Ah	1400 Ah	1680 Ah



WARRANTY

This device is covered by the standard INCLUSIVE CHARGER & BATTERY WARRANTY offered by Curtis (UK). A copy of this document is available from Curtis direct, or through our website.

In the event of a warranty claim, notification should be made through www.curtisinst.co.uk, by downloading and completing our online Warranty Form and returning the unit in question to Curtis (UK) in Northampton.

Upon receipt, warranty terms will only be granted if Curtis (UK) agrees that the damage claimed is covered by the terms of our Charger Warranty. The warranty will not be granted if:

- The unit has been tampered with or OPENED
- The unit has been damaged by misuse and/or bad installation
- The unit has been damaged by a use that is beyond its purpose/design
- The unit has been damaged by third party or environmental causes (eg. heavy rain, storms, etc etc)
- The unit has been damaged by the surrounding environment (eg. Alkaline environment)
- The unit has been damaged during transportation



Curtis Instruments (UK) LTD.

INCLUSIVE CHARGER & BATTERY GUARANTEE



Curtis Battery Chargers are warranted as follows, from the date of despatch:

Impulse, HF5 and 1600 Series – 2 years
 Piccolo, Rialto, Concerto (50hz) - 3 years
 HF6, HF7, HF9, Tempo (high frequency) - 3 years
 PrimoPower/Pulse - 5 years

Should any Charger fail as a result of poor workmanship or faulty components during this period, a repair (where possible) will be carried out free of charge within the UK mainland.

CONDITIONS OF WARRANTY

This warranty will be honoured in full, provided that:-

- 1.1 The Charger has been installed and maintained in accordance with the installation and operating instructions supplied.
- 1.2 No alterations or repairs have been carried out to the Charger by personnel other than engineers approved by Curtis Instruments (UK) Ltd.
- 1.3 Free access and all reasonable assistance to engineers approved by Curtis Instruments (UK) Ltd have been provided.

EXCLUSIONS

The Curtis warranty does not apply to AC input fuses, DC output fuses, charging cables and DC Connectors.

BATTERY GUARANTEE

Curtis Chargers use the Wa and WO-Wa taper characteristic as defined by Din 41774, and a voltage sensing timed control system with proportional gassing reduction to ensure batteries are recharged to meet Battery Manufacturer's requirements. This conforms to approved industry standards. HF Chargers have additional user selectable charging characteristics which should be set to meet the Battery Manufacturers requirements.

There is no technical reason why a Battery Manufacturers' warranty should be affected or changed when Curtis Battery Chargers are used to charge lead acid traction Batteries.

In the event of a Battery not being correctly charged, Curtis Instruments (UK) Ltd will liaise with the Battery Manufacturer and ascertain any technical reasons that have had, or may have, an adverse effect on the Battery. If a situation where Battery damage occurs as a result of Charger malfunction, Curtis Instruments (UK) Ltd will repair the Battery or replace damaged cells with cells manufactured by the original Manufacturer.

BATTERY DAMAGE GUARANTEE

- 2.1 In the event of a Battery being damaged during its warranty period as a result of suspected charger malfunction, Curtis Instruments (UK) Ltd must be informed immediately.
- 2.2 Curtis Instruments (UK) Ltd must be able to inspect the battery and charger on site.
- 2.3 The Battery must have been used and maintained in accordance with the Battery Manufacturer's instructions.
- 2.4 Curtis Instruments (UK) Ltd reserves the right to repair / replace damaged Cells using the services of a supplier of its choice.

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This warranty does not cover, in any **circumstance**, any compensation for costs, injuries, direct or indirect damages caused by unit fault (production stop included).

Curtis Instruments (UK) Ltd

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