

## Writing a Test Sequence File

Use the COMPEND **Test Sequence Menu** to open a previously created Test Sequence File (**Open**) or to create a new program starting with a blank file (**Create Blank**).

Once the TSF is open, pull it up to full screen to view more clearly. Default tiling can be reset by pressing **Arrange** on the COMPEND tool bar.

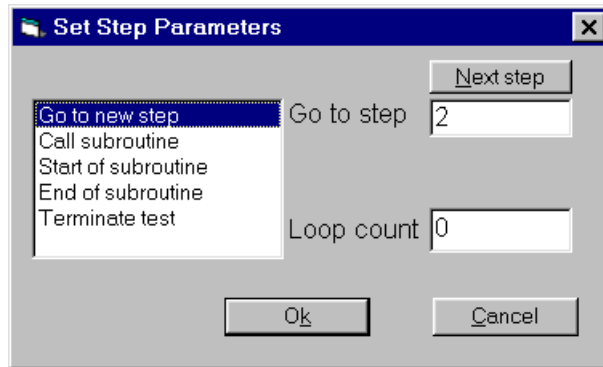
If required, using the **View** menu, reveal the **Comment Column**, so that notes about each step can be made.

### Step Number

The TSF is presented in a tabular form with 50 steps as the default length of the program. The left hand column is the **Step Number**, following the sequence 1 through 50.

### Next Step

The second column is the **Next Step**, defining the sequence that the steps are to be executed. The sequence can include loops and calls to sub-routines of steps. Right click to reveal the **Set Step Parameters** window:



The normal logical sequence would be to go to the next step. The next step is displayed automatically in the **Go to step** box. A simple loop sequence can be set up by using the **Go to step** box to define a loop of steps and the **Loop count** to define the number of times the loop is to be executed.

Alternatively, a series of steps placed lower in the TSF (away from the main sequence) may be used as a subroutine. In this case select **Call subroutine** and in the **Go to step** box place the step number where the subroutine will start. **Next step** will read: **GN** where **N** is the step number for the start of the subroutine.

Then create the subroutine by going to the selected step number and in this case select **Start of subroutine** for **Next Step**. **Next step** will read: **Sub**.

The subroutine may itself contain loops and calls to other subroutines. At the end of the series of steps defining a subroutine, the last step will be labelled **End of subroutine** for **Next Step**. **Next step** will read: **Return**.

The end of a TSF program is defined when the next Step contains the **Terminate test** command. **Next step** will read: **Exit**.

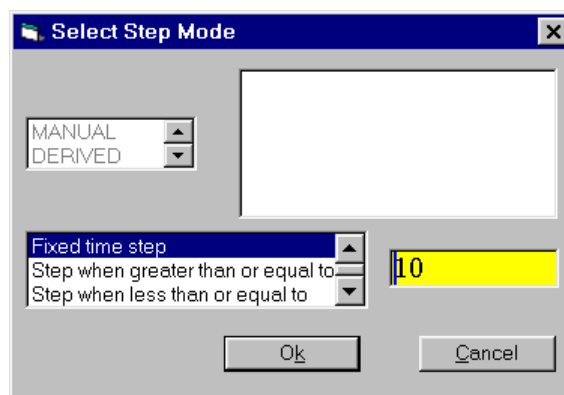
### Loop Count

The third column is the **Loop Count**, defining in the case of logical loops the number of times that the loop is to be executed. Right click to reveal the **Set Step Parameters** Window. Edit only the Loop Count if required, but this may already have been set in the Next Step selection.

### Step Time

The fourth column is the **Step Time** in seconds. Instead of time this can also be configured to be a condition for moving on to the next step or for quitting a loop.

Right click to reveal the **Select Step Mode** window:



A **Fixed Step Time** can be selected in seconds (yellow box). Alternatively a conditional step can be set such that the sequence will wait on the step until the condition is satisfied.

The **Step when Greater than or equal to** or **Step when Less than or equal to** requires a parameter to be defined. The **Step Time** box will show either: **C Stp +** or **C Stp -**. When the condition is satisfied, the sequence will move on as defined by Next Step.

Select either of these options and a browse list of parameters is presented. Select the relevant parameter, from MANUAL, DERIVED or LIVE data from the SUPERSLIM interface. In the yellow box set the applicable Value for that parameter.

Instead of the conditional step described above, a conditional jump may be selected. The conditional jump defines a zero duration step, which tests the condition. It will move directly to the logical step defined by **Next Step** if the condition is true. If the condition is false it goes to the next physical step.

The **Jump if greater than or equal to** and **Jump if less than or equal to** requires a parameter to be defined. The **Step Time** box will show either: **C Jmp +** or **C Jmp -**.

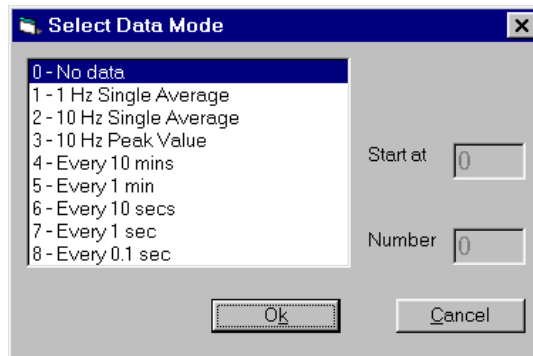
Select either of these options and a browse list of parameters is presented. Select the relevant parameter, from MANUAL, DERIVED or LIVE data from the SUPERSLIM interface. In the yellow box set the applicable Value for that parameter.

The final option for Step Time is a **Programmed pause**. This will freeze the test clock and hold all current set-point conditions. **Step Time** will read: **P Pause**.

### Data Mode

The fifth column is the **Data Mode**, defining the speed of data collection for that step. Every step may have a different data collection rate, with or without averaging of the data.

Right click to reveal the **Select Data Mode** Window:



The options with averaging (**Single Average**) store a single value at the end of the current step that is the average of data sampled at the specified frequency (1 Hz or 10 Hz). The number of samples for the average and the starting point (time in seconds) in the current step are user defined in the yellow boxes.

The **Peak Value** will take a series of samples at 10 Hz and store only the peak value at the end of the current step. The number of samples for the peak search and the starting point (time in seconds) in the current step are user defined in the yellow boxes.

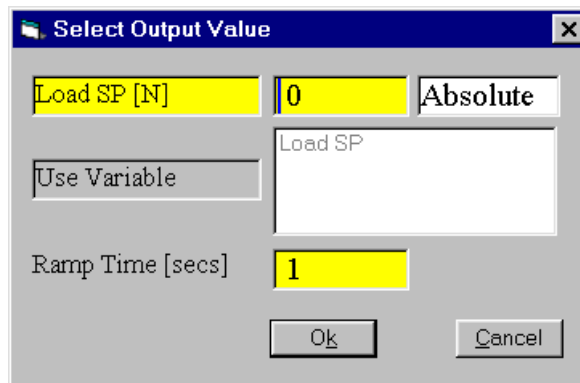
The other data options are fixed logging rates defined as one sample every X minutes or seconds.

The user may set up other periods for data collection by using the 1 Hz or 10 Hz single average option and the Step Time to define the period between samples and using a Loop in the program to keep repeating the same data collection option.

### Analogue Outputs (Set-points)

The next columns show the active Analogue Outputs or Set-points for the machine. Each set-point is accompanied by a ramp time in seconds. Alternatively the new set-point value may be set RELATIVE to the immediately previous value.

Right click to reveal the **Select Output Value** window:



The name of the Analogue Output is shown at the top left box and the default option is an **Absolute** value. In other words, the Setpoint Value will be the value typed in the yellow box.

Click on **Absolute** and this will toggle to **Relative**. This means that the Setpoint Value can be increased or decreased relative to the value IN THE PREVIOUS STEP. In **Relative** mode, a positive number in the yellow box will increase the Setpoint and a negative number will decrease the Setpoint by that amount.

Both the **Absolute** and **Relative** set-points require a ramp time in seconds. The default is 1 second. The ramp time should be less than or equal to the Step Time. Ramps are operative even if a Condition is used for the Step Time.

Note that in the case of temperature control, there will always be a maximum rate of heating for the system. Refer to the machine manual for these rates and convert Setpoint changes to **Ramp Times (s)**.

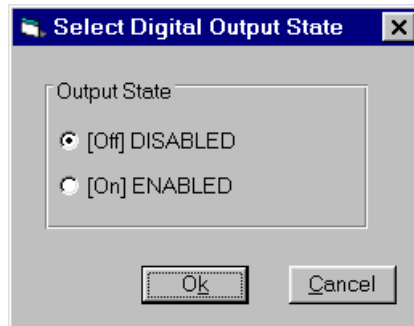
A fourth type of Setpoint comes from using the **Variables Table**. If Variables have been defined, these will appear in the Window and the **Use Variable** button will be active.

The **Variables Table** is created from the **View** menu of the **Test File View** window. Up to 8 Variables can be defined. Highlight the variable to be used and click **Ok** to accept. The **Setpoint** box will read: **VN**, where N is the Variable number from the **Variables Table**.

### **Digital Outputs**

The last columns show the Digital Outputs, controlling the status of hardware on the machine or the internal counter used for a cumulative count of revolutions.

Right click to reveal the **Select Digital Output State** window:



Click on the [Off] or [On] state as required.

### **Finishing a Test Sequence File**

Having set up the step-by-step sequence, make sure that the following have NOT been forgotten:

1. An **Exit** statement appears in the **Next Step** column (this defines the end of the program).
2. If an **Alarm Shutdown Jump** is active, make sure that the relevant part of the sequence has been written. Use **Alarms** menu to check settings.
3. If Variables are in use for set-points, make sure that the **Variables Table** is up to date.
4. Save the file to a new name using **Save As** on the **File** Menu.