Blade Sensor
Technical Manual

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1. Foreword

Thank you for purchasing a Blade Non contact Position Sensor from Gill Sensors. We recommend that you read the whole of this manual before proceeding. Gill Sensors products are in continuous development and therefore specifications may be subject to change and design improvements.

2. Introduction

The Blade sensor is a two-component non-contact position sensor. The Blade itself is one component, the other being a metallic activator, which is attached to the moving assembly to be measured. The activator can often be engineered as an additional feature of an existing cast or sheet metal assembly, ensuring economy and repeatability. The avoidance of traditional linkages enhances reliability and accuracy.

The concept of the Blade sensor and its operation will be new to you, but by following a few simple steps it is easy to get a feel for any application at a workbench with only a Personal Computer, a battery and voltmeter. In particular, activator material and design can be very easily checked by literally ‘cut & try’. With simple techniques the sensor can be extensively characterised before undertaking the engineering work needed for the real application.

The sensor can be treated as a traditional analogue device and tested with a voltmeter. However connecting the sensor to a personal computer will allow the user to have full access to, and control over all the Blade’s functions.

Sections 3 & 4 explain how the user can carry out a quick test to familiarise oneself with the basic functionality of the sensors, using both the analogue feature and the BladeCom GUI.

Section 5 gives details of how to design and make an activator for your Blade sensor.

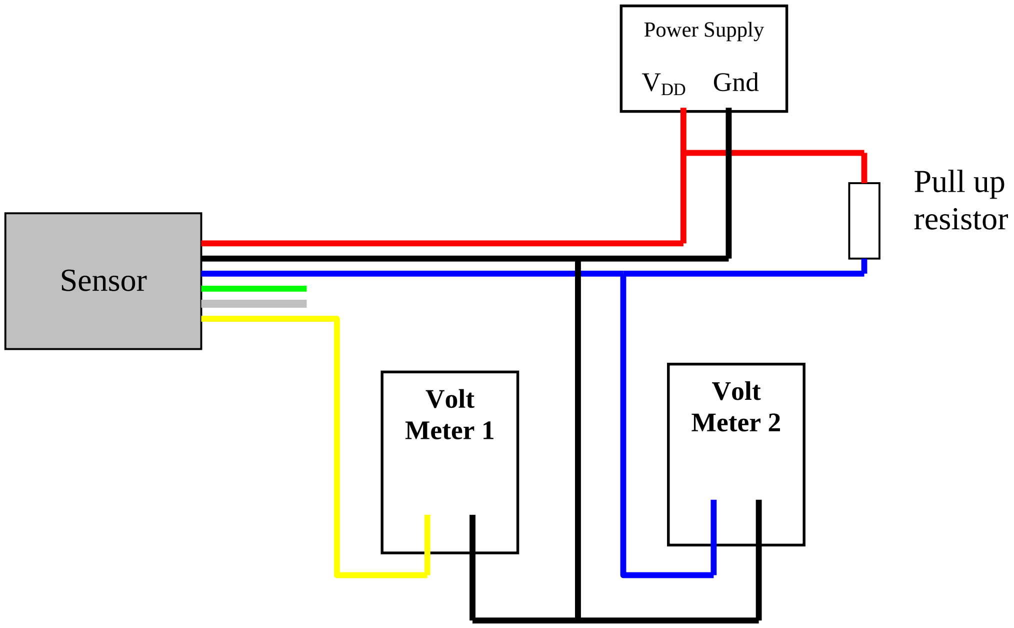
Sections 6 & 7 provide detailed information on setting up a Blade sensor. For simplicity, we have used the parameter numbers relevant to the 25mm Blade Sensor (firmware 2191 version 2.06 and above) throughout this document. For default, maximum and minimum parameter numbers of other types of sensors please refer to **Section 7.**

3. Analogue & Switch Output

The Blade sensor can be used in the same way as a traditional potentiometer, with an output that can be measured with a basic voltmeter. By following the simple procedure described bellow a feel for the operation of the blade sensor can be gained.

3.1. Connection

Connect the sensor as shown:



Positive DC supply (5V to 32V DC) – Typically 10mA

System & power ground (GND)

Switch output

Serial comms input (Sensor Rx); RS232 compatible

Serial comms output (Tx) – RS232 compatible

Analogue output: Voltage or PWM (Pulse Width Modulation)
Voltage – All sensors
PWM – 25mm Blade, 50mm linear Blade and 60mm Blade sensor.

3.2. Analogue Output

Move a standard activator or similar metal object such as large coin over the sensor (making sure the coin is very close or in contact with the surface of the sensor), a change in voltage on **voltmeter 1** will occur.

The sensor is supplied with a factory set of parameters most of which can be configured by the user. When an activator is present the analogue signal is limited between 10% and 90% of the full scale (0.00V to 4.20V). So the analogue output will vary between 0.42V and 3.78V for a standard activator.

The analogue output will default to a defined state if a sufficiently effective activator is not present. The default is 5% of full scale giving 0.21V analogue signal. This is a feature to replicate the behaviour of a contacting potentiometer if the wiper contact is lost; many systems are able to recognize this as an error condition.

For the factory settings of the other type of sensors please refer to **Section 7.**

3.3. Switch Output

The switch output provided is an independent output that can be set to operate at two points, it's factory set to change status at the centre of the sensor. The switch point is affected by ±0.2mm of hysteresis. Please see **Section 6.3.3 & 6.3.4** for information on how to change the switch point.

This output is an open collector drive and a pull up resistor is required for it to function. The current limit of the switch output for a 25mm Blade sensor is 8mA. To determine the minimum allowed resistor value for this component please refer to the equation below:

$$R > \frac{V_{DD}}{8mA}$$

Typical resistor value: 10kOhm for most applications

Move the activator from one end of sensing surface to the other. A change in voltage on **voltmeter 2** from 0V to VDD will indicate that the sensor is operating.

The switched output will default to a defined state if a sufficiently effective activator is not present. The default is *open switch* this means that the voltage on **voltmeter 2** will read V_{DD}.

Output Status	**Voltage on switch output**
Switch closed	0V
Switch open	V_{DD}

4. BladeCom Graphical User Interface

BladeCom is a GUI (Graphical User Interface) that allows the user to connect a Blade sensor to a personal computer so its settings can be adjusted to suit the users requirements.

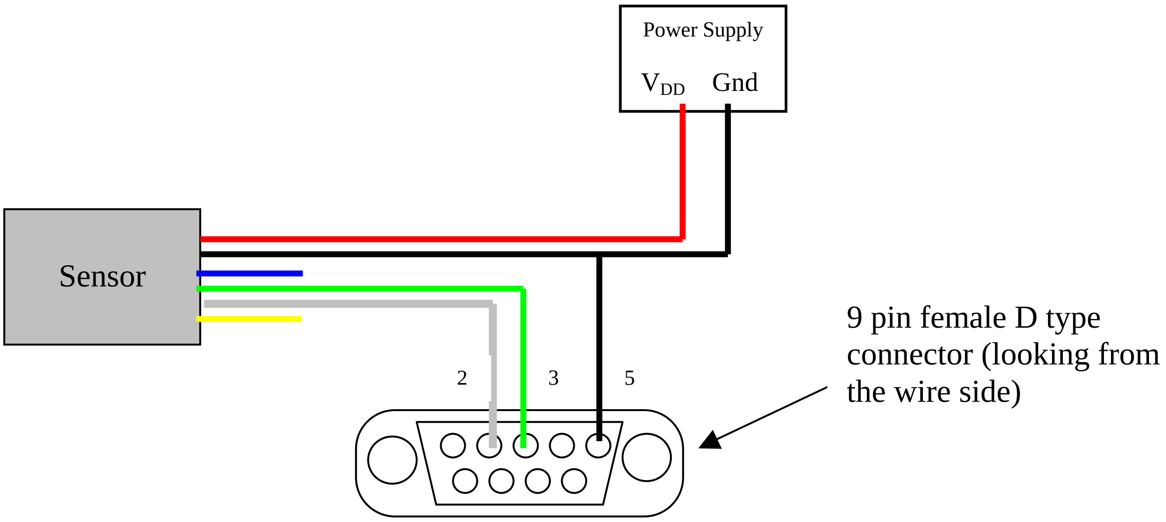
BladeCom is compatible with the 25mm Blade, 60mm Blade, 50mm Linear Blade and the 360^0 Rotary Blade sensor, it will automatically identify the type of sensor connected.

BladeCom GUI is designed to run with a minimum of Windows 95 on a 100MHz Pentium processor. A CD drive is required to run the installation software.

BladeCom software may also be installed online via our website www.gillsensors.co.uk.

4.1. Connection

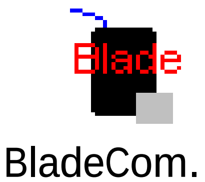
To communicate with the sensor using BladeCom software, connect the sensor as shown below.



Connect the D type connector to a serial communication port on the computer. For laptops with only USB connectivity an RS232-USB adaptor can be used. Apply power to the sensor.

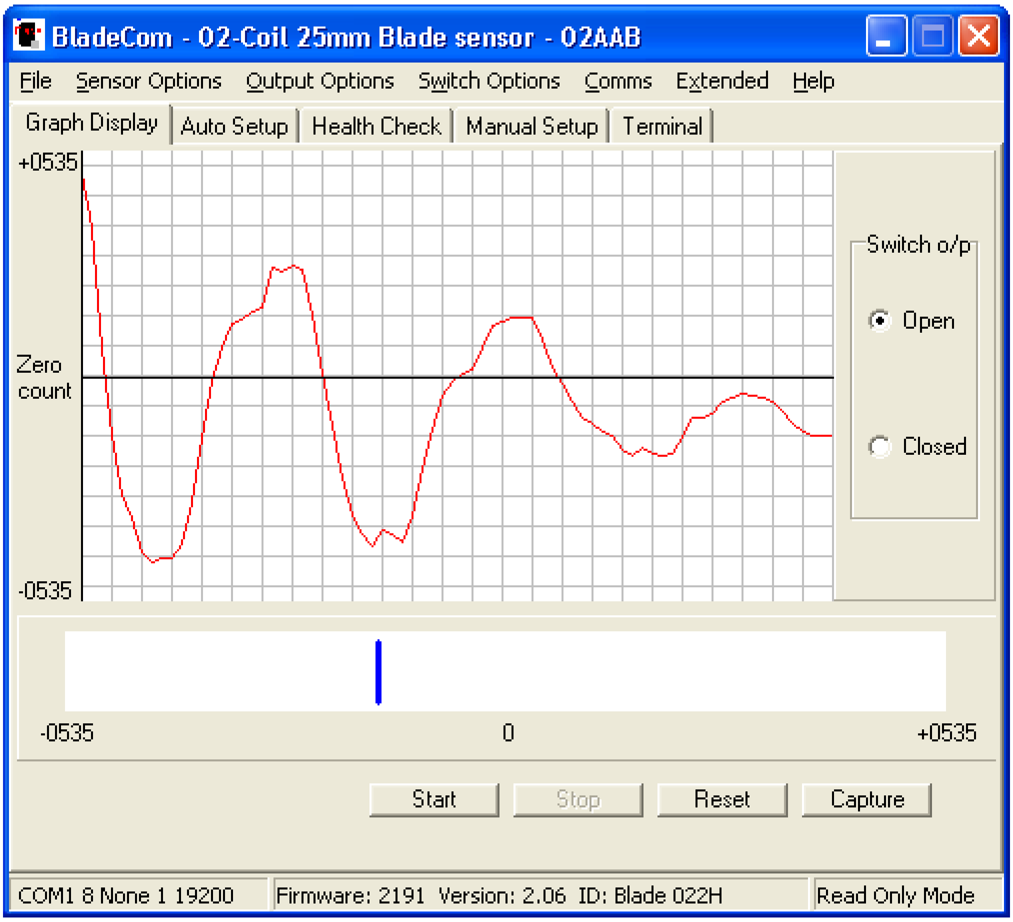
4.2. Install BladeCom GUI

Install the BladeCom GUI software using either a provided installation CD or download it online via our website www.gillsensors.co.uk. After installation an icon (shown below) will appear on the desktop, click this icon to run the application.



4.3. Graph Display

Once the software is loaded a window will appear as shown below.



Make sure the voltage supply to the sensor is within +5V to +32V DC and the serial communication wires are connected to the specified pins of the 9 way D type connector and click *Detect Sensor* on the *Sensor Options* menu to communicate with the sensor. If the software cannot communicate with the sensor or loses communication whilst running then an Error message will appear.

Click the *start* button to start a scrolling graph and a graphical representation of the activators position. When the graph reaches the end of the axis it will automatically scroll back the other way. Move a *standard* activator or similar metal object, such as a large coin, over the sensor to monitor its movement and position (ensuring that the coin is very close to or in contact with the sensors surface). The *Switch o/p* on the right hand side of the window indicates the status of the switched output of the sensor.

Please refer to **Section 6** to configure the sensor.

5. Activator Design Information

5.1. Standard Activator Design for 25mm& 60mm Blade sensors

For evaluation and testing purposes *Gill Sensors* recommend an activator is manufactured to the dimensions shown.

Referring to drawing 1457-G-009 in **Section 5.2**,

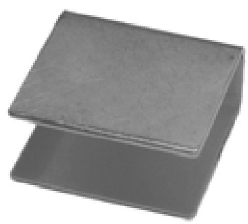
Start with a 1mm thick, 25mm wide, EN3B mild steel metal sheet and form it into a ‘U’ shaped channel nominally 10mm wide.

To obtain a linear response the activator should overlap the sensing edge of the Blade by 17mm in the central position.

The parts of the activator used for measurement are the two inside flat surfaces either side of the sensor. The rear of the ‘U’ channel is not significant, or anything else attached to or extending from the activator provided nothing else comes within 6mm of the sensing area.

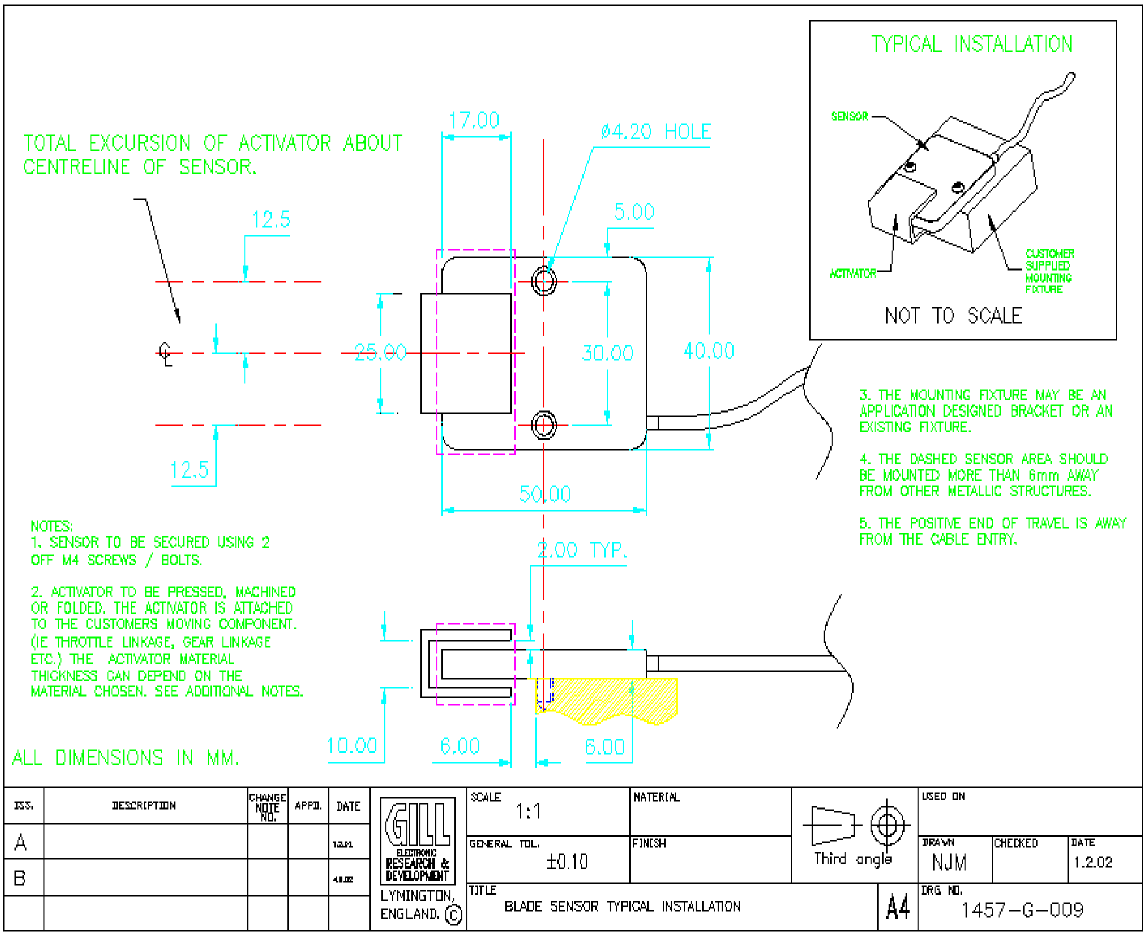
The sensor will work with a single sided activator but there will be greater sensitivity to side movement and sensor resolution will be affected.

It can be useful to adapt the shape to optimise sensor characteristics for some applications, please see the picture bellow. For special applications or custom activator designs please contact *Gill Sensors*.



Above are examples of two different types of activator design, the one on the right is the standard activator and on the left is a custom design for marine applications.

5.2. Typical Activator for 25mm & 60mm Blade Sensor



5.3. Standard Activator Design for other sensors

To view activator designs for other sensors in the Blade range please visit our web site www.gillsensors.co.uk.

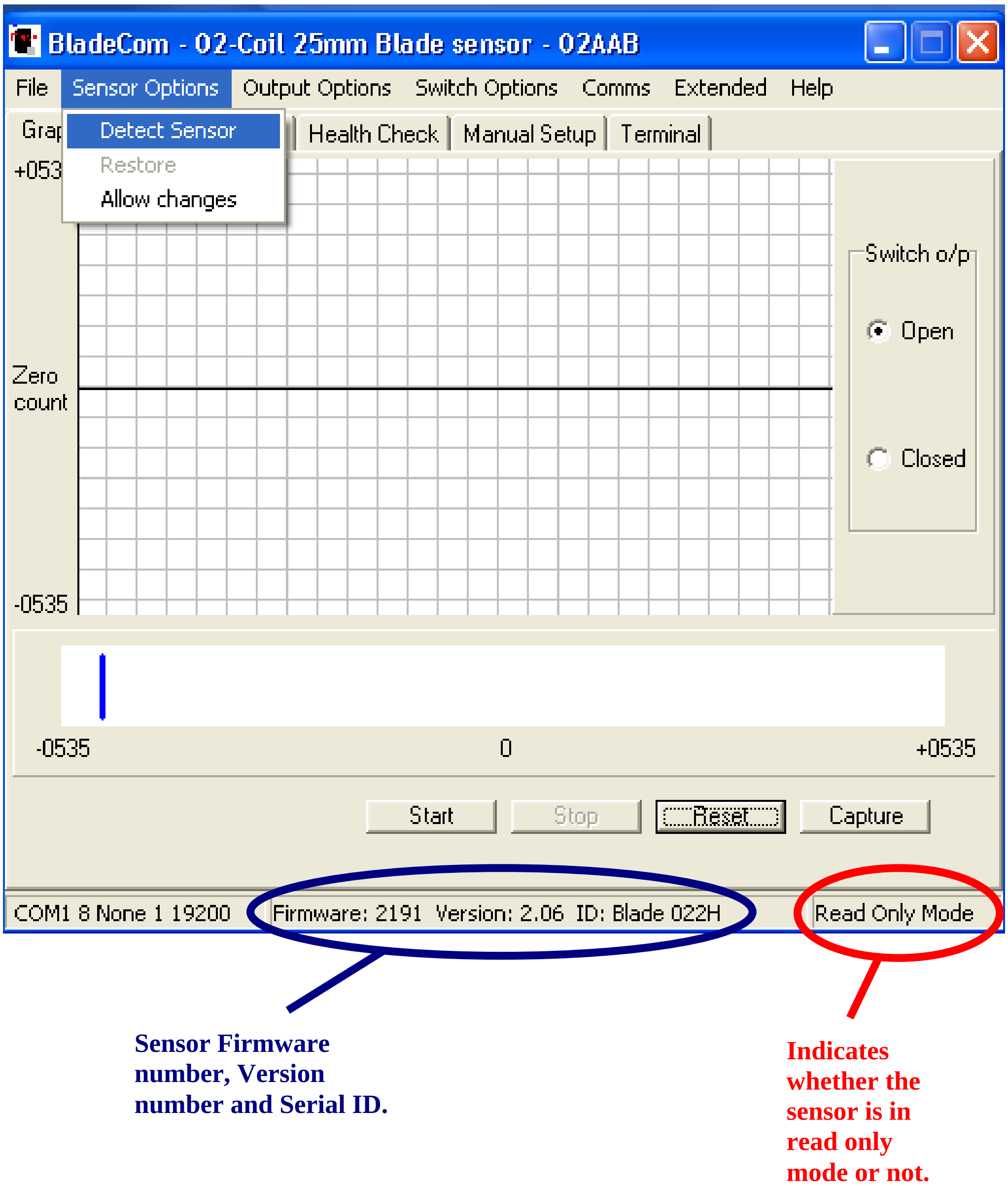
6. Configuring your Blade sensor using BladeCom GUI

In this section you will find information on how to configure your sensor using BladeCom. It is recommend that non-advanced users only read up to **Section 6.4**. Information after this point can be confusing if you are not familiar with the operation of the Blade sensor, as such its recommended that only advanced users read this information.

6.1. Sensor Write Protection

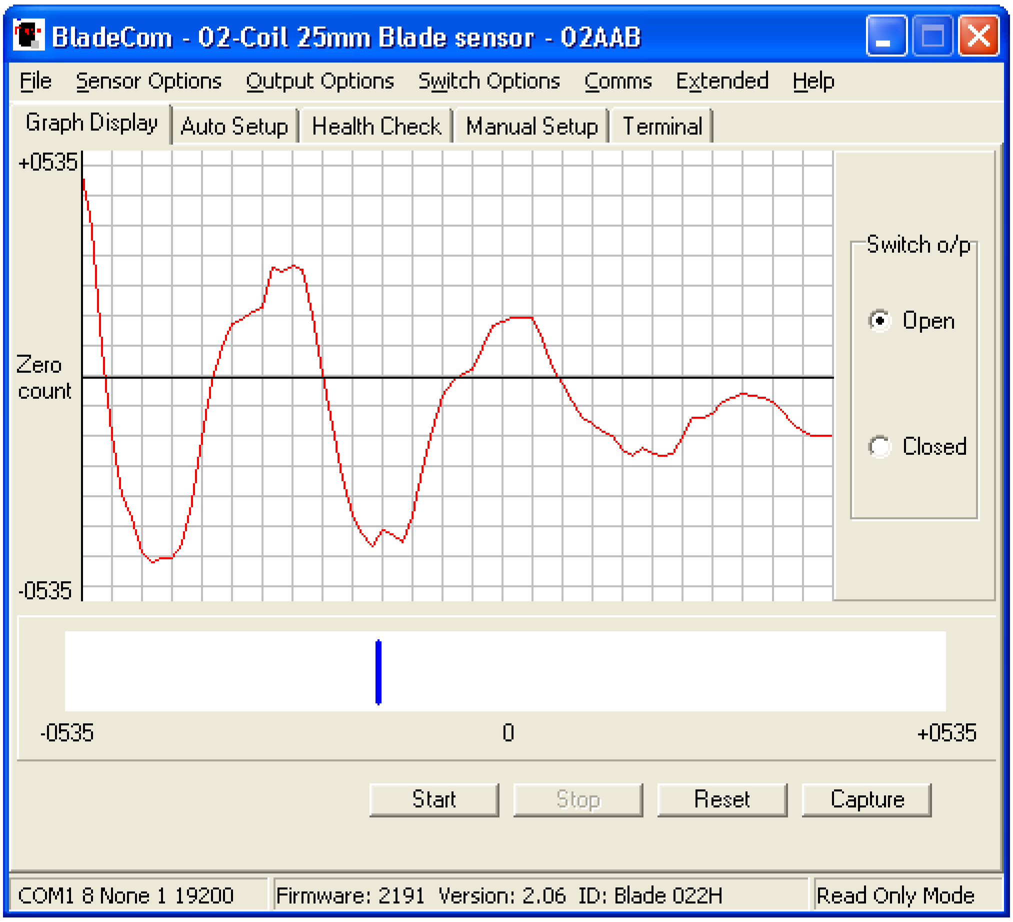
Important! - On initialisation the sensor parameters cannot be adjusted, the user can only monitor the sensor position in the *auto set up, terminal,* or *graph display*. This is to protect the sensor inadvertently being re-configured during testing.

Clicking on *Allow changes* on the *Sensor Options* menu will enable all user configurable functions in the software.



6.2. Graph Display

6.2.1. Graph Display (Linear Sensors)



6.2.1.1. Start

This button allows the user to start a scrolling graph and a graphical representation (blue bar) of the activators position. When the graph reaches the end of the axis, the graph will scroll left. **Note** that the graph Y-axis is auto scaling and will depend upon the range selected (see **Section 6.5.2** for more information about range). The current switch output state display is also enabled when the *start* button is clicked.

6.2.1.2. Stop

This button allows the user to stop the graph from scrolling.

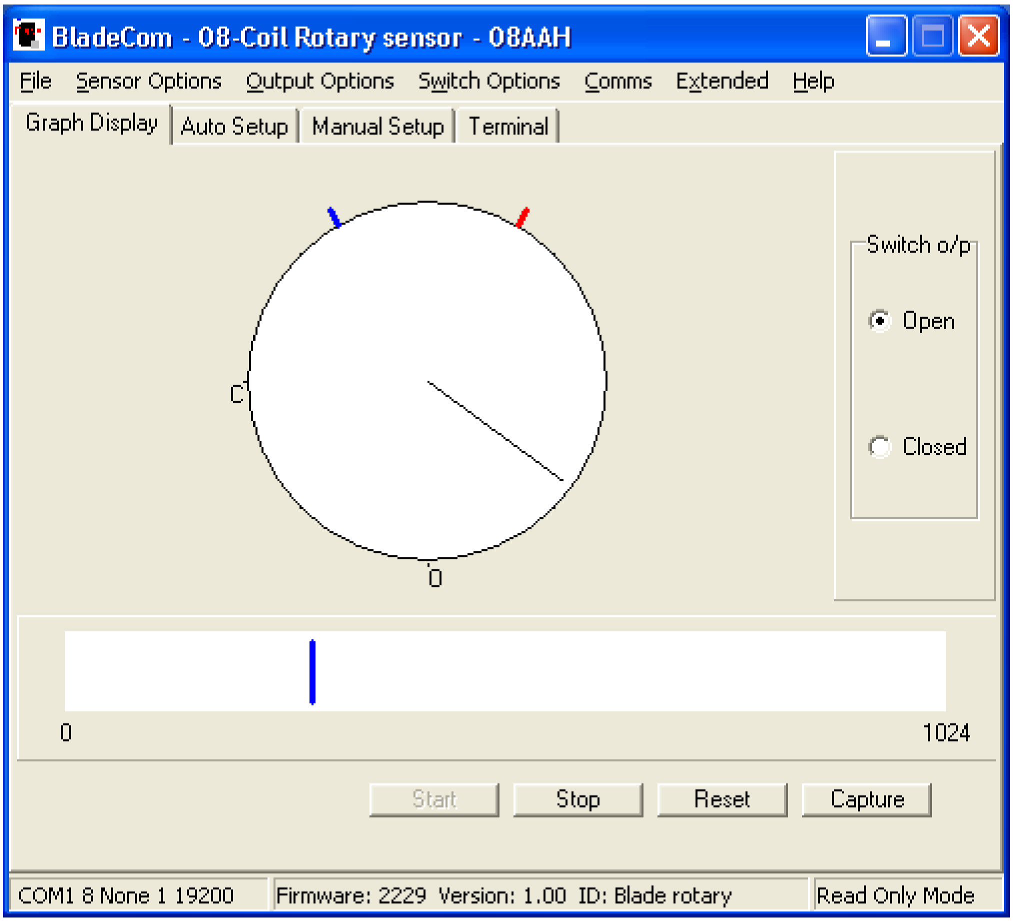
6.2.1.3. Reset

This button allows the user to clear the screen and reset the graph to the start of the axis.

6.2.1.4. Capture

This button allows the user to store the current screen to a bitmap file called ‘capture.BMP’. This will be stored in the root of the *My Documents* directory.

6.2.2. Graph Display (Rotary Sensors)



6.2.2.1. Start
This button allows the user to start a scrolling needle and a graphical representation (blue bar) of the activators position. When the needle rotates through 360^0 axis, the graph will scroll left. The button also starts monitoring the current switch output state.

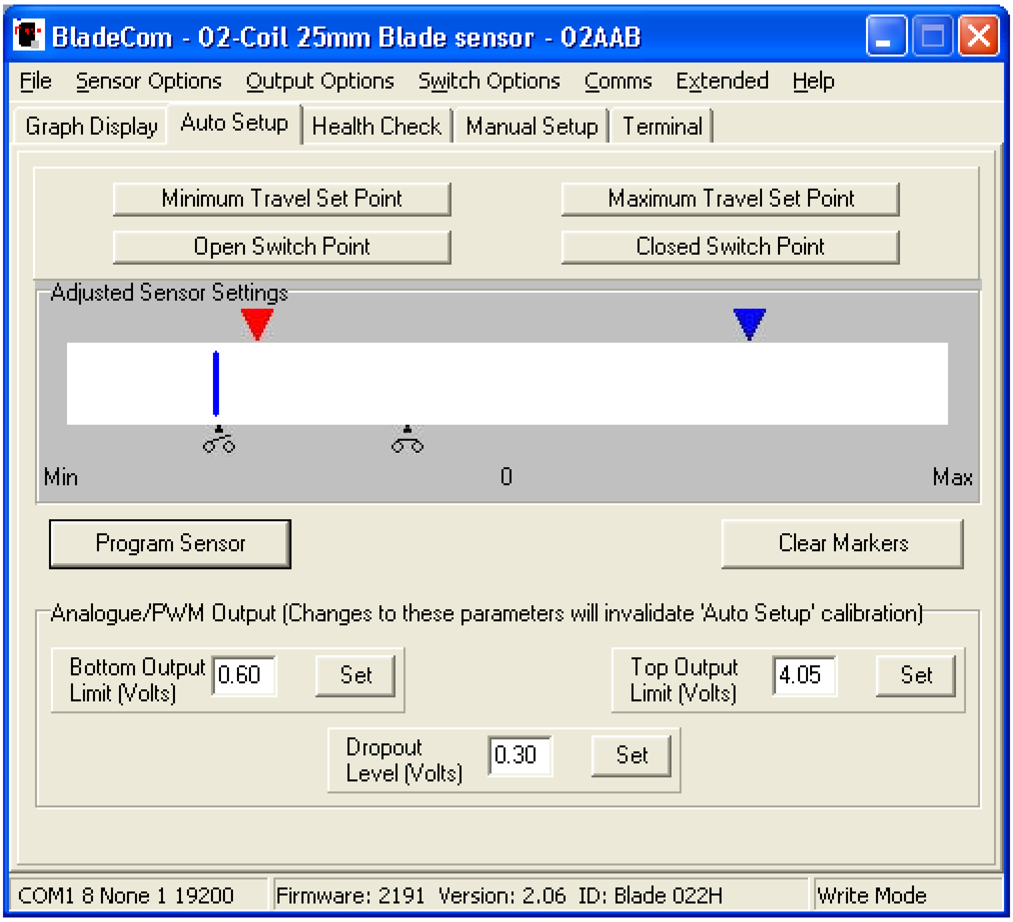
6.2.2.2. Stop
This button allows the user to stop the graph from scrolling.

6.2.2.3. Reset
This button allows the user to clear the screen and reset the graph to the start of the axis.

6.2.2.4. Capture
This button allows the user to store the current screen to a bitmap file called 'capture.BMP'. This will be stored in the root of the *My Documents* directory.

6.3. Auto Setup Screen (Linear and Rotary)

This screen provides easy means for setup of a Blade sensor. The user is asked for some simple information that is then used to setup the sensors analogue/PWM output for a particular application. The blue bar on this screen gives a moving indication of the current activator position. Please note that in order to set the maximum and minimum travel points the activator has to be physically moved to the desired position over the sensors surface. This *Auto Setup* process works in the same way for all the compatible Blade sensors, including the rotary sensor.



6.3.1. Minimum Travel Set Point

When this button is clicked a symbol (red triangle) will move to the current marker position (blue bar). This set point is used to mark the furthest point of travel required at one end of the activator movement.

6.3.2. Maximum Travel Set Point

When this button is clicked a symbol (blue triangle) will move to the current marker position (blue bar). This set point is used to mark the furthest point of travel required at the other end of the activator movement.

6.3.3. Open Switch Point

Setting this marker will set the point at which the switch turns off. Refer to previous sections regarding the switch output for further information on modes of operation. An *Open switch* symbol will be placed at the point where the blue indicator is currently positioned.

6.3.4. Closed Switch Point

Sets the point at which the switch closes from the open position. A *Closed switch* symbol will be placed at the point where the blue indicator is currently positioned.

6.3.5. Adjusted Sensor Settings (Display)

This is the graphical display that is used to setup the sensor. Triangular markers show the minimum and maximum range of travel required by the user. Placing the mouse cursor over these markers will cause a description of the particular marker to be shown. The switch markers with direction indicators show the switching points.

6.3.6. Program Sensor

This button is disabled by default. Clicking this button will result in the current setup parameters displayed on the graphical display being programmed into the sensor.

6.3.7. Clear Markers

Removes current set point and switch point marker symbols.

6.3.8. Bottom Output Limit

This is the voltage or percentage that the analogue/PWM output of the sensor will read when it is at the minimum set point.

6.3.9. Top Output Limit

This is the voltage or percentage that the analogue/PWM output of the sensor will read when it is at the maximum set point.

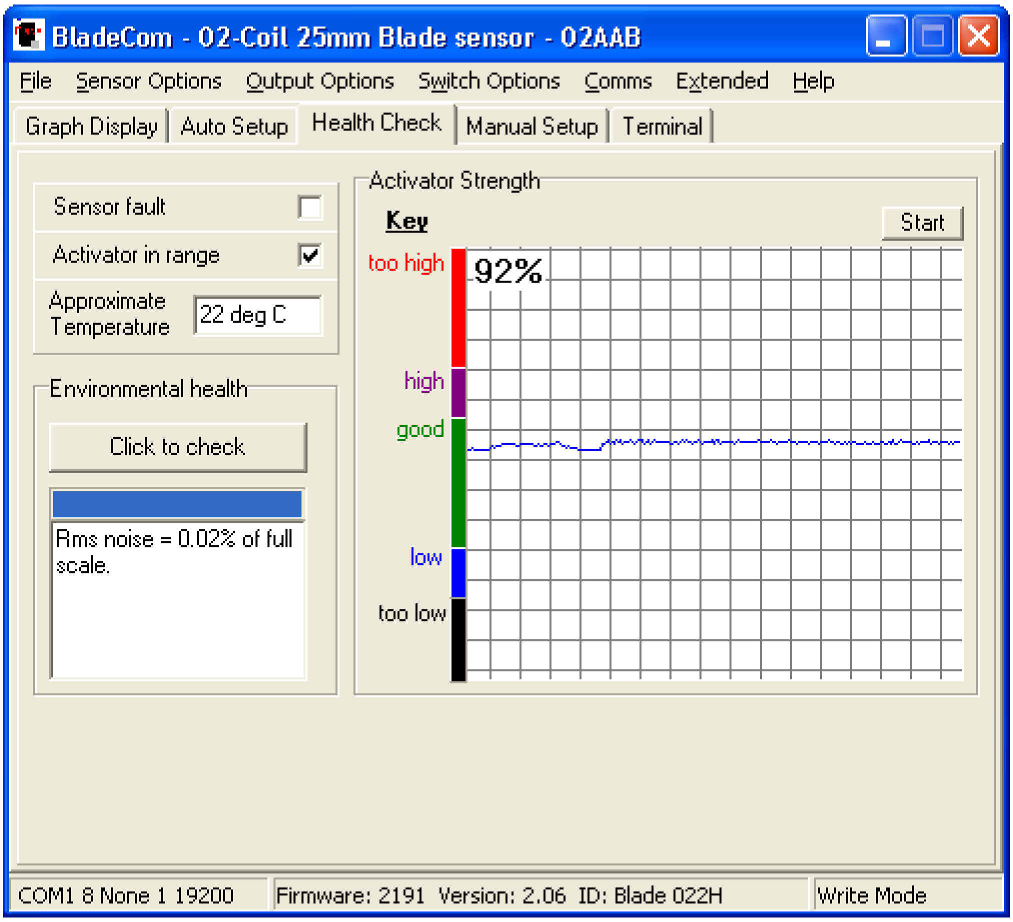
6.3.10. Dropout Level

This is the level, which the sensors output will default to if a sufficiently effective activator is not present.

For a more detailed explanation of the output limits and dropout level please refer to **Section 6.5.4 to 6.5.6.**

The output of the linear and rotary Blade sensors described in this manual will vary linearly between the top and bottom output limit.

6.4. Health Check Screen



6.4.1. Sensor fault
A Tick in this box indicates that the sensor may have developed a fault. The box may also be ticked if the sensor is being saturated, this may be due to incorrect activator positioning, size and/or material is present.

6.4.2. Activator in range
A Tick in this box indicates that the activator is within the defined range.

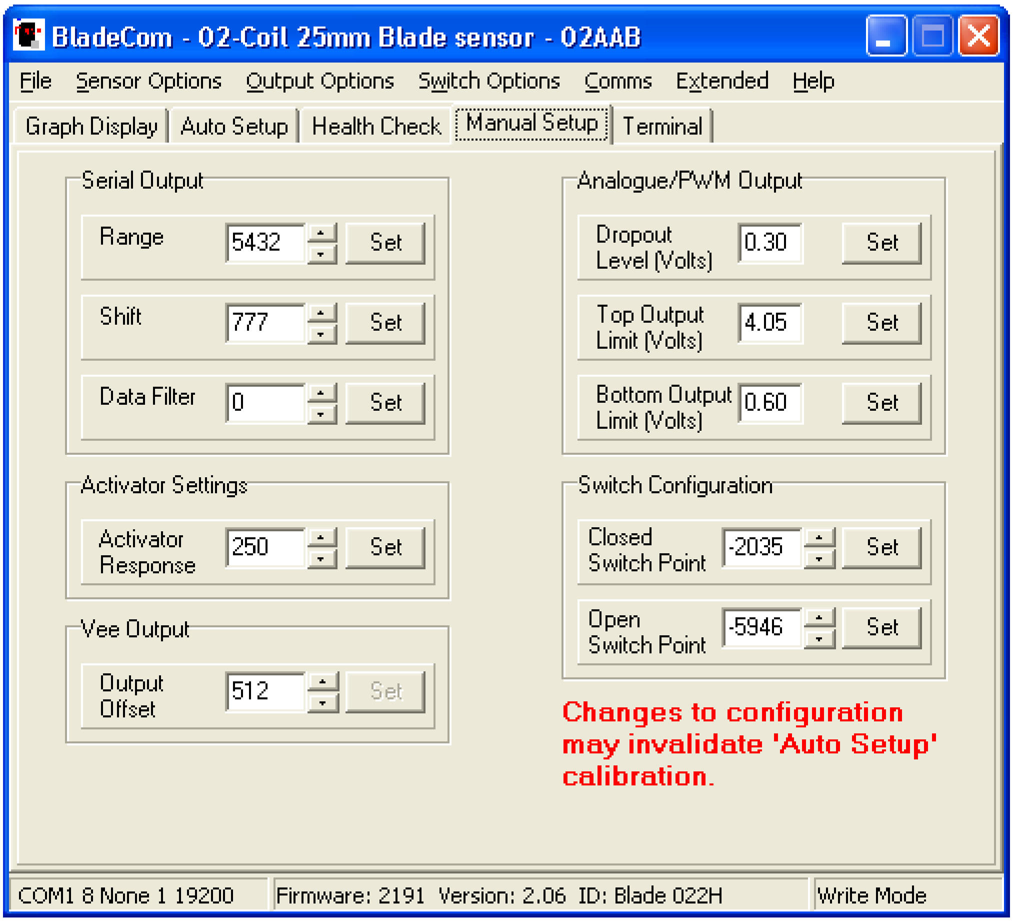
6.4.3. Approximate temperature
Shows the approximate current sensor temperature, this is a guide only.

6.4.4. Environmental health
If the user click's the *Click to check* button a process will begin to calculate how much electrical noise is present in the sensors local environment. This process takes a few seconds and gives a result as a percentage of the full-scale sensor output as shown above. This value can aid determination of sensor performance under certain environments. This value should not be greater than 0.1% for best results.

6.4.5. Activator strength
The plotted line should be in the 'green' region although the line may be slightly higher or lower for certain materials. The percentage indication in the top left-hand corner gives an indication of the current material response in relation to the optimum sensor response, please

note that this is only a guide. The *Pause* button halts the moving graph; it can be resumed by another click of the same button.

6.5. Manual Setup Screen



This screen provides an alternative means of setting up the sensor. It allows the user to configure all the basic parameters defining the output range, scaling and filtering as well as defining the analogue output limits.

The user can adjust both the centre position and scale of the output by changing the Shift and Range parameters. The Analogue and PWM outputs are directly proportional to count values. For a 25mm Blade Sensor the counts are between –512 and +511 e.g. –512 counts is 0 volts or 0% PWM, 0 counts is 2.1volts or 50% PWM.

Note: If the *Auto Setup* feature has been used to setup the sensor then values on this screen should not be altered. Any alteration may invalidate the *Auto Setup* calculations.

6.5.1. Serial Output – Shift

The *Shift* value allows the user to place zero count position along any part of the sensor over its movement range so that the user can do an in-situ calibration without mechanical adjustment. The default value for shift is 0 corresponding approximately to the mechanical centre of the sensor.

For the 25mm Blade sensor a *Shift* of +625 counts gives approximately -1mm of offset and is independent of range setting. Maximum values are ±8192 which allows an offset over the full

±12.5mm of travel. Note that the maximum available travel is reduced as more *Shift* is applied.

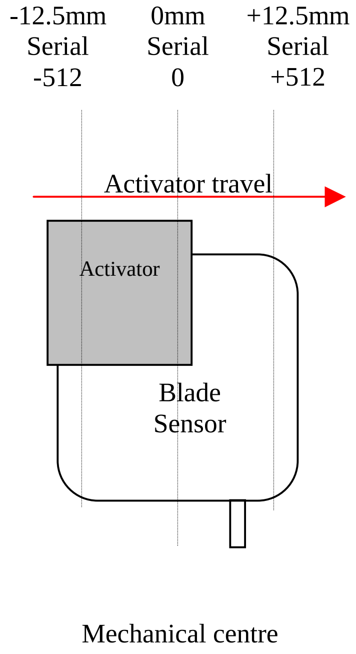
6.5.2. Serial Output - Range

The output count can be scaled from the zero point using the range parameter. Adjusting range will increase or decrease the count value for any given activator position.

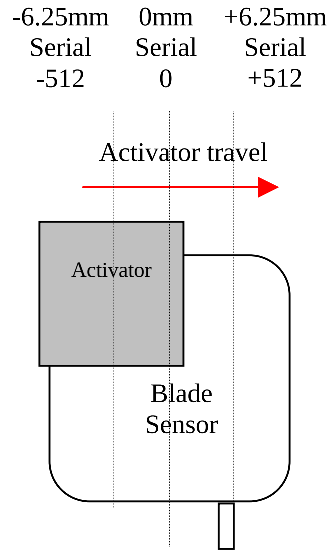
For the 25mm Blade sensor (firmware 2191 version 2.06 and above) the default Range value is 4800. This parameter can be adjusted from 200 to 32767. A value of 200 gives approximately 2 counts per mm of travel and 4800 gives 41 counts per mm or ±512 counts over ±12.5mm travel.

Below are examples of how shift and range work together for 25mm Blade sensor (Output reverse set to OFF).

Shift = 0; Range = 4800

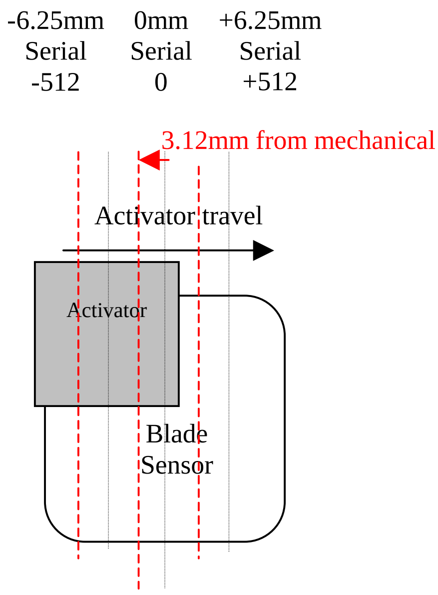


Shift = 0; Range = 9600



Mechanical Centre

Shift = 2000; Range=9600



6.5.3. Serial Output - Data Filter

The *Data Filter* setting stabilises the output value by making each reading the average of several consecutive samples with the output data rate maintained at 1kHz. The Data filter has 4 levels as detailed below:

0- No averaging
1- 4 sample average
2- 8 sample average
3- 16 sample average

6.5.4. Activator Settings – Activator Response

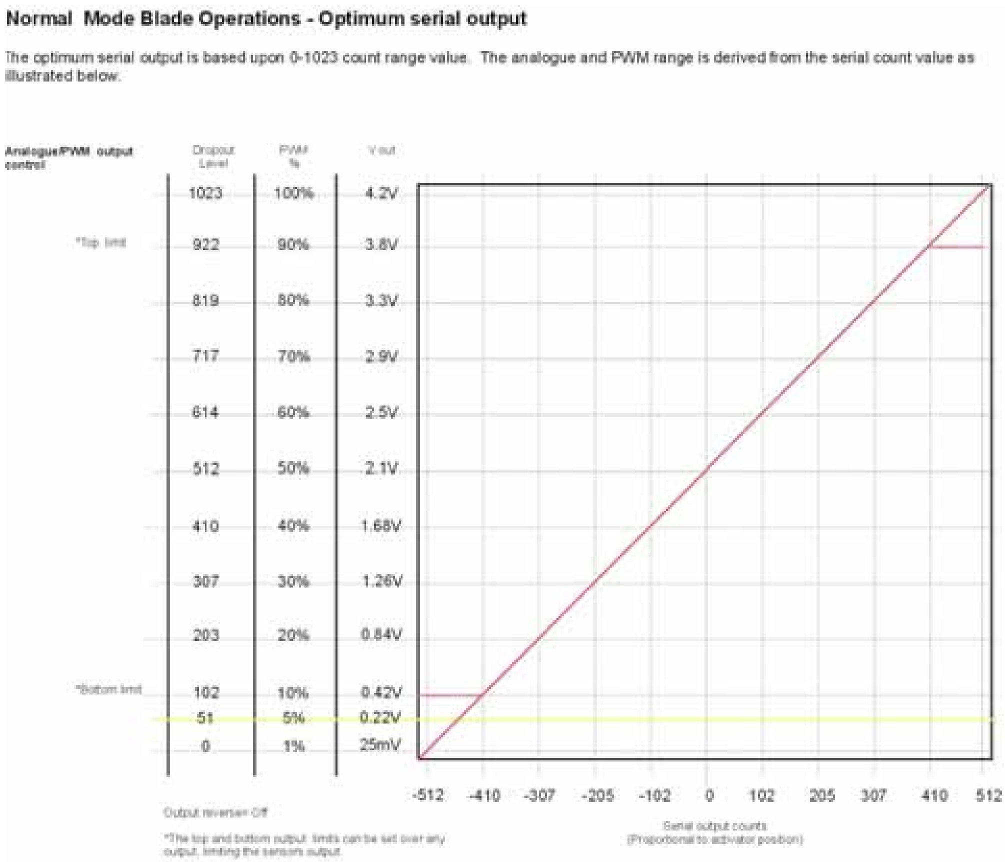
The *Activator Response* is a measure of signal strength received back from the activator by the sensor. This value will reduce as the activator travels away from the centre of the sensor and will also be affected by different activator materials and designs. The response setting is the minimum value that is considered adequate for full sensor performance. When the *Activator Response* drops below this limit, the serial output data is set to zero counts and the Analogue/PWM output modes will go to their pre-defined Dropout state.

6.5.5. Vee Output – Output Offset

The *Vee* output offset will only be enabled if the *Vee* mode is activated. See 'General Options – Output format' for full details on *Vee* mode operation.

6.5.6. Analogue/PWM Output

The graph below shows the relationship between serial count values and analogue/PWM output values.



6.5.7. Switch Configuration – Closed/Open switch points

The defaults for the Closed and Open switch points are 128 and –128 respectively. For the 25mm Blade sensor these values set the switching point around the centre of the sensor with ±0.2mm hysteresis.

6.5.8. Dropout level

If there is a complete loss of activator or the activator response falls below the Activator threshold, the analogue output will revert to the analogue/PWM dropout level. The default serial output for the 25mm Blade sensor is 51 which equates to 0.21V or 5% PWM but can be set to any between 0 and 1023 (0V and 4.20V). This spans the full analogue and PWM output range with 512 giving a midrange value (2.1 volts / 50% PWM).

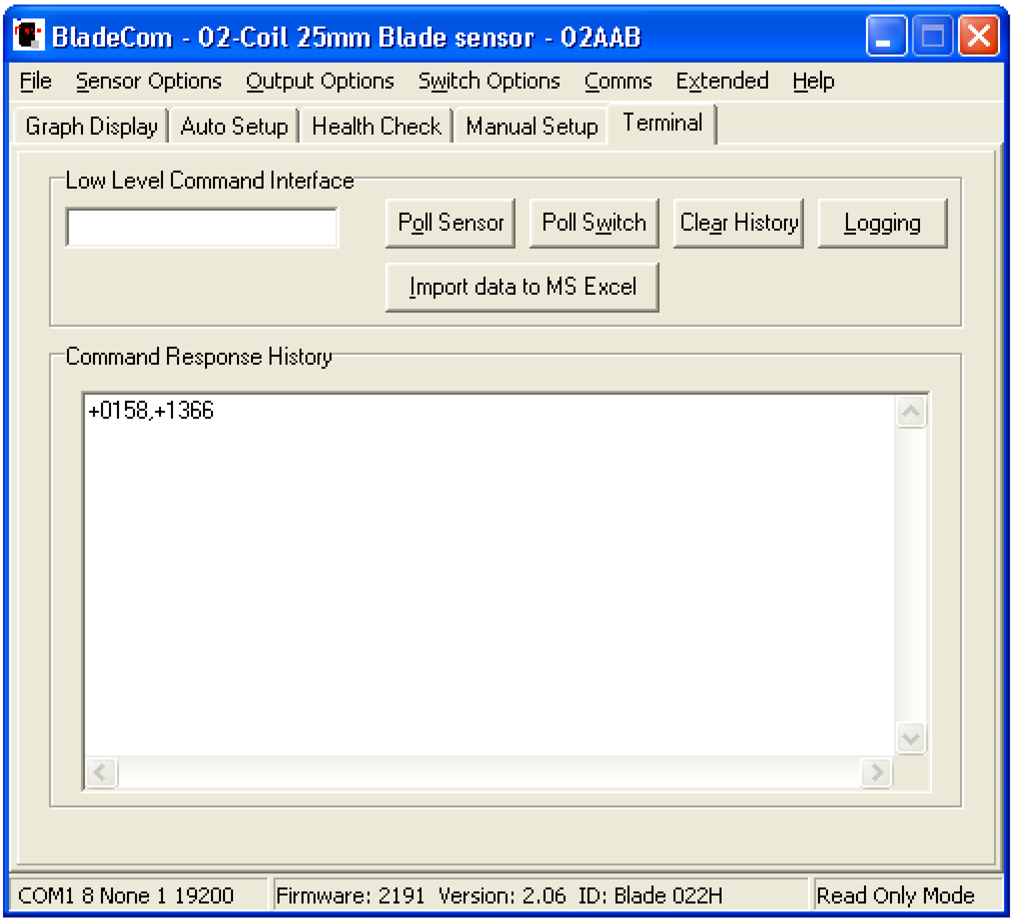
6.5.9. Top output limit

The analogue/PWM *Top Output* limit is the maximum value reported as the activator approaches its upper limit of travel. The default serial output for the 25mm Blade sensor is 921 which equates to 3.78V or 90% PWM but can be set to any between the *Bottom Output* limit (see below) and 1023 (4.20V). Once the output reaches the *Top Output* limit, the analogue/PWM value will be maintained until the *Dropout Level* condition.

6.5.10. Bottom output limit

The analogue/PWM *Bottom Output* limit is the minimum value reported as the activator approaches its lower limit of travel. The default serial output for the 25mm Blade sensor is 102 which equates to 0.42V or 10%PWM but can be set to any between (0.00V) and *Top Output* limit. Once the output reaches the bottom limit value, the analogue/PWM value will be maintained until the *Dropout level* condition.

6.6. Terminal Screen



6.6.1. Poll Sensor
This button allows the user to manually poll the sensor and obtain a position and activator response reading. See serial communications and activator design sections above for more information regarding the data returned.

6.6.2. Poll Switch
This button allows the user to manually poll the sensor and obtain a switch position reading. This reading is can then be used to set the parameters in the *Switch Configuration* screen switch positions.

6.6.3. Clear History
This button allows the user to clear all data within the log history buffer. The user is asked to confirm this command before the data is removed.

6.6.4. Logging

This button allows the user to log all data from within the terminal window. When selected the user is asked for a directory and file name for the data. All data then presented in the terminal window is stored in a simple text file format with date and file information. When the stop log button is pressed, the data is then stored to disk.

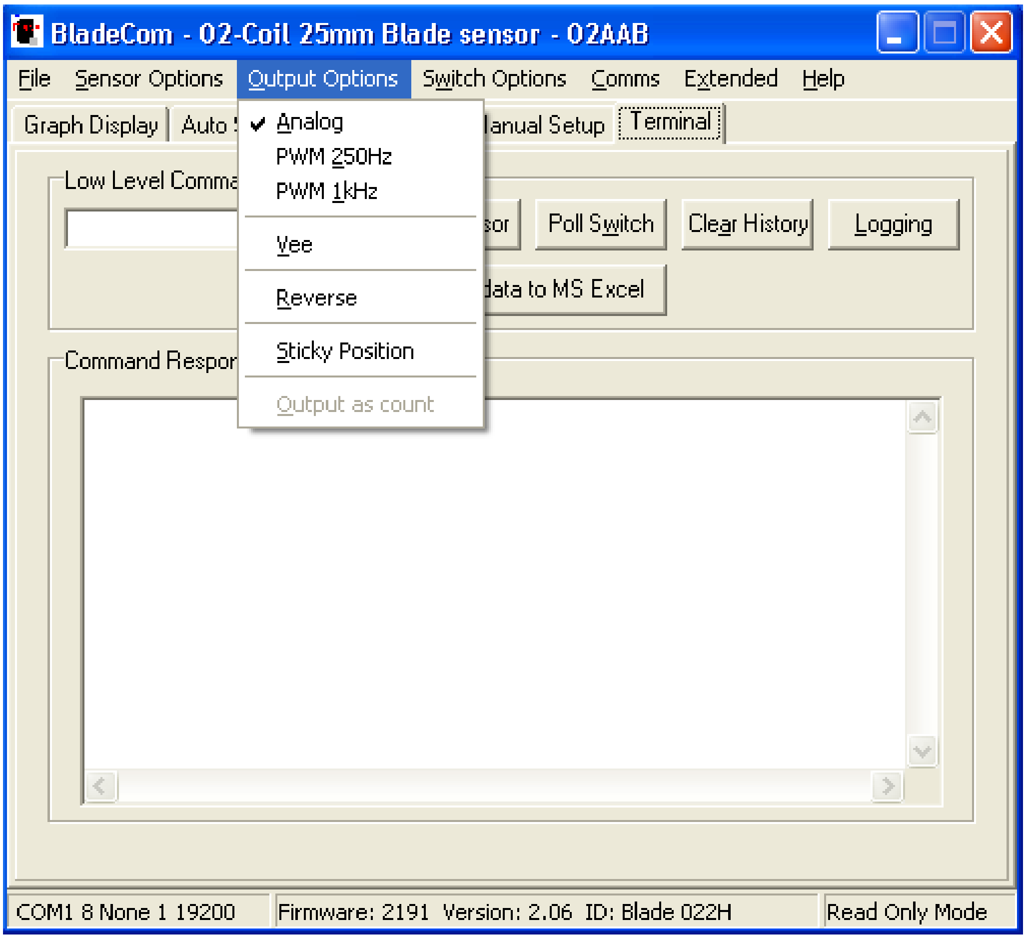
6.6.5. Low level command Interface

This line allows low-level communication direct with the sensor and has the same functionality as using the sensor with a terminal emulator. Contact Gill Sensors for a full set of low-level interface commands.

6.6.6. Import data to MS Excel

Any data that appears in the *Command Response History* may be transferred to Microsoft Excel. The data is transferred in a CSV (Comma-Separated Variable) format so that column<n> will contain a specific data type from the sensor provided the user has sent only one request type (for example *Poll Sensor*) to the sensor. Use the *Clear History* button to remove any old data from the *Command Response History* prior to requesting data from the sensor.

6.7. Output Options



6.7.1. Analogue Output mode

The Blade sensor provides an analogue output as described in **Section 3.2**. The maximum analogue voltage output for the 25mm Blade sensor is 4.2V (4.6V for all other sensor types). Clicking *Analogue* on the *Output options* drop down menu will select the analogue output mode.

6.7.2. PWM Output mode

All the Blade sensors provide a 1kHz PWM output. PWM is a way of representing the activator position using a switched logic level with a fixed frequency, either 250Hz or 1kHz for 25mm Blade and 1kHz for all other sensor types. It has a variable duty cycle i.e. the proportion of each cycle for which the output is high and is expressed as a percentage. The duty cycle can vary anywhere in between 0% and 100% depending on the sensor setting.

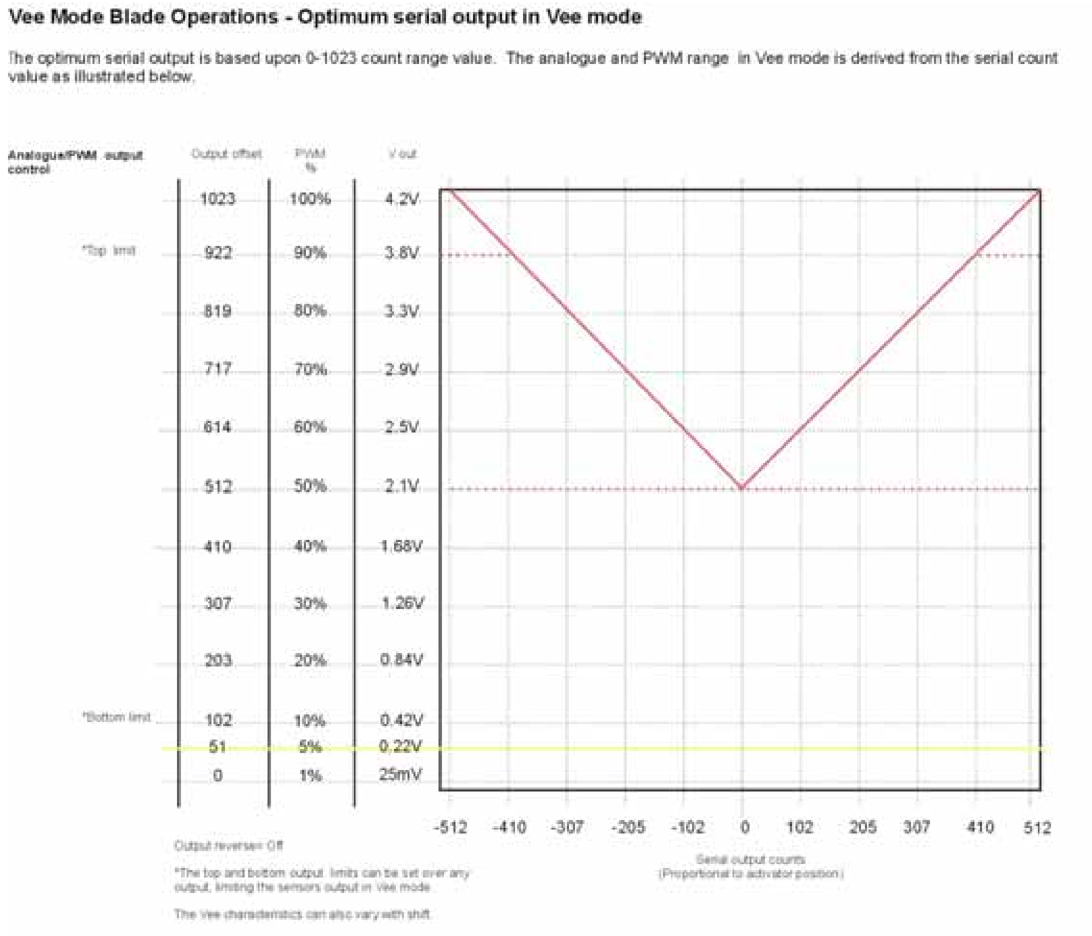
6.7.3. Output Format (Normal or Vee mode)

There are two output formats - Normal or *Vee* mode with the default output format set to Normal mode. Clicking *Vee* on output options drop down menu will select the *Vee* mode. In normal mode analogue or PWM output increases linearly as the activator is moved from one end of the sensor to the other. The *Vee* mode allows the measurement of the magnitude of travel either side of the zero position set using the Shift parameters. With output reverse set to off, the output voltage or duty cycle is at a minimum when at the zero point and will increase with activator movement in either direction. The graph below of output against travel shows this *Vee* shape.

The *Vee* output offset parameter sets the minimum output at the point of the *Vee*. A range of values from 0 to 1023 spans the entire output ranges of the sensor as per the top and bottom analogue limits. If the minimum value is set below the bottom limit then the point of the *Vee* is truncated giving an adjustable dead-band where the output does not vary. Increasing the range parameter can then give full-scale analogue output at the ends of travel.

If the switch point is set to coincide with the point of the *Vee* then this output can be used to signal the direction of travel e.g. power boat throttle control lever

Note the serial output counts are not affected by the *Vee* mode or *Vee* output shift parameters.



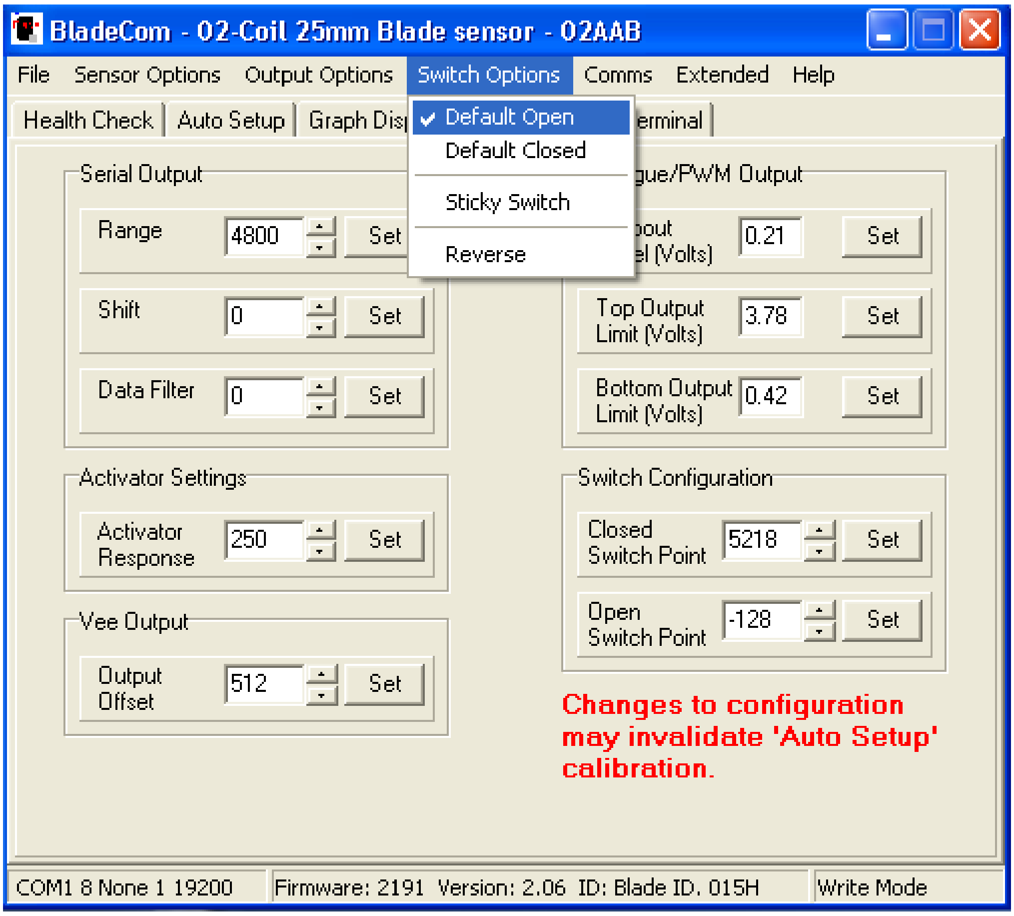
6.7.4. Reverse

Output reverse operates in the analogue/PWM output mode. It will reverse the output voltage/PWM value with respect to the position of the activator. The output reverse default is set to OFF which relates to minimum serial counts, voltage and PWM being near to the cable exit side. In Vee mode the point of the Vee will be high when the output reverse is on.

6.7.5. Sticky position

Sticky position operates in analogue/PWM output mode. Sticky position is a feature that retains the last valid position measured prior to the activator response falling to below the minimum activator response level. The analogue/PWM sticky position default is set to disabled. This function allows the user to measure a portion of the total travel of the activator e.g. the end of travel of a door. When enabled, the sensor will retain the last valid reading on the output as the activator travels off the sensor. When the activator returns to the sensor, the reading will continue to read from that position. Note that the output reading will revert to the Analogue/PWM drop-out level if the power is removed from the sensor.

6.8. Switch Options



6.8.1. Switch default

This is the state that the switch will default to when to the activator response falls below the minimum activator response level. Switch default can be set to either open or close.

6.8.2. Sticky switch

Sticky switch is a feature that retains the last valid switch state prior to the activator response falling to below the minimum activator response level. The default setting is disabled. When enabled, the sensor will retain the last valid switch state as the activator travels off the sensor. When the activator returns to the sensor, the sensor will maintain that switch state until the next switch point is reached. Note that the switch output will revert to open state if the power is removed from the sensor.

6.8.3. Switch reversal

The switch reverse feature, inverts the switch configuration. It allows the user to select at which end of the sensor the switch level is closed.

6.9. Comms

Clicking *Setup* on the *Comms menu* will enable the user to use any comms port from 1 to 5.

6.10. Batch processing

Clicking *Program* on the *Extended menu* will record all the current sensor settings and will allow them to be programmed into other sensors by pressing the Program current settings button.

7. Default Sensor Parameters

The maximum, minimum and default numbers for the Blade sensors are given below:

Parameters		25mm Blade Up to Version 2191204	25mm Blade Above version 2191204	50mm Linear Blade	60mm Blade		360 deg Rotary
Range	Default	4300	4800	10500	9800	Default angle	360
	Counts/mm	41	41	20.5	17		
	Max	32767	32767	32767	32767	Max angle	360
Shift	Default	0	0	0	0	Default angle	0
	Max	8192	8192	8192	8192	Max angle	360
	Min	-8192	-8192	-8192	-8192	Min angle	0
Data Filter	Default	0	0	0	0		0
	Max	3- 16 sample average	3- 16 sample average	3- 16 sample average	3- 16 sample average		3- 16 sample average
	Min	0- No average	0- No average	0- No average	0- No average		0- No average
Activator Response	Default	250	250	250	250		250
	Max	8191	8191	8191	8191		8191
	Min	0	0	0	0		0
Vee Output	Default	512	512	512	512		0
	Max	8192	8192	8192	8192		8192
	Min	0	0	0	0		0
Dropout Level (Volts)	Default	0.21	0.21	0.23	0.23		0.23
	Max	4.2	4.2	4.6	4.6		4.6
	Min	0	0	0	0		0
Top Output Level (V)	Default	3.79	3.79	4.14	4.14		4.14
	Max	4.2	4.2	4.6	4.6		4.6
	Min	0	0	0	0		0
Bottom Output Level (V)	Default	0.42	0.42	0.46	0.46		0.46
	Max	4.2	4.2	4.6	4.6		4.6
	Min	0	0	0	0		0
Closed Switch Point	Default	128	128	128	128	Default angle	200
	Max	8191	8191	8191	8191	Max angle	360
	Min	-8191	-8191	-8191	-8191	Min angle	0
Open Switch Point	Default	-128	-128	-128	-128	Default angle	160
	Max	8191	8191	8191	8191	Max angle	360
	Min	-8191	-8191	-8191	-8191	Min angle	0

8. Technical Specification

8.1. Power Supply and Protection

Recommended Operating voltage range	5V to 32V DC
Maximum analogue voltage output	4.2V - 25mm Blade Sensor 4.6V - All other types
PWM output frequency	250Hz or 1kHz - 25mm Blade sensor 1kHz - All other types
Switch output current limit	8mA - 25mm Blade sensor 4mA - All other types
Measuring cycle	1ms
Absolute maximum supply voltage	Tested to withstand 35V for 1 hour.
Reversed power supply voltage	Tested to withstand a reversed power supply voltage of 35V for 1 hour.
Resistance to random connection.	Tested to withstand inputs and outputs short circuit towards ground for 30 minutes.
Immunity to electrostatic charge	Tested at 15kV applied with a capacitance of 150pF and a resistor of 330ohm.
Immunity to electromagnetic disturbances	Tested in an electromagnetic field of 100V/m within the frequency range of 14kHz to 1GHz.
Pulse energy absorption	1.7J

8.2. Serial Communication

The serial communication facility of the sensor is used for setting up a new application and analysing activator performance. A logic-level (4.2V or 4.6V depending on the sensor type) output is available but this is found to work directly with most PC or laptop communication ports at short range. For laptops with only USB connectivity an RS232-USB adaptor can be supplied.

The user can also access basic position and activator serial data via a terminal emulator program e.g. *Terminal* application that is supplied with Win95. Connect the sensor to the PC communications port and configure the terminal settings as follows:

Sensor WHITE	9 way D-type pin 2
Sensor GREEN	9 way D-type pin 3
Sensor BLACK	9 way D-type pin 5

Baud rate:	19200
Flow control:	None
Data bits:	8
Stop bits:	1
Parity:	None

Place the cursor inside the terminal window, send a Carriage Return (<CR>) to the sensor. The sensor should now get a response of two number groups. Check and adjust settings if not.

If the terminal emulator program is set up to record data to a file, this file can be imported by a spreadsheet as ‘CSV’ data, and sensor response graphed and changes compared.
The sensor remains operational during serial communications, but slows during transmission.

Each time a <CR> is sent, the sensor will return 2 decimal values. If the activator has not moved between requests then these values will remain constant.

Example sensor output without activator: +0000, +0004

Example sensor output with an activator: +0234, +1020

The data sets are always in the following order:

First set: Signed position data, where zero is the central position.

Second set: Activator response signal. This is a vital parameter for determining whether an intended activator design will work properly. It is displayed as a signed number but only positive numbers are meaningful. With no activator present the number will register a small positive or zero value.

Place a large coin or similar metal object on the sensor to activate it. Observe the effect on position and activator response by sliding the coin and polling the sensor with <CR>'s. The position reading will stay at zero unless the activator response reading exceeds 250 (the default setting).

[To obtain a copy of the developer's guide on the 25mm Blade sensor please contact Gill Sensors]

8.3. Multiple Sensors

CAUTION keep individual Blade sensors 100mm clear of each other as they are sensitive to each other's operation and will exhibit output jitter.

Sensors can be placed in close proximity with the use of Aluminium screen plates between sensors. If you have an application for multiple sensors in close proximity please contact Gill for more details on screening methods and the various multi-channel format sensors that are becoming available.