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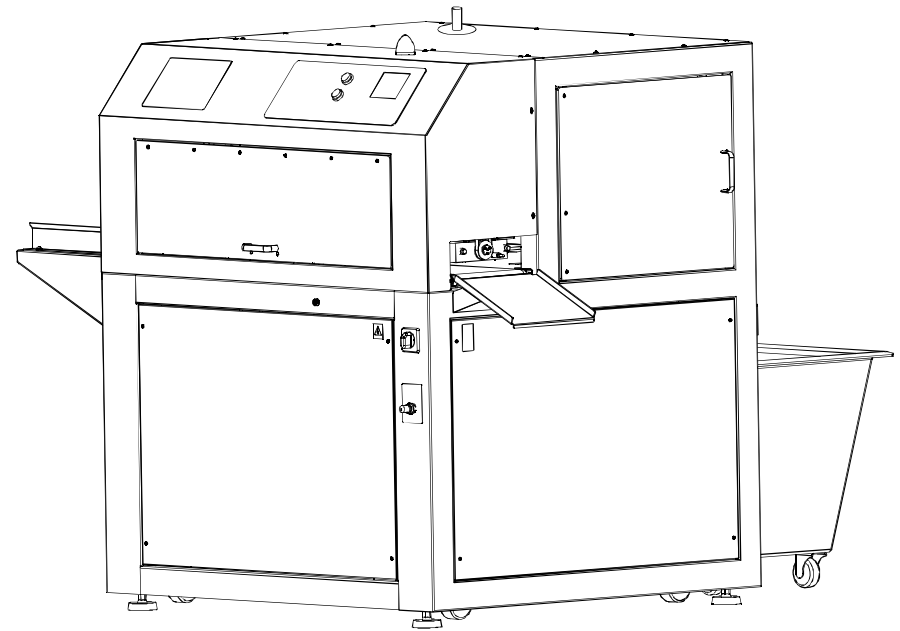
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THE CHALLENGE MACHINERY COMPANY

CMT 130

Book Trimmer Installation and Operator's Manual



The Challenge Machinery Company

6125 Norton Center Drive
Norton Shores, MI 49441 USA
ChallengeMachinery.com

SERIAL No.: _____

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Introduction

The introduction section of this manual is intended to provide installers and operators with basic information. Safety recommendations are made, and machine options and specifications are listed.

1.1 Warranty Information

READ THIS MANUAL BEFORE OPERATING!

Follow all precautions and instructions. For parts and service contact the Authorized Challenge Dealer from whom the machine was purchased. Always give the **SERIAL NUMBER** and **MODEL** of your machine to ensure the correct parts are sent.

* WARRANTY INFORMATION *

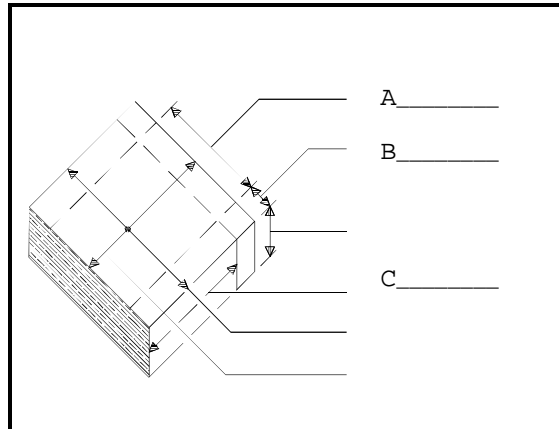
PLEASE REVIEW THE ENCLOSED WARRANTY INFORMATION SHEET

It is very important that you read and understand the conditions outlined in the *Warranty Information Sheet* attached to the outside of the shipping container of your machine. The *Warranty Information Sheet* must be filled out completely and returned to **THE CHALLENGE MACHINERY COMPANY** in order for the warranty to be issued for this machine.

NOTICE: Failure to use dry, non-lubricated compressed air that meets or exceeds the requirements given in Section 2.6 may cause damage to the machine and will result in **THE WARRANTY BEING VOIDED.**

RECORD YOUR MACHINE SERIAL NUMBER in the space provided on the front cover of this manual. Fill in the warranty card accompanying this manual and return it **DIRECTLY TO CHALLENGE.**

The letters in the following diagram correspond to the accuracy adjustment values listed on the affixed label.



If you bought a used machine, it is important to have the following information on record at Challenge. Copy this page, fill in the information and send it care of The Challenge Service Department, 6125 Norton Center Drive • Norton Shores • MI 49441.

* INSTALLATION INFORMATION *

Model: **CMT 130**

Serial No.:

Company Name:

Address:

City:

State/Province:

ZIP Code

Phone No.:

Date Installed:

Dealer Name:

Dealer City:

1.2 Warning Label Definitions

Warning labels are posted throughout the machine to indicate areas where physical injury may occur.



Read the instruction manual.

The instruction manual should be read and understood before operating this machine.



Do not operate with more than one person!

One person only should operate this machine at a time.



Cut / Crush Hazard!

Do not operate with covers removed.
Do not disable safety devices.



Crush Hazard!

Do not operate with covers removed.
Do not disable safety devices.



Crush / Entanglement Hazard!

Do not operate with covers or guards removed.



Electrical Shock Hazard!

Disconnect power before removing cover.



Electrical Shock Hazard!

Disconnect power before removing cover.

1.3 Note Definitions

The formats of three specific types of notes found throughout this manual indicate the level of danger or importance associated with the task presented. The format of warning notes, caution notes, and regular notes imply a certain level of danger. The following examples give a description. Associate the text format with its level of danger or importance.

Warning Definition:



WARNING

A warning indicates an operating or maintenance procedure, practice, or condition that, if not strictly observed, could result in injury or loss of life.

Caution Definition:



CAUTION

A Caution indicates an operating or maintenance procedure, practice, or condition that, if not strictly observed could result in damage to, or destruction of, equipment.

Note Definition:

Note: A regular note indicates an operating or maintenance procedure, practice, or condition that is necessary to accomplish a task efficiently.

1.4 Safety

Before installing or operating any equipment, it is important to take precautions. Read and thoroughly understand the safety precautions outlined below.

- This machine is designed for one-person operation. Never operate the machine with more than one person.
- Safe use of this machine is the responsibility of the operator. Use good judgment and common sense when working with and around the machine and its accessories.
- Read and understand all instructions thoroughly before using the machine. If questions remain, contact your Authorized Challenge Dealer. Failure to understand the operating instructions may result in personal injury.
- Only trained and authorized individuals should operate this machine.
- Only trained and authorized service technicians should service this machine.
- Do not alter safety guards or devices. They are there for your protection. Severe laceration or dismemberment may result if safety devices are altered.
- Disconnect power and lock out before performing any maintenance. See Section 1.5 , Power Lockout Procedure.
- Observe all caution and instruction labels on this machine.
- Be extremely careful when handling and changing knives. Severe lacerations or dismemberment could result from careless handling procedures.
- Perform the given on page 4-7 before each shift begins.

- Keep all conveyors and elevator accessories clear of foreign objects. Do not place foreign objects within the machine. Cutting anything other than qualifying perfect bound books could result in serious damage to the machine and create safety hazards. A qualifying perfect bound book will fall into the size range described in the specifications on page 1-8.
- Make sure all applicable accessories are securely bolted to the main machine. Tip hazards may result from unsecured accessories.
- If the machine operates abnormally, consult a Challenge authorized service agent.

1.5 Power Lockout Procedure

For maximum safety while making ADJUSTMENTS or REPAIRS to your machine, lock out the main power disconnect switch. The switch should be moved to the OFF position and a padlock securely fastened through the loop. The person adjusting or servicing the machine should hold the key.

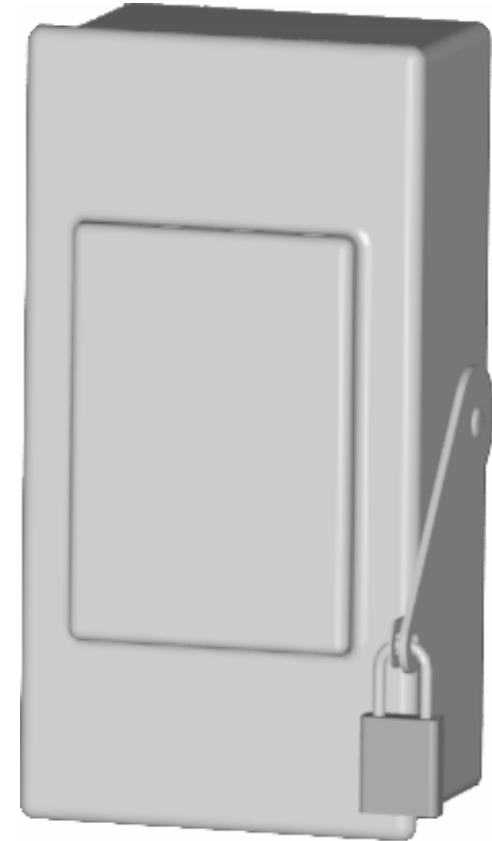


Figure 1-1. Main Power Disconnect

1.6 Packing List

Compare the contents of the crate against the following lists and the packing slip to be sure all items are included with your shipment.

1.6.1 Base Machine/Options

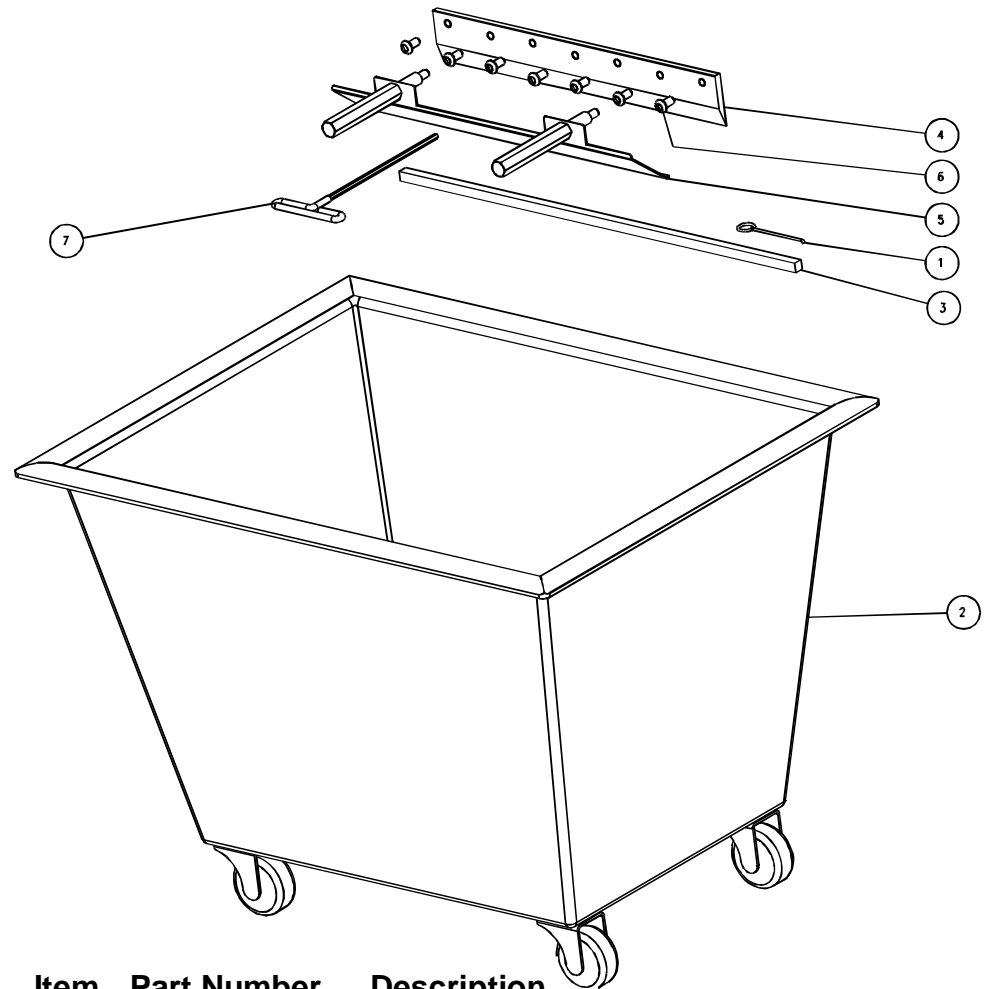
This parts list includes the base machine and any accessories that may have been ordered with it.



Part Number	Description	Qty.
CMC-130	CMT 130 Base Machine	1
Accessory Options		
Stand-Alone Options		
58500	Book Pile Feeder (shown above)	1
58000	Vertical Stacker (shown above)	1
59200	CMT 130 Manual In-feed (small, not shown)	1
56413	Hand-Feed Conveyor (large, not shown)	1
56420	Exit Conveyor (not shown)	1
In-line Option		
	(not shown)	
56600	Tilt In-feed Conveyor	1
56421	Cooling Elevator	1
	(also include exit options from above)	

1.6.2 Standard Accessories

The following list contains pre-installed, standard accessories for the CMT 130.



Item	Part Number	Description	Qty.
1	5064	Cut Stick Puller	1
2	41058	Waste Bin	1
3	59050	Cut Stick	3
4	59051-2	DMD 5X Knife	2
5	59070	Knife Lifter Assembly	1
6	H-6910-606	Knife Screw- 3/8-16 X 3/4 BHC	7
7	W-180	7/32" T-Handle Hex Wrench	1

1.6.3 Optional Items

The following items are optional or maintenance kits.

59051	High Speed Steel Knife
59051-1	Tungsten Carbide Knife
41058	Waste Bin
K-56149	Spare Parts Kit
K-56040	Oil Change Kit
K-56031	Oil Change Tool Kit
S-1991-3	Hydraulic Fluid (5 Gal.)

1.6.4 Consumables

The CMT 130 uses the following consumable items.

Part	Description	Qty.	Frequency
E-967-1	Lamp	6	10,000 hrs as needed
56523-1000	UHMW Tape	2	1 yr. as needed
SU-30-103	Grease- EP2 (black)	Bulk	1 wk.
SU-30-104	Grease- EP (red)	Bulk	each knife change
59032	Clamp Pad	1	6 mo.
59051	High Speed Steel Knife	optional	15,000-20,000 cuts
59051-1	Tungsten Carbide Knife	optional	40,000-60,000 cuts
59051-2	DMD 5X Knife	1	30,000-40,000 cuts
59050	Cut Stick	1	rot. 1000, change 8000 cuts

The following consumables are found in **Oil Change Kit, K-56040**.

Part	Description	Qty.	Frequency
56041	Filter Element (Air)	1	1 yr.
H-227-1	Filter Element (Oil)	1	1 yr.
S-1991-3	Grade 46 Hydraulic Fluid	1	1 yr.

1.7 Specifications



WARNING

The CMT 130 was designed specifically for use with the Challenge in-feed and exit accessories. If any other accessories are used, it is the purchaser's responsibility to comply with *ANSI B65.4 Safety Standard for Three-Knife Trimmers*. Failure to comply with this standard could result in personal injury or death.



CAUTION

The CMT 130 was specifically designed to trim perfect bound books only. It should not be used for trimming other materials. Trimming other materials with the CMT 130 may result in safety hazards or damage to the machine.

The CMT 130 was designed to trim perfect bound books only. For trimmable book sizes, see section 1.7.1 .

See manuals, F.501 and F.502, for specifications for the Book Pile Feeder and the Vertical Stacker.

Multiple Book Mode: Note that up to 3 books may be stacked in multiple book mode. The total thickness is not to exceed 1-1/4 in. (32 mm). Larger pile thicknesses may be cut, but the trim may be less accurate and more out-of-square. Always test before running books outside the published specifications.

NOTE: Challenge reserves the right to make changes to any product or specification without notice and without incurring responsibility to existing units.

Description	US Units	Metric Units
Max. start book	13 (spine) x 9.5 in.	330 (spine) x 241 mm
Min. start book (bottom cover)	7 (spine) x 6.75 in.	177.8 (spine) x 171.4 mm
Min. start book (w/feeder)	7(spine) x 6.75 in. (single book mode) 7 x 7 in.(multi-book mode)	177.8 (spine) x 171.4 mm 177.8 x 177.8mm
Min. finish book	5.82 (spine) x 4 in.	147.8 (spine) x 101.6 mm
Max. finish book	12 (spine) x 9 in.	304.8 (spine) x 228.6 mm
Max. trim (Top)	6 in.	152 mm
Max. trim (Bottom)	3.5 in.	89 mm
Max. trim (Face)	5.5 in.	140 mm
Minimum trim (all sides)	0.100 in.	2.5 mm
Book thickness range	0.048-2.000 in.	1.22-50.8 mm
CMT 130 Base Machine		
Width	52 in.	3121 mm
Length	57 in.	1448 mm
Height	60 in.	1524 mm
Net Weight	1500 lb.	680 kg
Shipping Weight	1800 lb.	816 kg
Floor Loading	53 PSI	3.73 kg/cm ²
Waste Bin Capacity	43 gal.	164 L
Oil Capacity	5 gal.	19 L
Air Consumption	5 CFM @ 80 PSI	142 LPM @ 5.5 Bar
Knife Re-Grind	1/4 in.	6.4 mm
60 Hz Requirements	208/230 V, 20 A, 3 phase	
50 Hz Requirements	380/415 V, 10 kW, 3 phase, 12 A	
Memory	99 jobs	
Time to change book size	up to 10 sec.	
Throughput	up to 200 books/hr. (single book mode) up to 500 books/hr. (multiple book mode)	
56420 Exit Conveyor (85 lb/39 kg net) (210 lb/95 kg ship) (6.76 PSI/.48 kg/cm ² load)		
Depth	12.14 in.	308.4 mm
Width	47 in.	1194 mm
Height	39.5 in.	1003 mm
56421 Cooling Elevator (335 lb/152 kg net) (470 lb/214 kg ship) (11.86 PSI/.83 kg/cm ² load)		
Depth	21.5 in.	546 mm
Width	37.03 in.	941 mm
Height	45.5 in.	1156 mm
56600 Tilt In-Feed Conveyor (150 lb/68 kg net) (230 lb/105 kg ship) (5.62 PSI/.40 kg/cm ² load)		
Depth	28.62 in.	727 mm
Width	39.38 in.	1000 mm
Height	26 in.	660 mm
Mates w/ binder @ exit heights	17.5-25.5 in.	445-648 mm

1.7.1 Book Size Chart

The physical parts of a book are defined as follows and will be referenced as such throughout this manual. Book dimensions are referenced as (spine length) X (top or bottom edge length).

Spine: The edge of a book where the pages are bound together.

Top edge: Also known as the head, the top edge is the edge of the book that is facing away from the reader.

Bottom edge: Also known as the foot, the bottom edge is the edge of the book that is facing toward the reader.

Face: The face or fore-edge is the edge of the book from which it is opened.

Book block: A book block is the printed and collated form of a book that does not include the cover. It contains all front and end matter as well as the text block.

Untrimmed book: An untrimmed book is a book block that has been bound with a cover but has not yet been trimmed to finish size.

Trimmed book: A trimmed book has been bound and trimmed to a finish size.

Figure 1-2. Book Size Charts can be used to determine if a specific book layout can be trimmed by the CMT 130. From Figure 1-2, see that (**x**) is the bottom trim and (**h**) is the spine length of the book. The book size must fall within the shaded region of the chart but never exactly on the sloped line.

The CMT 130 software will not allow a book to be cut outside this range. The operator should

be aware of these size constraints before books are printed. The CMT 130 will not allow the top or bottom to be trimmed by itself.

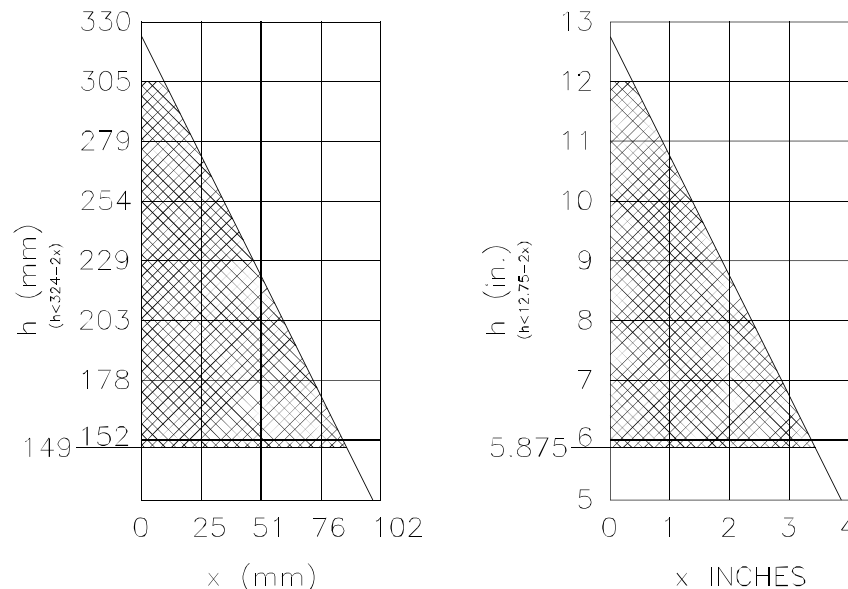
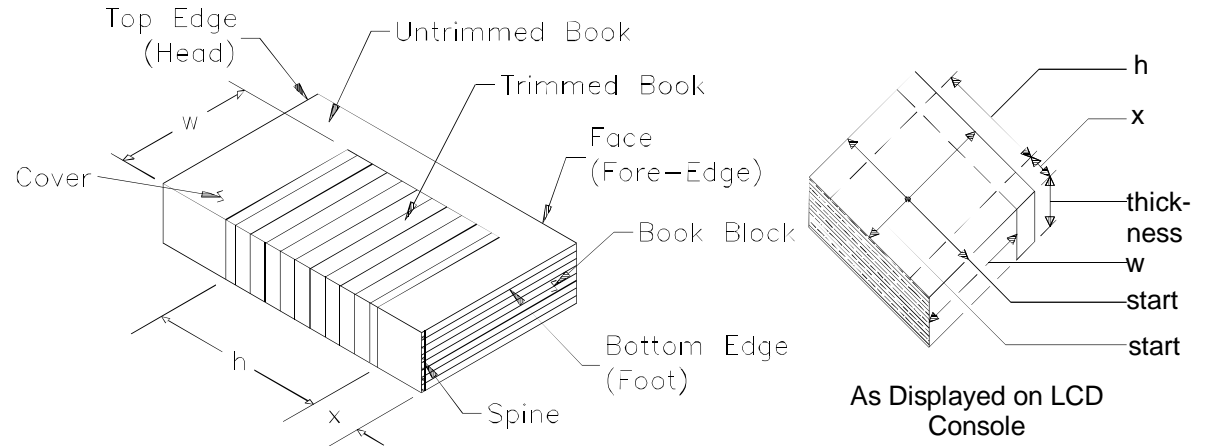


Figure 1-2. Book Size Charts

1.8 General Locations

Become familiar with general machine locations. This manual frequently refers to these locations. In order to understand the instructions presented, it is necessary to have a working knowledge of machine locations.

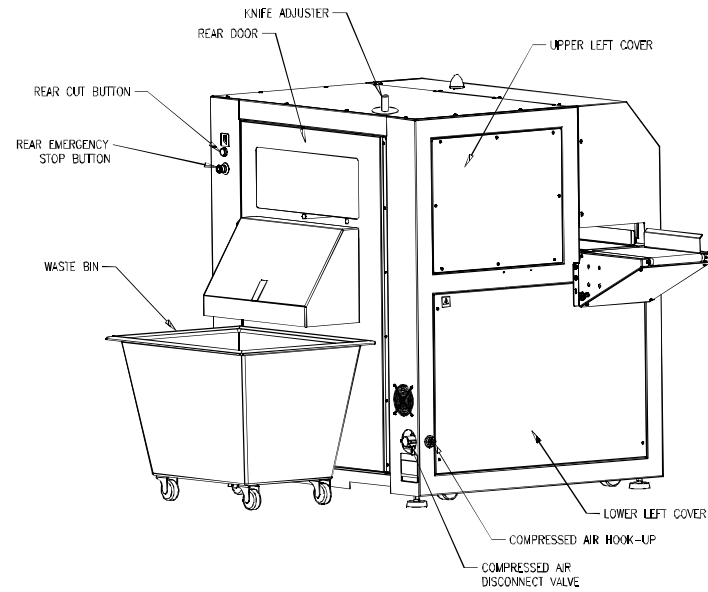


Figure 1-3 Left Rear View

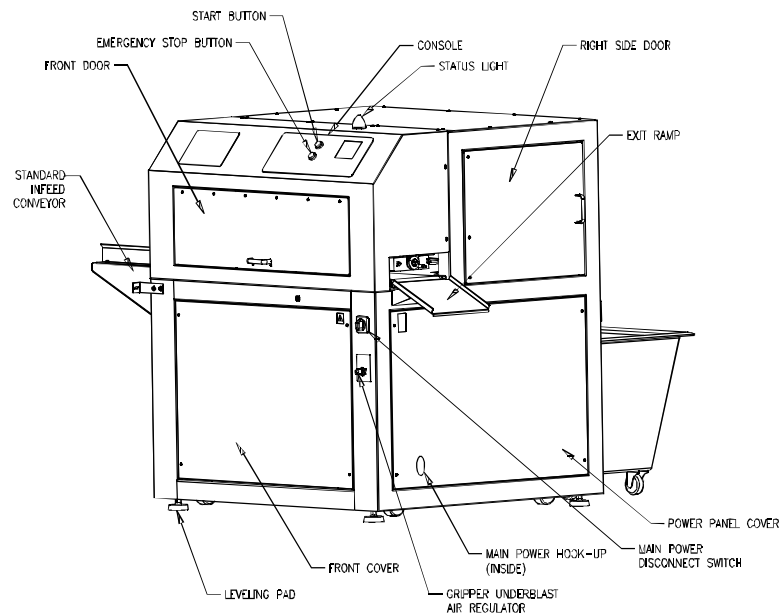


Figure 1-4 Right Front View

1.9 Exit Conveyor

Part Number: 56420

Important locations are shown in Figure 1-5.

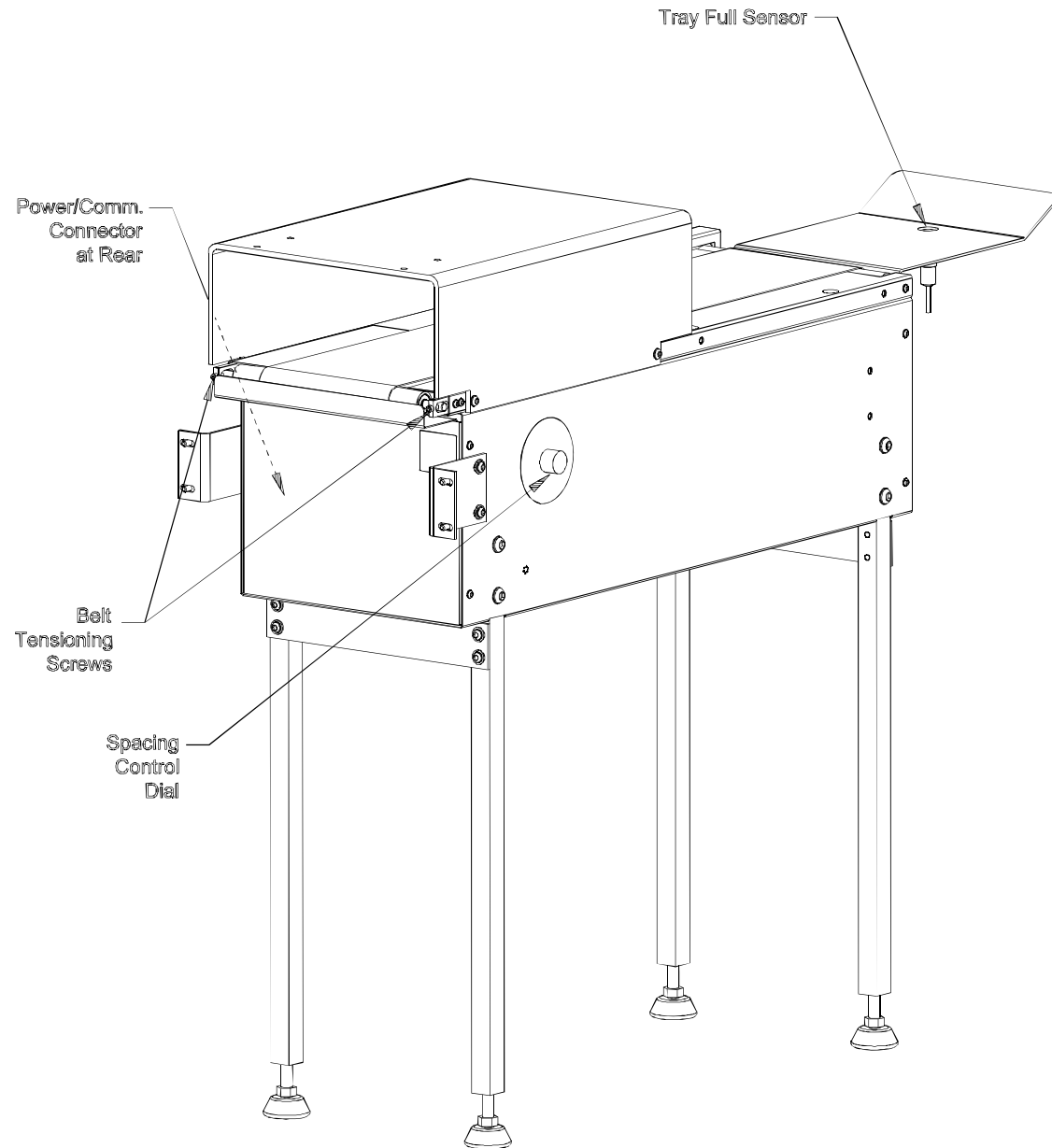


Figure 1-5. Exit Conveyor Locations

1.9.1 Advanced In-Feed Conveyor

Part No.: 56600

Important locations are shown in Figure 1-6.

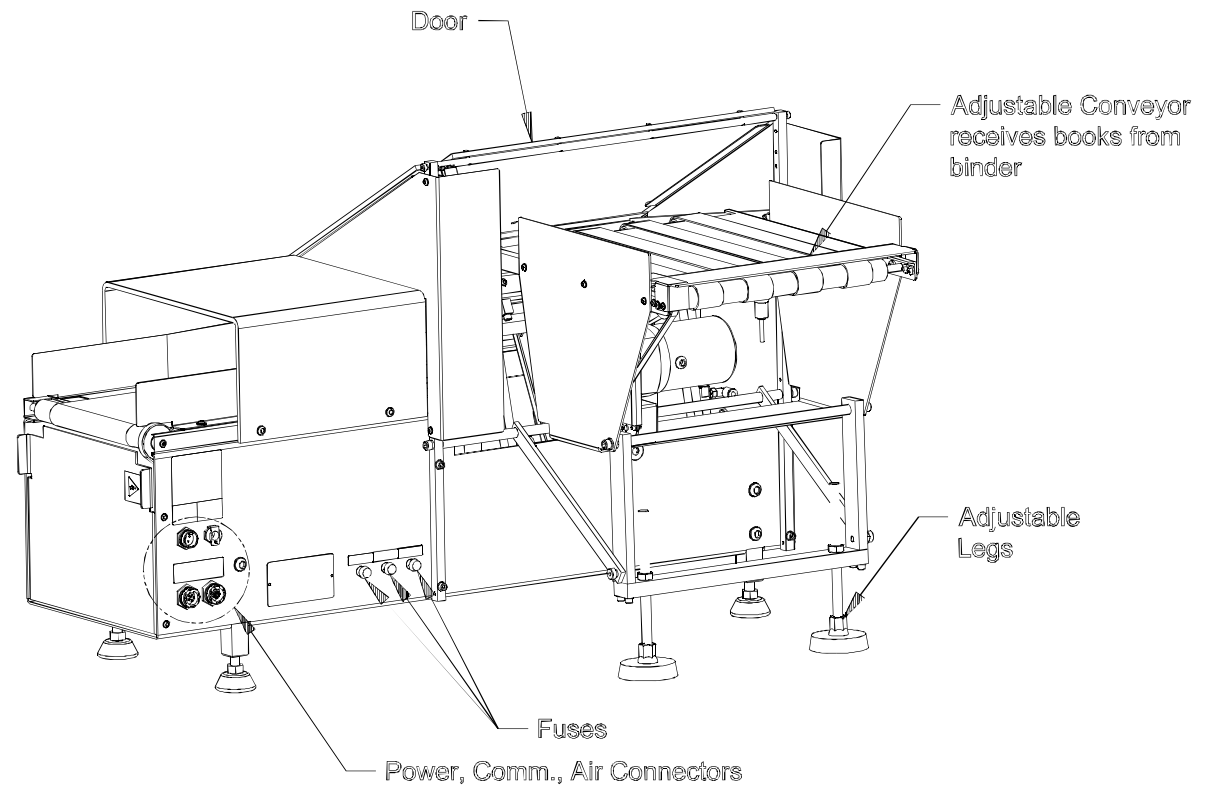


Figure 1-6. Advanced In-Feed Conveyor

1.9.2 Elevator

Part Number: 56421

Important locations are shown in Figure 1-7.

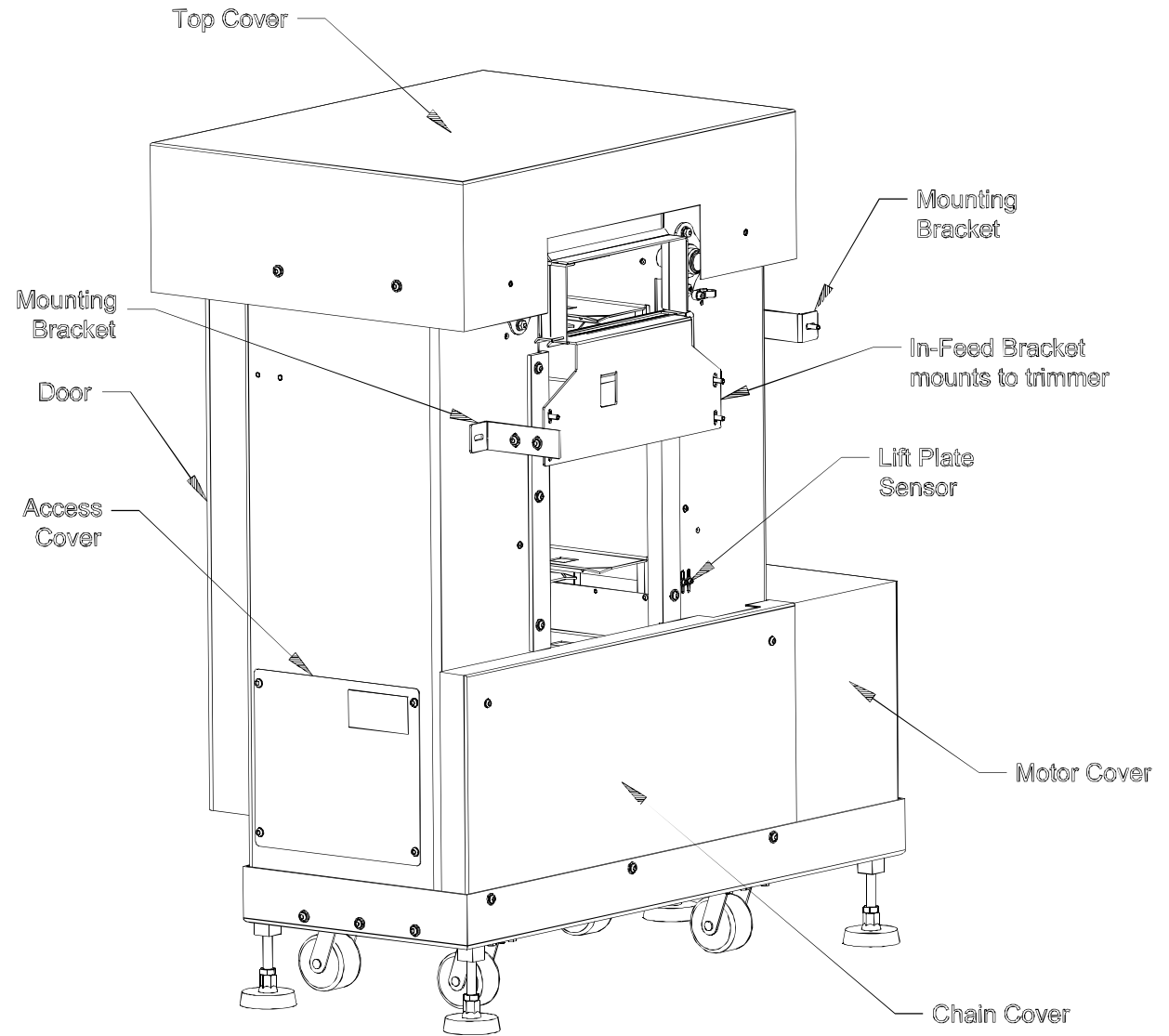


Figure 1-7. Elevator Locations

1.9.3 Site Specifications

The installation site must have adequate space and utilities to support the trimmer with its setup options. It requires a supply of compressed air and electricity. Refer to section 1.7

Specifications on page 1-8 to verify that the site can accommodate these requirements. Use the following figures to determine floor space requirements for the option to be installed.

1.9.3.1 In-Line Option

This in-line option is used when automated transport of books from a binder to the trimmer is required and book size changes are frequent. It includes the CMT 130 base machine, the Advanced Infeed Conveyor, the Elevator, and the Vertical Stacker. See Figure 1-8 for space requirements. If the basic Exit Conveyor is used in place of the Book Stacker, use 47" (120 cm) in place of the 18" shown in the diagram. If the standard hand feeder is used in place of the Pile Feeder, use 16" (41cm) in place of the 22" shown in the diagram.

Note the locations of the air and power hook-up locations. Air and power lines should be dropped from the ceiling in order to have clear access to the waste bins using a rolling cart.

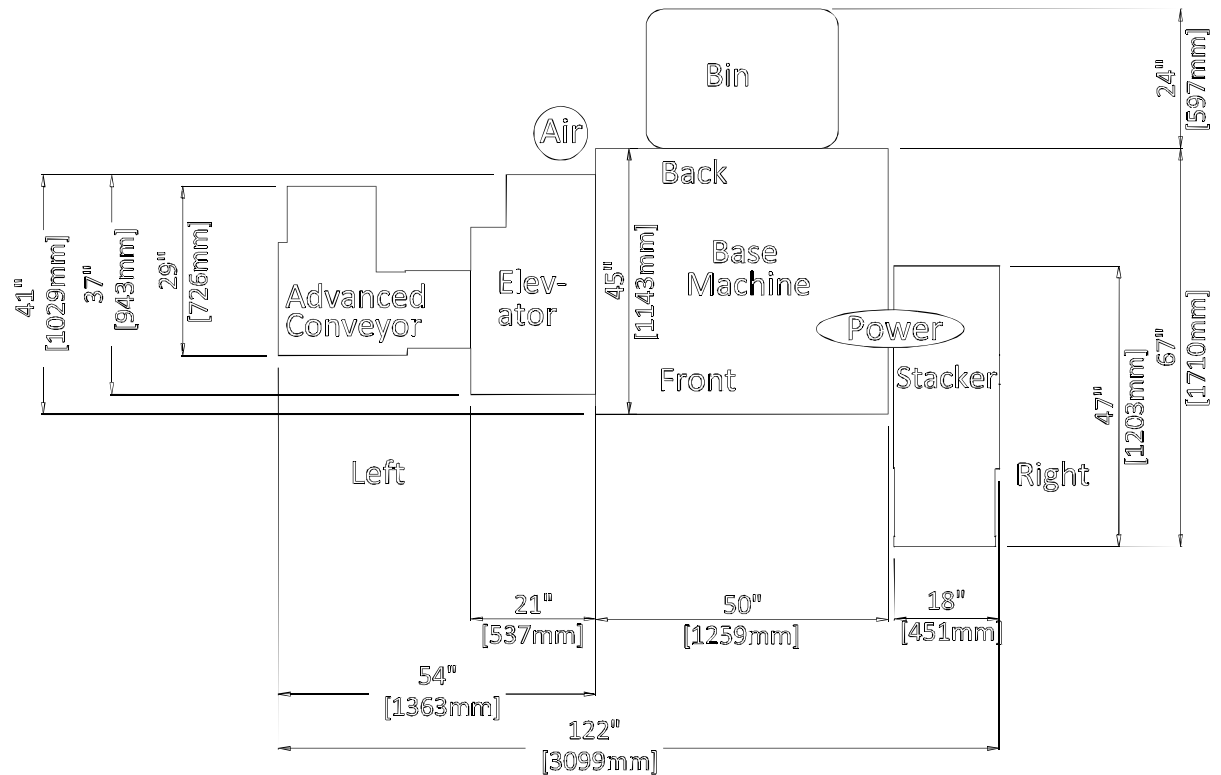


Figure 1-8. In-line Option

1.9.3.2 Stand-Alone Option

The Stand-Alone option is used when books are fed to the trimmer by hand. It includes the CMT 130 base machine, the Book Pile Feeder, and the Vertical Stacker. See Figure 1-9 for space requirements. If the basic Exit Conveyor is used in place of the Book Stacker, use 47" (120 cm) in place of the 18" shown in the diagram. If the standard hand feeder is used in place of the Pile Feeder, use 16" (41cm) in place of the 22" shown in the diagram.

Note the locations of the air and power hook-up locations. Air and power lines should be dropped from the ceiling in order to have clear access to the waste bins with a rolling cart.

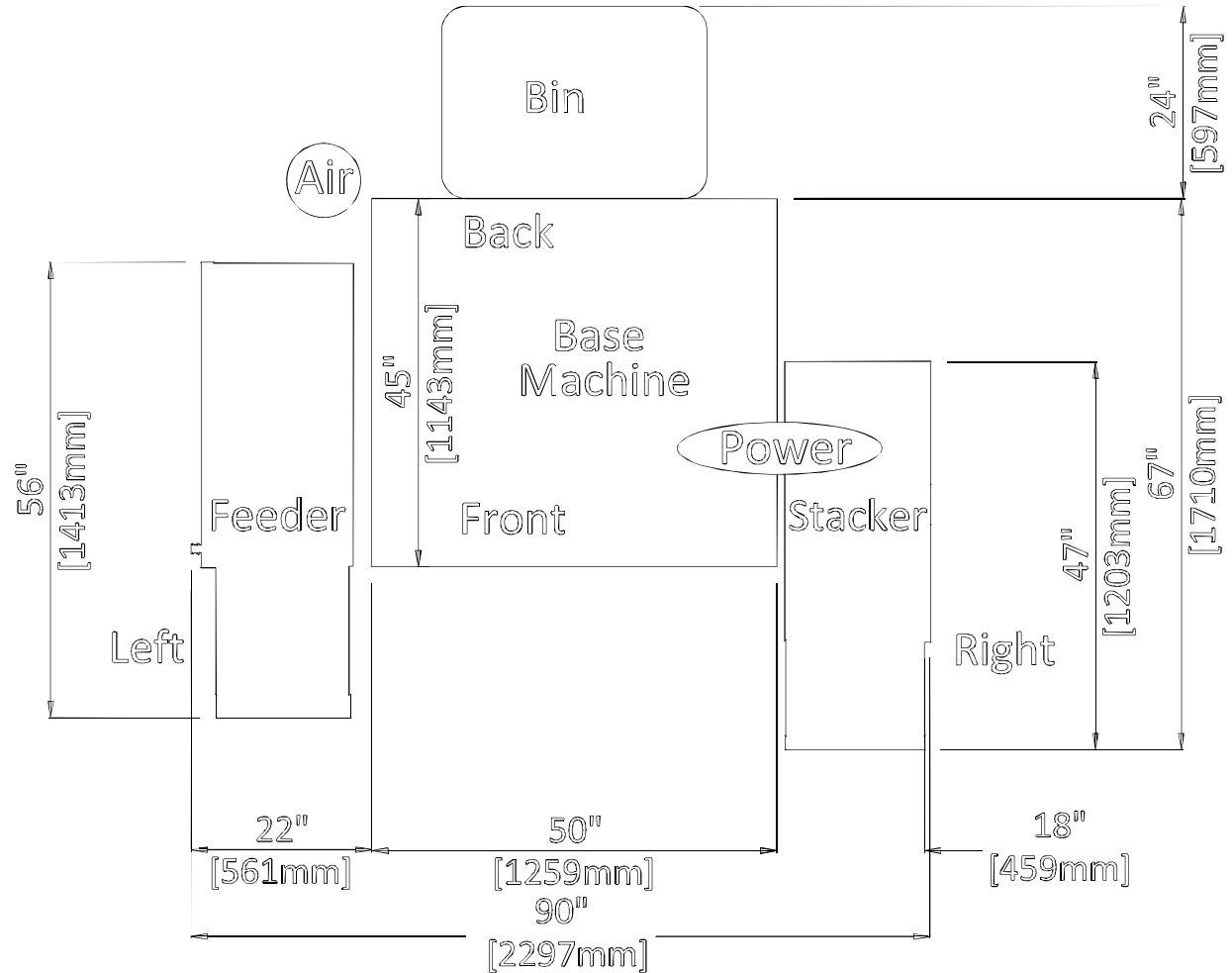


Figure 1-9. Stand-Alone Option

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Introduction

The installation guide provides information and instructions essential to the proper setup of each of the CMT 130 and its accessory options.

2.1 Shipping Claims

The CMT 130 has been packed to prevent damage during shipment. Claims for damage or loss are the responsibility of the recipient. Inspect all shipments as soon as they are received. If there is any noticeable damage, note it on the freight bill. Visual and/or hidden damage must be reported to the claims department of the carrier within 15 days. Contact your dealer if you need any assistance. Check the contents of the crate against both the packing list on page 1-5 and the freight bill. Make sure there are no missing items.

2.2 Unpacking

Remove the packing materials and four lag screws. Two lag screws are located at each end of the machine, behind the front cover and rear door as shown in Figure 2-1.

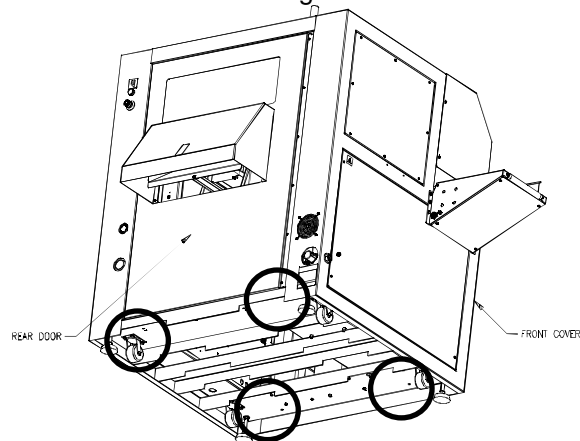


Figure 2-1. Lag Screw Locations

Remove Lag Screws

1. Remove 4 screws from the front cover using a 1/8" hex wrench.

2. Using a 9/16" wrench, remove the lag screws from the two front locations shown in Figure 2-1.
3. Open the rear door.
4. Remove the two lag screws from the two rear locations shown in Figure 2-1.
5. Close the rear door.

Use a forklift to remove the machine from the skid and place it as close as possible to its installation location. The machine has accessory power cables and air hoses wrapped-up and placed inside the machine. Be careful not to pinch or entangle these in the forks while lifting.

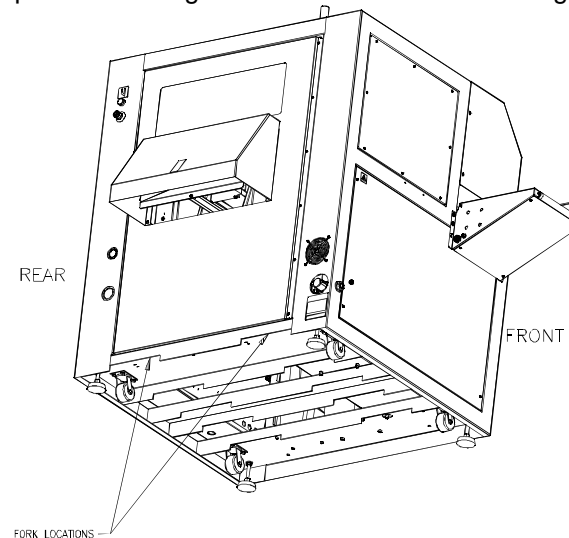


Figure 2-2. Fork Locations for Lifting

2.3 Moving

Once the machine is near its final location, it can be rolled into place.



WARNING

Do not roll on a graded surface. Roll only on a flat surface. Personal injury could result.

It may be necessary to raise the four leveling pads in order to roll the machine. A pad is located under each corner of the machine. Using either a 3/4" open-ended wrench or an adjustable wrench, turn the leveling pad counter-clockwise to raise it.

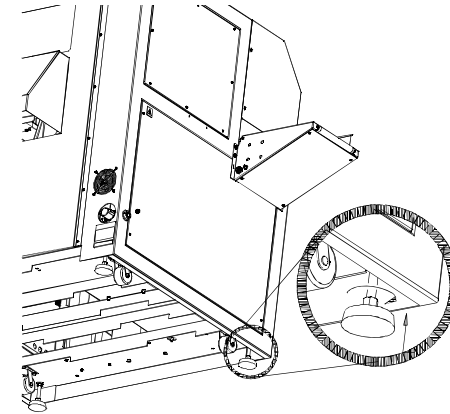


Figure 2-3. Leveling Pads

Push the CMT 130 into position. Do not lower the leveling pads at this time. Its final position may require slight adjustment depending upon the setup.

2.4 In-Feed/Exit Options

The CMT 130 can be used either in-line with a perfect binder or as a stand-alone trimmer. There are numerous possible combinations of in-feed and exit accessories. To set up either the Book Pile Feeder or the Vertical Stacker, see their manuals, F.501 and F.502 respectively. Common in-line and stand-alone options are presented here.

In-Line Option: 56600 Advanced Conveyor
56421 Cooling Elevator
56420 Exit Conveyor

Stand-Alone Option:
59200 Hand-Feed Conveyor
56420 Exit Conveyor

This In-Line Option may be configured with the Vertical Stacker in place of the Exit Conveyor. See F.502 Vertical Stacker manual to install the Vertical Stacker option.

The Stand-Alone Option may be configured with the Book Pile Feeder or Long Hand-Feed Conveyor in place of the Hand-Feed Conveyor. See F.501 Book Pile Feeder manual to install the Book Pile Feeder option.

2.4.1 In-Line Options

Use the following procedure to setup in-line options.

2.4.1.1 Advanced In-Feed Conveyor

1. The ledge on the right end cover should be set to about 13.5" (343 mm) from the floor. Adjust the leveling pads as necessary.

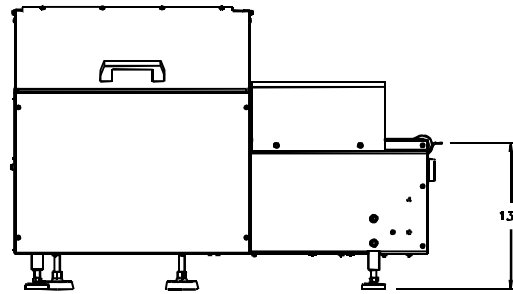


Figure 2-4. Height Adjustment

2. The Advanced In-Feed Conveyor is set in front of the binder such that adjustable portion of the conveyor is centered on the exit chute of the binder.
3. The adjustable portion should be set to the height of the bottom of the binder's exit chute. After adjusting the legs, lock into place with jam nuts.

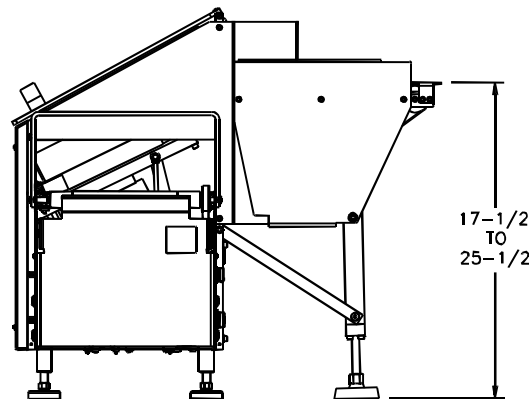


Figure 2-5. Adjustment Range

4. Move the entire conveyor close to the binder to minimize the distance between the adjustable conveyor and the binder's exit chute.

2.4.1.2 Elevator

1. The top shelf should be 36" (914 mm) from the floor as shown in Figure 2-8. Adjust the leveling pads as necessary.
2. Align the elevator with the in-feed conveyor by sliding the opening of the clear plastic cover over the in-feed conveyor's plastic cover.

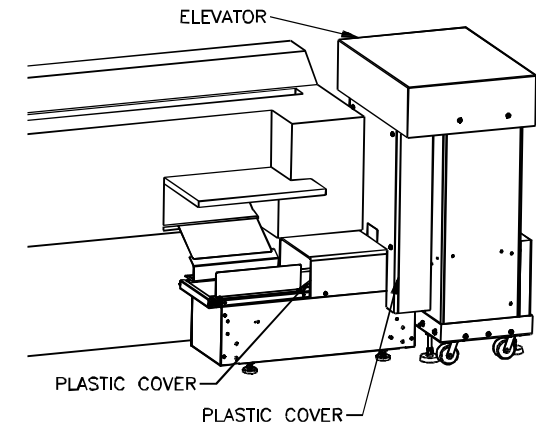


Figure 2-6. Elevator Placement

2.4.1.3 Trimmer

1. Install the in-feed bracket onto the left front door of the trimmer. Make sure the top of the bracket is flush with the trimmer's in-feed conveyor belt.
2. Remove the front cover of the trimmer and locate the loose photoelectric sensor. Remove the nuts from the sensor and push the sensor through the split bushing in the left side of the trimmer's base. Attach the sensor as shown in Figure 2-7. Attach the optional bar code scanner and sensor if applicable.

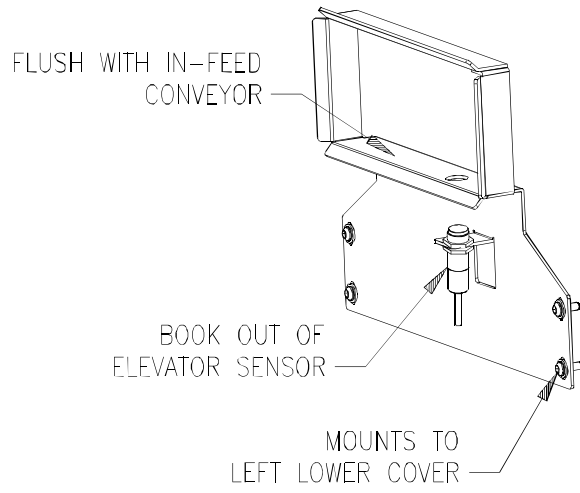


Figure 2-7. In-Feed Bracket

3. Move the trimmer next to the elevator such that the slots in the elevator mounting brackets (Figure 2-8) line up with the holes on the left side of the trimmer's sheet metal enclosure.
4. Adjust the trimmer's leveling pads such that the top of the table is 36" (914mm) off the floor.

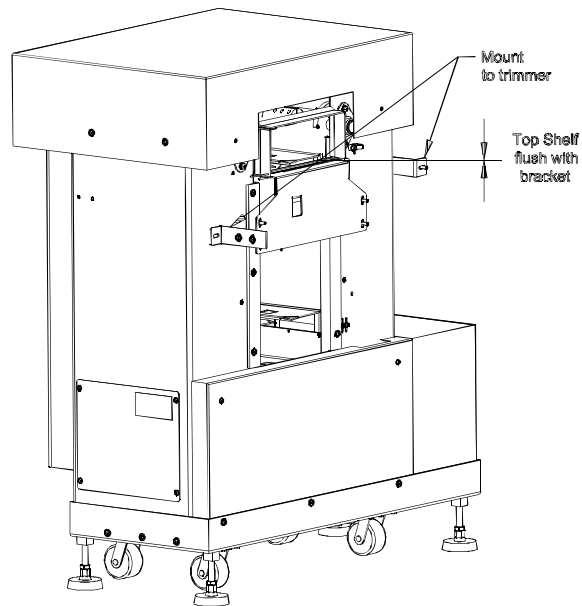


Figure 2-8. Elevator Mounting

5. Open the trimmer's front door and use a level on the table inside the machine. Level the front end of the machine by adjusting the leveling pads. Keep the final table height at 36".
6. Open the rear doors and repeat step 4 on the rear end of the machine.
7. Check the front end of the machine with the level to make sure the front is still level. Adjust as necessary.
8. Lock all (4) leveling pads in place by tightening the jam nuts against the inside of the machine's base as in Figure 2-9. The nuts are accessed from inside the machine.

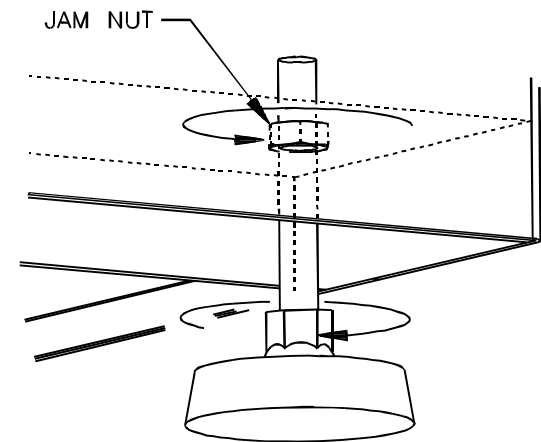


Figure 2-9. Tighten Jam Nuts

9. Fasten the elevator mounting brackets to the left side of the trimmer, Figure 2-8.
10. Connect shop air to the port at the rear of the trimmer. Refer to 2.6 on page 2-9.

At this point, the setup should similar to Figure 2-10.

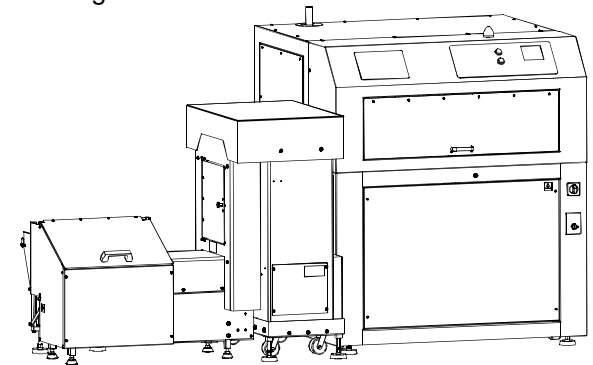


Figure 2-10. Current Progress

2.4.1.4 Exit Ramp (Standard Accessory)

Do not install the Exit Ramp if the trimmer has been purchased with either the optional Exit Conveyor (see next section) or the Vertical Stacker (see manual F.502). An Exit Ramp, 59093, is included as standard equipment with every trimmer. It may be used to deliver books to a collection device of your own design. Install the Exit Ramp to the exit conveyor side of the trimmer using (2) 1/4-20 button head cap screws with flat and lock washers as shown below.

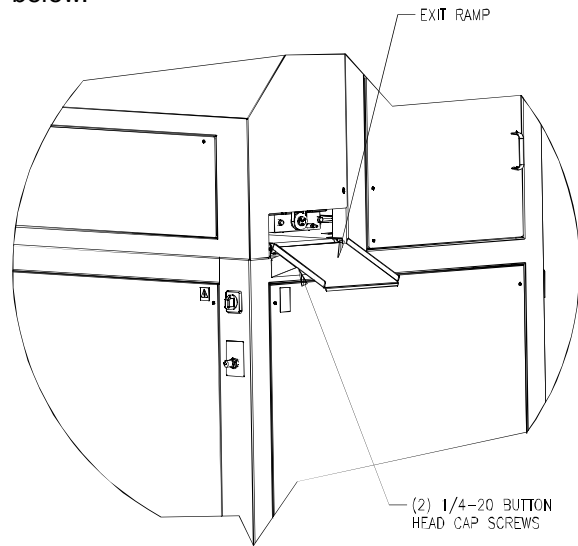


Figure 2-11. Exit Ramp- 59093

2.4.1.5 Exit Conveyor (Optional Accessory)

Before proceeding, go to Section 2.5 Power Hookup on page 2-7. Main power must be connected to the machine before proceeding.

1. Make sure the exit conveyor's leveling pads are set to 33-7/8" as shown in Figure 2-12. Adjust as necessary.

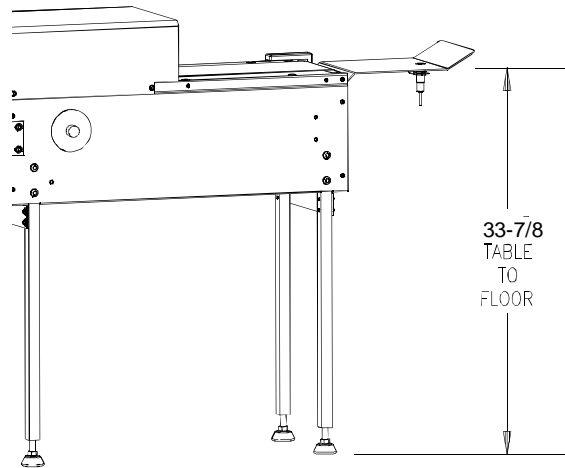


Figure 2-12. Exit Conveyor Leveling

2. Move the exit conveyor to the right-hand side of the as shown in Figure 2-13.

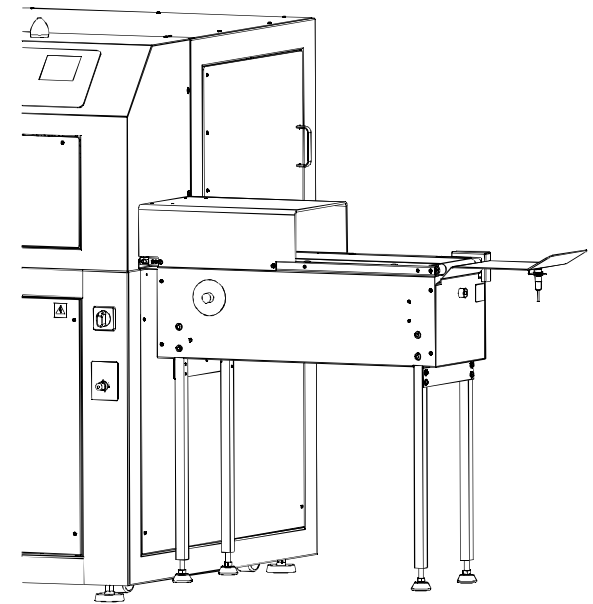


Figure 2-13. Exit Conveyor Placement

The completed setup should look like Figure 2-14. The accessory cables and hoses can now be connected to the trimmer.

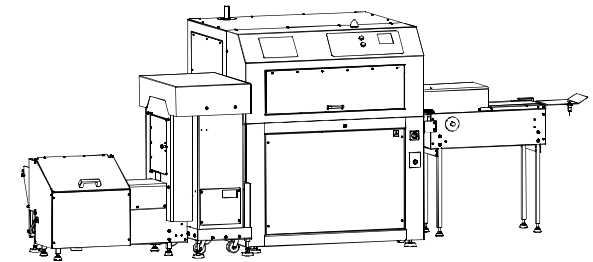


Figure 2-14. Completed Setup

2.4.1.6 Hookup Accessory Cables

Cables and air hoses must now be connected to the accessories.

Access the cables and hoses stored inside the machine through the front door.

In-feed Conveyor

1. Unwrap the two cables labeled In-Feed Conveyor.
2. Route the cable behind the hydraulic power unit and under the left-hand side of the machine base.
3. Connect the cables to the sockets on the backside of the in-feed conveyor. Lock into place by threading the connector collar onto the socket.
4. Connect the yellow cable from the Cooling Elevator to the in-feed conveyor.
5. If the Tilt In-feed Conveyor is being used, connect the air hose with the red cap to the port on the conveyor.

Cooling Elevator

1. Unwrap the cable labeled Cooling Elevator.
2. Route the cable behind the hydraulic power unit and under the left-hand side of the machine base.
3. Connect the cable to the socket on the backside of the elevator. Lock into place by threading the connector collar onto the socket.
4. Unwrap the two coiled hoses with quick disconnect fittings that have yellow and black caps. Route them with the cable from step 3.
5. Push the hose connector with the black cap into the fitting on the elevator with black label adjacent to it.
6. Push the hose connector with the yellow cap into the fitting on the elevator with yellow label adjacent to it.

Exit Conveyor

1. Unwrap the cable labeled Exit Conveyor.
2. Route the cable under the power panel enclosure and out the right-hand side of the trimmer base.
3. Connect the cable to the socket on the backside of exit conveyor. Lock into place by threading the connector collar onto the socket.

2.4.2 Stand-Alone Options

This option uses the hand-feed conveyor and exit conveyor options to make the CMT 130 a stand-alone trimmer.

Follow these steps to setup the stand-alone option.

2.4.2.1 Trimmer

1. Make sure there is adequate floor space for this setup. Figure 2-15 illustrates how much space this setup will require.
2. Move the trimmer to the appropriate location.
3. Complete steps 4-8, and 10 in section 2.4.1.3 on page 2-3.
4. Complete section 2.5 Power Hookup on page 2-7.

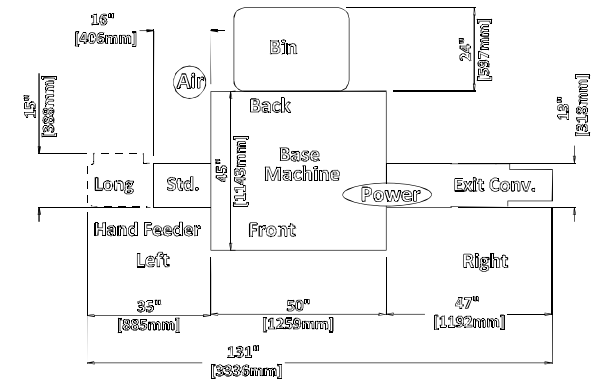


Figure 2-15. Stand-Alone Footprint

2.4.2.2 Exit Conveyor

Complete sections 2.4.1.4 Exit Ramp (Standard Accessory) on page 2-5. See manual F.502 if the Vertical Stacker option will be installed.

2.4.2.3 Standard Hand-Feed Conveyor

Mount the hand-feed conveyor to the in-feed side of the trimmer using (5) button head cap screws with flat washers and lock washers as shown in the diagram below. Adjust the hand-feed conveyor level with the in-feed conveyor inside the trimmer. Connect the (5) pin cable labeled Hand-Feed Conveyor from the trimmer to the hand-feed conveyor.

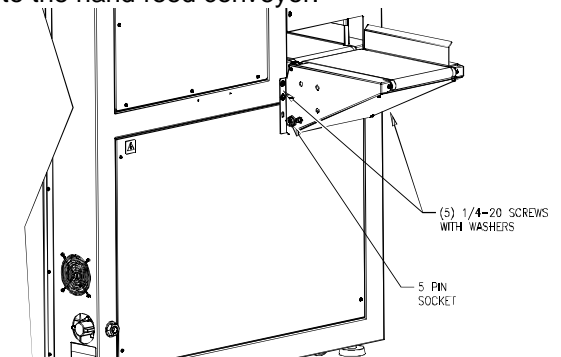


Figure 2-16. Std. Hand-Feed Conveyor

2.4.2.4 Long Hand-Feed Conveyor Option

1. Remove (3) sets of screws and washers fastened to the center of the door on the left-hand side of the trimmer as shown in Figure 2-18. Save them for later use.
2. Make sure the hand-feed conveyor's leveling pads are set at approximately 2-1/4" as shown in Figure 2-17.

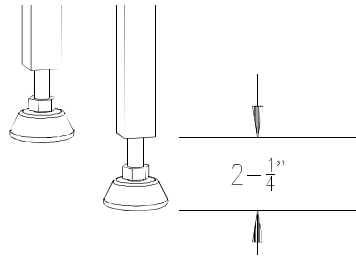


Figure 2-17. Long Hand-Feed Leveling Pads

3. Move the hand-feed conveyor to the left-hand side of the trimmer such that the slots in the conveyor mounting brackets line up with the holes in the Trimmer's left-hand door as shown in Figure 2-18 and Figure 2-19.

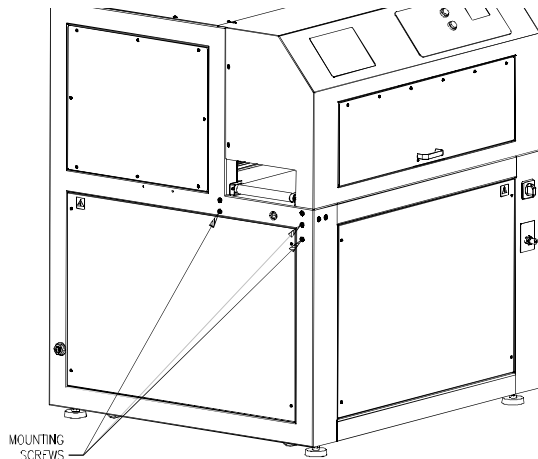


Figure 2-18. Long Hand Feed Mounting

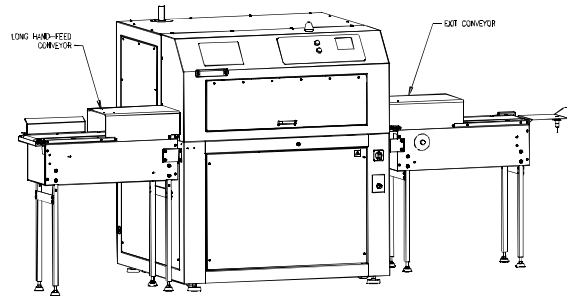


Figure 2-19. Example Stand-Alone Config.

4. Fasten the conveyor to the trimmer using the hardware from step 1.

2.4.2.5 Hookup Accessory Cables

Cables must now be connected to each conveyor.

Remove the lower front door from the trimmer to access the cables and hoses stored inside the machine.

Hand-Feed Conveyor

1. Unwrap the cable labeled In-Feed Conveyor.
2. Route the cable behind the hydraulic power unit and under the left-hand side of the machine base.
3. Connect the cable to the socket on the backside of Hand-Feed Conveyor. Lock into place by threading the connector collar onto the socket.

Exit Conveyor

To install the exit conveyor, follow the instructions in section 2.4.2.5 Hookup Accessory Cables / Exit Conveyor on page 2-6.

2.5 Power Hookup

This section describes how to hookup main power to the CMT 130. An adequate power supply must be provided to the machine. See section 1.7 Specifications on page 1-8 for power requirements. It should be on its own circuit with a lockable, disconnect switch. Too many machines on the same circuit will reduce power to each machine. Insufficient voltage may cause overheating, loss of cutting/clamping force, and in extreme cases, failure to operate. Test the line voltage when the shop is at actual working levels.

The following table lists recommended wire sizes for different voltage options. If a wire is run over 75 feet (23 meters), the next size wire should be used.

Recommended Wire Sizes for Main Power Hookup			
V	Circuit Size A	Wire Size # AWG	Metric Wire mm ²
380/415	15	12	4
230	30	10	6
208	30	10	6

2.5.1 Power Hookup Procedure

The following procedure describes how to hookup main power to the CMT 130. After power is hooked up, running the machine will verify if wires are correctly connected to the terminal block on the power panel.



WARNING

Shock Hazard! Always disconnect power at main disconnect switch before working on the trimmer. Lock it out to prevent accidental power up. See Power Lockout Procedure on page 1-4.

1. Locate the cover at the right-hand side of the machine.

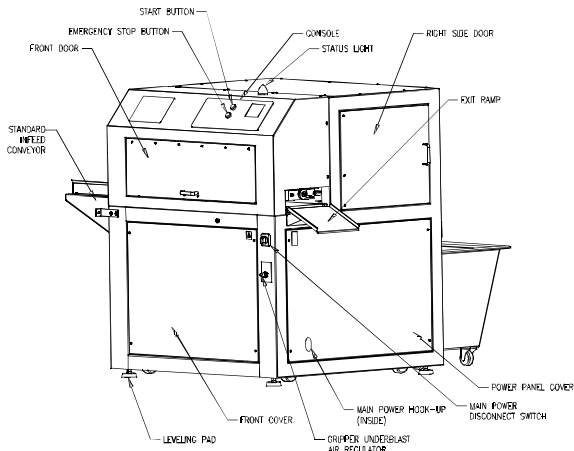


Figure 2-20. General Locations

2. Remove the four screws that mount the cover to the machine and set the door aside. The terminal block is located at the lower, left-hand corner of the power panel. The ground screw is located beneath the terminal block as shown in Figure 2-21.
3. Route the power cable under the right-hand side of the machine and behind the power panel enclosure.
4. Locate the cable hole in the back of the power panel enclosure. Mount a strain relief in this hole. Access this hole through the front cover of the machine.
5. Route the cable through the strain relief and through the access hole in the power panel.
6. Fasten the ground lead to the ground terminal lug, labeled GND in Figure 2-21.

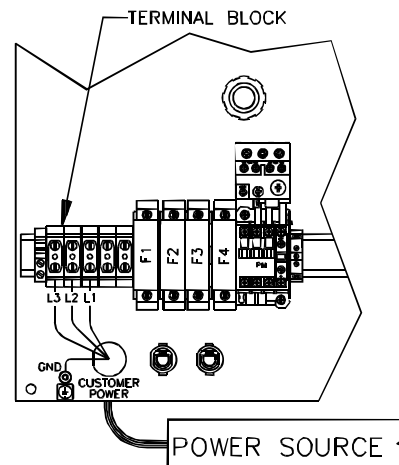


Figure 2-21. Power Panel

7. Fasten the three power leads to the three terminals **L1**, **L2**, and **L3** (Figure 2-21) on the main power terminal block.
8. Replace all covers. Make sure the shop air hose is connected to the machine and shop air is switched on. Switch the main, air disconnect valve to the on (**I**) position at the left rear corner of the machine. See Section 2.6 as necessary.
9. Unlock and switch on (**I**) the main power disconnect.
10. Switch on (**I**) the machine's power.
11. Press the green start button key on the console, shown in Figure 2-22. The hydraulic motor should turn on. The machine was shipped with all three knives in the down position. If power is hooked up correctly, the knives will automatically raise to the up position. If power is incorrectly connected, the knives will remain in the down position. Continue at step 12 if the knives do not

move to the up position. If the knives move, skip to step 15.

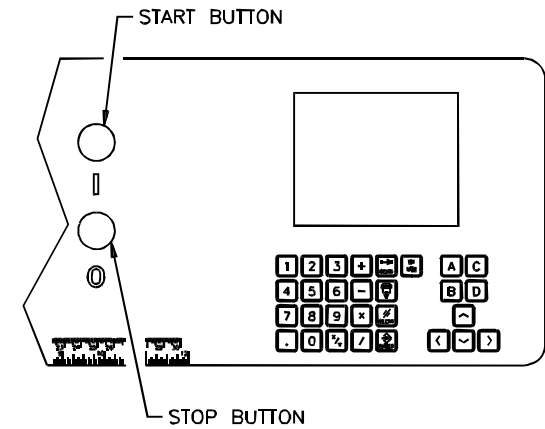


Figure 2-22. CMT 130 Console

12. Switch off (**O**) the main power disconnect switch and lock it out.
13. Remove the cover at the right-hand side of the machine.
14. Exchange any two of the main power leads at the terminals **L1**, **L2**, or **L3**.
15. Repeat steps 8-11.

2.6 Air Hookup

The CMT 130 requires 80-90 PSI regulated, dry, non-lubricated compressed air at a minimum of 5 cubic feet per minute (at 80-90 PSI). The required minimum air quality rating is ISO 8573.1 Class 2.4.2 (see chart below).

Air Quality Classifications ISO 8573.1 2001

SOLIDS		
ISO QUALITY CLASS	Particle size in microns	
1	0.1	
2	1	
3	5	
4	15	
5	40	
6	-	
WATER		
@ 100 psig Pressure Dew Point		
ISO QUALITY CLASS	°C	°F
1	-70	-94
2	-40	-40
3	-20	-4
4	+3	+38
5	+7	+45
6	+10	+50
OIL		
Including Liquid and Vapor		
ISO QUALITY CLASS	Mg/m ³	ppm
1	0.01	0.008
2	0.1	0.08
3	1	0.8
4	5	4
5	25	21
6	-	-

NOTICE: Failure to use dry, non-lubricated compressed air that meets or exceeds the above requirements may cause damage to the machine and will result in THE WARRANTY BEING VOIDED.

The main air connector shown in Figure 2-23 is a female 3/8 NPT port. A facilities maintenance technician should connect shop air using a male 3/8 NPT fitting using either Teflon thread tape or a liquid, pipe sealing compound.

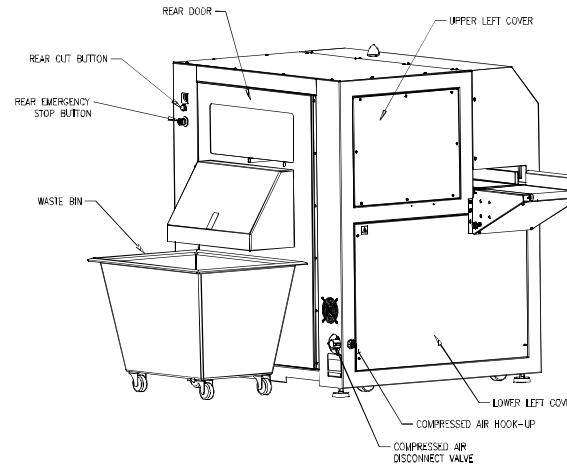


Figure 2-23. Main Air Connector

Using a flexible hose to connect the machine to shop air is preferred in case the location of the machine needs adjustment later. A line dropped from the ceiling is also preferred. Having the line off the floor keeps it clear of the waste bin.

2.7 Cleaning

It may be necessary to clean the machines after installation. They may be cleaned with a solution of dish soap and water. Do not use petroleum or acid based solvents to clean the machine. Damage may result.

NOTES:

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Introduction

The operator's guide provides instructions essential to operating the CMT 130 with each accessory option. These instructions include programming instructions and book size change-over, tasks.

3.1 Programming

The programming section gives detailed descriptions of how to efficiently program and store jobs within the CMT 130 computer.

3.1.1 Console Descriptions

The console is found on the front, right-hand side of the machine. General areas of the console are shown in Figure 3-1. The specific function of each key on the console is given in this section.

NOTE: Advanced operators may benefit from accessing the Service menu. To access the Service menu, select Service from the menu and enter 2.001 when prompted.

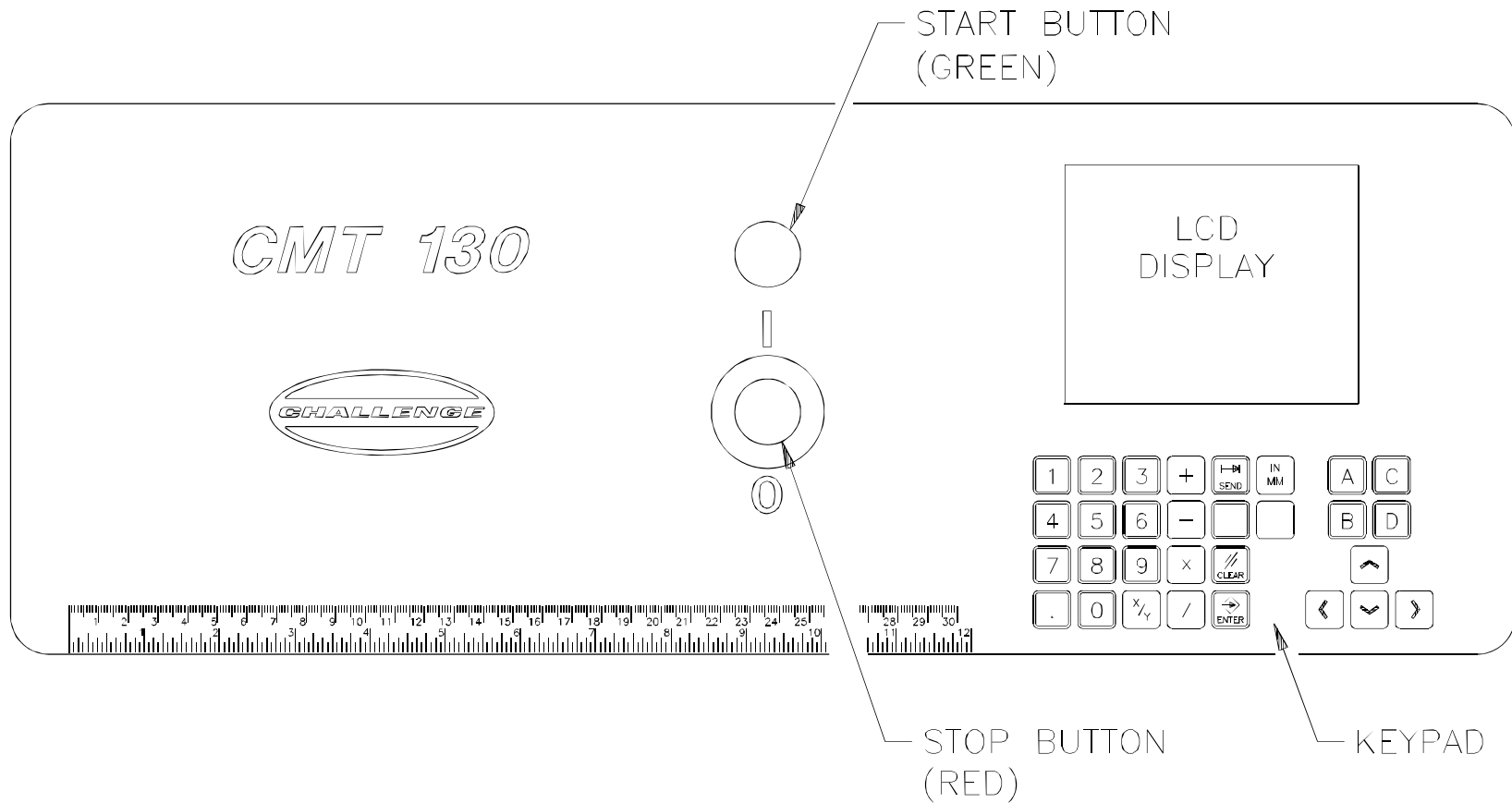


Figure 3-1. CMT 130 Console

IN/mm Scale

The IN/mm scale can be used for measuring the size of the start book while programming a job. The scale can also be used to verify the size of a trimmed book.

Start Button

The green start button is used to switch on the hydraulic pump and begin to trim books. A remote start button is located at the back of the machine.

Stop Button

The red stop button is used to switch off the hydraulic pump and stop trimming books. A remote stop button is located at the back of the machine.

LCD Screen

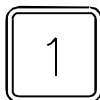
The LCD screen is used to program and view jobs. It also lists any errors or messages. A message is displayed on the screen when the status light on top of the machine blinks.

Keypad

The keypad is used to enter values into a program, scroll through programs, and navigate through maintenance screens.

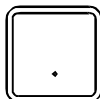
3.1.2 Key Descriptions

Number Keys



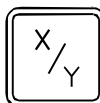
Number keys are used to write number values on the display.

Decimal Point



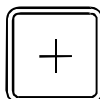
This decimal key is used to write a decimal point on the display.

Priority Add Key



The priority add key is used to input fractional numbers when combined with a whole number. An underscore (_) is displayed on the screen after the key is pressed. $1_1/2$ is an example of a number entered using the priority add key. This is equivalent to 1.500.

Addition Key



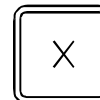
The plus key is used to add numbers in the display.

Subtraction Key



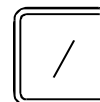
The minus is used to subtract numbers in the display.

Multiplication Key



The multiply key is used to multiply numbers in the display.

Division Key



The forward slash key is used to divide numbers in the display.

Send Key



The send key is used to instruct the computer to change the machine setup to match newly entered book dimensions.

Clear Key



The clear key is used to clear an entry value or clear a status message.

Enter Key



The enter key selects items in menu screens and processes data that has been entered in the other modes.

IN/mm Key



The units key is used to toggle between decimal inch, fractional inches, and mm units of length.

Soft Keys



The soft keys, or letter keys, are used to select screen menu options listed at the bottom of the display screen. The keys include the letters A, B, C, and D.

Up Arrow Key



The up arrow key is used to move the screen cursor up. It is also used to scroll forwards through the alphabet while naming a job.

Down Arrow Key



The down arrow key is used to move the screen cursor down. It is also used to scroll backwards through the alphabet while naming a job.

Right Arrow Key



The right arrow key is used to move the screen cursor right. It is also used to move the cursor to the right while naming a job.

Left Arrow Key



The left arrow key is used to move the screen cursor left. It is also used to move the cursor to the left while naming a job.

Entering Math

Rather than using a separate calculator, the CMT 130's computer can calculate lengths as you enter values. However, you should be familiar with the order of numerical operations if you intend to use this feature. Multiplication and division operations are always performed before addition and subtraction.

Example: You wish to enter a dimension, which is 8 inches, minus (2 times 1 and 5/32 inches), plus 1/2 inch. This sentence can be entered as: $8-2 \times 1_5/32+1/2$. The result is 6.188.

3.1.3 Using the Keypad

The following information briefly describes efficient ways to use the functions of the keypad.

Entering Fractions

Fractions are entered using the priority add key. The underscore symbol, $_$, is displayed when the key is pressed. This instructs the computer to add the fractional portion of the entry before performing the remaining math. This eliminates the need for parentheses.

Example: $3 \times 2_3/4 = 8.250$. If you use a plus instead of the priority add, the result would be $3 \times 2 + 3/4 = 6.750$.

3.2 User Interface Map

The following chart illustrates the organization of user interface screens encountered in the CMT 130 software.

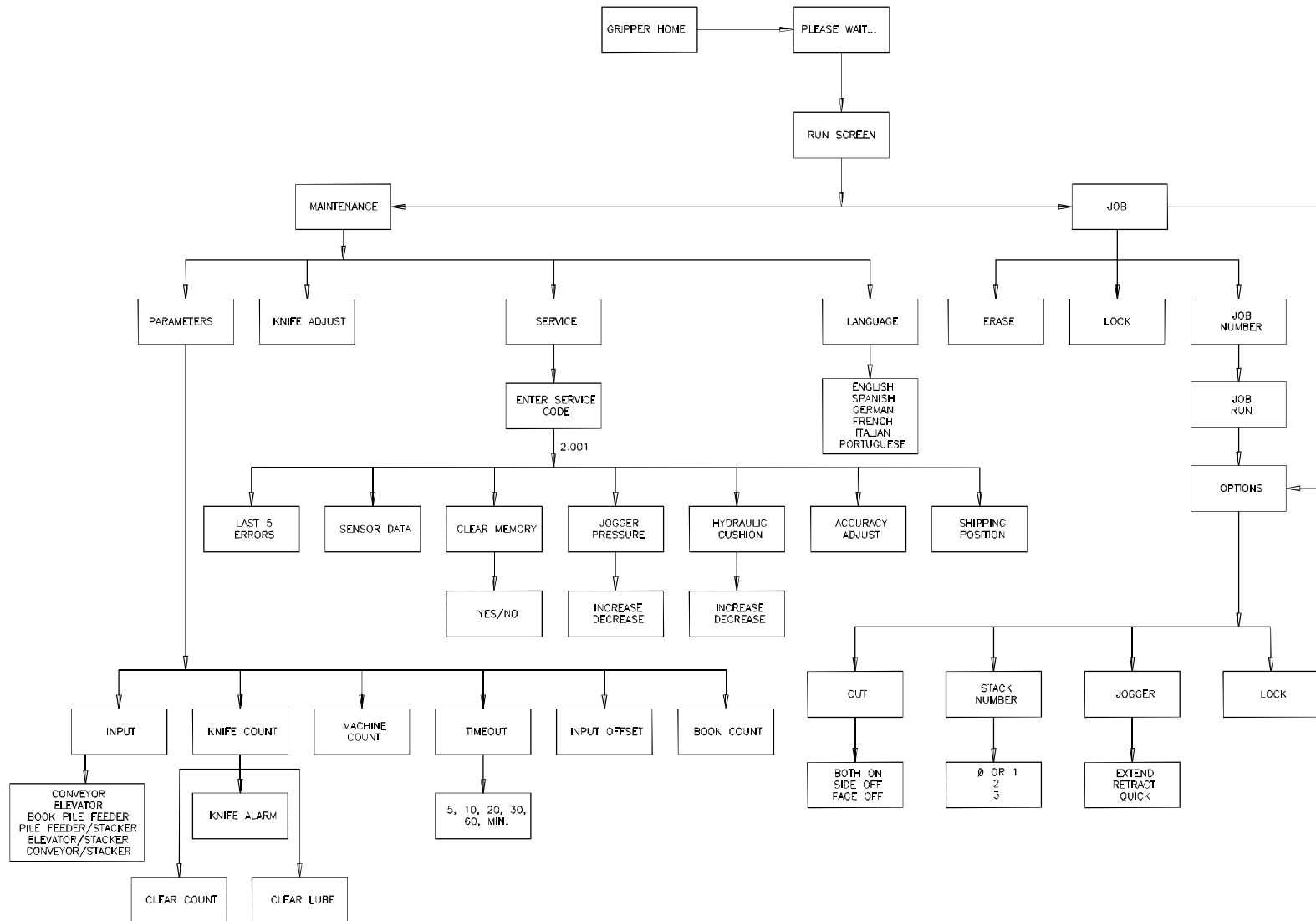


Figure 3-2. CMT 130 User Interface Map

3.3 Power Up

When the CMT 130 is switched on, the power up screen will appear.

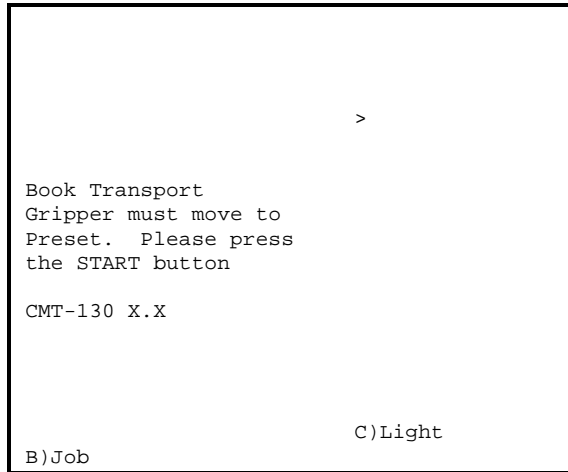


Figure 3-3. Start up Screen

Press and hold the green start button until the hydraulic motor starts. The following message will be displayed.

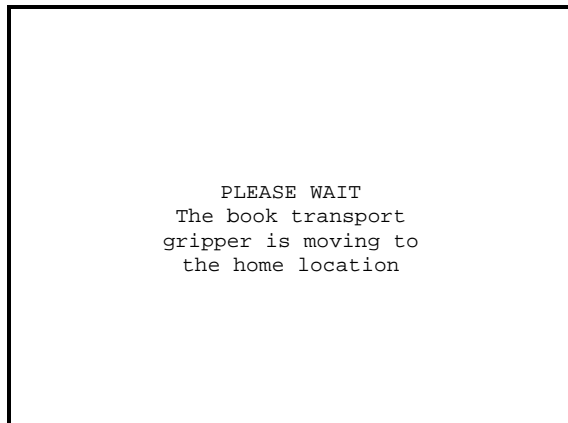


Figure 3-4. Start Prompt

The gripper will not move for approximately 3 seconds. The gripper will then move to approximately 1 inch (2.54 cm) in front of home position, past home, then to home.

3.4 Improper Wiring

If the knives do not move to the up position after power up, then the three phase power is connected incorrectly. The following message is displayed.

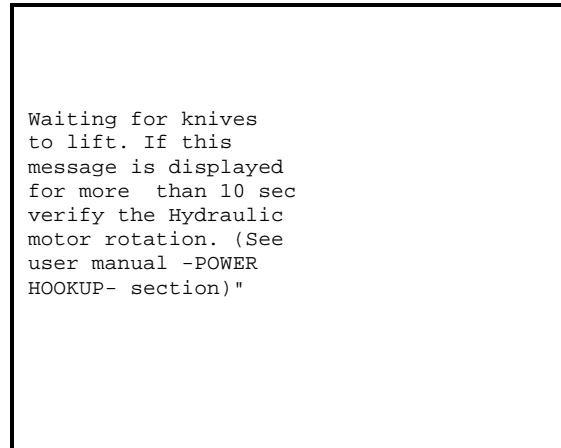


Figure 3-5. Power Hook Up Warning

See section 2.5.1 Power Hookup Procedure or page 2-7 to correct the wiring.

3.5 Run Mode

After the gripper reaches the home location, the Run screen will appear if there are no jobs stored in memory. Otherwise, the machine will initialize at the last job that was run. The conveyors will then start. The CMT 130 will sense incoming books and trim until the last book of that size is done.

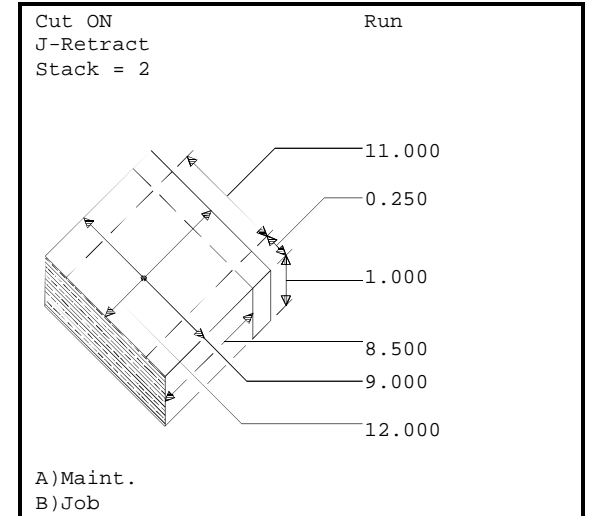


Figure 3-6. Run Screen

3.6 Job Mode

The CMT 130 can be programmed for up to 99 different jobs. A job is a particular book size including trim dimensions and options. Enter the Job screen by pressing the soft-key B. In the Job screen, all previously programmed job numbers will be displayed with their name and lock status. Locked jobs are indicated by a padlock symbol after their name. A plus sign at the bottom of the job list indicates there are more programmed jobs that are not displayed. Pressing the down arrow key will step through all jobs, one at a time. Pressing the left arrow key and the down arrow key simultaneously will move the cursor down the list nine at a time.

```
>
1 Name1
2 Name2
5 Name5
11
12
18 Name18
25
33 Name33
+
Select Job & Enter

A)Lock                               C)Erase
```

Figure 3-7. Job Screen

3.6.1 Creating a Job

To create a job, enter an unused job number between 1 and 99 inclusive. The job number is created with a blank name.

3.6.2 Editing a Job Name

The job name is edited in the job mode screen. To edit the name, use the up/down arrow keys to move the cursor to the appropriate job number. Then press the right arrow key to move the cursor to the desired character position and edit the character by pressing the up or down arrow keys to toggle between characters of the alphabet. Numbers can be entered directly by using the number keys. Pressing the clear key clears the current character. When finished, you may edit the current job by pressing the enter key, go to a different job, or exit job mode.

3.6.3 Lock/Unlock a Job

Locking a job prevents it from being edited. In the Job screen, the soft-key "A" will display Lock or Unlock depending on the status of the job. If a job is locked, the padlock symbol will be displayed at the right of the job name. To change the lock status of a job, move the cursor to the appropriate job using the up/down arrow keys, and press the soft-key "A" (Lock/Unlock).

The locking function may also be accessed through the Job Options menu (section 3.6.7) in the Job Run screen as shown in Figure 3-8.

3.6.4 Erasing a Job

Erasing a job will permanently remove it from memory. Use the arrow keys to select a job to be erased. Press the soft-key "C" (Erase). Clear channel # is displayed, followed by Yes and No. Use the up/down arrow key to select either yes or no, then press enter. Note that locked jobs cannot be erased.

3.6.5 Editing a New Job

To edit a new job, type in a number that is not already assigned to a job and press enter (en-

tering a job number greater than 99 will create #99). The cursor will move to the line corresponding to the number you entered, prompting you for a job name. If a job name is not desired, pressing enter again brings up the job edit screen.

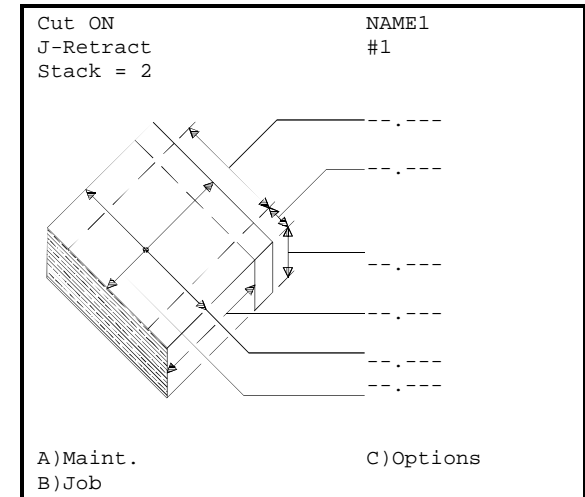


Figure 3-8. Job Run Screen

Use the arrow keys to move the cursor to the dimension to be edited. Type the dimension value, then press enter.

All dimensions must be supplied, or the job will not run. If the book size is outside the machine specifications, the message, BOOK SIZE CANNOT BE TRIMMED, is displayed. Refer to section 1.7.1 for sizes that can be cut.

3.6.6 Editing an Existing Job

If the job is not locked, it may be edited from either the Run screen or the Job Run screen. Using the arrow keys, move the cursor to the dimension to be changed. Enter a new value.

If the job is locked, it must be unlocked before editing. See section Lock/Unlock a Job.

3.6.7 Job Options

Each job has three options that are listed in the upper left corner of the display. These are Side Cut (ON/OFF), Jogger (Extend/Retract), and Stack number (1-3). To edit these options press the C key from the Job Run screen shown in Figure 3-8.

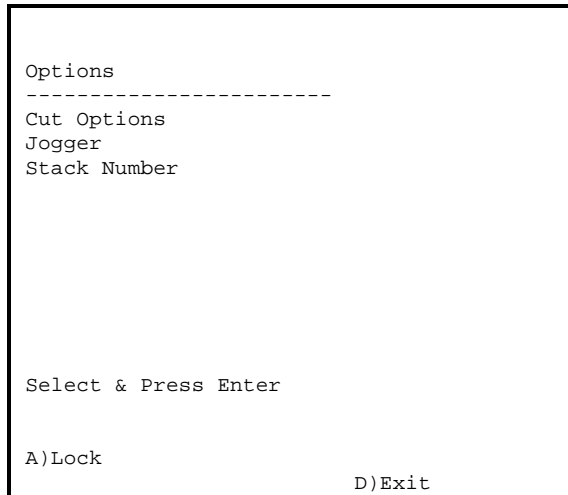


Figure 3-9. Job Options Screen

Use the up/down arrow keys to select the option and press enter to set the option.

3.6.7.1 Side Cut

When Side Cut is set to On, both the sides (top and bottom) and the face of the book are cut. When the Side Cut option is set to Off, only the face is cut. The side cut menu screen is shown below.

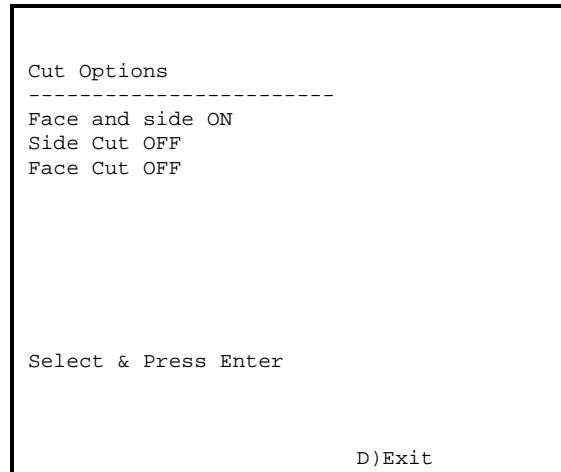


Figure 3-10. Side Cut Option Screen

3.6.7.2 Jogger

This parameter sets the jogger to remain extended as a book leaves the jogging station or retract immediately. In the jogger screen, use the up/down arrow keys to toggle the required jogger action and press enter.

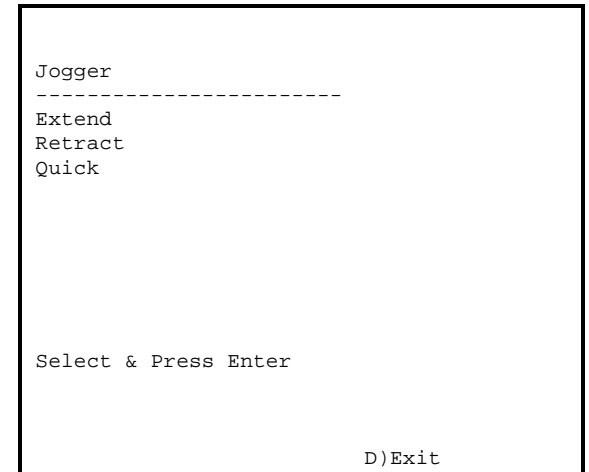


Figure 3-11. Jogger Option Screen

When cutting very thin books with overhanging covers, the jogger option should be set to Extend. Otherwise, it should be set to Retract.

3.6.7.3 Stack Number

This parameter sets the number of books to be stacked at the infeed conveyor before it is incremented. It can range between 1 and 3.

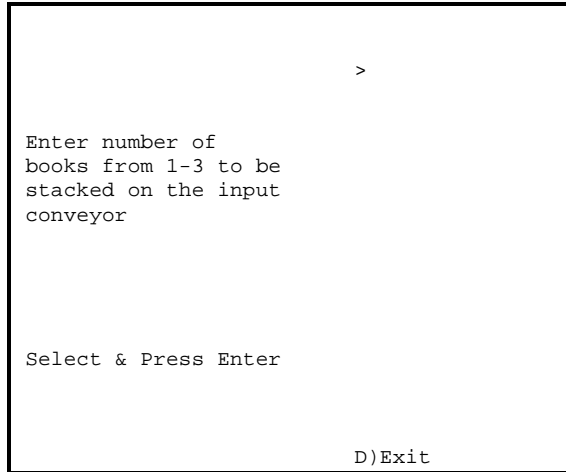


Figure 3-12. Stack Number Option Screen

This option is used to engage the face jog when running 2-3 books stacked.

3.6.8 Running a Job

The job must first be opened from the Job screen by using one of two methods:

1. Move the cursor to the desired job with the arrow keys and press enter.
2. Enter the job number with the keypad and press enter.

Once a job has been opened, the current job name and number will be displayed in the upper right corner. Press the green start button on the console to start the hydraulics and conveyors. Press the send key to set the side knives and the registration assembly to the proper position.

Once the motors start, books can be fed into the machine.

3.6.9 Closing a Job

To close an open job, press the soft-key B (Job) to return to Job mode, or press the soft-key D (Exit) to exit to the Run screen.

3.6.10 Service Code 2.001

Advanced operators may benefit from accessing the Service menu. To access the Service menu, select Service from the menu and enter 2.001 when prompted.

Incorrectly modifying settings in the Service menu can decrease quality and performance. Service menu options should not be altered without the advice of a qualified technician or factory representative.

If the Service menu options have been altered and the settings cannot be restored manually, the machine can be reset to factory defaults automatically. Resetting factory defaults will clear all jobs, custom settings and, most critically, the accuracy adjustment.

3.6.11 Resetting to Factory Defaults

The machine should only be reset to factory defaults under supervision of a qualified service technician or factory representative. The procedure for resetting factory defaults includes clearing all memory and reprogramming accuracy adjustment, jogger pressure, and hydraulic cushioning.

3.7 Status Messages

Message	Description
Book jam between CMT and elevator	Book was covering upper elevator sensor when the book was trying to lift.
Book elevator FAILED to lift to the proper level	The shelf level proximity sensor did not activate properly or in time. This can be caused by either a misadjusted or a faulty proximity sensor.
Clamp/knife down	The side knife was down while the side knives or registration assembly was moving.
DATA IS OUT OF RANGE	This error message displays when the operator tries to send either the knives or the registration assembly to a position that is out of range.
Elevator book jam. Check book in elevator sensor.	Book did not clear the sensor in time.
Knife latch error OFF when it should be ON	The knife latch proximity did not activate. This can be caused by a misadjusted or faulty sensor, or the air cylinder did not pull in.
Knife latch error ON when it should be OFF	The knife latch proximity sensor did not de-activate. This can be caused by a misadjusted or faulty proximity sensor, or the air cylinder did not extend.
Knife at down limit failed to move	This message displays when the knife fails to leave the down proximity sensor. It may be caused by either the cut valve not de-energizing or a faulty down limit proximity sensor.
Knife at up limit, Failed to move	This message displays when the knife fails to leave the up proximity sensor. There are four possible reasons for this failure: The dump valve did not energize, the hydraulic cushion valve did not energize, the knife down valve did not energize, or the side knife up proximity is faulty.
Knife down FAILURE timed out before reaching down limit	This message displays when the knife leaves the up limit but does not reach the down limit in time. If the knife went down, the proximity sensor is either faulty or misadjusted. If the knives only moved down slightly, either the dump valve or the proportional valve may not have energized.
Knife up FAILURE timed out before reaching up limit	This message displays when the knife does not reach the up limit in time. The proximity sensor is either misadjusted or faulty.
Slow down Failure	The slow down proximity sensor did not respond before the down proximity sensor. The knife slow down proximity sensor is either misadjusted or faulty.

Status Messages Continued

Message	Description
Input jam. Book was lost between binder & elevator	A book was detected on the in-feed conveyor but did not reach the elevator.
Input JAM Conveyor and Lift sensors are active	Both the proximity sensors on the elevator and on the input conveyor were on for more than three seconds.
Input door open	A door on either the Tilt In-feed conveyor or the Elevator is open, or the interlock circuit is open.
Jogger error! OUT when it should be IN	Jogger cylinder was out when it should have been in. Output 18 is off but input 12 shows jogger extended.
Jogger error! IN when it should be OUT	Jogger cylinder was in when it should have been out. Output 18 is on but input 12 shows jogger retracted.
Lost book in machine	The book proximity sensor deactivated during a cycle. The book may not have been gripped properly due to bad feeding. Stray pieces of scrap may also cause this error.
Lower door is Open	One of the three waste bin doors is open.
Lubricate Machine	The number of machine cycles has exceeded that which is recommended for lubrication. It is time to lubricate the machine.
Memory failed	One of the four EEPROM chips on the CMT controller board is faulty.
Motor starter error! ON when it should be off	Motor starter was on when it should have been off. Output 11 off with input 24 on.
Motor starter error! OFF when it should be on	Motor starter was off when it should have been on. Output 11 on with input 24 off.
NO Air Pressure	This error message displays when the air pressure falls below 20 PSI (1.4 Bar).
Number outside limit	The value entered is not valid.
OUTPUT CONVEYOR FULL	The output conveyor proximity sensor is covered.
Positioning error	This message displays after three failed attempts are made to position either the side knives or the registration assembly. It may be caused by a faulty drive motor, faulty encoder, or a loose connection between the motor and the lead screw.
Result is negative	This warning displays when a calculated result is a negative value.
Send canceled!	This message is displayed when a key is pressed while the side knives or registration assembly is moving.
Servo Disabled	This message is given when the hydraulic motor is off and the gripper is issued a move command. It is typically caused by pressing the stop button in the middle of a book cycle.
Sharpen Knife	The number of machine cycles has exceeded that which is recommended for a knife change. It is time to change knives.
Shorted Key error	A key on the keypad has been actuated for more than 90 seconds.
Side knife latch failed to disengage	The side knife latch proximity sensor did not activate. This can be caused by a faulty or misadjusted proximity sensor. The air cylinder may have failed to pull in.

Status Messages Continued

Message	Description
Serial Communication Port Failed	The external control port is not working properly.
Serial error no response from the servomotor	The servo control port is not working properly.
Servo Port Failed	RS-232 port controlling the servo drive failed.
Servo Relay Error! ON when it should be off	Output 11 is off and input 23 is on.
Servo Relay Error! OFF when it should be on	Output 11 is on and input 23 is off.
Start Button Held in at power up	Either the start button or remote cut button is being held in. Either button may be faulty.
Stop button pressed	Either a stop button is pressed or one is faulty.
Upper door is Open	One of the upper doors is open.

3.8 Example Job

This example will step through a typical in-line job. An in-line job uses the in-feed conveyor to accept books from a perfect binder. The in-feed conveyor transfers books into the elevator. The elevator feeds books into the trimmer. The trimmer then drops books onto the exit conveyor.

This example will trim a 1" thick, 9" x 12" book to 8.5" x 11". The right side trim will be 1/4" as shown below.

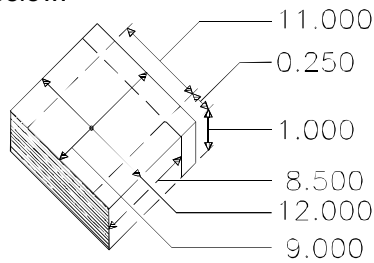


Figure 3-13. Example Book Dimensions

Preparation

Before books are printed, the document layout should be checked against the Book Size Chart on page 1-9.

Draw a vertical line, up from $x=0.25$ as shown in Figure 3-14. Draw a horizontal line, right from $h=8.5$. The lines intersect within the shaded region; therefore, the layout is acceptable.

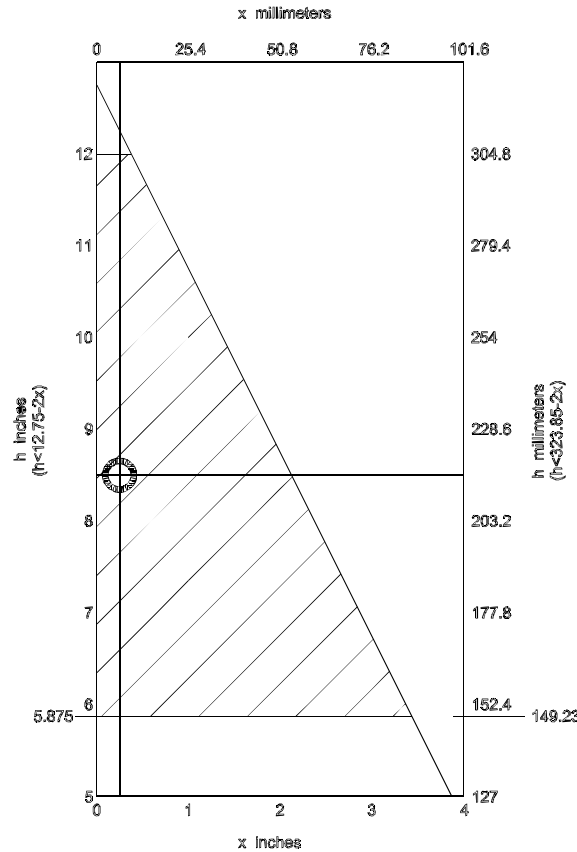


Figure 3-14. Book Chart

Program the Job

Switch on the trimmer and press the green start button. Allow a few seconds for the gripper to find home position. The screen will look similar to Figure 3-15.

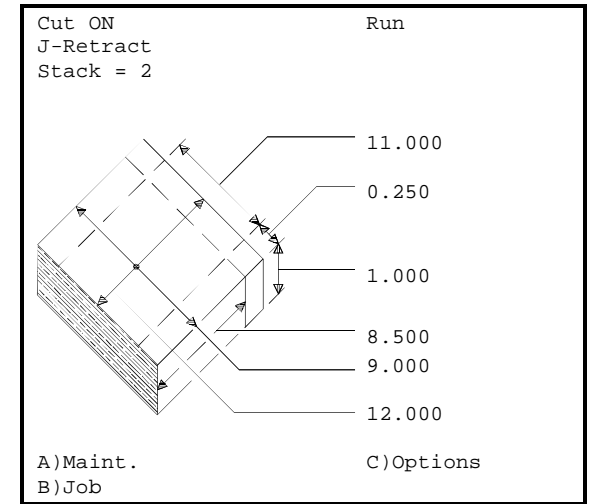


Figure 3-15. Example Start Screen

Press soft-key B to enter the Job screen. The display will look similar to Figure 3-16.

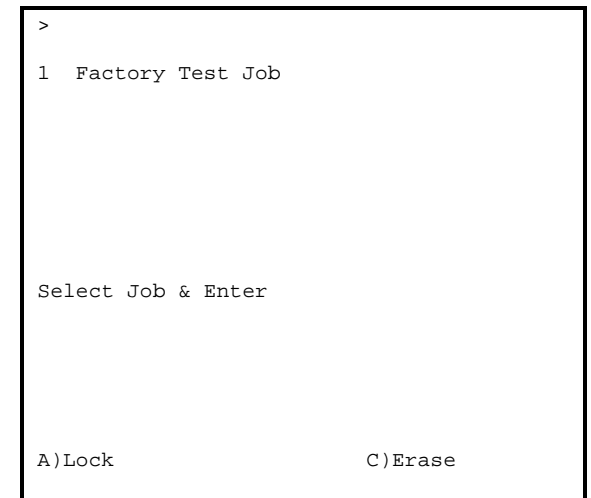


Figure 3-16. Job Screen

Create a new job number by typing a number from 2 to 99, then press the enter key. The screen will then look like Figure 3-17.

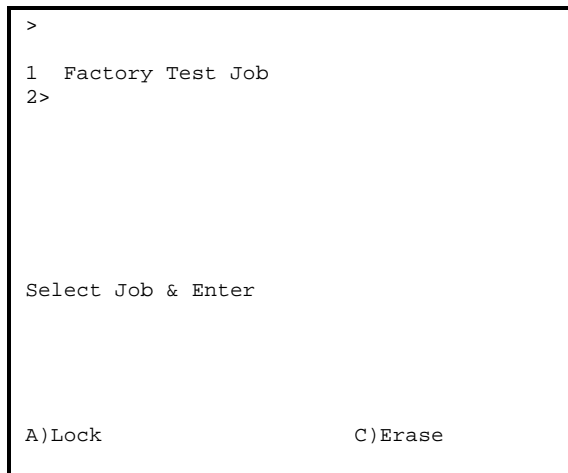


Figure 3-17. Job Number

Name the job. Use the right arrow key to move the cursor at least one space to the right. Use the up/down arrow keys to cycle through the alphabet. After arriving at the desired letter, symbol, or number, press the right arrow key to move to the next character field. Continue until the name is complete. The screen looks similar to Figure 3-18.

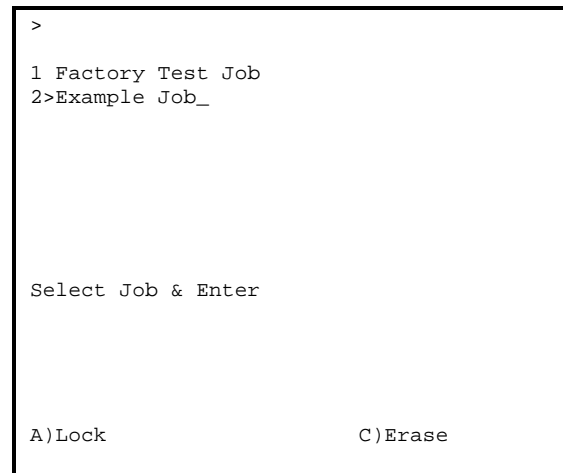


Figure 3-18. Job Name

After the job has been named, press the enter key to enter the book dimensions into the job. The screen looks similar to Figure 3-19.

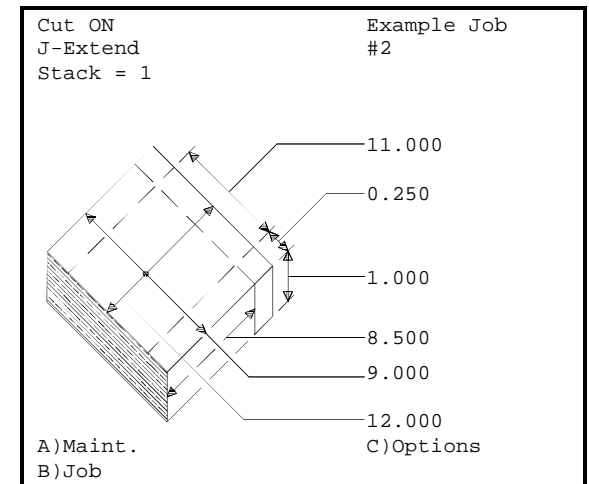


Figure 3-19. Job Run Screen

After all values have been entered, press the send key. The side knives will move into position followed by the registration assembly.

The job can now run. Before running books through the binder, press and hold the green start button on the console. Release the button when the hydraulics and conveyors start. Begin running books.

3.9 Serial Communication

Note: -Approximate time per book with size change 26 seconds
-Approximate time per book no size change 13 seconds

To switch between Serial Mode On and Serial Mode Off, switch off the machine. Hold down the left and right arrow keys, and switch on the machine. Select On or Off from the menu. Switch the machine off and then on again.

1. Physical connection

- 1.1 Standard PC Com port to CMT130. --- DB9 male/Female Null Mode Cable
9600 baud
1 stop bit
8 data bits
no Parity
no Flow control

2. Message Format

- 2.1 All messages start with ASCII -- 1010FF
- 2.2 All messages end with a Longitudinal Redundancy Check (LRC) Value. This value is calculated from the first byte of the Start sequence to the last byte of the data after the messages has been converted from ASCII to hex. Example 1010FF (0x31,0x30,0x31,0x30,0x46,0x46) becomes (0x10,0x10,0xFF).
- 2.3 All message are formatted as follows

```
Text Start-----  
1010FF  
Sequence number-----  
00-FF  
Message type-----  
see following information
```

```
Data length-----  
00-FF  
Message type sub code 1-----  
see following information  
Sub code 1 data length  
(Optional) Message type sub code 2  
Sub code 2 data length  
(Optional) Message type sub code (n)  
Sub code n data length  
(LRC)-----  
XOR of the first byte to the last  
(ASCII Carriage Return)-----  
0x0d  
(ASCII Line Feed)-----  
0x0a
```

3. Error Detection

- 3.1 All messages are responded to with an positive or Negative acknowledgment
 - 1) Positive Acknowledgement (ACK)— 10100600(CR)(LF)
 - 2) Negative Acknowledgement(NAK)-- -10101500(CR)(LF)
- 3.2 The receiver shall send a (NAK) response if the calculated LRC does not match the incoming value.
- 3.3 The receiver shall send a NAK response if the header is not 1010FF.
- 3.4 If a NAK is received the sender shall wait 150ms before retransmitting the message.
- 3.5 After 3 NAK's in a row an unrecoverable error should be declared.
- 3.6 An ACK shall be sent in 50ms after a good message is received. After 250ms NAK is assumed.

4. Command Codes and Sub Codes

4.1 Host command - Wake Up (00)

- 4.1.1 Sub Code (10) request Machine information and reset message sequence number.
Example ---
1010FF02000110EC(CR)(LF)

4.2 CMT130 - Response to Wake Up (60)

- 4.2.1 Sub Code (10) Description of product "trimmer "
- 4.2.2 Sub Code (11) Software level "3.3"
- 4.2.3 Sub Code (12) Brand "Challenge"
Example-
1010FF02601910087472696D6D65722
01102030312094368616C6C656E6765
8F(CR)(LF)

4.3 CMT130 - Serial Initialize (55)

- 4.3.1 Sub Code (01) Ready to Communicate Sent at power On
Example-1010FF01550101AB

4.4 Host command - (66)

- 4.4.1 Sub code (10) Start Enable Process
Example-1010FF026601108A(CR)(LF)
- 4.4.2 Sub code (11) Temp Stop Hold Process
Example-1010FF026601118B(CR)(LF)

4.5 Host Command- (04)

- 4.5.1 Sub Code (21) Job number (1-99)
- 4.5.2 Sub Code (22) Bottom Trim (0.1inch – max) (X 1000 no decimal point) 0.100in=0064
- 4.5.3 Sub Code (23) Trimmed Book Height (5.875-12.000in) (16F3-2EE0)
- 4.5.4 Sub Code (24) Trimmed Book Width (4.000-9.000in) (0FA0-251C)
- 4.5.5 Sub Code (25) Book Thickness (0.100-2.000)(0064-07D0)

4.5.6 Sub Code (26) PreTrimmed
Book Height (7.000-
12.500)(1B58-30D4)

Example-

1010FF0204172101032202006423022AF8
24022328250201F4260230D445(CR)(LF)

4.5.7 Sub Code (30) Current Job
Data Request will respond
with code (64) data

Example-1010FF02040130C8(CR)(LF)

4.6 Host command- (03)

4.6.1 Sub Code (13) Initiate/Eject
Book

Example-1010FF01030113EF(CR)(LF)

Section Contents

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Introduction

Certain tasks will be performed on a regular basis but not necessarily on a set schedule. The safety systems check, however, should be done before each shift. The waste bin must be emptied when full. The knives should be replaced when cut quality becomes unacceptable. Performing as many of these tasks before a shift begins prevents down time while a job is in progress and ensures safe operation of the machine.

4.1 Under Book Air Blast

The under cover air blast may require adjustment depending on the thickness of books being trimmed. The blast reduces scratching of the bottom cover as the books moves through the machine.

The valve is located on the left-hand side of the machine.

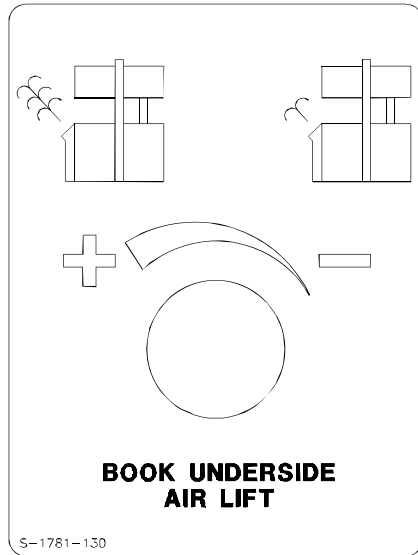


Figure 4-1. Underside Air Blast

For thicker books, adjust the valve counter-clockwise. Adjust the valve clockwise for thinner books.

4.2 Waste Bin

The waste bin may require emptying in the middle of a shift, but it is a good idea to do it before a shift begins. The computer will NOT indicate when the waste bin is near capacity.

Use the following procedure to change the waste bin.

If running, stop the machine's cutting mode by pressing the red stop button on the console shown in the following figure.

1. To preserve the status of each book in the job, press the stop button after the gripper transport releases a trimmed book, but before it clamps the next untrimmed book. If the untrimmed book is clamped by the gripper transport and not trimmed, it will be ejected when the machine is restarted. The book can be manually placed onto the in-feed to be trimmed later.

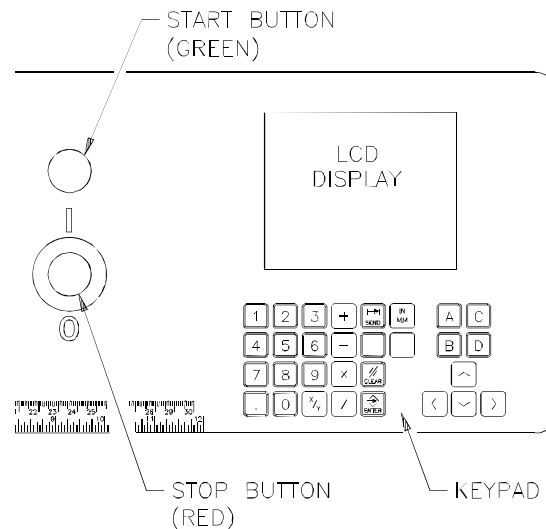


Figure 4-2. Stop Button Location

2. Remove the waste bin and replace with an empty one.
3. After replacing the bin, press the green start button to continue.

Using additional waste bins will reduce down time. To order additional waste bins, use Challenge part number, **41058**.

4.3 Cut Stick

The cut stick should either be changed or rotated with every knife change. They may also require changing at other times if deep grooves or jagged edges can be seen along the score marks. Cut stick wear directly effects cut quality.

4.3.1 Changing the Cut Stick

The cut stick can be rotated 8 times before disposal. It is located under the knife, accessed through the door at the rear of the machine. The cut stick puller provided with the machine is used to remove the cut stick. The cut stick and other tools are located on the inside of the rear door. The cut stick puller has a finger hold and hook as shown in Figure 4-3.

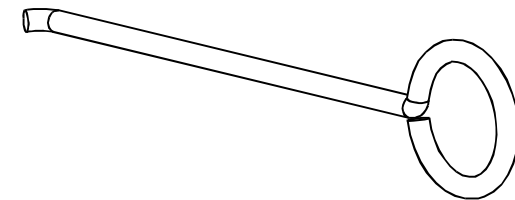


Figure 4-3. Cut Stick Puller

1. Switch off (O) main power at the front of the machine and lock out the main power disconnect switch as described in section 1.5 Power Lockout Procedure on page 1-4.
2. Move the waste bin aside and open the rear door.
3. Hook the Cut Stick Puller over one of the ends of the cut stick with a finger in the loop of the puller. Keep the Cut Stick Puller in-line with the cut stick.
4. Pull the Cut Stick Puller at a slight angle over the cut stick until the end of the cut stick comes out of the table.

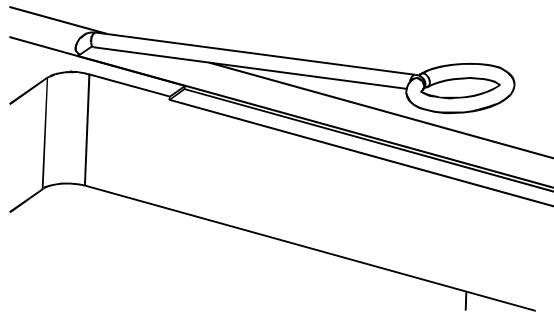


Figure 4-4. Pull at slight angle

5. Remove the remaining cut stick from the table by hand.
6. Inspect the cut stick for wear. It may be used 8 times (twice on each surface) before disposal. To use a surface twice, reinstall the cut stick by turning it such that end that came out of the right end of the slot goes into the left end of the slot. If a surface has been used twice, rotate the stick to an unused surface before reinstalling. If all (4) surfaces have been used twice, replace the stick with a new one.

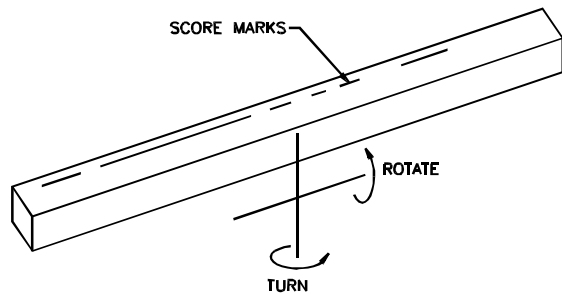


Figure 4-5. Cut Stick Rotation

7. Securely close the door and replace the waste bin.
8. Unlock the main power disconnect and resume operation.

New cut sticks may be purchased from your Challenge dealer using part number **59050**.

4.4 Knife

The knife should be changed when cut quality becomes unacceptable. By default, the computer will issue a Sharpen Knife alarm after 40,000 cuts if DMD knives were installed, 15K cuts for HSS or 30K cuts for carbide. The most appropriate number will vary depending on the type of paper stock being cut. Refer to the Operator's Guide for instructions on changing the value for the Sharpen Knife alarm.

CAUTION

The knives must be adjusted after every knife change. Improper knife adjustment may cause damage to the machine.

4.4.1 Knife Change

A stable rolling cart, approximately 36" tall, the knife lifter, the T-handle hex wrench, an empty scabbard, and a sharp knife are required to perform a knife change.



WARNING

Changing knives can be very dangerous unless safety precautions are observed and extreme care is taken when handling knives. Keep handling of unprotected knives to an absolute minimum. Have the scabbard nearby and insert knife immediately. Warn people of any unprotected knife.



WARNING

Knife changing is a **ONE PERSON OPERATION!** More than one person changing a knife creates safety hazards.



WARNING

Even used knives are extremely sharp! Use extreme care when handling new/re-ground knives and used knives.

The following procedure should be used to change knives.

1. Switch off (O) main power at the front of the machine and lock out the main power disconnect switch as described in section 1.5 Power Lockout Procedure on page 1-4.
2. Place an empty scabbard on a rolling cart.
3. The knife is located behind the rear door shown in Figure 4-6.

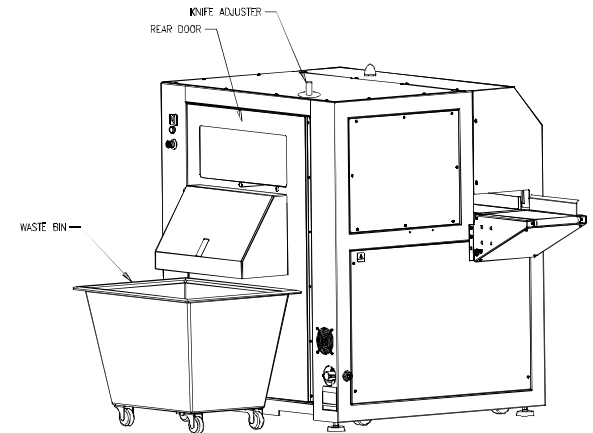


Figure 4-6. Knife Location

4. Remove the waste bin and open the door to access the knife.
5. Using the T-handle hex wrench, remove the **two** knife bolts that are in open slots in the knife bar. They are the second and sixth bolts from either end of the knife. Set the bolts aside and save for knife installation.

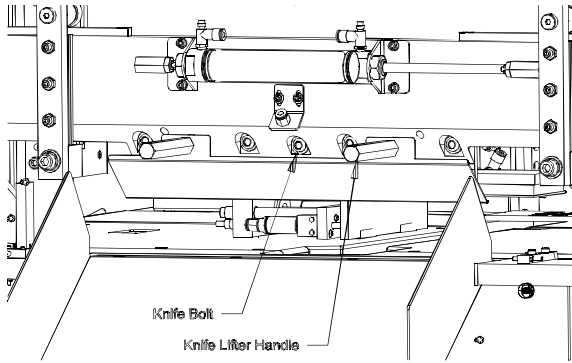


Figure 4-7. Knife Bolt Locations

6. Place the knife lifter on top of the knife bar and align each lifter handle with the holes from which the two knife bolts were removed in the previous step. Turn the handles clockwise until the lifter is securely fastened to the knife bar as in Figure 4-7.
7. Use the T-handle wrench to remove the remaining (5) knife bolts. Save the bolts with the two previously removed.



WARNING

Make certain to have a scabbard on the cart, prepared to receive a knife. The screws should be removed from the scabbard. The protecting edge of the scabbard should be facing the person changing the knife when he is placing the knife in it. Make sure the cart is nearby. Do not carry the knife across obstructed or slippery floors. Warn people nearby that a knife is being removed.

8. Slowly turn the knife lifter handles counterclockwise only until the knife is released from the machine. DO NOT turn the handles any more than what is required to free the knife.
9. When the knife is free, move it down and clear of the knife bar.

10. Hold the knife lifter with knife at a safe distance from the body. Other people should not be nearby. Carry the lifter to the cart containing the prepared scabbard.
11. Place the knife lifter with knife into the scabbard such that the edge of the knife is in the scabbard slot.
12. Carefully turn the knife lifter handles counterclockwise and disconnect the lifter from the knife while the knife-edge remains in the scabbard slot.
13. Align the two knife-bolt holes with the holes in the scabbard such that no portion of the knife-edge remains exposed.
14. Place a scabbard screw into each hole and turn them clockwise to tighten.
15. Use a wrench to secure the knife to its scabbard.
16. Set the knife aside.

With the knife removed, the replacement knife may be installed.



WARNING

Changing knives can be very dangerous unless safety precautions are observed and extreme care is taken when handling knives. Keep handling of unprotected knives to an absolute minimum. Have the scabbard nearby and insert knife immediately. Warn people of any unprotected knife.



WARNING

Knife changing is a ONE PERSON OPERATION! More than one person changing a knife creates safety hazards.



WARNING

Even used knives are extremely sharp! Use extreme care when handling new/re-ground knives and used knives.

17. Make sure main power is still turned off (O) at the front of the machine and is locked out at the main power disconnect switch as described in section 1.5 Power Lockout Procedure on page 1-4. Make sure all the waste chutes are still removed from the machine.
18. **Turn the knife depth adjustment handle clockwise until it stops.** The adjustment handle is located at the rear left corner of the machine.
19. Place a scabbard containing a replacement knife on the cart. Move the cart as close as possible to where the knife is to be installed.
20. After the cart is located, make sure the scabbard containing the replacement knife has its protected edge facing the installer. Have the knife lifter nearby.
21. Unwrap and clean the knife if necessary.
22. Carefully remove the two screws that fasten the knife to its scabbard.
23. Place the knife lifter on the knife and align the left handle with the second hole from the left end of the knife.
24. Align the right handle with the second hole from the right end of the knife.
25. Turn the lifter handles clockwise until the ends of the handles touch the scabbard under the knife.

26. Turn the handles counterclockwise 1/2 turn so the ends of the handles will not interfere with the clamp inside the machine.
27. Hold the knife lifter with knife at a safe distance from the body. Other people should not be nearby. Carry the lifter to the installation location.
28. Place the knife behind the knife bar while aligning the lifter handles to the open bolt slots in the knife bar as shown in Figure 4-8.

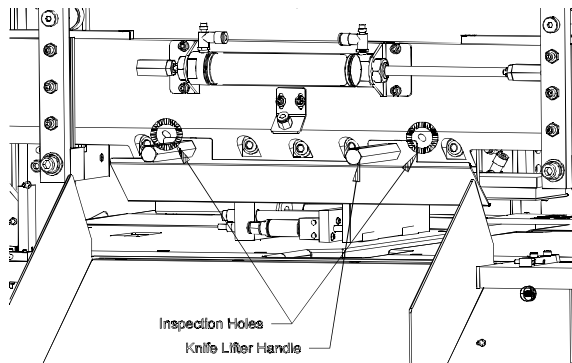


Figure 4-8. Knife Installation

29. Lift the knife into the knife bar such that the lifter handles are at the extreme top of the slot.



CAUTION

The knife lifter handles must be at the extreme top of the slot. If they are not, it will be difficult to adjust the cutting depth of the knives. Damage to the cut plates may result.

30. Turn the lifter handles clockwise and securely fasten the lifter and knife to the knife bar. Make certain the knife does not move down as the handles are tightened.

31. Place 4 knife bolts into the 4 available holes in the knife and use the T-handle wrench to secure them as shown in Figure 4-8.
32. Turn the lifter handles counterclockwise and remove the lifter from the machine.
33. Place 2 knife bolts into the holes from which the knife lifter handles were removed. Use the T-handle wrench to secure them. Viewed through the inspection holes, the blade should be inserted against the stops.

Once the knife has been installed, its cutting depth must be adjusted.

4.4.2 Knife Depth Adjustment

The knife requires adjustment after every knife change. To properly adjust the knife, it must be properly installed. It should have been installed to the top of the slots of the knife bar. If one side knife cuts through and the other does not, the knife was not properly installed.

Use the following procedure to adjust the depth at which the knives cut. 1/2" thick scrap or extra books are recommended for use when adjusting the knife. No tools are needed.



WARNING

Knife adjustment is a ONE PERSON OPERATION! More than one person adjusting the knives creates safety hazards.

Knife Adjustment Procedure

1. At the console, enter maintenance mode and choose Knife Adjust.
2. Remove the waste bin.
3. Open the rear door.

4. Find the knife adjustment knob at the left rear of the machine as shown in Figure 4-9.

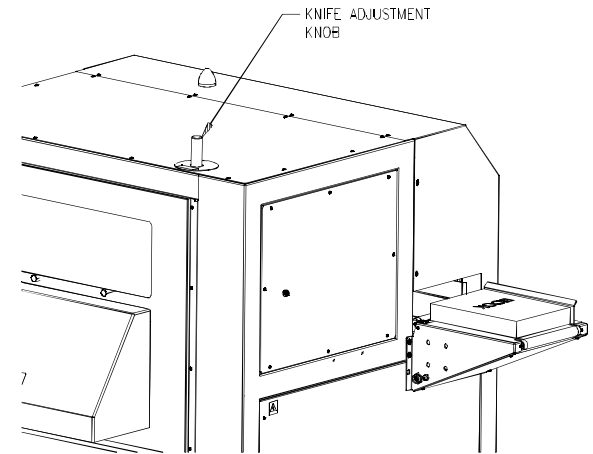


Figure 4-9. Knife Adjustment Knob

5. If the knife was just replaced, the knife adjustment knob should be turned to the full up position. If it is not, do so by turning the knob clockwise until it stops.
6. Turn the knife adjustment knob back out approximately three revolutions counterclockwise.
7. Place the face side of a scrap book underneath the knife with the binding facing the inside of the machine.
8. Securely close the door.
9. Press and hold the green button on the left-hand side of the door. The hydraulic motor turns on, and in about 1 second, the machine cuts the book.
10. Open the door and check the book. If the bottom cover of the book is not fully cut. Turn the face knife adjustment knob 1/4 revolution counterclockwise. Repeat steps 7 through 10 until the bot-

tom cover is cut fully. All doors must be closed for the machine to cut.

4.4.3 Knife Sharpening Rules

A total of 1/4" (6.4mm) of material may be removed due to grinding. Beyond this, the machine will not cut fully through a book.

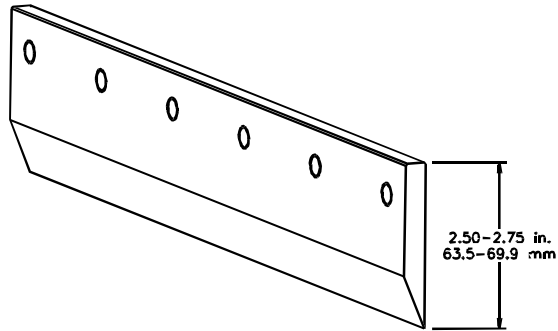


Figure 4-10. Knife Height Range

The knife must **not** be sharpened to less than 2.50 in. (63.5 mm) of knife height as shown in Figure 4-10.

4.5 Check Pressure Switch

The main air pressure switch should be checked for proper operation each month. The main air pressure switch is used to verify that main air is connected and switched on. If this switch fails, damage to the machine could result.

1. Switch on power, open lower back door.
2. Switch off main air valve.
3. Close the door.
4. Go to the console and read the LCD display. The message, "No air pressure," should be displayed.
5. Switch on main air valve.
6. Go to the console and read the LCD display. The message, "No air pressure," should not be displayed.

4.6 Safety Systems Check

Test Frequency: **Daily**



Only one person should perform this test at a time.

Use the following procedures to test the safety devices throughout the machine. If the machine fails any safety system test, **DO NOT USE** the machine. Have the machine serviced by an authorized service technician.

Console Stop Button:

1. Switch on the main power.
2. Press the green start button at the console to start the hydraulic motor.
3. Press the clear button, and wait for the machine to reset itself.
4. Press the red stop button at the console. The hydraulic motor should shut off.

Knife Change Operator Stop Button:

1. Press the green start button at the console to start the hydraulic motor.
2. Press the red stop button at the back of the machine. The hydraulic motor should shut off.

Front Door Interlock:

1. Press the green start button at the console to start the hydraulic motor.
2. Open the front door. The hydraulic motor should shut off.
3. Close the door.

Right Side Door Interlock:

1. Press the green start button at the console to start the hydraulic motor.
2. Open the right side door. The hydraulic motor should shut off.
3. Close the door.

Rear Door Interlock:

1. Press the green start button at the console to start the hydraulic motor.
2. Open the rear door. The hydraulic motor should shut off.
3. Close the door.

Use the table on the following page to record the initials of the person performing the tests and the date the tests are performed. Make photocopies of the check-off sheet as necessary.

Section Contents

TITLE	PAGE
5.1 Burr Marks.....	5-2
5.2 Jagged Bottom Cover.....	5-2
5.3 Burr Marks/Jagged Cover.....	5-2
5.4 Rectangular Crease Lines.....	5-3
5.5 Linear Crease Lines.....	5-3
5.6 Draw.....	5-3
5.7 All Sheets Not Cut.....	5-4
5.8 Book Not Square.....	5-4

Introduction

Operators may occasionally need to troubleshoot book quality issues. These quality issues are addressed by either changing machine settings or replacing the knife. Machine settings may require adjustment to be compatible with the type of paper and cover being used. Knives and cut sticks may require replacement because they are consumable items. The majority of quality issues are resolved by changing the knife and cut stick.

The trimmer is supplied with mid-grade knives. To increase the number of cycles before a knife change is required, use tungsten carbide knives. Carbide is more brittle and prone to damage due to accidentally cutting staples or other very hard materials. Use extra care when trimming with carbide knives. Approximate lifetimes for different knife types are listed below.

High Speed Steel	15k-20k cuts
DMD 5X (standard)	30k-40k cuts
Tungsten Carbide	40k-60k cuts

Other quality issues such as accuracy and square should be referred to an authorized technician because they involve service repairs or adjustments that are outside the scope of an operator's training.

5.1 Burr Marks

Description

Burr marks are found on books cut with a knife whose cutting edge has been burred. Figure 5-1 illustrates the appearance of burr marks.

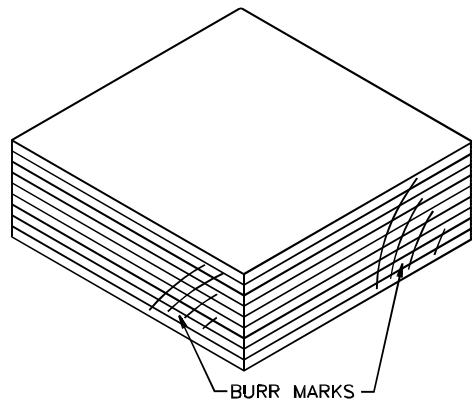


Figure 5-1. Burr Marks

Possible Causes

1. Burrs on knives can occur from improper knife handling.
2. Burrs may also occur from cutting hard, irregular materials.

Solutions

- Replace the knife.

5.2 Jagged Bottom Cover

Description

Books can appear as though the bottom few sheets and cover were torn apart rather than sharply cut. Tearing of the bottom sheets and cover occur when deep score marks develop in the cut stick. The cover is pushed into the score mark, folded over and torn.

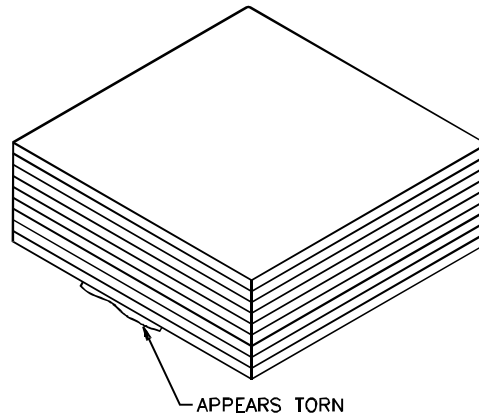


Figure 5-2. Jagged Cover

Possible Causes

1. The knife may be dull.
2. The cut stick may be worn.

Solutions

- Rotate or replace the cut stick. The knife may also require replacement.

5.3 Burr Marks/Jagged Cover

Description

A jagged bottom cover may also accompany burr marks. A burred knife may not fully cut into the cut stick or cut plate. As a result, it will leave a jaggedly cut bottom cover.

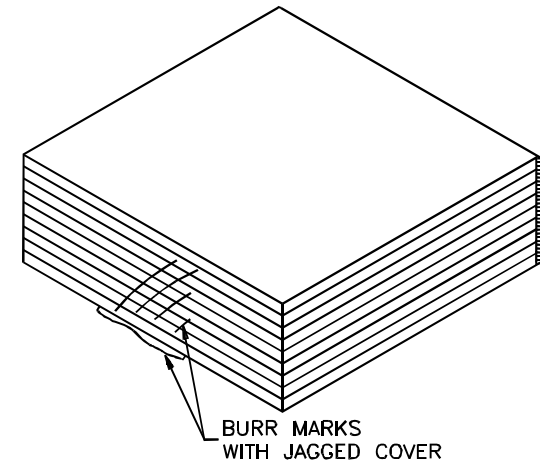


Figure 5-3. Burr Marks/Jagged Cover

Possible Causes

- The knife is burred, and the cut stick is worn.

Solutions

- Replace the knife and rotate or replace the cut stick.

5.4 Rectangular Crease Lines

Description

Indentations or crease lines may appear in a rectangular pattern in the center of the book.

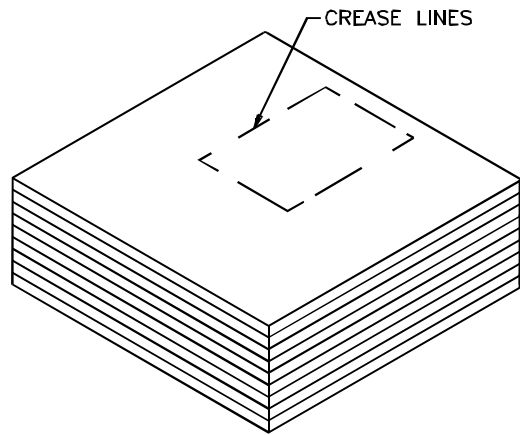


Figure 5-4. Crease Lines on Cover

Possible Causes

- The gripper has too much clamp pressure for the stock being cut.

Solutions

- Reduce the gripper clamp pressure by turning the control dial counterclockwise. Reduce the pressure until crease lines disappear on test books. The gripper adjustment gauge only reads gripper pressure while the gripper is holding the book.

5.5 Linear Crease Lines

Description

Indentations or crease lines may appear in a rectangular pattern in the near the edges of the book.

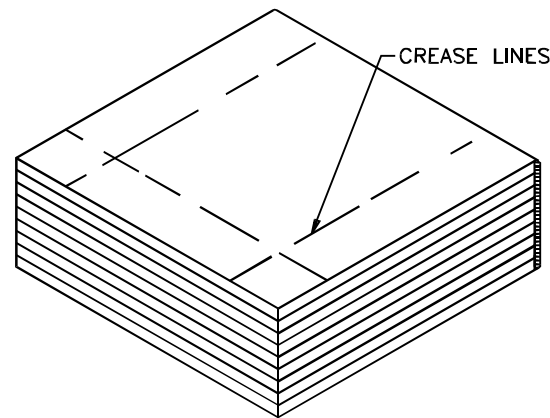


Figure 5-5. Linear Crease Lines

Possible Causes

- The clamps have too much clamp pressure for the stock being cut.

Solutions

- Reduce the clamp pressure by turning the control dial counterclockwise. Reduce the pressure until crease lines disappear on test books.
- Worn cut plates may create these lines on the bottom cover. Turn or change the cut plates.

Note: Reducing the clamp pressure too much will cause other quality problems such as draw. Only reduce clamp pressure by necessary amounts.

5.6 Draw

Description

The cut face appears to have a slope because all of the sheets are cut at different lengths.

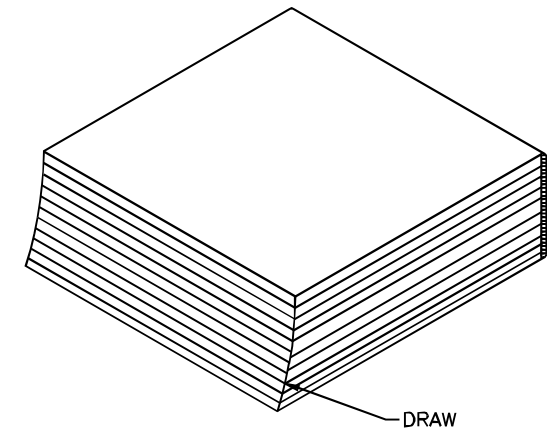


Figure 5-6. Draw

Possible Causes

- Clamp pressure may be too low.
- The knife may be dull.

Solutions

- Check clamp pressure. Clamp pressure should be 80-90 PSI.
- Replace the knife. Rotate or replace the cut stick.

5.7 All Sheets Not Cut

Description

Bottom sheets are not being cut.

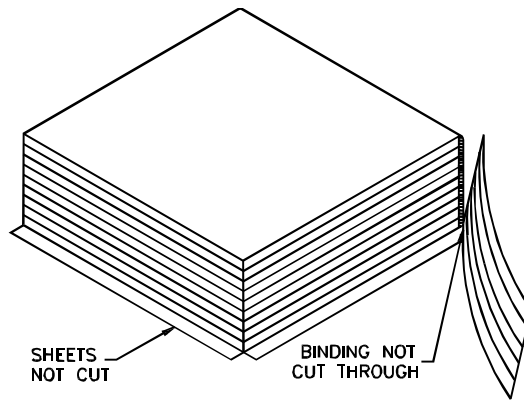


Figure 5-7. Not Cutting Through

Possible Causes

- The knife is not adjusted to cut deep enough.
- The cut stick or cut plates may be worn out.

Solutions

- If not cutting deep enough on the face of the book, adjust the face knife according to instructions in section 4.4.2 Knife Depth Adjustment on page 4-5.
- If not cutting deep enough on the top or bottom faces of the book, adjust the side knives according to section 4.4.2 Knife Depth Adjustment on page 4-5.
- Replace the cut stick or cut plates.

5.8 Book Not Square

Description

The book appears as though it was not cut square.

Possible Causes

- The book was allowed to cool with a twisted binding as shown in Figure 5-8. When the book is straightened after trimming, it looks similar to the book shown in Figure 5-9. This is the most common cause of out of square, especially in a stand-alone trimming application where the binding has had significant time to harden.
- Cover overhangs the book. The overhang reduces the reliability of the squaring process within the trimmer.
- Glue was applied past the binding, leaving a knob-like protrusion. The protrusion interfered with the trimmer's squaring process.
- Normal wear has forced the cutting or transport mechanisms out of square.

Solutions

- Carefully handle books with soft bindings. Keep twist out of the binding when storing. Allow bindings to harden before stacking.
- Cut cover to fall within the size of the untrimmed book.
- Adjust binder such that glue will not be applied past the end of the binding.
- If normal wear has forced the cutting or transport mechanisms out of square, refer the problem to an authorized service agent (see FX.013, Section 4).

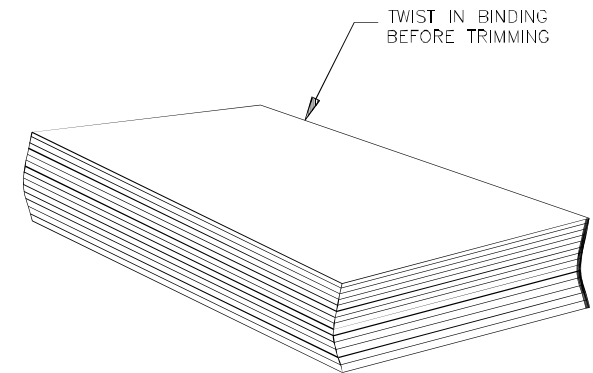


Figure 5-8. Twisted Binding

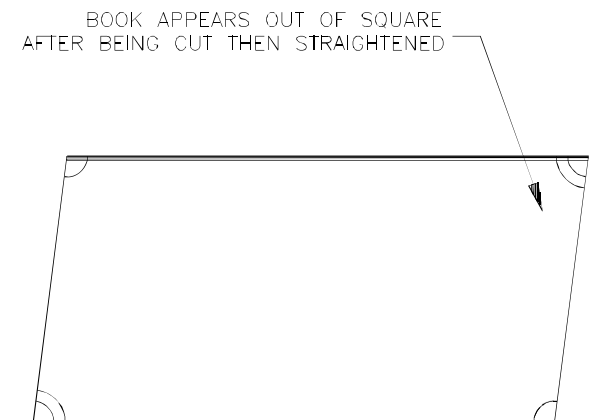
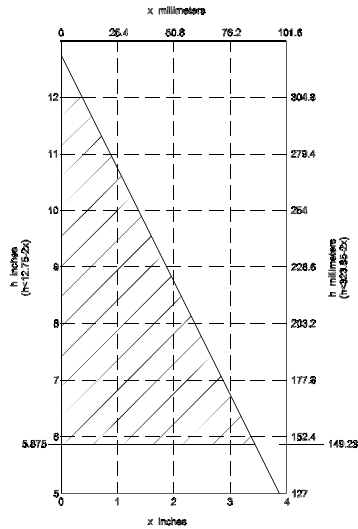


Figure 5-9. Straightened Binding

Inch / Metric Conversion Chart

in.	fractional in.	mm	in.	Fractional in.	mm	in.	fractional in.	mm
0.016	1/64	0.40	0.344	11/32	8.73	0.672	43/64	17.07
0.031	1/32	0.79	0.359	23/64	9.13	0.688	11/16	17.46
0.047	3/64	1.19	0.375	3/8	9.53	0.703	45/64	17.86
0.063	1/16	1.59	0.391	25/64	9.92	0.719	23/32	18.26
0.078	5/64	1.98	0.406	13/32	10.32	0.734	47/64	18.65
0.094	3/32	2.38	0.422	27/64	10.72	0.750	3/4	19.05
0.109	7/64	2.78	0.438	7/16	11.11	0.766	49/64	19.45
0.125	1/8	3.18	0.453	29/64	11.51	0.781	25/32	19.84
0.141	9/64	3.57	0.469	15/32	11.91	0.797	51/64	20.24
0.156	5/32	3.97	0.484	31/64	12.30	0.813	13/16	20.64
0.172	11/64	4.37	0.500	1/2	12.70	0.828	53/64	21.03
0.188	3/16	4.76	0.516	33/64	13.10	0.844	27/32	21.43
0.203	13/64	5.16	0.531	17/32	13.49	0.859	55/64	21.83
0.219	7/32	5.56	0.547	35/64	13.89	0.875	7/8	22.23
0.234	15/64	5.95	0.563	9/16	14.29	0.891	57/64	22.62
0.250	1/4	6.35	0.578	37/64	14.68	0.906	29/32	23.02
0.266	17/64	6.75	0.594	19/32	15.08	0.922	59/64	23.42
0.281	9/32	7.14	0.609	39/64	15.48	0.938	15/16	23.81
0.297	19/64	7.54	0.625	5/8	15.88	0.953	61/64	24.21
0.313	5/16	7.94	0.641	41/64	16.27	0.969	31/32	24.61
0.328	21/64	8.33	0.656	21/32	16.67	0.984	63/64	25.00

Book Size Chart



Replacement Items

5064	Cut Stick Puller
41058	Waste Bin
59032	Clamp Pad
59050	Cut Stick
59051	High Speed Steel Knife
59051-1	Tungsten Carbide Knife
59051-2	DMD 5X Knife
59070	Knife Lifter Assembly
E-967-1	Lamp
H-6910-606	Knife Screw
W-180	7/32" T-Handle Hex Wrench
K-56030	Spare Parts Kit
K-56031	Oil Change Tool Kit
K-56040	Oil Change Kit
S-1991-3	Hydraulic Fluid (5 gal.)
SU-30-103	EP2 Grease (black)
SU-30-104	EP Grease (red)

1.000	64/64	25.40
2.000	2	50.8
3.000	3	76.2
4.000	4	101.6
5.000	5	127
6.000	6	152.4
7.000	7	177.8
8.000	8	203.2
8.500	8-1/2	215.9
9.000	9	228.6
10.000	10	254
11.000	11	279.4
12.000	12	304.8
12.500	12-1/2	317.5
13.000	13	330.2

