COSEN SAWS

C-420NC

SNC-100 Programmable Automatic Mass Production 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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SNC-100 Programmable Automatic Mass Production Horizontal Bandsaw
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Safety rules

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

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

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

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

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

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

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

- 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.

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

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

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Section 1

SAFETY INFORMATION

SAFETY INSTRUCTIONS
SAFEGUARD DEVICES
EMERGENCY STOP
SAFETY LABELS
HEARING PROTECTION
CE COMPLIANCE
RISK ASSESSMENT

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

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

SAFETY INSTRUCTIONS

What the icons and signs in this user manual mean:

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

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

Do not operate this machine unless it is completely assembled.

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

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

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

Wear proper apparel during operation and when servicing the machine.

Keep unauthorized personnel away.

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

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

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

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

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

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

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

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

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

Use recommended accessories. Improper accessories may be hazardous.

Keep your work area well illuminated at minimum 500 lumen.

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

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

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

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

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

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

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

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

SAFEGUARD DEVICES

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

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

Protection Covers & Guards

1. Idle wheel housing cover
2. Drive wheel housing cover
3. Gear reducer cover
4. Wire brush belt cover
5. Blade guard cover (left & right)

 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. Up to your company's internal rules, this power switch can be locked with a padlock or a luggage lock to protect the operator and the machine.
Emergency stop button	Located on the control panel, the button when pressed will stop the machine completely.
Vise clamp switch	This switch assures firm clamping of the workpiece. If the workpiece is not clamped properly, the saw blade is not allowed to run.
Wheel cover interlock switches (CE model only)	Located on the two wheel housings, these switches are used to assure that the machine will stop whenever the wheel covers are open. This device is to protect users from being cut by the running saw blades.

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

EMERGENCY STOP

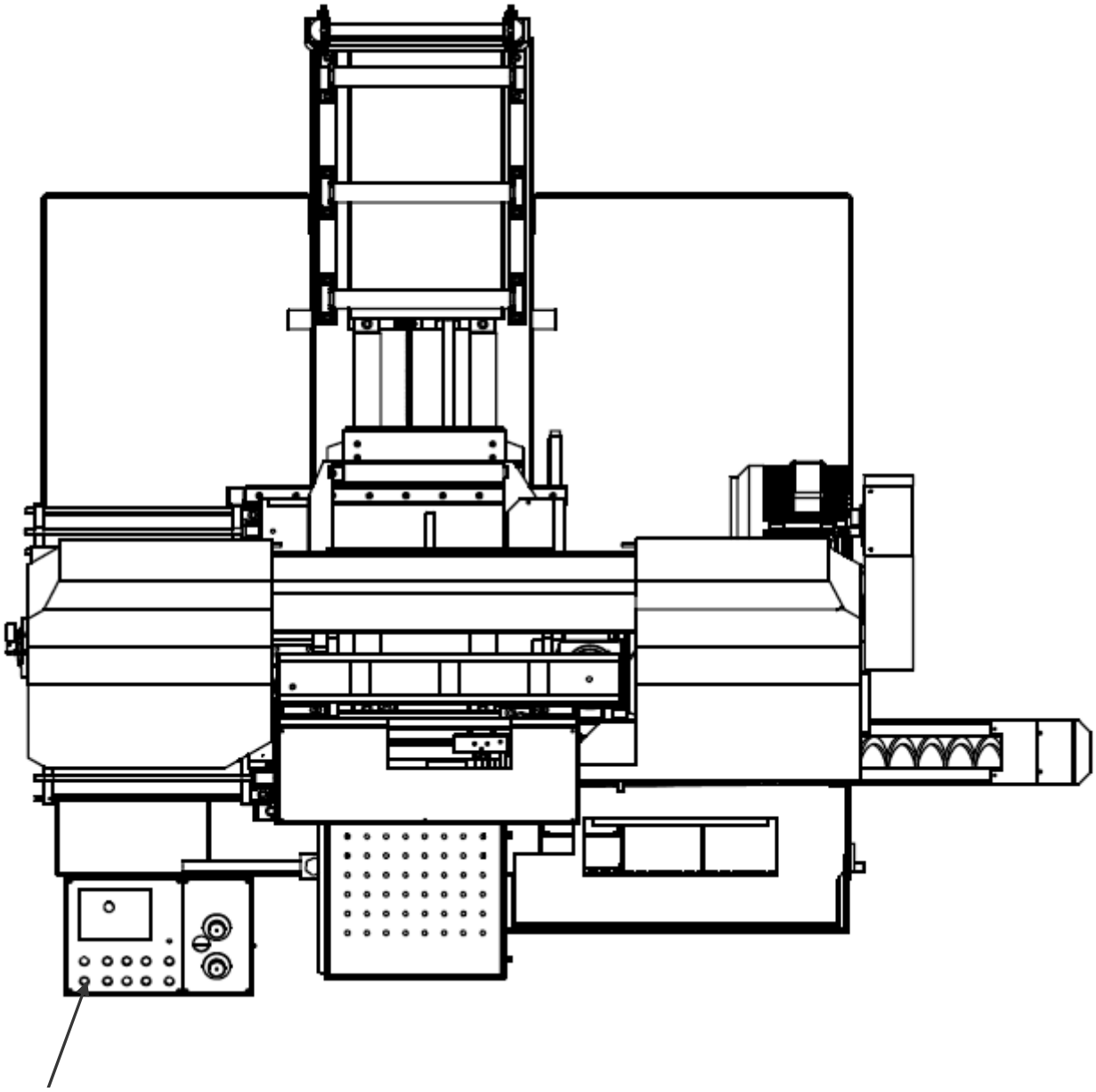
Designed to be easily accessible, the emergency stop button is located on the left bottom corner on the control panel and is made in red color and rubber material. For CE models, supplementary emergency stop button may be available at other area(s) of the machine depending on machine type. Please refer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

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

You should press it immediately without any hesitation when observing:

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

Illustration: Emergency Stop



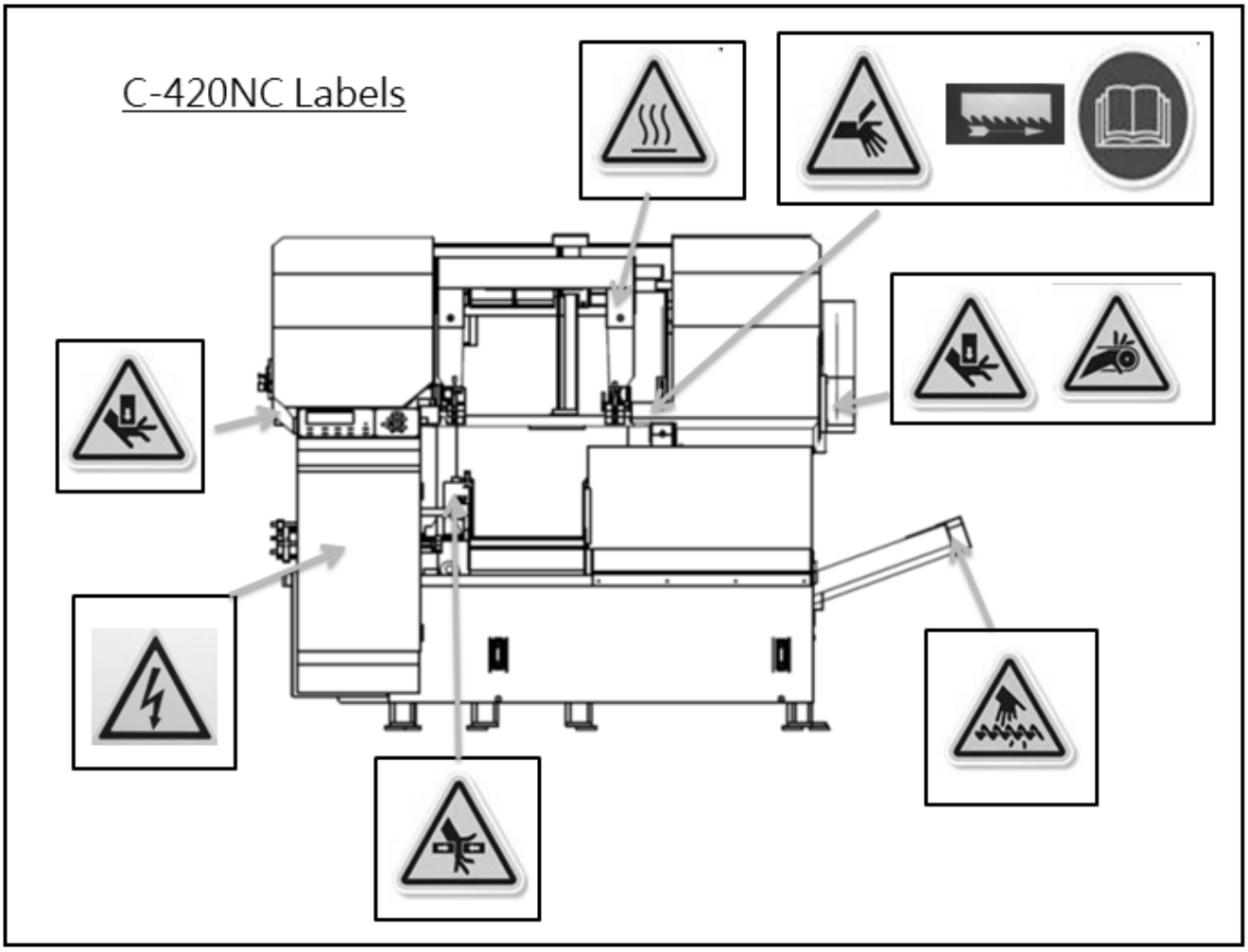
Emergency
Stop Button

SAFETY LABELS

Please read through and understand these safety labels 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

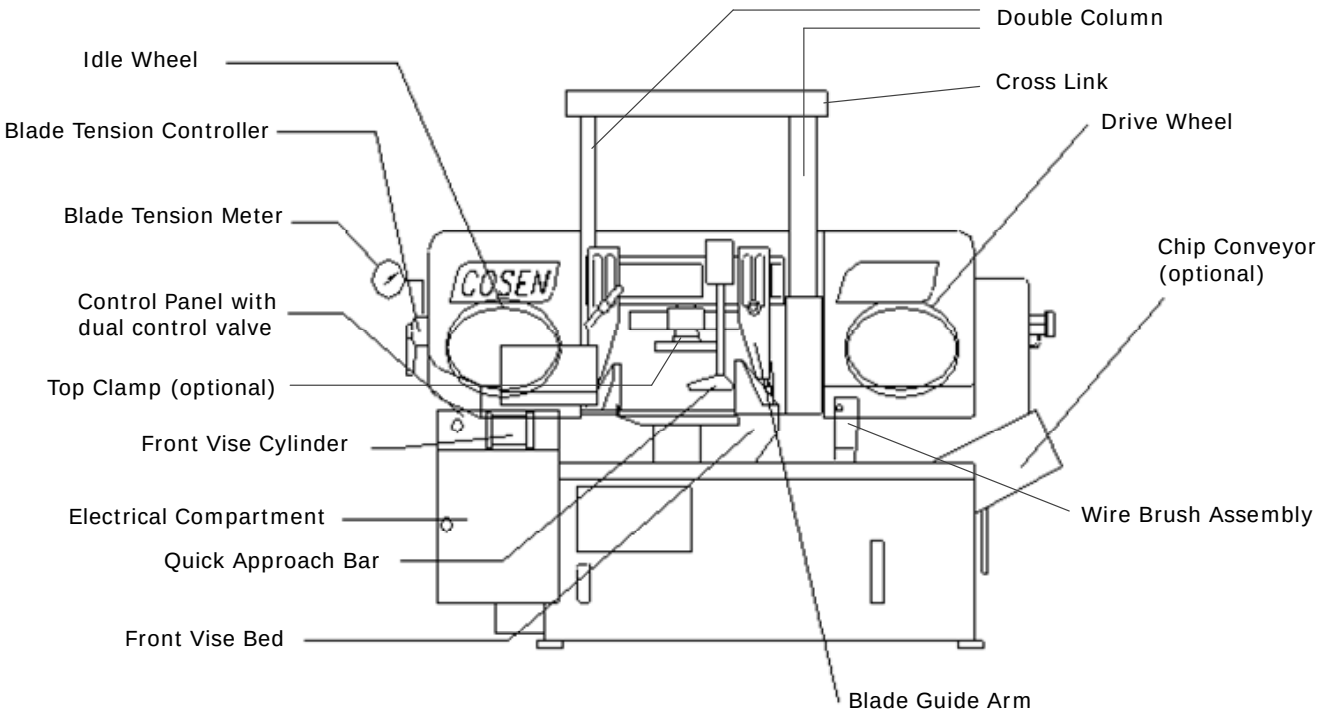
- The intended life-span of the machine is counted based on regular daily operation. It is calculated with the life expectancy of 10 years under normal operating condition and exact attention to the maintenance schedule.

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

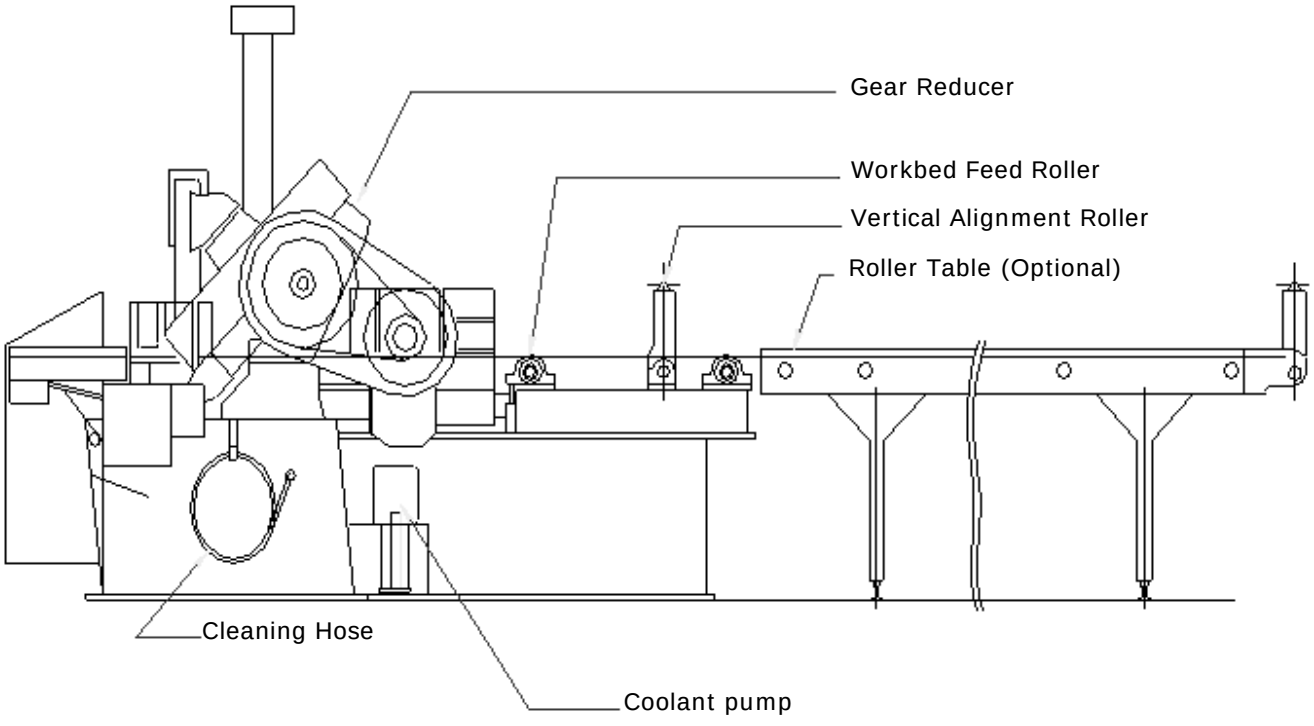
SPECIFICATION

Model		C-420NC SNC-100 Programmable Automatic Mass Production Horizontal Bandsaw
Capacity	Round	16.5” (420 mm)
	Square	16.5” (420 mm)
	Rectangular (H x W)	16.5” x 16.5” (420 x 420 mm)
	Bundle Cutting	W: 7.5” ~ 14.2”(190 ~ 360 mm) H: 3.9” ~ 7.1” (100 ~ 180 mm)
Saw Blade	Speed	66~328 fpm (20 ~ 100 m/min)
	Size	187.8” x 1.6” x 0.05” (4,770 x 41 x 1.3 mm)
	Tension	Hydraulic with automatic blade breakage detection
	Guide	Interchangeable tungsten carbide
	Cleaning	Steel wire brush with flexible drive shaft driven by main motor
Motor Output	Saw Blade	7.5HP (5.6 kW)
	Hydraulic	2 HP (1.5 kW)
	Coolant Pump	1/8 HP (0.1 kW)
Tank Capacity	Hydraulic	10.6 gal (40 L)
	Coolant	22.5 gal (85 L)
Feeding Length	Mode	Hydraulic, NC Automatic
	Single Stroke	19.8” (503 mm)
	Multi Stroke	Max. 999” (99 m)
	Rest Piece	2.4” (60 mm)
Workbed Height		28.9” (735 mm)
Weight	Net	4,664 lb (2,120 kg)
	Gross	4,891 lb (2,223 kg)
Floor Space (L x W x H)		110.4” x 100.8” x 74.9” (2,805 x 2,560 x 1,903 mm)

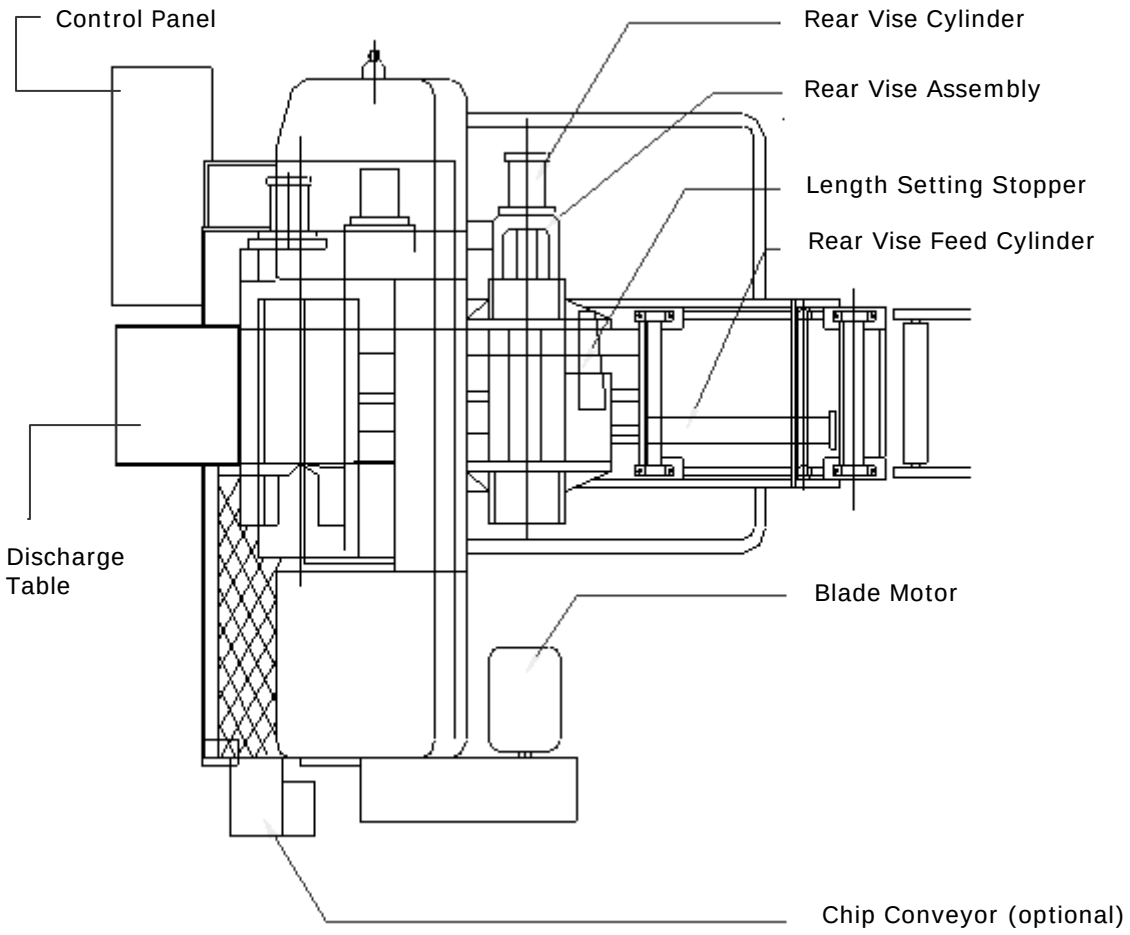
MACHINE PARTS IDENTIFICATION



Machine front view

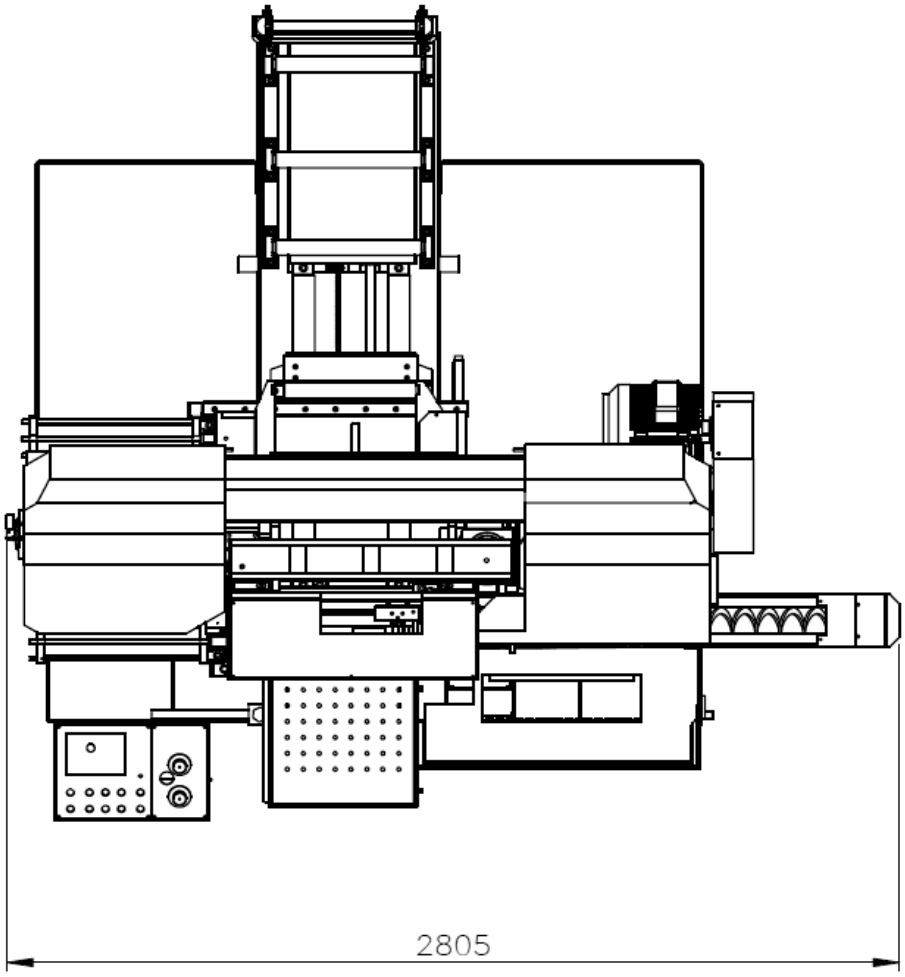


Machine side view

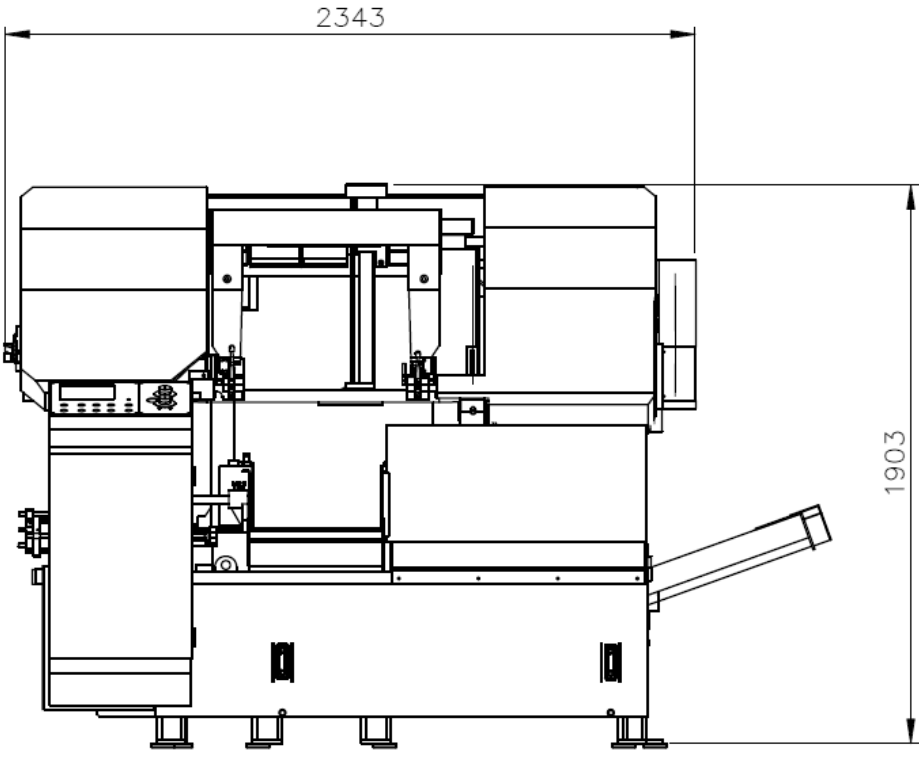


Machine top view

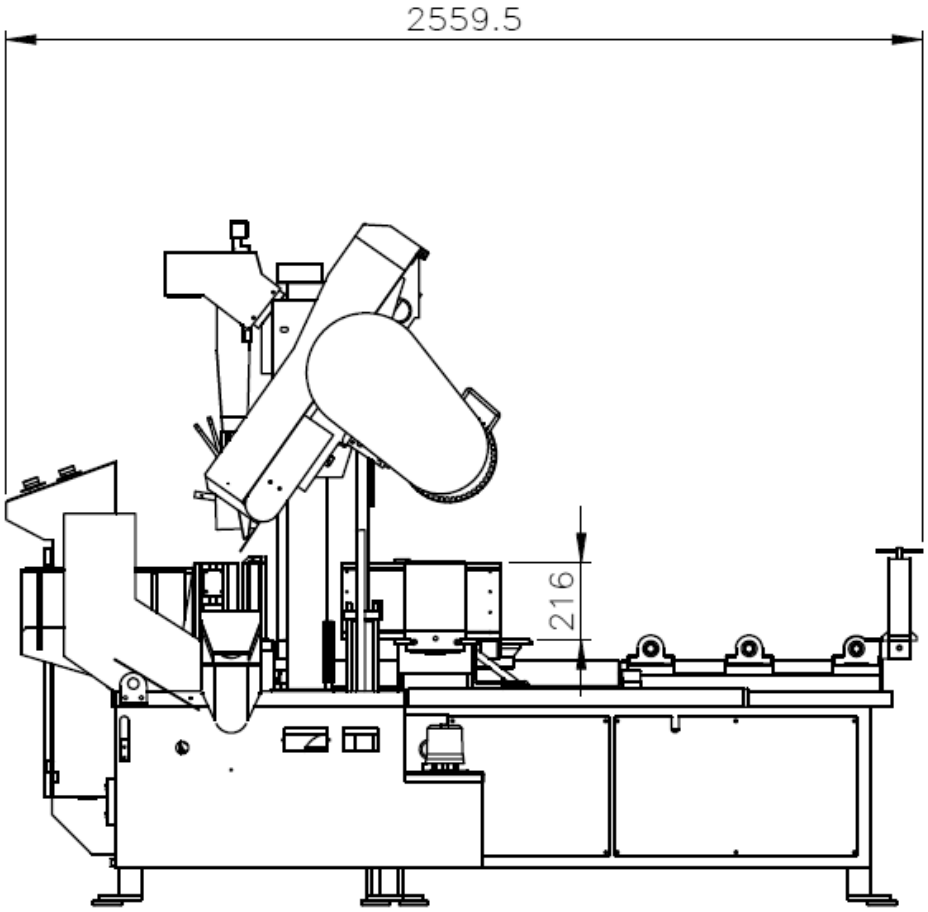
FLOOR PLAN



Machine top view



Machine front view



Machine side view

MOVING & INSTALLATION

LOCATION & ENVIRONMENT
UNPACKING & INSPECTING
LIFTING
REMOVING SHIPPING BRACKET
CLEANING
INSTALLING
RELOCATING

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 General Information - 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.

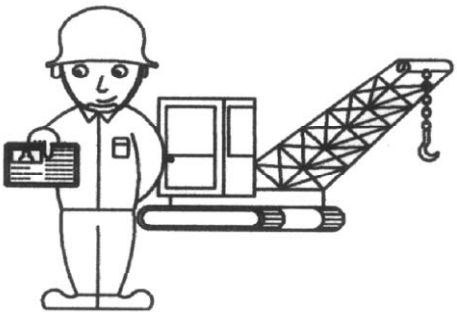
LIFTING

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

1. Use a crane

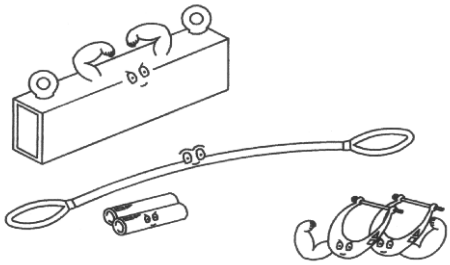
Move the machine to its location by using a crane and a wire rope sling that can fully withstand the weight of the machine (refer to machine specification under Section 2 *General Information*).

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

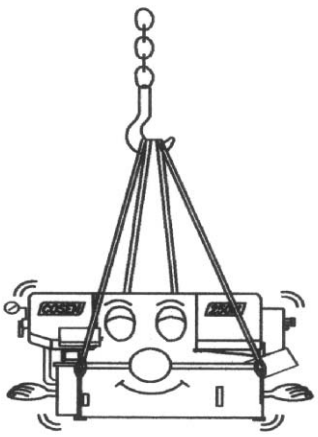


You must have a qualified crane operator to perform the job.

- 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.

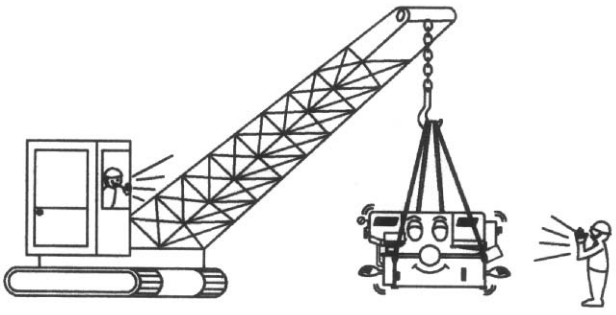
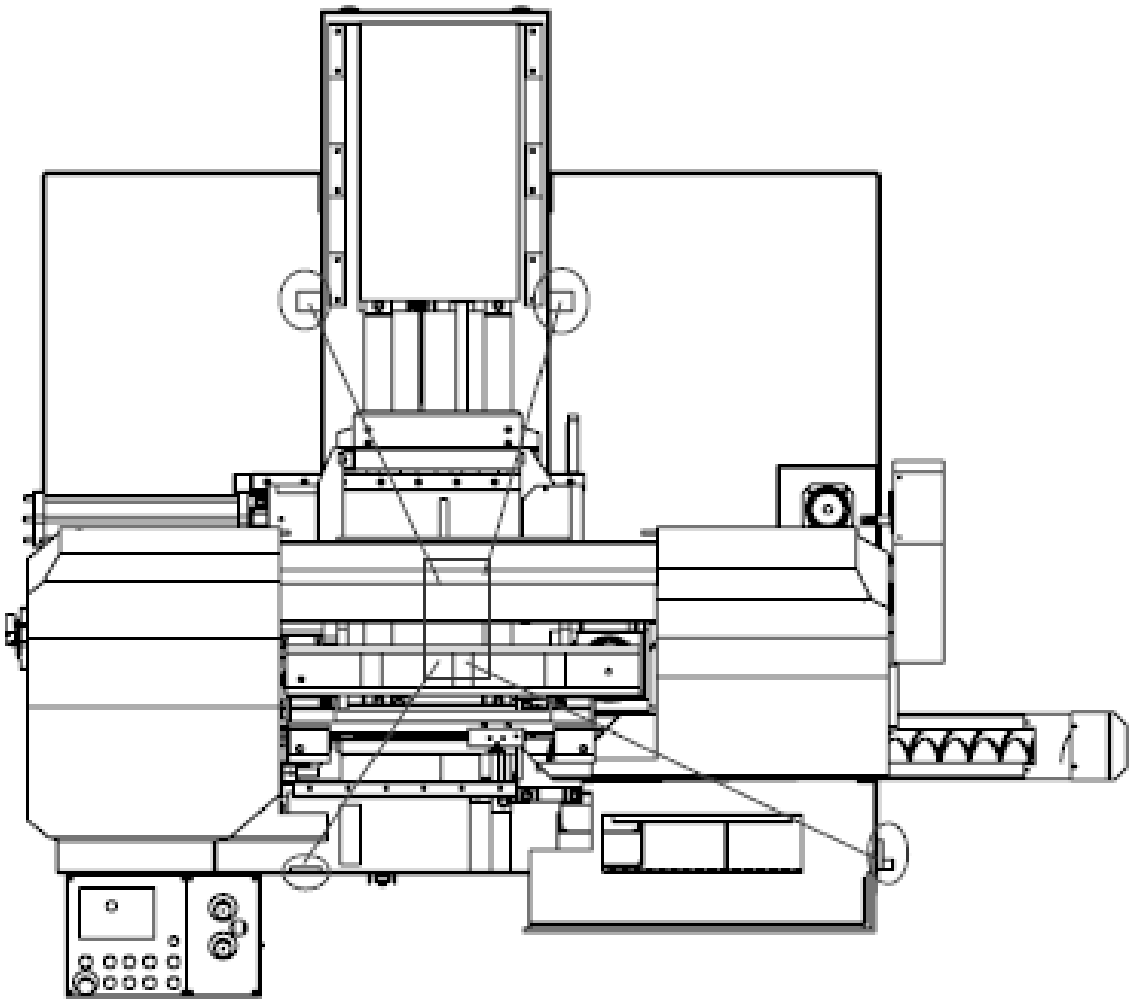


Illustration: Lifting Points



Machine top view

Minimum weight capacity for each wire rope: **3 ton**
Total number of wire ropes required: **4**

2. Use a forklift

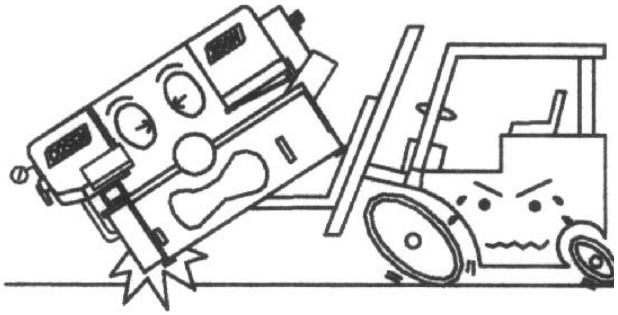
Most users choose this method to move their machine because it is easy to set up. Make sure that the lifting rod can fully withstand the weight of the machine. (Refer to *Section 2 – General Information for Specifications)*

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

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

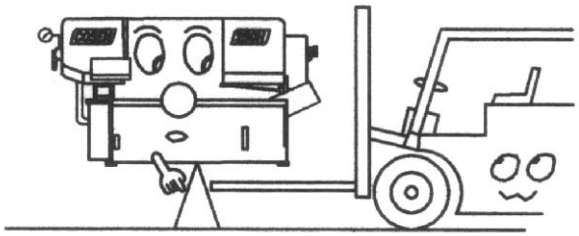
- You must apply proper forklift technique to avoid damage to the machine.

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



- You must keep the machine balanced at all times.

  Make sure the forks are centered before use.

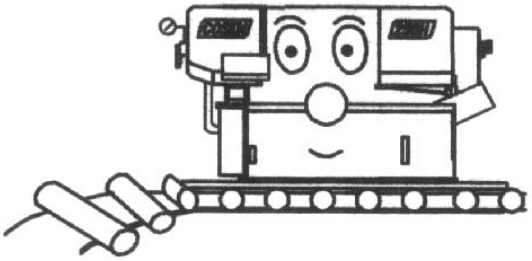


(Illustration only. Please follow user guide of your forklift.)

3. Use rolling cylinders

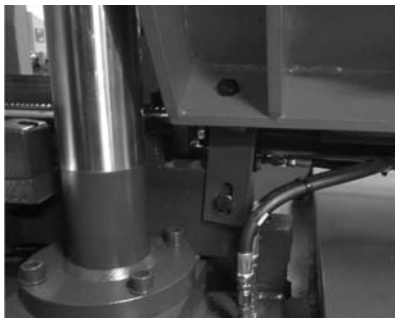
You can use rolling cylinders to move your machine in a small machine shop environment.

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



REMOVING SHIPPING BRACKET

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



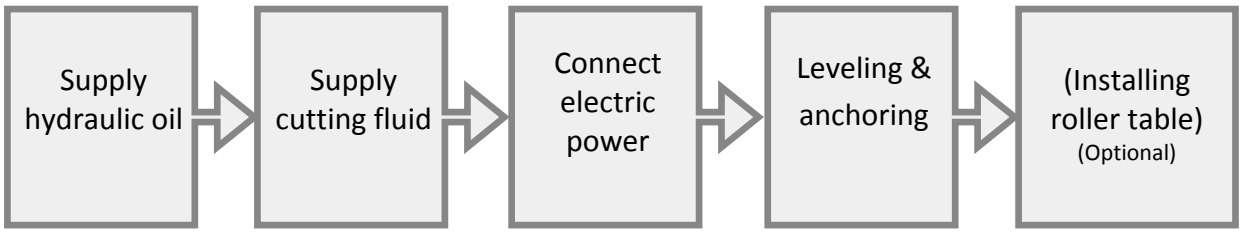
CLEANING

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

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

INSTALLING

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



Supplying hydraulic oil

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

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

Refer to specification chart under Section 2 for tank capacity.

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 *General Information* 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.

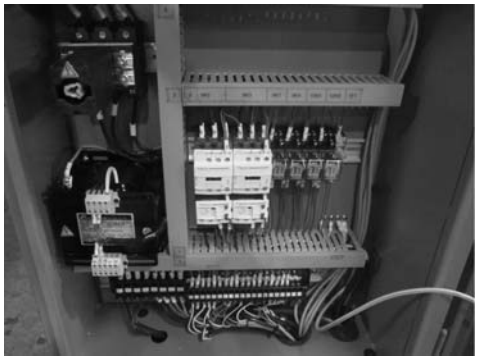
Ground the machine with an independent grounding conductor.

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.

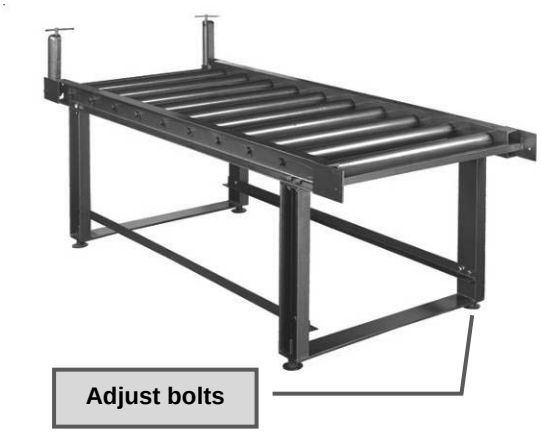
Shock absorption steel plates are provided and can be placed under each leveling bolt to prevent their sinking into the concrete floor.

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
USING TOP CLAMP FOR BUNDLE CUTTING
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.

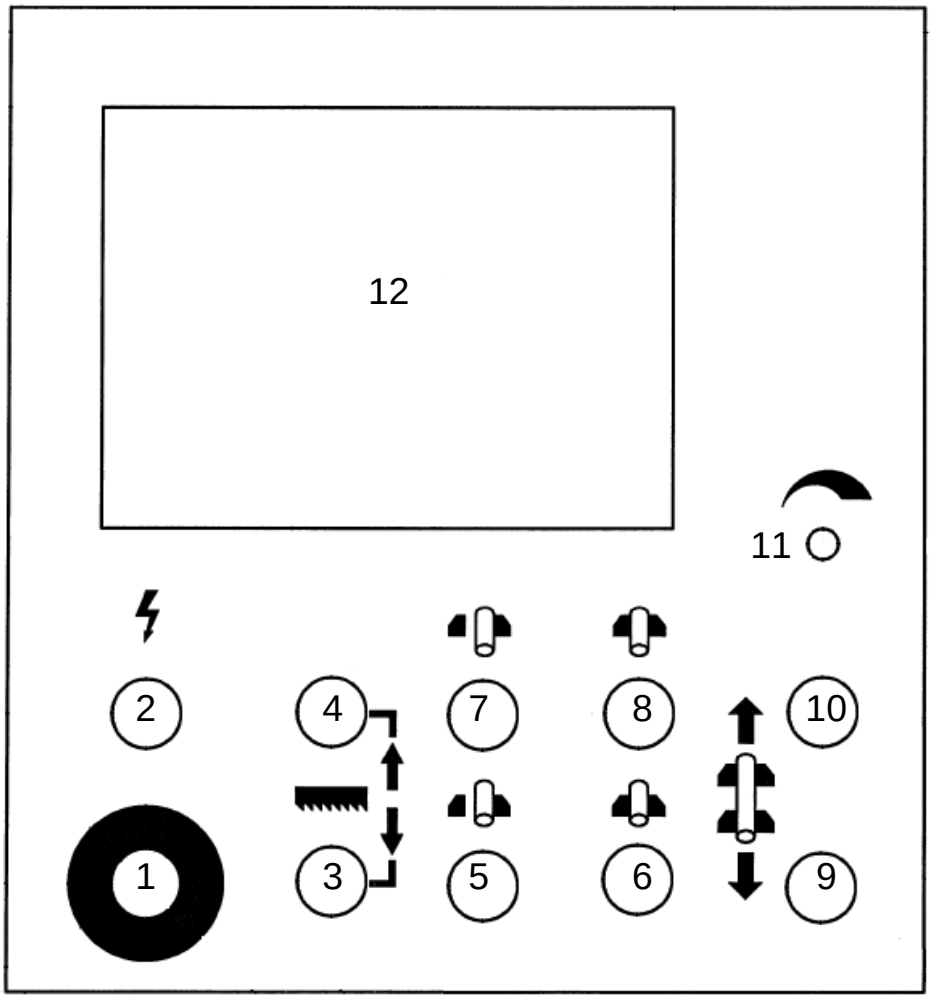
 Always add coolant into water for better mix result.

 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

When this button is pressed, the saw bow descends.

 Before lowering the saw bow, the guide arm must be positioned outside the vise in order to avoid hitting the vise and causing damages.

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 "".

 If the saw bow is not above the middle limit switch, the front vise can only be opened in small increments, so as to prevent the vise from hitting the guide arm.

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 current blade height is above the preset material height 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 t when the current blade height is above the preset material height 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

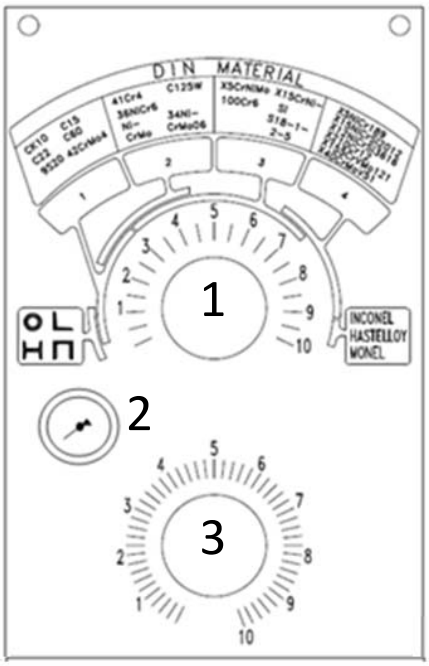
Blade speed is controlled by the inverter located under the workbed. Turning the knob clockwise increases the blade speed.

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. Cutting pressure gauge

- The gauge shows the current cutting pressure value, which appears upon a started blade.

3. Blade descend speed control knob

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

Human-Machine-Interface (HMI) Touch Screen

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

Do not wipe or clean the screen with volatile solvents.

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

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

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

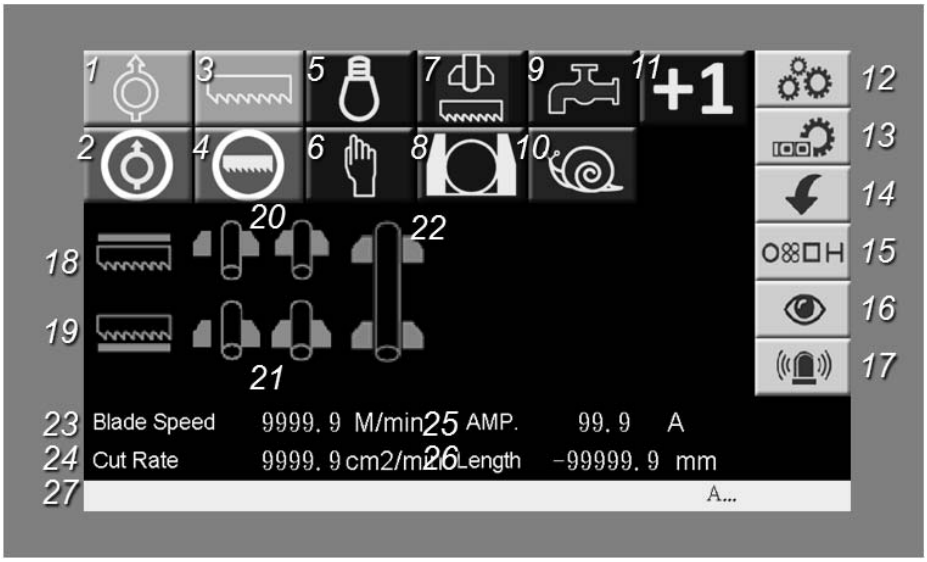
Item	Range
Ambient temperature	5℃ ~ 50℃
Temperature for safe operation	-10℃ ~ 60℃
Ambient humidity	30%~85% RH (No condensation)
Connection	RS422 MMI port
Environment	No condensation and rust

Startup Screen

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

Main control menu

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



Refer to the table below for descriptions of each function.

No	Item	Function	Description
1		Hydraulic start	When the power is turned on, press this button to start the hydraulic motor. A solid yellow icon indicates the hydraulic system has been turned on. 
2		Hydraulic stop	Press this button to turn off the hydraulic motor immediately.  When the blade is running, the *hydraulic stop* button is temporarily disabled. You need to press the *saw blade stop* or the *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.
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. 
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

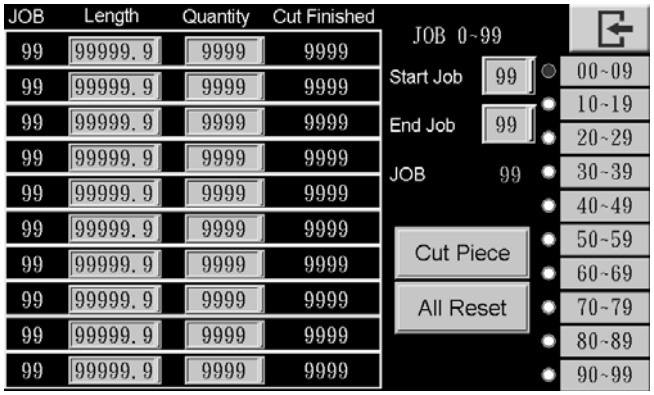
No	Item	Function	Description
			in action under AUTO mode, the machine will stop after the individual cut is finished. Switching to manual mode at any time other than cutting, the machine will proceed with the next cut until it is finished.
7		Material retract 2mm ON/OFF	When this function is turned 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.
9		Coolant ON/OFF	Press this button to turn on the coolant pump. A solid yellow faucet icon indicates the coolant pump has been turned on.  Press again to turn off the coolant pump.
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.

No	Item	Function	Description
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 program setting	Press this button to directly enter the cutting job program setup page. A total of 100 cutting programs can be set.
14		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.
15		Material cutting reference	This 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.
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. 

No	Item	Function	Description
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		Blade speed display	Displays current blade speed
24		Cut rate display (optional)	Displays current cut rate
25		Current display	Displays current in ampere (optional)
26		Feeding length display	Displays current feeding length while the material is being fed
27	 (yellow highlight)	Error display	Displays error messages in the order of occurrences; press the message for one second to clear the messages.  **The message must be cleared for the machine to continue to operate normally.**

Cutting program setup

When cutting is in operation, press  to quickly access the cutting program setup page.

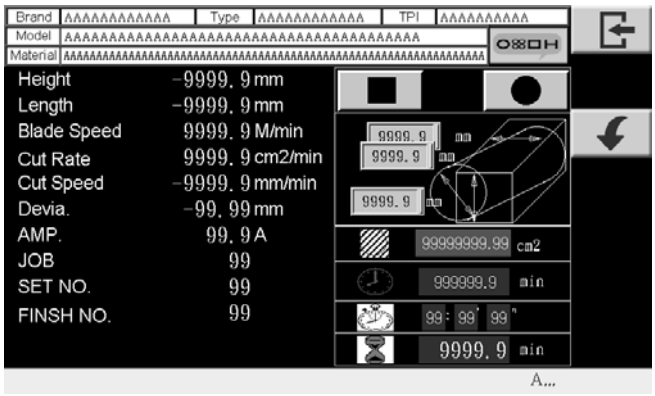


- In this page you can set your desired cutting length and quantity and see the number of finished cuts (*Cut Finished*) and number of current cutting job in operation
- A total of 100 cutting jobs can be set and performed under the automatic mode.
- In “start job” and the “end job” field, fill in the 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 Piece button for 3 seconds to reset the cutoff quantity.

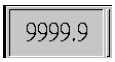
  If you start a new set of program without clearing cutoff data from previous job, the first cut (trim cut) will be skipped as the second program is deemed as the succeeding part of the previous program.
- All Reset - Reset all preset cutting data within *Start Job* and *End Job* by pressing this button for three seconds.
- Press  to return to the main control menu.
- Press 00~09, 10~19, 20~29, 30~39 to quickly jump between cutting programs (Job 00 ~ 99)

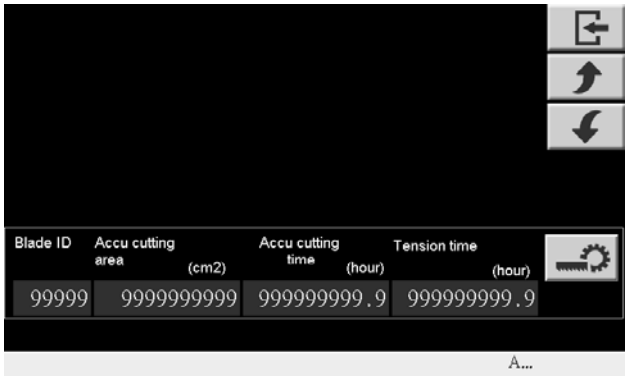
 *Cutting status display & setup*

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



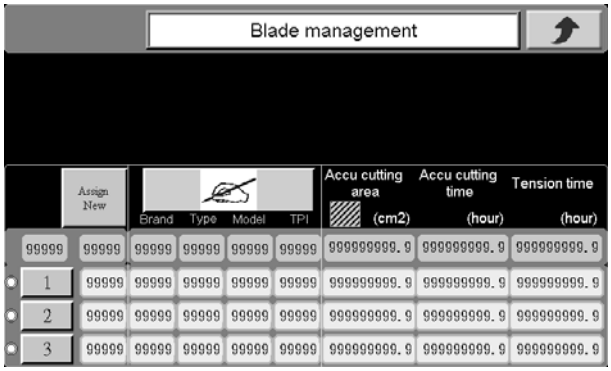
Page 1 – cutting status display & setup

- This page shows the following information (from top to bottom):
  - Blade brand, blade type, blade TPI, blade model, and cutting material are displayed only if installed CPC. Press  to enter material setup page (available only if installed CPC). Please refer CPC manual for description.
  - Blade height (optional)
  - Feeding length (current feeding vise position)
  - Blade speed
  - Cut rate (optional)
  - Current blade descending speed (optional)
  - Deviation value (optional)
  - Current in ampere
  - Number of current cutting job/step in operation
  - Preset quantity of current cutting job
  - Number of cuts finished
  - Press  or  to switch between material shape: rectangle and circle.
  - Press  to key in the material size. Without inputing the material size, cut rate can not be calculated by the system.
  - Cutting area
  - The upper clock shows cycle time per cut.
  - The lower clock shows estimated cutting time in hour, minute, and seconds.
  - The sandglass shows how much time left to finish the cut.
  - Error messages (highlighted in yellow; can be cleared by pressing down for one second)
- Press  to return to the main control menu.
- Press  to go to the next page.

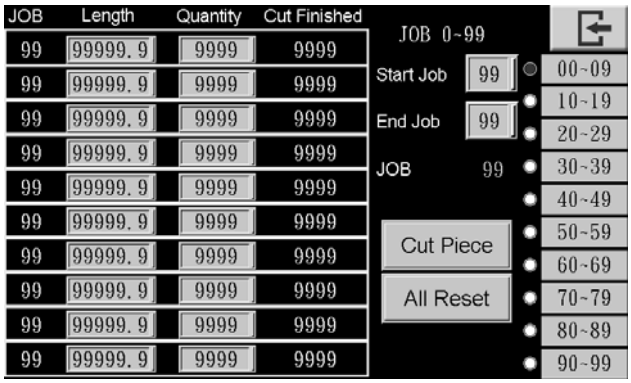


Page 2 – cutting status setup

- Blade ID, accumulative cutting area, accumulative cutting time and accumulative tension time are displayed (shown only if installed CPC).
- Press  to open the blade set up page shown below (available only if installed CPC). Please refer to CPC manual for description.



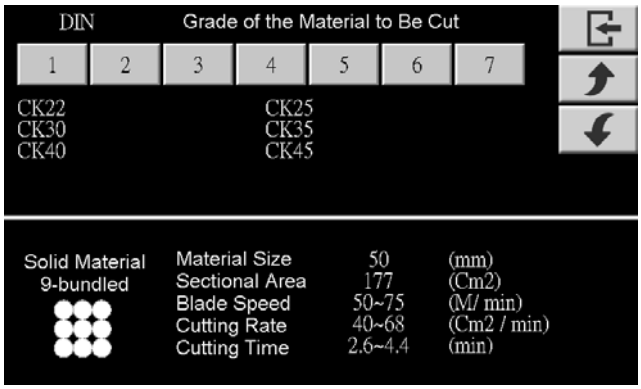
- Error message (bottom of page)
- Press  to return to the main control menu.
- Press  to go back to the previous page.
- Press  to go to the next page.



Page 3 – cutting program setup

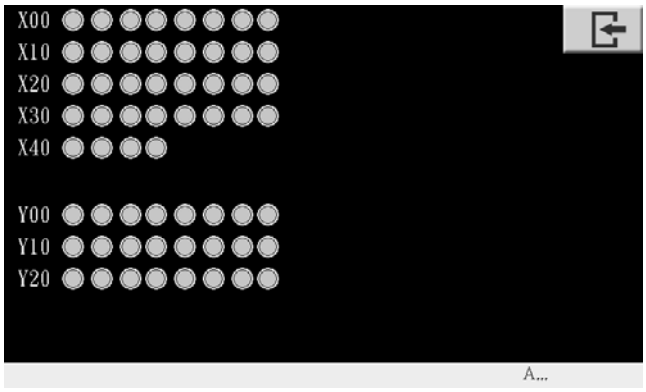
- This setup page is the same as the cutting program setup page.

Material cutting reference



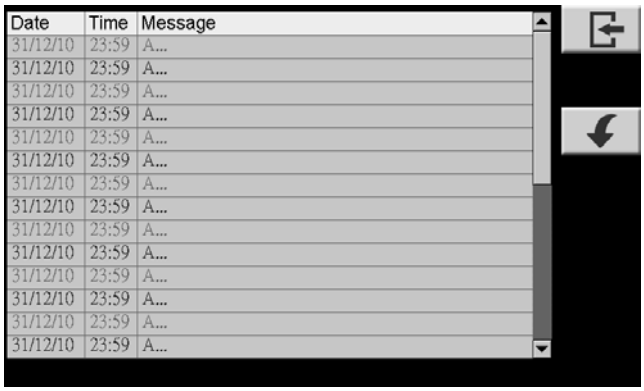
- This reference chart lists out the required blade speed and cutting rate for each different material.
- Press  to return to the main control menu.
- Press  to go back to the previous page.
- Press  to go to the next page.

PLC Monitor



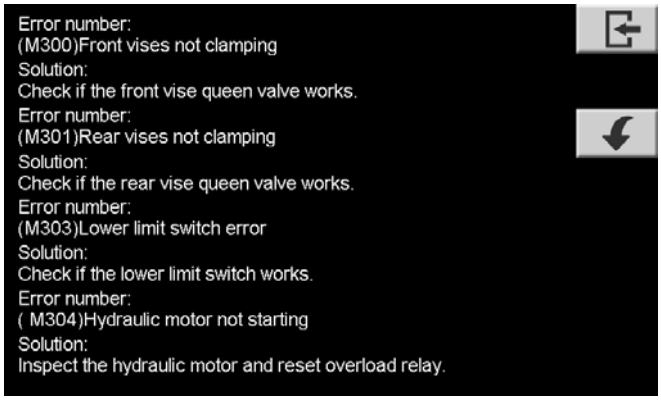
- Shows all signals of the PLC system.
- Press  to return to the main control menu.

Error report



Page 1 – error report

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



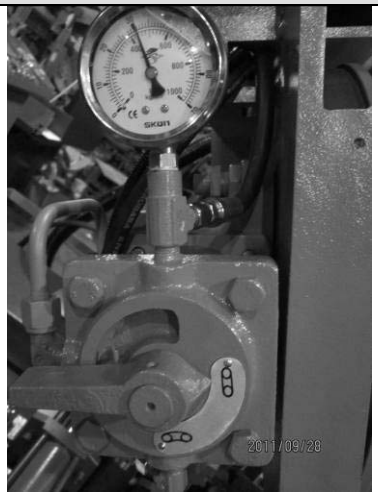
Page 2 – troubleshooting

- Provides suggestions on troubleshooting.
- Also refer to the below Table for error codes, descriptions and solutions.
- Press  to return to the main control menu.
- Press  to go to the next 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

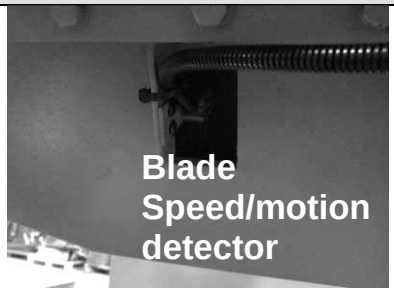
Blade tension device



- 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.

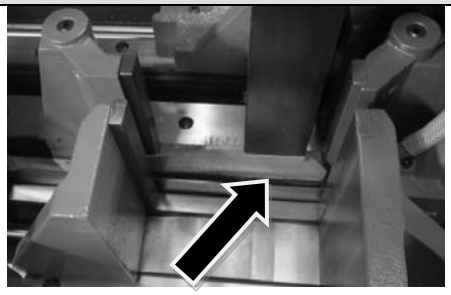
Inverter

- This inverter is installed 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:

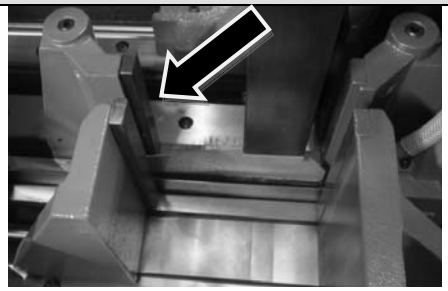
1. Make sure the terminal points are connected.
2. Make sure the ambient temperature is within acceptable range and keep the surroundings well ventilated.
3. Keep the inverter away from dust.
4. For repair or maintenance, please contact your local agent.

Quick approach device



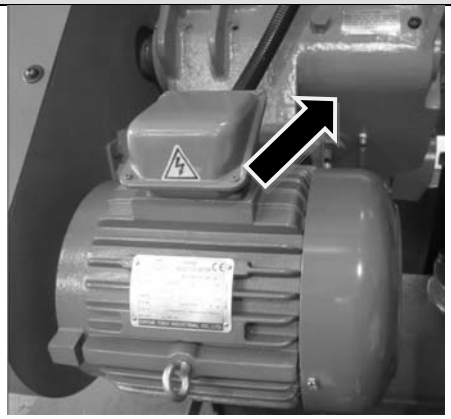
This device allows the blade to quickly descend to just right above the material to save you operation time.

Split front vises



The spilt vises are a clever design to make sure your workpiece is tightly clamped by the two vises from both sides of the blade, maximizing stability and cutting precision.

Gear reducer



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

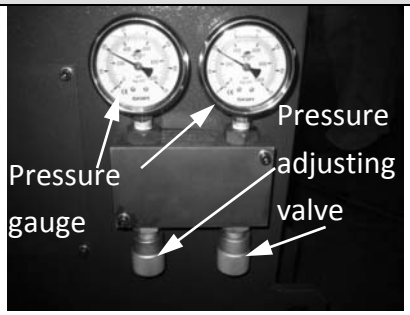
Please refer to Section 8 for information on maintenance.

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

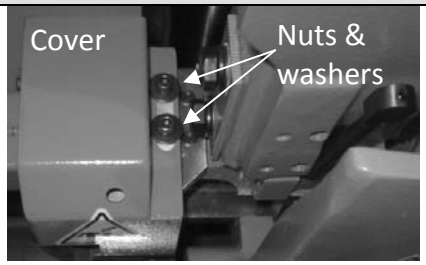


- This adjustment valve is used to control vise pressure.
- Adjust vise pressure based on the material of your workpiece.
- When cutting pipes or soft materials, reduce vise pressure to prevent exerted pressure from damaging the workpiece shape or exterior.

Do not adjust vise pressure at any time during cutting.

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

Vibration damper



with vibration damper

without vibration damper

The vibration damper can be assembled to the left saw arm. This optional accessory is extremely useful in reducing the blade vibration produced under high-speed cutting. Especially for cutting small materials on bandsaws of large width capacity, the vibration damper can reduce blade vibration, increase cutting rate, and enable smooth cut-off surfaces.

When cutting round and square material with C-420NC, use of vibration damper will limit the capacity to 15.6” (398mm). When cutting rectangular material with C-420NC, use of vibration damper will limit the HxW capacity to 15.6” (398mm) x 16.5” (420mm).

Therefore, when intending to cut at full capacity, vibration damper needs to be taken off. Please follow below steps to take off the vibration damper.

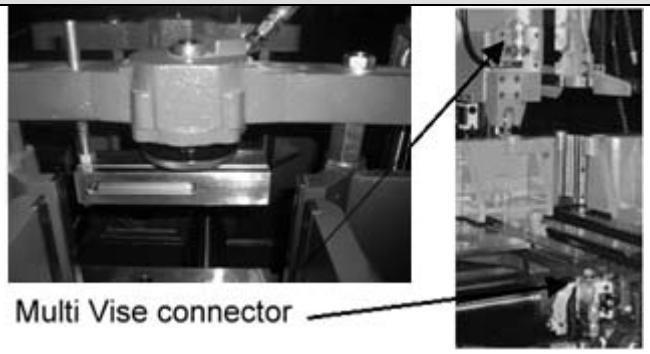
1. Loosen the nuts.
2. Remove the cover, nuts, washers, and vibration damper.
3. Tighten the nuts and washers back.

Chip conveyor

Chip conveyor is a spiral device to bring chips out during cutting.

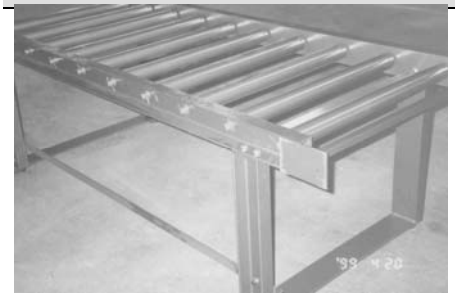
As a regular maintenance, remove the chip conveyor and clean all chip deposits inside.

Hydraulic top clamps



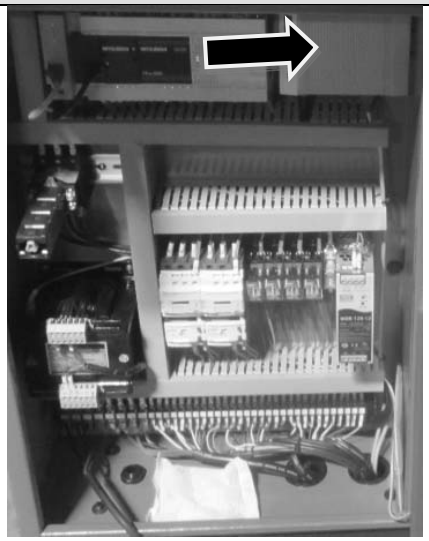
- The top clamp device composed of two clamps is installed on top of the front and rear vises before executing bundle cutting.
- Refer to *Using Top Clamp for Bundle Cutting* for operating procedure on bundle cutting.

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.

Cosen predictive computing



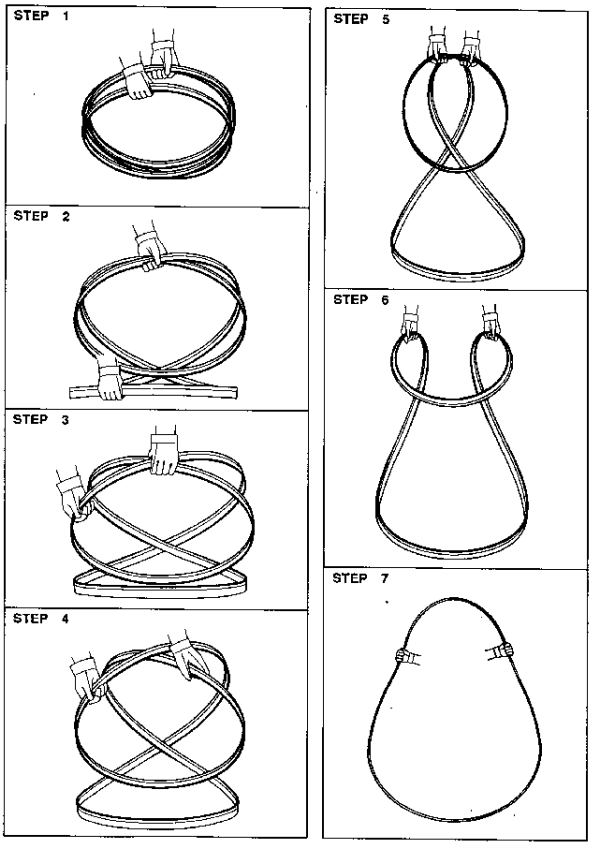
Cosen Predictive Computing MechaLogix is a cloud based system that revolutionizes the metal-working and fabrication industry. MechaLogix utilizes innovative technology that not only includes blade life monitoring, but also predicts blade failure. This technology will decrease cost and maximize tool usage.

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.

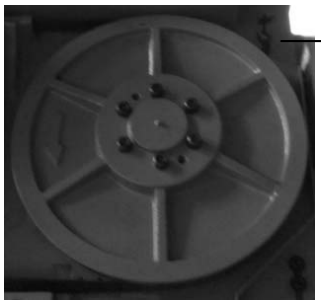
Step 3 - Switch to *manual* (✋) mode.

Step 4 - Press the *saw bow up* button and elevate the saw bow until it reaches to its highest point.

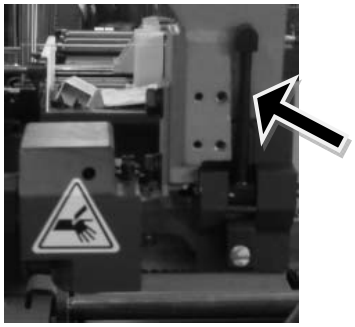
Step 5 - Turn the tension controller handle from "◯◯" to "◯◯" position to release tension. The idle wheel will then move slightly toward the direction of the drive wheel.

Step 6 - Open the idle and drive wheel covers.

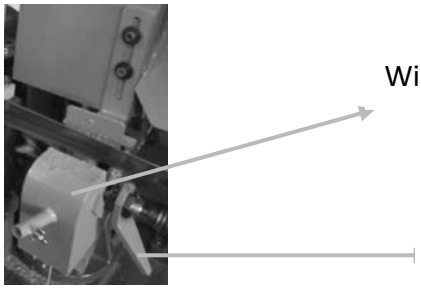
Step 7 - Press the *Blade Clip* device to hold onto the blade. This device makes blade changing easy and feasible even with only one operator available.



Step 8 - Loosen the left and right carbide inserts by unlocking the “lock bars” shown below.



Step 9 - Open the wire brush cover. Loosen the lock lever and lower the wire brush.



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 locking the “lock bars.”

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.

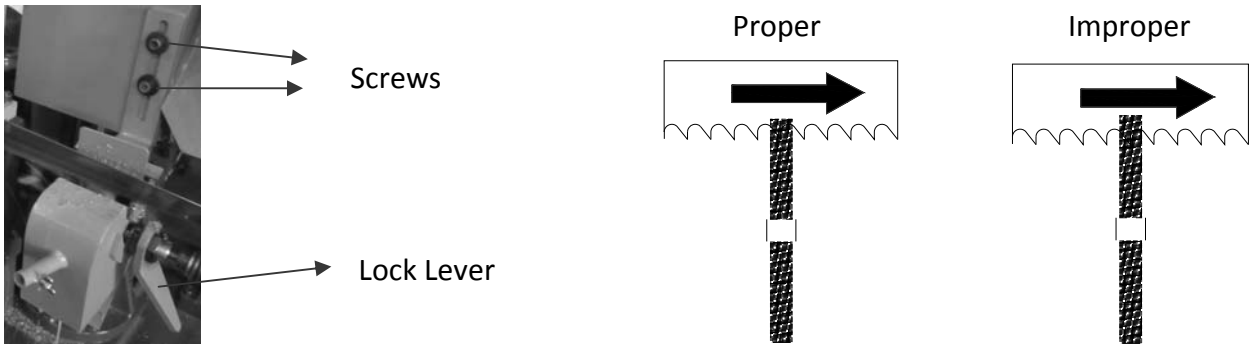
ADJUSTING WIRE BRUSH

Follow these steps to adjust wire brush to appropriate position:

Step 1 - Loosen the lock lever and the wire brush cover.

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

Step 3 - Reinstall the wire brush cover and tighten the lock lever.



ADJUSTING SAW ARM

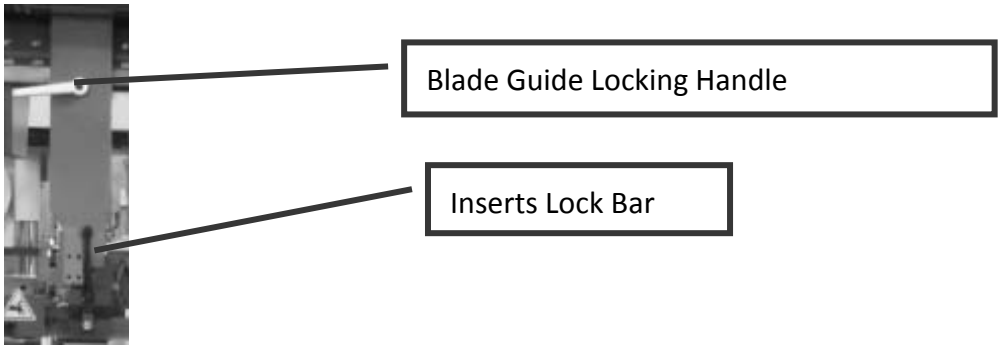
Adjust the blade guide (guide arm) position based on the size of your workpiece:

Step 1 – Loosen the inserts by unlocking the lock bar.

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.

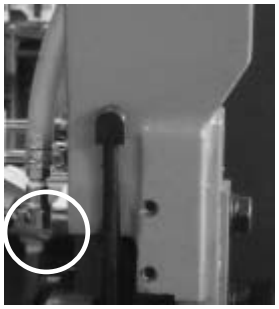


ADJUSTING COOLANT FLOW

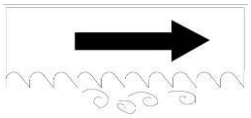
Step 1 – Press the *saw blade start* button to start the saw blade drive motor.

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

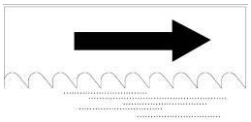
Step 3 – Use the flow control valve (shown below) to adjust the amount of fluid flowing to the cutting area.



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.

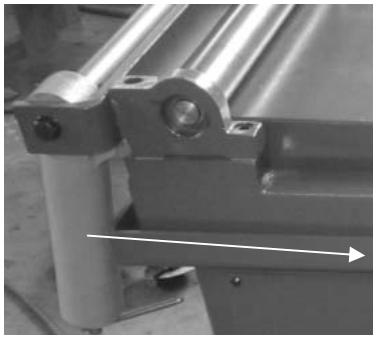
PLACING WORKPIECE ONTO WORKBED

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 – Loosen the vertical roller lock handles and fully open the vertical rollers.

Step 4 – Carefully place the workpiece onto the work feed table to where it extends approximately 3.9” (100mm) beyond the rear vise toward the front vise.



Vertical Roller

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.
align vertical rollers	*2*	Move the vertical alignment rollers toward workpiece until it stands against the workpiece. Lock the vertical alignment rollers by tightening the lock handles
feed material forward	*3*	Press the *feed forward* button until the rear vise touches the front limit switch.
front vises clamp material	*4*	Press the *front vise clamp* button until the workpiece is securely clamped.
rear vises retract to clamp material again	*5*	Press the *rear vise open* button.
	6	Press the *feed backward* button until the rear vises reach back limit switch.
	7	Press the *rear vise clamp* button until the workpiece is securely clamped again.
front vises open; prepare for precision position	*8*	Simultaneously press the *front vise open* button and the *rear vise clamp* button again to make sure the material is clamped.
confirm cutoff point	*9*	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	*10*	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	*11*	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 - The complete break-in operation requires cutting on a 645 mm^2 (25.4 square inches) section for 5 times.
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.

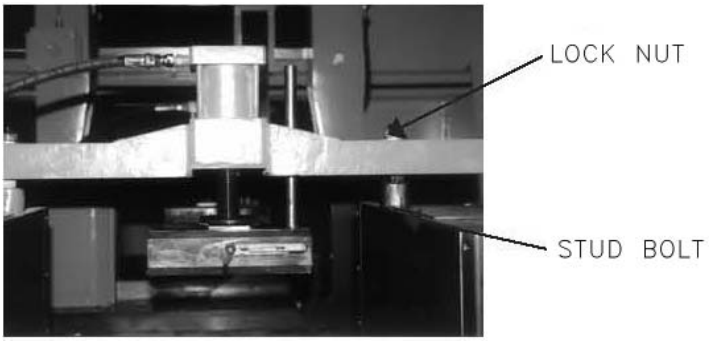
Step 6 – Press the *saw blade start* button and press the *saw bow down* button to start automatic cutting.

USING TOP CLAMP FOR BUNDLE CUTTING

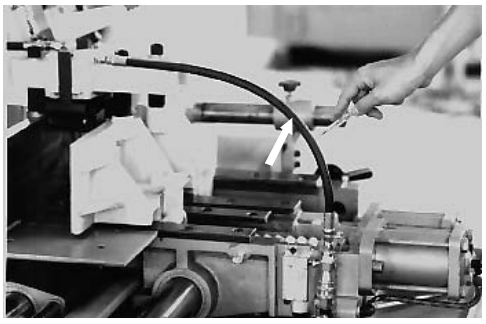
Installing top clamp

To perform bundle cutting, use the top clamps and take the following installation procedures.

Step 1 – Install stud bolts on the front and rear vises and position the top clamp.



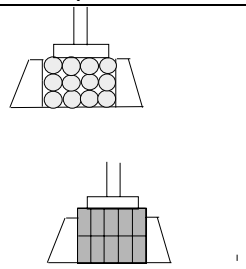
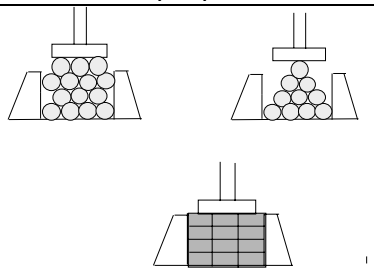
Step 2 – Connect the top clamp hoses to the pressure joints on the vise hydraulic cylinders.



Step 3 – Position the workpiece for bundle cutting.

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

Proper and improper stacking of workpieces

Proper	Improper
	

Step 4 – Align the top clamp cylinders with the center of the workpiece and tighten the lock nuts.

Step 5 – Turn the top clamp handles so that the clearance between the top clamp jaw and the top of the bundled workpiece is within 5 to 10 mm (0.2 ~ 0.4 inch).

Step 6 – Press *Single/Bundle cutting mode* button and switch to bundle cutting mode.

Step 7 – For subsequent cutting procedures, refer to the cutting instructions above.

Uninstalling top clamp

Follow these steps to uninstall top clamp for cutting single material:

Step 1 – Disconnect the top clamp hoses.

Step 2 – Loosen the lock nuts and remove the top clamp.

Step 3 – Remove the stud bolts.

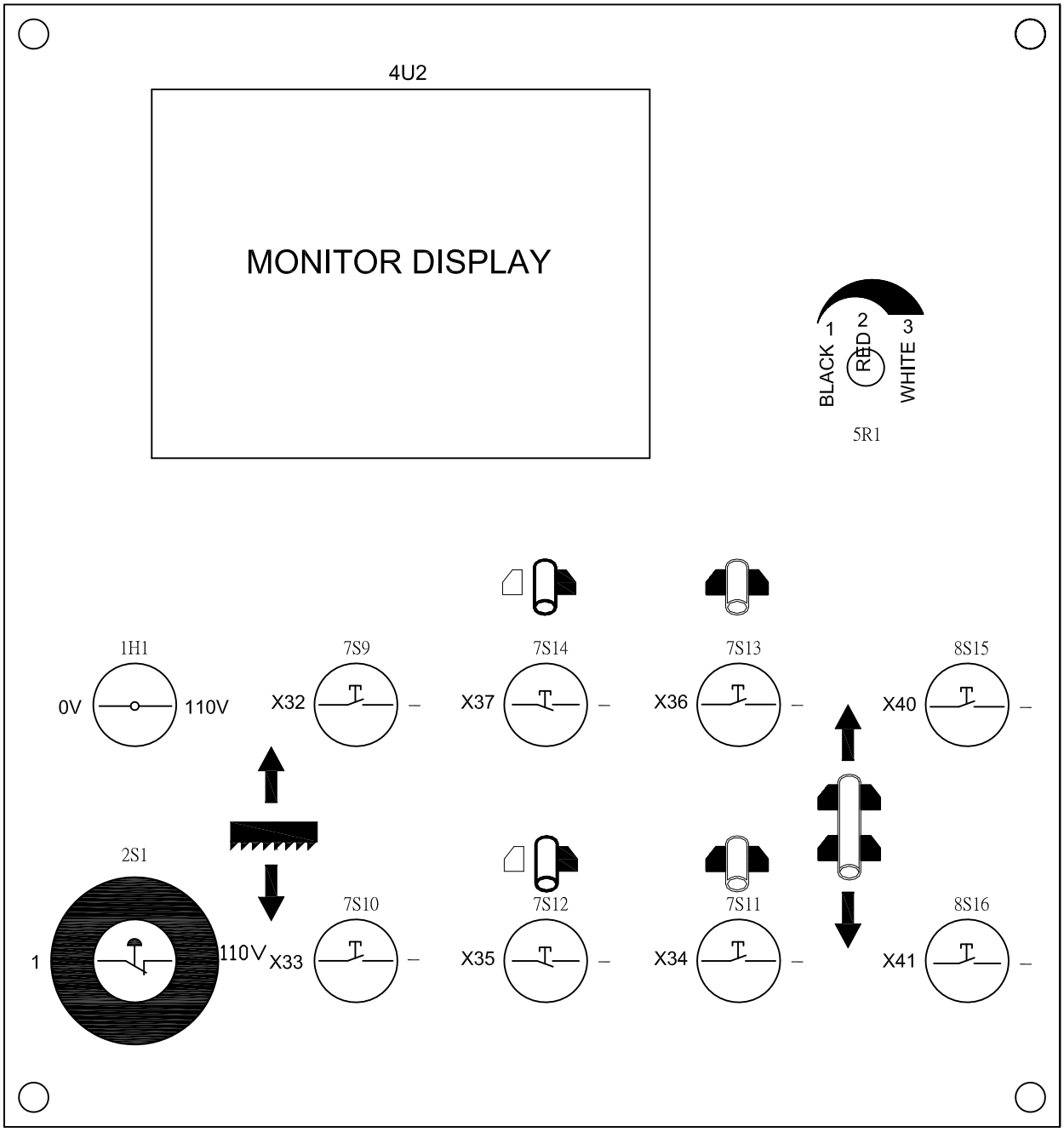
TERMINATING A CUTTING OPERATION

- 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



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-C420NC-F15-000S0-A AM55	繪圖	鍾泓龍	日期	1030220	版本
					審核		日期		S0

TB-1

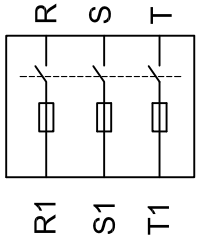
+	-	X32	X34	X35	X36	X37	X40	X41	0V	110V	1				

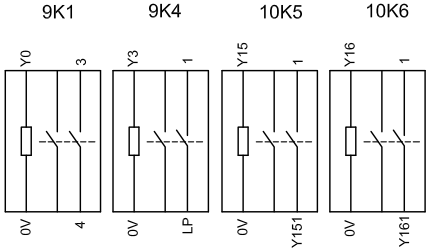
		+	A				X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37	X41	
	⏚	S/S	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37	X41	X43	
L	N	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36	X40	X42		
1	0V	B				X10	X12		X16	X20		X24	—	—	X32	X34	X36	X40			

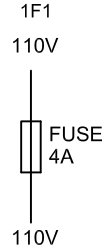
4A1
FX3G-60M

	-	Y0	Y1	Y2		Y4	Y6		Y10			Y14	Y16			Y22				
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	
+	1	1	1	Y3	1	Y5	Y7	1	Y11	Y13	1	Y15		1		Y23	1			

1Q1

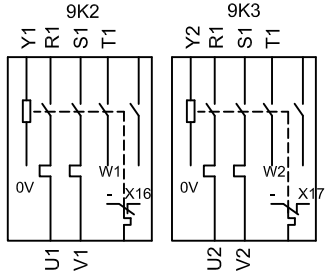






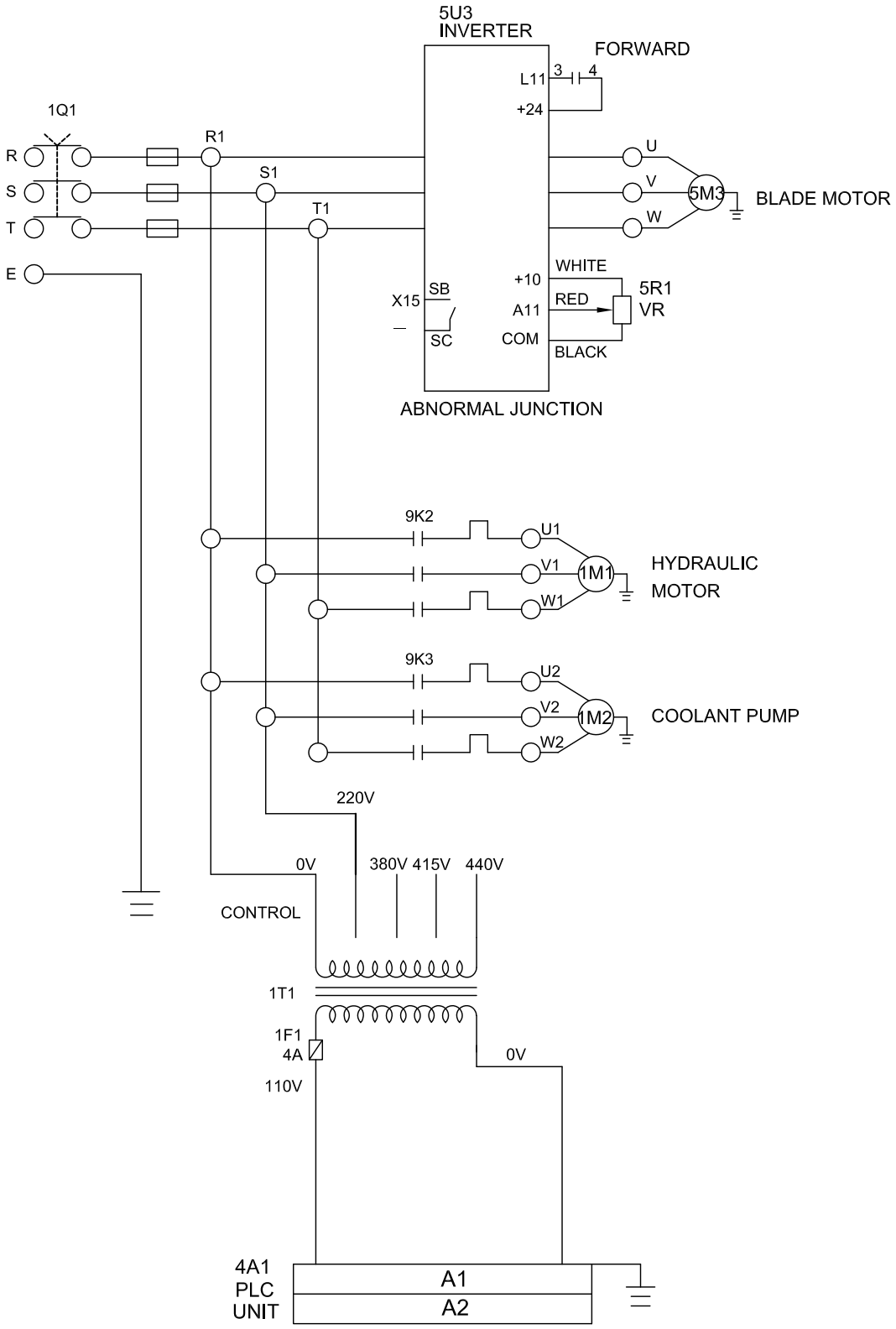
1T1

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

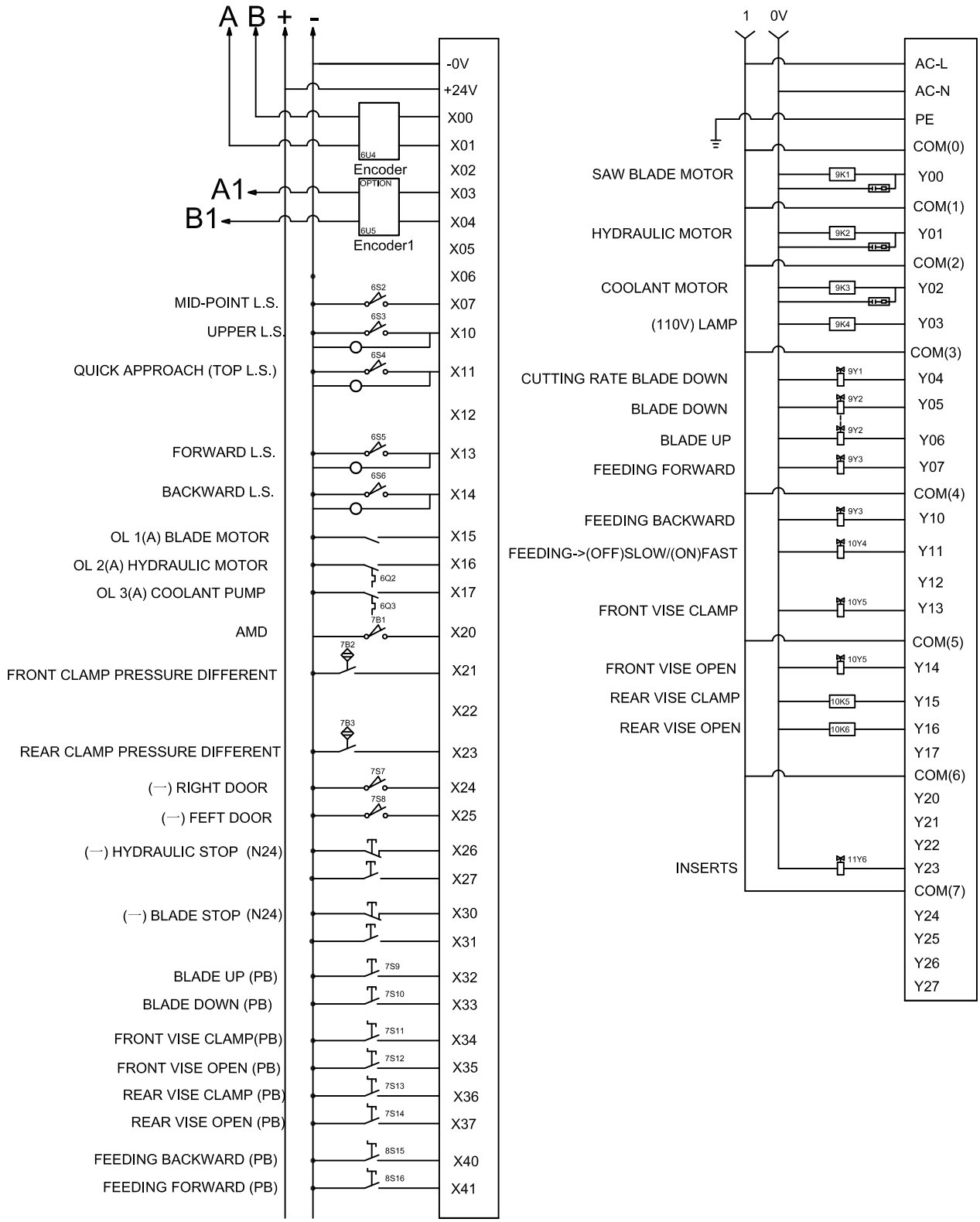


TB-2

R	S	T	E	U	V	W	E	U1	V1	W1	E	U2	V2	W2	E	X7	–	–	X10	X11	–	–	X13	–	X15	X20	–	–	+	+	X21	X23	–	–	+	+	A	B	X24	–	–	X25	Y4	0V	0V	Y5	Y6	Y7	Y10	0V	0V	Y11	Y13	Y14	0V	0V	Y151	Y161	0V	LP



cOsen 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-C420NC-F15-000S0-C AM55	繪圖	鍾泓龍	日期	1030220	版本
					審核		日期		S0

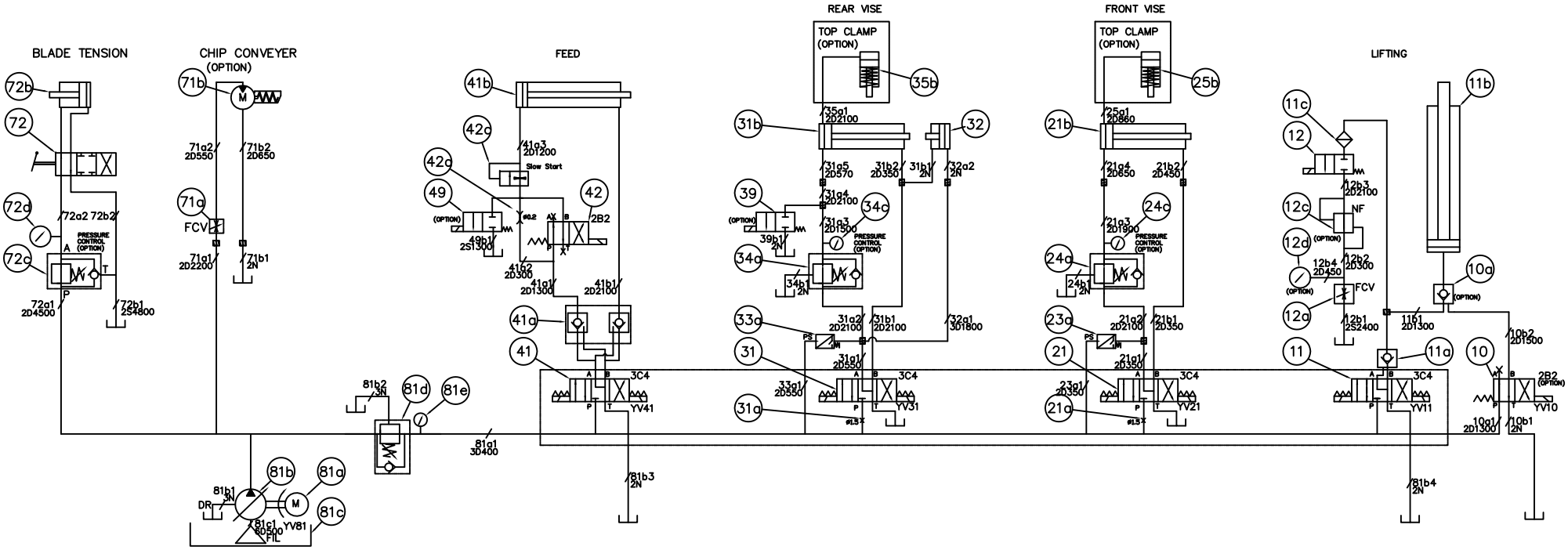


高聖精密機電股份有限公司 COSEN MECHATRONICS CO., LTD.	圖名	PLC Input /Output Layout PLC I/O配置圖	圖號	EL-C420NC-F15-000S0-D AM55	繪圖	鍾泓龍	日期	1030220	版本
					審核		日期		S0

HYDRAULIC SYSTEM

HYDRAULIC CIRCUIT DIAGRAM

C-420NC HYDRAULIC CIRCUIT



COSEN MECHATRONICS CO.,LTD.		DRAW	20151008	SHELBY
		CHECK		
TITLE	C-420NC HYDRAULIC CIRCUIT	APPROVED		
DRAWING NO.C-420NC HYDRA.DWG	VERSION 1-0		DATE	NAME

BANDSAW CUTTING: A PRACTICAL GUIDE

INTRODUCTION
SAW BLADE SELECTION
SOME SAWING PRACTICES
CUTTING CONDITIONS SETTING

INTRODUCTION

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

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

SAW BLADE SELECTION

The factors affecting cutting performance are:

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

Fig. 7.1 Description of Band

- Depending on the hardness of the material the cutting rate will increase or decrease. For example, it takes more time to cut stainless steel than to cut cast iron.
- The surface conditions will also affect the cutting rate. If there are places on the surface on the material which are hard, a slower blade speed will be required or blade damage may result.
- It will be slower to cut tubing than to cut solids, because the blade must enter the material twice, and because coolant will not follow the blade as well.
- Tough or abrasive materials are much harder to cut than their machinability rating would indicate.
- Tooth spacing is determined by the hardness of the material and its thickness in cross section.
- Tooth set prevents the blade from binding in the cut. It may be either a "regular set" (also called a "raker set") or a "wavy set".
- The regular or raker set is most common and consists of a pattern of one tooth to the left, 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:

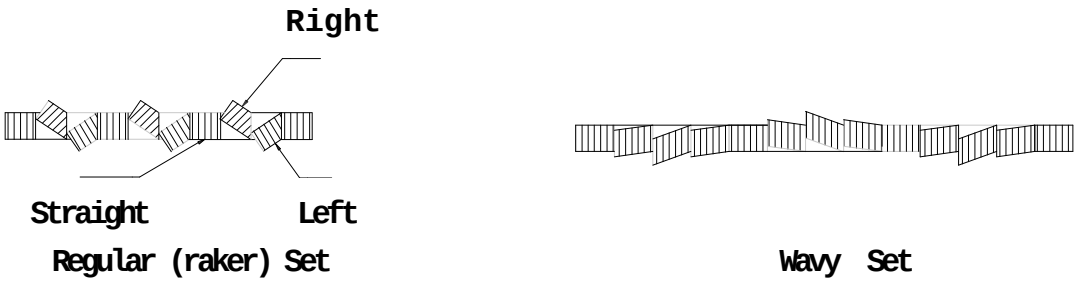


Fig. 7.2 The Saw Set

Material size and shape

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

Guide spacing

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

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

Blade selection

There are different types of blades available. Please contact a bandsaw blade manufacturer for advice.

Blade speed and feed

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

Tooth form and spacing

The selection of a tooth form generally is determined by the material to be cut. There are three general factors to consider: tooth form, style or shape of the teeth; tooth spacing, the number of teeth to the inch; and tooth set, which provides clearance for the body of the blade. Three styles of tooth are shown in Fig. 7.3 below:

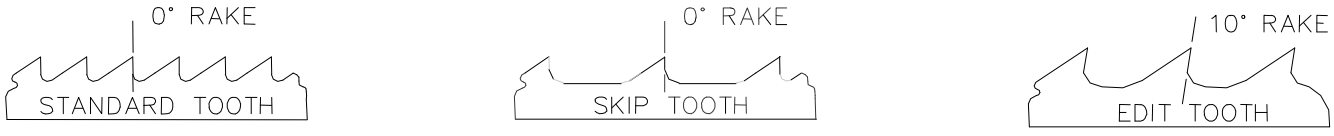


Fig. 7.3 Three Styles of Tooth

SOME SAWING PRACTICES

Saw Pitch Selection

Sawing “Rules of Thumb”:

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

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

Material Size and Saw Pitch

Anytime during the cutting operation, at least three teeth must be in contact with the material being cut. Figure 7.4 shows some sawing practices:

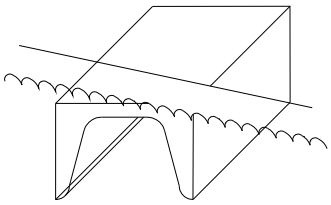
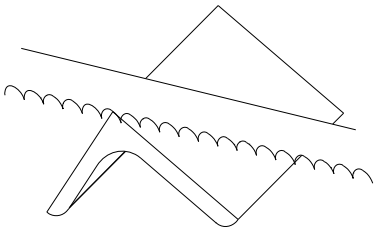
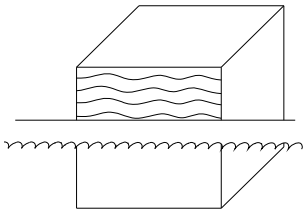
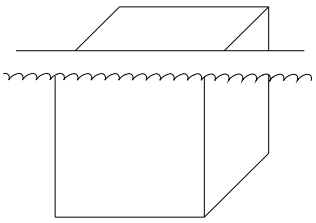
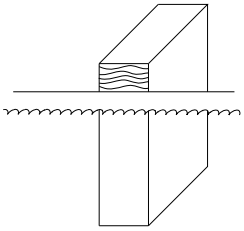
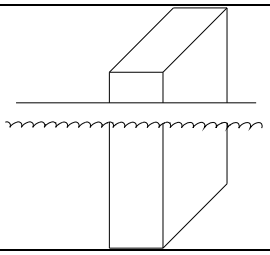
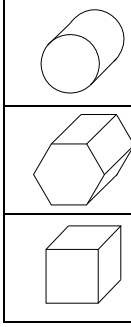
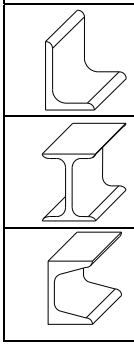
SAWING PRACTICES	
CORRECT	**INCORRECT**
	
several teeth contact work	teeth strike sharp edge
	
Coarse teeth clear chips freely	Teeth too fine for large solids
	
Three or more teeth on cutting wall	Coarse teeth rip on thin wall

Fig. 7.4 Some sawing practices

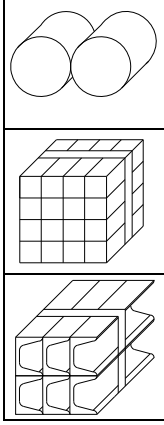
Solid Stock:

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

Structurals:

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

Solid Bundle:

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

Section 8

MAINTENANCE & SERVICE

INTRODUCTION

BASIC MAINTENANCE

MAINTENANCE SCHEDULE

- **BEFORE BEGINNING A DAY'S WORK**
- **AFTER ENDING A DAY'S WORK**
- **EVERY MONTH**
- **EVERY THREE MONTHS**
- **EVERY SIX MONTHS**

STORAGE CONDITIONS

TERMINATING THE USE OF MACHINE

OIL RECOMMENDATION FOR MAINTENANCE

INTRODUCTION

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

BASIC MAINTENANCE

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

MAINTENANCE SCHEDULE

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

Before beginning a day's work

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

After ending a day's work

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

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

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

Every month

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

Recommended Grease:

- Shell Alvania EP Grease 2
- Mobil Mobilplex 48

Every three months

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

- Shell Alvania EP Grease 2
- Mobil Mobilplex 48 (600W Cylinder oil)

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 32
- Mobil DTE OIL light Hydraulic28

STORAGE CONDITIONS

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

(1) Turn off the power.

(2) Ambient temperature: 5℃ ~ 40℃

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

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

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

(6) Avoid exposing to abnormal vibration.

(7) Must be connected to earth.

TERMINATING THE USE OF THE MACHINE

Waste disposal:

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

- Hydraulic oil
- Cutting fluid
- Drive wheel gear oil

OIL RECOMMENDATION FOR MAINTENANCE

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

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

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

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

Section 9

TROUBLESHOOTING

INTRODUCTION
PRECAUTIONS
GENERAL TROUBLES & SOLUTIONS
MINOR TROUBLES & SOLUTIONS
MOTOR TROUBLES & SOLUTIONS
BLADE TROUBLES & SOLUTIONS
SAWING PROBLEMS & SOLUTIONS
RE-ADJUSTING THE ROLLER TABLE

INTRODUCTION

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

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

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

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

PRECAUTIONS

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

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

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

GENERAL TROUBLES AND SOLUTIONS

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

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

MINOR TROUBLES & SOLUTIONS

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

MOTOR TROUBLES & SOLUTIONS

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

BLADE TROUBLES AND SOLUTIONS

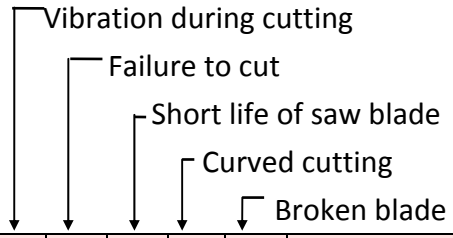
DISCONNECT POWER CORD TO MOTOR BEFORE ATTEMPTING ANY REPAIR OR INSPECTION.

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

SAWING PROBLEMS AND SOLUTIONS

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

Sawing Problems and Solutions



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

RE-ADJUSTING THE ROLLER TABLE

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

TOOL, measuring

Measurement, Horizontal balance

Procedure

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

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

Section 10

PARTS

SPARE PARTS RECOMMENDATIONS

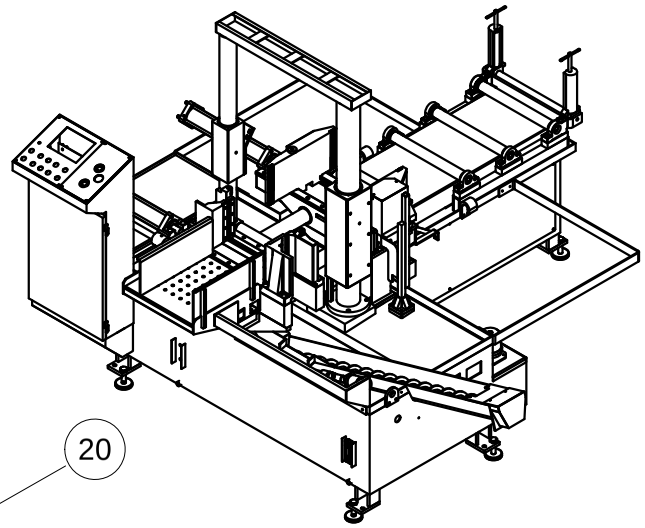
PART LIST

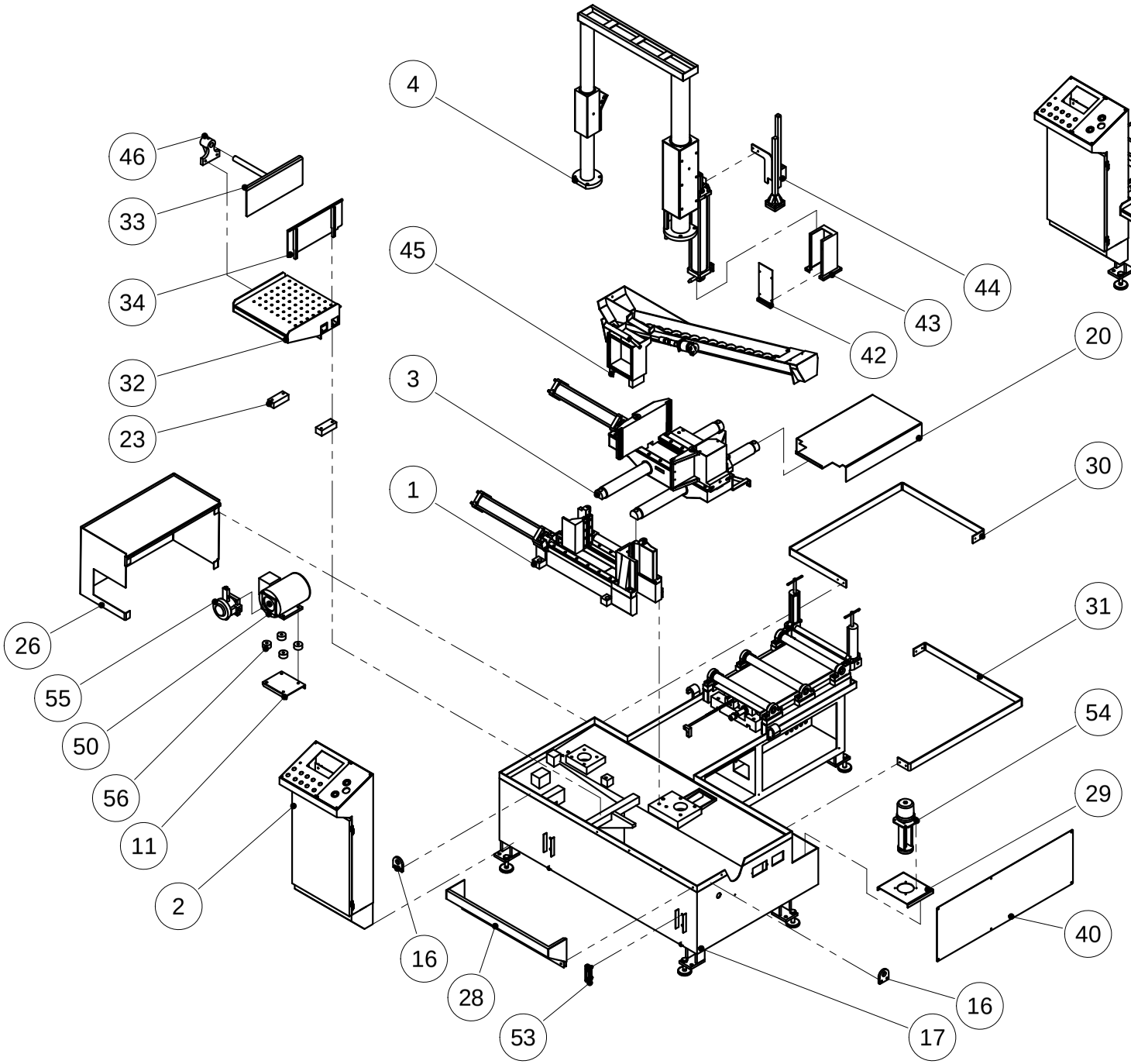
SPARE PARTS RECOMMENDATIONS

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 asbestos	Duster seal
Rubber washer	Oil seal
O-ring	Snap ring
Drive wheel	Idle wheel

底座組
BASE ASSEMBLY





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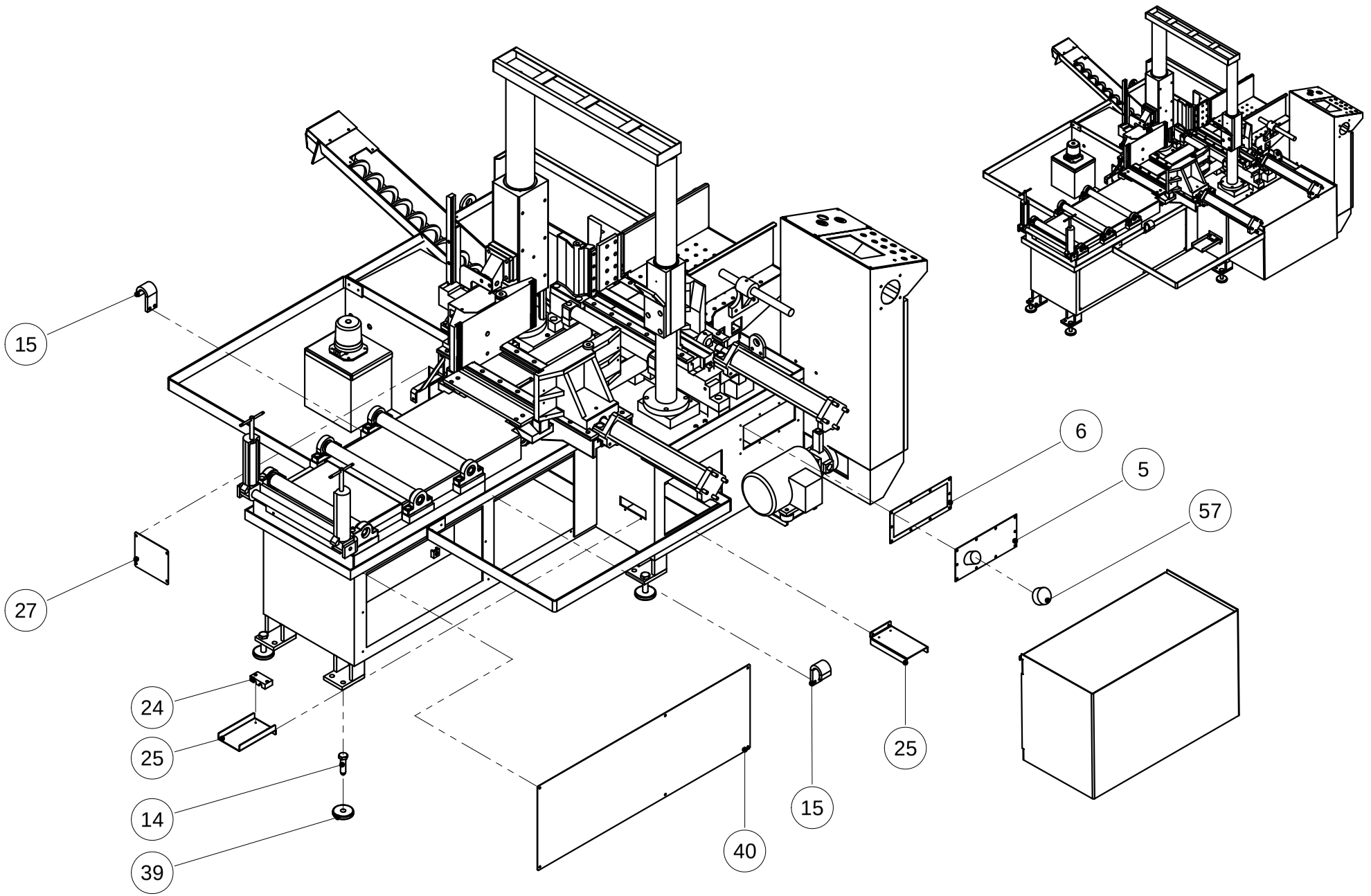
BASE ASSEMBLY



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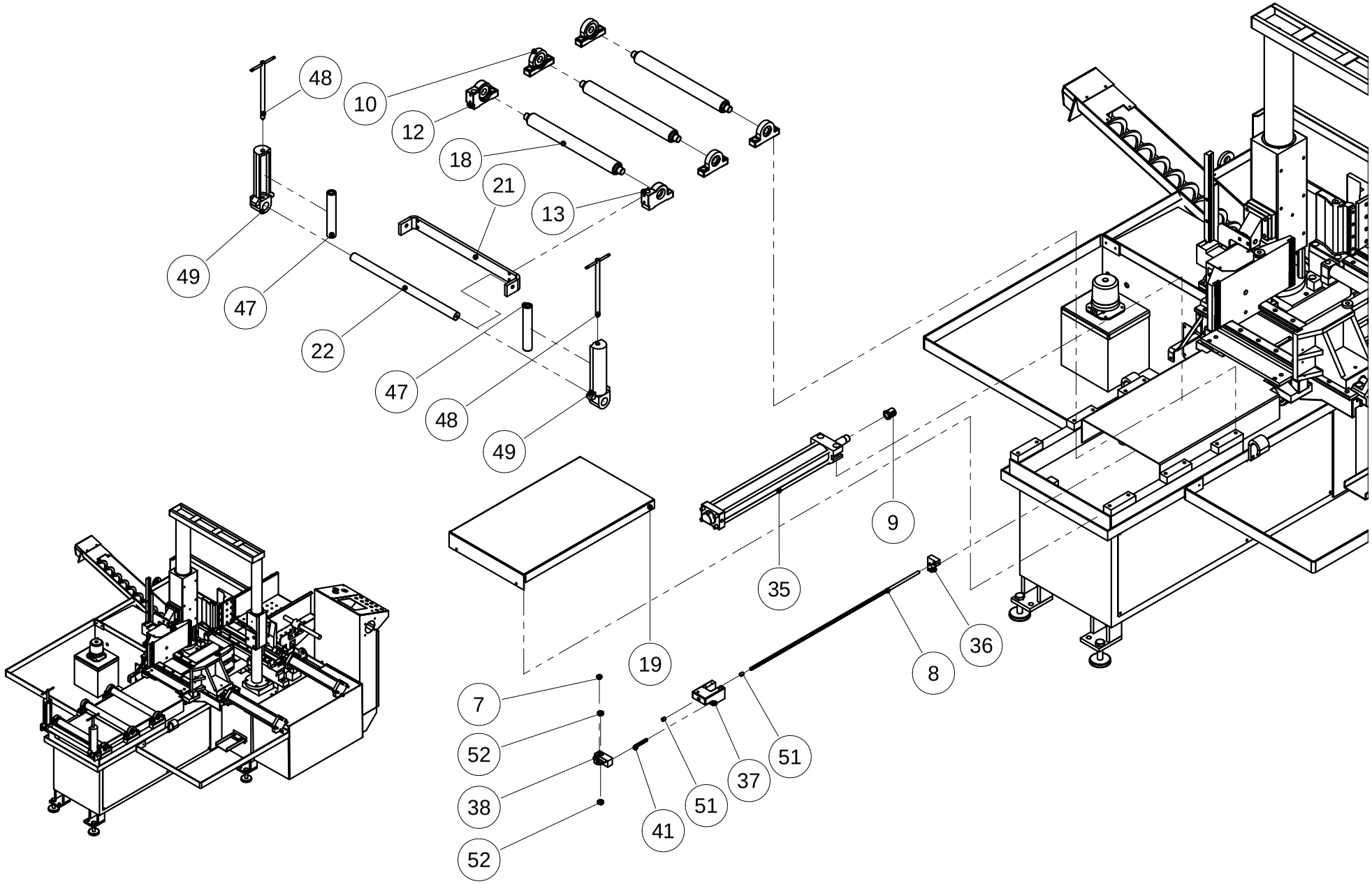
BASE ASSEMBLY



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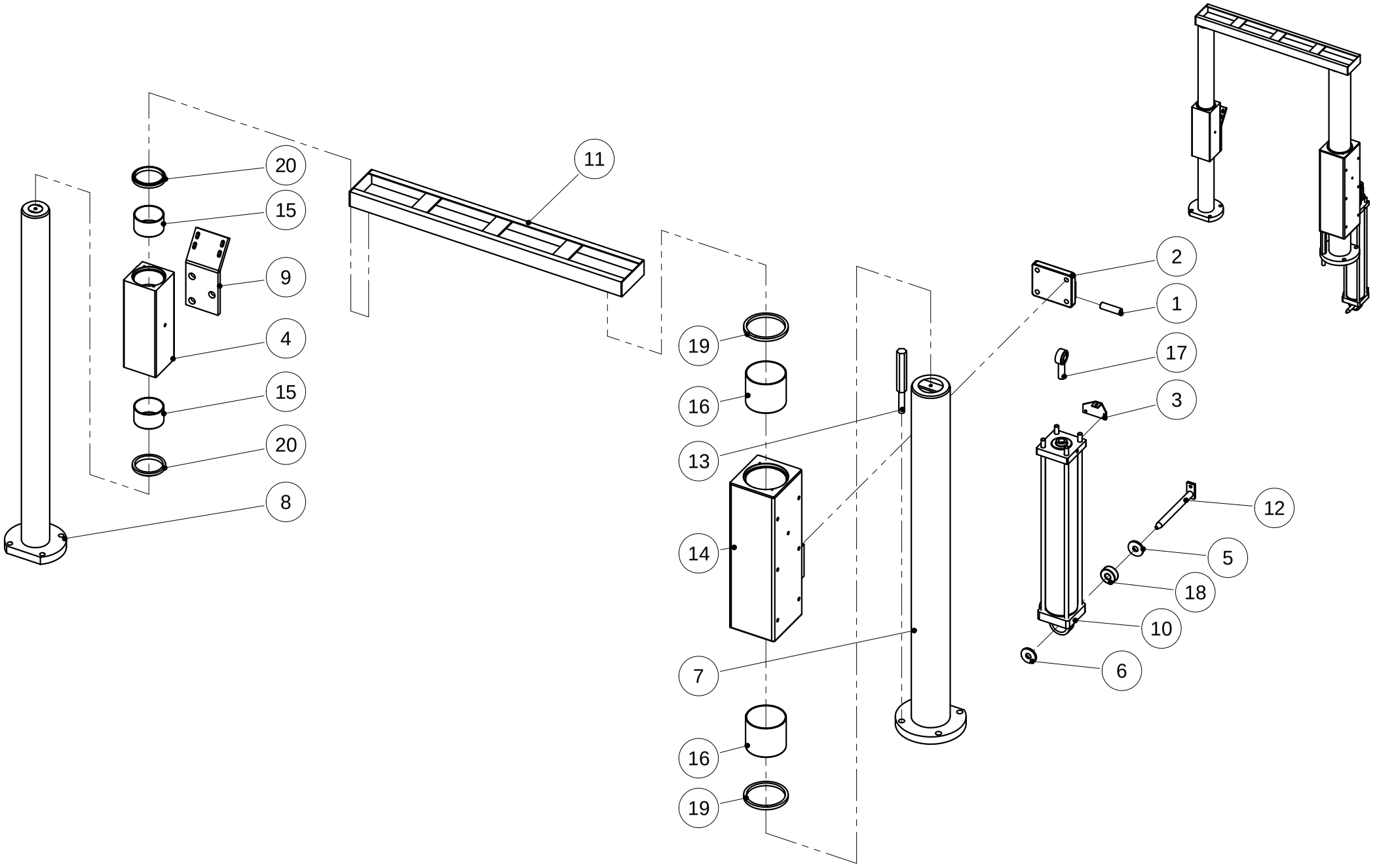
底座組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1		Bed assembly	床面組		1	
2		Control box assembly	控制箱組		1	
3		Feeding bed assembly	送料床面組		1	
4		Main shaft assembly	主軸組		1	
5	AHA-0102	Oil tank cover	油箱蓋		1	
6	AHA-0108A	Leak-proof asbestos	油箱蓋防漏石綿		1	
7	AHA-1560	Gear	定寸齒輪		1	
8	AHA-1561	Tooth bar	定寸齒條		1	
9	AHA-1605	Bushing cap nut	襯套螺帽		1	
10	AHA-16360	Roller fixed seat	滾輪固定座		4	
11	AHB-0132	Hydraulic motor seat	油壓馬達固定板		1	
12	AHB-16530	Roller fixed seat (right)	滾輪固定座(右)		1	
13	AHB-16560	Roller fixed seat (left)	滾輪固定座(左)		1	
14	AHC-0153	Base stand adjusting screw	底座調整螺桿	M20xP2.5xL80	6	
15	AHC-0160	Lifting ear (3)	吊耳(三)		2	
16	AHC-0161	Lifting ear (4)	吊耳(四)		2	
17	AHE-1001	Base	底座		1	

底座組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
18	AHE-1015A	Roller	滾輪		3	
19	AHE-1038	Feeding cylinder cover	送料油缸護蓋		1	
20	AHE-1039	Feeding shaft cover	送料軸護蓋		1	
21	AHE-1064	Vertical roller stopper	側滾輪檔板		1	
22	AHE-1065	Vertical roller sliding shaft	側滾輪滑軸		1	
23	AHK-1902	Bracket fixed block	托架固定塊		2	
24	AHN-1903	Oil pipe fixed seat	油管固定座		1	
25	AHN-1904	Bracket	拖盤		2	
26	AHN-1910	Hydraulic housing	油壓外罩		1	
27	AHN-1914	Cover	護蓋		1	
28	AHN-1916B	Cover	護蓋		1	
29	AHN-1917	Motor fixed plate	馬達固定板		1	
30	AHN-1920	Left fence	左護欄		1	
31	AHN-1921	Right fence	右護欄		1	
32	AHN-2701	Bracket	托架		1	
33	AHN-2702A	Left side fence	托架左側板		1	
34	AHN-2703	Right side fence	右側板		1	

底座組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
35	AHN-4300	Feeding cylinder assembly	送料油壓缸組		1	
36	AHN-4401	Fixed seat	固定座		1	
37	AHN-4402	Fixed seat	固定座		1	
38	AHN-4403	Encoder fixed seat	譯碼器固定座		1	
39	AHR-1055	Table stand pad	底座墊塊	ϕ80*15	6	
40	C420H-1063	Base side cover	底座後左右邊蓋		2	
41	C420H-1564	Spring	譯碼器微動彈簧		1	
42	C420H-3278A	Saw bow cyliner cover	鋸弓油缸前蓋		1	
43	C420H-3279A	Saw bow cyliner cover	鋸弓油缸護蓋		1	
44	C420H-21000	Sawbow height decoder	高度譯碼器組		1	
45	C420H-C001A	Chip conveyor assembly	除屑機組		1	
46	M3L-7-20	Bracket	托架		1	
47	OPR-5013C	Vertical roller	側滾輪		2	
48	OPR-5014B	Vertical roller shaft and handle	側滾輪軸及把手		2	
49	OPR-5015C	Vertical roller seat	側滾輪座		2	
50	PHH2-D418-P	Hydraulic motor	油壓馬達	2HP 3φ 60HZ 4P 230/460V 5.5/2.7A	1	
51	PP-13020	DU bushing	乾式軸承	MB1012	2	

底座組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
52	PP-14211	Bearing	軸承	608VV	2	
53	PP-21030	Oil sight gauge	油面計	3"	1	
54	PP-32081A-CE	Coolant pump (filterable)	浸水幫浦(過濾式)	1/8HP 3φ 230-240V/460-480V 0.43/0.32A 220L	1	
55	PP-32232	Hydraulic pump	油壓幫浦	VCMSF30C20 30L	1	
56	PP-70700-3	Rubber	防震墊		4	
57	PP-90857	Oil tank cover nut	油箱蓋螺帽		1	

主軸組
MAIN SHAFT ASSEMBLY



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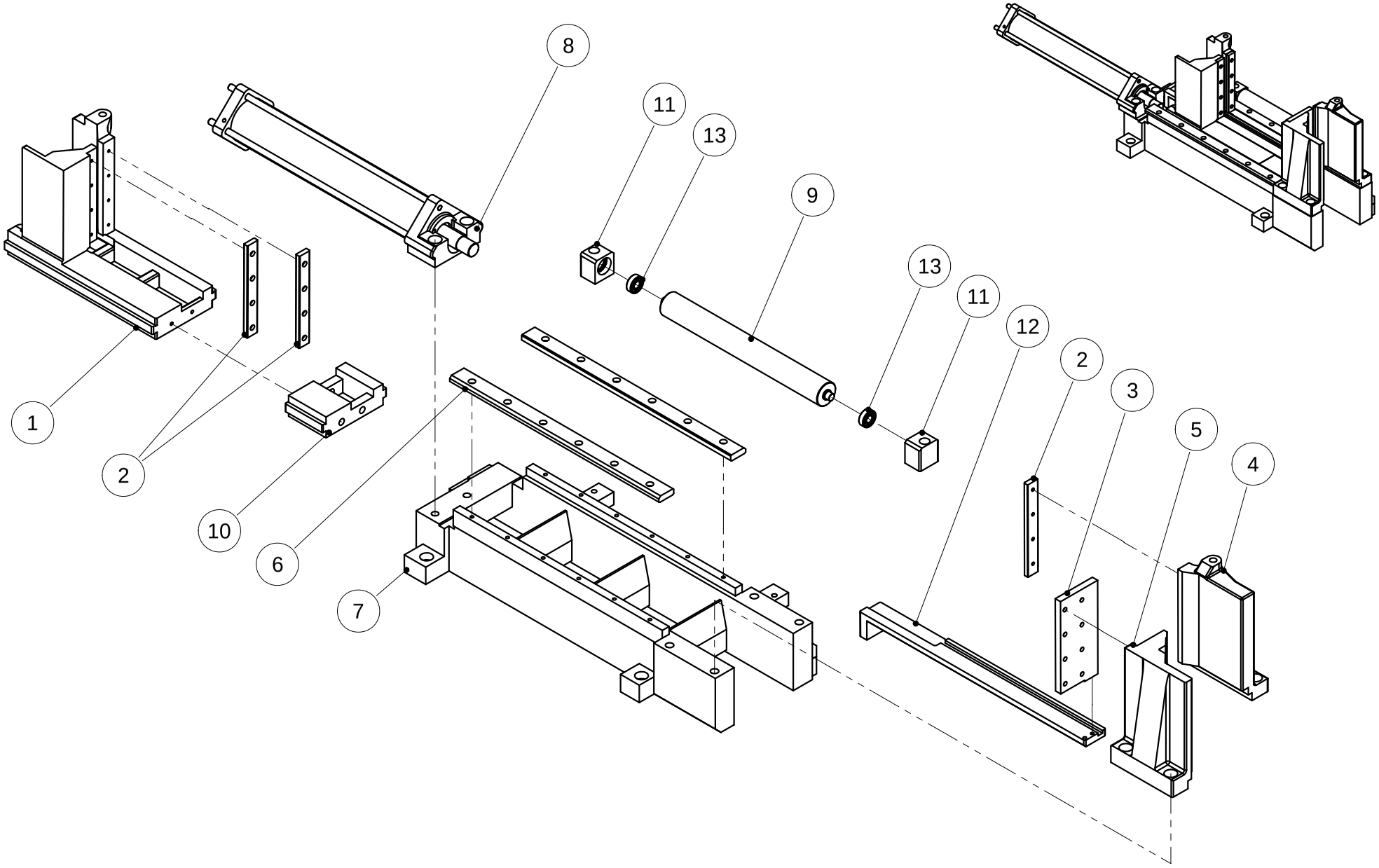
主軸組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AGB-70204A	Pin	鋸弓油缸上插銷		1	
2	AGB-70303	Saw bow cylinder top seat	鉅弓油缸頂座		1	
3	AGB-70343	3U limit switch plate	3U限開關檔板		1	
4	AGC-3010	Sub shaft sleeve	小軸套		1	
5	AHA-1105	Rubber pad	橡膠墊圈		1	
6	AHA-1105A	Washer	活動軸墊圈		1	
7	AHE-1013	Main shaft	大主軸		1	
8	AHE-1014	Sub shaft	小主軸		1	
9	AHE-3023	Sub shaft sleeve supporting plate	小軸套支撐板		1	
10	AHK-1700E	Cylinder assembly	舉昇油壓缸組	420H	1	
11	AHP-1514Y1	Cross beam	橫樑		1	
12	AHP-1708	Cylinder pin	油缸插銷(下)		1	
13	AHP-1803	Lower limit positioning rod	下限定位支桿		1	
14	C420H-1103	Main shaft sleeve	大軸套		1	
15	PP-13281	DU bushing	乾式軸承	8050	2	
16	PP-13312	DU bushing	乾式軸承	110100	2	
17	PP-14480	Connecting rod bearing	連桿軸承	POS18	1	

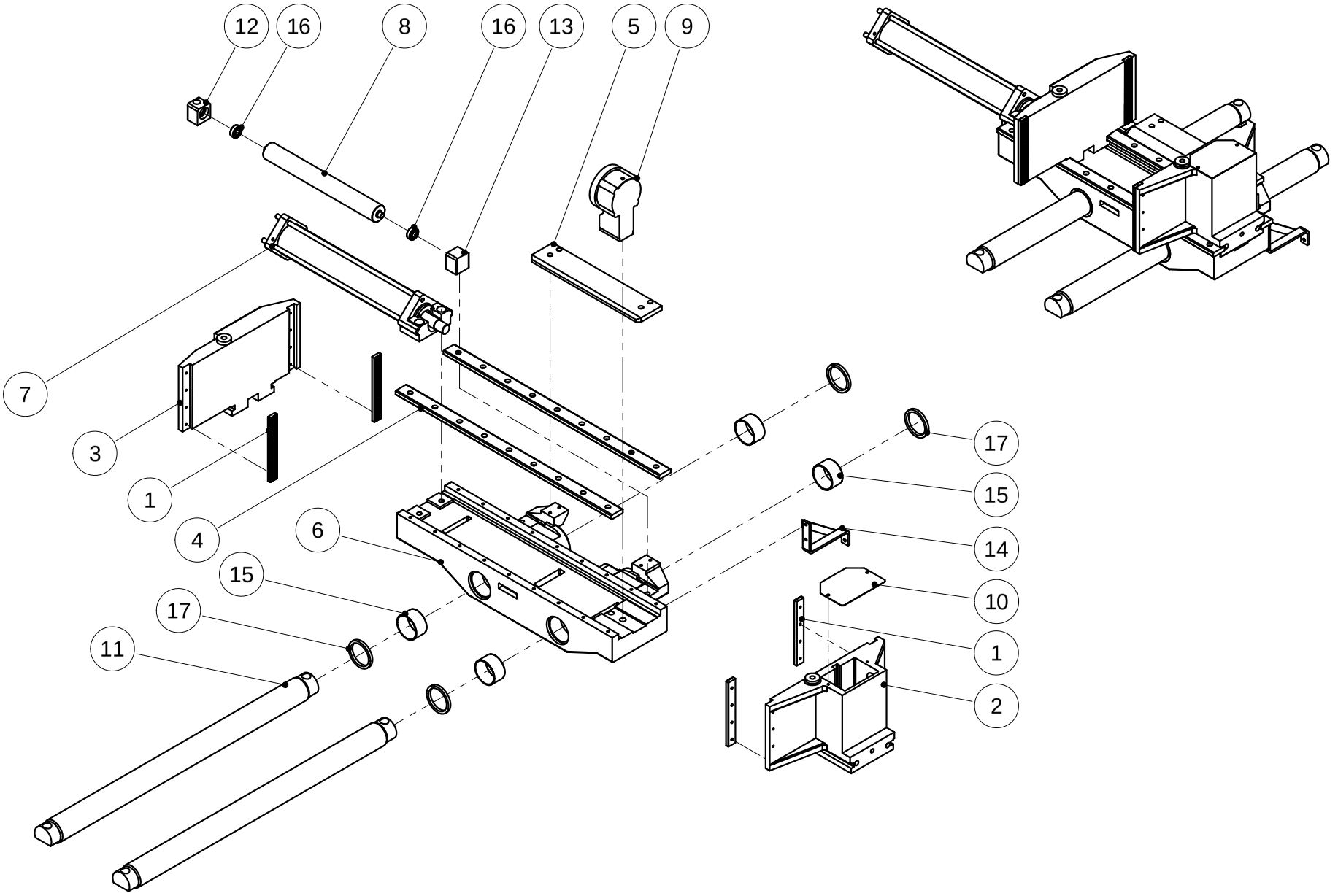
主軸組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
18	PP-14510	Bearing	軸承	2303	1	
19	PP-51140	Duster seal	防塵套	110*126*9/12	2	
20	PP-51196A	Duster seal	防塵套(軟橡皮)	75°C橡皮/DKB/80x94x8/11	2	

床面組
BED ASSEMBLY



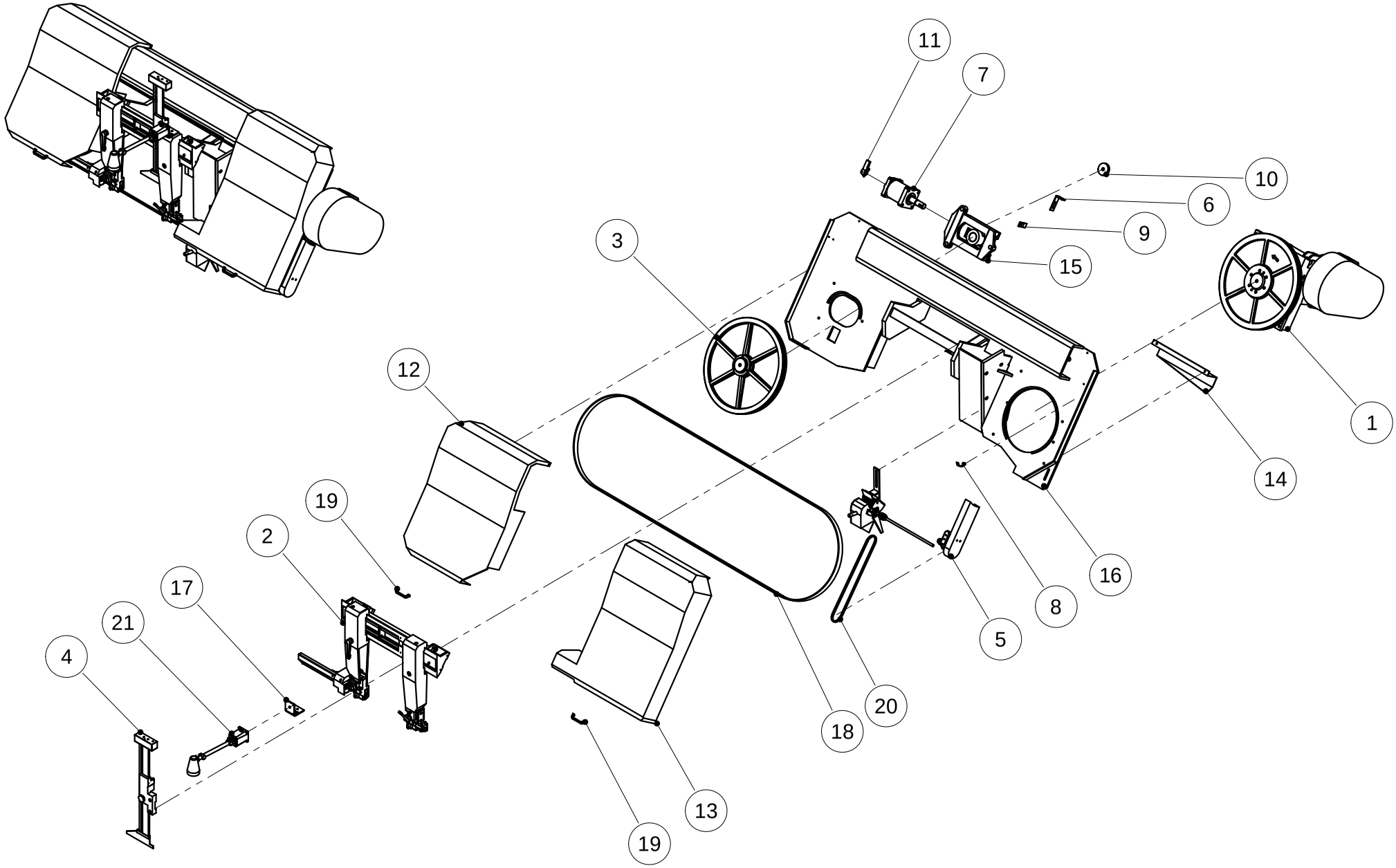
床面組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AHE-2803A	Front movable vise	前活動虎鉗		1	
2	AHE-2804A	Vise Plate	虎鉗鋼板		3	
3	AHE-2806A	Vise plate	虎鉗鋼板		1	
4	AHE-2808A	Front fixed vise (1)	前固定虎鉗(一)		1	
5	AHE-2809A	Front fixed vise (2)	前固定虎鉗(二)		1	
6	AHK-2801	Fixed bed plate	固定床面鋼板		2	
7	AHK-2810	Fixed bed	固定床身(面)		1	
8	AHK-4200E-1	Vise hydrauly cylinder	虎鉗油缸組(420H)		1	
9	AHK-4582	Roller	滾輪		1	
10	AHN-2811	Vise auxiliary plate	夾板輔助板		1	
11	AHN-4581	Bearing seat	軸承座		2	
12	C420H-2008	Blade line steel plate	鋸帶線鋼板		1	
13	PP-14003	Bearing	軸承	6202VV	2	

送料床面組
FEEDING BED ASSEMBLY



送料床面組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AHE-2804E	Vise plate	虎鉗鋼板(EU97)刻花		4	
2	AHE-2901A	Feeding fixed vise	送料固定虎鉗		1	
3	AHE-2910A	Feeding movable vise	送料活動虎鉗		1	
4	AHK-2908	Feeding bed plate	送料床面鋼板		2	
5	AHK-2909	Workbed plate	床面拖板		1	
6	AHK-2911	Feeding bed	送料床身		1	
7	AHK-4200E-1	Vise hydrauly cylinder	虎鉗油缸組(420H)		1	
8	AHK-4582	Roller	滾輪		1	
9	AHN-2200E-1	Rear fixed cylinder assembly	後虎鉗固定油缸組		1	
10	AHN-2902	Rear fixed vise cover	後固定虎鉗蓋		1	
11	AHN-2907	Feeding shaft	送料軸		2	
12	AHN-4581	Bearing seat	軸承座		1	
13	AHN-4581A	Bearing seat	軸承座		1	
14	AHP-1521	Switch fixed seat	前限開關固定座		1	
15	PP-13265	Bearing	自潤軸承	LFB-7040	4	
16	PP-14003	Bearing	軸承	6202VV	2	
17	PP-51193	Duster seal	防塵套	70*84*8	4	

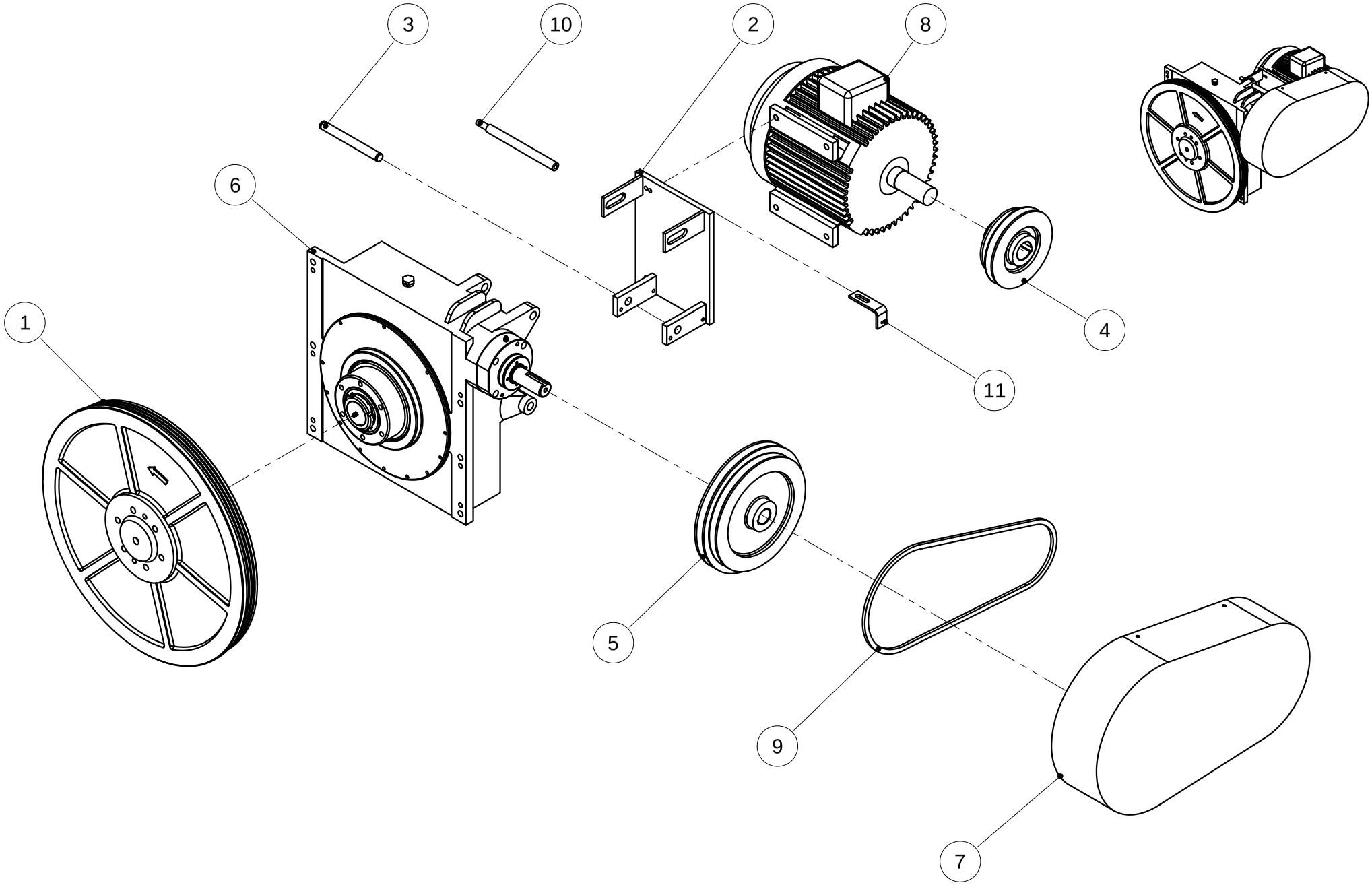
鋸弓組
SAW BOW ASSEMBLY



鋸弓組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1		Driver motor assembly	主動馬達組		1	
2		Guide arm assembly	鋸臂組		1	
3		Idle wheel assembly	上輪組		1	
4		Quick approach assembly	快降組		1	
5		Wire brush cover	鋼刷組		1	
6	AGB-70334A	Sensor seat	感應器底板座		1	
7	AGB-707210	Tensioner cylinder assembly	張力油壓缸組		1	
8	AHA-0414	Plate(for installing blade)	鋸片安裝板		1	
9	AHA-0672	Sensor base plate	感應器底板		1	
10	AHB-0613	Idle wheel lock washer	上輪鎖緊墊圈		1	
11	AHB-0653	Handle	切換把手		1	
12	AHE-3002	Idle wheel cover	上輪箱蓋		1	
13	AHE-3003	Drive wheel cover	下輪箱蓋		1	
14	AHE-3050	Wire brush cover	鋼刷傳動護蓋		1	
15	AHE-305800	Tensioner sliding plate assembly	張力滑座滑板組		1	
16	C420H-3001	Saw bow	鋸弓		1	
17	C420H-4371	Work light fixed seat	照明燈固定座		1	

鋸弓組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
18	PP-18247-1	Saw blade	鋸帶	HS 4770x41x1.3x3/4T	1	
19	PP-52080	Handle	輪箱把手	A303	2	
20	PP-56517	Belt	皮帶	M-45	1	
21	PP-91804C	Work light	工作燈	GT-M65A/110V/12V/20W10度	1	

主動馬達組
DRIVER MOTOR ASSEMBLY



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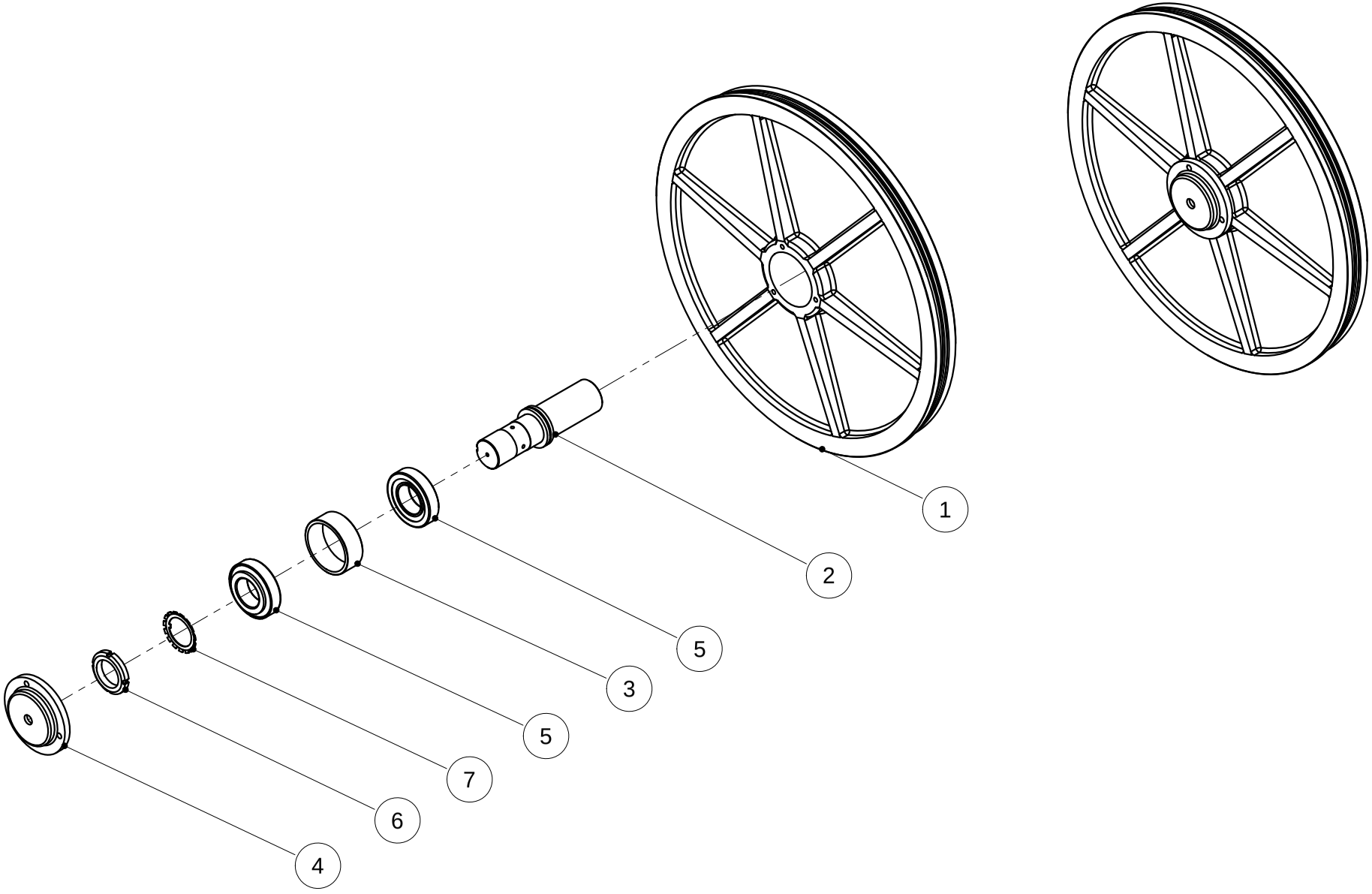
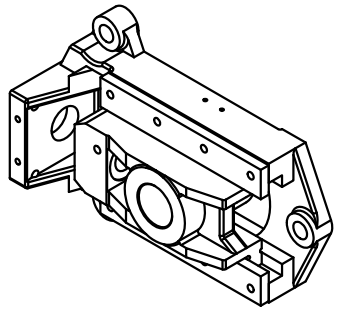
主動馬達組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AGB-70315C	Drive wheel	下輪		1	
2	AGB-70339	Motor base	馬達底座	For 10HP motor, use C420H-3081	1	
3	AGB-70340	Motor seat shaft	馬達底板活動軸		1	
4	AGB-70770G	Motor pulley	馬達普利		1	
5	AGB-70771G	Gear reducer pulley	減速機普利		1	
6	AGB-703109	Gear reducer assembly	減速機整組		1	
7	AHK-3634	Pulley cover	普利護蓋組		1	
8	PBH10-D417FB-W	Motor	馬達	10HP 3φ 4P 60HZ 230/460V 25.46/14.7A F級絕緣 IEC2	1	
9	PP-56295	Belt	皮帶	B-52	1	
10	S5542-3082	Motor movable shaft	馬達活動軸		1	
11	SJM-4032	Pulley cover bracket	普利護蓋固定板		1	

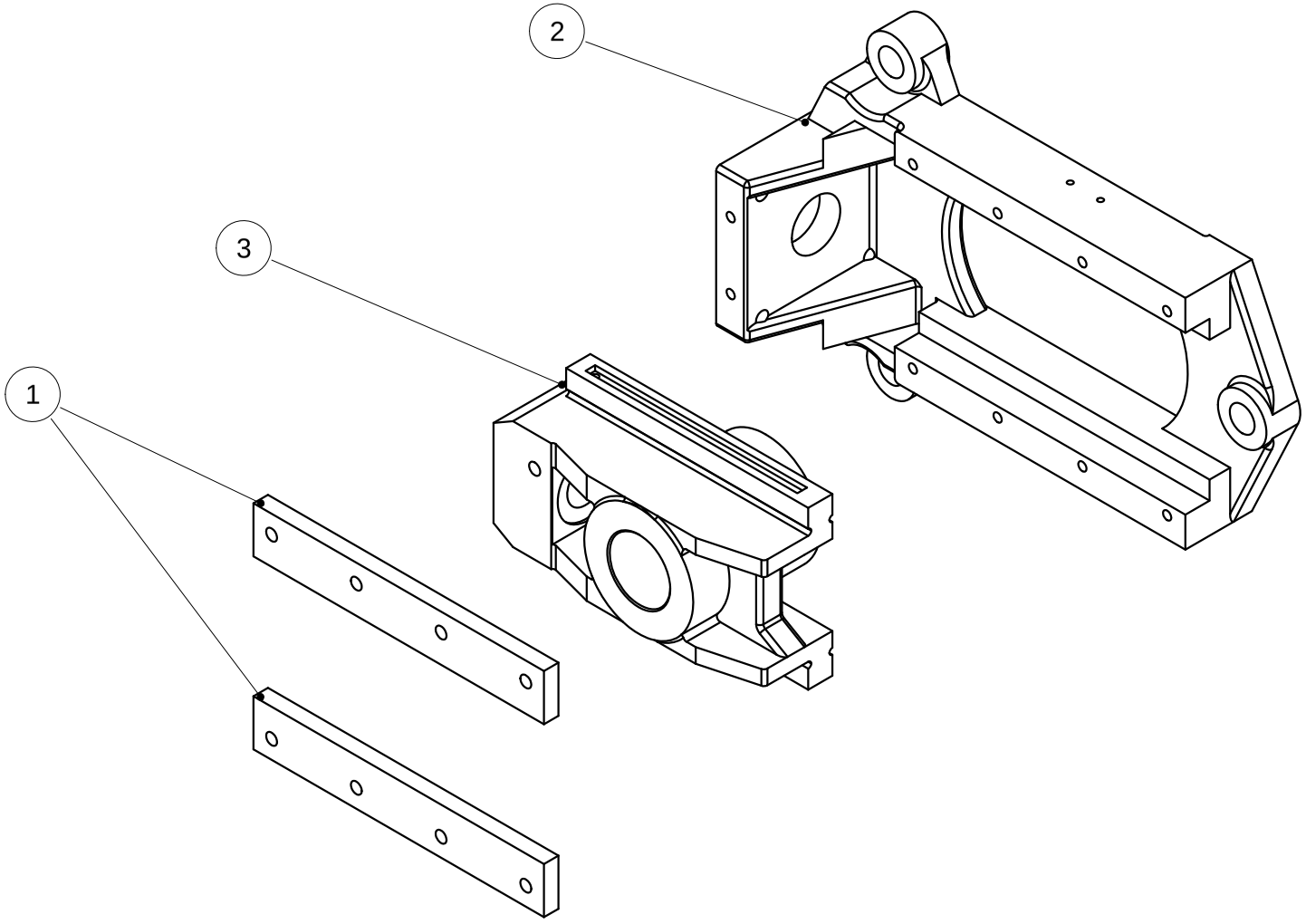
上輪組
IDLE WHEEL ASSEMBLY



上輪組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AGB-70328C	Idle wheel	上輪		1	
2	AGB-70329	Idle wheel shaft	上輪軸		1	
3	AGB-70330	Idle wheel bearing washer	上輪軸承墊圈		1	
4	AGB-70331	Idle wheel shaft cover	上輪軸蓋		1	
5	PP-14694	Bearing	軸承	32209V	2	
6	PP-14909	Fixed nut	固定螺母	AN09	1	
7	PP-14959	Stop ring	止動環	AW09	1	

AHE-305800 張力滑座滑板組
TENSIONER SLIDING PLATE ASSEMBLY

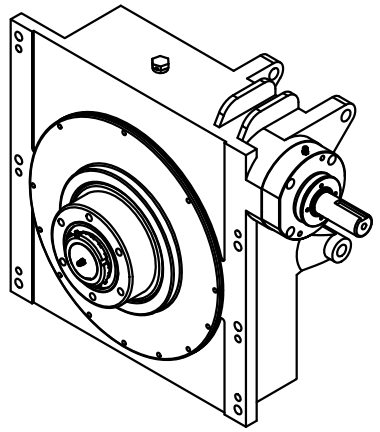




AHE-305800 張力滑座滑板組 TENSIONER SLIDING PLATE ASSEMBLY

AHE-305800 張力滑座滑板組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AGB-70360	Press down plate	壓板		2	
2	AHE-3058	Tensioner sliding seat	張力滑座		1	
3	AHE-3059	Tensioner sliding plate	張力滑板		1	

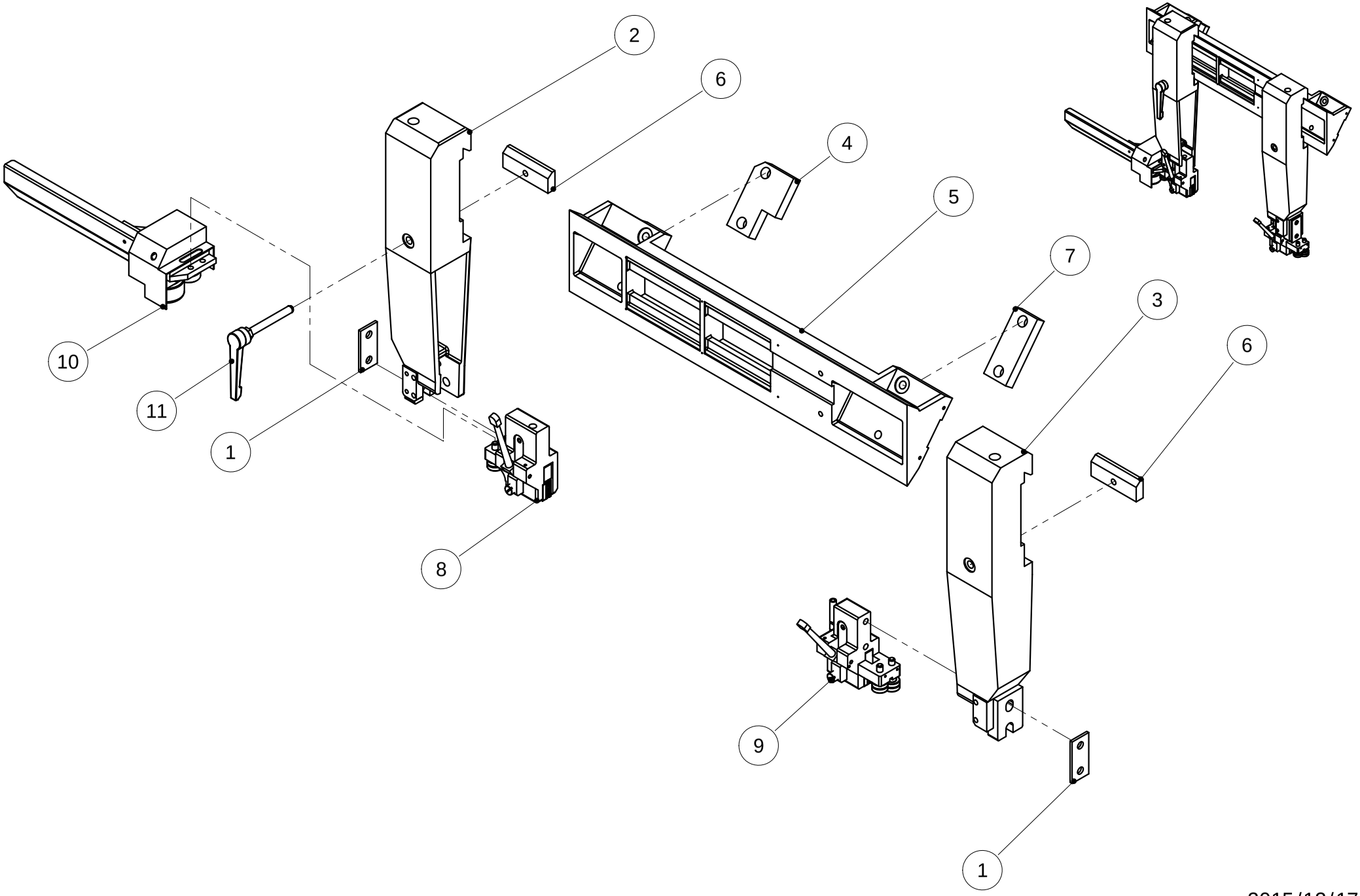
AGB-703109 減速機組
GEAR REDUCER ASSEMBLY



AGB-703109 減速機組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AGB-70309	Drive wheel shaft	下輪軸		1	
2	AGB-70310A	Worm gear	蝸輪	(1/30)(175-30左牙44L)	1	
3	AGB-70311A	Worm shaft	蝸桿	(1/30)(175-30左牙516L)	1	
4	AGB-70312	Worm gear fixed seat	蝸輪固定座		1	
5	AGB-70313	Drive wheel bearing washer (1)	下輪軸承墊圈(一)		1	
6	AGB-70314	Drive wheel bearing washer (2)	下輪軸承墊圈(二)		1	
7	AGB-70338	Fixed seat	固定座		1	
8	AHA-0307	Plug	透氣塞頭		1	
9	AHB-0613	Idle wheel lock washer	上輪鎖緊墊圈		1	
10	PP-14131	Bearing	軸承	6206Z SKF	1	
11	PP-14619	Bearing	軸承	30211 NSK	2	
12	PP-14654C	Bearing	軸承	30308 FAG	1	
13	PP-14693B	Ball bearing	滾錐軸承	32208 KOYO	1	
14	PP-14911	Fixed nuts	固定螺母	AN11	1	
15	PP-14961	Stop ring	止動環	AW11	1	
16	PP-51101	Oil Seal	油封	48.65.9	1	
17	PP-51105	Oil Seal	油封	50.67.9	1	

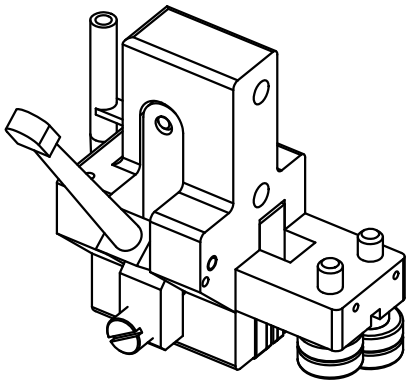
AGB-703109 減速機組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
18	PP-51125A	Oil Seal	油封	φ170xφ200x16T(NOK)	1	
19	PP-58116	Snap ring	扣環	R80	1	
20	PUC-020	Grease nipple	油嘴	1/4"-28UNF	3	
21	PUJ-010-025-01	Elbow joint	彎接頭	1/8P x5/16E	1	
22	SGA-2054	Gear reducer body	減速機本體		1	
23	SGA-2058	Worm shaft cap	蝸桿蓋		1	
24	SGA-2059	Packing asbestos	蝸桿蓋迫緊石棉		1	
25	SGA-2060	Oil seal seat	油封座		1	
26	SGA-2061	Wire brush pulley	鋼刷普利		1	
27	SGA-2067	Oil fixed plate	油封固定盤		1	
28	SGA-2069	Rubber washer	迫緊石棉		1	

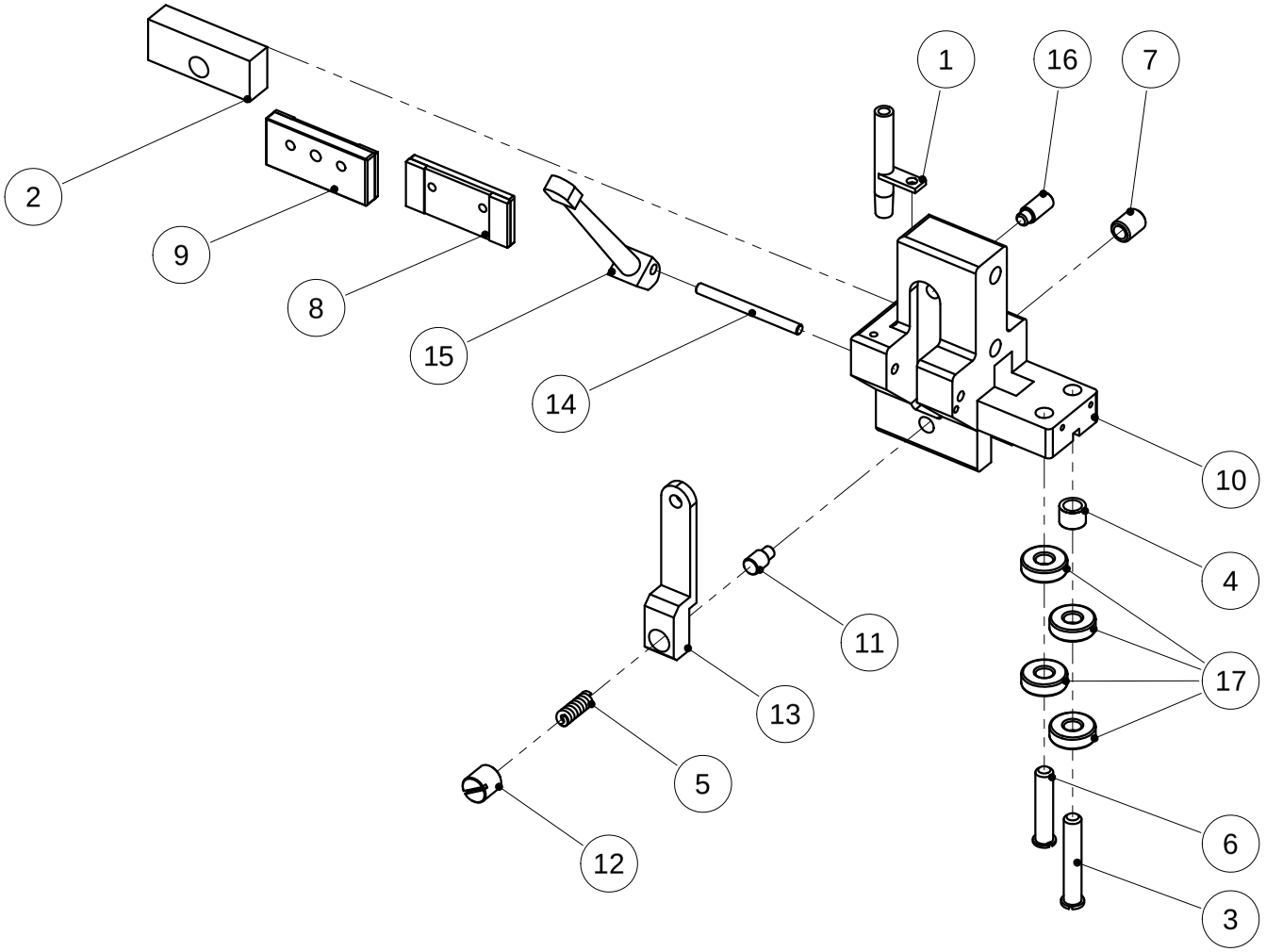
鋸臂組
GUIDE ARM ASSEMBLY



鋸臂組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AHA-0719	Spacer	導輪座墊片		2	
2	AHE-3004	Left guide arm	左鋸臂		1	
3	AHE-3005	Right guide arm	右鋸臂		1	
4	AHE-3013	Guide arm sliding plate fixed block	鋸臂滑板固定塊(左肋)		1	
5	AHK-1507	Guide arm sliding plate	鋸臂滑板		1	
6	AHN-3842	Guide arm fixed block	鋸臂固定塊		2	
7	AHP-1509-2	Guide arm sliding plate fixed block	鋸臂滑板固定塊(右肋)		1	
8	C420H-31300	Left guide roller assembly	左導輪座組		1	
9	C420H-31600	Right guide roller assembly	右導輪座組		1	
10	C420H-42000	Anti-vibration roller	防震導輪組		1	
11	PP-52111D	Saw arm handle	鋸臂把手	M12x100L	1	

C420H-31600 右導輪座組
RIGHT GUIDE ROLLER ASSEMBLY

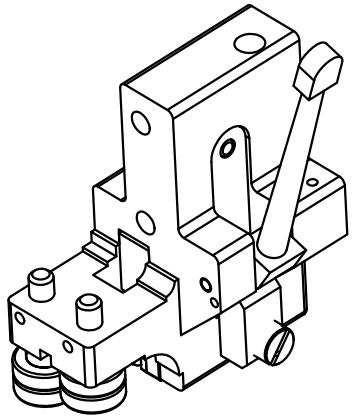


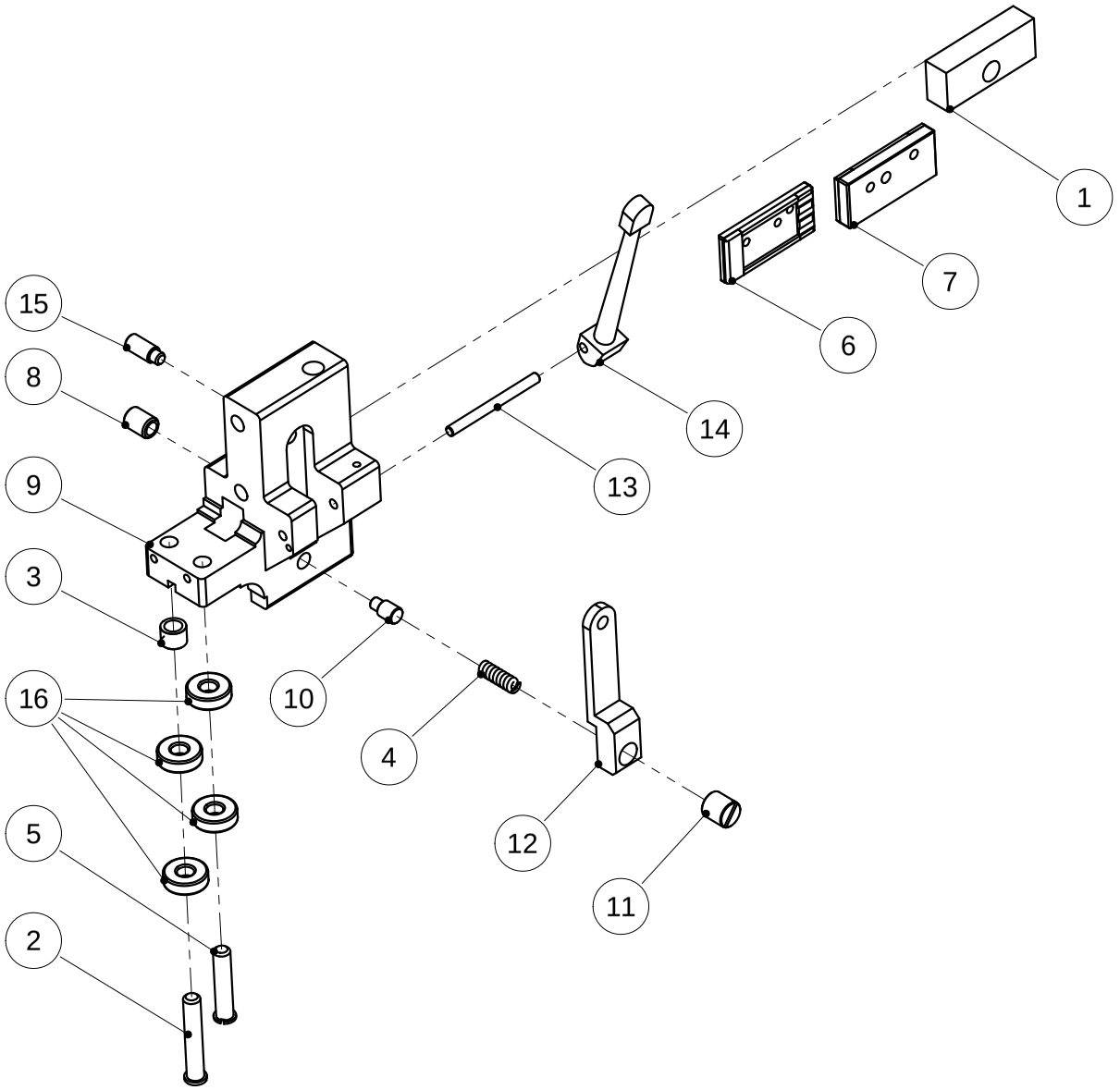


C420H-31600 右導輪座組 RIGHT GUIDE ROLLER ASSEMBLY

C420H-31600 右導輪座組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AGB-70425B	Spray nozzle	冷卻水噴嘴		1	
2	AHA-0704A	Pressure block	下壓座		1	
3	AHA-0707A	Guide roller shaft (1)	導輪軸(一)		1	
4	AHA-0708A	Washer	導輪墊圈		1	
5	AHA-0710	Carbide insert spring	鎢鋼片彈簧		1	
6	AHA-0714	Guide roller shaft (2)	導輪軸(二)		1	
7	AHB-0822	Position ring	下壓固定塊定位圈		1	
8	AHB-0836	Right Fixed Insert	右固定鎢鋼片		1	
9	AHB-0837	Right Movable Insert	右活動鎢鋼片		1	
10	AHK-3843A	Right guide roller seat	右導輪座		1	
11	AHN-3845	Positioning pillar	定位柱		1	
12	AHN-3847	Position screw	定位螺絲		1	
13	AHN-3848	Position block	定位塊		1	
14	AHN-3849	Core shaft	心軸		1	
15	AHN-3850	Handler	施力把手		1	
16	AHN-3851	Position bolt	彈簧定位螺絲		1	
17	PP-14105	Bearing	軸承	6000 2RUCM	4	

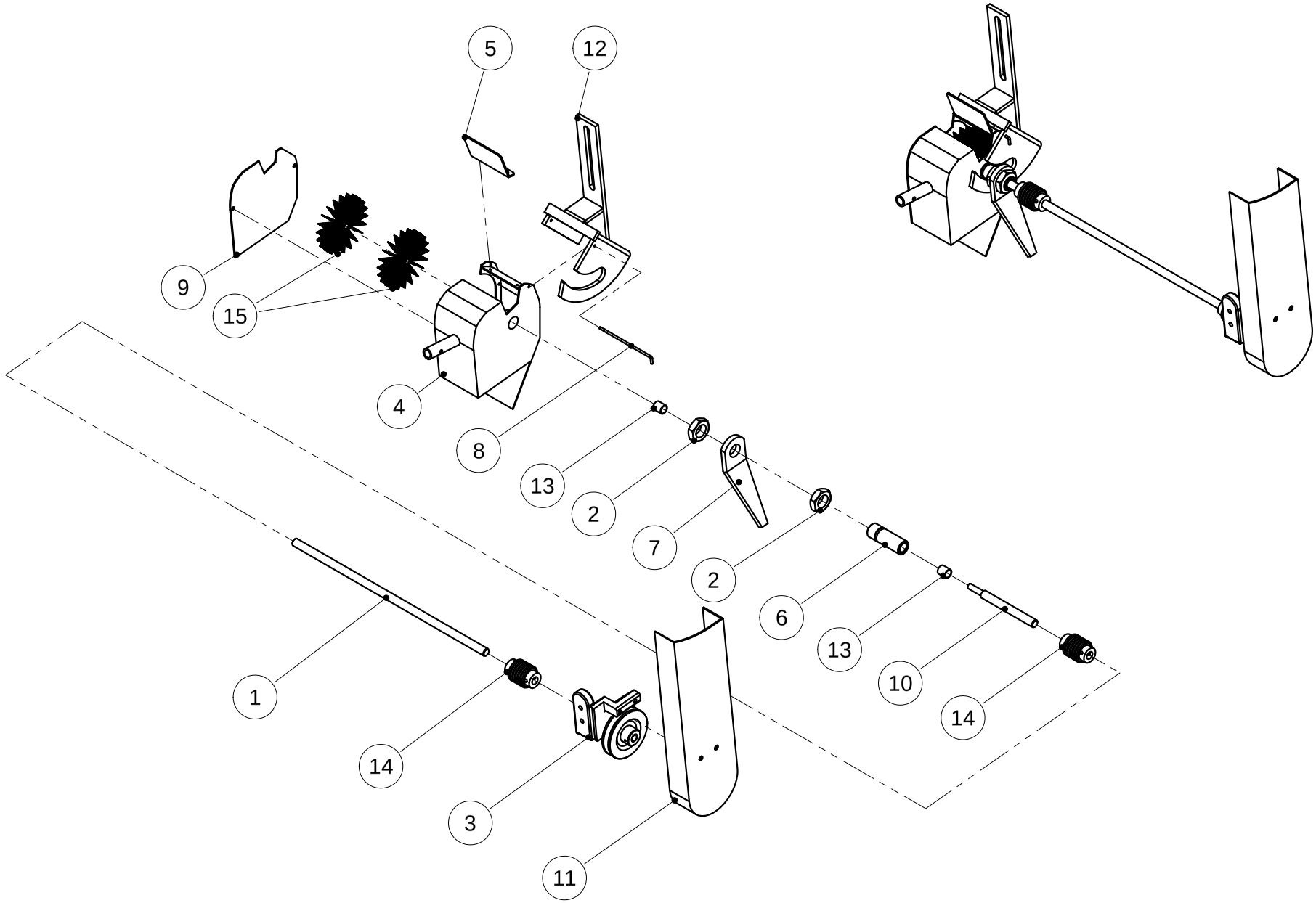
C420H-31300 左導輪座組
LEFT GUIDE ROLLER ASSEMBLY





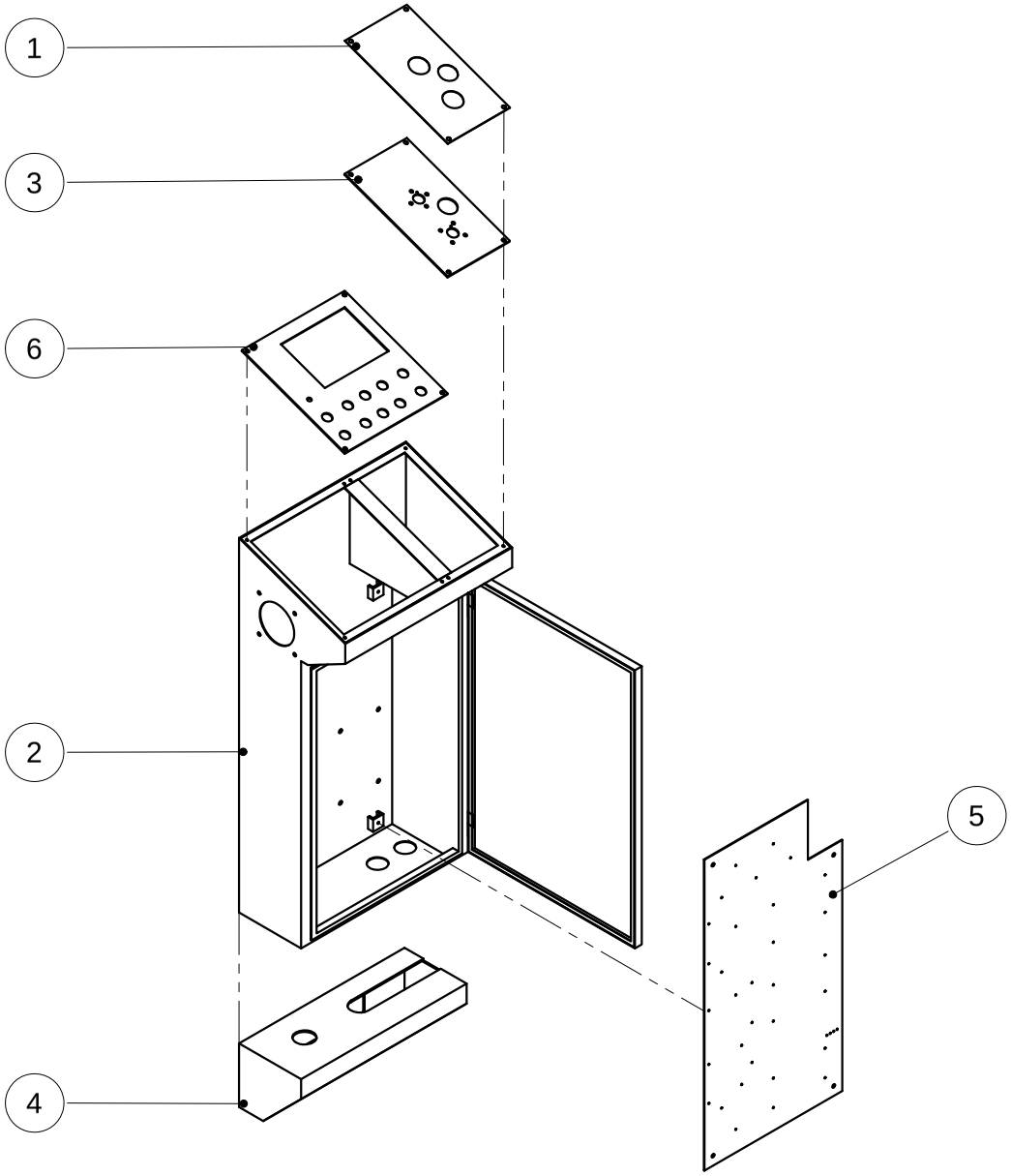
C420H-31300 左導輪座組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AHA-0704A	Pressure block	下壓座		1	
2	AHA-0707A	Guide roller shaft (1)	導輪軸(一)		1	
3	AHA-0708A	Washer	導輪墊圈		1	
4	AHA-0710	Carbide insert spring	鎢鋼片彈簧		1	
5	AHA-0714	Guide roller shaft (2)	導輪軸(二)		1	
6	AHB-0814	Left Fixed Insert	左固定鎢鋼片		1	
7	AHB-0816	Left movable insert	左活動鎢鋼片		1	
8	AHB-0822	Position ring	下壓固定塊定位圈		1	
9	AHK-3803A	Left guide roller seat	左導輪座		1	
10	AHN-3845	Positioning pillar	定位柱		1	
11	AHN-3847	Position screw	定位螺絲		1	
12	AHN-3848	Position block	定位塊		1	
13	AHN-3849	Core shaft	心軸		1	
14	AHN-3850	Handler	施力把手		1	
15	AHN-3851	Position bolt	彈簧定位螺絲		1	
16	PP-14105	Bearing	軸承	6000 2RUCM	4	

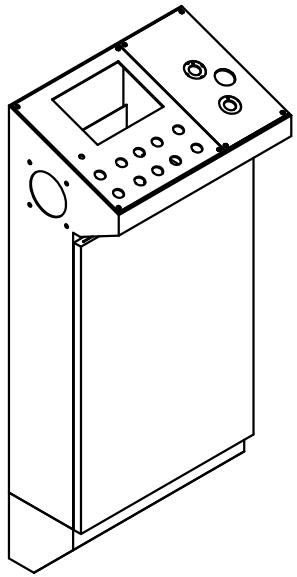
鋼刷組
WIRE BRUSH ASSEMBLY



鋼刷組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AGG-3061	Connecting rod	鋼刷連趕		1	
2	AHA-0611	Adjusting nut	調整螺母		2	
3	AHA-12110-1	Wire brush bearing seat assembly	鋼刷軸承座組		1	
4	AHB-0523B	Wire brush cover	鋼刷護蓋		1	
5	AHB-0523C	Wire brush cover accessory	鋼刷護蓋附件		1	
6	AHB-0524	Wire brush shaft sleeve	鋼刷軸套		1	
7	AHB-0528	Wire brush adjustment rod	鋼刷調整桿		1	
8	AHB-0530	Movable shaft	鋼刷護蓋活動軸		1	
9	AHB-2036-CE	Wire brush cover	鋼刷遮板		1	
10	AHN-3904	Wire brush shaft	鋼刷軸		1	
11	C420H-3237	Pulley cover	鋼刷普利護蓋		1	
12	C420H-3239	Movable plate	鋼刷護蓋活動板		1	
13	PP-13025	DU bushing	乾式軸承	1215	2	
14	PP-15010	Universal joint	萬向接頭	12M/M	2	
15	PP-58002	Wire brush	鋼刷	90m/m-8m/m*16T*＃0.3	2	

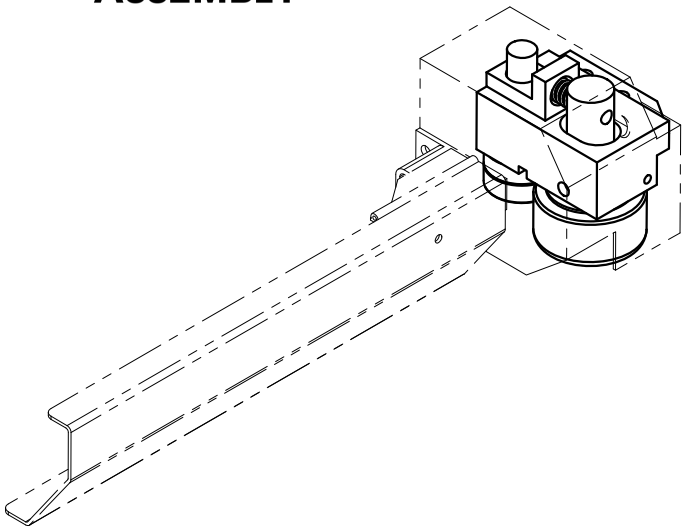
控制箱組
CONTROL BOX ASSEMBLY

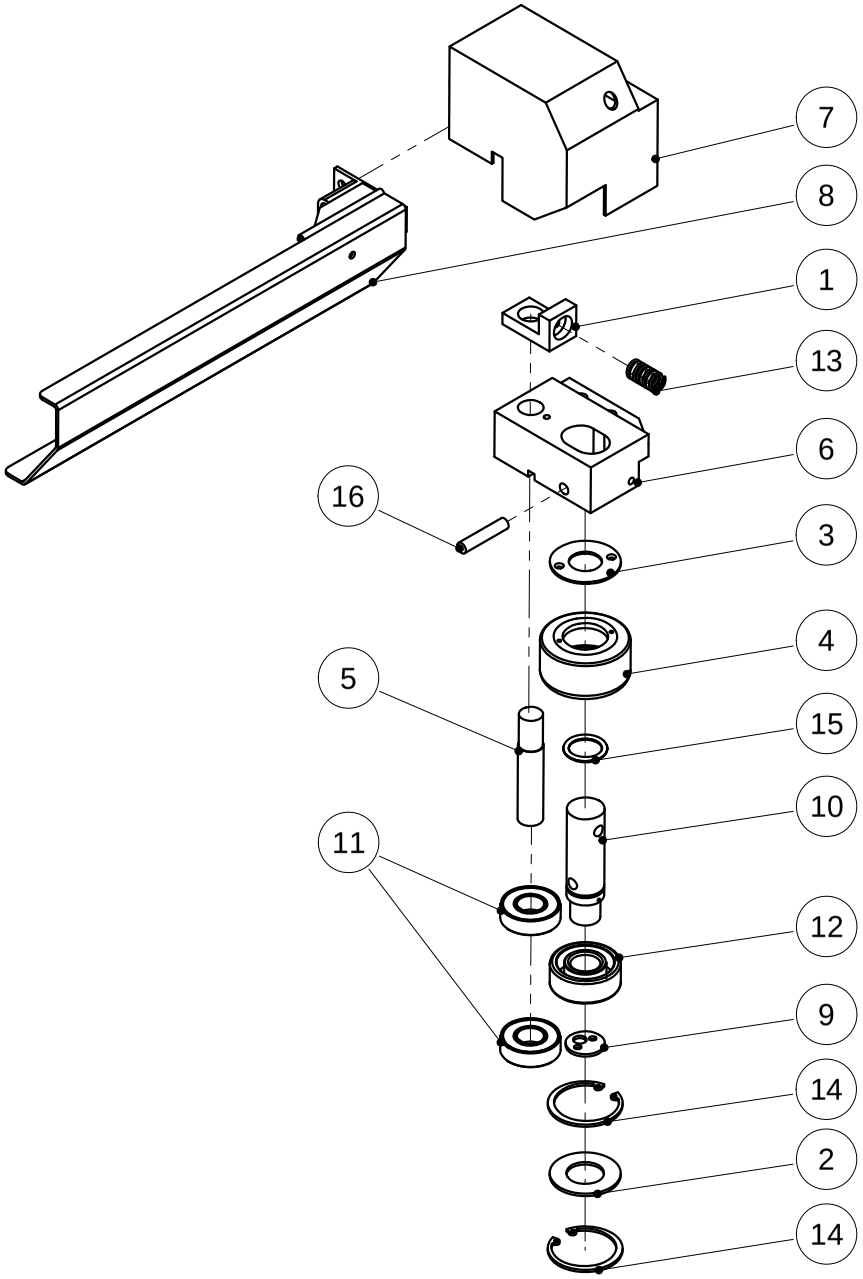




控制箱組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AHA-1811A	Flow valve control panel	流量閥控制面板AISI		1	
2	AHC-0131-CE	Control box	控制箱		1	
3	AHC-0135-CE	Base plate (Control panel)	控制面板底板(二)		1	
4	AHN-1908	Control box base plate	座板（電器箱）		1	
5	C320H-1302	Circuit board	線路板		1	
6	C460H-1321	Control panel	控制面板	5.7吋	1	

C420H-42000 防震導輪組
ANTI-VIBRATION ROLLER ASSEMBLY

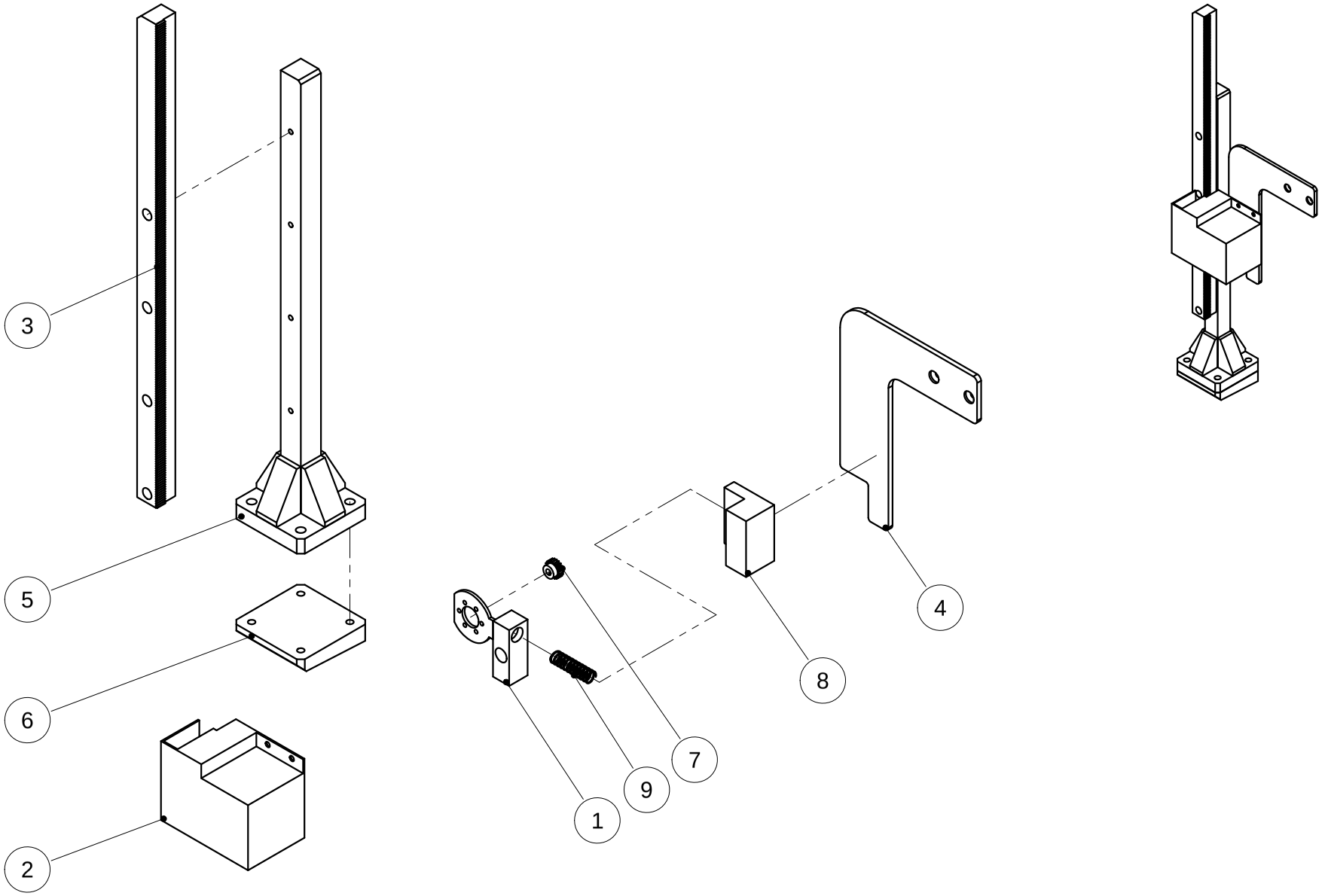




C420H-42000 防震導輪組 ANTI-VIBRATION ROLLER ASSEMBLY

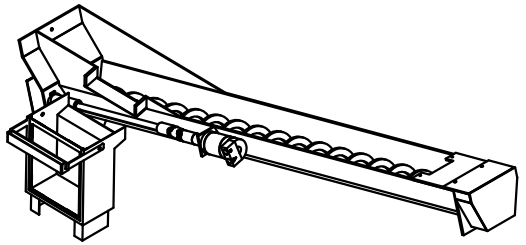
C420H-42000 防震導輪組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AGB-3306N	Spring holder	防震彈簧座		1	
2	AGB-3307A	Grease cover	牛油擋		1	
3	AGB-3308	Rubber ring	遮水橡皮		1	
4	AHA-3301	Vibration damper roller	防震導輪		1	
5	AHA-3305	Shaft	固定導輪軸		1	
6	AHE-3303	Vibration damper seat	防震座		1	
7	AHE-3317	Vibration roller cover	防震滾輪護蓋		1	
8	C420H-3013	Saw blade cover	鋸帶護蓋		1	
9	C510M-4206	Bearing washer	軸承墊圈		1	
10	C510M-4231A	Roller shaft	防震導輪軸		1	
11	PP-14267	Bearing	軸承	6203VV	2	
12	PP-14507	Bearing	調心軸承	2204	1	
13	PP-57403	Spring	彈簧	TH-1625	1	
14	PP-58111	Snap ring	扣環	R47	2	
15	PP-59085	O-ring	O型環	NOK P-22.4	1	
16	PRD-8-40	Pin	平行銷	Φ 8 x 40 mmL	1	

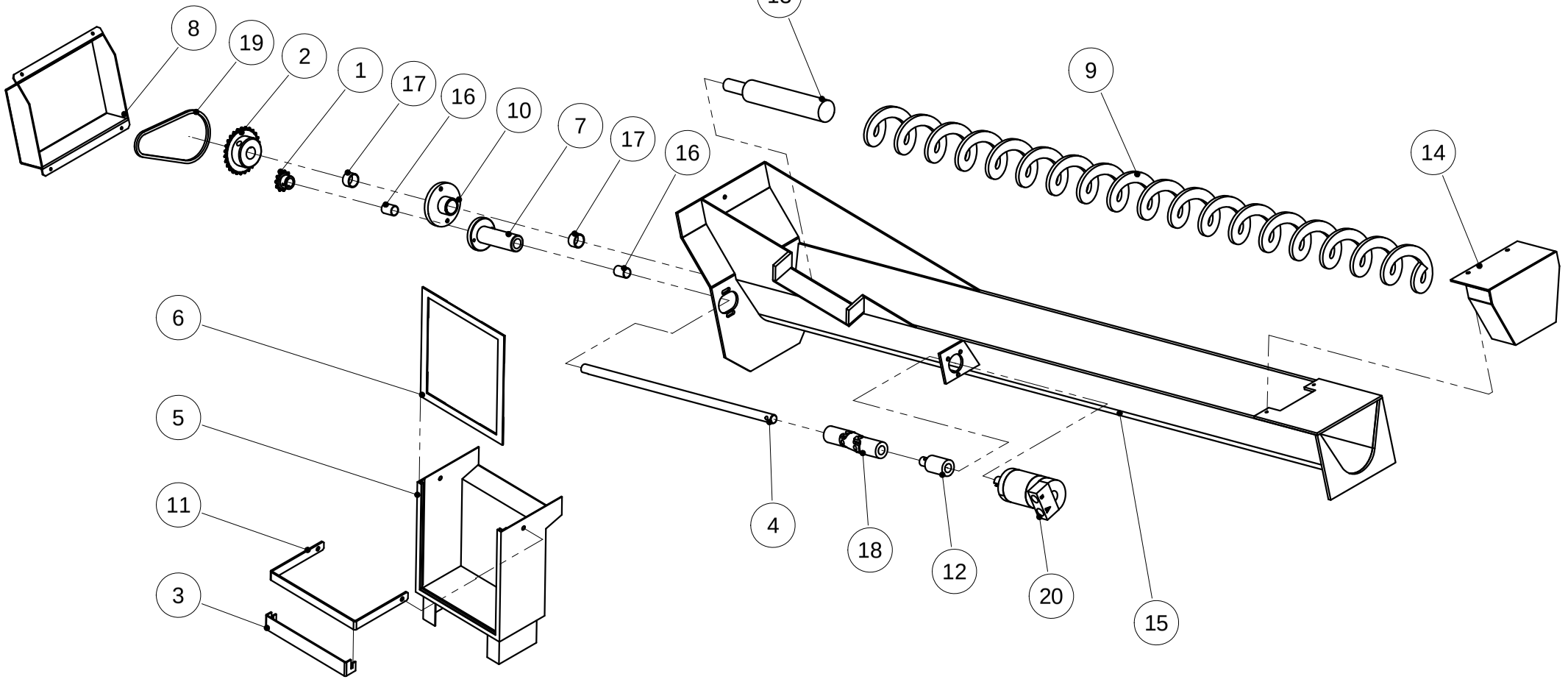
C420H-21000 高度譯碼器組
HEIGJT ENCODER ASSEMBLY



C420H-21000 高度譯碼器組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	C320G-70536	Encoder fixed seat	譯碼器固定座		1	
2	C420H-2104	Encoder cover	譯碼器護蓋		1	
3	C420H-2109	Tooth bar	定寸齒條		1	
4	C420H-2110	Fixed plate	中限固定板		1	
5	C420H-2143	Work height bar seat	高度設定桿座		1	
6	C420H-2145	Work height bar seat pad	高度設定桿座墊塊		1	
7	C560L-2105	Gear	定寸齒輪		1	
8	C-320G-2103	Encoder movable seat	譯碼器活動座		1	
9	M3L-9-10	Spring	微動彈簧		1	

C420H-C001A除屑機組
CHIP CINVEYOR ASSEMBLY

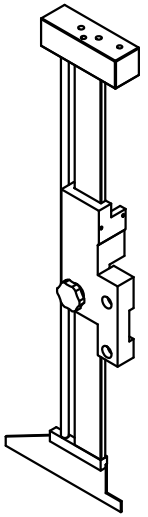


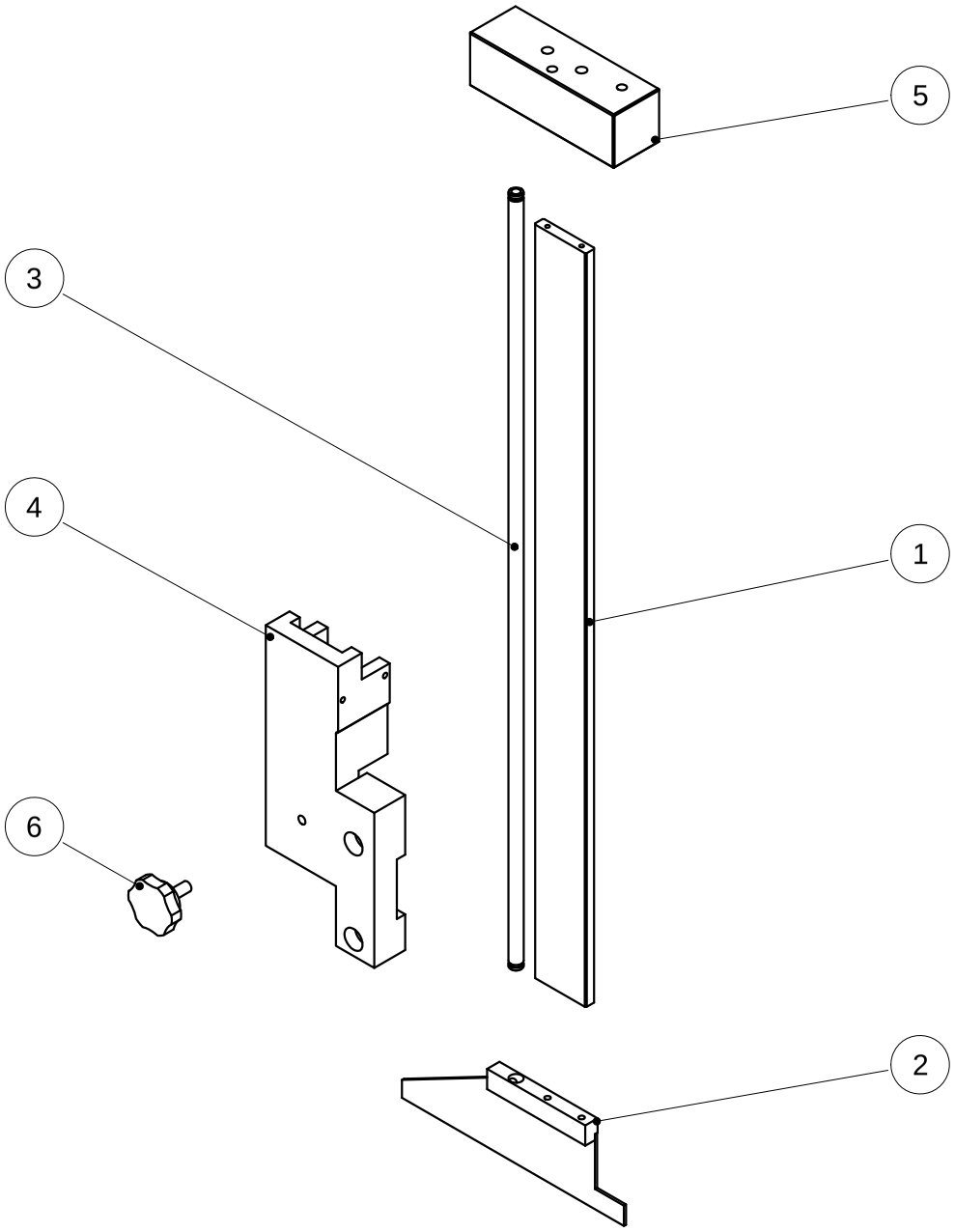


C420H-C001 除屑機組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AHB-2019B	Driving chain wheel (S)	傳動鍊輪(小)		1	
2	AHB-2019D	Chain wheel	鏈輪		1	
3	AHB-2034	Position clamp	集屑桶定位扣		1	
4	AHN-1403	Core shaft	傳動心軸		1	
5	AHN-1404	Chip can	切屑筒		1	
6	AHN-1405	Filter	過濾網		1	
7	AHN-1406	Shaft seat	軸座		1	
8	AHN-1407A	Cover	鍊齒蓋板		1	
9	AHN-1409A	Chip conveyor spiral	除屑螺旋桿		1	
10	AHN-1411	Shaft seat	軸座		1	
11	AHN-1413	Handle	拉柄		1	
12	AHN-1414	Connecting shaft	連接軸		1	
13	AHN-1416A	Chip screw rod	除屑螺桿		1	
14	AHN-1417-CE	Spiral cover	除屑螺旋護蓋		1	
15	C7656-4001	Chip conveyor body	除屑機本體		1	
16	PP-13070	DU bushing	乾式軸承	1625	2	
17	PP-13119	Bearing	自潤軸承	2215	2	

C420H-C001 除屑機組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
18	PP-15031	Universal joint	萬向接頭	3節-16	1	
19	PP-19061	Chain	鏈條	RS 35	1	
20	PP-31640-1	Hydraulic motor	油壓馬達	MMS-32C	1	

快降組
QUICK APPRO ASSEMBLY





快降組						
ITEM	PART NO.	PART NAME	PART NAME IN CHINESE	PART SPEC.	QTY	NOTE
1	AHE-3015	Quick approach bar	急降桿		1	
2	AHE-3051	Stopper plate	擋板		1	
3	AHE-3522	Coolant conduit	冷卻管		1	
4	AHN-3528A	Quick approach fixed seat	急降桿固定座		1	
5	AHN-3529	Quick approach position block	下降桿定位塊		1	
6	PP-53010	Knob screw	梅花螺絲	8*20"	1	

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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