Flowbird

DRIVE S5 - Flowbird GO Entry/Exit Machine Installation & Maintenance Manual

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Issue 1,

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Flowbird

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1 INTRODUCTION

1.1 About this Manual

This Manual describes the Installation and Maintenance of your DRIVE S5 Entry/Exit terminal. All available functions are described in the manual without specifically mentioning which functions are implemented as standard and which of them are optional. Some of the figures show optional items.

1.2 List of major changes

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

Area	Page	Change	Revision
ALL	ALL	Initial draft	1

1.3 Structure of this book

The structure of this document is outlined below.

- Introduction introduces this document itself.
- 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
- Preventive maintenance describes the maintenance you can do to keep the terminal working fault free

1.4 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. CWT User Interface Design Handbook
3. CWT 104 & Compact Installation & Maintenance
4. User guide CCC

1.5 Terminology

Term	Meaning
AVR	The AVR is an 8-bit RISC single chip microcontroller. The AVR uses on-chip flash memory for program storage. See more about AVR updates in the CWT Software Configuration Handbook.
CWO 2/ CWO	Flowbird WebOffice 2, an internet based back office system from Flowbird Access
CWT	Common term for all Flowbird WebTerminal models (CWT 2110, CWT 2115, CWT 2120, DRIVE S5 Classic, CWT 104, CWT 104 S, DRIVE S5 all models).
DRIVE S5	A DRIVE S5 terminal with a monochrome or color display and Soft keys. The display is tilted inwards. Optionally a keyboard can be available.
ESD	Electro Static Discharge
Firmware	Firmware is a computer program that is embedded in a hardware device, for example a microcontroller. 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.
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.

2 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.

2.1 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.

2.2 Batteries

2.2.1 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 of how best to replace the battery.

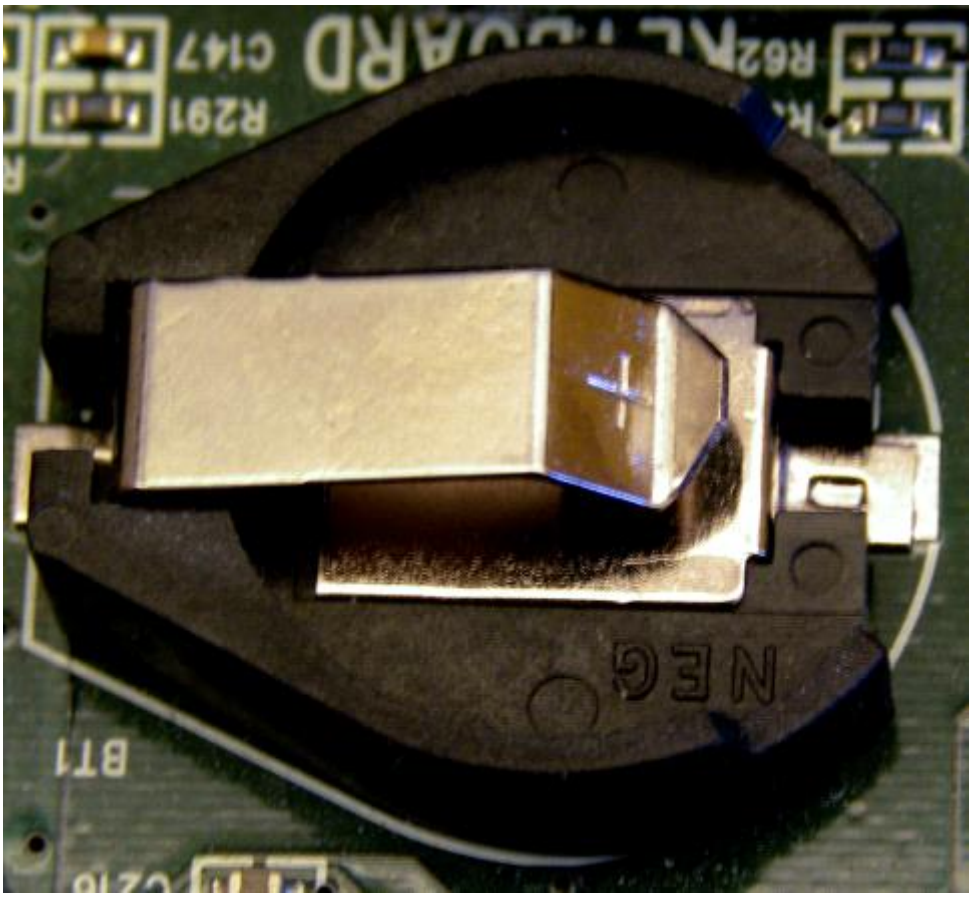


Figure 1, Backup Battery case

2.2.2 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.

2.2.3 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 be 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.

2.2.4 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.

2.2.5 Disposal

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

Old batteries must be discharged according to your country's policies and laws.

2.3 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 Display module replacement for a description how to replace the display unit.

2.4 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.

2.5 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.

2.6 ESD protection

2.6.1 What is ESD?

ESD is an abbreviation for Electro Static Discharge.

Electrical charges are built 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.

2.6.2 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 wear out. **Always use a new bag**.

The following ESD protection accessories can be ordered from Flowbird.

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.)

3 PRODUCT DESCRIPTION

The DRIVE S5 System includes an interactive touch-screen display, QR/Barcode Scanner, Ticket Printer, Microphone and Speaker, 4G Modem for backup communications, Credit Card Reader option, Prox Card reader option, multiple intercom options, Backup Operations DC Battery and Charger, High definition Pin-hole Camera, making it the ideal choice for Off-Street Parking.

See below, identification of the main components that make-up the DRIVE S5.

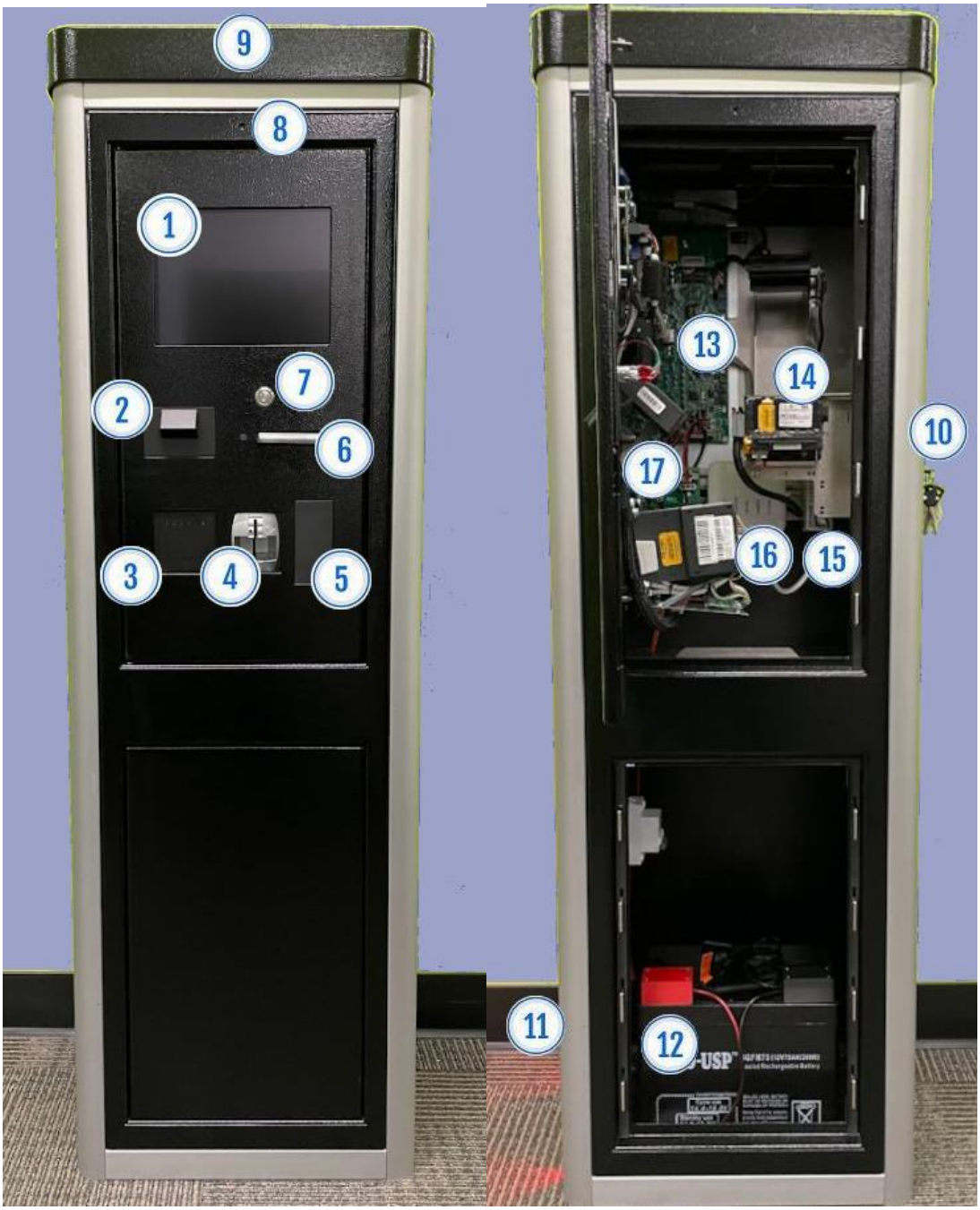
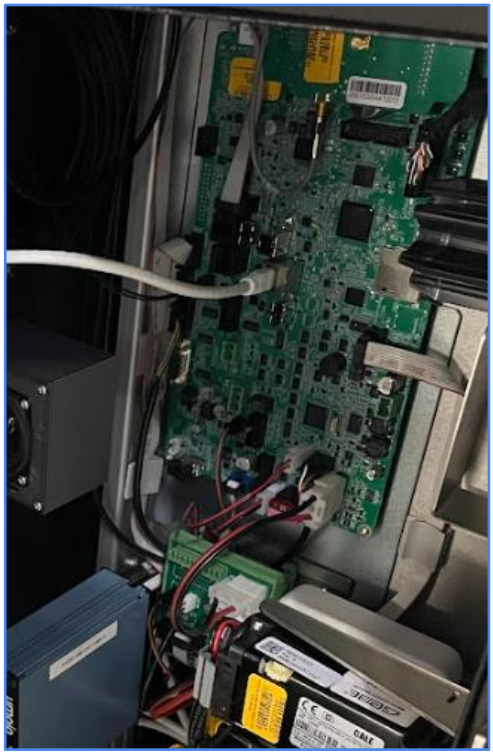


Figure 2, DRIVE S5 Overview Door Closed, Door Opened

The DRIVE S5 Major Component Identification Table (reference Figure 2)

ID#	Description
1	9.7” full-color touch screen monitor with LED automatic adaptive backlighting
2	QR Code Scanner
3	A1000 Contactless Credit Card Scanner
4	M1000 Credit Card Scanner
5	HID/PROX Access Card Reader
6	Ticket/Receipt Printer Out
7	Push for Intercom Button
8	Pin-hole CCTV Camera
9	4G LTE Modem
10	DRIVE S5 Key access for opening doors
11	RED/GREEN LED Light Strip Unit (RED - Closed, GREEN - Open)
12	Power Input, DC Battery, Trickle Charge Unit
13	DRIVE S5 Main and Sub Circuit Cards
14	Printer Assembly and Paper Roll Location
15	Network IO Device (relay inputs/outputs)
16	POE+ Internal Network Microswitch
17	Network Intercom Unit (varies by manufacturer)

3.1 DRIVE S5 Circuit Cards



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.

3.2 Graphical display

The Graphical Display for Each Drive S5 Unit includes the following:

• 9.7" full-color touch screen monitor with LED

automatic adaptive backlighting

• Can display animated pictures, text, maps,

videos and dynamic menus

• Reinforced 6mm thick tempered glass

• Anti-glare treatment

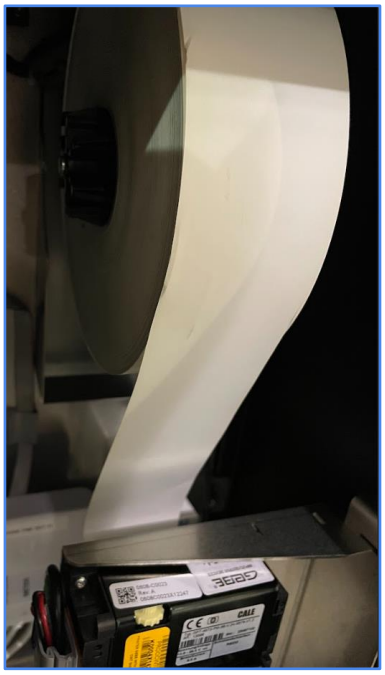
• Resolution: 768 X 1024 pixels

3.3 Thermal Printer

DRIVE S5 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.

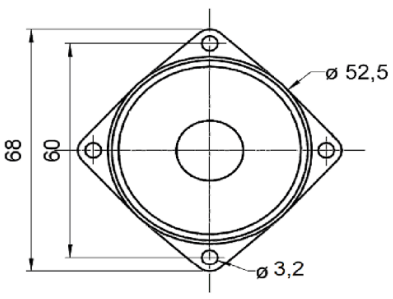
The printer module consisting of the printer and the paper supply roll are positioned on a vertical main assembly plate that can easily be removed. The printer module is held in position by means of hinges on the door frame and a locking hatch.

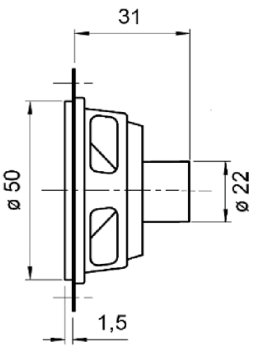


3.4 Microphone and Speaker

The Drive S5 includes standard with each unit, a Zenitel TA-17 microphone, 10 electret including 12cm cable, used standard with TKIS-2 Intercom systems to provide clear audio for intercom communications with the Parker.

Also included with each Drive S5 is a standard Zenitel TA-16 Speaker to provide clear sound for Intercom communications and System sounds of the unit. This speaker is rated 5W (max 8W) and has a frequency response of 120-20000 Hz, with a mean sound level at 86dB





3.5 Power/Battery System

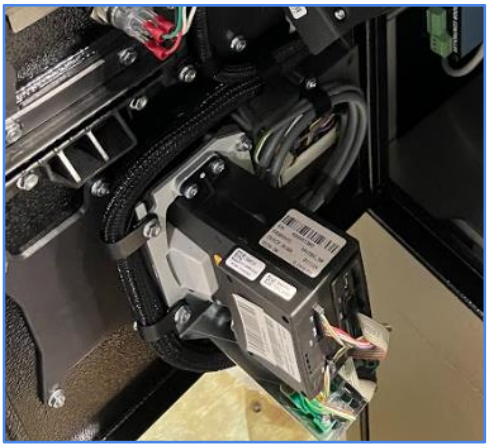
DRIVE S5 terminals are powered by a gel type, maintenance free lead-acid battery placed in the pedestal of the terminal. The battery is charged by mains power. In the latter case the terminal has a solar cell panel mounted at the top.

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.

3.6 Credit Card Reader Components

The DRIVE S5 terminals support different means of payment and a number of payment applications, shown below is the most common device.

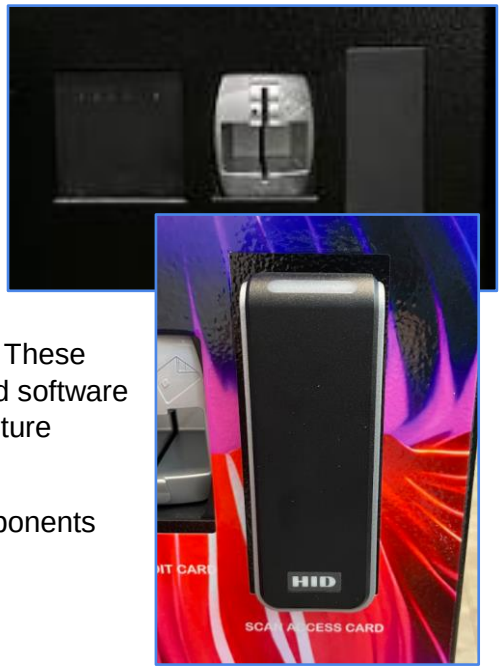
3.6.1 Credit Card Reader (M1000/A1000)



DRIVE S5 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 DRIVE S5 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.



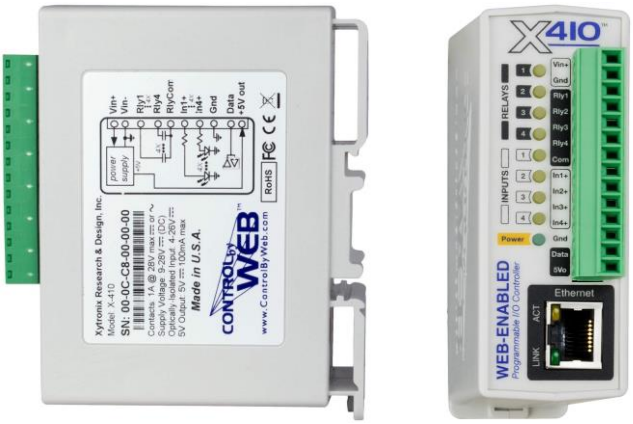
3.7 HID/PROX Card readers (optional)

The DRIVE S5 and DRIVE S5 Touch models can be equipped with Access Control Proximity Card readers. These readers and supporting 3rd party card components and software are currently separate from the Flowbird WebOffice (future integration is possible, but not currently available).

Mounting location is provided, but all other wiring components and communications have to separately be supplied.

3.8 IO Device (Web Relay Device)

Internal to the DRIVE S5, is a fully featured, ethernet I/O control module that includes 4 digital inputs, 4 relays, and a built-in web-server that allows remote access and monitoring access for the Gate and other internal DRIVE S5 optional devices.



This device is typically interconnected with the in-lane parking gate and the Flowbird Internal circuit cards to send gate open/close signals remotely from the PARCS software.

3.9 POE 5-port Micro-switch

Internal to the DRIVE S5, included is a 5-port POE+ Microswitch used to interconnect multiple ethernet endpoints such as DRIVE S5, Intercom board, IO Device, and Pin-

hole Camera inside the unit and consolidate into one POE+ connection out to the Parking Network.

With one uplink port (POE+) and four internal equipment interconnect ports, this device supports 10/100/1000 Mbps Ethernet connections and 802.3af/at/bt.

3.10 Pin-hole Camera (optional)

Internal option in the DRIVE S5, is a pinhole lens CCTV Camera that is ideal for in-lane live video feed to support Parking Operations and Intercom communication.

This pinhole camera is POE+ Network power enabled, includes a HDTV resolution network encoder device, and has a typical 57 degree horizontal field of view, which is ideal for capturing video at the driver's side window level for Parking Operations support.

3.11 Intercom Device (optional)

Internal option in the DRIVE S5, is a stand-alone SIP intercom system for two-way audio and external relays for Gate control.

Shown here is the UMojo Intercom device that connects to the DRIVE S5 microphone and speaker and provides dial out to phone line access to speak audio and signal capability to vend gates remotely, even via cell phone by pressing programmable number sequence.

Additional integration options offered are to use the UMojo intercom device and a number sequence to send a pre-set rate to exit machines as well (requires SW API integration).

4 CABINET DIMENSIONS

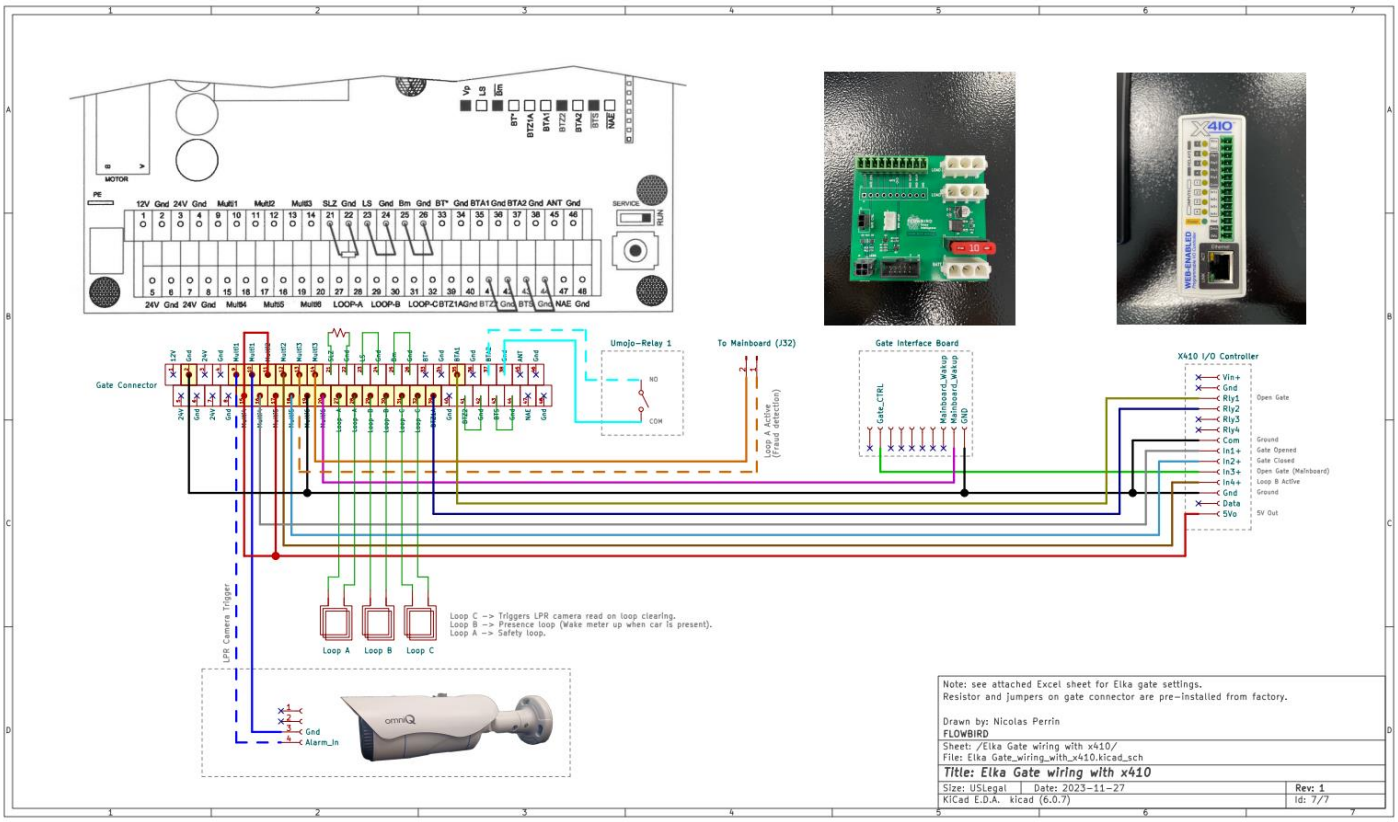
4.1 Drive S5 Exterior Cabinet Dimensions

The Drive S5 Dimensions are 14”d x 17.2”w x 55.5”h. Included in the base mounting frame are anchor point holes for securing the unit into concrete.

5 WIRING DIAGRAMS

5.1 Flowbird Main Components Wiring (typical)

Every Flowbird PARCS Project wiring setup is unique, but below is a typical Wiring Diagram when utilizing a gate, WebIO Device, Entry or Exit Unit and LPR Camera. Refer to the assigned Flowbird Project Manager to send out an updated Wiring diagram when in the process of installation.

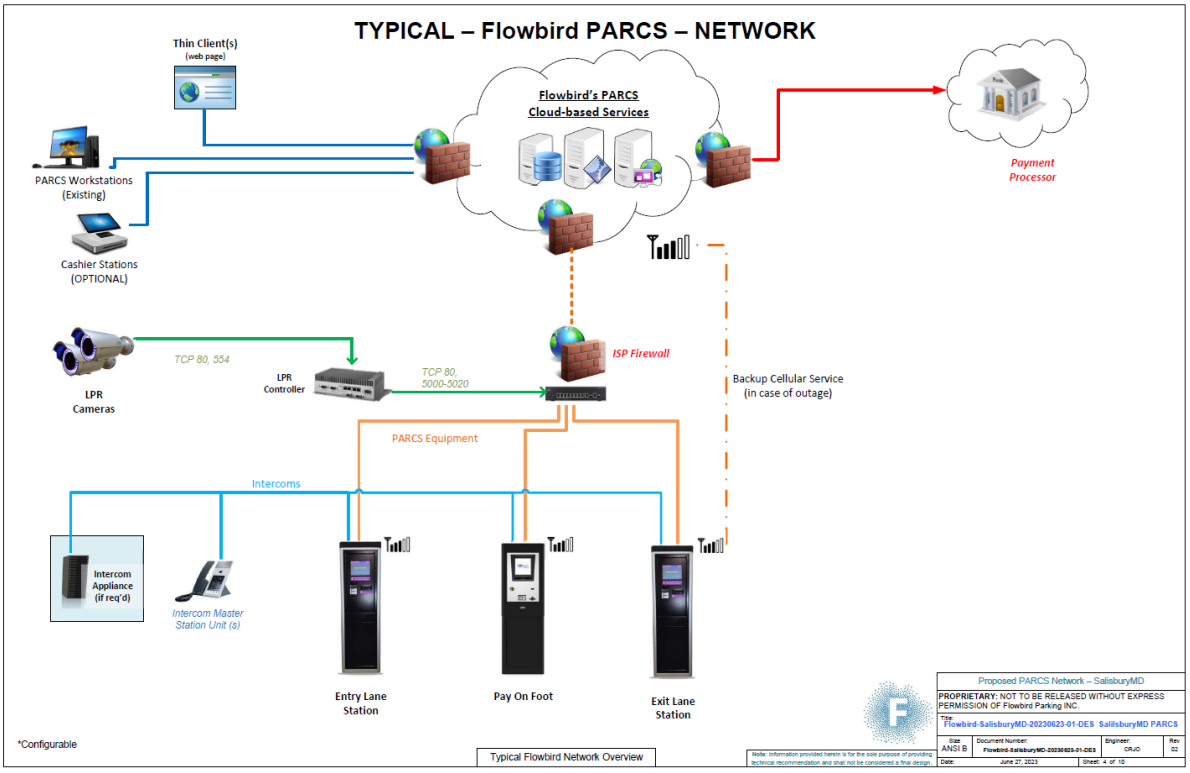


6 DATA COMMUNICATION

6.1 Flowbird WebOffice, FlowbirdGO, and Permit Portal

Flowbird WebOffice, FlowbirdGO, and Permit Portal are a cloud-based back-office suite for remote management of your terminals and for financial and statistical purposes. The DRIVE S5 communicates with this cloud based back office suite via GSM/GPRS, 4G or LAN using the TCP/IP protocol.

The DRIVE S5 includes a POE+ microswitch that connects internal devices and requires a single outgoing CAT6 POE+ ethernet cable out to the internet. Additionally, Network firewall exception rules must be set for cloud network connectivity.



7 PRINT SYSTEM

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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.

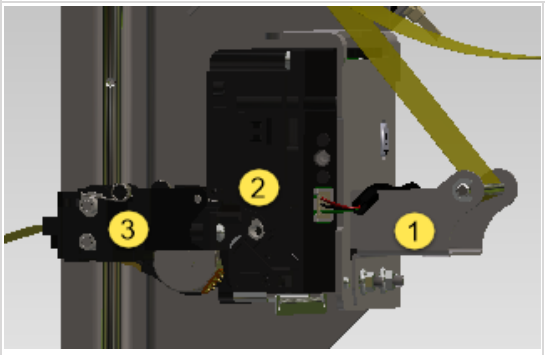
The printer is connected to the CPU board via a serial interface.

The printer firmware can be updated via Flowbird WebOffice.

7.1.1 GeBe GTP4672 Thermal printer

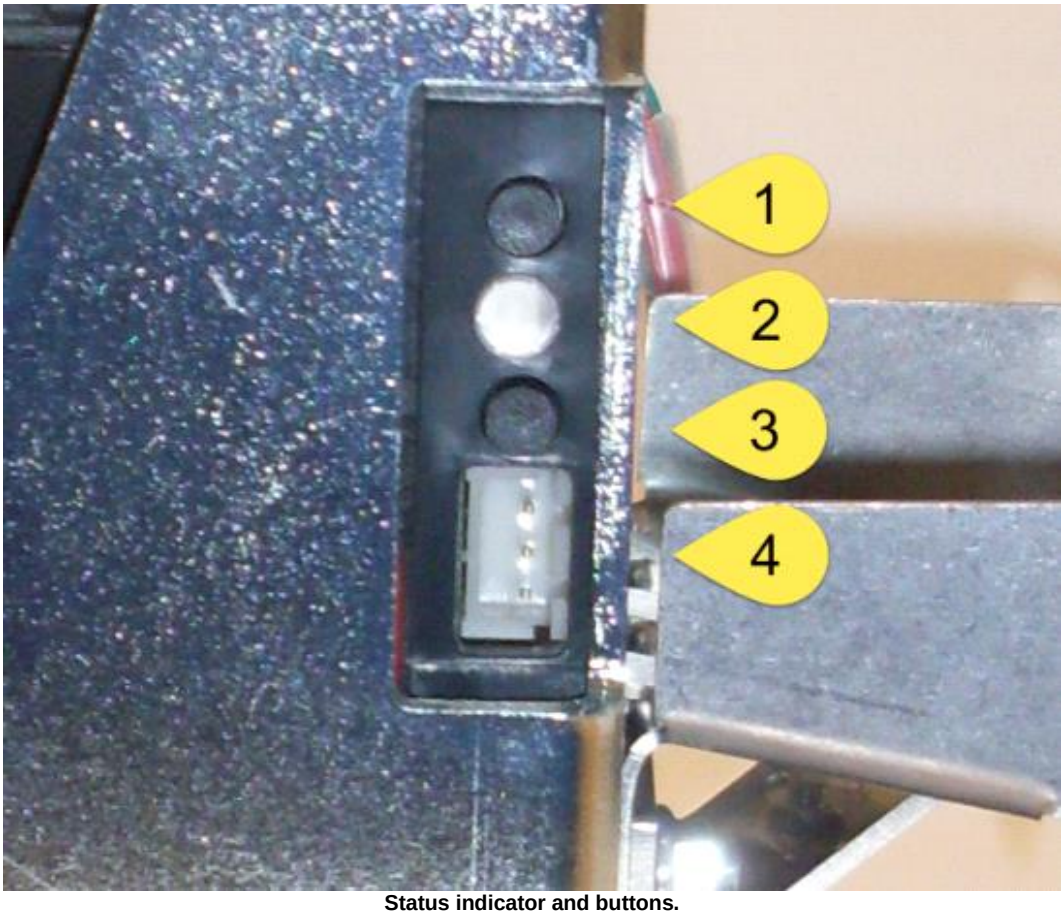
Note:
The printer shelf comes in two varieties.
The older version (version 1) has a long plate mounted in the cabinet with a lock mechanism at the end of the plate. The newer version (Version 2) has lock directly after the hinge. Both types are displayed in the manual.

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.



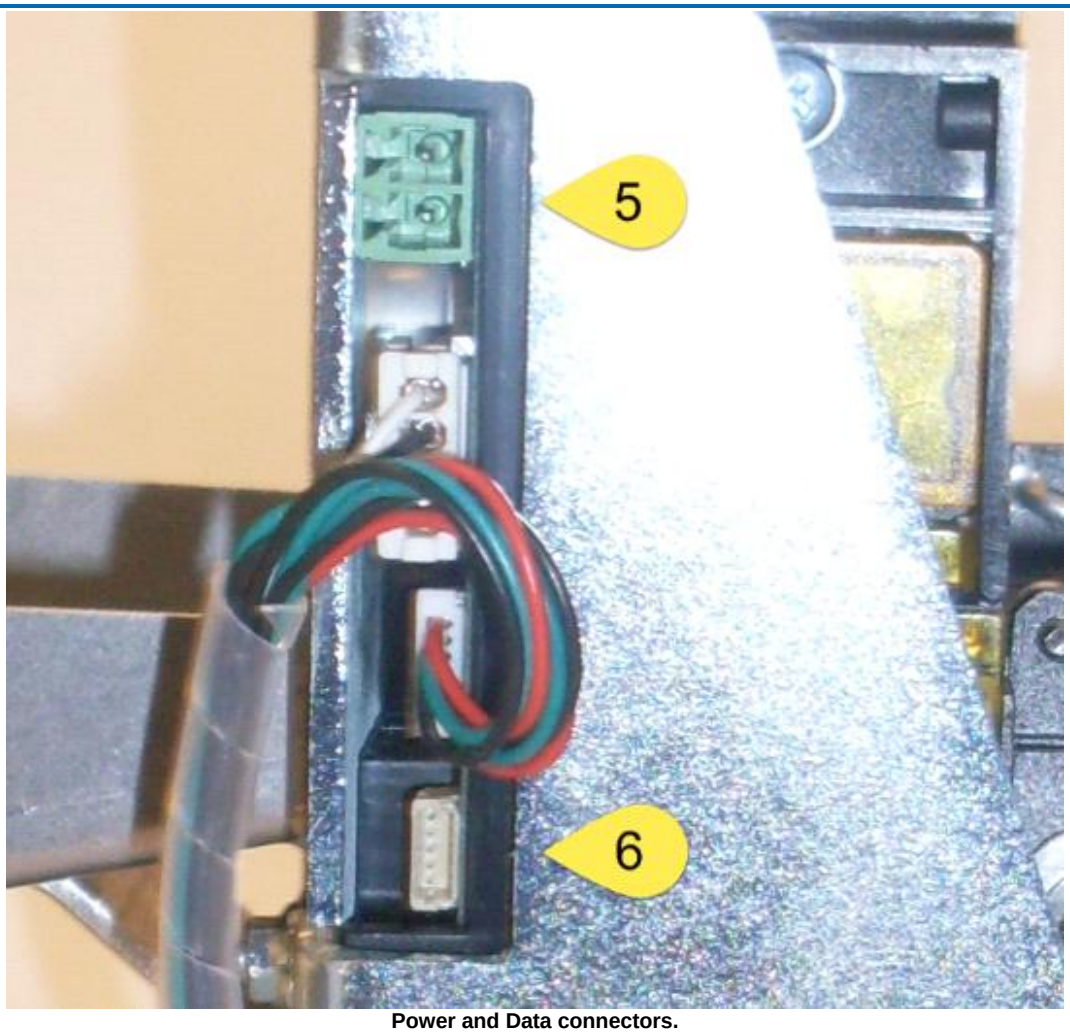
2. Paper guide

3. Printer
4. Ticket presenter



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



Power and Data connectors.

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

7.1.1.1 Sensors

The printer has four important sensors:

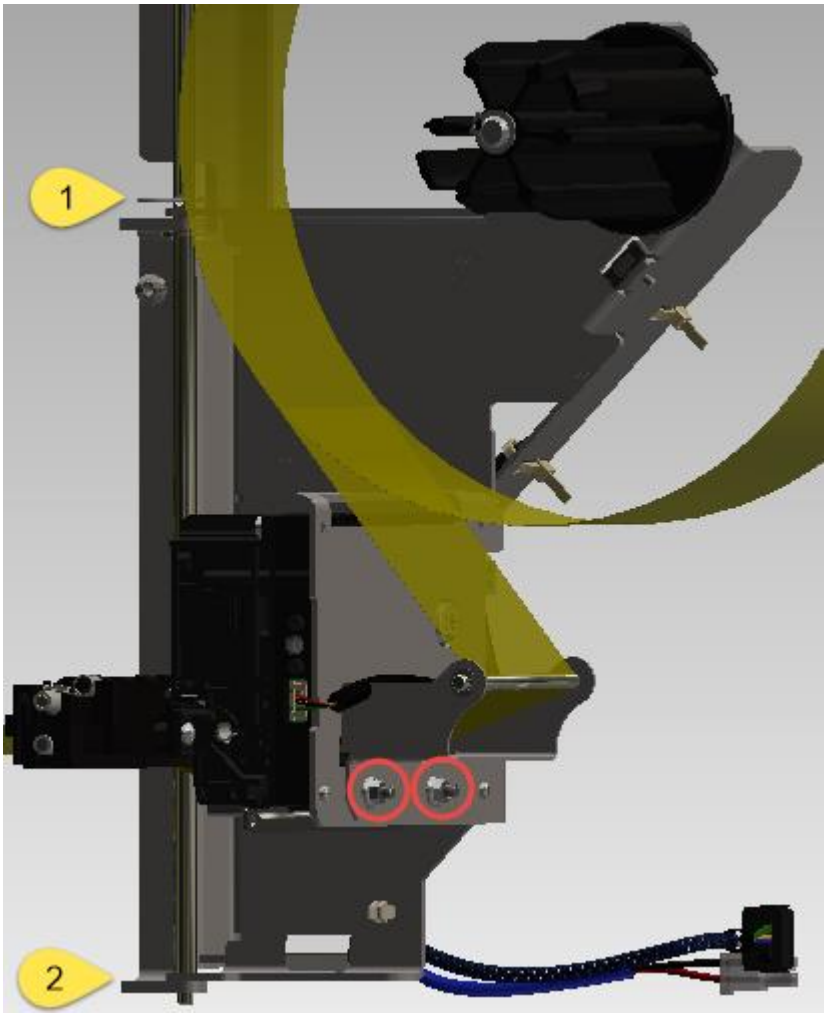
Physical sensor	Function
Paper low	Input connector for the external paper low sensor.
Paper out / Black mark	Detects paper presence and black marks. Translucent sensor. If the documents have pre-printed information, for instance a logotype, each document usually also have a pre-printed black mark for 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.

7.1.1.2 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.

7.1.1.3 Paper supply

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

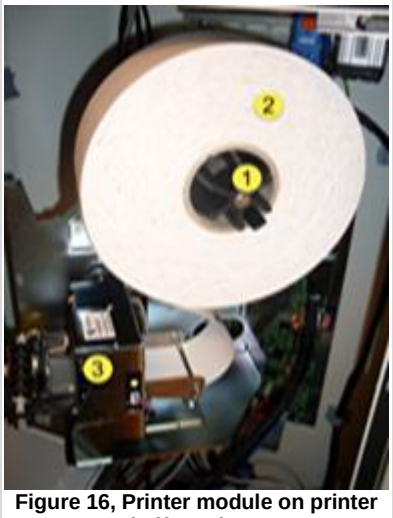


Figure 16, Printer module on printer shelf version 1.

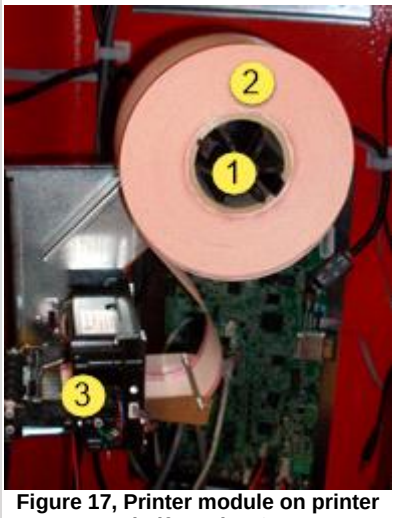


Figure 17, Printer module on printer shelf version 2.

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.

7.1.2 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 pre printing on paper intended for laser printing. OCR-blind ink shall be used.
- Ink used for pre printing 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 pre printing in the black mark zone and in the center 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

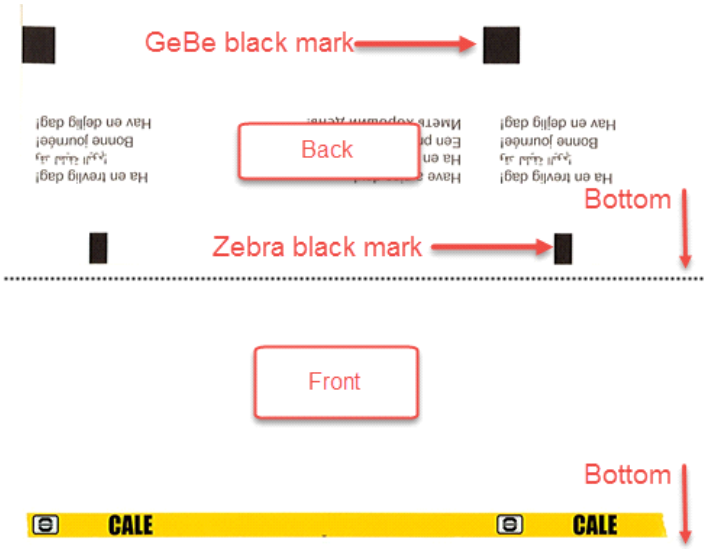
No preprint is allowed on any side of the paper in a 2-mm wide area from the edge of the roll.

7.1.3 Black mark location

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

Verify that you use the correct type of paper.

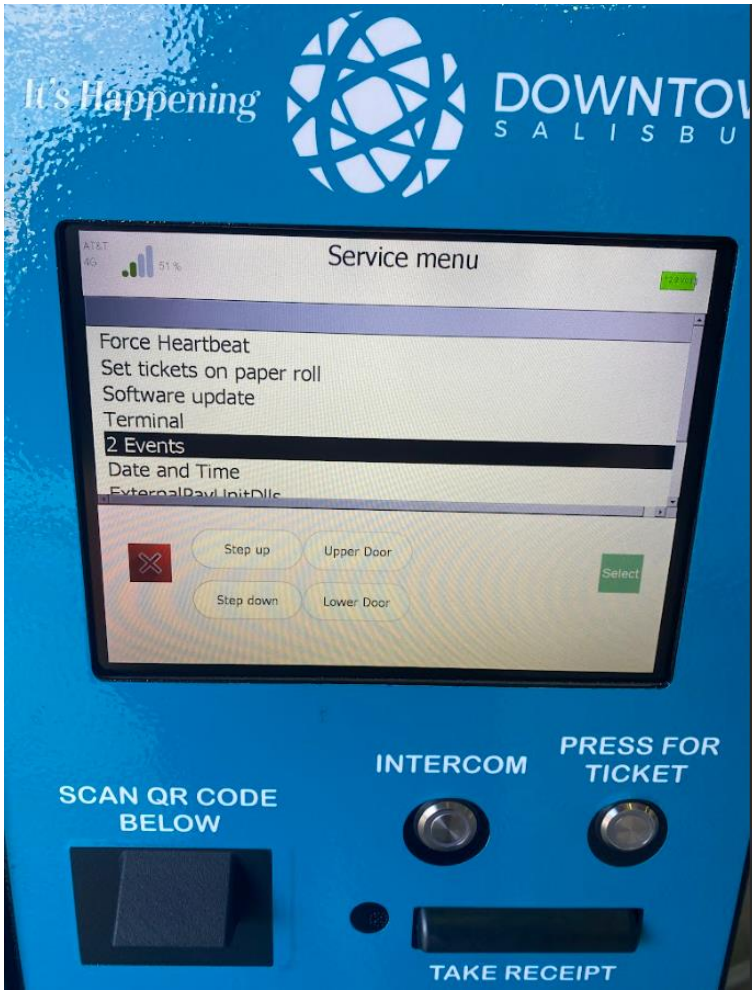
Warning:
When using black mark, you cannot use rolls for a Zebra printer in a GeBe printer as the black marks are on different locations on the paper



Paper with both Zebra and Gebe black marks

8 THE SERVICE MENU

The service menu is shown when the DRIVE S5 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.

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

9 MECHANICAL DESIGN

In this Chapter:

9.1.1 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

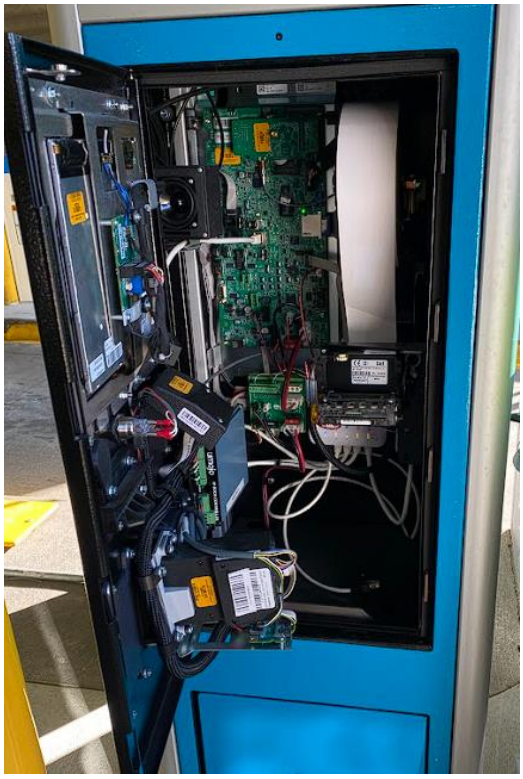
The cabinet can be detached from the pedestal and this is the way the DRIVE S5 is usually delivered from the factory.

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 DRIVE S5 is highly flexible and varies depending on installed pay units etc.

9.1.2 Inside the cabinet (upper)

The items found inside the cabinet vary between the DRIVE S5 models and between different versions of each model.



Shown here is the Upper Cabinet of the Drive S5. Inside this compartment on the backplane are the Main Cards, Printer, WebIO (behind the Printer), Speaker, Intercom, and Micro Switch for incoming Ethernet communication.

On the door of the Drive S5 unit are the Microphone, Display, Barcode Reader, Credit Card components, HID Card Reader, and buttons for selection.

Additional Hardware can be installed into units such as Pin-hole Camera (above door) and other network add-ons via the Din-Rails on side wall and backplane areas as well.

Unique Detail Diagrams will be issued per Project based on the add-on items selected.

9.1.3 Inside the pedestal (lower cabinet)

Shown here is the Lower Cabinet of the Drive S5. Inside this compartment on the left-hand side is the circuit breaker and Outlet installation area for incoming Power to terminate.

Additionally, in the bottom of the unit is the 24VDC Battery and Inverter that adapts incoming AC Power and distributes this DC Power converted to the upper cabinet components that require low voltage DC power.

Incoming conduit stub-ups are to be located below the Battery (which will have a shelf that can be installed). Cable routing pathways are on the left-hand and right-hand sides of the cabinet to route Ethernet cabling and Control cable up through to the upper cabinet landing locations.

9.1.4 Door locks

Each door is secured in a closed position by means of a mechanical lock that also has an open door sensor that indicates to the Back-Office when the door is open.

9.1.4.1 Mechanical locks

The standard lock in the DRIVE S5 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).

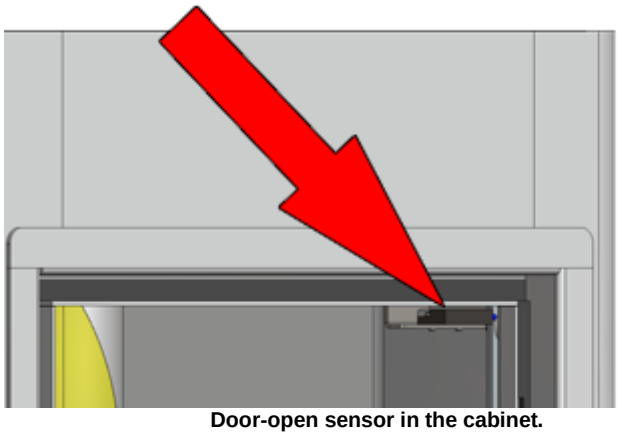
Standard mechanical door key.

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

9.1.4.2 Door-open sensors

Upper cabinet has a door-open sensor. All attempts to open the terminal are logged in the DRIVE S5 and the information is transferred to Flowbird 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.



Door-open sensor in the cabinet.

10 POWER SUPPLY

DRIVE S5 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. 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.

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.

10.1 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 an 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).

11 CPU BOARD VERSION 0501-E0150 REV K

> ***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.

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

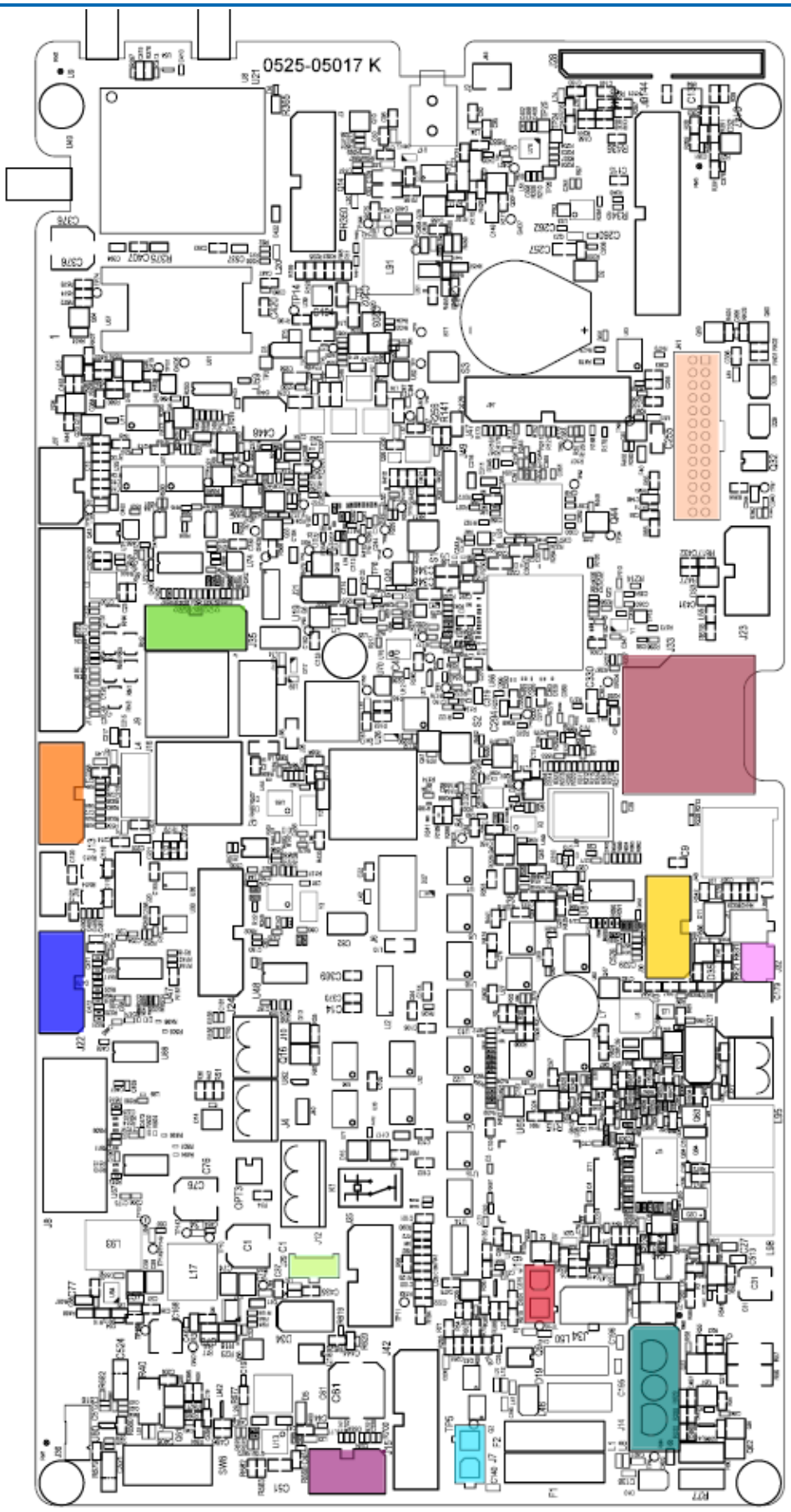


Figure 32, CPU board version 0501-E0150 RevK

Connector	Function	
F1	4A Fuse (ATO)	
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)	
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	

12 INSTALLATION

Flowbird strongly recommends the following conditions and settings to be considered when planning and installing DRIVE S5 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.

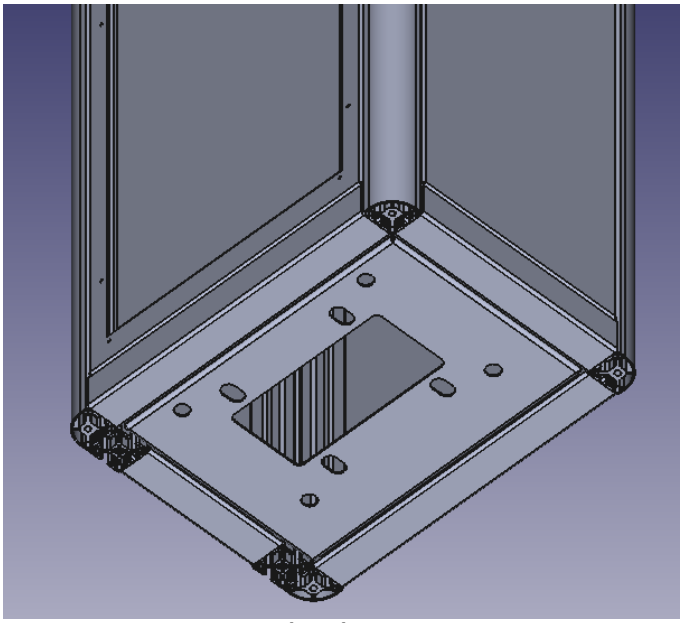
Before installing a terminal, you must verify that its location meets the requirements listed in the following section to secure proper operation.

12.1.1 DRIVE S5 Mounting

12.1.1.1 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 situations.
- 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.



Mounting Plate at Base

The above figure shows all the alternative mounting holes in the pedestal's bottom plate.

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.

12.1.2 Installing terminal on 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.

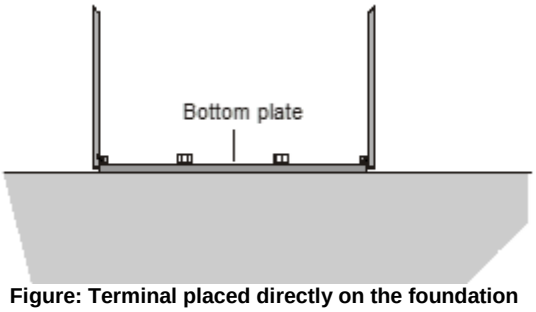


Figure: Terminal placed directly on the foundation

Danger:
Follow local regulations regarding electrical installations.

12.1.3 Power supply

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

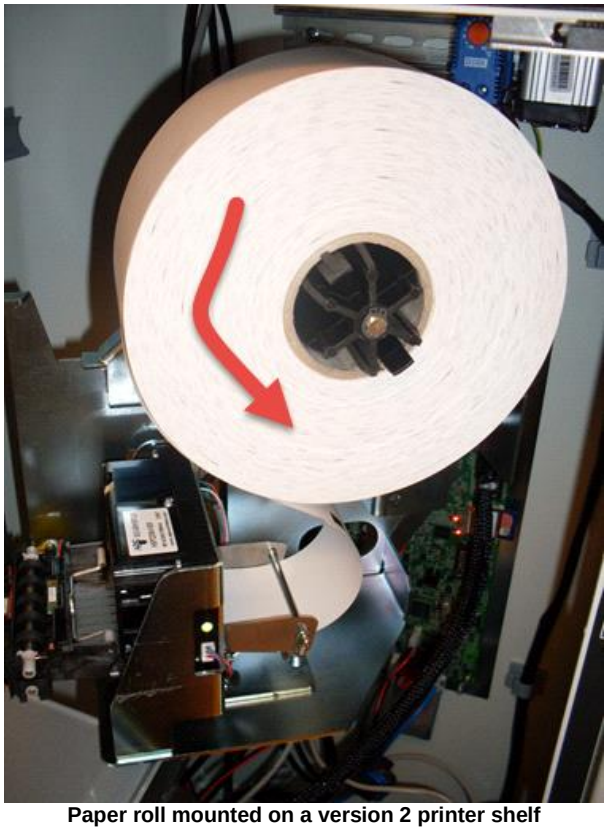
Unless otherwise agreed, the customer is responsible for providing an appropriate 12V battery. For DRIVE S5 terminals connected to the grid power supply, a battery capacity of 17 Ah is required. Terminals equipped with a solar cell panel require at least 45 Ah.

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.

12.1.4 Loading paper in a GeBe printer

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



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. 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.

12.2 Batteries

12.2.1 Battery levels

The DRIVE S5 can send battery measurements of the battery voltage to Flowbird WebOffice (CWO) for monitoring.

The DRIVE S5 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 DRIVE S5 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 Flowbird is maintenance free but will wear out over time. Verify on a regular basis that 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.

12.2.2 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 Flowbird is maintenance free. Verify on a regular basis that the contacts are not corroded. If so the battery and the cable should be replaced as soon as possible.

12.2.3 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.

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). Flowbird 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, Flowbird recommends using 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.

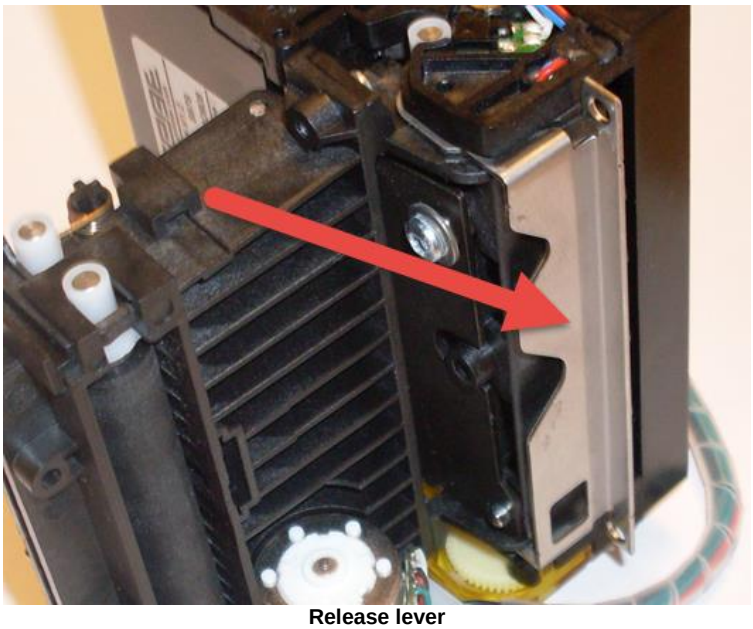
12.3 GeBe Printer

12.3.1 Print head

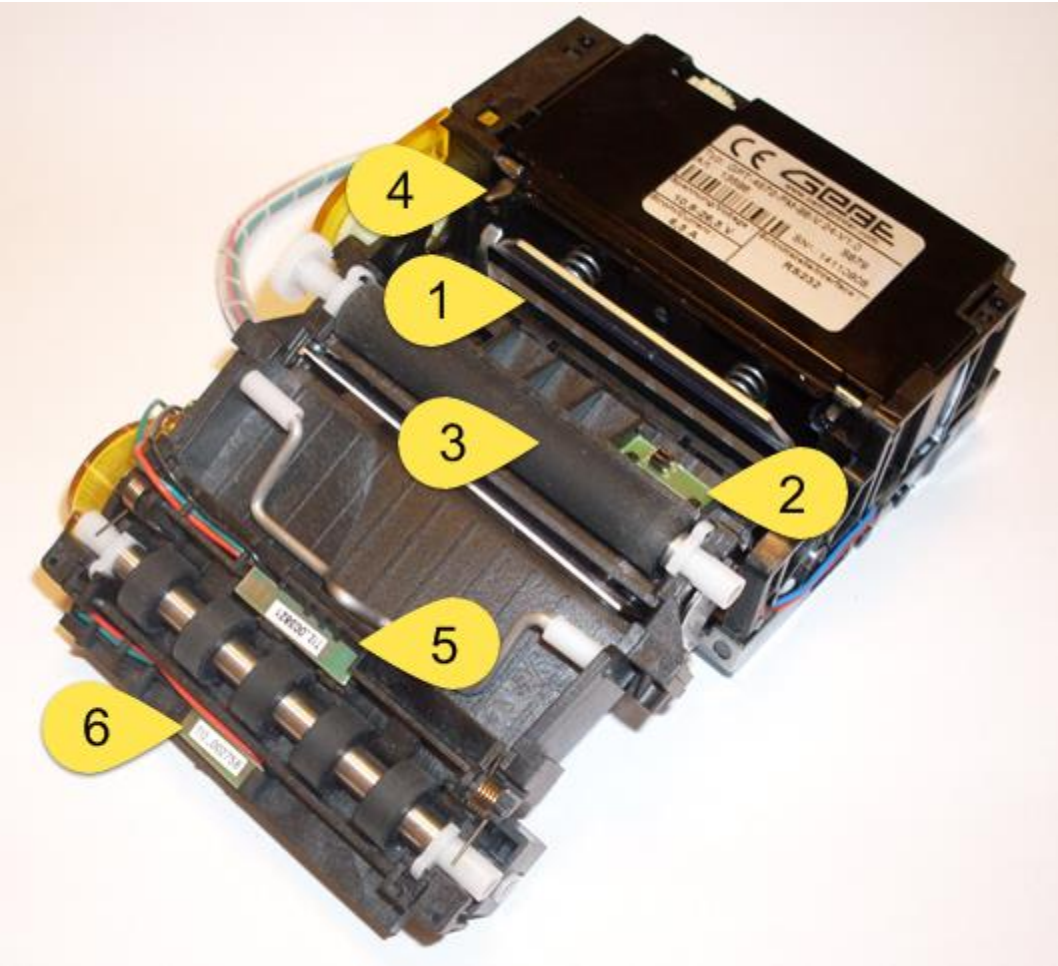
The print head and the black mark sensor can be accessed by dismounting the printer from its casing when installed on the printer shelf version 1.

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



Release lever



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 (depending on the type of paper used).

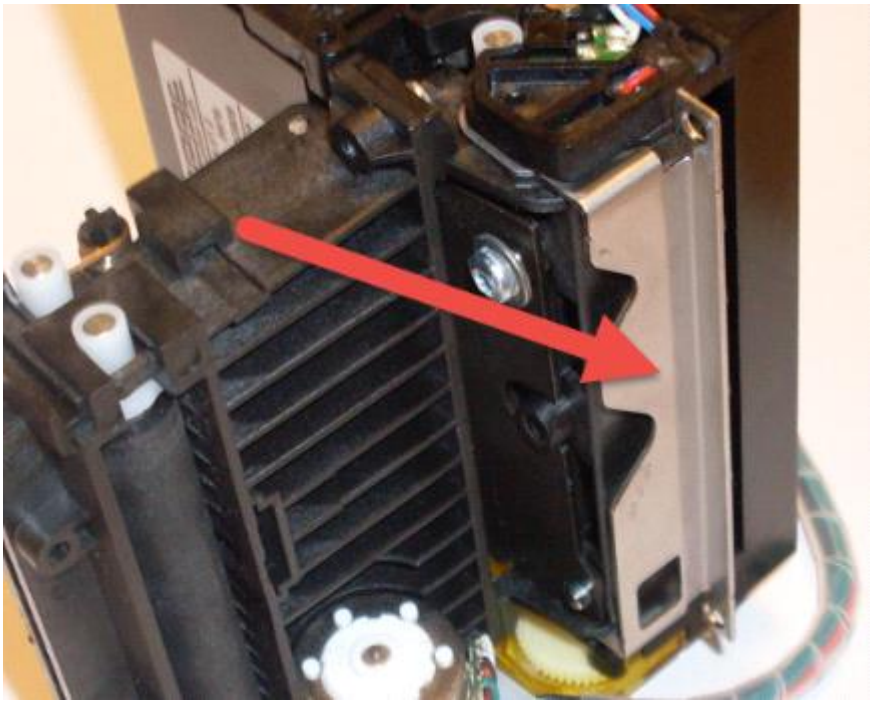
Print speed, number of burn pulses and burn time can be adjusted for optimal print result. See *CWT Software Configuration Handbook*.

12.3.2 Cleaning

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

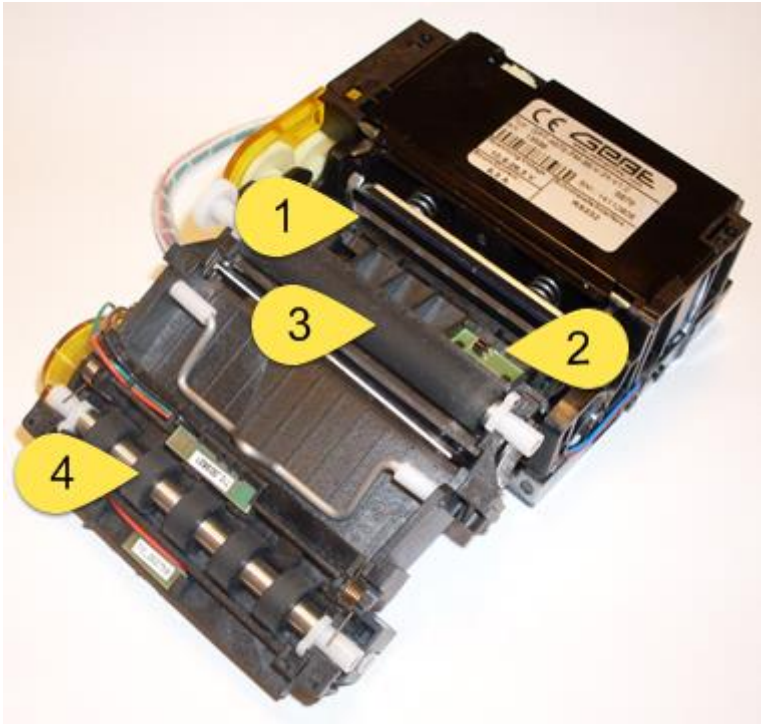
Caution:
Deposits accumulating on the row of heating points on the print head will negatively affect the thermal head's cooling which might damage or destroy the print head.

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 lever on the bottom of the printer.



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.

12.3.3 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.

12.4 Display module

This section is about cleaning of the outermost surface of the display modules.

Caution:
Do not apply excessive force to the display surface or the adjoining areas since this may cause the color 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.