MP5 System Guide for Kicker Magnet Thyatron
Database Administrator

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1 Introduction

This guide describes the procedures required for setting up and maintaining a thyratron database for the Kicker Magnet section of the PS Division using MP5. Further descriptions on MP5 features and the system setup are available in the publications mentioned in the references. It is strongly recommended to read the chapter 2 (Basics) of the User’s Guide prior to starting to work with MP5.

Chapter 2 contains the instructions for the initial system setup. Chapter 3 describes all the updating procedures. Chapter 4 contains the references to further resources.

In the beginning of each chapter a reference to other guides is stated. Also, the main form and database table are listed. Note that the names may change in future versions of MP5. Refer to the MP5 User Guide, Configuration Guide, and the program itself for current names.

2 System Setup

2.1 Creating Maintenance Responsibility Centers (MRC)

An MRC class indicates the division of CERN that has several sections. MRC is the section of the division that is responsible for specified systems or objects. Refer to Image 2.1.1 to get an insight into the relationship between system and MRCs.

When creating MRCs, the MRC class is created first (if it doesn’t exist). Then the actual MRCs are created and they are defined to belong the MRC class. MRCs must be specified prior to creating systems. Image 2.1.2 describes the processes to be completed in this phase.
2.1.1 Specify Maintenance Responsibility Center (MRC) Class

Resources
[System Configuration Guide] p.4: Defining or Modifying Classes

Database Table: R5CLASSES
Form: BNENTS (Entities)

In the list view, search for the MP5 entity MRC. Open the classes tab. Enter a unique system name for the MRC class in the class field and its full name in the description field. Save.

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>PS Division</td>
</tr>
</tbody>
</table>

2.1.2 Specify Maintenance Responsibility Centers (MRCs)

Resources
[System Configuration Guide] p.12: Defining Maintenance Responsibility Center Codes

Database Table: R5MRCS
Form: BNMRCSES (Maintenance departments)

Open the record view and click + to add a new MRC. Enter a unique system name for the MRC and its full name in the adjacent field. Select the MRC class from the classes list. Save.

<table>
<thead>
<tr>
<th>MRC</th>
<th>Description</th>
<th>Default Organization Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>KICK</td>
<td>Kicker Magnet Section of the PS Division</td>
<td>PS</td>
</tr>
</tbody>
</table>

2.2 Object Base Structure Setup

This chapter covers setting up the object base structure in MP5.

At first a location is created. Location is a building or room in which the equipment systems exist. The machine that resides in the defined building is defined and put into the created location. It is assigned a Maintenance Responsibility Center (MRC) to indicate which section is responsible for it.

When a location is created and it is assigned an MRC, equipments can be created and assigned to the location. After specifying the equipments, sections can be generated and assigned to the equipments. Creation of modules, and positions are done in the same manner, hierarchically and one type at a time. Machines, equipments, sections, modules, and positions are created as functional positions in MP5.

The processes are described in image 2.1.1.
The full object structure is described in image 2.1.2. Note that objects (i.e. thyatrons) are not inserted at this phase, for they can be entered only after specifying the necessary attributes (e.g. manufacturer).

**Resources**
2.2.1 Define Location

Database Table: R5OBJECTS
Form: OMLOCA (Locations)

In the List view or Record view, enter a unique system location name in the location field and the full name in the description field. Select the location class and Maintenance Responsibility Center (MRC). Save.

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>MRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLDG193</td>
<td>Building 193</td>
<td>KICK</td>
</tr>
<tr>
<td>KMSB1741B06Thyratron Storage Building 17, Room 1B06KICK</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.2.2 Define Position Types

Database Table: R5CLASSES
Form: BNENTS (Entities)

In the List View tab, search for the MP5 entity OBJ (Object). When OBJ is found and selected, open Classes tab. Insert a new class for the position type, enter a description for the class, and save.

Class        | Description
-------------|-------------
EQUI         | Equipment   
MACH         | Machine     
MODU         | Module      
SECT         | Section     

Table 2.2.3: Position types

2.2.3 Define Positions

Database Table: R5OBJECTS
Form: OMOBJC (Objects)

As stated in the beginning of chapter 2.2, machines, equipments, sections, modules, and positions are created as positions in MP5. When creating a machine, a location is assigned to it. When creating equipment, it is assigned to the machine instead of a location because it automatically inherits the location information of the machine it assigned to. Recall that the object structure must be created from bottom to top (location – machine – equipment – section – module – position) in order to be able to assign the pieces of equipment to the parent equipment.

In the List view or Record view, enter a unique system name of the machine in the object field and its full name in the description field. Select
Position from the Type options. Select the organization (default if no others have been specified) and MRC (Maintenance Responsibility Center). If you are creating a machine, select a location from the list. If creating equipment, section, module or position, select a parent from the list. Save.

<table>
<thead>
<tr>
<th>Object</th>
<th>Organization</th>
<th>Type</th>
<th>Description</th>
<th>MRC</th>
<th>Parent</th>
<th>Location</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>KMAAC</td>
<td>*</td>
<td>P</td>
<td>Kicker Magnet AAC</td>
<td>KICK</td>
<td>KMAAC</td>
<td>BLDG193</td>
<td>MACH</td>
</tr>
<tr>
<td>KMAAEJ</td>
<td>*</td>
<td>P</td>
<td>AA Ejection System</td>
<td>KICK</td>
<td>KMAAC</td>
<td>EQUIM</td>
<td></td>
</tr>
<tr>
<td>KMAAIN</td>
<td>*</td>
<td>P</td>
<td>AA Injection System</td>
<td>KICK</td>
<td>KMAAC</td>
<td>EQUIM</td>
<td></td>
</tr>
<tr>
<td>KMACEJ</td>
<td>*</td>
<td>P</td>
<td>AC Ejection System</td>
<td>KICK</td>
<td>KMAAC</td>
<td>EQUIM</td>
<td></td>
</tr>
<tr>
<td>KMSE04</td>
<td>*</td>
<td>P</td>
<td>Section 04</td>
<td>KICK</td>
<td>KMAAC</td>
<td>EQUIM</td>
<td></td>
</tr>
<tr>
<td>KMSE55</td>
<td>*</td>
<td>P</td>
<td>Section 55</td>
<td>KICK</td>
<td>KMACIN</td>
<td>EQUIM</td>
<td></td>
</tr>
<tr>
<td>KMSE56</td>
<td>*</td>
<td>P</td>
<td>Section 56</td>
<td>KICK</td>
<td>KMACIN</td>
<td>EQUIM</td>
<td></td>
</tr>
<tr>
<td>KMSE35</td>
<td>*</td>
<td>P</td>
<td>Section 35</td>
<td>KICK</td>
<td>KMACEJ</td>
<td>EQUIM</td>
<td></td>
</tr>
<tr>
<td>KMSE50</td>
<td>*</td>
<td>P</td>
<td>Section 50</td>
<td>KICK</td>
<td>KMACEJ</td>
<td>EQUIM</td>
<td></td>
</tr>
<tr>
<td>KMSE22</td>
<td>*</td>
<td>P</td>
<td>Section 22</td>
<td>KICK</td>
<td>KMAAEJ</td>
<td>EQUIM</td>
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</tr>
<tr>
<td>KMMO01</td>
<td>*</td>
<td>P</td>
<td>Module 01</td>
<td>KICK</td>
<td>KMSE04</td>
<td>EQUIM</td>
<td>MODU</td>
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<tr>
<td>KMMO02</td>
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<td>P</td>
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<td>EQUIM</td>
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<td>KMMO03</td>
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<td>KMMO05</td>
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<tr>
<td>KMMO06</td>
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<td>KMSE55</td>
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<tr>
<td>KMMO07</td>
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<td>P</td>
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<td>MODU</td>
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<tr>
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<td>P</td>
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<td>EQUIM</td>
<td>MODU</td>
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<tr>
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<td>MODU</td>
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<td>P</td>
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<td>MODU</td>
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<tr>
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<td>P</td>
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<td>KICK</td>
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<td>EQUIM</td>
<td>MODU</td>
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<td>P</td>
<td>Module 13</td>
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<td>KMSE50</td>
<td>EQUIM</td>
<td>MODU</td>
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<td>P</td>
<td>Module 14</td>
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<td>EQUIM</td>
<td>MODU</td>
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<td>*</td>
<td>P</td>
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<td>KMSE22</td>
<td>EQUIM</td>
<td>MODU</td>
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<tr>
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<td>*</td>
<td>P</td>
<td>Module 16</td>
<td>KICK</td>
<td>KMSE22</td>
<td>EQUIM</td>
<td>MODU</td>
</tr>
</tbody>
</table>

Table 2.1.4: Object systems in Kicker Magnet section (year 1987)

### 2.3 Create and Define Object Categories and Attributes

This chapter explains how to set up the object categorization from object classes to entering manufacturer-set values in MP5. The processes are described in image 2.2.1. Note that this chapter covers only setting up features that do not change over time. Setting up the base for parameter updating is described in chapter 2.3.

![Image 2.2.1: Setting up object categorization and attributes](#)
Each object (thyatron) is categorized and defined in the manner described in image 2.2.2. A thyatron always belongs to an object class (thyatron) and a category (tube type). Manufacturer is set for each thyatron category. The names of custom attributes (e.g. HV gaps and peak current) are connected to a thyatron class. However, custom attribute values may depend either on a thyatron category (e.g. voltage set by manufacturer) or on an individual thyatron (e.g. reception date).

2.3.1 Create Object Class

Resources
[System Configuration Guide] p.4: Defining or Modifying Classes
[System Configuration Guide] p.94: Defining Object Classes

Database Table: R5CLASSES

Form: BNENTS (Entities)

In the List View tab, search for the MP5 entity OBJ (Object). When OBJ is found and selected, open Classes tab. Insert a new class for the object group, enter a description for the class, and save.

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>THYR</td>
<td>Thyatron</td>
</tr>
</tbody>
</table>

Table 2.3.1: Thyatron Class
2.3.2 Create Custom Attributes

**Resources**
[System Configuration Guide] p.8: Defining Custom Attributes

**Database Table:** R5PROPERTIES

**Form:** BMPROM (Custom attributes)

A Custom Attribute is seen as a Custom Field in the Object form (OMOBJC) if object class (e.g. Thyatron - THYR) is set for the created object (e.g. thyatron 3150).

In List View or Record View tab, enter the unique name of the custom attribute field (that will be used for system purposes) in the Property field and custom attribute name in the Text field. Double-click the Type field to select the type of the field. Repeat the procedure in the same form for every custom attribute. Save the changes.

<table>
<thead>
<tr>
<th>Property</th>
<th>Text</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_AVECUR</td>
<td>Average Current</td>
<td>NUM</td>
</tr>
<tr>
<td>T_CONTNO</td>
<td>Contract Number</td>
<td>CHAR</td>
</tr>
<tr>
<td>T_HVGAP</td>
<td>HV Gap</td>
<td>NUM</td>
</tr>
<tr>
<td>T_HEICUIH</td>
<td>Heater Current Ih</td>
<td>NUM</td>
</tr>
<tr>
<td>T_HEICUIR</td>
<td>Heater Current Ir</td>
<td>NUM</td>
</tr>
<tr>
<td>T_PECUR</td>
<td>Peak Current</td>
<td>NUM</td>
</tr>
<tr>
<td>T_RECDAT</td>
<td>Reception Date</td>
<td>DATE</td>
</tr>
<tr>
<td>T_RECUCA</td>
<td>Reserve Current Capability</td>
<td>CHAR</td>
</tr>
<tr>
<td>T_VOLTAG</td>
<td>Voltage</td>
<td>NUM</td>
</tr>
</tbody>
</table>

Table 2.3.2: Thyatron Custom Attributes for Thyatron Class

2.3.3 Associating Attributes with a Class

**Resources**
[System Configuration Guide] p.9: Associating Attributes with an Entity or Class

**Database Table:** R5ADDPROPERTIES

**Form:** BXPROC (Custom attributes)

In the List View tab, search for the class you have created (e.g. thyatron class, Class: THYR). Once found and selected, open the Custom Attributes tab.

In the Custom Attributes page, enter the following information about each custom attribute:

- Line number (the order in which the custom fields will be shown in the Object form)
- Property (select the system name of the custom attribute field from the list). The name of the field appears on the Text field.
- Unit of Measure (UOM)

Save the changes.
2.3.4 Define Manufacturers

Resources
[System Configuration Guide] p.137: Manufacturers form

Database Table: R5MANUFACTURERS

Form: SNMANU (Manufacturer)

In the list view, enter the unique system name of the manufacturer in Manufacturer field and enter its full name in the Description field. Save.

Thyratron Manufacturer

Manufacturer: Marconi    Description: Marconi Electronic Devices

2.3.5 Create Object Categories

Resources
[System Configuration Guide] p.94: Defining Object Categories

Form: OMCATG (Categories of objects)

Database Table: R5OBJECTS

In the List View or Record View, enter the following:

- A unique name for the Object Category (i.e. object type) in the Category field
- Full name in the Description field
- Object Class, which is to be selected from the list
- Manufacturer, which is to be selected from the list
2.3.6 Enter Manufacturer-Set Parameter Values

Form: OM CATG (Categories of objects)

Database Table: R5CUSTATTRIBS

Open the Custom Fields tab. The custom fields of the class appear on the form. Enter the values of the custom attributes whose values have been set by the object manufacturer (i.e. the attributes that depend on the object type and do not change).

![Image 2.2.5: Manufacturer-set values of thyratron type CX1171](image)

Note that Contract Number and Reception Date depend on individual thyatrons, and therefore no values have been entered in the Category form.

2.4 Setting up the Base for Updatable Parameters

2.4.1 Creating Event Classes

Resources

[System Configuration Guide] p.4: Defining or Modifying Classes

Database Table: R5CLASSES

Form: BNENTS (Entities)

Event classes are created for parameters that are updated at times, e.g. thyratron fault information or reservoir voltage.

In the List View tab, search for the MP5 entity EVNT (Event). When EVNT is found and selected, open Classes tab. Insert a new class for the updating event, enter a description for the class, and save.

![Image 2.4.1: Classes for Updateable Parameters](image)
2.4.2 Custom Attributes for Event Classes

A Custom Attribute is seen as a Custom Field in the Jobs form (WMJOBS) if an event class (e.g. Thyatron Working Voltage - TWVO) is set for the created event. A custom field has to be created for those updatable parameters that a) fit in one line and b) need to contain a date for every change.

**Thyratron Custom Attributes for Event Classes**

<table>
<thead>
<tr>
<th>Property</th>
<th>Text</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR_REVO</td>
<td>Reservoir Voltage</td>
<td>CODE</td>
</tr>
<tr>
<td>TW_WOVO</td>
<td>Working Voltage</td>
<td>NUM</td>
</tr>
</tbody>
</table>

2.4.3 Custom Attribute Structures for Event Classes

**Database Table:** R5ADDPROPERTIES

**Form:** BXPROM (Custom attributes)

In the List View tab, search for a class you have created (e.g. Class: TWVO – Thyatron working voltage). Once found and selected, open the Custom Attributes tab.

In the Custom Attributes page, enter the following information about each custom attribute:

- Line number (the order in which the custom field(s) will be shown in the Jobs form.)
- Property (select the system name of the custom attribute field from the list). The name of the field appears on the Text field.
- Unit of Measure

Save the changes.

2.5 Define Object Statuses (i.e. Object Conditions)

Image 2.4 describes the statuses of an object. The black circle indicates the beginning of the object life cycle at CERN, and the black circle surrounded by a white circle indicates the end of the object life cycle.
2.5.1 Add New Status Codes

Resources
[System Configuration Guide] p.3: Defining or Modifying User Codes
[System Configuration Guide] p.222: Object Status

Database Table: R5UCODES

Form: BNENTS (Entities)

In the list view, search for the MP5 entity OBST (Object status). Select it and open the Codes tab.

Click + to add a new status code. Enter a unique system name in the Code field. Enter I (Installed) in the MP5 code field (other MP5 codes may contain unwanted usage constraints). Enter a descriptive name in the Description field. Save.
2.5.2 Modify the Authorization Matrix

Resources

Database Table: R5AUTH
Form: BNAUTH (Status change authorization matrix by group)

The authorization matrix is used to define the object lifecycle at CERN, as seen in image 2.5.1.2. Select the user group and user from the list of values. Enter OBJ (Object) in the entity field. Select an old status from the list of values. If you want the status to appear when a new object is inserted into the database, select -. Select the new status from the list of values. Repeat the procedure for all the statuses.

Image 2.5.1: Authorization matrix of for user group R5

2.6 Create Objects and Assign Them to Positions

2.6.1 Create Objects

Resources

Database Table: R5OBJECTS
Form: OMOBJC (Objects)

In the Record view, enter a unique system name for the object in the object field and a description in the adjacent field. Make sure that Asset is selected from the Type drop-down menu box and New, Untested is selected from the Status drop-down menu box. Select a MRC (Maintenance Responsibility Center), Class, and Category. Manufacturer appears once the category has been defined. Save.
Note that the objects should be created at arrival time because the system does not allow inserting past dates. In case past dates must be inserted, contact the EDMS support team.

**Example:**

<table>
<thead>
<tr>
<th>Object:</th>
<th>7008 Ceramic Thyratron</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization:</td>
<td>* Type: Asset</td>
</tr>
<tr>
<td>MRC:</td>
<td>* Status: New, Untested</td>
</tr>
<tr>
<td>Class:</td>
<td>THYR Category: CX1671A</td>
</tr>
<tr>
<td>Manufacturer:</td>
<td>MARCONI</td>
</tr>
</tbody>
</table>

Open the Custom fields tab. Enter the contract number and Reception date in the bottom fields. The date is format dd-mmm-yyyy, e.g. 01-JUL-1986.

### 2.6.2 Assign an Object to a Position

**Resources**


**Database Tables:** R5STRUCTURES, R5OBJECTS

**Form:** ODSTRU (Object structures)

Search for an asset (i.e. thyratron) for which to assign a position. In the parent field, select the position by typing its name or by searching it. Save.

### 2.7 Interface Configuration

#### 2.7.1 Enable Forms, Reports, and Graphs Menus

**Resources**


[System Configuration Guide] p.2: Modifying Installation Parameters

**Form:** BNINST (Installation codes)

Search for the code SHOWPDM (show pull-down menus). Set the default to YES and save.

#### 2.7.2 Modify Quick Access Bar

**Resources**


In the View menu, select Quick Access Bar and then Set up Quick Access Bar. Select the buttons you want to display in the quick access bar. Click Save and OK.
2.7.3  Add Custom Menus

Resources
[System Configuration Guide] p.76: Modifying Pulldown Menus

Forms: BMFUNC (Functions), BMGROU (User groups)

In BMFUNC form, open the record view and add a function by clicking the + button. Enter a system name for it and a description in the adjacent field. Select class MENU from the list and enter a file name for the function.

Example:
Function: MESETU, System Setup
Class: MENU
Form type: M
File: r5mesetu

In the list view of BMGROU form, search for the user group to which you want to make a custom menu (e.g. R5). Select the user group and open the Pulldown menu tab.

Select the function you want to appear in the menu from the list of values. If necessary, alter its description. Repeat the procedure for the submenu items on the lower part of the page. Save.

Image 2.5.3 is an example of R5 Admin user group functions (i.e. menus). The upper part of the page contains the items that appear directly under Forms menu. After clicking a main function, its subitems appear on the lower part of the page.

Note: The forms menu can contain 10 main functions at a maximum.

<table>
<thead>
<tr>
<th>User group</th>
<th>R5ADMIN</th>
<th>Administration</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulldown menu</td>
<td>Functions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Function</td>
<td>Description</td>
<td></td>
</tr>
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<td></td>
<td>MESETU</td>
<td>System Setup</td>
<td></td>
</tr>
<tr>
<td></td>
<td>USER</td>
<td>Users and User Groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UPDATE</td>
<td>Update Parameters</td>
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<tr>
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Image 2.5.2: R5 Admin user group functions
3 Updating

3.1 Update Structures

3.1.1 Position Updating Procedure

3.1.1.1 Update Object Structure


Database Tables: R5STRUCTURES, R5OBJECTS

Form: ODSTRU (Object structures)

Search for the asset (thyratron) whose position you want to update. Select the parent field and click the Delete Record button. Enter the new position and save.

Note: If it is the first time to assign a position to the asset, follow the guidelines in point 2.5.3 (Assign a Position to an Object).

3.1.1.2 Update Object Status (i.e. Condition)

Resources: [System Configuration Guide] p.222: Object Status

Database Table: R5OBJECTS

Form: OMOBJC (Objects)

Search for the object whose status is to be updated. Select it and open the Record View tab. Select a new status from the Status options. Save.

3.1.1.3 Enter Comments

Database Table: R5ADDETAILS

Form: OMOBJC (Objects)

In the object form, open Comments page. Enter comments and save.

3.1.1.4 Enter Heater Hours


Database Table: R5OBJUSAGEDEFS

Form: ODUSGD (Meter usage definitions)

Search for the object whose position was updated. Enter HUR (hour) in the UOM (Unit of Measure) field. If the total heater hours of the object have not been entered, enter the amount of hours in the Total Usage field. Enter the amount of hours since the last change in the object structure in the Since installation field. Save.
3.1.2 Update Machine Hierarchies

**Resources**

**Database Table:** R5STRUCTURES
**Form:** ODSTRU (Object structures)

Any locations, positions or assets can be searched in the ODSTRU form. Records without child records can be updated by deleting the current parent, inserting a new one, and saving. If a record contains child records, it can be updated only if child records are deleted from the object structure. For example, AA Injection system could only be deleted if equipments AA Injection and AA Ejection were removed from the object structure.

3.2 Update Voltages

**Resources**

**Database Table:** R5EVENTS
**Form:** WMJOBS (Jobs), WMCOMP (Report on work completed)

Open Record View and insert a new record by clicking the + button. Enter a descriptive topic in the job description field. Select TRVO (Thyatron Reservoir Voltage) or TWVO (Thyatron Working Voltage) from the Class list. Select a MRC. Select the object to which the update applies. Select its location from the location list. Save.

Open the Custom Fields tab and enter the new voltage in the correct field. Save.

In order to make the voltage update frozen (i.e. it cannot be modified later), open the Report on work completed form (WMCOMP), search for the job with the ID generated in the previous procedure, change the status to ‘completed’ from the Record view, and save.

3.3 Insert Fault Information

**Resources**

**Database Table:** R5EVENTS
**Form:** WMJOBS (Jobs)

Open Record View and insert a new record by clicking the + button. Enter a descriptive topic in the job description field. Select TFAU (Thyatron Fault Information) from the Class list. Select an MRC (Maintenance Responsibility Center). Select the object to which the update applies. Select its location from the location list. Save.

Open the Comments tab and enter the Fault information. Save.
In order to make the fault information frozen (i.e. it cannot be modified later), open the Report on work completed form (WMCOMP), search for the job with the ID generated in the previous procedure, change the status to 'completed' from the Record view, and save.
4 References


