Transport Training Series

Digital Tachographs

Train-The-Driver

Siemens DTCO 1381

Training the Driver

The Legislation

- Drivers' Hours Rules still apply
  - Regulation (EEC) No. 3820/85
- New Drivers' Hours Rules are currently under consideration
- Some changes to be introduced in May 2006
- Other changes to be introduced in 2007

It is important to point out that the digital tachograph has exactly the same purpose as its analogue counterpart – and that is to record information in order to demonstrate compliance with Drivers' Hours law.

The laws with which compliance must be demonstrated are fundamentally the same laws that applied in the case of the analogue tachograph.

Some changes will be introduced soon. For example, there will be a requirement to keep analogue charts for the driving week plus charts for the previous 15 calendar days.

System Overview

- Digital system is fundamentally the same as the current analogue system
  - Sensor / sender unit
  - Secure cable
  - Tachograph
- Same information is recorded and stored
- Different format, i.e. digital

It is important to emphasise that the digital system is fundamentally the same as the analogue tachograph with which drivers are already familiar.

In this respect there is nothing new to learn.

System Overview

The digital tachograph system comprises the following:

- The vehicle unit
- An intelligent speed sensor
- Tachograph smart cards

The speed sensor transmits digitally encrypted data via a secure cable.

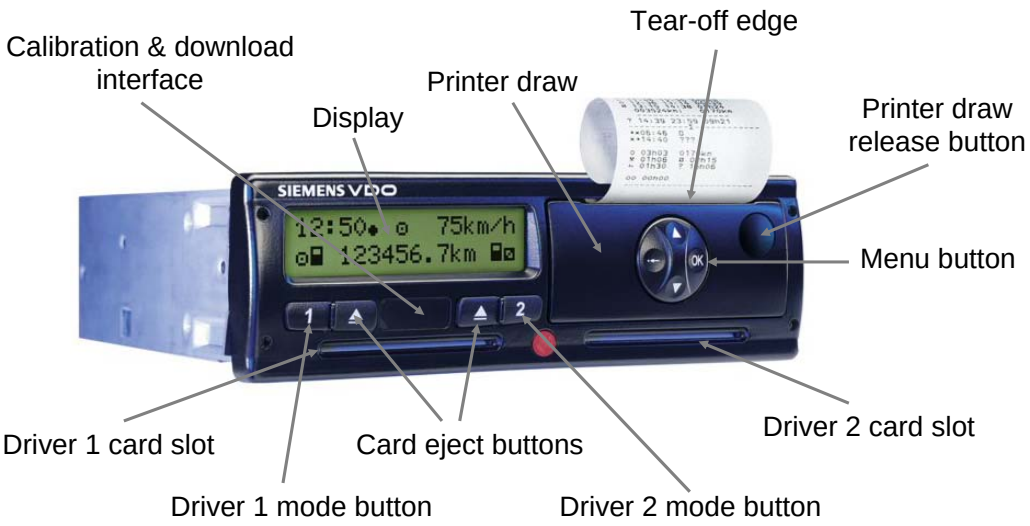
Information recorded by the digital tachograph can be viewed using the vehicle unit display and can be printed out using the integral thermal printer.

Information can also be downloaded from the vehicle unit using a download tool.

Different smart cards issued to:

- Drivers
- Companies
- Calibration workshop personnel
- Law enforcement officers, i.e. police officers and representatives of the Vehicle Operating Services Agency (VOSA)

Vehicle Unit Main Features



Vehicle Unit

The vehicle unit memory stores data for 1 year

- Distance & time
- Speed data for last 24 hours
- Mode data
- Drivers' manual entries
- Faults & events
- Driver card information

The vehicle unit memory stores data for 1 year. This is an approximation and could be slightly more or slightly less dependent on vehicle activity. The maximum memory capacity in units installed in vehicles operating 24/7 may be utilised within a year, in which case the data recorded at the beginning of the year will be over written by data recorded at the end of the year.

The unit records distance in km to a maximum tolerance of +/- 4%

The date and time are recorded in Universal Time Co-ordinated (UTC). The concept of UTC time is explained separately.

Speed is recorded in km/hr up to a maximum tolerance of +/- 6km/hr. Detailed speed data, i.e. at a frequency of 1 sample per second, is stored for a period of 24 hours only, following which earliest data is over written by latest recorded data. The frequency at which speed is recorded is the same for the digital tachograph as it is for the analogue tachograph.

Tachograph Cards

There are 4 cards used in the operation of digital tachographs:

- Driver Card
- Company Card
- Workshop Card
- Control Card

From the point of view of driver training, the most important card is the driver card.

The company card is used by the company to download information from the vehicle unit.

The workshop card is issued by technicians employed by tachograph calibration centres only. They are not issued to company workshop personnel.

Control cards are issued to enforcement officers, i.e. police and VOSA personnel. The control card gives enforcement officers access to information stored in the vehicle unit and on the driver card.

Driver Card

- Valid for 5 years
- Records:
  - Driving time, distance and events
  - Work and rest times
  - Manual entries
- Stores approximately 28 days of data

The driver card holds the following fixed information:

Surname
Date of birth
Driving licence number
Expiry date

The driver card stores information about the vehicles driven, including VIN number and odometer readings; driver activity data, including mode activity changes, insertion and withdrawal of card, start and end of daily working period.

The card can store a maximum of 72 events such as power supply interruption, and a maximum of 48 faults, such as card and vehicle unit faults.

Control activities are recorded on the card.

Drivers must apply for renewal not later than 15 days before expiry of the card.

Driver Card

- If damaged, lost or stolen:
  - Apply within 7 days for replacement
  - Authorities will issue replacement within 5 days
  - Can drive without card for 15 days (longer if necessary to return to UK)
  - Printouts must be taken at beginning and end of day

If the card is damaged or lost, drivers must apply for replacement within 7 days and DVLA will supply replacement within 5 days.

Replacement cards must be collected by the driver from the nearest VOSA office.

If the card is damaged or lost, the driver must make a printout at the end of the working day.

Cards lost or stolen are “black listed” listed on Tacho Net, a database accessed by enforcement officers throughout Europe.

Pictograms

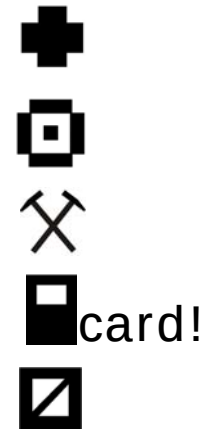
- Pictograms are used to convey information about modes of activity, events and faults
- The most common are also used with analogue tachographs
  - Rest and breaks 
  - Other work 
  - Availability 
- Some activities are depicted using combinations of pictograms

A full list of all pictograms should be given to each trainee.

This list should be referred to at all appropriate times during the training course.

Common Pictograms

- Local time
- Operational mode
- Other work
- Insert card
- Availability



From logging-in to logging-out, drivers will encounter approximately 10 pictograms.

This slide shows the first five, two of which drivers will immediately recognise as currently in use with the analogue system.

The first pictogram on this slide is the first new pictogram that users of the digital tachograph will encounter. It is used to denote “local” time and is also used when asked to confirm location at the beginning and end of the day.

The second pictogram on the slide is used to denote that the tachograph is in operational mode. It is also used to denote that the vehicle is in driving mode. On printouts, it is used as a reference to driver / operational activities.

The insert card pictogram is an obvious combination and flashes when the ignition is switched on. It is a request for the driver to insert the driver card.

Common Pictograms

- Start location 
- Cumulative breaks 
- Two weeks 
- End location 
- Daily printout 

Start location is another pictogram combination. It uses the location pictogram shown on the previous slide to ask for the driver's starting location.

The next pictogram will also be new to digitach users and denotes the sum of all breaks of at least 15 minutes.

The next pictogram will also be new to digitach users and denotes the total driving time over the previous two weeks.

The next pictogram is a similar combination to the first and asks the driver to confirm the end of duty location.

The final pictogram is a combination describing a type of printout, i.e. daily (24h) printout from the driver card.

UTC Time

- Universal Co-ordinated Time (UTC)
- All data recorded by the vehicle unit and on the driver card is in UTC time
- All printouts are in UTC time

UK Winter Time

UTC time = Local Time

UK Summer Time

UTC time = Local Time – 1hr

Since 1972, all broadcast time services distribute time scales based on Coordinated Universal Time (UTC). UTC is an atomic time scale that is kept in agreement with Universal Time.

All manual entries must be made in UTC time and printouts are in UTC time.

In the UK in winter, local time is the same as UTC time. In summer in the UK, UTC is local time minus one hour. A simple chart can be supplied to show the time conversion.

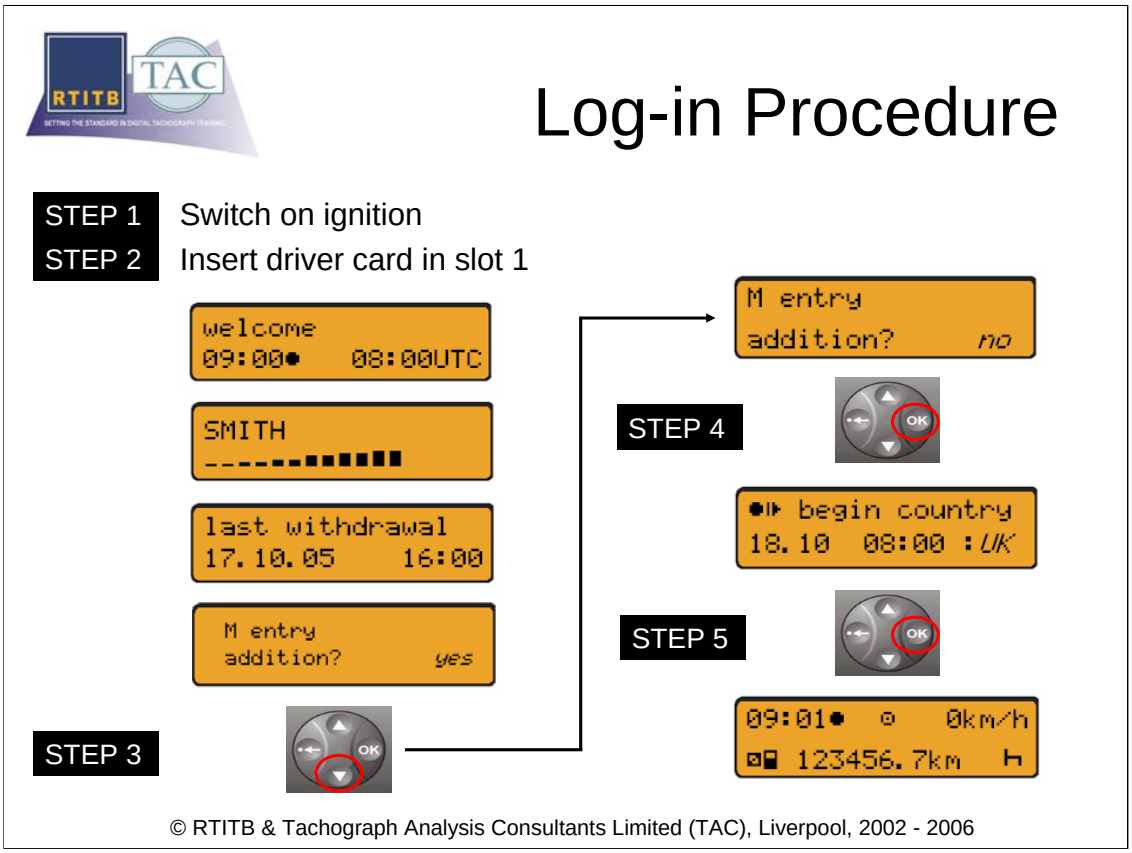
Calculating UTC time in other countries is dependent on whether it is winter or summer and the time zone offset for that country. For example, calculating UTC in summer:

UTC time = Local Time – (time zone offset + summertime offset)

In winter:

UTC time = Local Time – time zone offset

This need only be explained to drivers engaged in international transport.



This log-in procedure is demonstrated in its simplest form by excluding the manual entries procedure. However, in practical terms, manual entries must be made, if only to record daily rest. The only alternative to this would be for drivers to leave their cards in the tachograph all the time. This may present practical difficulties.

When the log – in procedure has been completed driving must not commence until the card pictogram appears in its complete form. If driving commences before this pictogram appears an event will be recorded – “Card inserted while driving”.

Once the driver card has been inserted, if the driver does not respond to the request to make a manual entry he/she will be prompted to make and entry. If this “warning” is ignored, the log – in process will complete automatically and the manual entry procedure will be bypassed.

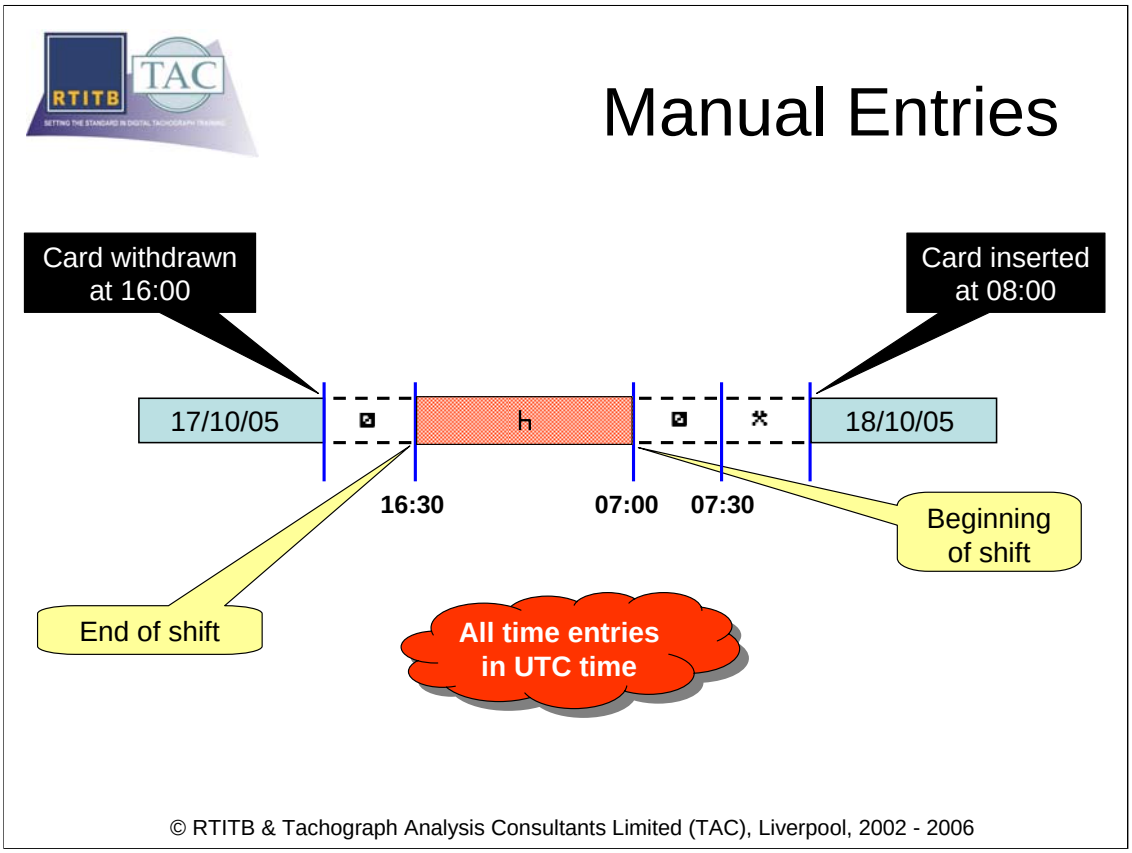
Manual Entries

- When work takes place away from the vehicle at the end or beginning of a shift, a manual entry must be made
- Manual entries are recorded on the driver card
- Manual entries are made during the log-in procedure
- The manual entry must be made in UTC time

Because Council Regulation (EEC) N0. 3821/85 stipulates that a daily rest must be recorded (Article 15.2) this must be done as a manual entry at the beginning of each shift.

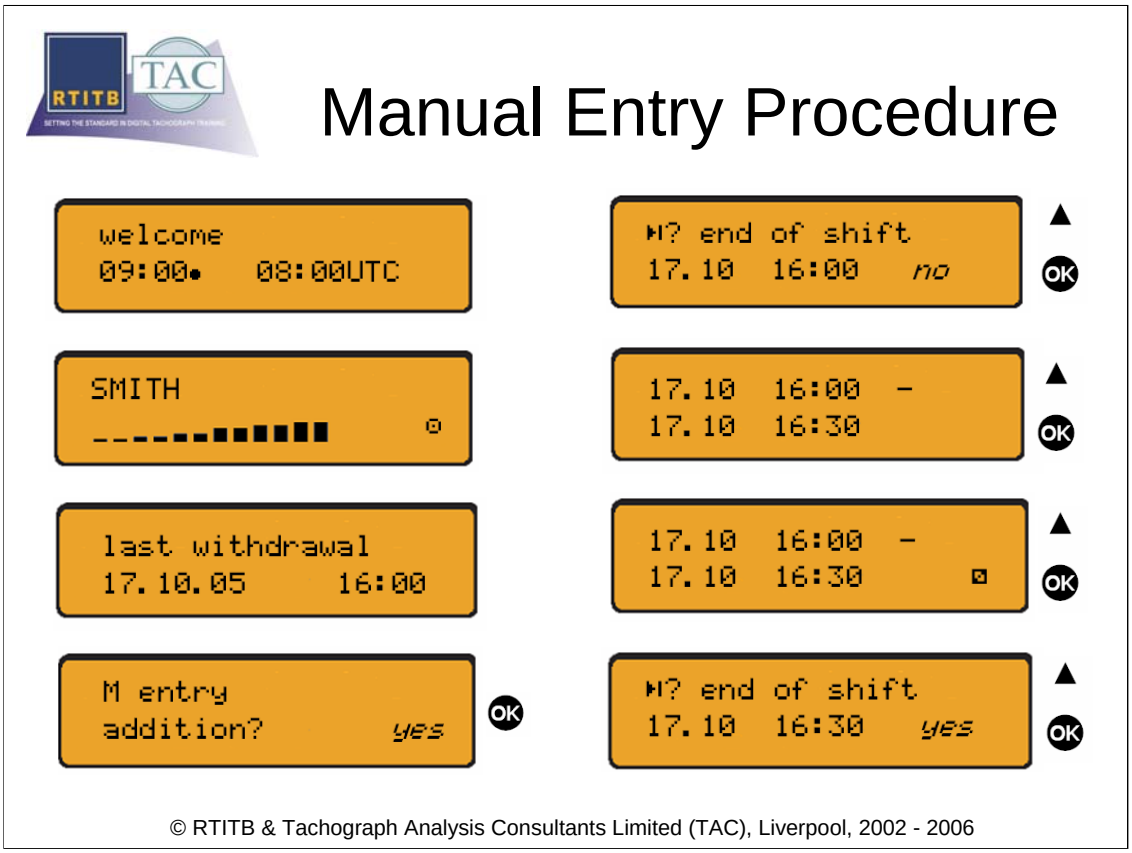
When the daily rest commences on one day and ends on the next, this will be shown on two separate printouts, since a day in this context is a calendar day.

The manual entry procedure must be demonstrated using the simulator or simulator software.



This slide is self explanatory.

Subsequent slides demonstrate the procedures for making the manual entries illustrated in this example.



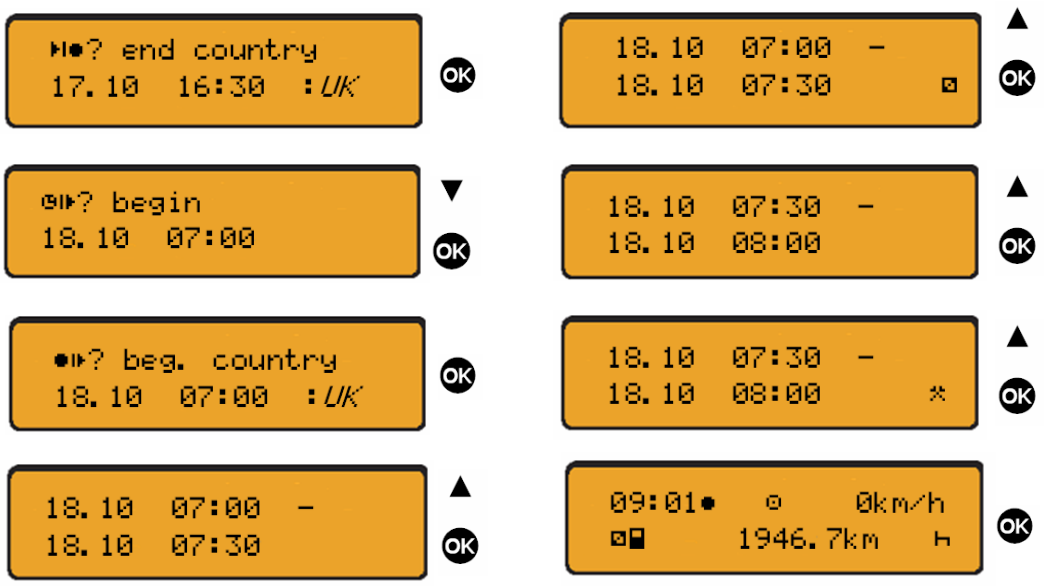
Important Note:

This example does not show the procedure for manually entering the daily rest period that is required to be recorded. To do this, instead of answering “yes” to the question “end of shift?”, answer “no”. Then scroll time forward to the start of the next activity. i.e. 0700 the next day. Scroll to the rest pictogram, press “OK” and then answer “yes” to “end of shift?”.

Alternatively, the rest daily rest period could be recorded by prefixing to activities at the start of a shift.

Prefixing activities is demonstrated on the next slide.

Manual Entry Procedure



The second part of the manual entry procedure, i.e. prefixing activities to the beginning of the day, differs to the procedure for adding activities to the end of the previous day.

At the second screen, when asked, using pictograms, is this the start time, a yes/no answer is not required. The first time shown will be the time at which the card was inserted, i.e. 08:00 (see slide 16). At this point, use the down arrow on the menu button to scroll the time back to the point at which the shift actually started, i.e. 07:00. Then continue as indicated by subsequent screens.

If the daily rest was to be recorded during this procedure, then instead of scrolling back to the beginning of the first prefixing activity, i.e. 07:00, scroll back to the end of the last shift worked. Then follow the above procedure.

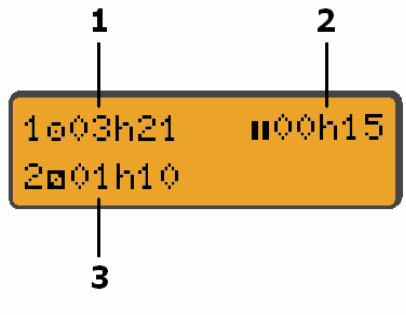
Standard Display

- On completion of log-in procedure standard display appears, showing:
  - Local Time
  - Operational mode
  - Speed
  - Drivers 1 and 2
  - Total odometer reading

Demonstrate using simulator or simulator software

In-motion Data Display

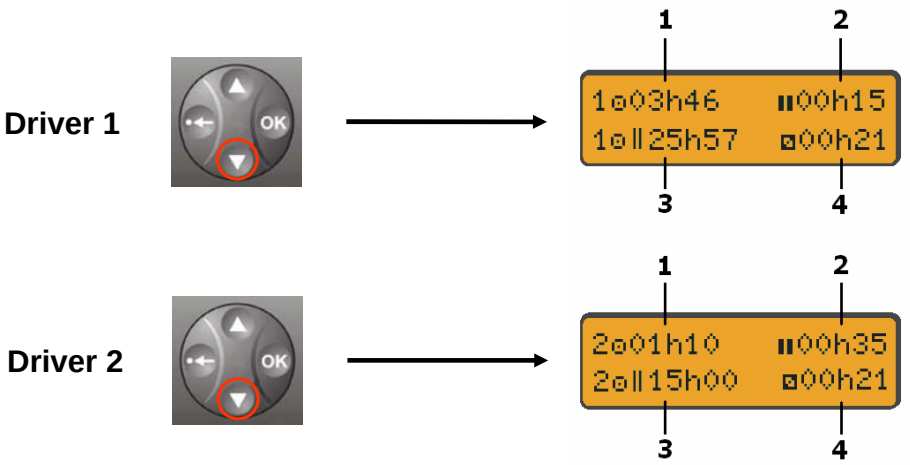
- Pressing any menu key whilst driving will display the following:
  1. Driver 1 - driving time since last 45 minute break
  2. Driver 1 - cumulative breaks in periods of at least 15 minutes
  3. Driver 2 - current activity and its duration



Display appears for approximately 10 seconds

Demonstrate using simulator or simulator software

Stationary Data Display



1. **Driving time (since break 45 minutes)**
2. **Sum of valid breaks**
3. **Driving time over 2 weeks**
4. **Duration of the current activity**

Demonstrate using simulator or simulator software

!!!!!Warning!!!!!

It must be made clear that the vehicle unit records breaks and availability exactly the same. This means that if the availability mode is used to record Periods of Availability (POA) for Working Time purposes, the amount of POA will add to any breaks and may ‘wipe the slate clean’ for the purpose of displaying cumulative driving.

Messages

- If an event or fault occurs, the display's backlight flashes for 30 seconds displaying the message

- Reminder to take a break flashes at 4 hours 15 minutes and 4 hours 30 minutes <u>continuous</u> <u>driving</u> (only)

Messages relating to such things as overspeeding must be acknowledged by the driver. Pressing the "OK" button once will stop the message flashing. Pressing the "OK" button a second time will cancel the message.

It must be stressed that the warning to take a break only appears during continuous driving.

No warning is given on the approach of 41/2 hours <u>cumulative</u> driving time

A full list of messages should be given to each driver

Standby Display

- Whilst in operational mode, display will switch to standby mode:
  - After 5 minutes inactivity
  - Ignition is switched off
  - No messages pending

Standby is cancelled by switching on ignition, by pressing any key, when a fault is displayed.

The different displays must be demonstrated using the simulator or simulator software.

Menu Structure

- The vehicle unit has a menu structure similar to that of a mobile phone
- The menu comprises different options for:
  - Printing and viewing data
  - Adjusting local and UTC time
  - Selecting options such as ‘Out of Scope’ driving

Demonstrate using simulator or simulator software

Mode Switch

- The mode switch can be used to select different activities
- Unlike the analogue tachograph, the digital tachograph defaults to ⚒ when not driving
- Breaks must be selected manually
- Stops under 2 minutes are recorded as driving time

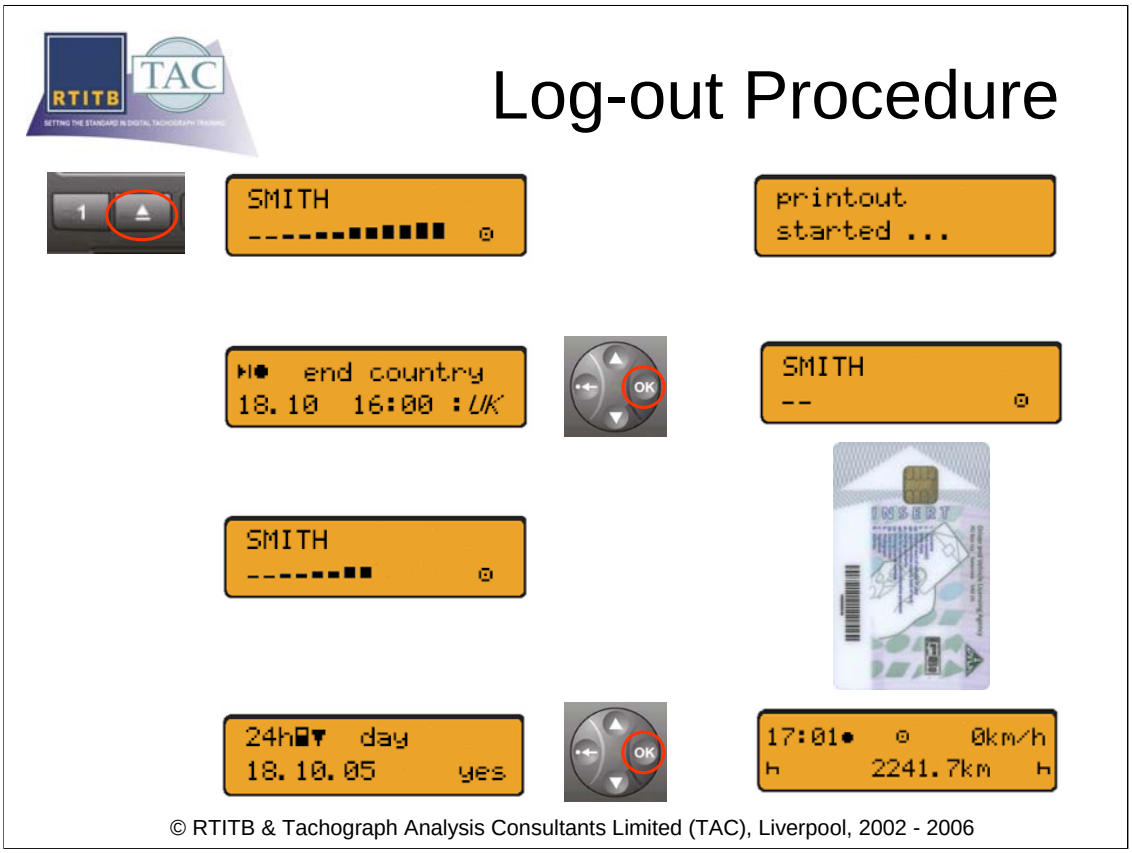
Stops longer than 2 minutes are recorded as other work.

If the driver selects another activity within 2 minutes, the vehicle unit records that activity from the moment the vehicle becomes stationary.

As from May 2006, all “other work” that would have previously been recorded using the envelope pictogram must be recorded using crossed hammers.

WARNING

The envelope pictogram is used for recording periods of availability. The digital tachograph does not differentiate between rest/break and availability. Therefore, any periods of availability longer than 15 minutes will add towards wiping the slate clean for cumulative driving.

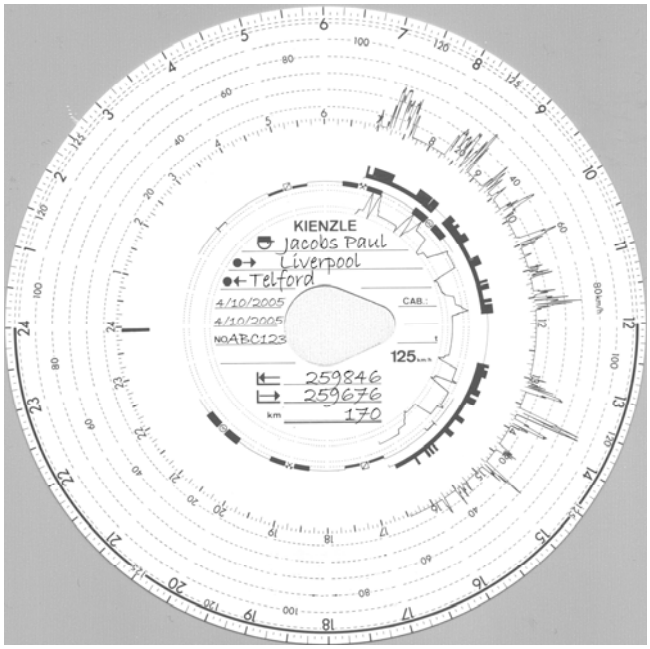


Demonstrate using simulator software.

Printouts

- A number of printouts are available:
  - Daily activity from driver card 
  - Events and faults from driver card 
  - Daily activities from vehicle unit 
  - Events and faults from vehicle unit 
  - Over speeding 

There are a number of printouts but the slide lists the ones that will be most commonly used by drivers.



This slide is used to demonstrate the following point:

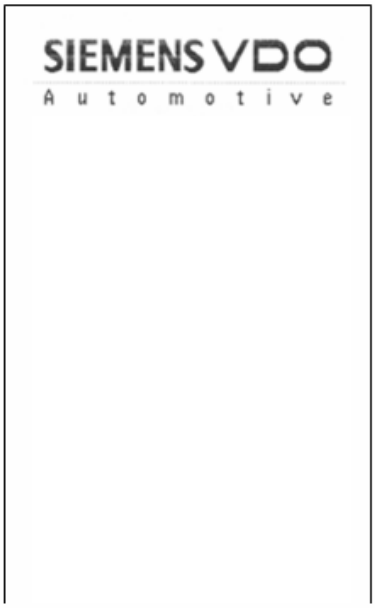
Analogue charts are complex and record very detailed information. To anyone not familiar with them the would seem difficult to understand. However, drivers use them every day and understand them well.

Understanding printouts is a straight forward and logical process. Looking at a printout for the first time could be off putting because they looking complicated.

It is vitally important that drivers are reassured of the logic attached to printouts and that they are a build of a number of pieces of straight forward information.

That is why it is crucial to ensure that the explanation of printouts is done step by step.

Printouts

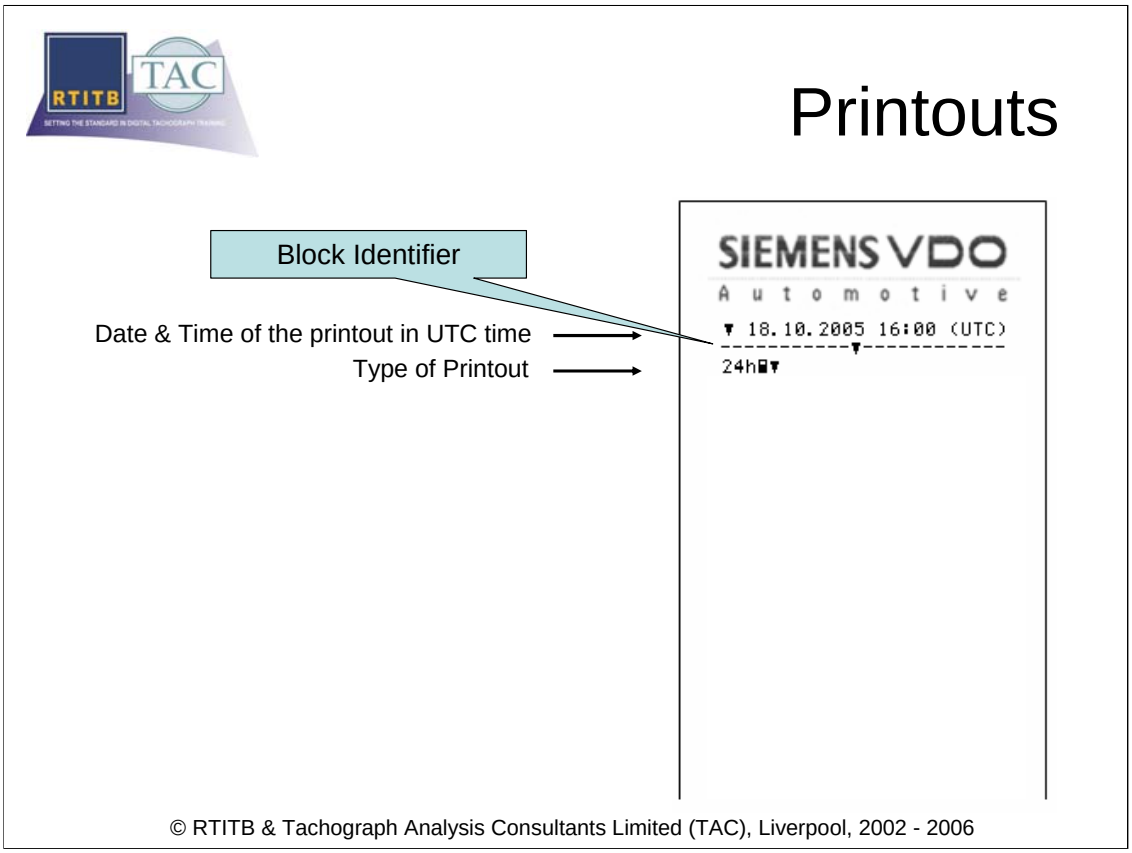


The first slide shows a printout with nothing but the brand name of the digitach. No problem.

Printouts

Date & Time of the printout in UTC time →

The first line of information is date and time of the printout beginning with the printer pictogram.

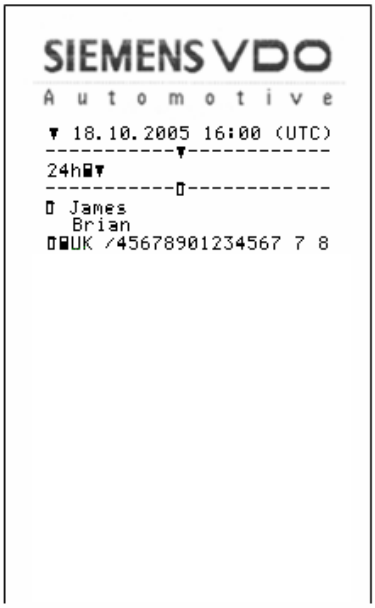


The date and time are separated by a “block identifier”. These are used to separate chunks of information and the pictogram in the centre of the dotted line indicates what the information under the line is about. In this case it is the printer pictogram telling you that the next piece of information will tell you about the type of printout.

The next line of information tells you that it is a daily printout from the driver card.

Printouts

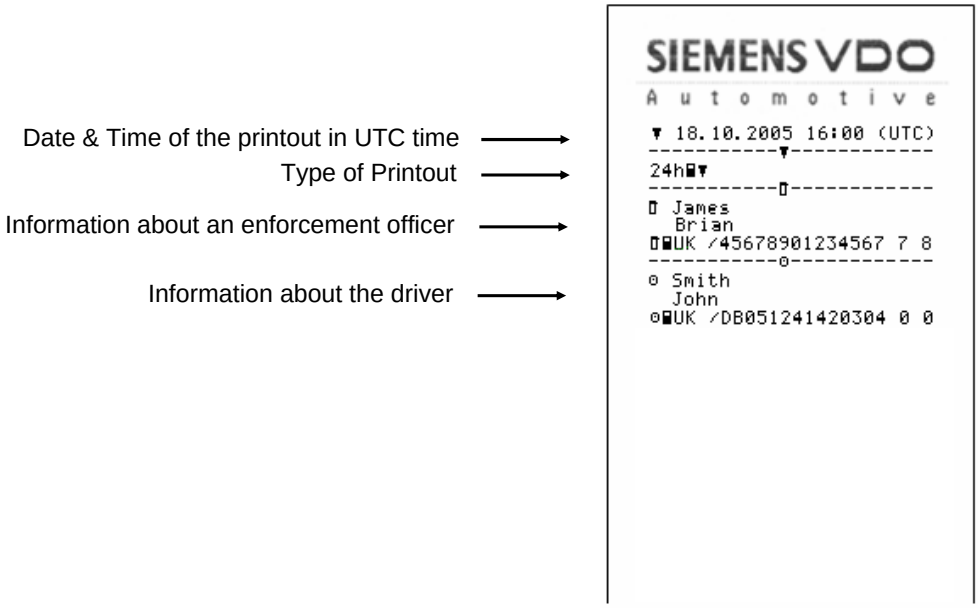
Date & Time of the printout in UTC time →
Type of Printout →
Information about an enforcement officer →



Information about the printout is followed by another block identifier carrying the “control” pictogram. This tells you that the next piece of information is about a law enforcement officer relating to a control “event”.

The information gives the officer’s name, preceded by the control pictogram and control card number, including the country (UK) in which it was issued.

Printouts

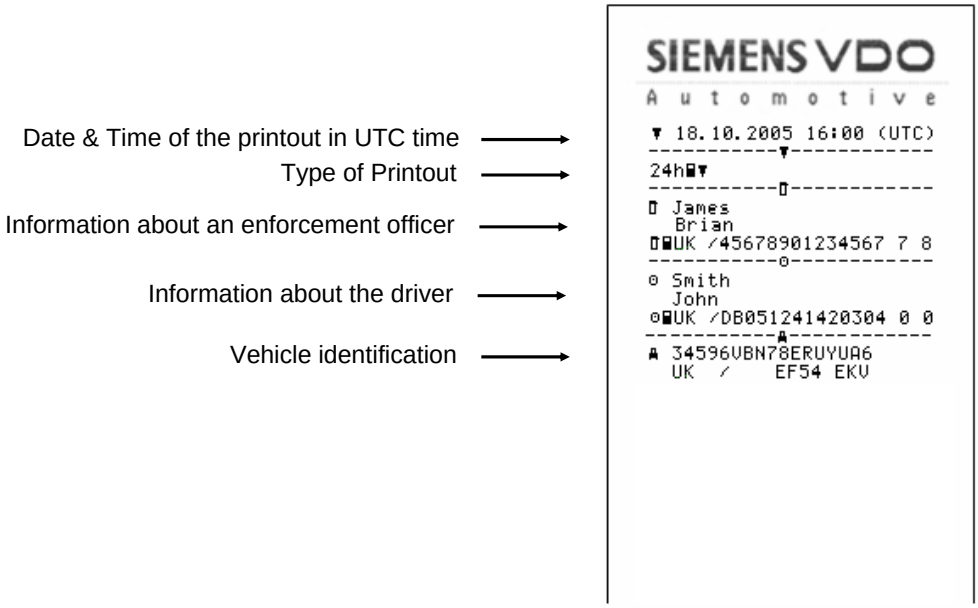


The next block identifier carries the operational pictogram, indicating that the following information will be about the driver.

The information includes the driver's name, preceded by the operational / driving pictogram, card number and country of issue.

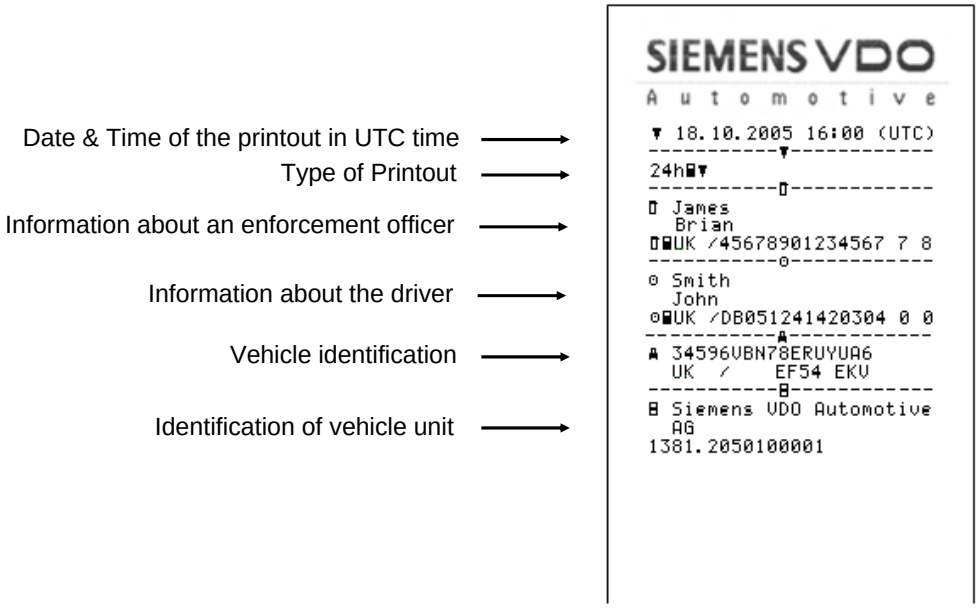
The last two digits of the card number indicate the number of times the card has been replaced (15th digit) and the number of times the card has been renewed (16th digit).

Printouts



The next block identifier carries the vehicle pictogram, indicating that the following information will pertain to the vehicle.

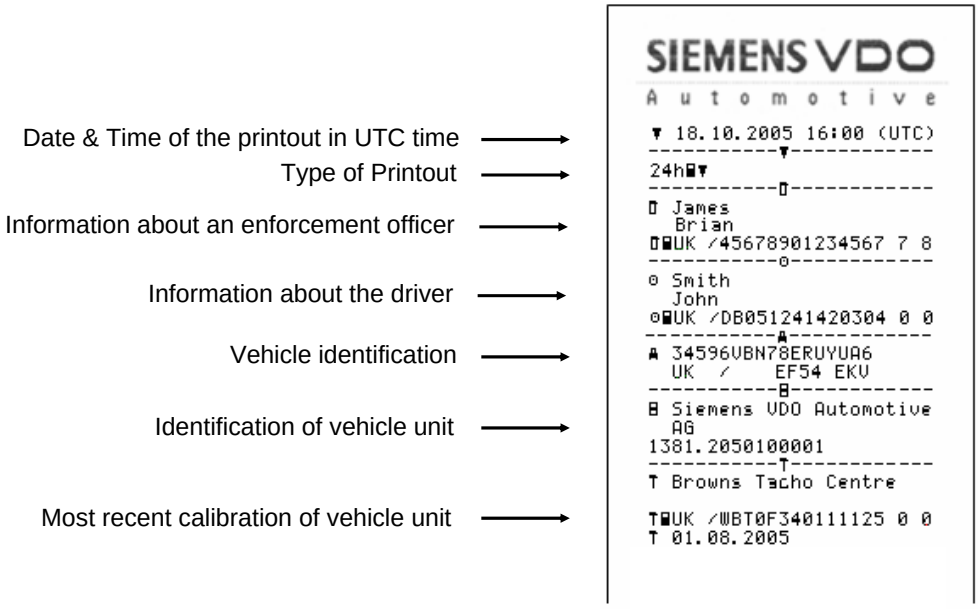
Printouts



The next block identifier carries the production pictogram, indicating that the following information will be about the actual digital tachograph.

The information includes the manufacturer of the tachograph and, preceded by the production pictogram, the model number, i.e. 1381, followed by the tachograph's serial number.

Printouts

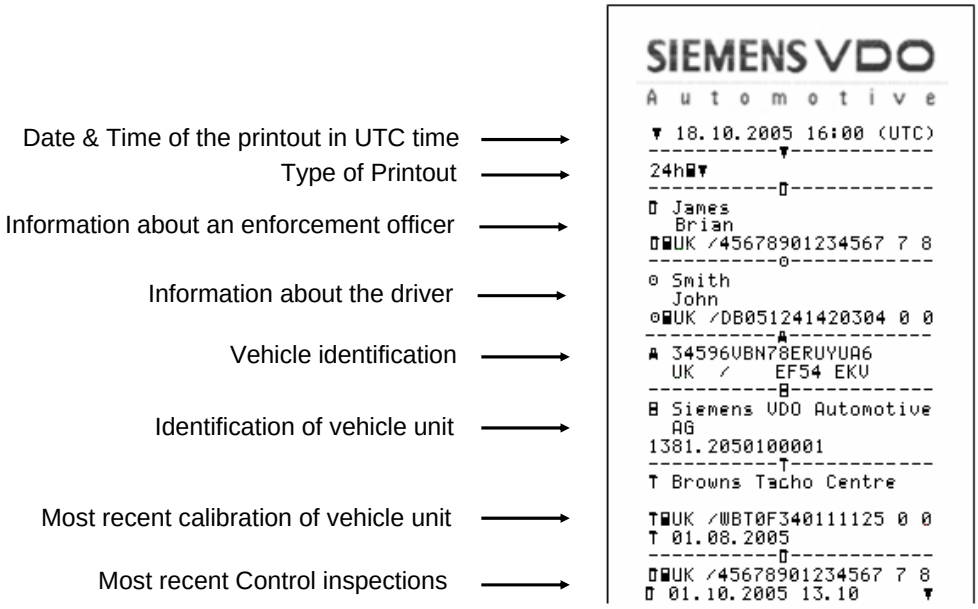


The next bock identifier carries the workshop (calibration) pictogram, indicating that the following information pertains to the calibration of the tachograph.

The information includes the name of the calibration centre, followed by the card number of the workshop technician responsible for the calibration.

The last line of the calibration begins with the workshop pictogram followed by the date on which the calibration took place.

Printouts

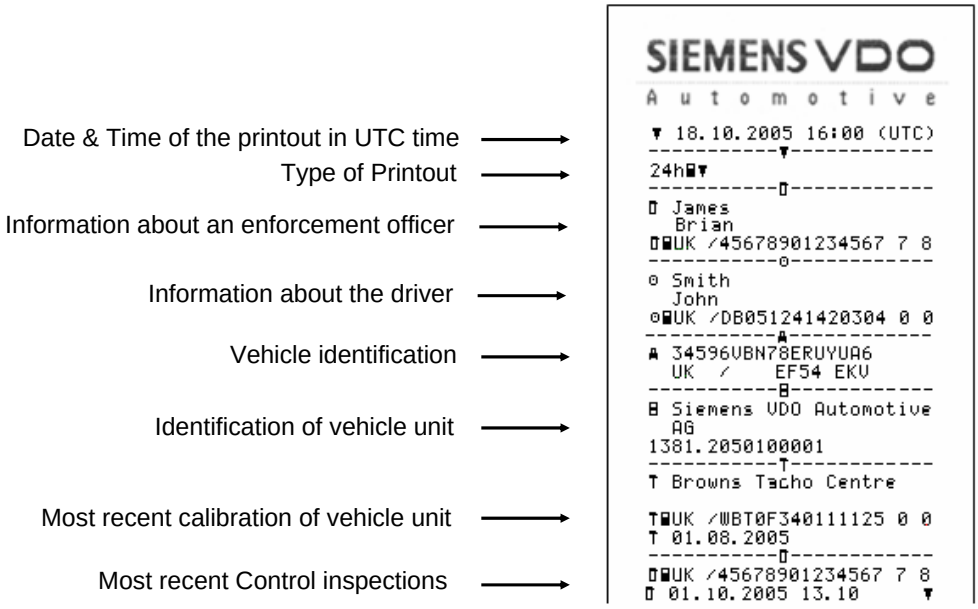


The next block identifier carries the control pictogram indicating that the following information pertains to a law enforcement inspection.

The first line of information gives the card number of the enforcement officer.

The second line of information begins with the control pictogram, followed by the date and time of the enforcement inspection. The printer pictogram is shown at the end of this line of information indicating that a printout was taken by the enforcement officer.

Printouts

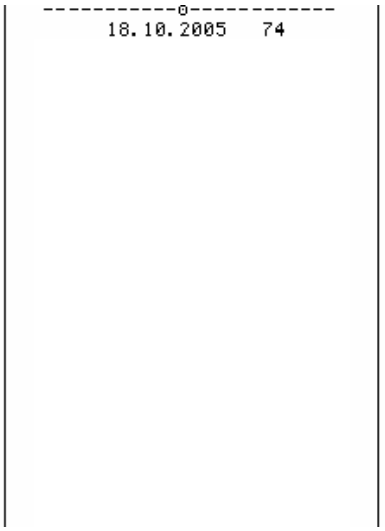


The whole of the information shown here is placed in the “header” of the printout.

Generally speaking, the header contains information about people and equipment, such as the driver, the vehicle and tachograph, etc.

Printouts

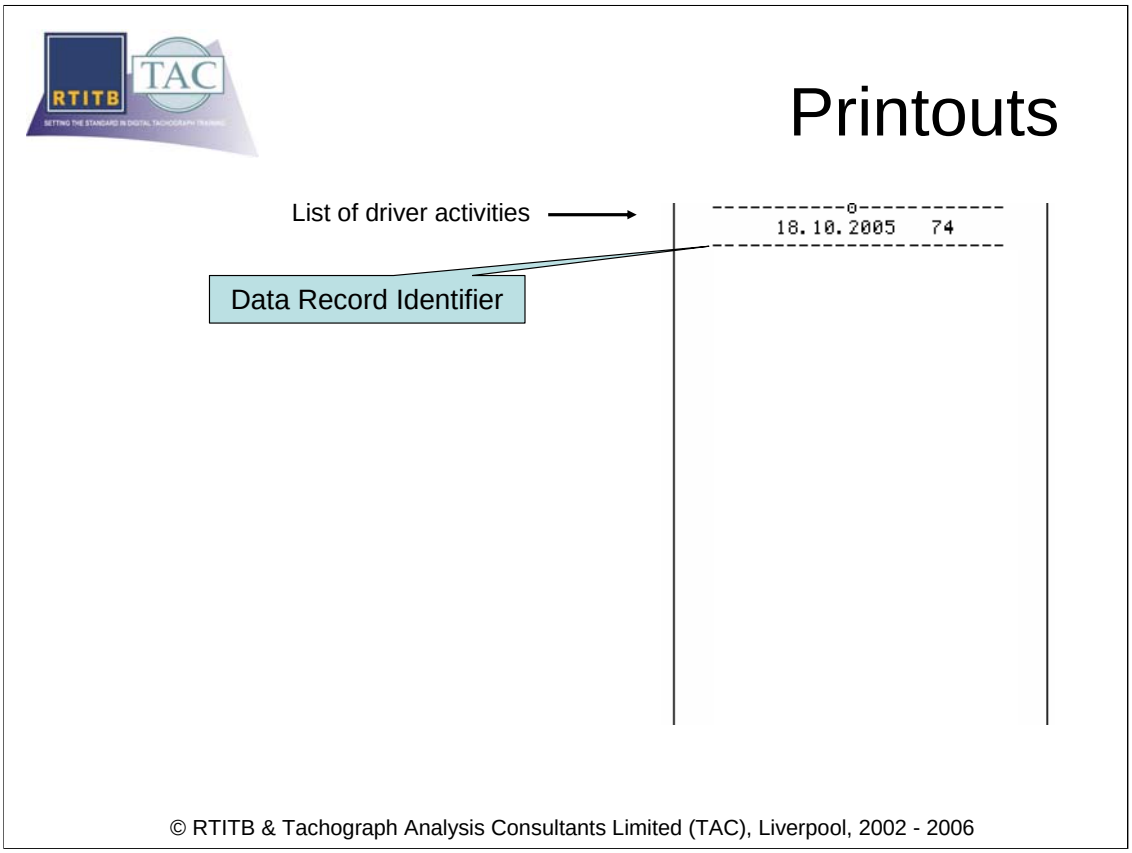
List of driver activities →



This is a continuation of the same printout.

The next block identifier carries the operational pictogram indicating that the following information will relate to operational activities.

The next line shows the current date followed by a number indicating the number of times (days) that this driver card has been used.

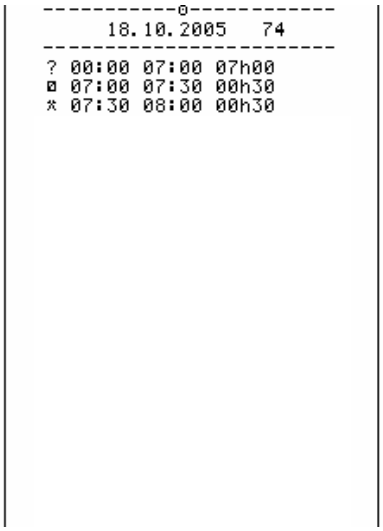


This dotted line is a data record identifier and is used to separate information but still of the type indicated by the block identifier.

Printouts

List of driver activities →

Time period that the card was not inserted →



The next three lines of information give details of activities that were not recorded by the driver card, i.e. they are manual entries.

For example, the '?' denotes an unknown activity from midnight (00:00) to 07:00, a period of 7 hours. It can reasonably be assumed that this is part of a daily rest period.

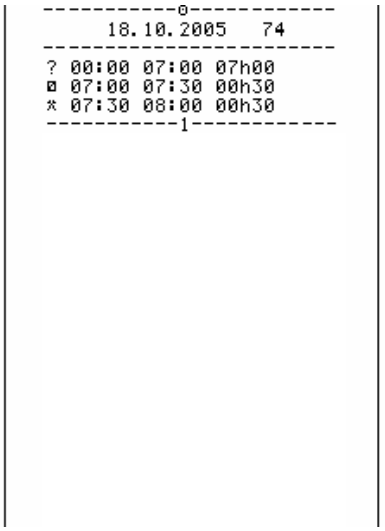
The second line shows 'availability' from 07:00 to 07:30 and 'other work' from 07:30 to 08:00.

Printouts

List of driver activities →

Time period that the card was not inserted →

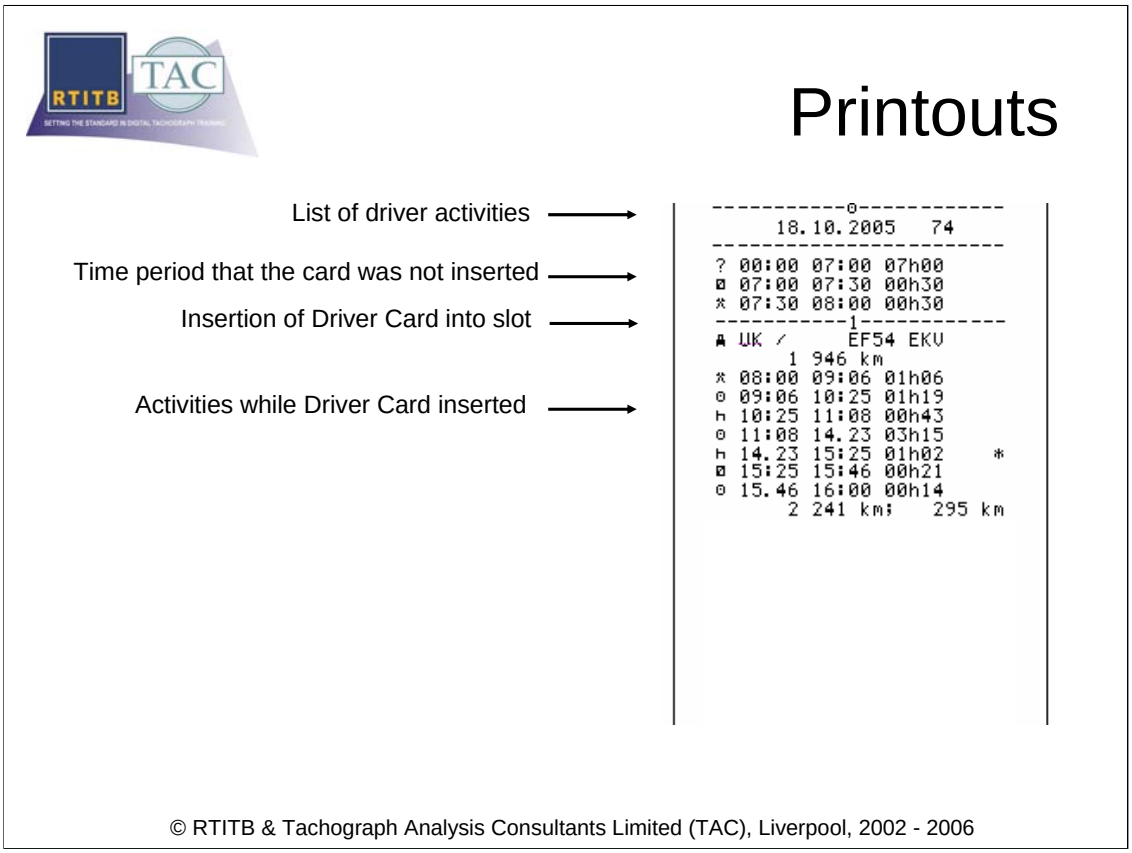
Insertion of Driver Card into slot →



It can now be seen that the driver card has been registered in slot 1.

It is this that confirms that the previous entries were ‘manual entries’.

Printouts



The following information shows operational activities undertaken throughout the day.

The first line starts with the ‘vehicle’ pictogram denoting that this is a vehicle registered in the UK. This is followed by the vehicle registration number.

The next line shows the vehicle odometer reading at the start of the day.

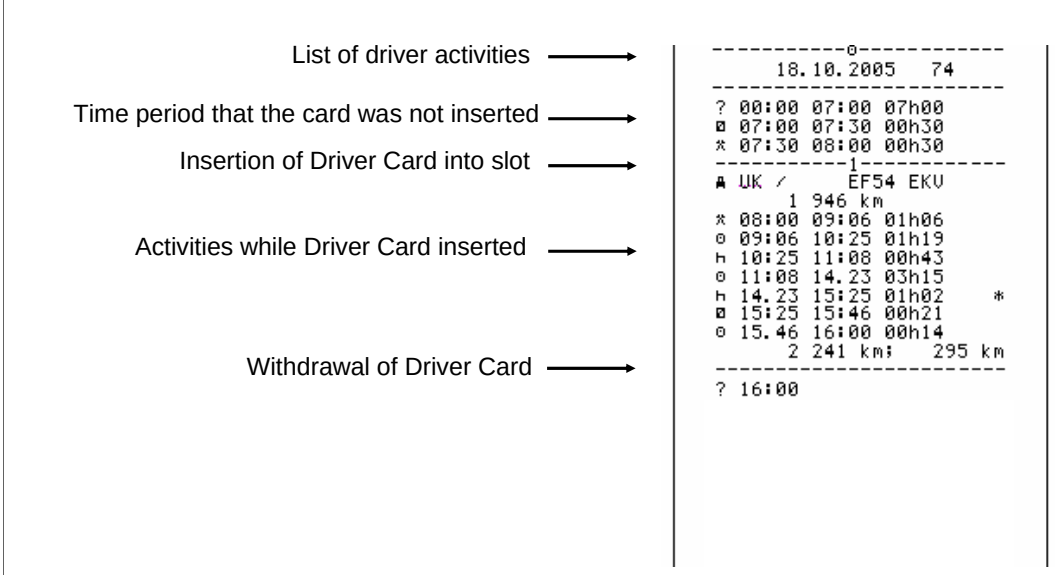
The following lines contain information about different operational activities showing start, finish and duration.

All of these are activities denoted by pictograms with which drivers are already familiar as they are the ones currently in use with the analogue system.

The asterisk denotes a break longer than one hour in duration.

The last line shows the final odometer reading and the total kilometers travelled.

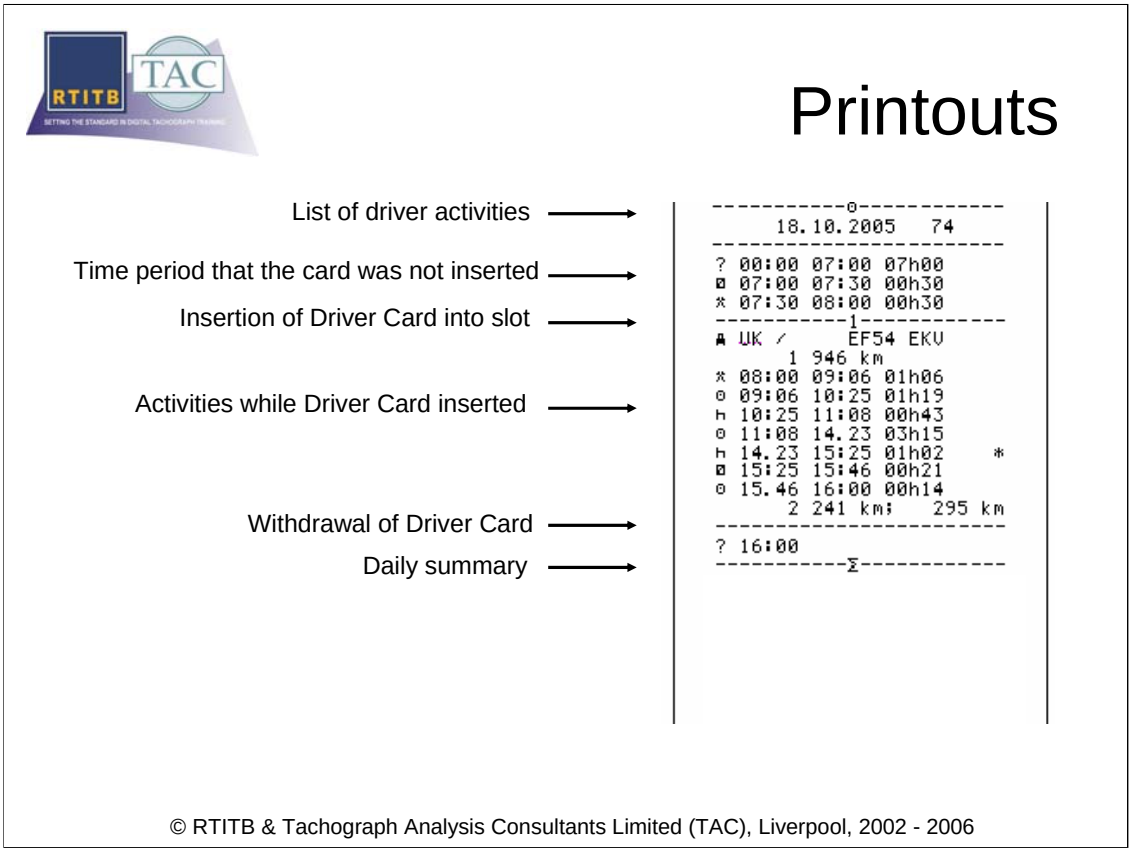
Printouts



The next ‘record identifier’ shows that the driver card has been removed, denoting the end of the period of duty in relation to this vehicle.

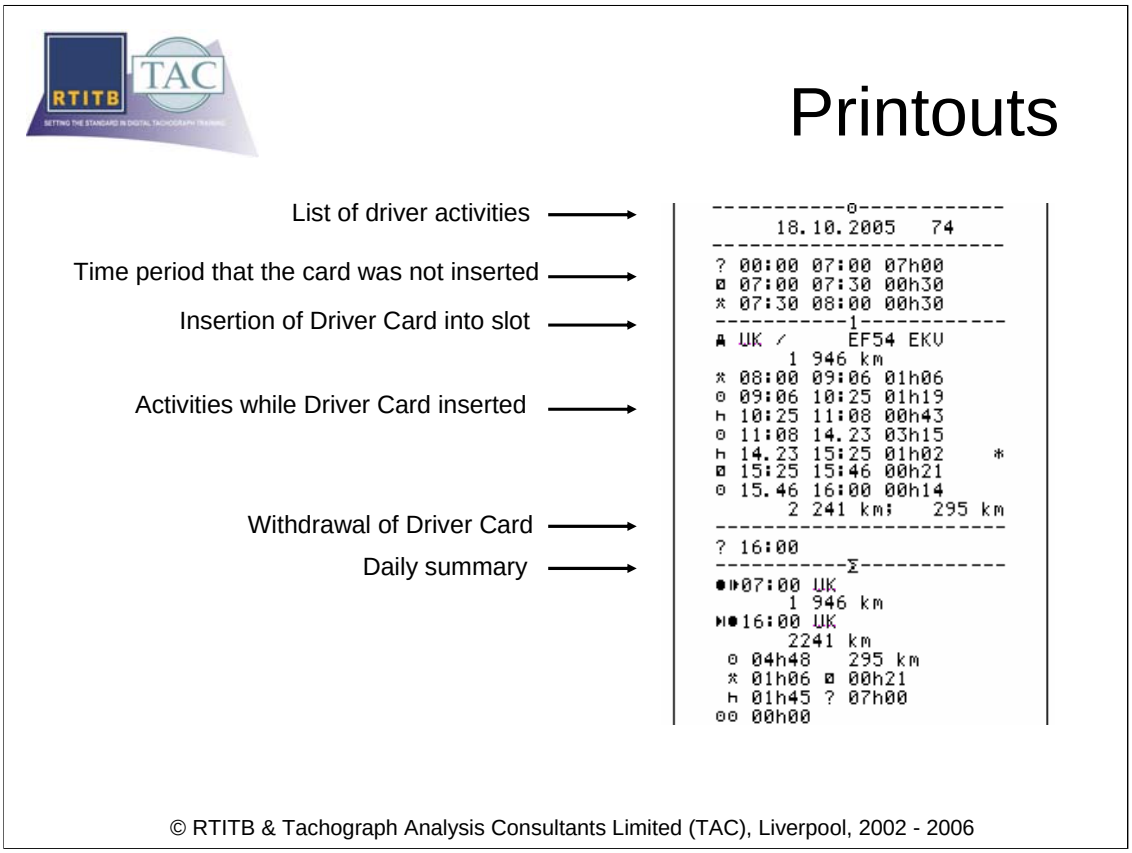
The ‘?’ indicates the driver card withdrawn at 16:00.

Printouts



The next ‘block identifier’ carries the ‘sigma’ pictogram which means the following information will be a summary of the days events.

Printouts



The first line of information shows the start location pictogram followed by the start time. 07:00 corresponding to the manual entry, followed by the country location in which the duty commenced.

The next line shows the opening odometer reading

The next line shows the end location pictogram followed by the time of the driver card withdrawal and country end location.

The next line shows the end odometer reading.

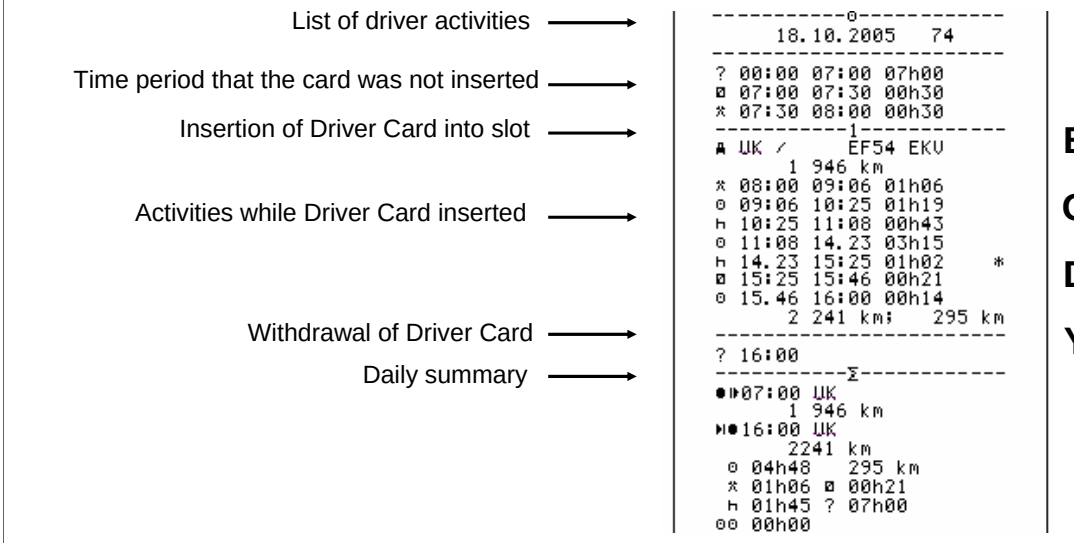
The next line shows total driving time and total kilometres.

The next line shows the totals for ‘other work’ and ‘availability’ but does not include the manual entries.

The next line shows total breaks and time during which the card was not inserted.

The next line shows a pictogram combination of two pictograms denoting operational activity. This refers to a crewed operation. Because the value is zero it can be assumed that this was not a crewed operation.

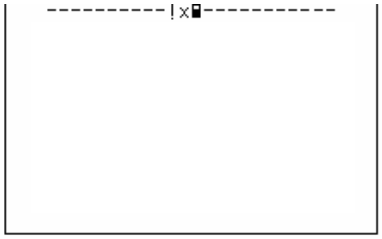
Printouts



Operational information is listed in what is referred to as the main ‘body’ of the printout.

Printouts

List of 5 most recent events or faults on the driver card →

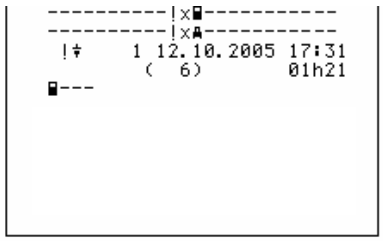


The next data block carries the combination of pictograms indicating that the following information relates to events and faults recorded on the driver card.

Printouts

List of 5 most recent events or faults on the driver card

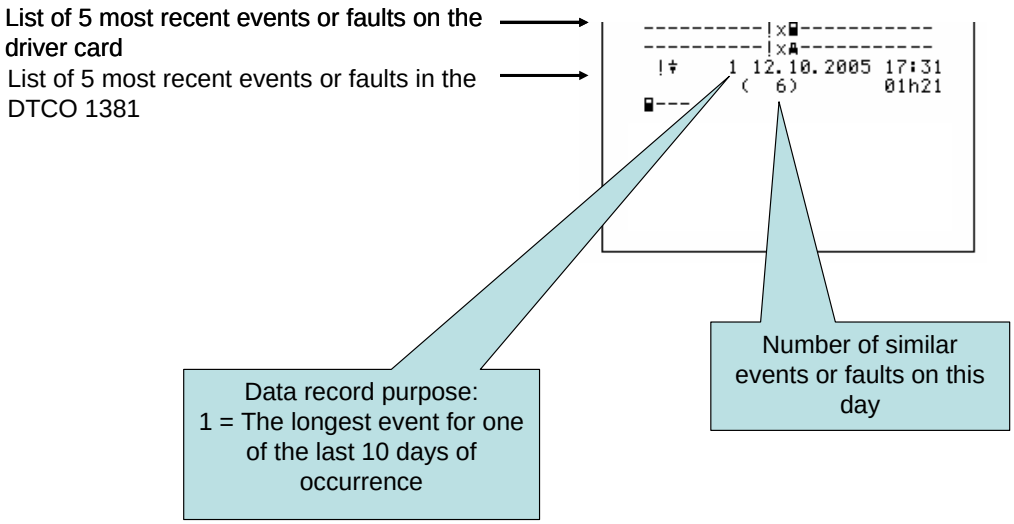
List of 5 most recent events or faults in the DTCO 1381



This data block is immediately followed by another, indicating that there are no events and faults recorded on the driver card. The next data block carries the combination of pictograms denoting events and faults recorded by the vehicle unit.

The next line of information starts with a pictogram combination denoting a power interruption event followed by the date and time that the event occurred.

Printouts

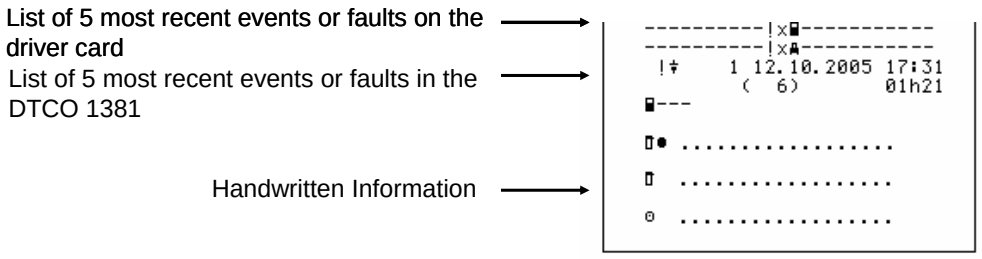


This data block is immediately followed by another, indicating that there are no events and faults recorded on the driver card. The next data block carries the combination of pictograms denoting events and faults recorded by the vehicle unit.

The next line of information starts with a pictogram combination denoting a power interruption event followed by the date and time of the event and the duration of the event.

The card pictogram followed by '---' denotes there is no driver card information associated with this event.

Printouts



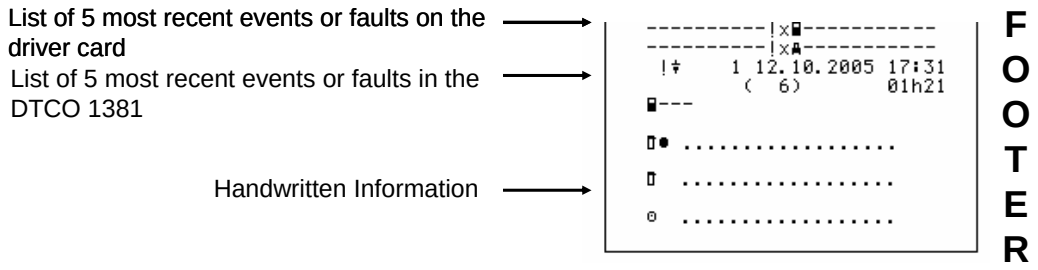
The bottom of the printout provides a place to insert handwritten information.

The first line starts with the combination of pictograms denoting the location of the control event.

The second line provides a space for the enforcement officer's signature.

The third line provides a space for the driver's signature.

Printouts



The bottom part of the printout is referred to as the footer.

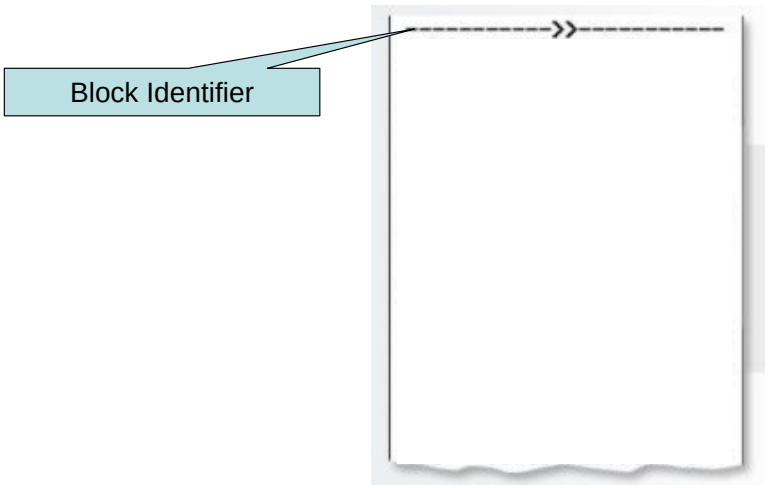
Over Speeding Printout

- Exceeding the “limited” speed for more than 60 seconds
- Printout shows:
  - First over speeding since last control event
  - Subsequent number of events
  - First over speed since last calibration
  - Five most serious in last 365 days
  - Most serious event for each of last 10 days

This slide describes the different type of printouts highlighting over speed events.

Over speeding is when the vehicle travels at a speed greater than its @limited’ speed for more than 60 seconds.

Over Speeding Printout

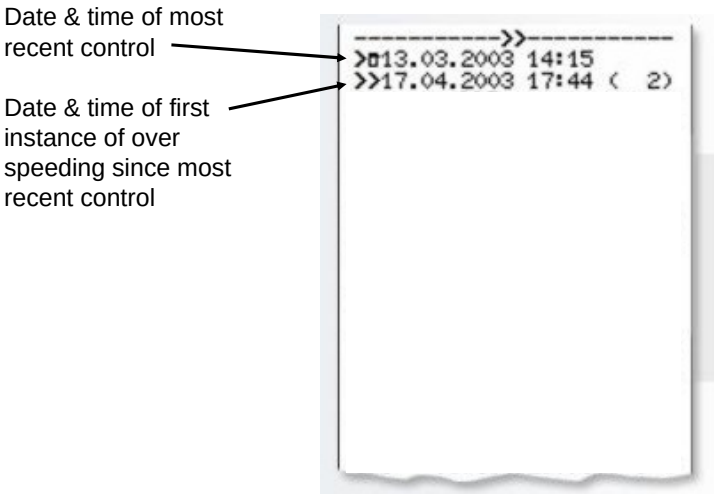


The block identifier signifies the beginning over data relating to over speed events.

Over Speeding Printout

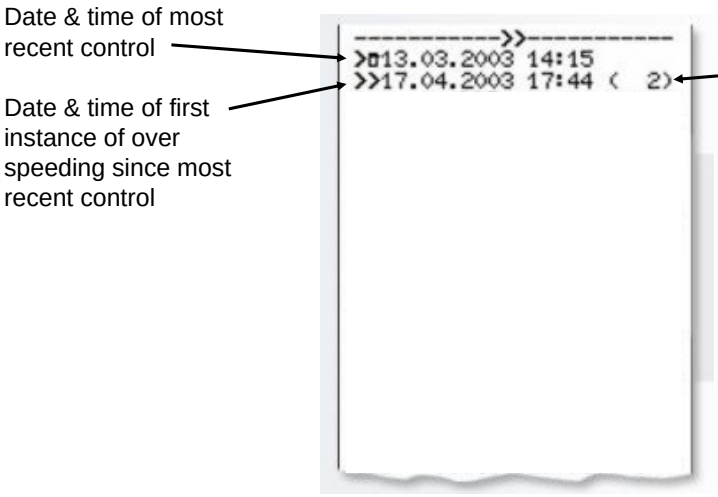
The first line of information shows the date and time of the most recent control event.

Over Speeding Printout



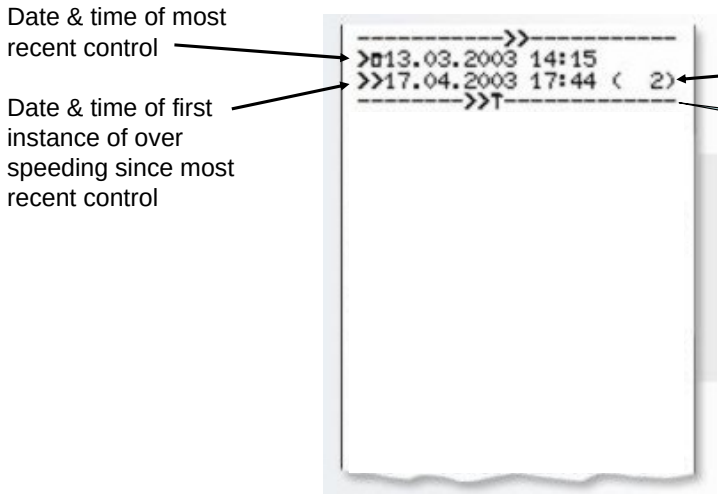
The next line shows the date and time of the first over speed since the most recent control.

Over Speeding Printout



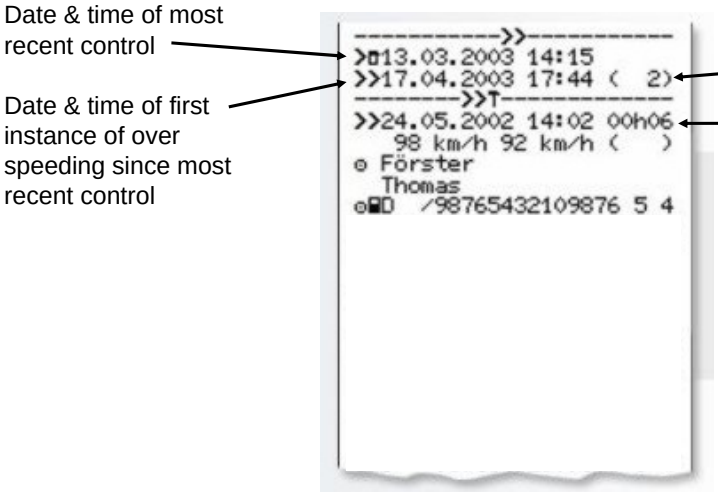
The bracketed number shows the number of subsequent events.

Over Speeding Printout



The next block identifier carries the workshop pictogram indicating that the following information refers to calibration.

Over Speeding Printout



The first line of information shows the first instance of over speeding since the most recent calibration, including the date, time and duration of the event.

The second line shows the highest recorded speed and the average speed for this event.

The following lines show details of the driver, including driver card number.

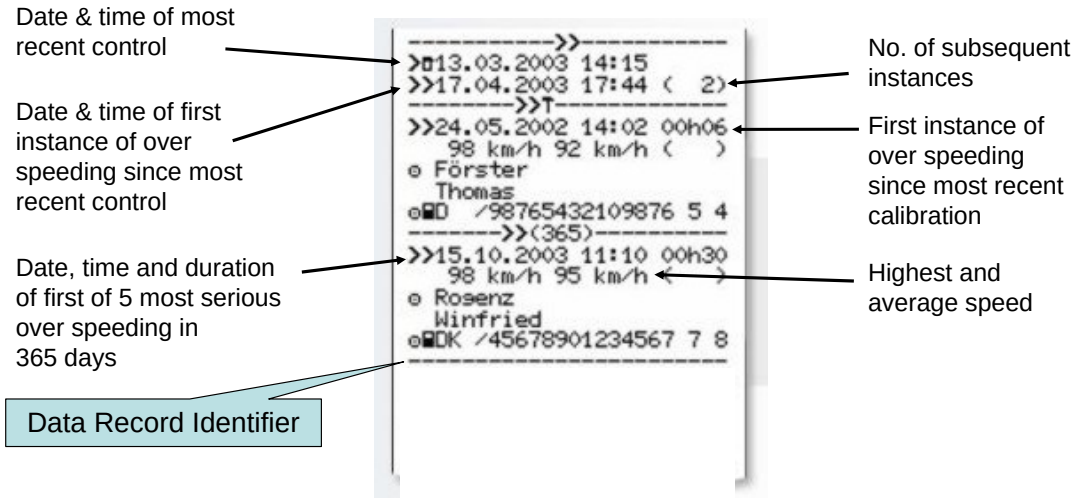
Over Speeding Printout

The next block identifier denotes that the following information relates to the 5 most serious over speed events in the last 365 days.

Over Speeding Printout

Again, the data shows date, time, highest and average speed and details of drivers.

Over Speeding Printout

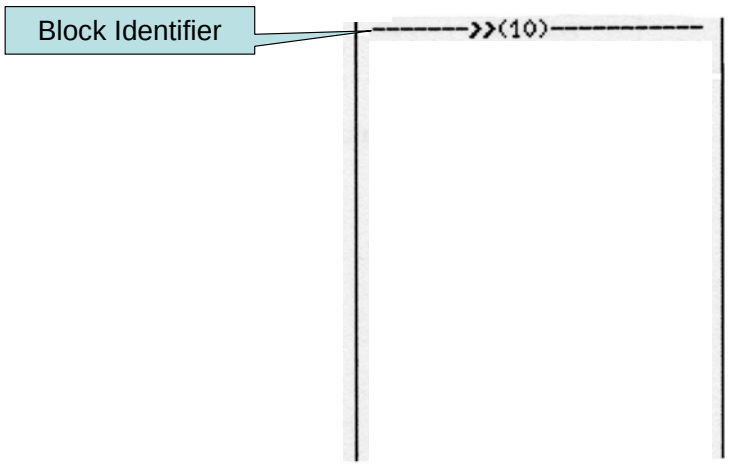


The data record identifier is used to separate blocks of information.

Over Speeding Printout

Subsequent events are arranged in descending order of highest average speed.

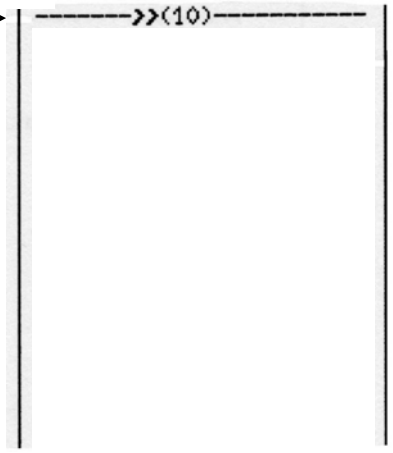
Over Speeding Printout



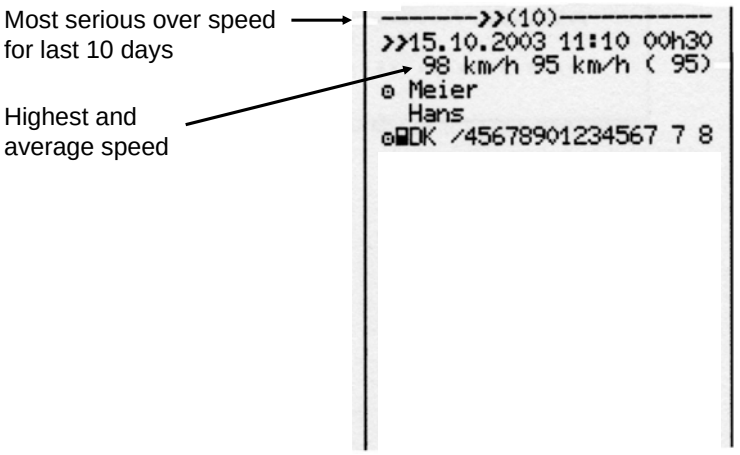
The next block identifier denotes information about the most serious over speed events for the last 10 days.

Over Speeding Printout

Most serious over speed for last 10 days →

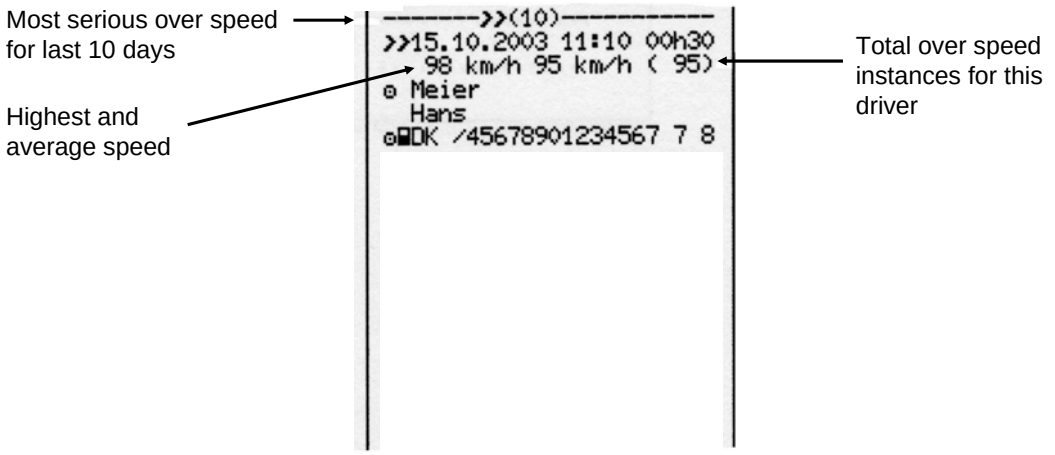


Over Speeding Printout



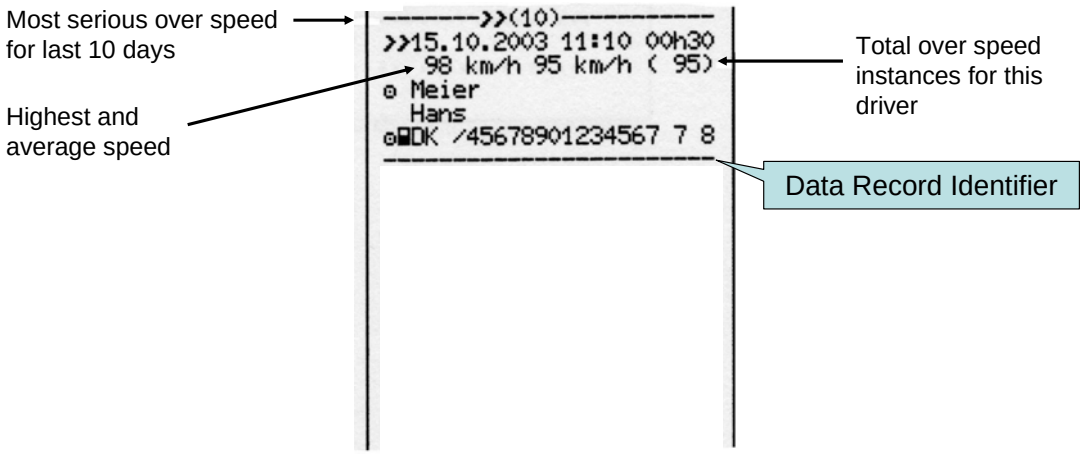
The information includes the date, time and duration of each event; the highest and average speed; and details of the driver.

Over Speeding Printout



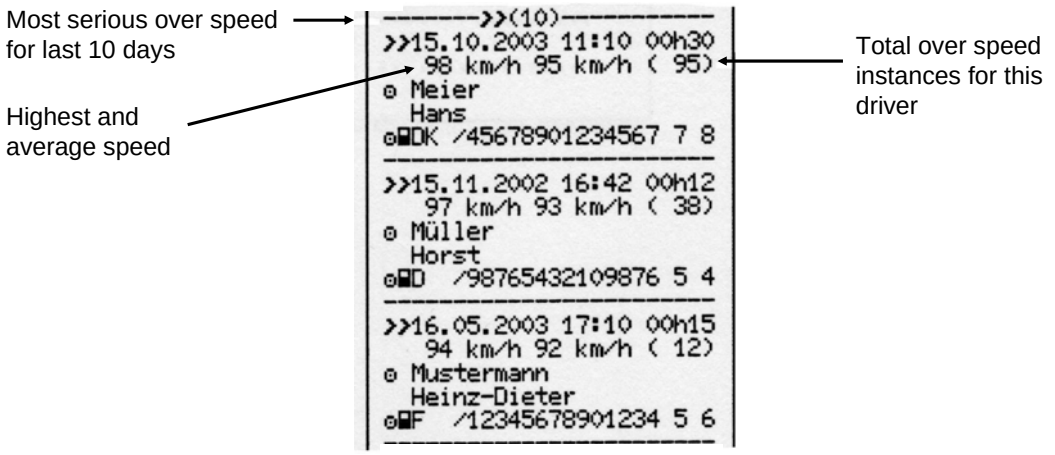
The bracketed number shows the total number of over speed events for this driver.

Over Speeding Printout



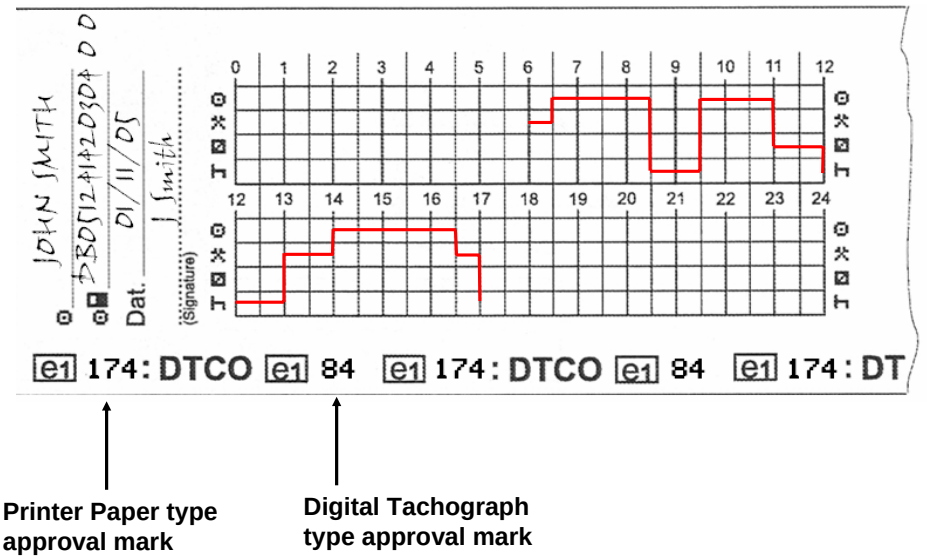
Data record identifier separates blocks of data.

Over Speeding Printout



This slide shows subsequent over speed events, each separated by a data record identifier.

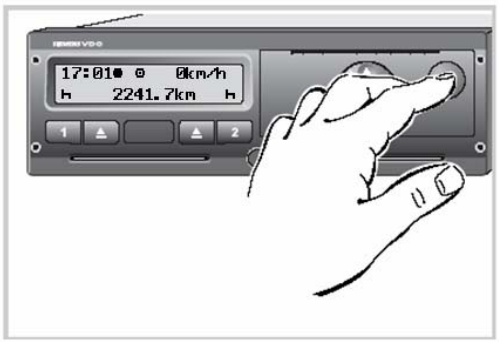
Daily Printout

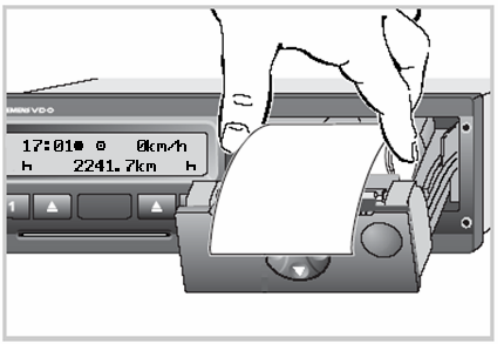


The back of printer paper allows drivers to insert manual entries.

Manual entries are necessary if the vehicle unit malfunctions or the driver has driven the vehicle without the driver card inserted.

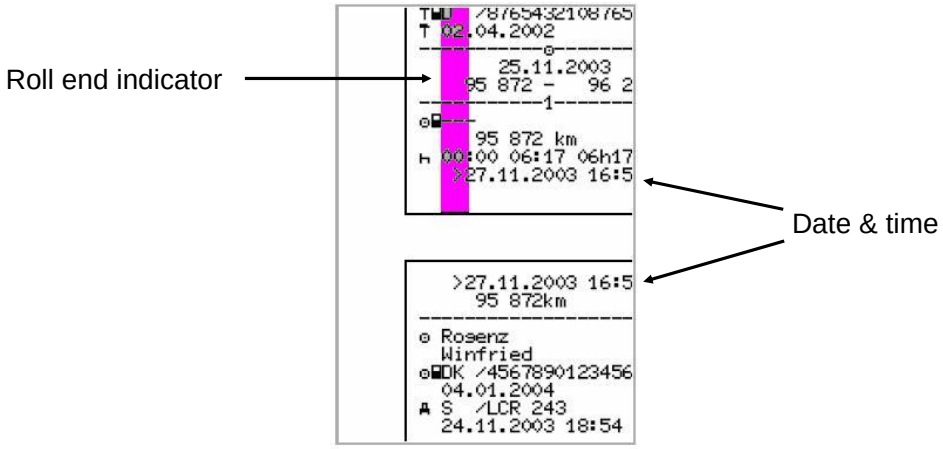
Printer Roll Replacement





Changing the print roll can be demonstrated using the digital tachograph simulator if available.

End of Printer Roll



When the print roll reaches the end a coloured line becomes visible.

The printer will stop printing.

Replace the print roll.

The printer will automatically continue the printout from the point at which it stopped.

Mixed Tachograph Work

- Drivers' Hours Rules apply
- Analogue
  - Charts for current week plus charts for the last 15 calendar days
  - Driver card (if held)
  - Printouts for any day during this period
- Digital
  - Driver card
  - Charts and any legally required printouts for relevant period

Because the Drivers' Hours Rules remain the same, a combination of charts and driver card must be carried during mixed tachograph work so as to be able to demonstrate compliance with the law.

From May 2006, the Rules will change in respect of the requirement to keep charts and printouts, i.e. charts for current week plus charts for previous 15 calendar days.