

Version: 01-2018



**HOFFMANN
Machine
Company, Inc.**

Operating and Maintenance Manual
X - 20
manual dovetail routing machine

Hoffmann Machine Company, Inc.
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1. Safety and Warning Labels

A number of important warning labels have been attached to this Dovetail Routing Machine for your information and protection.

For your own safety, please take a moment to locate and read all warning labels before operating this machine.

If a label has been removed, defaced or is illegible, please contact Hoffmann Machine Company, Inc. to request a free replacement.

NEVER REMOVE ANY SAFETY OR WARNING LABEL!





2. Safety Rules

Read and understand these safety rules before operating this machine!

1. Always disconnect the machine from the electrical power supply before attempting any adjustment, repair or maintenance procedure (change of router bit, depth-of-cut adjustment, removal of wood dust, etc.).
2. Do not allow power cord to lie on the floor, in the way of passing personnel or the machine operator. They may cause a trip hazard.
3. Always wear eye and ear protection as well as a respirator suitable for wood dust.
4. Remove or confine loose hair, clothing and jewelry to avoid entanglement.
5. Avoid a dangerous environment. Do not expose electrical equipment to rain. Do not use in presence of flammable liquids or gases.
6. Keep the area around the machine clean and free from scrap, sawdust, wood chips, oil and grease to avoid the danger of slipping.
7. Always use a suitable dust collection system. Duct must be properly connected to the dust extraction port at the back of the machine.
8. Use only sharp and flawless original Hoffmann router bits.
9. Check the machine upon receipt as well as before every use for improper functioning and worn or damaged parts. Make sure the appropriate router bit is securely installed.
10. Broken or defective parts must not be used until replaced or repaired by a qualified technician.
11. When interrupting work or upon leaving the area, machine must be switched off.
12. Only trained and qualified personnel must be allowed to use machine.
13. Only original Hoffmann replacement parts must be used to rebuild machine.

3. Operator Training

The Hoffmann Dovetail Routing Machine model X-20 is to be operated, maintained and repaired only by properly trained and qualified personnel. It is imperative that the operator has carefully read and understood these operating instructions, and that he or she is aware of all potential risks resulting from operating this machine. If the operator does not possess sufficient English language skills to completely understand all sections of this manual, especially the sections on Warning Labels and Safety Rules, it is the responsibility of the purchaser to retain a qualified translator to translate this entire manual.

All applicable safety procedures and rules, including but not limited to all OSHA Rules and Regulations, are to be adhered to.

Any unauthorized modification or alteration to this machine by the operator or owner, including the use of router bits other than Original Hoffmann Dovetail Router Bits, will immediately void the machine warranty. The manufacturer cannot be held liable if the machine is used for any operations other than outlined in this manual or if the machine is modified or altered.

Please refer to the complete Hoffmann Machine Company, Inc. warranty in the back of this operating manual.



4. General Machine Description

The Hoffmann Dovetail Routing Machine model X-20 is designed solely to process material for the Hoffmann Dovetail Joining System.

This machine is to be used only to process material for Hoffmann Dovetail Keys, size W-1, W-2 and W-3.

USE OF THIS MACHINE FOR ANY OTHER OPERATION IS DANGEROUS AND WILL VOID THE WARRANTY. The manufacturer cannot be held liable if the machine is used for any operations other than outlined in this manual.

The Hoffmann Dovetail Routing Machine model X-20 is designed to rout dovetail shaped keyways in hard and softwoods as well as wood related sheet goods, such as particleboard, MDF, plywood, MDO, etc.

The material is placed on the machine table and the proper location is established with either a steel fence plate for miter joints, or with square stops for butt joints.

Pulling the hand lever downward lowers the hold-down pad onto the workpiece. Further downward pulling raises the router motor and the router bit up into the material. A height adjustment rod is used to set the routing height. When the pre-set height is reached, the hand lever is lowly returned to its resting position and the workpiece is removed.

WARNING:

The machine is equipped with an automatic ON/OFF feature, pulling the lever starts the router motor immediately and releasing the lever to its home position stops the motor.

5. Potential Risks and Dangers

Even when the machine is used as designed, and when the aforementioned safety rules are adhered to, the potential risk of injury must always be considered.

It is especially important to be aware of the following:

- The risk of pinching between stationary and moveable parts of the machine.
- The risk of pinching on the clamping devices of the machine.
- The risk of injury from sharp edges when handling, adjusting or changing the tooling.
- The risk of injury due to the inhalation of wood dust when operating the machine.
- The potential risk of injury on the electrical parts of the machine.

6. Toolkit

The machine is shipped with a Hoffmann toolkit, consisting of:

- Hex key 2.5mm
- Hex key 3.0mm
- Hex key 4.0mm
- Hex key 5.0mm
- Hex key 6.0mm
- Wrench 14mm
- Wrench 17mm
- One Safety Equipment Starter Kit (safety glasses, ear plugs, dust mask)

This starter kit is included as a courtesy to allow the machinery owner to start using this machine upon receipt. It is the machine owner's responsibility to supply additional safety equipment as needed, and the machine operator's responsibility to use all safety equipment as instructed.



7. Technical Data

Number of motors	one
Motor type	115 Volt, 60 Hz, 450 watt
Rotation	CCW (counter clockwise)
Revolutions per minute	27,000 rpm (idle)
Collet size	1/4" = 6.35mm
Air supply	none
Max. routing height	3"
Max. material thickness	4"
Dovetail Key sizes	W-1, W-2, W-3
Dust collection port	2 3/8" dia. = 60mm
Operating noise	75.3 dB (A)
Machine dimensions	24" x 23 1/2" x 30 1/2" (handle extended)
Table dimensions	19 3/4" x 12 1/4"
Weight:	41 lbs.

8. Machine Installation

8.1 Unpacking – Inspection

Upon receipt, check the machine and shipping container for any damage. Report any transportation damage to the delivering carrier and indicate it on the bill of lading. Request an immediate inspection for assessment of damage. Claim should then be entered with the carrier. The carrier is solely responsible for any loss or damage during transit.

8.2 Placement

After unpacking, select a suitable location with enough room around the machine for safe and unobstructed workflow, cleaning and maintenance. It is best to place the machine on a sturdy workbench of comfortable height.

8.3 Cleaning

Clean the machine and remove the applied rust preventive coating with a cotton rag and thin oil (WD-40 or similar). Be careful when using liquids containing silicones – the finishing process of your material could later be impaired. Never use thinner or solvents to clean machine, damage could result.

8.4 Electric Connection

The machine power cord is equipped with a standard 115 Volt plug. Be sure the receptacle is in good working condition. Also, be sure the power cord does not obstruct any walkways. If applicable, use only three wire extension cords of the proper size. Replace damaged or worn power cords immediately.

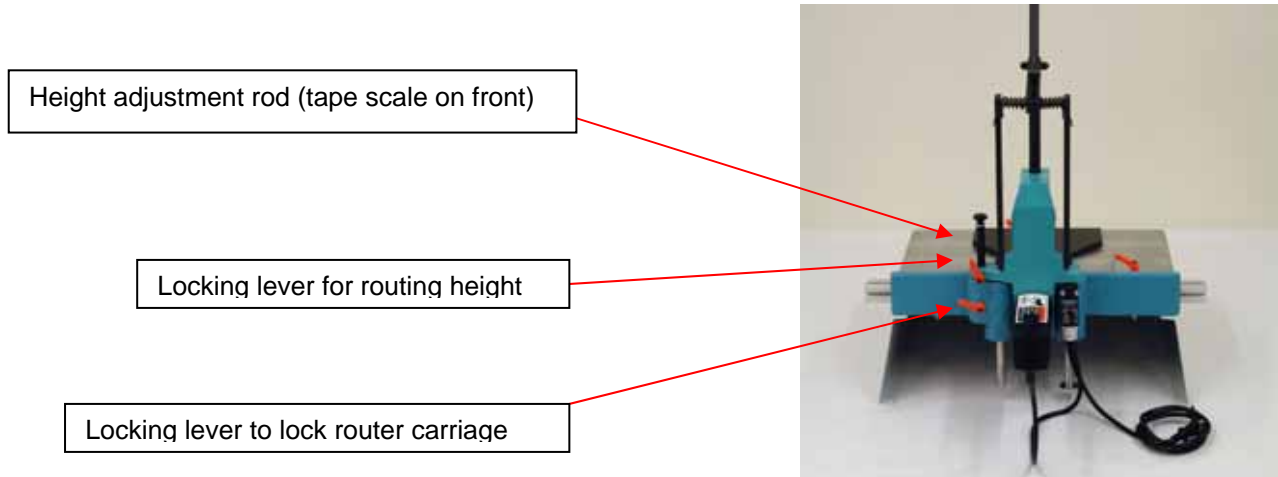
NEVER ATTEMPT TO REPAIR A DAMAGED POWER CORD.



9. Machine Operation

9.1 Standard 45-degree miters with one key per joint

The machine is equipped with a routing height tape scale attached to the routing height adjustment rod. The scale indicates the height the router bit will travel into the material.
 To adjust the height, simply loosen the top locking lever and move the bar to the desired height.
 Always use the longest key possible to achieve a tight joint on the face side of the workpiece.
 The lower locking lever is used to lock the router carriage for transport and to keep the router bit in a raised position when changing the router bit (see "Changing the router bit").



With the routing height and the keyway position set, place the material on the table and pull the hand lever downward to clamp the material and to raise the router bit.

Pull the handle in a slow and consistent motion.
 The motor is switched on automatically and the router bit cuts the keyway. When the pre-set routing height is reached, return the handle to its home position and remove the workpiece.

Before routing the material make sure the orange handle securing the steel fence plate on the table is properly tightened, and do not change the setting until both parts are routed.

9.2 Standard 45-degree miters with multiple keys per joint

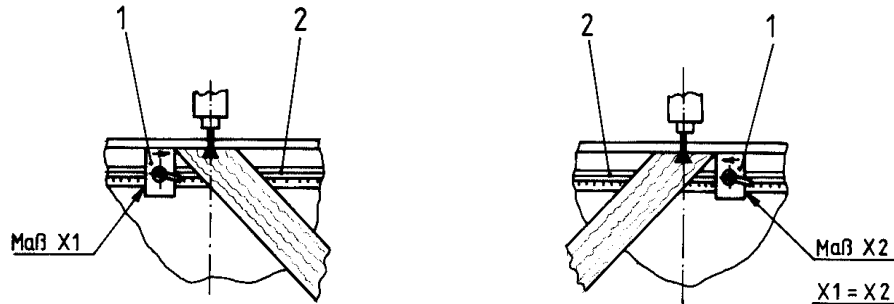
Adjust the machine and process the material for one dovetail key as described above.
 After all material has been machined for the first key location, re-set the steel fence plate (1) on the machine table (and re-set the routing height if necessary) and proceed as before.



9.3 Miter joints with angles other than 45 degrees

Replace the standard 45-degree steel fence plate (shipped with machine) with either a fixed fence plate for hexagon or octagon frames, or the adjustable Hoffmann Synchro fence and proceed as outlined in section 9.2.

The square stop (1) can also be used to machine miter joints with any given angle.



The square stop (1) is set to the desired position and locked in place. All material is machined on its right end miters with this setting.

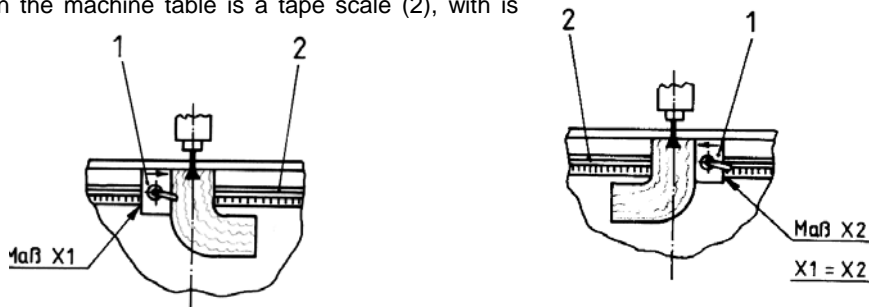
The square stop is then moved to the other side of the table, and the same position is set with the aid of the tape scale (2).

With both settings being equal, a perfectly aligned corner is achieved.

9.4 Butt-joints with square cut ends (e.g. face-frame construction, radiused parts)

Remove the steel fence plate from the machine table and use the supplied square aluminum stop (1) instead. Recessed in the machine table is a tape scale (2), with is

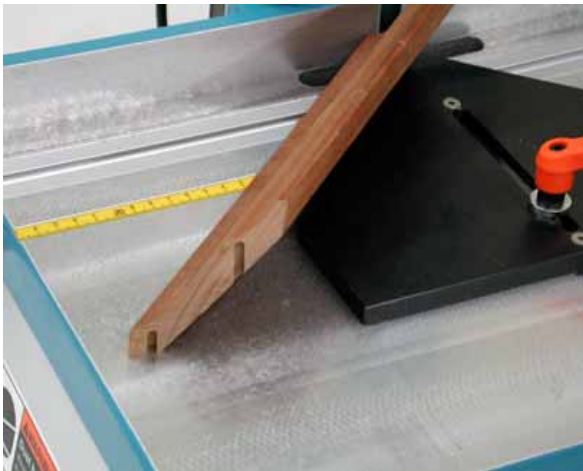
used to adjust these stops.



9.5 Compound Miter Joints

Moulding joined with a compound miter is machined almost like a standard, flat moulding. To achieve a tight and correctly aligned joint, the mitered face must be placed tight against the machine back fence and the moulding edge must rest against the black steel fence plate.

The machine is set for the first Key location and routing height. After all moulding parts are processed the set-up is changed for the second Key location and routing height.

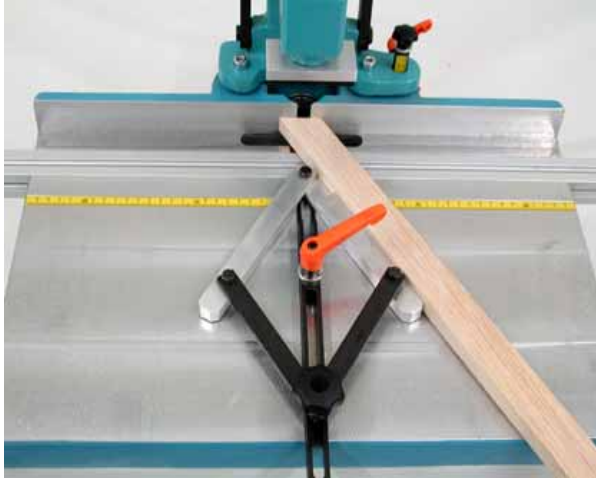


- Note: Depending on moulding width, use two or more Keys for tight joints.
 Use of good quality glue is important.
 For best results, use a shop-made jig to hold moulding steady while routing (jig can be mounted to recessed aluminum fence rail).
 Place first Key close to inside corner and second Key close to outside corner - choose thick moulding sections and use longest Key possible.



10. Accessories for X-20 bench-top models

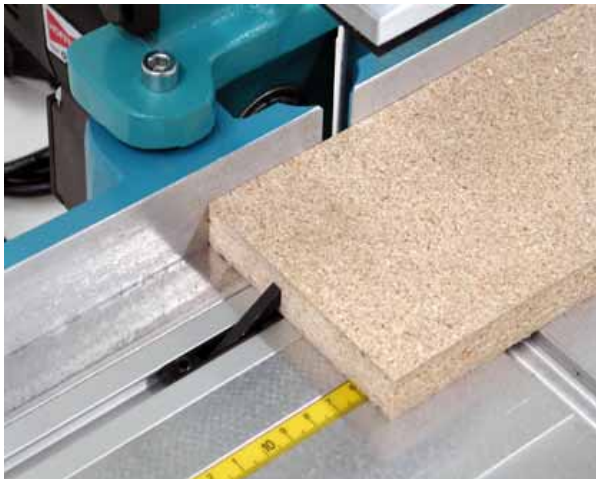
Synchro fence, adjustable from 18-64°
order number: W3105000



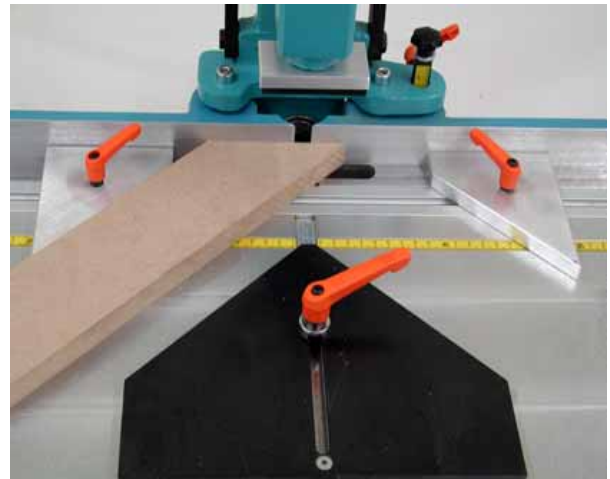
Laser guide for working to pencil lines
order number: W3900006



Table flip-stop with spring loaded tab
order number: W3900002



Inside corner fences for 45° miters
order number: W3010001





11. Change of router bit

ALWAYS DISCONNECT THE ELECTRICAL POWER SUPPLY BEFORE ATTEMPTING ANY SERVICE, MAINTENANCE OR REPAIR WORK!

Follow proper "Lock-Out / Tag-Out" procedures as specified by the Occupational Safety and Health Administration "OSHA".

1. Verify that electrical power has been disconnected.
2. Tighten the upper locking lever and loosen the lower locking lever on the back of the machine.
3. Pull the main lever to raise the carriage until the router bit is approx. 1/4" above the machine table.
4. Tighten the lower locking lever to lock router carriage.
5. Remove the old chip breaker from the table recess and discard.
6. Loosen the hex head screw on the underside of the motor bracket and carefully slide the motor out.
7. Use the included metric wrenches (14mm, 17mm) to open the 1/4" collet and remove the old router bit.
8. Install new bit and tighten collet securely.

Distance between tip of router bit and top of collet should be:

For W-1 router bit: 15.5 mm = 0.610"

For W-2 router bit: 17.0 mm = 0.669"

For W-3 router bit: 19.0 mm = 0.749"

9. Slide the motor back into the bracket and use the square stop to set the proper distance. The stop has three steps in one side (W1, W2, W3) and one large step machined in the opposite for W4 router bits (W-4 bits can only be used on MU-2 and larger machines, not on the X-20).

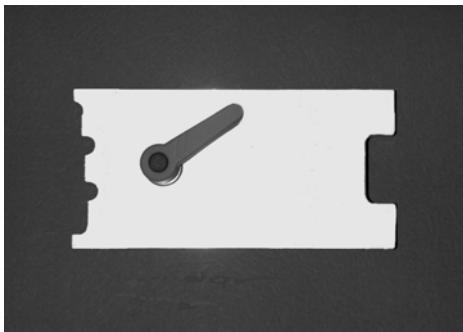
Slide the square stop out of the fence rail and remove the locking lever, washer and square nut. Place the stop upside down on the table to use.

Use the smallest step for W-1, the middle step for W-2 and the deepest step for W-3.

10. Lower the carriage to its home position.
11. Make a test cut and verify proper settings by inserting a Hoffmann key.
12. Raise the carriage again and install a new chip breaker insert. Place a piece of scrap wood over the insert and slowly lower the running router bit down through the wood. The scrap wood eliminates tearout on the surface of the chip breaker.

Hold the scrap wood securely in place and be aware of the turning bit at all times. Lower the router carriage slowly.

SQUARE STOP WITH STEPS FOR W1 - W4 BITS



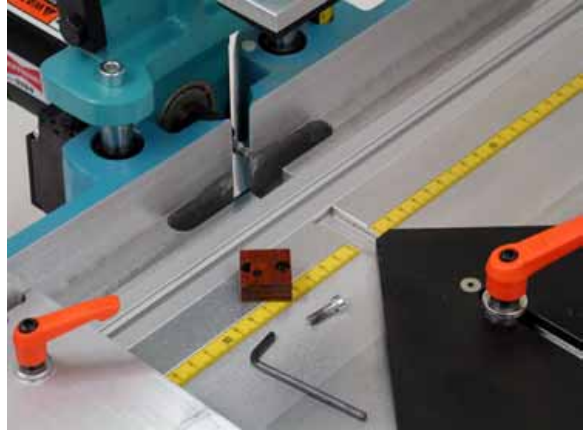


11.1 Change of router bit

ALWAYS DISCONNECT THE ELECTRICAL POWER SUPPLY BEFORE ATTEMPTING ANY SERVICE, MAINTENANCE OR REPAIR WORK!



Upper and lower locking lever



Old chip breaker and mounting screw



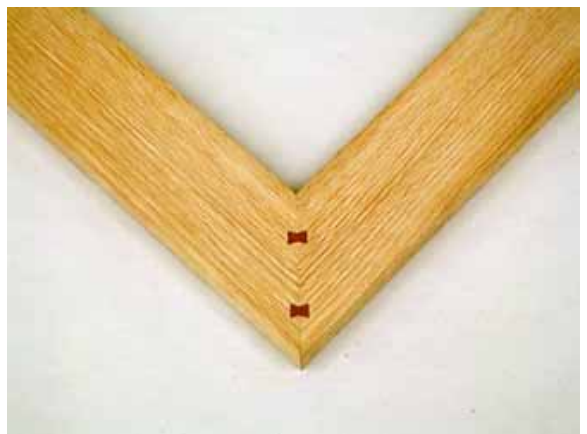
Socket head cap screw in motor bracket



Square-stop used as set-up jig (center notch = W2)



Scrap wood for initial cut through new chip



The finished test piece

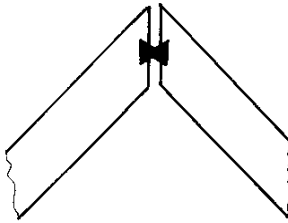
11.2 Fine Adjustment

The operator can adjust the tightness of an assembled joint as well as the clamping force exerted by the key.

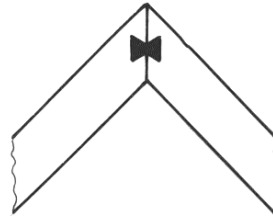
ALWAYS DISCONNECT THE ELECTRICAL POWER SUPPLY BEFORE ATTEMPTING ANY SERVICE, MAINTENANCE OR REPAIR WORK!

Follow proper "Lock-Out / Tag-Out" procedures as specified by the Occupational Safety and Health Administration "OSHA".

1. Verify that electrical power has been disconnected.
2. Raise the motor carriage as described before.
3. Loosen the hex head screw in the motor collet.
4. Carefully move the motor further toward the operator to increase the routing depth, or move the motor away from the operator to decrease the routing depth.
5. Only a small movement (0.1 – 0.5mm = 0.004 – 0.020") is necessary to make a noticeable difference. Increasing the depth will increase the "draw" or pull of the Key, resulting in a tighter joint.
6. Tighten the hex cap screw and lower the carriage.
7. Re-connect the electrical power supply and make a test cut. If the new setting is unsatisfactory, the above steps are repeated.
8. To re-set the machine to the factory setting, use the included aluminum set-up jig.

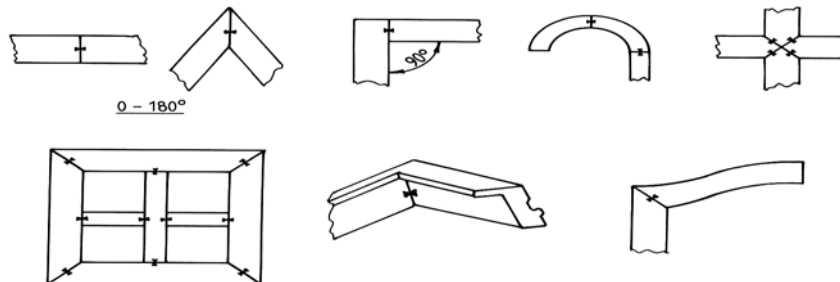


Wrong Setting



Correct Setting

12. Applications for the Hoffmann Dovetail Joining System

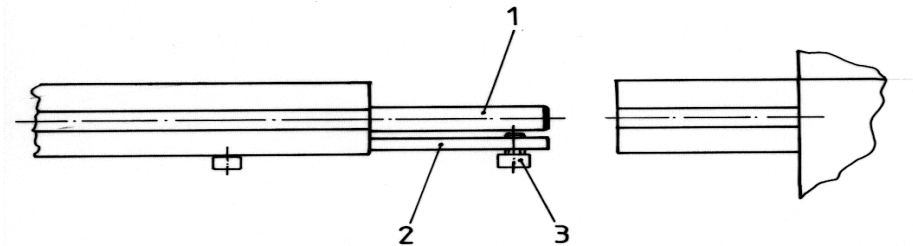




13. Installation of fence extensions

If accessory fence extensions have been ordered with the machine please follow these assembly instructions:

1. Push the left and right hand side fence with the steel connector plate (2) and bolt (1) into the machine fence profile.
2. Tighten the screw (3) on the connector plate.
3. Attach the self-adhesive tape scale to the fence extension.
Proper line-up with the table scale is important!



14. Maintenance

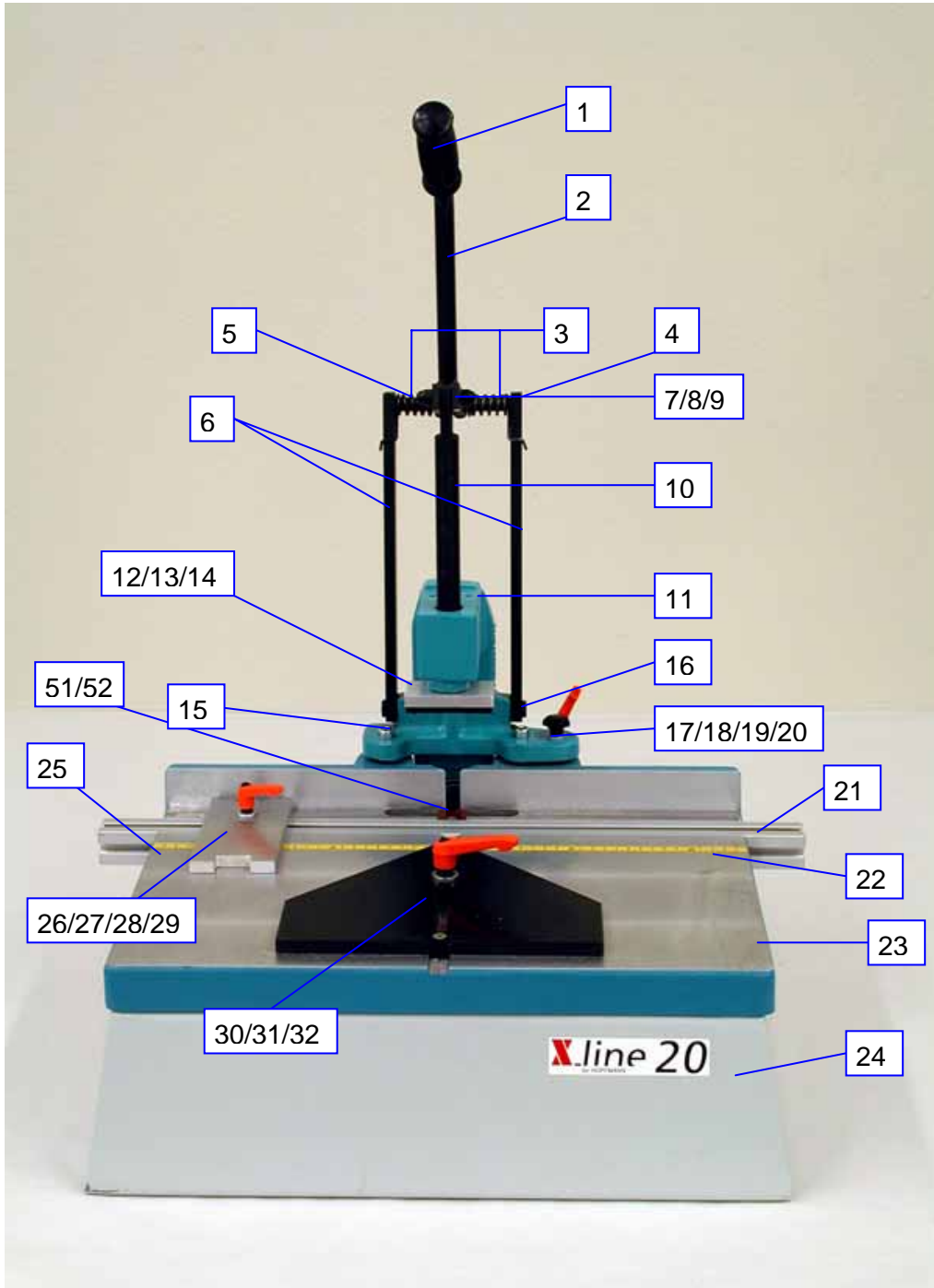
ALWAYS DISCONNECT THE ELECTRICAL POWER SUPPLY BEFORE ATTEMPTING ANY SERVICE, MAINTENANCE OR REPAIR WORK!

Follow proper "Lock-Out / Tag-Out" procedures as specified by the Occupational Safety and Health Administration "OSHA".

- All moving parts should be cleaned weekly and lubricated as necessary.
- The cooling vents in the motor housing must be kept free from dust and debris.
- Promptly replace damaged or worn router bits. Use only Original Hoffmann Dovetail Router Bits for best performance.
- All fasteners, nuts and bolts should be checked periodically and re-tightened as necessary.
- Periodically check the machine for damage or unusual wear. Never operate the machine if damaged.
- Do not modify the machine. Any modification will void the warranty and may cause a hazardous condition.

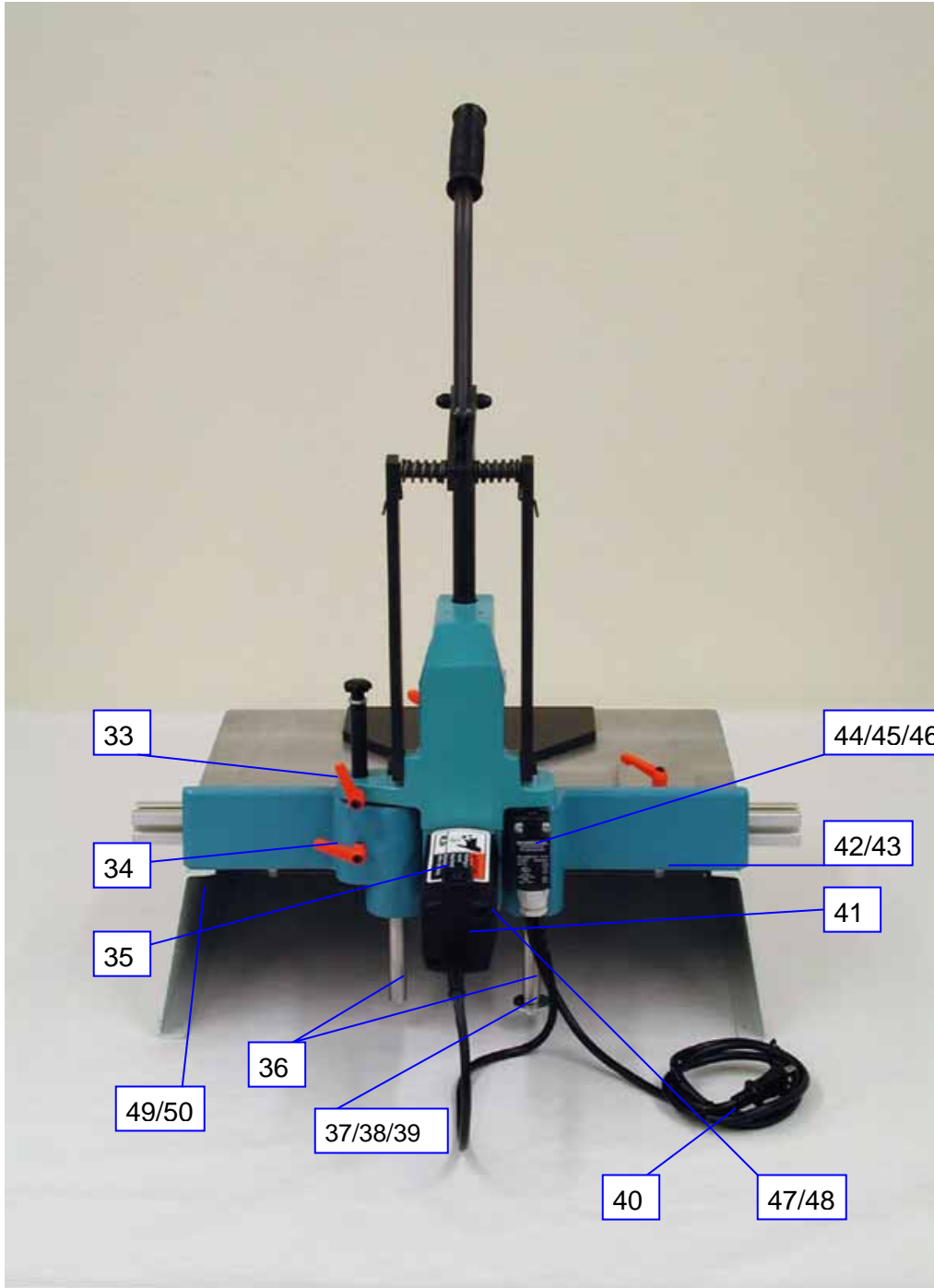


15. X-20 machine details





15.1 X-20 machine details





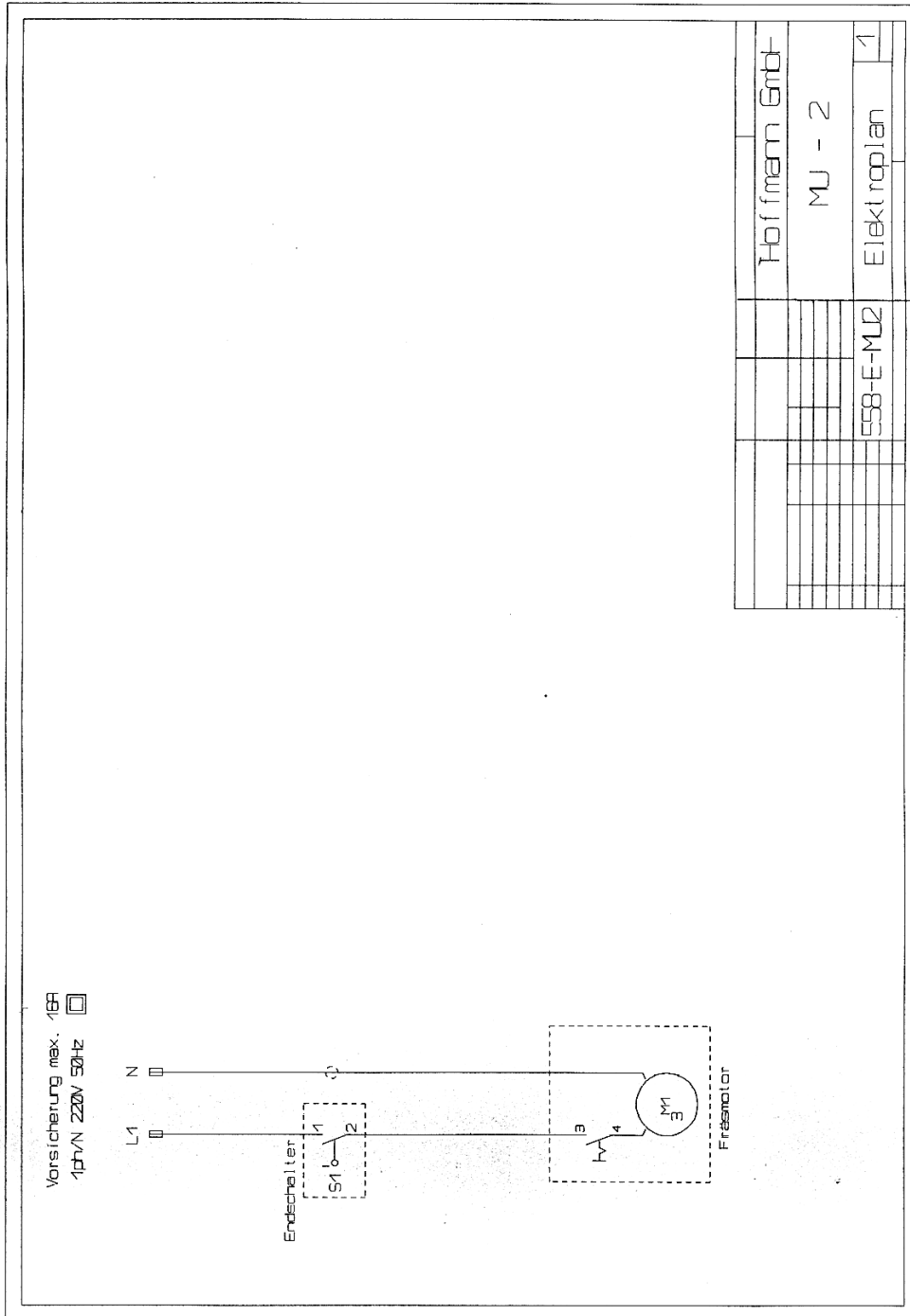
16. Parts list

Number	Order Number	Description	
1	W5000001	rubber handle cover	
2	W5000002	main handle	
3	W3990019	springs (L+R)	
4	W4050515	socket head cap screw	M5 x 15
5	W5000003	sleeve	
6	W5000004	connecting arm (L+R)	
7	W4030630	hex head cap screw	M6 x 30
8	W4020666	lock nut	M6
9	W4021116	cover plug (L+R)	M6
10	W5000005	main stem	
11	W5000006	cast aluminum arm	
12	W5000007	hold down plate	
13	W4040616	flat head cap screw	M6 x 16
14	W5000008	foam pad	
15	W4050820	socket head cap screw	M8 x 20
16	W4060000	shoulder screw	
17	W5000009	height adjustment rod	
18	W5000010	tape scale, vertical	0-170
19	W4015100	knurled knob	M5
20	W4010005	washer, heavy	M5
21	W5000011	aluminum fence rail	603
22	W3900007-L	self-adhesive tape scale L-R	0-250
23	W5000012	cast aluminum machine table top	
24	W5000013	machine base	
25	W3900007-R	self-adhesive tape scale R-L	0-250
26	W3900004	square stop	
27	W4016200	lever handle	M6 x 20
28	W4010006	washer, heavy	M6
29	W4026666	bottom plate	M6
30	W3060000	45° center fence plate	
31	W4018300	lever handle	M8 x 30
32	W4010008	washer, heavy	M8
33	W4016300	lever handle	M6 x 30
34	W4016300	lever handle	M6 x 30
35	W3900015	ON-OFF switch for router motor	
36	W5000014	guide rods (L+R)	16 x 190
37	W4050820	socket head cap screw	M8 x 20
38	W4010168	washer	16mm
39	W4010348	washer	34mm
40	W5000015	power cord, 120 volt	
41	W3900005	HOFFMANN router motor	
42	W4050616	socket head cap screw	M6 x 16
43	W4010066	washer	M6
44	W3990028	limit switch with plunger	
45	W4050425	socket head cap screw	M4 x 25
46	W4010044	washer	M4
47	W4050650	socket head cap screw	M6 x 50
48	W4010066	washer	M6
49	W4050616	socket head cap screw	M6 x 16
50	W4010066	washer	M6
51	W2000015	chip breaker, square	
52	W4050416	socket head cap screw	M4 x 16

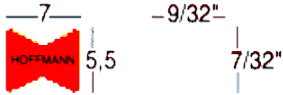
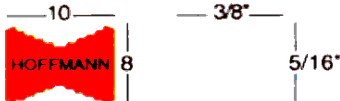
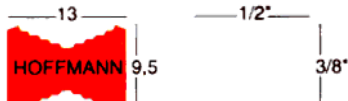
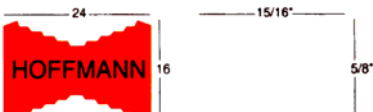


17. Electric Schematic

Note: All x-20 machines for the USA, Canada and Mexico are shipped for 115 Volt, single phase electrical power supply.



18. Hoffmann Dovetail Keys, standard brown plastic, without flange

	Part number	length in inches	length in mm
W-1 	W 9100600	W1 – 1/4"	6.0mm
	W 9101000	W1 – 3/8"	10.0mm
	W 9101400	W1 – 9/16"	14.0mm
	W 9101800	W1 – 3/4"	18.0mm
	W 9102200	W1 – 7/8"	22.0mm
	W 9103000	W1 – 1 1/4"	30.0mm
	W 9104000	W1 – 1 9/16"	40.0mm
	W 9105000	W1 – 2"	50.0mm
W 9106000	W1 – 2 3/8"	60.0mm	
W-2 	W 9200600	W2 – 1/4"	6.0mm
	W 9200900	W2 – 3/8"	9.5mm
	W 9201200	W2 – 1/2"	12.0mm
	W 9201400	W2 – 9/16"	14.0mm
	W 9201500	W2 – 5/8"	15.8mm
	W 9201800	W2 – 3/4"	18.0mm
	W 9202200	W2 – 7/8"	22.0mm
	W 9202000	W2 – 13/16"	20.6mm
	W 9202200	W2 – 7/8"	22.0mm
	W 9202500	W2 – 1"	25.4mm
	W 9203200	W2 – 1 1/4"	31.7mm
	W 9203800	W2 – 1 1/2"	38.1mm
	W 9204600	W2 – 1 13/16"	46.0mm
	W 9206000	W2 – 2 3/8"	60.0mm
W-3 	W 9301200	W3 – 1/2"	12.7mm
	W 9391500	W3 – 5/8"	15.8mm
	W 9301900	W3 – 3/4"	19.0mm
	W 9302500	W3 – 1"	25.4mm
	W 9303100	W3 – 1 1/4"	31.7mm
	W 9303800	W3 – 1 1/2"	38.1mm
	W 9304600	W3 – 1 13/16"	46.0mm
	W 9305200	W3 – 2"	52.0mm
	W 9306000	W3 – 2 2/8"	60.0mm
	W 9308000	W3 – 3 1/8"	80.0mm
W 9301000	W3 – 4"	100mm	
W-4 	W 9404000	W4 – 1 9/16"	40mm
	W 9406000	W4 – 2 3/8"	60mm
	W 9408000	W4 – 3 1/8"	80mm
	W 9401000	W4 – 4"	100mm



19. Hoffmann Machine Company, Inc. Warranty

Hoffmann Machine Company, Inc. (hereinafter called "seller") guarantees all machines and parts of its own manufacture against defects in material and workmanship for a period of twelve (12) months from the date of shipment, under normal use and service by buyer (one eight hour production period per day). No other warranties are to be implied with respect thereto. The liability of seller under its warranty is limited to adjustment, in accordance with the warranty adjustment terms set forth below, for products which are found to be defective by seller in the form in which they were originally shipped. In no event will seller be liable for collateral, consequential or other damages of any kind or nature.

SELLER MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

It is buyer's sole responsibility to test, approve and authorize the use of the Hoffmann Dovetail Joining System and the Hoffmann Dovetail Keys or "Schwalbe" for any and all applications.

Warranty Adjustment Terms

1. Adjustments will be limited to claims which are presented promptly after the product is found to be defective, and within the aforesaid warranty period.
2. All products claimed to be defective will be subject to inspection and test by seller. Normally, seller will request return of products for inspection and test, however, seller reserves the right to make inspection and test on buyer's premises. Returns are to be made only as and if authorized by seller.
3. Buyer will pay all packaging, inspection, labor and transportation costs involved. Credit for the transportation costs only will be issued by seller provided adjustment subsequently is allowed.
4. No adjustments will be allowed for products which have been subjected to abuse, improper installation or application, alteration, accident or negligence in use, storage, transportation or handling; nor for products on which original identification markings have been removed, defaced or altered.
5. Final determination as to whether any adjustment is allowable, and as to the extent thereof, rests with the seller. Full adjustment, if allowed, normally will be made by replacement in kind on an exchange basis. Pro rata adjustment, if allowed, normally will be made by issuance of credit. In all cases, however, the seller reserves the right to make adjustments by repair, replacement or credit.
6. Replacement for products found subject to adjustment, whether new or repaired, will be shipped F.O.B. City of destination with transportation charges prepaid by seller.

Installation

Buyer shall install machinery purchased from seller at buyer's cost and expense, unless otherwise expressly stipulated in writing. At the request of buyer, seller will recommend competent engineers to supervise the installation, and to instruct buyer in the proper operation of the machinery and equipment. During such period of supervision and instruction, such personnel shall be deemed to be employees of the buyer who shall pay the wages, remuneration, board and traveling expenses of such personnel and shall not make seller liable, directly or indirectly, in any manner whatsoever, for any damages resulting from any act of commission or omission or any misfeasance or malfeasance, on the part of said personnel.



20. Terms and Conditions of Sale

1. Application and Scope:

The terms and conditions contained herein apply to proposals made, and to purchase orders received, by HOFFMANN MACHINE COMPANY, INC. (hereinafter called "Seller"), and sets forth the entire agreement between the parties hereto, and supersedes all communication, representations or agreements, whether oral or written, between the parties hereto with respect to the subject matter herein, and no agreement or understanding varying or extending the terms or conditions hereof will be binding unless expressly agreed to in writing by Seller. No conditions stated by Buyer in its purchase order or orders shall be binding upon Seller if in conflict with, inconsistent with, or in addition to, the terms and conditions contained herein, unless expressly accepted in writing by Seller. Seller's failure to object to any provision contained in any communication or purchase order from Buyer shall not be deemed a waiver of the terms and conditions herein. All orders or contracts are subject to approval and acceptance by Seller at its main office in North Carolina. These Terms and Conditions are within the sole discretion of Seller and are subject to change with or without prior notice.

2. Quotations and F.O.B. Point:

Prices are quoted and all sales are made F.O.B. Sellers facility and, unless otherwise indicated in the proposal, prices quoted are effective for a maximum thirty (30) days after the date of any proposal.

3. Terms of Payment:

All invoices are due and payable as set forth on the front of the invoice. Each delivery shall be considered a separate and independent transaction and payment thereof shall be made on terms set forth on invoice covering same. If delivery is delayed by Buyer, payment shall become due when Seller is prepared to make delivery. If, in the sole judgment of the Seller, the financial condition of Buyer at any time does not justify continuation of manufacture or of delivery as originally specified, Seller may vary terms of payment by requiring full or partial payment in advance, or otherwise, or may ship to Buyer's order against sight draft with bill of lading attached.

4. Taxes:

Unless the quotation expressly provides otherwise, the amount of any present or future Federal, State or local sales, excise or other tax applicable to the products purchased hereunder, or to the manufacture or sale thereof (including, without limitation, state or local privilege or excise taxes based on gross revenue), and any taxes or amounts in lieu thereof paid or payable by Seller in respect of the foregoing (excluding, however, taxes based on net income), shall be added to the purchase prices and shall be paid by Buyer. In lieu thereof, Buyer may provide Seller with an appropriate tax exemption certificate acceptable to the taxing authorities.

5. Warranty:

The products covered herein are warranted, for a period of twelve (12) months from date of shipment, against defects in material and workmanship under normal use and service by Buyer. The liability of Seller under its warranty is limited to adjustment, in accordance with the Warranty Adjustment Terms set forth below, for products which are found to be defective by Seller in the form in which they were originally shipped. In no event will Seller be liable for collateral, consequential or other damages of any kind.

SELLER MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

6. Warranty Adjustment Terms:

- (a) Adjustments will be limited to claims which are presented promptly after the product is found to be defective, and within the aforesaid warranty period.
- (b) All products claimed to be defective will be subject to inspection and test by Seller. Normally, Seller will request return of products for inspection and test, however, Seller reserves the right to make inspection and test on Buyer's premises. Returns are to be made only as and if authorized in writing by Seller.
- (c) Buyer will pay all packaging, inspection, labor and transportation costs involved. Credit for the transportation costs only will be issued by Seller provided adjustment subsequently is allowed.
- (d) No adjustments will be allowed for products which have been subjected to abuse, improper installation or application, alteration, accident or negligence in use, storage, transportation or handling; nor for products on which original identification markings have been removed, defaced or altered.
- (e) Final determination as to whether any adjustment is allowable, and as to the extent thereof, rests with Seller. Full adjustment, if allowed, normally will be made by replacement in kind on an exchange basis. Pro rate adjustment, if allowed, normally will be made by the issuance of credit. In all cases, however, Seller reserves the right to make adjustment by repair, replacement or credit.
- (f) Replacement for products found subject to adjustment, whether new or repaired, will be shipped F.O.B. city of destination with transportation charges prepaid by Seller.

7. Installation:

Buyer shall install machinery purchased from Seller at Buyer's cost and expense, unless otherwise expressly stipulated in writing.

8. Packaging and Shipment:

All products shipped hereunder will be packaged in accordance with standard commercial practice for domestic shipment. Seller's liability as to delivery ceases upon making delivery of products purchased hereunder to carrier at Seller's facility, in good condition, the carrier acting as Buyer's agent. All claims for damages must be filed with the carrier or Buyer's insurer as appropriate. Seller will select the method of shipment unless Buyer does so in writing at least ten (10) days in advance of the scheduled delivery date. Equipment held for Buyer because of Buyer's delay in acceptance, shall be at Buyer's risk and expense. Seller does not assume liability for shipping in the least expensive manner.



20. Terms and Conditions of Sale (continued)

9. Deliveries:

It is the desire of Seller to meet requested delivery schedules, however, Seller shall not incur any liability, consequential, collateral or otherwise, due to any delay or failure to deliver for any reason, other than arbitrary refusal by Seller to perform. Any delivery indication furnished by Seller only represents the best estimate of the time required to make shipment.

10. Assignment:

Buyer shall not assign this purchase order or any interest herein or any rights thereunder, without the prior written consent of Seller.

11. Termination:

Seller may terminate the purchase order or any part thereof herein referred to or any other purchase order or orders then outstanding by written, telegraphic or electronic mail notice to Buyer if Buyer becomes insolvent or is subject to proceedings under any law relating to bankruptcy, insolvency or relief of debtors. Upon such termination Seller shall be entitled to receive reimbursement for reasonable termination charges.

12. Cancellations or Returns:

Buyer shall not cancel any order nor return any equipment without first obtaining the written consent of Seller. In any event, in case of refusal or inability of Buyer to accept a delivery, the Buyer shall nevertheless be liable for freight, express, storage, handling, restocking and any other expense resulting. In no event are orders for machines or parts built to customers' specification subject to cancellation and Buyer shall be liable for work done and materials used.

13. Specifications:

- (a) Phone order specifications are filled at Buyer's risk unless confirmed in writing prior to commencement of manufacture.
- (b) If equipment is found not to meet original specifications, Seller shall have a reasonable time to make adjustments.

14. Law Governing:

Buyer's purchase order shall be governed by and construed according to the laws of the State of North Carolina. The courts of the State of North Carolina shall have jurisdiction over any controversy that may arise out of the dealings between Buyer and Seller.

15. Force Majeure:

Seller shall not be liable under this agreement by reason of its delay in the performance of or failure to perform any of its obligations hereunder if such delay or failure is caused by acts of God or the public enemy, riots, incendiaries, interference by civil or military authority, compliance with government laws, rules and regulations or any fault beyond its control.

16. Acceptance:

Payment for or a deposit made for the products shall constitute a contract embodying all of terms and conditions stated herein.

17. Ownership:

All products remain the sole property of the Seller until all charges, including all transportation, crating and installation costs, are paid in full.

18. Severability:

The provisions of these Terms and Conditions are intended to be severable. If, for any reason, any of the above provisions should be found unenforceable or invalid in whole or in part, in any jurisdiction, such provision be ineffective only to the extent the determination of invalidity or unenforceability in that jurisdiction. Any such determination shall not affect the enforceability or validity of the remaining provisions.

19. EOE

All errors and omissions are excluded. Changes to the design and technical specifications of this equipment are reserved.