

AMV5000 Weld Data Logger



Introduction

This manual covers the AMV5000, initial setup and operation.

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General

The AMV5000 is an arc welding data logger intended for procedure development and qualification along with production monitoring. The AMV5000 Weld monitor can monitor two separate arcs simultaneously. The main intention is for monitoring both arcs of the same weld, such as a tandem pipe welding bug or sub merged arc system. However, it can also monitor two completely separate processes.

Each arc can be monitored with four channels of data. Typically the AMV5000 is setup to Table 1.

Channel	Parameter	Unit	Max Value	Accuracy
1	Voltage	Voltage (V)	100	+/- 0.5V
2	Current	Current (A)	1000	the greater of +/- 1A or 1%
3	Wire Feed Speed	m/min	20	+/- 0.1 m/min
4	Temperature	deg C	350	+/- 1% of reading

Heat Input

Heat Input is calculated at the completion of each pass and is based on average power. So the heat input calculation is:

$$Heat\ Input = \left(\frac{\sum V \times I}{No\ samples} \right) \times \frac{Time\ (s)}{Distance\ (mm)}$$

Pulse data

The AMV5000 calculates pulse data based on the current channel. This is recorded at the end of the arc and is shown as live data during the weld.

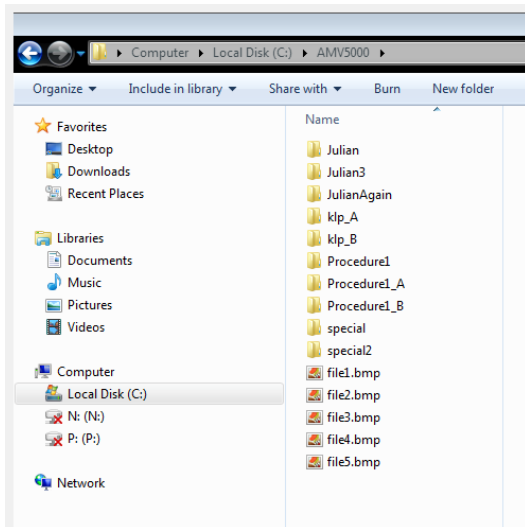
Electrical specification

Mains power supply in	110 to 240 V AC
Power supply into AMV5000	18V DC 5A
Battery voltage	12V
Battery life	Typically, 4 hours
Charge time	6 hours
Chemistry	NiMH

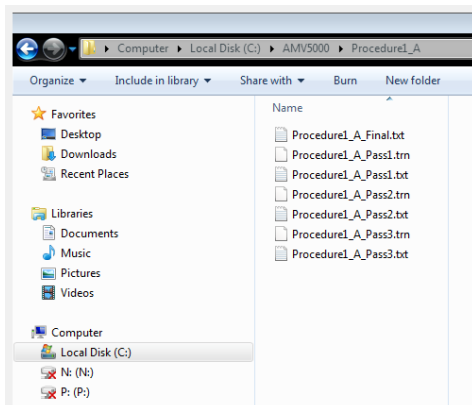
Data Management

Text Files

The data files are stored in the C:\AMV5000 folder. Each new procedure has a separate folder:



Each pass then has a text file and a binary data file.



The text file is generated during welding and contains average data, arc data and pass data the options are controlled by the Print Options (see page 10).

The .trn files are binary files containing the transient data for the pass. The .trn files can become large and it is good practice to remove these files to a storage area regularly.

Finally, there is another text file – ProcName_Final.txt. This file contains the summary for the procedure, so each pass and the pass average are listed.

Database

From version 171 Resume data is stored in an Access database in file c:\triton\database\AMV5000Data.mdb.

AMV5000 contents and setting up



The AMV5000 comes with 2 amp clamps, 2 voltage lead sets and a mains power supply.

To setup the AMV5000 the amp clamps are placed around the welding cables, either torch side or return. The direction of the current does not affect the average amperage calculation. The current flow is only important for the graphical display.



The voltage leads should be connected as close as possible to the torch to minimise voltage drop across the welding cables. However, it is often only practical to measure the voltage at the power source in which case the length of the voltage leads should be noted. Average voltage is not affected by the connection, but positive and negative voltages are displayed on the graph.

The AMV5000 can be used either on battery or run directly from the mains via the adaptor.

Start the AMV5000

The AMV5000 runs Windows 7 operating system, start the AMV by pressing the power button. After 10 seconds, there is an audible beep and the AMV should show the boot processes.

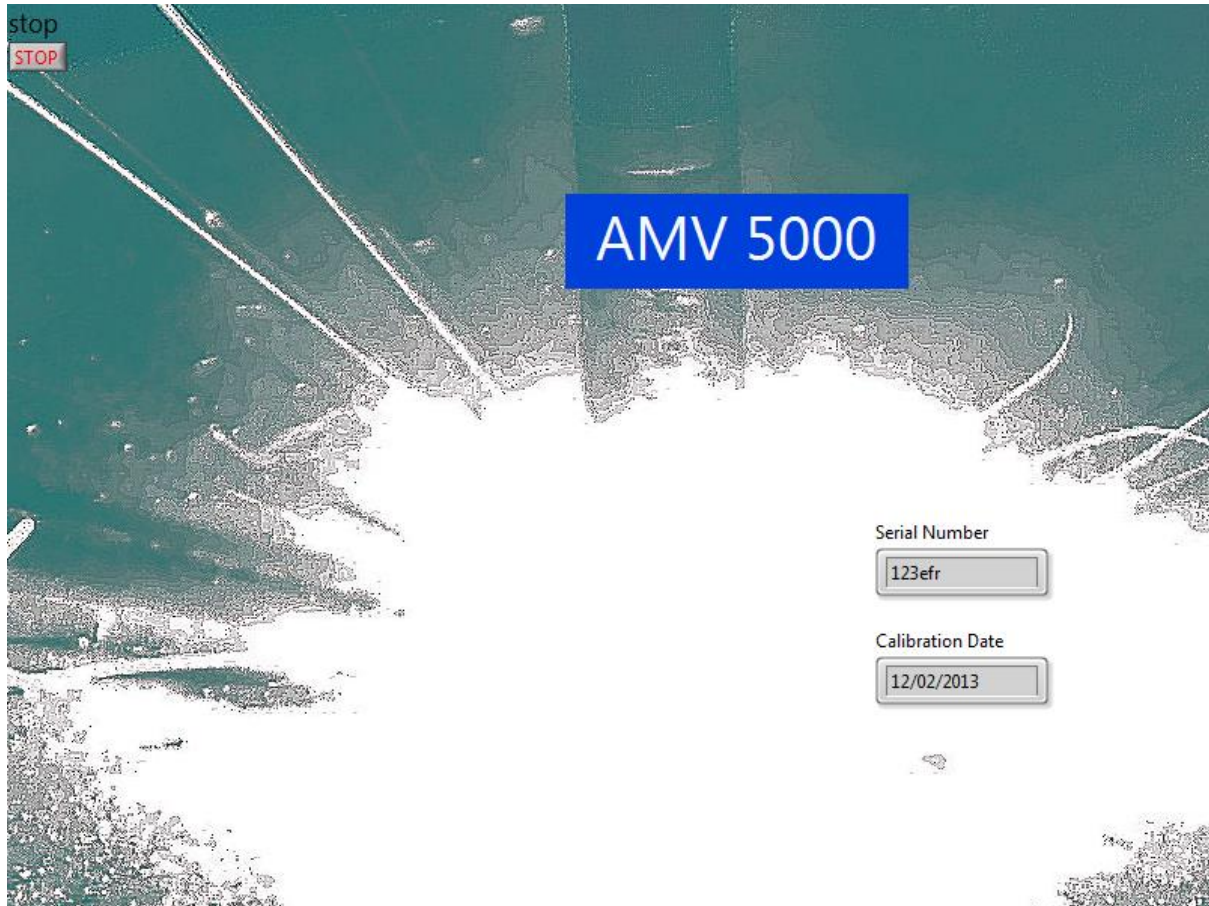


Power
button

Once the AMV has booted double click on the AMV5000 logo to start the monitoring programme.

Screen Detail

Start-up Screen



The start-up screen shows the unit serial number and the last calibration date.

It leads automatically to the New Procedure screen

New Procedure

At start up the procedure name is disabled.

To setup a new monitoring profile:

1. Press New Procedure. This brings up the New Procedure Name screen:

Fill in the text box then press update

2. This unlocks the New Procedure Screen
3. Select the alarm level from the drop-down list
4. Select the mode:
 - a. Multi Arc – select this option if both arcs are going to have the same procedure name. Both A and B arcs start and stop independently, have their own weld length and associated heat input.
 - b. Single Arc – Select this option if only one process is to be monitored.
 - c. Independent – this is for 2 completely different processes. When this option is selected the second set of procedure headers are available for use. In this case both arcs start and stop separately, both heat input calculations are handled individually.

To resume a procedure

To resume a previously recorded procedure

1. Press Load/Resume button
2. This opens the files that are available to resume:



3. Use the drop-down button to select the file to resume
4. When happy with the selection press LOAD

The other options accessible are

Cancel – this just clears the text boxes and returns to the newly opened screen.

Exit – closes the AMV5000 software.

Settings – opens the settings screen

Calibration – opens the calibration screen (requires a password)

Review Waveform – opens the waveform viewing screen.

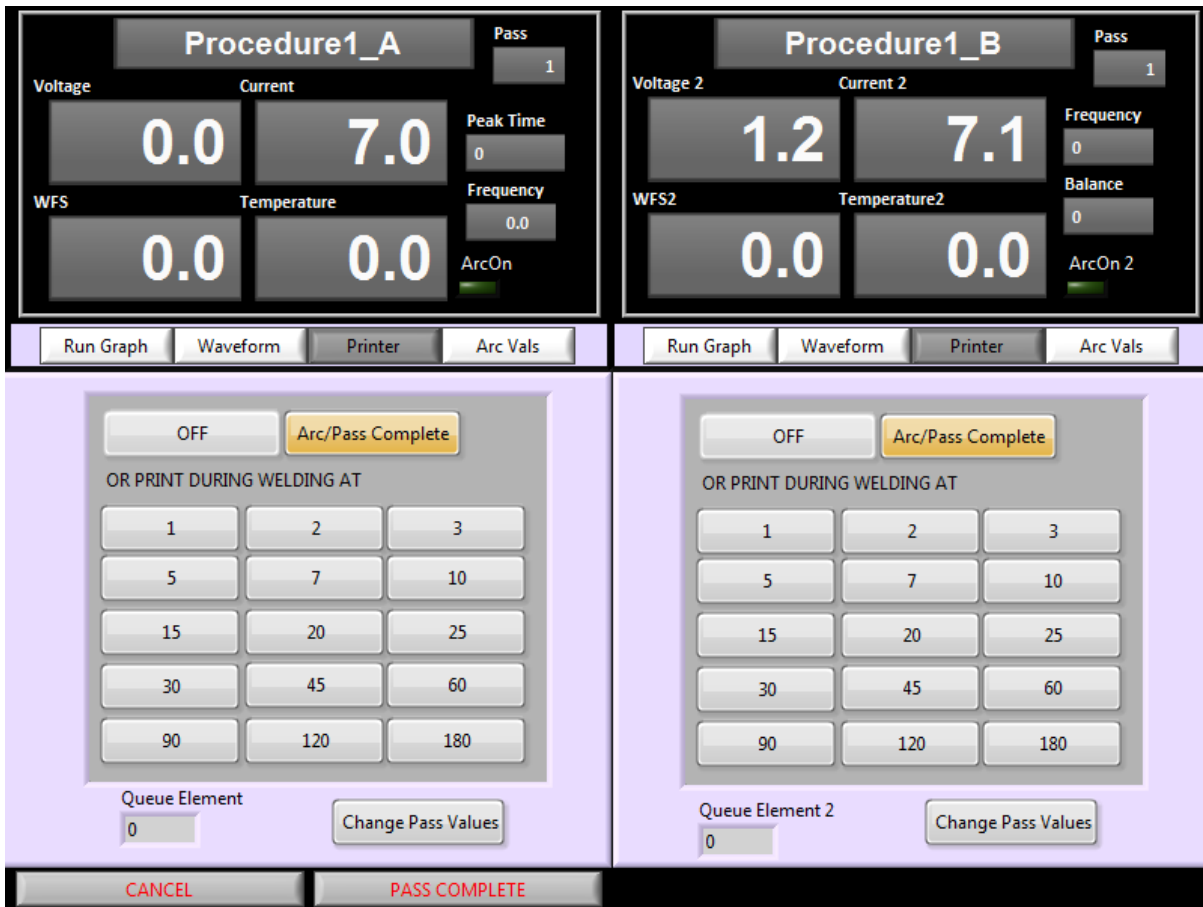
Set Alarm – this screen sets the alarm levels

About – shows software version

The automatic weld length options are for use with the Function buttons.

Once the procedure information has been entered either by resuming an existing procedure or creating a new one press Monitor to go to the monitoring screen.

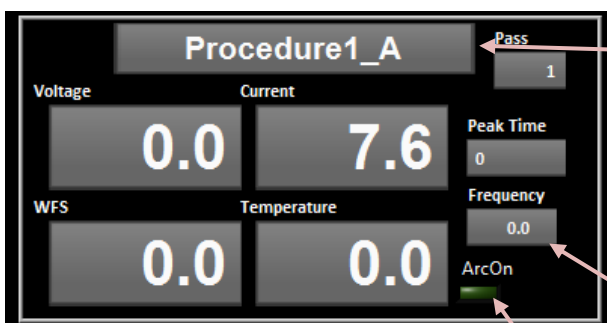
Monitor Screen



The monitoring screen is split into 4 sections.

Firstly, the screen is vertically split into the A and B channels. Then it is split horizontally showing the digital running average data at the top and allowing a selection of views in the bottom.

Looking at the running digital data:



The procedure name is shown in the top box with the pass number next to it.

Then the average values for the last second of each channel are displayed with the channel names above.

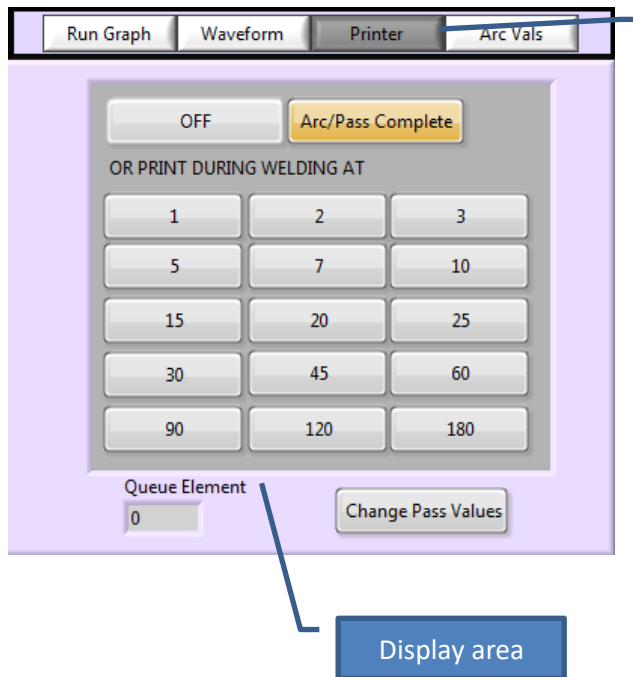
During welding the software will try to determine the dominant frequency (if pulsing)

and show the peak time in milliseconds.

Finally, there is an indicator to show that the arc has been detected.

The digital boxes are always displayed while on the monitoring screen – it is not affected by the display selection for the graphical part of the screen.

The layout of the graphical screen is shown below. There is a CONTROL AREA and below the DISPLAY AREA.



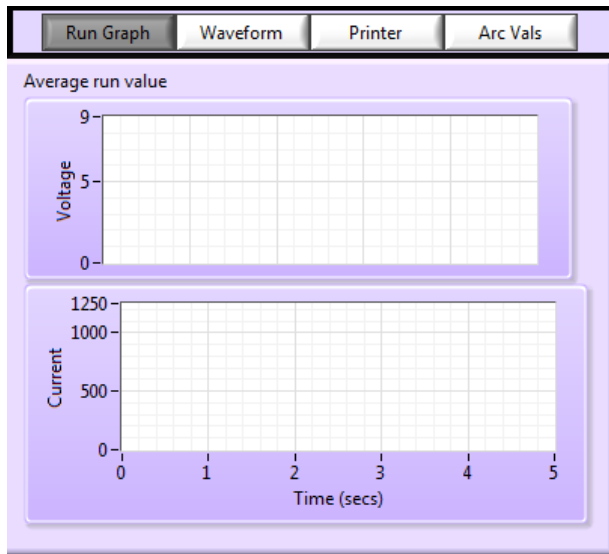
The buttons in the control area select what is displayed.

The options are:

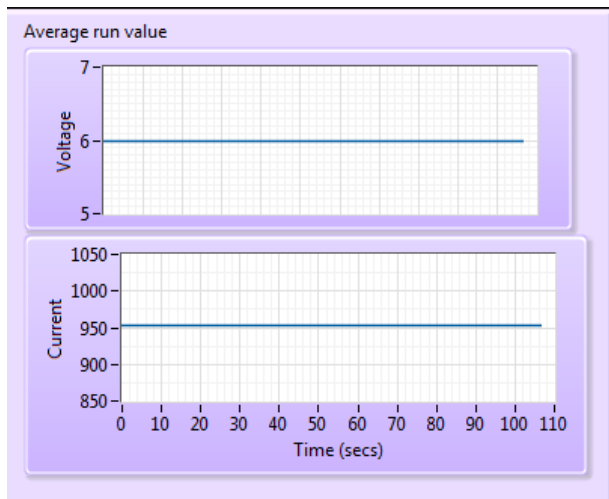
1. Run Graph – this shows the average running data. It is good for showing any long term drift in voltage or current.
2. Waveform – shows the welding waveform, allowing pulse or dip cycles to be examined.
3. Printer – this allows for control of the print rate.
4. Arc Vals – shows the average values recorded in this pass and more detailed pulse data.

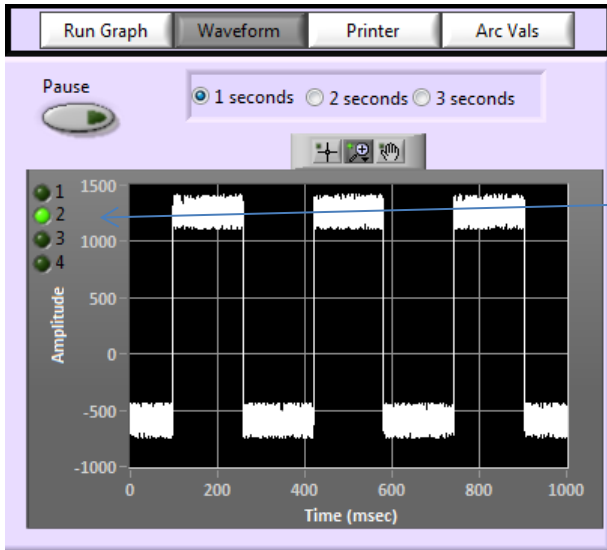
Before the arc is started the print screen is displayed.

Once the arc is detected the graphical screen will automatically show the Run Graph.



As the weld progresses the weld data is displayed:



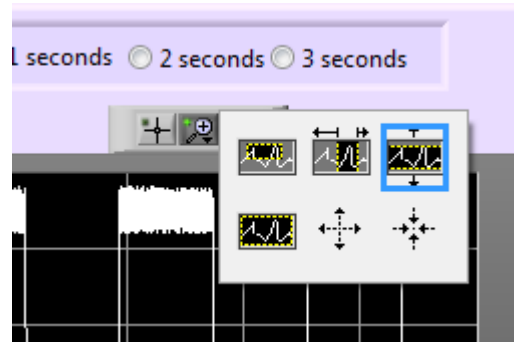
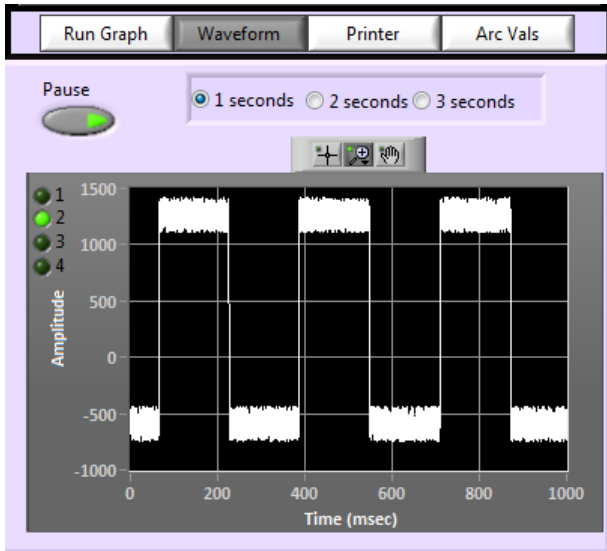


The Waveform button shows the welding waveform as it is captured.

The buttons on the left control which channels are displayed. The trace of the lowest number channel selected is displayed in white, the next in red, then green and finally if all four are selected blue.

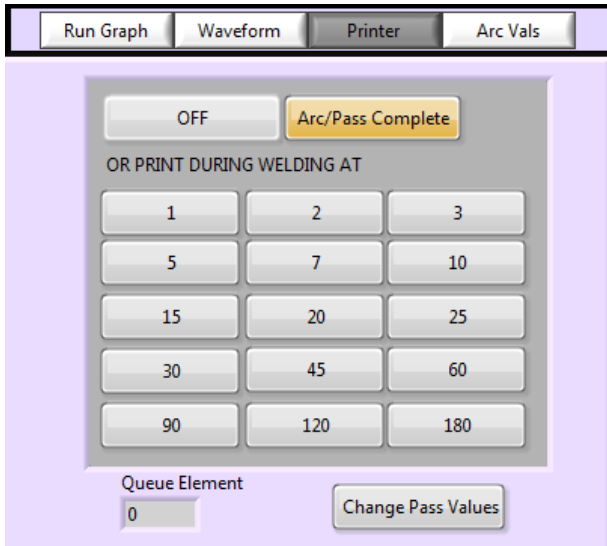
The display can be set for 1, 2 or 3 seconds. In this way long pulse process can be displayed.

To look at the waveform in more detail press the Pause button and use the tool to zoom in to the necessary region.



To get to the zoom tools press the magnifying glass to see the options above.

To carry on refreshing the screen press the Pause button again. The zoom buttons can only be accessed when the display is paused.



When the monitor screen first loads the bottom graphical part displays the printing options.

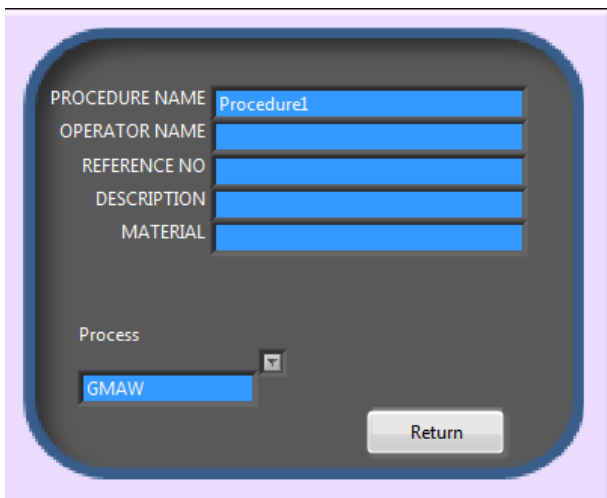
If a printer is attached to the serial port the AMV5000 will print out the average values at the required interval. It also generates a text file with the same information. (Use the SETTINGS: EXTERNAL PRINTER: YES)

An example of the print out is shown in the next panel.

The print rate sets the interval at which the average is printed. In the example, it is set to print every 2 seconds. At the completion of the arc there is an arc summary and at the completion of the pass there is a pass summary.

Queue Element shows how much data is pending and has not been displayed. If the data queue constantly shows more than 5 this indicates a potential fault in the hardware.

Change Pass Values is only available before the first arc is detected. It allows for the header information to be changed without going back to the New Procedure Screen.



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TRITON ELECTRONICS LTD

AMV 5000 Arc Weld Data Monitor

PROCEDURE NAME: Test3

OPERATOR NAME: John

REFERENCE NO: 12345678

DESCRIPTION: Test sample

MATERIAL: SS and CS

Process: GMAW

Time: 10/11/2012 : 21:56

2Secs 82.2V 82A 0.8mm/s 0.8C

Arc no: 1

Arc Time: 3.0Secs

Arc Voltage: 78.9V Arc Current: 79A

Arc WFS: 1mm/min Arc Temp: 0.8degC

----PASS VALUES----

Procedure: Julian3

Pass: 1

Voltage 79V

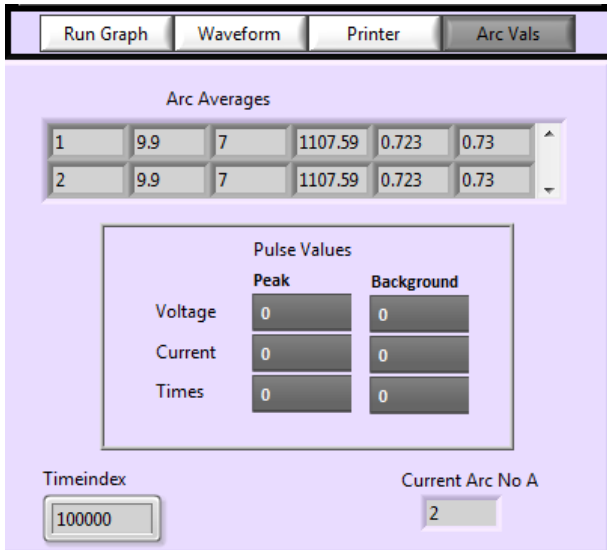
Curr 79A

WFS 0mm/min

Temperature 0mm/min

Heat input: 0.510kj/mm

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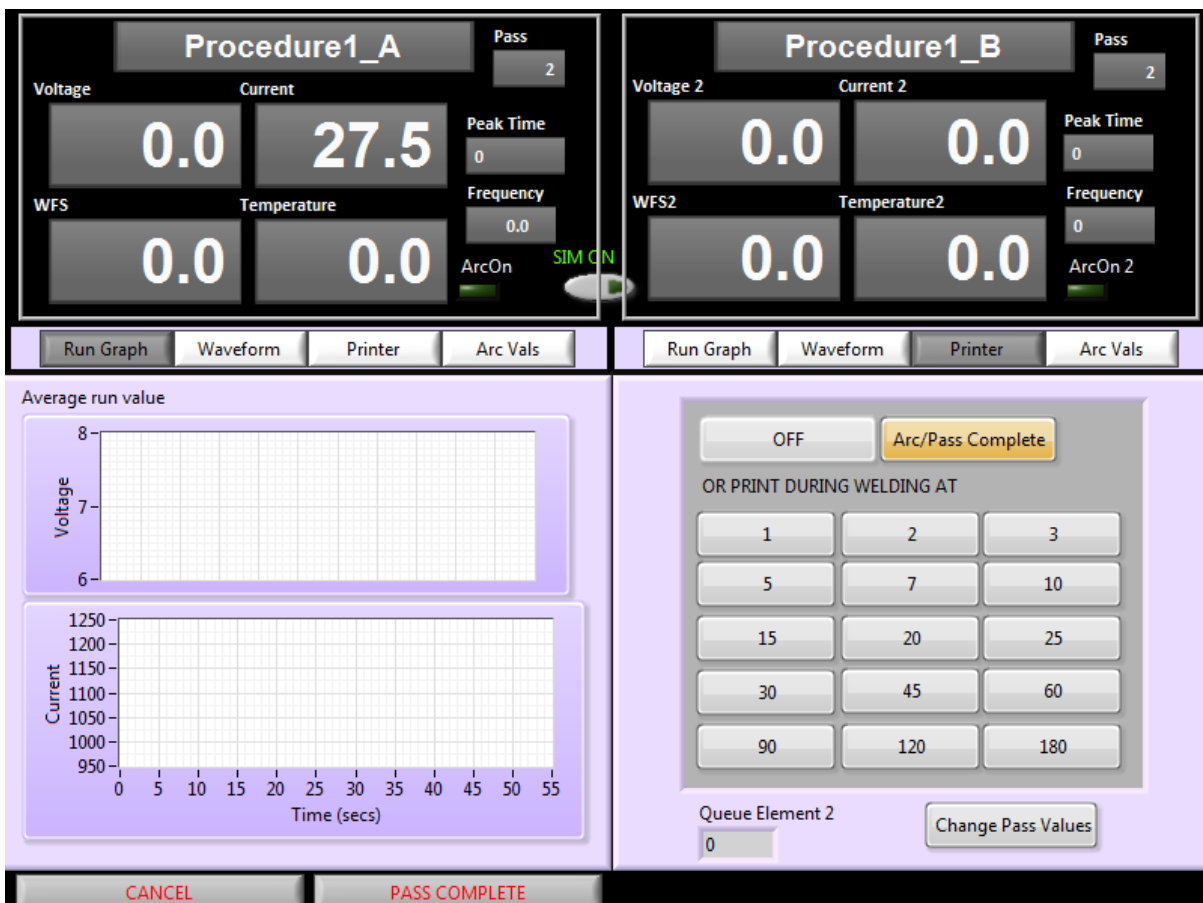
The arc values button shows all the arcs recorded in the the current pass.

It also shows more detailed pulse data.

There are two other boxes:

- The Timeindex which is a counter used for the graphical saving option.
- The current arc no is also shown

Once the pass is completed press the Pass Complete button at the bottom of the Monitor screen.



Pass complete – greyed out while the arc is on.

Pass complete



The Pass Complete screen shows a summary of all the arcs in the pass and allows for the travel distance to be entered.

From the pass complete screen there are 2 options:

- Procedure Complete – this closes the procedure and shows a summary of all the passes
- Next Pass – just increments the pass number and zeros the arc number.

Procedure Complete



The Procedure Complete screen shows a summary of the pass data collected.

The options are:

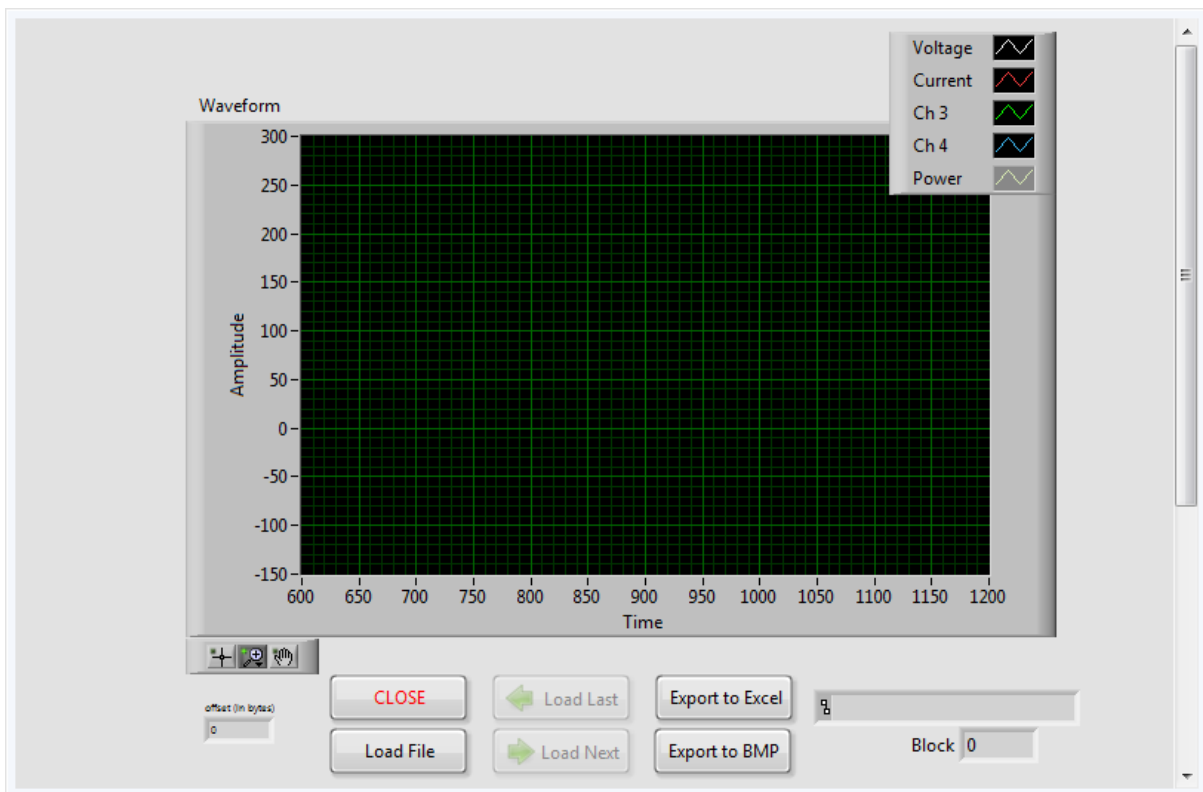
- Procedure Complete – final chance to close this procedure, after this point the transient is converted into files and the temporary memory is cleared..
- Cancel – takes the programme back to the Pass Complete screen. All temporary data is still available.

Returns to new procedure menu.

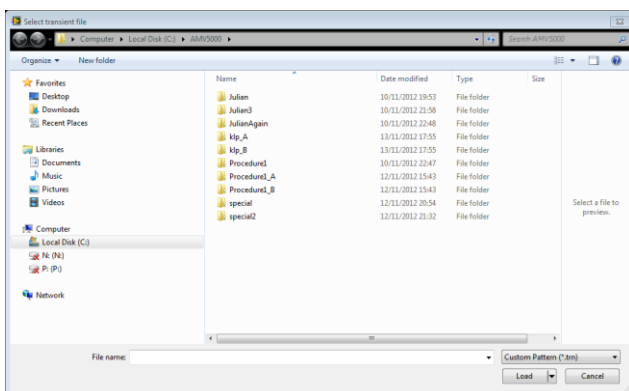
Calibration

The calibration menu should only be accessed for calibration under the AMV5000 calibration instructions.

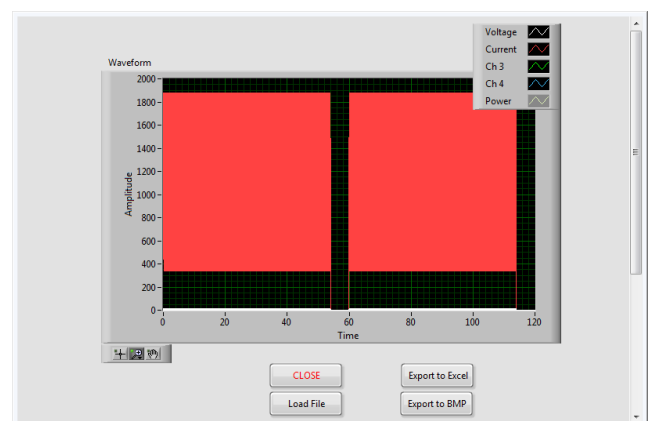
Review Waveform



The Review Waveform screen loads previously saved transient pass files. As the screen is opened a file open dialog box allows for selection of the .trn file to view.



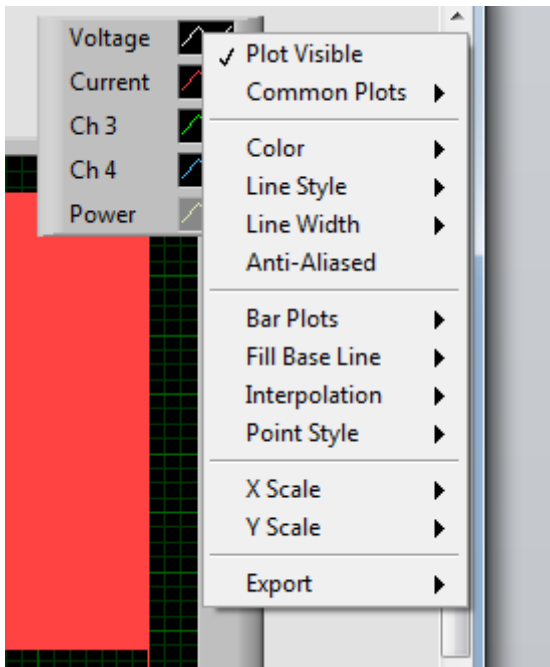
Once the file is opened all the data is displayed



Use the graph tools to zoom into the waveform



- The channels can be turned on or off by right clicking on the legend and either tick or un-tick Plot Visible.



Other options such as plot colour and style can also be selected from this menu.

Once the graph displays the information you want to capture use the Export to BMP function to save a bitmap image of the graph.

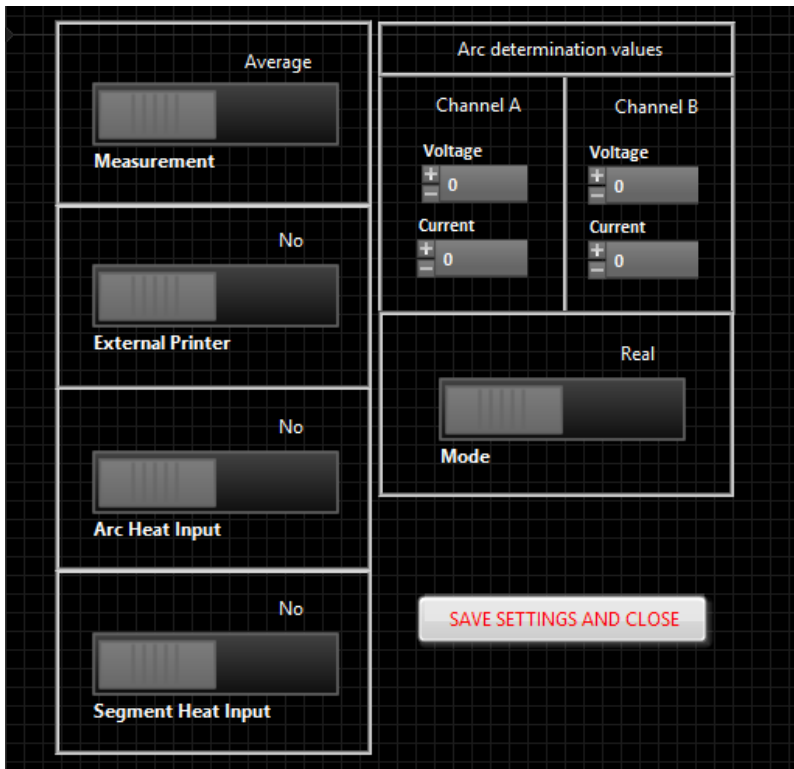
The Review Waveform programme is also available as a PC programme to be installed on any PC running Windows 7 or later.

Once the Review Waveform programme has been installed on a separate PC copy the data files from the C:\AMV5000 folder. Then use the file open dialog to navigate to the files from your PC – the easiest way is to either network the AMV5000 or copy the data files to a removable flash drive.

The main advantage of the PC mounted programme is that the Export to Excel function is available as long as the PC has excel installed as well. The Export to Excel function exports the visible graph to an excel spread sheet.

The waveform is loaded as a series of 12 minute windows, use the Load Next and Load Last buttons to move back and forth. Please note the export to Excel function returns an error unless Excel is installed. We do not install Excel on the AMV5000.

Settings



The setting screen controls how the AMV5000 functions.

The options are:

Measurement -Can be either average or RMS (average is default)

Mode – Real data is data recorded from the ADCs, select Simulation to use internally generated data.

Arc determination values – these are the values that are required to assume a valid welding arc.

Set Alarm

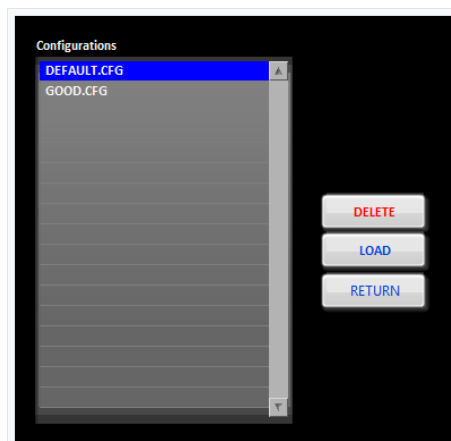
Alarm Levels								
	Voltage		Current		Channel 3		Channel 4	
	Max	Min	Max	Min	Max	Min	Max	Min
RED	0	0	0	120	0	0	0	0
AMBER	45	0	0	0	0	0	0	0

Filename: DEFAULT

Buttons: CONFIGURATIONS, CANCEL, SAVE AND EXIT

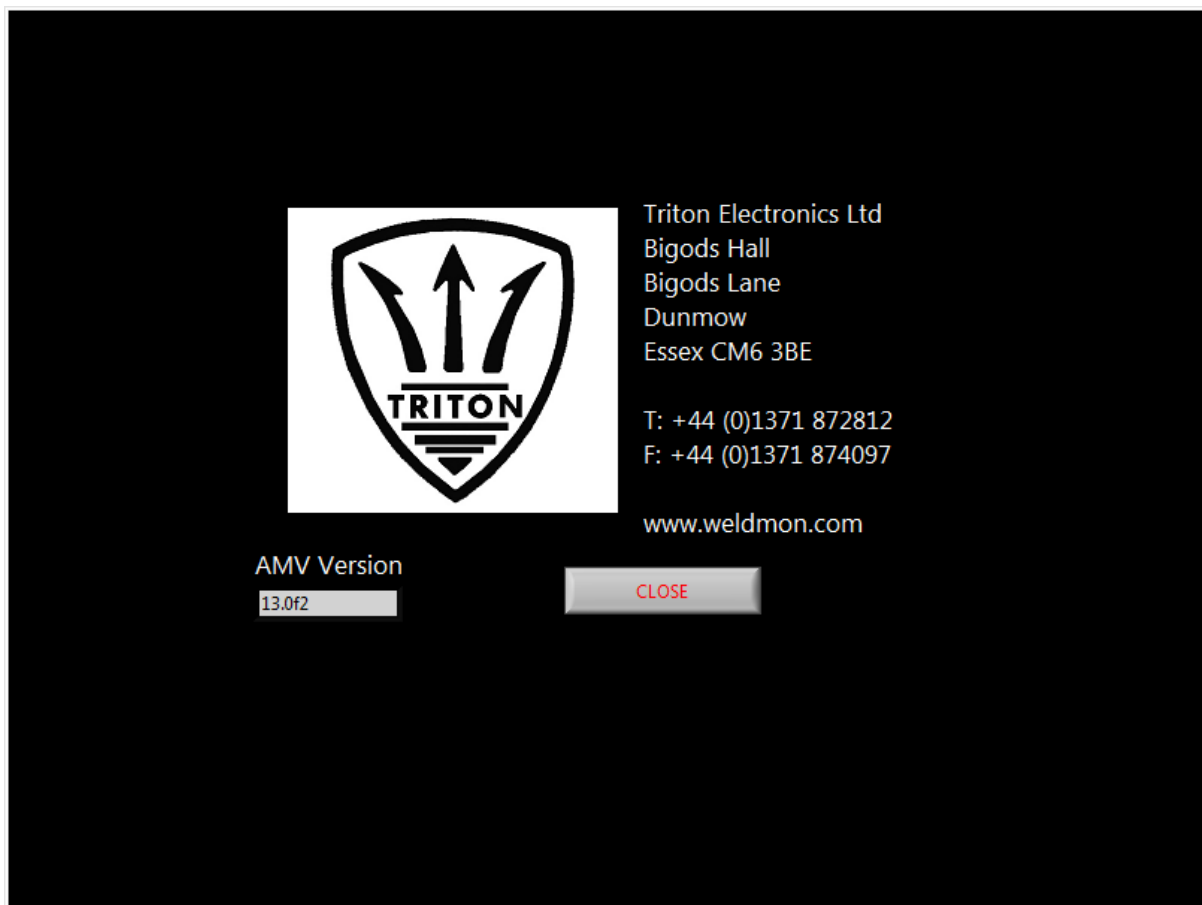
The alarm values are split into RED and AMBER alarm levels. The alarms can be set independently for A and B.

Enter the alarm levels into the correct box and press the SAVE AND EXIT button to save the new values. A warning screen appears if the filename already exists – just change the file name if you want to save the details as a new alarm file.



To load saved values, press CONFIGURATIONS and a list of saved files will be shown. From this screen a set of alarm values can be deleted, loaded into the main editing screen or just returned without any further action.

About



The About screen contains software version details and Triton contact details.

Accessories

Wire feed speed

Wire feed speed can be monitored using the AMV309WFS



Temperature

Temperature can be monitored with the AMV309Temp



Gas Flow

Gas Flow can be monitored with the AMV309GasFlow



Dinz voltage connector

Voltage connectors made to plug into Dinz connectors on the front of a power supply.