COSEN SAWS

C-650MNC

SNC Programmable Automatic Miter-Cutting Horizontal Bandsaw

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:

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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 step or stand on the roller table. Your foot may slip or trip on the rollers and you will fall.

- 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.

- 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.

- 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.

- 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.

- 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.

Safety rules

- 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.

- 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.

- 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.

- 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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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. 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

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

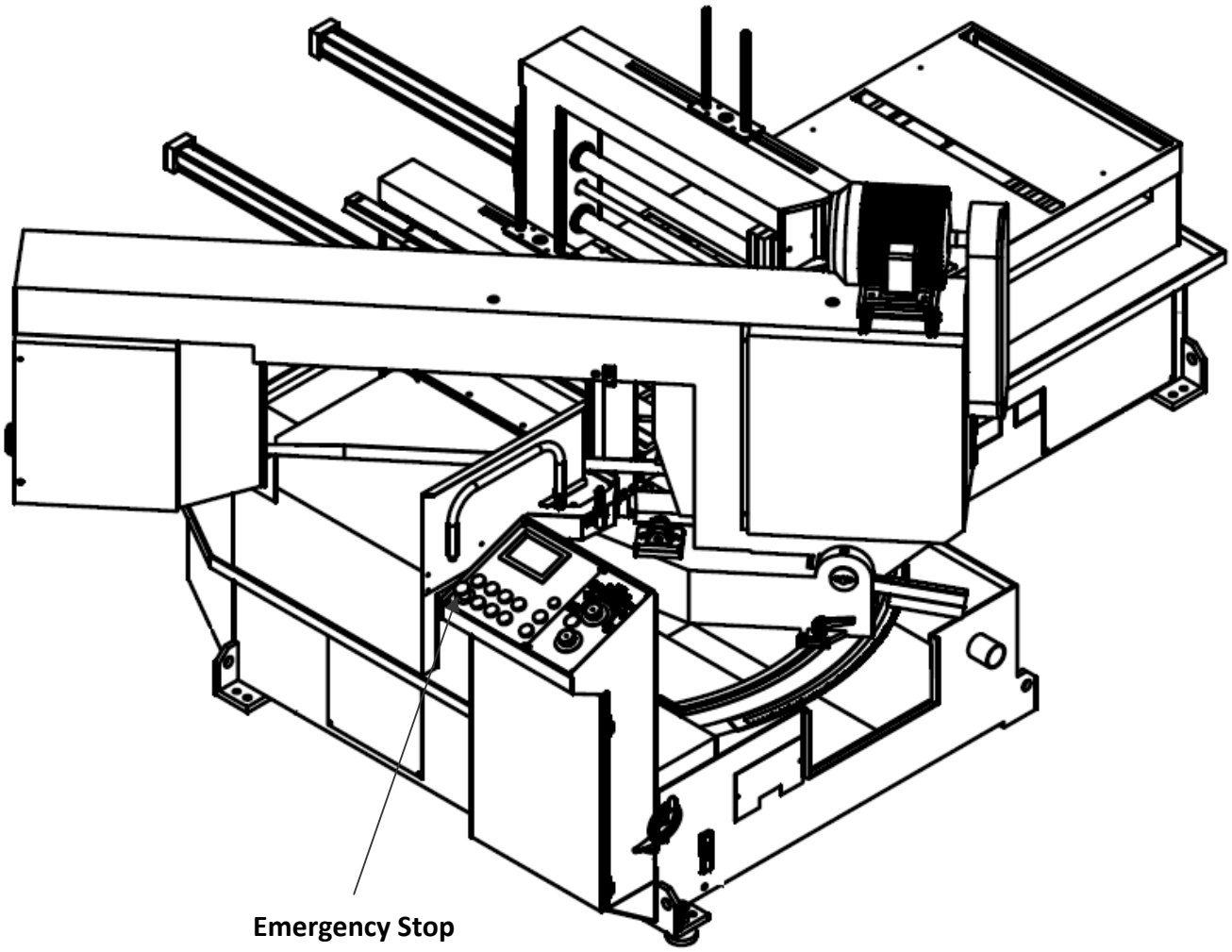
Designed to be easily accessible, the emergency stop button is located on the left bottom corner on the control panel and is made in red color and rubber material. For CE models, supplementary emergency stop button may be available at other area(s) of the machine depending on machine type. Please refer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

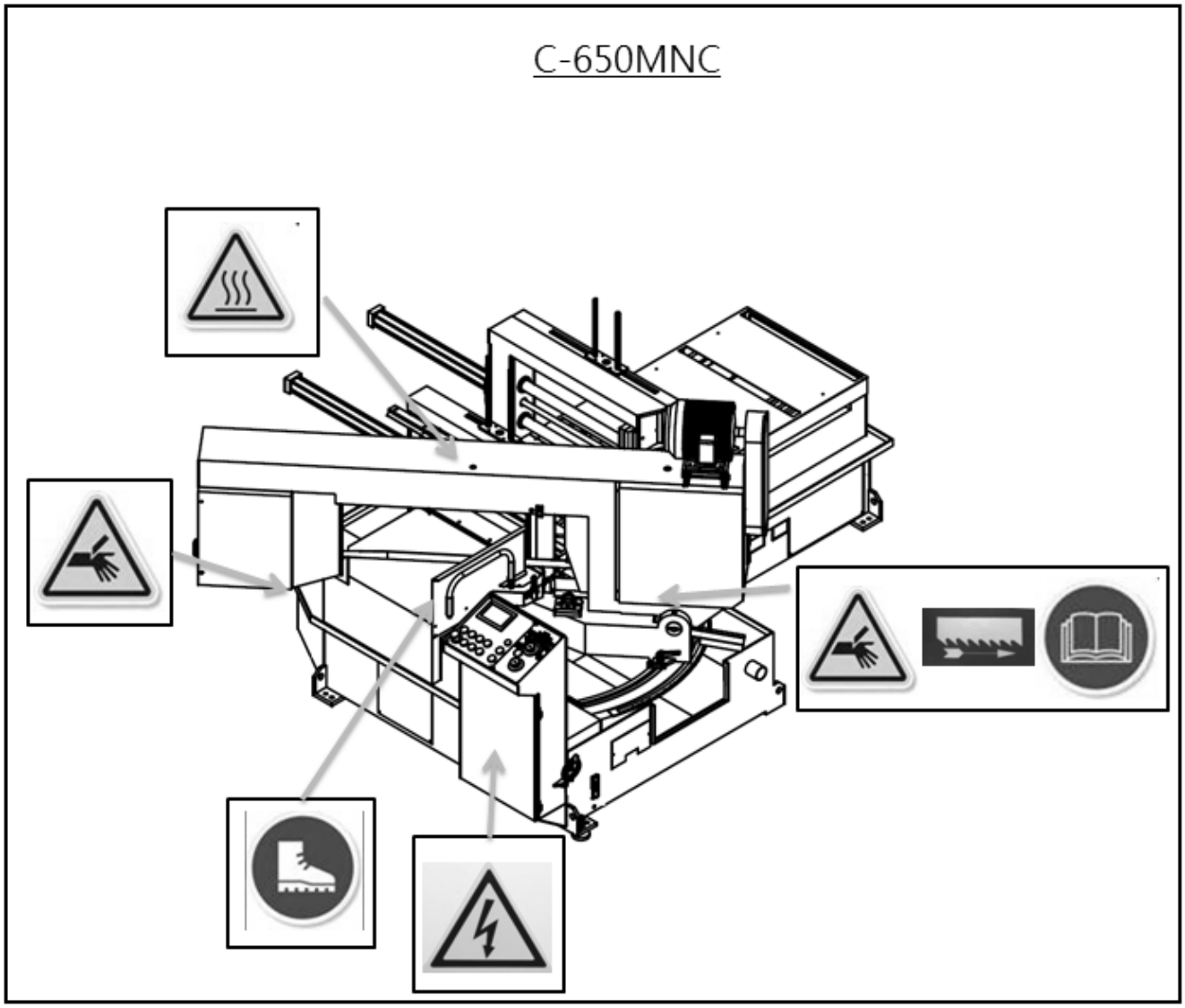


SAFETY LABELS

Please read through and understand them before operating the machine. Refer to *Illustration: Safety Labels.*

Label	Meaning	Label	Meaning
	Impact Hazard WEAR SAFETY SHOES. Do not approach dropping area during operation.		Read Operator's Manual This manual has important safety information. Read through it carefully before operating this machine to prevent personal injury or machine damage.
	Keep Unauthorized Personnel Away		Do not step. Do not stand on the machine or on the accessories!
	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.		Cutting Hazard KEEP COVER CLOSED / KEEP HAND OFF while the blade is running. Turn power off before opening cover. Failure to follow the warning can result in severe injury.
	Hazardous Voltage TURN POWER OFF before servicing. Failure to following the warning can result in severe injury.		Burn Hazard/Hot Surface
	Hand Crush/Force from Above		Crush hazard by vise
	Loose Hand Hazard KEEP HAND OFF. Do not touch chip conveyor. Failure to follow the warning can result in severe injury.		Pinch Point/Hand Entanglement

Illustration: Safety Labels



HEARING PROTECTION

 Always use ear protection!

When your machine is running, 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

Our products pass noise testing less than 78 dBA. Noise level vary according to working conditions and we recommend ear plugs or other hearing protection at all time. 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 8).
2. If maintenance does not seem to solve the problem, follow the troubleshooting procedures under Section 9.

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

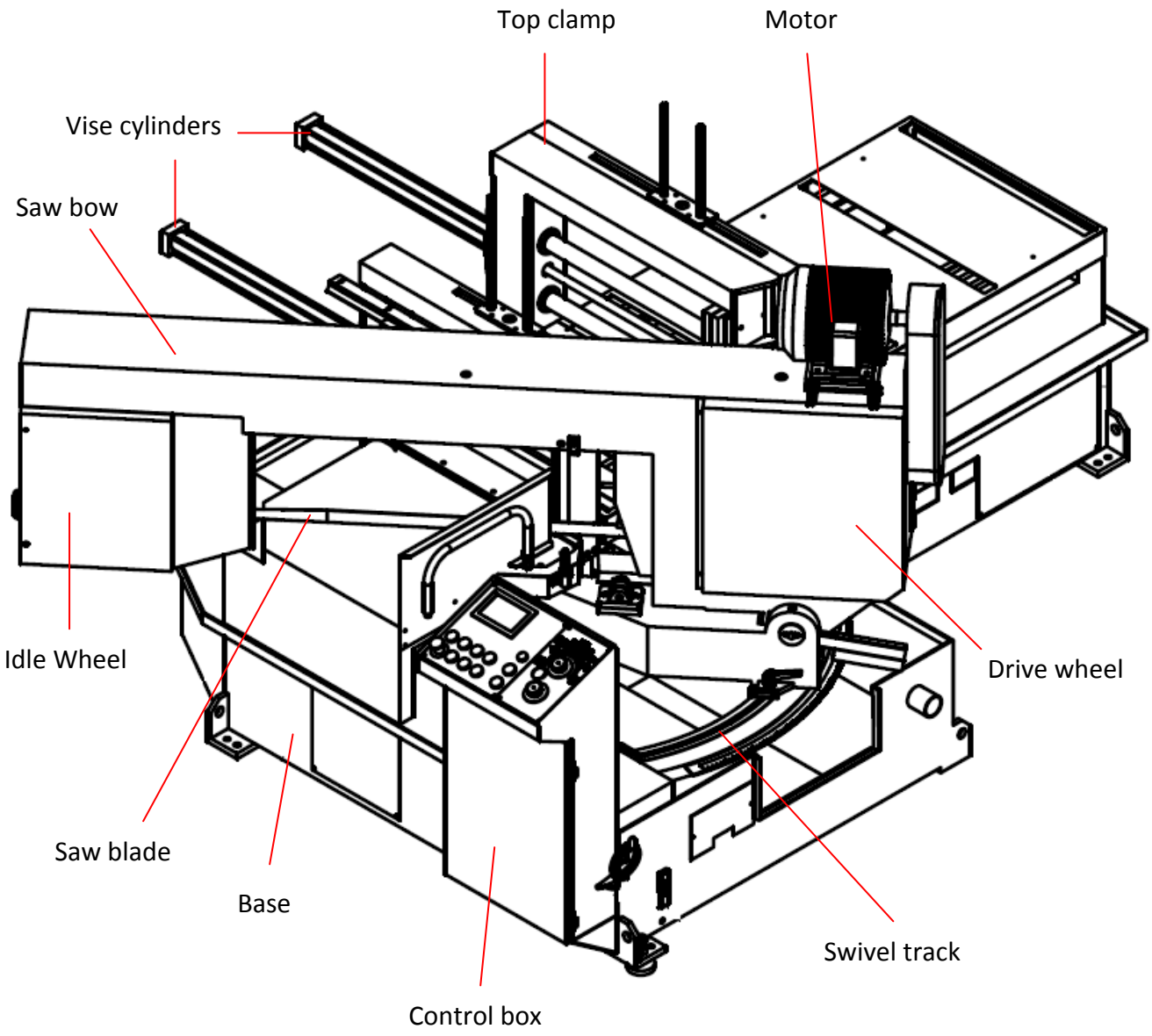
- The intended life-span of the machine is counted based on regular daily operation. It is calculated with the life expectancy of 10 years under normal operating condition and exact attention to the maintenance schedule.

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

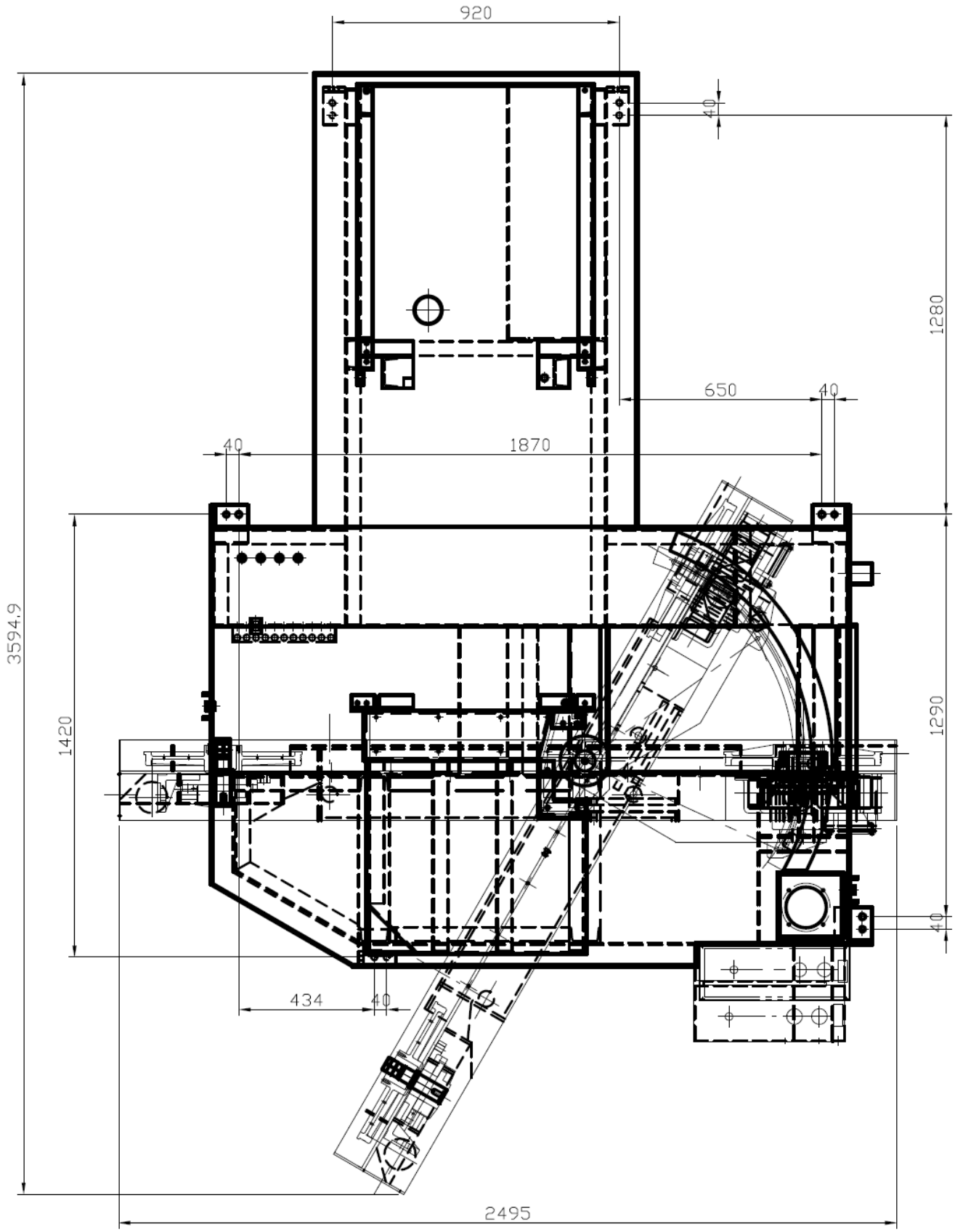
SPECIFICATION

Model		C-650MNC SNC Programmable Automatic Miter-Cutting Horizontal Bandsaw		
Capacity	Angle	0°	+45°	+60°
	Round	17.5” (445 mm)	17.5” (445 mm)	11.4” (290 mm)
	Rectangular (H x W)	17.5” x 26” (445 x 665 mm)	17.5” x 26” (445 x 665 mm)	17.5” x 11.4” (445 x 290 mm)
	Bundle Cutting	W: 7.1”, 15.7”, 25.6” H: 0.6” ~ 17.5”	(180, 400, 650 mm) (15 ~ 445 mm)	
Saw Blade	Speed	82 ~ 328 fpm (25 ~ 100 m/min)		
	Size (L x W x T)	209” x 1.6” x 0.05” (5,300 x 41 x 1.3 mm)		
	Tension	Hydraulic with automatic blade breakage detection		
	Guide	Interchangeable tungsten carbide		
	Cleaning	Steel wire brush		
Motor Output	Saw Blade	7.5 HP (5.6 kW)		
	Hydraulic	2 HP (1.5 kW)		
	Coolant Pump	1/4 HP (0.18 kW)		
Tank Capacity	Hydraulic	16.9 gal (65 L)		
	Coolant	29.9 gal (115 L)		
Vise	Control Method	Hydraulic with full stroke cylinder		
Feeding Length	Mode	Hydraulic, NC Automatic		
	Single Stroke	31.5” (800 mm)		
	Multi Stroke	Max. 650” (6,500 mm)		
Workbed Height		29.5” (750 mm)		
Weight	Net	5,904 lb (2,678 kg)		
	Gross	6,613 lb (3,000 kg)		
Floor Space (L x W x H)		112.7” x 141.5” x 97.1” (2,863.3 x 3,594.9 x 2,465.1 mm)		

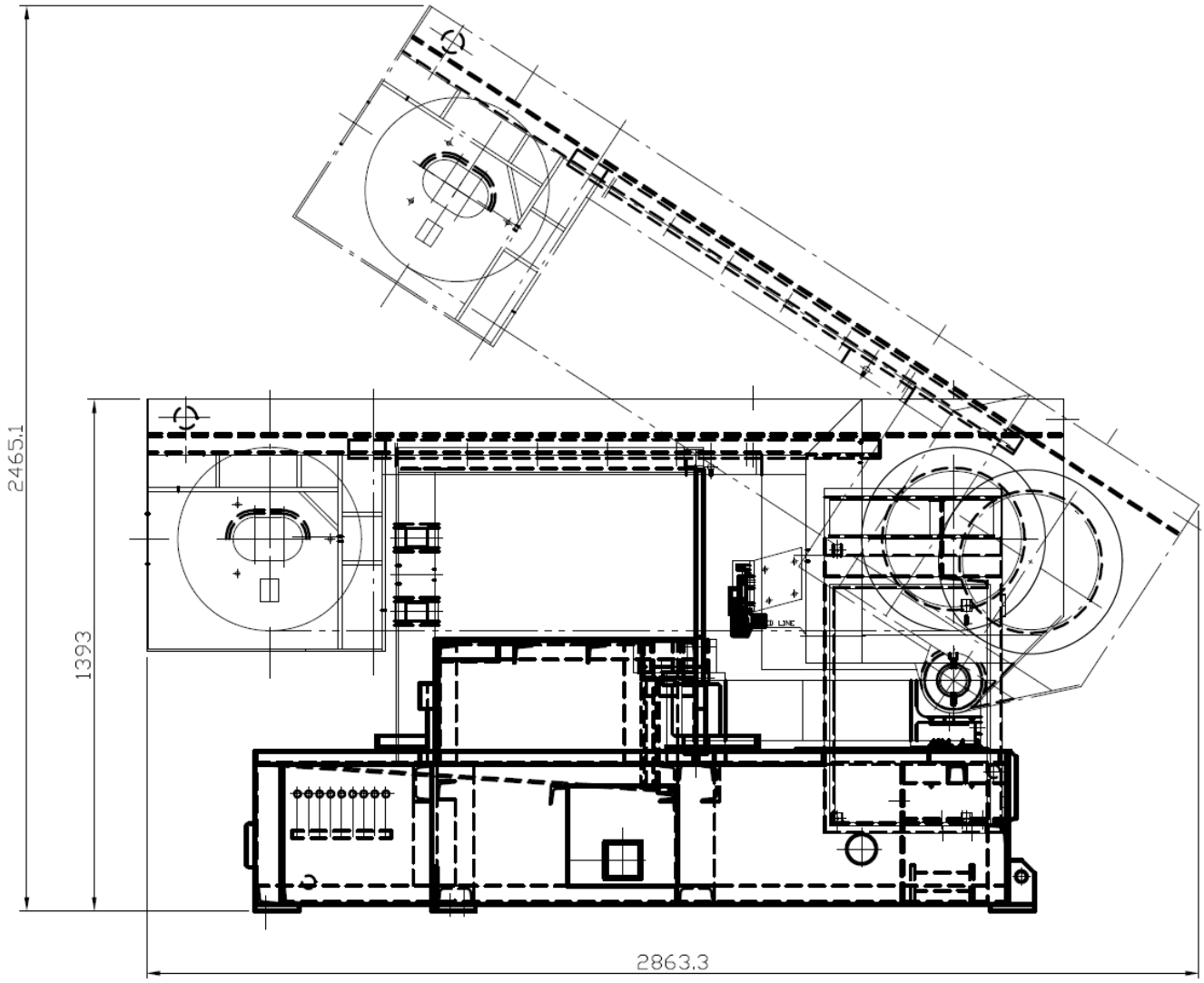
MACHINE PARTS IDENTIFICATION



FLOOR PLAN



Machine top view



Machine front view

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 2 Specification* 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 both machine and material.
- 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. **(Only applies to the machine with the design of the hanging point.)**

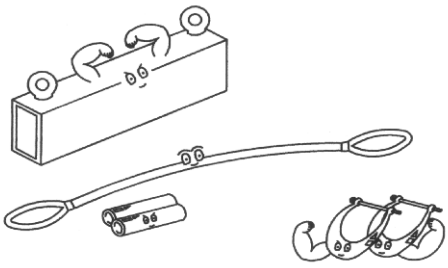
Move the machine to its location by using a crane and a wire rope sling that can fully withstand the weight of the machine (refer to machine specification under Section 2 *General Information*).

Machine hanging with a crane should be done strictly according to the hanging points designated by the original manufacturer. If there is any doubt on missing hanging points on your machine, please consult with the original manufacturer or its qualified agent before hanging the machine.

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

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

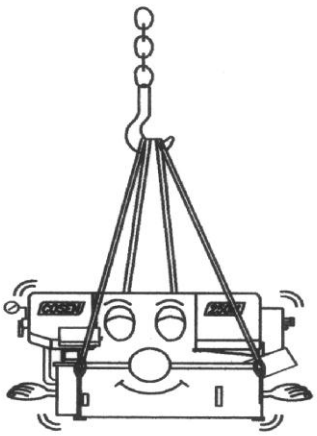
- You must use tools and equipment with the proper tensile strength and use proper method when moving your machine.



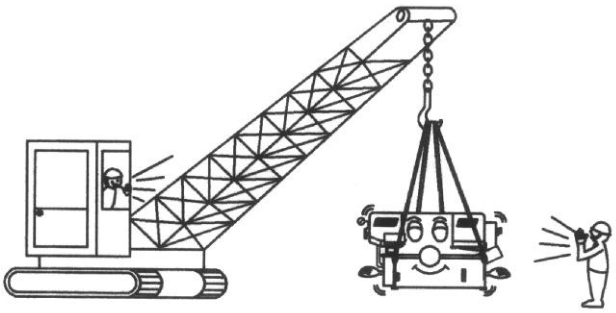
- Apply the wire rope sling to the lifting hooks on the four ends of the machine. Refer to *Illustration: Lifting Points* for exact locations.

- 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.



2. Use a forklift (Only applies to the machine with the design of the lifting point.)

Make sure that the lifting rod can fully withstand the weight of the machine. (Refer to *Section 2 – General Information for Specifications.)*

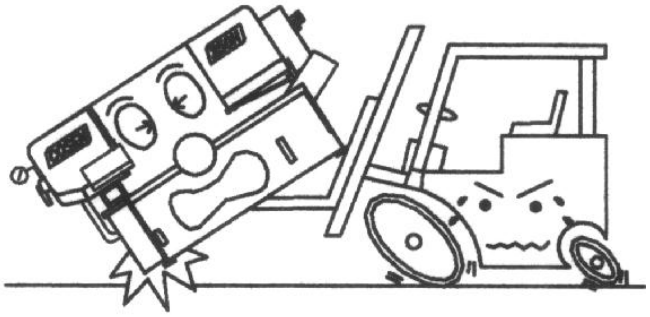
Machine lifting with a forklift should be done strictly according to the lifting points designated by the original manufacturer. If there is any doubt on missing lifting points on your machine, please consult with the original manufacturer or its qualified agent before lifting the machine.

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

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

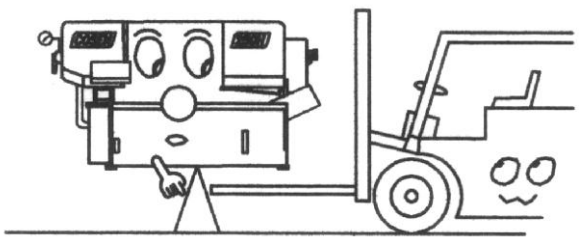
- You must apply proper forklift technique to avoid damage to the machine.

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.

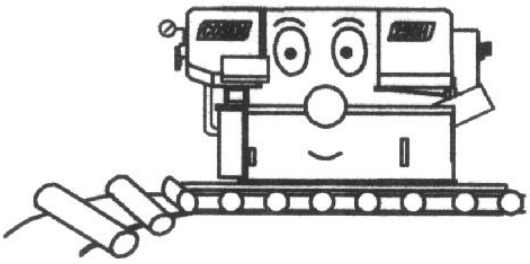


(Illustration only. Please follow user guide of your forklift.)

3. Use rolling cylinders

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

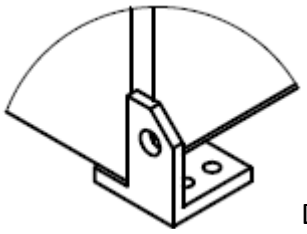
- You must use rolling cylinders made in material of proper compressive strength.



4. Other ways to move

If the machine does not have  or  stickers, please contact your local agent immediately.

Illustration: Lifting Points



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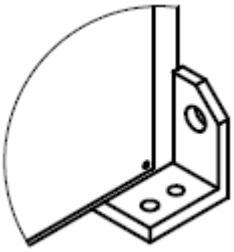

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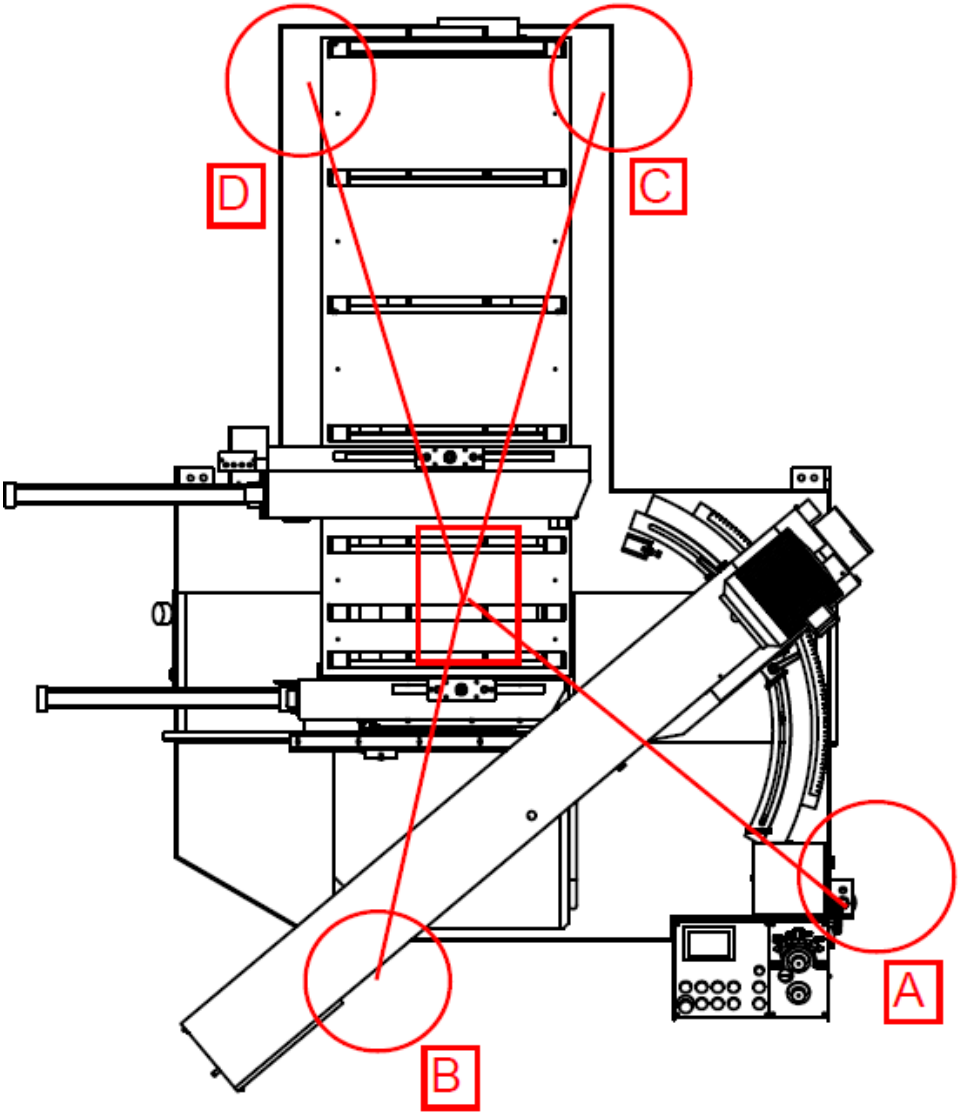

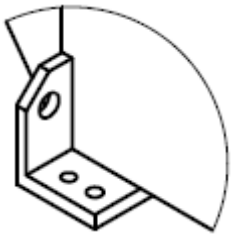

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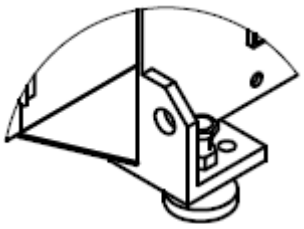


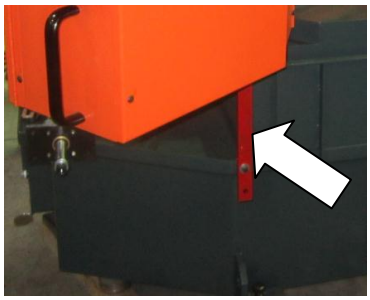
A

Minimum weight capacity for each wire rope: **3 ton**

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

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.



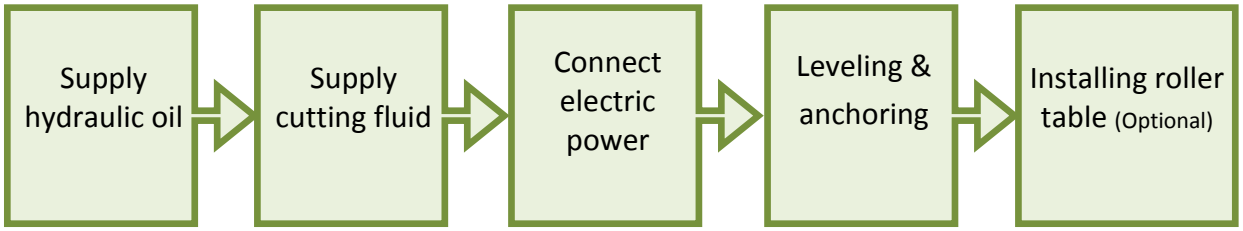
CLEANING

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

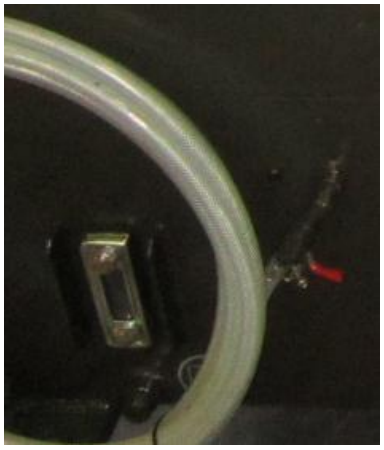
Open the filler cap and fill the hydraulic oil tank to above 2/3 or full level.

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

Refer to specification chart under Section 2 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 2 *Specification* 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.

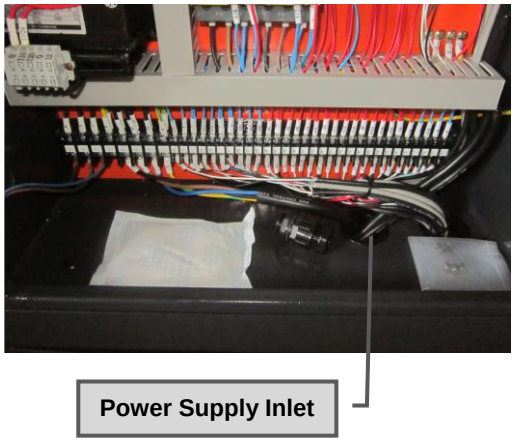
Ground the machine with an independent grounding conductor.

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

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

Refer to the specification chart under Section 2 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.

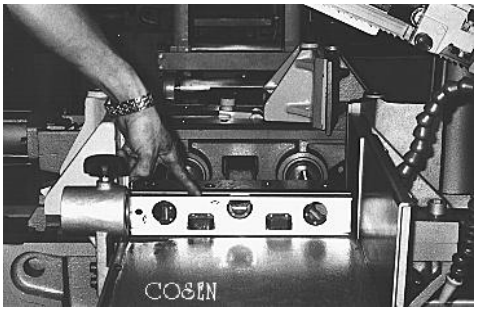
1. Turn off the shop circuit breaker.
2. Make sure the machine circuit breaker switch on the electrical compartment door is turned to OFF.
3. Remove the screw securing the electrical compartment and then open the door.
4. Pull the power supply cable and grounding conductor through the power supply inlet 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.

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.

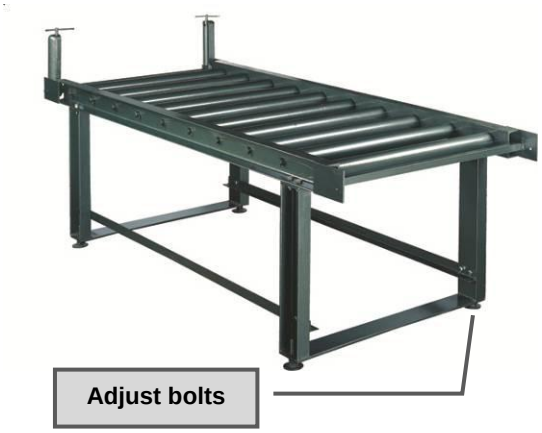
Shock absorption steel plates are provided and can be placed under each leveling bolt to prevent their sinking into the concrete floor.

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
BEFORE OPERATING
CONTROL PANEL
STANDARD ACCESSORIES
OPTIONAL ACCESSORIES
UNROLLING & INSTALLING THE BLADE
ADJUSTING WIRE BRUSH
ADJUSTING SAW ARM
ADJUSTING COOLANT FLOW
PLACING WORKPIECE ONTO WORKBED
POSITIONING WORKPIECE FOR CUTTING
ADJUSTING BLADE SPEED
BREAKING-IN THE BLADE
TEST-RUNNING THE MACHINE
CUTTING OPERATION
STARTING AN AUTOMATIC OPERATION
TERMINATING A CUTTING OPERATION

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.

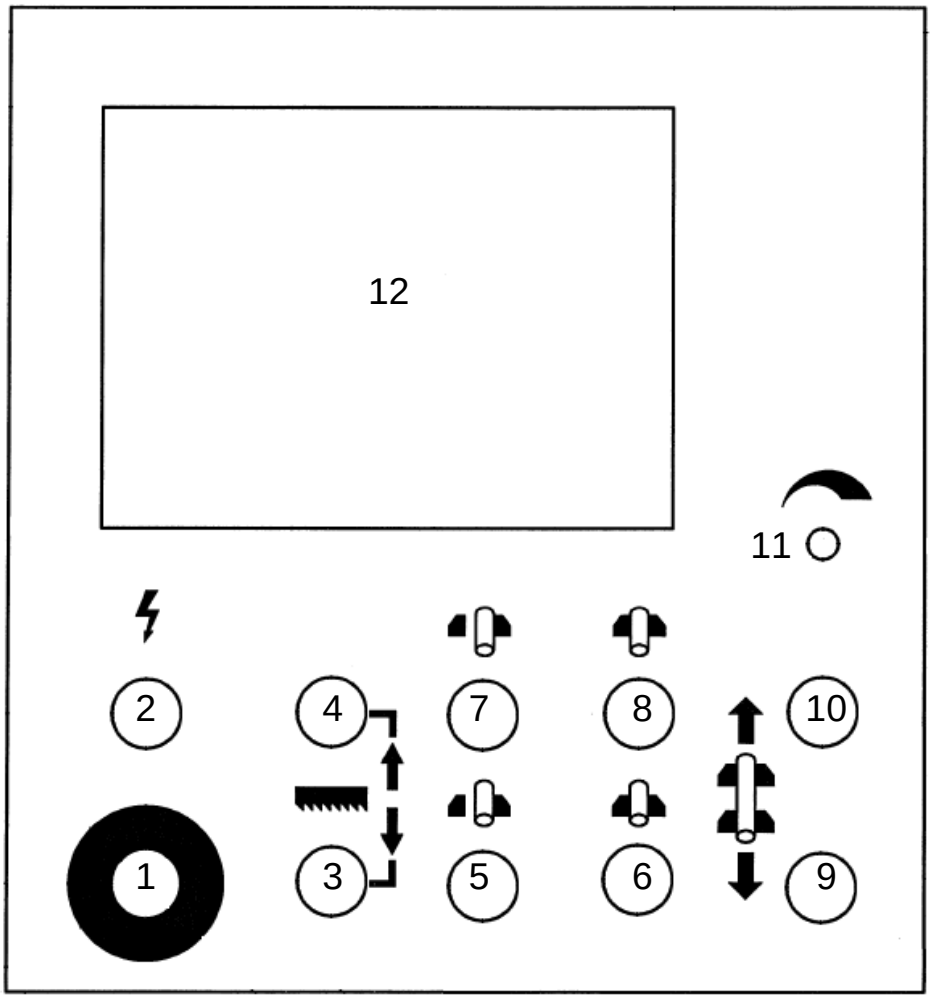
 Always add coolant into water for better mix result.

 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.



No.	Name	No.	Name
1	Emergency stop button	7	Rear vise open button
2	Power indicator lamp	8	Rear vise clamp button
3	Saw bow down button	9	Feed forward button
4	Saw bow up button	10	Feed backward button
5	Front vise open button	11	Blade speed control knob
6	Front vise clamp button	12	HMI touch screen

Control Buttons

1. 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.

2. Power indicator lamp

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

3. Saw bow down button

When this button is pressed, the saw bow descends.

4. 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 touches the upper limit switch.

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

5. Front vise open button

This button only works when the machine is switched to manual mode "".

6. Front vise clamp button

This button only works when the machine is switched to manual mode "".

7. Rear vise open button

This button only works when the machine is switched to manual mode "".

8. Rear vise clamp button

This button only works when the machine is switched to manual mode "".

9. Feed forward button

- When this button is pressed, the feeding workbed will move forward. Press and hold the button to feed forward. As soon as the button is released, the feeding workbed will stop moving forward.
- This button only works when the machine is switched to manual mode "".

- This button is only in function when the quick approach bar is touching the upper limit switch AND when either of the front and rear vises are unclamped.

After the blade motor starts running, the function of rear vise is disabled due to safety concerns.

10. Feed backward button

- When this button is pressed, the feeding workbed will move backward. Press and hold the button to feed backward. As soon as the button is released, the feeding workbed will stop moving backward.
- This button only works when the machine is switched to manual mode "".
- This button is only in function when the quick approach bar is touching the upper limit switch AND when either of the front and rear vises are unclamped.

After the blade motor starts running, the function of rear vise is disabled due to safety concerns.

11. Blade speed control knob

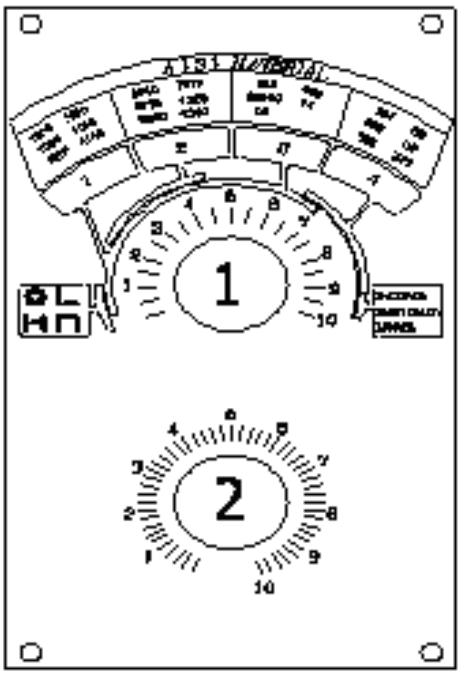
Blade speed is controlled by the inverter located under the workbed. Turning the knob clockwise increases the blade speed.

12. HMI touch screen

Please refer to later section for detailed introduction.

Blade descend pressure and speed control panel

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



Cutting pressure and speed control panel

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:

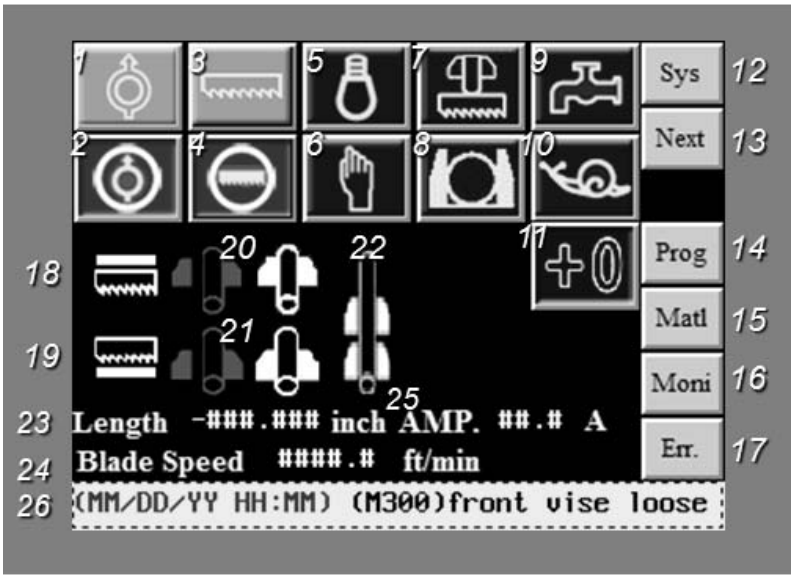
Item	Range
Ambient temperature	5℃ ~ 50℃
Temperature for safe operation	-10℃ ~ 60℃
Ambient humidity	30%~85% RH (No condensation)
Connection	RS422 MMI port
Environment	No condensation and rust

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

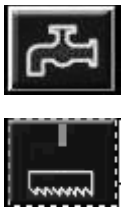
The main control menu includes some operating button that were used on the control panel of the earlier machines. Some convenient functions are added to the page for the operator to better understand the features of the machine. Setting the parameters shown on the screen requires a gentle touch of the 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 sto*p button is temporarily disabled. You need to press the *saw blade stop* or the *saw bow up* button to stop the blade first.
3		Blade start	When the work piece is clamped properly, press this button to start cutting. A solid yellow blade icon indicates the blade has been started. 
4		Blade stop	Press this button to stop the blade.

No	Item	Function	Description
5		Work light ON/OFF	Press this button to turn on the work light. The light bulb showing a solid yellow icon indicates the worklight has been turned on.  Press again to turn the work light off.
6	 	AUTO / Manual mode	Use this button to switch between automatic and manual mode. ● **AUTO mode:** used to automatically perform continuous cutting jobs. When switched to this mode, the machine will automatically operate according to the preset parameters. ● **Manual mode:** used to perform individual cutting job. When switched to the Manual mode, you can execute each individual function.  *Trim Cut* - When the machine is switched from the Manual mode to the AUTO mode, the first cut (trim cut) will not be counted into finished cuts and the machine will continue to operate according to the preset parameter. This function allows the machine to finish the trim cut and directly proceed into automatic cutting till the last cutting job.  If you switch to manual mode while cutting is already in action under AUTO mode, the machine will stop after the individual cut is finished. Switching to manual mode at any time other than cutting, the machine will proceed with the next cut until it is finished.
7		Material retract 2mm ON/OFF	When this function is turned on, the machine will retract the material for 2mm after completing each cut before the blade rises from its lowest position. A solid yellow icon indicates the *Material retract 2mm* mode has been turned on. 
8		Single/Bundle cutting mode	This button is used to switch between single or bundle cutting mode. ● Switch to single cutting model () to cut a single work piece. ● Switch to bundle cutting mode () to cut a stack of work pieces.  When under bundle cutting mode, the feeding vise must be touching the front limit switch for the blade to be able to start.

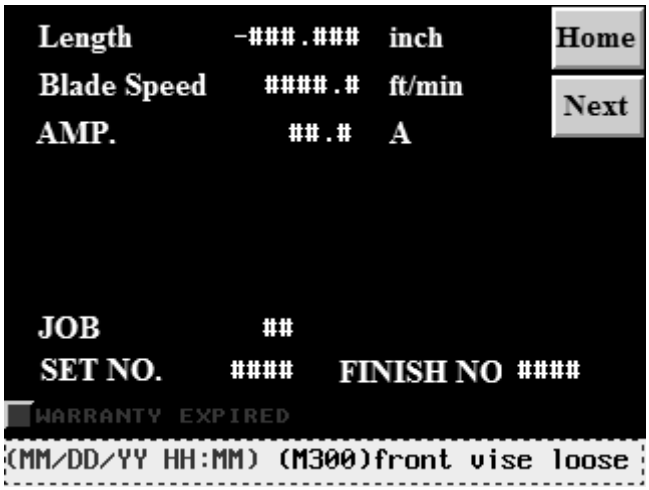
No	Item	Function	Description
9		Coolant/Spray ON/OFF	Choose to use coolant or spray in cutting status setup page and the icon will change accordingly. Press this button to turn on the coolant pump/spray system. A solid yellow faucet icon indicates the coolant pump/spray system has been turned on.  Press again to turn off the coolant pump/spray system.
10		Slow material feeding mode	Used only when under Manual mode. When the slow material feeding mode is turned on, the material feeding speed will dramatically reduce to help you position the work piece precisely.
11		Trim cut ON/OFF	This selection button works with the AUTO mode. When under AUTO mode and before proceeding with your automatic cutting jobs, select +0 if you wish the first cut to be "trim cut" i.e. trimming the edge of your material without the cut being counted into the "finished cuts." In the other hand, select +1 if you do not need to trim cut the material. The first cut will then be counted as the first cut of your programmed jobs.  After the first cut begins, you may still change your selection before the saw bow has descended to its lowest point.
12		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.
13		Cutting parameter setting	Press this button to display cutting-related information e.g. total number of cuts completed and feeding length OR to set parameters e.g. cutting lengths and quantity. (A total of 100 cutting programs can be set.) Blade deviation detector (optional) can be also configured in this setup page. Refer to Cutting Display & Setup in the following page.
14		Cutting program setting	Press this button to directly enter the cutting job program setup page. A total of 100 cutting programs can be set.

No	Item	Function	Description
15		Material cutting reference	This 2-page reference chart lists out the required blade speed and cutting rate for each different material.
16		PLC monitor	Shows current PLC signals.
17		Error report	Lists a historical report of the errors and the time of occurrence as well as provides troubleshooting support. 6 pages in total.
18		Saw blade up indicator	Indicates that the saw blade is rising. When activated, the saw blade icon will turn solid white. 
19		Saw blade down indicator	Indicates that a cut is completed and the saw blade 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. 
20		Rear vise status indicator	Indicates if the **rear** vises have clamped and secured the workpiece. When the rear vises have secured the workpiece, the clamping vise icon on the right will turn solid white. 
21		Front vise status indicator	Indicates if the **front** vises have clamped and secured the workpiece. When the front vises have secured the workpiece, the clamping vise icon on the right will turn solid white. 
22		Feeding movement indicator	When the feeding vise reaches the front limit, the vise set icon will turn solid white. 
23	Length	Feeding length display	Displays current feeding length while the material is being fed.
24	Blade Speed	Blade speed display	Displays current blade speed.
25	AMP.	Current display (optional)	Displays current in ampere (optional)
26	(yellow highlight)	Error display	Displays error messages in the order of occurrences; press the message for one second to clear the messages.

No	Item	Function	Description
			The message must be cleared for the machine to continue to operate normally.

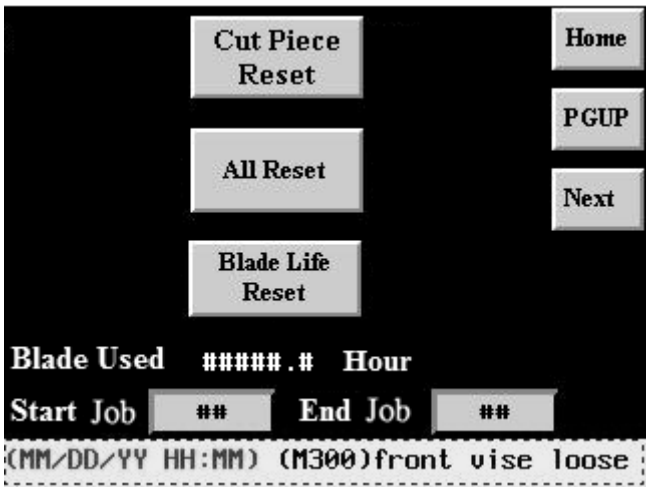
Next *Cutting status display & setup*

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

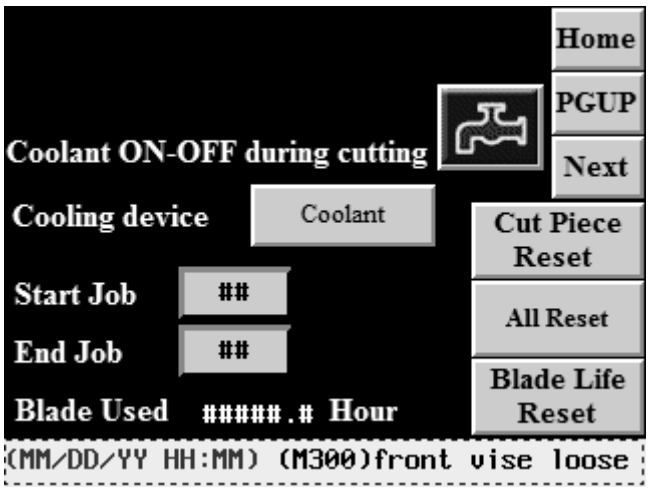


Page 1 – cutting status display

- This page shows the following information (from top to bottom):
  - Feeding length (current feeding vise position)
  - Blade speed
  - Current in ampere (optional)
  - Number of current cutting job/step in operation
  - Preset quantity of current cutting job
  - Number of cuts finished
  - 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.
  - Error messages (highlighted in yellow; can be cleared by pressing down for 1 second)
- Press Home to return to the main control menu.
- Press Next to go to the next setup page.



(Display without optional spray device included)

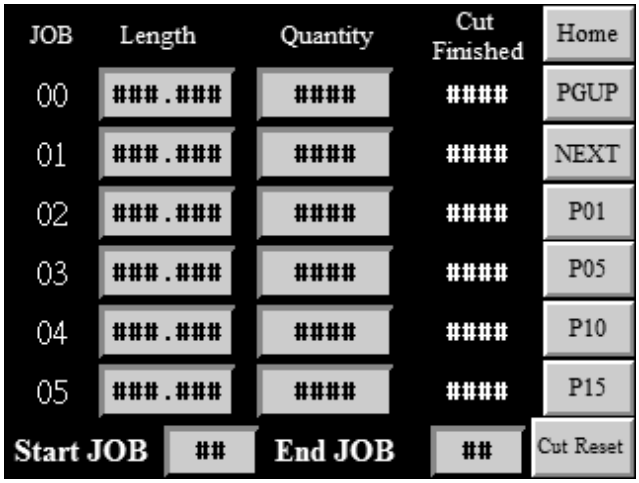


(Display with optional spray device included)

Page 2 – cutting status setup

- This page comes in two versions depending on if the optional spray device is installed on the machine. The shared features are as follows:
  - Cut Piece Reset - Reset all *Cuts Finished* data by pressing this button for three seconds.

     If you start a new set of program without clearing cutoff data from previous job, the first cut (trim cut) will be skipped as the second program is deemed as the succeeding part of the previous program.
  - All Reset - Reset all preset cutting data within *Start Job* and *End Job* by pressing this button for three seconds.
  - Blade Life Reset - Reset the blade life to zero
  - Current blade life in hours
  - Start JOB – Key in the number of the job you wish to execute first under automatic mode
  - End JOB – Key in the number of the job you wish to execute last under automatic mode
  - Error message (bottom of page)
- Press Home to return to the main control menu.
- Press PGUP to go back to the previous setup page.
- Press Next to go to the next setup page.
- For machines with optional spray device installed, additional two command are provided:
  - Coolant On/Off during cutting - Turn on this function to allow coolant pump start automatically during cutting.
  - Cooling device - press this button to use either coolant or spray



Page 3 – cutting program setup

- In this page you can set your desired cutting length and quantity and see the number of finished cuts (*Cut Finished*).
- A total of 100 cutting jobs can be set and performed under the automatic mode.
- In “start job” and the “end job” field, fill in the number of the cutting job you wish to start and end with. The machine will automatically perform cutting jobs within this range.
- In *Length* column, set each respective cutting

length in mm or inch.

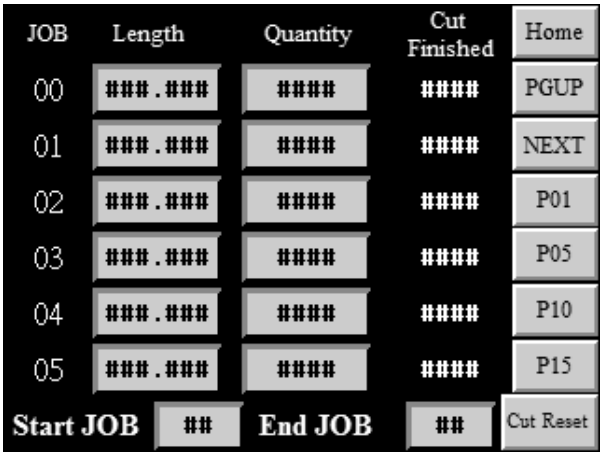
- In *Quantity* column, set each respective cutting quantity.
- Press Cut Reset button for 3 seconds to reset the cutoff quantity.

If you start a new set of program without clearing cutoff data from previous job, the first cut (trim cut) will be skipped as the second program is deemed as the succeeding part of the previous program.

- Press Home to return to the main control menu.
- Press PGUP to go back to the previous setup page.
- Press NEXT to go to the next cutting program setup page.
- Press P01, P05, P10, P15 to quickly jump between cutting programs (Job 00 ~ 99)

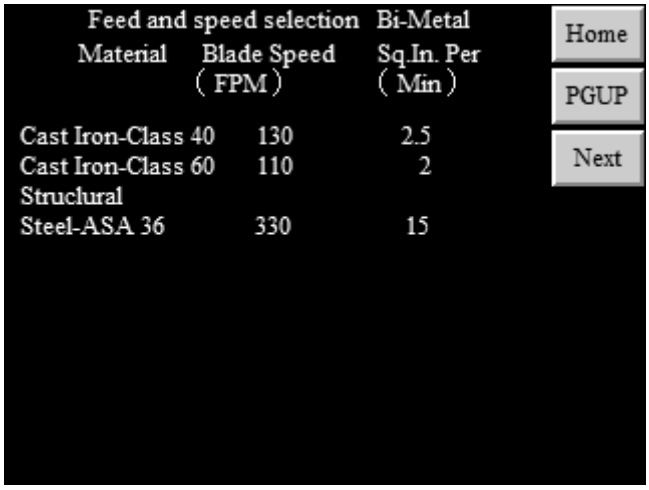
Prog *Cutting program setup*

When cutting is in operation, press Prog to quickly access the cutting program setup page (the same as page 3 of the cutting status display and setup page).



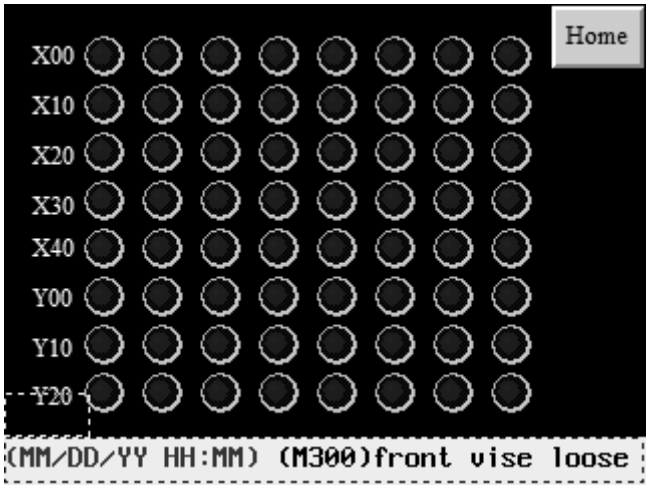
This setup page is the same as page 3 of the cutting status display and setup page.

Mtrl *Material cutting reference*



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

Moni *PLC Monitor*

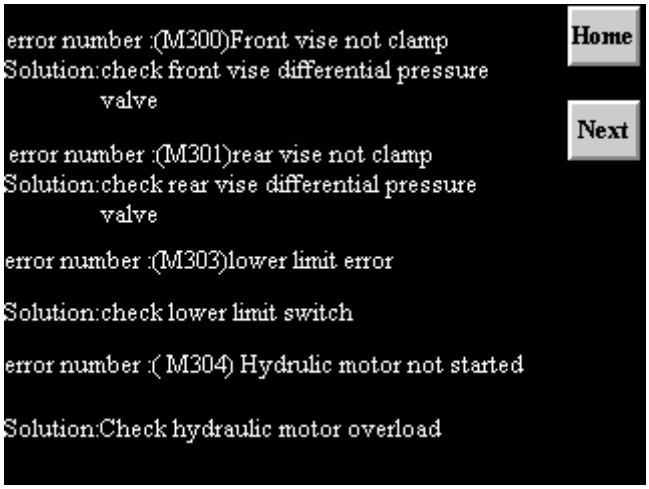


- Shows all signals of the PLC system.

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	Saw blade motor abnormal	Check if the blade motor overload relay has tripped
M314	Hydraulic motor abnormal	Check if the hydraulic motor overload relay has tripped
M315	Coolant pump abnormal	Check if the coolant pump motor overload relay has tripped
M316	Saw bow upper limit abnormal	Check the upper limit switch works
M350	Insufficient length – first cut	Material 100mm out of vise
M352	Front vise clamping error	1. Check if the vise queen valve works 2.Check if the “no material parameter” is too small
M357	Saw bow descending error	1. Check the quick approach bar works 2. Check if the quick approach bar limit switch works
M358	Saw bow ascending error	1. Check the quick approach bar works 2. 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 small
M363	PLC battery voltage too low	Replace PLC battery

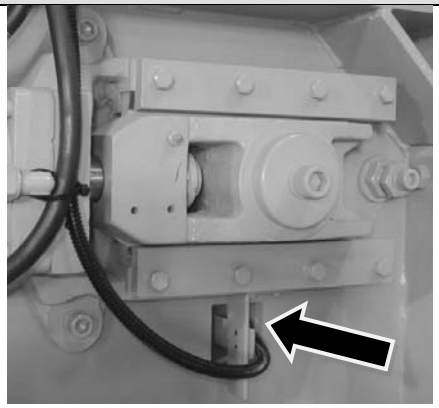
STANDARD ACCESSORIES

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.
- The limit switch of the safety device can be reset by turning the blade tension selector to ◯◯.
- 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.

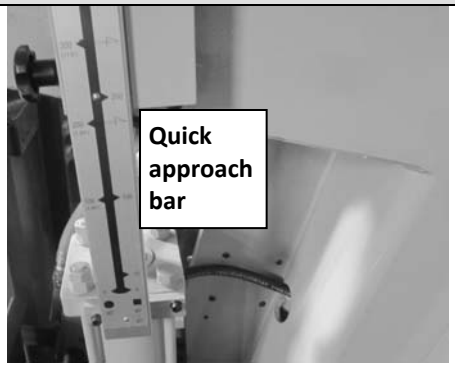
Inverter

- 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.

Note:

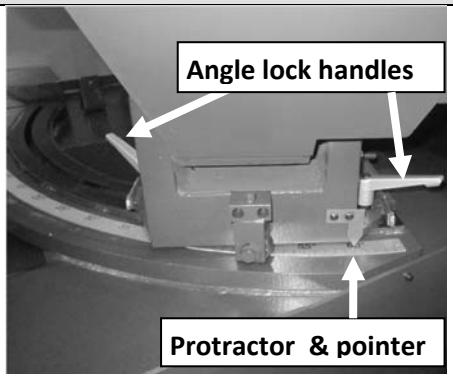
1. Make sure the terminal points are connected.
2. Make sure the ambient temperature is within acceptable range and keep the surroundings well ventilated.
3. Keep the inverter away from dust.
4. For repair or maintenance, please contact your local agent.

Quick approach device



This device allows the blade to quickly descend to just right above the material to save you operation time.

Miter cut angle



The *swivel sawhead* allows the user to cut at any angle between 0° (straight cut) and 60° (miter cut). The angles have been accurately configured before machine shipment.

For your miter-cutting jobs, simply swivel the saw bow until the pointer points to your desired angle and lock the saw bow via 2 angle lock handles. Also loosen the screw and adjust the fixed saw arm position according to the miter cut angle: 90° (straight cut)~30° (miter cut).

Gear reducer

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

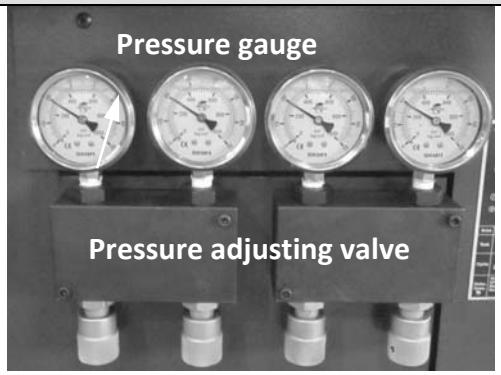
Please refer to Section 8 for information on maintenance.

Coolant pump

When the hydraulic system is turned on, the coolant pump can be operated individually from the control panel. Coolant can be used to wash off chips as well as providing cooling during cutting.

OPTIONAL ACCESSORIES

Vise pressure regulator & Top clamp pressure regulator

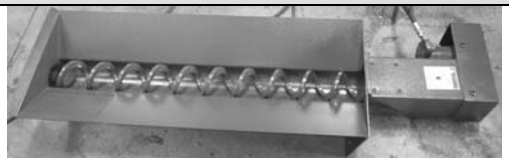


- This adjustment valve is used to control vise and top clamp pressure.
- Adjust vise and top clamp pressure based on the material of your workpiece.
- When cutting pipes or soft materials, reduce vise and top clamp pressure to prevent exerted pressure from damaging the workpiece shape or exterior.

Do not adjust vise pressure at any time during cutting.

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

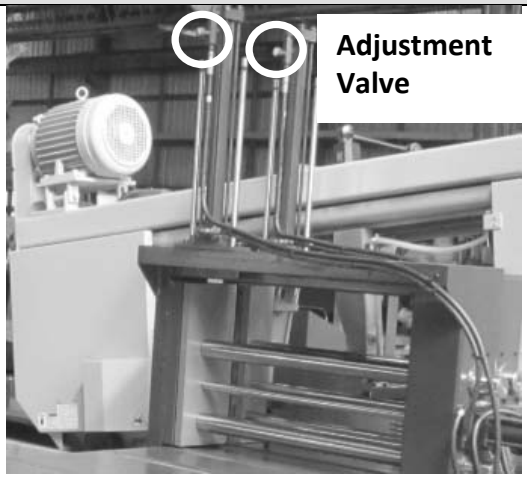
Chip conveyor



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.

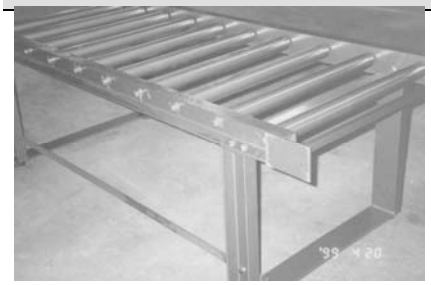
As a regular maintenance, remove the chip conveyor and clean all chip deposits inside.

Hydraulic top clamps



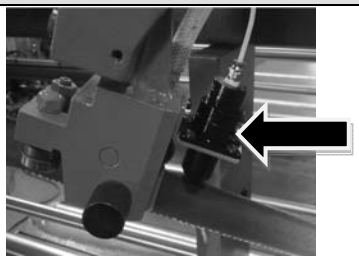
- The top clamp device composed of two clamps is installed on top of the front and rear vises before executing bundle cutting.
- Open the adjustment valve, which is used to adjust its speed during clamping/unclamping. When the vises move, the top clamps will act in synchronization.

2M roller table



- The optional 2M roller table supports the work material and ensures the material be fed in smoothly.
- Refer to Section 9 for further information on adjusting the roller table.

Spray system



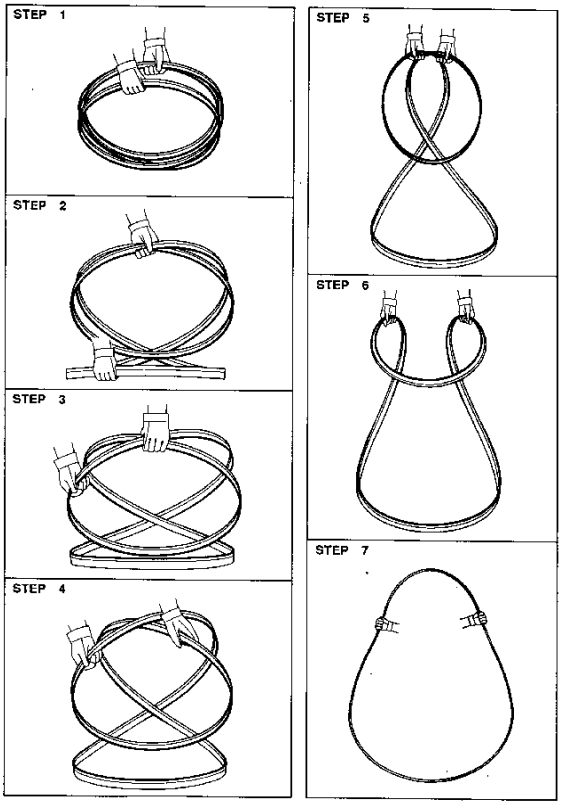
Choose to use coolant or spray device via HMI to wash off chips or providing lubrication during cutting. For spray system setup and troubleshooting, please refer to UNIST FAQ at http://unist.com/faq/category/1/unist-mql-systems.html.

UNROLLING & INSTALLING THE BLADE

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

Unrolling the blade

Please follow the procedures illustrated below.



Unroll and roll the blade

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 power.

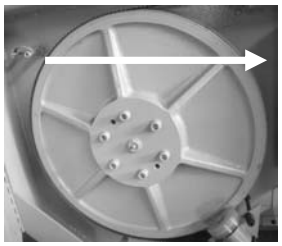
Step 3 - Switch to *manual* (✋) mode.

Step 4 - Press the *saw bow up* button and elevate the saw bow until the right guide arm is clear of the front fixed vise.

Step 5 - 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 6 - Open the idle and drive wheel covers.

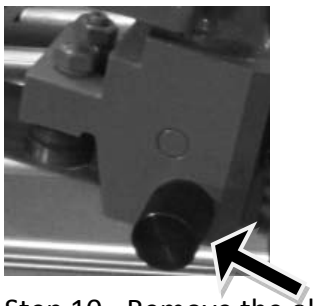
Step 7 - Press the *Blade Clip* device to hold onto the blade. This device makes blade changing easy and feasible even with only one operator available.



Easy Blade Replacement Device

Step 8 - Loosen the screws of the wire brush assembly to move wire brush away from the blade.

Step 9 - Loosen the left and right carbide inserts by loosening the "lock nut" shown below.



Step 10 - Remove the old blade. If necessary, clean the carbide inserts before installing a new saw blade.

Step 11 - Place the new blade around the idle wheel and the drive wheel.

Step 12 - 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 13 - Place the blade to the drive wheel and press the back of the blade against the flange of the drive wheel. Use the *Blade Clip* device to tightly hold the blade from falling out of the drive wheel.

When saw blade begins to rotate, the blade holder will automatically release the blade and fall back to its original position.

Step 14 - Make sure the back of the blade is also pressed against the flange of the idle wheel.

Step 15 - Turn the tension controller handle to [ ] position to obtain blade tension.

Step 16 - Make sure the sides of the blade are in close contact with the carbide inserts and then tighten the left and right carbide inserts by tightening the “lock nut.”

Step 17 - Gently close the idle and drive wheel covers.

Step 18 - 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 19 - Adjust wire brush to a proper position. Refer to *Adjusting Wire Brush* in this section.

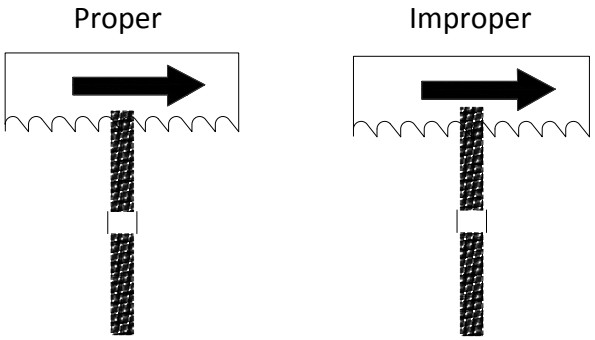
ADJUSTING WIRE BRUSH

Follow these steps to adjust wire brush to appropriate position:

Step 1 - Open the drive wheel cover.

Step 2 - Adjust the screws to make brush move up / down until it makes proper contact with the saw blade (see below illustration).

Step 3 - Close the drive wheel cover.



ADJUSTING SAW ARMS

Adjust the movable blade guide (guide arm) position based on the size of your workpiece:

Step 1 – Loosen the carbide inserts by unlocking the lock nut.

Step 2 – Loosen the blade guide locking handle. Then adjust the guide arm to a position suitable for your workpiece size.

Step 3 – After adjustment is made, tighten the blade guide locking handle.

Step 4 – Clamp the inserts back by locking the lock bar.

Adjust the fixed blade guide (guide arm) position based on the miter angle:

Step 1 – Loosen the screw.

Step 2 – Adjust the guide arm to a position suitable for your miter angle: 90° (straight cut)~30° (miter cut).

Step 3 – After adjustment is made, tighten the screw.

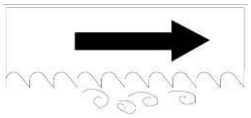
ADJUSTING COOLANT FLOW

Step 1 – Press the *saw blade start* button to start the saw blade drive motor.

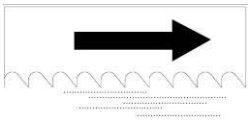
Step 2 – Press the *saw bow down* button to lower the saw bow.

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.

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 – Press the *front vise open* and *rear vise open* buttons to open vises.
Step 3 – Carefully place the workpiece onto the work feed table to where it extends approximately 1.2” (30mm) beyond the rear vise toward the front vise.

POSITIONING WORKPIECE FOR CUTTING

Follow these steps to position your workpiece:

Step		Action
rear vises clamp material	*1*	Press the *rear vise clamp* button until the workpiece is securely clamped.
feed material forward	*2*	Press the *feed forward* button until the rear vise touches the front limit switch.
front vises clamp material	*3*	Press the *front vise clamp* button until the workpiece is securely clamped.
rear vises retract to clamp material again	*4*	Press the *rear vise open* button.
	5	Press the *feed backward* button until the rear vises reach back limit switch.
	6	Press the *rear vise clamp* button until the workpiece is securely clamped again.
front vises open; prepare for precision position	*7*	Simultaneously press the *front vise open* button and the *rear vise clamp* button again to make sure the material is clamped.
confirm cutoff point	*8*	Press the *saw bow down* button to lower the saw bow until the quick approach bar descends to just about 10mm (0.4 inch) above the workpiece.  Under no circumstances should the quick approach bar be lowered below the height of the workpiece.
precision position	*9*	Press the *feed forward* button (and the *feed backward* button if necessary) until the cutoff point on the workpiece aligns with the blade line.
front vises clamp material; ready to cut	*10*	After the workpiece is correctly positioned, press the *front vise clamp* button so the workpiece is securely clamped.

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.

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 feed 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 - Start the break-in operation.
Step 4 - 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.
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/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 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.

STARTING AN AUTOMATIC OPERATION

Step 1 – Use manual mode and cut the edge of the workpiece by using the same procedures as those described under manual operation.

Step 2 – After the trim cut is completed and the saw blade has stopped at the lower limit position, press the *saw blade up* button to raise the saw bow until the quick approach bar is approximately 10mm (0.4inch) above the workpiece.

Step 3 – Turn the *Auto / manual* switch to manual.

Step 4 – Set your desired cutting length and quantity via the HMI touch screen. A total of 100 sets of cutting data can be programmed.

Step 5 – Turn the *Auto / manual* switch to Auto.

Step 6 – Press the *saw blade start* button and press the *saw bow down* button to start automatic cutting.

TERMINATING A CUTTING OPERATION 

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

Section 5

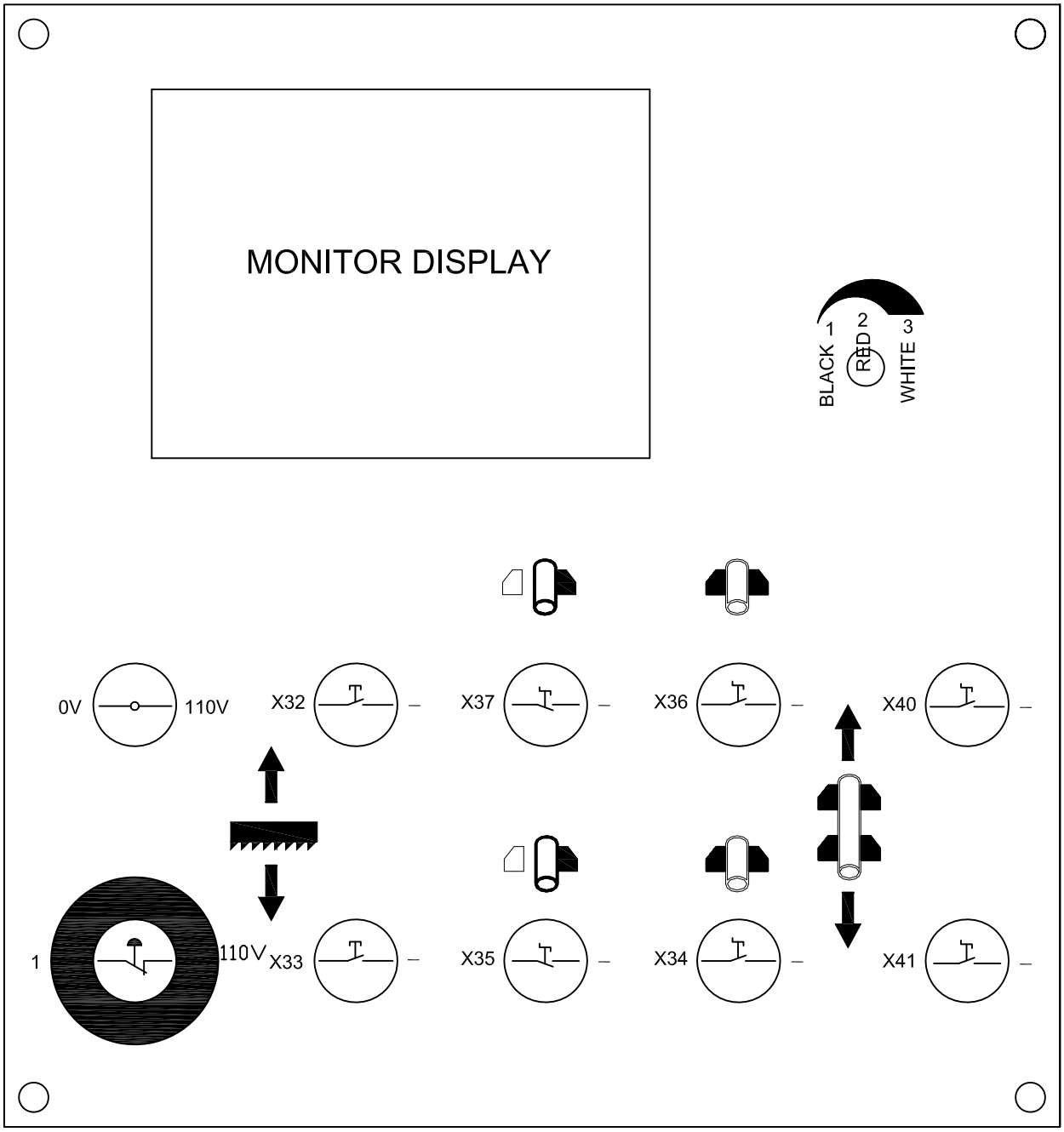
ELECTRICAL SYSTEM

ELECTRICAL CIRCUIT DIAGRAMS

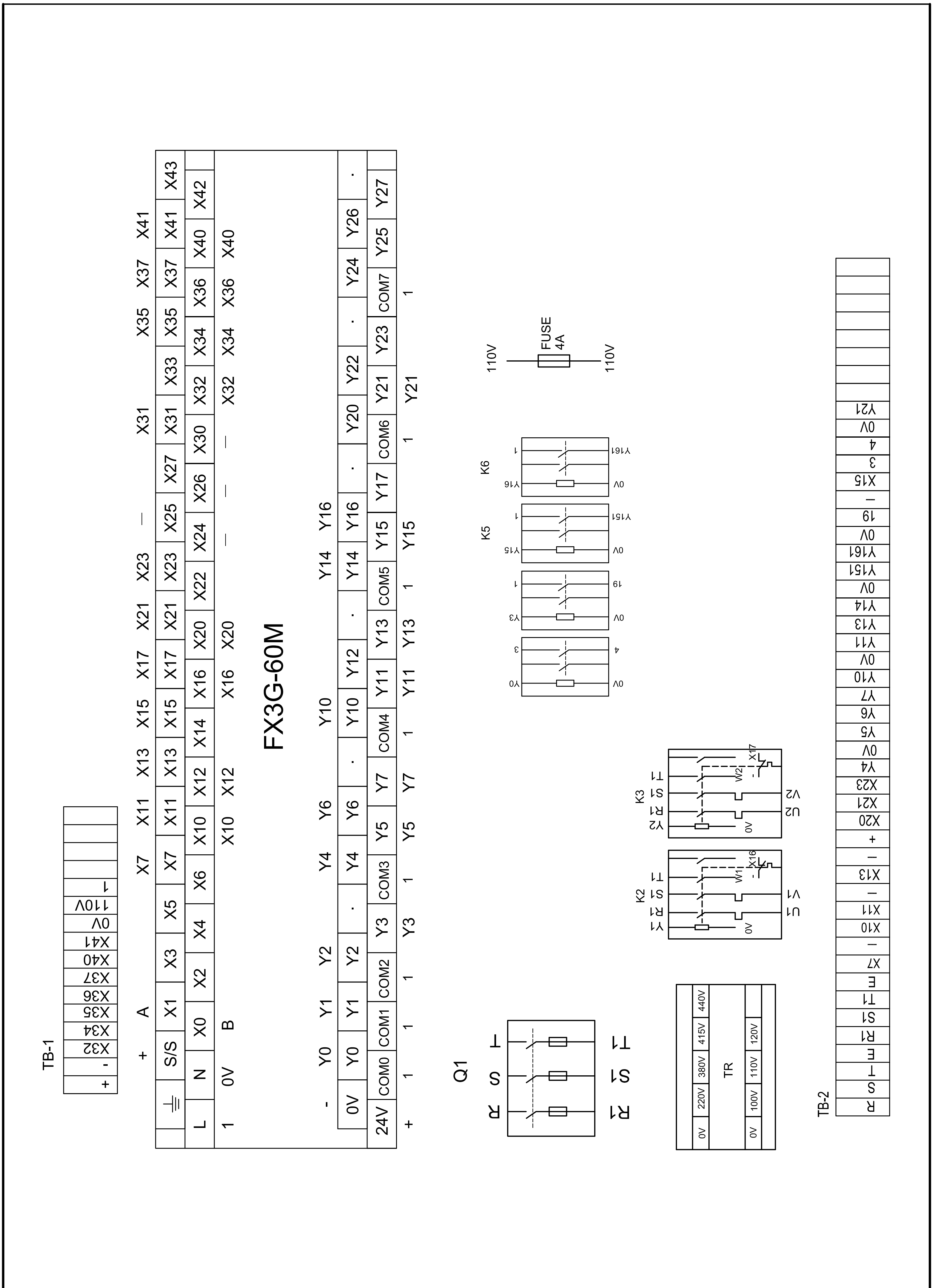
The following are electrical circuit diagrams of the non-CE model with optional spray system:

The following are electrical circuit diagrams of the non-CE model without optional spray system:

The following are electrical circuit diagrams of the CE model without optional spray system:



高聖精密機電股份有限公司 COSEN MECHATRONICS CO., LTD.	圖名	Control Panel Layout 面板配置圖	圖號	EL-C650MNC-F15-000S0-A	繪圖	陳偉崧	日期	1010424	版本
					審核		日期		S0



高聖精密機電股份有限公司 COSEN MECHATRONICS CO., LTD.	圖名	Circuit Board Layout 線路板配置圖	圖號	EL-C650MNC-F15-000S0-B	繪圖	陳偉崧	日期	1010424	版本
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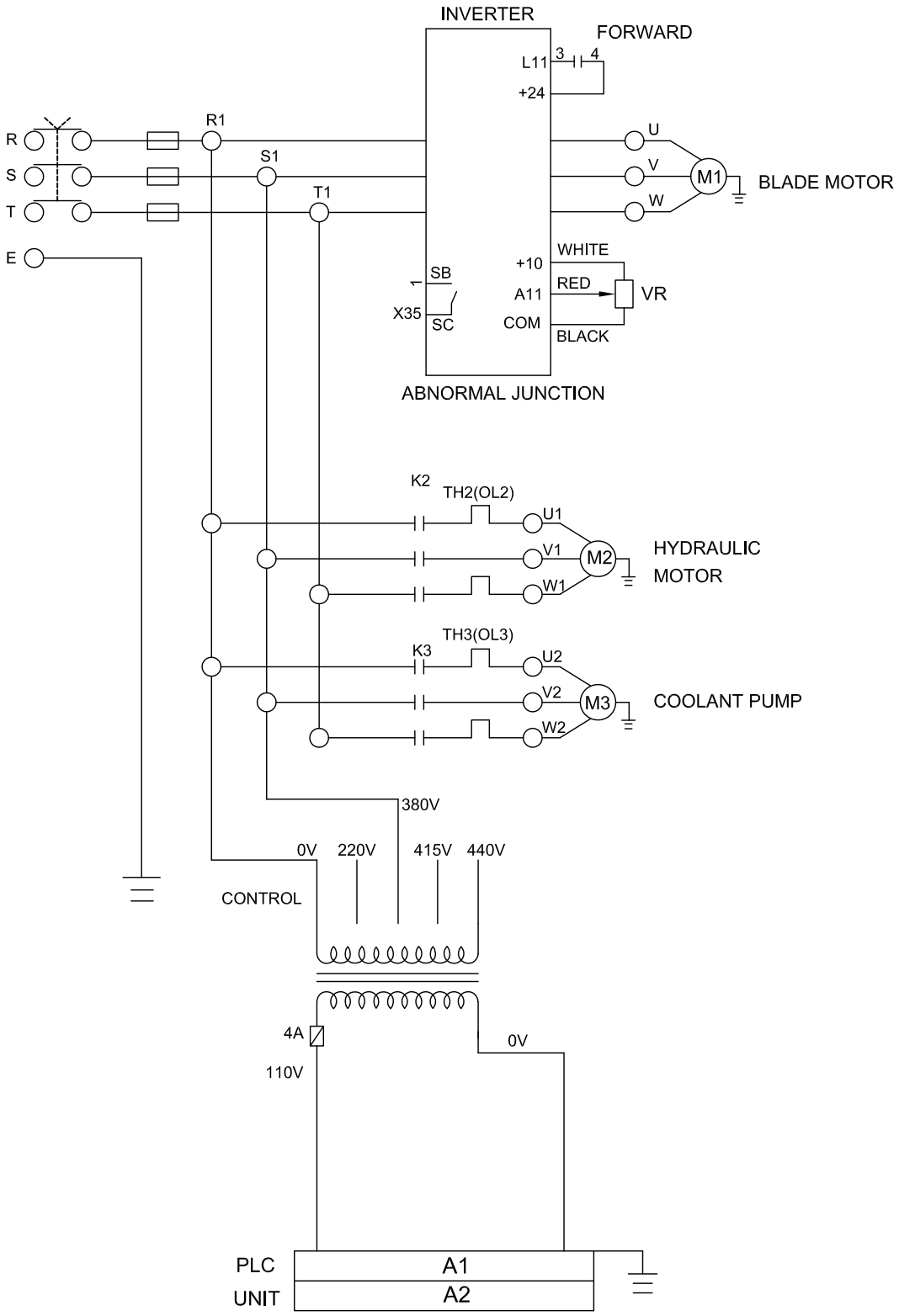

高聖精密機電股份有限公司 COSEN MECHATRONICS CO., LTD.	圖名	Power Supply Layout 動力配置圖	圖號	EL-C650MNC-F15-000S0-C	繪圖	陳偉崧	日期	1010424	版本
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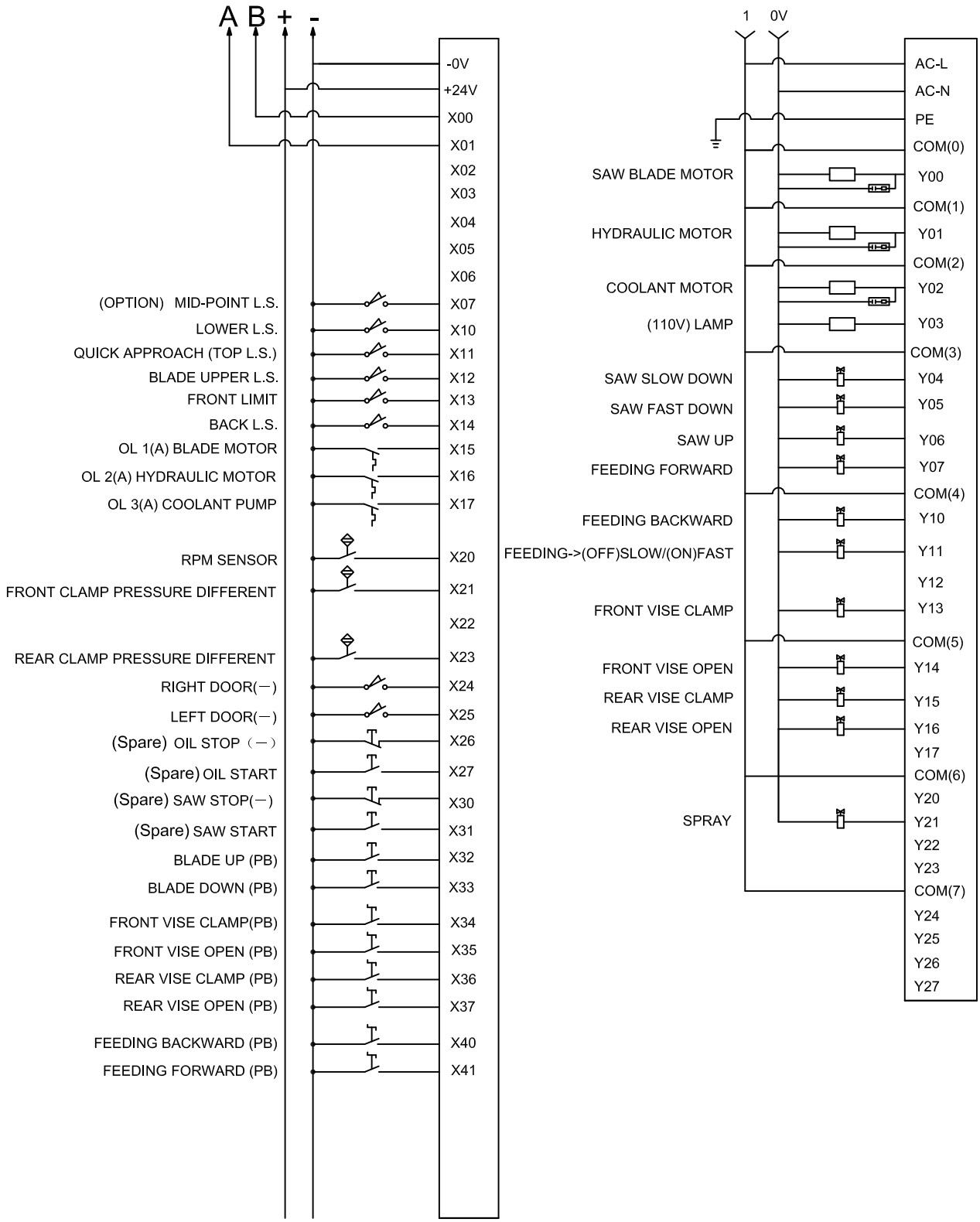

高聖精密機電股份有限公司 COSEN MECHATRONICS CO., LTD.	圖名	PLC Input /Output Layout PLC I/O配置圖	圖號	EL-C650MNC-F15-000S0-D	繪圖	陳偉崧	日期	1010424	版本
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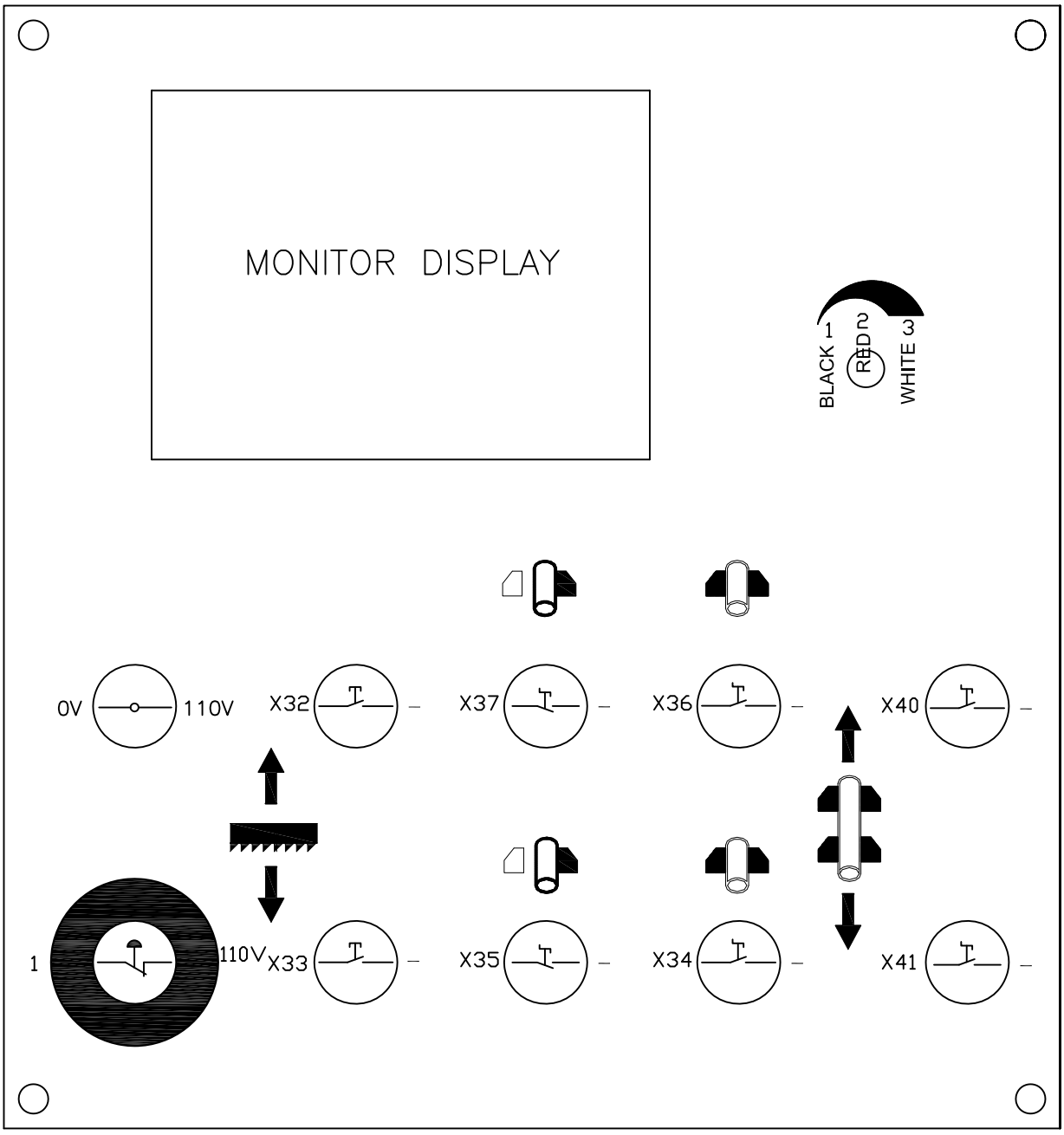


高聖機械工業股份有限公司 Cosen Machinery Industrial Co., Ltd.	圖名	面板配置圖	圖號	EL-C650MNC-F15-000S0-A	繪圖	陳偉崧	日期	1010424	版本
					審核		日期		S0

TB-1

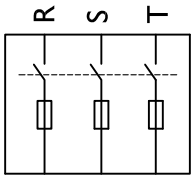
+	-	X32	X34	X35	X36	X37	X40	X41	0V	110V	I				

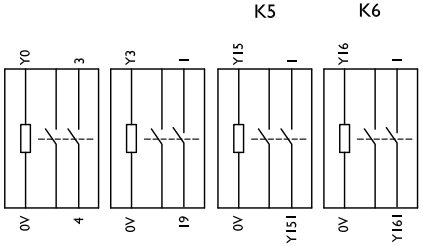
		+	A				X7	X11	X13	X15	X17	X21	X23	—		X31		X35	X37	X41	
	⏚	S/S	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37	X41	X43	
L	N	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36	X40	X42		
I	0V	B				X10	X12		X16	X20		—	—	—	X32	X34	X36	X40			

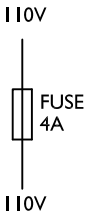
FX3G-60M

	-	Y0	Y1	Y2		Y4	Y6		Y10			Y14	Y16								
	0V	Y0	Y1	Y2	·	Y4	Y6	·	Y10	Y12	·	Y14	Y16	·	Y20	Y22	·	Y24	Y26	·	
24V	COM0	COM1	COM2	Y3	COM3	Y5	Y7	COM4	Y11	Y13	COM5	Y15	Y17	COM6	Y21	Y23	COM7	Y25	Y27		
+	I	I	I	Y3	I	Y5	Y7	I	Y11	Y13	I	Y15		I			I				

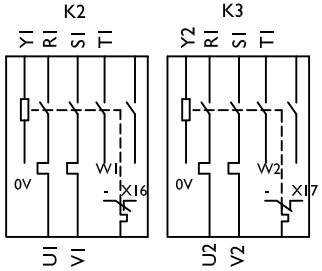
Q1







0V	220V	380V	415V	440V
TR				
0V	100V	110V	120V	



TB-2

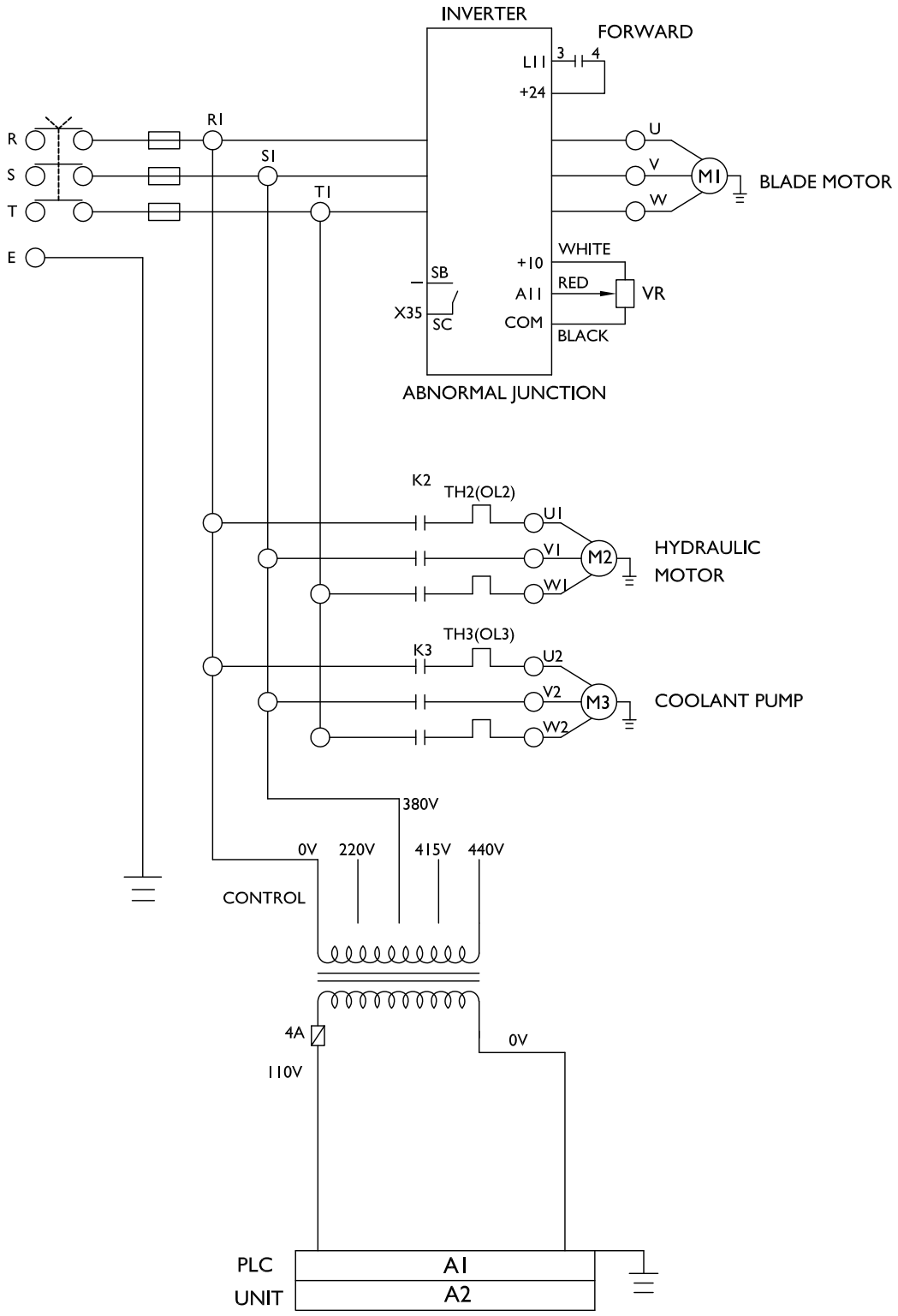
R	S	T	E	RI	SI	TI	E	X7	—	X10	X11	—	X13	—	+	X20	X21	X23	Y4	0V	Y5	Y6	Y7	Y10	0V	Y11	Y13	Y14	0V	Y151	Y161	0V	19	—	X15	3	4									

繪圖	
審核	陳偉松
日期	1010424
版本	S0

圖名 線路板配置圖

圖號 EL-C650MNC-F15-000S0-B

Cosen Machinery Industrial Co., Ltd. 高星機械工業股份有限公司



高聖機械工業股份有限公司 Cosen Machinery Industrial Co., Ltd.	圖名	動力配置圖	圖號	EL-C650MNC-F15-000S0-C	繪圖	陳偉崧	日期	1010424	版本
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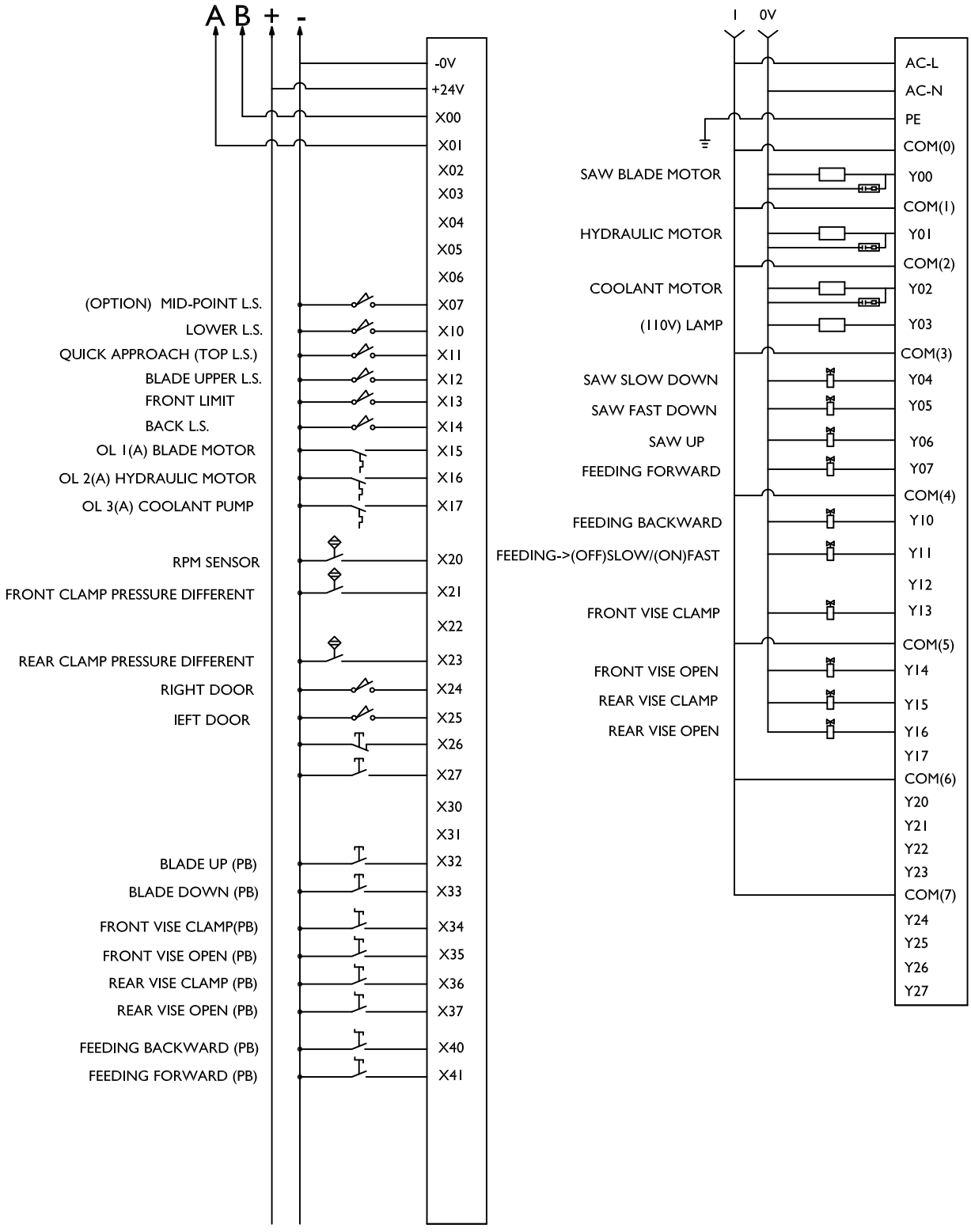

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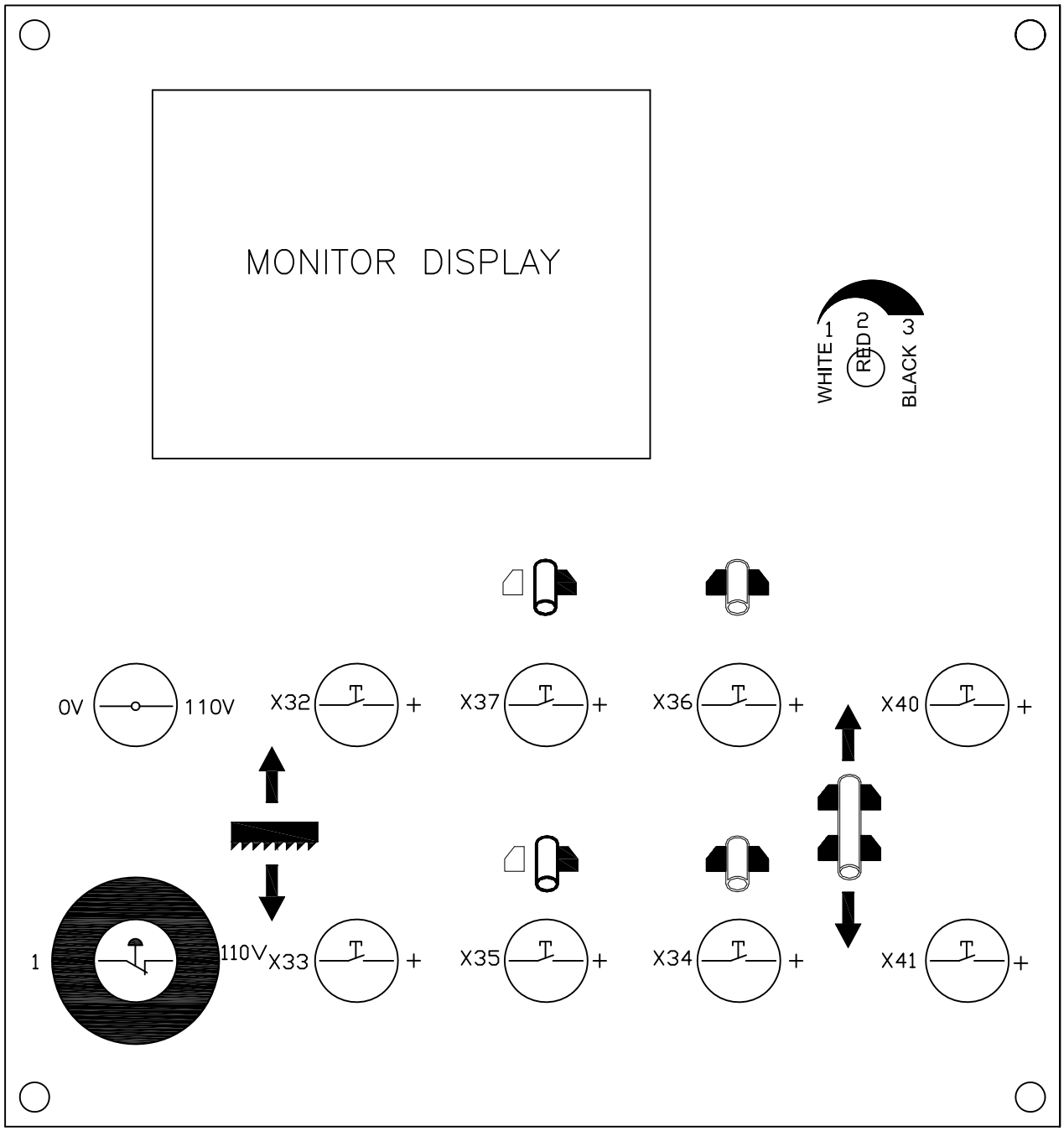

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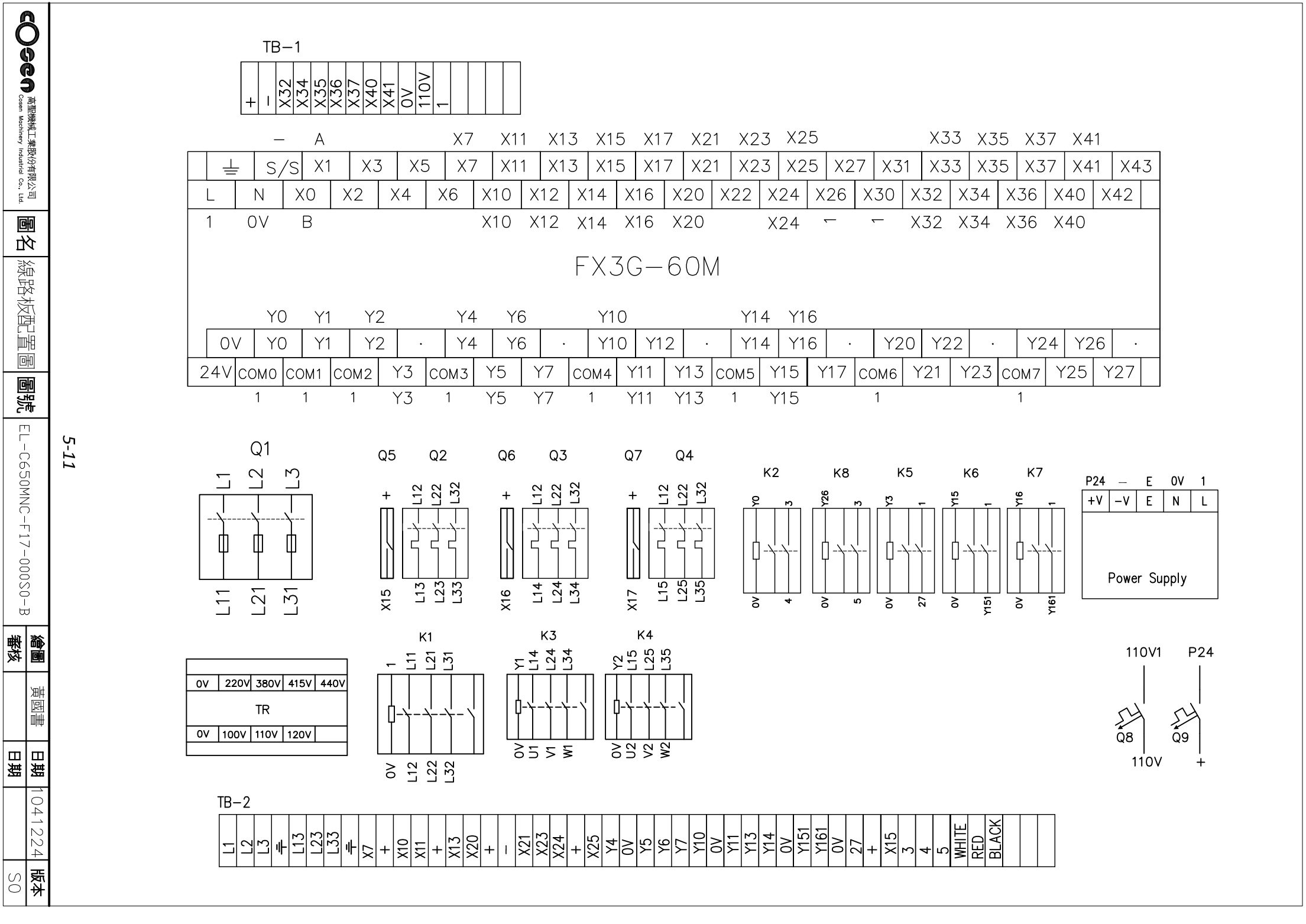

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繪圖 黃國書
日期 1041224
版本 S0

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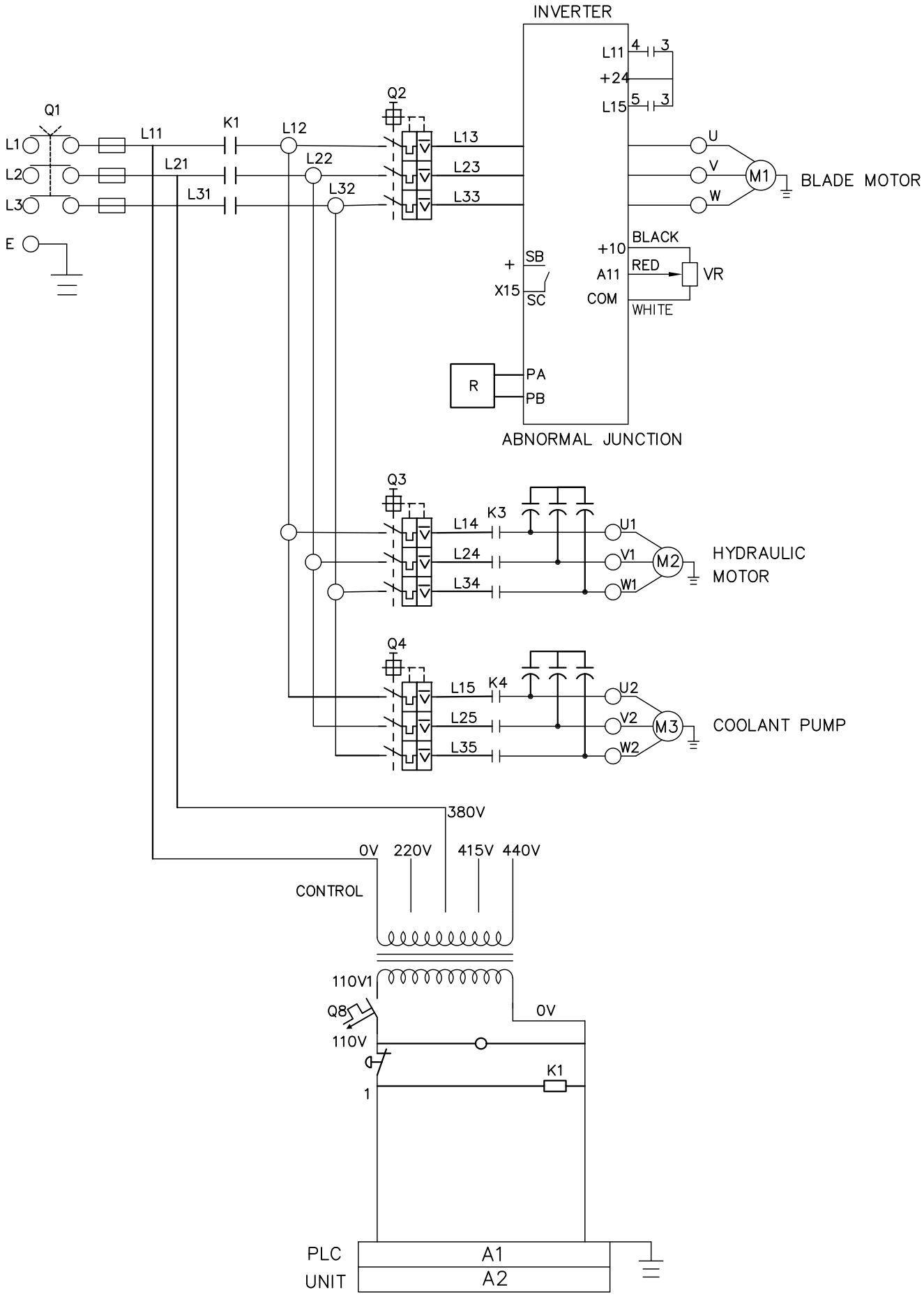

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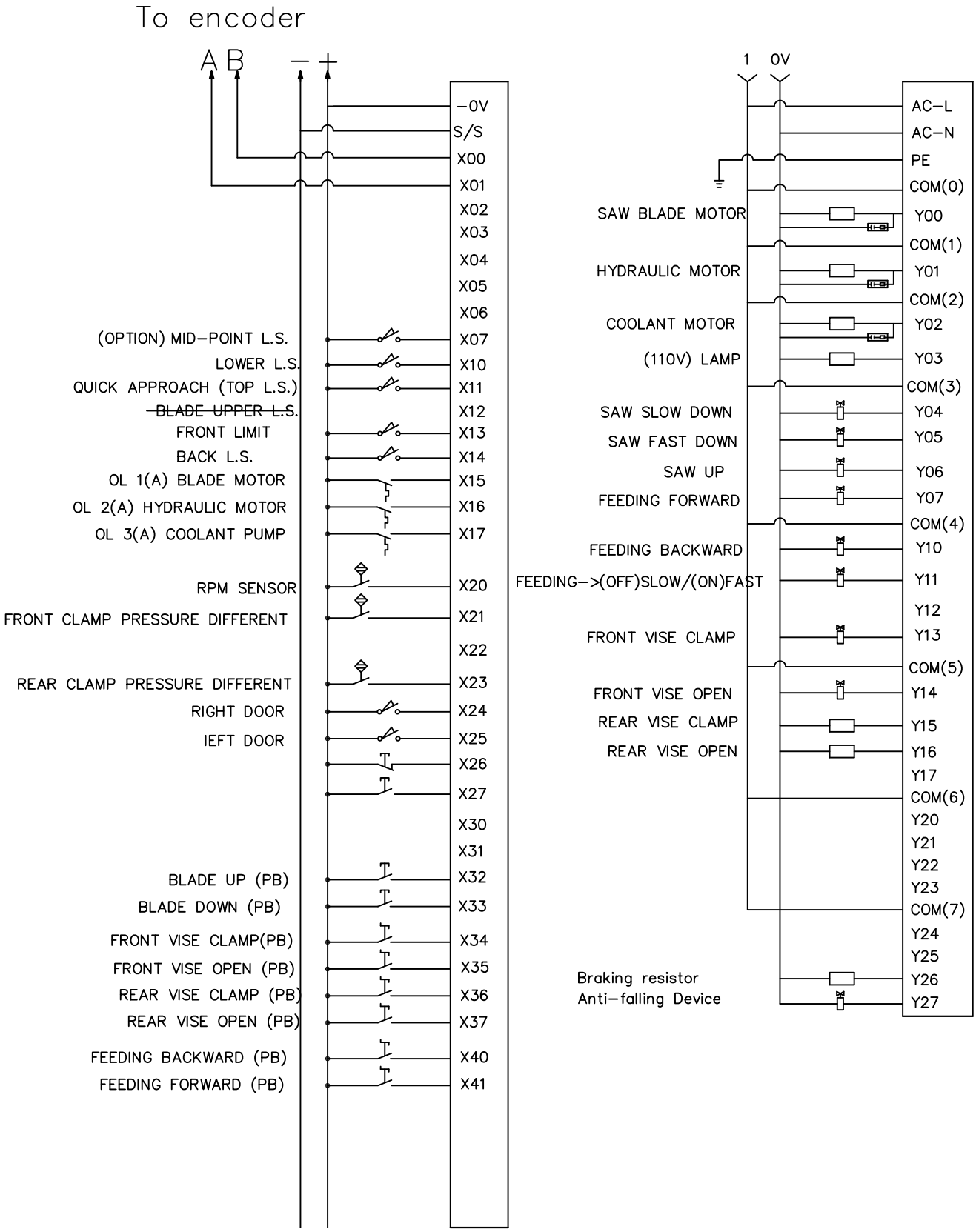

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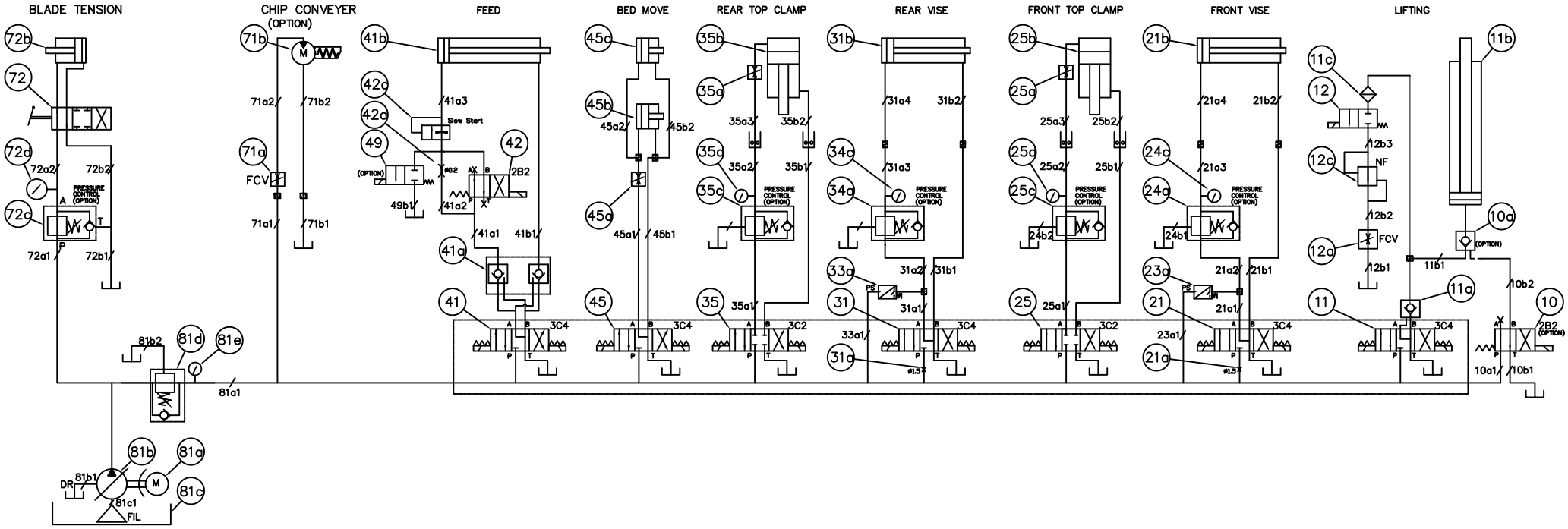
HYDRAULIC SYSTEM

HYDRAULIC CIRCUIT DIAGRAM

C-650MNC HYDRAULIC CIRCUIT



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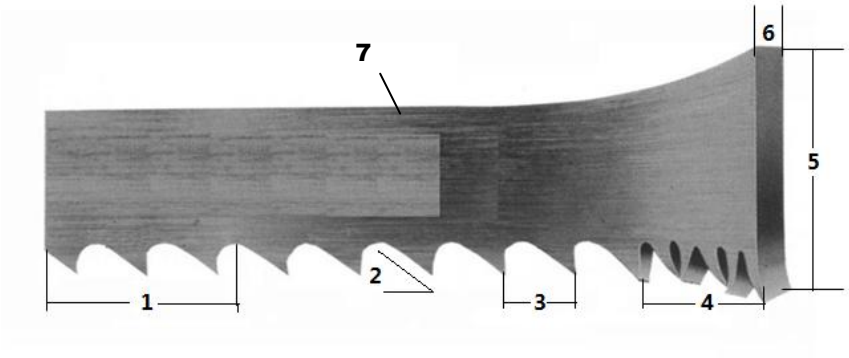
Section 7

BANDSAW CUTTING: A PRACTICAL GUIDE

INTRODUCTION



1. TPI: The number of teeth per inch as measured from gullet to gullet.

2. Tooth Rake Angle: The angle of the tooth face measured with respect to a line perpendicular to the cutting direction of the saw.

3.Tooth Pitch: Tooth pitch refers to the number of teeth per inch (tpi). 1 inch equates to 25.4 mm.

A distinction is made between constant tooth pitches with a uniform tooth distance, 2 tpi for example, and variable tooth pitches with different tooth distances within one toothing interval.

Variable tooth pitches, for instance 2-3 tpi, can be characterized by two measures: 2 tpi stands for the maximum tooth distance and 3 tpi stands for the minimum tooth distance in the toothing interval.

Constant **Variable**

4. Set: The bending of teeth to right or left to allow clearance of the back of the blade through the cut.

5. Width: The nominal dimension of a saw blade as measured from the tip of the tooth to the back of the band.

6. Thickness: The dimension from side to side on the blade.

7. Gullet: The curved area at the base of the tooth. The tooth tip to the bottom of the gullet is the gullet depth.

SAW BLADE SELECTION

1. Band length

The dimensions of the band will depend on the band saw machine that has been installed.

Please refer to Section 2 – General Information

2. Band width

Band width: the wider the band saw blade, the more stability it will have.

3. Cutting edge material

The machinability of the material to be cut determines what cutting material you should choose.

4. Tooth pitch

The main factor here is the contact length of the blade in the workpiece.

If it is 4P, 25.4 ÷ 4 P = 6.35 mm, that is, one tooth is 6.35 mm.

If it is 3P, 25.4 ÷ 3 P = 8.46 mm If the number is small, it means that the tooth is large.

What is written as 3/4 is that it is a variable pitch of large (3) / small (4).

The saw blade must contact the cutting material at least two pitches. In the case of a thickness of 15 mm, 4P = OK, 3P = NG.

- 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, one tooth to the right, 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:

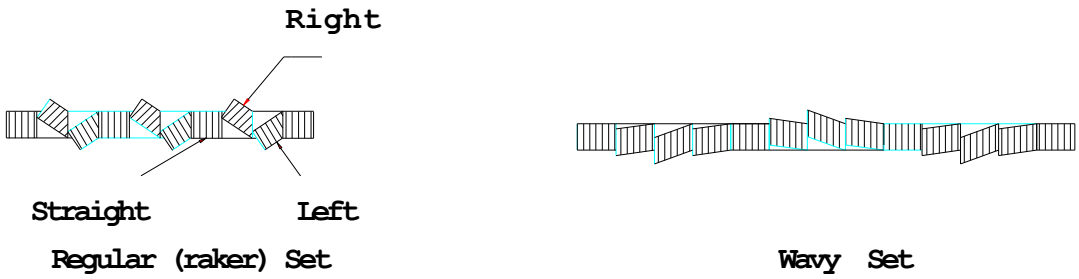


Fig. 7.2 The Saw Set

VISE LOADING

The position in which material is placed in the vise can have a significant impact on the cost per cut.

Often, loading smaller bundles can mean greater sawing efficiency.

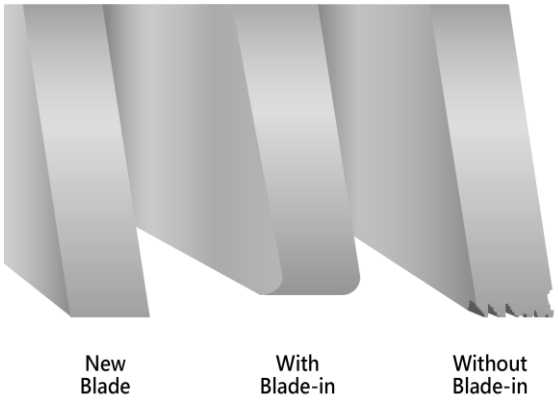
When it comes to cutting odd-shaped material, such as angles, I-beams, channel, and tubing, the main point is to arrange the materials in such a way that the blade cuts through as uniform a width as possible throughout the entire distance of cut.

The following diagrams suggest some costeffective ways of loading and fixturing. Be sure, regardless of the arrangement selected, that the work can be firmly secured to avoid damage to the machine or injury to the operator.

BladeBreak -In

Completing a proper break-in on a new band saw blade will dramatically increase its life.

1. Select the proper band speed for the material to be cut.



2. Reduce the feed force/rate to achieve a cutting rate 20% to 50% of normal (soft materials require a larger feed rate reduction than harder materials).

3.Begin the first cut at the reduced rate. Make sure the teeth are forming a chip. Small adjustments to the band speed may be made in the event of excessive noise/vibration. During the first cut, **increase feed rate/force** slightly once the blade fully enters the workpiece.With each following cut, **gradually increase feed rate/force** until normal cutting rate is reached.

Section 8

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.

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 2 weeks

Please apply grease to the following points:

1. Idle wheel
2. Drive wheel
3. Blade tension device

Recommended Grease:

- Shell Alvania EP Grease 2
- Mobil Mobilplex 48

First 600hrs for new machine,then every 1200hrs

Replace the transmission oil after operating for first 600hrs for new machine,then every 1200hrs

Recommended gear oil

- Shell Omala oil HD220
- Mobil gear 630

Recommended hydraulic oil

- ShellTellus 32
- Mobil DTE Oil Light Hydraulic 28

Every six months

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 Alvania EP Grease 2, Mobil Mobilplex 48
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 us pass a 48 hours continuously running test before shipping out and we are 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.

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

It is hoped that you will give us 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

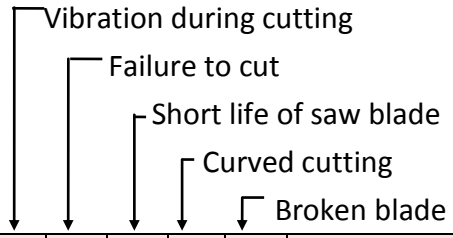
DISCONNECT POWER CORD TO MOTOR BEFORE ATTEMPTING ANY REPAIR OR INSPECTION.

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**

SOLUTIONS TO SAWING PROBLEMS

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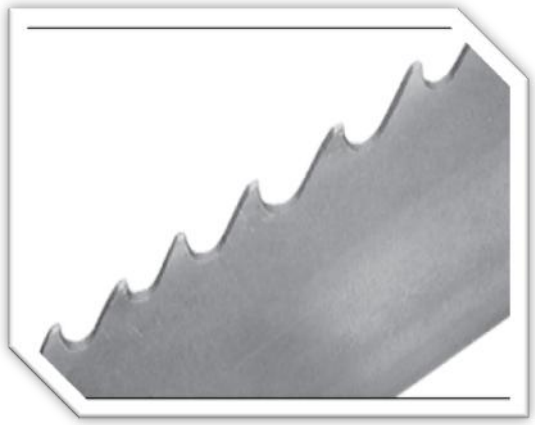
#1. Heavy Even Wear On Tips and Corners Of Teeth



Probable Cause :

A. Improper break-in procedure.

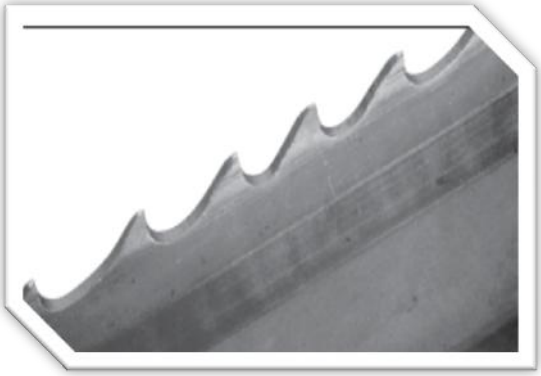
B. Excessive band speed for the type of material being cut. This generates a high tooth tip temperature resulting in accelerated tooth wear.

C. Low feed rate causes teeth to rub instead of penetrate. This is most common on work hardened materials such as stainless and toolsteels.

D. Hard materials being cut such as "Flame Cut Edge" or abrasive materials such as " Fiber Reinforced Composites".

E. Insufficient sawing fluid due to inadequate supply, improper ratio, and/or improper application

#2. Wear On Both Sides Of Teeth



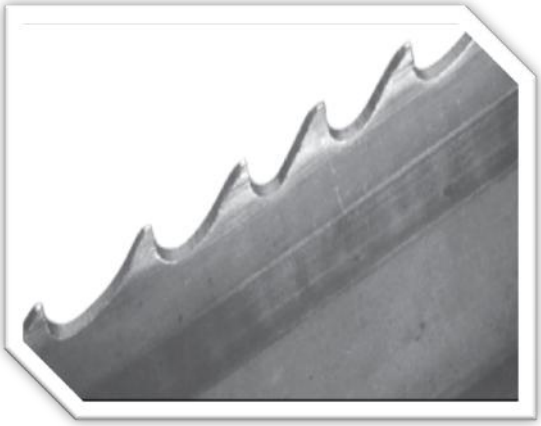
Probable Cause :

A. Broken, worn or missing back-up guides allowing teeth to contact side guides.

B. Improper side guides for band width.

C. Backing the band out of an incomplete cut.

#3. Wear On One Side Of Teeth



Probable Cause :

A. Worn wheel flange, allowing side of teeth to contact wheel surface or improper tracking on flangeless wheel.

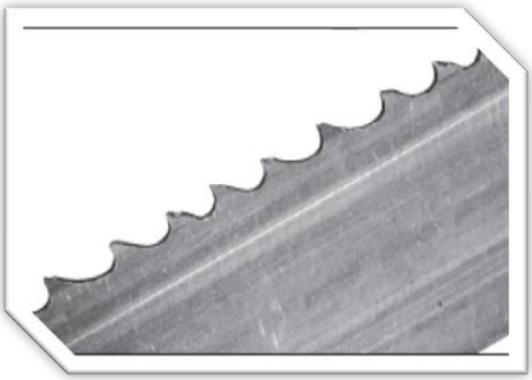
B. Loose or improperly positioned side guides.

C. Blade not perpendicular to cut.

D. Blade rubbing against cut surface on return stroke of machine head.

E. The teeth rubbing against a part of machine such as chip brush assembly, guards, etc.

#4. Chipped Or Broken Teeth



Probable Cause :

A. Improper break-in procedure.

B. Improper blade selection for application.

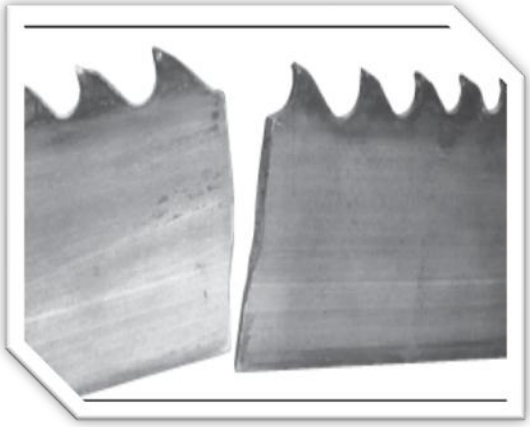
C. Handling damage due to improper opening of folded band.

D. Improper positioning or clamping of material.

E. Excessive feeding rate or feed pressure.

F. Hitting hard spots or hard scale in material

#5. Body Breakage Or Cracks From Back Edge



Probable Cause :

A. Excessive back-up guide "preload" will cause back edge to work harden which results in cracking.

B. Excessive feed rate.

C. Improper band tracking – back edge rubbing heavy on wheel flange.

D. Worn or defective back-up guides.

E. Improper band tension.

F. Notches in back edge from handling damage

#6. Tooth Strippage

Probable Cause :

A. Improper or lack of break-in procedure.

B. Worn, missing or improperly positioned chip brush.

C. Excessive feeding rate or feed pressure.

D. Movement or vibration of material being cut.

E. Improper tooth pitch for cross sectional size of material being cut.

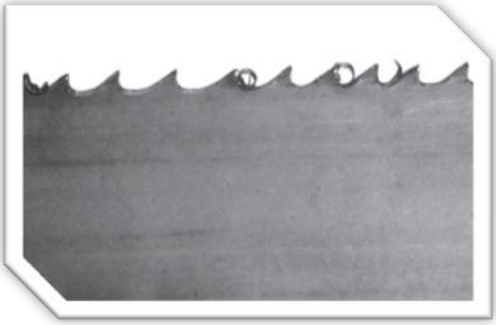
F. Improper positioning of material being cut.

G. Insufficient sawing fluid due to inadequate supply,improper ratio and/or improper application.

H. Hard spots in material being cut.

I. Band speed too slow for grade of material being cut.

#7. Chips Welded To Tooth Tips



Probable Cause :

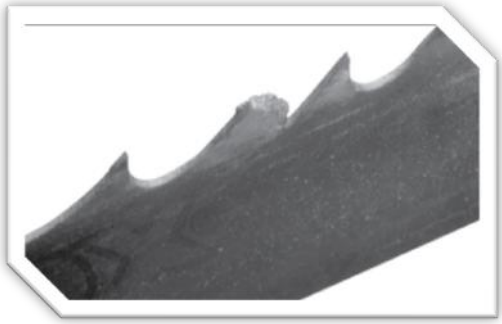
A. Insufficient sawing fluid due to inadequate supply, improper ratio and/or improper application.

B. Worn, missing or improperly positioned chip brush.

C. Improper band speed.

D. Improper feeding rate.

#8. Gullets Loading Up With Material



Probable Cause :

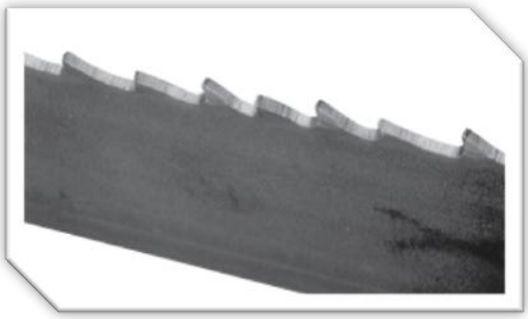
A. Too fine of a tooth pitch – insufficient gullet capacity.

B. Excessive feeding rate producing too large of a chip.

C. Worn, missing or improperly positioned chip brush.

D. Insufficient sawing fluid due to inadequate supply, improper ratio and/or improper application.

#9. Discolored Tips Of Teeth Due To Excessive Frictional Heat



Probable Cause :

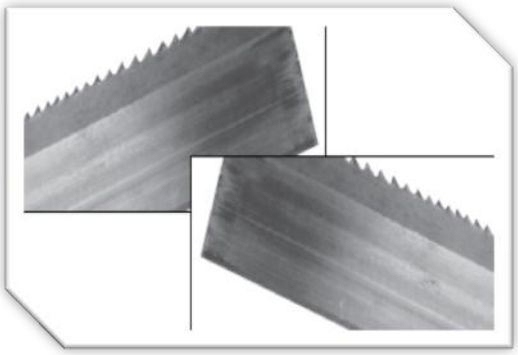
A. Insufficient sawing fluid due to inadequate supply, improper ratio and/or improper application.

B. Excessive band speed.

C. Improper feeding rate.

D. Band installed backwards.

10. Heavy Wear On Both Sides Of Band



Probable Cause :

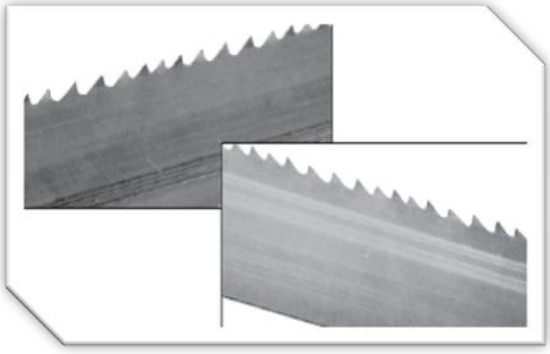
A. Chipped or broken side guides.

B. Side guide adjustment may be too tight.

C. Insufficient flow of sawing fluid through the side guides.

D. Insufficient sawing fluid due to inadequate supply, improper ratio and/or improper application.

#11. Uneven Wear Or Scoring On The Sides Of Band



Probable Cause :

A. Loose side guides.

B. Chipped, worn or defective side guides.

C. Band is rubbing on part of the machine.

D. Guide arms spread to maximum capacity.

E. Accumulation of chips in side guides.

#12. Heavy Wear And/Or Swagging On Back Edge

Probable Cause :

A. Excessive feed rate.

B. Excessive back-up guide "preload".

C. Improper band tracking – back edge rubbing heavy on wheel flange.

D. Worn or defective back-up guides.

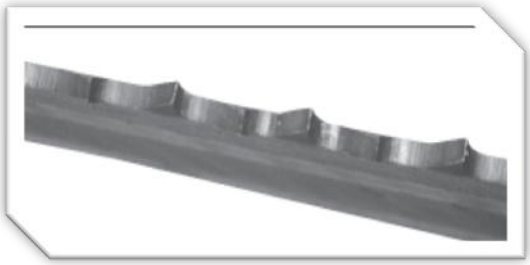
#13. Butt Weld Breakage

Probable Cause :

A. Any of the factors that cause body breaks can also cause butt weld breaks.

(See Observations #5, #15 and #16)

#14. Heavy Wear In Only The Smallest Gullets



Probable Cause :

A. Excessive feeding rate.

B. Too slow of band speed.

C. Using too fine of a tooth pitch for the size of material being cut.

#15. Body Breaking – Fracture Traveling In An Angular Direction

Probable Cause :

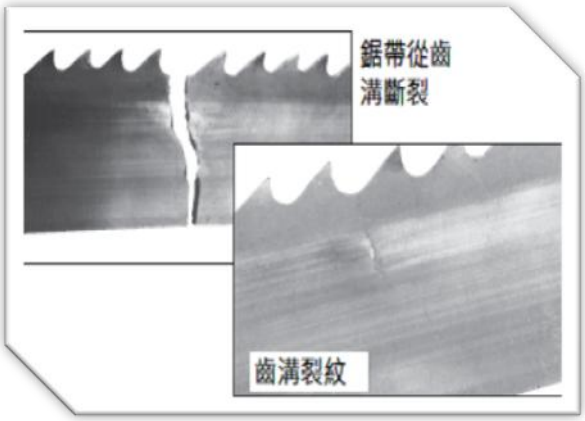
A. An excessive twist type of stress existed.

B. Guide arms spread to capacity causing excessive twist from band wheel to guides.

C. Guide arms spread too wide while cutting small cross sections.

D. Excessive back-up guide "preload".

#16. Body Breakage Or Cracks From Gullets



Probable Cause :

A. Excessive back-up guide "preload".

B. Improper band tension.

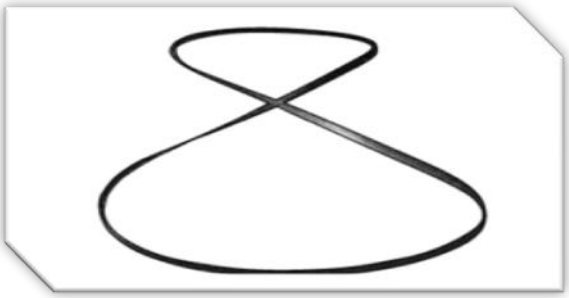
C. Guide arms spread to maximum capacity.

D. Improper beam bar alignment.

E. Side guide adjustment is too tight.

F. Excessively worn teeth.

#17. Band is Twisted Into A Figure "8" Configuration



Probable Cause :

A. Excessive band tension.

B. Any of the band conditions which cause the band to be long (#18) or short (#19) on tooth edge.

C. Cutting a tight radius.

#18. Used Band Is "Long" On The Tooth Edge

Probable Cause :

A. Side guides are too tight – rubbing near gullets.

B. Excessive "preload" – band riding heavily against back-up guides.

C. Worn band wheels causing uneven tension.

D. Excessive feeding rate.

E. Guide arms are spread to maximum capacity.

F. Improper band tracking – back edge rubbing heavy on wheel flange.

#19. Used Band Is "Short" On The Tooth Edge

Probable Cause :

A. Side guides are too tight – rubbing near back edge.

B. Worn band wheels causing uneven tension.

C. Guide arms are spread too far apart.

D. Excessive feeding rate.

#20. Broken Band Shows A Twist In Band Length

Probable Cause :

A. Excessive band tension

B. Any of the band conditions which cause the band to be long (#18) or short (#19) on tooth edge.

C. Cutting a tight radius.

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

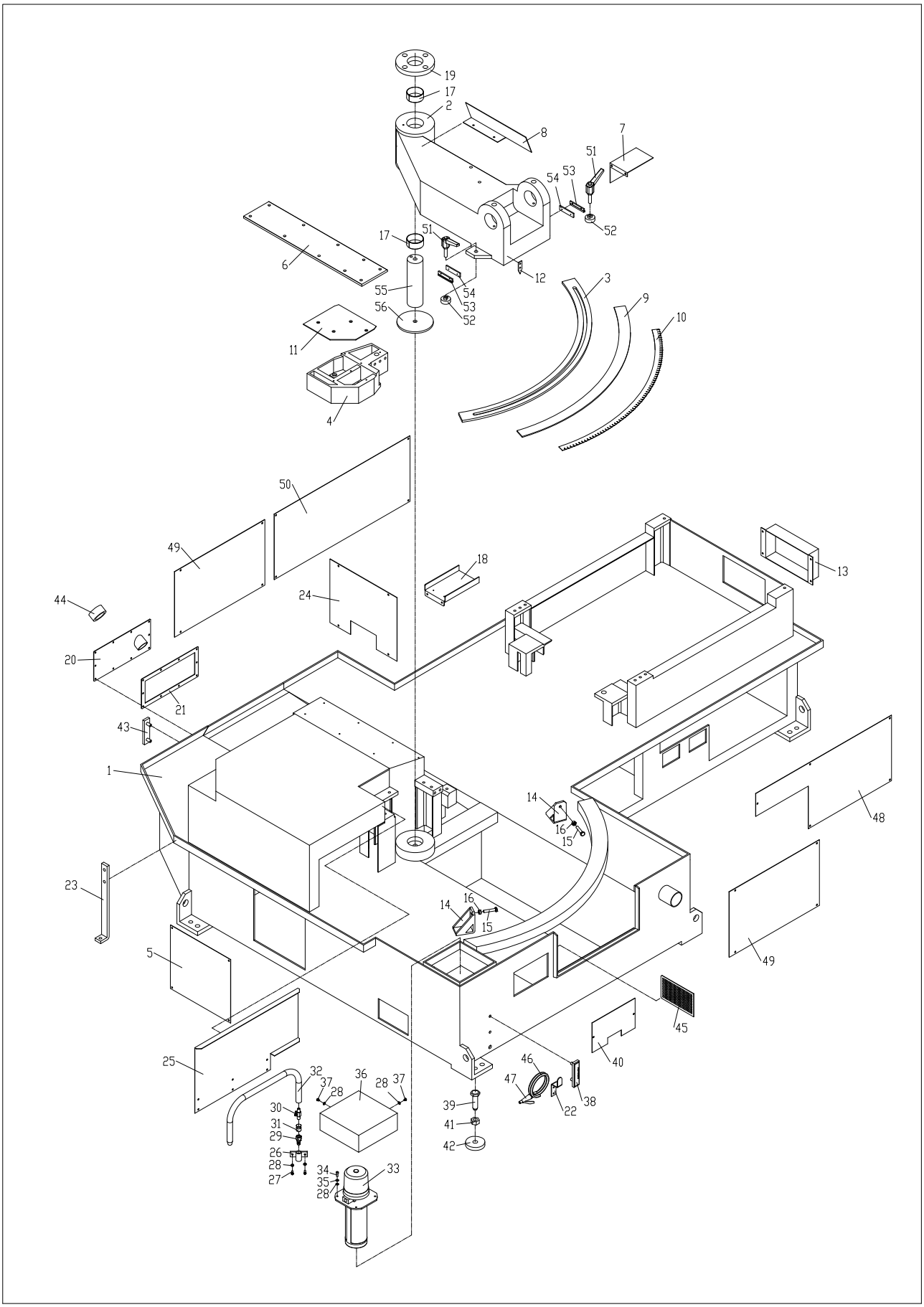
SPARE PARTS RECOMMENDATIONS

PART LIST

SPARE PARTS RECOMMENDATIONS

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

Part Name	Part Name
Saw blade	Coolant tank filter
Wire brush	Steel plates
Carbide inserts	Rollers
Bearings	Belt
Hydraulic tank leak-proof gasket	Duster seal
Rubber washer	Oil seal
O-ring	Snap ring
Drive wheel	Idle wheel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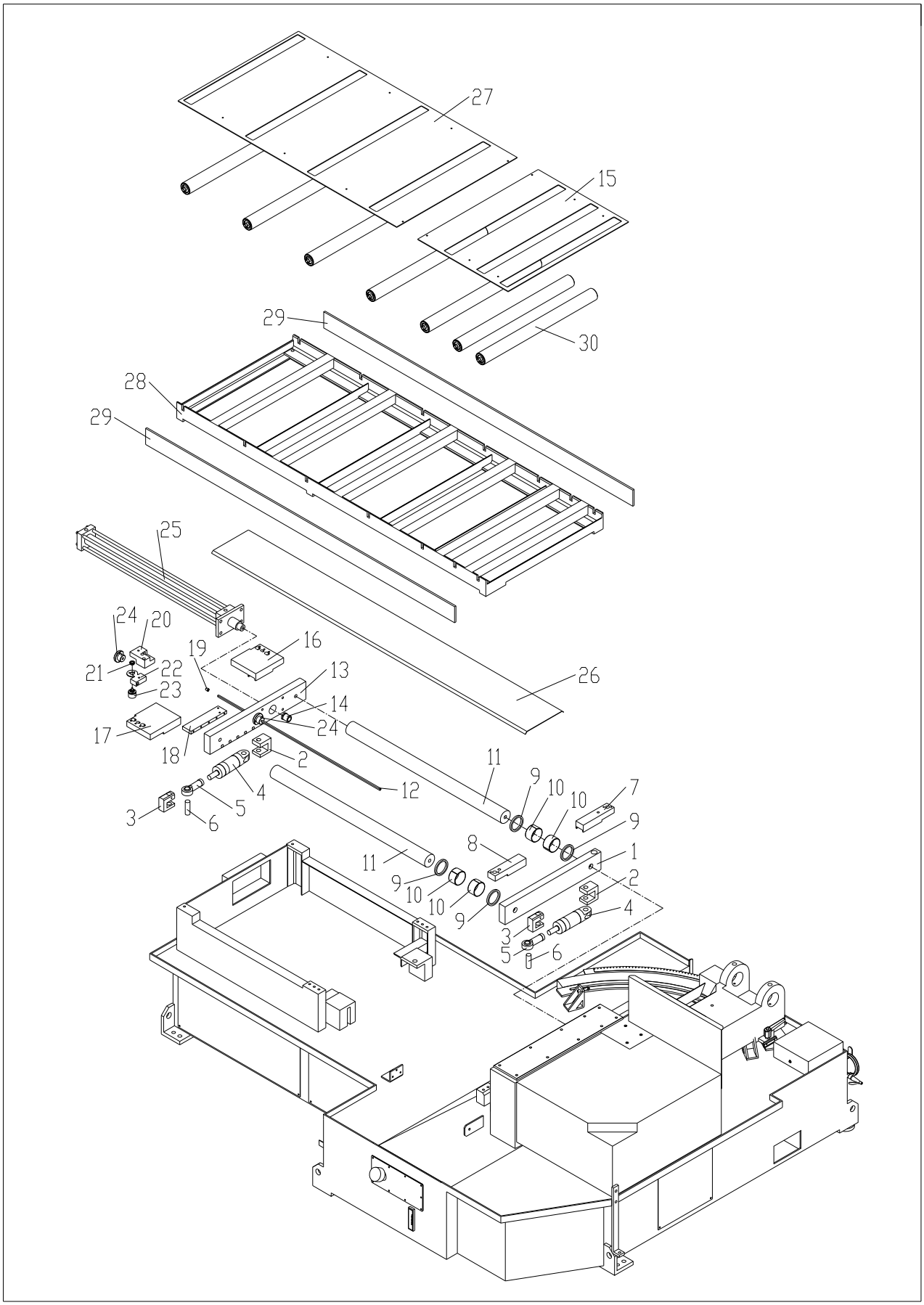
ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
1	AEE-1001A	底座	Base	1	PCS
2	SEE-1020A	關節座	Joint bracket	1	PCS
3	SEE-1016A	旋轉軌道	Swivel track	1	PCS
4	SEE-1021	床面	Bed	1	PCS
5	AEE-1053	底座前蓋	Front cover	1	PCS
6	SEE-1027	床面鋼板	Bed plate	1	PCS
7	SEE-1044A	軌道削擋	Track shield	1	PCS
8	SEE-1045	關節座屑擋	Joint bracket shield	1	PCS
9	SEE-1056	角度銘牌固定板	Fixed plate (angle scale)	1	PCS
10	SEE-1037A	角度銘板	Angle scale	1	PCS
11	SEE-1064	床面蓋板	Bed cover plate	1	PCS
12	SEE-1046	旋轉指針	Angle indicator	1	PCS
13	AEE-2017	送料油缸護蓋	Feeding cylinder cover	1	PCS
14	AEE-1054	角度定位板	Angle position plate	2	PCS
15	PBA-8-50	有頭內六角螺絲	Hex soc cap screw	2	PCS
16	POA-10	螺帽	Nut	2	PCS
17	PP-13259	乾式軸承MB6530	DU bushing	2	PCS
18	AHN-1904	拖盤	Bracket	1	PCS
19	S650M-1174	旋轉軸墊塊	Swivel shaft gasket	1	PCS
20	AHA-0102	油箱蓋	Hydraulics tank cover	1	PCS
21	AHA-0108A	油箱蓋防漏石綿	Anti-leaking Asbestos	1	PCS
22	AHA-1309	軟管架	Hose bracket	1	PCS
23	AGB-70373	右出車固定耳	Lifting ring	1	PCS
24	AEE-1021	底座左後蓋	Base rear cover(L)-1	1	PCS
25	SEE-1042	托架側護板	Side cover plate	1	PCS
26	AGB-70220	冷卻水管固定板	Water pipe fixed bracket	1	PCS
27	PFA-6-16	丸頭螺絲(十字)	Oval head screw	2	PCS
28	PPA-6	平面華司(公)	Washer	5	PCS
29	PP-21099	快速接頭	Fast connector	1	PCS
30	PP-43136	開關閥	On/off valve	1	PCS
31	AHA-1932	防塵套	Duster seal	1	PCS
32	PP-57081	噴油管	Tube	1	PCS
33	PP-32121A-CE	浸水幫浦	Coolant pump	1	PCS
34	PBA-6-15	有頭內六角螺絲	Hex soc cap screw	1	PCS
35	PQA-6	彈簧華司	Spring washer	1	PCS
36	SEE-1018	水泵護蓋	Pump cover	1	PCS
37	PDA-6-10	丸頭內六角螺絲(公)	Ball bolt	2	PCS
38	PP-21030A	水面計	Water gauge	1	PCS
39	AHC-0153	底座調整螺桿	Base stand adjusting screw	1	PCS
40	AEE-1022	底座右蓋	Base side cover - R1	1	PCS
41	POA-20	螺母	Nut	1	PCS
42	AHR-1055	底座墊塊	Table stand pad	1	PCS
43	PP-21030	油面計	Oil gauge	1	PCS

ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
44	PP-90857	油箱蓋螺帽	Hydraulics tank cover nut	1	PCS
45	AHA-0139	水箱通管濾網	Filter	1	PCS
46	PP-57079	出水管	Water pipe	1	PCS
47	PP-58003	水槍	Spray gun	1	PCS
48	AEE-1023	底座後右蓋	Base rear cover (R)	1	PCS
49	AEE-1024	底座後左右蓋	Base rear cover(L&R)	2	PCS
50	AEE-1052	底座後左蓋	Base rear cover(L)-2	1	PCS
51	PP-52111F	鋸臂把手 M12X45L	Saw arm handle	2	PCS
52	SEE-1053	軌道固定塊	Track fixed block	2	PCS
53	SGB-71144	刮刷片	Way wiper	2	PCS
54	SGB-71145	刮刷片固定塊	Way wiper fixed block	2	PCS
55	SEE-1010	轉軸	Shaft	1	PCS
56	SEE-1015	轉軸墊圈	Shaft washer	1	PCS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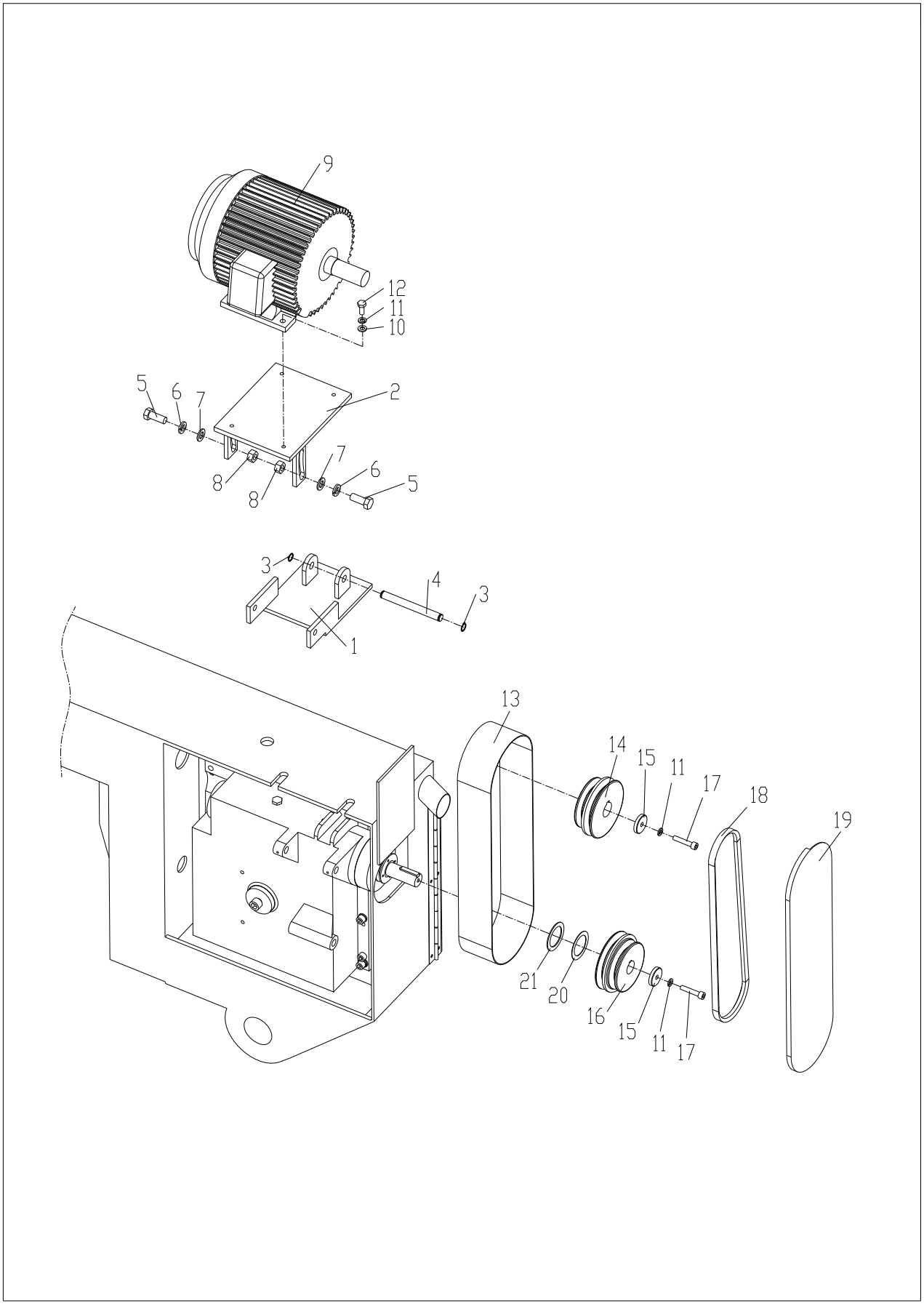
ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
1	AEE-2203	送料前固定板	Feeding shaft fixed plate (front)	1	PCS
2	AEE-2219	油缸固定座(前)	Cylinder fixed seat	2	PCS
3	AEE-2210	推轉前耳	Infeed cylinder front bracket	2	PCS
4	PP-43470A	油壓缸	Cylinder	2	PCS
5	PP-14485	連桿軸承PHS22	Connecting rod bearing PHS22	2	PCS
6	AEE-2209	推轉油缸插銷	Infeed cylinder pin	3	PCS
7	AEE-2215A	前送料壓板(二)	Front infeed press plate-2	1	PCS
8	AEE-2214A	前送料壓板	Front infeed press plate	1	PCS
9	PP-51146	防塵套	Dust seal	4	PCS
10	PP-13260	乾式軸承	Du Bushing	4	PCS
11	AEE-2202	送料軸	Feeding shaft	2	PCS
12	AHA-1561-3	定寸齒條	Tooth bar	1	PCS
13	AEE-2204	送料後固定板	Feeding shaft fixed plate (rear)	1	PCS
14	AHA-1605	襯套螺帽	Bushing cap nut	1	PCS
15	AEE-1017-1	料架遮板	Roller rack top	1	PCS
16	AEE-2212A	右送料壓板	Right infeed press plate	1	PCS
17	AEE-2213A	左送料壓板	Left infeed press plate	1	PCS
18	AEE-2205	譯碼器固定板	Encoder fixed plate	1	PCS
19	PP-13020	乾式軸承	DU bushing	1	PCS
20	AHA-1563	譯碼器固定座	Encorder seat	1	PCS
21	AHA-1560	定寸齒輪	Gear	1	PCS
22	AHA-1562	譯碼器活動板	Movable plate	1	PCS
23	EP-90492	譯碼器	Encorder	1	PCS
24	AHA-1564	齒排固定座(二)	Tooth bar seat	2	PCS
25	PP-43461	油壓缸	Cylinder	1	PCS
26	AEE-2218	齒條護蓋	Tooth bar cover	1	PCS
32	AEE-1017-2	料架遮板	Roller rack top	1	PCS
28	AEE-1003	料架	Infeed roller rack	1	PCS
29	AEE-1003-1	料架附件 90X9TX2000扁鐵	Accessory-iron strip 90X9TX2000	2	PCS
30	AEE-1004	料架滾輪	Infeed roller	7	PCS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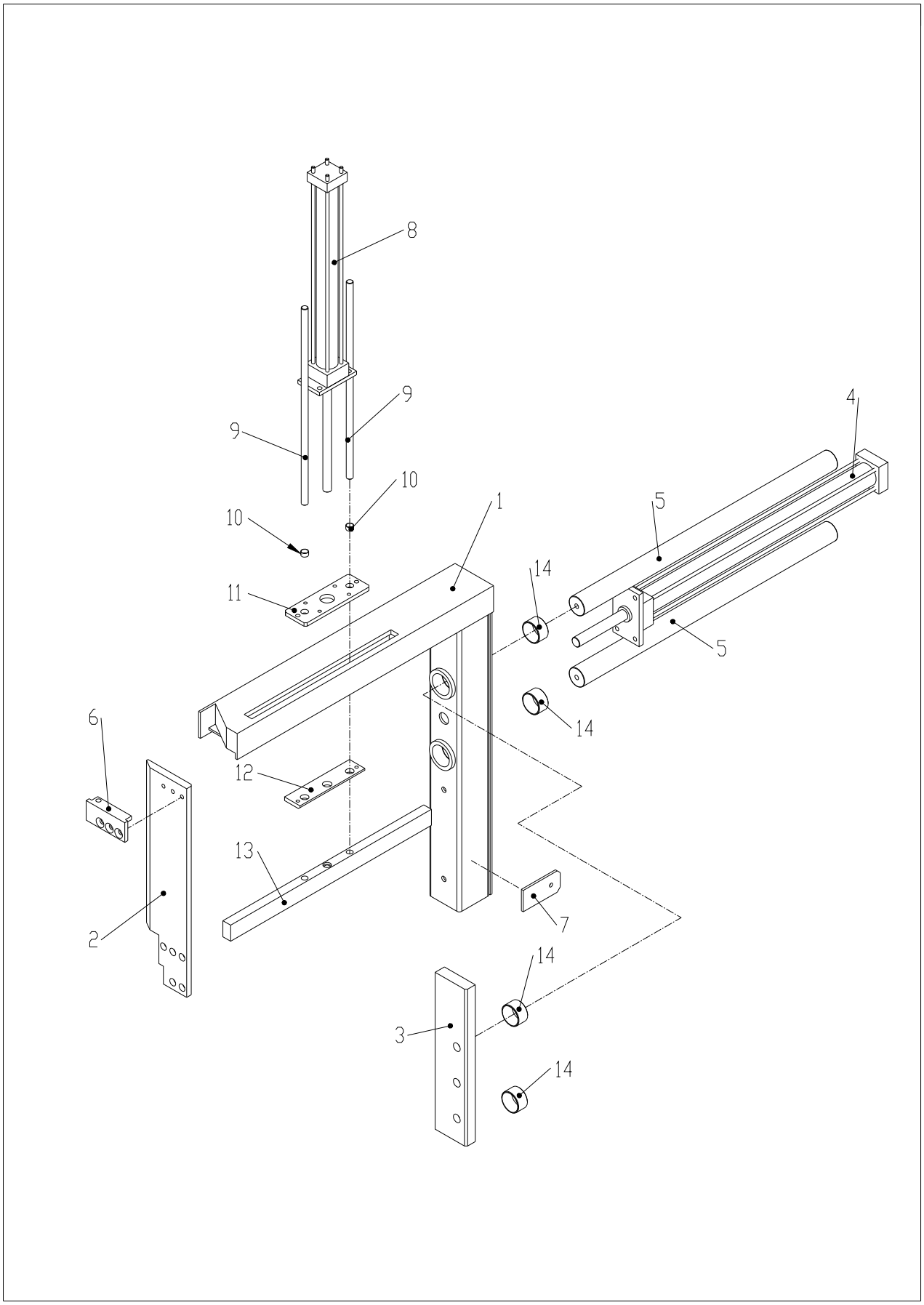
ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
1	AGB-70340B	鋸弓馬達底板(二)	Blade motor seat (2)	1	PCS
2	AGB-70339B	鋸弓馬達底板(一)	Blade motor seat (1)	1	PCS
3	PP-52089	扣環 S17	Ring S17	2	PCS
4	AGB-70340	馬達底板活動軸	Motor seat shaft	1	PCS
5	PLA-16-40	外六角螺絲	Hexagon bolt	2	PCS
6	PQA-16	彈簧華司	Spring washer	2	PCS
7	PPA-16	平面華司	Washer	2	PCS
8	POA-16	螺帽	Nut	2	PCS
9	PP-31153	馬達7.5HP	Motor	1	PCS
10	PPA-10	平面華司	Washer	6	PCS
11	PQA-10	彈簧華司	Spring washer	4	PCS
12	PLA-10-25	外六角螺絲	Hexagon bolt	4	PCS
13	SEE-3035b-1	普利護蓋	Pulley cover	1	PCS
14	SEE-3007A	馬達普利	Motor pulley	1	PCS
15	AHA-0525	墊圈	washer	2	PCS
16	SEE-3006A	減速機普利	Gear reducer pulley	1	PCS
17	PBA-10-50	有頭內六角螺絲	Hex soc cap screw	2	PCS
18	PP-56289	皮帶B-50	Belt B-50	1	PCS
19	SEE-3035B	普利護蓋(塊輪減速	pulley cover	1	PCS
20	AHA-0325	軸承墊圈	Washer	1	PCS
21	AHA-0324	鐵弗龍墊圈	Hard Long washer	1	PCS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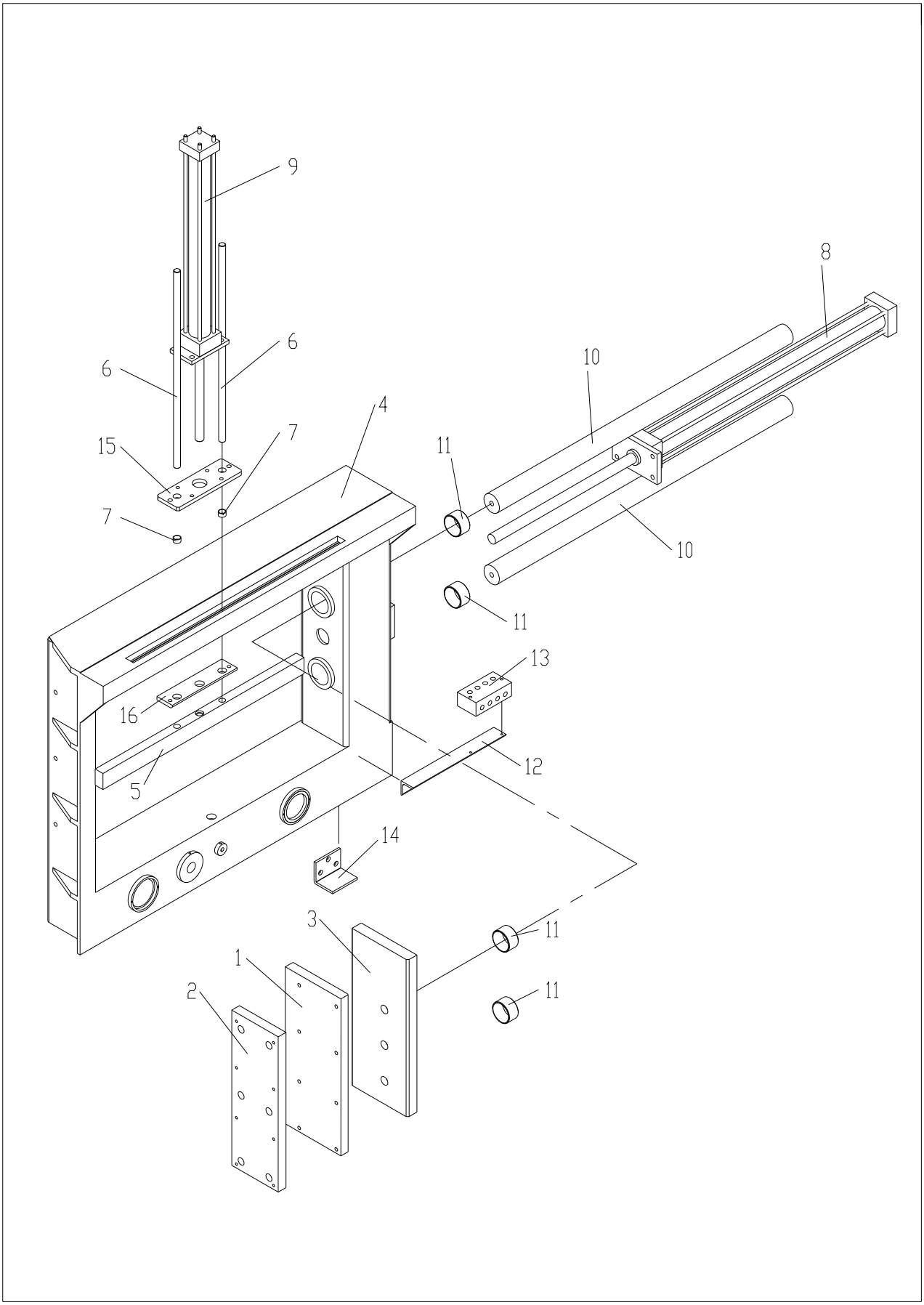
ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
1	SEE-1022A	虎鉗座	Frame(for vise)	1	PCS
2	SEE-1026B	固定虎鉗鋼板	Fixed vise plate	1	PCS
3	SEE-1023B	活動虎鉗	Movable vise	1	PCS
4	PP-43463	油壓缸	Cylinder	1	PCS
5	SEE-1024	虎鉗滑軸	Vise shaft	2	PCS
6	SEE-1032	虎鉗座固定塊	Vise fixed block	1	PCS
7	AEE-1012	開關擋板(二)	Plate	1	PCS
8	PP-43464	油壓缸	Cylinder	1	PCS
9	SEE-1038	下壓滑軸	Sliding shaft	2	PCS
10	PP-13061	乾式軸承	DU bushing	2	PCS
11	SEE-1061	油壓固定板	Hydrlic fixed plate	1	PCS
12	SEE-1062	油壓反頂固定板	Hydrlic fixed plate	1	PCS
13	SEE-1063	下壓塊	Clamping block	1	PCS
14	PP-13242	乾式軸承5030	DU bushing	4	PCS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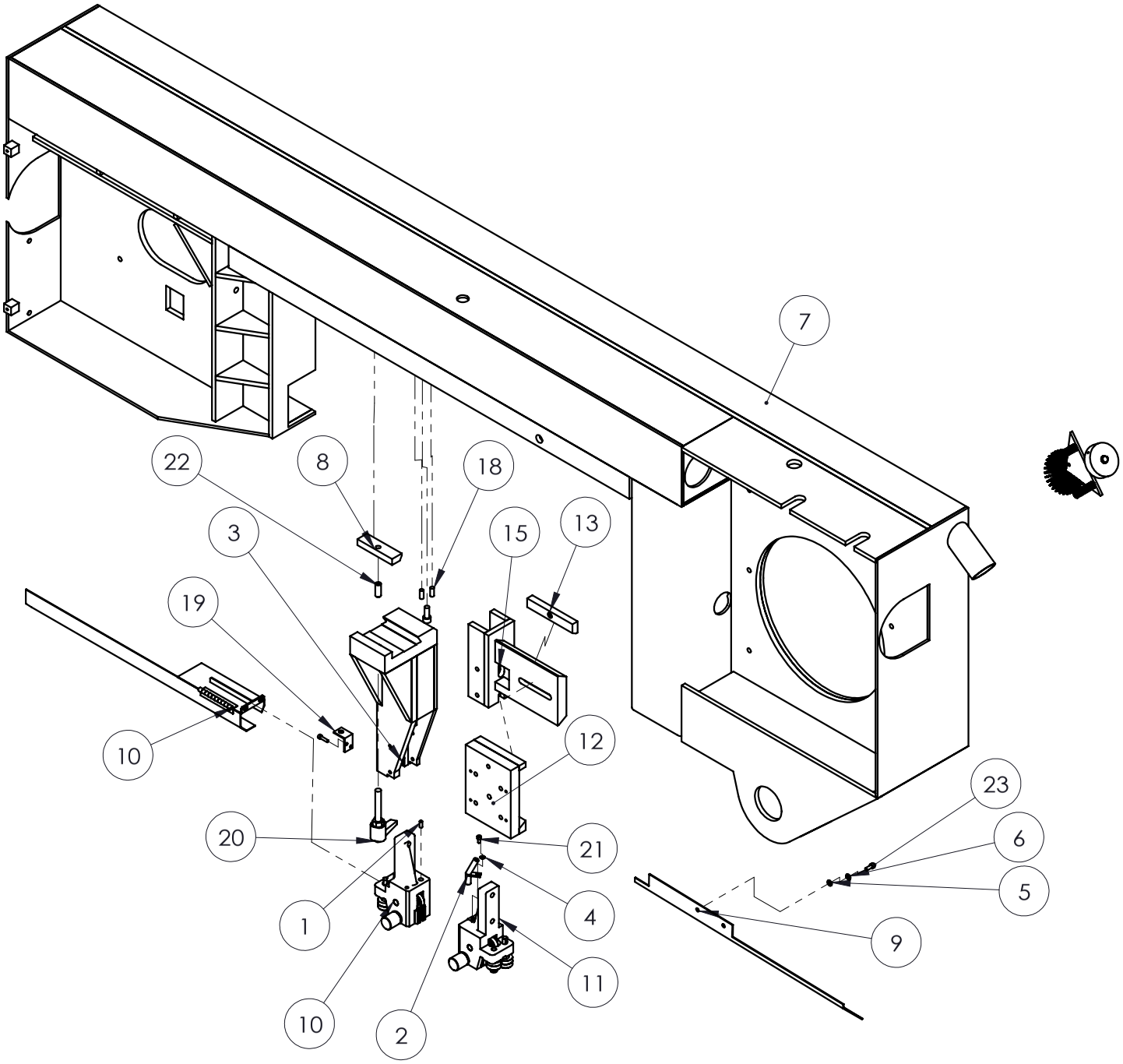
ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
1	AEE-2220B-1	送料固定虎鉗	Feeding fixed vise	1	PCS
2	AEE-2220B-2	送料固定虎鉗	Feeding fixed vise	1	PCS
3	AEE-2221B	送料活動虎鉗鋼板	Feeding movable vise	1	PCS
4	AEE-2201	送料座	Shuttle feed frame	1	PCS
5	SEE-1063	下壓塊	Clamping block	1	PCS
6	SEE-1038	下壓滑軸	Sliding shaft	2	PCS
7	PP-13061	乾式軸承	DU bushing	2	PCS
8	PP-43463B	油壓缸	Cylinder	1	PCS
9	PP-43464	油壓缸	Cylinder	1	PCS
10	AEE-2222	送料虎鉗滑軸	Shuttle vise shaft	2	PCS
11	PP-13242	乾式軸承5030	DU bushing	4	PCS
12	AEE-1015-1	油路板附件	Manifold plate accessory	1	PCS
13	AEE-1015	油路板(二)	Manifold plate(二)	1	PCS
14	AEE-1011	開關擋板(一)	Plate	1	PCS
15	SEE-1061	油壓固定板	Hydrlic fixed plate	1	PCS
16	SEE-1062	油壓反頂固定板	Hydrlic fixed plate	1	PCS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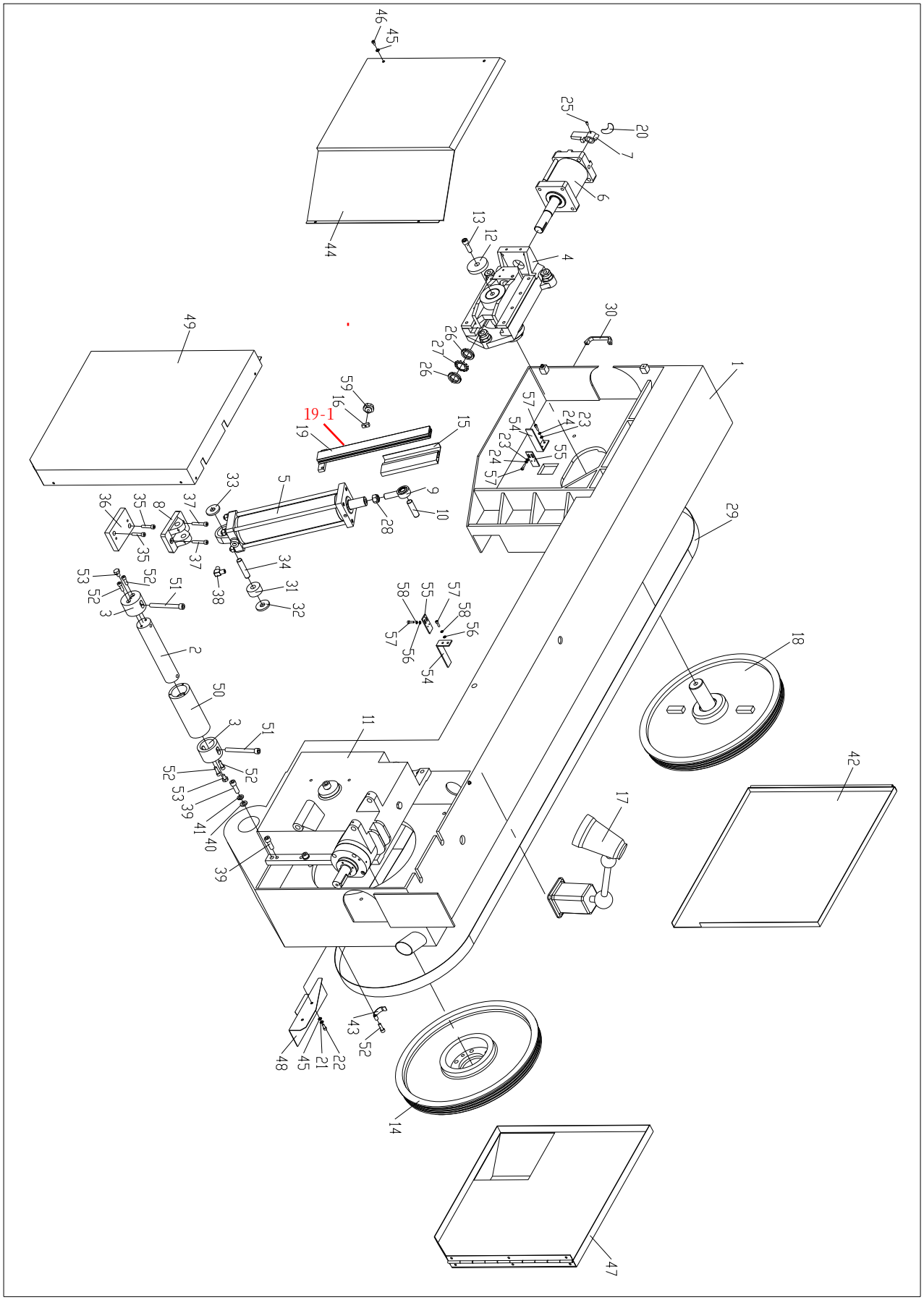
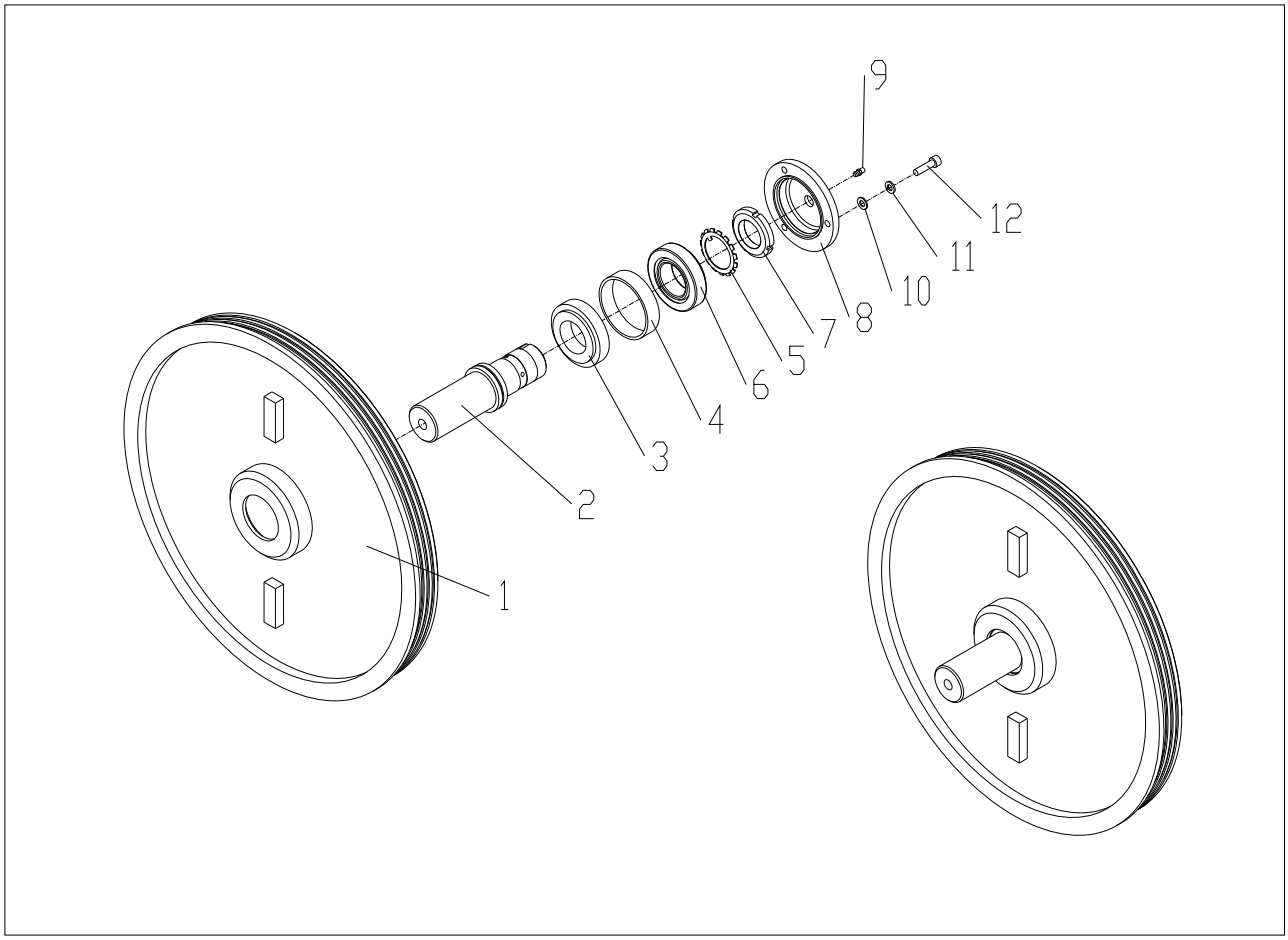
ITEM	PART NO.	PART NAME (CH)	PART NAME	PART SPEC.	COUNT
1	PP-52111E	鋸臂把手 M12X75L	saw arm handle		1
2	AHA-0745	冷卻水噴嘴	spray nozzle		1
3	PBA-5-10	有頭內六角螺絲	hex soc cap screw		1
4	PPA-5	平面華司	washer	M5	1
5	PBA-6-15	有頭內六角螺絲	hex soc cap screw	M6	2
6	PQA-6	彈簧華司	spring washer	M6	2
7	PAA-8-20	止付螺絲	set screw		1
8	MJA-2041	水龍頭座板	faucet base plate		1
9	SEE-3022	下輪屑擋	idle wheel shield		1
10	PAA-8-20	止付螺絲	set screw		1
11	SGB-710801	右導輪座組	right guide roller assembly		1
12	WC650M-0006	固定鋸臂滑座	fixed saw arm sliding seat		1
13	WS650M-0008	鋸臂固定塊	guide arm fixed block		1
15	WC650M-0007	固定鋸臂	fixed guide arm		1

ITEM	PART NO.	PART NAME (CH)	PART NAME	PART SPEC.	COUNT
18	PAA-8-20	止付螺絲	set screw		2
19	MJA-2041	水龍頭座板	faucet base plate		1
20	PP-52111E	鋸臂把手 M12X75L	saw arm handle		1
21	PBA-5-10	有頭內六角螺絲	hex soc cap screw		1
22	PAA-8-20	止付螺絲	set screw		1
23	PBA-6-15	有頭內六角螺絲	hex soc cap screw	M6	1

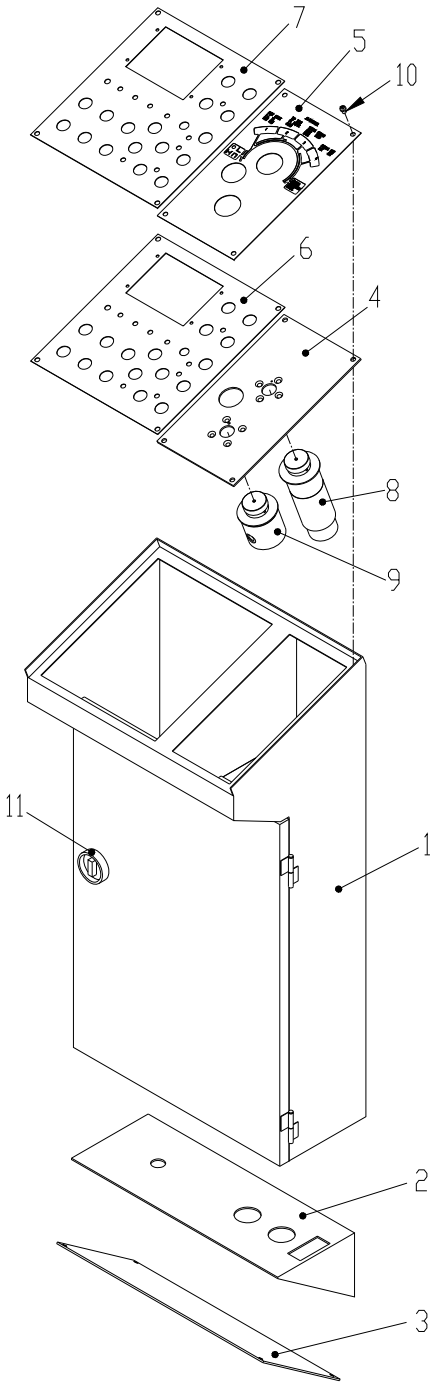

19-1

ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
1	SEE-3001A	鋸弓	Saw bow	1	PCS
2	SEE-1028	關節軸	Joint shaft	1	PCS
3	SEE-1030	關節軸套	Shaft sleeve	2	PCS
4	AGB-703500	張力滑座滑板組	Tensioner sliding plate assemly	1	PCS
5	SEE-100500A	鋸弓油壓缸組	Sawbow cylinder assembly	1	PCS
6	AGB-707209-1	張力油壓缸組	Tensioner cylinder assembly	1	PCS
7	AHB-0653	切換把手	Handle	1	PCS
8	AGB-70735	油壓缸固定座	Cylinder seat	1	PCS
9	PP-14480	連桿軸承	Connecting rod bearing	1	PCS
10	AGB-70304a	上鋸弓油缸插銷	Pin	1	PCS
11	AGB-703109B	減速機	Gear reducer assembly	1	PCS
12	AHB-0613	上輪鎖緊墊圈	Motor pulley lock washer	1	PCS
13	PBA-12-40	有頭內六角螺絲	Hex Soc Cap Screw	1	PCS
14	SEE-3003A	下輪	Drive wheel	1	PCS
15	AEE-1043	上限滑板	Sliding seat	1	PCS
16	SEE-1039	上限滑桿螺母	Upper slider nut	1	PCS
17	PP-91804C	工作燈	Working lamp	1	PCS
18		上輪組	Idle wheel assembly	1	PCS
19	SEE-1035	上限滑座	Sliding seat	1	PCS
19-1	SEE-3032B	高度銘板	Height scale	1	PCS
20	SEE-3039	鋸片鬆緊銘牌	Label	1	PCS
21	PQA-6	彈簧華司	Spring washer	1	PCS
22	PBA-6-15	有頭內六角螺絲	Hex soc cap screw	1	PCS
23	PPA-5	平面華司	Washer	2	PCS
24	PQA-5	彈簧華司	Spring washer	2	PCS
25	PAA-6-10	止付螺絲	Set screw	1	PCS
26	PP-14906	固定螺母AN06	Fixed nut AN06	2	PCS
27	PP-14956	止動環AW06	Stop ring AW06	1	PCS
28		螺帽M16	Spiral shaft	1	PCS
29	PP-18308C	鋸帶	Blade	1	PCS
30	PP-52080	輪箱把手	Handle	1	PCS
31	PP-14510	軸承	Bearing 2303	1	PCS
32	AHA-1105	橡膠墊圈	Rubber pad	1	PCS
33	AHA-1105A	活動軸墊圈	Washer	1	PCS
34	AGB-70304B	下插銷	Pin	1	PCS
35	PBA-8-40	有頭內六角螺絲	Bolt	2	PCS
36	SEE-3041DM	鋸弓油缸固定板	Cylinder fixed plate	1	PCS
37	PBA-8-50	有頭內六角螺絲	Hex soc cap screw	2	PCS
38	AHC-0618C	張力針孔閥	Tube connector	1	PCS
39	PBA-12-35	有頭內六角螺絲	Hex soc cap screw	2	PCS
40	PPA-12	平面華司	Washer	1	PCS
41	PQA-12	彈簧華司	Spring washer	1	PCS
42	SEE-3004	上輪箱蓋	Idle wheel cover	1	PCS

ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
43	AHA-0414	鋸片安裝板	Plate(for installing blade)	1	PCS
44	SEE-3008A	張力護蓋	Tension cover	1	PCS
45	PPA-6	平面華司(公)	Washer	3	PCS
46	PFA-6-10	丸頭螺絲(十字)	Oval head screw	2	PCS
47	SEE-3005A	上輪箱蓋	Idle wheel cover	1	PCS
48	SEE-3031	左鋸片護蓋	Blade cover (left)	1	PCS
49	SEE-3025B	減速機護蓋	Gear reducer cover	1	PCS
50	SEE-3015	鋸弓軸套	Saw bow shaft sleeve	1	PCS
51	PBA-12-120	有頭內六角螺絲	Hex soc cap screw	2	PCS
52	PBA-8-25	有頭內六角螺絲	Hex soc cap screw	5	PCS
53	PLA-10-15	外六角頭螺絲	Hexagon bolt	2	PCS
54	AHA-0670A	感應器底板座	Sensor seat	2	PCS
55	AHA-0672	感應器底板	Sensor base plate	2	PCS
56	PPA-5	平面華司(公)	Washer	2	PCS
57	PBA-5-18	有頭內六角螺絲	Hex soc cap screw	4	PCS
58	PQA-5	彈簧華司	Spring washer	2	PCS
59	PP-53021	梅花螺絲	Screw	1	PCS



ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
1	SEE-3002A	上輪	idle wheel	1	PCS
2	SEE-3037	上輪軸	wheel shaft	1	PCS
3	PP-14615	滾錐軸承 30209	taper roller bearing	1	PCS
4	SEE-3038	上輪軸承墊圈	bearing collar	1	PCS
5	PP-14959	止動環 AW09	toothed washer	1	PCS
6	PP-14694	軸承 32209V	taper roller bearing	1	PCS
7	PP-14909	固定螺母 AN09	toothed nut	1	PCS
8	AGB-70331	上輪軸蓋	bearing cap	1	PCS
9	PUC-020	油嘴 1/4"-28UNF	grease nipple	1	PCS
10	PPA-8	平面華司	washer	3	PCS
11	PQA-8	彈簧華司	spring washer	3	PCS
12	PBA-8-30	有頭內六角螺絲	bolt	3	PCS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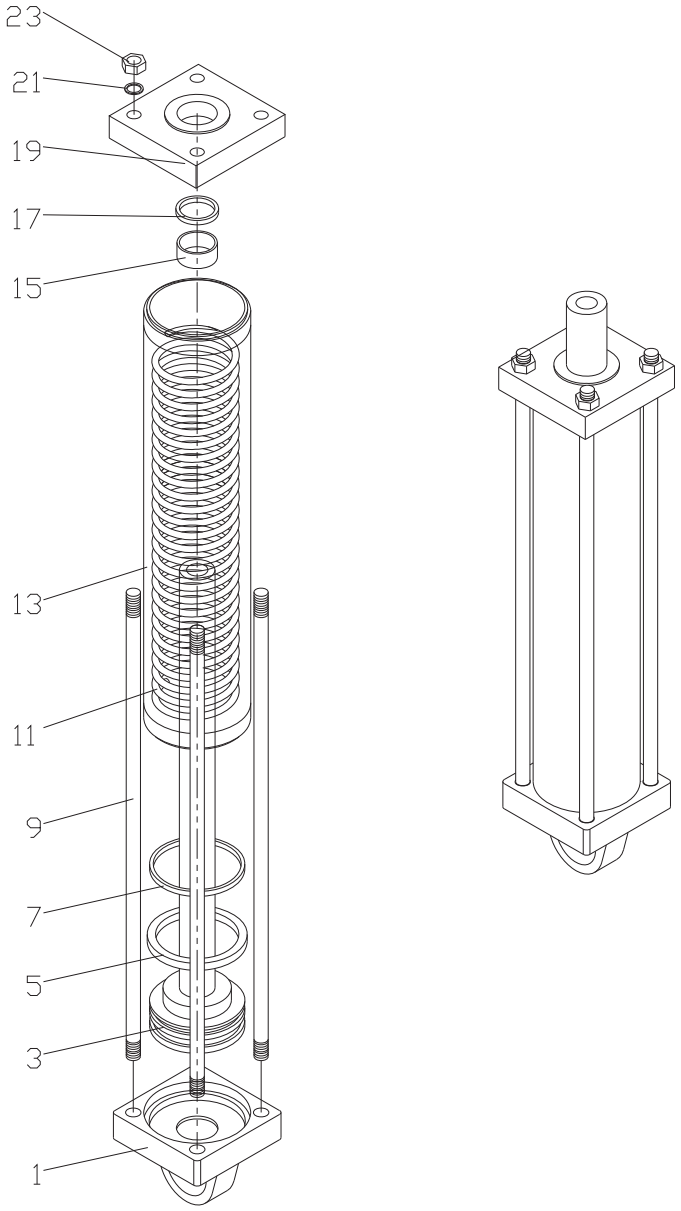
ITEM	PART NO.	PART NAME	PART NAME	QTY	UNIT
1	AHC-0131-CE	控制箱	Electric control box	1	PCS
2	SEE-1074	控制箱底板	Base plate (electric control box)	1	PCS
3	SEE-1075	蓋板	Cover	1	PCS
4	AHC-0135-CE	控制面板底板	Base plate (Control panel)	1	PCS
5	AHA-1812	流量閥控制面板	Flow valve control panel	1	PCS
6	AGC-1041A	控制面板底板	Base plate (Control panel)	1	PCS
7	AGC-1040A	控制面板	Control panel	1	PCS
8	AHA-10289	調壓閥整組	Adjusting valve assembly	1	PCS
9	AHA-6100	流量閥組	Flow valve assembly	1	PCS
10	PFA-6-8	丸頭螺絲(十字)	Oval head screw	8	PCS
11	PP-90282	門式開關	Main power switch	1	PCS

PART D1

HOUSING YOKE CYLINDER ASSEMBLY

PART NO : SEE-100500A

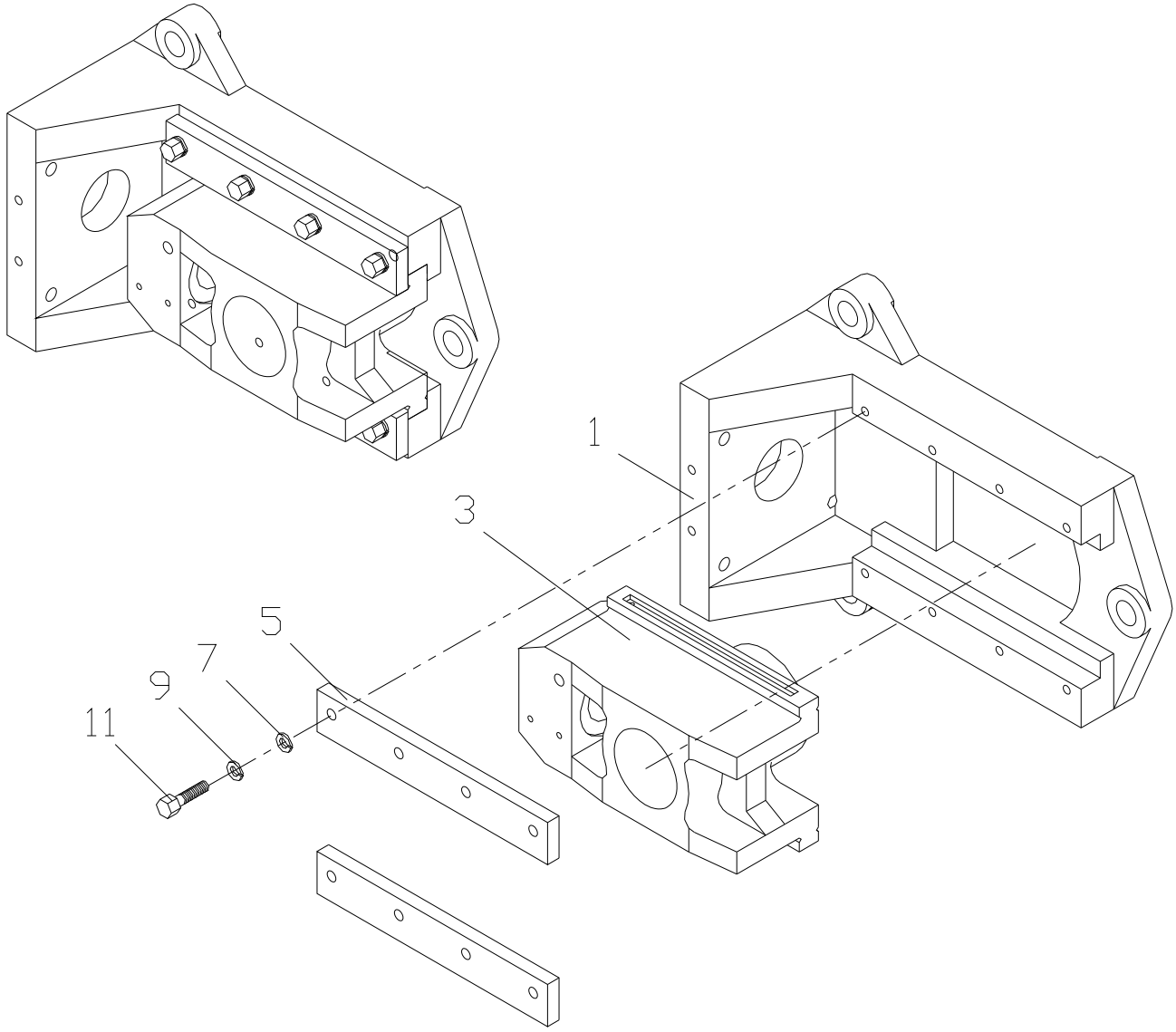


ITEM	PART NO.	PART NAME	PART NAME (CH)	PART SPEC.	COUNT	UNIT
1	AGC-1024	rear cap	鋸弓油缸後蓋		1	PCS
3	SEE-1005	piston	鋸弓油缸活塞		1	PCS
5	PP-59170	o-ring	O 型環	P-70	1	PCS
7	AHA-1117	washer	鐵弗龍墊圈		1	PCS
9	AGC-1027A	tie rod	鋸弓油缸連桿		4	PCS
11	SEE-1019A	spring	鋸弓油壓缸彈簧		1	PCS
13	AGC-1020A	cylinder	鋸弓油缸管		1	PCS
15	PP-13190	du bushing	乾式軸承	MB3015	1	PCS
17	PP-59110	o-ring	O 型環	P-30	1	PCS
19	AGC-1021	front cap	鋸弓油缸前蓋		1	PCS
21	PQA-12	spring washer	彈簧華司	M12	4	PCS
23	POA-12-175	nut	螺帽	M12	4	PCS

PART E2

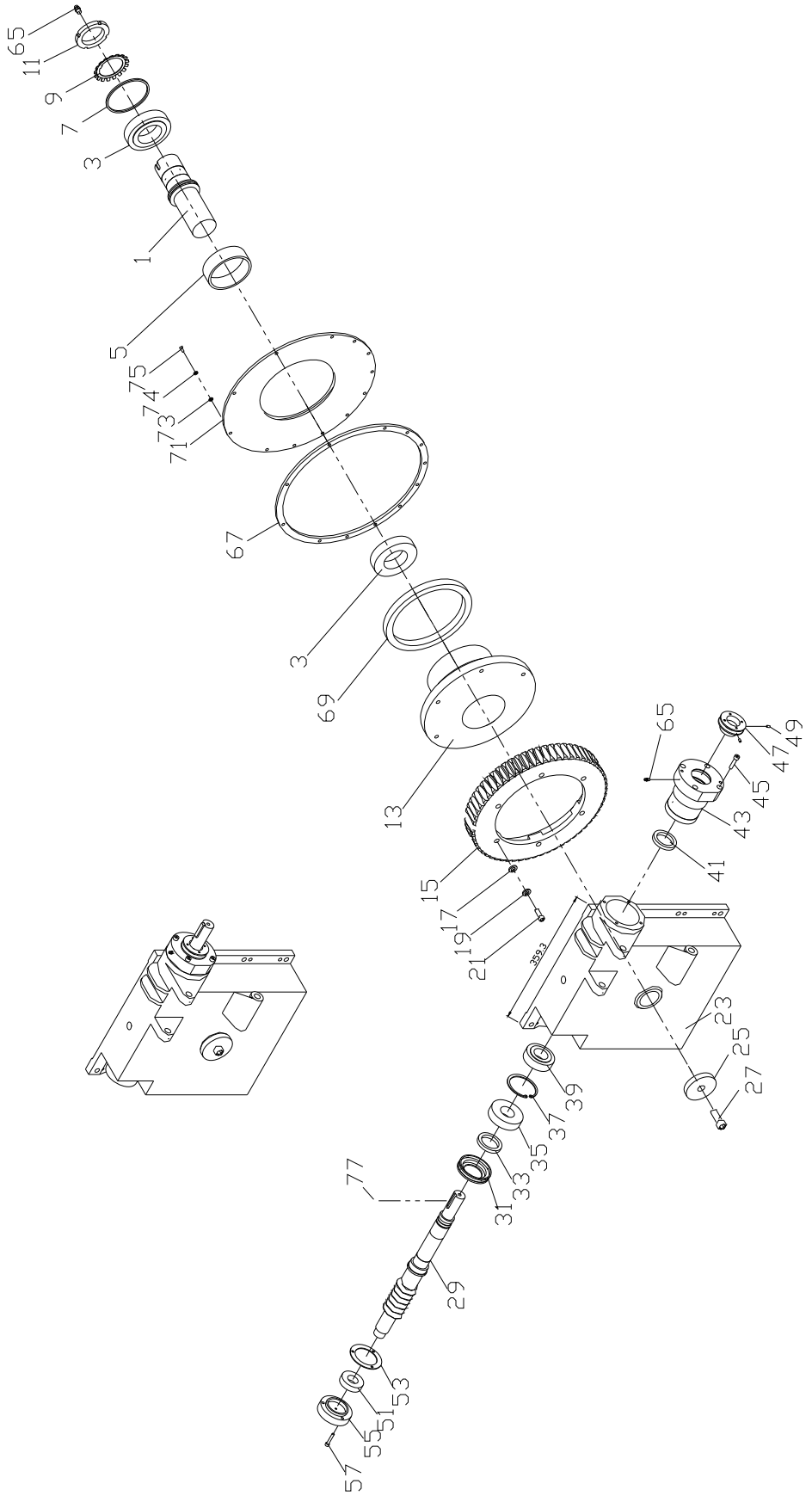
TENSION ASSEMBLY

PART NO : AGB-703500



ITEM	PART NO.	PART NAME	PART NAME (CH)	PART SPEC.	COUNT	UNIT
1	AGB-70358	tension body	張力滑座		1	PCS
3	AGB-70359	slide piece	張力滑板		1	PCS
5	AGB-70360	guide plate	壓板		2	PCS
7	PPA-8	washer	平面華司	M8	8	PCS
9	PQA-8	spring washer	彈簧華司	M8	8	PCS
11	PLA-8-25	hexagon head bolt	外六角螺絲	M8x25L	8	PCS

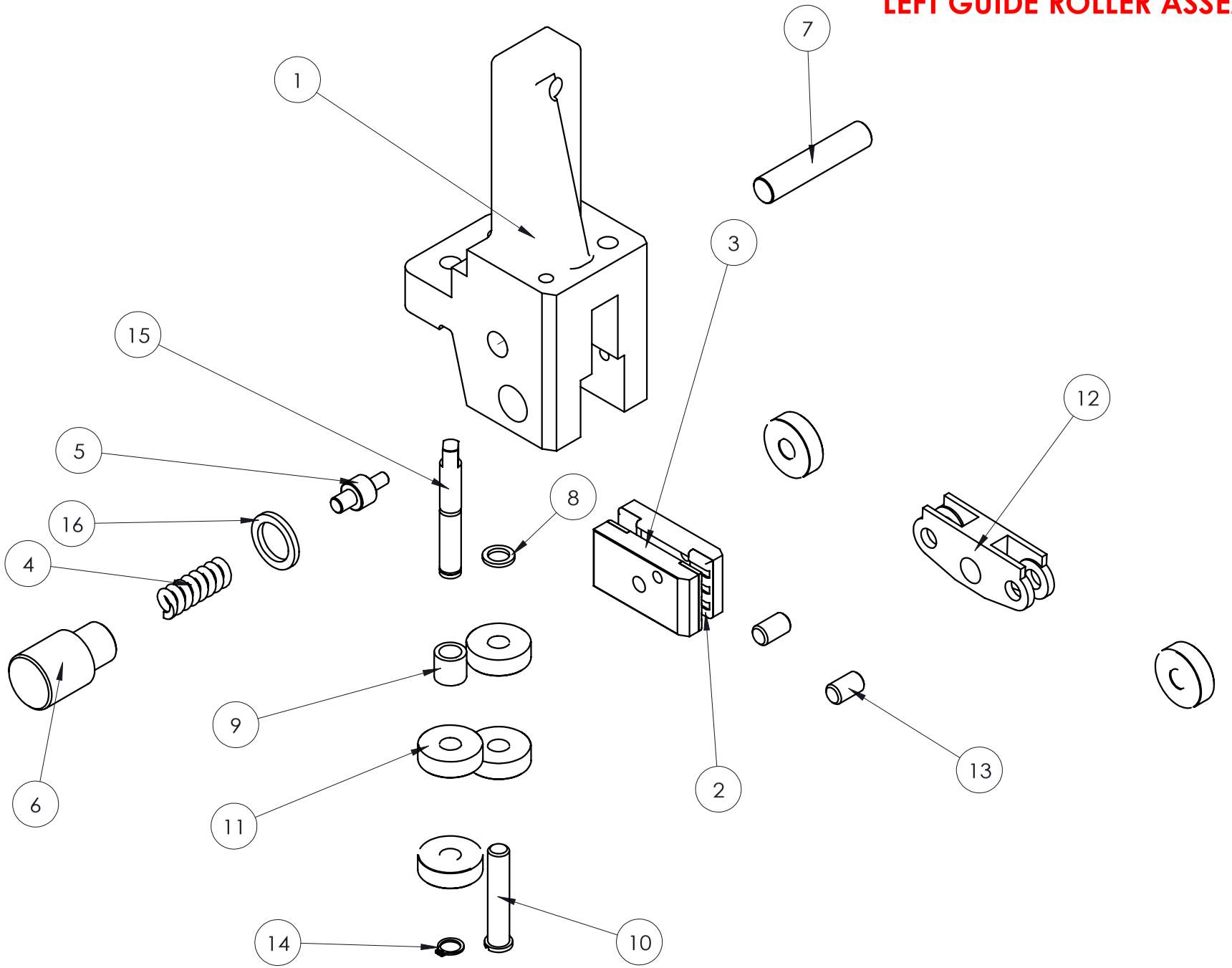
PART E3
GEAR BOX ASSEMBLY
PART NO : AGB-703109B



PART E3
GEAR BOX ASSEMBLY
PART NO：AGB-703109B

ITEM	PART NO.	PART NAME	PART NAME (CH)	PART SPEC.	COUNT	UNIT
1	AGB-70309	wheel shaft	下輪軸		1	PCS
3	PP-14619	taper roller bearing	軸承	30211 NSK	2	PCS
5	AGB-70313	distance collar	下輪軸承墊圈(一)		1	PCS
7	AGB-70314	distance collar	下輪軸承墊圈(二)		1	PCS
9	PP-14961	toothed washer	止動環	AW11	1	PCS
11	PP-14911	toothed nut	固定螺母	AN11	1	PCS
13	AGB-70312	housing	蝸輪固定座		1	PCS
15	AGB-70310	worm gear	蝸輪		1	PCS
17	PPA-10	washer	平面華司	M10	8	PCS
19	PQA-10	spring washer	彈簧華司	M10	6	PCS
21	PBA-10-40	bolt	有頭內六角螺絲	M10x40L	6	PCS
23	SGA-2054B	reducer frame	減速機本體		1	PCS
25	AHB-0613	washer	上輪鎖緊墊圈		1	PCS
27	PBA-16-45	bolt	有頭內六角螺絲	M16x45L	1	PCS
29	AGB-70311	worm	蝸桿		1	PCS
31	SGA-2060	bearing support	油封座		1	PCS
33	PP-51105	oil seal	油封	50.67.9	1	PCS
35	PP-14654	taper roller bearing	軸承	30308 SKF	1	PCS
37	PP-58116	snap ring	扣環	R80	1	PCS
39	PP-14693	taper roller bearing	滾錐軸承	32208 NSK	1	PCS
41	PP-51101	oil seal	油封	48.65.9	1	PCS
43	AGB-70338	bearing case	軸承座		1	PCS
45	PBA-8-35	bolt	有頭內六角螺絲	M8x35L	4	PCS
47	SGA-2061	wire brush pulley	鋼刷普利		1	PCS
49	PAA-5-8	set screw	止付螺絲	M5x8L	2	PCS
51	PP-14612	bearing	軸承	30206	1	PCS
53	SGA-2059	packing	蝸桿蓋迫緊石棉		1	PCS
55	SGA-2058A	worm cap	蝸桿蓋(厚)		1	PCS
57	PBA-6-35	bolt	有頭內六角螺絲	M6x35L	3	PCS
59	PED-025	soc. hexagon plug	外六角塞頭(英)	PT 1/2"	1	PCS
61	AHA-0307	plug	透氣塞頭		1	PCS
63	PAA-8-25	set screw	止付螺絲	M8x25L	1	PCS
65	PUC-020	grease nipple	油嘴	1/4"-28UNF	1	PCS
67	SGA-2069	packing	迫緊石棉		1	PCS
69	PP-51125A	oil seal	油封	ø170x ø200x16T(NOK)	1	PCS
71	SGA-2067	fixed ring	油封固定盤		1	PCS
73	PPA-8	washer	平面華司	M8	8	PCS
74	PQA-5	spring washer	彈簧華司	M5	12	PCS
75	PBA-5-20	bolt	有頭內六角螺絲	M5x20L	12	PCS
77	PS-10-8-45	key	方鍵	10x8x45L	1	PCS

C650M 31300 左導輪座組
LEFT GUIDE ROLLER ASSEMBLY



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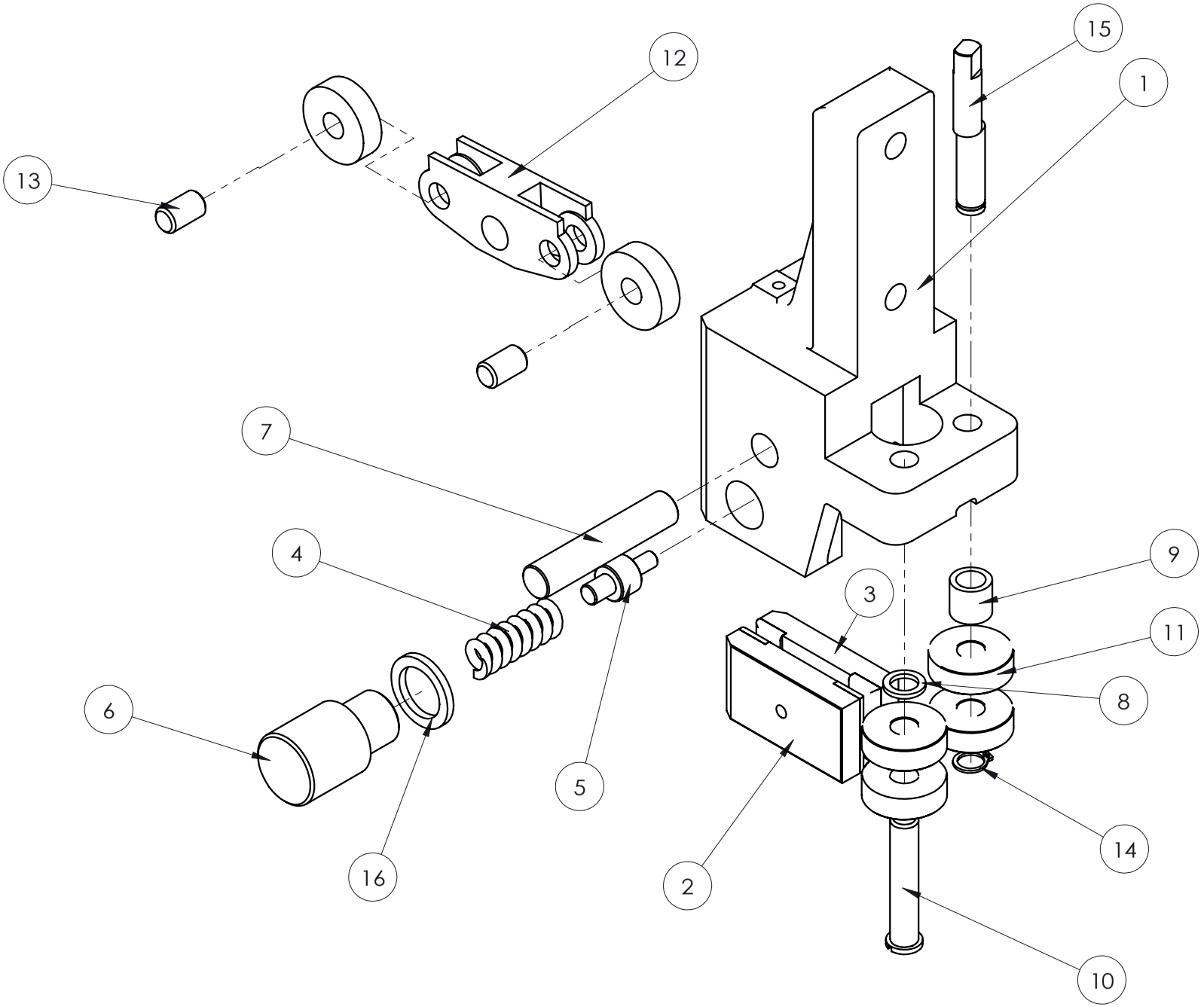
C650M 31300 左導輪座組
LEFT GUIDE ROLLER ASSEMBLY

ITEM	PART NO.	PART NAME (CH)	PART NAME	PART SPEC.	COUNT
1	SGB-71085	左導輪座	left guide roller seat		1
2	SGB-71088	左固定鎢鋼片	left Fixed Insert		1
3	SGB-71089	左活動鎢鋼片	left movable insert		1
4	SGB-71090	鎢鋼片彈簧	carbide insert spring		1
5	SGB-71091	簧塞	left fitting		1
6	SGB-71092	鎢鋼片鎖緊螺絲	carbide insert bolt		1
7	AGB-70410A	下壓軸承座銷	pin		1
8	AGB-70412	下壓軸承墊圈	washer		1
9	AGB-70418	導輪墊圈	washer		1
10	AHA-0707C	導輪軸(三)	guide roller shaft (3)		1

ITEM	PART NO.	PART NAME (CH)	PART NAME	PART SPEC.	COUNT
11	PP-14270B	軸承 半密雙塑膠(NSK)	bearing	6200UU	6
12	AHA-0704	下壓軸承座	bearing holder		1
13	AHA-0706B	下壓軸承銷	pin		2
14	PP-52087	扣環	snap ring	S10	1
15	WC650M-0003	偏心導輪軸(長)	eccentric guide roller shaft (long)		1
16	WC650M-0009	鎢鋼片鎖緊螺絲限制圈	limit piece		1

SERIES PART LIST C650M-31600 右導輪座組
RIGHT GUIDE ROLLER ASSEMBLY



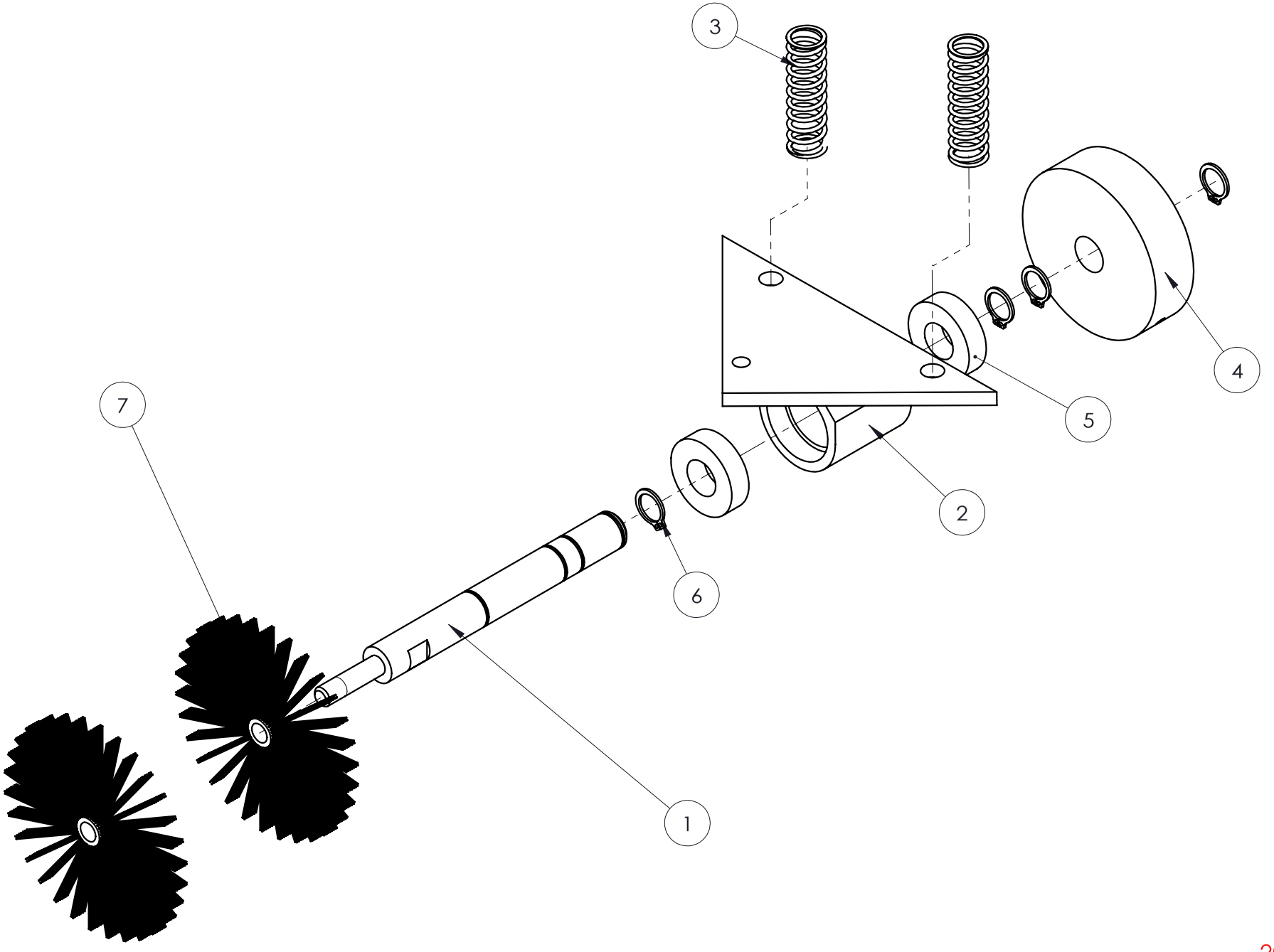
2016/07/26

SERIES PART LIST C650M-31600 右導輪座組
RIGHT GUIDE ROLLER ASSEMBLY

ITEM	PART NO.	PART NAME (CH)	PART NAME	PART SPEC.	COUNT
1	SGB-71084	右導輪座	right guide roller seat		1
2	SGB-71086	右固定鎢鋼片	right Fixed Insert		1
3	SGB-71087	右活動鎢鋼片	right Movable Insert		1
4	SGB-71090	鎢鋼片彈簧	carbide insert spring		1
5	SGB-71091	簧塞	spring plug		1
6	SGB-71092	鎢鋼片鎖緊螺絲	carbide insert bolt		1
7	AGB-70410A	下壓軸承座銷	pin		1
8	AGB-70412	下壓軸承墊圈	washer		1
9	AGB-70418	導輪墊圈	washer		1
10	AHA-0707C	導輪軸(三)	guide roller shaft (3)		1

ITEM	PART NO.	PART NAME (CH)	PART NAME	PART SPEC.	COUNT
11	PP-14270B	軸承 半密雙塑膠(NSK)	bearing	6200UU	6
12	AHA-0704	下壓軸承座	bearing holder		1
13	AHA-0706B	下壓軸承銷	pin		2
14	PP-52087	扣環	snap ring	S10	1
15	WC650M-0003	偏心導輪軸(長)	eccentric guide roller shaft (long)		1
16	WC650M-0009	鎢鋼片鎖緊螺絲限制圈	limit piece		1

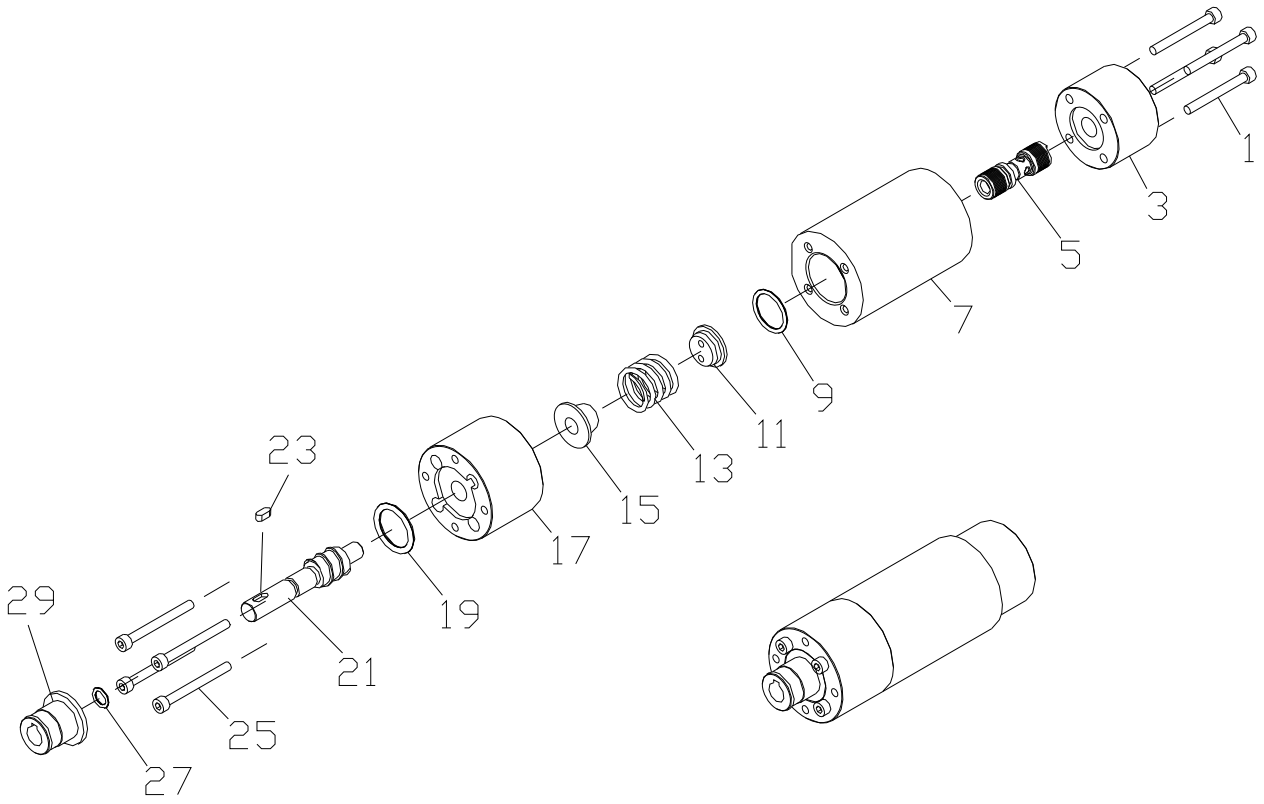
S650M-32200 鋼刷組
WIRE BRUSH ASSEMBLY



S650M-32200 鋼刷組
WIRE BRUSH ASSEMBLY

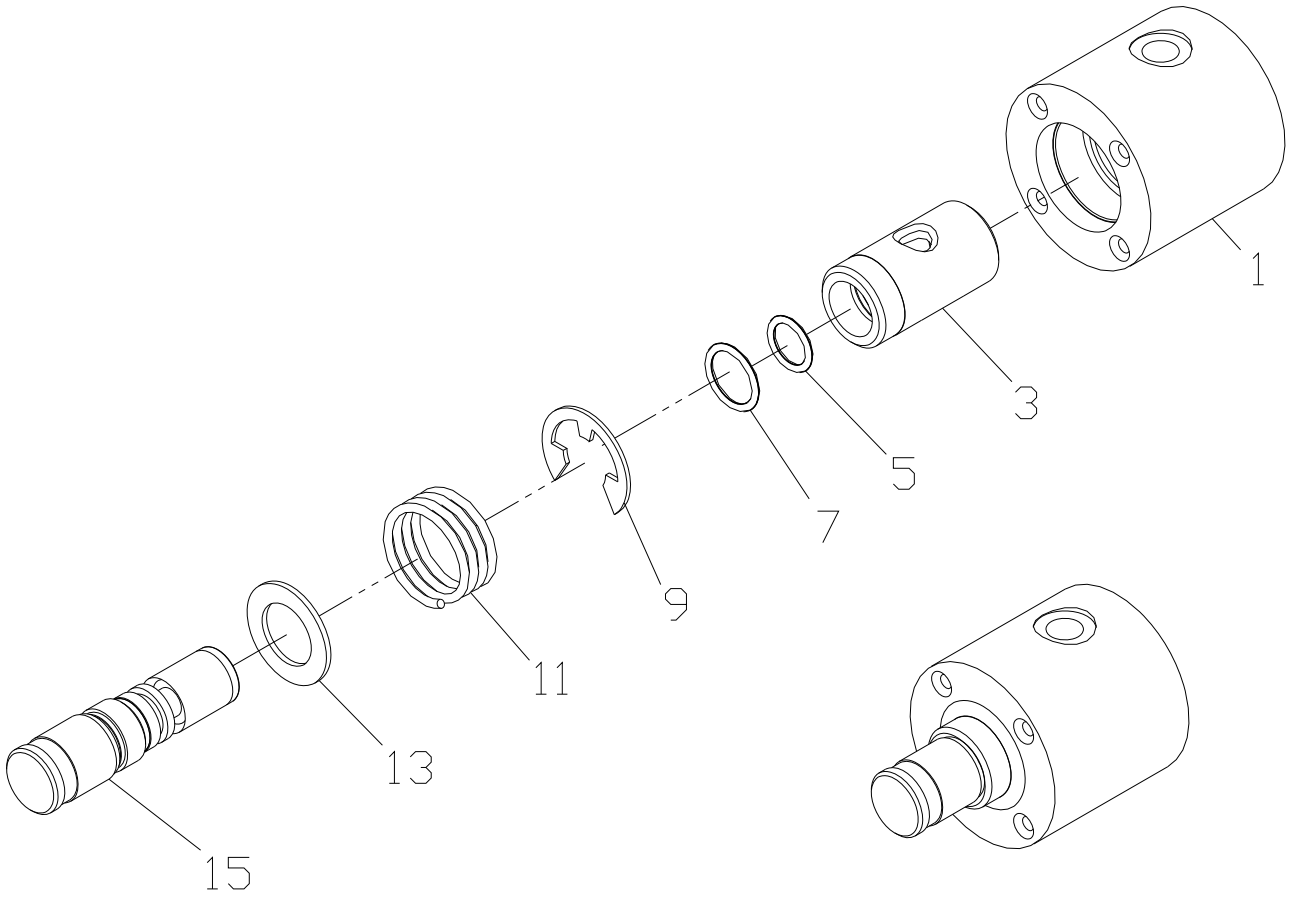
ITEM	PART NO.	PART NAME (CH)	PART NAME	PART SPEC.	COUNT
1	MBR-9129	鋼刷軸	wire brush shaft		1
2	PP-52097	扣環	snap ring	S15	1
3	MER-3109	鋼刷壓縮彈簧	compressioning spring		2
4	SEE-3029	鋼刷傳動輪	brush drive wheel		1
5	PP-14250	軸承	bearing	6002ZZ	2
6	PP-52085	扣環	buckle	S12	4
7	PP-58002	鋼刷	wire Brush		2

PART H1
REGULATOR SET ASSEMBLY
PART NO : AHA-10289



ITEM	PART NO.	PART NAME	PART NAME (CH)	PART SPEC.	COUNT	UNIT
1	PBA-5-45	bolt	有頭內六角螺絲	M5x45L	4	PCS
3	AHA-1036	rear cap	後蓋		1	PCS
5	AHA-1030	valve	針閥		1	PCS
7	AHA-1029	valve seat	閥座		1	PCS
9	PP-59082	o-ring	O形環	P-22	1	PCS
11	AHA-1031	spring seat	彈簧定位套(一)		1	PCS
13	AHA-1032	spring	彈簧		1	PCS
15	AHA-1033	spring seat	彈簧定位套(二)		1	PCS
17	AHA-1035	front cap	前蓋		1	PCS
19	PP-59090	o-ring	O形環	P-24	1	PCS
21	AHA-1034	adjusting bolt	調整螺栓		1	PCS
23	PS-4-4-10	key	方鍵	4x4x10L	1	PCS
25	PBA-5-50	bolt	有頭內六角螺絲	M5x50L	4	PCS
27	PP-59030	o-ring	O形環	P-9	1	PCS
29	AHA-1037	dial seat	旋鈕座		1	PCS

PART H2
FLOW CONTROL VALVE ASSEMBLY
PART NO : AHA-6100

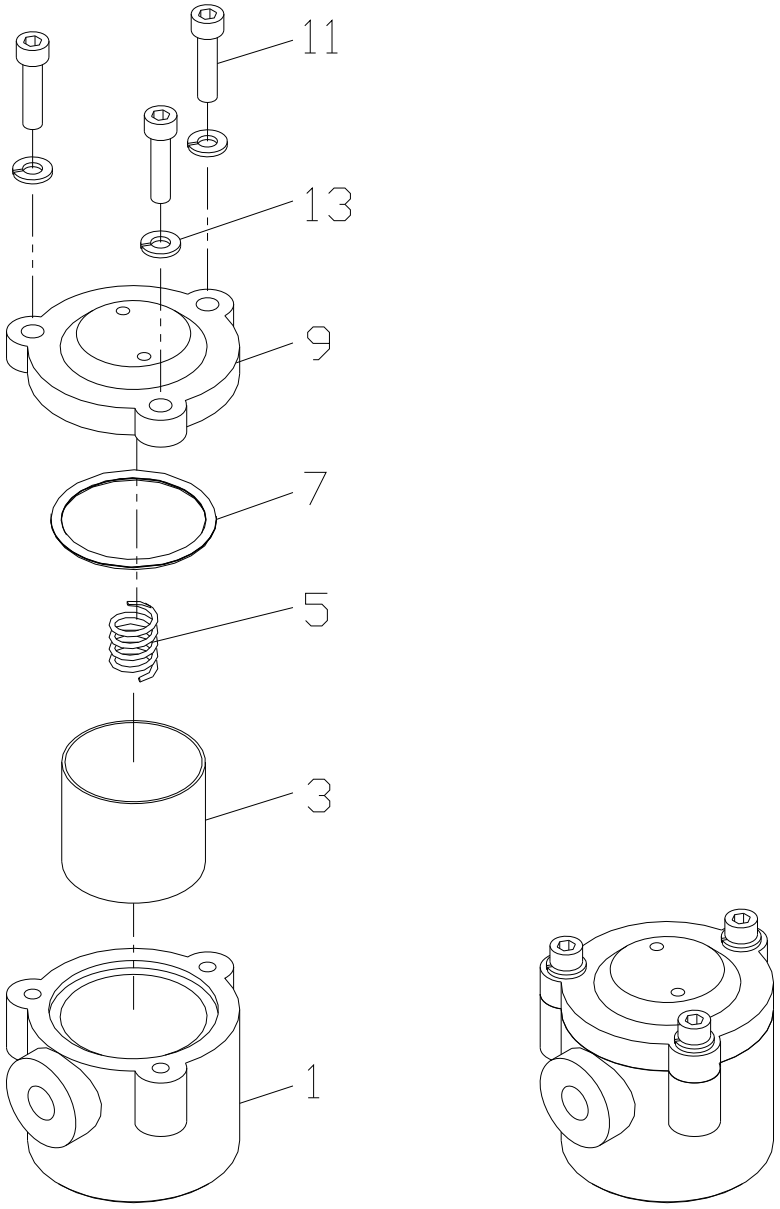


ITEM	PART NO.	PART NAME	PART NAME (CH)	PART SPEC.	COUNT	UNIT
1	AHA-1039	valve seat	閥座		1	PCS
3	AHA-1043	valve sleeve	針閥套筒		1	PCS
5	PP-59071	o-ring	O 形環	P-15	1	PCS
7	PP-59075	o-ring	O 形環	P-19	1	PCS
9	PP-58152	snap ring	E 扣環	E-19	1	PCS
11	AHA-1042	spring	彈簧		1	PCS
13	AHA-1041	washer	彈簧墊圈		1	PCS
15	AHA-1040	valve	針閥		1	PCS

PART I

OIL FILTER ASSEMBLY

PART NO : AGB-707270

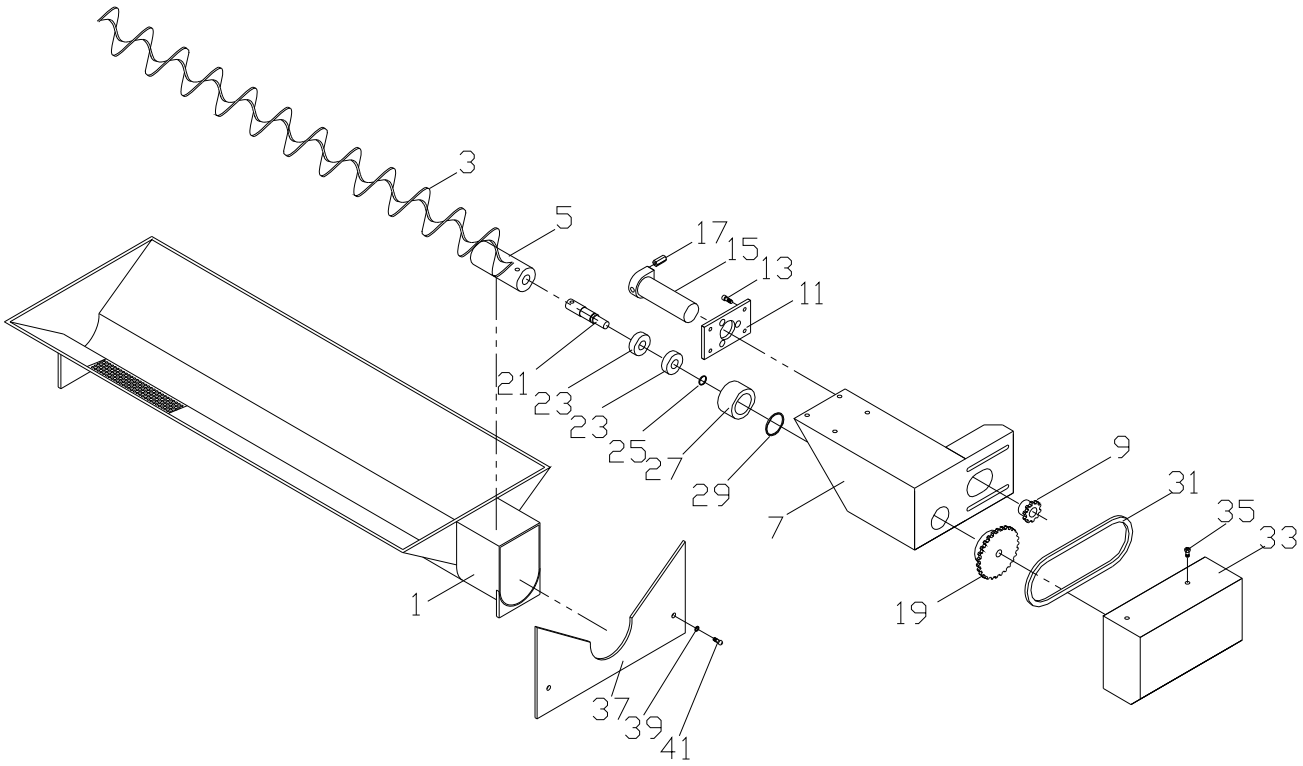


ITEM	PART NO.	PART NAME	PART NAME (CH)	PART SPEC.	COUNT	UNIT
1	AGB-70727	filter frame	濾油器本體		1	PCS
3	AGB-70730	filter	濾油器芯		1	PCS
5	AGB-70729	spring	濾油器彈簧		1	PCS
7	PP-59531	o-ring	0形環	G-45	1	PCS
9	AGB-70728	cap	濾油器蓋		1	PCS
11	PBA-6-25	bolt	有頭內六角螺絲	M6x25L	3	PCS
13	PQA-6	spring washer	彈簧華司	M6	3	PCS

PART L

CHIP CONVEYOR ASSEMBLY (OPTIONAL)

PART NO：AEE-C001



ITEM	PART NO.	PART NAME	PART NAME (CH)	PART SPEC.	COUNT	UNIT
1	AEE-1008	basket	除屑機本體		1	PCS
3	AHA-2014C	rod	除屑螺旋		1	PCS
5	AHA-2022B	shaft	除屑螺旋軸		1	PCS
7	AGC-1060	motor bracket	除屑馬達座		1	PCS
9	AHB-2019B	wheel	傳動鍊輪(小)		1	PCS
11	AHB-2026	plate	泵浦連接板		1	PCS
13	PBA-6-20	hexagon socket head bolt	內六角螺絲	M6 x 20L	4	PCS
15	PP-31640-1	motor	油壓馬達	OMM-20-128-0020	1	PCS
17	PP-43117	flow control valve	流量閥		1	PCS
19	AHB-2019A	wheel	傳動鍊輪(大)		1	PCS
21	AHB-2023A	wheel shaft	鏈輪軸		1	PCS
23	PP-14003	bearing	軸承	6202 VV	2	PCS
25	PP-52097	snap ring	扣環	S15	1	PCS
27	AHB-2020B	bearing holder	軸承座		1	PCS
29	PP-58106	snap ring	扣環	R35	1	PCS
31	PP-19061	chain	鏈條	RS35	1	PCS
33	AGC-1061	motor cover	除屑馬達蓋		1	PCS
35	PLA-6-12	hexagon head bolt	外六角螺絲	M6 x 12L	2	PCS
37	SEE-1058	fixed plate	除屑機架		1	PCS
39	PPA-6	washer	平面華司	∮6	2	PCS
41	PFA-6-15	Cross pan head screw	丸頭螺絲(十字)	M6 XP1.0x15L	2	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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Vertical Plate Saws
Horizontal Billet Saws
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Structural Miter-Cutting Saws
Automatic Band Saws

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