COSEN SAWS

SH-710LDM

Semi-Automatic Double Column
Double Miter-Cutting Horizontal Band saw

(Non-CE & CE Models)

Instruction Manual

The Pinnacle of Cutting Performance

Cosen Mechatronics Co., Ltd.

FROM THE MANUFACTURER

Thank you for your purchase of COSEN's bandsaw machine and your trust in the COSEN brand.

We are excited to have you as our valued customer and look forward as much as you do to the accelerated productivity, long-lasting endurance and superb cost-effectiveness this machine is about to bring to you.

To ensure you are fully utilizing our machine and being advantaged in every possible way, please do take your time and read through this instruction manual.

Any comment or suggestion in making our service better, please do not hesitate to let us know. Thank you again!

NOTE:

- Read this instruction manual carefully to familiarize yourself with the installation, operation and maintenance of your COSEN bandsaw machine.
- Operate the machine following the procedures described in the manual to prevent personal injuries or machine damage.
- Keep this manual handy and refer to it whenever you are uncertain of how to perform any of the procedures.
- For technical support or parts purchase, please contact your nearest COSEN representative or our service center:

For US, Mexico, and Canada:
email: info@cosensaws.com.
phone: 1-704-943-1030
toll free: 1-877-SAWING1
fax: 1-704-943-1031

For service in other countries:
email: info@cosen.com
phone: 886-3-5332143
fax: 886-3-5348324

Instruction Manual: **SH-710LDM**
Semi-Automatic Double Column Double Miter-Cutting Horizontal Band saw
Ver. 4 2013/11/11

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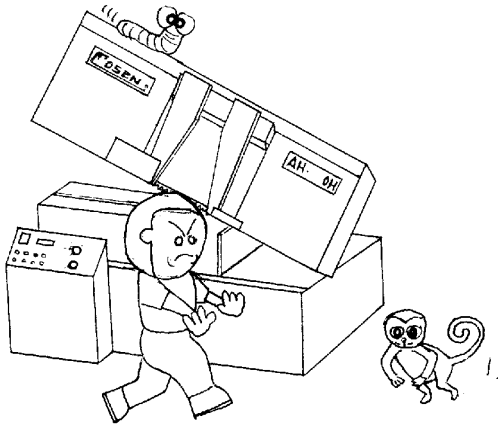
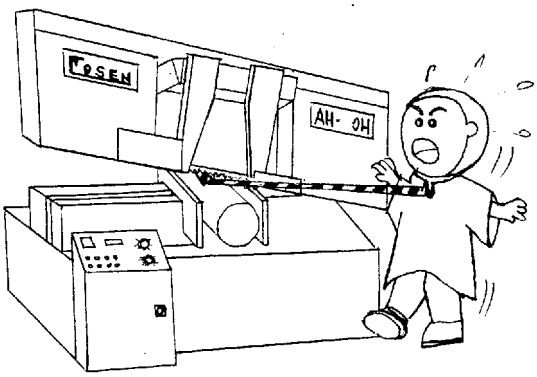
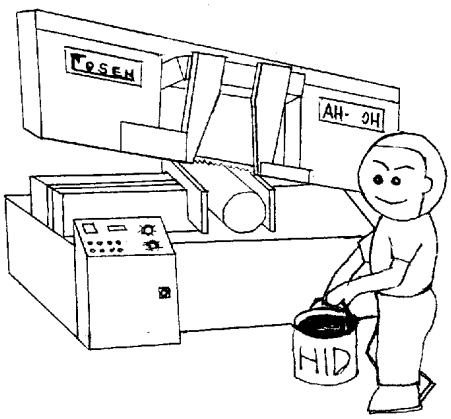
Safety rules



- Make sure your work area is cleared of uninvited people and obstacles every time before you start operating the machine.

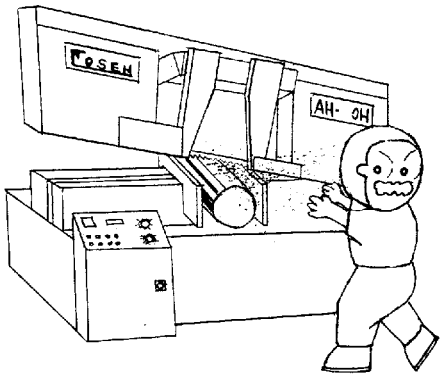


- Never wear gloves or loose clothing when operating the machine. It may lead to serious injury if they are caught in the running machine. Wrap or cover long hair.

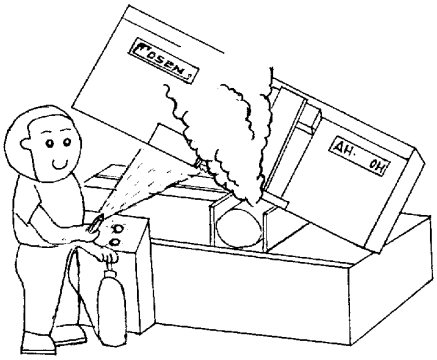


- Use a water-soluble cutting fluid on this machine. Oil-based cutting fluids may emit smoke or catch fire, depending on how they are used.

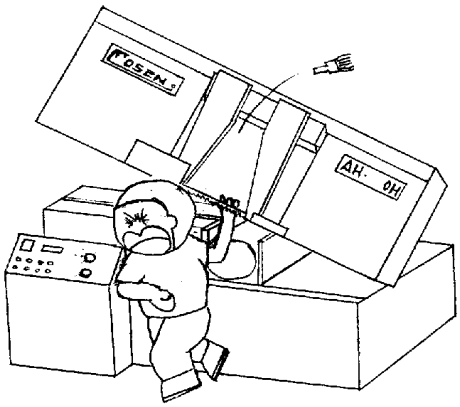
Safety rules



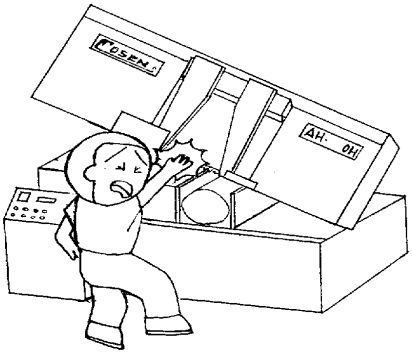
- Never cut carbon or any other material that may produce and disperse explosive dust. It is possible that sparks from motors and other machine parts will ignite and explode the air-borne dust.



- Make sure any use of fire is prohibited in the shop and install a fire extinguisher or other fire control device near the machine when cutting titanium, magnesium, or any other material that produces flammable chips. Never leave the machine unattended when cutting flammable materials.

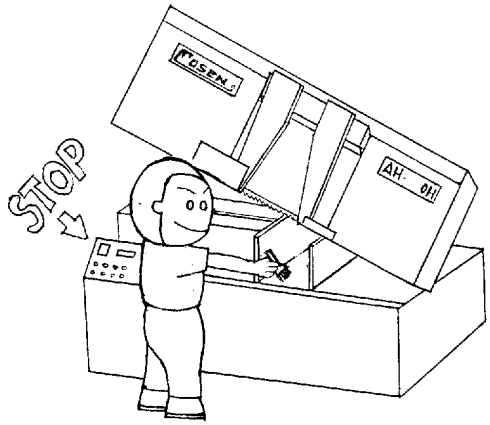


- Never adjust the wire brush or remove chips while the saw blade is still running. It is extremely dangerous if hands or clothing are caught by the running blade.

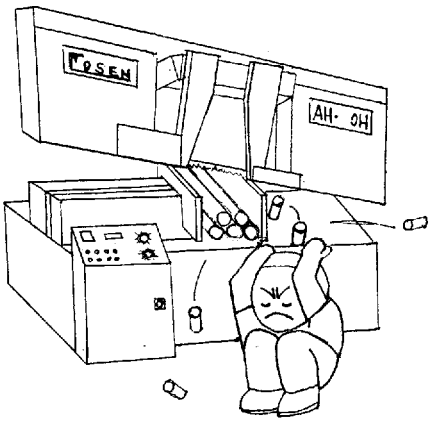


- Never touch the running saw blade with gloves or not. It is dangerous if your hands, clothing or gloves are caught by the running blade.

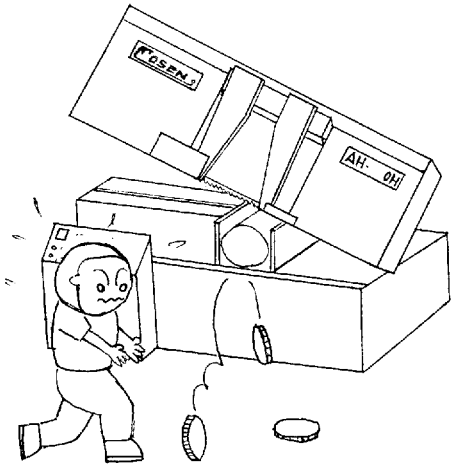
Safety rules



- Stop the saw blade before you clean the machine. It is dangerous if hands or clothing are caught by the running blade.

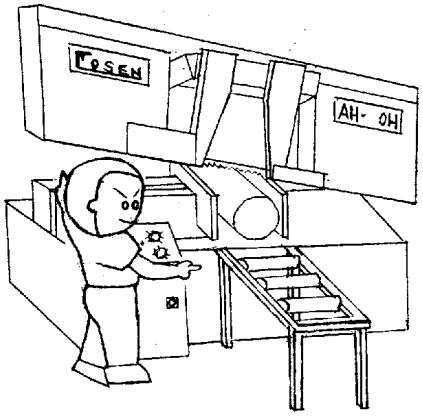


- Never start the saw blade unless the workpiece has been clamped firmly. If the workpiece is not securely clamped, it will be forced out of the vise during cutting.

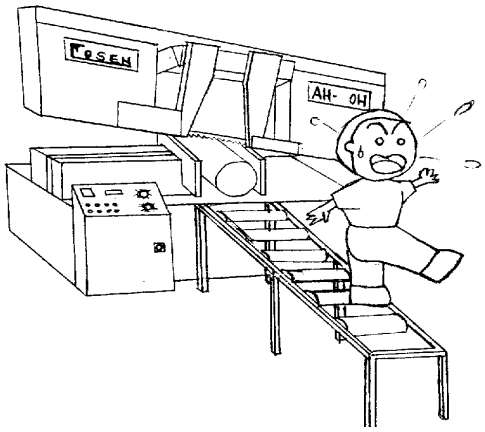


- Take preventive measures when cutting thin or short pieces from the work to keep them from falling. It is dangerous if the cut pieces fall.

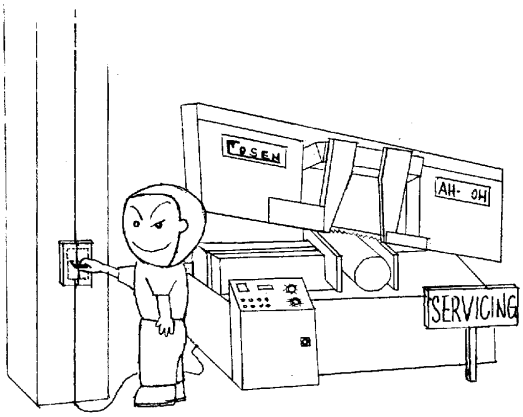
Safety rules



- Use roller tables at the front and rear sides of the machine when cutting long work. It is dangerous if the work piece falls off the machine.



- Never step or stand on the roller table. Your foot may slip or trip on the rollers and you will fall.



- Turn off the shop circuit breaker switch before performing maintenance on the machine. Post a sign indicating the machine is under maintenance.

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SAFETY INFORMATION

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RISK ASSESSMENT

Safety is a combination of a well-designed machine, operator's knowledge about the machine and alertness at all times. COSEN's band machine has incorporated many safety measures during the design process and used protective devices to prevent personal injuries and potential risks. Warning labels also serve as a reminder to the operator.

Throughout this manual, you will also see various safety-related symbols indicating important information that you should take note of prior to use of the machine or part of its functions. These important safety instructions do not cover all possible situations that might occur. It is your responsibility to take caution and follow procedures stated in this manual when installing, maintaining and operating your machine. Cosen will not be liable for damages resulting from improper use.

SAFETY INSTRUCTIONS

What the icons and signs in this user manual mean:

	This icon marks **DANGER**; hazards or unsafe practices that may result in **severe personal injury or death.**
	This icon marks **WARNING**; hazards or unsafe practices that may result in **personal injury or damage to the machine.**
	This icon marks **CAUTION**; information that should be read before use to prevent **damage to the machine.**
	Supplementary information to the procedures described in this manual.
	Call your local agent or our service center for help.

This manual has important safety information. Read through it carefully before operating this machine to prevent personal injury or machine damage. Learn the operation, limitation and the specific potential hazards peculiar to this band saw.

Do not operate this machine unless it is completely assembled.

Make sure the power switch is off before plugging in power cord.

Disconnect the power cord before making adjustment, maintenance or blade changes.

Keep all guards and shields in place before installing or starting up the machine.

Wear proper apparel during operation and when servicing the machine.

Keep unauthorized personnel away.

Do not reach over or stand on any part of the machine.

Never hold the material by hand for cutting. Always use the vise and make sure the material is clamped securely before cutting.

It is dangerous to operate the machine when the floor is slippery. Keep the floor clean and dry. Check for ice, moisture, or grease before entering.

Do not use the machine to cut explosive material or high pressure vessels as it will generate great amount of heat during the sawing process and may ignite an explosion.

Keep the work environment safe. Do not use band saw in a damp or wet location.

Never operate while under the influence of drugs, alcohol or medication.

All users must read it before performing any activity on the machine, such as replacing the saw band or doing regular maintenance.

Some personal protective equipment is required for the safe use of the machine, e.g. protection goggles.

Keep blade protection cover and wheel covers in place and in working order.

Use recommended accessories. Improper accessories may be hazardous.

Keep your work area well illuminated at minimum 500 lumen.

Keep your work area clean. Cluttered and slippery floors invite accidents.

Remove adjusting keys, wrenches or any loose parts or items from the machine before turning on power.

Check for damaged parts. Before continuing using the machine, the damaged part should be checked and replaced.

Moving parts should be kept in proper alignment and connection with the machine. Check for breakage, mounting and any other conditions that may affect its operation. Any damaged part or guard should be properly repaired or replaced.

When a workpiece is too long or heavy, make sure it is supported with a roller table (recommended).

Always remember to switch off the machine when the work is completed.

Use a sharp saw blade and keep the machine in its best and safest performance by following a periodical maintenance schedule.

Do not force the band saw beyond its intended use. It is safer to operate with the cutting rate for which it was designed.

SAFEGUARD DEVICES

The safeguard devices incorporated in this machine include the following two main parts:

1. Protection covers & guards
2. Safety-related switches

Protection Covers & Guards

1. Idle wheel housing cover
2. Drive wheel housing cover
3. Gear reducer cover
4. Wire brush belt cover
5. Blade guard cover (left & right)
6. Safety fence (left & right)(CE model only, as shown in Illustration: *Safety Fence*)
7. Chip conveyor cover (CE model only)

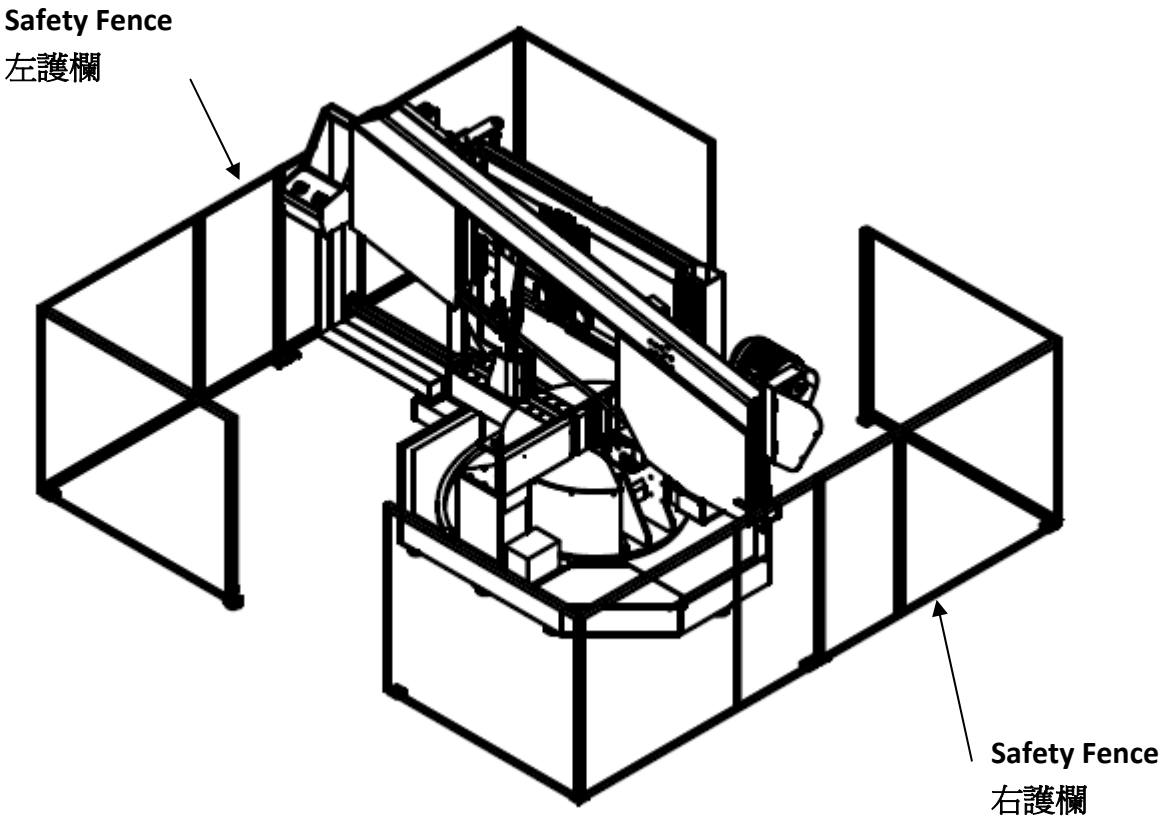
 The protection devices should always be mounted on the machine whenever the machine is running.

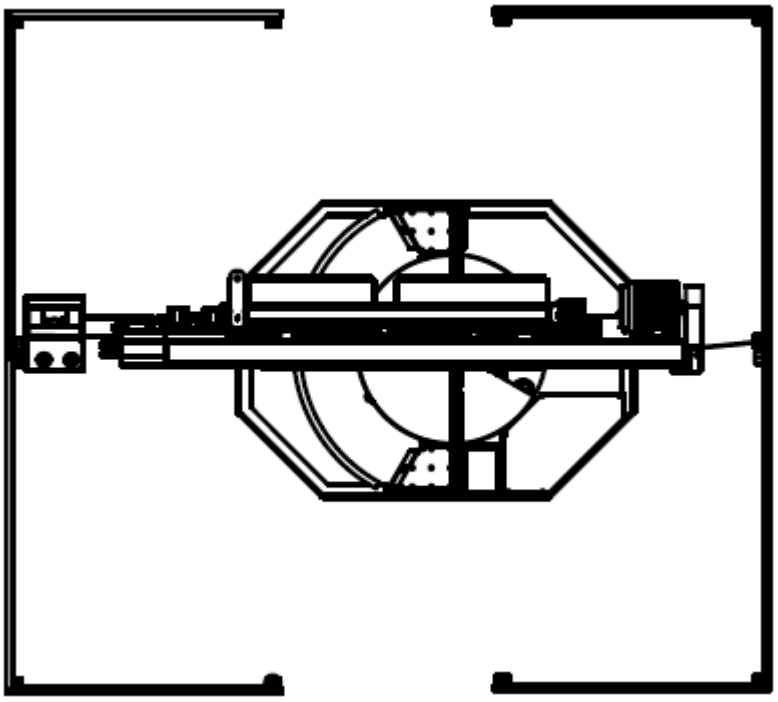
 Do not remove any of these safeguard devices under any circumstances except when servicing the machine. Even skilled service technicians should still take cautions when performing repairs or service on the machine with any of these protectors removed. It is the responsibility of the user to make sure all these elements are not lost and damaged.

 Take note of the following main moving parts on the machine prior to and during machine operation:

- Saw bow assembly
- Drive and idle wheels
- Blade guide arm
- Saw blade guide rollers
- Quick approach device
- Wire brush
- Chip conveyor (optional)
- Workpiece clamping vises
- Shuttle vises and workbed rollers
- Top clamps (optional)
- Gear reducer

Illustration: Safety Fence (CE model only)





Safety Related Switches

To protect the operator, the following safety related switches on the machine are actuated when the machine is in operation.

Wheel motion detector	This is a proximity sensor used to detect the motion of the drive wheel. Once the saw blade is broken or as soon as it starts slipping, the sensor will detect and stop the drive wheel and the machine.
Power switch	Located on the cover of electrical cabinet, the power switch controls the main power of the machine.
Emergency stop button	Located on the control panel, the button when pressed will stop the machine completely.
Vise clamp switch	This switch assures firm clamping of the workpiece. If the workpiece is not clamped properly, the saw blade is not allowed to run.
Wheel cover interlock switches (CE model only)	Located on the two wheel housings, these switches are used to assure that the machine will stop whenever the wheel covers are open. This device is to protect users from being cut by the running saw blades.

Among all these safety switches, some of them are used to protect the users and some of them are used to prevent damage to saw blades, the workpiece and the machine itself, etc. We have taken every precaution to prevent injury or damage and to provide safe and economical operation of the machine.

EMERGENCY STOP

Designed to be easily accessible, the emergency stop button is located on the left bottom corner on the control panel and is made in red color and rubber material. For CE models, supplementary emergency stop button may be available at other area(s) of the machine depending on machine type. Please refer to *Illustration: Emergency Stop.*

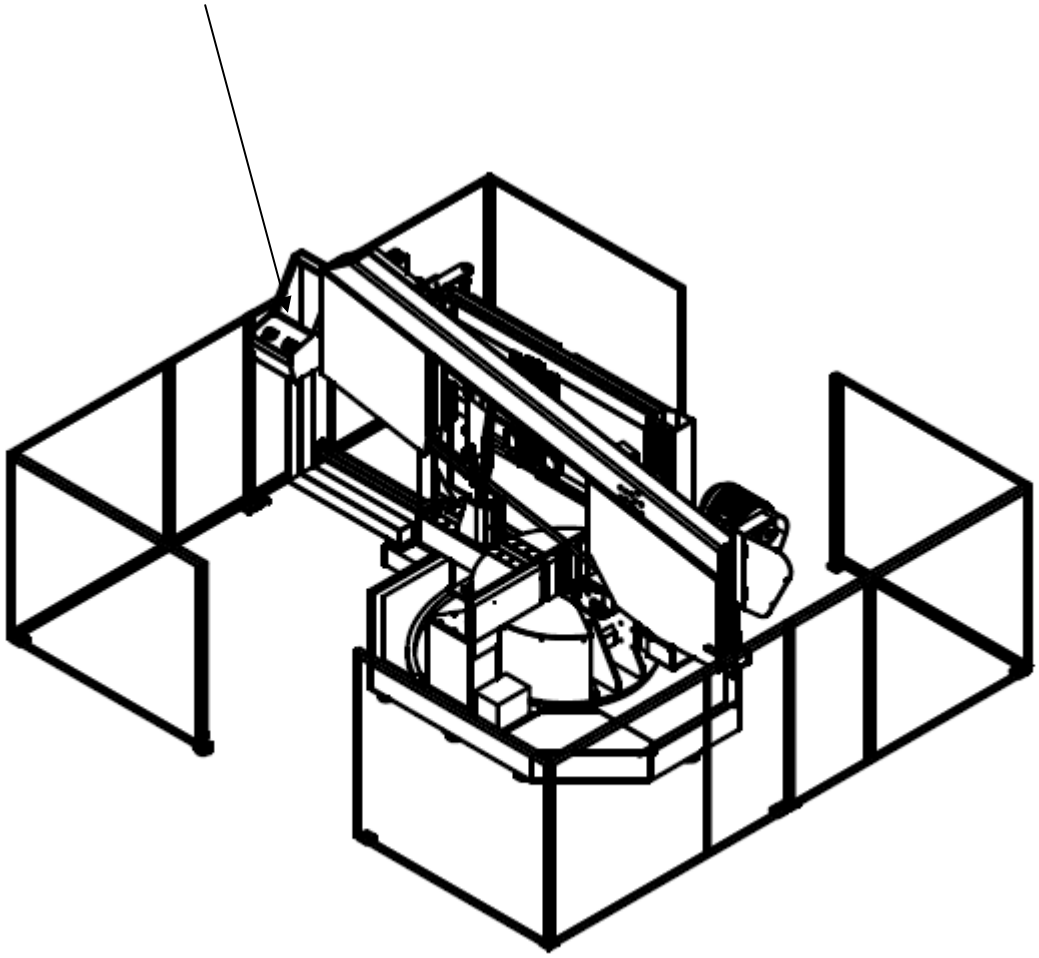
When you press the button, the machine will immediately come to a full stop to avoid injury or damage when an accident occurs. The button will be locked when you press it. To unlock it, pull it upward.

You should press it immediately without any hesitation when observing:

- An emergency situation that would cause any injury or damage
- An abnormal situation or problem such as fire, smoke, abnormal noise and etc.

Illustration: Emergency Stop

Emergency Stop
急停按鈕



SAFETY LABELS

Safety-related labels mounted on the machine are categorized into the following four categories. Please read through and understand them before operating the machine. Refer to *Illustration: Safety Labels.*

DANGER Labels

A red and white DANGER labels marks s hazards or unsafe practices that will result in severe personal injury or death.

Label	Meaning	Label	Meaning
	Hazardous Voltage TURN POWER OFF before servicing. Failure to following the warning can result in severe injury.		DANGER: Running Blade Blade runs through this area. Keep your hands away from a running blade to avoid severe injury. The arrow indicates direction of the blade.

WARNING Labels

An orange and black WARNING label marks hazards or unsafe practices that can result in severe personal injury or damage to the machine.

Label	Meaning	Label	Meaning
	Cutting Hazard KEEP COVER CLOSED while the blade is running. Turn power off before opening cover. Failure to follow the warning can result in severe injury.		Cutting Hazard KEEP HAND OFF while the blade is running. Turn power off before opening cover. Failure to follow the warning can result in severe injury.
	Please add antifreeze coolant when the ambient temperature is below 0˚C (32˚F).		Loose Hand Hazard KEEP HAND OFF. Do not touch chip conveyor. Failure to follow the warning can result in severe injury.
	Impact Hazard WEAR SAFET SHOES. Do not approach dropping area during operation.		

CAUTION Labels

Yellow and black CAUTION labels mark hazards or unsafe practices that can result in considerable personal injury.

Label	Meaning
	Keep hands out of the machine while the blade is running.
	Power to machine must be turned off when changing blades or adjusting wire brush.

NOTICE Labels

Blue and white NOTICE labels mean unsafe practices that could result in damage to products or property.

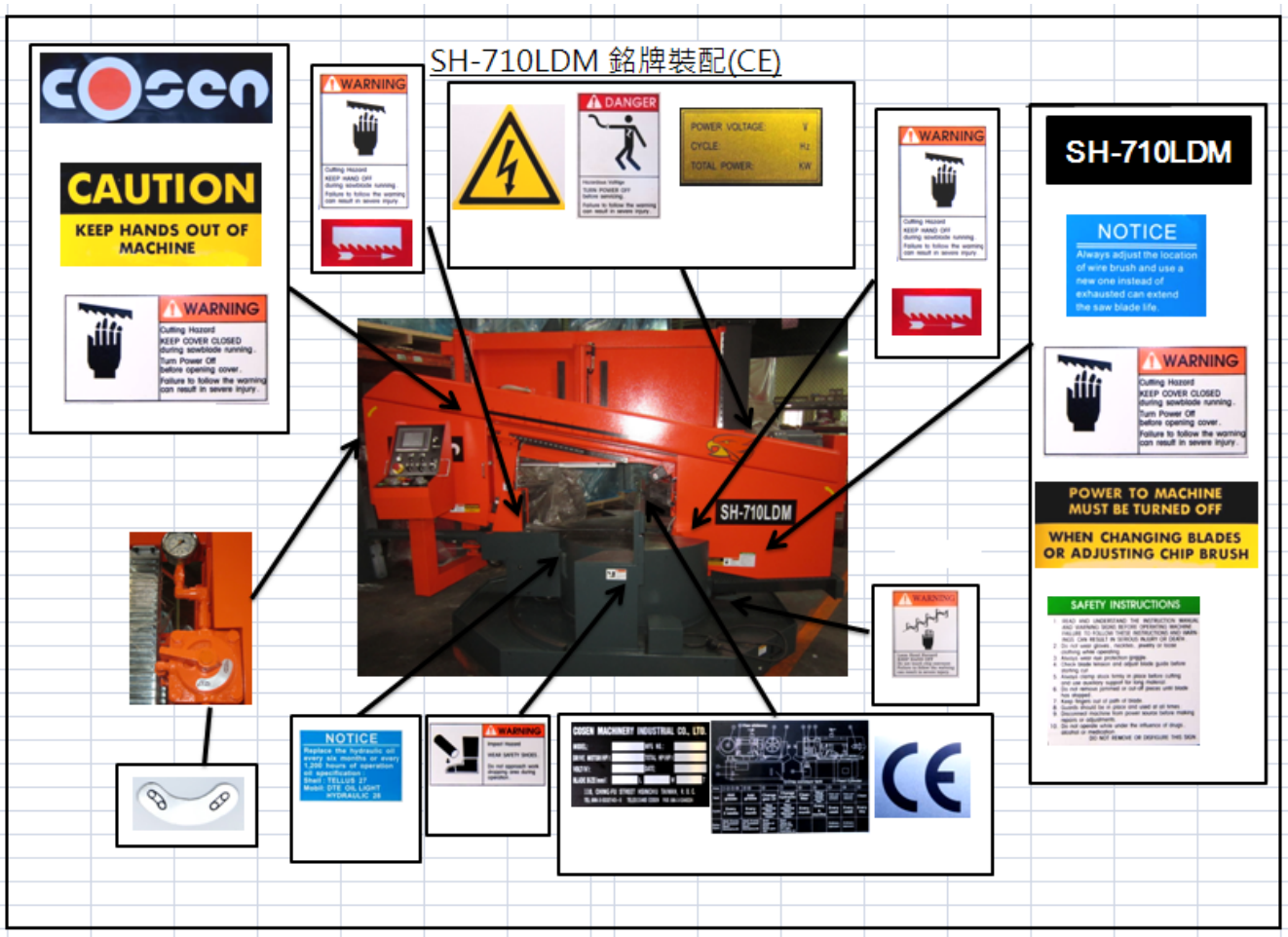
Label	Meaning
	Replace the hydraulic oil every six months or every 1,200 hours of operation. Oil specification: Shell TELLUS 27 or Mobil DTE OIL LIGHT / HYDRAULIC 28
	To extend blade life, always adjust the location of wire brush so that it is properly touching the blade. Also replace a worn wire brush with a new one.

SAFETY INSTRUCTION Labels

Green and white SAFETY INSTRUCTIONS are important reminders that should be read before operating the machine.

Label	Meaning
	1. Read and understand the instruction manual and warning signs before operating machine. Failure to follow these instructions and warnings can result in serious injury or death. 2. Do not wear gloves, neckties, jewelry or loose clothing while operating the machine. 3. Always wear eye protection goggles. 4. Check blade tension and adjust blade guide before starting to cut. 5. Always clamp stock firmly in place before cutting. 6. Do not remove jammed or cut-off pieces until blade has stopped. 7. Keep fingers out of path of blade. 8. Blade guards should be in place and used at all times. 9. Disconnect machine from power source before marking repairs or adjustments. 10. Do not operate while under the influence of drugs, alcohol or medication.

Illustration: Safety Labels



HEARING PROTECTION

Noise has a major effect on the quality of your work environment. Here we refer you to testing data and information as follows:

Excessive exposure to high levels of noise may cause impairment to hearing, but the vulnerability to hearing loss varies between individuals and must be taken into account in specifying an allowable limit for noise exposure.

A level of 90 dBA is widely accepted as a criterion for 8 hour/day exposure to steady-state broad-band noise. The unprotected ear should not be exposed to noise levels higher than 120 dBA.

Noise generated by the machine may come from the following:

- Saw blade during cutting or material feed mechanism
- Wire brush unit
- Chip conveyor unit
- Speed reducer
- Hydraulic motor/pump
- Belt transmissions variable speed motors
- Blade motor
- Coolant pump
- Drive wheel
- Parts not assembled tightly causing mechanical vibration

When your machine is running, noise will come out. This is a machine-electric interface problem that may make people feel uncomfortable. Our products pass noise testing less than 78 dBA. If your machine produces an undesirable noise while it is running, you should:

1. Make sure all maintenance tasks have been performed following the prescribed maintenance schedule (Refer to Section 7)

2. If maintenance does not seem to solve the problem, follow the troubleshooting procedures under Section 8.

CE COMPLIANCE

Cosen's CE model is designed to satisfy regulations of the Council Directive on the approximation of the laws of the Member States relating to machinery (2006/42/EC) - Annex I Essential health and safety requirements relating to the design and construction of machinery.

RISK ASSESSMENT

Risk assessment generally takes account of intended use and foreseeable misuse, including process control and maintenance requirements. We made every effort to avoid any personal injury or equipment damage during the machine design stage. However, the operator (or other people) still needs to take precautions when handling any part of the machine that is unfamiliar and anywhere on the machine that has potential hazards (e.g. the electrical control box).

Section 2

GENERAL INFORMATION

SPECIFICATION

MACHINE PARTS IDENTIFICATION

FLOOR PLAN

This band saw machine is designed by Cosen's R&D engineers to provide you the following features and advantages:

Safety

- This machine is designed to fully protect the operator from its moving parts during cutting operation.
- The machine and each compoment has passed strict testing (Council Directive on the approximation of the laws of the Member States relating to Machinery).
- The machine will shut off automatically when the saw blade is broken, protecting both the operator and the machine.

Convenience & High-Performance

- The machine is designed in the way that the operation and adjustment can be easily performed.
- The machine will stop automatically when out of stock.
- Dual valve system is designed to achieve optimal cutting performance with the simple setting of feed rate and perspective cutting pressure for different material.

Durability

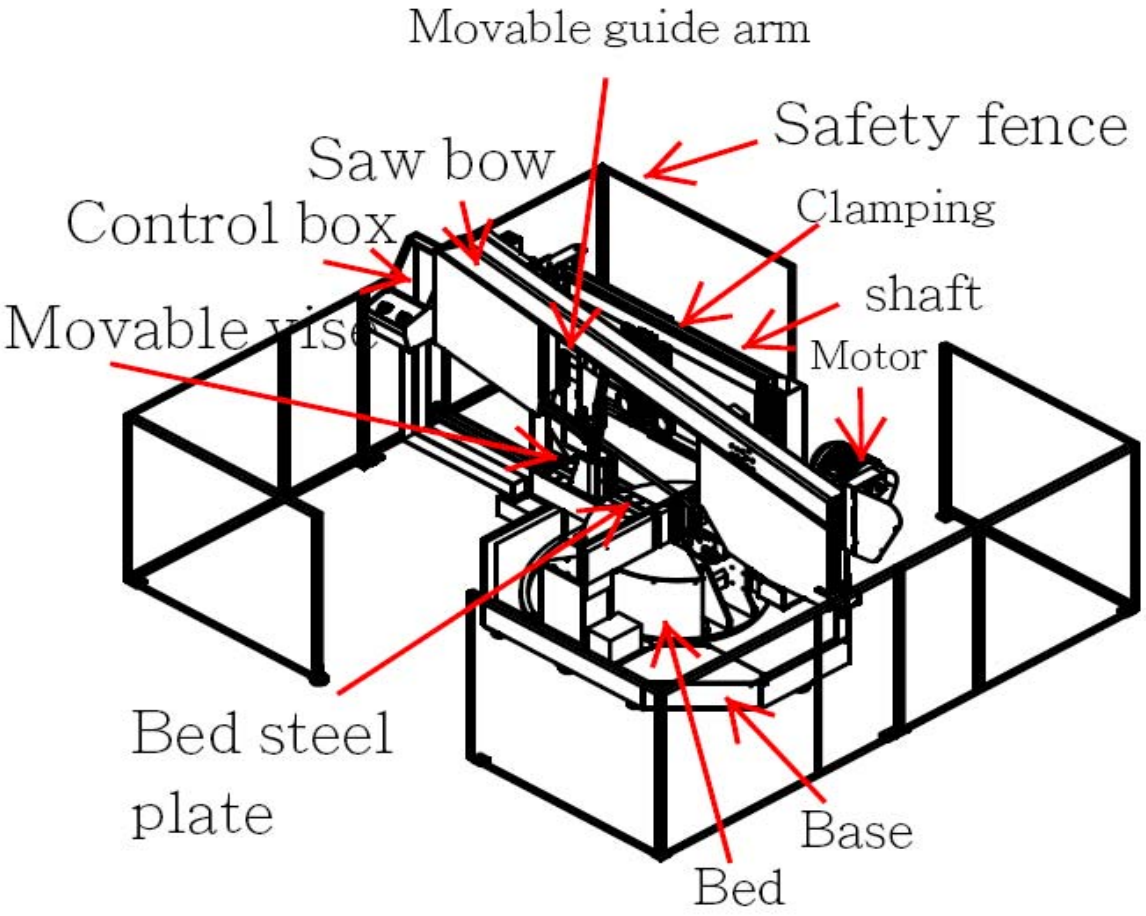
- The intended life-span of the machine is counted based on regular daily operation. It is calculated with the life expectancy of 10 years under normal operating condition and exact attention to the maintenance schedule.

  8 hours × 5 days × 52 weeks × 10 years ＝ 20,800 hours

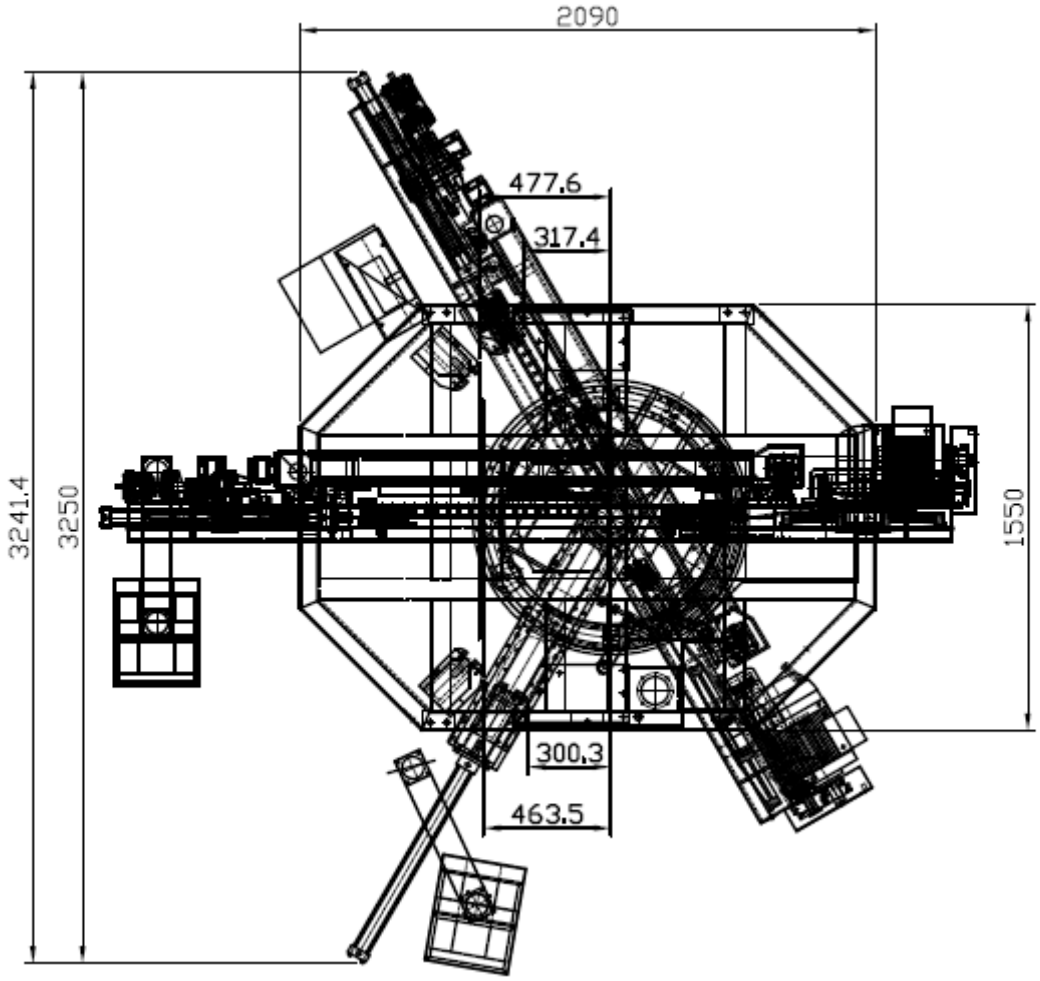
SPECIFICATION

Model		SH-710LDM
Machine Type		Semi-Automatic Double Column Double Miter-Cutting Horizontal Band saw
Miter Degree		±45° ~ ±60°
	0° Rectangular (H x W)	420 x 710 mm (16.5 x 28 in.)
	±45° Rectangular (H x W)	420 x 460 mm (16.5 x 18 in.)
	±60° Rectangular (H x W)	420 x 300 mm (16.5 x 11.8 in.)
Saw Blade	Speed	205~ 100 m/min (83 ~ 330 ft/min)
	Size (L x WxT)	6520 x 41 x 1.3 mm (257" x 1.6 "x 0.050")
	Tension	Hydraulic
Motor Output	Saw Blade	7.5 HP (5.6 kW)
	Hydraulic	1 HP (0.75 kW)
	Coolant Pump	1/8 HP (0.1 kW)
Workbed Height		750 mm (29.5")
Floor Space (L X W X H)		3250 × 3200 × 1920 mm (128" × 126" × 76")

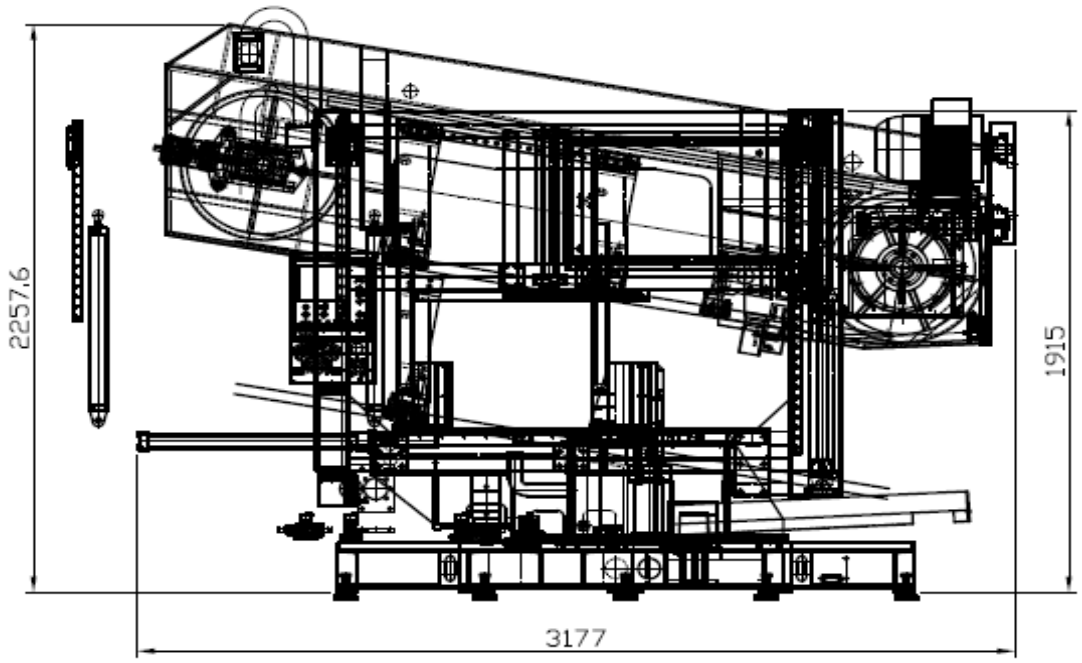
MACHINE PARTS IDENTIFICATION



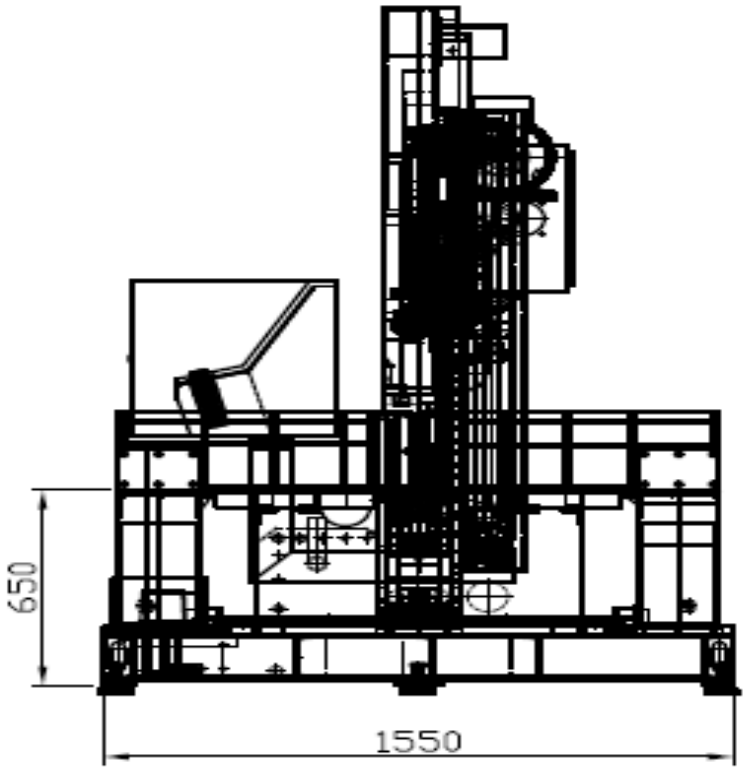
FLOOR PLAN



Machine top view



Machine front view



Right view Drawing

Section 3

MOVING & INSTALLATION

LOCATION & ENVIRONMENT

For your safety, please read all information regarding installation before proceeding. Install your machine in a place satisfying all of the following conditions:

Space:

- Leave enough free space around the machine for loading work and unloading cut-off pieces as well as for maintenance and inspection. Refer to *Section 1 Description* for machine dimensions and floor space.

Environment:

- Well lighted (500 lumen at minimum).
- Floor kept dry at all times in order to prevent operators from slipping.
- Away from direct exposure to the sunlight
- Room temperature between 5˚C to 40˚C.
- Humidity level kept at 30%~95%“(without condensation) to avoid dew on electric installation and machine.
- Away from vibration of other machines
- Away from powders or dusts emitted from other machines
- Avoid uneven ground. Choose a solid level concrete floor which can sustain weight of approximately 15 tons (including both machine and material weight).
- Limit the operation area of the machine to staff only.

UNPACKING & INSPECTING

- Unpack your machine carefully to avoid damage to machine parts or surfaces.
- Upon arrival of your new band saw, please confirm that your machine is the correct model and it comes in the same specification you ordered by checking the model plate on the machine base.
- It is also imperative that a thorough inspection be undertaken to check for any damage that could have occurred during shipping. Pay special attention to machine surface, equipments furnished and the electrical and hydraulic systems for damaged cords, hoses and fluid leaks.
- In the event of damage caused during shipping, please contact your dealer and consult about filing a damage claim with the carrier.
- Your machine comes in with a set of tools for you to maintain the machine. The accessories furnished are as follows:

1.	Tool box	1 pc
2.	Grease gun	1 pc
3.	Screwdriver (+, -)	2 pcs
4.	Open-ended spanner	3 pcs
5.	Hexagon wrench	1 set
6.	Chip spade (only for manual models)	1 pc
7.	Operation manual	1 pc

 Should you find any missing accessories, please contact your local agent immediately.

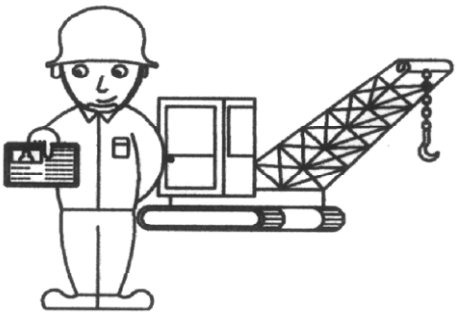
LIFTING

When moving the machine, we strongly suggest you choose any one of the methods described below to move your machine.

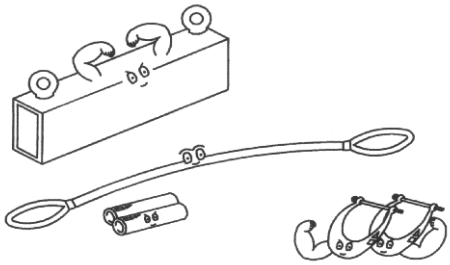
1. Use a crane

Move the machine to its location by using a crane and a wire rope sling that can fully withstand the weight of the machine (refer to machine specification under Section 1 *Description*).

- Machine lifting is likely to damage the machine if not performed properly.

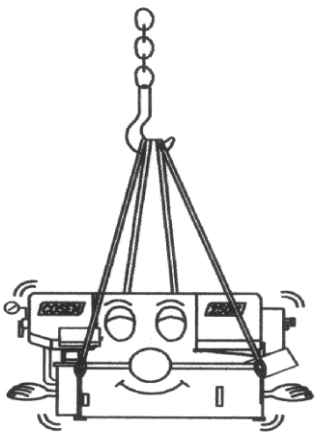


***Warning*:** You must have a qualified crane operator to perform the job.



- You must use tools and equipment with the proper tensile strength and use proper method when moving your machine.

- Apply the wire rope sling to the lifting hooks on the four ends of the machine. Refer to *Illustration: Lifiting Points* for exact locations.



- Slowly lift the machine. Be sure to protect the machine from impact or shock during this procedure. Also watch out your own fingers and feet to avoid injuries.

- Keep the machine well balanced during lifting process and make sure the wire rope does not interfere with the saw frame.

- When you work together with more than two people, it is best to keep constant verbal communication with each other.

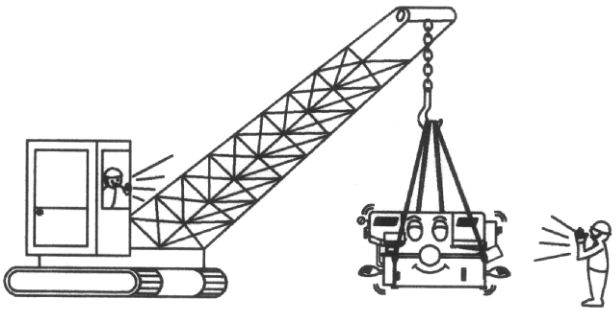
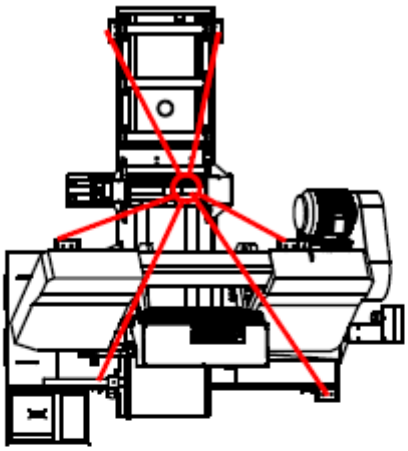
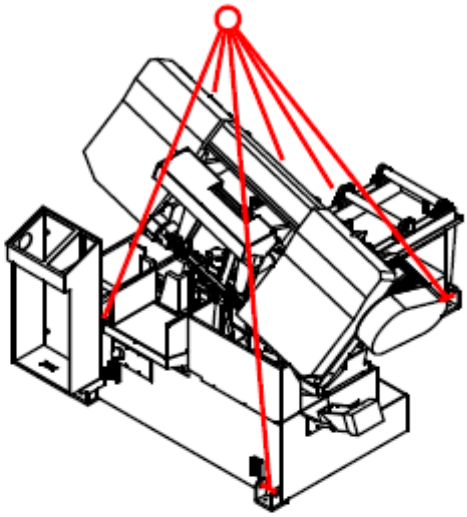
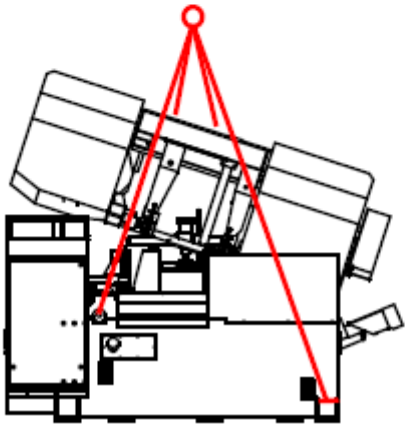
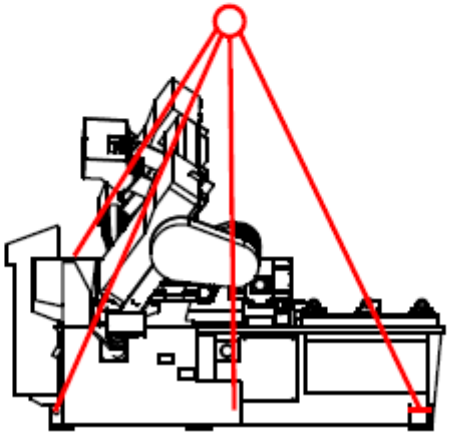


Illustration: Lifiting Points (applicable for CE model only)









Minimum weight capacity for each wire rope: **3.2 ton**

Total number of wire ropes required: **4**

2. Use a forklift

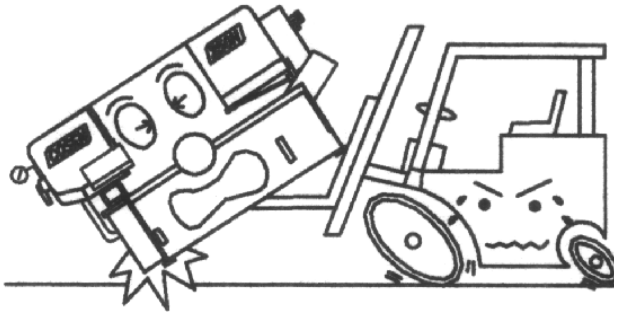
Most users choose this method to move their machine because it is easy to set up. Make sure that the lifting rod can fully withstand the weight of the machine. (Refer to *Section 2 – General Information for Specifications)*

- Machine lifting is likely to damage the machine if not performed properly.

  You must have a qualified forklift operator to perform the job.

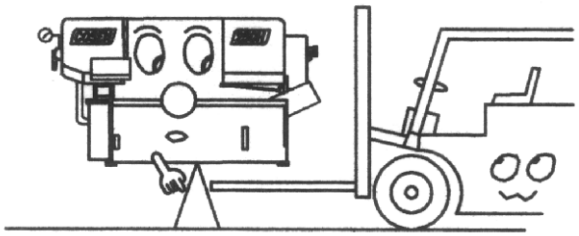
- You must apply proper forklift technique to avoid damage to the machine.

  Make sure the forks are able to reach in at least 2/3 of the machine depth.



- You must keep the machine balanced at all times.

  Make sure the forks are centered before use.

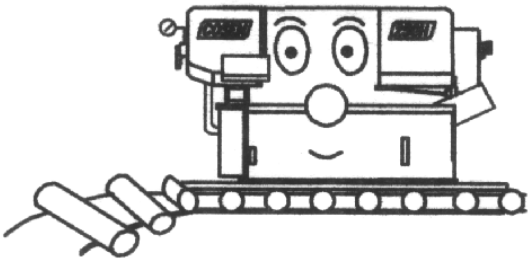


(Illustration only. Please follow user guide of your forklift.)

3. Use rolling cylinders

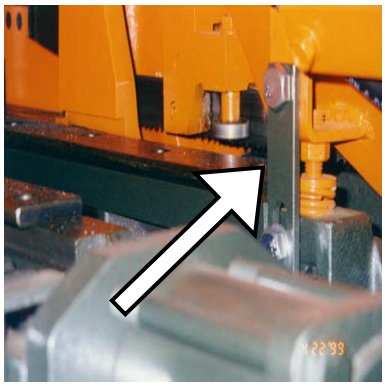
You can use rolling cylinders to move your machine in a small machine shop environment.

- You must use rolling cylinders made in material of proper compressive strength.



REMOVING SHIPPING BRACKET

- After the machine has been properly positioned, remove the shipping bracket that is used to lock the saw frame and the saw bed.
- Retain this bracket so that it can be used again in the event that your machine must be relocated.



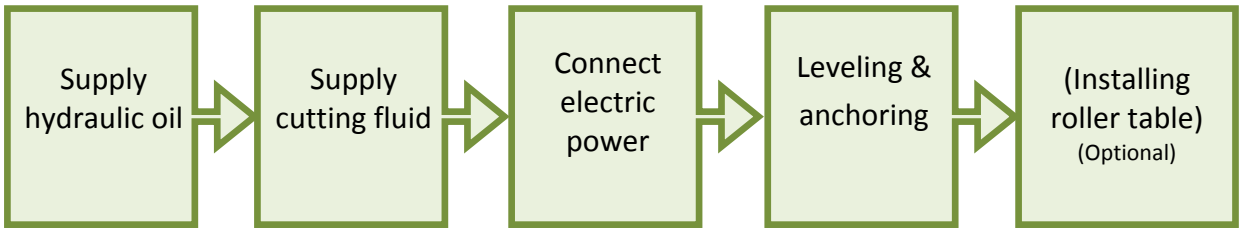
CLEANING

After the machine has been placed at the designated position, remove the rust-preventive grease with wiping cloth dampened with cleaning oil or kerosene. Apply machine oil to machine surfaces that are prone to rust.

Do not remove the rust-preventive grease with a metal scraper and do not wipe the painted surfaces with solvent as doing so would damage surface paint.

INSTALLING

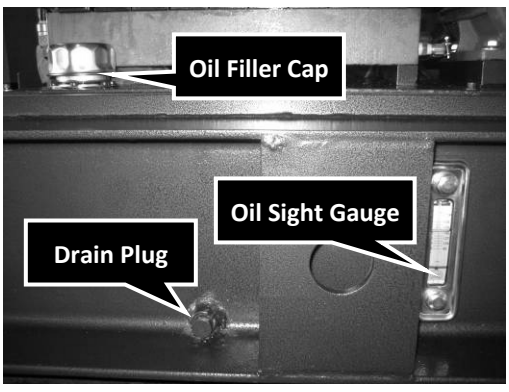
Cosen's bandsaw machine is relatively easy to install. Follow these six easy steps to install your machine.



Supplying hydraulic oil

Open the filler cap and fill the hydraulic oil tank to above 2/3 or full level.

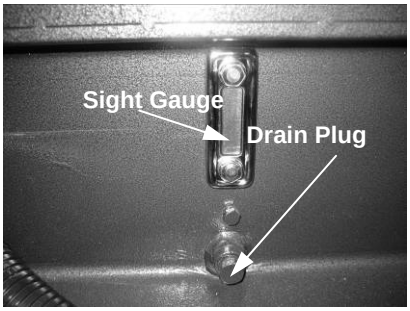
Check the sight gauge to make sure the oil level in the tank.



Refer to specification chart under Section 1 for tank capacity.

Oil tank should be full already if it is a new machine that operates for the first time.

Supplying coolant



Fill the coolant tank to the middle level of the sight gauge by pouring the coolant from above the chip conveyor.

Use the sight gauge to check the coolant level remaining in the tank.

Always check the coolant supply before starting the machine. If the coolant pump is started without enough coolant supply in the tank, the pump and its drive motor may be damaged.

Refer to specification chart under Section 1 *Description* for tank capacity.

Consult your coolant supplier for bandsaw use regarding coolant type and mix ratio.

Connecting electric power

Have a qualified electrician make the electrical connections.

If the power supply voltage is different from the transformer and motor connection voltage shown on the label attached to the electrical compartment of the machine, contact COSEN or your agent immediately.

Connect to power supply independently and directly. Avoid using the same power supply with electric spark machines such as electric welder. Unstable electric tension may affect your machine's electric installation from working properly.

Ground the machine with an independent grounding conductor.

Supply voltage: 90% - 110 % of nominal supply voltage.

Source frequency: 99% - 101 % of nominal frequency.

Refer to the specification chart under Section 1 for total electric power consumption of the motors and make sure your shop circuit breaker is capable of this consumption amount. Also use a power supply cable of proper size to suit the power supply voltage.

1. Turn off the shop circuit breaker.
2. Make sure the machine circuit breaker switch on the electrical compartment door is turned to OFF.
3. Remove the screw securing the electrical compartment and then open the door.
4. Pull the power supply cable and grounding conductor through the power supply inlet into the electrical compartment. (Shown right)
5. Connect the power supply cable to the circuit breaker (N.F.B.) to the R, S and T terminals, and connect the ground cable to the E terminal.
6. Close the compartment door and fasten the screw back.
7. Turn on the shop circuit breaker and then turn the machine circuit breaker switch to ON. The *Power Indicator* on the control panel will come on.
8. Pull to unlock the *Emergency Stop* button and press the *hydraulic ON* button to start the hydraulic motor.
9. Make sure the sawing area is clear of any objects. Start the blade and check the blade rotation. If the electrical connections are made correctly, the blade should run in a counterclockwise direction. If not, shut the hydraulics off, turn off the machine as well as the shop circuit breaker. Then swap the power the power cable conductors connected to R and T terminals.
10. Repeat step 6 to 9 to ensure the electrical connections are in the right order.

Leveling

Place spirit level on the vise slide plates and the work feed table.

Level the machine in both directions i.e. along and across the machine. Adjust the level of the machine by turning the leveling bolts.

Make sure all leveling bolts evenly support the machine weight.

In some cases, leveling the machine with a slight slope toward the front of the machine is recommended as it would prevent coolant from running down cutting material especially tubes or bundles. To do so, make the rear end of the machine approximately 10 mm higher than the level of the front end.

Anchoring the machine

Normally there is no need to anchor the machine. If the machine is likely to vibrate, fix the machine to the floor with anchor bolts.

Shock absorption steel plates are provided and can be placed under each leveling bolt to prevent their sinking into the concrete floor.

Installing roller table (optional)

The roller table is used to support long material at the rear and/or the front of the machine.

If you have ordered the optional roller table for cutting long material, position it before or behind the machine.

Level the roller table and the stand with the machine by adjusting the leveling bolts.

Installing Fire Control Device

Install a fire extinguisher or any other fire control device in the shop in case a fire breaks out.

RELOCATING

We recommend you follow these procedures when relocating or shipping your machine to other place:

1. Descend the saw frame to its lowest position then turn off the power.
2. Fix the saw frame using the shipping bracket that originally came with the machine.
3. If you are shipping the machine, pack the machine carefully with industrial plastic wraps to protect it from dust.
4. Use a crane or forklift to raise it. If a crane is used to lift the machine, ensure that the lifting cable is properly attached to the machine.
5. Do not forget to include the equipments originally furnished including the shock absorption steel plates and the instruction manual.

Section 4

OPERATING INSTRUCTION

SAFETY PRECAUTIONS

For your safety, please read and understand the instruction manual before you operate the machine. The operator should always follow these safety guidelines:

- The machine should only be used for its designated purpose.
- Do not wear gloves, neckties, jewelry or loose clothing/hair while operating the machine.
- For eye protection, always wear protective safety glasses.
- Check the blade tension and adjust blade guides before starting the machine.
- Use auxiliary clamping or supporting devices to fix material in place before cutting long workpieces. Always make sure the material is clamped firmly in place before starting to cut.
- Do not remove jammed or cut-off pieces until the blade has come to a full stop.
- Keep fingers away from the path of the blade.
- Protection devices should be in place at all times. For your own safety, never remove these devices.
- Disconnect machine from the power source before making repairs or adjustments.
- Wear protection gloves only when changing the blade.
- Do not operate the machine while under the influence of drugs, alcohol or medication.
- Do not take your eyes off the machine while in operation.
- Do place warning signs to mark out machine work zone and restrict entry to be staff-only.

BEFORE OPERATING

Choosing an appropriate saw blade and using the right cutting method is essential to your cutting efficiency and safety. Select a suitable saw blade and cutting method based on your work material and job requirements e.g. cutting accuracy, cutting speed, economic concern, and safety control.

Wet cutting

If you choose dry cutting or low-speed cutting, the chips may accumulate in machine parts and may cause operation failure or insulation malfunction. We suggest you choose wet cutting to avoid machine damage.

Cutting unknown materials

Before cutting an unknown material, consult the material supplier, burn a small amount of chips from the material in a safe place, or follow any other procedure to check if the material is flammable.

 Never take your eyes off the machine while in operation.

Cutting fluid

For cooling and lubrication purpose, we recommend you use water-soluble cutting fluids. The following table lists out its pros and cons for your reference.

Pro	Con
• Have a high cooling effect • Not flammable • Economical • Does not require cleaning of the cut products	• Remove machine paint • Lose its rust protection effect if deteriorated • Tend to create foam • Subject to decay • Decline in performance, depending on the quality of the water used for dilution

 Never use water as your coolant.

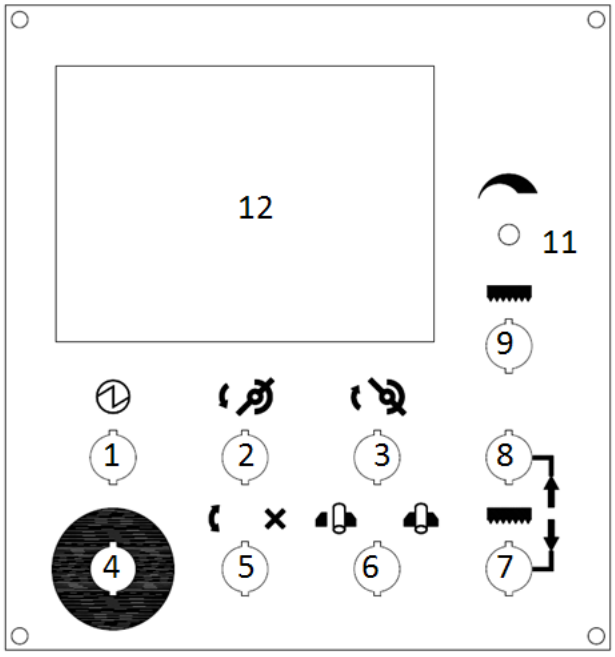
 Always add coolant into water for better mix result.

 Consult your coolant supplier for bandsaw use regarding coolant type and mix ratio.

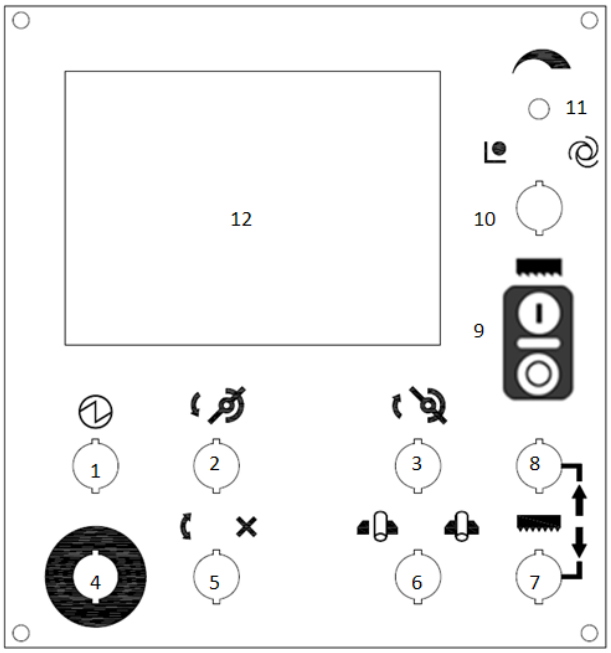
 Before starting a cutting job, make sure there is sufficient amount of coolant in the tank. Check the fluid level through the sight gauge. Please refer to machine specifications in this manual (Section 2) for tank capacity.

CONTROL PANEL

The control panel is located on the top of the electrical box. It includes the following function: power system, hydraulic system, cooling system and the human-machine–interface (HMI). The operator must fully understand the function of each switch and button before operating the machine.



Non-CE Model



CE Model

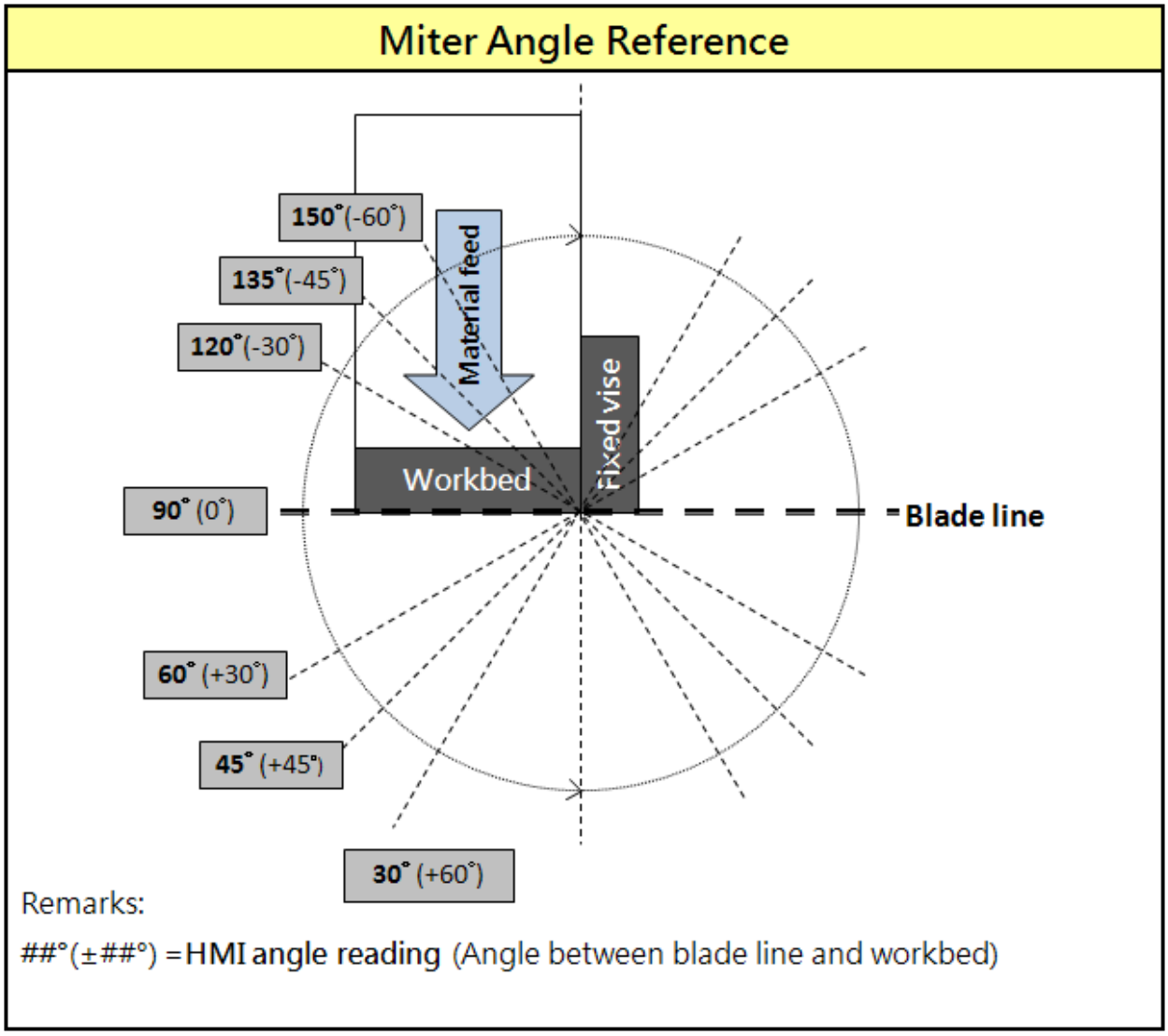
No	Control
1	Power indicator lamp
2	Sawhead swivel forward (counterclockwise) button
3	Sawhead swivel backward (clockwise) button
4	Emergency stop button
5	Sawhead swivel LOCK/UNLOCK switch
6	Vise open/clamp switch
7	Saw bow down button
8	Saw bow up button
9	Saw blade start/stop buttons with built-in lamp (CE model only)
10	Setting/cutting mode key switch (CE model only)
11	Blade speed control knob
12	HMI touch screen

Control Buttons

1. Power indicator lamp

When the lamp is on, it indicates the power to the machine is turned on.

2. Sawhead swivel FORWARD (counterclockwise) button



When this button is pressed, the sawhead will start swiveling forward (i.e. counterclockwise) until the button is released or until reaching the maximum "+" mitering capacity. Press the button and release it when arriving at your desired mitering angle (shown on the HMI touch screen).

This button only works when the following four conditions are met:

- When the machine is switched to setting mode " " (CE model only)
- When the *sawhead swivel lock/unlock* switch is unlocked
- When the saw frame is raised to its upper most position i.e. when the saw frame upper limit switch is activated
- When the vise is open

3. Sawhead swivel BACKWARD (clockwise) button

When this button is pressed, the sawhead will start swiveling backward (i.e. clockwise) until the button is released or until reaching the maximum "-" mitering capacity. Press the button and release it when arriving at your desired mitering angle (shown on the HMI touch screen).

This button only works when the following four conditions are met:

- When the machine is switched to setting mode " " (CE model only)
- When the sawhead swivel switch is unlocked
- When the saw frame is raised to its upper most position i.e. when the saw frame upper limit switch is activated
- When the vise is open

4. Emergency stop button

Press this button to stop the machine in an emergency. When the button is pressed, it brings the machine to a full stop. The button locks when pressed. In order to unlock it, please turn the button clockwise.

5. Sawhead swivel LOCK/UNLOCK switch

Use this selector switch along with the #2 *sawhead swivel forward button* and #3 *sawhead swivel backward button*. Turn the selector switch to the left to allow swiveling. Once your desired mitering angle is reached, switch the selector switch to the right to lock the sawhead.

This selector switch only works when the following two conditions are met:

- When the machine is switched to setting mode " " (CE model only)
- When the saw frame is raised to its upper most position i.e. when the saw frame upper limit switch is activated.

6. Vise OPEN / CLAMP switch

When turning the switch to the left, the vises will open until the operator lets go of the button or until the vises are fully opened. When turning the switch to the right, the vises will clamp until the operator lets go of the button. Turn and hold the switch to the right for three seconds and let go of it; the vise will automatically close until it is fully clamped.

This selector switch only works when the machine is switched to setting mode " "

7. Saw bow down button

When this button is pressed, the saw bow descends until the operator lets go of the button or until the saw bow reaches the lowest position and touches the lower limit switch.

This button only works when the machine is switched to setting mode “ ”

8. Saw bow up button

When this button is pressed, the saw bow rises until the operator lets go of the button or until the saw bow reaches the highest position and touches the upper limit switch. Under cutting mode, press and hold this button for three seconds and the saw bow rises automatically to its highest position.

While pressing the saw bow up button can stop the running blade, please still use the emergency stop button in an emergency.

9. Saw blade start/stop buttons with built-in lamp (CE model only)

The upper button is saw blade start button and the lower button is saw blade stop button. When the upper button is pressed, the built-in lamp comes on and saw blade starts to cut. Press lower button to stop cutting. The blade will start only when the sawhead swivel LOCK/UNLOCK switch is turned to locked position and under cutting mode.

10. Setting/cutting mode switch (CE model only)

This selector switch provides two modes to choose from: setting and cutting. To switch between these modes, a key is required. Please keep the key at a safe place and do not lose it.

	Setting mode	The setting mode provides a safe environment while adjustment prior to cutting is conducted or when machine maintenance is required. Cutting is not allowed in the setting mode.
	Cutting mode	Cutting is allowed only in cutting mode.

11. Blade speed control knob

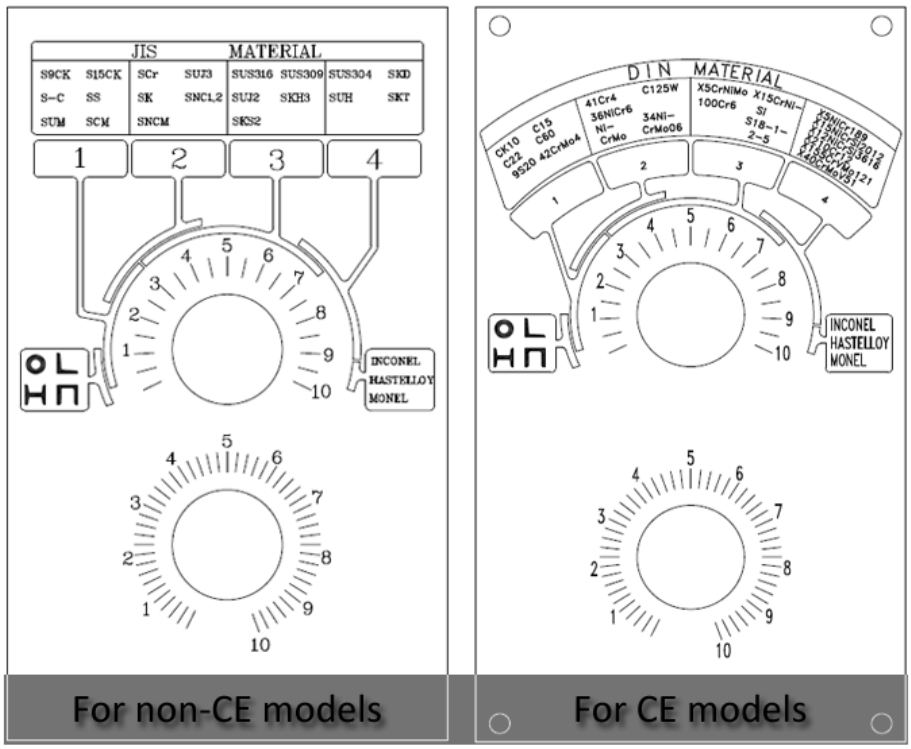
Blade speed is controlled by the inverter located under the workbed. Turning the knob clockwise increases the blade speed.

12. HMI touch screen

Please refer to later section for detailed introduction.

Blade descend pressure and speed

The part of control panel is where cutting pressure and saw bow descend speed can be adjusted.



1. Cutting pressure control knob

- This pressure control knob is used to adjust the cutting pressure of the blade.
- Turning the knob clockwise increases the cutting pressure.
- To obtain a good cutting result, choose the right cutting pressure by turning the knob until it points to your material on the color chart.

2. Blade descend speed control knob

- This knob is used to adjust the descend speed of the saw blade.
- Turning the knob clockwise increases the blade descend speed.
- Blade descend speed is a determining factor to a good cutting time and quality cutoff surface.
- Set the blade descend speed in accordance with the *cutting pressure control* knob.
- Also commonly known as the flow control valve.

Human-machine-interface (HMI) touch screen

This HMI touch screen displays operation messages so that the operator is able to understand the system condition. It also provides different operating modes and selections for the operator to work with. During a cutting job, the operator can still enter the system and make changes to the cutting operation as needed.

Do not wipe or clean the screen with volatile solvents.

Do not overexert pressure on the screen. The touch screen is very sensitive; all buttons on the screen just need a slight touch to operate.

All range parameters in HITECH 5.7” are configured under the “manual” mode.

Please pay attention to the following environment conditions necessary for HITECH 5.7” HMI touch screen to properly operate:

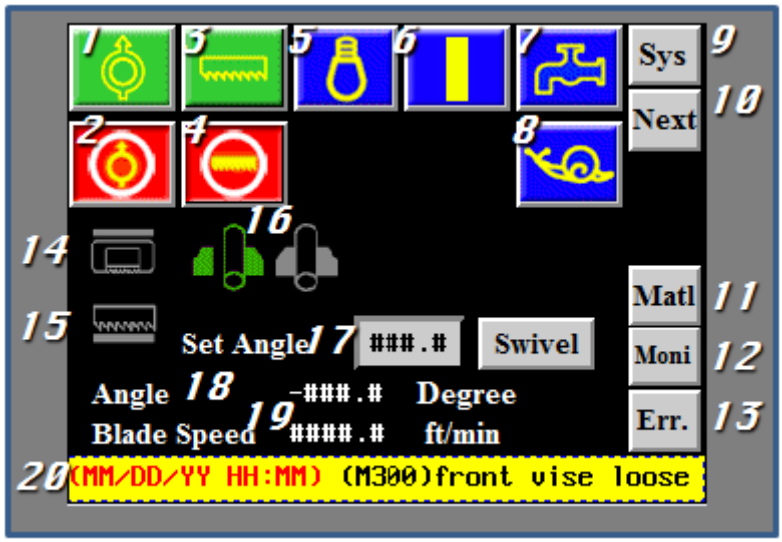
Item	Range
Ambient temperature	5℃ ~ 50℃
Temperature for safe operation	-10℃ ~ 60℃
Ambient humidity	30%~85% RH (No condensation)
Connection	RS422 MMI port
Environment	No condensation and rust

Startup Screen

After the power is turned on, Cosen’s logo will appear as the startup screen, followed by the main operation menu..

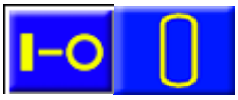
Main control menu

The main control menu includes some operating button that were used on the control panel of the earlier machines. Some convenient functions are added to the page for the operator to better understand the features of the machine. Setting the parameters shown on the screen requires a gentle touch of the finger. You can also look up the parameters or make changes while in the middle of a cut.



Refer to the table below for descriptions of each function.

No	Item	Function	Description
1		Hydraulic start	When the power is turned on, press this button to start the hydraulic motor. A solid yellow icon indicates the hydraulic system has been turned on.
2		Hydraulic stop	Press this button to turn off the hydraulic motor immediately.  When the blade is running, the Hydraulic Stop button is temporarily disabled. You need to press the *saw blade stop* or the *emergency stop* button to stop the blade first.
3		Saw blade start (non-CE model only)	When the work piece is clamped properly, press this button to start cutting. A solid yellow blade icon indicates the blade has been started.  While the blade is running, all controls except the emergency stop button, blade up button, blade speed setting buttons and blade flow control valve on the control panel are temporarily disabled. When cutting completes, all controls on the panel become operable again.
4		Saw blade stop (non-CE model only)	Press this icon to stop the saw blade.

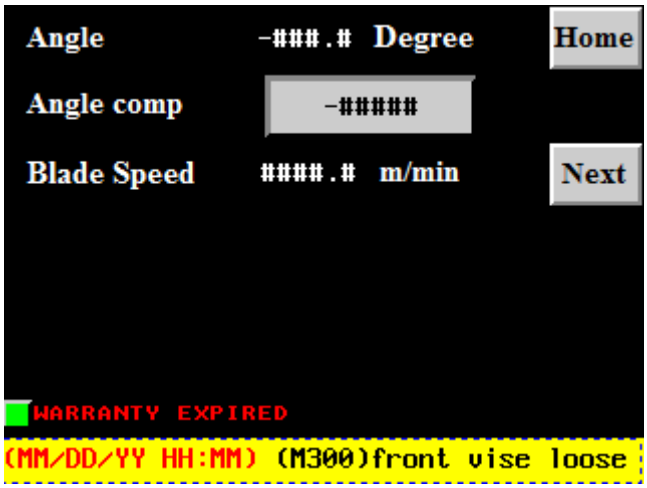
No	Item	Function	Description
5		Projection lamp ON/OFF	Press this button to turn on the projection lamp. A beam of light will be projected on the work piece for alignment. A solid yellow light bulb icon indicates the lamp has been turned on. The projection lamp automatically turns off in 90 seconds to prolong light bulb lifetime.
6		Last cut function ON/OFF	When the  mode is selected, the blade will automatically stop and the hydraulic system will shut down (in 10 seconds) after the current cut is finished.
7		Coolant ON/OFF	Press this button to turn on the coolant pump. A solid yellow faucet icon indicates the coolant pump has been turned on. Press again to turn off the coolant pump. Under cutting mode, a started blade will also start the coolant. Under setting mode, the user can turn on the coolant and use it to wash off chips accumulated on the machine.
8		SLOW/FAST swivel mode	When the slow swivel mode is turned on, the swivel speed will dramatically reduce to help the machine finely position to the mitering angle. Used only when under setting mode.
9		System parameter setting	Press this button to set up system parameters. Password is required. All parameters have been set up by the manufacturer. In order to prevent random change from being made to these parameters and affect cutting precision and machine life, this function is protected with a set of password.
10		Cutting program setting	Press this button to display cutting-related information e.g. blade speed. Information and parameter setups for optional accessories such as blade deviation detector can also be configured in this setup page.

No	Item	Function	Description
			Refer to Cutting Display & Setup in the following page.
11		Material cutting reference	This 2-page reference chart lists out the required blade speed and cutting rate for each different material.
12		PLC monitor	Shows current PLC signals.
13		Error report	Lists a historical report of the errors and the time of occurrence as well as provides troubleshooting support. 6 pages in total.
14		Saw bow up indicator	Indicates that the saw bow has risen to its highest position. At this time, the saw bow icon will turn solid white as an indicator.
15		Saw bow down indicator	Indicates that a cut is completed and the saw bow is at its lowest position. When the blade completes each cut and triggers the lower limit switch, the saw blade icon will turn solid white.
16		Vise status indicator	Indicates if the vises have clamped and secured the workpiece. When the vises have secured the workpiece, the clamping vise icon on the right will turn solid white. Otherwise, the unclamping vise icon on the left will be in solid green.
17		Angle setting	Key-in ### in HMI, press “Swivel” and saw bow inclines to the setting angle.  Saw bow must be at upper most position for swiveling.  Adjust the angle of saw bow by manual, actual angle and angle display on the screen need to match for the machine to start cutting.
18		Miter angle display	Displays the current angle the saw bow is swiveled at.
19		Blade speed display	Displays current blade speed.

No	Item	Function	Description
20	(yellow highlight)	Error display	Displays error messages in the order of occurrences; press the message for three seconds to clear the messages. **Error messages must be cleared for the machine to continue to operate normally.**

NEXT *Cutting status display & setup*

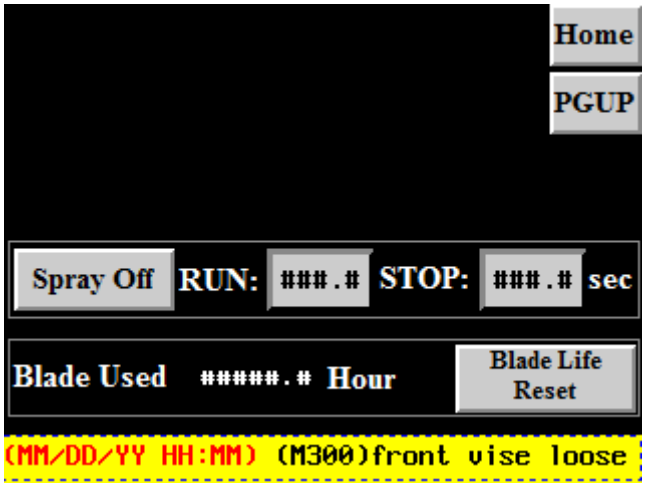
When cutting is in operation, press NEXT to enter cutting status display and setup page.



Page 1 – cutting status display 1

- This page shows the following information (from top to bottom):
  - Angle: Mitering angle
  - Angle comp: Compensation value for angle adjustment.

    The compensation value has been preset at "0" at time of manufacturer. Please do not make random change to this figure as doing so will effect mitering accuracy. Shall mitering accuracy go off, users can use this function to compensate angle differences. Please consult Cosen at a time like this.
  - Blade speed
  - Error messages (highlighted in yellow; can be cleared by pressing down for three seconds)
- Press Home to return to the main control menu.
- Press NEXT to go to the next setup page.
- The green square light on the bottom left corner indicates the warranty status of the HMI touch screen. Warranty is one year and starts counting after 70 hours of operation after the machine is shipped. Warranty status light turning to red indicates the HMI touch screen has expired.

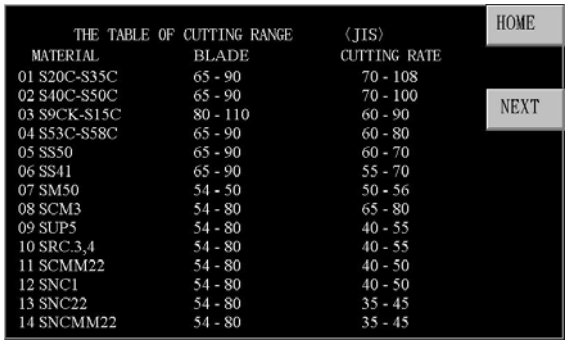


Page 2 – cutting status display 2

This page shows the following information (from top to bottom):

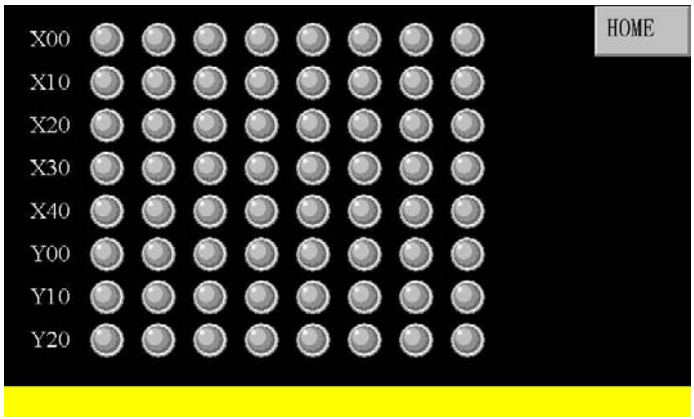
- Spray Off -Press "Spray On/Off" button to turn on and off the spary function right away. RunSet up the "spray on" timer. Stop Set up the "spray off" timer.
- Blade Used - Current blade life in hours
- Blade Life Reset - Reset the blade life to zero
- Error message (bottom of page)
- Press Home to return to the main control menu.
- Press PGUP to go back to the previous setup page.

Mtrl *Material cutting reference*



- This 2-page reference chart lists out the required blade speed and cutting rate for each different material.

Moni *PLC Monitor*

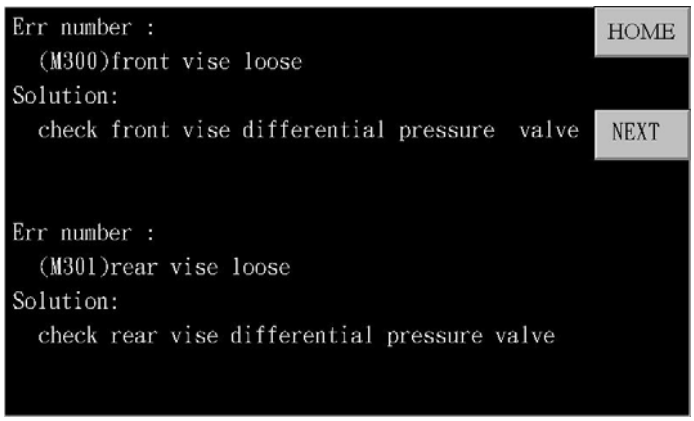


- Shows all signals of the PLC system.

Err *Error report*

Page 1 – error report

- Lists a historical report of the errors and the time of occurrence.
- Press Home to return to the main control menu.
- Press NEXT to go to the troubleshooting support page.



Page 2 – troubleshooting

- Provides suggestions on troubleshooting. 6 pages in total.
- Also refer to below table for error codes, descriptions and solutions.
- Press Home to return to the main control menu.
- Press NEXT to go to the troubleshooting support page.

Error Code	Error Description	Solution
M300	Front vises not clamping	Check if the queen valve works
M301	Rear vises not clamping	Check if the queen valve works
M303	Lower limit switch error	Check if the lower limit switch works
M304	Hydraulic motor not starting	Check if the hydraulic motor works
M306	Broken blade detected	1. Check if the speed switch works 2. Check if the blade is broken
M308	Left safety door abnormal	1. Check if the left safety door is shut properly 2. Check if the left safety door limit switch works
M309	Right safety door abnormal	1. Check if the right safety door is hut properly 2. Check if the right safety door limit switch works
M312	Quick approach bar abnormal	Check if the quick approach limit switch works
M313	OL1 abnormal	Check if the blade motor overload relay has tripped
M314	OL2 abnormal	Check if the hydraulic motor overload relay has tripped
M315	OL3 abnormal	Check if the coolant pump motor overload relay has tripped
M316	Saw bow upper limit abnormal	Check the upper limit switch works
M352	Front vise clamping error	1. Place new material 2. Check if the vise queen valve works 3.Check if the “no material parameter” is too low
M357	Saw bow descending error	1. Check if the descend solenoid valve is stuck 2. Check the quick approach bar works 3. Check if the quick approach bar limit switch works
M358	Saw bow ascending error	1. Check if the ascend solenoid valve is stuck 2. Check the quick approach bar works 3. Check the quick approach bar limit switch works
M361	No material	1. Place new material 2. Check if the vise queen valve works 3.Check if the “no material parameter” is too low
M363	PLC battery voltage too low	Replace PLC battery

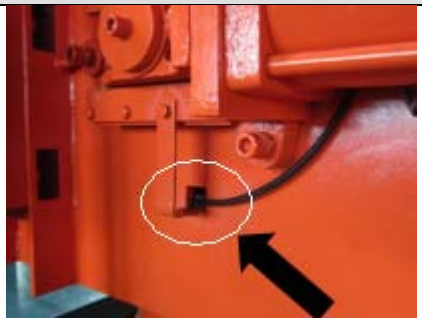
STANDARD ACCESSORIES

Blade tension device

- This blade tension device equipped with hydraulic cylinder provides appropriate tension to the saw blade.
- To tighten the saw blade, turn the selector to  .
- Upon saw blade breakage, the safety device will activate and automatically stop all machine operation.
- To change the blade, turn the handle to  to release saw blade tension.

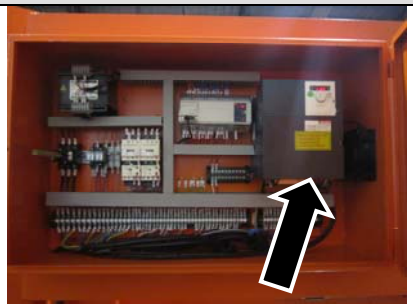
Never adjust blade tension while the blade is running.

Blade speed/motion detector



- Besides detecting the blade speed, the speed/motion detector also functions as a safety device.
- The speed/motion detector protects operators and the machine by preventing blade overloads and consequent damages if a saw blade breaks or skids.
- Once blade breakage or slippage is detected, the drive wheel will stop in 10 seconds.

Inverter



This inverter is installed inside the machine base. It is used to control and stabilize the saw blade speed during cutting.
To adjust blade speed, use the *blade speed control* knob on the control panel.

Voltage used should not exceed AC 460V.

Note:

1. Make sure the terminal points are connected.
2. Make sure the ambient temperature is within acceptable range and keep the surroundings well ventilated.
3. Keep the inverter away from dust.
4. For repair or maintenance, please contact your local agent.

Gear reducer

The specially designed gear reducer can work toward your preset blade speed and torque.

Please refer to Chapter 8 for information on maintenance.

Coolant Pump

The coolant pump supplies coolant to cool off cutting temperatures during cutting. Also, it can be used to wash off chips.

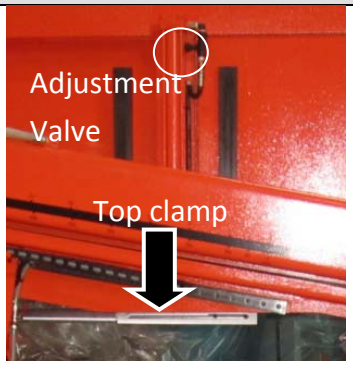
Wire Brush

The wire brush is driven by the belt to rotate at the same speed as the blade motor. It removes the metal chips on the saw blade teeth so that blade life can be extended.

Keep hands away from the transmission shaft and the brush while the wire brush is running.

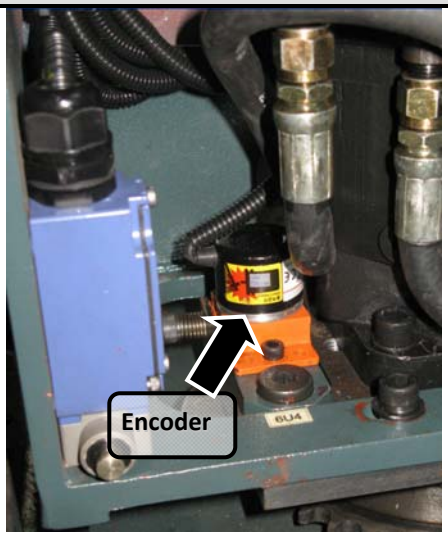
Turn off the hydraulic motor or the main power switch before performing maintenance or cleaning on the wire brush drive system.

Hydraulic top clamp device



- The device is installed on the saw bow.
- Used for cutting bundles, the top clamp will hold the material tightly so as to avoid material sliding during cutting.
- Use the adjustment valve to adjust its speed during clamping/unclamping.
- When the vise moves, the top clamp will act in synchronization.

Mitering Angle Encoder



Located inside the pivot base, the mitering angle encoder comes into work as the operator executes hydraulic mitering by giving a precise angle reading.

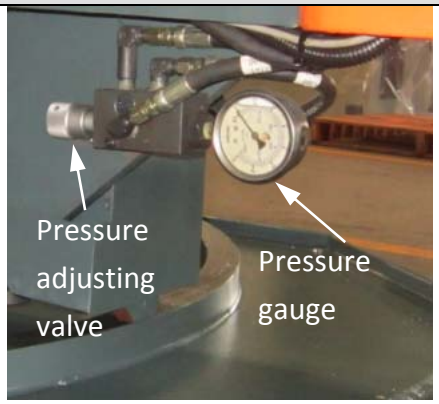
The encoder is a high-precision electronic device. It has been factory-adjusted before shipment. Please do not make any random change to it.

Avoid high impact on the device.

The reset point is set at the point of 30° as indicated below.

OPTIONAL ACCESSORIES

Vise Pressure Regulator

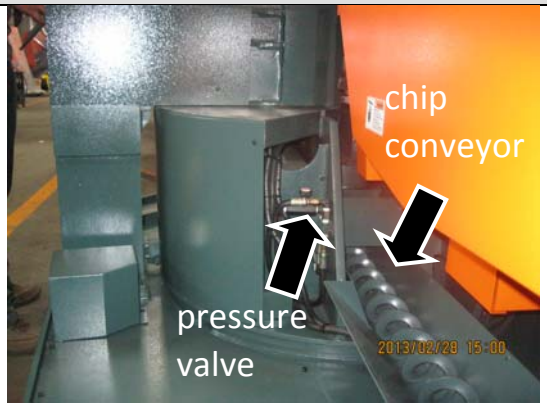


- This adjustment valve is used to control vise pressure.
- Adjust vise pressure based on the material of your workpiece.
- When cutting pipes or soft materials, reduce vise pressure to prevent exerted pressure from damaging the workpiece shape or exterior.

Do not adjust vise pressure at any time during cutting.

Vise pressure should never be lower than 8 kg/cm^2.

Chip conveyor



Chip conveyor is a spiral device to bring chips out during cutting. When the hydraulic system is turned on, the user can adjust the conveying speed via the pressure valve.

As a regular maintenance, remove the chip conveyor and clean all chip deposits inside.

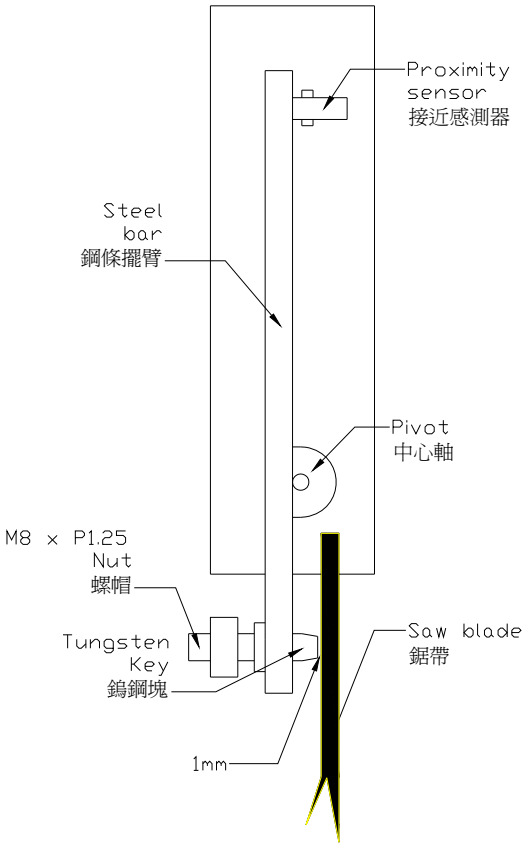
Vibration Damper

Vibration damper roller is installed on the left saw arm. It reduces the high frequency noise while cutting large work piece.

Blade Deviation Detector

This device detects blade deviation. If the blade deviates beyond the preset range, the machine will stop automatically. When this device is installed, the cutting width will be reduced. The blade deviation detected value and preset values are displayed on the control panel screen.

Deviation Detector Calibration Procedure



How to Adjust

1. Unclamp the tungsten carbide inserts.
2. Loosen the nut (M8 x P1.25).
3. Adjust the nut until the blade deviation value shown the display returns to zero.
4. Tighten the nut.
5. Clamp the tungsten carbide inserts.

How to Check

1. When the carbide inserts are relieved, the distance between the saw blade and the proximity sensor set should be about **4 mm.**
2. When the carbide inserts are clamped, the distance between the saw blade and the proximity sensor set should be about **1 mm.**

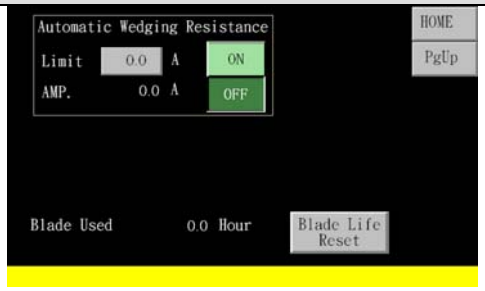
Adjust the nut so that when the steel bar touches the proximity sensor, the blade deviation displayed on the control panel is zero.

Make sure the saw blade is set up square at 90° right angle.

2M Roller Table

- The optional 2M roller table supports the work material and ensures the material is fed in smoothly.

Blade protection device

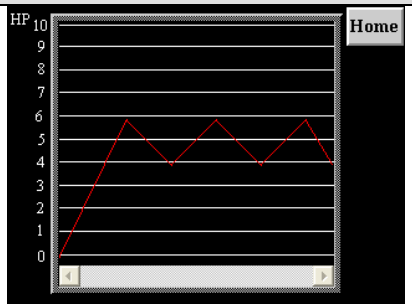


- This device is for blade protection.
- When electric current value is greater than default setting value, saw bow automatically rises to avoid blade damage.

Spray device

- This device is for cutting aluminum.
- Spray on blade during cutting period.
- Easy to control and clean the chips on the blade.

V-Drive



- It increases cutting efficiency and reduces vibration.

Projection Light

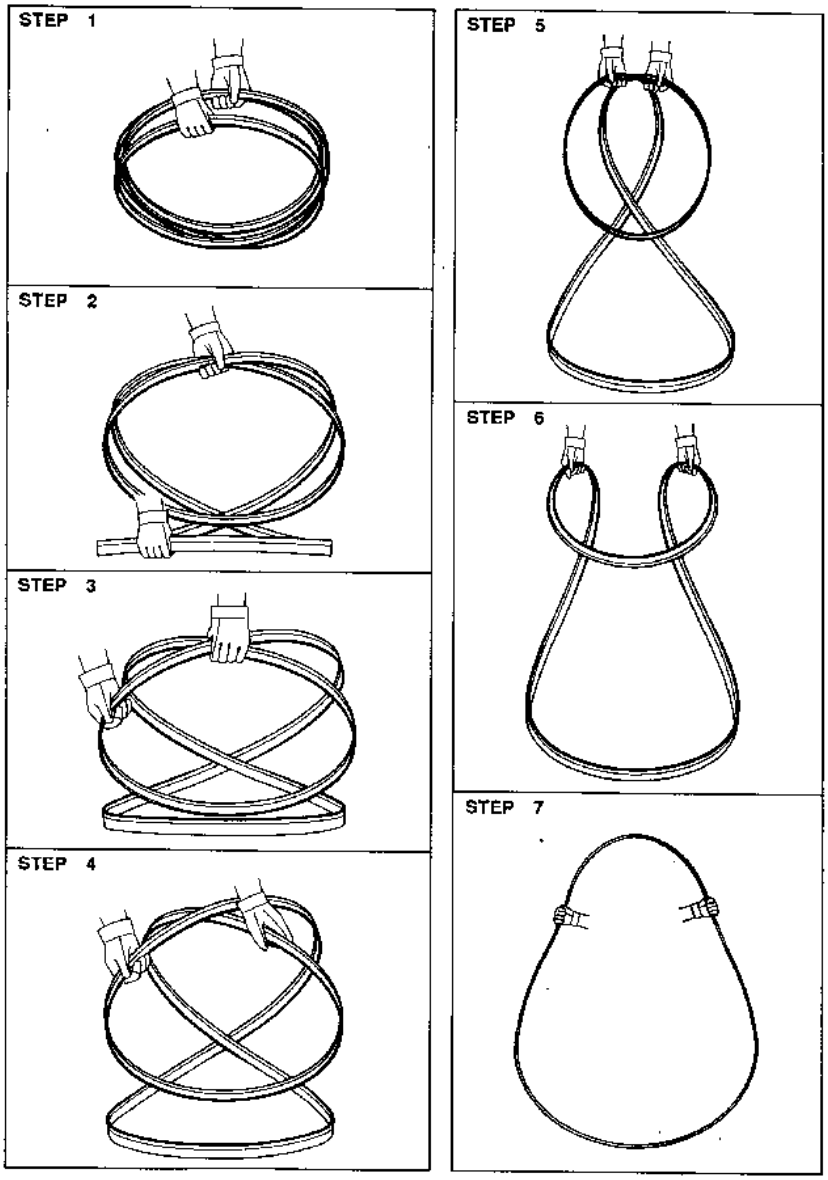
Activate the switch to project a beam of light on the work piece. The operator can use the light as reference to adjust the cutting dimension of the work piece. The light will shut off automatically within 90 seconds.

UNROLLING & INSTALLING THE BLADE

Always wear leather gloves and protection glasses when handling a blade.

Unrolling the blade

Please follow the procedures illustrated below.

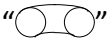


Installing a new blade

Step 1 - Select the most suitable saw blade for your workpiece considering the size, shape and material.

Step 2 - Turn on the machine power by switching to *ON* and turn on the hydraulic system.

Step 3 - Press the *saw bow up* button and elevate the saw bow to an appropriate height.

Step 4 - Turn the tension controller handle from "  " to "  " position to release tension. The idle wheel will then move slightly toward the direction of the drive wheel.

Step 5 - Open the idle and drive wheel cover.

Step 6 – Loosen the wire brush assembly fixed screws and pull the wire brush away from the blade.

Step 7 – Loosen the left and right carbide inserts. Detach the old blade from below the left and right guide seat and then pull the entire blade out.

Step 8 - If necessary, clean the carbide inserts before installing a new saw blade.

Step 9 - Place the new blade around the idle wheel and the drive wheel

Step 10 - Insert the blade into the left and right tungsten carbide inserts. The back and the sides of the blade need to be touching the inserts as well as the adjacent rollers.

Step 11 - Place the blade to the drive wheel and press the back of the blade against the flange of the drive wheel.

Step 12 - Make sure the back of the blade is also pressed against the flange of the idle wheel.

Step 13 - Turn the tension controller handle to [] position to obtain blade tension.

Step 14 - Make sure the sides of the blade are in close contact with the carbide inserts and then tighten the left and right carbide inserts.

Step 15 – Gently close the idle and drive wheel covers.

Step 16 - Press the *saw blade start* button to start the blade. Allow the blade to run for a few rotations then press the *saw bow up* button to elevate the saw bow. Open the wheel covers and make sure the blade has not fallen off the drive and idle wheels. If the blade has shifted, follow the same procedure to reinstall the blade again.

Step 17 - Adjust wire brush to a proper position. Refer to *Adjust wire brush* in this section.

ADJUSTING WIRE BRUSH

Follow these steps to adjust wire brush to appropriate position:

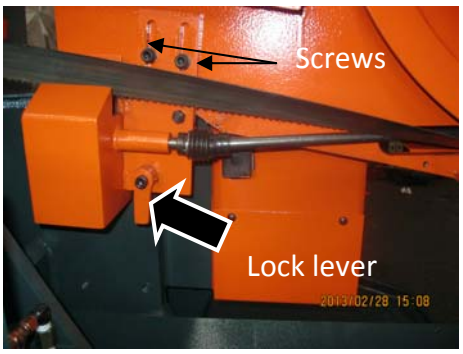
Step 1 – Open the drive wheel cover.

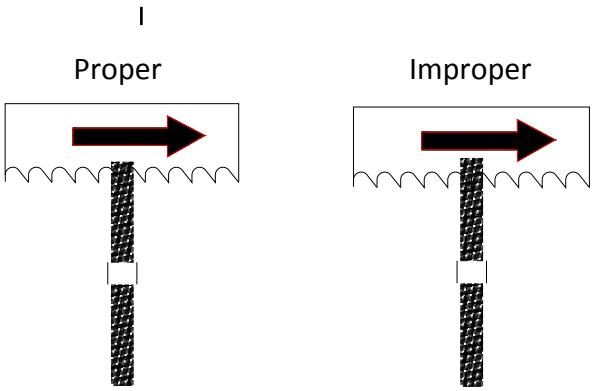
Step 2 – Loosen the lock lever.

Step 3 – Adjust the screw to make brush move up / down until it makes proper contact with the saw blade (see below illustration).

Step 4 – Tighten the lock lever.

Step 5 – Close the drive wheel cover.





PLACING WORKPIECE ONTO WORKBED

Step 1 – Press the s*aw bow up* button and elevate the saw bow until it reaches to its highest point.

Step 2 – Turn the *vise open/clamp* switch to the left to open vise.

Step 3 – Carefully place the workpiece onto the work feed table.

POSITIONING WORKPIECE FOR CUTTING

Follow these steps to position your workpiece:

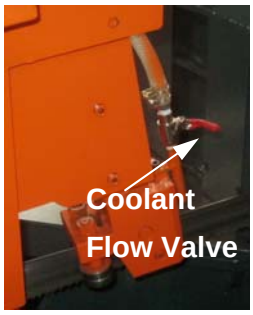
Step		Action
vise clamp material	*1*	Turn the *vise open/close* switch to the right until the workpiece is securely clamped.
confirm cutoff point	*2*	Press the *saw bow down* button to lower the saw bow until it descends to just about 10mm (0.4 inch) above the workpiece.
precision position	*3*	Adjust until the cutoff point on the workpiece aligns with the blade line.

ADJUSTING BLADE SPEED

Step 1 – Set the flow control to “0” position.
Step 2 – Press the *saw blade start* button to start the blade.
Step 3 – Turn the *blade speed control knob* to adjust the blade speed. The blade speed should be adjusted based on the size and the material of the workpiece.

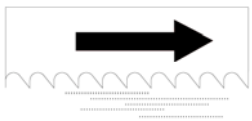
ADJUSTING COOLANT FLOW

Step 1 – Press the *saw blade start* button to start the saw blade drive motor.
Step 2 – Press the *saw bow down* button to lower the saw bow.
Step 3 – Use the flow control valve (shown below) to adjust the amount of fluid flowing to the cutting area.



Adjust the flow amount if you observe the following changes to the chips generated from cutting.

If the chips are sharp and curved, increase the coolant flow amount.



If the chips are granulated, decrease the coolant flow amount.

BREAKING-IN THE BLADE

When a new saw blade is used, be sure to first break in the blade before using it for actual, extended operation. Failure to break in the blade will result in less than optimum efficiency. To perform this break-in operation, the following instructions should be followed:
Step 1 - Reduce the blade speed to one-half of its normal setting.
Step 2 - Lengthen the cutting time to 2-3 times of what is normally required.
Step 3 - After the break-in operation is completed, set all parameters back to normal settings.

TEST-RUNNING THE MACHINE

Test-running this machine can ensure good machine performance in the future. We suggest you run the following tests on the machine before first use:

Testing machine performance:

Turn on the power and run a basic performance test after you finish installing the machine. Follow these steps to test machine performance:

Step 1 – Disassemble shipping brackets and bolts.

Step 2 – Install roller table (optional).

Step 3 – Turn on the relay switch in the control box.

Step 4 – Elevate the saw bow. (If your coolant pump is in reverse and the machine cannot run, please change the electrical phase.)

Step 5 – After the saw bow ascends, extend the quick approach device(optional).

Step 6 – Remove the rust-prevention grease with cleaning oil or kerosene.

Step 7 – Start the coolant pump.

Step 8 – Test these functions under manual mode:

- vise clamping/unclamping
- saw bow ascending/descending
- feeding forward and backward.

CUTTING OPERATION

Step 1 – Check before you cut

- **Power:** Check the voltage and frequency of your power source.
- **Coolant:** Check if you have sufficient coolant in the tank.
- **Hydraulic:** Check if you have sufficient (at least two-thirds or higher) hydraulic oil.
- **Workbed:** Check if there is any object on the feeding bed that may cause interference.
- **Blade:** Check the blade teeth and make sure there is no worn out teeth along the blade.
- **Light:** Check the work lamp or laser light (optional) and make sure there is sufficient lighting.
- **Roller:** Check all the rollers on the front and rear workbed can roll smoothly.
- **Saw bow:** Check the saw bow to see if it can be elevated and lowered smoothly

Step 2 – Place your workpiece onto the workbed manually or by using a lifting tool e.g. a crane.

 Before loading, make sure the vises are opened to at least wider than the width of the workpiece.

Step 3 – Position your workpiece.

Step 4 – Clamp the workpiece.

Step 5 – Turn the *cutting pressure control* knob to adjust blade cutting pressure according to the material.

Step 6 – Adjust *blade descend speed control* knob to obtain a suitable blade descend speed for your material.

Step 7 – Start running the blade.

 Before you start cutting, check again that there is no other object in the cutting area.

Step 8 – While the blade descends, adjust the blade speed if necessary. You can do so by turning the *blade speed control* knob, clockwise to speed up and counterclockwise to slow down. The blade speed is displayed in the HMI touch screen.

Step 9 – Select the proper cutting condition according to different material.

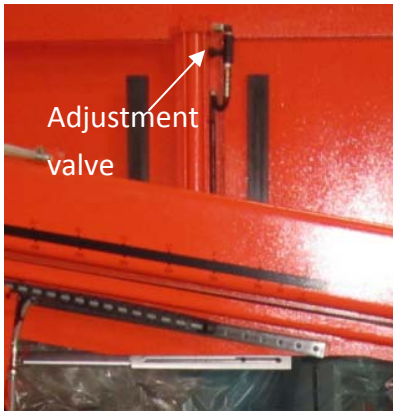
Step 10 – After the entire cutting job is completed, elevate the saw bow to the top and open the vises to remove the workpiece.

Step 11 – Clean the workbed by removing chips and cutting fluids.

Step 12 – Lower the saw bow to a proper position then turn off the power.

USING TOP CLAMP FOR BUNDLE CUTTING

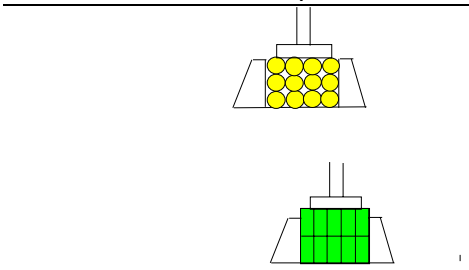
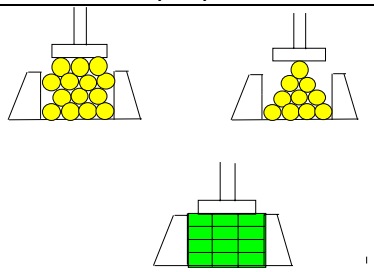
Step 1 – Open the adjustment valve of top clamp.



Step 2 – Position the workpiece for bundle cutting.

Note the allowable clamping width and height. (Refer to *Section 2 – General Information, Specifications*)

Proper and improper stacking of workpieces

Proper	Improper
	

Step 3 – Install the bundle-cutting on the work bed. The purpose of bundle cutting is to prevent cut pieces from scattering across the work bed.

Step 4 – For subsequent cutting procedures, refer to the instructions under cutting operation.

TERMINATING A CUTTING OPERATION

- To terminate a cutting operation, press either the *saw bow up* button or the *saw blade stop* button.
- The saw blade will stop running when the *saw bow up* button or the *saw blade stop* button is pressed.
- The machine will stop automatically when an error occurs. The error message will be shown on the screen.

Section 5

ELECTRICAL SYSTEM

ELECTRICAL CIRCUIT DIAGRAMS

The following are electrical circuit diagrams of the system:

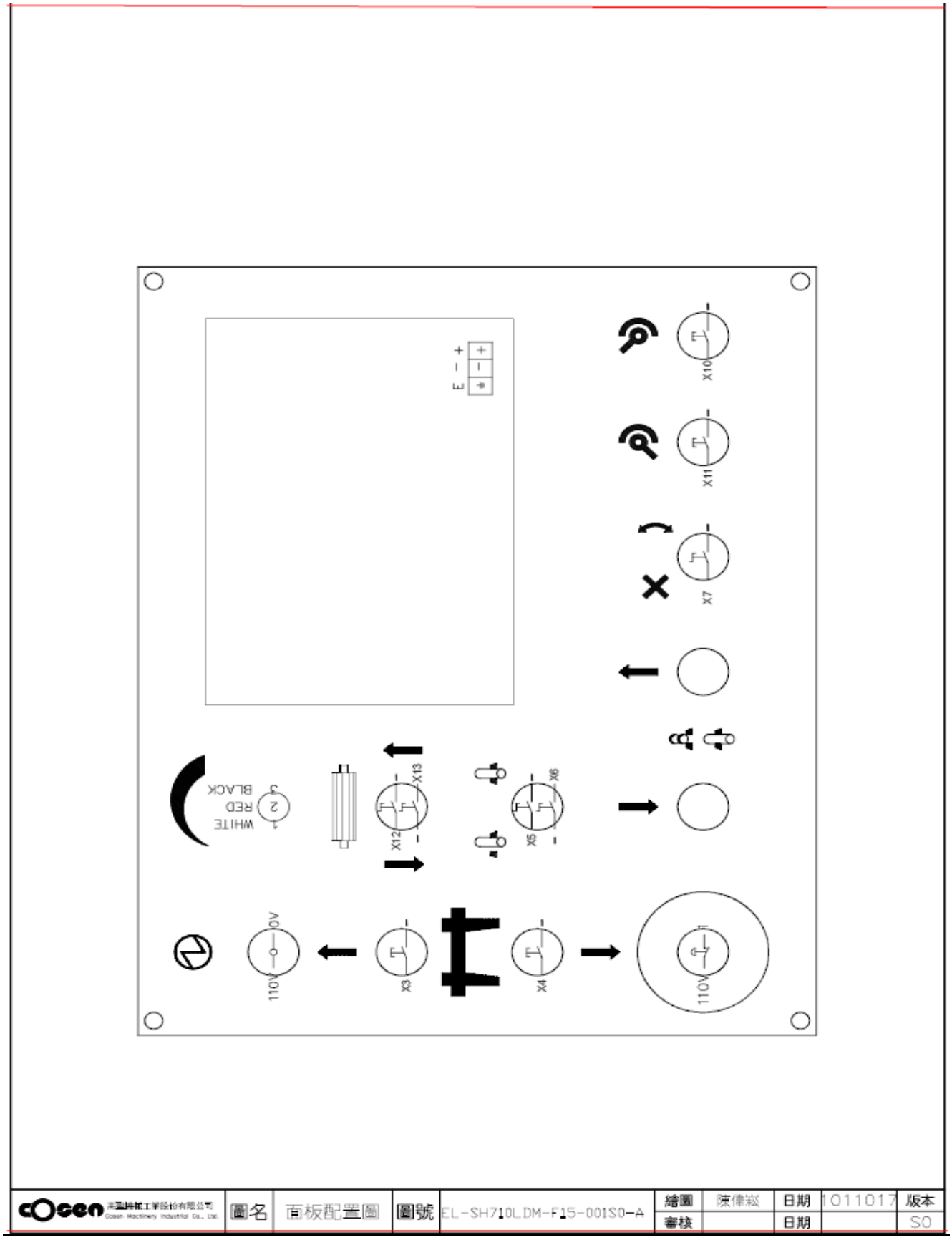


Fig.5-1 Control panel layout

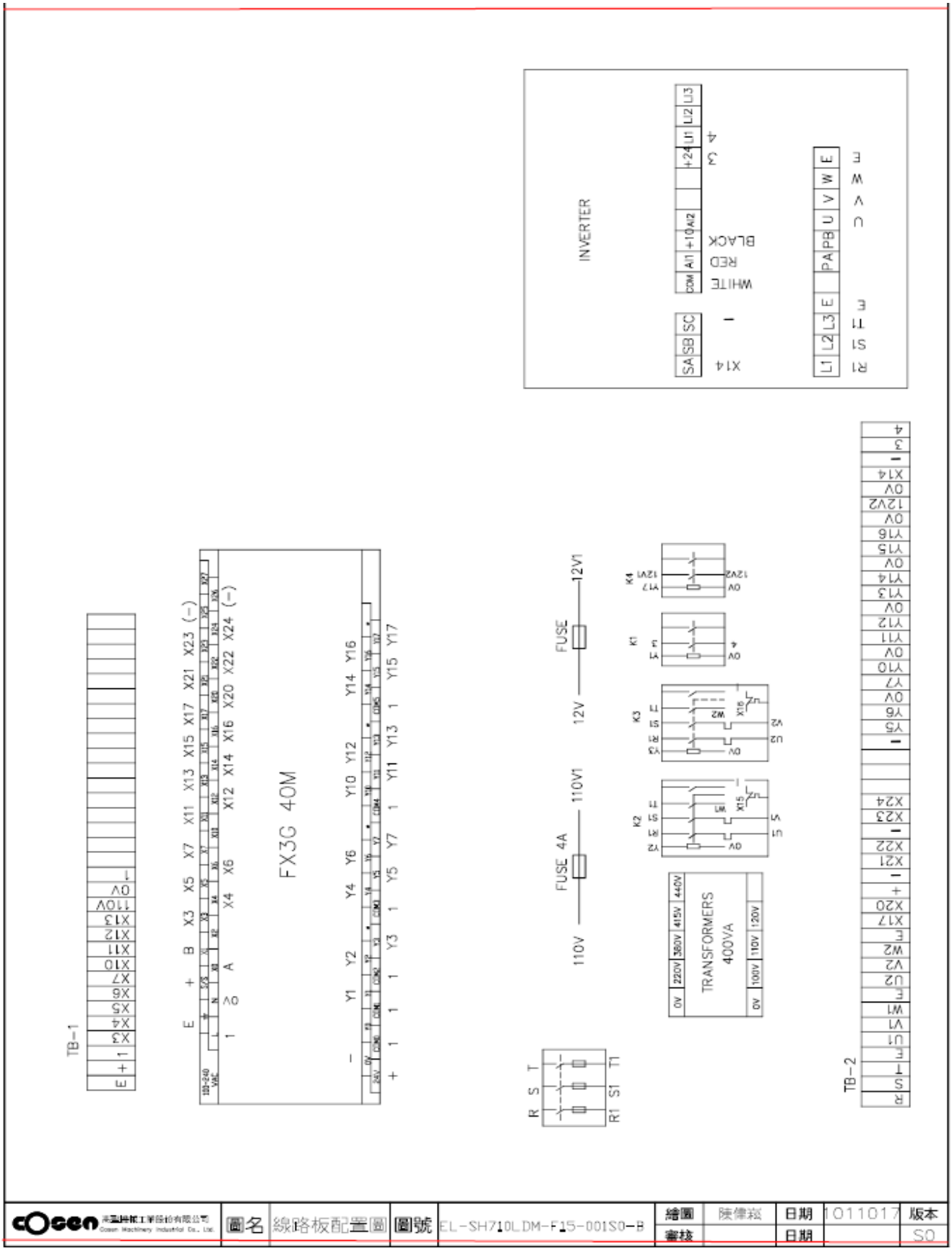


Fig.5-2 Circuit board layout

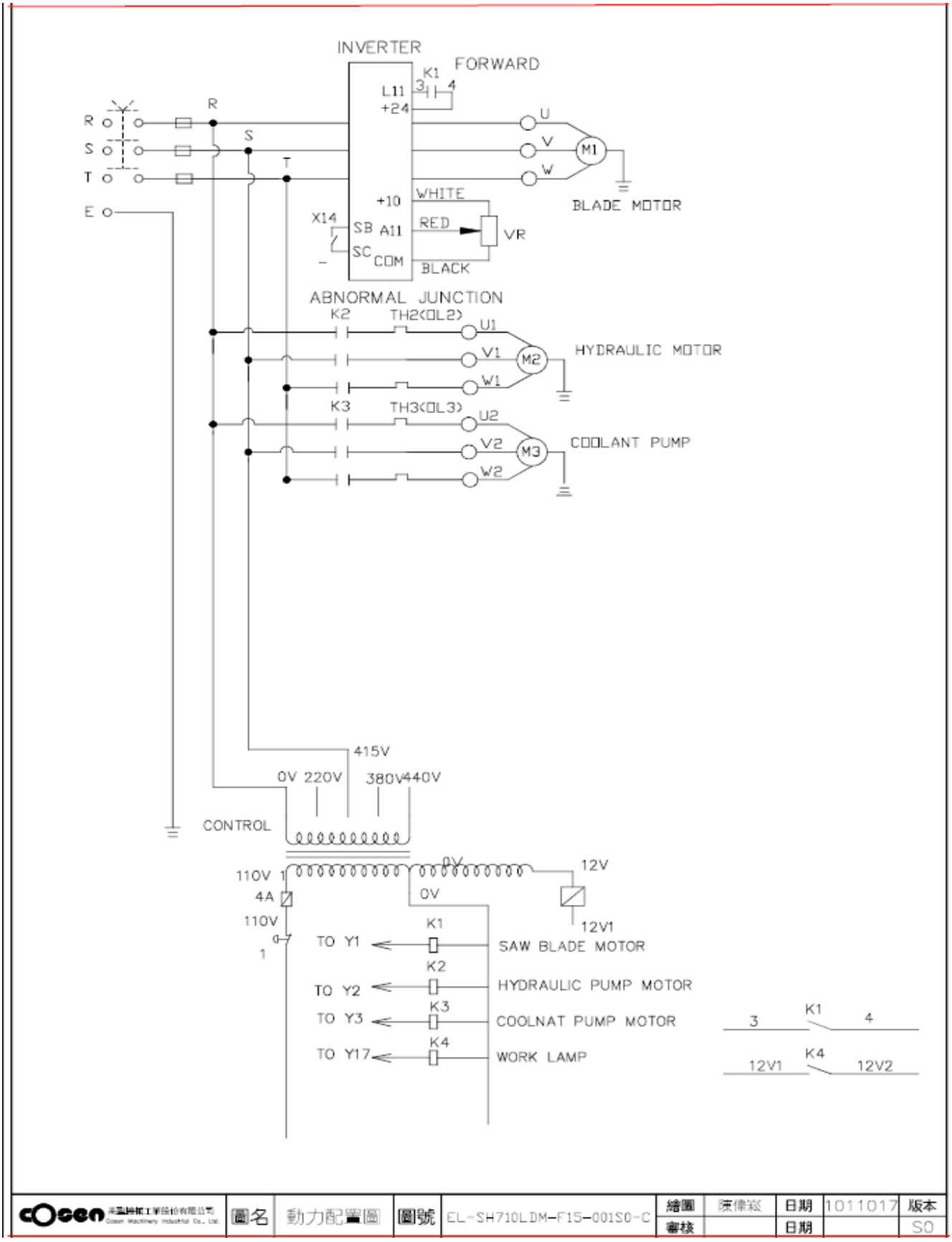


Fig.5-3 Power supply layout

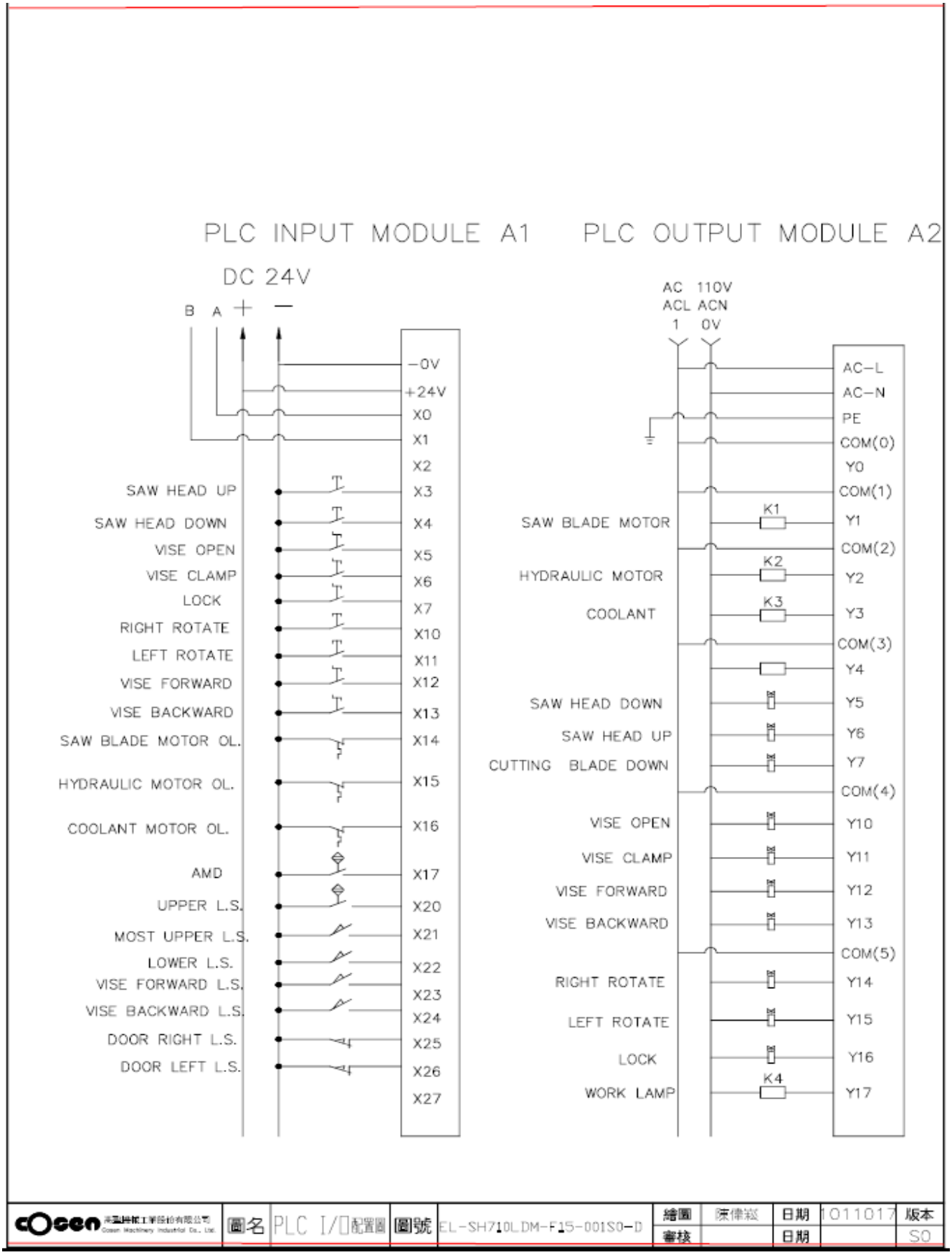


Fig.5-4 PLC I/O layout

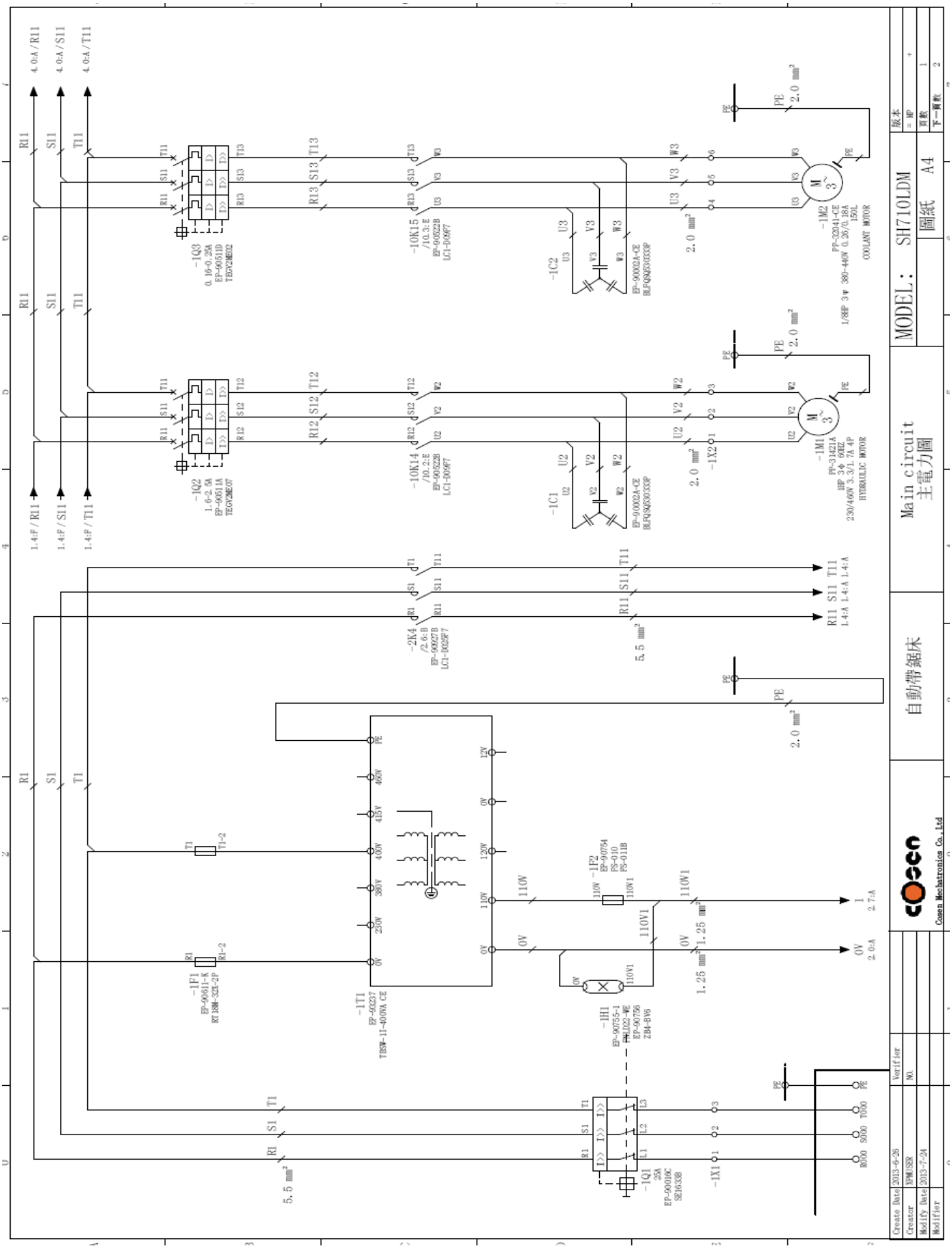


Fig 5-5 Main circuit layout (CE)

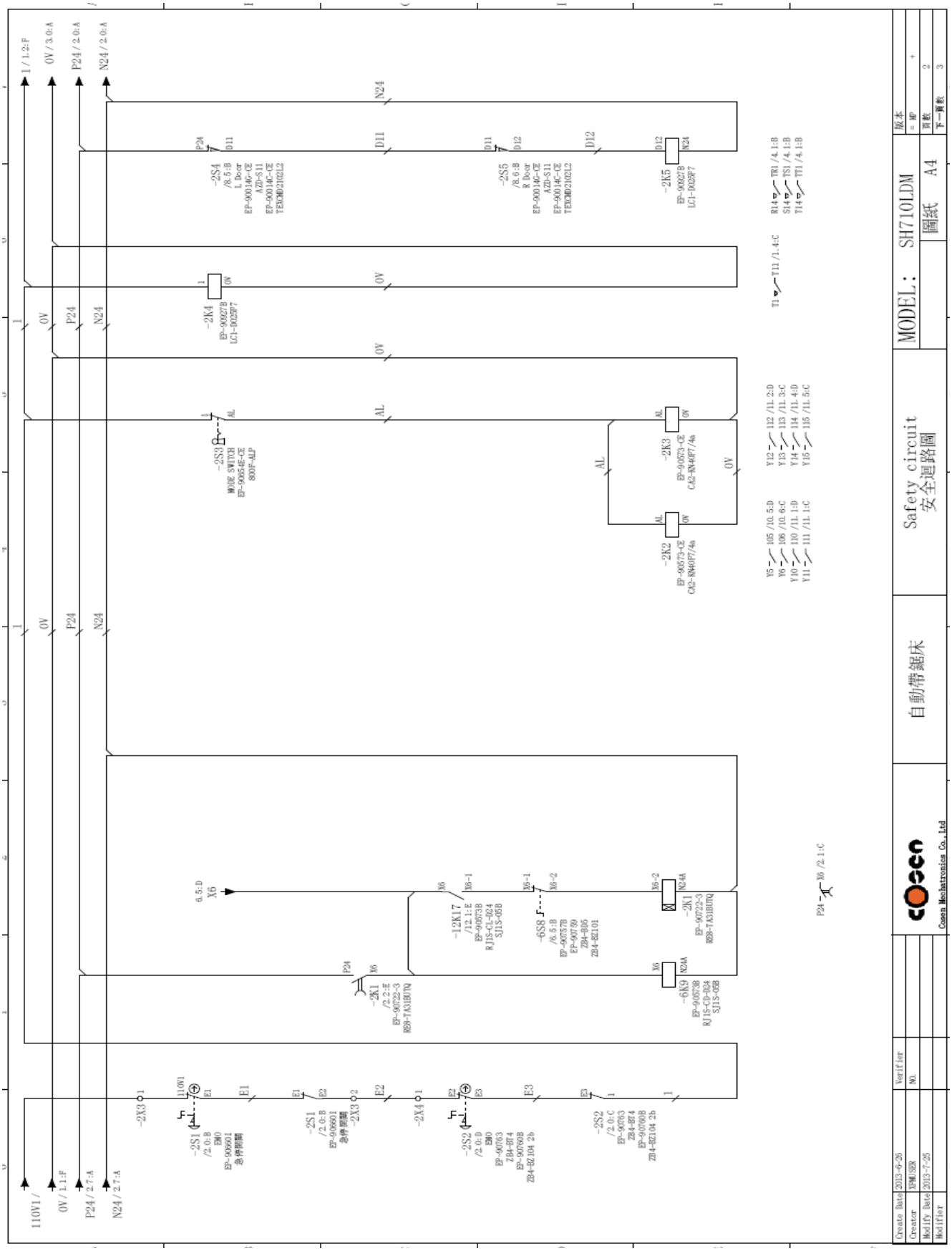


Fig 5-6 Safety circuit layout (CE)

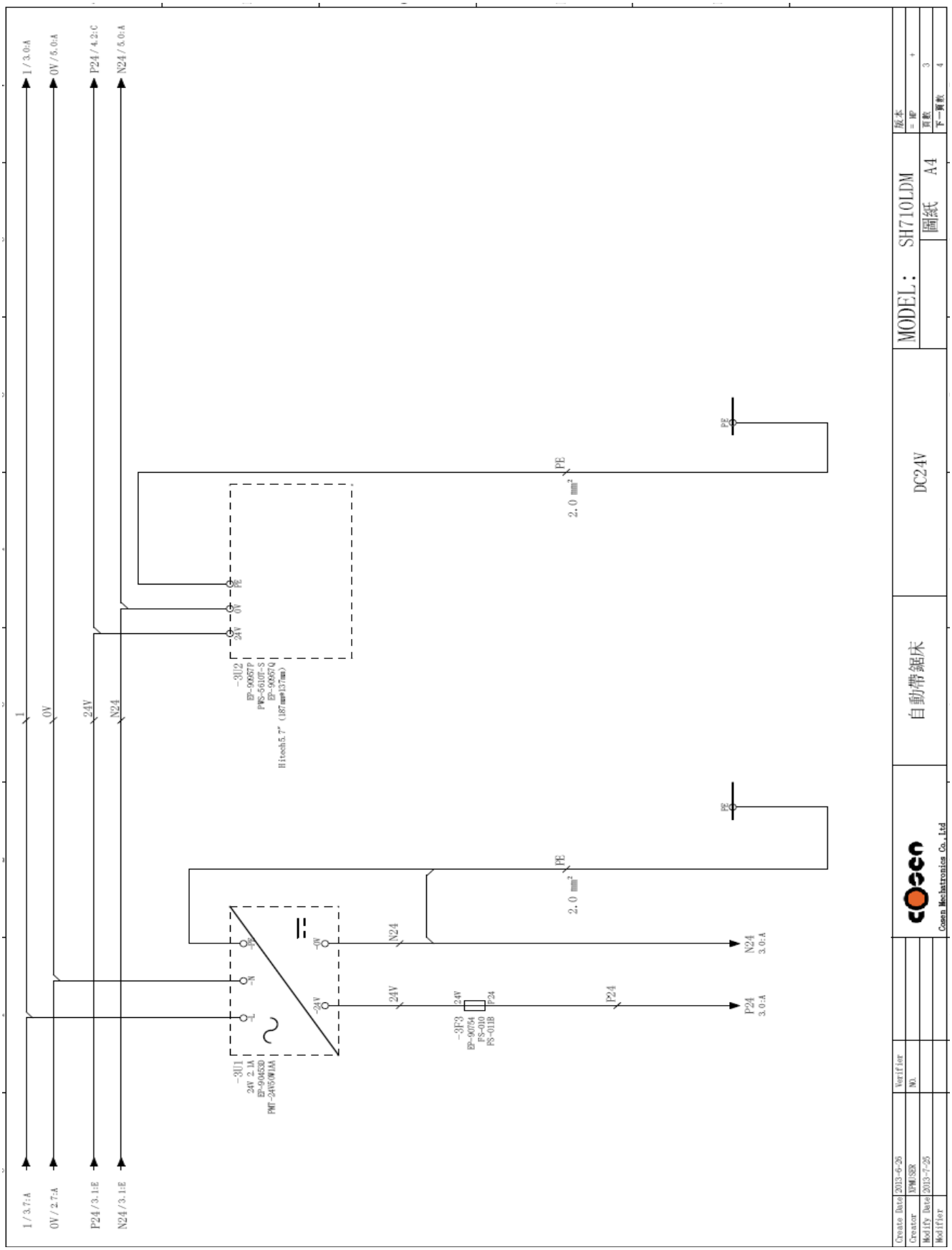


Fig 5-7 DC24V layout (CE)

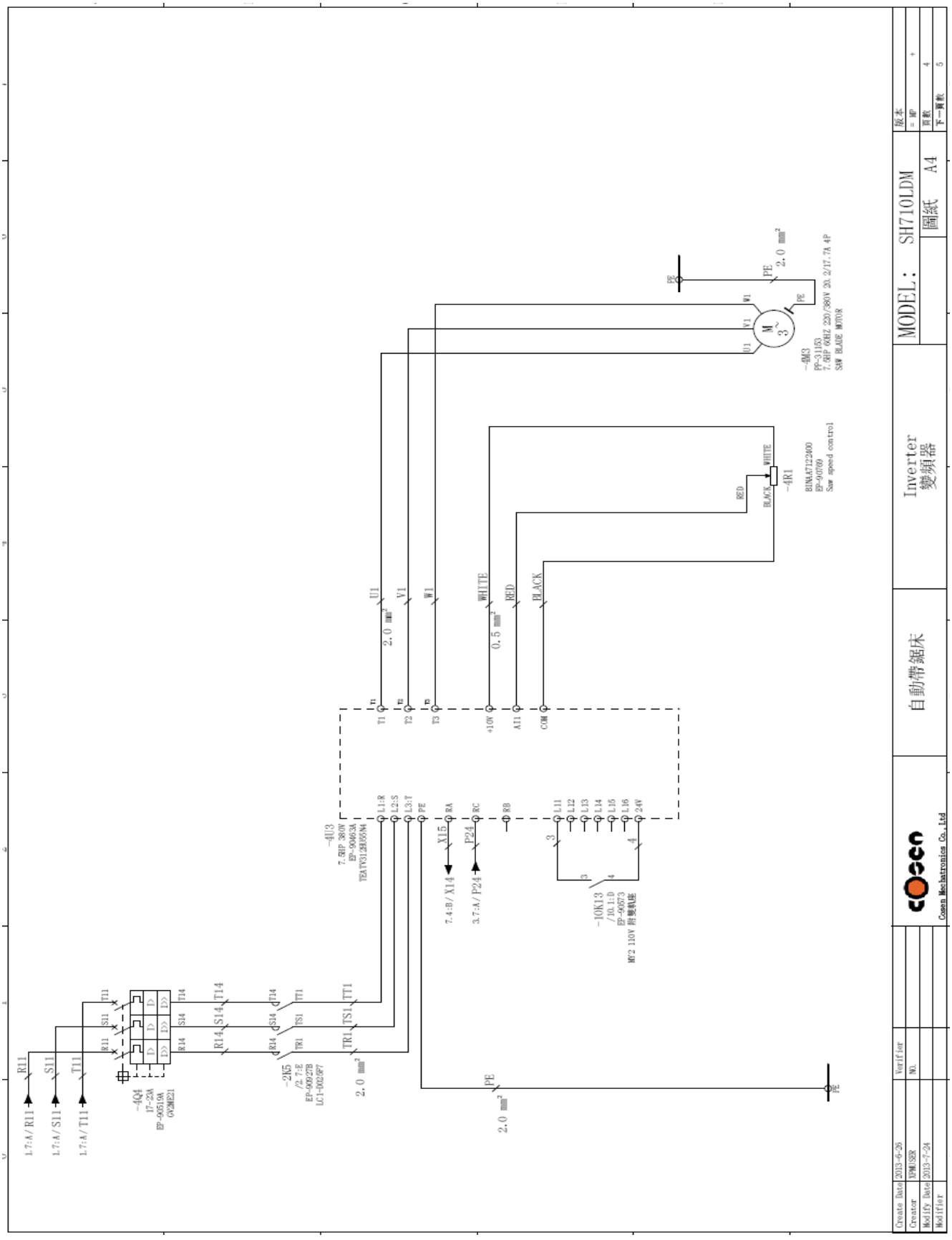


Fig 5-8 Inverter layout (CE)

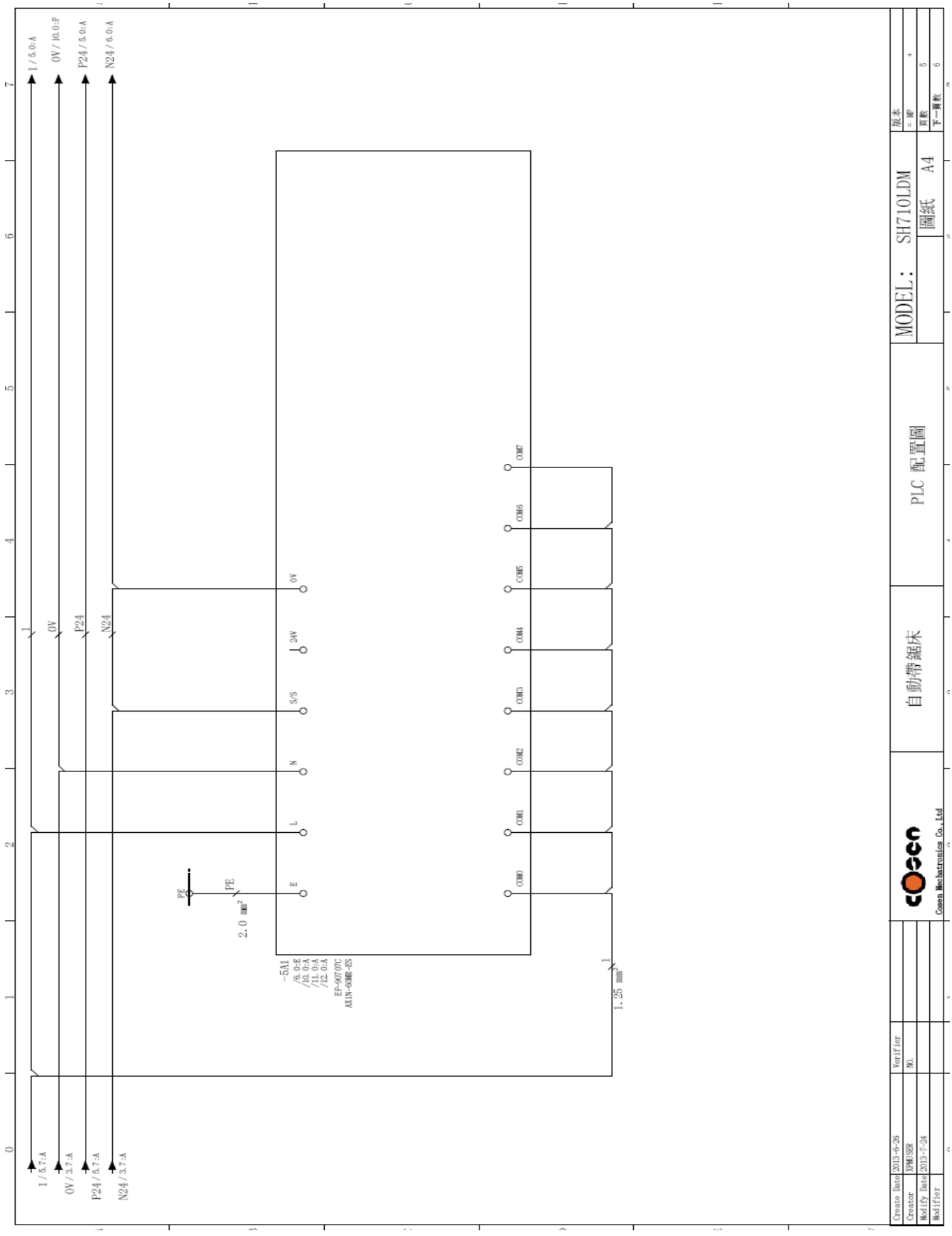


Fig.5-9 PLC layout (CE)

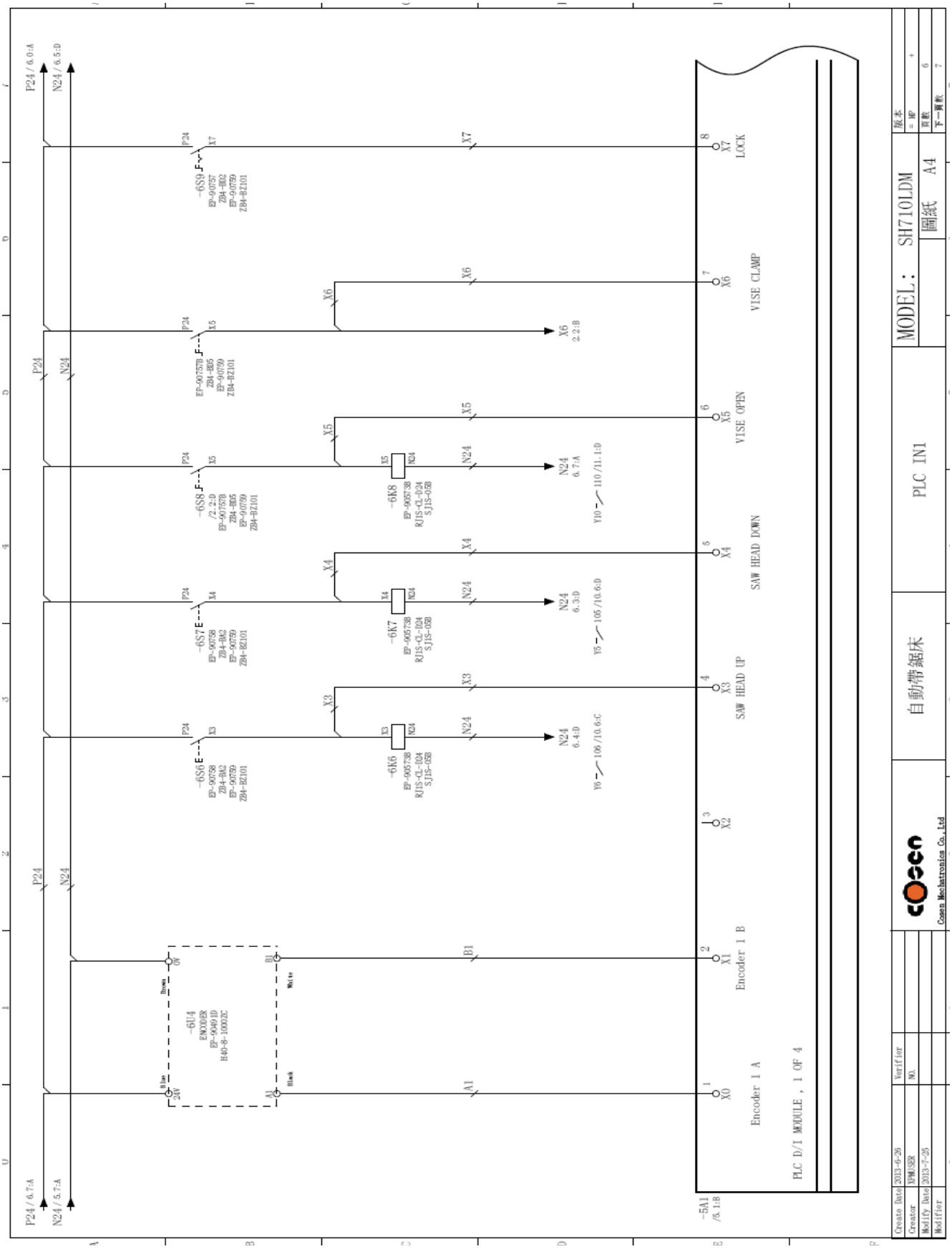


Fig.5-10 PLC IN1 layout (CE)

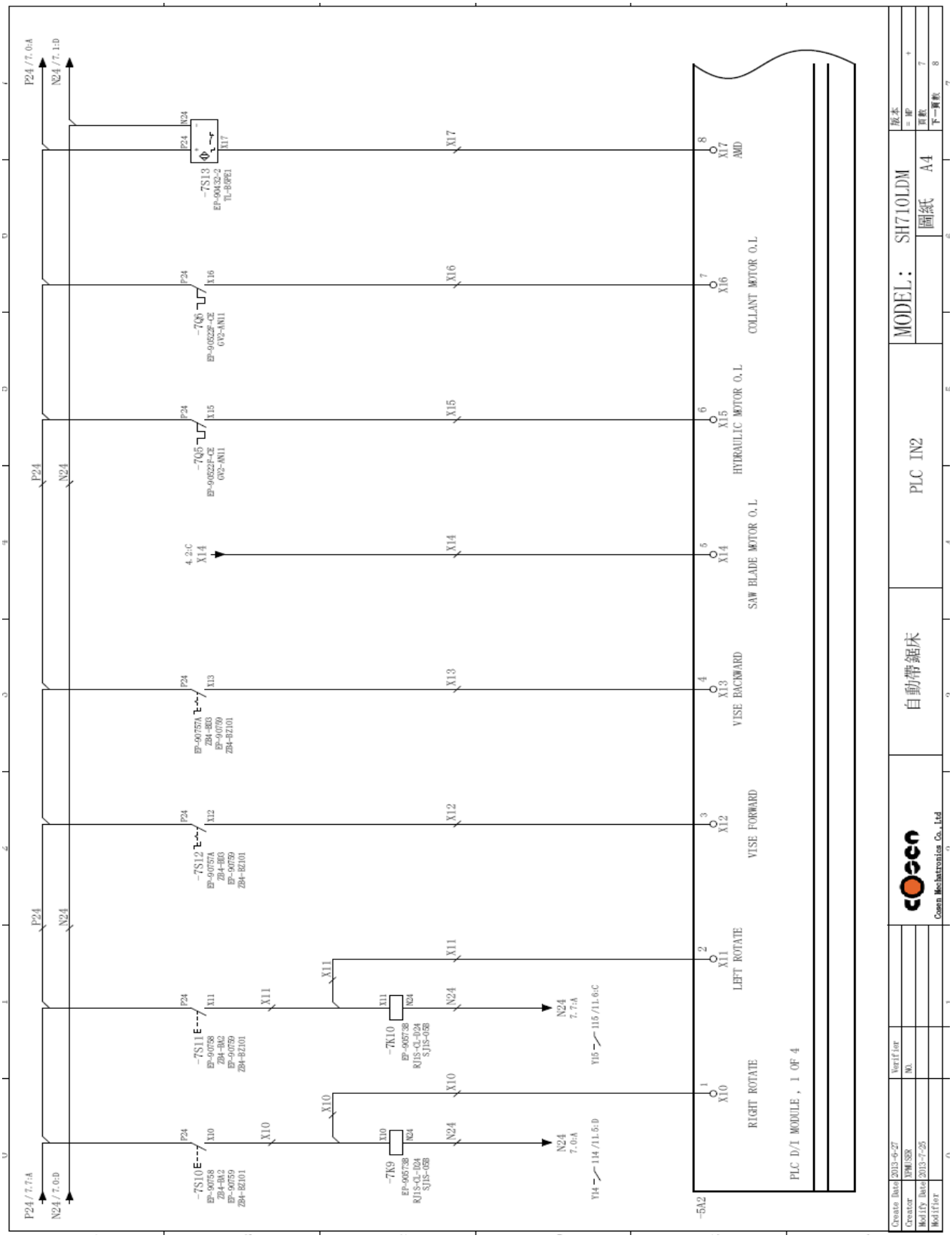


Fig.5-11 PLC IN2 layout (CE)

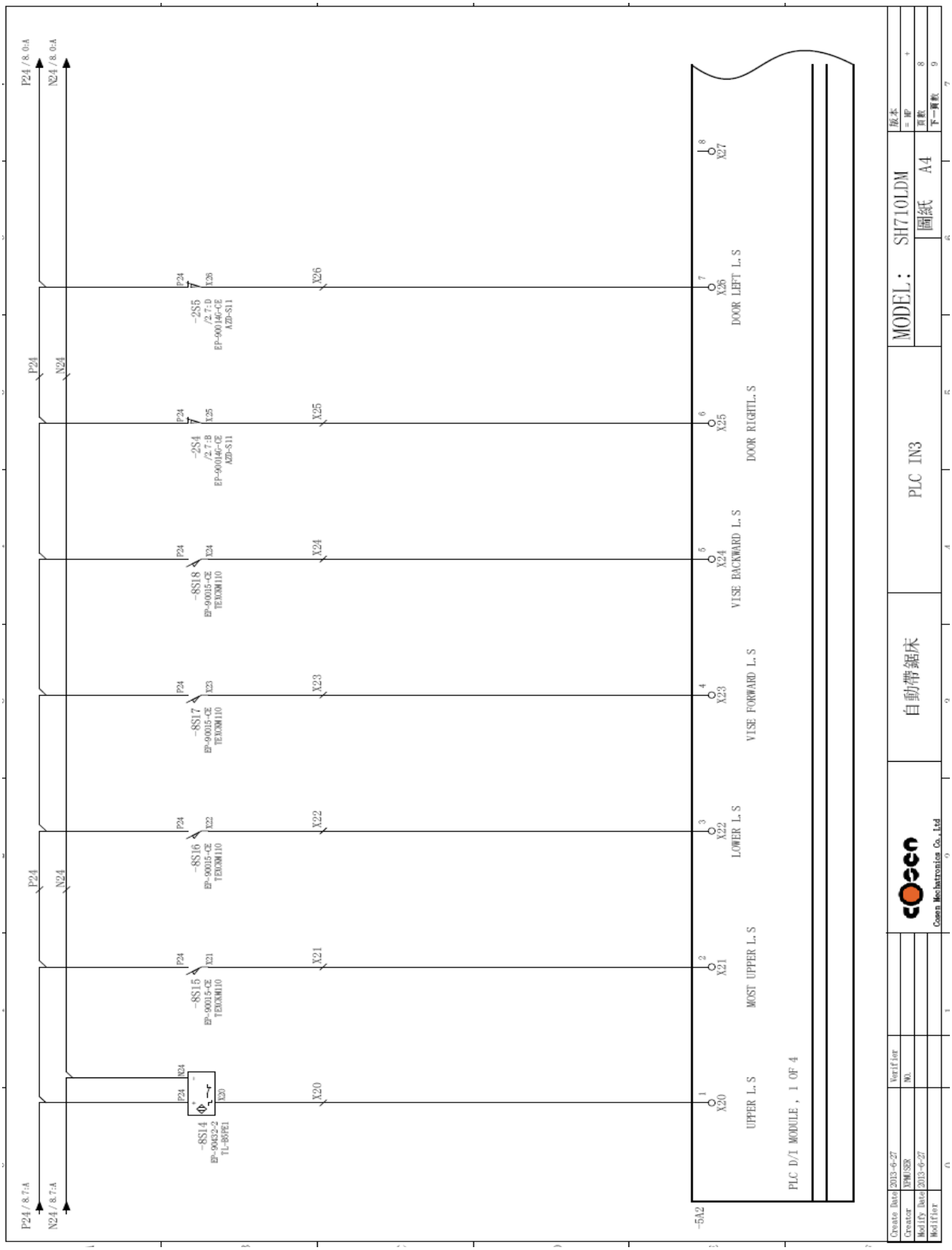


Fig.5-12 PLC IN3 layout (CE)

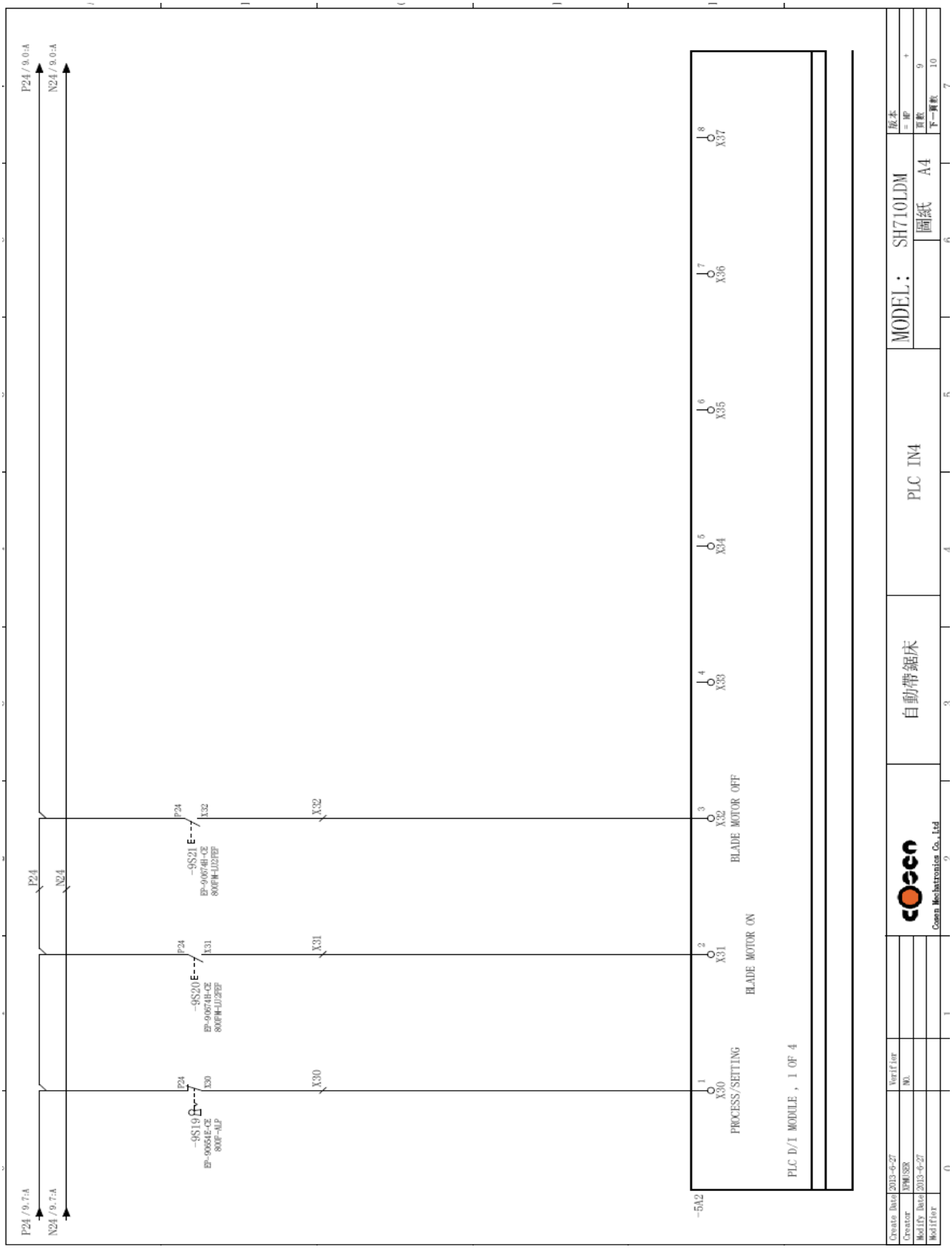


Fig.5-13 PLC IN4 layout (CE)

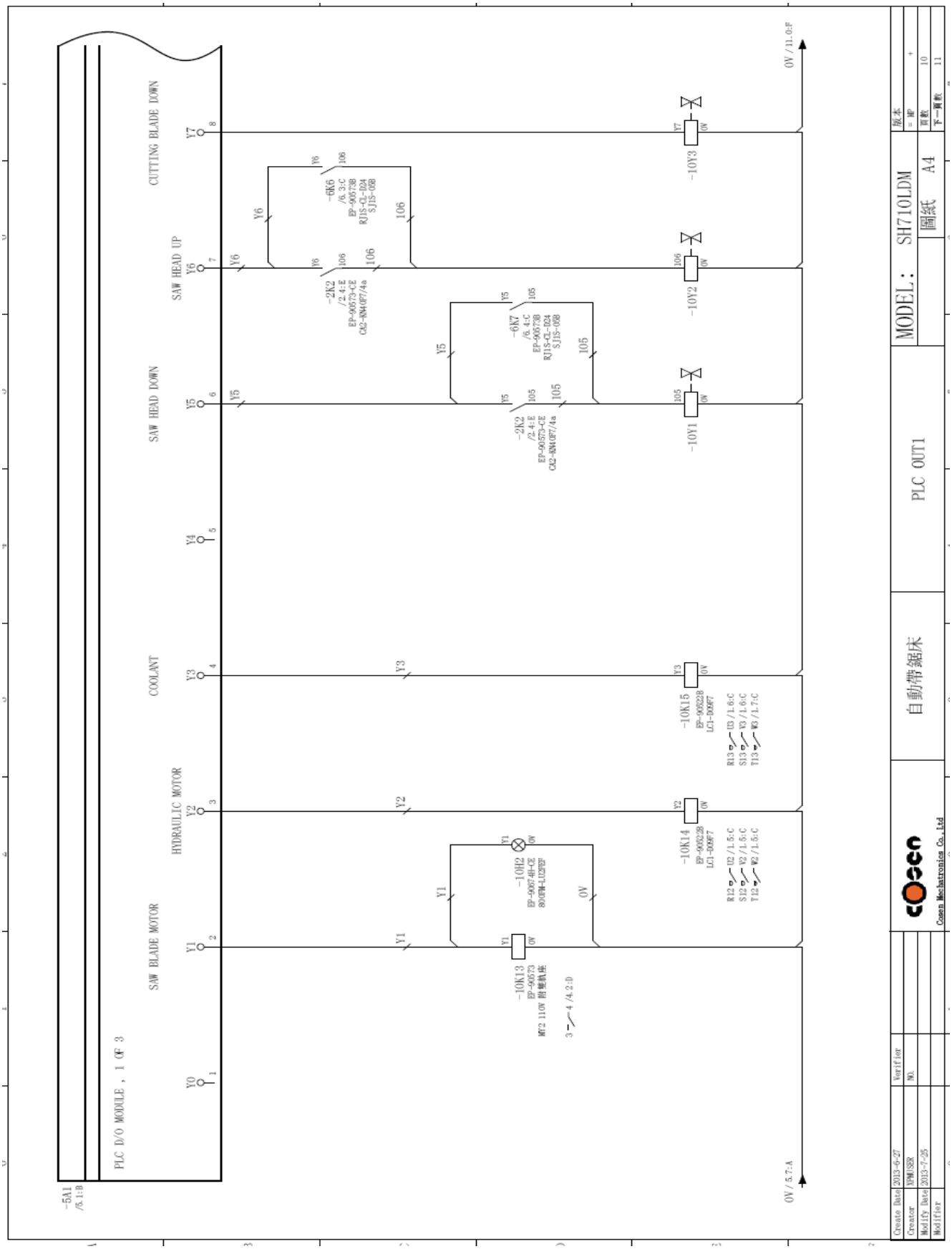


Fig.5-14 PLC OUT1 layout (CE)

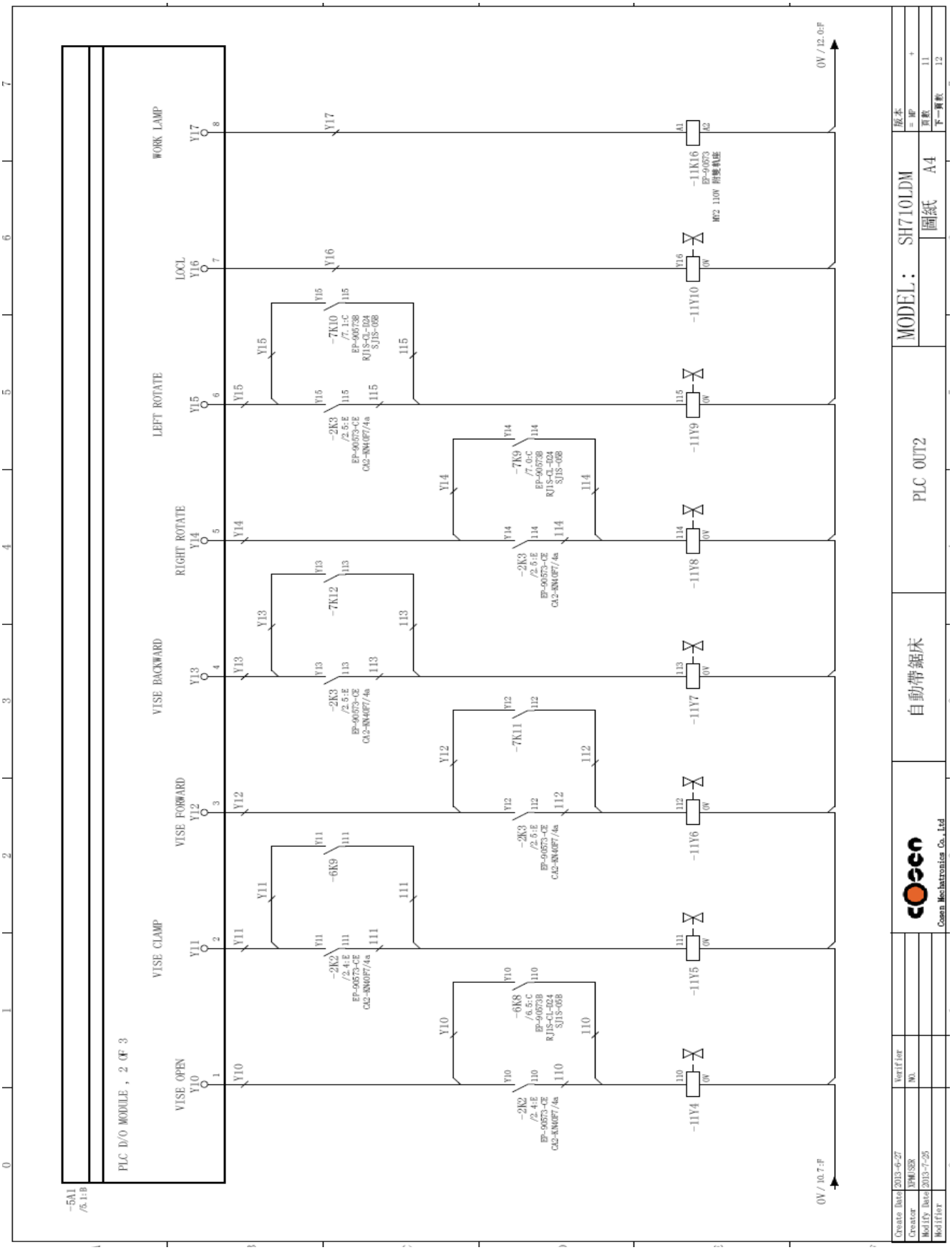


Fig.5-15 PLC OUT2 layout (CE)

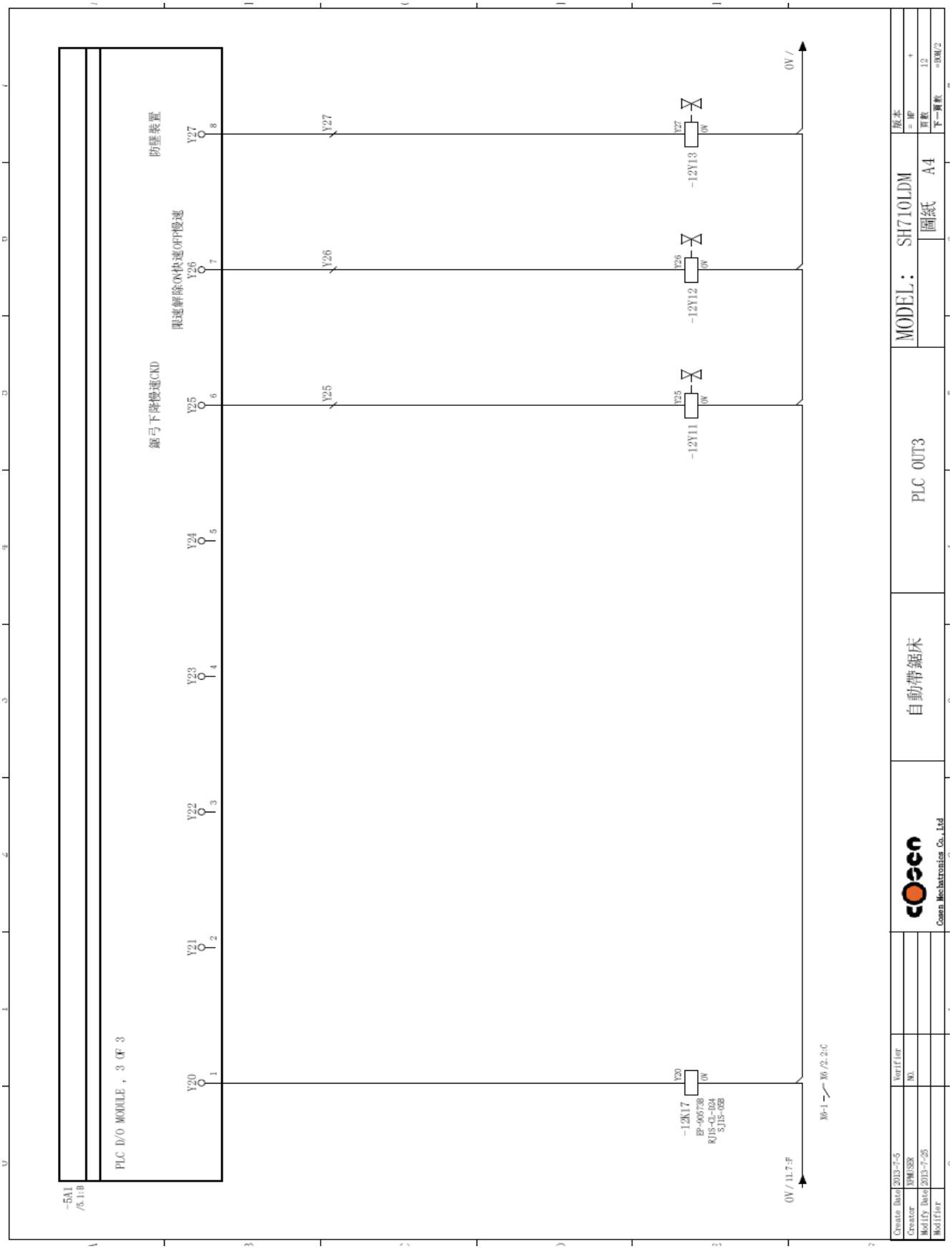
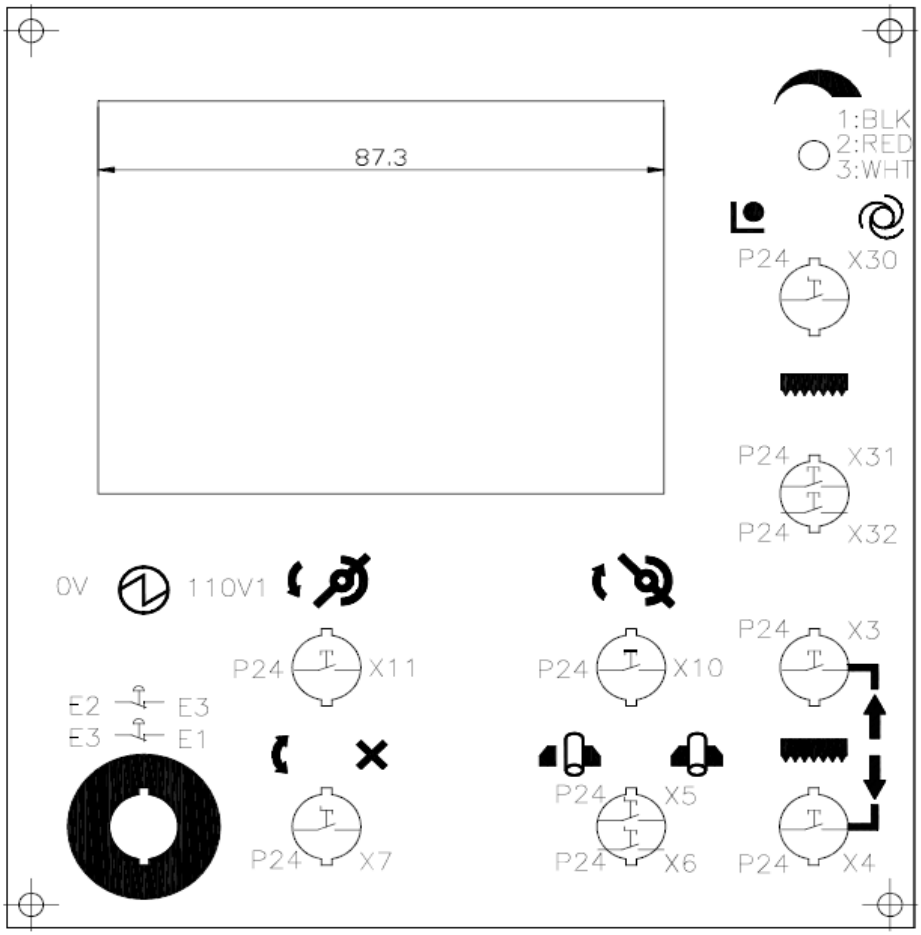


Fig.5-16 PLC OUT3 layout (CE)



cosen 高森機械工業股份有限公司 Cosen Machinery Industrial Co., Ltd.	圖名	面板配置圖	圖號	EL-SH710LDM-F17-001S0-A	繪圖	陳慧城	日期	1020708	版本
					審核		日期		S0

Fig.5-17 Control panel layout (CE)

HYDRAULIC SYSTEM

HYDRAULIC DIAGRAMS

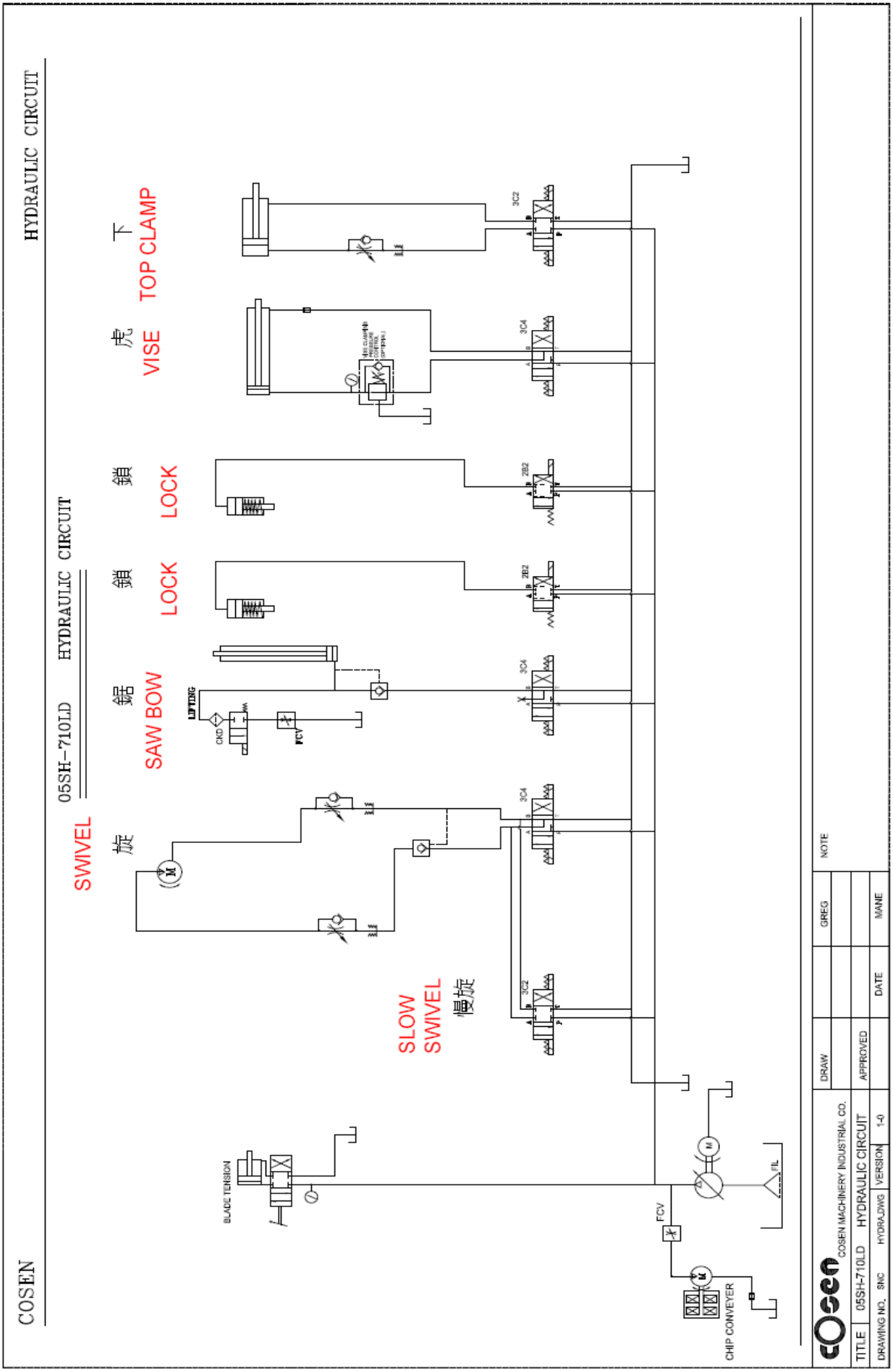


Fig. 6-1 Hydraulic layout

BAND SAW CUTTING: A PRACTICAL GUIDE

INTRODUCTION

COSEN band saw machines are designed to be installed with high quality using high speed saw blades for maximizing productivity. To be able to use this kind of high performance band saw blade, the machine has to be of rugged design, has high quality saw blade guides, has sufficient motor horse power for high saw band speeds, and has to be able to apply necessary tension to the saw bands. Your COSEN machine has all these features to provide a better service for you.

The saw blade is guided through the cutting area by roller guides to keep it straight as it comes off the driving wheels. The precision carbide inserted guides then holds the blade securely and accurately throughout the sawing process. The tension of the saw blade is adjusted through the tensioning device on the strong saw bow. The cutting feed and down feed pressure of the blade is regulated automatically by hydraulic regulation.

SAW BLADE SELECTION

The factors affecting cutting performance are:

- Type of material
- Material size and shape
- Guide spacing
- Blade selection
- Blade speed and feed
- Blade tension
- Blade vibration
- Coolant

Material and its relation to the cutting rate:

Fig. 7.1 Description of Band

- Depending on the hardness of the material the cutting rate will increase or decrease. For example, it takes more time to cut stainless steel than to cut cast iron.
- The surface conditions will also affect the cutting rate. If there are places on the surface on the material which are hard, a slower blade speed will be required or blade damage may result.
- It will be slower to cut tubing than to cut solids, because the blade must enter the material twice, and because coolant will not follow the blade as well.
- Tough or abrasive materials are much harder to cut than their machinability rating would indicate.
- Tooth spacing is determined by the hardness of the material and its thickness in cross section.
- Tooth set prevents the blade from binding in the cut. It may be either a "regular set" (also called a "raker set") or a "wavy set".
- The regular or raker set is most common and consists of a pattern of one tooth to the left. Set to the right, to the left and one which is straight, or unset. This type of set is generally used where the material to be cut is uniform in size and for contour cutting.
- Wavy set has groups of teeth set alternately to right and left, forming a wave-like pattern. This reduces the stress on each individual tooth, making it suitable for cutting thin material or a variety of materials where blade changing is impractical. Wavy set is often used where tooth breakage is a problem. This is shown in Fig. 7.2 as follows:

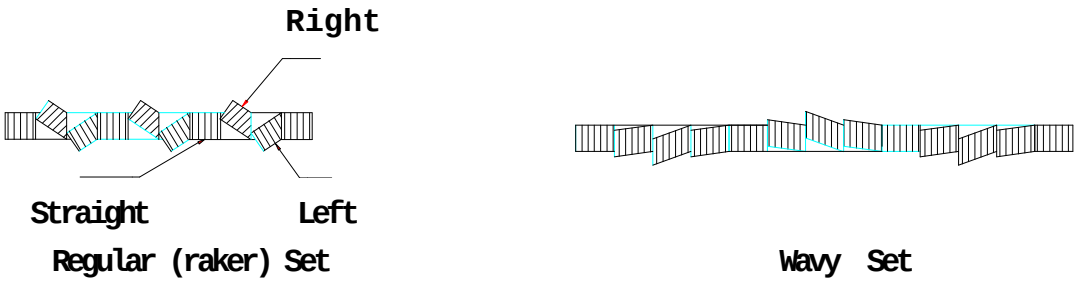


Fig. 7.2 The saw set

Material Size and Shape:

The optimum material width for a band saw blade is 1 inch wide by 0.35 thick and is about 5 inches long. Below this width tooth loading may become excessive and the cutting rate must be reduced. Above this width blade control begins to be lost, as discussed below. Since the blade "sees" only that material it is cutting, the shape of the stock being cut will also affect cutting speeds, particularly if the piece is excessively wide or if it varies in the dimensions being cut.

Guide Spacing:

The rigidity of the blade is a function of guide spacing, with rigidity being reduced to the third power as the distance between the guides increases. For example, with guides spaced 2 inches apart, blade deflection might be approximately 0.2. Under the same conditions, but with the guides spaced at 4 inches apart, blade deflection would be approximately 0.8.

This is a much simplified version of the formula, because it does not consider band tension or guide design. It is important to recognize, for example that rollers are considered as a pivotal contact. Whereas carbide faces could be considered as anchored supports. A more complete deviation, including band tension and guide design, is included in Roark's handbook, "Formula for stress and strain".

Blade selection:

There are five types of blade material generally used:

- Hard-back carbon
- Semi-high speed
- High speed
- Carbon
- Electron-welded blade

In most high speed production cutting either the semi-high speed or the electron-welded band are used. Electron welded blade is the best blade. But it is also the most expensive. To construct the electron-welded blade, M-2 tool steel is welded to the blade back. Therefore the blade is capable of very high surface speed. The semi-high speed blade is used more in structural because it is capable of taking a great deal more abuse. The hard-back carbon blade's teeth does not have red-hardness but if the blade is run slowly it can be very economical. We do not recommend carbon blades because the back of the blade is not sufficiently strong to stand adequate tension and because it has poor resistance to heat and abrasion. Usually, the coarse hook tooth blade will give better results, but accurate feed control is a must with a coarse tooth blade.

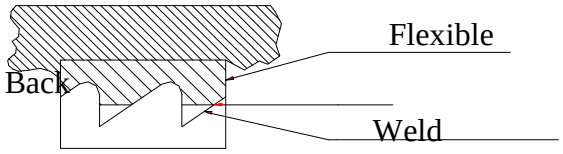


Fig. 7.3 Electron Welded Blade

A particular blade may have teeth which are too hard at the tips, causing them to break off in the material. This is most likely to happen as a result of chips wedging together in the cut. A broken tooth in the material can easily cause dulling on one side of the entire blade before it is dislodged from the cut.

Blade Speed and Feed:

Blade speed is generally limited by vibration and the ability to keep the blade sufficiently cool to avoid dulling the teeth. A blade which is running fast and taking a very light cut will dull quickly because the tips of the teeth will overheat from the rubbing action. If, however, we force the blade teeth deeper into the material, the blade will be less sensitive to heat, because the teeth are cutting more and rubbing less.

Tooth Form and Spacing:

The selection of a tooth form generally is determined by the material to be cut. There are three general factors to consider: tooth form, style or shape of the teeth; tooth spacing, the number of teeth to the inch; and tooth set, which provides clearance for the body of the blade. Three styles of tooth are shown in Fig. 7.4 below:

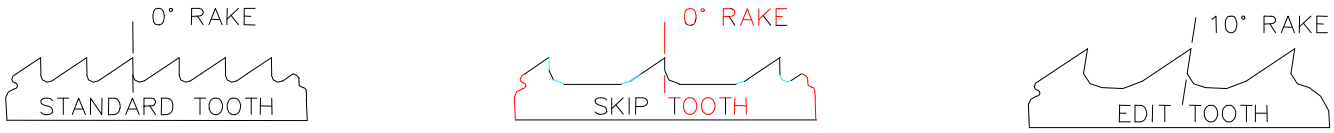


Fig. 7.4 Three styles of tooth

SOME SAWING PRACTICES

Saw Pitch Selection

Sawing “Rules of Thumb”:

1. The thinner the stock, the finer the saw pitch
2. The thicker the stock, the coarser the saw pitch
3. The more difficult the stock, the finer the saw pitch
4. The softer the material , the coarser the saw pitch

Always have at least three teeth in contact with the material being cut.

Material Size and Saw Pitch

Anytime during the cutting operation, at least three teeth must be in contact with the material being cut. Figure 7.5 shows some sawing practices:

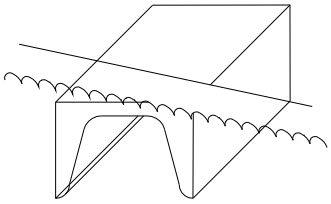
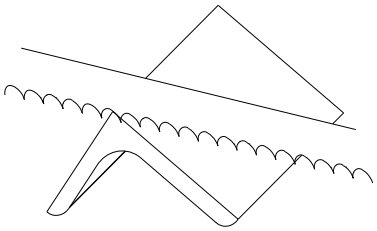
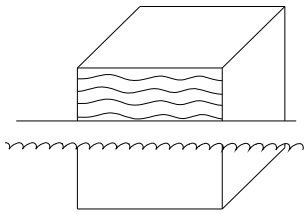
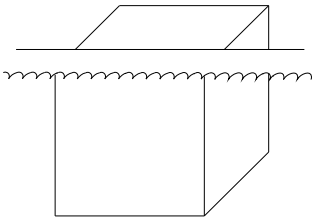
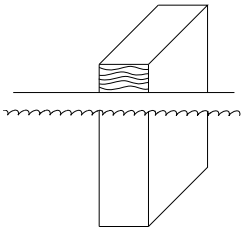
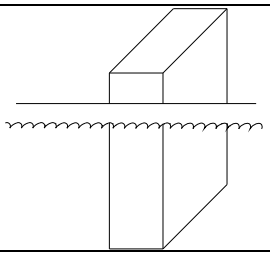
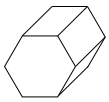
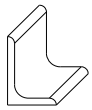
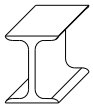
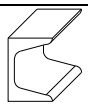
SAWING PRACTICES	
CORRECT	**INCORRECT**
	
several teeth contact work	teeth strike sharp edge
	
Coarse teeth clear chips freely	Teeth too fine for large solids
	
Three or more teeth on cutting wall	Coarse teeth rip on thin wall

Fig. 7.5 Some sawing practices

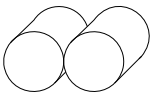
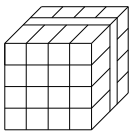
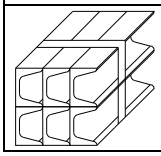
Solid Stock:

STYLE	up to 25 mm (1”)	25-100mm (1-4”)	100-250mm (4-10”)
  	8-10 TPI (Teeth per inch)	6-8 TPI	3-4 TPI

Structurals:

STYLE	up to 10 mm (3/8”)	10-20mm (3/8-3/4”)	above 20mm (3/4”)
  	10-8 TPI	8-10 TPI	6-8 TPI

Solid Bundle:

STYLE	up to 20 mm (3/4”)	20-80mm (3/4–3 1/4”)	above 80mm (3 1/4”)
  	8 - 10 TPI	2 - 8 TPI	4 - 6 TPI

MAINTENANCE & SERVICE

INTRODUCTION

For the best performance and longer life of the band saw machine, a maintenance schedule is necessary. Some of the daily maintenance usually takes just a little time but will give remarkable results for the efficient and proper operation of cutting.

BASIC MAINTENANCE

It is always easy and takes just a little effort to do the basic maintenance. But it always turns out to be a very essential process to assure the long life and efficient operation of the machine. Most of the basic maintenance requires the operator to perform it regularly.

MAINTENANCE SCHEDULE

We suggest you do the maintenance on schedule. The recommended schedule includes three periods, 1.Daily maintenance. 2.Monthly maintenance. 3. Six months maintenance.

Before beginning a day's work

1. Please check the hydraulic oil level. If oil level volume is below 1/2, please add oil as necessary.(Filling up to 2/3 level is better for system operation.)
2. Please check the cutting fluid level, adding fluid as necessary. If the fluid appears contaminated or deteriorated, drain and replace it.
3. Please check the saw blade to ensure that it is properly positioned on both the drive and idle wheels.
4. Please make sure that the saw blade is properly clamped by the left and right inserts.
5. Please check the wire brush for proper contact with the saw blade. Replace the wire brush if it is worn out.

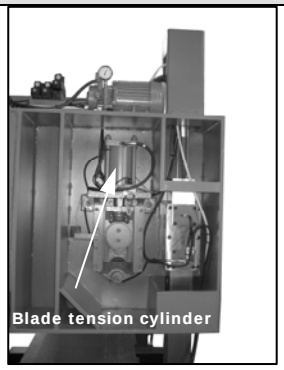
After ending a day's work

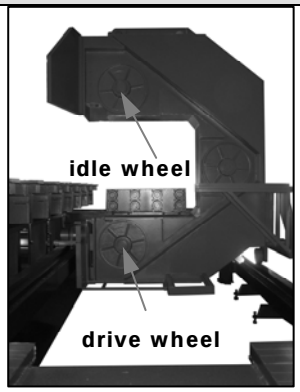
Please remove saw chips and clean the machine with discharging the cutting fluid when work has been completed.

Do not discharge cutting fluid while the saw blade is operating because it will cause severe injury on operator's hand.

Be sure the saw blade is fully stop, it will be performed after working inspection.

Every month

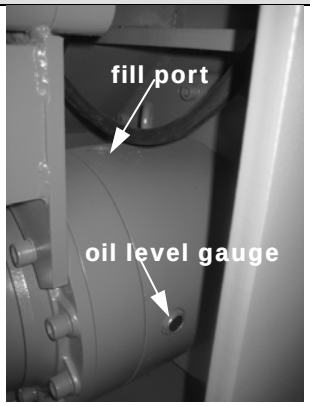


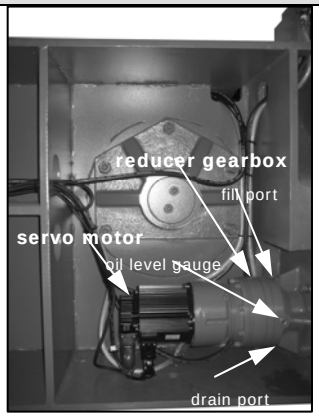


Please apply grease to the following points:
1. Idle wheel
2. Drive wheel
3. Blade tension device

<u>Recommended Grease:</u>
- Shell Alvania EP Grease 2
- Mobil Mobilplex 48

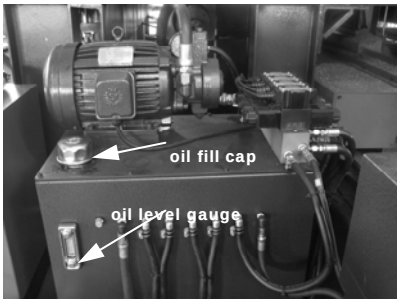
Every three months

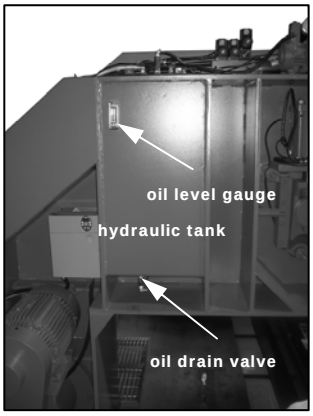




Replace the transmission oil after operating for three months (or 600 hours).

<u>Recommended Grease:</u>
- Shell Alvania EP Grease 2
- Mobil Mobilplex 48 (600W Cylinder oil)





1.Clean the filter of the cutting fluid.
2.Replace the transmission oil for every half of a year(or 1200 hours). Check the sight gauge to ascertain the transmission level.
Recommended TRANSMISSION OIL
- Omala oil HD220
- Mobil comp 632 600W Cylinder oil

3.Replace the hydraulic oil.
Recommended HYDRAULIC OIL
- Shell Tellus 27
- Mobil DTE OIL light Hydraulic28

STORAGE CONDITIONS

Generally, this machine will be stored on the following conditions in future:

(1) Turn off the power.

(2) Ambient temperature: 5℃ ~ 40℃

(3) Relative humidity: 30%~95% (without condensation)

(4) Atmosphere: use a plastic canvas to cover machine to avoid excessive dust, acid fume, corrosive gases and salt.

(5) Avoid exposing to direct sunlight or heat rays which can change the environmental temperature.

(6) Avoid exposing to abnormal vibration.

(7) Must be connected to earth.

TERMINATING THE USE OF THE MACHINE

Waste disposal:

When your machine can not work anymore, you should leak out the oil from machine body. Please storage the oil in safe place with bottom. Ask a environment specialist to handle the oil. It can avoid soil pollution. The oil list in machine:

- Hydraulic oil
- Cutting fluid
- Drive wheel gear oil

OIL RECOMMENDATION FOR MAINTENANCE

Item		Method	Revolution	Suggest oil
Dovetail guide		Keep grease covered. Antirust.	Daily	Shell R2
Roller bearing		Sweep clean and oil with lubricant.	Daily	SEA #10
Bed roller / surface		Sweep clean and oil with lubricant.	Daily	SEA #10
Nipples of bearing		Use grease gun, but not excess.	Monthly	Shell R2
Blade tension device		Use grease gun, but not excess.	Monthly	Shell R2
Reducer		Inspect once a week. Change oil of 600 hours of using. Change it every year.	Regularly	Omala oil HD220 Mobil Gear 630
Hydraulic system		Inspect half a year. Change oil every year.	Regularly	Shell Tellus 32 Mobil DTE oil Light Hydraulic 24
Bearing	Inserts	Oil with lubricant, but not excess.	Daily	Shell R2
	Band wheel	Oil with lubricant, but not excess.	Weekly	
	Cylinder	Oil with lubricant, but not excess.	6 Monthly	
	Wire brush	Oil with lubricant, but not excess.	6 Monthly	

1. Turn off the stop circuit breaker switch before servicing the machine.

2. Then post a sign to inform people that the machine is under maintenance.

3. Drain all of the cutting fluid and oil off and carefully treat them to avoid pollution.

Section 9

TROUBLESHOOTING

INTRODUCTION

All the machines manufactured by COSEN pass a 72 hours continuously running test before shipping out and COSEN is responsible for the after sales service problems during the warranty period if the machines are used normally. However, there still exist the some unpredictable problems which may disable the machine from operating.

Generally speaking, the system troubles in this machine model can be classified into three types, namely GENERAL TROUBLES, MOTOR TROUBLES and BLADE TROUBLES. Although you may have other troubles which can not be recognized in advance, such as malfunctions due to the limited life-span of mechanical, electric or hydraulic parts of the machine.

COSEN has accumulated enough experiences and technical data to handle all of the regular system troubles. Meanwhile, the engineering department of COSEN had been continuously improving the machines to prevent all possible troubles.

It is hoped that you will give COSEN your maintenance experience and ideas so that both sides can achieve the best performance.

PRECAUTIONS

When an abnormality occurs in the machine during operation, you can do it yourself safely. If you have to stop machine motion immediately for parts exchanging, you should do so according to the following procedures:

- Press HYDRAULIC MOTOR OFF button or EMERGENCY STOP button.
- Open the electrical enclosure door.
- Turn off breaker.

BEFORE ANY ADJUSTMENT OR MAINTENANCE OF THE MACHINE, PLEASE MAKE SURE TO TURN OFF THE MACHINE AND DISCONNECT THE POWER SUPPLY.

GENERAL TROUBLES AND SOLUTIONS

DISCONNECT POWER CORD TO MOTOR BEFORE ATTEMPTING ANY REPAIR OR INSPECTION.

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Motor stalls	Excessive belt tension	Adjust belt tension so that belt does not slip on drive pulley while cutting (1/2“ Min. deflection of belt under moderate pressure.)
	Excessive head pressure	Reduce head pressure. Refer to Operating Instructions “Adjusting Feed”.
	Excessive blade speed	Refer to Operating Instructions “Speed Selection”.
	Improper blade selection	Refer to Operating Instructions “Blade Selection”.
Cannot make square cut	Dull blade	Replace blade.
	Guide rollers not adjusted properly	Refer to Adjustments.
	Rear vise jaw not adjusted properly	Set fixed vise jaw 90° to blade.
	Excessive head pressure	Reduce head pressure. Refer to operating instructions “Adjusting Feed.”
Increased cutting time	Dull blade	Replace blade
	Insufficient head pressure	Increase head pressure. Refer to Operating Instructions “Adjusting Feed.”
	Reduce blade speed	Refer to Operating Instructions “Speed Selection.”
Will not cut	Motor running in wrong direction	Reverse rotation of motor. (Motor rotation C.C.W. pulley end.)
	Blade teeth pointing in wrong direction	Remove blade, turn blade inside out. Re-install blade. (Teeth must point in direction of travel.)
	Hardened material	Use special alloy blades. (Consult your industrial distributor for recommendation on type of blade required.)

MINOR TROUBLES & SOLUTIONS

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Saw blade motor does not run even though blade drive button is pressed.	Overload relay activated	Reset
	Saw blade is not at forward limit position.	Press SAW FRAME FORWARD button

MOTOR TROUBLES & SOLUTIONS

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Motor will not start	Magnetic switch open, or protector open.	Reset protector by pushing red button (inside electric box.)
	Low voltage	Check power line for proper voltage.
	Open circuit in motor or loose connections.	Inspect all lead terminations on motor for loose or open connections.
Motor will not start, fuse or circuit breakers “blow”.	Short circuit in line, cord or plug.	Inspect line, cord and plug for damaged insulation and shorted wire.
	Short circuit in motor or loose connections	Inspect all lead terminations on motor for loose or shorted terminals or worn insulation on wires.
	Incorrect fuses or circuit breakers in power line.	Install correct fuses or circuit breakers.
Motor fail to develop full power. (Power output of motor decreases rapidly with decrease in voltage at motor terminals.)	Power line overloaded with lights, appliances and other motors.	Reduce the load on the power line.
	Undersize wires or circuit too long.	Increase wire sizes, or reduce length of wiring
	General overloading of power company‘s facilities.	Request a voltage check from the power company
Motor overheat	Motor overloaded.	Reduce load on motor
	Air circulation through the motor restricted.	Clean out motor to provide normal air circulation through motor.
Motor stalls (Resulting in blown fuses or tripped circuit breakers)	Short circuit in motor or loose connections.	Inspect terminals in motor for loose or shorted terminals or worn insulation on lead wires.
	Low voltage	Correct the low line voltage conditions.
	Incorrect fuses or circuit breakers in power line.	Install correct fuses circuit breakers.
	Motor overloaded	Reduce motor load.
Frequent opening of fuses or circuit breakers.	Motor overloaded	Reduce motor load
	Incorrect fuses or circuit breakers.	Install correct fuses or circuit breakers.

BLADE TROUBLES AND SOLUTIONS

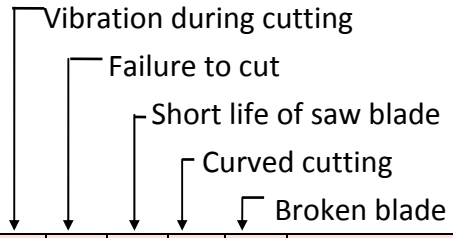
DISCONNECT POWER CORD TO MOTOR BEFORE ATTEMPTING ANY REPAIR OR INSPECTION.

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Teeth strippage	Too few teeth per inch	Use finer tooth blade
	Loading of gullets	Use coarse tooth blade or cutting lubricant.
	Excessive feed	Decrease feed
	Work not secured in vise	Clamp material securely
Blade breakage	Teeth too coarse	Use a finer tooth blade
	Misalignment of guides	Adjust saw guides
	Dry cutting	Use cutting lubricant
	Excessive speed	Lower speed. See Operating Instructions “Speed selection.”
	Excessive speed	Reduce feed pressure. Refer to Operating Instructions “Adjusting Feed.”
	Excessive tension	Tension blade to prevent slippage on drive wheel while cutting.
	Wheels out of line	Adjust wheels
Blade line Run-out or Run-in	Guides out of line	For a straight and true cut, realign guides, check bearings for wear.
	Excessive pressure	Conservative pressure assures long blade life and clean straight cuts.
	Support of blade insufficient	Move saw guides as close to work as possible.
	Material not properly secured in vise	Clamp material in vise, level and securely.
	Blade tension improper	Loosen or tighten tension on blade.
Blade twisting	Blade not in line with guide bearings	Check bearings for wear and alignment.
	Excessive blade pressure	Decrease pressure and blade tension
	Blade binding in cut	Decrease feed pressure
Premature tooth wear	Dry cutting	Use lubricant on all materials, except cast iron
	Blade too coarse	Use finer tooth blade
	Not enough feed	Increase feed so that blade does not ride in cut
	Excessive speed	Decrease speed

SAWING PROBLEMS AND SOLUTIONS

Other than this manual, the manufacturer also provides some related technical documents listed as follows:

Sawing Problems and Solutions



Vibration during cutting	Failure to cut	Short life of saw blade	Curved cutting	Broken blade		
✓	✓	✓	✓	✓	**Use of blade with incorrect pitch**	**Use blade with correct pitch suited to workpiece width**
✓	✓	✓	✓	✓	**Failure to break-in saw blade**	**Perform break-in operation**
✓	✓	✓			**Excessive saw blade speed**	**Reduce speed**
			✓	✓	**Insufficient saw blade speed**	**Increase speed**
✓		✓	✓	✓	**Excessive saw head descending speed**	**Reduce speed**
✓		✓	✓		**Insufficient saw head descending speed**	**Increase speed**
		✓	✓		**Insufficient saw blade tension**	**Increase tension**
✓		✓	✓	✓	**Wire brush improperly positioned**	**Relocate**
✓		✓	✓		**Blade improperly clamped by insert**	**Check and correct**
✓	✓	✓	✓	✓	**Improperly clamped workpiece**	**Check and correct**
	✓	✓	✓		**Excessively hard material surface**	**Soften material surface**
		✓	✓	✓	**Excessive cutting rate**	**Reduce cutting rate**
	✓	✓			**Non-annealed workpiece**	**Replace with suitable workpiece**
✓		✓	✓	✓	**Insufficient or lean cutting fluid**	**Add fluid or replace**
✓		✓	✓	✓	**Vibration near machine**	**Relocate machine**
		✓	✓		**Non-water soluble cutting fluid used**	**Replace**
✓		✓	✓		**Air in cylinder**	**Bleed air**
✓		✓		✓	**Broken back-up roller**	**Replace**
✓	✓	✓	✓	✓	**Use of non-specified saw blade**	**Replace**
✓	✓	✓	✓	✓	**Fluctuation of line voltage**	**Stabilize**
✓		✓	✓		**Adjustable blade guide too far from workpiece**	**Bring blade guide close to workpiece**
✓		✓	✓	✓	**Loose blade guide**	**Tighten**
		✓		✓	**Blue or purple saw chips**	**Reduce cutting rate**
✓		✓		✓	**Accumulation of chips at inserts**	**Clean**
	✓				**Reverse positioning of blade on machine**	**Reinstall**
✓		✓	✓		**Workpieces are not bundled properly**	**Re-bundle**
✓		✓		✓	**Back edge of blade touching wheel flange**	**Adjust wheel to obtain clearance**
✓	✓	✓			**Workpiece of insufficient diameter**	**Use other machine, suited for diameter of workpiece Replace**
	✓	✓	✓		**Saw blade teeth worn**	**Replace**

RE-ADJUSTING THE ROLLER TABLE

If the feeding table suffers the huge stroke and the alignment is effected, follow the below procedure to adjust.

TOOL, measuring

Measurement, Horizontal balance

Procedure

1. Screw or loosen the adjusting bolt to attain the horizontal balance (leveling) between the roller table and the machine frame.
2. Ensure that the machine frame is not struck by the loaded material on the feeding table.
3. Check the leveling by the measuring tool.
4. After finished the adjusting, fix the roller table.

 **If the feeding table and the machine frame are not positioned under the horizontal balance, the loaded material may be going up gradually and affect the cutting effect.**

Section 10

PARTS

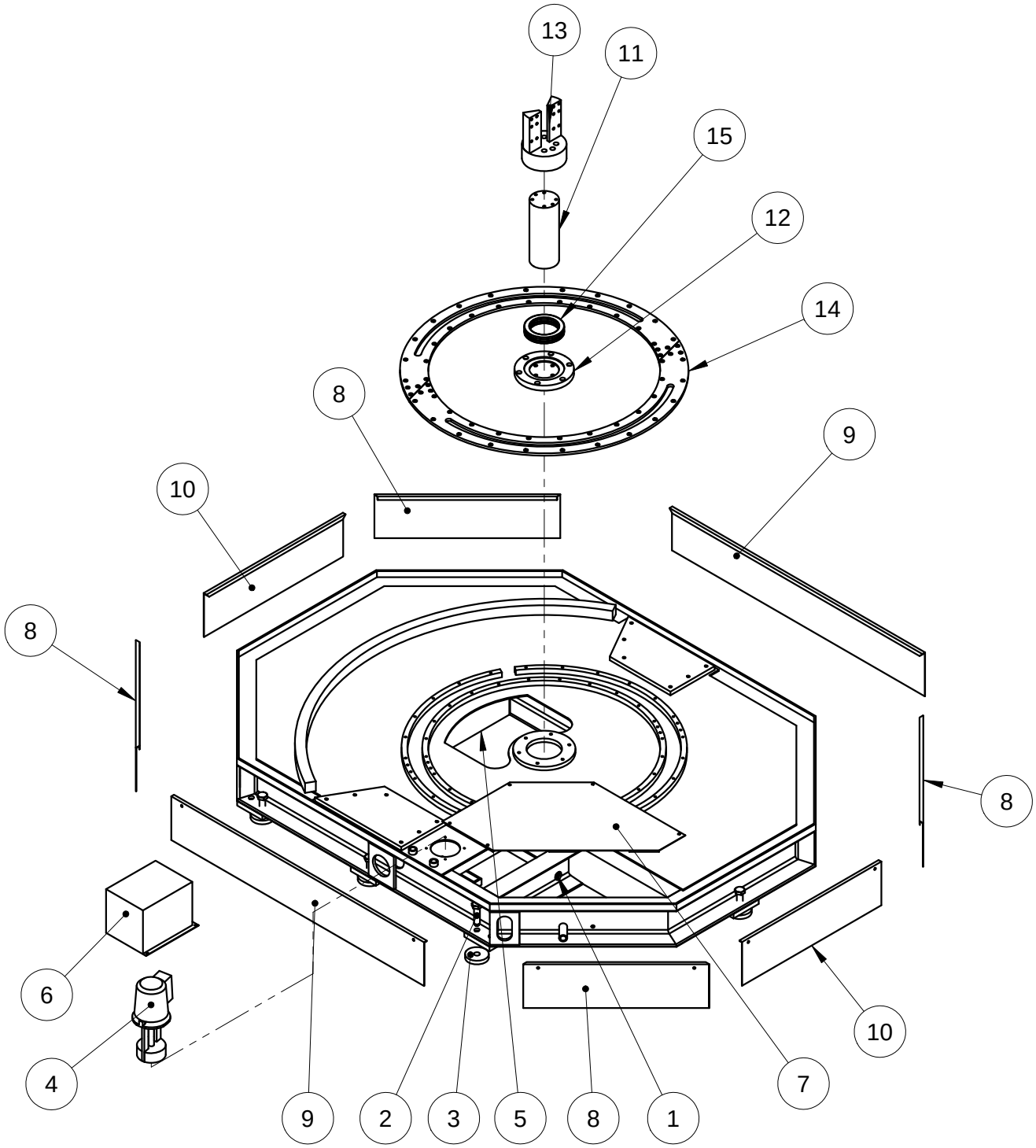
SPARE PARTS RECOMMENDATIONS

PART LIST

The following table lists common spare parts we suggest you purchase in advance:

Part Name	**Part Name**
Saw blade	Filter
Wire brush	Steel plates
Carbide inserts	Rollers
Bearings	Top Clamp
Chain	Pump
Asbestos	Belt
Washer	Chip conveyor
Gear reducer	Duster seal
Drive wheel	Idle wheel

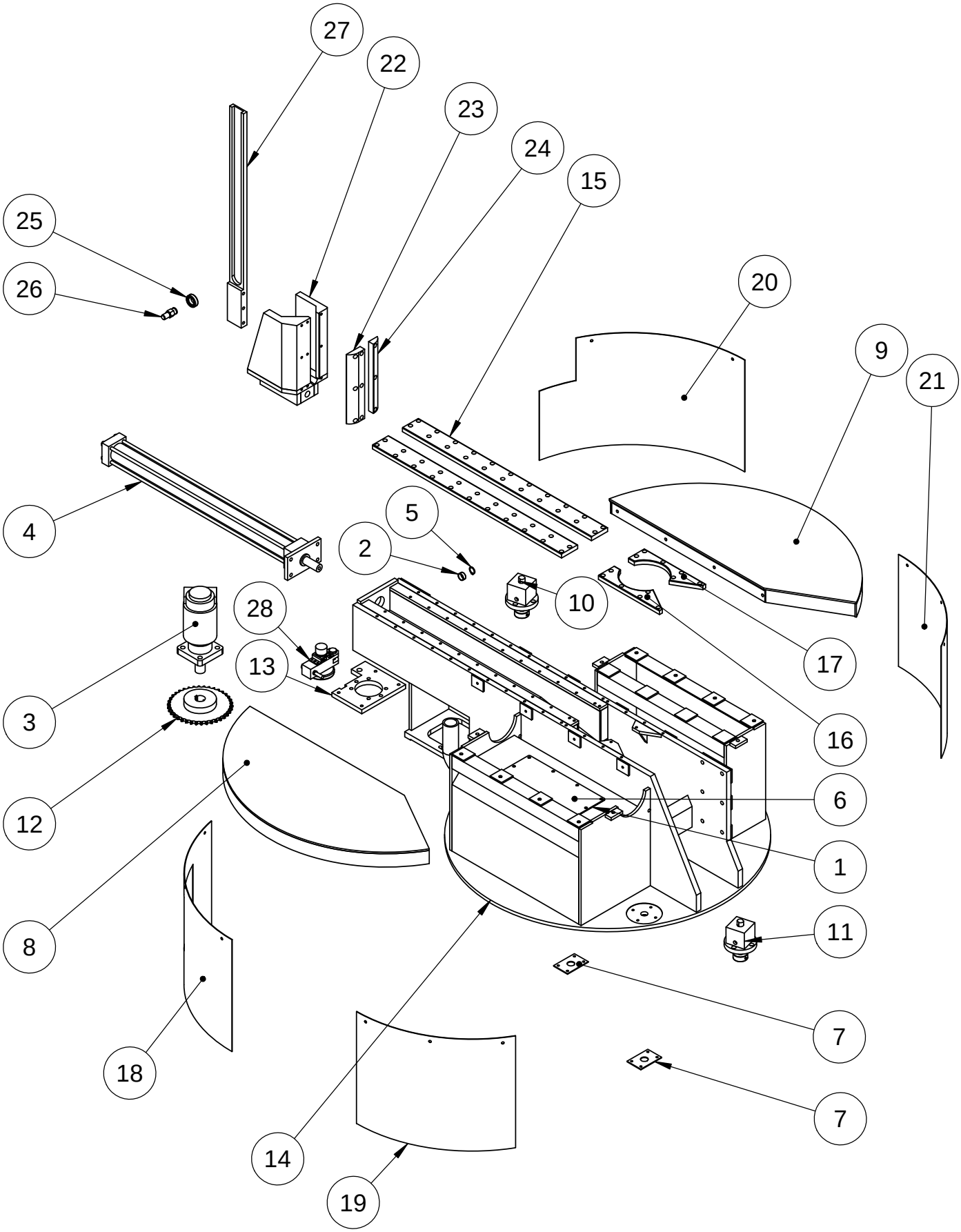
S710D-1000 底座組
BASE ASSEMBLY



S710D-1000 底座組
BASE ASSEMBLY

ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AHA-0139	Filter	水相通管濾網(小)		1
2	AHC-0153	Base stand adjusting screw	底座調整螺桿		8
3	AHR-1055	Base stand pad	底座墊塊		8
4	PP-32041-CE	Coolant pump	浸水幫浦		1
5	S710D-1001	Base	底座		1
6	S710D-1005	Coolant pump cover	水泵護蓋		1
7	S710D-1035	Coolant tank cover	水箱護蓋		1
8	S710D-10500-1	Base side cover 1	底座邊蓋(一)		4
9	S710D-10500-2	Base side cover 2	底座邊蓋(二)		2
10	S710D-10500-3	Base side cover 3	底座邊蓋(三)		2
11	S710D-1173	Rotating shaft	旋轉軸		1
12	S710D-1175	Rotating shaft seat	旋轉軸座		1
13	S710D-1177	Rotating shaft holder	旋轉壓軸		1
14	S710D-1195	Swivel track	旋轉軌道		2
15	PP-14816	Thrust bearing	止推軸承	51120	1

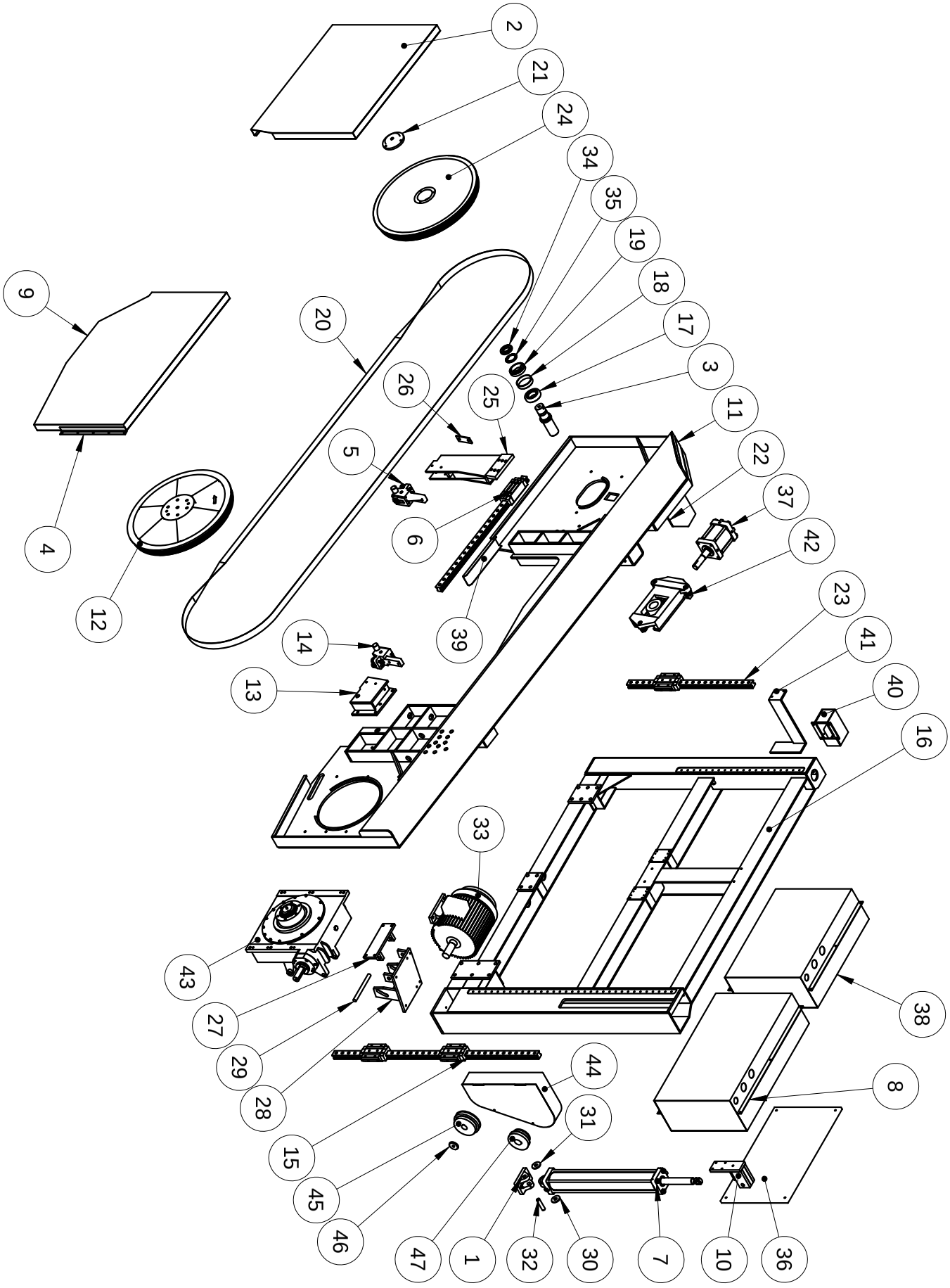
S710D-2000 床面組
BED ASSEMBLY



S710D-2000 床面組
BED ASSEMBLY

ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AHA-0108A	Leak-proof asbestos	油箱蓋防漏石棉		1
2	PP-13100	DU bushing	乾式軸承	2010	1
3	PP-31508	Hydraulic motor	油壓馬達(齒輪用)	MAS315CC	1
4	PP-43473D	Hydraulic cylinder	油壓缸	FA φ50*710L E:65	1
5	PP-52093	Clasp	扣環	S20	1
6	S710D-1003	Hydraulic tank cover	油箱蓋		1
7	S710D-1185	Rotating gasket	旋轉墊片	DU90x60x2.5T	2
8	S710D-1201	Front infeed table	前托架		1
9	S710D-1241	Rear infeed table	後托架		1
10	S710D-13600	Rotating locked cylinder assembly	旋轉鎖定油缸組		1
11	S710D-13600	Rotating locked cylinder assembly	旋轉鎖定油缸組		1
12	S710D-1371	Rotating chain wheel	旋轉鏈輪		1
13	S710D-1379	Rotating motor seat	旋轉馬達座		1
14	S710D-2001	Bed	床面		1
15	S710D-2003	Bed steel plate	床面鋼板		2
16	S710D-2008	Front blade steel plate	前鋸帶線鋼板		1
17	S710D-2009	Rear blade steel plate	後鋸帶線鋼板		1
18	S710D-2063-1	Bed cover 1	床面遮板(一)		1
19	S710D-2063-2	Bed cover 2	床面遮板(二)		1
20	S710D-2063-3	Bed cover 3	床面遮板(三)		1
21	S710D-2063-4	Bed cover 4	床面遮板(四)		1
22	S710D-2207	Movable vise	活動虎鉗		1
23	S710D-2241	Vise plate1	虎鉗鋼板(一)		1
24	S710D-2243	Vise plate 2	虎鉗鋼板(二)		1
25	S710D-3171	Guide arm driven wheel	鋸臂連動擋輪		1
26	S710D-3173	Guide arm driven shaft	鋸臂連動輪軸		1
27	S710D-3175	Guide arm driven block	鋸臂連動擋板		1
28	S710D-13800	Angle encoder assembly	角度譯碼器組		1

S710D-3000 鋸弓組
SAW BOW ASSEMBLY



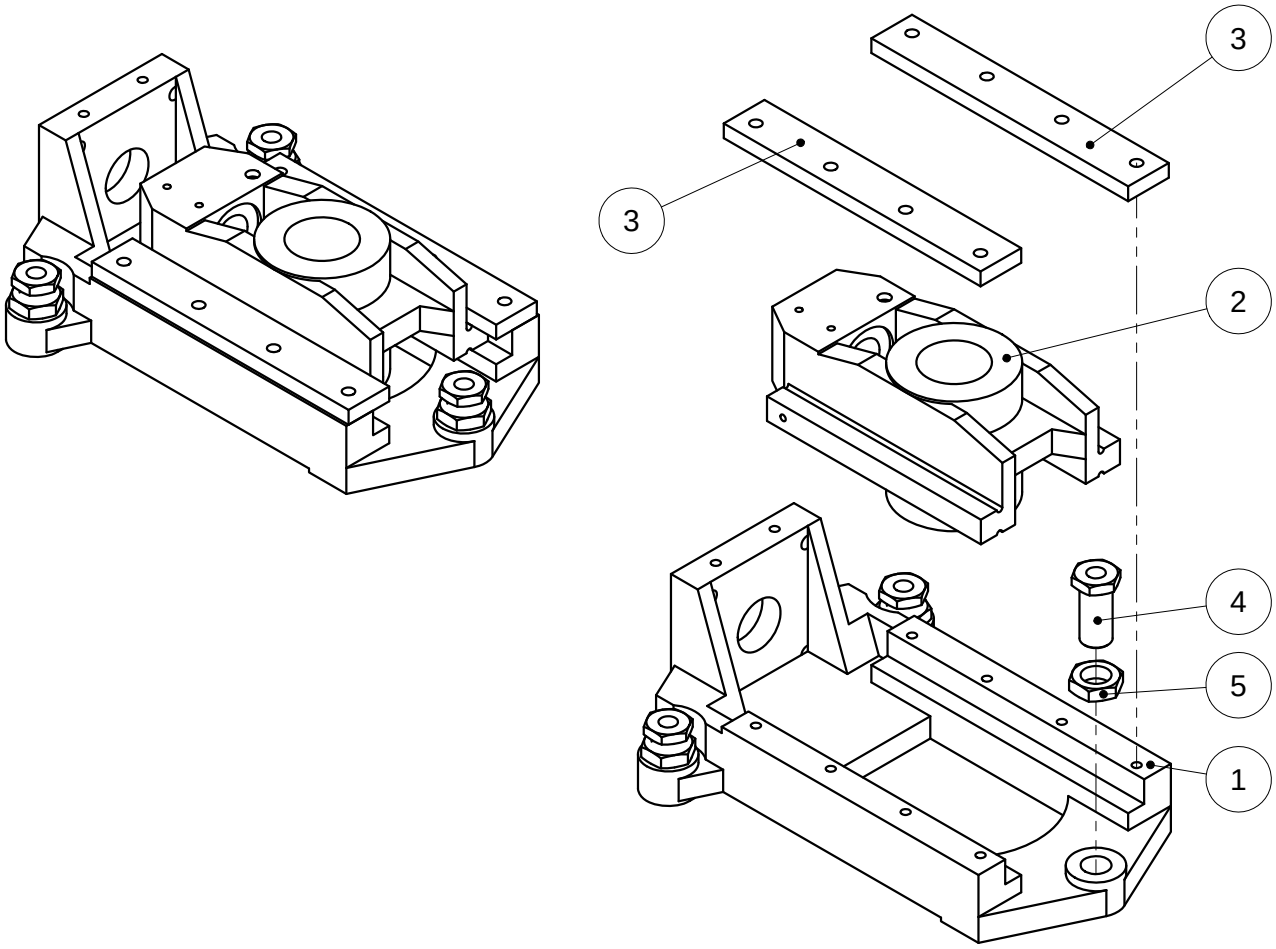
S710D-3000 鋸弓組
SAW BOW ASSEMBLY

ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AGB-70735	Cylinder seat	油壓缸固定座		1
2	S710D-3003	Idle wheel cover	上輪箱蓋		1
3	SEE-3037	Idle wheel shaft	上輪軸		1
4	S710D-3003	Idle wheel cover	上輪箱蓋-絞鏈		2
5	SGB-710800	Left guide roller assembly	左導輪座組		1
6	PP-92048B	Linear guide	滑軌	MSR35LS1UUF1+R840-HⅠ	1
7	SGB-707019	Saw bow cylinder assembly	鋸弓油壓缸組		1
8	S710D-1301	Control box	電器箱		1
9	S710D-3005	Drive wheel cover	下輪箱蓋		1
10	S710D-3275	Saw bow cylinder upper ear	鋸弓油缸上耳		1
11	S710D-3001	Saw bow	鋸弓		1
12	S710D-3041	Drive Wheel	下輪		1
13	S710D-3105	Fixed guide arm	固定鋸臂		1
14	SGB-710801	Right guide roller assembly	右導輪座組		1
15	PP-92048	Linear guide	滑軌	MSR35LE2UUF1+R1320-HⅡ	1
16	S710D-1101	Main shaft	主軸		1
17	PP-14694	Bearing	軸承	32209	1
18	SEE-3038	Bearing washer	上輪軸承墊圈		1
19	PP-14615	Bearing	軸承	30209	1
20	PP-18816	Saw blade	鋸帶	HS6540x41Wx1.3	1
21	AGB-70331	Idle wheel shaft cover	上輪軸蓋		1
22	S710D-3623	Continuous tracks fixed cover 2	履帶固定蓋(二)		1
23	PP-92048A	Linear guide	滑軌	MSR35LE1UUF1+R800-HⅡ	1
24	S710D-3031	Idle wheel	上輪(41W)		1

S710D-3000 鋸弓組
SAW BOW ASSEMBLY

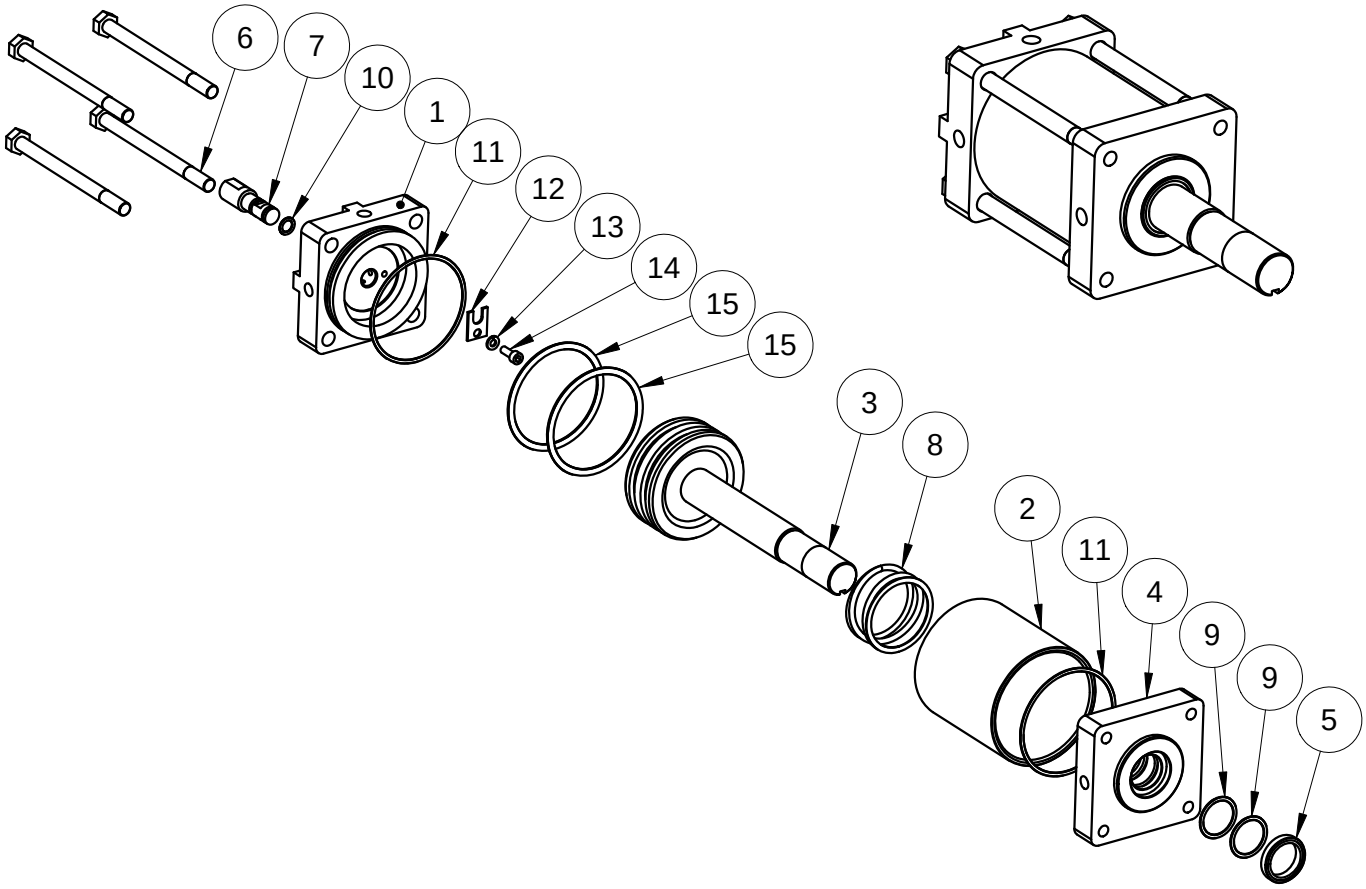
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
25	S710D-3103	Movable guide arm	活動鋸臂		1
26	AGB-70407	Guide roller seat fixed plate	導輪座鎖緊墊板		1
27	S710D-3084	Motor seat bracket	馬達底板關節座		1
28	S710D-3081	Saw bow motor seat	鋸弓馬達底板		1
29	S710D-3085	Motor position shaft	馬達定位軸		1
30	AHA-1105A	Washer	活動軸墊圈		1
31	AHA-1105	Rubber washer	橡膠墊圈		1
32	AGB-70304B	Pin	下插梢		1
33	PP-31153	Motor	馬達		1
34	PP-14909	Fixed nut	固定螺母	AN09	1
35	PP-14959	Stop ring	止動環	AW09	1
36	V6068T-1302	HMI control panel	線路板		1
37	AGB-707209	Tension cylinder assembly	張力油壓缸組		1
38	S710D-1301	Control box	電器箱		1
39	W1307024	ldle Wheel saw blade cover	上輪鋸片護蓋		1
40	S710D-2555	Continuous tracks fixed cover 1	履帶固定蓋(一)		1
41	S710D-3208	Limit switch fixed seat	限動開關固定座		1
42	AGB-703500	Tension sliding plate assembly	張力滑座滑板組		1
43	AGB-703109	Gear reducer	減速機整組		1
44	S710D-3071	Pulley cover	普利護蓋		1
45	SEE-3006A	Gear reducer pulley	減速機普利		1
46	AHA-0403	Washer	下輪鎖緊墊圈		1
47	SEE-3007DM	Motor pulley	馬達普利		1

AGB-703500 張力滑座組
TENSION ASSEMBLY



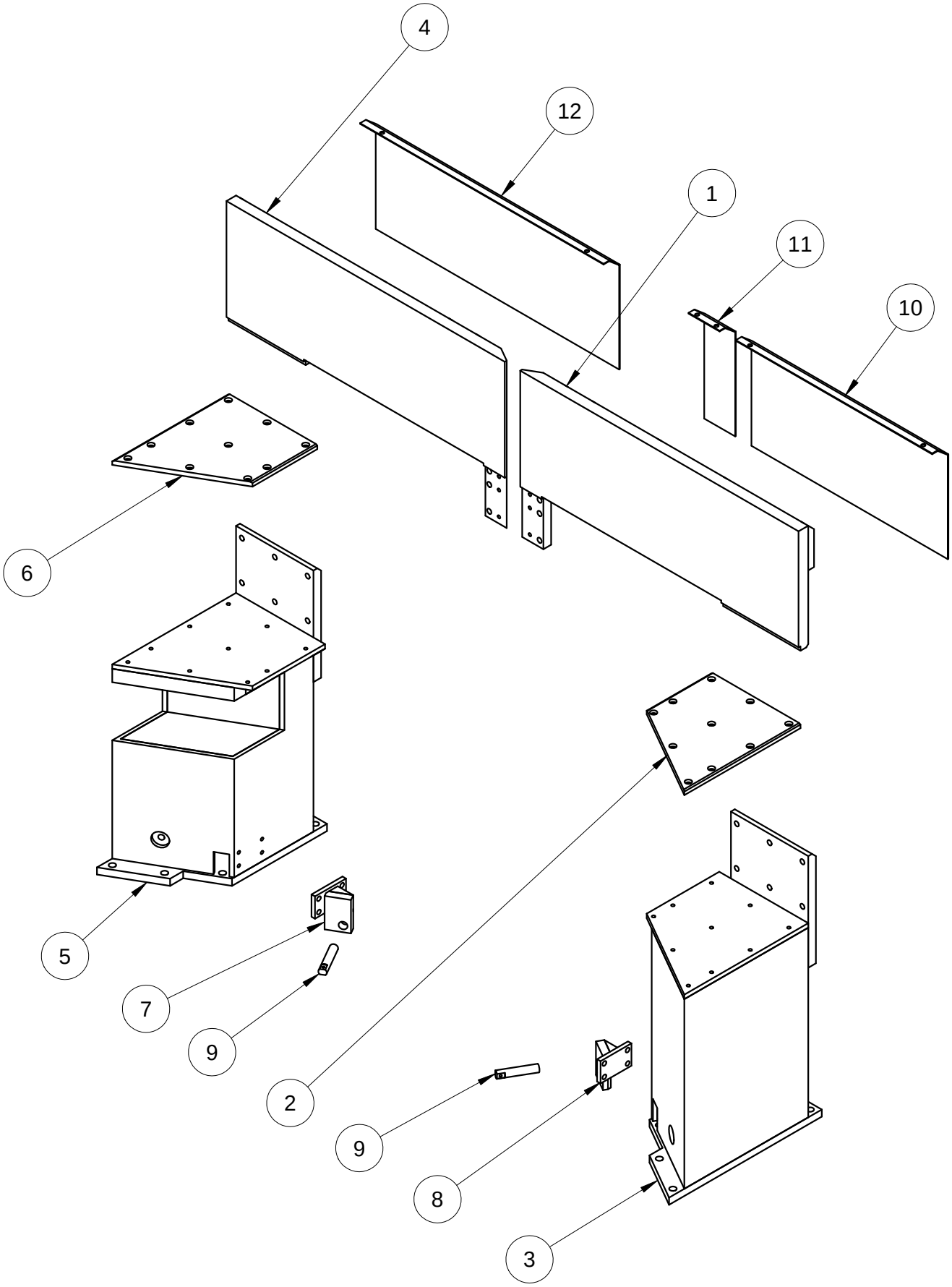
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AGB-70358	Tensioner sliding seat	張力滑座		1
2	AGB-70359	Slide piece	張力滑板		1
3	AGB-70360	Pressure plate	壓板		2
4	AHA-0610	Adjusting bolt	調整螺絲		3
5	AHA-0611	Adjusting nut	調整螺母		3

AGB-707209-1 張力油壓缸組
TENSION CYLINDER ASSEMBLY



ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AGB-70721	Cylinder cover	張力油缸護蓋		1
2	AGB-70722	Cylinder tube	張力油壓缸管		1
3	AGB-70723	Cylinder piston	張力油壓活塞		1
4	AGB-70720	Cylinder front cover	張力油缸前蓋		1
5	PP-51120	Oil seal	油封		1
6	PP-90858	Hexagon bolt	外六角螺栓		4
7	AHB-0651	Needle rod	切換閥針		1
8	AHN-3313	Spring	張力油壓缸內彈簧		1
9	PP-59120	O-ring	O型環	P-32	2
10	PP-59050	O-ring	O型環	P-11	1
11	PP-59615	O-ring	O型環	G-95	2
12	AHB-0655	Plate	閥針定位板		1
13	PQA-6	Spring washer	彈簧華司		1
14	PBA-6-16	Hex soc cap screw	有頭內六角螺絲		1
15	PP-59802	O-ring	O型環	P-90	2

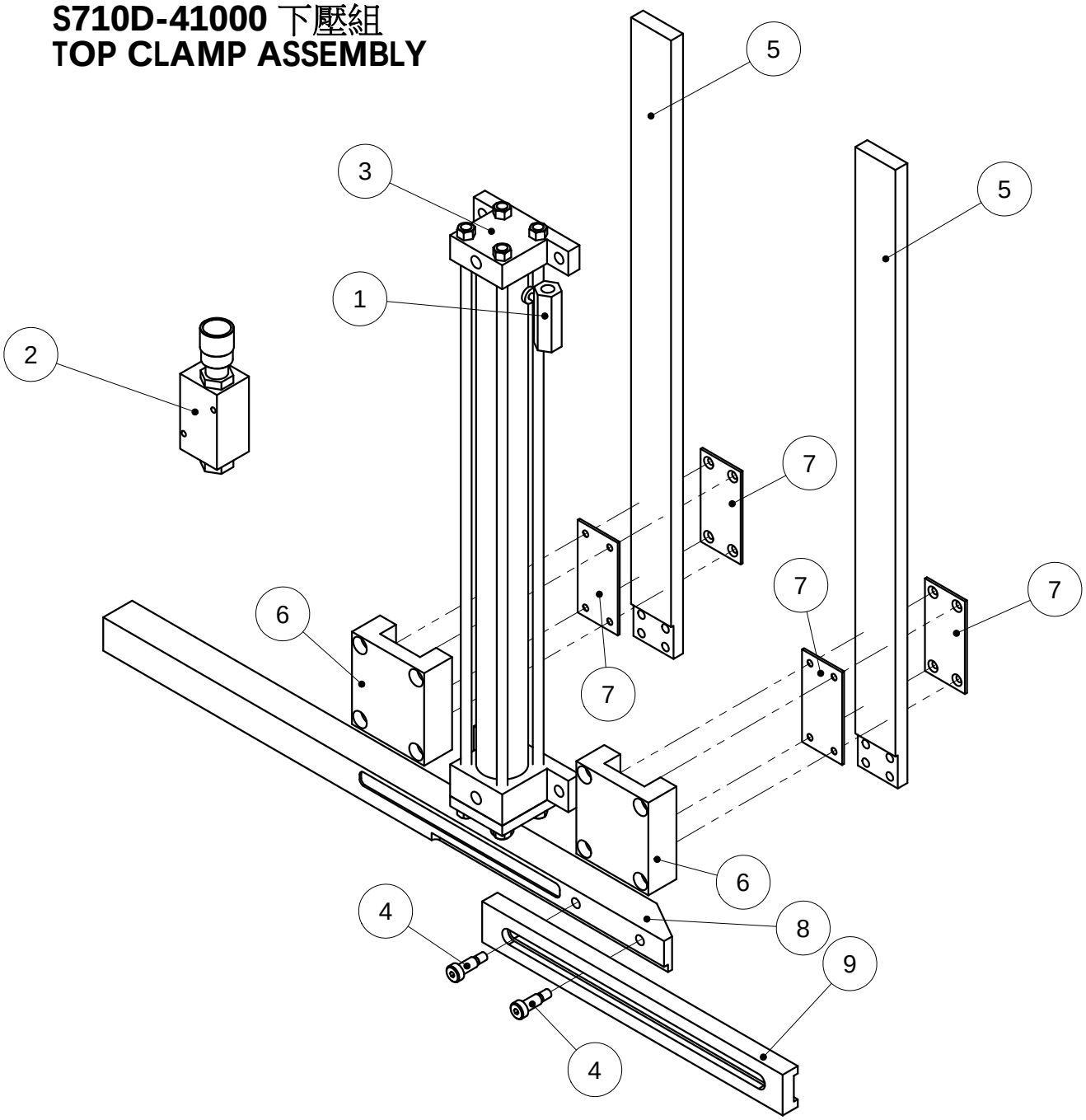
S710D-22000 虎鉗組
VISE ASSEMBLY



S710D-22000 虎鉗組
VISE ASSEMBLY

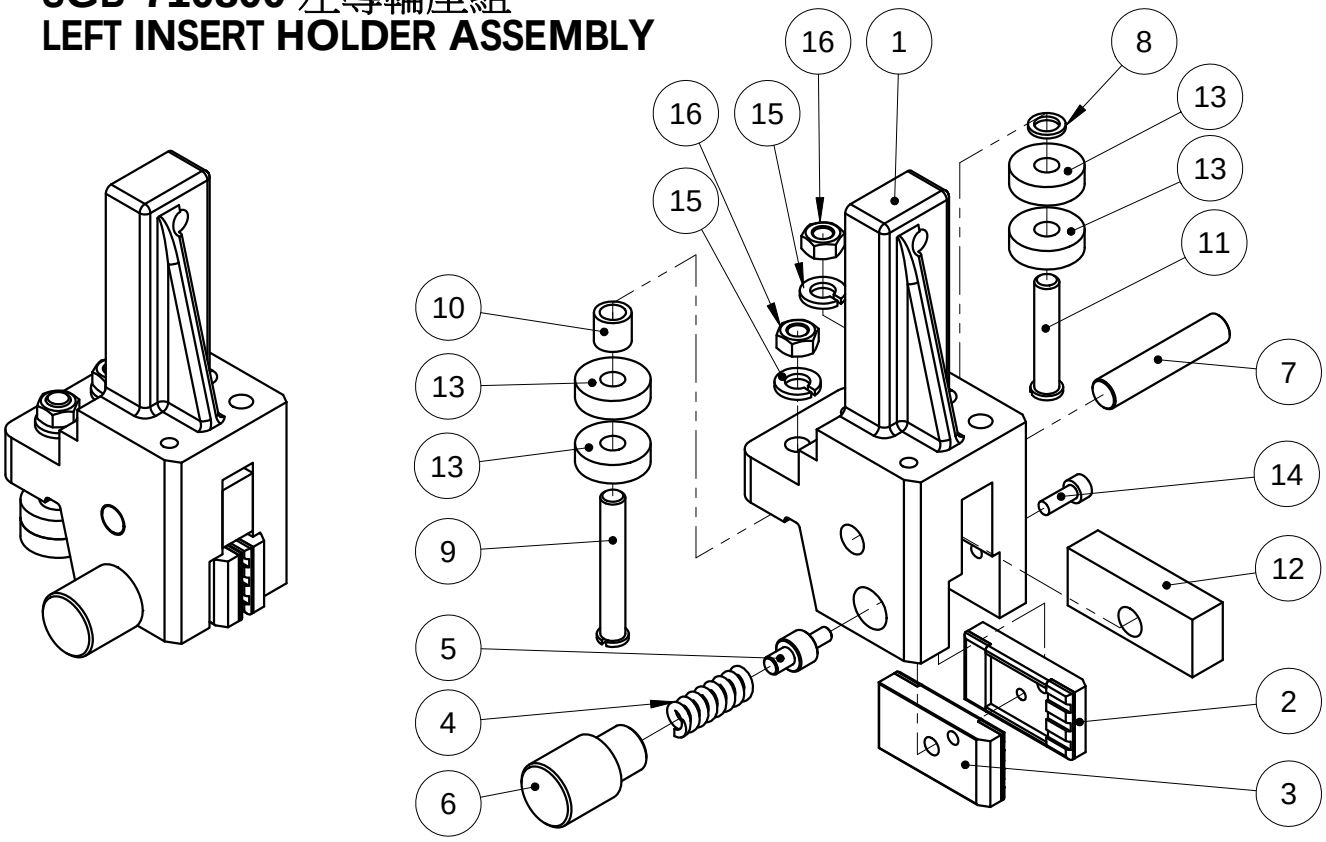
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	S710D-2201	Front fixed vise	前固定虎鉗		1
2	S710D-2216	Front vise seat plate	前虎鉗座鋼板		1
3	S710D-2215	Front vise seat	前虎鉗座		1
4	S710D-2221	Rear fixed vise	後固定虎鉗		1
5	S710D-2235	Rear vise seat	後虎鉗座		1
6	S710D-2236	Rear vise seat plate	後虎鉗座鋼板		1
7	S710D-1377	Rotating chain adjusting seat	旋轉鏈條調整座		1
8	S710D-1378	Rotating chain adjusting seat	旋轉鏈條調整座		1
9	S710D-1375	Rotating chain adjusting screw	旋轉鏈條調整螺絲		2
10	S710D-2240-1	Front fixed vise cover 1	前固定虎鉗護蓋(一)		1
11	S710D-2240-2	Front fixed vise cover 2	前固定虎鉗護蓋(二)		1
12	S710D-2239	Rear fixed vise cover	後固定虎鉗護蓋		1

S710D-41000 下壓組
TOP CLAMP ASSEMBLY



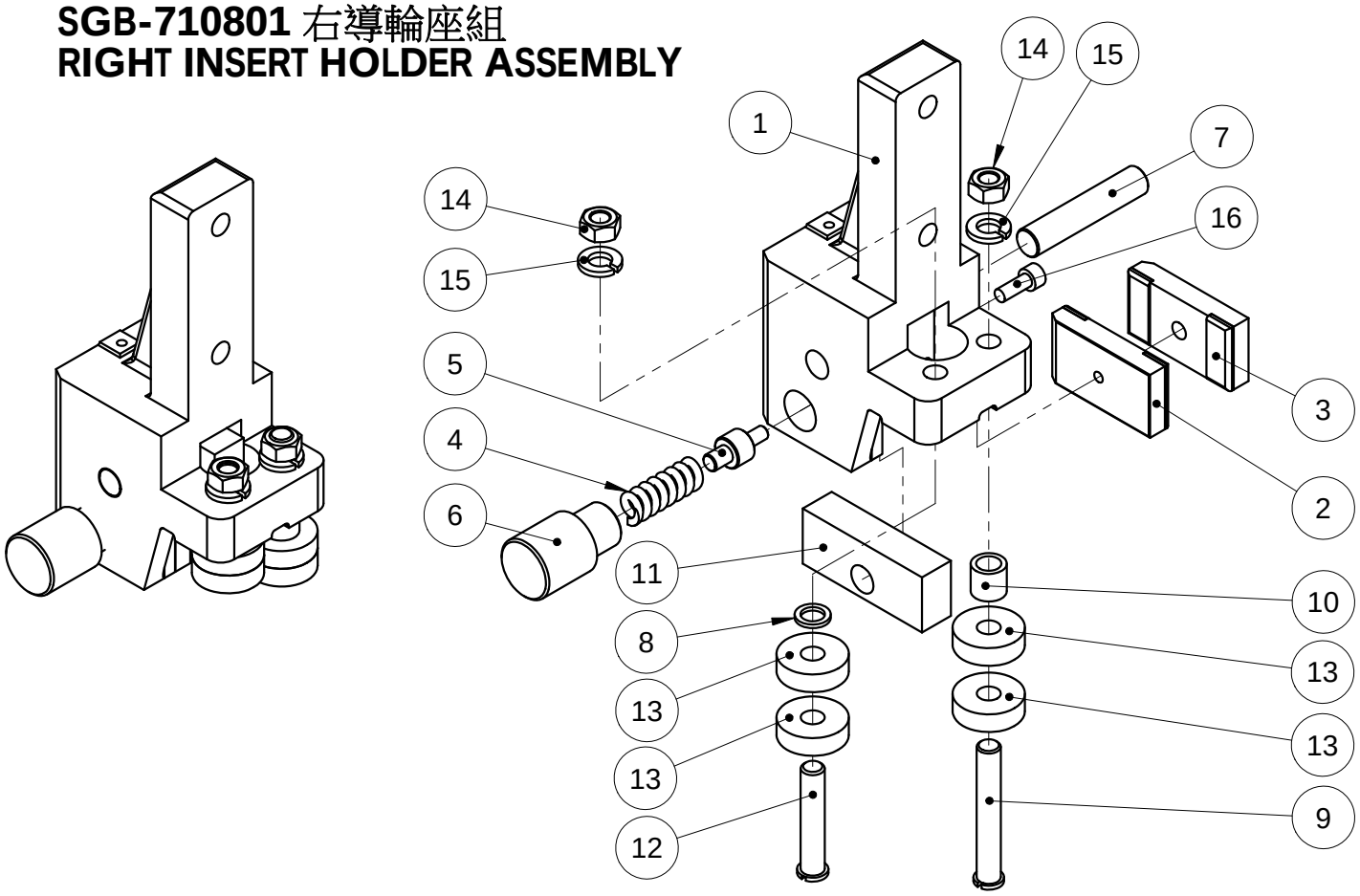
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	PP-43117	Flow control valve	流量閥	1/4	1
2	PP-43127B	Pressure regulator	減壓閥	RSN-P02	1
3	PP-43422F	Hydraulic cylinder	油壓缸	LA ϕ 40x500L	1
4	PP-91315B	Cap screw	等高螺絲	MSB-10-20	2
5	S710D-4121	Guide board	下壓導板		2
6	S710D-4123	Guide board seat	下壓導板座		2
7	S710D-4125	DU plate	乾式軸承片		4
8	S710D-4127	Clamping block	下壓塊		1
9	S710D-4129	Clamping extension block	下壓延伸塊		1

SGB-710800 左導輪座組
LEFT INSERT HOLDER ASSEMBLY



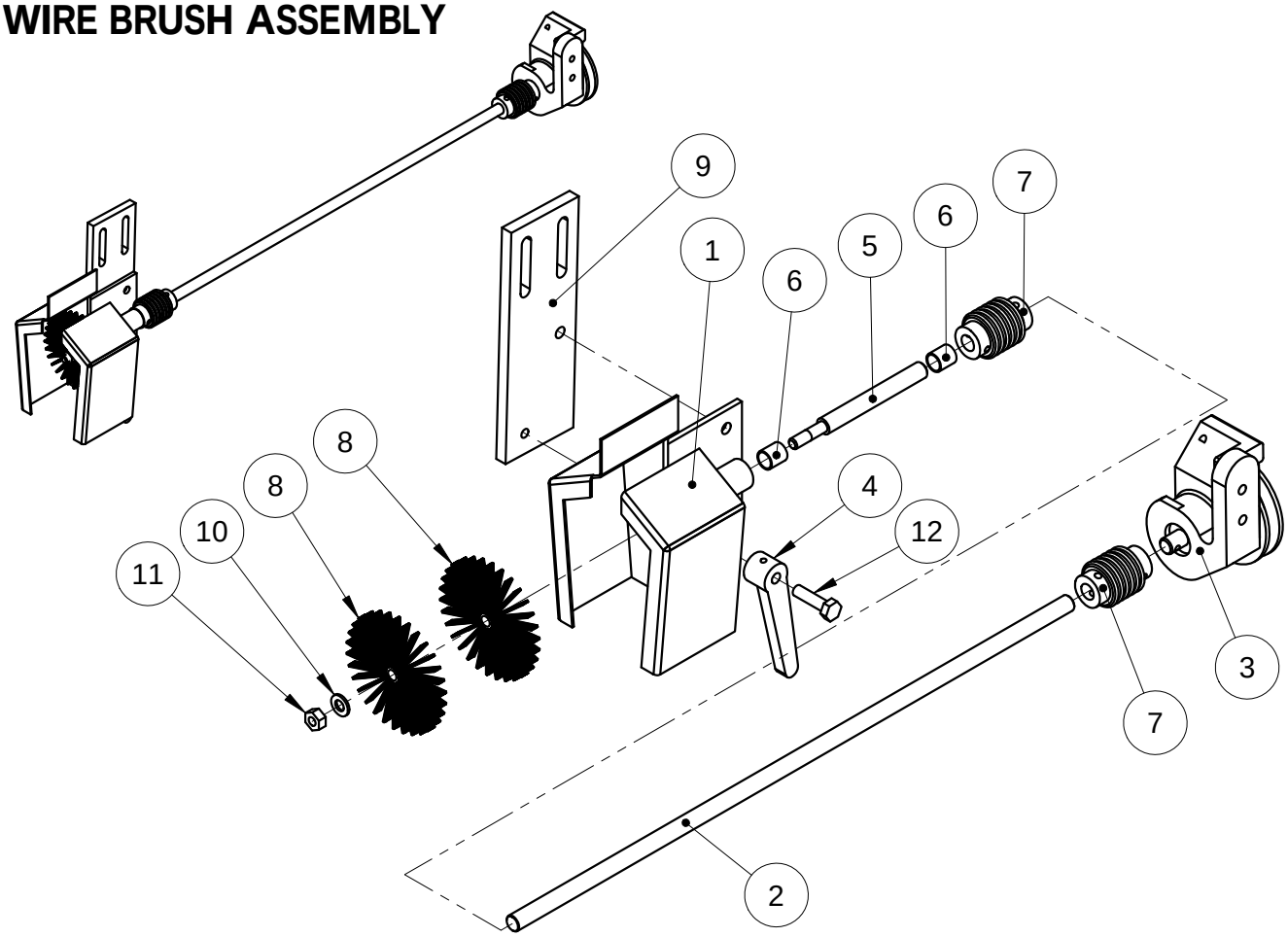
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	SGB-71085	Left insert holder seat	左導輪座		1
2	SGB-71088	Left fixed insert	左固定鎢鋼片		1
3	SGB-71089	Left movable insert	右活動鎢鋼片		1
4	SGB-71090	Spring	鎢鋼片彈簧		1
5	SGB-71091	Spring plug	簧塞		1
6	SGB-71092	Carbide insert bolt	鎢鋼片鎖緊螺絲		1
7	AGB-70410A	Pin	下壓軸承座銷		1
8	AGB-70412	Washer	下壓軸承墊圈		1
9	AGB-70417	Shaft (long)	導輪軸(長)		1
10	AGB-70418	Washer	導輪墊圈		1
11	AHA-0707C	Shaft 3	導輪軸(三)		1
12	AHA-0704A	Pressure block	下壓座(EU79用)		1
13	PP-14270B	Bearing	軸承	6200DDU	4
14	PBA-6-16	Hex soc cap screw	有頭內六角螺絲	M6*16L	1
15	PQA-10	Spring washer	彈簧華司	M10	2
16	POA-10	Nut	螺母(公)	M10	2

SGB-710801 右導輪座組
RIGHT INSERT HOLDER ASSEMBLY



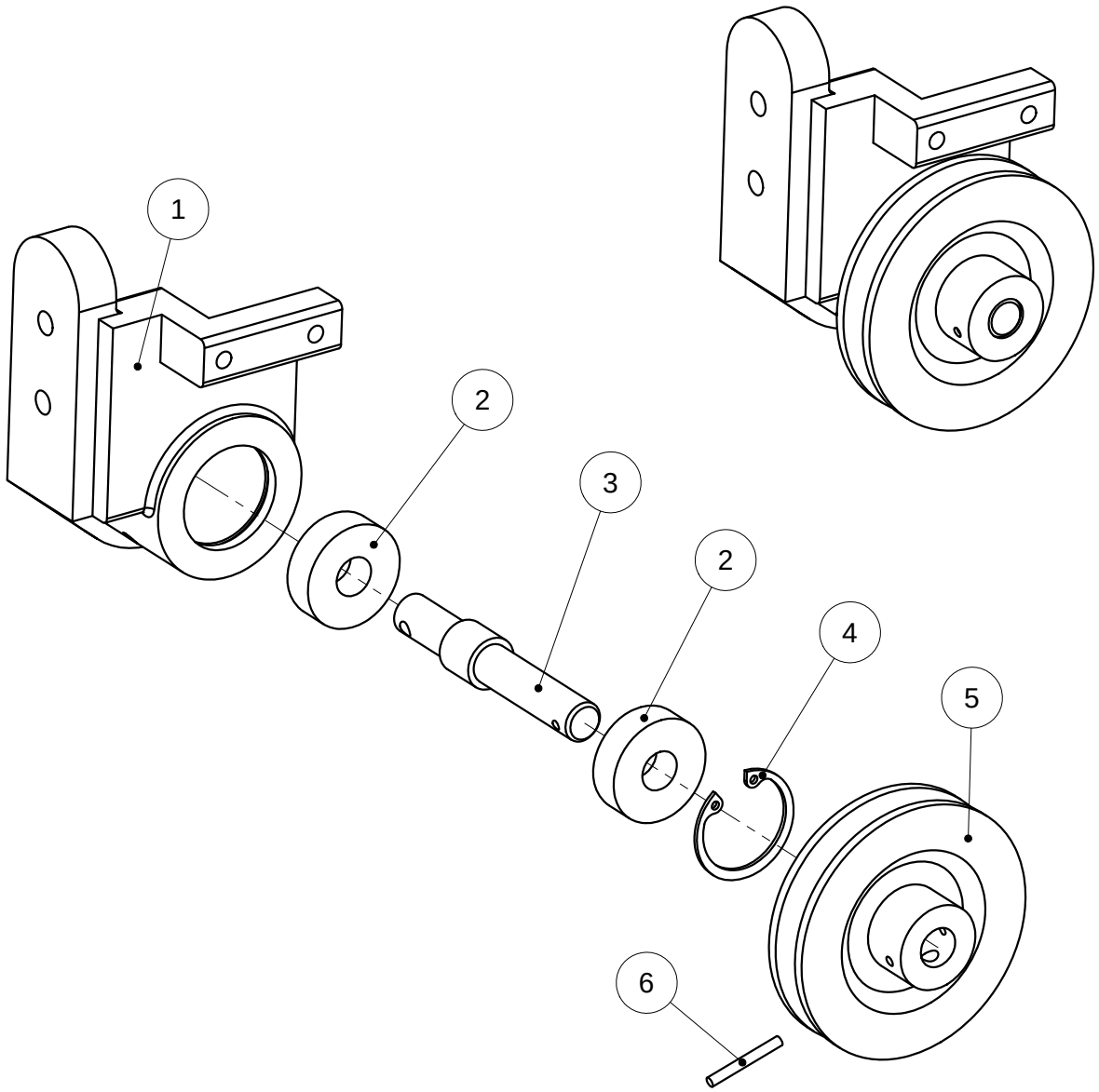
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	SGB-71084	Right insert holder seat	右導輪座		1
2	SGB-71086	Right fixed insert	右固定鎢鋼片		1
3	SGB-71087	Right movable insert	右活動鎢鋼片		1
4	SGB-71090	Spring	鎢鋼片彈簧		1
5	SGB-71091	Spring plug	簧塞		1
6	SGB-71092	Carbide insert bolt	鎢鋼片鎖緊螺絲		1
7	AGB-70410A	Pin	下壓軸承座銷		1
8	AGB-70412	Washer	下壓軸承墊圈		1
9	AGB-70417	Shaft (long)	導輪軸(長)		1
10	AGB-70418	Washer	導輪墊圈		1
11	AHA-0704A	Pressure block	下壓座(EU79用)		1
12	AHA-0707C	Shaft 3	導輪軸(三)		1
13	PP-14270B	Bearing	軸承	6200DDU	4
14	POA-10	Nut	螺母(公)	M10	2
15	PQA-10	Spring washer	彈簧華司	M10	2
16	PBA-6-16	Hex soc cap screw	有頭內六角螺絲	M6*16L	1

S710D-32200 鋼刷組
WIRE BRUSH ASSEMBLY



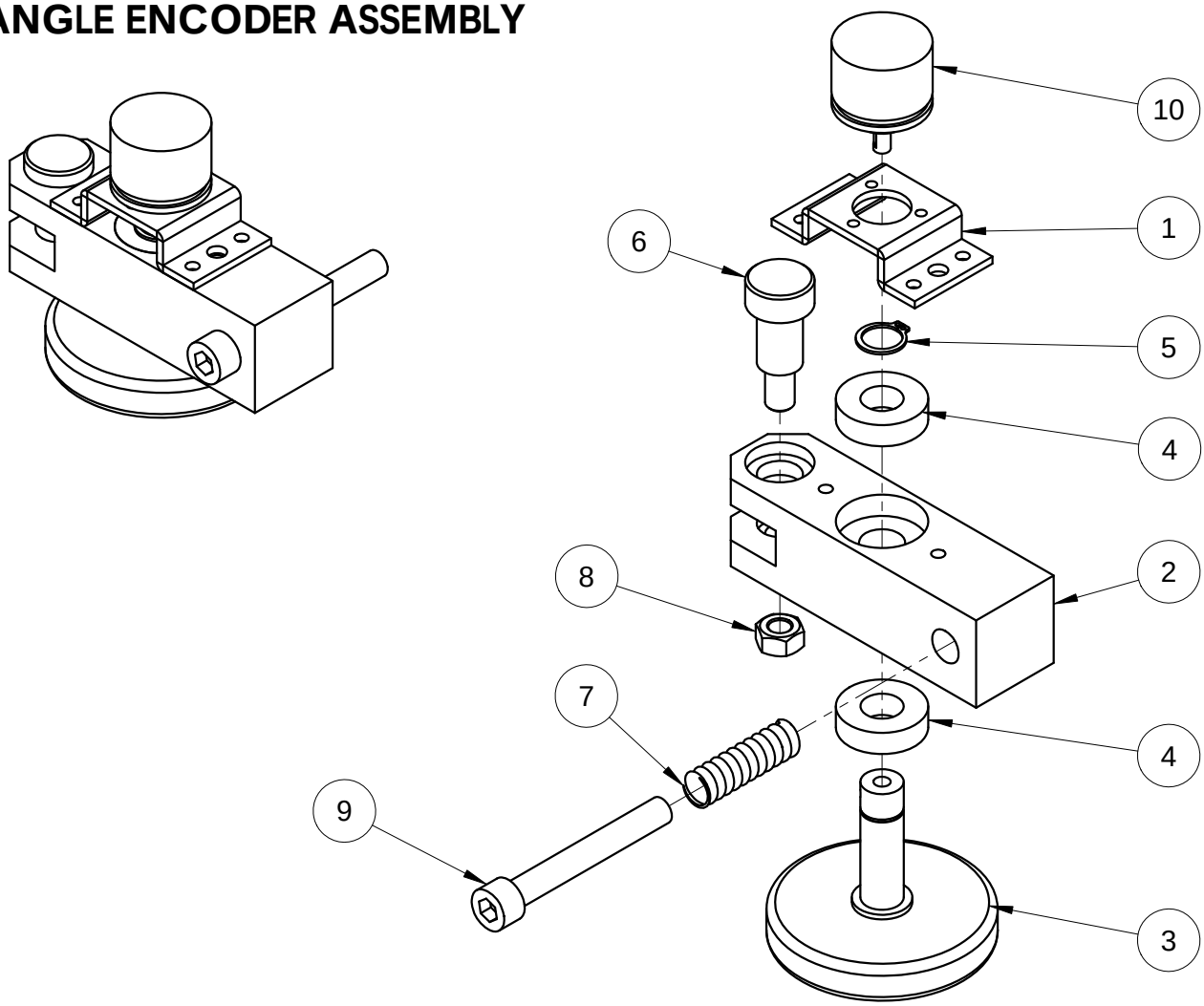
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AGB-70317	Wire brush cover	鋼刷護蓋		1
2	AGB-70755	Connecting rod	鋼刷連桿		1
3	AHA-12110-1	Wire brush bearing seat assembly	鋼刷軸承座組		1
4	AHA-1217	Lock lever	鋼刷調整桿		1
5	AHB-0519	Wire brush shaft	鋼刷軸		1
6	PP-13025	DU bushing	乾式軸承		2
7	PP-15010	Universal joint	萬向接頭	12mm	2
8	PP-58002	Wire Brush	鋼刷	M#0.3	2
9	S710D-3231	Wire brush cover fixed plate	鋼刷護蓋固定板		1
10	PPA-8	Flat washer	平面華司	M8	1
11	POA-8	Nut	螺帽	M8	1
12	PLA-8-30	Hexagon bolt	外六角頭螺絲		1

AHA-12110-1 鋼刷軸承座組
BRUSH SHAFT ASSEMBLY



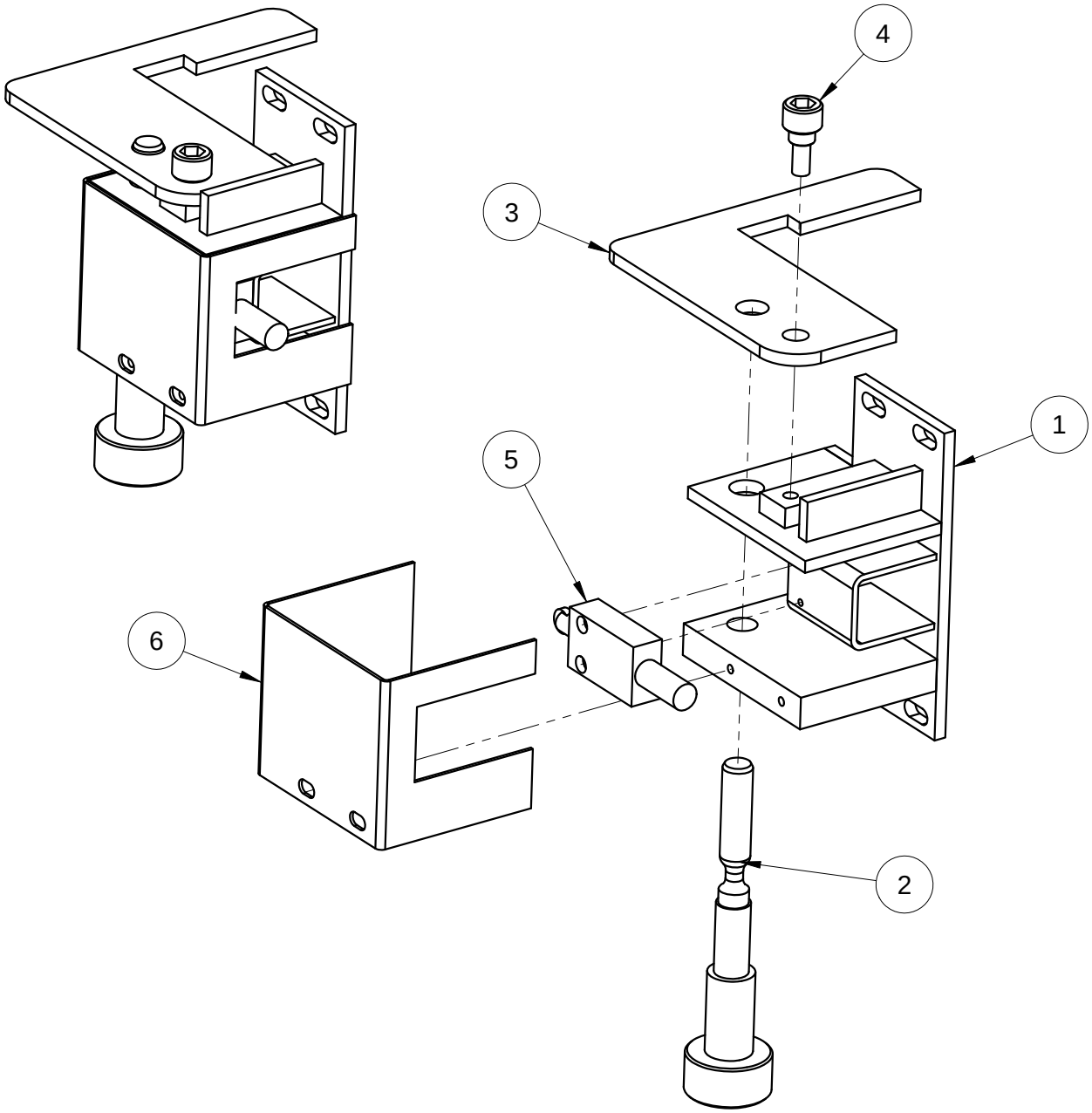
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AHA-1211	Bearing bracket	軸承座		1
2	PP-14271A	Bearing	軸承	6201DDU	2
3	AHA-1207	Pulley shaft	皮帶輪軸		1
4	PP-58109	Snap ring	扣環	R32	1
5	AHA-1202	Brush pulley	鋼刷皮帶輪		1
6	PRD-3-25	Pin	平行銷	Φ3*25L	1

S710D-13800 角度譯碼器組
ANGLE ENCODER ASSEMBLY



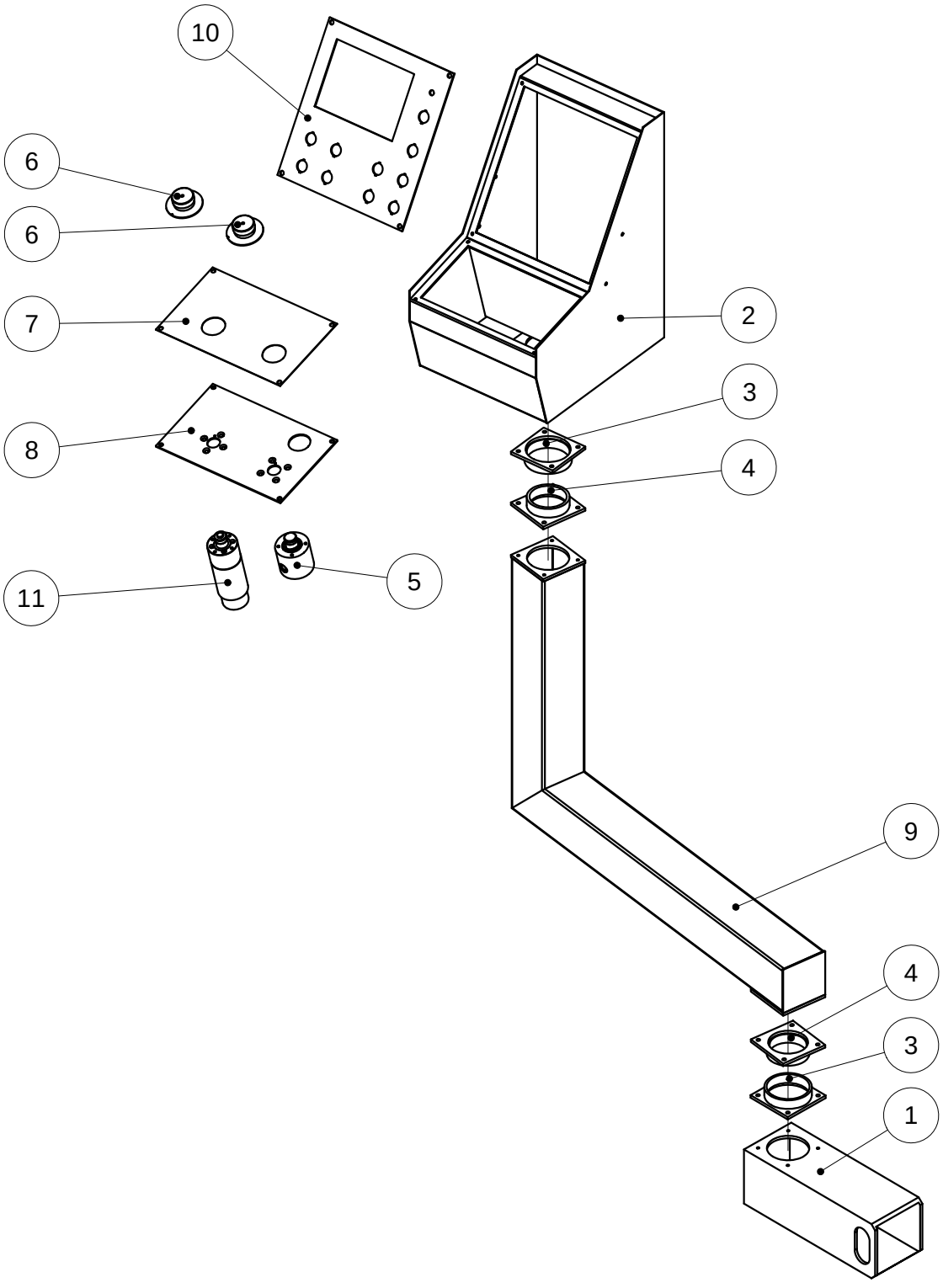
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	S710D-1387	Encoder seat	譯碼器固定座		1
2	S710D-1383	Detecting roller seat	偵測滾輪座		1
3	S710-1381	Detecting roller	偵測滾輪		1
4	PP-14250	Bearing	軸承	6002ZZ	2
5	PP-52097	Snap ring	扣環	S15	1
6	PP-91310	Cap screw	等高螺絲	MSB-16-25	1
7	M3L-9-10	Spring	微動彈簧		1
8	POA-10	Nut	螺母(公)	M10	1
9	PBA-10-75	Hex soc cap screw	有頭內六角螺絲	M10X75L	1
10	EP-90491B	Encoder	譯碼器		1

安全開關組
WHEEL COVER INTERLOCK SWITCH ASSEMBLY



ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	C320G-3024	Left fixed seat	左固定座		1
2	C320G-3023	Core shaft	心軸		1
3	C320G-3025	Shield	擋板		1
4	C320G-3027	Shaft	轉軸		1
5	EP-90014	Switch	安全開關	XCM D2-02L1	1
6	C320G-3026	Left cover	左遮蓋		1

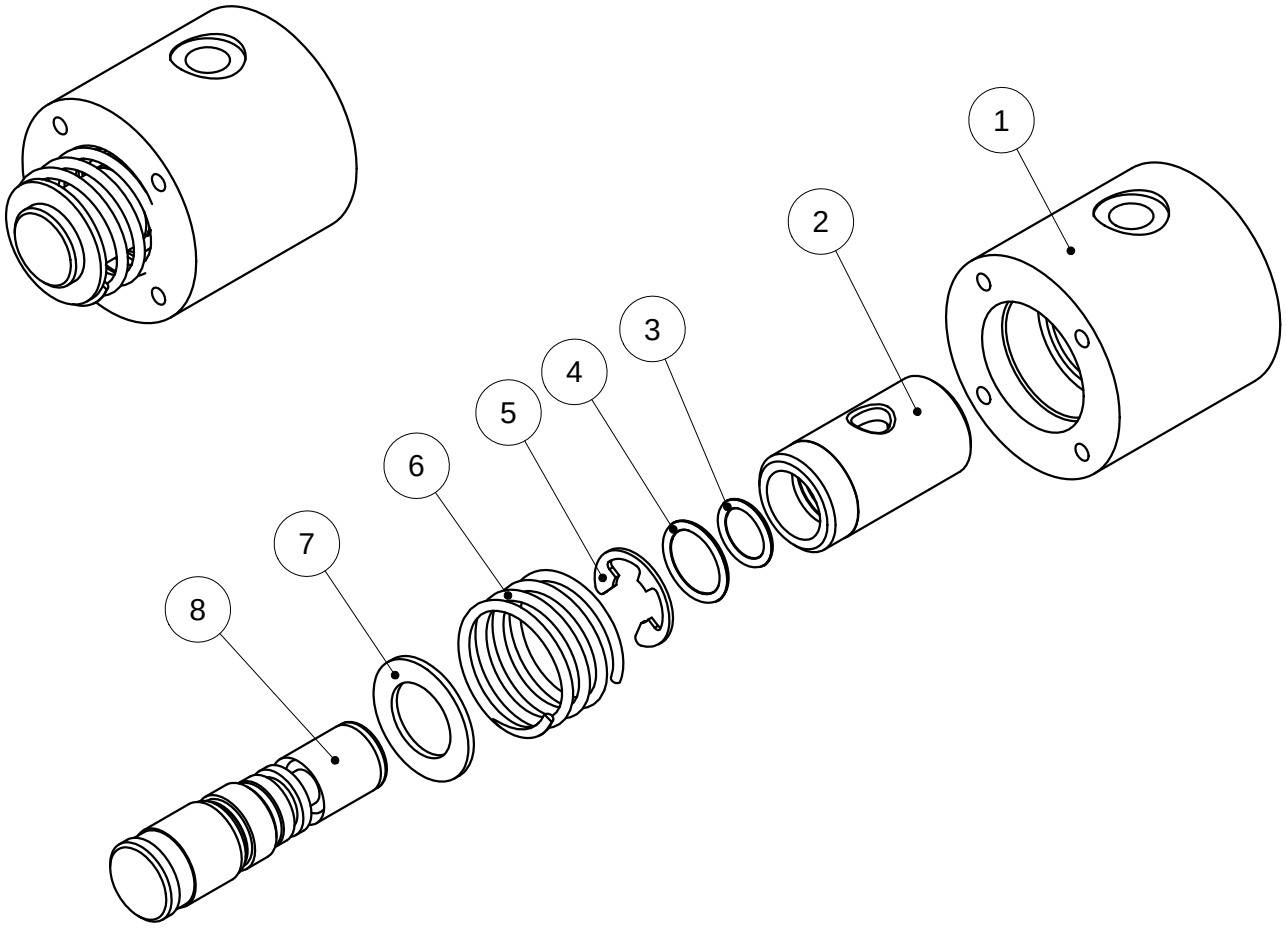
S710D-13000 控制箱組
CONTROL BOX ASSEMBLY



S710D-13000 控制箱組
CONTROL BOX ASSEMBLY

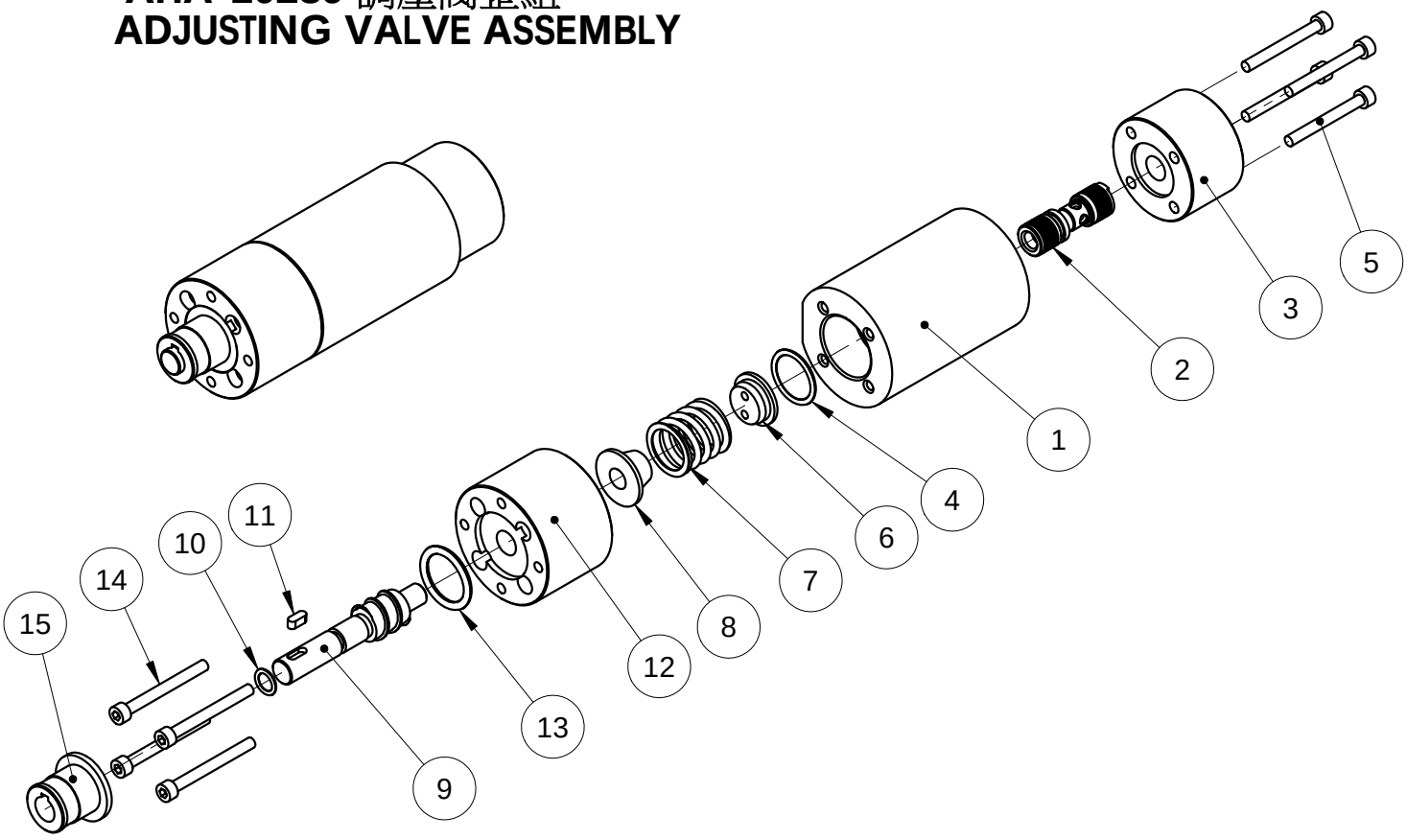
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	S710D-1344	Control box fixed seat	控制箱旋轉固定座		1
2	S710D-1337	Control box	操作箱		1
3	S710D-1339	Control box stand 1	操作箱座(一)		2
4	S710D-1341	Control box stand 2	操作箱座(二)		2
5	AHA-6100	Flow control valve assembly	流量閥組		1
6	AHA-1806	Control knob	流量閥旋鈕		2
7	S710D-1325J	Flow control valve panel	流量閥面板		1
8	S710D-1327	Flow control valve base plate	流量閥底板		1
9	S710D-1343A	Control box stand 3	控制箱座(三)		1
10	S710D-1321-CE	Control panel	控制面板		1
11	AHA-10289	Adjusting valve assembly	調壓閥整組		1

AHA-6100 流量閥組
FLOW CONTROL VALVE ASSEMBLY



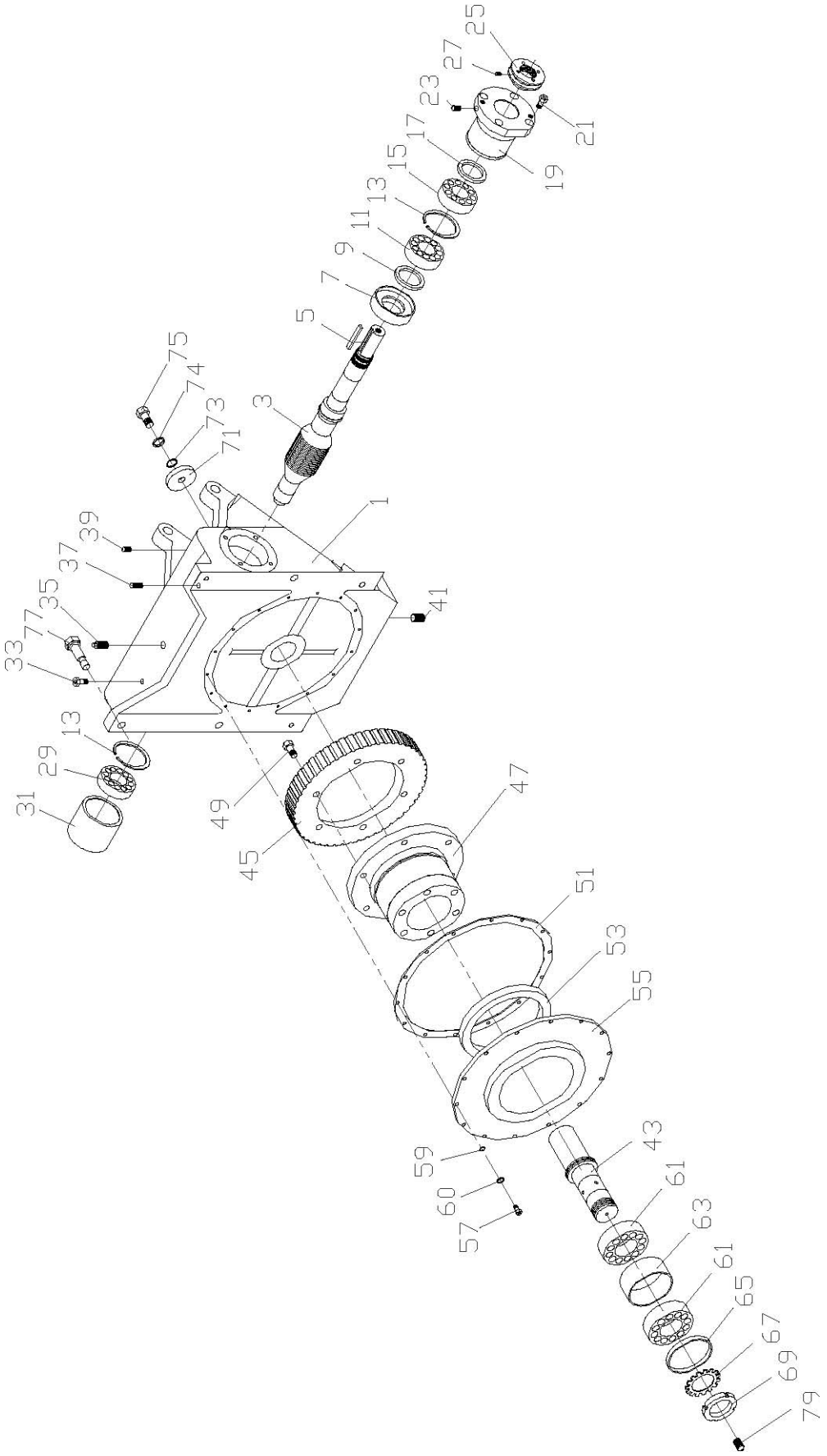
AHA-6100 流量閥組 FLOW CONTROL VALVE ASSEMBLY					
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AHA-1039	Valve seat	閥座(流量閥)		1
2	AHA-1043	Valve sleeve	針閥套筒		1
3	PP-59071	O-ring	O形環	P-15	1
4	PP-59075	O-ring	O形環	P-19	1
5	PP-58152	E-ring	E扣環	E-19	1
6	AHA-1042	Spring	彈簧		1
7	AHA-1041	Washer	彈簧墊圈		1
8	AHA-1040	Needle valve	針閥(流量閥)		1

AHA-10289 調壓閥整組
ADJUSTING VALVE ASSEMBLY



ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY
1	AHA-1029	Valve seat	閥座		1
2	AHA-1030	Valve	針閥		1
3	AHA-1036	Rear cap	後蓋		1
4	PP-59082	O-ring	O形環	P-22	1
5	PBA-5-45	Hex soc cap screw	有頭內六角螺絲		4
6	AHA-1031	Spring positioning sleeve 1	彈簧定位套(一)		1
7	AHA-1032	Spring	彈簧		1
8	AHA-1033	Spring positioning sleeve 2	彈簧定位套(二)		1
9	AHA-1034	Adjusting bolt	調整螺栓		1
10	PP-59030	O-ring	O型環	P-9	1
11	PS-4-4-10	Key	方鍵	4*4*10L	1
12	AHA-1035	Front cap	前蓋		1
13	PP-59090	O-ring	O型環	P-24	1
14	PBA-5-50	Hex soc cap screw	有頭內六角螺絲	M5*50L	4
15	AHA-1037	Knob	旋鈕座		1

AGB-703109 減速機整組
GEAR BOX ASSEMBLY



AGB-703109 減速機整組
GEAR BOX ASSEMBLY

ITEM	PART NO.	PART NAME	PART NAME (CH)	PART SPEC.	COUNT	UNIT
1	SGA-2054	Gear box body	減速機本體		1	PCS
3	AGB-70311A	Worm shaft	蝸桿		1	PCS
5	PS-4-7	Key	方鍵	4 x 7 x 50L	1	PCS
7	SGA-2060	Bearing seat cover	軸承座蓋		1	PCS
9	PP-51105	Oil seal	油封	50x67x9	1	PCS
11	PP-14619	Tapered roller bearing	滾錐軸承	30211	1	PCS
13	PP-58116	Snap ring	扣環	R80	2	PCS
15	PP-14654	Tapered roller bearing	滾錐軸承	30308	1	PCS
17	PP-51101	Oil seal	油封	48x65x9	1	PCS
19	AGB-70338	Bearing seat 1	軸承座(一)		1	PCS
21	PBA-8-25	Hex soc cap screw	有頭內六角螺絲	M8 x 25L	4	PCS
23	PUC-005	Grease nipple	油嘴	1/16"	1	PCS
25	SGA-2061	Wire brush pulley	鋼刷普利		1	PCS
27	PAA-5-8	Set screw	止付螺絲	M5 x 8L	2	PCS
29	PP-14131	Bearing	軸承	6206Z	1	PCS
31	SGA-2058	Cover	蝸桿蓋		1	PCS
33	AHA-0328	Filling screw	注油螺絲	M8 x 16L (3/16-28 牙)	1	PCS
35	AHA-0307	Hex socket head plug	透氣塞頭	1/2"	1	PCS
37	PAA-8-20	Set screw	止付螺絲	M8 x 20L	1	PCS
39	PUC-020	Grease nipple	油嘴	1/4"	1	PCS
41	PED-025	Hex head plug	管塞	1/2"	1	PCS
43	AGB-70309	Drive wheel shaft	下輪軸		1	PCS
45	AGB-70310A	Warm gear	蝸輪		1	PCS
47	AGB-70312	Housing	蝸輪固定座		1	PCS
49	PBA-10-35	Hex soc cap screw	有頭內六角螺絲	M10 x 35L	6	PCS
51	SGA-2069	Asbestos washer	迫緊石棉		1	PCS
53	PP-51125A	Oil seal	油封	170x200x16	1	PCS
55	SGA-2067	Fixed ring	油封固定盤		1	PCS
57	PBA-6-16	Hex soc cap screw	有頭內六角螺絲	M6 x 16L	14	PCS
59	PQA-6	Spring washer	彈簧華司	M6	14	PCS
60	PPA-6	Flat washer	平面華司	M6	14	PCS
61	PP-14693	Tapered roller bearing	滾錐軸承	32208	1	PCS
63	AGB-70313	Bearing washer 1	軸承墊圈(一)		1	PCS
65	AGB-07314	Bearing washer 2	軸承墊圈(二)		1	PCS

AGB-703109 減速機整組
GEAR BOX ASSEMBLY

67	PP-14961	Toothed ring	止動環	AW11	1	PCS
69	PP-14911	Fixed nut	固定螺母	AN11	1	PCS
71	AHB-0613	Lock washer	鎖緊墊圈		1	PCS
73	PQA-12	Spring washer	彈簧華司	M12	1	PCS
74	PPA-12	Flat washer	平面華司	M12	1	PCS
75	PBA-12-35	Hex soc cap screw	有頭內六角螺絲	M12 x 35L	1	PCS
77	AHA-0309	Fixed bolt	固定螺絲		2	PCS
79	PUC-005	Grease nipple	油嘴	1/16"	1	PCS

Section 11

Warranty

Warranty

New machines are warranted to be free from defects in workmanship and material for a period of one (1) year from the date of shipment by Seller. The warranty period is based on normal usage of two thousand eighty hours (2080) per year and is reduced proportionately for any excess usage. Products, which under normal operating conditions in Buyer's plant are defective in workmanship or material, will be repaired or replaced at the option of Seller.

This warranty does not cover shipping freight charges for either the return of the defective part or for the shipping of the replacement or repaired part.

Seller will have no obligation to repair or replace perishable parts, or materials or parts damaged by misuse, negligence or failure of Buyer to provide appropriate maintenance and service as stated in the operator's manual or industry standard and normally acceptable practices.

This warranty does not apply if the machine has been altered or modified without our prior written consent.

In the case of components or units purchased by Seller including work holding devices, tool holders, motors and controls, the warranty shall not exceed that received by Seller from the supplier of such components or units.

Seller will not assume responsibility for products or components returned to Seller without prior consent or for unauthorized repairs to its products, even though defective.

Electrical Equipment: The warranty available for all electrical components to the Buyer will be voided if the voltage supplied to the machine is found to be outside the stated voltage of the machine by +/- 10% and/or grounded at machine.

Accessories Supplied with Manufacturer's Equipment: The warranties available to the Buyer are those extended by the accessory manufacturer, if any, to the extent they are in force and effect. The ACCESSORY MANUFACTURER'S WARRANTY, if any, is exclusive and is in lieu of all other warranties whether written, oral or implied.

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