CoastOne Press Brake

original user manual
Coastone Oy

rev.190903

AUTOMEC
50+ YEARS

82 Calvary St
Waltham, MA 02453

PHONE: (781) 893-3403
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1 INTRODUCTION

Press brake's life span is greatly dependant on maintenance and service. By following instructions of this manual machine can be kept in good condition for years.

CoastOne Oy machines and devices are realiable and safe to use, assuming they are used according instructions. This manual must be red carefully before starting to operate the machine to avoid injuries of personnel and damage of machine.

As Coastone Oy continuosly developes it's products, it reserves right to make changes into machine construction and design without any notification. Information in this manual is valid at the time of it's release.

For more information contact CoastOne Oy or your local supplier.

COASTONE OY

Tuottajantie 27 A 1
60100 Seinäjoki
Finland

http://www.coastone.fi

2 TECHNICAL DATA

Authorized compiler for technical file:
Jukka Hakala
Tuottajantie 27 A 1
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Finland

TECHNICAL DATA	DIM.	C9	C9 X
Press tonnage	kN(US tons)	220(24)	220(24)
Motor power	kW	5	5
Max. bending lenght (D)	mm	850	850
Distance between side frames	mm	790	790
Frame width (A)	mm	1440	1440
Frame height (B)	mm	2200	2500
Frame depth (C)	mm	1280	1280
Throat depth	mm	150	150
Table height	mm	850	850
Weight	kg	1800	2000
daylight	mm	500	650/800
Y-axis stroke	mm	250	250
Y-axis repeatin accuracy	mm	+/-0.002	+/-0.002
Y-axis max working speed	mm/s	10 (20*)	10 (20*)
Y-axis approach speed	mm/s	100	100
Y-axis return speed	mm/s	100	100
X-axis speed	mm/s	500	500
X-axis accuracy	mm	+/-0.025	+/-0.025
X-axis stroke	mm	400	400
X-axis max position dimension	mm	550	550
Delta X-axis speed	mm/s	100	100
Delta X-axis accuracy	mm	+/-0.025	+/-0.025
Delta X-axis stroke	mm	+/-50	+/-50
R-axis speed	mm/s	100	100
R-axis accuracy	mm	+/-0.05	+/-0.05
R-axis stroke	mm	140	140
Z-axis speed	mm/s	1000	1000
Z-axis accuracy	mm	+/-0.5	+/-0.5
Z-axis stroke	mm	120 to 730	120 to 730

*can be up to 20mm/s, depending on requlations.

TECHNICAL DATA	DIM.	C12	C12 X
Press tonnage	kN(US tons)	440(48)	440(48)
Motor power	kW	2x5	2x5
Max. bending lenght (D)	mm	1300	1300
Distance between side frames	mm	1250	1250
Frame width (A)	mm	1930	1930
Frame height (B)	mm	2150	2450
Frame depth (C)	mm	1550	1550
Throat depth	mm	150	150
Table height	mm	820	820
Weight	kg	2800	3000
daylight	mm	500	650/800
Y-axis stroke	mm	250	250
Y-axis repeatin accuracy	mm	+/-0.002	+/-0.002
Y-axis max working speed	mm/s	10 (20*)	10 (20*)
Y-axis approach speed	mm/s	100	100
Y-axis return speed	mm/s	100	100
X-axis speed	mm/s	500	500
X-axis accuracy	mm	+/-0.025	+/-0.025
X-axis stroke	mm	600	600
X-axis max position dimension	mm	750	750
Delta X-axis speed	mm/s	100	100
Delta X-axis accuracy	mm	+/-0.025	+/-0.025
Delta X-axis stroke	mm	+/-50	+/-50
R-axis speed	mm/s	100	100
R-axis accuracy	mm	+/-0.05	+/-0.05
R-axis stroke	mm	200	200
Z-axis speed	mm/s	1000	1000
Z-axis accuracy	mm	+/-0.5	+/-0.5
Z-axis stroke	mm	120 to 1180	120 to 1180

*can be up to 20mm/s, depending on requlations.

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TECHNICAL DATA	DIM.	C15	C15 X
Press tonnage	kN(US tons)	440(48)	440(48)
Motor power	kW	2x5	2x5
Max. bending lenght (D)	mm	1600	1600
Distance between side frames	mm	1550	1550
Frame width (A)	mm	2230	2230
Frame height (B)	mm	2150	2450
Frame depth (C)	mm	1550	1550
Throat depth	mm	150	150
Table height	mm	820	820
Weight	kg	3000	3200
daylight	mm	500	650/800
Y-axis stroke	mm	250	250
Y-axis repeatin accuracy	mm	+/-0.002	+/-0.002
Y-axis max working speed	mm/s	10 (20*)	10 (20*)
Y-axis approach speed	mm/s	100	100
Y-axis return speed	mm/s	100	100
X-axis speed	mm/s	500	500
X-axis accuracy	mm	+/-0.025	+/-0.025
X-axis stroke	mm	600	600
X-axis max position dimension	mm	750	750
Delta X-axis speed	mm/s	100	100
Delta X-axis accuracy	mm	+/-0.025	+/-0.025
Delta X-axis stroke	mm	+/-50	+/-50
R-axis speed	mm/s	100	100
R-axis accuracy	mm	+/-0.05	+/-0.05
R-axis stroke	mm	200	200
Z-axis speed	mm/s	1000	1000
Z-axis accuracy	mm	+/-0.5	+/-0.5
Z-axis stroke	mm	120 to 1480	120 to 1480

*can be up to 20mm/s, depending on requlations.

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TECHNICAL DATA	DIM.	G20	G25
Press tonnage	kN(US tons)	600(67)	800(89)
Motor power	kW	3x5	4x5
Max. bending lenght (D)	mm	2040	2550
Distance between side frames	mm	2200	2700
Frame width (A)	mm	2990	3500
Frame height (B)	mm	2500	2650
Frame depth (C)	mm	1780	1780
Throat depth	mm	O-frame	O-frame
Table height	mm	900	900
Weight	kg	5100	6500
daylight	mm	600	600
Y-axis stroke	mm	280	280
Y-axis repeatin accuracy	mm	+/-0.002	+/-0.002
Y-axis max working speed	mm/s	10 (20*)	10 (20*)
Y-axis approach speed	mm/s	100	100
Y-axis return speed	mm/s	100	100
X-axis speed	mm/s	500	500
X-axis accuracy	mm	+/-0.025	+/-0.025
X-axis stroke	mm	600	600
X-axis max position dimension	mm	750	750
Delta X-axis speed	mm/s	100	100
Delta X-axis accuracy	mm	+/-0.025	+/-0.025
Delta X-axis stroke	mm	+/-50	+/-50
R-axis speed	mm/s	100	100
R-axis accuracy	mm	+/-0.05	+/-0.05
R-axis stroke	mm	200	200
Z-axis speed	mm/s	1500	1500
Z-axis accuracy	mm	+/-0.5	+/-0.5
Z-axis stroke	mm	100 to 1940	100 to 2450

*can be up to 20mm/s, depending on requlations.

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TECHNICAL DATA	DIM.	G30	G40
Press tonnage	kN(US tons)	1000(111)	1500(166)
Motor power	kW	5x5	6x5
Max. bending lenght (D)	mm	3060	4080
Distance between side frames	mm	3200	4200
Frame width (A)	mm	4010	5030
Frame height (B)	mm	2830	2950
Frame depth (C)	mm	1780	1780
Throat depth	mm	O-frame	O-frame
Table height	mm	900	900
Weight	kg	7500	10000
daylight	mm	600	600
Y-axis stroke	mm	280	280
Y-axis repeatin accuracy	mm	+/-0.002	+/-0.002
Y-axis max working speed	mm/s	10 (20*)	10 (20*)
Y-axis approach speed	mm/s	100	80
Y-axis return speed	mm/s	100	80
X-axis speed	mm/s	500	500
X-axis accuracy	mm	+/-0.025	+/-0.025
X-axis stroke	mm	600	600
X-axis max position dimension	mm	750	750
Delta X-axis speed	mm/s	100	100
Delta X-axis accuracy	mm	+/-0.025	+/-0.025
Delta X-axis stroke	mm	+/-50	+/-50
R-axis speed	mm/s	100	100
R-axis accuracy	mm	+/-0.05	+/-0.05
R-axis stroke	mm	200	200
Z-axis speed	mm/s	2500	2500
Z-axis accuracy	mm	+/-0.5	+/-0.5
Z-axis stroke	mm	100 to 2960	100 to 3980

*can be up to 20mm/s, depending on requlations.

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TECHNICAL DATA	DIM.	Bull 12	Bull 15
Press tonnage	kN(US tons)	1000(110)	1500(160)
Motor power	kW	2x5	3x5
Max. bending lenght (D)	mm	1320	1620
Distance between side frames	mm	1390	1690
Frame width (A)	mm	2200	2500
Frame height (B)	mm	2650	2950
Frame depth (C)	mm	1760	1760
Throat depth	mm	O-frame	O-frame
Table height	mm	900	900
Weight	kg	4500	5500
daylight	mm	600	600
Y-axis stroke	mm	250	250
Y-axis repeatin accuracy	mm	+/-0.002	+/-0.002
Y-axis max working speed	mm/s	10 (20*)	10 (20*)
Y-axis approach speed	mm/s	40	40
Y-axis return speed	mm/s	40	40
X-axis speed	mm/s	500	500
X-axis accuracy	mm	+/-0.025	+/-0.025
X-axis stroke	mm	600	600
X-axis max position dimension	mm	750	750
Delta X-axis speed	mm/s	100	100
Delta X-axis accuracy	mm	+/-0.025	+/-0.025
Delta X-axis stroke	mm	+/-50	+/-50
R-axis speed	mm/s	100	100
R-axis accuracy	mm	+/-0.05	+/-0.05
R-axis stroke	mm	200	200
Z-axis speed	mm/s	1000	1000
Z-axis accuracy	mm	+/-0.5	+/-0.5
Z-axis stroke	mm	120 to 1100	120 to 1400

*can be up to 20mm/s, depending on requlations.

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3 SAFETY

3.1 Warnings and ways to prevent accidents during normal operation

When using this machine, operator should be careful and exact, because this machine is classified as dangerous construction machine. Manufacturer does not take responsibility for the damage of machine or accidents, which are caused by the machine abuses.

Warnings below are only used in this manual and are suggested to be taken in consideration when using the machine.

Warning! Watch out for the moving tools, fingers can be caught in. If safety devices like AOPD are muted, or machine is designed to close only at safety speed, closing speed is limited to 10mm/s, and closing movement will always be stopped by releasing pedal or pressing pedal over force limit to position 3. Make sure that releasing of trapped person section 3.16 is clear.

Warning! Watch out for deflection of protruding work-pieces. In case of long, protruding work-piece, adjust bending speed to 1mm/s and increase it little by little until bending process feels comfortable and the end of long work-piece is not moving dangerously fast.

Warning! Be careful when bending box shaped parts as fingers can be crushed between the existing, upwards protruding side of the part and the frame of machine. Pay attention how you hold the part, never hold the part from the end where the upwards protruding side is.

Warning! Back gauge manual adjustments must be done through the back door. Never place hands between tools, this must be a basic rule even if power is turned off.

Warning! Only professional electrician is allowed to open the control cabinet door.

Warning! After tool chance pay attention to programmed tool values and AOPD adjustments. Wrong programmed tool values may lead to breaking the tools. If AOPD is adjusted in a wrong way this may prevent machine operating in correct way. In sections 5.2.4 and 5.2.9 are explained correct way to program tool info and adjust AOPD.

Warning! Machine falling during transportation can cause serious injuries and break the machine. In section 3.11 safe way of transportation is explained.

3.2 Warning signs

From left to right, up to down:

Warning sign in electric cabinet door for danger of electric shock

Warning sign in front of machine for danger caused by deflection of protruding work-pieces

Warning sign in front of machine for danger of getting crushed between bending tools

Warning sign in front of machine for danger of getting crushed between work-piece and parts of machine

3.3 Safety devices / functions

light curtain, laser actuated AOPD, hold-to-run control or scanner system to stop the beam closing and hold it as stopped. When a safety device is being muted or access is prevented only by hold-to-run control, press brakes beams closing speed is limited to <=10mm/s.

Safety foot pedal for hold-to-run control with a 3 position where 1st and 3rd position stops the closing of press and 2nd position allows the closing.

Programmable reduced bending speed for protection against injury caused by the deflection of a protruding workpiece.

Side guards to prevent lateral reach from the sides of the machine into the danger zone.

Interlocked back guard to prevent access from the rear of machine to the danger zone.

Emergency stop for all actuators to stop and to isolate them from energy

3.4 General safety

- Machine owner must retail this instruction manual for whole service time of the machine. Instructions for the machines correct use and safety are included in the manual.
- Machine must only be used in the sheet metal industry. Machine must not be used for any other purpose.
- The thickest recommended sheet metal is 6 mm. For your own safety, do not use any thicker sheet metal. (Recommended thickness of the sheet metal can change in different material.)
- Don't change construction or design of the machine any way.
- For your own safety, read this user manual carefully.
- Read manufacturer / retail dealer duties and make sure, that machine is installed accordingly.
- After you have closed the deal, make sure that manufacturer introduces you the correct use of machine.
- Follow all the rules which includes machine safety.
- The operator must be an adult and able to use the machine.
- The operator must know the downrights of this manual. **The Operator has a responsibility for his own safety and also for the safety of the others.**
- Machine operators are recommended to be aged 16 and over. Even then, older and more experienced persons must educate a younger person to use the machine. In the vicinity of the machine shouldn't sojourn other people during working, so that the user manages to avoid disturbing factors and the user's concentration is on his duties.
- Machine user must be in good physical condition. Breaks should retain often enough. Machine shouldn't be used under the influence of any kind of intoxicating substance.

3.5 Before starting to work

- Make overall check, that machine is fit for duty.
- Check that tools are in good shape, if you notice any damages, tools must be replaced immediately.
- Make sure that your working area is clean, that will prevent tripping or slipping.
- Machine is recommended to be bolted on the floor.

3.6 During working

- Always take care of the sufficient lighting. (The minimum requirement is 500 lux).
- It's recommend that other people are not in the vicinity of the danger area during work.
- Stop the machine when you leave away from the machine.
- Necessary parts should be changed in consequence of breaking or exhaustion. And always use those spare parts which the manufacturer delivers or recommends.
- You must follow extreme caution during work and should be concentrated in ongoing function.
- If you hear an abnormal sound from machine, stop the machine and check where the sound comes, so a possible fault can be fixed immediately.

3.7 Changing the tools

After changing the die make sure die is fixed properly with die fixing screws.

After changing the punch make sure punch is fixed properly with punch fixing screws and punch's left or right end wont exeed the punch holders ends.

After changing of punch or die make sure active program has correct punch and die values. Refer to section 5.2.4 in this manual where tool info programming is explained.

If machine has Lazersafe AOPD refer to section 4.2.9 in this manual to perform AOPD adjustments.

WARNING! Wrong punch or die values in program may lead to breaking of the tools.

WARNING! Maximun weight and lenghts for punches and dies are:
-C9 punch max weight 15kg. Max length for punch and die 868mm.
-C12/Bull12 punch max weight 20kg. Max length for punch and die 1190mm.
-C15/Bull15 punch max weight 26kg. Max length for punch and die 1530mm.
-G20 punch max weight 35kg. Max length for punch and die 2100mm.
-G25 punch max weight 44kg. Max length for punch and die 2600mm.
-G30 punch max weight 52kg. Max length for punch and die 3100mm.
-G40 punch max weight 69kg. Max length for punch and die 4100mm.

3.8 Basic maintenance

Every two weeks:

- ♣ Check the condition and tightness of belts
- ♣ Grease ball screws and bearing
- ♣ Grease linear bearings of linear guidings
- ♣ Check that screws and nuts are tight.
- ♣ Check cable conditions.

Recommend grease is NLGI class 2.

3.9 Periodic inspection / tests after installation or major overhaul of the machine

Once a year manufacturer or manufacturers dealer shall perform periodic inspection according the following check list in addition of basic maintenance list. Also after installation or major overhaul the following tests must be performed by manufacturer/dealer.

☐ Emergency stop tested

☐ Interlocking of sideguards tested

☐ Interlocking of backguard tested

☐ Stopping of ram movement by both foot pedal positions 1 and 3 tested

☐ Functionality of all limit switches of all axes tested

☐ Lining and leveling of brackets of AOPD checked

☐ Reference values of all axes checked

☐ Test bends done with accepted max error of 0,1mm

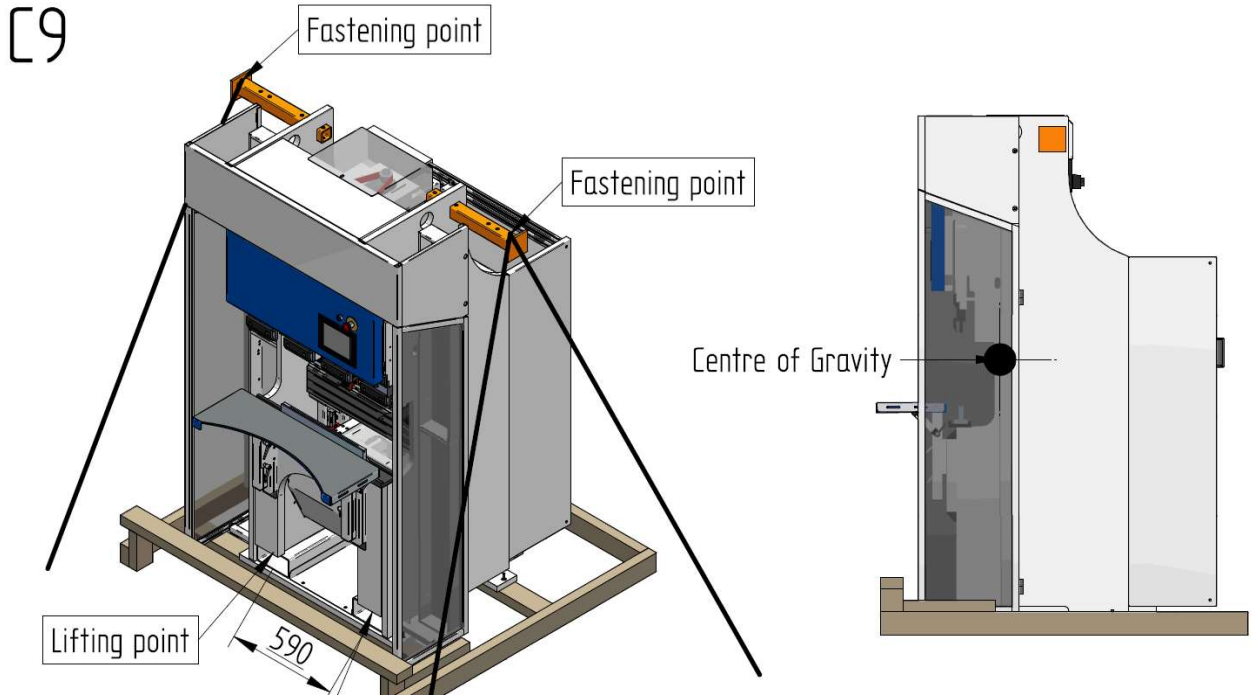
3.10 Cleaning

- ♣ Check the ball screws and the linear guidings if they need to be cleaned.
- ♣ Check the touch screen if it's need to be cleaned.
- ♣ Warning signs should be in sight freely.
- ♣ Clean tools when necessary.
- ♣ Clean possible contraries away from working area.

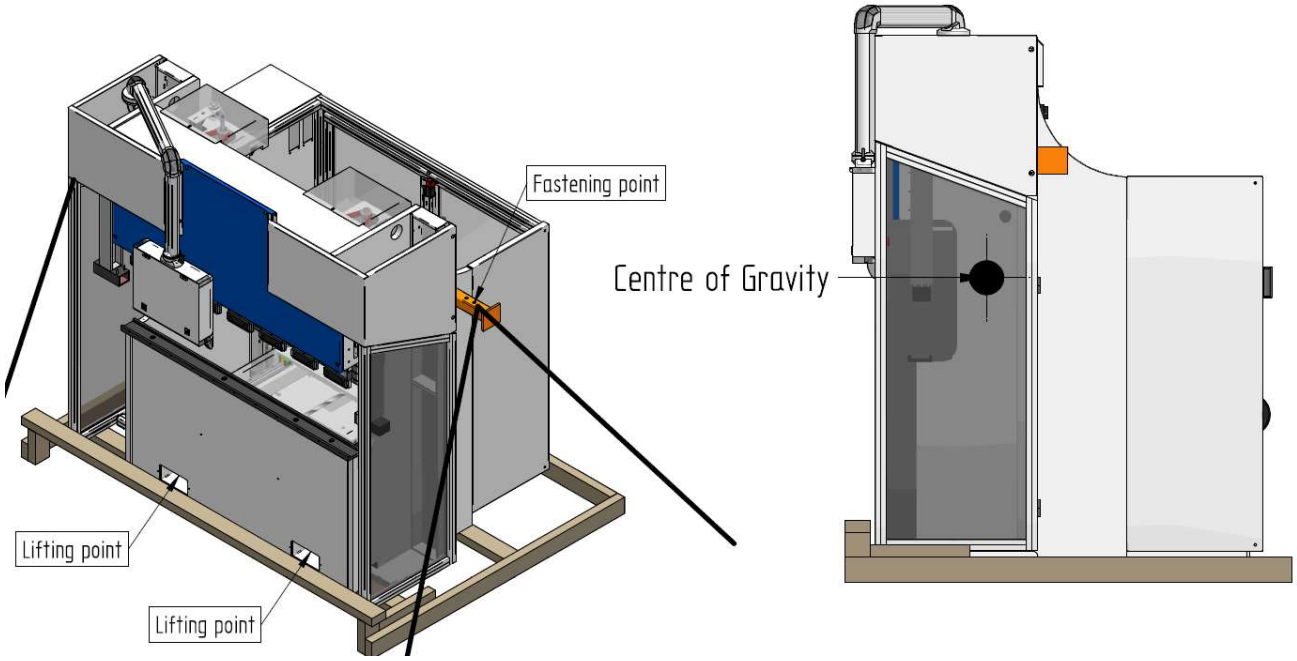
3.11 Transportation

- ♣ Before transporting the machine, make sure that the machine is disconnected from power.
- ♣ Machine must be lifted up by a lifting belt or by chains with a forklift or a crane
- ♣ Lifting points and centre of gravity are marked in following picture.
- ♣ Weight and dimensions are mentioned in machine ID plate
- ♣ Protect machine from humidity.

WARNING! Machine falling can cause serious injuries or break the machine.



C12 / C15



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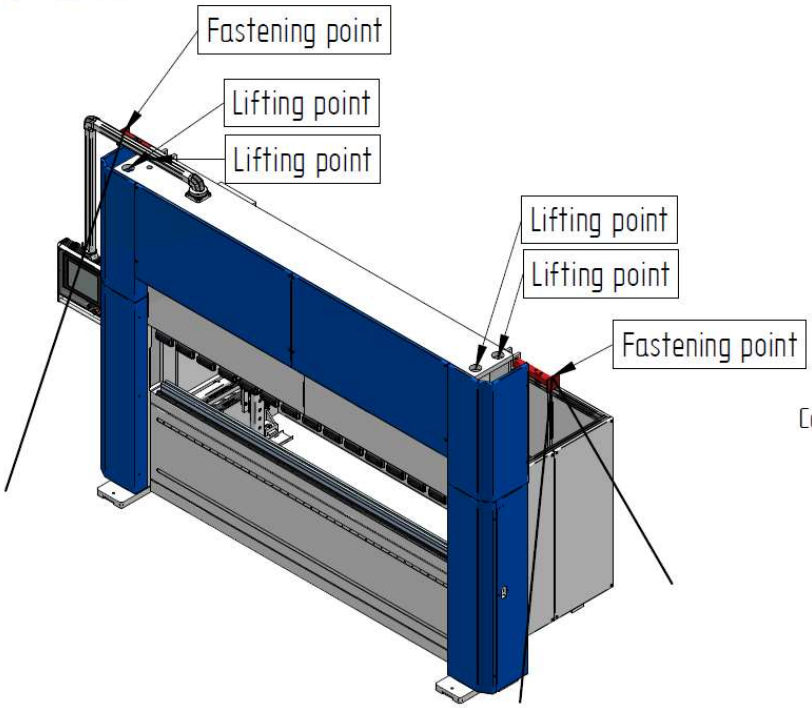
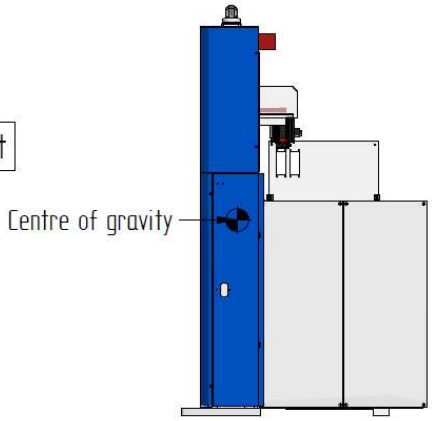
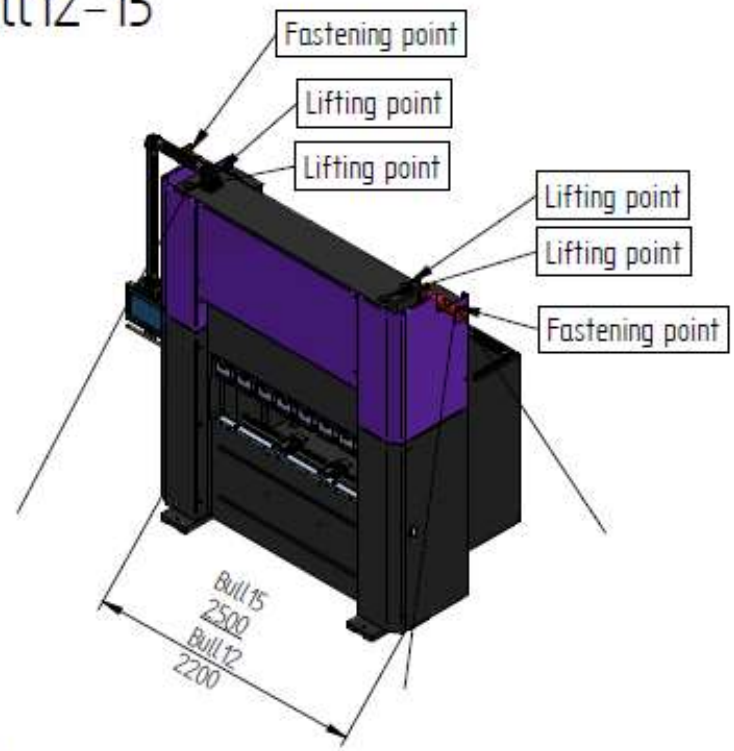
G20 – G40

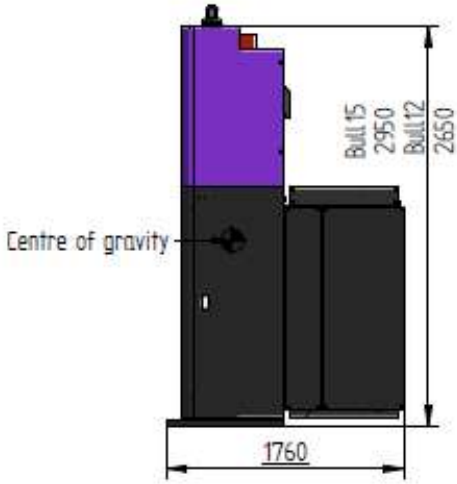
G20-G40





Bull12-15





Use 4 Cargo straps

3.12 Acting in extremis

When emergency situation happens, act by the rules of the general emergency rules.

3.13 Disposal

Disposal of the machine will be taken care as the general rules require.

3.14 Manufacturer/ retail dealer duty

- ♣ Manufacturer/ retail dealer responses the transportation of the machine to the client.
- ♣ Machine install to fit for your duty (include testing, adjustments etc.)
- ♣ Training, how to use the machine
- ♣ Setting the machine parameters

NOTE! Operators are not allowed to change the parameters protected by password.

Manufacturer/retail dealer must teach the client how the edging press works and its correct use and also tell to the client which dangers are possible when working with the machine. Manufacturer/ retail dealer must go through the rules by filling the significant details, so that the clients won't have any unclear things.

If necessary, manufacturer/retail dealer gives instructions in problem cases.

3.15 Noise

Noise was measured at the operators place which is in the front of the machine.

C9: <70dB(A)

C12/C15: <74dB(A)

G20-G40, Bull12-Bull15: <79dB(A)

3.16 Release of trapped person

1. Turn power off from main switch

2. Remove covers above Y axis servo motors. Cut the timing belts by using tools designed to cut metal, for example angle grinder, as timing belts have steel wires inside them.

3. Force ram/upper tool up by using one of the following methods

    - Manually rotate each Y axis timing pulley clock wise (while observing above)
    - Force upper beam up with a hydraulic jack
    - Force upper beam up with a fork lift

3.17 Replacing the batteries

Y absolute encoder:

In case the machine has absolute encoders in Y axis servo motors these batteries must be replaced every 3 years. When changing the battery follow the same rule as above; do not replace the battery before drive has had power on atleast for 5min and new battery must be installed within 5min after disconnecting the old one.

4 WORKING WITH THE MACHINE

4.1 Basic operations

4.1.1 Startup

Power is turned ON from the main switch located at the electric cabinet door. After this safety circuit must be reset from blue mechanical button.

If machine has lazersafe safety device, back guard must be separately reset from mechanical blue button at the backside of electric cabinet, excluding model C9.

4.1.2 Shutdown

It is recommended that machine would be shut down if it is not operated continuously. Power can be turned OFF from the main switch located at the electric cabinet door.

4.1.3 Emergency stop

Machine can be stopped by emergency stop by pressing the emergency stop button next to the touch screen. To continue after emergency stop, the button must be released and safety circuit must be reset by pressing the mechanical blue reset button.

NOTE! Use emergency stop only in emergency cases.

4.2 Using the control

Touch screen can be operated by pushing the functions gently by finger or corresponding soft, round-tipped object.

When power has been switched on, it will take a moment, while system starts up. After a while main screen appears.

4.2.1 Main screen

From here operation can be continued with the buttons in lower bar.

4.2.2 Lower bar

Lower bar is visible on each page.

Button above enables auto mode. Light/dark color in button indicates if auto mode is active and **servo motors are ON**.

Half light / half dark color indicates semi-auto mode.

Possible causes for this button being inactive:
-machine is not referenced
-machine has an alarm

Button above enables manual mode. In manual mode page machine can be referenced, axes can be jogged and certain service operations can be done.

Light/dark color in button indicates if manual mode is active and **servo motors are ON**.

Possible causes for this button being inactive:
-machine has an alarm

Blinking alarm indicates there is active alarm. With this button alarm page can be switched and cause of alarm can be seen.

Settings.

Program menu.

Upper tool can be lifted with this button while servo motors are ON. If servo motors are OFF this button is inactive.

4.2.3 Manual mode

Manual mode can be entered with this button when machine is in normal stage (no alarm etc).

Axis being jogged can be selected with above buttons. Buttons are visible according if axis actually exists.

- Y-axis, upper tool/beam.
- X-axis, back gauge horizontal, back and forward.
- R axis, back gauge vertical.
- Z1/Z2 axis, back gauge finger left/right.
- ΔX-axis, right side back gauge finger proportional to main X axis.
- S1/S2-axis, servo driven sheet followers.

Reference run button. When reference run is done reference symbol is shown in upper bar of screen aswell as the axis positions.

Y-axis position in upper beam means the distance from punch tip into the material surface. Value is proportional to the selected tools and material thickness in program menu page.

X- and ΔX-axis position means the distance from back gauge fingertip to the bend line.

R-axis position means the distance from the lower surface of the back gauge fingertip to the upper surface of selected die.

Z1/Z2-axis position means the distance from back gauge fingertip's left edge to the left edge of die holder.

S1/S2-axis position means the distance to the horizontal plane.

Note! Some of the axis positions are proportional the currently selected tools and material thickness.

++	+0.1	+0.01	+0.001
--	-0.1	-0.01	-0.001

With above buttons selected axis can be jogged manually.

With ++/-- buttons axis can be jogged continuously, ++ being the positive direction (upwards, backwards, rightwards.

Y-axis jog with - - requires also pedal being pressed. To avoid safety device error, pedal being pressed without downwards movement, first press the button on screen, then press the pedal.

When jogging Y axis upwards with ++ button, do not push the pedal for the same reason.

With 0.1, 0.01 ja 0.001 axes can be jogged step by step.

If 0.1 button is kept pressed for 1s, axis moves continuously with slow speed.

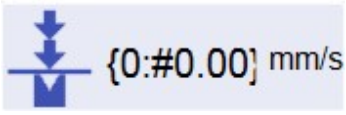
"Parking" function. Y axis can be run down with limited force, for example if tools are being fixed or bottom dead point has to be checked for special cases like hemming tools etc. Pedal has to be pressed simultaneously. Parking force can be adjusted from settings page 1.

When parking function has been used, Y axis must be lift with the button on lower bar.

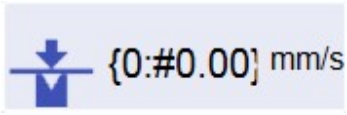
4.2.4 Settings

At above middle, settings page number is shown. Settings page can be changed with buttons on left/right.

Page 1



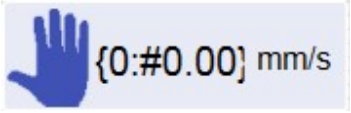
Y-axis fast closing speed, if fast closing is enabled for the machine.



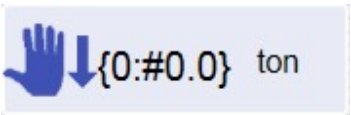
Y-axis slow closing speed from speed change point to material surface, or whole stroke if fast closing is not enabled.

Y axis holding time at bottom dead point.

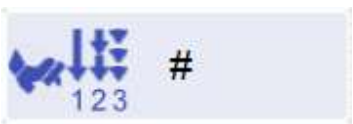
Y-axis opening speed.



Y-axis manual mode speed.



Y-axis parking force.



Y-axis autocycle stopping modes.

If fast closing is not enabled, with selection “3”, Y-axis stops at material surface, and continues to bottom dead point with next push of pedal.

If fast closing is enabled, with selection “2” Y-axis stops at speed change point, and with selection “3” Y-axis stops at speed change point and material surface.

Y axis MCP (material clamping point) adjustment. Y axis stops at material surface (MCP) in the following cases:
-program has retraction for back gauge.
-robot commands Y-axis to move to MCP.
-Y axis is selected to stop at material surface with above mentioned setting.

Two-hand control mode. This enables the two-hand controller, left one is so that the movement happens with hand controls until the beam reaches speed change point, then you must press the pedal to do the bend. Right one is only hand control.

After changing control methods, the reset button must be pressed, the alarm that comes is just a notification that the control method has been changed.

Unit selection. Inch selection also converts material ultimate tensile strength into PSI, bend force into short ton and punch/die bend force limit into short ton/foot.

Page 2

	X	R	Z	ΔX	S
	{0:#0.00} mm/s	{0:#0.00} mm/s	{0:#0.00} mm/s	{0:#0.00} mm/s	{0:#0.00} mm/s
	{0:#0.00} mm/s	{0:#0.00} mm/s	{0:#0.00} mm/s	{0:#0.00} mm/s	↑ {0:#0} %
					↓ {0:#0} %

Manual and auto mode speeds for back gauge axes.

For S axes auto mode speed upwards is calculated automatically according tool info, bend angle etc. With this setting (arrow up) 100% means exactly that calculated speed. If it appears that sheet followers rise too fast or too slow, for a reason or another, increasing/decreasing this value this can be compensated.

S axes auto mode speed downwards 100% means max allowed speed. This can be adjusted smaller if wanted.


Basic setting for X dimension when a program is created. Outer dimension or direct X measure to bend line.


Back gauge positioning in auto mode, by pressing pedal or automatic.

Page 3.

	Kg / mm²	K-Factor
#	#	{0:#0.00}
#	#	{0:#0.00}
#	#	{0:#0.00}
#	#	{0:#0.00}
#	#	{0:#0.00}
#	#	{0:#0.00}
#	#	{0:#0.00}
#	#	{0:#0.00}
#	#	{0:#0.00}
#	#	{0:#0.00}

Material table. Materials ultimate tensile strength (Kg / mm2) affects calculated bending force and frame deflection compensation. K-factor affects to X-axis outer dimension correction.

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Waltham, MA 02453

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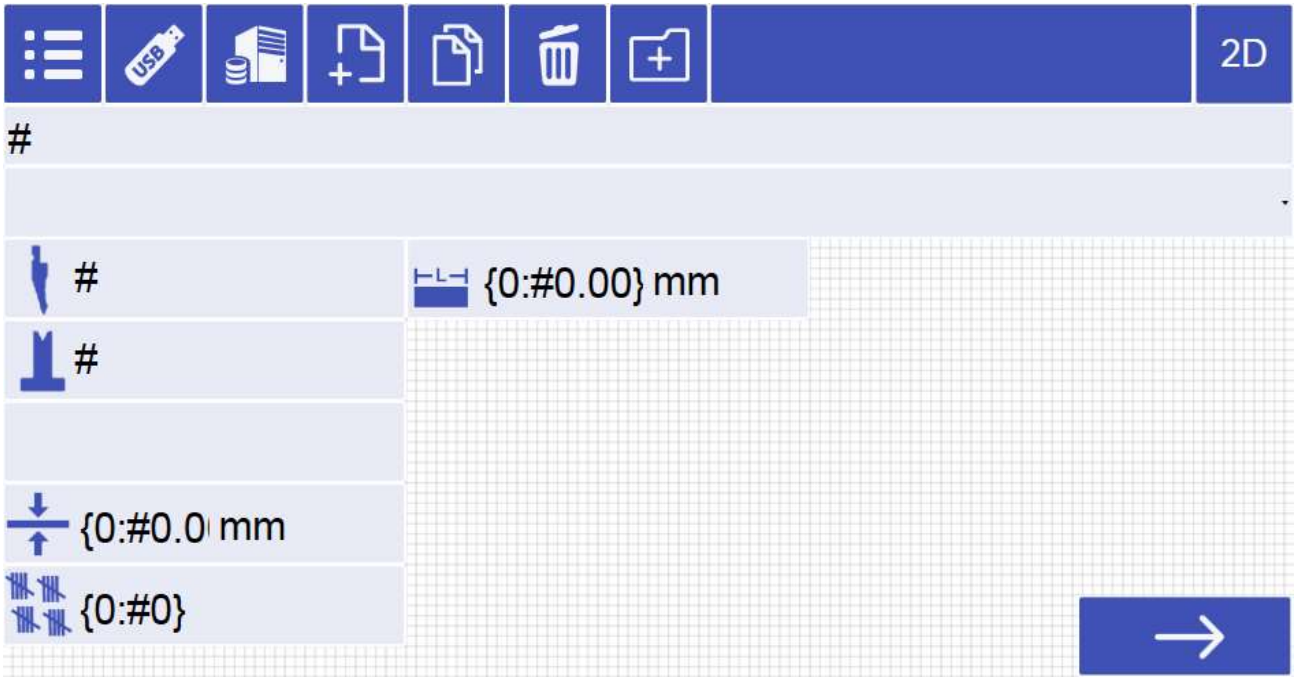
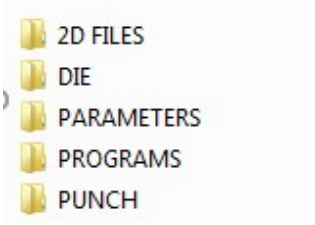
FAX: (781) 899-5708

4.2.5 Program menu.

Bending program menu can be entered with this button.



Program listing/storage can be selected for USB. Also returns to the root in the directory tree. USB stick, which is always provided with the machine, is the default storage media of the machine. Bending programs, tools, 2D files, parameter backup and frame deflection databases are stored in it.



In the root of the USB above shown folders must be found. Other than that, there is no restrictions for the USB stick.

Programs and tools can be freely copied from USB to another, or into office PC, by means of backup for example.

With above button program listing can be switched into FTP server. Also returns to the root for FTP. FTP server is located in the touch screen and can be configured to be seen as external network location at a PC, which enables direct program transfer between machine and the PC. This function must be enabled from commissioning settings, and network settings has to be configured properly. Refer to a guide for configuration in chapter “FTP server”.

Above button lists programs, from USB or FTP. List can be scrolled with a bar on right side. Program can be selected by pushing the name. Also the list can be closed with this button if program.

When list is open, and list is from USB, by pushing the directory path (on root as \USBDisk\PROGRAMS) sub folders can be listed, and sub folder can be entered by pushing the sub folder name.

With this button new program can be made into the current folder. When this button is pressed, keyboard appears. When name is written and enter is pressed, new program is created.

with this button, active program can be copied into the current folder, meaning that programs can also be moved from folder to another with this function.

Active program can be deleted with this button. Button must be kept pressed briefly.
Also if current sub folder is empty, it can be deleted with this button.

New sub folder can be created.

Program search function. Programs will be searched only from the current folder of USB. When button is pressed keyboard appears. Programs can be searched with any amount of starting letters/numbers. Note that capital letters do make a difference.

2D programming/simulation can be entered with this button.

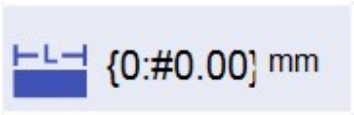
Selected punch name, also punch menu can be entered by pushing the name of the punch.

Selected die name, also die menu can be entered by pushing the name of the die.

Selected material. By pushing the material name, material list appears, and material can be selected. Content of material list can be adjusted from settings page3.

Material thickness.

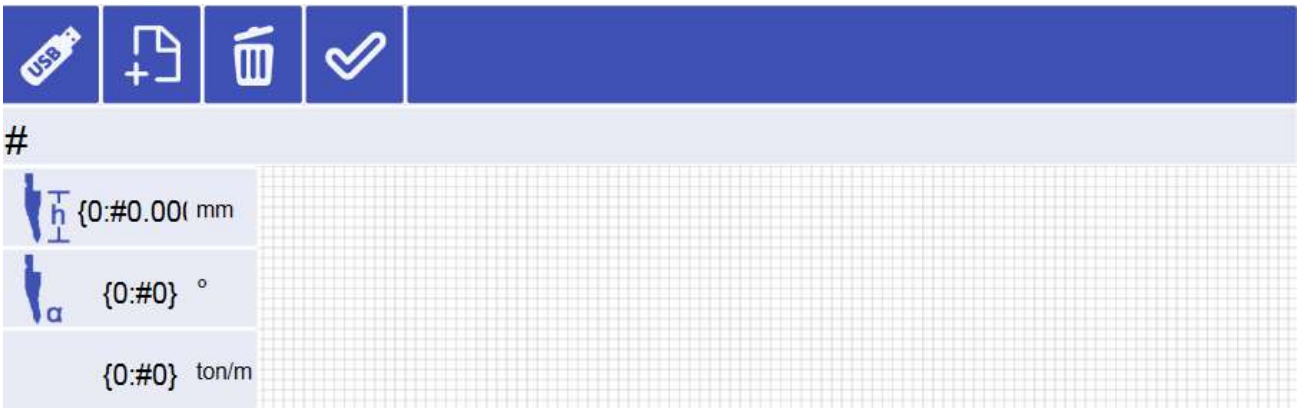
Work piece counter. Not in use with value 0. Operator is notified when selected amount is reached in full auto mode.



Bend length basic value. When creating bend steps this will be the bend length automatically. Also when program is created in 2D each step will have bend length according this.

Comment field. Operator can write program specific notes etc. This function must be enabled from commissioning settings.

4.2.6 Punch menu



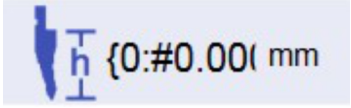
Opens punch list from USB.

New punch can be created.

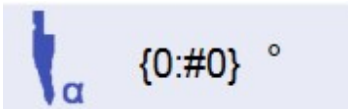
Punch can be deleted. Button must be pressed briefly.

Current punch can be selected into the program. Note that if page is changed with one of the lower bar buttons, punch is not selected into the program.

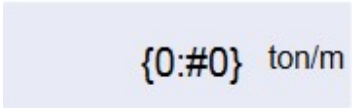
Punch name is shown below these buttons. When existing punch is opened or new punch is created, actual punch parameters will be shown and can be modified.



Punch height. Extremely important to have correct value to make machine work properly.

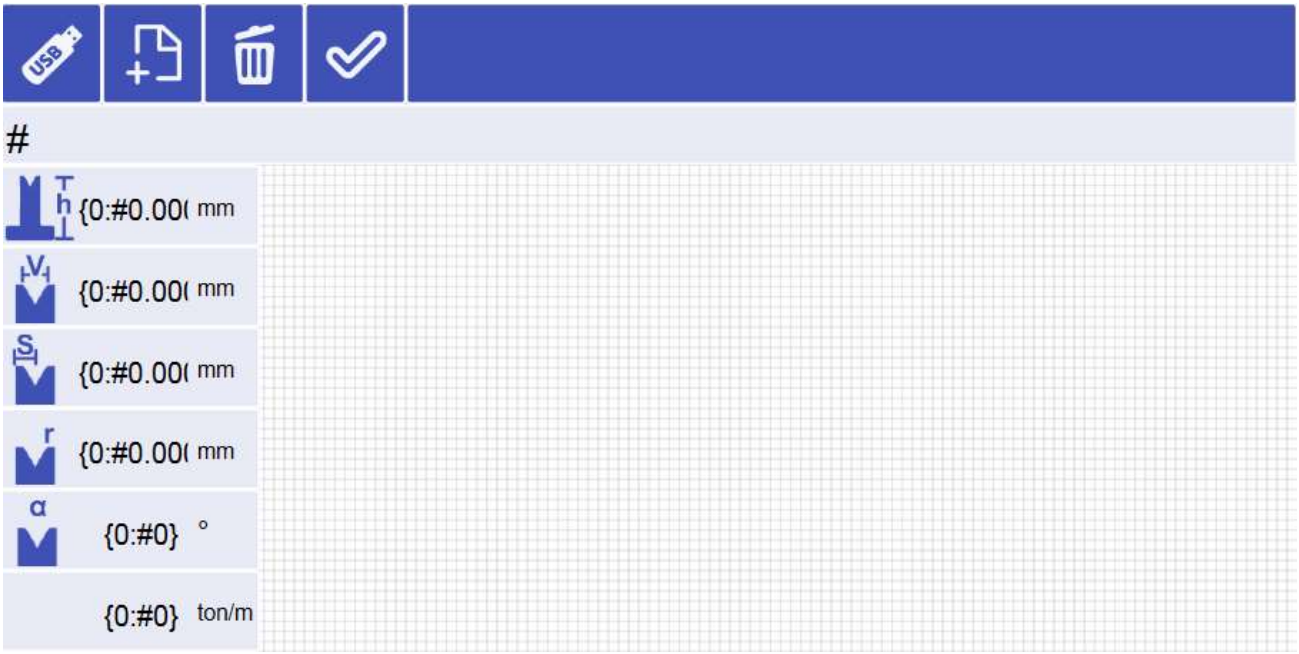


Punch angle.

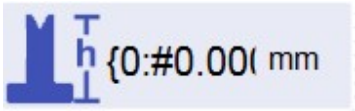


Max allowed bending force.

4.2.7 Die menu



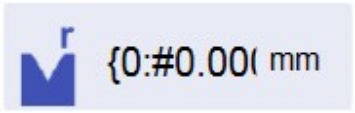
Same buttons and functions in upper bar like in punch menu.



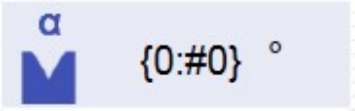
Die height. Extremely important to have correct value to make machine work properly.

Die V opening. Extremely important to have correct value to make machine work properly.

Die safety distance. According this value back gauge avoids collision with the die. It is recommended to add 2mm to the measured distance from middle of the die to the back gauge side edge of the die.

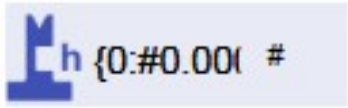


Die V opening radius. Extremely important to have correct value to make machine work properly.



Die V opening angle. Extremely important to have correct value to make machine work properly.

Max allowed bending force.

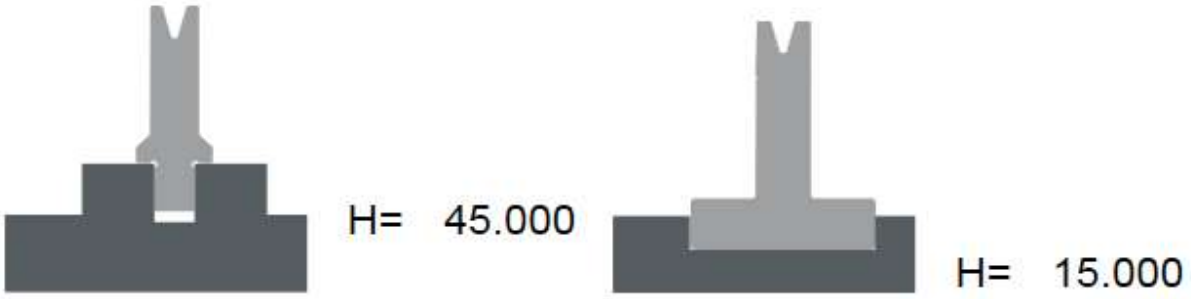


Height of hemming notch of specific type. This value must be enabled from commissioning settings.

Basically this value only moves Y axis zero point downwards.

Do not try to adjust Y zero point with a tool which has value in this field.

It is also possible to switch between different die holders and adapters at die info page.



This function must be enabled from commissioning settings.

Also USB\2D FILES folder must have prober die holder files, which are available from CoastOne Oy and local dealers.

Die holder files must be named as follows;
First, the basic one must be “Die holder.xaml”.
Second optional “Die holder2.xaml”. And so on, up to 5 different can be stored, and the last would be “Die holder5.xaml”.

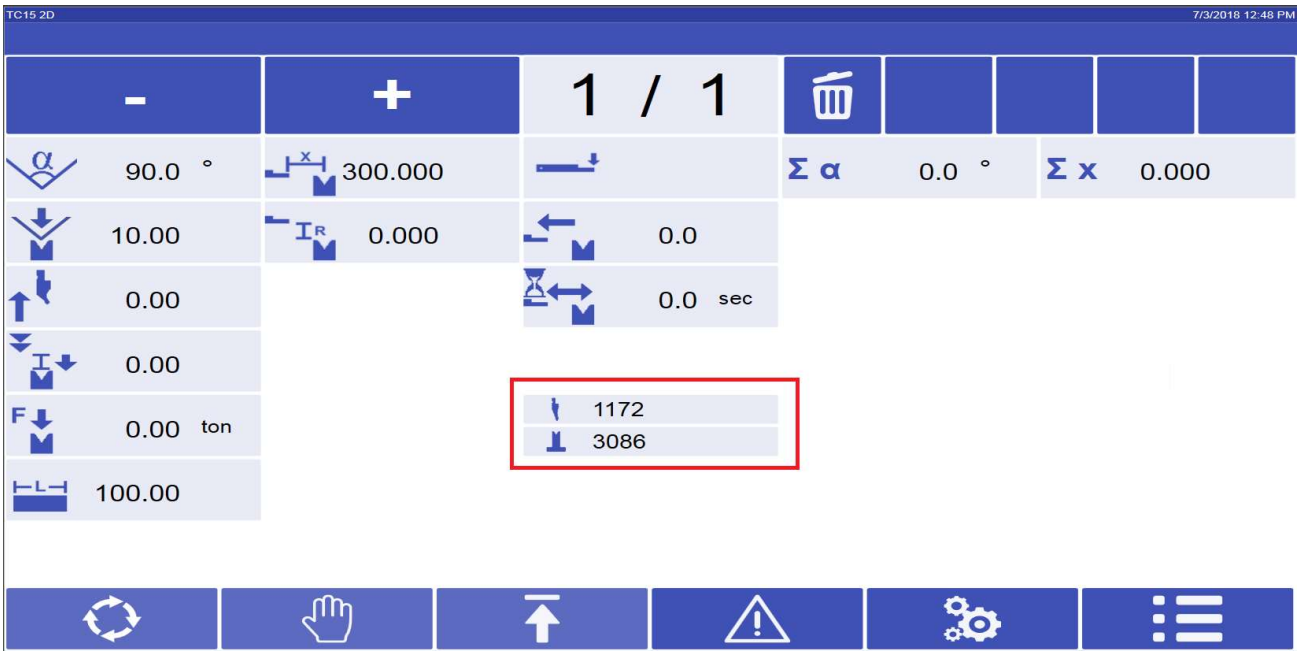
Die holder can be changed by pressing the image of die holder for few seconds.

By doing this operator must be fully trained and understanding what he/she is doing as this automatically changes Y axis zero point according the height of the die holder, and collision/damage to the tools and machine can be caused.

4.2.8 Multitool function

Up to 2 additional punches and dies can be used in single bending program. This function must be enabled from commissioning settings.

When additional tools are required, desired tools must be “reserved” for given program as shown in picture above. After a tool is opened from USB, reserve slot can be selected (top right on tool info page). When only one reserved tool is needed, upper reserve slot must be used. With “X” button reservation can be canceled. Reserve function is identical with punches and dies.



When additional tools are being reserved, punches and dies can be selected separately for each bend step by pushing the image of punch or die in bend info page as shown above.

Some notes;

These images are not shown in bend info page if there are no tools reserved for active program.

Bend specific tools can be toggled only in programming mode.

After any modification to the reserved tools or main tool of the program, all bend specific tools will be reset to the main tools of the program.

If program has additional die, largest Die S value and highest die H value among them will be used for R axis retraction in each bend step.

After entering the auto mode, operator will be notified with below shown warning, if one of the tool pairs would cause a crash. This is only a warning with certain safety factor (as actual tool profile may not be as of standard tools) and operation can be continued, **with operators own responsibility**. Warning is not shown again until tool selections have been modified.

If tool values are incorrect, or special tools are being used, crash is possible even without warning. When multitool function is being used, the program must be tested with extra care, paying attention to avoid crashes of tools.

4.2.9 Bend info

Bend info page can be switched with the arrow button in program menu page lower right corner.

Note that existing program must be opened or new program has to be created before bend info page can be switched. Also, program must have tools selected.

Bend step browse.

Bend step delete.

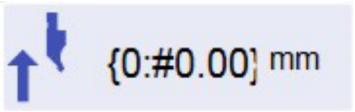
Bend step copy. Works like a copy-paste. When button is pushed to bottom bend step to be copied is stored, and when pushed again (button is released) stored bend step is copied to the current step number.

Bend angle in degrees. When new bend step is about to be entered, bend info page only shows bend angle, to force operator to enter it first, in which case bend step amount is added by one. Bend steps can be added only in programming mode, and when the program is not a 2D program.

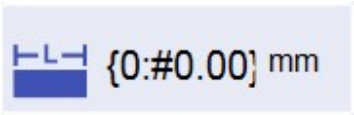
By double clicking this angle symbol it changes into symbol shown below. Note that this option must be enabled from commissioning settings.

Bottom dead point can now be entered directly. This can be useful for some special cases. Large positive values can also be entered, in which case operator has to ensure that the top dead point (also of the preceding bend step) and possible speed change point is always above the bottom dead point.

Bending speed from material surface to the bottom dead point.



Opening after bend into top dead point.



Bend length.

Bend position proportional to the lower beam. When bend length is entered, bend position is calculated into the middle of machine, but this can be changed if necessary. With this value Z1-Z2 positions are calculated automatically, also required bend force for separate Y axes. This function must be enabled from commissioning settings.

Theoretical calculated bending force.

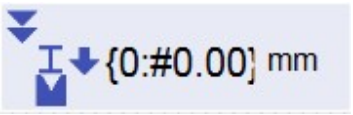
By double clicking the symbol so called bottoming mode is activated. For function changes color and bend angle disappears, as it does not have any effect to the bottom dead point calculation anymore.

In bottoming mode Y axis moves down until calculated bending force is reached.

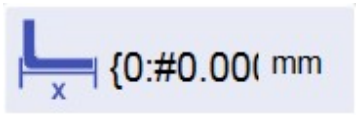
Bottom bending must be enabled from commissioning settings.

Bending force can also be entered manually and in that case entered value will be stored into current bend. This might be helpful for example in hemming bend.

When die. material type, material thickness, material values in settings 3 or the bend length is adjusted calculated bend force will be returned for safety reasons.

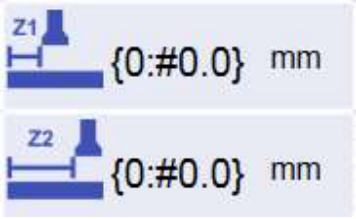


Speed change point. To enable fast closing this value must be above zero.



Direct X-axis position or flange outer diameter can be selected separately for each step by pushing the symbol.

R-axis position.



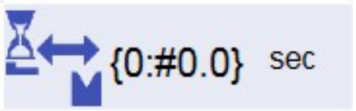
Z1-Z2 axis positions.

Delta X position.

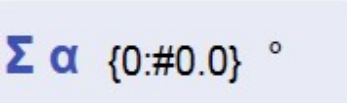
Sheet followers 1 and 2 can be selected separately for each step to support the sheet during bend.

Surface of the back gauge fingertip where sheet will be positioned. According the selection X axis position is calculated automatically.

X-axis retraction.



Delay before back gauge moves automatically after bend is finished.



Angle correction. With negative value Y-axis moves deeper. This function is incremental, exept value 0.

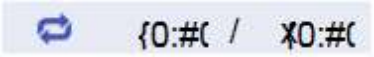
By double clicking angle correction icon repeat icon appears as shown above. In this mode entered angle correction is added to each step of the program.

Bull15 and G series machines crowning can be adjusted if necessary.

X-axis correction.

Pneumatic/hydraulic hemming die. When this is on it will lift the die up and when pedal is pressed, the die is released on the sheet. The tool is then pressed with bottoming mode to flatten the sheet, after which the die is lifted again so the sheet can be removed, pressing the pedal will release the die down.

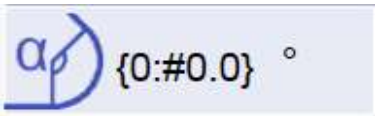
Radius bend function. This must be enabled from commissioning settings.



Bend step repeat. Given bend step can be repeated X times. In auto mode this field also shows ongoing repeat count, which can be changed manually in case of operator mistake etc. By pushing the symbol briefly repeat sequence resets to start.

Note that this option must be enabled from commissioning settings.

4.2.10 Radius bend



Total angle of the radius bend. Like in symbol, radius bend total angle is given as complement angle, unlike normal bend angle with cone TC15 2D control. Thus, it is natural to enter large angles of 180-360degrees.

Radius of the radius bend.

When the total angle and the radius has been entered, step length and step quantity is automatically calculated. Shortest possible step length is calculated according Die values so that unbent part of sheet is above the die in each step.

This can be changed manually, but if step length is too short proportional to the Die V opening, bottom dead point calculation cannot work anymore properly, and large/random angle correction values might be required.

Lenght of single step.

Quantity of the steps.

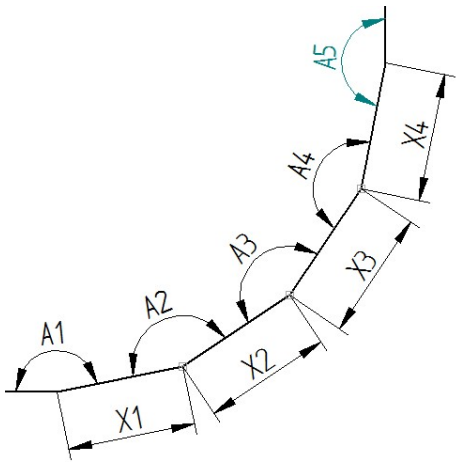
In programming mode this will reset radius bend values. In auto mode this button resets the radius bend cycle.

With this button radius bend parameters are confirmed, and current bend step is set as a radius bend step. Only possible in programming mode.

Radius bend selection can be cancelled, bend step is returned as normal step with basic values. Only possible in programming mode.

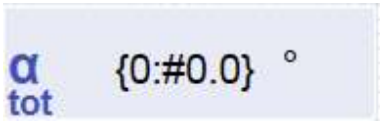
Return to auto mode page. Only visible in auto mode.

Radius bend step number. If radius bend has for example 4 steps, there will be 5 angles according the following example.



Radius bend step number is shown also in auto mode page at the position of normal bend angle.

In auto mode measured total angle can be entered to make angle correction for each step. Note that this entered value must be complement angle as well.



In auto mode total complementary angle what should have reached at current point is shown.

Actual angle correction which is added to each single step. When above mentioned measured angle function is used this value is automatically calculated. This is not complementary angle, it works similarly as normal angle correction. This value can be entered also manual when care is taken to not get confused with complementary angle concept.

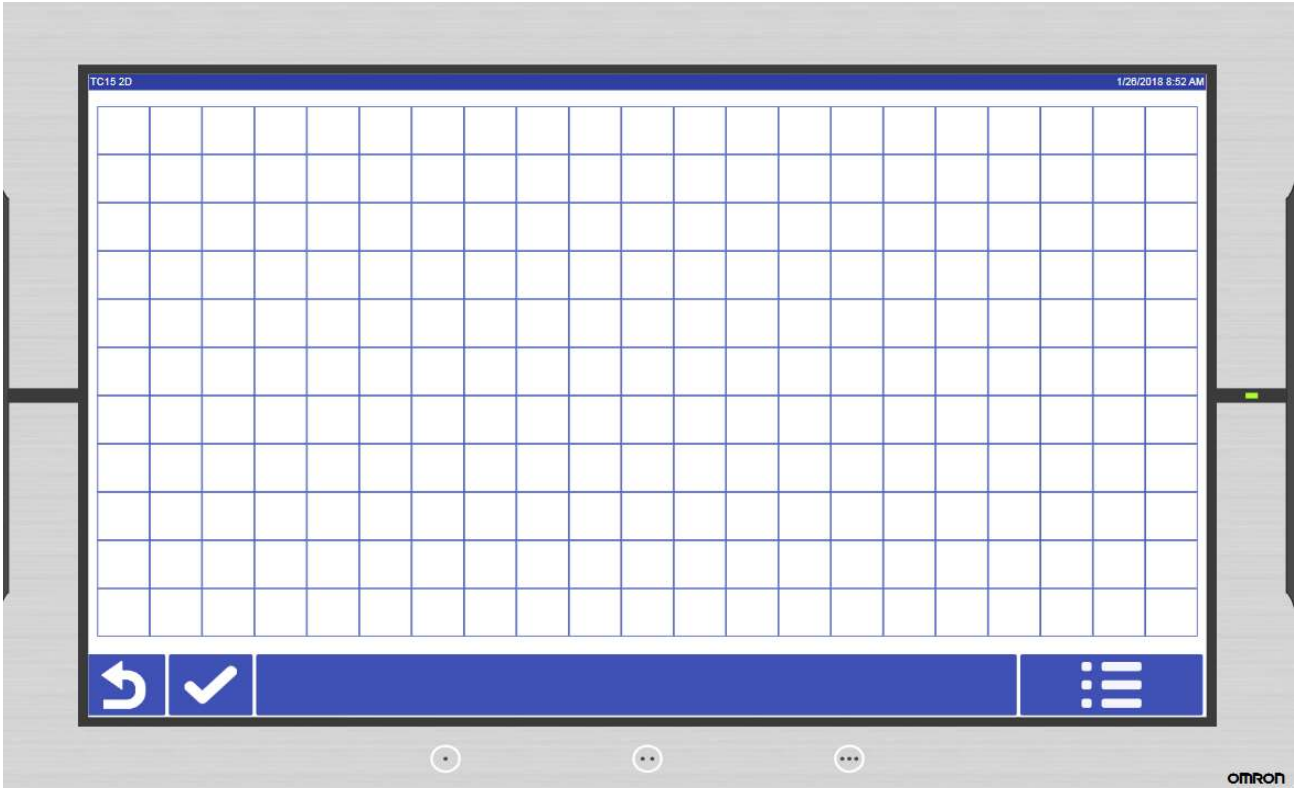
In auto mode each single step complementary angle is shown.

As assumption R axis retracts while in die safety area. This can be turned off if required, and care is taken by adjusting R value so that collision is avoided.

4.2.11 2D

In 2D page bending program can be created and simulated graphically.

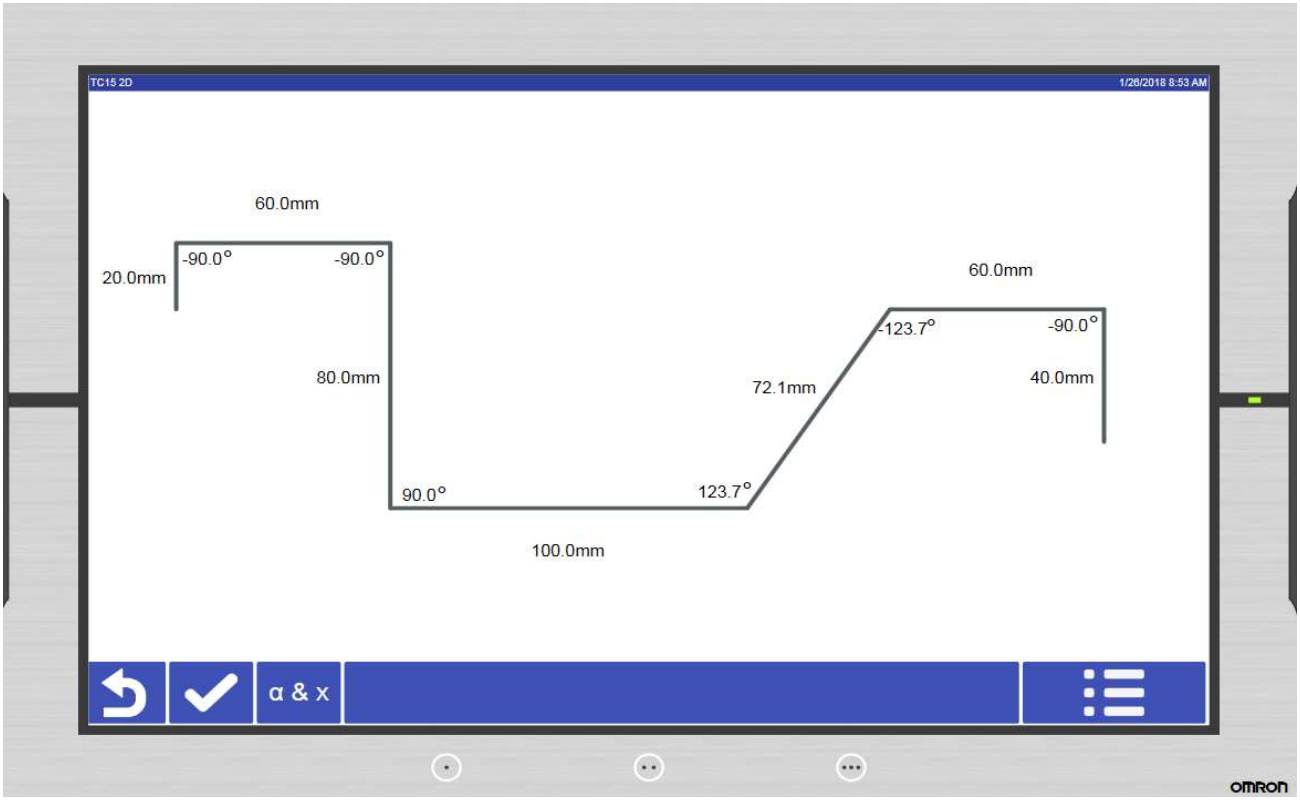
2D page can be entered with the 2D button in program menu page and in bend info page, when program is opened or created.



If new program is created, a drawing grid awaits at 2D page. With it, the desired profile can be sketched.

When profile sketch is desired, next step can be entered with this button.

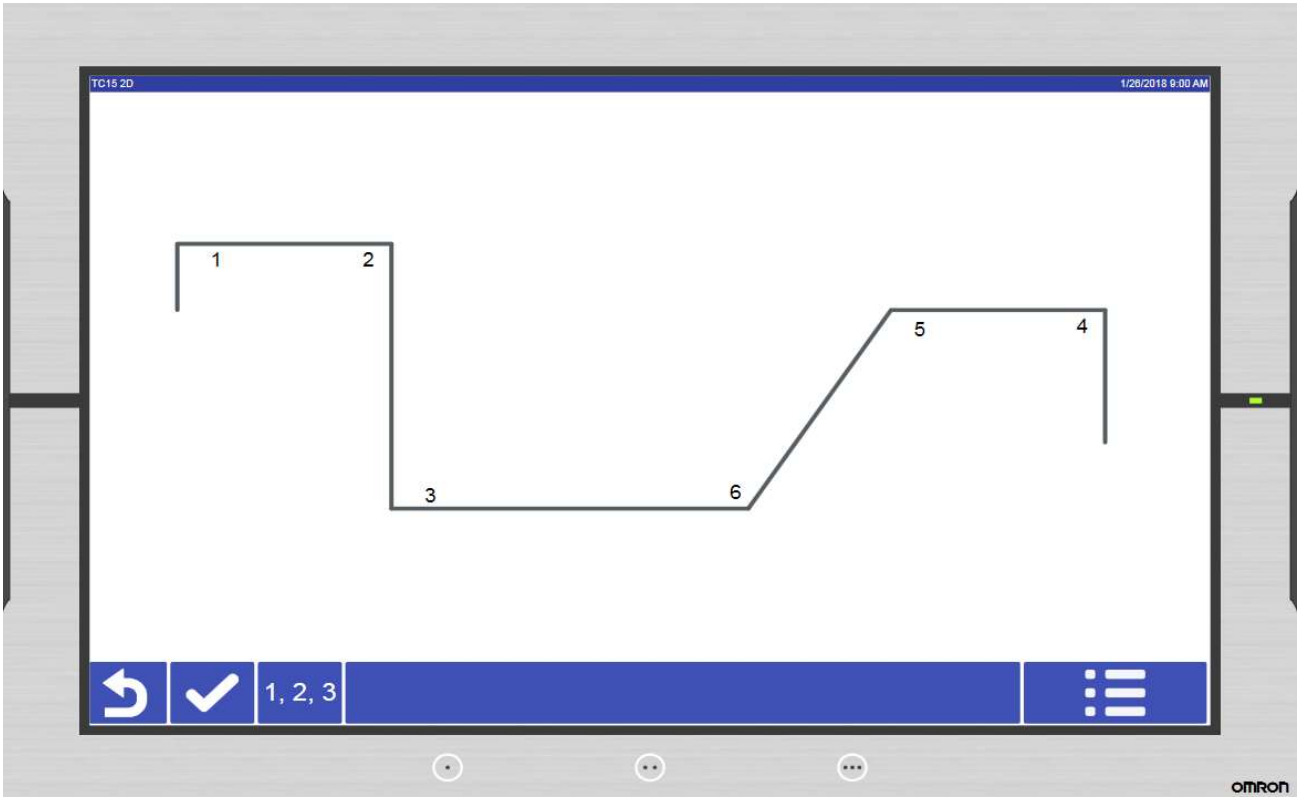
Profile can be cleared with this button. Note that this button also clears complete program.



In next step profile is scaled to fill the screen and bend order is automatically calculated. Now actual angles and flange dimensions can be entered. Note that angle has to have – or + to specify the direction, clockwise or counterclockwise.

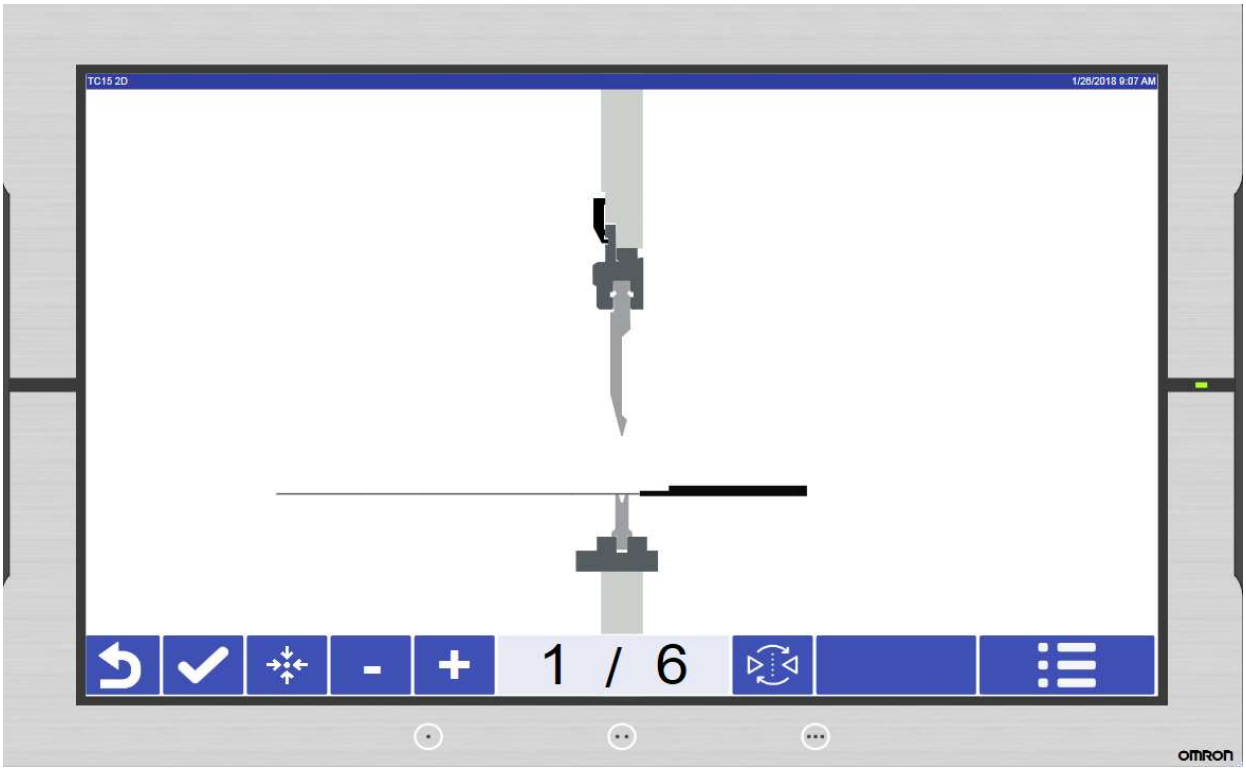
With these buttons view can be toggled to show bend angles or bend order number.

At the bottom left of the screen unfolded length for current part profile is shown.



Bending order can be manually changed if required by entering the bending order numbers.

When angles, dimensions and bending order is desired, with this button simulation step can be started.



If tools were not selected before entering 2D, first tools in the punch/die lists are selected. In simulation step in program mode punch and die can be browsed by pushing to punch/die.

With this button profile dimensions, angles and bending order can be re-adjusted.

With these buttons simulation and be toggled forward/backwards.

With this button work piece can be flipped horizontally.

By pressing back gauge finger image, different positioning options are rotated for current step.

With this button at this point complete bending program is created. All values are automatically calculated, but values can also be modified.

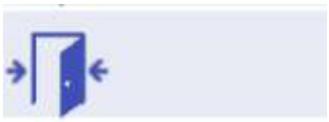
4.2.12 Alarms and warnings

Alarms and warnings page can be entered with above button.

Emergency stop button pressed/safety circuit is not reset. Safety circuit can be reset from blue mechanical button, when cause of emergency stop is removed.

Foot pedal is pressed into position 3. Pedal must be released with the mechanical button in the pedal.

Back guard open.



Side guard open.

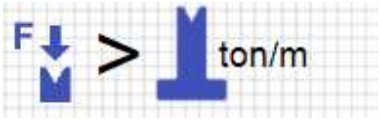
Ethercat / system error.

Ethercat / system errors can be reset if the cause of alarm has been fixed.

Trouble shooting page. Contains useful info about system errors, which helps support and service personnel to solve issues. Always check and pass the info from trouble shooting page when contacting support/service.

Notification for periodic greasing of machine linear components.

Bend force limit of the active punch is exceeded.



Bend force limit of the active die is exceeded.

4.2.13 Adjusting the reference values

Before reference values can be adjusted properly, machine must be referenced, there has to be active program with real tool values, material thickness and machine has to have those tools fixed into it.

Notification! Hemming tools with sprigs or pneumatics cannot be used for reference adjustment!

Idea of the reference adjustment is that each axis is teached where actual 0.00 position should be. Excluding Z1-Z2 axes who are teached 400.00 position.

After machine is referenced and actual tools corresponds the tools in program, axis can be selected in manual mode page which requires adjustment. Axis must be manually jogged into position which should be 0.00 (or 400.0 for Z).

Y-axis zero point:
The sheet is firmly hold between punch and die. Sheet thickness has to be the same as in program.

X-axis zero point:
Back gauge fingertip is at bend line.

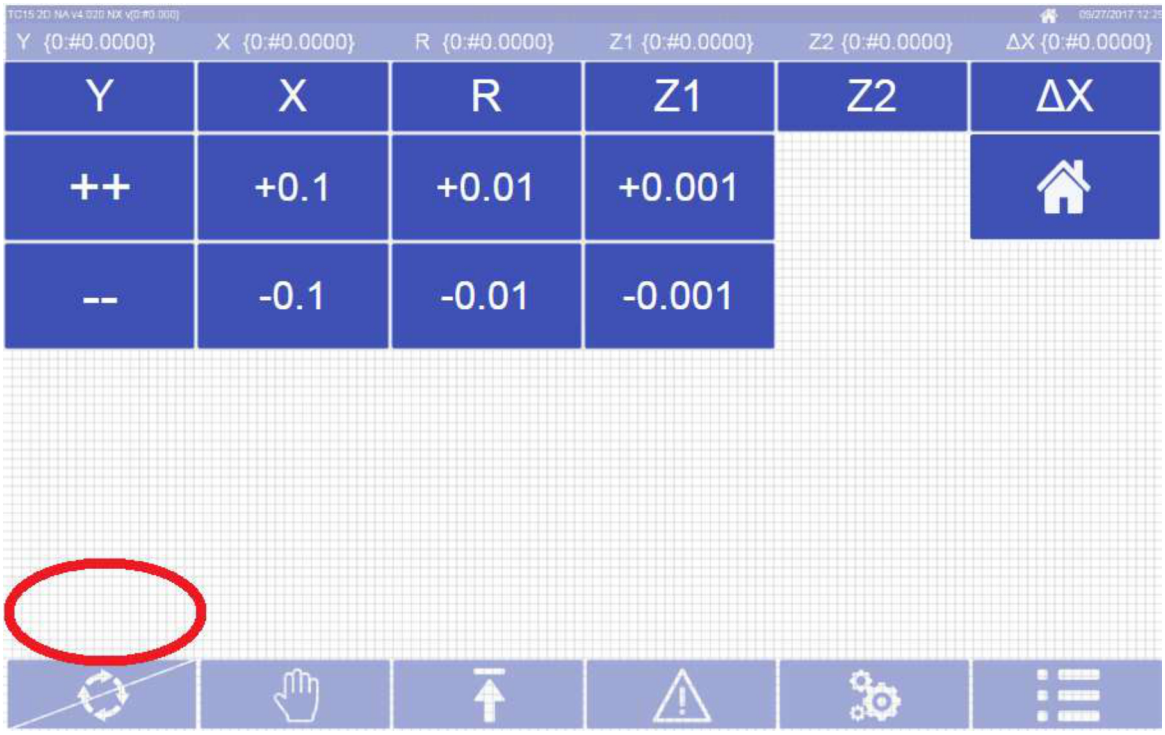
R-axis zero point:
Back gauge finger lower surface is at the level of the top of the die.

Z1/Z2-axis 400.0 position:
Distance from the left edge of die holder is 400 to the left edge of back gauge finger.

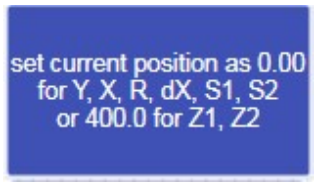
Delta X axis zero point:
Back gauge fingertip is at bend line.

S1/S2-axis zero point:
Sheet follower is at horizontal plane.

When selected axis is moved to correct position below shown point of the screen must be pressed briefly.



After a while below shown button appear. When it is pushed briefly reference value is adjusted and axis position in upper bar should be 0.00 / 400.0.



4.2.14 Lazersafe

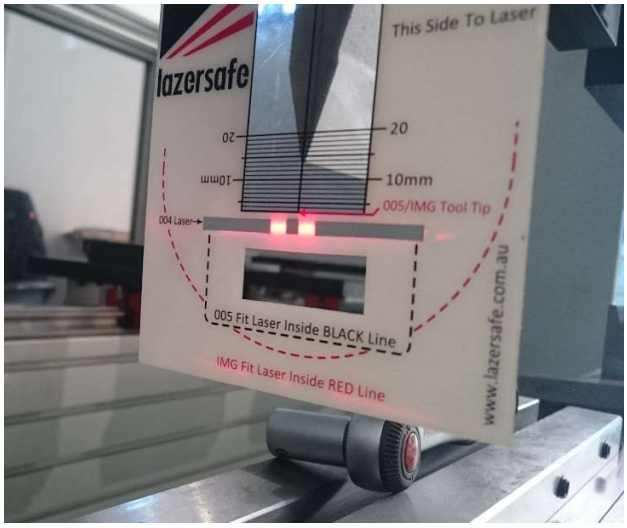
After machine has been referenced lazersafe guards will be turned ON. IRIS/IRIS plus will also perform final tool alignment automatically at this point.

When proper program with proper tools are selected and corresponding tools are fixed to the machine, vertical position of the guards must be confirmed and adjusted if needed.

Height adjustment is only needed if the height of the punch changes.

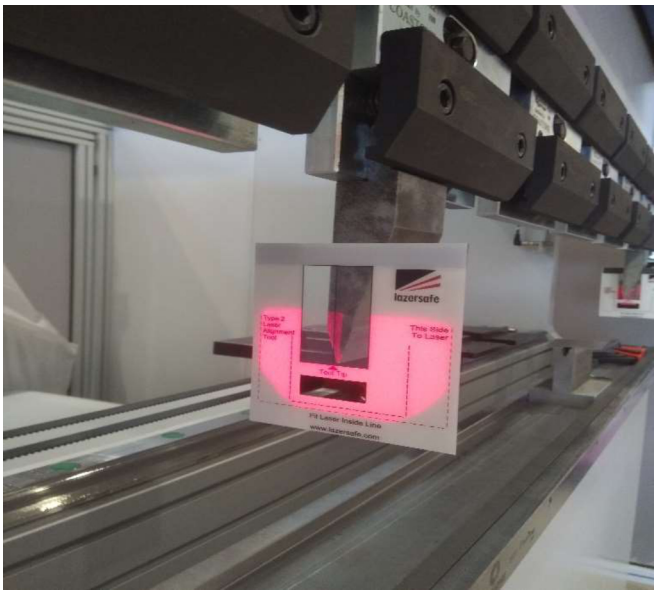
With IRIS/IRIS plus final tool alignment procedure must be performed always, as described below.

For height adjustment you need to place the adjustment tool to the left side of the punch as shown in the pictures below.

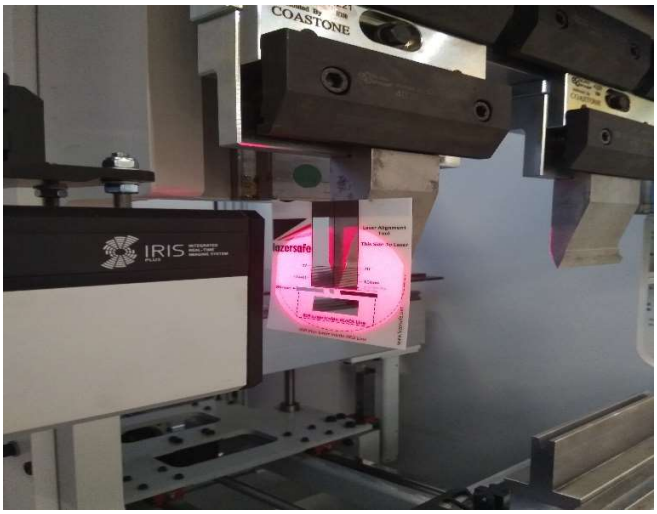


Adjustment tool with LZS-004-HS.

Adjustment tool with LZS-2.



Adjustment with IRIS.



Adjustment tool with IRIS plus.

For LZS-004-HS, place the tip of the punch to the point of 14mm in the scale.

For LZS-2 place the tip of the punch to the point marked as “Tool tip”.

For IRIS place the tip of the punch to the point marked as “Tool tip”.

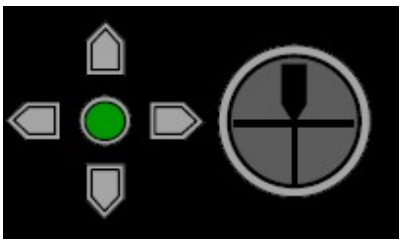
For IRIS plus place the tip of the punch to the point of 0mm (marked also as IRIS) in the scale.

Pay attention that the adjustment tool is approximately perpendicular to the vertical axis.

After that loosen the fixing handle of the vertical bracket of the transmitter and move the transmitter so that with LZS-004-HS the laser beam hits the rectangle in the adjustment tool, and with LZS-2/IRIS/IRIS plus laser hits the red dotted line circle/rectangle, as shown in the pictures above. Tighten the fixing handle again.

Then remove the adjustment tool, loosen the fixing handle on receiver side, move receiver so that the laser beam hits to the middle of the receiver vertically. Tighten the fixing handle again.

At this point, with IRIS/IRIS plus push the tool align button on IRIS receiver, button shown below. IRIS performs final adjustment according tool tip. Make sure that there is enough opening/daylight that die silhouette / anything else than the punch silhouette is not seen at the receiver.



After final adjustment if middle led is green adjustment is completed successfully and machine is ready for operation.

If upper led is red receiver should be adjusted upwards little bit, if lower led is red receiver should be adjusted downwards etc. Push tool align button again.

If both upper and lower led are red, it might be caused by poor initial adjustment of transmitter and receiver, or by an obstruction.

If both left and right led are red, it might be caused by too high level of ambient light or no upper tool present.

Do not touch other adjustments of the transmitter or receiver unless you are trained to do so and you are absolutely sure you have to do it. Normally this is done only once during the installation of the machine. This procedure is explained at the end of this chapter.

For the first stroke after power ON or after 8 hours of operation stopping test will be performed automatically 2 times. This means that the closing stroke will be stopped around the middle point between the opening of current tools. System measures stopping distance, and after brief moment ram will be driven to the top dead point.

After 2 stopping tests machine is ready for operation.

Note that a sheet with programmed thickness has to be above the die for the first stroke. Safety system has to detect the sheet at expected position to be able to set the mute point properly.

With this button in settings page 1 lazersafe guards can be turned off, in which case machine closes only with the slow speed.

With this button tray mode can be selected. In tray mode closing stroke stops when a flange is detected, but with second press of pedal after this fast closing can continue of the middle sensor of the receiver is clear.

Incase machine has two separate pedals connected to the PCSS operator can choose one pedal mode and two pedal mode with above button.

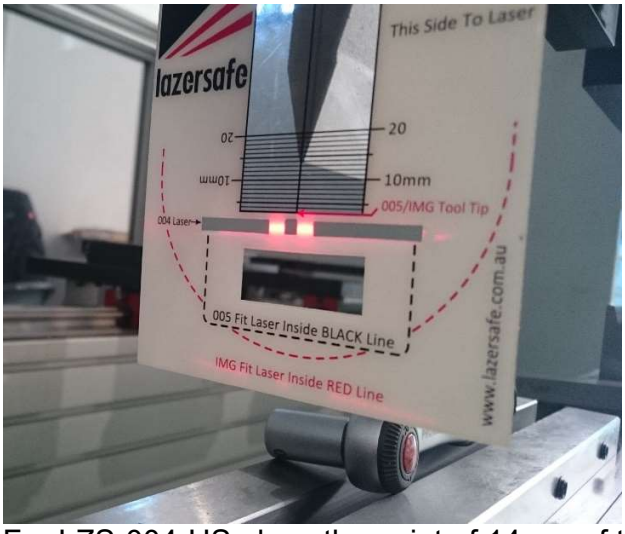
In two pedal mode both pedals are required to be pressed to enable closing stroke and releasing either of pedals stops the closing stroke.

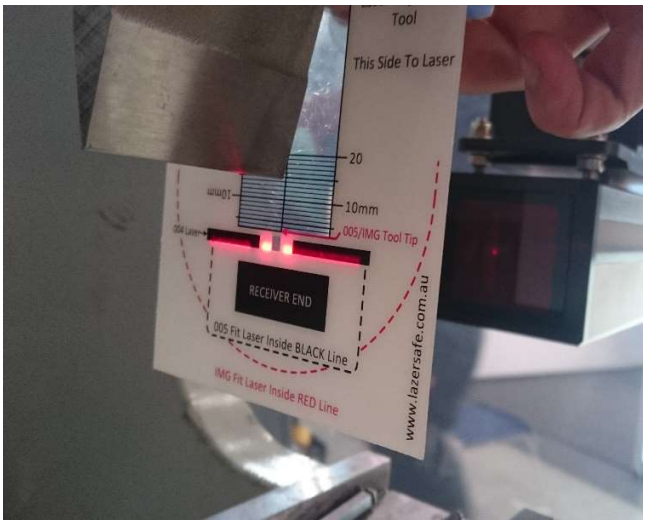
Pedals are marked as “1” and “2”, pedal number 1 is the main pedal which is always in use.

When pedal mode is changed PCSS condition code must be reset from blue reset button. This is only notification for operator.

Initial adjustment

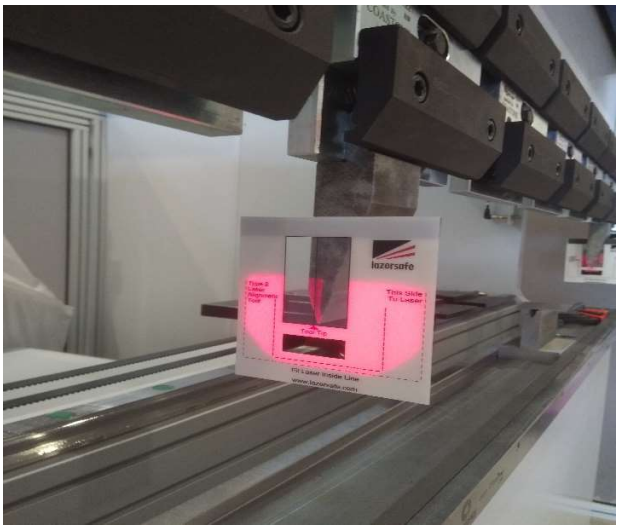
1. Install a punch of a same type to both ends of the upper beam.
2. Place adjustment tools on both ends of the punch/punches as shown in pictures below



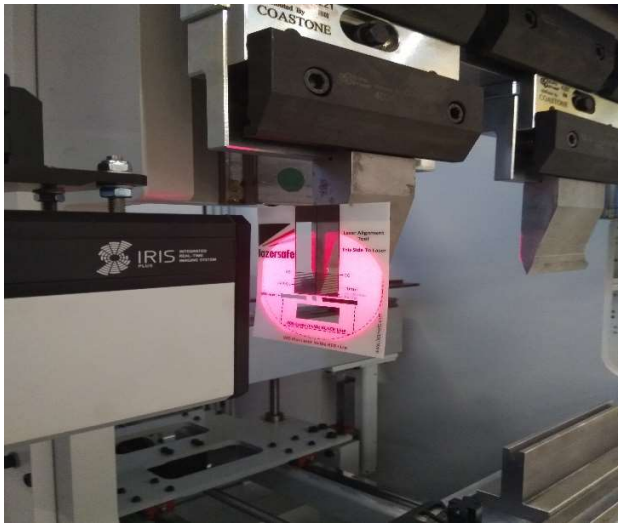


For LZS-004-HS place the point of 14mm of the scale to the tip of the punch.

For LZS-2 place the point of “Tool tip” to the tip of the punch.



For IRIS place the point of “Tool tip” to the tip of the punch.



For IRIS plus place the tip of the punch to the point of 0mm (marked also as IRIS) in the scale.

Pay extra care to do this as accurately as possible as well as place the adjustment tools perpendicularly to the vertical axis as accurately as possible.

3. LZS-004-HS: Adjust the transmitter so that the beam hits precisely to the 3 small rectangle holes of transmitter side adjustment tool, and the parts of the beam which goes through the holes hits precisely to the corresponding rectangles on the receiver side adjustment tool.

   LZS-2/IRIS/IRIS plus: Adjust the transmitter so that the beam hits the red dotted circular/rectangle area on transmitter side adjustment tool, and part of the beam which goes through hits the rectangle of transmitter side adjustment tool, marked as “RECEIVER END”.

4. LZS-004-HS/LZS-2: Adjust the receiver so that the tiny part of the beam which comes throught the recerver side adjustment tool hits to the middle of the receiver and so that middle sensor of the receiver is clear.

   IRIS/IRIS plus: Adjust the receiver so that the beam hits approx. middle of receiver (without adjustment tools).

5. Remove adjustment tools. Rotate receiver horizontally and pay attention where are the ends of a sector in which the receiver sensors are clear. Place the receiver approximately to the middle of this sector. Do the same in horizontal direction. Very important for LZS-004-HS.

4.2.15 FTP server

The touch screen of TC15 2D control can be used as FTP server to transfer bending programs with an office computer etc. inside a factory network or with direct connection to single PC.

Ethernet cable and correct network settings are required for this. To set correct settings follow the next steps

1. Find out what is the **IPv4 address** of the factory network, and what is free IP address what can be used for the FTP server. When connecting directly to a single PC it enough to know what the IP address of that PC is.

2. To enter touch screen system menu, double tap left corner of the touch screen

3. Go to device system menu -> Interface settings -> Ethernet
   Set proper IP address for **Port 2**. **Do not touch settings of Port 1!**

   Proper IP address is at the same range as the factory network / target single PC, which means the first 3 parts of the IP address must be the same. 4th part must be a free address in the factory network, or just different than of the single target PC.

   Set subnet mask as 255.255.255.0.

   Example: FTP will relate to a single PC. Single PC has IP address 192.168.0.250. Suitable IP address for FTP would be for example 192.168.0.251.

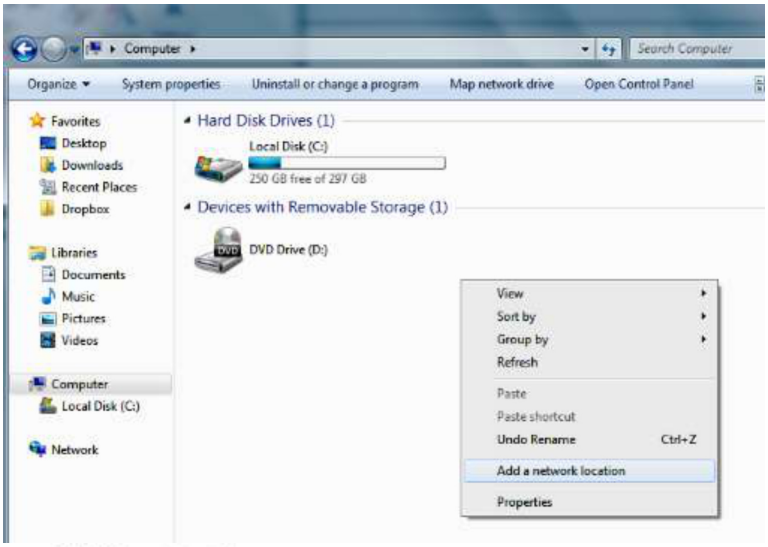
   If this single PC does not have static IPv4 yet set it as 192.168.0.250 / subnet mask 255.255.255.0.

   Make sure that the firewall of the PC is not blocking this connection!

   If encountering problems during first test it is recommended that firewall would be turned off completely until the problem is solved and firewall is set up properly.

4. Connect the ethernet cable between PC and the touch screen. There is ethernet port outside of the enclosure of the screen, which is connected to Port 2, next to USB port.

5. At PC side add network location with right clicking on the “computer” and select “choose a custom network location”, click next



Syntax for FTP address according the example would be “FTP://192.168.0.251/”, adjust according if using another IP.

Choose to enter username which must be “cone”.

You can name this network location as you wish. Default name would be the IP address of it.

Now the connection to the FTP server is ready to be used.

4.2.16 IRIS plus angle measurement system

All functions related to IRIS plus are located on a separate page. Page can be entered from settings or bend info, button has the following IRIS plus icon

Besides normal height adjustment and alignment of IRIS transmitter and receiver, which are explained in chapter 4.2.14, IRIS plus system requires reference image to be taken every 4th hour and system calibration minimum once a day.

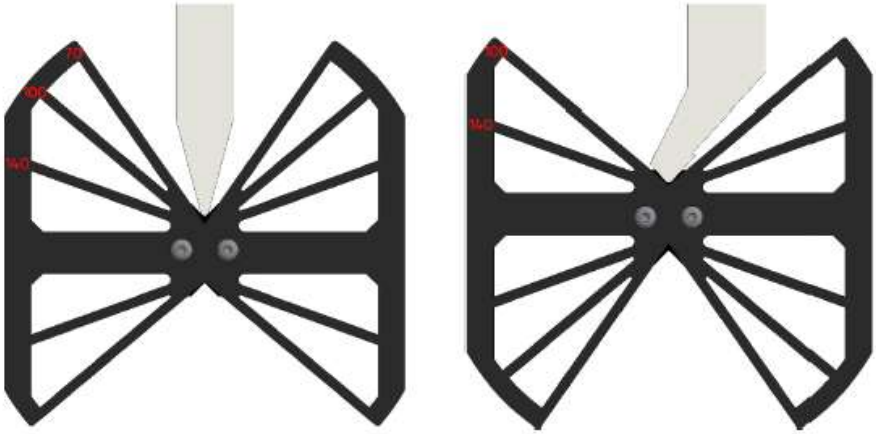
Besides these intervals, reference image and system calibration should be performed also after tools have been changed.

First step is to get the reference image, and before that axes of the machine must be referenced.

After axis reference cycle, IRIS plus reference image can be taken with the following button which can be found from IRIS plus page. Note that punch silhouette must be clearly visible without any obstructions on IRIS plus receiver during the reference image.

Possible reasons why reference image might be unsuccessful:
-miss alignment of the transmitter/receiver
-unclean or scratchy transmitter/receiver window
-extreme conditions such as
-direct sunlight on IRIS plus receiver
-exposure to the outside elements (e.g. near open doorways)
-machine located directly beneath or next to fans, heating, or air conditioning units
-hardware failure

After successful reference image system calibration can be performed. To do that calibration tool shown below is required. Calibration tool is always provided with the machine.



If angle of the punch is <70 degrees, calibration tool should be fixed to the punch according left picture, otherwise according right picture.

With below shown button operator must also select corresponding choice so that calibration can be performed properly. Note that incorrect selection will cause calibration to be unsuccessful. Also, reasons for unsuccessful reference image listed above applies to the calibration.

Calibration should be performed at 3 points on current tool setup, at the very left, middle, and very right.

When calibration tool is placed on one of those places, corresponding calibration button must be pressed, which are left, middle and right on 3 separate buttons as shown below.

After successful reference image and calibration, system is ready to be operated.

Below are the functions and provided info from IRIS plus.

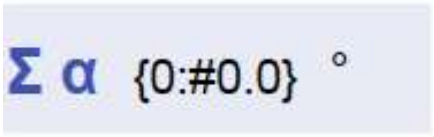
Angle measurement ON/OFF, selection is stored to the given bend step. It might be necessary to turn measurement OFF in some cases where IRIS plus system won't be able to measure the angle reliably, like for example too short flange.

If bent angle is incorrect after the measurement cycle, bend step can be repeated by turning this off and adjusting angle correction manually.

When bending open profile (not a box, Lazersafe tray mode is OFF) final angle will be confirmed precisely by closing the press with crawl speed until target angle is reached.

When bending box/closed profile tray mode must be turned ON. In tray mode final bottom dead point will be calculated according measured and adjusted angle correction and spring back.

With above button operator can choose if the spring back will be measured or not. Measured spring back is stored to a given bend step, and it is possible to turn spring back measurement off after the first part to fasten the cycle. Note that if stored spring back value is zero, spring back will be measured at least once.



Angle correction. When measurement is ON, system adjusts this value automatically, towards to the programmed target angle. Spring back is added besides this when defining the actual bottom dead point of the bend step.

If this value is 0, basically when new program has been created, angle is first left open intentionally by several degrees to avoid part being over bend.

If a die, material thickness or programmed angle will be changed to an existing program this value will be reset to 0 to avoid over bend.

If angle correction is 0 and measurement quality drops to 0% during cycle angle correction will be 0.1 and normal bend cycle without measurement will be executed.

Above shown field is informative, the programmed target angle.

Above shown field is the current measured angle. On bottom right is shown the measurement quality, which can be 100%, 75% or 50%.

0% quality means that the angle cannot be measured, in which case normal bend cycle is executed without measurement. Operator can try to find out and fix the reason causing this or turn angle measurement OFF for this bend step incase it is impossible to measure the angle.

IRIS plus starts to output angle measurement data when Y axis position is below 1mm.

Above shown field is the measured/stored spring back.

Above shown fields are the measured inside angle and outside angle, with respective measurement qualities.

Above shown fields are the final target angle and final achieved angle.

Final target angle = programmed angle minus spring back.

In tray mode final achieved angle is not possible to measure.

Other points to take into account

There are few parameters which are automatically tuned during operation. In operator point of view this means that the very first part of new program will take few seconds longer, but after few cycles the relevant parameters are tuned for faster operation.

Parameters are adjusted only in full auto mode.

If a die, material thickness or programmed angle is changed on existing program, these parameters are reset to minimize error in final angle. Otherwise the tuned parameters are stored on given program.

Angle correction is used as one of the automatically tuned parameters on angle measurement cycle and should not be changed unless angle measurement is turned off for given bend.

When closed profile will be bend, meaning a box like shape, Lazersafe tray mode must be turned ON from Y axis settings with the following button.

Measurement cycle uses bottom dead point delay (can be found from Y axis settings page) in several points to measure and adjust angle correction and spring back.

Required minimum delay may depend on material quality, -thickness and tools being used. System automatically uses value of 0.3sec. Too short delay can cause the final angle being under bend if the delay is too short for to achieve maximum spring back.

Measurement accuracy

Theoretical angle measurement accuracy is +/- 0.25 degrees at 100% measurement quality.

Measurement quality can be 100%, 75% or 50%.

0% means that angle can't be measured.

Below are factors which might decrease measurement quality.

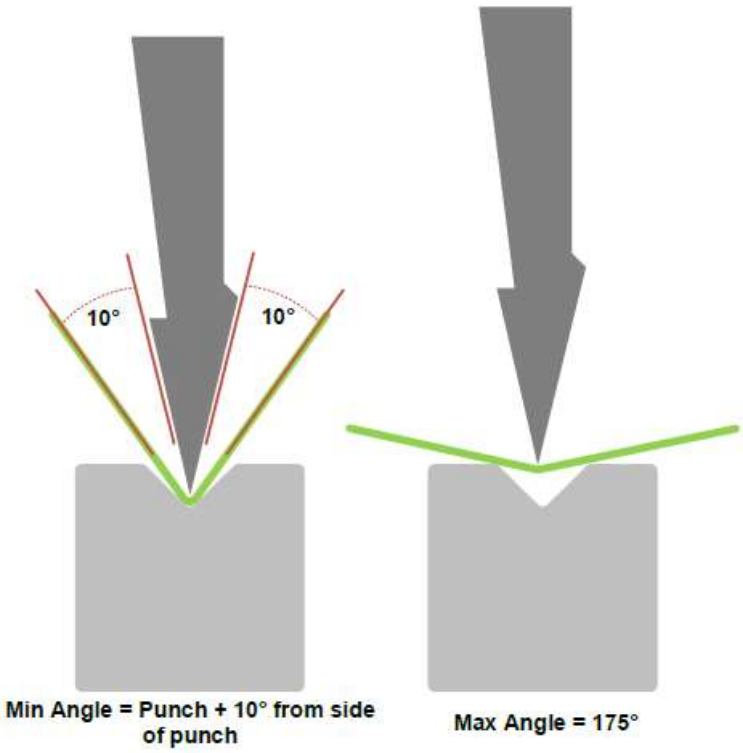
1. extreme conditions such as
   -direct sunlight
   -exposure to the outside elements (e.g. near open doorways)
   -machine is located directly beneath or next to fans, heating, or air conditioning units

2. Machine length is more than 3m

3. Installed tools are longer than required for given bend length. Always use minimum length of tools required

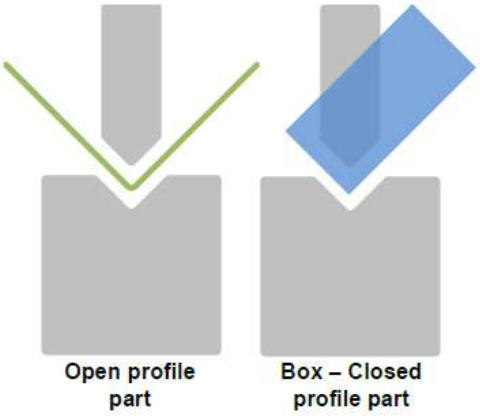
4. Bend is performed at the very left on the machine, always bend at middle if possible

5. Angle range is exceeded as shown below. Always use 30 degrees tools for best possible quality



6. Exposed limb length, meaning the part of sheet coming over the die edges on both sides. Minimum 20mm for 100% quality, minimum 10mm for 50% quality.

7. Part profile, with closed profile only 75% or 50% can be achieved. Always set the Lazersafe tray mode ON if part has a closed profile bend.



4.3 Trouble shooting

Touch screen does not start up

- Make sure that machine power cable is connected properly and the fuse of the power supply is ok.
- Authorized person can open the cabinet door and check that the fuses inside cabinet are ok.
- Authorized person can check that the power supply cable to the screen is ok.

Blue safety circuit reset does not work

- If blue light does not light up after starting up, authorized person can open the cabinet door, check the fuses, cables going to the reset button and functionality of the led of the button.

- **If blue light does not go off**
  - Check that emergency stop button is returned to normal position by twisting it.
  - Check that back door is properly closed. Good idea is also to try to open and close again the door to make sure safety switch key goes into the switch.
  - Authorized person can open the cabinet door and inspect safety circuit with the help of electric schematics.
  - If machine has lazersafe safety device check the PCSS error code.

Manual mode cannot be entered.

- Check the status of the machine from alarm and warning page. Refer to chapter alarms and warnings.

Reference run or manual jog does not work

- Try to jog each axis into both directions in manual mode, and before reference run try to jog axes away from the reference limit switch.
- Check the torques of axes while jogging manually. Torques should never exceed 100%.
- Test that each axis stops correctly on both directions limit switches. From trouble shooting page can be seen what the cause of stop was. If something else that limit switch passes the info for the support/service.
- If machine has more than one Y axis, check that Y axes absolute positions are the same when in manual mode. If this is not the case, contact support/service.
- Note that when trying to jog Y downwards pedal must be pressed, and when upwards pedal must not be pressed. Refer to chapter manual mode.

Cannot enter bend info page

- Select listing from USB and open or create program and set tools into it.

Tool info is not visible.

- Open or create a tool.

When trying to start auto mode notification appears

- Check the following list of different notifications

Axes will not move while in auto mode

- Authorized person can check the condition of pedal and its cable.
- Check that pedal is not pressed into position 3. Release it from the mechanical button in the pedal.
- If machine has lazersafe safety device, check the PCSS code.
- Main page appears with a notification, check the following list of different notifications.
- If Y axis won't start the opening stroke, likely reason is that some/all of the Y axes hasn't reached the target bottom dead point. Check the tool info, bend angle and angle correction values. Authorized person can enter commissioning settings, turn visible separate Y axes bottom dead points and actual positions, to make it easier to judge if such has happened.

In automode axis is positioned incorrectly / bending angle result is more than what material tolerances would cause.

- If an alarm appears, find out the cause/ explanation from alarm and or trouble shooting page.
- Authorized person can check reference values and adjust if required.
- Refer to chapter **Using the control.**
- Check the tool info and that actual tools fixed to the machine corresponds.
- Check everything in bend info page.
- Try to re-create the program.
- Note that when using tight die V opening proportional to the thickness, material thickness and tensile strength tolerances can cause up to 2-3-degree difference in angle.

Notifications and warnings

- ”**Y pos < 0.00**”, Y axis position is negative. Check tool info and/or manually lift Y axis.
- Punch image and question mark, check punch info.
- Die image and question mark, check die info.
- Thickness symbol and question mark check the thickness in the program.
- Angle symbol and question mark, the bend info page.
- Notification with an Axis identifier, like ”Y”, ”X” tai ”R”, and notifier ”++” or ”- -”. This means that software limit would be exceeded. ++ means upper or back, - - means lower or front. Check the program values. Authorized person can check the software limit values in machine parameters.
- ”**X<die V/2**”. Back gauge finger would exceed the die V opening edge, making the bending impossible, and causing a risk that back gauge finger is between the tools.
- ”**Y following limit exceeded**”, one of the Y axes leaves behind too much from the calculated trajectory. If this appears during bending, likely reason is that calculated bend force is too small. Check the tool info, bend info and current material info.
  If this appears during fast closing or opening, first aid is to decrease fast closing or opening speed from settings, refer to chapter **Settings**, and contact support/service.
- ”**Y tilt limit exceeded**”, allowed difference between separate Y axes is exceeded.
  If this appears during bending, Y axes has too big difference in bottom dead points. Likely because of crowning adjustment. Check the crowning adjustment value. If bending angle result requires such crowning adjustment that this warning appears, contact support/service.
  If this appears during fast closing or opening, first aid is to decrease fast closing or opening speed from settings, refer to chapter **Settings**, and contact support/service.

Some usual PCSS error codes while machine is working as expected.

- **00CB**, back door open.
- **00CC**, emergency stop button is no released.
- **4102**, lazersafe receiver angle is not adjusted properly.
- **4203,** no material sensed at expected position. Always have a sheet with programmed thickness above the die.
- **4220**, lazersafe system detects obstruction in unexpected position. Check tool info make sure that both lazersafe transmitter and receiver lenses are clean and that they are adjusted to correct height.

In several lazersafe error cases good first aid to try is to decrease fast closing or opening speed from settings, refer to chapter **Settings**.

Lazersafe offers comprehensive database of PCSS error code causes and solutions. Registering into lazersafe webpage is free.

http://lazersafe.com/support