



# **TOOL MANAGEMENT SYSTEM (TMS) GETTING STARTED AND QUICK REFERENCE GUIDE**

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# 1 Introduction

This getting started manual and reference guide is intended for the end-user. It is assumed that the user has a basic knowledge on how to use Microsoft Windows<sup>®</sup> applications in general and that he or she is familiar with the terms used and work done in tool rooms in particular. This is not a TMS software installation manual. To install TMS use the TMS setup and database implementation documents or contact Object Software Ontwikkeling BV.

## 1.1 Purpose of this document

This document consists of two parts. The first – getting started – part describes in short the 'theory' and ideas behind the Tool Management System. Why is data structured as it is within TMS and what do the terms used within TMS mean.

The second – quick reference – part tries to provide 'how to' information to use alongside the Tool Management System.

## 1.2 Conventions and terms used in this document

Specific term used in TMS – *Italic*. Example: *Cluster*.

Reference to a literal or a text on screen – **bold**. Example: **EmployeeID**.

Reference to a Windows button – **bold between []**. Example **[Cancel]**.

Reference to a keyboard combination – **bold between {}**. Example **{Alt X}**.

## 2 TMS definitions and methods

For the daily practice of a department that lends and distributes tools by means of barcode readers the tool management system uses certain methods and terms. In this chapter these key terms are explained.

### 2.1 Common tables

An administrative system such as TMS often requires data that is indirectly related to the job at hand. This data must be available in the system and it often has a certain hierarchy.

For instance: a tool is lent to a person and this person belongs to a department. Because we don't want to enter the entire department description each time we add a new employee to the system a table of departments is put together. This table also provides consistency in the description and allows proper grouping of data in reports and screens. But deleting a department from this table implies that all employees that are part of this department must also be deleted or must be assigned to another department.

In such a case TMS will either not allow the deletion or reassign the related data to a different record in the departments table.

Common tables can be entered and edited within TMS under the **Edit** menu. There are currently six common tables in TMS:

- Departments:* a register of departments.
- Functions:* a list of personnel functions.
- Employees:* a register of all persons (or perhaps a workgroup) that might lend something.
- Suppliers:* List of suppliers of tools.
- Products:* a catalogue of products that might be used.
- Product groups:* divides products into groups.

The relationship between the data determines the order in which each table must be filled (the order in the **Edit** menu is alphabetic). For example: an employee belongs to a department and not the other way round therefore the department must be entered before the employee is entered.

This kind of data always consists of a unique ID and other relevant data. E.g. there can only be one department with ID **'001'** but several departments can have the same *description* (not clever though).

There is an **'Undefined'** record with ID **'P'** available in all tables that can be selected when for instance the department of an employee is not known. It is however recommended that you collect and enter data at the top of the hierarchy first (as much as possible) before you start entering data more down the line. It is much more work when you have to reassign products to new product groups or employees to new departments later on when you find that you cannot print properly grouped reports.

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*ADVICE: Collect and enter data at the top of the hierarchy first and as much as possible before you start entering data that relies on other tables.*

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### 2.2 Products and Items

TMS uses two terms that relate to tools; *product* and *item*. Both represent a tool in a different way:

**Product** A product in TMS is a description and definition of a type of tool. The products table can be regarded as a catalogue of tools; you may not have any tangible item of a tool but you can have it described in the product list. For each type of tool there should only be one product representing its properties. There is no need to enter the same product more than once to get multiple serial numbers for instance. You should enter a product record for each type of

chisel you have on stock (chisel 10mm, chisel 20mm etc...) but not for the fact that you have 10 pieces of chisels of 10mm.

**Item** An *item* in TMS is physical, tangible, representation of a product. If you have 10 pieces of chisel 10mm you have 10 *items* of 1 *Product* 'chisel 10mm'. If you have zero (0) items of chisel 10mm you still have 1 *Product* 'chisel 10mm' and TMS can alert you that this product has gone below stock and that you should buy chisels 10mm.

If you want to add a tool to TMS that has not been defined before then formally you should:

- First enter a new description of that tool in **Product**
- Then add new **items** to the stock.

However, to simplify matters TMS allows you to enter a new product and add a number of items to the stock in one go (in the 'add to stock' screen). In this way you can gradually build the product list and stock as you work with TMS.

### 2.3 Serialized and non-serialized items

TMS can handle both serialized and non-serialized tools. At the *Product* level you define whether a tool is a serialized tool or not.

**Non Serialized** For this kind of tool it is only important to know how many you have on stock and who has lend the items. Items cannot be traced individually. Non serialized products are for example small hammers, screwdrivers or sandpaper. You want to know how many you have and who has them but these items don't have to be calibrated or recalled for a safety inspection. Non serialized items only contain the product code and an amount in TMS; if there are zero (0) items of a product the product is not shown at all.

**Serialized** With serialized tools you can keep track of each *item* individually. You can see exactly which item has been lent by whom and know when an item has had regular maintenance or has been calibrated (TMS check and inspection options). If the tool is serialized then each item must get a *company number* and optionally a serial number. The serial number field is intended for the manufacturers' serial number and is not required. The company number is either a unique code for the product or a unique code throughout the system (globally unique). This company code is required for serialized tools. The company number can be derived from the serial number or it contains a completely different code given by the company (hence the term company number). The company number is restricted to characters that can be printed on a Code 39 barcode (A...Z, 0...9) up to 20 characters long but the manufacturers' serial number can contain all characters and may even be left empty. Non unique company codes are shown in grey within TMS; unique company codes are black. If a company code is unique then the barcode label will only contain the company code. If it is not unique the barcode label will have both the product code and company code printed on it because the productcode cannot be derived from the company number. So there are 2 kinds of company numbers:

	<b>Product code</b>	<b>Company number</b>
<b>Non unique</b>	123 - Drill 250W	Esso.1
	123 - Drill 250W	Esso.2
	234 - Drill 500W	Esso.1
	234 - Drill 500W	Esso.2
<b>Unique</b>	345 - Harness 500Kg	E93746
	345 - Harness 500Kg	E37467
	456 - Harness 1000Kg	E74678

Of course for each item with a company number the amount is one (1).

*ADVICE: Use unique company numbers where possible. TMS can better ascertain the owner and your barcode labels will be shorter.  
Use company numbers for tools that exceed a certain value (f.i. more than € 100,-)*

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## 2.4 Clusters

A cluster is a special kind of tool that can contain other tools. For example: a toolbox or tool set. Clusters are always serialized and can contain both non serialized and serialized tools. If you lend or issue a cluster all tools within that cluster are lend or issued as well. A cluster can also have an end date that differs from the lend term. This end date can be used to assemble a cluster for a project and then lend or issue it to a person or workgroup. A report with expired cluster end dates reminds you which projects have finished and which clusters should be recalled.

*ADVICE: The add-in CopyCluster enables you to quickly create several identical clusters containing non-serialized items (e.g. for toolboxes).*

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## 2.5 Operational and non-operational items

The Tool Management System distinguishes between items that are operational and those that are – perhaps temporary – not available for operation. Operational items are shown in the stock and lend screens. Non-operational items are shown in the issued items and non-operation items screens. The reasons for unavailability can be:

- **Issued**; the item is hand out and not expected to be returned.
- **Damaged**; the item cannot be used because it is damaged.
- **Missing**; the item is lost.
- **Inspection**; the item is being inspected or recalled for inspection.
- **Repair**; the item is being repaired.
- **Discarded**; the item is no longer being used (administrative write-off).

The Issued items screen is displayed by clicking the [**Issued items**] button in the toolbar or selecting the **Manage→Issued items** menu. All other non operational items can be viewed via the **Manage→non operational items** menu. Of course an item can first be indicated as *damaged*, then moved to *Repair* and finally be activated again so it can be lend again (*Return item to stock*).

## 2.6 Item inspections and checks

Within TMS there are two methods to follow up tools that periodically must be inspected or checked. The two ways have a different implementation that can be used simultaneously; one method does not rule out the other but they just fulfil different needs.

**Inspection** When an *item* is moved to inspection it is taken away from the operational items just like the actions *damage* or *missing* do. These items are probably inspected by a person from a certification organization or send to a different location (in house or 3<sup>rd</sup> party) to be calibrated, inspected or maintained. Therefore, such items must be held back and not lend until inspection has taken place. When this inspection has been done and the item is approved you can add comments to the inspected item line and use the [**Return to stock**] button to return the item to the operational items again. When the item was part of a *cluster* you can return it directly to the cluster or when it was issued (lent for an undefined period of time) directly to the 'issued to' employee. When the item is returned, the 'last inspected date' is set to the current date. A report of inspected items within a given time frame tell you on which items inspections have taken place (**item history reports**). In the product definition (**Edit→Products**) you can set the inspection interval in days. TMS uses this number of days, along with the deployment- or last

inspected date in the *items to be inspected* report to show you which items must be recalled for inspection.

## Checks

For a lot of quick checks the *inspection* method is a too heavy method. To register (and show to an auditor or inspector) that you also perform intermediate checks can use the *checks* method. Per *item* you can maintain a list of checks that consists of check date/time, comments and an indication whether the check was okay or not. But you could also use the checks mechanism to register for example that a stock count of these tools has taken place. Similar to the inspection method you can enter the check interval in the product definition. The report *items to be checked* will show you which items should be checked within the given number of days and when the check date is overdue. The report *item checks* under the **Reports→Item actuals** menu will show you all the checks done in a given time frame.

## 2.7 Issued items

Issued items are items that are not lend but are handed out while not expected to be returned. For example items like sandpaper (consumables), safety shoes or helmets. With the issue function you can keep track of your stock and handle these items with the barcode reader in the same way as you would lend items.

Another application of the issue function is to lend items to a person for an indefinite period of time. All lend items have a lend time (as set in TMS through **File→Configuration, General, lend time**) and when this time has expired it will show on the *Lend items* report.

If you, for instance, want each technician to get his own toolbox when he starts working and that must be returned when he is not employed anymore then you can *issue* the items to that technician. Those items won't show on the lending reports but you still have registered the tools he has gotten on his first working day and during his career. This is why *clusters* and *serialized items* can also be issued. TMS will recall clusters with an enddate and serialized items for inspection/check also from the *issued items* bin.

## 2.8 TMS itembag

TMS uses handheld barcode readers that run its own TMS data collection program. With 128Kb of memory it can collect about a 1000 transactions. All lends and returns (transactions) via barcode readers take place *off-line* with no wire limitation or need for RF equipment. Transactions are only transferred to TMS when you place the reader in the communications cradle and order TMS to get the data from the reader. Because multiple barcode readers can be used simultaneously a tool can be lend on reader A but be returned on reader B. Therefore, if more than one reader is being used, all transactions from all barcode readers must be transferred to TMS first before processing them. All the transactions are stored in the *itembag* and when processed they are treated as one virtual barcode reader and processed in date en time order.

Because the barcode readers work off-line they are not aware of the actual status of items that are scanned. So it might be that 2 barcode readers both lend four 10mm screwdrivers (8 in total) while there are only 5 registered on stock. During transfer (from barcode reader to TMS), product- employee- and company codes are validated and automatically corrected if possible. When the itembag processing takes place, it is checked that a transaction is valid and possible. If that is not the case, it will not be processed but appear in the itembag error section. The itembag processing error section will show you the nature of the problem and allow you to search for solutions and correct the problem or discard the transaction entirely. The TMS database is only then up to date when all itembag transactions including errors have been processed or cleared.

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*ADVICE: Instruct the people that work with the barcode readers thoroughly on how to use the readers correctly. It will spare you a lot of itembag errors!  
Get your toolroom 'watertight'; do not allow tools to slip out or into the toolroom without being scanned. Discrepancies between reality and a management system*



*like TMS will always occur but will quickly get unacceptable if not all tools are scanned.*

---

## 2.9 TMS log

All the actions on tools are registered in the TMS log. When you add, lend, issue, inspect, damage (...) items it will be logged. The logging occurs after the event has taken place; i.e. when you lend an item it will enter the log when the item is returned. Only then it has become history. Most TMS screens will show the actual status of the system. If you want to look at the history of an item, select the **history** button or right-click on an item and select history. In the reports menu a menu section **item history** allows you to select history reports.

## 2.10 Barcodes

There are many barcode types in use in various applications. There are 1 and 2 dimensional barcodes, codes with built in checksum and predefined application codes. Widely used types are: Code 3 of 9 (also called Code 39), Code 128, Code 2 of 5, EAN13 and EAN128. Code 39 is reliable and effective and not subject to a committee validating the codes you create and it can be read by every barcode reader for sale. Therefore code 39 has been chosen as the basis barcode within TMS. Other barcode type can be used (dependent on your label printer) but checks of the validity of the codes and IDs are always against the Code 39 character set. This set consists of capital A to Z, numbers 0 to 9 and characters % + - . /. The \$ sign is also a valid Code 39 character but has been reserved by TMS to mark unique company numbers within the barcode (so the reader can act accordingly). There are 4 kinds of barcode labels that can be printed with TMS:

- Employee label; this contains the **EmployeeID** as a barcode and the name of the employee.
- Product label; Contains only the **ProductCode** as barcode and the product description when printed from the **Productlist** or from any of the itemlists (stock, lending overview, ...) when it is a *non-serialized item*.
- Non unique serialized item label; contains both the **ProductCode** and the **CompanyNumber** as barcodes and the product description of the tool.
- Unique serialized item label; contains only the **CompanyNumber** as barcode and the product description of the tool.

Optionally the storage location can be printed on all item labels as well.

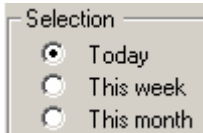
## 3 Quick reference guide


This part does not provide detailed information on every screen of TMS but focuses on how to accomplish specific tasks within TMS.

### 3.1 Quick explanation of TMS controls

#### 3.1.1 Common program controls

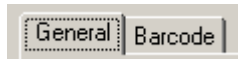
Preview *Check box; activate option by checking the box.*


*Radio buttons; only one of the options is selectable.*


*Combo box; pick a value from a list.*


*Record navigator; browse through records.*



*Toolbar; activate functions.*

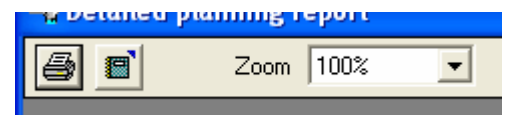

*Tabbed screen; screen has been split up in several sections*


*Greyed textbox; textbox that cannot be edited.*


*Yellow textbox; data entry is required.*

#### 3.1.2 Reports

In any IT system there are reports that show the current state of the system or summarize the results. All reports can be started from the **Reports** menu but sometimes they are shown when the  button is clicked in stead of a print screen. All reports are first previewed on screen and can be printed or exported using the report toolbar. You can also enlarge or reduce its size on screen by using the **Zoom** combobox (this doesn't affect the printout on paper).



### 3.1.3 Listviews

TMS uses a lot of lists to show and control data. Most of these lists can be manipulated in a similar way.

(1) →

Surname	Firstname	Gender	MobilePhone	eMail
<input type="checkbox"/> Albayrak	Taylan	M	0174/3599279	taylanalba
<input type="checkbox"/> Allbrecht	Sebastian	M	0178-2135474	
<input type="checkbox"/> Ansoerge	Marion	F	0172 - 6741805	marion.an
<input type="checkbox"/> Antolin	Selina	F	1702851295	tanja_dor
<input type="checkbox"/> Arens	Klaus	M		klaus.aren
<input type="checkbox"/> Aring	Heinrich	M		heinrich.a
<input type="checkbox"/> Arnould	Bernard	M		
<input type="checkbox"/> Arslanlar	Tugnil	M		phokai@c
<input type="checkbox"/> Bakker	Yvonne	F		
<input type="checkbox"/> Bannefeld	Alina	F	1625604123	anilaba90
<input type="checkbox"/> Bannefeld	Martina	F	1627460277	anilaba90
<input type="checkbox"/> Bassner	Lothar	M		
<input type="checkbox"/> Bauch	Jennifer	F	1743682554	jb1984reC
<input type="checkbox"/> Bauk	Agnes	F	0163 5526295	agnesbau

The listview element always has the following properties:

1. The columnwidth can be controlled by dragging the column separator in the list heading<sup>(1)</sup> to the left or the right. By using the key combination **{control +}** TMS will automatically set the columnwidth of each column based on its contents (the control must be the active control for this to work). **{control \*}** sets the column width to fit either its contents or the text of the columnheader (whichever is widest). TMS stores the columnwidths for each screen per user in order to restore these same settings when the screen is opened a next time.
2. You can search for a specific row in the list based on the information in the first column. Activate the list (left mouse click in the list) and type in the (first few) characters you search for. The more characters you enter, the closer you get to the data you look for. The typing of characters must be done rather quickly (within 2 seconds for each character) otherwise the search function will presume you search for a new value.
3. The sort order of the list can be changed by clicking on the column header. A 2<sup>nd</sup> click on the same column header will reverse the sort order of that column. The altered sort order is always temporary and will not be stored.
4. The **{F5}** key will refresh the list.
5. When the listview contains checkboxes ( in front of each row) you can select and unselect rows by clicking on each checkbox. A range of rows can be selected in combination with the **{shift}** key. Select the first row, hold down **{shift}** and select the last row you want to select. All rows between the first and last row will be checked. In most cases there will also be toolbar buttons to select and unselect all rows or reverse selection.

### 3.1.4 Window menu

The window menus offer standard facilities such as **Tile Horizontally**, **Tile Vertically**, **Cascade** and **Arrange Icons**. Additionally there is the **AutoArrange** menu option that neatly Arranges the main window, icons, window sizes and positions when your TMS screen is a mess. The **Close All** option quickly closes all open windows of TMS.

### 3.1.5 Help→Support→e-mail Support Request

This menu opens an e-mail in your e-mail program addressed to [support@objectso.nl](mailto:support@objectso.nl) with additional technical information about your system. You can add/edit your question or problem and send it.

## 3.2 Employee actions

### 3.2.1 Add an employee

From the **Edit** menu select **Employees**. Click **[Insert]** on the *employee overview* toolbar. Enter an employee code (Yellow: required). This code is limited to the barcode code 3 of 9 character set and can be up to 10 characters in length. Numeric codes are padded with zeroes on the left up to the number of positions as set by your TMS administrator (default = 6). For example: when you enter code 123 it will be converted to 000123.

---

*ADVICE: It is recommended that you use numeric IDs in stead of alphanumeric IDs. Numbers can be entered into the barcode reader a lot more easy than alphanumeric characters.*

---

### 3.2.2 Delete or deactivate an employee

Select an employee in the *Employee overview* and click **[delete]** in the toolbar. When an employee has never gotten any items you can delete the Employee by clicking on **[OK]**. If the employee has a history (i.e. has gotten items) then you can only *deactivate* the ID. When an *EmployeeID* is deactivated it will no longer appear in the lending and issued items overviews and reports unless the Employee still has items.

### 3.2.3 Renumber/rename an employee

Select an employee in the *Employee overview* and click **[edit]** in the toolbar. Select the **[#]** button on the right of the EmployeeID. Enter a new ID in the field **New EmployeeID** and click **[OK]**. Note that you cannot rename an ID to a number or code that already exists.

### 3.3 Add a new tool

#### 3.3.1 Using an existing product definition

From the **Edit** menu choose **Add items to stock** or click the **[Add]** button on the *Stock overview* screen. The *Add items to stock* screen will appear (see screenshot). Tools can only be added to the stock and never directly to a cluster or person. To add an *item* you follow four steps as indicated by the 1 2 3 4 headers in the dialog.

1. Type in (a part of) the productcode or description of the tool you look for. When you click on **[find]** or press {enter} the productlist under (2) will show you the items that match your search.
2. Select the product you want to add in the productlist by clicking in the *listview*. Dependent on the product being serialized or not the field **serial-** and **company number** are editable or not. This also applies to the **number of items to add** field. When serialized it is fixed to 1.
3. Enter item details in the fields under **item information**. When the product selected is serialized you can enter the serial number, company number and unique fields otherwise you can edit the number of items to add (between 1 and 30.000). If you enter the serial number first and the company number is empty TMS will convert the serial number into a valid Code 39 company number by replacing invalid characters with dots. Of course you can overwrite the company with your own number or you may leave the serial number field blank and only enter a company number. In case of a serialized item you can select whether the serial number must be unique or not. When checked TMS validates that the company number entered is unique throughout the system. When unchecked the company number must be unique within the product code. The storage location field enables you to register where the item is located in your warehouse. For non-serialized items that are already on stock this field is ignored. It is recommended that you enter an (estimated) item price because it will give you an indication of the value of your stock and the tools people take with them but if you don't know or want to register the price set it to zero. If the product selected is a *cluster* you can also enable and enter a *cluster end date*.

**1. Search for product**

ID or searchcode contains:

**2. Select product (3587 found)**

ID	Description	Searchcode1
(NEW)	(double click to add a new product)	
80000003	Boor,Metaal- 0,5 Mm.	tirfor
80000008	Boor,Metaal- 1 Mm.	Boor,Metaal
80000009	Boor,Metaal- 1,1 Mm.	Boor,Metaal
80000010	Boor,Metaal- 1,2 Mm.	Boor,Metaal
80000011	Boor,Metaal- 1,3 Mm.	Boor,Metaal
80000012	Boor,Metaal- 1,4 Mm.	Boor,Metaal
80000013	Boor,Metaal- 1,5 Mm.	Boor,Metaal
80000014	Boor,Metaal- 1,6 Mm.	Boor,Metaal
80000015	Boor,Metaal- 1,7 Mm.	Boor,Metaal
80000017	Boor,Metaal- 1,9 Mm.	Boor,Metaal
80000018	Boor,Metaal- 2 Mm.	Boor,Metaal
80000019	Boor,Metaal- 2,1 Mm.	Boor,Metaal

**3. Enter item information**

Serial number:

Company number:   Unique

Supplier:

Storage location:

Number of items to add:

Item price (per piece in €):

**4. Finish**

Print barcodelabel

Add to stock

4. When you click on the **[add to stock]** the item will be added to the stock. If the item is serialized or not yet on stock a new item line will be created, if the item is non-serialized but already on stock the amount will be added to the current number of items on stock. A new entry will be created in the log registering that x number of items have been added to the stock. With the report **Items added to stock** in the **Reports→Item history** menu you can review when, which and how many items have been added in a given period of time. When you check the **print barcodelabel** checkbox a barcode label of the item (containing product- or company code or both) will be printed if the *item* has successfully been added to the stock.

### 3.3.2 Using a new product definition

It might be that the product you look for is not in the product list. In that case you can either add a new product in the products table first (**Edit→Products, New**) or double click on the (**NEW**) line in the product list or click on the vertical **Select product** caption. A different part will slide in place of the product list that allows you to enter a new product AND enter a new item. Step 2 has now changed to enable you to enter new product specifications.

1. This step works similar as described in section 3.3.1. Click **[find]** or **[clear]** and the new product section (2) will be cancelled and the product list will appear again.
2. In this step you can now enter a new product. The **ProductCode** field is limited to the Code 39 character set and has a field length of 10. With the **serialized** and **cluster** checkboxes you can set that the item is *serialized* or is a *cluster* (always serialized). **Description** obviously describes the tool (max 100 chars). **Search code 1** and **2** (each up to 12 chars) are not displayed on TMS screens but can be used to add extra information to the product to find the product when you add new tools or in the **Edit→Find item(s)** function of TMS. The **ProductGroup** combobox allows

you to group tools together so they are easier to find in the Stock overview for instance. **Default supplier** identifies the vendor that usually supplies this kind of tool. In step 3 this default supplier is shown first but there you can deviate from the default when the item in a particular case has been supplied by another vendor. The fields, **inspection- and check interval** let you set a period of time between checks/inspections in days (up 3650 days or 10 years) or disable it for this product (when 0). The **minimum stock** field assigns a minimum level of items you want on stock. The report *Products to be ordered* (**Report→Orderlist**) uses this value to determine which products need to be ordered to get to that minimum level. Set to zero this product won't show on the report (no minimum level). The field **Warranty months** can be used in combination with the deployment date each *item* gets (mainly useful for serialized items) to show if the item still has warranty or not (currently unused feature). **Distribution type** determines how data processed from the barcode reader will be handled. If set to **Always lend** (default for serialized items) then TMS will always lend the tool even though on the barcode reader the function *issue item* has been selected. Likewise when set to **Always issue**, all items processed by the barcode reader will not be lend but issued. This option is recommended for consumables like sandpaper for which you know up front that you will never lend it. When **Determine at barcode reader** is selected the handling of barcode transactions is fully dependent on the choices made on the barcode reader.

**TIP:** *You can copy a product definition by selecting a similar product in the product list and then click on the vertical sidebar. Only a new product code must be entered and the description altered.*

3. See description of step 3 under section 3.3.1
4. See description of step 4 under section 3.3.1

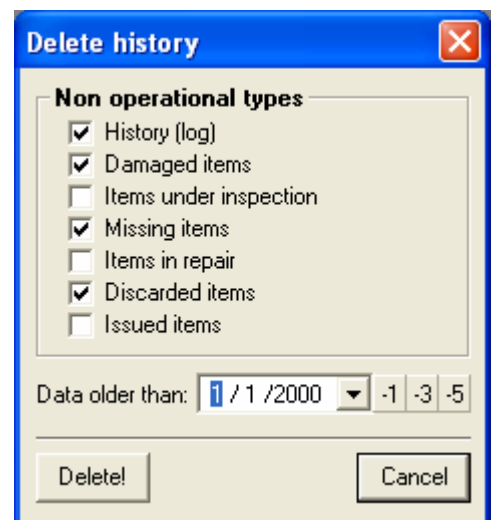
### 3.4 Remove a tool

Tools (items) enter into service through the *Add items to stock* screen. An item can be removed from service in several ways; it gets issued, missing, damaged or discarded. In the first three cases the item gets *non operational* as a result of the event itself. With the **Discard** option, available on several *Manage* screens, you manually remove the item from service. It will be moved to the **discarded** section in the *Non Operational Items* screen and the history of the item is preserved. After a while you can use the *Delete history* method (from the **File** menu) to remove items and history older than a given time. If you want instantly want to remove an item from TMS you can move it to the **Non Operational Items** (by using *discard* for instance) and remove it permanently, including its history, by holding down the **{control}** key in the **Non Operational Items** screen and click on the **[Delete]** button.

### 3.5 Remove historical data and non operational items

After a few years using TMS you can think of removing historical data and items that have been missing, discarded or damaged for so long. With **File→Delete history** you activate the *Delete history* screen that enables you to delete the TMS history and non-operational items older than a given date. The data to be deleted has to be at least from the previous year or older. You can enable or disable each type by clicking its checkbox. Serialized issued items will never be deleted; TMS presumes these to be indefinite lends. Use this procedure every 5 years or so.

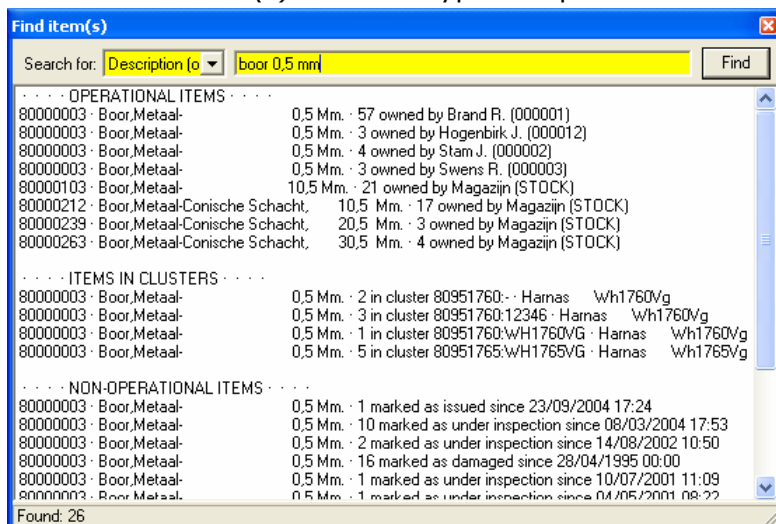
*ADVICE: Only delete history and non-operational items because the data isn't relevant anymore. You don't have to cleanup for performance or disk space reasons.*



### 3.6 Moving around item screens

#### 3.6.1 Find items... function

When you want to find an item regardless if it is lend, issued or on stock you can use the **Edit→Find item(s)...** function (or press **{control-F}** on your keyboard). In this window you can search for items based on its *productcode*, *companynumber*, *description* or *searchcode(s)*. You can type in a part of or several parts of the code or description. It will find



items in stock when lend, issued or non operational (damaged etc...) and in clusters (whatever status). With a click on **[Find]** you get a list of items that match your search criteria. When you double click on a line, TMS will activate the appropriate screen and jump to the item selected. If it turns out that you selected the wrong item select **Find items...** again and repeat the search (you last search has been kept) or select the **[others]** button or menu (right click on a line).



### 3.6.2 Others button or sub-menu choice

In most *item* screens like the *Stock overview* there is an **[others]** button. When you click on this button (or select *Others* on the item sub-menu (right click on a line)) a complete list of all the items with the product code of the item you selected is shown. If you double click on an item in this list you will jump to that particular entry in TMS. The *Others* function is also available in the *product overview* screen (**Edit**→**Products**) but is called the **[Items]** button there.



### 3.6.3 Go from cluster content to cluster entry itself

When you use the *Find items...* or *Others* function you might end up within a *cluster content* screen. If you want to manipulate the cluster itself you must go up one level to the entry of the cluster in the stock, lendings etc... overview. You do so by double clicking on the **Registered to...** text in the statusbar of the cluster contents window.



### 3.6.4 Items per storage location

The **Items per storage location** screen shows items grouped by storage location but regardless of their status (either lend, issued, non-operational or in stock). By using the **[Other]** button you can quickly switch to the screen that actually contains the item. You can use this screen also to print multiple barcode labels by marking the checkboxes and click on **[print barcode(s)]**.

## 3.7 Manipulate items manually

TMS lets you lend, issue and return items using barcode readers. Most of the work will be done with the readers but you can of course also perform these actions with the TMS PC software. This will allow you to correct problems, mark items as damaged, missing and so on and compose clusters. In general you can use drag and drop to drag an item from one window to another. Furthermore you can use the **[Damaged]**, **[Inspect]**, **[Missing]**, **[Repair]** and **[Discard]** buttons to mark an item as such instantly (where available).

---

*ADVICE:* Use a screen resolution of 1024x768 and a 17" monitor so that you have enough room for drag and drop actions.

---

### 3.7.1 Lend and return

Open both *Stock* and *Lending overviews* and select a person in the *Employee list* on the left of the *Lending overview*. If you have not selected an employee in the left panel ((*all*) is selected) then the tool will be lend to the person who owns the selected tool in the *item listview* (the right panel). From the *Stock overview* select the tool you want to lend and drag it to the *item listview* from the *Lending overview*. TMS will ask you to confirm that you want to move the item selected to the person selected; click **[ok]**. If the item is non-serialized and there is more than one available then you will be able to change the number of items to lend. To return an item you can either drag and drop it back to stock or click on the **[Return]** button on the toolbar.

### 3.7.2 Issue and return

Open both *Stock* and *Issued items overviews* and drag and drop items from the *Stock* window to the *Issued items* window (similar to 3.7.1; Lend and return).



### 3.7.3 Mark item as damaged, inspect, missing, repair or discard

Use the **[Damaged]**, **[Inspect]**, **[Missing]**, **[Repair]** and **[Discard]** buttons to mark an item as such instantly from the *Stock*, *lending*, *non-operational items* and *cluster overviews*. Note that these buttons are not available in the *Issued items overview*. Because the *issue* action is mainly intended for consumables, marking these items as damaged and so on isn't meaningful for non-serialized items. You can however drag and drop serialized items that have been issued to a non-operational section in the *non-operational items overview* and it will be moved to that part (after confirmation).

The report *Inactive items per department* (**Report**→**Item actuals**→**Inactive items per department**) will show you all the damaged, missing, discarded etc... items grouped by department for a given period of time.

### 3.7.4 Return non-operational items back to operation.

From the *non-operational items overview* click on the **[return]** button or drag and drop it onto the *Stock overview's* item listview. When you use the **[return]** button and the item originated from a cluster or an issued item screen TMS will offer you to return it to either the original cluster/issue owner or to stock. This will limit your effort to return inspected items to a cluster or issued owner (indefinite lend). This way there is no need to move the item from stock to the cluster or the issued owner again.

### 3.7.5 Create and compose a cluster.

Create a cluster item by using an existing product definition that is a cluster or create a product definition with a cluster marking as described under chapter 3.3 'Add a new tool'. Find the cluster in the *stock overview* (you can recognize them by the toolbox icon) and click on the **[cluster]** button (or right click and select cluster). A new window opens showing the cluster content (this will initially be empty). You can add items to the cluster by dragging items from *stock* into the cluster content window. You may also move items from one cluster content window to another or even from the *lending overview* into a cluster.

### 3.7.6 Other item movements.

Apart from the item movements described above you can also move items:

- From the *lending overview* to the *issued items overview*. This will be handled first as a *return to stock* action and secondly an *issue* action and will be logged accordingly.
- From the *issued items overview* to the *lending overview*. This will be handled as a *return to stock* and then as *lend* action and logged accordingly.

## 3.8 Manage the purchase list

By using the **minimum stock** field in product definitions you can set your minimum stock for each product type individually. TMS uses these minimum stock values to determine for which *items* the number of items have fallen below stock minimum in the 'List of products to be ordered' report (**Report**→**Orderlist**). If you set it to zero then the product will not appear on the order list.

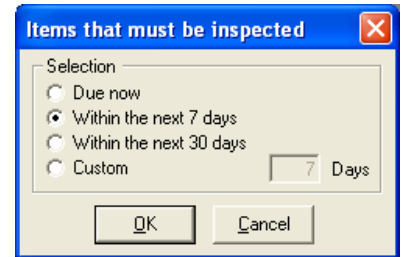
Productcode		Description	Stock calculation	Item calculation
80000003	Boor,Metaal-	0,5 Mm.	Stock: 0	Total: 67
Supplier: 1 Van Eyle & Ruygers			Stock minimum: 99	99
Contact: Cortenberghe, Van C. Phone: 010-2455014			<b>To be ordered: 99</b>	<b>32</b>
80000008	Boor,Metaal-	1 Mm.	Stock: 15	Total: 18
Supplier: 1 Van Eyle & Ruygers			Stock minimum: 59	59
Contact: Cortenberghe, Van C. Phone: 010-2455014			<b>To be ordered: 44</b>	<b>41</b>

This list will show you two calculations of the amount to be ordered: first is a calculation of the minimum level minus the number on stock. The second calculation is the minimum on stock

minus the total number of items on stock and lend. You can judge yourself how many items you must order to get to the optimal stock level again.

### 3.9 Manage checks and inspections

For each product you can set a number of days between inspections or checks an item needs (**Edit→Products, Edit product, field Inspection interval and Check interval**). Although the interval for each item of a product is the same, the actual inspection/check due date is determined for each item individually (serialized items only). This inspection/ check due date of an item is either the deployment date or the last inspection/check date of the item plus the number of days under **Inspection/check interval** of the product. When set to zero no periodic inspection/check is required. In general the interval between checks will be less than the interval between inspections (see chapter 2.6 Item inspections and checks).



To see for which items the inspection/check date will be or already is due, use the reports *Items to be inspected* and *Items to be checked* (**Reports→Items to be inspected/checked**).

The report *History of inspected items* (**Report→Item history→Inspected**) shows which items have been inspected (or are still under inspection) in a given period of time. The report *Item checks* (**Report→Item actuals→Item checks**) shows you all checks carried out in a given period of time.

### 3.10 Solving item bag processing errors

As explained in chapter 2.8, the item bag contains unprocessed or incorrect transactions from the barcode readers. Transaction are downloaded with a click on the **[Retrieve transactions]** button (then click **[Transfer]**) in the toolbar. After download these records will appear under the section **Barcode reader** on the right of the item bag screen. The **[Process]** button will process the pending transactions into the administration. With the **[Discard]** button you can remove a transaction from the item bag; it will not be processed.

View	Date	Product	Compa...	Description	#	Action	Sender	Name (S)	Receiver	Name (R)	Status
	2004-05-10 09:23:03	6547000	-	Kitpistool	1	Lend	STOCK	Magazijn	00863001	Majoor, E.	pending...
	2004-05-10 09:23:08	6350015	-	Verst. moersleutel 18" L=450mm	1	Lend	STOCK	Magazijn	00863001	Majoor, E.	pending...
	2004-05-10 10:22:22	73C01AA	73C0105	Laptop	1	Lend	STOCK	Magazijn	00861856	Plantinga, M.P.	warning; deactivated emp...
	2004-05-10 10:47:13	6368307	2.11.238	Momentsleutel 8-40 Nm 3/8"	1	Lend	STOCK	Magazijn	00933754	Sawal, P.S.	pending...
	2004-05-10 10:47:16	6368301	2.11.240	Momentsleutel voor 1/2"	1	Lend	STOCK	Magazijn	00933754	Sawal, P.S.	pending...
	2004-05-10 10:51:24	6368848	08C0117	Slagmoersleutel 1" pneumatisch	1	Lend	STOCK	Magazijn	00861773	Muntjewerff, R.G.T.	pending...
	2004-05-10 10:52:09	6363636	-	Sluitedop zeskant 36mm (1") L=87mm	1	Lend	STOCK	Magazijn	00861773	Muntjewerff, R.G.T.	pending...
	2004-05-10 10:52:57	6354565	-	Ringsteekleutel 36mm	1	Lend	STOCK	Magazijn	00861773	Muntjewerff, R.G.T.	pending...
	2004-05-10 10:54:21	6350015	-	Verst. moersleutel 18" L=450mm	1	Return	00863001	Majoor, E.	STOCK	Magazijn	pending...
	2004-05-10 10:54:27	6547000	-	Kitpistool	1	Return	00863001	Majoor, E.	STOCK	Magazijn	pending...
	2004-05-10 10:54:46	6368828	08C0127	Slagmoersleutel 1/2" pneumatisch	1	Lend	STOCK	Magazijn	00862898	Rooy, de, D.	pending...
	2004-05-10 10:54:54	6368828	08C0130	Slagmoersleutel 1/2" pneumatisch	1	Lend	STOCK	Magazijn	00862898	Rooy, de, D.	pending...
	2004-05-10 11:00:40	71C0102	-	Megger voor tractiemotoren en hoogspanning...	1	Lend	STOCK	Magazijn	00672527	Uslu, M.	pending...
	2004-05-10 11:01:04	5259062	16C0102	Boormachine 15.6V, accu Metabo BST 15.6...	1	Lend	STOCK	Magazijn	00690271	Mese, N.	pending...
	2004-05-10 11:08:46	73C01AA	73C0105	Laptop	1	Return	00861856	Plantinga, M.P.	STOCK	Magazijn	warning; deactivated emp...
	2004-05-10 11:09:11	01C0112	-	Steekleutel voor stoot en trekwerk	1	Lend	STOCK	Magazijn	00863001	Majoor, E.	pending...
	2004-05-10 11:09:31	6368864	08C0135	Slagmoersleutel 1" pneumatisch rechte uitv.	1	Lend	STOCK	Magazijn	00863001	Majoor, E.	pending...
	2004-05-10 11:09:46	08C0104	-	Lucht slang 6 bar	1	Lend	STOCK	Magazijn	00863001	Majoor, E.	pending...
	2004-05-10 11:09:57	6362550	-	Sluitedop tweekant 50mm (1") L=78mm	1	Lend	STOCK	Magazijn	00863001	Majoor, E.	pending...
	2004-05-10 11:10:14	6415978	-	Opsteekijzer D=25mm, L=710mm	1	Lend	STOCK	Magazijn	00863001	Majoor, E.	pending...
	2004-05-10 11:10:47	71C0102	-	Megger voor tractiemotoren en hoogspanning...	1	Return	00672527	Uslu, M.	STOCK	Magazijn	pending...
	2004-05-10 11:18:00	6345022	-	Zaag, ijzer hand zaagblad L=300mm 24 tande...	1	Lend	STOCK	Magazijn	00553529	Croonen, B.G.A.	pending...
	2004-05-10 11:24:41	6345022	-	Zaag, ijzer hand zaagblad L=300mm 24 tande...	1	Return	00553529	Croonen, B.G.A.	STOCK	Magazijn	pending...
	2004-05-10 11:25:01	6188014	-	Vijl basterd platstomp L=350mm	1	Lend	STOCK	Magazijn	00553529	Croonen, B.G.A.	pending...
	2004-05-10 11:37:16	95C01AC	95C0102	Kaliberkoffer deuren IRM kist 2	1	Lend	STOCK	Magazijn	00933598	Aardenburg, A.H.	warning; deactivated emp...
	2004-05-10 11:38:55	61A0A16	-	Maatmal neeie daat t.o.v. bakwand IRM	1	Lend	STOCK	Mansin	00933598	Aardenburg, A.H.	warning; deactivated emp...

### 3.10.1 Itembag sections

Besides a toolbar this screen is also divided into sections:

#### 3.10.1.1 Manually added

All movements of items, including drag and drop actions within TMS, are in fact handled via the itembag. If you want that manual actions are not immediately and automatically processed deselect the checkmark under **File→Configuration, Process manual actions immediately**. When disabled your manual actions will be treated equally and in order of date/time as barcode reader transactions and such manual transaction will appear in the section **Manually added** in the *itembag*. It is however recommended not to deactivate this option.

#### 3.10.1.2 Barcode reader

This section contains all transactions downloaded (transferred) from the barcode readers. When item(s) are lent to a person who is deactivated you are warned. If you do not *discard* this transaction the item(s) will be processed. After all, the item(s) have been lent to this person or whoever who has that employee code...

#### 3.10.1.3 Processing errors

Transactions can be marked as erroneous in two ways:

1. During download; when data of a transaction is apparently flawed and processing of it will fail, it is marked erroneous immediately and moved to **processing errors** even when the transactions have not been processed yet.
2. After processing; if there was any kind of inconsistency or error during the processing of a transaction it will be marked erroneous.

#### 3.10.1.4 Blanks

When more parts of the transaction are left out or are invalid then it might not be possible to process the transaction at all, even after correction. The *blanks* section shows probable garbage transactions that can be deleted immediately. For example: if someone enters '1' on all scan requests of the barcode reader this line will be stored and transferred but shown on the *blanks* page so it can easily be removed.

### 3.10.2 Order of actions

The proper order of actions to take when you want to incorporate barcode reader transactions into TMS:

1. Retrieve transactions
2. Eliminate blanks (optional)
3. Process transactions
4. Deal with processing errors

### 3.10.3 Deal with processing errors

Processing errors can occur because of various reasons. When a conflict occurs or some data is missing in a transaction TMS will not process that transaction but mark it with an error.

For instance: someone lends 5 screwdrivers 15mm and this is scanned with the barcode reader but TMS has only registered 4 on stock. Since the barcode reader works *off-line* it doesn't know the administrative stock. If there are actually 5 screwdrivers on stock you will notice the discrepancy only when you process this transaction.

Another example: someone lends 1 wrench and returns a screwdriver. The warehouse however scans both tools with '*return item*'. During process TMS will show the error that the person cannot return the wrench (he has actually lent it) because he never owned it.

It has been stated before: the better the desk personnel works with the barcode readers the less processing errors there are to deal with. Nevertheless there will be processing errors since mistakes can always happen and the TMS administration can (and probably will to some extent) deviate from reality.

To solve these problems it is best to go through each error chronologically starting with the oldest transaction. When you click on the erroneous transaction you can see the error description in the status bar and in the **Status** column. If the employee- or product code or company number is invalid it will be coloured red. A right mouse click on the transaction shows



you the options you have to handle the error. These options are context related and while some options are available for one problem they might not be for other types of problems.

3.10.3.1 Discard transaction (always available).

This will delete the transaction from the list. It is like the transaction never happened and thus it will not be processed. Use this when other options fail.

3.10.3.2 Change to→Issued/Lend/Return (always available)

Switch to a different transaction type. In case of the previous example where you know that someone has lent a tool in stead of returned it you can correct it.

3.10.3.3 Retry (always available).

Always try this option first (a double click also triggers this option). It might be that the error is caused by another problem earlier on and that it has been solved already. In case of the example where someone has lent a tool but it has been registered as a return: this might be the transaction where he really returns it. Since the previous problem has been corrected using *Change to lend* this line is now correct. A retry will now process the transaction without problem.

3.10.3.4 Log and discard (context sensitive).

In TMS version 1.xx a string of problems could occur such as described above. In version 2.xx an erroneous transaction of an item will also no longer 'block' correct transactions from a later date. This might lead to the error 'transaction is older than the current assignment'. In that case you can either *discard* or *log and discard* it. With the last option the transaction will only be registered in the log but not be processed.

3.10.3.5 Process max. possible (context sensitive).

This option will be available when for instance more items are lend or returned than the owner has. Say 5 items are lent to person X but only 4 are registered on stock within TMS. With *Process max. possible* you will only lend those 4 that are on stock.

3.10.3.6 Force transaction (context sensitive).

This option will be available when for instance more items are lend or returned than the owner has. Say 5 items are lent to person X but only 4 are registered on stock within TMS. With *Force transaction* you will lend 5 items (and increase the total number of items of that product).

3.10.3.7 Keep with sender or keep with receiver (context sensitive).

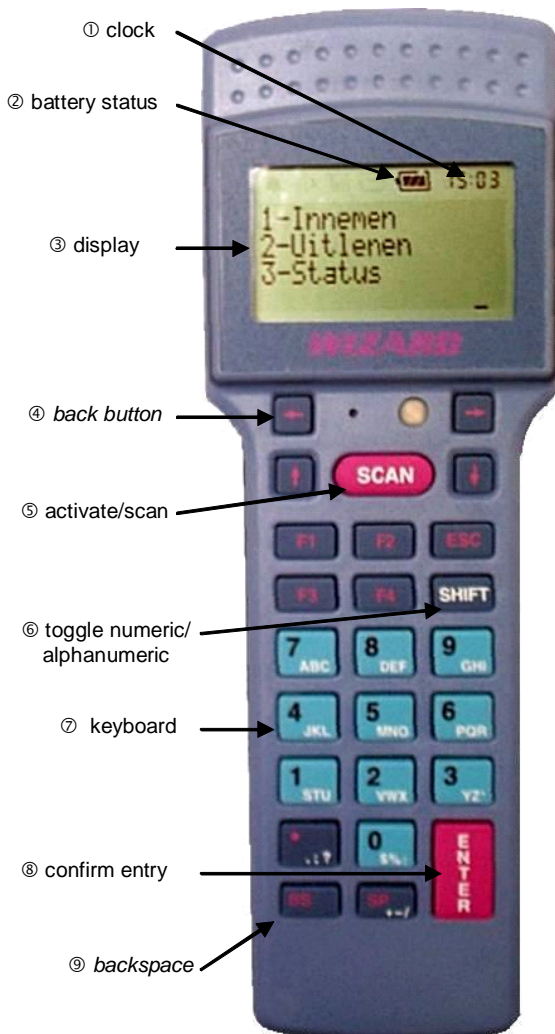
These options will be shown when an item appears to have 2 owners. A choice for one removes all other registrations of the item.

3.10.3.8 Suggest solution (context sensitive).

When an employee code, product code or company number is missing or incomplete or a code has been scanned in the wrong section TMS provides you the *suggest solution* option. TMS will try to resolve missing or misplaced data automatically but human help is often needed to make the right choice. You can select the right tool or employee from a list of codes that match the faulty code in the transaction.

Use the **[other]** and **[history]** buttons to figure out where a tool currently is or what has happened. You can also use the *Manage* screens to correct problems or to do the transaction manually.

## 4 Using the TMS barcode reader



The barcode reader used for TMS is a kind of handheld computer with its own CPU, memory, display<sup>3</sup> and keyboard<sup>7</sup>. It can operate completely autonomously because it runs its own software and stores information in its own internal memory. This means that you are not attached to wires and thus limited to the length of a wire nor will you have any interference or dead spots on your site as with wireless RF-solutions often is the case (especially in tool rooms with a lot of steel). A drawback of an independent system like this is that it isn't directly connected to the central TMS database. It is therefore not aware of mistakes you make and changes made by other barcode readers.

The reader has several keys but not all of them are active because they are not needed for TMS.

### 4.1 Parts of the barcode reader

1. Internal clock; all transactions get a date and time stamp so they can be processed correctly by TMS. The time is synchronized with the PC clock every time data is transferred to TMS (if the difference is more than 10 seconds).
2. Battery status symbol; if the symbol is empty, so is the battery. The battery is recharged when it is in the communication/charging cradle.
3. LCD display with 4 lines of 16 characters; use {shift ←} to toggle the backlight, {shift →} to cycle through 15 steps of contrast settings.
4. arrow keys; with the TMS application only the ← key is enabled. It acts like the 'back' key in a web browser and always takes you one step back.
5. activate/scan; turn on the barcode reader or scan a barcode with this key. The barcode reader automatically shuts down after 15 seconds of inactivity. When you press {scan} you will always return to the state the barcode reader was in when it shut down.
6. shift key; this will toggle between numeric and alphanumeric digits input when the keyboard<sup>7</sup> is used.
7. keyboard; enter numbers (default) or characters using the {shift} key.
8. Enter key; press {enter} to confirm an entry or choice.
9. backspace key; use {backspace} to delete the previously typed character.

## 4.2 TMS barcode application

The TMS barcode reader application starts with a main menu. If the reader is not in the main menu press the {←} several times until you are in this menu. The main menu:

1. Lend
2. Issue
3. Return
4. Status

You can select the action you want to do by pressing key 1 to 4 and press {enter}. The reader will now show the selected action and requests the employeecode. For instance:

```
Lend
Employee?
```

Scan or type in the employeecode; you will hear a short beep. Now TMS requests the productcode of the tool:

```
Lend
123
Productcode?
```

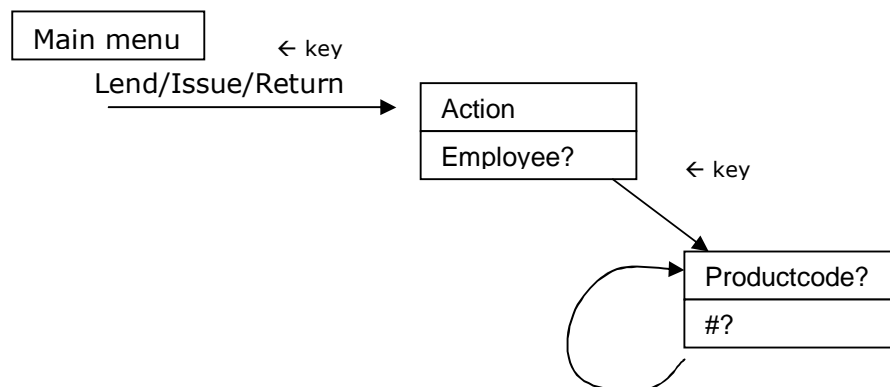
Scan the productcode on the barcodelabel of the tool (you may also use the keypad). When it is a *serialized tool* and this code is *unique* (marked with a \$ sign) you can scan the *companynumber* at this point. The scanner will store and request a new tool immediately. When a productcode is scanned the barcode reader will ask for either the number of items or the *companynumber*.

```
Lend
123
5320139
#?
```

Now enter the number of items you will lend if the product is not serialized. For instance: type in 3 and press {enter}. If the product is serialized you scan the second barcode on the label (the one on the right). When you have scanned or typed in this last code or number of items two beeps of increasing pitch will be heard indicating that the tool is now stored as lend. Note that with the *return* function the two tones have a decreasing pitch. The barcode reader will request another product code to lend for this same person. You can continue to lend tools to this person until you are done.

When you need to lend a tool to a different person press {←} until the barcode reader requests a new employeecode. When you want select a different action press {←} until you are in the main menu again and select the new action.

### 4.2.1 Schematic overview of the TMS barcode application



#### 4.2.2 Return exception

The menu options Lend, Issue and Return all operate in the same way. The only exception is the return of *unique serialized items*. When such an item is scanned on the **Employee?** request it will store and loop immediately because TMS can determine the owner from the database.

#### 4.2.3 Barcode reader status

This menu option will show how many records (transactions) are stored in memory and how much memory is still free (in percent). Use the {←} key to return to the main menu.