

CAPITAL MACHINERY SALES

Australia's Machinery Specialists



Matrix 330A

Fully Automatic Horizontal Band Saw Machine

OPERATION AND MAINTENANCE MANUAL

Please read this manual carefully before installing, operating, or servicing this machine.

Retain this manual for future reference.

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1. Introduction

1.1 About This Manual

This manual covers the Matrix 330A Fully Automatic Horizontal Band Saw Machine, supplied and supported in Australia by Capital Machinery Sales Pty Ltd. It has been prepared to help you install, operate, and maintain the machine safely and to get the best working life from it.

Please read this manual in full before hoisting, installing, or operating the machine, and keep it available for reference by all operators and maintenance personnel. Only use the machine after you are familiar with its performance, the safety information in Section 2, and the related precautions described throughout this manual.

1.2 Machine Overview

The Matrix 330A is designed for the precise, high-volume cutting of metal bar and section using a bi-metal band saw blade. It offers a compact structure, fast sawing speed, high cutting accuracy, a narrow kerf, low noise, and straightforward operation. As a modern, energy-efficient alternative to circular saws and hacksaws, it is widely used for cutting metal materials in the electromechanical, metallurgical, automotive, bridge-building, shipbuilding, and general fabrication industries.

1.3 Key Features

- Designed for mass-cutting operations, offering high efficiency and precision.
- PLC and touchscreen control for straightforward operation and set-up, with traditional push-button back-up control.
- Five stored sets of cutting parameters to suit different materials and job requirements.
- Improved sawing speed and blade service life compared with earlier models.
- Improved machining accuracy, extending overall equipment service life.
- Robot-welded frame construction for stability, uniformity, and long-term consistency.
- Precision CNC machining, shot-blasting, and corrosion- and wear-resistant coatings on key components for durability and reliability.
- Dual control operation — use either the touchscreen or the traditional push-buttons.
- Hydraulic-cylinder-controlled workpiece feeding, with feed length and feed count adjustable from the touchscreen.

1.4 Standard and Optional Equipment

Standard Equipment

- Blade cleaning brush
- Working light
- Roller table (approximately 600 mm)
- Bi-metal saw blade (one piece)
- Tool set with toolbox
- NC control system
- Bundle-cutting device
- Inverter-controlled blade line speed
- Hydraulic blade tensioning
- Automatic chip conveyor

Optional Equipment

- Additional common roller table

2. Safety Information

Your safety, and the safety of everyone working around this machine, is the first priority. Read this section fully before hoisting, installing, operating, or servicing the Matrix 330A.

2.1 Safety Alert Symbols and Signal Words

This manual uses the following signal words to draw attention to safety and operating information. Familiarise yourself with each before proceeding.

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, or damage to the machine.

NOTE

Provides additional information to help you operate or maintain the machine correctly. Not associated with a risk of injury.

2.2 General Safety Rules

Observe the following precautions at all times:

- Maintain a high level of safety awareness, follow safe operating procedures, and stay alert to potential hazards at all times.
- When hoisting the machine, be mindful of its centre of gravity to prevent tipping. Failure to do so may result in a serious accident.
- When unpacking the machine, take care to avoid injury from packing boards, nails, and other loose fixings.
- The machine's electrical circuit must have a reliable and effective earthing (grounding) system. Without proper earthing, there is a risk of electric shock or more serious injury.
- Power must be supplied strictly in accordance with the power supply parameters specified in this manual, to prevent damage to the machine.
- Do not operate the machine before it has been correctly commissioned and tested.
- This band saw is designed only for cutting general metal materials. Do not use it to cut agricultural or fishery products, timber, food, combustible materials, or radioactive metals.
- Do not remove warning signs or instructional labels from the machine. Never overload the machine.

- Do not alter the wiring of any safety device, and do not bypass, defeat, or force any interlock, self-locking, overload, or power-off function. These devices protect both the machine and the operator; altering them will remove that protection.
- The operator must be in good health, alert, and appropriately trained before operating the machine.
- All protective covers must be fitted before the machine is run. Adjust the movable guard on the band saw blade as close to the workpiece as practical. Never open any protective cover while the machine is running.
- Wear appropriate personal protective equipment at all times: safety glasses, gloves, and safety footwear.
- Do not leave tools on the machine. Return tools to the toolbox after use, and keep tools and workpieces clear of the machine to avoid hazards.
- The workpiece must be completely and securely clamped on the worktable before cutting.
- Never reach into the machine's working area.
- The machine must be stopped before changing the blade line speed.
- If any safety cover on the saw is opened, the machine must be shut down immediately.
- Stop the machine and wear safety gloves whenever loading, unloading, or replacing the saw blade or the steel wire brush.
- Never open a protective cover or touch the saw blade while the machine is running.
- Stop the machine before opening the motor cover to change the drive belt.
- Select the saw blade, blade line speed, and coolant in accordance with this manual or the relevant technical guidance.
- Keep the machine clean, and remove swarf and oil residue regularly.
- Maintenance must only be carried out by suitably qualified personnel, with the power supply isolated beforehand.
- Coolant is harmful if mishandled. Take care when cleaning or draining coolant, and never discharge it directly onto the ground; dispose of it in accordance with applicable environmental regulations.

2.3 Operating Environment

This machine is designed for use within the following environmental limits:

- Altitude: below 1,000 m
- Ambient temperature: 0°C to 40°C
- Relative humidity: below 85%

2.4 Electrical Safety

All electrical installation work must be carried out by a licensed electrician in accordance with applicable Australian wiring rules and standards.

- Before carrying out any work on the electrical supply, isolate the machine at the mains and verify that it is de-energised. Isolating only the machine's main isolator switch does not de-energise the incoming supply cable up to that switch.
- Use cabling that is correctly rated for the machine's electrical load when connecting to the mains supply.
- When the machine is connected to the mains, the protective earth conductor must be connected to the dedicated earth terminal in the machine's electrical enclosure.
- Before carrying out maintenance on the machine, isolate the mains supply, lock the isolator in the off position, and remove the key to protect personnel and equipment.
- An appropriately rated residual current device (RCD) is recommended on the supply circuit in accordance with Australian electrical safety practice.

3. Specifications

The table below summarises the key specifications of the Matrix 330A. Figures are as supplied by the manufacturer; always confirm critical dimensions and electrical requirements on site before installation.

3.1 General Specifications

Item		Unit	Matrix 330A
Maximum cutting capacity	Round	mm	330
	Rectangular (W × H)	mm	330 × 330
Saw wheel diameter		mm	450
Blade	Size	mm	34 × 1.1 × 4115
	Line speed	m/min	20 – 80 (stepless adjustment)
Main motor		kW	4 (4-pole)
Hydraulic motor		kW	0.75
Coolant pump motor		W	120 / 135
Hydraulic tank capacity		L	60
Coolant tank capacity		L	50
Machine dimensions (L × W × H)		mm	2350 × 2220 × 1500
Machine weight		kg	2100

3.2 Hydraulic and Blade Tension Settings

Setting	Unit	Matrix 330A
Hydraulic system pressure	MPa	< 3.5
Blade tension	N·m	30 – 40

3.3 Hydraulic Component Schedule

No.	Name	Model	Qty
1	Hydraulic pump	VP-20F-A3	1
2	Speed control valve	L-10	1
3	Solenoid valve	02-3C2	6
4	Solenoid valve	02-2B2	2
5	Pressure gauge	16 MPa	1
6	Filter	HY37-25	1
7	Hose connector	Nominal diameter	1
8	Lifting cylinder	80 × 350	1
9	Front clamping cylinder	70 × 330	1
10	Back clamping cylinder	80 × 330	1
11	Feeding cylinder	70 × 510	1

No.	Name	Model	Qty
12	Way-giving cylinder	90 × 5	2
13	Top clamping cylinder	63 × 30	2

4. Installation and Pre-Start Set-Up

Complete the checks in this section before the machine is put into service for the first time, and after any period of extended storage.

4.1 Hydraulic Oil

Check the oil level in the hydraulic tank before using the machine. If the level is low, top up with hydraulic oil (or an equivalent grade) until the filter element is fully submerged.

As a general guide for the Australian climate: use ISO VG 46 hydraulic oil in warmer conditions and ISO VG 32 hydraulic oil in cooler conditions.

4.2 Coolant

The coolant tank is shipped dry. Before first use, fill the tank with coolant mixed at 5–8% soluble (saponified) cutting fluid concentrate, with the balance made up of clean tap water. Check that the coolant level does not exceed the maximum level marked on the coolant pump.

Clean the machine after each day's work to prevent corrosion. If the machine will be out of service for an extended period, protect it with a suitable rust-inhibiting oil.

WARNING

Never run the coolant pump without coolant in the tank — this will damage the pump.

If the coolant has frozen, do not switch the machine on. Thaw it first using water at approximately 10°C; otherwise the coolant pump may be damaged.

4.3 Power Supply

All electrical connection work must be carried out by a licensed electrician, in accordance with applicable Australian wiring rules and standards.

- Before beginning any electrical connection work, isolate the incoming supply to achieve a fully de-energised state. Isolating the machine's main switch alone does not de-energise the cable between the incoming supply and that switch.
- Use appropriately rated cable for the connection, sized to suit the machine's electrical load.
- When the machine is connected to the mains supply, connect the protective earth conductor to the dedicated earth terminal in the machine's electrical enclosure.
- Before carrying out any overhaul or major maintenance, isolate the mains supply, lock the isolator in the off position, and remove the key to protect personnel and equipment.

Confirm the site supply voltage, phase, and frequency match the machine's rating plate before connecting power. Refer to Section 3.1 for motor ratings.

5. Operation

5.1 Saw Blade Replacement

If the blade breaks during operation, replace it using the following procedure:

1. Release the emergency stop.
2. Press the saw frame up switch to raise the saw frame.
3. Open the left- and right-hand saw wheel protective covers.
4. Release the blade tensioning device.
5. Withdraw the used blade from between the carbide guide blocks.
6. Remove the used blade completely.
7. Fit the new blade onto both saw wheels.
8. Insert the back edge of the blade into the carbide guide blocks.
9. Position the back of the blade against the edge of the drive wheel.
10. Adjust the blade tensioning device to tension the blade correctly.
11. Refit the protective covers on the saw wheels.

WARNING

Wear gloves when handling the saw blade.

5.2 Operating Instructions

1. Fit the saw blade to the machine.
2. Start the hydraulic pump.
3. Adjust the distance between the two guide arms to suit the width of the workpiece.
4. Raise the saw frame.
5. Move the movable clamping vice so that the gap between the two vices is wider than the workpiece.
6. Load the workpiece onto the worktable.
7. Operate the clamping vices to secure the workpiece.
8. Press the “blade run” button. Coolant will begin flowing from the nozzles at the guide arms and drive saw wheel — adjust the coolant flow as required.
9. Adjust the saw frame feed rate using the speed control valve.

NOTE

A new saw blade should be run in gradually to achieve its full service life — see Section 5.7.3.

At the end of each day's work, remove the workpiece, lower the saw frame to its lowest position, and release the blade tension.

5.3 Machine Structure

This machine uses mechanical transmission to drive the rotary motion of the saw blade, hydraulic transmission to raise and lower the saw frame and to clamp and release the vices, and an electrical control system to coordinate the complete sawing cycle.

5.3.1 Base and Worktable

The base is a multi-chamber welded steel structure that houses the hydraulic tank, coolant tank, and electrical enclosure. The worktable is a high-grade casting fastened to the base, which carries the workpiece and supports the other machine components.

5.3.2 Saw Frame

The saw frame is a welded steel-plate assembly mounted on a sliding sleeve, which travels up and down the column under the drive of a lifting cylinder. The drive wheel is rotated by the worm gearbox. The saw frame carries a guide beam, with the left- and right-hand guide arms mounted on it; guide bearings and carbide guide blocks ensure stable, accurate blade travel.

5.3.3 Worm Gearbox

Located at the rear of the saw frame, the worm gearbox drives the saw wheel directly via the motor, pulley, and belt. Changing the belt position on the pulley provides four blade line speed ranges to suit different workpiece materials. The machine must be stopped before the belt position is changed.

5.3.4 Column

The main column is a welded and ground No. 45 seamless steel tube with a wear-resistant plated surface. The column sleeve is HT200 cast iron with an oil-impregnated wear-resistant bush fitted internally. An auxiliary round column, fitted on the left-hand side of the machine, helps to balance the lifting motion of the saw frame.

5.3.5 Workpiece Clamping Mechanism

The workpiece is clamped by a hydraulic-cylinder-driven vice, with a cylinder stroke of 330 mm. A top clamping cylinder is also fitted for bundle cutting.

5.3.6 Feeding Device

The machine feeds the workpiece by moving the clamping vices along round guide rails under the control of the hydraulic feed cylinder, with a free-path feed. A grating scale measures the feed length; a single feed stroke is 500 mm, and multiple feeds can be combined for longer lengths.

5.3.7 Hydraulic System

A sealed, self-contained hydraulic power unit, together with piping, a throttle valve, and cylinders, drives the lifting of the saw frame, the clamping and release of the vices, and the feeding and retraction of the workpiece. The throttle valve is mounted on the control box for ease of use and provides stepless adjustment of the saw frame feed rate.

5.3.8 Electrical Control System

The control box, mounted on the left-hand side of the machine, houses the operator panel together with the transformer, contactors, and thermal overload relays. Interlocks between key actions ensure safety — for example, the main drive cannot run unless the vice is clamped, and the vice cannot be released during sawing. All actions are managed by a PLC. A touchscreen replaces traditional push-button operation for most functions, allowing several groups of feed values and feed counts to be programmed and displayed directly.

5.3.9 Coolant System

Comprising a tank, pump, piping, valves, and nozzles, the coolant system cools and lubricates the blade to improve cutting efficiency and accuracy, extend blade life, and clear swarf from the blade teeth to maintain correct operation.

5.3.10 Blade Tensioning and Breakage Protection

The blade tensioning device, fitted behind the idle saw wheel on the left-hand side of the saw frame, allows the blade to be tensioned or released by hand once it is fitted to the wheels; tension is then maintained hydraulically.

A proximity switch behind the idle saw wheel detects the rotation of the saw wheel. If the blade breaks or the machine becomes overloaded, the switch stops receiving a signal and the machine will stop automatically, protecting both equipment and personnel.

5.3.11 Out-of-Stock Detection

A photoelectric switch, fitted behind the fixed feed vice, detects when material has run out. When the last section of material has been cut, the switch can no longer detect stock, the machine stops, and the touchscreen displays a “no material” prompt. Adjust the height of this switch to suit the size of the material being cut.

5.3.12 Bundle Cutting Device

To support cutting small-section bar in bundles, a top clamping cylinder is fitted above the clamping vices. It operates in conjunction with the horizontal clamping action of the vice to secure bundled, small-section material for cutting.

5.4 Hydraulic System

The hydraulic circuit — comprising pumps, valves, cylinders, the oil tank, and piping — drives the movement of the saw frame, the clamping of the workpiece, and the feeding of the workpiece under electrical control. The throttle valve provides stepless adjustment of the saw frame feed rate to suit different materials. The hydraulic component schedule is provided in Section 3.3.

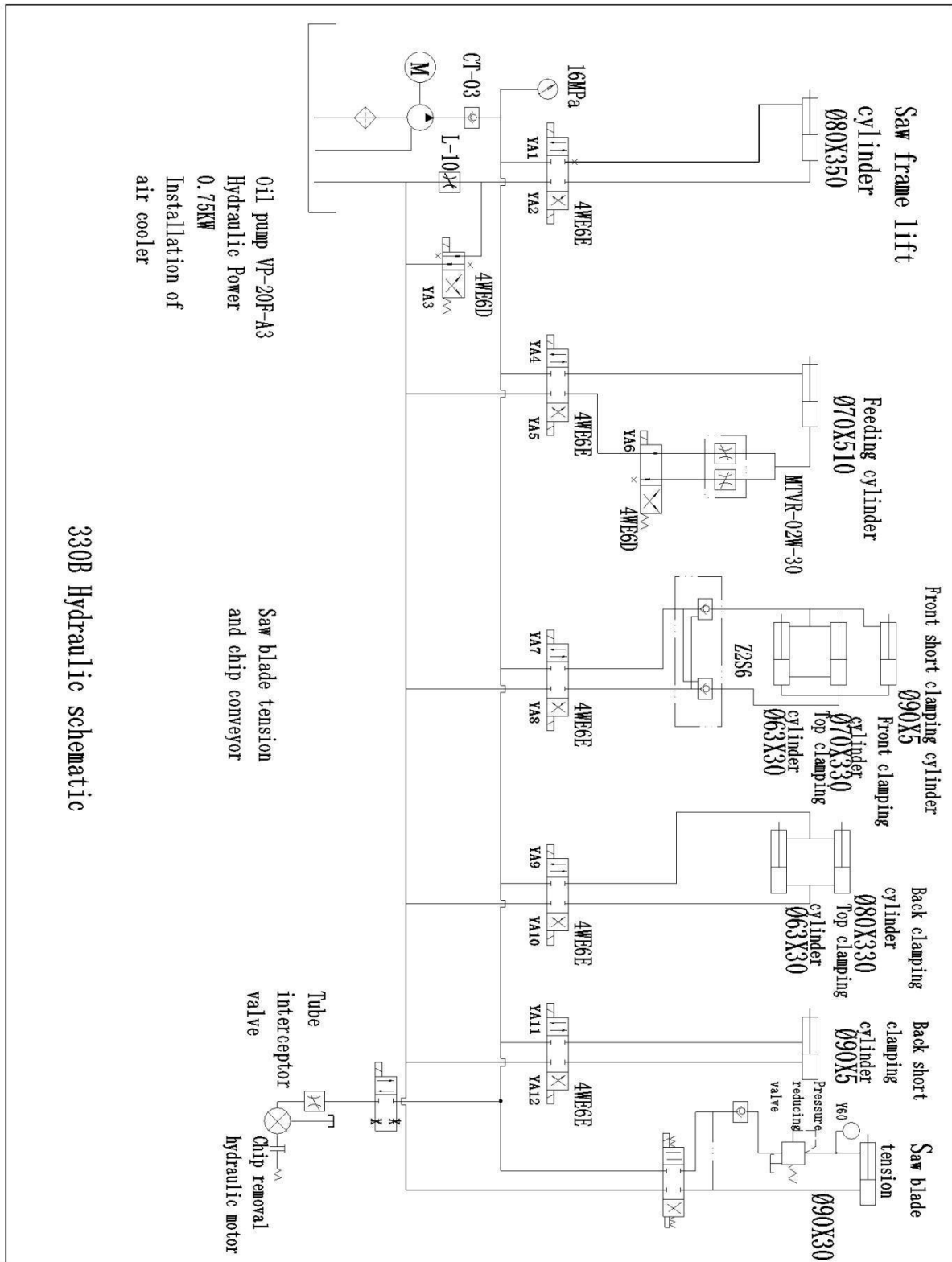


Figure 5.1 — Hydraulic schematic diagram (Matrix 330A)

5.5 Electrical System

5.5.1 Operation Buttons

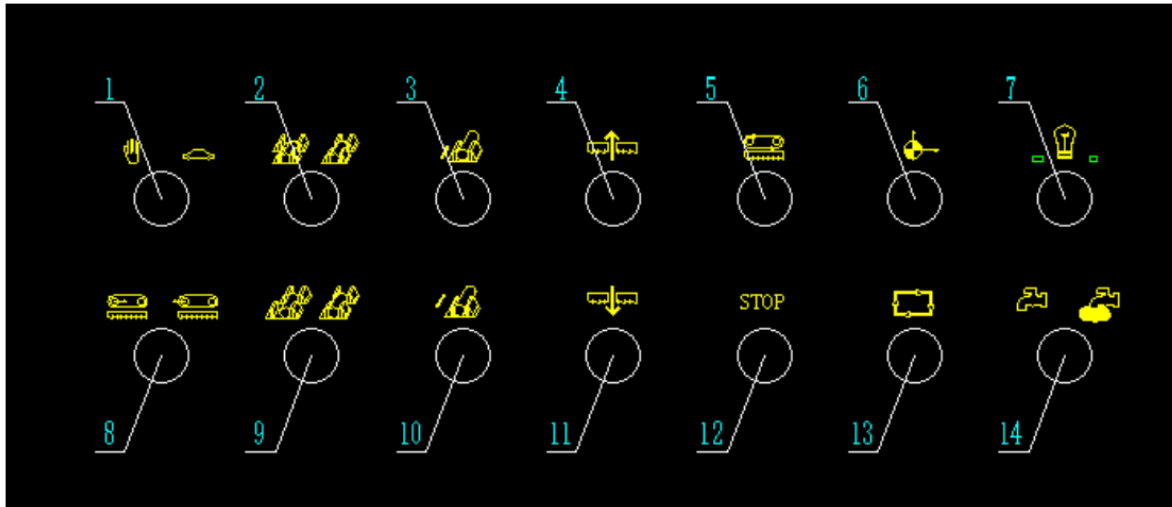


Figure 5.2 — Operator panel push-button layout

The push-button panel provides manual back-up control of the machine and is numbered as follows:

- 1. Manual/automatic selector — turn left for manual operation, right for automatic operation.
- 2. Rear vice clamp/release — controls clamping and release of the feeding (rear) vice.
- 3. Material return — feeds the workpiece backward.
- 4. Retreat — raises the saw frame.
- 5. Saw wheel start — starts rotation of the saw wheels.
- 6. Return to mechanical origin — in automatic mode, returns the machine to its mechanical home position.
- 7. Working light switch.
- 8. Blade tension/release — not fitted on this model.
- 9. Front vice clamp/release — controls clamping and release of the front vice.
- 10. Material feed — feeds the workpiece forward.
- 11. Saw frame feed — feeds the saw frame downward at the normal cutting rate.
- 12. Total stop — stops all actions except the oil pump.
- 13. Automatic start — starts automatic operation once the manual/automatic selector (1) is in automatic mode and the machine has returned to origin (6).
- 14. Coolant pump switch — independently starts/stops the coolant pump.
- 15. Manual hydraulic pump start (touchscreen back-up): with selector (1) in manual mode, press buttons 6 and 13 together for two seconds to start the hydraulic pump. Use this method if the touchscreen is not available.
- 16. Quick-set back vice stop position (touchscreen back-up): with selector (1) in automatic mode, press buttons 2 and 9 together for two seconds to assign the current rear vice position as the feed stop position for automatic cutting. Use this method if the touchscreen is not available.
- 17. To cancel the function set in (16), press button 4 for two seconds with selector (1) in automatic mode.

5.5.2 Touchscreen Operation

The touchscreen human-machine interface (HMI) provides an intuitive, responsive control platform. Working together with the PLC and the grating scale, it provides advanced automated control of the band saw.

NOTE

The touchscreen shown in this section may display units of ft/min and inches, reflecting the configuration used at the time these reference images were captured. Australian Matrix 330A machines are supplied configured in metric units (m/min and mm). Displayed values and screen layout may vary slightly by firmware revision.

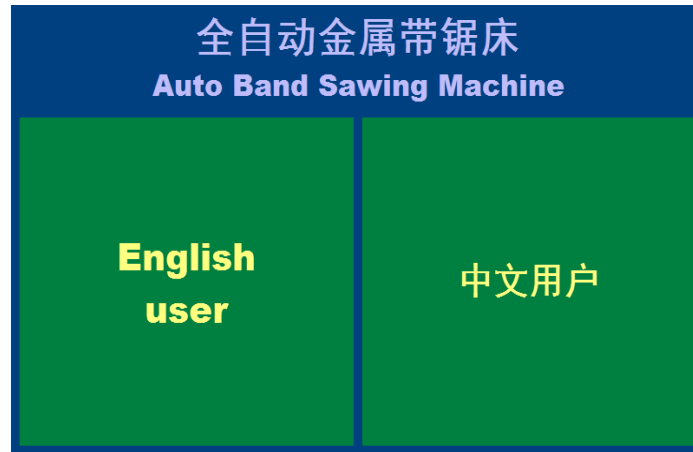
a) Start Menu

Figure 5.3 — Start menu: select English or Chinese

The start menu allows the operator to select the operating language: English or Chinese.

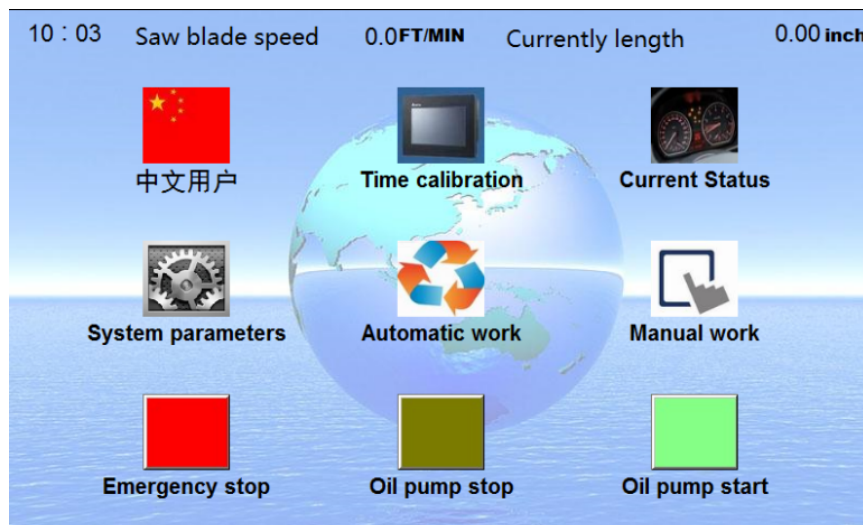
b) Master Menu

Figure 5.4 — Master menu

The master menu provides switching buttons to each functional area, including automatic work, current status monitoring, manual work, and system parameter setting.

The bottom row provides the oil pump start, stop, and total stop buttons. Because the system is primarily hydraulically driven, the oil pump must be started before any other action is carried out. Pressing “oil pump stop” has the same effect as pressing total stop.

The “total stop” button disables all action outputs except the oil pump motor and clears all current working status. It has the same effect as pressing the external emergency stop switch while power remains connected.

c) Manual Work

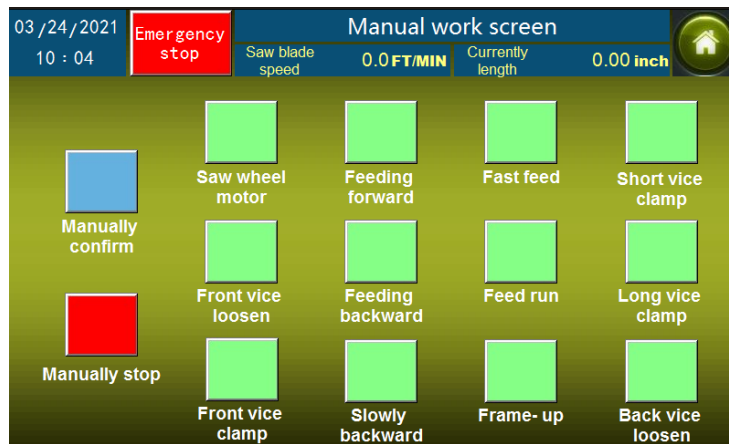


Figure 5.5 — Manual work screen

The saw wheel is driven by a motor; all other actions are hydraulically driven. Actions on this screen can only be carried out after pressing “Manual Confirm”. Note the following interlocks, limits, and other functions:

- (1) The saw wheel motor button is self-locking (runs continuously) only once the front clamping vice solenoid valve is engaged; otherwise it acts as a jog (momentary) button.
- (2) The saw wheel motor, front clamp, short vice clamp, long vice clamp, feed run, and frame-up controls are self-locking; all other controls are jog (momentary) buttons.
- (3) The following pairs of actions are interlocked with one another: front vice clamp/front vice release; short vice clamp/long vice clamp/back vice release; fast feed/feed run/frame-up; and feed backward/slow backward/feed forward.
- (4) Once the saw wheel is running, releasing the front vice will stop the saw wheel. While the saw wheel is running or the saw frame is feeding downward, feed forward, feed backward, and slow backward cannot be executed if the rear vice is clamped.
- (5) When the saw frame reaches its lower feed limit, the lower limit switch activates, and the frame stops and retracts. During retraction, if the fast-approach bar loses contact with the workpiece for 0.5 seconds, the upper limit switch activates and the frame stops.
- (6) Pressing “Manually Stop” halts all screen-controlled actions.
- (7) Tapping “Current length” opens a confirmation screen for resetting the position. Tap “OK” to clear the current position, or “Close” to cancel.
- (8) If the oil pump motor has not been started, pressing “Manual Confirm” will display a prompt to start the oil pump.

d) Automatic Work — Data Setting

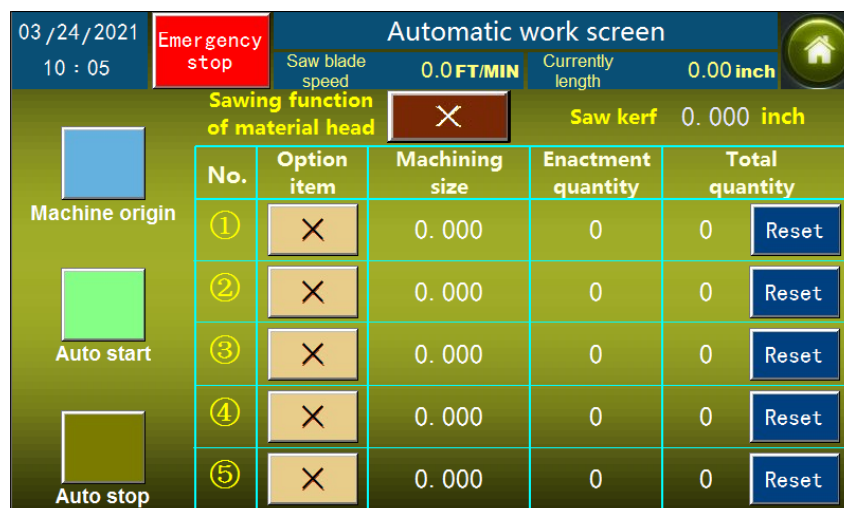


Figure 5.6 — Automatic work data setting screen

This screen sets, adjusts, and monitors all data used in automatic machining.

Before starting automatic work, the operator must set the machining size (mm) and quantity. Up to five different machining size sets can be stored; the machine will cut through each set in sequence, from the first to the fifth.

To enter data, tap the field under “machining size” to open the input keypad. Note the permitted input range shown at the top left of the keypad — values outside this range will be rejected.

- Tap “option item” to select a cutting group for use; a successful selection changes $\times$ to $\sqrt{}$.
- “Machining size” accepts the required cut length, to an accuracy of 0.1 mm, over a range of 0–20,000 mm.
- “Enactment quantity” accepts the required cut quantity (range 1–999). If the cut length is set to zero, the quantity must also be zero.
- “Total quantity” displays the number of workpieces processed so far.
- “Reset” clears the total quantity count, which otherwise persists even after a power interruption.

03 / 24 / 2021		Emergency stop		System Parameters screen			
10 : 05		Saw blade speed		0.0 FT/MIN		Currently length 0.00 inch	
Front vice clamp time	0.0 <Sec>	Back vice clamp time	0.0 <Sec>				
Front vice loosen time	0.0 <Sec>	Back vice loosen time	0.0 <Sec>				
Saw frame rise delay	0.0 <Sec>	Buffer after the trip	0.0 <inch>				
Travel of feeding cylinder	0.0 <inch>	Buffer before the trip	0.0 <inch>				
Saw wheel continuous work		Saw wheel speed frequency	0.0 <FT/Min>				
Saw blade detect function		0.0 <Sec>	Many times setting				
Material detect function		0.00 <inch>					
Saw belt tension time interval	0 <Min>						
Chip removal operation mode	continuous	Pause time	0 <Min>	Running time	0 <Min>		

Figure 5.7 — Automatic work control screen

The left side of the screen controls automatic sawing and the return to mechanical origin. The machine must return to its home position before automatic operation can begin. After homing, tap “Auto Start” to begin cutting to the programmed size and quantity. During automatic operation, tapping “Auto Stop” pauses the cycle once the current cut is complete. The current rear vice position is shown in the “Currently length” field.

When using the machine to cut off the front remnant of a workpiece (material head sawing), place the remnant beyond the saw blade before making the first cut.

e) System Parameters

Before running automatic work, set the following parameters:

- “Vice loosen time” — the time taken for the vice to complete its “release” action during automatic operation.
- “Vice clamp time” — the time taken for the vice to complete its “clamp” action during automatic operation.
- “Saw frame rise delay” — the rise time of the fast-approach bar before lifting begins. Set to 0 on machines without a fast-approach bar.
- “Buffer after the trip” — the distance travelled after switching to slow-backward during automatic feed-backward.
- “Buffer before the trip” — the distance travelled after switching to slow-backward during automatic feed-forward.

- “Saw wheel continuous work” — if enabled, the saw wheel keeps running after the first automatic cut until the enactment quantity reaches zero, or the cycle is paused.
- “Saw wheel diameter” — if not set, the blade line speed will not be displayed.
- “Saw blade detect function” — if the proximity switch behind the driven wheel does not change state within the set time while the saw wheel is running, the system stops the saw wheel and other actions and indicates a broken blade. Select “√” to enable this function, or “x” to disable it.
- “Material detect function” — if the proximity switch cannot detect the workpiece, a warning dialogue appears and the machine may stop automatic cutting. Select “√” to enable, or “x” to disable.
- “Oil pump automatic stop” (optional) — if the operator leaves the machine idle for the set period, the hydraulic system shuts down automatically to reduce unnecessary wear, bringing the machine to a total stop.
- “Saw wheel speed frequency” — adjusts the blade line speed.
- “Saw belt tension” — sets the interval between automatic blade re-tensioning cycles; set to zero for continuous tensioning, or to a typical value of 10 depending on conditions.
- “Chip removal operation mode” — sets the chip conveyor to run continuously with the saw wheel, or intermittently on a programmable run/stop cycle.

f) Status Monitoring

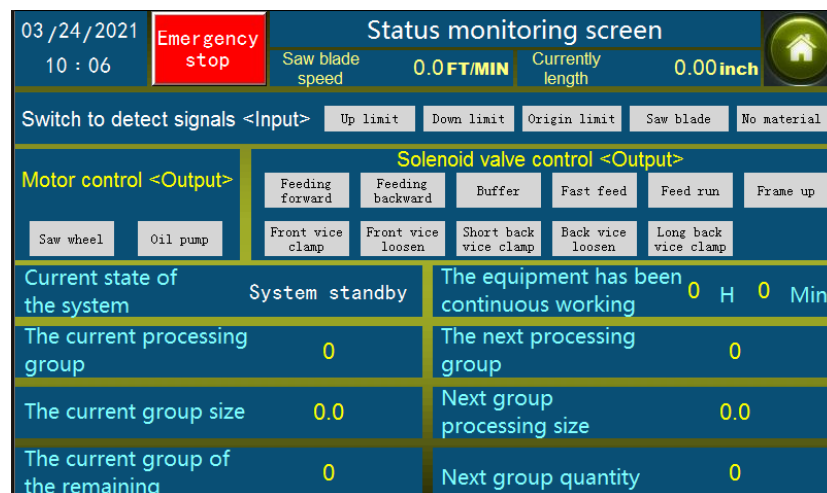


Figure 5.8 — Status monitoring screen

This screen displays the state of each switching signal, the machine's current operating mode, the active automatic cutting data, and the number of workpieces remaining. It supports operator monitoring, commissioning, and quick fault-finding.

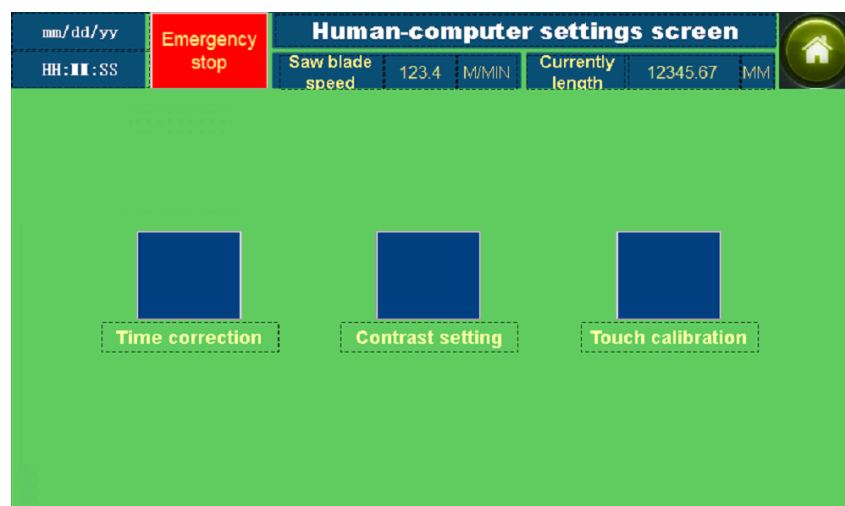


Figure 5.9 — Human-machine settings screen

i) Time, Contrast, and Touch Calibration

This screen provides access to time correction, display contrast, and touchscreen calibration settings.

j) Main Motor Fault

If the main (saw wheel) motor becomes overloaded, its thermal relay activates. Once the PLC receives this signal, the touchscreen displays the warning shown, and the machine stops.

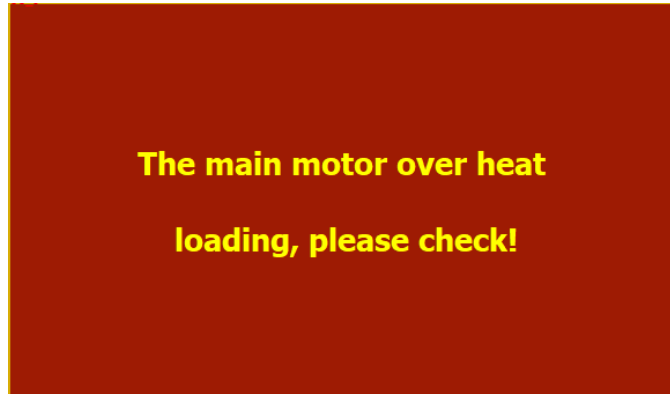


Figure 5.10 — Main motor fault warning

k) Oil Pump Motor Fault

If the oil pump motor becomes overloaded, its thermal relay activates. Once the PLC receives this signal, the touchscreen displays the warning shown, and the machine stops.

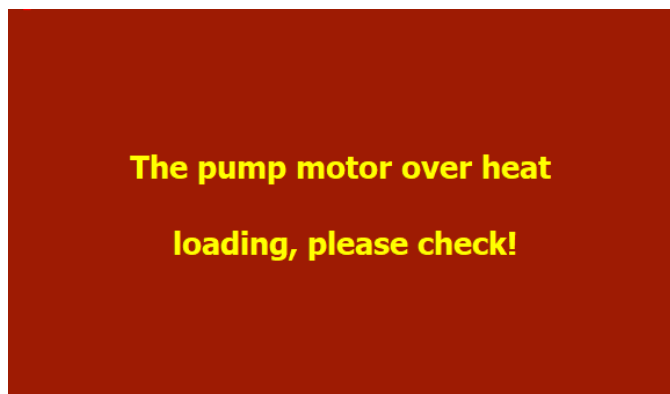


Figure 5.11 — Oil pump motor fault warning

l) Saw Blade Detection

If the saw blade detection function activates, the system stops the machine and the touchscreen displays the warning shown.

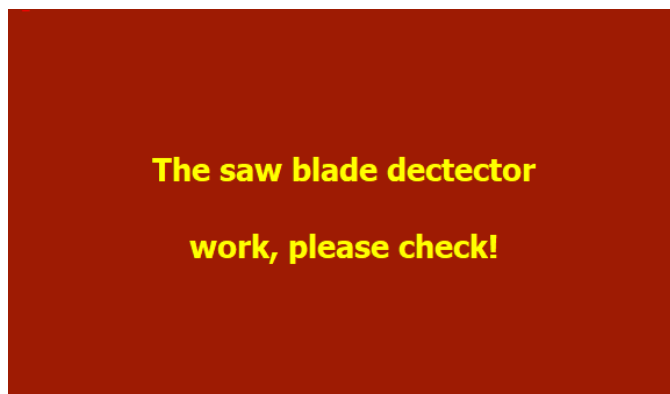


Figure 5.12 — Saw blade detection warning

m) Material Detection

If material detection activates and no new workpiece is loaded, the touchscreen displays the warning shown. If a new workpiece is not loaded within three minutes, the machine stops.

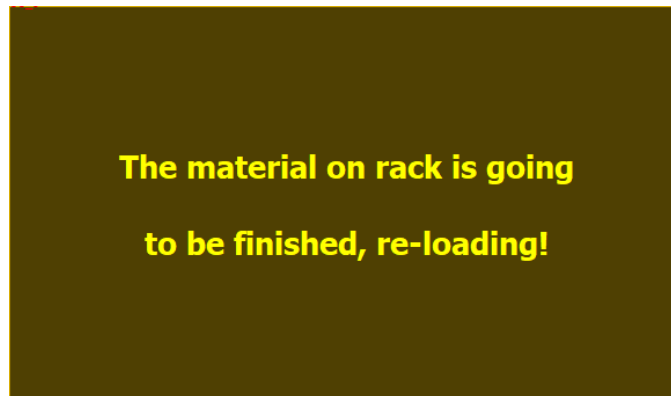


Figure 5.13 — Material detection warning

n) Reverse Positioning

If the two grating signal lines are connected in reverse, the touchscreen displays the warning shown during forward or backward feeding. Reconnect the signal lines correctly and restart the system to resolve this.

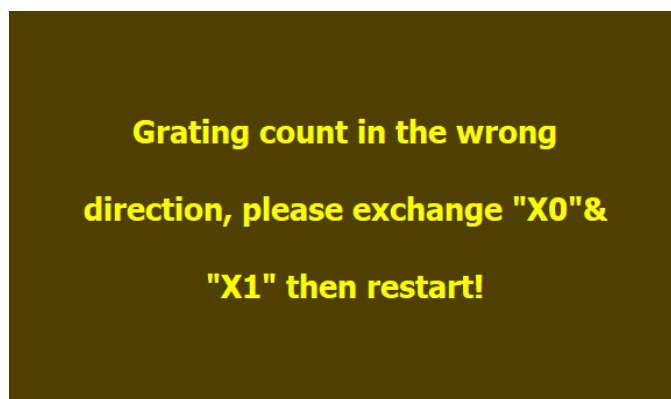


Figure 5.14 — Reverse positioning warning

o) Positioning Abnormal

If the PLC cannot read a valid signal from the grating scale, the touchscreen displays the warning shown.

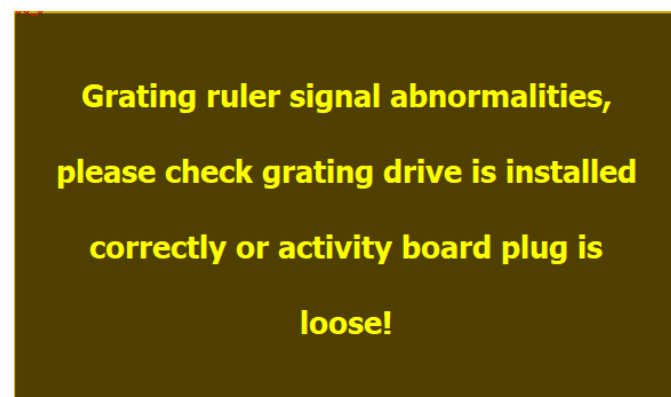
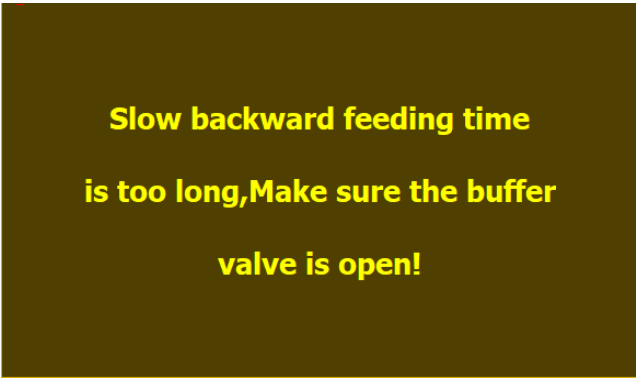


Figure 5.15 — Positioning abnormal warning

p) Buffer Time Too Long

Slow-backward feeding of the saw frame normally takes 2–5 seconds. If this time is exceeded, the touchscreen displays the warning shown.



**Slow backward feeding time
is too long, Make sure the buffer
valve is open!**

Figure 5.16 — Buffer time too long warning

q) Origin Signal Abnormal

If the origin switch signal is abnormal, the touchscreen displays the warning shown.

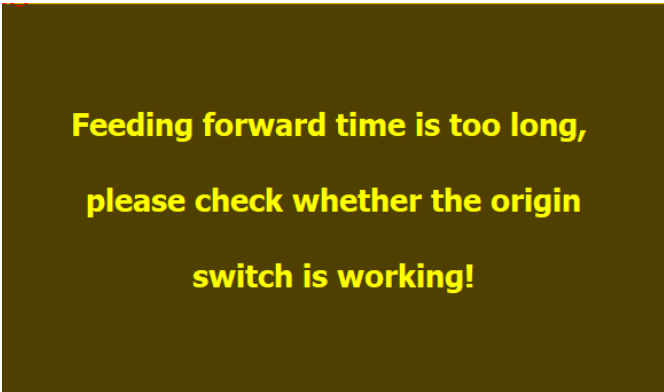


**Origin signal abnormal,
please check!**

Figure 5.17 — Origin signal abnormal warning

r) Origin Signal Lost

If the origin limit switch signal is lost, check that the switch is functioning correctly. The normal gap between this switch and the metal stopper is 1–4 mm. Also check that the switch is not damaged and that its wiring is properly connected.



**Feeding forward time is too long,
please check whether the origin
switch is working!**

Figure 5.18 — Origin signal lost warning

s) Upper Limit Switch Abnormal

If the upper limit switch signal is abnormal, the touchscreen displays the warning shown.

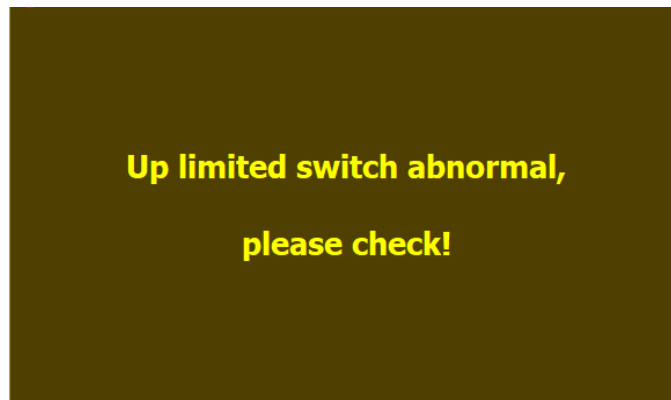


Figure 5.19 — Upper limit switch abnormal warning

t) Upper Limit Switch Signal Lost

If the upper limit switch signal is lost, check that the switch is functioning correctly. The normal gap between this switch and the metal stopper is 2–4 mm. Also check that the switch is not damaged and that its wiring is properly connected.

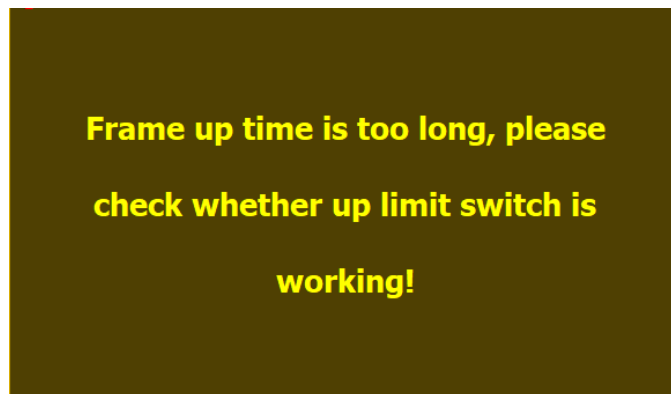


Figure 5.20 — Upper limit switch signal lost warning

u) Lower Limit Switch Abnormal

If the lower limit switch signal is abnormal, the touchscreen displays the warning shown.

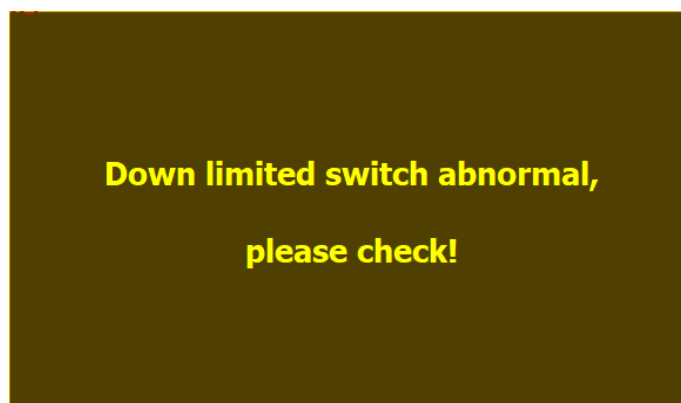


Figure 5.21 — Lower limit switch abnormal warning

v) Oil Pump Stopped

Confirm that the oil pump has started before carrying out any other operation. If it has not, the touchscreen displays the warning shown.



Figure 5.22 — Oil pump stopped warning

w) Operated Without Returning to Mechanical Origin

If the machine is operated in automatic cutting mode without first returning to the mechanical origin, the touchscreen displays the warning shown. Return to origin before starting automatic work.

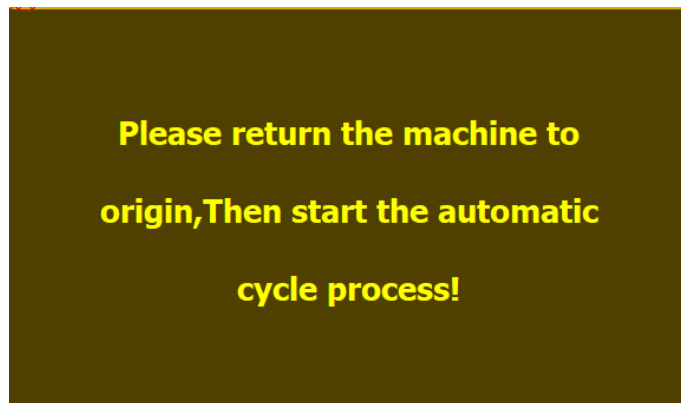


Figure 5.23 — Not returned to origin warning

x) Operation Without Cutting Data

If automatic cutting is started without cutting data configured, the touchscreen displays the warning shown. Automatic work can only proceed once the cutting data has been set.

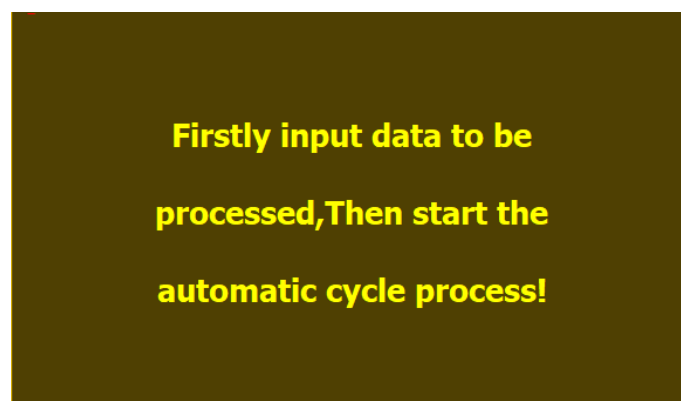


Figure 5.24 — No cutting data warning

y) Operation Without System Parameters

If the automatic control process is started without the system parameters configured, the touchscreen displays the warning shown. Enter the correct parameters before starting the automatic process.

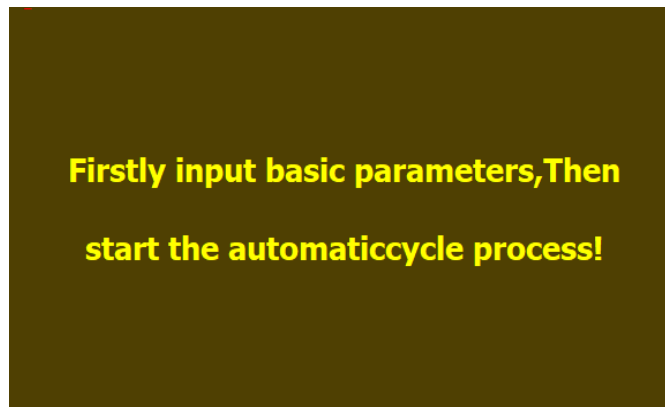


Figure 5.25 — No system parameters warning

5.5.3 Electrical Circuit Diagrams

The circuit diagrams below are provided for use by qualified electricians during installation, fault-finding, and servicing. All conductor cross-sections shown are for copper cable; confirm sizing against the relevant Australian wiring rules before installation.

NOTE

These reference drawings display the manufacturer's internal model code (330B / CH-330B) in the title block. This is the wiring diagram for the Matrix 330A — the electrical circuit is unchanged. See the issues list at the end of this manual for details.

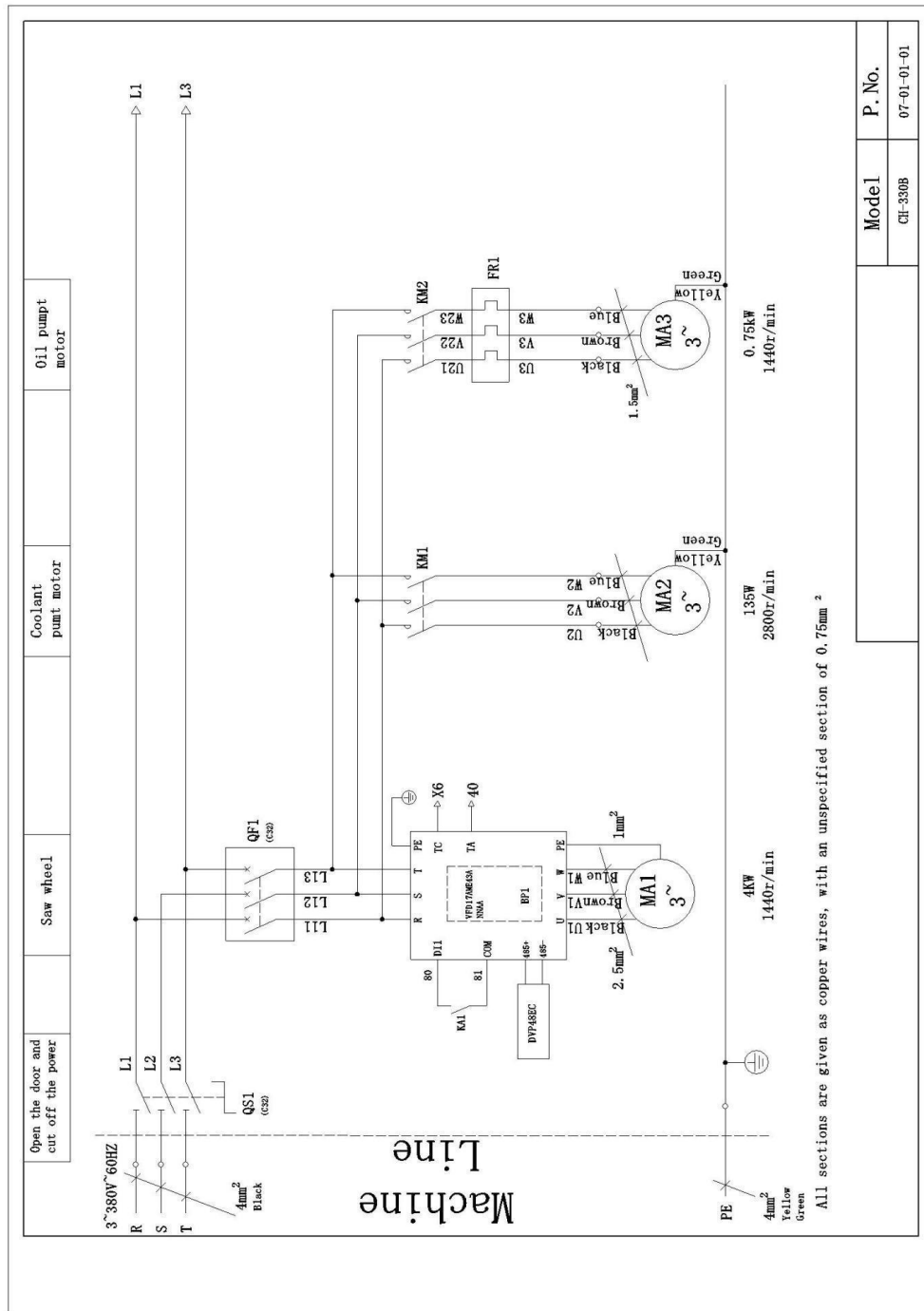


Figure 5.26 — Circuit diagram, sheet 1 of 5 (main line, motors)

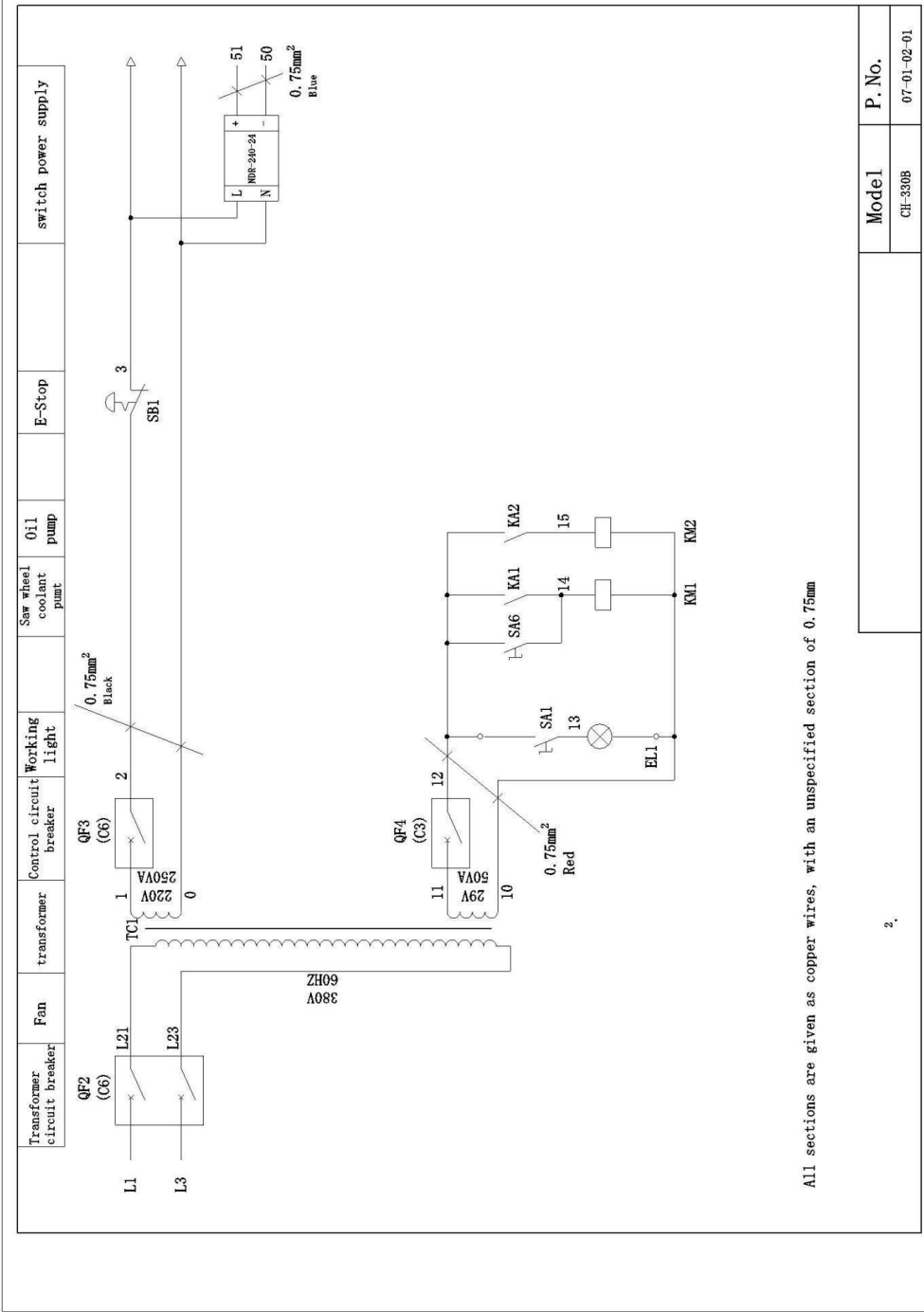


Figure 5.27 — Circuit diagram, sheet 2 of 5 (control transformer, E-stop)

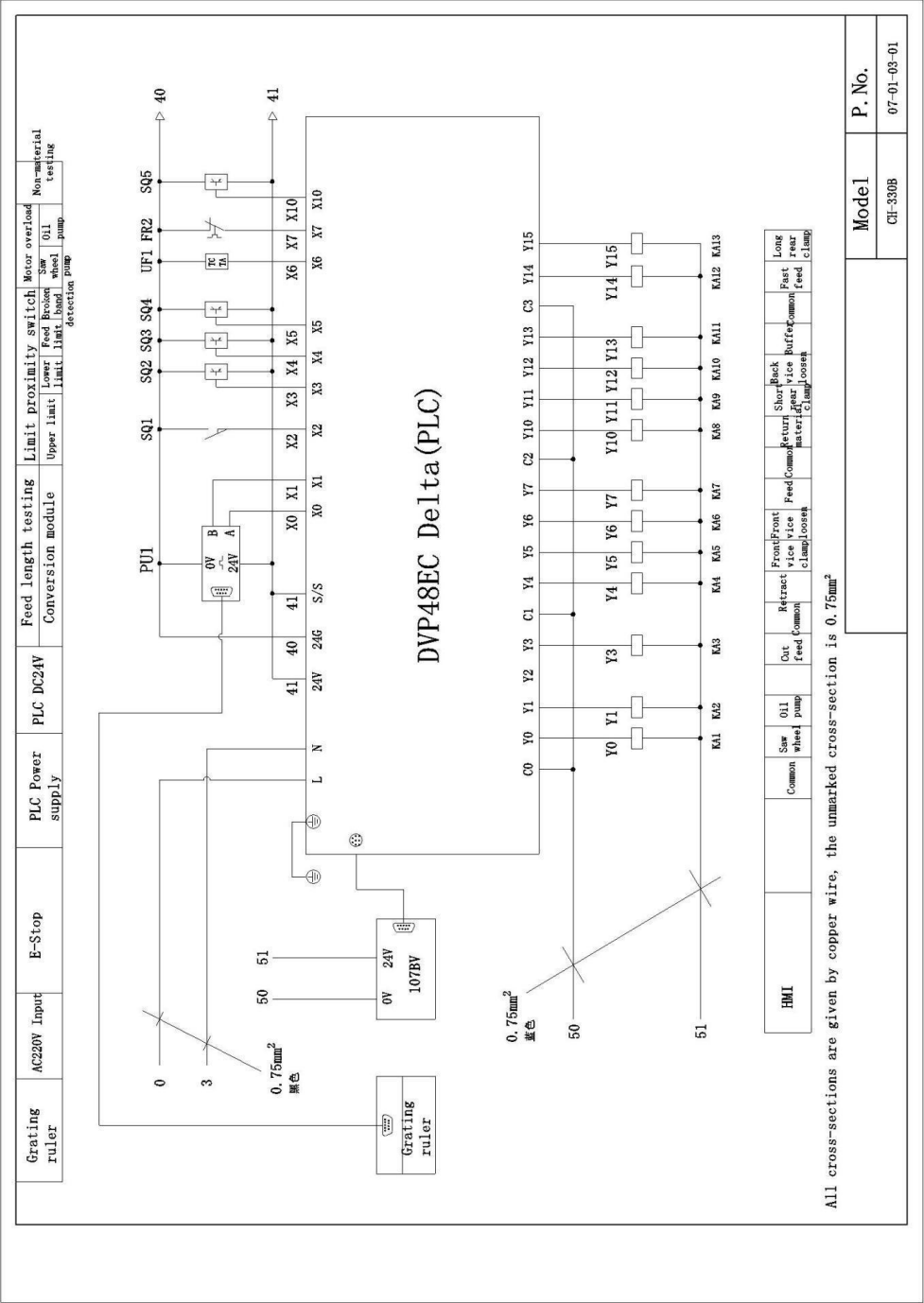


Figure 5.28 — Circuit diagram, sheet 3 of 5

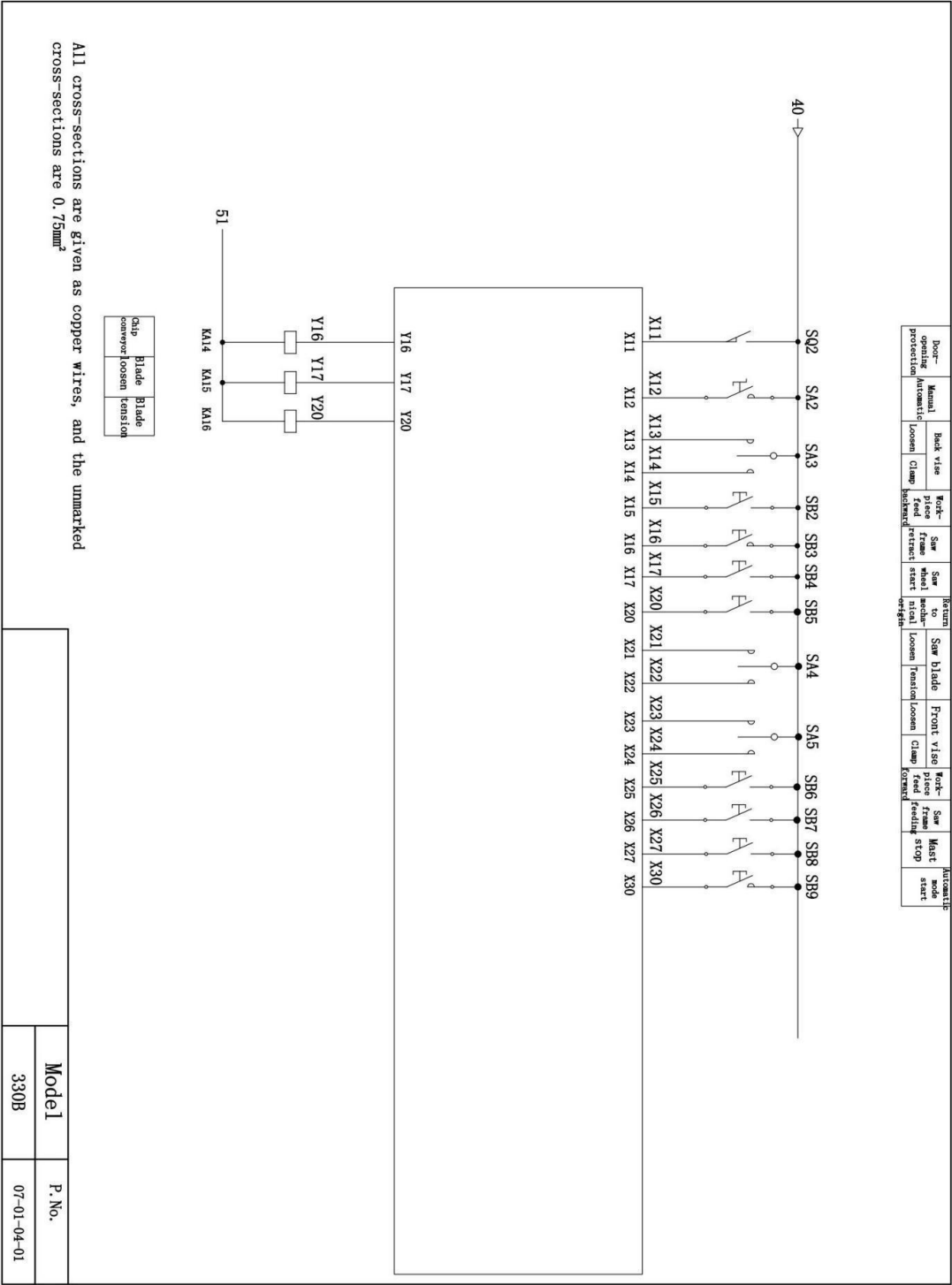


Figure 5.29 — Circuit diagram, sheet 4 of 5

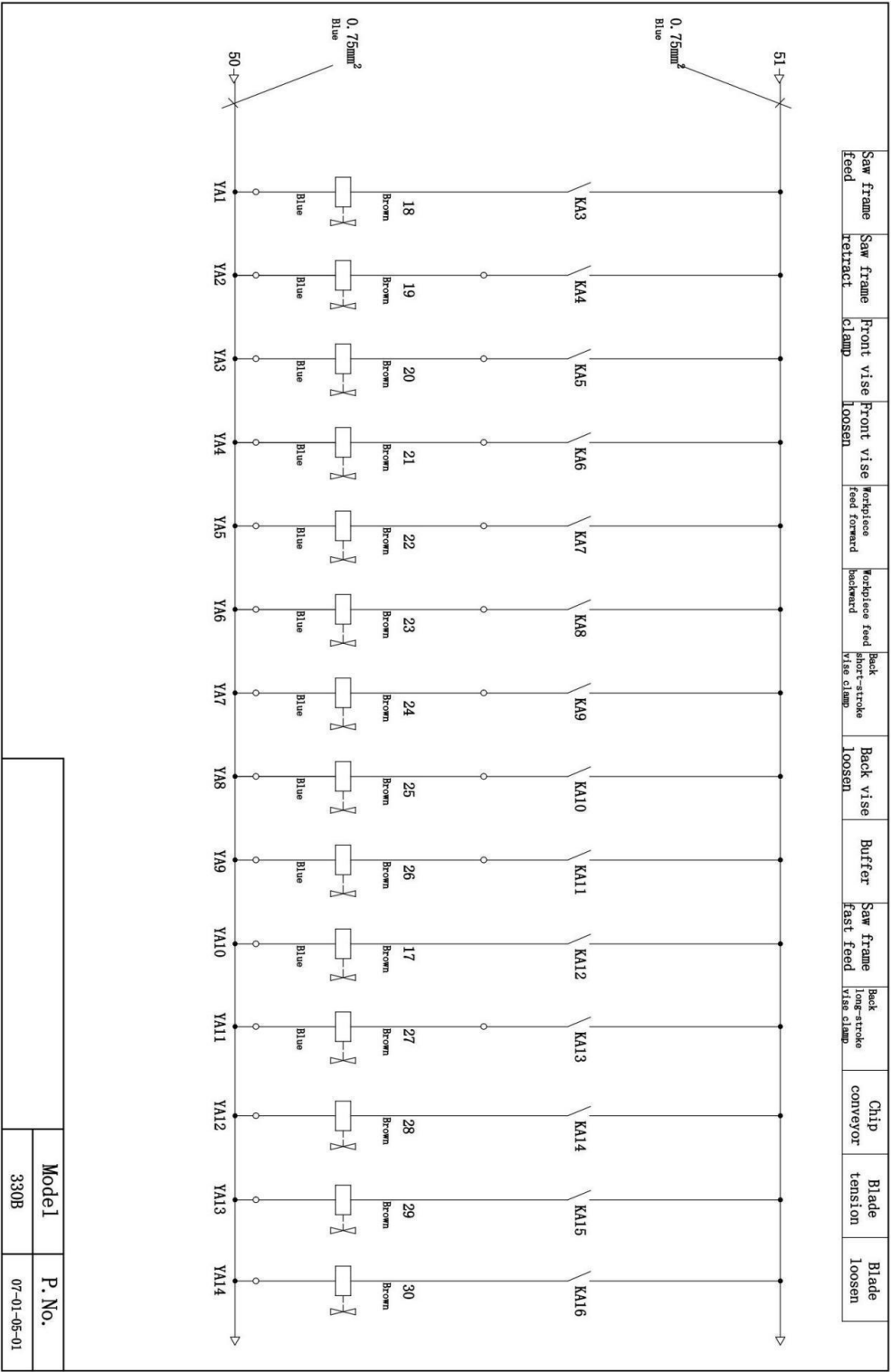


Figure 5.30 — Circuit diagram, sheet 5 of 5

5.6 Blade Selection

5.6.1 Blade Tooth Selection

Select the blade tooth pitch to suit the cross-section of the workpiece, using the reference chart below.

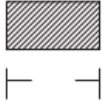
					
Width mm		Diameter mm		Thickness mm	
1~5	14/18T	1~5	14/18T	1~3	10/14T
6~7	10/14T	6~10	10/14T	4	8/12T
8~13	8/12T	11~16	8/12T	5~6	6/10T
14~16	6/10T	17~21	6/10T	7~9	5/8T
17~25	5/8T	22~30	5/8T	10~18	4/6T
26~53	4/6T	31~69	4/6T	19~33	3/4T
54~114	3/4T	70~144	3/4T	>34	2/3T
115~205	2/3T	145~230	2/3T	-	-
206~381	1.4/2.5T	231~381	1.4/2.5T	-	-
>382	1/1.5T	>382	1/1.5T	-	-

Figure 5.31 — Blade tooth pitch selection chart

5.6.2 Cutting Data Recommendations

The table below cross-references common steel grades against national standards, and recommends a blade line speed and cutting rate for each.

Material	China (GB)	Japan (JIS)	USA (AISI)	Germany (DIN)	Blade speed (m/min)	Cutting rate (cm ² /min)
Low carbon steel	08	S10C	1010	C10	50-75	70-80
	15	S15C	1015	C15	50-75	70-80
Medium carbon steel	45	S45C	1045	C45	50-70	60-70
	55	S55C	1055	CK55	50-70	50-60
Carbon tool steel	T10	SK4	W1	C75W	40-50	25-45
	T12	SK2	W1	C125W	40-50	35-45
	T8Mn	SK2	W1	C125W	40-50	35-45
Alloy structural steel	40CrNi	SNC236	3140	40NiCr6	30-40	30-40
	40CrMoA	SCM440	4140	42CrMo8	40-50	35-45
	40CrNiMoA	SNCM439	4340	34CrNiMo8	35-45	30-40
High speed steel	W18Cr4V	SKH2	T1	S18-0-1	25-35	20-30
	W18Cr4VCo5	SKH3	T4	S18-1-2-5	20-30	15-25
Cold-work tool steel	Cr12MoV	SKD11	D2	X155CrVMo121	25-35	20-25
	CrWMn	SKS2	D7	105WCr6	20-30	15-20
	9SiCr	SKS3	D1	105WCr6	25-35	20-25

Material	China (GB)	Japan (JIS)	USA (AISI)	Germany (DIN)	Blade speed (m/min)	Cutting rate (cm ² /min)
Hot-work tool steel	3Cr2W8V	SKD5	H21	X30CrV93	35-45	30-35
	4Cr5MoV1Si	SKD61	H13	X40CrMoV51	30-40	25-30
	5CrNiMo	SKT4	L6	X55NiCrMoV6	25-30	20-25
Alloy spring steel	50CrVA	SUP10	6150	50CrV4	20-35	25-35
	50CrMnVA	SUP10	6150	50CrV4	20-35	25-35
Bearing steel	GCr15	SUJ2	52100	100Cr6	35-45	30-40
Stainless steel	0Cr18Ni9	SUS304	304	X5CrNi1810	35-45	20-30
	0Cr17Ni12Mo2	SUS316	316	X5CrNiMo1712	20-25	15-20
	1Cr17	SUS430	430	X6Cr17	30-40	25-35

5.6.3 Run-In Period for a New Blade

When fitting a new blade, select the feed rate to suit the material being cut. For example, when cutting 45# steel of 200 mm diameter: on the first cut, set the feed rate to 0.2 times the usual rate; on the second cut, 0.5 times; on the third cut, 0.8 times; from the fourth cut onward, the usual rate can be used.

When cutting harder materials, adjust the feed rate accordingly — otherwise blade efficiency and service life will be significantly reduced.

Correctly running in a new blade delivers a longer service life, faster cutting speed, and higher cutting accuracy.

5.6.4 Factors Affecting Blade Service Life

- Blade fracture is usually caused by excessive tension or sudden loading at the guide arm entrance, which fatigues the back of the blade.
- Tooth breakage or deviation is generally caused by incorrect cutting conditions, such as an excessive feed rate.
- Machine vibration can also cause tooth breakage.
- Impurities within the workpiece can cause the blade to strike hard spots unexpectedly during cutting, leading to tooth breakage.

5.6.5 Blade Speed and Cutting Rate Selection

Select the blade line speed and cutting rate to suit the material of the workpiece, referring to Section 5.6.2. As a benchmark load test reference: for 45# steel of 150 mm diameter, at a cutting speed of ≤ 70 m/min, a cutting rate (productivity) of approximately 80 cm²/min can be expected, in accordance with the applicable band saw machine load test standard.

Cutting rate (cm²/min) is calculated as workpiece cross-sectional area (cm²) divided by cutting time (min). Once the blade line speed has been selected, adjust the speed control valve on the operator panel to set the saw frame feed rate so that the workpiece is cut through in an appropriate time.

6. Maintenance and Lubrication

- Clean swarf from the machine after each day's work.
- After cleaning, lower the saw frame to its lowest position.

6.1 Daily Maintenance

Before operating the machine, carry out the following checks:

1. Check that the hydraulic oil level is above the filter element. If not, top up with the appropriate hydraulic oil.
2. Check the coolant level and top up if necessary.
3. Check that the saw blade is correctly positioned between the left and right saw wheels and the carbide guide blocks.

6.2 Weekly Maintenance

Apply an appropriate amount of grease to the points shown below.

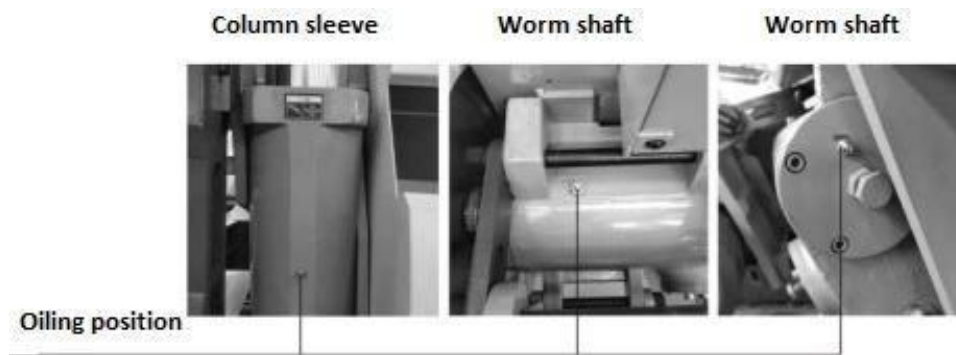


Figure 6.1 — Weekly grease points: column sleeve and worm shaft

6.3 Six-Monthly Maintenance

Replace the gear oil. Recommended type: L-CKC220 medium-load industrial closed gear oil.

NOTE

The first gear oil change must be carried out after the first 240 operating hours or one month, whichever comes first. The second change is due after 720 operating hours or three months. Thereafter, change the gear oil every 1,440 operating hours or six months.

6.4 Annual Maintenance

Replace the hydraulic oil. Recommended type: L-HM46 anti-wear hydraulic oil.

6.5 Lubrication Schedule

No.	Part	Method	Interval	Quantity	Recommended Lubricant	Remarks
1	Worm gearbox	Fill: unscrew filler cap and add oil to the level mark. Drain: remove drain plug.	6-monthly	—	L-CKC220 medium-load industrial closed gear oil	
2	Hydraulic tank	Fill: remove shutters and add oil until the filter screen is fully submerged. Drain: remove drain plug.	6-monthly	40 L	L-HM46 anti-wear hydraulic oil	

No.	Part	Method	Interval	Quantity	Recommended Lubricant	Remarks
3	Drive wheel shaft	Grease gun	6-monthly	As required	Grease	
4	Coolant tank	Fill using bucket or suitable container	Daily / as required	40 L	5-8% soluble concentrate, balance tap water	When coolant is too contaminated for use, drain, clean the tank, and refill with fresh coolant.
5	Driven wheel shaft	Grease gun	Weekly	As required	Mobilux EP (NLGI 1) or equivalent	
6	Guide arm	Grease gun	Weekly	As required	Mobilux EP (NLGI 1) or equivalent	
7	Blade tension screw	Grease gun	Weekly	As required	Mobilux EP (NLGI 1) or equivalent	
8	Workpiece feed guide rod	Grease can	Weekly	As required	Mobilux EP (NLGI 1) or equivalent	
9	Unpainted parts	Brush	As required	As required	N32–N68 machine oil	Reduces wear, corrosion, and rust, and maintains appearance.

7. Troubleshooting

7.1 Blade Problems and Solutions

Use the tables below to help diagnose common blade and cutting problems. Symptom columns are marked ● where the cause applies.

Shake	Bad cuts	Blade won't lift	Cuts crooked	Blade breaks	Possible Cause	Corrective Action
	●	●	●		Lack of coolant	Top up to the specified level
●		●	●		Air in the hydraulic cylinder	Bleed the air out
●	●	●	●	●	Unsuitable blade	Change the blade
●	●	●	●	●	Excessive voltage fluctuation	Correct the supply voltage
●		●	●		Left guide arm too far from the workpiece	Bring the arm close to the workpiece without touching it
●		●	●	●	Guide arm clamped too tightly	Adjust
	●		●		Blue or purple chips (overheating)	Reduce the feed rate
●		●		●	Chips built up in the guide plate	Clean
●	●	●	●	●	Guide plate worn or shattered	Replace
●			●		Blade not suited to guide plate contact	Adjust the clearance

Shake	Bad cuts	Blade won't lift	Cuts crooked	Blade breaks	Possible Cause	Corrective Action
•		•	•		Workpiece incorrectly positioned	Reposition
•		•		•	Blade edge contacting drive or idle wheel	Set the correct clearance
•	•	•			Uneven workpiece surface	Smooth the surface
•	•	•	•		Blade tooth pitch unsuitable / damaged	Replace the blade
•		•	•		Excessive cutting pressure	Reduce the pressure

Shake	Bad cuts	Blade won't lift	Cuts crooked	Blade breaks	Possible Cause	Corrective Action
•	•				Low cutting pressure	Increase the pressure
•	•	•	•	•	Wrong blade tooth pitch	Change the blade
•	•	•	•	•	Blade has stopped running	Restart the blade motor
•		•	•	•	Excessive cutting speed	Reduce the blade speed
•	•	•	•		Cutting speed too slow	Increase the blade speed
•		•	•	•	Excessive blade feed speed	Reduce the feed speed
•	•				Blade feed speed too slow	Increase the feed speed
•		•	•		Low blade tension	Increase the tensioning pressure
•		•	•	•	Steel wire brush incorrectly positioned	Adjust the position or replace
•		•	•		Guide plate not clamping the blade correctly	Check and correct
•	•	•	•	•	Workpiece incorrectly clamped	Re-clamp
•	•	•	•		Workpiece surface too hard/rigid	Soften the surface (anneal)
	•	•			Workpiece not annealed	Use annealed material
•		•	•	•	Coolant depleted or degraded	Top up or replace the coolant
•		•	•	•	Vibration transmitted from nearby machinery	Isolate the machine or reposition nearby equipment

NOTE

If a fault persists after working through the applicable corrective actions above, stop the machine and contact Capital Machinery Sales for support — see Section 8.

8. Warranty and Support

8.1 Warranty

[Warranty terms — please contact Capital Machinery Sales for applicable warranty information relating to your Matrix 330A.]

8.2 After-Sales Support

Capital Machinery Sales provides Australia-wide after-sales support, backed by over 30 years of industry experience and a dedicated support team. Support includes:

- Application support — helping you set up and run the machine correctly for your specific job, and supporting you as your requirements evolve.
- Pre-dispatch testing — every machine is fully checked and commissioned before leaving Capital Machinery Sales.
- Spare parts — a wide range of parts and consumables is kept in stock; parts not held in stock will be sourced as quickly as possible.
- Remote support — fast assistance by phone, email, or live video, resolving most issues without a site visit.
- On-site service — field engineers and trusted contractors service machines Australia-wide, including remote areas.
- In-house repairs — machines can be returned to Capital Machinery Sales for expert servicing and overhaul.

8.3 Contact Details

Capital Machinery Sales Pty Ltd

Phone: 1800 706 620

Website: www.capitalmachinery.com.au

ABN: 82 113 895 097

[Postal / service address — to be confirmed]

NOTE

Please have your machine's model (Matrix 330A) and serial number ready when contacting Capital Machinery Sales for service, spare parts, or warranty support.