

Equipment Performance Review (EPR) v2.2

User Manual

By

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Software Program Revision Record

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Document Revision Notice

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1 Introduction

1.1 Background Information

At its inception, Equipment Performance Review (EPR) was a bespoke software tool developed for the dredging contractor TAMS to be used specifically on Chevron's Wheatstone project. EPR is a spin-off of this customised software developed for the Wheatstone/TAMS project, which was then named QACheck, by in2Dredging in February 2017.

During the above-mentioned project, large volumes of datalogger data were collected onboard all project vessels. QACheck was then used to flag gaps or errors in the data, and to generate graphs showing track plots of vessels with overlaid speed zones, dumping ground contours, etc. These graphs were then used to instantly and reliably perform quality assurance checks to ensure compliance with speed zone restrictions and dumping ground allocations.

This first version of QACheck was tailored to the requirements of the Wheatstone project, and was sufficiently user-friendly to enable non-specialist resources to perform the quality assurance tasks.

EPR v2.0 formalises and completely replaces QACheck version 1. It has all the features of QACheck v1 plus some additional new features. In addition, the user interface has been enhanced to facilitate customisation of the software for any project and for any ASCII datafile formats, as well as facilitating the creation of new charts to meet any new project requirements. This enables in2Dredging to quickly and easily customise EPR for any project.

1.2 Equipment Performance Review (EPR) Overview

EPR allows i2D to setup customised templates to quickly check and visualise data stored in ASCII datafiles.

To access the data held in ASCII datafiles, EPR splits the datafile into columns, performs checks on each separate column of data and finally generates user defined charts.

At a minimum, a name and a datatype need to be specified by the user for each column of data. Optionally, several other flags can also be set to highlight, for example, incorrect datatypes and identical values, as well as minimum and maximum values. Two simple data manipulations, i.e. multiplication and offsetting, can also be applied to the data at EPR's project customisation stage. EPR then generates statistical information showing minimum, maximum and average values for each column of data.

In addition, required charts can be defined for plotting the above-mentioned data. EPR generates charts using the data held within each column. Each line in a chart, called a Series, can be subjected to various plot conditions depending on the value of any other column. Other plot options, such as the use of primary and secondary Y-axes and, manual setting of plot minima and maxima may also be defined.

Once all the data and chart specifications have been set, the settings can be saved to a proprietary EPR file. Each individual EPR file, can then be used as a template to instantly and quickly assess multiple ASCII datafiles with the same format.

EPR is a valuable time saving ASCII data viewer, which reduces the number of people required on site. Even a non-specialist team member can instantly and reliably assess project datafiles and share this assessment with the team. Compliancy or production performance can easily be assessed daily to maintain and create a focussed team.

1.3 Abbreviations

ASCII	American Standard Code for Information Interchange
EPR	Equipment Performance Review
GUI	Graphical User Interface
i2D	in2Dredging Pty Ltd
TAMS	Total AMS Pty Ltd

1.4 About this Manual

This manual describes EPR's Graphic User Interface (GUI) and explains its features. The chapters in this manual follow the workflow of a typical project application.

The manual's section, table and figure cross references can be clicked on to navigate to the relevant information.

2 Getting Started

You can download a demo version of EPR from the [EPR web page](#). The demo version allows for unlimited use of EPR using a sample datafile. This demo version is fully functional except that it is not customised to accept your project specific datafile formats. To use EPR with datafiles specific to your project, you will need a project customisation of EPR, which can be obtained in the following manner:

1. Download and install EPR
2. Pay a fee online to have EPR customised
3. Send your project ASCII datafiles, including the ASCII datafiles' header descriptions, to support@in2dredging.com
4. Send which, if any, optional data column specifications need to be applied to your project ASCII datafiles to support@in2dredging.com
See section 3.2: *Optional Data Column Specifications* for a list of the optional data column specifications that may be applied to your ASCII datafiles.
5. Receive your unique EPR customisation within 24 hours
6. Receive access to a short online training course, if required

Once EPR is customised for your project, you can instantly and reliably review your project datafiles. i2D support will also provide a default proprietary EPR file that acts as a default template containing standard data definitions and charts. You can amend this default template by defining new graphs or new conditions you need to flag.

It is **important to note** however, that you will not be able to change the datafile format that your unique EPR customisation will accept. Similarly, any optional data column specifications you may have selected to have applied to your project ASCII datafiles will not be able to be amended once set in your unique EPR customisation.

3 Project Customisation of EPR

To have EPR customised for your project, please provide support@in2dredging.com with your project's ASCII datafiles and a description of each column in the files, as per the example shown in *Table 1* below. i2D Support relies on the column descriptions provided by you to set how your project datafiles will be imported into EPR.

Please flag any datafile columns you do not want uploaded into EPR as “Dummy” and EPR will ignore them.

Column Number	Column Description	Dummy Column
1	Vessel Name	Yes
2	Date and Time	No
3	Easting	No
4	Northing	No
5	Vessel Speed	No
6	Vessel Draft Fore	No
7	Discharge	No
8	Mixture Density	No
9	Pump Revolutions	No
10	Pump Discharge Pressure	No

Table 1: Example Columns specification

Please note that the project datafiles you send to i2D Support must meet the specifications stipulated in *Section 3.1* below for them to be able to be uploaded into EPR.

Furthermore, if you wish any of the optional data column specifications listed in *Section 3.2* below to be applied to your project ASCII datafiles, please provide i2D Support with a list of the optional specifications you would like set in your unique project customisation of EPR.

Once i2D Support receives your project's ASCII datafiles and specifications, EPR will be customised within 24 hours to accept your project specific datafiles so as not to adversely impact your project's start-up phase.

3.1 Datafile Specifications

Datafiles needing to be uploaded into EPR must satisfy the following requirements:

The datafiles' format must be in ASCII format (text), i.e. not binary;

Please note that the ASCII datafiles' format must always remain the same for your unique EPR customisation provided by i2D to remain valid;

For example, the ASCII datafiles' delimiters, e.g. tab delimited or comma delimited, must never change;

The datafile must have a consistent number of columns;

The datafile must contain a consistent header row, if any, which EPR can easily identify and ignore;

There is no preferred or compulsory file extension for the datafile;

The number of rows or lines within the datafile may vary; and

There are no set limits to the datafile's file size or, the number of rows or lines in the datafile

The limits are governed by system hardware restrictions. Successful runs have been performed with files containing 300,000 lines.

3.2 Optional Data Column Specifications

Apart from the mandatory properties of Name and Datatype needing to be defined for each column, optional data column specifications may also be defined for inclusion into your unique project customisation of EPR.

Table 2 below provides a list of the optional data column specifications you may choose for inclusion into your unique project customisation of EPR and describes their functionality.

Property Name	Description	Default
Flag incorrect datatype	Flag when a column value cannot be converted to the specified datatype. This option can be switched off when many error messages are reported for a column that is not of interest.	Yes
Flag identical sequential values	Flag when two columns' values in sequential lines are identical.	No
Flag if the raw data point value is less than or higher than a set value	Flag when a column's value is under or above a specified value. A similar option is also available in <i>Chart Options</i> (refer to conditional plotting described in section 4.4.2.2: <i>Conditional Plotting</i> in this manual). Multiplication and Offset values as described below are <u>not</u> applicable with this flag.	None

Property Name	Description	Default
Flag if the step-in raw data point values between two sequential lines is less than or higher than a set value	Flag when the step between two columns' values is under or above a specified input value. Please note that the unit for datetime values, in this program version, is seconds. Multiplication and Offset values, as described below, are <u>not</u> applicable with this flag.	None
Multiplication value	The column value in the datafile is multiplied, e.g. in unit conversions, for display in charts. This multiplication may not be applied to the above-mentioned flags.	1
Offset value	A value with which the value in the datafile will be offset, e.g. for tidal correction, for display in charts. This offset may not be applied to the above-mentioned flags.	0

Table 2: Data Column Optional Specifications

4 Graphical User Interface (GUI)

EPR's window contains the following Graphical User Interface (GUI) elements.

1. Title bar

2. Menu bar

3. Chart Tabs

The following are example chart tab titles:

- Tide
- Drag Head Depth and Pump RPM
- Hopper Level
- Dumping Track Plot

4. Specification Tab

The Specification Tab's screen is divided up into the following sections:

- Project and Datafile input section
- Charts input section
- Output panel

5. Status bar

- Modified Input flag

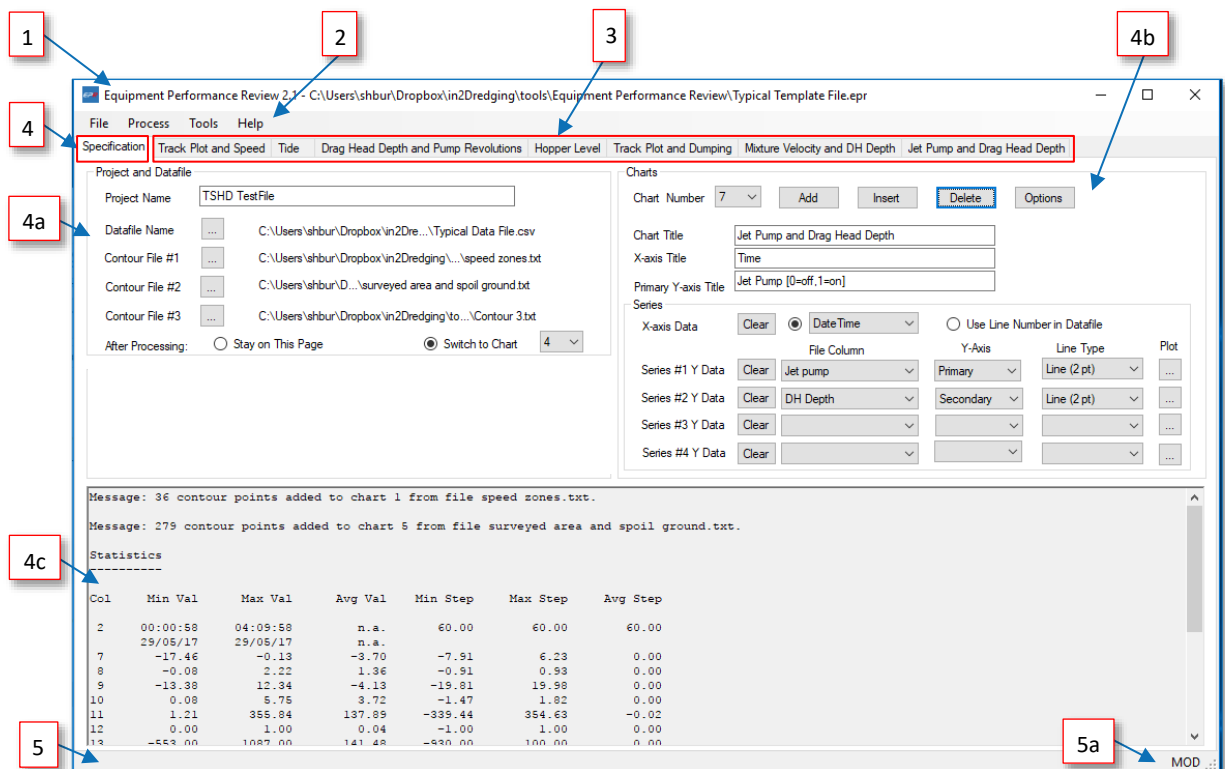


Figure 1: EPR's Graphical User Interface

Table 3 below lists the main GUI elements of the EPR window and provides more detailed information as to their function.

GUI Elements	Description
Menu Bar	Contains all menu commands. Where available shortcut keys are also shown (see Table 5: <i>Menu Shortcut Keys</i> for a list of these).
Status Bar	Contains the progress bar during processing and displays the word MOD when input data has changed. If input data has been modified, a dialog box will appear when exiting the program, prompting the user to save the inputted data.
Specification Tab	The first tab of the EPR window is called <i>Specification</i> and is used to enter specifications to instruct the program how to import, manipulate and sort the data held in the datafile, and to define for the program the graphs that need to be generated. The <i>Specification</i> tab's screen is divided up into two sections. These are the: <ul style="list-style-type: none"> • Project and Datafile section This section is used to input the datafile's import specifications. Refer to section 4.4.1: <i>Project and Datafile Section</i> in this manual for information on how this is done. • Charts section This section is used to input charting specifications. Refer to section 4.4.2: <i>Charts Section</i> in this manual for information on how this is done. The <i>Specification</i> tab's screen also has an Output panel where feedback information is displayed.
Chart Tabs	The remaining tabs display the generated charts, created using the specifications inputted in the various sections of the <i>Specification</i> tab.

Table 3: GUI elements and their functions

4.1 The Menu Bar

The Menu bar uses mainly standard Windows Menu items. In *Section 4.1.1* below the functionality of all the Menu items are described and a table is provided that summarises the shortcut keys available for some of the Menu items.

4.1.1 Menu Items

Menu Items	Submenu	Functionality
File	New	Resets the program, clearing all data previously inputted in the GUI frontend.
	Open EPR File	Opens the proprietary EPR file containing user inputted data definitions and charts. EPR users can update the EPR file, but are unable to change the datafile format accepted by EPR. The default extension for EPR files is “.epr” (optional).
	Save EPR File	Saves the proprietary EPR file, along with all data inputted in the GUI frontend.
	Save EPR File As	Saves the EPR file under a new name.
	Print Chart	Prints the chart that is currently displayed
	Exit	Exits the EPR program. If any inputted data has changed, the user will be prompted to save the file.
Process		This Menu item reads the datafile, processes the data columns and (re)generates specified charts. Charts and contents are not automatically updated when inputted data is modified, but are only updated after processing.
Tools	Export Current Chart Data to Excel	This Menu item exports the Series, i.e. lines or markers, of the currently displayed chart to an Excel file. Note that all series are exported as two lists containing both X and Y values. This is done to account for potential differences in the series’ lengths and data points, attributable to EPR’s conditional plotting feature.
	Show first 50 Lines of Datafile	This menu item opens a text editor window and displays the first 50 lines of the current datafile. A line number and colon are added at the start of each line to assist in identifying the datafile’s line number. The purpose of this Menu item is to permit a review of the datafile’s data columns by allowing a visual inspection of the datafile’s format.

Menu Items	Submenu	Functionality
Help	User's Manual	Opens this User's Manual in pdf format in a separate window. The pdf version of this manual can be navigated by clicking on the chapter and section numbers.
	About	Shows the About box with internet links to in2Dredging's websites (click on logo).

Table 4: Menu Items

Menu Item	Shortcut Key
File/Open	Ctrl + o
File/Save	Ctrl + s
File/Exit	Ctrl + x
Process	Ctrl + p
Help/User's Manual	F1

Table 5: Menu Shortcut Keys

4.2 Tabs

The first tab of the EPR window is the *Specification* tab. This tab allows users to input program specifications and is used by the program to provide feedback information to the user via the **Output** panel.

The remaining tabs on EPR's window display the predefined charts.

In the **Project and Datafile** section of the *Specification* tab's screen, the user can select whether to remain on the current tab, or to open the selected chart's tab, after completion of processing by checking the respective radio button. The user may choose to remain on the *Specification* tab's screen after completion of processing to inspect set flags or error messages.

TIPS

1. For convenience sake, when in a *Chart* tab, double clicking on the *Chart* tab's title returns the user to the *Specification* tab with the Series parameters already preselected.
2. When deleting a chart, the corresponding tab will also be deleted.
To recreate the Chart tab, click the **Process** menu item again.

4.3 Charts

Charts can be zoomed and panned as shown in *Figure 2* below. Detailed information on zooming and panning charts is available in *Table 6: Zoom and Pan* below.

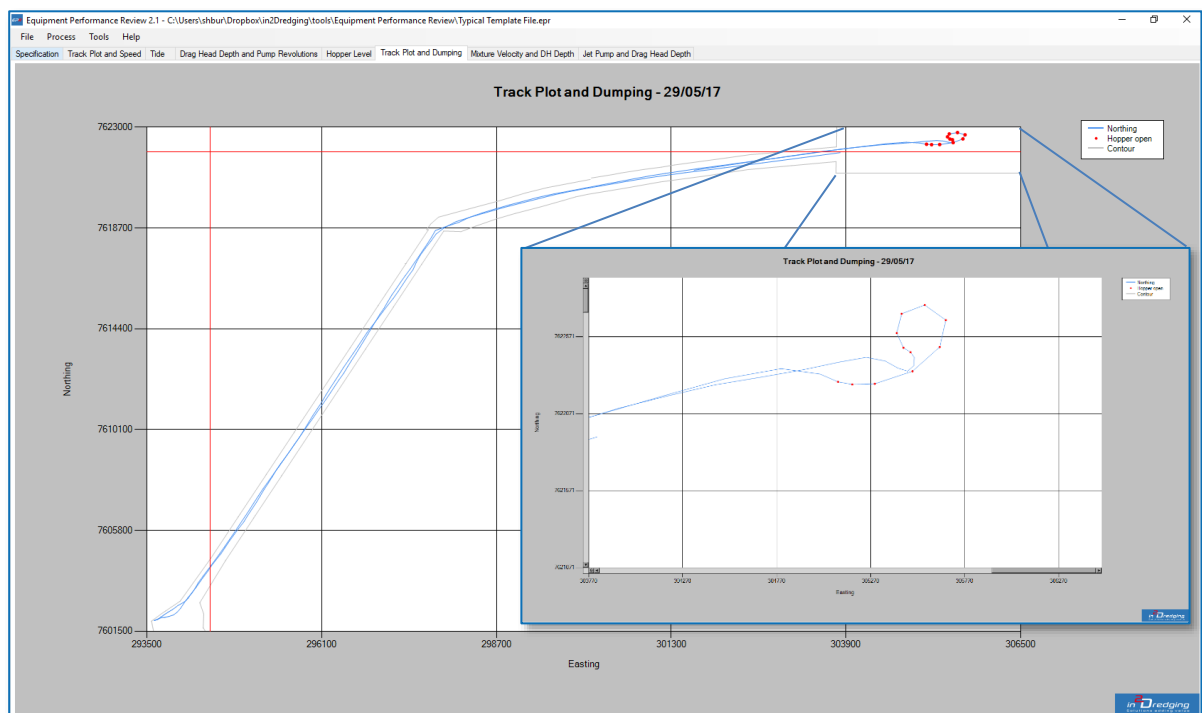


Figure 2: Chart Zooming and Panning example


Action	Method of Use
Zoom	A zoom rectangle can be defined by dragging the mouse over the area requiring zooming while keeping the left mouse button depressed
Pan	When the chart is zoomed in, the scrollbars down the right-hand side and below the chart can be used for panning. Refer to <i>Figure 2</i> above for an example of this.
Reset	Pan and zoom actions can be reset to their defaults by pressing the following small button located at the end of both scrollbars. 

Table 6: Zoom and Pan

4.4 Specification Tab

4.4.1 Project and Datafile Section

The first section of the *Specification* tab's screen is the **Project and Datafile** section as shown in *Figure 3* below. In this section of the screen, the ASCII datafile and optional contour files can be selected for importing by clicking the **More** button depicted below.



In this section, the user may also specify the default chart that will open once processing has completed.

Figure 3: Datafile Input

Field Name	Description	Default
Project Name	A random identifier for the currently inputted specification data.	None
Datafile Name	Name of the ASCII datafile that contains the column data to be processed and charted. Click the More button to open an Open File dialog box, from which the required datafile can be selected.	None
Contour Filenames	An optional contour ASCII file, containing points of a polyline that can be overlaid on a chart, may also be selected. This file can be used to define zone(s) of special significance in a chart. The display of the file's contour line is controlled from the Chart Options dialog box. Click the More button to open an Open File dialog box, from which the required contour file can be selected.	None
Stay on this page	When this radio button is selected the <i>Specification</i> tab will stay visible after completion of processing, so that errors and set flags reported in the Output panel may be investigated.	Default
Switch to chart	When this radio button is selected, the selected Chart's tab will be opened immediately after completion of processing.	No

Table 7: Project and Datafile section

4.4.1.1 Contour File Specifications

The contour file to be uploaded into EPR must satisfy the following requirements:

- Each line in the contour file must contain a pair of X and Y values separated by a comma;

- The file format must be in ASCII format (text), i.e. not binary;

- There is no preferred or compulsory file extension; and

- There are no set limits to the contour file's file size or the number of lines in the contour file

File size limits are governed by system hardware restrictions.

Figure 4 below shows an example of a typical contour file.

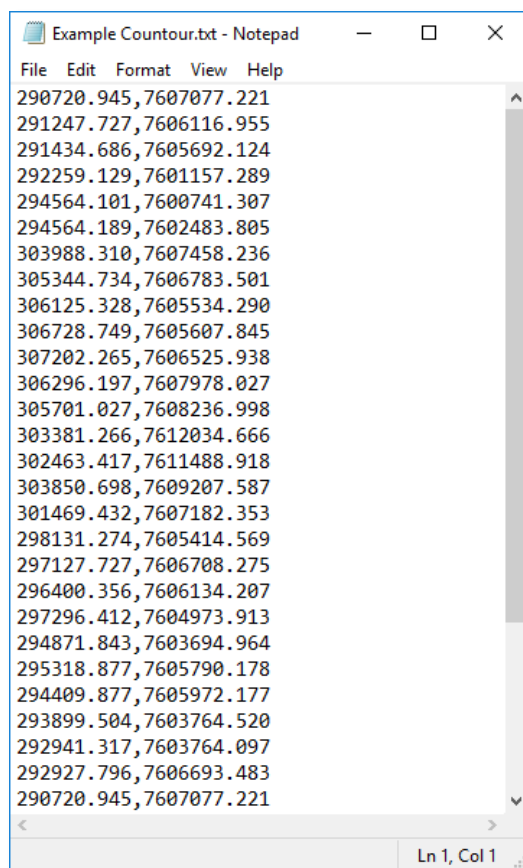


Figure 4: Typical Contour File example

4.4.1.2 Preview Datafile

The EPR generated datafile can be previewed by selecting the menu item **Tools/Show first 50 Lines of Datafile**. This menu item is useful if the datafile is too large to be opened with Notepad or Excel or if a visual interpretation of the file is required.

4.4.2 Charts Section

The image below depicts the **Charts** section of the *Specification* tab's screen.

Figure 5: Chart Input

Element Name	Functionality	Default
Chart Number dropdown list	Select the number of the chart you wish to edit	N/A
Add button	Adds a new chart tab at the end of the chart tabs. All other chart inputs are disabled when no chart is specified.	N/A
Insert button	Inserts a new chart at the current position in the list.	N/A
Delete button	Deletes the current chart's specifications. All other chart controls are disabled when no chart is specified. When deleting a chart, the corresponding tab will also be deleted. Use the Process menu item to recreate Chart tabs.	N/A
Options button	Opens the Options - Chart <number> dialog box where optional chart data may be inputted. Please refer to section 4.4.2.1: <i>Chart Options</i> in this manual for further information on this dialog box.	N/A
Chart Title field	Specifies the title for the current chart. This title will be displayed as the chart's tab's title and as the title on the chart itself. It is recommended that the chart name field be completed to provide a meaningful title for the chart.	"Chart Name"
X-axis Title field	X-axis title to be shown on the chart.	None


Element Name	Functionality	Default
Primary Y-axis Title field	Y-axis title to be shown on the chart. This is the title for the primary Y-axis. A title for the secondary Y-axis can be specified with <i>Chart Options</i> . Please refer to section 4.4.2.1 <i>Chart Options</i> in this manual for further information.	None
Clear button	Remove column containing X-axis data.	None
X-axis dropdown list	Select column for X-axis	None
Use Line Number in Data File radio button	Select line number as X-axis	None
File Column dropdown list	Select the datafile column to be used	None
Y-axis dropdown list	Select the primary or secondary axis for the data series	Primary
Line Type dropdown list	Select the type of line to be used in the chart	Line (1pt)
Plot Condition button 	Opens the Plot Condition dialog box. Please refer to section 4.4.2.2: <i>Conditional Plotting</i> in this manual for further information.	None

Table 8: Data Columns Input

4.4.2.1 Chart Options

Clicking the **Options** button located in the **Chart** section of the *Specification* tab's screen, brings up the **Options** dialog box shown below.

Figure 6: Chart Options

The table below lists the settings available from the **Options** dialog box for generating charts.

Field Name	Functionality	Default
X-axis Minimum	User override for the automatically determined minimum for the X-axis.	Auto
X-axis Maximum	User override for the automatically determined maximum for the X-axis.	Auto
Primary Y-axis Minimum	User override for automatically determined minimum for the primary Y-axis [*] .	Auto
Primary Y-axis Maximum	User override for automatically determined maximum for the primary Y-axis [*] .	Auto
Secondary Y-axis Minimum	User override for the automatically determined minimum for the secondary Y-axis [*] .	Auto
Secondary Y-axis Maximum	User override for the automatically determined maximum for the secondary Y-axis [*] .	Auto

^{*} Adjusting these values can assist in lining up the major and minor gridlines when using both primary and secondary y-axes.

Field Name	Functionality	Default
Clear	Deletes axis limits set above	N/A
Show Legend	Displays the legend on the chart. The titles in the legend are taken directly from the datafile's column names or from the labels specified in the Plot Condition dialog box. Please refer to section 4.4.2.2: <i>Conditional Plotting</i> in this manual for further information.	Yes
Ignore Zero value	Ignores a point when either the X or the Y value equals zero, e.g. used for filtering out spurious points. Note that this criterion is tested after the multiplication and offset for the column data have been applied, since multiplication and offset are applied when your unique project customisation of EPR is created.	No
Sort X-values	Currently not available.	No
Show Minor Gridlines	Displays minor gridlines	No
Show First Date in Title	Adds the date of the first data point to the chart title	No
Secondary Y-axis Title	Name of the secondary Y-axis to be plotted on the chart	No
Footnote	Adds an arbitrary footnote, defined by the user, to the bottom of the chart	No
Show Contour Datafile	Plots the contour from a selected contour file onto the graph. Contour files are selected in the Project and Datafile section of the <i>Specification</i> tab's screen. Please refer to section 4.4.1.1: <i>Contour File Specifications</i> in this manual for further information.	No
Moving Average	Plots the moving average on top of a data series. The moving average filter is depended on the number of points given.	No

Table 9: Chart Options

4.4.2.2 Conditional Plotting

EPR's Conditional Plotting feature is intended to be used for the following purposes:

Plot a variable and use a second series that is conditional, such as plot markers, if its Y-value is higher than or lower than a specified value

Plot a variable and use a second series that is conditional on the value of a different column being higher than or lower than a specified value

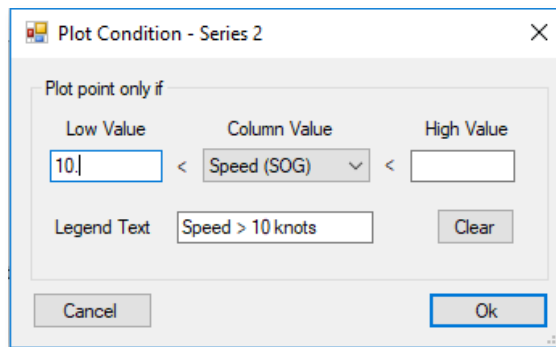


Figure 7: Plot Conditions of Series

Field Name	Functionality	Default
Low Value	Plots if the data column value is higher than the value specified in the <i>Column Value</i> field.	N/A
Column Value	This is the data column against which data column values specified in the <i>Low Value</i> and the <i>High Value</i> fields will be tested. Note that this column can be any column that contains a numeric datatype.	N/A
High Value	Plots if the data column value is lower than the value specified in the <i>Column Value</i> field.	N/A
Legend Text	This text is added to the legend of the chart and can be used to describe the condition that has been used in the chart, e.g. "Speed > 10 knots".	N/A
Clear button	Clears all entered content	N/A

Table 10: Conditional Plotting

Important Note:

If a multiplication factor or an offset has been specified for the selected column during the creation of your unique project customisation of EPR (refer to section 3: *Project Customisation of EPR* for further information), these will be applied to the raw data before the conditional plotting criteria are applied.

5 Software Limitations

Item	Limit	Comments
Number of data columns	25	Arbitrary limit. The modifications required to lift this limit would be straightforward to implement.
Number of charts	10	Arbitrary limit. Any modification would require changes to the GUI.
DateTime formatted data	Limited to X-axis only	Implemented to avoid the problem of multiple series with both number and datetime variables. Although in principle there's no reason why a series cannot have a time format, this is expected to occur only rarely.
Chart Series	4 data series	Arbitrary limit. The number of data series available in one chart have been sufficient to address all requirements encountered to date. Increasing this number will require some work, but would not be a major modification. Note that series 5 is reserved for showing contour lines.