

Operating Instruction

System PM 100

Exit terminal
AKG 100 BASIC / TREND

Ticket / CHIPMASTER

Version 2.00

DESIGNA

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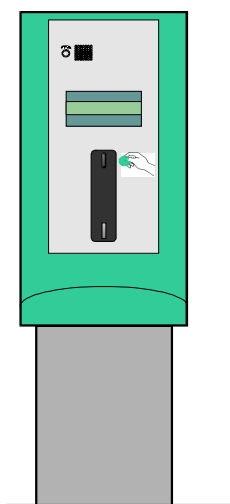
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1. Construction of AKG 100

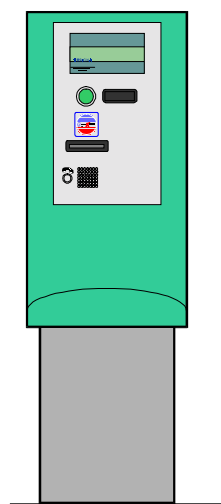
1.1 Kinds and characteristics

1.1.1 BASIC

The exit terminal is available with one of two options: 1. The CHIPMASTER system (CM) which uses park chips, and 2. the TICKET system, which uses paper tickets with magnetic stripe. Further options are available under use of credit card, bank card (ec), or cash card (if available for your area) and these options allow payment at the exit. In the standard terminal there is included a two line ascii display (LCD) and a socket, however if required a graphical display can be made available for the magnetic stripe system only. Easy Move system is another option for the use of hands free parking.



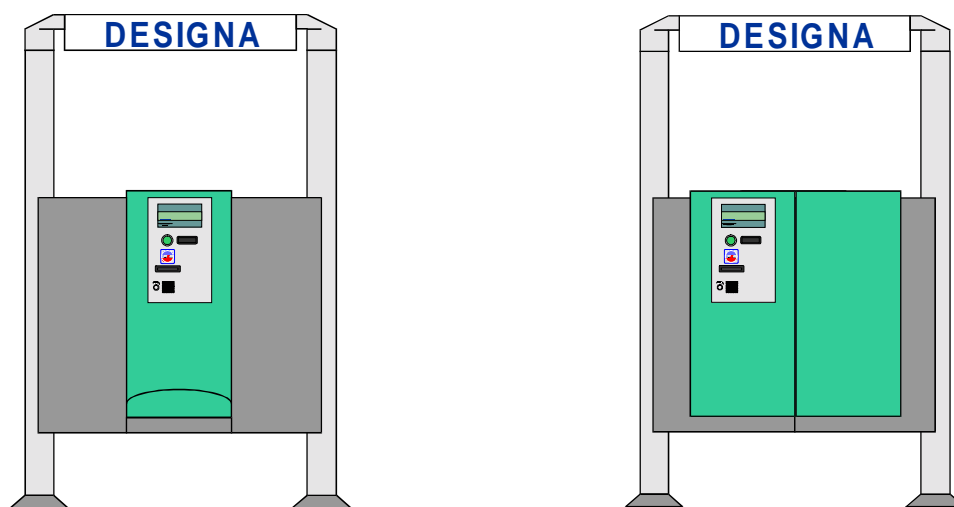
Graph 1: View of an AKG 100 CM
in Basic closet



Graph 2: View of an AKG 100 BASIC
with optional cash card reader

1.1.2 TREND

The only difference between the TREND and BASIC are the casing and the location of the components. The casing is mounted on two pillars of 100mm diameter, this pillars are made from non-corroding steel of degree VA 1.4512, and painted in Pantone 320C. As with the BASIC the TREND terminals are available with the features listed above.



Graph 3: View of an AKG 100 TREND / TWIN 100 TREND

1.2 Casing

The casing is made from non-corroding steel, painted with Pantone 320C. Any Pantone or RAL colour may be selected as an option, and the steel may be non-corroding of a higher degree. This however will increase the price and cause longer production time as well.

The front door is double locked with steel locking bars, which will be handled by a crank key handle. The opening hole for of the lock is kept secure by a cobolt. barrell

The front panel of the unit is made from aluminum, toughened in neutral colour. The labels and logos are either printed to the aluminum directly, or stuck to the surface, using plastified aluminum foil. The front panel and all logos are widely scratch resistant.

1.3 Operating tools at the front door

At the front panel of door of the AKG there are some items for the operation.

1.3.1 Buttons

- Info-button
The information request button establishes a connection to the main intercom station and rings for the operator there.
- Cancel button
The cancel button will stop the current process of payment and return the parking chip / the magnetic stripe ticket to the client. This button is effective only with option "payment at exit". The button is red and has a „C“ visible inside.

1.3.2 Display

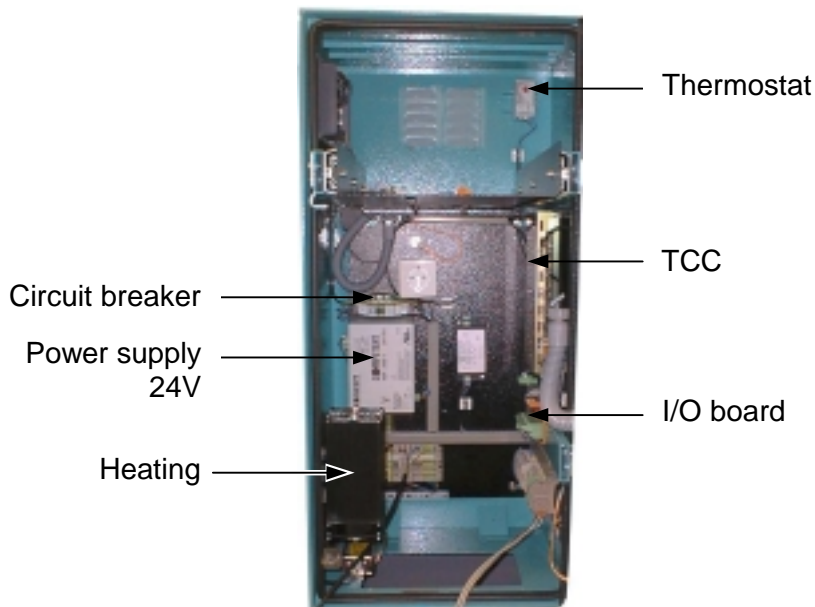
By default the BASIC and TREND devices come with a LCD display of 2x20 character. The character size is 10mm. For better viewing there is a backlight which automatically comes on after the first character to display was received.

Magnetic strip systems only:

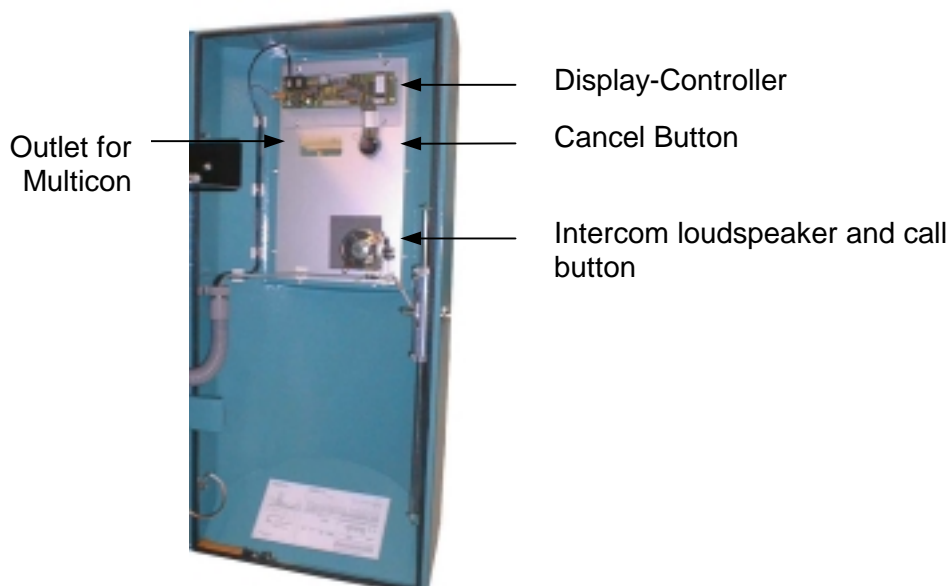
There is an option that this unit can be equipped with a graphical display allowing customized pictures to be displayed.

1.4 Inner construction of the AKG

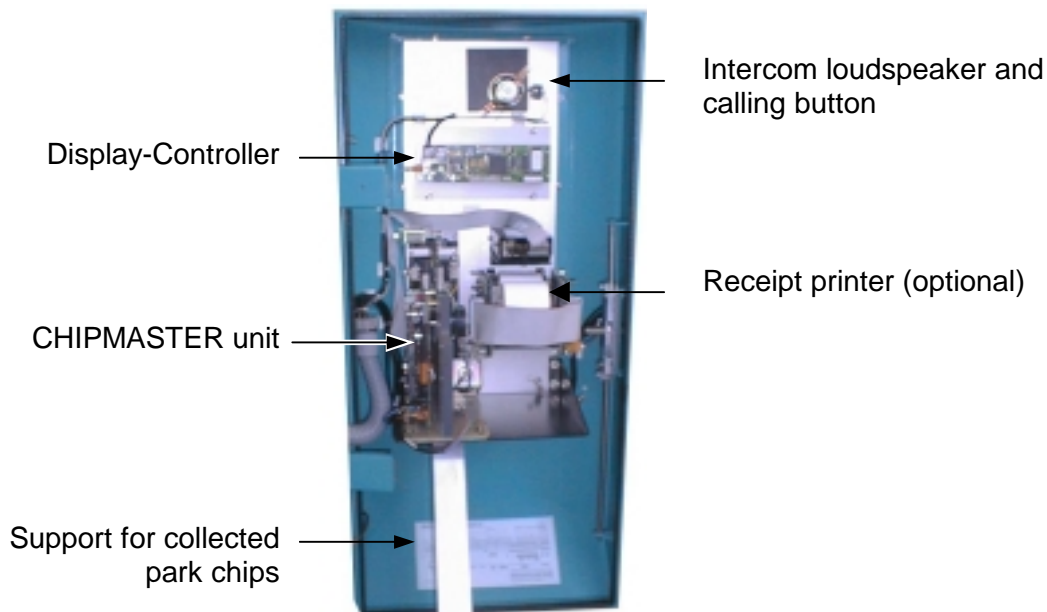
The exit device AKG100 BASIC or TREND consist out of the following components:



Graph 4: Inner view of AKG100 BASIC/TREND



Graph 5: Inner view of door of AKG100 BASIC/TREND



Graph 6: Inner view of door of AKG100 CM

1.4.1 Main switch

In the left back corner of the AKG there is the main switch of the unit. With this switch all electronic components of the AKG will be powered down.

NOTE:

The connector clamps, the mains filter, the socket and the illumination (if existing) are furtherin powered.

To make the entire unit power isolated, all fuses at the connector clamp must be removed. To do so, just flip the fuse holder gently towards you, and take out all fuses. When putting back the fuses, make sure not to accidently mix them, as their ratings vary. When the unit is powered up again, the AKG will automatically boot. If the power was down for too long, the TCC will reload the program instantly, which will take roughly 7 minutes per unit.

1.4.2 Power supply 24V

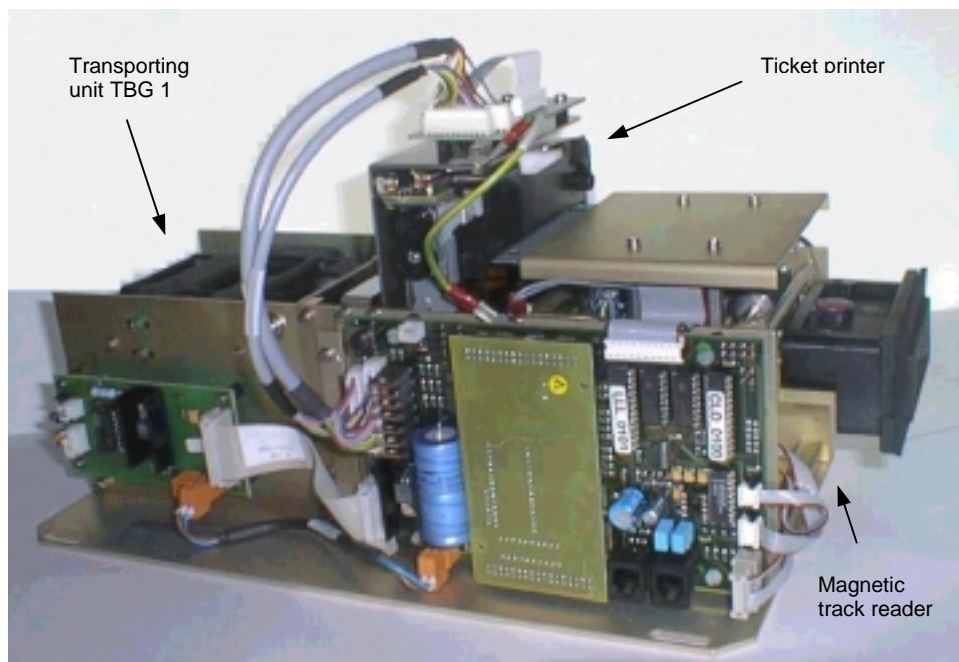
The power supply is placed in the left hand side at the rear of the casing, just below the main switch. It supplies all components in the unit with 24V DC. The function of this power supply is indicated by an LED labelled POWER.

Depending on your choice, inside there is either a magnetic stripe reader or a chip coin reader:

1.4.3 The magnetic stripe reader

The magnetic stripe reader itself is just the front component which can read and write cards. Together with the transportation unit it is mounted to a carrier board. When the ticket printer is added, the total unit is called „multikon“.

Depending on the options selected the unit comes with heads to read track ISO-2 or a special track near the centre track which contains rebating information.



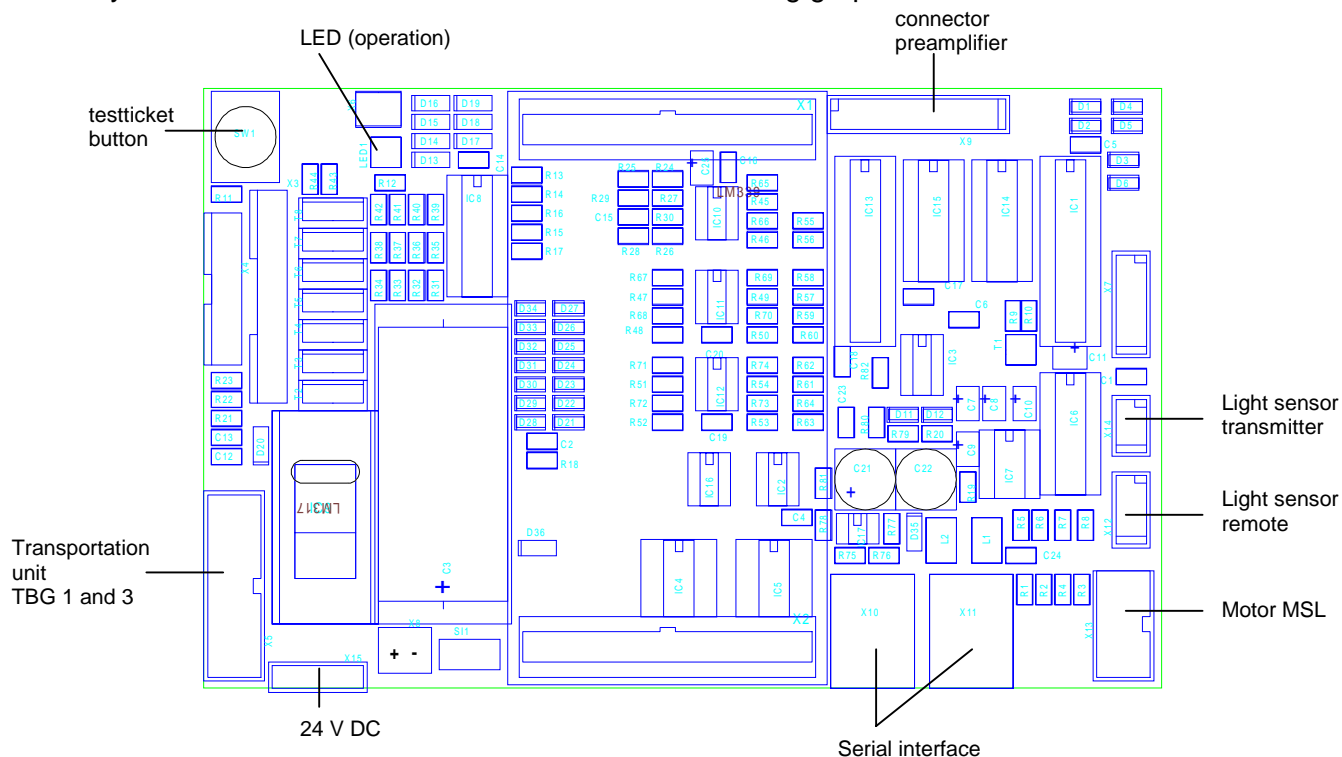
Graph 7: Magnetic Track Reader „Multikon“

1.4.3.1 Magnetic Track Reader (MSL)

The magnetic track reader pulls in the tickets or cards. On demand it writes the modified data back to the ticket or card, and either ejects the ticket/card or withdraws it and pushes it down the slope into the bin. Depending on the options, the MSL will read paper tickets, optional plastic cards and credit cards / bank cards. When the card is written, the existing coding will be entirely replaced, for which reason the unit is blocked by firmware not to write onto an ISO-2 track, as this tracks are containing read-only data only.

Attached to the MSL there is a PCB which does the direct controlling of this unit. It communicates by a serial interface (serial port no. 4) with the TCC. The TCC activates, controls and supervises the actions of the MSL, as well as those of the attached transportation unit and the ticket printer.

The layout and connector location is visible on the following graph.



Graph 8: PCB magnetic track reader (MSL)

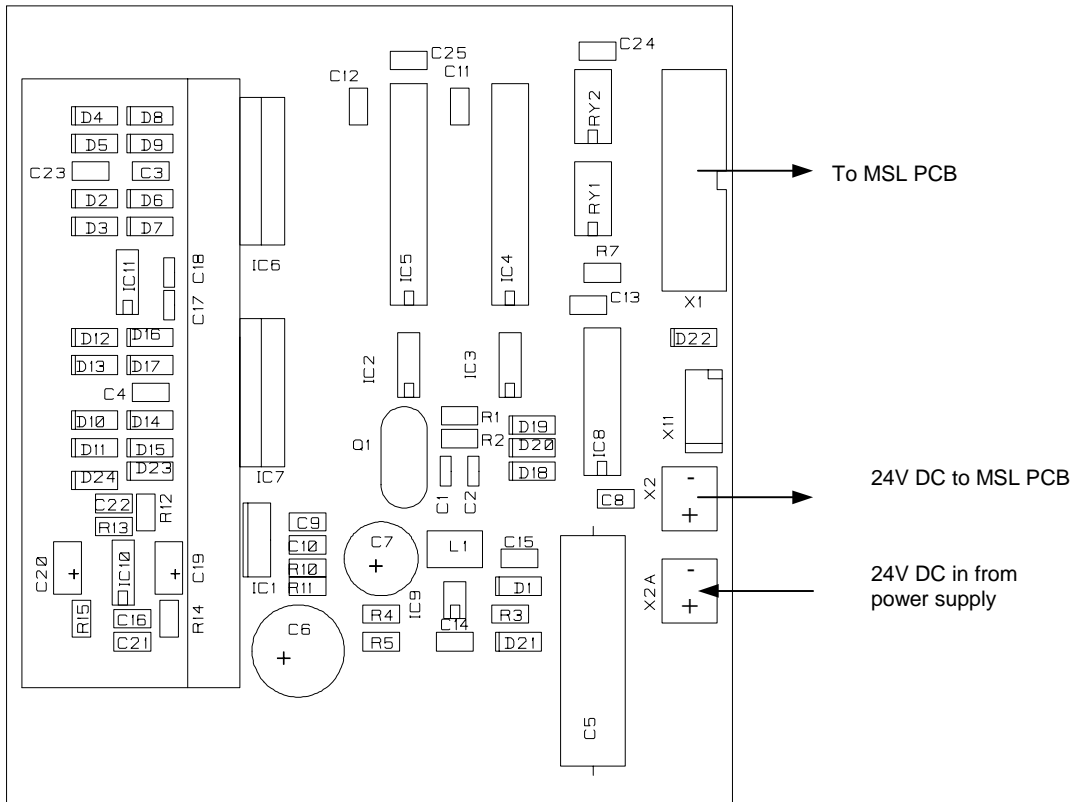
1.4.3.2 Transportation unit 2 (Optional)

- The transportation unit 2 (TBG2) has a built in ticket separator, which can be used to push the ticket either into the store-position, or into the bin. This feature is used for example when an hourly ticket is to be paid by credit card or by cheque.

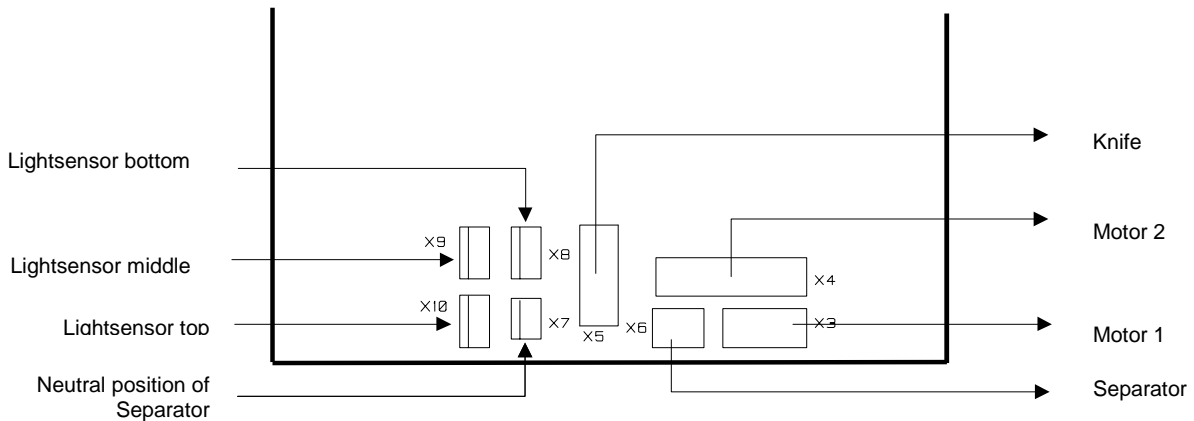
Option:

When a ticket is to be paid, the fee shows up in the display of the AKG. If a credit card is inserted, the TBG2 will pull the ticket to be paid into a parking position within the TBG2. The MSL will pull in and read the credit card in the same time. For the ease of spare part handling the TBG3 may be used instead of a TBG2 as well.

The connectors of the PCB for TBG2 and TBG3 are shown in the following graph:



Graph 9: Printed circuit board TBG2 and TBG3 (assembly side)

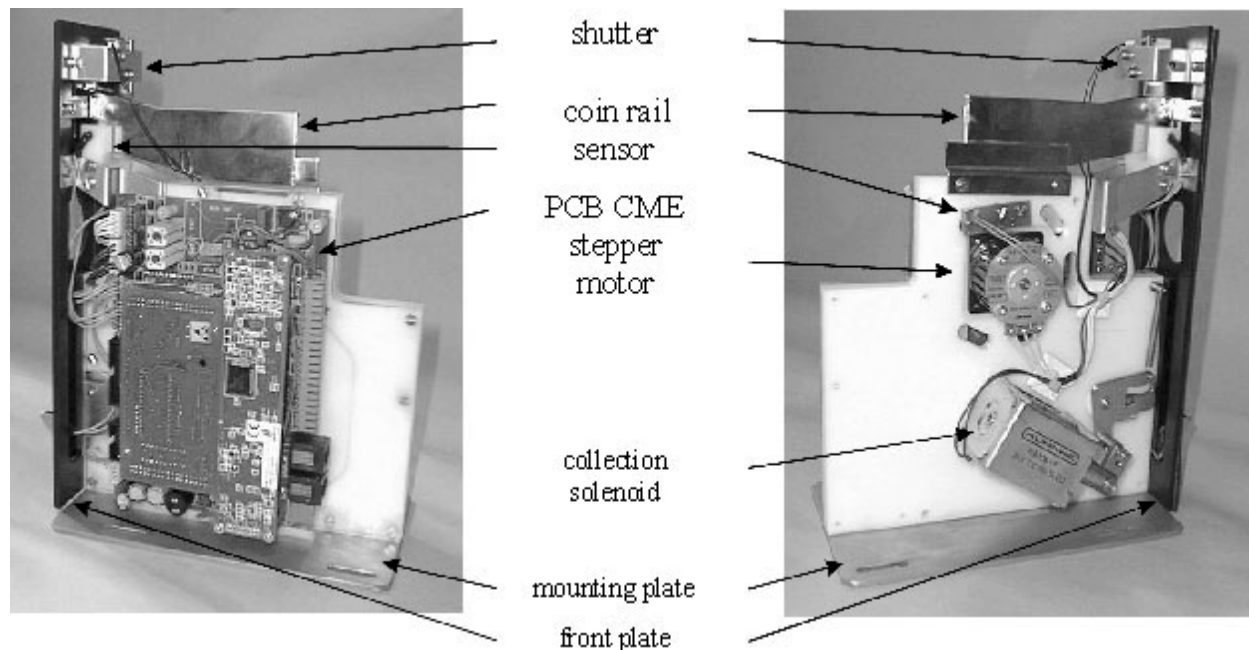


Graph 10: Circuit board TBG 2 and TBG3 (soldering side)

1.4.4 The Chipmaster Unit (CM)

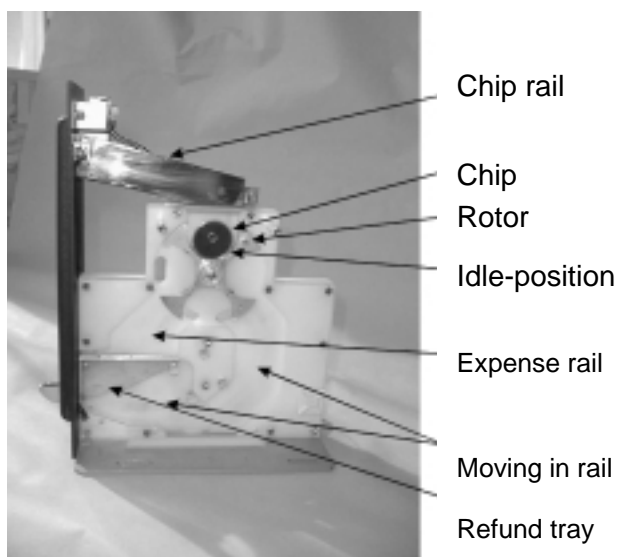
The CHIPMASTER unit is a module on a mounting plate. The modul includes the front panel with chipcoin inlet and the return tray. It also includes the motor and the electronic parts. The unit has a rotor driven by a stepping motor, which moves the chipcoins around and positions them right before the programming coil. The unit can take back the chipcoins not taken by the client. The tray will be flipped up, the coin then will roll back into the bin.

At the exit the chip coin will be inserted by the client. The chip is read, written, and then the barrier will open. The chip will be marked „unusable“ and given to the bin. The barrier is opened. Season chips and debit chips will be returned to the client. When the client takes the chip, the barrier will open.



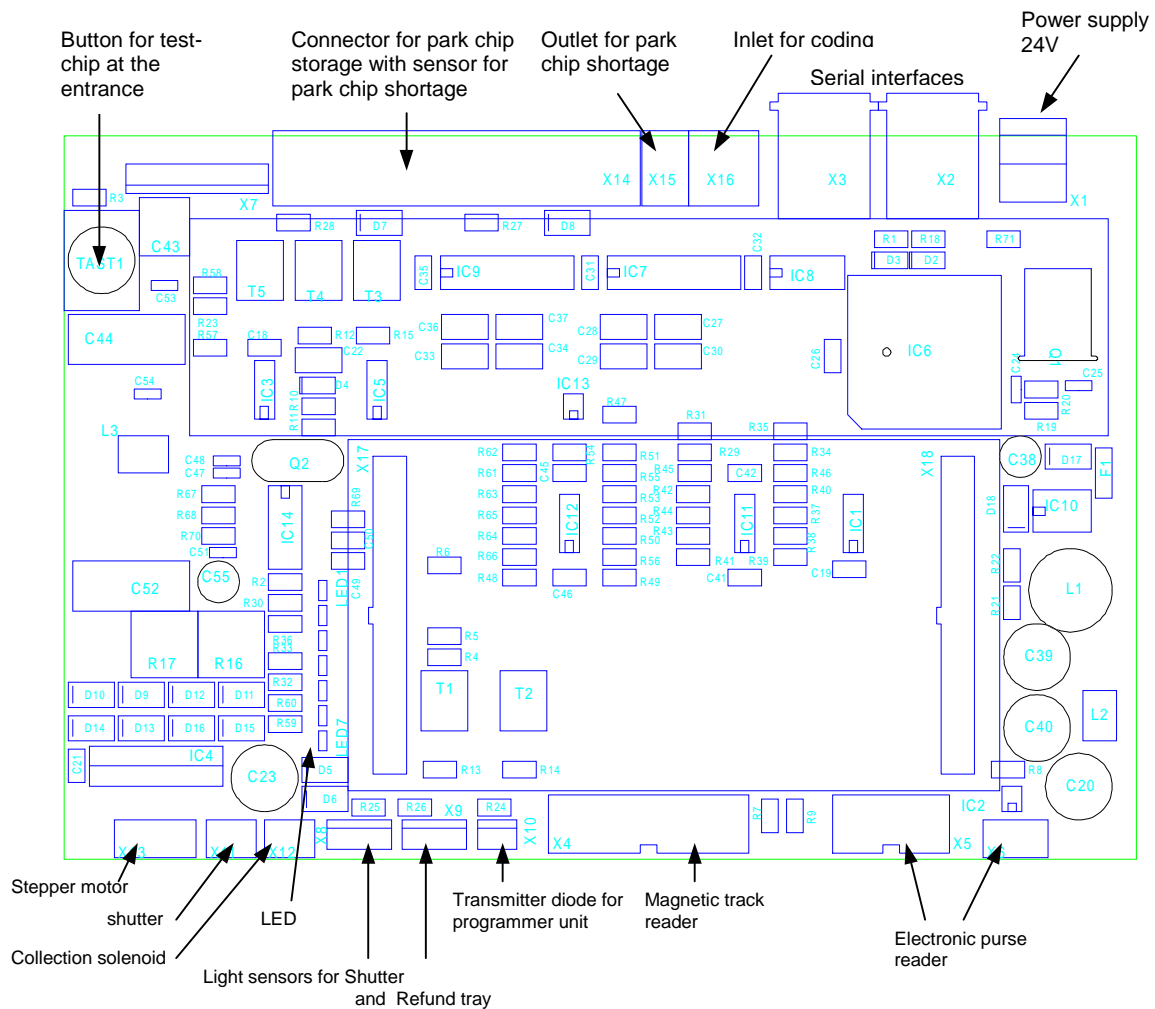
Graph 11: Chipmaster unit

In the picture on the right you can see the rotor and the transport channels within the unit.



Graph 12. View of the CHIPMASTER Transport channels

The layout of the connectors you can see on the following graph.



Graph 13: PCB Chipmaster reader (CME)

On the PCB there are all connectors for peripheric compinents and the optional readers (credit card reader for example).

There are some LED to indicate the the status of various sensors.

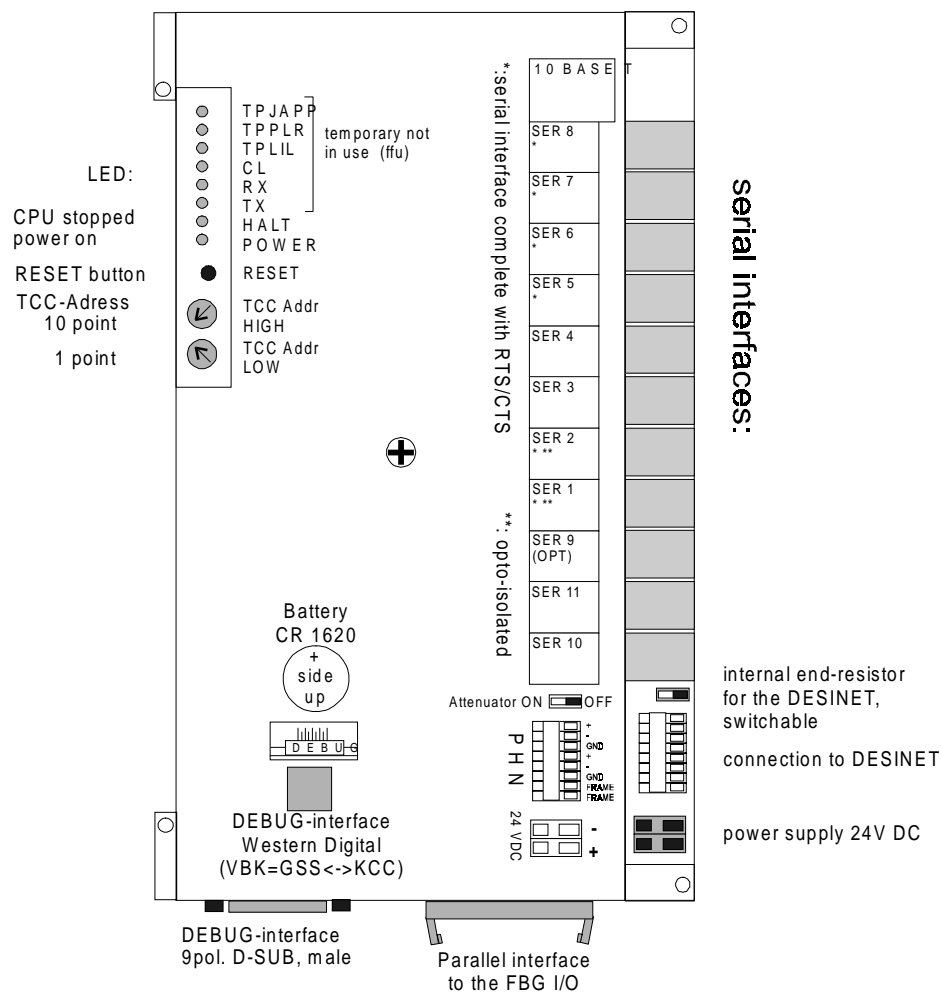
- LED 1 = not used
- LED 2 = Hopper right nearly empty
- LED 3 = Hopper left empty
- LED 4 = Return position for chip coins is empty
- LED 5 = Insertion slot is empty
- LED 6 = Rotor is in idle position
- LED 7 = Chipcoin is in programming position

1.4.5 TCC (Terminal Control Computer)

The TCC is the exit unit's controlling computer (as the name indicates). It contains all necessary connectors and sockets for all components inside the exit unit. It initiates all actions and supervises all functions.

1.4.5.1 Layout of the TCC

The TCC is capsulated in a box of steel tin, cromatized.



Graph 14: View onto the TCC (Type KCC)

1.4.5.2 Serial interfaces

The serial interfaces of the TCC are connected to the following components.

- Port 1 serial receiptprinter (if any)
- Port 2 serial cashcard reader (if any)
- Port 3 serial speech output (if any)
- Port 4 Chipcoin reader or Multikon
- Port 5 Videosystem or GAC (if any)
- Port 6 Display (2 x 20 char or GSS)

1.4.5.3 Parallel interfaces

There are build-in driver transistors to control a parallel interface board, named I/O board. This I/O board is connected to the TCC using a ribbon cable. The I/O board provides clamps to connect to, and it has some LED to indicate the status of the channels. The input and output of this channels are supervised as follows: (En stands for Input, An for output)

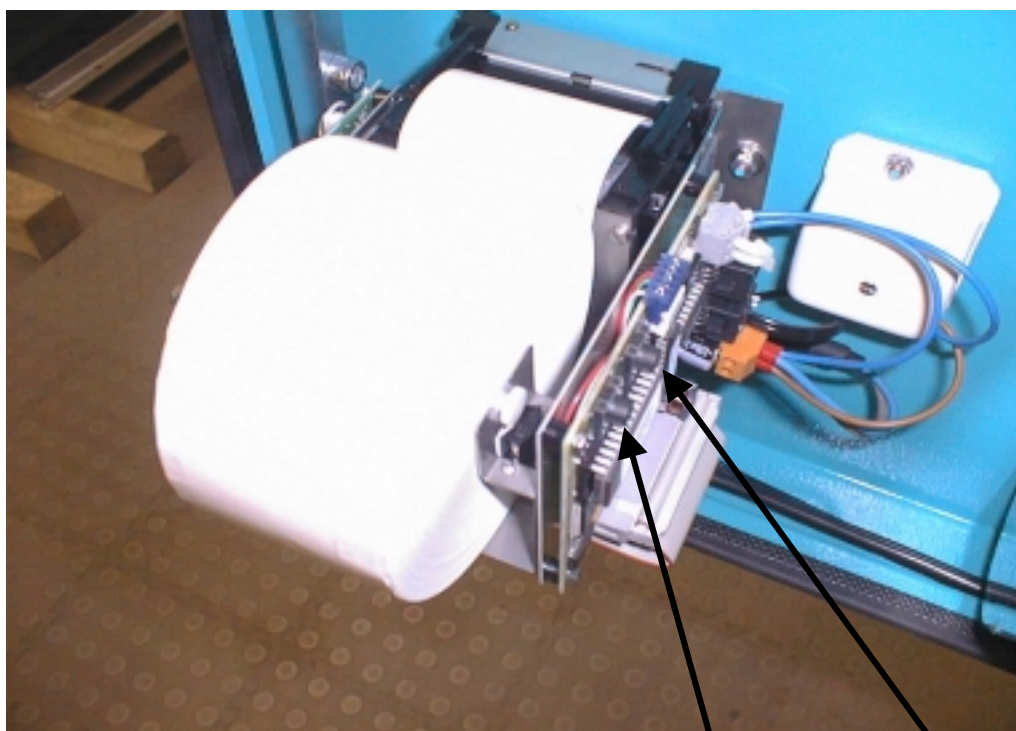
E1:	Barrier is down	A1:	Barrier to open for hourly parker
E2:	Chip or ticket stock nearly up	A2:	Barrier to open for hourly parker 1
E3:	Barrier is up	A3:	Barrier in operation
E4:	Barrier is broken	A4:	Receipt paper shortage
E5:	DET-N, closing loop	A5:	Parking time exceeded
E6:	Request for chipcoin/ticket	A6:	Barrier to close
E7:	DET-V, car is present	A7:	Barrier to open for season parker
E8:	Not used	A8:	Terminal in operation
E9:	GAC modul is off	A9:	GAC off /Barrier to open for sp #4(*2)
E10:	Language switch	A10:	Easy Move off / GAC off
E11:	Not used	A11:	Barrier to open for season p. #2 (*1)
E12:	Power Fail (Option)	A12:	Barrier to open for season p. #3 (*1)

(*1) since V10.84 (*2) since V10.86

If the display is a graphical one (GSS), the buttons of the front panel are wired to the display instead of to the I/O board directly, for the ease of wiring. The display communicates to the TCC by serial interface to indicate the use of any button on the front panel.

1.4.6 Receipt printer

The thermoprinter will print receipts for payments with credit cards, with cash card, and on request for cash payments.



Graph 15: Receipt printer
Two buttons: Test cutting

Feed paper

The thermoprinter does have a build-in sensor to supervise a paper-low situation. It will send an alarm to the data central when this happens. The paper can be supplied by a suitable local store or by DESIGNA GmbH, Identnummer 7 232 120 550.

Change of receipt printer paper

- Open the door of the exit station
- Remove the old paper roll, place a new roll on the shaft and set it back in the holder.
- Cut the paper off smoothly and at right angles to the rolling direction.
- Thread the paper into the intake slot until you feel a slight counterpressure.
- Press the thread-in button and the paper is pulled into the printer. Hold this button until the paper is pushed out of the output slot (in the pay station door).
- Activate the cutting head to cut off the paper.
- Close the door

General notes:

- To avoid wear and tear, please use the specified paper only.
- Paper of low quality may cause paper jam, bad printing, wear of the printer bar.
- Do not print when there is not paper inside
- Be careful of damaging the printing device with any sharp objects.
- Never touch the printing bar with your fingers.

Technical Data of the receipt printer:

Characteristic	Data
Printing method	Thermo
Resolution	4 dots pro mm
Dots per line	192
Printing width	48 mm
Low-paper-sensor	With a light sensor
Speed of printing	200 dot-Lines per Sec. (55 mm per sec.)
Paper Feed	0,25 mm per pulse
Power supply	24V DC
Temperature range	0° bis + 60 °C
Life span	300.000 cuts 50 mio pulses 30 km paper
Paper width	58 (+0 –1) mm
Paper thickness	50 g/m ²
Weight of unit	ca. 330 g
Recommended Paper	FH65BX (65 µm) Honshi Paper Co. TF50KS-E2C (65 µm) Nippon Paper Ind. AF50KS-E (65 µm) Nippon Paper Ind. AF50KS-E3 (65 µm) Nippon Paper Ind.

1.4.7 Heating

The device does include an electrical heater to prevent condensation in low temperatures. To regulate the heater there is a thermostat. The thermostat is located in the upper right part of the back panel of the unit, and is by default adjusted to 5-10C only.

1.4.8 Hydrostat (Option)

The device may be equipped with an optional hydrostate which takes over the function of the thermostat then. It will power up the heater when the humidity inside the unit exceeds a certain limit. To protect the device against overheating, the thermostat will switch off the heater at a given limit of temperature.

2. Functional description

The AKG100 works together with the barrier (LS100) and creates a dedicated, protected area. Inside the barrier there are loop detectors, which are wired to loop coils beneath the driving lane.

2.1 Operation with chipcoin or magnetic stripe ticket

We now describe the use of CHIPMASTER. The magnetic stripe function is identical.

The exit device is connected to the barrier unit by a connection array in parallel wiring. The barrier control unit will send signals using the connection cable, one signal per lead. When a car covers the loop-V (car detection loop), the relevant signal is given to the TCC. This signal allows the exit station to accept a normal client's chipcoin.

- When the chipcoin is inserted, the reader will check the chipcoin and open the barrier or
- reject the coin and leave the barrier closed. The barrier will open for paid hourly chipcoins and for those chipcoins within the free passing time. The chipcoin will be marked as unusable and will be dropped into the bin.
 - Season parker may use their chip coin. The barrier will open when the client takes out the coin after it was recoded.
 - When the optional credit card reader is installed at the chipcoin exit device, or when the credit card option is installed at the MSL, the holder of a credit card can use the card directly at the entry and exit. A park chipcoin or park ticket then is not therefore required for this person.
 - Option: When an separate credit card reader is installed at the exit, or when the MSL is having the credit card feature, the client can use her/his credit card to pay for the parking fee.

Depending on the configuration at the exit, the season parker chips will be checked at the exit

Blacklist-check enabled:

When the season parker chip is on blacklist, it will be cancelled. Depending on the configuration, the barrier opens or not, and the chip is returned to the client or not. However, this chip cannot be used any further without operator interaction.

I/O check enabled:

The record of this season parker will be checked for presence in the car park already or not. If the parker is registered as „already out of the car park“, this request to exit now is rejected. An according message will be shown on the display and sent to the operator in the central booth.

NOTE:

I/O check disabled will cause no fee calculation. It will cause a total loss of income on credit cards and credited season parkers.
(No I/O check = no fee = no income)

When all checks are complete, the chip will be recoded and returned to the client. When the chip is taken, the barrier opens. The barrier will close after the vehicle has passed the closing loop.

The same principle applies when a credit card is used directly at the entry and exit. As these cards cannot be written to, there is a data base record for each such card currently in the car park. When the card leaves the car park, the record is deleted, and the fee is added to an invoice file.

2.2 Operation with option Easy-Move EM 100

A convenient access for season parkers can be provided by the installation of an Easy Move Option to an entry and exit device. The normal season chip or season card will be replaced by a season tag, which contains some electronic circuit to communicate with the easy move readers.

At the exit situation there will be a transmitting antenna, which is connected to a coupler to a controller, and then to the TCC. When a TAG is shown to the antenna, the controller will transmit the coded tag number to the TCC, which will request the BFR for the full record of this tag. With this full record, the exit station will perform a normal season parker treatment and open the barrier accordingly.

NOTE: When using roller gates instead of barriers, it might be necessary to shortcut some signals to check the barrier-is-following-the-command supervising. When a barrier is opened, it is allowed 8 seconds after which the TCC will send an alarm to the BFR „barrier is jammed“.

Please also refer to the manual „Easy-Move EM 100“.

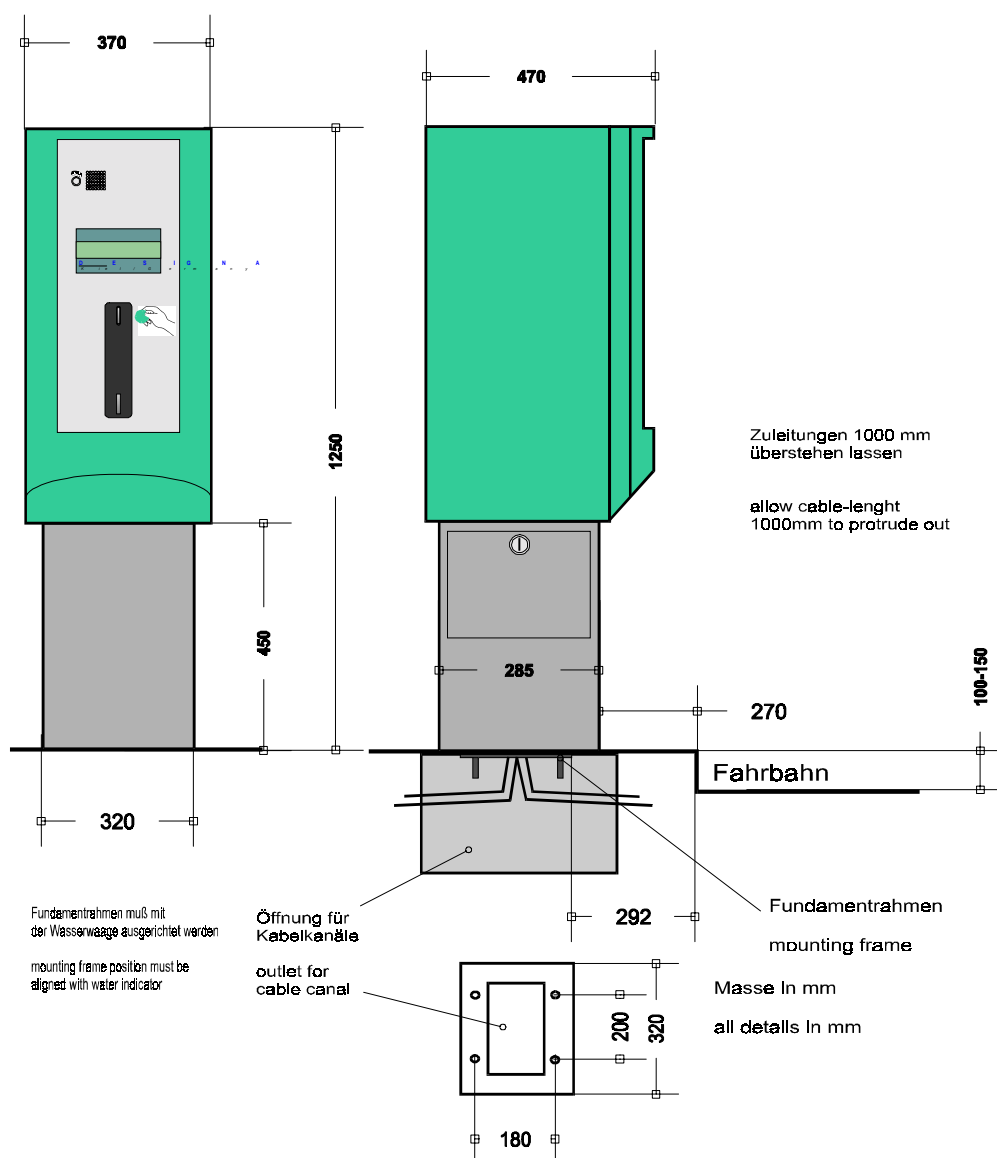
3. Installation

3.1 Mounting the AKG100

To provide a solid stand for the device, they are mounted onto a foundation frame casted in concrete. The plain surface of the foundation frame makes it easy to mount the device. Alternatively, you may use chemical bolts, UPAT 10mm. The concrete should have a quality of at least $W=25N/mm^2$, the class is labelled BH PC 250.

For TREND devices there is no foundation frame.

The concrete surface must be plain and smooth, and the surface of the concrete must match with the surface of the foundation frame.



Graph 16: mounting frame AKG 100

3.1.1 Mounting of BASIC device

- Unwrap device close to the final position to avoid damages during transport.
- Open the door (keys are in the bag outside)
- Take out the screws of the safety bars
- Take out the screws of the foundation frame
- Place the device on top of the frame, keep it in an angle to feed all the cable through the bottom part
- Let down the device, adjust it to match the holes of the frame
- Insert the screws and fix them
- Now start to fix the electrical wiring.

3.1.2 Mounting of TREND device

NOTE:

The TREND device has a small base and tends to tip over very easily. It is therefore advisable to have one person holding the device while another bolts it down.

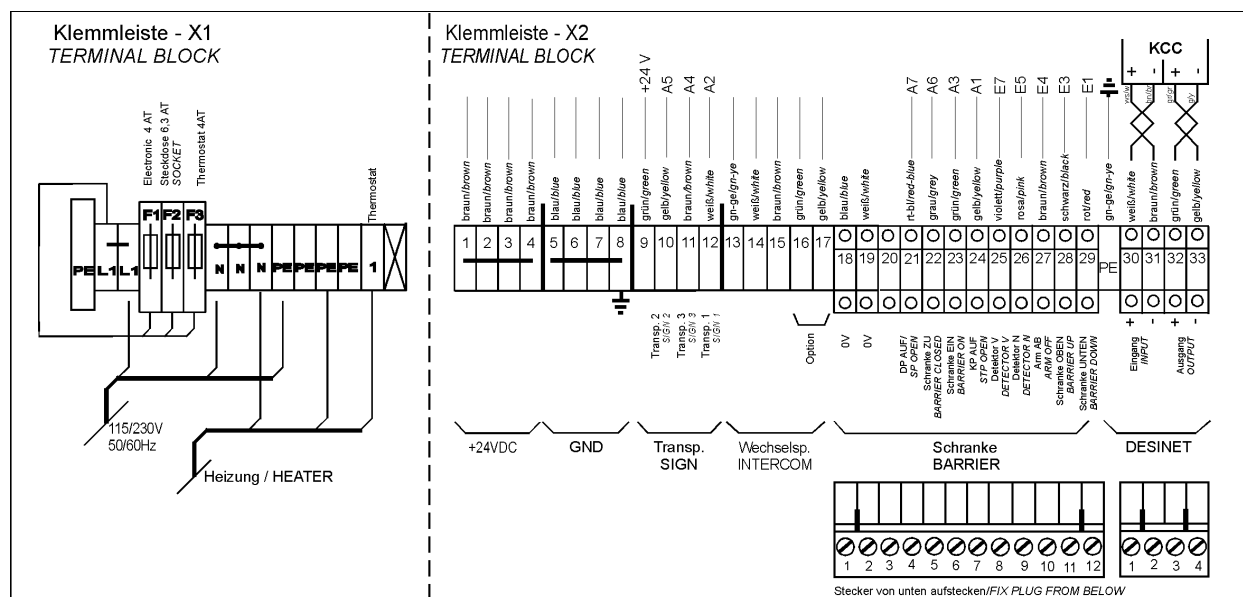
- Unwrap device close to the final position to avoid damages during transport.
- Open the door (keys outside) and remove all packing.
- Remove the screws from foundation and securing bars
- Adjust the device and mark the holes.
- Shift the unit aside to have space to drill the holes.
- Place the chemical bolts inside the holes.
- Bring back the device, hold it in angle and feed the cable through the pillars.
- Place the device onto the holes and drill the bolts in
- Hold the device for 20 minutes and then fix the bolts.
- Inside the unit there are inbus screws to adjust the frame
- Close the cover

Now you may start with the electrical interconnections.

3.2 Electrical connections

NOTE:
The installation of power and control leads should
Be done by authorized personnel only.
Please make sure any voltage is switched off.

All connections will be done in the back part of the casing. The connection is following this connection scheme:



Graph 17: Connection clamps

3.2.1 Power Supply

The power supply (230V/50Hz, 1 phase) is to be brought to an junction box, individually for each device. Please also make sure each barrier has an own feed, so the barriers may be fused individually. The circuit breaker will be 10-16A, the cable should have the dimension 1.5mm². Depending on the length and the local requirements the cable might have to have a bigger diameter. The clamps do support up to 2.5mm², and bigger clamps are available on request.

The power supply will be connected to the back row of clamps. There are three separate fuses for supply of electronic, heating and illumination. This fuses may be supplied individually. If there is just one lead supporting the unit, you will have to provide a strap between those three clamps on the lower side. The idea is, a shortcut in the heater or illumination will not cause the electronic circuit to fail as well.

All other connections are done on the right side of the unit. The layout of the connections please find on the sticker inside the door.

3.2.2 Connection of Intercom

The wiring of the intercom is to be done separately, star-topologic. The intercom cable can be run in the same conduits, but on a separate cable from the data line. The power cable should never be run in the same conduits as intercom or data cable. Minimum distance between the two conduits is 30cm.

The connection cable may be standard outdoor telephone cable of 0.8mm diameter, or LIYCY 2x0.8mm, or JY(st)Y 2x2x0.6mm².

3.2.3 Connection to barrier

The connection to the barrier is done with a 12 pin plug. The cable should be a 10 pair cable, just to have some spares. The following diagram shows the connection layout:

Signal description	EKG/AKG clamp	LS Plug-7 Left plug
0V	1	1
0V	2	2
	3	
Barrier to open for SP	4	4*
Barrier to close	5	5
Barrier to enable	6	3
Barrier to open for hourly	7	4*
Detector V	8	10
Detector N	9	9
Barrier arm is broken	10	6
Barrier arm is up	11	7
Barrier arm is down	12	8

Tabelle 1 : Connection AKG <-->LS

- If the signals „barrier to open“ for hourly and for season parkers are to be used on an external counting unit, you need to map the outputs using Schottky diods, Designa ID 7 222 081 204

3.2.4 DESINET Connection

Please refer to separate manual „**installation**“ of DESINET“

The cable for the car parking line will be connected directly to the connection bar.

The shield is to be pulled back and connected to the mechanical earth of the unit. The data leads shall remain twisted and be connected to the clamps. Twisting is very important. When connection to the clamps, flexible leads might be

If the shield of the data cable is not connected to the mechanical earth of the unit, it will be connected to the shield of the second data cable. This connection should be done with care.

Due to regulations of EMV please take the matter of shielding and earthing seriously



3.2.5 Transparents

When attaching outputs for car park signs, please use relays when the required load is more than 24V, 0.05A.

4. Going in service

When the wiring is done, you may take the unit in service. To do so, make sure the TCC address is matching the configuration of the data central, then power up the unit. The first booting may take up to 10 minutes.

**The built in TCC might have a station address different from what you require.
In that case the TCC will not go online.**

- To set the station address, first switch off the terminal. Take a small screw driver and adjust the switches to the required address. Please refer to graph 14. The two switches are coded decimal, so for example the address 15 is represented as high=1, low=5.
- Switch on the unit again.

5. Maintenance

To ensure full operation for years, the device needs to be maintained periodically. The recommended work is separated in three chapters.

5.1 Daily care and checking

- Before opening the door, wipe away any water, so it will not drip into the machine
- Magnetic stripe reader and chip coin reader: Does the front panel and the mouth piece match?

If necessary to adjust :

Loosen the screws at the back of the reader and move the reader. Then tighten the screws.

- If the outside temperature is below 10°C, the functioning of the heating needs to be checked. Turn the thermostat until the heating turns on. If the heating element produces warmth, the thermostat can be turned back into the normal position.
- If there is a second person in the central office, you may try the function of the intercom. Press the intercom button, talk to the central booth.

Magnetic stripe reader:

- Check the bin, empty it if necessary, wipe it out or use press air to clean it.
- Use press air to clean the reader from all adhesive dust. Never do wet cleaning. Make sure not to blow the dust into the unit but out of it.
- Clean the ticket rolls and the magnetic heads. For this cleaning please use isopropyl alcohol or spirits. Fold four tickets to a double layer of double length ticket, with the magnetic stripe at the inner. Then apply some isopropyl and let the package be pulled in several times.

Only CHIPMASTER:

- Is the chip storage box filled with chips? Take the chips and put them into the hopper in the entrance control device.

5.2 Monthly maintenance

Additionally to what we mentioned so far, every month please do the following steps.

- Control of all connectors in view of correct and tight placement.
- Clean the device with a soft pad and a mild detergent at the inside and outside. Vacuum clean the device at the inside if necessary (vacuum clean the mounting plate carefully also).

For magnetic stripe systems only:

- Clean the transport rollers of the magnetic card reader with isopropyl alcohol or spirit and dust and fuzz free pad.
- Oil the knife and the excenter in the transport unit with a non-resinous oil (Ballistol-Spray, Ident-no. 8 815 057 000 advised) lightly.

5.3 Quarterly maintenance

Additionally to what we mentioned so far, every three months please do the following steps.

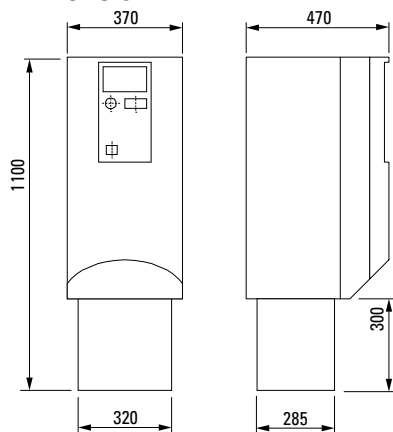
- Check the knife in the transportation unit, if necessary, oil it with a non-resinous oil.

6. Appendix A – Technical data

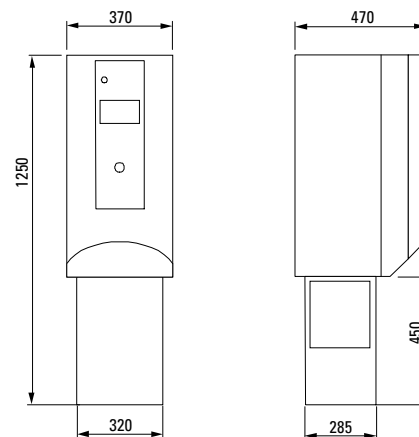
6.1 Technical data AKG 100 BASIC

Power supply	110/230V AC 60/50Hz
Consumption	200W max.
Heater	350W
Controlling voltage	24V DC 0.5 A max
Control input and output	0V active open collector
Load of controlling output	24V DC, 0.05A
Temperature:	
Store:	-25 bis +80 °C
Operation:	-20 bis +50 °C (Optional ist eine Lüftung einsetzbar)
Protection class:	IP 54 Open voltage in the casing
Noise:	< 70 dB(A)
Weight:	ca. 50 Kg

Dimension:



AKG 100 BASIC

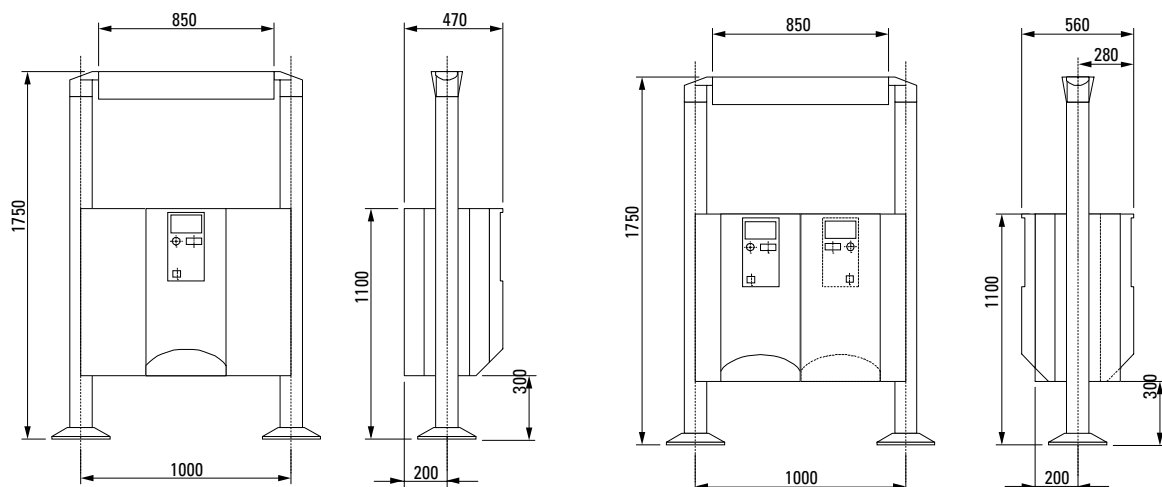


AKG 100 CHIPMASTER

6.2 Technical data AKG 100 TREND / TWIN

Power supply:	110/230V AC 60/50Hz
Consumption:	200W max.
Heater:	350W
Controlling voltage:	24V DC 0.5 A max
Controlling inputs and outputs	0V active open collector
Max load on contr. Output	24V DC, 0.05A
Temperature	
Store:	-25 bis +80 °C
Operation:	-20 bis +50 °C (Optional fan available)
Protection class:	IP 54 Open voltage inside the casing
Noise:	< 70 dB(A)
Weight:	TREND ca. 120 Kg TWIN ca. 200 Kg

Dimensions:



AKG 100 TREND

AKG TWIN 100 TREND

6.3 Technical data TCC (Typ KCC)

Supply	24V DC
Processor	Motorola 68EN302, 20MHz
Memory	2 MB RAM (1 MB Flash-RAM for Programm, 1 MB S-RAM for Daten)
Data buffering	build-in goldcap for 1-3 days Optional Lithiumbatterie for apx. 1 Year
Serial interface	7x RS 232 galvanically connected 2x RS 232 opto insulated 1x RS 232 for DEBUG 1x RS 485 for DESINET, with integrated switchable termination 120R
Parallel interface	12 input, 12 output for 24V control, active low, open collector, 50mA each
Dimension	250mm x 150mm x 30 mm
Gewicht	1000g
Temperature	Store -20 to 70 °C Operation 0 to 60 °C