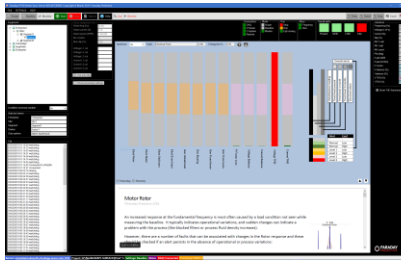
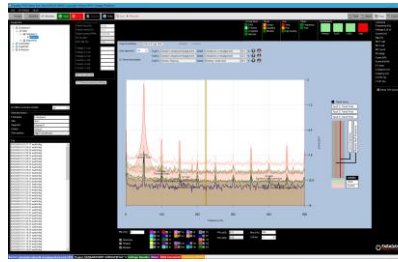


# Operating levels – expert



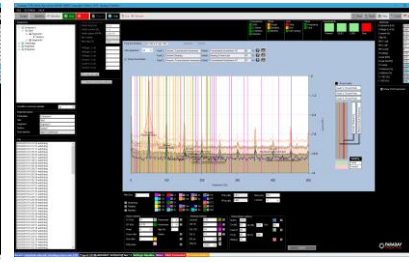
## Simple level

- Condition summary
- Electrical values
- Basic setup
- Diagnostic info pages



## Advanced level

- Frequency plot with intelligent cursor
- Time plot
- Diagnostic info pages



## Expert level

- Frequency plot with custom markers
- Trend analysis plot

## Operating level summary

For the expert user, the system allows complete fine-tuning of all setup values so that it can be used even with very demanding equipment. Analysis can be carried out as Multiple Input Multiple Output (MIMO) with 2 or 3 phases, with a Single Input Single Output (SISO), or current only for Motor Current Signature Analysis).

A processing panel is available to allow the expert user to monitor the progress of the analysis process, and to review any problems that may occur with complicated equipment types.

## Frequency plot with custom markers

Custom markers allow the expert user to identify all frequencies of interest in the frequency plot for in-depth analysis of the measured data.

## Trend analysis plot

The Trend analysis chart shows how faults have developed over time. At the top of the chart is a bar showing alarm values over time, and the main chart shows up to three diagnostic parameters and up to three electrical values at the same time.

## Full setup

The expert user has access to a very wide range of setup parameters, allowing even very complex equipment to be tested:

Project settings – for creating new projects and connecting to existing projects.

Channels settings – for setting up voltage and current measurement channels.

Multivariate settings – for setting up variable speed and load systems.

Auxiliary measurement settings – for detailed measurement settings.

Equipment information – for specific equipment information allowing very accurate and detailed fault analysis.

Diagnostic settings – for in-depth modification of the analysis process.

## Handling measurement errors

### Handling errors – quick fix

Occasionally the system may not be able to produce a model and an entry in the Log will appear alerting the user that the number of retries has been exceeded. Most often simply trying again will produce a valid reading, but there may be rare cases when the system repeatedly produces an invalid model and in this event we advise the user to carry out the following steps:

1. Select **Settings -> Measure Aux** and **uncheck Use Modelling**
2. Take a Scope measurement
3. Examine the waveforms using the time plot, checking for the following:
  - The **voltage and current channels** are correct (if not, then select **Settings -> Channels** to reorder these)
  - The **voltage and current calibrations** are correct (these can also be changed under **Settings -> Channels**). Particularly, current calibrations may need to be changed to be negative if the orientations of the CTs are not correct.
  - The **motor rated details** are correct (under Basic equipment info on the front screen).
  - The waveforms look roughly sinusoidal and in the correct phase orientations, with voltage leading current (for an inductive system).
4. **If any changes have been made, go back to Settings -> Measure Aux, check Use Modelling, and try again.** Most of the time, failure of the model is due to incorrect channel inputs. If problems persist, consult the error code key and carry out the steps required for further error correction.

### Error code key

During the modelling process, the data measured by the system undergoes a number of validity checks. By clicking on **Settings -> Processing**, the user can see whether these validity checks have been passed or not. The table below summarises the 8 different errors that might be seen, and how they could be dealt with if the errors continually recur:

Error code	Error name	Meaning	Correction
0	No Fault	All validity checks passed	None
1	Crossings Invalid	The sample length is too short or the frequency too low for an accurate frequency estimate to be made	Decrease FFT cycles; under <b>Settings -&gt; Measure Aux FFT Cycles</b> . Increase the sample length; under <b>show processing settings, nominal s pts</b> . Decrease the sampling rate to 2.5kHz; under <b>show processing settings, nominal SR (Hz)</b> .
2	Current Threshold	The measured current	Check the current

	Invalid	is too low; the system assumes the small amount of current measured is just residual current (noise) and the motor is not running	calibrations and the rated current. If this is a recurring problem and the current is known to be correct, try lowering the rated current and increasing the current calibrations.
3	Frequency Variation Invalid	The frequency has changed by more than the recommended range over the course of the measured sample and is considered unstable	Re-take the measurement and/or decrease the sample length.
4	Current Variation Invalid	The amplitude of the current has changed by more than the recommended range over the course of the measured sample and is considered unstable	Re-take measurement and/or decrease the sample length.
5	Model Invalid	There is too much noise in the data for the system to build a stable model	Change the sample length and sample duration, in <b>show processing settings, nominal s pts/ nominal SR (Hz)</b> . Change the number of modelling points, under <b>measure aux, Modelling Points</b> .
6	FFT Invalid	The system is unable to produce a spectrum as the model is unstable, and the FFT algorithm has encountered an infinite residual current	Change the sample length and sample duration, in <b>show processing settings, nominal s pts/ nominal SR (Hz)</b> . Change the number of modelling points, under <b>measure aux, Modelling Points</b> .
7	Frequency Range Invalid	The measured frequency is outside of the range expected for the multivariate processing cells	Select <b>Settings -&gt; Multivariate</b> and increase <b>Max f (Hz)</b> , the maximum allowed frequency, to well above the measured frequency.
8	Current Range Invalid	The measured current	Select <b>Settings -&gt;</b>

		is outside of the range expected for the multivariate processing cells	<b>Multivariate</b> and increase <b>Max I (A)</b> , the maximum allowed current, to well above the measured current.
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Note: Error readings such as '48' simply mean that both error code 4 and error code 8 have been triggered.

#### Model continually fails

If after trying all of these options it is still impossible to take a reading, please turn off Modelling (**Settings -> Measure Aux** and **uncheck Use Modelling**) and take multiple Adhoc readings and store each of them to a database. Then contact Faraday Predictive staff for support, either by phone on (+44) 0333 772 0748 or by email at [info@faradaypredictive.com](mailto:info@faradaypredictive.com) and we will be able to assist.