

2011-10-10
Revision 2.7

Panel Profiler Board Measurement System

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2 Safety information

The distance measuring sensors PreciCura is an instrument conforming to Class 2 Lasers according to IEC 825

Low power lasers that emit visible radiation. (Wavelength 400-700nm).
With exposure of the eye to dazzling radiation the eye triggers the blinking reflex before the allowable limit for maximum permitted exposure can be reached. If the blinking reflex is suppressed or the eye is repeatedly exposed to dazzling radiation the retina can be damaged. For a constantly lit laser the maximum radiation level allowed is 1mW.

PreciCura has an in-built laser with very low power. The light is visible in the red spectrum. Normally the eyes blinking reflex prevents the light from hitting the retina.

Laser light can damage the eye. Do not stare into the laser beam.

3 Installation

3.1 Basic system thickness

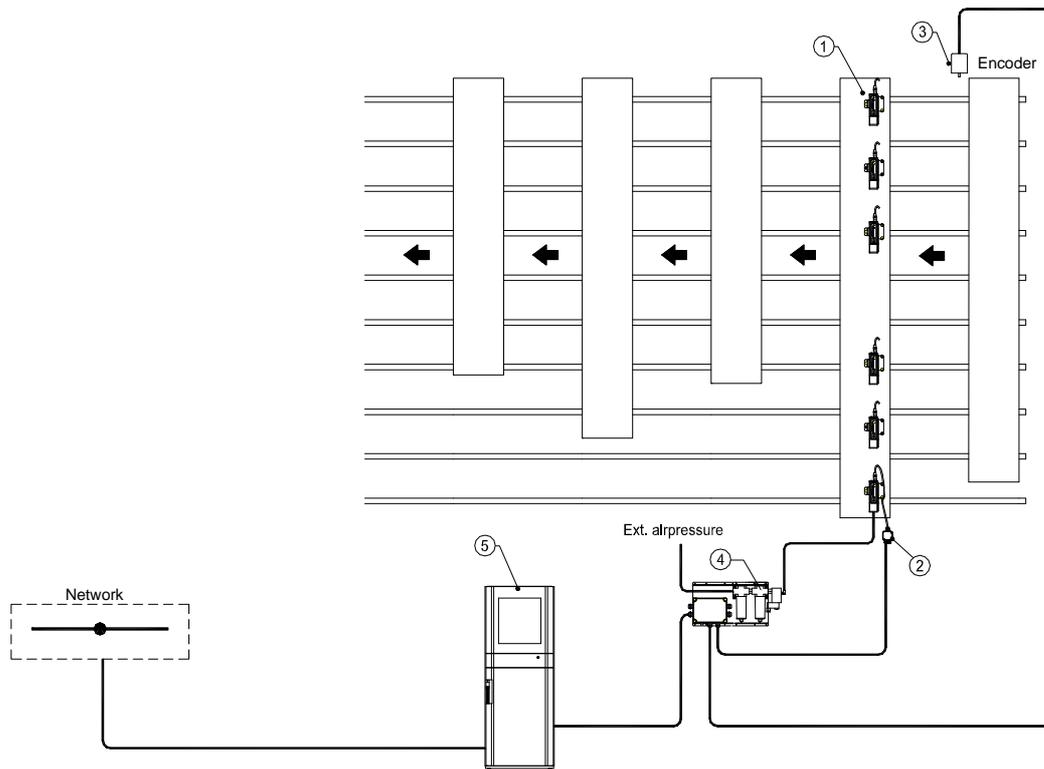


Figure 3.1.1 A system with 6 PreciCura sensors mounted.

3.1.1 Basic system

Ref	Qty	Description	Note
1	2xN	LIMAB, PreciCura SR,	
1	2xN	LIMAB, Bracket PreciCura	
1	N	LIMAB, Air Knife PreciCura	
2	2xN	LIMAB, CAN Connection box	
3	1	Encoder assembly	
4	1	Air purge and CAN-bus connection box	
5	1	PC	
5	1	2ch CAN-bus board, PCI	
5	1	PC-cabinet	
6	152	CAN-bus cable 2x2x0,36mm	
1	1	Measurement frame	

N= Nr of tracks

3.1.2 Options

Ref	Qty	Supplier	LIMAB part no.
1	1	Calibration unit	96306
2	1	Medium pressure ventilation fan	772983
	1	Spare filters for fan	62063
3	1 set	Air boxes	-

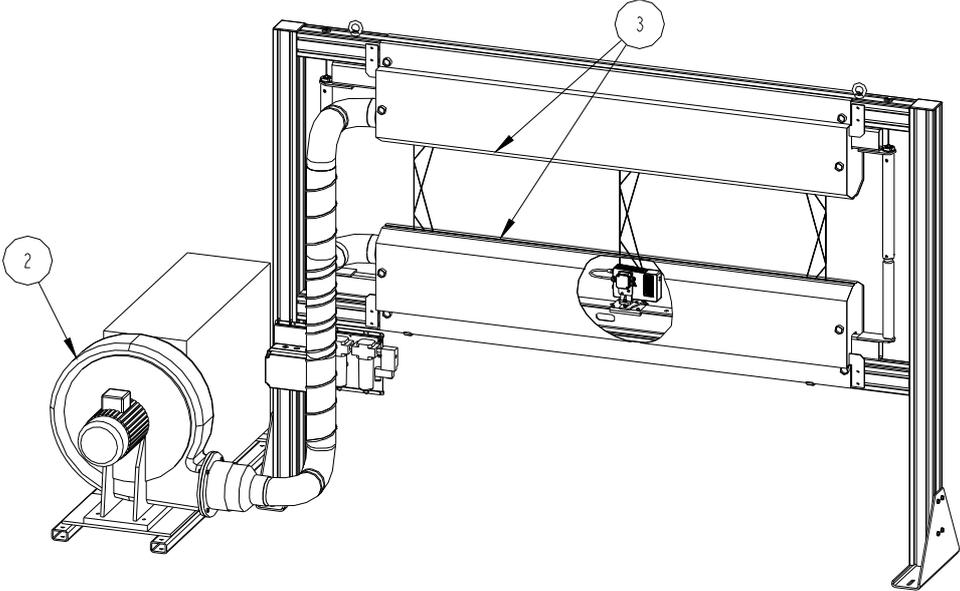


Figure 3.1.2 A Frame with PreciCura and blow unit mounted.

Air pipes provided by customer.

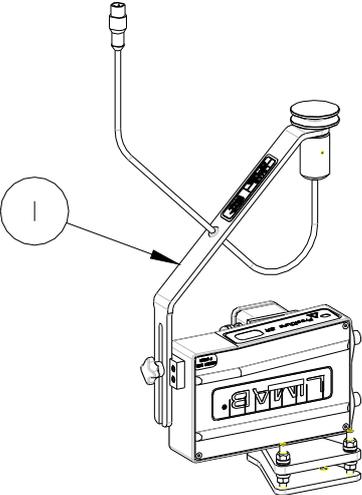


Figure 3.1.3 A PreciCura sensor with a calibration tool mounted.

Customer preparations: Following preparations are recommended to make before commission. Use the list as a checklist. Mark with OK if action is made or make a note if not. Sign the document and fax it to LIMAB before commissioning.

3.1.3 Checklist

Action	Reference	Action made / Note
Mounting of encoder on transversal conveyor	Encoder on page 16	
Frame for thickness sensors.	System documentation	
Power supply	Power supply Power supply requirements on page 14	
Compressed air to air purge	Air purge system on page 14	
Mounting of air purge unit	Air purge system on page 14	
Cabling between units	Cabling on page 14	
Network connection for PC		
Signature /Date	Company	

3.1.4 Dimensional drawing thickness

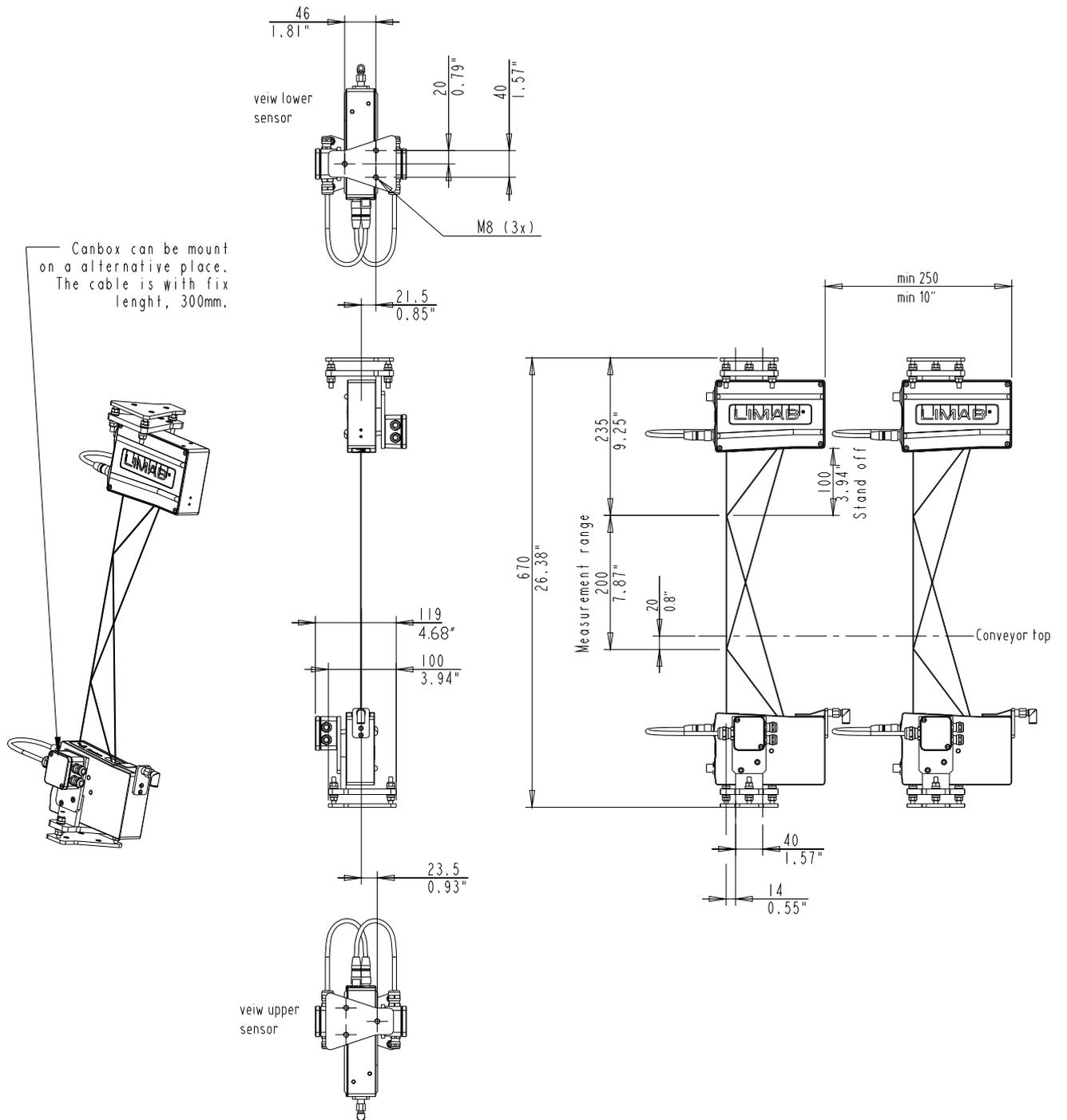


Figure 3.1.4 PreciCura dimension, alignment and positioning between sensors.

3.1.5 Frame design

To be sure to reach desired measurement accuracy it is most important that the sensors are mounted correctly. For that reason a measurement frame is always included in the standard system. The most vital part in such a frame is the O-frame that is mounted around the board. The frame is built by a combination of steel alloys and heat treated bars that will equalize temperature elongations in the frame and sensors. LIMAB will adapt the frame to fit your production line.

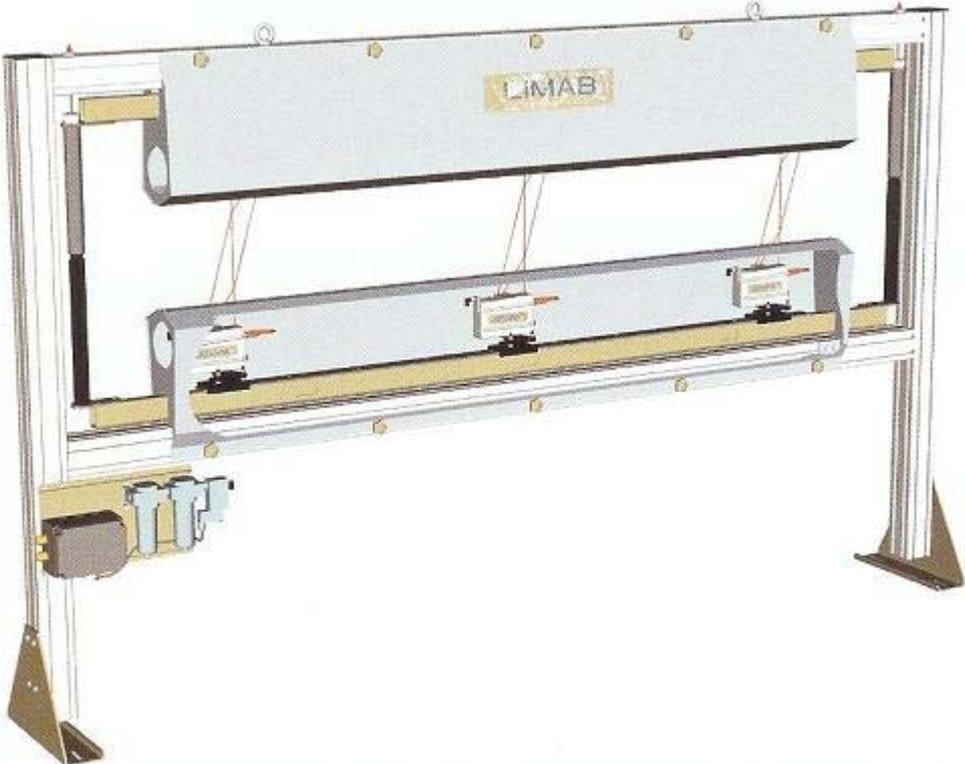


Figure 3.1.5 A typical frame with 3 pars of PreciCura sensors mounted.

3.1.6 Sensor location and programming

3.1.6.1 Example with 4-tracks

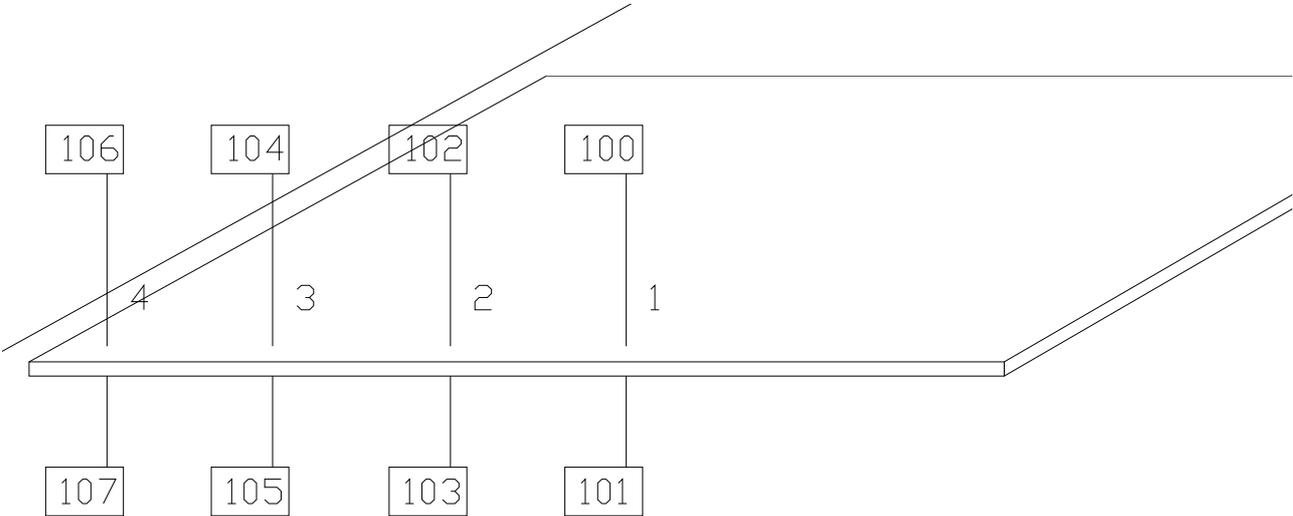


Figure 3.1.6 Four tracks measuring on a board.

The PreciCura numbers, 100 to 107 is the ID of the PreciCura sensors, together in pairs making measurement in 4 tracks possible, and the number 1 to 4 is the number of the track. Note the positioning of even and odd ID numbers.

3.1.6.2 Programming of sensors

Each PreciCura sensor has a unique parameter setup, dependent of location and track number. The Figure 3.1.5 will show the CAN-bus address for each sensor. The following parameters have to be changed from default. There are two possible types of PreciCura sensors compatible for this application.

PreciCura	
Parameter	Value for Panel Profiler application
CAN Baud rate	500kbit/s
Data per message	4
CAN Id	Dependent of location
Filter type	AVG CONT
Filter length	1
Measurement Function	Distance

PreciCura SR	
Parameter	Value for Panel Profiler application
CAN Baud rate	500kbit/s
Data per message	4
CAN Id	Dependent of location
Filter type	AVG CONT
Filter length	1
Sample Time	500us
Sample Division	2
Measurement Function	Distance

See PreciCura manual for parameter setting. The parameters need to be set accordingly to the manual for the PreciCura to work properly.

3.1.7 Power supply requirements

Unit	Voltage	Power
PreciCura	18 30 VDC	< 180mA / Unit (<1A during 10ms at power up)
Encoder	9 36 VDC	<150mA
PC	110 230 VAC 50 60Hz	500W max
Air purge	Compressed Air	max 10 Bar

3.1.8 Cabling

Following cables is recommended to install before LIMAB's commissioning

Cable type (in drawing on page 7)	Ref (in drawing on page 21)	Description	Max length (m)
8	CAB01 CAB03	PC --- PreciCura M01	150
8	CAB02 CAB04	PC --- Encoder	150

3.1.9 Air purge system

The lower sensor needs to be cleaned from particles, periodically otherwise the measurement quality will drastically decrease. The easiest way of doing this is to install a *Timer- and connection box with mounting plate*. Blow time: 1sec, pause time: 1min. A blow unit for the frame is also recommended, but is optional, it will increase air pressure inside the frame and make the sensors environment cleaner.

- The customer installs a complete *Timer- and connection box with mounting plate*.
- Complementary installation with air pipes for the frame, also done by the customer (optional).

3.1.9.1 Replacement of filters

Ref	Part no	Description	Qty		Supplier
	44024	Filter, LF-1/4-D-5M-MIDI	1	pc	Festo
	44025	Fine filter, LFMA-1/4-D-MIDI	1	pc	Festo

3.1.10 Timer and connection box

Connection box (A1) for power supply to thickness sensors and encoder. Timer relay for air purge with default setting **1.0s ON, 1min PAUSE**.

The connection box has the following connections:

- CAN-bus connection for
 - PC
 - Encoder
 - Thickness sensors (in)
 - Thickness sensors (out)
- Power supply for
 - Connection box (in)
 - Calibration tool (out)

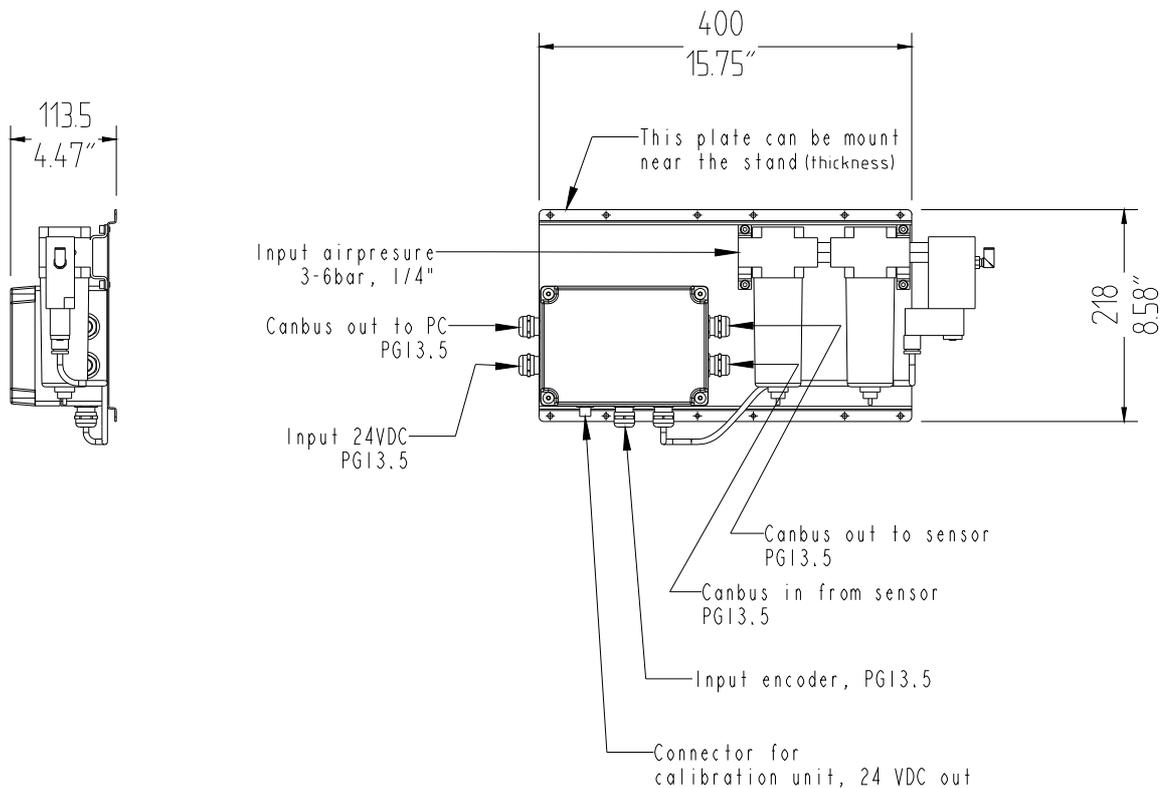


Figure 3.1.7 Mounting plate with connection box A1 and air purge unit.

3.1.11 Encoder

The encoder is mechanically connected to the conveyor or a measurement wheel. It is recommended to connect it mechanically to the conveyor if possible. The encoder is electrically connected to the connection box. Direction of rotation is not significant. The delivered encoder has 4096 pulses/revolution. It's recommended to use the delivered mounting bracket and bellow coupling.

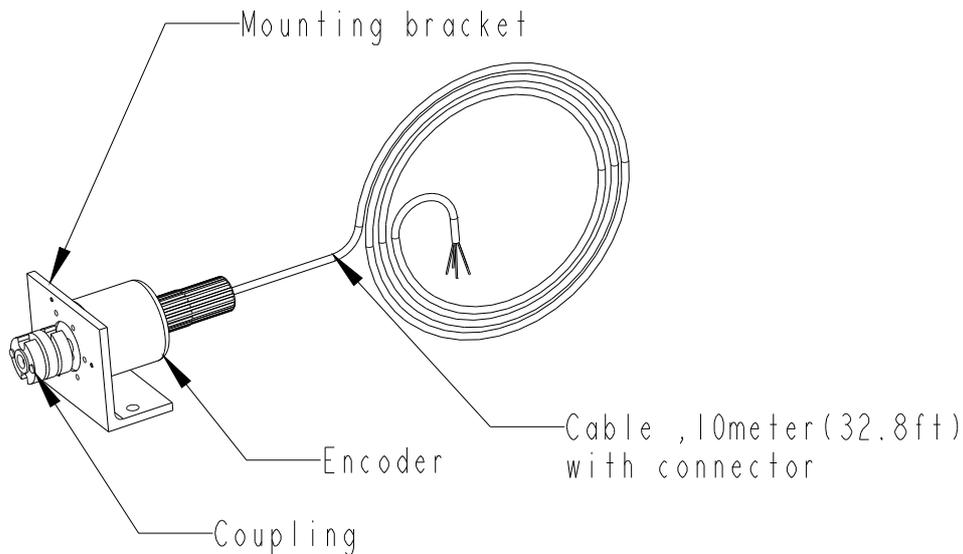


Figure 3.1.8 Encoder, mounting bracket and caballing.

Data for the bellow coupling:

Bore Diameter	10-10 mm
Max misalignment	
Angular	3°
Radial	0.2 mm
Axial	+/- 0.2mm

Encoder is delivered with a cable of 10m length. Recommended pulse rate is 1 to 10 pulses/mm.

Spare part list for encoder

Pos	Qty	LIMAB PartNo.	Supplier Description
1	1	P1280	Leine & Linde, 464 33 3232 Shaft coupling, encoder CAN Shaft ø10mm
2	1	1016	Leine & Linde, 00208011 Flange for encoder CAN
3	1	42016	Leine & Linde, 01209090 Connector EML 12-pin CW FM

4	1	42015	Leine & Linde, 672416083 IS-A Encoder CAN-open 4096ppr Shaft \varnothing 10mm
---	---	-------	---

3.1.11.1 Electrical connection

PIN	IN/OUT	Description	Colour
8	I/O	CAN_H	White
9	I/O	CAN_L	Green
10	IN	0V	Black
12	IN	+24 Supply	Red

3.1.11.2 Encoder dimensional drawing

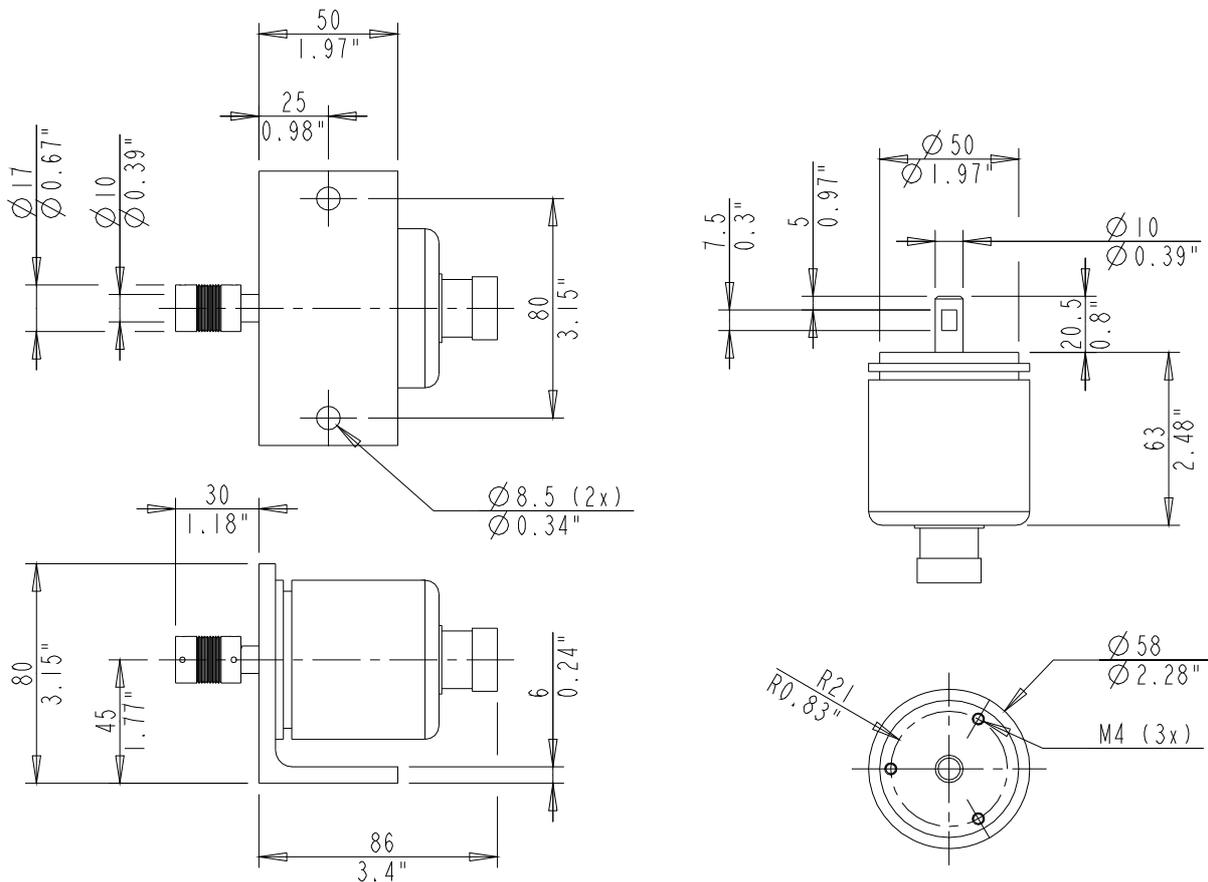


Figure 3.1.9 Encoder.

772544

3.1.11.3 Measurement wheel (Option)

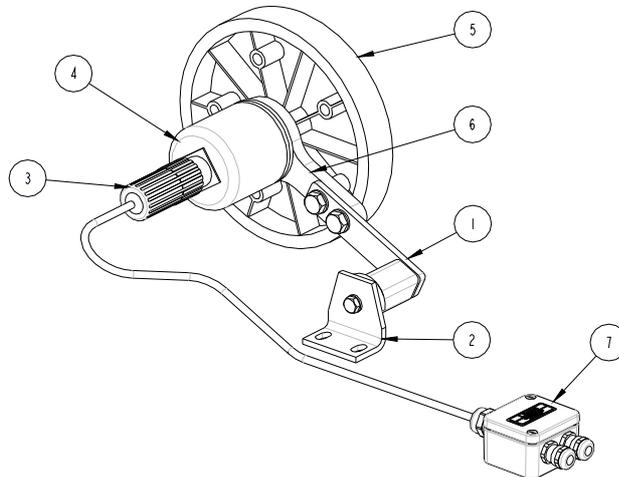


Figure 3.1.10 Encoder mounted to a measurement wheel.

Pos	Qty	LIMAB Part No.	Supplier Description
1	1	31225	ROSTA, 06011001 Tensioning element Type SE 11
2	1	31226	ROSTA, 06590001 Support Type WS 11-15
3	1	42016	Leine & Linde, 01209090 Connector EML 12-pin CW FM
4	1	42015	Leine & Linde, 672416083 IS-A Encoder CAN-open 4096ppr Shaft \varnothing 10mm
5	1	42032	Leine & Linde, 00208002 Measurement wheel 500mm
6	1	772870	Measurement wheel holder
7	1	96305	CAN Connection box

It's recommended to mount the encoder and measurement wheel under the board. If it's mounted above the board the starting point will be different dependant on the thickness of the board. When the board is going to be measured, it's important that the encoder starts to rotate a little bit before the PreciCura detects the board, about 20mm ($\frac{3}{4}$ "') before. See drawing below. And also, after passage, the wheel will rotate a bit after the measurement is done by means of the wheels rotating mass. It's an advantage to have the support bracket (pos2) adjustable in board direction.

The outside diameter is 159mm. That will give a circumference of 500mm (19.67").

4096 pulses/revolution/500 = 8,2 pulses/mm (208,3 pulses/inch).

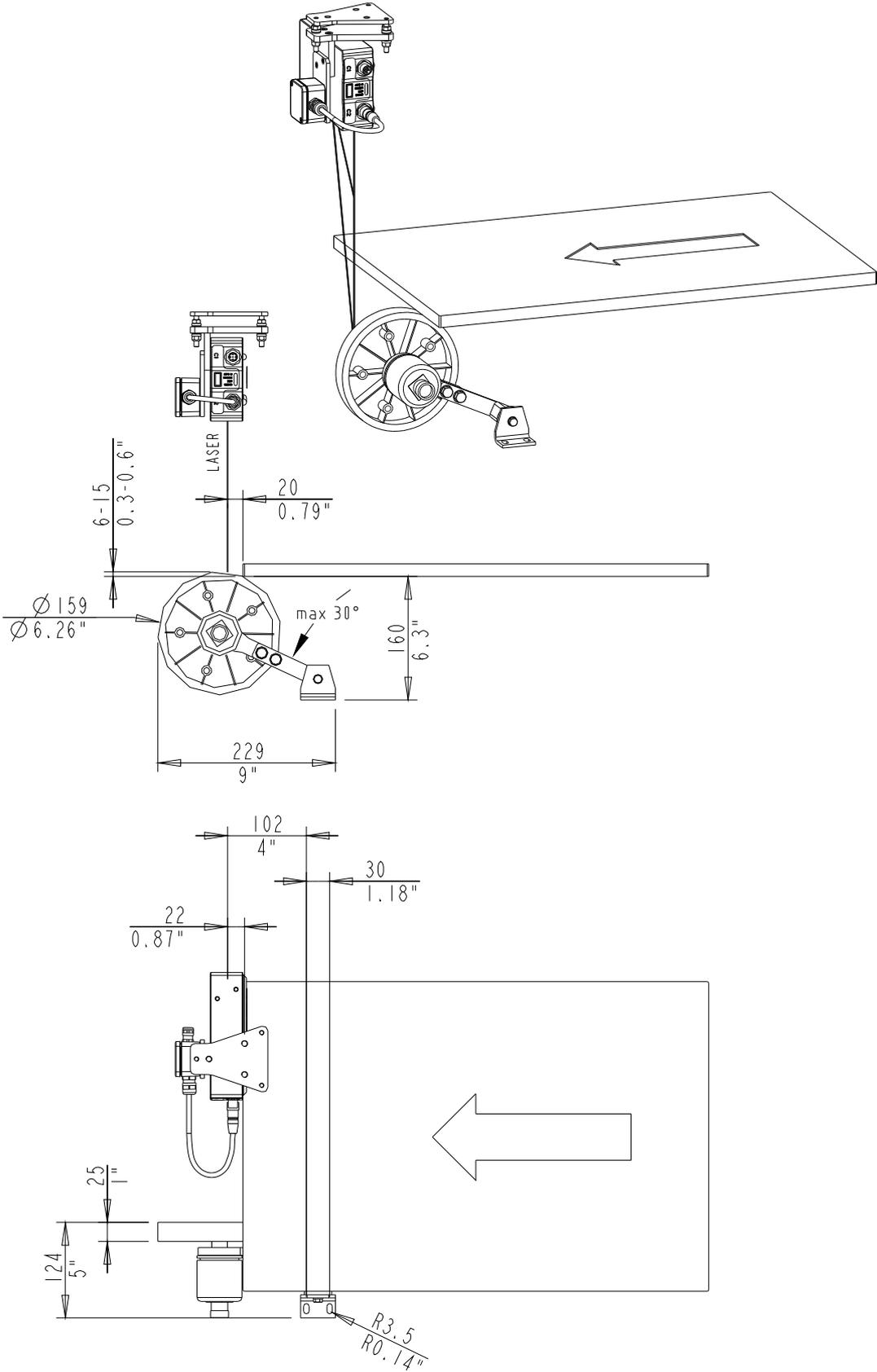


Figure 3.1.11 The measurement wheel installed under the conveyor and the PreciCura laser sensor

3.1.11.4 Frame with positionable measurement tracks

As an option you can get a frame with one or more positional sensors. With this option you can either position the measurement tracks to a desired position or you can have the sensors traversing back and forth all the time to scan the thickness over the whole board.

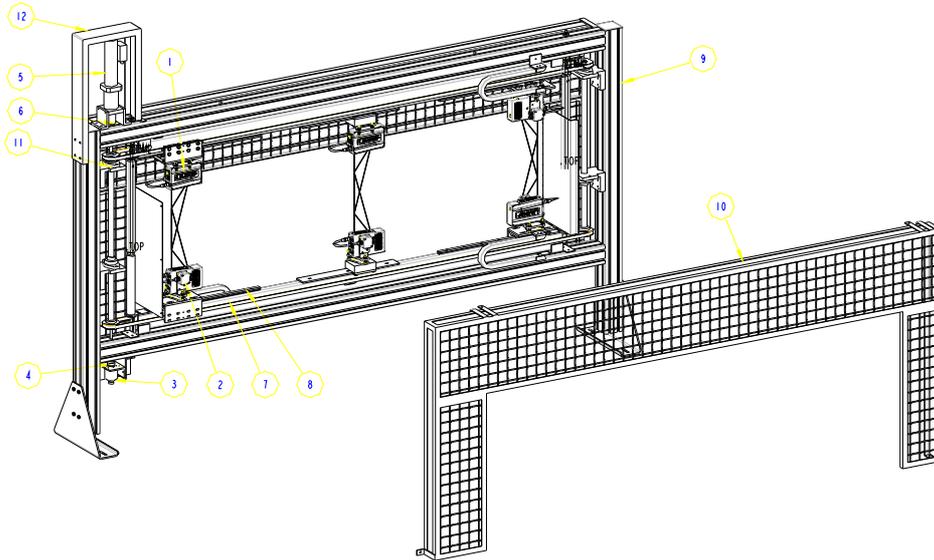


Figure 3.1.12 Additional frame with traversing PreciCura sensors.

Pos	Qty	LIMAB Part No.	Description
1	6*	96246	PreciCura sensors
2	6*	96306	CAN bus boxes
3	1	42015	Encoder
4	1	P1280	Shaft coupling encoder
5	1		Motor and gearbox assembly
6	1	P1368	Shaft coupling motor
7	2		Drive belt
8	4*		Linear guides
9	1		Aluminium frame
10	2		Protection lid
11	4		Bearings
12	1		Motor protection plate

*Quantity depending of application

This system also requires a steering box that can be mounted on the frame or at any other place. The system can also be equipped with an air purge system or a fan with blowing units. Necessary maintenance is to check the tension in the drive belts and the lubrication of the linear guides. The linear guides are designed to operate in extremely rough conditions and have an estimated life length of minimum 10' kilometres of running distance. After that the slide blocks might have to be changed.

3.1.12 Electric Schematic

3.1.12.1 Panel Profiler PC (page1)

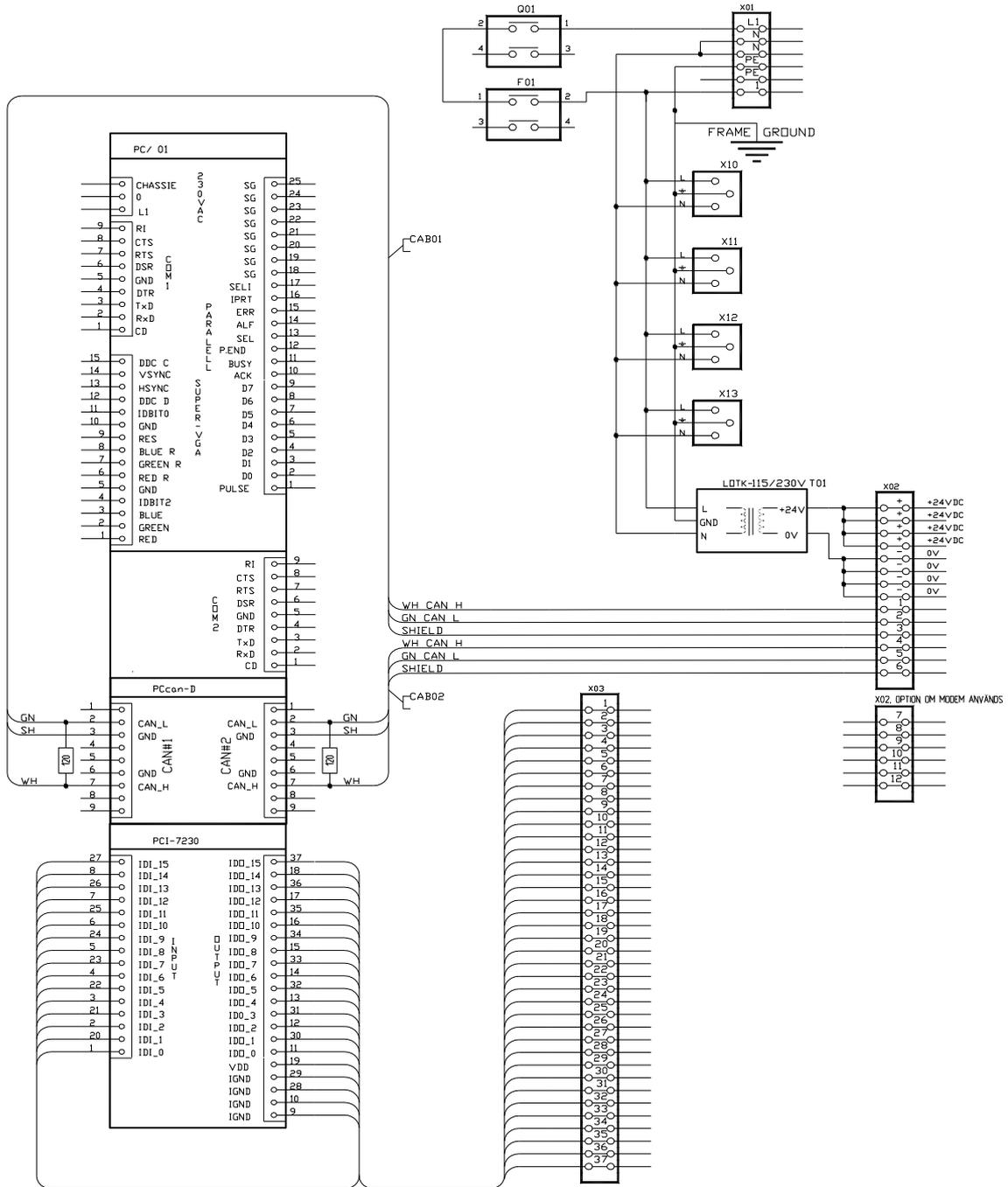


Figure 3.1.13 PC card with peripherals units

3.1.12.2 Panel Profiler

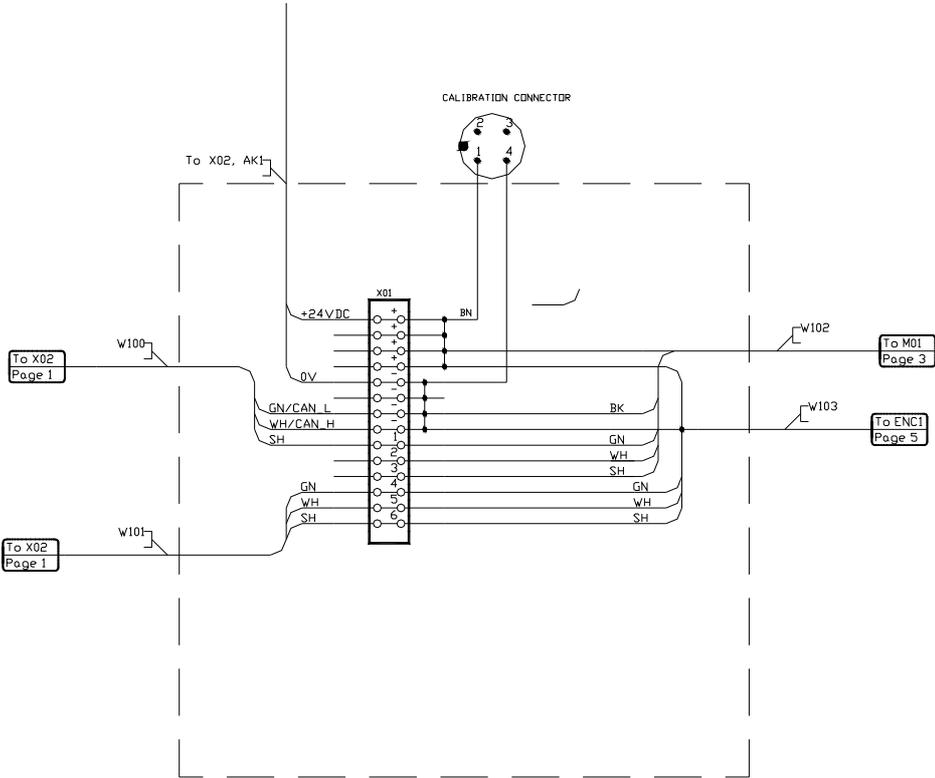


Figure 3.1.14 Connection box (A1)

3.1.12.3 PreciCura Lower (page2)

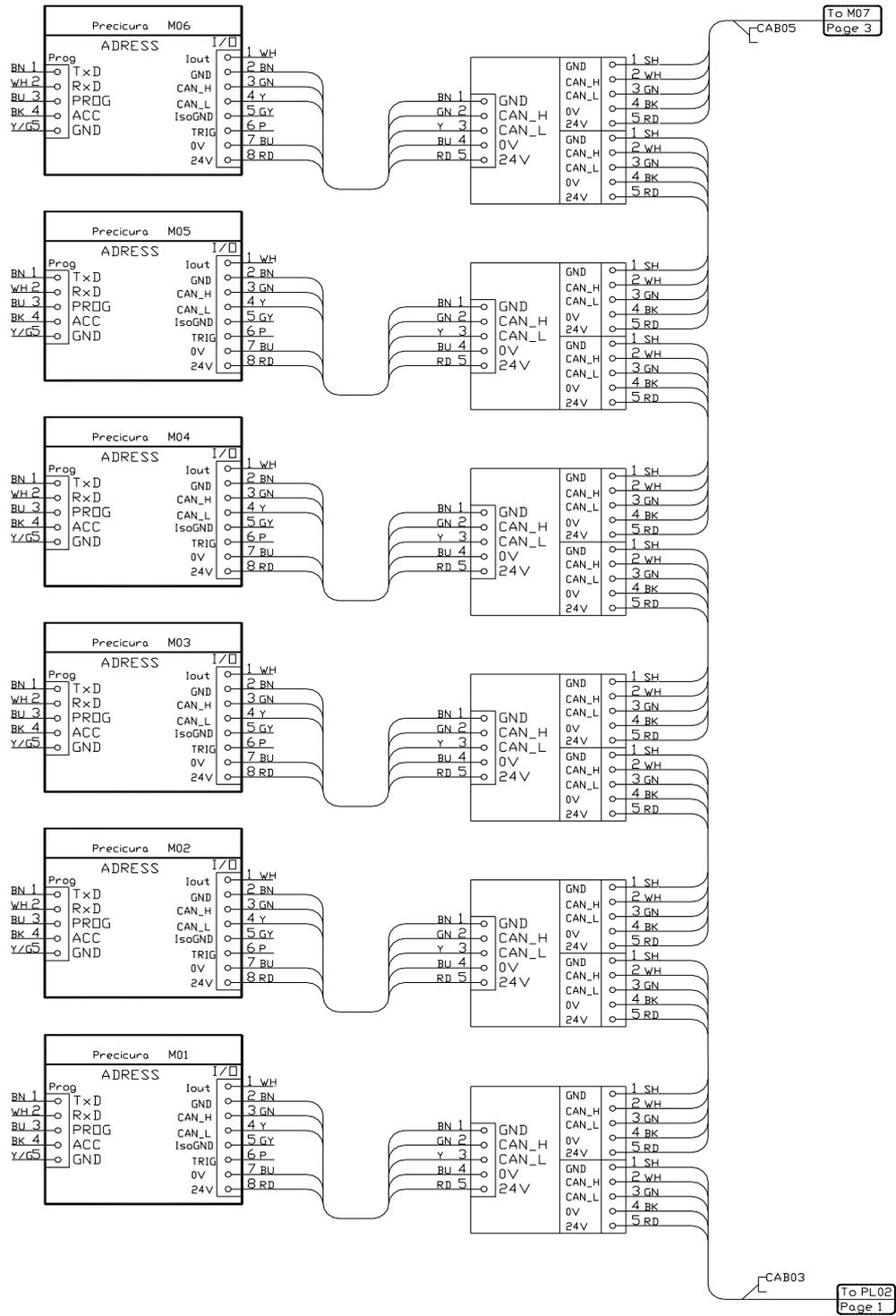


Figure 3.1.15 The six lower PreciCura sensors connected to the CAN bus via connections boxes.

3.1.12.4 Panel Profiler PreciCura Upper (page3)

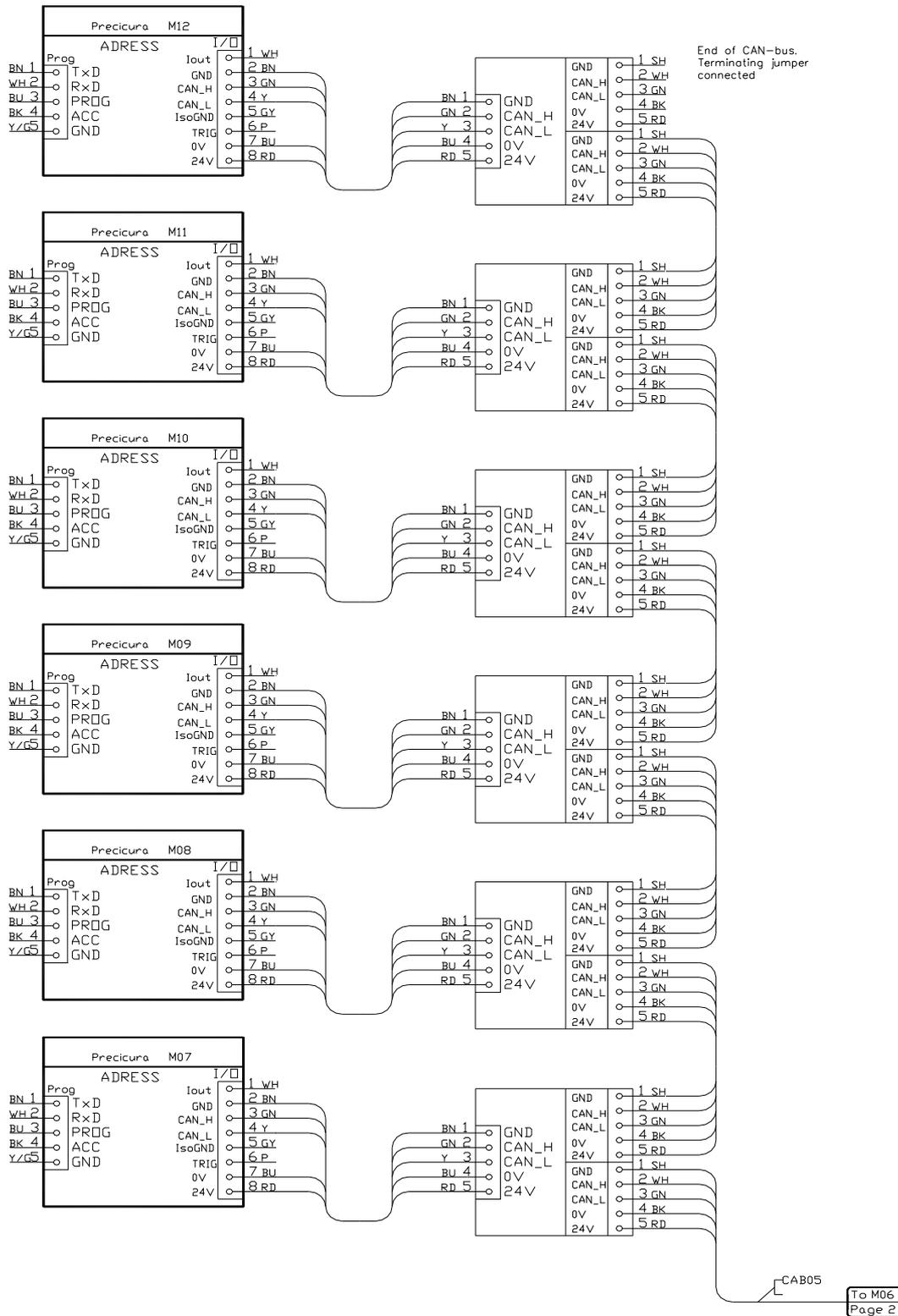


Figure 3.1.16 The six upper PreciCura sensors connected to the CAN bus via connections boxes.

3.1.12.5 PANEL PROFILER Encoder (page4)

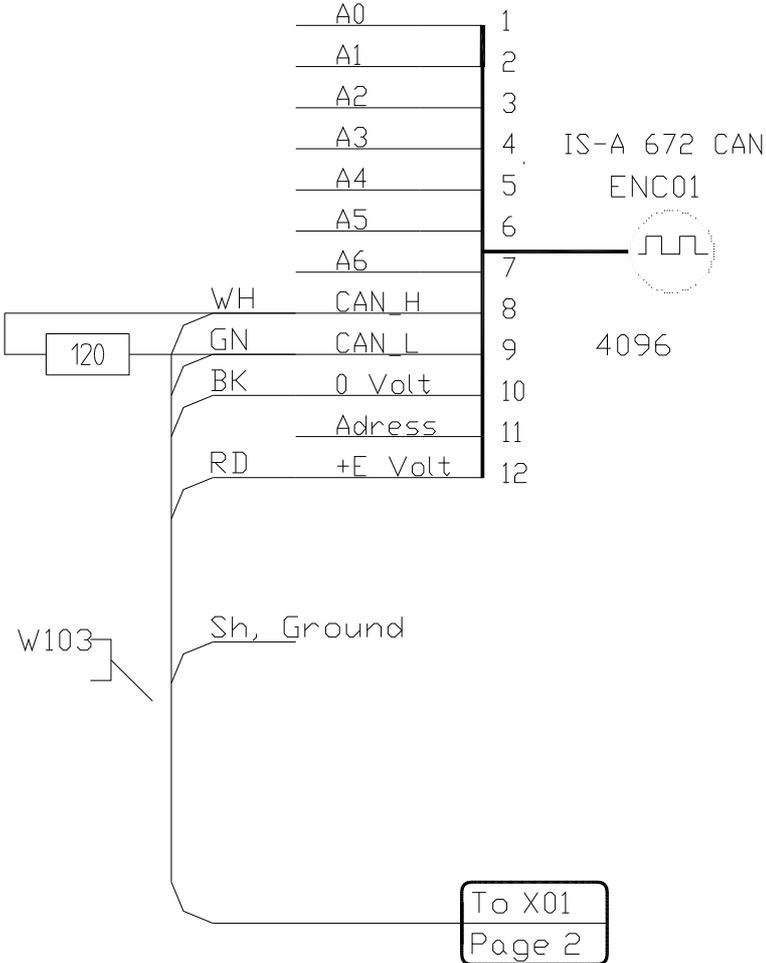


Figure 3.1.17 Connection schematics for the Encoder.

3.2 PC

The PC is delivered with all programs preinstalled but can be reinstalled with the supplied installation CD

3.2.1 Extra boards in PC

External board(s) in the PC

Ref	Part no	Description	Qty		Supplier
	1030	CAN-bus Board, PCican-D	1	pc	Kvaser AB, 733-0130-00083-4

3.2.2 Electric Specifications digital I/O

Optical Isolated Input Channel

Input Voltage	up to 24Vdc
. Logic "L"	0~2.4V
. Logic "H"	3~24V
Input resistance	1.2k Ω @ 0.5W
Isolated voltage	5000 V rms

Optical Isolated Output channel

Output type	Darlington transistors
Output Voltage	open collector 5V (min.), up to 35VDC (max.)
Sink Current	. 500 mA max @ 100 % duty, for one of the 8 transistor device ON . 370 mA @ duty 10% for all transistors devices ON . 140 mA @ duty 50% for all transistors devices ON
Isolated voltage	5000 Vrms

3.2.3 Software installation

The PANEL PROFILER consists of several programs, communicating with each other over the network with TCP/IP-protocol. The communication principle is Client/Server. The system has only one server and many clients. The software are installed at delivery.

PANEL PROFILER software family

Program module	Short description	Num. of modules
Main Server	Dispatches all TCP/IP messages between modules	1
Thickness Client	Collection of thickness profile	1 3
Operator Client	Display of measured values of board profiles	≥ 1
Logging Client	Stores the data produced from the system	≥ 1

3.2.3.1 Main Server

The Main Server is collecting all thickness values from Thickness clients, calculating thickness, width, rejection and can be installed on any PC in the network.

The following files have to be installed in the same directory:

File	Type
MainServer.exe	Program
cg32.dll	
cp3245mt.dll	
PCI-Dask.dll	
MainServerLang.eng	Language file in English but any other language is supported the same way, if a language file is provided. The file can be edited to local language.

For proper function in network, each client has to be assigned a port number. There are up to 10 clients. Contact responsible network technician for assignment.

3.2.3.2 Thickness Client

The thickness module has to be installed on the PC, which is connected to the thickness sensors.

Install drivers for CAN-bus.

Driver	Manufacturer	Homepage	Note
CAN bus	Kvaser	http://www.kvaser.se/	If no can card is installed use the NT/ISA driver

The following files have to be installed in the same directory:

File	Type
Thickness.exe	Program
cg32.dll	
cp3245mt.dll	
ThicknessLang.eng	Program text in English. Can be edited to local language.

3.2.3.3 Operator

The Operator module can be installed on any PC in the network.

The following files have to be installed in the same directory:

File	Type
OperatorModule.exe	Program
cg32.dll	
cp3245mt.dll	
OperatorLanguage.eng	Program text in English. Can be edited to local language.

3.2.3.4 Logging

The Logging module can be installed on any PC in the network.

The following files have to be installed in the same directory:

File	Type
LoggingModule.exe	Program
cg32.dll	
cp3245mt.dll	
LoggLanguage.ENG	Program text in English. Can be edited to local language.

4 PC-software

4.1 Main Server

4.1.1 Main Layout

The main layout will display the different program modules and their status, if they are connected they will be displayed in green otherwise in red.

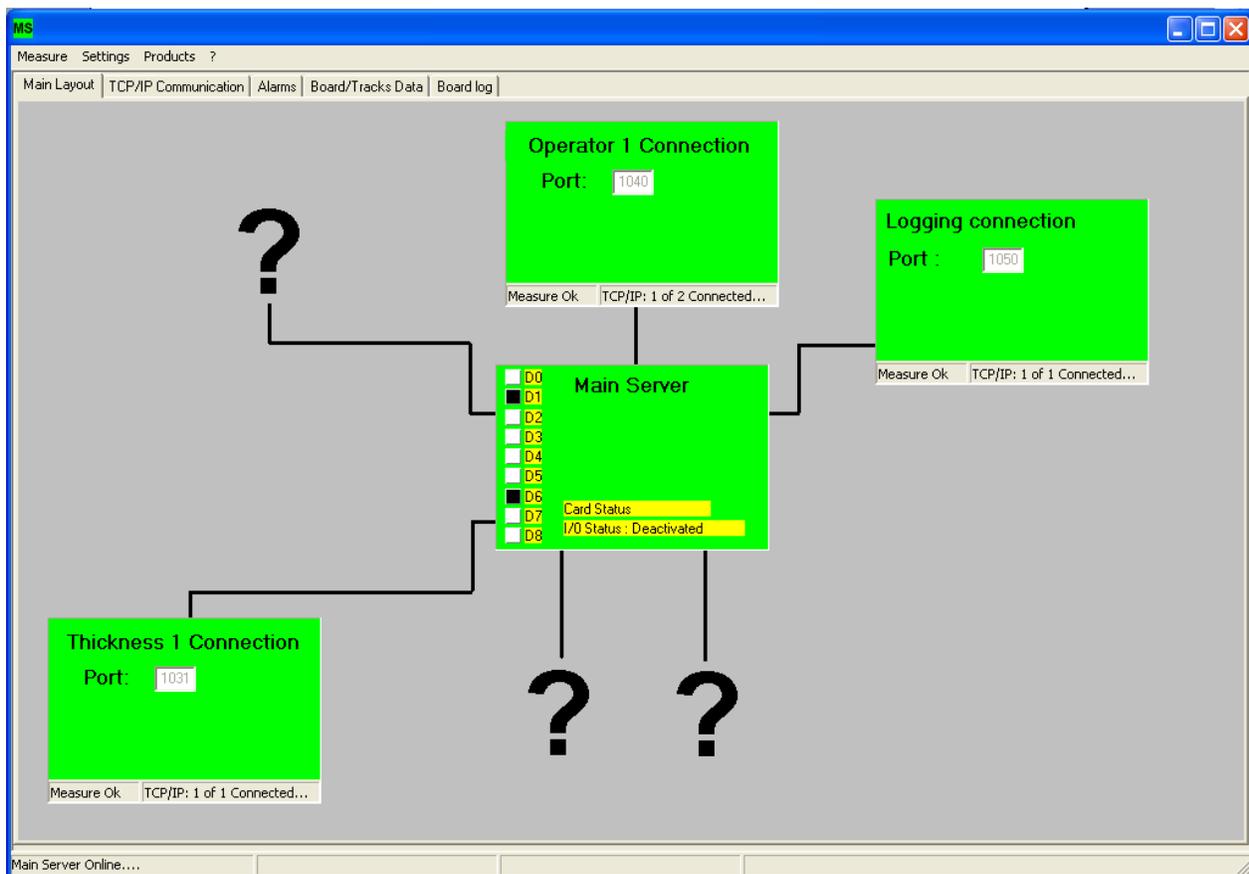


Figure 4.1.1 Main Server and three different modules connected.

4.1.2 TCP/IP Communication

Log for events on the TCP/IP connection.

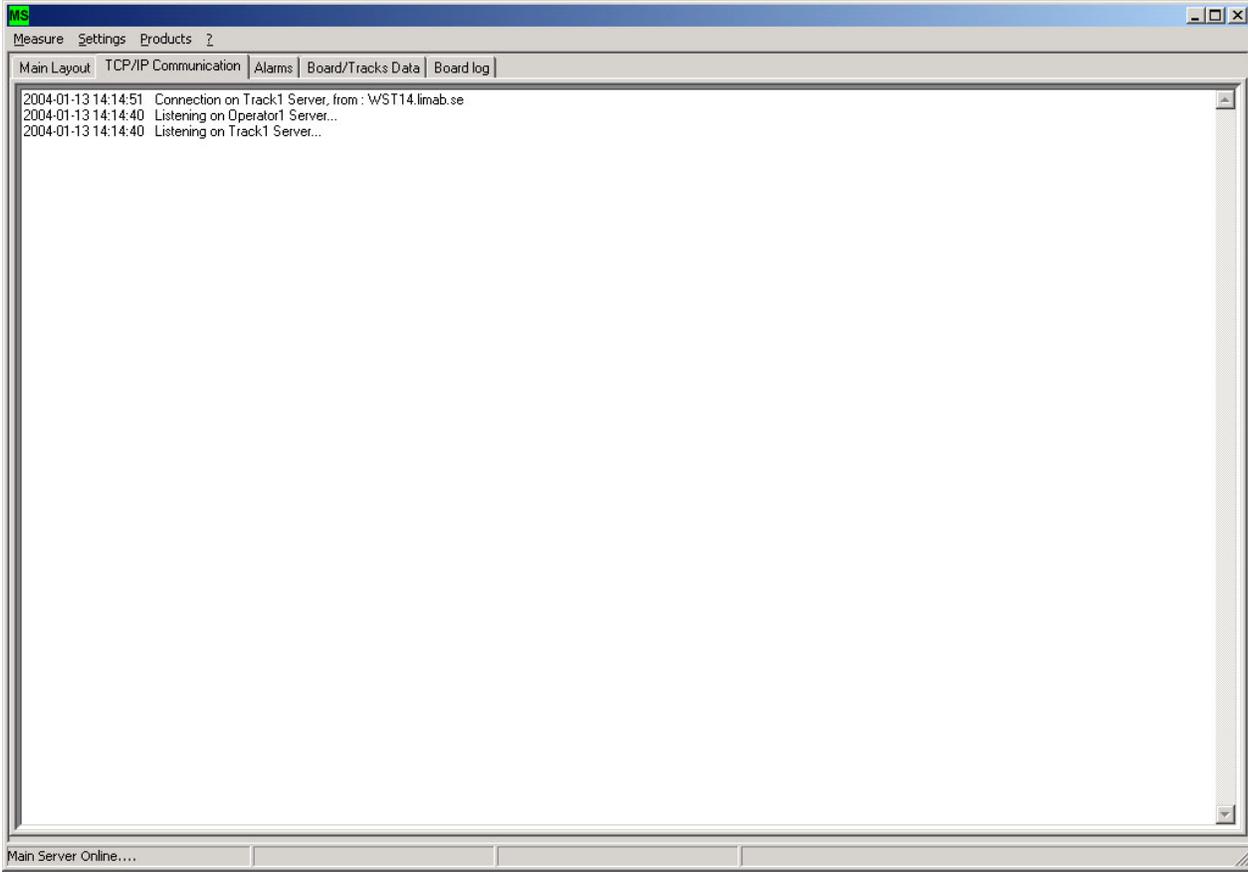


Figure 4.1.2 The TCP/IP log in the Main Server.

4.1.3 Alarms

There are three different output methods for digital alarms. An older method is a PCI-board in the MainServer PC or a remote output unit connected to the Thickness module. All new systems are equipped with the remote output unit. The third method is to send info via tcp/ip. So far this method is only implemented to a certain model of PLC and give alarms if maxthickness is above maxtolerance.

Quality and (dust) factor in %. The quote of measured values without error and total number of values, from last board Background will turn to red if value is below Q-limit (see 4.2.4 page 88)

If text is **q/e**:

q is Q-value

e is error type:

Low Q-value

Sample overflow

Max collect length

Transmit overflow

No valid data

Dust above alarm limit.

Dust is measured as number of measurements with valid data related to total number of measurements in the gap between two boards. (see 4.2.4)

4.1.3.1 Alarm items

Thickness Out Of Tolerance	Thickness is over upper tolerance or under lower tolerance at least the Tolerance length set in product specification.										
Error	<p>Error code originating from Thickness module. When an error is detected information about the error is written to the Alarms tab. When the alarm has been going on for a specified number of boards (see Alarm 4.1.6.6) the alarm will also trigger an output and be written to a text file.</p> <p>Possible reasons:</p> <table border="1"> <tr> <td>Quality and (dust) factor in %. The quote of measured value without error and total number of values, from last board Background will turn to red if value is below Q-limit (see 4.2.4 page 88)</td> </tr> <tr> <td>If text is q/e:</td> </tr> <tr> <td>q is Q-value</td> </tr> <tr> <td>e is error type:</td> </tr> <tr> <td>Low Q-value</td> </tr> <tr> <td>Sample overflow</td> </tr> <tr> <td>Max collect length</td> </tr> <tr> <td>Transmit overflow</td> </tr> <tr> <td>No valid data</td> </tr> <tr> <td>Dust above alarm limit. Dust is measured as number of measurements with valid data related to total number of measurements in the gap between two boards. (see 4.2.4)</td> </tr> </table>	Quality and (dust) factor in %. The quote of measured value without error and total number of values, from last board Background will turn to red if value is below Q-limit (see 4.2.4 page 88)	If text is q/e :	q is Q-value	e is error type:	Low Q-value	Sample overflow	Max collect length	Transmit overflow	No valid data	Dust above alarm limit. Dust is measured as number of measurements with valid data related to total number of measurements in the gap between two boards. (see 4.2.4)
Quality and (dust) factor in %. The quote of measured value without error and total number of values, from last board Background will turn to red if value is below Q-limit (see 4.2.4 page 88)											
If text is q/e :											
q is Q-value											
e is error type:											
Low Q-value											
Sample overflow											
Max collect length											
Transmit overflow											
No valid data											
Dust above alarm limit. Dust is measured as number of measurements with valid data related to total number of measurements in the gap between two boards. (see 4.2.4)											
Stacker A Stacker C Stacker B	See stacker outputs below for description.										
Thick Warning	Thickness is over upper warning or under lower warning at least the Tolerance length set in product specification.										
Thick Over Warning	Thickness is over upper warning at least the Tolerance length set in product specification.										
Thick Under Warning	Thickness is over lower warning at least the Tolerance length set in product specification.										
Thick Over Tol	Thickness is over upper tolerance at least the Tolerance length set in product specification.										

Thick Under Tol	Thickness is over lower tolerance at least the Tolerance length set in product specification.
Avg Thick Out Of Tol	Average board thickness is over upper tolerance or under lower tolerance.
Avg Thick Under Tol	Average board thickness is under lower tolerance.
Avg Thick Over Tol	Average board thickness is over upper tolerance.

4.1.3.2 Stacker outputs

Outputs Stacker A, B and C are updated according to the following rules.

Logical signals:

AVG+	Average thickness over upper tolerance limit
AVG-	Average thickness below upper tolerance limit
MAX	Max thickness over upper tolerance limit
MIN	Min thickness below lower tolerance
!	Logical negation
	Logical OR
&&	Logical AND
Stacker A	AVG- (MIN && !AVG+)
Stacker B	!AVG+ && !AVG- && !MAX && !MIN
Stacker C	AVG+ (MAX && !MIN && !AVG+ && !AVG-)

4.1.3.3 PCI-board in the PC

A digital I/O board of type PCI-7230 or compatible is installed in the PC, there are 16 inputs and 16 outputs

The connection of isolated digital output is shown as following diagram. The PCI-7230 need external 10~30V DC power from the VDD pin to provide the power source of the digital output circuit.

On PCI-7230, an external voltage source, minimum 10V, maximum 35 VDC, is necessary to power the internal isolated circuits. It is connected with pin-19 When the isolated digital output goes to high, the sink current will be from VDD.

PIN	Description	Usage
10, 28, 29	COMMON_LOW	
11	Output D0	Watchdog
30	Output D1	Thick Out Of Tolerance
12	Output D2	Error
31	Output D3	Stacker A
13	Output D4	Stacker C
32	Output D5	Air purge
14	Output D6	Stacker B
33	Output D7	Thick Warning
15	Output D8	Strobe 20ms length after 20ms from update of D1-D4 and D6-D7
34	Output D9	Thick Over Warning
16	Output D10	Thick Under Warning
35	Output D11	Thick Over Tolerance
17	Output D12	Thick Under Tolerance
36	Output D13	Avg Thick Out Of Tolerance
18	Output D14	Avg Thick Under Tolerance
37	Output D15	Avg Thick Over Tolerance
19	External +24V	

4.1.3.4 Remote outputs

The following signals are available as outputs on the remote output unit connected to the Thickness module. Selections is made in the settings in the Thickness module.

Thick Out Of Tol
 Error
 Stacker A
 Stacker C
 Stacker B
 Thick Warning
 Thick Over Warning
 Thick Under Warning
 Thick Over Tol
 Thick Under Tol
 Avg Thick Out Of Tol
 Avg Thick Under Tol
 Avg Thick Over Tol

Thick Max	Max thickness over the board length, reduced with a length defined by the parameter Skip begin/end at each end. The value is averaged over a filter length set by the parameter Filter Length.
Thick Min	Min thickness over the board length, reduced with a length defined by the parameter Skip begin/end at each end. The value is averaged over a filter length set by the parameter Filter Length.
Width Max	Max width over the board length, reduced with a length defined by the parameter Skip begin/end at each end. The value is averaged over a filter length set by the parameter Filter Length.
Width Min	Min width over the board length, reduced with a length defined by the parameter Skip begin/end at each end. The value is averaged over a filter length set by the parameter Filter Length.
Pos Max	Position for the Max value, related to the front
Pos Min	Position for the Min value, related to the front
LogPos1...5	Measured thickness or width in the log positions, specified by the product.
Limit	<p>If any of the warning and tolerance limits are exceeded one of the following messages will appear.</p> <p>Lower Tolerance Lower Warning Upper Warning Upper Tolerance</p> <p>If measurement is within warning limits, the message "Ok" will appear.</p>

4.1.4.1 Board data

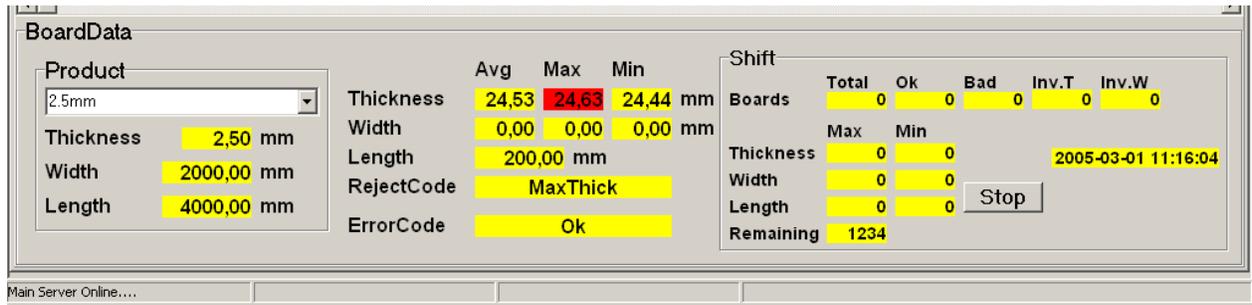


Figure 4.1.4 Board data and product selection.

Item	Description		
Product	Select	Selection box for product in the product database. The products are editable in the Settings Product rules.	
	Thickness	Nominal thickness for selected product.	
	Width	Nominal width for selected product.	
	Length	Nominal length for selected product	
Thickness Avg	Measured average thickness over all tracks		
Thickness Max/Min	Measured maximum and minimum thickness over all tracks. If value is within tolerance set by product spec, the background colour is yellow, if value is exceeding tolerance the background colour is red, and the reject code Max/Min thickness is active.		
Width Avg	Measured average width over all tracks		
Width Max/Min	Measured maximum and minimum width over all tracks. If value is within tolerance set by product spec, the background colour is yellow, if value is exceeding tolerance the background colour is red, and the reject code Max/Min width is active.		
Length	Measured length of the board, evaluated according to the algorithm specified by settings/common/board length.		
Reject Code	Cause for rejection of board.		
	Text	Description	Code

	Ok	Value Ok if the values within TolLen is OK. TolLen described in (4.1.7.1.3 Other)	0
	maxLength	Out of maximum length if values out of tolerance	1
	minLength	Out of minimum length if values out of tolerance	2
	maxThick	Out of maximum thick if values out of tolerance for more than TolLen (4.1.7.1.3 Other)	3
	minThick	Out of minimum thick if values out of tolerance for more than TolLen (4.1.7.1.3 Other)	4
	maxWidth	Out of maximum width if values out of tolerance for more than TolLen (4.1.7.1.3 Other)	5
	minWidth	Out of minimum width if values out of tolerance for more than TolLen (4.1.7.1.3 Other)	6
Error Code	Text	Description	Code
	Ok		0
	Low Q	To many bad measurements (see Thickness module for description)	1
	Sample overflow	To many samples required to measure the complete board. (max 3000)	4
	Max collection length	Collection is terminated due to the maximum collection length is reached. This parameter is set in the thickness module	5
	Transmission overflow	To many measuring points sent from thickness module (max 3000)	6
Shift	Boards Total	Total number of boards, since start of shift	

Boards OK	Number of boards that are OK, since start of shift
Boards Bad	Number of boards with one or more measurements outside tolerance limits, since start of shift
Boards Inv. T	Number of boards with no valid thickness, since start of shift
Boards Inv. W	Number of boards with no valid width, since start of shift
Thickness Max	Number of boards with thickness over maximum tolerance limit, since start of shift
Thickness Min	Number of boards with thickness less than minimum tolerance limit, since start of shift
Width Max	Number of boards with width over maximum tolerance limit, since start of shift
Width Min	Number of boards with width less than minimum tolerance limit, since start of shift
Length Max	Number of boards with length over maximum tolerance limit, since start of shift
Length Min	Number of boards with length less than minimum tolerance limit, since start of shift
Start	Start and display of shift date and time start.
Stop	Stop and display of shift date and time stop.
Remaining	Only visible if board counter is set from external host. The remaining counter will be decremented after each measured board.

4.1.5 Board log

Page for monitor board measuring history. Each line represents one board.

	Time	Product	Thickness	MaxThick	MinThick	Width	MaxWidth	MinWidth	Length	RejectCode	ErrorCode
1	14:19:51	Muje	22,65	22,99	21,83	0,00	0,00	0,00	6865,00	Ok	Ok
2	14:19:51	Muje	22,82	27,00	19,80	0,00	0,00	0,00	7088,00	MaxThick	Ok
3	14:19:51	Muje	23,35	30,56	1,63	0,00	0,00	0,00	6929,00	MaxThick	Ok
4	14:19:51	Muje	22,78	38,00	0,07	0,00	0,00	0,00	6946,00	MaxThick	Ok
5	14:19:50	Muje	21,28	22,96	-41,47	0,00	0,00	0,00	7266,00	MinThick	Ok
6	14:19:49	Muje	22,58	23,25	21,89	0,00	0,00	0,00	6890,00	Ok	Ok
7	14:19:48	Muje	21,28	22,96	-41,47	0,00	0,00	0,00	7266,00	MinThick	Ok
8	14:19:48	Muje	22,78	38,00	0,07	0,00	0,00	0,00	6946,00	MaxThick	Ok
9	14:19:48	Muje	23,35	30,56	1,63	0,00	0,00	0,00	6929,00	MaxThick	Ok
10	14:19:48	Muje	22,82	27,00	19,80	0,00	0,00	0,00	7088,00	MaxThick	Ok
11	14:19:47	Muje	22,65	22,99	21,83	0,00	0,00	0,00	6865,00	Ok	Ok
12	14:19:47	Muje	22,42	32,12	0,17	0,00	0,00	0,00	6928,00	Ok	Ok
13	14:19:47	Muje	22,86	44,96	-2,45	0,00	0,00	0,00	6881,00	MaxThick	Ok
14	14:18:45		22,65	23,01	20,82	0,00	0,00	0,00	6859,00	Ok	Ok
15	14:18:44		22,64	23,00	21,38	0,00	0,00	0,00	6864,00	Ok	Ok
16	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0

Figure 4.1.5 Board log shows data that is possible for logging, if a Logging module is connected to the Main Server.

Item	Description
Product	Id of actual product
Time	Time and time of measurement of board
Thickness	Measured averaged thickness over all tracks
MaxThick MinThick	Measured maximum and minimum thickness over all tracks. If value is within limit set by product spec, the background colour is yellow, if value is exceeding limit the background colour is red, and the reject code Max/Min thickness is active.
Width	Measured averaged width over all tracks, if sensors for width measurement is installed in the system. Se chapter 4.1.6.5 <i>Track grouping</i> for determination of sensor function. Normally only thickness measurement sensor is used.

MaxWidth MinWidth	Measured maximum and minimum width over all tracks. If value is within limit set by product spec, the background colour is yellow, if value is exceeding limit the background colour is red, and the reject code maximum and minimum width is active.
Length	Measured length of the board, evaluated according to the algorithm specified by settings/common/board length.
Reject Code	OK means that the board was not rejected and anything else means that the board was rejected and the message is an rejections code telling the reason for rejection. Cause for rejection of board, see <i>4.1.4.1 Board data</i> for specifications.
Error Code	OK means no error, anything else is an error code. See <i>4.1.4.1 Board data</i> for specifications.

4.1.6 Settings

4.1.6.1 Common

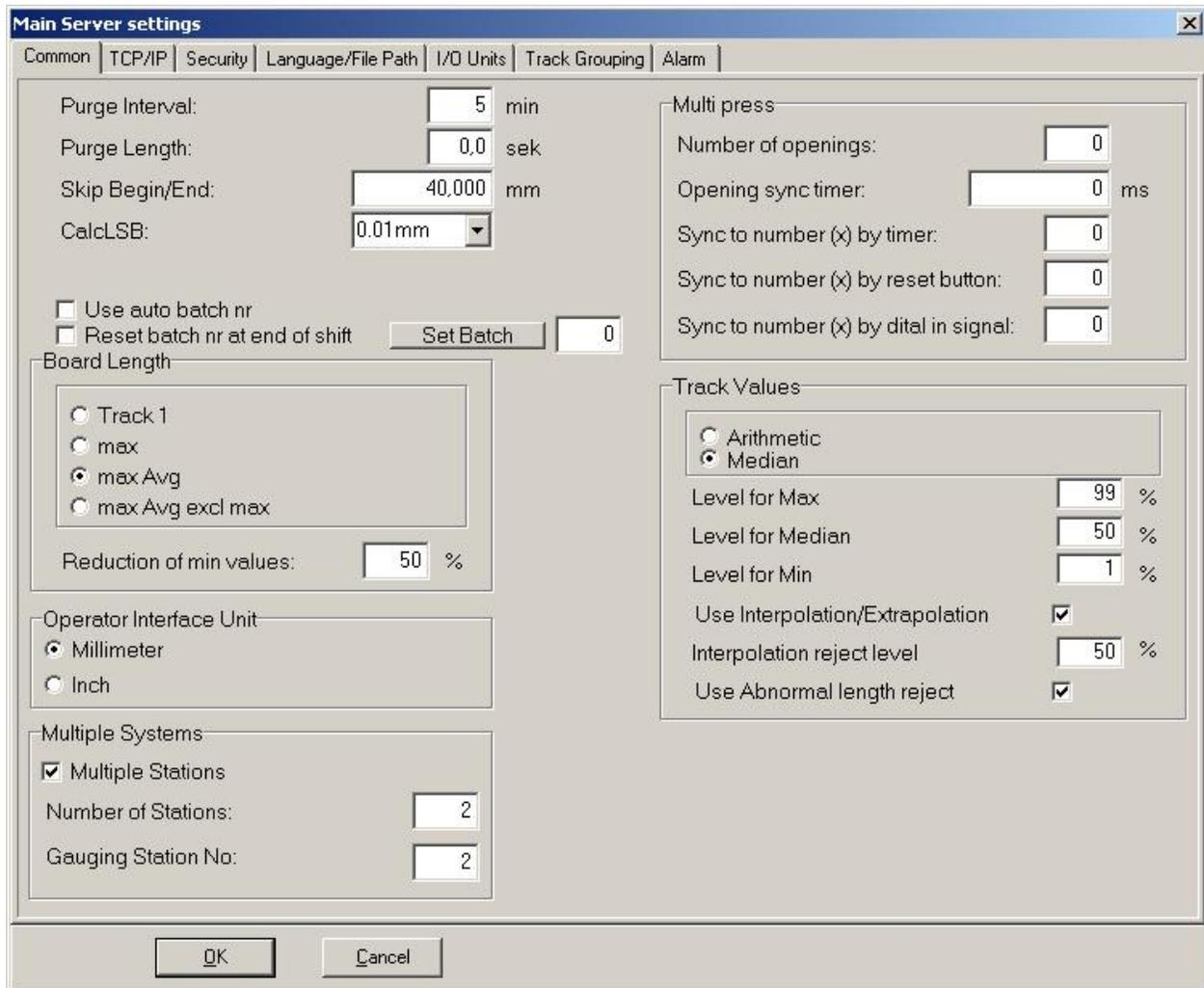


Figure 4.1.6 This is the Common tab in the Main Server, under Settings/Options.

Item	Description
Purge Interval	Interval in minutes for air purging of sensor windows (Optional output).
Purge Length	Duration of air purge in seconds (Optional output).
Skip Begin/End	Length at start and end of board which will be omitted in the calculations.
Calc LSB	Resolution of data from Thickness module.

Use auto batch nr	Check box to activate auto batch, The batch number is increased every time the product is changed	
Reset batch nr at end of shift	Batch is reset at every shift end	
Set Batch	When pressed current batch number is set to the number in the edit box to the right of the Set Batch button	
Number of openings	Number of openings used by a multi-opening press. The parameter will affect the presentation in the Operator module.	
Opening sync timer	This timer is deactivated if the value is zero and active other vice. Then active the timer will reset the <i>board counter</i> by the interval given. The board counter is the counter that counts the board in a multi-press up to <i>Number of openings</i> .	
Operator interface unit	Selection of millimetre or inch human interface.	
Multiple Stations		
Multiple Stations	Used when having more than one PanelProfiler frame connected to the same PC. In a system with multiple frames more than one Mainserver is used, if this is not checked the Mainserver only allows one Mainserver instance..	
Number of stations	The number of PanelProfiler frames.	
Gauging Station No	The number of the Station this Mainserver represents. Only the Mainserver with Gauging Station No 1 can edit products.	
Track Values		
Arithmetic / Median	Used when calculating the average thickness for each track.	
Level For Max	Used when Median is chosen to find max thickness. The thickness values for each track is sorted. To avoid outliers the max value is not chosen. Instead a the value at <i>Level for Max</i> is used to find the max thickness. E.g if there is 10 thickness values. These values are sorted, if Level For Max is set to 90% the value at position $10 * 0.9 = 9$. is used as max thickness	
Level for Median	As above but instead of max value this is used for median value	
Level for Min	As above but this is used to find min value	
Board Length	Track 1	Board value is taken from track 1.
	max of all Tracks	Board value is the max value from all tracks
	max Avg (with max/min reduction)	Board value is the average of all tracks, except "Reduction of min and max values" % of the smallest and the biggest single track.
	max Avg excl max (with min reduction)	Board value is the average of all tracks, except "Reduction of min values" % of the smallest.

	Reduction of min values	% of the smallest tracks which will be omitted in the average calculation.
--	-------------------------	--

4.1.6.2 Settings TCP/IP

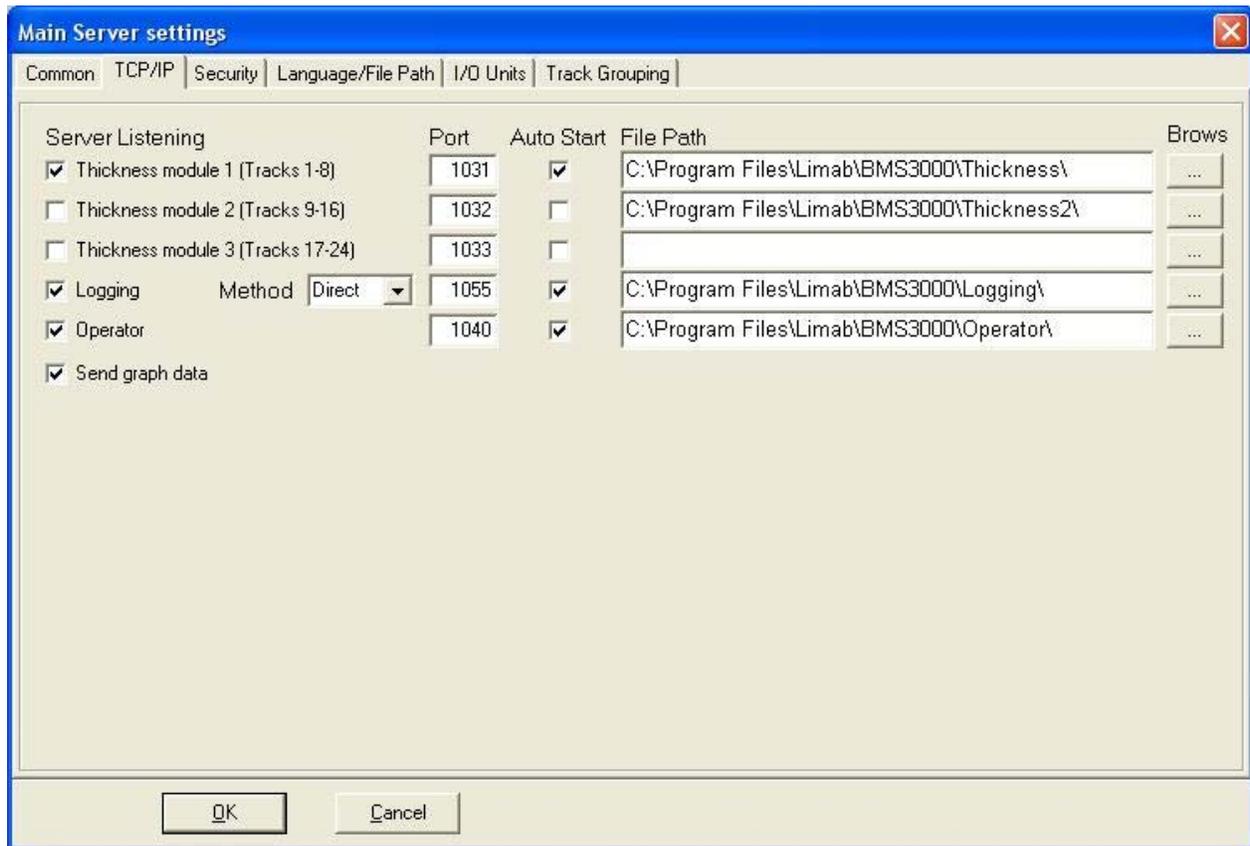


Figure 4.1.7 This is the TCP/IP tab under Settings, where Main Server listening port is set.

Item	Description
Thickness module 1 Track 1-8 Port	If checked, the server expects track data 1-8 from port number (1031).
Thickness module 2 Track 9-16 Port	If checked, the server expects track data 9-16 from port number (1032).
Thickness module 3 Track 17-24 Port	If checked, the server expects track data 17-24 from port number (1033).
Logging Port	If checked, the server will send logging data to given port, if <i>Direct</i> is chosen. <i>Direct</i> means that the data is sent to Logging module directly without the logging module need to ask for it. The other method <i>Polled</i> means that the Logging module need to ask for data.
Operator Port	If checked, the server expects one or more operators on port number (1040).
Send graph data	If checked, graph data is transmitted to operator(s).

Port	Port number that Main Server will listen on, for respective module.
Auto Start	If checked, Main Server will attempt to start up respective module on start-up of system.
File path	For automatic start of Thickness, Operator and Logging modules from Main Server a correct file path need to be set. If no or wrong file path is set, the modules will not be started from Main Server. Use the <i>Brows</i> button to locate the different modules you like to start.
Brows button (...)	Let you choose file path for each module, by open a select file dialog.

4.1.6.3 Settings Security

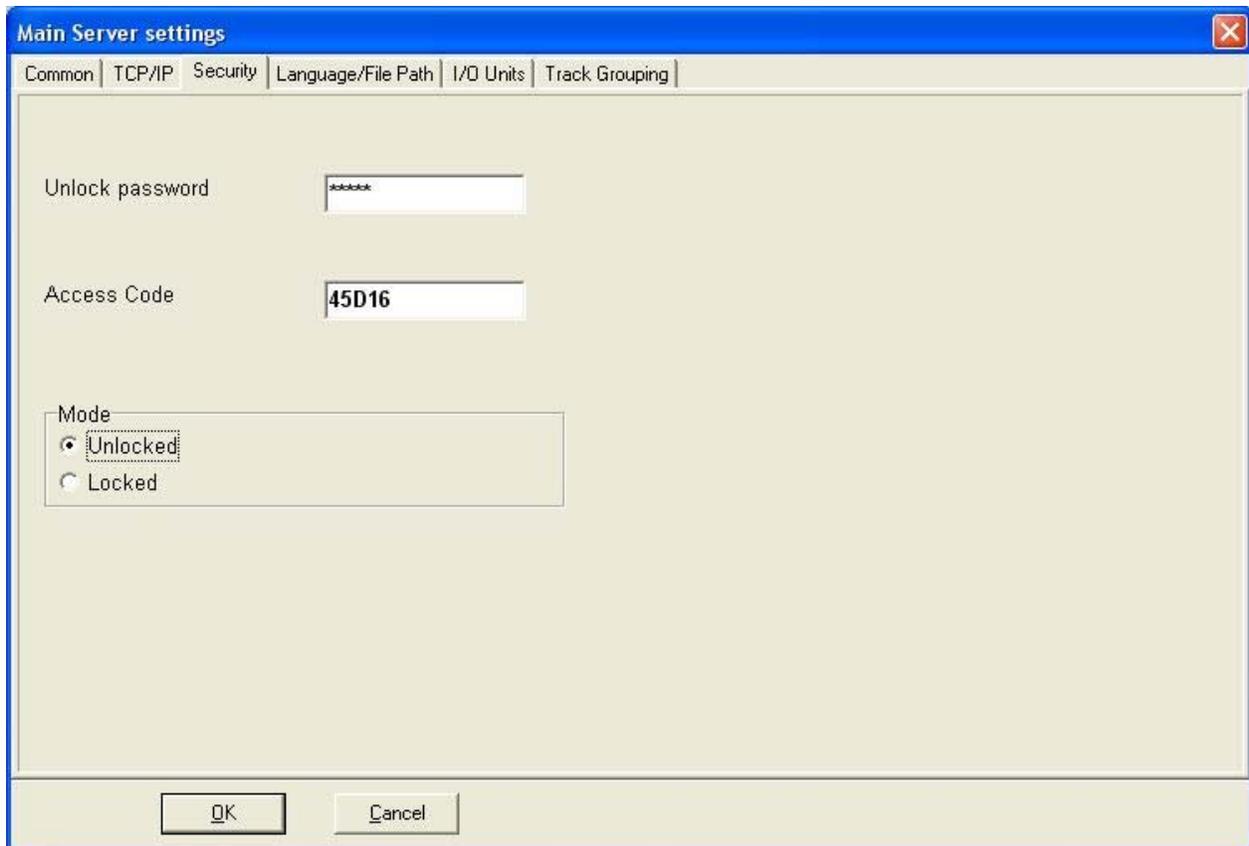


Figure 4.1.8 Unlock password and Access code.

Item	Description
Unlock password	User editable password.
Access Code	The access code determines how many modules that can connect to the Main Server and is in fact a license code for the different modules. If you like to add more modules, an extra Operator module for example, you need to buy more licenses and you will then be given a new access code.
Mode Unlocked	All parameters and menus are open for user.
Mode Locked	Access to menus and parameters through password login. Password may be changed.

4.1.6.4 Language/File Path

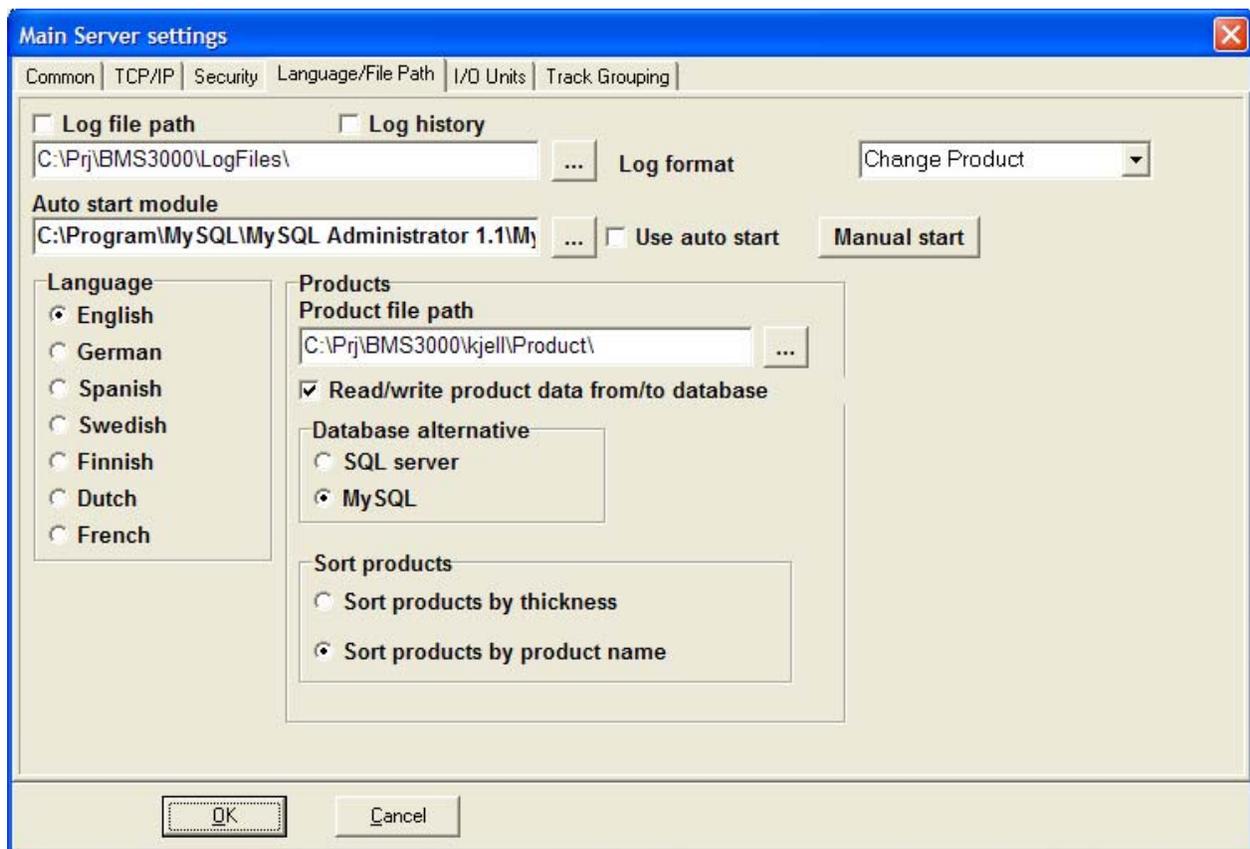


Figure 4.1.9 Language and File Path tab. This tab also includes selection of products source.

Item	Description	
Log file path check box	If checked, a log file will be created directed by log file path and Log format, see 4.1.6.4.1 for details.	
Auto start module & Use auto start	Path to program to auto start. If <i>Use auto start</i> is checked then that program will start automatically 10 seconds after the Main Server has started. If checkbox is unchecked and the <i>Manual start</i> button is clicked the program will start 10 seconds after the button was clicked.	
Product file path	File path for products. This file will be used to fetch the product list if not database is in use.	
Read/write product data from/to database	Select this option and the products will be fetch from and stored in a database, instead of a text file. This is the recommended option but the costumer need to have a database installed for this to work.	
Database alternative	There is different types of database that can be used. Only MySQL is supported.	
Sort products	Sorting products by there thickness or by the product name.	
Language	Selection of language. Select one of the available languages.	
Log format	24 Hour	A new log file will be created every midnight 00:00:00, and named by the date
	12 Hour	A new log file will be created at 06 :00 AM, and given the name of the date with an AM suffix. At 06:00 PM a new will be created with the days date, and this file will be written to until 05:59 AM next day.
	Change product	When a new product is selected, a new log file is created with the name of today's date and start time in hours and minutes. This will make a new log file for every new product.

4.1.6.4.1 Log files

If Log file path is checked, a subdirectory "Log Files" will be created. The log files will be created in the directory, directed by Log file path. Log files may be of several types.

4.1.6.4.2 Panel Profiler

ASCII file with name given by date, example "2002-10-15.log", a new file will be created each day. The fields are separated by TAB.

Note! Date format have to be set to YYYY-MM-DD for correct file creation

Date
Time
Product
Thickness
MaxThick
MinThick
Width
MaxWidth
MinWidth
Length
Reject Code
Error Code
Track1 Log Point 1
Track1 Log Point 2
Track1 Log Point 3
Track1 Log Point 4
Track1 Log Point 5
.....
.....
Trackn Log Point 1
Trackn Log Point 2
Trackn Log Point 3
Trackn Log Point 4
Trackn Log Point 5
Track1 Q-Upper
Track1 Q-Lower
.....
.....
Trackn Q-Upper
Trackn Q-Lower

* Track number is the last used track. May be max 24.

4.1.6.5 Track grouping

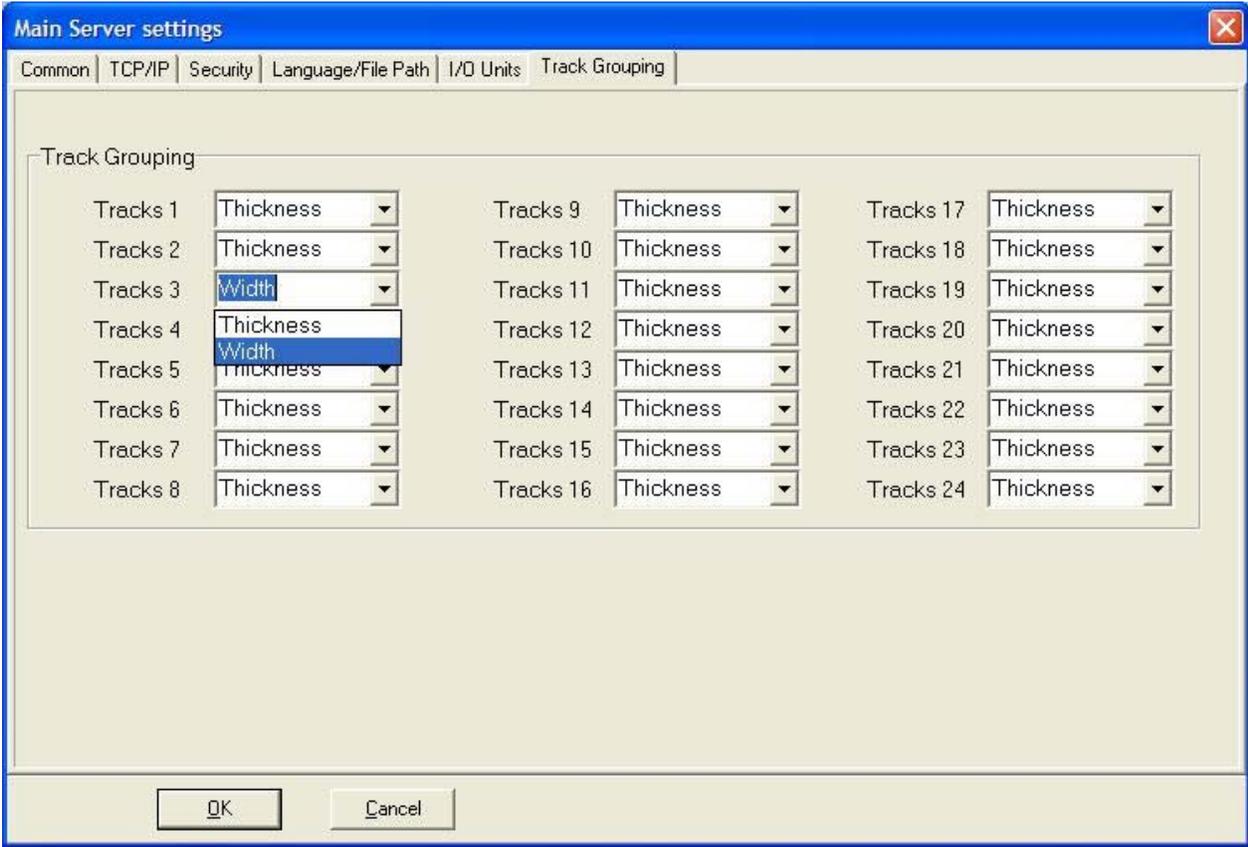
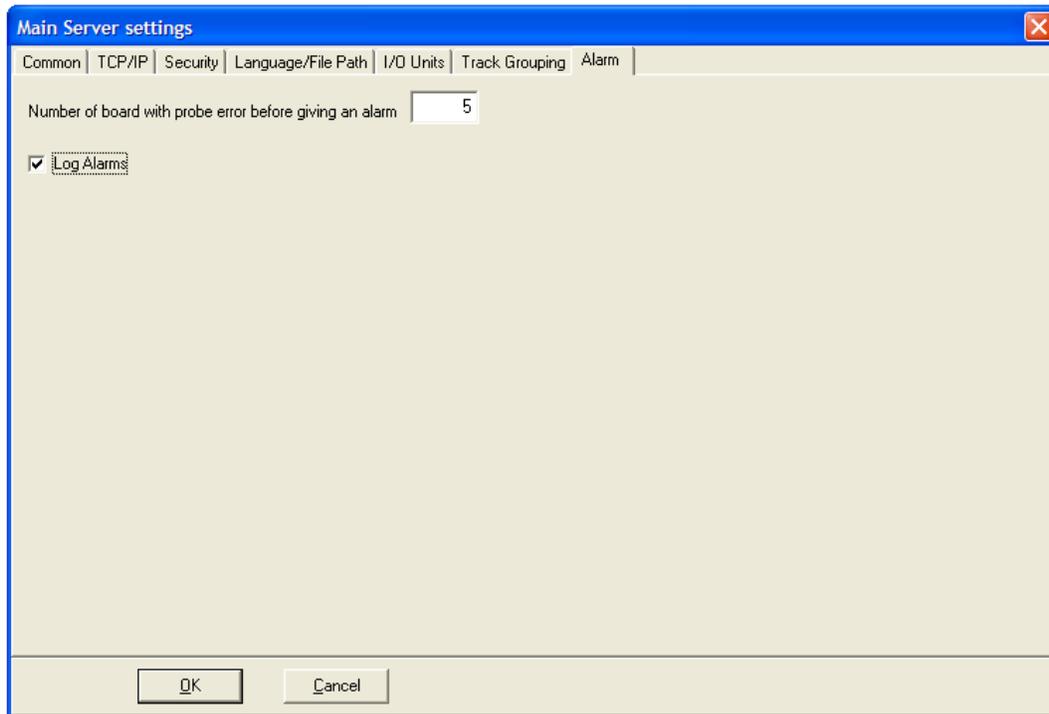


Figure 4.1.10 Track Grouping show selected measurement settings for each track.

Determination of measuring dimension ,(thickness or width), for each track.

4.1.6.6 Alarm



Item	Description
Number of board with probe error before giving alarm	Number of boards with the same alarm and same sensor before the alarm is activated
Log Alarm	If checked the alarms is written to the log file ErrorLog.log

4.1.7 Product rules

There are two different ways to handle products with the Main server and the operator module.

1. *Products read from text file* described in chapter 4.1.7.1
2. *Products read from a database* described in chapter 4.1.7.2

4.1.7.1 Products read from text file

When products is read from a text file there is a limit of the amount of products that can be handled within the system. That limit is 50 products. This limitation dose not exist if the products are stored in a database.

4.1.7.1.1 Product settings

The first tab under *Products settings* is the Nominal dimension which shows the nominal thickness, width and length of each product.

No.	Product	Thick	Width	Length	Optional 1	Optional 2	Optional 3	Optional 4	Optional 5
1	Muje	22,5	1000	6800	glue	edge	0	0	0
2	Nisse	0,6	5	200	0	0	0	0	0
3	Inch	0,9	47	150	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0

Figure 4.1.11 Nominal dimensions for the products, if product-list were loaded from a text file.

Item	Description
Product	Name of product, can be any ASCII character
Thick	Nominal thickness
Width	Nominal width
Length	Nominal length
Optional 1...5	5 alphanumeric fields with max 50 characters, for optional information about the specific product.

WidthWarnMax	Upper width warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
WidthWarnMin	Lower width warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
WidthMinTol	Lower width limit relative to nominal. If value is set to 0, no tolerance check will be performed.
LengthMaxTol	Upper length limit relative to nominal. If value is set to 0, no tolerance check will be performed.
LengthWarnMax	Upper length warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
LengthWarnMin	Lower length warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
LengthMinTol	Lower length limit relative to nominal. If value is set to 0, no tolerance check will be performed.

Item	Description
Logging	0 = Logging disabled and Reject enabled 1 = Logging enabled and Reject enabled 2 = Logging disabled and Reject disabled 3 = Logging enabled and Reject disabled
Log point 1...5	Position of log point, relative to front edge if value is positive and if the value is negative (-100 for example), the position is related to the rear edge of the board. If set to 0 or outside board, log point will be inactive and value will be set to 0.
TolLen	Length of an area in inch/mm exceeding tolerance, to obtain a reject. Rejection codes described in (4.1.4.1 Board data).
EdgeOffset	Positions of movable outer tracks, from nominal width.
CenterPos	Centre position of board. Used for calculation of outer tracks in a moveable track system

4.1.7.2 Database products

If *Read products from database* (see 4.1.6.4 Language/File Path) is checked the following screen will be displayed when clicking Products → Edit products.

The screenshot shows the 'Product settings' dialog box with the 'Edit products' tab selected. The 'Choose product' dropdown is set to 'New Product'. The 'Product name' field contains 'New Product'. Under 'Product settings', 'Center pos.' is 1,000, 'Edge offset' is 100,000, 'Tolerance length' is 0,000, and 'Thickness offset' is 0,500. The 'Log points' section shows 'Enter logging type' as 0 and five 'Pos log point' fields, all with values of 0,000. The 'Optional product information' section contains ten fields, all set to '(null)'. At the bottom, there are buttons for 'Edit products', 'Add new product', 'Save', 'Cancel', 'Clear fields', and 'Delete product'. The status bar at the bottom indicates the action: 'Listing information for product with name: New Product. Choose operation'.

Figure 4.1.14 Information about a selected product, if the products were loaded from a database.

The module reads from the database and populates the combo box with those products that exist in the database. Product name will be set to the last chosen product. The first time the module starts it will be blank. When a product is chosen the user has to choose an operation. Feedback is given in the status bar, in the field right to “Action:” in the bottom of the screen.

If user click *Edit products* button all fields except Product name is enabled. If the user clicks *Add new product* all fields from previous product will be left as is, making it easier to slightly change a product and save it with a new name. In this mode all fields are enabled. By clicking *Save* the new product is added to the database and the combo box is updated, including the new product.

Clicking *Cancel*, cancels the actual operation and locks all the fields. *Clear fields* just clears all the fields. By clicking *Delete product* the actual product will be deleted if the user clicks OK in the appearing message box.

Product list is a listing of all products in the database, with all the values for each product.

Use sections. Check this box if you want to divide the board in different section, and you can obtain avg thickness for each section.

Chose which section to use in the combobox. It is possible to have different section to different products.

4.1.7.3 Sections (CutPattern)

Section is where you divide the board in different section. It is than possible to obtain avg thickness for each section.

To create a new section:

- Push Add new section
- Enter the name of the new section in the Name field
- Enter number of section
- Press update, and the screen will update according to the number of section chosen
- Enter the positions of the section in the figure. (in figure below the section along the length is 0-150, 150-1000, 1000-length of board)
- Push Save to save the section

To use this section

- Go to tab *Edit products*.
- Chose the product that should use this section in the *choose product* combobox
- Push *edit product*
- Chose the new section in the combobox below *Use Section*
- Push Save

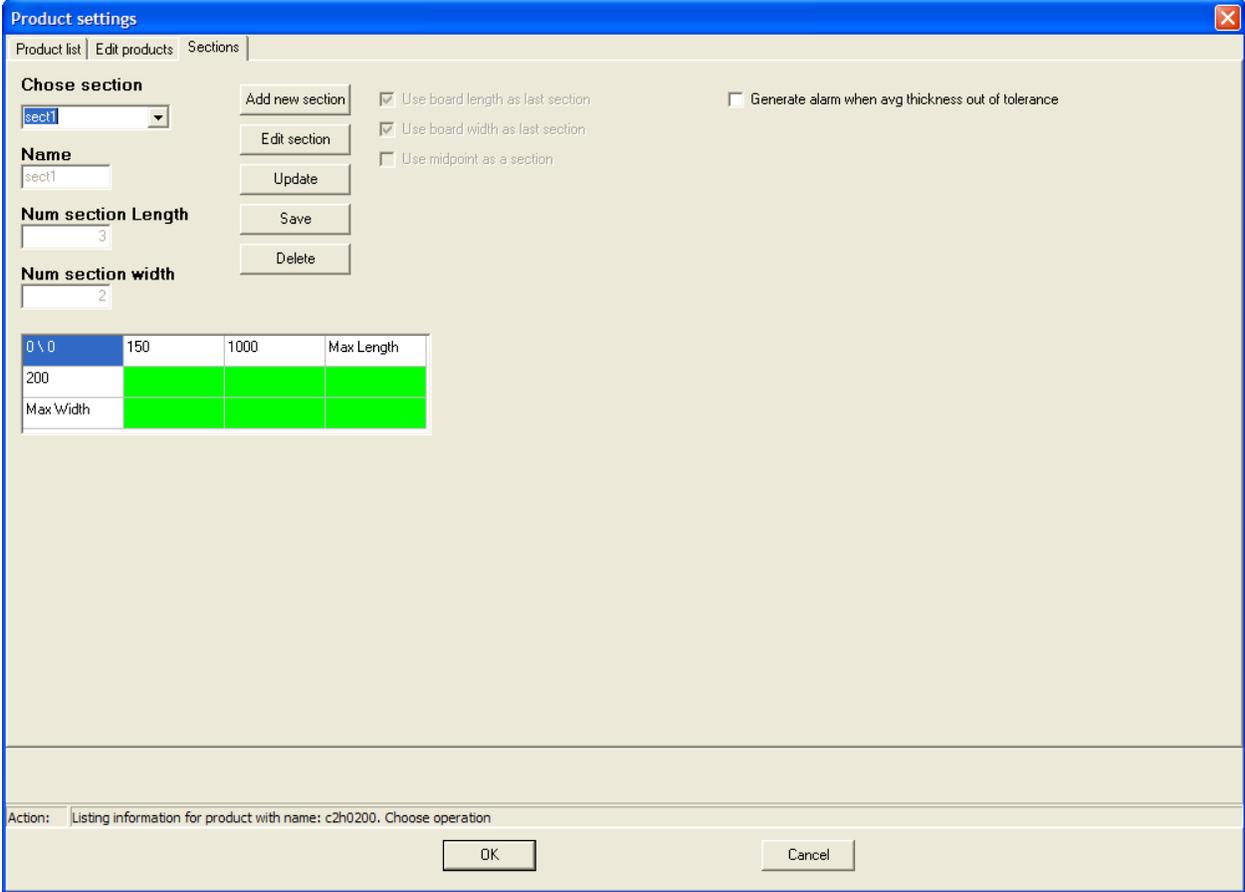
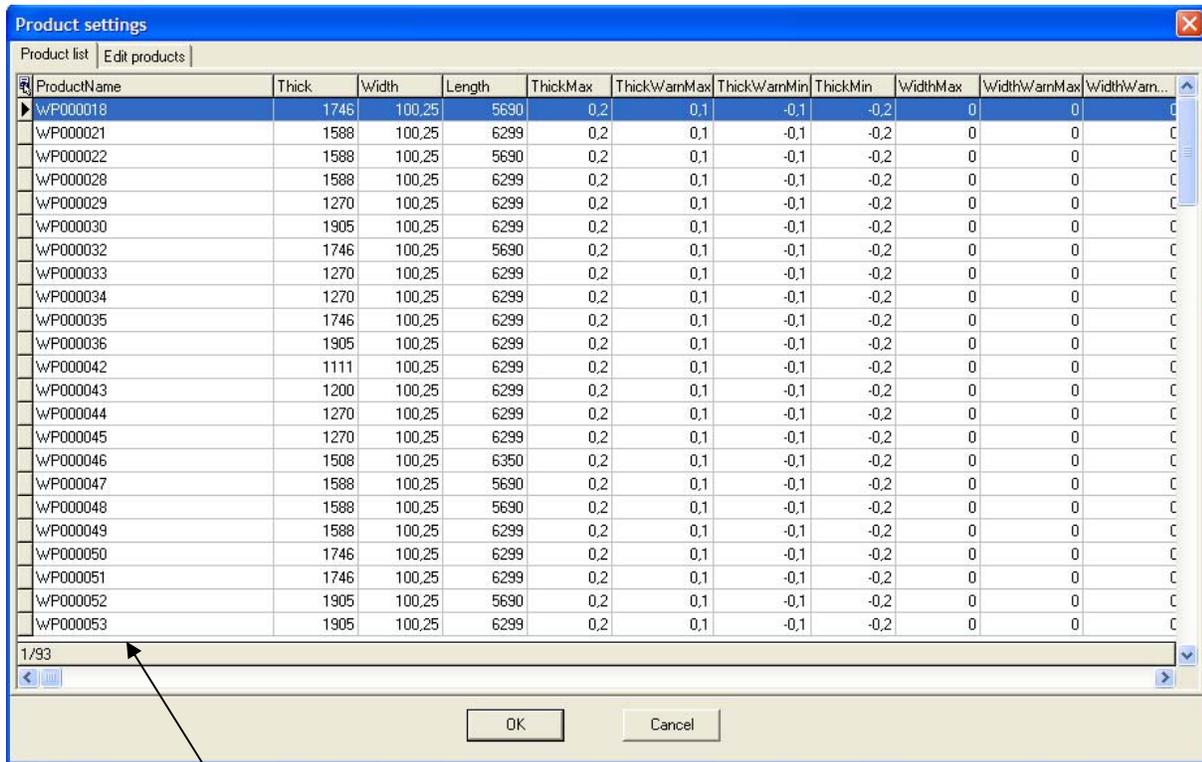


Figure 4.1.15 Create and edit patterns

Item	Description
Chose section	Chose which section to display or edit
Name	When creating a new section, enter name of section here
Num section length	Number of section along the length of the board
Num section width	Number of section along the width of the board
Add new section	Push this button to add a new section
Update	Push this button to update section
Save	Store section
Delete	Delete section
Use board length as last section	Check this box if the last section should end at the end of the board
Use board width as last section	Check this box if the last section along the width should end at the end of the board
Use midpoint as a section	This is only possible if you only use two section along the length. Check this box if the two section should be divided in half



Product settings

Product list | Edit products

ProductName	Thick	Width	Length	ThickMax	ThickWarnMax	ThickWarnMin	ThickMin	WidthMax	WidthWarnMax	WidthWarn...
WP000018	1746	100,25	5690	0,2	0,1	-0,1	-0,2	0	0	0
WP000021	1588	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000022	1588	100,25	5690	0,2	0,1	-0,1	-0,2	0	0	0
WP000028	1588	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000029	1270	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000030	1905	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000032	1746	100,25	5690	0,2	0,1	-0,1	-0,2	0	0	0
WP000033	1270	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000034	1270	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000035	1746	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000036	1905	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000042	1111	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000043	1200	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000044	1270	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000045	1270	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000046	1508	100,25	6350	0,2	0,1	-0,1	-0,2	0	0	0
WP000047	1588	100,25	5690	0,2	0,1	-0,1	-0,2	0	0	0
WP000048	1588	100,25	5690	0,2	0,1	-0,1	-0,2	0	0	0
WP000049	1588	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000050	1746	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000051	1746	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0
WP000052	1905	100,25	5690	0,2	0,1	-0,1	-0,2	0	0	0
WP000053	1905	100,25	6299	0,2	0,1	-0,1	-0,2	0	0	0

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OK Cancel

Figure 4.1.16 A product list , if products where loaded from a database.

Clicking one of the fields will make that product appear in edit products mode (which is the other tab).

A detailed description of the fields can be found in chapter 4.1.7.1 *Products read from text file*. The values saved in the database are the same as for the text file.

4.1.8 I/O-units

Output interface for measured values. Output is performed immediately after trailing edge of board.

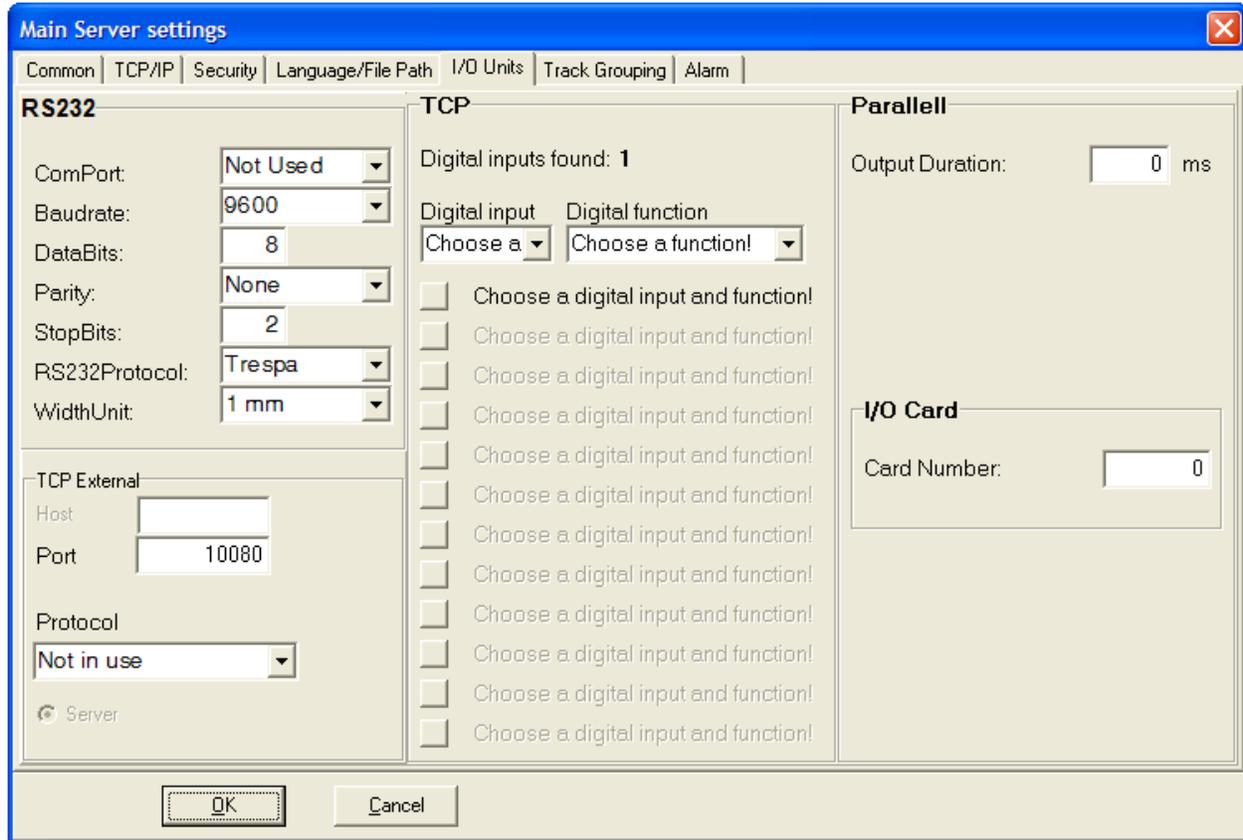


Figure 4.1.17 Connections and interfaces to the server.

4.1.8.1 RS232

Item	Description
ComPort	Comport number (Not Used, Com1Com6)
Baudrate	2400 ... 38400
Databits	7,8
Parity	None, Odd and Even
StopBits	1 and 2
Protocol	A specific protocol needs to be specified for each customer.
Width unit	
Cut unit	mm or saw number for cutting point
TCP External	To generate alarms through tcp/ip
host	Not used, so far the main server is used as server and therefore no host name has to be entered.
Port	Port number
Protocol	So far only one protocol exists, ABB_1 that protocol is according to table below

Message to Main Server TCP/IP

Protocol ABB_1 is designed to communicated via a PLC. The PLC sends below information

Startsign = STX (0x2)

BatchID = 00000001 (8 numeric figures)

ArkID = 00000001 (8 numeric figures)

Pressfack= 20 (2 numeric figures [1-27])

Productname= hdu330 (max 8 tecken)

Endsign = ETX (0x3)

Example:

[0x2]00001000;00002047;18;hdu550[0x3]

The plc inputs endsigns (\0) , also, each string has to be 12 signs so the string from the plc will look according to:

```
'0x2"\0" " " '0"0"0"0"1"0"0"0"\0";" " " "0"0"0"0"2"0"4"7"\0;" " " " " " " " 1"8"\0;" " " " " "
"h"d"u"5"5"0"\0"[0x3]"\0'
```

bachid is saved to Database as batchnamn

Arkid is saved to Database as Options0

Pressfack is saved to Database as Option1

Product name is saved to Database as Name.

Message from Main Server TCP/IP

After each measured board a message is send. The message looks according to below

BatchID = ‘0’0’0’0’0’0’0’0’0’0’0’0’0’0’0’0’0’ (11 numeric figures where the last character is a ‘\0’)

Error type ‘0’0’0’0’0’0’0’0’0’0’0’0’0’0’0’0’0’ (11 numeric figures where the last character is a ‘\0’)

Error type

The following error types exists

Error code	Explanation
0	Within tolerance
1	Above warning tolerance
2	Below warning tolerance
3	Above tolerance
4	Below tolerance

The error code can is generated for average max and min values se figure below. There is also one error code for each section, At the moment there is only two section and

Pos	explanation
0-11	11 numeric characters describing ark Id
\0	‘\0’ End character
12-16	Not used
17	Avg. value sector 2
18	Max value sector 2

19	Min value sector 2
20	Avg. value sector 1
21	Max value sector 1
22	Min value sector 1
23	'\0' End character

Example:

A message with arkid = 23. The board has 2 sections where section 1 is ok, section 2 has a average below tolerance and a max above warning tolerance. The min value is ok.

The error message would look according to below:

pos	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
char	"	"	"	"	"	"	"	"	"	'2'	'3'	'\0'	"	"	"	"	"	'4'	'1'	'0'	'0'	'0'	'0'	'\0'

4.1.9 TCP/IP-protocol to external logging client

The Panel Profiler system will act as a server with a user defined port number. Character strings are null terminated. Multi-byte data will be transferred with low byte first. The interface can work in two modes *Polled* and *Non Polled*, set by a parameter in the Main Server settings.

Summary of message ID:s commands.

Message ID	Direction	Description
1050	Host → BMS	Setting of product
1050	BMS → Host	Acknowledge of setting of product from Host, at connection with Host and after manual change of product in BMS.
1030	BMS → Host	Board and track data for one board in non polling mode. The message is sent immediately after passage of board.
1031	Host → BMS	Poll request
1032	BMS → Host	No board is measured, NACK
1033	BMS → Host	Board and track data for one or more boards in polling mode. Max 99 boards.
1000	BMS ↔ Host	Command message

4.1.9.1 Command messages.

Stop measuring. Sent when Panel Profiler server is closing down.
BMS3000 → Logging client.

Name	Type/Size	Data	Description
Length	Integer, 4 bytes		Total size of the message
Id	Short, 2 bytes	1000	Message Id.
To	Short, 2 bytes	Invalid	Not used
From	Short, 2 bytes	Invalid	Not used
DateTime	Char, 30 bytes	Not being used	Not being used at this time
Command	Integer, 4 bytes	110	Stop measuring
Spare	Char 120 bytes		For future use

4.1.9.2 TCP/IP protocol for setting of product.

Logging client → BMS3000 and BMS3000 → Logging client

Name	Type/Size	Data	Description
Length	Integer, 4 bytes		Total size of the message
Id	Short, 2 bytes	1050	Message Id.
To	Short, 2 Bytes	Invalid	Not used
From	Short, 2 Bytes	invalid	Not used

DateTime	Char, 30 bytes	Not being used	Not being used at this time
ProductName	Char, 50 bytes		Product name
NomThickness	Integer, 4 bytes		Nominal thickness in 1/100mm
NomWidth	Integer, 4 bytes		Nominal width in 1/100mm
NomLength	Integer, 4 bytes		Nominal Length in mm
ThickMax	Integer, 4 bytes		Thickness max tolerance in 1/100mm related to nominal. (normally xxxx)
ThickMin	Integer, 4 bytes		Thickness min tolerance in 1/100mm related to nominal. (normally -xxxx)
ThickWarnMax	Integer, 4 bytes		Thickness upper warning tolerance in 1/100mm related to nominal. (normally xxxx)
ThickWarnMin	Integer, 4 bytes		Thickness lower warning tolerance in 1/100mm related to nominal. (normally -xxxx)
WidthMax	Integer, 4 bytes		Width max tolerance in 1/100mm related to nominal. (normally xxxx)
WidthMin	Integer, 4 bytes		Width min tolerance in 1/100mm related to nominal. (normally -xxxx)
WidthWarnMax	Integer, 4 bytes		Width upper warning tolerance in 1/100mm related to nominal. (normally xxxx)
WidthWarnMin	Integer, 4 bytes		Width lower warning tolerance in 1/100mm related to nominal. (normally -xxxx)
LengthMax	Integer, 4 bytes		Length max tolerance in mm related to nominal. (normally xxxx)
LengthMin	Integer, 4 bytes		Length min tolerance in mm related to nominal. (normally -xxxx)
LengthWarnMax	Integer, 4 bytes		Length upper warning tolerance in mm related to nominal. (normally xxxx)
LengthWarnMin	Integer, 4 bytes		Length lower warning tolerance in mm related to nominal. (normally -xxxx)
Logging	Integer, 4 bytes		0 = No logging of this product to file 1 = Logging of this product to file.
LogPos1	Integer, 4 bytes		Position of log point in mm, relative to front edge if value is positive. If position is negative (-), position will be related to rear edge. If set to 0 or outside board, log point will be inactive and value will be set to 0.
LogPos2	Integer, 4 bytes		
LogPos3	Integer, 4 bytes		
LogPos4	Integer, 4 bytes		
LogPos5	Integer, 4 bytes		

OutOfTolLength	Integer, 4 bytes		Length of an area in mm exceeding tolerance, to obtain a reject.
EdgeOffset	Integer, 4 bytes		Position in mm of movable outer track from nominal width.
CenterPos	Integer, 4 bytes		Centre position in mm of board. Used for calculation of outer tracks in a moveable track system
NoOfOpenings	Integer, 4 bytes		Number of openings for a multi layer press.
Spare	Char, 504 bytes		For future use.

4.1.9.3 TCP/IP protocol for measured board data after each board (non poll mode).

BMS3000 → Logging client

Name	Type/Size	Data	Description	
Length	Integer, 4 bytes		Total size of the message	
Id	Short, 2 bytes	1030	Message Id.	
To	Short, 2 Bytes	invalid	Not used	
From	Short, 2 Bytes	invalid	Not used	
DateTime	Char, 30 bytes	Not being used	Not being used at this time	
ProductName	Char, 50 bytes		Product name	
Width	Integer, 4 bytes		Board average width in 1/100mm	
Thickness	Integer, 4 bytes		Board average thickness in 1/100mm	
Length	Integer, 4 bytes		Board average length in mm	
Reject code	Integer, 4 bytes	Reject code	Description	Reject code
			Ok	0
			maxLength	1
			minLength	2
			maxThick	3
			minThick	4
			maxWidth	5
minWidth	6			
NomThickness	Integer, 4 bytes		Nominal thickness in 1/100mm	
NomWidth	Integer, 4 bytes		Nominal width in 1/100mm	
NomLength	Integer, 4 bytes		Nominal Length in mm	
WidthMax	Integer, 4 bytes		Board Width max in 1/100mm	
WidthMin	Integer, 4 bytes		Board Width min in 1/100mm	
ThickMax	Integer, 4 bytes		Board Thickness max in 1/100mm	
ThickMin	Integer, 4 bytes		Board Thickness min in 1/100mm	
PosWidthMax	Integer, 4 bytes		Position of board Width max in mm	
PosWidthMin	Integer, 4 bytes		Position of board Width min in mm	
PosThickMax	Integer, 4 bytes		Position of board Thickness max in mm	
PosThickMin	Integer, 4 bytes		Position of board Thickness min in mm	
maxWidth	Byte	0,1	1= Limit exceeded	
minWidth	Byte	0,1	1= Limit exceeded	
maxThick	Byte	0,1	1= Limit exceeded	
minThick	Byte	0,1	1= Limit exceeded	
maxLength	Byte	0,1	1= Limit exceeded	
minLength	Byte	0,1	1= Limit exceeded	
Error	Integer, 4 bytes		Description	Code
			Ok	0

			Low Q To many bad measurements (see Thickness module for description)	1
			Sample overflow To many samples required to measure the complete board. (max 3000)	4
			Max collection length Collection is terminated due to the max collection length is reached. This parameter is set in the thickness module	5
			Transmission overflow To many measuring points sent from thickness module (max 3000)	6
SkipBeginEnd	Short, 2 Bytes		Length in mm at start and end of board which have been excluded in the calculations.	
AvgThickUpperTol	Byte	0,1	1= Limit exceeded	
AvgThick UpperWarning	Byte	0,1	1= Limit exceeded	
AvgThickOk	Byte	0,1	1= Ok	
AvgThickLowerWar ning	Byte	0,1	1= Limit exceeded	
AvgThickLowerTol	Byte	0,1	1= Limit exceeded	
AvgWidthUpperTol	Byte	0,1	1= Limit exceeded	
AvgWidth UpperWarning	Byte	0,1	1= Limit exceeded	
AvgWidthOk	Byte	0,1	1= Ok	
AvgWidthLowerWar ning	Byte	0,1	1= Limit exceeded	
AvgWidthLowerTol	Byte	0,1	1= Limit exceeded	
OpeningNo	Short, 2 Bytes		Actual opening number in a multi- press	
Spare	186 Bytes		For future use	

Next part of the message is individual track data, 1 record per active track. Max 24 tracks.
The text below will describe one record. (5 active tracks → 5 records directly after each

other)			
UpperActive	Byte	0,1	1= Indicates upper sensor active
QUpper	Short, 2 Bytes	0...100	Quality value for upper sensor.
QLower	Short, 2 Bytes	0...100	Quality value for lower sensor.
StatusUpper	Short, 2 Bytes		0=Ok 1=Q-value to low 2=Sample overflow 3=Max collect length 4=Transmission overflow
StatusLower	Short, 2 Bytes		0=Ok 1=Q-value to low 2=Sample overflow 3=Max collect length 4=Transmission overflow
TrackPos	Short, 2 Bytes		Track position in width or height direction in mm
StartPos	Integer, 4 Bytes		Start position of track in length direction relative to first track detecting the board in mm
Length	Short, 2 Bytes		Board length in mm
Type	Short, 2 Bytes		Type of measurement 0= Thickness 1=Width
TrackNo	Short, 2 Bytes	0 ... 23	Track number
Avg	Short, 2 Bytes		Average in 1/100mm
Max	Short, 2 Bytes		Max in 1/100mm
Min	Short, 2 Bytes		Min in 1/100mm
PosMax	Short, 2 Bytes		Position for Max in mm
PosMin	Short, 2 Bytes		Position for Min in mm
ValueInLogPos[5]	Short, 2 Bytes x5		Value in the 5 user defined log points in 1/100mm -1 = Not possible to calculate 0 = Not in use
UpperTol	Byte	0,1	1= Limit exceeded
UpperWarning	Byte	0,1	1= Limit exceeded
LowerWarning	Byte	0,1	1= Limit exceeded
LowerTol	Byte	0,1	1= Limit exceeded
Spare	32 Bytes		For future use

4.1.9.4 TCP/IP protocol for measured board data, poll request.

Logging client → BMS3000

Name	Type/Size	Data	Description
Length	Integer, 4 bytes	40	Total size of the message
Id	Short, 2 bytes	1031	Message Id poll request
To	Short, 2 bytes	invalid	Not used
From	Short, 2 bytes	invalid	Not used
DateTime	Char, 30 bytes	Not being used	Not being used at this time

4.1.9.5 TCP/IP protocol for measured board data, poll NACK.

BMS3000 → Logging client

No new data available

Name	Type/Size	Data	Description
Length	Integer, 4 bytes	40	Total size of the message
Id	Short, 2 bytes	1032	Message Id poll NACK
To	Short, 2 bytes	invalid	Not used
From	Short, 2 bytes	invalid	Not used
DateTime	Char, 30 bytes	Not being used	Not being used at this time

4.1.9.6 TCP/IP protocol for measured board data, poll ACK.

BMS3000 → Logging client

Name	Type/Size	Data	Description	
Length	Integer, 4 bytes		Total size of the message	
Id	Short, 2 bytes	1033	Message Id.	
NBoards	Short, 2 bytes	1...99	Number of boards in message	
Status	Short, 2 bytes		0 = Ok 1 = Board queue overrun	
DateTime	Char, 30 bytes	Not being used	Not being used at this time	
Next part of the message is individual board data, 1 record per board in queue. Max 99 boards.				
DateTime	Char, 30 bytes		Date and time for measuring of actual board. Format: "yyyymmddhhnnss" nn = minute	
ProductName	Char, 50 bytes		Product name	
Width	Integer, 4 bytes		Board average width in 1/100mm	
Thickness	Integer, 4 bytes		Board average thickness in 1/100mm	
Length	Integer, 4 bytes		Board average length in mm	
Reject code	Integer, 4 bytes	Reject code	Description	
			Reject code	
			Ok	0
			maxLength	1
			minLength	2
			maxThick	3
			minThick	4
			maxWidth	5
			minWidth	6
NomThickness	Integer, 4 bytes		Nominal thickness in 1/100mm	
NomWidth	Integer, 4 bytes		Nominal width in 1/100mm	
NomLength	Integer, 4 bytes		Nominal Length in mm	
WidthMax	Integer, 4 bytes		Board Width max in 1/100mm	
WidthMin	Integer, 4 bytes		Board Width min in 1/100mm	
ThickMax	Integer, 4 bytes		Board Thickness max in 1/100mm	
ThickMin	Integer, 4 bytes		Board Thickness min in 1/100mm	
PosWidthMax	Integer, 4 bytes		Position of board Width max in mm	
PosWidthMin	Integer, 4 bytes		Position of board Width min in mm	
PosThickMax	Integer, 4 bytes		Position of board Thickness max in mm	
PosThickMin	Integer, 4 bytes		Position of board Thickness min in mm	
maxWidth	Byte	0,1	1= Limit exceeded	

minWidth	Byte	0,1	1= Limit exceeded	
maxThick	Byte	0,1	1= Limit exceeded	
minThick	Byte	0,1	1= Limit exceeded	
maxLength	Byte	0,1	1= Limit exceeded	
minLength	Byte	0,1	1= Limit exceeded	
Error	Integer, 4 bytes		Description	Code
			Ok	0
			Low Q To many bad measurements (see Thickness module for description)	1
			Sample overflow To many samples required to measure the complete board. (max 3000)	4
			Max collection length Collection is terminated due to the max collection length is reached. This parameter is set in the thickness module	5
			Transmission overflow To many measuring points sent from thickness module (max 3000)	6
SkipBeginEnd	Short, 2 Bytes		Length in mm at start and end of board which have been excluded in the calculations.	
AvgThickUpperTol	Byte	0,1	1= Limit exceeded	
AvgThick UpperWarning	Byte	0,1	1= Limit exceeded	
AvgThickOk	Byte	0,1	1= Ok	
AvgThickLowerWar ning	Byte	0,1	1= Limit exceeded	
AvgThickLowerTol	Byte	0,1	1= Limit exceeded	
AvgWidthUpperTol	Byte	0,1	1= Limit exceeded	
AvgWidth UpperWarning	Byte	0,1	1= Limit exceeded	
AvgWidthOk	Byte	0,1	1= Ok	
AvgWidthLowerWar	Byte	0,1	1= Limit exceeded	

ning			
AvgWidthLowerTol	Byte	0,1	1= Limit exceeded
OpeningNo	Short, 2 Bytes		Actual opening number in a multi-press
Spare	186 Bytes		For future use
NoOfActTracks	Short, 2 Bytes	1...24	Number of active tracks
<p>Next part of the message is individual track data, 1 record per active track. Max 24 tracks.</p> <p>Below will describe one record. (5 active tracks → 5 records directly after each other)</p>			
UpperActive	Byte	0,1	1= Indicates upper sensor active
QUpper	Short, 2 Bytes	0...100	Quality value for upper sensor.
QLower	Short, 2 Bytes	0...100	Quality value for lower sensor.
StatusUpper	Short, 2 Bytes		0=Ok 1=Q-value to low 2=Sample overflow 3=Max collect length 4=Transmission overflow
StatusLower	Short, 2 Bytes		0=Ok 1=Q-value to low 2=Sample overflow 3=Max collect length 4=Transmission overflow
TrackPos	Short, 2 Bytes		Track position in width or height direction in mm
StartPos	Integer, 4 Bytes		Start position of track in length direction relative to first track detecting the board in mm
Length	Short, 2 Bytes		Board length in mm
Type	Short, 2 Bytes		Type of measurement 0= Thickness 1=Width
TrackNo	Short, 2 Bytes	0 23	Track number
Avg	Short, 2 Bytes		Average in 1/100mm
Max	Short, 2 Bytes		Max in 1/100mm
Min	Short, 2 Bytes		Min in 1/100mm
PosMax	Short, 2 Bytes		Position for Max in mm
PosMin	Short, 2 Bytes		Position for Min in mm
ValueInLogPos[5]	Short, 2 Bytes x5		Value in the 5 user defined log points in 1/100mm -1 = Not possible to calculate

			0 = Not in use
UpperTol	Byte	0,1	1= Limit exceeded
UpperWarning	Byte	0,1	1= Limit exceeded
LowerWarning	Byte	0,1	1= Limit exceeded
LowerTol	Byte	0,1	1= Limit exceeded
Spare	34 Bytes		For future use

Item	Description
I/O Card Card Number	Number of the PCI card. If set to -1 the card is not activated

4.2 Thickness profile

After start of program a small icon will appear in the lower right corner. Text in the icon is T and the colour will change depending of state:

Colour	State
Red	Measurement not started
Yellow	Measurement started but no contact to main server
Green	Measurement started and connected to main server

At normal use the icon will change to green within 10seconds automatically, when the program have connected to the main server.

At right click on the icon, a small menu will appear in the lower right corner.



Command	Description
Start	Start measuring
Stop	Stop measuring
Settings	Parameters and service display

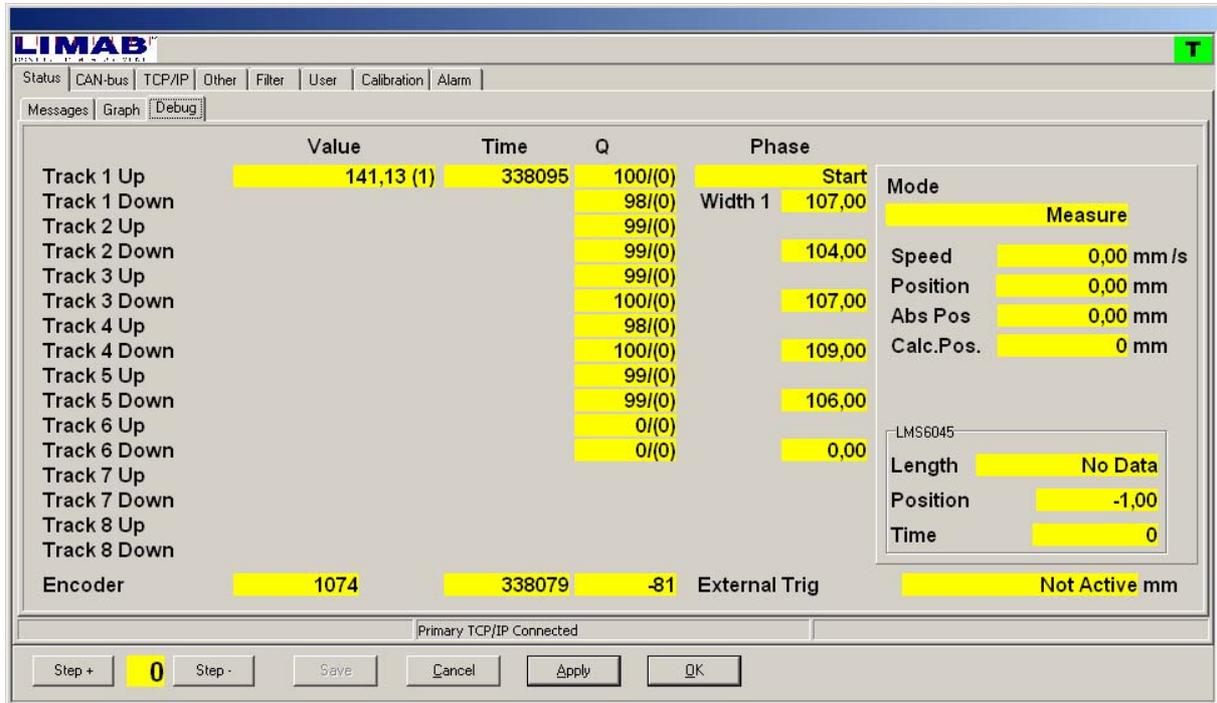
If password protection is activated next menu appears:



Enter password or call LIMAB if the password is lost.

4.2.1 Settings

4.2.1.1 Debug

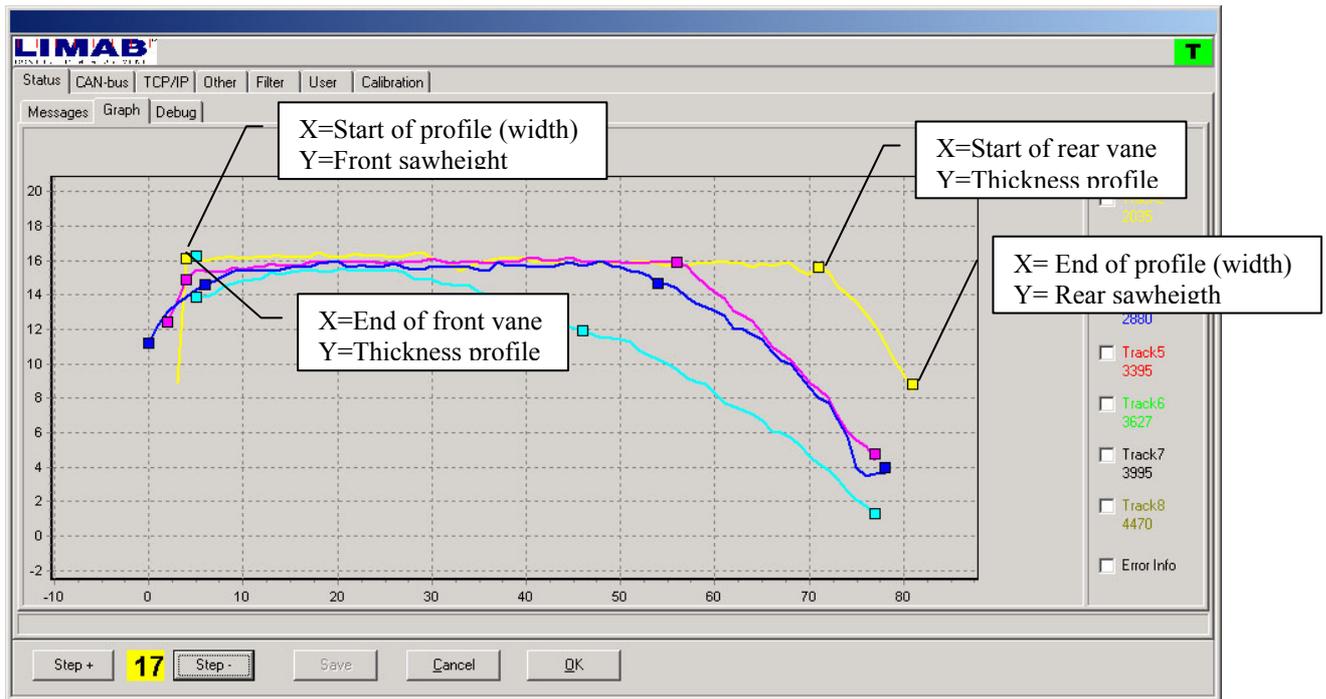


Item	Description
Value	Actual value measured by each probe. Panel will have yellow background for connected active probes. Number of data/message will be displayed within (4).
Track n Up/Down	<p>Error messages: No Object Out of range Saturation To Big/Small</p>

<table border="1"> <thead> <tr> <th>Value</th> </tr> </thead> <tbody> <tr><td>Speed: 570 TE: 14</td></tr> <tr><td>TDiff: 1 RP: 698,00</td></tr> <tr><td>Speed: 570 TE: 17</td></tr> <tr><td>TDiff: 1 RP: 699,70</td></tr> <tr><td>Speed: 570 TE: 12</td></tr> <tr><td>TDiff: 1 RP: 696,90</td></tr> <tr><td>Speed: 570 TE: 11</td></tr> <tr><td>TDiff: 1 RP: 696,30</td></tr> <tr><td>Speed: 570 TE: 9</td></tr> <tr><td>TDiff: 1 RP: 695,20</td></tr> </tbody> </table>	Value	Speed: 570 TE: 14	TDiff: 1 RP: 698,00	Speed: 570 TE: 17	TDiff: 1 RP: 699,70	Speed: 570 TE: 12	TDiff: 1 RP: 696,90	Speed: 570 TE: 11	TDiff: 1 RP: 696,30	Speed: 570 TE: 9	TDiff: 1 RP: 695,20	<p>After history step the value background will change to green, the upper field will show the speed and the time (TE:) to latest encoder reading, the encoder is read every 20ms The lower field shows time difference (TDiff:) at latest encoder reading, between the encoder and the latest incoming probe message, in ms. RP: is the relative encoder position, (distance from latest calculation).</p> <p>All values are sampled at the time when the track transits to "Collect".</p>													
Value																									
Speed: 570 TE: 14																									
TDiff: 1 RP: 698,00																									
Speed: 570 TE: 17																									
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Speed: 570 TE: 9																									
TDiff: 1 RP: 695,20																									
<p>Value Encoder</p>	<p>Actual encoder value in pulses, (0...4095) The Q-value panel for the encoder will display the time difference between the two CAN-busses in ms.</p>																								
<p>Time</p> <table border="1"> <thead> <tr> <th>Time</th> </tr> </thead> <tbody> <tr><td>243723843</td></tr> <tr><td>17,80</td></tr> <tr><td>243723846</td></tr> <tr><td>19,80</td></tr> <tr><td>243723860</td></tr> <tr><td>28,10</td></tr> </tbody> </table>	Time	243723843	17,80	243723846	19,80	243723860	28,10	<p>Actual timestamp in ms.</p> <p>After history step the time stamp background will change to green, the upper field will show the time for start of collection, and the lower the absolute encoder position, (distance from encoder zero position)</p>																	
Time																									
243723843																									
17,80																									
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<p>Q</p> <table border="1"> <thead> <tr> <th>Q</th> </tr> </thead> <tbody> <tr><td>100/(0)</td></tr> <tr><td>100/(0)</td></tr> <tr><td>100/(16)</td></tr> <tr><td>100/(17)</td></tr> <tr><td>100/(0)</td></tr> </tbody> </table> <p>Q-value</p> <p>Dust level</p> <table border="1"> <thead> <tr> <th>Q</th> </tr> </thead> <tbody> <tr><td>100/(0)</td></tr> <tr><td>100/(0)</td></tr> <tr><td>100/7</td></tr> <tr><td>100/7</td></tr> <tr><td>100/(0)</td></tr> </tbody> </table>	Q	100/(0)	100/(0)	100/(16)	100/(17)	100/(0)	Q	100/(0)	100/(0)	100/7	100/7	100/(0)	<p>Quality and (dust) factor in %. The quote of measured values without error and total number of values, from last board Background will turn to red if value is below Q-limit (see 4.2.4 page 88) If text is q/e: q is Q-value e is error type:</p> <table border="1"> <tbody> <tr><td>1</td><td>Low Q-value</td></tr> <tr><td>2</td><td>Sample overflow</td></tr> <tr><td>3</td><td>Max collect length</td></tr> <tr><td>4</td><td>Transmit overflow</td></tr> <tr><td>6</td><td>No valid data</td></tr> <tr><td>7</td><td>Dust above alarm limit. Dust is measured as number of measurements with valid data related to total number of measurements in the gap between two boards. (see 4.2.4)</td></tr> </tbody> </table>	1	Low Q-value	2	Sample overflow	3	Max collect length	4	Transmit overflow	6	No valid data	7	Dust above alarm limit. Dust is measured as number of measurements with valid data related to total number of measurements in the gap between two boards. (see 4.2.4)
Q																									
100/(0)																									
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<p>Phase</p>	<p>Phase in collection of values</p> <table border="1"> <tbody> <tr> <td>Start</td> <td>Wait for No Board in Stop length.</td> </tr> <tr> <td>Wait</td> <td>Wait for Board in Start length</td> </tr> </tbody> </table>	Start	Wait for No Board in Stop length.	Wait	Wait for Board in Start length																				
Start	Wait for No Board in Stop length.																								
Wait	Wait for Board in Start length																								

	Forced wait	Track is forced by another track to collect	
	Collect	Storing of values and wait for No Board in Stop length.	
	Wait for finish	Wait for Calculation delay	
	Reverse	Conveyor may move backwards to -50mm. At that position the position resets to 0, and phase text "Reverse" are displayed	
Width n	Measured width		
Mode			
Speed	Actual conveyor speed in m/s		
Position	Actual position relative last board calculation point.		
Absolute position	Actual position relative first measured board or 30m gap.		
Calc.Position	Calculation position relative last measured board		
LMS6045 Length	Length value from length gage LMS6045 with offset added		
LMS6045 Position	Position of conveyor at receiving of length value from LMS6045.		
LMS6045 Time	Time stamp at receiving of length value from LMS6045.		
External Trig	Status for external- and thickness trig		
	Colour	Text	Description
	Lime	Ext Trig	External trig detected on any of the connected PreciCuras
	Light blue	Thick Trig n	Negative thickness edge on track n
	Yellow	Not Active	No external trig detected
	Yellow	kkkk / nnnn	External trig position relative encoder reset point, and expected midpoint in mm

4.2.1.2 Graph

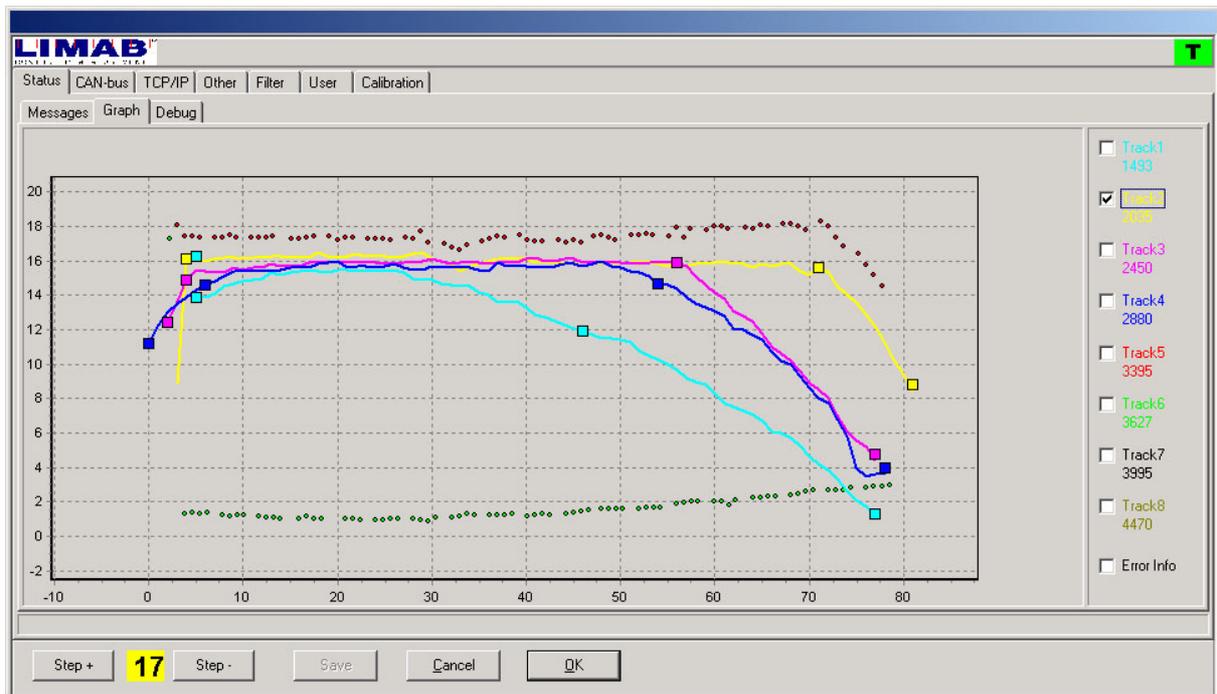


Graphic display of measured values from each probe and track.

Tracks are displayed in different colours

The solid lines displays each track thickness profile.

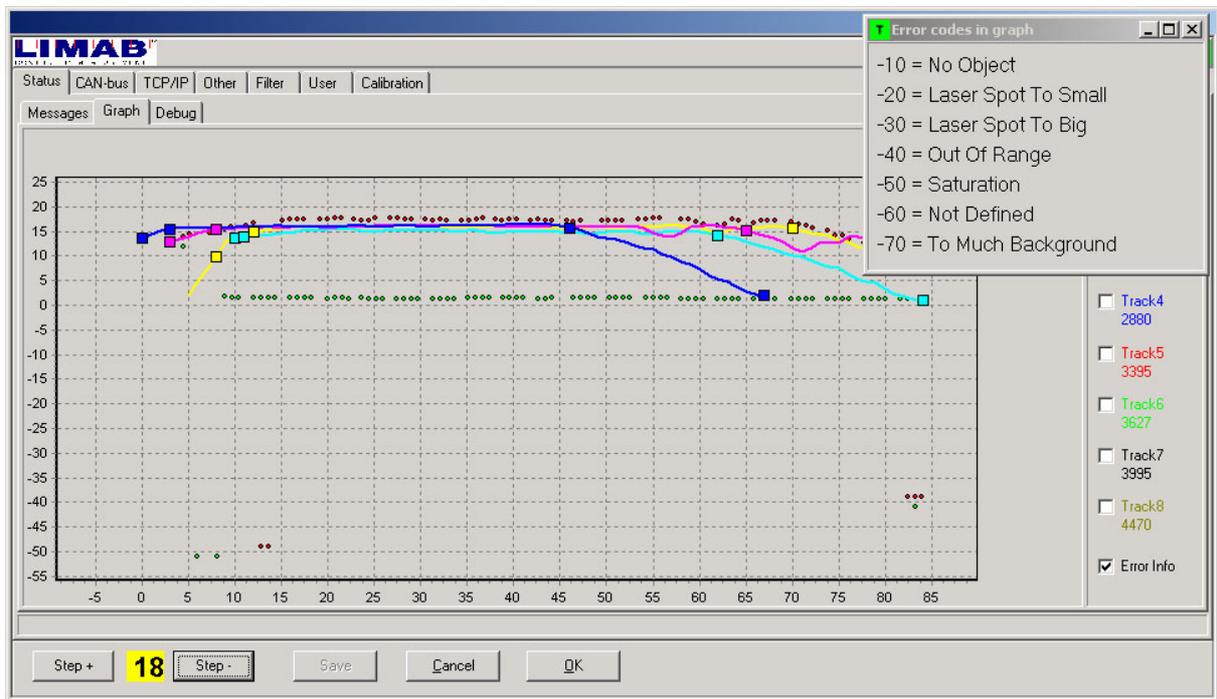
The square dots indicates the calculated points for the vanes. These are calculated by the MainServer. These points will only be displayed if the MainServer is connected.



Top surface is displayed with red dots, and bottom surface is displayed with green dots.

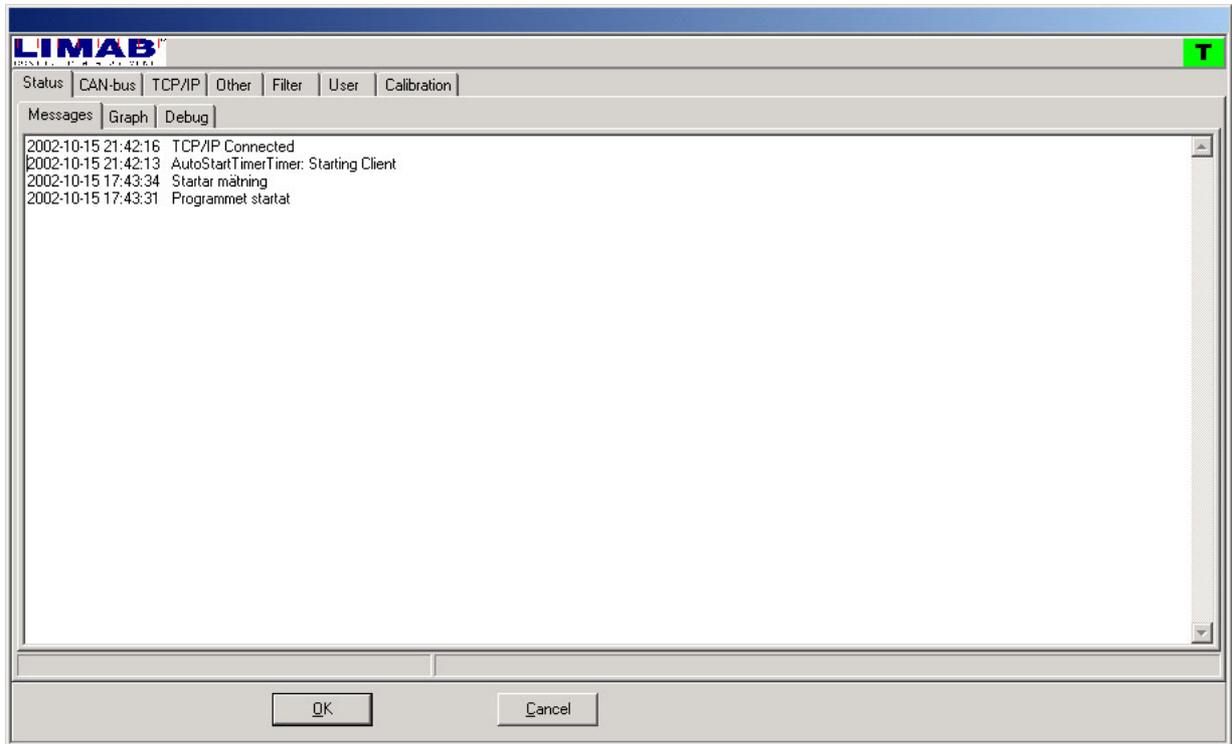
Track n checkbox will turn on/off top/bottom surface display.

When Error Info is selected, the individual error codes will be displayed as negative values according to the "Error codes in graph", see separate Accura manual for error description.



4.2.1.3 Messages

Logging of processing events will be written on the messages tab and in a text file “ErrorLog.txt” located in the same directory as “Thickness.exe”.



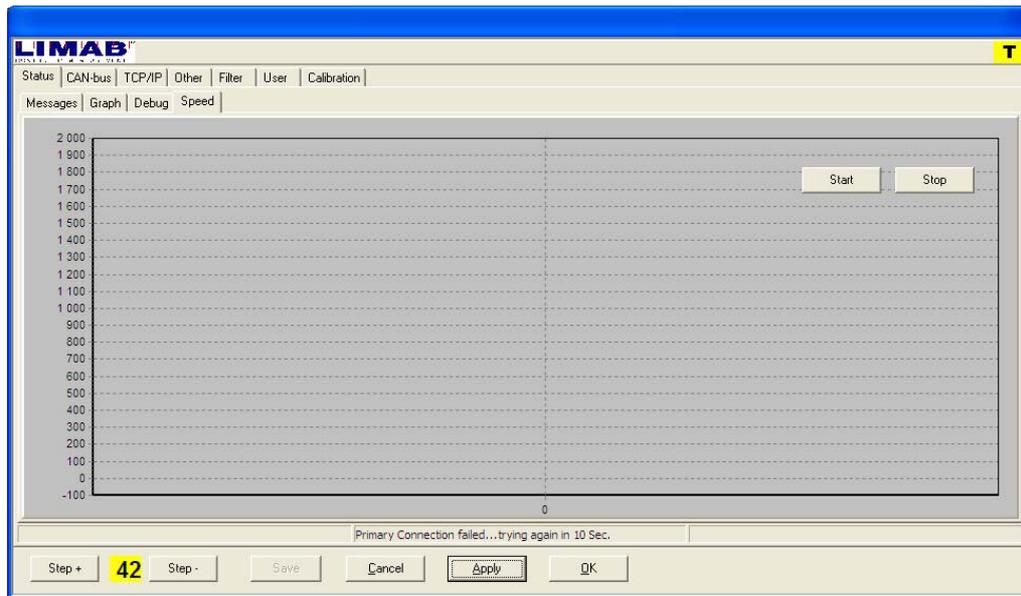
Possible events are:

Message	Description
Started Measuring...	
Stopped Measuring	
Closed Client..	
Starting Client...	
Connection failed	
No messages from sensors	No data received from the connected PreciCuras
Messages from sensors restored	Data from PreciCuras restored
Alarm setup from BMS3000 server	Alarm setup received from BMS3000 server
Alarm setup from BoardProfiler server	Alarm setup received from BoardProfiler server
Alarm setup from UNKNOWN server	
No XION-module connected	No XION I/O-module connected to the encoder CAN-bus
XI/ON: Slot empty	No output module connected in the socket
XI/ON: XN-BR-24VDC-D	Basic XION bridge detected
XI/ON: XN-4DO-24VDC-0.5A-P	Output module with 4 open collector outputs detected
XI/ON: XN-2DO-R-CO	Output module with 2 relay outputs detected
XI/ON: Module unknown ID:	Unknown module detected

4.2.1.4 Speed monitor

Graphic monitoring of conveyor speed. “Start” button will start monitoring of conveyor speed in mm/sec with 20ms interval. The monitoring will be stopped by the “Stop” button.

Note! In some older systems the PC may be overloaded by this function. Check with task manager.



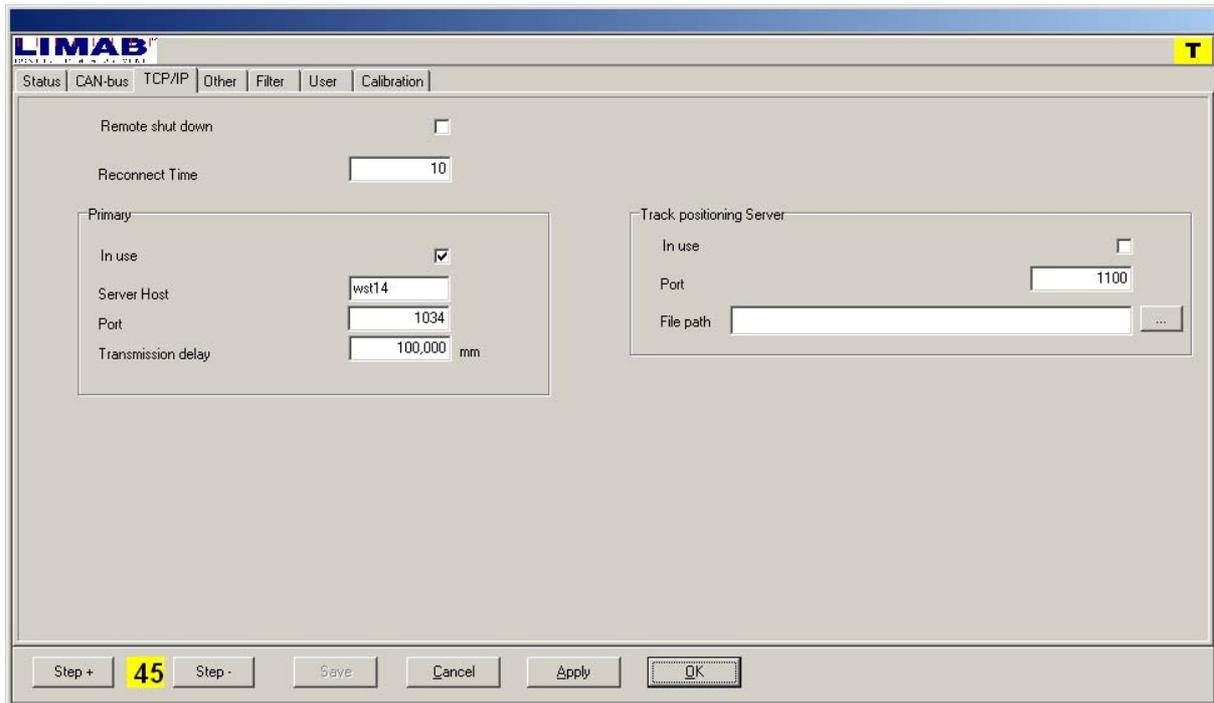
4.2.2 CAN-bus

Set-up for CAN-bus interface

The screenshot shows the LIMAB software interface with the 'CAN-bus' configuration window open. The window has a menu bar with Status, CAN-bus, TCP/IP, Other, Filter, User, Calibration. Below the menu bar are tabs for Messages, Graph, Debug, and Speed. The main area is divided into two columns: 'Gauges' and 'Encoder'.
 Under 'Gauges':
 - Channel: Radio buttons for 0 (selected), 1, 2, 3.
 - Baudrate: Radio buttons for 1 MBit/s, 500 KBit/s (selected), 250KBit/s, 125KBit/s.
 - Sample frequency: Radio buttons for 2000Hz, 1000Hz, 800Hz (selected), 500Hz.
 Under 'Encoder':
 - Channel: Radio buttons for 0, 1 (selected), 2, 3.
 - Baudrate: Radio buttons for 1 MBit/s, 500 KBit/s, 250KBit/s, 125KBit/s (selected).
 - Initialisation: Radio buttons for Master (selected), Slave.
 - Direction: Radio buttons for Incrementing, Decrementing (selected).
 At the bottom of the window is a control bar with buttons: Step +, 0, Step -, Save, Cancel, Apply, and OK.

Item	Description
Channel	Selection of channel for the connected sensors
Baudrate	Selection of baud rate
Sample frequency	Actual sample frequency of the PreciCura.
Initialisation	<p>In a multi master system with only one encoder connected to several masters, only one master is allowed to initialize the encoder.</p> <p>Master = The encoder will be initialized Slave = No initialisation will be performed</p>
Direction	Setting for conveyors forward direction.

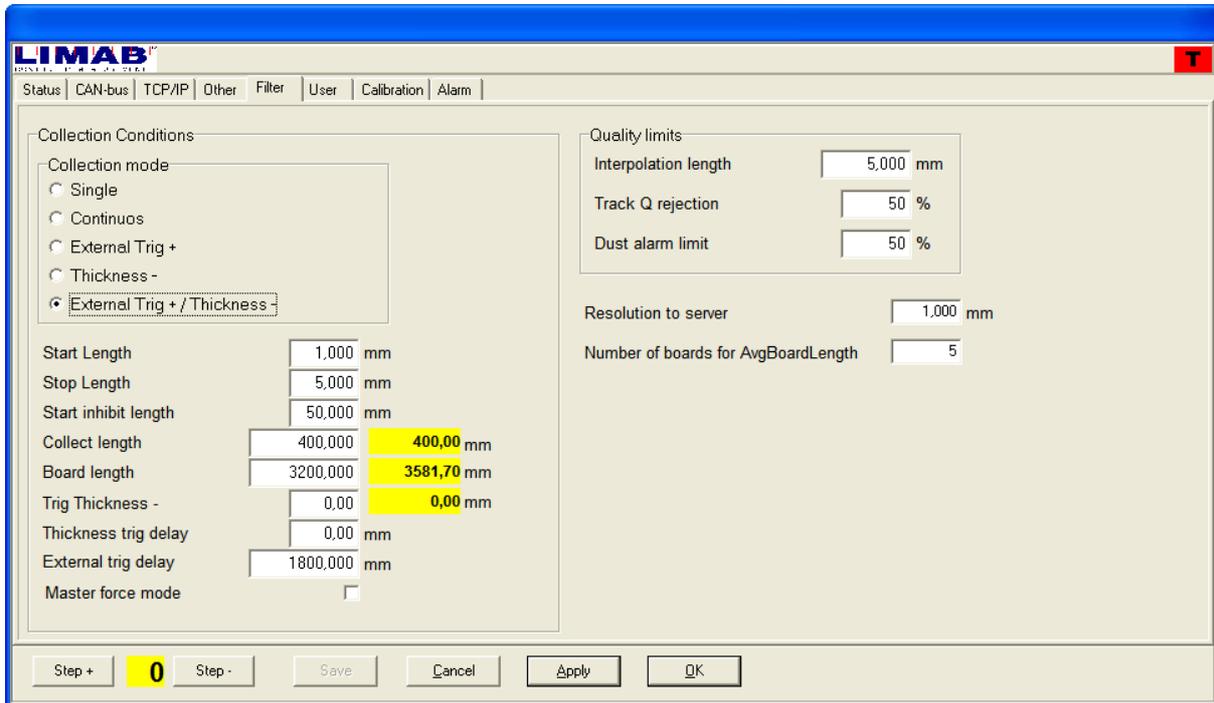
4.2.3 TCP/IP



The thickness profiles can be sent to one MainServer.

Item	Description
Remote shut down	Enable shut down command over TCP/IP connection to MainServer, to shut down the program. If not checked only the CANbus will be stopped on shut down command from MainServer. If Thickness program runs on another PC than the MainServer, the "Remote shut down" should be unchecked.
Reconnect time	see In Use.
In Use	Checked, An attempt to connect to main server is made at program start. If it fails a new attempt will be made every "Reconnect time" After connection, the main server will start the measuring
Server Host	Name of the computer where the main server program is installed
Port	Port number for Thickness connection. Have to be the same in the main server.
Transmission delay	Transmission of profile from Primary connection will be delayed this distance after calculation.
TrackPositioning server. In Use	Activates the server for connection to a Track positioning client.

4.2.4 Filter



Item	Description
Collection mode	<p>Single</p> <p>Collection starts when all consecutive measurements within the StartLength is of type Ok, ToBig/Small and Saturation. Collection stops when collect length is reached or 3000 values is reached or when all consecutive measurements within the StopLength is of type NoObject or OutOfRange</p>
	<p>Continuous</p> <p>After each Collect length data is updated and sent to MainServer.</p>
	<p>External Trig +</p> <p>Collection of data begins after positive edge detected on any of the PreciCuras trig input, + (Boardlength – CollectLength/2 – ExternalTrigDelay) Note!. PreciCura filter length have to be set to 1 and sample division to 2 to enable trig input.</p>
	<p>Thickness -</p> <p>Collection of data begins when any track detects a thickness decrease through the TrigThicknessLimit + (BoardLength – ThicknessTrigDelay)</p>

	External Trig+/Thickness-	Collection of data begins after positive edge detected on any of the PreciCuras trig input, + (Boardlength – CollectLength/2 – ExternalTrigDelay) or Collection of data begins when any track detects a thickness decrease through the TrigThicknessLimit + (BoardLength – ThicknessTrigDelay)
Start Length	Length of measurements in sequence to start collection of profile.	
Stop Length	Length of error messages in sequence to terminate collection of profile.	
Start inhibit length	After end of board, the conveyor have to run this length without the sensors senses a board, before the phase can change to WAIT.	
Collect Length	In mode single are data collected until the object ends or max collect length is reached. In all other modes date are collected until collect length is reached. The panel to the right shows the actual value in yellow at startup, when the parameter value is used. And when MainServer is connected the value is obtained from MainServer, and the panel color becomes green.	
Board length	Only used in mode ExternTrig+ and TrigThickness- The panel to the right shows the actual value in yellow at startup, when the parametervalue is used. And when MainServer is connected the value is obtained from MainServer, and the panel color becomes green.	
Trig thickness -	Limit for thickness trig in mode TrigThickness-. Trig is active at negative edge. The panel to the right shows the actual value in yellow at startup, when the parametervalue is used. And when MainServer is connected the value is obtained from MainServer, and the panel color becomes green.	
Thickness trig delay	Delay in mm in TrigThickness-	
External trig delay	Delay in mm in ExternTrig+	
Master force mode	The last track detecting the board, (phase change WAIT → COLLECT) will reset the other tracks to COLLECT if they are in either phase START or COLLECT. The first track finishing COLLECTION will terminate all other tracks if they are in phase COLLECT.	

Interpolation length	The maximum distance to interpolate between two measured values in thickness profile. If exceeded the lower probe value will not be used.
Track Q rejection	If Q-value of the lower probe is lower than this limit, the lower probe values will not be used for creating thickness profile.
Dust alarm limit	Dust limit in % where alarm is sent to MainServer for logging and message to operator. Dust is measured as number of measurements with valid data related to total number of measurements in the gap between two boards. (see 4.2.1.1)
Resolution to server	Length between two measurements sent to MainServer. If "Resolution to server" is bigger than the sampling distance, values sent to server will be averaged.
Number of boards for AvgBoard Length	Only used in External Trig+ mode for averaging the measured board length.

4.2.5 Other

Before Sander
LIMAB T

Status | CAN-bus | TCP/IP | Other | Filter | User | Calibration

Board Spacing mm

Calculation Delay mm

Sample Distance mm

Gauge LSB Unit mm

Calc LSB unit mm

Transmit lower profile

Graph X length mm

UseCANDiffTime offset adjust

SensorInterface
 CAN-bus
 Rotate File
 Step File

SpeedSource
 CAN Encoder
 Fixed
 TCP/IP
 MoveComp

Operator Interface Unit
 mm
 inch

Length/Positioning Sensor
 Dynamic Width Adjustable
 Length
 None

Multiple Stations
 Gauging Station No

Dynamic Width Adjustable
 Max Queue Length
 Distance Zero Position mm
 Clear Queue Timer ms
 Debug Positioning

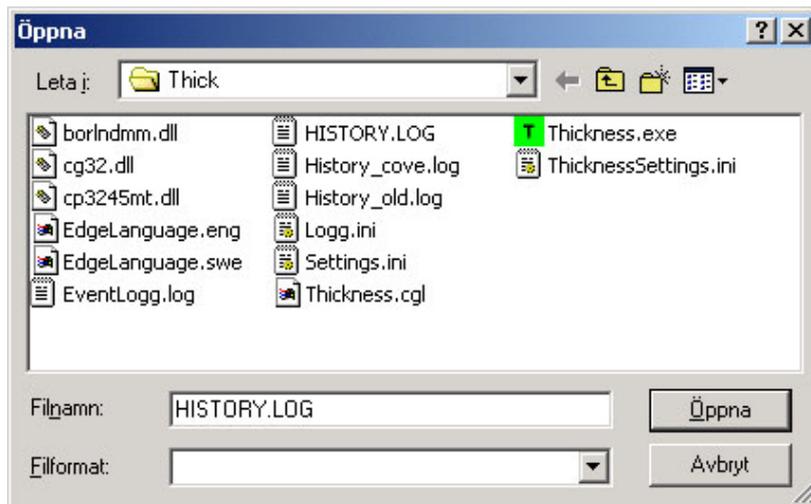
Step + **0** Step -

Item	Description	
Board Spacing	Distance between boards on conveyor	
Calculation Delay	Delay of calculation from last measured value on any track	
Sample Distance	Distance between thickness measured points. Width is measured in resolution of sample distance. (If time between to samples is longer than 1.25ms, all measured values will be averaged, to create next sample)	
Gauge LSB Unit	Resolution of measured values measured by thickness probes Precicura = 0,01mm	
Calc LSB Unit	Internal numeric precision. Set to 0,1mm for BoardProfiler and TMS1000 Set to 0,01mm for Panel Profiler	
Selection of sensor interface	Selection of sensor interface. Normal setting is CAN-bus	
Gauging Station No	Used when having multiple PanelProfiler frames connected to the same PC. This values represents the number of the current Station.	
Operator Interface Unit	The unit in which measured values will be displayed	
Speed source	Selection of conveyor speed source. CAN-encoder Fixed speed set by parameter	
Use CANDiffTime offset adjust	When checked the absolute encoder position will be requested with a time stamp adjusted by time difference between the encoder and the probes.	
Operator unit	Selection of mm or inch	
Sensor interface	Are only used for demo purpose to play already recorded data. Normal setting is CAN-bus.	
Speed source	Can Encoder	The speed is measured by a CAN-bus encoder attached to the conveyor.
	Fixed	Fixed speed, determined by the parameter.
	TCP/IP	Not in use

	MoveComp	The speed is measured by means of using the distance between the to upper sensors in mode Movement compensation of track 1. When a valid speed is calculated, the speed panel in the debug screen will change color to green.
Movement compensation of Track1	Distance at calibration height	Distance between the two laserspots at the top surface of the board, when the board top surface is on the calibration level. The value is negative when the compensation sensor is mounted in front of the normal sensor. The value is positive when the compensation sensor is mounted behind of the normal sensor. (Behind means that the normal sensor detects the board first)
	Edge skip	Base length for extrapolation of top surface values at the edges.
	Non flat edge length	Area at the edges which are not used. These areas are extrapolated.
Length/Positioning Sensor	Dynamic Width Adjustable	The outer tracks are width adjustable, individually.
	Length	Not used in PanelProfiler.
	None	There is no sensor for detecting board positions or board length.
Dynamic Width Adjustable	Max queue length	For DWA, the thickness module keeps a queue of board positions. This field limits how many board positions the software needs to remember, and depends on the distance between the frames.
	Distance Zero Position	Distance between the positioning sensor zero position, and the last track zero position (first track is on the opposite side of the positioning sensor).
	Clear Queue Timer	Contains time in milliseconds, if there is no new input from the positioning sensor for the amount of time given in this field, the board queue is cleared in order to keep the queue synchronized.
	Debug Positioning	Enables positioning simulation functions.

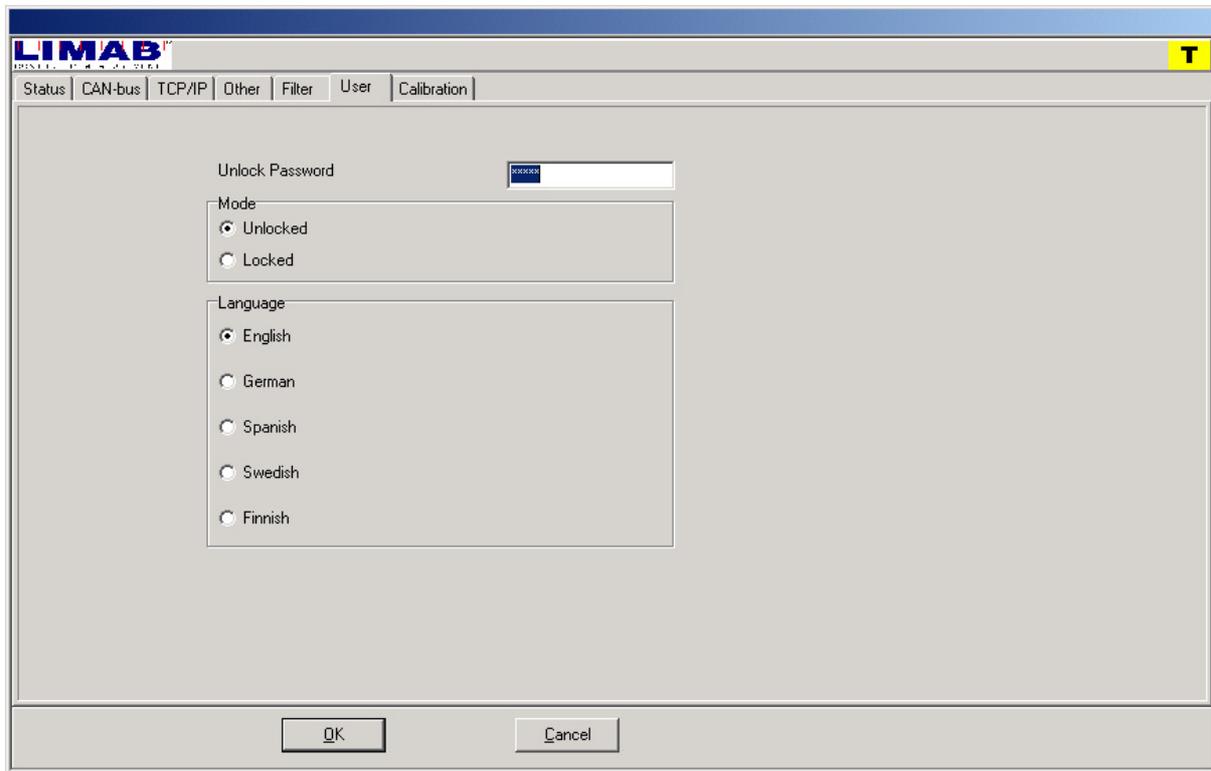
4.2.5.1 Rotate file

Profile data will continuously be stored in the file HISTORY.LOG. This file always contains the 50 last profiles. To input these profiles, the measuring have to be stopped, the LOAD button will be enabled. Following menu will appear:



Enter file HISTORY.LOG, and start measuring, the stored profiles will be displayed. In the Can Debug menu (4.2.1.1), the mode will change to Playing Profile.

4.2.6 User



Item	Description
Unlocked	All parameters and menus are open for user
Password protected	Access to menus and parameters through password login. Password may be changed.
Language	Selection of language

4.2.7 Calibration

The screenshot shows the LIMAB software interface for calibration. It features a menu bar at the top with options: Status, CAN-bus, TCP/IP, Other, Filter, User, Calibration, and Alarm. The main window is divided into several sections:

- Thickness Calibration:** Includes fields for 'Number of sampels to average' (990) and 'Conveyor Inclination' (0,0). Below is a table with columns for 'Actual', 'Nominal', and 'Offset mm' for tracks 1 through 7.
- Width Calibration:** Includes 'Pulses/mm' (4,000) and 'Actual Width' (115,00 mm).
- Track Position:** A table with columns for 'U', 'L', 'X', and 'Y' (mm). It lists 'Track Position 1' through 'Track Position 7', each with a checkbox and a value in the 'X' column. 'Track Position 1' is checked and has a value of 200,00. 'M.Comp' is also checked.
- LMS6045:** Includes an 'Offset' field set to 0,00.

At the bottom, there are control buttons: 'Calibrate', 'Verify', 'Step +', 'Step -', 'Save', 'Cancel', 'Apply', and 'OK'. A progress bar shows 0% completion.

Track	Actual	Nominal	Offset mm
Track 1	0	50,000	37,230
Track 2	0	50,000	34,870
Track 3	0	50,000	36,870
Track 4	0	20,000	20,000
Track 5	0	20,000	20,000
Track 6	0	20,000	20,000
Track 7	0	20,000	20,000

Track Position	U	L	X	Y	mm
<input checked="" type="checkbox"/> Track Position 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	200,00	200,00	-15,00
<input checked="" type="checkbox"/> Track Position 2	<input type="checkbox"/>	<input type="checkbox"/>	2300,00	2300,00	0,00
<input checked="" type="checkbox"/> Track Position 3	<input type="checkbox"/>	<input type="checkbox"/>	3600,00	3600,00	0,00
<input type="checkbox"/> Track Position 4	<input type="checkbox"/>	<input type="checkbox"/>	6000,00	6000,00	0,00
<input type="checkbox"/> Track Position 5	<input type="checkbox"/>	<input type="checkbox"/>	6000,00	6000,00	0,00
<input type="checkbox"/> Track Position 6	<input type="checkbox"/>	<input type="checkbox"/>	6000,00	6000,00	0,00
<input type="checkbox"/> Track Position 7	<input type="checkbox"/>	<input type="checkbox"/>	6000,00	6000,00	0,00

Item	Description
Number of samples to average	Averaging length in samples for thickness calibration. Distance between samples is 1.25ms.
Conveyor inclination	The angle between the conveyor and the horizontal plane in degrees. A horizontal conveyor have the inclination 0.
Nominal thickness	Nominal thickness of board to calibrate.
Offset	The calculated offset value for the upper probe. May be edited.
Calibrate	Button. By pressing, collection of actual values will start and last until the first track will reach “Number of samples to average”, which will take approx 2-3 sec. The progress bar below the buttons will show collection status. After collection the upper sensors will be offsetted to the nominal value, and the lower sensors to 0. The offset fields will be updated with the offset to the upper sensor, this may be edited for fine adjustment. The calibration offsets will also be written to the file “CalVerifyLog.txt” with timestamp.
Verify	Button. By pressing, collection of actual values will start and last until the first track will reach “Number of samples to average”, which will take approx 2-3 sec. The progress bar below the buttons will show collection status. After collection the “Actual” panels will change color to green, and display the averaged value for 30 sec. The value within parenthesis is the number of collected values. The verification result will also be written to the file “CalVerifyLog.txt” with timestamp.
Pulses/mm	Resolution of encoder. 1 turn is 4096 pulses.
Actual width	Averaged width of all active tracks.
Track Position X n	Position of track relative justified end of board.
Track Position Y n	Normally the probes are mounted in a straight line across the conveyor. the Y position is the deviation from this line.
U and L checkbox	Checkbox for controlling if probe will participate or not.
Move comp	When checked the upper sensor in track 8, is used for movement compensation of track 1.
LMS6045 Offset	Offset value added to incoming value from LMS6045.

4.2.8 Alarm

Optional 2, 4 or 2+4 channel digital outputs for track and board alarms.

The alarm tab is only visible before start of measurement, and if the CAN output module is connected

Track alarms are updated during measurement of the board, Board alarms are updated after passage of board.

4.2.8.1 Track alarms

Tolerance parameters are set locally in the Thickness module for stand alone and BoardProfiler application, and set from the MainServer in the Panel Profiler system, the actual tolerance panels will then have green background.

Track alarm is monitored every 20ms during the COLLECT-phase.

LIMAB™

Status | CAN-bus | TCP/IP | Other | Filter | User | Calibration | Alarm | Digital In

Tolerance

Nominal thickness	0,00	0,00 mm
Upper limit relative to Nom	0,00	0,00 mm
Lower limit relative to Nom	0,00	0,00 mm
Tolerance length	0,00	0,00 mm
Skip Begin/End	0,00	0,00 mm

Average thickness

Average thickness of all tracks	0 mm
Skip Begin/End	0,00 mm

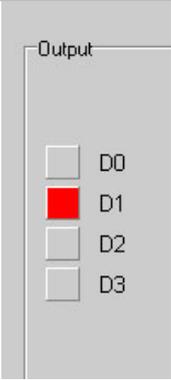
Output

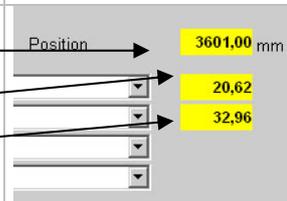
Logic: PNP NPN Position: 0 mm

<input type="checkbox"/>	4DO 11	Track 1	0
<input type="checkbox"/>	4DO 21	Not in use	0
<input type="checkbox"/>	4DO 14	Not in use	0
<input type="checkbox"/>	4DO 24	Not in use	0
<input type="checkbox"/>	2RO 11	Air Purge	0
<input type="checkbox"/>	2RO 21	Not in use	0
<input type="checkbox"/>	D6	Not in use	0
<input type="checkbox"/>	D7	Not in use	0

Delay length: 0,00 mm
 Max activation time after end of board: 200 ms
 Multi use of output module:

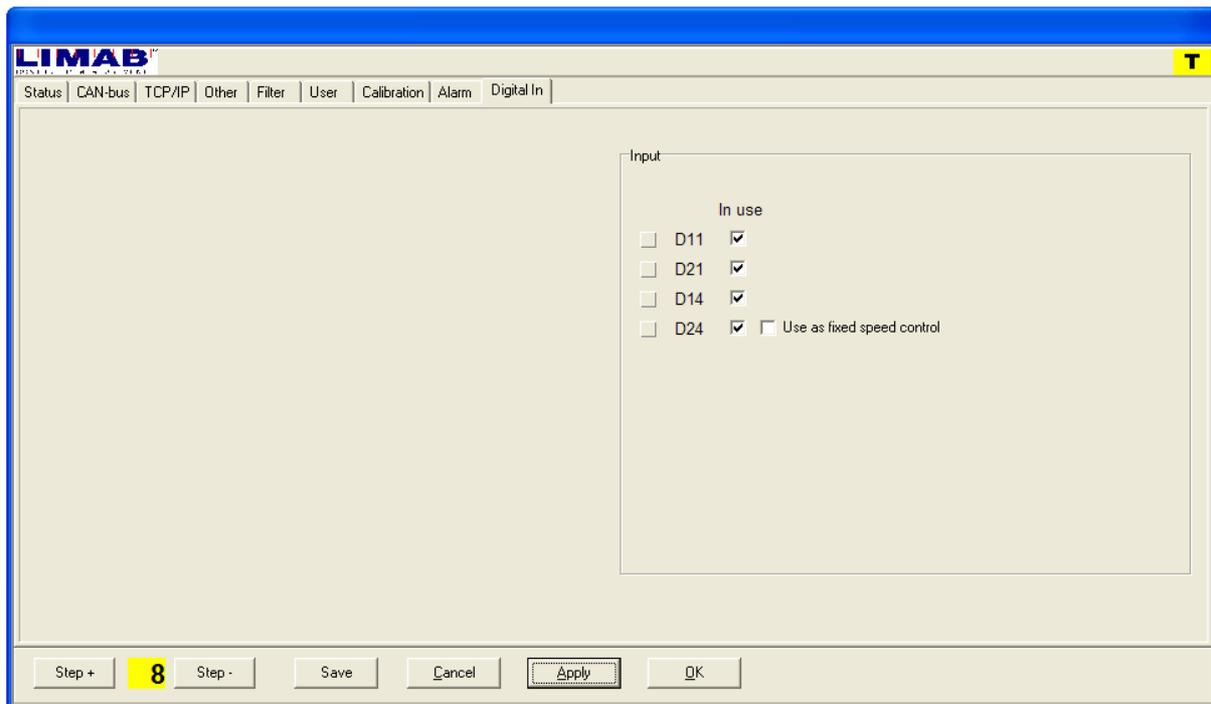
Step + | **0** | Step - | Save | Cancel | Apply | OK

Item		Description
Tolerance	Nominal thickness	<p>Edit field: Nominal thickness in the local Thickness module parameter settings. If value is set to 0 the nominal thickness is set as the average of all tracks from the previous board.</p> <p>Panel: Local Nominal thickness with Yellow background, and Nominal thickness from MainServer with Green background.</p>
	Upper limit relative to Nom	<p>Upper limit relative to nominal. Can be either + or -.</p> <p>Absolute limit = NominalThickness + UpperLimit</p> <p>Edit field and Panel works like Nominal thickness</p>
	Lower limit relative to Nom	<p>Lower limit relative to nominal. Can be either + or -.</p> <p>Absolute limit = NominalThickness + LowerLimit</p> <p>Edit field and Panel works like Nominal thickness</p>
	Tolerance length	Averaging length for thickness value to be monitored.
	Skip Begin/End	Area at the begin and end of board which not will be monitored. To skip at the end the Output delay length have to be longer than the skip length.
Average thickness	Average thickness of all tracks	Panel displaying the average thickness of all tracks for previous board. Used as reference when nominal thickness is set to 0.
	Skip Begin/End	Area at the begin and end of board which not will be included in calculation of average thickness
Logic		PNP or NPN logic on digital outputs D0-7
Output mirror D0-D7		<p>Indicators for mirroring of digital outputs. Red means always active, independent of NPN or PNP.</p> <p>Clicking on a indicator will invert the status and update the output.</p> 
Drop down menus with selection of outputs when no MainServer is connected.	Drop down menu for selection of value to monitor for each output bit D0-7.	
	Possible selections:	

	Not in use		
	Track1-8	Monitoring thickness values during the COLLECT phase according to the tolerance parameters.	
	Air purge	Connect to air purge valve of lower sensors. If no MainServer is connected the interval is 5 minutes and purge length is 1 second. When MainServer is connected the interval and purge length is controlled from parameters in MainServer.	
Additional outputs when MainServer is connected. D0... D15 refers to the digital outputs in the MainServer	D0	See description of alarm outputs in MainServer	
	D1		
		
	D15		
Position and actual values	Position is the conveyors actual position relative to previous calculation point. Actual thickness value for output D0. Actual thickness value for output D1.		
Delay length	Distance from measuring sensors to the point where you want the alarm to be activated.		
Max activation time after end of board	The time from board end to when the alarms will be terminated after end of board. Only active in individual track alarm mode.		
Multi use of output module	Makes it possible for several T-modules to share one output module with max 8 outputs. Each T-module can control one or more outputs. Set the parameter “Encoder Initialisation Master” on the T-module who is the last one to start, set Encoder Initialisation Slave” on the others.		

4.2.9 Digital Input

Optional 4 channel digital inputs for common use. The input status is transferred to the MainServer.



Item	Description
Input status indicators D11 ... D24	Shows the actual status of the input bits D11, D21, D14 and D24. Red is "1".
Use as fixed speed control	If D24 is checked, D24 is used to tell the system whether the belt is running or if it has stopped

4.3 Track Positioning

The track positioning program is an add-on for the *Thickness module* to control the movement of a traversing thickness system. The system can traverse from side to side or positioning sensor pair at predefined position. There is also possibly to manually move the traversing sensor pair.

After start of program a small icon will appear in the lower right corner, of your screen. The icon will change depending of state:

Picture	State
	None of TCP/IP or CAN-bus is connected
	Application has contact with Main Server or is not in running mode
	Application started and connected to Main Server

At normal use the icon will change automatically to Smiley within 10 seconds after the module has connect to the thickness program.

If you right click a small menu will appear in the lower right corner.

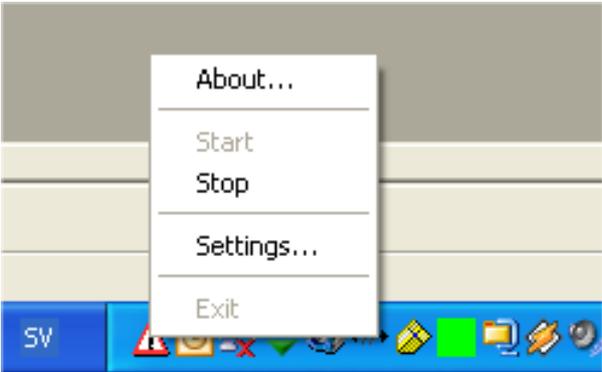


Figure 4.3.1 Right click on icon, shows drop down menu.

Command	Description
About	Enters the about dialog
Start	Activates the running mode of the program.
Stop	Deactivates the running mode.
Settings	Enters the setup.
Exit	Quit application

4.3.1 Settings

When entering the setup you will find that the tabs contains a combination of status and settings to give you an easy feedback from the system. On the first tab called status you will find to your left the pulse factor for each track, and some commands as “Go To” or manual movement of the system.

4.3.1.1 Status

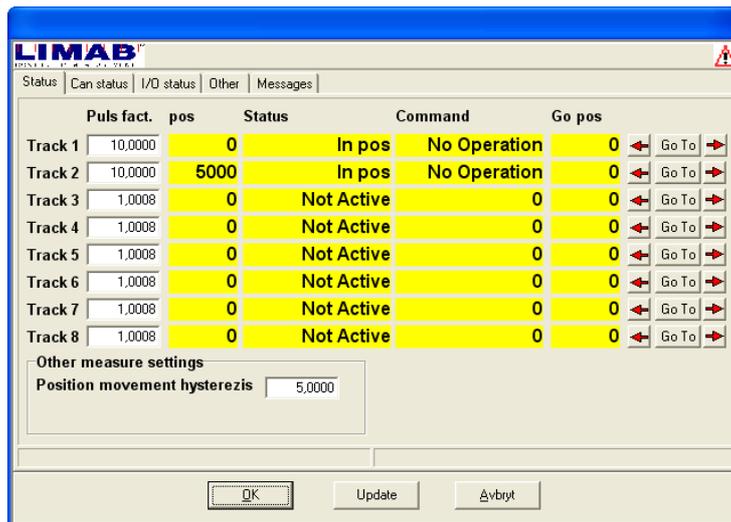
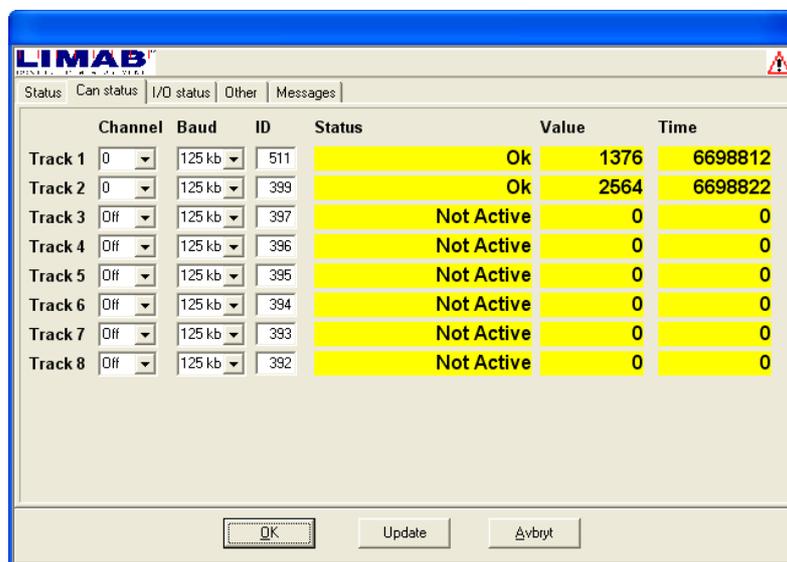


Figure 4.3.2 Status.

Command	Description
Track 1-8	On the left vertical you will find the different tracks, and the system can handle up to 8 tracks.
Pulse factor	The conversion of the Pulse/distance.
Pos	The position of the sensors according to the number of pulses/pulse factor.
Status	The current status of each track
Command	The last given command for each track
Go pos	The desired position to go to.
 or 	Moves the Sensors manually Out or in on the track.
Go to	Go to, is a local request of go to desired position

The last two manual commands will override any commands given by the remote system, to restore the system to its previous state, the remote system must give the desired command again.

4.3.1.2 Can Status



	Channel	Baud	ID	Status	Value	Time
Track 1	0	125 kb	511	Ok	1376	6698812
Track 2	0	125 kb	399	Ok	2564	6698822
Track 3	Off	125 kb	397	Not Active	0	0
Track 4	Off	125 kb	396	Not Active	0	0
Track 5	Off	125 kb	395	Not Active	0	0
Track 6	Off	125 kb	394	Not Active	0	0
Track 7	Off	125 kb	393	Not Active	0	0
Track 8	Off	125 kb	392	Not Active	0	0

Figure 4.3.3 CAN bus status.

Command	Description
Channel	The CAN-bus channel the encoder is connected to.
Baud	The desired baud rate of the CAN-bus encoder
ID	The CAN-bus id of the encoder.
Status	Status gives you the current status of the encoder different values are: <ul style="list-style-type: none">- Not Active- Ok- Can offline- Encoder timeout
Value	The current pulse of the encoder either 0-4096 or 0-8192
Time	The current time in milliseconds since computer start.

The channel and ID can be configured in many ways, it is possible to have 8 tracks with one encoder on one bus or eight encoders - one for each track on one bus or one encoder for each track on eight different CAN-bus channels.

4.3.1.3 I/O Status

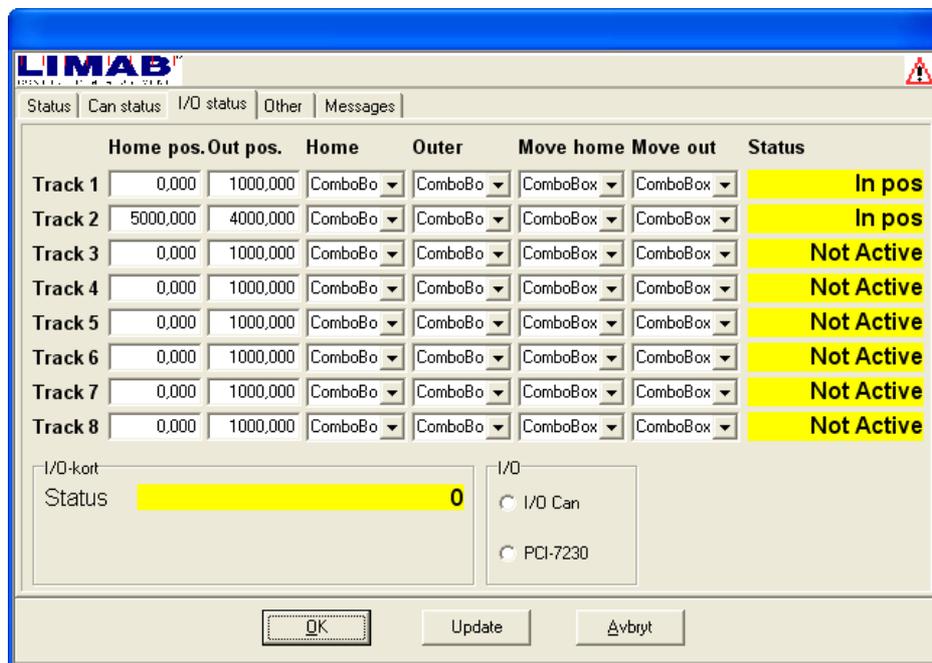


Figure 4.3.4 I/O status.

Command	Description
Home pos.	The position of the home location, usually 0.
Out pos.	The outer position of the system.
Home	Channel for the “At home position” signal.
Outer	Channel for the “At outer position” signal
Move home	Move home channel signal
Move out	Move out channel signal.
Status	Current track status, same as on the status tab.
I/O card	I/O Status.
I/O type	Type of I/O card to be used.

4.3.1.4 Other

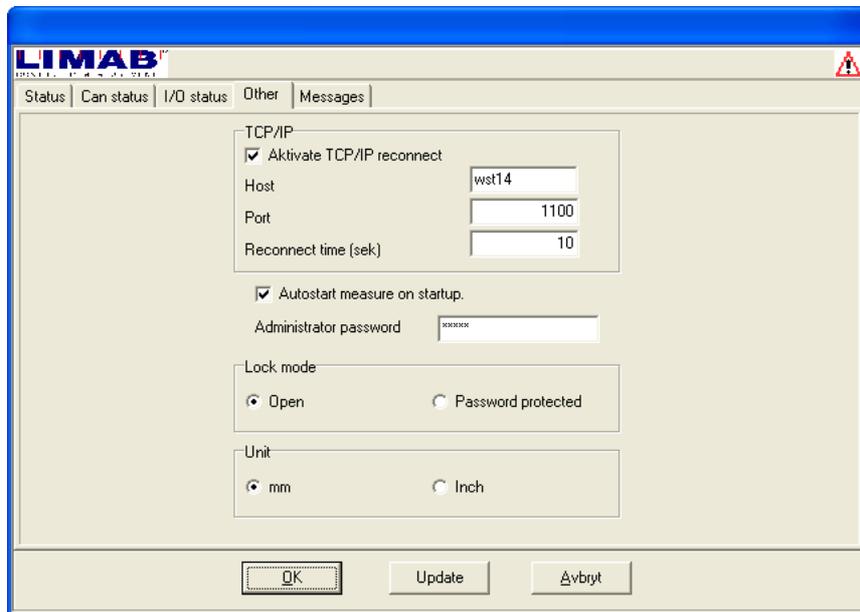


Figure 4.3.5 Other settings.

Command	Description
TCP/IP Activate	Activates or deactivates the TCP/IP communication.
Host	Host for the TCP/IP to connect to.
Port	Port to connect to.
Reconnect	If disconnected, this is how often to retry the connection.
Autostart	Auto starts the running mode on program start.
Password	Administrator password.
Lock mode	Setting for running the software in operator or administrator mode.
Unit	The measurement unit, inch or millimetre.

4.3.1.5 Messages

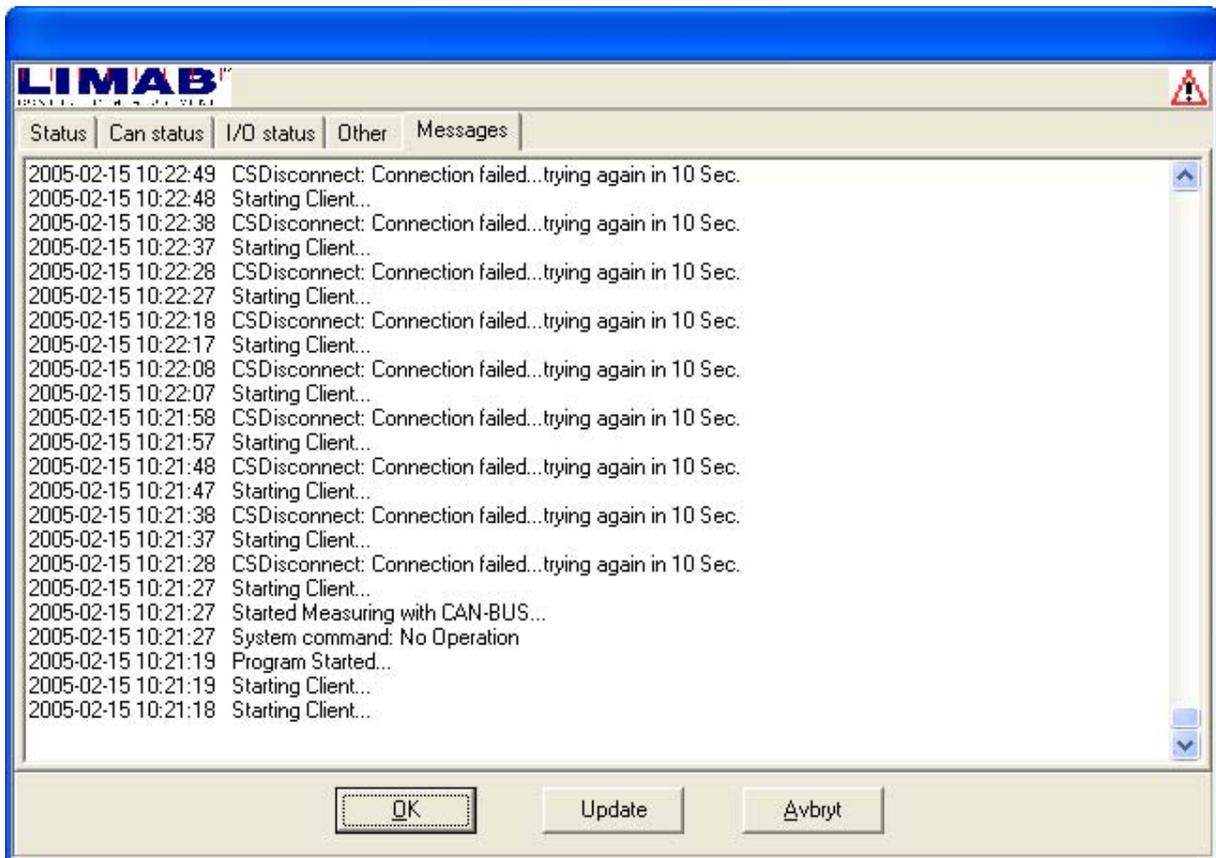


Figure 4.4.6 Message/debug window showing ongoing activity.

Messages is also a debug window, it gives you a feedback on what the software is doing and what command that run at a specific time.

4.3.2 Calibrating

The measurement system very seldom needs to be recalibrated, however there are instances like encoder change or other parts replacement when it is advisable to do a calibration check. At first time installation, the system needs calibration, to do this follow the steps bellow.

1. Set the encoder pulse factor to 1.
2. Set the traversing sensors at the home position. This is the “0” position.
3. Now move the sensors outwards to the outer position, and measure the actual distance the sensors travel. For instance 500 mm.
4. Under the I/O tab you can enter the sensors home and outer position for this example system you will enter 0 at home and 500 at outer position (the actual distance physically measured).
5. Now read the number of pulses at the outer position, lets say 14500 pulses, depending on which way the encoder spin this value can either be positive or negative.
6. To get the pulse factor take the number of pulses and divide with the travel distance like this: $14500/500 = 29$, or -29 if the pulse number is negative (encoder rotate counter clockwise).
7. Exchange the pulse 1 (Value 1) to the calculated value above (29).
8. Now you can run the sensors out or in and see if you have the correct value, if not you will need to adjust the pulse factor to do further adjustments.

Note that this procedure is needed for each individual track, if you have any slave tracks you will need to use the same pulse factor as on the “master” track.

4.3.3 Thickness module

The Thickness program will start and stop the Track position program if the TCP/IP port and file path are activated.

4.3.3.1 Track positioning Server

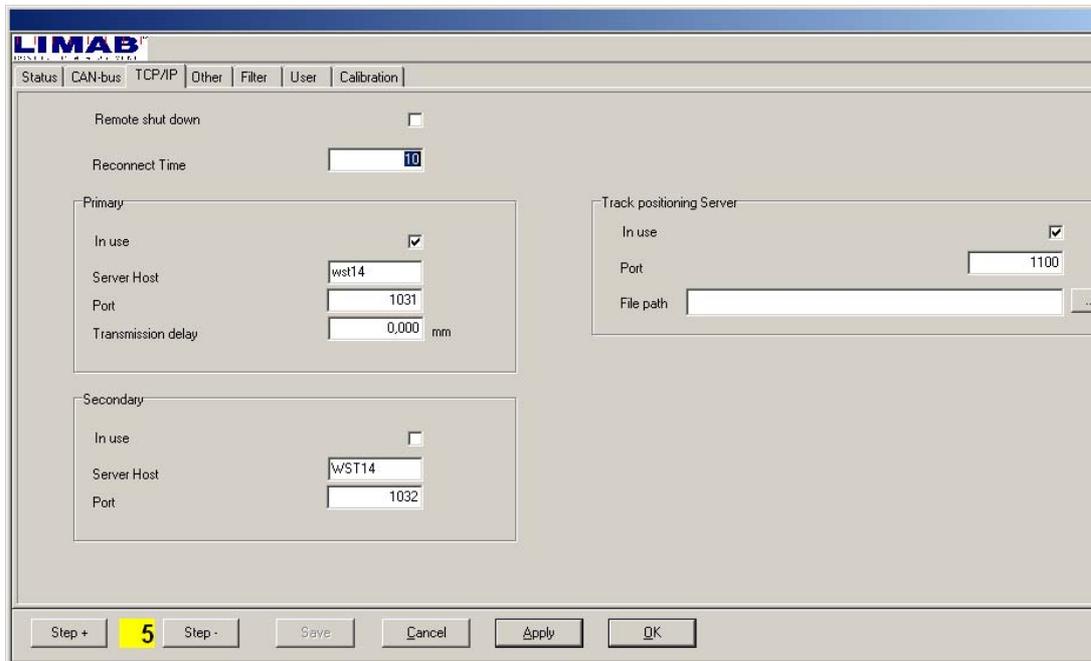


Figure 4.3.7 Here is the track positioning server in use.

Item	Description
In use	If checked, the server expects the traversing program to connect.
Port	Port number for the traversing program (Track positioning Server) .
File path	For location and automatic start of traversing program. If no or wrong file path is set, the traversing program will not start.

Then *Thickness module* is connected it will display the following:

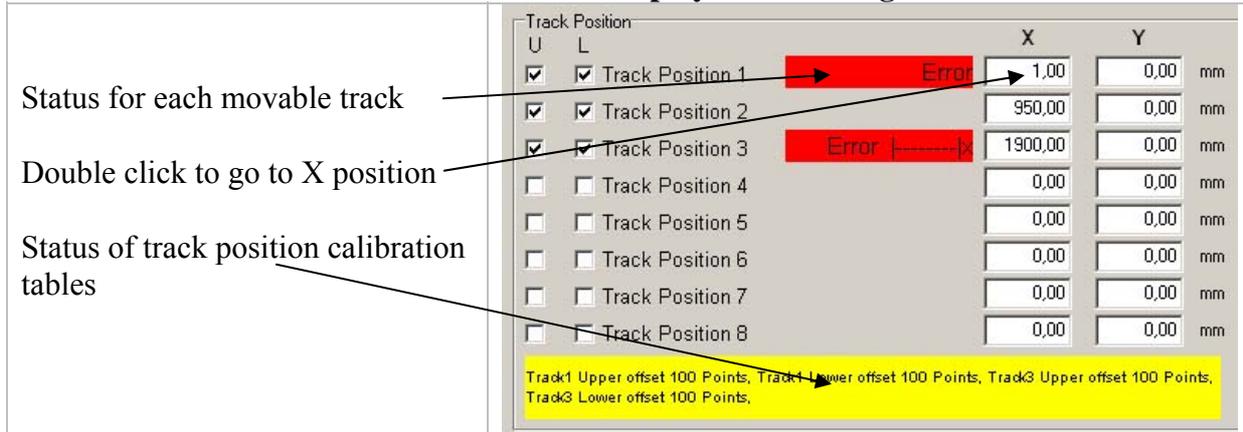


Figure 4.4.8 Track Position.

<p>Status for movable track</p>	<p>1234 ----<>---- </p> <p>1234 --- x --- </p> <p>Error ----- x</p> <p>Error -----?</p> <p>Error ?----- </p> <p>Error ---x --- </p> <p>Error ---???--- </p> <p>1234. 56</p>	<p>Track is moving and is at position 1234 (Yellow)</p> <p>Track is in position 1234 (Yellow)</p> <p>Track is out of range (Red)</p> <p>Outer position sensor missing (Red)</p> <p>Home position sensor missing (Red)</p> <p>Position error (Red)</p> <p>Encoder timeout (Red)</p> <p>Track position read from a history file (Lime)</p>
<p>Status of track position calibration tables</p>	<p>Status of reading the calibration tables for track positions. At TCP/IP connection the calibration tables for the connected tracks will be read from same directory as the Thickness.exe file. The files are named PositionOffsetn.txt, where n is the track number. The background colour will be yellow.</p> <p>At reading of a History. log file, the associated calibration files are assumed to be located in the same directory as the History. Log. The background colour</p>	

will be **lime**.

If no calibration files are found the offset will be set to 0 for all positions. The only position with correct offset is the home position

4.3.3.2 Calibration

Thickness calibration and creating position offset table, is made by using rotating calibration tool, fastened to the upper sensor, and levelled to the nominal height of the normal board.

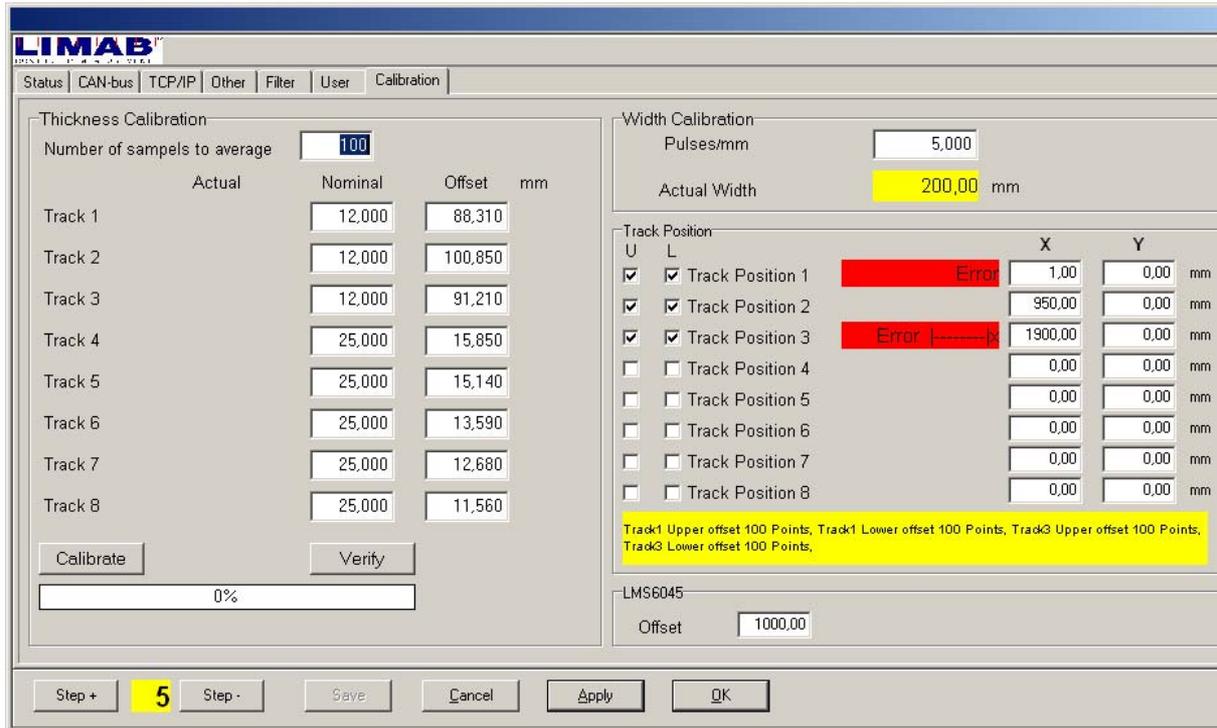


Figure 4.3.9 Calibration and track position.

Enter Nominal thickness for the actual track to be calibrated. Press **“Calibrate”** button. If the track is movable, a oscillate command will be sent to the Track Positioning module. The track will start to move between the outer and home position, until **“Number of samples to average”** are collected. We recommend to use a value of 500.

4.4 Logging module

The *Logging module* provides the opportunity to save measurements in MySQL database. The logging module also includes an optional feature, the *Report* generation features which is not a standard part in the Panel Profiler software.

The logging module communicates with Main Server via TCP/IP. It is possible to auto start the logging module from the Main Server. If the connection is OK the Logging Module symbol which appear in the activity field will turn from red to green. See symbols below:



DateTime	Name	PressloadNo	OpeningNo	TotAvgThick	TotMaxThick	OutOfTotMaxThick	OutOfTotMaxWarnThick
2009-10-27 08:13:07	test5	0	10	22,44	22,57	0	0
2009-10-26 17:01:45	test5	13	9	22,41	22,57	0	0
2009-10-26 17:01:45	test5	13	8	22,42	22,55	0	0
2009-10-26 17:01:45	test5	13	7	22,43	22,6	0	0
2009-10-26 17:01:45	test5	13	6	22,4	22,55	0	0
2009-10-26 17:01:44	test5	13	5	22,42	22,57	0	0
2009-10-26 17:01:44	test5	13	4	22,4	22,52	0	0
2009-10-26 17:01:44	test5	13	3	22,39	22,57	0	0
2009-10-26 17:01:44	test5	13	2	22,41	22,54	0	0
2009-10-26 17:01:44	test5	13	1	22,43	22,57	0	0
2009-10-26 17:01:43	test5	12	12	22,44	22,55	0	0
2009-10-26 17:01:43	test5	12	11	22,41	22,55	0	0
2009-10-26 17:01:43	test5	12	10	22,44	22,59	0	0
2009-10-26 17:01:43	test5	12	9	22,45	22,59	0	0
2009-10-26 17:01:42	test5	12	8	22,45	22,59	0	0
2009-10-26 17:01:42	test5	12	7	22,38	22,57	0	0
2009-10-26 17:01:42	test5	12	6	22,44	22,54	0	0
2009-10-26 17:01:42	test5	12	5	22,46	22,61	0	0
2009-10-26 17:01:42	test5	12	4	22,45	22,6	0	0
2009-10-26 17:01:41	test5	12	3	22,4	22,58	0	0
2009-10-26 17:01:41	test5	12	2	22,46	22,61	0	0
2009-10-26 17:01:41	test5	12	1	22,47	22,6	0	0
2009-10-26 17:01:41	test5	11	12	22,42	22,57	0	0
2009-10-26 17:01:41	test5	11	11	22,47	22,61	0	0

Figure 4.4.1: Overview Logging module, showing logged boards.

4.4.1 Measure

Measure is one of three possible menu choices. Under *Measure* the user is displayed these three alternatives:

Command	Description
Connect	The logging module tries to connect to Main Server.
Disconnect	The logging module disconnects from Main Server.
Exit	The logging module disconnects from Main Server and is shut down.

4.4.2 Settings

The *Settings* menu alternative will open a new dialog. Settings are stored in the file called LoggSettings.ini.

4.4.2.1 Reporting settings

These settings are used in the report part of the *Logging Module*.

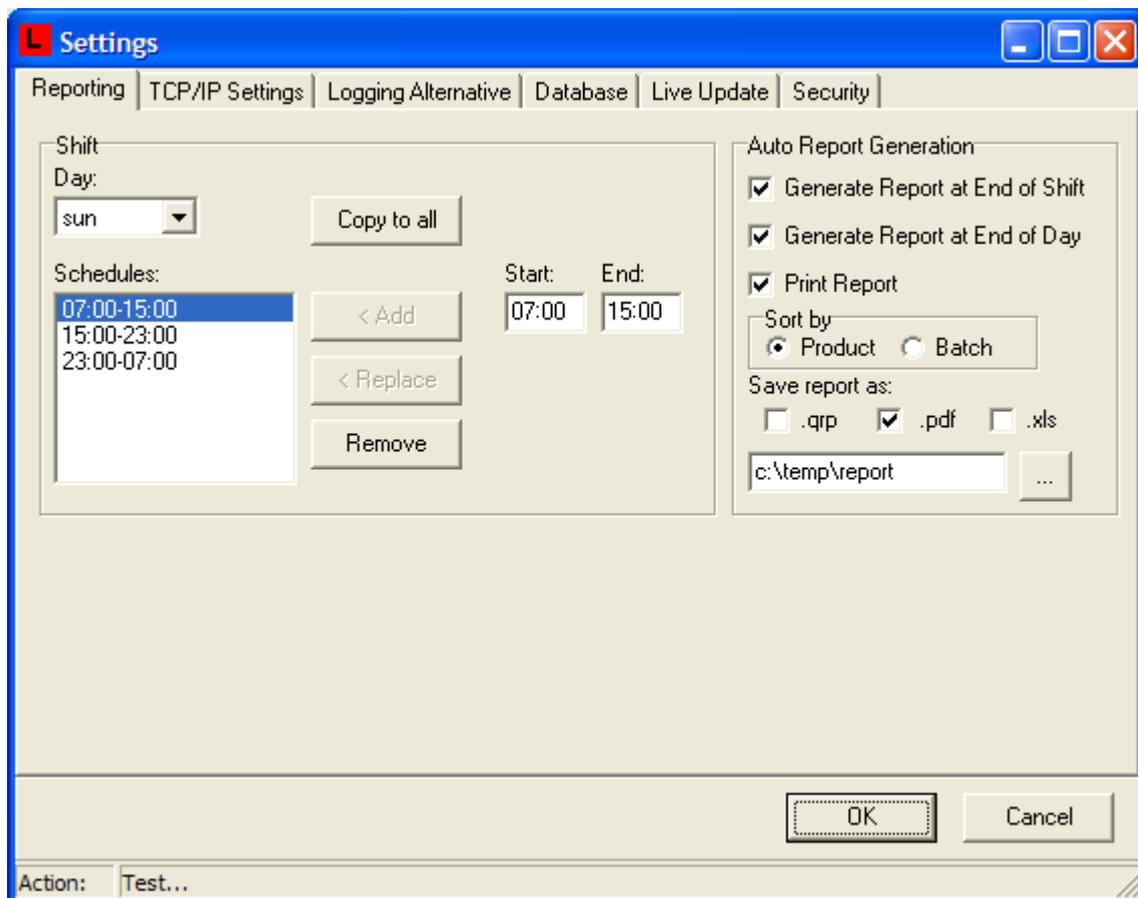


Figure 4.4.2: Settings window for the Logging module, Time settings tab open.

Command	Description
Day	The currently selected day.
Copy to all Schedules	Copies the displayed shift schedules to all other days All shift schedules for the selected day
Generate report at end of shift	If checked, a report is generated at each shift end. The time when shift ends is set in shift Shift X Ends. The report could either be printed or saved see below.
Generate report at end of day	If checked, a report is generated at midnight each day.
Sort by	If product is chosen. The report is divided in different products. For each product, avg and maxthickness etc. is given. If batch is chosen. The report also divide the result in Batches. For each Batch, all products produced in that batch is listed, for each product in that btach avg and maxthickness etc is given.
Print report	If checked, and either of <i>Generate report at end of shift</i> or <i>Generate report at end of day</i> is checked the report is printed using the default printer
Save report	If checked, and either of <i>Generate report at end of shift</i> or <i>Generate report at end of day</i> . The report is saved to the location specified by the input box below.
Save report as	Chose which format the report should have. .grp, this format could only be read by the logging module. .pdf, use Adope Reader to read this format .xls, use Microsoft excel to read this format

4.4.2.2 Pressload settings (not visible in all installations)

Use automatic pressload reset, reset to number	If checked, The pressload number written to the DB is reset automatically. (The pressload can be reset either by a digital signal or using a timer se below). The pressload is reset to the number specified in the text box to the right
Reset on timer	If checked. A timer is used to reset the pressload. E.g. if hour is chosen and 3 is written in the text box . the pressload is reset every 3 hours. If shift is selected the pressload is reset at the end of every shift
Reset on digital input signal	If checked the pressload is reset on an extern digital signal

4.4.2.3TCP/IP settings

TCP/IP settings are needed to connect to the Main server.

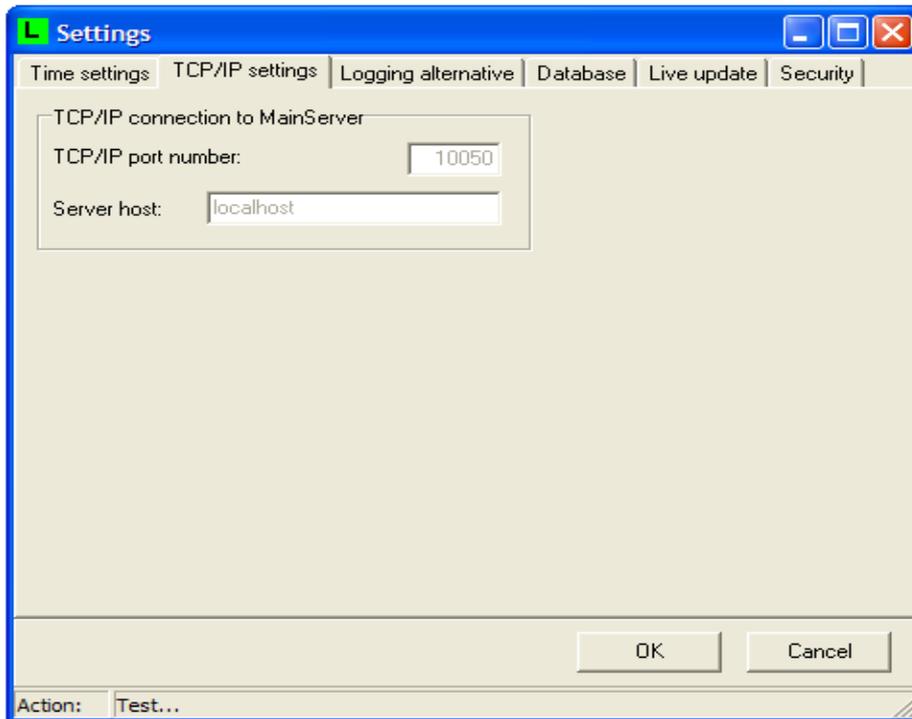


Figure 4.4.3: Settings window for the Logging module, TCP/IP tab open.

Command	Description
OK button	The current settings are written to LoggSettings.ini and the Settings window is closed.
Cancel button	Closes the Settings window without saving any changes made.
Logging module TCP/IP port number	The TCP/IP port that will be used to connect to Main Server. It is important that these settings are the same as the listening port in the Main Server. If the Main Server don't listen on this port connection will fail.
Server host	The name or IP-number of the computer where the Main server is running. Usually <i>Localhost</i> then both server and connecting module running on the same PC machine.

4.4.2.4 Logging alternative

Logging alternative let you select to which unit to use. Error log will log program state and error down to file and in silent mode all message boxes are suppressed.

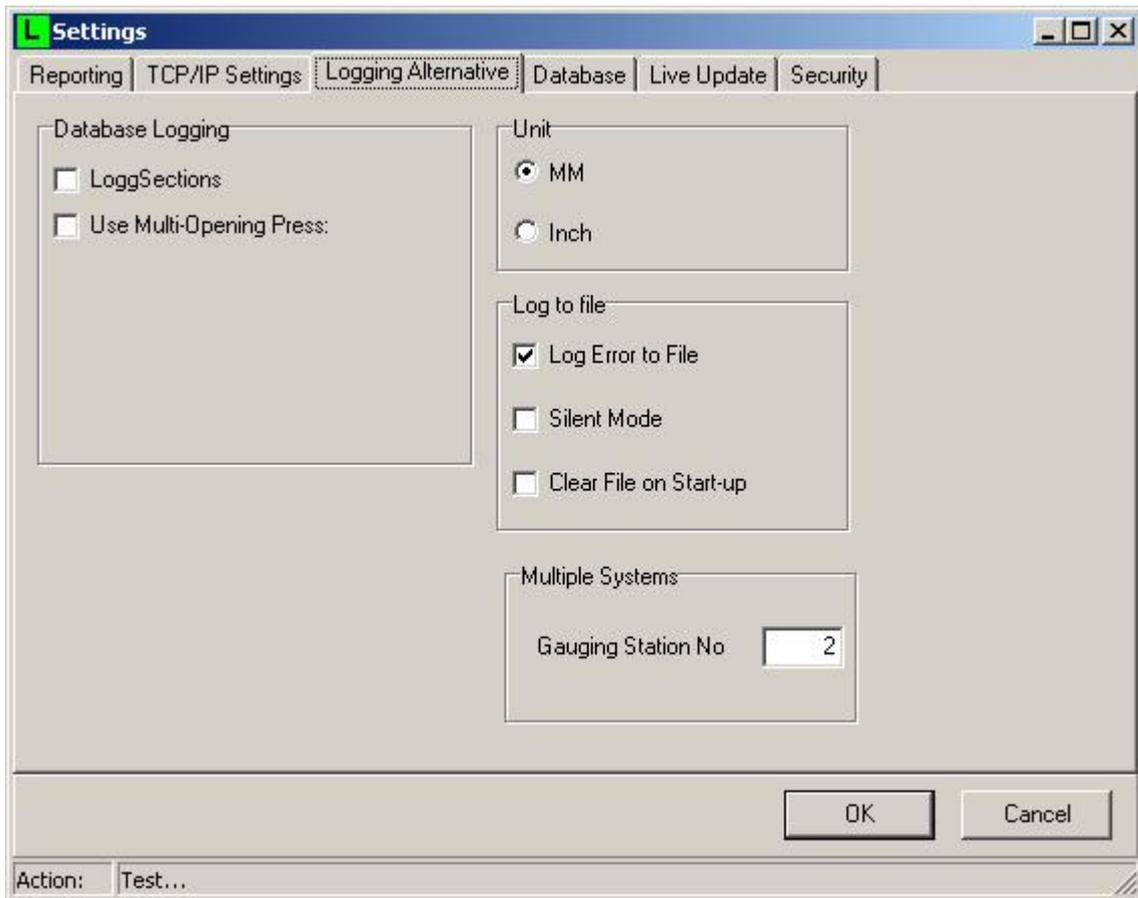


Figure 4.4.4: Settings window for the Logging module, Logging alternative tab open.

Command	Description
OK button	The current settings is written to LoggSettings.ini and the Settings window is closed
Cancel button	Closes the Settings window without saving any changes made
Database logging	
LoggSections	In the thickness module there is a parameter called <i>resolution to server</i> . Say this parameter is set to 100mm. A measure is then written every 100 mm to DB (it is written to DB table <i>sections</i>), if loggsections is checked.
Use multi opening press.	Whether using a multi opening press or not
Unit	Set unit to mm or inches will show measurement in selected unit

Error Log – Log error to file	Log error to file or not by checking the <i>Log error to file</i> check box. The log file are created in the <i>Log</i> folder in the Logging module's directory. The file name is: LoggFile.log.
Silent Mode	In silent mode error message are only logged to file and not shown, for the user/operator, in a message box.
Clear file on start-up	The file can be cleared at every start-up, by checking the corresponding check box, so logging starts with a fresh file for every run, otherwise it might be very large over time.
Gauging Station No	Used when having multiple PanelProfiler frames connected to the same PC. This value represents the Station No the LoggingModule belongs to.

4.4.2.5 Database settings

Enter parameters for the database here, and test your connection to make sure it works. You could also change database settings in the ini-file (LoggSettings.ini) before starting the module.

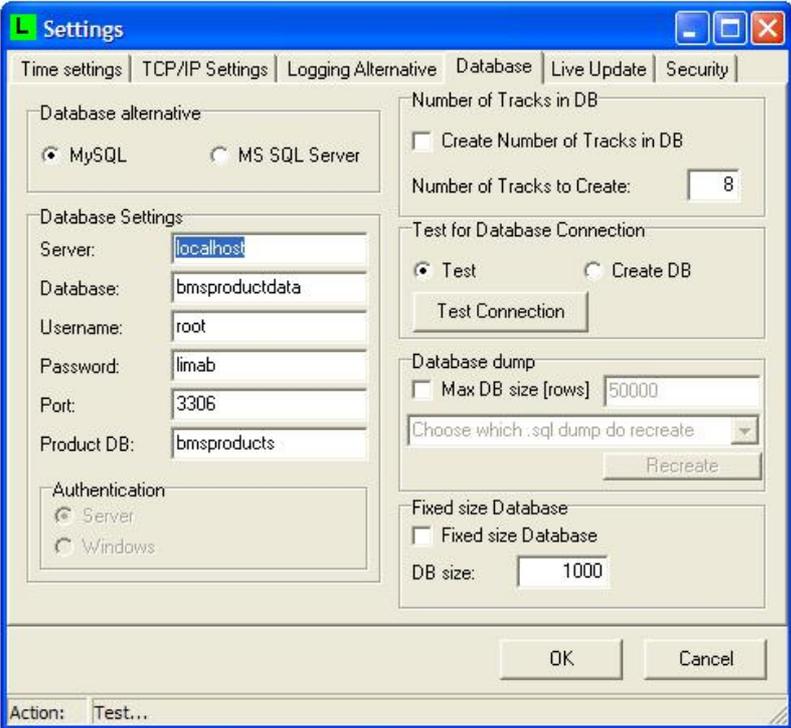


Figure 4.4.5. Settings for database.

Command	Description
Database alternative	Only MySQL is available.
OK button	The current settings are written to LoggSettings.ini and the Settings window is closed.
Cancel button	Closes the Settings window without saving any changes made
Database settings	
Server	The database server to connect to, usually localhost if the SQL server runs on the same machine. It can also be a dedicated server on the network.
Database	<p>The database to connect to, or to create. If no database with the given name exists it will be created.</p> <p>Note: The test button only test for a connection, it will not create any database for you.</p>
Username	The username needed to connect to the database.

Password	The password, if needed, to connect to the database.
Port	The port number to the database server
Product DB	Database where products are stored
Authentication	Only for MS SQL server. If Server is chosen then a specific login for the database is required. If windows is chosen then the password will be the same as for the windows login and never shown for database login.
Test for database connection	
Test for database connection	If Test is chosen when pressing the <i>Test Connection</i> button the connection to the database is tested. If Create DB is chosen the button changes name to <i>Create DB</i> . A database is created when pressing the <i>Create DB</i> button.
Number of tracks in DB	
Create number of tracks in DB	<p>Set the maximum number of tracks that the system can log and create corresponding number of columns in the database. The default value for a standard system are 8 tracks but a system with 5 tracks is quite common as well. Observe that a system set up for 8 tracks can easily log all data for a system with only 5 tracks, the other way around is not possible.</p> <p>If this value is changed, to the number of tracks in the current system, before any data is logged to the database the database will simply change the number of columns in the database. However if any data is found in the database the entire table will be dropped and the user will be warned! If the user accepts the changes a new table will be created with the right number of columns.</p> <p>Note! Don't change this settings on a system that is up and running, with a working Logging database (BMSProduct) – it will most likely be truncated/destroyed!</p>
Number of tracks to create	The actual number of columns in the database that will be created on start up, if they don't exist. Usually 8 for a standard system, including 8 pairs of sensors.
Database dump	
Max DB size [rows]	If checked, the logging module will automatically reduce the database size and saved the deleted rows to a sql dump. This happens when the number of rows in the database exceeds the number specified in the input box to the right. The file is saved to <code>limab\MySQL_database\backup\"dbName\"result</code>
Recreate	Chose a .slq file above, push the recreatebutton, the file chosen is now recreated and inserted in the database. You will be given a question for how long you want the file to be recreated for, when this time is exceeded the database will again be reduced to the previous size
Fixed size Database	If activated the data base size is fixed. When the size exceeds the limit the oldest row is deleted
Fixed size Database	Check this box to activate fixed size database
DB size	Size of database. If database exceeds this limits the oldest row is deleted

4.4.2.6 Live Update

In live update you can chose how the update works in the logging module

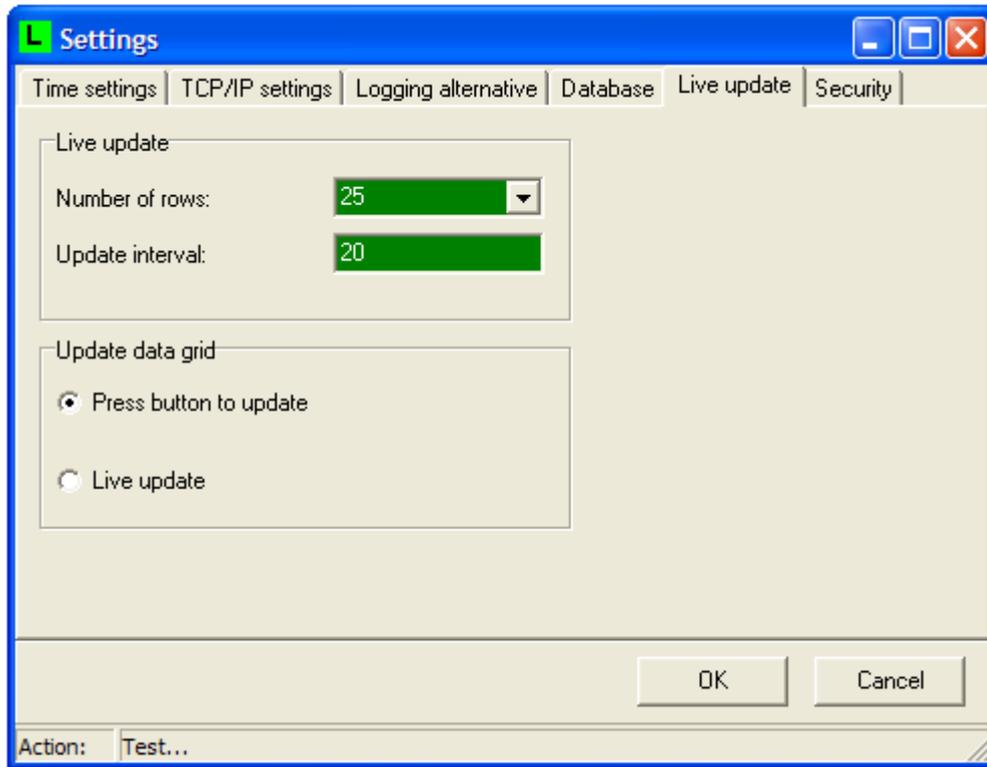


Figure 4.4.6: Settings window for the Logging module, Live update tab open

Live update/ Number of rows	Number of rows with data shown in the logging module
Live update/ Update interval	Number of items that has to be produced before the window in the logging module is updated
Update data grid/ Press button to update	If checked, the update button in the logging module has to be pressed to update what is shown in logging module
Update data grid/ Live update	If checked, the logging module is automatically updated according to “update interval”

Security

The *Exit security* option makes it possible to prevent unauthorized shutdowns of the system.

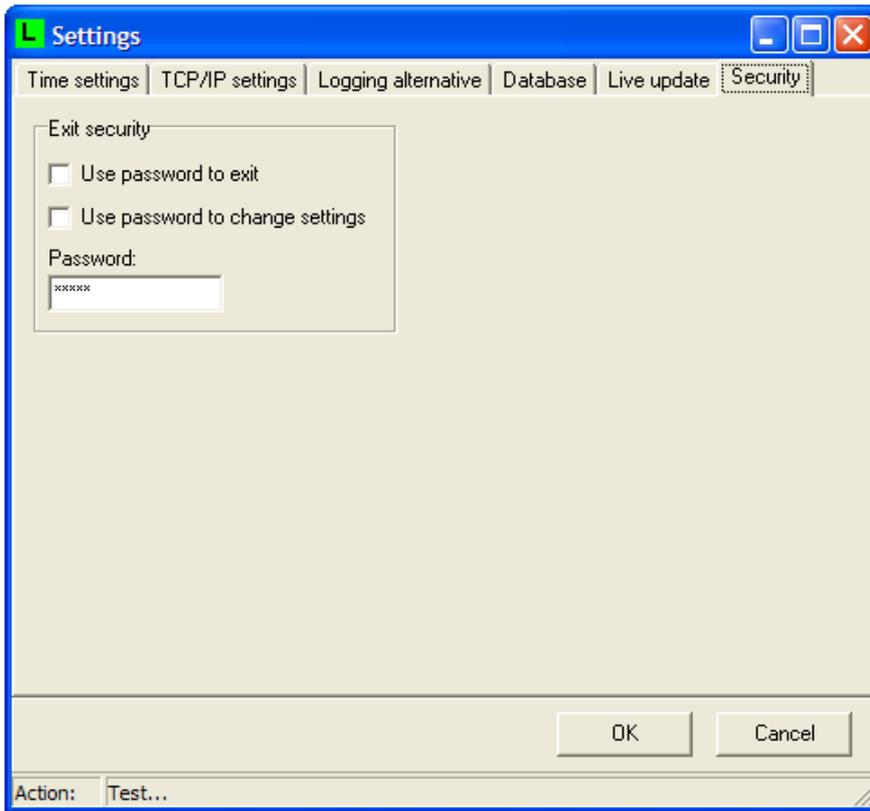


Figure 4.4.7: Settings window for the Logging module, Security tab open.

Command	Description
Use password to exit	If checked the module can't be closed without having the correct password entered in the text box.
Use password to change settings	If checked the, the settings dialog is password protected.
Password	Password used to be able to exit and change settings.

4.4.3 Report

The report part is the part where the user can review the production using the different search criterion that exists.

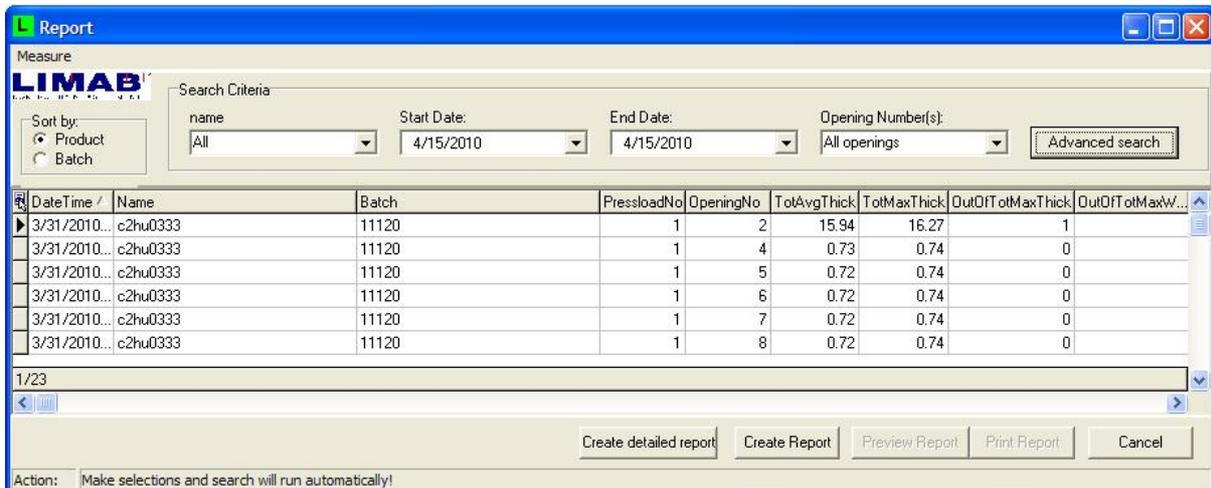


Figure 4.4.8: Report window opened and some selections made before creating an report.

4.4.3.1 Measure

If the user clicks Measure and chooses Close the Report window is closed and the Logging module main window appears.

4.4.3.2 Create report or review products

From this part of the logging module the user decides what data to show or which data that will be in the report.

Search criteria simple search

Command	Description
Product	The menu choices consists of all product names that have been produced. Clicking one of those names makes all data for that product appear in the report window. There is also a possibility to chose all products.
Start date / End date	Chose to display products produced between the specified start and end dates.
Opening number	The openings are displayed as numbers 1-X. If the press has 8 openings it should be possible to choose any opening from 1-8. The maximum number of openings is 32. If user chooses opening X all data for products produced in that opening are presented.
Sort by	If product is chosen. The report is divided in different products. For each product, avg and maxthickness etc. is given. If batch is chosen. The report also divide the result in Batches. For each Batch, all products produced in that batch is listed, for each product in that btach avg and maxthickness etc is given.

Search criteria advanced search

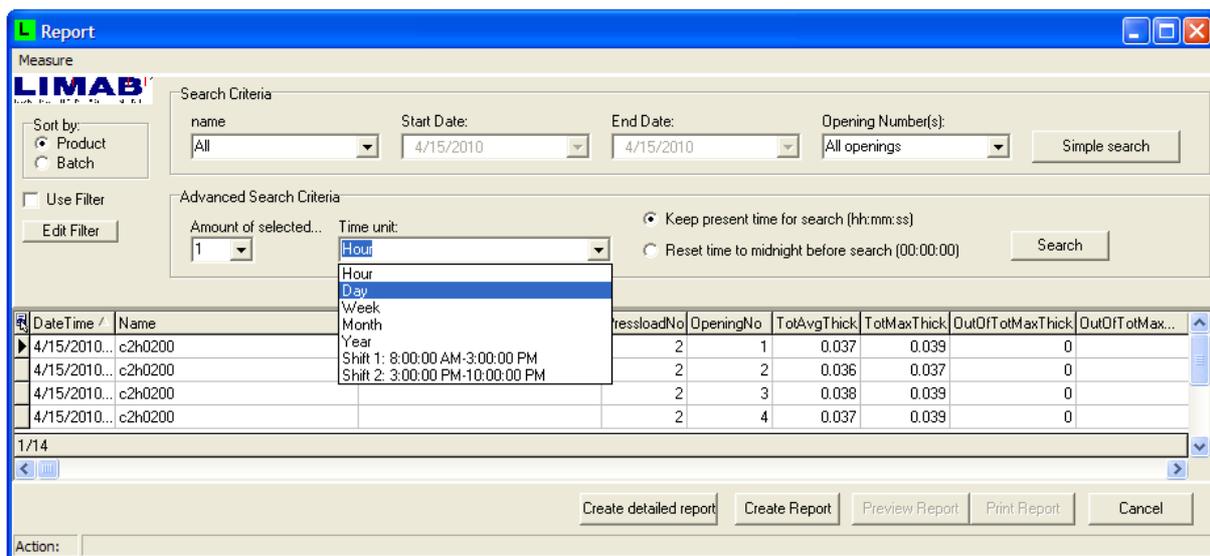


Figure 4.4.9: Press advanced button to receive advance search options.

Press the advanced search button to receive the advanced search options (the advanced search button will change name to simple search). Start date and end date are now greyed out. The search option are now Hour, Day, Week, Month, Year, Shift 1, shift
Example. Choose *Time unit* = Hour and *Amount of selected* = 2. When the search button is pressed the products produced in the latest 2 hours are displayed.

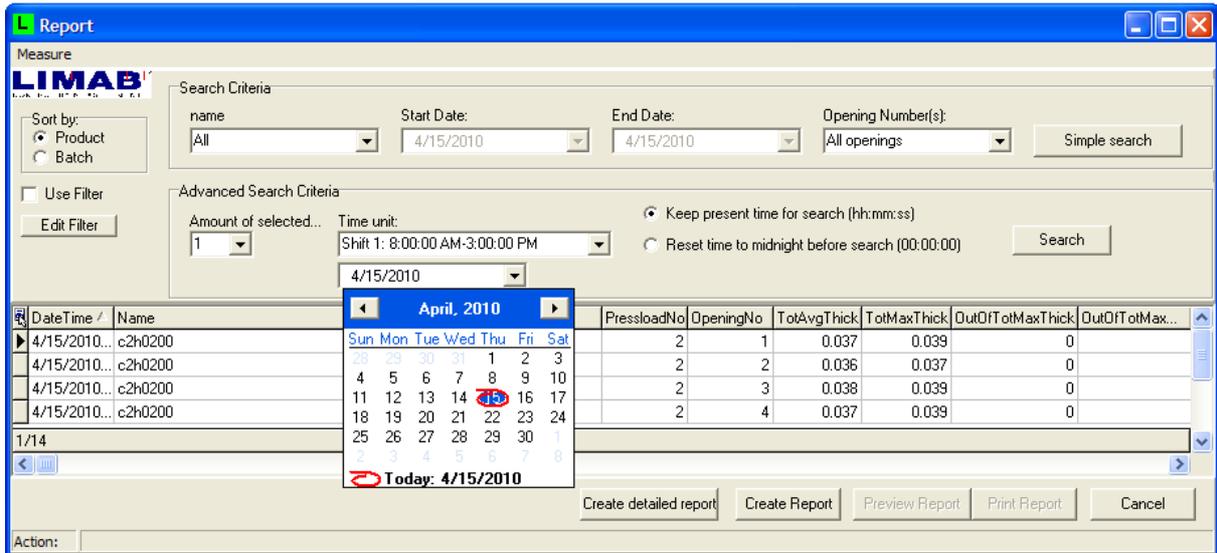


Figure 4.4.10: If shift is chosen another input box appear where the date of the shift could be chosen.

If shift is selected a new input box appear where dates could be chosen. The Default value is today's date. To show information about products manufactured during a specific shift another day, just change this date to the preferred day.

Review products produced within the latest hour, shift, days, weeks, month or year

Command	Description
Hour	Shows all products produced within the last hour specified by <i>Amount of selected</i> . E.g. if <i>Amount of selected</i> = 2, the 2 latest hours are displayed.
Day	Show products produced within the last number of days specified by <i>Amount of selected</i> .
Week	Show products produced within the last number of weeks specified by <i>Amount of selected</i> .
Month	Show products produced within the last number of month specified by <i>Amount of selected</i> .
Year	Show products produced within the last number of years specified by <i>Amount of selected</i> .
Shift	Shows product produced in the specified shift. The number of shift and when shifts starts and ends are specified in the settings. E.g. chose Shift 1 that starts 08:00 and ends 16:00. If current time is 09:00 The products produced between 08:00 and 09:00 are shown. If the time is 07:00 (the shift hasn't started yet it shows the products produced between 08:00 and 16:00 previous day. If <i>Amount of selected</i> is set to 2 it will show the products produced from shift 1 the 2 latest shifts 1 shifts.
Keep present time for search	Use present time as reference. E.g. Hour and <i>Amount of selected</i> = 2 the 2 latest hours counted from current time are displayed
Reset time to midnight before search	Use midnight as reference. E.g. Hour and <i>Amount of selected</i> = 2 the 2 latest hours counted from midnight are displayed (22:00 – 00.00)
Search	The advanced search are conducted when this button is pressed
Use filter	Activate a filter that in the search, se below for more information
Edit filter	Opens up a window where filter parameters can be changed, se below



Figure 4.4.11: Set filter parameters to filter out boards that are way out of tolerance

Press Edit filter (se figure 4.5.9) to set the filter parameters. The filter could be used to filter out boards that are way out of tolerance. If it is way out of tolerance it is possible that the board isn't out of tolerance, the measurements values could have been corrupted in some way.

Command	Description
Factor	Enter the factor a value has to be out of tolerance to be rejected
Max thickness – nom > Max tol * factor	Equation showing how much the measurement has to be out of tol. to be rejected

4.4.3.3 Report creation

To be able to create a report the operator needs to choose a time interval, a specific opening or a specific product.

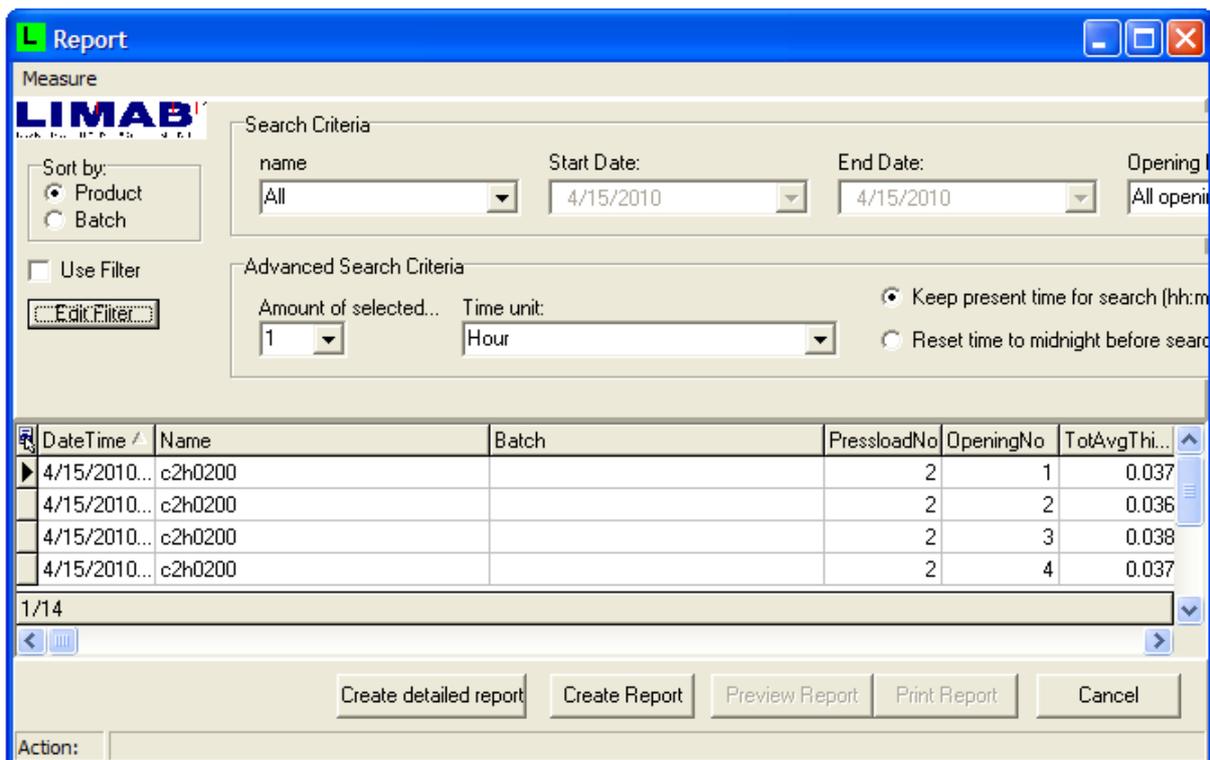


Figure 4.4.12 Selected products for a report.

Command	Description
Create detailed report	This button opens a window where it is possible to chose which of the database column to be saved to either excel, pdf or qrp
Create report button	A report is created with chosen measurements. Observe: The create report button is only enabled when all selections needed are made. When this button is pressed the <i>Preview report</i> and <i>Print report</i> buttons are enabled.
Cancel button	If the user clicks Cancel the Report window is closed and the Logging module main window appears

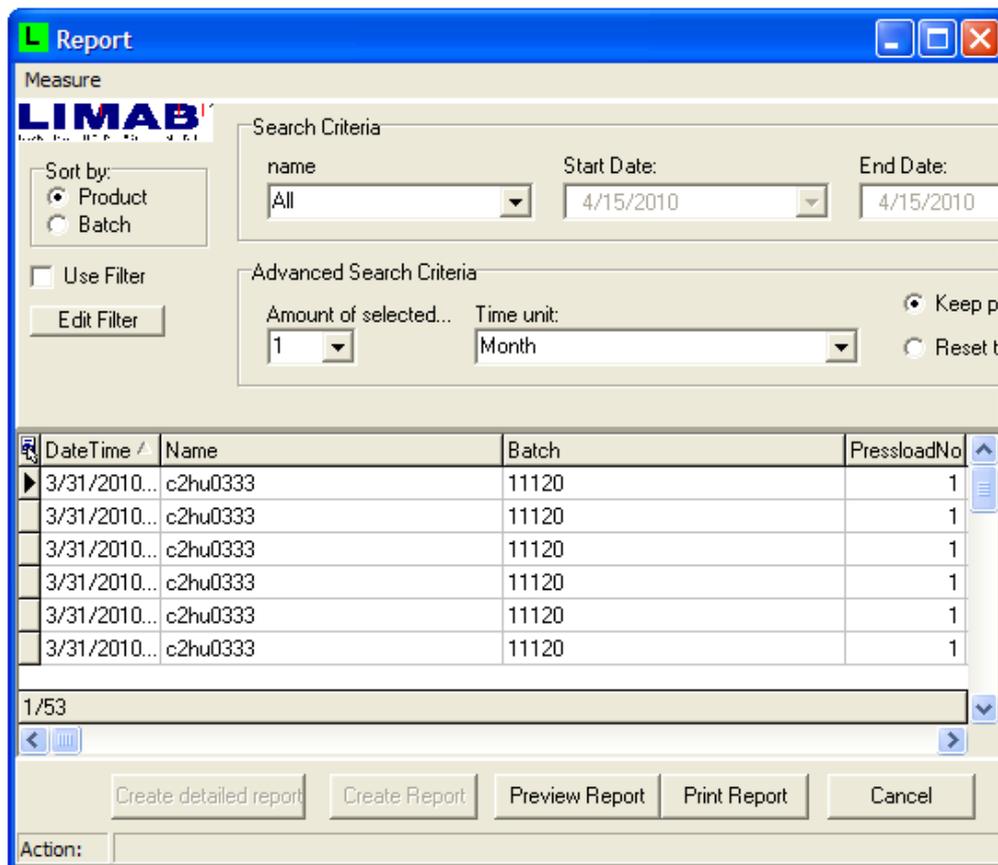


Figure 4.4.13 Products selected and a report created ready to be printed or viewed.

Command	Description
Preview report button	A preview window appears containing all the chosen measurements. The data is divided by product with a header that summarizes all measurements. See fig above (Figure 4.5.9).
Print report button	Send report to network printer if any is available.
Open report button	In <i>Settings/Time settings/Autoreport generation</i> it is possible to automatically save reports. A report is saved with file ending .qrp. By pressing open report the same window appears as when pressing the preview report button. To open a saved report press the standard windows open dialog button se Figure 4.5.12.

Production Report			
Report Date	Tot No. of Panels	Tot No. out of Tolerance	Tot No. out of Warn. Tolerance
4/15/2010 4:09:59 PM	53	53	53
		100.00 %	100.00 %
Chosen Report			
Products produced in opening: 1 2 3 4 5 6 7 8 9 10 11 12 21 22 25			
Product Name	Batch		
c2h0200	11170		
No. of Panels	First Date	Last Date	
36	4/13/2010 8:55:07 AM	4/15/2010 3:34:35 PM	
Average Thickness / Standard Deviation	Max Thickness above Tol./ Max	Min Thickness below Tol. / Min	
0.2233 / 0.4178 [inch]	6	30	
Max/Min Thickness Overall	Max Thickness above Warn. Tol.	Min Thickness below Warn. Tol.	
2.38 / 0.033 [inch]	6	30	
% Pass / Fail (AVG Thickness outside Tol.)	AVG Thickness above Tol.	AVG Thickness below Tol.	
0.00 / 100.00	6	30	
Nom Thickness	Thickness Tol. Max/Min	Thickness Warn. Tol Max/Min	
1 [inch]	0.07 / -0.07 [inch]	0 / 0 [inch]	
Product Name	Batch		
c2hu0333	11120 11910		
No. of Panels	First Date	Last Date	
17	3/31/2010 10:29:46 AM	3/31/2010 11:24:23 AM	
Average Thickness / Standard Deviation	Max Thickness above Tol./ Max	Min Thickness below Tol. / Min	
2.3382 / 3.5736 [inch]	6	11	
Max/Min Thickness Overall	Max Thickness above Warn. Tol.	Min Thickness below Warn. Tol.	
16.27 / 0.71 [inch]	6	11	

Figure 4.4.14 Preview of created report.

In the *Print Preview* mode printer settings can be made. The interface for this is Windows standard. The report can also be printed directly from this view.

The upper part of the report are info about all the panels in the report. After this part follows a part for each product in the report

Label	Description
	Summary of all products in report
Report date	The date the report is generated
Tot no. of panels	Total number of panels, in this report
Tot no. out of tolerance	Total number of panels outside tolerance. The percentage of this number compared to total number of panels is also displayed
Tot no. out of warn tolerance	Total number of panels outside warning tolerance. The percentage of this number compared to total number of panels is also displayed
Chosen report setting	Here are displayed from which opening the items are produced from
	For each product in the report
Product Name	Name of the this product
Batch	Which batch this product is from
No. of panels	Number of panels of this product
First date	Date of the first panel of this product in this report
Last date	Date of the last panel of this product in this report
Average thickness / standard deviation	Average thickness and standard deviation of this product in this report
Max thickness above tol. /Max	Number of panels of this product in this report which have a maximum thickness greater then the max tolerance.
Min thickness below tol. /Min	Number of panels of this product in this report which have a min thickness below the min tolerance.
Max/Min Thickness Overall	Maximum and minimum thickness of all the panels of this product in this report
Max thickness above warn tol. /Max	Number of panels of this product in this report which have a maximum thickness greater then the max warning tolerance
Min thickness below warn tol. /Min	Number of panels of this product in this report which have a min thickness below then the min warning tolerance
%Pass/Fail (AVG thickness outside tol)	The percentage of the number of panels of this product in this report which have a average thickness within the tolerance / The percentage of the number of panels of this product in this report which have a average thickness outside the tolerance
AVG thickness above tol.	Number of panels of this product in this report which have a average thickness above max tolerance
AVG thickness below tol.	Number of panels of this product in this report which have a average thickness below min tolerance
Nom thickness	The nominal thickness of this product
Thickness Tol. Max/Min	The Max/Min tolerance of this product
Thickness Warn. Tol Max/Min	The Max/Min warning tolerance of this product

If *Create detailed report* is pressed below window appear

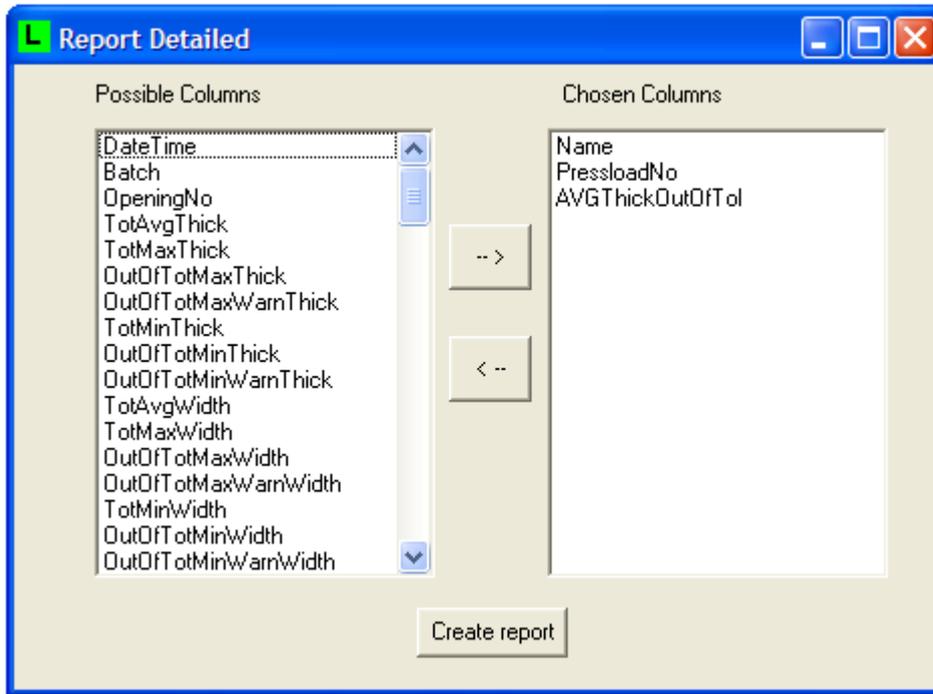


Figure 4.4.15 Window where the columns for the detailed report is chosen

The column marked *Possible Columns* contains all possible column names from the result database except the column names contained in the column marked *Chosen Columns*. There is actually an extra column that can be chosen that don't exist in the database, AVGThickOutofTol. The column names can be moved between the two columns by first marking a column name and then press the corresponding arrow buttons (E.g. press -> to move from possible Columns to chosen Columns). To create a detailed report press button *Create report* and the report will contain information about the columns contained in *Chosen columns*

Extra columns not contained in database	Description
AVGThickOutofTol	If the average thickness is outside tolerance this columns is 1, else 0

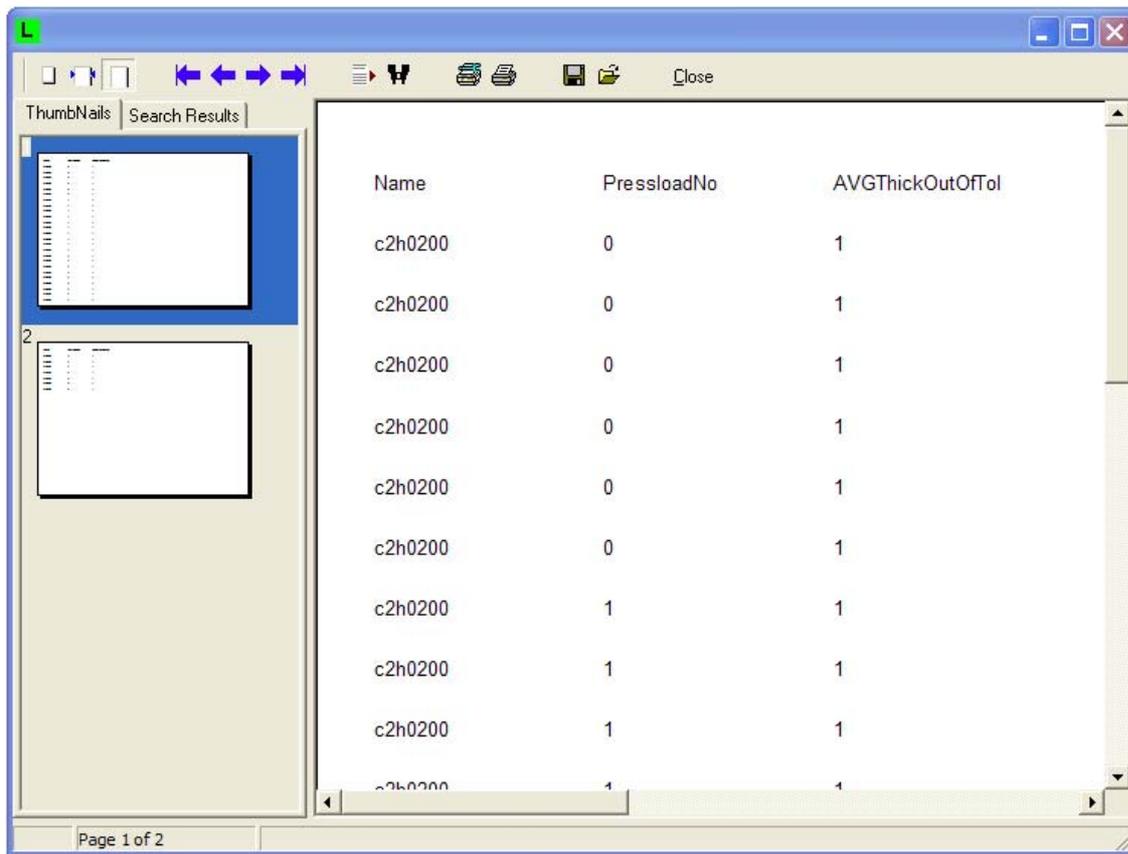


Figure 4.4.16, Preview of the detailed report

Press the save button and chose which format to save the report (.qrp, .pdf, .xls)

Command	Description
Preview report button	A preview window appears containing all the chosen measurements. The data is divided by product with a header that summarizes all measurements. See fig above (Figure 4.5.9).
Print report button	Send report to network printer if any is available.
Open report button	In <i>Settings/Time settings/Autoreport generation</i> it is possible to automatically save reports. A report is saved with file ending .qrp. By pressing open report the same window appears as when pressing the preview report button. To open a saved report press the standard windows open dialog button se Figure 4.5.12.

4.4.4 Database

The database is a MySQL database server. The logging client creates five different tables: *Result* (contains the measurements), *Tolerances* (contains the tolerances for produced products), *Sections* (contains measured thickness for each section created with resolution to server), *Reportable* (contains values for the report) and *TempProd* (holds temporary data when report is created). The tables consist of the following columns.

Result and TempProd:

DB column	Type	Description
DateTime	DateTime	The date and time when the board was measured.
Name	Varchar(30)	Product name from Main Server
PressloadNo	Integer	The number of press loads measured.
Batch	Varchar(30)	Batch name
PressloadNo	Integer	Pressload number
OpeningNo	Integer	Shows from which opening the board comes.
TotAvgThick	Decimal(4,2)	The average thickness for a complete board.
TotMaxThick	Decimal(4,2)	The max. thickness detected looking at a complete board.
OutOfTotMaxThick	Integer	A value that indicates whether the board was out of max thickness or not. Displayed as either 1 out or 0 ok.
OutOfTotMaxWarnThick	Integer	A value that indicates whether the board was out of max warn thickness or not. Displayed as either 1 out or 0 ok.
TotMinThick	Decimal(4,2)	The min thickness detected looking at a complete board.
OutOfTotMinThick	Integer	A value that indicates whether the board was out of min thickness or not. Displayed as either 1 out or 0 ok.
OutOfTotMinWarnThick	Int	A value that indicates whether the board was out of min warn thickness or not. Displayed as either 1 out or 0 ok.
TotAvgWidth	Dec(10,2)	The average width for complete board.
TotMaxWidth	Dec(10,2)	The max width for complete board.
OutOfTotMaxWidth	Integer	A value that indicates whether the board was out of max width or not. Displayed as either 1 out or 0 ok.
OutOfTotMaxWarnWidth	Integer	A value that indicates whether the board was out of max warn width or not. Displayed as either 1 out or 0 ok.
TotMinWidth	Dec(10,2)	The min width for complete board.
OutOfTotMinWidth	Integer	A value that indicates whether the board was out of min width or not. Displayed as either 1 out or 0 ok.
OutOfTotMinWarnWidth	Integer	A value that indicates whether the board was out of min warn width or not. Displayed as either 1 out or 0 ok.
Length	Float	
Width	Float	
SkipBeginEnd	Integer	Cut of values in the beginning and the end of the received measured interval.
Moved	Integer	
AvgT(X)	Decimal(4,2)	Average thickness for each measurement

		track.
MaxT(X)	Decimal(4,2)	Max thickness for each measurement track.
MaxTPos(X)	Integer	Position on board where max thickness was detected.
MinT(X)	Decimal(4,2)	Min thickness for each measurement track
Reject_Track(X)	Varchar(10)	If track measure out of max thick tolerance the value (rejection code) will be <i>out high</i> . If out of min thick tolerance the value will be <i>out low</i> . Else it will be OK.
MinTPos(X)	Integer	Position on board where min thickness was detected.
Track(X)Lp1	Decimal(4,2)	Actual thickness in Log position one. Every single active measurement track has five possible log points available for use.
Track(X)Lp2	Decimal(4,2)	Actual thickness in Log position two. Every single active measurement track has five possible log points available for use.
Track(X)Lp3	Decimal(4,2)	Actual thickness in Log position three. Every single active measurement track has five possible log points available for use.
Track(X)Lp4	Decimal(4,2)	Actual thickness in Log position four. Every single active measurement track has five possible log points available for use.
Track(X)Lp5	Decimal(4,2)	Actual thickness in Log position five. Every single active measurement track has five possible log points available for use.
UpperActive(X)	Varchar(10)	Each track has this column to display if it is currently active.
QUpper(X)	Integer	A value describing how well the sensor has measured expressed in percent. For example if half of the sensors generate some error the Quality value will drop to 50%.
QLower(X)	Integer	A value describing how well the sensor has measured expressed in percent. Se example above.
TrackPos(X)	Integer	The position of the measurement track. related from left edge.
Option(0-10)	Varchar(30)	10 optional columns, that could be used to store customer specific information. Option3 is used to store a Message from operator

Sections:

DB column	Type	Description
DateTime	date time	Date and time to match the sections measurement with corresponding measurements in the <i>Result</i> table.

Name	Varchar(30)	Product name.
OpeningNo	Integer	From which opening number the values come from.
SectionNo	Integer	An increasing number to show the location of the section, 1 = beginning of board then for each section the measurements move by resolution to server towards the end of the board.
Track(X)	Dec(6,3)	Thickness measurements for each track in that section.

Tolerances:

DB column	Type	Description
DateTime	date time	Date and time to match the <i>Sections</i> measurement with corresponding measurements in the <i>Result</i> table.
Name	Varchar(30)	Product name.
NomThick	float	The nominal thickness
ThickMax	float	The upper thickness tolerance
ThickWarnMax	float	The upper thickness warning tolerance
ThickMin	float	The lower thickness tolerance
ThickWarnMin	float	The lower thickness warning tolerance
Lp1Pos	Integer	The length position of log point one.
Lp2Pos	Integer	The length position of log point two.
Lp3Pos	Integer	The length position of log point three.
Lp4Pos	Integer	The length position of log point four.
Lp5Pos	Integer	The length position of log point five.
NomWidth	float	The nominal width.
WidthMax	float	The upper width tolerance.
WidthWarnMax	float	The upper width warning tolerance.
WidthMin	float	The lower width tolerance.
WidthWarnMin	float	The lower width warning tolerance.
NomLength	float	The nominal length.
LengthMax	float	The upper length tolerance.
LengthWarnMax	float	The upper length warning tolerance.
LengthMin	float	The lower length tolerance.
LengthWarnMin	float	The lower length warning tolerance.
Optional1	Varchar(50)	Optional information set in the products window in Main Server.
Optional2	Varchar(50)	Optional information set in the products window in Main Server.
Optional3	Varchar(50)	Optional information set in the products window in Main Server.
Optional4	Varchar(50)	Optional information set in the products window in Main Server.
Optional5	Varchar(50)	Optional information set in the products window in Main Server.

ReportTable

DB column	Type	Description
Name	Varchar(30)	Product name.
FirstDate	datetime	The first date for each product in the report.
LastDate	datetime	The last date for each product in the report.
NoOfMeas	Integer	Number of measurements for each product in the report.
NoOutTMax	Integer	Number of boards out of upper thickness tolerance.
NoOutTMaxWarn	Integer	Number of boards out of upper warning thickness tolerance.
NoOutTMin	Integer	Number of boards out of lower thickness tolerance.
NoOutTMinWarn	Integer	Number of boards out of lower warning thickness tolerance.

Products:

DB column	Type	Description
ProductName	Varchar(30)	Name of product
Thick	float	Nominal thickness
Width	float	Nominal width
Length	float	Nominal length
ThickMax	float	Upper thickness tolerance relative to nominal. If value is set to 0, no tolerance check will be performed.
ThickWarnMax	float	Upper thickness warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
ThickWarnMin	float	Lower thickness warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
ThickMin	float	Lower thickness tolerance relative to nominal . If value is set to 0, no tolerance check will be performed.
WidthMax	float	Upper width limit relative to nominal. If value is set to 0, no tolerance check will be performed.
WidthWarnMax	float	Upper width warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
WidthWarnMin	float	Lower width warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
WidthMin	float	Lower width limit relative to nominal. If value is set to 0, no tolerance check will be performed.
LengthMax	float	Upper length limit relative to nominal. If value is set to 0, no tolerance check will be performed.

LengthWarnMax	float	Upper length warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
LengthWarnMin	float	Lower length warning limit relative to nominal. If value is set to 0, no tolerance check will be performed.
LengthMin	float	Lower length limit relative to nominal. If value is set to 0, no tolerance check will be performed.
Logging	Integer	0 = Logging disabled and Reject enabled 1 = Logging enabled and Reject enabled 2 = Logging disabled and Reject disabled 3 = Logging enabled and Reject disabled
Log point (1...5)	float	Position of log point, relative to front edge if value is positive and if the value is negative (-100 for example), the position is related to the rear edge of the board. If set to 0 or outside board, log point will be inactive and value will be set to 0.
TolLen	float	Length of an area in inch/mm exceeding tolerance, to obtain a reject.
EdgeOffset	float	Positions of movable outer tracks, from nominal width.
CenterPos	float	Centre position of board. Used for calculation of outer tracks in a moveable track system
Optional(1..10)	Varchar(15)	Optional columns
cutPattern	Varchar(15)	Which, if any cutpattern/section that is used

5 Maintenance

5.1 Calibration of Thickness and Length

Calibration of thickness is made in the PC where the program Thickness Profile is installed. Look for the icon **T**

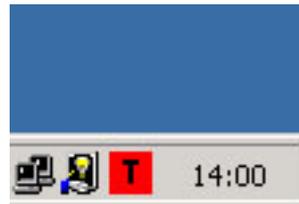


Figure 5.1.1 The Thickness tray icon.

Right click, and following menu will Pop up

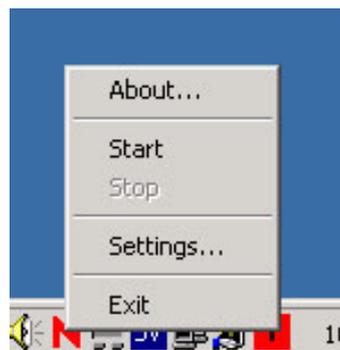


Figure 5.1.2 Right click on the icon and the menu shows.

Click on *Settings* and in the Thickness modules window that appear choose *Calibration*



Figure 5.1.3 The tabs that are available in the Thickness module after you selected settings from the menu.

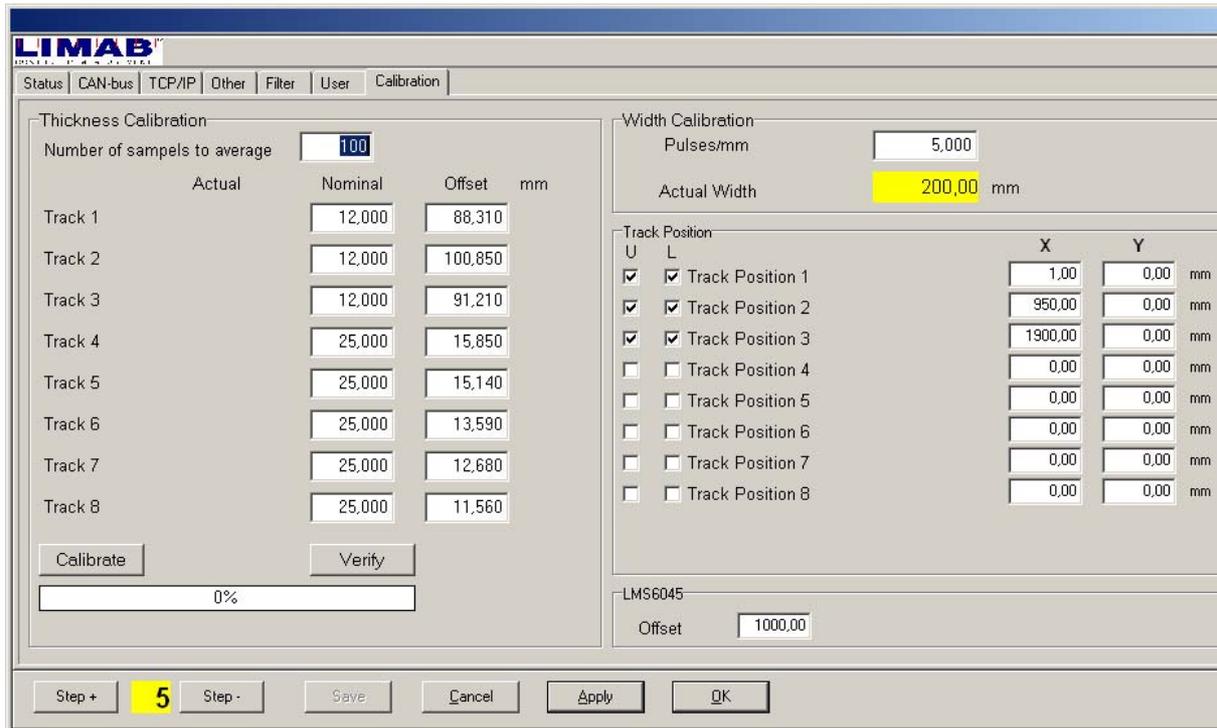


Figure 5.1.4 The calibration tab selected.

5.1.1 Calibration of thickness

Position a calibration board on the conveyor at the measuring passline. All active tracks will now display the actual thickness. Follow these steps:

1. Enter Nominal thickness.
2. Press calibration.

5.1.2 Calibration of length.

Run a calibration board at the conveyor, through the measuring passline. Averaged measured length will be displayed. Enter a pulse factor until averaged measured width is correct. Figure 5.1.4 shows an example with 3 tracks. Track number 1 have position T1, Track2 T2 and so on.

6 Technical specifications

6.1 Measurement object		
Type	Boards	
Thickness	0 ... 200mm	
Length	0,5 ... 30m	
Speed	0 ... 2m/s	
6.2 Measurement		
Thickness resolution	0.01mm	
Accuracy at 1m/s conveyor speed @ 2σ		
Thickness	+/- 0,03mm	
Length		
Minimum thickness sampling distance	1.0ms	1.0mm@1m/s
		2.0mm@2m/s
Minimum length resolution	1.0ms	1.0mm@0.5m/s
		1.0mm@1m/s
		2.0mm@2m/s
Measurement range thickness	0-200mm	
Measurement range length	max 30m	
Number of samples/board	max 3000	
6.3 PreciCura		
Measurement range	200mm	
Standoff	100mm	
Resolution	0,01mm	
Operating temperature range	0 .. +40° C	
Laser power	< 1mW	
Wavelength	670nm	
Laser Class	Laser, Class 2 (IEC825)	
Power supply	18 .. 36VDC, < 180mA	

7 Revision history

Doc Rev	Main Server Rev	Thickness Rev	Operator Rev	Changes
1.0	1.0.0.0	2.5.0.0	1.0.0.1	Initial version.
1.1	1.1.0.0	2.5.0.0	1.0.0.1	Fast stepping or close gap between boards could cause hanging of Main Server.
1.2	1.2.0.0	2.6.0.0	1.0.0.1	<p>Thickness:</p> <ul style="list-style-type: none"> • Thickness values not possible to interpolate are replaced by 0. • Apply button added. <p>Main Server:</p> <ul style="list-style-type: none"> • Access code added. • Max and Min calculation discards thickness 0 values. • Date and Q-values added to log file.
1.3	1.2.0.0	2.6.0.0	1.0.0.1	CAN Connection box added to measurement wheel assembly option.
1.4	1.2.0.0	2.6.0.0	1.0.0.1	Electric schematic changed
1.5	1.3.0.0	2.16.0.0	1.0.0.1	<p>Thickness:</p> <ul style="list-style-type: none"> • CAN-bus source extended to 4 channels • Apply button works on Start/Stop filter. • If first value is Saturation, it will be treated as a board. • During wait phase, one error message of type NoObject is allowed, without restarting sequence. • Error messages are displayed as error messages in wait phase. • Not possible to start more than one instance of Thickness program in one folder. • Remote shut down checkbox added • Length from LMS6045 added. • Start with no History.log do not give error condition. • Parameter “Sample frequency” added.

				<ul style="list-style-type: none"> • Acceptance of change of parameter “Pulse factor” is now made at pressing keys “Apply” or “Ok”, not only at start of application. • Checkboxes for selection of active sensors. • Error messages ”<i>Probe not active</i>” and ”<i>No measuring values</i>” added. • Length value from LMS6045 is now stored in history file “History.log”. • Auto start of encoder after power loss on encoder. <p>Main Server:</p> <ul style="list-style-type: none"> • Board average alarm output added.
1.6	1.4.0.0	2.17.0.0	1.2.0.0	<p>Thickness:</p> <ul style="list-style-type: none"> • Control of movable tracks added. <p>Main Server:</p> <ul style="list-style-type: none"> • Parameters for movable tracks added in product database. • Parameter for number of openings added.
1.7	1.5.0.0	2.17.0.0	1.2.0.0	<p>Main Server:</p> <ul style="list-style-type: none"> • Average thickness tolerance outputs replaced by Stacker outputs.
1.8	1.5.0.0	2.17.0.0	1.2.0.0	<ul style="list-style-type: none"> • Traversing measurement frame described
1.10	1.5.0.0	2.19.0.0	1.2.0.0	<p>Main Server:</p> <ul style="list-style-type: none"> • TCP/IP-protocol to logging client added. • Error and Reject signals D1 and D2 changed place in documentation. <p>Thickness:</p> <ul style="list-style-type: none"> • History stepping and searching of boards within time limit from Main Server added. • Secondary TCP/IP connection deleted. • French and Dutch language added.
1.10	1.6.0.0	2.19.0.0	1.2.0.0	<p>Main Server:</p> <ul style="list-style-type: none"> • TCP-messages NEW_PRODUCT by name and NEW_PRESSLOAD, from Logging Client added.
2.0	1.6.0.0	2.24.0.0	1.2.0.2	<p>Main Server:</p> <ul style="list-style-type: none"> • Options for storing products in databases

				<p>either MySQL or MS SQL server.</p> <ul style="list-style-type: none"> Options for Multi opening. A fixed no. of openings is entered in the settings. view. <p>Operator</p> <ul style="list-style-type: none"> Options for displaying products from database and select products from database. Options for multi opening. <p>Thickness</p> <ul style="list-style-type: none"> After history stepping the calibration offsets and sampling distance are not replaced by the parameters in the history file. Track alarm added. Start inhibit length added. Master force mode added. Dust level monitor added. Debug functions Speed, TE, TDiff and RP added. Parameter “UseCANDiffTime” added. Movement compensation of track 1, with belonging parameters added. Extern Trig+ and ThicknessTrig- added. XION-output module can now handle alarms from Main Server. Event- and error log file added.
2.2	1.6.1.0	2.27.0.0	1.3.0.0	<p>Main Server</p> <ul style="list-style-type: none"> Signa option added. <p>Thickness</p> <ul style="list-style-type: none"> Conveyor inclination added. <p>Operator</p> <ul style="list-style-type: none"> Cursor values added. Signa option added.
2.3	1.6.2.0	2.29.0.0	1.3.0.22	<p>Main Server</p> <ul style="list-style-type: none"> Improved error handling for file and database operation. <p>Thickness</p> <ul style="list-style-type: none"> Movement compensated track 1 is now fitted to track 1 upper instead of horizontal. Conveyor inclination added. <p>Operator</p> <ul style="list-style-type: none"> Reset board function added for multi press

				<p>opening.</p> <ul style="list-style-type: none"> • Signa functions added. <p>Logging</p> <ul style="list-style-type: none"> • New improved database functions for the MySQL server (yet to implement for MS SQL server). • Improved error handling. • Error log to file Implemented, mostly for debugging but can be used to locate errors during runtime as well. • Altered Settings dialog with new functions implemented. • Test function for database connection.
2.4	1.6.1.20	2.40	1.3.0.22	<p>Thickness</p> <ul style="list-style-type: none"> • Now able to handle 2ch relay output on XION. • Length from Accura and LMS6045 can now be delayed up to next calc position. • Air purge and track alarm are now working again, 2.29 and 2.30 does'nt. • Calculation of NexSamplePosition now correct after reset in SpeedMode Fixed and MoveComp →No board will be missed, due to this. • Writing to output module is now made bitwise. Several T-modules can use the same output module. • Optional digital input module added. • Error message “No answer from slave” from PreciCura added. • Recover from 24V power failure now works together with KVASER Can driver 3.7 , 3.8 and 3.9 • Tab with graph for monitoring conveyor speed added. • Different icon for track groups. • XION-Output for TMS1000 added. • Improved edge and vane tracking in MoveComp mode. • Move compensation with comp sensor mesuring before (-) is now working. This mode was corrupted in 2.39.

Doc Rev	Main Server Rev	Thickness Rev	Operator Rev	Changes
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Doc Rev	Main Server Rev	Thickness Rev	Logging Rev	Changes
2.4	1.6.1.33	2.45.1.2	1.1.2.16	<p>Manual</p> <ul style="list-style-type: none"> • The operator was excluded from this manual. The operator has its own manual from now on • Changes for the logging module is introduced
2.4	1.6.1.33	2.45.1.2	1.1.2.16	<p>Thickness</p> <ul style="list-style-type: none"> • Digital input indicating the speed is 0, this works both with fixed speed and encoder. E.G If a boards is stuck and the encoder in rolling we can tell the software by a digital siganl that the board is still • New messages to send realtime thickness to mainserver. • New messages to send verify thickness (send a thickness avg based on 1000 messurements)
2.4	1.6.1.33	2.45.1.2	1.1.2.16	<p>Logging module</p> <ul style="list-style-type: none"> • Database dump. Possible to set a max dabase size, when databse size exceeds limit the size of the databse is cut in half. The half that is removed. is ssaved to a dump.sql file • Fixed Databse size. Possible to set the databse to a fixed size. When databse exceed this limit, the oldest row is erased. • Generate reports at end of shifts. Shift can be set either a certain shift every day or the same shift every day.

				<ul style="list-style-type: none"> • possible to save reports to pdf and excel. • New column in databse, batch • New columns in databse Option0 to option9. for customer that have spcific information that they would like to save to db • possible to sort products by batch,(before only possible to sort by products • Save report is pdf adn exel, achived by purchasing third part software from www.qusoft.com • indexed the databse to increase searchspeed • Filter. filter used to filter out avg, max min thicknesses that are way out of tolerance from report • Detailed report where you chose which column to use and export those columns to pdf or excel • Extra column in detailed report where info if thickness is out of tol.
				<p>MainServer</p> <ul style="list-style-type: none"> • Automatic batch nr (batch number is increased every time the product is changed • New messages between thickness and operator for realtime thickness • New messages Section/cutpattern • Section/cutpattern, where a board could be divided in section • New tcpip protocol where manserver is communication with a plc (ABB)
2.6	1.6.1.45	2.45.1.2	1.1.2.53	Support for dual PanelProfiler