



CATALOGUE
**3D STRETCH
BENDING MACHINES**

www.inductaflex.com

Introduction



WHO ARE WE?

Aluminum profile forming machine manufacturer with the widest range of machines in the World to produce the best result.

8 styles of bending machine,
traditional roller benders
die benders
stretch formers



SUSTAINABILITY

- Our machines are all servo or servo/ hybrid 70% power saving
- Faster achievement of Net Zero
- Industry 4.0 capable

Inductaflex produces no hazardous waste
95% of our own machines are servo electric
We hit Net Zero by 2029 at all sites.



RANGE OF SOLUTIONS

We bend in 2 and 3 dimensions.
Simple CNC benders
Complex bend and machining cells



LOCATIONS

We design and manufacture from 3 locations around the World.

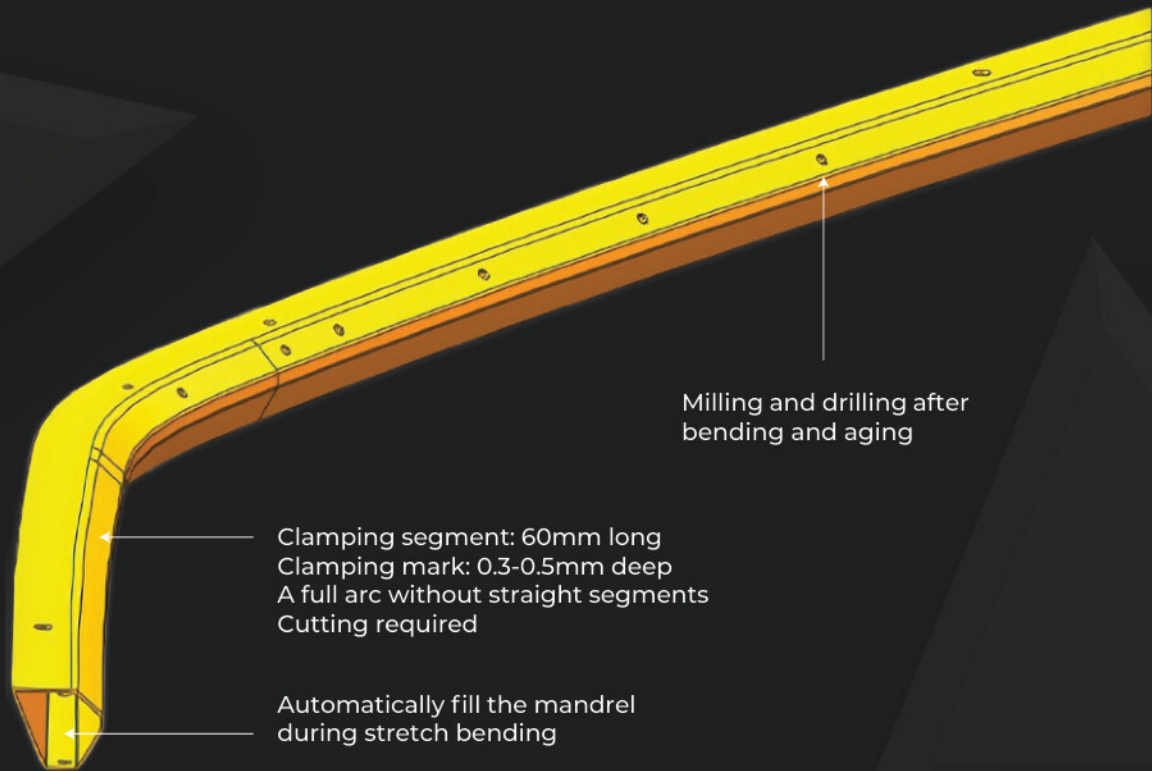
UK - large Induction Benders
Vietnam – Roller Benders and Bend Cells
USA – Robot Development and Stretch formers
South China – Machine frames



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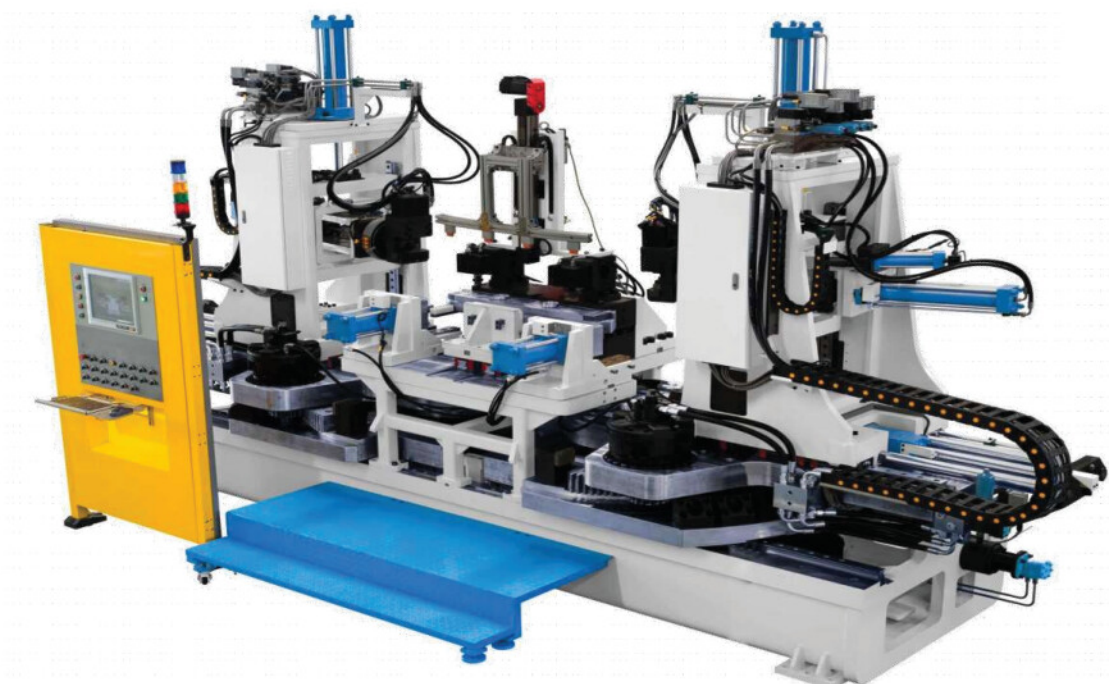
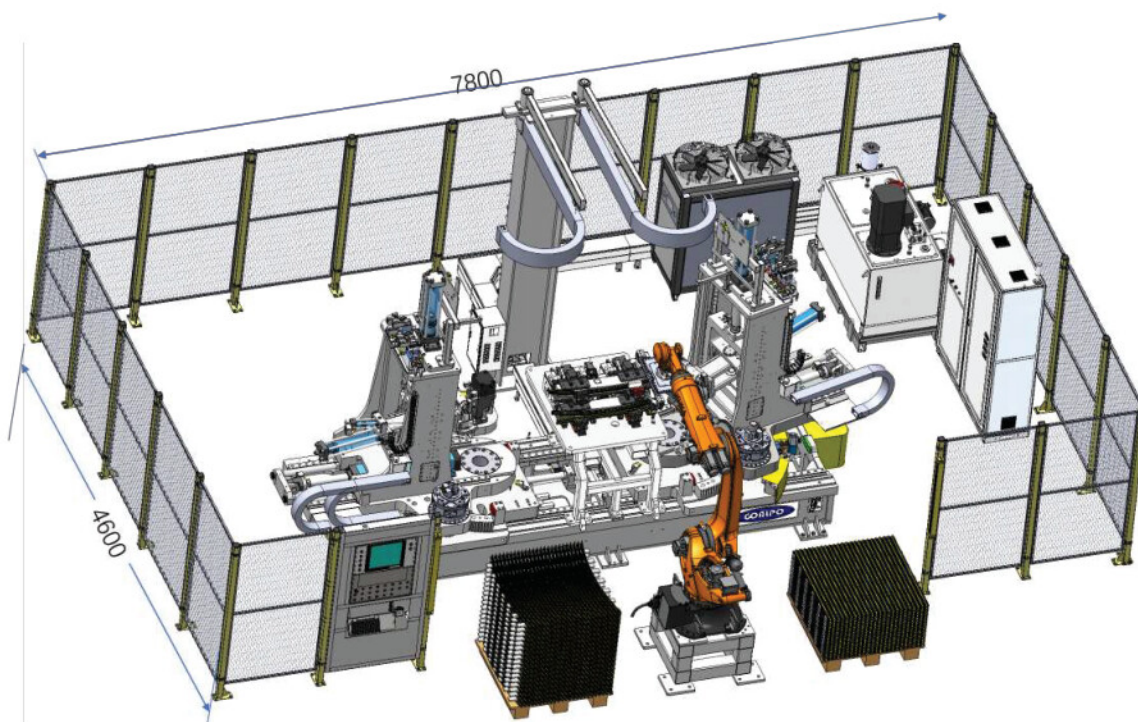
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Profile Bending and Forming Analysis



Forming Method	3D stretch bending machine
Cycle Time	50s/pcs
Qualification Rate	Over 98%
Quality	Contour fitness $\leq \pm 1\text{mm}$, Flatness $\leq \pm 1\text{mm}$ Depression $< 0.5\text{mm}$
Positioning Hole	Drilling on the workpiece
Clamping Length	Clamping segment: 60mm long, clamping mark: 0.3-0.5mm deep, cutting required
Feeding Length	Expanded length+120
Checking Fixture	Customer Provided
Material	T4 or T0 within 10days, as per drawing
Material Aging	T4 extruded profile-> stretch bending-> aging to T6-> cutting, drilling and milling
Machine Name	20T 3D stretch bending machine
Time of Delivery	30 working days around
Tooling	30 working days around

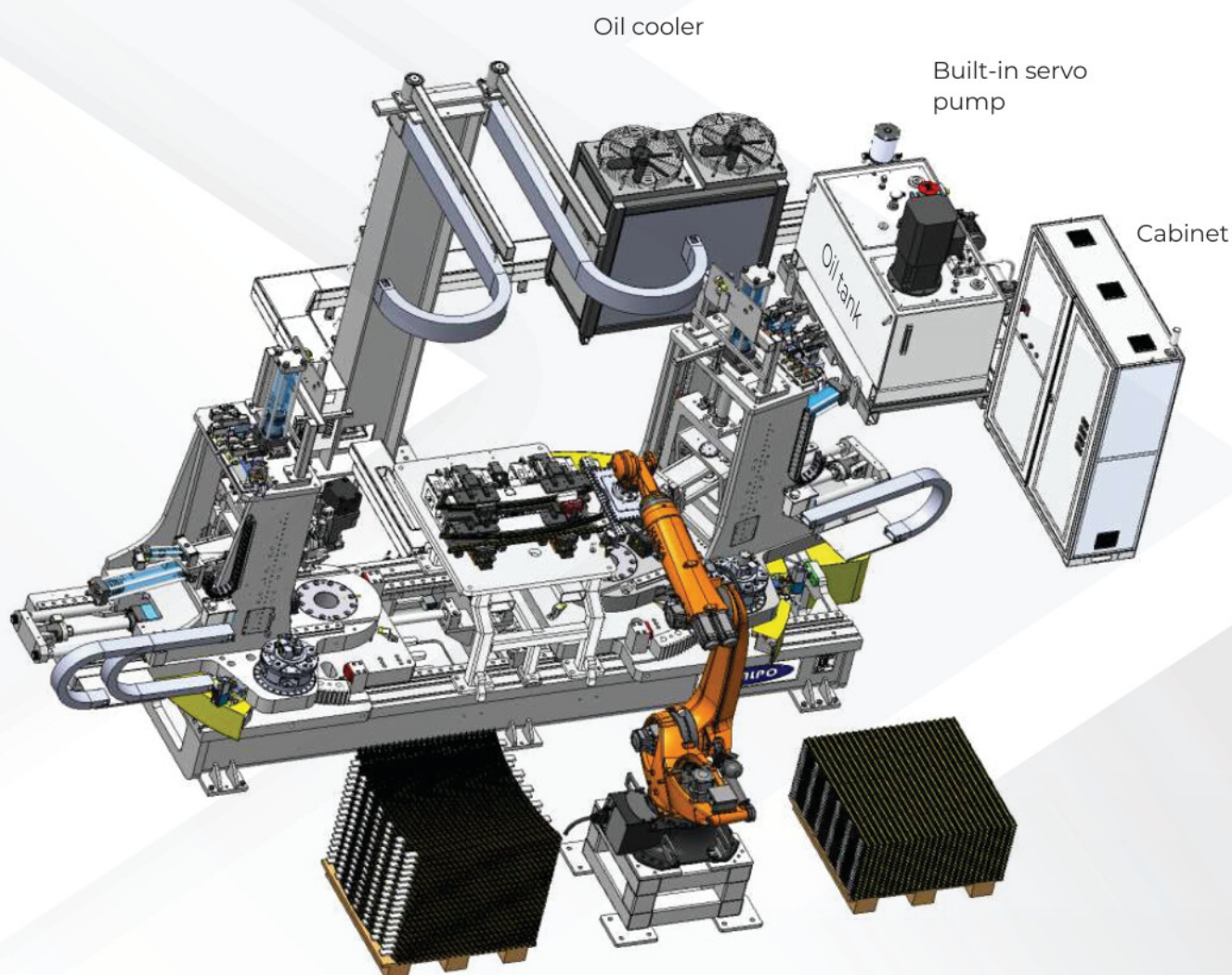
3D Stretch Bending Machine



SUMMARY

Adjustable wheelbase

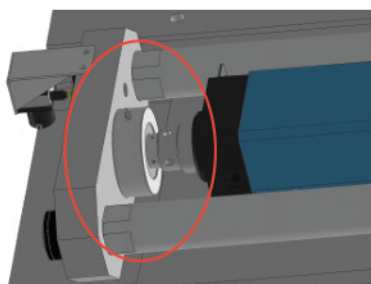
Rated forming capacity	≥20T
Clamp spacing	400-3500mm
Plan Layout (estimated)	7700*4600mm
Power	55KW



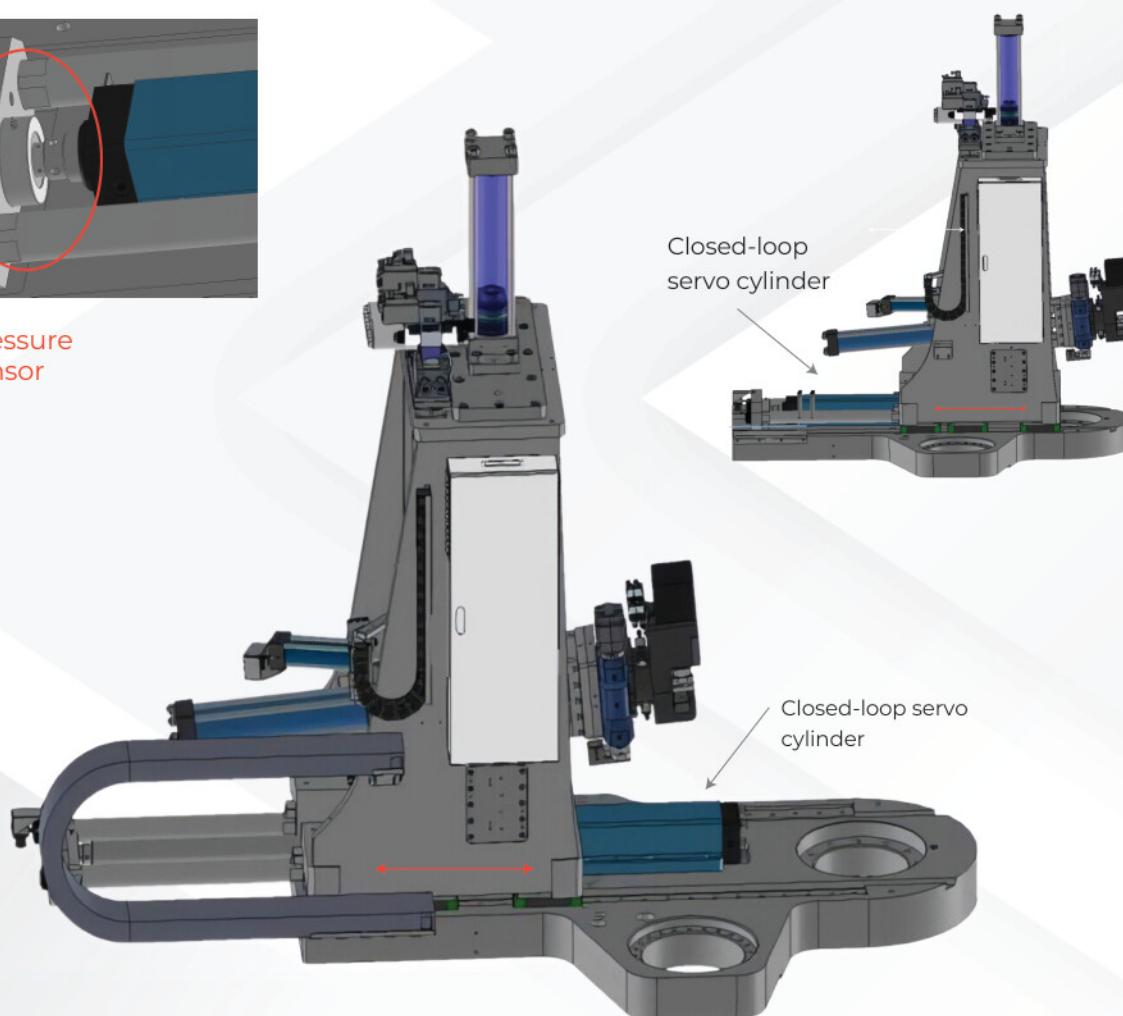
STRETCH CYLINDER

X1 X2 axis

Force	20T
Force control precision	$\pm 0.5\%$
Stroke	700mm
Position control precision	$\pm 0.01\text{mm}$
Speed	762mm/min
Swing in horizontal plane (clamp)	$\pm 30^\circ$
Drive method	Closed-loop servo cylinder



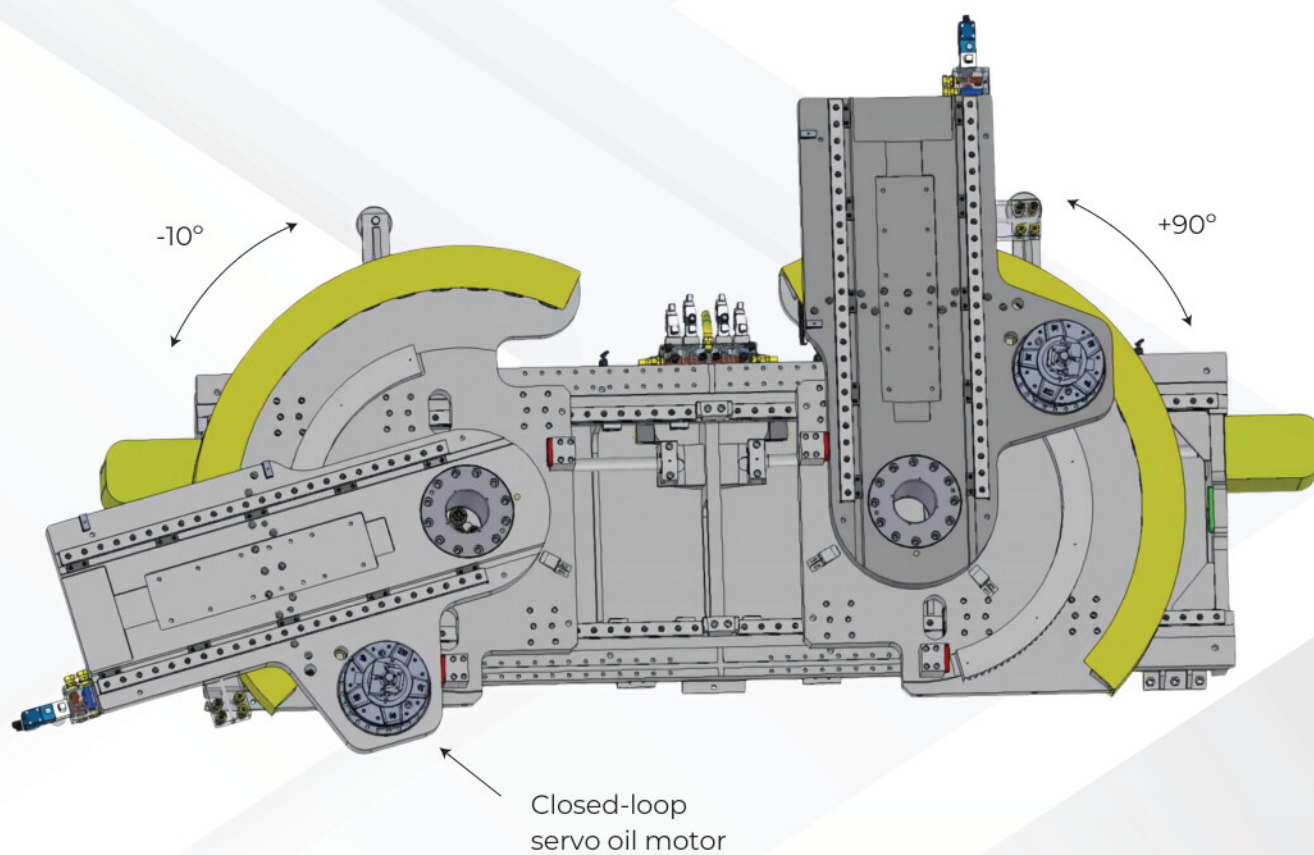
Pressure sensor



STRETCH BENDING ARM

X3 X4 axis

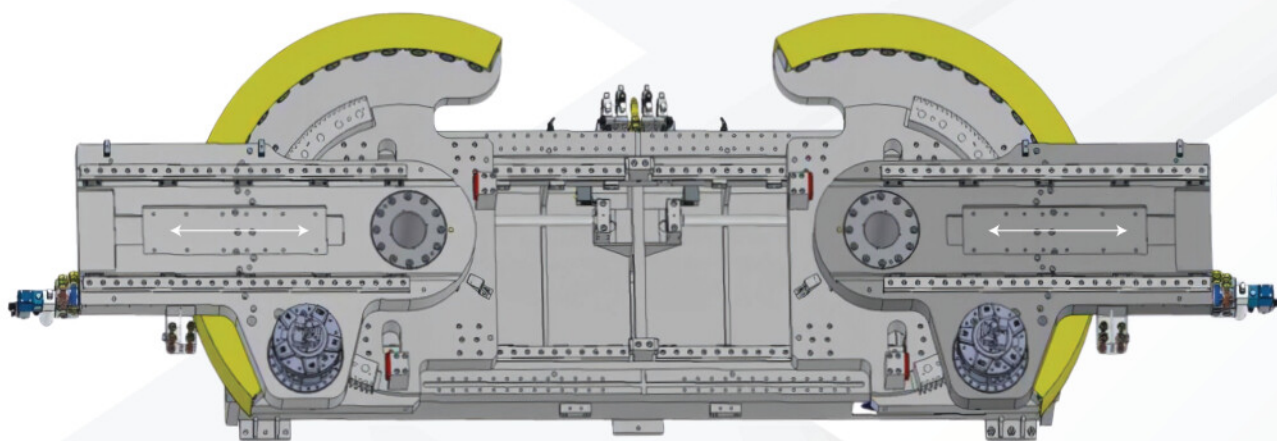
Moving angle	-10° ~90°
Position control precision	± 0.1°
Rotating speed	3°/sec
Drive method	Close-loop servo oil motor



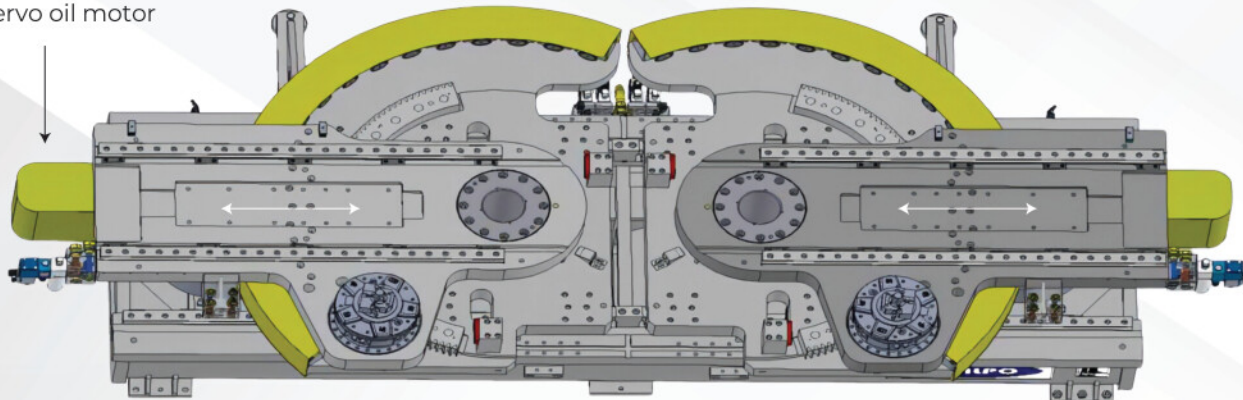
WHEELBASE ADJUSTMENT

X5 X6 axis

Unilateral stroke	500mm
Position control precision	$\pm 0.01\text{mm}$
Speed	300mm/min
Drive method	Closed-loop servo oil motor



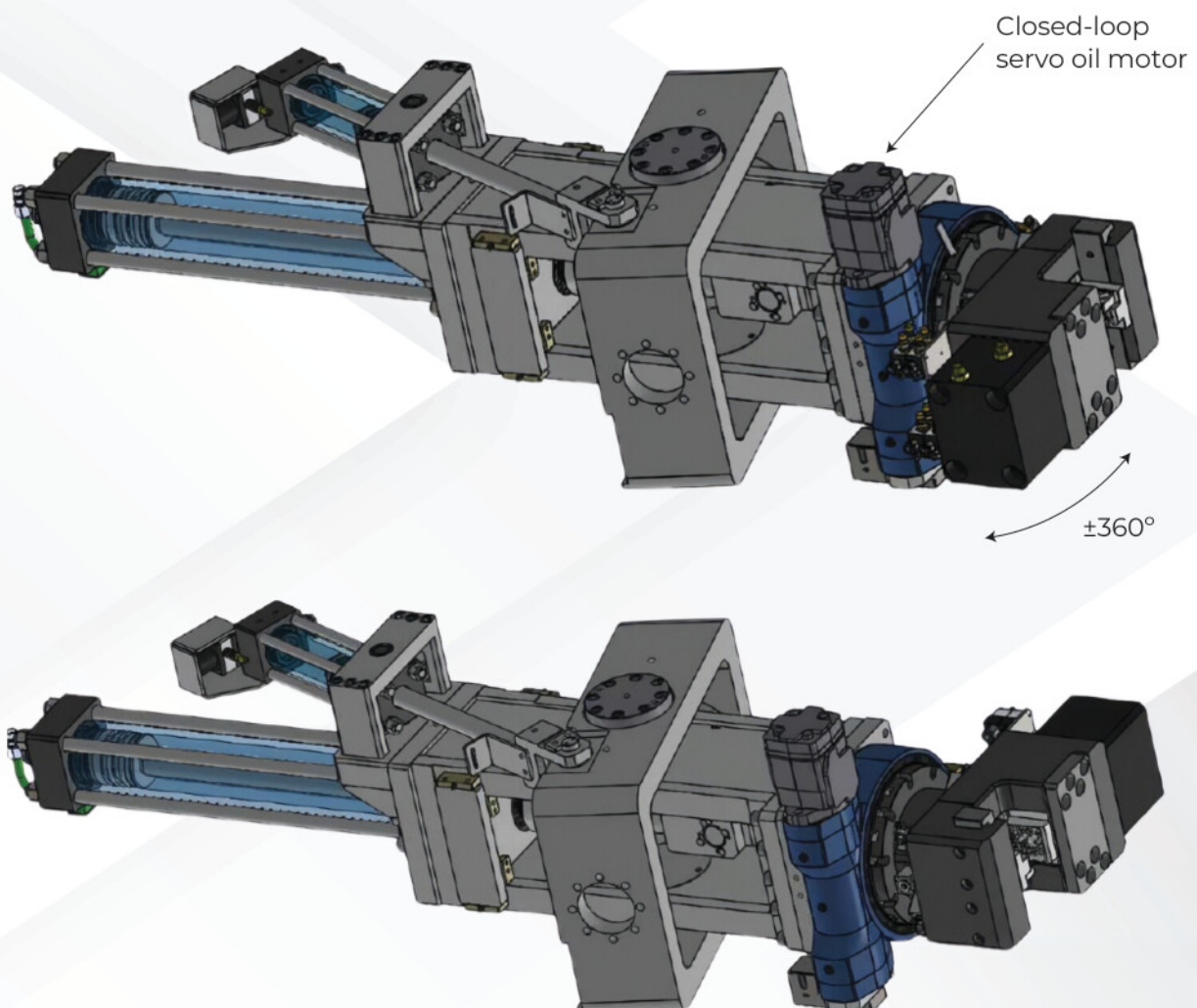
Closed-loop
servo oil motor



ROTATING CLAMP

X7 X8 axis

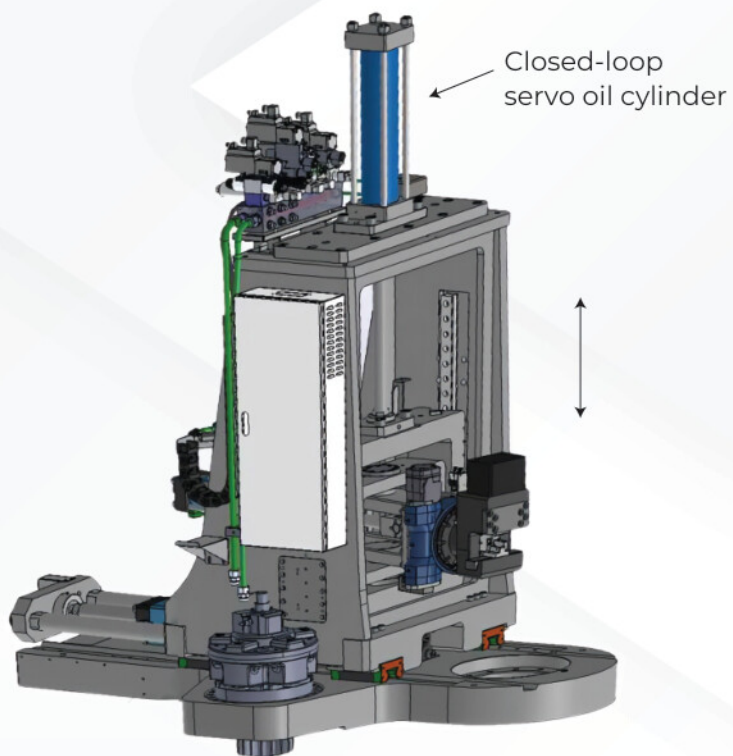
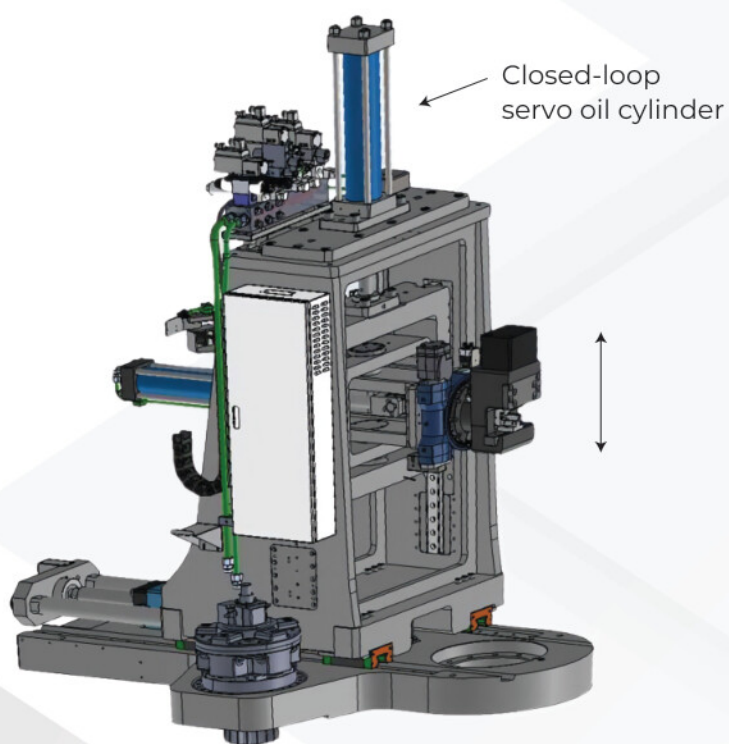
Axial rotation angle	$\pm 360^\circ$
Clamp torque	4448.5N.m
Position control precision	$\pm 0.1^\circ$
Rotating speed	1°/sec
Drive method	Closed-loop servo oil motor



CLAMP LIFTING CYLINDER

X9 X10 axis

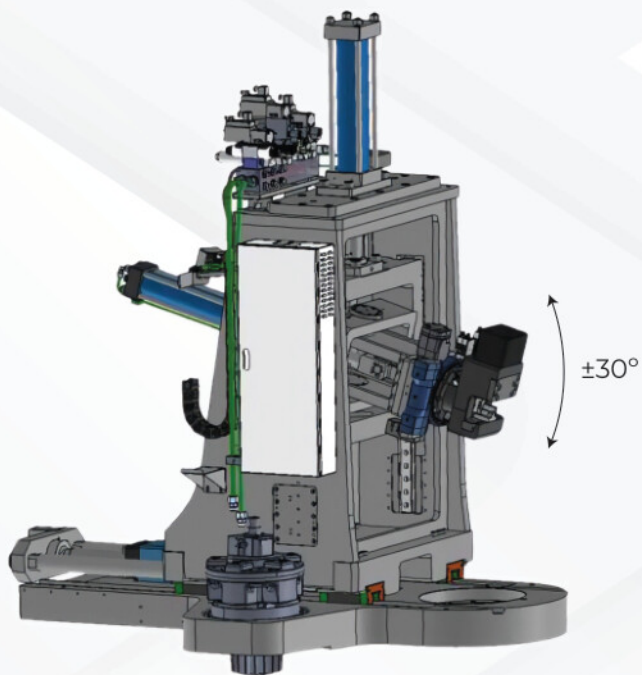
Stroke	600mm
Position control precision	$\pm 0.01\text{mm}$
Speed	600mm/min
Drive method	Closed-loop servo oil cylinder



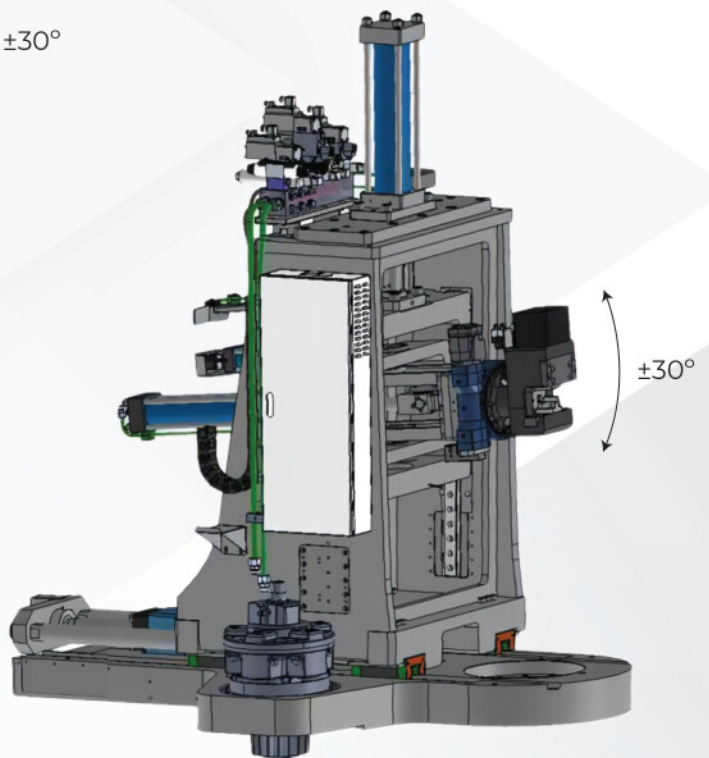
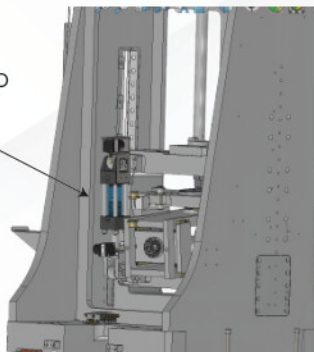
THE CLAMP LOOKS UP AND DOWN

X11 X12 axis

Swing angle	$\pm 30^\circ$
Position control precision	$\pm 0.1^\circ$
Forming speed	$1^\circ/\text{sec}$
Drive method	Closed-loop servo oil cylinder



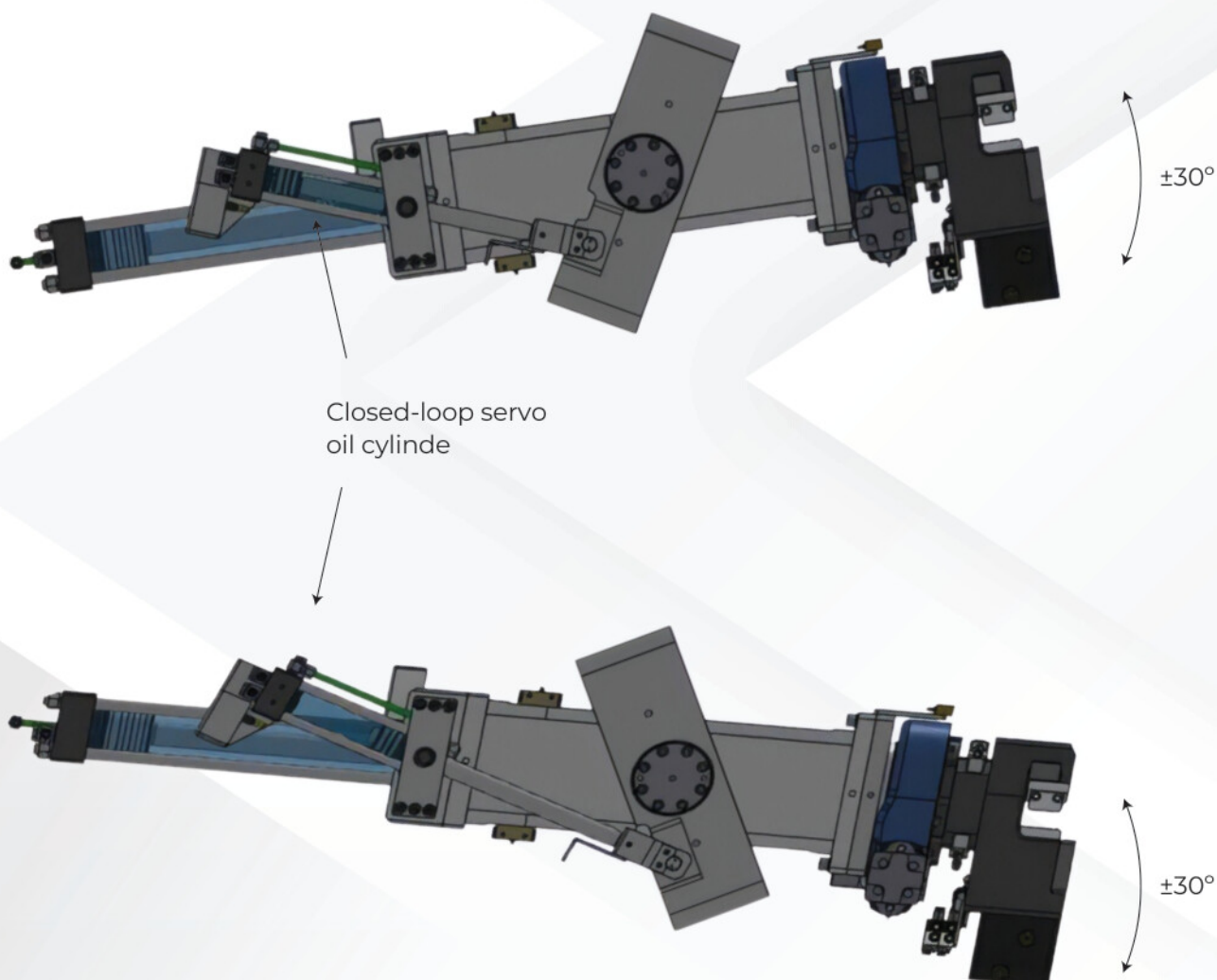
Closed-loop
servo oil
cylinder



HORIZONTAL SWING OF THE CLAMPS

X13 X14 axis

Swing angle	$\pm 30^\circ$
Position control precision	$\pm 0.1^\circ$
Forming speed	1°/sec
Drive method	Closed-loop servo oil cylinder



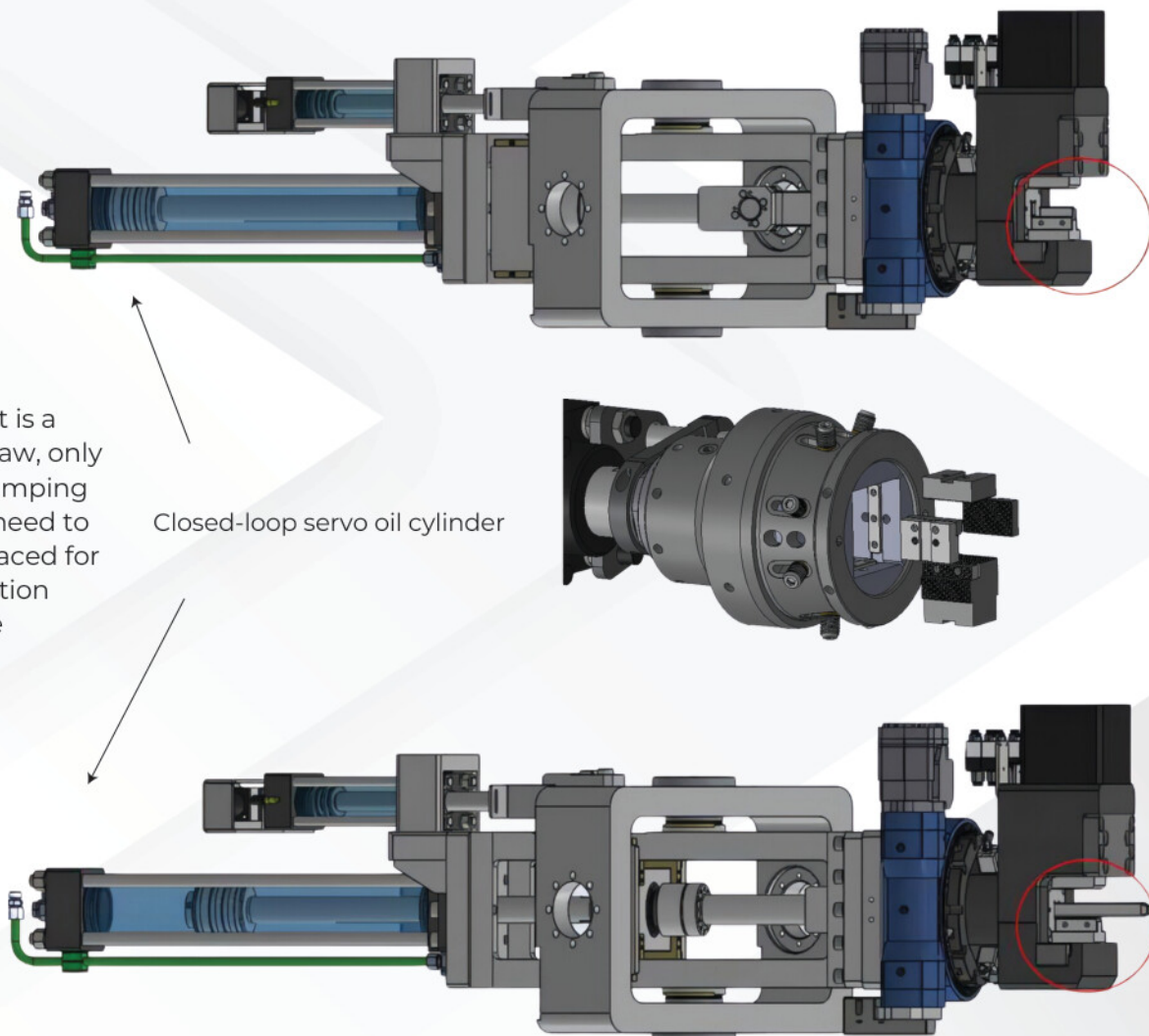
AUTOMATIC MANDREL

X15 X16 axis

Stroke	800mm
Position control precision	$\pm 0.01\text{mm}$
Speed	600mm/min
Drive method	Closed-loop servo oil cylinder

When it is a round jaw, only four clamping plates need to be replaced for production change

Closed-loop servo oil cylinder



AUTOMATIC LOADING AND UNLOADING

X17 axis

Stroke	350mm
Position control precision	$\pm 0.05\text{mm}$
Speed	600mm/min
Drive method	Open-loop servo motor

Open-loop
servo motor



This project uses robotic arms for loading and unloading. This device is not included.

TOOLING BASE AND TOOLING

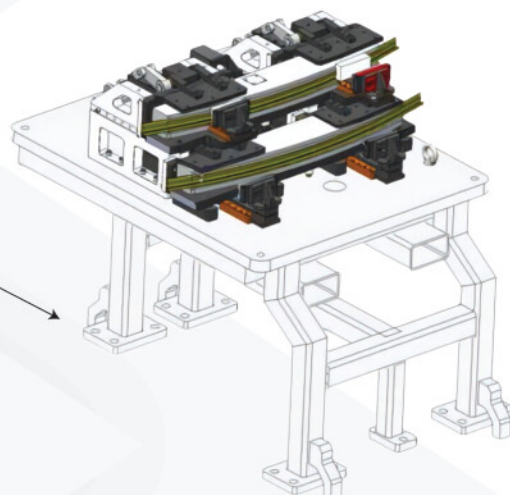
X18 X19 X20 X21 X22 X23 axis

Stroke	150mm
Position control precision	$\pm 0.01\text{mm}$
Speed	300mm/min
Drive method	Closed-loop servo oil cylinde

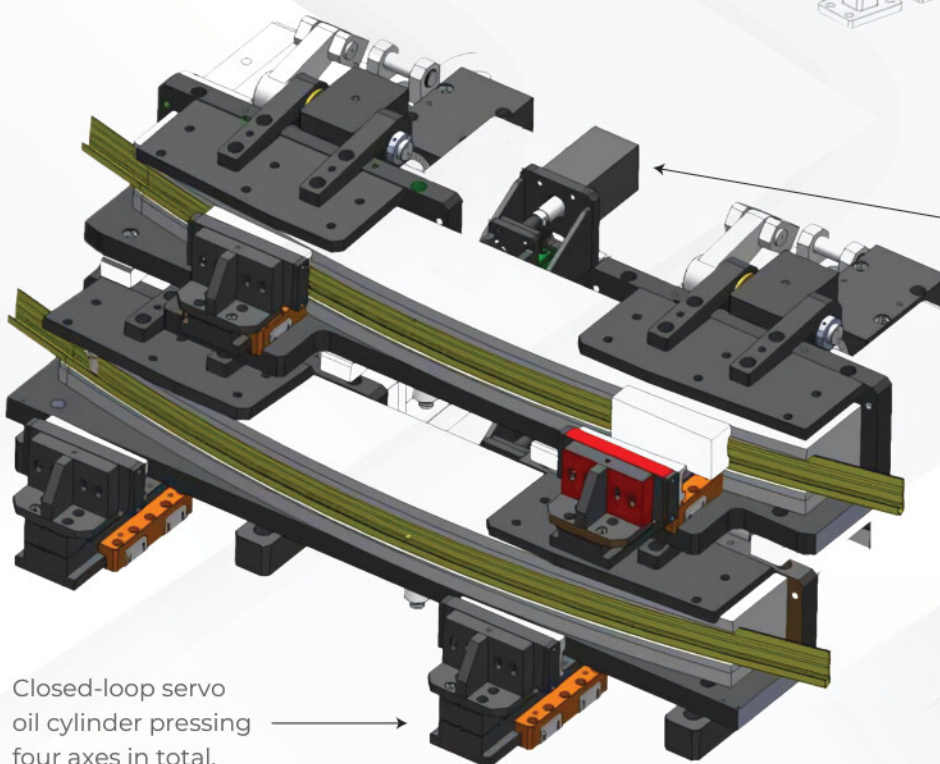
Upper and lower layout
Produce symmetrical
parts simultaneously ;
Automatic centering. ;
Locating hole ;
Prevent reverse
placement; ;
Laser marking

Quick-connect methods for oil
electric and gas circuit.
No valve terminal

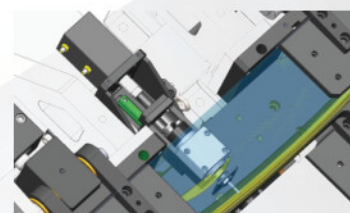
Tooling base, fool-proof
quickchange method



Locating hole,
one axis at the
upper and lower
side respectively



Closed-loop servo
oil cylinder pressing
four axes in total.

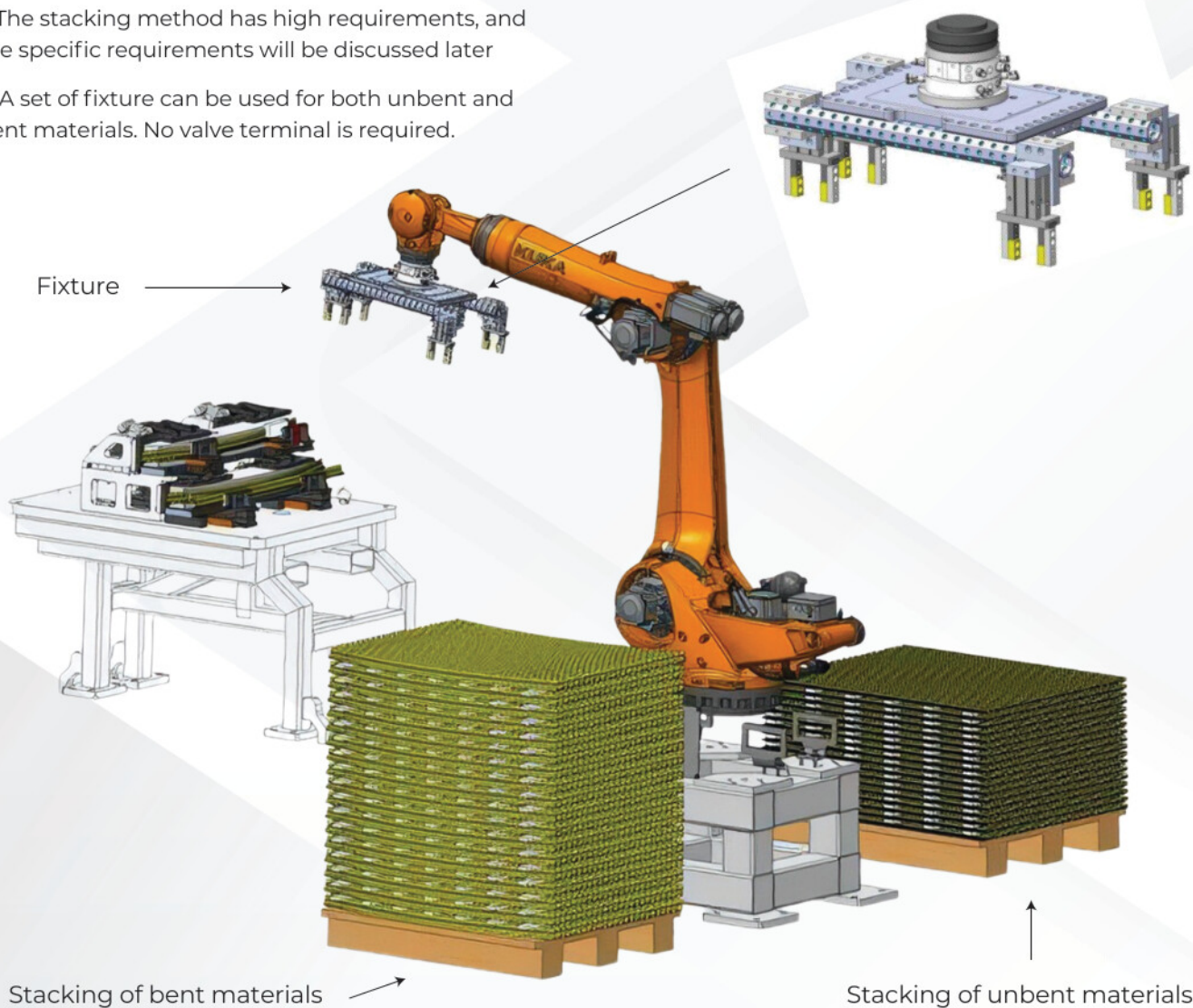


AUTOMATION

Stroke	350mm
Position control precision	$\pm 0.05\text{mm}$
Speed	600mm/min
Drive method	Open-loop servo motor

1, The stacking method has high requirements, and the specific requirements will be discussed later

2, A set of fixture can be used for both unbent and bent materials. No valve terminal is required.



PARAMETER TABLE

Not final parameters. Adjust
according to actual situation.

1.Overview	Unit	Specification /Quantity		Unit	Specification /Quantity
Rated Forming Capacity	T	≤20	6. Clamp Horizontal Swing	piece	2
Power	kW	55	Swing Angle	deg	±28°
Working Environment Temperature	°C	2 -40	Position Control Accuracy	deg	±0.1°
Working Noise	decibel	≤85	Forming Speed	deg/sec	1°
2. Stretch Cylinder	piece	2	7. Clamp Lifting	piece	2
Stretch Cylinder Pulling Force	T	1.5 -20	Stroke	mm	600
Force Control Accuracy	range	±0.5%	Position Control Accuracy	deg	±0.1°
Stretch Cylinder Stroke	mm	400	Speed	mm/min	0 -500
Position Control Accuracy	mm	±0.1	8. Clamp Pitch	piece	2
3. Stretch Bending Arm	piece	2	Pitch Angle	deg	±25°
Movement Angle	deg	-10°-90°	Position Control Accuracy	deg	±0.1°
Position Control Accuracy	deg	±0.1°	Forming Speed	deg/sec	1°
Rotation Speed	deg/sec	3°	9. Automatic Mandrel	piece	2
4. Wheelbase Adjustment	piece	2	Stroke	mm	0 -700
Stroke	mm	300	Position Control Accuracy	mm	±0.1
Position Control Accuracy	mm	±0.5	Forming Speed	mm/min	0 -600
Speed	mm/min	0 -300	Return Speed	mm/min	600
5. Rotary Clamp	piece	2	10. Automatic Loading and Unloading	piece	1 (excluding this item)
Axial Rotation Angle	deg	±180°	Stroke	mm	350
Clamp Torque	N.m	2500	Position Control Accuracy	mm	±0.1
Position Control Accuracy	deg	±0.1°	Speed	mm/min	0 -600
Rotation Speed	deg/sec	1°	11. Tooling Servo Axis	piece	2-8
Clamp Spacing	mm	400 -2200	Stroke	mm	as required
Clamping Length (one side)	mm	≤150mm	Position Control Accuracy	mm	±0.1

AUTOMATIC CENTRALIZED LUBRICATION

The oiling device will alarm when there is no oil or the oil level is low.

No.	Lubrication Position	Lubricating Oil Brand	Single Use Amount	Lubrication Cycle	Operator
1	Left Stretch Guide Rail	Extreme Pressure Lithium Grease 1#	Appropriate Amount	once/48 hours	Automatic
2	Right Stretch Guide Rail	Extreme Pressure Lithium Grease 1#	Appropriate Amount	once/48 hours	Automatic
3	Left Rotating Bearing	Extreme Pressure Lithium Grease 1#	Appropriate Amount	once/48 hours	Automatic
4	Right Rotating Bearing	Extreme Pressure Lithium Grease 1#	Appropriate Amount	once/48 hours	Automatic

Composition of Inductaflex Hydraulic Control System

Traditional: noise, heat generation, no accuracy

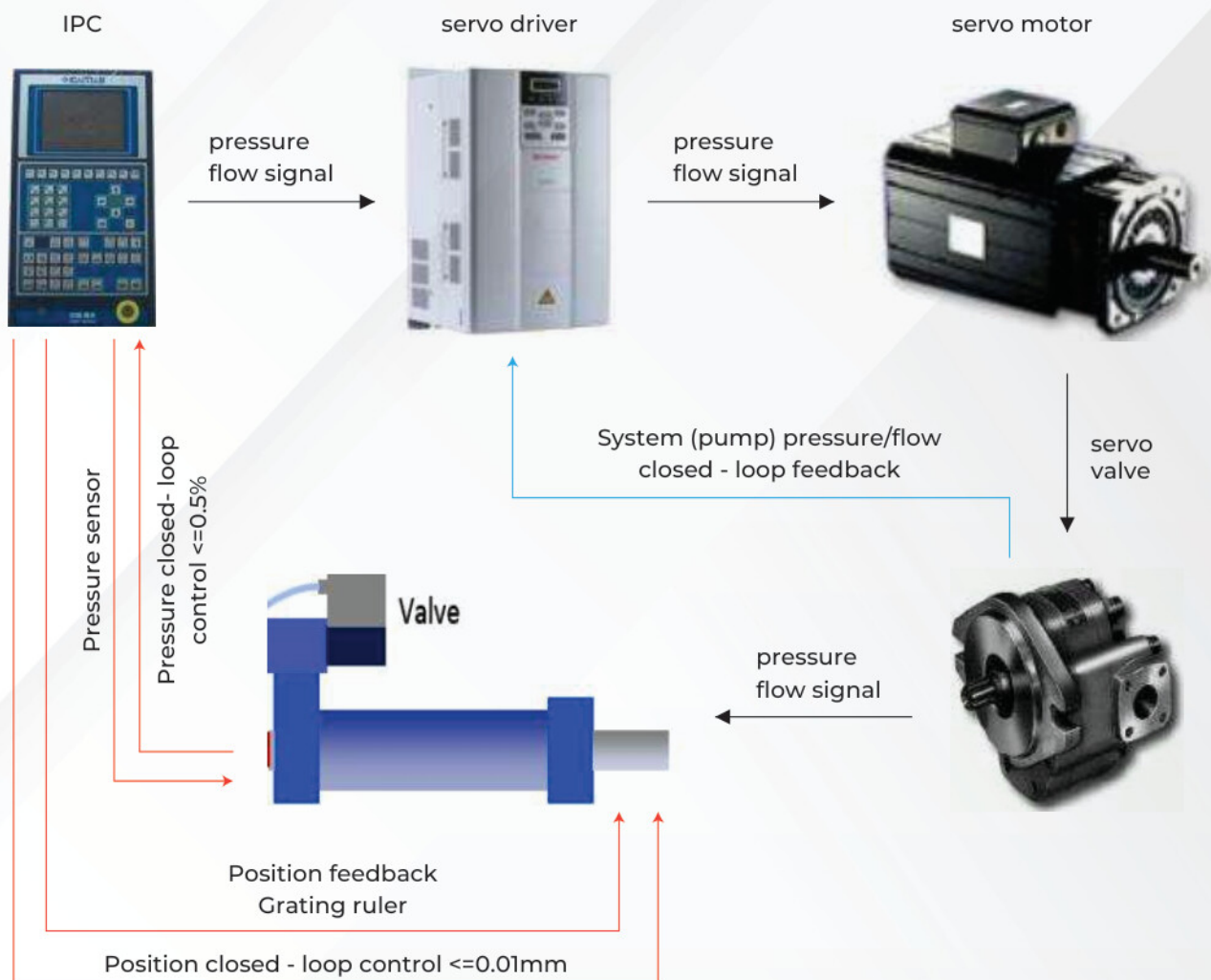
Hydraulic servo, multi - axis linkage ;

Repeated position accuracy of $\leq 0.01\text{mm}$

Energy - saving, environmentally friendly, no noise, solving the heat problem of the hydraulic system

System pressure, input pressure, position control closed - loop

control, controllable



Principle Of Stretch Bending

1

Each axis individually servo control, accurate real-time control of tensile force and displacement;

5

Bending product quality and stability, accuracy are always consistent;

2

Bending can be set in stretching mode and the displacement mode;

6

No need to rely on the experience of skilled workers;

3

Automatically detect the material yield strength, and adjust the stretch force;

7

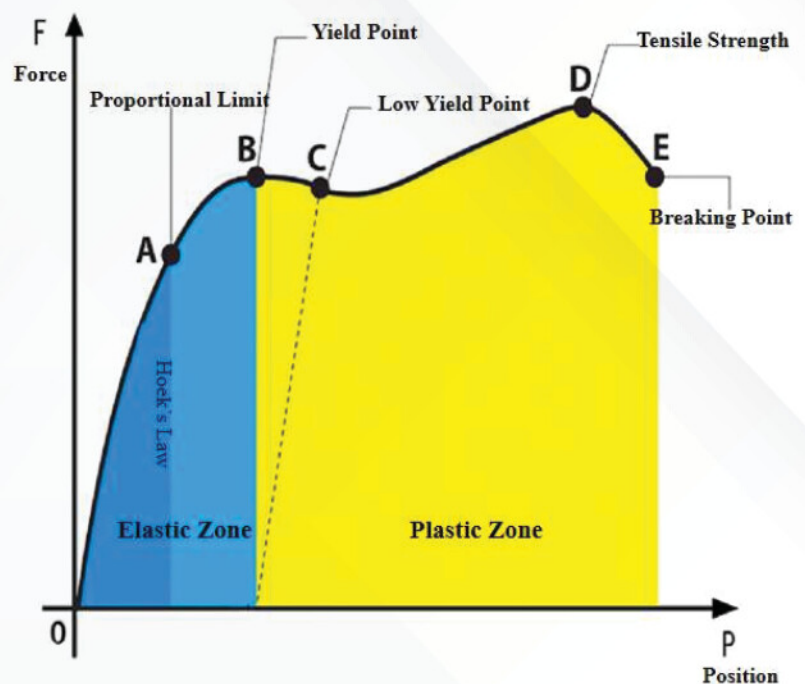
Energy saving, environmental protection. The heating problem of the hydraulic system is solved.

4

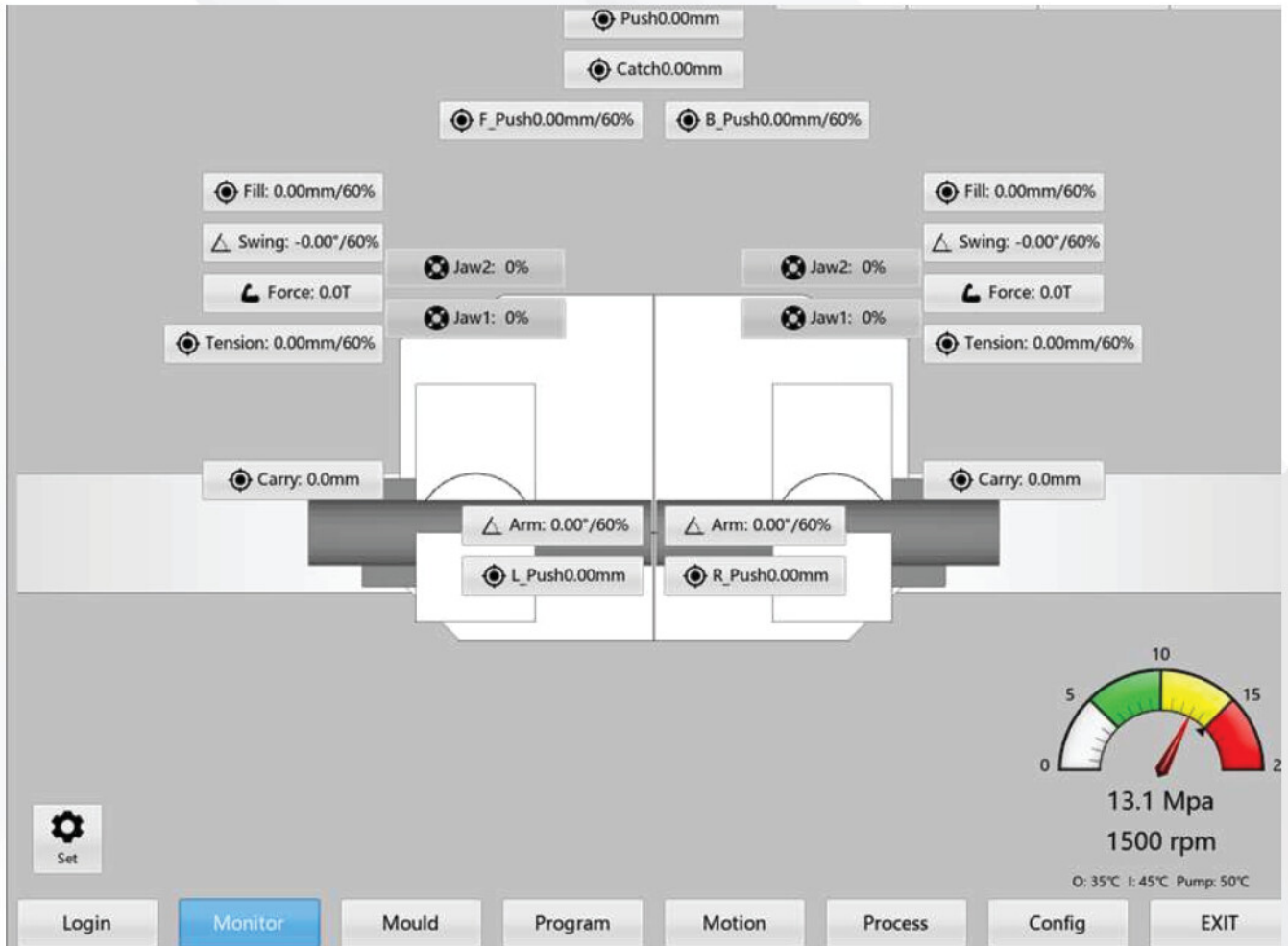
CNC program independent learning, automatic generation of tooling parameters;

1. Solve the problem of bending and forming stability for unstable materials.

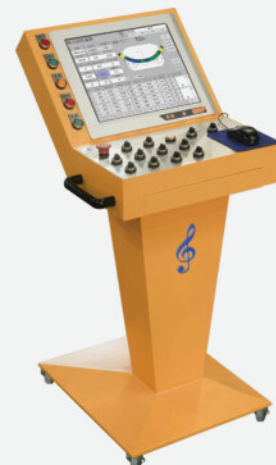
2. It can pull and bend materials with a tensile force of 85T, and can also bend materials with a tensile force of 1 kg!



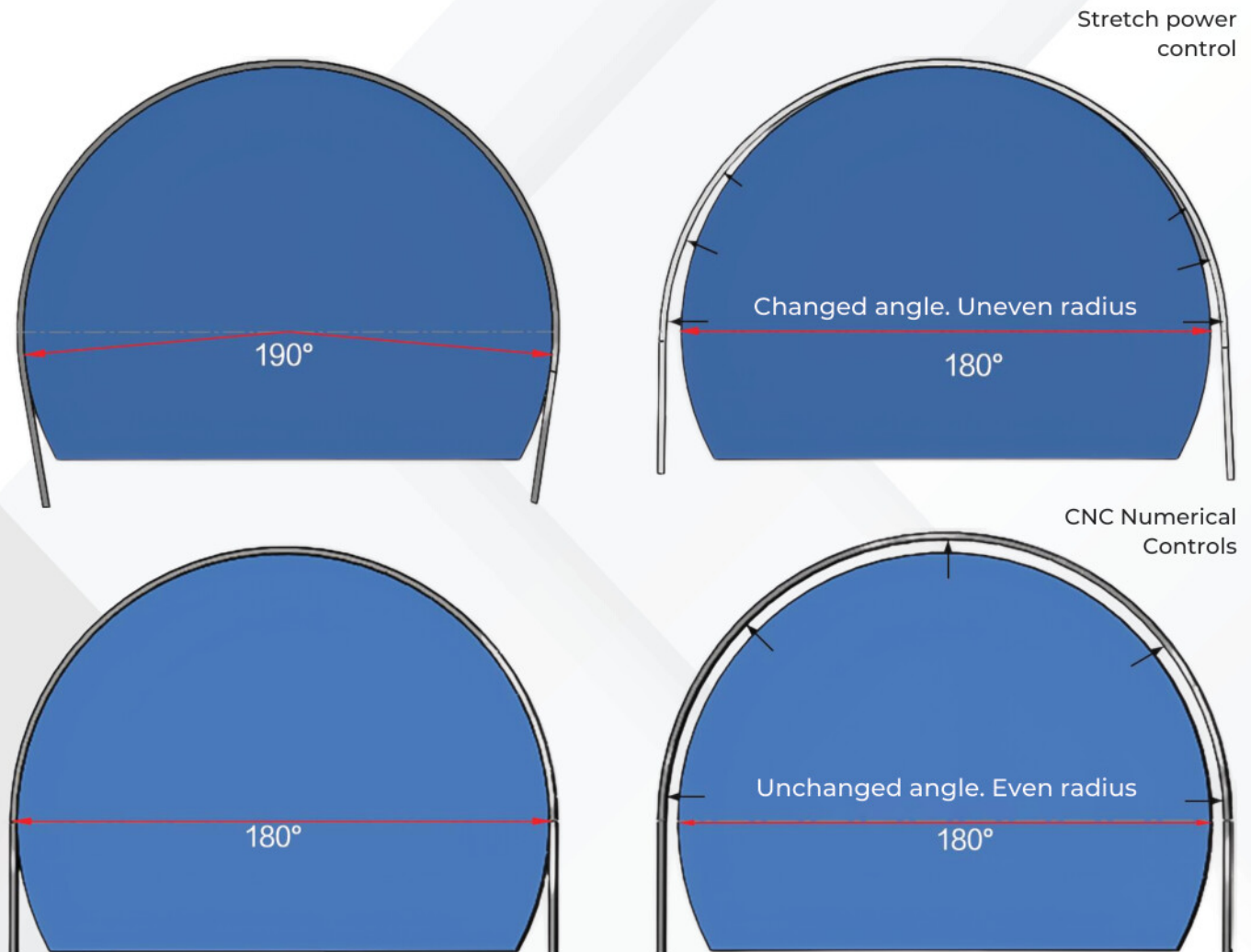
The Independently Developed Core Operating System



- 1 Graphic and digital, completely solving the dependence on manual operation.
2. Only need to input the material, radius, yield strength, cross-sectional area, length, etc.
3. Unique core algorithm, big data processing, seamless connection with the office system.



Stretch Bending Principle Spring Back Control



180-degree stretch bending forming

Now: CNC bending machine Simply stretch bending to 181 degrees.

The spring back is small, while the spring back is consistent. After loosening the end radius is the same as the center.

When the radius is wrong, only need to modify the stretch parameters. No need to change or replace the tooling.

Before: Traditional nonnumerical control

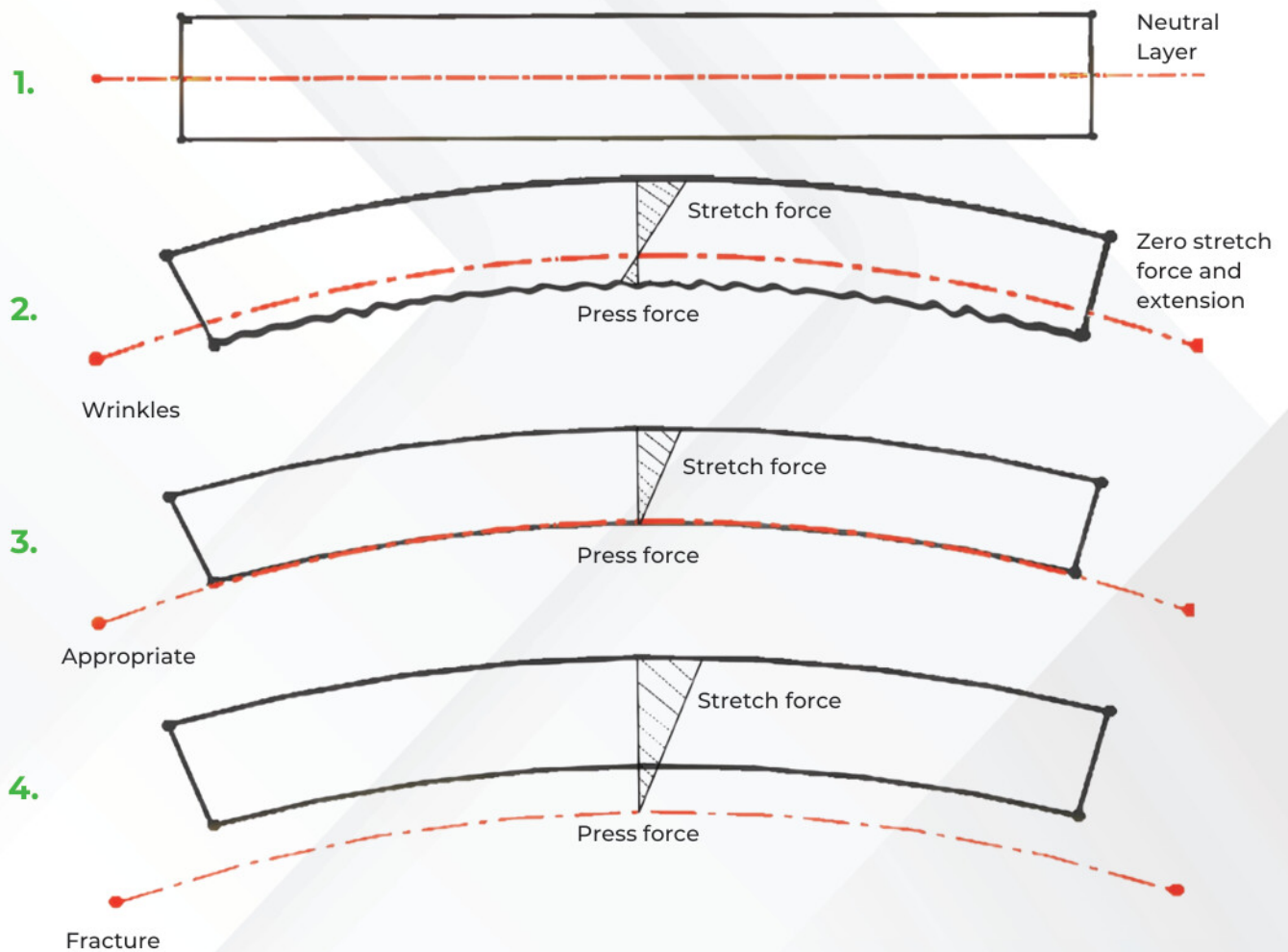
Need to exceed 190 degrees.

Loosened and formed by spring back.

End radius is not the same as the center.

When the radius is wrong, you can only change the tooling

Principle Of Stretch Bending Neutral Layer Control



Total length of the material remains unchanged after bending.
Automatic generate parameters of stretch length, bending angle.

1. **Original state:** neutral layer in the center.
2. Non-numerical control bending:
Insufficient bending, bottom surface wrinkles.

3. CNC bending

The neutral layer is just at the very bottom.

Digitally controlled, no wrinkles.

Minimum cross section deformation, meeting the state of yielding.

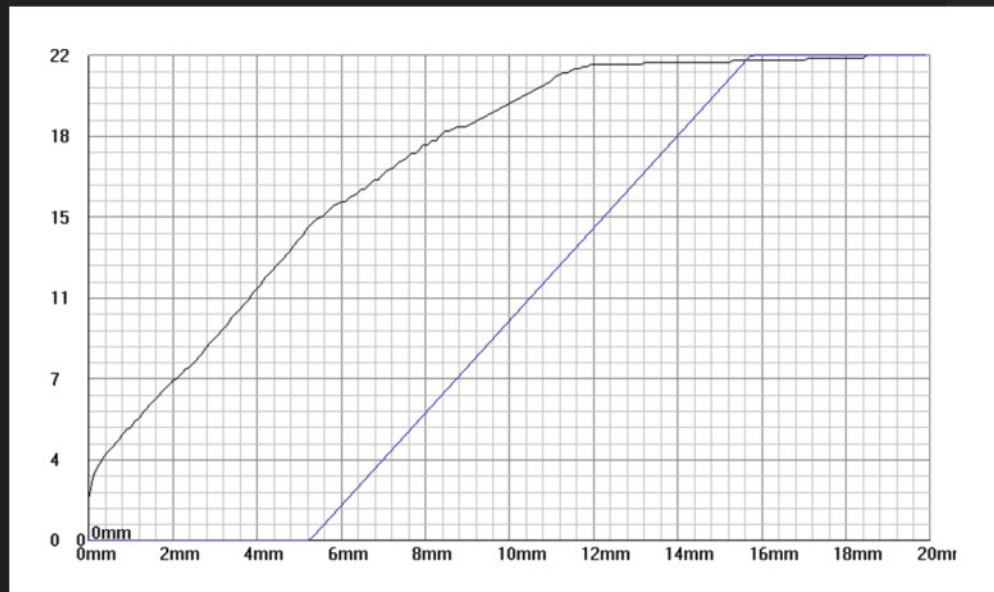
4. Non-numerical control bending.
Overstretching, material deformation, fracture.

Yield detection cases

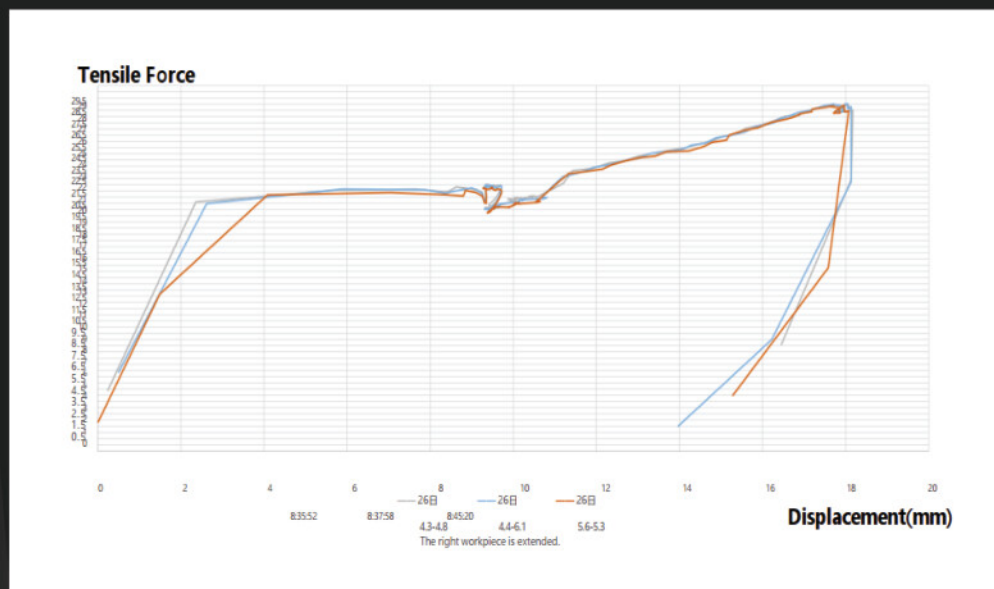
The trajectory of yield point detection

The stress - strain curve = 2T,

The released stress rebound = 0T



Stress - strain curve Tension - position



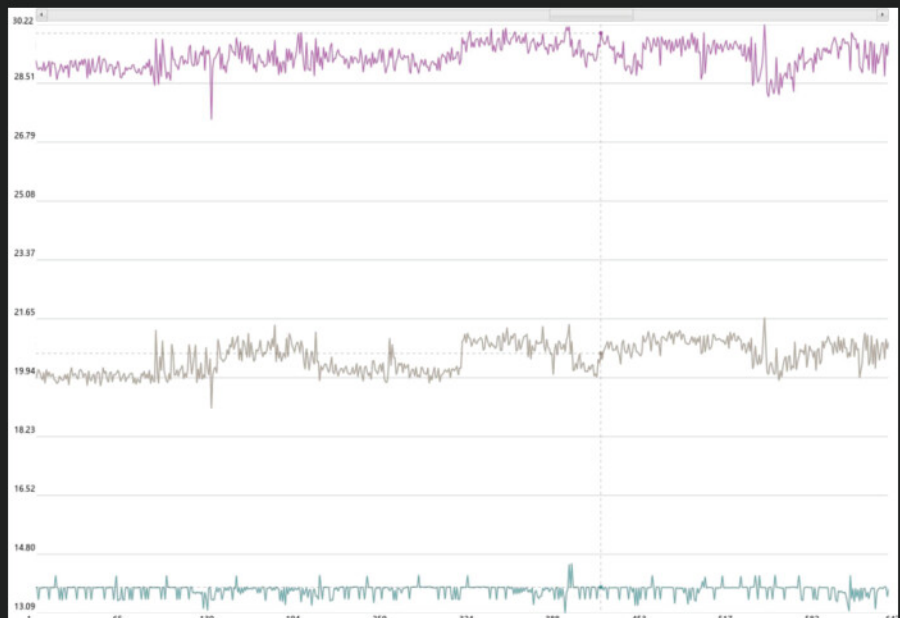
Cycle Time Curve

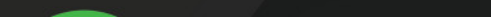
Parameter analysis from start to end elongation, tension, bending angle, pressure, temperature...



Customizable User Management

The variation pattern of all parameters for machine and profile





Customizable User Management

Customizable
User
Management
for the Best
Protection of
Parameters

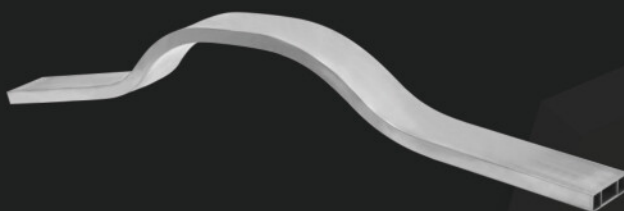
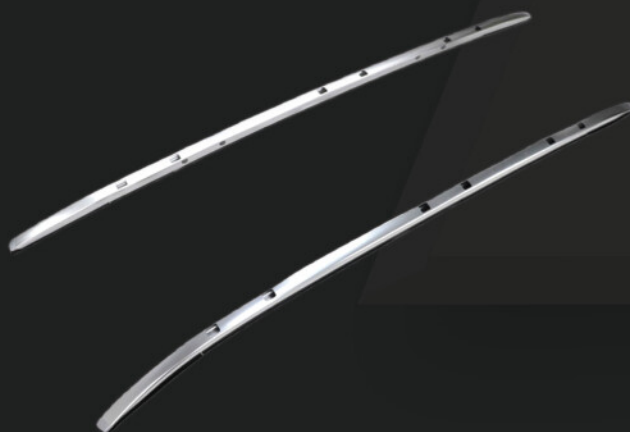
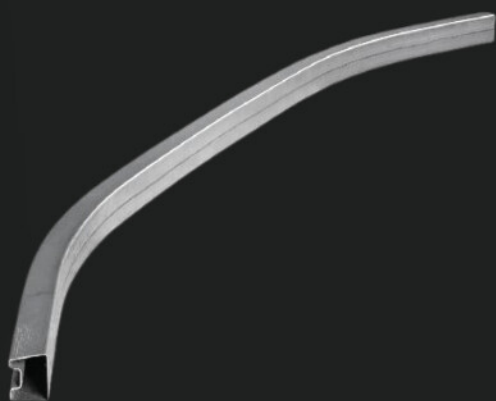
[illegible]

Maintenance Automatic Prompt

Maintenance
Automatic
Prompt
Eliminating the
Trouble of
Looking at the
Maintenance
Manual

After completing the machine maintenance parameters, Click the value to reset			
IDX	Maintenance Content	Maintenance Way	Maintenance Frequency
1	Production pieces total		0p
2	Hydraulic running time		0h
3	Machine running time		0.17h
4	The mandrel cleans debris	Air gun/Rag	0p / 200p
5	Mold surface cleaning	Air gun/Rag	0p / 500p
6	The dental plate is cleaned of debris	Air gun/Rag	0p / 500p
7	Check plate screw fastening	Hexagon wrench	0p / 500p
8	Check the fastening screws on the cover plate of the chuck	Hexagon wrench	0p / 500p
9	Check the fixing screw of punching device	Hexagon wrench	0p / 500p
10	Check the setting screws of the front pressing device	Hexagon wrench	0p / 1000p
11	Check the setting screw of the cutting device	Hexagon wrench	0p / 1000p
12	Check the screws at the connection between the core-pulling cylinder and the mandrel	Hexagon wrench	0p / 5000p
13	Check fastening screws of core cylinder	Hexagon wrench	0p / 5000p
14	Tensile cylinder shaft head end fastening screw inspection	Hexagon wrench	0p / 10000p
15	wing reset screw tightening check	Hexagon wrench	0p / 10000p
16	Oil leak inspection of tubing joint	Visual	0h / 120h
17	Whether the automatic lubricating device is normal,whether to add lubricating oil	Visual	0h / 120h
18	The hydraulic fluid in the tank needs to be replaced	Replace	0h / 6000h
19	Clean the dust outside the solenoid valve and servo valve of the equipment	Air gun/Rag	0.17h / 500h
20	Control cabinet air filter cleaning	Air gun	0.17h / 500h
21	The heat sink of the oil cooler needs cleaning	Air gun/Rag	0.17h / 500h
22	Emergency stop button and safety door validity check	Starter Test	0.17h / 500h

Stretch Forming Products





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