

# fastbend 2D-MT fastbend 3D-MT easybend 2D-MT

Firmware for fastbend 2D/3D MT and easybend 2D-MT control

by HACO

## User's Reference Manual for fastbend 2D

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Printed: juni 2022 in (Roeselare, Belgium)

#### Publisher

HACO nv Oekensestraat 120 B-8800 Rumbeke-Belgium

Editor David Dobbelaere

Cover Designer
David Dobbelaere

Special thanks to:

Programmers @ Robosoft

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## Introduction

Fastbend 2D/3D and Easybend 2D is a software module used for creating simple 2D/3D-profiles for production on a press brake. It is quick and easy to use thanks to the clear and simple user-interface.

Extensive drawing functions allow the user to exactly duplicate the workshop drawing in the software, thus reducing the chance of interpretation errors during production.

Once the profile is designed, the software automatically calculates the number of bending solutions and the back gauge settings. The bending sequences, the back gauge settings and other preferences for the production can be edited at will.

Once the part is designed, it can be produced on HACO's multi touch press brake controls.

#### Remark:

The following actions can only be performed on the "Fastbend 3D-MT controller", namely:

- a 3D-drawing
- controlling perifheral devices such as a " plate follow system", ..... etc.



# **General Description**

## 1.1 Aim of the Software

The main objective of the FastBend 2D application is:

\* Simplify and optimize the production process by creating the bend program accurate, fast and in a user friendly modern way.

\* Offline creation of bend programs. The FastBend 2D application is built around this philosophy to save time.

\* Multi Hardware possibilities: Windows operated PC's, Laptops, tablets and 2in1 Laptop/Tablets.

These objectives are achieved by:

- \* Displaying as organized and clear as possible only the essential information.
- \* Modern App style look and feel.
- \* Using the most modern techniques from gesture control.
- \* Advanced user settings.

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## **1.2** What are the features from each control

### **1.2.1** What are the features of a "FastBend3D-MT" control

#### 1.2.1.1 What are the main features

- 24" multi color Multi Touch screen
- 2D Design and Bending Sequence Calculation in Multitasking Mode
- Standard 2D/3D visualisation
- Automatic or manual bending
- 2D Automatic double bends solution
- 2D Fast Design mode
- Execution of generated 2D & 3D-programs
- Editable graphical tool database
- Editable material database
- 2D Automatic/ Programmable retraction
- 2D False bend solution
- 2D Auto tool search
- 2D Real time bend sequence calculation
- metric or imperial measure input
- USB interface
- Network + offline functions
- Multi-language support
- Remote diagnostics
- Integrated Partmanager for 3D bend-program creation
- 1.2.1.2 The "Bend Manager 3D MT" functions.

1.2.1.2.1 Profile design concepts for 2D bend-programs

- Multiple drawing methods :
  - Smart Draft
  - Point to Point
  - With or without adjustable background grid
- Insert line segment at start/end/within profile
- Zoom on drawing

- Display of dimensions during drawing
- Measure functions

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- Line segment/angle adjustment to fit certain variable dimensions
- Messages concerning tools during drawing
- Select tools during drawing
- Bending sequence info during drawing
- HalfBegin & HalfEnd function for arcs
- Automatic tool search
- Automatic hemming solutions

1.2.1.2.2 Bending sequence & back gauge setting for 2D bend-programs :

- Display actual bending sequence search
- Real time search for ALL solutions
- Saving of 3 "best" sequences
- Score for bending sequence (parameters : collisions, safety zone for fingers, sheet manipulations, cycle time)
- Score for gauging quality
- Select alternative bending sequence
- Extensive solution search for arcs (e.g. 180° arc)
- Retraction taken into account during solution search
- Automatic retraction calculation
- Move finger over adjustable distance
- Bending step overview with swap function
- Calculation of stretched length
- Estimated bending cycle calculation
- Bending sequence simulation video

#### 1.2.2 What does the "FastBend2D MT" have less than FastBend3D-MT

- 1/ There is no "On Board Part Manager"
  - I.e. : One cannot make "3D programs" They can only be performed
- 2/ There is no "Corner meeting" possible

3/ IPC with Celeron CPU instead of I5 (FB3D)

4/21.5" Touchscreen instead of 24" (FB3D)

#### 1.2.3 What does the "EasyBend2D MT" have less than FastBend2D-MT

#### 1.2.3.1 No 3D

- No 3D display possible
- No Simulation possible
- No 3D tool set-up possible
- No integration of Partmanager on control possible

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- Running 3D program created in PartManager is without graphical display
- 1.2.3.2 No Status-Bar and the periphery attached to it not usable
  - No control of the Pump via HMI
  - No Visualization of Backdoor and Machine Reset On/Off
  - No Reference Status info
  - No Syncview
  - No Angle Measuring System
  - No Plate Tracking System
  - No Shift Container / Hemming control via HMI
  - No Tool clamping operation via HMI
  - No electrical finger contacts
  - No integrated light curtain and underlying functions.
    - a. Safety not On/Off via HMI
    - b. No Stop at Mute via HMI
    - c. No Box Mode via HMI
    - d. No visualization of light curtain status in top right corner

#### 1.2.3.3 Other Features that are not usable

- No external DACs (pump via frequency converter)
- None 1/2 Operator Selection control via HMI
- No Smart Tool Locator
- No Robot
- No Internal Sheet support operation via HMI
- No confirmations via Down Pedal (wait for input, safety zone, etc,....)
- No tandem
- 1.2.3.4 Specific Functions Easybend2D\_MT
  - Arrows in Edit mode for Finger Up/Down

## **1.3 Gesture control**

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The gesture control applied in the software is designed to work on multi touch devices as laptops and tablets.

See hardware specifications to see the requirements.

All the software's functionality can be controlled with gesture control. So there is no need for a hardware mouse or Keyboard.

This is also the most preferable working method to operate the software in the fastest and most accurate way.

All gestures used to control the software are listed in following table.

We describe here their general functions.

Mode and function specific gestures will be described in their appropriate chapters.

<u>Gestur</u> <u>e</u>	<u>Symbol</u>	<u>Function in</u> graphic window	<u>Function in</u> other windows	<u>Mouse</u> equivalent
Тар	Phy	Mode dependant functions	Select De-Select Toggle	Left Click
Double Tap	R	Best Zoom (2D +3D) Mode dependant functions	Open Run	Double Left Click
Press	Im	Mode dependant functions	Not Used	Long Left Click
Drag	The	Move (2D) Rotate (3D) Mode dependant functions	Scroll Slide bars Control Time bar Control	Left Click + Hold + Move
Press +Drag		Mode dependant functions	Not Used	Long Left Click + Hold + Move

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#### Keyboards 1.4

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## 1.5 Name Lengths

The length from different names is limited up to a maximum of 28 characters. For some names it is even less.

- \* Program names.
- \* Material names
- \* Tool names
- \* Adaptor names
- \* Press names

Not following this directive can result in the clipping of displayed text.

## 1.6 Registration

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When you are using Fastbend 2D offline, you must use a USB hardware key combined with a password file.

Without the hardware key or password file the software will not start up.

The software can only be used properly on one device, namely the one with the hardware key. The hardware key will only work when the appropriate key driver is installed on your system. This driver can be found on the USB stick delivered with the software.

Installing the serial (USB) Sentinel hardware key:

- Plug in the USB hardware key.
- The operating system detects the hardware key and the "Found New Hardware" wizard starts.
- Press "Next".
- Choose "Search for a suitable driver for my device" and press "Next".
- Check "Specify a location" and press "Next".
- Now you have to specify the location of the hardware key driver on the USB stick.
- Complete the wizard and the USB hardware key will be installed.

The password file can also be found on the USB stick delivered with the software.

#### Remark:

You don't need a hardware key or license file when your PC is connected (through network) to a registered machine.

## 1.7 Hardware Requirements

	Minimum	Recommended or Higher
Resolution	1280x1024	1920x1080
OS	Windows XP	Windows 7
Ram	2 GB	4 GB
Disk	1 GB	2 GB
CPU	1 GHz	2,7 GHz
Graphics card	True Color Capable	Intel HD Graphics 4600

#### Remark:

Modern devices combine high resolutions with small screens.

On these devices Fastbend 2D will work correctly but will be difficult to operate due to the physical size of the screen.

The minimal screen size for running the Fastbend 2D software is 10".

It is not recommended and it is not guaranteed to work on windows smart phones.

It is is also not intended to work well on small tablets. (screen size < 10")



# **The Main User Interface**

- 1. Side panels
- 2. Navigation buttons
  - 2.1. Design
  - 2.2.Edit
  - 2.3. Production
- 3. Mode specific buttons
- 4. Main menu
- 5. Switch user
- 6. File Browser
- 7. Step overview
- 8. Safety System Info
- 9. Status bar



## 2.1 The opening screen

Following appears when you start fastbend 2D:



After start up, you arrive in the production mode.

The last active program will be automatically loaded.

The upper part of the screen is used to access main menu, user change and file browser.

The lower part of the screen is the bend step browser.

The left part of the screen is used for the production data.

The right part of the screen is reserved for mode change and the graphical representation of the part and machine.

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## 2.2 Navigation

General navigation between the 3 main application modes (design, edit and production) is done by use of the 3 buttons at the top right of the main interface.

1. Design mode



2. Edit mode



3. Production



#### 2.2.1 Design mode

In the design mode you can draw a cross-section of how you want your end result to look like. When transferring to the <u>Edit</u> or the <u>Production</u> mode a sequence of steps will be calculated for how to best create your product.

#### 2.2.1.1 Side panels

1. Profile

Change material properties such as the thickness, width and material. You can import/export a DXF file by using the buttons "2D section" and "Export unfolded".

2. Machine Change machine properties such as the tools and adapters.

3. Info

Define details and comments, these will be stored in the generated program and are purely informational.

#### 2.2.1.2 Functions

Functions specifically for the design mode.

Snap



Description: length and angle measurements can snap to increments of a value that is defined in the user settings

#### Type: toggle

Action: toggle if the length and angle of a drawn line will snap to increments of a value

Grid



Description: set the visibility of the drawing grid Type: toggle Action: toggle if the drawing grid is showing

Bend type mode



Description: in this mode, you can set false bends, double bends or add/edit arcs Type: toggle/mode Action: enables the bend type mode

Measuring mode



Description: in this mode, you can link the dimensions of lines together Type: toggle/mode Action: enables the measuring mode





Description: change the positioning of measure lines and text on the drawing Type: toggle Action: shows several buttons to configure the measure lines with

Recalculate solution



Description: this button is only visible when you've already generated a bend sequence and returned to design mode to make some changes. To avoid overwriting any changes you may have made in edit or production mode the solution is by default only partially re-generated. Enabling this button means that all changes in edit or production mode will be overwritten the next time you navigate to edit or production mode.

Type: toggle

Action: discards changes made in edit or production mode

• Full screen mode.

Description: hide all the visible controls for an optimal viewing of the drawing Type: toggle Action: hides/displays all the visible buttons and side panels

#### 2.2.2 Edit mode

After drawing a cross-section in the <u>Design</u> mode you can evaluate the calculated program by going to the edit mode. In this mode you can review the auto-generated steps, choose another auto-generated solution or change the sequence of the bend steps in the current solution.

#### 2.2.2.1 Side panels

1. Axes

View and edit the positions and speeds that the axis will go to per step.

2. Info View and edit the information in the generated program.

#### 2.2.2.2 Functions

Functions specifically for the edit mode.

Sequence, Solutions



Description: It shows the 3 most usable bend-order solutions according the combined best score for rotation and movement.

Type: toggle

Action: toggle to select the best bending order

Profile overview



Description: the profile overview window shows your drawing with step numbering to help you interpret the bend steps Type: toggle

Action: toggle if the profile overview is showing

Reset solution



Description: reset the solution Type: toggle Action: undo all changes that have been made to the generated program

• Full screen mode

[]

Description: hide all the visible controls for an optimal viewing of the machine Type: toggle Action: hides/displays all the visible buttons and side panels

#### 2.2.3 **Production mode**

In this mode you can run your auto-generated solution, insert steps or manually control your axes. If you import a 3D program from PartManager, this is the only mode that will be available.

#### 2.2.3.1 Side panels

1. Workpiece Change material properties such as the thickness, width and material.

2. MachineChange machine properties such as the tools and adapters.A button "Tool composition" is available.

3. Depth

Set corrections to calculated values such as the depth, crowning, tilt... If an angle measuring system is enabled, then the angle measuring options are shown here.

4. Cycle

Change the speeds in greater detail per phase of the bend and set the starting distances of those phases.

When your machine has a Lazersafe system, then the safety options will be available here.

5. Axes

View and edit the positions and speeds that the axes will go to per step.

#### 6. Sequence

Add/delete steps, simulate the bend sequence, define hemmingsteps, and on which steps to wait for input of the footpedal.

In the "Info" pane, you can select an image that will be displayed when you reach that step, this can be used to remind the operator of specific dangers or actions needed for that step.

#### 7. Info

View and edit the information in the generated program

#### 8. Overview

A summarization of all the most important data in a larger font so it can be easily viewed from a

distance.

#### 2.2.3.2 Functions

Functions specifically for the production mode.

Start/stop

 $\bigcirc \bigcirc$ 

Description: start/stop the referencing procedure (displayed in the header) or start/stop production of the current program

Type: action/toggle

Action: the button will change to indicate if the start was successful, the axes will be positioned and the foot pedal will be enabled

• NC reset

Description: Reset the numerical control.

Safety related error codes & messages must be reset with the physical reset button on control panel.

Type: action

Action: clears the current error codes/messages (if possible)

• Manual/automatic mode



Description: in automatic mode, the selected step will change to the next one after a successful bend, in manual mode however the same step will be repeated until you select a different step yourself Type: toggle

Action: the button will change to indicate the change in status

• Auto up



Description: when enabled, the beam will return to the top position after the final depth or angle has been reached

Type: toggle

Action: the button will change to indicate the change in status

• Operators



Description: choose how many operators are using the machine or change where a single operator is standing

Type: toggle

Action: the button will change to indicate the change in status

• 2D/3D

## 2D 3D

Description: switch between a 3D rendering or a 2D cross-section (if available) Type: toggle

Action: the button will change to indicate the change in status and the viewer will switch to the selected viewing mode

• Full screen mode



Description: hide all the visible controls for an optimal viewing of the machine Type: toggle Action: hides/displays all the visible buttons and side panels

#### 2.2.3.3 Tool composition

The tool composition window will help you set up all the required tools for the loaded program.

Tools are rarely the full length of the table, so it's possible to use multiple smaller tools to form one bigger surface to bend on. When you are designing your program, Fastbend will calculate which tools you will need and form an optimized configuration for your machine. For this calculation to work correctly, you will need to define the available segments you have of every available tool using <u>the tool</u> editor.

In this window the functionality of the Wila tool locator system (if available) will change to indicate the position of the selected tool.

You can use the footpedal or the button on the screen to select the next tool.

## 2.3 Main menu

The main menu can be opened by pressing on the top left button on the screen.



Some options will not be available when you are logged in to the "Manager" and "User" accounts.

- File management
  - New
  - Open
  - Save
  - Save as...
- Start
  - Log off
  - Shut down
- Apps
  - Calibration
  - Clean screen
  - ... (available known applications will be added here automatically, for example "Part Manager")
- Libraries
  - Top tools
  - Bottom tools
  - Top tool adapters
  - Bottom tool adapters
  - Materials
  - Presses
- Tables
  - Motion time
  - Stretched length
  - Depth correction
- Help
  - Manual
  - Version info
  - Register
  - Service routines
  - Remote support
- Settings
  - User settings
  - Fastbend settings
  - Machine settings

#### 2.3.1 Log off

Close the application and return to Windows, this option is only available when you are logged in with the service account.

#### 2.3.2 Shut down

Turn the controller off.

#### 2.3.3 Calibration

Some tools may have minor deviations from how the tool was defined in the software. To account for these changes and improve the precision of the end results, a tool calibration may be necessary.

To calibrate a tool, please select the equipped top and bottom tools and perform the three measurements. Start with the first sample (sample 1) by making a bend to 100 degrees and measure the depth and the angle that this results in. Repeat this step for 135 and 170 degrees and enter the measured values in the tool calibration window. These measurements will be compared to the calculated values and corrections will be shown in the 'Result' block and stored in the tool file.

#### 2.3.4 Clean screen

A simple black screen which enables you to clean your screen without turning your controller off. Touch both white dots on the screen at the same time to leave this screen.

#### 2.3.5 Tool editor

The tool editor allows you to create and edit tools, copy a newly purchased tool from the catalog library to the owned library, import existing tools (.TTL files, .BTL files), import tool designs (.DXF files) and define the available tool segments for e specific tool type.

To use the tool editor, press 'Top tools', 'Bottom tools', 'Top tool adapters' or 'Bottom tool adapters' in the main menu, the tool selection window will appear where tools can be copied, deleted, imported or selected for editing. Selecting a tool in this mode will not affect your currently opened program, but making changes to a tool that is loaded in the program can alter the calculated values for the axes and depth.

Making a selection here by double-tapping on a tool or selecting a tool and tapping on 'Edit' will take you to the editing screen. This is where the properties of the tool can be changed and a DXF file can be imported. The segments that you have of that tool type are to be defined in the 'Lengths' tab of this screen. For example if you own 3 top tools of the type 'BIU-012', two of 200 mm and one of 400 mm, your table should look like this:

#	Length (mm)	Horn
1	400.00 mm	None
2	200.00 mm	None

Some tools will have a protrusion on one or both sides that won't allow the tool to be stacked against another one. This protrusion is called a horn. If you define which tool segments have a horn, that will be taken into account in the tool composition.

#### 2.3.6 Material editor

The material editor allows you to create and edit materials.

If a material is consistently not yielding good results, you can make corrections here to it's elasticity, tensile strength, radius, density or spring-back.

Some angle measurement systems may have issues with shiny, dark or uneven material surfaces, if that is the case you can set the values for 'Laser check possible' (Alfa-F) or Iris plus possible' to 'No'. The next time you create a program with this material and enable the angle measurements system, you will be reminded of this setting with an exclamation point mark in the step-viewer.

#### 2.3.7 Pressbrake editor

The press brake editor allows you to create and edit machine configurations or import new/changed sections of the machine.

In the machine sections window, there will be several possible actions to take:

- Upper
- Lower
- Beam
- Clamp
- Finger

Import the new upper, lower, beam, clamp or finger sections for the machine, after selecting a DXF file a prompt will show up called 'XY Translation' where you can set an offset (this should only be changed if the DXF was drawn with an incorrect zero position). The imported section will appear in a different color for previewing.

Tap 'Update' to apply this new section to the press (it is still possible to cancel these changes at this point).

Update

Apply the imported section(s) that are being previewed.

Refuse

Clear the imported section(s) that are being previewed.

Zoom all

Resets the zoom intensity and position.

#### 2.3.8 Motion time table

In the 'Info' tab of 'production', 'edit' and 'design' mode the field 'Estimated time' will give you an approximation of how long it should take to complete the program. This time is calculated using the values in the 'Motion time table'. In this table you can enter how many operators are needed for that task and how long each task will take the operator(s) to complete.

#### 2.3.9 Stretched length table

In the 'Info' tab of 'production', 'edit' and 'design' mode the field 'Stretched length' will give you an approximation of how long the plate will have to be to create this workpiece. A plate can stretch and compress at varying rates depending on several factors and might need to be corrected to get a better precision. These corrections can be entered in this table.

The rows are the thickness of the plate, the columns are the radius divided by the thickness. For

example if you have a radius of 1 mm and the plate thickness is 0.8 mm, then you'll have to adjust the cell in the column called '1.25' and the row called '1'.

#### 2.3.10 Depth correction

If the machine is inaccurate with all materials and tools, you might need to correct the machine itself. The maximum capacity in this table corresponds with the used force in relation to the value of the 'Maximum capacity' in the Fastbend settings.

For example, if the force is calculated to be 50 and the 'Maximum capacity' is set to 100, the 50% row will be used. If the plate you are bending is 200 mm and the table is 2000 mm wide, the column will be 10%. So the correction that will be applied in this case will be the cell in the first column and the fifth row.

All values in between the filled in corrections will be extrapolated.

#### 2.3.11 Service routines

When entering the service routines the MACON will enter a testmode. In this testmode all the inputs and outputs can be monitored and set.

If you own an Iris Plus angle measuring system, a direct connection to the webpage of that device can be made by tapping 'Iris plus interface' (via LAN, not internet connection is required).

#### 2.3.12 Remote support

Shows a TeamViewer window with a code that you can give to a service technician. This will allow the technician to remotely connect to your control via internet.

#### 2.3.13 User settings

In a default installation, you will find 3 types of users. Several settings can be changed per user.

#### General

Changing passwords

You can change or remove passwords by selecting the user and clicking 'Change password'.

To remove a password, simply leave the 'New password' input field blank.

The 'Service' user's password can't be changed.

A regular user account cannot view/change settings for a manager account and a manager account cannot view/change settings for a service account.

Custom usernames

You can change the names of new accounts so that everyone who has access to the machine can use the machine with their own settings.

• Language

• Debug information (for troubleshooting with the help of a service technician)

Shows a window with detailed information about the communication with the MACON and the angle measure systems (optional) for diagnosing problems.

Units

Two options are available for the unit system, SI (International system of units) and USCS (United states customary system units).

For example, using the SI system, lengths will be displayed in 'mm', while using USCS the unit will be feet (ft). The values in your sidepanels will automatically be recalculated and changed upon leaving the 'User settings' window.

Fractional format

While using the USCS unit system, you have the option of displaying some values as fractions, for example 0.5 ft will be shown as 1/2 ft.

Snap length

Changes the distance to which the lines will snap, can be toggled on/off with the snap button.

Snap angle

Changes the distance to which the angles will snap, can be toggled on/off with the snap button.

• Snap finger (0 = auto)

In edit mode, you can drag the finger axes up or down in the 2D view.

• Show 3D workpiece

2 sliders are available here, 'folded state' and 'unfolded state'. These sliders represent what states of the workpiece will be visible in the production mode. This can only be changed for the 3D view, in 2D mode both folded and unfolded states will always be visible since they do not obstruct each others view.

#### **Keyboard settings**

• Default layout

The built-in text-keyboard can be modified to different language styles, the default for that style is defined here. You can still change the keyboard by pressing on the icon at the top right of the keyboard while it is showing, but the next time the application starts up the keyboard will show the default style again.

#### Available tools

• Primary top tool directory

The directory that holds all your owned '.TTL' files. This directory should also contain a directory named 'Adapters' where you will store the '.TTL' files for your adapters.

Primary bottom tool directory

The directory that holds all your owned '.BTL' files. This directory should also contain a directory named 'Adapters' where you will store the '.BTL' files for your adapters.

Secondary top tool directory

The directory that holds all the catalog '.TTL' files. These catalog tools can be used to create programs with tools that you don't yet own but that are available for purchase.

Secondary bottom tool directory

The directory that holds all the catalog '.BTL' files. These catalog tools can be used to create programs with tools that you don't yet own but that are available for purchase.

#### Security settings

#### Log-out after inactive period

After this period has expired without detecting any input, a window will pop up, lock the software and force the user to log in again. This is a security measure to prevent unauthorized people from taking control of your machine or stealing your data while you aren't present.

#### • Duration

Set the time that needs to pass before the software will be locked.

• Always select user on startup

When enabled the log-in screen will always be shown at start-up, even if no password was defined for the last user.

#### 2.3.14 Fastbend settings

All the settings that determine how the software operates are shown here.

### 2.3.15 Machine settings

All the machine configuration parameters can be modified here.
# 2.4 User switching

To change the user, tap on the username in the header bar, a window will be displayed with all the available users.

Logging out means that the control will be locked and unusable until another user logs in.

# 2.5 File browser

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The file browser is used to open/save/import files.

On the left side of the browser, a tree-branch structure is used to navigate through the available directories, on the right side are the files within that directory.

At the top of the screen, you can choose between 4 viewing modes, 'Detailed icons', 'Simple icons', 'List' and 'Fast list'. Changing the view here are for this session only and will not override the defaults defined in the settings window.

Remote drives can be added by entering the settings window and tapping on 'Edit remote drives', entering a valid path (eg. "\\yourserver\PROGRAMS\") and tapping 'Add'. To delete a path, select it and tap 'Delete'.

Basic file operations are done via the buttons at the bottom of the screen, notice that the functions change whether a file or a folder is selected.



# 2.6 Step overview

The step overview shows a sequential order of the operations.

In edit mode, the step overview can be used to organize the bend sequence by pressing down on a step and dragging it to a new position.

# 2.7 Status bar

The status bar displays information about your machine and accessories.



Description: represents the on (green) or off (gray) status of the hydraulic pump Type: status/action

Action: turn the pump on/off (optional, some machines will require the pressing of a physical button on your machine)



Description: represents the on (yellow) or off (gray) status of the physical reset button which is usually mounted on the back of your machine Type: status

Action: none

Reset curtain



Description: represents the on (yellow) or off (gray) status of the second physical reset button (optional), can be toggled on or off in <u>the Fastbend settings</u> Type: status Action: none

Reference



Description: will turn yellow after successfully taking a machine reference Type: status/action Action: (re)take a machine reference

• Top tool clamping



Description: controls the (hydraulic) tool clamping system for the top tools, turns green when the tool is clamped Type: status/action Action: clamp/unclamp the top tool Bottom tool clamping



Description: controls the (hydraulic) tool clamping system for the bottom tools, turns green when the tool is clamped

Type: status/action

Action: clamp/unclamp the bottom tool

Sync view parking



Description: turns green when the axis is parked Type: status/action Action: park the sync view axis

Angle measure system parking



Description: turns green when the angle measure system axis is parked Type: status/action Action: park the angle measure system axis

Angle measure system reference image



Description: turns green when the angle measure system has successfully taken a reference image Type: status/action Action: take a reference image with the angle measure system

• Angle measure system calibration



Description: turns green when the angle measure system has successfully been calibrated Type: status/action Action: start the calibration procedure

• Angle measure system mute



Description: turns green when the angle measure system is muted Type: status/action

Action: mute the angle measure system (angle measuring disabled)

• Follow axis/axes mute



Description: turns green when the follow axis is in the mute position (can display up to 7 follow axes) Type: status Action: none



# The main menu

To open the main menu push the following button.



Main menu structure:



The main menu	36

# 3.1 File management

# 3.1.1 New

Start a new program.

# 3.1.2 Open

Open the file browser window in "open program" mode.

# 3.1.3 Save

Save the actual program with current name.

When a program has not been named, it's default name is "Untitled". When doing a "Save" on an "Untitled" program the function "Save as" is automatically called.

# 3.1.4 Save as

Open the file browser window in "Save program as..." mode.

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# 3.2 Libraries

View and modify tools, adapters and machine libraries.

# 3.2.1 Top and bottom tools

# 3.2.1.1 Tool browser

Top tool browser view:

Bottom tool browser view: View and working principles are identical as with top tools. Only "tool specific parameters" are different.



There is a possibility to select two pre-defined libraries:

1) User library "Owned Tools": This library is used for the actual tools the customer uses on his machine.

2) Haco library "Catalog Tools": This library contains all Haco predefined tools from catalog.

On top of the browser you have all standard action buttons to make manipulation on tool files.

There is a standard "text" search function.

There is a filter and sort function that can be accessed by tapping on the following icon.



Filter and sort function view:

Advanced Search	×
Sort by: Name v	
Valid tools first:	
Height between: 0.00 and 0.00	ρ
Angle between: 0.00 and 0.00	ρ
Radius between: 0.00 and 0.00	ρ

Possibility to up or down sort results according "Sort by" most tool specific parameters.



Possibility to filter results between an upper and lower limit according most tool specific parameters.



Possibility to list valid tools first. These are tools, selected by the software according to your design shape and thickness.

# 3.2.1.2 Create/Edit Tools

This window is used to create or edit tool drawings and/or parameters.

There are 3 ways to open the tool create/edit window from within the tool browser:

- 1) By tapping the "New" action button.
- 2) By tapping the "Edit" action button.
- 3) By double tapping on a specific tool.

Top tool create/edit window view:

Edit Top Too	l (BIU-001)		
BIU-001 Height	135.00 mm	General	
Angle Phase Width	28.00 deg 1.00 mm 3000.00 mm	Hemming	
Max. Press. Force Rotatable Safety area	YES + 9.10 mm	Lengths	
Rev. Safety area	9.10 mm 0.00 mm		
			Import Exit

In "general" and "hemming" all "tool specific parameters" and tool name can be set.

In "lengths" we can enter all tool segments by quantity and length.

When tool segments are inserted they will be taken into account for tool composition.

When no tool segments, then parameter width will be used as default width for 1 tool segment. The physical shape can only be imported by dxf drawing.

Zero point on dxf must be located as indicated by the red cross.

Dxf must be a one layer closed contour only containing lines and arcs.

Dxf drawing scale must be 1:1.

Height, is the distance between the center of the red cross and the green line indicating the .

This can be different for different tool styles.

Figure shows height for Wila head load (left) and Promecam (right) tool style.

When using Wila shoulder load the height is longer then physical tool height as the pressure point of the machine drawing is higher then the pressure surface of the tool.



# 3.2.1.3 Tools specific parameters

Specific parameters for top and bottom - tools:

Top-Tool

Name The name of the toptool

Max. Press. The maximum force the toptool can support per meter. Force

Width The width of the toptool in mm.

Height The height of the toptool in mm.

Angle The angle of the toptool in degrees.

Phase The radius of the tip of the toptool.

Correction When the center of the toptool isn't quite in line with the center of the bottomtool, you can enter a correction in mm (inch). Both positive and negative values are possible.



Safety Area This is the minimum distance for the back gauge, to prevent a collision with the top-tool. When in a program-step this position is reached for the first time, the message "Safety area reached !" is displayed. Only when you have assured yourself that it is safe for the back gauge to move further to the programmed position, without hitting or getting in the way of the toptool, you can press <enter>.

The back gauge will now move to the programmed position so you can make the bending. The message will appear only the first time the safety area is reached for each program-step.

Afterwards, for as long as you haven't quit the program, the back gauge will immediately go to the programmed position without messaging "safety area reached !".

remark :	There is also a safety area for the bottomtool.
	The program only considers the largest of the two
	(worst case scenario).

Rev. Safety This is the same as the safety area, but with the tool turned.

Area

- Rotatable Set this parameter on "YES" to make it possible to turn the toptool.
- Hemming The hemming parameters do not apply to toptools.

# **Bottom-Tool**

Name	The name of the bottomtool
Max. Press. Force	The maximum force the bottomtool can support per meter.
Width	The width of the bottomtool in mm.
Height	The height of the bottomtool in mm.
V-opening	The size of the V-opening of the bottomtool.
VPhase	The shoulder-radius of the bottomtool, expressed in mm.

Heightcorr	A readout of the applied height-correction, only shown to inform. No value must be entered here.
OpeningCorr	A readout of the applied phase-correction, only shown to inform. No value must be entered here.
PhaseCorr	This is the same as the safety area, but with the tool turned.
Angle	The angle of the V-opening, expressed in degrees.
Safety Area	This is the minimum distance for the back gauge, to prevent a collision with the bottom-tool. When in a program-step this position is reached for the first time, the message "Safety area reached !" is displayed. Only when you have assured yourself that it is safe for the back gauge to move further to the programmed position, without hitting or getting in the way of the bottomtool, you can press <enter>. The back gauge will now move to the programmed position so you can make the bending. The message will only appear the first time the safety area is reached for each program-step. Afterwards, for as long as you haven't quit the program, the back gauge will immediately go to the programmed position without messaging "safety area reached !". <i>remark</i> : There is also a safety area for the top-tool. The program only considers the largest of the two (worst case scenario).</enter>
Rev. Safety	This parameter is the same as the "Safety Area" parameter.

# Area but with the tool turned.

# Hemming

The hemming parameters are only important for pressing-tools. There are two types of hemming-tools :





Regular type

Type shift container

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HemmingHeight	This is the height of the press-opening, expressed in mm (1).
HemmingRotation	This is the rotation of the part before entering it in the press-opening (2). In other words, it represents the rotation of the press-opening in relation to the V-opening.
HemmingTransIDx	This is the displacement of the part in X-direction, needed to place it in the press-opening (3). This value is needed for the collision detection.
HemmingTransIDy	This is the displacement of the part in Y-direction, needed to place it in the press-opening (4). This value is needed for the collision detection.
HemmingShiftDx	This is the displacement of the tool in X-direction, measured between the middle of the V-opening and the press-point of the hemming-tool (5). This is only the case for hemming-tools type shift container ! In case of a regular hemming-tool, you have to enter 0 for this parameter !
HemmingShiftDy	This is the displacement of the tool in Y-direction, measured between the middle of the V-opening and the press-point of the hemming-tool (6). This is only the case for hemming-tools type shift container ! In case of a regular hemming-tool, you have to enter 0 for this parameter !

# 3.2.2 Materials

Adding a material to the material list will make it possible to choose that material for the drawing of the profile.

However, you will have to restart FastBEND before the new material will be available ! Go to the parameters section by selecting "Parameters" in the main menu.

Then choose "Material".

Following appears :

N	Materials							
Nr	Material	Elasticity	Tens. Strength	Radius Corr.	Sp.Back Corr.			
1	Steel 37	200	370	0.15	1			
2	Stainless steel	600	630	0.18	1			
3	Aluminium	40	150	0.12	1			
4	Steel 42	200	420	0.15	1			
5	Galvanised Steel	200	420	0.15	1			
6	Steel E24	200	240	0.16	1			
7								
8								
9								
10								
11								
12								
13								
11								

As you can see, the standard materials are already present in the list, namely aluminum, galvanic, steel and inox.

These valeus can be verifyed and corrected if needed by those given by your material supplier.

To add a material using the mouse, simply click in the fields and enter the necessary data, namely the material name, elasticity, tensile strength and radius correction.

To add a material using the keyboard, use the arrow-keys to move the cursor around and use the numerical keys to enter the numerical data.

To enter the name, move the cursor in the name field and press <enter>, followed by <delete>. Following appears :

Enter													
-													
								0					
А	z	E	R	т	Y	U	T	ο	Ρ	-	7	8	9
Q	S	D	F	G	н	J	к	L	М	ОК	4	5	6
w	×	С	v	В	N	<	<	,	·>	ESC	1	2	3
Shift	Shift	Lock	SPACE						DEL	Shift		)	

Use the arrow-keys to highlight the character you want and press <enter> to select it. When done, move the cursor to "OK" and press <enter>.

# 3.2.3 Presses

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Enter topic text here.

# 3.2.3.1 sections

# Importing the sections into ProfileManager

To import the sections into ProfileManager, proceed as follows :

Select "Parameters" in the main menu.
Select "Sections" in the parameter menu.
Following appears :

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#### Procedure :

Press one of the section keys (F1  $\rightarrow$  F4) to insert it in the software. A new window appears with a system tree displayed.

Select the DXF of the corresponding section to insert it (double-click or <enter>). The new section appears in grey.

When you are satisfied with the inserted section, click or press UPDATE (F5). When you aren't satisfied with the inserted section, click or press REFUSE (F6) to remove the inserted section.

You can zoom the drawing by dragging the mouse over the desired area. Press or click UNZOOM (F7) to return to the original drawing size.

### 3.2.3.1.1 Drawing Sections

First of all, the four segments of the machine - frame, beam, table and finger must be drawn SEPARATELY (size 1/1) in DXF-format (standard version : via Robolnput, optional version : AutoCAD or other CAD-software).



Other than the fact that the sections have to be drawn separately, their reference point in relation to the absolute zero-point (0,0) of the corresponding (color) coordinate system must be defined. The section-screen in ProfileManager is useful to know the zero-points of the segments :

The colors of the sections :

- both the table and the upper frame are green, which means they have to be drawn according to the green coordinate system.

- the beam is red, so it has to be drawn according to the red coordinate system
- the back gauge is purple, so it has to be drawn according to the purple coordinate system.

\*\*\* REMARK \*\*\*

When drawing the separate machine-elements, you have to keep in mind to draw only the most relevant properties of these elements.

All extra information - irrelevant for the collision detection - may result in a reduced performance (and even memory problems) of both the system and the software !

Example :



Could cause problems (too complex)

No problem (relevant data for collision detection)

#### 3.2.3.1.2 Example of a machine configuration

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# Upper frame (green) :

- X-values : distance to the centre of the table (or centre of the beam)
- Y-values : distance to the floor/base





# Remark :

In some cases the lower part of the beam has another shape than the one displayed to the right. In that case the reference point lies somewhere else, namely :



# Table (green) :

- X values : distance to the centre of the table
- Y-values : distance to the floor/base





# - the Y-axis separates the fixed (X $\geq$ 0) and the moveable finger part (X $\leq$ 0) - Y-values : distance to the floor/base

Back gauge (bleu) :

# 3.3 Tables

# 3.3.1 Motion time

# 3.3.2 Stretched length

The software calculates the stretched length in the construction of the bending sequence. This calculation is a mathematical approach, so the result is a theoretical value. it may occur that the actual stretched length differs from this calculation. That's why we included a list which enables you to influence the result of the stretched length calculation.

# 3.3.2.1 Accessing the stretched length table

In the main menu, select "Parameters". In the Parameters menu, select "Stretched Length". Following appears :

				Ri/Th	nickness				
	0.00	0.20	0.40	0.60	0.80	1.00	1.25	1.50	1.75
1.00	0.06	0.19	0.28	0.34	0.38	0.41	0.44	0.46	0.48
2.00	0.06	0.19	0.28	0.34	0.37	0.40	0.43	0.46	0.48
3.00	0.06	0.18	0.28	0.33	0.37	0.40	0.43	0.45	0.47
5.00	0.06	0.18	0.28	0.33	0.37	0.40	0.43	0.45	0.47
7.00	0.06	0.18	0.27	0.33	0.36	0.39	0.42	0.45	0.47
	1	lo or	12.50	2 75	12.00	1	1	1	
	2.00	2.25	2.00	2.10	3.00	3.25	3.50	4.00	5.00
1.00	0.50	0.52	0.53	0.55	0.56	0.57	3.50 0.58	4.00	0.63
1.00 2.00	0.50 0.50	0.52	0.53	0.55	0.56	0.57 0.56	3.50 0.58 0.57	4.00 0.60 0.59	5.00 0.63 0.62
1.00 2.00 3.00	2.00 0.50 0.50 0.49	0.52 0.51 0.51	0.53 0.53 0.52	0.55 0.54 0.54	0.55 0.55	3.25 0.57 0.56 0.56	3.50 0.58 0.57 0.57	4.00 0.60 0.59 0.59	5.00 0.63 0.62 0.62
1.00 2.00 3.00 5.00	2.00 0.50 0.50 0.49 0.49	0.52 0.51 0.51 0.51 0.50	0.53 0.53 0.52 0.52	0.55 0.54 0.54 0.53	0.56 0.55 0.55 0.55	3.25 0.57 0.56 0.56 0.55	3.50 0.58 0.57 0.57 0.56	4.00 0.60 0.59 0.59 0.58	5.00 0.63 0.62 0.62 0.61

#### 3.3.2.2 Explanation of the list

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Let's take the top half of the default list.

	0	0.2	0.4	0.6	0.8	1	1.25	1.5	1.75	<b>→</b> Ri/
1	0.063	0.188	0.283	0.338	0.377	0.407	0.437	0.462	0.483	thickness
2	0.062	0.186	0.28	0.335	0.373	0.403	0.433	0.458	0.479	
3	0.061	0.184	0.278	0.332	0.37	0.399	0.429	0.454	0.474	
5	0.061	0.183	0.275	0.329	0.367	0.396	0.425	0.449	0.47	
7	0.06	0.181	0.273	0.326	0.363	0.392	0.421	0.445	0.466	

¥

#### thickness

The first column contains different sheet thicknesses in mm. They are predefined and cannot be modified.

The first row of the list contains the internal radius - thickness ratios.

3.3.2.2.1 How to calculate the internal radius

The internal radius is calculated using the following formula :

#### Ri = rad. corr. x V

Ri :	internal radius
rad. corr. :	radius correction
V :	V-opening of the bottom tool

Two variables :

- the used V-opening of the bottom tool

- the radius correction that can be found in the material list.

This correction is different for each kind of material. Some default values are :

Material type	Rad. corr.
Aluminium	0.12
Steel 42	0.15
Stainless steel	0.18

#### Example :

Material :	aluminium
Thickness :	2mm
Rad. corr. :	0.12
V-opening :	8 x thickness = 8 x 2mm = 16mm
radius :	Ri = Rad. corr. x V = 0.12 x 16 = 1.92mm

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#### 3.3.2.2.2 How to use the list

Once you have the internal radius - calculated in 8.5.4.3.2. - you will be able to calculate the radius - thickness ratio.

Ri / thickness = 1.92 / 2 = 0.96

The calculated value (0.96) lies between 0.80 and 1.00

To find out which values need to be changed, you have to take the row for thickness 2mm and two columns for the Ri/thickness ratio, namely 0.80 and 1.00.

	Ri/Thickness									
		0	0.2	0.4	0.6	0.8	1	1.25	1.5	1.75
	1	0.063	0.188	0.283	0.338	0.377	0.407	0.437	0.462	0.483
Thickness	2	0.062	0.186	0.28	0.335	0.373	0.403	0.433	0.458	0.479
	3	0.061	0.184	0.278	0.332	0.37	0.399	0.429	0.454	0.474
	5	0.061	0.183	0.275	0.329	0.367	0.396	0.425	0.449	0.47
	7	0.06	0.181	0.273	0.326	0.363	0.392	0.421	0.445	0.466

In fact, four cases can occur :

- 1. only one default needs to modified
- 2. two default values need to be modified (double ratio).
- 3. two default values need to be modified (double thickness).
- 4. four default values need to be modified.

#### 1. Only one default value needs to be modified

This is the case when the internal radius / thickness ratio and the thickness of the plate correspond with a value in the list.

#### Example :

thickness :	2mm
Ri/thickness :	1.25
corresponding value :	0.433

	Ri/Thickness									
Thickness		0	0.2	0.4	0.6	0.8	1	1.25	1.5	1.75
	1	0.063	0.188	0.283	0.338	0.377	0.407	0.437	0.462	0.483
	2	0.062	0.186	0.28	0.335	0.373	0.403	0.433	0.458	0.479
	3	0.061	0.184	0.278	0.332	0.37	0.399	0.429	0.454	0.474
	5	0.061	0.183	0.275	0.329	0.367	0.396	0.425	0.449	0.47
	7	0.06	0.181	0.273	0.326	0.363	0.392	0.421	0.445	0.466

#### 2. Two default values have to be modified (double ratio)

This happens when the internal radius lies between two values from the list and the thickness

corresponds to a value in the list.

#### Example :

			thicknes Ri/thick values :	ss : ness :		2n 0.9 0.3	nm 96 ==> 373 and 0	• 0.8 < .403	< 0.96 < 0	.1
	Ri/Thickn	ess								
		0	0.2	0.4	0.6	0.8	1	1.25	1.5	1.75
	1	0.063	0.188	0.283	0.338	0.377	0.407	0.437	0.462	0.483
Thickness	2	0.062	0.186	0.28	0.335	0.373	0.403	0.433	0.458	0.479
	3	0.061	0.184	0.278	0.332	0.37	0.399	0.429	0.454	0.474
	5	0.061	0.183	0.275	0.329	0.367	0.396	0.425	0.449	0.47

0.326

#### 3. Two default values have to be modified (double thickness)

0.181

0.273

0.06

This happens when the thickness lies between two values in the list and the internal radius - thickness ratio corresponds to a value in the list.

#### Example :

thickness :	4mm	==>	3 < 4 < 5
Ri/thickness :	0.8		
values :	0.370 a	nd 0.367	

0.363

0.392

0.421

0.445

0.466

	RI/Thickness									
		0	0.2	0.4	0.6	0.8	1	1.25	1.5	1.75
	1	0.063	0.188	0.283	0.338	0.377	0.407	0.437	0.462	0.483
Thickness	2	0.062	0.186	0.28	0.335	0.373	0.403	0.433	0.458	0.479
	3	0.061	0.184	0.278	0.332	0.37	0.399	0.429	0.454	0.474
	5	0.061	0.183	0.275	0.329	0.367	0.396	0.425	0.449	0.47
	7	0.06	0.181	0.273	0.326	0.363	0.392	0.421	0.445	0.466
							-			

### 4. Four default values have to be modified

-----

This happens when the internal radius - thickness ratio lies between two values in the list and the thickness of the sheet also lies between two values in the list.

#### Example :

thickness :	
Ri/thickness :	
values :	

4mm	==>	3 < 4 < 5
0.69	==>	0.80 < 0.96 < 1.00
0.370 a	and 0.367	7; 0.399 and 0.396

**Ri/Thickness** 

		0	0.2	0.4	0.6	0.8	1	1.25	1.5	1.75
	1	0.063	0.188	0.283	0.338	0.377	0.407	0.437	0.462	0.483
Thickness	2	0.062	0.186	0.28	0.335	0.373	0.403	0.433	0.458	0.479
	3	0.061	0.184	0.278	0.332	0.37	0.399	0.429	0.454	0.474
	5	0.061	0.183	0.275	0.329	0.367	0.396	0.425	0.449	0.47
	7	0.06	0.181	0.273	0.326	0.363	0.392	0.421	0.445	0.466

3.3.2.2.3 How to edit values in the list

On a PC : Simply click in the field you wish to change. Overwrite the value with a new one using the numerical keys. Press <enter> to confirm.

On a machine : Use the arrow-keys to move the cursor to the field you wish to change. Overwrite the value with a new one using the numerical keys. Press <enter> to confirm.

When you are done changing the value(s), press <F10 - Exit>. Following appears :



Select "Yes" to save the changes that you have made. Select "No" if you don't want to save the changes.

#### Remark :

You can load the default values of the stretched length table by pressing <F1 - Default>.

# 3.3.2.3 Examples

3.3.2.3.1 Only one value needs to be modified

Example 1 :

Material :	St37
V-opening :	20mm
Thickness :	3mm
Rad. corr. :	0.15

In the bending sequence construction, the software has calculated a stretched length of e.g. 267.97mm. Bend the workpiece and measure all the bends to check if the workpiece matches the drawing. If it doesn't, you have to define the deviation between the theoretical and the actual value of the stretched length. Suppose that the actual stretched length is 268.93mm. This means that the theoretical value of the stretched length has to be increased with 0.96mm.

Proceed as follows :

The first thing that needs to be defined, is the Ri-value.

Ri = rad. corr. x V-opening =  $0.15 \times 20 = 3$ Ri/thickness = 3/3 = 1

Knowing this value, it's now possible to define which value needs to be modified. Look in the table and you will see that value 0.399 needs to be adjusted.

To find the right value you have to enter, you have to use the principle of trial and error. The only tips we can give are :

- If the calculated stretched length is smaller than the actual value, then you will have to increase the value in the table.
- If the calculated stretched length is larger than the actual value, then you will have to decrease the value in the table.

Enter another value in the list and recalculate the bending sequence. In the Solution page you will find the new theoretical value. You have to repeat this procedure until the theoretical value matches the practical value.

In this example you have to enter value 0.440 in the table to have a theoretical stretched length of 268.93mm.

#### Remark :

You have to keep in mind that, when you change the stretched length, the position of the back gauge will also change.

3.3.2.3.2 Two values need to be modified (same thickness)

Example 2 :	
Material :	St37
V-opening :	24mm
Thickness :	3mm
Rad. corr. :	0.15

In the bending sequence construction, the software has calculated a stretched length of e.g. 267.24mm.

Bend the workpiece and measure all the bends to check if the workpiece matches the drawing. If it doesn't, you have to define the deviation between the theoretical value and the actual value of the stretched length.

Suppose that the actual stretched length is 268.26mm. This means that the theoretical value of the stretched length has to be increased with 1.02mm.

Proceed as follows :

The first thing that needs to be defined, is the Ri-value.

Ri = rad. corr. x V-opening = 0.15 x 24 = 3.6 Ri / thickness : 3.6 / 3 = 1.2

Knowing this value, it's now possible to define which values have to be modified. This value lies between 1 and 1.25. This means that you will have to modify two values. Look in the table and you will see that you have to adjust values 0.399 and 0.429.

To find the right value you have to enter, you have to use the principle of trial and error.

If the calculated stretched length is smaller than the actual value, then you will have to increase the value in the table.

If the calculated stretched length is larger than the actual value, then you will have to decrease the value in the table.

Keep in mind that the proportion between the two original values must remain the same.

e.g. original values are : 0.399 and 0.429 The proportion between these two values is 0.399 / 0.429 = 0.93

> Now, if you increase the first value to 0.440, the proportion remains 0.93 The second value will be  $(0.429 \times 0.440) / 0.399 = 0.473$ The proportion remains 0.440 / 0.473 = 0.93

Now enter another value in the list and recalculate the bending sequence. In the Solution page you will find the new theoretical value. You have to repeat until the theoretical value matches the actual value.

In this example, you have to enter values 0.440 and 0.473 in the table to have a theoretical stretched length of 268.26mm.

3.3.2.3.3 Two values need to be modified

Example 3 :

Material :	St42
V-opening :	25mm
Thickness :	4mm
Rad. corr. :	0.16

In the bending sequence construction, the software has calculated a stretched length of e.g. 263.77mm. Bend the workpiece and measure all the bends to check if the workpiece matches the drawing. If it doesn't, you have to define the deviation between the theoretical value and the actual value of the stretched length.

Suppose that the actual stretched length is 265.05mm. This means that the theoretical value of the stretched length must be increased with 1.28mm.

Proceed as follows :

The first thing that needs to be defined, is the Ri-value.

Ri = rad. corr. x V-opening =  $0.16 \times 25 = 4$ Ri / thickness = 4 / 4 = 1

Knowing this value, it's now possible to define which values have to be modified. The thickness lies between 3 and 5mm. This means that you have to modify two values.

Look in the table and you will see that you have to adjust values 0.399 and 0.396.

To find the right value you have to enter, you have to use the principle of trial and error.

If the calculated stretched length is smaller than the actual value, you will have to increase the value in the table.

If the calculated stretched length is larger than the actual value, you will have to decrease the value in the table.

Keep in mind that the proportion between the two original values must remain the same.

e.g. original values are : 0.399 and 0.396 The proportion between these two values is 0.399 / 0.396 = 1.007

> Now, if you increase the first value to 0.440, the proportion remains 1.007 The second value will be  $(0.440 \times 0.396) / 0.399 = 0.437$ The proportion remains 0.440 / 0.437 = 1.007

Now enter another value in the list and recalculate the bending sequence. In the Solution page you will find the new theoretical value. You have to repeat this procedure until the theoretical value matches the actual value.

In this example you have to enter value 0.440 and 0.437 in the table to have a theoretical stretched length of 265.05mm.

3.3.2.3.4 Four values need to be modified

Example 4 :

Material :	St42
V-opening :	32mm
Thickness :	4mm
Rad. corr. :	0.16

In the bending sequence construction, the software has calculated a stretched length of 262.38mm. Bend the workpiece and measure all the bends to check if the workpiece matches the drawing.

Suppose that the actual stretched length is 263.64mm. This means that the theoretical value of the stretched length has to be increased with 1.26mm.

Proceed as follows :

The first thing that needs to be defined, is the Ri-value.

Ri = rad. corr. x V-opening = 0.16 x 32 = 5.12
Ri / thickness = 5.12 / 4 = 1.28

Knowing this value, it's now possible to define which values have to be modified. The thickness lies between 3 and 5mm and the value Ri/thickness lies between 1.25 and 1.5. This means you will have to modify four values.

Look in the table and you will see that you have to adjust values 0.429 ; 0.454 and 0.425 ; 0.449.

To find the right value you have to enter, you have to use the principle of trial and error.

If the calculated stretched length is smaller than the actual stretched length, then you will have to increase the value in the table.

If the calculated stretched length is larger than the actual stretched length, then you will have to decrease the value in the table.

Keep in mind that the proportion between the two original values must remain the same.

e.g.

Original values in horizontal line : 0.429 and 0.454The proportion between these two values is 0.429 / 0.454 = 0.945

Original values in vertical line : 0.429 and 0.425 The proportion between these two values is 0.429 / 0.425 = 1.009

Now, when you increase the first value up to 0.469, the proportion in horizontal line remains 0.945 The second value will be  $(0.469 \times 0.454) / 0.429 = 0.496$ The proportion in vertical line remains 1.009 The third value will be  $(0.469 \times 0.425) / 0.429 = 0.465$ 

To calculate the fourth value, the proportion between the third value and the fourth has to remain the same.

The proportion in horizontal line remains 0.425 / 0.449 = 0.947The fourth value will be  $(0.465 \times 0.449) / 0.425 = 0.491$ 

Now enter another value in the list and recalculate the bending sequence. In the Solution page you will find the new theoretical value. You have to repeat this procedure until the theoretical value matches the practical value.

In this example you have to enter values 0.469; 0.496 and 0.465; 0.491 in the table to have a theoretical stretched length of 263.64mm.

#### Remark :

You have to keep in mind that, when you change the stretched length, the positions of the back gauge will also change.

# 3.3.3 Depth correction

						Tat	blewidth					
	ММ	0%	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
	0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	10 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
≥	20 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
aci	30 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Maximum Cap	40 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	50 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	60 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	70 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	80 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	90 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100 %	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

With this table it is possible to increase the precision of the bending angle. When this table is filled in, the machine will compensate for possible deflections that occur while bending.

The values may differ from machine to machine.

#### example :

MM	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0%	0	0	-0.03	0	-0.01	0	0	0	0	0	0
10%	0	-0.04	-0.02	-0.01	-0.02	-0.01	-0.1	-0.13	-0.12	-0.11	-0.1
20%	-0.04	-0.08	-0.22	-0.12	-0.16	-0.16	-0.2	02	-0.2	-0.18	-0.11
30%	-0.08	-0.22	-0.12	-0.32	-0.24	-0.24	-0.26	-0.26	-0.3	-0.25	-0.22
40%	-0.1	-0.12	-0.32	-0.24	-0.35	-0.3	-0.26	-0.27	-0.28	-0.28	-0.31
50%	-0.12	-0.32	-0.24	-0.24	-0.3	-0.4	-0.4	-0.34	-0.28	-0.3	-0.25
60%	-0.32	-0.24	-0.24	-0.3	-0.26	-0.4	-0.45	-0.44	-0.3	-0.3	-0.3
70%	-0.24	-0.24	-0.3	-0.26	-0.4	-0.34	-0.44	-0.48	-0.41	-0.5	-0.45
80%	-0.24	-0.3	-0.26	-0.4	-0.34	-0.44	-0.3	-0.41	-0.48	-0.37	-0.4
90%	-0.3	-0.26	-0.4	-0.34	-0.44	-0.3	-0.41	-0.5	-0.37	-0.4	-0.34
100%	-0.26	-0.4	-0.34	-0.44	-0.3	-0.41	-0.5	-0.37	-0.37	-0.34	-0.4

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The main menu	66

# 3.4 Help

## 3.4.1 Manual

## 3.4.2 Version info

This menu shows the info screen of the software

About	
Ro	BOS <sup>O</sup> FT
Version 8550080	2   85600802
© 10-04-2008	RoboSoft N.V.
Author : Gino Dery	/cke
REGISTERED	
NetworkID :	EXP15
IP address :	10.1.1.31
	Close

Some important info is shown on this screen :

The software version The network Id The network IP address.

## 3.4.3 Remote support

## 3.4.4 Backup

## Backup to floppy

Select this item when you want to backup data to disk. Make sure there is an empty disk in the disk-drive. First you have to select the data you wish to back up in the "Set folders" section.

## **Backup from floppy**

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Select this item when you want to backup data from floppy. Manual Windows press brake RoBoBend

## Set folders

When you select this item you can select which folder(s) you want to backup. Following appears : Press  $<\uparrow>$  or  $<\psi>$  to select a disk.

Press <enter> to display the contents of disk C:\.

Press  $<\uparrow>$  or  $<\downarrow>$  to move the cursor.

Press <enter> to open a folder. Press <delete> to select it.

When a box is marked, it means this particular folder will be backed up. To exit, press <F10>.

Now you can back up the selected data in the "Backup to floppy" section.

# 3.5 Settings

Enter topic text here.

## 3.5.1 User settings

When different operators work with the same machine, each operator has his own preferences. Via "User settings", four sets of preferences can be configured. This way the operator can choose his own settings before working with the machine.

SETTINGS FOR USER 1	
USER 1 USER 2	USER 3 USER 4
KEYBOARD MODE	NORMAL
MENU STYLE	ROBOSOFT
TOUCH SCREEN	NO
MACHINE VISIBLE	YES
VIEW STYLE	ICON
BACKGROUND	YES
OPERATIONMODE	NORMAL
SAVE 3D VIEWPOINT	NO

- To change a setting, use the arrow keys to place the cursor in the appropriate field and press <delete> to activate the pull-down menu containing the different possibilities for the setting.

- To select a user (set of preferences), press the <+1> or <-1> key and press <F10> to confirm.
- Keyboard mode

The procedure for entering alphabetic characters.

"Normal" means the use of the virtual keyboard. This consists of selecting the desired characters using the arrow keys.

"SMS" is a method that consists of pressing a certain numerical key repeatedly to obtain a character.

You may be familiar with this method since it is the same as when creating a text message on your mobile phone.

 Menu style of the user interface "Robosoft" means navigation through the software using a button-style menu.

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"Windows" means all items will be selectable from a menu-bar at the top of the Production screen.

- Touch screen With this parameter you can define whether your system is equipped with a touch screen.
- Machine visible

With this parameter you can define whether you would like to see the machine in the simulation of the program.

• View style

Here you can choose how the files of the programs should be displayed, namely as icons, as small icons or as a list.

- Background Here you can choose if the graphical background should be displayed in the menu structure.
- Operation mode. Not used.

## 3.5.2 Fastbend settings

### 3.5.2.1 Machine Parameters

The "Machine Parameters" section is only for qualified service technicians ! That's why this section is protected by a password.

Entering a false code will enable you to view the parameters. However you will not be able to change them, as this can lead to damaging the machine or cause hazardous situations for the operator.

#### 3.5.2.1.1 Axes Parameters

The "Axes" parameter section is only for qualified service technicians ! That is why this section is protected by a password.

Entering a false code will enable you to view the parameters. However you will not be able to change them, as this can lead to damaging the machine or hazardous situations for the operator.



# Main modes

# 4.1 General

There are three main modes in fastbend 2D: Design, Edit and Produce.

Tap the desired Icon to change to its Mode.



#### Design mode:

In the design mode it's possible to draw and modify the desired profile. It is possible to import dxf section drawings and export the design to unfolded dxf.

#### Edit mode:

In the Edit mode it's possible to choose and/or adjust a bending sequence for the profile, and determine the back gauge settings. These are the basic settings mostly done by the program designer.

#### **Production mode:**

In this mode you can set all the production parameters needed to make the bend. These settings are mostly executed by the operator on the machine, however they can also be done by the bend program designer.

This is the operator production screen on the machine.

# 4.2 Design mode

# 4.2.1 General

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In the Design mode you can draw a profile using simple and quick touch based methods. Creating a 2D-workpiece in fastbend 2D consists of defining lines and angles until the desired shape is achieved.

After drawing the part, you will be able to create the program in the Edit mode.

Design mode interface:



Functional design mode buttons:

Design data fields buttons Mode change buttons Snap + grid

Advanced drawing functions Fullscreen on/off

Undo / redo



Information bar		
🚊 🔒 Default 📲 Untitled 🏲 1920 solutions	Ξ	🍐 Default 📄 Untitled 📕

## 4.2.2 Design data fields

Here you can insert/adjust settings and parameters to create your design.



Profile: Insert or modify the shape or material settings for the profile.



Machine: Insert or modify the parameters depending on your machine configuration



Info: Set additional info for the work piece or get info back from the software

## 4.2.2.1 Profile

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Profile: Insert or modify the shape or material settings for the profile.

#### 4.2.2.1.1 Shape

Overview:	
Shape	
Thickness	1.00 mm
Width	1000.00 mm
Force	97.11 kN
Measure type	<ul><li>Inside</li><li>Outside</li></ul>
2D Section	Export unfolded

You can select a data field by clicking it, or use the combined shape icon's touch zones.



1) Thickness: Material thickness used for the design.

2) Measure type: Insde / Outside dimensions for the design.

3) Width: Plate width measured along the bendlength.

Force: This field is here only for your information. This field is not accessible. The used force is automatically calculated and depends on: Tools, Width, Thickness and material. It is useful to see how modifying these parameters will modify the Force.

It is possible to Import dxf section drawings or export the design to an unfolded dxf: When using this functions the standard FastBend 2D file browser is opened with the default preferred locations for DXF import/export.

Import 2D section dxf

## Export design to unfolded dxf



DXF Drawing rules : It must be a one layer drawing. Only lines and arcs (to be used for bend radius) can be included.

dxf example :



The radius will be altered at import according to the tooling used to bend the part!

4.2.2.1.2 Material

Material selection for the workpiece.

Select material touch zones:

Material				
1.	Steel 37		3	
	Material:			
	Tensile Strer	ngth:	370.00 MPa	
	Elasticity:	200.00	KN/mm²	لال

1) Select the previous material from library.

2) Select the next material from library.

3) Go to the material library for material selection.

## 4.2.2.2 Machine

## 4.2.2.2.1 Tools

Tools selection for workpiece.

Select toptool touch zones:

1) Top tool Sel ect Tool flip off 🗨 Catalog off 🗨 the pre vio **BIU-001** us too Radius: 1.00 mm L fro Angle: 28.00 deg m libr Height: 135.00 mm ary • 2) Sel ect the ne xt too Т fro m libr ary • 3) Go to the too L libr ary for too L sel ect ion . 4) То rot ate the

sel ect too l: To ggl e the " To ol Fli p " fro
off " to
on "
an d swi tch will ligh
t up. Se dra win g " 3 " will be rot ate d.
5) Ch ge bet we en the

Main mode	s 80
	us
	er
	libr
	ary
	an
	d
	the
	Ha
	со
	cat
	alo
	g.

Select bottomtool touch zones:

Tool flip off Catalog off   1 3   3 4   V-opening: 12.00 mm   Angle: 35.00 deg   Height: 135.00 mm	Bottom	n tool 4		5		1) Sel
1   3   S3001-12   2     V-opening:   12.00 mm   1     Angle:   35.00 deg   1     Height:   135.00 mm   2		Tool flip off 🌑		Catalog off (		the
	1	3	S3001-12 V-opening: Angle: Height:	12.00 mm 35.00 deg 135.00 mm	2	iou too fror libr ry. 2) Sel

libra ry. 2) Sel ect the next tool from libra ry. 3) Go to the tool libra ry

for tool sele ctio n.

4) To rota te the sele cted tool: Tog gle the
Flip
from
off " to " on " and swit ch will light up. See dra win g " 3 " will be rota ted.
5) Cha nge bet wee n the user libra ry and the Hac o

cata log.

Search tools according to workpiece:

121	Find top tool	Search for toptool according workpiece.
121	Find bottom t	Search for bottomtool according workpiece.
:=:	Find both	Search for top and bottom tool according workpiece. The search starts with the first V-die from library and search for this V-die a possible top tool. If no solution was found, the next V-die will be selected and the search for a matching top tool starts over.

Tool search will try every consecutive tool from the library and will stop on the first tool where a solution is possible.

Tool search will take into account:

- \* Bottom tool V-width (min 6 times material thickness)
- \* Top and bottom tool angle
- \* Shape of the tool (collision detection)

To switch of tool search during execution, just tap the button again.

4.2.2.2.2 Pressbrake

In this screen the pressbrake info is marked, namely:

- Machine number
- The maximum pressure capacity ( Bar ), needed following the used tools
- The width of the table
- Machine reference

86101	Pressbrake				
Max capacity:15.00 BarTable width:4000.00 mm# machines:1		86101 Max capacity: Table width: # machines:	15.00 Bar 4000.00 mm 1		

## 4.2.2.3 Info

Here it is possible to add information to the program.

## 4.2.2.3.1 General and Comment

In these two sections you can enter any predefined info and/or comment for the program. This info depends completely to the customer and is not obliged.

General and Comment Info view:

General		Comment	
Customer	CUSTOMER		
Drawing Number	RHV123-02345		
Order	A. 1024		
Date	24 Mar 2017	Edit	

4.2.2.3.2 Design

These are more specific information fields:

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Design				
Stretched length	547.48 mm			
Backgauge score	0 %			
Motion score	0 %			
Estimated time	0 s			
To do	0			
Done	0			

Stretched length: This is the unfolded length (neutral line length) from the unfolded workpiece. This is mostly depending on the workpiece shape and the used tools that are responsible for the workpiece bend radius.

Backguage score: In Design mode this field is not used as there is no bend sequence defined or no program completed.

Motion score: In Design mode this field is not used as there is no bend sequence defined or no program completed.

Estimated Time: In Design mode this field is not used as there is no bend sequence defined or no program completed.

To Do: In Design mode this field is not used as there is no bend sequence defined or no program completed.

Done: In Design mode this field is not used as there is no bend sequence defined or no program completed.

#### Modifying a line according to stretched length:

It is possible to select a bend line in the design and then modify the Stretched Length value. The difference with the original value will be modified on the selected length.

## 4.2.3 Standard drawing functions

When entering design mode coming from edit or production, standard drawing is always activated. Also when creating a new program when in design mode standard drawing functions are default activated.

Standard drawing functions are only de-activated when using advanced drawing functions.

#### 4.2.3.1 Drawing the basic shape of the profile

The general method of creating a profile in fastbend 2D consists of first defining the basic shape of the profile, and then optimizing lengths an angles where necessary.

## Remark :

When the background color in the drawing area changes from blue to orange, it means no bending sequence is found due to a detected collision.

You may have to select other tooling to be able to bend the part.

To locate the problem, go back to the Edit mode and browse through the steps.

When the screen turns back to blue, it means a solution has been found.

#### 4.2.3.1.1 Gesture Control Basic Shape



#### 4.2.3.1.2 Point to point

Tap the screen to set the first begin point. The place on the screen will be marked by a cross symbol.



Tap somewhere else to define the endpoint for the bend line. The bend line and length will be visualized.



The purple dot always marks the begin point for the next bend line.

Tap somewhere else to define the endpoint for the next bend line. The bend line with length and angle will be visualized.



Switch drawing side by tapping the blue dot. Now this dot will become purple indicating the begin point for next bend line.



Repeat the above steps to continue drawing on the other side.



Continue using this method until the basic shape is finished.



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#### 4.2.3.1.3 Smartdraw

The smart draw function is used to make a basic shape drawing on the touch screen as you would draw it with free hand on paper.

It will replace the free hand sketched lines with the most fitting straight lines. This technique requires some practice!

Press on the screen at the start position for the sketch. A big yellow dot will appear on this position.



Move now with your finger over the screen to make the sketch. Attention not to lose contact with the screen before completion. A yellow line will mark the followed path.



When the finger is lifted from the screen, the software will replace all sketch lines by its best fitting straight lines.



4.2.3.1.4 Combination

Point to point method and smart draw can be combined as whished.

Start with point to point, then press and move on the purple dot and so continue to design with smart draw.

Make a drawing with smart draw and then continue from the purple dot to design from point to point by tapping different positions.

4.2.3.1.5 Undo/Redo

When making a design you can use Undo en Redo to delete and rollback the last modifications to your design.

Undo: Delete with every tap the last change.



Redo: Roll-Back with every tap the last change.

Remark:

Undo/Redo can only be used on changes since (re)entering design mode.

## 4.2.3.2 Adjusting the basic profile

After the creation of the basic profile, it's possible to adjust it to fit your requirements. This can be done by changing segment lengths or angles between segments.

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#### 4.2.3.2.1 Gesture Control Adjust Basic Profile

Gesture	Symbol	Function in graphic window	Mouse equivalent
Тар	P	Modify lengths and angles with keyboard Definition of the drawn side Select bendline (Modifying according to stretched length) Select bendline (Definition of the drawn side)	Left Click
Double Tap	R	Display of dimensions (rotate dimensions)	Double Left Click
Press	Im	Start Function: Modify lengths and angles with touch	Long Left Click
Drag	The	Modification: Modify lengths and angles with touch Hemming bend Delete a segment	Left Click + Hold + Move

4.2.3.2.2 Modify lengths and angles with Keyboard

This is the only possible option for lengths not rounded to 1mm or angles not rounded to 1°. To change the length or angle, tap on the dimension value and enter the new value with the keyboard.



Touch zones: length modification with keyboard



Touch zones angle modification with keyboard

## Remark:

The angle is always the enclosed angle between two lengths.

Each length can have two times the same enclosed angle depending on the side.

Therefore we define an enclosed angle that is defined clockwise as negative and one defined counterclockwise as positive.

The start-point for the work piece depends on the direction from the first length.



4.2.3.2.3 Modify lengths and angles with touch

## Modify First or last bend line.

Tap to Place the purple dot on the begin or the end.



Tap the purple dot again and drag the point, modifying the bend line to the desired length an angle.



## Modify within the design.

Press the angle enclosed by one of the bend lines that need to be modified.



Two blue dots appear on both sides of the selected angle.



Tap and drag the dot on the preferred side to the new position. Angle and length will be modified accordingly.



4.2.3.2.4 Deleting a segment

Depending on the bend line that need to be deleted, there are 3 possibilities for deleting.

undo:

Delete the last added bend line by tapping the undo button.



## modify enclosed angle to 180°:

When you modify an angle to 180° then the angle will disappear and both connected lines will be replaced by one line where the line length will be the sum of both.

Tap for begin or end segment to have the selectable dots. Press to have the selectable dots within the design.



Tap an drag a selectable dot until the enclosed angle equals 180°. When finger is released both lines will be replaced by one line.



## Modify line length to 0mm:

When modifying a line length to 0mm, the line will be deleted.

Tap for begin or end segment to have the selectable dots. Press to have the selectable dots within the design.



Tap an drag a selectable dot until the line is 0mm.

It is not necessary to go completely to 0mm. From the moment the dot turns red, you can release the finger.

When finger is released the line will be deleted.



4.2.3.2.5 Hemming bend

In fastbend 2D it's possible to add one (or multiple) hemming bends to the profile.

Tap begin or end to have the selectable dots when hemming bend is the first or last bend. Press the bend you want to make a hemming bend to have the selectable dots within the design.

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Tab and drag the desired dot until the enclosed angle becomes smaller then 10°. The bend will now automatically be considered as a hemming bend. The default pre-bend angle will be equal to the bottom tool angle.



Remarks:

A hemming bend can only be drawn onto an existing (piece of) profile, because a line must be available to which the hemming bend can be attached.

This operation will only be possible when there is a hemming tool selected. the hemming options are set in the tool parameters.

When creating a hemming bend, first a small bending angle is made (usually  $\pm 35^{\circ}$ ) and then this bend is "crushed" in a specially designed part of the bottomtool.

Obviously hemming bends require special "Hemming tools".

When drawing a hemming bend in fastbend 2D, the software will automatically create two steps for the program : one for the first bend and one for the actual hemming.

Example of a hemming process :



4.2.3.2.6 Definition of the drawn side

When drawing a 2D-profile, only one dimension line is drawn. However, since the material has a certain thickness, the drawn side must be defined.

To define this drawn side, you will first have to tap the segment to select it. The start point is presented as a green dot, the endpoint is red.



Now you can edit the begin and endpoint by tap toggle on the green and purple dots.



Following overview shows you the toggle possibilities for open or closed angles. 90 Degree Angles are less complex, because Inside and Outside are the same as Tangent Inside and Outside.



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4.2.3.2.7 Display of dimensions

Sometimes it can be useful to know the linear dimensions of angular segments that aren't shown on the initial drawing of the profile.

It is also possible to put no dimensions on the line.

This can be done by toggling by double tapping the measurement value or the length line.


Toggle possibilities:



# 4.2.4 Snap + Grid

Snap and grid can be switched ON/OFF with following buttons



Snap ON/OFF

Snap values for lengths and angels from User Parameters.



Grid ON/OFF

Grid is set standard to 50mm in SI Grid is set standard to ??" in USC

# Remark :

When "Snap" is switched off, the smallest drawing units possible by basic touch drawing functions are 1mm for lengths an 1° for angles.

When "Snap" is switched on the basic unit settings for length and angle are dependant on the user parameters "snap length" and "snap angle".

When measurements smaller then 1mm length or 1° angle are necessary they should be entered with the keyboard.

# 4.2.5 Information bar

The left side of the information bar has mode independent functions user change and file browser. See Main user interface, Information bar.

In Design Mode the right side of the information bar, will show you design related information.

When there are no design issues present, it will inform you about the number of possible solutions.

#### Solution info:

After entering the second line length, the software automatically calculates the number of solutions.

Mind that this is *not* the number of bending sequences. One bending sequence can have multiple solutions.

By solutions we mean different "variations" of one bending sequence.

If in a certain step the sheet can be turned from front to back, then it is considered to be another solution of the same bending sequence.

In the same information bar, is it possible that there appear messages during the creation of the profile. These message are concerning with the tools since you have to choose the tools before starting to draw the profile.

The selected tool(s) is (are) no perhaps no longer suitable for the part. So in that case, a message appear so you can choose a more appropriate tool.

Possible messages while creating the profile:

Main modes	102

#### 4.2.5.1 PressTableWidth too small

This means the width of the profile exceeds the width of the table. With other words, the profile won't fit in the machine. Change width of the profile or create the profile on a larger machine.

## 4.2.5.2 Toptool / Bottomtool Width too small

This means the width of the profile exceeds the width of the available toptool/bottomtool. Change the width of the profile or use a wider toptool/bottomtool.

# 4.2.5.3 ToptoolAngle too big

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This means the angle of the toptool is too large for a certain bend. For example, trying to create an angle of 45 degrees with a toptool of 88 degrees.

Choose a toptool with a smaller angle.

### 4.2.5.4 BottomtoolV Angle too big



This means the angle of the bottomtool V-opening is too large for a certain bend.

For example, trying to create an angle of 45 degrees in a bottomtool with a Vangle of 88 degrees.

Choose a bottomtool with a smaller V-angle.

#### 4.2.5.5 BottomttoolVOpening too small

This means the bottomtool V-opening is too small for a certain bend. The V-opening should always be at least 8 times the thickness of the material. Choose a bottomtool with a larger V-opening.

# 4.2.5.6 BottomttoolVOpening too bigg



This means the bottomtool V-opening is too large for a certain bend. Choose a bottomtool with a smaller V-opening. Manual FastBEND-2D FastBend Main Menu Draw Product

# 4.2.5.7 MaxTDC too small

This means the maximum opening of the press brake is smaller than the height of the toptool + the height of the bottomtool + the material thickness. In other words, the opening is too small for the chosen tools. Choose smaller tools or change the MaxTDC of the machine (if possible).

# 4.2.5.8 MaxCylCourse too smallDC too small

This means the press brake won't be able to reach target depth, probably because the chosen tools aren't high enough.

Choose higher tools.

# 4.2.5.9 NoHemmingTool

This means the current bend of the profile needs to be done using a hemming tool. Choose a hemming tool.

# 4.2.6 Advanced drawing functions

These functions are used to add more complex content to your design, such as special bends or variable dimensions.

When an advanced drawing function is activated all standard drawing functions will be de-activated. Both advanced drawing function sets can be switched on and off by toggling their button.



**Special Bends Functions** 



Variable Dimensions Functions

# 4.2.6.1 Special bends

These functions can be used to insert special bends as radius-bends or multiple-bends into the design.



Special Bends On/Off Toggle Button

## 4.2.6.1.1 Gesture Control Special Bends

Gesture	Symbol	Function in graphic window	Mouse equivalent
Тар	Phy	Draw / Insert / Replace By / Add / Modify Radius Bend Scroll through multiple bends (double / triple / normal)	Left Click
Press	In	Insert/Delete False Bend Insert/Delete Multiple Bend	Long Left Click
Drag	The	Modify False bend position	Left Click + Hold + Move

#### 4.2.6.1.2 Stepped Radius : drawing of arc(s)

In fastbend 2D it's possible to add an arc to a profile, create an arc-shaped profile or insert an arc in an existing profile.



#### Create an arc-shaped profile:

Touch Zone: Tab anywhere on the drawing surface where the arc shaped profile must be inserted.



Parameters: Fill in the necessary parameters.

See description below.

Result: In this example an arc was added with parameters as in the parameter window.



#### Add begin / end arc to a profile:



Touch Zones: Tab the blue or purple dot at begin or end of the profile to cal the parameter window to define begin or end arc.

The direction was defined when the first line was drawn. The direction defines the begin and endpoint from the profile.



Parameters: Fill in the necessary parameters.

See description below.



Result: In this example an end arc was added with parameters as in the parameter window. To add a begin arc, the same procedure can be used.

Insert arc in existing profile:



Touch Zone: Tab on the angle value field on the position where you want the enclosed angel to be replaced by an arc where the begin and end angle is already defined by the connected bend lines.



Parameters: Fill in the necessary parameters.

See description below.



Result: In this example an arc was inserted with parameters as in the parameter window.

#### Explanation of the parameters:

Radius:	This is the radius of the theoretical circle of the arc. Entering a positive value will make the arc follow counter-clockwise direction. Entering a negative value will make the arc follow clockwise direction.
Begin angle:	This is the start-angle of the arc. The direction of the start-angle is also determined by the positive or negative value of the radius. When it is being attached to an existing segment, the angle of that segment is taken by default.
End angle:	This is the angle at which you want to end the arc. When it is being attached to an existing segment, the angle of that segment is taken by default.
Tangent angle:	The angle where the beginning of the arc is tangent to. This is the angle between the previous line and the first arc-segment. When there is no previous line (arc-shaped profile), the software takes 0° by default.

Total angle:	This is the total angle, covered by the arc.
Chord:	This the length of a segment of the arc. The length of an arc segment should always be at least half the size of the V- opening. If the length is given, the number of segments is automatically filled in.
# Segments:	This is the number of segments for the arc. When the number of segments is given, the length of the chord is automatically filled in.
Half Begin:	The first segment has half segment length. This feature is used to make a smooth connection between two identical radiuses. (see example)
Half End:	The last segment has half segment length. This feature is used to make a smooth connection between two identical radiuses. (see example)

#### Half End / Half Begin Example

Connection between two identical radiuses without half end / half begin.

Connection between two identical radiuses w begin.





#### Remark:

It is possible that the software places the bends of the radius (rounded corner) in a non- consecutive order. This is the result of automatic bending optimization such as weight distribution, back gauge positioning, etc...

When you want the radius to be bent consecutively, you will have to manually adjust the found bending sequence (Changing a bending sequence in Edit Mode).

#### 4.2.6.1.3 False bend

The false bend function allows to make a bend and then unbend the plate at the same position. This is not a preferred method of bending. Sometimes it is a simple solution for a complex problem. It will never have the same result as producing the work-piece on the correct machine or with correct tooling.

Mostly it is used to make U-profiles with large upstanding flanges, that would have a collision with standard bending.





Collision with traditional bending.

We will add to the design a bend and counter bend.



Touch Zone: Long Press on the bend line a the False Bend must be added.



The false bend is added on the desired po The screen turns from orange to blue indic bending solution.



It is possible to still modify the position ald Touch Zone: Tab on the false bend icon an position.

Now the false bend is added at the new po



When we check the bend solution in Edit Mode we will see that a bend and counter bend was added. So we have for steps to create this profile.



#### Remark:

Backguage position for counter bend is not automatically calculated. Backguage is set away from the profile by default.

If backguage is desired, position must be added manually.

Collision with traditional bending.

#### Remark:

The False Bend can be deleted with a long press on the false bend icon.

4.2.6.1.4 Double bend

Sometimes it is necessary to bend a part where not all bends can be executed fully in one run. This is for example the case with Z-shaped profiles.

It is necessary to execute the bends in 2 times to avoid collision. This can best be done with the double bends function.

The double bends can be automatically searched or can be added manual to the profile.





This problem can be solutioned by double bending one or more bends.



Touch Zone: Long Press on the angle dim where the double bend must be added.

The double bend is added on the desired p The screen turns from orange to blue indic bending solution.



When we check the bend solution in Edit Mode we will see that a double bend was added. So we have tree instead create this profile.



We can also let the software search the double bend positions automatically.

Tab this button to auto-search double bend



In following example double bend positions were searched for by the software.



## Remark:

Backguage position for double bend is not automatically calculated. Backguage is set away from the profile by default.

If backguage is desired, position must be added manually.

#### Remark:

The Double Bend can be deleted with a long press on the double bend icon.

## 4.2.6.2 Variable dimensions

This function can be used to insert variable dimensions or to measure on the profile with a main dimension.



Variable Dimensions On/Off Toggle Button

#### 4.2.6.2.1 Gesture Control Variable Dimensions

Gesture	Symbol	Function in graphic window	Mouse equivalent
Тар	Phy	Select a variable dimension Scroll through the variable numbers Definition of the drawn side of the main dimension	Left Click
Double Tap	R	Type of the main dimension (rotate the main dimension)	Double Left Click



4.2.6.2.2 Variable Dimensions

When drawing a profile, it could be possible that certain dimensions are more important than other ones. A special function in FastBEND 2D allows you to make dimensions variable, so that they change depending on the new main dimensions.

This function will be explained by means of an example :









First we sketch and modify the profile with all known dimensions using the techniques from the basic drawing methods.



Touch zones for variable dimension 1. As the two lines are variable to the same dimension need to define them both as variable 1. Make a long press on the 1st line. The variable dimension symbol will appear. Now also make a long press on the second line until there the variable dimension symbol appears.



To define the variable number we must now tap the variable dimension symbol. We tap both symbols 1 time to define them both as variable dimension 1. To be able to define the dimension both are variable to, we must select the line we defined as first.

The dimensions that will be variable we call variable dimensions. The dimension they are variable to we call the main dimension.





We can now move both sides of the main dimension (small purple or blue dot) by tapping it and dragging to the desired position. when moving the purple or blue dot it will become yellow. When going over possible positions you will see the yellow dot become bigger.

We loosen the main dimension on the desired position where the small yellow dot is replaced by a bigger one. Now we see that here we have a linear main dimension.

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We still have to rotate this main dimension to become the vertical main dimension. This is done by double tapping the dimension text. As you will scroll to al possible possibilities it might be necessary to execute the double tap various times until the main dimension is correct. See main dimension types further in this section for more info.

Now we have the vertical main dimension. By tapping the text we can modify this value, as in the standard drawing functions. Now we change this value according our design.

By tap and drag on the main dimension text we can also modify the position on the screen.

Now our first variable dimensions are defined.



We will repeat the same procedure for the 2nd variable dimensions. Long press on both lines to define them as variable. Tap both icons two times to define as variable 2.



Select the 1st defined to see the main dimension.

Move the start and endpoint to their desired position by tap and drag.





Rotate the main dimension until we have the horizontal main dimension by double tapping the main dimension text. Modify the value by tapping the main dimension text. Move the main dimension help-lines and text to the desired position by dragging.

Now our profile is finished.



100(2-)

Main Dimension Information:

the text information:



Explanation:

100: main dimensionlength (dimension text)3: number of the variabledepending on this length-: main dimension type

main dimension type: Modify by double tap on main dimension text.





dimension.



The drawn side can also be defined by tap toggling the begin or endpoint (purple or blue dot) from the main dimension line in exactly the same way as was done in the standard drawing functions. The possibilities are also exactly the same as in the standard dimension in the standard drawing functions:

Inside / Outside Tangent to Inside / Outside Center of Radius

#### Remark 1:

The main dimension can also be used as a measuring function, without modifying anything. This is very handy to measure over measured dimensions.

#### Remark 2:

Variable dimensions are best done at the end of the designing process. After defining them it is not possible to execute any drawing functions anymore.

You will need to delete the variables before being able to use any drawing functions to continue your design process.

#### Remark 3:

The variable dimensions can be deleted by a long press on the variable dimension icon. It can also be deleted by scrolling completely through the variable numbers by tapping the icon. After passing variable 6, the variable will be deleted.

# 4.2.7 Recalculate

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This function gives the designer the choice to modify a design with or without re-calculation of the bending solution.



Toggle Button: Recalculate ON/OFF

This button will only become available when Edit or Production Mode has been active before returning to the Design Mode.

This function is very important and it is necessary to understand fully its working principle!

When a design is finished and a bending solution is active it is sometimes still necessary to make small modifications to the design according possible issues faced during production of the first part. A bending solution becomes active from the moment Edit or Production Mode was selected. After slightly having modified the design we wish to still have the chosen or modified solution we had before.

In this case we do not want the control to recalculate bending solution during design.

Without recalculate following parameters are fixed:

- \* The bend order.
- \* The finger height.
- \* The plate rotation.

The only parameter that will change is the X-value from the backguage.

We will illustrate the working principle using an example:



We start from a simple design made with standard drawing functions

We go to Edit Mode were we see the best bending solution according the software. In edit mode we can now modify this solution. See Edit Mode for info on how to modify the





We have modified: \* The bend order: Bend n°2 is now the first bend in the solution. \* The rotation of the

plate in the second bend of the solution. \* The finger height in the second bend of the

second bend of the solution.

We go back to the design mode and there we modify: \*All bend lengths. (100 to 125 and 200 to 225) \*The first angle from 90° to 115°.

125



225

When back in Edit Mode we see that the solution has not been changed: \* Bend order is the same.

\* Finger height is the same.

\* Plate rotation is the same.

The backguage has repositioned in Xdirection to search for the new contact points with the part.

#### Remark 1:

In the background the control is still calculating possible bending solutions even when recalculate is switched off. These are the number of solutions displayed in the information bar.

If you would switch recalculate on, then the best solution would immediately be chosen as in normal design.

The information bar continuously displays the info as if the control was calculating.



## Remark 2:

During the modifying of the design with recalculate off, there is still collision detection. If you have an orange screen it will be necessary to go to Edit Mode to study the collision.

In some cases it is possible to have the screen orange indicating a collision using the current bending solution, while in the information bar we see a certain number of solutions.

In this case we know that there are a number of possible solutions when recalculate would be switched on.





or delete bends nor to change angles.

However all of these modifications will still be treated in the best possible way a good bending solution will be difficult. In these cases it is better to recalculate.

Added bends will be placed at the end of the bending solution.

Deleted bends will be deleted at their actual position in the bending solution.

Modified angles will lead to bad backguage positions.

Mostly it is used for small modifications on bend lengths.

# 4.3 Edit mode

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After drawing a cross-section in the " Design " mode, you can evaluate the calculated program by going to the edit mode.

In this production preparation mode you can review the auto-generated steps, choose another autogenerated solution or change the sequence of the bend steps in the current solution.

In this section we will explain how to choose and/or adjust the generated bending solution(s) for the profile.

By "solution" we do not mean "sequence, because one sequence can have multiple solutions. A solution is a variation of a sequence.

For example, if in a certain step the sheet can be turned from front to back, then it is considered to be anther solution of the same bending sequence.

# 4.3.1 General

In the production preparation mode, it's possible to set all parameters regarding the bending sequence and the back gauge settings.

To be able to go into production preparation mode, you will first have to be in the production/simulation mode.

First you need to open or draw the profile from which you would like to see the bending sequence. Enter the production preparation mode pressing the " Edith " button:



Following " Edit Mode " interface ( example ) :



On screen next information available:

- On top : The Information bar
- On left : The Side panels
- On right : The Function buttons
- In center : The bend view from the selected step
- Below screen : The " Step overview " with the bending sequence
- Left above : The Profile overview with the bending lines

Functional edit mode buttons:

Edit data	Mode	Reload	Sequence	Fullscreen on/off
fields buttons	change			
	buttons			



# 4.3.2 Design data fields

This are the side panels; Axes and Info

# 4.3.2.1 Axes

View and edit from positions and speeds that the axis will go to pro step, namely:

- Backgauge axis
- Angle measeurement axis

#### 4.3.2.1.1 Backgauge

View and edit from the positions and speeds that the backgauge axis will go to pro step.



Distance: Distance the axis must retract

#### 4.3.2.1.2 Angle measurement axis

Edit the measurement information from the " Angle measurement axis ".

Angle measurement axis			On	•
	Current	Target	Correction	
AngleMeasure	0.00 mm	0.00 mm	0.00 mm	
Speed		•		
Speed		•		

- Current: bending at this moment
- Target : The expected final bending angle
- Correction: Correction on proposed angle
- Speed : % from maximum displacment speed.

## 4.3.2.2 Info

#### 4.3.2.2.1 General

In these section you can enter any predefined info for the program. This info depends completely to the customer and is not obliged. General Infoview:

	General	
Customer	CUSTOMER	
Drawing number	RHV123-02345	
Order	A. 1024	
Date	13 Nov 2019	
		/
	Comment	

4.3.2.2.2 Production

These are more specific information fields:

Production			
Stretched length	205.52 mm		
Backgauge score	0 %		
Motion score	0 %		
Estimated time	30 s		
To do	0		
Done	0		

Stretched length: This is the unfolded length (neutral line length) from the unfolded workpiece. This is mostly depending on the workpiece shape and the used tools that are responsible for the workpiece bend radius.

Backguage score: In Design mode this field is not used as there is no bend sequence defined or no program completed.

Motion score: In Design mode this field is not used as there is no bend sequence defined or no program completed.

Estimated Time: In Design mode this field is not used as there is no bend sequence defined or no program completed.

To Do: In Design mode this field is not used as there is no bend sequence defined or no program completed.

Done: In Design mode this field is not used as there is no bend sequence defined or no program completed.

#### Modifying a line according To Do / Done:

It is possible to select a bend line in the edit faze and then modify the "To Do" and "Do" on the selected bend.

4.3.2.2.3 Comment

In these section you can enter any predefined comment for the program. This info depends completely to the customer and is not obliged.

Comment Info view:

	Comment		

# 4.3.3 Adjusting a bending solution

A bending sequence can be adjusted:

- by changing the order of the bends
- by altering the sheet orientation for (a) certain step(s).

To run through the steps of the currently selected bending solution, you can :

- use the <PgUp> and <PgDn> keys.
- touch on the bending sequence from the " Step overview " you wish to select

In the "Edith" phase, the "Sequence button" can be activated.

The 3 best "Production solutions" according to the program are presented. You can select and confirm one of these.

-Anager C Untitled •<u>ĕ</u>• ---肉 4 Axes  $\oplus$  $(\mathbf{i})$ 1 1. 3  $\langle \! \! \! \rangle$ F. C) Reload 2 4

This will be presented on the screen. See example of a bending solution :

At the bottom of the screen, you have the "Step overview "with the actual bending sequence. Left above the screen is the profile overview with the bending lines.

Into the center of the window screen, is the selected bending sequence. This with a view on the profile before and after its bend.

To change the bending sequence, drag in the " Step overview " the requested bend and move it up or down the bending sequence.

For example : " Bending line 2 " will moved to a later stage



As you see on the screen below, move one or more bending lines to a other step in the bending order, bending error can occur.

A dangerous situation or error is marked by he software program it will be marked in the ' Step overview " by a red " Exclamation mark in a circle " .

However it is possible to accept this bend in the sequence, at your own risk, because **accepting a bend with a collision could result in hazardous situations for both the machine and the operator !** When a collision is detected, you can consult the simulation by clicking that particular bend, for example :



Click on this to display the description of the warning. It is not always immediately clear as in our example what is wrong.



Use the " reload " button to load the original bendingsequence.

# 4.3.4 Defining the back gauge settings

The software automatically calculates valid finger positions upon the generation of the bending solution (s).

You can however still adjust the back gauge settings where needed. Select " Axes " from the " Data field buttons".

Next screen appear ( example ):


The Target values from each axis are displayed, follows selected bend.

In this example, value from X1 and X2 from third bend is selected and modified, see screen below:



If a axis value is changed and a dangerous situation or error is marked by he software program it will be marked in the ' Step overview " by a red " Exclamation mark in a circle " . Click on this to display the description of the warning.( for example )



The back gauge settings can be entered per bending step.

To run through the steps of the currently selected bending solution, use the " Step overview ".

When a segment of the part is obstructing the backgauge in a certain step, a collision between the plate and the backgauge could occur while bending.

To keep this from happening, the machine can retract the backgauge once the plate is clamped.

Activate the retraction by checking the corresponding box :

	Speed	Retract	Dist.
x1 د	<b></b>	No	0.00 mm
X2	•	No	0.00 mm
Z1	•	No	0.00 mm
Z2	•	No	0.00 mm
R1	•	No	0.00 mm

After activating the retraction, you can choose the retraction type :

- "Wait" means the beam will wait for the retraction to be completed before descending.
- "No wait" means the beam won't wait for the retraction to be completed before descending.
- "No" means the beam will not wait for descending.

Now you can enter the actual retraction values in the correct field, next to the absolute position of the fingers.

Only when your machine is equipped with a 6-axis, CNC-controlled back gauge, will all the directions (X, Z and R) be available.

When you enter a retraction value outside the back gauge limits, will be marked in the ' Step overview " by a red " Exclamation mark in a circle " .

# 4.4 **Production mode**

Once the profile has been drawn and processed, it's possible to your auto-generated solution, insert steps of manually control your axes. If you import a 3D-program from PartManager, this is the only mode that will be available.

# 4.4.1 General

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For our example, next screen became available:



On screen next information available:

- On top : The Information bar
- On left : The Side panels
- On right : The Function buttons
- In center : The bend view from the selected step
- Below screen : The " Step overview " with the bending sequence
- Left above : The Profile overview with the bending lines

Use the <PgUp> and <PgDn> keys to run through the different bending steps or

Touch on the bending sequence from the " Step overview " you wish to select . The production data and the graphic simulation will change accordingly.

### **On the Machine**

On the machine, It is possible to push the start button.



At that point, the machine is ready to use. If the footpedal is pushed down, the machine will make a bend. The operator can check if the bend is correct, and use the angle correction if needed. The machine will not go automatically to the next step.



Functional production mode buttons:

# 4.4.2 Production Data Fields.

The side panels, on the left of the screen, contains all the data ot the part displayed.

Uorkpiece	Change mateial properties such as the thickness, width and material
Machine	Change machine properties such as the tools and adapters. A button " Tool composition "
<u>کې</u> Depth	Set corrections to calculated values such as the depth, crowning, tilt If an angle measuring system is enabled, then the angle measuring options are shown here.
L Cycle	Change the speeds in greater detail per phase of the bend and set the starting distances of those phases.
Axes	View and edit the positions and speeds that the axes will go to per step
Sequence	Add / Delete, simulate the bend sequence, define hemmingsteps and on which steps to wait for input of the foot pedal. In the "Info" pane, you can select an image that will be displayed when you reach that step, this can be used to remind the operator of specific dangers or actions needed for that step.
(i) Info	View and edit the information in the generated program.
Overview	A summarization of all the most important data in a larger font so it can be easily viewed from a distance

# 4.4.2.1 Workpiece

The next screen became available:



# Sync Off/On button :

The "Sync " creates the possibility to activate different selections.

## Thickness:

This is the thickness of the material, expressed in mm. Click in the field and use the numerical keys to enter a new value.

## Width :

This is the maximum width of the profile.



Click in the field and use the numerical keys to enter a new value.

## Force

This is the force needed to bend the part. If this area shows red, the pressure needed is too high for the tools or the machine.

## Tensile strength,

Is the maximum stress a material withstands when subjected to an applied load. Dividing the load at

failure by the original cross sectional area determines the value.

### Yield strength,

Is the point at which material exceeds the elastic limit and will not return to its origin shape or length if the stress is removed. This value is determined by evaluating a stress-strain diagram produced during a tensile test.

### Elastic limit,

Is the point of stress-strain curve beyond which the material permanently deforms after removing the load

# 4.4.2.2 Machine

The screen remains the same in all bendingsteps

The "Tools " show information about the used top and bottom tools, with its specific shape and characteristics.



The "Pressbrake " show the pressbrake information.

Pressbrake			
	86101 Max capacity: Table width: # machines:	15.00 Bar 4000.00 mm 1	



The next screen appear if " Tool compositon " is activated

It show the position of the used top and bottom tools on the different positions. Use " back " button to return to the production screen.

# 4.4.2.3 Depth

To set corrections to the calculated values such as angle, crowning ...... etc



## Sync Off/On button :

The "Sync " creates the possibility to activate different selections.

## Bend mode:

### Air bending,

During the bend, the material contacts only the punch tip and the 2 die shoulders.

#### Bottoming.

The punch and die are brought together so that the material makes contact with the punch tip and the sidewalls of the V-Opening. Is under construction.

### Angle:

This is the desired angle you want to bend.

### Depth:

When working in depth-mode, this is the target depth for the bend. When working in angle-mode, this is the calculated depth for the programmed angle with the correction taken into account. When working in pressure-mode, this is the calculated depth of the programmed pressure with the correction taken into account.

### Force

This is the force needed to bend the part. If this area shows red, the pressure needed is too high for the tools or the machine.

## **Crowning:**

Is the value the anti deflection table must be pre-bend, this to compensate the deflection from " Beam and Table " during the bend.

# Tilt

On the hydraulic synchro press brakes, it is possible to obtain a different depth on the cylinders.

You can do this by programming a tilt-value. Tilt is the difference in depth for the right cylinder compared to the left one. The amount of tilt is the distance that one cylinder has to stay above the programmed depth. This value can be negative as well as positive. A negative value will make the left cylinder reach for the programmed depth while the right one stays above it. A positive value will make the right cylinder reach for the programmed depth while the left one stays above it.





## Spring back:

The capacity of a bent material to revert to its original form. The angle the bended material will return/ spring back.

## Pre Target:

The bend depth the beam must reach to achieve the bending angle.

## Measure Sp.back:

Must the angle measuring system measure the spring back.

- Off = No

- On = Yes, continue - Once = One time

### Final angle:

Must the final bending angle be measured:

- Off	=	No
- Confiirm	=	Confirmation from the measured angle
		Analog as you should measure manual angle from the bend with a protractor
- Correct	=	Has the function to confirm if angle is to small or within tolerance.
		In case angle is to big, a extra bend cycle must be execute.

# 4.4.2.4 Cycle

Change the speed in greater detail detail per phase of the bend and set the starting distances of those phases.

When your machine has a Lazersafe sysem, then the safety options will ,be available here.



# Fa-SI

The position of the fast/slow point. This is the position (in relation to the target-depth) where the beam decreases its speed from fall-speed to work-speed The minimum allowed fast/slow value is determined in a parameter.

*remark :* When you are working with a safety light guard, it's possible that the position of the fast/slow point must be higher than a certain value. Please refer to the manual of the light guard to see where the fast/slow point should be.

### **Clamping point**

The position of the clamp-point. Normally, when the beam reaches the zero point (surface of the material), the sheet is clamped and then it's safe to start the retraction.

If, because of tolerances of the plate thickness, the clamp-point does not match the zero-point, it is possible to adjust the clamp-point.

For example :

plate thickness : 2mm clamping-point : -0.3mm ⇒ retraction starts when the beam reaches a depth of - 0.3mm.

### **Decompression:**

It's the distance needed to move up slowly until internal stress is gone and springback is finished.

# TDC

TDC of current step is start position for next step.



## Fall:

Is a % from the maximum down speed when the beam going down.

## **Closing:**

Is a % from the maximum workspeed to clamping point.

## Work:

Is a % from the speed of the beam during the bend.

# **Decompression:**

This " Slow Up" speed needed for a smooth de-stress of the metal sheet.

# Up:

Is a % from the maximum up speed when the beam going up.



### **Dwell Time**

This is the time the beam remains at the target depth before going up again (if Auto-up function = on).

# Pause

This is the time the beam remains at the TDC before going down again for the next step. This is for safety reasons.



## Stop at mute point:

Switch on to activate the " Mute position ", this to stop the cycle at the mute point. Confirm the " Mute point " by re-pushing the foot pedal.

### Box mode:

Switch on to use boxmode. In this mode the safety system will ignore a front or a back obstruction. The center or both (front & back) can never be obstructed

### **Upstand height:**

In case the upstand has a height from +/-62mm, enter " 62.00 " as " Upstand height ".

When 0 Beam will stop at obstruction position to confirm upstanding edge. After confirmation by foot pedal the beam will continue fast down movement. When upstand hight is set correct, the beam will move down in Fast speed without any interruption.

### Otherwise,

Down stroke will stop at uptand height and will continue at law workspeed after second down command.

### Mute position:

This is the absolute "Y - height " position, calculated by LazerSafe where the beam will switch over to bending speed.

This is the sum from the next dimensions:

- Height from bottom tool.
- Height from top tool.
- Plate thickness
- Fa/SI point.

# **Condition Code:**

The actual height position from the beam.

# 4.4.2.5 Axes

View and edit from positions corrections and retractions that the axis will go to pro step, namely:

- Backgauge axis
- Angle measeurement axis

Backgauge				
	Finger 1		Fing	er 2
	_1			
	_	Current	Target	Correction
X1	<u>د</u>   0.0	00 mm	102.91 mm	0.00 mm
X2	_   0.0	00 mm	102.91 mm	0.00 mm
Z1	0.0	00 mm	-135.00 mm	0.00 mm
Z2	0.0	00 mm	135.00 mm	0.00 mm
R1	0.0	00 mm	70.00 mm	0.00 mm
		Speed	Retract	Dist.
X1	<u>ا</u> م		No	0.00 mm
X2	- -		No	0.00 mm
Z1			No	0.00 mm
Z2			- No	0.00 mm
D1			No	0.00

Sync : Toggle On / Off, synchronization from different axes

Axes : X1, X2 Z1, Z2 R1	<ul> <li>movement according the backgauge position to the bendingline :</li> <li>according the transverse movement of the fingers</li> <li>the fingers height position</li> </ul>
Current:	Position axis at this moment
Target :	Position to where the axis has to displace
Correction:	Correction on proposed axisposition
Retract:	Choose : No / No Wait / Wait When the value of an axis can't be changed, it means it isn't controlled by the CNC. You can also enter retraction values for the axes. When some section of the part is going under the back gauge, a collision between the plate and the back gauge could happen while bending. To keep this from happening, the machine can retract the back gauge once the plate is clamped.

If a program is made with the bending sequence-construction, the needed retraction is calculated automatically. If not, you will have to do it yourself. The retraction starts when the plate is clamped, this is when the beam reaches the plate (point zero).

This way the plate can't shift.

### Distance: Distance the axis must retract

	Angle meas	surement axis	On 🔤	•
	Current	Target	Correction	
AngleMeasure	0.00 mm	0.00 mm	0.00 mm	
Speed		•		

### AngleMeasure:

Is the angle measured by the angle measurement system, it's target en the needed bend correction to achieve the correct angle.

Speed : % from maximum axis speed from angle measurement system

### 4.4.2.6 Sequence

Add / Delete steps, simulate the bend sequence, define hemming steps and on which steps; to wait for input of the footpedal.

In the " info " pane, you can select an image that will be displayed when you reach that step.

This can be used to remind the operator of specific dangers or actions needed for that step.

General				
□ Insert st ↓□□ before	ep □ □□ <sup>↓</sup>	Insert step after	X	Delete step
Repetition	0			
Simulate	e	Speed	0.25 0.5	5 1 2

### Insert Step:

To insert a manual bending step before or after the current step

### **Delete Step:**

To delete the selected bendingsstep.

### **Repetition:**

The current bendingstep must be x-times repeated.

### Simulate:

To simulate in 3D on screen the current bending step. To return to normal screen, toggle on the " Simulate " button.



### Hemming:

Indicates if a hemming device is configured.

	Step options	
Bend separation	Off 🛑	<b>_</b> / <b>_</b>
Wait for input	Off <b>O</b>	L

### Bend separation:

This function is to execute 1 bend in 2 bendsteps.

When bend separation is on the Bend is finished at BDC instead of TDC, when the footpedal is released the control goes to the next bend where the BDC is deeper then in the first bend. This function is intended for auto mode combined with auto-up. In this case TDC is discarded.

When manually pushing the up pedal, normal TDC will be targeted.

# Wait for input

Wait for footpedal confirmation before axes will re-position to the target values.



### Select Image.

You can select an image that will be displayed when you reach that step. This can be used to remind the operator of specific dangers or actions needed for that step.

## Clear Image.

To clear this image

### Comment.

To select the comment to be displayed together with the image when you reach that step.

### 4.4.2.7 Info

View and edit the information in the generated program.

### General and Comment Info view:

General			
Customer	CUSTOMER		
Drawing number	RHV123-0345		
Order	A. 1024		
Date	9 Dec 2019		
Comment			

In these two sections you can enter any predefined info and/or comment for the program. This info depends completely to the customer and is not obliged.

The production Info view.

Production			
Stretched length	260.81 mm		
Backgauge score	95 %		
Motion score	41 %		
Estimated time	31 s		
To do	0		
Done	0		

### Stretched length:

This is the unfolded length (neutral line length) from the unfolded workpiece.( the calculated length of the profile )

This is mostly depending on the workpiece shape and the used tools that are responsible for the workpiece bend radius.

### Backguage score:

In Design mode this field is not used as there is no bend sequence defined or no program completed

### Motion score:

In Design mode this field is not used as there is no bend sequence defined or no program completed.

### Estimated Time:

The calculated time for the complete bend of the workpiece.

### To Do:

Total quantity of workpieces to bend.

### Done:

Quantity of workpieces already bendedc.

# 4.4.2.8 Overview

A summation of all the most important data in a larger font so it can be easily viewed from a distance.

The configaration view:

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Configuration			
1.00 mm	Top tool:	BIU-001	
	Bottom tool:	S20-35-12L	
	× TTL adapter:	No adapter	
	× BTL adapter:	No adapter	
<u>300.00 mm</u>	🕒 Material:	Steel 37	

The depth view, with a resume of the bend information:

Depth					
		Current	Target		
	Force	0.00 Bar	1.54 Bar		
	Angle	0.00 deg	155.00 deg	To do: 0	
	Depth	-216.00 mm	-1.42 mm	Done: 0	

Tghe vieuw with the axes ifnormation





# Parameter lists.

Parameter lists.	160
	l

This is a example from the different parameter lists.

# 5.1 User Setting

# 5.1.1 General

Description	Unit	Default	Mach.value
Language		English	
Debuginfo	ON/OFF	OFF	
Units	SI	SI	
Fractional Format	ON/OFF	OFF	
Snap length	mm	15,00	
Snap Angle		15	
Show 3D Workp .: Folded state	ON/OFF	OFF	
Show 3D Workp .: unfolded state	ON/OFF	ON	
Font size		Normal	

# 5.1.2 Available tools

Description	Unit	Default	Mach. value
Primary top tool directory		D:\GRAPHIC\TOPTOOLS\	
Primary bottom tool directory		D:\GRAPHIC\BOTTOOLS\	

# 5.1.3 Automatad Imports

Description	Unit	Default	Mach. value
Import directory			
Backup completed imports			
Permanently remove			
Completed imports directory			
Backup deleted imports			
Permanently remove			
Deleted imports directory			

# 5.1.4 Log in Settings

Description	Unit	Default	Mach. value
Log-out after inactive period			
Duration			

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# 5.2 FastBend Settings

# 5.2.1 General

# 5.2.1.1 General

Description	Unit	Default	Mach.value
Name		86102	
Pressbrake type	Hydraulic/Folding	Hydraulic	
	with bottom/Folding		
	without bottom		
Communication Protocol		3	
MaconIP		192,168,11,31	
Slave1 MaconIP			
Slave2 MaconIP			
Slave3 MaconIP			
Slave4 MaconIP			

# 5.2.1.2 Pressure or force

Description	Unit	Default	Mach.value
Туре	Bar/Ton/kN/PSI	Bar	
Factor		1,725	
Surface Area	mm²	45396,0	

# 5.2.2 Geometry

Description	Unit	Default	Mach.value
Max capacity	Ton	150,00	
Max Top Dead Center	mm	-20,00	
Max clamping point	mm	70,00	
Max Cylinder course	mm	370,00	
Max tilt/m	mm	0,50	
Min top tool height	mm	0,00	
Min bottom tool height	mm	0,00	
Min Fa/SI point	mm	2,90	

# 5.2.2.1 Dimensions

Description	Unit	Default	Mach.value
Table width	mm	3650,0	
Table height	mm	920,0	

# 5.2.2.2 Limits

Description	Unit	Default	Mach.value
Max capacity	Ton	150,00	
Max Top Dead Center	mm	-20,00	

Max clamping point	mm	70,00	
Max Cylinder course	mm	370,00	
Max tilt/m	mm	0,50	
Min top tool height	mm	0,00	
Min bottom tool height	mm	0,00	
Min Fa/SI point	mm	2,90	

# 5.2.3 Program generation

# 5.2.3.1 Program Information

Description	Unit	Default	Mach.value
Drawingnumber		RHV123-02345	
Order		A. 1024	
Customer		CUSTOMER	

# 5.2.3.2 Program step information

Description	Unit	Default	Mach.value
Thicknes	mm	1,00	
Width	mm	300,00	
Top Dead Center	mm	60,00	
Fa/SI point	mm	2,00	
Decompression speed	mm/s	10,00	
Decompression distance	mm	0,50	

# 5.2.3.3 Miscellaneous

Description	Unit	Default	Mach.value
Reference finger		0,0	
Retraction tolerance	mm	0,05	

# 5.2.4 Safety

Description	Unit	Default	Mach.value
Beam Safety	Present/Not present	Present	
Safety device	None/LaserSafe	LazerSafe PCSS	
	PCSS		
Backside safety	Present/Not present	Present	

# 5.2.5 Axes

# 5.2.5.1 Axes 1

Description	Unit	Default	Mach.value
Name		X1	
Abbrevation		X1	
Decimals		2	
Туре	None/DC/AC	DC	
Value Type	RelAxis/AbsAxis	RelAxis	
Minimum	mm	-50,00	
Maximum	mm	50,00	
Min Disance	mm	0,00	
Purpose	Unknown/X1/S2/X3	X1	

Parking	mm	0,00	
Acceleration	m/s²	0,40	
Workspeed	m/s	0,20	
Deceleration	m/s²	0,40	

# 5.2.5.2 Axes 2

Description	Unit	Default	Mach.value
Name		X2	
Abbrevation		X2	
Decimals		2	
Туре	None/DC/AC	DC	
Value Type	RelAxis/AbsAxis	RelAxis	
Minimum	mm	0,00	
Maximum	mm	50,00	
Min Disance	mm	801,00	
Purpose	Unknown/X1/S2/X3	X3	
Parking	mm	0,00	
Acceleration	m/s²	2,00	
Workspeed	m/s	1,00	
Deceleration	m/s²	2,00	

# 5.2.5.3 Axes 3

Description	Unit	Default	Mach.value
Name		Z1	
Abbrevation		Z1	
Decimals		2	
Туре	None/DC/AC	DC	
Value Type	RelAxis/AbsAxis	NegAbsAxis	
Minimum	mm	-970,00	
Maximum	mm	851,10	
Min Disance	mm	119,90	
Purpose	Unknown/X1/S2/X3	Z1	
Parking	mm	0,00	
Acceleration	m/s²	4,00	
Workspeed	m/s	2,00	
Deceleration	m/s²	2,00	

# 5.2.5.4 Axes 4

Description	Unit	Default	Mach.value
Name		Z2	
Abbrevation		Z2	
Decimals		2	
Туре	None/DC/AC	DC	
Value Type	RelAxis/AbsAxis	AbsAxis	
Minimum	mm	-851,10	
Maximum	mm	970,00	
Min Disance	mm	119,90	
Purpose	Unknown/X1/S2/X3	Z2	

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Parking	mm	0,00	
Acceleration	m/s²	4,00	
Workspeed	m/s	2,00	
Deceleration	m/s²	2,00	

# 5.2.5.5 Axes 5

Description	Unit	Default	Mach.value
Name		R1	
Abbrevation		R1	
Decimals		2	
Туре	None/DC/AC	DC	
Value Type	RelAxis/AbsAxis	AbsAxis	
Minimum	mm	35,00	
Maximum	mm	270,00	
Min Disance	mm	0,00	
Purpose	Unknown/X1/S2/X3	R1	
Parking	mm	0,00	
Acceleration	m/s²	0,60	
Workspeed	m/s	0,01	
Deceleration	m/s²	0,60	

# 5.2.5.6 Axes 6

Description	Unit	Default	Mach.value
Name		R2	
Abbrevation		R2	
Decimals		2	
Туре	None/DC/AC	None	
Value Type	RelAxis/AbsAxis	AbsAxis	
Minimum	mm	-6,00	
Maximum	mm	600,00	
Min Disance	mm	0,00	
Purpose	Unknown/X1/S2/X3	R2	
Parking	mm	0,00	
Acceleration	m/s²	0,80	
Workspeed	m/s	0,60	
Deceleration	m/s²	0,60	

# 5.2.5.7 Optional 1

Description	Unit	Default	Mach.value
Name		SyncView	
Abbrevation		SyncView	
Decimals		1	
Туре	None/DC/AC	None	
Value Type	RelAxis/AbsAxis	AbsAxis	
Minimum	mm	-1390,00	
Maximum	mm	1180,00	
Min Disance	mm	0,00	
Purpose	Unknown/X1/S2/X3	SyncView	
Parking	mm	0,00	

Acceleration	m/s²	0,80	
Workspeed	m/s	0,60	
Deceleration	m/s²	0,60	

# 5.2.5.8 Optional 2

Description	Unit	Default	Mach.value
Name		AngleMeasure	
Abbrevation		AngleMeasure	
Decimals		1	
Туре	None/DC/AC	None	
Value Type	RelAxis/AbsAxis	AbsAxis	
Minimum	mm	-1390,00	
Maximum	mm	1180,00	
Min Disance	mm	0,00	
Purpose	Unknown/X1/S2/X3	AngleMeasure	
Parking	mm	0,00	
Acceleration	m/s²	0,80	
Workspeed	m/s	0,60	
Deceleration	m/s²	0,60	

# 5.2.6 Manual Axes

# 5.2.6.1 Manual Axis 1

Description	Unit	Default	Mach.value
Name		Manual 1	
Abbrevation		Man 1	
Decimals		2	
Туре	None/Unmeasred/	None	
	Measured		
Value Type	Abs Axis/NegAbs	Abs Axis	
	Axis		
Minimum	mm	-1000,00	
Maximum	mm	1000,00	
Min.Distance	mm	0,00	
Purpose	Unknown/Finger X1/	Unknown	
Parking	mm	-1200,00	

# 5.2.6.2 Manual Axis 2

Description	Unit	Default	Mach.value
Name		Manual 2	
Abbrevation		Man 2	
Decimals		2	
Туре	None/Unmeasred/	None	
	Measured		
Value Type	Abs Axis/NegAbs	Abs Axis	
	Axis		
Minimum	mm	-1000,00	
Maximum	mm	1000,00	
Min.Distance	mm	0,00	
Purpose	Unknown/Finger X1/	Unknown	

Parking	mm	-1200,00	

# 5.2.6.3 Manual Axis 3

Description	Unit	Default	Mach.value
Name		Finger Z1	
Abbrevation		FingZ1	
Decimals		2	
Туре	None/Unmeasred/	None	
	Measured		
Value Type	Abs Axis/NegAbs	Abs Axis	
	Axis		
Minimum	mm	-1000,00	
Maximum	mm	1000,00	
Min.Distance	mm	0,00	
Purpose	Unknown/Finger X1/	Unknown	
Parking	mm	-1200,00	

# 5.2.6.4 Manual Axis 4

Description	Unit	Default	Mach.value
Name		Finger Z2	
Abbrevation		FingZ2	
Decimals		2	
Туре	None/Unmeasred/	None	
	Measured		
Value Type	Abs Axis/NegAbs	Abs Axis	
	Axis		
Minimum	mm	-1000,00	
Maximum	mm	1000,00	
Min.Distance	mm	0,00	
Purpose	Unknown/Finger X1/	Unknown	
Parking	mm	-1200,00	

# 5.2.6.5 Manual Axis 5

Description	Unit	Default	Mach.value
Name		Manual 5	
Abbrevation		Man 5	
Decimals		2	
Туре	None/Unmeasred/	None	
	Measured		
Value Type	Abs Axis/NegAbs	Abs Axis	
	Axis		
Minimum	mm	-1000,00	
Maximum	mm	1000,00	
Min.Distance	mm	0,00	
Purpose	Unknown/Finger X1/	Unknown	
Parking	mm	-1200,00	

# 5.2.6.6 Manual Axis 6

Description	Unit	Default	Mach.value
Name		Manual 6	

Abbrevation		Man 6
Decimals		2
Туре	None/Unmeasred/	None
	Measured	
Value Type	Abs Axis/NegAbs	Abs Axis
	Axis	
Minimum	mm	-1000,00
Maximum	mm	1000,00
Min.Distance	mm	0,00
Purpose	Unknown/Finger X1/	Unknown
Parking	mm	-1200,00

# 5.2.6.7 Manual Axis 7

Description	Unit	Default	Mach.value
Name		Follow Z1	
Abbrevation		FolZ1	
Decimals		2	
Туре	None/Unmeasred/	None	
	Measured		
Value Type	Abs Axis/NegAbs	Abs Axis	
	Axis		
Minimum	mm	-1000,00	
Maximum	mm	1000,00	
Min.Distance	mm	0,00	
Purpose	Unknown/Finger X1/	Unknown	
Parking	mm	-1200,00	

# 5.2.6.8 Manual Axis 8

Description	Unit	Default	Mach.value
Name		Follow Z2	
Abbrevation		FolZ2	
Decimals		2	
Туре	None/Unmeasred/	None	
	Measured		
Value Type	Abs Axis/NegAbs	Abs Axis	
	Axis		
Minimum	mm	-1000,00	
Maximum	mm	1000,00	
Min.Distance	mm	0,00	
Purpose	Unknown/Finger X1/	Unknown	
Parking	mm	-1200,00	

# 5.2.7 Options

# 5.2.7.1 Crowning

Description	Unit	Default	Mach.value
Active	False/True	TRUE	
Min Crowning	%	8	
Max Crowning	%	40	
Scope	mm	1,20	

# 5.2.7.2 General

Description	Unit	Default	Mach.value
Shift container	False/True	FALSE	
Hydraulic clamping	None/Upper/Both/	Both	
	Lower		
Pneumatic clamping	None/Upper/Both/	None	
	Lower		
Sheet follower	False/True	FALSE	
Number of follow axes		2,0	
Number of external DACs		0,0	
Pneumatic fingers	False/True	FALSE	
Editing of decompression	False/True	TRUE	
Operator selection	False/True	FALSE	
Run with open tools	Ignore/Not Allowed/	Allow with message	
	Allow with message		
Smart tool locator	None/Upper/Both/	None	
	Lower		
Actuator		3	
R axis level	Frame/Lower tool	Frame	
Number of machines		1	
Auto adjust axes on toolchange	False/True	TRUE	

# 5.2.7.3 Angle Measurement

# 5.2.7.3.1 Alfa-F

Description	Unit	Default	Mach.value
Enabled	False/True	TRUE	
IP Address		192,168,11,33	
Port		4660	
Min angle	deg	35,0	
Max angle	deg	160,0	
Angle tolerance	deg	5,0	
Anglevariance	deg	10,0	
Brake distance	mm	5,0	
Min Limb	mm	10,0	
Filtre quality		0,0	
Number of consecutive filtering		50	
Min angle frequency		10,0	
Monitor timer interval	ms	300	

### 5.2.7.3.2 IrisPlus

Description	Unit	Default	Mach.value
Enabled	False/True	TRUE	
IP Address		192,168,11,33	
Port		2345	
Min angle	deg	35,00	
Max angle	deg	179,00	
Angle tolerance	deg	5,00	
Anglevariance	deg	10,00	
Brake distance	mm	7,00	
Min Limb	mm	12,00	

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Filtre quality		0,00	
Number of consecutive filtering		20	
Min angle frequency		10,00	
Monitor timer interval	ms	300	
Reference lifespan	hours	24,00	
Calibration lifespan	hours	48,00	

# 5.2.7.3.3 Flattening

Description	Unit	Default	Mach.value
Туре	None/Manual open/	None	
Height	mm	0,50	
Rotation type		0	
Rotation	deg	90,00	
Translation		X -60,0 Y -45,0	
Shift		X 0,0 Y 0,0	
Output	None/Aux1 On/	None	
Operation	None/Dummy wait/	None	
	Dummy Wait2		
Safety Zone	mm	120,00	

# 5.2.7.3.4 Robot

Description	Unit	Default	Mach.value
Number of Robots		0	
Remote Robotmanagement		0	

# 5.2.7.3.5 Rear Plate Support

Description	Unit	Default	Mach.value
Enabled	False/True	FALSE	
Minimum coverage X		10,00	
Up height		130,00	
Xmin below up height		300,00	
Xmin above up height		50,00	

# 5.3 Machine setting

# 5.3.1 Axes

# 5.3.1.1 Axis 1

	Description	Unit	Default	Mach.value
P01	P01 CAN-ID		17	
P02	P02 Max Ptp Velocity	m/s	1000,00	
P03	P03 Safety Distance	mm	0,0	
P04	P04 HMmethod: Hamming Method	Limp Pulse/Ref+Inv	LIMP PULSE	

OUTPULSE/....

# For the other parameters, see the manual from the Siemens Drivers

# 5.3.1.2 Axis 2

	Description	Unit	Default	Machine
				value
P01	P01 CAN-ID		18	
P02	P02 Max Ptp Velocity	m/s	1000,00	
P03	P03 Safety Distance	mm	0,0	
P04	P04 HMmethod: Hamming Method	Limp Pulse/Ref+Inv	LIMP PULSE	

OUTPULSE/....

# For the other parameters, see the manual from the Siemens Drivers

# 5.3.1.3 Axis 3

	Description	Unit	Default	Machine
				value
P01	P01 CAN-ID		21	
P02	P02 Max Ptp Velocity	m/s	1000,00	
P03	P03 Safety Distance	mm	0,0	
P04	P04 HMmethod: Hamming Method	Limp Pulse/Ref+Inv	LIMP PULSE	

OUTPULSE/....

# For the other parameters, see the manual from the Siemens Drivers

# 5.3.1.4 Axis 4

	Description	Unit	Default	Machine
				value
P01	P01 CAN-ID		22	
P02	P02 Max Ptp Velocity	m/s	1000,00	
P03	P03 Safety Distance	mm	0,0	
P04	P04 HMmethod: Hamming Method	Limp Pulse/Ref+Inv	LIMP PULSE	

OUTPULSE/....

### For the other parameters, see the manual from the Siemens Drivers

# 5.3.1.5 Axis 5

	Description	Unit	Default	Machine
				value
P01	P01 CAN-ID		19	
P02	P02 Max Ptp Velocity	m/s	0,250	
P03	P03 Safety Distance	mm	0,0	

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Parameter lists	s. 172
-----------------	--------

P04	P04 HMmethod: Hamming Method	Limp Pulse/Ref+Inv	LIMP PULSE	

OUTPULSE/....

For the other parameters, see the manual from the Siemens Drivers

#### 5.3.1.6 Axis 6

	Description	Unit	Default	Machine
				value
P01	P01 CAN-ID		20	
P02	P02 Max Ptp Velocity	m/s	0,250	
P03	P03 Safety Distance	mm	0,0	
P04	P04 HMmethod: Hamming Method	Limp Pulse/Ref+Inv	LIMP PULSE	

OUTPULSE/....

For the other parameters, see the manual from the Siemens Drivers

#### 5.3.1.7 Optional 1

	Description	Unit	Default	Machine
				value
P01	P01 CAN-ID		23	
P02	P02 Max Ptp Velocity	m/s	0,250	
P03	P03 Safety Distance	mm	0,0	
P04	P04 HMmethod: Hamming Method	Limp Pulse/Ref+Inv	LIMP PULSE	

OUTPULSE/....

#### For the other parameters, see the manual from the Siemens Drivers

#### 5.3.1.8 Optional 2

	Description	Unit	Default	Machine
				value
P01	P01 CAN-ID		24	
P02	P02 Max Ptp Velocity	m/s	1000	
P03	P03 Safety Distance	mm	0,0	
P04	P04 HMmethod: Hamming Method	Limp Pulse/Ref+Inv	LIMP PULSE	

OUTPULSE/....

#### For the other parameters, see the manual from the Siemens Drivers

#### 5.3.2 AngleMeasurment

	Description	Unit	Default	Mach.value
P01	SpringbackSpeed	mm/s	0,200	
P02	PreTarget	deg	0,500	
P03	ControlTime	S	0,500	
P04	EndSpeed	mm/s	0,020	
P05	DebugCode		65,000	
P06	KDz51		3500	
P07	KGz51		2000	
P08	KDz71		10000	
P09	Tolerance	deg	0,2	
P10	IrisAngle	deg	10	
P11	Parallelism check	No/Yes	Yes	
P12	Position deviation end point	mm	1,000	
P13	Position deviation brake point	mm	10,000	

#### 5.3.3 Spindle zone Compensation Axis

	Description	Unit	Default	Mach.value
P01	A Position	mm	0,000	
P01	B Measured	mm	0,000	
P02	A Position	mm	0,000	
P02	B Measured	mm	0,000	
P03	A Position	mm	0,000	
P03	B Measured	mm	0,000	
P04	A Position	mm	0,000	
P04	B Measured	mm	0,000	
P05	A Position	mm	0,000	
P05	B Measured	mm	0,000	
P06	A Position	mm	0,000	
P06	B Measured	mm	0,000	
P07	A Position	mm	0,000	
P07	B Measured	mm	0,000	
P08	A Position	mm	0,000	
P08	B Measured	mm	0,000	
P09	A Position	mm	0,000	
P09	B Measured	mm	0,000	
P10	A Position	mm	0,000	
P10	B Measured	mm	0,000	
P11	A Position	mm	0,000	
P11	B Measured	mm	0,000	
P12	A Position	mm	0,000	
P12	B Measured	mm	0,000	
P13	A Position	mm	0,000	
P13	B Measured	mm	0,000	
P14	A Position	mm	0,000	
P14	B Measured	mm	0,000	
P15	A Position	mm	0,000	
P15	B Measured	mm	0,000	
P16	A Position	mm	0,000	
P16	B Measured	mm	0,000	
P17	A Position	mm	0,000	
P17	B Measured	mm	0,000	
P18	A Position	mm	0,000	
P18	B Measured	mm	0,000	
P19	A Position	mm	0,000	
P19	B Measured	mm	0,000	
P20	A Position	mm	0,000	
P20	B Measured	mm	0,000	

#### 5.3.3.1 Spindle zone compensation axis 1

#### 5.3.3.2 Spindle zone compensation axis 2

Analog table as the table from spindle zone compensation axis 1

#### 5.3.3.3 Spindle zone compensation axis 3

Analog table as the table from spindle zone compensation axis 1

#### 5.3.3.4 Spindle zone compensation axis 4

Analog table as the table from spindle zone compensation axis 1

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#### 5.3.3.5 Spindle zone compensation axis 5

Analog table as the table from spindle zone compensation axis 1

#### 5.3.3.6 Spindle zone compensation axis 6

Analog table as the table from spindle zone compensation axis 1

#### 5.3.3.7 Spindle zone compensation axis 7

Analog table as the table from spindle zone compensation axis 1

#### 5.3.3.8 Spindle zone compensation axis 8

Analog table as the table from spindle zone compensation axis 1

#### 5.3.4 External Dac

#### 5.3.4.1 External Dac1

	Description	Unit	Default	Mach.value
P01	P01 v-1	mm/sec	25,000	
P02	P02 DAC-1	Volt	1,000	
P03	P03v-2	mm/sec	50,000	
P04	P04 DAC-2	Volt	2,000	
P05	P05v-3	mm/sec	75,000	
P06	P06 DAC-3	Volt	3,000	
P07	P07 v-4	mm/sec	100,000	
P08	P08 DAC-4	Volt	4,000	
P09	P09v-5	mm/sec	125,000	
P10	P10 DAC-5	Volt	6,000	
P11	P11 v-6	mm/sec	150,000	
P12	P12 DAC-6	Volt	6,600	
P13	P13v-7	mm/sec	175,000	
P14	P14 DAC-7	Volt	6,600	
P15	P15v-8	mm/sec	200,000	
P16	P16 DAC-8	Volt	6,600	
P17	P17v-9	mm/sec	225,000	
P18	P18 DAC-9	Volt	6,600	
P19	P19v-10	mm/sec	250,000	
P20	P20 DAC-10	Volt	6,600	

#### 5.3.4.2 External Dac2

Analog table as the table from External Dac1

#### 5.3.4.3 External Dac3

Analog table as the table from External Dac1

#### 5.3.4.4 External Dac4

Analog table as the table from External Dac1

#### 5.3.4.5 External Dac5

Analog table as the table from External Dac1.

#### 5.3.4.6 External Dac6

Analog table as the table from External Dac1

#### 5.3.5 Follow axes

#### 5.3.5.1 Follow axis 1

	Description	Unit	Default	Mach.value
P01	P01 CounterDir	Pos/Neg	POS	
P02	P02 RefValue	mm	0,5	
P03	P03 Resolution at 90 deg	pulses	1003	
P04	P04 Gainfactor Up		0,100	
P05	P05 Minimal Up		0	
P06	P06 Maximal Up		150	
P07	Gainfactor Down		0,100	
P08	P08 Minimal Down		0,100	
P09	P09 Maximal Down		150	
P10	P10 Lim Angle-	deg	-3,0	
P11	P11 Lim Angle+	deg	45,0	
P12	P12 Ref Speed		100	
P13	P13 RefPulsReturn	pulses	60	
P14	P14 DacDir	Pos/Neg	Neg	
P15	P15 Max. Angular Speed	Deg/s	1,0	

#### 5.3.5.2 Follow axis 2

	Description	Unit	Default	Mach.value
P01	P01 CounterDir	Pos/Neg	POS	
P02	P02 RefValue	mm	0,5	
P03	P03 Resolution at 90 deg	pulses	1003	
P04	P04 Gainfactor Up		0,100	
P05	P05 Minimal Up		0	
P06	P06 Maximal Up		150	
P07	Gainfactor Down		0,100	
P08	P08 Minimal Down		0,100	
P09	P09 Maximal Down		150	
P10	P10 Lim Angle-	deg	-3,0	
P11	P11 Lim Angle+	deg	45,0	
P12	P12 Ref Speed		100	
P13	P13 RefPulsReturn	pulses	60	
P14	P14 DacDir	Pos/Neg	Neg	
P15	P15 Max. Angular Speed	Deg/s	1,0	

#### 5.3.5.3 Follow axis 3

	Description	Unit	Default	Mach.value
P01	P01 CounterDir	Pos/Neg	POS	
P02	P02 RefValue	mm	0,5	
P03	P03 Resolution at 90 deg	pulses	1003	
P04	P04 Gainfactor Up		0,100	
P05	P05 Minimal Up		0	
P06	P06 Maximal Up		150	
P07	Gainfactor Down		0,100	
P08	P08 Minimal Down		0,100	
P09	P09 Maximal Down		150	
P10	P10 Lim Angle-	deg	-3,0	

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P11	P11 Lim Angle+	deg	45,0	
P12	P12 Ref Speed		100	
P13	P13 RefPulsReturn	pulses	60	
P14	P14 DacDir	Pos/Neg	Neg	
P15	P15 Max. Angular Speed	Deg/s	1,0	

#### 5.3.5.4 Follow axis 4

	Description	Unit	Default	Mach.value
P01	P01 CounterDir	Pos/Neg	POS	
P02	P02 RefValue	mm	0,5	
P03	P03 Resolution at 90 deg	pulses	1003	
P04	P04 Gainfactor Up		0,100	
P05	P05 Minimal Up		0	
P06	P06 Maximal Up		150	
P07	Gainfactor Down		0,100	
P08	P08 Minimal Down		0,100	
P09	P09 Maximal Down		150	
P10	P10 Lim Angle-	deg	-3,0	
P11	P11 Lim Angle+	deg	45,0	
P12	P12 Ref Speed		100	
P13	P13 RefPulsReturn	pulses	60	
P14	P14 DacDir	Pos/Neg	Neg	
P15	P15 Max. Angular Speed	Deg/s	1,0	

#### 5.3.6 General

	Description	Unit	Default	Mach.value
P01	P01 DecimalPoint	1/feb	1	
P02	P02 MetricSystem	mm/inch	mm	
P03	P03 8/23mm	8mm/23mm	8mm	
P04	P04 AntiDeflection	No/ I/O / DAC / I/O-	No	
		inv /		
P05	P05 CE	No/Yes	Yes	
P06	P06 8/23 Enable	No/Yes	Yes	
P07	P07 DynaFaSI	No/Yes	Yes	
P08	DepthCalc	No/Yes	Yes	
P09	P09 MaxPressure		3950	
P10	P10 ExtraDebug	No/Yes	Yes	
P11	P11 TDC Monitoring	Off/On	Off	
P12	P12 Min AntiDeflection	%	6	
P13	P13 Max AntiDeflection	%	36	
P14	P14 Delayed Prefill Off	S	0,000	
P15	P15 Hydraulic Unit Off	min	-60,0	
P16	P16 Test Configuration		0	
P17	P17 Robot function	No/Norma/110/410	No	
P18	P18 Machine ID		0	
P19	P19 PLC Active	No/Yes	Yes	
P20	P20 Max Synchro Sendout	DAC	5000	
P21	P21 ProcWaitTime	%	0	
P22	P22 DelayeRestTime	S	0,000	
P23	P23 RefDownVoltage	V	6,600	
P24	P24 RefUpVoltage	V	6,600	
P25	P25 External Security	mm	300,000	
P26	P26 Clamp Voltage	V	6,600	
P27	P27 Clamp Pressure	%	50,000	
P29	P29 FullTouch	No/Yes	Yes	

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P30	P30 Alternate Guarding Mode	False/True	FALSE	
P31	P31 X Safe Support		300	
P32	P32 R Safe Support		130	

#### 5.3.7 Sensors

#### 5.3.7.1 Sensor 1

	Description	Unit	Default	Mach.value
P06	P06 Calibration C1		10,333	
P07	P07 Calibration B1		13,740	
P08	P08 Calibration D1		-6,412	
P09	P09 Calibration C2		9,760	
P10	P10 Calibration B2		11,548	
P11	P11 Calibration D2		-7,321	
P12	P12 Min Angle		80,000	

#### 5.3.7.2 Sensor 2

	Description	Unit	Default	Mach.value
P06	P06 Calibration C1		10,333	
P07	P07 Calibration B1		13,740	
P08	P08 Calibration D1		-6,412	
P09	P09 Calibration C2		9,760	
P10	P10 Calibration B2		11,548	
P11	P11 Calibration D2		-7,321	
P12	P12 Min Angle		80,000	

#### 5.3.7.3 Sensor 3

	Description	Unit	Default	Mach.value
P06	P06 Calibration C1		10,333	
P07	P07 Calibration B1		13,740	
P08	P08 Calibration D1		-6,412	
P09	P09 Calibration C2		9,760	
P10	P10 Calibration B2		11,548	
P11	P11 Calibration D2		-7,321	
P12	P12 Min Angle		80,000	

### 5.3.8 Synchro

	Description	Unit	Default	Mach.value
P01	P01 Simulation	yes/no	No	
p02	P02 Counter Direction synchro axis	left/right	Right	
	1			
P03	P03 Counter Direction synchro axis	left/right	Right	
	2			
P04	R04 Resolution	pulses/mm	200	
P05	P05 Reference value synchro axis 1	mm	300	
P06	P06 Reference value synchro axis 2	mm	300	
P07	P07 RefSpeedUp	%	20	
P08	P08 RefSpeedDown	%	35	
P09	P09 OffsetUp1	DAC	1250	
P10	P10 OffsetUp2	DAC	1250	
P11	P11 OffsetDown1	DAC	1150	
P12	P12OffsetDown2	DAC	1050	
P13	P13 KDz12		95	

P14	P14 KGz12		30	
P15	P15 KDz34		3250	
P16	P16 KGz34		160	
P17	P17 KDz56		2400	
P18	P18 KDz7		540	
P19	P19 KDz8		85	
P20	P20 KGz8		30	
P21	P21 SecUpSpeed	mm/s	75,000	
P22	P22 AccTDC	mm/s <sup>2</sup>	1000	
P23	P23 Fall Speed	mm/s	200,000	
P24	P24 DecFaSI Factor	gainfactor	6500	
P25	P25 VminFaSI	mm/s	1,000	
P26	P26 AccEndpoint	mm/s <sup>2</sup>	750	
P27	P27 UpSpeed	mm/s	200.000	
P28	P28 DecTDC	gainfactor	2000.000	
P29	P29 VminTDC	mm/s	35.000	
P30	P30 BrakeDist	mm	0.200	
P31	P31 BrakeSpeed	mm/s	1.000	
P32	P32 PosOK	mm	0.020	
P33	P33 Pressure Wage	ves/no	No	
P34	P34 OffsetPress	DAC	1350	
P35	P35 Pressure Up	%	58.00	
P36	P36 Pressure RefDown	%	2.50	
P37	P37 LimitMax1	DAC	4500	
P38	P38 LimitMax2	DAC	4900	
P39	P39 LimMin	DAC	3000	
P40	P40 Pressmax1	%	1 00	
P41	P41 Pressmax2	%	1 00	
P42	P42 PressMin	%	2 00	
P43	P43 CtrlPressTime	s s	0.050	
P44	P44 AutoOffsetLIp	DAC	10	
P45	P45 AutoOffsDown	DAC	20	
P46	P46 Minimum Delay TDC	S	0.100	
P47	P47 Delay Fa/SI	S	0,100	
P48	P48 Minimum Delay Denth	6	0,100	
P40	P49 Maximum Workspeed	s	10,000	
P50	P50 Decompression distance	mm	0.500	
P51	P51 Decompression speed	mm/s	8,000	
P52	P52 ToolHeight	mm	0,000	
D53	P53 LDC Max	mm	-20,000	
P5/	P54 Maximum tilt	mm	10,000	
D55		mm	5 000	
P 55 D 56		mm	5,000	
P50	P57 PofTupo1	0/4/22/64/06/129/16/	102	
F37	F57 Kertyper	10/4/32/04/90/120/10/	192	
	DE0 DofTura 2	192	102	
P00	P56 Rei Typez	_0/4/32/04/90/128/10/	192	
DEO		192	0.000	
P59		S	0,000	
P60	P60 Dac01 ime	S DAO	0,000	
P61	P61 DacUp	DAC	0,000	
P62	P62 Delay for activation	S	30,000	
P63	Po3 Minimum fast/slow point	mm	0,000	
P64	P64 Maximum clamping point	mm	5,000	
P65	P65 Pressure limit UP	%	50,000	
P66	P66 Pressure limit DOWN	<u>%</u>	100,000	
P67	P67 StartFall DAC	DAC	0	

P68	P68 RapDown P67	S	0,000	
P69	P69 StartUp DAC	DAC	1000	
P70	Delay UpTheoPos	S	0,000	
P71	TDC-Pressure	DAC	0	
P72	PressRefUp	%	50,00	
P73	Press2ndUp	%	50,00	
P74	Fasl Press	%	15,00	
P75	Fasl Dac	DAC	1	
P76	PressSlowUp	%	100,00	
P77	TeachInup	DAC	0	
P78	NormVoltage	DAC	0	

### 5.3.9 Inputs

Description	ByteNr	BitNr
Tandem Mode	1	0
Syncro Down	1	2
Crowning Alarm	1	3
Syncro Up	1	4
Crowning Limit+	1	6
Crowning Limit-	1	7
Pump	2	0
Reset	2	1
Syncro Safety Speed	2	2
Down Pedal Action	2	4
AirPressure	1	1
Robot Manual Request	0	0
Manual Security Zone	0	0
Robot Mode	2	7
Robot Ready Pos OK	0	0
Robot Ready Clamp	0	0
Robot Ready Depth	0	0
Robot Ready TDC	0	0
Clamping Punch	2	5
Clamping Die	2	6
DataM Slip	1	5
Tandem Center Door Fault	0	0
Tandem Center Door Limit+	0	0
Tandem Cebter Door Limit-	0	0
Backguage Finger1	0	0
Backguage Finger2	0	0
Robot Synchro Enable	0	0
Support at TDC	3	1
Support at LDC	3	2
Support oil level	3	3
Support oil temperature	3	4

### 5.3.10 Outputs

Description	ByteNr	BitNr
Crowning Up	1	4
Crowning Down	1	5
Robot Syncro Moving	0	0
Finger Valve L	2	1
Finger Valve M	2	2
Finger Valve K	2	3
Pump Off	2	4

Auxiliary 2	0	0
Auxiliary 1	0	0
Robot Pos OK	0	0
Robot Clamp Point	0	0
Robot Depth	0	0
Robot TDC	0	0
Clamp Punch	1	3
Clamp Die	1	2
Unclamp Punch	1	1
Unclamp Die	2	0
Follow Arm 1	2	6
Follow Arm 2	0	5
Follow Arm 3	0	0
Follow Arm 4	0	0
Tandem Door Forward	0	0
Tandem Door Backward	0	0
Robot Manual Request Accepted	0	0
Support up	3	0
Support down	3	1
Support pump	3	2



# Codes

The following codes can occur when working with the controller. Most codes are specifically for service technicians and are not explained in this manual.

The first character in the code message definition is either {0} or {1}.

{0} means the shown coder is more like a warning. In most of the cases warnings refer to a bad data input ( a message).

{0} also means this code will not be registered in the log file.

{1} means the shown code message will be registered in the log file.

The codes (message/error ) created by Pressbrake/Controller will appear on screen ; yellow letters into a red info bar.

In case it concern the "PCSS message/error code" from lazersafe: lightguard:

- For message: yellow info bar with blue letters
- For error : red info bar with yellow letters
- -

### 6.1 General code

Code	Sta	General Codes	Ea	Ea	Fa	Ful
	tus		sy	sy	st	
			в.	B	В.	10
				2D T		uc h
01	0	Fatal error : Reset not OK	х	X	х	X
		For CE-machine				
		The reset button hasn't been pressed.				
		On CE-machines the reset button must be pressed at certain,				
		times for example at start-up, after activation of the pump.				
		Press the reset button to clear the error.				
02	1	Fatal error : Reset failure	Х	Х	Х	Х
		For CE-machine				
		The reset command has been detected when it shouldn't.				
		Try restarting the machine.				
		When this error, remains, there's probably something wrong				
		with the reset-contact or the reset button.				
03	0	Pump not OK	Х	Х	Х	Х
		The hydraulic pump is not active. Press the green pump				
		button				
04	1	Reset OK while disable> restart control	Х	Х	Х	Х
		For CE-machine				
		Input reset should never be active .				
			1			
05	1	Check Configuration (Restart control)	Х	X	X	Х
		There are no 2 syncro ID's founded at start-up				
06	1	Not enough backgauge devices (restart control)	Χ	Х	Х	Х
		Into parameters, more backgauge devices defined as found				
		at start-up				
07	1	Configuration Error (restart control).	Χ	X	X	Χ
08	1	No compatible software	Χ	Х	X	Х
		Synchro software version to old ( older as v1601 )				
0B	1	Can error, synchro left	Χ	X	Х	Х
		Less as 90 CAN-messages received from synchro-1				
00	1	Can error, syncro right	Х	X	X	Х
		Less as 90 CAN-messages received from synchro-2				
0F	1	Hardware stop failure	Х	X	X	X

		At start is reference or porduction input " Low ".				
		No Serial stop received, within 5 seconds the input has				
		became low.				
PR ERR	1	Possible after installing new software	Χ	Χ	Χ	X
		Press on the DELETE button and use code 793				

### 6.2 Syncro related codes

Code	Sta tus	Synchro related Codes	Ea sy	Ea sy	Fa st	Ful I
			В.	B-	В.	То
				2D		uc
				Τ.		h
15	1	Security-test : Check on left (Y1) reference pulse failed.	Х	X	X	X
		For CE-machine				
		Reference pulse Y1 already active before start of reference procedure				
16	1	Security-test : Check on right (Y2) reference pulse failed.	X	X	X	X
		For CE-machine				
		Reference pulse Y2 already active before start of reference procedure				
17	1	Security-test : Left (Y1) counter counts reverse.	X	X	X	X
		For CE-machine				
		During the up or downard movement of the reference-cycle cylinder Y1	1			
40	4		v	v	v	v
18	1	Security-test : Right (Y2) counter counts reverse.	X	X	X	X
		For CE-machine				
		During the up or downard movement of the reference-cycle cylinder Y2	1			
4.0	4			v	~	×
19	1	Security-test : Left (Y1) machine-tilt on fast-slow point.	X	X	X	X
		Parallelism deviation cylinder Y1 is larger than parameter 54	_			
		at fa/si-point ( fast/slow point )				
10	4	Security test - Dight (V2) mechine tilt on fest clevy neint	v	v	~	v
1A		Security-test : Right (12) machine-thit on fast-slow point.	^	^	^	^
		et fa/al paint ( fast/alaw paint )				
		at la/si-point ( lasi/siow point )				
10	1	Security test - Lease belt control left (V1) failed	v	v	v	v
		Security-lest . Loose bolt control left (11) failed.	^	^	^	^
		Actual position moves >0.2mm upward, during downard movement on V1				
		Actual position moves >0,2mm upward, during downard movement on TT	1			
10	1	Security-test : Loose bolt control right (Y2) failed	X	X	X	Х
		For CE-machine	Ê			
		Actual position moves >0.2mm upward, during downard movement on Y2				
1D	1	Security-test:Delay closing left (Y1) holdup valve on Fa-SI point.	X	X	X	X
		For CE-machine				
		Concern delayed closing holdup valve	1			
		Only during workspeed in zone 3 between " fa/sl & clamping point".				
		If speed of measuring stick in workspeed exceeds 40mm/sec.				
1E	1	Security-test: Delay closing right (Y2) holdup valve on Fa-SI point.	X	X	X	X
		For CE-machine,				
		Only during workspeed in zone 3 between " fa/sl & clamping point".				
		If speed of measuring stick in workspeed exceeds 40mm/sec.				

			I	I		
24	4	Security test + Leskers, of left (V4) prepartienal down value	v	v	v	V
ZA		Security-test : Leakage of left (fi) proportional down-valve.	^	^	^	^
		For CE-machine	-			
		Cylinder Y1 drops mored than 0,020mm/0,1sec	-			
00			~		~	
2B	1	Security-test : Leakage of right (Y2) proportional down-valve.	X	X	X	X
		For CE-machine	-			
		Cylinder Y2 drops mored than 0,020mm/0,1sec	-			
2C	1	Security-test : Left (Y1) holdup valve remains open.	X	X	Х	X
		For CE-machine	<u> </u>			
		Cylinder Y1 drops more than 0,020mm/0,1sec				
2D	1	Security-test : Right (Y2) holdup valve remains open;	Х	Х	X	X
		For CE-machine				
		Cylinder Y2 drops more than 0,020mm/0,1sec				
2E	1	Security-test : Pressure valve check left (Y1) failed.	Χ	Χ	Х	X
		For CE-machine				
		Cyl.Y1 increases more than 0,1mm/1sec without pressure valve control.				
2F	1	Security-test : Pressure valve check right (Y2) failed.	Χ	Χ	Χ	X
		For CE-machine				
		Cyl.Y2 increases more than 0,1mm/1sec without pressure valve control.				
30	0	Communication Error.	Χ	Χ	Χ	X
		RS232 serial communication problem between Macon and Windows				
32	1	Security-test : Leakage of left (Y1) cylinder.	Χ	Χ	Χ	X
		For CE-machine				
		Cylinder Y1 drops averaged 1,2mm / minute				
33	1	Security-test : Leakage of right (Y2) cylinder.	Х	Χ	Χ	X
		For CE-machine				
		Cylinder Y2 drops averaged 1.2mm / minute				
34	1	Security-test : Left (Y1) overshoot during work speed.	Х	Х	Х	X
		For CE-machine				
		Current position cvl. Y1 overshoots $> 0.75$ mm the theoretical target				
25	4	Converts toot - Direkt (V2) overale oot during work enough	v	v	v	v
30		Security-test : Right (12) overshoot during work speed.	^	^	^	^
		For CE-machine	-			
		Current position cyl. Y2 overshoots > $0,75$ mm the theoretical target				
36	1	Security-test : Left (Y1) up-speed too high.	X	X	X	X
36	1	<b>Security-test : Left (Y1) up-speed too high.</b> The up speed is more than twice as high as requested ( Cylindre Y1 )	X	X	X	X
36	1	Security-test : Left (Y1) up-speed too high. The up speed is more than twice as high as requested ( Cylindre Y1 )	X	X	X	X
<u>36</u> <u>3</u> 7	1	Security-test : Left (Y1) up-speed too high. The up speed is more than twice as high as requested ( Cylindre Y1 ) Security-test : Right (Y2) up-speed too high.	X X	X	X X	X

			I			
38	1	Security-test : Left (Y1) un-speed too low	x	x	x	x
		The up speed of cylinder Y1 is smaller than 1mm/s	Ê	Ê		
39	1	Security-test : Right (Y2) up-speed too low.	Х	Х	Х	Х
		The up speed of cylinder Y2 is smaller than 1mm/s				
			T			
3A	1	Security-test : Left (Y1) overshoot on endpoint.	Χ	Χ	Х	Χ
		For CE-machine				
		" Current " posistion cylinder Y1 is 1mm lower than the " end point "				
3B	8 1	Security-test : Right (Y2) overshoot on endpoint.	Χ	Χ	Χ	Χ
		For CE-machine				
		" Current " posistion cylinder Y2 is 1mm lower than the " end point "				
3D	0	State : Antideflection - Alarm input active	X	Х	Х	Х
3E	1	Antideflection - Axis 7 not defined	X	X	Χ	Х
		Motorised antideflection is defined (general P04) but no Axis 7 defined				
3F	0	State : Antideflection Limit	X	X	X	X
		Given antideflection value exceeds the minimum allowed value (input b7).	1	1		
40	0	State : Antideflection Limit +.	X	X	X	X
		Given antideflection value exceeds the maximum allowed value (input bb)	_	1	-	
	4	Detell Clin estive	v	v	v	v
41			<u>^</u>	^	^	^
40	0	State : Tilt value too large	v	v	Y	Y
40		The tilt value in the programmed step exceeds the allowed value	~	Ê	Â	^
		(Maximum Tilt parameter)				
	Ì				Ì	
4F	1	Security-test : Left work-speed left (Y1) too high.	x	x	х	x
		The detected work speed of the left cylinder (synchro 1) is more				
		than twice as high as requested.	T			
4F	1	Security-test : Right work-speed (Y2) too high.	Х	Х	Х	Х
		The detected work speed of the left cylinder (synchro 2) is more	T			
		than twice as high as requested.				
50	1	Security-test : Overrun-control failed left (Y1) distance.	Χ	Χ	Х	Χ
		At fast/slow point, the beam is stopped. At that moment, the overshoot				
		distance is measured. If the left (synchro 1) overshoot exceeds 10mm,				
		code 50 is generated.	Ι			
	Ī		1	1	Ī	
51	1	Security-test : Overrun-control failed right (Y2) distance.	X	X	Х	Х
	Ē	At fast/slow point, the beam is stopped. At that moment, the overshoot				
	Ī	distance is measured. If the right (synchro 2) overshoot exceeds 10mm.		I		
		code 51 is generated.				
				<b>1</b>		

			Ĩ	Ĩ	ľ	
52	1	Security-test : Overrun-control failed left (V1) time	Y	Y	Y	Y
J2	-	At fast/slow point, the beam is stopped. At that moment, the overshoot	~	~	~	Ê
		distance is measured (- time between the stop command and	1	1	1	
		the complete stop of the beam movement). If the overshoot time of the left	t		İ.	
		cylinder (synchro 1) exceeds 250ms, code 52 is generated	Ì	T		
			ł			
53	1	Security-test : Overrun-control failed right (V2) time	Y	Y	Y	Y
- 33	-	At fast/clow point, the beam is stopped. At that moment, the oversheet	^	^	^	<u>^</u>
		dictance is measured (- time between the step command and	1	1	1	-
		the complete step of the beam meyement). If the systemed time of the				-
		right extinder (expense 2) exceede 250me, eade 52 is generated	I	-		-
	-	ngni cylinder (synchro 2) exceeds 250ms, code 53 is generated.				-
50	4	Occurrity (control of (VA) monthing (it) dening following	v	v	v	~
56	1	Security-test : Left (Y1) machine tilt during fail/refdown.	X	X	X	X
		Synchro 1: parallelism deviation larger as 12.5mm during fall-movement.	1	1	1	<b>r</b>
				_		-
57	1	Security-test : Right (Y2) machine tilt during fall/retdown.	X	X	X	X
	_	Synchro 2: parallelism deviation larger as 12.5mm during fall-movement.	1		1	_
				_		
58	1	Security-test : Left (Y1) machine tilt during up/ref up.	X	X	Χ	X
		Synchro 1: parallelism deviation larger as 12.5mm during up-movement.				
59	1	Security-test : Right (Y2) machine tilt during up/ref up.	Χ	Χ	X	X
		Synchro 2: parallelism deviation larger as 12.5mm during up movement.				
5A	1	Security-test : Work Speed left (Y1) cylinder too small	Χ	Χ	Χ	Χ
		Synchro 1: the fall speed is smaller than 0.5mm/s, even though a value				
		of over 1500 is sent.				
5B	1	Security-test : Work Speed right (Y2) cylinder too small.	Χ	Χ	Χ	Χ
		Synchro 2: the fall speed is smaller than 0.5mm/s, even though a value				
		of over 1500 is sent.				
5C	1	Security-test : Fall-Speed left (Y1) cylinder too small.	Х	Х	Х	Х
		Synchro 1: the fall speed is smaller than 1mm/s, even though a value				
		of over 1500 is sent.	I	I	I	
			1			
5D	1	Security-test : Fall-Speed right (Y2) cylinder too small.	x	x	x	x
		Synchro 2: the fall speed is smaller than 1mm/s, even though a value				F
		of over 1500 is sent	1			
55	0	Angle out of range	Y	Y	Y	Y
JL	-	Angle out of range during alpha-measurement system	ŕ	Ê	ŕ	Ê
	-	Current syncrodenth < as calculated ODP by Windows	┢	╋		-
	-		┢	╋	$\mathbf{H}$	-
	~	Sensor not estivated		~	~	~
51	0	Sensor not activated.	X	X	Χ	٨
	-	ino alpha-measurement present at the moment anglemeasurement step	T	1	1	
						<u> </u>
60	1	Security-test : Left (11) tall speed too high.	X	X	X	<b>^</b>
		Synchro 1 : the fall speed is more than twice as high as requested.				

	I				1	
64	4	Security test - Dight (V2) fell aread tes high	v	v	v	V
0		Security-test : Right (12) fail speed too high.	~	~	^	^
		Synchro 2 : the fail speed is more than twice as high as requested.	1	1		
60	4	Security test + 1 oft (V4) mechine tilt during work speed	v	v	v	v
02		Security-test : Left (11) machine tilt during work speed.	^	^	^	<u>^</u>
63	1	Security-test : Right (V2) machine tilt during work speed	x	x	Y	Y
	ŀ	bedanty test . Hight (12) machine the daring work speed.			Ê	Ê
64	1	Security-test : Left (Y1) scale doesn't count.	х	х	Х	x
65	1	Security-test : Right (Y2) scale doesn't count.	Х	Х	Х	Х
66	0	State : Time-out antideflection (I/O).	Χ	Χ	X	Х
		Anti-deflection is active but there is no reaction. This state is				
		generated after 10 sec.(minimum 5 ADC pro 2 seconds)				
67	0	Synchro: Endpoint too deep, end of range.	Χ	Χ	Χ	X
		Endpoint (depth) from bend cyclus is out of range (P53>0) from cylinders	5			
68	0	Synchro: Tandem-input active at start-up	Χ	Χ	X	X
69	1	Synchro: Alarm from External Dac	Χ	Χ	Х	X
6A	0	Synchro: No Plate detected	X	X	X	X
		If plate thickness measurement via pressure: Ram already placed 1mm	-	-		
		into V-grove but still plate detected.				
					_	_
6B	0	Maintenance required	Х	Х	X	X
		Please contact your service department				
		Machine works normal, but service intervention can be solved with			-	
		RoboDiagnostics intervention.				-
			v	v		
60	1	Service Error - Maintenance period expired	X	X	X	×
		Potential risk of machine system damage,			-	
60	<u> </u>	Superro: No START possible			<b>_</b>	~
00		Synchro. No START possible	Λ	Λ	^	<u>^</u>
	┢				1	
65	1	Unknown arrar from laft synchro ( synchro#1 )	Y	Y	Y	Y
UL			Â	Â	Ê	Ê
65	1	Unknown error from right synchro ( synchro#2 )	x	x	x	x
	Ľ		Ê	Ê	Ê	Ê
71	1	PLC output-use conflicts.	X	X	Х	x
	Ĺ	PLC and Macon use the same outputs	Ē	Ē	Ē	Ľ.
	Ĩ		Í	Í		
72	1	IRIS Lazersafe RS485 problems	Х	Х	Х	Х
	Ĩ	Ethernet communication problem between Macon and the	Ī	Ī		
	Ĩ	Iris-LazerSafe-AngleMeasurementSvstem.	Ī	Ī	1	
	L		L	L		
73	1	PCSS Lazersafe Can Problems	X	X	X	X

		CAN communication problem between Macon and PCSS-LazerSafe				
74	0	No Air pressure	Χ	Χ	Χ	Χ
		More as 3 second no air pressure during productin proces.				
75	1	WILA STL CAN problems	Χ	Χ	Χ	Χ
		STL = Smart Tool Locator				
		Communication problem between Macon and WILA STL				
					┢	
77	0	Robosoft, internal security	X	X	X	X
78	0	Top Tool not clamped	X	Х	Х	X
		I/O timeout, Top Tool not hydaulicg clamped.				
	_				_	
79	0	lop lool not unclamped	X	X	X	X
		I/O timeout, Top Tool not hydaulicg unclamped			-	-
74	<u> </u>	Dettem Teel net elemned	v	v	v	~
/A	0	Bottom Tool not clamped	<u> </u>	^	^	<u> </u>
7B	0	Bottom Tool not unclamped	Y	Y	Y	Y
	Ŭ	VO timeout Bottom Tool not bydaulicg unclamped			Ê	
70	0	Synchro: KeepUp Left not "0" during fall	х	х	х	х
7D	0	Synchro: KeepUp Right not "0" during fall	Х	Х	Х	Х
7E	0	Synchro: KeepUp Left not "1" during slow	X	Χ	Χ	X
7F	0	Synchro: KeepUp Right not "1" during slow	Χ	Χ	Χ	X

### 6.3 Axis related codes

Code	Sta	Axis related Codes : resumed	Ea	Ea	Fa	Ful
	tus	Axis Telaleu Coues . Tesuilleu	sy	sy	st	Т
			В.	В	В.	То
				2D T		uc
		The following codes (%0.2.8E) are specific axis codes				n
	-	There are more axis codes than shown in this list				
		Code 90 to FF have the same code message order as from 80.2 8F				
		but they are referring to other axes:				
		80> 8F : Axis 1 (X1)	Х	Х	Х	Х
		90> 9F : Axis 2 (X2)	х	Х	Х	Х
		A0> AF : Axis 3 (Z1)	х	Х	Х	Х
		B0> BF : Axis 4 (Z2)	Х	Х	Х	Х
		C0> CF : Axis 5 (R1)	Х	Х	Х	Х
		D0> DF : Axis 6 (R2)	Х	Х	Х	Х
		E0> EF : Axis 7 (Antideflection)	Х	Х	Х	Х
		F0> FF : Axis 8	Х	Х	Х	Х
Code	Sta	Axis related codes : Axis 1 (X1)				
	tus	AXIS Telaleu Coues . AXIS T (XT)				
80	1	Current limit.	Χ	X	X	X
81	1	Duty cycle 200V DC motor.	X	X	X	X
		Illegal command in Main Loop				
82	1	CAN problems	Χ	Χ	X	X
		Illegal command in Run Loop				
84	0	Position not valid.: CNC Reset	Х	Х	X	X
85	0	State : Target value too small.	Х	Х	X	X
		The entered target value is smaller than the minimum software limit.				
	•					
86	0	State : larget value too big.	X	X	X	X
		The entered target value is larger than the maximum software limit.				
	4		v	v	v	v
88			^	^	^	^
	4	Des/Counter Configuration	v	v	v	v
09			^	^	^	^
0.4	4	Poference Lect		~	~	<b>_</b>
ŏA			^	^	^	^
00	4	No reference channel detected		v	~	v
δB	1	NO reference channel detected.	~	X	~	~

				-		_
		Limit switch remains controlled			<u> </u>	
	_					
80	0	State : Limit - Switch.	X	X	X	X
		winimum limit switch reached.				
28	0	State : Limit + Switch	Y	x	x	x
00	U	Maximum limit switch reached	- î	^	Â	Ê
8E	1	No CounterPulses.	Х	Х	Х	Х
		The motor is CNC-controlled but the control detects no counter pulses				
		within the time specified in the No Pulse Timer parameter				
8F	0	Unknown error	X	X	X	X
Code	Sta tus	Axis related codes : Axis 2 (X2)				
90	1	Current limit.	X	X	X	X
91	1	Duty cycle 200V DC motor.	X	Х	X	X
		Illegal command in Main Loop	-		-	<u> </u>
02	1	CAN problems	Y	Y	Y	Y
52	-	llegal command in Run Loop	<b>^</b>	^	<u>^</u>	Ê
			Ť			
94	0	Position not valid.: CNC Reset	Х	Х	Х	Х
95	0	State : Target value too small.	X	X	X	X
		The entered target value is smaller than the minimum software limit.				
96	0	State : Target value too big.	X	X	X	X
		The entered target value is larger than the maximum software limit.				
90	1	Driver not OK	Y	x	x	x
	-				Ê	Ê
99	1	Dac/Counter Configuration	X	Х	Х	Х
9A	1	Reference Lost.	X	X	X	X
9B	1	No reference channel detected.	X	X	X	X
		Limit switch remains controlled				
~	0	State Limit Switch	~	~	<u> </u>	<b>_</b>
90	U	State : LIMIT - SWITCH. Minimum limit switch reached	<b>^</b>	^	<b>^</b>	$\frown$
					┢──	
9D	0	State : Limit + Switch.	X	x	x	x
		Maximum limit switch reached.			Ē	Ē
9E	1	No CounterPulses.	X	X	Χ	X

		The motor is CNC-controlled but the control detects no counter pulses				
		within the time specified in the No Pulse Timer parameter				
9F	1	Unknown error	X	Χ	Χ	X
Code	Sta tus	Axis related codes : Axis 3 (Z1)				
A0	1	Current limit.	X	Χ	X	X
A1	1	Duty cycle 200V DC motor.	X	Х	Х	X
		Illegal command in Main Loop	_			
A2	1	CAN problems	X	X	X	X
		niegai command in Run Loop				
Δ4	0	Position not valid : CNC Reset	x	x	x	x
711	Ŭ				Ê	
A5	0	State : Target value too small.	Х	Х	Х	X
		The entered target value is smaller than the minimum software limit.				
A6	0	State : Target value too big.	X	Χ	X	X
		The entered target value is larger than the maximum software limit.				
			_			
A8	1	Driver not OK	X	Х	X	X
40	4	Dee/Counter Configuration	v	v	v	~
Ay		Dac/Counter Configuration	<b>^</b>	<u> </u>	<u>^</u>	^
ΔΔ	1	Reference Lost	Y	x	Y	x
	Ľ			Â	Ê	^
AB	1	No reference channel detected.	Х	Х	Х	Х
		Limit switch remains controlled				
AC	0	State : Limit - Switch.	X	Х	X	X
		Minimum limit switch reached.				
4.0						
AD	0	State : Limit + Switch.	X	X	X	×
AF	1	No CounterPulses.	X	x	x	x
	-	The motor is CNC-controlled but the control detects no counter pulses				
		within the time specified in the No Pulse Timer parameter				
AF	1	Unknown error	Х	Х	X	X
			_		<b> </b>	
Code	Sta tus	Axis related codes : Axis 4 (Z2)				
B0	1	Current limit.	X	Χ	X	X

			1	Ĩ		
B1	1	Duty cycle 200V DC motor	Y	Y	Y	Y
	-	Illegal command in Main Loop		Ê	Â	^
B2	1	CAN problems	Х	Х	Х	Х
		Illegal command in Run Loop				
B4	0	Position not valid.: CNC Reset	Χ	X	X	X
B5	0	State : Target value too small.	X	X	X	X
		The entered target value is smaller than the minimum software limit.				
	_					
B0	0	State : l'arget value too big.	X	X	X	X
		I ne entered target value is larger than the maximum software limit.				-
B8	1	Driver not OK	Y	Y	Y	Y
DO	-	Divernotor	Ê	<u>^</u>	<u>^</u>	<u>^</u>
B9	1	Dac/Counter Configuration	x	x	x	x
	-		Ê			
BA	1	Reference Lost.	Х	Х	Х	х
BB	1	No reference channel detected.	X	X	X	Х
		Limit switch remains controlled				
BC	0	State : Limit - Switch.	Χ	X	X	X
		Minimum limit switch reached.				
	_					
BD	0	State : Limit + Switch.	X	X	×	×
	_					-
BF	1	No CounterPulses	x	x	x	x
	-	The motor is CNC-controlled but the control detects no counter pulses				
		within the time specified in the No Pulse Timer parameter				
BF	1	Unknown error	X	X	X	X
Code	Sta	Axis related codes : Axis 5 ( R1 )				
	tus					
C0	1	Current limit.	Х	Х	Х	х
C1	1	Duty cycle 200V DC motor.	Χ	X	X	X
		Illegal command in Main Loop				
C2	1	CAN problems	X	X	X	X
		Illegal command in Run Loop		<u> </u>		
				<u> </u>		_
C4	0	Position not valid.: CNC Reset	X	X	X	X

C5	0	State : Target value too small.	Х	Х	Х	X
		The entered target value is smaller than the minimum software limit.				
C6	0	State : Target value too big.	X	Х	X	X
		The entered target value is larger than the maximum software limit.				
60	1	Driver not OK	v	v	v	Y
			ŕ	Ê	Ê	^
C9	1	Dac/Counter Configuration	Х	х	х	X
CA	1	Reference Lost.	Χ	Χ	X	X
CB	1	No reference channel detected.	X	X	X	X
		Limit switch remains controlled	-			
00	0	State : Limit - Switch	x	x	x	X
	Ť	Minimum limit switch reached.	Ê	Ê	Ê	^
CD	0	State : Limit + Switch.	X	Χ	Χ	X
		Maximum limit switch reached.				
CE	1	No CounterPulses.	X	X	X	X
	-	within the time specified in the No Pulse Timer parameter	-		-	
CF	1	Unknown error	X	X	X	X
Code	Sta	Axis related codes : Axis 6 (R2)				
	tus					
D0	1	Current limit.	Х	Х	Х	Х
D1	1	Duty cycle 200V DC motor.	X	Х	X	X
		Illegal command in Main Loop	_			
- D0	4		<b>_</b>	~	~	<b>v</b>
	┢╴	CAN problems	$\mathbf{f}$	<b>^</b>	<b>^</b>	^
			$\mathbf{T}$	1		
D4	0	Position not valid.: CNC Reset	X	X	X	X
D5	0	State : Target value too small.	X	X	X	X
		The entered target value is smaller than the minimum software limit.		-		
	0	State · Target value too big	v	Y	Y	Y
	-	The entered target value is larger than the maximum software limit	ŕ	ŕ	<b>^</b>	^
		היה כווניוכע נמוסכי שמעכיוס ומוסכי נוזמו נווכ ווזמאווועווו סטונשמיכ ווווונ.	┢			
D8	1	Driver not OK	X	X	X	X
	1	Dac/Counter Configuration	X	X	Y	X

			1	T	T .	
	-					
DA	1	Reference Lost.	X	<u>×</u>	X	X
DB	1	No reference channel detected.	X	Χ	X	X
		Limit switch remains controlled				
DC	0	State : Limit - Switch.	Х	Х	Х	Х
		Minimum limit switch reached				
חח	0	State : Limit + Switch	Y	Y	Y	Y
	- U	Maximum limit switch reached	^	Ê	Ê	^
				-		
		No CounterPulsos	v	~		v
DE	1	No CounterPuises.	<b>_</b>	<u> </u>	<u> </u>	<b>^</b>
		The motor is CNC-controlled but the control detects no counter pulses	_	┢──		
		within the time specified in the No Pulse Timer parameter		┣—		
				┢		
DF	1	Unknown error	X	X	X	X
Code	Sta	Axis related codes : Axis 7 ( Antideflection )				
	tus					
E0	1	Current limit.	X	X	X	X
E1	1	Duty cycle 200V DC motor.	X	Χ	X	X
		Illegal command in Main Loop				
E2	1	CAN problems	Χ	Χ	X	X
		Illegal command in Run Loop				
E4	0	Position not valid.: CNC Reset	Х	Х	Х	Х
	Ť			Ē		
E5	0	State : Target value too small	Y	Y	Y	Y
	- V	The entered terret value is smaller than the minimum software limit	^	Ê	Ê	^
				-		
<b>E</b> 0	^	State - Target value tee hig	~			~
<u> </u>	U	State . Target value too big.	<b>^</b>	┢	<u>^</u>	^
		i ne entered target value is larger than the maximum software limit.	-	┢	┢──	
				Ŀ		
E8	1	Driver not OK	X	<u>X</u>	X	X
				⊢		
E9	1	Dac/Counter Configuration	X	X	X	X
EA	1	Reference Lost.	X	X	X	X
				Γ	Γ	
FB	1	No reference channel detected.	X	Х	X	Х
	l -	l imit switch remains controlled		F	Ê	
					┢──┤	
					• '	
	0	State : Limit - Switch	v	Y	Y	Y
EC	0	State : Limit - Switch.	X	X	X	X

			T		Γ	
ED	0	State - Limit - Switch	v	v	v	V
	0	State : Limit + Switch	<b>^</b>	^	^	^
EE	1	No CounterPulses.	x	x	x	x
	-	The motor is CNC-controlled but the control detects no counter pulses			<u> </u>	<u> </u>
		within the time specified in the No Pulse Timer parameter				
EF	1	Unknown error	Χ	Χ	X	X
Code	Sta tus	Axis related codes : Axis 8				
F0	1	Current limit.	X	Χ	Χ	X
F1	1	Duty cycle 200V DC motor.	X	X	X	X
		Illegal command in Main Loop				
F2	1	CAN problems	X	Х	X	X
		Illegal command in Run Loop				
	•	Desition restantials, ONO Deset			<u> </u>	<b>_</b>
F4	0	Position not valid.: CNC Reset		×	X	X
<b>F</b> 6	0	State - Terret velue tee emell		v	v	v
FO	0	State : Target value too Small. The entered terret value is smaller then the minimum software limit	<b>^</b>	^	<u>^</u>	^
					-	
F6	0	State : Target value too big	x	x	x	x
	Ŭ	The entered target value is larger than the maximum software limit		Ê	Ê	^
F8	1	Driver not OK	Х	Х	Х	X
F9	1	Dac/Counter Configuration	Χ	Χ	Χ	X
FA	1	Reference Lost.	X	X	X	X
FB	1	No reference channel detected.	X	Х	X	X
		Limit switch remains controlled				
50	•	Ofere Limit Order			<u> </u>	<u> </u>
FC	0	State : Limit - Switch.	<b>X</b>	X	<u>×</u>	X
ED	0	State : Limit + Switch	Y	Y	Y	Y
	Ŭ	Maximum limit switch reached		Ê	Ê	Ê
FE	1	No CounterPulses.	Х	X	Х	X
		The motor is CNC-controlled but the control detects no counter pulses		Ĺ		
		within the time specified in the No Pulse Timer parameter				

Code	s 198
FF 1 Unknown error X	ХХХ

### 6.4 Lazersafe specific error codes

Code	Sta	Lazarcafa chasifia arrar andas	Ea	Ea	Fa	Ful
	tus	Lazersale specific error coues	sy	sy	st	I
			В.	В	В.	То
				2D		uc
				Т		h
00CA	1	Right and Left Gates are open	Х	Х	X	X
		For CE-machine	-			
						_
00CB	1	Rear gate are open	Х	X	X	X
		For CE-machine				
	<u> </u>					
00000	1	Emergency stop button activated	X	X	X	X
		For CE-machine				
0054						_
00FA	1	Line driver fault at Y1	X	X	X	X
		For CE-machine	-			
0050			v	v		~
00FB	1	Line driver fault at Y2	X	X	X	X
		For CE-machine				
0050		Device a second of M4	v	v		~
UUFC	1	Power supply error at 11	X	X	×	<u>×</u>
		For CE-machine				
0050	4	Power oursely error of V2	v	v		v
		Fower supply error at 12	^	^	$\frown$	^
		FOI CE-Machine				
4210	1	V1 too bigh when obstruction consol during setting	v	v	v	v
4210		For CE-maching	^	^	Ê	^
4211	1	V2 too high when obstruction sensed during setting	Y	Y	Y	Y
7211		For CE-machine	<b>^</b>	Â	Ê	^
4212	1	Y1 too low when obstruction sensed during setting	x	x	x	X
	-	For CE-machine				
4213	1	Y2 too low when obstruction sensed during setting	Х	Х	Х	Х
		For CE-machine				
4214	1	Mach.not level-Y1 too high when obstr.sensed during mute setting	Х	Х	X	X
		For CE-machine	Ĩ			
			l			
4215	1	Mach.not level-Y2 too high when obstr.sensed during mute setting	Х	Х	X	X
		For CE-machine	Ī			
4220	1	Down stroke stpped by first obstruction in normal mode	Х	X	X	X

		For CE-machine				
012C	1	Pump fault ( frequency convertor on PM )	X	X	X	X
		Decimal error code = 202				
012D	1	X1 fault	X	X	X	X
		Decimal error code = 301				
012E	1	X2 fault	Х	Х	Х	Х
		Decimal error code = 302				
012F	1	R1 fault	Х	Х	Х	Х
		Decimal error code = 303				
0130	1	R2 fault	Х	Х	Х	Х
		Decimal error code = 304				
0131	1	Z1 fault	Х	Х	Х	Х
		Decimal error code = 305				
0132	1	Z2 fault	Х	Х	Х	Х
		Decimal error code = 306				
0133	1	Optional axis 1 fault	Х	Х	Х	Х
		Decimal error code = 307				
0134	1	Optional axis 2 fault	Х	Х	Х	Х
		Decimal error code = 308				
0135	1	Optional axis 3 fault	X	X	X	X
		Decimal error code = 309				
0136	1	Optional axis 4 fault	Х	Х	Х	Х
		Decimal error code = 310				
			Γ	Γ		

### 6.5 Lazersafe message codes

Code	Sta	Lazersafe specific message codes	Ea	Ea	Fa	Ful
	tus		sy	sy	st	
			В.	B	В.	10
						uc h
	_					
4040	0	Fault reset Monitor NC contact = OFF	х	х	x	х
4042	0	Fault reset Monitor NO contact = ON	X	X	X	X
4080	0	Lazersafe Machine stop from start up test 1	Х	X	X	X
4081	0	Lazersafe Machine stop from start up test 2	Х	Х	X	х
4220	0	Down stroke stopped by first obstruction in normal mode	Х	Х	X	Х
4221	0	Down stroke stopped by second obstruction in normal mode	Х	Х	X	Х
4222	0	Down stroke stopped by outside obstruction in tray mode	Х	Х	X	Х
4223	0	Down stroke stopped by centre obstruction in tray mode	Х	Х	X	Х
4224	0	Down stroke stopped at mute point in mute stop mode	Х	Х	X	Х
4225	0	Down stroke stop for acknowledgem.of entry to or exit from field muted mode	X	X	X	X
4226	0	Down stroke stopped by opening of side doors	X	X	X	X
4227	0	Crawl speed because of field muted mode	Х	Х	X	Х
4228	0	Crawl speed because of second obstruction in normal mode	Х	Χ	X	Х
4229	0	Crawl speed because of centre obstruction in tray mode	X	Χ	X	Х
422A	0	Crawl speed because of open door	Χ	Χ	X	Χ
422B	0	Crawl speed because of open tools with protection off	Χ	Χ	X	Χ
422C	0	Disparity of robot pin state and CNC robot bit	Χ	X	X	Х
422D	0	Hand/Foot operator mode change latch	Χ	X	X	Х
422E	0	Machine not leveled	X	Χ	X	X
422F	0	Down stroke stopped by selecting robot mode while not in field muted mode	X	X	X	X
4230	0	Down stroke stopped by emergency stop ok latch	X	X	X	X
4231	0	Down stroke stopped by hardware interrupt 2 or 3 in tray mode	X	X	X	X
4232	0	Down stroke stopped by first obstruction in guard only mode	X	X	X	X
4233	0	Down stroke stopped by second obstruction in guard only mode	X	X	X	X
4234	0	Crawl speed because of second obstruction in guard only mode	X	X	X	X
4236	0	Down stroke stopped for acknowledgement of tray mode with upstand height	Х	Х	X	X
4237	0	Down stroke stop by obstr.or foot pedal press during LC break modes oper.	Х	Х	X	Х
4238	0	Down stroke stopped for end of flattening stroke	Х	X	X	Х
4239	0	Crawl speed because no Start-Up Test performed	X	X	X	Х
423F	0	Crawl speed because machine is not referenced	X	X	X	Х
4241	0	Down stroke stopped by first obstruction in tray mode	X	X	X	X
4242	0	Down stroke stopped by second obstruction in tray mode	X	X	X	X
4243	0	Crawl speed because of second obstruction in tray mode	X	X	X	X
4246	0	Disparity of robot pin state and CNC robot bit	X	X	X	X
424B	0	Down stroke stop due to CNC mute actv. during startup tests with no CNC opt	X	X	X	X
424C	0	Down stroke stopped due to brake wear condition	X	Χ	X	X
424D	0	Crawl speed because of Static brake test not performed	X	Χ	X	Χ
4256	0	Crawl speed because of 20mm mute for special tool is not yet allowed.	Х	Х	X	Х

4257	OCrawl speed because of no material condition.	Х	Х	Χ	Х
4258	ODown stroke stop due to both down switch and error reset depress condition	X	X	X	X
4259	ODown stroke stop due to spec.mode activ.disparity for "24hr tests disabling"	Χ	Χ	Χ	Χ
425B	ODown stroke stopped due to hydraulic valve test	Χ	Χ	Χ	Χ
00CA	0Right and left Gates open (decimal code = 202)	X	X	X	Χ
00CB	0Rear gate open (decimal code = 203)	Χ	X	X	Χ
00CC	0Emergency stop button activated ( decimal code = 204)	Χ	X	X	Χ
00FA	0Line driver fault at Y1 ( decimal code = 250)	Χ	X	X	Χ
00FB	OLine driver fault at Y2 ('decimal code = 251 )	Χ	X	X	Χ
00FC	0Power Supply error at Y1 (decimal code = 252)	Χ	X	X	Χ
00FD	0Power Supply error at Y2 (decimal code = 253)	Χ	X	X	Χ
0137	0Reset monitor NC contact = OFF	Χ	X	X	Χ
0138	0Reset monitor NO contact = ON	Χ	Χ	Χ	Χ

### 6.6 Lazersafe PCSS codes

See manual from LazerSafe for all PCSS codes.

Into this document are almost all lasersafe related codes summarized. Also these which are not possible on our pressbrake control. .

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