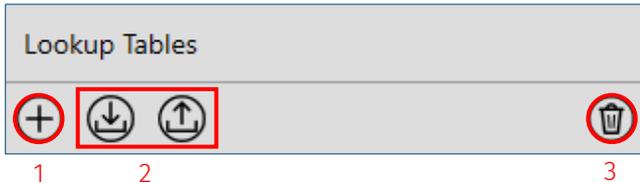


## Lookup tables overview

Lookup Tables (LUTs) are a useful way to use one or two input values to reference an output value. LUTs can then be used elsewhere in the setup through maths channels (see [Setups – Maths Channels](#)).

### Add a lookup table

Click the + tool to add a LUT (1). Use the 'import' and 'export' tools to import and export LUTs between existing setups (2). Use the 'bin' tool to delete LUTs (3).



Once a LUT is added, you can configure the general settings. Add a name for the LUT (1) and an optional comment (2). Select the number of dimensions (inputs) for the LUT (either 1 or 2) from the check box (3). Select the output quantity (4) and units (5).

The image shows a "General" settings dialog for a lookup table. The title is "General" and the subtitle is "Configure the properties of the lookup table." There are five numbered fields:

1	Name	Example Lookup Table
2	Comment	Example Lookup Table for User Guide
3	Dimensions	<input checked="" type="radio"/> 1D <input type="radio"/> 2D
4	Output Quantity	proportion
5	Output Unit	%

## Interpolation mode

The interpolation mode determines how Toolset outputs a value when the input falls between specified discrete values. There are three options:

- **Extrapolate** – Used to estimate the output value when the input exceeds the limits of the specified input values, assuming a linear transition between after the last value.
- **Interpolate** – Used to estimate the output value when the input falls between specified discrete input values, assuming a linear transition between input values.
- **Sample & Hold** – Used to hold the output value until the next discrete input value is met.

## One-dimensional tables

A one-dimensional table is used when one input channel is used to reference one output value.

For example, this could be rotary switch position (Volts) on a device such as the CCW Mk3, correlating to a screen brightness (%) setting.

Set the input value units (1) and then the interpolation mode (2). Enter the required number of rows in the box (3). Finally, fill in the input (4) and output (5) axis increments.

Inputs

1 Quantity voltage

Unit V

2 Interpolation Mode Sample & Hold

Input and Output Values

Configure the input and output values for the lookup table.

3 Size 10 Rows

Input 1 Axis		
+	0	10
+	0.45	20
+	0.9	30
+	1.35	40
+	1.8	50
+	2.25	60
+	2.7	70
+	3.15	80
+	3.6	90
+	4.05	100

4 5

## Two-dimensional tables

A two-dimensional table is used when two input channels are used to reference one output value.

For example, this could be used to control cooling fan duty (%) where ambient temperature (°C) is on input axis 1 and speed (kph) is on input axis 2.

**Inputs**

	Input 1		Input 2
1	Quantity	temperature	velocity
	Unit	°C	kph
2	Interpolation Mode	Interpolate	Interpolate

**Input and Output Values**

Configure the input and output values for the lookup table.

3 Size  Rows ×  Columns

		Input 2 Axis <span style="font-size: small;">(+)</span> <span style="font-size: small;">(🗑)</span>							
		0	20	40	80	120	180	240	300
Input 1 Axis	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	15	25	25	25	20	20	15	10	5
	20	50	50	50	40	35	20	15	10
	25	75	75	75	65	50	25	20	15
	30	100	90	85	65	55	30	20	20
	35	100	100	90	70	60	35	25	20
	40	100	100	100	80	70	50	30	25

Set the input value units for the two input axes (1), and then set the interpolation mode (2). Enter the required number of rows and columns in the boxes (3) Fill in the input axis 1 (4) and input axis 2 (5) increments. Finally, fill in the output values (6).

## Create lookup tables in Excel

For large LUTs or complex LUTs that require calculations to define the inputs, it is possible to create the LUT in Excel and then copy and paste it Toolset. This can save a lot of time and makes creating LUTs simpler.