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**by Schneider** Electric

T2750

# Batch & Recipe on T2750 User Guide

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When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

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# Safety Information

## Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

### **DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

### **WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

### **CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

### **NOTICE**

**NOTICE** is used to address practices not related to physical injury.

**Note:** Electrical equipment must be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

**Note:** A qualified person is one who has skills and knowledge related to the construction, and operation of electrical equipment and its installation, and has received safety training to recognise and avoid the hazards involved.

## Safety Notes

The safety of any system incorporating this product is the responsibility of the assembler/installer of the system.

The information contained in this manual is subject to change without notice. While every effort has been made to ensure the accuracy of the information, your supplier shall not be held liable for errors contained herein.

This controller is intended for industrial temperature and process control applications when it will meet the requirements of the European Directives on Safety and EMC.

Use in other applications, or failure to observe the installation instructions of this manual may impair safety or EMC. The installer must ensure the safety and EMC of any particular installation.

Failure to use approved software/hardware with our hardware products may result in injury, harm, or improper operating results.

# Introduction

## Purpose

The batch and recipe functionality of the T2750 instrument enables the control of Batch Processing. This User Guide describes the functionality available and the use of the various editing facilities to control the management of Batch and Recipe.

# Recipe Management

## Introduction

The Recipe functionality is used to control the parameters that change based on the product or formula, e.g. reaction time.

Recipes provide a set of LIN function block field names ('variables') with a particular value assigned to each, e.g. if the recipe is for one or more identical cake baking lines, it would include setpoint values representing the amounts of each flavouring in the mixture needed for a particular cake. In use, the recipe is downloaded to the LIN database controlling a particular plant line, i.e. each recipe value is copied to the corresponding LIN block field to achieve the required control.

It will usually be required to run several related recipes on a given plant line at different times, with the same set of variables but with different assigned values, e.g. for different cake types. These recipes constitute a recipe set, that are stored in a single comma-separated text file with extension '.uyr'.

## Terminology

The Recipe functionality uses certain terms. It is important to understand the meaning of these terms.

File Header	This part of the recipe file comprises three lines and contains basic information about the recipe file. Refer to "FILE HEADER" on page 18 for further details on the contents of the File Header.
Recipe	A Recipe contains information about the required values to be applied to a production line to manufacture the required product. Different recipes represent variants on the set of values to be used.
Recipe Line	A Recipe Line refers to a line of equipment (such as a production line) that is being controlled.
Title Line	The Title contains information about the numbers of recipes and recipe lines contained in the recipe file. Refer to "TITLE LINE" on page 19 for more details.
Variable	A variable can be assigned the required values to be used with recipes and recipe lines. Refer to "VARIABLE LINES" on page 19 for more details.

## Recipe Creation

The LINTools application is the usual method for creating recipe files. An On-line Recipe Editor is also available. This provides the facilities to enable an operator to edit recipe files. Refer to "On-line Recipe Editor" on page 22 for more details.

## LIN Database

Before creating a recipe, a LIN database must have been created. As a minimum, this database must contain the following blocks:

- Header (Tactician)
- BatchControl
- RCP\_SET
- RCP\_LINE
- at least one suitable I/O block

Refer to the LINTools documentation in Online Books for details of creating a LIN database.

## Recipe Editor

A recipe is a list of ingredients or steps used to create the product and is configured using the Recipe File Editor, part of LINTools. The method of starting the Recipe File Editor depends on whether you are creating a new recipe file, or editing an existing one.

**Note:** Anything 'greyed-out' on any of the tabs within the Recipe Editor indicates the information is not editable.

## Creating a new Recipe File

To create a new recipe file, proceed as follows:

1. In the tree view of LINTools, right-click and select New > Other LIN Files > Recipe File:

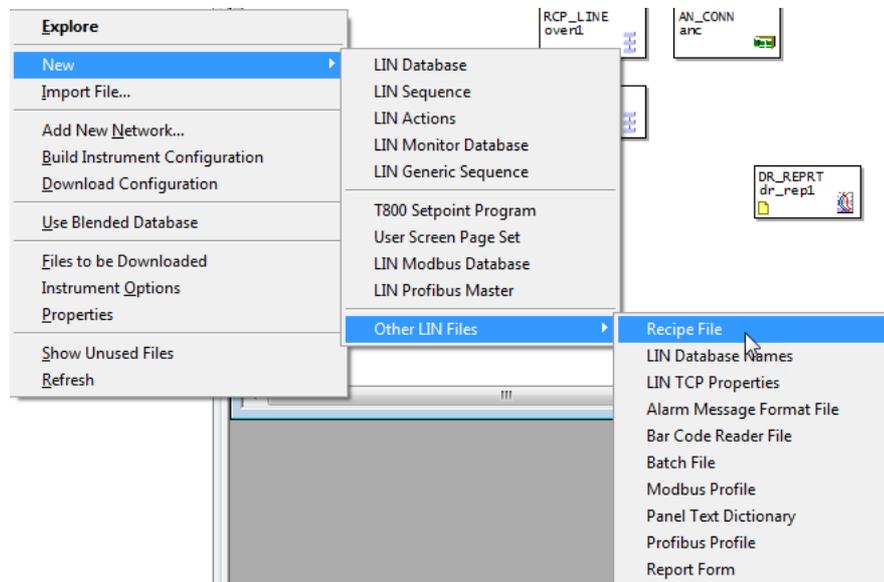
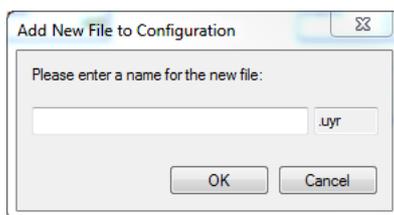


Figure 1 LINTools - Creating a New Recipe

2. The following dialog is displayed:



3. Enter the name for the new recipe file and click OK. The file name must be a maximum of eight characters.
4. Double-click on the recipe file name in the tree view of LINTools.
5. The Recipe File Editor opens, displaying the File Header tab and with the correct database selected.

Configure the information on the various tabs as described in the following sections.

### File Header tab

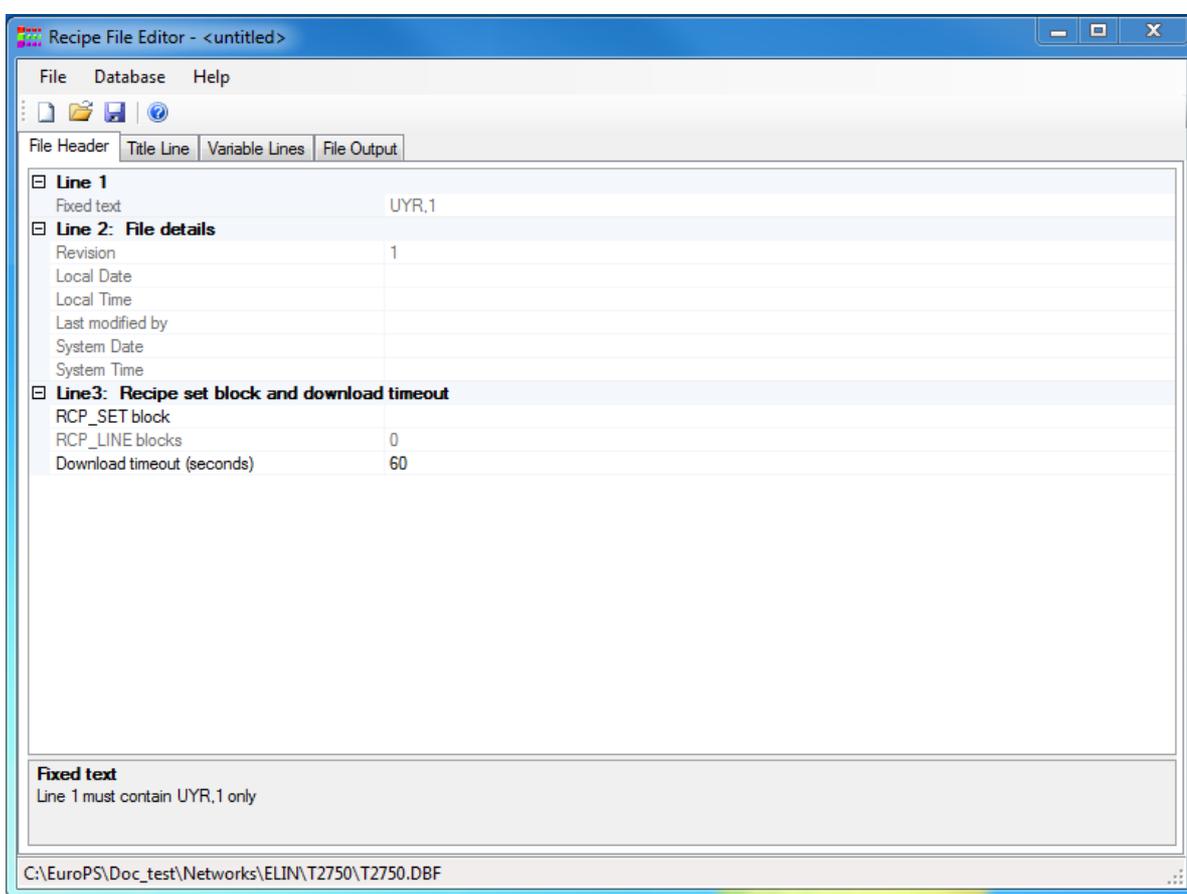


Figure 2 File Header tab

The File Header tab (see Figure 2) shows basic information about the recipe file. This information is contained in the header section of the recipe file. The three lines contain the following information:

- Line 1 Fixed text (UYR,1) and cannot be edited.
- Line 2 Details of the recipe file. This is updated after the file is saved following an edit.
- Line 3 Further information about the recipe file. Edit this information as follows:

**RCP\_SET** block shows the name of the Recipe Set block used in the recipe. Click in this field and select the required Recipe Set block by clicking the ellipsis button and selecting from the displayed list.

**RCP\_LINE** blocks shows the number of Recipe Line blocks associated with the Recipe Set block. This is specified in the RCP\_SET block and cannot be edited.

**Download Timeout (seconds)** shows the number of seconds set as a timeout for the recipe download. If this value is exceeded, the recipe download is assumed to have not succeeded and the recipe goes into a failed state.

### Title Line tab

The Title Line tab lists each of the recipe lines and recipes that are configured in this file. Each recipe line is controlled by a RCP\_LINE block in the assigned database.

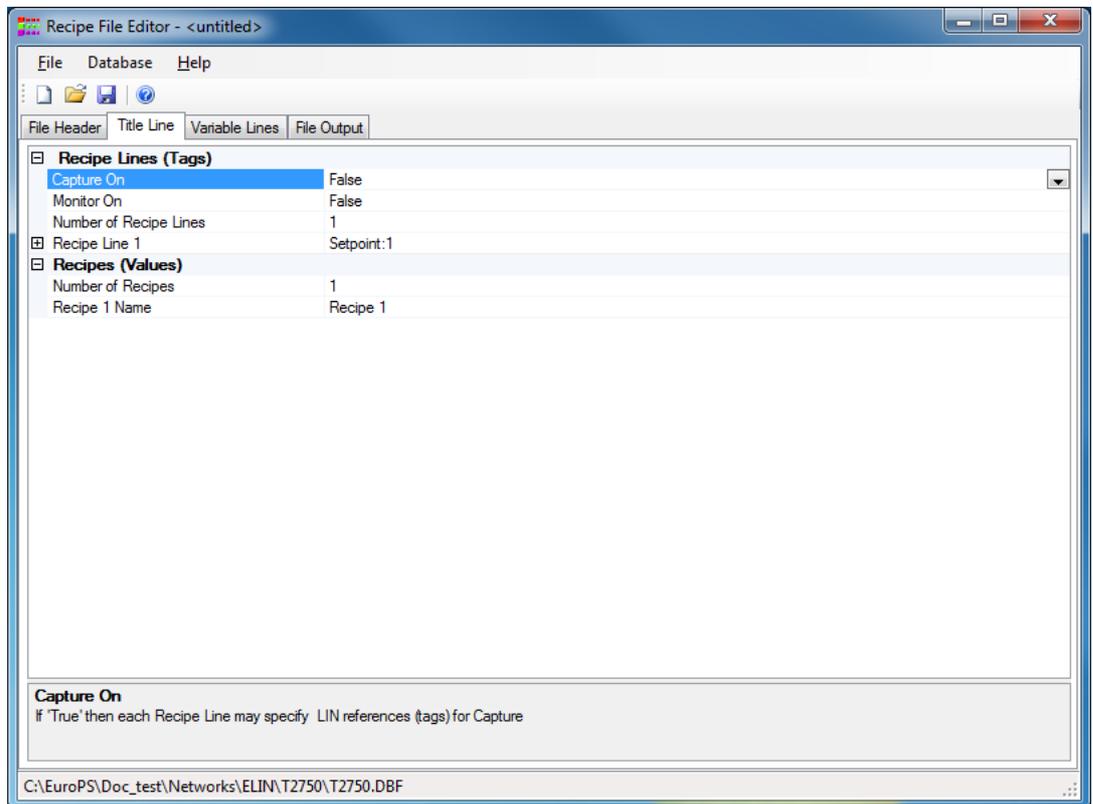


Figure 3 Recipe Editor - Title Line tab

To configure the Title Line parameters, proceed as follows:

1. Configure the Capture On parameter, i.e. <Capture>. This enables the optional Capture feature for each of the configured recipe lines. The Capture feature allows specified Block.Field reference values to be written to the Block.Field reference defined in the corresponding recipe line, i.e. recipe line values are overwritten with the value from the Block.Field reference specified in the Capture column.
2. Select Capture On and press the down arrow to display the True/False options. Select as required. When True an additional Block.Field reference from the assigned database can be configured in the Variable Line tab parameters.

**Note:** The Monitor On parameter is not relevant for T2750 instrument. DO NOT CONFIGURE THIS.

3. Configure the Number of Recipe Lines parameter.  
This defines the number of plant lines (between 1 and 8 recipe lines) that are, or will be, using this recipe file. Each of these is associated with a RCP\_LINE block.
4. Select the Number of Recipe Lines to enable a text cursor.
5. Type the number of recipe lines using this recipe file.  
The corresponding number of Recipe Line N parameters are generated. Each Recipe Line N parameter represents one recipe line (plant line, one RCP\_LINE block per plant line) associated with a RCP\_SET block (used to group the RCP\_LINE blocks into a specific recipe configuration) in the database.

**Note:** A message appears at the bottom of the editor window if the value defined in the Number of Recipe Lines parameter differs from the number of RCP\_LINE blocks associated with the defined RCP\_SET block.

6. Configure the Recipe Line 1 parameters, i.e. <Setpoint:Recipe Line Name,Capture>.  
These parameters specify the properties of this recipe line.
7. Open the Recipe Line 1 parameter to display the additional parameters. Observe that Capture and RCP\_LINE parameters are already defined. These parameters are automatically configured via the Capture On parameter and the RCP\_SET block already configured in the RCP\_SET Block name parameter on the File Header tab.
8. Select Name to enable a text cursor and type the name of this recipe line, i.e. <Setpoint:Recipe Line Name>. This information is used to identify this recipe line as shown on the Variable Line tab.

**Note:** A number will be automatically applied if a Recipe Line Name is not defined.

9. If necessary, open the remaining Recipe Line N parameters as required to display the additional parameters and repeat the previous instructions.
10. Configure the Recipes (Values) parameter, i.e. <Setpoint:Recipe Line Name>.  
These parameters define the details of a maximum of 16 recipes in the recipe file.
  - Select the Number of Recipes to enable a text cursor and type the number of recipes that will be configured in the Recipe file. The corresponding number of Recipe N Name parameters are generated. Each parameter represents one recipe that is controlled by a single RCP\_LINE block (used to control the downloading of a specific recipe from the recipe file associated with the defined RCP\_SET block).
  - Select Recipe 1 Name to enable a text cursor and type the name of this recipe. This information is used to identify the recipe as shown on the Variable Line tab.
  - If necessary, name the remaining Recipe Name parameters.

## Variable Lines tab

The Variable Line tab lists each of the variables (Block.Field references in the assigned database) associated with the recipe lines and recipes that are configured in this file. This tab is used to configure Block.Field references and associated recipe values for a maximum of 1000 rows.

This information is shown on the File Output tab in the form of:

```
<Variable Line Name>,<Tagname>,<Value Captured  
from>,-,-,-,-,<Value>,-
```

**Example:**

```
Carbon,steelspc.C,steelsp2.C,SP01C1S1.Events_1.Event1,,,,,1.203,3.5
```

The information configured on this tab is verified when the file is opened and when a Block.Field reference is configured. Verification checks that the configured Block.Field references are present in the assigned database and that the same data type is configured across all Block.Field references for each Variable Line row. Successfully verified Block.Field references are shown in black and unsuccessfully verified Block.Field references are listed in the Report pane and shown in red. Parameters shown in blue indicate that verification of the Block.Field reference is disabled, i.e. verification of this Block.Field reference will not be attempted.

**Note:** When configuring each variable use the filtering icons and drop-down menu on the pick list to show the required data type only. This will restrict the number of invalid data type errors that occur.

When first opened, no variables have been created and so the tab appears as follows:

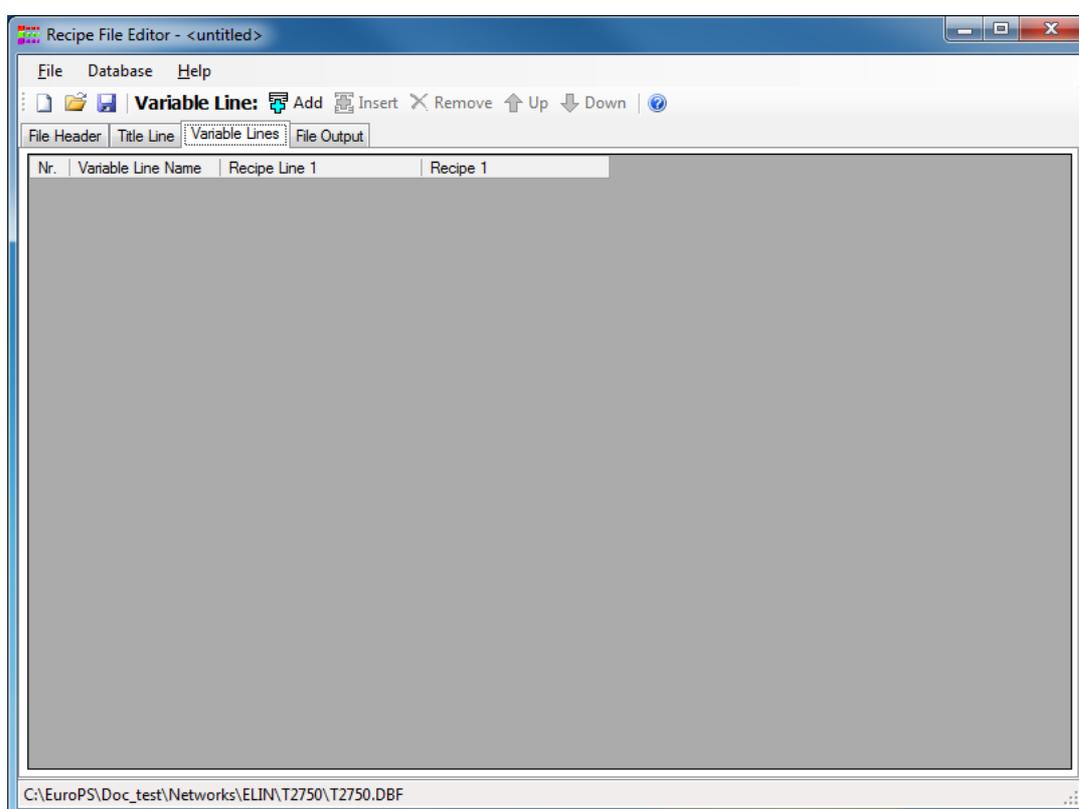


Figure 4 Recipe File Editor - Variable Lines tab

To configure the Variable Line parameters, proceed as follows:

**Note:** Observe that the parameters configured in the Title Line tab appear as the column titles on this tab.

1. Configure the number of variables required. This should be equivalent to the number of ingredients in a product.
2. Press the Add button to add one recipe variable. If a number of variables already exist on this tab, this will add one row to the end of the list of existing variables. Press the Insert button to add one row before the selected variable. Press the Remove button to delete the selected variable.

**Tip:** Use the Up and Down arrow buttons to change the order of the configured variables.

3. Configure the Variable Line Name parameter. This is used to identify the specific ingredient or step in the recipe.

4. Type a title for variable in the corresponding Variable Name column.
5. Configure the Recipe Line 1 parameter. This defines the Block.Field reference containing the value used to parameterise the corresponding Variable Line Name.  
Observe that the name configured in the Recipe N Name parameter on the Title Line tab is shown as the column header.
6. Select the required Recipe Line N parameter to display the ellipsis button.
7. Press the ellipsis button to display the pick list and select the required Block.Field reference from the picklist.
8. If the Capture On parameter was enabled on the Title Line tab, configure the Capture parameter. This defines the Block.Field reference that will be used to replace the value already configured in the corresponding Recipe Line N parameter.
9. Select the required Capture parameter to display the ellipsis button.
10. Press the ellipsis button to display the pick list and select the required Block.Field reference.

**Note:** Use the Disable LIN Verify button to control the database verification of each Block.Field reference in the corresponding Variable Number. Any incorrect or inconsistent entries are displayed in the Report pane.

11. If multiple recipe lines have been defined in the Title Line tab configure the Recipe Line N, and Capture On parameters as required.
12. Configure the Recipe 1 to Recipe n parameters as necessary, i.e. <Value>. This defines the value that will be loaded into the Block.Field reference configured in the corresponding Recipe Line N parameter when the Recipe is downloaded.
  - If the Block.Field reference is an Enumerated data type the corresponding Recipe 1 value provides a list of the enumerated values corresponding to the Block.Field reference defined in the Recipe 1 parameter.
  - If the Block.Field reference is not an Enumerated data type the corresponding Recipe 1 value supports free format text entry.
  - If the Block.Field reference is a Free format text entry it is verified to ensure it is a valid match for the data type in Recipe Line 1.

**Note:** When a Capture is carried out from a RCP\_LINE block the values in the Recipe N (where N is the number in the 'RecipeNo' field in the RCP\_LINE block) are overwritten with the live values from the Capture column.

## File Output tab

The File Output tab shows the recipe file as displayed when opened using a text editor, e.g. 'Notepad', for example:

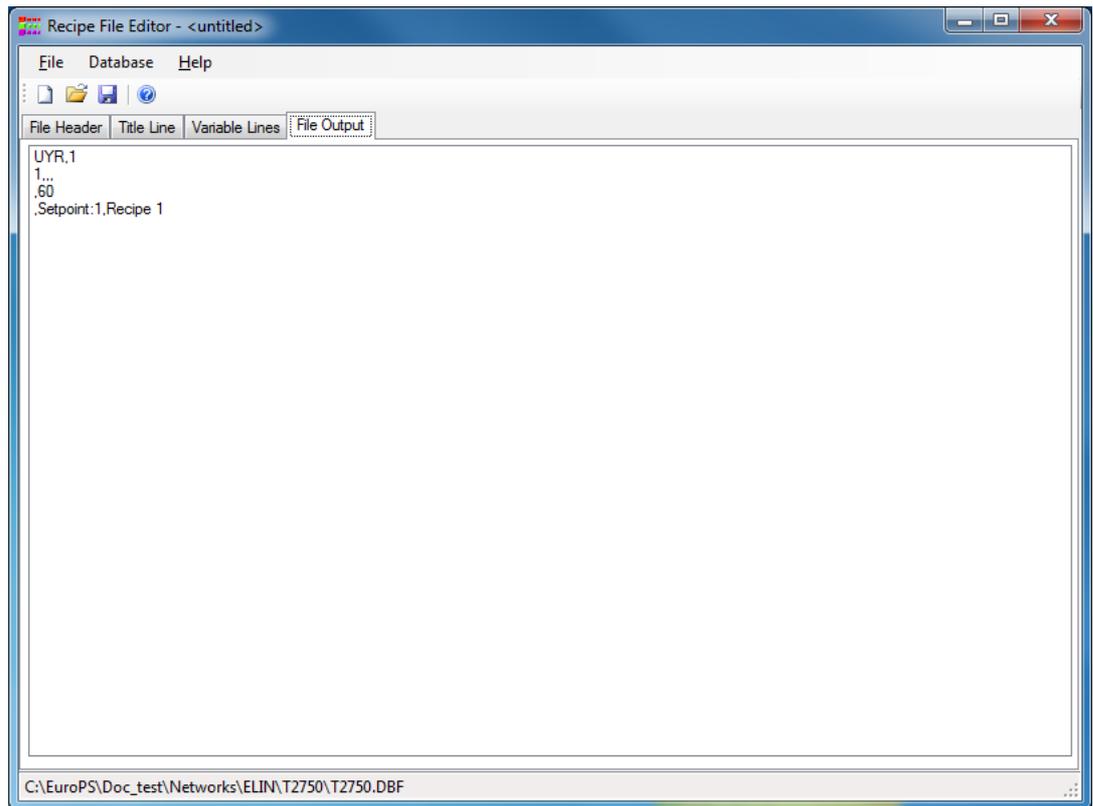


Figure 5 Recipe File Editor - File Output tab

**Note:** This editor is the preferred tool for configuring a recipe file. Advanced users can still use a text editor, e.g. 'Notepad', although additional constraints are applied (see below).

## Constraints when using a text editor

If using a text editor such as 'Notepad' to configure a recipe file, the following must be noted:

- No line may exceed 4096 characters, including line feed/carriage return instructions.
- Spaces are also counted as characters.
- Strings (such as variable names) do not have to be unique.
- If the maximum allowable string length is exceeded, extra characters are omitted when the file is loaded.
- Trailing commas are treated as illegal characters unless otherwise stated.
- Commas (,), double quotes ("), single quotes ('), and equals (=) characters are illegal characters in fields.
- Non-printing characters (excluding <CR> and <LF>) are not permitted in the file.

## Editing an existing Recipe File

To edit an existing recipe file, proceed as follows:

1. From within LINTools, double-click on the required recipe name in the tree view. Alternatively, double-click on the recipe file in Windows Explorer.
2. The Recipe File Editor screen opens showing the Title Line tab, populated with the details of the selected recipe file:

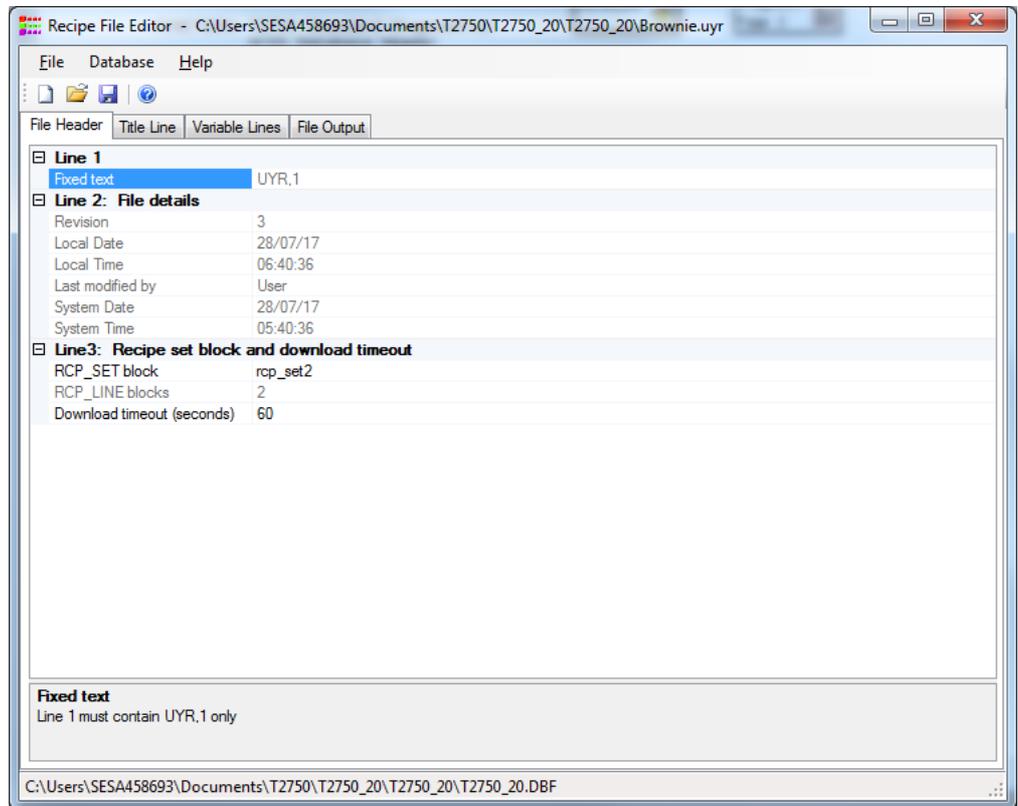
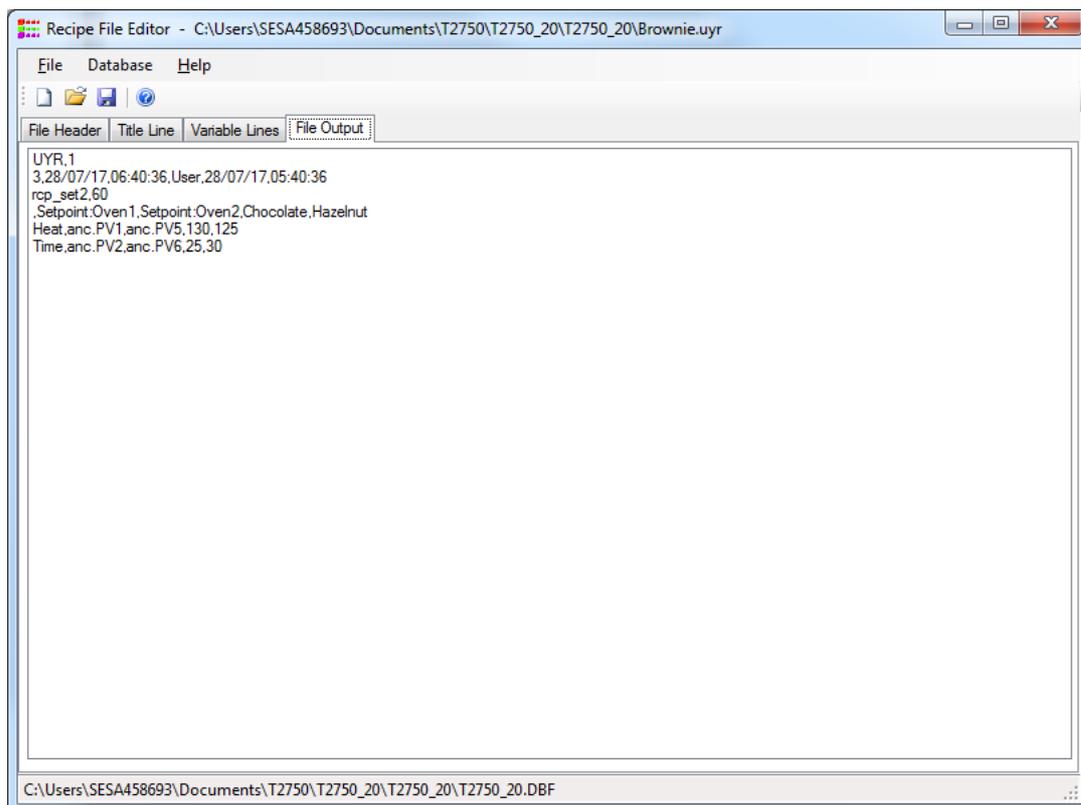


Figure 6 Recipe File Editor - Existing file

1. Select the various tabs, as required, and modify the information to suit the requirements.
2. From the File menu, select Save to save the file using the existing name. Select Save As to specify a different name.

## Basic Recipe File structure

Although a recipe file is created using the Recipe Editor, it is useful to understand the format of these files. Select the File Output tab to show the structure of the selected recipe file:



### FILE HEADER

Line 1:

Line 1 must contain **UYR,1** only.

Line 2:

Line 2 contains comma-separated information about the current revision of the file,

e.g:

3,28/07/17,06:40:36,User,28/07/17,05:40:36

**Where:**

'3'	is the revision level of the file
'28/07/17'	is the day/month/year that revision was carried out (local time).
'06:40:36'	is the hours:minutes:seconds that the revision was carried out (local time).
'User'	is the name of the person who last modified the file.
'28/07/17'	is the day/month/year that revision was carried out (UTC <sup>1</sup> ).
'05:40:36'	is the hours:minutes:seconds that the revision was carried out (UTC <sup>1</sup> ).

1. The UTC (GMT) time and date is accurate only if the instrument's clock and time zone are set correctly. Only relevant when the file is written from the instrument.

Line 3:

Line 3 defines the recipe set block to be used and recipe download timeout value, in seconds (max. 60):

<Recipe Set Block>,<Timeout>

e.g:

rcp\_set2,60

The recipe Set Block is the name of the RCP\_SET block to be used. If left blank, this field implies any RCP\_SET block.

If the download timeout is exceeded, the recipe download is assumed to have been unsuccessful, and the recipe goes into a failed state.

## TITLE LINE

This line defines how many recipes there are in the file (minimum 1).

,Setpoint:<Line Name>,<Recipe 1 Name>,-,-,<Recipe N name>

### Where:

<Line name> defines the name of the recipe line (not required for single line files).

<Recipe N name> is the name of the *n*th recipe.

e.g:

,Setpoint:Oven1,Setpoint:Oven2,Chocolate,Hazelnut

## VARIABLE LINES

For each variable in the recipe, a line is required of the form:

<Name>,<Tag>,<Value 1>,-,-,<Value N>

### Where:

<Name> is the name of the variable

<Tag> is the tag name in the database. If the tag name is enclosed within braces ({}), the variable is considered to be non-verifiable.

<Value N> is the value of the *n*th recipe. The number of values must correspond with the number of recipes.

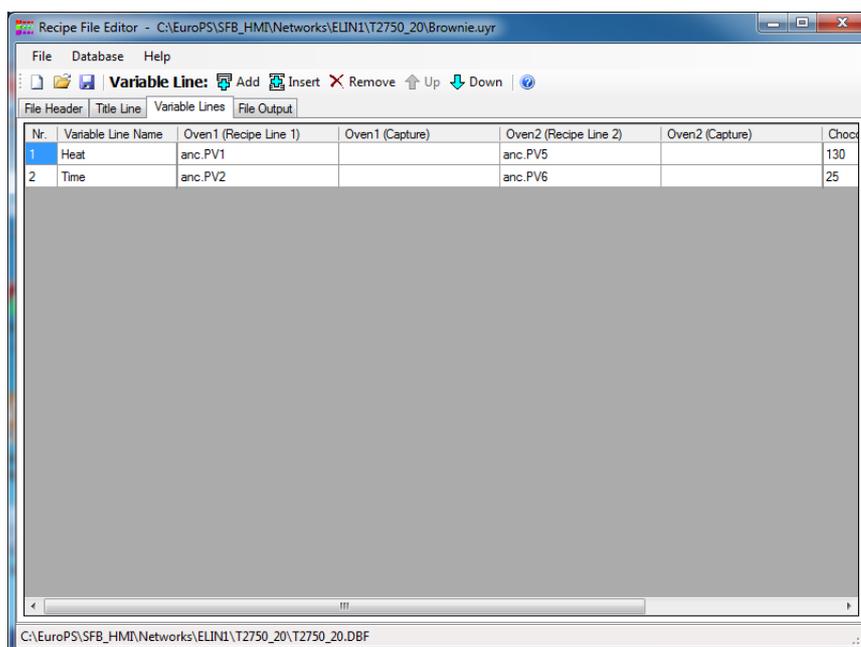
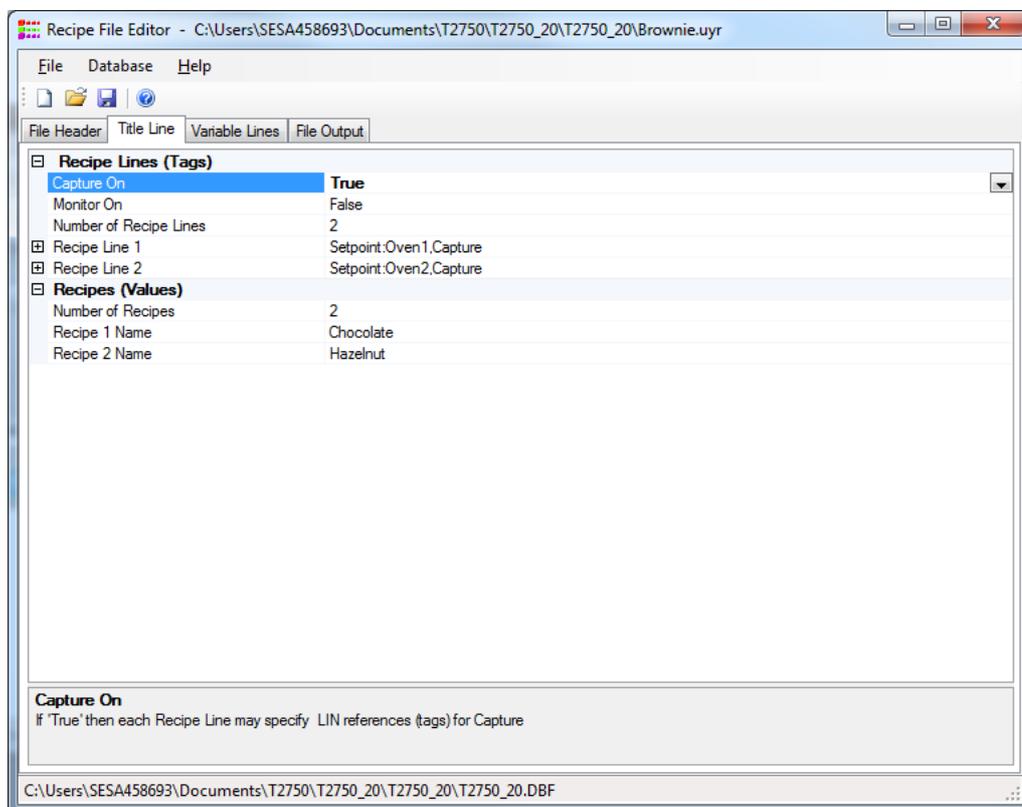
e.g:

Heat,anc.PV1,anc.PV5,130,125

Time,anc.PV2,anc.PV6,25,30

## Files with optional Capture variables

To generate a recipe file with separate capture points, then for each recipe line there must be an additional field after each column in the title line and for each variable. The title line entry should be an item called 'Capture', and the field for the variable is the tag of the field to be captured. This field may be left blank to indicate that the reference in the adjacent line column is to be used for capture.



## Files with optional Monitor variables

**Note:** As the T2750 does not have an HMI, monitor points are not relevant for this instrument type.

## Recipe Dictionary

The recipe dictionary holds text that originates from the recipe files (\*.uyr). It may not be initialised from a normal dictionary (\*.uyl) file. The text held by this dictionary changes whenever recipe (\*.uyr) files are loaded or modified from the Recipe Editor.

The section 1-999 represents the recipe set currently on view and is thus a duplicate of one of the other sections. The following table indicates how the records are allocated in each recipe set. To get the actual record, from recipe set number n, simply add 1000\*n. For example, to get the record of the user who last edited the recipe 3 \*.uyr file, use record number 3014.

Record	Value
1	File name (excluding '.uyr').
11	Revisions number of *.uyr file.
14	Name of user who last edited the *.uyr file.
15	Returns "YES" if the file has been edited but not saved or "NO" if not edited.
111	Name of line number 1.
112	Name of recipe selected on line 1.
113	Name of recipe active on line 1.
114	State of recipe on line 1.
121 to 124	As 111 to 114 but for line 2.
131 to 134	As 111 to 114 but for line 3.
141 to 144	As 111 to 114 but for line 4.
151 to 154	As 111 to 114 but for line 5.
161 to 164	As 111 to 114 but for line 6.
171 to 174	As 111 to 114 but for line 7.
181 to 184	As 111 to 114 but for line 8.
301 to 316	Names of recipes 1 to 16 respectively.
401 to 699	Names of variable numbers 1 to 299 respectively.

The dictionary is divided up into sections, one for each recipe set, each spanning a range of up to 1000 records.

The sections are allocated as follows:

- 1001-1999, Recipe set number 1
- 2001-2999, Recipe set number 2
- 3001-3999, Recipe set number 3
- 4001-4999, Recipe set number 4
- 5001-5999, Recipe set number 5
- 6001-6999, Recipe set number 6
- 7001-7999, Recipe set number 7
- 8001-8999, Recipe set number 8

## On-line Recipe Editor

### Overview

The on-line recipe editor provides facilities to enable an operator to edit recipe files. Once started, the on-line editor opening screen is displayed:

The screenshot shows the opening screen of the on-line recipe editor. On the left, there are two dropdown menus: 'File Name:' and 'Recipe'. Below the 'Recipe' dropdown, a mouse cursor is visible. To the right of these controls is a table with three columns: 'Nr', 'Variable', and 'Value'. The table body is currently empty. At the bottom of the screen, there are two buttons: 'Cancel' and 'Save Changes'.

From this screen, you can:

- Select the recipe file and recipe to be edited.
- Change the value of one or more variables.
- Add a new recipe to the selected batch.
- Delete a recipe.

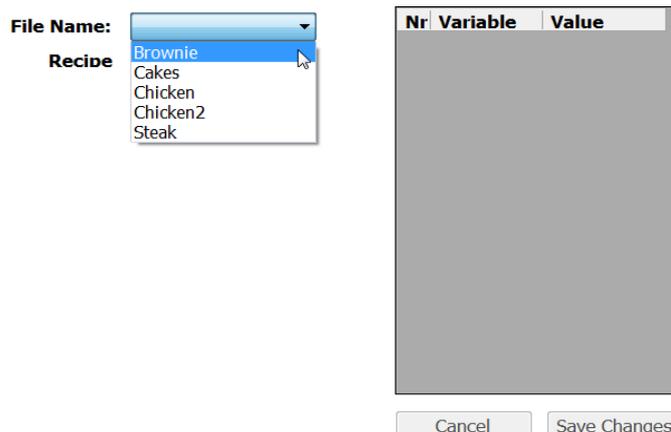
You cannot:

- Add or delete variables.
- Change the name of a variable.
- Create a recipe from scratch (rather than copy an existing one).

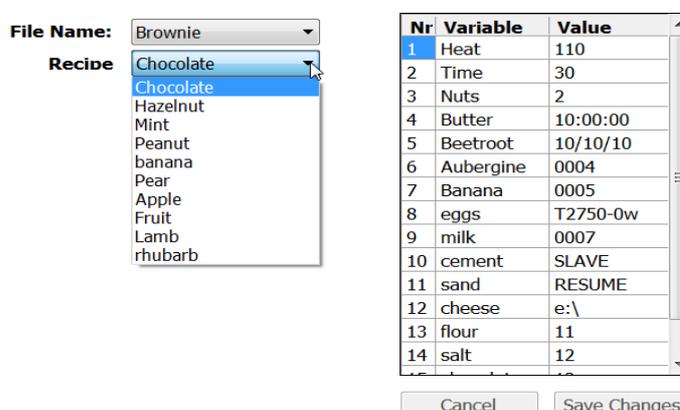
To perform any of these tasks, use the Recipe File Editor as described at the beginning of this chapter.

## Selecting the required recipe

To select the recipe file to work with, click the File Name drop-down and select the required recipe file from the list.



To select the required recipe associated with the selected recipe file, click the Recipe Name drop-down and select the required recipe from the list.



**Note:** Only those recipes associated with the selected recipe file will be displayed in the list.

Once the required recipe has been selected, the table at the right of the dialog displays details of the variables used in that recipe.

## Changing the value of a variable

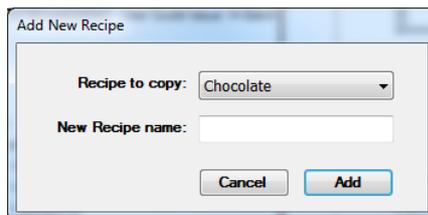
To change the value of a variable, proceed as follows:

1. Click in the Value field to be changed.
2. Enter the new value as required.
3. To confirm the change, click Save Changes.
4. To cancel the change and leave the variable with its original value, click Cancel Changes.

## Adding a new recipe

When using the on-line Recipe Editor, it is only possible to add a new recipe by copying an existing one. To create a new recipe, use the Recipe File Editor.

From the opening screen, click Add New Recipe. The following pop-up dialog is displayed:

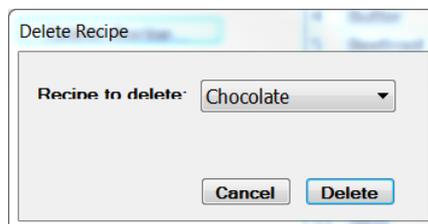


Proceed as follows:

1. Click on the Recipe to copy drop-down and select a recipe.
2. Enter the name of the new recipe in the New Recipe name box.
3. Click the Add button. A new recipe will be created using the new name, but with the variable names and values from the copied recipe.
4. Edit these variable details as required.

## Deleting a recipe

From the opening screen, click Delete Recipe. The following pop-up dialog is displayed:



Proceed as follows:

1. Click on the Recipe to delete drop-down and select a recipe.
2. Click the Delete button. A confirmation dialog is displayed.
3. To confirm the deletion of the selected recipe, click Yes. The selected recipe is deleted.

# Batch Processing

## Introduction to Batch Processing

### What is Batch Production?

Batch Production is a manufacturing method in which the products are created stage by stage and small quantities of identical products are made. Each batch has a unique identifier to enable quality control and any potential future investigations. Batch Production is in contrast to Continuous Production which is a flow production method used to manufacture, produce, or process materials without interruption.

Batch production is most common in bakeries and in the manufacture of foodstuffs, pharmaceutical ingredients, inks, paints, and adhesives or for any manufacturing process where a controlled number of products needs to be treated as a distinct manufacturing set.

Within the T2750, Batch Production is controlled and monitored by the Batch Engine. This control is referred to as 'Batch Processing'. The Batch Engine is a State Machine that controls processes which have a defined Start and End. The engine has interfaces to the HMI (Human-Machine Interface) and the Data Recording Engine (for data logging).

### Associated files

The following files are associated with Batch Processing:

File type	Purpose	Filename extension
LIN database	A LIN database groups data into blocks of related data to form a control strategy for a particular application.	*.dbf
Batch File	A Batch file is an interface between the LIN Database and the Batch Engine which runs the batch state machine. It is a comma-separated text file and it specifies how the batch will operate.	*.uyb
Recipe File	A recipe file can be associated with a batch. The recipe file defines one or more recipes that will be used to parameterise the batch when the batch starts. A RCP_SET block and at least one RCP_LINE block is required for using the recipe file.	*.uyr
Batch Report File	A Batch Report file contains a definition of how to generate a report.	*.uyf

## Batch States

A batch may exist in any of the following states:

State	Description
RESET	Completely empty, no batch loaded, the start point with a newly loaded configuration, also get back here when the 'reset' command is issued (but only if 'reload on reset' is TRUE). Additionally, get to here from IDLE when the 'unload' command is issued.
IDLE	The batch engine is not running, but a valid batch configuration is loaded and is ready to be started.
STARTING	A 'start' command was issued and the batch engine is starting the batch configuration (transitory state from IDLE).
RUNNING	The batch configuration is running (transition here from STARTING if the start attempt was successful).
COMPLETE	Transition here from RUNNING when current phase = zero.
HOLDING	A 'hold' command was issued (transitory state from RUNNING).
HELD	The batch engine held (transition here from HOLDING if the hold attempt was successful).
RESTARTING	A 'restart' command was issued (transitory state from HELD).
ABORTING	The batch configuration is aborting (transitory state from any running state).
ABORTED	The batch engine aborted (transition here from ABORTING).
FAILED	Something has gone wrong! (excluding a failed load attempt).

## Creating a Batch File

Batch files are created using the Batch Editor, part of LINTools. This editor comprises three tabs; File Header, Batch Phases and File Output. Please refer to the Batch File Editor on-line help and the subsequent sections in the chapter for more details.

The File Header tab contains the necessary information to configure a batch file. The Batch Phases tab defines the phases (if any) required in the batch. The File Output tab contains a textual representation of the Batch File which is updated dynamically as the batch file is configured.

## LIN Database

Before creating a batch file, a LIN database must have been created. As a minimum, this database must contain the following blocks (for a T2750):

- Header (TACTICIAN)
- BatchControl
- at least one suitable I/O block

**Note:** A LIN Database always requires a Header block to define the strategy instrument type. For the T2750, this will be the TACTICIAN Header Block.

Refer to the LINTools documentation for details of creating a LIN database.

## Configure a Batch File - Overview

The following stages may overlap, and their order can be varied especially when editing an existing strategy. To configure a batch file, follow these stages.

1. For a *new* batch file, configure the File Header tab parameters. The File Header tab parameters configure a 6-line, fixed format, description that provides most of the information contained in the Batch file. It is specifically used to determine to relationship between the batch operation and the database.
2. Then, configure the Batch Phases tab parameters. The Batch Phases tab parameters configure each phase in the batch associated with this batch file. A phase can be a specific part of a process (such as Heating, Resting, Mixing, Cooling, and so on).
3. Inspect the File Output tab. The File Output tab shows the batch file as displayed when opened using a text editor, for example, 'Notepad'.
4. The configured batch file should now be complete and ready to download to the instrument.

## Creating a new Batch File

To create a new batch file, proceed as follows:

1. In the tree view of LINTools, right-click and select New > Other LIN Files > Batch File:

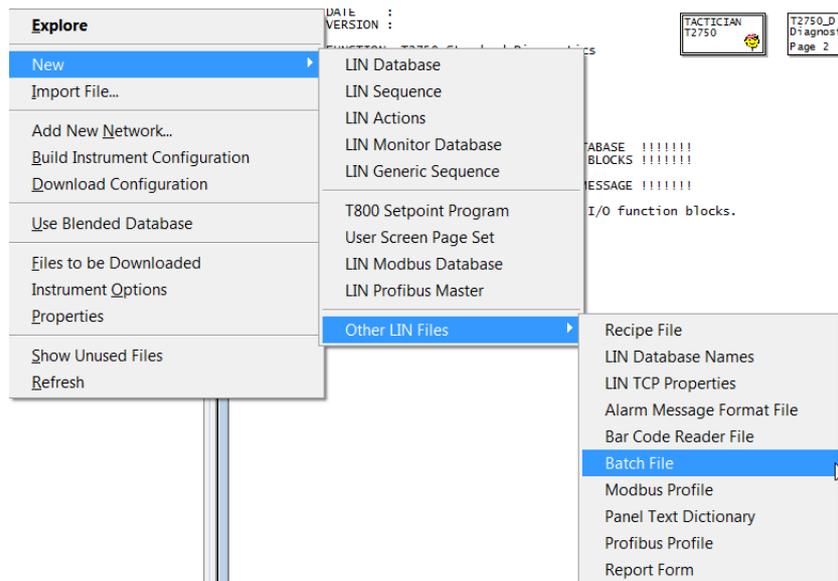
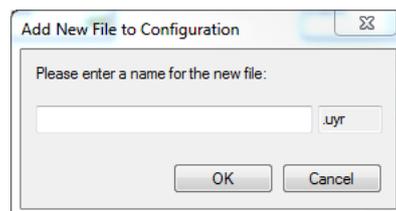


Figure 1 LINTools - Creating a New Batch

2. The following dialog is displayed:



3. Enter the name for the new batch file and click OK. The file name must be a maximum of eight characters.
4. Double-click on the batch file name in the tree view of LINTools.
5. The Batch File Editor opens, displaying the File Header tab and with the correct database selected.

Configure the information on the various tabs as described in the following sections.

## File Header

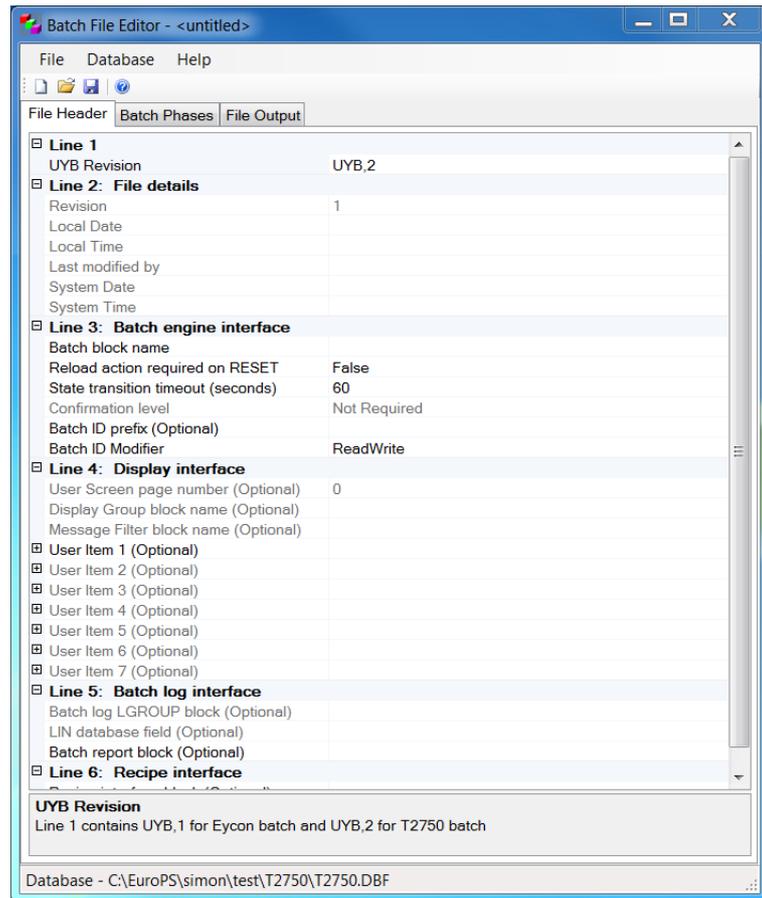


Figure 2 File Header tab

The File Header tab (see Figure 2) shows basic information about the batch file. This information is contained in the header section of the batch file. The three lines contain the following information:

- |        |   |
|--------|---|
| Line 1 | Select from the drop-down list. This should always be 'UYB,2' for a T2750 instrument. |
| Line 2 | Details of the batch file. This is updated after the file is saved following an edit. |

- Line 3 Further information about the batch engine interface. Edit this information as follows:
- Batch block name** shows the name of the Batch Control block used in the batch. Click in this field and select the required Batch Control block by clicking the ellipsis button and selecting from the displayed list.
- Reload action required on RESET** defines whether the batch is to be reloaded after a reset. Click in this field and select either TRUE or FALSE by clicking the ellipsis button and selecting from the displayed options.
- State transition timeout (seconds)** shows the number of seconds set as a timeout for the batch to transition from one state to another. If this value is exceeded, the transition is considered to have failed.
- Confirmation level** for a T2750, this is always set to 'Not Required'. This specifies that confirmation is not required. For a T2750, this is not editable.
- Note:** This field may contain valid values other than 'Not Required' if the batch file has previously been edited for an Eycon (UYB,1).
- Batch ID prefix** this optional parameter can be used to define a prefix for the associated batch. The <BatchID Prefix> is appended to the beginning of the BatchID (the text string used to identify a batch). This BatchID is written to the BatchId field of the BatchControl block.
- Batch ID Modifier** this parameter is used to define whether the Batch ID can be changed once it has been automatically set when the batch is loaded. It can be set to 'MustWrite' (Batch ID *must* be changed), 'ReadWrite' (Batch ID *may* be changed, but doesn't have to be), or 'ReadOnly' (Batch ID cannot be changed).
- Line 4 Information about the display interface. **For a T2750, the first three elements (User Screen page number, Display Group block name, and Message Filter block name) are not applicable and are greyed-out.**
- User Item *n*  
(part of Line 4) These parameters (up to seven groups) are used to configure the start-up values of an individual batch. Edit these parameters as follows:
- Title** is the User Dictionary file reference in the form #<Dict> (U=User dictionary, W=Writeable dictionary, B=Batch dictionary). For example, #U12. Can also be plain text.
- Value** is either a Writeable dictionary value, e.g. #W12, a database block field that will be written to this parameter, e.g. [LOOP\_PID.SL] or plain text.
- MinimumWidth** is the minimum number of characters that the value can contain.
- Width** is the number of characters used to display the value. A width of '3' would result in a value of '12389' being shown as '123'. The maximum value of this parameter is 40.
- Initial Value** is the optional required initial value shown in Value when a batch is loaded, e.g. #U13 (user dictionary file reference). This value can be another dictionary file reference which is applied at load or it can also be plain text.
- Attributes** define the process for editing the value parameter. Type 'W' to specify that the value must be written, but it is acceptable for the write to not actually change the data. This implies that data entry must occur after loading and before starting the batch. Type 'M' to specify that the value must be written and the write must change the value. This applies to Writeable dictionary file references only and specifies that the value configured in Initial value must be edited after the batch is loaded and before it is started.

Line 5 Information about the Batch log interface. Edit this information as follows:

**Batch log LGROUP block** for a T2750, this is not applicable.

**LIN database field** for a T2750, this is not applicable.

**Batch report block** the name of a DR\_RPRT block to be used to generate batch report definition files (\*.uyf). The '\*.uyf' file must have the same name as the '\*.uyb' file.

Line 6 Information about the interface to recipes. Edit this information as follows:

**Recipe interface block** the name of a RCP\_LINE block. The '\*.uyr' file will have the same name as the '\*.uyb' file.

### Batch Phases

The Batch Phases tab show the phases configured for the batch. A phase can be a specific part of a process (such as Heating, Resting, Mixing, Cooling, and so on).

The parameters on this tab are used to configure the identification of each Phase in the batch. Each phase of a batch can be controlled via a sequence.

**Note:** A maximum of 40 phases are permitted for a batch.

To configure the Batch Phases parameters, proceed as follows:

1. Press the Add button to add one phase to the Batch Phases tab.  
If a number of phases already exist on the Batch Phases tab this will add one row to the end of the list of existing phases. Alternatively, press the Insert button to add one row before the selected phase.
2. Type a title for the Batch Phase in the corresponding Batch Phase Name column.  
This is used to identify the Batch Phase in the configured Phase Controller sequence (SFC).
3. To delete a phase, select it and press the Remove button.

## File Output

The File Output tab shows the batch file as it will be displayed when opened using a text editor, e.g. 'Notepad', for example:

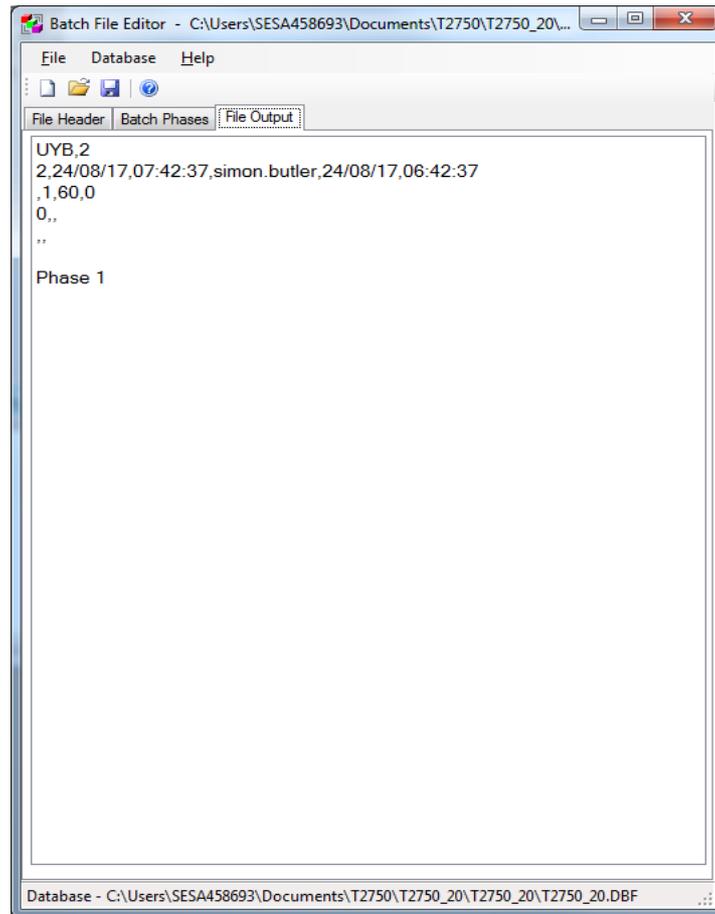


Figure 3 Batch File Editor - File Output tab

**Note:** This editor is the preferred tool for configuring a batch file. Advanced users can still use a text editor, e.g. 'Notepad', although additional constraints are applied (see below).

### Constraints when using a text editor:

If using a text editor such as 'Notepad' to configure a batch file, the following must be noted:

- No line may exceed 512 characters, including line feed/carriage return instructions.
- Spaces are also counted as characters.
- String titles do not have to be unique, but extra characters are omitted when the file is saved if the string length is exceeded.
- Trailing commas are treated as illegal characters unless otherwise stated.
- Commas (,), double quotes ("), single quotes ('), and equals (=) characters are illegal characters in fields.
- Non-printing characters (excluding <CR> and <LF>) are not permitted in the file.

## Save the file

Once the required information has been entered, save the file by either selecting Save or Save As from the File menu, or by clicking the Save icon. Enter the required filename and location when requested.

## Editing an Existing File

To edit an existing file, double-click on its filename in the relevant folder. The Batch Editor starts with the selected UYB file ready for editing and with the correct database selected.

## Format of a Batch File

Although a Batch file is created using the Batch Editor, it is useful to understand the format of these files. The contents of a Batch file can be viewed on the File Output tab of the Batch Editor (see Figure 4).

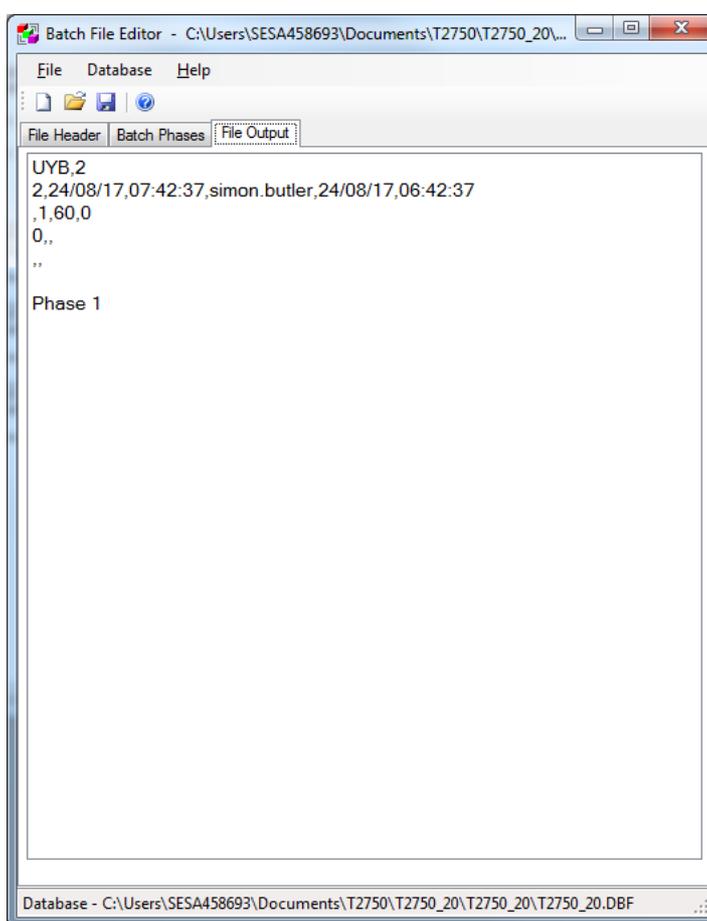


Figure 4 File Output tab

## FILE HEADER

Line 1:

Line 1 must contain **UYB,2** only (for a T2750 instrument).

## Line 2:

Line 2 contains comma-separated information about the current revision of the file

e.g:

2,24/08/17,07:42:37,simon.butler,24/08/17,06:42:37

**Where:**

'2'	is the revision level of the file
'24/08/17'	is the day/month/year that the revision was carried out (local time)
'07:42:37'	is the hours:minutes:seconds that revision was carried out (local time)
'simon.butler'	is the name of the person who last modified the file.
'24/08/17'	is the day/month/year that the revision was carried out (UTC <sup>1</sup> )
'06:42:37'	is the hours:minutes:seconds that revision was carried out (UTC <sup>1</sup> )

## Line 3:

Line 3 defines the batch engine interface as:

<BAT\_CTRL>,<End Action>,<Timeout>,<Confirm level>,<BatchID Prefix>

e.g:

BATCH1,0,60,0,ABC:R

**Where:**

'BATCH1'	is the name of the BatchControl block to run the batch.
'0'	defines the action on RESET: 0 Requires a reload. 1 Can be re-started without a reload.
'60'	defines the timeout, in seconds for state transitions (maximum 3600 seconds).
'0'	defines the level of confirmation required when starting from the front panel: 0 No confirmation required. <b>This is the only valid value for a T2750 instrument.</b> 1 OK/CANCEL dialog box. 2 Required re-entry of password.
ABC:R	is an optional batch id prefix of the form <Prefix>:R, where Prefix overwrites the batch ID, from the left, with the characters of the prefix. For example, a prefix of RKN, would result in batch IDs such as RKN00014. :R, if added, makes the batch ID read only (i.e. it cannot be changed from the HMI control.)

1. This UTC (GMT) date is accurate only if the instrument's clock and time zone are set correctly.

## Line 4:

Line 4 defines the display interface as:

<User Screen>,<Display Group>,<Message Filter>,<User Item1>...<User Item7>

**Where:**

<User Item> specifies a title and value to be displayed on the BATCH start screen.

The value may be edited prior to starting the batch. Each user item is of the form:

<Title>:<Value>:<Minimum Width>:<Width>=<Initial value>:<Attributes>

**Where:**

<Title> is a dictionary reference of the #<Dict><Index> e.g. #U12 or plain text.

<Value> is either a writeable dictionary value e.g. #W12, a LIN dB value e.g. [PID.SL], or plain text.

<MinimumWidth> is the minimum number of characters used for the value.

<Width> is the number of characters wide to display the value.

<Initial value> (optional) is the text value to be used to initialise a writeable dictionary entry value.

For example #U13 = user dictionary entry 13. The value may be another dictionary reference, which is applied at load or plain text.

<Attributes> (optional). Can have one of the following:

W = Value must be written. This implies that data entry must occur after load. If the batch is not unloaded, it may be run without re-writing this value.

M = Value must be modified from its initial value (for 'W' dictionary items only) after load. If the batch is not unloaded, it may be run without rewriting this value.

## Line 5:

Line 5 defines the (optional) name of a DR\_REPRT block to be used to generate batch reports.

If a batch report is to be generated then three reports are required in the \*.uyf file

(1: start, 2: stop, 3: abort). The \*.uyf file must be the same name as the \*.uyb file,

e.g. if using 'SAMPLE.UYB' then the corresponding \*.uyf is 'SAMPLE.UYF'.

Line 6:

Line 6 defines the recipe interface.

e.g:

LINE1

**Where:**

'LINE1' is the name of RCP\_LINE block used to provide parameters for the batch. If 'SAMPLE.UYB' is used then the corresponding recipe file will be 'SAMPLE.UYR'.

### BATCH PHASES

For each phase of the batch, a line is required of the form:

<Name>

**Where:**

<Name> is the name of the phase.

## Downloading a Batch File

A Batch File is downloaded to the instrument via LINTools. Please refer to the LINTools documentation for details. Once downloaded, a Batch File can be controlled via the Eurotherm HMI panel as described in the following sections.

### Loading a Batch File

With the Batch File downloaded to the instrument, the following screen (Figure 5) is displayed on the HMI Control Panel:

<b>File Name:</b>	<input type="text" value="Chicken"/>	<input type="button" value="LOAD"/>
<b>Recipe Name:</b>	<input type="text"/>	
<b>Batch ID:</b>	<input type="text" value="00000001"/>	<b>RESET</b>
<b>Order No:</b>	<input type="text"/>	<b>Phase:</b>
<b>Operator Name:</b>	<input type="text"/>	<b>Start:</b>
<b>Phase:</b>	<input type="text"/>	<b>End:</b>

Figure 5 Initial HMI Control Panel screen (file downloaded to instrument)

**Note:** The status of the Batch is 'RESET'.

1. Ensure that the correct Batch File is selected from the File Name drop-down.

2. Click Load.  
This loads the Batch File into the Batch Control block in the instrument to prepare the Batch for start.

<b>File Name:</b>	<input type="text" value="Chicken"/>	<input type="button" value="START"/>
<b>Recipe Name:</b>	<input type="text" value="Korma"/>	<input type="button" value="UNLOAD"/>
<b>Batch ID:</b>	<input type="text" value="00000001"/>	<b>IDLE</b>
<b>Order No:</b>	<input type="text"/>	<b>Phase:</b>
<b>Operator Name:</b>	<input type="text"/>	<b>Start:</b>
<b>Phase:</b>	<input type="text"/>	<b>End:</b>

Figure 6 HMI Control Panel (file loaded - ready to start)

Note: The status of the Batch is now 'IDLE'.

3. Select the required recipe (if applicable) for the Batch File to use from the Recipe drop-down list.
4. The Batch ID field is updated to show the ID of the Batch to be run. Refer to the next section for details of the Batch ID.

## Batch ID

The Batch ID is used to uniquely identify the Batch to be run. By default, it is made up of the Batch Prefix (if any) and a sequential number. This ID can, however, be changed (provided that the ID has not been set to 'read-only' in the Batch File). To do this, proceed as follows:

1. Click in the Batch ID field to initiate a change to the Batch ID. Depending on the HMI being used and its setting, a keyboard window may be displayed as shown in Figure 7.

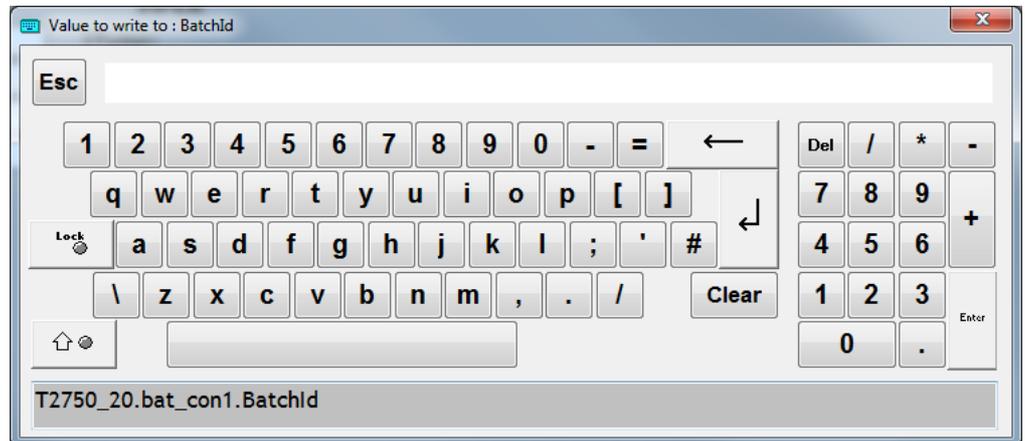


Figure 7 Batch ID Editor Keyboard

## Starting a Batch

To start a Batch, proceed as follows:

1. From the screen shown in Figure 8, click Start.

Figure 8 HMI Control Panel (file loaded - ready to start)

Figure 8 HMI Control Panel (file loaded - ready to start)

2. The screen shown in Figure 9 is displayed.

Figure 9 HMI Control Panel (file running)

Figure 9 HMI Control Panel (file running)

**Note:** The status of the Batch is now 'RUNNING'.  
 The Phase field shows the first Phase of the Batch (if applicable)  
 The Start date and time are populated appropriately.

3. The options available via the control buttons are:
  - Hold (refer to "Holding a Batch" on page 38).
  - Abort (refer to "Aborting a Batch" on page 38).

## Monitoring a Batch

The HMI screen offers several facilities for monitoring a Batch, as follows:

- The status of the Batch is shown. This can be one of the statuses listed in "Downloading a Batch File" on page 35.
- The Start date and time are displayed.
- If the Batch has ended (either by completing or by manual control) the End date and time are displayed.

## Holding a Batch

To hold a Batch, proceed as follows:

1. With the Batch running (see Figure 9), click Hold. The screen shown in Figure 10 is displayed.

<b>File Name:</b>	<input type="text" value="Chicken"/>	<input type="button" value="RESUME"/>
<b>Recipe Name:</b>	<input type="text" value="Korma"/>	<input type="button" value="ABORT"/>
<b>Batch ID:</b>	<input type="text" value="00000001"/>	<b>HELD</b>
<b>Order No:</b>	<input type="text"/>	<b>Phase:</b>
<b>Operator Name:</b>	<input type="text"/>	<b>Start: 11:36:42 14/02/18</b>
<b>Phase:</b>	<input type="text"/>	<b>End:</b>

Figure 10 HMI Control Panel (file held)

Note: The status of the Batch is now 'HELD'.

2. The options available via the control buttons are:
  - Restart (refer to "Resuming a Batch" on page 38)
  - Abort (refer to "Aborting a Batch" on page 38).

## Resuming a Batch

If a Batch has been Held, it can be resumed by clicking Resume as shown in Figure 10. It will return to the RUNNING state.

## Aborting a Batch

To Abort a Batch, proceed as follows:

1. With the Batch either RUNNING (Figure 9) or HELD (Figure 10) click Abort. The screen shown in Figure 11 is displayed.

<b>File Name:</b>	<input type="text" value="Chicken"/>	<input type="button" value="RESET"/>
<b>Recipe Name:</b>	<input type="text" value="Korma"/>	
<b>Batch ID:</b>	<input type="text" value="00000001"/>	<b>ABORTED</b>
<b>Order No:</b>	<input type="text"/>	<b>Phase:</b>
<b>Operator Name:</b>	<input type="text"/>	<b>Start: 11:36:42 14/02/18</b>
<b>Phase:</b>	<input type="text"/>	<b>End: 11:39:42 14/02/18</b>

Figure 11 HMI Control Panel (file aborted)

Note: The status of the Batch is now 'ABORTED'. The Start date and time and the End date and time are populated appropriately.

## Batch Maintenance

Batch Files are edited and maintained using the Batch File Editor (refer to "Editing an Existing File" on page 32' for details). Once the Batch File has been edited to suit requirements, download it as described in "Downloading a Batch File" on page 35'.

## Batch Dictionary

The batch dictionary holds text that originates from the batch files (\*.uyb) and any corresponding recipe files (\*.uyr). It may not be initialised from a normal dictionary (\*.uyl) file. The text held by the batch dictionary changes whenever the batch file (\*.uyb) and/or recipe file (\*.uyr) are loaded. Some items may be subsequently modified.

The dictionary numbers are in the range 1-999 and refer to the current batch (i.e. when referring to these dictionary entries from the DR\_REPRT block it refers to the batch in the **same recording group**). The following table indicates how the records are allocated for each batch.

Record	Value
1	File name (excluding '.uyb').
11	Revisions number of *.uyb file.
14	Name of user who last edited the *.uyb file.
41	Custom title number 1.
42	Custom title number 2.
43	Custom title number 3.
44	Custom title number 4.
45	Custom title number 5.
46	Custom title number 6.
47	Custom title number 7.
51	Custom variable number 1.
52	Custom variable number 2.
53	Custom variable number 3.
54	Custom variable number 4.
55	Custom variable number 5.
56	Custom variable number 6.
57	Custom variable number 7.
91	State of the batch.
92	Name of recipe selected for batch.
93	Name of current phase.
101 to 120	Names of phase numbers 1 to 20.
301 to 316	Names of recipes 1 to 16.
401 to 699	Names of recipe variable numbers 1 to 299.

The dictionary is divided up into sections, one for each batch number, each spanning a range of up to 1000 records. The sections are allocated as follows:

- 1001-1999, Batch number 1
- 2001-2999, Batch number 2
- 3001-3999, Batch number 3

- 4001-4999, Batch number 4
- 5001-5999, Batch number 5
- 6001-6999, Batch number 6
- 7001-7999, Batch number 7
- 8001-8999, Batch number 8

This is of use if you want to refer to a batch other than the current batch.



Scan for local contents

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