

# Operating Instruction

# System PM 100

Entrance Control Device  
EKG 100 BASIC / TREND

TICKET / CHIPMASTER

Version 2.00

# **DESIGNA**

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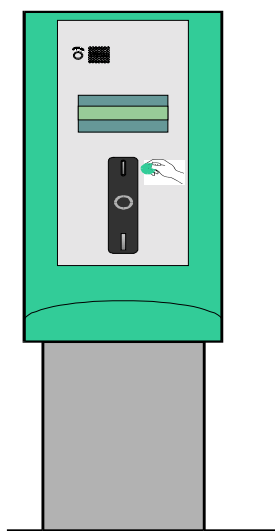
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# 1. Construction of EKG 100

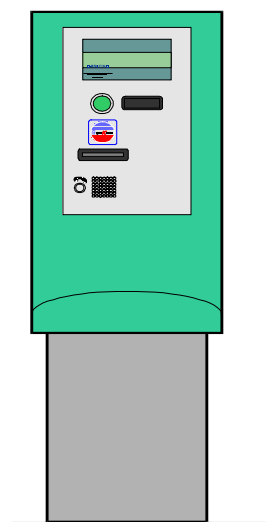
## 1.1 Kinds and characteristics

The entrance control device is available with two different options, 1) the chipmaster system (cm), which uses chip coins, and 2) the ticket system, which uses paper tickets and magnetic stripe cards. Further options are available as the use of credit card, bank card (ec), or cash card (if available in your area). All these options allow direct use of this card at the entry (and later on at the exit). On 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 handsfree parking.

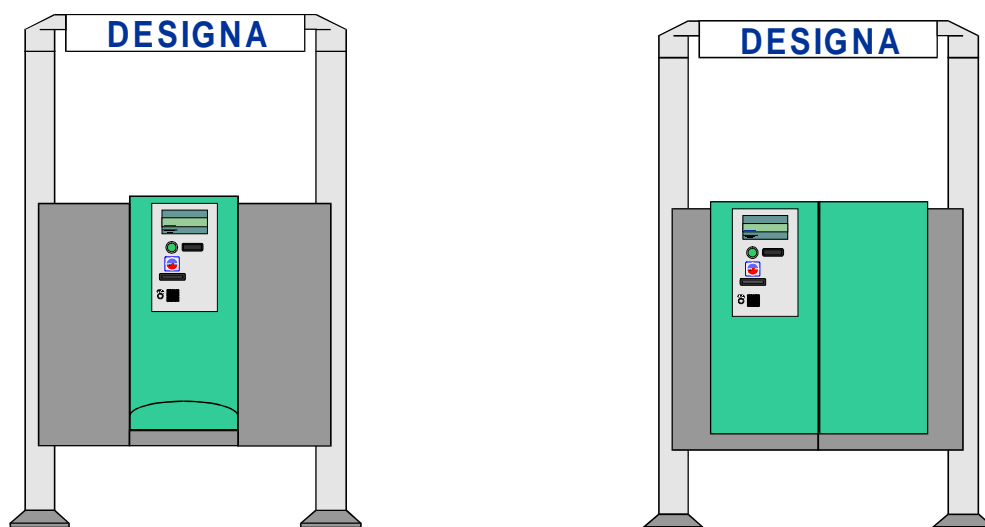
The entrance control terminal EKG is deliverable in the BASIC- and in the TREND or TWIN TREND casing. The only difference between the basic and trend are the casing and the location of the components. The casing of a TREND Terminal is mounted on two pillars of 100mm in diameter, these pillars are made from non corroding steel of degree V1.4512, and painted in Pantone 320C. As with the BASIC the TREND Terminal are available with the features as listed above.



Graph 1: View of EKG 100 CM in Basic closet



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



Graph 3: View of EKG 100 TREND / TWIN 100 TREND

### 1.1.1 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.

## 1.2 Operating tools at the front door

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

### 1.2.1 Buttons

- Info-button  
The information request button establishes a connection to the main intercom station and rings for the operator there.
- Ticket Request Button (only available in TICKET systems)  
By use of this button the car park client can request a short term parker card (magnetic track ticket or chip coin). The button is activated by driving onto the loop V (presence loop) and flashes green.

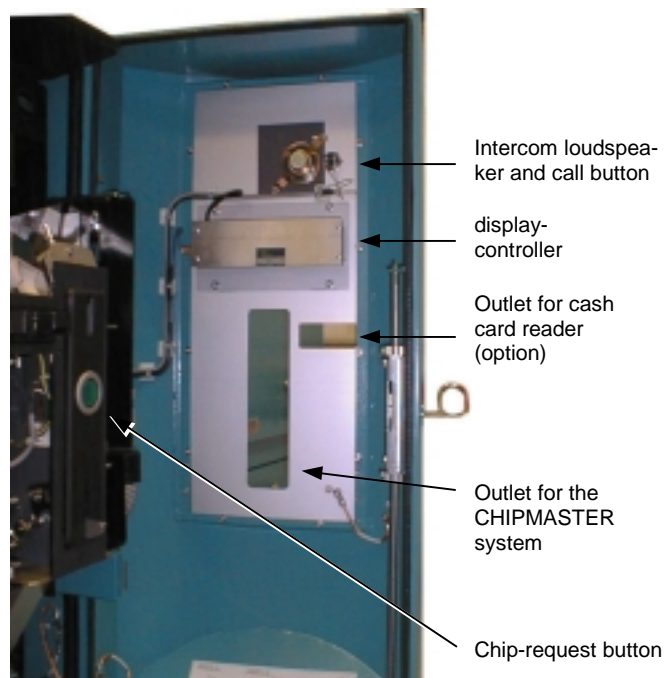
### 1.2.2 Display

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.

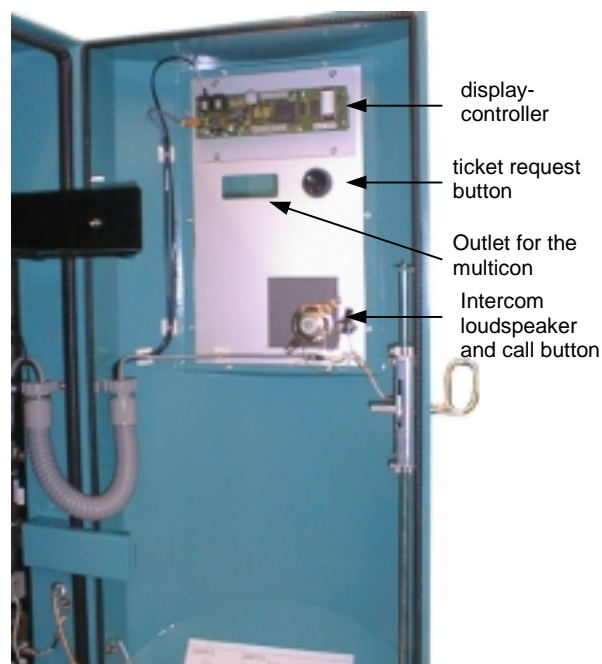
Magnetic Stripe systems only: There is an option that this unit be equipped with a graphical display allowing customized pictures to be displayed.

### 1.3 Inner construction of the EKG 100

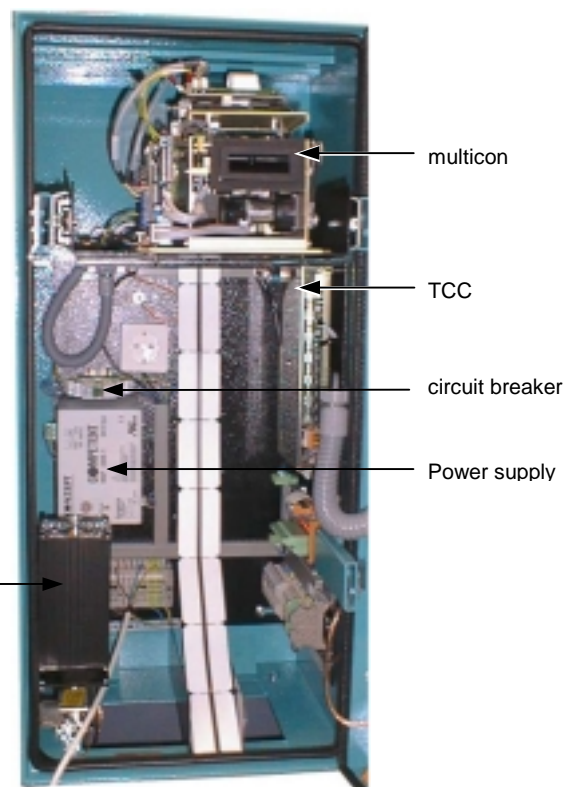
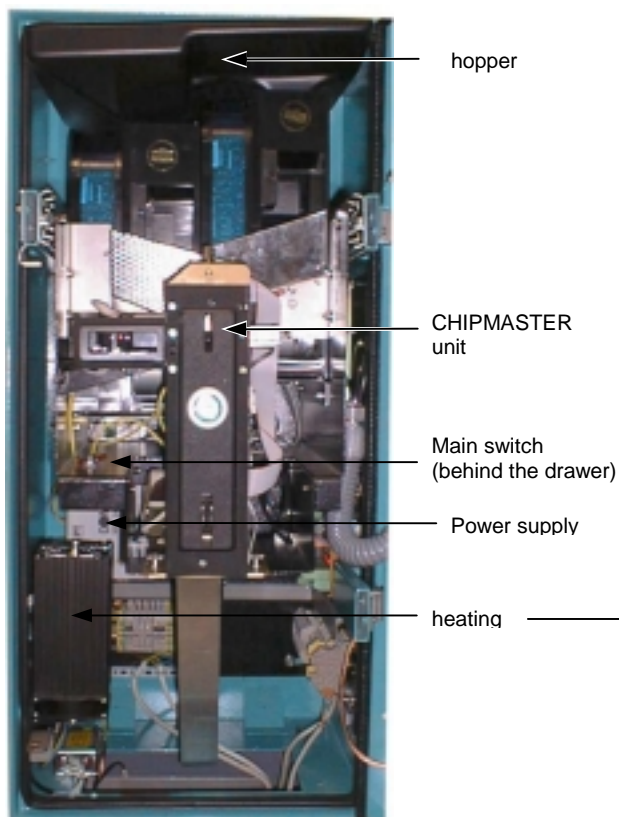
The entrance device AKG 100 BASIC or TREND consist out of the following components:



Graph 4: Inner view of door of EKG 100 CM



Graph 5: Inner view of door of EKG 100



Graph 6: Inner view of EKG 100

### 1.3.1 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 accidentally 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.

### 1.3.2 Power supply 24V

The power supply is placed at 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.

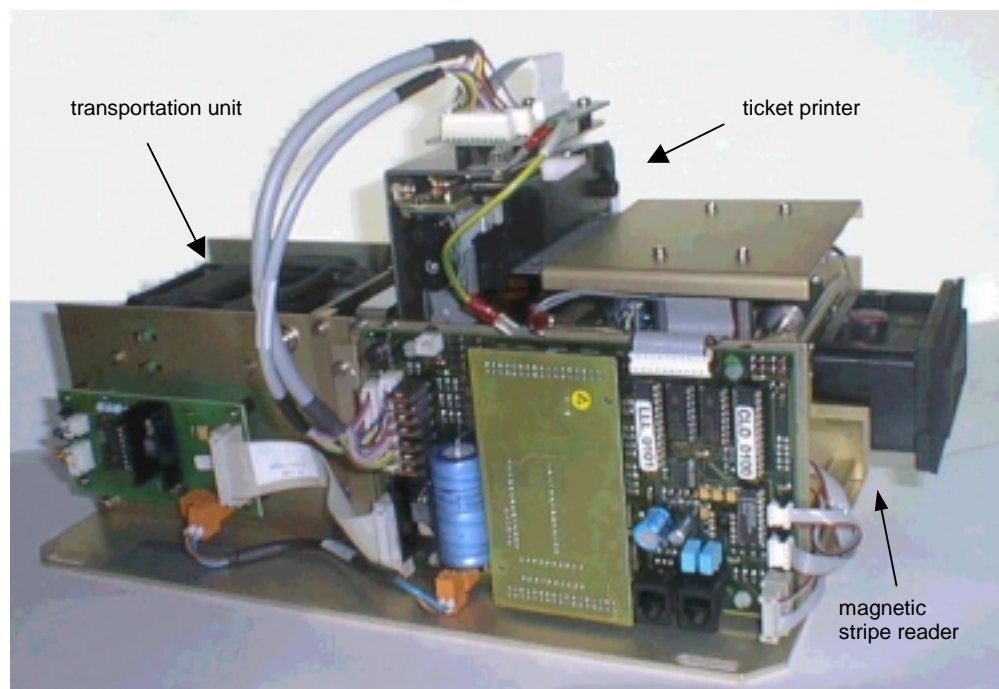


Depending on your choice, inside there is either a magnetic stripe reader or a chip coin reader:

### 1.3.3 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.



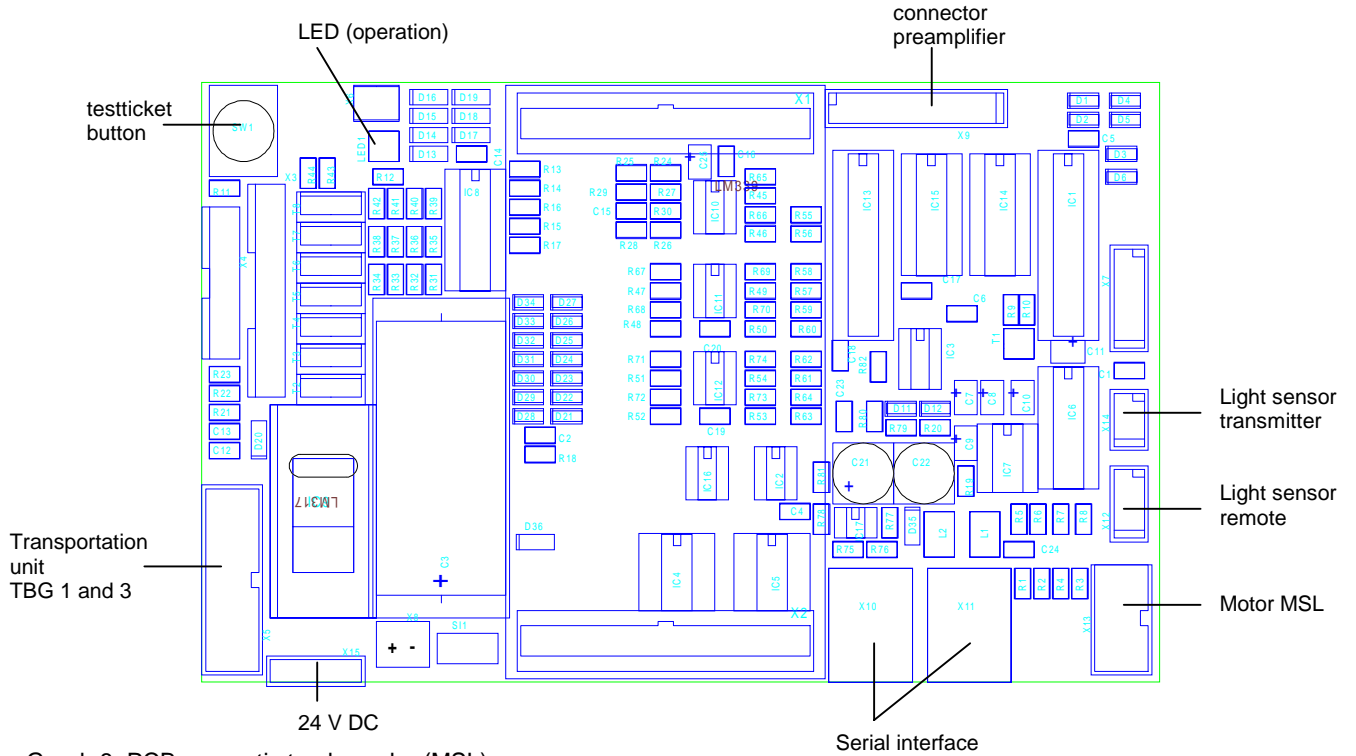
Graph 7: magnetic stripe reader

#### 1.3.3.1 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)

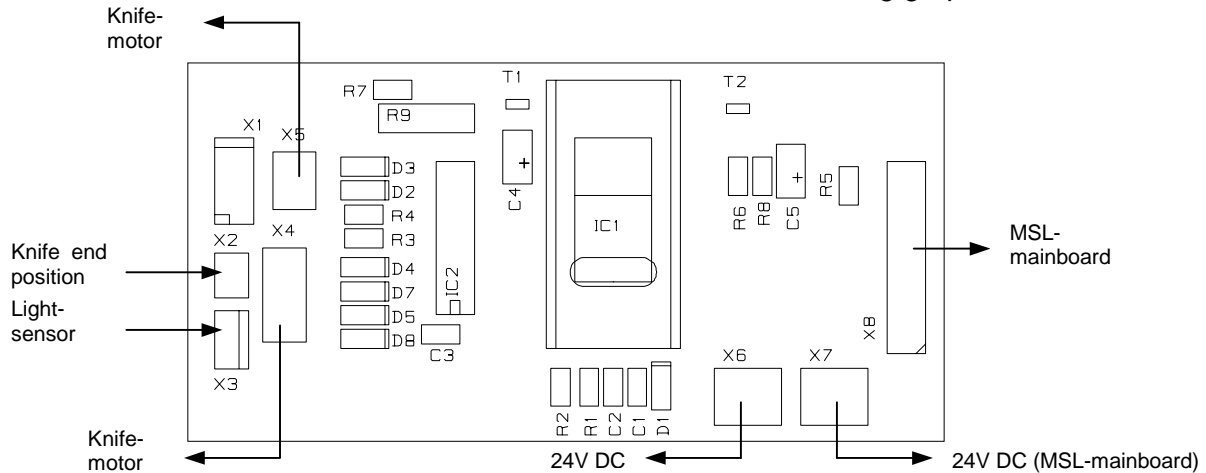
### 1.3.3.2 Ticket Printer

Paper tickets (cardboard) can be printed in optical characters from 0 to 9 and in capital letters. The matrix printer is only used in connection with the magnetic track reader, as the reader controls the transport of the tickets to the print position.

### 1.3.3.3 Transport Unit TBG I

The transport unit TBG I leads the short term parker tickets to the magnetic track reader. The TBG has its own driving motor, which transports the serial ticket string out of the ticket container and a cutting device to cut single tickets off the string. The ticket string is transported by the TBG by the length of one ticket until a light barrier indicates the cutting position. The knife cuts the ticket off and the magnetic card reader takes the ticket over for further processing.

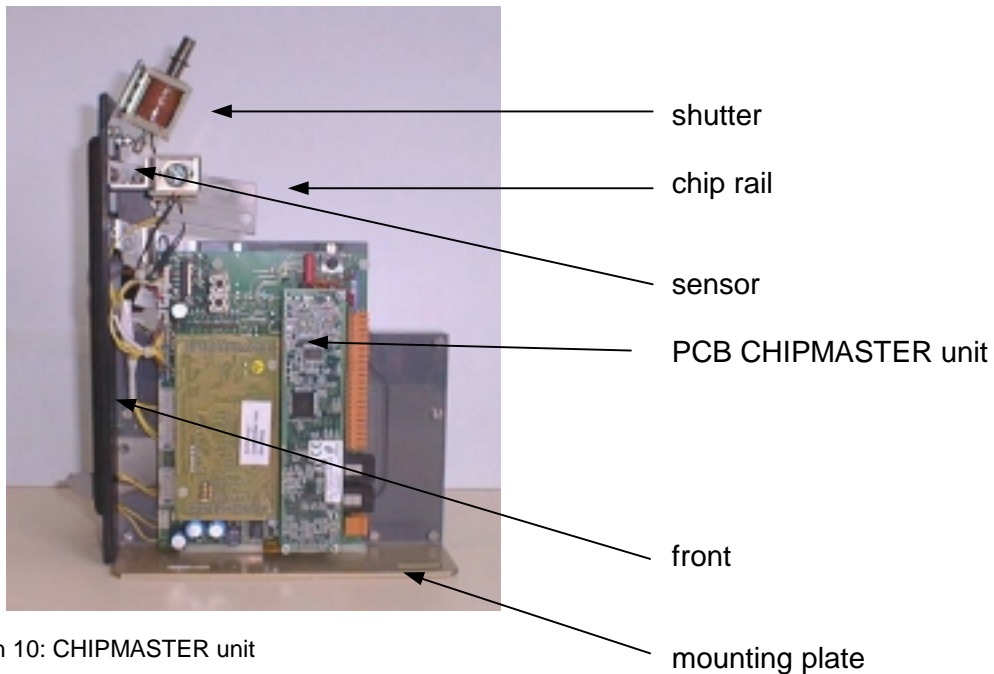
The connectors of the PCB for the TBG 1 are shown in the following graph:



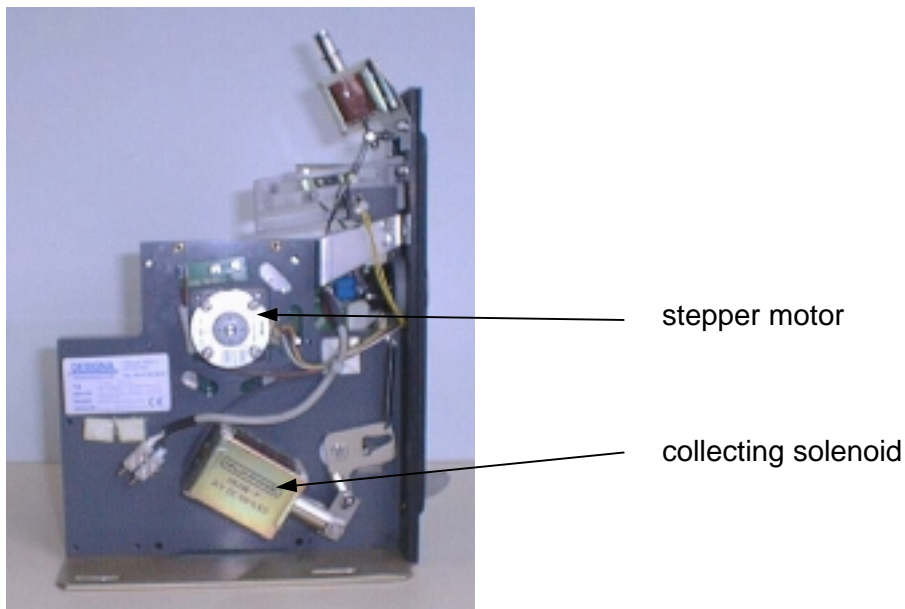
Graph 9: Transportation board TBG 1

1.3.4 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.

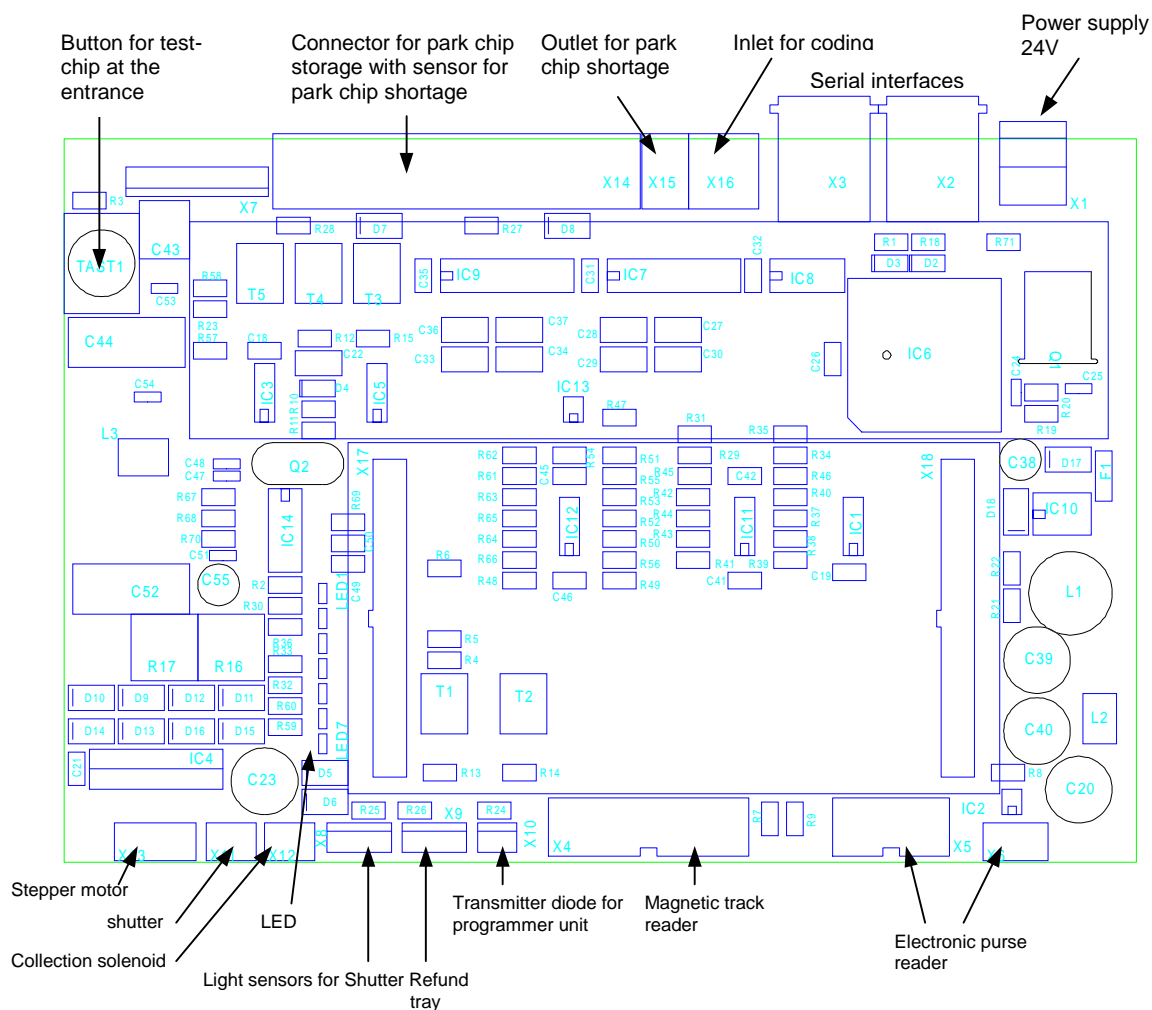


Graph 10: CHIPMASTER unit



Graph 11: CHIPMASTER unit (view of motor)

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



Graph 12: 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.

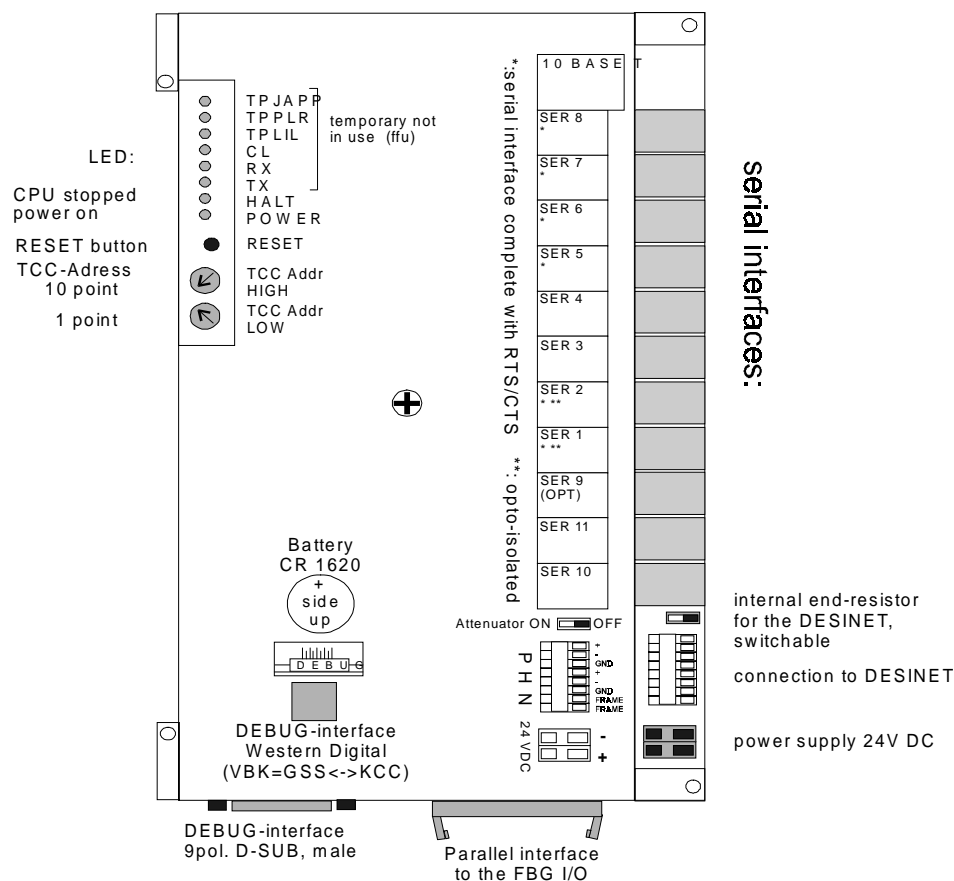
- LED 1 = not used
- LED 2 = Hopper right nearly empty
- LED 3 = Hopper left nearly empty
- LED 4 = Return position for chip coins is empty
- LED 5 = Insertion slot is empty
- LED 6 = Rotor is in idle position
- LED 7 = Chipcoin is in programming position

### 1.3.5 TCC (Terminal Control Computer)

The TCC is the entrance 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

#### 1.3.5.1 Layout of the TCC

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



Graph 13: View of TCC

#### 1.3.5.2 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)

### 1.3.5.3 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 this: (En stands for Input, An for output)

E1:	Barrier is down	A1:	Barrier to open for hourly
E2:	Chip or ticket stock nearly up	A2:	VMS 1
E3:	Barrier is up	A3:	Barrier enabled
E4:	Barrier is broken	A4:	VMS 3
E5:	DET-N, closing loop	A5:	VMS 2
E6:	Request for chipcoin/ticket	A6:	Barrier to close
E7:	DET-V, car is present	A7:	Barrier to open for season parker 1
E8:	Request #2 for chipcoin/ticket	A8:	operation without error
E9:	GAC modul is off	A9:	Barrier to open for seson parker 4
E10:	Language switch	A10:	Easy Move off / GAC off
E11:	Not used	A11:	Barrier to open for season parker 2
E12:	Power Fail (Option)	A12:	Barrier to open for season parker 3

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.

### 1.3.6 Heating

The device does include an electrical heater to prevent condensation water 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.

### 1.3.7 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 entrance 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.

Depending on the kind of arriving parkers different procedures may take place:

- If a season parker arrives at the EKG and inserts a season parker chip into the chip card reader, the reader encodes the data. If the season parker is admitted, the barrier will open when the client takes out the coin after it was read.
- The short term parker pushes the ticket request button and the chip coin unit issues a short term parker chip, including time of entry, date, device number, car park number etc. Once the ticket is coded, it is led to the front panel for return. The barrier opens, once the client takes the chip.

If the client now leaves the presence loop without passing the barrier (drives backwards away from the entrance), this ticket is registered in the data bank as parking fraud. This information is immediately transmitted to all other devices, so that this ticket is useless in this car park.

- Only CHIPMASTER systems: The unit can take back chipcoins not taken by the client. The tray will be flipped up, the coin then will roll back into the bin.
- Option: Short term parkers can enter with their credit card. The credit card number is registered by the system at the data control center in a data bank together with the according information (time of entry, device number). At the exit this data are activated and the parking fee is charged.

Depending on the configuration of the entrance the data of the season parker ticket are checked.

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 to open, after which the TCC will send an alarm to the BFR „barrier is jammed“.

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



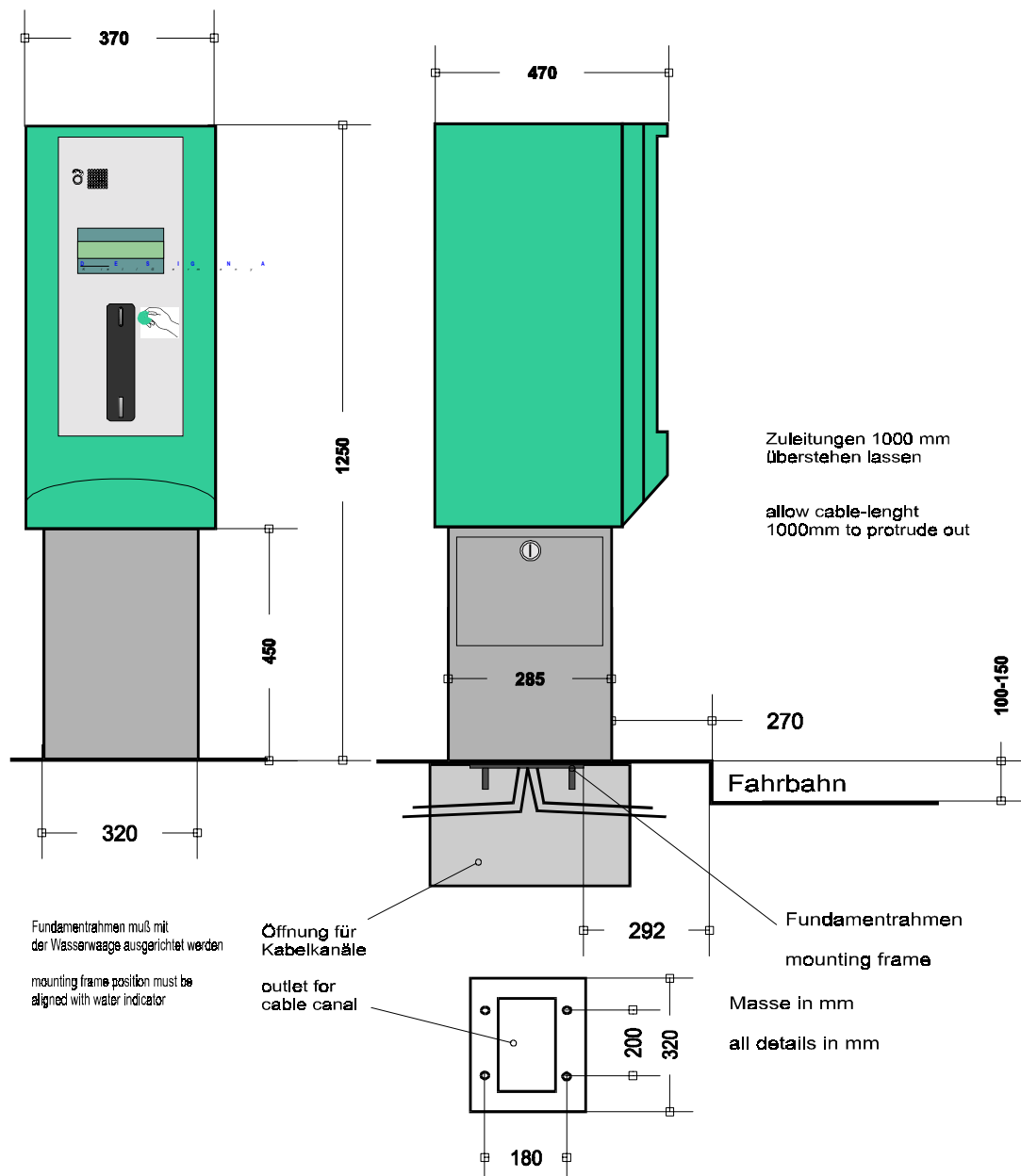
## 3. Installation

### 3.1 Mounting the EKG100

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 14: mounting frame EKG

### 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 easily. It is therefore advisable to have one person holding the device while another bolts it down.

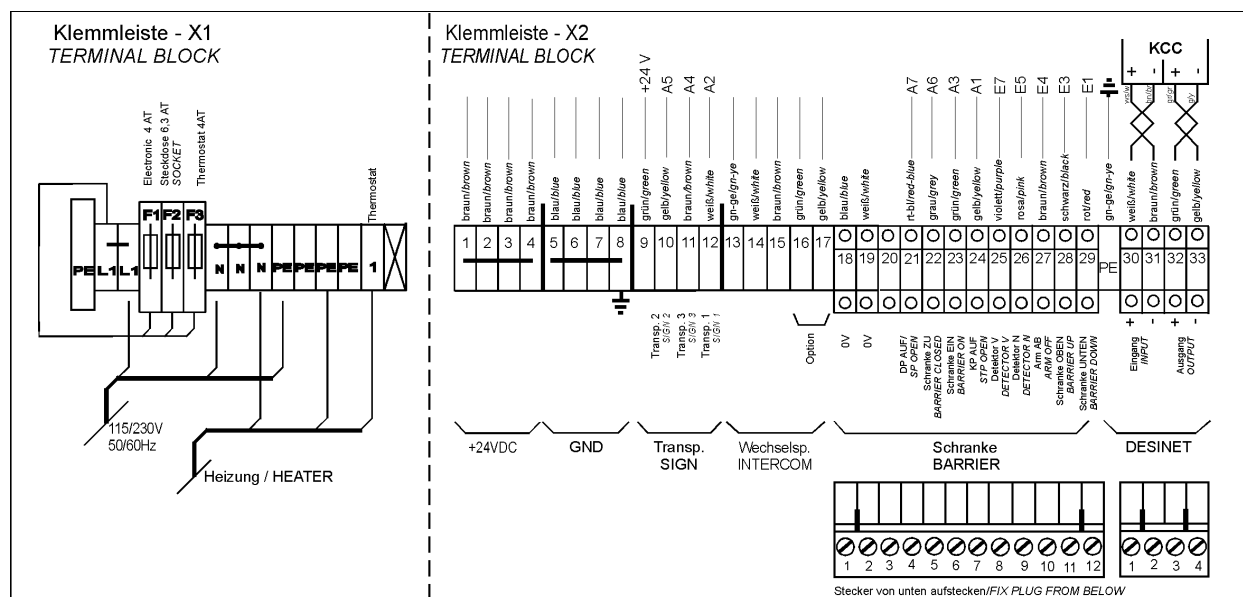
- Unwrap device close to the final position to avoid damages during transport.
- Open the door (keys outside) and remove all packing.
- Remove the screws from foundation and securing bars
- Adjust the device and mark the holes.
- Shift the unit aside to have space to drill the holes.
- Place the chemical 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 15: Connection clamps

#### 3.2.1 Power Supply

The power supply (230V/50Hz, 1 phase) is to be brought to a 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 1.5mm<sup>2</sup>. Depending on the length and the local requirements the cable might have to have a bigger diameter. The clamps do support up to 2.5mm<sup>2</sup>, 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 2x2x0.6mm<sup>2</sup>.

### 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 Connector	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

Chart 1 : Connection EKG <-->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, for example BAT48, 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 or configured in the data control center.  
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 13. 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
- Check position of ticket/chip coin slot. The slot should end with the front panel.

Correction:

Loosen the milled screws at the rear of the reader and position the reader.

- 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 a second person is present, control the functioning of the intercom. Press the information button on the EKG. In the supervision a signal must sound. Afterwards control the voice transmission.

For CHIPMASTER systems only:

- Is the chip storage sufficient? Fill it up early.

For magnetic card systems only:

- Control the contents of the ticket box. If it obvious that it soon has to be exchanged, have a box in stock at the supervision to replace the old.
- Control cutting of tickets. The cut should be exactly in between two tickets on the connection straps. If the occasion occurs the light barrier of the transport unit has to be re-adjusted.
- Control if magnetic card reader is clean. If the device is strongly soiled by paper dust or bits of paper, it has to be cleaned with compressed air carefully. Make sure, that no bits of paper are blown back into the ticket slots.
- 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.
- Pull out a test ticket by pressing the button on the transport unit. Control the printout of the printer on the ticket. If the printout is too weak, the ribbon needs to be replaced.
- 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.

## 5.2 Monthly checking

In addition to the daily care of the device the following actions have to be carried out during the monthly maintenance.

- 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 card 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

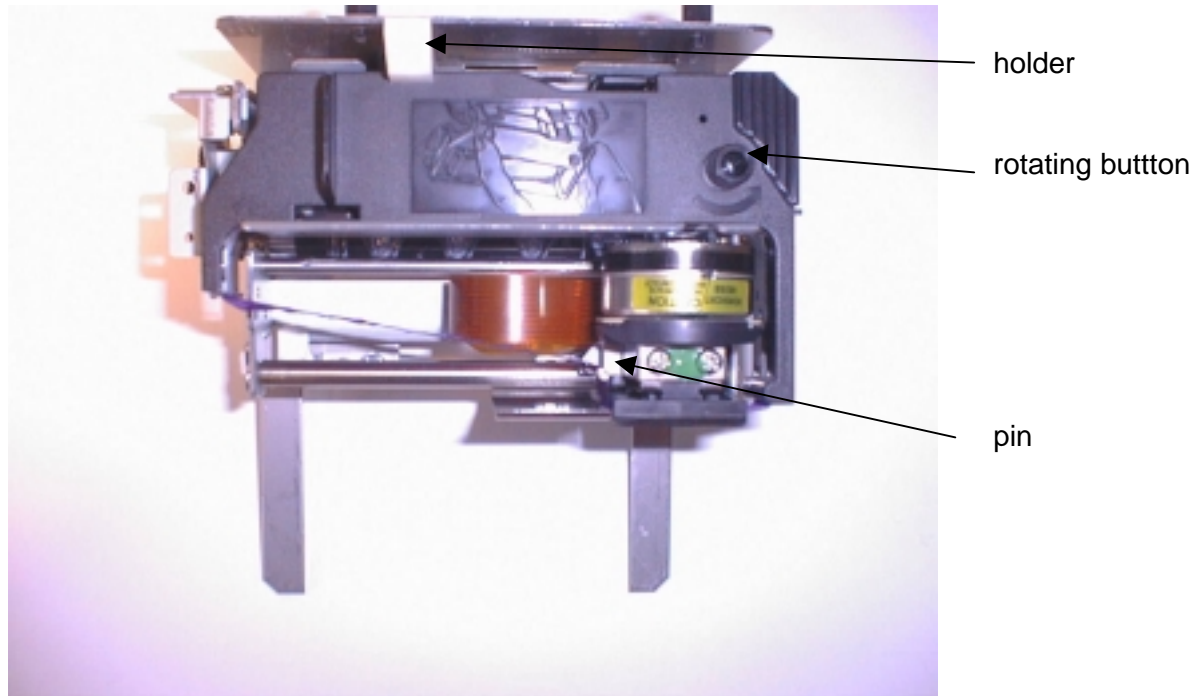
The quarterly maintenance is advised in addition to each 3rd monthly maintenance. The following actions then complete the monthly maintenance and care.

Only for ticket systems:

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

## 5.4 Replace Ribbon box of Ticket Printer (only ticketsystems)

The printer is taken out of its stay-rail and placed with the ribbon at the top. Press the holder to the top and take the box.



Graph 16: Ticketprinter

Insert a new ribbon box. Then the ribbon is to be threaded between pin head Druckkopf and punched sheet as show in the picture above. Afterwards the ribbon needs to be stretched.

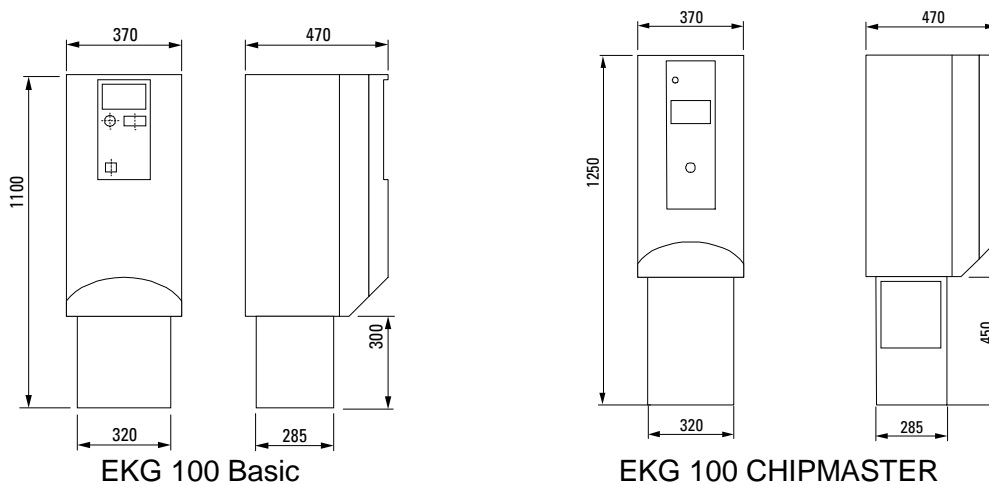
Finally the printer is put back into its guide.



## 6. Appendix A – technical data

### 6.1 Technical data AKG 100 BASIC

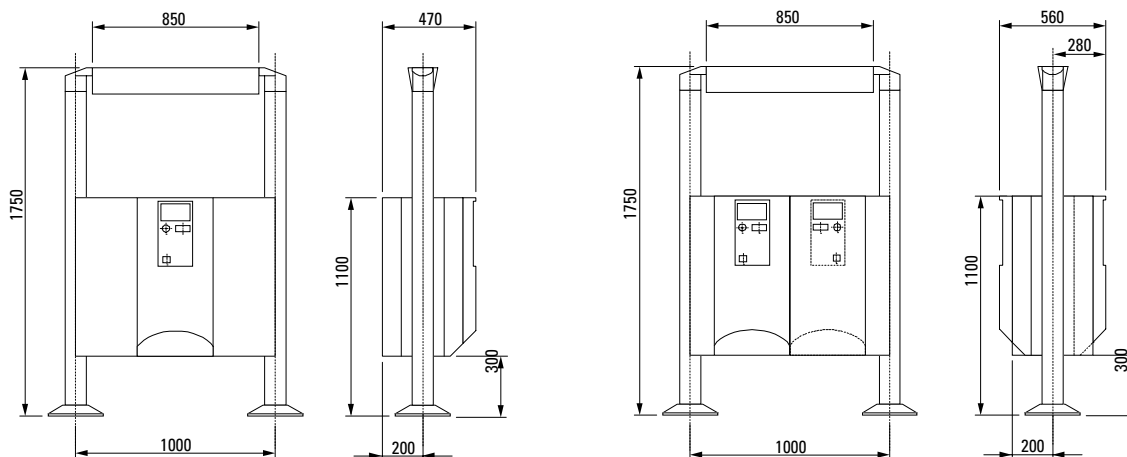
Power supply	110/230V AC 60/50Hz
Consumption	200W max.
Heater	350W
Controlling voltage	24V DC 0.5 A max
Control input and output	0V active open collector
Load of controlling output	24V DC, 0.05A
Temperature	
Store:	-25 bis +80 °C
Operation:	-20 bis +50 °C (optional fan available)
Protection class:	IP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



## 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:



EKG 100 TREND

EKG 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 program, 1 MB S-RAM for data)
Data buffering	build-in goldcap for 1-3 days Optional Lithiumbattery 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