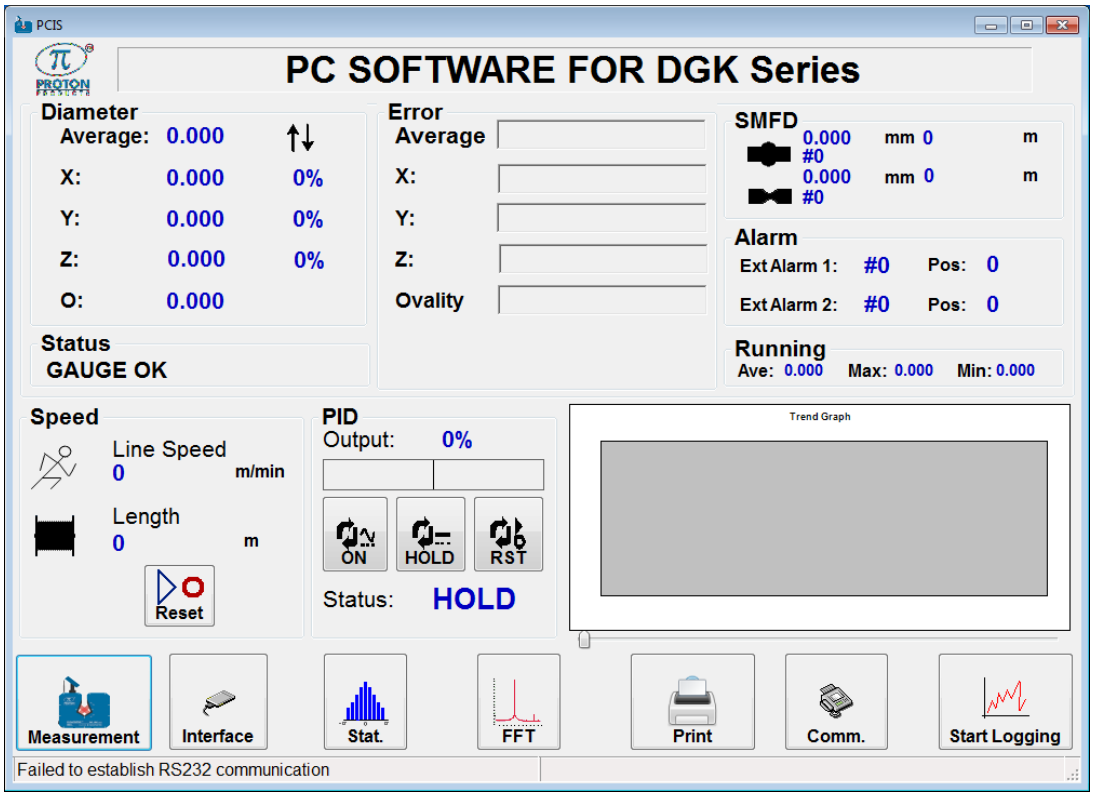
Instruction Manual

PCIS_DGK

PC Software for CCD Diameter Gauges

DG2015-5/10k
DG2030-5/10k
DG3030-5/10k
DG2060-5/10k
DG3060-5/10k



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INTRODUCTION

The Proton Products PCIS_DGK PC software is designed for use with Proton Products DG2015/2030/2060/3030/3060-5/10k CCD based diameter gauges.

The PCIS_DGK software provides an intuitive graphical user interface (GUI) for:

1. Configuring gauge operation (operating mode, presets, upper / lower tolerances, optional PI feedback control and SMFD thresholds).
2. Configuring gauge communications interfaces (standard CAN-bus, RS-232, RS-422 / 485 and Ethernet interfaces, and optional PROFIBUS, DeviceNet and EtherNet / IP interfaces).
3. Configuring gauge electrical interfaces (standard logic inputs, relay outputs and speed pulse input and optional analogue speed input, analogue outputs and PI feedback I/O).
4. Display of gauge status and measurements (diameters and errors, line speed, optional PI feedback control and SMFD data).
5. Graphing of gauge measurements.
6. Performing statistical analysis of gauge measurements.
7. Logging gauge measurements to log files.

A PC running the PCIS_DGK software may connect to the gauge via any one of the following interfaces:

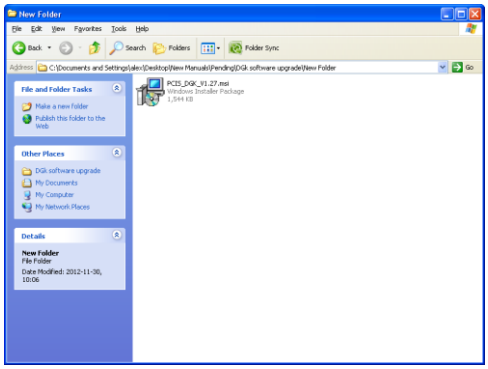
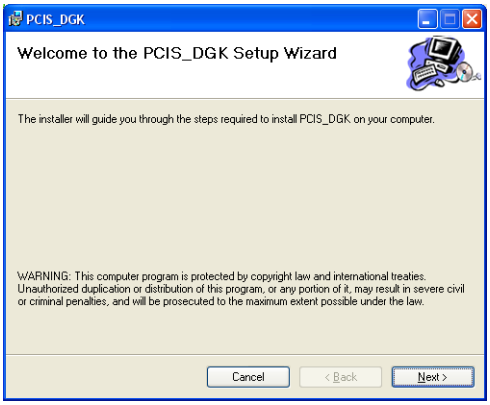
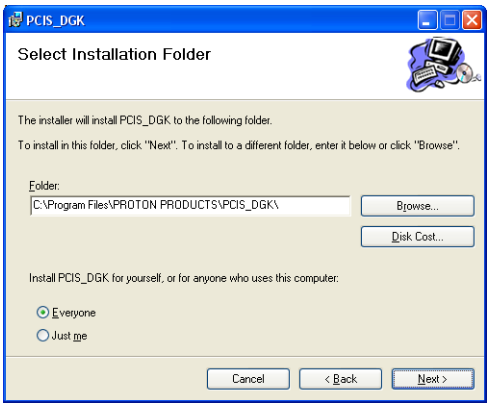
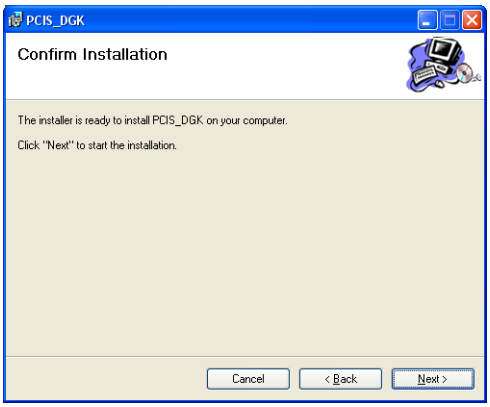
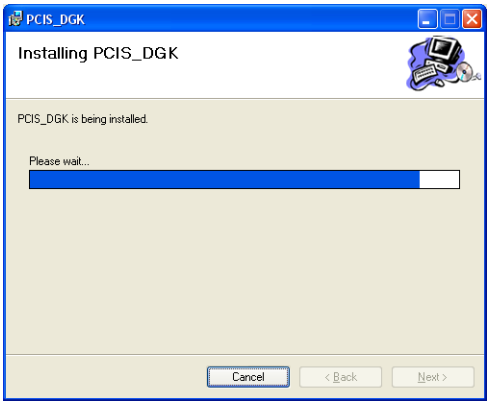
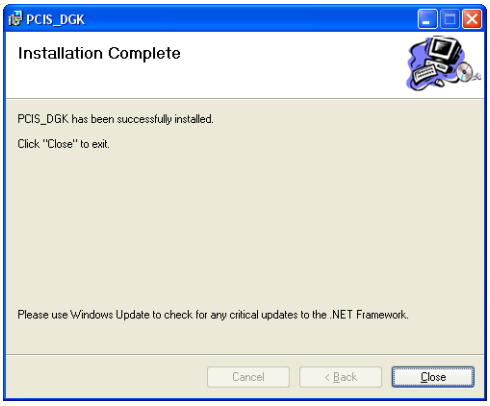
1. Direct RS-232 serial cable connection between the PC and gauge.
2. PC and gauge connected via an Ethernet network.
3. PC and gauge connected via an EtherNet/IP network.

Note: This manual should be read in conjunction with the “DG2030-DG3030-5K-10K” gauge manual which describes operational behaviour and interface connections for the gauge in greater detail.

PC SYSTEM REQUIREMENTS

Minimum processor	Pentium 300 MHz CPU compatible or higher
Minimum RAM	512 MB
Minimum free hard disk space	100 MB
Display resolution	1024 x 768
Operating system	Microsoft Windows XP
Other requirements	100Base-TX Ethernet port or adapter card
	RS-232 port or USB port and USB to RS-232 adaptor cable
	CD-ROM drive (for software installation)
	Keyboard and mouse (for configuration and software installation)

SOFTWARE INSTALLATION

1	Double-click the “PCIS_DGK_Vx.yy.msi” icon on the supplied CD-ROM (“x.yy” will depend on the software version).	**2**	Click “Next >” to proceed with the installation.
			
3	If required, click “Browse” to select an alternative installation folder. If required, click “Just me” to limit access to this program to the current user. Click “Next >” to proceed with the installation.	**4**	Click “Next >” to proceed with the installation.
			
5	Wait for the installation to complete.	**6**	Click “Close” to finish installation.
			

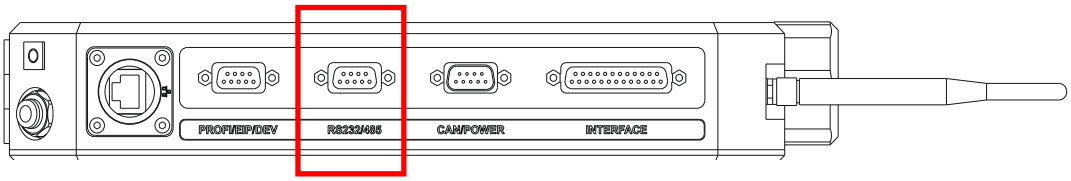
CONFIGURATION AND CONNECTION TO A DG-K GAUGE

The DG2030/3030-5/10k gauge may be connected to a PC running the PCIS_DGK software by one of the following methods:

1. Direct RS-232 serial cable connection between the PC and gauge.
2. PC and gauge connected via an Ethernet network.
3. PC and gauge connected via an EtherNet/IP network.

RS-232 CONNECTION

The RS-232 interface is fitted as standard and may be accessed through the “RS232/485” connector.



Connector type: DB9 female (socket)

Pin	Designation	Comment	PC DB9 serial port pin
2	TXD1		2
3	RXD1		3
5	GND_R	Ground reference is not isolated from earth.	5
7	CTS1		Not used
8	RTS1		Not used
S	Shield	Ensure that the cable shield is connected to this via the plug shield connection.	Shield

The above table also indicates the configuration of a null modem cable for connection to a personal computer (PC) type DB9 serial port.

The maximum baud rate depends on the cable capacitance and length. For low-cost overall shielded cable with total capacitance of shield to core-plus-core to core of 300pF per metre, the maximum recommended baud rates are as follows:

Cable length range / m		Maximum Baud rate / s
0	3	115200
3	10	38400
10	20	19200
20	40	9600
40	80	4800

Gauge configuration

Configuration via an optional AiG2 interface display unit:

	User Action	Result
1	Press MENU to display the “MENU”.	MENU
2	Press ⌂ or ⌄ to highlight “Communication”.	Communication
3	Press ↵ to open the “Communication” menu.	

4	Press ⊠ to advance to the “RS232 PORT” page.	RS232 PORT Baud: 9600 Mode: Modbus RS422/485 PORT Baud: 9600 Mode: Modbus
5	Press ⌂ or ⌄ to select the required “Baud” rate (Options are: 4800, 9600, 19200, 38400 or 115200).	RS232 PORT Baud: 9600 Mode: Modbus
6	Press ↵ to save the “Baud” rate and advance to “Mode”.	RS232 PORT Baud: 9600 Mode: Modbus
7	Press ⌂ or ⌄ to set the “Mode” to “Modbus” (The PCIS_DGK software operates using the “Modbus” RS-232 mode).	RS232 PORT Baud: 9600 Mode: Modbus
8	Press ↵ to save the “Mode”.	
9	Press MENU or ⌂ to exit.	

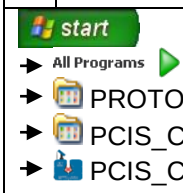
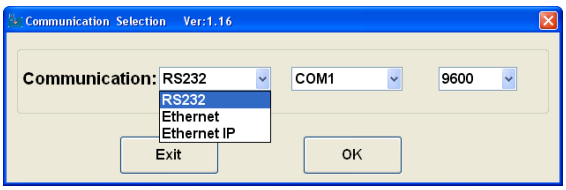
Configuration via input parameters:

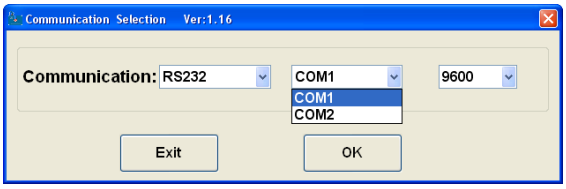
This interface may be configured by writing to the following input parameters (Note: the PCIS_DGK software operates using the “Modbus” RS-232 mode):

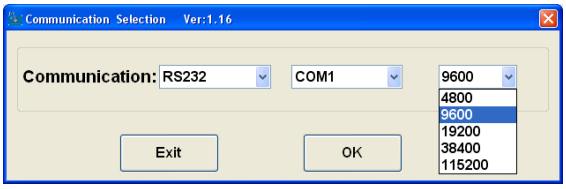
Input parameters

DW	Bit	Comments	Unit	Range/Remark	Default value
53		RS232 baud rate		0=4800 1=9600 2=19200 3=38400 4=115200	1
54		RS232 mode		0=Modbus 1=Proton 2=SLP 3=Print	0

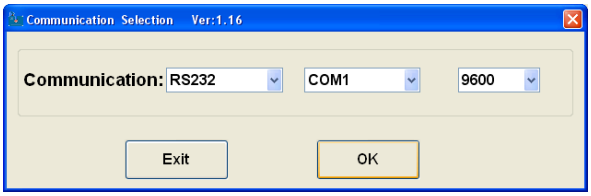
PCIS_DGK start-up configuration

1	Run the PCIS_DGK software by clicking on:	**2**	Select “RS232” from the “Communication” drop down menu:
			
3	Select the PC serial port (either “COM1” or “COM2”) from the drop down menu:	**4**	Select the Baud rate as set on the gauge (4800, 96001 19200, 38400 or 115200) from the drop down menu:



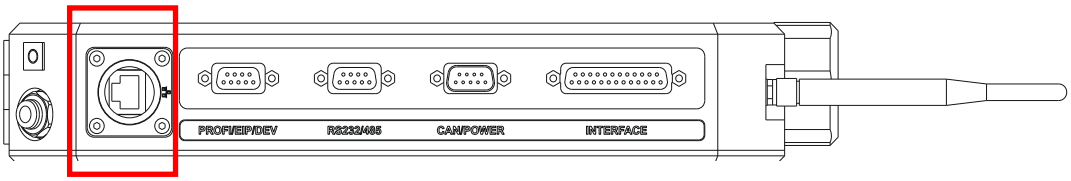


5 Click the “OK” button to proceed:



ETHERNET CONNECTION

The Ethernet interface is fitted as standard and may be accessed through the RJ45 connector.



Connector type: RJ45 8P8C female (socket)

Pin	Designation	Comments
1	LAN TX+	
2	LAN TX-	
3	LAN RX+	
6	LAN RX-	
S	Shield	Ensure that the cable shield is connected to this via the plug shield connection.

Ethernet LED indicator

EIP		**LED status**	**Indication**
		Continuous green	Online and connected
Ethernet communications		Flashing green	Online but not connected
		Continuous red	Critical link failure
		Flashing red	Connection timeout

Gauge configuration

Configuration via an optional AiG2 interface display unit:

	User Action	**Result**
1	Press MENU to display the “MENU”.	MENU
2	Press ⌂ or ⌄ to highlight “Communication”.	Communication
3	Press ↵ to open the “Communication” menu.	

4	Press ⏭ to advance to the first “MODBUS ETHERNET” page. Note: The “MAC ADDRESS” parameter is read only.	MODBUS ETHERNET Enable DHCP: Disable MAC ADDRESS 1A-2B-3C-4D-5E-6F
If using automatic IP address assignment by a DHCP server on the network:		
1	Press ⌂ or ⌄ to set “Enable DHCP” to “Enable”.	Enable DHCP: Enable
2	Press ↵ to save the “Enable DHCP” setting.	Enable DHCP: Enable
3	Press MENU or ⌂ to exit	
If using manual IP address assignment:		
1	Press ⌂ or ⌄ to set “Enable DHCP” to “Disable”.	Enable DHCP: Disable
2	Press ↵ to save the “Enable DHCP” setting.	Enable DHCP: Disable
3	Press ⏭ to advance to the second “MODBUS ETHERNET” page.	MODBUS ETHERNET IP Address: 192.168.001.100 Sub net mask: 255.255.000.000 Gateway: 192.168.001.001
4	Press ▷ or ◁ followed by ⌂ or ⌄ to highlight and edit individual digits in the “IP Address”.	IP Address: 192.168.001.103
5	Press ↵ to save the “IP Address” setting and advance to the “Sub net mask”.	Sub net mask: 255.255.000.000
6	Press ▷ or ◁ followed by ⌂ or ⌄ to highlight and edit individual digits in the “Sub net mask”.	Sub net mask: 255.255.255.000
7	Press ↵ to save the “Sub net mask” setting and advance to the “Gateway”.	Gateway: 192.168.001.001
8	Press ▷ or ◁ followed by ⌂ or ⌄ to highlight and edit individual digits in the “Gateway”.	Gateway: 192.168.001.002
9	Press ↵ to save the “Gateway” setting and advance back to the “IP Address”.	IP Address: 192.168.001.103
10	Press MENU or ⌂ to exit	

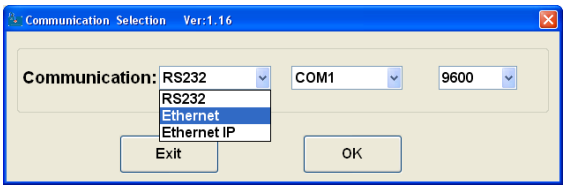
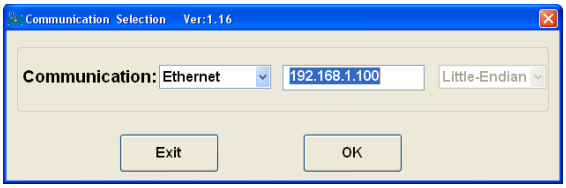
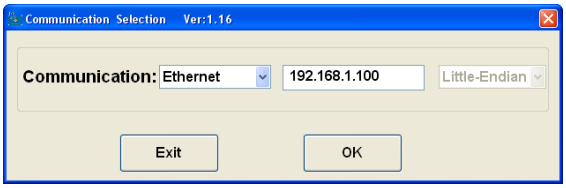
Configuration via input parameters:

This interface may be configured by writing to the following input parameters:

Input parameters

DW	Comments	Unit	Range/Remark	Default value
58	Ethernet DHCP		0=Disable 1=Enable	0
60 61	MODBUS IP address	xx.xx.xx.xx		C0A80164 (192.168.1.100)
64 65	Subnet mask	xx.xx.xx.xx		255.255.0.0
66 67	Gateway	xx.xx.xx.xx		C0A80101 (192.168.1.1)

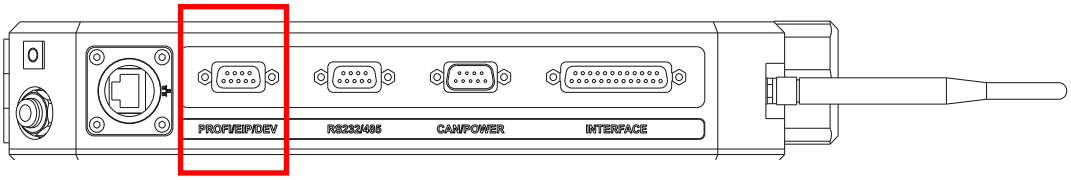
PCIS_DGK start-up configuration

1	Run the PCIS_DGK software by clicking on:	2	Select “Ethernet” from the “Communication” drop down menu:
			
3	Click on the IP address field and enter the IP address of the gauge:	**4**	Click the “OK” button to proceed:
			

ETHERNET I/P OR PROFINET CONNECTION

The EtherNet / IP or PROFINET interface is an optional extra that must be ordered for installation during manufacture; it cannot be retrofitted to the gauge.

The EtherNet / IP interface may be accessed through the “PROFI/EIP/DEV” connector.



Connector type: DB9 female (socket)

Pin	EtherNet/IP or PROFINET	Comments
1	LAN TX-	
2	LAN TX+	
7	LAN RX-	
9	LAN RX+	
S	Shield	Ensure that the cable shield is connected to this via the plug shield connection.

EtherNet / IP LED indicator

i-BUS		**LED status**	**Indication**
		Continuous green	Online
EtherNet / IP communications		Continuous red	Communication error
		Extinguished	No communication

Gauge configuration

Configuration via an optional AiG2 interface display unit:

	User Action	Result

1	Press MENU to display the “MENU”.	MENU
2	Press ⌂ or ⌄ to highlight “Communication”.	Communication
3	Press ↵ to open the “Communication” menu.	
4	Press ⏭ to advance to the “ETHERNET/IP” or “PROFINET” page as appropriate.	ETHERNET/IP Enable DHCP: Disable IP Address: 192.168.001.101
		PROFINET Enable DHCP: Disable IP Address: 192.168.001.101
If using automatic IP address assignment by a DHCP server on the network:		
1	Press ⌂ or ⌄ to set “Enable DHCP” to “Enable”.	Enable DHCP: Enable
2	Press ↵ to save the “Enable DHCP” setting and advance to the “IP Address”.	IP Address: 192.168.001.001
3	Press MENU or ⌂ to exit	
If using manual IP address assignment:		
1	Press ⌂ or ⌄ to set “Enable DHCP” to “Disable”.	Enable DHCP: Disable
2	Press ↵ to save the “Enable DHCP” setting and advance to the “IP Address”	IP Address: 192.168.001.001
3	Press ▷ or ◁ followed by ⌂ or ⌄ to highlight and edit individual digits in the “IP Address”.	IP Address: 192.168.001.005
4	Press ↵ to save the “IP Address” setting and advance back to “Enable DHCP”.	Enable DHCP: Disable
5	Press MENU or ⌂ to exit	

Configuration via input parameters:

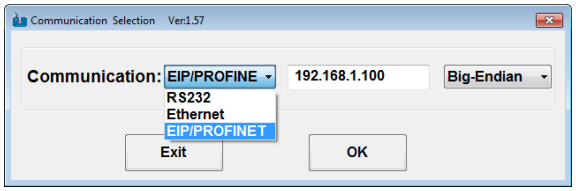
This interface may be configured by writing to the following input parameters:

Input parameters:

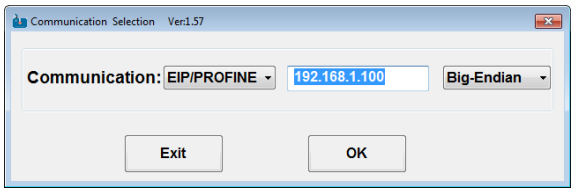
DW	Bit	Comments	Unit	Range/Remark	Default value
59		EIP DHCP		0=Disable 1=Enable	0
62		Anybus IP address	xx.xx.xx.xx		C0A80165 (192.168.1.101)
63					
82		Endianess		1=Little endian 0=Big endian	0

PCIS_DGK start-up configuration

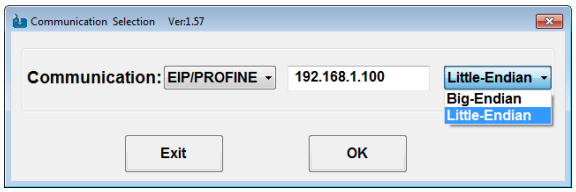
1	Run the PCIS_DGK software by clicking on:	**2**	Select “EIP/PROFINET” from the “Communication” drop down menu:



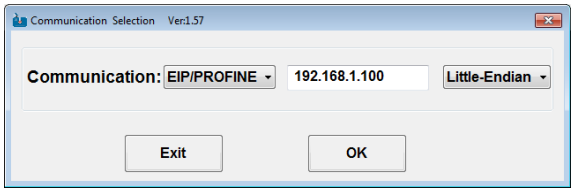
3 Click on the IP address field and enter the IP address of the gauge:



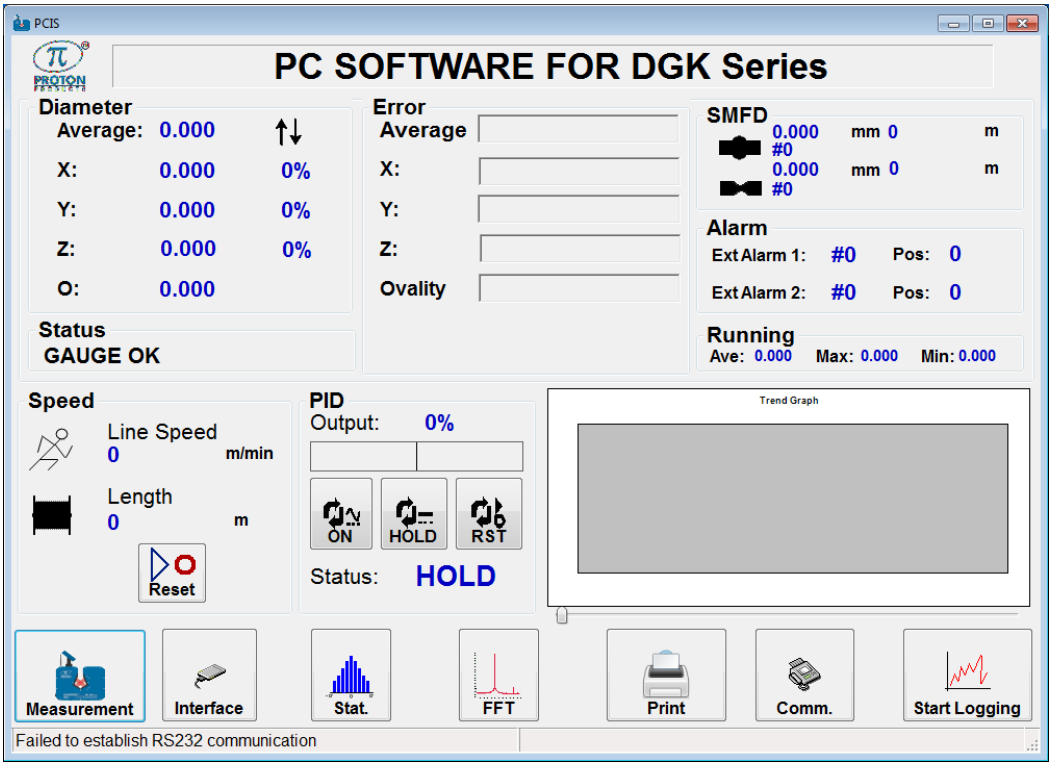
4 Select the endianess (either “Little-Endian” or “Big-Endian” (default)) from the drop down menu:



5 Click the “OK” button to proceed:



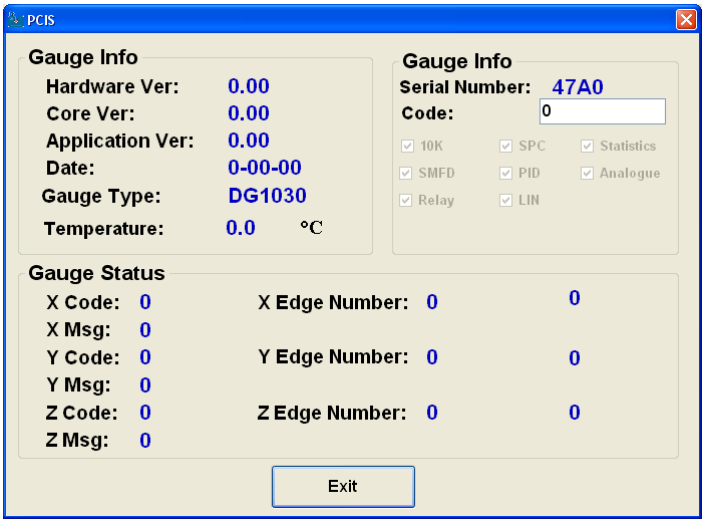
MAIN PAGE



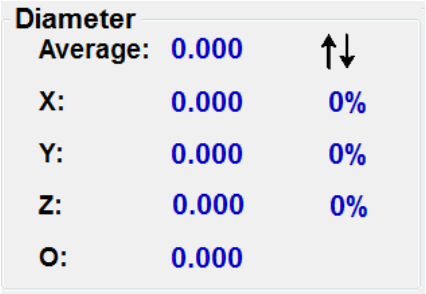
GAUGE INFORMATION

PC SOFTWARE FOR DGK Series

Double-click the above title banner to display the gauge information dialog box:

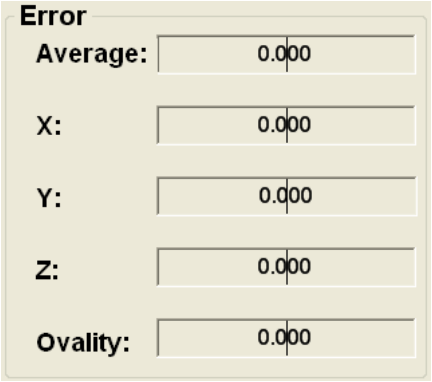


DIAMETER

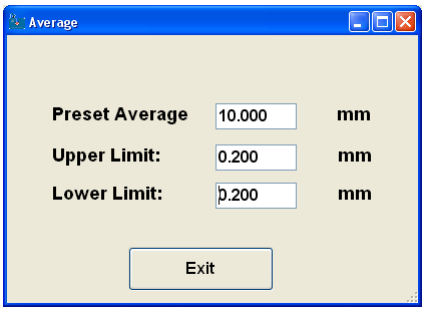
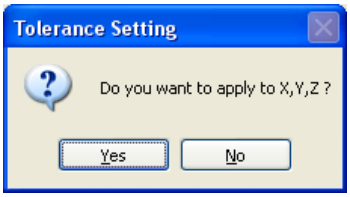
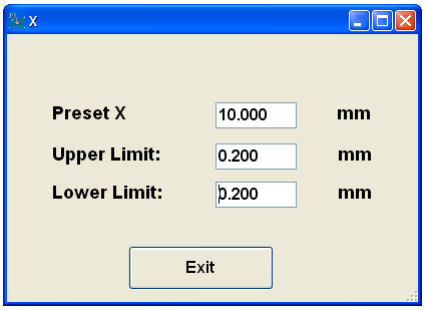
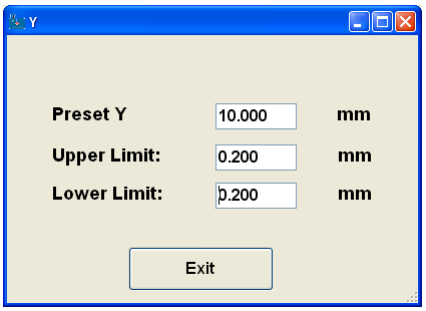


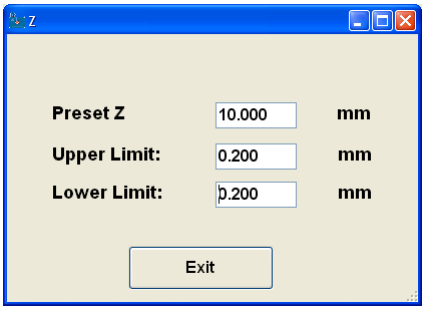
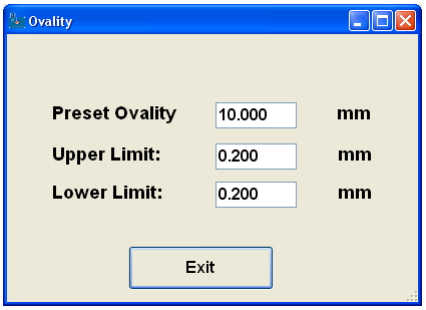
Field	Description	Out DW	Description	Out DW
Average	Average of measured X, Y, Z (DG3030 only) diameters.	2	↑↓	
X	Measured X diameter (time averaged).	3	Object position in X-axis optical gate (0% indicates object centred).	20
Y	Measured Y diameter (time averaged).	4	Object position in Y-axis optical gate (0% indicates object centred).	21
Z	Measured Z diameter (time averaged; DG3030 only).	5	Object position in Z-axis optical gate (0% indicates object centred; DG3030 only).	22
O	Ovality = max(X, Y, Z) – min(X, Y, Z)	6		

ERROR



Field	Description	DW
Average	[Average (of X, Y and Z) diameter] – [Preset average (of X, Y and Z) diameter]	Out: 7

	Click on this field to open a dialog to set the preset average diameter and upper / lower tolerances:  Entry of a “Preset Average”, “Upper Limit” or “Lower Limit” will be followed by the appearance of a dialog box requesting if the new value should be duplicated across the individual X, Y and Z-axes:  Click “Yes” to duplicate the new value across all X, Y and Z-axes. Click “No” to apply the new value only to the average preset or limit.	In: 1 6 7
X	(Measured X diameter) – (Preset X diameter)	Out: 8
	Click on this field to open a dialog to set the preset X diameter and upper / lower tolerances:  	In: 2 8 9
Y	(Measured Y diameter) – (Preset Y diameter)	Out: 9
	Click on this field to open a dialog to set the preset Y diameter and upper / lower tolerances:  	In: 3 10 11
Z	(Measured Z diameter) – (Preset Z diameter); DG3030 only.	Out: 10
	Click on this field to open a dialog to set the preset Z diameter and upper / lower limi tolerances ts (DG3030 only):	In: 4

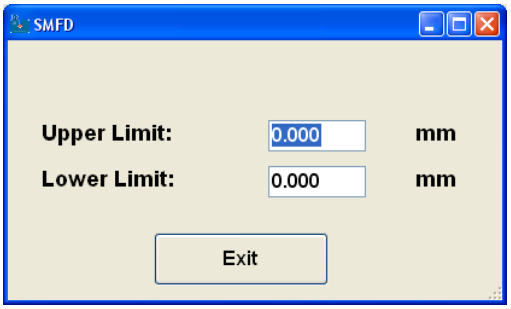
		12 13
Ovality	(Measured Ovality) – (Preset Ovality)	Out: 11
	Click on this field to open a dialog to set the preset ovality and upper / lower tolerances: 	In: 5 14 15

SMFD (Single Measurement Flaw Detection)

Field	Description		Out DW	Description	Out DW
	Last lump flaw size / mm		12	Last lump flaw location / m	13
	#	Lump flaw count	16	-	-
	Last neck flaw size / mm		14	Last neck flaw location / m	15
	#	Neck flaw count	17	-	-

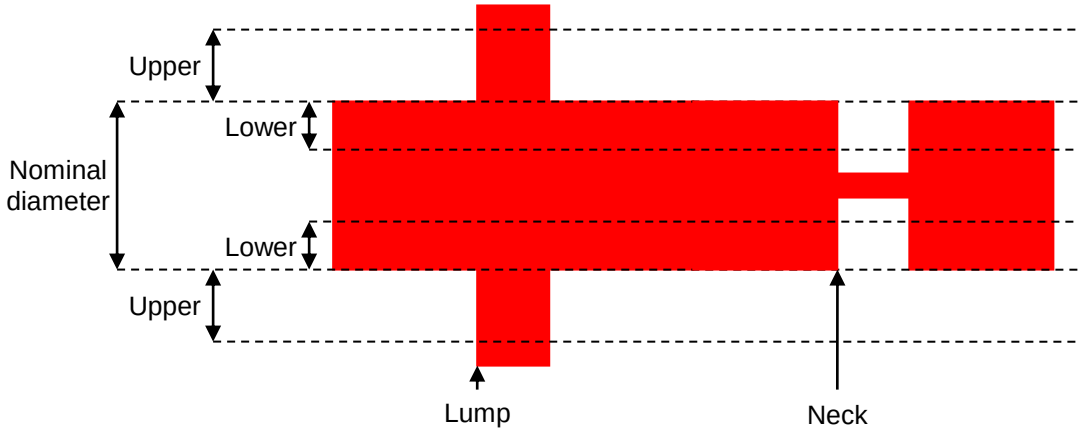
Click the  button in the “Speed” pane to reset the SMFD results to zero (equivalent to writing “1” to input parameter DW25).

Click either the “  ” or “  ” icons to open the SMFD configuration dialog:

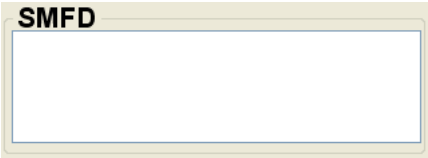


Click the “Exit” button to return to the main page.

Field	Description	In DW
Upper limit	Preset SMFD upper tolerance.	16
Lower limit	Preset SMFD lower tolerance.	17



Double-click **SMFD** to view a flaw log:

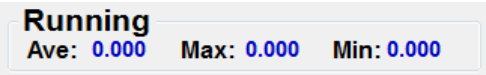


Double-click anywhere inside the flaw log box to return to the most recent SMFD flaw data.

ALARM

Field	Description		Field	Description
Ext Alarm 1:	#	Indicates the number of times that the “Ext Alarm 1” logic input has been activated. **Note**: click on the “Ext Alarm 1:” label to change it to a user-defined label.	Pos:	Indicates the position along the cable when the “Ext Alarm 1” logic input was last activated.
Ext Alarm 2:	#	Indicates the number of times that the “Ext Alarm 2” logic input has been activated. **Note**: click on the “Ext Alarm 2:” label to change it to a user-defined label.	Pos:	Indicates the position along the cable when the “Ext Alarm 2” logic input was last activated.

RUNNING



Field	Description	Out DW
Ave	Running average diameter.	**37**
Max	Running maximum diameter.	18

Min	Running minimum diameter.	19

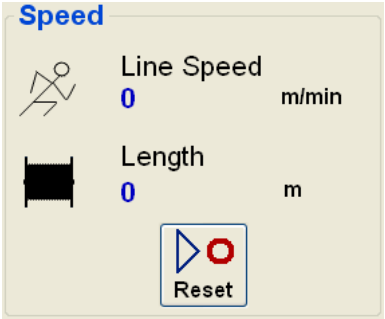
Click the 

button in the “Speed” pane to reset the running maximum and minimum diameters to zero (equivalent to writing “1” to input parameter DW25).

STATUS

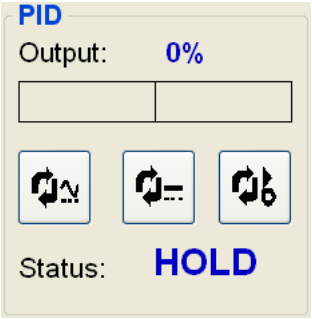
Status message	Cause	Out DW
GAUGE OK	Diameter measurement normal.	-
NO OBJECT	Indicates no object detected by the receiver: • No object present in the optical gate light beams. • Object diameter less than minimum measurable diameter specification.	1.2
NO READING	Indicates no light detected by the receiver: • Object is wider than the optical gate. • Optical window is fully obscured by dirt.	1.1

SPEED



Field	Description	DW
Line Speed	Line speed from one of the following sources: • User preset line speed. • Measured line speed from the speed pulse input. • Measured line speed from the analogue input.	Out: 23
Length	Calculated cumulative length of object.	Out: 24
	Click this button to reset the above “Length”, “Running Max Min” diameters and SMFD (Single Measurement Fault Detection) results to zero.	In: 25

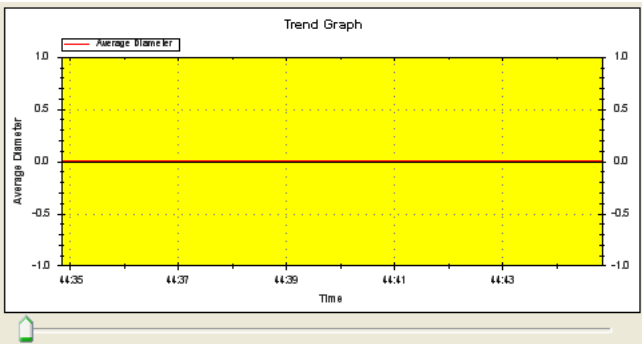
PID

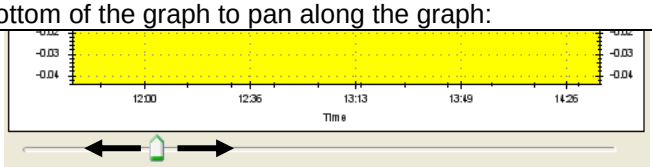
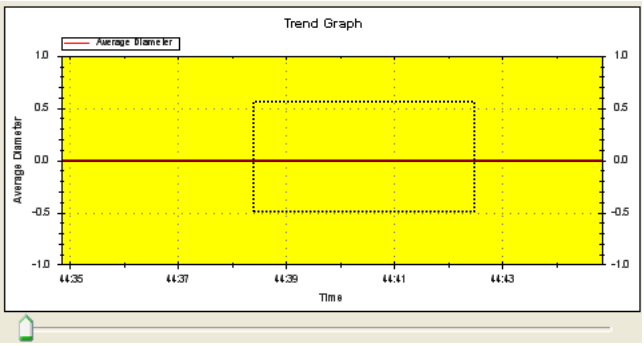


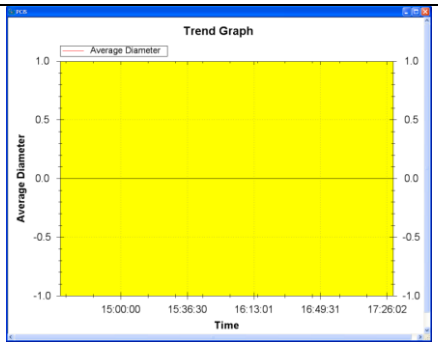
Field	Description	DW
Output	Controller output value (the bar chart below indicates this value pictorially with 0% output at the centre, negative output on the left and positive output on the	Out: 36

	right).		
	Click to turn ON the controller output.		In: 31
	Click to HOLD the controller output voltage constant at its current value.		
	Click to reset the controller output voltage to zero.		
Status	RESET	Controller output voltage reset to zero.	Out: 35
	READY	Controller output voltage at zero and ready to run.	
	ON	Controller output voltage running.	
	HOLD	Controller output voltage held constant at its current value.	

TREND GRAPH



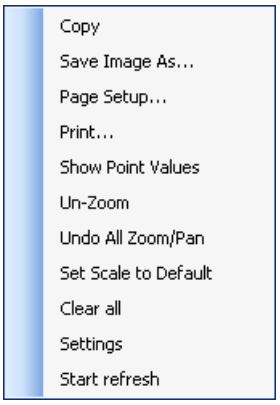
Drag the slider at the bottom of the graph to pan along the graph:

Click and drag to zoom in on the graph:

Double-click on the graph to open it in a larger window:

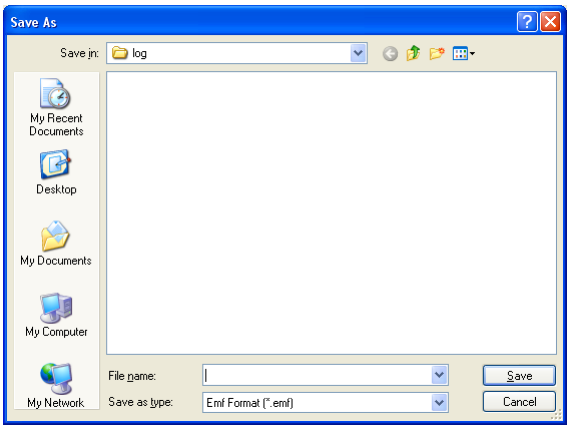
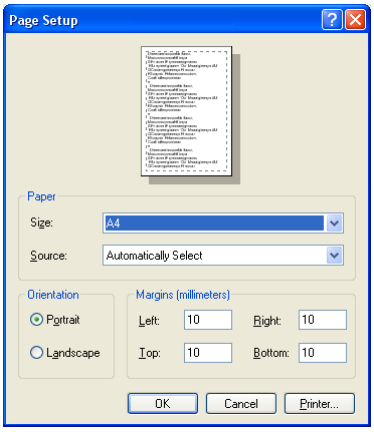


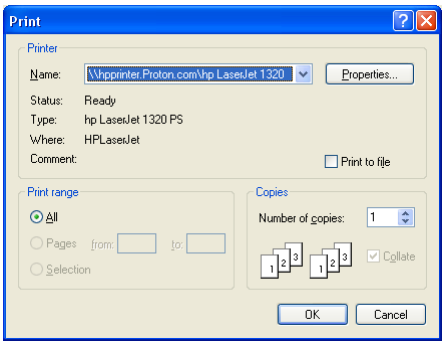
Double-click on the graph to return to the main page.

Context menu

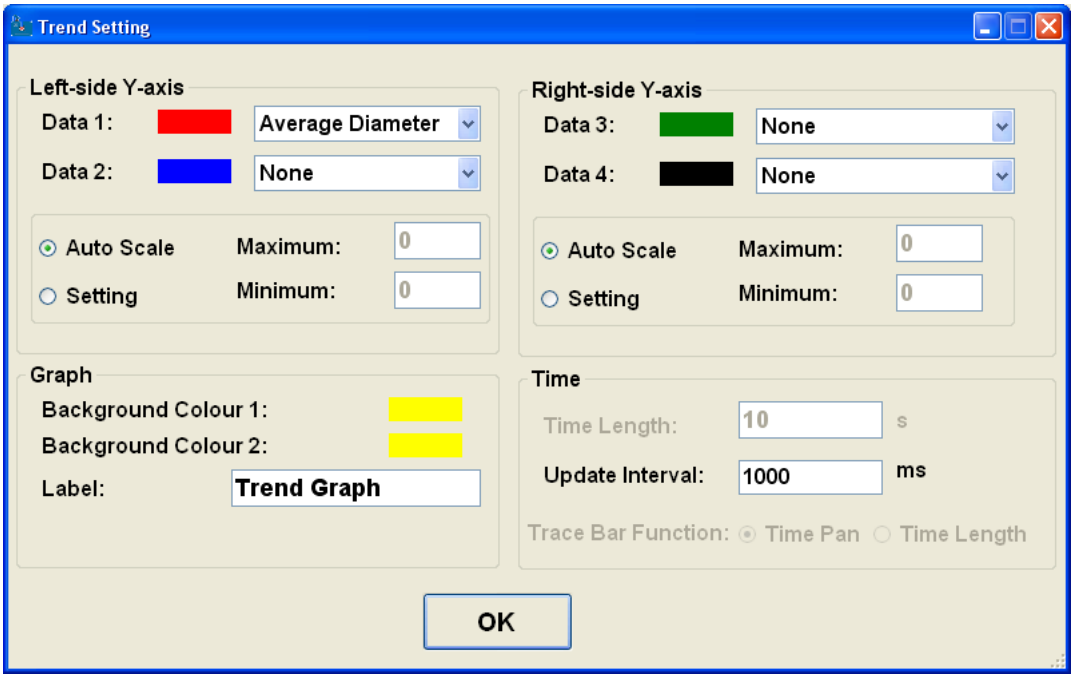
Right-click on the graph to open the context menu:



Field	Description
Copy	Copy the image of the graph to the clipboard (for subsequent pasting into other documents).
Save Image As…	Save an image of the graph to a file: 
Page Setup…	Open the “Page Setup” dialog box for printing the graph: 

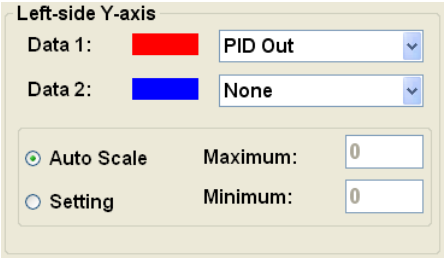
Print…	Open the “Print” dialog box for printing the graph: 	
Show Point Values	Ticked	Show the value of the point on the graph under the cursor.
	Un-ticked	Do not show the value of the point on the graph under the cursor.
Un-Zoom	Return to the un-zoomed view of the graph.	
Undo All Zoom/Pan	Return to the un-zoomed, un-panned view of the graph.	
Set Scale to Default	Return to default scale settings.	
Clear all	Clear the current graph and begin plotting from the left side of the time axis.	
Settings	Open the graph settings dialog box (see below).	
Stop refresh	Halt graph update.	
Start refresh	Resume graph update.	

Settings



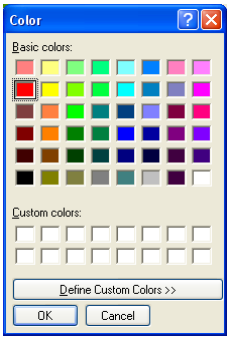
Click the “OK” button to return to the main page.

Left-side Y-axis

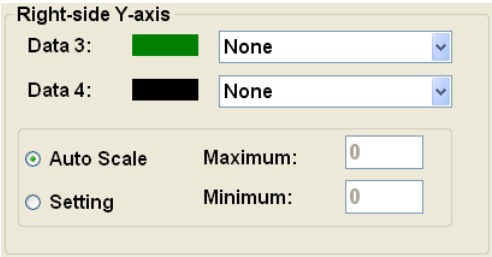


Field	Description
Data 1	Click on the drop down box to select the data plotted on this axis (see “Plottable data” table below for data that can be plotted).
	Click on the coloured box to select the line colour.
Data 2	Click on the drop down box to select the data plotted on this axis (see “Plottable data” table below for data that can be plotted).
	Click on the coloured box to select the line colour.
Auto Scale	Click to allow the software to automatically set the minimum and maximum values for this axis.
Setting	Click to manually set “Maximum” and “Minimum” values for this axis.
Maximum	Click to enter the maximum value for this axis.
Minimum	Click to enter the minimum value for this axis.

Clicking on “Data” or colour boxes will open the colour selection dialog:



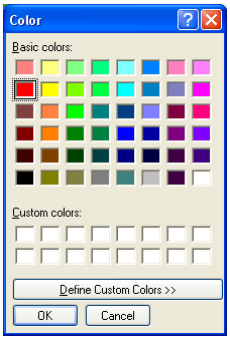
Right-side Y-axis



Field	Description
Data 1	Click on the drop down box to select the data plotted on this axis (see “Plottable data” table below for data that can be plotted).
	Click on the coloured box to select the line colour.
Data 2	Click on the drop down box to select the data plotted on this axis (see “Plottable data” table below for data that can be plotted).
	Click on the coloured box to select the line colour.
Auto Scale	Click to allow the software to automatically set the minimum and maximum values for this axis.
Setting	Click to manually set “Maximum” and “Minimum” values for this axis.
Maximum	Click to enter the maximum value for this axis.

Minimum	Click to enter the minimum value for this axis.

Clicking on “Data” or colour boxes will open the colour selection dialog:



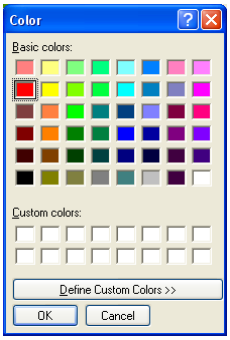
Plottable data

Data	Description	Out DW
Average Diameter	Average of measured X, Y, Z (DG3030 only) diameters.	2
X	Measured X diameter (time averaged).	3
Y	Measured Y diameter (time averaged).	4
Z	Measured Z diameter (time averaged; DG3030 only).	5
Ovality	Ovality = max(X, Y, Z) – min(X, Y, Z)	6
Average Error	(Average diameter) – (Preset average diameter)	7
X Error	(Measured X diameter) – (Preset X diameter)	8
Y Error	(Measured Y diameter) – (Preset Y diameter)	9
Z Error	(Measured Z diameter) – (Preset Z diameter)	10
Ovality Error	(Measured Ovality) – (Preset Ovality)	11
Last Lump Value	Size of the last lump flaw.	12
Last Lump Position	Position of last lump flaw.	13
Last Neck Value	Size of the last neck flaw.	14
Last Neck Position	Position of last neck flaw.	15
Lump Count	Lump flaw count.	16
Neck Count	Neck flaw count.	17
Running Max Diameter	Running maximum diameter.	18
Running Min Diameter	Running minimum diameter.	19
X Position	Object position in X-axis optical gate (0% indicates object centred).	20
Y Position	Object position in Y-axis optical gate (0% indicates object centred).	21
Z Position	Object position in Z-axis optical gate (0% indicates object centred; DG3030 only).	22
Line Speed	Line speed from one of the following sources: • Preset line speed. • Measured line speed from the speed pulse inputs. • Measured line speed from the analogue input.	23
Length	Calculated cumulative length of object.	24
Statistics Remain	Statistical analysis sampling window remaining time.	26
Standard Deviation	Statistical analysis diameter standard deviation.	27
Max Diameter	Running maximum diameter.	18
Min Diameter	Running minimum diameter.	19
Mean Diameter	Statistical analysis mean diameter.	30
Chi	Statistical analysis normalness of diameter distribution (χ^2).	31
Cp	Statistical analysis C_p	32
Cpk	Statistical analysis C_{pk}	33
FFT Remain	FFT sampling window remaining time.	34
PID Out	PI controller output signal level.	36
None	-	-

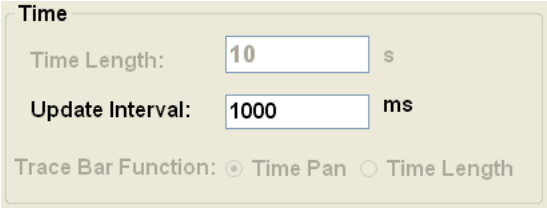
Graph

Field	Description
Background Colour 1	Click on the coloured box to select the top left corner background colour for the graph; this colour will be graded across the graph to “Background Colour 2”.
Background Colour 2	Click on the coloured box to select the bottom right corner background colour for the graph; this colour will be graded across the graph to “Background Colour 1”.
Label	Click to enter a title for the graph.

Clicking on “Background Colour” colour boxes will open the colour selection dialog:



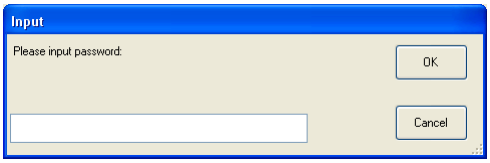
Time

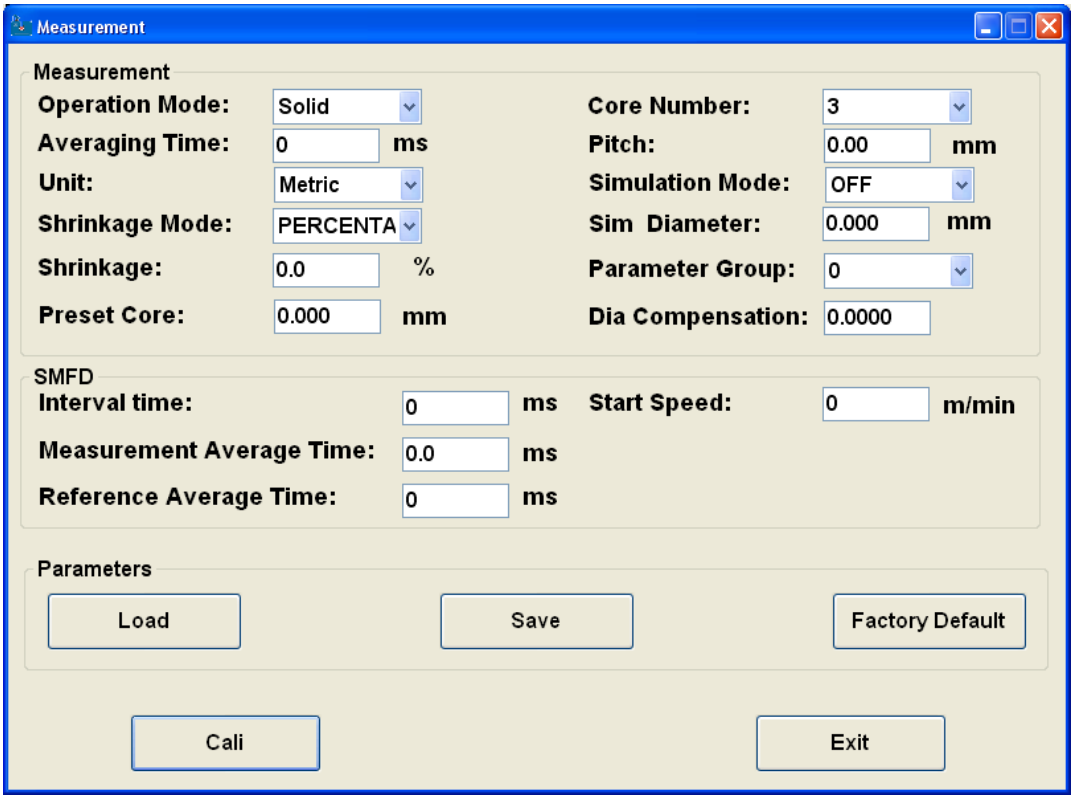


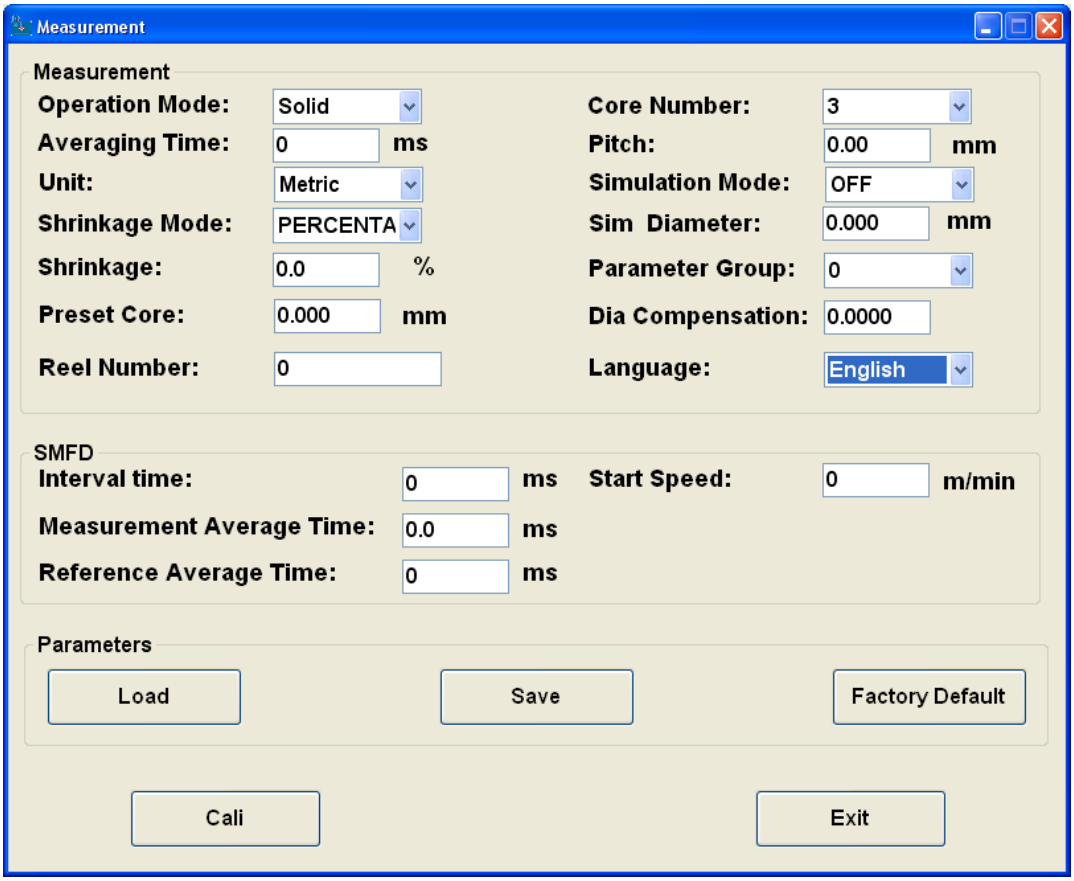
Field	Description
Update interval	Set the time interval at which data is updated on the graph; a shorter time interval will result in a more detailed graph, whilst a longer time interval is clearer at showing long-term trends.

MEASUREMENT

To access the “Measurement” page and set measurement parameters:

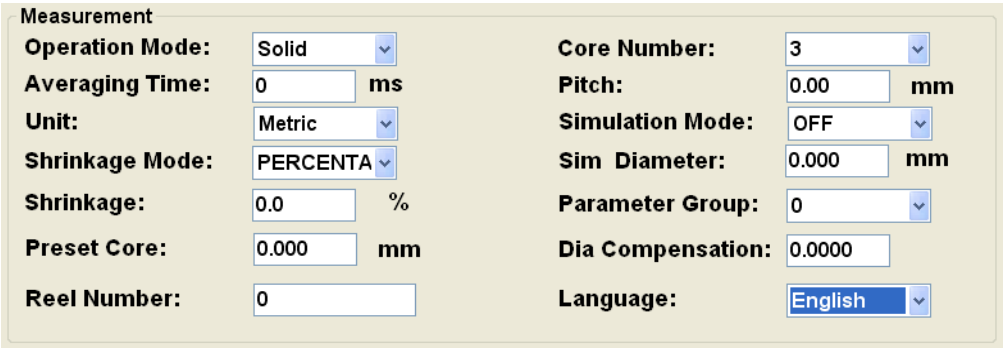
1	Click the “Measurement” button:	2	Enter 63000 for the “Measurement” password and click “OK”:
			





Click the “Exit” button to return to the main page.

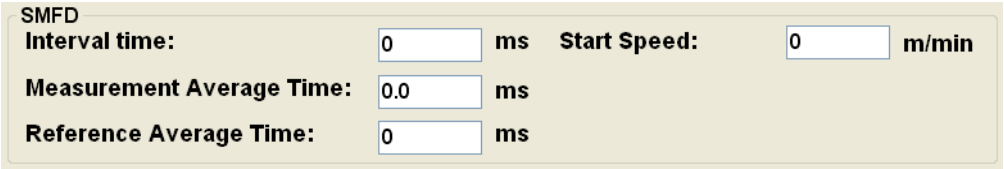
Measurement



Field	Description		In DW
Operation mode	Solid	Measure the diameter of opaque objects.	0
	Glass	Measure the diameter of transparent objects such as glass rod (outermost edge detection).	
	Helix	Measure the envelope diameter that encloses a twisted or braided multi-core cable. • Requires provision of line speed. • SMFD (Single Scan Flaw Detection) is NOT available in “Helix” mode.	
Averaging time	Set the time window over which diameter measurements are averaged.		19
Unit	Metric	Millimetre (mm) and metre (m) measurement units.	0.3
	Imperial	Inch (in) and feet (ft) measurement units.	
Shrinkage mode	PERCENTAGE	Percent shrinkage scales the averaged measured diameter by the Shrinkage.	0.4

		Output diameter =(Measured diameter) x [1– (Shrinkage/100)]	
	ABS	Absolute shrinkage mode deducts the Shrinkage from the averaged measured diameter. Output diameter =(Measured diameter) – (Shrinkage)	
Shrinkage	Absolute or percentage shrinkage value (depending on the setting for “Shrinkage Mode”). A value of zero disables shrinkage compensation.		20
Preset core	Preset core diameter (required for PI feedback controller operation).		18
Reel Number	Enter the current reel number (for report printing purposes).		-
Core Numbers	Cable core count (for “Helix” mode operation only).		
	3	Select this for 3-core cable.	0.8
	Other	Select this for multi-core cable	
Pitch	Set the multi-core cable pitch length (for “Helix” mode operation only).		21
Simulation mode	OFF	Normal measurement operation.	-
	ON	Simulation mode operation: The gauge will behave as if an object of diameter “Sim diameter” has been placed in the optical gate (all gauge measurements, output parameters and analogue outputs will behave accordingly). Do not forget to set to “OFF” to exit simulation mode and resume normal measurement operation.	
Sim Diameter	Set a simulation mode object diameter.		-
Parameter Group	Select the parameter group (0 to 49) to retrieve and set as active. Gauge input parameters (configuration) stored under a particular parameter group that were previously set by the user will be retrieved and become active for the gauge. Input parameter groups which have never been set by the user will have factory default input parameter values. Any changes to input parameter values will be saved to this parameter group.		-
Dia Compensation	All measured diameter values are multiplied by this “Diameter Compensation” factor before display or reading through a communications interface.		70
Language	English	Set the PCiS_DGk display language to English.	-
	Chinese	Set the PCiS_DGk display language to Chinese.	

SMFD



Field	Description	In DW
Interval time	After detection of a flaw, subsequent flaws detected within this time period will be ignored (subsequent flaws are effectively counted as part of the first flaw).	23
Measurement Average Time	Set the time window over which diameter measurements are averaged to generate the “Measurement Diameter”.	46
Reference Average Time	Set the time window over which diameter measurements are averaged to generate the “Reference Diameter”. A flaw is detected if the above “Measurement Diameter” deviates from this “Reference Diameter” by more than the preset upper or lower SMFD flaw limits.	22
Start Speed	Set the minimum line speed above which SMFD is enabled. Setting a minimum “Start Speed” prevents the SMFD function from logging flaws during line start-up and shutdown.	47

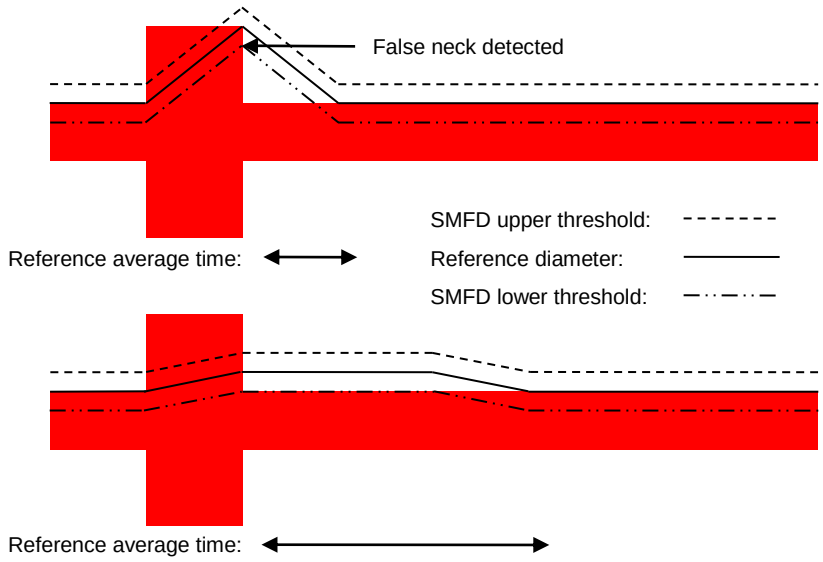
Flaws are detected when the “Measurement Diameter” deviates from the “Reference Diameter” by more than the preset upper or lower SMFD flaw limits.

The “Measurement Average Time” should be set to smooth out any short duration noise on the measurement; it may be left at its default value of 1ms unless measurement noise is large.

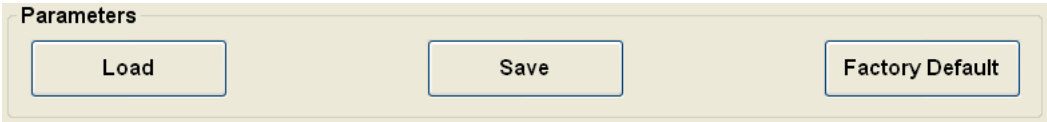
The “Reference Average Time” should be set to approximately 100 times the time duration of the longest expected flaw.

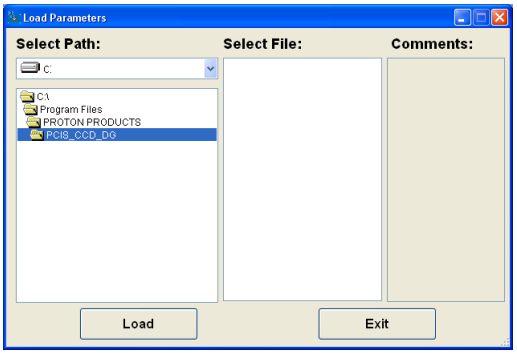
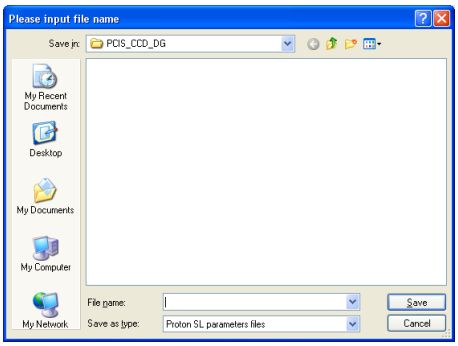
If the “Reference Average Time” is set to too short a duration (i.e. close to the time duration of the flaws), then the flaws will significantly affect the value of the “Reference Diameter” and may result in the detection of false flaws.

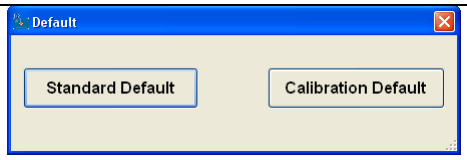
If the gauge has just been powered on or a cable has just been inserted into the empty optical gate, then the calculated “Reference Diameter” will only be valid after the “Reference Average Time” has elapsed. During this period, multiple false neck flaws will be detected. Hence the “Reference Average Time” should not be set to an excessively large value in order to minimise the ramp up time for the “Reference Diameter”.



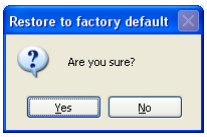
Parameters



Button	Description
Load	Click this button to load gauge input parameters (configuration) from a file: 
Save	Click this button to save current active input parameters to a file: 
Factory Default	Click this button to restore input parameters to factory default values: **1** Click “Standard Default” (do NOT click “Calibration Default”):



2 Click “Yes” to restore input parameters to factory default values:



End-user recalibration procedure

The end-user may periodically recalibrate the a DG-k series gauge by attaching a calibration sample to the gauge and then running the automatic calibration function in the PCiS-DGk software.

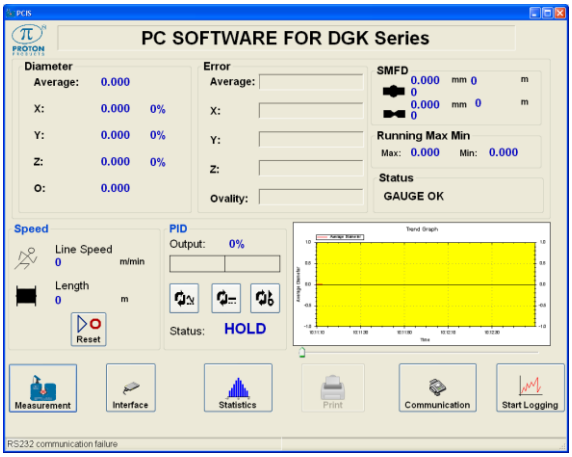
Please contact your Proton Products representative to order a suitable calibration kit for your DG-k series gauge.

DG-k gauge model		Calibration kit name	Part number	Included sample diameters / mm			
DG2030-k	DG3030-k	KAL30-DGK	00013MC004	1	5	15	25
DG2060-k	DG3060-k	KAL60-DGK	TBA	1	15	25	50

Calibration procedure:

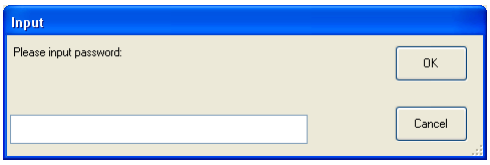
1 Install the calibration kit sample holder onto the case of the DG-k gauge and insert the required calibration sample into the holder.

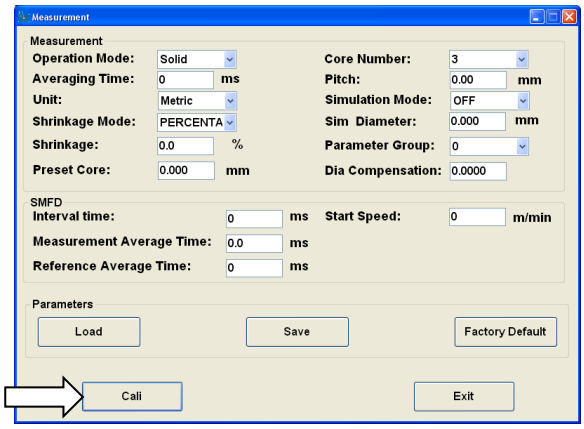
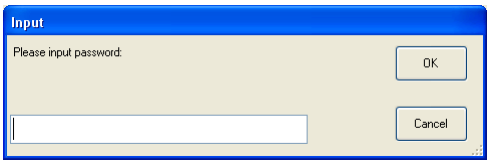
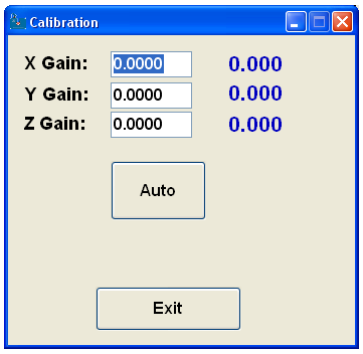
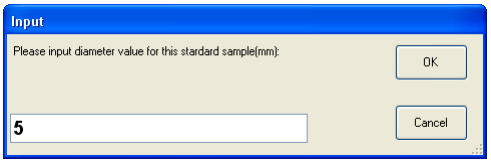
2 Connect the DG-k gauge to a PC running the PCiS-DGk software (as detailed earlier in this manual):



3 Click the “Measurement” button:

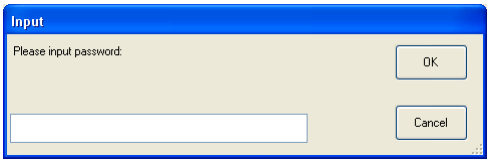
4 Enter 63000 for the “Measurement” password and click “OK”:

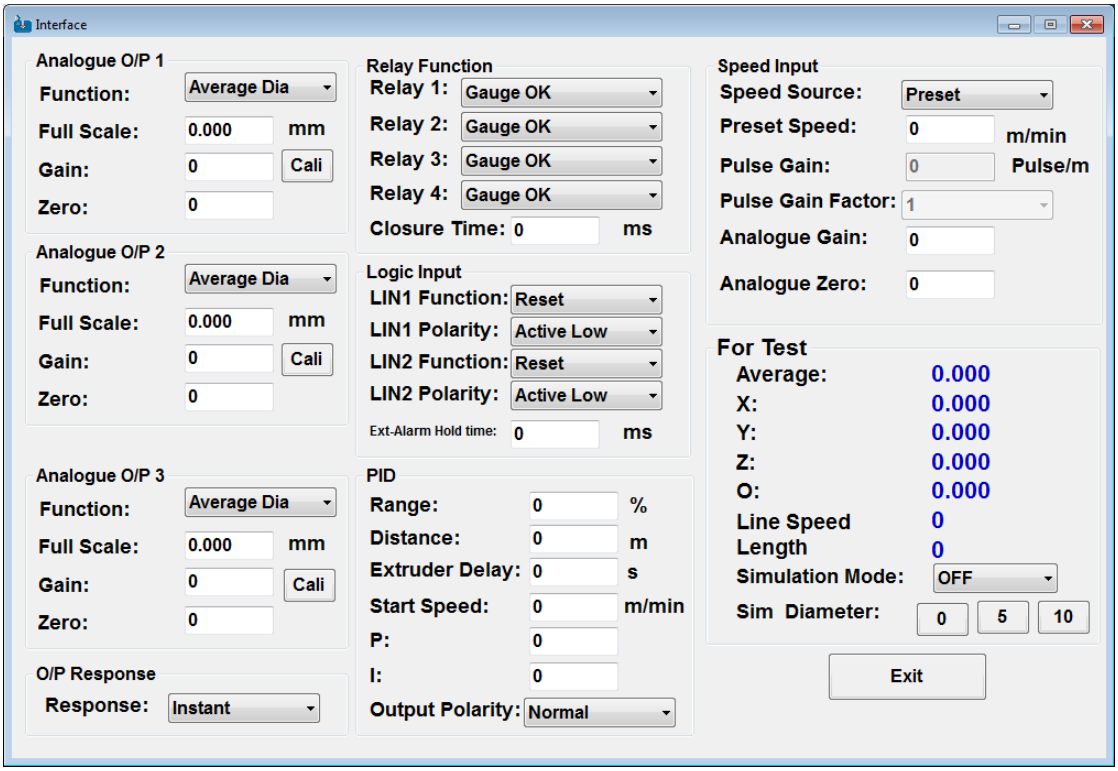


5	Click the “Cali” button:	**6**	Enter 63063 for the calibration page password and click “OK”:
			
7	Click the “Auto” button:	**8**	Enter the diameter (in mm) of the calibration sample and click “OK”: The PCiS software will automatically instruct the DG-k gauge to measure the calibration sample diameter and then adjust the X, Y and Z Gains so that the gauge outputs the correct diameter reading.
			

INTERFACE

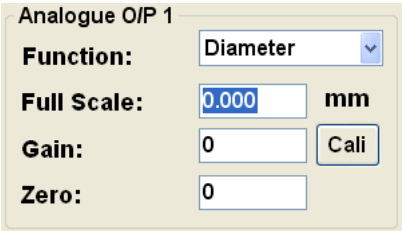
To access the “Interface” page and set measurement parameters:

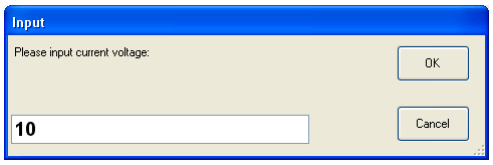
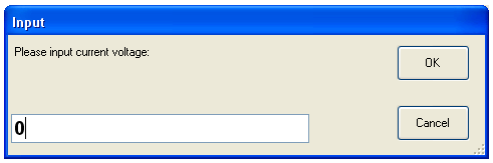
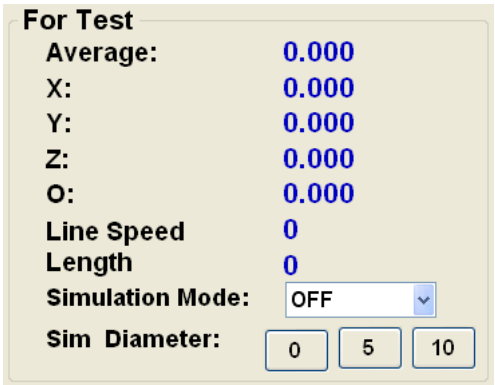
1	Click the “Interface” button:	2	Enter 64000 for the “Interface” password and click “OK”:
			



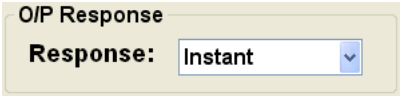
Click the “Exit” button to return to the main page.

Analogue O/P 1, Analogue O/P 2 and Analogue O/P 3



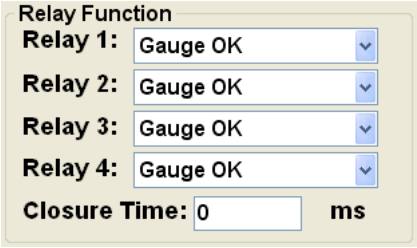
Field	Description		In DW
Function	Select the analogue output voltage representation:		38
	Unipolar (0 to +10 V) outputs	**Bipolar (-10 to + 10 V) outputs**	
	Average of X, Y, Z (DG3030 only) diameters	***Average error*** of X, Y, Z (DG3030 only) diameters	
	X diameter	***X error***	
	Y diameter	***Y error***	
	Z diameter (DG3030 only)	***Z error*** (DG3030 only)	
	Ovality	***Ovality error***	
Full Scale	Set the maximum measured diameter or most positive error for a +10V output voltage. • For unipolar outputs, a zero measured diameter corresponds to a 0V output voltage. • For bipolar outputs, the most negative measured error corresponds to a -10V output voltage.		39, 40, 41
Gain	Gain factor for calibrating the analogue output voltage.		73, 75, 77
Zero	Zero level for calibrating the analogue output voltage.		74, 76, 78
	**1**	**Click this button to automatic calibrate the analogue output voltage.**	-
	2	Use a voltmeter to measure the actual output voltage (approximately +10V), enter its value into the first dialogue box and click “OK”.	
			
	3	Use a voltmeter to measure the actual output voltage (approximately 0V), enter its value into the second dialogue box and click “OK”. The software will automatically adjust the “Gain” and “Zero” parameters so that the full scale analogue output voltage is +10V and zero analogue output voltage is 0V.	
			
	4	Set the “Simulation Mode” drop down under the “For Test” pane to “OFF”.	
			

O/P Response



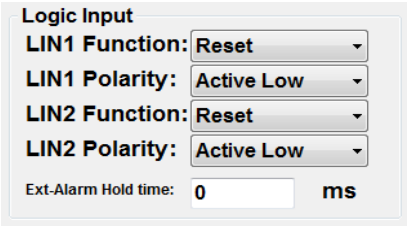
Field	Description		In DW
Response	Instant	Analogue output voltage represents the value of each individual measurement.	38
	Average	Analogue output voltage represents the time averaged measured value.	

Relay Function



Field	Description		In DW
Relay 1	Set the condition under which this relay contact will close (short-circuit):		27
	Gauge OK		
	Over all limits	***Under all limits***	
	Flaw (Lump & Neck)		
	Lump	***Neck***	
	Over Average Upper limit	***Under Average Lower limit***	
	Over X Upper limit	***Under X Lower limit***	
	Over Y Upper limit	***Under Y Lower limit***	
	Over Z Upper limit (DG3030 only)	***Under Z Lower limit*** (DG3030 only)	
	Over Ovality Upper limit	***Under Ovality Lower limit***	
Relay 2	See above description for “Relay 1”.		27
Relay 3	See above description for “Relay 1”.		27
Relay 4	See above description for “Relay 1”.		27
Closure Time	Set the relay contact closure time duration (this setting applies to all four relays).		24

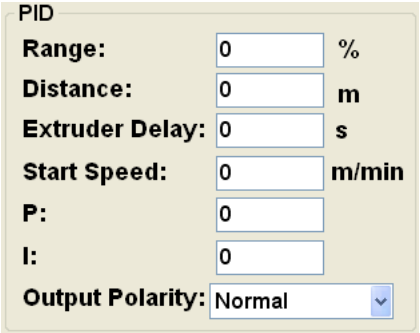
Logic Input



Field	Description		In DW
LIN1 Function	Reset	Resets to zero: • All SMFD flaw sizes, counts and positions to zero. • Running maximum and minimum diameters. • Cumulative length.	26
	Ext Alarm 1	• Increment the “Ext Alarm 1” counter and update the alarm position on the PCiS Main Page. • Trigger printing of an “EXT-ALARM-1” message to a printer connected to the DG-k gauge RS232 port. • Set output parameter bit DW1.8 = 1	
	Ext Alarm 2	• Increment the “Ext Alarm 2” counter and update the alarm	

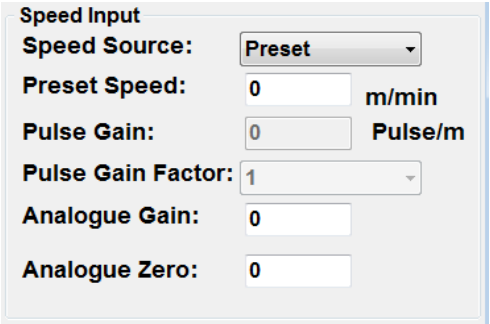
		position on the PCiS Main Page. • Trigger printing of a “EXT-ALARM-2” message to a printer connected to the DG-k gauge RS232 port. • Set output parameter bit DW1.9 = 1	
LIN1 Polarity	Active Low	Active when applied input voltage is below +3V.	26
	Active High	Active when applied input voltage is above +10.5V.	
LIN2 Function	Reset	Resets to zero: • All SMFD flaw sizes, counts and positions to zero. • Running maximum and minimum diameters. • Cumulative length.	26
	Ext Alarm 1	• Increment the “Ext Alarm 1” counter and update the alarm position on the PCiS Main Page. • Trigger printing of an “EXT-ALARM-1” message to a printer connected to the DG-k gauge RS232 port. • Set output parameter bit DW1.8 = 1	
	Ext Alarm 2	• Increment the “Ext Alarm 2” counter and update the alarm position on the PCiS Main Page. • Trigger printing of a “EXT-ALARM-2” message to a printer connected to the DG-k gauge RS232 port. • Set output parameter bit DW1.9 = 1	
LIN2 Polarity	Active Low	Active when applied input voltage is below +3V.	26
	Active High	Active when applied input voltage is above +10.5V.	
Ext-Alarm Hold time	Set a minimum hold time (in milliseconds) for the “Ext Alarm 1” and “Ext Alarm 2” logic inputs; multiple activations of any “Ext Alarm 1” and “Ext Alarm 2” logic input within this time period are counted as a single activation.		-

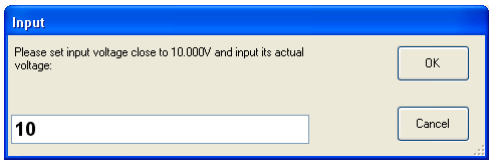
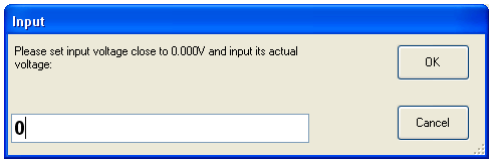
PID



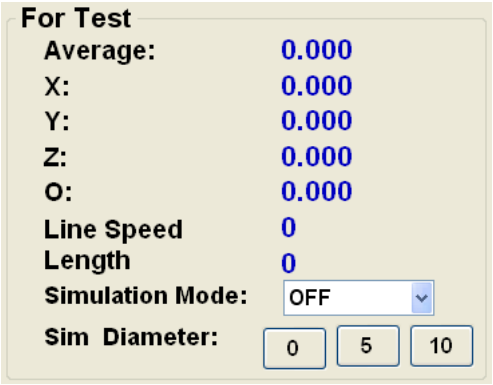
Field	Description			In DW
Range	Maximum controller output voltage range (0 to 50%).			33
Distance	Wire path distance between the gauge and the controlled equipment (extruder or capstan).			35
Extruder Delay	Response time of the controlled equipment (extruder or capstan; typically 1s).			34
Start Speed	Minimum line speed for controller operation.			32
	Line speed	< Start Speed	> Start Speed	
	Controller state	HOLD	ON / Ready	
P	Diameter error proportional gain (0 to 100%).			36
I	Diameter error integral gain (0 to 100%).			37
Output Polarity	Normal	Normal controller output polarity.		31.8
	Reverse	Reverse controller output polarity.		

Speed Input



Field	Description		In DW
Speed Source	Preset	Use the fixed “Preset Speed” value for the line speed.	28
	Pulse	Determine the line speed from the pulse input.	
	Analogue	Determine the line speed from the analogue input voltage.	
Preset Speed	**Applicable only when “Speed Source” is set to “Preset”.** Preset line speed.		29
Pulse Gain	**Applicable only when “Speed Source” is set to “Pulse”.** Set the line speed encoder pulse rate in pulses/metre.		30
Pulse Gain Factor	**Applicable only when “Speed Source” is set to “Pulse”.** Set the pulse gain factor to change the entry range for the “Pulse Gain” (set to “1” unless using very high or very low pulse rates).		-
Full Scale	**Applicable only when “Speed Source” is set to “Analogue”.** Set the line speed encoder full scale speed (in metres/minute) corresponding to the +10V maximum input voltage.		30
Analogue Gain	**Applicable only when “Speed Source” is set to “Analogue”.** Gain factor for calibrating the analogue input voltage.		84
Analogue Zero	**Applicable only when “Speed Source” is set to “Analogue”.** Zero level for calibrating the analogue input voltage.		85
	**This button only appears when “Speed Source” is set to “Analogue”.**		-
	1	Click this button to automatic calibrate the analogue input voltage.	
	2	Apply a voltage close to +10V to the analogue input, enter the measured voltage into the first dialogue box and click “OK”.	
			
	3	Apply a voltage close to 0V to the analogue input (or short-circuit the input to ground for 0V), enter the measured voltage into the second dialogue box and click “OK”. The software will automatically adjust the “Analogue Gain” and “Analogue Zero” parameters so that the full scale analogue input voltage is +10V and zero input voltage is 0V.	
			

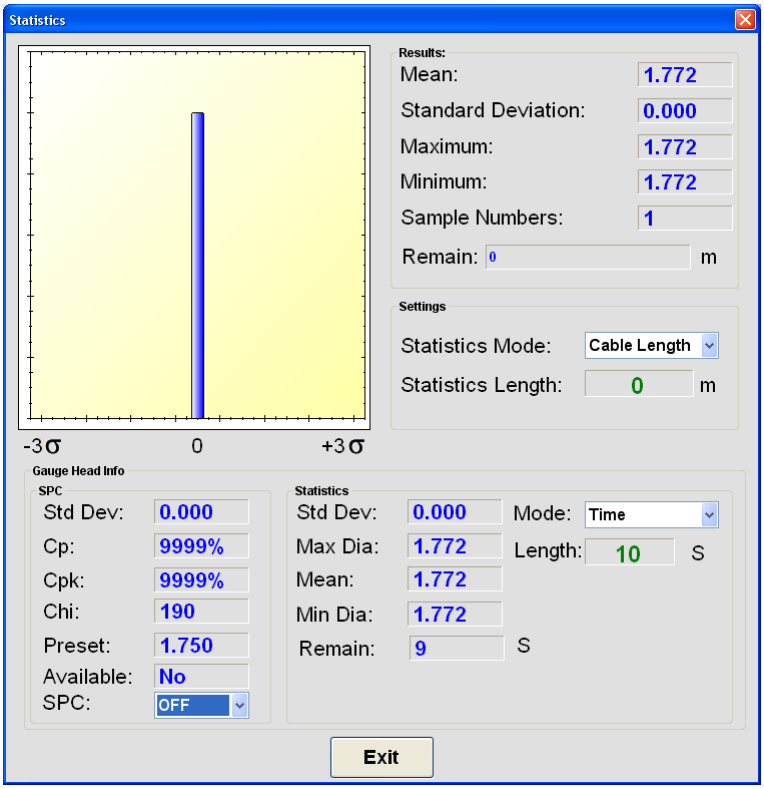
For Test



Field	Description		Out DW
Average	Average of measured X, Y, Z (DG3030 only) diameters.		2
X	Measured X diameter (time averaged).		3
Y	Measured Y diameter (time averaged).		4
Z	Measured Z diameter (time averaged; DG3030 only).		5
O	Ovality = max(X, Y, Z) – min(X, Y, Z)		6
Line Speed	Line speed from one of the following sources: • User preset line speed. • Measured line speed from the speed pulse input. • Measured line speed from the analogue input.		23
Length	Calculated cumulative length of object.		24
Simulation Mode	OFF	Normal measurement operation.	-
	ON	Simulation mode operation: The gauge will behave as if an object of diameter “Sim diameter” has been placed in the optical gate (all above gauge measurements, output parameters and analogue outputs will behave accordingly). Do not forget to set to “OFF” to exit simulation mode and resume normal measurement operation.	
Sim Diameter	0	When “Simulation Mode” is set to “ON”, click this button to simulate a 0mm object diameter.	-
	5	When “Simulation Mode” is set to “ON”, click this button to simulate a 5mm object diameter.	
	10	When “Simulation Mode” is set to “ON”, click this button to simulate a 10mm object diameter.	

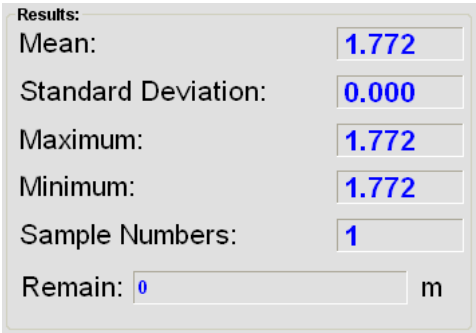
STATISTICS

Click the “Statistics” button to access the “Statistics” page:



Click the “Exit” button to return to the main page.

Results

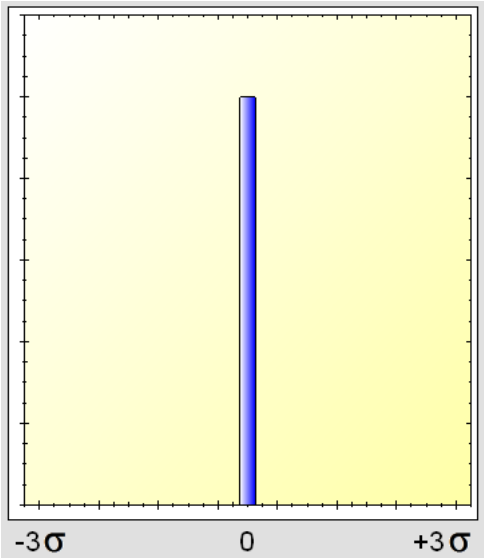


Note: statistics shown on the “Results” pane are compiled by the PCIS_DGK software using raw diameter data collected from the gauge and may not correspond to statistics computed by the gauge.

Field	Description
Mean	Mean of all diameters sampled during the sampling window.
Standard deviation	Standard deviation of all diameters sampled during the sampling window.
Maximum	Maximum diameter sampled during the sampling window.
Minimum	Minimum diameter sampled during the sampling window.

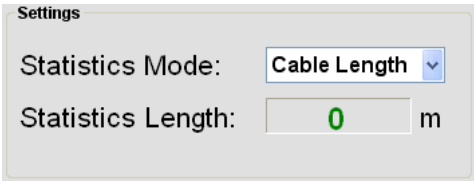
Sample numbers	Number of diameter samples collected during the sampling window.
Remain	Count down of the remaining sampling window time or length until the next statistics result.

Graph



Note: statistics shown on the graph are compiled by the PCIS_DGK software using raw diameter data collected from the gauge and may not correspond to statistics computed by the gauge.

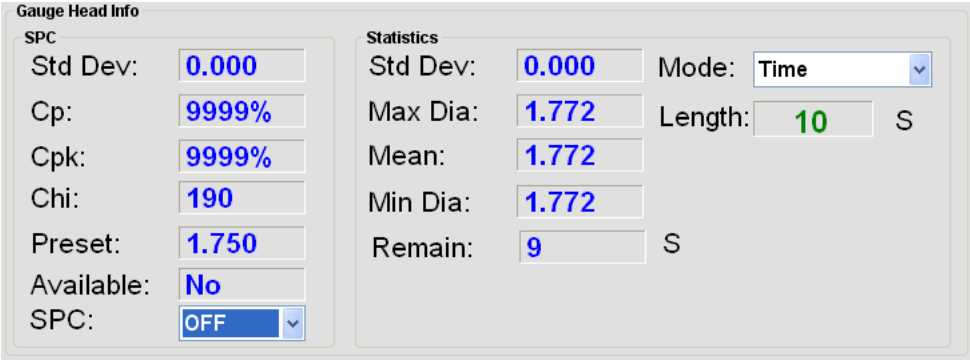
Settings



Note: the “Settings” pane defines the calculation window for statistics compiled by the PCIS_DGK software using raw diameter data collected from the gauge; these statistics are displayed in “Results” window. These settings are NOT used for statistics calculations onboard the gauge.

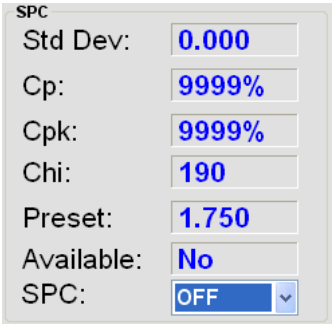
Field	Description	
Statistics Mode	One Reel	Set the sampling window as the period between two resets. A reset may be triggered by: • Clicking the Reset button in the “Speed” pane of the main page. • Pressing ◁ and ▷ together on optional AiG2 interface display unit connected to the gauge. • Applying a reset pulse to an appropriately configured logic input on the gauge.
	Cable Length	Set the sampling window as a line length.
	Time	Set the sampling window as a time period.
Statistics Length / Time	Sampling window time (if “Statistics Mode” is set to “Time”) or length (if “Statistics Mode” is set to “Cable Length”). Click on this field to set its value. The statistical analysis runs continuously and resets all “Results” values to zero at the end of each sampling window.	

Gauge Head info



Note: the statistics shown on the "Gauge Head info" pane are computed by the gauge.

SPC



Note: statistics shown on the "SPC" pane are computed by the DG-k gauge.

Statistical Process Control (SPC) is an optional function on DG gauges fitted with the PID feedback controller option.

SPC automatically adjusts the preset diameter for the PID feedback controller to minimise insulation diameter (and material consumption) whilst keeping the insulation diameter within the lower tolerance limit.

A short SPC sampling window is required for responsive adjustment of the preset diameter. The SPC sampling window is automatically set to:

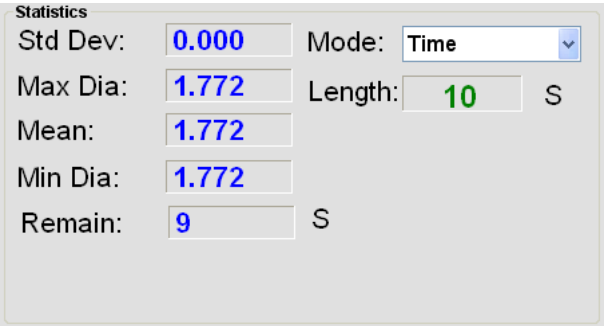
$$SPC\ sampling\ window = 3 \times \left(\frac{Distance}{Line\ speed} + Delay\right)$$

Distance is the extruder-to-DG gauge distance (as set on the "PID" pane of the "Interface" window).
Delay is the extruder response delay time (as set on the "PID" pane of the "Interface" window).

Field	Description	
Std Dev	Standard deviation of all diameters sampled during the sampling window.	
Cp	Process capability C_p.	
Cpk	Process capability C_{pk}.	
Chi	X^2 normal distribution test result.	
Preset	Adjusted PID controller preset value.	
Available	NO	Insufficient data collected for SPC to run or data collected is not normally-distributed.
	YES	Sufficient data collected for SPC to run.
SPC	OFF	Toggle SPC on or off.

	ON	

Statistics



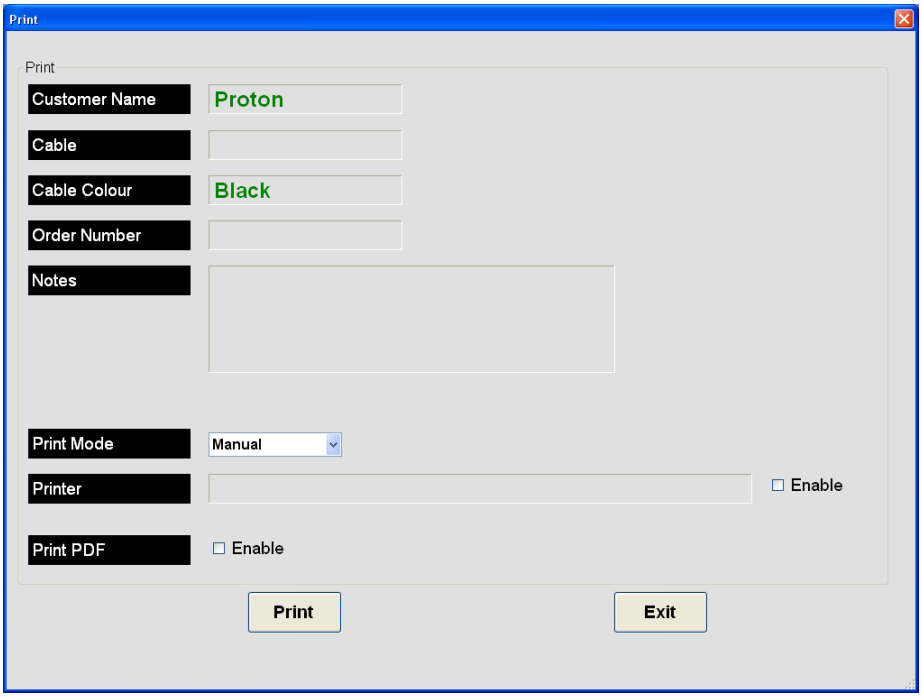
Note: statistics shown on the “Statistics” pane are computed by the gauge.

Field	Description	
Std Dev	Standard deviation of all diameters sampled during the sampling window.	
Max Dia	Maximum diameter sampled during the sampling window.	
Mean	Mean of all diameters sampled during the sampling window.	
Min Dia	Minimum diameter sampled during the sampling window.	
Remain	Count down of the remaining sampling window time or length until the next statistics result.	
Mode	Time	Set the sampling window as a time period.
	Cable Length	Set the sampling window as a line length.
	One Reel	Set the sampling window as the period between two resets. A reset may be triggered by: • Clicking the Reset button in the “Speed” pane of the main page. • Pressing ◁ and ▷ together on optional AiG2 interface display unit connected to the gauge. • Applying a reset pulse to an appropriately configured logic input on the gauge.
Length / Time	Click to set the sampling window time or length.	

PRINT

Click the “Print” button for report printing:

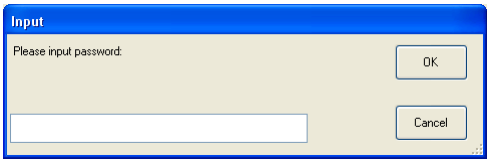
If you are prompted for a license key, then please contact your Proton Products representative with the software serial number to obtain the license key (once the correct license key has been entered, this request will not appear again).

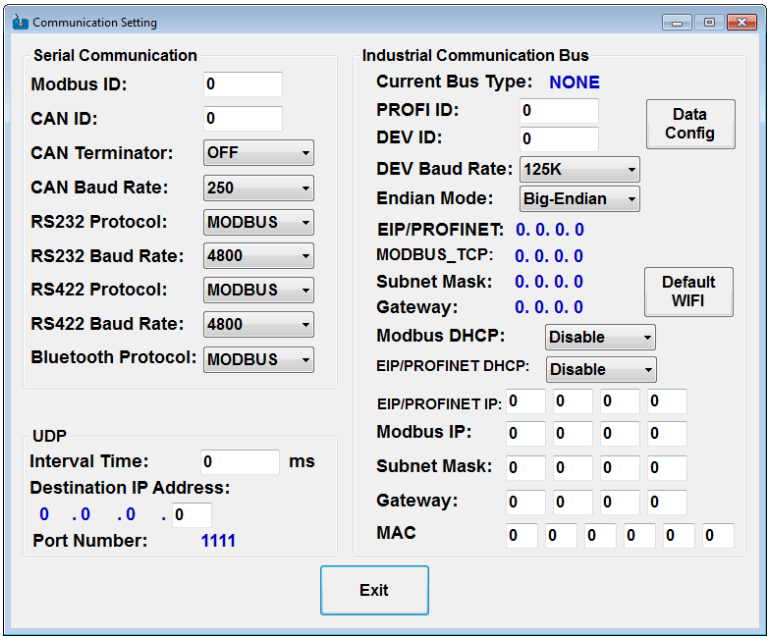


Field	Description	
Customer Name	Click to enter the customer name.	
Cable	Click to enter the cable code.	
Cable Colour	Click to enter the cable colour.	
Order Number	Click to enter the cable order number.	
Notes	Click to enter order notes.	
Print Mode	Manual	Select for manual report printing (click Print to print).
	By Statistics	Select to automatically print a report at the end of each statistics window.
	Reset	Select to automatically print a report whenever the DG-k gauge is reset by: • Clicking the Reset button in the “Speed” pane of the main page. • Pressing ◁ and ▷ together on optional AiG2 interface display unit connected to the gauge. • Applying a reset pulse to an appropriately configured logic input on the gauge.
Printer	Click to select a printer.	Enable: Tick to enable printing.
Print PDF	Enable: Tick to print the report to .pdf file.	
Print	Click to print the report.	
Exit	Click to exit the “Print” page.	

COMMUNICATION

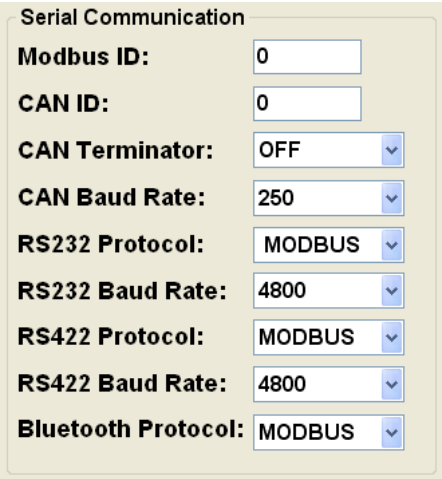
To access the “Communication” page and configure communications interfaces:

1	Click the “Communication” button:	2	Enter 65000 for the “Communication” password and click “OK”:
			



Click the “Exit” button to return to the main page.

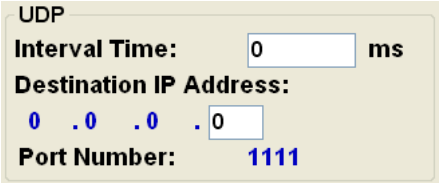
Serial Communication



Field	Description		In DW
Modbus ID	Modbus address (0 to 255).		57
CAN ID	CAN-bus address (0 to 255).		51
CAN Terminator	OFF	CAN-bus port termination resistor NOT connected.	68

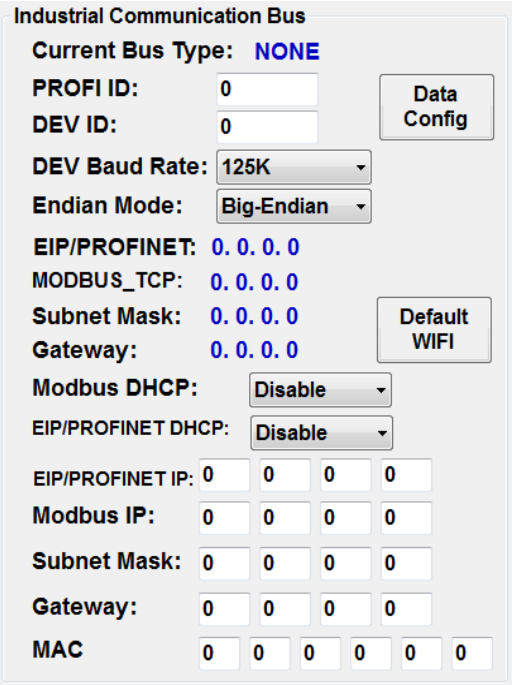
	ON	CAN-bus port termination resistor connected.	
CAN Baud Rate	250k, 500k or 1M.		52
RS232 Protocol	Modbus, Proton or SLP (Single Letter Protocol). Will be forced to “Modbus” by the PCIS_DGK software whenever the gauge is connected to a PC via the RS-232 port.		54
RS232 Baud Rate	4800, 9600, 19200, 38400 or 115200.		53
RS422 Protocol	Modbus, Proton or SLP (Single Letter Protocol).		55
RS422 Baud Rate	4800, 9600, 19200, 38400, 115200, 250k, 500k or 1M.		56
Bluetooth Protocol	Modbus or Proton.		69

UDP



Field	Description	In DW
Interval Time	UDP data output interval time. Set to zero to disable UDP data output.	72
Destination IP Address	UDP data output destination IP address (last octet only, first three octets are the same as the “MOD IP address” in the “Industrial Communication Bus” pane).	81
Port Number	UDP data output is sent to port 1111 (fixed, not user configurable)	-

Industrial Communication Bus



Field	Description	DW
Current Bus Type	Indicates the installed optional communications interface (None, PROFIBUS, PROFINET, DeviceNet or EtherNet / IP)	Out: 40
PROFI ID	PROFIBUS address (0 to 125)	In: 50
DEV ID	DeviceNet address (0 to 63)	In: 79
DEV Baud Rate	DeviceNet baud rate (125k, 250k or 500k)	In:

			80
Endian Mode	Endianess (Big-Endian or Little-Endian)		In: 82
EIP/PROFINET	Gauge EtherNet/IP or PROFINET IP address (value displayed may be user or DHCP set; read only).		Out: 46-47
MODBUS_TCP	Gauge Ethernet Modbus IP address (value displayed may be user or DHCP set; read only).		Out: 44-45
Subnet Mask	Subnet Mask (value may be set by user or DHCP; read only).		Out: 48-49
Gateway	Gateway (value may be set by user or DHCP; read only).		Out: 51-52
Modbus DHCP	Disable	Disable DHCP allocation of the Ethernet Modbus IP address (user set “Modbus IP” applies).	In: 58
	Enable	Enable DHCP allocation of the Ethernet Modbus IP address (user set “Modbus IP” ignored unless DHCP fails).	
EIP/PROFINET DHCP	Disable	Disable DHCP allocation of the Ethernet/IP or PROFINET IP address (the user set “EIP/ PROFINET IP” applies).	In: 59
	Enable	Enable DHCP allocation of the Ethernet/IP IP address (user set “EIP/ PROFINET IP” is ignored unless DHCP fails).	
EIP/ PROFINET IP	Set the gauge EtherNet/IP or PROFINET IP address as required (ignored if “EIP/PROFINET DHCP” is set to “Enabled” unless DHCP fails).		In: 62-63
Modbus IP	Set the gauge Ethernet Modbus IP address as required (ignored if “Modbus DHCP” is set to “Enabled” unless DHCP fails).		In: 60-61
Subnet Mask	Set the subnet mask as required (ignored if either DHCP is set to “Enabled” unless DHCP fails).		In: 64-65
Gateway	Set the gateway as required (ignored if either DHCP is set to “Enabled” unless DHCP fails).		In: 66-67
MAC	Modbus Ethernet interface MAC address (in decimal).		-

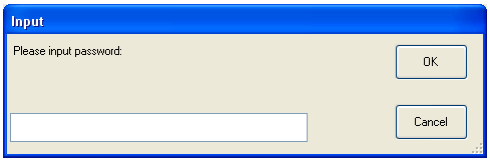
Data Configuration

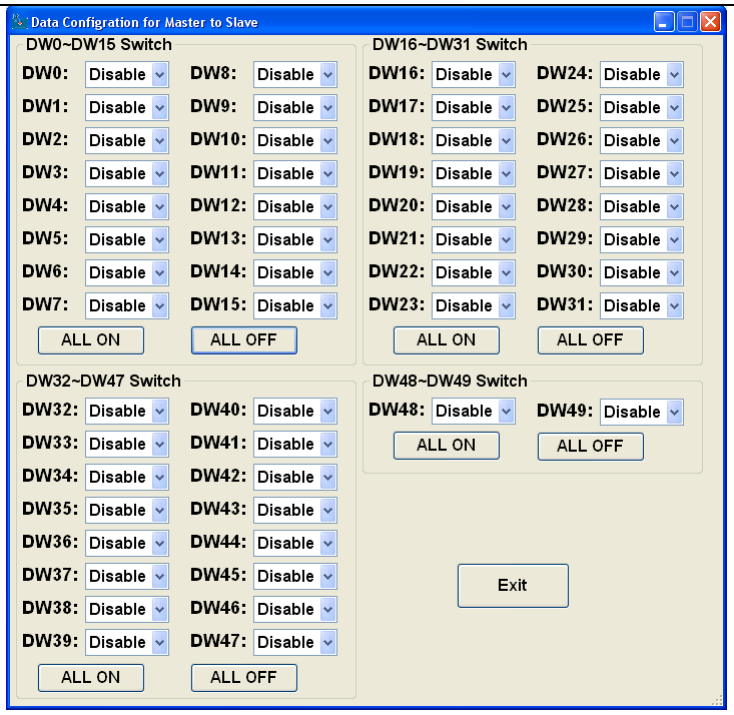
For optional PROFIBUS, DeviceNet and EtherNET / IP communications interfaces, the gauge may be configured to ignore (disable) specific input parameters sent to it over these interfaces (master to slave communications i.e. configuration data sent from a controller to the gauge).

Controllers do not need to set a value for disabled input parameters each time that they send a data page to the gauge to configure it; only enabled input parameters must be set with valid values.

CAN-bus, RS-232, RS-422 / 485 and Ethernet communications interfaces are not affected by this function; all input parameters are always enabled and configurable under these interfaces.

To enable or disable specific input parameters or groups of input parameters:

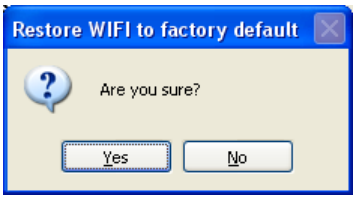
1	Click the “Data Config” button:	**2**	Enter 65065 for the “Data Configuration” password and click “OK”:
			
3	Enable or disable individual parameters using the drop-down menus. Enable or disable groups of parameters by clicking on the “ALL ON” or “ALL OFF” buttons respectively.		



4	Click the “Exit” button to return to the “Interface” page.

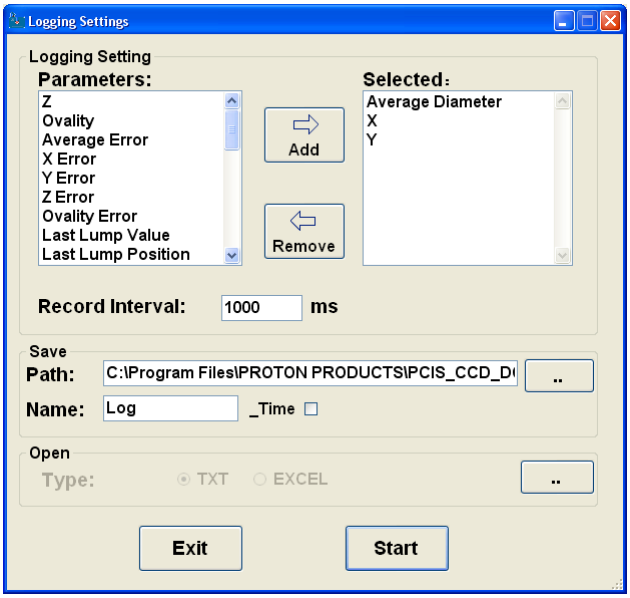
Restore WiFi settings to factory defaults

To restore WiFi settings to factory defaults:

1	Click the “Default WIFI” button:	**2**	Click “Yes” to restore WiFi settings to factory defaults:
			

START LOGGING

Click the “Start Logging” button to open the “Logging Settings” dialog:



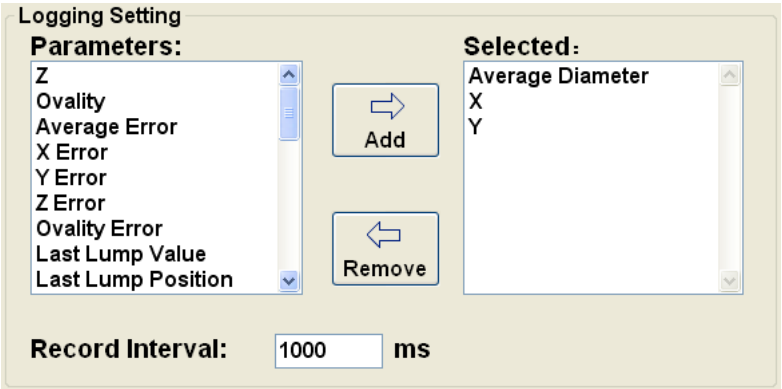
Click the “Start” button to commence logging data to a log file.

The “Logging Settings” dialog may be closed during data logging by clicking the “Exit” button.

Click either the “Stop” button on the “Logging Settings” dialog or the “Stop Logging” button on the main page to terminate data logging.

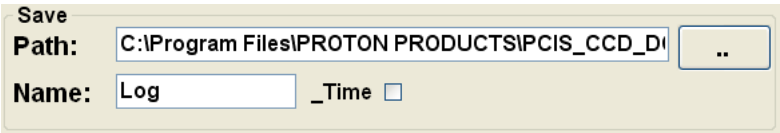
Two separate log files are generated; one containing the selected parameters and one containing a log of Single Measurement Flaw Detection (SMFD) lump and neck flaws.

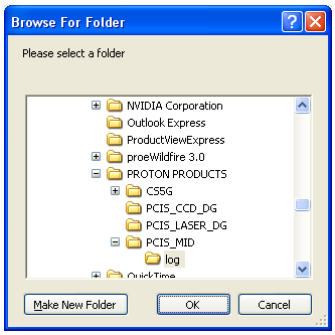
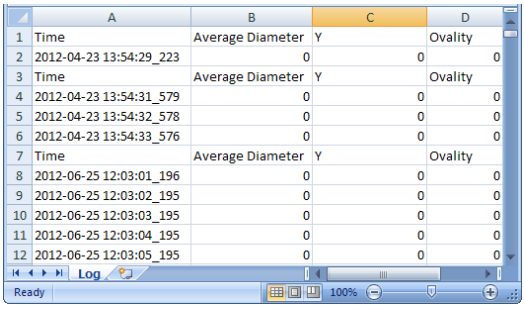
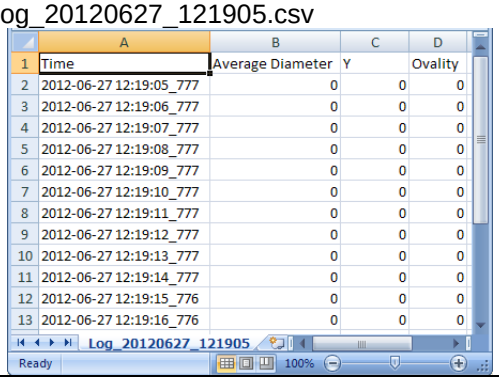
Logging Setting



Field	Comments
Parameters	Click and highlight parameters to be logged to the log file and then click [Add] to transfer to the "Selected" box.
Selected	Click to highlight parameters to be removed from logging and then click [Remove].
Record Interval	Enter the time interval (in milliseconds) at which data should be written to the log file (the default time interval is 1000ms).

Save



Field	Comments	
Path	Click [..] to select an alternative or new folder to store the log file: 	
Name	Enter the name of the log files (the default file names are "Log.csv" and "Log_SMFD.csv"). The log file is written using the "comma separated values (.csv)" format, which can be opened using Microsoft Excel and other common spreadsheet programs.	
_Time	**Un-ticked (default)**	**Ticked**
	Each logging session (when the "START" button is pressed) is appended to the same log file: Log.csv 	Each logging session (when the "START" button is pressed) is written to a new log file with a date and time stamp appended to the filename: Log_20120627_121905.csv 

	A	B	C	D
1	Time	Average Diameter	Y	Ovality
2	2012-04-23 13:54:29_223	0	0	0
3	Time	Average Diameter	Y	Ovality
4	2012-04-23 13:54:31_579	0	0	0
5	2012-04-23 13:54:32_578	0	0	0
6	2012-04-23 13:54:33_576	0	0	0
7	Time	Average Diameter	Y	Ovality
8	2012-06-25 12:03:01_196	0	0	0
9	2012-06-25 12:03:02_195	0	0	0
10	2012-06-25 12:03:03_195	0	0	0
11	2012-06-25 12:03:04_195	0	0	0
12	2012-06-25 12:03:05_195	0	0	0

Log

Ready 100%

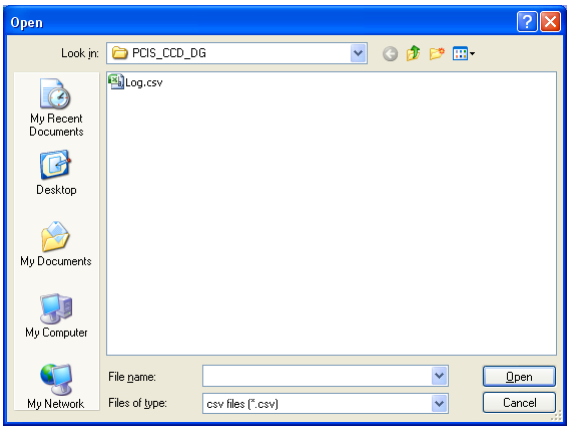
	A	B	C	D
1	Time	Average Diameter	Y	Ovality
2	2012-06-27 12:19:05_777	0	0	0
3	2012-06-27 12:19:06_777	0	0	0
4	2012-06-27 12:19:07_777	0	0	0
5	2012-06-27 12:19:08_777	0	0	0
6	2012-06-27 12:19:09_777	0	0	0
7	2012-06-27 12:19:10_777	0	0	0
8	2012-06-27 12:19:11_777	0	0	0
9	2012-06-27 12:19:12_777	0	0	0
10	2012-06-27 12:19:13_777	0	0	0
11	2012-06-27 12:19:14_777	0	0	0
12	2012-06-27 12:19:15_776	0	0	0
13	2012-06-27 12:19:16_776	0	0	0

Log_20120627_121905

Ready 100%

Open

Click [..] to select a log file to open with the system default .csv file viewing program:



Log file format

The following are examples of “comma separated values (.csv)” log files generated with the default log file name “Log”:

_Time:	Un-ticked (default)	**File name:**	Log.csv

```
Time,Average Diameter,Y,Ovality
2012-04-23 13:54:29_223,0,0,0
Time,Average Diameter,Y,Ovality
2012-04-23 13:54:31_579,0,0,0
2012-04-23 13:54:32_578,0,0,0
2012-04-23 13:54:33_576,0,0,0
Time,Average Diameter,Y,Ovality
2012-06-25 12:03:01_196,0,0,0
2012-06-25 12:03:02_195,0,0,0
2012-06-25 12:03:03_195,0,0,0
2012-06-25 12:03:04_195,0,0,0
2012-06-25 12:03:05_195,0,0,0
```

_Time:	Ticked	**File name:**	Log_20120627_121905.csv

```
Time,Average Diameter,Y,Ovality,
2012-06-27 12:19:05_777,0.000,0.000,0.000,
2012-06-27 12:19:06_777,0.000,0.000,0.000,
2012-06-27 12:19:07_777,0.000,0.000,0.000,
2012-06-27 12:19:08_777,0.000,0.000,0.000,
2012-06-27 12:19:09_777,0.000,0.000,0.000,
2012-06-27 12:19:10_777,0.000,0.000,0.000,
2012-06-27 12:19:11_777,0.000,0.000,0.000,
2012-06-27 12:19:12_777,0.000,0.000,0.000,
2012-06-27 12:19:13_777,0.000,0.000,0.000,
2012-06-27 12:19:14_777,0.000,0.000,0.000,
2012-06-27 12:19:15_776,0.000,0.000,0.000,
2012-06-27 12:19:16_776,0.000,0.000,0.000,
```

_Time:	Ticked	**File name:**	Log_SMFD_20121127_111835.csv

```
Time,Type,No.,Size,Position
2012-11-27 11:18:44_934,Lump,1,1.436,32
2012-11-27 11:18:45_975,Neck,2,-1.742,34
2012-11-27 11:18:46_812,Lump,3,1.570,35
2012-11-27 11:18:47_145,Neck,4,-1.578,36
2012-11-27 11:18:47_796,Lump,5,1.461,37
2012-11-27 11:18:48_15,Neck,6,-1.544,37
2012-11-27 11:18:48_423,Lump,7,1.608,38
2012-11-27 11:18:48_726,Neck,8,-1.796,39
```

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