MANUAL

Ti-SERIES
THERMAL INKJET

Thermal Inkjet
Printer Manual

BV Korthofah
Lageweg 39
NL-2222 AG Katwijk
The Netherlands

kortho
coding & marking

“original instructions”

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This manual has been drawn up by BV Korthofah. Address information see cover page.

Our History

Kortho was founded in Amsterdam in 1926 and is still a Dutch and 100% family owned company today. Because of our long history we were able to witness the evolution of Coding & Marking from the beginning. Naturally our machines also evolved along the way. From stencilling and the standalone mechanical stamping machines in the early days. To the network connected Industry 4.0 printers of today.

Our technologies

Next to still offering our mechanical hotfoilprinters, rollcoders and touch-dry marking systems, Kortho also specializes in Thermal Print as well as Hi-res Inkjet systems. Two core technologies that stand at the base of our new generation printers: Consisting of TIJ and Piezo inkjets on one end, and Label and TTO printers on the other. This makes us the widest multi-technology oriented specialist in the market today. Furthermore as all products have been fully developed in-house our printers and software have a highly integrated and standardized design between them.

Our values

As an independent and longtime family owned business Kortho has always been able to stay true to itself. Firstly by remaining a specialist. Hence, we will only develop a printer if we can make it best in its kind. Never shall we launch an average product just to widen our offering. And secondly by staying transparent. Basing our pricing on manufacturing cost and obvious value only. Never on marketing, strategy or artificial product differences. These principals not only guarantee technologically dominant and best valued priced printing systems, but also a loyal partner that will always choose long term relationships over short term results.

Our mission

As early as 2007, and with our first network controlled TTO launched in 2009, Kortho saw clearly that high automation and centralized (human-free) printer control was the future in coding. Winning OEM's and dealers would not just have to offer good printers, but also be able to integrate them into any smart customized coding solution. Something that just very recently became known as Industry 4.0. As a result Kortho has focused its development in this direction ever since. First by implementing the needed functionalities. And now, through our SLIMLINE concept, by making them easy, quick and cheap to implement. Our mission: Making smart, tailored and error free coding into the new global standard. And thus turning Industry 4.0 into a turn-key available commodity.

INDUSTRY 4.0 IS NOW A TURN-KEY AVAILABLE COMMODITY!

SLIMLINE™

SLIMLINE printers are all about bringing Industry 4.0 within reach. To achieve this we specifically designed this new line of equipment to excel in an IoT network environment. On the software side by making any tailored printer control solution easy and quick to implement. And on the hardware side by re-using as much as possible of existing network and IT infrastructure. Allowing for significant savings on printer hardware. Something that's an absolute first in Coding & Marking.

For this, Kortho's SLIMLINE concept is based on the following principles:

LESS CODING ERRORS

The biggest savings in coding are not found in the cost per print, maintenance costs nor equipment price. Because although these costs are still very important, they are insignificant in comparison to the costs of a product recall or factory downtime due to coding errors. This is why SLIMLINE printer control is specifically designed to address coding errors. Be it human, mechanical or process related.

LESS SOFTWARE LICENSE FEES

The costs of IT solutions traditionally start with license fees. In order for SLIMLINE to work Kortho took the strategic decision to offer our own Kortho Control Center software for free. This label design and network control platform can operate the entire range of SLIMLINE printers from one central GUI. And with more than a decade of IoT oriented development will cover 95% of all smart coding requirements. Straight out of the box, free of charge and with all features unlocked. Effectively turning our software into a service product without profit motive.

SLIMLINE™ CONCEPT

LESS PROGRAMMING TIME

Second cost component in IT is the need for extended scripting. Which at the same time is also the main reason for complexity. To address these issues we designed SLIMLINE printers to be open and omnicompatible to other third party software as well. The idea behind this is simple: The more software that supports our printers, the bigger our offering in turn-key software solutions. And with the world as our IT supplier there's always going to be an existing specialist for each application. Because of this with SLIMLINE printers you no longer need to script every new or exotic requirement from scratch. Nor conform to the capabilities of just the printer manufacturer's software. Instead, our printers will allow you to use to best suited and already proven software for the application. Something that, with no financial incentive to sell our own software, will always be enabled and promoted by Kortho objectively.

LESS HARDWARE INVESTMENTS

Just like with software the key to reduce hardware costs lies in needing as little as possible. This as Kortho will never make concessions on equipment build quality in order to lower its price. Luckily in centralized control this is not needed as equipment savings can also be found by re-using existing infrastructure. This is why SLIMLINE printers are designed to operate without each needing an individual HMI. Everything you need is in the printer itself so that up to 250 different systems can be operated from one single terminal. Even across different production plants. Naturally each printer can still be equipped with its own HMI, but this is optional. Meaning that the more the control is centralized, the bigger the savings will be on controllers. On top, SLIMLINE printers can also be controlled from any previously purchased HMI. Allowing for further hardware savings by re-using already present servers, PC's, tablets or other devices to control the printers from.

Smart coding
Less license fees
Less coding errors
Less programming time
Less hardware investments

SLIMLINE: Smart Less Is More

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100% MADE IN HOLLAND

Preface

This manual informs the user on how to safely use (and daily maintain) the Ti-Series.

Read this manual carefully before first using the Ti-Series or before carrying out any operating activities on it. This is the only way to ensure optimum safety.

Related documents

In addition to this manual, the following documents belong with the Ti-Series

- EC Declaration of Conformity of the Machinery in accordance with Annex II 1.A of the Machinery Directive (2006/42/EC).
- Datasheet external power supply.

Symbols

The following symbols are used in this manual:

A tip or hint.

Draws your attention to possible problems.

Draws your attention to the risk of the Ti-Series being damaged if the instructions are not followed carefully.

Draws your attention to the risk of users becoming seriously injured if the instructions are not followed carefully.

A reference to another chapter, section, or document.

Contents

1 Introduction

1.1 Manufacturer

The Ti-Series is manufactured by:

BV Korthofah
Lageweg 39
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The Netherlands

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Fax: +31 (0) 71 40 32 807
Web: www.kortho.com
Email: info@kortho.nl

1.2 Machine identification

The name of the machine is: Ti-Series.

A type plate example of the Ti-Series is shown below:

Figure 1-1: Type plate examplate

The Ti-Series is CE-marked. This means that the Ti-Series complies with the essential health and safety requirements in Appendix I of the Machinery Directive.

Fill in the article number, serial number and year of production as stated on the type plate in the table below.

Machine identification	
Article number	
Serial number	
Year of production	

1.3 Service life

With normal use and adherence to the specified maintenance periods, the service life of the Ti-Series is ten years. The service life can be negatively affected if original parts are not used during repairs. Using non-original parts also voids any claim to warranty or compensation.

1.4 Liability

The manufacturer of the machine is not liable for any hazardous situations, accidents and damage that are the result of:

- Improper use of the Ti-Series.
- Using the Ti-Series for applications or under conditions other than those specified in this manual.
- Ignoring safety warnings or safety instructions as stated on the Ti-Series or in this manual.
- Making changes of any kind to the Ti-Series. This includes the use of other replacement parts.
- Insufficient maintenance.
- Normal wear and tear.

The manufacturer cannot be held liable for consequential damage, such as damage to products, interrupted operations, loss of production, etc., resulting from machine malfunction.

2 Safety

2.1 User

The Ti-Series may only be operated by qualified personnel.

Observe the safety instructions in this manual. Failure to observe the safety instructions may cause unacceptable risks.

The Ti-Series may only be operated by one person at a time.

Users must familiarise themselves with Chapters 1 to 6 of this manual and the safety regulations below before using the Ti-Series or performing any operation on the Ti-Series.

2.2 Maintenance engineer

The Ti-Series may only be serviced by suitably qualified personnel.

Observe the safety instructions in this manual. Failure to observe the safety instructions may cause unacceptable risks.

The maintenance engineer must be familiar with the full contents of this manual and the safety instructions provided below before putting the Ti-Series into use and carrying out maintenance work on the Ti-Series.

2.3 Safety instructions

The Ti-Series complies with the basic health and safety requirements of the machinery directive. This means that the Ti-Series can be operated and maintained safely if all safety instructions are carefully observed. However, improper or careless use can create dangerous situations.

Observe the safety instructions in this manual. Always remain alert to dangerous situations and avoid any improper or careless use.

2.3.1 General safety instructions

Observe the following general safety instructions:

- Tie back long hair.
- Do **not** wear loose clothing or jewellery.
- Check the general operation of the Ti-Series.
- Keep your hands away from hazardous areas of the Ti-Series.

Keep bystanders at a distance. Do not allow unauthorised personnel to operate the Ti-Series.

- Never start the Ti-Series while people are working on the machine.
- Carry out the maintenance work in accordance with the safety instructions in chapter 7. Replace any damaged or faulty parts or components before using the Ti-Series again or carrying out operating activities on the machine.
- Modifications to the Ti-Series may only be made with the express written permission of BV Korthofah.

The Ti-Series is connected via an external power supply. BV Korthofah recommends using this external power supply. See Appendix 4 for safety instructions when using this external power supply.

2.3.2 Residual hazards

The following hazards may occur when using or servicing the machine:

To replace the print cartridge:

Caution is advised when changing the print cartridge, to prevent injuries to hands or fingers.

2.3.3 Warnings

The following warnings are issued when the machine is used or maintained:

Cable routing:

To avoid damage to the cables or printer, the cables must be routed at a suitable distance from moving parts.

Mains voltage:

To prevent damage to the printer, the connected mains voltage must be between the minimum and maximum mains voltage as specified in the technical specifications.

Power supply to the printer:

The power supply to the printer is adapted to the operation of the printer. Using a different power supply may result in safety issues and, in extreme cases, even damage the printer. If the power supply is damaged for any reason, it must be replaced with the same model and type.

Print head cleaning:

To prevent damage to the print head only use non-woven cloths. Do not use compressed air, abrasive materials, metal objects or liquids.

Spare and consumable parts:

To prevent damage to the printer, only use BV Korthofah print cartridges.

The Ti-Series does not contain any parts that you as a user can replace yourself. Contact BV Korthofah in case of defective parts.

2.4 Function of the Ti-Series

The function of the Ti-Series is:

- Printing variable codings.

The Ti-Series has been developed specifically for this function and may not be used for other purposes.

⚠ ***The only way in which the Ti-Series may be used is described in chapter 3. Any other use of the Ti-Series is NOT permitted.***

Before using the Ti-Series for the first time, the operator and maintenance engineer should be instructed in how to use and maintain the Ti-Series.

3 Machine description

3.1 Scope of supply

Figure 3-1: Scope of supply

1. Ti-Series Thermal Inktjet printer.
2. Kortho Printerface (optional).
3. External power supply.

The Kortho Printerface shown here is optional. You can also install Kortho Control Center on a Windows 10 (or higher) system of your choice.

Controlling multiple printers (max. 100) from a single HMI is also possible with Kortho Control Center.

The Ti-Series is connected via an external power supply. BV Korthofah recommends using this external power supply. See Appendix 4 for detailed information about this external power supply.

3.2 Machine overview Ti-Series Thermal Inktjet printer

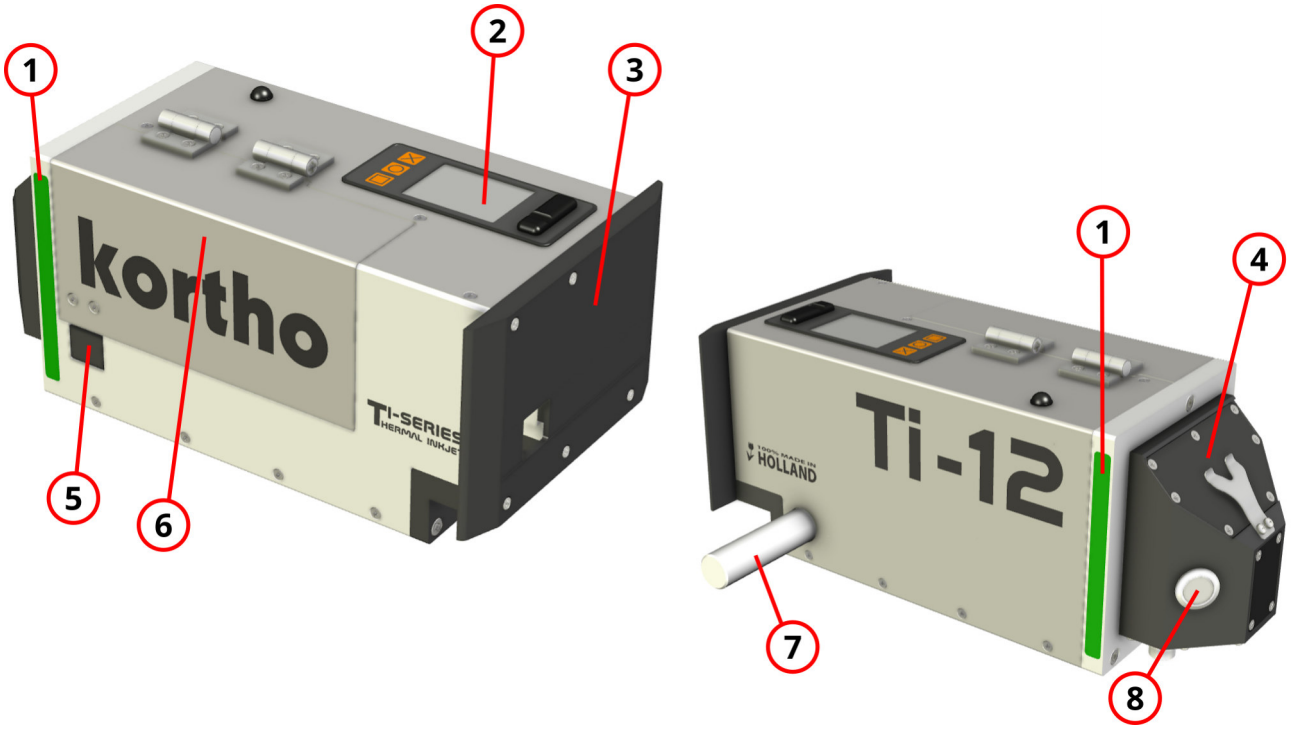


Figure 3-2: Machine overview Ti-Series

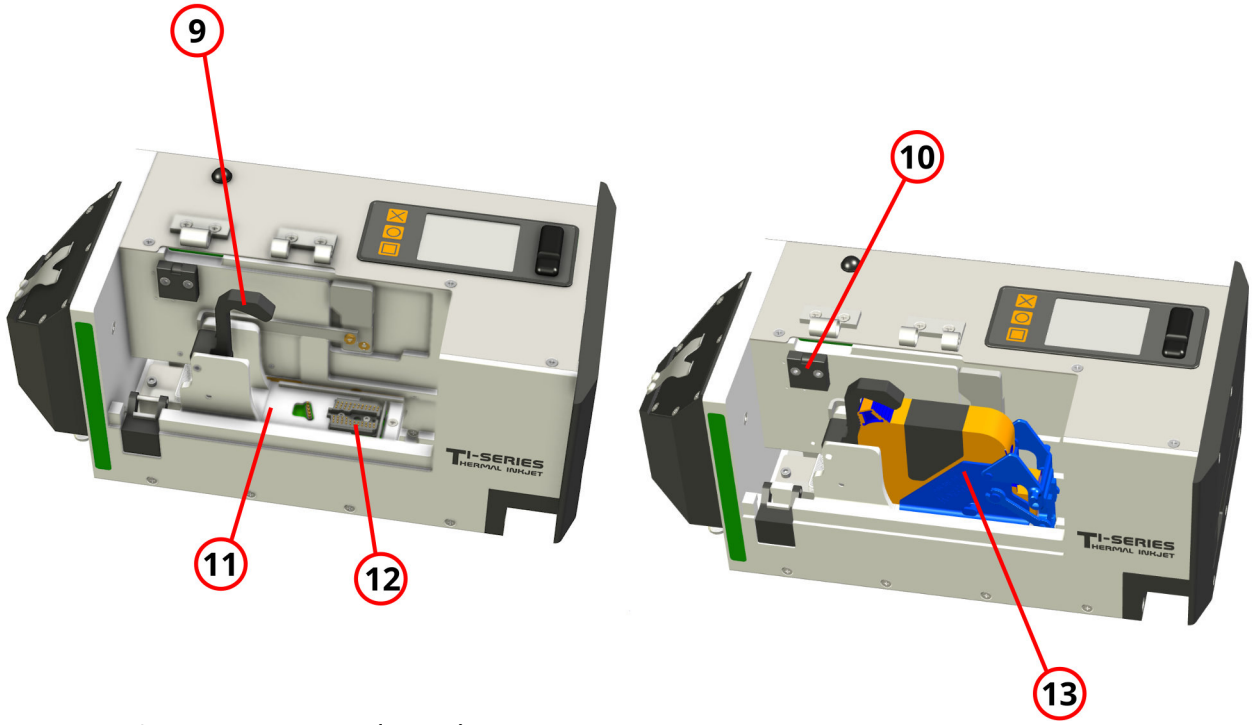


Figure 3-3: Machine overview Ti-Series (interior)

The Ti-Series consists of the following parts:

1. Signal strip.
2. Status panel.
3. Guide plate.
4. Card reader.
5. Release button lid.
6. Lid.
7. Support axle.
8. On/off button.
9. Locking handle print cartridge.
10. Sensor lid.
11. Carriage.
12. Electrical contacts print cartridge.
13. Print cartridge.

The function of the Ti-Series is:

- Printing variable codings.

The Ti-Series is mounted with a support axle to a bracket next to or above a conveyor belt, such that the guide plate almost touches the product to be printed. The carriage with the print cartridge moves forward, uncapping the nozzle plate of the integrated printhead. The product to be printed is guided past the printer and the desired data is printed. If no print is placed within a set time, the carriage with the print cartridge then moves back and the nozzles of the integrated printhead are capped again.

The print cartridge is located in a closed compartment, which can be opened with a release button. A sensor detects whether the lid is closed. Only with a closed lid the carriage can move and printing can take place. The Ti-Series can automatically close the nozzles of the print cartridge cap by moving the carriage with print cartridge to the "cap" position. This prevents dots from being missed in a first print after a long period of time without printing, which would cause the ink to dry out because the nozzles of the integrated printhead are exposed to the air.

A plastic print tag is supplied with each new print cartridge. The print tag contains credits. When a new print cartridge is placed into the Ti-Series, the system will ask to place a print tag so that credits can be loaded into the Ti-Series. There are enough credits on the print tag to use all the usable ink in the print cartridge for printing. Once the credits are loaded into the Ti-Series, the print tag is no longer usable and can be disposed off according to local regulations.

An print cartridge contains one color of ink. It is possible to change print cartridges so that you can print with a different color. The resolution of the print can be set between 300 and 150 DPI using the KCC software. A lower resolution makes it possible to save ink.

3.3 Status panel

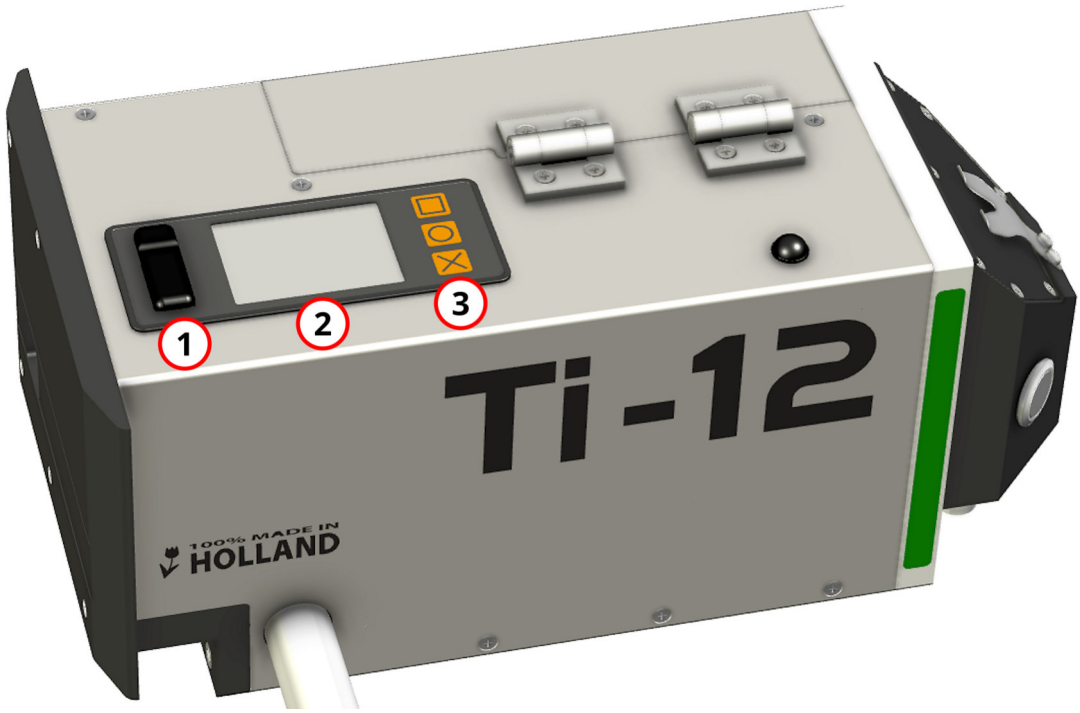


Figure 3-4: Status panel

The status panel consists of the following parts:

1. USB port.

2. Display.

3. Operating buttons (the function is shown in the display).

The status panel provides multiple functions:

- It offers two status screens (§3.3.1).
- A number of basic settings (§3.3.2) can be changed using the simple menu structure.
- If applicable, it displays warnings or error messages with the corresponding orange or red background color.
- The system software can be updated using a USB stick.
- The printer can be set to RUN or STOP mode.
- One can select a test label.
- One can make a test print.
- One can purge the printhead.
- One can select a language for the display.
- One can set the IP-address, Subnet and Gateway of the system.
- One can rotate the display in 4 orientations.
- One can add credits to the system.
- A test report from the printer can be placed on the USB stick.
- Bluetooth can be activated (for service personnel).

3.3.1 Status screens

The display can show two status screens. The default main screen will show the following information:

- The type of printer (Ti-12) in the top right corner.
- The name of the printer.
- The amount of ink which is still present in percentage (%).
- The number of prints since the current label was selected.
- The name of the label current being printed.
- The function of the three control buttons (opening USB menu, test menu, and settings menu).

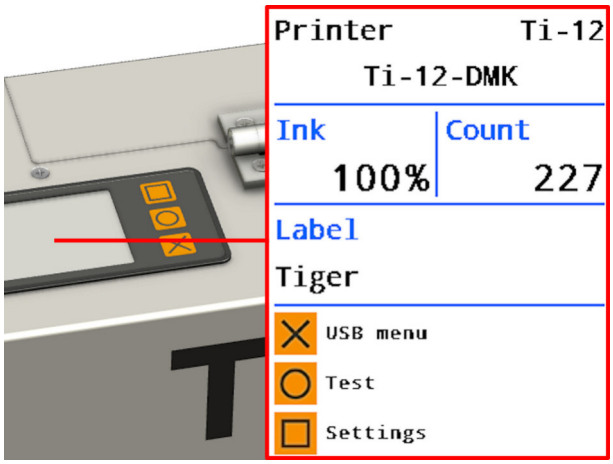


Fig. 3-5: Main screen

See section 3.3.2 - 'Basic settings' for more information on the USB menu, test- menu en settings-menu.

If no controls buttons are pressed for approximately one minute, a screen saver with the following information is displayed:

- The current time.
- The print modus (ON / OFF or RUN / STOP).
- The number of prints per minute.
- The amount of ink available in percent.

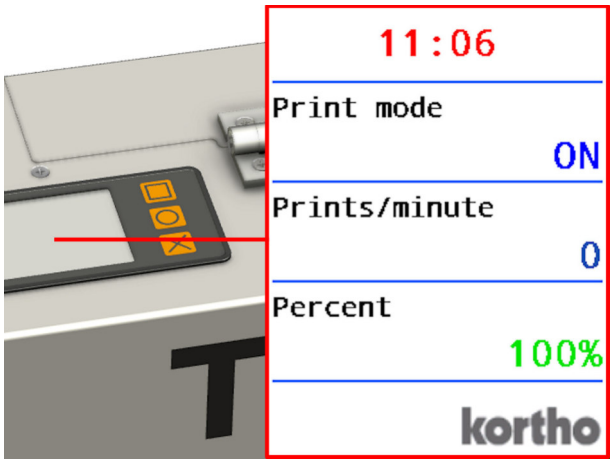


Fig. 3-6: Screensaver

Press the X-button to return to the main screen.

3.3.2 Basic settings

You can also set up some basic settings on the status screen, such as:

- Language of the menu.
- Rotation/viewing orientation display.
- Network settings: IP-adres/Subnet mask/Gateway.
- Firmware update: by inserting a USB stick with new firmware.
- Bluetooth discoverable/pair.
- And some more settings.

Extensive process parameters, settings and job processing can be read and set via Kortho Control Center (please refer to §3.4 and the separate Kortho Control Center software manual).

With the operating buttons one can navigate through the menu options and select or change the settings. The function of these buttons differ throughout the screens. The current functions of a buttons is always shown in the display.

3.3.2.1 USB menu

The USB menu is accessed by pressing the USB menu button on the main screen.

Create report

Select the option with the Back/Next buttons and press the Select button to save a report file to a USB stick.

Make sure the USB stick is inserted in the USB port when activating this option.

Upgrade software

Select the option with the Back/Next buttons and press the Select button to upgrade the printers firmware.

Make sure a USB stick with the update file in the root is inserted in the USB port before activating this option.

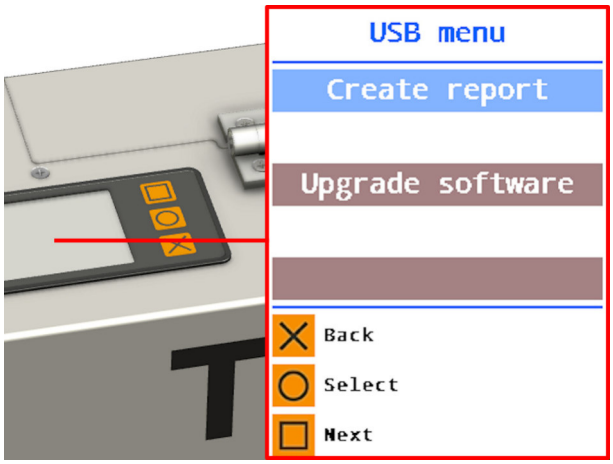


Fig. 3-7: USB menu

3.3.2.2 Test menu

The test menu is accessed by pressing the Test button on the main screen.

Pause printer

Select the option with the Back/Next buttons and press the Execute button to pause the printer. The LED turns red.

Press the Execute button again to set the printer back in running mode. The LED turns green again.

Test print

Select the option with the Back/Next buttons and press the Execute button to make a test print.

> ***Make sure the printer is running mode before activating this option.***

Load test label

Select the option with the Back/Next buttons and press the Execute button to load the internal test label.

Purge Head

Select the option with the Back/Next buttons and press the Execute button to purge the print nozzles. All the available nozzles will fire a number of times.

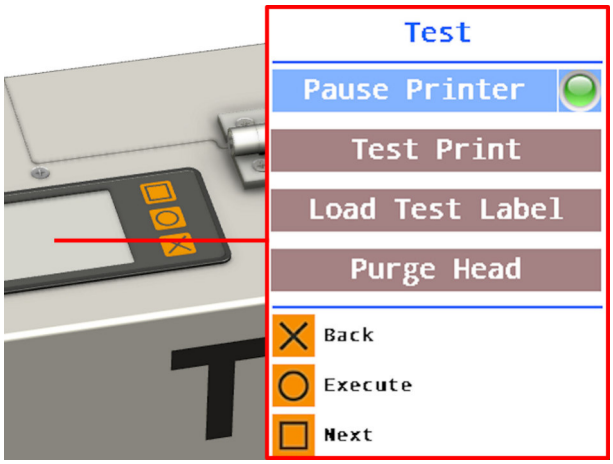


Fig. 3-8: Test menu

3.3.2.3 Settings menu

The settings menu is accessed by pressing the Settings button on the main screen. The following settings can be changed:

- Screen rotation.
- Language.
- Network settings.

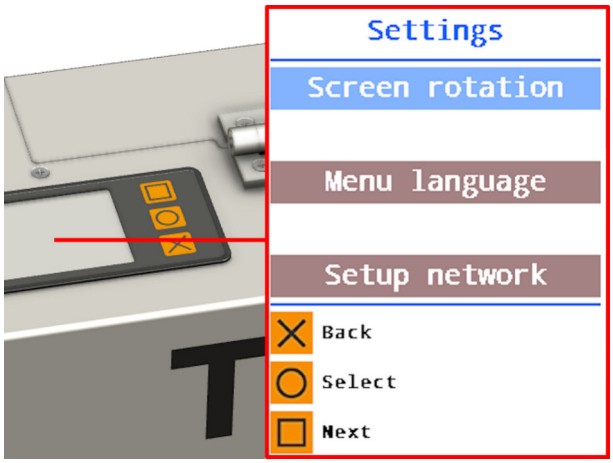


Fig. 3-9: Settings menu (1)

- Bluetooth settings.
- Add credits.

To change a setting select it with the Back/Next buttons and press the Select button. A new screen is shown where the setting can be changed.

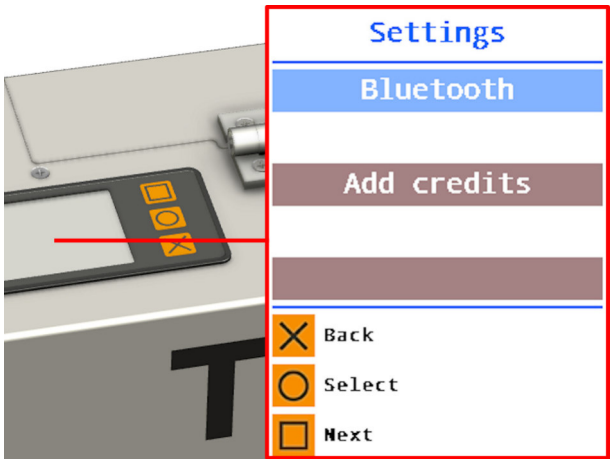


Fig. 3-10: Settings menu (1)

The Ti-Series supports a Bluetooth connection for Kortho service engineers only at the moment. When this option is selected, the Ti-Series system will activate Bluetooth for 1 minute. Within that time, a service engineer can make a connection with the system for diagnostic reasons.

See section 5.4 for information about this option.

Screen rotation

Press the Rotate button to rotate the screen in 90° steps.

Press the OK button to select the screen orientation.

Press the Cancel button to return to the settings menu without changing the screen orientation.

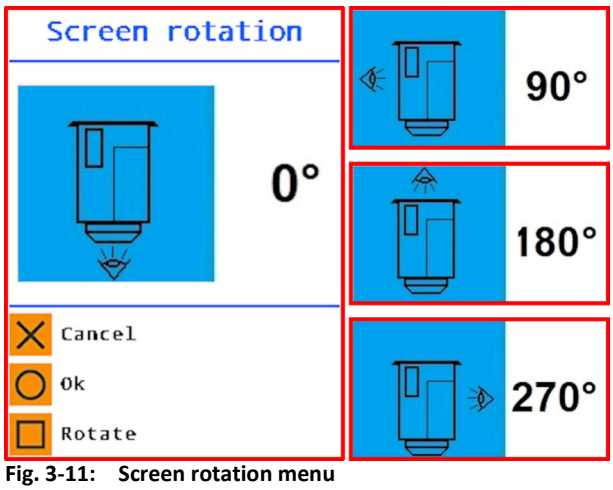


Fig. 3-11: Screen rotation menu

Menu language

Select the preferred language with the Back/Next buttons and press the OK button to change the language.

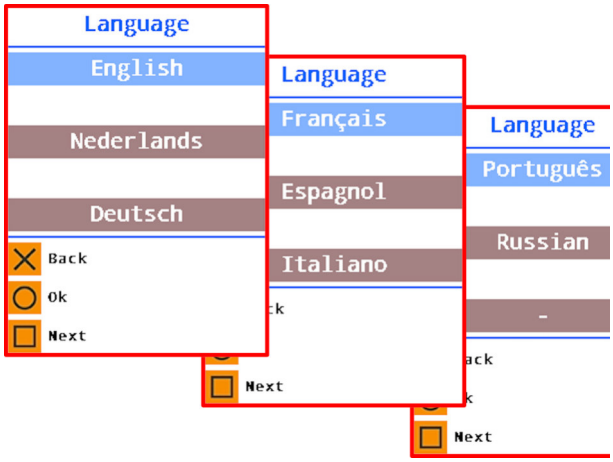


Fig. 3-12: Language menu

Setup network

Select the network setting with the Back/Next buttons and press the Change button. A new screen is shown with the individual octets of the setting.

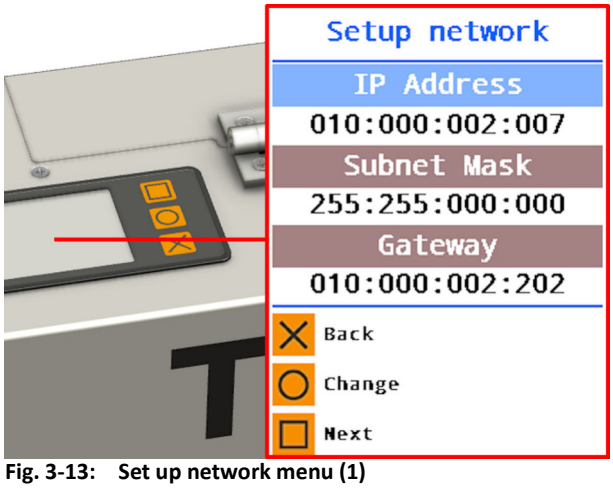


Fig. 3-13: Set up network menu (1)

Use Next button to select the octet to set or change and press the change button. A new screen is shown with the individual digits of the octet.

Press the OK button to store the setting a return to the previous screen.

After pressing the OK button the new settings will become active in a few seconds.

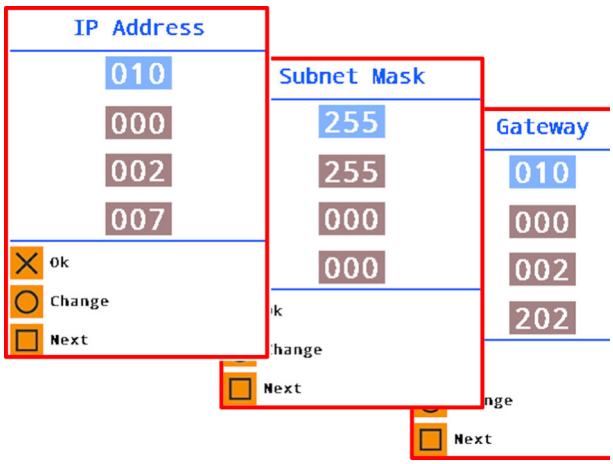


Fig. 3-14: Set up network menu (2)

Use Next button to select the digit to be changed and press the Scroll button to scroll through the possible values.

Press the OK button to store the setting a return to the previous screen.

After pressing the OK button the new settings will become active in a few seconds.

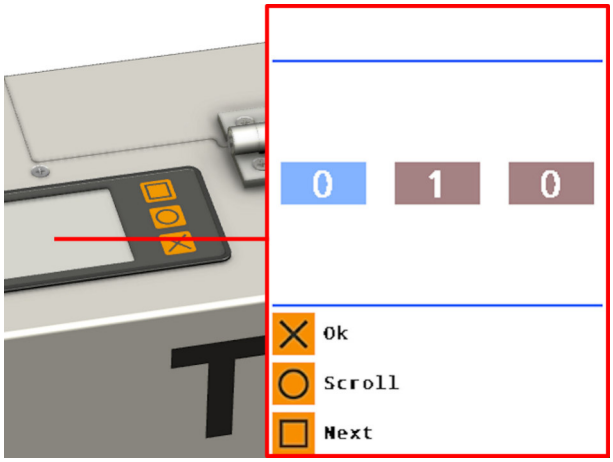


Fig. 3-15: Set up network menu (3)

3.4 HMI Kortho Control Center

The Interface software for all BV Korthofah printers is called Kortho Control Center. This software is installed by default on the Kortho Printerface, but can also be downloaded free of charge to use on any other Windows system (Windows 10 or higher). Control from the HMI with KCC to the printer(s) is done via Ethernet. Up to 100 printers can be controlled from a single HMI with KCC. It is possible to use different models with different print sizes. The HMI with KCC consists of the following parts:

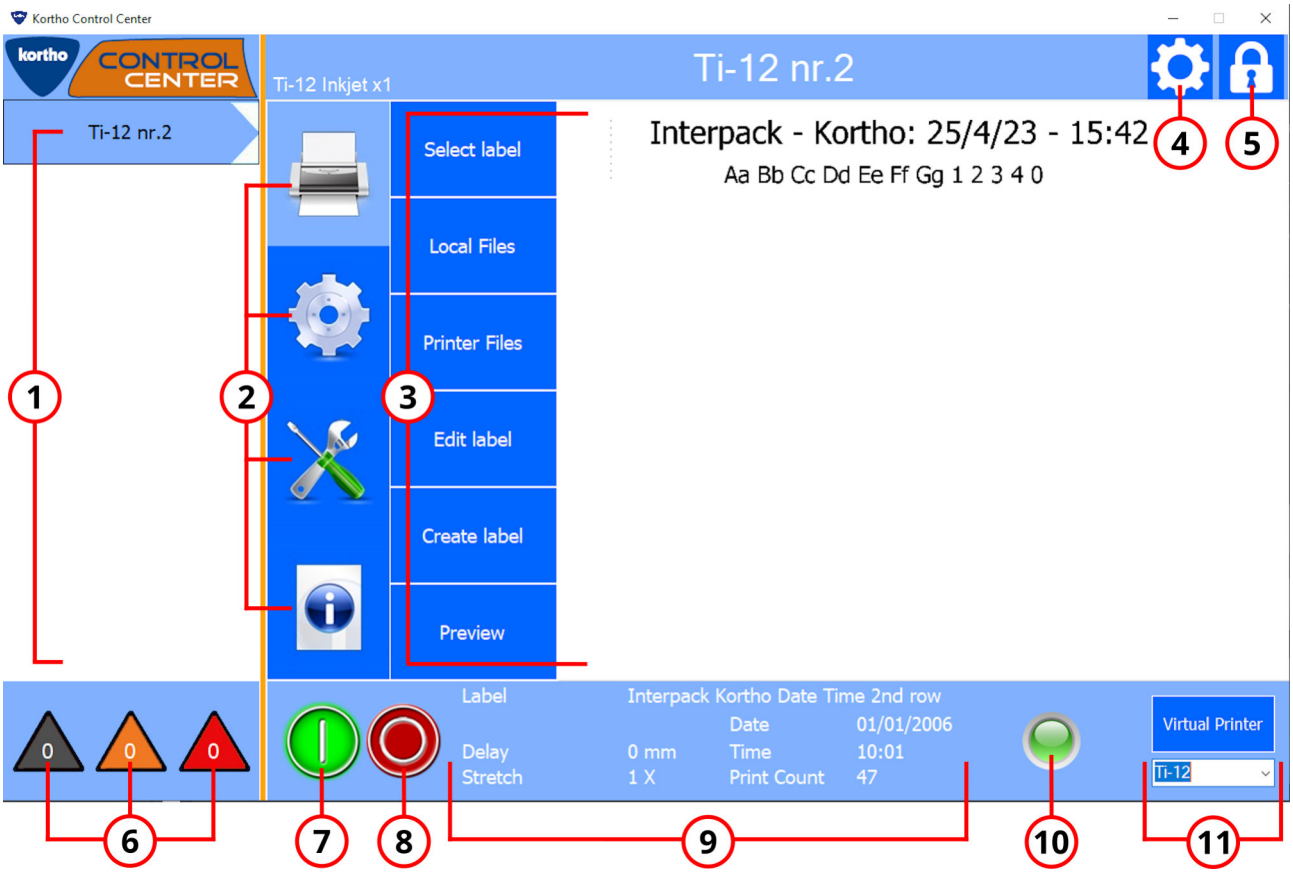


Figure 3-16: HMI

No.	Description
1.	**Printer overview / printer selection** Displays a list of all network-connected printers. Press one of the buttons to select a printer. • Connected printers will automatically be found and displayed in the printer ID overview. • The printer's default name will be displayed as the printer ID by default. You can change this to a printer ID of your choice in KCC. • Depending on the status of the printer, the printer ID button will change colour (Offline = Grey, Ready/OK = Blue, Warning = Orange, Error = Red).

No.	Description
2.	**Printer settings** • Printer (label selection and label management). • Settings (printer and interface settings). • Service and diagnostics (service and diagnostics functions). • Information (system information). Press one of the buttons to display the details / settings on the details / settings screen.
3.	**Detail / settings screen** Shows the details / settings of the setting selected in the printer settings. (In this example the details / settings of the Printer (label selection and label management) are shown.)
4.	**Software settings** Press this button to open the software settings screen.
5.	**Lock screen** Press this button to lock the screen (this must be setup in the software settings in the security tab).
6.	**Printer status triangles** Displays the status of all active printers in the IP address list. • Grey = no connection. • Orange = warning. • Red = error. - The number in the triangle indicates the number of printers with the relevant status.
7.	**Start button** Press this button to start the printer selected in the printer overview. • The printer will wait for a signal from the production line.
8.	**Stop button** Press this button to pause the printer selected in the printer overview. • The printer will not print, regardless of what the production line is doing.
9.	**General printer info** Displays the name of the selected label, speed, delay, date, time, ink left (%) and number of prints of the printer selected in the printer overview. • This data is also visible on the display of the printer itself.

No.	Description
10.	**Status LED** Displays the status of the printer selected in the printer overview. • Blue = power is present and printer is starting up. • Green = ready. • Orange = warning. • Red = error.
11.	**Virtual printer** Demo mode to be able to work with the KCC without actually connecting a printer / connecting to a printer.

For extensive KCC functions for the Ti-Series and other Kortho printers, please refer to the separate Kortho Control Center software manual.

3.5 Signal strip

Both sides of the Ti-Series are equipped with a LED signal strip. The colour of the signal strip indicates the status of the Ti-Series.

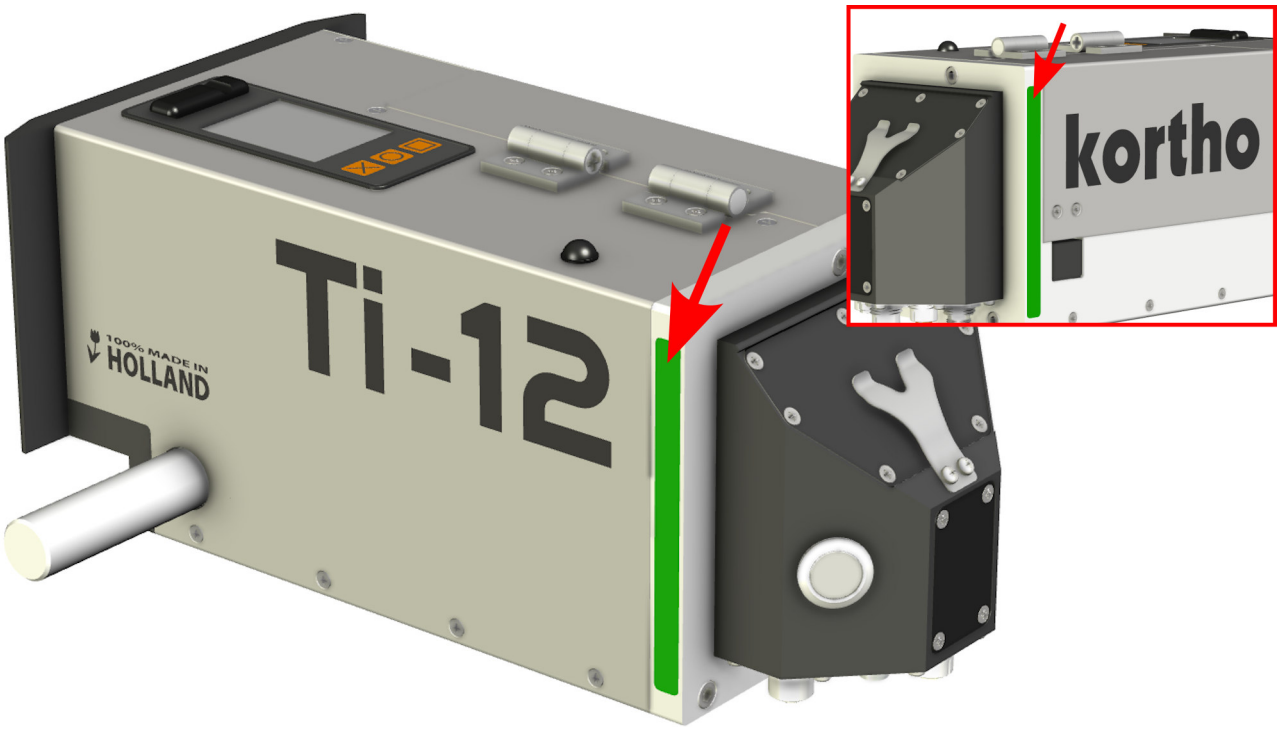


Figure 3-17: Signal strip

The signal strip contains the following status colours:

- Blue = Booting.
- Green = Active / ready.
- Orange = Warning.
- Red = Error.
- Pink = Software update in progress.

Printer status changes and notifications will be simultaneously displayed, centrally in KCC and locally on the printer. KCC will show the notification in a pop-up in combination with a colour change of the Printer-ID button. The printer shows the notification on the display in combination with a colour change of the LED strips and background colour of the display.

4 Installation

4.1 Safety regulations

Installation must be carried out by qualified staff.

Personnel must take all necessary measures to prevent injury to persons and/or damage to a production line.

4.2 Environment

The environment in which the Ti-Series may be installed must meet several requirements regarding humidity, temperature and vibration.

- The relative humidity should be between 0 and 85% (non-condensing).
- The ambient temperature must be between 0 and 40 °C.
- The Ti-Series may not be used in fire or explosion hazard areas.
- The Ti-Series must be mounted with low vibration.

4.3 Positioning

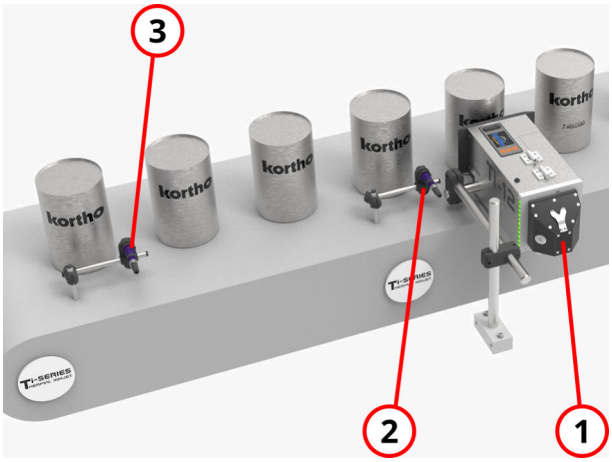
The location of the Ti-Series on a production line must meet several requirements:

- There is sufficient room to carry out maintenance work on the Ti-Series.
- The Ti-Series does not interfere with production or control processes of the production line.
- The Ti-Series is placed out of reach of human operations taking place on the production line.

4.4 Printer installation

To install the Ti-Series, perform the following operations:

1. **Mount** the Ti-Series at the desired location.

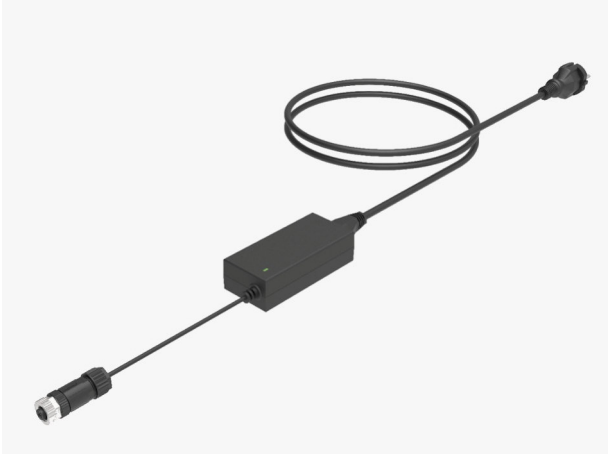


See section 4.4.1 for instructions on how to adjust the position of the printer.

2. **Mount** the print request sensor at the desired location.
3. **Mount** the uncap signal sensor at the desired location.

See section 4.4.2 for instructions on how to adjust the position of the uncap signal sensor.

4. **Mount** the printer power supply in the desired location.



See appendix 4 for installation instructions of the external power supply.

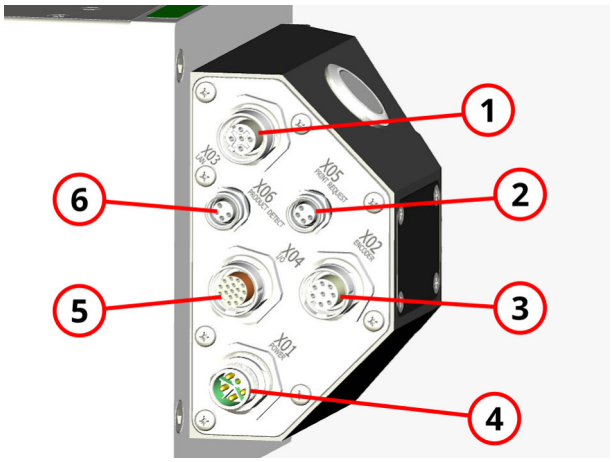
5. **Mount** the HMI (Kortho Printerface IoT or your own Wiindow based system) at the desired location.

See the KCC software manual for installation instructions of the KCC software.

6. **Connect** the Ti-Series.

The printer has the following connectors:

1. Ethernet.
2. Print request.
3. Encoder.
4. Power supply.
5. I/O (freely configurable).
6. Uncap request.



Securely tighten the clamping ring of the connectors.

See chapter 8 for detailed information of the connectors.

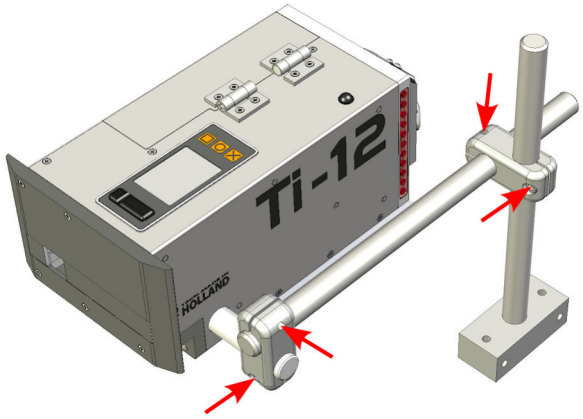
4.4.1 Adjust the position of the printer

⚠ ***Correct adjustment before commissioning is very important for correct operation of the Ti-Series. It improves print quality, reduces wear on parts and extends machine life.***

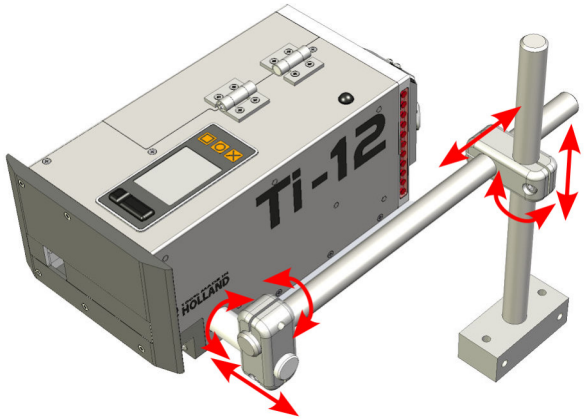
The printer is mounted on a tubular frame above or next to the product to be printed. This makes it possible to rotate the printer at an angle that is parallel to the production line. The Ti-Series can print in vertical position downwards and in horizontal position. This tubular frame can either be supplied by BV Korthofah or installed by the owner. The product to be printed must always move along the guide plate of the Ti-Series.

Perform the following to adjust the position of the Ti-Series relative to the product to be printed:

1. **Loosen** the screws of the clamps slightly, while holding on to the printer.
   - Readjust one clamp and one screw at the time for optimum results.
   - The printer does not need to be removed from the frame.



2. **Move** the printer to the desired location along the frame.
   - Readjust one clamp and one screw at the time for optimum results.



! ***Make sure that the tubular frame does not protrude into the product path.***

3. **Retighten** the screws to secure the printer.

4.4.2 Positioning of the uncap request sensor / timing the uncap singnal

The Ti-Series will cap and seal the print cartridge nozzles automatically if no new print signal (2) is detected within a preset time. This prevents the ink from drying in the print cartridge nozzles when the printer is not in use. During normal operation capping is not needed as the constant printing will keep the nozzles open. Meaning that capping typically only happens when the production line is stopped. Or when product throughput is very low and there's a long time in between each print. Depending on the used ink and/or settings decapping again can take a few seconds up to 30 minutes. When production is re-initiated it is therefore important that the decapping process is completed before the first product of the new batch reaches the print position. This is done by sending the uncap signal (1) to the printer (3) first. Which, in most cases, will be a photocell placed ahead of the print request photocell. The distance between the two depends on the line speed of the product on the production line.

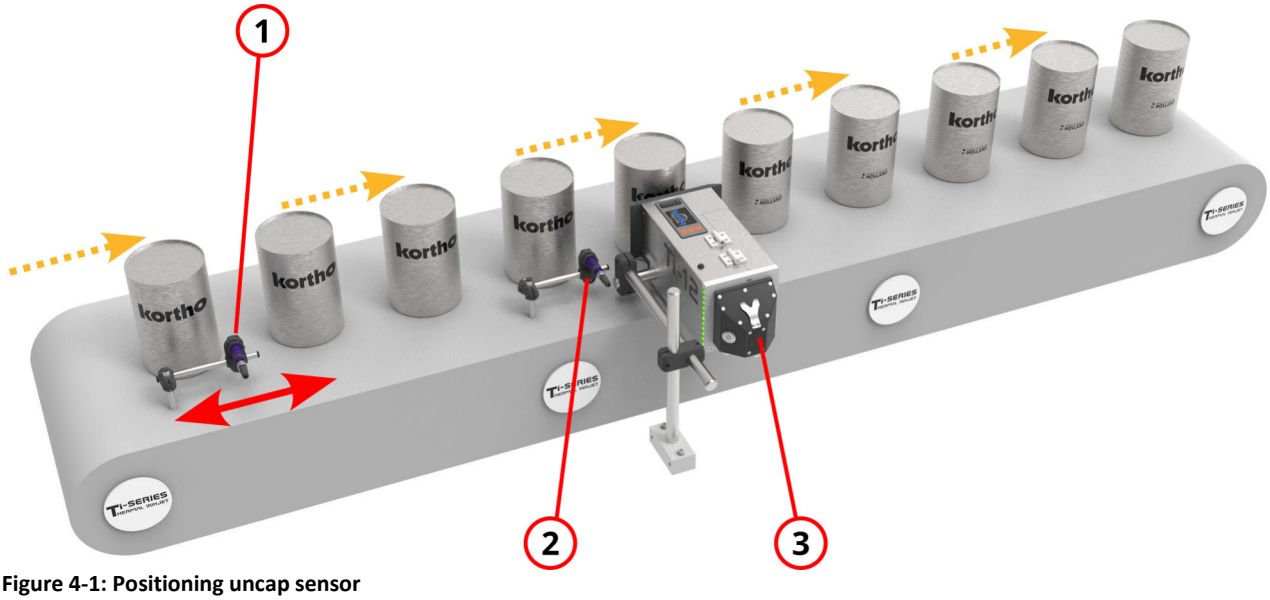


Figure 4-1: Positioning uncap sensor

Carry out the following steps to position the uncap sensor and set the decap timer:

1. Establish the printhead decap time.
2. Setting the capping timer.
3. Timing the uncap signal.

Prevent the ink from drying by not leaving the print cartridge cover open for an unnecessarily long time when there is no print request.

Once the ink has dried, you can try to wipe the nozzles with a non woven cloth to remove the dried ink.

When a row of nozzles is not functioning properly it is possible to deselect a row of nozzles and continue printing with the other nozzles of the print head. See the KCC software manual for more details.

Step 1: Establish the ink's decap time

The decap time varies per ink type, but is also influenced by the environment. In general the more aggressive the ink, and the dryer the environment, the shorter the decap time will be. For some high-adhesion non-porous inks the decap time can be just mere seconds. Meaning that their print window is short and so an accurate decap timing is needed. Because of this, when working with fast-dry inks, it is best to test the decap time per installation. To determine the decap time, first wipe the nozzles and perform a print. Then increasingly add one second in between each print without capping in between. The longest time the printer can be idle before nozzles start to fail is the decap time. Inks with a long decap time are much less critical and do not need to be tested upon each installation. For these inks the decap time as issued on the datasheet will be accurate enough.

Step 2: Setting the capping timer

The second step is to set the decap timer in KCC. If this timer expires before a new print signal is detected the nozzles will automatically be capped. This ensures that the nozzles stay uncapped as long as consecutive prints are made within the ink's decap time. However if the printing stops the nozzles will be sealed before the ink's decap time expires. To ensure this the decap timer must always be set shorter than the ink's maximum decap time, yet the longest possible to prevent unnecessary excessive capping. In general setting the decap timer 5 to 10% shorter than the ink's decap time will suffice.

Step 3: Timing the uncap signal

The final step is to time the actual uncap signal. To determine the uncap signal first the line speed must be established. This is important in order to know how long it will take for a product to reach the nozzles after the uncap signal is generated. This time must be longer than the time the printer needs to uncap. But ideally as short as possible so the printing window is not shortened unnecessary. The time the printer needs to uncap varies on the ink, but also if the optional purge function is activated in KCC. If for example the line speed is 30 meters/min and the printer needs 1 second to uncap, then the photocell for the uncap signal should be placed approximately 50mm before the print request position. Tuning the uncap signal can be further done in KCC with the uncap delay function.

Furthermore it's important to note that if the line speeds varies a line encoder will have to be installed.

4.5 Commissioning

Perform the following operations before commissioning:

- Check that the Ti-Series is connected correctly.
  - Check whether the external power supply is connected correctly.
  - Check whether the network cable is connected correctly.
  - Check whether the I/O cable is connected correctly.
  - Check whether the encoder is connected correctly.
  - Check whether the print request sensor is connected correctly.
  - Check whether the uncap request sensor is connected correctly.
  - Check whether the clamping rings of the connectors are properly tightened.
- Check whether the type of ink matches the product to be printed.
- Check whether the printer and sensors are positioned correctly.

5 Operation

5.1 Safety regulations

The Ti-Series should only be operated by qualified personnel.

Personnel must take all necessary measures to prevent injury to persons and/or damage to a production line.

5.2 Switching on

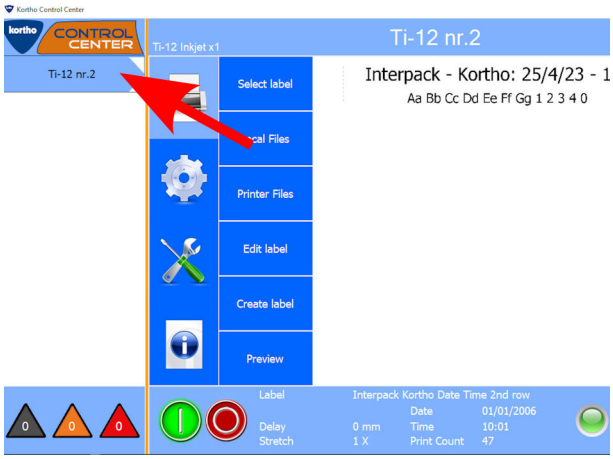
To switch on the Ti-Series, perform the following operations:

1. **Press** the ON/OFF button to switch on the Ti-Series.
   - The signal strip will light up blue and the printer display starts up.
   - If it concerns the first connected printer, start the HMI with KCC.
   - Make sure the HMI is connected to the printer with KCC via Ethernet.
   - When the Ti-Series has booted up, the signal strip will normally light up green. In specific circumstances, this might be orange or red. Also, the display will show the main screen when booted.
   - Make sure the IP address and Subnet mask are set correctly in order for communications to work between HMI (KCC) and the printer. In some situations, where communications is governed by a gateway, the gateway address should also be set correctly.

5.3 Starting

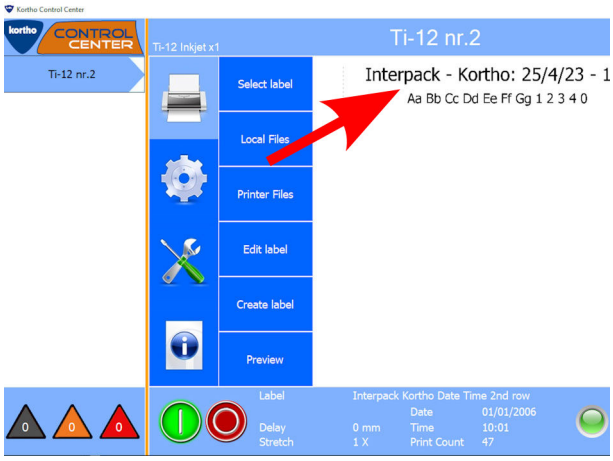
To start the Ti-Series, perform the following actions in KCC:

1. **Select** the printer to be started/configured by pressing the corresponding Printer ID button.
   - The default printer ID is "Machine1". As the printer is not connected, it will show up with a dark blue background, without the right facing point. When right clicking on a discovered printer, one will see the printers IP and MAC address. One can verify, using the IP address value, if one is connecting to the required printer. Use KCC to change the default printer name to a name of your liking (Settings->Printer->Printer ID).

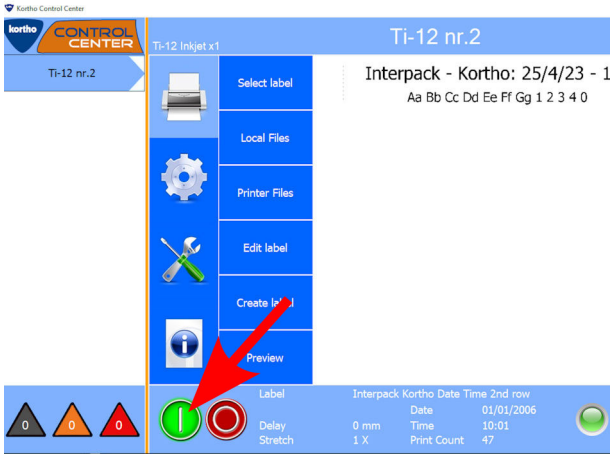


2. **Select** the desired label to be printed.

3. **Check** the printer settings. Important settings are:
   - Use an encoder or set a fixed line speed.
   - Set the correct encoder direction when an encoder is used.
   - Set the correct line speed if no encoder is used.
   - Set the correct date and time.
   - Set the uncap time.
   - Select the correct setting for the uncap and print request inputs (High or low).
   - Tune other parameters once the system can place prints.



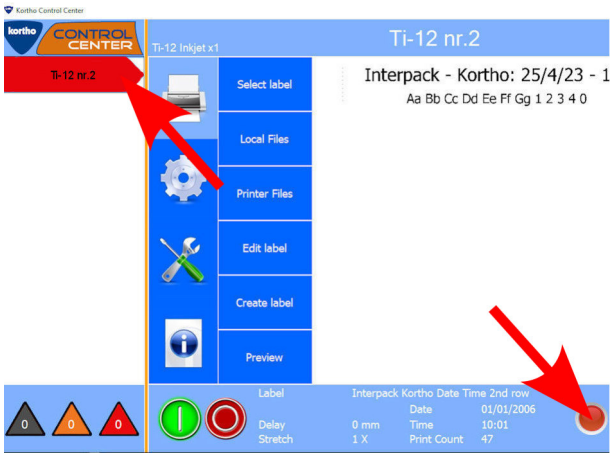
4. **Press** the START button to set the printer in "running" mode.
   - The printer is now activated and will wait for an uncap and following print request. After that, printing will actually start.

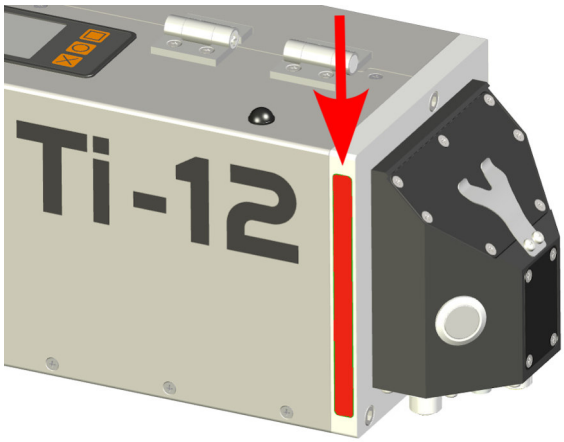


5.4 Changing or replacing the print cartridge

During production it is possible that the print cartridge with ink in the printer runs out. In KCC, you can enter at which remaining amount of ink the "low ink" output will become active (only when the output is enabled in the signal settings menu). When running out of ink the printer indicates this as folllows:

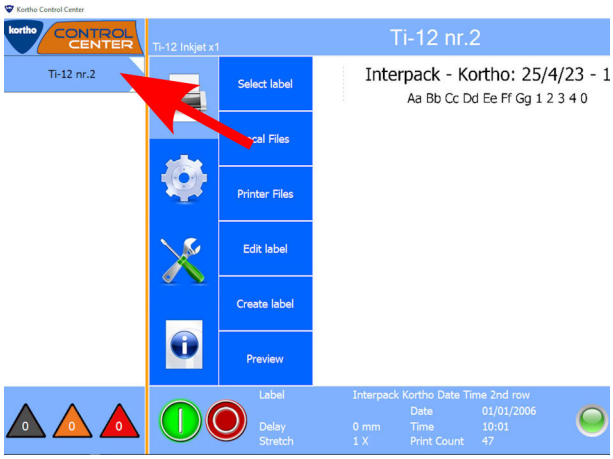
- Both KCC and the printer itself will indicate that the ink is running low, or even finished. The "low ink" notification is a "warning". With these notifications, the printer requires attention, but will continue printing. The "ink finished" notification is an "error". With these notifications, the printer cannot continue printing and will require immediate attention.
- The printer will show the notification in the status display in combination with a colour change of the signal strip and the background colour of the display. In KCC the printer ID button on the left will change color (orange for warning, red for error). The message will also appear in the error list.





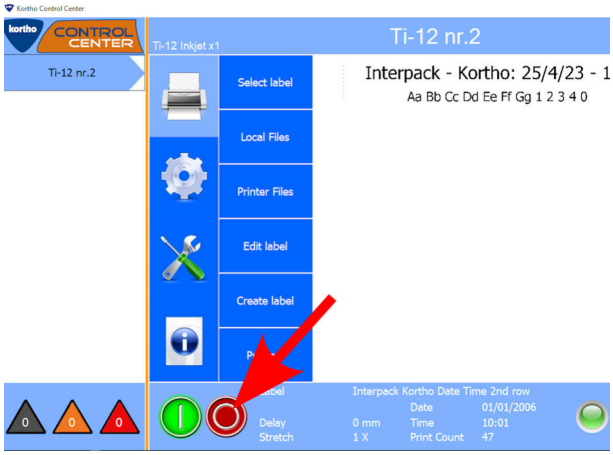
Perform the following operations to change or replace the print cartridge:

1. **Select** the printer for which the print cartridge needs to be replaced by pressing the corresponding Printer ID button.
   - If the printer has not yet been given a name, the default name, Machine1, of the printer will be displayed here.



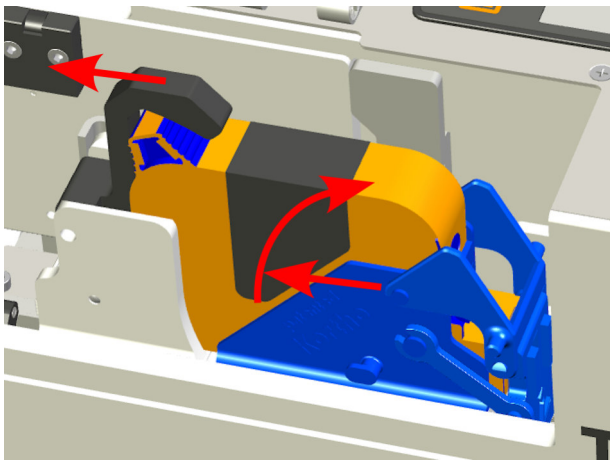
When the print cartridge is empty and the Ti-Series signal strip shows a red colour, you can immediately start with step 3.

2. **Press** the STOP button to stop the Ti-Series.
   - The printhead moves to its 0-position.



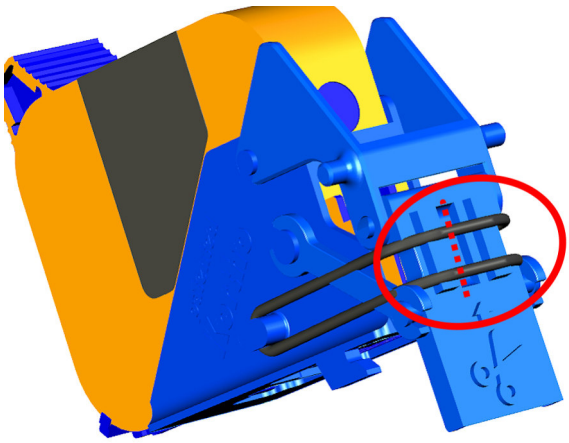
3. **Press** the release button to open the lid.

4. **Pull** the lever back to release the print cartridge.
5. **Remove** the print cartridge by first pulling it backwards and then removing it with a rotating movement.



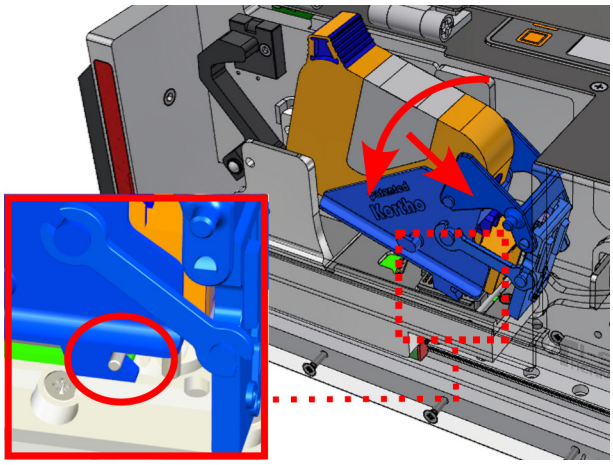
! ***If the print cartridge is not yet completely empty, it can be used again later. Store the print cartridge in a cool and dry place. Make sure that the nozzles are clean and that the cover is closed and secure it with an elastic band.***

6. **Take** a new print cartridge out of the package.
7. **Remove** the rubber band by hand or by cutting it on the indicated position on the front of the cap.



! ***If the print cartridge is to be removed from the printer before depletion (for example when working with different inks) then it is advised to keep the rubber band intact so it can be placed back on the print cartridge when taken outside of the printer.***

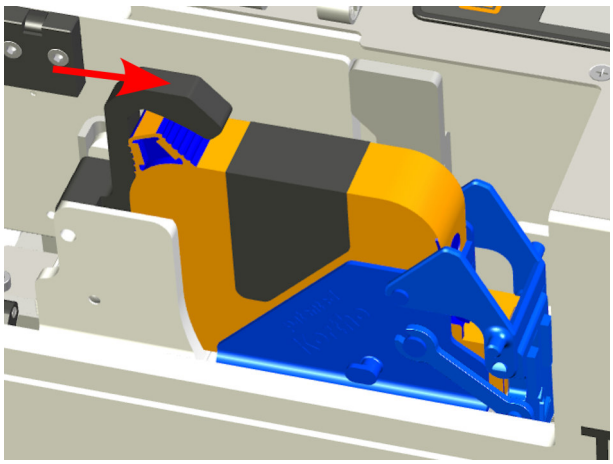
8. **Move** the capping mechanism upwards and **wipe** the nozzles several times with a non-woven cloth.
9. **Insert** the print cartridge into the carriage with a rotating motion.



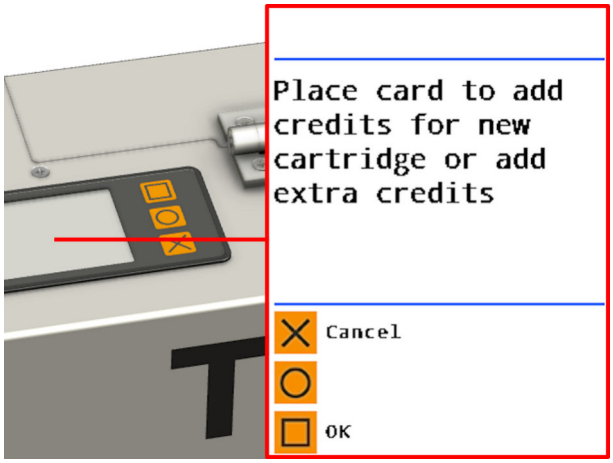
! ***Make sure that the hooks of the print cartridge fit around the rod of the carriage.***

10.Push the lever forward while holding back the carriage to lock the print cartridge.

11.Close the lid.



If the printer detects that the inserted print cartridge is new a notification will be shown on the display requesting to place the print tag (supplied with each new print cartridge) on the reader.



See section 5.5 - 'Adding credits' for information on how to add credits to the Ti-Series.

If a used print cartridge is placed back in the printer, the Ti-Series is now ready for use again. No credit have to be added.

5.5 Adding credits

The Ti-Series makes use of a so-called loyalty system which uses credits. This means that the system requires enough credits to be able to print. The credits are supplied with the print cartridge in the form of an RFID print tag. On this print tag are enough credits to be able use all the usable ink in the print cartridge.

There are different moments when credit scan be added to the Ti-Series:

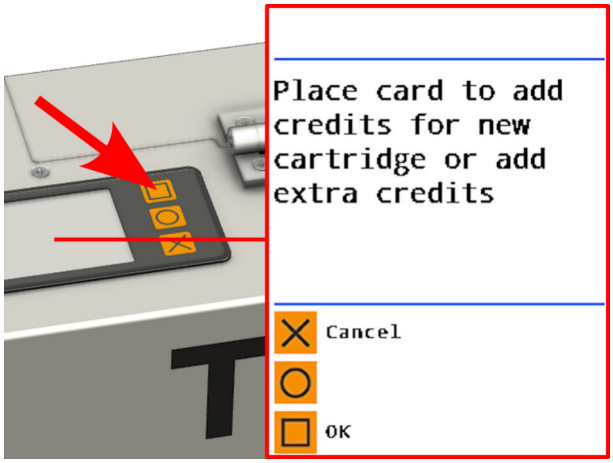
- Adding credits when placing a new cartridge, see section 5.5.1.
- Adding credits without placing a new cartridge, see section 5.5.2.

5.5.1 Adding credits when placing a new cartridge

1. **Place** the print tag.

The print tag should be placed as shown in the figure to the right.

2. **Press** the OK button.



- When a print cartridge with the same type of ink as the previous print cartridge is placed a notification will be shown on the display indicating the credits are added to the system.

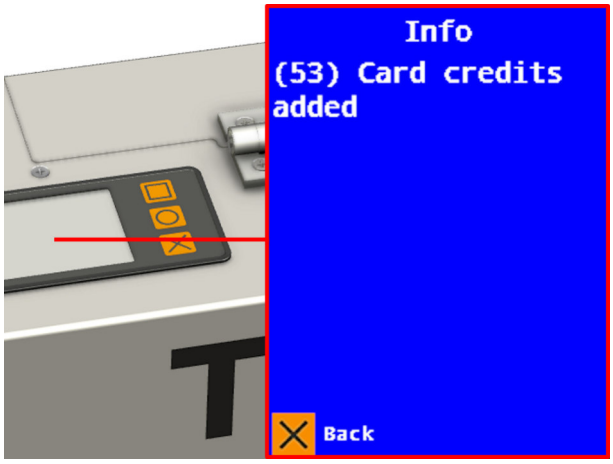
You can now discard the print tag as it can only be used once and the Ti-Series is now ready for use again.

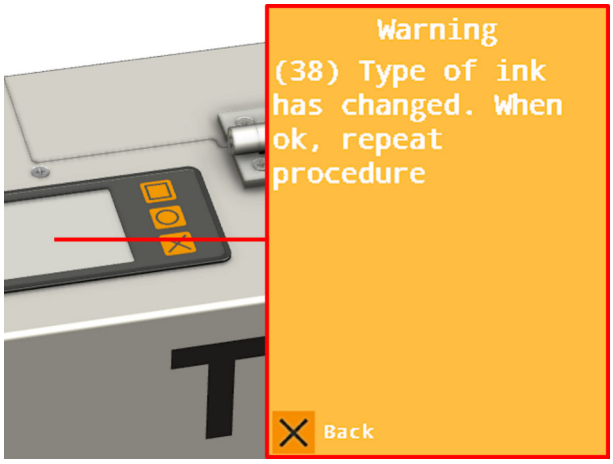
When an error occurs a red screen is shown. See section 5.5.3 - 'Errors' for more information.

- When a print cartridge with a different type of ink as the previous print cartridge is placed a warning will be shown on the display indicating the type of ink has changed.

If it was the intention to change the ink type. Press the Back-button and follow the procedure in section 5.5.3 - 'Errors' for more information.

If accidentally the wrong print cart ridge is placed. Press the Back-button, change the print cartridge as described in section 5.4 - 'Changing or replacing the print cartridge' and add the credit as described in section 5.5.1 - 'Adding credits when placing a new cartridge'.

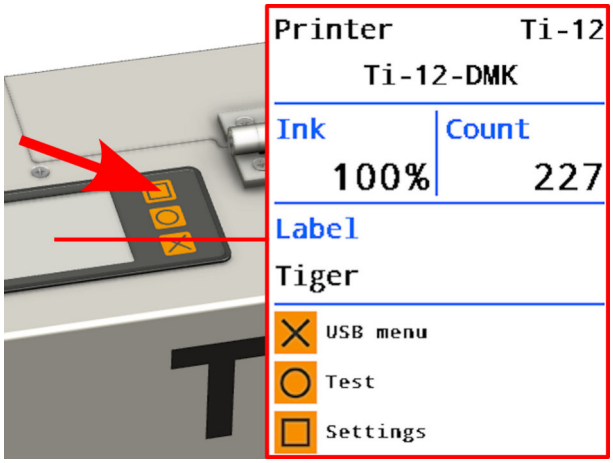




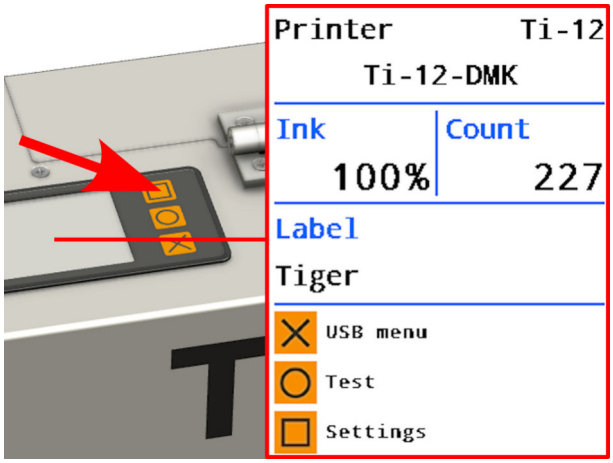
5.5.2 Adding credits without placing a new cartridge

It is also possible to add more than one print tag. This could be useful when the print cartridge needs to be changed every day to change colour and the print cartridge is not empty. To do this, simply follow the procedure described below.

1. **Press** the Settings button.



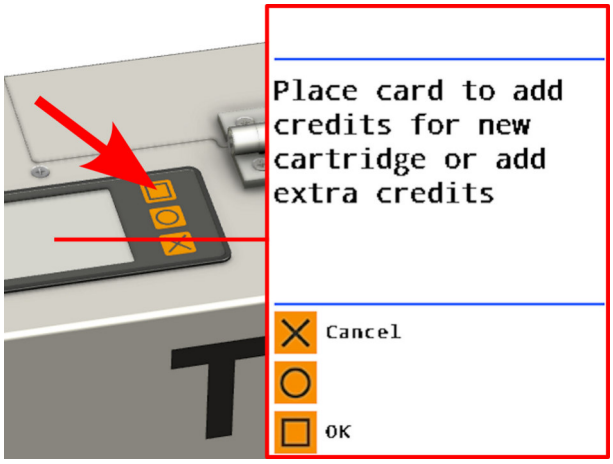
2. **Select** the option Add credits with the Back/ Next buttons.
3. **Press** the Select button.



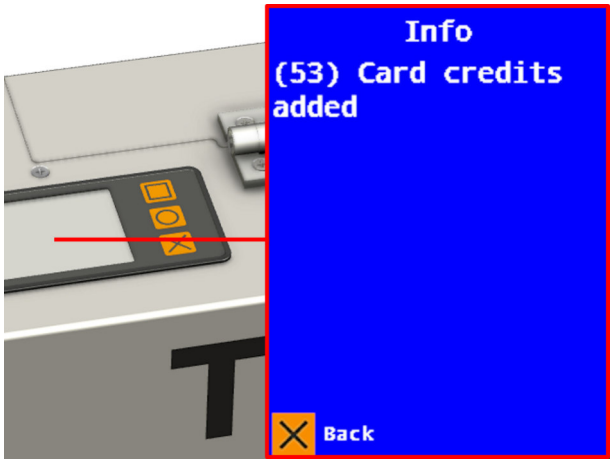
4. **Place** the print tag.

! ***The print tag should be placed as shown in the figure to the right.***

5. **Press** the OK button.



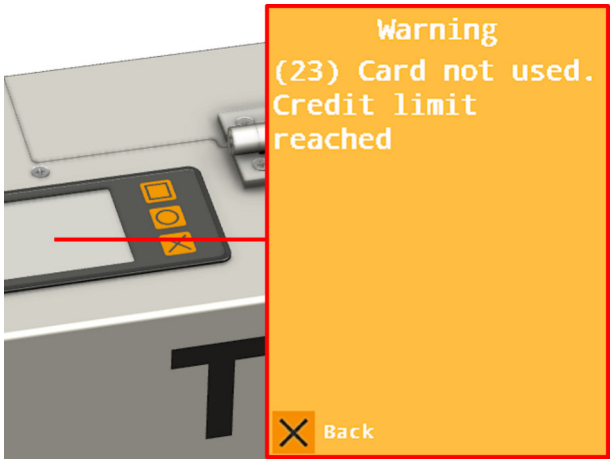
- A notification will be shown on the display indicating the credits are added to the system



You can now discard the print tag as it can only be used once and the Ti-Series is now ready for use again.

When an error occurs a red screen is shown. See section 5.5.3 - 'Errors' for more information.

- Up to 7 print tags can be added. When trying to add more tags a warning will be shown to indicate the maximum has been reached.



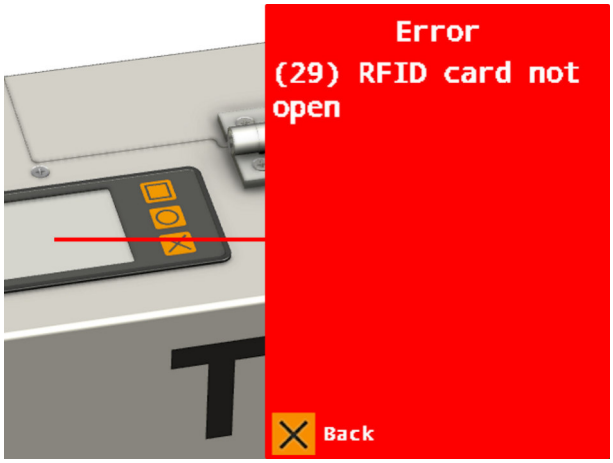
When this happens, the last print tag can be used another time.

5.5.3 Errors

As always, it is possible that errors can occur during this process. The main causes of this are:

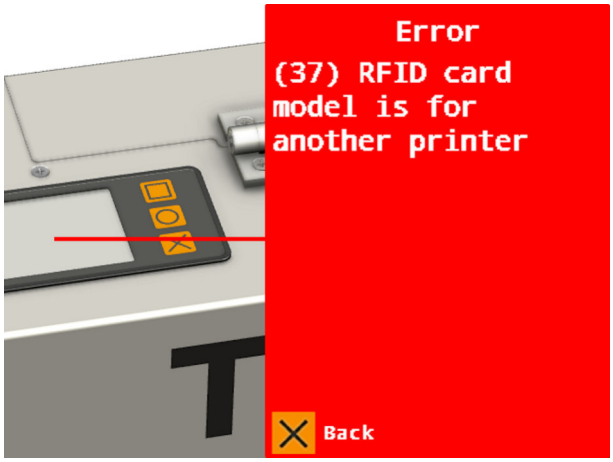
- The print tag has already been used. Use another print tag.

- The print tag is not correctly positioned or not present. Position the print tag correctly.

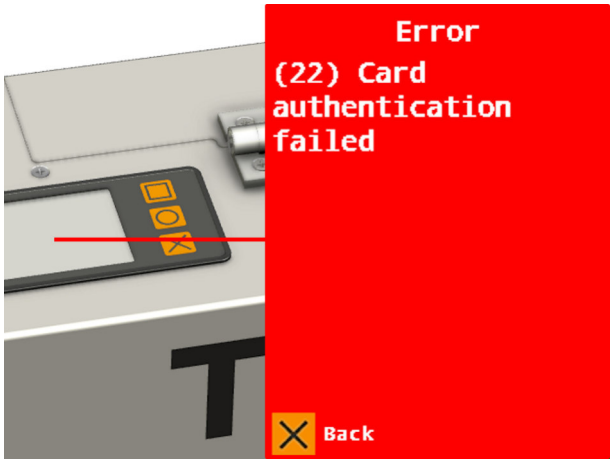


- The print tag is for another distributor. A wrong print tag must have been included in the print cartridge package. Please contact BV Korthofah.

- The print tag is meant for another printer. Use the correct print tag for the correct printer.



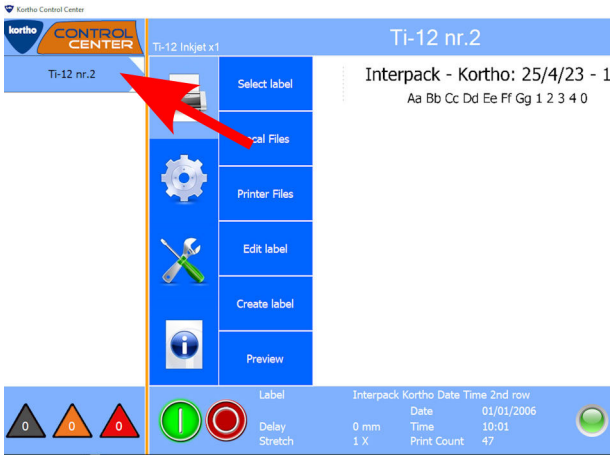
- The print tag is not a BV Korthofah print tag. Use a valid BV Korthofah print tag for the correct printer.



5.6 Stopping

To stop the Ti-Series perform, the following actions:

1. **Select** the printer to be stopped by pressing the corresponding Printer ID button.



2. **Press** the STOP button to stop the Ti-Series.
   - The printhead moves to its 0-position.

Alternatively, one can stop the printer using the status panel:

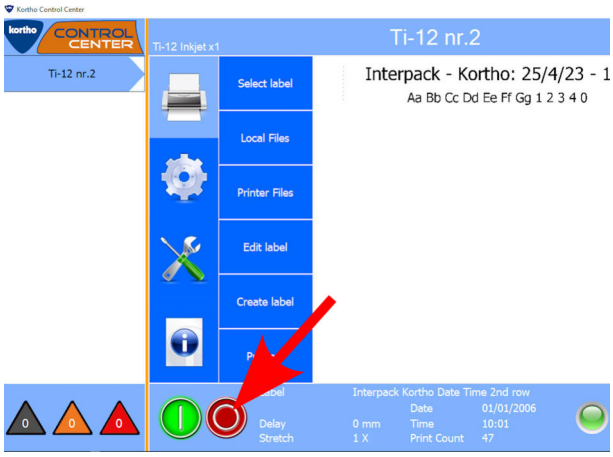
- **Press** "X" to get to the main screen.
- **Select** Test and than Pause printer than select "Excecute" to put the printer in paused mode.
  - The LED should turn red.

There is also a shortcut to do this:

- **Press** "X" to get to the main screen and **press and hold** the "X" button more than 3 seconds.
  - The system will go to paused mode.
  - If the head is in the printing position, it will now go to the capped position.

To put the system in running mode again:

- **Press** "X" to go to the main menu and than **press and hold** the "O" button for more than 3 seconds.



5.7 Switching off

To switch off the Ti-Series, perform the following operations:

1. **Press** the ON/OFF button to switch off the Ti-Series.

⚠ ***Always first stop the Ti-Series with the STOP button so the print head is at is 0-position before switching the Ti-Series off.***

6 Maintenance

6.1 Safety regulations

Carry out the following safety steps before starting any maintenance work:

Maintenance and inspection must be carried out by qualified staff.

Make sure the Ti-Series is completely turned off and de-energised before performing any maintenance on the machine.

Completely stop the production line on which the Ti-Series is mounted before performing any maintenance work on the Ti-Series.

Modifications to the Ti-Series may only be made with the express written permission of BV Korthofah.

The Ti-Series does not contain any parts that you as a user can replace yourself. Contact BV Korthofah in case of defective parts.

The Ti-Series is connected via an external power supply. BV Korthofah recommends using this external power supply. See Appendix 4 for safety instructions when using this external power supply.

6.2 Inspection and maintenance table

The Ti-Series is maintenance free by design. This means that with normal use no parts need to be replaced, readjusted or refurbished during the lifespan.

Periodic inspection is required to ensure optimal operation of the Ti-Series. The frequency of these inspections depends on the operating conditions.The intervals are based on normal use of the Ti-Series. In the case of extreme operating conditions, the interval may be adjusted at your discretion.

An overview of the inspection and maintenance work is given in the table below:

Maintenance action	Frequenty
Check the print head for contamination and dust.	Daily
Check the mounting of the printer. It should not be moving across the frame.	Monthly
Check the linear motor of the carriage for wear.	Annually
Check the cables connected to the connector block for proper assembly and any wear.	Annually

7 Connection interfaces

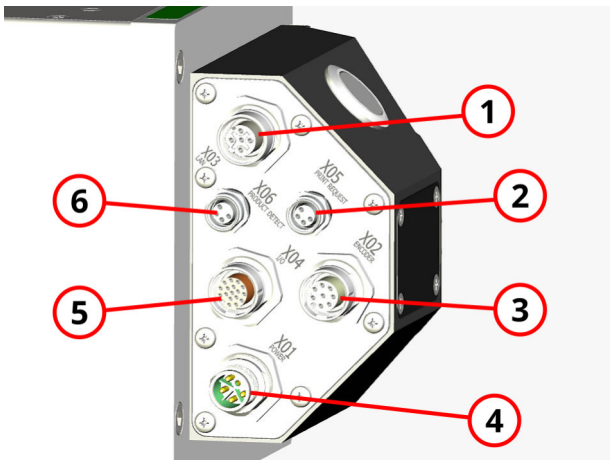
7.1 Overview interfaces

On the back of the Ti-Series a so called connector block is mounted. On this block are four M12 connectors and two M8 connectors which are used to guarantee a secured and fluid proof connection to any peripheral equipment and the power supply.

> ***Because the connectors are waterproof, they are a bit more difficult to connect and disconnect. Ensure that the connectors are properly tightened for a reliable connection.***

The connector block contains the following interfaces:

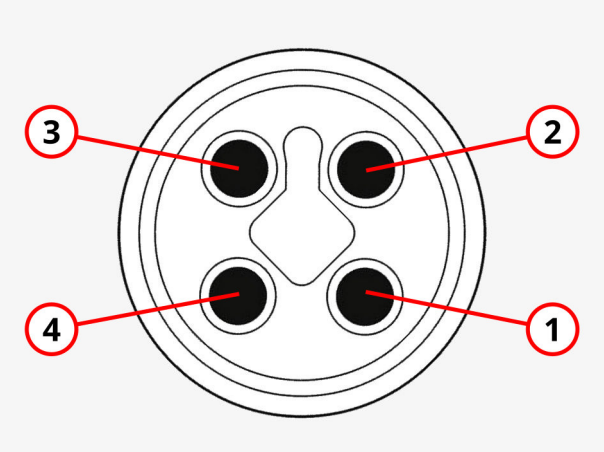
1. X03 - LAN.
2. X05 - Print request.
3. X02 - Encoder.
4. X01 - Power.
5. X04 - I/O.
6. X06 - Uncap request.



7.2 Interface X01 - Power

The cable from the external power supply is connected to this connector. This is an M12 T coded 4-pin male connector with the following pin assignment:

1. Not used.
2. 30 VDC.
3. Not used.
4. 0 VDC.



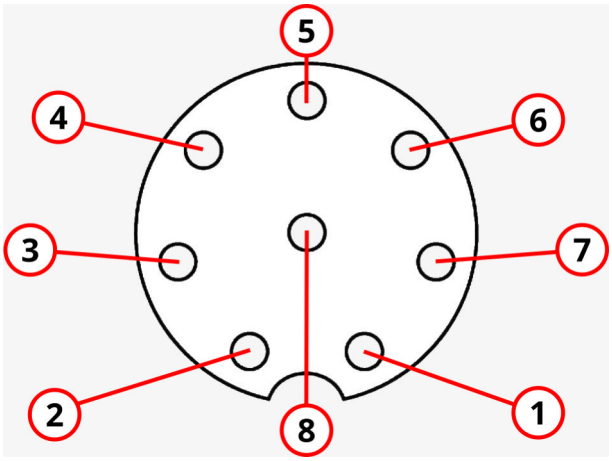
For more information about the power supply, please see annex 5.

7.3 Interface X02 - Encoder

An encoder can be connected to this connector. An encoder passes speed information to the Ti-Series. This encoder is only necessary if the line speed is varying and is used to measure the speed of the substrate so the print head can adjust the firing rate to maintain the correct resolution and print position.

This is an M12 A coded 8-pin female connector with the following pin assigment:

1. GND.
2. 24 VDC.
3. Substrate encoder channel A+.
4. Substrate encoder channel A-.
5. Substrate encoder channel B+.
6. Substrate encoder channel B-.
7. Not used.
8. Not used.



The Ti-Series uses an encoder that has the following characteristics:

Item	Waarde
Resolution:	1800 PPR.
Wheel diameter:	97 mm
Input voltage:	5-30 VDC, connected to 24VDC onTi-Series
Input current:	100 mA max (65 mA typical) with no output load
Output type:	Line Driver (RS422)

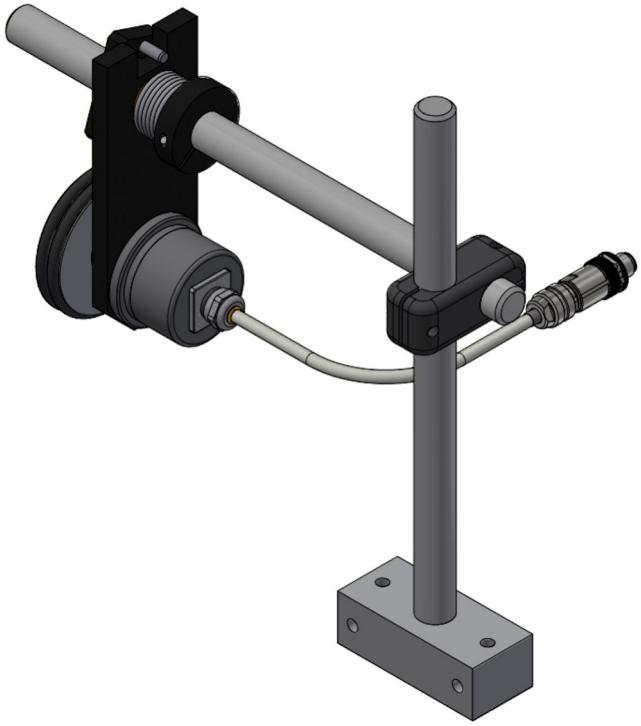
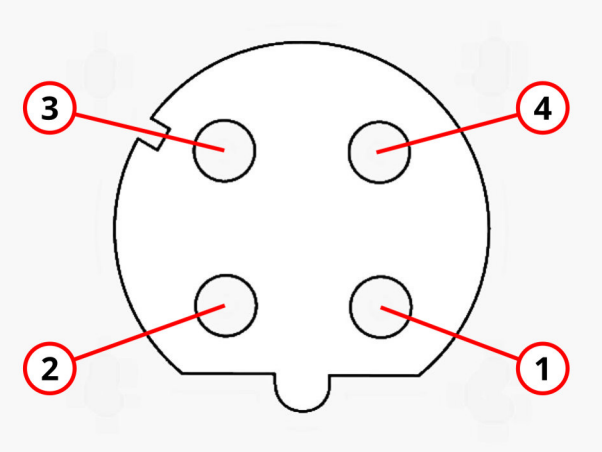


Figure 7-1: Encoder

7.4 Interface X03 - LAN

The LAN cable is connected to this connector. This is an M12 D coded 4-pin female connector with the following pin assigment:

1. ETH_TX+ (yellow).
2. ETH_TX- (white).
3. ETH_RX+ (orange).
4. ETH_RX- (blue).

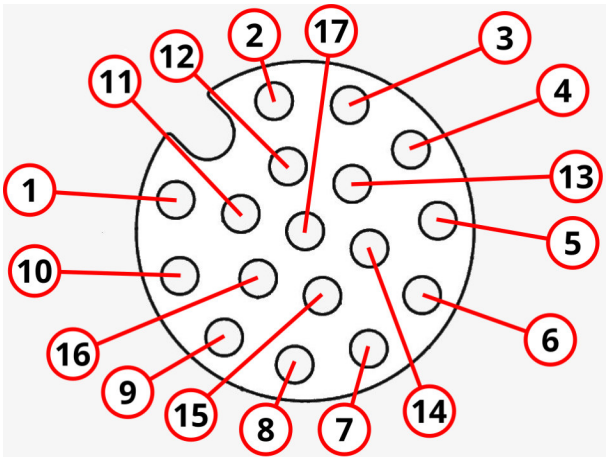


Always use shielded LAN cables kabels. BV Korthofah can supply LAN cables (length 5 m) from stock (art. no. 170841).

7.5 Interface X04 - I/O

This is a M12 17-pin A coded female connector with the following pin assignment:

1. Ink low A (output).
2. Busy B (output).
3. Ink low B (output).
4. Trigger A (input).
5. Inhibit A (input).
6. Trigger B (input).
7. Ink out A (output).
8. Inhibit B (input).
9. Busy A (output).
10. Ink out B (output).
11. Ready A (output).
12. Ready B (output).
13. General Error A (output).
14. General Error B (output).
15. 24 V (power).
16. Not used.
17. GND (power).



7.5.1 Functions

Ink low (output) - The amount of used ink is monitored and stored on the print cartridge. When the used ink is below a set value, this output is activated.

Inhibit (input) - When the Inhibit input is active, the system will not print. When this input becomes active during the printing process, it will finish the print first. This function can be used as a safety feature on a host machine.

General Error (output) - If this output becomes active, the printer has entered a situation where it can no longer print. The operator must resolve the problem to resume the printing process. An error can be caused due to running out of ink or print being skipped etc.

Connect the error output to an alarm device (i.e. lamp, buzzer, etc) or to the host machine. This will stop the host machine when the printer reports an error. The output signal can be set to be active high or active low.

Busy (output) - This output signal tells the host machine that the printer is busy printing. During the time that busy is active, the system should NOT receive another print request. If it does, depending on the settings, it will create an error (stop printing) or a warning (continuous to print) or it will ignore it (continuous to print).

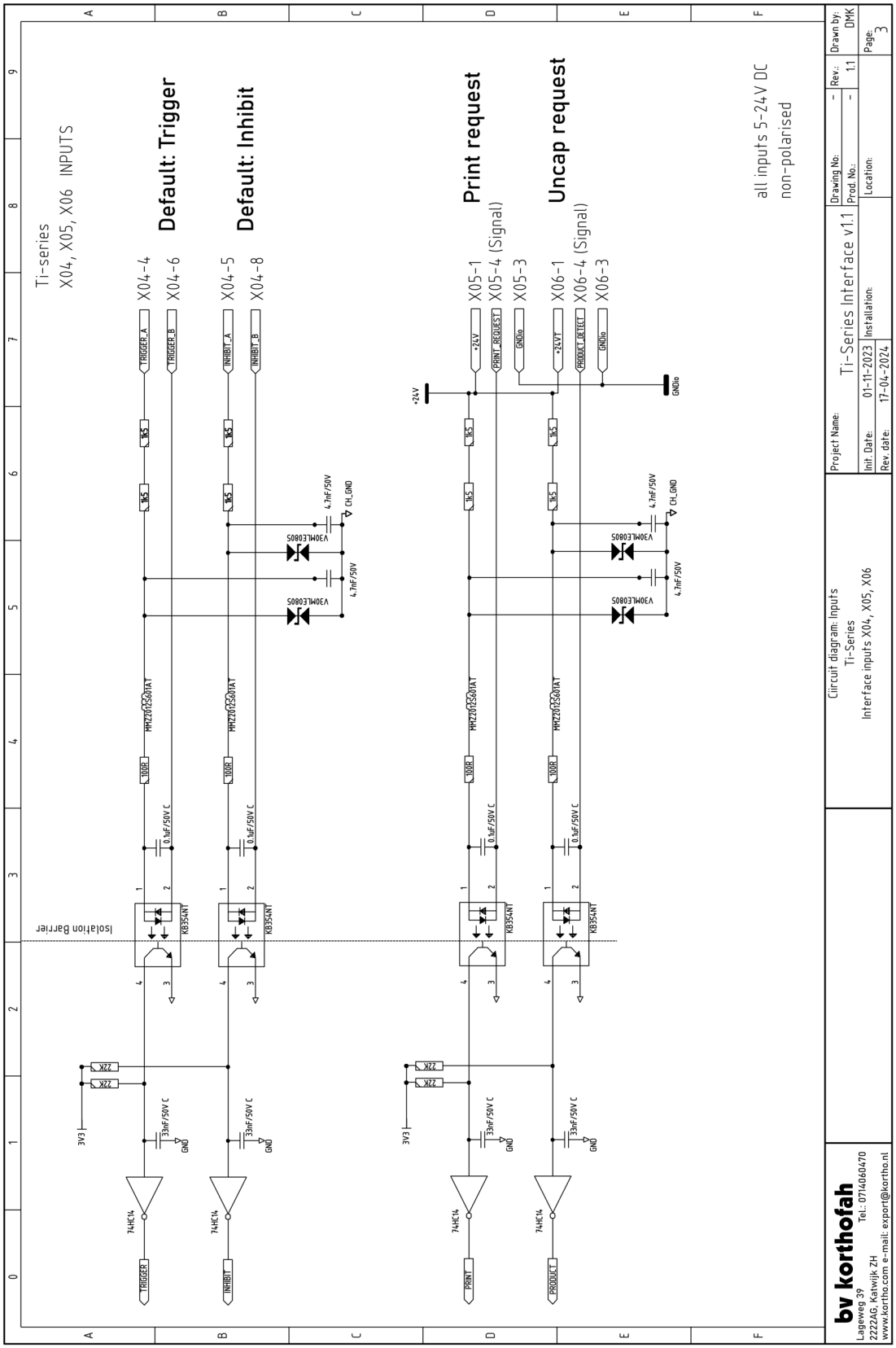
Ink out (output) - When the printer has calculated that almost all the ink in the print cartridge has been used, it will activate the ink out output and show an ink out error. The system will stop printing and also the general error output will become active.

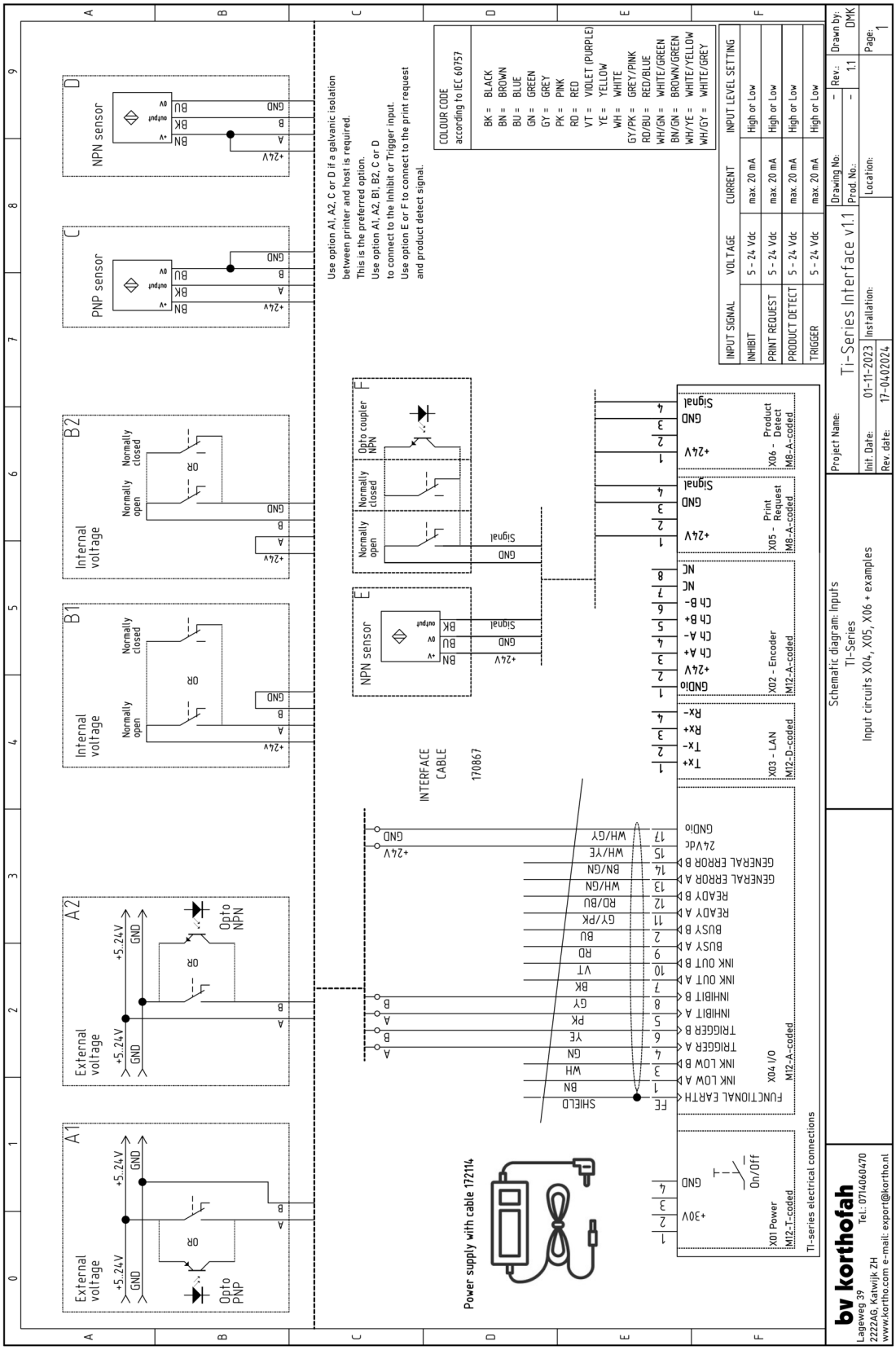
Ready (output) - When the Ready output is active, the printer is ready to make a print. This output becomes active when the following conditions are true:

- The system must be on.
- The system must be in Standby mode.
- General alarm must be inactive.

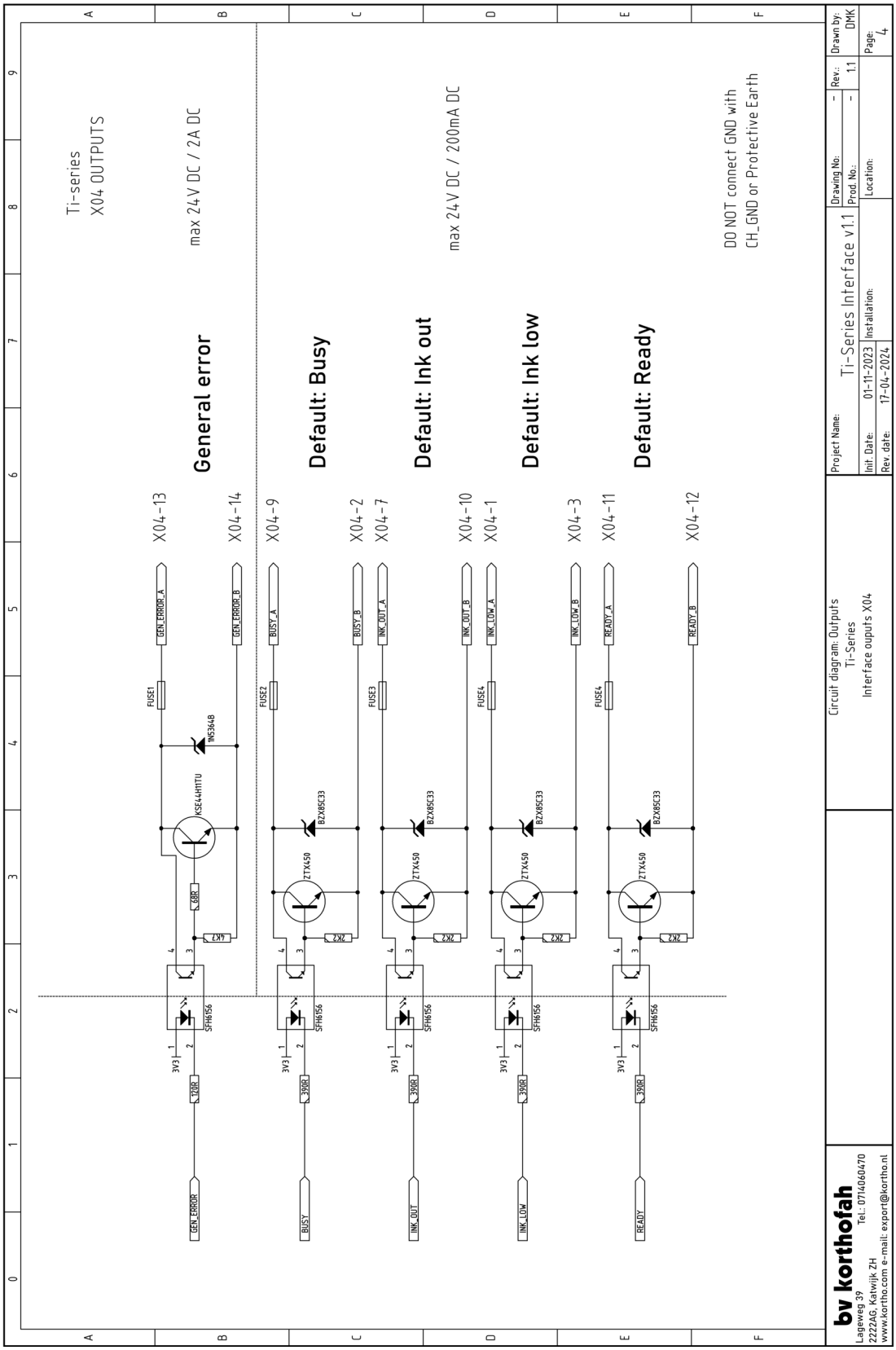
This output can be used to check that if the system is on, and ready to make a print.

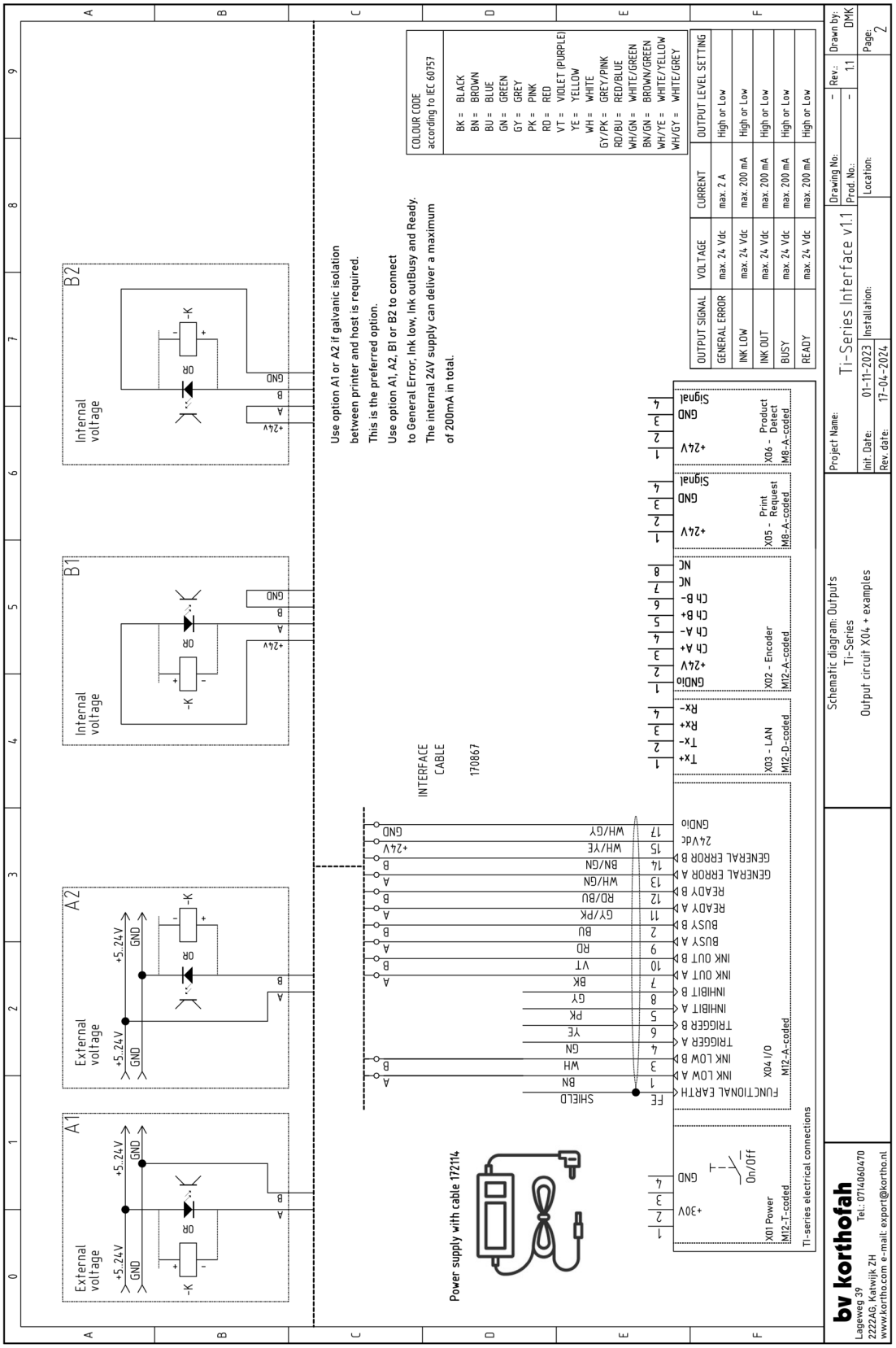
7.5.2 Circuit diagrams - inputs




Use option A1, A2, C or D if a galvanic isolation between printer and host is required.
This is the preferred option.
Use option A1, A2, B1, B2, C or D to connect to the Inhibit or Trigger input.
Use option E or F to connect to the print request and product detect signal.
COLOUR CODE according to IEC 60757
BK = BLACK
BN = BROWN
BU = BLUE
GN = GREEN
GY = GREY
PK = PINK
RD = RED
VT = VIOLET (PURPLE)
YE = YELLOW
WH = WHITE
GY/PK = GREY/PINK
RD/BU = RED/BLUE
WH/GN = WHITE/GREEN
BN/GN = BROWN/GREEN
WH/YE = WHITE/YELLOW
WH/GY = WHITE/GREY
INPUT SIGNAL | VOLTAGE | CURRENT | INPUT LEVEL SETTING
INHIBIT | 5 - 24 Vdc | max. 20 mA | High or Low
PRINT REQUEST | 5 - 24 Vdc | max. 20 mA | High or Low
PRODUCT DETECT | 5 - 24 Vdc | max. 20 mA | High or Low
TRIGGER | 5 - 24 Vdc | max. 20 mA | High or Low
NPN sensor
PNP sensor
Internal voltage
External voltage
Opto NPN
Opto PNP
Normally closed
Normally open
INTERFACE CABLE 170867
Power supply with cable 172114
X01 Power M12-T-coded
X02 - Encoder M12-A-coded
X03 - LAN M12-D-coded
X04 I/O M12-A-coded
X05 - Print Request M8-A-coded
X06 - Product Detect M8-A-coded
TI-series electrical connections
Project Name: Ti-Series Interface v1.1
Schematic diagram: Inputs TI-Series
Input circuits X04, X05, X06 + examples
Init. Date: 01-11-2023
Rev. date: 17-04-2024
Drawing No: -
Prod. No.: -
Location:
Installation:
Rev.: 1.1
Drawn by: DMK
Page: 1
by korthofah
Lageweg 39
2222AG, Katwijk ZH
Tel.: 0714060470
www.korthho.com e-mail: export@korthho.nl

7.5.3 Circuit diagram - outputs

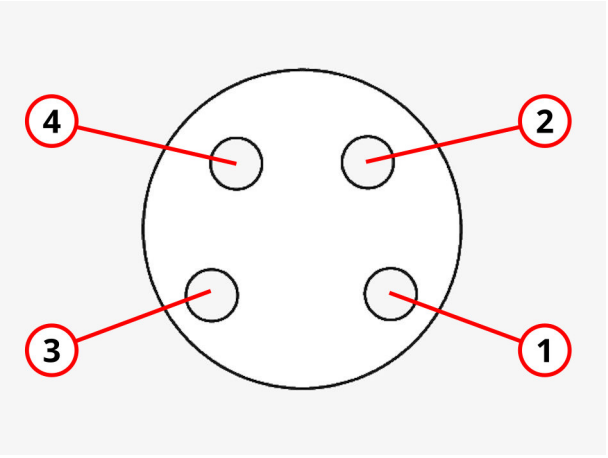



Use option A1 or A2 if galvanic isolation between printer and host is required.
This is the preferred option.
Use option A1, A2, B1 or B2 to connect to General Error, Ink low, Ink outBusy and Ready.
The internal 24V supply can deliver a maximum of 200mA in total.
COLOUR CODE according to IEC 60757
BK = BLACK
BN = BROWN
BU = BLUE
GN = GREEN
GY = GREY
PK = PINK
RD = RED
VT = VIOLET (PURPLE)
YE = YELLOW
WH = WHITE
GY/PK = GREY/PINK
RD/BU = RED/BLUE
WH/GN = WHITE/GREEN
BN/GN = BROWN/GREEN
WH/YE = WHITE/YELLOW
WH/GY = WHITE/GREY
OUTPUT SIGNAL
VOLTAGE
CURRENT
OUTPUT LEVEL SETTING
GENERAL ERROR
INK LOW
INK OUT
BUSY
READY
max. 24 Vdc
max. 2 A
max. 200 mA
High or Low
A1
A2
B1
B2
External voltage
Internal voltage
+5..24V
+24V
+30V
GND
OR
INTERFACE CABLE
170867
X01 Power
X02 - Encoder
X03 - LAN
X04 I/O
X05 - Print Request
X06 - Product Detect
M12-A-coded
M12-D-coded
M12-T-coded
M8-A-coded
FUNCTIONAL EARTH
INK LOW A
INK LOW B
TRIGGER A
TRIGGER B
INHIBIT A
INHIBIT B
INK OUT A
INK OUT B
BUSY A
BUSY B
READY A
READY B
GENERAL ERROR A
GENERAL ERROR B
24Vdc
GNDio
Ch A+
Ch A-
Ch B+
Ch B-
Tx+
Tx-
Rx+
Rx-
NC
Signal
On/Off
Power supply with cable 172114
TI-series electrical connections
Schematic diagram: Outputs Ti-Series
Output circuit X04 + examples
Project Name: Ti-Series Interface v1.1
Init. Date: 01-11-2023
Rev. date: 17-04-2024
Installation:
Drawing No: -
Prod. No.: -
Location:
Rev.: 1.1
Drawn by: DMK
Page: 2
by korthofah
Lageweg 39
2222AG Katwijk ZH
Tel.: 0714060470
www.korthofah.com e-mail: export@korthofah.nl

7.6 Interface X05 - Print request

This is a M8 4-pin A coded female connector with the following pin assignment:

1. +24 V (power, brown).
   - Used to supply power to the sensor (usually a photocell to detect the product).
2. Not used (-, white).
3. GNDio (power, blue).
   - The ground of the +24 V.
4. Signal (input, black).
   - This signal needs to be pulled down to GNDio to activate the input.



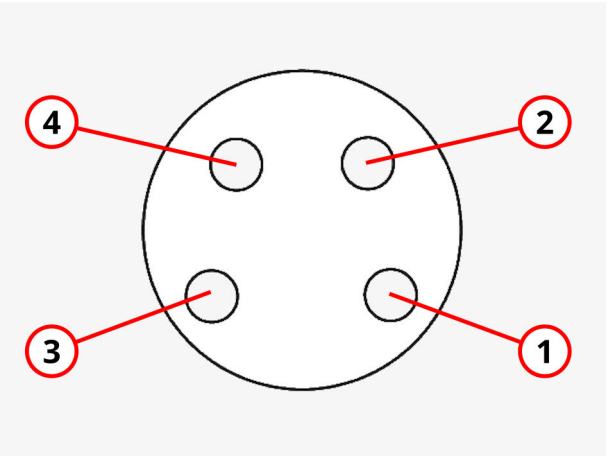
The print request signal needs to be activated to make the system place a print. Usually, this is a photocell which detects the product which is near the printhead. The photocell (or other sensor) used MUST be of the NPN type. One can also use a voltage free switch (normally open) between pin 3 and pin 4.

The print request input should only be activated when the carriage inside the printer has positioned the printhead in the printing position. In order for this to happen, the uncap request sensor should have detected the product some time before the product reaches the printer.

7.7 Interface X06 - Uncap request

This is a M8 4-pin A coded female connector with the following pin assignment:

1. +24 V (power, brown).
   - Used to supply power to the sensor (usually a photocell to detect the product).
2. Not used (-, white).
3. GNDio (power, blue).
   - The ground of the +24 V.
4. Signal (input, black).
   - This signal needs to be pulled down to GNDio to activate the input.



The uncap request signal needs to be activated to move the carriage with print cartridge to the printing position. Usually, this input is activated by a photocell which detects the product. The photocell (or other sensor) used MUST be of the NPN type. One can also use a voltage free switch (normally open) between pin 3 and pin 4.

The uncap request sensor should detect the product to be printed at least a number of seconds before the print request sensor detects this product.

8 Transport & storage

8.1 Transport

The Ti-Series should be inspected for transport damage immediately upon receipt. In the event of any damage, the sender must be notified immediately.

8.2 Storage

The Ti-Seriesmay only be stored indoors, under the following conditions:

- Temperature: -10 / +50 °C.
- Relative humidity: 20 - 80%.

9 Disposal

9.1 Safety regulations

Before dismantling and disposing of the Ti-Series, the following safety instructions must be observed:

Make sure that all machine parts are turned off and disconnected from power sources before dismantling and disposing of the Ti-Series!

Ensure that the Ti-Series is safely disassembled and disposed of according to the current legal regulations of the country of use.

Think of the environmentally-friendly method of disposing of hazardous substances and materials.

9.2 Disposing of materials

Ensure that the separated dust is removed and/or processed in accordance with applicable environmental laws.

The Ti-Series contains no harmful substances or materials and can be scrapped or recycled at the end of its service life.

Used print cartridges should be treated as small chemical waste.

A1 Technical specifications

A1.1 Print and ink specifications

Print characteristics

Item	Value
Max. printsize (vertical)	12.7 mm
Max. prinsize (horizontal)	500 mm
Max. resolution (vertical)	300 DPI
Max. resolution (horizontal)	300 DPI
Max. prints speed	40 m/min
Print direction	Omnidirectional within 90 degrees angle from fully vertical to top down

Ink characteristics

Item	Value
Thermal inkjet technology	Hewlett Packard 45si (19pL)
Ink technology	Digital Ink Technologies – POLYTIJ (polymeric ink)
Print cartridge content	35 ml effective print out
Ink adhesion performance	90+ rub resistance on glass, metal & plastics
Dying time on product	1 second
Max. open time	Infinite / equal to ink shelf life
Shelf life	12 months

A1.2 Printer specification

General

Item	Value
Dimension (L x B x H)	315 x 126 x 130 mm
Weight	5 kg
Power supply	External 30 VDC
Compressed air	Not required
Connectors	Configurable I/O port, Ethernet, USB, Power supply, Encoder, Uncap and print request signal
Material	Stainless steel and aluminium
Status signals	Integrated full-color display and LED signal strip.

HMI

Item	Value
Kortho HMI/GUI	See KCC leaflet
External HMI/GUI	Any Windows based LMS - Nicelabel, Bartender or other
ERP direct	Direct printer control through ERP output files - SAP, Navision or other
SLIMLINE concept	No controller needed, operation from any Windows system.

Communication

Item	Waarde
Wired	Ethernet – I/O – USB
Wireless	Bluetooth (service only), RFID for print tags
Supported protocol	Small subset of ESC protocol - Communication protocol with 350+ commands
Driver	Windows print driver

Accesoires

Item	Value
Kortho Printerface IoT	Kortho branded Windows industrial tablet + bracket
Ethernet cable	Industrial cable with Rj45 and M12D network connector
Encoder	Line speed encoder, can be mounted on the production line
Dual photocell (2x)	One uncapping the print cartridge and moving it to the print position signal; one for start print signal
Support bracket	Omnidirectional bracket included (custom bracket sizes available on request)

A2 Declarations and test certificates

EU – Declaration of conformity

Name of Manufacturer Address	BV Korthofah Lageweg 39 2222AG Katwijk aan Zee Nederland

We, BV Korthofah, declare under our sole responsibility that our products are in compliance with the requirements of the following European directives.

Products

Kortho Ti-12 Power supply Ti-12	820438 821167

Directives

2006/42/EG 2014/30/EU	Machinery directive EMC directive

Standards

EN 61000-6-4 (2007) + A1 (2011), class A EN 61000-3-2 (2014) EN 61000-3-3 (2013) EN 61000-6-2 (2005) + A1 (2005), Industrial EN 60204-1 (2006) + A1 (2009) NEN-EN-ISO 12100:2010 FSO/TR 14121-2:2007

Place of issue	Katwijk aan Zee, Nederland
Date of issue	28-09-2023
Name and title of authorized person	M.P.J.J de Groot, director
Signature of authorized person	

BV Korthofah
Lageweg 39
2222 AG Katwijk aan Zee
Nederland

Phone +31 71 40 60 447
E-mail info@kortho.nl
URL https://kortho.com/nl/

DARE!!

Certificate of Compliance

This certificate is issued under the conditions as described in the test report as mentioned below

Certificate number:	**20210639CRT01**
Product name:	**Thermal Transfer printer TT-53**
Model number:	**Print unit TT-53**
Serial number:	**Printerface IoT**
(Product identification)	**2025306502**
Manufacturer:	**Korthofah B.V.** **Lageweg 39** **222 AG Katwijk ZH** **The Netherlands**
Measurements carried out on behalf of:	**Korthofah B.V.** **Lageweg 39** **222 AG Katwijk ZH** **The Netherlands**
Applicant's representative:	**Mr. M. Hageman**
In the capacity of:	**Manufacturer**
Date of measurement:	**2021 October, 14-15-18**
The measurement results are laid down in report:	**20210639RPT01**
The product has been examined according to [1]:	**Emission: EN 61000-6-4 (2007) + A1 (2011)** **Immunity: EN 61000-6-2 (2005) + AC (2005) & EN 61000-6-2 (2019)** **Emission: EN 61000-3-2 (2014)** **Emission: EN 61000-3-3 (2013)**

D. van der Vlugt
Director

Woerden, 2021 November, 11

[1] *Meeting the requirements of these standards and the requirements mentioned in the report means presumption of conformity with EMC Directive - 2014/30/EU.*

DARE!! Services B.V.
Vijzelmolenlaan 7
NL-3447 GX Woerden
The Netherlands

T: +31 348 200 900
M: services@dare.nl
W: www.dare.nl

The Standard for EMC & Automotive, FCC and Product Safety.

Test sequence	Test description	Basic standard	EUT modified during test (yes/no)	Result (Pass/Fail)
1	Conducted emission, test with an AMN	EN 55032 (2015) + A11 (2020)	No	Pass
13	Conducted emission at telecommunication ports, test with an AAN	EN 55032 (2015) + A11 (2020)	No	Pass
	Conducted emission at telecommunication ports, test with a current probe	EN 55032 (2015) + A11 (2020)		Not applicable
	Conducted emission at telecommunication ports, test with a capacitive voltage probe* & current probe	EN 55032 (2015) + A11 (2020)		Not applicable
9	Radiated emission up to 1 GHz (SAC)	EN 55032 (2015) + A11 (2020)	No	Pass
11	Radiated emission above 1 GHz (FAC) **	EN 55032 (2015) + A11 (2020)	No	Pass
2	Harmonics (I ≤16 A per phase)	EN-IEC 61000-3-2 (2014) & EN-IEC 61000-3-2 (2019)* not yet harmonized)	No	Pass
3	Flicker (I ≤16 A per phase)	EN-IEC 61000-3-3 (2013)	No	Pass
7	ESD	EN-IEC 61000-4-2 (2009)	No	Pass
10	Radiated immunity	EN-IEC 61000-4-3 (2006) + A1 (2008) + A2 (2010)	No	Pass
5	EFT	EN-IEC 61000-4-4 (2012)	No	Pass
6	Surge	EN-IEC 61000-4-5 (2014) + A1 (2017)	No	Pass
4	Conducted immunity	EN-IEC 61000-4-6 (2014)	No	Pass
8	Voltage dips and interruptions 230 V – 50 Hz (I ≤16 A per phase)	EN-IEC 61000-4-11 (2004) + A1 (2017)	No	Pass
12	Voltage dips and interruptions* all other voltages and frequencies. (I ≤16 A per phase)	EN-IEC 61000-4-11 (2004) + A1 (2017)	No	Pass
	Transients and surges in the vehicular environment (12/24 V)	ISO 7637-2 (2004)		Not applicable

* Testen zijn uitgesloten van accreditatie.

De onderstaande tabel toont details over tests die niet van toepassing zijn.

Phenomenon	Comment
Conducted emission, telecommunication/network ports (CVP/CP)	Tested according AAN method
Transients and surges in the vehicular environment (12/24 VDC)	The EUT is not connected to the 12/24 VDC power mains of a vehicle.

CE

EC-Declaration of Conformity

According to the regulations
2014/53/EU (RED) & 2015/863/EU (RoHS3)

We, Importer / Distributor

2direct GmbH
Langenstück 5
58579 Schalksmühle
Germany

Declare that the product

Brand Name: **LogiLink**
Model Number: BT0037
Bluetooth Dongle

Is in Conformity with the following European Standards:

EN 62479:2010
EN 50663:2017
EN 62368-1:2014+A11:2017
EN 301 489-1: V2.2.3
EN 301 489-17: V3.2.4
EN 300 328: V2.2.2
EN 50581:2012

Report No: AGC00126210101EH02, AGC00126210101ES01, AGC00126210101EE01, AGC00126210101EE04

Identification of signatory empowered to bind the manufacturer or his authorized representative.

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Schalksmühle, 1st February 2021
Place and date of issue

Signature (Wilfried Gehrt)

BACL
Bay Area Compliance Labs Corp.

ATTESTATION OF CONFORMITY

Attestation Number :	AOCRSZ200328011A2-03
Date of Issue:	2020-06-24
Product:	USB NFC Reader Module
Model(s):	**ACM1252U-Z2, ACM1252U-Z6**
Brand:	NA
Manufacturer & Address:	Advanced Card Systems Ltd. Units 4108 - 4110, 41st Floor, Manhattan Place, 23 Wang Tai Road, Kowloon Bay, Hong Kong

Bay Area Compliance Laboratories Corp. (Shenzhen) hereby declares that the submitted sample(s) of the above equipment has been tested for CE-marking and in accordance with the following European Directives and Standards:

Radio Equipment Directive 2014/53/EU

Essential Requirement	Harmonized Standards	Test Report Number
Radio Spectrum	ETSI EN 300 330 V2.1.1 (2017-02)	RSZ200328011-22A1
EMC	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-3 V2.1.1 (2019-03)	RSZ200328011-02A1
Safety	EN 62368-1: 2014+A11: 2017	RSZ200328011-SF
Health/SAR	EN 50364:2018	RSZ200328011A1
* Note: Harmonized Standards not yet cited in OJ		

CE Mark is permitted only after all applicable requirements are met in accordance with the European Union Rules, including the manufacturer's issuance of a "Declaration of Conformity. The Declaration of Conformity is issued under sole responsibility of manufacturer. This attestation is specific to the standard(s) stated above and compliance with additional standards and/or European directives are applicable.

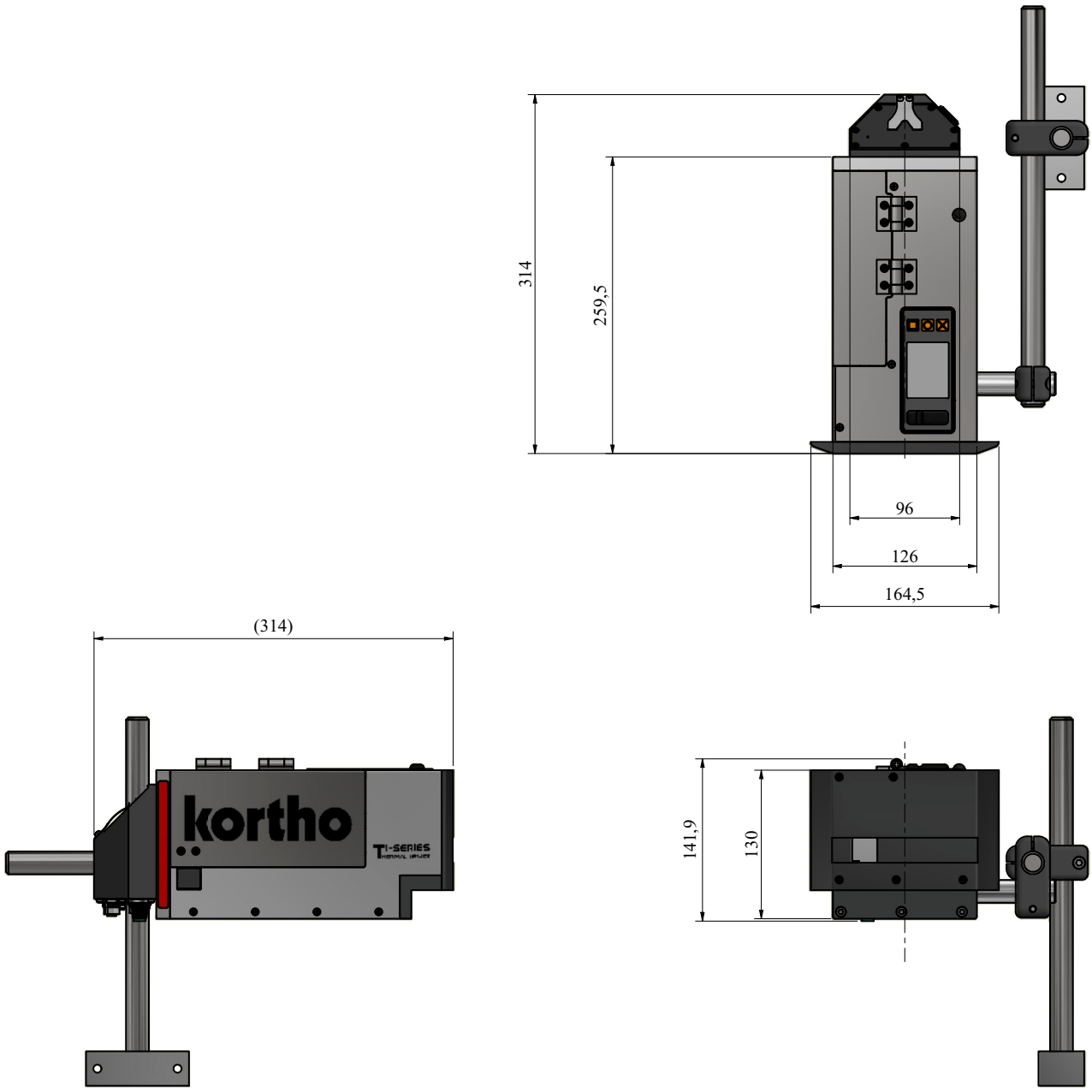
Attestation by: Alvin Huang
Lab Manager

Signature

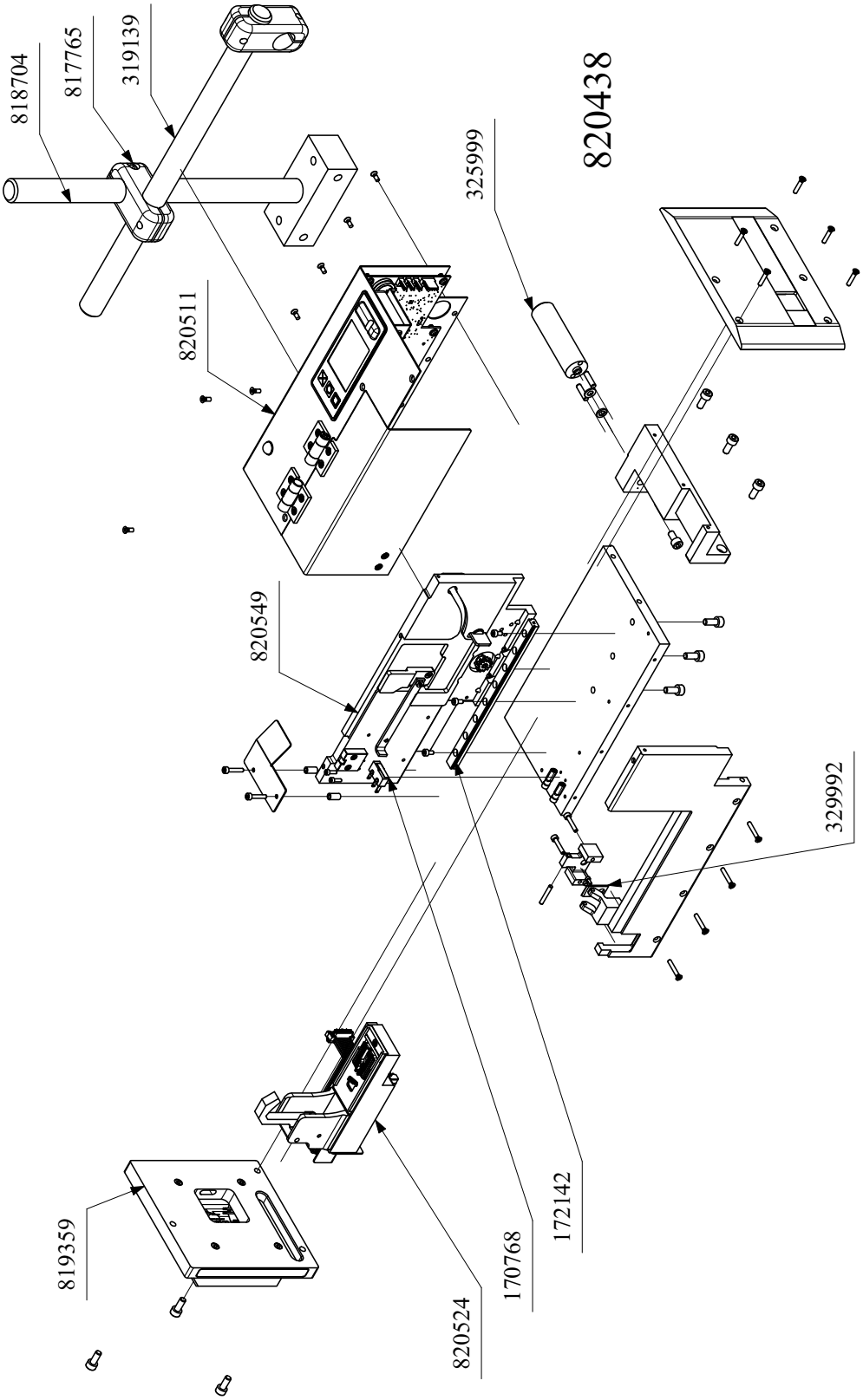
COMPLIANCE TESTING AND VERIFICATION SERVICES BACL

A3 Technical drawings

A3.1 dimensional drawing



A3.2 Exploded view)



A4 Spare parts

Article number	Description	Amount
125061	Draw Spring,L=32 Dm=6,6 D=0,6	1
165451	Microswitch Qic	1
167157	Rubber Block D=11, H=5, Black	1
169298	Frontfoil Display TTO	1
169342	Frontdisplay TTO	1
169454	Push button with lighting	1
169549	Bluetooth (BT)	1
170768	Wire-To-Board Connector, Side Entry, 1.5 mm, 8 Contacts	1
171287	Stepper motor incl. AMT112Q-V & JST Plug, Ti-12	1
171385	Spring plunger, Ti-12	3
171398	RFD modules, Connectorblock	1
171862	Compression spring D=0,4 Dm=5,0 L=10,9	1
171888	Hinge, Ti-12	1
171891	Hinge friction, Ti-12	1
171932	Compression spring Dm 4.0x0.4, Lo=7.90 mm, stainless steel	1
172142	Rail l=165, Ti-12	1
172155	Carriage transportrail, Ti-12	2
319139	Bracket axle print unit	1
323132	Cover Usb Tsc20	1
325999	Shaft Bracket Ph-X18/X54	1
326801	Set Screw M3X4 With Locking	1
327065	Gasket Connector plate, Connectorblock	1
327078	Gasket Bluetooth plate	1
327081	Gasket Reader plate	1

Article number	Description	Amount
327107	Plate Reader, connectorblock	1
327119	Plate Bluetooth, connectorblock	1
328857	Clip connectorblock	1
328885	Pal-switch cartridgeholder, Ti-12	1
328898	HTD Belt wheel POGO, Ti-12	1
328942	Intermediate plate Interior Ti-12	1
328971	Rack POGO, Ti-12	1
328984	Mounting plate connector block Ti-12	1
328997	Holder POGO, Ti-12	1
329124	Housing hatch protection Ti-12	1
329137	Slide hatch protection Ti-12	1
329149	Cover plate switch hatch TI-12	1
329152	Print cartridge holder, Ti-12	1
329992	Lip locking hatch, Ti-12	1
330018	Cover POGO Cable, Ti-12	1
330021	Cover tension spring, Ti-12	1
330047	Click position cover, Ti-12	1
330059	Click position cap cartridge, Ti-12	1
330062	Nut guide, Ti-12	2
330075	Bearing bush Pal Ti-12	1
330088	Cable clamp POGO, Ti-12	1
330129	Hook Retaining cartridge Ti-12	1
817765	Bracket cross clamp print unit	2
818704	Bracket support print unit	1
819359	Connector block Ti-12, First edition	1
819362	PCB Bluetooth (BT), Connectorblock	1
819824	PCB USB	1
819922	Cable Frontdisplay - intern, TT-53	1

Article number	Description	Amount
820441	PCB POGO Ti-12	1
820467	PCB CPU, Ti-12	1
820479	LED Strip 110*9mm, Ti-12	2
820511	Display with Cover Ti-12	1
820524	Holder Print Cartridge, Ti-12	1
820549	Internal mounting plate, Ti-12	1
820594	Cable BT module - CPU TT53	1
821055	PCB power supply CPU, Ti-12	1
821068	Cable print cartridge 10 pin, Ti-12	2
821071	Cable print cartridge 16 pin, Ti-12	2
821084	Cable Power supply board - CPU board, Ti-12	1
821097	Cable motor Ti-12	1
821109	Cable LCD CPU board, Ti-12	1
821112	Cable microswitch, L=350mm, Ti-12	1
821138	Cablel RFID module - CPU Ti-12	1
821179	Solenoid with connector/bracket, Ti-12	1
821182	Cable BT module - CPU Ti-12	1
821195	Cable BT module - CPU Ti-12	1
821249	Cable push button - power supply Ti-12	1

A5 External power supply

A5.1 Safety regulations

Always observe the following safety instructions for the external power supply:

Do not open, modify or repair the power supply.

Do only use indoors at a dry locations.

If touched for a long time, warm surfaces of the power supply may cause burns.

If damage or malfunction should occur during installation or operation of the power supply, immediately disconnect the power from the power supply. Rather than taking action yourself, please get in touch with technically qualified or Kortho-trained personnel.

Do not use the power supply without a proper PE (Protective Earth) connection.

Do not connect the negative potential of the output to a PE outside the power supply.

Only clean the power supply with a damp cloth.

The input of the power supply must be equipped with a disconnection device. This allows maintenance personnel to make sure that the power supply and the connected Ti-Series are disconnected from the mains.

It is strongly advised to use an external fuse. The fuse protects your installation by cutting the current in case of overload, short circuit or overcurrent. Preventing damage and downtime of the Ti-Series power supply. For this use an automatic fuse that can turn off up to 16A (B or C characteristic). Do not use automatic fuses smaller than 6A (B or C characteristic) in order to prevent shutdown of the fuse.

A5.2 Product Description

The power supply (Ideal Power 44ATM065P-P300) is chosen specifically for the Ti-Series. This is why BV Korthofah recommends only using this power supply in combination with a Ti-Series printer. Should you decide otherwise, the warranty in the event of electrical damage to your Ti-Series printer will lapse.

If the power supply is used in a way that is not covered in the product specifications, the protection provided by the power supply cannot be guaranteed.

See the datasheet for detailed information about technical features and specifications of the power supply.

A5.3 Installation and mounting instructions

- Install the power supply on a flat surface, with the connectors facing down.
  - Place the power supply in the direct vicinity of the printer.
  - Do not place the power supply on the ground or in a position which compromises the integrity of the device or safety of people.
- Please observe the following minimum installation distances:
  - 30 mm at the top of the power supply.
  - 150 mm at the bottom (for the cables).
  - 10 mm at the front.
  - 10 mm left and right.

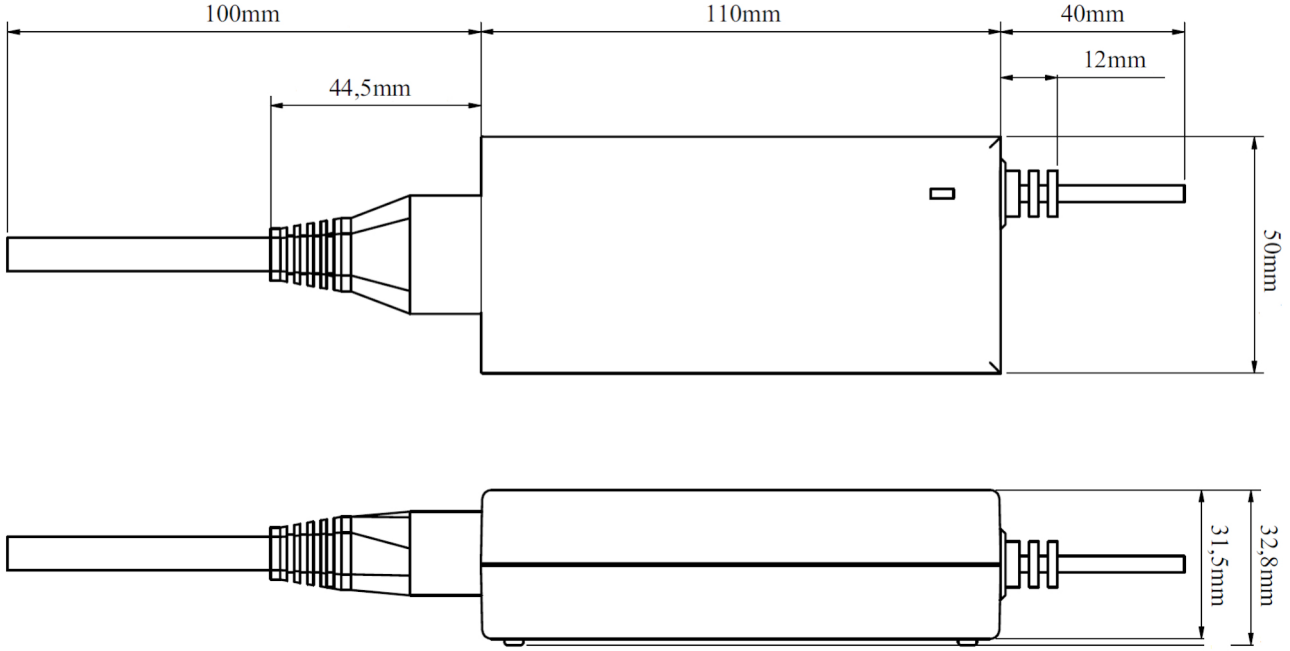


Figure 5-1: External power supply dimensions