

This guide should be used for the following products

- **T14-1LW:** Lower (24-36VDC) power, Wago connectors
- **T14-1LH:** Lower (24-36VDC) power, Harting connectors
- **T14-1UW:** Upper (72-110VDC) power, Wago connectors
- **T14-1UH:** Upper (72-110VDC) power, Harting connectors

Box Contents

- 1 x T14-1 Driver
- T14-1 Quick Start guide

Applicable versions

- T14-1LH
- T14-1LW
- T14-1UH
- T14-1UW
- including the T14-1V VOIP audio option

Related Documents

- T14-1 General Arrangement 2D Drawing
- T14-1 Protocol Guide
- T14-1 Mounting Template
- T14-1 Connector Pin-outs (includes pin-outs and suggested mating parts for both Harting and WAGO connectors). Harting and WAGO connector sets are also available separately.

Further information can be obtained from the Ampetronic website or by contacting Ampetronic Support.



This symbol is used to alert the user to important operating or maintenance instructions.



The Lightning bolt triangle is used to alert the user to the risk of electric shock.

1. SAFETY

1. It is important to read these instructions, and to follow them.
2. Clean only with a dry cloth. Cleaning fluids may affect the equipment.



3. Install in accordance with the manufacturer's instructions.
4. Do not install this equipment near any heat sources such as radiators, heating vents or other apparatus that produces significant heat.

**5. WARNING – THIS APPARATUS MUST BE EARTHED / GROUNDED.**

6. Refer all servicing to qualified personnel. Servicing is required when the apparatus has been damaged in any way, such as a power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to any rain or moisture, does not operate normally or has been dropped.



7. **WARNING** – To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids shall be placed on the apparatus.



8. **WARNING** - Connection to a 70V/100V line speaker system may involve the risk of electric shock and therefore must be carried out by an instructed or skilled person.

**CAUTION****RISK OF ELECTRIC SHOCK
DO NOT OPEN**

TO PREVENT ELECTRIC SHOCK DO NOT REMOVE THE COVER. THERE ARE NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL

2. TOOLS AND EQUIPMENT

Small hand tools including a wire stripper, and small flat blade screwdrivers will be required.

A magnetic field strength meter, Loopworks Measure App & R1 Receiver, or at minimum an induction loop receiver is vital to check that the loop system is providing the desired level of performance.

3. FRONT PANEL & CONNECTIONS

- ① M6 Chassis Ground Stud
- ⚠ Safety ground connection to vehicle chassis - **MUST BE CONNECTED**
- ② DC Power Input (Wago)
 - 'U' option: 72-110 VDC, use +V(HI) and 0V
 - 'L' option: 24-36 VDC, use +V(LO) and 0V
- DC Power Input (Harting) - see manual
- ③ Loop Output
- Connect loop between the two terminals
- ④ Status Output and Input Enable
- Status output is an isolated relay contact
- To remotely enable an input, apply +5V to +24V DC between the relevant input terminal and common.
- NB remote control must be enabled in the web interface before use.*
- ⑤ Analogue Audio Input 1 & 2
- For each input, connect to 0V(common) and one of 3V / 30V / 100V, as appropriate for the signal source.

⑥ LED Indications

	In startup	Normal operation
STATUS (red/green)	Flash green: Testing Flash amber: Updating software	Green: OK Flash red: Error
AGC (green)	-	Green: Signal >6dB above AGC threshold
CLIP (red)	-	Red: Clipping (output)
CURRENT (green)	Slow flash: overcurrent	Green: Output >-20dB (flashes on/off in normal use)
PROTECT (red)	Slow flash: overcurrent	Slow flash: overtemp Fast flash: power limit On: both of the above
LOOP O/C (red)	Fast flash: Loop low resistance	Slow flash: Loop open circuit

- ⑦ USB 'A' connector Firmware / config update from USB memory only
- ⑧ 10/100 Ethernet M12 connector, D-coded
- ⑨ Ethernet status / activity LEDs

Figure 1: Front panel, WAGO connectors

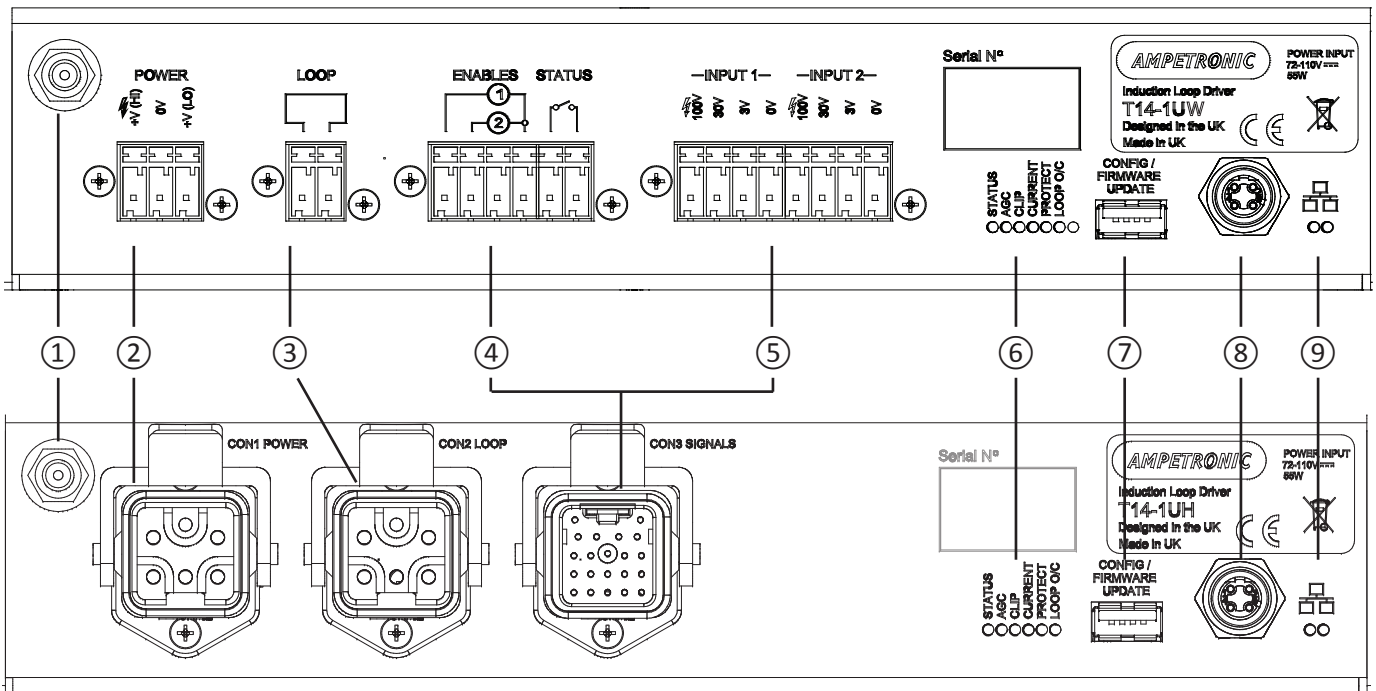


Figure 2: Front panel, Harting connectors - see separate sheet for pin-outs

4. CONTROLS

The T14-1 family of products are controlled through a number of ethernet based protocols. The normal setup interface is accessed through a built-in website interface.

Telnet and SNMP protocols are also available. Please see separate guides to use these protocols.

To access the built-in website, use a suitable cable connect the web interface of the T14-1 to an ethernet network or directly to the ethernet port of your computer. Type the T14-1 unit's IP address (e.g. 169.254.0.10) into the address bar of your web browser to access the configuration website.

The T14-1 is supplied with DHCP enabled, and will be allocated an IP address by your DHCP server, if present. You will need to find the T14-1 address using the DHCP server or a network scanning application.

If there is no DHCP server, the T14-1 supports autoconfiguration and will have the address 169.254.0.10 (or the next available address above, if this is taken). Your computer will normally also have an address in the 169.254.x.x range in this case, and the website should be directly accessible from a connected computer.

5. USING THE WEBSITE

The web interface is used to monitor and adjust the driver. You will be asked for the User Name and Password for the driver as a deterrent to unauthorised parties. These values are case sensitive and need to be entered once per session to access the driver.

Four levels of access are available:

Username	Access to
<i>(not logged in)</i>	Status page only <i>(default on first connection)</i>
audioadmin	Audio settings page & Status page
netadmin	Network settings page & Status page
superadmin	all settings

For all usernames, the default password = ampetronic *(all lower case)*

You can change the password for each user from the Network page of the website. For full details of the web control interface see the T14-1 product handbook.

6. TROUBLESHOOTING

In case of error, the website Status tab colour will change and error messages will be displayed on the Status page.

Startup test messages	
DIAGNOSTICS IN PROGRESS	This message is displayed whilst start-up tests are being performed. Not an error.
LOOP R < 200mR FIX AND RESTART	The driver measured < 200 mΩ for the loop impedance. This is too low for the driver and must be fixed before the driver will finish the start-up diagnostics. Switch off, fix the fault and switch on again.
LOOP > 10R LOOP COULD CLIP	The loop is not open circuit but has a resistance of > 10Ω. This is too high – the output will clip on signal peaks. This is a warning and the driver will continue to operate.
HEATSINK TOO HOT PLS SWITCH OFF	The heatsink is at a critical temperature and thermal protection has activated at startup. Switch off, fix the fault and switch on again.
OUT IDLE OVERCURRENT OUT FUNC TEST HIGH OVERCURRENT	Error in the internal circuitry of the driver. Please contact Ampetronic technical support if any of these errors are seen, quoting the error message text.
Error messages during operation	
OUTPUT OPEN CIRCUIT	This message is displayed if the loop is disconnected whilst the driver is operating (e.g. if the loop is cut). This is a critical state and the output will not operate.
LOOP > 10R LOOP COULD CLIP	The loop is not open circuit but has a resistance of > 10Ω. (See notes above for startup error)
POWER LIMIT - DERATED	The driver is overloaded and the drive current has been reduced
POWER LIMIT - SHUTDOWN	The driver is seriously overloaded and the loop output has been shut down
TEMP LIMIT - DERATED	The internal heatsink is hot and the driver current has been reduced.
TEMP LIMIT - MUTED	The internal heatsink is too hot and the output has been turned off.
OUTPUT CLIPPING	The driver output maximum voltage is being exceeded and the loop signal is being clipped
OUTPUT CLIP - ATTENUATED	The driver output maximum voltage is being exceeded and the loop signal is being attenuated to prevent clipping

7. WARRANTY

This product carries a five year parts and labour warranty from date of shipment from Ampetronic. To qualify for the five year warranty, the product must be registered at www.ampetronic.co (products/warranty), without which the warranty will be valid for two years only.

The warranty could be invalidated if the instructions in this handbook are not followed correctly, or if the unit is misused in any way.

8. BASIC SETUP METHOD

- a. As a minimum, connect power, loop, and audio input signals (see connections above). Enable and status connects can be used if desired.
- b. Connect a computer to the ethernet port as described above. Log on using 'audioadmin' or 'superadmin'.
- c. Browse to the 'Audio' tab of the website.
- d. Apply an input audio signal to the unit, and increase the input gain slider for that input on the website until the compression bargraph shows about 6-12dB compression (and the AGC LED is lit)
- e. Enable the 'combi' test signal using the website interface. Turn up the loop output current until the correct magnetic field strength (0dB re: 400mA^{m-1}) is obtained in the intended area of use. Measure the magnetic field strength using a magnetic field strength meter.
- f. Enable the 'pink noise' test signal using the website interface. Use the magnetic field strength meter to measure the frequency response of the magnetic field. On the website adjust the Metal Loss Control (using the dual-slope feature if necessary to correct a more complex curve), and repeat the test adjusting until the frequency response is +/- 3dB re: the 1kHz value over the 100Hz to 5kHz range.
- g. Turn off the test signals and connect the intended audio input signals.

9. DECLARATION OF CONFORMITY

Manufacturer: Ampetronic Ltd.
Unit 2, Trentside Business Village, Farndon Road, Newark,
Nottinghamshire, NG24 4XB, United Kingdom.

Declares that the product:

Description: Hearing / Induction Loop Driver
Type name: T14-1

in accordance with the following directives, conforms to the following Directive(s) and Norm(s):

2014 / 35 / EU	The Low Voltage Directive and its amending directives
2014 / 30 / EU	The Electromagnetic Compatibility Directive and its amending directives
2011 / 65 / EU	The RoHS Directive and its amending directives

and has been designed and manufactured to the following specifications:

Safety & General Standards:

EN 50155: 2017	Railway applications. Rolling stock. Electronic equipment.
EN 45545	Railway applications. Fire protection on railway vehicles.

EMC Standards:

EN 50121-3-2: 2016	Railway applications. Electromagnetic compatibility. Rolling stock apparatus.
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Environmental Standards:

EN 61373	Railway applications. Rolling stock equipment. Shock and vibration tests and relevant referenced standards
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Date: December 2019

J.R. Pieters
Managing Director,
Ampetronic Ltd.



CAUTION: Changes or modifications not expressly approved by Ampetronic or an authorised partner could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.