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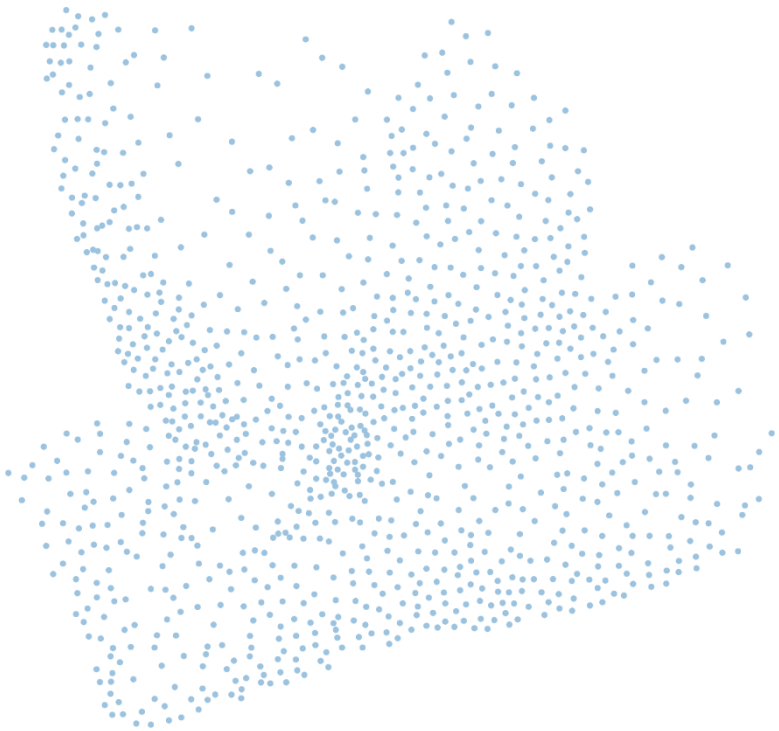
CWT Compact S4 Touch Installation & Maintenance Manual



CWT Compact S4 Touch Installation & Maintenance Manual

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1 APROVALS

PCI Data Security Standard (PCI DSS), Level 1.

A set of comprehensive requirements for enhancing payment account data security. Developed by the founding payment brands of the PCI Security Standards Council, including American Express, Discover Financial Services, JCB International, MasterCard Worldwide and Visa Inc. Inc. International, to help facilitate the broad adoption of consistent data security measures on a global basis. This is a multifaceted security standard that includes requirements for security management, policies, procedures, network architecture, software design and other critical protective measures. This comprehensive standard is intended to help organizations proactively protect customer account data.

EN 12414 - Vehicle parking control equipment – Pay and display ticket machines – Technical and functional requirements.

Cale has the IP 33 approved

EN 14450 - Secure storage units. Requirements, classification and methods of test for resistance to burglary.

Secure safe cabinets. The CWT Compact is tested according to this standard with very good result, but a pay and display terminal cannot be certified to this standard due to the requirements of the standard. Test documentation is available from Cale Access.

FCC part 15 (2006) Subpart B, class B

ADA, DDA and Article 11

CE

2 INTRODUCTION

2.1 About this Manual

This Manual describe the Installation and Maintenance of your CWT Compact terminal, model <%MODEL5%>

All available functions are described in the manual without specifically mentioning which functions are implemented as standard and which of them that is optional. Some of the figures show optional items.

2.2 Available formats

The handbook is available in the following formats:

- Adobe Acrobat Reader (PDF)
- WebHelp (HTML)
- WebHelp with viewer for Windows (.EXE)

Cale distributors can download them from the Partner Area of our website www.calegroup.se. We recommend that you visit the web site regularly to ensure that you have the latest version of the handbook.

Keep previous issues of the manual because Cale Access cannot guarantee that new issues will include information on older versions of the CWT Compact products.

2.3 List of major changes

The list below contains major changes since the last released versions.

Area	Page	Change	Issue
		Initial draft	1

2.4 Target audience

This manual is intended primarily for personnel who plan and carry out the installation and maintenance of the CWT Compact terminals in the field.

This document is focused on the CWT Compact <%MODEL5%>.

2.5 Structure of this book

The structure of this document is outlined below.

- Introduction introduces this document itself, as well as to Cale Web Office in terms of a system overview and general functions.
- Safety describes the risks when working with the terminal
- Product presentation describes the product and its use
- Installation describes how to best install the terminal
- Operation describes how to operate the terminal on a daily base
- Preventive maintenance describes the maintenance you can do to keep the terminal working fault free
- Corrective Maintenance describes how to fix problems.
- changing the CWT Compact software and firmware describe the process of upgrading the terminal to the latest software
- The Appendix Contains 3 exploded view drawings depicting:
    - The CWTC S4 Touch door
    - The CWTC S4 Touch Display Panel
    - The CWTC S4 Touch Display unit

2.6 References

1. CWT Software Configuration Handbook (0400-T0232). This document also describes the service menu AVR and program updating procedures, information that may be required during installation and maintenance.
2. Exploded view drawings for each model
3. CWT User Interface Design Handbook
4. CWT 104 & Compact Installation & Maintenance
5. User guide CCC
6. CWTC OS Update for CPU board version 0501-E0150.docx
7. Mounting of Top Hat

2.7 Terminology

Term	Meaning
AVR	The AVR is an 8-bit RISC single chip micro controller. The AVR uses on-chip flash memory for program storage. See more about AVR updates in the CWT Software Configuration Handbook.
CWO 2/ CWO	Cale WebOffice 2, an internet based back office system from Cale Access
CWT	Common term for all Cale WebTerminal models (CWT 2110, CWT 2115, CWT 2120, CWT Compact Classic, CWT 104, CWT 104 S, CWT Compact all models).
CWTC S4 Touch	A CWT Compact terminal with a touch screen display and wake up button. The display is tilted inwards.
ESD	Electro Static Discharge
Firmware	Firmware is a computer program that is embedded in a hardware device, for example a micro controller. Firmware is somewhere between hardware and software. Like software, it is a computer program which is executed by a computer. But it is also an intimate and vital part of a piece of hardware and has little meaning outside of that particular hardware.
GPRS	General Packet Radio Service is a mobile data service available to users of GSM (see below) based mobile phones and modems. GPRS is packet-switched meaning that multiple users share the same transmission channel, only transmitting when they have data to send. Thus, the total available bandwidth can be immediately dedicated to users who are actually sending at any given moment, providing higher utilization where users only send or receive data intermittently. Usually, GPRS data are billed per kilobytes of information transferred.
GSM	The Global System for Mobile communications is the most popular standard for mobile phones in the world. It includes packet data capabilities by means of GPRS (see above).
LAN	Local Area Network
Magstripe	Short for Magnetic stripe
PCB	Printed Circuit Board – A thin board with electrical wires "printed" onto the board, connecting the central processor to other components on the board. Some examples of PCBs include motherboards, RAM chips, and network interface cards.
RFID	Radio Frequency Identification – An automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Most RFID tags contain at least two parts. One is an integrated circuit for storing and processing information,

	modulating and demodulating an RF signal. The second is an antenna for receiving and transmitting the signal.
Residual-current device (RCD)	Also known as a ground fault circuit interrupter (GFCI), ground fault interrupter (GFI) or an appliance leakage current interrupter (ALCI). In Australia, they are sometimes known as "safety switches". The device disconnects a circuit whenever it detects that the electric current is not balanced between the live and the neutral conductors. Such an imbalance is sometimes caused by current leakage through the body of a person who is grounded and accidentally touching the energized part of the circuit.
TFT	TFT-LCD (Thin Film Transistor-Liquid Crystal Display) is a variant of Liquid Crystal Display (LCD) which uses Thin-Film Transistor (TFT) technology to improve image quality. TFT LCD is one type of active matrix LCD, though it is usually synonymous with LCD.
Wi-Fi	Short for Wireless Fidelity, a wireless technology brand owned by the Wi-Fi Alliance intended to improve the interoperability of wireless local area network products based on the IEEE 802.11 standards.

3 SAFETY

This manual uses the labels listed below to indicate specific type of risks that you will encounter during certain procedures:

Danger:
Danger means that an accident may occur if the safety precautions are not followed. This type of accident is likely to be fatal to human beings.

Warning:
Warning means that an accident may occur if the safety precautions are not followed. This type of accident may be fatal or cause severe injuries to human beings or may create essential damage to the product.

Caution:
an accident could occur if safety instructions are not followed. This type of accident may cause injury to people or may create damage to the product.

Caution:
ESD-sensitive component. Follow procedures for ESD protection. See section ESD protection.

3.1 High voltage

Danger:
Contact with live components of equipment powered by high-voltage current can be life-threatening. Also, bear in mind that moist components may conduct electricity although they possess insulating properties when dry.

Some parts inside the pedestal and in the heating system inside the cabinet are live with hazardous voltage even when the terminal is switched OFF.

Before working on components that conduct high-voltage electricity:

Turn OFF the power supply. Unscrew or switch OFF the fuse if there is one.

Make sure that the equipment is not exposed to moisture while you are working.

Follow all applicable local worker safety regulations.

3.2 Batteries

3.2.1 Back-Up battery holder on CPU board

The CPU board contains a lithium battery (button cell CR2032, 3 V, 210 mAh, 20 mm diameter) to keep the terminal's memory alive on power down.

Caution:
It is very important that the battery is of an approved brand (Duracell, Eveready, Panasonic, Ray-O-Vac, Sanyo, Varta, Toshiba, Seiko or another major battery manufacturer).

The battery must be replaced at least every 5 years. See Batteries for a description how best to replace the battery.

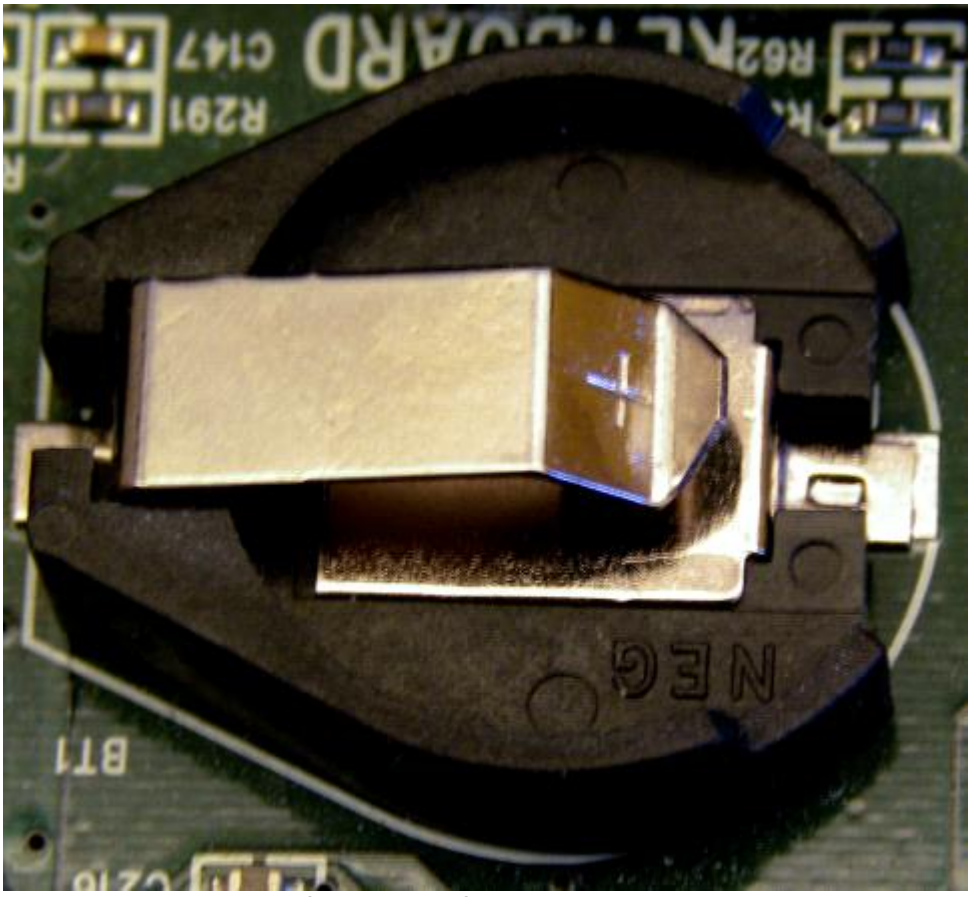


Figure 1, Backup Battery case

3.2.2 Short-circuit risk

Warning:
Although the battery voltage is relatively low, there is a risk of personal injury (such as burns) if the battery poles are short-circuited. Make sure you do not short-circuit the battery when using tools and other metal objects.

When working with equipment connected to the power supply:

- Remove rings, necklaces, watches, key rings with chains, etc.
- Always use insulated tools.
- Follow all applicable local worker safety regulations.

3.2.3 Caustic acid

Only batteries that are not maintenance-free need to be checked regularly.

Warning
The sulphuric acid used in lead batteries is caustic. Always wear eye protection when checking the battery acid level and refilling with water. If you get acid in your eyes, flush them immediately with water. There should possibilities for flushing eyes available on facilities where the battery is charged. If you get acid on your skin, wash immediately with soap and water.

Handle the battery with care during transportation and installation.

Follow all applicable local worker safety regulations.

3.2.4 Risk of explosion

Warning:
Battery charging develops hydrogen gas that is highly explosive and inflammable. The charging area must therefore be well ventilated. Besides hydrogen gas, an acid fog is also developed.

An explosion may also occur within a few seconds if the battery poles are short circuited by a metal object such as a wrench and sulphuric acid will then be spread around.

Fire extinguishers must be accessible and clearly marked. You must not smoke, weld, cut, or use an open flame in the charging area. The charger must be OFF both when you connect and when you disconnect the battery.

Follow all applicable local worker safety regulations.

3.2.5 Disposal

Lead acid batteries should be disposed of according to the manufacturer's instructions.

Old batteries must be discharged according your countries policies and laws.

3.3 LCD display

Warning:
The liquid inside the CWT LCD display is a hazardous substance.

If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance comes into contact with your skin or clothes thoroughly and promptly wash it off using soap and water.

See Display Module replacement for a description how to replace the display unit.

3.4 Heavy lifting

Warning:
When lifting equipment that weighs more than 20 kg, always use a hoist, or let two or more people lift it. There is a major risk of back injury or sprain.

The weight of the terminal depends on the configuration.

Follow all applicable local worker safety regulations.

3.5 Risk of tipping

Warning:
Before the terminal is fixed with screws to the floor or ground, there is a risk that it may tip, especially if you open the doors.
The top cabinet can tip forward if it is not fixed to the pedestal.

3.6 ESD protection

3.7 What is ESD?

ESD is an abbreviation for Electro Static Discharge.

Electrical charges are build up when materials are rubbed or separated – e.g. when you walk across a carpet or get out of your car. The charge, which may be several thousand volts, can then be transferred to other objects if they get close enough.

Caution:
Handling ordinary plastic causes a charge to build up.

Most modern integrated circuits are extremely sensitive to ESD. The component either ceases functioning altogether, causing the equipment to stop working, or suffers damage that makes it extremely susceptible to further injury. This can eventually result in intermittent faults that are extremely difficult to locate.

Caution:
Never expose ESD-sensitive components to shocks of static electricity.

3.8 Avoiding ESD damage

Rule number 1: Prevent charge build-up!

Plastic packaging and other large plastic objects can transfer charges to conductive objects, which can then damage components. Except for special anti-static plastic, all plastic must be kept away from unconnected printed circuit board assemblies.

Rule number 2: If you need to work with electronic components or modules, connect yourself through a wristband to a grounded part inside the terminal.

Avoid touching connector pins/poles and components on printed circuit board assemblies.

Ensure that all components containing electronic parts are always stored in an ESD protection bag when handled outside the terminal.

Remember that the bags' insulating properties gradually wears out. **Always use a new bag**.

The following ESD protection accessories can be ordered from Cale Access AB.

0401-E0360	Wristband (for connection to the ticket terminal cabinet)
0040-07012	ESD bag, small (fits print head and coin verifier, etc.)
0040-07013	ESD bag, large (fits CPU board etc.)

4 PRODUCT DESCRIPTION

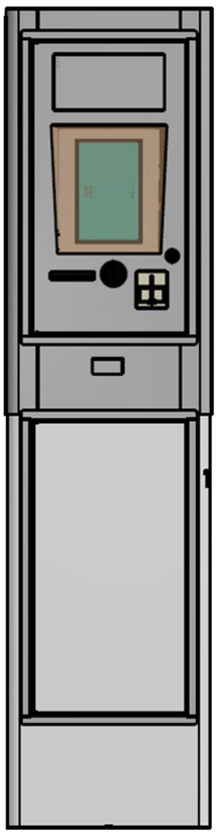


Figure 2, CWTC S4 Touch

The CWTC S4 Touch system is equipped with a touch enabled 800x480 pixels colour display with adjustable luminescence. The CWTC S4 Touch features a green wake-up button.

All buttons required for the user interaction are part of the user interface design presented in the display. Even a full alpha-numeric keyboard can, for instance, be presented in the display.

The information panel above the display is fully customizable. The surface can also contain instructions or advertising elements.

4.1 Means of payment

The CWT Compact terminals support different means of payment and a number of payment applications.

4.1.1 Payment applications

Currently the CWT Compact offers:

1. pre-payment, that is, the user pays in advance and receives a ticket

   A special pre-payment application is Code Payment which requires that the user enters a code or number, for instance a license plate number. The user pays at the terminal using an available payment option.

2. Post-payment, that is, the user pays afterwards for the time used and receives a ticket depending on the configuration.

   The user checks in on the terminal on arrival with her credit or fleet card and checks out and pays when she leaves. All steps of this process can be followed in the CWO Post Payment menu. The feature is licensed.

4.1.2 Payment methods

The card and coin payment systems work independently of each other. Should one payment unit be out of order for some reason, the other payment unit will remain operable. A message in the display informs the customer about available payment methods.

4.1.2.1 Cards

CWT Compact terminals offer the possibility to pay with credit/debit magnetic stripe cards, smart cards (chip cards), contact less cards, and hybrid cards using various card reader configurations.

The standard card reader in CWT Compact is a hybrid reader capable of reading all track-2 ISO payment magstripe cards (common credit/debit cards) and ISO smart cards (chip cards). The reader requires manual card insertion and retraction of the card which enables the customer to remove the card if the terminal or transaction fails. It is also possible to install card reader solutions to be used with certain chip card applications, such as EMV2. The reader automatically detects if an inserted card is a magnetic card or a chip only card and the card functions are adapted accordingly.

To verify that a card is valid, the card number is evaluated according to prescribed rules before being checked against a blacklist containing non-valid card numbers.

4.1.2.2 Coins

The CWT Compact supports coin payment. The terminal uses various techniques for rejecting and disposing of foreign objects and not accepted coins. The coins used for payment are collected in a coin box that needs to be emptied or replaced on site.

Cash collection system

Cale Access AB provides a complete system for secure collection and transport of coins. With this system, the coins will never be displayed at any stage of the collection process. Contact Cale Access or your local Cale representative for more information. An alternative source of information on this matter is www.calegroup.se.

4.1.3 Coin system

The coin system consists of the coin unit in the cabinet and the vault with its coin box in the pedestal.

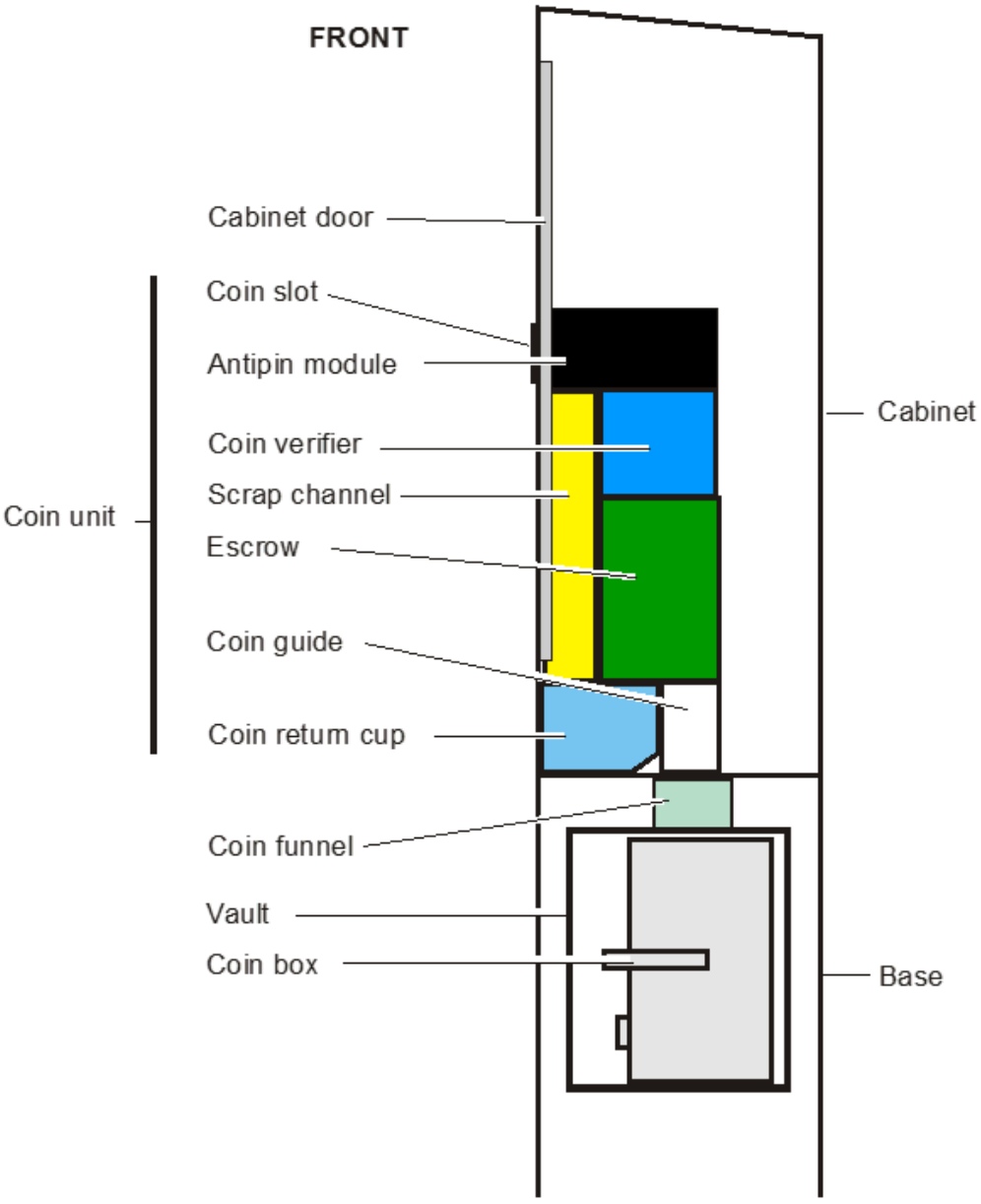


Figure 3, Logical structure of the coin system

The coin unit is designed as a module that is fitted at the back of the cabinet door by means of two key holes. The module is secured with two screws that only need to be loosened slightly when the module is to be removed.

4.1.3.1 Anti-pin module

The function of the anti-pin module is to prevent external manipulation of the coin system. The figures below illustrate the function principles of the anti-pin module. The mechanism is seen from above.

The anti-pin module has a pair of metal-detector coils just inside the coin slot opening. A bit further in there is a barrier plate that usually covers the coin slot. The barrier plate is pulled into closed position by a tension spring.

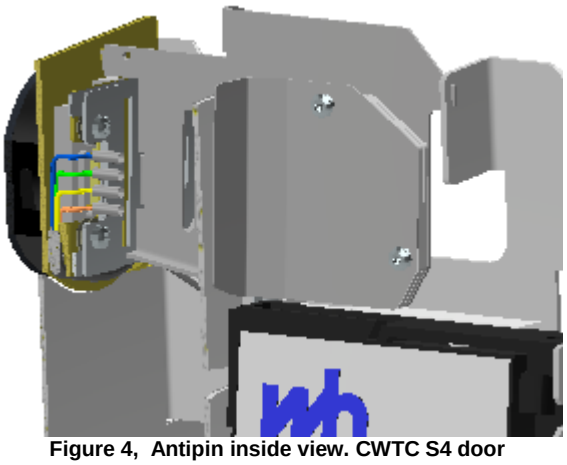


Figure 4, Antipin inside view. CWTC S4 door

A slightly inclined trap door, operated by a solenoid plunger, is held in opened (clock-wise) position by a permanent magnet inside the solenoid across which no voltage is currently applied (the above figure shows the trap door in its closed position).

The figure below illustrates the mechanism in idle mode before any metal object is detected in the coin slot. The barrier plate is kept closed by a compression spring and the trap door is in the open position.

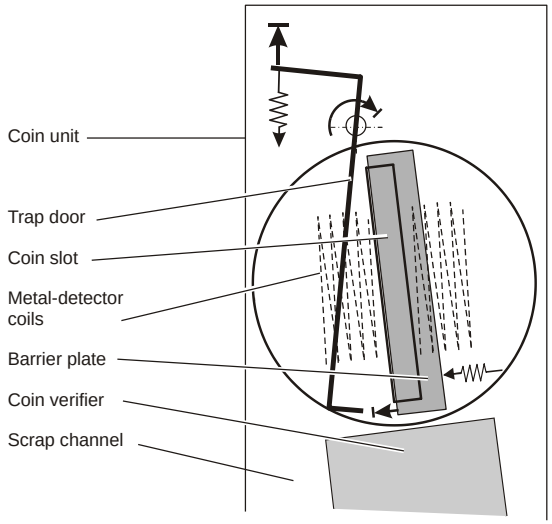


Figure 5, Anti pin in idle mode. The barrier plate covers the coin slot opening and the trap door rests in open position.

When a metal object is detected by the detector coils, a voltage is temporarily applied across a separate coil in the solenoid which generates a magnetic field that repulses the field of the permanent magnet. The trap door now rotates anti-clockwise pulled by a tension spring mounted on the solenoid plunger. The trap door also forces the barrier plate to the right to allow the metal object to be fully inserted. See figure below.

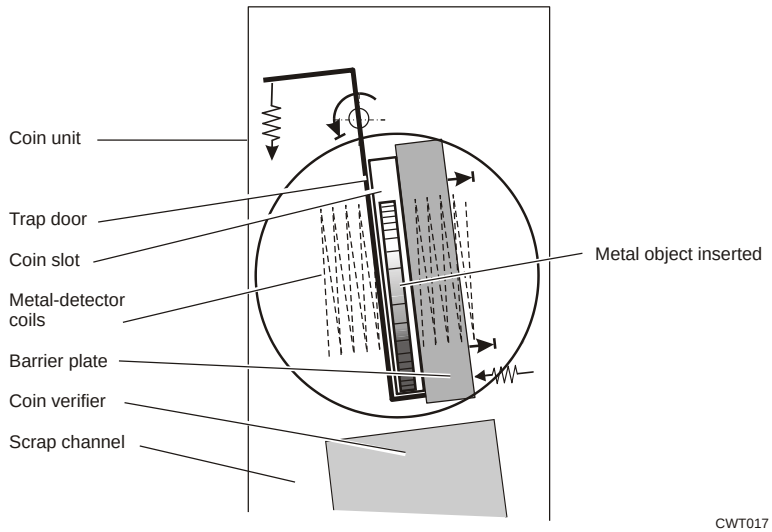


Figure 6, Barrier plate, and thus the antipin module, opens for metal objects.

The almost vertical trap door has a perpendicular shelf at its lower edge. This shelf slopes downward and rearward toward the coin verifier. A round metal object will roll along the shelf and fall into the coin verifier. A metal object that cannot roll will fall into the scrap channel as the trap door is swung clock-wise by the solenoid after a pre-set time delay.

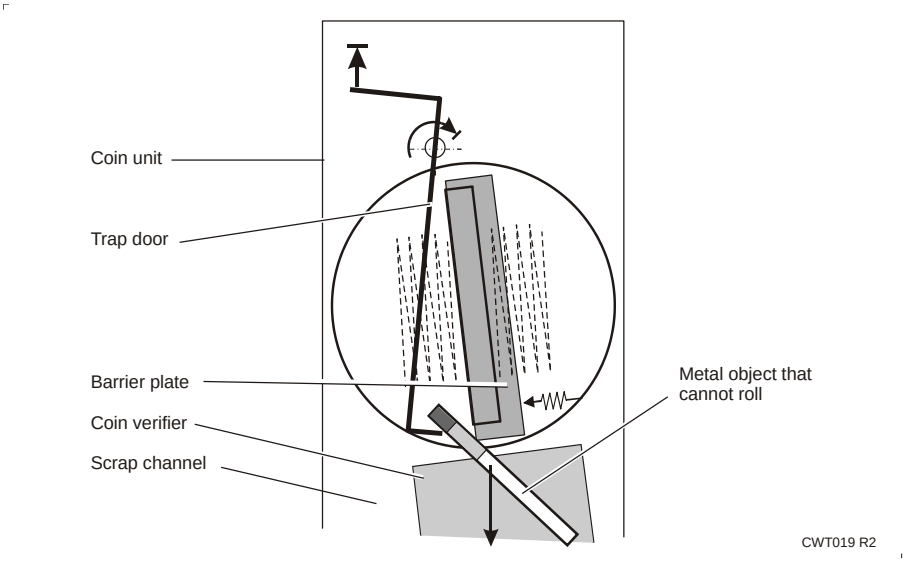


Figure 7, Non-valid metal objects are scrapped.

The permanent magnet in the solenoid module will keep the trap door in open position and thus no voltage needs to be applied to the solenoid continually which reduces the power consumption.

As the trap door opens, the compression spring will close the coin slot by pushing the barrier plate to the left.

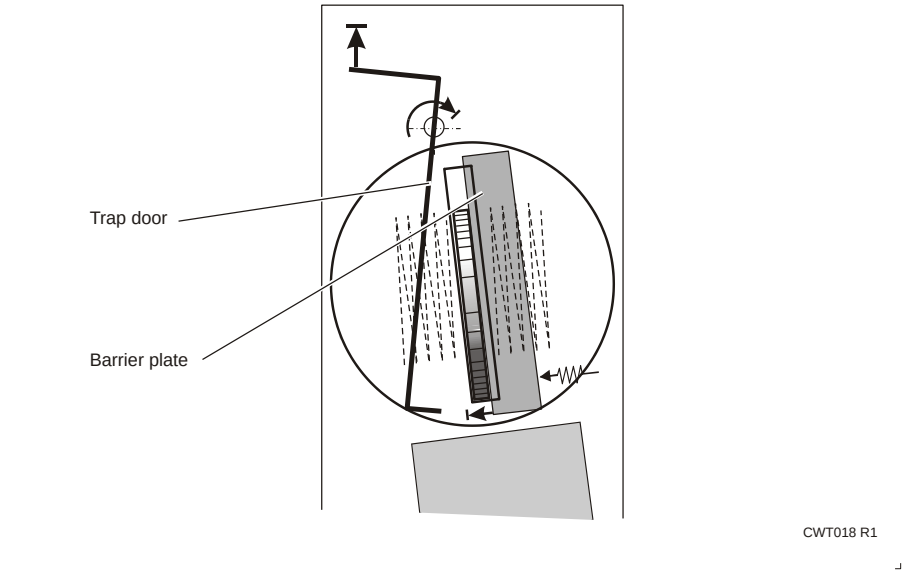


Figure 8, Metal object stuck in the coin slot.

If an object, or part of an object, remains in the coin slot opening as shown in the figure above, the barrier plate will stop against this object but will close as soon as the object is removed.

Important:
The function of the coin system may be interrupted if the terminal leans too much in any direction.

If an object, or part of an object, is inserted and prevents the trap door from closing, this will be detected. The coin system will try to remove the object, if it doesn't succeed the terminal will send an alarm to CWO.

4.1.3.2 Coin verifier

The coin verifier reveals if valid coins have been used. The verifier also includes sophisticated electronics for determining what type of coin is passing.

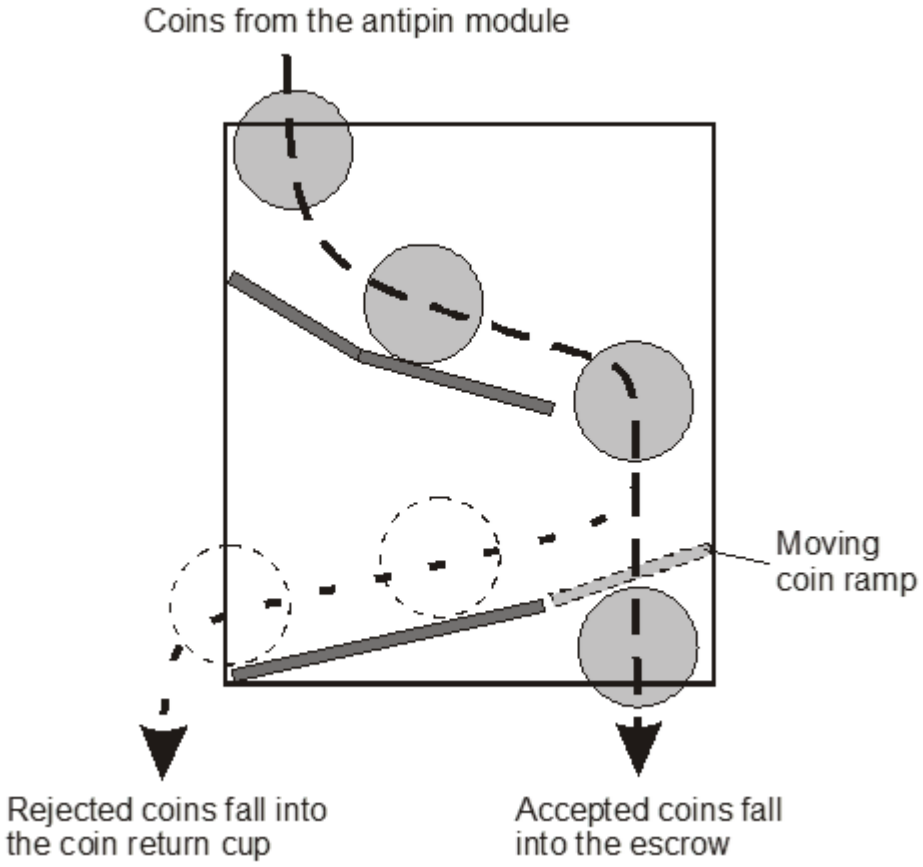


Figure 9, Coin verifier checks that a coin is valid and determines its type.

If a coin is valid, the movable coin ramp moves out of the way so the coin falls into the escrow. If the coin is invalid, the movable coin ramp guides it, via the scrap channel, into the coin return cup instead.

On the right side of the coin verifier (as seen from the front of the terminal) there is a lid.

Important:
The coin verifier can be opened manually for inspection, emptying, and cleaning.

The coin verifier is an industry standard 3.5” electronic device programmed to recognize up to 16 types of coins from optional currencies. For each coin type recognized a unique code is sent to the CPU board.

Cale Access provides pre-programmed coin verifiers for all countries where the terminals are sold, but clients can also program the modules themselves if necessary. Contact Cale Access for further information about coin verifier programming.

4.1.3.3 Escrow

The task of the escrow is to store the inserted coins until the customer accepts or cancels the purchase. Accepted coins are guided into the coin box. Cancelling the purchase empties the coins into the coin return cup. The volume of the escrow is approximately 0.35 l, equal to about 120 coins.

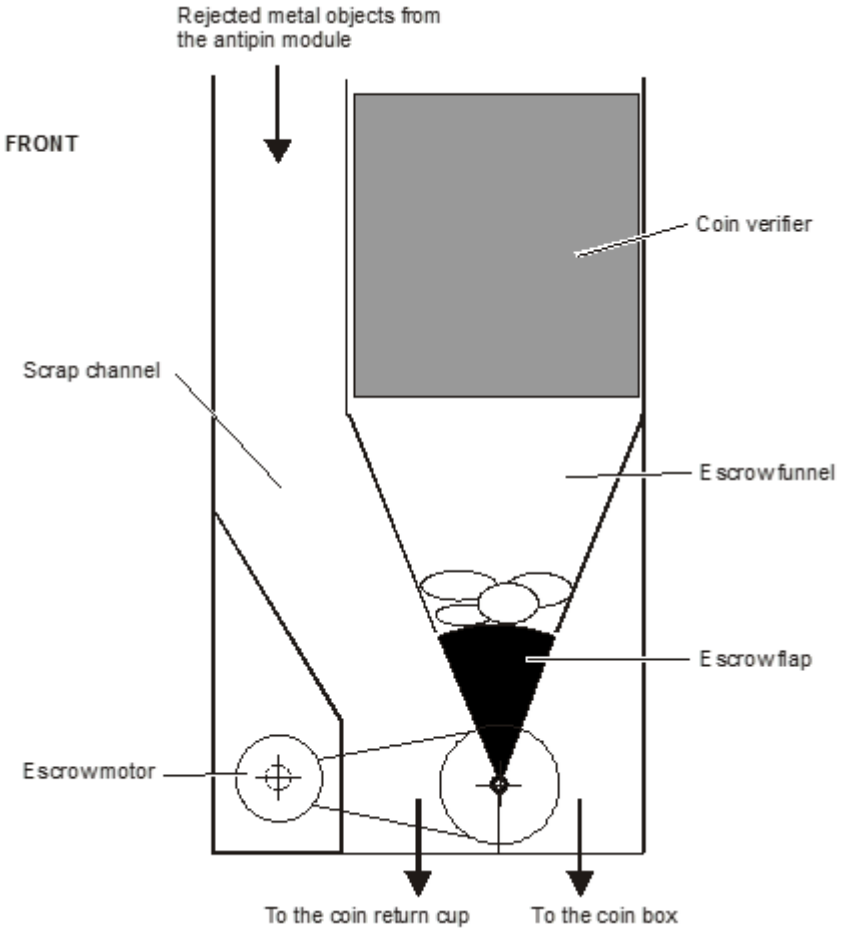


Figure 10, Escrow in home position.

The figure above shows the coin unit as seen from the terminal’s right side.

To the left is the scrap channel through which any objects rejected by the anti-pin module or the coin verifier will fall into the coin return cup.

Below the coin verifier is the escrow that consist of a funnel, a flap and a DC motor (escrow motor).

The flap can be rotated to the left or right by the motor via a toothed belt and a pulley attached to the flap. The pulley has a small permanent magnet mounted close to its outer edge. There is a printed circuit board, named coin handling board, mounted on the left side of the coin system module (not shown in the above figure). This board has three Hall- effect sensors that detect the position of the permanent magnet, and thus the position of the pulley and the flap.

The figure above shows the escrow flap in home position, that is, the position it has until the customer either accepts or cancels the purchase. Any inserted coins remain inside the escrow funnel.

In the figure below the customer has accepted the purchase and the escrow motor have turned the flap to the Accepted Purchase position. The coins fall into the coin box.

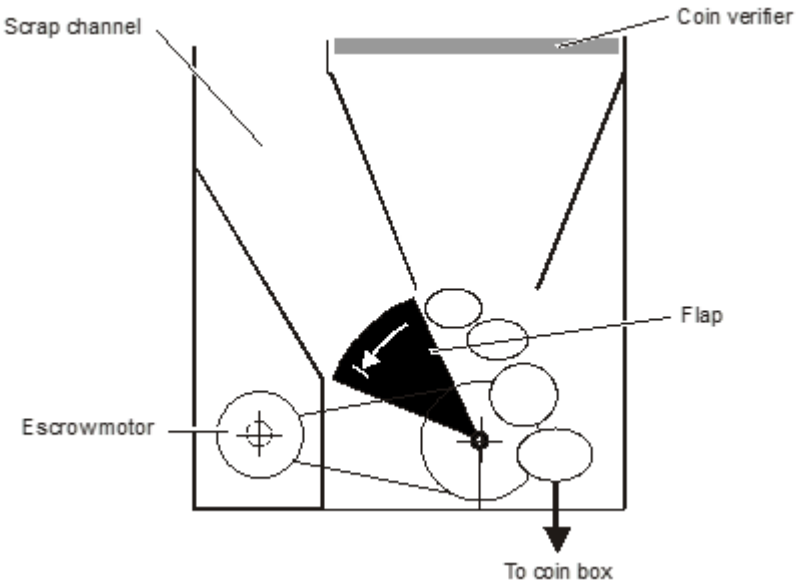


Figure 11, Escrow in Accepted Purchase position.

In the next figure, the customer has cancelled the purchase and the escrow motor has turned the flap to the Cancelled Purchase position. The coins fall into the coin return cup.

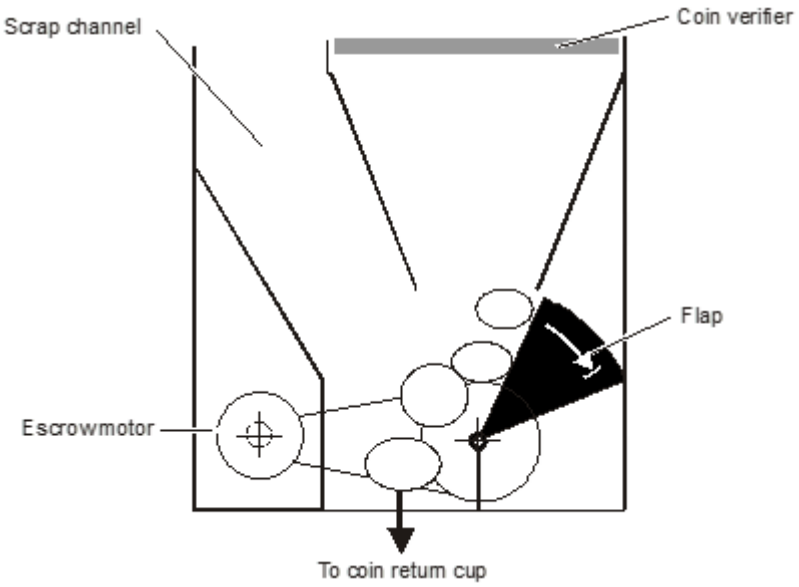


Figure 12, Escrow in Cancelled Purchase position.

4.1.3.4 Coin handling board

A PCB assembly named Coin Handling Board is mounted on the left side of the coin unit.

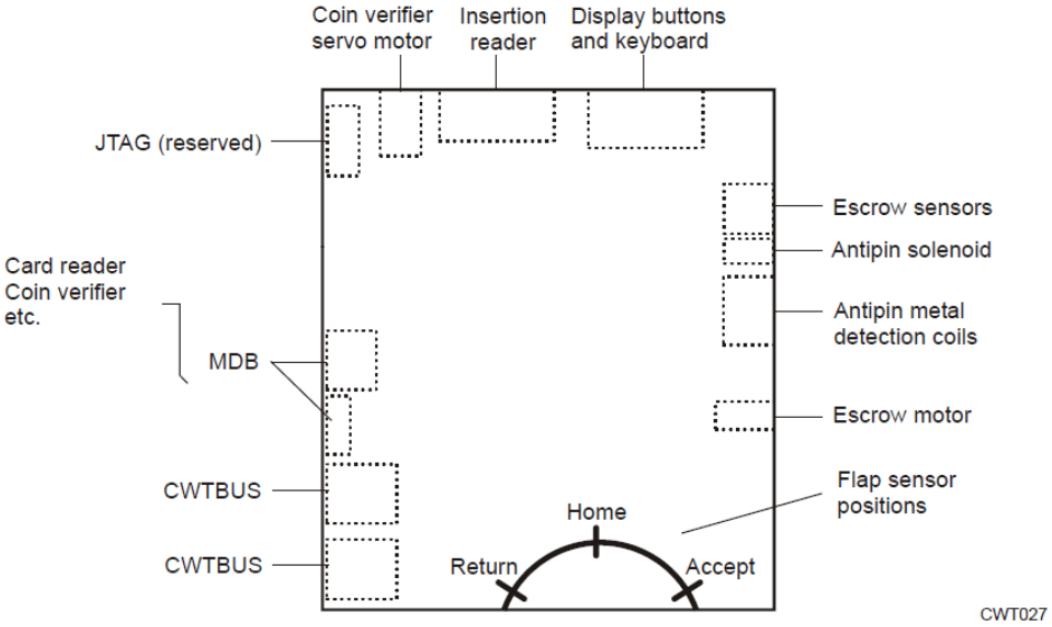


Figure 13, Coin handling board as seen from the solder side.

The coin handling board, with its own AVR (micro controller), controls the functions of the coin system module. The board, which connects to the CPU board via the CWT BUS, also serves as an interface between the display buttons in CWT Compact and an optional card reader. The AVR firmware can be updated using a PC.

A screen print at the bottom of the board indicates the position of the flap sensors mounted on the component side. The sensors are affected by the tiny permanent magnet fitted on the flap pulley.

4.1.3.5 Coin box

The coin box has 4.6 litre capacity. A presence sensor and software detection of when the box is near full and full is also built into the system.

Coin collection personnel must have the proper access privileges to be able to open the pedestal door. All access attempts are logged in CWT Compact and are transferred to the Cale WebOffice management system.

All structural joints on the coin box are riveted or welded. Screw fittings are not used. This reduces the risk of anyone breaking into the coin box without leaving any traces.

Removing the coin box activates a micro switch mounted inside the vault.

For security reasons, the design of the coin box is not described in detail in this manual. For operation and maintenance instructions, see Changing and emptying the coin box.

4.2 Card readers

The CWTC S4 and CWTC S4 Touch models can be equipped with a Xenoa card reader.

4.3 Touch enabled Colour display

The display assembly is build up with the following components:

1. Warning/Error Indicator
2. Notification area. This area can be used to display information that will not change often.
3. inwards tilted display with touch panel
4. Ticket outlet
5. Coin insertion slot
6. Wake Up Button
7. Card Reader

Warning/error indicator

The warning/error indicator can light with either red or yellow color.

RED = Error
YELLOW = Warning

The slot for the warning indicator also support the ambient light sensor

Wake Up button

When in sleep mode the display is dark. This button wakes the terminal and will display the default panel.

4.4 Data communication

4.4.1 Cale WebOffice 2 (CWO 2)

Cale WebOffice 2 is a back-office service for remote management of your terminals and for financial and statistical purposes. The CWT Compact communicates with CWO 2 via GSM/GPRS, 3G or LAN using the TCP/IP protocol.

4.4.2 Transaction processing

Purchase data can be stored in a non-volatile memory device inside the CWT Compact, but in some card payment applications the data is immediately transferred to an external source, such as CWO, without being stored anywhere inside the terminal.

Coins must be collected on site by emptying or replacing the coin box.

Collection of card purchases can be done either on site by means of a memory device such as a USB stick, or the data can be transferred automatically to the CWO database on a regular basis where the operator can process the data in several ways.

4.5 Print system

CWT Compact terminals can be equipped with a thermal printer using direct thermal printing to generate characters, symbols and graphics.

Both landscape and portrait orientation are supported. The document length is 75 – 100 mm. Paper loading is automatic and full cutting is supported. There is a

translucent sensor for preprinted black marks used for precise positioning of printing and cutting.

The printer module consisting of the printer and the paper supply roll are positioned on a vertical main assembly plate that can easily be removed. The printer module is held in position by means of hinges on the door frame and a locking hatch. The location of the lock hatch depends on the version of the printer shelf. See Printer mounting.

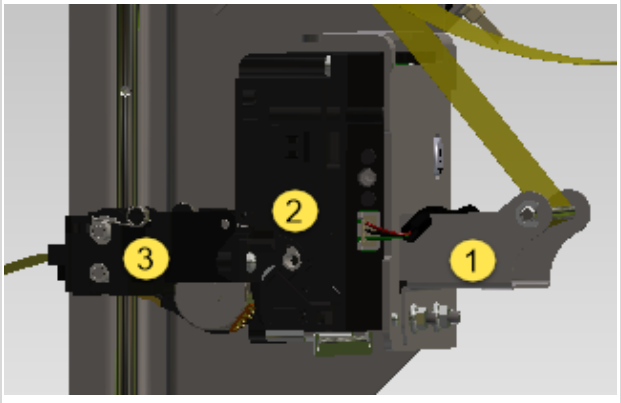
The printer is connected to the CPU board via a serial interface.

The printer firmware can be updated via Cale WebOffice.

4.5.1 GeBe GTP4672 Thermal printer

Note:
The printer shelf comes in two variates.
The older version (version 1) has a long plate mounted in the cabinet with a lock mechanism at the end of the plate. The newer version (Version 2) has lock directly after the hinge.
Both types are displayed in the manual.

Reference:
This section describes the printer exterior and the function principles. See the CWT Software Configuration Handbook section GEBE printer for information regarding all other aspects of printer control and printer settings.



1. Paper guide
2. Printer
3. Ticket presenter

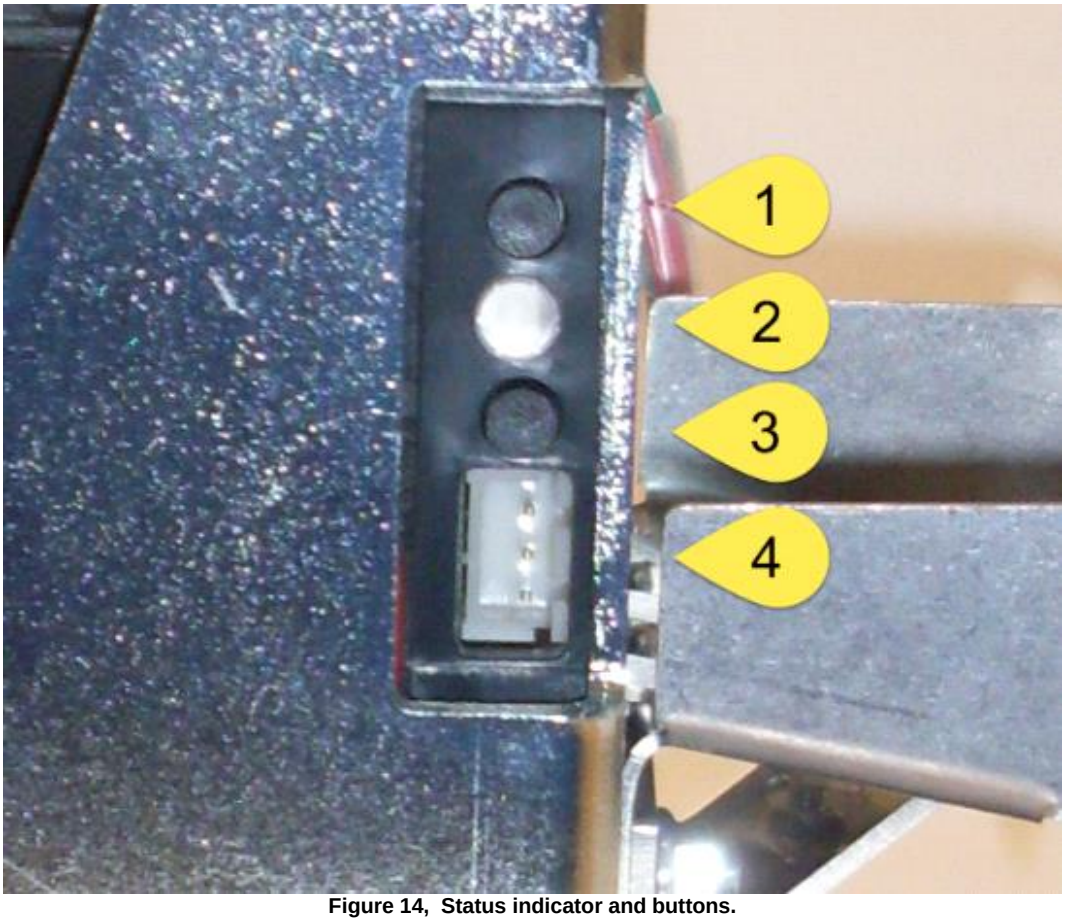


Figure 14, Status indicator and buttons.

1. Test printout button
2. Status indicator. The Status Indicator will blink when an error occurs
3. Feed button
4. Connector for a paper out sensor

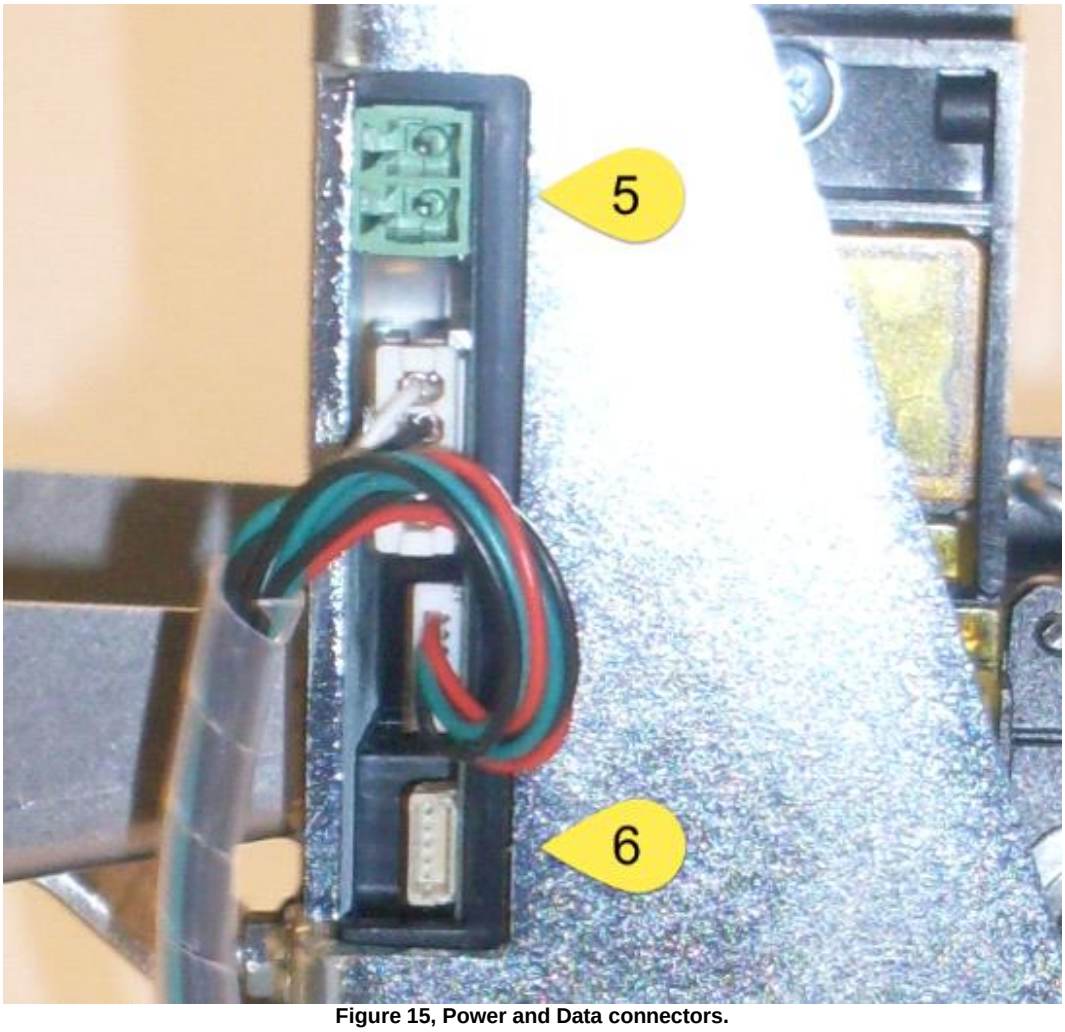


Figure 15, Power and Data connectors.

5. Power connector 12 V
6. RS 232 Data connector

4.5.1.1 Sensors

The printer has four important sensors:

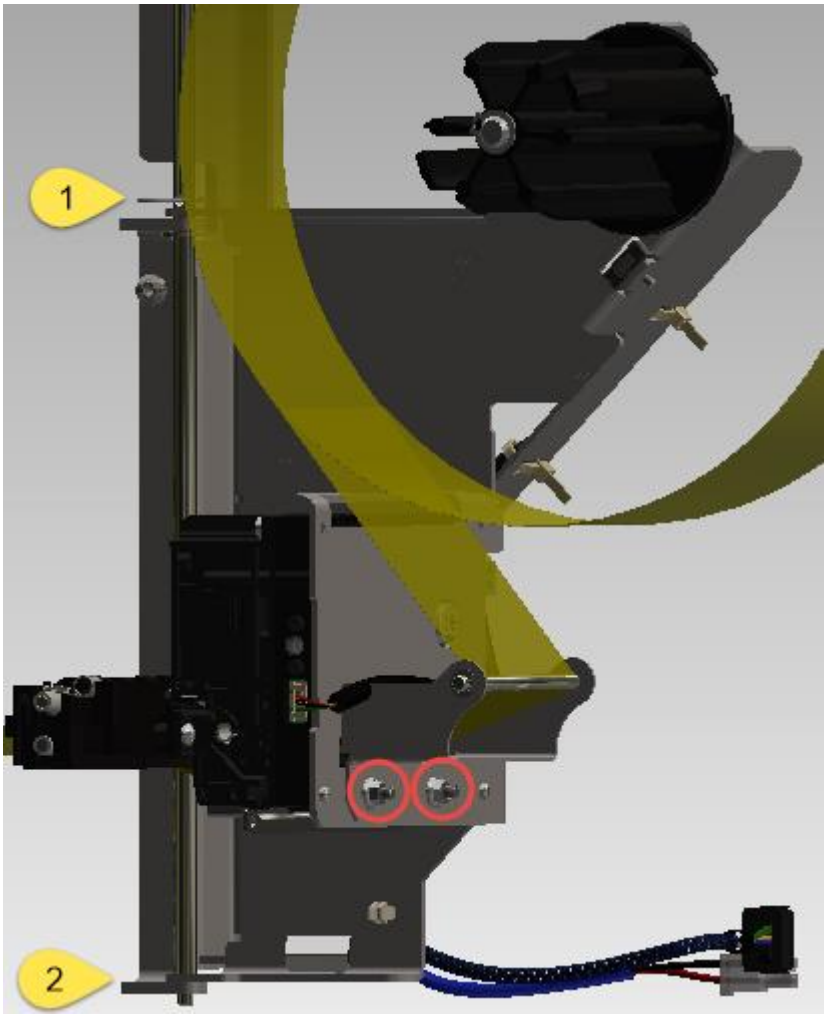
Physical sensor	Function
Paper low	Input connector for the external paper low sensor.
Paper out / Black mark	Detects paper presence and black marks. Translucent sensor. If the documents have pre-printed information, for instance a logotype, each document usually also have a pre-printed black mark for exact positioning of the printed elements and the cutting. Because the combined paper out and black mark sensor lights through the paper, it will detect a black mark irrespective of which side of the paper that has the black mark. If the length of the detected black area exceeds the set maximum black mark length value by 5 mm this is interpreted as out of paper.

Presenter	Document presence in presenter area.
Document exit	Document presence / Document taken.

Based on the status of the sensors the printer can determine if there is a paper jam, for instance in the paper entrance or presenter region.

4.5.1.2 Printer mounting

The printer is mounted on a shelf and secured by means of screws on the back of the printer.



To remove the printer module, pull and swivel the module to the right, then lift the complete module away from the hinges (1 and 2) on the door frame. To replace the printer module, place it on the hinges on the door frame and swivel the module into its locked position.

To remove the actual printer from the module, simply release the two bolds holding it in place. Lift the printer from the mounting plate.

4.5.1.3 Paper supply

The paper roll is supported by a hub designed for correct paper roll position with 58 mm rolls.

Figure 16, Printer module on printer shelf version 1.

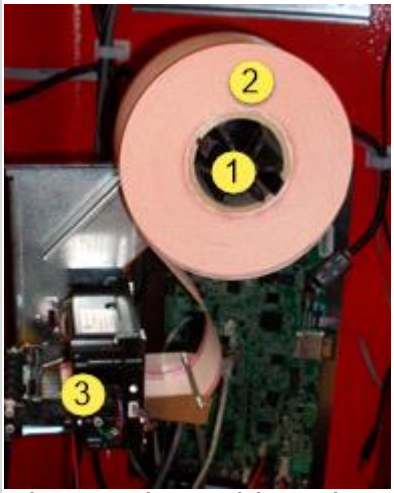


Figure 17, Printer module on printer shelf version 2.

1. Hub
2. Paper roll
3. Printer

An optical paper low sensor is mounted at the main assembly plate behind the paper roll. The sensor changes its state when there are about 150—200 tickets left on the roll. Rather than using the optical near end sensor, it is possible to use an internal ticket counter and enter the amount of printed tickets after which an alarm or warning should be generated. An out-of-paper sensor is built into the thermal printer.

4.5.2 Preprinting on printer media

There are a few guidelines that need to be followed to ensure operation:

- Due to the heat developed during printing, the preprint shall meet the requirements applicable for preprinting on paper intended for laser printing. OCR-blind ink shall be used.
- Ink used for preprinting on the thermal side shall be non-abrasive.
- The ink shall not smear while wound up on the supply roll, or during the printing process.

- Ink used for preprinting in the black mark zone and in the centre of the paper on the non-thermal side shall have no influence on the reflective IR-sensor. OCR-blind ink shall be used.

Print side

preprint is not recommended in the black mark zone on the inner side unless the above conditions are met.

Paper low sensor area

No preprint is allowed on any side of the paper in a 2-mm wide area from the edge of the roll.

4.5.3 Black mark location

The GeBe printer uses a different location for the black mark the Zebra printer in older machines.

Verify that you use the correct type of paper.

Warning:
When using black mark, you cannot use rolls for a Zebra printer in a GeBe printer as the black marks are on different locations on the paper

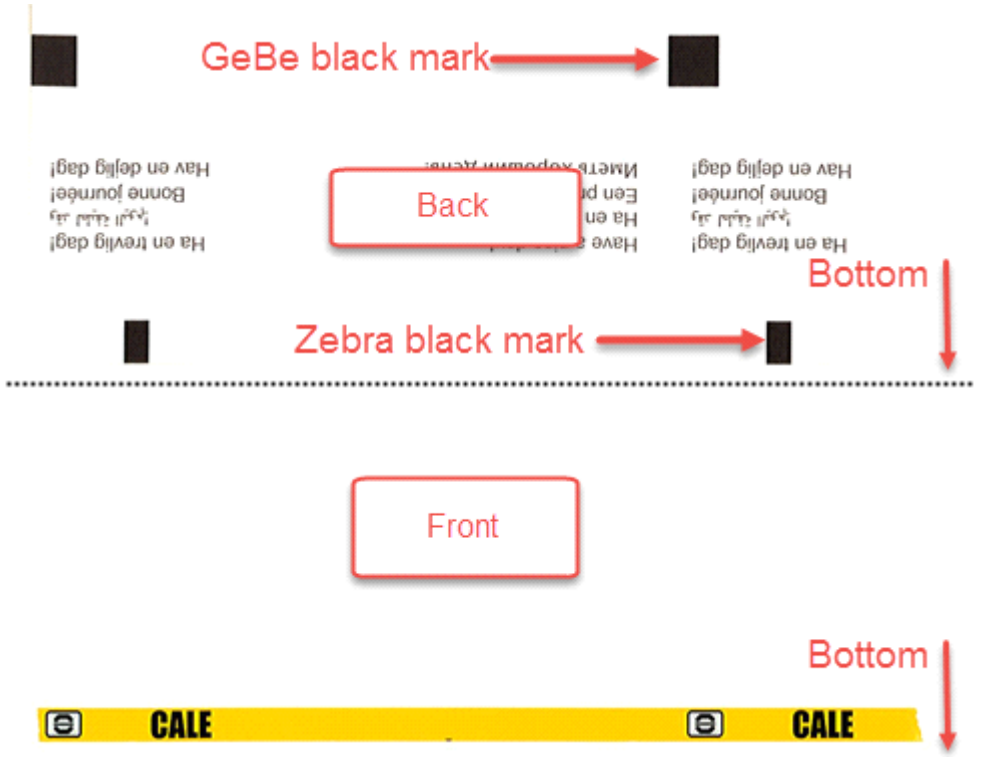


Figure 18, Paper with both Zebra and Gebe black marks

4.6 The service menu

The service menu is shown when the CWT Compact switches into service mode when you open the cabinet door. The numerous options in the service menu let you:

1. Change terminal settings.
2. Export and import terminal settings.
3. Update the software and firmware of the terminal.
4. Export credit card transactions, etc.

Most of the functions available in the service mode can, however, be performed more conveniently through the CWO Service.

The terminal exits the service mode when you close the door again. The printer can produce a printout showing the software and firmware versions installed in the terminal and numerous data regarding the printer, including the current printer settings. This lets you check any changes you have made while in the service mode. This feature is default enabled but can be disabled since the CWT application 2.36.

Reference:
For a detailed description of the service menu see CWT Software Configuration Handbook.

4.7 Mechanical design

In this Chapter:

- General
- Product label
- Inside the cabinet
- Inside the pedestal
- Door locks
- Door-open sensors

4.7.1 General

The terminal comes in 2 parts:

1. the upper part or Cabinet. See Inside the cabinet
2. the lower part or Pedestal. See Inside the pedestal

The cabinet can be detached from the pedestal and this is the way the CWT Compact is usually delivered from the factory.

The cabinet can be removed from the pedestal at a later stage, for example for maintenance or upgrading reasons, or if the terminal is to be taken out of operation for a lengthy period.

The configuration of the CWT Compact is highly flexible and varies depending on installed pay units etc.

4.7.2 Product label

Both the cabinet and the pedestal have a product label specifying the Type, Colour, and Quality Inspection during production

The figure below depicts the information shown on the product label attached inside the cabinet.

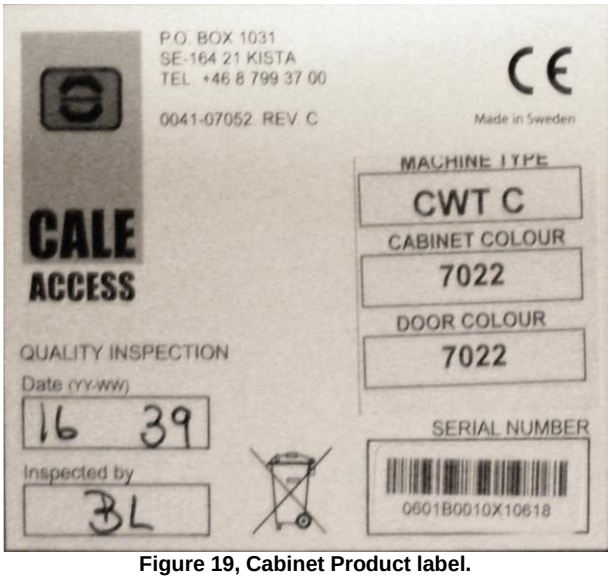


Figure 19, Cabinet Product label.

4.7.3 Inside the cabinet

The items found inside the cabinet vary between the CWT Compact models and between different versions of each model. The figures show a CWT Compact model equipped for payment with coins, credit cards, and optional contact-less cards.

Door inside

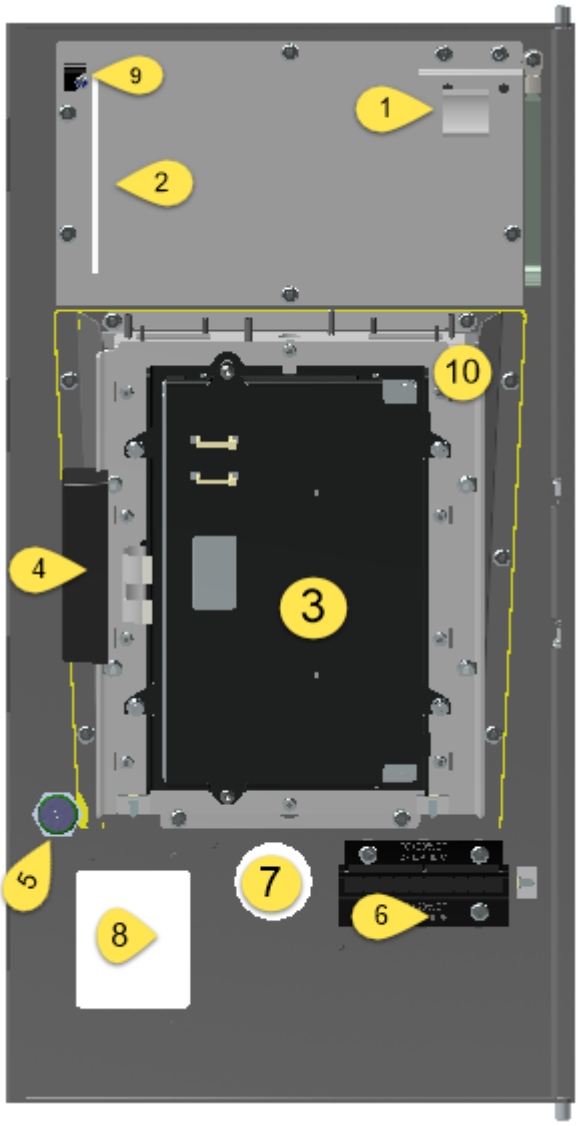


Figure 20, CTWC S4 Touch door interior.

1. Warning/Error Indicator
2. Insert slot for Notification area.
3. Display Unit
4. Touch screen unit
5. Wake-up button
6. Ticket outlet
7. Coin unit insert slot
8. Card reader slot
9. Permanent magnet
10. Inwards tilted display frame including display mounting frame. The yellow line indicates the border of the tilted frame

Coin unit

The Coin unit is mounted in the lower part of the cabinet and is fixed with 2 bolts to the front.

The Coin Return Lid is removed for this image.

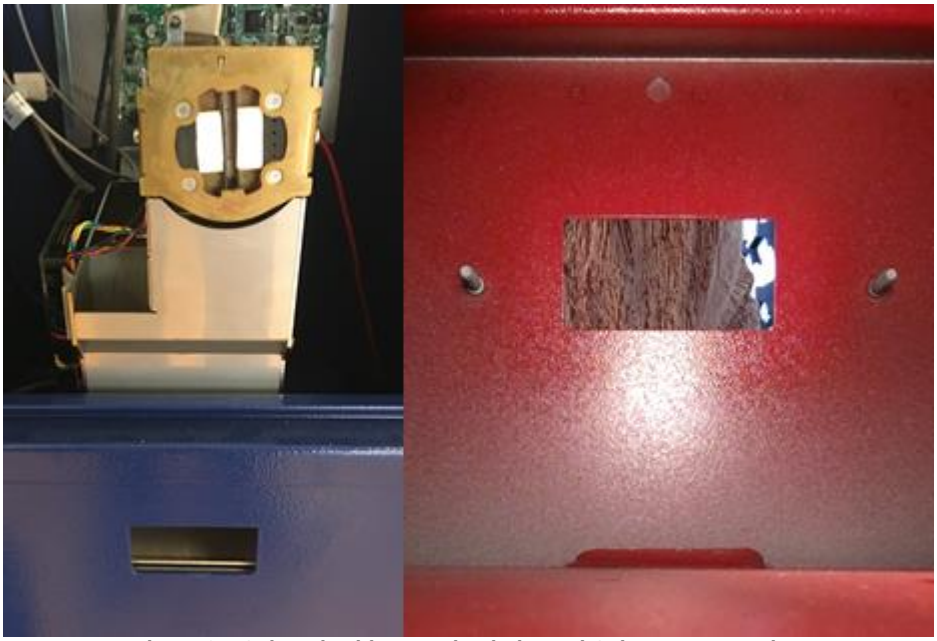


Figure 21, Coin unit with mounting bolts and Coin Return opening

Inside of the cabinet

1. Door Open Sensor
2. Antenna
3. Paper roll
4. Printer
5. Mother board
6. Coin inlet
7. Coin return cup
8. Door lock mecanism

4.7.4 Inside the pedestal

The contents of the pedestal may vary depending on local regulations, needs for specific electrical components, etc.

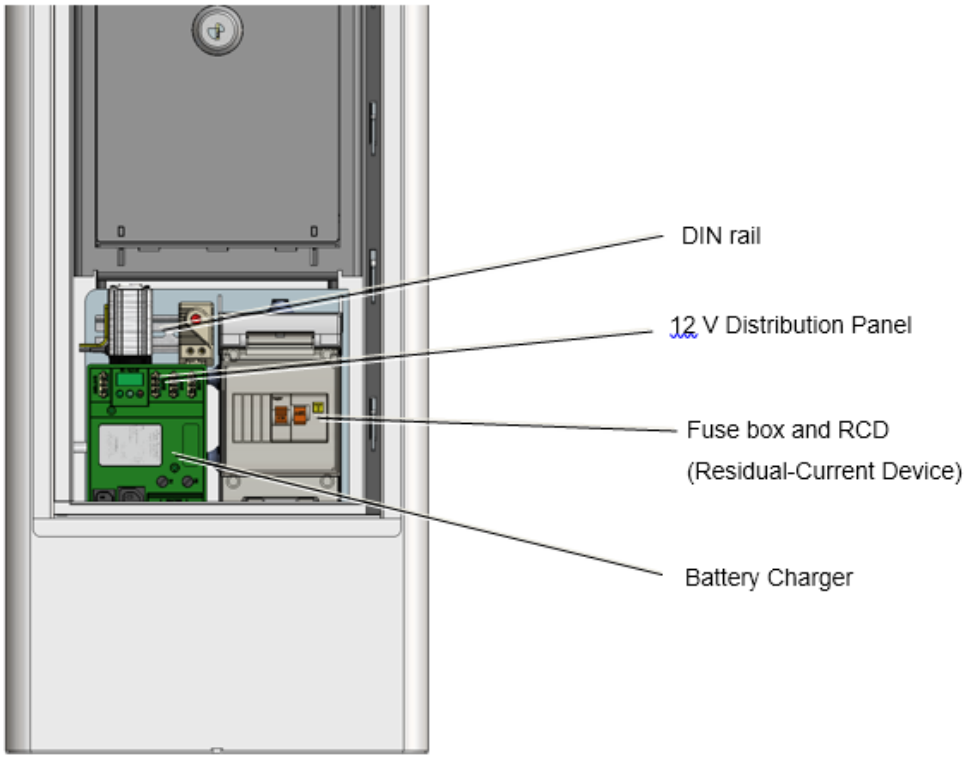


Figure 22, Pedestal interior (example)

4.7.4.1 COIN BOX Vault

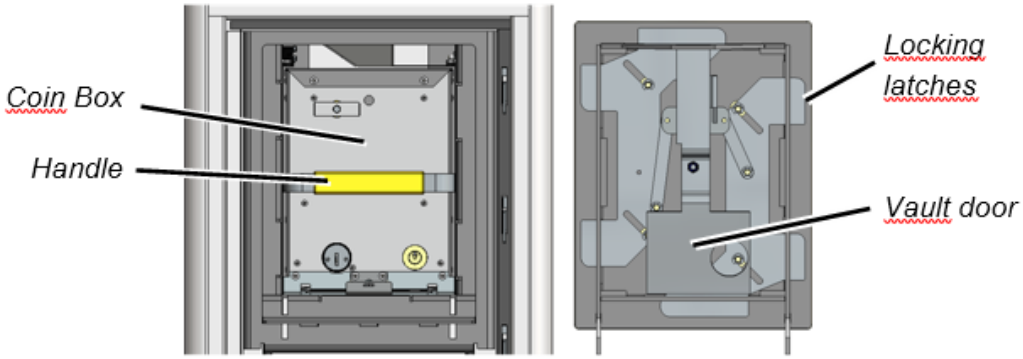


Figure 23, Vault interior.

The coin box vault is made of 4 mm sheet metal with side drilling protection.

The vault door, made of 6 mm armoured steel, has six drilling protected locking latches along its edges.

The coin box vault door lock, placed inside a drilling protected and anti-bolster fitting, is of a high security mechanical type such as Kaba or any of the Abloy locks Guard-x, Exec and Protec. All of them use a key profile that can only be obtained from the original lock manufacturer. The key does not have any serrated surfaces neither any sharp or pointed edges. Registered locks and keys are available.

The key can only be removed when in the locked position. It is impossible to close the outer pedestal door until you have locked the vault door and removed the key.

When collecting the coins, you can pull out the coin box and let it rest on top of the vault door before you start lifting the box.

When open, the lowered vault door can easily be lifted away from the vault for repair or replacement. No tools are required for this.

4.7.4.2 Coin Box

Seen from outside in, the coin box is protected by the pedestal and the coin box vault.

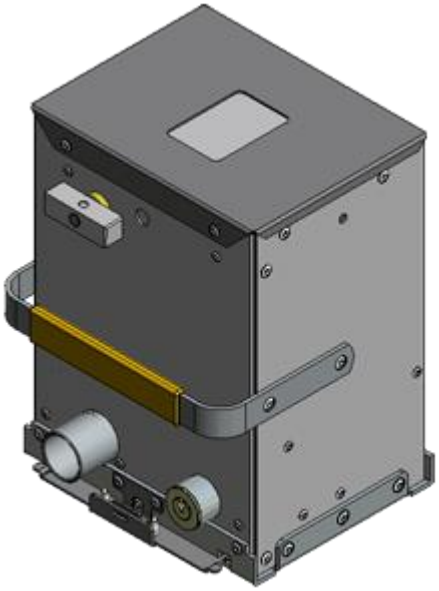


Figure 24, Coin box.

4.7.5 Door locks

Each door is secured in closed position by means of four locking latches.

4.7.5.1 Mechanical locks

The standard lock in the CWT Compact is a mechanical Exec lock from Assa Abloy. It is a mechanical lock that is opened with a key. The lock can be

protected against dirt and water by two flaps that slide apart when the key is inserted (option).

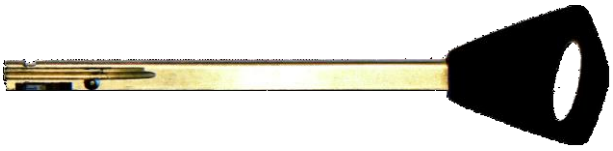


Figure 25, standard mechanical door key.

4.7.5.2 Electronic locks

The CWT Compact terminals also have an optional electronic lock system with online central administration and authorization via Cale WebOffice. This solution replaces the expensive and tedious handling and administration of keys because all persons that need access to a CWT Compact use the same type and version of door key that is more to be seen as a door opening tool.

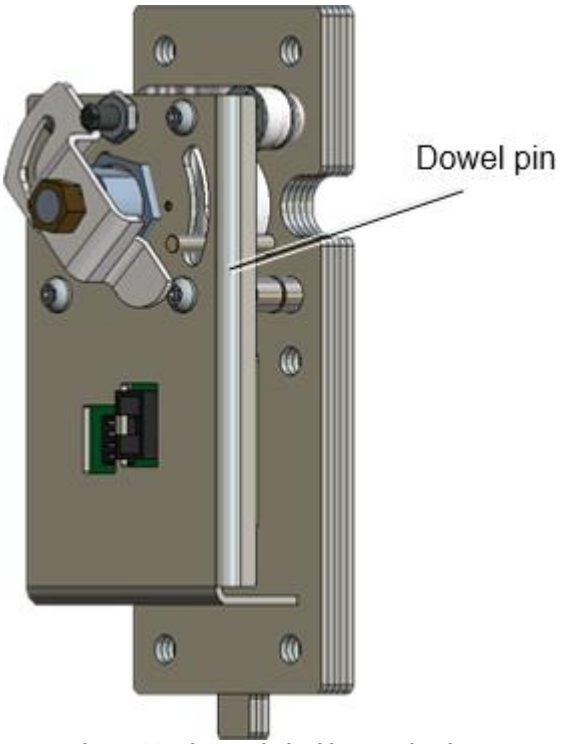


Figure 26, Electronic-locking mechanism.

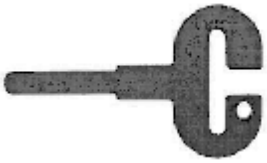


Figure 27, Door key for electronic locks

There is a round key hole at the right side of both the cabinet and the pedestal.

The inside of each hole is covered by a protective plate. To enable the insertion of a key, this plate will automatically move out of way if these conditions are met:

- You are registered as a user in Cale WebOffice and have been given the proper privileges for access times, opening frequencies, compartment (cabinet, pedestal or both), etc.
- You identify yourself by inserting an access card in the card reader and entering an optional PIN code at the keyboard (CWTC S3A with keyboard and CWTC Touch). In a CWTC S3A without keyboard and in terminals without a card reader, you place a special ID card against an RFID reader mounted in the plastic casing in the right bottom corner.

NOTE:
After you have opened the upper door, the lock will be closed again after a 15 second time out to save power. Because the terminal now is in the service mode you cannot prove your identity and get the necessary privilege to open the door again. Instead you have to press an Open Upper Door key shown in the start page of the service menu to open the lock mechanism again.
The pedestal door lock also has a 15 second time out, but you can still run the normal application with the upper door closed and open the lower door lock as usual.

Master key

The electronic lock system also provides an opening alternative in case of power failure, software failure or communication disturbances. Inside the electronic lock there is a regular lock as well. A mechanical master key is used for emergency access, but the protective plate has to be pushed up manually first by means of a small screwdriver, paper clip, or similar.

Latches

The electronic lock has a relay operated latch mechanism that prevents anyone from opening the key lock unless the person can prove his identity.

Note:
The minimum voltage required for proper operation of the electronic locks is 11.1 V at room temperature (20 ˚C).

Configuration of the E-locks

The upper and the lower E-locks are of the same type. Each lock is a DIP-switch whose setting tells the system if the lock is mounted in the cabinet or pedestal.

The E-locks are connected to the CPU board (Connector J16) board

Please note that if an upgrade from mechanical to electronic lock is desired, the locking bar also needs to be replaced.

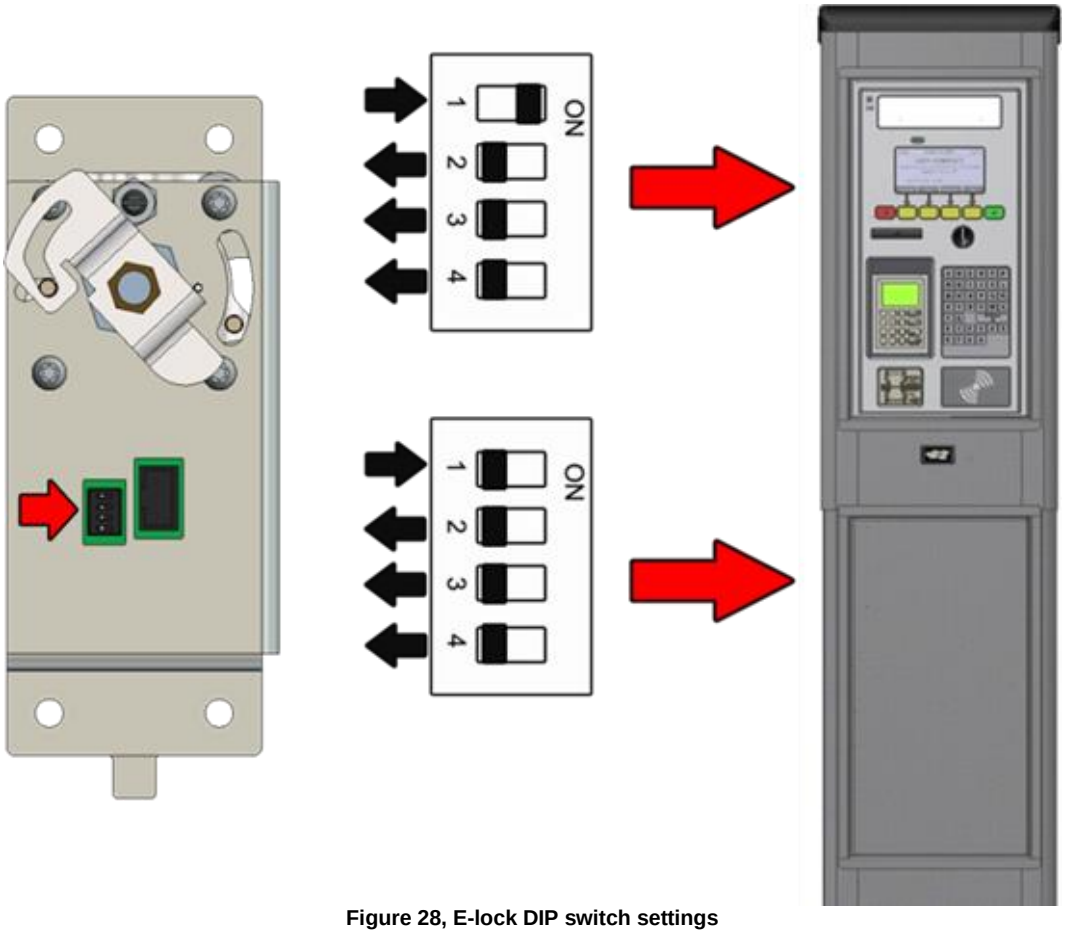


Figure 28, E-lock DIP switch settings

4.7.5.3 Door-open sensors

Both doors have a door-open sensor. All attempts to open the terminal are logged in the CWT Compact and the information is transferred to Cale WebOffice.

The door-open sensor consists of a permanent magnet mounted on the door and a magnetic field sensitive sensor mounted inside the door frame.

Figure 29, Door-open sensor in the cabinet.

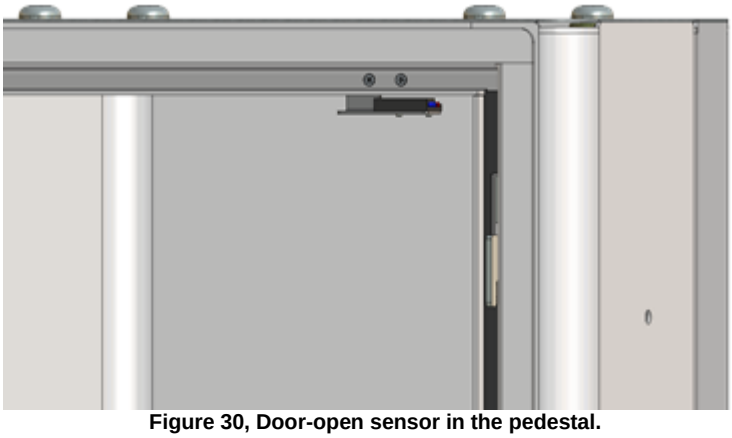


Figure 30, Door-open sensor in the pedestal.

4.7.6 Heating system

The CWT Compact can be provided with heating in both the cabinet and the pedestal by means of 100 W heating fans and thermostats adjustable between 0 and 60 °C.

Both the fan and the thermostat are mounted on existing DIN rails. The heating fan is connected to one of the two 230 V (115 V UK) outlets (for the heating radiator) and one 12 V outlet (for the fan itself) in the battery charger module located in the pedestal.

4.8 Power supply

CWT Compact terminals are powered by a gel type, maintenance free lead-acid battery placed in the pedestal of the terminal. The battery is charged by mains power or solar power. In the latter case the terminal has a solar cell panel mounted at the top.

Alternatively, the terminal can be powered from the battery only which requires regular battery replacement. An alternative is to have the battery charged from a power source that is regularly available, such as a street light post.

Danger:
Always ensure that the external power supply to the terminal is disconnected or switched OFF before carrying out any work on parts that ordinarily conduct dangerous current.

4.8.1 Power control

The battery voltage can be measured automatically on a regular basis and a report can be sent to CWO periodically. See the CWT Software Configuration Handbook.

A warning event can be generated and sent to CWO if the voltage drops below a certain warning level. The default value is 11.9 V.

The terminal will be set in error state and an error event can be sent to CWO if the voltage drops below a certain error level. The default value is 11.5 V.

A restore event will be generated and can be sent to CWO when the voltage, while increasing, reaches a certain recovery level. The default value is 12.1 V. A typical measured value is 12.5 V.

Note:
The automatically measured voltage usually differs from the battery voltage measured with a voltage meter without any load applied.

When the battery is being charged, the measured charging voltage will be approximately 13.7 V.

Under certain circumstances, a sleep mode function can be activated if the terminal is solar powered or powered by the battery only.

Important:
The minimum voltage required for proper ticket printing and operation of the electronic locks is 11.1 V at room temperature (20 ˚C).

4.8.2 Battery charging by solar power

A solar powered terminal has no battery charger. Instead, the solar panel charges the battery via the CPU board and a cable between the CPU board and the battery. The CPU board measures the charging current and if the charging voltage exceeds 18 V a fuse will blow.

The result of the measured charging current is sent to CWO. A warning event will be generated if the current drops below the warning level and the terminal will be

set in error state if the current drops below the error level. A restore event will be generated when the current reaches the recovery level.

Reference:
See CWT Software Configuration Handbook for more information about this.

Figure 31, CWT Compact solar panel example

4.8.3 Battery charging by mains power

In mains powered terminals the 12 V battery is charged by the battery loader that outputs 12 V (13.8 V) to the battery via a separate 6.3 A fuse.

The charger has three indicators:

GREEN ON when 230 V (115 V UK) Mains power is available.
YELLOW ON when charging is in progress.
RED Initially ON when a deeply discharged battery is being charged.

The charger also has a 12 V distribution panel with three output connectors and two 230 V (115 V UK) outputs for optional heating fans.

A diode in the battery charger protects the circuitry if the battery is connected with wrong polarity. In such a case one or both main fuses F1 and F2 on the CPU board may blow.

The cable from the mains power grid is connected to a termination block in the Pedestal. The termination block contains a residual-current device, optionally combined with a fuse.

4.9 Administrative tools

Cale Access supplies programs and services for credit card administration, collection, terminal maintenance, etc. Contact Cale Access or your nearest Cale representative for more information. You are welcome to visit https://www.caleaccess.com for details.

4.10 CWT Compact interconnections

This chapter aims to shows how each part of the terminal is connected to the CPU board.

The drawings are available in a separate document: “CWT Compact Cable Diagrams for AVE (2100-0009).pdf”

4.11 CPU board version 0501-E0150 Rev I

Note:
For earlier versions of the CPU board see earlier issues of this document

The CPU board consists of a main printed circuit board assembly. It contains a 32-bit 800 MHz processor with a 256 MB non-volatile flash memory used to store the operating system (Windows CE) and a 512 MB RAM. The latter, including the real-time clock, is backed up by a battery positioned on the CPU board.

Important:
This board requires Compact AVR AVE version 3.0.0.28 or later

The figure below shows the positions of connectors etc. The figure is followed by a list of all connectors and their use.

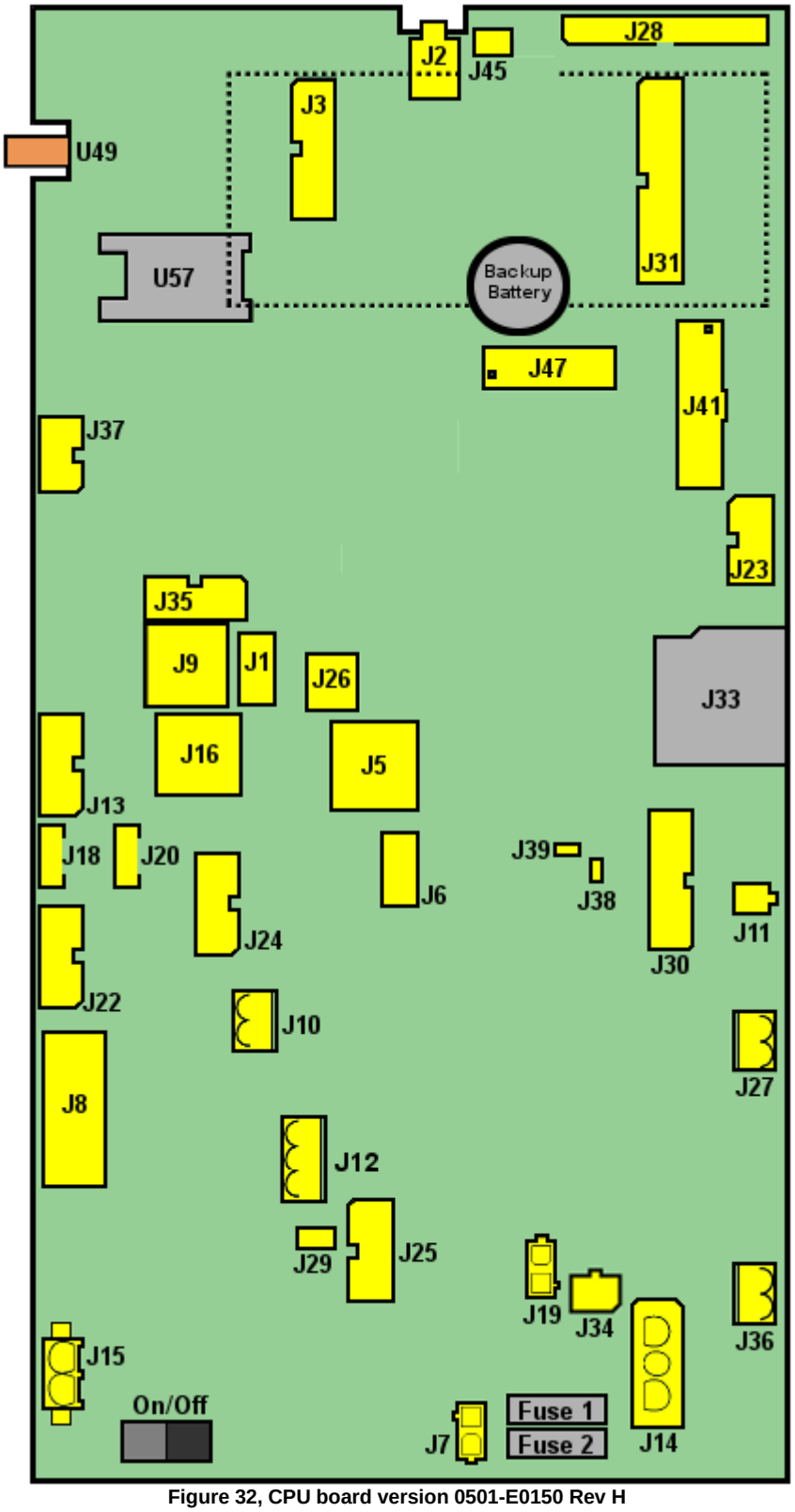


Figure 32, CPU board version 0501-E0150 Rev H

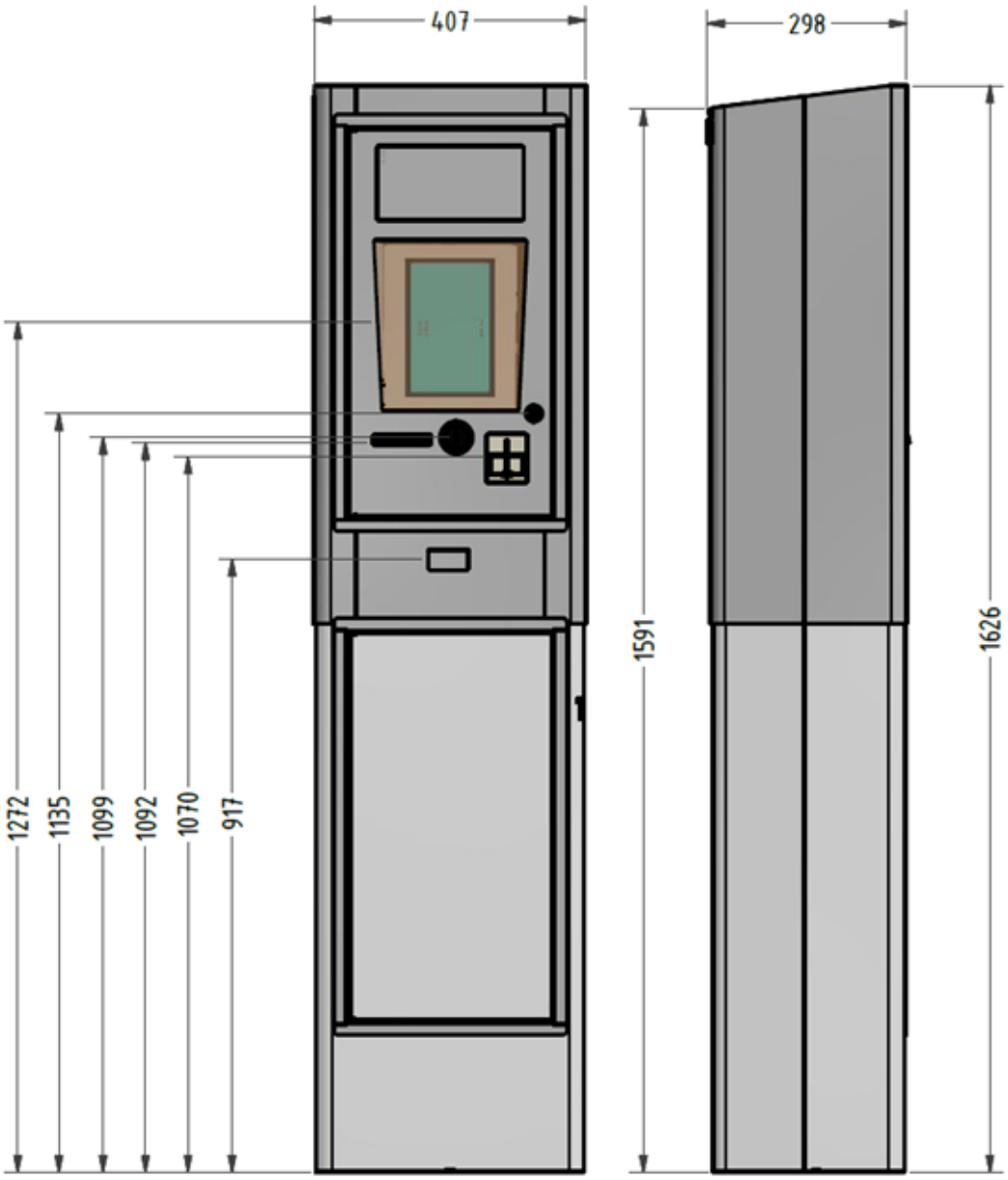
Connector	Function
F1	4A Fuse (ATO)

Connector	Function
F2	10A Fuse (ATO)
J1	USB 2.0 Host Type A
J2	Speaker
J3	Expansion board
J4	Not mounted
J5	Ethernet
J6	USB 2 host type A
J7	12V Printer from Battery
J8	Serial 2 – com 7
J9	CWT Cap Bus
J10	Opto coupled input (e.g. Seismic alarm)
J11	Extra battery Zink-Air
J12	Relay Output
J13	Serial 4 – Com 9
J14	Battery 12 V In
J15	24V Printer
J16	CWT Cap Bus
J17	Not mounted
J18	Coin Box (1/2) Lower Door (3/4)
J19	12 V Out from Battery (External Pay Unit)
J20	Upper Door switches
J21	Not mounted
J22	Printer - Serial 3
J23	Status LEDS and Ambient light sensor
J24	Touch controller - Serial 5 – Com 10
J25	AVR JTAG (for loading of AVR software)

Connector	Function
J26	USB Device (type B)
J27	Solar Panel 36 cells Input
J28	STN Display
J29	12 V Out from Battery
J30	Debug port
J31	Expansion board
J33	SD Card
J34	External Light
J35	External Pay unit e.g. SIX - Serial 1 – Com 3
J36	Solar Panel
J37	MDB
J38	Boot Mode
J39	Fuse Voltage
J40	Not mounted
J41	Colour display with LDVS and Backlight
J44	Not mounted
J45	Microphone
J47	JTAG imx53
J48	Not mounted
J49	Not mounted
SW8	On/Off Switch
U49	Modem Antenna
U57	SIM Card

4.12 Terminal measurements

Note:
The CWT Compact is available in two heights, the one presented in the figure above (1616, 5 mm) and a shorter one (1516,5 mm).


407
298
1272
1135
1099
1092
1070
917
1591
1626

5 INSTALLATION

Cale strongly recommend the following conditions and settings to be considered when planning and installing solar operated CWT Compact terminals. Deviations from the guidelines will result in lower efficiency from the solar panel which may lead to operational issues depending on location, configuration, maintenance and usage frequency.

5.1 Site preparations

Before installing a terminal, you must verify that its location meets the requirements listed in the following section to secure proper operation.

5.1.1 Minimal site dimensions & Mounting holes

The given distances between fixed objects at the back and the sides of the terminal are minimum recommended distances:

- The distance behind the terminal enables easy handling while mounting the terminal and some vertical adjustment of the terminal. This distance is strongly dependent on GSM/GPRS reception and should be increased in poor situation.
- The distance at the left side ensures that the doors can be fully opened.
- The distance at the right side allows easy insertion of the door key and gives enough space if a locking mechanism needs to be repaired.

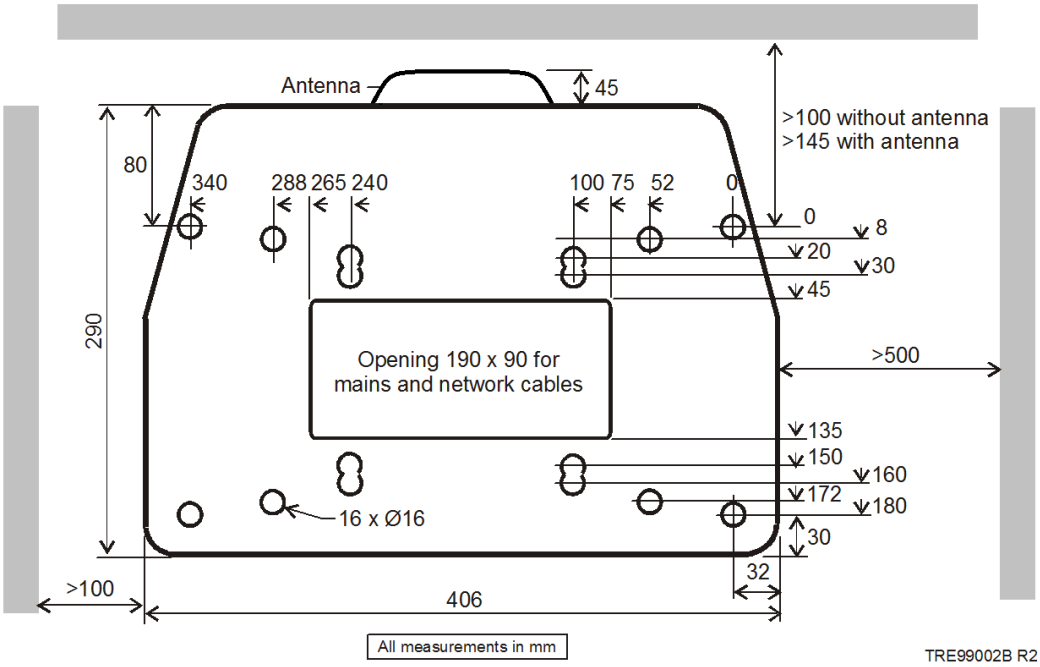


Figure 33, Terminal installation drawing

The above figure shows all the alternative mounting holes in the pedestals bottom plate. See Pouring a new concrete foundation regarding placing the terminal on a base anchor cast into a foundation.

A cable for connection to the power grid is drawn through the floor (from the floor below, for example) and into the pedestal through the opening in the mounting frame (optional). Alternatively, a hole can be drilled in the pedestal and the cables drawn in some other way. The cable must be protected against damage. Use proper cable bushing to prevent cable wear and moisture entry into the pedestal.

Danger:
Follow local regulations regarding electrical installations.

5.1.2 Solar power positioning

The ideal installation of the terminal may vary due to the surroundings. A thumb rule is to have the solar panel facing south with the panel surface perpendicular towards the sun.

The drawing below illustrates how a Cale terminal is installed on an undefined street with obstacles (buildings) on both sides. The illustration also shows the angle where the solar panel will get the most sun during the day. Please note that the angle is also 360 degrees around the terminal. Mentioned parameters must be considered when planning an installation.

Also, note that different latitudes will give variances in optimal solar angles, which also affects the ideal positioning of the terminal.

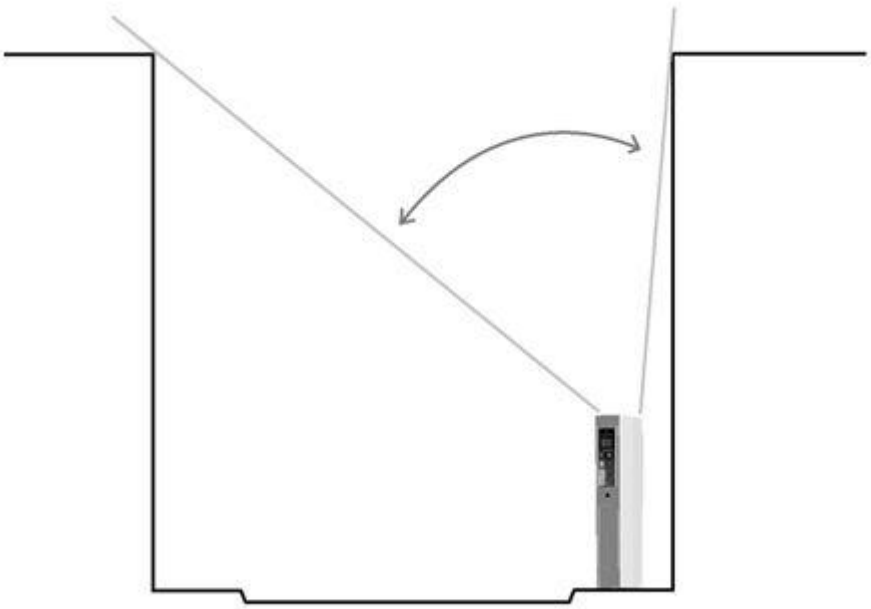


Figure 34, Solar Panel Placement.

Obstacles and shading

Even the smallest shading of the solar panel will result in substantial loss of output power. If, for example, 2% of the surface of the solar panel were to be shaded, the output efficiency would be 30% lower due to serial connection between the solar cells.

Shading can be caused by many different things, such as trees, buildings, balconies, dirt/debris, and snow. The risk of shading from buildings and other objects in the vicinity will increase during the winter due to the lower altitude of the sun.

5.1.3 Placing the terminal on an existing concrete foundation

The pedestal is attached directly to the foundation using 4–8 expansion bolts, see Figure below. The maximum bolt diameter is 12 mm.

The bottom plate extends 1.5 mm below the housing of the pedestal and you can place the pedestal directly on top of the foundation without any risk of damaging the housing.

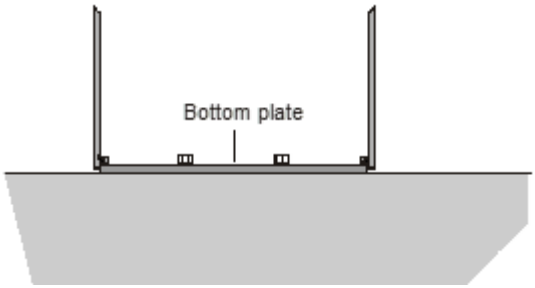


Figure 35, Terminal placed directly on the foundation

Important:
Terminals for coin payment must be properly aligned vertically because the function of the anti-pin module and the coin verifier may be interrupted if the terminal leans more than a couple of degrees in any direction.

5.1.4 Pouring a new concrete foundation

If the installation site does not have an existing concrete base or the equivalent, you can pour a concrete foundation, casting a base anchor (0403-B0122) into position. The Cale base anchor is supplied as a flat package containing parts to be assembled at the installation site.

Important:
Terminals for coin payment must be properly aligned vertically because the function of the anti-pin module and the coin verifier may be interrupted if the terminal leans more than a couple of degrees in any direction.

Figure 36, Base anchor 0403-B0122.

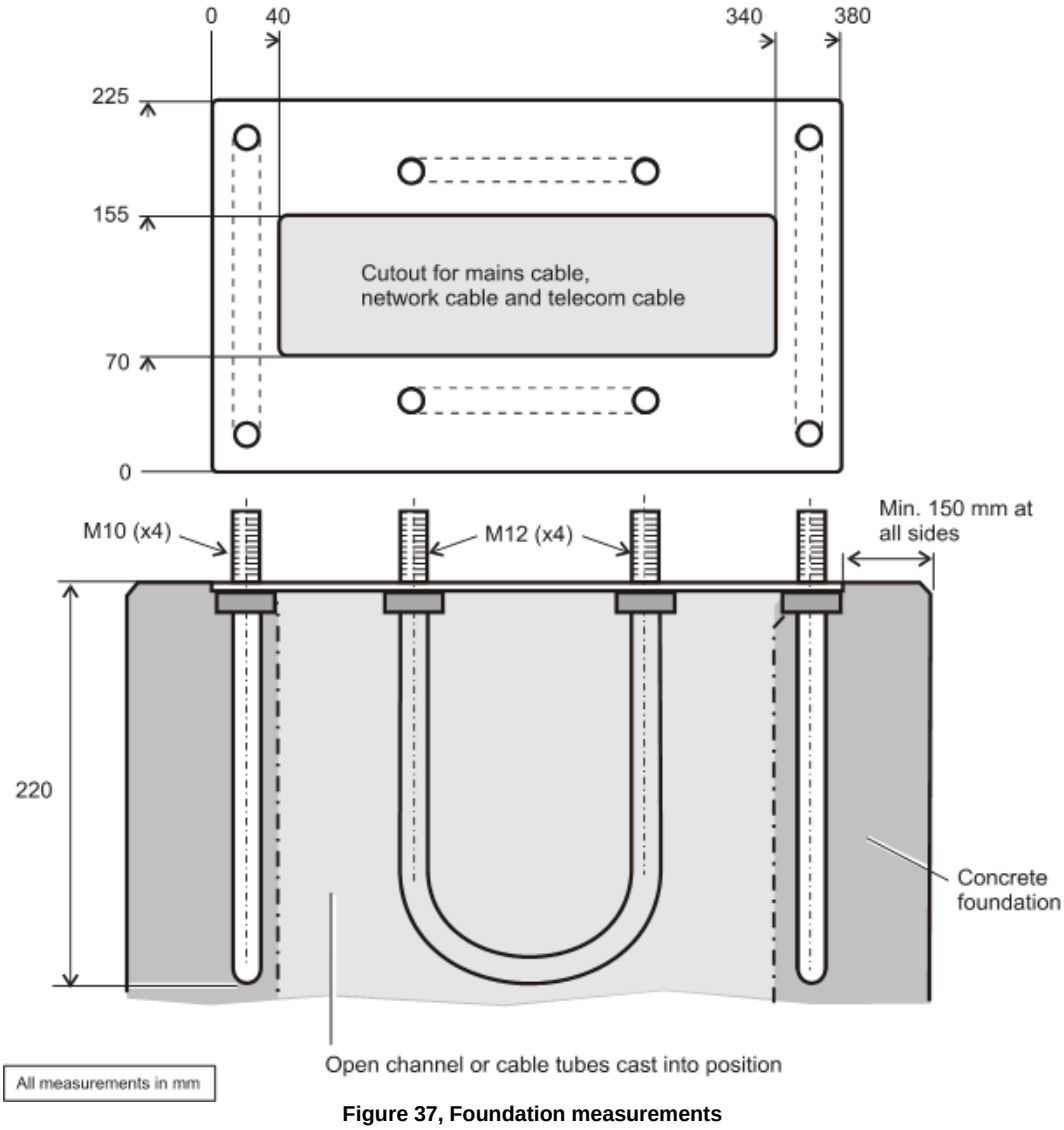


Figure 37, Foundation measurements

If the terminal should be connected to the grid power supply, a duct must be cast in the concrete foundation so that the cable can be routed in through the bottom of the pedestal. You can cast an approved type of plastic or steel pipe, according to local regulations.

Danger:
Follow local regulations regarding electrical installations.

5.1.5 Power supply

Danger:
Only qualified personnel may carry out electrical installation. Follow all local regulations.

Unless otherwise agreed, the customer is responsible for providing an appropriate 12V battery. For CWT Compact terminals connected to the grid power supply, a battery capacity of 17 Ah is required. Terminals equipped with a solar cell panel require at least 45 Ah.

The customer is responsible for installing cables for terminals that will use the grid power supply. When delivered, terminals are ready to be connected to the power supply used at the installation site. It is up to the customer to ensure that the correct type of battery charger and fuses are used.

Note:
The maximum total power consumption depends on the configuration of the terminal.

5.2 Installing the terminal

Due to its heavy weight the terminal is usually transported in two pieces to the installation site where the pedestal is secured to a concrete base or floor before the cabinet is mounted on top of the pedestal.

Provided there is an appropriate lifting device or a hand cart at hand, the entire terminal can be installed as a complete unit.

5.2.1 Mounting the pedestal in its foundation

WARNING:
Lifting the pedestal, the cabinet, or the complete terminal, requires two or three persons due to the heavy weights.

WARNING:
Before the terminal has been secured to the foundation, there is a risk of the terminal tipping forward, especially when you open the cabinet door.

- Place the terminal at the site that has been prepared. see Site preparations for instructions.
- Fasten the terminal with 4–8 expansion screws or mount the terminal on an existing base anchor or similar using the appropriate nuts and washers.

Important:
The function of the coin system and the water drainage (door shelf) may be interrupted if the terminal leans more than a couple of degrees in any direction.

5.2.2 Mounting the cabinet on top of the pedestal

- Remove the 4 screws fixing the protective plate at the top of the pedestal. The screws will be used to secure the cabinet onto the pedestal.
- Carefully place the cabinet on top of the pedestal.
- Secure the cabinet to the pedestal with the four screws as mentioned above.
- Thread the unconnected cables up into the cabinet or down into the pedestal.

5.2.3 Installing the battery

Place the battery on the floor in the bottom of the pedestal.

Important:
The RED coloured lead must be attached to the PLUS pole on the battery. Connecting with wrong polarity will blow one or more fuses on the CPU board and will result in unrepairable damages to the Main board.

in a mains-powered terminal

Connect the battery to the 12 V distribution panel on the battery charger to the connector marked

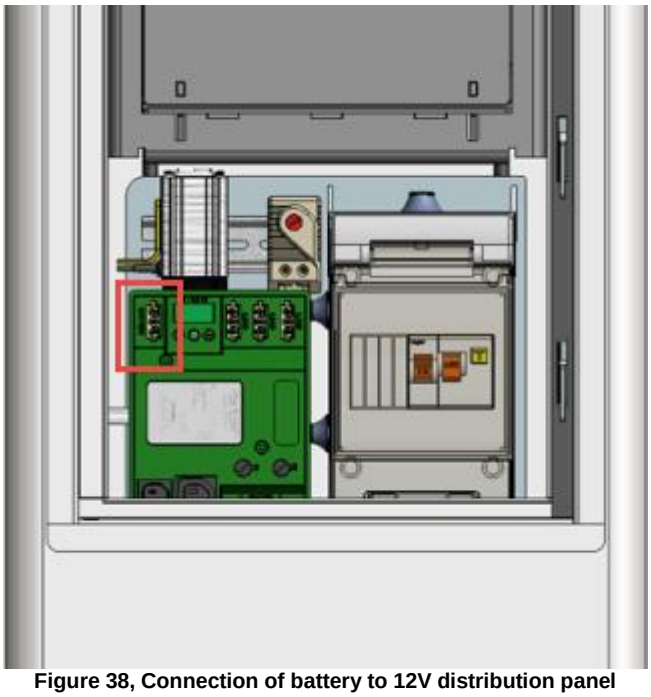
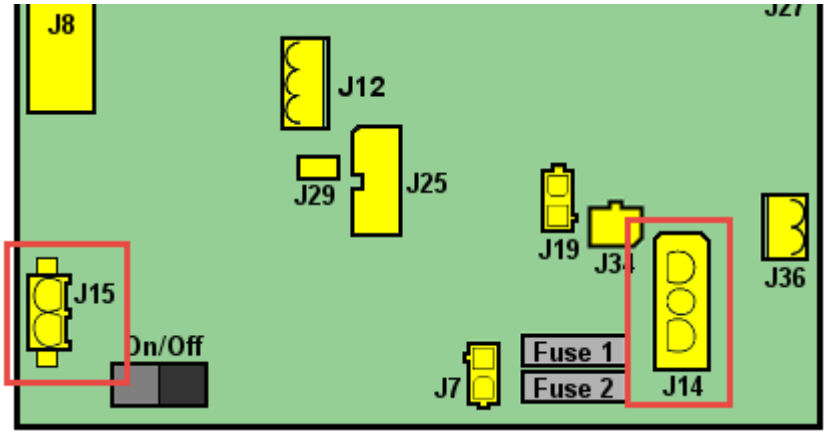


Figure 38, Connection of battery to 12V distribution panel

in a solar or battery-only powered terminal

Connect the 12 V supply cable from connectors J5 and J14 on the CPU board to the battery.



5.2.4 Connecting to the mains power grid

Connect the incoming power cable to the terminal block (automatic residual current device or fuse socket) in the pedestal (design may vary due to customer requirements). See Installing the battery.

Secure the cable using the strain relieving clamp. See Figure below.

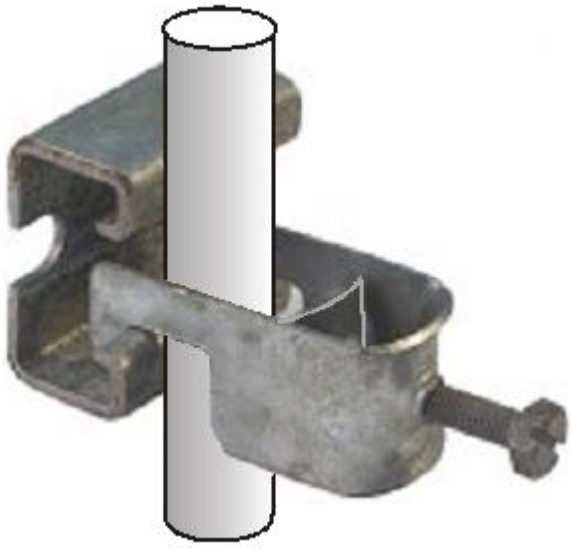


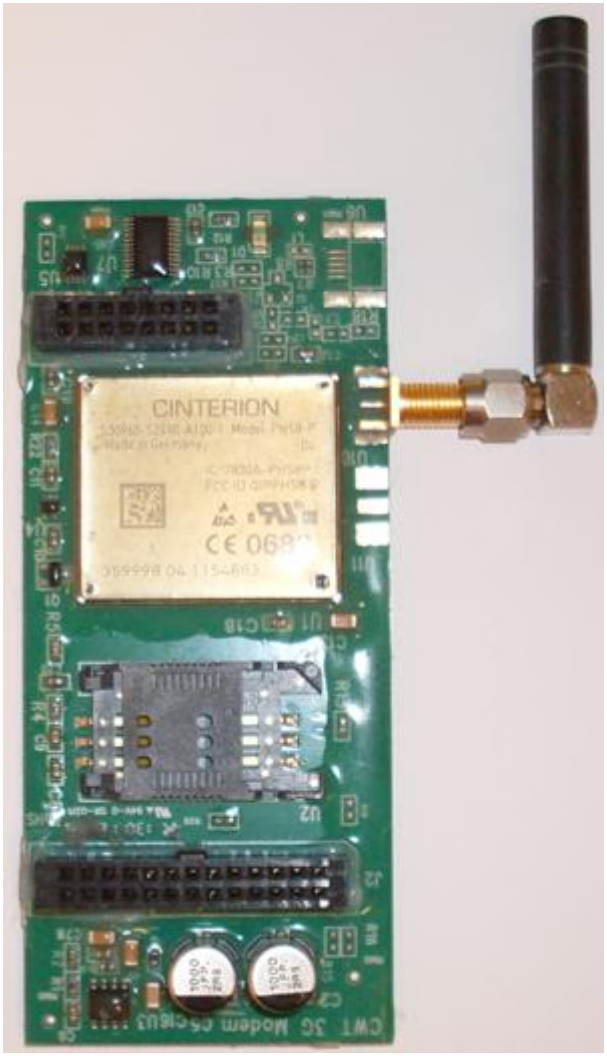
Figure 39, Power cable strain relieving clamp

5.2.5 Installing a modem

The end customer is entirely responsible for the set up and function of the modem communication unless otherwise is agreed upon in writing with the Cale representative.

Parts required

- Cale modem 3G expansion board part number 0501-E0051
- SIM-card with subscription to data communication service.
- Cale antenna 0040-07115 GSM/GPRS/3G antenna.
- Self-adhesive label with subscription telephone number / SIM card number.
- Self-adhesive Cable camps.



1. Open the SIM card holder on the expansion board and insert the SIM card with the card's cut-off corner positioned as shown in Figure below.

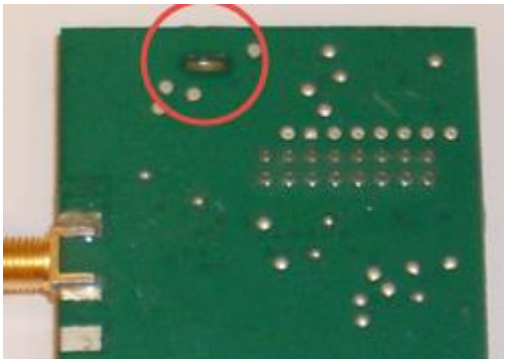
2. Close the SIM card holder and mount the expansion board on the CPU board on connectors J3 and J31. See CPU board version 0501-E0150 Rev H.
3. Connect the antenna cable to the connector on the expansion board.
4. Write the subscription telephone number / SIM card number on the label and attach the label, fully legible, inside the cabinet, not on the modem itself because it might be necessary to replace the modem some time.

5.2.5.1 Checking modem contact with network provider

To check the connection:

1. Switch ON the terminal.
2. Check the LED status indicators on the modem.

LED Status indicator



The LED indicator is located on the top of the expansion board and visible when mounted on the main board.

RED Registered in the GSM network. Should always be ON.

YELLOW Connected to the GPRS network. Should always be ON.

GREEN Connected to GPRS network and ready to communicate with the CWO gateway.

The LED will be turned off when the modem it powered off. If no LED is lit and the modem is powered on the SIM is not valid or an incorrect PIN code has been entered in the terminal configuration.

Blinking pattern

10 ms on / 1990 ms off Modem has an active PPP-connection (GPRS and UMTS) and is ready to communicate.

10 ms on / 3990 ms off Modem registered to a network. No call, no data transfer active.

500ms on / 500 ms off Limited Network Service (e.g. because no SIM, no PIN or during network search)

5.2.6 Loading paper in a GeBe printer

Note:
The maximum diameter of the paper role is 200 mm

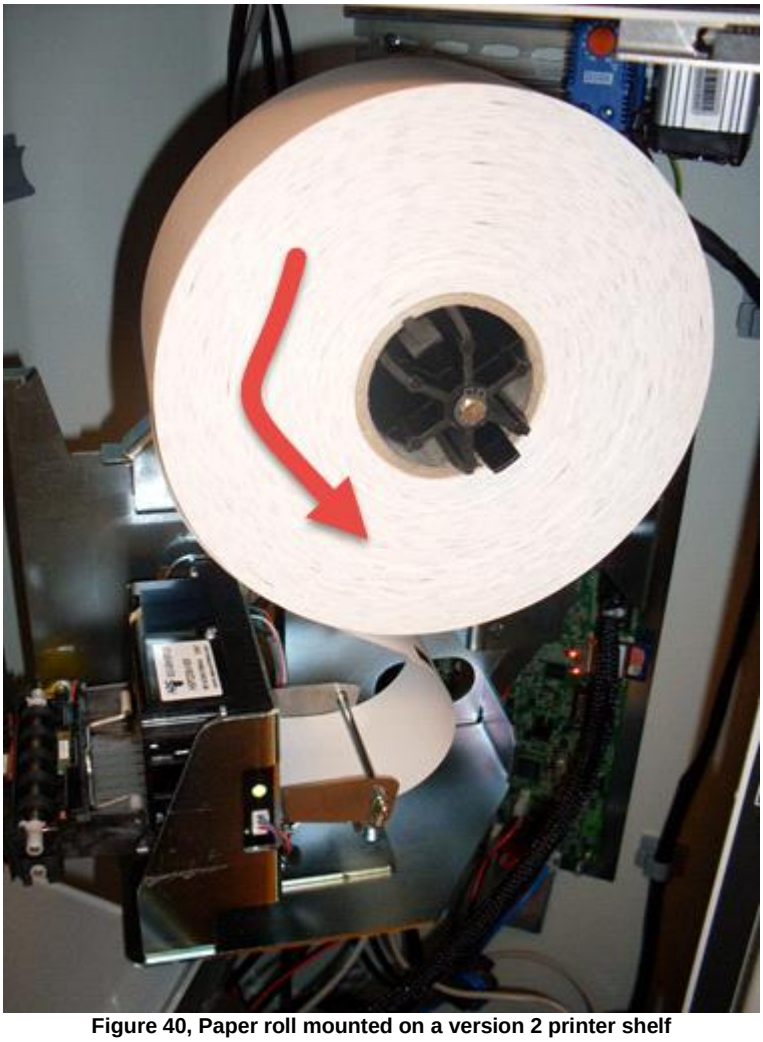


Figure 40, Paper roll mounted on a version 2 printer shelf

1. Remove about 0.7 m of the paper from a new roll to ensure there is no glue residue left.
2. Swivel the printer module by pulling the locking hatch while moving the module to the right.
3. Orient the roll so the paper leaves the roll from the front and downwards. The temperature-sensitive layer should face toward the front of the terminal.

4. Put the roll onto the roll hub. Make sure the role clicks in place to prevent it dropping off during operation
5. Let the terminal boot up in service mode (leaving the upper door open and bottom door closed).

Note:
The printer and paper role shelf may differ from model to model.

5.2.7 Installing the coin box

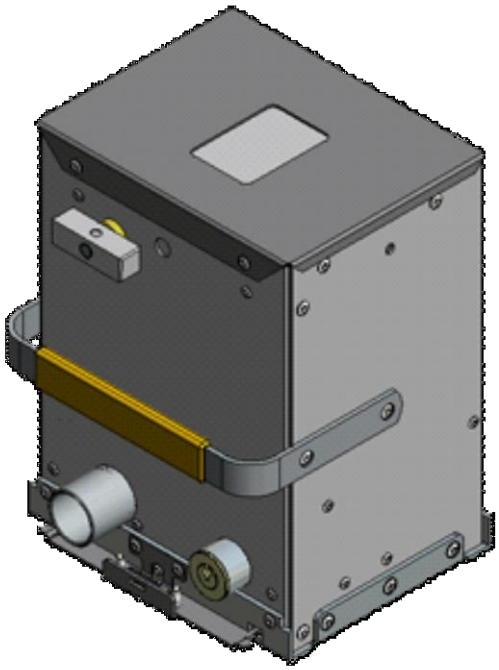


Figure 41, Coin box

1. Open the vault door with the appropriate key.
2. Insert the coin box
3. Turn the opening knob a quarter turn counter clockwise into vertical position. This will lock the box into position in the pedestal and open the collection hatch on top of the box.

Important
if the knob is now returned to the horizontal position, the box must be emptied before the knob can be returned to the correct position. The vault door cannot be closed while the knob is in the horizontal position.

4. Close the vault door and lock it.

5.3 Program loading

Usually, a CWT Compact terminal comes complete with the appropriate application software and settings.

The CWT application software itself is subject to continuous improvements which means that all CWT terminals will benefit from being updated now and then.

It may also be necessary to update AVR firmwares when the CWT application and Operating System (OS) have been updated, see more in the CWT Software Configuration Handbook.

Finally, it might be that the operating system (Windows CE or EC7) needs to be updated.

5.4 Changing the settings of the terminal

Sometimes, a terminal's application software settings need to be adapted to meet new functional requirements. There are some alternative ways to change software parameters, etc. See the CWT Software Configuration Handbook.

6 DAILY OPERATION

Depending on the configuration some actions must be performed one regular base

- Changing and emptying the coin box
- Paper refill

Next to these actions, you must perform regular preventive to prevent doing corrective maintenance.

- Preventive maintenance describe the action to keep the terminal in good shape.
- Corrective maintenance describes the repair and replacement of part you can fix yourself

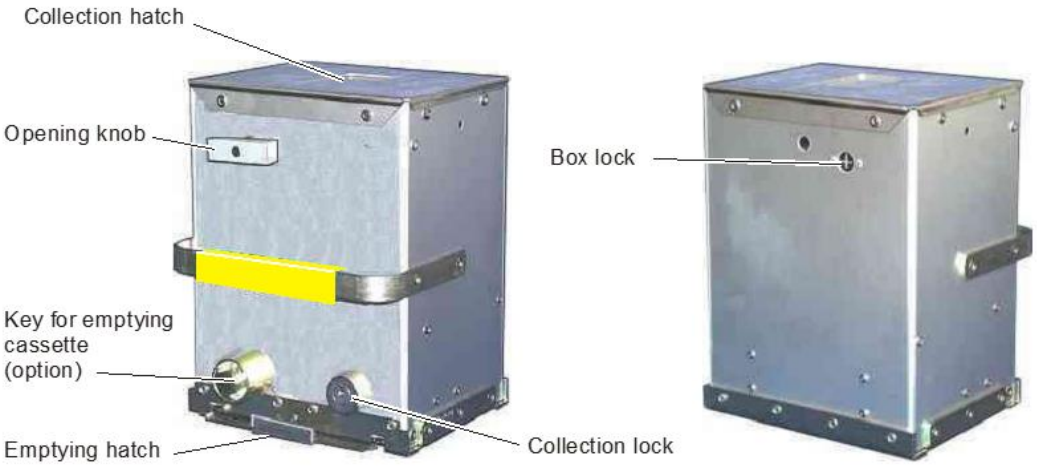
Depending on your configuration the CWT software must be updated to e.g. implement new tariffs or implement new features.

Most of these actions can be done using the CWO application

- changing the CWT Compact software and firmware

6.1 Changing and emptying the coin box

To empty the coin box, follow the 3 steps described below



6.1.1 Removing the coin box

1. Open the vault door with the appropriate key.

2. Turn the opening knob clockwise to the horizontal position. This closes the collection hatch and releases a catch that holds the box in position in the vault.
3. Pull the coin box out. A collection ticket will be printed.

Warning:
The coin box may be heavy depending on the amount of coins in it

6.1.2 Emptying the coin box

1. Turn the collection lock clockwise with the appropriate key. The same key combination is usually used for all coin boxes.
2. Pull the emptying hatch out completely. This will empty the box of its contents and activate the internal mechanism.
3. Push the emptying hatch in. The hatch can be pushed back in only if it has previously been pulled out completely.
4. Turn the collection lock counter clockwise and remove the key.

6.1.3 Inserting the coin box

1. Insert an empty coin box.
2. Turn the opening knob counter clockwise to its vertical position. This locks the box into position in the vault and opens the collection hatch.

Important:
If the knob is accidentally turned to the horizontal position at this point, the box must be emptied as described in section 2 above before the knob can be returned to the correct position.

3. Close the vault door. The opening knob must be in the vertical position for the door to be closed.

6.2 Paper refill

Raise the print head and remove the remaining paper, if any.

Install new paper roll as described in section Loading paper in a GeBe printer.

7 PREVENTIVE MAINTENANCE

This chapter primarily describes preventive maintenance activities. How often these activities need to be carried out depends, to a large extent, on the conditions of the area where the ticket terminals have been installed. The thermal head, for instance, must be cleaned more frequently if the surrounding air contains a high concentration of diesel exhaust fumes.

Note:
Spare part numbers can be found on the exploded view drawings of each models.

7.1 Batteries

7.1.1 Battery levels

The CWT C can send battery measurements of the battery voltage to Cale WebOffice for monitoring.

The CWT will send the battery voltage measured during regular intervals to CWO

The warning and error levels can be set but are default set to:

- Warning = 11.9 V
- Error = 11.5 V

When the CWT has sent a warning; e.g. due to a power down; the terminal will send a recovery event to CWO when the battery is charged to its normal level again.

If a Warning is sent and no recovery event is sent within a day, it may be time to change the battery

Note:
The gel type, lead-acid battery supplied by Cale is maintenance free but will wear out over time.
Verify on a regular base if the contacts are not corroded. If so the battery and the cable should be replaced as soon as possible.

Mains-powered terminal

The battery needs replacement if the yellow light on the charger on a mains-powered terminal remains lit even after a longer charging time.

7.1.2 Lead accumulators

Follow normal procedures for the handling of lead accumulators. Instructions are usually available from the battery supplier.

Follow local regulations for the disposal of replaced batteries. Used batteries should be returned for recycling if required according to local laws and regulations.

Note:
The gel type, lead-acid battery supplied by Cale is maintenance free.
Verify on a regular base if the contacts are not corroded. If so the battery and the cable should be replaced as soon as possible.

7.1.3 Battery on CPU board

In some cases, the back-up batteries on the CPU boards are causing malfunctions (real-time clock instability, memory loss). This is caused by bad contact between the contact springs of the battery holder and the coin cell battery.

Caution:
It is very important that the battery is of an approved brand (Duracell, Eveready, Panasonic, Ray-O-Vac, Sanyo, Varta, Toshiba, Seiko or another major battery manufacturer) and that it is kept clean. Oils from fingers (i.e. fingerprints) may together with humidity and time cause problems. Such dirt may just as well be deposited on the underside of the positive contact spring, if a dirty battery has been mounted in the holder.

As the holder is made from a material impervious to most industrial solvents, you may use almost any cleaning solvent at hand (isopropyl alcohol is recommended). Cale recommends wearing cotton or latex gloves when replacing batteries in order to prevent fingerprints on the battery surfaces. It is also recommended to inspect the positive spring contact to establish that it has not been bent upwards to such an extent that the pushing force has been affected, even as it is made out of spring steel.

To prevent excessive bending of the positive contact spring, Cale recommends using of a pair of plastic (or otherwise insulated) pliers when mounting new batteries. The coin cell should be pushed in such that the cell is in contact with

the plastic housing of the battery holder, not bending the positive contact spring upwards more than necessary.

The CPU board contains a lithium battery (button cell) that should be returned for recycling if required according to local laws and regulations. The battery (CR2032, 3 V, 210 mAh, 20 mm diameter) supplies backup voltage to the real-time clock in case of interrupted power supply from the 12 V batteries.

Important:
To ensure uninterrupted terminal operation; replace the battery every 5 years.

Warning:
Lithium batteries can be dangerous because they can explode if short-circuited. Handle batteries in accordance with local laws and regulations.

7.2 GeBe Printer GTP4672

7.2.1 Print head

The print head and the black mark sensor can be access by dismounting the printer from its casing when installed on the printer shelf version 1.

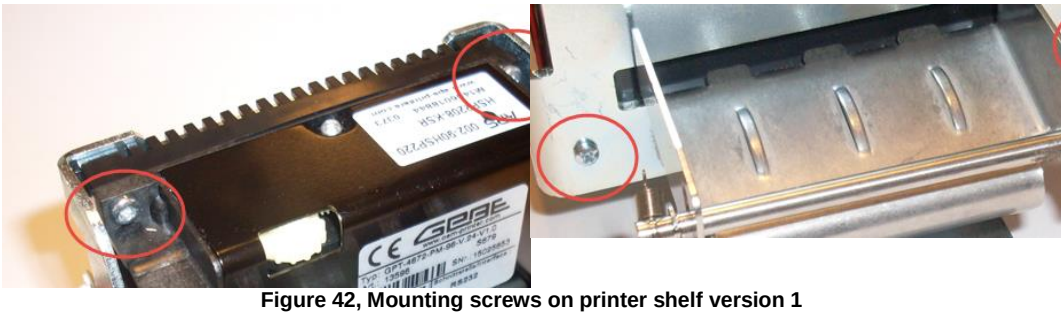
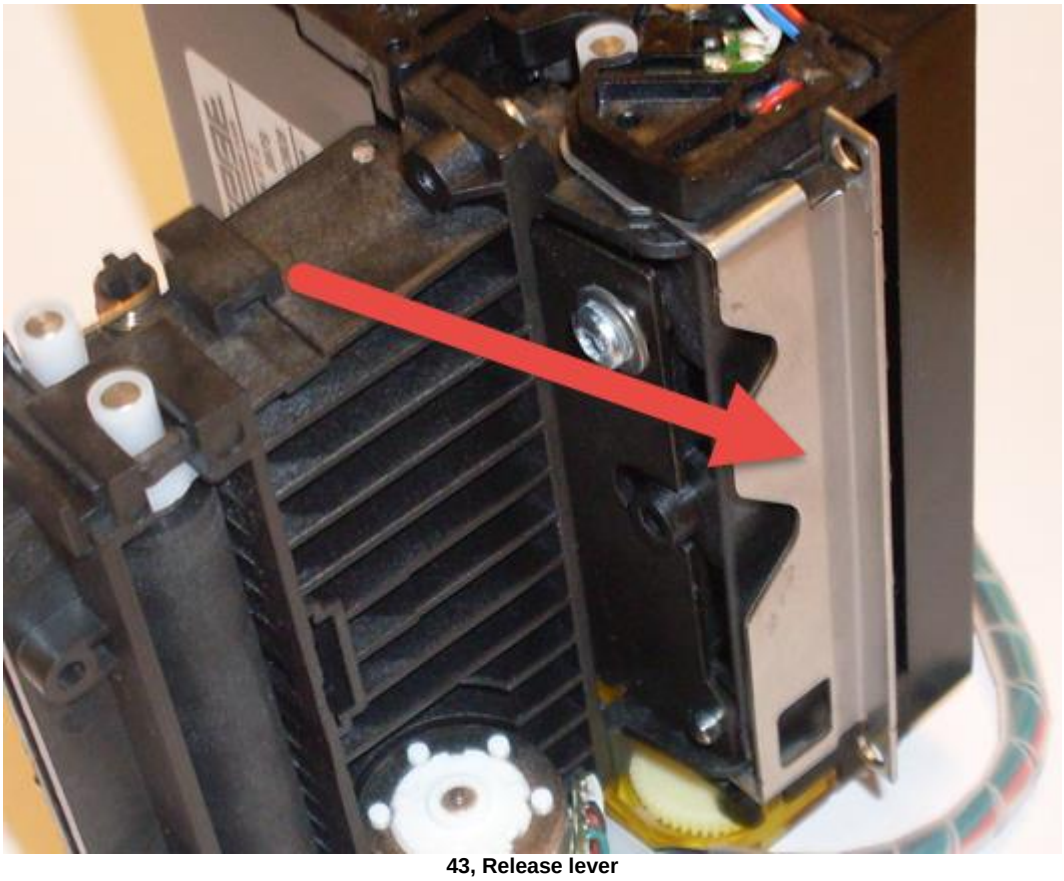


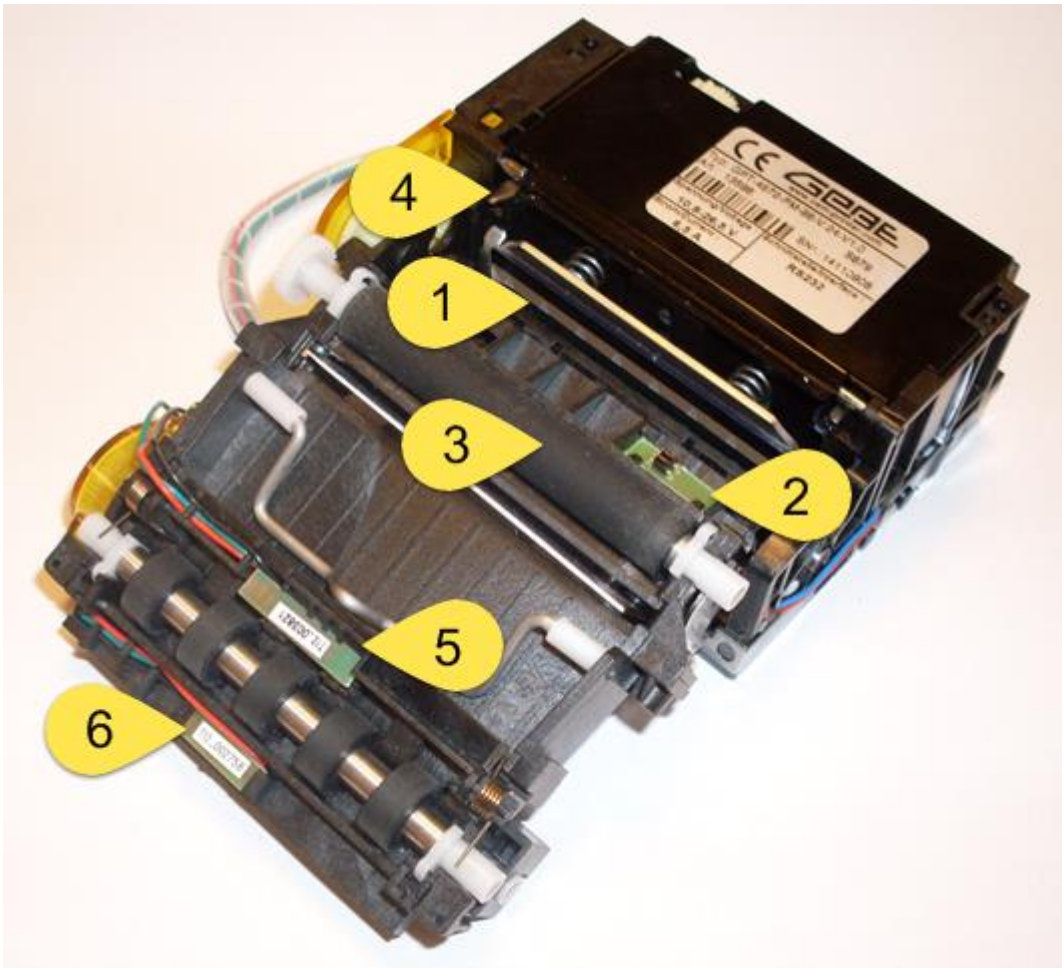
Figure 42, Mounting screws on printer shelf version 1

Remove the 4 screws from the top front of the printer and the bottom back of the casing

Pull the metal lever to release the Ticket Presenter



43, Release lever



44, Printer in opened state

1. Print head
2. Black mark sensor
3. Pressure roll
4. Cutting knife
5. Presenter sensor
6. Document exit sensor

The print head consists of a ceramic plate with a large number of heated points positioned in a line perpendicular to the feed direction of the paper. When a point is heated, it warms the heat-sensitive top layer of the paper to a temperature above 70 °C which develops a black or blue dot (depends on the type of paper used).

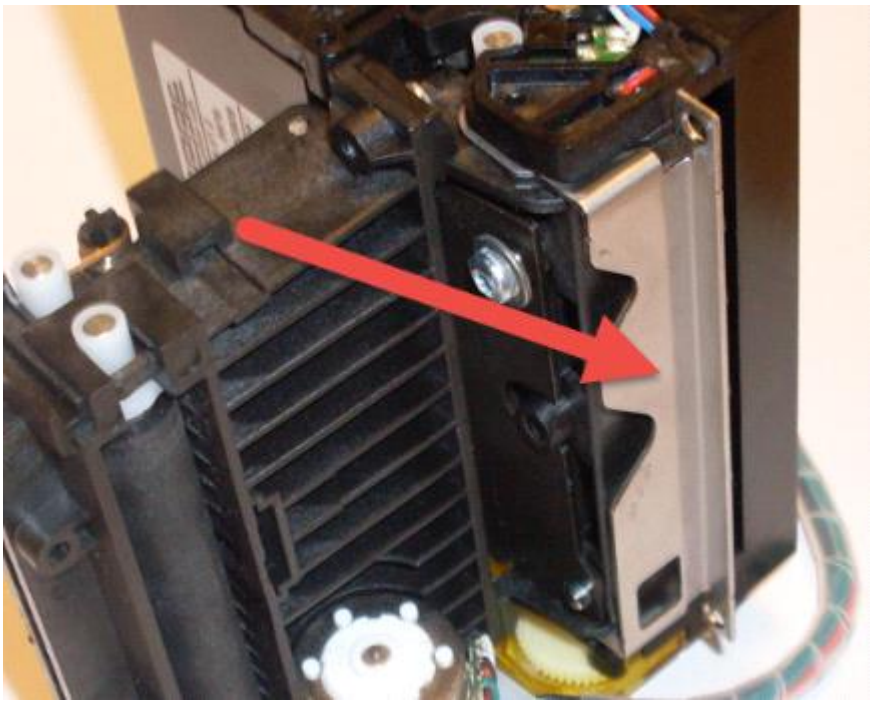
Print speed, number of burn pulses and burn time can be adjusted for optimal print result. See *CWT Software Configuration Handbook*.

7.2.2 Cleaning

Visible paper dust should be blown off regularly (at least once per year), especially from the black mark and paper-out opto-sensors.

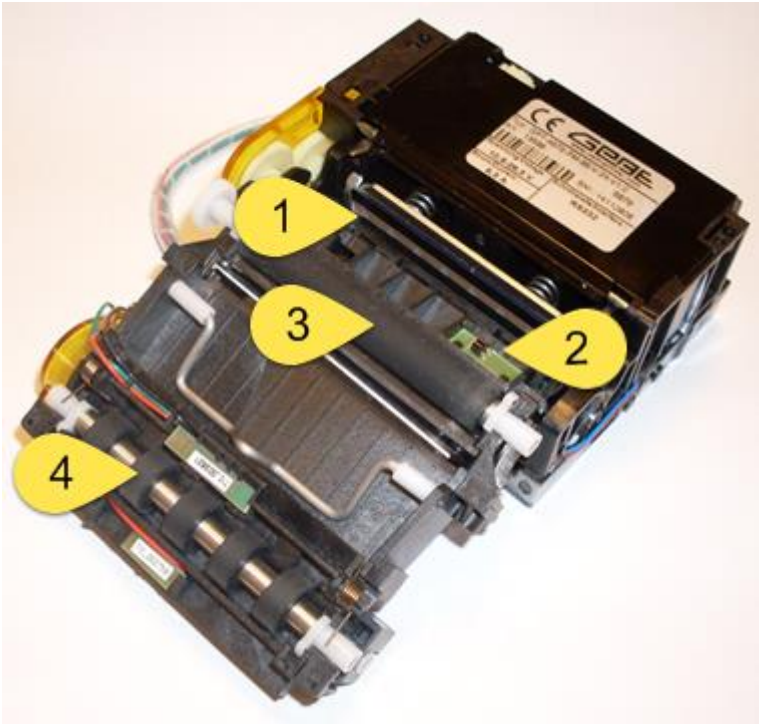
Caution:
Deposits accumulating on the row of heating points on the print head will negatively affect the thermal head's cooling which might damage or destroy the print head.

The transportation rolls must be cleaned regularly. The frequency of cleaning depends on factors such as paper quality, the type of pre-printing on the tickets, and the degree of air pollution.



1. Pull the metal lever to release the Ticket Presenter
2. Moisten a lint free piece of cloth (non-woven textile is recommended) or a piece of paper with platen cleaner solvent usually available on the market.
3. Wipe off the presenter feed rolls A and B

To clean the printer, disconnect and dismount the printer from the module and from its casing. Open the printer using the leaver on the bottom of the printer. See Print head for detailed figures



45, Cleaning points inside the printer

4. Use an air blower to remove dirt and small paper particles inside the printer.
5. Check that the black mark/paper out (2) sensor is clean.
6. Moisten a lint free piece of cloth (non-woven textile is recommended) or a piece of paper with platen cleaner solvent usually available on the market.
7. Wipe off the presenter feed rolls (3 and 4) while rotating them. Ensure that there are no paper particles left.
8. Wipe off the row of heating points (1) on the print head using isopropyl alcohol.
9. Re-mount the printer in its casing and on the mounting plate.

7.2.3 Testing

1. With paper loaded, press the Feed button immediately after closing the print head. This produces a self-test printout.
2. The printer exits self-test mode and goes on-line.

7.3 Coin handling unit

7.3.1 Cleaning

Get into the habit of regularly checking (once or twice per year) for foreign matter in the various parts of the coin unit.

Important:
Use isopropyl alcohol for cleaning. If another solvent is required, test it first to make sure it does not cause any damage.

7.3.2 Testing

The function of the coin unit should be checked regularly, for instance when refilling the ticket paper. Select Utilities / Test purchase mode in the service menu and make test purchases with all the applicable coin types.

7.4 Card readers

7.4.1 Chip-card reader

7.4.1.1 Cleaning

The magstripe read head and the Chip reader sensor in this device needs regular cleaning using commercially available cleaning cards for Chip card readers.

7.4.1.2 Testing

Test the function of the card reader regularly by making test purchases with a Cale test card.

7.4.2 Hybrid card reader

7.4.2.1 Cleaning

The magstripe read head in this device needs regular cleaning using commercially available cleaning cards for magstripe card readers.

7.4.2.2 Testing

Test the function of the card reader regularly by making test purchases with a Cale test card.

7.5 Display module

This section is about cleaning of the outmost surface of the display modules. Cleaning the polycarbonate plastic display window in the cabinet door is described in section Cabinet door display window, cleaning.

Caution:
Do not apply excessive force to the display surface or the adjoining areas since this may cause the colour tone to vary. Don't touch, push or rub the exposed polarizer covering the display surface of the LCD module with anything harder than an HB pencil lead. The polarizer is soft and easily scratched. Handle it carefully. Don't put or attach anything on the display area to avoid marks.

If the display surface is contaminated or dusty, gently wipe it with a soft dry cloth. To avoid damaging the surface do not scrub hard. If still not completely clear, moisten a cloth with isopropyl alcohol or ethyl alcohol.

Solvents other than those mentioned above may damage the polarizer. Especially, do not use water, ketones such as acetone, or aromatic solvents.

Immediately wipe off any drops of adhesives like saliva and water from the display surface. They might otherwise cause panel surface variations and color change.

7.6 Cabinet door display window

Clean the outside using a very soft cloth such as the type used for cleaning glasses. Moisten with mild cleaning detergent solution. The rear side of the window is more sensitive than the outside and should be cleaned with great care.

Important:
Do not forget to clean the glass in front of the warning/error indicator and the ambient light sensor. If the light sensor is obstructed, this can increase the power consumption of the terminal.

7.7 Cabinet

7.7.1 Cleaning

Clean the exterior of the metal cabinet surfaces using petroleum spirits (white spirit) or a mild cleaning solution.

- See Section Cabinet door display window, cleaning, regarding cleaning of the display window in the cabinet door.
- See Section Solar panel, cleaning, regarding cleaning of the solar panel.

7.7.2 Lubrication

Lubricate the lock cylinders with *Kaba-Clean spray* or an equivalent lubricant. The autumn is a good time to do this.

Check the friction in the hinge pins of the doors. Lubricate if necessary with a lubricant such as Moebius 8200.

Caution:
Thin lubricants such as CRC 556 must not be used.

7.8 Solar panel

7.8.1 cleaning

High efficiency of the solar panel requires that the panel is cleaned free from foreign objects such as dust, sand, leaves, excrements from birds, snow, ice, etc.

Regular checking of the solar panel is recommended.

When cleaning the panel, first remove dust and other lose particles by blowing or using a soft brush. If necessary, clean the panel using a soft cloth moistened with a mild detergent solution

Note:
When removing snow or ice, do not use metal objects because they can scratch the panel surface which reduces the panel's efficiency. A plastic ice scrape is recommended.

8 CORRECTIVE MAINTENANCE

Caution:
The terminal must be switched OFF when you disconnect or connect cables inside the terminal. An exception is USB cables and USB devices that can be connected and disconnected without switching OFF the terminal.

In this chapter:

- Lead battery replacement
- Printer replacement
- Coin unit replacement
- Coin verifier replacement
- Card reader replacement
-
- Keyboard replacement
- Cabinet & pedestal
- CPU board lithium cell replacement

8.1 Lead battery replacement

For replacement of the on-board battery see Batteries

8.1.1 Replacing the battery

To replace the battery, follow the steps below:

1. Shut down the external power supply if any.
2. Lift out the battery from the pedestal. Be careful to not short-cut the contacts.
3. Unscrew the cable.
4. Connect the cable to the new battery. Make sure the red wire is connected to the [+] pole
5. Place the new battery in the pedestal
6. reconnect the external power

8.2 CPU board lithium cell replacement

Warning:
Lithium batteries can be dangerous because they can explode if short-circuited. Handle batteries according to local laws and regulations.

8.2.1 Removal

Carefully lift the battery holder tongue a little when you remove the battery cell.

Warning:
Avoid using conductive objects due to the risk of short circuiting the battery.

8.2.2 Assembly

Install in reverse order.

8.3 Printer replacement

8.3.1 Gebe GTP4672 replacement

No specific actions needed

See Printer mounting for instruction how to dismount and mount the printer

- Remove any paper left in the printer
- disconnect all the cables
- unlock and lift of the printer shelf
- dismount the printer from its shell
- replace the new printer in reversed order

8.4 Coin unit replacement

8.4.1 Removal

1. Disconnect all cables from the coin unit. The number of cables depends on the terminal model and configuration.
2. Unscrew the two screw nuts, one on each side of the Coin Return opening.

3. Remove the coin unit.

Install in reverse order. Keep the assembly pressed down while tightening the screws.

8.5 Coin verifier replacement

8.5.1 Removal

1. Ensure that there is sufficient free length of the verifier cable. Loosen more of the cable from the cable clamp if necessary.
2. Keep the locking latch pulled out while you lower the coin verifier a bit and remove it.
3. Disconnect the cable at the back of the verifier.

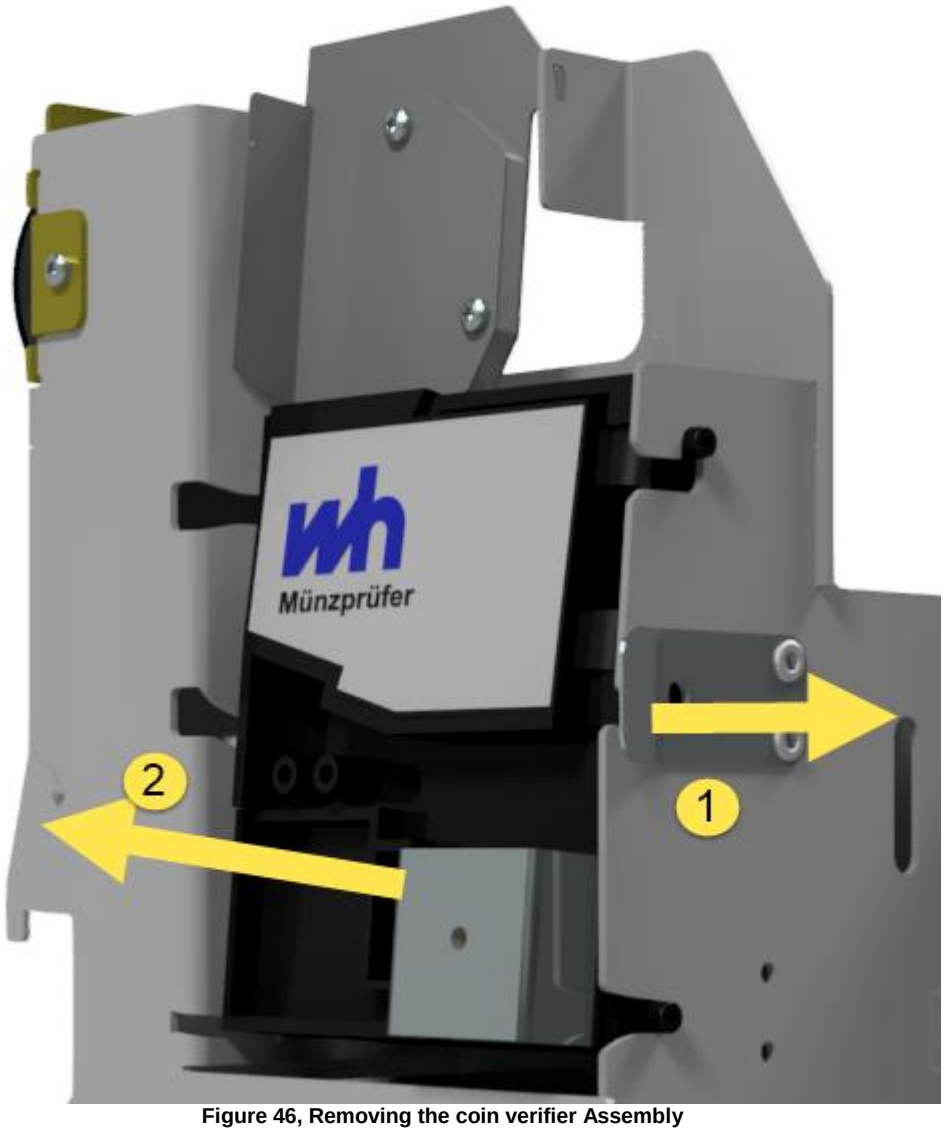


Figure 46, Removing the coin verifier Assembly

Install in reverse order.

8.6 Card reader replacement

Replacing the card reader depends on the model installed.

8.6.1 Chip Card Reader

Chip card readers are often equipped with tamper switches on both the card reader and pin pad. Partly unscrewing the reader may already trigger the tamper switch making the reader useless. If this is the case, the reader must be sent back to the supplier to reset the switch.

Reference:
How to safely dismount and mount a reader is described in the reader's installation guide: e.g. 3C XENTEO ECO Mounting instructions CWT C with CPU board 0501-E0150

8.6.2 MagStripe readers

- Disconnect the cable
- Unscrew the reader
- Mount the new reader
- Connect the cable

8.7 Display Module replacement

CWTC S4 Touch Display Panel gives an exploded view drawing of the touch panel without the display unit.

CWTC S4 Touch Display unit gives an exploded view drawing of the display unit itself.

The display module consists of the following parts:

1. Display Unit
2. Connector for the Display cable.
3. Connectors for the touch panel.

4. Touch panel mounting
5. Controller unit
6. Controller connector to main board

To dismount the Display Unit

- disconnect the Display Cable nr (1) from the main board.
- loosen the nuts in the red circles.
- lift of the display unit upwards.

We do not recommend to open the display unit as the internal construction is very sensitive.

Mount the new display unit in reverse order.

Connect the display unit cable to the main board. see Connecting the display to the CPU board.

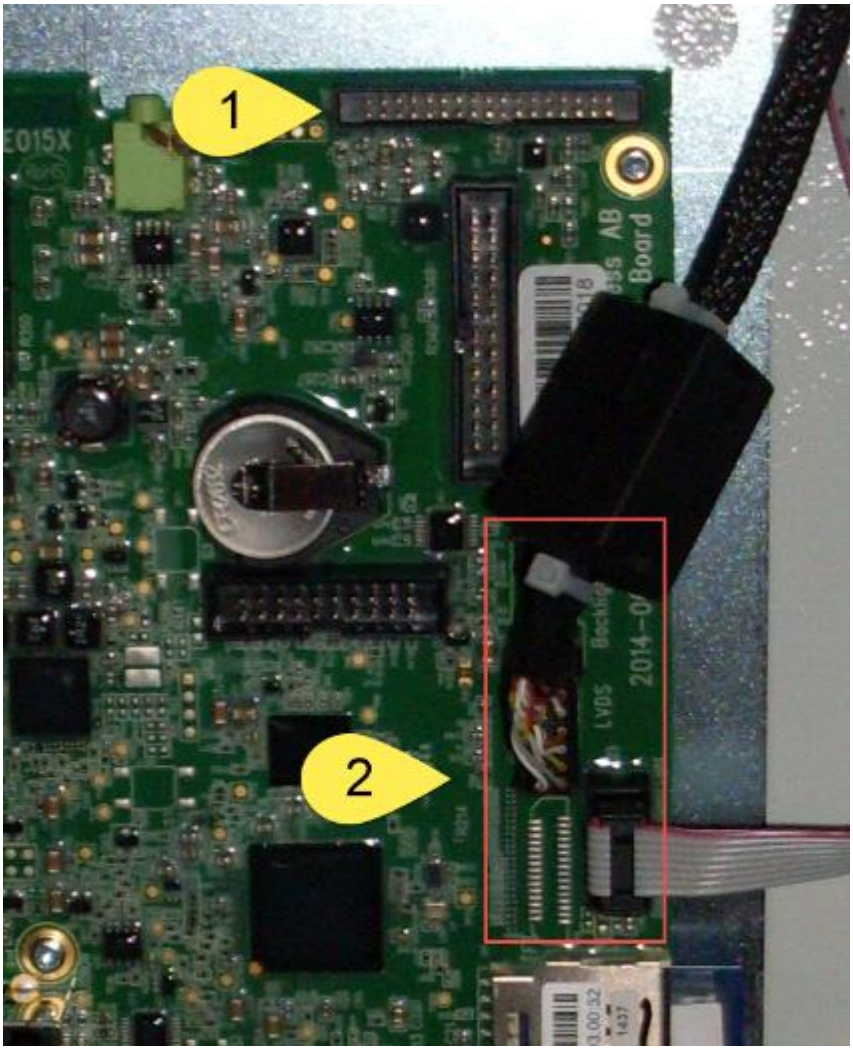
To dismount the Touch panel:

- Disconnect the 2 flat cables nr (2) from the controller unit. Be careful as these cables are fragile.
- unscrew the nuts in the green circles.
- lift of the frame that holds the touch panel in place.
- lift out the touch panel. You may need to apply some force as the gasket sits very tight.

When mounting a touch panel:

1. clear of any remaining gasket from frame.
2. Apply a new gasket to the touch panel.
3. mount the panel in the frame.
4. mount the frame that holds the touch panel in place.
5. fasten the nuts until the gasket is pressed to against the frame completely .
6. reconnect the cables to the controller. Be careful as these cables are fragile.

8.7.1 Connecting the display to the CPU board



The display must be connected to the CPU board in different locations depending on the type of the display.

1. Display connector
2. Touch Screen Connector
3. Status indicator

8.8 Cabinet & pedestal

8.8.1 Cabinet and pedestal lacquer, touching up

Cale Access AB provides kits including touch-up paint (3 x 0.3 litres), sandpaper and instructions. When ordering, please state the article number and the colour number (usually a RAL number) indicated on labels inside the cabinet and pedestal.

8.8.2 Cabinet & pedestal door replacement

The door is fastened to the cabinet with an upper and a lower hinge pin. A spring helps pressing the pins into corresponding holes in the cabinet.

Note:
The procedure for the pedestal is the same as for the cabinet door replacement

8.8.2.1 Removal

Caution:
The weight of the door is approximately 15 kg.

1. Turn OFF the ticket terminal.
2. Disconnect all cables running between the door and the cabinet.
3. Ensure that the upper hinge pin's locking screw (2 mm Allen key) is tightened.
4. Hold the door with a steady grip.
5. Loosen the lower hinge pin's locking screw (2 mm Allen key) and push the screw with the attached hinge pin up and out of grip with the cabinet. Lock the hinge pin in this upper position.
6. Carefully pull the lower end of the door out and then lower the door to disengage the upper hinge pin from the cabinet.

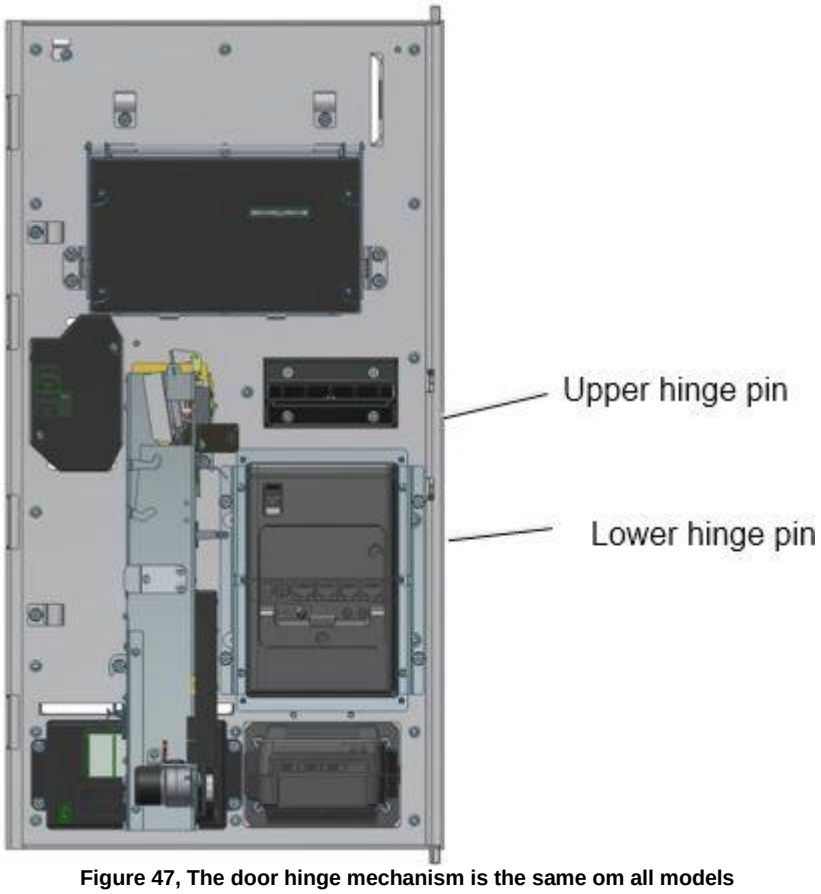


Figure 47, The door hinge mechanism is the same om all models

8.8.2.2 Assembly

Follow the directions above in reverse order.

Important:
Loosen the lower hinge pin's locking screw to let the hinge pin enter the corresponding hole in the cabinet.

8.8.3 E-lock replacement

8.8.3.1 Removal

1. Disconnect the cables from the E-lock.
2. Remove four nuts and remove the E-lock. A small box spanner (10 mm) is required to remove the lower E-lock due to limited space.

8.8.3.2 Assembly

Ensure that the dowel pin (see arrow) mates with the locking latches.

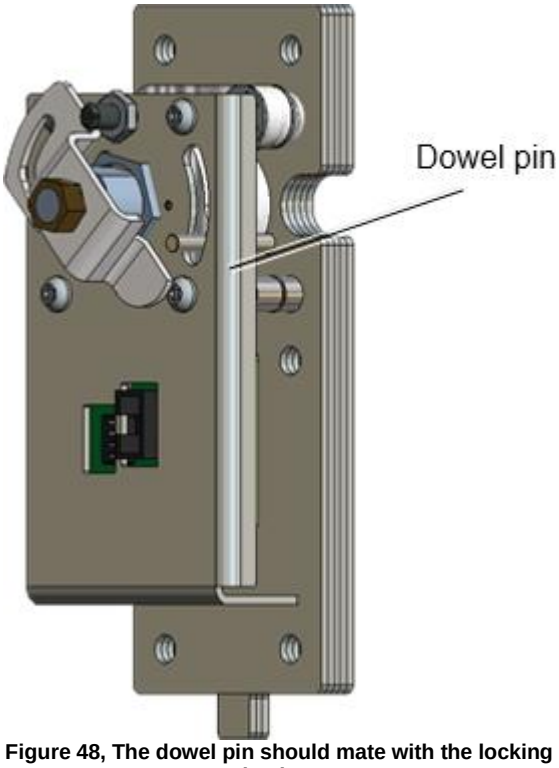


Figure 48, The dowel pin should mate with the locking latches

Check that the DIP switch setting corresponds to the E-lock position in the terminal.

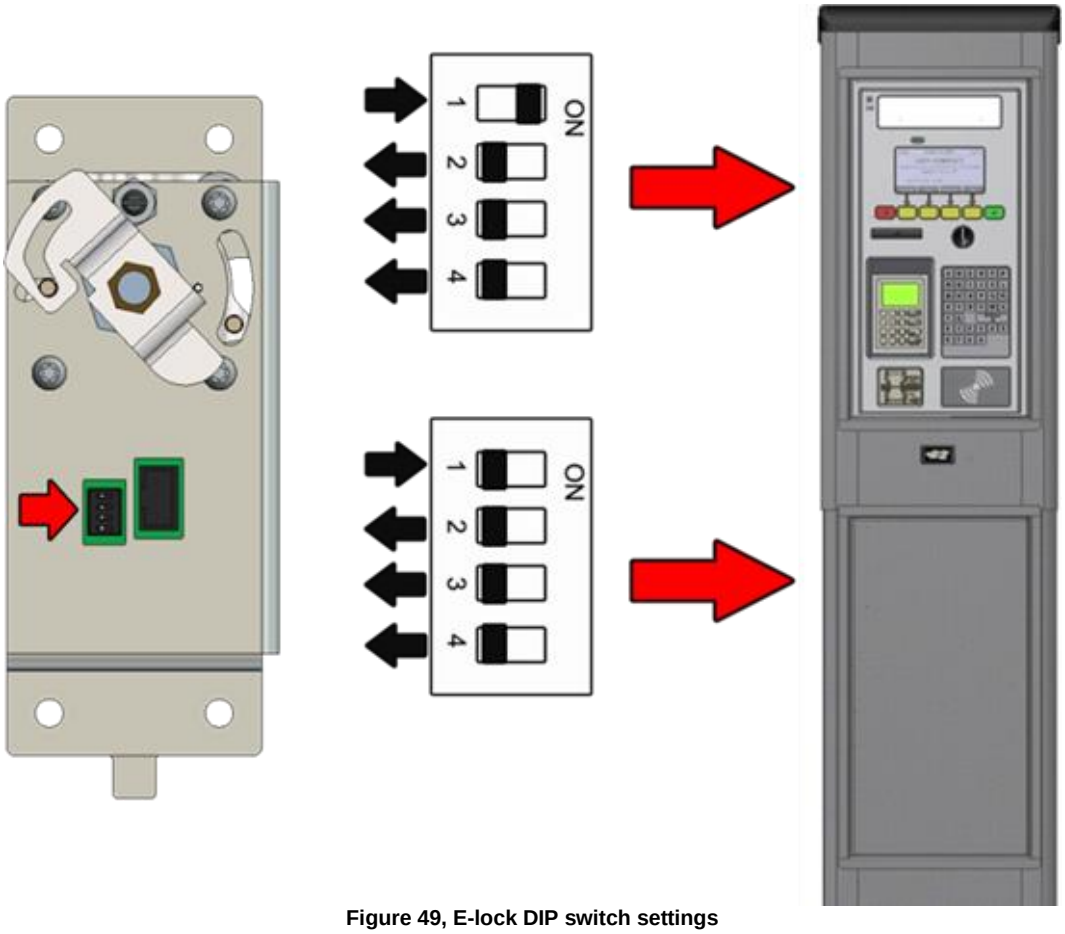


Figure 49, E-lock DIP switch settings

Start the terminal and close the cabinet door to get a printout showing the version of the E-lock AVR program. If necessary, update. See more about AVR updates in the CWT Software Configuration Manual.

9 CHANGING THE CWT COMPACT SOFTWARE AND FIRMWARE

See *CWT Software Configuration Handbook* on how to make changes in the application software files.

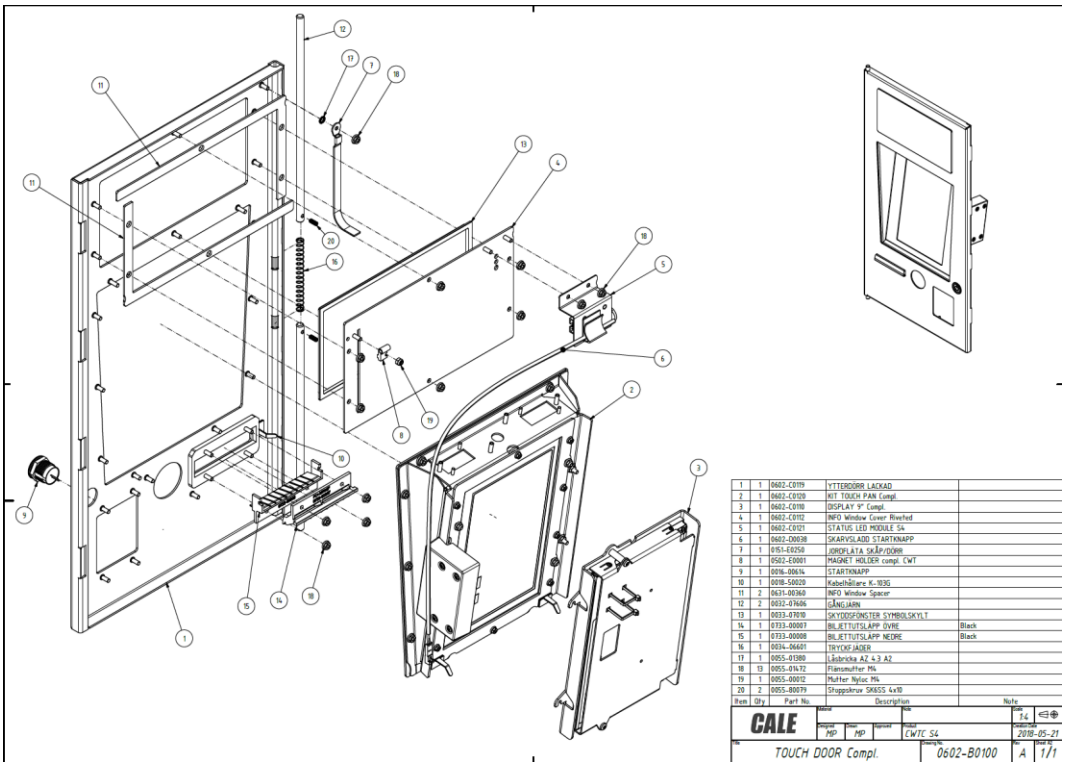
The whole CWT application, or parts of it, can be changed centrally via CWO or on site via the service menu.

In the latter case, changes can either be keyed in one at a time or the service menu can be used to transfer new application files from a temporary storage medium, a USB stick for instance, via the USB port on the CPU board.

10 APPENDIX

The Exploded view drawings are unfortunately partly in Swedish but the part numbers are correct.

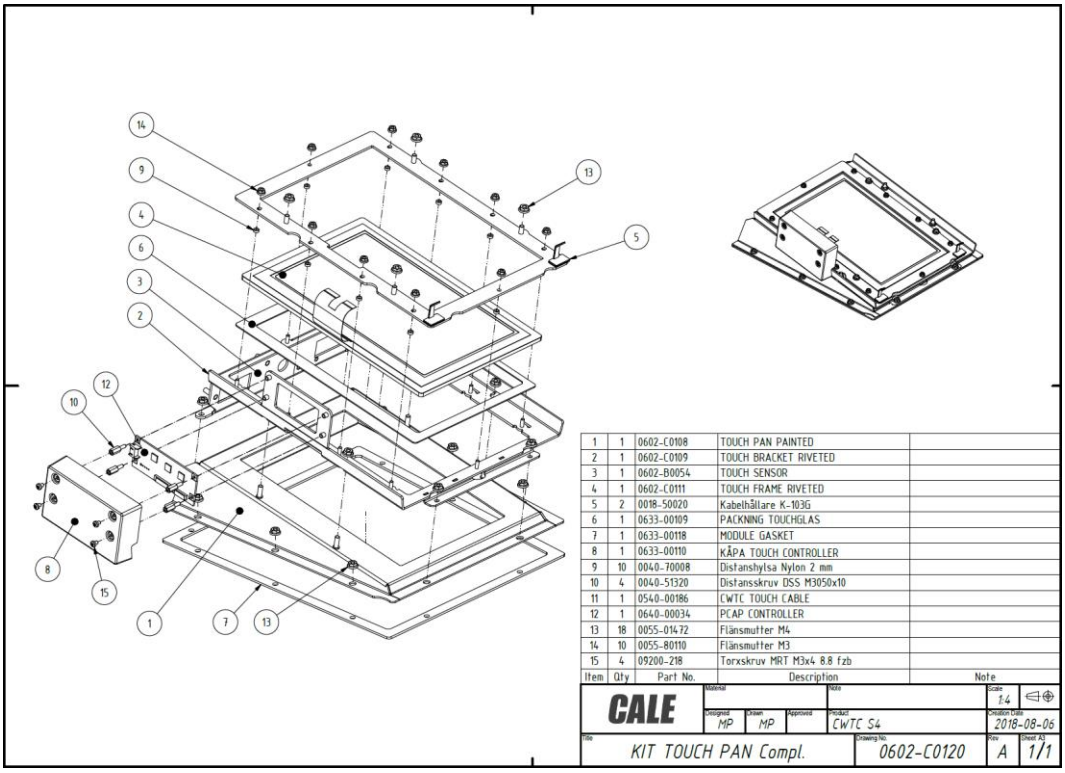
10.1 CWTC S4 Touch door



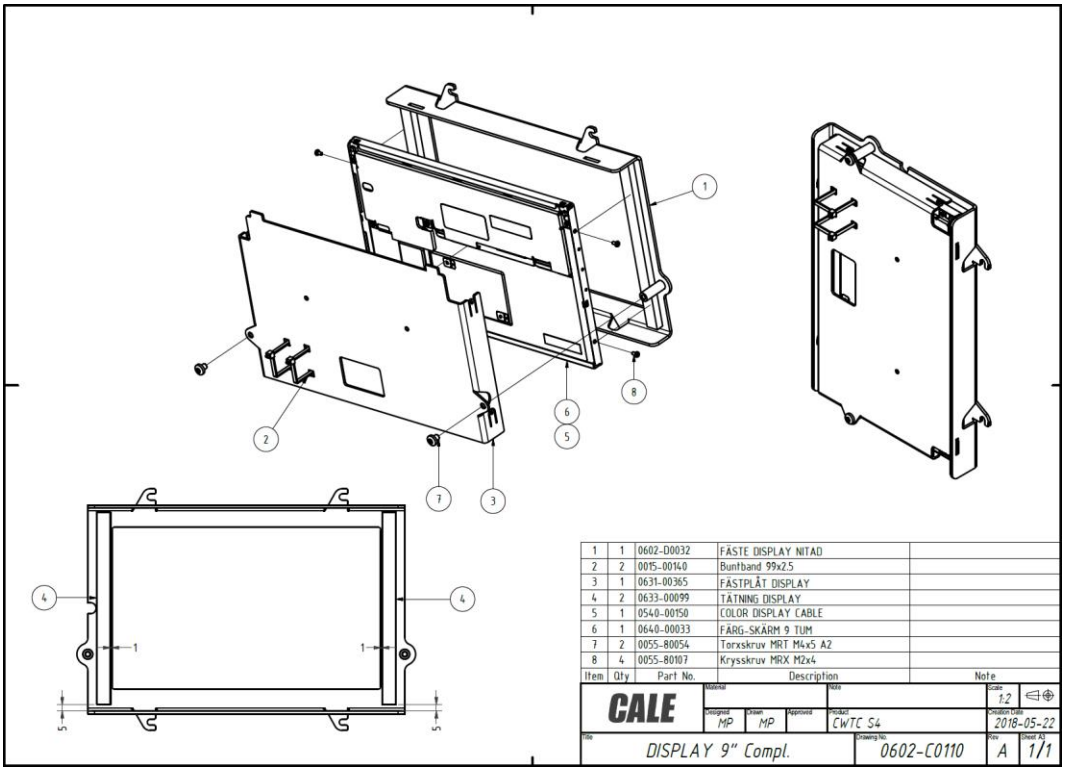
Item	Qty	Part No.	Description	Note
1	1	0602-C0119	YTTERDÖRR LACKAD	
2	1	0602-C0120	KIT TOUCH PAN Compl.	
3	1	0602-C0110	DISPLAY 9" Compl.	
4	1	0602-C0112	INFO Window Cover Riveted	
5	1	0602-C0121	STATUS LED MODULE S4	
6	1	0602-D0038	SKARVSLADD STARTKNAPP	
7	1	0151-E0250	JORDFLÄTA SKÅP/DÖRR	
8	1	0502-E0001	MAGNET HÅLLER compl. CWT	
9	1	0016-00614	STARTKNAPP	
10	1	0038-50020	Kabelhållare K-103G	
11	2	0631-00360	INFO Window Spacer	
12	2	0032-07606	GÅNGJÄRN	
13	1	0033-07010	SKYDDSFÖNSTER SYMBOLSKYLT	
14	1	0733-00007	BILJETTUTSLAPP ÖVRE	Black
15	1	0733-00008	BILJETTUTSLAPP NEDRE	Black
16	1	0034-06601	TRYCKFJÄDER	
17	1	0055-01380	Låsbricka AZ 4,3 A2	
18	13	0055-01472	Flansmutter M4	
19	1	0055-00012	Mutter Nylac M4	
20	2	0055-80079	Stoppskruv SK6SS 4x10	

CALE — Material: MP — Finish: MP — Scale: 1:4 — Date: 2018-05-21 — TOUCH DOOR Compl. — 0602-B0100 — A — Sheet 1/1

10.2 CWTC S4 Touch Display Panel



10.3 CWTC S4 Touch Display unit



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