HORIZONTAL BANDSAW

HFA-250/250W/400/400W(US)

(HFA-252T/252TW/407T/407TW)

OPERATOR'S MANUAL

AMADA

HFA250/400T/TW US-E01-200409

PREFACE Read this manual carefully to obtain a thorough knowledge of machine operation and maintenance. Be sure to follow the instructions to ensure proper procedures and prevent injuries and accidents. Do not operate the machine by guesswork. Keep the manual at hand and refer to it whenever you are not sure of how to perform any of the procedures.

Operator's Manual:

HFA-250/250W/400/400W Horizontal Bandsaw

Printed in Japan

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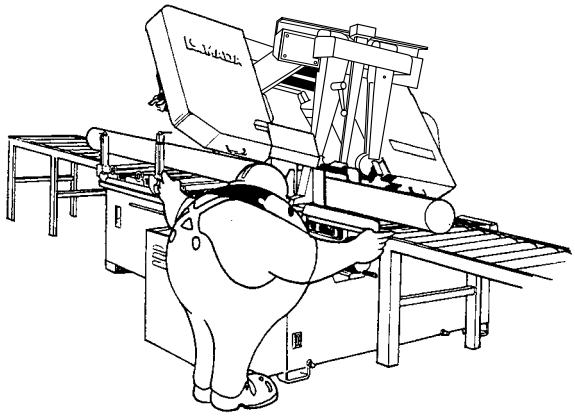
Safety Rules & Cutting Precautions

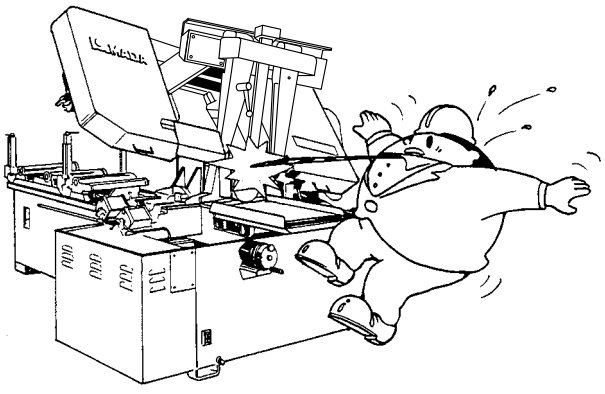
SAFETY RULES

Observe these safety rules to prevent injuries and accidents. *(The illustrations may be partly different from the actual machine in detail.)*

a) Use roller tables on both front and rear sides of the machine when cutting long work. It is dangerous if the work falls off the machine when the roller tables are not used.

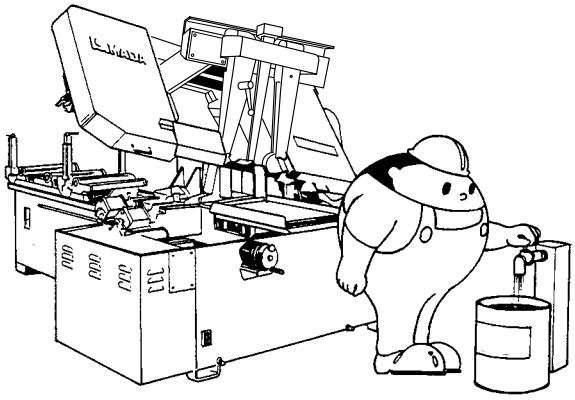


b) Never wear gloves and loose clothing when operating the machine. It is dangerous if they are caught in the running machine.

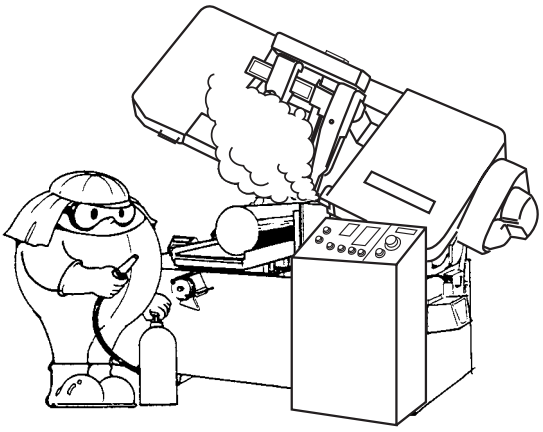


c) Use a water-soluble cutting fluid on this machine. Oil-based cutting fluids may emit smoke or catch fire, depending on the condition of their use (such as insufficient flow rate).

When using an oil-based cutting fluid, strictly observe the precautions described in “Cutting Method” on page xv.

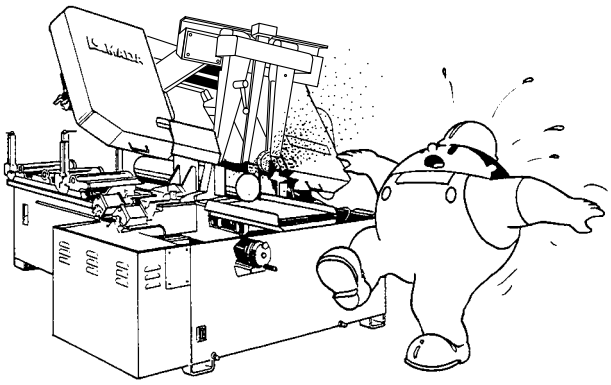


d) Be sure to prohibit any use of fire in the shop, and install a fire extinguisher or other fire control device near the machine when cutting titanium, magnesium, or any other material that produces flammable chips. Never leave the machine unattended when cutting flammable materials.



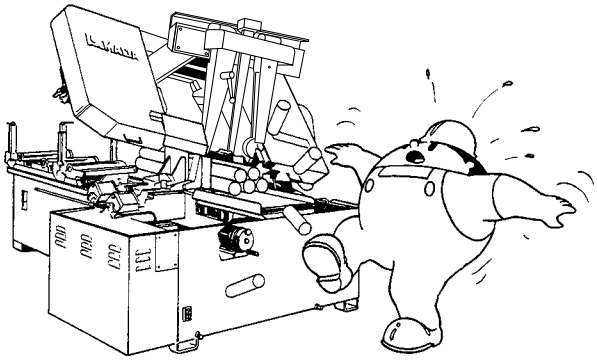
e) Never cut on this machine carbon or any other material that produces and disperses explosive dust. Sparks from motors and other machine parts may ignite and explode the air-borne dust.

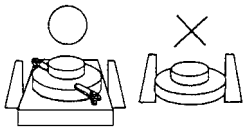
The machine needs special measures for cutting explosive materials (for details, refer to page xvi).



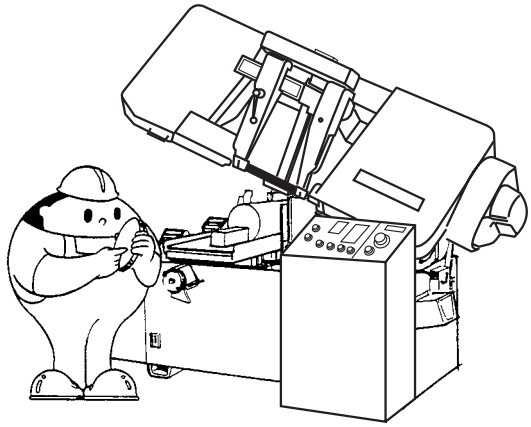
f) Be sure to confirm that the area around the machine is cleared of people and obstacles every time before starting the machine or operation.

g) Never start the saw blade unless it has been confirmed that the work is firmly clamped. If the work cannot be securely clamped with the vise, be sure to clamp it using jigs. It is dangerous if the work is clamped loosely and forced out of the vise during cutting.

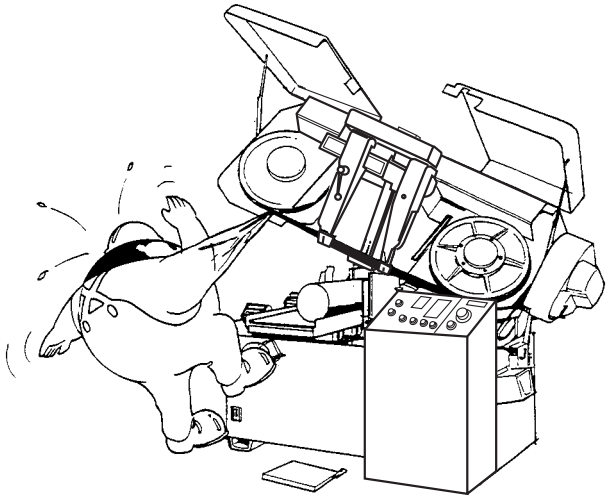




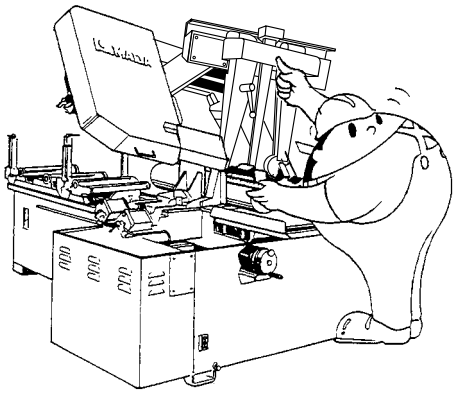
h) When cutting a thin or short piece from the work, take preventive measures to keep the cut piece from falling. It is dangerous if the cut piece falls or rolls.



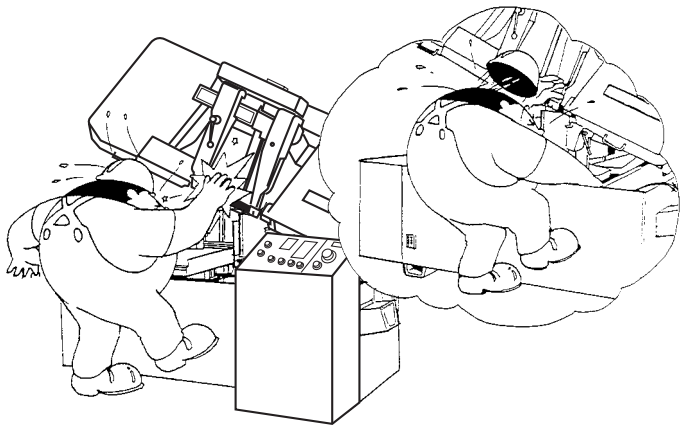
i) Never operate the machine with the wheel cover, the saw blade cover, and other covers removed or opened. It is dangerous if your hands or clothing are caught in the running machine.



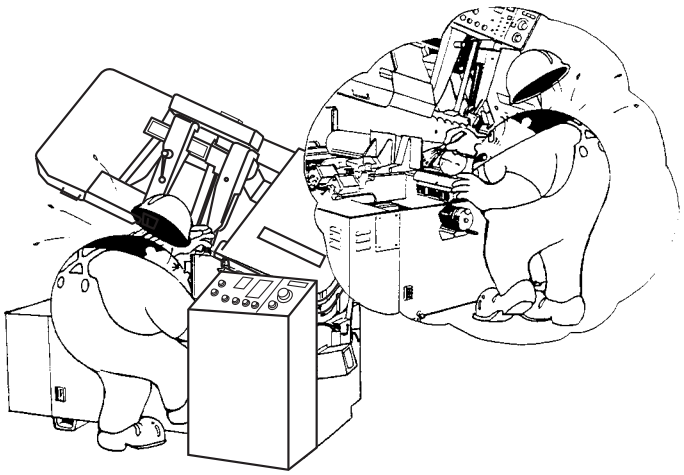
j) Never take your eyes off the machine or lean on the machine during operation. Be ready for a situation that demands immediate attention to prevent an accident.



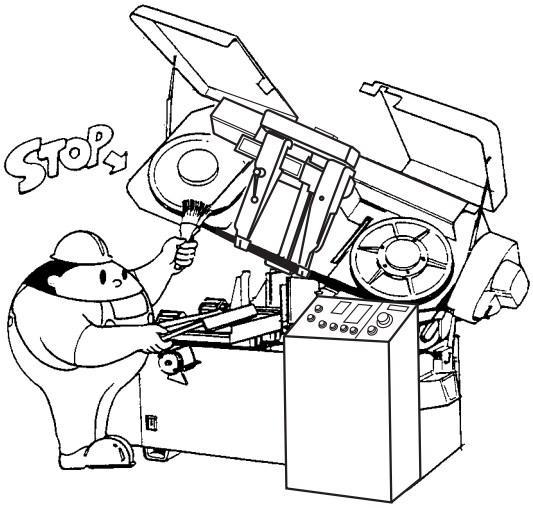
k) Never touch the running saw blade or chip conveyor. It is dangerous if your hands or clothing are caught in the running saw blade or chip conveyor.



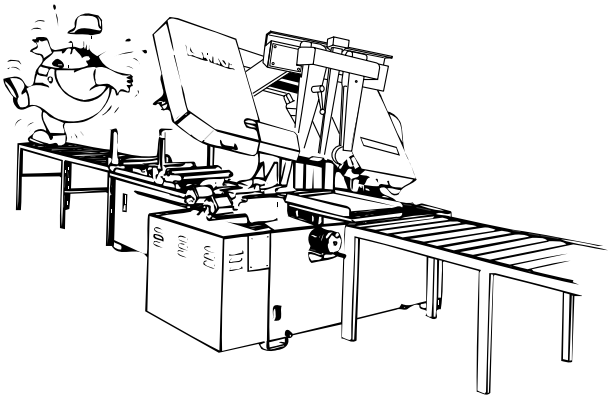
l) Never try to adjust the wire brush on the saw blade or remove chips when the saw blade is running. It is dangerous if your hands or clothing are caught in the running saw blade.



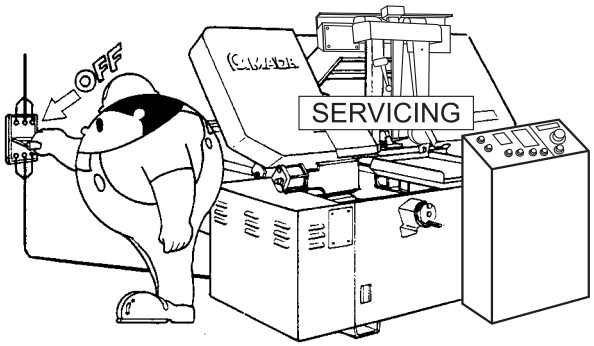
m) Stop the saw blade whenever cleaning the machine. It is dangerous if your hands or clothing are caught in the running saw blade.



n) Never step or stand on the roller table. It is dangerous if your foot slips on the rollers and you fall.



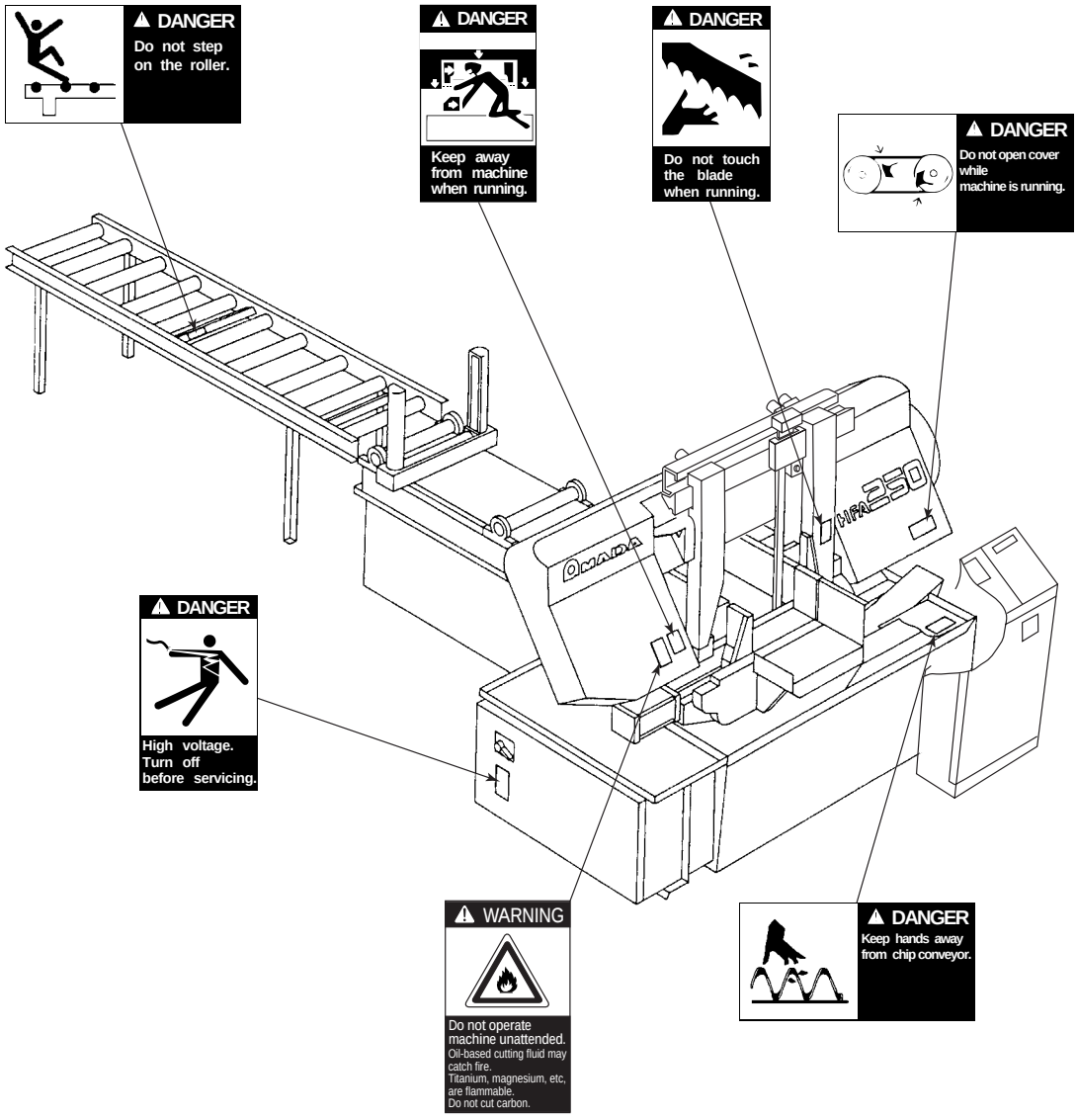
o) Turn off the shop circuit breaker switch before servicing the machine. Then post a sign to inform people that the machine is under maintenance.



p) Never modify the machine's parts or electric circuits or change them with unauthorized parts or circuits. Doing so will cause machine problems and damage and disrupt the safety of the machine and the operator.

DANGER and WARNING plates

Keep the DANGER and WARNING plates well noticeable and never remove them.



Hazard seriousness level

DANGER	**Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**
WARNING	**Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**
CAUTION	**Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

CUTTING PRECAUTIONS

The selection of an appropriate saw blade and cutting method is important in cutting the work safely and efficiently. Select an appropriate saw blade and cutting method by fully considering the work to be cut and the requirements of your job (such as cutting accuracy, cutting speed, economy, and safety control).

Selecting saw blade

The tooth form, pitch, and grade of an appropriate saw blade change with the material, shape, size, and fixing method of the work to be cut. An appropriate saw blade also varies with the requirements of your job (such as cutting accuracy, cutting speed, and economy) even when the same work is to be cut. Consult AMADA about the selection of saw blades for specific jobs.

The pitch of an appropriate saw blade for cutting round or rectangular bars is shown in the table below.

Saw blade pitches for cutting round or rectangular bars (teeth per inch)

Variable pitch	3-4		2-3				
Regular pitch	6	4	3			2	
Maximum cutoff width mm {in.}	50 or less {2 or less}	50 to 100 {2 to 3.9}	100 to 150 {3.9 to 5.9}	150 to 200 {5.9 to 7.9}	200 to 250 {7.9 to 9.8}	250 to 300 {9.8 to 11.8}	300 or more {11.8 or more}

Cutting method

According to its material, the work may be cut wet (or with a cutting fluid), or dry (or without a cutting fluid). The materials to be cut wet or dry are listed in the table below.

Wet cutting

Use a water-soluble cutting fluid on this machine.

Select an appropriate cutting fluid by referring to Appendixes 1 to 3. The main composition and characteristics of cutting fluids vary from manufacturer to manufacturer. Some cutting fluids may adversely affect the human body. For the main composition, characteristics, effect on the human body, and other details, consult the manufacturers of specific cutting fluids. Do not use cutting fluids of unknown composition.

Oil-based cutting fluids may emit smoke or catch fire, depending on the condition of their use. When using an oil-based cutting fluid on the machine, strictly observe the following precautions:

- When the cutting operation is continued with an insufficient discharge of the cutting fluid, the cutting fluid may emit smoke or catch fire. Take care so that the cutting fluid is discharged in a sufficient amount during the cutting operation.
- Some cutting fluids may degrade the cutting fluid hose. Periodically inspect the cutting fluid hose for any leakage of the cutting fluid. As soon as the cutting fluid hose is found to be leaking, change it.
- When covered with the cutting fluid, dust is very flammable. Be sure to clean the machine every day.
- When the oil-based cutting fluid is used for cutting a flammable material like titanium or magnesium, the risk of fire is much higher than when a water-soluble cutting fluid is used. Strictly observe the precautions described in "Cutting Flammable Materials" on page xvii.
- Install a fire extinguisher or other fire control device near the machine to provide against a fire.
- Never leave the machine unattended during the cutting operation.

Never use oils other than cutting fluids (kerosene, for example) because they have the high possibility of causing a fire.

Dry cutting

The machine needs special measures for performing dry cutting. Consult AMADA. If dry cutting is performed without taking special measures, chips may accumulate in machine parts and may cause the operation or insulation failure of the machine.

The machine also needs special measures for cutting carbon and other materials that produce and disperse explosive dust. Consult AMADA. If such an explosive material is cut on the machine without special measures, sparks from motors and other machine parts may ignite and explode the air-borne dust.

Even if the machine is equipped with special measures for cutting explosive materials, carbon and other air-borne dust may still explode. Be sure to prohibit any use of fire in the shop and install a fire extinguisher or other fire control device near the machine. Never leave the machine unattended during cutting operation.

Materials to be cut wet or dry

	JIS	DIN	NF	BS	AISI
Wet Cutting	SUM11–43 SS S20C–S55C SUP3–13 SCr415–445 SCM415–822 SNC415–815 SNCM220–815 SUS201–631 SK1–7 SKS2–5,7– SKD1,11,12 SKT SKH2–59 SF Aluminum Aluminum alloy Copper Copper alloy Magnesium Titanium Nickel base alloy Monel Inconel	9S20–9SMn36 St33–St52-3 CK22–CK55 (C22–C55) 55Cr3–50CrV4 34Cr4–41Cr4 34CrMo4–42CrMo4 X10CrNiS189–X20Cr13 C105W1–C70W2 105WCr6 X210Cr12 X155CrVMo12 1 X100CrVMo5 1 55NiCrMoV6 S18-1-2-5–S2-10-1-8 St37-3–St52-3 Aluminum Aluminum alloy Copper Copper alloy Magnesium Titanium Nickel base alloy Monel Inconel	S250Pb–45MF6.3 1C22–1C55 55C3–50CV4 20MC5–45C4 18CD4–42CD4 30NC11 20NCD2 Z10CNF18.09–Z20C13 $Y_2$140–$Y_1$70 105WC13 Z200C12 Z160 CDV12 Z100 CDV5 55NCDV7 Z80WCV18-04-01– Z110DKCWV09-08-04-02-01 F37–F52 Aluminum Aluminum alloy Copper Copper alloy Magnesium Titanium Nickel base alloy Monel Inconel	220M07–226M44 40A–50F 070M20–070M55 250A53–735A50 530A30–530A40 708M20–708A47 655M13 805A20 303S21–420S29 BW1C–BW1A BD3 BD2 (BA2) BH19 BT1–BM42 Aluminum Aluminum alloy Copper Copper alloy Magnesium Titanium Nickel base alloy Monel Inconel	1110–1144 30–70 1020–1055 1075–6150 5120–5147 4130–4145 8615–4340 303–420 W1-13–W1-7 D3 D2 (A2) H19 T1–M42 Class A–D Aluminum Aluminum alloy Copper Copper alloy Magnesium Titanium Nickel base alloy Monel Inconel
Dry Cutting	FC10–35 FCMB FCMP SKD1 Carbon	GG10–GG35 GTS-35-10 X210Cr12 Carbon	Ft10D–Ft35 Z200C12 Carbon	150–350 B150/4–B690/2 BD3 Carbon	A48-20B–A48-50B 45006–90001 D3 Carbon

Cutting flammable materials

Chips of titanium or magnesium violently burn when they catch fire. Once these chips burn, the resultant fire may explosively propagate through surrounding chips. When an oil-based cutting fluid is used on the machine, it may also be ignited and spread the fire.

When cutting such flammable materials, be sure to clean the machine of accumulated chips at the start and end of every operation. During automatic operation, stop the machine as required to remove the chips. Take care so that the cutting fluid is discharged in a sufficient amount during the cutting operation.

When cutting a flammable material, be sure to prohibit any use of fire in the shop, install a fire extinguisher or other fire control device near the machine. Never leave the machine unattended during the cutting operation.

When carrying or disposing of chips, take due care so that they do not catch fire. Be sure to prohibit any use of fire where the chips are stored.

Cutting unknown materials

Before cutting an unknown material, consult the supplier of the material, burn a small amount of chips from the material in a safe place, or follow any other procedure to check to see if the material is flammable or not.

Appendix 1: Classification of cutting fluids

Water-soluble cutting fluids

	Color when diluted	Main composition
Soluble	Milky white or clear	Mineral oil
Semi-synthetic	Clear	Mineral oil
Synthetic	Clear	Polymer

NOTE

● Dilute each product to the specified ratio.

Oil-based cutting fluids

	Main composition
Straight mineral oil	Mineral oil
Fatty oil	Animal or vegetable oil
Mixed oil	Mixture of straight mineral oil and fatty oil
Chlorinated oil	Straight mineral oil or mixed oil with addition of chlorine compound
Sulfurized oil Active: Heavy cutting Inert: Light cutting	Straight mineral oil or mixed oil with addition of sulfur compound
Sulfochlorinated oil Active: Heavy cutting Inert: Light cutting	Straight mineral oil or mixed oil with addition of chlorine and sulfur compounds

Appendix 2: Characteristics of cutting fluids

Water-soluble cutting fluids

Advantage	Disadvantage
• Have high cooling effect • Not flammable • Economical • Do not require cleaning of cut products (especially when soluble)	• Remove paint • Lose rust protection effect when deteriorated • Foam • Putrefy • Decline in performance, depending on quality of water used for dilution

Oil-based cutting fluids

Advantage	Disadvantage
• Have high lubricating effect (suited for heavy cutting) • Have high cooling effect at elevated temperatures • Prevent chip weldment (suited for heavy cutting) • Provide high corrosion protection for nonferrous materials (inert type)	• Smoke • Flammable • Corrosive to nonferrous materials (active type)

Appendix 3: Cutting fluids suited for specific materials

This table shows the general machinability of materials with different cutting fluids. Some materials may be cut better with an oil-based cutting fluid than a water-soluble cutting fluid. When using an oil-based cutting fluid, strictly observe the precautions described in "Cutting Method" on page xv.

JIS	SUM11–43 FC10–35 S20C–S30C FCMB SS	S40C–S55C SCM415–822 SNCM220–815 SKS2, 4, 5 SF	SCr415–445 SUP3–13 SNC415–815 SK1–7 SKS3, 7– SUS201–631 SKD1, 11, 12 SKH2–59 SKT	Aluminum Aluminum alloy Magnesium Copper Copper alloy Titanium	Nickel base alloy Monel Inconel
DIN	9S20–9SMn36 GG10–GG35 CK22–CK35 (C22–C35) GTS-35-10 St33–St52-3	CK45–CK55 (C45–C55) 34CrMo4–42CrMo4 St37-3–St52-3	34Cr4–41Cr4 55Cr3–50CrV4 C105W1–C70W2 X10CrNiS189–X20Cr13 105WCr6 X210Cr12 X155CrVMo12 1 X100CrVMo5 1 S18-1-2-5–S2-10-1-8 55NiCrMoV6	Aluminum Aluminum alloy Magnesium Copper Copper alloy Titanium	Nickel base alloy Monel Inconel
NF	S250Pb–45MF6.3 Ft10D–Ft35 1C22–1C25	1C45–1C55 18CD4–42CD4 20NCD2 F37–F52	20MC5–45C4 55C3–50CV4 30NC11 $Y_2$140–$Y_1$70 Z10CNF18.09–Z20C13 105WC13 Z200C12 Z160CDV12 Z100CDV5 Z80WCV18-04-01– Z110DKCWV09-08-04-02-01 55NCDV7	Aluminum Aluminum alloy Magnesium Copper Copper alloy Titanium	Nickel base alloy Monel Inconel
BS	220M07–226M44 150–350 070M20–080A30 40A–50F	060A40–070M55 708M20–708A47 805A20	530A30–530A40 250A53–735A50 655M13 BW1C–BW1A 303S21–420S29 BD3 BD2 (BA2) BT1–BM42 BH19	Aluminum Aluminum alloy Magnesium Copper Copper alloy Titanium	Nickel base alloy Monel Inconel
AISI	1110–1144 A48-20B–A48-50B 1020–1030 30–70	1040–1055 4130–4145 8615–4340 Class A–D	5120–5147 1075–6150 W1-13–W1-7 303–420 D3 D2 (A2) T1–M42 H19	Aluminum Aluminum alloy Magnesium Copper Copper alloy Titanium	Nickel base alloy Monel Inconel
Soluble	▲	●	●	●	▲
Semi-synthetic	▲	●	●	●	▲
Synthetic	●	●	▲	●	▲
Oil-based	×	▲	▲	▲	●

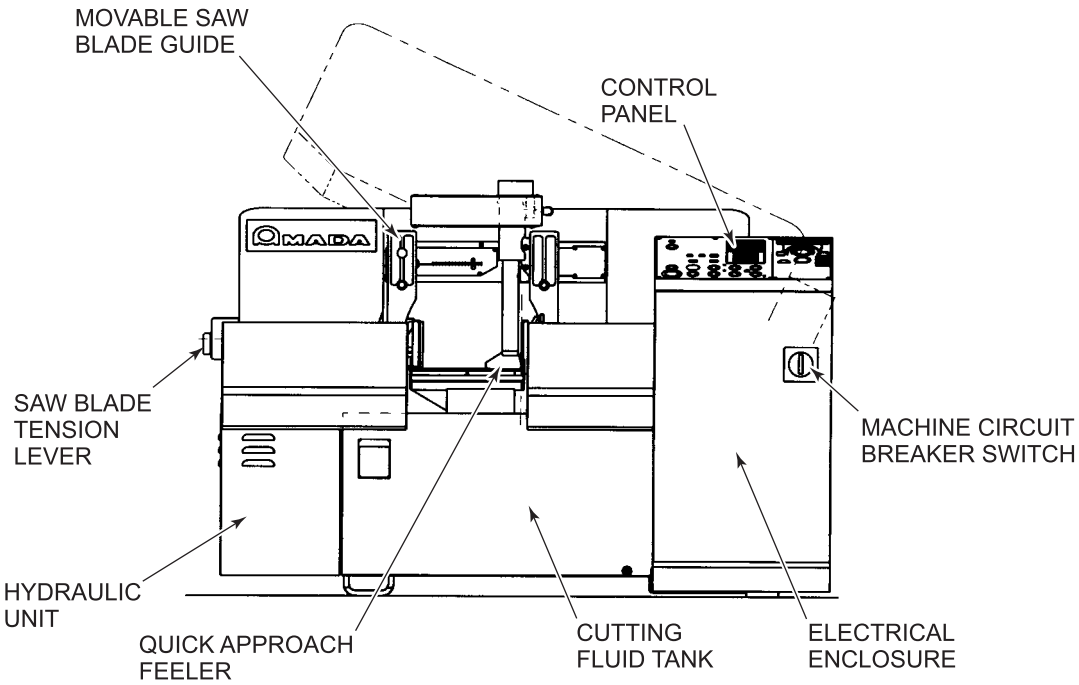
●: Best ▲: Good ×: Not good

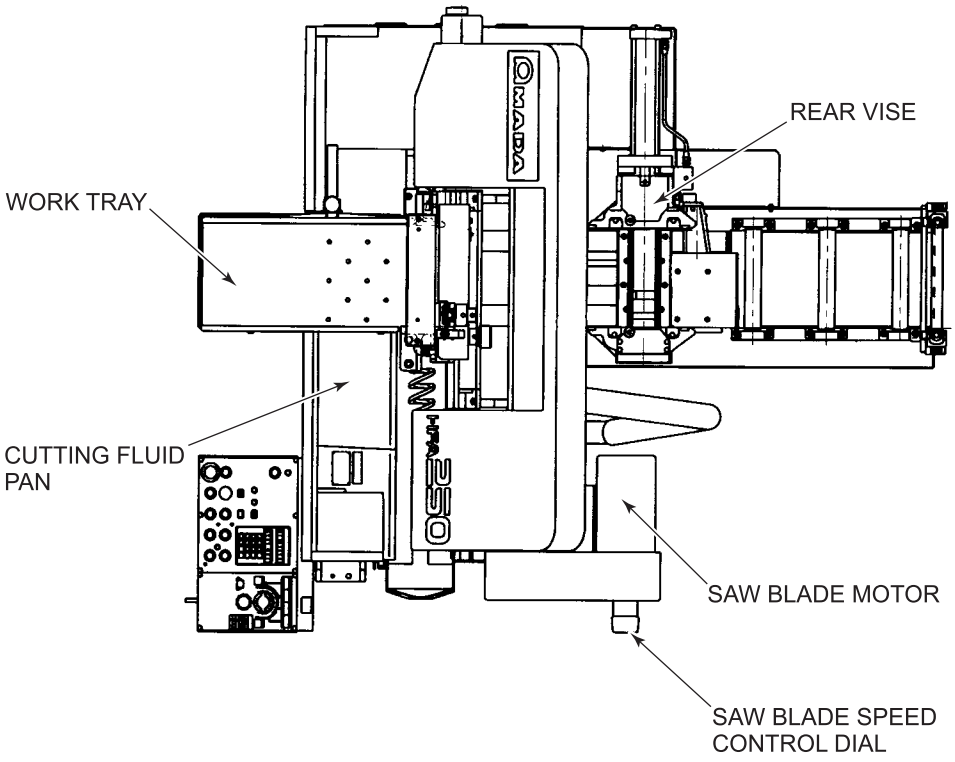
Part I

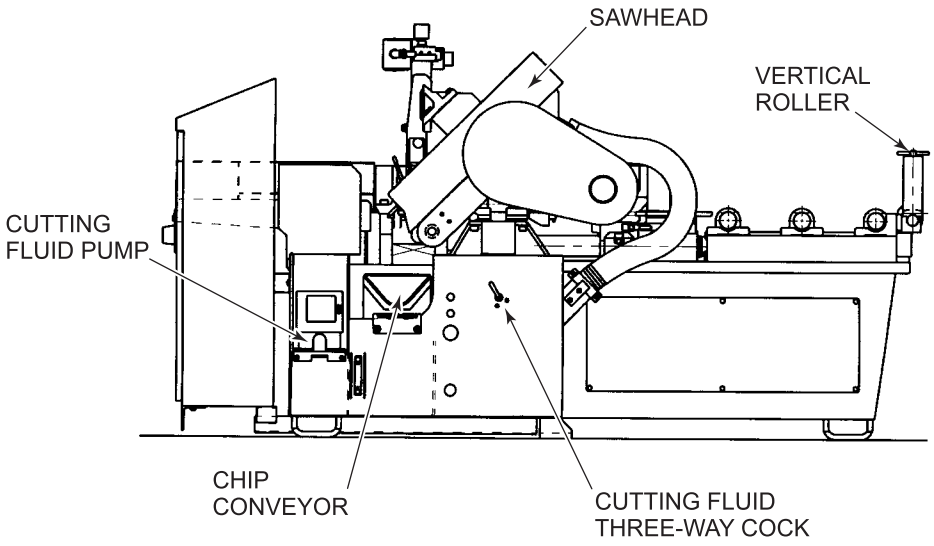
Description

IDENTIFICATION OF MACHINE PARTS

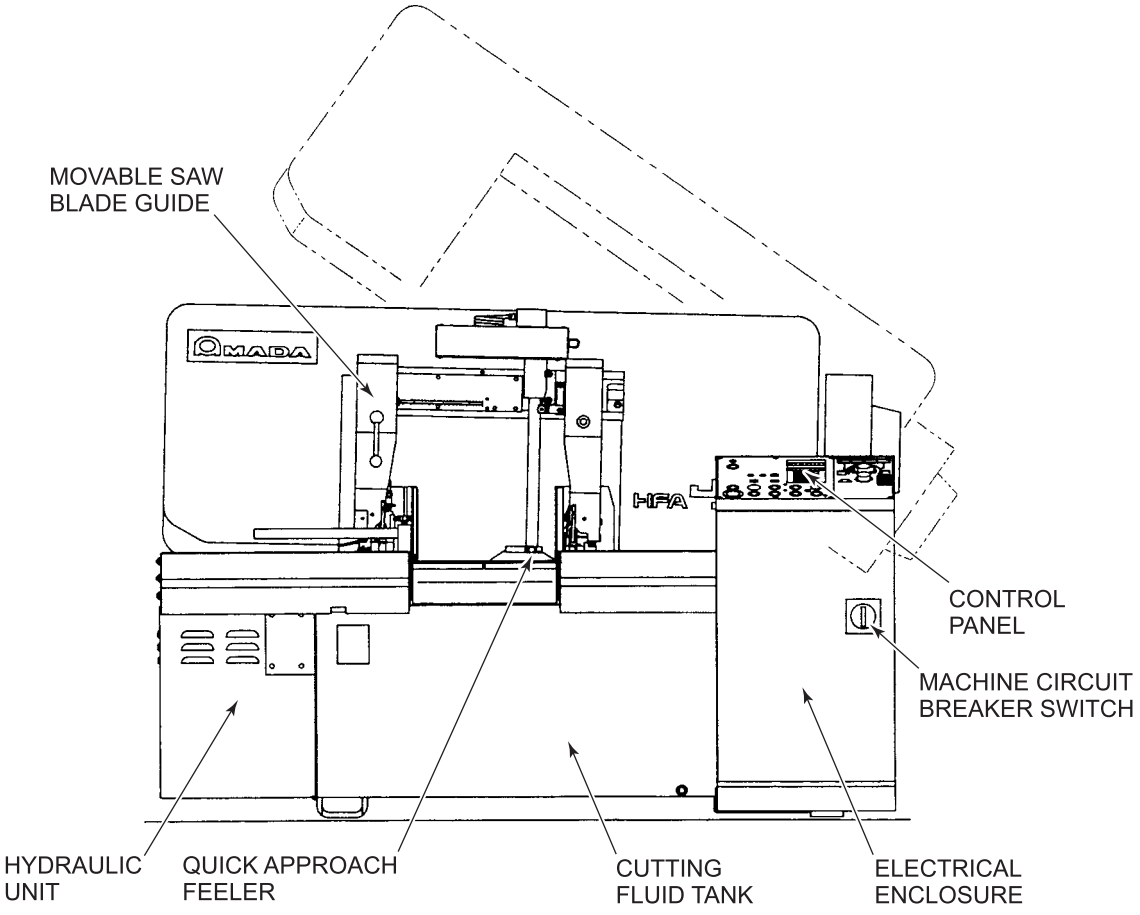
HFA-250 and HFA-250W machines

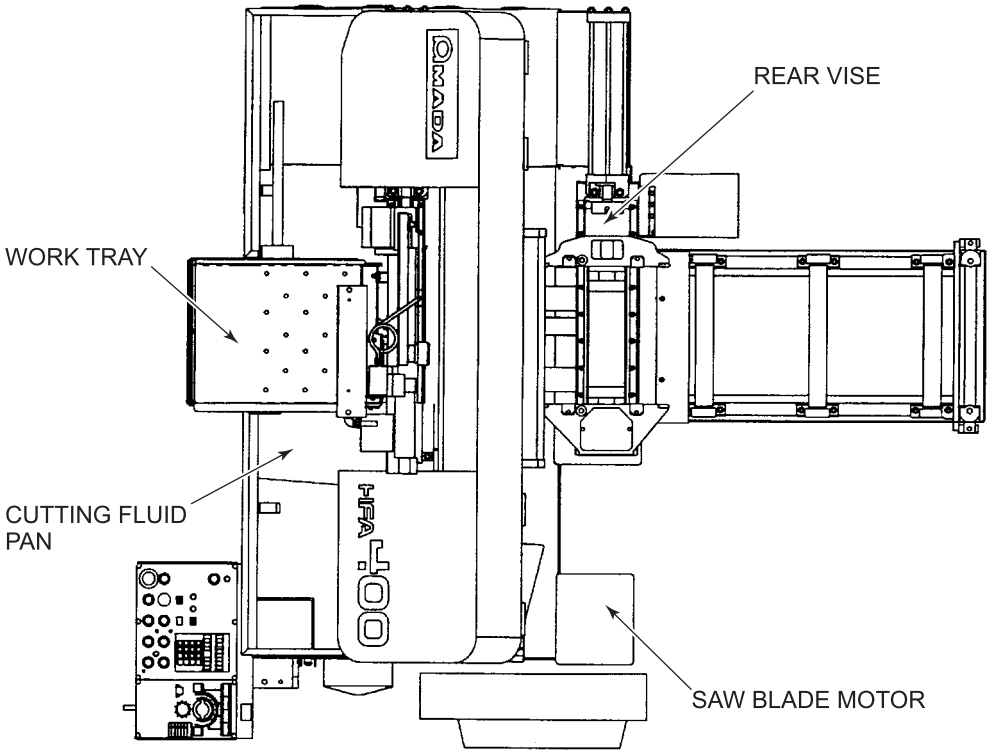


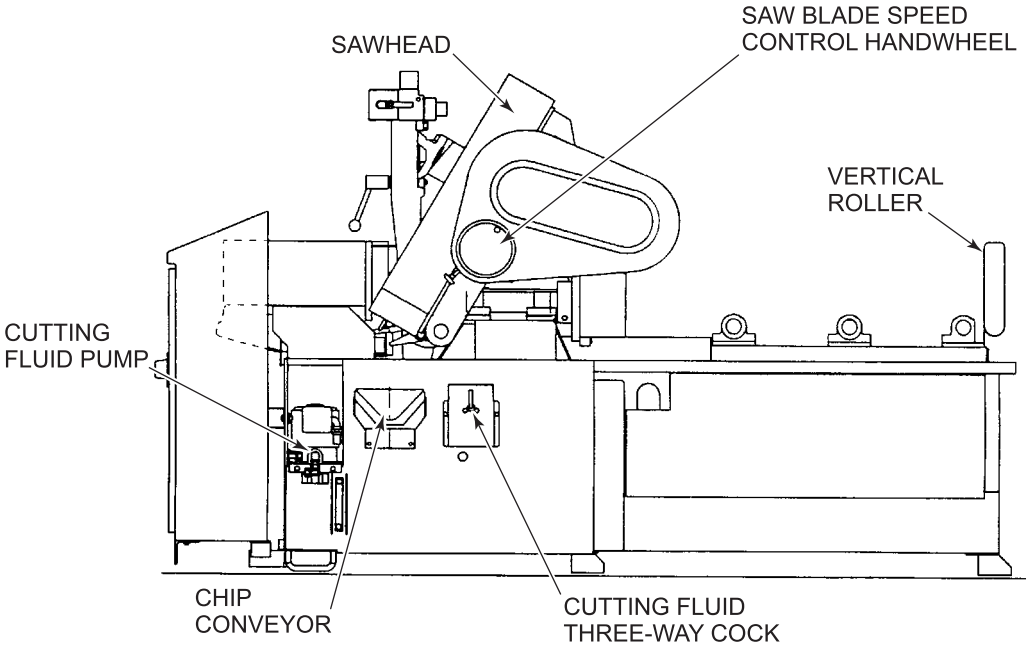

REAR VISE
WORK TRAY
CUTTING FLUID
PAN
SAW BLADE MOTOR
SAW BLADE SPEED
CONTROL DIAL


SAWHEAD
VERTICAL
ROLLER
CUTTING
FLUID PUMP
CHIP
CONVEYOR
CUTTING FLUID
THREE-WAY COCK

HFA-400 and HFA-400W machines




REAR VISE
WORK TRAY
CUTTING FLUID
PAN
SAW BLADE MOTOR
OMADA
HFA 100


SAWHEAD
SAW BLADE SPEED
CONTROL HANDWHEEL
VERTICAL
ROLLER
CUTTING
FLUID PUMP
CHIP
CONVEYOR
CUTTING FLUID
THREE-WAY COCK

SPECIFICATIONS

HFA-250 and HFA-250W machines

Cutting capacity	Single cutting	Round work (diameter)*	250 mm {9.84 in.}
		Rectangular work (H × W)*	250 × 300 mm {9.84 × 11.81 in.} 250 × 270 mm {9.84 × 10.63 in.} when machine is equipped with optional runout detector
	Stack cutting (H × W)		50 × 150 mm {1.97 × 5.91 in.} to 150 × 150 mm {5.91 × 5.91 in.}
Motors	Saw blade motor		HFA-250: 2.2 kW {3.0 HP}, 4P HFA-250W: 3.7 kW {5.0 HP}, 4P
	Hydraulic pump motor		0.75 kW {1.0 HP}, 4P
	Cutting fluid pump motor		0.18 kW {0.24 HP}, 2P
Environment	Power source		3-phase, 400 VAC ± 10%, 50 Hz
	Temperature		Operating: 0 to 40°C {32 to 104 °F} Nonoperating: –5 to 50°C {23 to 122 °F}
	Humidity		Operating: 30 to 90% Nonoperating: 10 to 95% (noncondensing)
Control circuit voltage			AC 100 V, DC 24 V, DC 12 V
Saw blade	Dimensions (W × T × L)		HFA-250: 25 × 0.95 × 3505 mm {1 in. × 0.037 in. × 11 ft 6 in.} HFA-250W: 32 × 1.066 × 3505 mm {1-1/4 in. × 0.042 in. × 11 ft 6 in.}
	Speed		HFA-250: 20 to 80 m/min {66 to 262 fpm}, stepless shift HFA-250W: 24 to 90 m/min {79 to 295 fpm}, stepless shift
	Tension control		Hydraulic powered, with saw blade breakage and slip detection functions
	Guide	Side	Insert 4-point support, bearing twist
		Back	Bearing, seesaw support
Vise operation			Hydraulic full-stroke cylinder
Cutting fluid	Tank capacity		85 liters {22.4 US gal}
	Pump type		Centrifugal pump
	Pump capacity		20 liters/min {5.3 US gal/min}

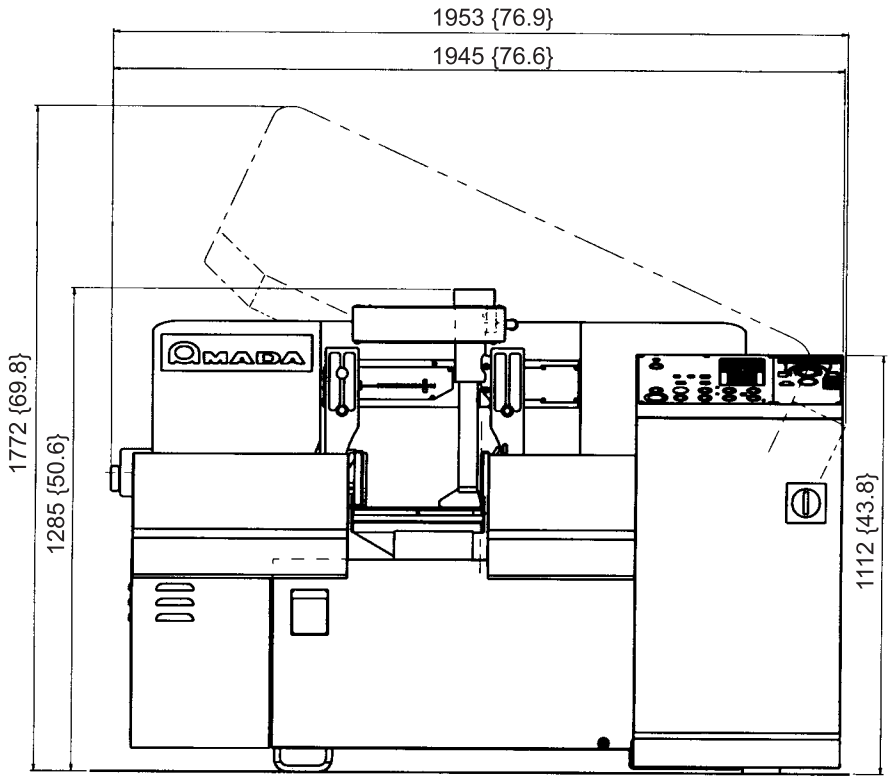
*When automatic operation is to be performed, work must be at least 30 mm {1.18 in.} in diameter or width.

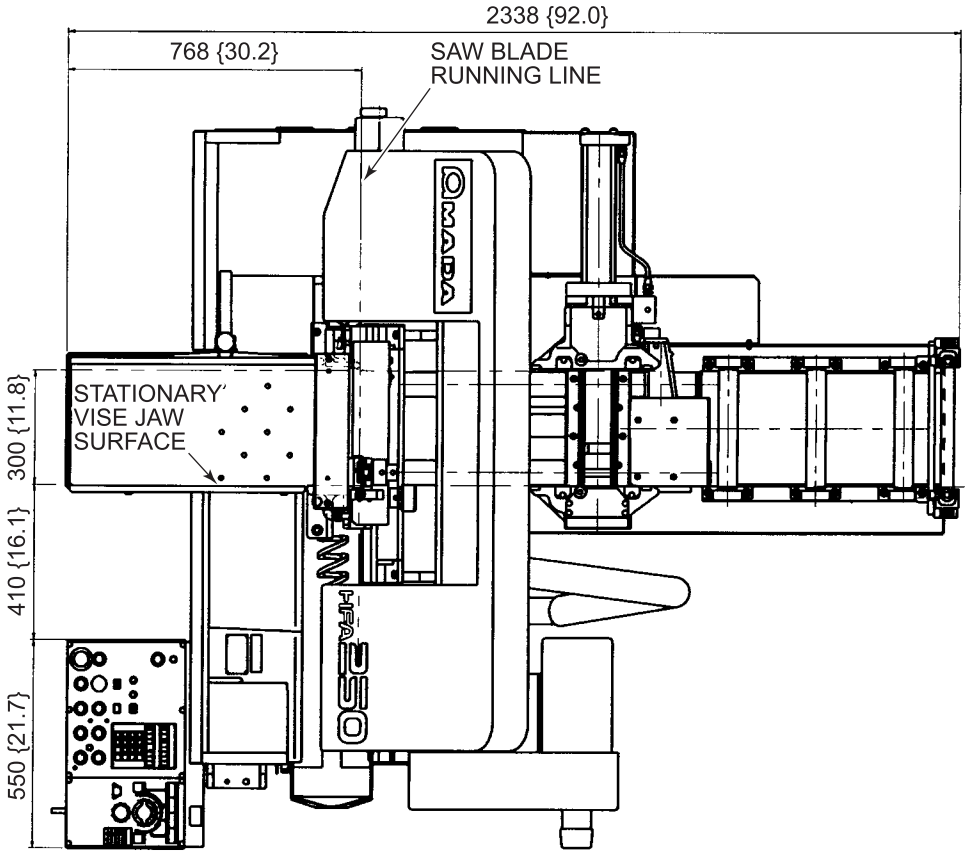
Hydraulic	Tank capacity		30 liters {7.9 US gal}
	Pump type		Variable-discharge vane pump
	Pump capacity		15 liters/min {3.9 US gal/min}
	Pressure setting		2.7 MPa {27 kgf/cm^2 or 384 psi}
Saw blade control	Up	Automatic	Hydraulic automatic rise (automatic stop at upper limit)
		Manual	Inching up by pushbutton operation
	Rise height setting		Automatic setting with quick approach feeler
	Down	Automatic	Rapid approach with quick approach feeler
		Manual	Inching down by pushbutton operation
	Depth-of-cut control		Hydraulic pressure-flow control valve
	Slip detection		Automatic stop at overload, jamming, or breakage
Work feed	Type (capacity)		Hydraulic shuttle type, maximum stroke length of 400 mm {15.75 in.}, standby position selectable
	Remnant length [for clamp clearance of 10 mm {0.4 in.}]		Single cutting: 57 mm {2.24 in.}** Stack cutting: 188 mm {7.40 in.}
Chip disposal			Chip conveyor (automatic hydraulic screw type)
Table height			700 mm {27.6 in.}
Saw blade twist angle			45°
Allowable loading mass on machine			1500 kg {3310 lb}
Machine dimensions (W × D × H)			2035 × 2370 × 1772 mm {80.1 × 93.3 × 69.8 in.}
Machine mass			Approx. 1500 kg {3310 lb}

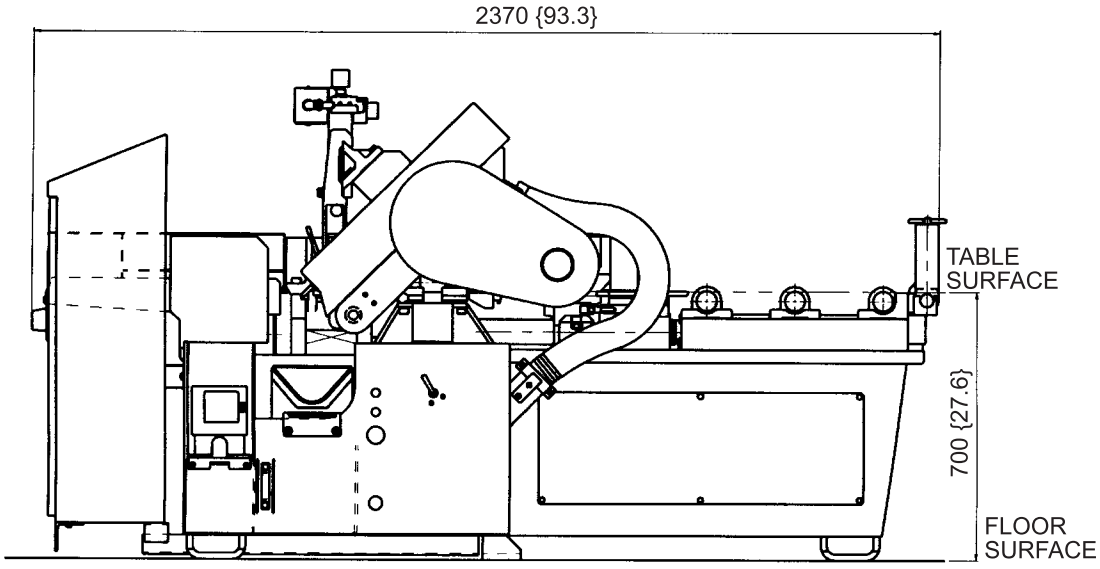
**When the machine is equipped with an optional head-end positioning function, the remnant must be 150 mm {5.91 in.} or longer when work with a diameter or height of less than 12 mm {0.47 in.} is to be fed.

Machine dimensions

Unit: mm {in.}




2338 {92.0}
768 {30.2}
SAW BLADE
RUNNING LINE
STATIONARY
VISE JAW
SURFACE
300 {11.8}
410 {16.1}
550 {21.7}
OMAPA
HFA250


2370 {93.3}
TABLE
SURFACE
700 {27.6}
FLOOR
SURFACE

HFA-400 and HFA-400W machines

Cutting capacity	Single cutting	Round work (diameter)*	420 mm {16.54 in.}
		Rectangular work (H × W)*	415 × 415 mm {16.34 × 16.34 in.} 400 × 400 mm {15.75 × 15.75 in.} when machine is equipped with optional runout detector
	Stack cutting (H × W)		50 × 180 mm {1.97 × 7.09 in.} to 200 × 300 mm {7.87 × 11.81 in.}
Motors	Saw blade motor		5.5 kW {7.4 HP}, 4P
	Hydraulic pump motor		1.5 kW {2.0 HP}, 4P
	Cutting fluid pump motor		0.18 kW {0.24 HP}, 2P
Environment	Power source		3-phase, 400 VAC ± 10%, 50 Hz
	Temperature		Operating: 0 to 40°C {32 to 104 °F} Nonoperating: –5 to 50°C {23 to 122 °F}
	Humidity		Operating: 30 to 90% Nonoperating: 10 to 95% (noncondensing)
Control circuit voltage			AC 100 V, DC 24 V, DC 12 V
Saw blade	Dimensions (W × T × L)		HFA-400: 32 × 1.066 × 4570 mm {1-1/4 in. × 0.042 in. × 15 ft} HFA-400W: 38 × 1.3 × 4570 mm {1-1/2 in. × 0.051 in. × 15 ft}
	Speed		15 to 90 m/min {49 to 295 fpm}, stepless shift
	Tension control		Hydraulic powered, with saw blade breakage and slip detection functions
	Guide	Side	Insert 4-point support, bearing twist
		Back	Bearing, seesaw support
Vise operation			Hydraulic full-stroke cylinder
Cutting fluid	Tank capacity		120 liters {31.7 US gal}
	Pump type		Centrifugal pump
	Pump capacity		60 liters/min {15.9 US gal/min} at lift of 4 m {13 ft}

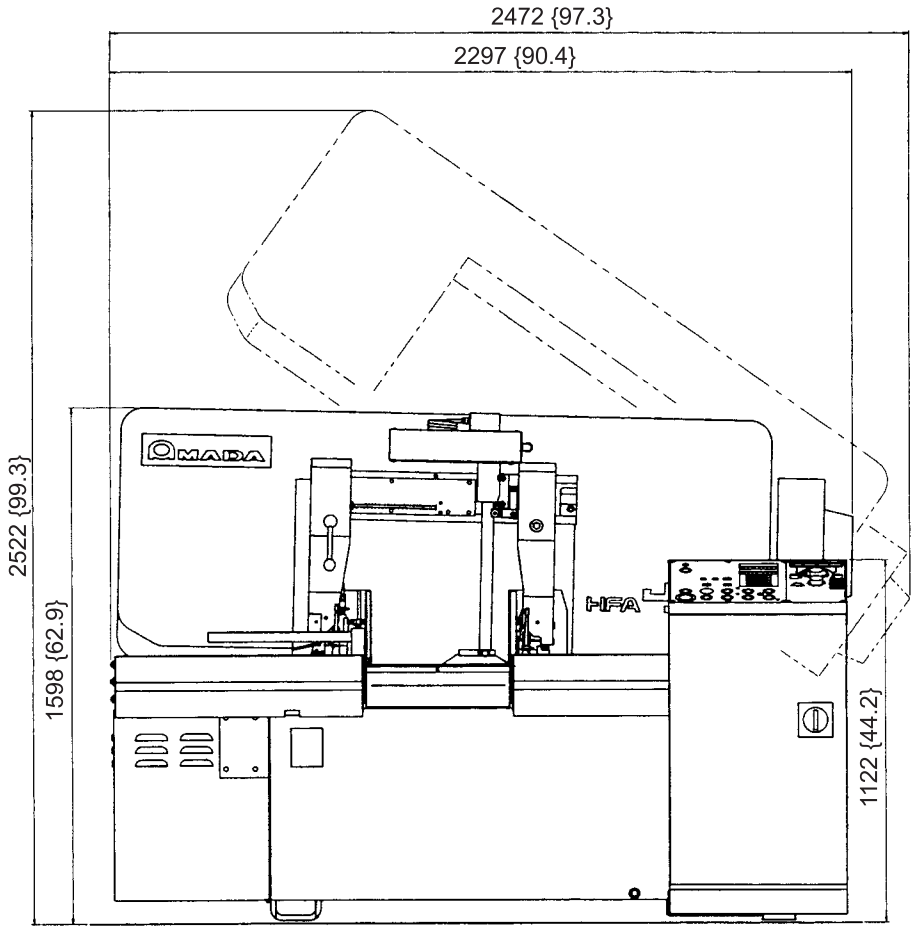
*When automatic operation is to be performed, work must be at least 30 mm {1.18 in.} in diameter or width.

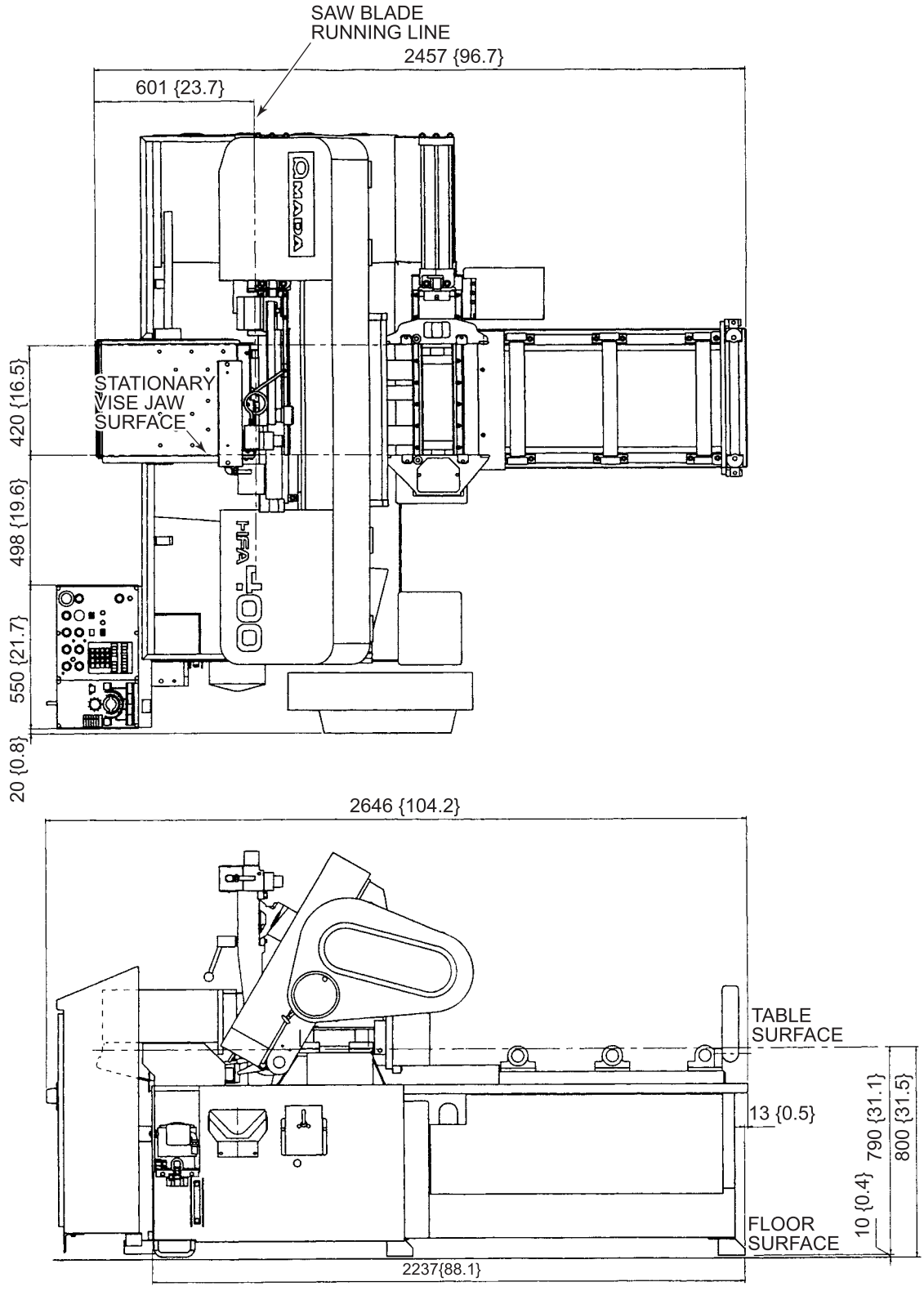
Hydraulic	Tank capacity		40 liters {10.6 US gal}
	Pump type		Variable-volume piston pump
	Pump capacity		22 liters/min {5.8 US gal/min}
	Pressure setting		3.5 MPa {35 kgf/cm^2 or 498 psi}
Saw blade control	Up	Automatic	Hydraulic automatic rise (automatic stop at upper limit)
		Manual	Inching up by pushbutton operation
	Rise height setting		Automatic setting with quick approach feeler
	Down	Automatic	Rapid approach with quick approach feeler
		Manual	Inching down by pushbutton operation
	Depth-of-cut control		Hydraulic pressure-flow control valve
	Slip detection		Automatic stop at overload, jamming, or breakage
Work feed	Type (capacity)		Hydraulic shuttle type, maximum stroke length of 400 mm {15.75 in.}, standby position selectable
	Remnant length [for clamp clearance of 10 mm {0.4 in.}]		Single cutting: 76 mm {2.99 in.}** Stack cutting: 214 mm {8.43 in.}
Chip disposal			Chip conveyor (automatic hydraulic screw type)
Table height			800 mm {31.5 in.}
Saw blade twist angle			60°
Allowable loading mass on machine			2500 kg {5510 lb}
Machine dimensions (W × D × H)			2472 × 2646 × 2522 mm {97.3 × 104.2 × 99.3 in.}
Machine mass			Approx. 2200 kg {4850 lb}

**When the machine is equipped with an optional head-end positioning function, the remnant must be 150 mm {5.91 in.} or longer when work with a diameter or height of less than 12 mm {0.47 in.} is to be fed.

Machine dimensions

Unit: mm {in.}




SAW BLADE
RUNNING LINE
2457 {96.7}
601 {23.7}
STATIONARY
VISE JAW
SURFACE
420 {16.5}
498 {19.6}
550 {21.7}
20 {0.8}
2646 {104.2}
TABLE
SURFACE
13 {0.5}
790 {31.1}
800 {31.5}
10 {0.4}
FLOOR
SURFACE
2237{88.1}

Sound level

HFA-250 and HFA-250W

L_A eq = 65 dB (A) no load

L_A eq = 77 dB (A) in normal use of machine
< 85 dB (A)

L_P peak < 130 dB

Measurements made:

- At a distance of 1 meter from front of machine and at height of 1.6 meters from floor.
- Work material: carbon steel, work diameter: 200 mm, saw blade running speed: 60 m/min, cutting rate: 60 cm^2/min, cutting fluid: water-soluble.

HFA-400 and HFA-400W

L_A eq = 66 dB (A) no load

L_A eq = 75 dB (A) in normal use of machine
< 85 dB (A)

L_P peak < 130 dB

Measurements made:

- At a distance of 1 meter from front of machine and at height of 1.6 meters from floor.
- Work material: carbon steel, work diameter: 250 mm, saw blade running speed: 65 m/min, cutting rate: 70 cm^2/min, cutting fluid: water-soluble.

Advice for decreasing sound level

- Change the saw blade with a new one if the sound level increases.
- Use the variable-pitch saw blade.
- Use the cutting fluid suited for the work material to be cut.

Automatic backgauge function

Number of input stations	99
Cutoff length	5.0 to 9999.9 mm in 0.1-mm increments, 0.197 to 99.999 inches in 0.001-inch increments 10.0 to 9999.9 mm {0.394 to 99.999 in.} when machine continues to operate automatically according to preset cutting data
Number of cut pieces	1 to 9999 per station
Kerf compensation	Automatic kerf compensation Also automatically calculated during feed of long work
Input method	Numeric-key input
Cutting data display	LCD screen
Memory backup	Yes (dedicated battery built in)

OPTIONAL ACCESSORIES

Name	Specification or type	Qty
Multi-vises	Used for stack cutting and hydraulically driven together Installed one each on front and rear vises Clamp width: 150 mm {5.9 in.} for HFA-250 and HFA-250W 180 to 300 mm {7.1 to 11.8 in.} for HFA-400 and HFA-400W Clamp height: 50 to 150 mm {2.0 to 5.9 in.} for HFA-250 and HFA-250W 50 to 200 mm {2.0 to 7.9 in.} for HFA-400 and HFA-400W	1 set
Vise pressure control valves	Pressure adjusting range: 1.0 to 2.7 MPa {10 to 27 kgf/cm^2, or 142 to 384 psi} for HFA-250 and HFA-250W 1.1 to 3.5 MPa {11 to 35 kgf/cm^2, or 156 to 498 psi} for HFA-400 and HFA-400W	1 set
Runout detector (factory option)	Digital display: 0.0 to ±99.9 mm in 0.1-mm increments 0.000 to ±9.999 inches in 0.001-inch increments Runout tolerance: Set in both of plus and minus directions Saw blade automatically stops when runout tolerance is exceeded	1 set
Roller table	Table length: 2 m {6.56 ft} Roller width: 330 mm {13.0 in.} for HFA-250 and HFA-250W 480 mm {18.9 in.} for HFA-400 and HFA-400W Allowable loading mass: 1000 kg/m {7230 lb/ft}	1
Roller stand	Height adjusting range: 650 to 780 mm {25.6 to 30.7 in.} for HFA-250 and HFA-250W 780 to 820 mm {30.7 to 32.3 in.} for HFA-400 and HFA-400W Roller width: 220 mm {8.7 in.} for HFA-250 and HFA-250W 416 mm {16.4 in.} for HFA-400 and HFA-400W Allowable loading mass: 600 kg {1320 lb} for HFA-250 and HFA-250W 1500 kg {3310 lb} for HFA-400 and HFA-400W	1
Head-end positioning function (factory option)	Round bar diameter of 20 mm {0.79 in.} or less and flat bar thickness of 12 mm {0.47 in.} or less are out of specification Grooveless vise plate is optional	1 set
Rotating beacon lights (factory option)	Yellow and red beacon lights flash to indicate that machine has stopped at end of automatic operation and at occurrence of alarm, respectively. Green beacon light illuminates to indicate that cutting is under way.	1
Wheel cover open limit switch (factory option)	Safety device to stop saw blade running when wheel cover is opened	1 set

Part II

Installation

LOCATION

Install the machine on a firm and level floor. It is best to install the machine on a concrete floor to prevent distortion from ground subsidence, among other things.

Place base plates (150 mm {5.91 in.} square and 12 mm {0.47 in.} thick) where the machine is to be located. There is no particular need to install the machine on a raised foundation, but if the machine is likely to vibrate, secure its legs with anchor bolts. (See the foundation drawing below).

Allow enough space around the machine for loading work, unloading cut-off pieces, and for maintaining and inspecting the machine.

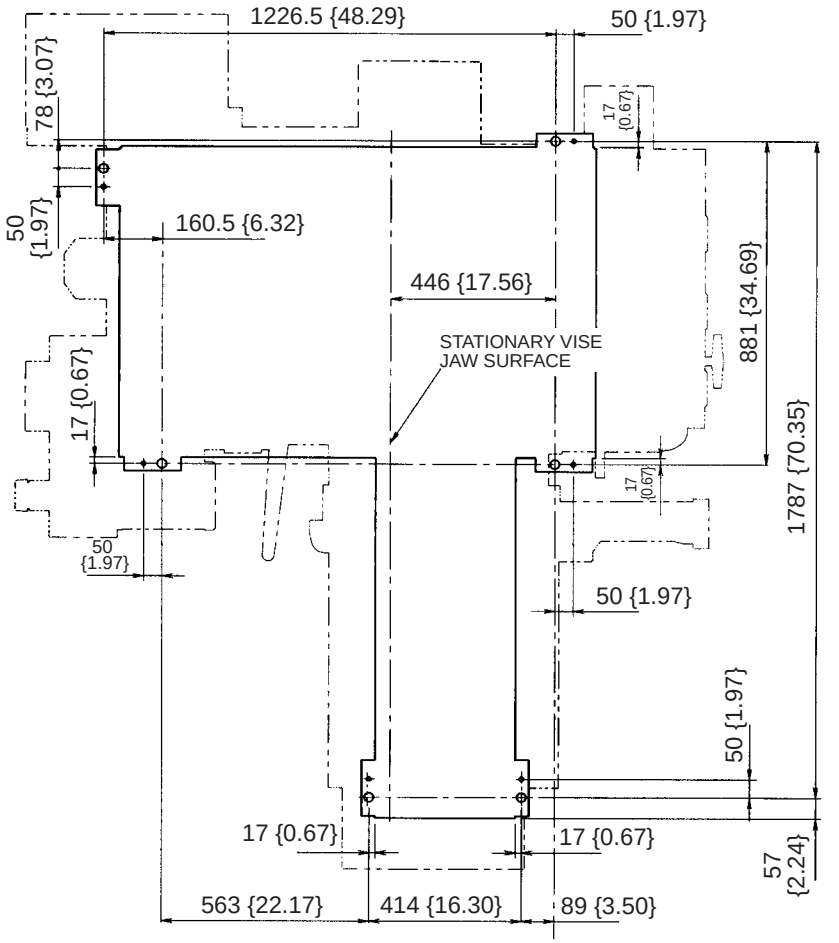
HFA-250 and HFA-250W foundation drawing

Position where machine leg rests on floor: ▭

Leveling bolt position: ●

Anchor bolt position: ○

Unit: mm {in.}



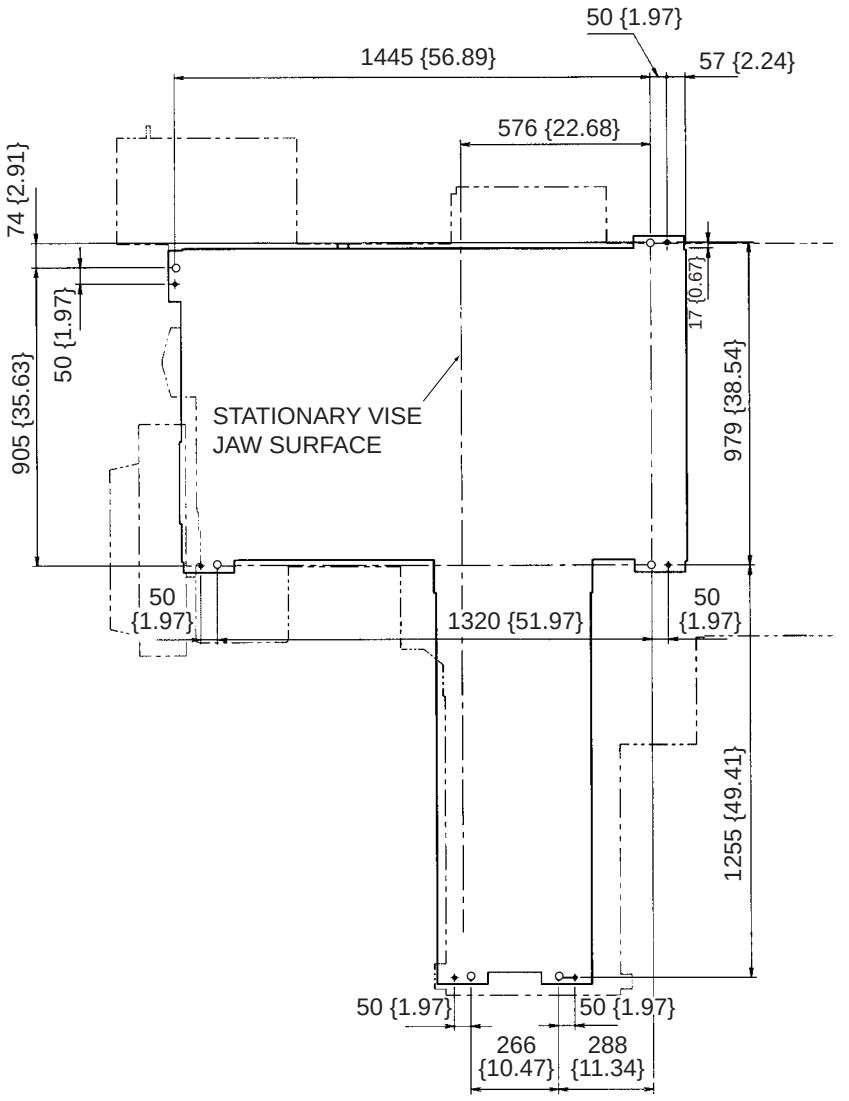
HFA-400 and HFA-400W foundation drawing

Position where machine leg rests on floor: ▭

Leveling bolt position: ●

Anchor bolt position: ○

Unit: mm {in.}



CARRYING

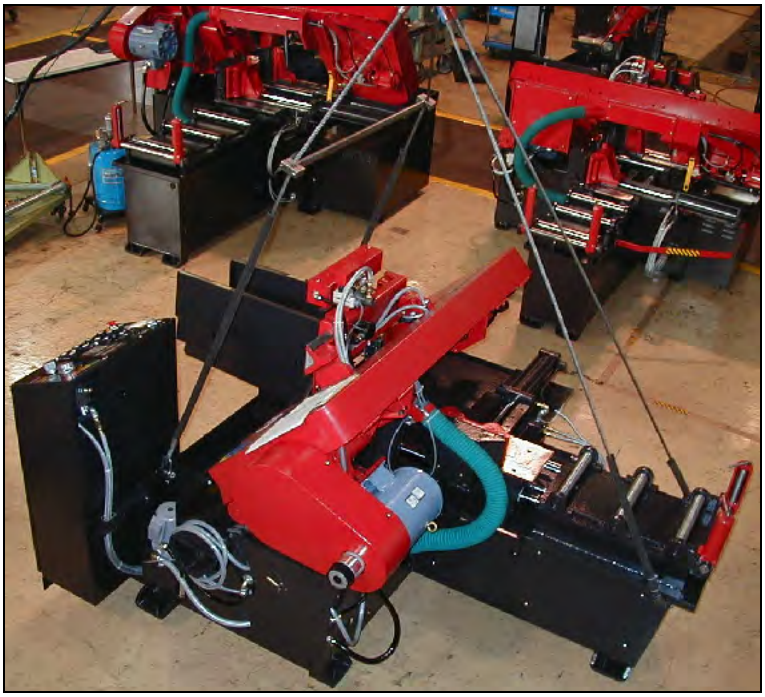
WARNING

- **Carrying the machine is not only likely to damage the machine, but also is very dangerous. Have a qualified contractor perform the carrying work.**
- **Be absolutely sure that the crane, wire ropes, or forklift used to carry the machine are strong enough to handle the machine's mass.**

The mass of the machine is as follows:

HFA-250 and HFA-250W: Approx. 1500 kg {3310 lb}
HFA-400 and HFA-400W: Approx. 2200 kg {4850 lb}

Carry the machine to its location by using a crane or forklift. If a crane is used, apply the wire rope sling to the front and rear of the machine, and slowly lift the machine. Do not apply impact to the machine when lifting or lowering it.



If a forklift is used, insert the forks under the front of the machine, and lift the machine. Carry the machine to its location while balancing it and applying no impact to it.

CLEANING

After the machine has been installed in place, wipe off unnecessary rust-preventive grease with a cloth dampened with kerosene.

Apply machine oil to the machine surfaces that are susceptible to rusting.

NOTICE

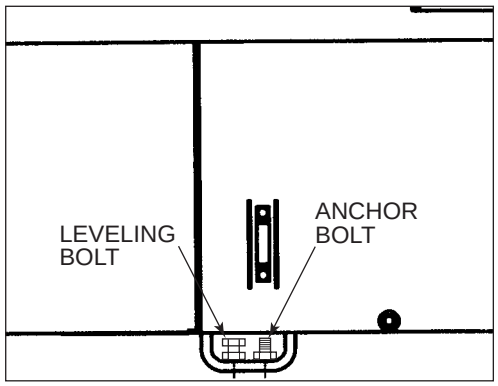
- If the rust-preventive grease is washed with a cutting fluid, the cutting fluid pump may be clogged, resulting in failure. Be sure to wipe off with kerosene.
- If the rust-preventive grease is removed with a scraper or the like, or the painted surfaces are wiped with a thinner or other solvent, the machine may be damaged or the paint may be removed.

LEVELING

Place spirit levels on the front vise bed and rear vise bed (front and rear vise slide plates), and turn the leveling bolts so that the machine is leveled front to back and left to right.

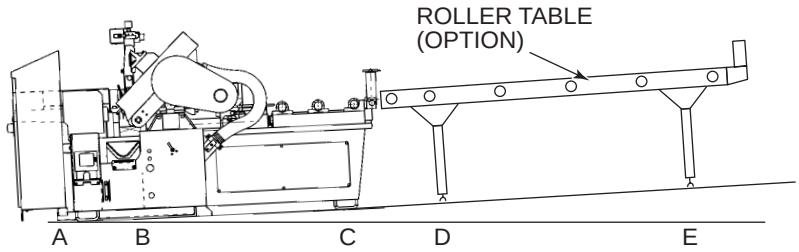
NOTE

- Make sure that the leveling bolts equally carry the mass of the machine.



Adjust the machine in the front-to-back direction to about 5/1000 with a spirit level so that the cutting fluid can return well (see the figure below).

Check with a ruler or the like to see that the front vise bed surface, rear vise bed surface, work feed roller surface, and optional roller table surface are flush with each other. Be sure that the roller surface is flush with or higher by a maximum of 0.12 mm {0.005 in.} than the rear vise table surface.

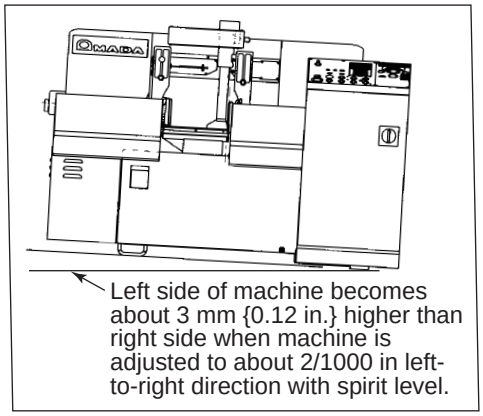


When HFA-250 and HFA-250W machines are adjusted to about 5/1000 in front-to-back direction with spirit level, surfaces B, C and D become about 4 mm {0.16 in.}, 8 mm {0.31 in.} and 12 mm {0.47 in.} higher than surface A, respectively.

When HFA-400 and HFA-400W machines are adjusted to about 5/1000 in front-to-back direction with spirit level, surfaces B, C and D become about 5 mm {0.20 in.}, 11 mm {0.43 in.} and 13 mm {0.51 in.} higher than surface A, respectively.

Adjust the machine level or to about 2/1000 in the left-to-right direction with another spirit level. (See the figure at right.)

If the machine is higher at the right side than at the left side, the cutting fluid will not be recovered well.



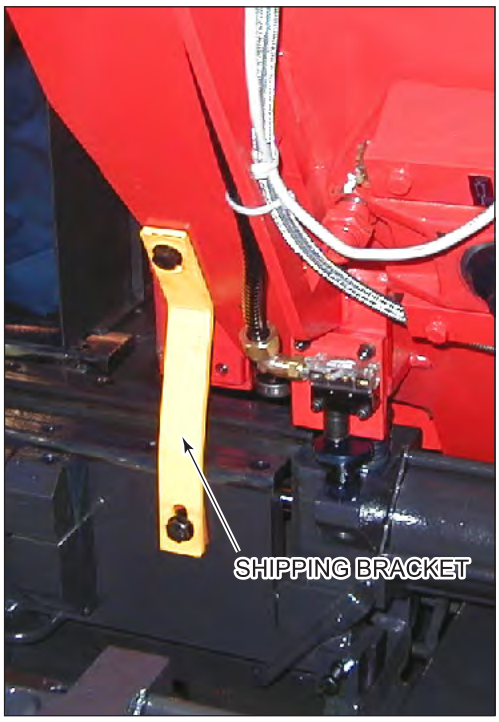
Left side of machine becomes about 3 mm {0.12 in.} higher than right side when machine is adjusted to about 2/1000 in left-to-right direction with spirit level.

REMOVING SHIPPING BRACKET

After the machine has been leveled, remove the shipping bracket securing the sawhead.

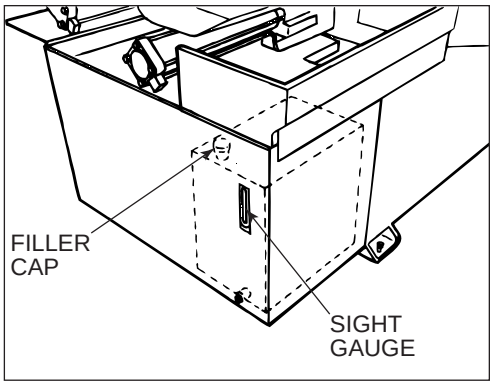
NOTICE

- Carefully store the shipping bracket. It must be attached when moving the machine to another location. Securely tighten the bracket attaching bolts in place.
- Be sure to install the shipping bracket when moving the machine for layout change, for example.



SUPPLYING HYDRAULIC OIL

Remove the hydraulic unit cover at the left side of the machine, and remove the filler cap. Pour one of the recommended hydraulic oils into the tank to the middle of the sight gauge.



Recommended oils: Esso Teresso 32
Shell Tellus Oil C32
Mobil DTE Oil Light
(ISO VG32 equivalent)

Tank capacity: 30 liters {7.9 US gal} for HFA-250 and HFA-250W
40 liters {10.6 US gal} for HFA-400 and HFA-400W

NOTICE

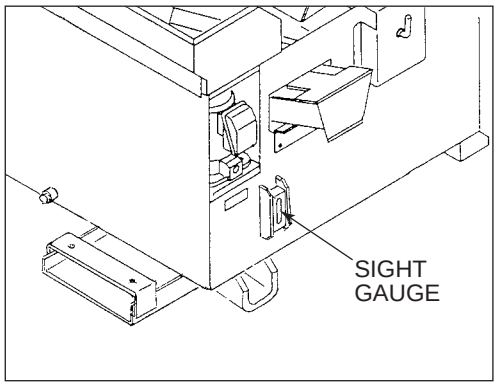
- If the hydraulic pump is started without a sufficient supply in the tank, it and its drive motor may be damaged. The machine is drained of hydraulic oil at factory shipment. Be sure to supply the hydraulic oil to the machine before starting its operation.

SUPPLYING CUTTING FLUID

WARNING

- **Use a water-soluble cutting fluid on this machine. Oil-based cutting fluids may emit smoke or catch fire, depending on the condition of their use.**
  When using an oil-based cutting fluid, strictly observe the precautions described in "Cutting Method" on page xv.

Pour the cutting fluid into the spiral portion of the chip conveyor. The standard level is slightly above the middle of the sight gauge.



Tank capacity: 85 liters {22.4 US gal} for HFA-250 and HFA-250W
120 liters {31.7 US gal} for HFA-400 and HFA-400W

NOTICE

- If the cutting fluid pump is started without a sufficient supply in the tank, it and its drive motor may be damaged. The machine is drained of cutting fluid at factory shipment. Be sure to supply the cutting fluid to the machine before starting its operation.

SUPPLYING ELECTRIC POWER

WARNING

- **Have a qualified electrician make the necessary electrical connections.**
- **Before opening the door of the electrical enclosure, be sure to turn off the shop circuit breaker switch.**
- **Before connecting the power cable to the machine, be sure to turn off the shop circuit breaker switch.**

NOTICE

- If the power supply voltage is different from the transformer and motor connection voltage shown on the label affixed to the electrical enclosure, contact AMADA.
- If the power supply frequency is different from the specified serial plate power supply frequency, contact AMADA.
- Supply electric power to the machine from a source different from those for welding or other machines that produce electrical noise. Ground the machine with an independent grounding conductor. If the power cable conductors and grounding conductor are shared by this machine and a noise-producing machine, this machine may be damaged. Additionally, the machine may abruptly stop its operation or may operate improperly. These conditions can lead to a serious accident.
- Limit power supply voltage variations to within ±10%.
- The apparent power of the machine is as follows:
  HFA-250: 6 kVA
  HFA-250W: 8 kVA
  HFA-400 and HFA-400W: 11 kVA
  Install a shop circuit breaker that suits the apparent power.
- Use a power cable of such a size and type as to suit the power supply voltage.

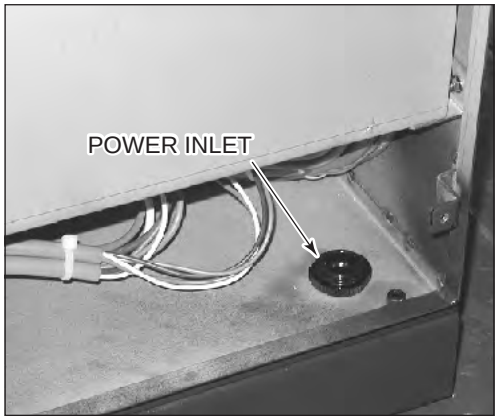
Connecting power cable

Connect the power cable to the machine as described below.

1 Turn off the shop circuit breaker switch.

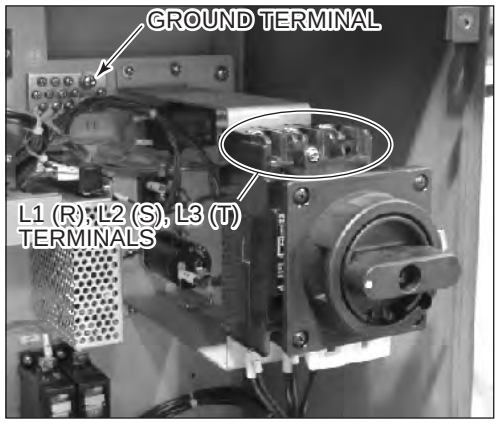
2 Open the door of the electrical enclosure.

3 Pull the power cable from the shop circuit breaker through the power inlet into the electrical enclosure.



4 Connect the three power cable conductors to the L1 (R), L2 (S) and L3 (T) terminals of the machine circuit breaker.

5 Connect the grounding conductor to the ground terminal on the left side of the machine circuit breaker mounting bracket (deep in the electrical enclosure).



6 Check that the circuit protectors QF2, QF3 and QF4 are turned on.

7 Close the door of the electrical enclosure.

Checking electrical connections

Once the electrical connections are completed, check them to see that they are correctly made as described below.

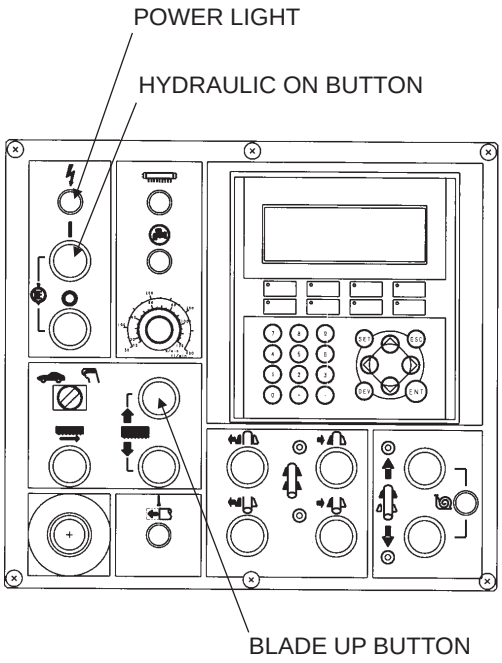
1 Turn on the shop circuit breaker switch.

2 Turn the machine circuit breaker switch to ON.

The POWER light on the control panel comes on.

3 Press the HYDRAULIC ON button on the control panel.

The light of the button comes on, and the hydraulic pump motor starts.



NOTE

- When pressing the HYDRAULIC ON button with the saw blade not installed, turn the saw blade tension lever at the rear of the driven wheel to " ◀◯ " beforehand to disable the saw blade breakage detection limit switch.

4 Press and hold the BLADE UP button on the control panel.

If the electrical connections are correctly made, the sawhead starts rising 1 to 2 seconds later and continues to rise as long as the button is pressed and held. The connection of the power cable is completed when the sawhead rises.

If the sawhead does not rise despite the depression of the button, the hydraulic pump motor is running in the reverse direction. Immediately press the HYDRAULIC OFF button on the control panel, and rewire the hydraulic pump motor as described on the next page.

NOTICE

- If the hydraulic pump motor is run in the reverse direction for a long period of time, it will be damaged. Immediately press the HYDRAULIC OFF button to stop the hydraulic pump motor.

Rewiring hydraulic pump motor

If the hydraulic pump motor runs in the reverse direction, rewire it as described below.

1. Turn the machine circuit breaker switch to OFF.

   The POWER light goes out.

2. Turn off the shop circuit breaker switch.
3. Open the door of the electrical enclosure.
4. Interchange the power cable conductors connected to the L1 (R) and L3 (T) terminals of the machine circuit breaker.
5. Close the door of the electrical enclosure.
6. Repeat the electrical connection checking procedure to reconfirm that the sawhead rises when the BLADE UP button is held pressed.

INSTALLING FIRE CONTROL DEVICES

Install a fire extinguisher or other fire control device in the shop to provide against fires.

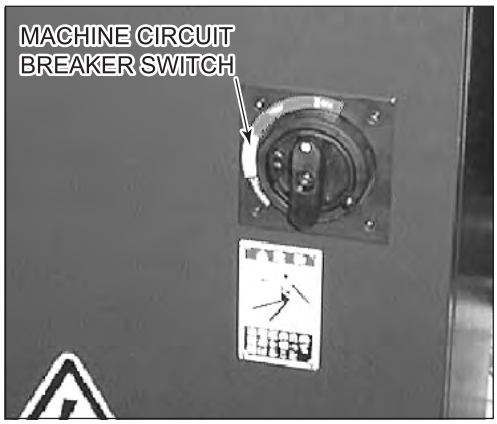
Part III

Controls

MACHINE CIRCUIT BREAKER SWITCH

Used to turn on and off the power of the machine and located at the front of the electrical enclosure.

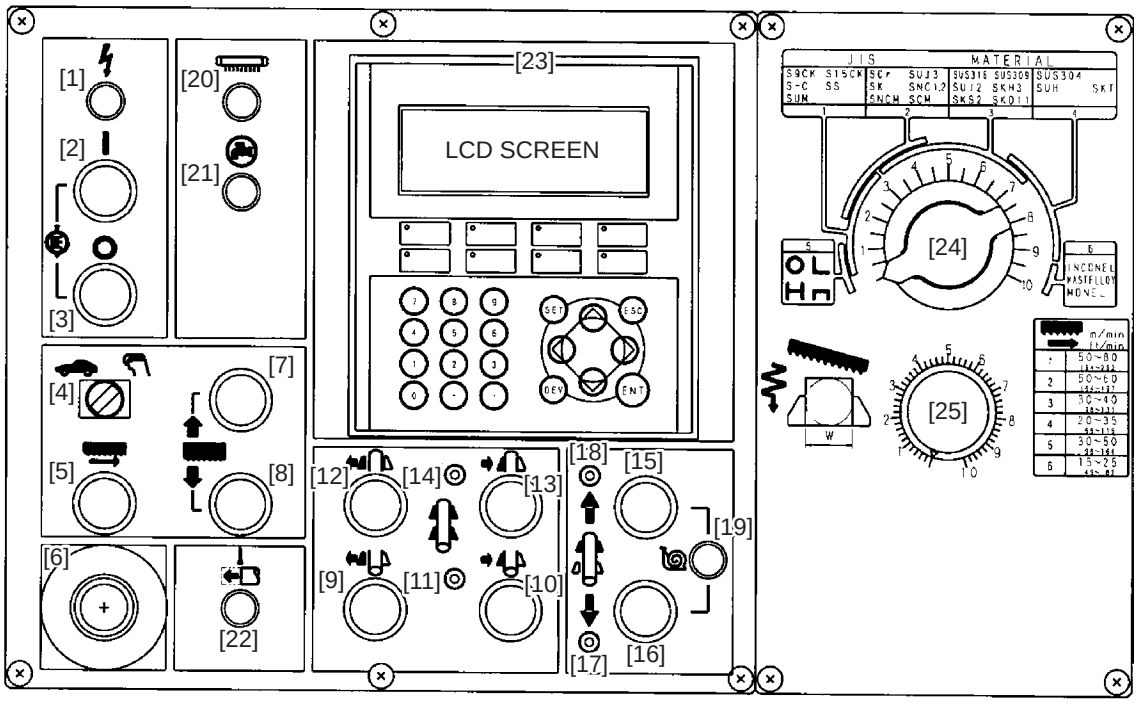
Turned to ON to turn on the power of the machine and the POWER light on the control panel and to present the initial display on the LCD screen of the control panel. Turned to OFF to turn off the power of the machine and the POWER light on the control panel.



NOTE

- When turning on the power of the machine, first turn on the shop circuit breaker switch, and then turn the machine circuit breaker switch to ON.
- When turning off the power of the machine, first turn the machine circuit breaker switch to OFF, and then turn off the shop circuit breaker switch.

CONTROL PANEL



[1] POWER light

Illuminated to indicate that the power of the machine is turned on when the machine circuit breaker switch on the electrical enclosure is turned to ON.

[2] HYDRAULIC ON button

Illuminates the built-in light and starts the hydraulic pump motor.

[3] HYDRAULIC OFF button

Stops the hydraulic pump motor and extinguishes the built-in light of the HYDRAULIC ON button.

[4] AUTO/MANUAL switch

Used to select the automatic or manual mode of operation. Turned to "☝ (MANUAL)" to cause the machine to make one cut. Turned to "🚗 (AUTO)" to cause the machine to automatically operate according to the preset cutting data.

NOTE

- When the machine is first started in the MANUAL mode and then switched to the AUTO mode during the downfeeding of the sawhead, the first cut is not counted, but the subsequent cuts are counted as the number of pieces cut during automatic operation. This function can be used for the machine to automatically cut the work after it trims the end of the work.
- If the switch is turned to MANUAL during its automatic operation, the machine stops immediately. When the switch is turned to MANUAL during cutting, the machine stops after completing the current cut.

[5] BLADE DRIVE button

Starts the saw blade running, turns on the cutting fluid, and lowers the sawhead.

NOTE

- There are several necessary conditions and confirmations to be met before starting the cutting operation. Refer to "Manual operation" and "Automatic operation" in Part IV, Operation.

[6] EMERGENCY STOP button

Brings the machine to a total stop immediately.

The button locks when pressed and must be pulled to unlock it.

[7] BLADE UP button

Pressed to stop the saw blade running, and pressed and held to raise the sawhead.

[8] BLADE DOWN button

Pressed and held to rapidly lower the sawhead.

When the quick approach feeler touches the work, the sawhead automatically changes to the downfeed speed preset with the FLOW CONTROL dial.

NOTE

- The button is enabled only when the AUTO/MANUAL switch is turned to MANUAL.

[9] FRONT VISE OPEN button

With the sawhead at the upper limit, pressed and held to open the front vise over the full stroke.

With the sawhead in any other position, pressed to open the front vise slightly. When the front vise is already opened, it does not open any more at the depression of the button.

NOTE

- The button is enabled only when the AUTO/MANUAL switch is turned to MANUAL.

[10] FRONT VISE CLOSE button

Pressed and held to close the front vise and illuminate the FRONT VISE CLOSE light.

NOTE

- The button is enabled only when the AUTO/MANUAL switch is turned to MANUAL.

[11] FRONT VISE CLOSE light

Illuminated to indicate that the front vise is closed and extinguished to indicate that the front vise is opened.

[12] REAR VISE OPEN button

With the sawhead at the upper limit, pressed and held to open the rear vise over the full stroke.

With the sawhead in any other position, pressed to open the rear vise slightly. When the rear vise is already opened, it does not open any more at the depression of the button.

NOTE

- The button is enabled only when the AUTO/MANUAL switch is turned to MANUAL.

[13] REAR VISE CLOSE button

Pressed and held to close the rear vise and illuminate the REAR VISE CLOSE light.

NOTE

- The button is enabled only when the AUTO/MANUAL switch is turned to MANUAL.

[14] REAR VISE CLOSE light

Illuminated to indicate that the rear vise is closed and extinguished to indicate that the rear vise is opened.

[15] REAR VISE BACKWARD button

Pressed and held to move the rear vise backward. The rear vise cannot be moved backward if the front vise and rear vise are both closed. The rear vise may not be moved backward when the quick approach feeler is in contact with the work.

NOTE

- The button is enabled only when the AUTO/MANUAL switch is turned to MANUAL.

[16] REAR VISE FORWARD button

Pressed and held to move the rear vise forward. The rear vise cannot be moved forward if the front vise and rear vise are both closed. The rear vise cannot also be moved forward if the quick approach feeler is in contact with the work or is raised and locked.

NOTE

- The button is enabled only when the AUTO/MANUAL switch is turned to MANUAL.

[17] REAR VISE FORWARD LIMIT light

Illuminated to indicate that the rear vise is at the forward limit.

[18] REAR VISE POSITIONED light

Illuminated to indicate that the rear vise is completely positioned.

[19] REAR VISE SLOW button

Used to select the rear vise speed. Pressed to illuminate the built-in light and select a low speed for the forward and backward movements of the rear vise. Pressed again to extinguish the built-in light and select a high speed for the forward and backward movements of the rear vise.

[20] WORK LIGHT button

Used to turn on and off the work light. Pressed to illuminate the work light and pressed again to extinguish the work light.

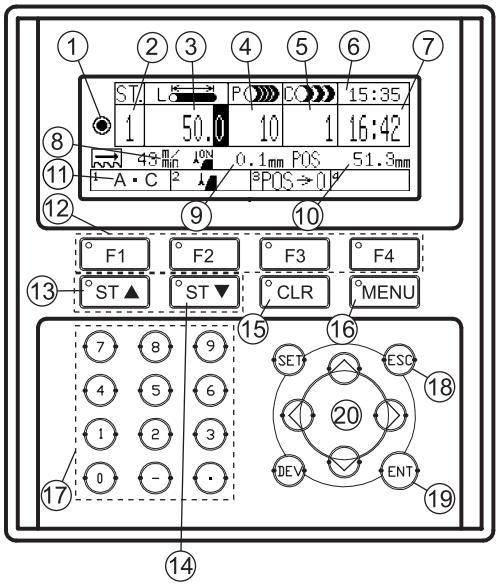
[21] CUTTING FLUID button

Used to start the cutting fluid pump alone for cleaning the machine. Pressed to illuminate the built-in light and discharge the cutting fluid even when the saw blade does not run. Pull out the cleaning nozzle in the wire brush area, and wash away the chips on the cutting fluid pan. Pressed again to extinguish the built-in light and stop the cutting fluid.

[22] HEAD-END POSITIONING button (option)

Starts the head-end positioning of the work. Pressed to flash the built-in light and raise the sawhead to the upper limit. When the head-end positioning of the work is completed, the built-in light goes out.

[23] Cutting data setting controls



① Current station light

Illuminated to indicate that the number of the station currently being run agrees with the number displayed in the ST. field.

Usually, the machine starts its automatic operation from the station number displayed in the ST. field, and both cutting data display and operation go to the next station each time a station is finished. The current station light remains illuminated during the automatic operation.

The current station light goes out if the ST. field is changed to another station number after the start of the automatic operation.

NOTE

- If the current station light is extinguished, there is no knowing which station is currently run. Change the ST. field from one station number to another with the ST ▲ or ▼ key until the current station light is illuminated.
- The machine allows the ST. field to be changed from one station number to another, and then the cutting data of other than current stations to be confirmed or changed. The cutting data of the current station cannot be changed.

② ST. field

Indicates the number for the station. The stations 1 to 99 can be used for cutting in the AUTO mode. A maximum of 9999 pieces of the same cutoff length can be set at each station. The station 0 is used for the semiautomatic positioning function.

③ L field

Indicates the cutoff length in the AUTO mode. The setup range is 5.0 to 9999.9 mm {0.197 to 99.999 in.}.

④ P field

Indicates the number of pieces to be cut in the AUTO mode. The setup range is 1 to 9999 pieces.

⑤ C field

Automatically counts and indicates the number of pieces already cut in the AUTO mode. The display range is 0 to 9999 pieces.

⑥ Current time field

Indicates the current time. The display range is 00:00 to 23:59.

⑦ Anticipated cutting end time field

Indicates the time at which the cutting operation for the station displayed in the ST. field during automatic operation is anticipated to end. The anticipated cutting end time is calculated from the measured cutting time of the first piece cut for the station displayed, and is thus not displayed until the first piece is cut. When the cutting conditions are changed during the cutting operation, the anticipated cutting end time displayed after the cutting of the first piece may not agree with the actual cutting end time.

⑧ Blade speed field

Indicates the running speed of the saw blade in m/min or fpm.

⑨ Blade runout field

Indicates whether the runout detection function is set enabled (ON) or disabled (OFF) and the current runout of the saw blade. The ON or OFF indication in this field corresponds to the setting made on the runout setup display.

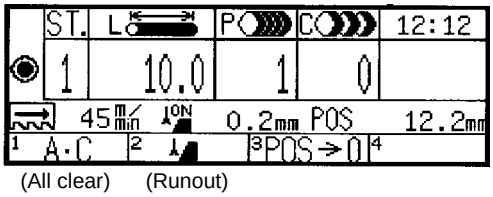
⑩ POS field

Indicates the current position of the rear vise in mm or inches. In the MANUAL mode, press the function key F3 (POS→0) to reset the position of the rear vise to zero. The sign "–" or "+" is indicated when the rear vise moves forward or backward from the position. In the AUTO mode, the distance from the forward limit of the rear vise is always indicated.

⑪ Function label fields

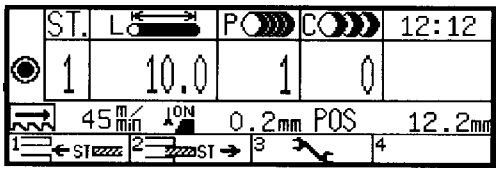
Indicate the function labels corresponding to the function keys F1 to F4, respectively, and cycle through the following three menus each time the MENU key is pressed.

Menu 1



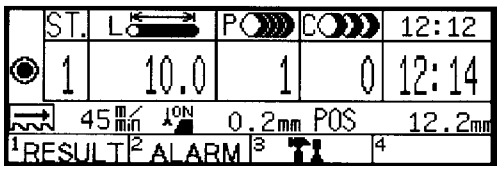
(All clear) (Runout)

Menu 2



(ST interrupt) (ST delete) (Set)

Menu 3



(Maintenance)

⑫ Function keys F1 to F4

Perform the functions displayed in the function label fields and correspond to the numerals 1 to 4 displayed at the upper left corner of each function label field.

NOTE

- The function represented by a function key is enabled if the LED at its upper left corner is illuminated and is disabled if the LED at its upper left corner is extinguished.

⑬ ST ▲ key

⑭ ST ▼ key

Change the station number displayed in the ST. field. Move the cursor to the ST. field and press the ST ▲ or ▼ key once to increase or decrease the station number by one and to display the cutting data for the selected station in the respective fields. The largest possible station number is 99.

⑮ CLR key

Clears the data set in the L, P, and C fields. When an alarm occurs, press the key to clear the alarm code and alarm condition.

NOTE

- The CLR key is enabled if the LED at its upper left corner is illuminated. When an alarm occurs, the LED of the CLR key alone is illuminated. Unless the CLR key is pressed to clear the alarm condition, the other keys remain disabled.

⑯ MENU key

Cycles the functions displayed in the function label fields through the three menus. Each time the key is pressed, the functions change from one menu to another.

⑰ Numeric keys

Used to enter the cutting data and station numbers.

NOTE

- After entering cutting data in each field, be sure to press the ENT key. Unless you do so, the new cutting data is not stored for the field, but the old cutting data remains set or stored for the field.

⑱ ESC key

Returns a field from the newly entered cutting data to the old cutting data before the ENT key is pressed. When the key is pressed after the new cutting data is entered, the new cutting data is deleted, and the old cutting data stored is displayed instead.

⑲ ENT key

Sets or stores cutting data after it is entered. Press the key to set the entered cutting data and store it in the memory.

NOTE

- After entering cutting data in each field, be sure to press the ENT key. Unless you do so, the new cutting data is not stored for the field, but the old cutting data remains set or stored for the field.

⑳ Cursor keys

Move the cursor on the LCD screen.

[24] CUTTING PRESSURE CONTROL dial

Used to adjust the pressure with which the saw blade is pressed against the work being cut. The cutting pressure is adjusted according to the material and shape of the work to ensure efficient cutting.

Turn the dial clockwise to increase the cutting pressure and counterclockwise to decrease the cutting pressure. Work materials are indicated in colored zones around the dial. Set the dial within the applicable colored zone to suit the material and size of the work to be cut.

For work of the same material and size but more difficult to cut, turn the dial clockwise to increase the cutting pressure. For work less difficult to cut, turn the dial counterclockwise to decrease the cutting pressure.

NOTE

- When the dial is turned clockwise, the variation of the sawhead downfeed speed with the cutting resistance decreases or the sawhead lowers at an almost constant speed. When the dial is turned counterclockwise, the variation of the sawhead downfeed speed with the cutting resistance increases.
- The colored zones of the dial give Amada's recommended values for cutting round bars of representative material types. For single cutting of plates and rectangular bars and for stack cutting, set the dial near the maximum value of the colored zone for each type of material. In this case, the dial may be set somewhat beyond the applicable colored zone.

[25] FLOW CONTROL dial

Used to adjust the downfeed speed of the sawhead for cutting.

Turn the dial clockwise to increase the downfeed speed and counterclockwise to decrease the downfeed speed. Set this dial in accordance with the CUTTING PRESSURE CONTROL dial.

NOTE

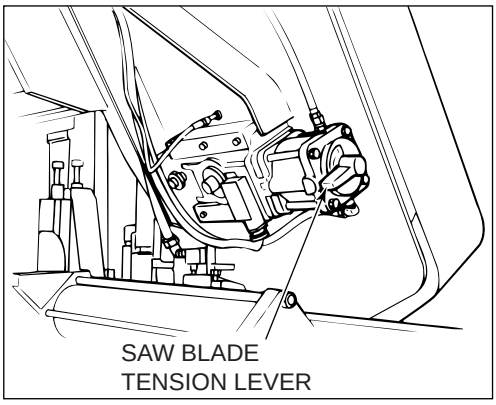
- The downfeed speed of the sawhead changes with the setting of the CUTTING PRESSURE CONTROL dial even if the FLOW CONTROL dial remains at a certain position. The sawhead increases in downfeed speed when the CUTTING PRESSURE CONTROL dial is turned clockwise and decreases in downfeed speed when the CUTTING PRESSURE CONTROL dial is turned counterclockwise. When you have turned the CUTTING PRESSURE CONTROL dial, also adjust the FLOW CONTROL dial.
- When you have turned the CUTTING PRESSURE CONTROL dial clockwise, turn the FLOW CONTROL dial counterclockwise. Similarly when you have turned the CUTTING PRESSURE CONTROL dial counterclockwise, turn the FLOW CONTROL dial clockwise.
  When the cutting operation is performed at high pressure, at high downfeed speed and at higher than standard cutting rate, the machine and saw blade may be overloaded, and the cutting accuracy and the machine and saw blade life may be adversely affected.

OTHER CONTROLS

Saw blade tension lever (at rear of driven wheel)

Used to keep the saw blade tensioned to a constant degree by a hydraulic cylinder.

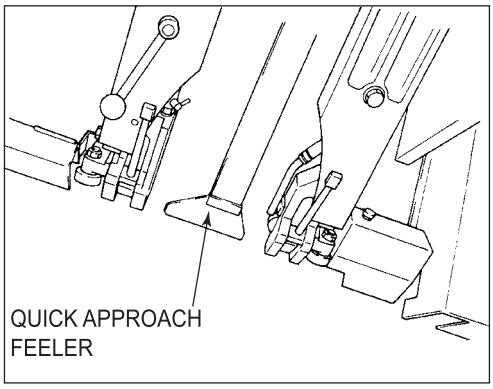
Turned to the "  " position to tension the saw blade and to the "  " position to slacken the saw blade.



Quick approach function

Used to rapidly lower the sawhead to bring the saw blade close to the work and shorten the idle time.

When the sawhead lowers and the quick approach feeler touches the work, the sawhead automatically changes to the downfeed speed. During automatic operation, the quick approach feeler detects the height of the work and prevents the useless rise of the sawhead.



If the quick approach function is not required, pull up the feeler and push it to the stroke end. The feeler is locked in that position. When the feeler is locked, the sawhead always lowers at the downfeed speed.

To unlock the feeler, securely hold the feeler with one hand, and push the release lever for the HFA-250 and HFA-250W and pull the release lever for the HFA-400 and HFA-400W. The feeler will be unlocked and drop under its own mass.

CAUTION	● **When unlocking the feeler, take care so that the hand should not be caught between the feeler and the back of the saw blade.**

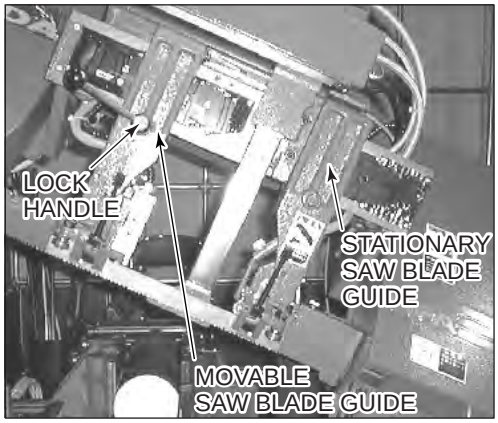
NOTE

● The machine cannot be automatically operated when the feeler is locked.

Saw blade guides

There are two saw blade guides, one each at the left (driven) and right (drive) wheel sides and installed on the sawhead frame. The left-hand (driven-side) saw blade guide can be moved left and right by loosening the lock handle.

Adjust the saw blade guide distance to suit the width of the work to be cut, so that the saw blade can be guided as close as possible to the work.



Saw blade speed control device

The saw blade running speed can be adjusted steplessly by turning the saw blade speed control dial (for the HFA-250 and HFA-250W) or saw blade speed control handwheel (for the HFA-400 and HFA-400W) at the right side of the machine.

NOTICE

- Never turn the saw blade speed control dial or handwheel when the saw blade motor is stopped.

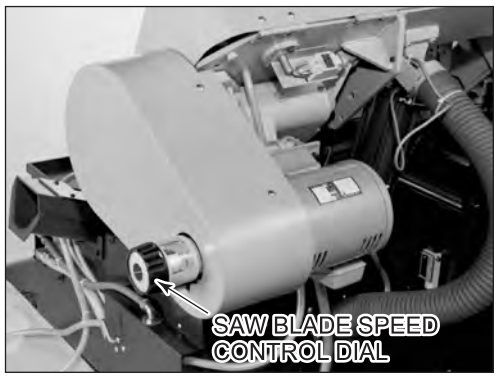
NOTE

- The saw blade speed control device is equipped with a mechanical stepless shift, so that the pointer can be set at the center of the scale without any problem.

HFA-250 and HFA-250W

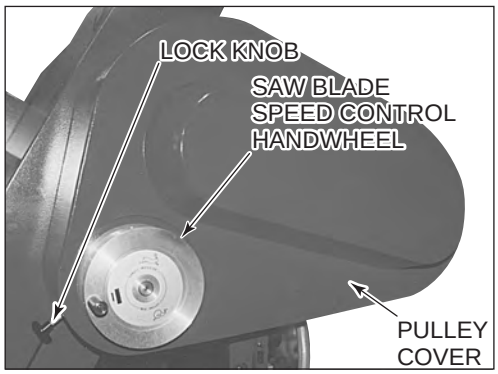
Turn the saw blade speed control dial clockwise to decrease the saw blade running speed and counterclockwise to increase the saw blade running speed.

The setup range is 20 to 80 m/min {66 to 262 fpm} for the HFA-250 and 24 to 90 m/min {79 to 295 fpm} for the HFA-250W.



HFA-400 and HFA-400W

Loosen the lock knob of the saw blade speed control handwheel, and turn the handwheel clockwise to increase the saw blade running speed and counterclockwise to decrease the saw blade running speed. Once the saw blade running speed is set, tighten the lock knob securely and clockwise to lock the handwheel.



The setup range is 15 to 90 m/min {49 to 295 fpm}.

Cutting fluid system

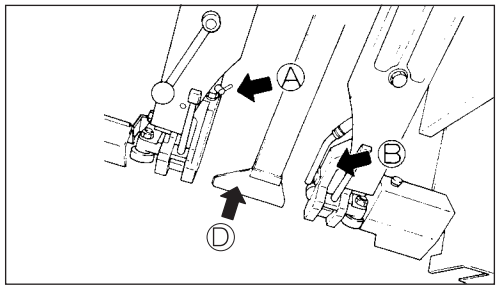
The cutting fluid is discharged from the nozzles in the positions A, B, C, and D as shown below.

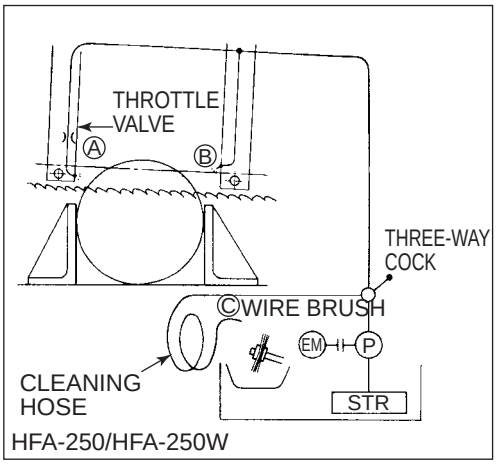
A: Movable saw blade guide

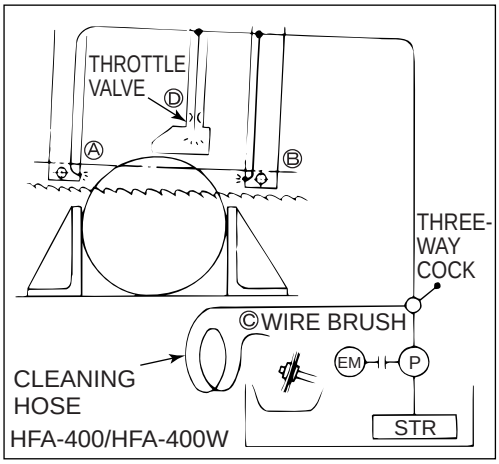
B: Stationary saw blade guide

C: Cleaning hose end

D: Quick approach feeler (only for HFA-400 and HFA-400W)







The throttle valve to adjust the cutting fluid flow rate is installed in the position A or D.

The cutting fluid flows to the positions A, B, and D when the lever of the three-way cock installed at the right side of the chip outlet is turned to the right side, flows to all of the positions A to D when the lever is turned to the middle position, and flows only to the position C when the lever is turned to the left side.

Normally, keep the lever at the middle position so that the cutting fluid can flow to all of the positions A to D.

Adjusting cutting fluid flow rate

The cutting fluid is discharged from the nozzles A and D for cooling and lubricating the saw blade. Discharge the cutting fluid at the highest rate above which the cutting fluid splashes.

The cutting fluid is discharged from the nozzle B for removing the chips from the saw blade. Discharge the cutting fluid at the highest rate above which the cutting fluid splashes.

While the machine is cutting the work, insert the nozzle C in the wire brush cover and use it for removing the chips from the wire brush. When dry cutting the work, turn the lever of the three-way cock to the left side, and discharge the cutting fluid only from the nozzle C. When cleaning the machine, remove the nozzle C from the wire brush cover, and wash away the chips with the nozzle C.

Chip conveyor

The chip conveyor is hydraulically driven and operated only when the sawhead is lowering.

When removing the chips after cleaning the machine, move the sawhead down to the lower limit, and press the BLADE DOWN button. The chip conveyor operates as long as the BLADE DOWN button is pressed and held.

WARNING

- **Never reach into the chip conveyor when the machine is operating. Before removing foreign matter from the chip conveyor, be sure to turn the machine circuit breaker switch to OFF and turn off the shop circuit breaker switch.**

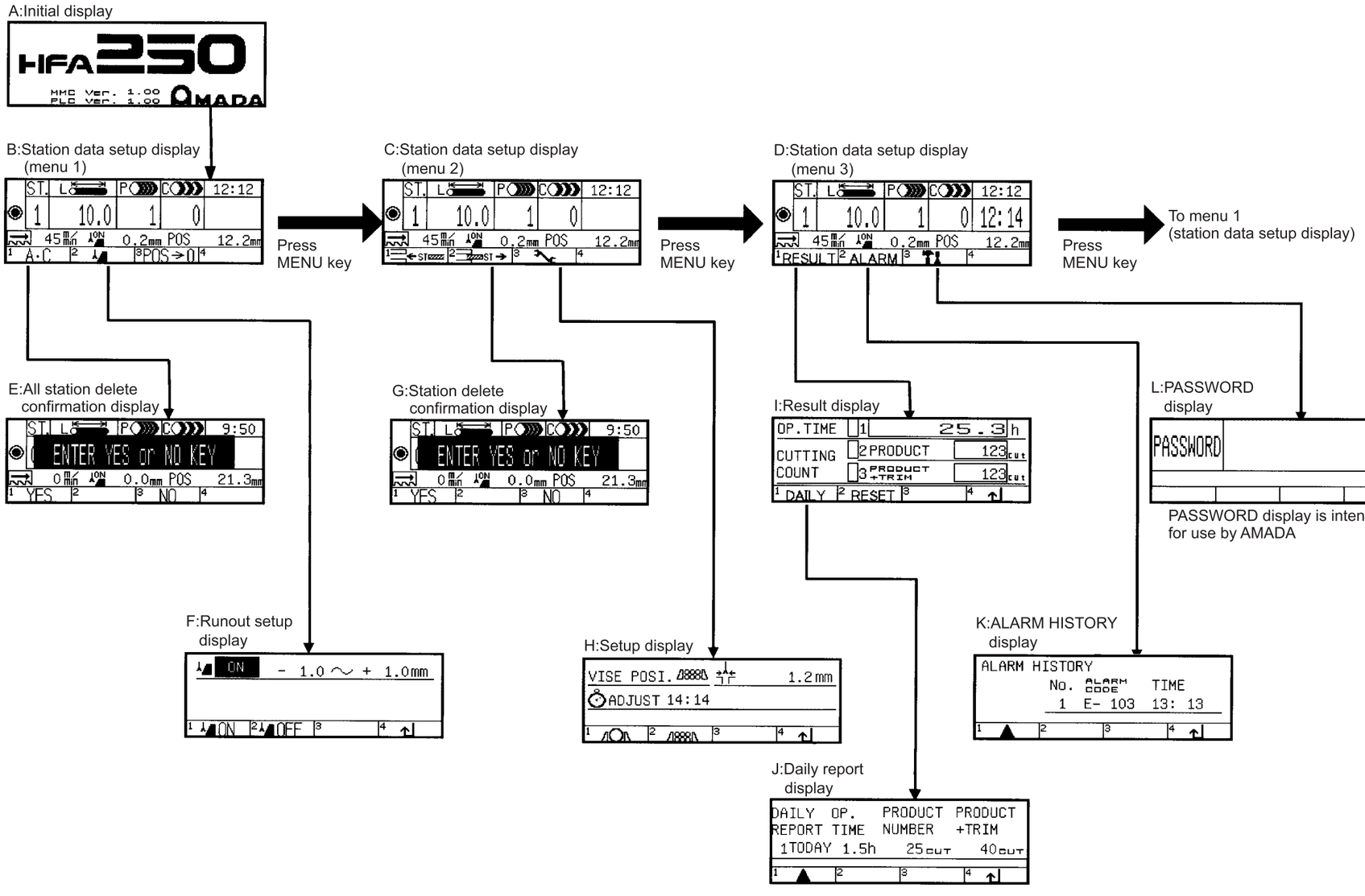
NOTICE

- When a trimming or solid material other than chips enters the chip conveyor, it may eat into the spiral or damage the spiral. Take care so that nothing other than chips should fall into the chip conveyor.

DESCRIPTION OF DISPLAYS

The displays shown on the LCD screen are composed as shown below. You can set or change cutting data on the station data setup display. You can also check or set the data on the display shown after selecting a menu and pressing a function key. The contents of each display and the function of each function key are described on the pages that follow.

Composition of displays



Contents of displays

INITIAL DISPLAY

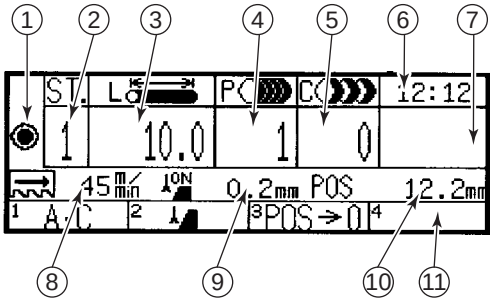
The initial display is shown on the LCD screen for about 7 seconds after the power of the machine is turned on. The LCD screen then changes to the station data setup display.

STATION DATA SETUP DISPLAY

The contents of the item fields and the functions of the function keys shown on the station data setup display are described below.

Displayed contents of item fields

① Current station light



Illuminated to indicate that the number of the station currently being run agrees with the number displayed in the ST. field.

Usually, the machine starts its automatic operation from the station number displayed in the ST. field, and both cutting data display and operation go to the next station each time a station is finished. The current station light remains illuminated during the automatic operation.

The current station light goes out if the ST. field is changed to another station number after the start of the automatic operation.

NOTE

- If the current station light is extinguished, there is no knowing which station is currently run. Change the ST. field from one station number to another with the ST ▲ or ▼ key until the current station light is illuminated.
- The machine allows the ST. field to be changed from one station number to another, and then the cutting data of other than current stations to be confirmed or changed. The cutting data of the current station cannot be changed.

② ST. field

Indicates the number for the station. The stations 1 to 99 can be used for cutting in the AUTO mode. A maximum of 9999 pieces of the same cutoff length can be set at each station. The station 0 is used for the semiautomatic positioning function.

③ L field

Indicates the cutoff length in the AUTO mode. The setup range is 5.0 to 9999.9 mm {0.197 to 99.999 in.}.

④ P field

Indicates the number of pieces to be cut in the AUTO mode. The setup range is 1 to 9999 pieces.

⑤ C field

Automatically counts and indicates the number of pieces already cut in the AUTO mode. The display range is 0 to 9999 pieces.

⑥ Current time field

Indicates the current time. The display range is 00:00 to 23:59.

⑦ Anticipated cutting end time field

Indicates the time at which the cutting operation for the station displayed in the ST. field during automatic operation is anticipated to end. The anticipated cutting end time is calculated from the measured cutting time of the first piece cut for the station displayed, and is thus not displayed until the first piece is cut. When the cutting conditions are changed during the cutting operation, the anticipated cutting end time displayed after the cutting of the first piece may not agree with the actual cutting end time.

⑧ Blade speed field

Indicates the running speed of the saw blade in m/min or fpm.

⑨ Blade runout field

Indicates whether the runout detection function is set enabled (ON) or disabled (OFF) and the current runout of the saw blade. The ON or OFF indication in this field corresponds to the setting made on the runout setup display.

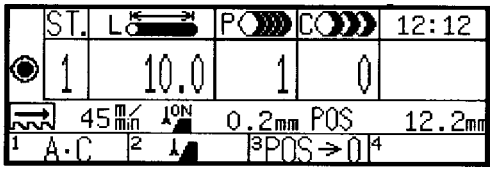
⑩ POS field

Indicates the current position of the rear vise in mm or inches. In the MANUAL mode, press the function key F3 (POS→0) to reset the position of the rear vise to zero. The sign "– " or "+" is indicated when the rear vise moves forward or backward from the position. In the AUTO mode, the distance from the forward limit of the rear vise is always indicated.

⑪ Function label fields

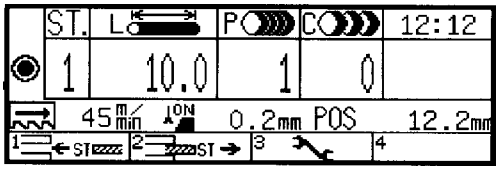
Indicate the function labels corresponding to the function keys F1 to F4, respectively, and cycle through the following three menus each time the MENU key is pressed.

Menu 1



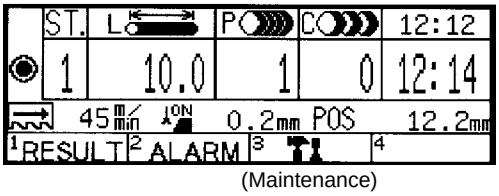
(All clear) (Runout)

Menu 2



(ST interrupt) (ST delete) (Set)

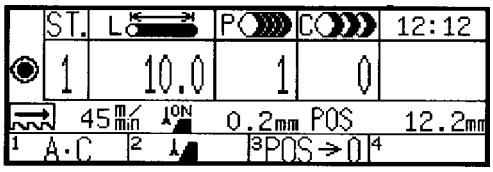
Menu 3



(Maintenance)

Functions of function keys

[Menu 1]

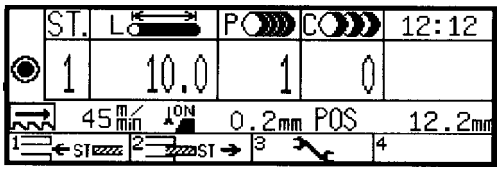


F1 (A•C) key: Pressed to open the all station delete confirmation display. Press the key to delete the cutting data of all stations registered.

F2 (runout) key: Pressed to open the runout setup display. Press the key to set the runout tolerances of the saw blade.

F3 (POS→0) key: Pressed to reset the POS field to zero. Press the key to reset the current position of the rear vise.

[Menu 2]

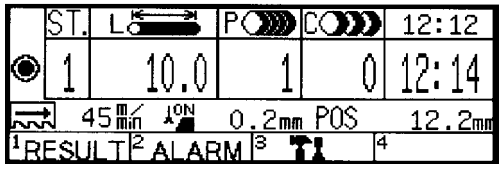


F1 (ST interrupt) key: Pressed to set interrupt cutting data by the interrupt station function. Press the key to perform interrupt cutting.

F2 (ST delete) key: Pressed to open the station delete confirmation display. Press the key to delete all cutting data of a station.

F3 (set) key: Pressed to open the setup display.

[Menu 3]



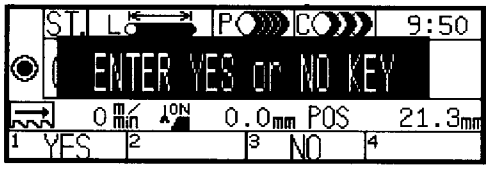
F1 (RESULT) key: Pressed to open the result display.

F2 (ALARM) key: Pressed to open the ALARM HISTORY display.

F3 (maintenance) key: Pressed to open the PASSWORD display to open the maintenance display. The maintenance display has the password set for use by AMADA.

ALL STATION DELETE CONFIRMATION DISPLAY

This display appears when you press the F1 (A•C) key on the station data setup display (menu 1). The functions of the function keys on the display are as described below.



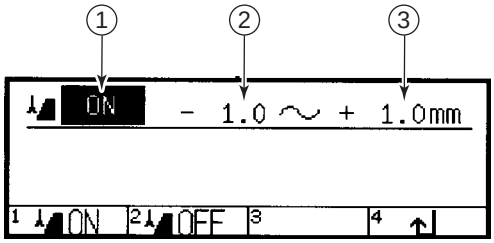
Functions of function keys

F1 (YES) key: Pressed to delete all of the cutting data of all stations.

F3 (NO) key: Pressed to abort the delete processing of cutting data of all stations.

RUNOUT SETUP DISPLAY

This display appears when you press the F2 (runout) key on the station data setup display (menu 1). The contents of the item fields and the functions of the function keys on the display are as described below.



Displayed contents of item fields

① Runout setup ON/OFF field

Indicates whether the saw blade runout detection function is set ON (enabled) or OFF (disabled). Press the F1 (ON) or F2 (OFF) key to set the function ON (enabled) or OFF (disabled).

② Minus runout tolerance field

Sets the minus runout tolerance of the saw blade. Move the cursor to the field, enter the minus runout tolerance in the field with the numeric keys, and press the ENT key. The setup range is –99.9 to 0 mm {–9.999 to 0 in.}.

③ Plus runout tolerance field

Sets the plus runout tolerance of the saw blade. Move the cursor to the field, enter the plus runout tolerance in the field with the numeric keys, and press the ENT key. The setup range is 0 to +99.9 mm {0 to +9.999 in.}.

Functions of function keys

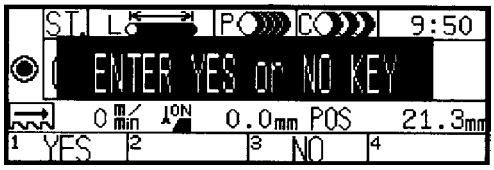
F1 (ON) key: Pressed to set the runout setup ON/OFF field to ON and enable the runout tolerances (runout detection function).

F2 (OFF) key: Pressed to set the runout setup ON/OFF field to OFF and disable the runout tolerances (runout detection function).

F4 (↵) key: Pressed to return to the station data setup display.

STATION DELETE CONFIRMATION DISPLAY

This display appears when you press the F2 (ST delete) key on the station data setup display (menu 2). The functions of the function keys on the display are as described below.



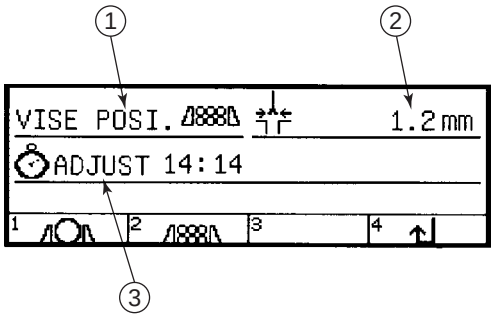
Functions of function keys

F1 (YES) key: Pressed to delete all of the cutting data of the station number shown in the ST. field.

F3 (NO) key: Pressed to abort the delete processing of the cutting data of the station number shown in the ST. field.

SETUP DISPLAY

This display appears when you press the F3 (set) key on the station data setup display (menu 2). The contents of the item fields and the functions of the function keys on the display are as described below.



Displayed contents of item fields

① VISE POSI. field

Indicates the standby position of the rear vise set with a function key.

Standby at forward limit:

Standby at backward limit:

② Set width of saw blade field

Sets the set width of the saw blade. The set width variation of the saw blade sometimes makes the actual cutoff length different from the preset cutoff length. In this case, the set width in the field can be adjusted to compensate for the difference. To make the necessary compensation, move the cursor to the field, enter the set width in the field with the numeric keys, and press the ENT key. The setup range is 0 to 99.9 mm {0 to 9.999 in.}.

③ ADJUST field

Corrects the current time shown on the station data setup display. Move the cursor to the field, enter the correct current time in the field with the numeric keys, and press the ENT key. The setup range is 0 to 23 hours and 0 to 59 minutes.

Functions of function keys

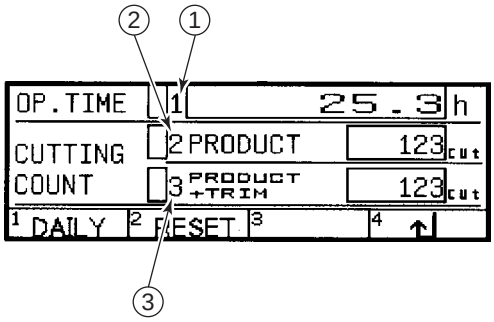
F1 (backward limit standby) key: Pressed to set the standby position of the rear vise to the backward limit. The rear vise clamps the work at the backward limit during cutting.

F2 (forward limit standby) key: Pressed to set the standby position of the rear vise to the forward limit. The rear vise clamps the work at the forward limit during cutting.

F4 (↵) key: Pressed to return to the station data setup display.

RESULT DISPLAY

This display appears when you press the F1 (RESULT) key on the station data setup display (menu 3). The contents of the item fields and the functions of the function keys on the display are as described below.



Displayed contents of item fields

① OP. TIME field

Indicates the cumulative time the saw blade has run. Move the cursor to the field, and press the F2 (RESET) key to reset the field to zero.

② CUTTING COUNT PRODUCT field

Indicates the cumulative number of pieces cut in the AUTO mode. Move the cursor to the field, and press the F2 (RESET) key to reset the field to zero.

③ CUTTING COUNT PRODUCT + TRIM field

Indicates the sum of the number of pieces cut in the AUTO mode and of the number of pieces and trimmings cut in the MANUAL mode. Move the cursor to the field, and press the F2 (RESET) key to reset the field to zero.

Functions of function keys

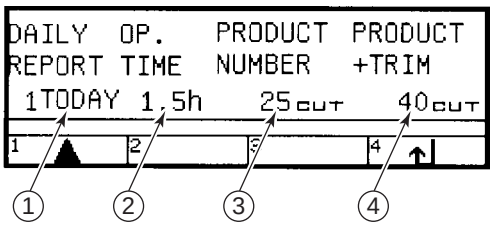
F1 (DAILY) key: Pressed to open the daily report display.

F2 (RESET) key: Pressed to reset the OP. TIME, CUTTING COUNT PRODUCT, and CUTTING COUNT PRODUCT + TRIM fields to zero.

F4 (↵) key: Pressed to return to the station data setup display.

DAILY REPORT DISPLAY

This display appears when you press the F1 (DAILY) key on the result display. The contents of the item fields and the functions of the function keys on the display are as described below.



Displayed contents of item fields

① DAILY REPORT field

Indicates the date of the daily report recorded. The daily reports over the past 11 days are left as records. Each time the F1 (▲) key is pressed, the field sequentially changes from today to 10 days before. Note that the daily reports can be recorded only when the power of the machine is turned on.

② OP. TIME field

Indicates the operating time of the saw blade for the date shown in the DAILY REPORT field.

③ PRODUCT NUMBER field

Indicates the cumulative number of pieces cut in the AUTO mode on the date shown in the DAILY REPORT field.

④ PRODUCT + TRIM field

Indicates the sum of the number of pieces cut in the AUTO mode and of the number of pieces and trimmings cut in the MANUAL mode on the date shown in the DAILY REPORT field.

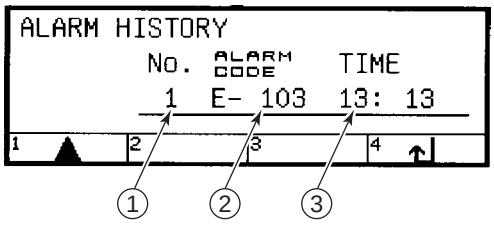
Functions of function keys

F1 (▲) key: Pressed to change the date whose daily report is to be indicated.

F4 (↵) key: Pressed to return to the result display.

ALARM HISTORY DISPLAY

This display appears when you press the F2 (ALARM) key on the station data setup display (menu 3). The contents of the item fields and the functions of the function keys on the display are as described below.



Displayed contents of item fields

① NO. field

Indicates an alarm history number. Up to ten alarms are recorded. The number 1 corresponds to the latest alarm.

② ALARM CODE field

Indicates the code of an alarm.

③ TIME field

Indicates the occurrence time of an alarm.

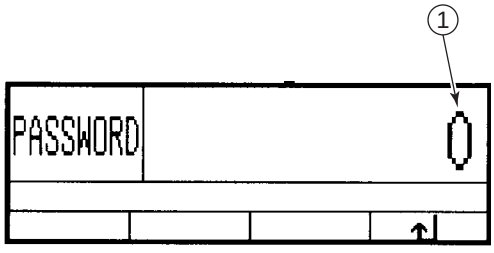
Functions of function keys

F1 (▲) key: Pressed to change from one recorded alarm to another. Press the key to confirm up to the ten latest alarms.

F4 (↵) key: Pressed to return to the station data setup display.

PASSWORD DISPLAY

This display appears when you press the F3 (maintenance) key on the station data setup display (menu 3). The contents of the item field and the function of the function key on the display are as described below.



Displayed contents of item field

① Password entry field

Enters the password to open the maintenance display. This field is provided for sole use by AMADA. Do not operate on this field by yourself.

Function of function key

F4 (↵) key: Pressed to return to the station data setup display. If you have opened the PASSWORD display, press the key to return to the station data setup display.

Part IV

Operation

(Continued on next page.)

INSPECTION BEFORE START OF DAY'S WORK

Before starting the machine every day, check it as described on page VI-2.

TURNING ON MACHINE

Start the hydraulic pump motor as described below.

1 Turn on the shop circuit breaker switch.

2 Turn the machine circuit breaker switch to ON.

The POWER light illuminates, and the LCD screen shows the initial display for about 7 seconds and then changes to the station data setup display.

3 Press the HYDRAULIC ON button.

The button illuminates, the hydraulic pump motor starts, and the machine becomes ready for operation.

SELECTING SAW BLADE

An appropriate saw blade changes with the material, shape, size, and clamping method of the work to be cut. When cutting a single solid bar, select the saw blade tooth pitch by referring to the table below.

Saw blades with dedicated tooth pitches and shapes are available for cutting structural steel shapes and special materials. Contact AMADA.

Saw blade tooth pitches for cutting round and rectangular bars (teeth per inch)

Variable pitch	3-4		2-3				
Regular pitch	6	4		3		2	
Maximum cutoff width, mm {in.}	50 or less {2 or less}	50 to 100 {2 to 3.9}	100 to 150 {3.9 to 5.9}	150 to 200 {5.9 to 7.9}	200 to 250 {7.9 to 9.8}	250 to 300 {9.8 to 11.8}	300 or more {11.8 or more}

UNFOLDING AND FOLDING SAW BLADE

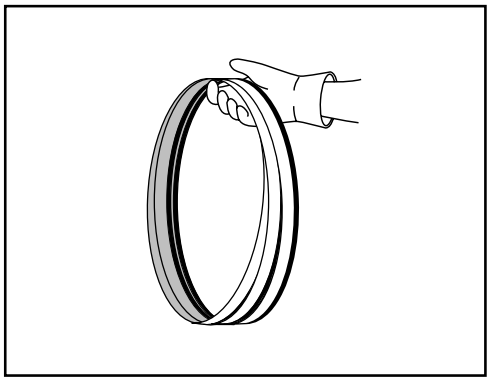
WARNING

- **Wear leather gloves and protective goggles when unfolding and folding the saw blade.**

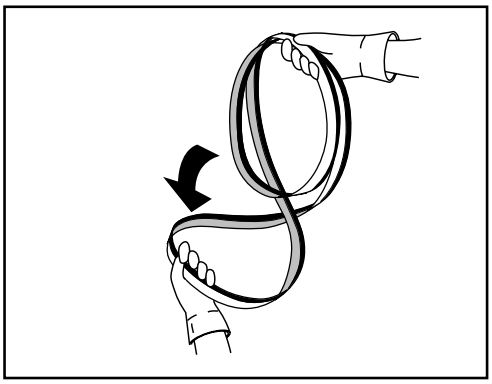
Unfolding saw blade

Unfold the saw blade as described below.

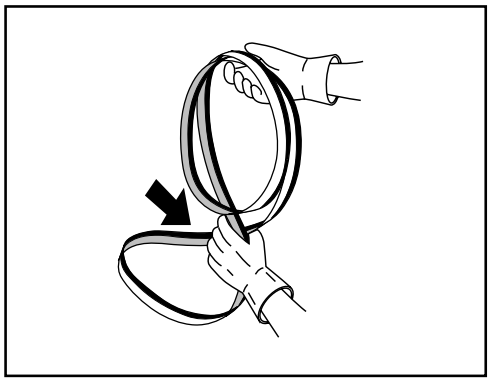
1 Grasp the band securing the saw blade in your right hand. The teeth of the saw blade must be facing the palm of your right hand.



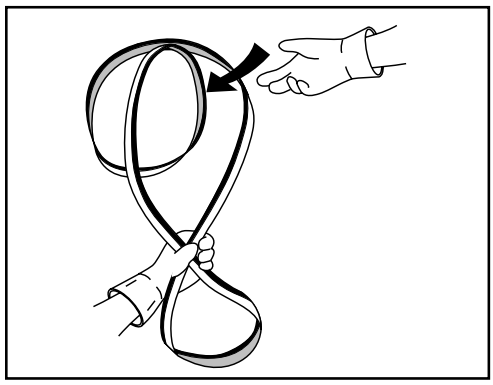
2 Remove the securing band from the saw blade. Grasp two of the saw blade loops (crossed portion) with your right hand. Grasp the remaining saw blade loop with your left hand.



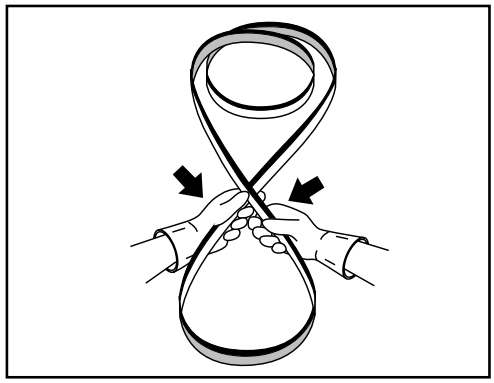
3 Firmly grasp the crossed portion of the saw blade with your left hand as shown in the figure.



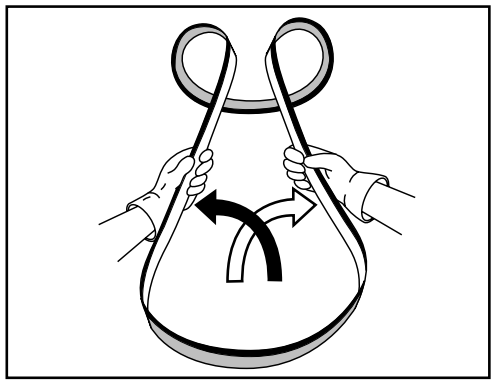
4 Check that you are maintaining a firm grip on the saw blade with your left hand. Release your grip at the top of the saw blade (right hand).



5 Position your left hand so that the palm of your hand is facing your body. Use your right hand to carefully free the right-hand loop.

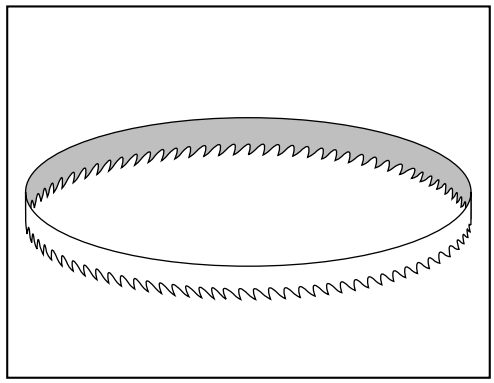


6 Hold one portion of the crossed section of the saw blade in each hand. Twist both portions away from each other to completely open the saw blade loop.



7 Check that the saw blade teeth are facing down and to the right.

If the saw blade teeth are facing down and to the left, immediately contact AMADA for assistance.

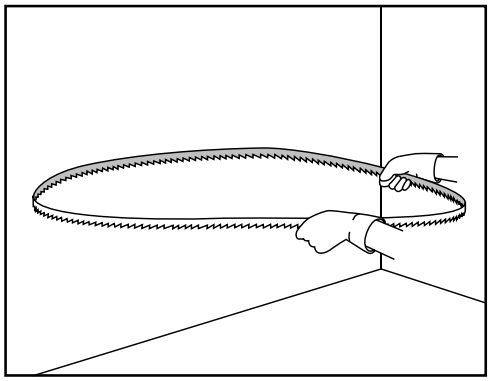


8 Remove the teeth guard from the saw blade.

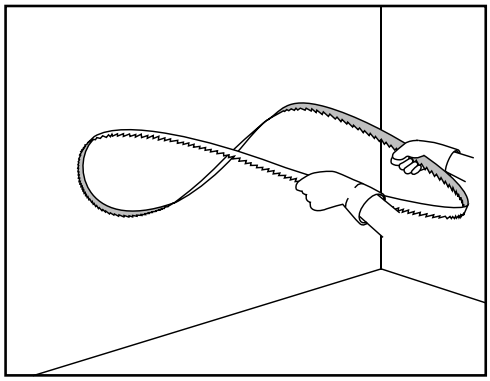
Folding saw blade

Fold the saw blade as described below.

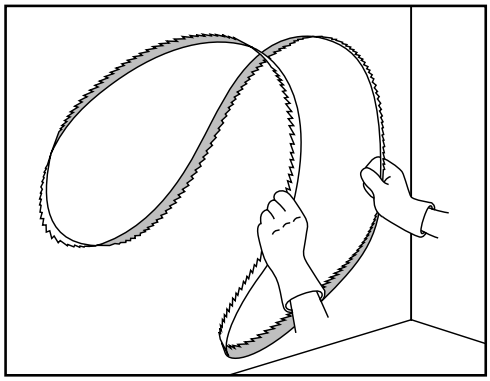
1 Pick up the saw blade and hold it as shown in the figure. The palms of your hands must be facing up. Approximately 1/3 of the saw blade circumference should be between your hands. The saw blade teeth must be facing down.



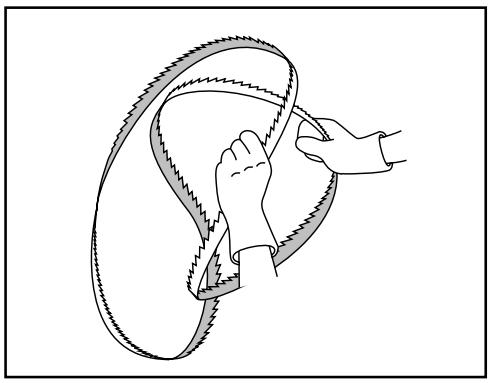
2 Press the opposite side of the saw blade against a wall.



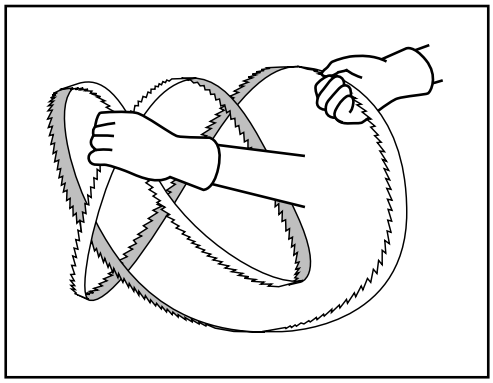
3 Push against the saw blade to force the saw blade center portion up.



4 Twist the saw blade toward the inside of your wrists until the saw blade crosses itself.



5 Grasp the crossed portion of the saw blade in one hand. Use the other hand to bundle the saw blade.



6 Secure the bundled saw blade with the band.

INSTALLING SAW BLADE

WARNING

- **Never operate the machine with the wheel cover, the saw blade cover, and other covers removed or opened. It is dangerous if your hands or clothing are caught in the running machine.**
- **Always wear leather gloves when handling the saw blade.**
- **Be careful not to let the wheel cover fall during the saw blade change.**

CAUTION

- **When applying tension to the saw blade in step 14 below, take care not to have your hands pinched between the saw blade and driven wheel.**

Install the saw blade as described below.

1 Turn on the shop circuit breaker switch.

2 Turn the machine circuit breaker switch to ON.

The power of the machine is turned on, and the POWER light illuminates.

3 Press the HYDRAULIC ON button.

The button illuminates, and the hydraulic pump motor starts.

NOTE

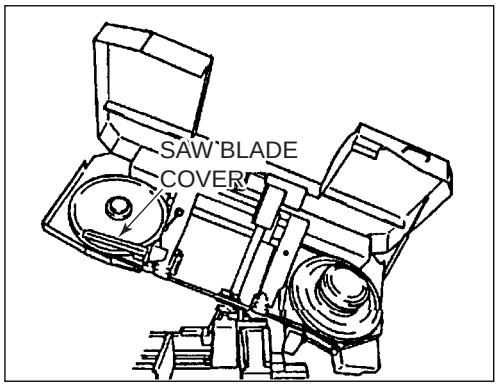
- When the HYDRAULIC ON button is pressed without the saw blade installed, the saw blade breakage alarm code “E-001” may be displayed. For how to clear the alarm, see “Alarm code list” in Part V, Troubleshooting.

4 Turn the AUTO/MANUAL switch to MANUAL.

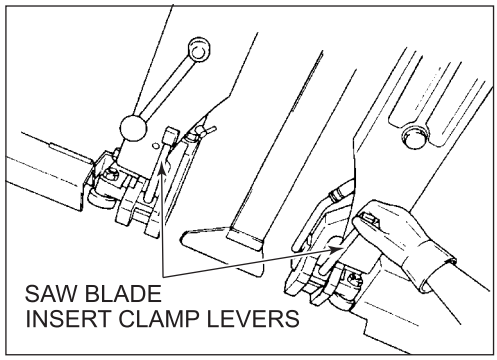
5 Press and hold the BLADE UP button to raise the sawhead until the right-hand saw blade insert rises above the vise top surface.

6 Open the wheel cover.

7 Open the saw blade cover.

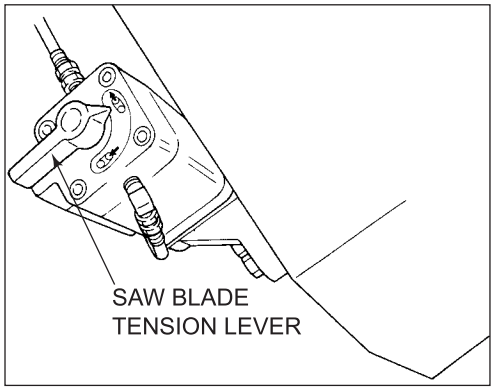


8 Pull down the left-hand and right-hand saw blade insert clamp levers to open the saw blade inserts.

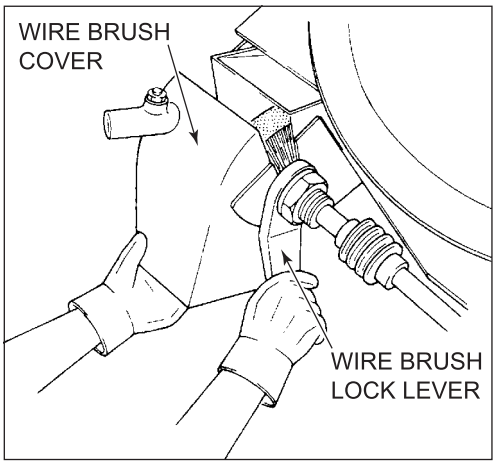


9 Turn the saw blade tension lever to the "◀○" position.

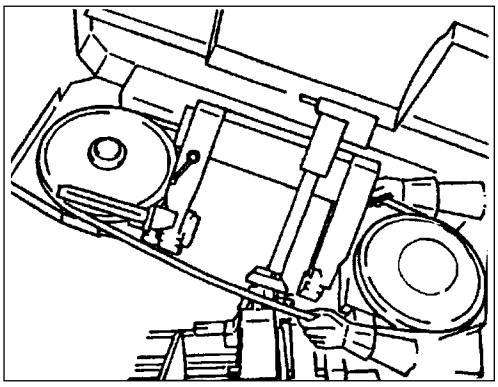
The driven wheel moves to the right.



10 Loosen the wire brush lock lever, and lower the wire brush and wire brush cover.

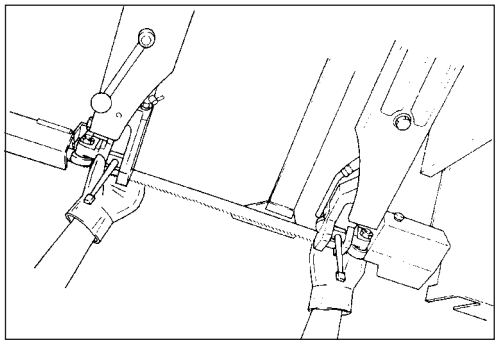


11 Install the saw blade on the drive and driven wheels with the cutting edge facing down.



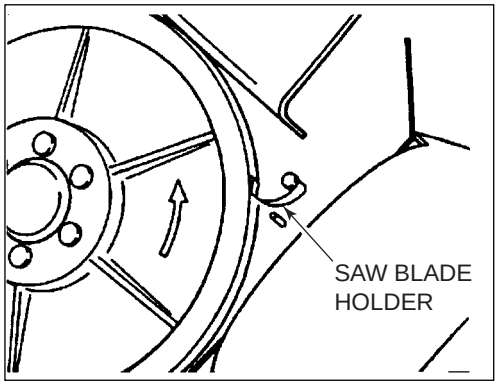
12 Push the saw blade into between the guide rollers and then the left-hand and right-hand saw blade inserts.

Where the back of the saw blade is pushed against the backup rollers, pull up the left-hand and right-hand saw blade insert clamp levers to close the saw blade inserts.



13 Push the back of the saw blade against the flange of the drive wheel, and set the saw blade holder.

This prevents the saw blade from coming off the drive wheel.



NOTE

- The saw blade holder is automatically released as soon as the saw blade starts running.

14 Check that the saw blade is securely installed on the drive wheel, hold the saw blade with one hand so that its back is pushed against the flange of the driven wheel, and turn the saw blade tension lever to the "  " position.

The saw blade is hydraulically tensioned to a proper degree.

15 First pull down and then pull up the left-hand and right-hand saw blade insert clamp levers to close the saw blade inserts again.

This operation is designed to ensure or check that the saw blade is securely clamped with the saw blade inserts.

16 Adjust the position of the wire brush as described on the next page.

17 Close the saw blade cover, and gently close the wheel cover.

ADJUSTING POSITION OF WIRE BRUSH

WARNING

- **Never try to adjust the wire brush on the saw blade when the saw blade is running. It is dangerous if your hands or clothing are caught in the running saw blade.**

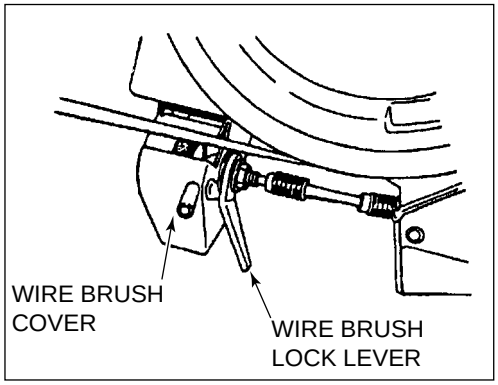
NOTE

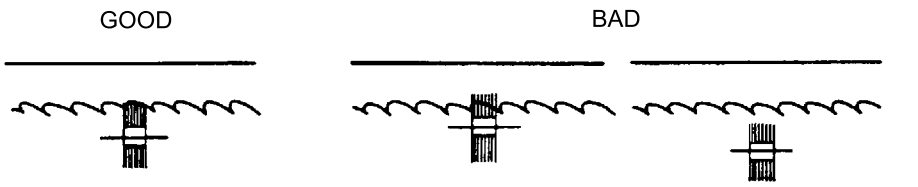
- The wire brush is consumable. If it is worn, remove the hexagon nut securing it to the shaft, and change it for a new one.

Adjust the position of the wire brush so that the wire bristles just touch the gullet as described below. Make this adjustment not only after changing the saw blade, but also at regular intervals.

1 Loosen the wire brush lock lever.

2 Adjust the position of the wire brush so that the wire bristles just touch the gullet, and tighten the wire brush lock lever in that position.





WIRE BRISTLES JUST TOUCH GULLET

WIRE BRUSH IS PREMATURELY WORN

CHIPS CANNOT BE PROPERLY REMOVED

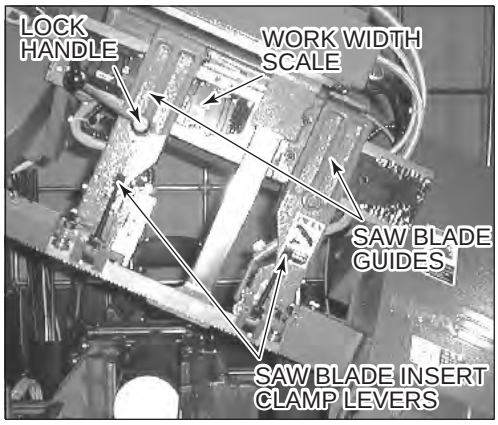
ADJUSTING POSITION OF MOVABLE SAW BLADE GUIDE

Adjust the distance between the saw blade guides to suit the width of the work to be cut as described below. If this distance is too wide, the saw blade may run out or break.

1 Pull down the left-hand saw blade insert clamp lever to open the left-hand saw blade insert.

2 Loosen the lock handle for the movable saw blade guide, and slide the movable saw blade guide by hand to suit the width of the work to be cut.

Bring the movable saw blade guide as close as possible to the work. Refer to the work width scale attached to the guide bar.



3 Securely tighten the lock handle so that the movable saw blade guide has no play.

4 Pull up the left-hand saw blade insert clamp lever to close the left-hand saw blade insert.

LOADING AND POSITIONING WORK

WARNING

- **When clamping the work with the vise, do not come close to the work. It is dangerous if the work is of such a shape as to spring out of the vise.**
- **If the work cannot be securely clamped with the vise, use jigs to clamp it securely. It is dangerous if the work is clamped loosely and forced out of the vise during cutting.**
- **Take preventive measures when cutting a thin or short piece from the work to keep it from falling. It is dangerous if the cut piece falls.**

Loading work

Load the work on the machine as described below.

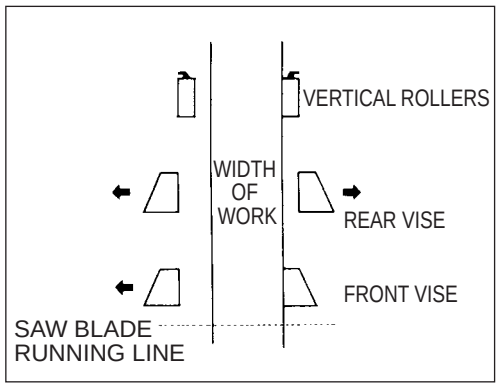
1 Press and hold the BLADE UP button to raise the sawhead to the upper limit.

NOTE

- Unless the sawhead is at the upper limit, the front and rear vises cannot fully open.

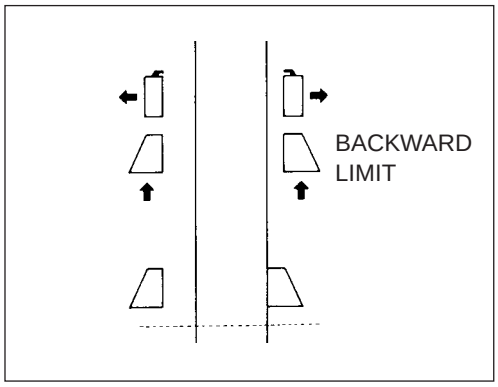
2 Press and hold the FRONT VISE OPEN button to open the front vise wider than the width of the work.

3 Press and hold the REAR VISE OPEN button to open the rear vise wider than the width of the work.



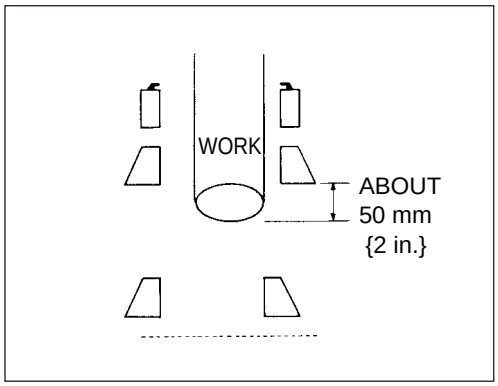
4 Press and hold the REAR VISE BACKWARD button to move the rear vise to the backward limit.

5 Loosen the lock levers above the vertical rollers, and move the vertical rollers by hand to make their distance greater than the width of the work.



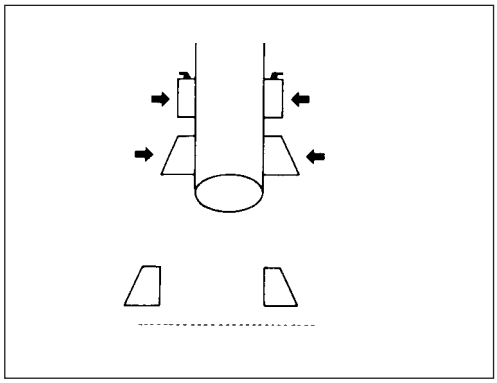
6 Gently place the work on the rear vise bed.

Check that the head end of the work projects about 50 mm {2 in.} from the front end of the rear vise toward the front vise.



7 Press and hold the REAR VISE CLOSE button to clamp the work with the rear vise.

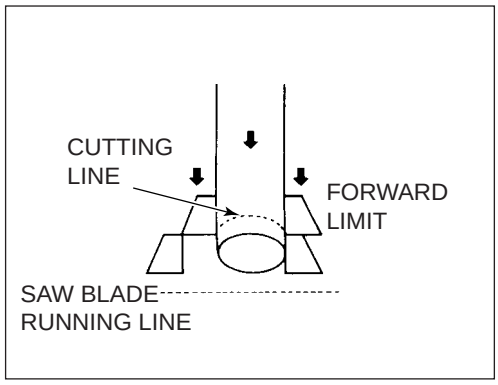
8 Move the vertical rollers by hand against the work, and securely tighten the lock levers.



Positioning work

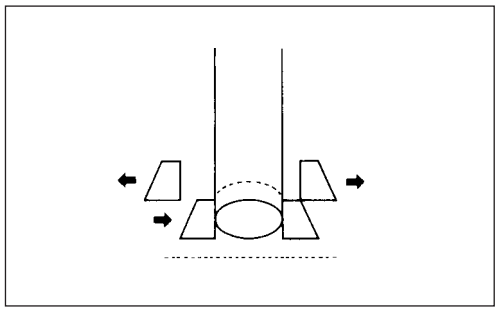
Position the loaded work as described below.

1 Press and hold the REAR VISE FORWARD button to move the rear vise to the forward limit and move the work forward.

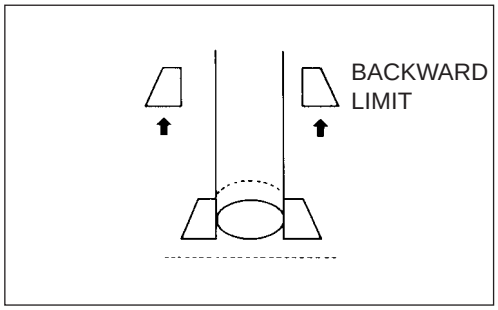


2 Press and hold the FRONT VISE CLOSE button to clamp the work with the front vise.

3 Press and hold the REAR VISE OPEN button to open the rear vise.

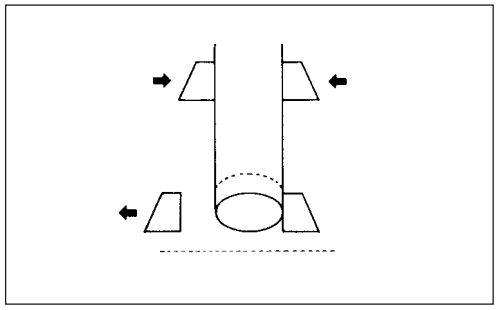


4 Press and hold the REAR VISE BACKWARD button to move the rear vise to the backward limit.

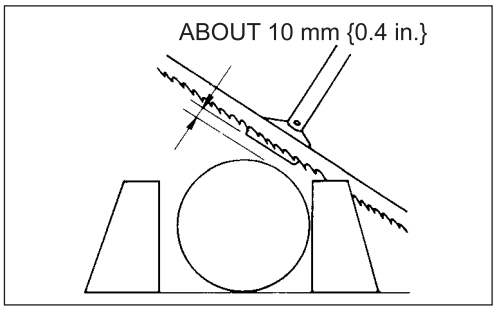


5 Press and hold the REAR VISE CLOSE button to clamp the work with the rear vise.

6 Press and hold the FRONT VISE OPEN button to open the front vise.



7 Intermittently press the BLADE DOWN button to lower the sawhead slowly until the quick approach feeler comes to about 10 mm {0.4 in.} above the top surface of the work.

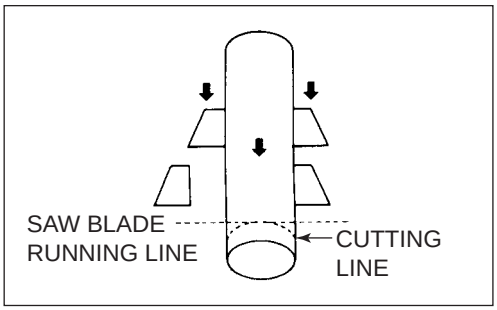


NOTICE

- When lowering the sawhead, take care so that the quick approach feeler does not touch the work. If the quick approach feeler is lowered too close to the work, it may touch the work when the work is moved. Be sure to ensure a clearance of about 10 mm {0.4 in.}.

8 Press and hold the REAR VISE FORWARD button until the cutting line of the work comes right below the saw blade.

If necessary, press and illuminate the REAR VISE SLOW button to move the rear vise at the low speed.

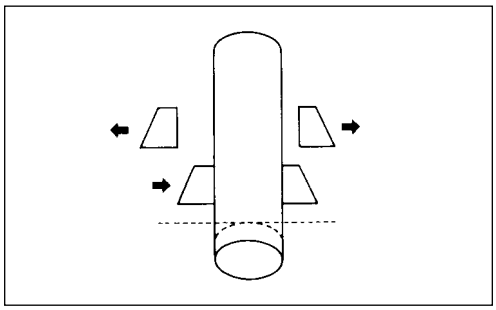


NOTE

- When trimming the head end of the work in automatic operation, align the cutting line with the saw blade running line, and start the machine in the MANUAL mode. When the AUTO/MANUAL switch is turned to AUTO after the sawhead has started lowering, the machine can operate automatically without counting the head-end trim.
  If you do not trim the head end of the work, align the first cutting line with the saw blade running line, and start the machine in the AUTO mode. In this case, the work is not automatically fed for the first cutoff length.

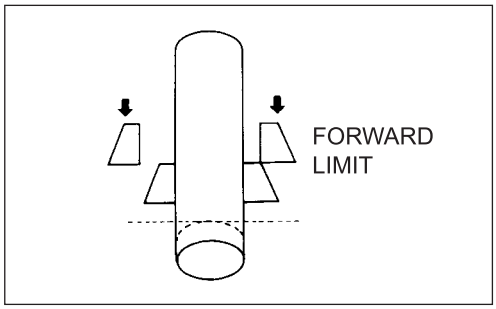
9 If the cutoff length is longer than the rear vise feed stroke of 400 mm {15.748 in.} during manual operation, repeat steps 2, 3, 4, 5, 6, and 8 above in that order.

10 When the work positioning operation is completed, press and hold the FRONT VISE CLOSE button to clamp the work with the front vise.



11 Press and hold the REAR VISE OPEN button to open the rear vise.

12 Press and hold the REAR VISE FORWARD button to move the rear vise to the forward limit.



POSITIONING REMNANT FOR CUTTING FURTHER

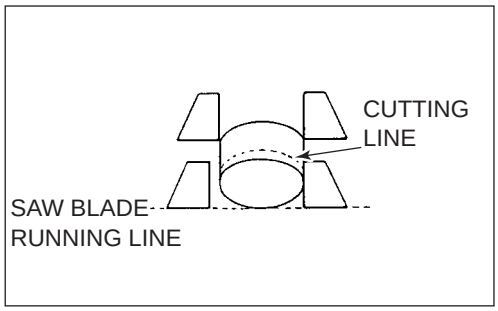
If the work becomes too short, it cannot be clamped when the rear vise is moved backward. This condition actuates the work absence detection function and does not allow the automatic operation of the machine.

The smallest possible length of this remnant is 76 mm {3 in.} when the grip allowance of the rear vise is 10 mm {0.4 in.}. When cutting the remnant further, position it as described below.

1 Remove the remnant from the rear vise table.

2 Press and hold the FRONT VISE OPEN button to open the front vise.

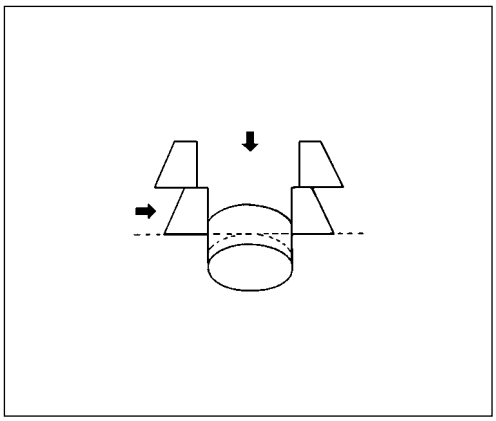
3 Place the remnant on the front vise table.



4 Move or turn around the remnant by hand to align its cutting line with the saw blade running line.

5 Press and hold the FRONT VISE CLOSE button to clamp the remnant with the front vise.

6 Press and hold the REAR VISE FORWARD button to move the rear vise to the forward limit.



Semiautomatic positioning function

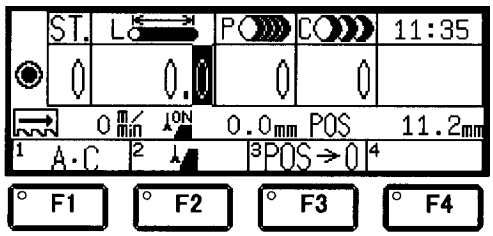
During the manual operation of the machine, its semiautomatic positioning function automatically moves the rear vise backward for the preset cutoff length.

SETTING CUTOFF LENGTH

Set the cutoff length as described below.

1 Move the cursor to the ST. field with the cursor keys.

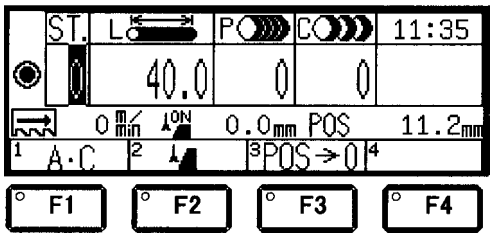
2 Press the numeric key “0” and the ENT key to call the station 0 in the ST. field and move the cursor to the L field.



The station 0 is exclusively used for the semiautomatic positioning function, and nothing can be entered in the P and C fields.

If the station 0 was used before, the cutoff length preset then is shown in the L field.

3 Enter the cutoff length in the range of 5.0 to 400.0 mm {0.197 to 15.748 in.} with the numeric keys.



NOTE

- With the semiautomatic positioning function, allow for the saw blade kerf.

4 Press the ENT key to store the cutoff length in memory.

SEMIAUTOMATIC POSITIONING

Semiautomatically position the loaded work as described below.

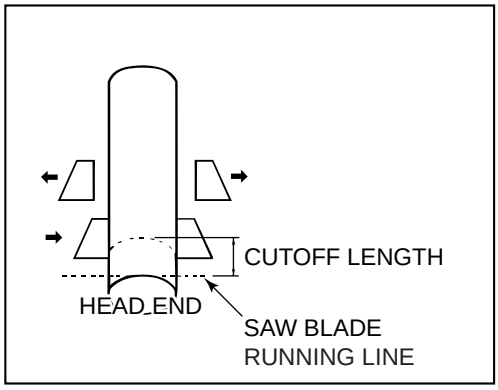
NOTE

- Before semiautomatically positioning the work, be sure to check that the head end of the work is positioned just below the saw blade.

1 Press and hold the BLADE UP button to raise the sawhead until the saw blade is a minimum of 10 mm {0.4 in.} apart from the work.

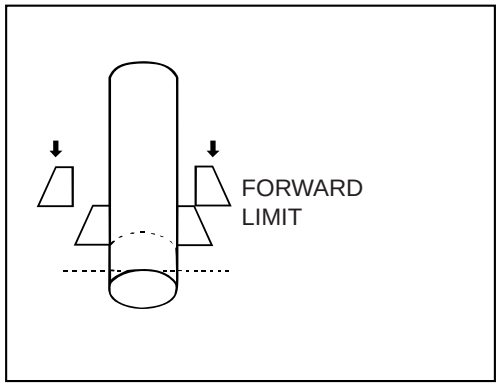
2 Press and hold the FRONT VISE CLOSE button to clamp the work with the front vise.

3 Press and hold the REAR VISE OPEN button to open the rear vise.



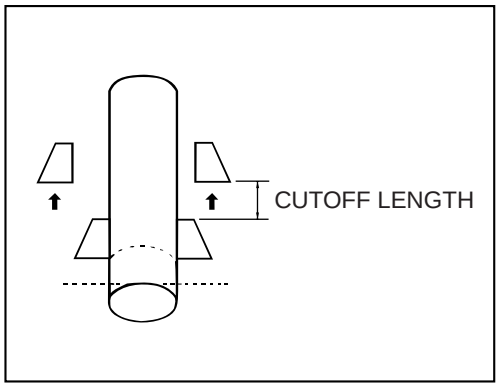
4 Press and hold the REAR VISE FORWARD button to move the rear vise forward until the REAR VISE FORWARD LIMIT light illuminates.

5 Turn the AUTO/MANUAL switch to AUTO.



6 Press the REAR VISE BACKWARD button. (The button need not be held.)

The rear vise moves backward over the preset cutoff length and stops. The REAR VISE POSITIONED light illuminates to indicate that the rear vise has moved backward and completed the semiautomatic positioning operation.



To stop the semiautomatic positioning operation while the rear vise is moving backward, press the BLADE UP button.

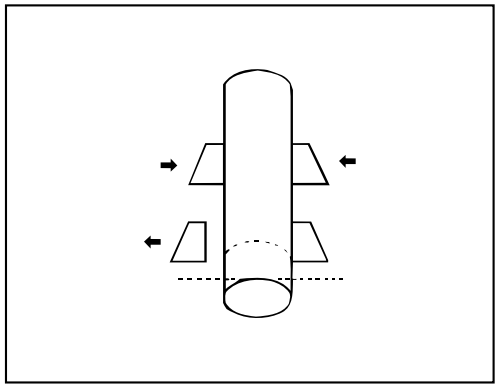
7 Turn the AUTO/MANUAL switch to MANUAL.

NOTICE

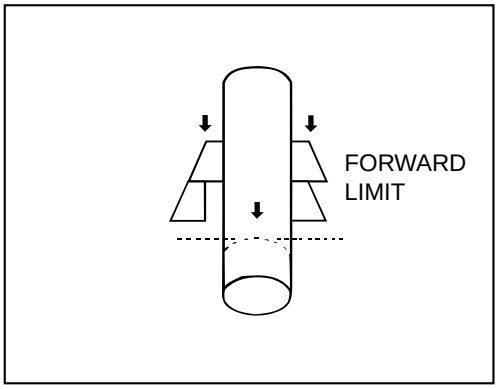
- Before turning the AUTO/MANUAL switch to MANUAL, be sure to check that the positioning of the rear vise is completed and that the REAR VISE POSITIONED light is illuminated. If the AUTO/MANUAL switch is turned to MANUAL while the rear vise is moving backward, the rear vise stops in that position.

8 Press and hold the REAR VISE CLOSE button to clamp the work with the rear vise.

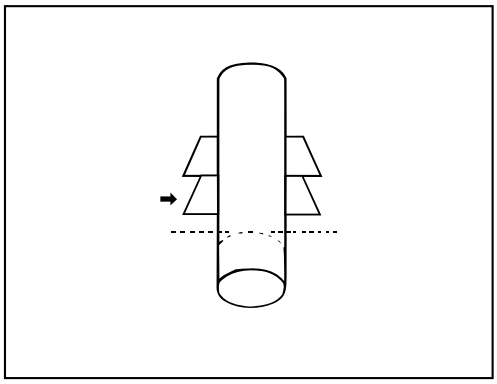
9 Press and hold the FRONT VISE OPEN button to open the front vise.



10 Press and hold the REAR VISE FORWARD button to move the work forward until the REAR VISE FORWARD LIMIT light illuminates.

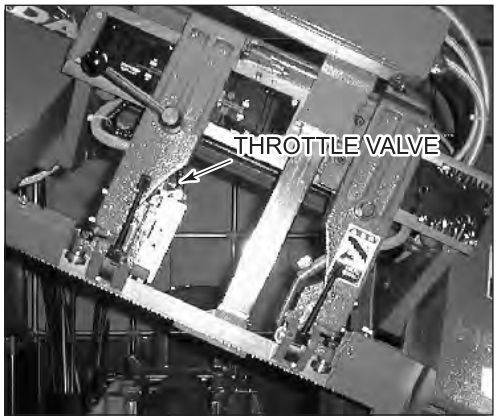


11 Press and hold the FRONT VISE CLOSE button to clamp the work with the front vise.



ADJUSTING CUTTING FLUID FLOW RATE

As soon as the BLADE DRIVE button is pressed, the saw blade starts running, the cutting fluid pump starts, and each nozzle discharges the cutting fluid. Adjust the flow rate of the cutting fluid with the throttle valve and three-way cock in the cutting fluid system to suit the work to be cut. (See “Other controls” in Part III, Controls.)



RUNNING IN NEW SAW BLADE

When a new saw blade is to be used for the first time, be sure to run it in. Unless the new saw blade is properly run in, it may become unable to cut any more in the middle of a cutting operation, prematurely run out, and decrease in service life. Each time a new saw blade is to be used, run it in as described below, because it is basic to the proper use of the machine.

1 Set the saw blade speed control dial or handwheel at a speed 20 to 30% lower than the normal setting.

2 Set the FLOW CONTROL dial at 1/2 to 2/3 of the normal setting to reduce the sawhead downfeed speed.

3 Leave the CUTTING PRESSURE CONTROL dial at the normal setting.

4 Make five to six cuts with large work under the above conditions.

NOTE

● If the work is smaller or is a structural steel shape, make 10 to 15 cuts.

5 After the saw blade has been run in for some time, gradually return the saw blade speed control dial or handwheel and the FLOW CONTROL dial to the normal setting while cutting the work.

6 If the saw blade vibrates before it reaches the standard cutting conditions, it is not properly run in. In that case, again reduce the saw blade running speed and sawhead downfeed speed, and gradually bring the saw blade to the standard cutting conditions while checking that it does not vibrate.

STACK CUTTING

When stack cutting workpieces, be sure to use the optional multi-vises.

Stacking workpieces

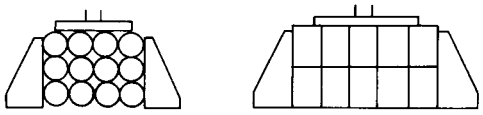
Stack workpieces of the same size as shown in the good examples below. The nest dimensions should be as given below.

Nest dimensions

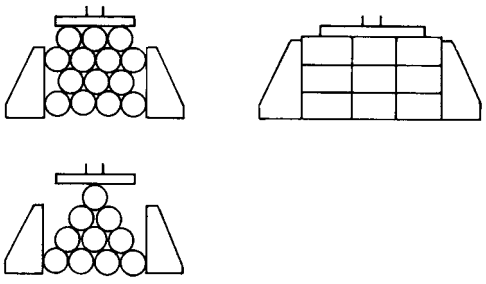
Width: 150 mm {5.9 in.} for HFA-250 and HFA-250W
180 to 300 mm {7.1 to 11.8 in.} for HFA-400 and HFA-400W

Height: 50 to 150 mm {2.0 to 5.9 in.} for HFA-250 and HFA-250W
50 to 200 mm {2.0 to 7.9 in.} for HFA-400 and HFA-400W

Good

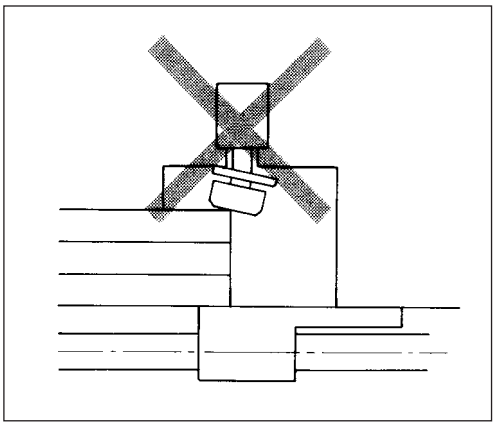


Bad



NOTICE

- When using each multi-vise, take care so that it does not clamp short workpieces at the tail end. Otherwise, its cylinder may break.



Using multi-vises (optional)

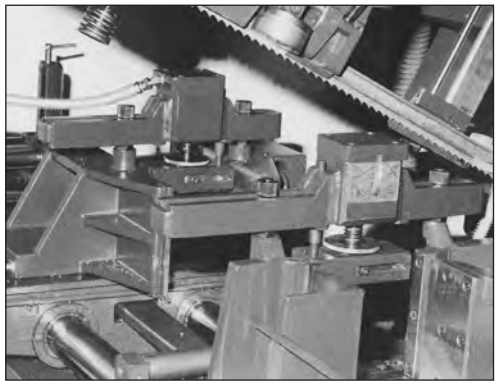
Use the multi-vises as described below.

NOTE

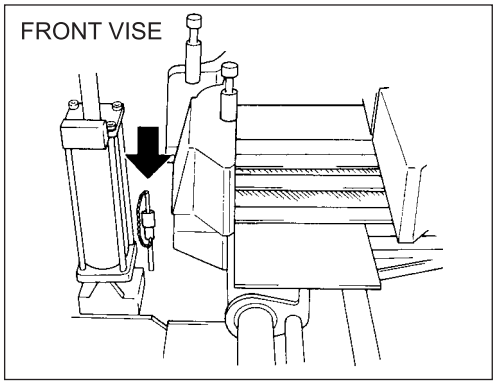
- When stack cutting workpieces, check that they are each securely clamped, and take special care so that they do not vibrate. Vibration adversely affects the life of the saw blade.

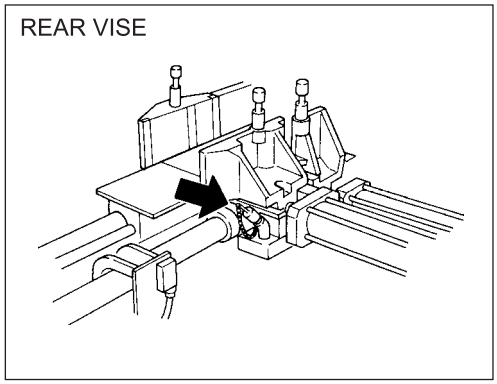
1 Open the front and rear vises wider than the nest width of workpieces, and stack the workpieces on the front and rear vise tables.

2 Install the multi-vises on the front and rear vises. They need not be fixed at this point of time.



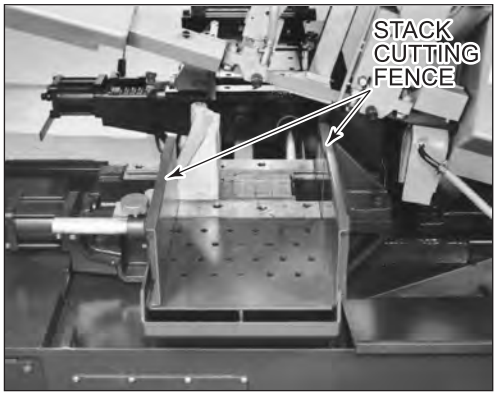
3 Connect the hydraulic hoses of the multi-vises to the plugs of the front and rear vise cylinders.





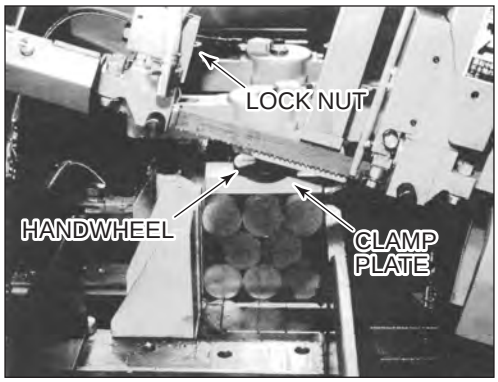
4 Install the stack cutting fence on the work tray.

The stack cutting fence is designed to prevent the stack-cut pieces from collapsing on the work tray. Securely fix the stack cutting fence to a width slightly greater than the width of the nest.

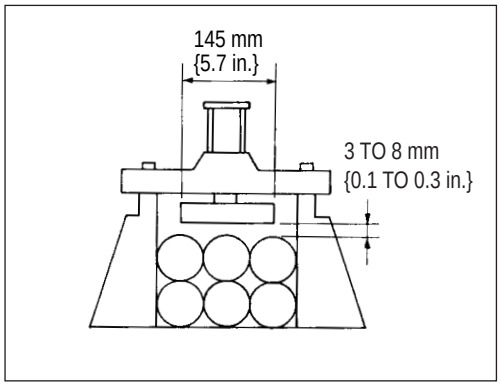


5 Adjust the left-to-right position of each multi-vise so that its cylinder comes to the center of the nest width.

Securely fix the multi-vise with the two lock nuts.

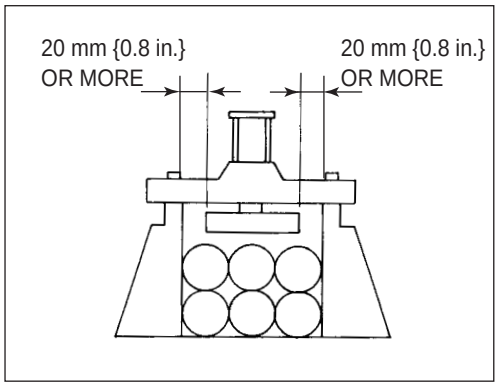


6 Turn the handwheel above the clamp plate of each multi-vise so that the bottom surface of the clamp plates comes to 3 to 8 mm {0.1 to 0.3 in.} above the top of the stack of workpieces.



7 When the machine model is HFA-400 or HFA-400W, loosen the socket head bolt of each clamp plate, and slide the clamp plates so that they are equally apart 20 mm {0.8 in.} or more from the left and right sides of the front and rear vises.

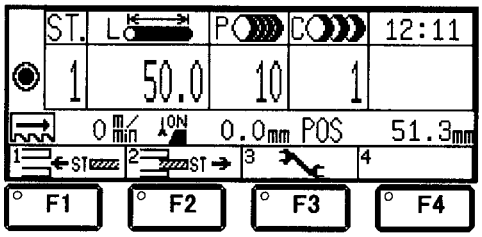
After the width of the clamp plates is properly adjusted, tighten the socket head bolts to fix the clamp plates.



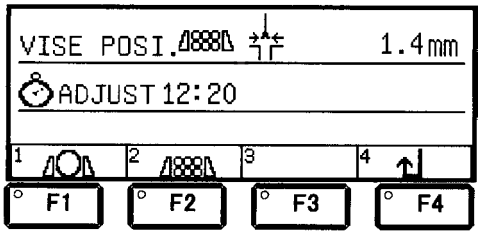
NOTE

- Unless the clamp plates are at least 20 mm {0.8 in.} apart equally from the left and right sides of the front and rear vises, the work absence detection function is not activated.

8 Press the MENU key several times to indicate in the function label fields the menu shown right.



9 Press the F3 (set) key to open the setup display as shown right. Set the standby position of the rear vise on the display.



10 Press the F2 (forward limit standby) key.

The rear vise is set to stand by at the forward limit during automatic operation and to clamp the workpieces at the forward limit until each cut is completed.

NOTE

- If the workpieces can be securely clamped with the front vise alone so that they do not whip up or fly off, the rear vise may be set to stand by at the backward limit to shorten the idle time.

11 After the workpieces are completely positioned for cutting, their stack cutting can be started in the MANUAL or AUTO mode in the same way as during normal cutting.

RUNOUT DETECTOR (OPTIONAL)

When using the optional runout detector during cutting, set the runout tolerances of the saw blade before starting the machine. The runout detector automatically stops the machine at the prescribed time after it detects the runout of the saw blade that exceeds the tolerances.

Setting runout tolerances

The runout tolerances of the saw blade are stored in memory even after the power of the machine is turned off. This means that the previous runout tolerances are retained in memory when the power of the machine is turned on the next time.

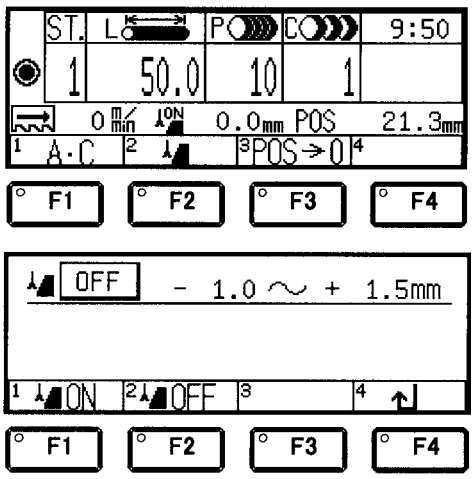
Set the runout tolerances of the saw blade as described below.

1 Turn the machine circuit breaker switch to ON.

NOTE

- The power of the runout detector is interlocked with that of the machine. As soon as the machine circuit breaker switch is turned to ON, the power of the runout detector is automatically turned on.

2 Press the F2 (runout) key on the station data setup display to go to the runout setup display.

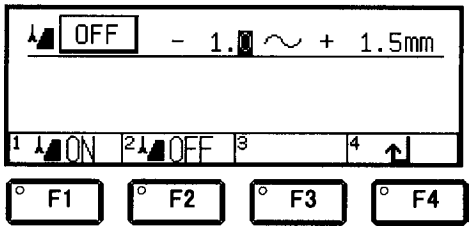


3 Set the minus runout tolerance.

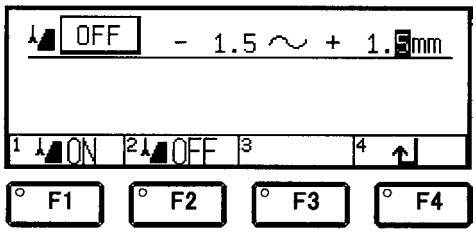
Example: Change the minus runout tolerance from 1.0 mm to 1.5 mm.

Check that the cursor is positioned on the "–" side.

If the cursor is positioned on the "+" side, move the cursor to the "–" side with the cursor keys.



4 Enter “1”, “.” and “5” with the numeric keys, and press the ENT key to move the cursor to the “+” side.



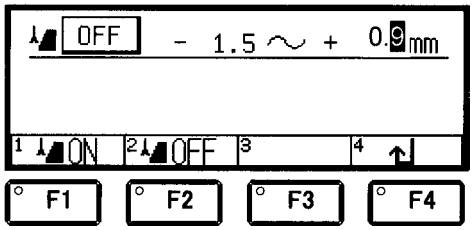
5 Set the plus runout tolerance.

Example: Change the plus runout tolerance from 1.5 mm to 0.9 mm.

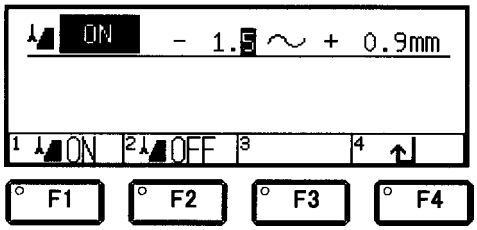
Check that the cursor is positioned on the “+” side.

If the cursor is positioned on the “–” side, move the cursor to the “+” side with the cursor keys.

6 Enter “0”, “.” and “9” with the numeric keys, and press the ENT key.



7 Press the F1 (ON) key to change the runout setup ON/OFF field to ON.



NOTE

- The runout detector cannot work if the runout tolerances are set but the runout setup ON/OFF field is set to OFF.

HANDLING CUTTING DATA

Entering and storing cutting data

When the automatic operation of the machine is to be performed, enter cutting data at respective stations and store them in memory as described below.

NOTE

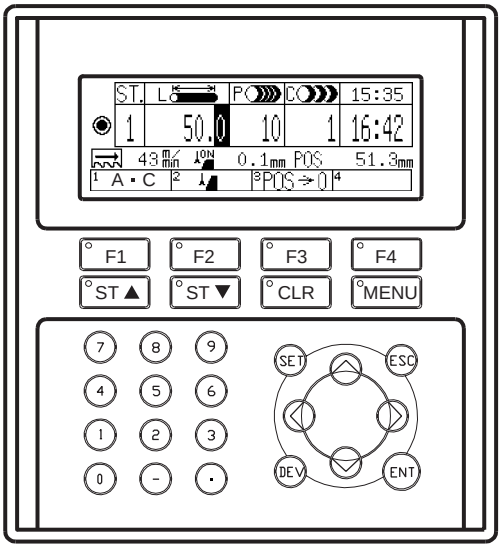
- The cutting data are stored in memory even after the power of the machine is turned off. When the power of the machine is turned on the next time, the previous cutting data are all retained in memory.

1 Move the cursor to the ST. field with the cursor keys.

2 Press the F1 (A・C) key to go to the all station delete confirmation display.

3 Press the F1 (YES) key to delete the cutting data stored at all stations.

4 Enter a station number in the ST. field with the numeric keys.



5 Press the ENT key to set the station number in the ST. field and move the cursor to the L field.

6 Enter the cutoff length in the L field with the numeric keys. The setup range is 5.0 to 9999.9 mm in 0.1-mm increments {0.197 to 99.999 inches in 0.001-inch increments}. The kerf of the saw blade and the feed stroke of the rear vise need not be considered.

NOTE

- If the entered value is outside the setup range, the ENT key is not allowed to set the entered value in the ST. field and move the cursor to the P field. In such a case or when a wrong value is entered, press the CLR key to delete the entered value, and enter a correct value.
- When continuously cutting the work in the AUTO mode, enter a cutoff length of 10 mm {0.394 in.} or more. If you want to continuously cut the work to 10 mm {0.394 in.} or less, contact AMADA.

7 Press the ENT key to set the cutoff length in the L field and move the cursor to the P field.

8 Enter the quantity of pieces to be cut in the P field with the numeric keys. The setup range is 1 to 9999.

9 Press the ENT key to set the quantity of pieces to be cut in the P field and move the cursor to the ST. field.

NOTE

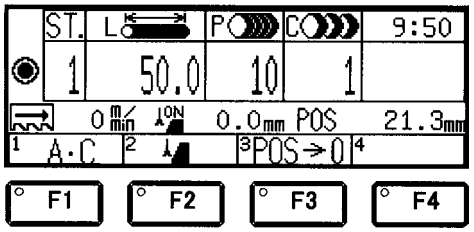
● If you enter a wrong value, press the CLR key to delete it, and enter a correct value.

10 Repeat steps 4 to 9 above to enter and store the cutting data for the required number of stations.

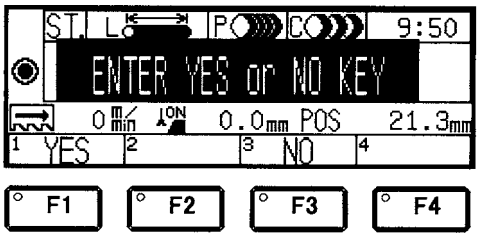
Example of data entry

Station 1 … L field (cutoff length): 10 mm
P field (quantity of pieces to be cut): 3 pieces
Station 2 … L field (cutoff length): 20 mm
P field (quantity of pieces to be cut): 5 pieces

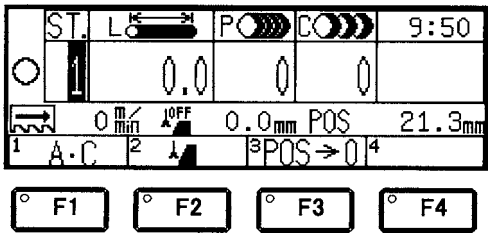
1 Press the F1 (A•C) key to go to the all station delete confirmation display.



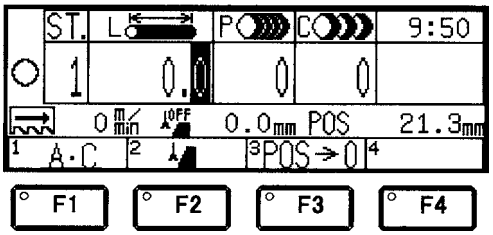
2 Press the F1 (YES) key to delete the cutting data of all stations.



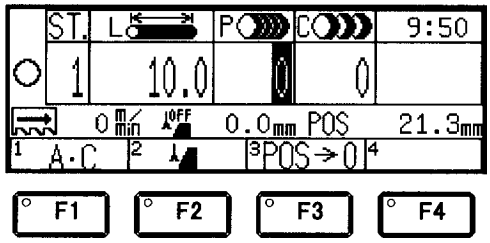
3 Press the numeric key "1" and the ENT key to set "1" in the ST. field.



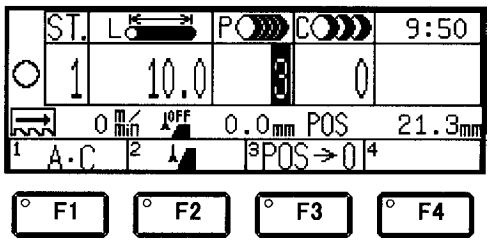
4 Once the station number is set in the ST. field, the cursor moves to the L field.



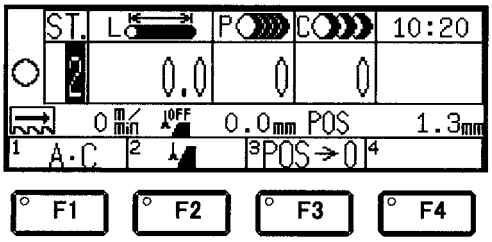
5 Press the numeric keys “1” and “0” and the ENT key to set “10.0” in the L field and move the cursor to the P field.



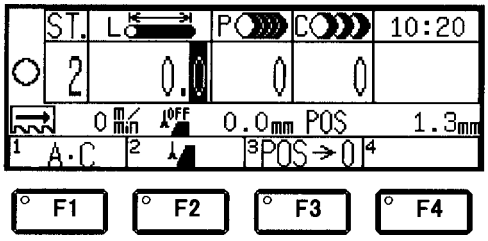
6 Press the numeric key “3” and the ENT key to set “3” in the P field.



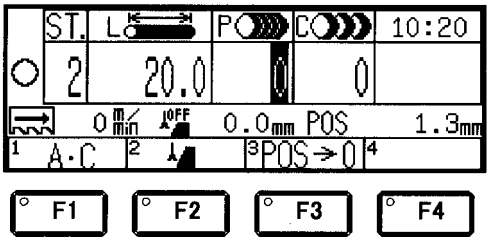
7 Once the quantity of pieces to be cut is set in the P field, the cursor moves to the ST. field. The station number is increased by 1 to “2”.



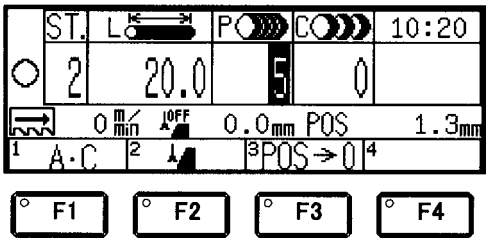
8 Press the ENT key to move the cursor to the L field.



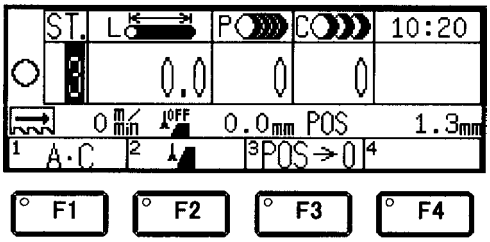
9 Press the numeric keys “2” and “0” and the ENT key to set “20.0” in the L field and move the cursor to the P field.



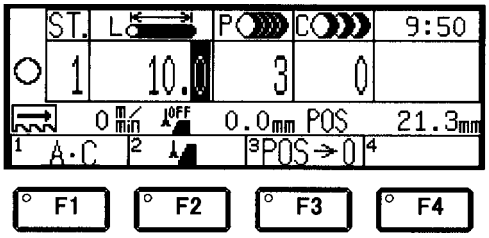
10 Press the numeric key “5” and the ENT key to set “5” in the P field.



11 Once the quantity of pieces to be cut is set in the P field, the cursor moves to the ST. field. The station number is increased by 1 to “3”.



12 Press the numeric key “1” and the ENT key to call the station 1 in the ST. field and display the cutting data of the station 1.



NOTE

- During its automatic operation, the machine starts cutting the work at the station whose number is displayed in the ST. field.

Checking cutting data (calling station)

When calling the station whose cutting data are to be checked, move the cursor to the ST. field and enter the number for the station in the ST. field as you did when entering and storing the cutting data for the station.

The length and quantity of pieces to be cut as stored at the station number are displayed in the L and P fields, respectively. The C field displays the quantity of pieces cut during the last automatic operation.

NOTE

- Before starting the automatic operation of the machine, check the cutting data of all stations.

Changing cutting data

Change the stored cutting data as described below.

NOTE

- The cutting data can be changed during the automatic operation of the machine, except that the cutting data of the station currently being executed cannot be changed.

1 Enter with the numeric keys the number for the station whose cutting data you want to change, and press the ENT key.

2 To change the cutoff length, move the cursor to the L field with the cursor keys. To change the quantity of pieces to be cut, move the cursor to the P field with the cursor keys.

3 Enter the appropriate value with the numeric keys, and press the ENT key.

4 To reset the quantity of pieces already cut, move the cursor to the C field with the cursor keys. In this condition, the quantity of pieces already cut may be reset by either of the following methods:

(a) Press the CLR key and the ENT key.

(b) Press the numeric key “0” and the ENT key.

5 This stores the new cutting data.

Canceling cutting data

When canceling the cutting data stored at a station, call the station first. Set either the L or P field to “0”, and press the ENT key.

The automatic operation of the machine skips the station.

NOTE

- When the L and P fields are both set to “0” for a given station, the automatic operation of the machine is stopped at the station.

Conditions for execution of cutting data

The following conditions affect the automatic operation of the machine being executed according to the cutting data stored at the respective stations:

- When “0” is set in either of the L and P fields for a given station, the machine skips the station and goes to the next station.
- When “0” is set in both of the L and P fields for a given station, the machine ends its automatic operation at the station.
- When the P and C fields display the same value for a given station, the machine skips the station and goes to the next station.

Example of data execution

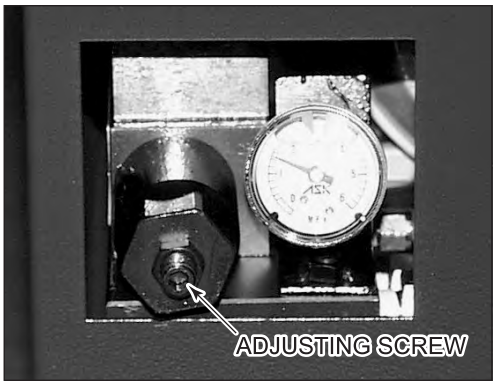
ST. field	L field	P field	C field	Operating status	Execution condition
1	100.0	10	0	Started and executed	Automatic operation is started
2	200.0	0	0	Skipped	P field is set to “0”
3	0.0	10	0	Skipped	L field is set to “0”
4	400.0	40	40	Skipped	40 pieces are already cut
5	500.0	50	0	Executed	
6	0.0	0	0	Ended	L and P fields are both set to “0”
7	700.0	70	0	Started and executed	Automatic operation is resumed
8	800.0	80	0	Executed	
9	0.0	0	50	Ended	L and P fields are both set to “0”

When the cutting data are stored at the stations 1 to 9 as shown above,

- Displaying the station number 1 and starting the machine cut the work at the station 1, skip the stations 2 to 4, cut the work at the station 5, and end the automatic operation.
- Displaying the station number 7 and starting the machine cut the work at the stations 7 and 8 and end the automatic operation.

HEAD-END POSITIONING FUNCTION (OPTIONAL)

- If the head-end positioning operation is performed with bent work, the head end of the work may not reach the front vise even when the work is fed for the preset length.
- When cutting work whose diameter or height is less than 12 mm {0.47 in.} on the machine that is equipped with a head-end positioning function, enter the cutting data so that the remnant length becomes 150 mm {5.91 in.} or more. If the remnant length becomes less than 150 mm {5.91 in.}, the vise jaws may be damaged.
- Before performing the head-end positioning operation, be sure to remove the chips from the contact surface at the back of the front vise. If the chips are deposited on the contact surface, they may be lodged between the contact surface and work head and may degrade the accuracy of cutoff pieces.
- If the optional vise pressure control valves are used together, the head-end positioning operation cannot be performed in principle because the vise clamping force is reduced. When the vise pressure control valves are provided, the pressure of the head-end positioning pressure reducing valve is reduced from a standard level of 1.5 MPa {15 kgf/cm^2, 213 psi} to 0.75 MPa {7.5 kgf/cm^2, 106 psi} at the time of factory shipment. However, the head-end positioning function can be used together with the vise pressure control valves under the following conditions:
  - Set the pressure of the vise pressure control valves at or above 2.0 MPa {20 kgf/cm^2, 285 psi}.
  - Adjust the pressure of the head-end positioning pressure reducing valve to 1.5 MPa {15 kgf/cm^2, 213 psi} with the adjusting screw.



BACK OF MACHINE

  The pressure can be set at a minimum of 0.75 MPa {7.5 kgf/cm^2, 106 psi}. When feeding heavy work, set the pressure at 1.5 MPa {15 kgf/cm^2, 213 psi}.
- When the optional grooveless vise plate is used together, raise the pressure of the optional vise pressure control valves. Since the grooveless vise plate reduces the frictional resistance between the vise and work, the work may slip to increase the likelihood of alarms if the head-end positioning operation is performed with the pressure of the vise pressure control valves lowered.
- If the head-end positioning function is used together with the optional vise pressure control valves, the head-end positioning operation may not be properly performed.

Setting cutoff length

Set the length of pieces to be cut by using the head-end positioning function as described below.

1 Move the cursor to the ST. field with the cursor keys, and call the station whose cutoff length is to be set.

NOTE

- Use a station from the stations 1 to 99, and set the quantity of pieces to be cut at the same time.

2 Press the ENT key to set the station number in the ST. field and move the cursor to the L field.

3 Enter the cutoff length in the range of 5.0 to 9999.9 mm {0.197 to 99.999 in.} with the numeric keys, and press the ENT key to set the cutoff length in the L field and move the cursor to the P field.

The kerf of the saw blade is automatically added to the cutoff length.

NOTE

- If the cutoff length is 10 mm {0.394 in.} or less, contact AMADA.

4 Enter the quantity of pieces to be cut in the range of 1 to 9999 with the numeric keys, and press the ENT key to set the quantity of pieces to be cut in the P field and move the cursor to the ST. field.

Head-end positioning operation

CAUTION

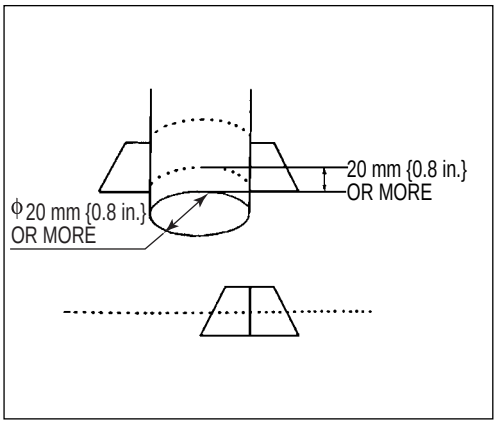
- **The rear vise may repeat its forward and backward motions several times until it positions the work for the preset cutoff length.**

Perform the head-end positioning operation as described below.

1 Press and hold the REAR VISE BACKWARD button to move the rear vise backward.

2 Press and hold the REAR VISE OPEN button to open the rear vise over the full stroke.

3 Place the work on the rear vise bed so that its head end projects 20 mm {0.8 in.} or more from the front end of the rear vise toward the front vise.



4 Press and hold the REAR VISE CLOSE button to clamp the work with the rear vise.

5 Press and hold the FRONT VISE CLOSE button to close the front vise.

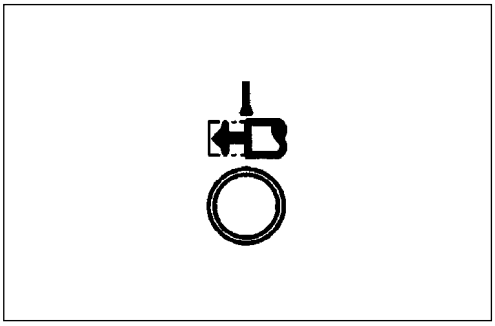
6 Turn the AUTO/MANUAL switch to AUTO.

7 Check that:

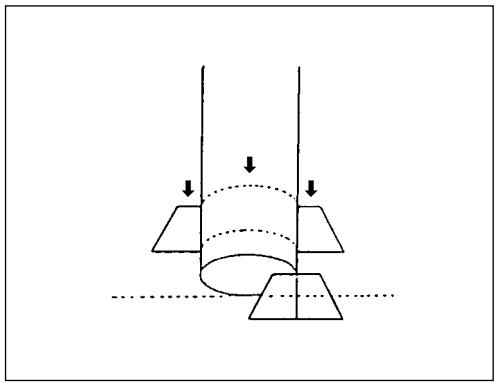
- The work is clamped with the rear vise (the REAR VISE CLOSE light is illuminated).
- The front vise is fully closed (the FRONT VISE CLOSE light is illuminated).
- The rear vise is not at the forward limit (the REAR VISE FORWARD LIMIT light is extinguished).

8 Press the HEAD-END POSITIONING button.

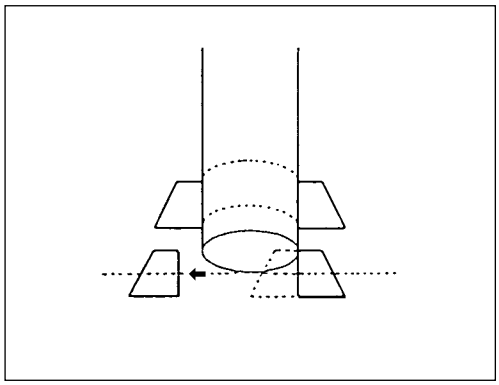
The button flashes, and the sawhead rises to the upper limit. The rear vise starts the head-end positioning operation.



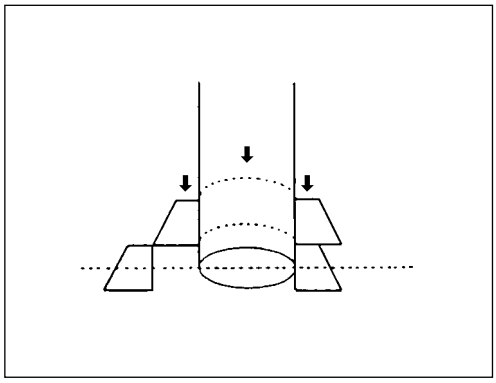
The rear vise moves forward. When the work is pushed against the front vise, the rear vise stops the forward motion.



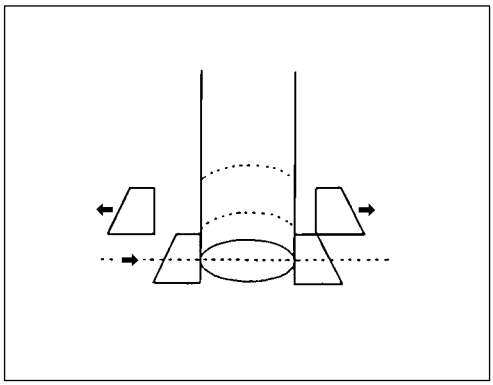
The front vise fully opens.

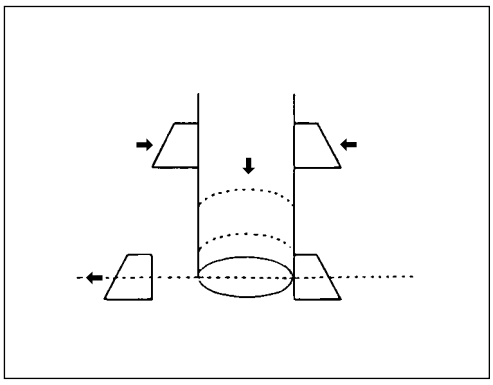


The rear vise performs the positioning operation until the preset cutoff length is achieved.

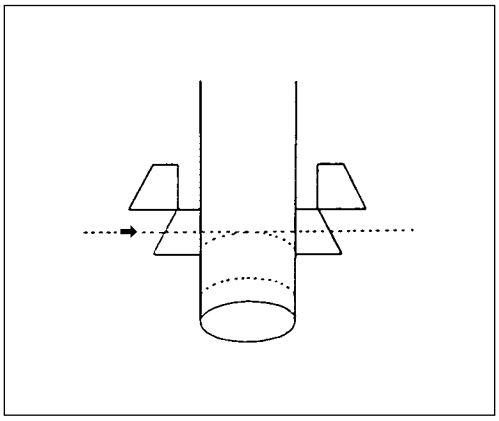


The rear vise moves to the forward limit.





9 When the front vise clamps the work, the HEAD-END POSITIONING button extinguishes.



Going from head-end positioning operation to automatic operation

CAUTION

- **If the BLADE DRIVE button is pressed during the head-end positioning operation, the saw blade starts running.**

If you want to go directly to the automatic operation of the machine after completing the head-end positioning operation, press the BLADE DRIVE button while the HEAD-END POSITIONING button is flashing.

After the head-end positioning operation, the machine starts the automatic operation at the station where the head-end positioning operation has been performed (or at the station for which the Current station light illuminates).

OPERATION

WARNING

- **Before starting the operation of the machine each time, be sure to check that there are no people and obstacles around the machine.**
- **Never take your eyes off the machine or lean on the machine during operation. Be ready for a situation that demands immediate attention to prevent an accident.**
- **Never touch the running saw blade or chip conveyor. It is dangerous if your hands or clothing are caught in the running saw blade or chip conveyor.**
- **Never try to adjust the wire brush on the saw blade or remove chips when the saw blade is running. It is dangerous if your hands or clothing are caught in the running saw blade.**
- **Be sure to check that the flow rate of the cutting fluid is adjusted to a proper degree. If the cutting fluid is not supplied in sufficient amounts, the life of the saw blade may be markedly shortened. If the cutting operation is continued in this condition, a fire may occur.**

Manual operation

STARTING CUTTING

Position the work and cut it once during the manual operation as described below.

1 Check again that:

- The sawhead downfeed speed and cutting pressure are properly set.
- The saw blade running speed is properly set.
- The saw blade inserts are closed.
- The wire brush is properly positioned.
- The flow rate of the cutting fluid is properly adjusted.
- The work is securely clamped.

2 Turn the AUTO/MANUAL switch to MANUAL.

3 Press the BLADE DRIVE button to start cutting the work.

The saw blade starts running, and the sawhead rapidly lowers until the quick approach feeler touches the work. The sawhead then lowers at the preset downfeed speed.

ENDING CUTTING

When the sawhead reaches the lower limit after cutting the work once, the sawhead and saw blade automatically stop lowering and running, respectively.

INTERRUPTING OR STOPPING CUTTING

Press the BLADE UP button or EMERGENCY STOP button to interrupt or stop cutting.

- Press the BLADE UP button to stop the saw blade running, and press and hold it to raise the sawhead. Press the BLADE DRIVE button to resume the interrupted cutting operation.
- Press the EMERGENCY STOP button to immediately stop the entire machine.

The machine stops as soon as it falls into an alarm condition. When the saw blade runout alarm code “E-007” is displayed, the saw blade stops running, the sawhead rises to the upper limit, and the machine immediately stops. (See “Alarm code list” in Part V, Troubleshooting.)

Automatic operation

Execute the cutting data stored at each station to continuously cut the work.

NOTE

● If you want to set the work absence detection width to less than 30 mm {1.18 in.}, contact AMADA.

BEFORE STARTING AUTOMATIC OPERATION

Before pressing the BLADE DRIVE button, check again that:

- The sawhead downfeed speed and cutting pressure are properly set.
- The saw blade running speed is properly set.
- The saw blade inserts are closed.
- The wire brush is properly positioned.
- The flow rate of the cutting fluid is properly adjusted.
- The first station to be executed is called. (The machine starts continuously cutting the work at the station number displayed in the ST. field and skips the previous stations.)
- The cutting data of each station are properly set.
- The conditions for the start of the automatic operation are satisfied.
- The work is securely clamped with the front vise (the FRONT VISE CLOSE light is illuminated).
- The rear vise is at the forward limit (the REAR VISE FORWARD LIMIT light is illuminated).

STARTING CUTTING WITHOUT TRIMMING HEAD END

Start cutting the work without trimming its head end as described below.

1 Place the work cutting line just below the saw blade as described in “Positioning work” on page IV-15.

2 Turn the AUTO/MANUAL switch to AUTO.

3 Press the BLADE DRIVE button to start continuously cutting the work.

As soon as the saw blade starts running, the Current station light illuminates. The machine continues to operate automatically according to the preset cutting data.

NOTE

- Unless the automatic operation start conditions were satisfied when the BLADE DRIVE button was pressed, the saw blade does not start running, and the FRONT VISE CLOSE light or REAR VISE FORWARD LIMIT light flashes.
  When either light flashes, turn the AUTO/MANUAL switch to MANUAL, and press the FRONT VISE CLOSE button or REAR VISE FORWARD button to change the light from flashing to steady.

STARTING CUTTING AFTER TRIMMING HEAD END

Start cutting the work after trimming its head end as described below.

1 Place the work head-end trimming line just below the saw blade as described in “Positioning work” on page IV-15.

2 Turn the AUTO/MANUAL switch to MANUAL.

3 Press the BLADE DRIVE button to start the saw blade running.

4 When the sawhead starts lowering, turn the AUTO/MANUAL switch to AUTO to start continuously cutting the work.

As soon as the head-end trim is completed, the Current station light illuminates. The machine continues to operate automatically according to the preset cutting data. (This head-end trim is not counted.)

NOTE

- Unless the automatic operation start conditions are satisfied, the machine stops immediately.

ENDING AUTOMATIC OPERATION

When the execution of all cutting data is completed, the machine positions the sawhead at the lower limit and stops the saw blade and the hydraulic pump motor.

INTERRUPTING AUTOMATIC OPERATION

To interrupt the automatic operation of the machine, press the BLADE UP button. The machine immediately stops. When the BLADE UP button is pressed during cutting, the saw blade stops running. As long as the BLADE UP button is pressed and held, the sawhead rises. (The interrupted cut is not counted as complete.)

To resume the interrupted automatic operation, press the BLADE DRIVE button. The saw blade starts to resume the automatic operation.

NOTE

- If the AUTO/MANUAL switch is turned to MANUAL during the interruption of the automatic operation, the interrupted automatic operation cannot be resumed.

STOPPING AUTOMATIC OPERATION AFTER DETECTION OF EXCESSIVE RUNOUT

When the plus or minus runout tolerance is exceeded for more than the prescribed time during cutting, an alarm condition occurs, and the alarm code “E-007” is displayed above the function label fields.

The saw blade stops running, the sawhead rises to the upper limit, and the machine immediately stops. The electric power of the machine and the hydraulic pump motor remain on, and the LCD screen continues to display the runout of the saw blade when the alarm condition occurred.

Restoring operation after automatic stop

Clear the alarm condition as described below.

1 Press the CLR key.

The alarm code “E-007” and its message disappear, and the LCD screen displays the runout tolerances of the saw blade again.

2 Press the CLR key again.

The runout of the saw blade when the alarm condition occurred is reset to allow the machine to be operated again.

3 Investigate and remove the cause of the runout (e.g., saw blade life, improper cutting conditions, clamp failure, or internal stress in the work).

STOPPING AUTOMATIC OPERATION

When the machine falls into such a condition that it cannot continue cutting during its automatic operation, press the EMERGENCY STOP button. The entire machine, including the saw blade and hydraulic unit, comes to an immediate stop.

The machine stops as soon as the AUTO/MANUAL switch is turned to MANUAL during its automatic operation. If the machine is cutting the work, it stops after completing and counting the current cut.

When the alarm code “E-007” is displayed at the occurrence of a runout alarm, the machine comes to an immediate stop. (See “Alarm code list” in Part V, Troubleshooting.)

The machine also stops as soon as it falls into an alarm condition or its power is turned off.

When the machine has stopped in emergency, its automatic operation cannot be resumed by pressing the BLADE DRIVE button. Investigate and remove the cause of the emergency stop, and restart the automatic operation of the machine from the beginning.

NOTE

- When restarting the automatic operation of the machine after its emergency stop, pay attention to the quantity displayed in the C field. The work is not cut for the pieces already counted.

Interrupt station function

The interrupt station function actuates during the automatic operation of the machine and comes in handy when there occurs a rush job using the work currently being cut. This function can be used to insert and store new cutting data as an interrupt station. The interrupt station is preferentially executed, so that there is no need to stop the machine.

Press the F1 (ST interrupt) key to enable the interrupt station function. The interrupt station function may be activated in one of the following three ways:

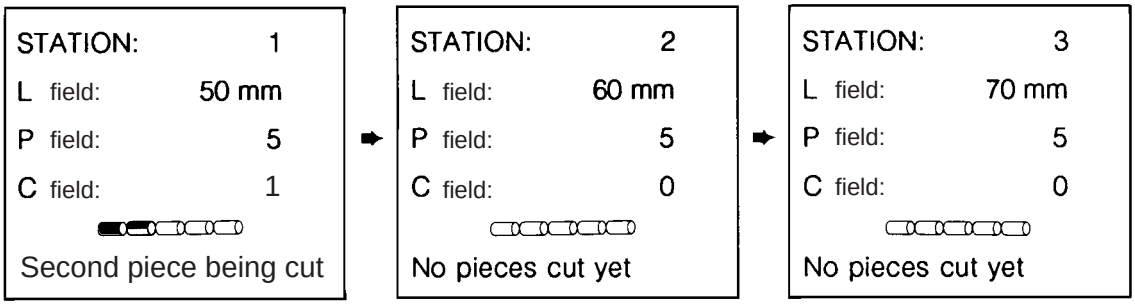
- The interrupt station is inserted in the middle of the station currently being executed (see the next page).
- The interrupt station is inserted between the stations to be executed later (see page IV-48).
- The interrupt station is inserted as the first station of automatic operation while the head end of the work is being trimmed during the automatic operation (see page IV-50).

NOTE

- To disable the interrupt station function after pressing the F1 (ST interrupt) key (or pressing the F1 (ST interrupt) key by mistake), press the F2 (ST delete) key to delete the inserted station and display the cutting data of the original station.
- The cutting data of the interrupt station, once stored, can be changed in the same way as those of ordinary stations.
- When the interrupt station is inserted, the subsequent stations are incremented by one each in number. Note that the cutting data stored at the station 99 will be deleted.
- The interrupt station function can be used not only during the automatic operation, but also before the start of the automatic operation, during the pause of the automatic operation or in the MANUAL mode.
  The following pages describe the procedures for inserting an interrupt station while an ordinary station is being executed. The same procedures can be used for inserting an interrupt station in other cases.

INSERTING INTERRUPT STATION IN CURRENT STATION

Example:

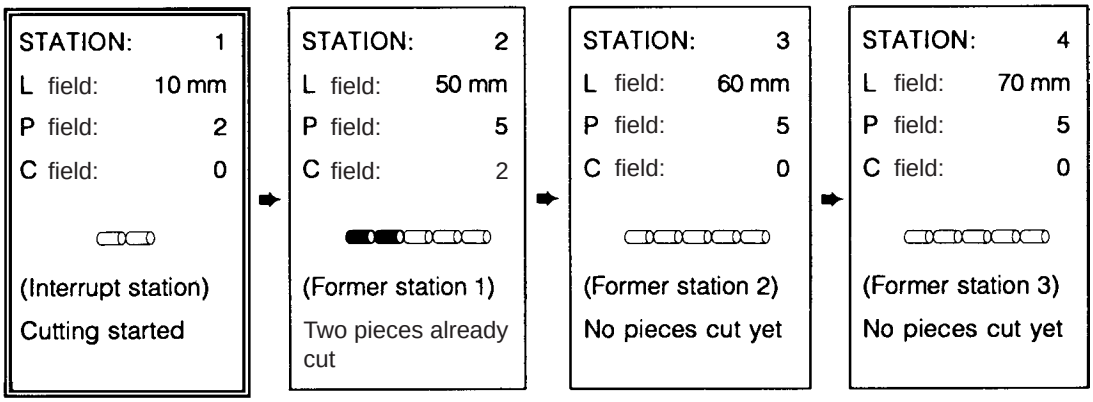


Insert the following cutting data as interrupt station after the second piece is cut at the station 1 under the above conditions:

> Cutoff length (L field): 10 mm
>
> Quantity to be cut (P field): 2 pieces

When the interrupt station is set as described on the next page, the numbers of the stations become as shown below after the second piece is cut at the station 1.

The interrupt station is stored as the new station 1, and the former station 1 and subsequent stations are incremented by one each in number.



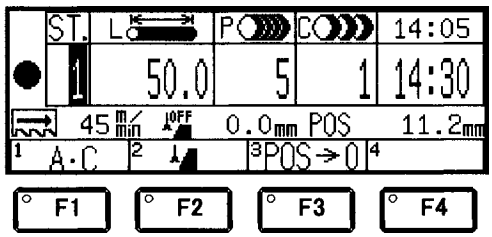
After executing the interrupt station, the machine continues to cut the third piece at the interrupted station 2 (former station 1).

NOTE

- Depending on the timing of pressing the ENT key to set the interrupt station as the last step of the entry procedure, the interrupt station may be executed after another piece is cut at the current station.

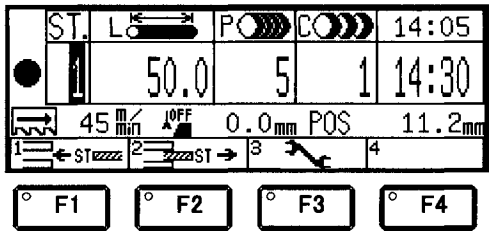
Entry procedure (Inserting interrupt station (10 mm × 2 pieces) in station 1 currently being executed)

1 Enter the number for the currently running station in the ST. field with the numeric keys. (In this example, enter “1”, and press the ENT key.)



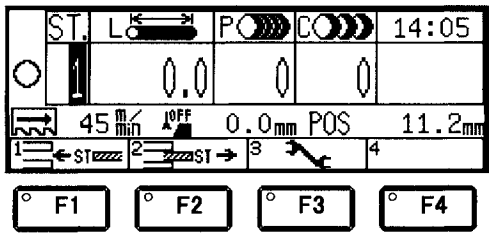
The Current station light illuminates, and the cutting data of the station 1 are displayed.

2 Press the MENU key several times to display the F1 (ST interrupt) key.

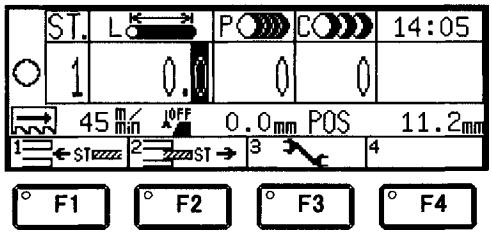


3 Press the F1 (ST interrupt) key.

The L, P, and C fields are all reset to “0”, and the Current station light extinguishes.

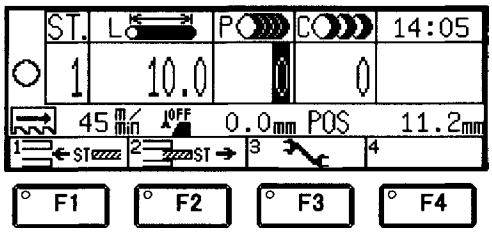


4 Press the ENT key to move the cursor to the L field.



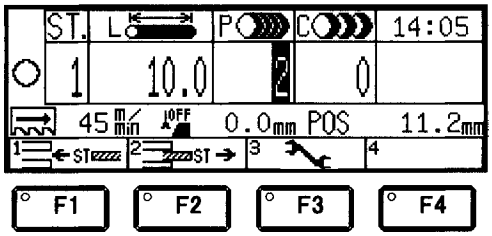
5 Enter the cutoff length with the numeric keys. (In this example, enter “1” and “0”, and press the ENT key.)

The cursor moves to the P field.



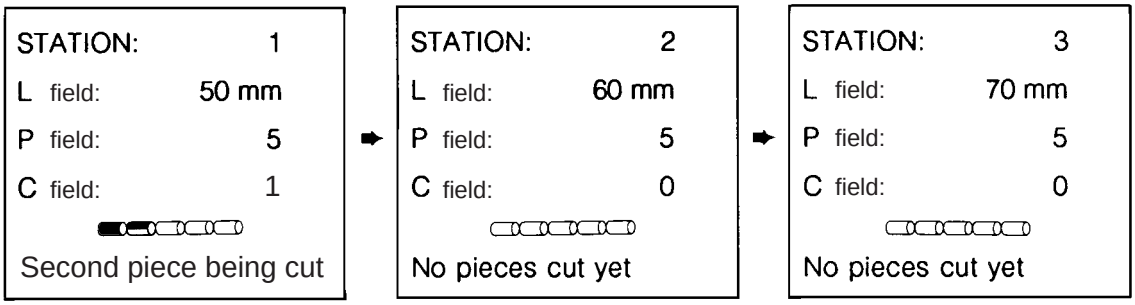
6 Enter the quantity of pieces to be cut with the numeric keys. (In this example, enter “2”, and press the ENT key.)

This completes the setting of the interrupt station.



INSERTING INTERRUPT STATION BETWEEN STATIONS TO BE EXECUTED

Example:



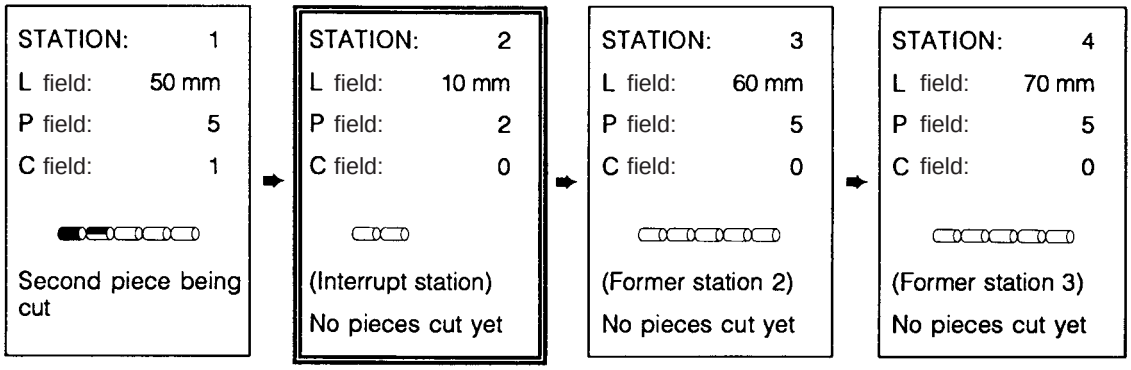
Insert the following cutting data as interrupt station between the stations 1 and 2 under the above conditions:

Cutoff length (L field): 10 mm

Quantity to be cut (P field): 2 pieces

When the interrupt station is set as described on the next page, the numbers of the stations become as shown below. After the execution of the station 1, the interrupt station begins to be executed.

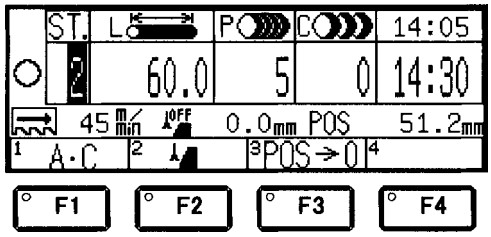
The interrupt station is stored as the new station 2, and the former station 2 and subsequent stations are incremented by one each in number.



After executing the interrupt station, the machine continues to execute the new station 3 (former station 2).

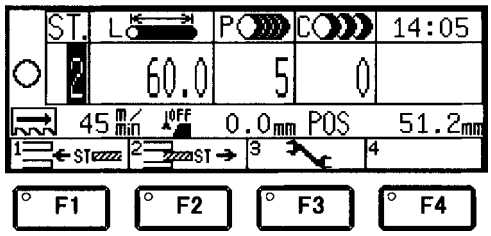
Entry procedure (Inserting interrupt station (10 mm × 2 pieces) between stations 1 and 2)

1 Enter with the numeric keys the number for the station before which to insert the interrupt station. (In this example, enter “2”, and press the ENT key.)



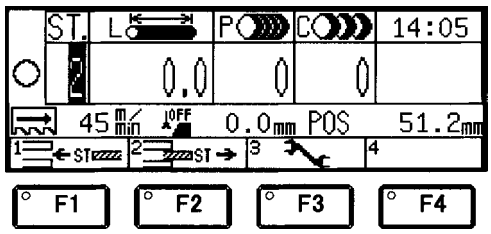
The cutting data of the station 2 are displayed.

2 Press the MENU key several times to display the F1 (ST interrupt) key.

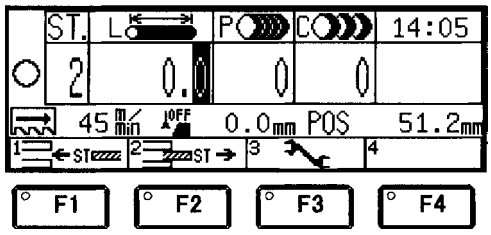


3 Press the F1 (ST interrupt) key.

The L, P, and C fields are all reset to “0”.

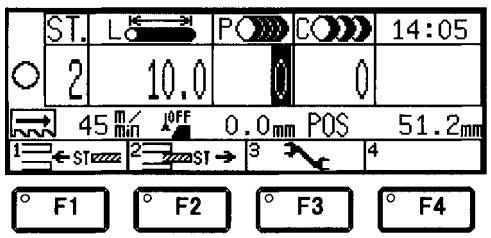


4 Press the ENT key to move the cursor to the L field.



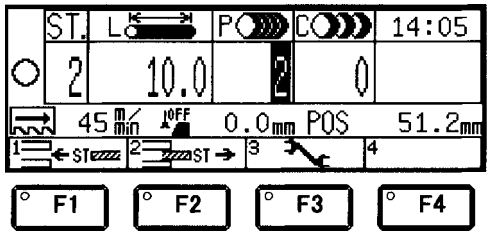
5 Enter the cutoff length with the numeric keys. (In this example, enter “1” and “0”, and press the ENT key.)

The cursor moves to the P field.



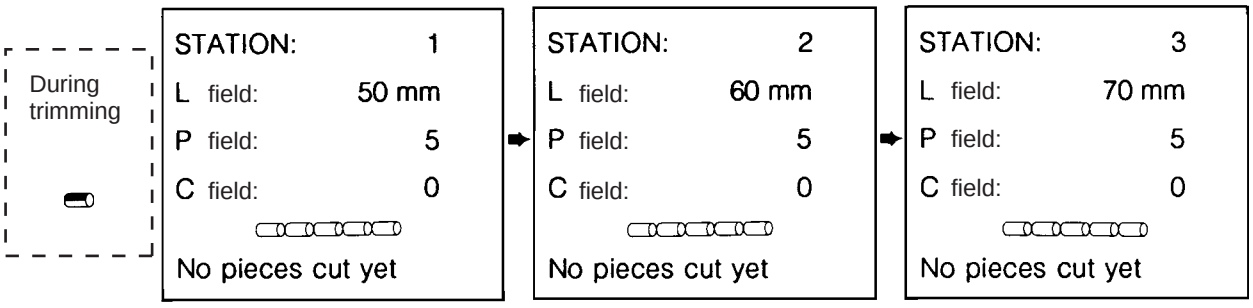
6 Enter the quantity of pieces to be cut with the numeric keys. (In this example, enter “2”, and press the ENT key.)

This completes the setting of the interrupt station.



INSERTING INTERRUPT STATION AS FIRST STATION OF AUTOMATIC OPERATION DURING HEAD-END TRIMMING

Example:

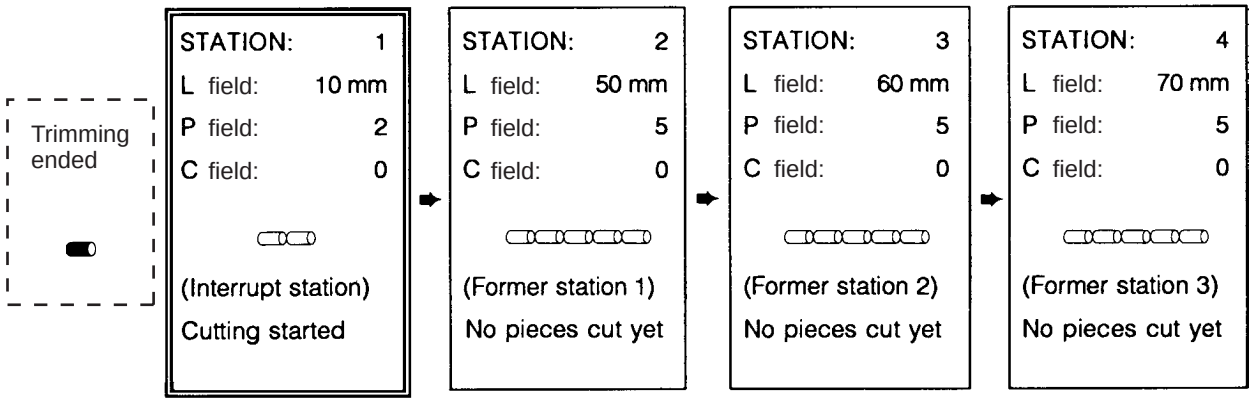


Insert the following cutting data as interrupt station before the station 1 under the above conditions:

> Cutoff length (L field): 10 mm
>
> Quantity to be cut (P field): 2 pieces

When the interrupt station is set as described on the next page, the numbers of the stations become as shown below. After trimming the head end of the work, the interrupt station begins to be executed.

The interrupt station is stored as the new station 1, and the former station 1 and subsequent stations are incremented by one each in number.



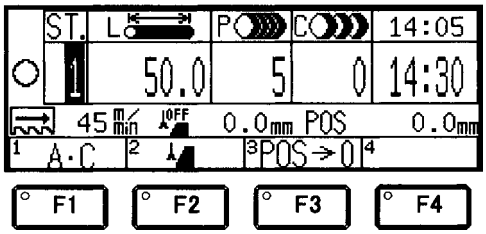
After executing the interrupt station, the machine continues to execute the new station 2 (former station 1).

NOTE

- When you insert an interrupt station while the head end of the work is being trimmed, do not change the station number displayed in the ST. field until the head-end trim is completed. If you do so, you may change the sequence of the stations during automatic operation.

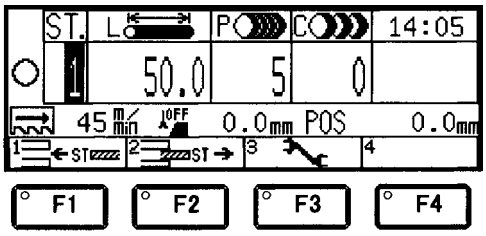
Entry procedure (Inserting interrupt station (10 mm × 2 pieces) before station 1 while head end of work is being trimmed)

1 Enter with the numeric keys the number for the station to be executed after trimming (or the first station of automatic operation). (In this example, enter “1”, and press the ENT key.)



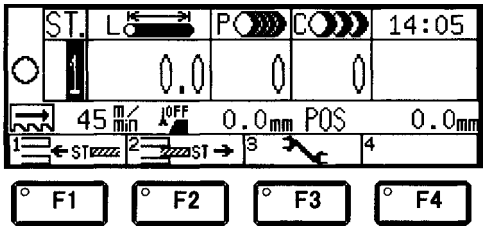
The cutting data of the station 1 are displayed.

2 Press the MENU key several times to display the F1 (ST interrupt) key.

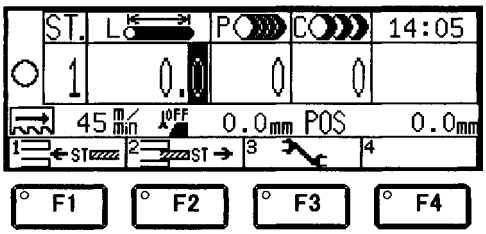


3 Press the F1 (ST interrupt) key.

The L, P, and C fields are all reset to “0”.

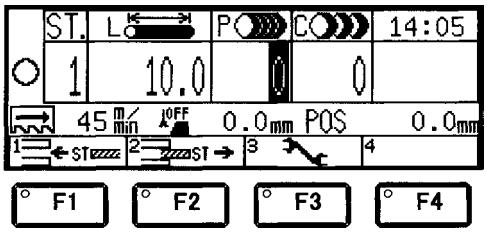


4 Press the ENT key to move the cursor to the L field.



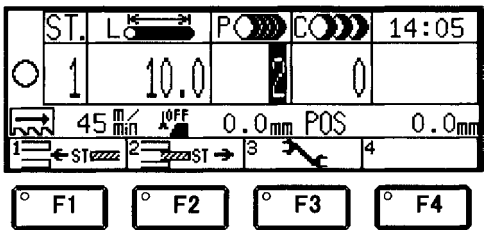
5 Enter the cutoff length with the numeric keys. (In this example, enter “1” and “0”, and press the ENT key.)

The cursor moves to the P field.



6 Enter the quantity of pieces to be cut with the numeric keys. (In this example, enter “2”, and press the ENT key.)

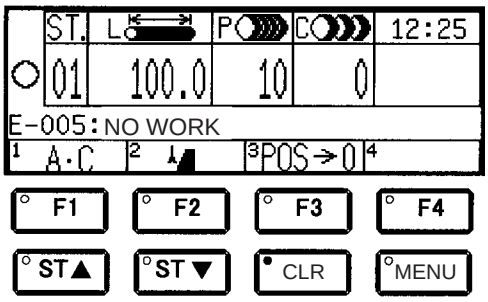
This completes the setting of the interrupt station.



Self-diagnostic function

The machine is equipped with the self-diagnostic function of detecting an alarm and informing the operator of the alarm.

If an alarm occurs when the machine is powered up or operating, its code and message are displayed above the function label fields. Referring to “Alarm code list” in Part V, investigate and remove the cause of the alarm and press the CLR key to clear the alarm condition.



NOTE

- While an alarm code is displayed, all of the keys but the CLR key are disabled. These keys cannot be enabled unless the alarm condition is cleared.

ENDING OPERATION

WARNING

- **Be sure to stop the saw blade before cleaning the machine. It is very dangerous if any part of your body is caught in the running saw blade.**
- **When carrying or disposing of flammable chips (like those of titanium or magnesium), take due care so that the chips do not catch fire. Prohibit any use of fire in the chip storage place.**

NOTICE

- If chips are left accumulated in the machine, they may accelerate the deterioration of the cutting fluid or cause the machine to malfunction.
- To prevent freezing in a cold region, drain the cutting fluid from the hoses after cleaning the machine.

End the operation of the machine as described below.

1 Turn the lever of the three-way cock in the cutting fluid system to the left side.

2 Hold the cleaning nozzle, and press and illuminate the CUTTING FLUID button.

3 Apply the cutting fluid to the chip-deposited areas to clean them.

NOTICE

- Take care so that the cutting fluid does not splash over the control panel.

4 After cleaning the machine, press and extinguish the CUTTING FLUID button.

5 Remove the chips from the chip box.

6 Press and hold the BLADE DOWN button to move the sawhead down to the lower limit.

7 Press the HYDRAULIC OFF button to stop the hydraulic pump motor.

8 Turn the machine circuit breaker switch to OFF.

9 Turn off the shop circuit breaker switch.

Part V

Troubleshooting

OPERATING TROUBLES

The saw blade is consumable. It is certain to reach the end of its life after cutting so many workpieces. If its life is extremely short, the following causes may be considered according to symptoms. Remove the cause of the trouble, and continue correct cutting. Similarly remedy other symptoms.

Checkpoints for improving cutting accuracy

- The saw blade is properly center aligned.
- The saw blade insert clamp levers are not loose.
- The saw blade inserts are not worn.
- The backup rollers are not worn.
- The saw blade is properly tensioned.
- The saw blade tooth pitch is suitable for the shape and material of the work to be cut.
- The saw blade tooth form is suitable for the shape and material of the work to be cut.
- The cutting rate is not too high.
- The saw blade running speed is not too high.
- The cutting fluid is not insufficient or thin.
- The saw blade is properly run in.

	Symptom	Cause	Remedy
1	Saw blade runs out or vibrates.	Saw blade is new and is not run in.	Run it in.
2	Saw blade runs out or vibrates.	Saw blade running speed is too high.	Reset it.
3	Saw blade runs out.	Saw blade running speed is too low.	Reset it.
4	Saw blade vibrates or breaks.	Cutting rate is too high.	Check saw blade running speed and sawhead downfeed speed.
5	Saw blade runs out or breaks.	Cutting rate is too low.	Turn FLOW CONTROL dial toward “10”.
6	Saw blade vibrates.	Work surface is too rough.	Turn outside of work on another machine.
7	Saw blade teeth are prematurely chipped or worn.	Chips appear blue or violet.	Reduce cutting rate and saw blade running speed.

	Symptom	Cause	Remedy
8	Saw blade teeth are prematurely chipped or saw blade runs out.	Work surface is too hard or work is not annealed.	Remove hard surface on another machine or anneal work.
9	Saw blade runs out.	Saw blade tooth pitch or tooth form is not appropriate.	Select another saw blade.
10	Saw blade runs out or breaks.	Saw blade tooth pitch is too fine for width of work.	Select another saw blade.
11	Saw blade runs out.	Saw blade tooth pitch is too coarse for width of work.	Select another saw blade.
12	Saw blade runs out.	Saw blade teeth are not offset equally to left and right or are unevenly worn.	Change saw blade for new one.
13	Saw blade runs out.	Saw blade is not properly center aligned.	Adjust perpendicularity of saw blade.
14	Saw blade runs out.	Movable saw blade guide is not securely locked.	Tighten its lock handle.
15	Saw blade runs out.	Movable saw blade guide is too apart from work.	Bring it close to work.
16	Saw blade runs out.	Too many workpieces are stack cut together.	Reduce number of workpieces stack cut.
17	Saw blade vibrates or runs out.	Workpieces are not properly stacked.	Properly stack them.
18	Saw blade vibrates or runs out.	Work is not securely clamped.	Check and reclamp it.
19	Saw blade teeth are prematurely chipped.	Chips are embedded in vise jaw slide surface.	Clean to remove them.
20	Saw blade teeth are clogged and prematurely chipped.	Chips are not properly removed or cutting fluid is insufficient.	Adjust cutting fluid flow rate or add cutting fluid.
21	Saw blade vibrates or runs out.	Saw blade inserts are dirty.	Clean and check them.
22	Saw blade vibrates.	Saw blade is in contact with wheel flange.	Adjust saw blade to proper clearance.
23	Saw blade runs out.	Saw blade teeth are unevenly worn.	Change saw blade for new one.
24	Saw blade runs out.	Saw blade teeth are not offset equally to left and right.	Change saw blade for new one.
25	Saw blade teeth are prematurely chipped.	Vise jaws are unevenly worn.	Change them.

	Symptom	Cause	Remedy
26	Saw blade runs out.	Saw blade tension is low.	Retension saw blade, or check hydraulic pressure and cylinder.
27	Saw blade breaks.	Saw blade tension is too high.	Check hydraulic pressure.
28	Saw blade breaks or runs out.	Saw blade is improperly set in running position.	Adjust saw blade so that it runs in proper position.
29	Saw blade vibrates or runs out.	Sawhead knocks during downward movement.	Remove air from lift cylinder.
30	Saw blade teeth are clogged and prematurely chipped or saw blade runs out.	Wire brush is worn.	Adjust wire brush to appropriate position or change it.
31	Saw blade runs out.	Saw blade inserts are unevenly worn.	Change them.
32	Saw blade runs out or vibrates.	Guide roller or rollers are worn.	Change them.
33	Saw blade teeth are prematurely chipped.	V-belt is worn.	Change it.
34	Saw blade teeth are prematurely chipped or saw blade prematurely breaks.	Backup roller or rollers are worn or cracked.	Change them.
35	Saw blade prematurely breaks.	Wheel or wheels are worn.	Change them.
36	Saw blade teeth are prematurely chipped or saw blade runs out.	Speed reducer oil is degraded or insufficient.	Change or add it.
37	Saw blade teeth are prematurely worn, or saw blade teeth are clogged and saw blade runs out.	Cutting fluid is insufficient.	Clean tank, and add specified amount of cutting fluid.
38	Saw blade vibrates and decreases in cutting rate. Saw blade teeth are chipped and saw blade is reduced in life.	Cutting fluid is degraded or its dilution factor is too large.	Change or add it.
39	Saw blade prematurely breaks.	Cutting fluid pump filter is clogged.	Clean tank and filter.
40	Saw blade vibrates.	There is vibration-producing machine nearby.	Treat this machine not to produce vibration or relocate it.
41	Saw blade runs out or saw blade teeth are prematurely chipped.	Power supply voltage is low so that saw blade running speed decreases with increasing load.	Check it and connect machine to dedicated power source.

	Symptom	Cause	Remedy
42	Saw blade vibrates or runs out.	Input voltage varies too greatly.	Check it and connect machine to dedicated power source.

	Symptom	Cause	Remedy
Manual operation	Alarm code is displayed on LCD screen.	Machine malfunctions.	Clear alarm by referring to alarm code list on pages that follow.
	Hydraulic pump motor does not start when HYDRAULIC ON button is pressed.	EMERGENCY STOP button is pressed and locked.	Pull button to unlock it.
	Rear vise does not move forward.	Quick approach feeler is in contact with work.	Press and hold BLADE UP button to raise sawhead until quick approach feeler moves away from work.
		Both front and rear vises are closed.	Open either vise.
	Front and rear vises do not open wide.	Sawhead is too low.	Press and hold BLADE UP button to raise sawhead to upper limit.
	Machine cannot be operated in any other way than raising sawhead.	AUTO/MANUAL switch is turned to AUTO.	Turn switch to MANUAL.
Automatic operation	Saw blade does not start when BLADE START button is pressed.	Invalid value or values are set on LCD screen. Check that L field indicates value from 5.0 to 9999.9 mm {0.197 to 99.999 in.}, P field indicates value from 1 to 9999, and C field indicates value smaller than P field does.	Correct value or values. If C field indicates same value as P field, reset it to zero.
		Front vise is not closed.	Close front vise.
		Rear vise is not at forward limit.	Move rear vise to forward limit.

ALARM CODE LIST

To clear an alarm, press the CLR key of the cutting data setting controls.
If the alarm cannot be cleared, contact AMADA.

Alarm code	Cause	Remedy	Remarks
E-000	Control system is faulty.	Turn off power and then turn it back on. (If alarm recurs, contact AMADA.)	Hydraulic pump motor stops.
E-001	Saw blade is broken.	Turn saw blade tension lever to "  ", and press and hold HYDRAULIC ON button for 5 to 10 seconds until saw blade breakage limit switch is turned off. Then clear alarm.	Hydraulic pump motor stops.
	If saw blade is not broken, saw blade breakage detection limit switch is faulty.	Contact AMADA.	
E-002 (option)	BLADE DRIVE button was pressed with wheel cover opened.	Close wheel cover, and clear alarm.	Saw blade stops running.
	Wheel cover was opened while saw blade was running.		
	If wheel cover is not open, wheel cover open limit switch is faulty.	Contact AMADA.	
E-003	Sawhead upper and lower limit detection limit switches simultaneously turned on.	Clear alarm.	Hydraulic pump motor stops.
	Sawhead upper and lower limit detection limit switches are faulty.	Contact AMADA.	
E-004	During automatic operation, work did not come within ±0.2 mm {±0.008 in.} of target position after three positioning attempts.	Contact AMADA.	Saw blade stops running.
E-005	During automatic operation, work became too short to be clamped with rear vise.	Clear alarm, and change work.	Hydraulic pump motor stops.
	Stacked workpieces collapsed during stack cutting.	Clear alarm, and restack workpieces.	
	Either front or rear vise pressure switch is faulty.	Contact AMADA.	

Alarm code	Cause	Remedy	Remarks
E-007 (option)	Runout of saw blade was detected.	Clear alarm, reset runout, and change saw blade or reduce cutting rate.	Sawhead rises to upper limit and stops.
	Runout detector is faulty.	Contact AMADA.	
E-008	PLC backup battery ran down.	Clear alarm. Contact AMADA for changing run-down battery.	This alarm occurs only when hydraulic pump motor is running. (Machine can be operated without changing run-down battery, but machine parameters and cutting data may be erased from memory when power is turned off.)
E-009	Backup battery for cutting data setting controls ran down.	Clear alarm. Contact AMADA for changing run-down battery.	This alarm occurs only when hydraulic pump motor is running. (Machine can be operated without changing run-down battery, but current time may be improperly displayed on LCD screen once power is turned off.)
E-011 (option)	During head-end positioning, work projection from rear vise is 20 mm {0.8 in.} or less.	Clear alarm, and properly set work.	Hydraulic pump motor stops.
	During head-end positioning, amount by which rear vise can move backward is small.		
E-101	Saw blade motor thermal relay (FR1) tripped.	Reset thermal relay, and clear alarm.	Hydraulic pump motor stops.
E-102	Hydraulic pump motor thermal relay (FR2) tripped.	Reset thermal relay, and clear alarm.	Hydraulic pump motor stops.
E-103	Cutting fluid pump motor thermal relay (FR3) tripped.	Reset thermal relay, clear alarm, and check cutting fluid filter.	Hydraulic pump motor stops.
E-105	Solenoid valve or valves are faulty, and circuit protector (QF2) is turned off.	Check solenoid valves, turn on circuit protector (QF2), and clear alarm.	Hydraulic pump motor stops.

Alarm code	Cause		Remedy	Remarks
E-106	Sawhead lower limit is detected although predetermined time is elapsed after output of upward movement signal.	Lower limit detection limit switch is faulty.	Clear alarm.	Hydraulic pump motor stops.
		Up-down solenoid valve is faulty.	Clear alarm.	
E-107	During automatic operation, sawhead upper limit is detected although predetermined time is elapsed after output of downward movement signal.	Upper limit detection limit switch is faulty.	Clear alarm.	Hydraulic pump motor stops.
		Up-down solenoid valve is faulty.	Clear alarm, and check solenoid valve.	
		Hydraulic oil temperature is low.	Restart after warm-up operation.	
E-108	Rear vise forward limit is detected although predetermined time is elapsed after output of backward movement signal.	Forward limit switch is faulty.	Clear alarm.	Hydraulic pump motor stops.
		Proportional solenoid valve is faulty.	Clear alarm.	
E-109	Rear vise forward limit is not detected within predetermined time after output of forward movement signal.	Forward limit switch is faulty.	Clear alarm, and manually check work feed operation.	Hydraulic pump motor stops.
		Proportional solenoid valve is faulty.	Clear alarm.	

Alarm code	Cause		Remedy	Remarks
E-110	FRONT VISE CLOSE light does not come on within predetermined time after output of front vise close signal.	Front vise solenoid valve is faulty.	Clear alarm, and manually check vise open and close operation.	Hydraulic pump motor stops.
		Front vise pressure switch is faulty.	Clear alarm.	
E-111	REAR VISE CLOSE light does not come on within predetermined time after output of rear vise close signal.	Rear vise solenoid valve is faulty.	Clear alarm, and manually check vise open and close operation.	Hydraulic pump motor stops.
		Rear vise pressure switch is faulty.	Clear alarm.	
E-112	Saw blade was broken during operation.		See “E-001”.	Hydraulic pump motor stops.
	Saw blade breakage detection limit switch is faulty.			
E-113	Motion detector actuated during operation.	Saw blade slipped.	Check saw blade tension, clear alarm, and reduce cutting rate to decrease load.	Hydraulic pump motor stops.
		Motion detector is faulty.	Clear alarm.	
E-114	During automatic operation, backward movement amount of rear vise was different from its return amount.		Clear alarm, and remove obstacle near rear vise forward limit.	Hydraulic pump motor stops.
E-115	Rear vise moved during temporary stop of automatic operation.		Clear alarm.	Saw blade stops running.

Part VI

Maintenance

WARNING

- **Turn off the shop circuit breaker switch before servicing the machine. Then post a sign to inform people that the machine is under maintenance.**

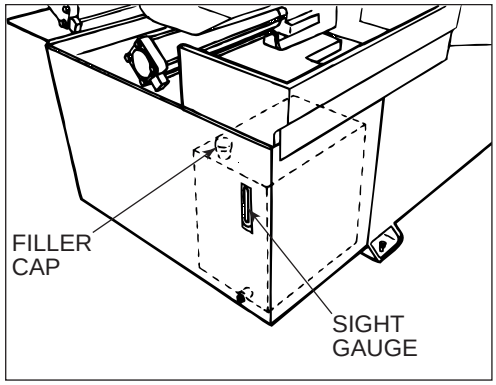
CHECKING BEFORE START OF DAY'S WORK

Before starting the machine every day, check the following items.

Hydraulic oil level

Check that the hydraulic oil is filled to the middle of the sight gauge.

If the hydraulic oil level is lower, remove the hydraulic unit cover at the left side of the machine, remove the filler cap, and add one of the recommended hydraulic oils into the tank.



Recommended oils: Esso Teresso 32
Shell Tellus Oil C32
Mobil DTE Oil Light
(ISO VG32 equivalent)

Tank capacity: 30 liters {7.9 US gal} for HFA-250 and HFA-250W
40 liters {10.6 US gal} for HFA-400 and HFA-400W

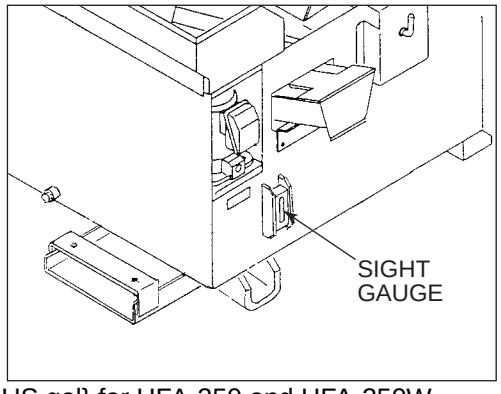
Cutting fluid level

WARNING

- **If the tank is low on the cutting fluid, the cutting fluid may not be supplied in sufficient amounts, markedly shortening the life of the saw blade. If the cutting operation is continued in this condition, a fire may occur.**

Check that the cutting fluid is filled to a little above the middle of the sight gauge.

If the cutting fluid level is lower, pour the cutting fluid into the spiral portion of the chip conveyor.



Tank capacity: 85 liters {22.4 US gal} for HFA-250 and HFA-250W
120 liters {31.7 US gal} for HFA-400 and HFA-400W

Speed reducer oil level

Check that the speed reducer oil is filled to the middle of the sight gauge. Make this check after moving the sawhead down to the lower limit and leaving it to stand there for about 3 min.

If the oil level is lower, remove the filler plug, and add one of the recommended oils.

Recommended oils: Amada Gear Oil EP320
Esso Teresso 320
Shell Tellus Oil C320
Mobil DTE Oil AA
(ISO VG320 equivalent)

Required amount of oil: 2 liters {0.53 US gal} for HFA-250 and HFA-250W
5.5 liters {1.45 US gal} for HFA-400 and HFA-400W

Saw blade

Check that the saw blade is properly installed on the drive and driven wheels. If not, properly install it on the drive and driven wheels.

Wire brush

Check that the wire brush is properly applied to the saw blade. If not, adjust the position of the wire brush. If the wire brush is worn, change it for a new one.

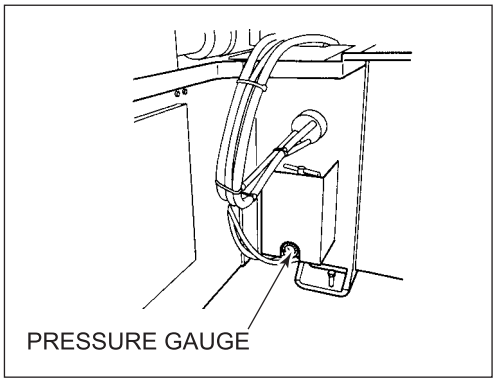
Oil cleaner pressure gauge

WARNING

- **Before changing the filter in the oil cleaner case, be sure to turn off the power of the machine.**

Press the HYDRAULIC ON button to start the hydraulic pump motor, and check the gauge pressure.

If the gauge pressure lies in or above the red zone of 0.6 MPa {6 kgf/cm^2 or 85.4 psi}, change the filter in the oil cleaner case.



PERIODIC MAINTENANCE

Every day

CLEANING

WARNING	● **Be sure to stop the saw blade before cleaning the machine. It is dangerous if any part of your body is caught in the running saw blade.**

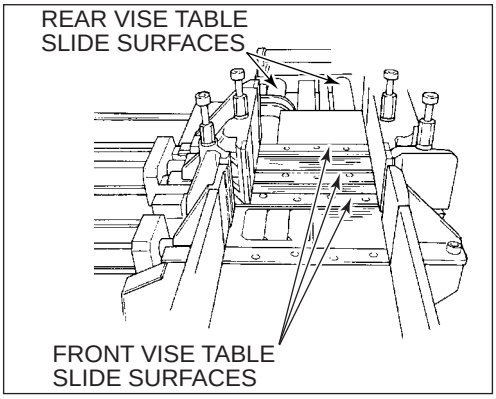
At the end of the day's work, clean the machine.

Stop the saw blade, press the CUTTING FLUID button to discharge the cutting fluid from the cleaning nozzle, and wash away the chips deposited on various parts of the machine.

Carefully wipe off the vise and slide surfaces susceptible to rusting.

LUBRICATION

Check the slide surfaces, and apply machine oil to them before they are rusted.



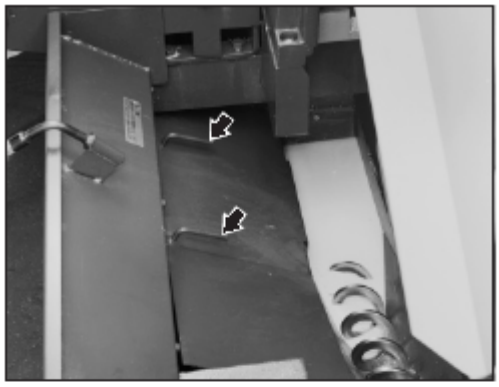
Every month

CLEANING

Chip box

Clean the chip box as described below.

1 Pull up the handle of the chip chute to remove the entire chip chute.



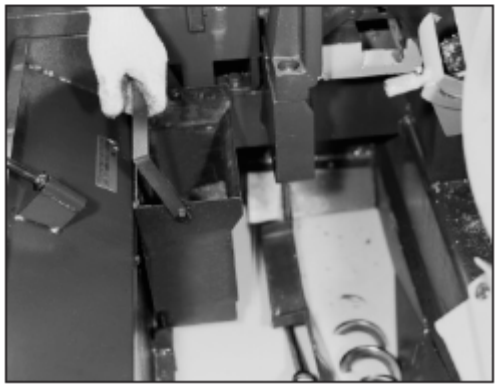
2 Remove the chip box fixing lever, pull out the chip box, and remove it upward.

3 Remove the chips from the chip box, and clean the filter.

Clear the filter of foreign matter with an air gun. If oil is deposited on the filter, wash it away with kerosene.

4 Replace the filter in the grooves of the chip box without any clearance.

5 Replace the chip box in the cutting fluid pan, and apply the chip box fixing lever to the cutting fluid pan hook. Unless the fixing lever is applied to the hook, the chip box may move.



6 Replace the chip chute in the cutting fluid pan.

Cutting fluid pump suction filter

Remove the cutting fluid pump, and clean the suction filter.

LUBRICATION

Check the lubrication condition of the following parts. Remove the old grease deposited on and around their nipples and apply fresh grease to them with a grease gun if necessary.

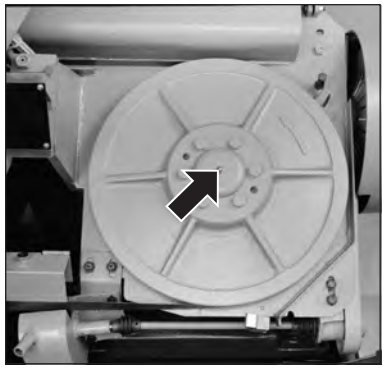
Recommended greases: Esso Lithtan EP2
Shell Alvania EP Grease R2
Mobil Mobilux EP2

NOTICE

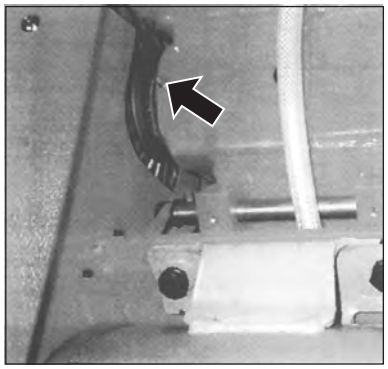
- Be sure to apply the grease to the grease nipples with a grease gun. Do not apply an excessive amount of grease.

Driven wheel bearing

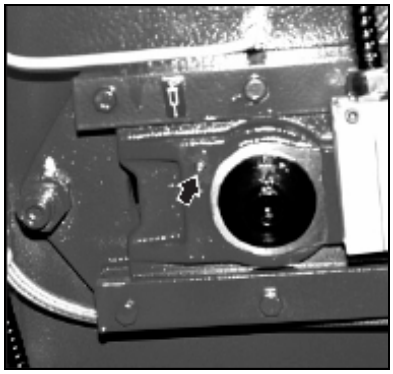
Drive wheel bearing



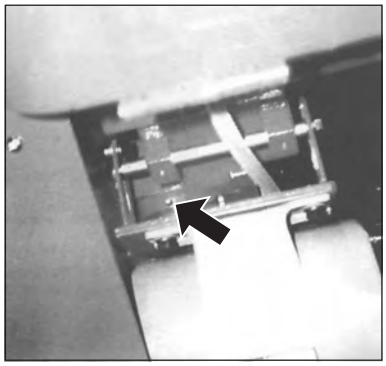
Worm shaft bearing



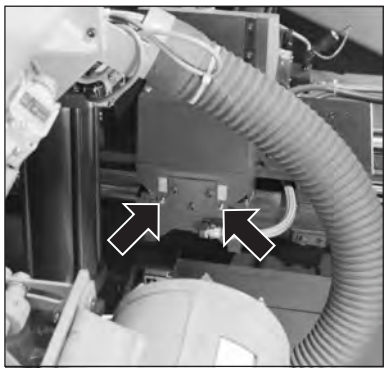
Saw blade tension controller slide



Hinge pin thrust bearing



Rear vise stationary jaw slide
(2 points)



Movable saw blade guide slide

First three months (or 500 hours)

CHANGING SPEED REDUCER OIL (FOR FIRST TIME)

Change the entire speed reducer oil after the first three months or 500 hours of machine operation, whichever comes first. For the changing procedure, see “Every year” later in this section.

Every six months

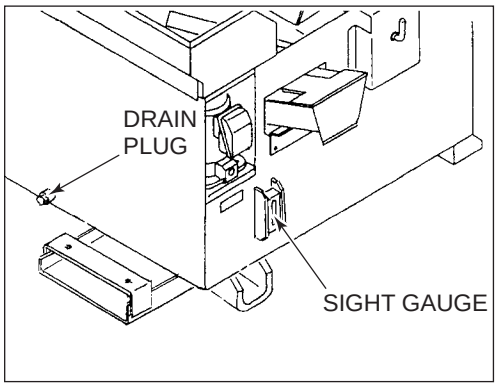
CHANGING CUTTING FLUID

WARNING

- **Use a water-soluble cutting fluid on this machine. Oil-based cutting fluids may emit smoke or catch fire, depending on the condition of their use.**
  When using an oil-based cutting fluid, strictly observe the precautions described in “Cutting Method” on page xv.

The cutting fluid is not only discolored by work contaminants and rust, but also degraded and putrefied as it gets older.

Change the entire cutting fluid at least every six months as described below.



Tank capacity: 85 liters {22.4 US gal} for HFA-250 and HFA-250W
120 liters {31.7 US gal} for HFA-400 and HFA-400W

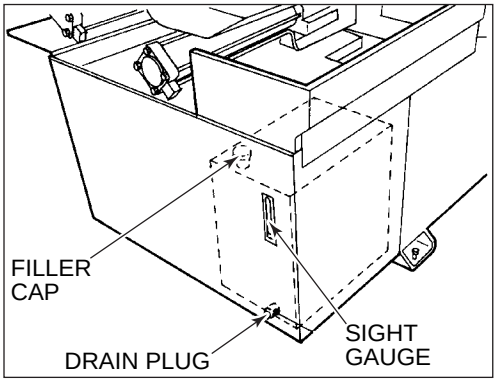
NOTE

- Dispose of the used cutting fluid as specified by the manufacturer and by the applicable government regulations in your country.

1. Turn off the shop circuit breaker switch.
2. Remove the drain plug of the cutting fluid tank to drain the cutting fluid.
3. After the cutting fluid is completely drained, replace the drain plug.
4. Remove the sediments from the cutting fluid tank.
5. Pour a fresh cutting fluid from above the chip conveyor to a little above the middle of the sight gauge.

CHANGING HYDRAULIC OIL

Change the hydraulic oil as described below. Be sure to change the entire hydraulic oil despite its intermediate addition.



Recommended oils: Esso Teresso 32
Shell Tellus Oil C32
Mobil DTE Oil Light
(ISO VG32 equivalent)

Tank capacity: 30 liters {7.9 US gal} for HFA-250 and HFA-250W
40 liters {10.6 US gal} for HFA-400 and HFA-400W

NOTE

- Dispose of the used hydraulic oil as specified by the manufacturer and by the applicable government regulations in your country.

1 Turn off the shop circuit breaker switch.

2 Remove the hydraulic unit cover at the left side of the machine.

3 Remove the filler cap of the hydraulic oil tank.

4 Remove the drain plug of the hydraulic oil tank to drain the hydraulic oil.

5 After the hydraulic oil is completely drained, replace the drain plug.

6 Pour a fresh hydraulic oil through the filler opening to the middle of the sight gauge.

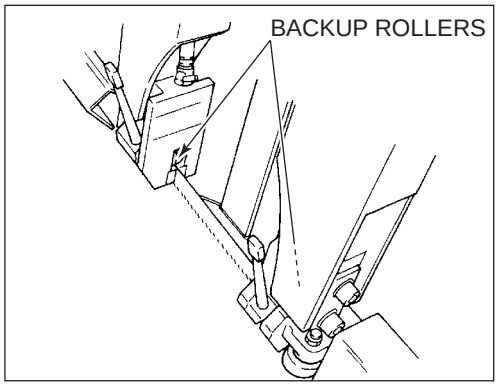
7 Securely tighten the filler cap.

8 Replace the hydraulic unit cover.

CHECKING AND CHANGING BACKUP ROLLERS

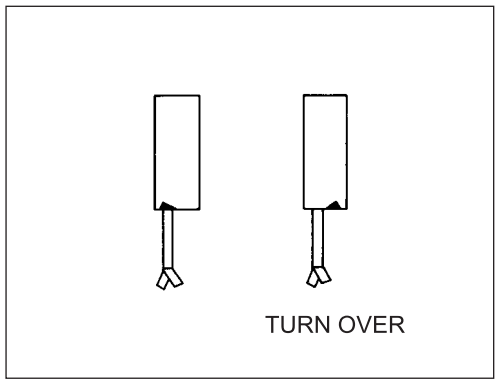
The two backup rollers always support the back of the saw blade and press the saw blade against the work during cutting.

If the backup roller or rollers are worn or fail to rotate any more, they do not allow the saw blade to deliver sufficient cutting performance. In such a case, change the backup rollers for new ones.



NOTE

- The backup rollers are consumable.
- If the backup rollers are not badly damaged or worn, they may be turned over and used as shown at right.



CHECKING AND CHANGING GUIDE ROLLERS

The two guide rollers always support the side of the saw blade.

If the guide roller or rollers are worn or fail to rotate any more, they do not allow the saw blade to deliver sufficient cutting performance. In such a case, change the guide rollers for new ones.

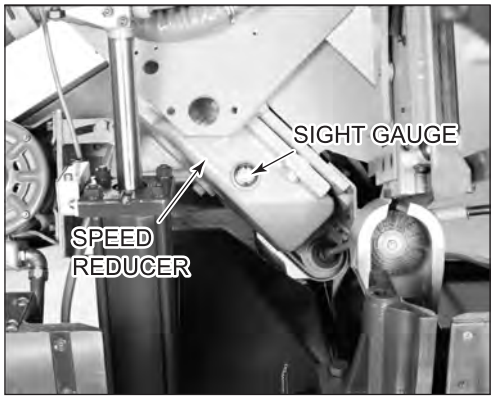
NOTE

- The guide rollers are consumable.

Every year

CHANGING SPEED REDUCER OIL (FOR SECOND AND SUBSEQUENT TIMES)

Change the speed reducer oil as described below. At one year after its complete change, be sure to change the entire speed reducer oil despite its intermediate addition.



Recommended oils: Amada Gear Oil EP320
Esso Teresso 320
Shell Tellus Oil C320
Mobil DTE Oil AA
(ISO VG320 equivalent)

Required amount of oil: 2 liters {0.53 US gal} for HFA-250 and HFA-250W
5.5 liters {1.45 US gal} for HFA-400 and HFA-400W

NOTE

- Dispose of the used speed reducer oil as specified by the manufacturer and by the applicable government regulations in your country.

1. Press and hold the BLADE DOWN button to move the sawhead down to the lower limit.
2. Press the HYDRAULIC OFF button to stop the hydraulic pump motor.
3. Turn the machine circuit breaker switch to OFF.
4. Turn off the shop circuit breaker switch.
5. Remove the filler plug of the speed reducer.
6. Remove the drain plug of the speed reducer to drain the speed reducer oil.
7. After the speed reducer oil is completely drained, replace the drain plug.
8. Pour a fresh speed reducer oil through the filler opening to the middle of the sight gauge.

   NOTICE

   - If the saw blade is started with an insufficient supply of speed reducer oil, the speed reducer may be damaged.

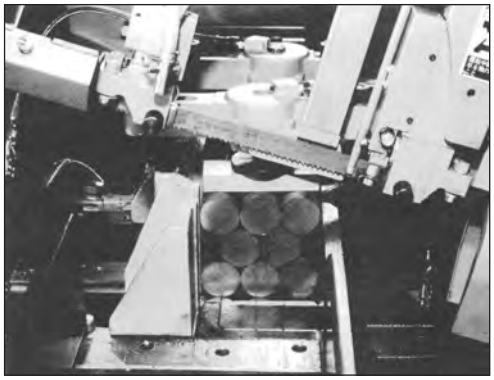
9. Replace the filler plug.

Appendix A

Options

MULTI-VISES

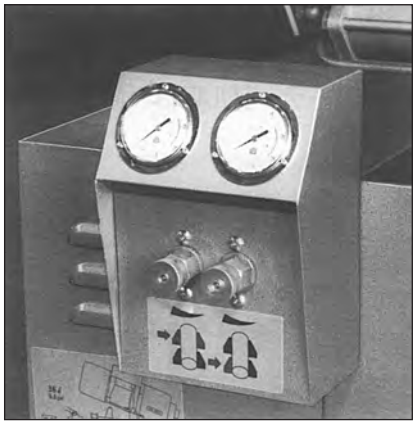
Operate together with the front and rear vises, and clamp from above multiple workpieces stacked in the front and rear vises. Be sure to use the multi-vises when stack cutting the workpieces.



VISE PRESSURE CONTROL VALVES

Adjust the force with which the front and rear vises clamp the work. The vise pressure control valves are used to clamp pipes and other workpieces likely to deform.

Pressure adjusting range:
1.0 to 2.7 MPa {10 to 27 kgf/cm^2, or 142 to 384 psi} for HFA-250 and HFA-250W,
1.1 to 3.5 MPa {11 to 35 kgf/cm^2, or 156 to 498 psi} for HFA-400 and HFA-400W



RUNOUT DETECTOR (FACTORY OPTION)

A device to detect the runout of the saw blade during cutting and automatically stop the machine when the preset runout tolerance is exceeded.

ROLLER TABLE

Installed at the rear of the machine and used for cutting long workpieces. The roller table is equipped with vertical rollers whose distance can be adjusted.

Specifications of roller table

Table length: 2 m {6.56 ft}

Allowable loading mass: 1000 kg/m {7230 lb/ft}

ROLLER STAND

Used as accessory to the machine or roller table when cutting long workpieces. The height of the roller stand can be adjusted to suit the pass line of the workpieces.

Specifications of roller stand

Height adjusting range: 650 to 780 mm {25.6 to 30.7 in.} for HFA-250 and HFA-250W,
780 to 820 mm {30.7 to 32.3 in.} for HFA-400 and HFA-400W

Allowable loading mass: 600 kg {1320 lb} for HFA-250 and HFA-250W,
1500 kg {3310 lb} for HFA-400 and HFA-400W

HEAD-END POSITIONING FUNCTION (FACTORY OPTION)

Once the work is set in the rear vise, the head-end positioning function automatically feeds the work for the preset length and makes the machine ready for automatic operation. (The machine can continuously go to the automatic operation.)

ROTATING BEACON LIGHTS
(FACTORY OPTION)

The yellow and red beacon lights flash to indicate that the machine has stopped at the end of automatic operation and at the occurrence of an alarm, respectively. The green beacon light illuminates to indicate that cutting is under way.

When working apart from the machine, the operator can know from the beacon lights to see if the machine is operating or not.

WHEEL COVER OPEN LIMIT SWITCH
(FACTORY OPTION)

A safety device to stop the saw blade running when the wheel cover is opened.

When the wheel cover is opened during the operation of the machine, its open limit switch is activated to stop the saw blade running and display the alarm code “E-002”. The same alarm occurs also when the BLADE DRIVE button is pressed with the wheel cover opened.

Appendix B

Safety Data Sheets

SAFETY DATA SHEET

SHELL TELLUS OIL C32

1. NAME

PRODUCT: Tellus Oil C32

CHEMICAL NAME: Petroleum Hydrocarbons

2. PRODUCT/INGREDIENT

	percent	toxicity
Tellus Oil C32	100	not available
Severely refined petroleum hydrocarbons	ca.99	oil mist, TWA ACGIH/OSHA 5 mg/m^3 oral LD_{50} > 15 g/kg(rat) estimated

Based upon data available to Showa Shell this product is not considered to be carcinogenic under OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910, 1200) (IARC MONOGRAPH 33).

3. HEALTH INFORMATION

ROUTE OF ENTRY:

Eye contact: Expected, at worst, to be minimally irritating to the skin.

Skin contact: Prolonged or repeated skin contact may cause skin irritation.

Inhalation: No specific information.

Ingestion: No specific information.

SIGNS AND SYMPTOMS:

Irritation as above.

AGGRAVATED MEDICAL CONDITIONS:

Pre-existing skin disorder may be aggravated by exposure to this product.

OTHER HEALTH EFFECTS:

This specific product has not been tested in long-term chromic exposure tests.
Lubricating oils are generally considered to be a low order of acute toxicity to humans and experimental animals. However, the handling procedures and safety precautions in this MSDS should be followed to minimize employee exposure.

4. OCCUPATIONAL EXPOSURE LIMITS

OSHA		ACGIH		OTHER
PEL/TWA	PEL/CEILING	TLV/TWA	TLV/STEL	
		5 mg/m^3	—	
(OIL MIST, mineral		Severely refined)		

5. EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT:

Flush with water for 15 minutes while holding eyelids open. Get medical attention.

SKIN CONTACT:

Remove contaminated clothing and wipe excess off. Wash with soap and water or waterless hand cleaner followed by soap and water. Do not re-use clothing until thoroughly cleaned. If irritation persists, get medical attention promptly to prevent serious damage; do not wait for symptoms to develop.

INHALATION:

Remove victim to fresh air and provide oxygen if breathing is difficult. Get medical attention.

INGESTION: Get medical attention.

6. SUPPLEMENTAL INFORMATION

Not identified.

7. PHYSICAL DATA

Boiling Point °C: NA

Specific Gravity: ca. 0.87 at 15/4 °C

% Volatile by wt: NA

Vapour Density: > 1 (air = 1)

Appearance: pale yellow liquid

Solubility in water: negligible

Odour: characteristic odour

8. FIRE AND EXPLOSION HAZARDS

Flash Point (COC) °C: 226

Flammable Limit % vol in air: NA

EXTINGUISHING MEDIA: Use water fog, dry chemical or CO_2.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS:

Do not enter confined fire space without proper protective equipment including a NIOSH approved self-contained breathing apparatus. Cool fire exposed container, surrounding equipment and structures with water.

9. REACTIVITY

Stability: Stable

Hazardous polymerization: Will not occur.

Conditions and Materials to avoid: Strong oxidizers

Hazardous decomposition product:

NOx, SOx, CO, and other unidentified oxygenates can be formed during combustion.

10. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION:

A NIOSH approved respiratory protection equipment should be used when vapour or mist concentration exceeds applicable standards.

PROTECTIVE CLOTHING:

Use oil resistant gloves and other clothing as minimize skin contact.

VENTILATION: Mechanical equipment

EYE PROTECTION:

Normal industrial eye protection equipment should be employed.

11. ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURE:

Prevent entry into sewers and waterways. Pick up free liquid for disposal. Absorb small amount on inert material for disposal.

WASTE DISPOSAL:

Dispose of in an appropriate disposal facility in compliance with appropriate regulations.

12. SPECIAL PRECAUTIONS

Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperature. Minimize skin contact. Wash with soap and water before eating, drinking, smoking or using toilet facilities.

Launder contaminated clothing before using. Discard leather goods if they cannot be decontaminated. Wash before eating or smoking. Observe good personal hygiene.

13. OTHER REGULATORY

All components of this product are listed on the EPA/TSCA inventory of chemical substances.

The information contained herein is based on the data available to Showa Shell and is believed to be correct. However, Showa Shell makes no warranty, expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Showa Shell assumes no responsibility for injury from the use of the product described herein.

DATE PREPARED: 22nd August, 1994

SAFETY DATA SHEET

ESSO LITHTAN EP2

1. IDENTIFICATION

PRODUCT NAME: Lithtan EP 2

PRODUCT GROUP: Industrial Grease

CHEMICAL NAME: Petroleum Lubricating Grease

DATE ISSUED: 18th February, 1997

2. COMPONENTS AND HAZARD INFORMATION

COMPONENTS	CONCENTRATION	CAS NO.	ACGIH TLV
Lubricating Oil Base Stock and Lithium Soap Thickener	> 90 %	Confidential 4485-12-5	5 mg/m^3 (Mist)
Proprietary Additives	< 10 %	7620-77-1 Mixture (contains lead compounds)	

3. PHYSICAL/CHEMICAL CHARACTERISTICS

APPEARANCE / COLOR / ODOR:
Smooth grease / Dark brown color / Mild bland odor

BOILING POINT: > 300°C (IBP)

DENSITY: 0.93 g/m^3

VAPOR PRESSURE: < 0.01 mmHg (@20°C)

DROPPING POINT: 185°C

VAPOR DENSITY: > 5 (Air = 1)

PENETRATION: 274 (@25°C Worked)

PERCENT VOLATILE BY VOLUME:
Negligible from open container

EVAPORATION RATE:
Less than 0.01 (n - B.A. = 1) (@1 ATM and 25°C)

SOLUBILITY IN WATER:
Negligible; less than 0.1 % (@1 ATM and 25°C)

4. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: > 200°C (SCC)

FLAMMABLE LIMITS: Est. 0.9 - 7.0 vol.%

EXTINGUISHING MEDIA:
Foam, dry chemical, carbon dioxide and water spray (fog).

SPECIAL FIRE FIGHTING PROCEDURES:
Use extinguish media for extinguishing fires. Use water to keep fire-exposed containers cool. Minimize breathing of gases, vapor, fumes or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Empty metal containers retain residue can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to sources of ignition. Empty drums should be returned to a drum reconditioner.

5. REACTIVITY DATA

STABILITY:

STABLE	X
UNSTABLE	

CONDITIONS TO AVOID: Not applicable

INCOMPATIBILITY (MATERIALS TO AVOID):
Strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite or calcium hypochlorite.

HAZARDOUS DECOMPOSITION PRODUCTS:
Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products.

6. HEALTH HAZARD DATA

ACUTE HAZARDS:

Product has a low order of acute oral and dermal toxicity.
LD50 (oral rat) > 5 g/kg. LD50 (dermal rabbit) > 3.16 g/kg.
Product contacting the eyes may cause irritation.

CHRONIC HAZARDS:

Prolonged or repeated skin contact with product tends to remove skin oils, possibly leading to irritation and dermatitis. Product is judged to be neither a corrosive nor an irritant.

CARCINOGENICITY:

NTP ? No OSHA ? No IARC MONOGRAPHS ? No

SIGNS/SYMPTOMS OF EXPOSURE:

Prolonged or repeated skin contact may cause skin irritation and dermatitis. High pressure grease gun injection injury can cause serious delayed soft tissue damage.

MEDICAL CONDITION GENERALLY AGGRAVATED BY EXPOSURE:

None recognized

7. EMERGENCY AND FIRST AID PROCEDURE

EYE:

Flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

SKIN:

Wash skin thoroughly with soap and water. If injected under skin, contact a physician immediately. Remove any contaminated clothing.

INHALATION:

Vapor inhalation under ambient conditions is normally not a problem. If overcome by vapor from hot product, remove from exposure and call a physician.

INGESTION:

Do not induce vomiting, call a physician immediately.

8. CONTROL AND PROTECTIVE MEASURES

VENTILATION:

Provide ventilation sufficient. Use local exhaust to capture vapor, mists or fumes, if necessary. Use explosion-proof equipments.

RESPIRATORY PROTECTION:

Use supplied-air respiratory protection in confined or enclosed spaces, if needed.

PROTECTIVE GLOVES:

Use chemical-resistant gloves.

EYE PROTECTION:

Use safety glasses, splash goggles or face shield.

OTHER PROTECTIVE EQUIPMENT:

Use chemical-resistant apron or other impervious clothing, if needed.

9. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL/RELEASE:

Recover free product. Keep product out of sewers and watercourses. Add sand, earth or other suitable absorbent to spill area.

WASTE DISPOSAL:

Assure conformity with applicable governmental regulations. Incinerate waste grease in approved equipment.

STORAGE:

Keep containers closed when not in use. Do not store near heat, sparks, flame or strong oxidants.

10. PREPARATION OF MSDS

PREPARED BY (GROUP, DEPARTMENT):

QC & Training Advisor (Lubes Dept)

SAFETY DATA SHEET

AMADA GEAR OIL EP320

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

NAME OF PRODUCT	GEAR OIL EP 320	
PRODUCT USE	Industrial Gear Oil	
NAME OF COMPANY	AMADA Co. Ltd.	
Address	200 Ishida, Isehara, Kanagawa, Japan	
DEPARTMENT	Quality Assurance Dept.	
TEL	0463-96-3423	FAX 0463-96-3403
EMERGENCY CONTACT	Oil Service Division Development Group	
TEL	048-281-7767	FAX 048-281-7768
DOCUMENT PREPARED &UPDATED	Updated : Feb. 2004	

SECTION 2. COMPOSITON/INFORMATION ON INGREDIENTS

COMPOSITION

COMPONENTS	Amount (wt%)
Highly refined petroleum oil	>95
Additives	<5

JAPANESE COMPOSITION INFORMATION

Labour Safety Law :	Amount (wt%)
169 Mineral oil	>95%

PRTR Law :	Amount (wt%)
Not Applicable	

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Warning statement:

Caution! Prolonged or repeated contact with skin may cause irritation in some cases.

Precautionary Measures:

Avoid breathing vapor and mist. Keep container closed.
Avoid contact with eyes, skin, and clothing.
Wash thoroughly after handling. Keep away from heat.

Potential health effect:

Eyes: May cause minor irritation.

Skin: May cause minimal skin irritation.

Inhalation: Vapor or mist, in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material, or as from exposure in poorly ventilated areas or confined spaces, may cause irritation of the nose and throat, headache, nausea, and drowsiness.

Ingestion: May cause abdominal discomfort, nausea, or diarrhea.

Sensitization properties: Unknown

Chronic Properties: If prolonged exposure occurs, nausea, headache, diarrhea, and physical discomfort.

Other remarks: None

SECTION 4. FIRST AID MAESURES

Eyes:	Flush immediately with water for at least 15 minutes. Get immediate medical attention.
Skin:	Wash with soap and water. Get medical attention if irritation develops. Launder contaminated clothing before reuse.
Inhalation:	Remove exposed person to fresh air if adverse effects are observed.
Ingestion:	Do not make person vomit unless directed to do so by medical personnel.
Note to physician:	Treat symptomatically.

SECTION 5. FIRE FIGHTIN MEASURES

Flash point (Typical), ℃	254(COC)
Autoignition tempt., ℃	Not Determined.
Flammability limits:	Not Determined.
Extinguishing media:	CO_2, dry chemical, or foam.
Special fire fighting procedures:	Recommend wearing self-contained breathing apparatus. Water may cause splattering. Material will float on water.
Unusual fire & explosion hazards:	Toxic fumes, gases or vapors may evolve on burning.
Autoignition temperature:	Not determined.
Explosion data:	Material does not have explosive properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures in Case of Accidental Release, Breakage or Leakage:

Stop the source of the leak or release. Clean up releases as soon as possible. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping.

Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.

SECTION 7. HANDLING AND STRAGE

Do not weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous material which may ignite with explosive violence if heated sufficiently.

Minimum feasible handling temperatures should be maintained.

Periods of exposure to high temperatures should be minimized.

Water contamination should be avoided.

CAUTION: Do not use pressure to empty drum or drum may rupture with explosive force.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye Protection:	Chemical type goggles or face shield optional.
Skin Protection:	Avoid prolonged or frequently repeated skin contact by wearing impervious protective clothing including gloves.
Respiratory Protection:	Wear a breathing mask.
Ventilation:	No special ventilation is usually necessary. However, if operating conditions create high air borne concentrations of this material, special ventilation may be needed.
Other clothing and Equipment:	No special clothing or equipment is usually necessary,
Work practices, hygienic practices:	No information is available.

Other handling and storage requirements: No information is available.

Protective measures during maintenance of contaminated equipment: No Data Available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Odor		Slight odor
Appearance		L3. 5(ASTM)
Boiling point	℃	No Data Available
Solubility		Insoluble in water
Density	@15℃, g/cm^3	0.900
Pour point	℃	−12.5

SECTION 10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to Avoid:	See the Handling and storage section for further details.
Incompatibility (materials to avoid):	Acids. Oxidizing agents. Halogens and halogenated compounds.
Hazardous Polymerization:	Will not occur
Thermal decomposition:	Smoke, carbon monoxide, aldehydes and other products of incomplete combustion. Hydrogen sulfide and alkyl mercaptans and sulfides may also bereleased. Under combustion conditions, oxides of the following elements will be formed: Calcium, Sulfur, Zinc.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral:	No Data Available:	
Dermal:	No Data Available:	
Carcinogen:	OSHA:	This material is listed as Group 3 by IARC.
(Base oil)	EU:	The classification as a carcinogen need not apply.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradation:	No Data Available
Environmental fate:	This material is not expected to present any environmental problems other than those associated with oil spills.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

SECTION 14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations.

DOT Proper Shipping Name:	Not applicable.
IMDG Proper Shipping Name:	Not applicable.
ICAO Proper Shipping Name:	Not applicable.
TDG Proper Shipping Name:	Not applicable.
NFPA Proper name:	Class 1.
UN Number:	Not applicable.

SECTION 15. REGULATION INFORMATION

JAPANESE REGULATORY INFORMATION

(PRTR) Pollutant Release and Transfer Register.
Industrial Safety and Health Law (Article 57-2, 1, reported objects).
Description of PRTR, Law concerning examination & regulation
of manufacture etc. of chemicals, List of chemical name.
Law concerning Industrial Waste Management.
Law concerning marine pollution control and Mineral Oil Effluent Regulation.
Water Pollution Control Law: Oil effluent regulation.
Sewage Water Law: Mineral oil effluent regulation.
Fire Defense Law.

SECTION 16. OTHER INFORMATION

References:

1. Handbook of Toxic and Hazardous Chemicals and Carcinogens (2nd ed.)
2. Registry of Toxic Effects of Chemical Substances (NIOSH, 1983)

Material safety data sheets are provided as reference information on the safe handling of hazardous or harmful materials to companies using such materials. When referring to this data sheet, companies should remember that they must take responsibility for implementing the proper measures for their own particular situations. This data sheet is not a guarantee of safety.