

CNC Press Brake Wattsan E 4016 / TB 4016

Manual



Wattsan

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Dear customer!

Thank you for purchasing our equipment. We hope that his work will delight you for a long time.

The machines are manufactured in accordance with global standards. Each piece of equipment undergoes pre-sale preparation.

First of all, we strongly recommend that this manual be read carefully and completely before using the equipment. Failure to comply with certain points of the Operating Manual may result in injury to personnel and/or damage to equipment!

Follow the instructions in this instruction. This will not only make the work easier but also make the use of the equipment safe and long-term. Please follow these instructions carefully.

This document is intended to provide an overview of the basic technical data and requirements for the use of the Wattsan machine.

In the event that the equipment is transferred to another customer, this document shall be transferred with it.

The manufacturer reserves the right to make changes and improvements to the design that do not impair the declared characteristics of the equipment.

Information about signs and symbols

In this operating manual and on the equipment, the following designations, signs and symbols are used to transmit especially important information:

	This indicates a hazardous situation that could result in serious injury or death if the specified instructions are not strictly followed.
	Indicates a potential hazard that could result in minor injury or damage to the product.
	It contains important information about the safe and correct handling of the product.
	This component is energized by an electric current. In these places, strictly follow the safety rules when working with electricity.

Read the instructions carefully before starting.

Note!

The equipment you directly purchased may differ from the equipment shown in the figures.

	Untrained personnel should not be allowed to work with this equipment and install it.
	All operators who are working with the machine must wear goggles, gloves and safety shoes.
	Do not work without the protections fitted to the machine.
 MUST-DO	The location of the equipment must be equipped with fire extinguishing equipment. It is forbidden to store flammable and explosive substances near the device.
 MUST-DO	The user must ensure that the material to be processed is suitable for bending in order to avoid risks to the life and operation of the equipment.
 FORBIDDER	The operator must not leave the equipment unattended while it is in operation. The equipment must be turned off at the end of operation.
	The equipment must be located in a dry, uncontaminated place. The temperature inside the room should be 10-40 Co. Humidity should be in the range of 5-70% (provided there is no condensation).
	The equipment operates from an alternating power supply of 220 / 380 V with a frequency of 50 / 60 Hz. It is forbidden to use the equipment without a voltage stabilizer.

Attention!

The seller is not responsible for the improper use of the equipment and if the user fails to take precautions.

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Specifications

Model		E 4016 / TB 4016
Nominal pressure, kN		400
Length of working table, mm		1600
Space between pillars, mm		1200
Depth of throat, mm		230
Slide stroke, mm		80
Max. opening height between the working table and slides, mm		320
Speed of slide stroke	Approach speed, mm/s	90
	Working speed, mm/s	9
	Return speed, mm/s	80
Pump driving motor	Model	Y132S-4
	Power, kW	5.5
	Rotating speed, r/min	1440
Axial piston pump	Model	SP1-10-R
	Pressure, MPa	31.5
	Flow, mL/r	10
Max. working press of the hydraulic system, MPa		25
Appearance dimensions	Length, mm	2100
	Width, mm	1500
	Height, mm	2000
Supply voltage, V		380
Supply voltage frequency, Hz		50
Weight (approximate), kg		2200

CHAPTER 1. PRELUDE

1.1 THE MAIN PURPOSE AND SCOPE OF THE EQUIPMENT

The Wattsan press brake is designed for precision bending of sheet metal using a torsion bar synchronization system that ensures equal stroke and parallel movement of both hydraulic cylinders. This machine is ideal for workshops, small manufacturing facilities, and metal fabrication industries.

1.2 BASIC REQUIREMENTS FOR OPERATION

- Connected Ground: Ground resistance $<5 \Omega$.
- Voltage Stabilizer: A mains voltage stabilizer is required to stabilize the voltage of the machine and all associated devices.
- Good ventilation is required to prevent dust accumulation and corrosion.
- To prevent fire, the workplace must be equipped with a suitable fire extinguisher.
- The left and rear parts of the machine should be at a distance of more than 1 m from the wall.

The control box, motor, display and control panel are the main parts of the machine. They have certain requirements for the environment and must be protected from mechanical effects and electromagnetic interference.

CHAPTER 2. SAFETY PRECAUTIONS

Safety is the top priority when operating a CNC Press Brake machine. Failure to adhere to proper safety protocols can lead to serious injury, equipment damage, or even fatalities. This section outlines critical safety measures and provides guidelines for the safe operation of the machine.

2.1 GENERAL SAFETY GUIDELINES

1. General Safety
 - Read this manual carefully before first use.
 - Do not remove safety guards or disable interlocks.
 - Keep hands and limbs away from the tooling area.
 - Always wear safety shoes, gloves, and protective eyewear.
 - Ensure emergency stop buttons are accessible and functional.
2. Operator Training
 - Only trained and authorized personnel should operate the Press Brake.
 - Operators must be familiar with the machine's control panel, CNC interface, and emergency stop procedures.
 - Training should include machine setup, operation, troubleshooting, and emergency response.
3. Work Area Safety
 - Keep the work area around the machine clear of obstructions, tools, and debris to prevent accidents.
 - Ensure the floor is clean and dry to avoid slips and falls.
 - Maintain a well-lit environment to ensure visibility during machine operation.
4. No Distractions
 - Avoid distractions such as talking or using a phone while operating the machine.
 - Never leave the machine unattended while it is in operation.



It is not allowed to allow personnel who do not have the necessary qualifications to work with the equipment, otherwise the manufacturer is not responsible for the breakdown of the equipment.

2.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

All operators must wear the following PPE to minimize the risk of injury:

- **Safety Glasses:** Protect eyes from flying debris or metal fragments during the bending process.
- **Gloves:** Wear cut-resistant gloves when handling sheet metal to prevent cuts and abrasions, but remove them when working with the machine's control panel to avoid accidental pressing of buttons.
- **Steel-Toed Boots:** Prevent foot injuries caused by falling metal sheets or tools.
- **Hearing Protection:** If the machine operates in a loud environment, earplugs or earmuffs should be worn to protect against hearing damage.
- **Close-Fitting Clothing:** Avoid loose clothing, ties, or jewelry that could get caught in moving parts.

2.3 MACHINE-SPECIFIC SAFETY FEATURES

1. Emergency Stop Button
 - Ensure that emergency stop button is functioning properly before each operation. These buttons should be located on the control panel and easily accessible from different angles.
 - Pressing the emergency stop immediately halts all machine movements, including the hydraulic press and backgauge.
2. Light Curtains or Laser Safety Systems (optional)
 - The CNC Press Brake is often equipped with light curtains or laser sensors that detect any obstruction near the moving ram. If the sensor is tripped, the machine stops immediately to prevent injury.
 - Regularly inspect these safety systems to ensure they are calibrated and functioning correctly.
3. Guarding (optional)
 - Fixed or movable guards should be in place to prevent accidental access to dangerous areas such as the ram or die area during operation.
 - Never remove or disable these guards while the machine is operational.
4. Two-Hand Control Operation
 - For certain high-risk tasks, the machine may require simultaneous use of both hands to activate the press cycle. This prevents the operator from having hands near the tooling during operation.

2.4 POTENTIAL HAZARDS

The following hazards are commonly associated with CNC Press Brake machines. Operators must be aware of these risks to avoid injury or equipment damage:

1. Crushing and Pinching Hazards
 - The main danger comes from the ram, which applies a large amount of force to the material. Hands or fingers can be crushed if placed between the punch and die.
 - Always use the backgauge to position the material and never reach into the die area while the machine is operating.
2. Sharp Edges on Metal Sheets
 - Sheet metal often has sharp edges that can cause severe cuts. Handle all material carefully, and never run your hands along the edges of metal sheets. Wear cut-resistant gloves.
3. Falling Material
 - Large or heavy workpieces can fall or tip over during or after bending. Always secure workpieces using proper clamping and support systems.
 - Avoid standing in the path of falling materials and ensure that bystanders are clear of the machine area.
4. Hydraulic System Hazards
 - High-pressure hydraulic systems can cause injury if a line bursts or if oil leaks occur. Periodically check hydraulic lines and connections for signs of wear or damage.
 - Do not attempt to service or adjust the hydraulic system unless the machine is powered off and pressure is released.
5. Electrical Hazards
 - Ensure that the machine is properly grounded to prevent electric shock.

- Never work on the electrical components unless qualified and the machine is disconnected from the power source.
- Periodically inspect cables, connectors, and control panel for signs of wear or damage.

The equipment includes a large number of high-precision and high-tech components that are sensitive to the characteristics of the supply voltage.

The equipment should work without sudden power surges. If the voltage fluctuates, the equipment will not work properly.

To prevent the above factors, it is necessary to install a voltage stabilizer that is suitable in power for the configuration of your equipment.

The equipment must be properly grounded. Poor grounding shortens the service life of the equipment, and a high voltage discharge is destructive to the equipment electronics and life-threatening.

	<i>After turning off the power to the machine, you must wait at least 5 minutes, and only then you can touch the electrical circuit of the machine. For a period of time after the power is turned off, there may be a high voltage in the machine's electrical system, which can cause harm to people and equipment.</i>
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2.5 SAFE OPERATING PROCEDURES

1. Before Starting the Machine

- Inspect the machine for visible damage or loose parts.
- Check that all safety devices, including light curtains, guards, and emergency stops, are in place and functioning.
- Ensure the proper punch and die are installed and securely fastened.
- Make sure the hydraulic oil level is adequate, and there are no signs of leaks.

2. Loading Material

- Use the backgauge to position the material accurately before initiating the bend. This minimizes the need for manual positioning near the ram.
- When loading large sheets, use mechanical lifting aids like hoists or trolleys to prevent strain or injury.
- Ensure that the material is flush against the backgauge to avoid incorrect bends.

3. During Operation

- Keep hands and other body parts away from the bending zone.
- Monitor the CNC controller for any error messages or unusual behavior during the bend cycle.
- Do not attempt to adjust or reposition the workpiece during the bending process.

4. After Completing a Job

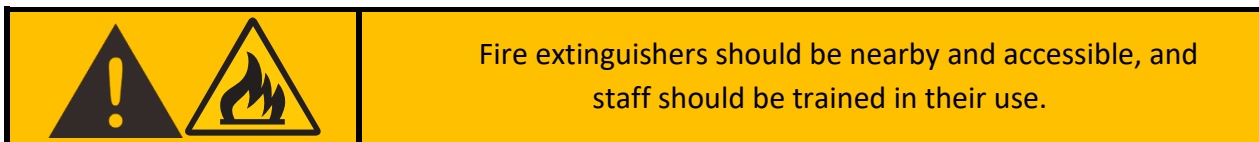
- Power down the machine if no further operation is planned.
- Remove all tools, material, and debris from the work area.
- Perform a post-operation inspection to identify any potential issues that need addressing before the next use.

2.6 MAINTENANCE SAFETY

1. Lockout/Tagout Procedures
 - Before performing any maintenance or repairs, follow the lockout/tagout procedure to ensure that the machine is completely de-energized.
 - This includes disconnecting the power supply, releasing hydraulic pressure, and securing moving parts to prevent accidental activation.
2. Routine Inspections
 - Conduct daily inspections of safety components such as light curtains, emergency stops, and guarding systems.
 - Regularly check hydraulic hoses for wear and leaks, and inspect the electrical system for loose wires or damaged components.
3. Servicing
 - Only qualified personnel should perform maintenance or service tasks.
 - Use only manufacturer-recommended parts and follow the service intervals outlined in the manual to keep the machine running safely and efficiently.

2.7 EMERGENCY PROCEDURES

1. In Case of an Accident
 - Immediately press the emergency stop button to halt the machine.
 - Call for medical assistance if required and administer first aid as necessary.
 - Report all incidents to the supervisor and document them according to company policy.
2. Fire Hazards
 - Know the location of fire exits and emergency shutdown procedures.



To prevent the ignition of the machines, their operation should be treated as carefully and carefully as possible. The equipment must be grounded, as well as protected from the ingress of gas, vapors, liquids, dust, dirt and other substances that are used or emitted during operation of the device.

CHAPTER 3. INSTALLATION AND CONNECTION

Proper installation and setup are critical to ensuring the CNC Press Brake operates efficiently, safely, and without unnecessary downtime. This section outlines the steps for positioning, electrical and hydraulic setup, initial calibration, and ensuring the machine’s stability.

3.1 UNPACKING

1. Inspect packaging for visible shipping damage before opening.
2. Carefully remove the outer crate, then remove plastic and wooden supports.
3. Check that accessories (tools, back-gauge parts, pedal, documents) are present.
4. Remove anti-corrosion grease from painted and machined surfaces using soft cloth and mild solvent.

3.2 INSPECTION AFTER DELIVERY

Item	Check	Action
Frame & ram	No deformation or cracks	Report if any damage
Hydraulic system	Tight fittings, no leaks	Tighten if necessary
Electrical cabinet	Intact wiring, no loose terminals	Inspect visually
Tools & accessories	Complete according to packing list	Report shortages

3.3 PRE-INSTALLATION CONSIDERATIONS

Before the machine is delivered and installed, there are several critical factors to consider to ensure a smooth installation process:

1. Space Requirements
 - Check the machine’s dimensions (refer to technical specifications) to ensure adequate space for both the machine and the operator to move freely.
 - Allow sufficient clearance around the machine for maintenance access and to accommodate large workpieces. Ensure at least 1 meter of clearance behind the backgauge and at the sides of the machine.
 - Identify potential hazards in the area (like overhead obstacles or tight doorways) that could interfere with the installation process.

2. Weight and Floor Load

- Verify that the floor can support the weight of the machine. Concrete floors are typically required to handle the machine's weight, which can range from a few tons to several dozen tons, depending on the machine size.
- If necessary, reinforce the floor or install vibration-absorbing mats to minimize vibrations during operation.

3. Environmental Conditions

- Ensure the installation site is well-ventilated and free from excessive dust, moisture, or corrosive elements that can affect the machine's performance or cause rusting.
- The temperature of the room should be kept between 10°C and 40°C to avoid damage to the CNC control system or hydraulic components.



It is forbidden to use the equipment at a relative humidity of more than 70%.

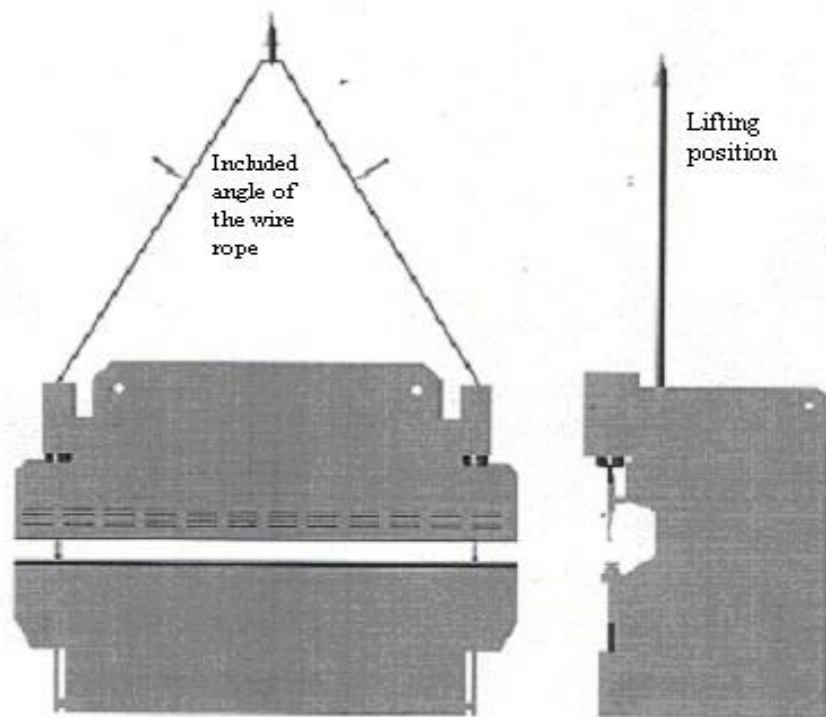
Do not use the equipment at temperatures below the dew point.

Temperature	Humidity															
	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
16°C				0	2	4	5	7	8	9	10	11	12	13	14	15
18°C			1	3	4	6	8	9	11	12	13	14	15	16	17	18
21°C		1	3	5	7	9	11	12	13	14	16	17	18	18	19	21
27°C	2	5	8	10	12	13	16	17	18	19	21	22	23	24	25	26
29°C	4	7	10	12	14	16	18	19	21	22	23	24	26	27	28	28
32°C	7	10	12	15	17	19	21	22	23	25	26	27	28	29	31	31
35°C	9	12	15	17	19	21	23	24	26	27	29	30	31	32	33	34
38°C	11	14	17	20	22	24	26	27	29	30	31	33	34	35	36	37

3.4 UNLOADING AND POSITIONING THE MACHINE

1. Transport and Handling

- Upon delivery, use appropriate equipment, such as forklifts or cranes, to unload the machine from the transport vehicle.
- Ensure the machine is handled with care to avoid damage to sensitive components such as the CNC control system, hydraulic lines, and safety sensors.
- Use lifting hooks or eyebolts if the machine has designated lifting points. Refer to the machine's user manual for the specific weight distribution and lifting points.



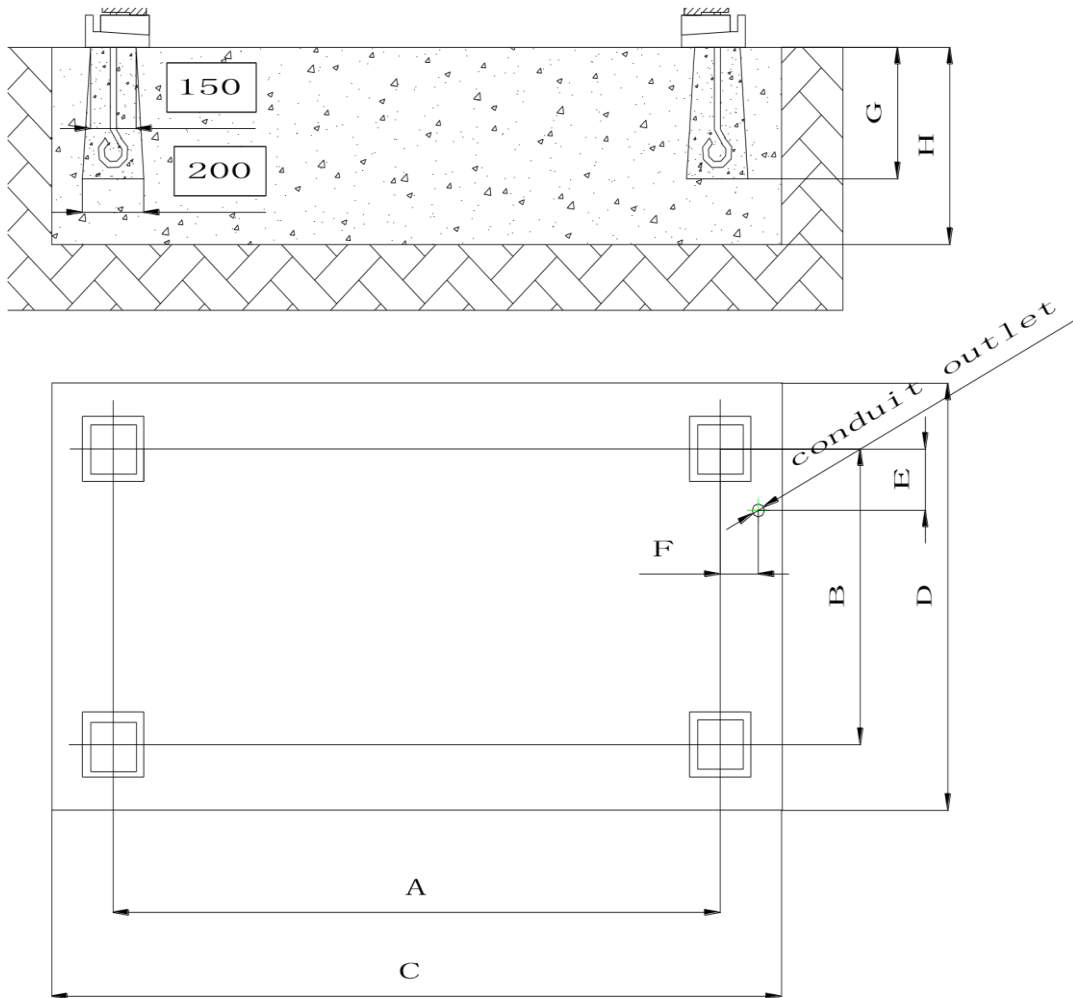
Lifting position



Never lift the machine by the ram, cylinders, or torsion bar.
Use the designated lifting points marked on the frame.

2. Machine Positioning

- Position the machine on a solid, level surface. Use a precision level to verify that the machine is perfectly horizontal, as even slight tilting can affect the accuracy of bending.
- Adjust the machine's feet or mounting bolts as needed to ensure stability. Uneven surfaces can cause vibrations or inaccuracies in the press cycle.
- If the machine is bolted to the floor, use heavy-duty anchors and ensure the bolts are securely fastened. Improperly secured machines can shift during operation, causing misalignment and possible accidents.



Foundation drawing

	mm
A	1320
B	750
C	2000
D	1350
E	120
F	60
G	450
H	650

3.5 ELECTRICAL SETUP

Proper electrical setup is critical to the safe and efficient operation of the CNC Press Brake. This includes ensuring that the machine is connected to a suitable power supply and that electrical connections are installed according to regulations.

1. Power Supply Requirements

- Refer to the machine's technical manual for specific voltage, phase, and frequency requirements (e.g., 380V, 3-phase, 50/60Hz). Ensure that the electrical supply meets these requirements.

- If necessary, have a qualified electrician install a dedicated power line for the machine to avoid overloading other circuits.
2. Electrical Connection
 - Connect the machine to the main power supply through a dedicated electrical panel equipped with appropriate circuit breakers and fuses.
 - Ensure that the power cable is properly sized to handle the machine's power requirements, and that all electrical connections are tight and secure.
 - Install a grounding wire according to local safety regulations to prevent electrical shocks or damage to the CNC controller. Improper grounding can lead to malfunctioning components and safety hazards.
 3. Powering On the Machine
 - Before powering on the machine, double-check all electrical connections and ensure that the main power switch on the control panel is turned off.
 - After connecting to the power source, turn on the main switch and allow the CNC control system to initialize. Monitor the control panel for any error messages or malfunctions during the initial power-up.

3.6 HYDRAULIC SETUP

The hydraulic system provides the force needed for bending operations. It is essential to ensure the hydraulic setup is done properly to avoid pressure loss, fluid contamination, or component damage.

1. Filling the Hydraulic Tank
 - Locate the hydraulic oil tank (usually at the rear or side of the machine). Remove the cap and fill the tank with the recommended type and quantity of hydraulic oil (e.g., ISO 46 hydraulic oil).
 - Ensure that the oil is clean and free from contaminants. Using contaminated or incorrect oil can damage the hydraulic pump and valves.
2. Bleeding the Hydraulic System
 - After filling the oil, start the machine and allow the hydraulic pump to run for a few minutes to circulate the oil.
 - Bleed any trapped air from the system by opening the bleed valves located on the hydraulic cylinders. This ensures smooth and consistent movement of the ram during operation.
 - Check the hydraulic pressure gauges and ensure that the system is pressurized within the manufacturer's specified limits.
3. Checking for Leaks
 - Inspect all hydraulic hoses, connectors, and fittings for any signs of leaks. Tighten or replace components as necessary.
 - Periodically check the hydraulic system for leaks after the machine has been in operation for a few hours, as some issues may not be immediately noticeable.

3.7 BACKGAUGE SETUP

The backgauges is a critical component that ensures precise material positioning during the bending process. Proper setup of the backgauges is essential for achieving accurate bends.

1. Initial Calibration
 - After powering up the machine, use the CNC control system to move the backgauges along its X, Y, Z, and R axes to ensure proper movement in all directions.

- Calibrate the backgauges according to the machine's manual. This involves adjusting the backgauge's positioning so that it accurately corresponds to the programmed positions on the CNC controller.
2. Adjusting for Material Thickness
 - Input the material thickness into the CNC control system to ensure that the backgauges accounts for the exact position of the workpiece. This is important for achieving precise bends.
 - Test the backgauges positioning by inserting a sample workpiece and running the machine in dry run mode (without applying full pressure) to check for alignment and positioning accuracy.

3.8 CONTROL SYSTEM INITIALIZATION

1. CNC Control System Setup
 - Turn on the CNC control panel and allow it to fully initialize. Follow the manufacturer's instructions for setting the language, units of measurement (mm or inches), and default bend parameters.
 - Input any initial machine settings required for your operations, such as the bending force limits, cycle time, and safety parameters.
2. Software and Firmware Updates
 - Check for any available software or firmware updates for the CNC control system. Updates may improve machine performance, add new features, or fix potential bugs.
 - Ensure that the machine's software is compatible with any CAD/CAM programs being used for job creation and design.
3. Trial Run
 - Perform a dry run with no material to ensure all axes (ram, backgauges, and tool movement) function correctly and respond accurately to the CNC controller's inputs.
 - Test all control buttons, foot pedals, emergency stops, and safety systems (e.g., light curtains) to verify functionality before proceeding with normal operation.

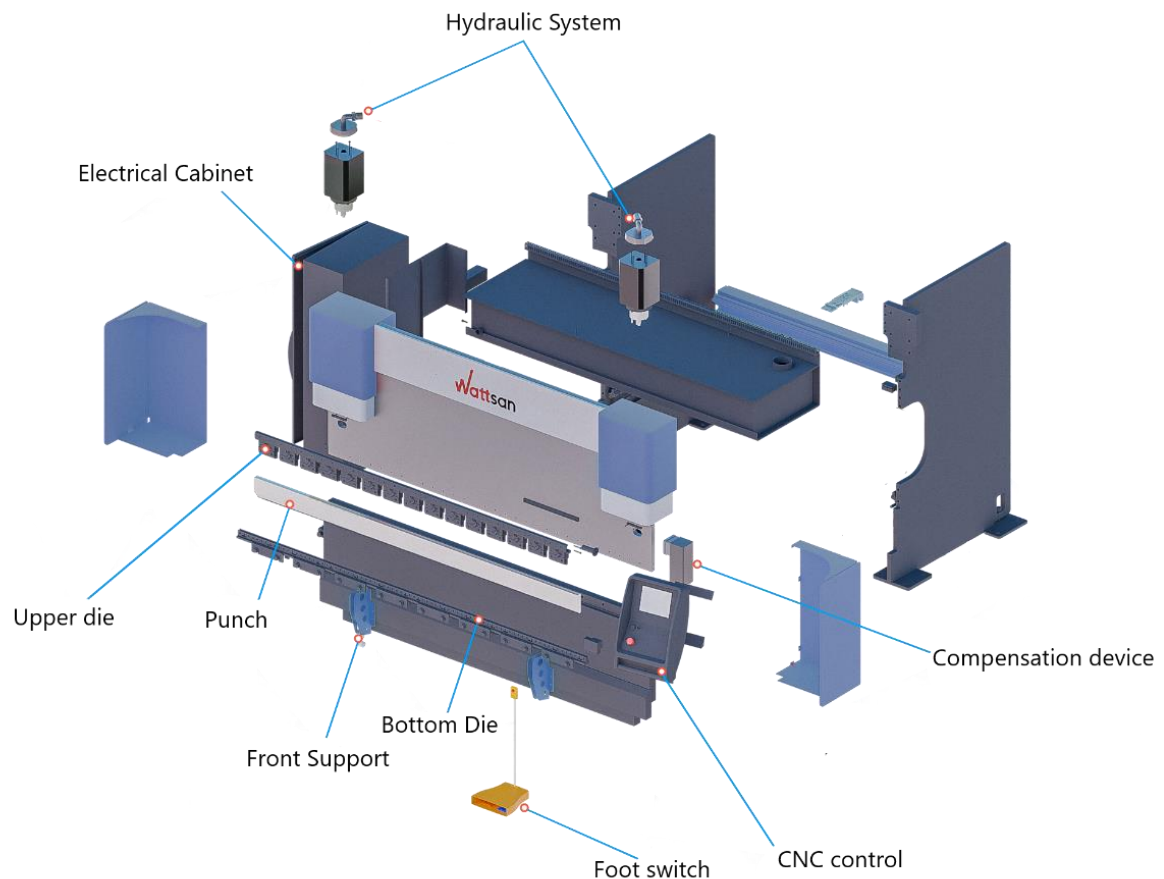
3.9 FINAL INSPECTION AND TESTING

1. Safety Inspection
 - Conduct a thorough inspection of all safety systems, including emergency stop buttons, light curtains, and machine guarding, to ensure they are working properly.
 - Verify that all warning labels, safety signs, and instruction decals are visible and legible.
2. First Bending Test
 - Load a sample workpiece and program a simple bend using the CNC control system. Observe the machine closely during this first test run.
 - Check the accuracy of the bend angle, backgauges positioning, and material handling. If necessary, adjust the CNC parameters or backgauge calibration.
 - Inspect the workpiece for any defects, such as scratches, bending inaccuracies, or deformation. Make adjustments as needed.

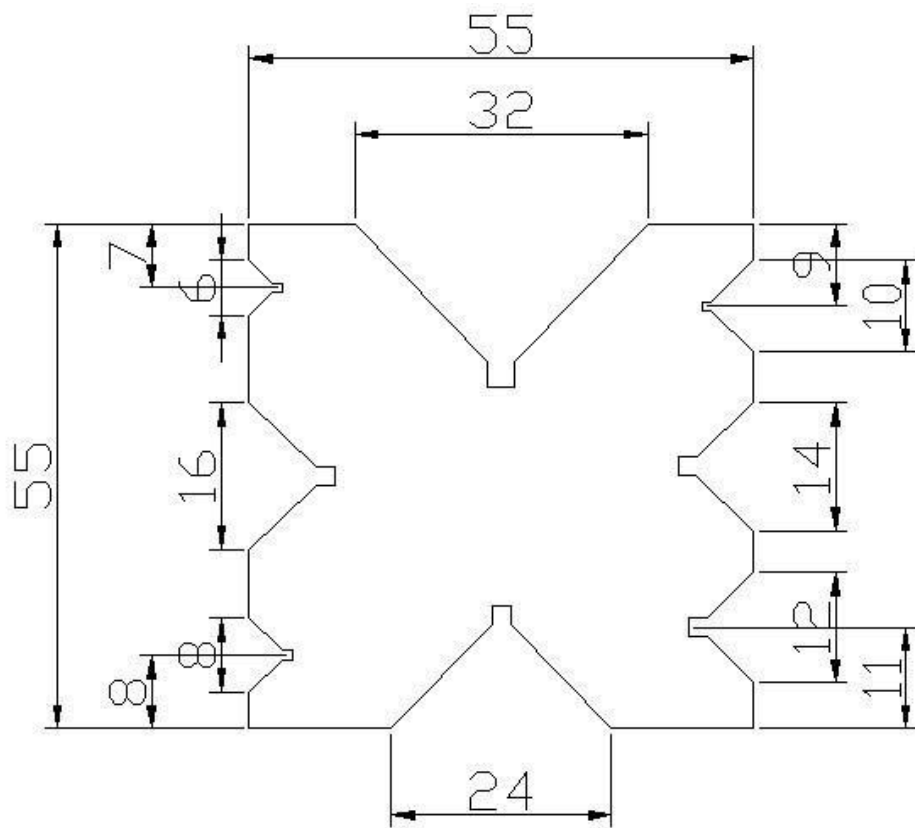
3.10 OPERATOR TRAINING

1. Familiarization with the Control Panel
 - Ensure all operators are thoroughly trained on how to use the CNC control panel, including navigating menus, inputting job programs, and starting/stopping the machine.
 - Operators should also be trained on the use of the backgauges, loading and unloading workpieces, and changing punch and die sets.
2. Emergency Procedures
 - Provide comprehensive training on emergency stop procedures, troubleshooting basic machine errors, and responding to equipment failures.
 - All operators must know how to safely shut down the machine in case of malfunction or emergency.

CHAPTER 4. MACHINE COMPONENTS AND TOOL SETTINGS



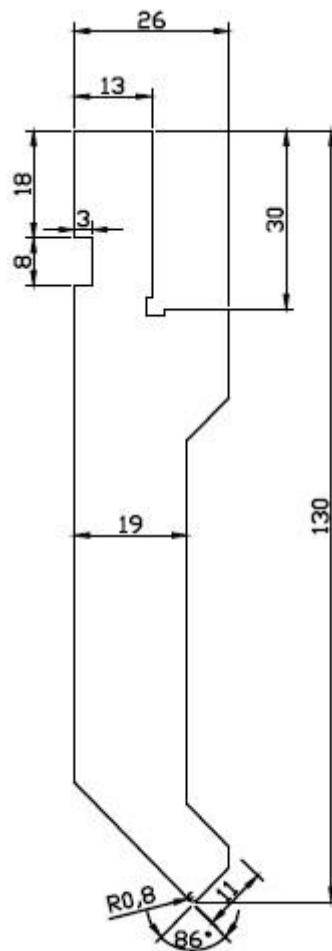
The Wattsan press brake is designed for use with "V" dies, punches, and die holders. It can also accommodate other dies with sectioned V punches and press brake anvils. For more information, consult the manufacturer.



Lower die

Technical requirements:

1. Heated treatment: plane straightening
2. The inverted angles of the slots are all $R0.5^\circ$
3. The rest inverted angles are $1 \times 45^\circ$
4. The die mouth is 86°



Upper die

Technical requirements:

1. Heated treatment
2. The inverted angle of the die tips is $R0.5^\circ$
3. The rest inverted angles are $1 \times 45^\circ$
4. The die tip is 88°

The settings for an operation must be changed according tool or material.

There is an instruction on how to calculate the required pressure and bending force.

Formula

$$P = \frac{650 S^2 L}{V} \text{ kN}$$

P-bending force (kN)

S-thickness of bent plates (mm)

L-width of plates bent (meter)

V-opening size of the lower die (mm)

650-calculation constant

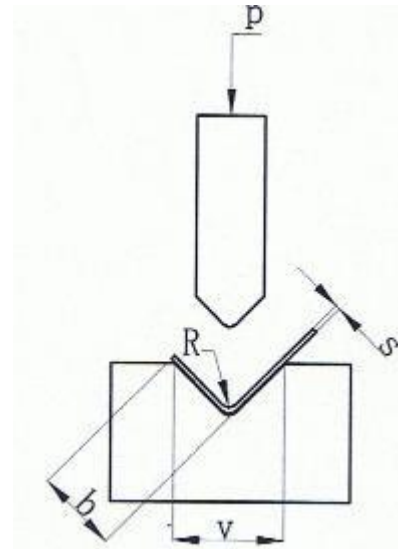


Plate Bending Force

V	4	6	8	10	12	14	16	18	20	24	28	32	36	40	45
B	2.8	4.2	5.7	7.1	8.5	9.9	11	13	14.1	17	20	22.6	25.6	28.3	31.8
R	0.6	1	1.3	1.6	1.9	2.2	2.6	2.9	3.2	3.8	4.5	5.12	5.76	6.4	7.2
S	0.5	41	27												
	0.6	59	39	29	23								Bending force p Unit: kN		
	0.8		69	52	42	35									
	1		108	81	65	54	46								
	1.2			117	94	78	67	59							
	1.5				146	122	104	91	81						
	2					217	186	163	144	130	108				
	2.5						290	254	226	203	169	145	127		
	3								325	293	244	209	183	163	
	3.5									398	332	284	249	221	199
	4										433	371	325	289	260
	4.5											470	411	366	329
	5												508	451	406
	6														585
															520

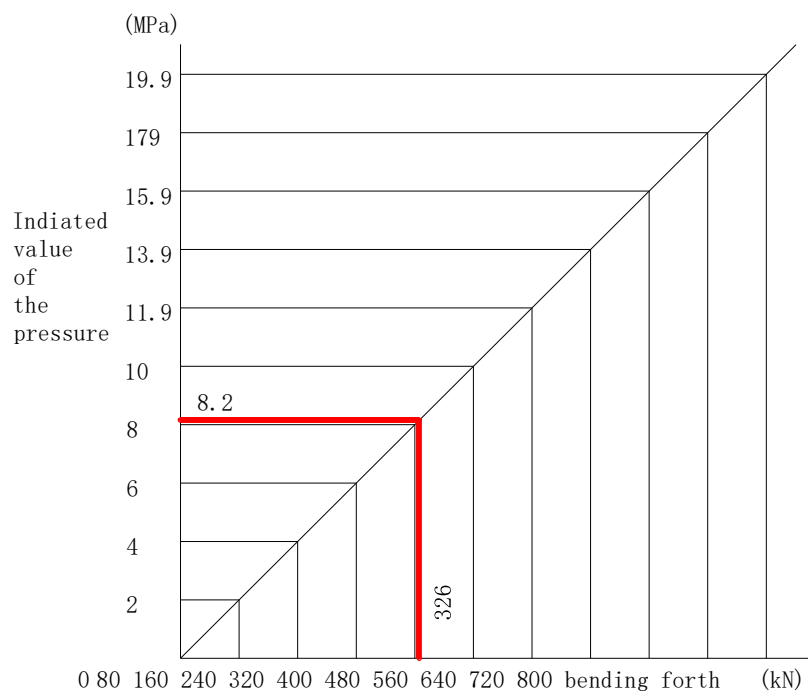
Note:

1. The formula and table values are based on a carbon structural steel plate with a tensile strength of 450 MPa.
 - For stainless steel, multiply the P value in the table by 2.
 - For aluminum, multiply the P value by 0.5.
 - For manganese steel, multiply the P value by 1.5.
2. The bending force in the table is calculated for a plate length of 1 meter. If the length is greater, adjust the value accordingly. For example, for a 2-meter carbon steel plate with a 16 mm lower die opening and 2 mm thickness, the table shows a P value of 163 kN/m. Therefore, the total bending force is $P = 163 \text{ kN/m} \times 2 \text{ m} = 326 \text{ kN}$. According to Figure 2, this force corresponds to a hydraulic system pressure of 8.2 MPa.



The maximum working pressure of the hydraulic system of this machine tool $p \leq 21\text{MPa}$!

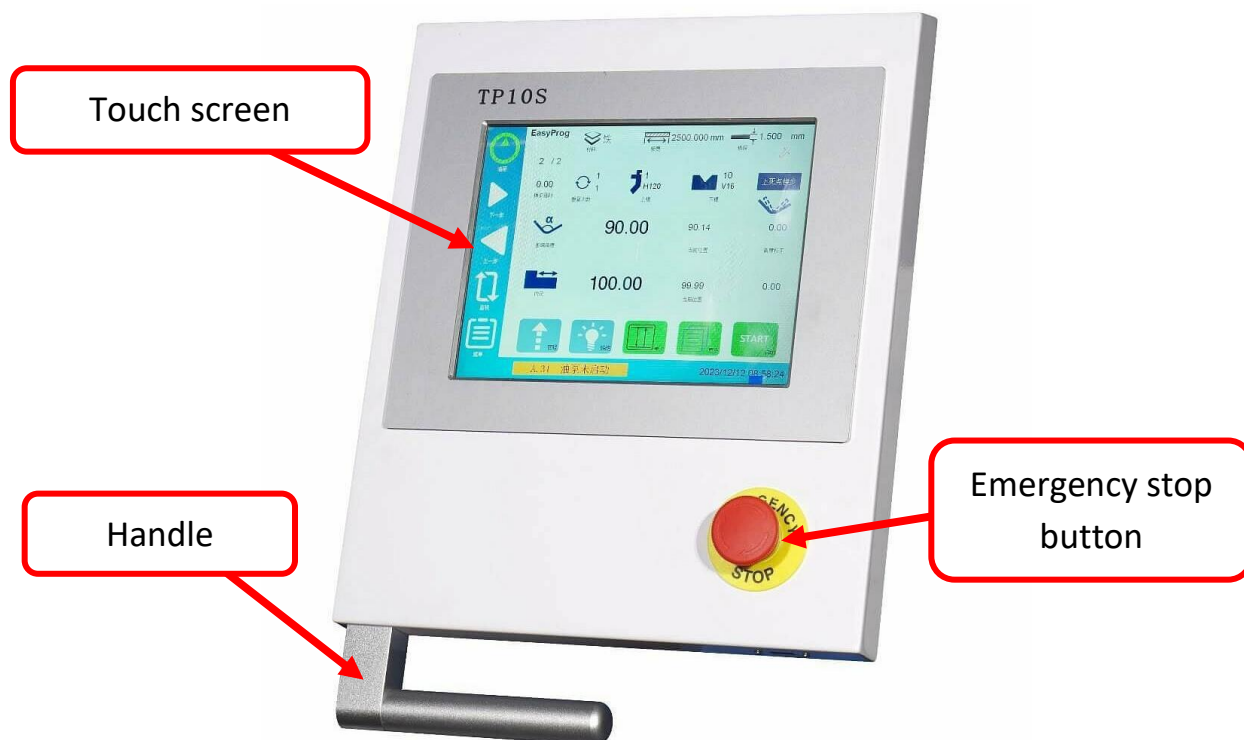
Conversion Chart of Bending Force-oil Pressure of the System



CHAPTER 5. CONTROL PANEL OVERVIEW

5.1 THE CONTROL UNIT

The control looks as follows:



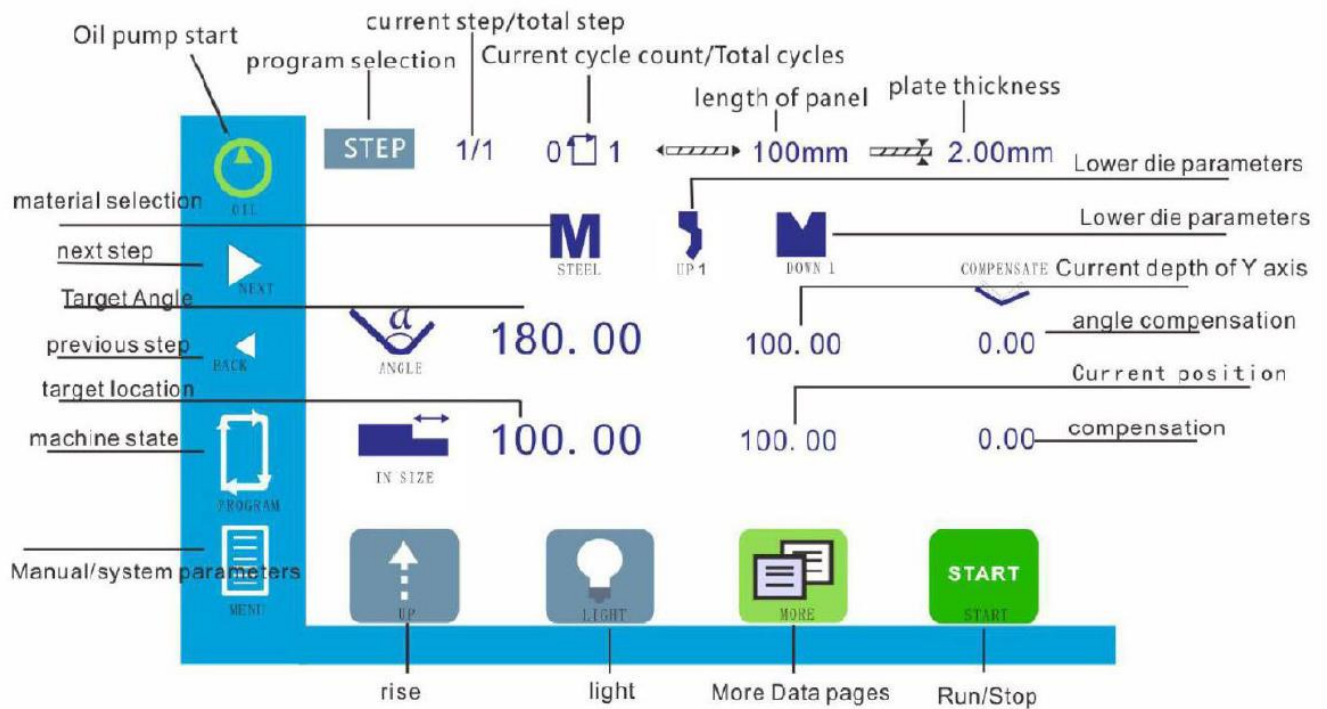
The precise outfit of your control may vary.

Operation of the control is mainly done over the touchscreen. A description of the functions and available touch controls is given in the next sections of this manual, aside of the description of the specific functions.

Beside the touch controls the front of the control consists of an emergency stop and handle.

5.2 SYSTEM OVERVIEW

5.2.1 MAIN MENU



5.2.2 MORE DETAILS MENU



Parameter	Introductions
GIVEAWAY	After the system is in place, the distance at which the bending gear begins to yield
GIVE DELAY	After the system is in place, when bending, the delay time for the rear file to give up
COUNT	Record the current number of products processed
COMPENSATION	Compensation table compensation height (optional)
DWELL TIME	pressure dwell
HIGHT	The height at which the slider opens
CHANGE STEP	Top dead center: Move the slider to the next step
	Bottom stop: Switch to the next step on the return trip of the slider
	Loose foot: The slider moves to the next step when it loosens foot
STEP DELAY	Wait time for another step.

5.2.3 ADVANCE PARAMETERS



Parameter	Introductions
UPLOADING	Unloading duration of the slide block
DWELL DELAY	Pressure pause time
BACK DELAY	Time to wait on the return trip
CHANGE	Pressure height
FOOT RUN	Step down and automatically run into position
FACTORY	Formatting (user prohibited)
ANGLE PRO	Angle programming switch

CHAPTER 6. MAINTENANCE AND TROUBLESHOOTING

In order to ensure the normal operation of the machine, it must undergo daily maintenance. Due to the fact that the machine uses components manufactured with high processing precision, maintenance must be carried out in strict accordance with the operating rules of each part of the machine so as not to damage its components.

6.1 GENERAL RULES

Use the most appropriate oils to lubricate machine tool systems. At the same time, you should pay attention to the following:

- 1) Before the initial commissioning of the machine (or after a long downtime), it is necessary to check the lubrication condition of all equipment.
- 2) Do not use woolen, fiber, woolen rags to lubricate the machine. Do not use kerosene and gasoline.
- 3) Do not mix synthetic and mineral lubricants.

6.2 DAILY MAINTENANCE CHECKLIST

Before starting work each day, operators should perform the following maintenance checks to ensure the machine is ready for operation:

1. *Visual Inspection*

- Check for visible signs of wear, damage, or leaks in key areas such as the hydraulic system, electrical wiring, and moving parts.
- Ensure that the tooling (punch and die) is properly aligned, free from cracks, and securely fastened.

2. *Lubrication Check*

- Verify that all moving parts, such as guide rails, are properly lubricated to prevent friction and wear. If necessary, apply additional lubricant to the required areas.
- Refer to the lubrication points specified in the manual to check for any that need replenishing daily.

3. *Safety System Check*

- Test the emergency stop buttons and light curtains (or other safety sensors) to ensure they are functioning properly.
- Verify that the guarding systems are in place and securely fastened, and that no interlocks are bypassed or damaged.

4. *Hydraulic Oil Level*

- Inspect the hydraulic oil level using the sight glass or dipstick. If the level is below the recommended minimum, top up with the appropriate grade of hydraulic oil (e.g., ISO 46 or as specified in the manual).
- Check for any visible leaks or signs of hydraulic fluid around hoses, pumps, and valves.

5. *Backgauge and Ram Movement*

- Perform a quick test of the backgauge and ram movement to ensure smooth and accurate operation. Listen for any unusual noises or jerky movements that may indicate wear or misalignment.

6.3 WEEKLY MAINTENANCE TASKS

1. *Clean the Machine*

- Thoroughly clean the machine surfaces to remove any dust, dirt, or metal shavings. These contaminants can accumulate and interfere with the machine's moving parts or lead to rust.
- Use a dry cloth or air blower to clean the CNC control panel, ensuring that buttons and touchscreens are free from dust.

2. *Check Hydraulic Hoses and Connections*

- Inspect all hydraulic hoses, fittings, and connectors for signs of wear, cracking, or leaks. Tighten any loose connections and replace any worn components immediately.
- Listen for any unusual sounds from the hydraulic pump, which may indicate an issue with fluid pressure or contamination.

3. *Inspect Tooling for Wear*

- Examine the condition of the punches and dies. Worn or damaged tooling can affect the quality of bends and may cause additional strain on the machine.
- If necessary, sharpen or replace worn tooling to ensure consistent, high-quality bends.

4. *Inspect the Electrical System*

- Open the electrical cabinet and visually inspect the wiring, relays, and connectors for signs of wear, overheating, or loose connections.
- Check that all cables are properly fastened and free from exposure to moisture or physical damage.

6.4 MONTHLY MAINTENANCE TASKS

1. *Lubrication System*

- Inspect the machine's automatic or manual lubrication system. Ensure that all grease points and reservoirs are full and that lubrication lines are delivering lubricant to all required areas.
- Apply machine oil or grease to any exposed sliding surfaces, such as guide rails and ball screws, as per the machine's lubrication chart.

2. *Check Hydraulic Oil Quality*

- Inspect the hydraulic oil for signs of contamination, such as discoloration (cloudy or dark oil) or metal particles. If the oil appears dirty or contaminated, perform a complete oil change.
- Replace the hydraulic oil filter as recommended by the manufacturer. Clogged filters can restrict oil flow and reduce system efficiency.

3. *CNC Control System Inspection*

- Check the cooling fans and air filters inside the CNC control cabinet. Clean or replace air filters to ensure proper cooling and prevent dust from accumulating on sensitive electronic components.
- Backup the CNC programs and system parameters regularly to prevent data loss due to unexpected failures or updates.

4. *Align the Backgauge and Tooling*

- Perform a calibration check of the backgauge to ensure it is aligned properly with the ram and workbench. Misalignment can lead to bending inaccuracies.
- Verify that the tooling (punch and die) alignment is precise and within tolerance limits. Incorrect alignment can cause defects in the workpiece or machine damage.

6.5 ANNUAL MAINTENANCE TASKS

1. Hydraulic System Maintenance

- Perform a full hydraulic oil change if not already done during a monthly check, especially if the oil shows signs of contamination or has been in use for an extended period.
- Drain the hydraulic tank, clean it thoroughly to remove any sludge or metal particles, and refill it with fresh hydraulic oil.
- Inspect and clean the hydraulic pump, valves, and cylinders. Replace any worn seals, gaskets, or O-rings to prevent leaks and pressure loss.

2. Electrical System Overhaul

- Have a certified electrician perform a comprehensive inspection of the electrical system. Check for loose wiring, corroded terminals, or burned-out components that need replacing.
- Test the machine's power supply, transformers, and voltage regulators to ensure they meet the required specifications.

3. Complete Machine Calibration

- Perform a full recalibration of the CNC Press Brake, including the ram positioning, backgauge alignment, and tooling accuracy. This ensures that the machine continues to operate within the specified tolerances and produces accurate bends.
- Use precision instruments such as dial indicators or laser alignment tools to verify the machine's geometric accuracy.

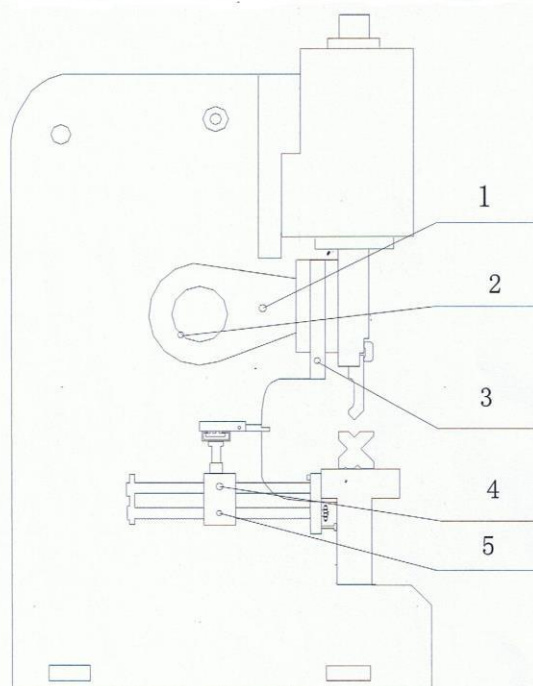
4. Replace Worn Components

- Inspect all high-wear components, such as ram seals, hydraulic pistons, and ball screws, and replace them as necessary. This will prevent unexpected failures during operation.

5. Machine Safety Features

- Test the light curtains, emergency stop buttons, and any other safety devices to ensure they are functioning correctly. Replace any faulty components to maintain safe operation.
- Review the machine's safety guarding and adjust or replace worn-out guards.

6.6 LUBRICATION OF THE MACHINE



No	Lubrication point	Amount of oil	Refueling time	Type of lubricant
1	Swing link (right and left)	Small	8h	Mixed grease lubricant
2	Balancing axis (right and left)	Small	8h	Mixed grease lubricant
3	Slide guide line (right and left)	Small	8h	Mixed grease lubricant
4	Sliding (right and left)	Small	8h	Mixed grease lubricant
5	Sliding (right and left)	Small	8h	Mixed grease lubricant

Note:

1. Lubrication for each point is applied individually using a doper.
2. The lubrication grease is a blend of No. 3 calcium-based grease (Standard: GB491) and 50% N46 total loss system oil (Standard: GB443).

CHAPTER 7. TROUBLESHOOTING

No.	Trouble	Cause	Troubleshooting method
1	No oil output of the oil pump	Wrong direction of rotation of the oil pump	Change the phase of the entering line of the electric machine
2	Leakage of components, pipe joint, and fuel tank	Abrasion or aging of the bearing seal	Change the bearing seal
3	The vibration of the pipe line and the machine tool	Lack of oil in fuel tank or the blockage of the filter net that the oil suction pipe sucks nothing	Wash the filter net or fuel tank, and add the oil to the center of the oil superscript
4	The hydraulic system builds up the work pressure	The electromagnetic valve does not change the direction or the stuck of the spool of the electromagnetic relief valve, etc.	Plunge the plug of the electromagnetic valve to prevent from loosing, and demolition of each spool for washing
5	Scramble during sliding downward of the slide	The opening of the spool is too small, or the temperature of the oil is lower than 15°C	Adjust the opening of spool 10, and increase the temperature of the oil unload
6	The slide cannot stop at arbitrary position, and move	The stuck of spool	Wash valve 12
7	The descending speed of the slide is too fast or too slow	Cone valve opens too large or too small	Adjust the spool 10
8	Noise during the return travel moment of the slide	The time relay does not relay or the delay time is too long, and the directional valve spool is stuck	Adjust the delay time of time relay to about 1 second, and achieve the high voltage unload and clean the wash valve 5

CHAPTER 8. TRANSPORT, UNLOADING AND STORAGE

8.1 TRANSPORTATION OF THE MACHINE

- 1) When transporting the machine, it is necessary to avoid rain, moisture, strong inclinations, rodents, potholes on the roads. The ambient temperature should be in the range from -10 °C to + 40 °C, relative humidity should not exceed 70%. It is forbidden to store the machine in the open air for a long time.
- 2) Do not put other loads on the machine during transportation.
- 3) When transporting the machine, do not use cables that are tied directly to the machine.
- 4) The packaging of the machine should protect from moisture and sunlight.

8.2 MACHINE CONSERVATION

If you want to suspend the use of the machine for a long time, then it is necessary to carry out anti-corrosion treatment of all mechanical parts and components of the machine, cover them with impermeable bags.

CHAPTER 9. WARRANTY

9.1 DURING THE WARRANTY PERIOD

In case of equipment breakdown during its warranty period due to a defect caused by the manufacturer, repair is carried out by the supplier's company free of charge.

However, consumable parts are not eligible for warranty service.

For free repair or replacement of accessories, the buyer bears the cost of delivering new components from the place of their storage to the buyer's address, and, if necessary, the buyer bears the cost of the specialist's visit to the place of work.

If the equipment failure is caused by a defective part or assembly of the equipment, this part or assembly is repaired or replaced free of charge.

Defective components and parts must be returned to the supplier.

If the malfunction is not caused by the quality of parts or components of the equipment, the buyer will have to pay the cost of repair as well.

Warranty service is also not subject to malfunctions due to improper use of equipment, non-compliance with maintenance rules, operating conditions, as well as warnings specified in manuals and on warning plates that have arisen during the warranty period.

It is also a prerequisite that your equipment and peripheral devices are grounded and operated through a voltage stabilizer.