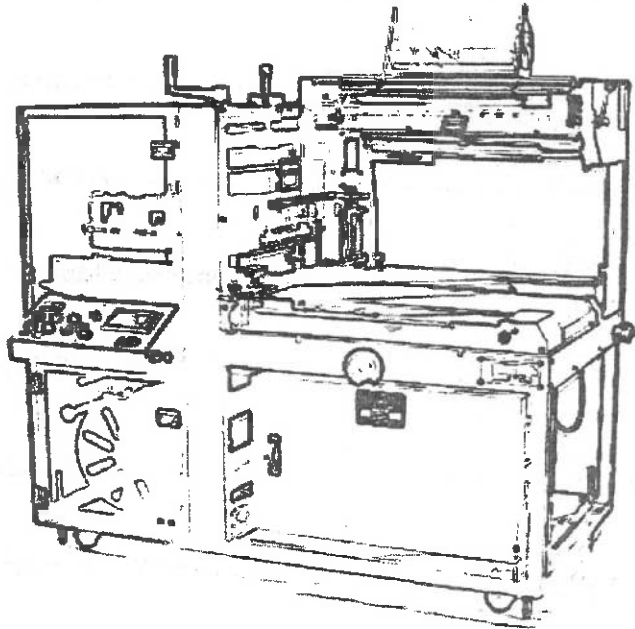


HANAGATA

Z-Series

OPERATION AND MAINTENANCE MANUAL



MODEL HP-10Z

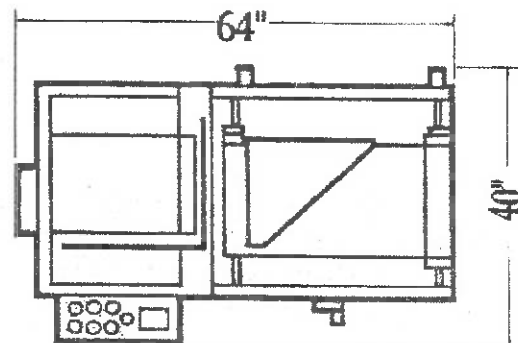
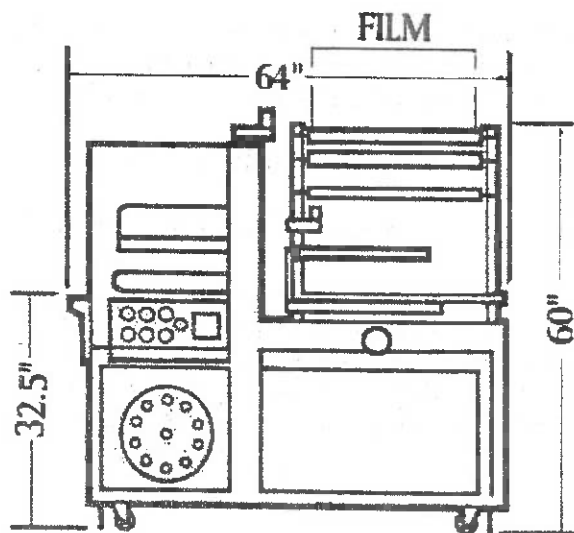
Serial Numbers 110031 - 110305
Manufactured before 2/1/99

Table of Contents

<u>SECTION</u>	<u>PAGE</u>
1. Specifications	3
2. Unpacking/Shipping Instructions	4
3. Operator Controls	
A. Operator Control Panel	5
B. Operator Interface Usage	6
C. Operator Interface Function Map	7
D. Operator Interface Functions Description	8
1. Timer Setup	8
2. Temperature Setup	9
3. Options	10
4. Special Functions	12
4. Product/Film Sizing Procedure.....	18
5. Product Changeover Procedure.....	19
6. Error Messages/Troubleshooting.....	21
7. Seal Head Speed Calibration.....	33
8. Preventative Maintenance.....	34
9. Recommended Spare Parts List.....	35
10. Electrical Schematic/Parts List.....	36
11. Pneumatic Diagram/Parts List.....	39
12. Mechanical Drawings/ Parts List.....	41
13. AC Inverter Speed Control Manufacturer's Data.....	

Specifications

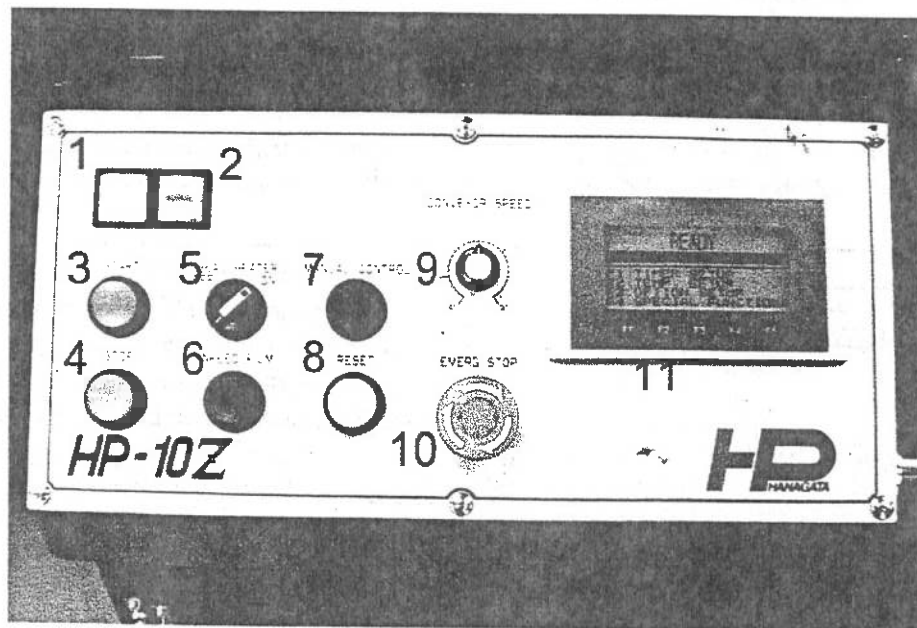
Power Requirements:	200-240 Volts, 60Hz., 1 Phase, 15 Amps
Air Requirement:	80 PSI @ 1CFM
Seal Bar Dimensions:	17.5"W x 19.5"L
Package Size Capability: (Note: Package maximums cannot occur together)	Width: 1" thru 15" Length: 4" thru 18.5" (1.5" min w/Closing Conveyor Option) Height: ¼" thru 6" (0" min w/Vertical Eye Option)
Film Size Capability:	24" Centerfold Width Maximum, 11.5" Roll Dia. Maximum, 'B' wind
Packaging Speed Capability:	Up to 40PPM (based on 7"W x 4"L x 1"H product) Production speed is dependent on product size, stability and film characteristics.
Product Weight Capacity:	25 Lbs. Maximum
Conveyor Speed:	45-90 FPM variable w/Soft Start control by AC frequency drive
Conveyor Pass Height:	32 ½" Adjustable up to 36 ½" by leveling legs
Sealing Method:	Hot Knife Sealbar w/Guillotine style seal motion
Trim Removal Method:	Rewind spool
Shipping Weight:	1200 Lbs. Gross 950 Lbs. Net
Machine Dimensions:	40"W x 64"L x 60"H



Unpacking and Re-Shipping Instructions

- Your Z-Series machine is shipped to you in a fully enclosed crate to minimize the possibility of shipping damage. If the crate appears damaged, notify the shipping company immediately for a possible claim.
- Prior to shipping the machine to you, the original manufacturer's crate was opened to inspect and run-off the machine. To reopen the crate, remove the splice boards at the bottom of the crate, and carefully lift the top of the crate over the machine with a fork truck.
- Next, carefully lift the machine from the shipping pallet with a fork truck, taking care not to damage working components or cables under the machine. (Save the custom shipping pallet for future reshipment)
- Position the machine in the work area. Find the four (4) Leveling Screws attached to the rear leg of the machine and the four (4) Leveling Pads in the electrical control panel. Screw the Leveling Screws into the leveling points at each corner of the machine. With the Leveling Pads between the Screws and the floor, adjust the machine to the correct conveyer height and level.
- Attach the power cord to 200-240VAC, 1Ø, 15 AMP service.
- Connect 80 PSI @ 1CFM compressed air to the Air Regulator input using a 3/8" ID or larger flexible hose or piping with a 3/8" NPT male coupling.
- Remove Operator Control Box from shipping position by removing the shipping mounts. Using the same screws, remount the Control Box to the frame such that the mounting holes align to the rightmost holes used for the shipping mounts. (Save the Shipping Mounts for future reshipment)
- Attach Arm Crank provided to the Seal Head Height adjustment (on top of the machine at the Center Frame) and attach the Hand Crank to the Infeed Table Width adjustment (on front of the machine, under the Infeed Table).
- Untie the Safety Roller at the Outfeed Gravity Roller section and place in the first roller position. Untie the Film Unwind Dancer roller for free movement. Place single pop-out roller in bracket at infeed table transition.
- Remove any other shipping materials from the machine.
- In the case of reshipment, reverse the unpacking procedure.
- **Note: Always ship the machine with the Seal Head and Film Forming Plow adjusted to their lowest positions. When in the shipping position, provide cushioning between the face of the Operator Control Panel and the Seal Head Frame to prevent friction damage. Never ship the machine with a film roll on the film Cradle. Run strapping over frame only. Never run strapping over Film Unwind, Infeed Table or Forming Plow.**

Operator Control Panel



1. **SOURCE INDICATOR**- Indicates that machine power is on.
2. **WORKING INDICATOR**- Indicates that the machine is in Automatic Mode.
3. **START**- Press to begin Automatic Mode.
4. **STOP**- Press to stop Automatic Mode. Note: The machine will complete the current sealing cycle before stopping.
5. **SEAL HEATERS ON/OFF**- Turns Heater Bars and optional Heated Seal Pads On/Off.
6. **INFEEED FILM**- Press to manually feed film into the seal area. Note: The program logic limits the length of film feed to the length of the Seal Bar. Once this limit has been reached, the push-button becomes inoperative. To reset, the "Manual Control" must be cycled.
7. **MANUAL CONTROL**- Press to initiate a Manual Seal cycle. Note: Push-button must be pressed twice, quickly, to operate. This is a safety feature to prevent accidental operation.
8. **RESET**- Press to clear a Fault Screen and reset the machine after any fault condition.
9. **CONVEYOR SPEED**- Controls the Conveyor Speed for the machine and synchronously controls all other motor speeds. The speed range is 45-90 Feet/Minute.
10. **EMERGENCY STOP**- Press to immediately stop the machine cycle. Note: Once the button is pressed, it must be rotated clockwise to disengage.
11. **OPERATOR INTERFACE**- Displays all machine conditions and is used for machine set-up and operation. See Operator Interface section for more detailed description of use.

Operator Interface Usage

OVERVIEW: The FX-25Due Operator Interface guides the operator thru machine set-up and operation with text messages. The interface displays pre-programmed text messages which report the current status of the machine operation. Also, thru the operator interface, the operator has the ability to change preset timer/temperature functions; turn on/off various features and options; save/recall up to 10 product setups; and retrieve machine performance data.

OPERATION: The function keys F1 thru F5 are used to either change screens or, if variable information is displayed on the screen, use the function keys to change preset values.

Changing a preset value – This type of screen shows variable information. To change a preset value, press **F1** to begin the set mode and activate the cursor. Next, press **F2** and **F3** to move the cursor to the digit you would like to change. Now press **F4** to increment the digit to the desired number (after 9 the digit will rollover to 0). Press **F5** to save the new preset (pressing F5 again, while the cursor is not active, will return to the Main Menu).

>>SEAL DWELL		0.85
RUNNING DWELL		0.60
BAG LENGTH		0.10
PREFEED		0.07
BUNCHING		0.03
SET	MOV	ADJ
MODE	↓	→
		SAV/RTN

F1

F2

F3

F4

F5

Sample Variable Data Screen

Operator Interface Functions Description

Main Menu – Shows the machine status and gives access to all other machine setup and function screens.

Machine Status Display

Message Display

→ READY	
PUSH START FOR AUTO	
F1: TIMER SETUP	
F2: TEMP. SETUP	
F3: OPTION SETUP	
F4: SPECIAL FUNCTIONS	

F1

F2

F3

F4

F5

Main Menu

TIMER SETUP – Press F1 to access the Timer Setup Menu

TEMPERATURE SETUP – Press F2 to access the Seal Bar Heater and Optional Seal Pad Heater temperature setpoint and current temperature display.

OPTION SETUP – Press F3 to access the Option Menu and turn On/Off any options or peripheral devices equipped with the machine.

SPECIAL FUNCTIONS – Press F4 to access any Special Functions such as: Production Data Reporting; Speed Test; Product Memory Save/Recall; Maintenance History; etc.

Operator Interface Functions Map

Timer Setup	Seal Dwell Running Dwell Bag Length Prefeed Bunching			See Page 8
Temp. Setup	T/D Bar M/D Bar	Optional T/D Pad Optional M/D Pad		Page 9
Option Setup	Infeed Staging Slide Conveyor Aux. Conveyor Vertical Eye Hole Punch Print Registration Bypass Mode Lead Edge Trigger Vacuum Scrap Removal	On/Off On/Off On/Off On/Off On/Off On/Off On/Off On/Off		Page 10-11
Special Functions	Production Data	Total Cycles XXXX	Avg/Hr XXXX	Page 12
		Total Hours XXXX	% Uptime XXXX	
	Speed Test	Max Speed XXXX	Actual ppm XXXX	Page 13
	Product Memory	Save	Choose Product 1 thru 10	Page 14-15
		Recall	Choose Product Prod 1-10	
	Maintenance Data	Total Work Hours	Total Cycles Hours Since PM	Page 16
	Heater Life Remaining	T/D Bar M/D Bar	Optional T/D Pad Optional M/D Pad	Page 16
	Custom Timers	Auto Timeout	C7	Page 17
		Product Gap Compensation	T203	
		Slide Open Delay	T206	
		Film Feed Delay	T205	
		Hole Punch Duration	T216	
		Outfeed Start Delay	T208	
		Print Registration Delay	T212	

Operator Interface Function Descriptions

Timer Setup- Use the Timer Setup Screen to adjust the Timers that control the machine operation.

*Press F1 from Main Screen
to access the Timer Setup*

>>SEAL DWELL		0.85
RUNNING DWELL		0.60
BAG LENGTH		0.10
PREFEED		0.07
BUNCHING		0.03
SET	MOV	ADJ SAV/
MODE	↓ →	RTN
F1	F2	F3 F4 F5

Timer Setup Screen

Seal Dwell Timer – Controls the amount of time the Seal Bar stays down to make a seal. Normal setting is .40-.80 seconds dependent on Film Type/Thickness, Seal Bar Temperature, and Condition of Seal Blades/Pads.

Running Dwell – Running Dwell becomes the active Seal Dwell time after running five products consecutively. After this short warm-up period, the seal pads will retain a certain amount of heat and therefore the system will require less dwell time to create a strong seal. Set Running Dwell .1-.2 seconds less than the Seal Dwell Timer for the fastest production speeds after the seal pads have warmed up.

Bag Length Timer – Controls the length of the excess bag on the trailing end of the product. This timer is activated when the trailing edge of the product passes the photoeye. When Bag Length times out, the product stops and the seal head is activated. Normal setting is .05-.25 dependent on Conveyor Speed and product height..

Prefeed Timer – This timer Prefeeds a small amount of film after seal cycle and ahead of the next product, so that the next product's leading edge does not "run into" and distort the film or upset an unstable product. Normal setting is .05-.15 seconds dependent on Conveyor Speed and product height/stability.

Bunching Timer – Used to relax the film tension during the Seal Cycle, to allow strong seals with high profile products. Once the Bag Length Timer has timed out and the product has stopped, the Bunching Timer is activated to feed a small additional amount of film into the seal area to relax the film prior to sealing. Normal setting is .00-.15 dependent on Conveyor Speed and product height.

Operator Interface Function Descriptions

Temperature Setup- Use this screen to setup T/D and M/D Seal Bar temperatures.

Press F2 from Main Menu to access the Temperature Setup Screen

SETPOINT		375F		
T/D BAR	ACTUAL	374F		
SETPOINT		375F		
M/D BAR	ACTUAL	376F		
SET	MOV	ADJ	SAV/	
MODE	↓	→	RTN	
F1	F2	F3	F4	F5

Temperature Setup Screen

T/D (Transverse Direction) Bar - Setpoint and Actual T/D Seal Bar temperatures are displayed. Normal setpoint is 325 - 400 °F dependent on film type and thickness.

M/D (Machine Direction) Bar - Setpoint and Actual M/D Seal Bar temperatures are displayed. Normal setpoint is 325 - 400 °F dependent on film type and thickness.

Note: If optional Seal Pad Heaters are equipped, press F4 to access Pad Heat Setpoint and Actual display. See Optional Equipment Section.

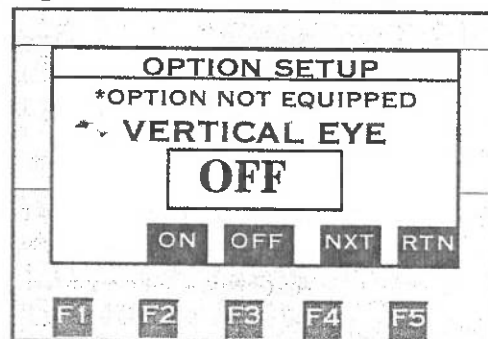
Operator Interface Function Descriptions

Note: Options on the Z-Series machines are modular and pre-programmed to be activated if the required hardware is installed. The message "Option not Equipped" appears if the required hardware does not exist on the machine. Consult your local Hanagata Representative if you desire to add any of the optional hardware. Once the hardware is installed, access the "Factory Service Menu" (by pressing Stop and Reset pushbuttons simultaneously for three seconds) and select "F3: System Configuration," then scroll thru list of options and press "Install" for the option hardware you have installed. Return to the Main Menu by pressing Reset. Now, when viewing the Option Menu, the newly installed option is enabled and able to be turned On/Off from its associated screen.

See *Optional Equipment Parts Breakdown* section for optional hardware kits or replacement part numbers.

Option Setup- Used to turn various options or features On/Off as needed for each product setup. Press F2/F3 to turn Option On/Off, press F4/F5 to scroll Forward or Back.

Press F3 from the Main Menu to access the Option Setup Menu



Sample Option Setup Screen

Infeed Staging – This is a standard option and does not require any hardware. When On, Infeed Staging allows the Infeed Conveyor to continue running during a sealing cycle, thereby "staging" the next product to the position of the horizontal photoeye. This, in effect, allows the machine to provide automatic and efficient product spacing for the fastest production speeds. *Note: Turn off Infeed Staging when using the Slide Conveyor Full-Stroke Option (See below) because product may fall into the gap left by the transition rollers in their storage position. Also, because of the close proximity of the optional Vertical Photoeye to the Seal Bar, Infeed Staging is automatically disabled when the Vertical Photoeye is turned On.*

Slide Conveyor – The Slide Conveyor or "Closing Conveyor" closes the gap, created by the Seal Bar, between the Infeed and Outfeed Conveyors for a smooth transfer of small or unstable products. The opening and closing of the Slide Conveyor becomes part of the cycle time, therefore, a decrease in production speed can be expected when in use. For this reason, the Slide Conveyor is equipped with a stroke limiter that is factory set to extend only to the transition rollers between the infeed and outfeed conveyors. This allows the fastest speed while still providing a smooth transfer for small/unstable products. For very small or unstable products, the transition rollers can be lowered to their storage position and the Slide Conveyor stroke limiter extended to reach to the infeed conveyor. *Note: When using the Full-Stroke feature, it is recommended to turn off Infeed Staging so as to prevent product from falling into the gap left by the transition roller while in their storage position.*

Auxiliary Conveyor – The PLC has an output programmed to turn On/Off in tandem with the Infeed Conveyor. This output is used to control the Optional Auxiliary Control Relay which can provide power or "dry contact" control for an inhibit circuit of any type of upstream equipment.

Operator Interface Functions Description

Option Setup (Cont.)

Vertical Eye – A Vertical Photoeye can be placed at the transition between the Infeed and Outfeed Conveyors to detect low profile products (under ¼" high) or products otherwise difficult to detect consistently with the standard Horizontal Photoeye. Turning On the Optional Vertical Photoeye automatically disables the standard Horizontal Photoeye. *Note: Because the Vertical Eye is located so close to the Seal Bar, the Infeed Staging feature is automatically turned Off when the Vertical Eye is turned On.*

Hole Punch – The Optional Hole Punch utilizes an air cylinder with a ¼" serrated tip to create a hole through both the top and bottom layers of film. Use for polyethylene films or large products that require quick air evacuation during the shrink process. An additional cylinder can be added for dual hole punches.

Print Registration – The Optional Print Registration Photoeye is used to detect an "eye mark" on print registered film. Once the "eye mark" is detected, the film and product continues to feed into the seal area for the amount of time set for the Bag Length Timer. The cut-off is determined by the repeat pattern of the "eye mark." Move the Print Registration Photoeye position for coarse adjustment of the seal position. Change the Bag Length Timer for fine adjustments.

Bypass Conveyor – Bypass Conveyor is a standard feature and requires no hardware. Turning this feature on, disables all functions of the machine except Infeed and Outfeed Conveyors (if equipped, the Slide Conveyor Option is also active). Use this feature to allow product to pass through the machine without being wrapped. Generally used when the machine is located in a production line where some products do not require wrapping and it is undesirable to move the machine in/out of line. When activated, "Bypass Mode" is displayed in the machine status bar.

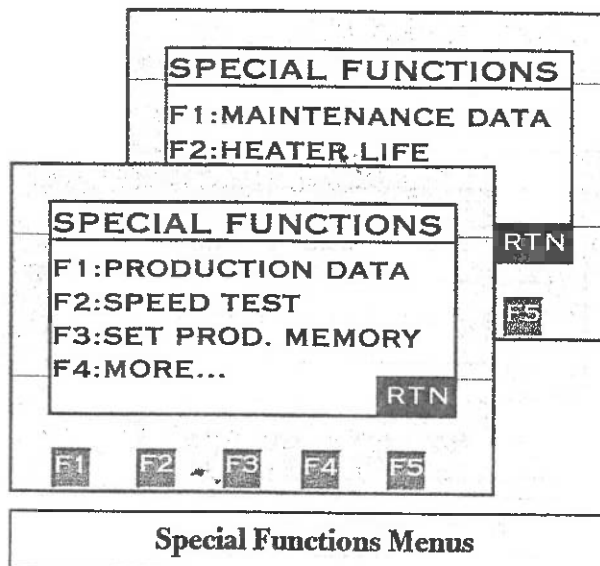
Lead Edge Trigger – Lead Edge Trigger is a standard feature and requires no hardware. Turning this feature On, causes the Bag Length Timer to be activated when the Photoeye detects the Leading Edge of an incoming product. Therefore, the machine will generate a constant length bag once the Photoeye detects a product. Use this feature for products which are difficult to scan consistently over their entire length or when using the Optional Vertical Eye and maximum Conveyor Speed. When activated, "Lead Edge" is displayed in the machine status bar.

Vacuum Scrap – Turn this feature On when using an auxiliary Vacuum Scrap Removal system. Turning this feature On does not energize an auxiliary Vacuum System, but only disables the standard Rewind System and associated Fault Messages. An auxiliary Vacuum System should be independently wired and provide an independent On/Off switch.

Operator Interface Function Descriptions

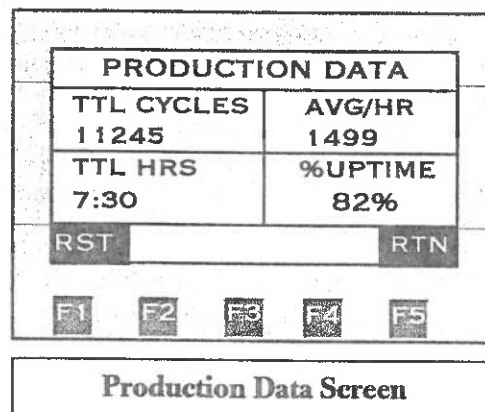
Special Functions- Gives access to Production Data, Speed Test, Product Memory, Maintenance Data and Custom Timers. Press F4 to access 2nd Special Functions screen.

Press F4 from the Main Menu to access the Special Functions Menu.



Production Data - Used to monitor Product Count, Average Product/Hour, Total Time and % Uptime for a given monitor period. Press "RST" at the beginning of a monitor period to zero all data.

Press F1 from the Special Functions Menu to access the Production Data Screen. Press F1 to Reset all values to zero. Press F5 to Return to Main Menu.



TTL CYCLES - Total seal head cycles since last reset. Does not count cycles made by manual operation.

TOTAL HRS - Total hours the machine power has been On since last reset.

AVG/HR - Displays current average production speed: Total Cycles/Total Hours.

% UPTIME - Math function displaying the Total Working (Automode) Time divided by Total Hours. Used to determine production efficiency. Machine shutdown due to film change, emergency stops, safety fault, and operator breaks/lunches, - all decrease uptime efficiency. In short, anytime the machine falls out of Automode, its Uptime percentage is being decreased.

Operator Interface Function Descriptions

Special Functions (cont.)

Speed Test – After complete product setup, select Speed Test and run at least two products consecutively simulating a realistic production run to determine the realistic production rate for the product.

Press F2 from the Special Functions Menu to access the Speed Test Screen.

SPEED TEST				
MAX SPEED CAPACITY	REAL TIME AVG. SPEED			
38PPM	35PPM			
RTN				
F1	F2	F3	F4	F5

Speed Test Screen

MAX. SPEED – Maximum Speed potential for the given product using the current setup conditions. Increase the maximum potential speed by increasing conveyor speed and/or decreasing Dwell Time, Bag Length and Prefeed to minimum values.

REAL TIME AVERAGE– Displays actual expected product/minute production rate based on average speed of the last two product cycles. The difference between Max Speed potential and Avg. PPM is the production inefficiency caused by large gaps in product spacing. To increase Avg. PPM, feed the product more efficiently by turning on Infeed Staging (See Options) or otherwise decrease product spacing.

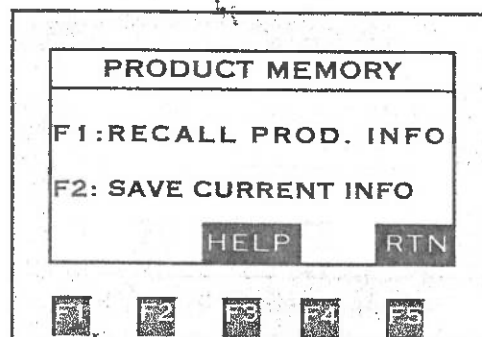
Operator Interface Function Descriptions

Special Functions (Cont.)

The Product memory feature allows the user to Save all the set-up parameters associated with a given product. Recall this information at a later date to automatically reload all parameters and display the scale positions for all mechanical adjustments.

Product Memory-Use this feature to Save or Recall set-up information for up to 10 standard products. Press F1 to Recall a Product Setup from Memory, press F2 to Save the Current Product Setup in Memory.

Press F3 from the Special Functions Menu to access the Product Memory Screen.

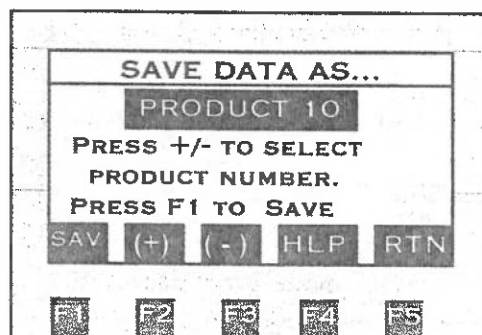


The Product Memory screen displays the title "PRODUCT MEMORY" at the top. Below it, the first option is "F1: RECALL PROD. INFO" and the second is "F2: SAVE CURRENT INFO". At the bottom of the screen, there are two buttons labeled "HELP" and "RTN". Below the screen, there are five function key icons labeled F1, F2, F3, F4, and F5.

Product Save/Recall Screen

Save- Select the memory position you would like to designate for the product. Chose position 1-10 by pressing F2 or F3 to increase or decrease. Then press F1 to Save. (Follow similar steps for Recall process)

From the Product Memory Screen, press F1 to access Save Product Selection or press F2 to access the Recall Product Selection

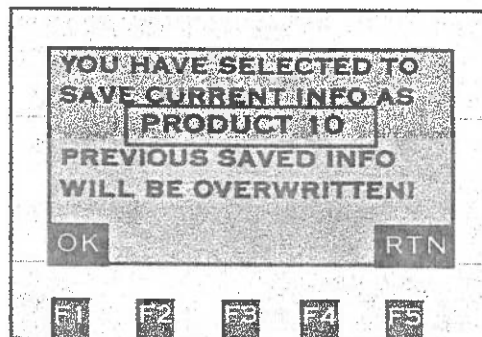


The "SAVE DATA AS..." screen shows "PRODUCT 10" selected. It instructs the user to "PRESS +/- TO SELECT PRODUCT NUMBER." and "PRESS F1 TO SAVE". At the bottom of the screen, there are buttons labeled "SAV", "+", "-", "HLP", and "RTN". Below the screen, there are five function key icons labeled F1, F2, F3, F4, and F5.

Save data as... Selection Screen

Save Product Caution-You will be reminded that saving this product information in this memory position will overwrite any existing data already in this memory position. Press F1 to confirm and continue the Save process.

If you have entered a memory position in error or do not want to complete the Save process, press F5 to Return to the Save Product Selection Screen.



The "YOU HAVE SELECTED TO SAVE CURRENT INFO AS PRODUCT 10" screen displays a warning: "PREVIOUS SAVED INFO WILL BE OVERWRITTEN!". At the bottom of the screen, there are two buttons labeled "OK" and "RTN". Below the screen, there are five function key icons labeled F1, F2, F3, F4, and F5.

Save Product Caution Screen

Operator Interface Function Descriptions

Special Functions (Cont.)

Product Saved Confirmation-Confirmation is displayed indicating that the Product information has been successfully saved in the memory location you chose. Press F1 to continue the Save process.

Press F1 to continue the Save process and manually enter Scale Positions.

TIMERS, TEMPS AND
OPTIONS HAVE BEEN
SAVED AS PRODUCT 10...
PRESS F1 TO MANUALLY
ENTER SCALE POSITIONS.
PRESS F1 TO CONTINUE...



Product Saved Confirmation Screen

Enter Scale Positions-Manually enter the Scale Positions for the current Product Set-up.

Use Set Mode, Move, Adjust and Save functions to enter information. Press F5 to return to Product memory screen.

FILM WIDTH	12.0		
FILM POSITION	3.0		
FILM FLOW HEIGHT	3.0		
TABLE WIDTH	18.5		
SEAL HEAD HEIGHT	3.0		
CONVEYOR SPEED	90		
SET	MOV	ADJ	SAV/
MODE	→	↓	RTN



Scale Position Entry Screen

Operator Interface Function Descriptions

Special Functions(Cont.)

Maintenance Data- Displays machine usage history: Total Run Hours and Total Seal Cycles. Also, monitors Hours Since Last PM(Preventative Maintenance). Press F1 to Reset PM Hours after PM has been performed.

Press F1 from 2nd Special Functions Screen to access the Maintenance Data Screen.

MACHINE HISTORY	
TTL WORK HRS	2091
TTL CYCLES	62730
HRS SINCE PM	39
PRESS F1 TO RESET PM HRS AFTER PM IS DONE	
RST	RTN
F1	F2
F3	F4
F5	

Total Work Hours- Displays the Total Hours the Machine has been in the "Automode." This is useful to determine the machine's total work history. Total Work Hours is not resetable.

TTL Cycles- Displays the Total Cycles of the Seal Head, including Manual Seals. This value is not resetable and is useful to determine the machine total cycle history.

Hrs Since PM- Displays the total work hours since Preventative Maintenance(PM) was last performed. PM is recommended every 40 working hours. An alarm message will appear at the Main Screen every 40 working hours as a reminder to perform the regular PM.(See Preventative Maintenance section for list of recommended maintenance tasks.) The alarm message can be removed from the Main Screen and production resumed by pressing the Reset pushbutton, but the alarm will continue to appear as a reminder each time power is applied to the machine until PM Hours is reset. Reset the PM Hours after performing the PM tasks by pressing F1 from the Maintenance Data screen.

Heater Life- Counts down from 6000, the total number of hours the T/D and M/D Seal Bar heaters have been On.

Press F2 from the 2nd Special Functions Menu to access the Heater Life Screen.

HEAT LIFE REMAINING	
T/D BAR	M/D BAR
5446HRS	5523HRS
RESET T/D	RESET M/D
F1	F2
F3	F4
F5	
Heater Life Screen	

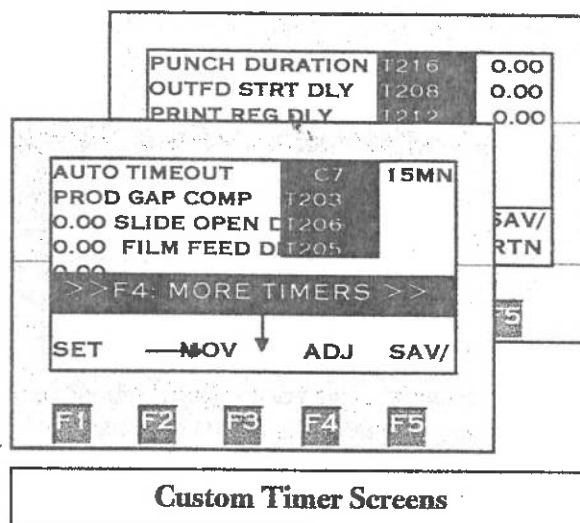
Heater Life- The expected life of the heater is 6000 hours. Counting down from 6000, Heater Life displays the estimated hours of heater life remaining. As the value approaches zero, the likelihood of the heater failing increases. Reduce unscheduled downtime by having replacement heaters on-hand. Once a heater has been replaced, press F1 or F3 to reset the respective heater's life expectancy to 6000.

Operator Interface Function Descriptions

Special Functions (cont.)

Custom Timers- Used to access certain timers which are not normally required for standard product applications. Note: these timers will affect normal machine operation, and should only be adjusted by a Qualified Technician.

Press F3 from 2nd Special Functions Screen to access the Custom Timer Menu. Press F4 from main Custom Timer Screen to access the 2nd Custom Timer Screen.



Auto Timeout- When in Automode, the machine will stop and enter the Ready mode if no product has been detected by the photoeye within this period of time. The default time is 10 minutes. Restart the machine by pressing the Start pushbutton.

Product Gap Compensation- Used to ignore small gaps in the product. Timer is started by a product gap or trailing edge, and will be reset if the photoeye is again blocked before the set time. Once the timer is allowed to timeout, the Bag Length Timer is triggered. This setting will affect the product's bag length, as the Bag Length Timer will not activate until after this timer is allowed to timeout.

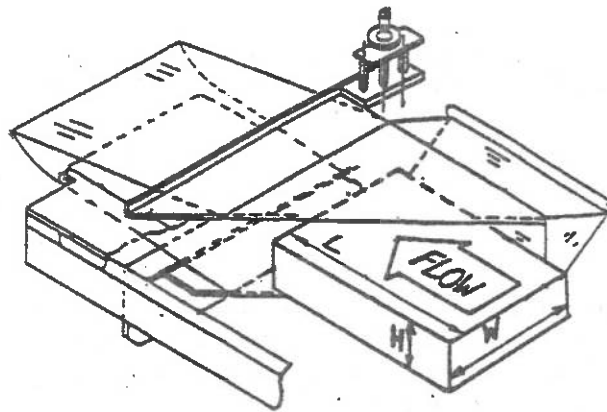
Slide Open Delay- When set to 0.00, the optional slide conveyor begins to open as the trailing edge of the product passes the photoeye. Increase this time if the conveyor speed is set low and therefore allowing the Slide Conveyor to open before the product transition is completed. The best setting is when the opening Slide Conveyor "follows" the trailing edge of the product as it transitions to the seal area.

Film Feed Delay- When set to 0.00, the film feed Pinch Rollers begin pulling the film along with the product as soon as the photoeye sees the leading edge of the product. Increasing this timer delays the start time of the Pinch Rollers. Used to cause a stable product to "seat" into the film before the film starts moving with the product. Caution: Excessive delay can cause film distortion and film tracking problems.

Punch Duration- When using the pneumatic Hole Punch Option, this timer determines the duration of the output pulse (Y2) to the hole punch solenoid valve.

Outfeed Start Delay- Delays the start of the Outfeed Conveyor after the completion of a seal cycle. Used for polyethylene film where cure time is necessary for seal integrity.

Print Registration Delay- When using the Print Registration Option, the Print Registration photoeye stops the feeding of film when an eye mark on the film is detected. This timer delays the sensing of the eye mark to allow fine adjustment to the position of the product within the printed bag.



PRODUCT SIZING- The product size capability is limited by the length of the seal bars and the conveyor bed width. The Z-Series machine will have the capacity to run most products that pass both formulas below:

First, determine if the product falls within the machine's minimum and maximum product specifications:

WIDTH	.5" Min. – 15" Max.
LENGTH	4" – 18.5" (1.5" Min. w/ optional Closing Conveyor)
HEIGHT	¼" – 6" (0" Min. w/ optional Vertical Photoeye)

Next, determine if a combination of the product's dimensions is Greater than the 10z's respective seal bar length:

A Product's Width + Height must be Less than or equal to 17.5" (10z T/D Seal Bar Length)

ALSO

A Product's Length + Height must be Less than or equal to 19.5" (10z M/D Seal Bar Length)

Once it is determined that the machine has the capacity to run a given product, determine the size of film required by the formula below:

Film Sizing Formula

If the product is less than 3" tall: $\text{Width} + \text{Height}^* + 3" = \text{Centerfolded Film width.}$

OR

*(Note: If product is less than 1" high, use 1" as its Height.)

If the product is greater than 3" tall: $\text{Width} + \text{Height} + 4" = \text{Centerfolded Film width.}$

Film Cut-off Formula

$$\text{Length} + (1.25 \times \text{Height}) = \text{Film Cut-Off}$$

Note: The Film Sizing and Cut-Off Formulas are intended as guides for determining the approximate film size and cut-off for a given product. Certain products may require more or less film than determined by the formulas due to the product's specific characteristics.

Product Changeover Procedure

Prior to Product Changeover, turn on the options to be used for the new product. See Operator Interface: Options Setup.

1. Place product on the infeed conveyor and adjust Film Forming Plow height to the new product height. Note the value shown on the Film Forming Plow scale.
2. Adjust the seal head height to the value shown on the Film Forming Plow scale.
3. Adjust the Infeed Table position to the width of the new product plus $\frac{1}{2}$ of the product's height.
4. Next, set the Conveyor Speed control for the speed that is most appropriate for the product. Minimum speed for unstable product which is difficult to load. Maximum speed for easy loading, stable product. Note: If the Conveyor Speed is changed after the setup is complete, timer settings must be readjusted.
5. Select Temp. Setup from Main Menu, and adjust Seal Bar temperatures for the type and gauge of film. 300 - 350° F for polyethylene and PVC films. 350 - 400° F for polyolefin films.
6. Select Timer Setup from Main Menu, and adjust Seal Dwell for the type and gauge of film to be used. If unsure, 0.90 sec. is a good starting point. Next, set Running Dwell to 0.80 sec.
7. Thread the film according to the following film threading procedure. If film is already threaded on the machine, simply adjust the position of the centerfold edge of the film roll to the value shown on the Film Forming Plow scale, and skip ahead to Step 17.

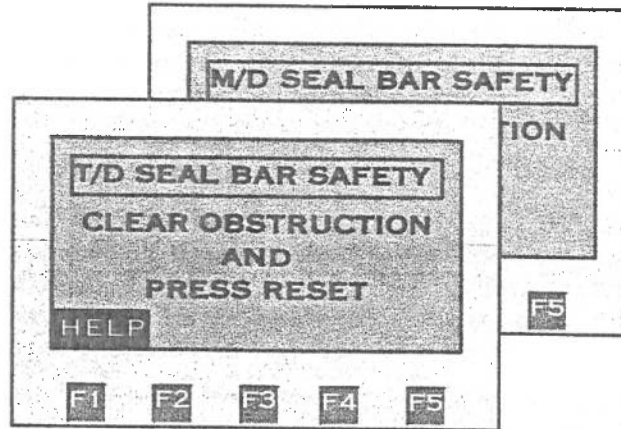
Film Threading Procedure

8. Press Emergency Stop during the Film Threading procedure.
9. Choose the proper film size for the product according to the Film Sizing Formula.
10. Place the film roll on the film cradle with the centerfold edge toward the infeed side of the machine, and adjust the position of the centerfold edge so that it is equal to the value of the Film Forming Plow scale.
11. Thread the film over the film unwind rollers according to the Film Threading Diagram on right side of unwind system.
12. Thread the film over the adjustable Film Forming Plow.
13. Align the upper and lower edges of the film together and insert into the spring loaded pinch rollers.
14. Release the Emergency Stop pushbutton and press Reset to resume normal machine functions.
15. Press Infeed Film to pull film into the seal area, then press Manual Control to cut and seal the film while generating a film tail.

16. Alternately press Infeed film and Manual Control to continue to generate a tail of film scrap.
17. Thread the tail of film scrap as shown, and attach to the core of the rewind spool.

Note: Because the Timer Setup values are dependent on the Conveyor Speed, the values suggested below assume a medium speed setup. Increase timer values as the Conveyor Speed decreases. Decrease timer values as the Conveyor Speed increases.

18. Select Timer Setup from the Main Menu and set Bag Length to 0.20 sec., Prefeed to 0.10 sec., and Bunching to 0.10 sec. These are nominal settings based on an 8 1/2 L x 11 W x 2"H product.
19. Place the product on the infeed conveyor, positioned against the product guide and press the Start pushbutton. Product should be conveyed into the seal area, stop, and the seal cycle activated. Continue to run test products to setup: Bag Length, Prefeed and Bunching below.
20. Bag Length: If the seal head hits the trailing edge of the product, increase Bag Length by 0.10 sec. If the product traveled into the seal area too far, decrease Bag Length. Continue running test product, and by trial and error, adjust Bag Length so that when stopped in the seal area the product's trailing edge is approximately 1/2 its height away from the T/D seal bar.
21. Prefeed: Run a test product and watch the product's leading edge as it enters the film. Determine if the product "runs into" the film or "stalls" as it enters the seal area. Increase the Prefeed Timer incrementally until the product no longer "runs into" the film. If there is excessive film on the leading edge of the product, the Prefeed is set too high.
22. Bunching: The Bunching Timer feeds a small additional amount of film into the seal area after the product has stopped, causing the film to relax before sealing. Taller products require more Bunching, while those under 2" may require none at all. Continue running test products while reducing Bunching to its lowest value and still maintaining a strong seal at the trailing edge of the product.
23. Slide the scrap finger to within approximately 2" of the leading edge of the product where it stops to be sealed. Its purpose is to pull the leading edge of the tail away from the seal area to make a square cut on the package. Position the scrap finger closer to the product for lower profile products, and further away for taller products. The finger is too close if it causes the film tail to bunch and/or break.
24. Product setup is now complete...Load products on the infeed conveyor allowing approximately 6" gap between products. Press Start.
25. Once in production, select Timer Setup from the Main Menu and incrementally reduce Running Dwell for faster operation while still maintaining clean film cut-off and strong seals.



Overview

Caution: Never put hands in the seal area when the machine is operating. Severe cuts and burns can result due to contact with the seal bar.

The seal bar is equipped with spring loaded safety shields. Safety switches mounted on the seal bar detect any deflection of the safety shields. If any one of the safety switches detects the deflection of a safety shield during a seal cycle, the seal cycle is aborted and a fault message appears, indicating which safety shield caused the fault. Approximately 3/8" before the seal bar makes contact with the seal pad, the safety override switch (at air cylinder) disables the safety switches so as to allow the seal head to contact the seal pad, expose the seal knife and seal the film. The seal bar safety system is only active during the down stroke of the seal head.

Setup

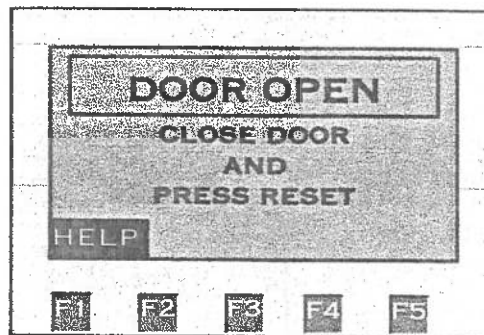
NOTE: Only a qualified technician should perform the Safety Setup.

1. Ensure all seal bar safety components are installed and operational. Check: Safety Shields, Safety Shield Springs, Safety Switches and Safety Override Switch.
2. The safety switches on the seal bar are adjustable. Ensure that they are adjusted so as to detect a minimum of 1/8" deflection of the safety shield.
3. The safety shield spring tension is adjustable. Ensure that the spring tension is sufficient to prevent false deflection of the safety shields due to the inertia of the downward moving seal bar, or that the tension is so great that the deflection of the safety shields is restricted.
4. Remove air pressure from the machine, and manually push the seal bar down until the safety shields just contact the seal pad.
5. Adjust the Safety Override Switch so that it is activated with the seal head in this position. Note: The direction of the seal cylinder piston while the seal head closes is UP. Adjust override so that it detects the leading edge of the piston for greatest sensitivity.

6. Reapply air pressure to the machine, and press the Manual Control pushbutton to activate a seal cycle. If a Seal Bar Safety Fault is indicated, readjust the override switch downward approximately 1/16" so as to activate the override slightly sooner. Repeat step 6 until a manual seal can be made consistently without tripping the Seal Bar Safety Fault.
7. Test the setup by placing a 3/8" thick piece of cardboard in the way of the seal bar and pressing Manual Control to activate a seal cycle. The seal head should contact the cardboard and immediately return to the Open position and the Seal Bar Safety Fault displayed. If the cardboard was not detected, readjust the Override Switch slightly upward. Repeat step 7 until the system will detect a 3/8" thick obstruction in the path of both the T/D and M/D seal bars.

Troubleshooting

Seal bar safety trips, but no obstruction is evident.	<ul style="list-style-type: none"> ➤ Safety Override is detected too late, go to step 6. ➤ Check that Safety Shield indicated is not sticking in the Up position or faulty wiring. This is indicated by either X2 or X6 input Off when Seal Head is in Open position. ➤ One of the Safety Switches on the Safety Shield indicated is set too sensitive, go to step 2. ➤ Film tension caused by sealing when a product is too close to the seal bar or film bridging between two products. Increase Bag Length or Bunching timer.
Seal bar safety does not trip with a 3/8" obstruction.	<ul style="list-style-type: none"> ➤ Check X2 input for T/D safety, X6 input for M/D safety. Safety inputs should turn Off when Seal Bar is in contact with the Seal Pad. ➤ One of the Safety Switches on the Safety Shield indicated is not sensitive enough, go to step 2. ➤ Safety Override switch is being detected too soon, go to step 7.



Overview

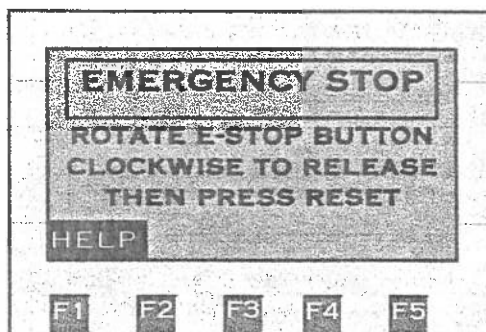
The seal area and scrap rewind doors are safety interlocked to prevent access during machine operation. Opening either door during Automatic Mode immediately stops all automatic machine operations and disables any manual operations, and displays the Door Open fault screen. Close the doors and press Reset to continue machine operations. Opening either door while the machine is not in Automatic Mode is not considered a fault, but disables any manual functions.

Setup

Ensure that magnetic latches are positioned to hold the doors securely closed. Check that the door switches are functional and positioned to operate upon door closure.

Troubleshooting

Doors are closed, but Door Open fault occurs.	<ul style="list-style-type: none"> ➤ Check that magnetic latches hold doors closed securely and vibration does not activate the door switches.
Door Open fault will not reset.	<ul style="list-style-type: none"> ➤ Check that door switches are operational and adjusted properly. ➤ Check that Input X13 is activated when doors are closed. ➤ Check wiring from switches to PLC.



Overview

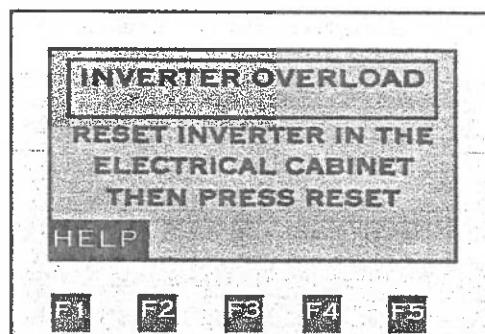
The Emergency Stop pushbutton on the Operator Control Panel or an Optional Auxiliary Emergency Stop pushbutton will immediately shutdown all machine operations when pushed, and an Emergency Stop Fault screen will occur. The pushbutton becomes mechanically latched when pushed, and must be rotated clockwise to release. Release the Emergency Stop pushbutton and press Reset to resume normal operations.

Setup

No setup is required.

Troubleshooting

Emergency Stop fault will not Reset.	<ul style="list-style-type: none"> ➤ Rotate the Emergency Stop pushbutton clockwise to release, and then press Reset. ➤ Check that Optional Auxiliary Emergency Stop pushbutton is not pressed. ➤ Check that Input X11 is Off when Emergency Stop pushbutton is released.
Emergency Stop fault screen has been Reset, but now some machine functions are not operational.	<ul style="list-style-type: none"> ➤ Check that multiple contacts on the back of the Emergency Stop pushbutton are operational and wires are securely connected.



Overview

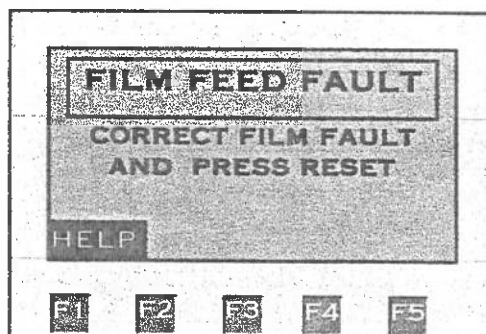
The five (5) motors are controlled individually by AC frequency inverters. The inverters are used to control the speed, acceleration/deceleration time and monitor the amperage output to the motor. If the amperage draw rises above the motor's rated limit, the inverter will shut down the motor operation, give an error code on it's LED display, and display an Inverter Overload fault screen. To resume operation, turn off the main power for 5 seconds and then reapply.

Setup

All motors have their maximum amperage limit displayed on their nameplate. The motor's maximum amperage is preset in its respective inverter at the factory. To check or adjust the inverter's maximum amperage, press the Mode key twice on the motor's inverter. "P0" will be displayed. Press the "Up" arrow key until the display reads "P9". Press "Set" and the current amperage limit will be displayed. If the value is correct, press "Mode" to return to the normal display. Or, if you wish to adjust the value, press the "Up"/"Down" arrow key to the desired setting. Now, press "Set" to save the new setting. Press "Mode" to return to normal operation. See the Manufacturer's data section for more information on the Mitsubishi Inverters.

Troubleshooting

An INVERTER OVERLOAD FAULT activates repeatedly.	<ul style="list-style-type: none"> ➤ Check that there is no mechanical bind to the affected motor or gear head. The motors and drive systems should turn freely with the main power Off. ➤ Check that the weight of the product on the infeed or outfeed conveyors does not exceed the maximum capacity of eleven (11) Pounds. ➤ Check that the belt tension is not too tight. Only tension the belts to provide a positive grip on the drive roller.
The Inverter Overload Fault Screen will not reset when the Operator Control Panel Reset pushbutton is pressed.	<ul style="list-style-type: none"> ➤ The affected AC frequency inverter in the electrical control cabinet must be reset. Press "reset" on the affected inverter or turn off main power for 10 seconds before pressing the Reset pushbutton on the Operator Control Panel. ➤ Input X12 should be lit when inverters have been reset. If not, check for continuity and voltage on the overload circuit input. (Note: INV5 uses NC contact of RY1) ➤ Faulty inverter.



Overview

The Film Unwind System runs on the demand of the Film Takeaway System. If the logic monitor detects the Film Feed System is feeding film while the Takeaway System is not active, a Film Feed Fault occurs. Also, an encoder measures the amount of film pulled by the Film Takeaway System. If the amount of film is greater than the length of the M/D Sealbar, a Film Feed Fault occurs.

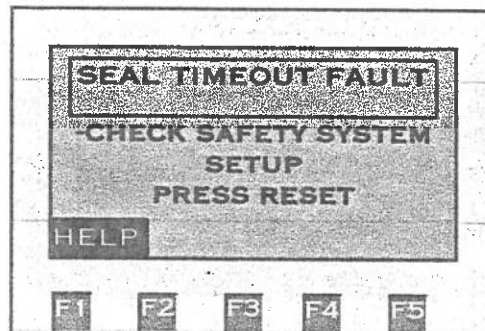
Setup

This is a factory setting, but can be influenced by incorrectly specifying the equipment's model type in the System Configuration screen found in the Factory Setup menu. Verify that the correct model has been installed. (Press and hold the "Stop" and "Reset" pushbuttons simultaneously for three seconds to access the Factory Service Menu.

Troubleshooting

FILM FEED FAULT occurs repeatedly.

- Check that the Film Unwind pinch roller is engaged and provides adequate pressure to drive the film.
- Check that Film Unwind dancer bar has sufficient weight to fall as film is delivered and thereby turns off the film drive.
- Check that the product Length + Width measurement is less than or equal to the M/D seal bar length. (See Product/ Film /Sizing Section)
- Check that the film is threaded correctly.

**Overview**

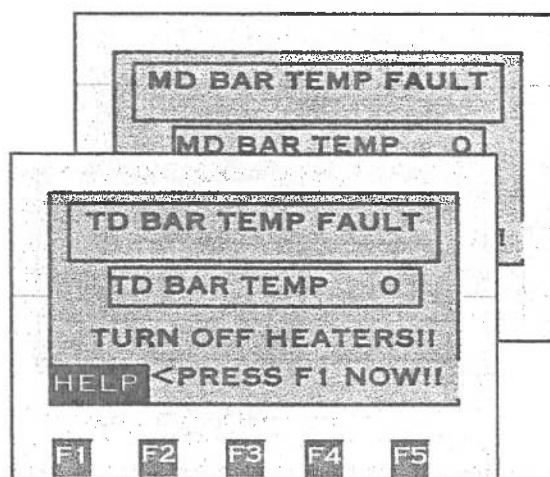
As a safety feature, the time duration of the seal bat downstroke is monitored. If a seal cycle is initiated, and the seal bar does not make contact with the seal pad within a set period of time, the seal cycle is aborted and the SEAL TIMEOUT FAULT screen is displayed.

Setup

This is a factory setup.

Troubleshooting

SEAL TIMEOUT FAULT occurs	➤ Check that air pressure to the machine is 80-90 PSI.
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Overview

A thermocouple, positioned on each seal bar, reports the actual temperature of that seal bar. If, for any reason, the seal bar thermocouple reports a temperature above 475° F, equal to 0° F or below 0° F (negative) the BAR TEMP FAULT screen is displayed. To assist in troubleshooting, the current reported temperature of the indicated bar is shown on the fault screen.

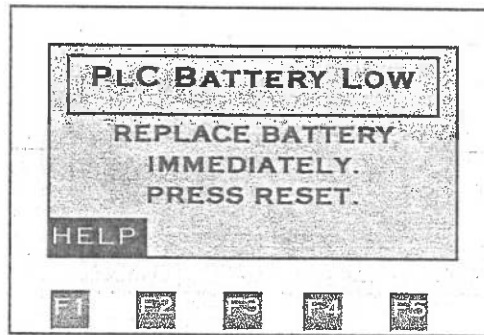
Setup

This is a factory setting.

Troubleshooting

Note: Immediately upon a BAR TEMP FAULT indication, turn the Seal Heaters On/Off select switch to the Off position, and note the actual temperature displayed on the fault screen.

The BAR TEMP FAULT occurs and reported temperature is 475° F or higher(250° F for Heated Seal Pads)	<ul style="list-style-type: none"> ➤ Check output Y14(T/D) or Y15(M/D) is not shorted closed. (Also check Y16 and Y17 ➤ Check SSR1(T/D) or SSR2(T/D) has not shorted closed. (Also check SSR3 and SSR4 if Optional Heated Pads are installed) ➤ Check thermocouple is attached securely to the bar.
The BAR TEMP FAULT occurs and reported temperature is 0° F	<ul style="list-style-type: none"> ➤ Check thermocouple for damage or open circuit .
The BAR TEMP FAULT occurs and reported temperature is below 0° F(negative)	<ul style="list-style-type: none"> ➤ Check that the polarity of the thermocouple wire is not reversed.



Overview

The PLC is equipped with a lithium battery for the retention of RAM Memory while power is removed. RAM memory consists of variable input data entered by the operator during the machine setup. Replacement of the battery is recommended every five (5) years. If the PLC battery voltage becomes low, the Battery Low LED indicator on the face of the PLC will light and the PLC BATTERY LOW fault screen will appear. Press the Reset pushbutton to resume normal operation. The machine is functional for approximately one (1) month from the first indication that the battery is low. As a reminder, the PLC BATTERY LOW fault screen will reappear everytime power is turned on. Also, a Battery Low message will be displayed in the Message Display area of the Main Screen when in Automode. Note: *The PLC logic program is permanently stored in the 8K EEPROM cassette, and is not in jeopardy of being lost...even if the battery is allowed to completely fail. The battery is only used to retain operator input values while the power is off.*

Setup

Order battery Part Number F2-40BL from any Mitsubishi dealer. With power off, remove the PLC face plate. Unplug the battery terminal and remove the old battery. Once removed, the variable RAM data will be lost if the new battery is not replaced within 30 seconds.

Troubleshooting

PLC BATTERY LOW fault screen appears, but battery is in good condition

➤ Check that battery is properly installed

**Overview**

A Magnetic Reed switch is located on the seal head cylinder to detect when the seal head is in the upper position. The logic program monitors this reed switch and the SEAL BAR UPPER LIMIT fault screen appears if the seal head position is out of sequence or if the seal head does not return to the upper position within a reasonable time after a seal cycle.

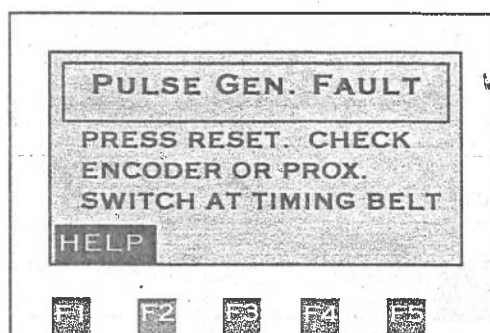
Setup

With compressed air applied to the machine, adjust the Head Up reed switch (attached to the cylinder by a metal band) so that the indicator light is ON while the seal head is in the upper position.

Troubleshooting

The SEAL BAR UPPER LIMIT fault screen appears.

- Check that compressed air is applied to the machine.
- Check the reed switch and associated wiring is functional. X3 input should light when a magnet is placed in the proximity of the switch.
- Check that the mechanical cushion internal to the seal cylinder does not restrict the full stroke of the piston.
- Check that there is not a mechanical bind that restricts the seal head's return to its upper position.



Overview

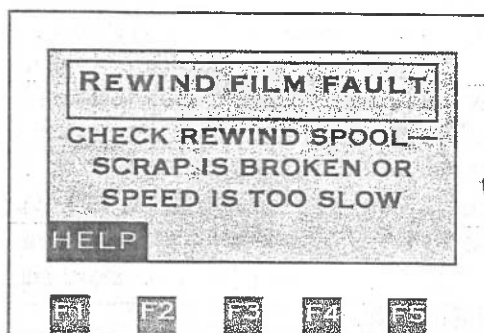
A pulse generator is located on the lower pinch roller timing belt drive shaft. On earlier models it is comprised of a proximity switch reading the teeth on an open gear, later models use an encoder style unit attached to the rear end of the timing belt drive shaft. Older logic programs (pre- **Z#220 Series) uses the pulse generator to detect a seal bar height change and initiate a Seal Height Calibration Cycle as well as monitor the amount of film pulled through the system (See Film Feed Fault). Later programs utilize a Seal Height Proximity Switch to detect a Seal Bar Height change and uses an encoder style Pulse Generator to monitor the amount of film pulled through the system during each product cycle.

Setup

If the older style gear/prox. unit is installed, adjust the position of the proximity switch so that the indicator light changes state from green to red to off as the gear rotates. The newer encoder style system requires no setup.

The PULSE GENERATOR fault appears.

- Check that input X1 receives pulses when the scrap takeaway timing belts are actuated by manually pressing the Infeed Film pushbutton.



Overview

The film trim that is generated during normal operation is accumulated for easy disposal on the rewind spool. The scrap film is threaded around the dancer such that the dancer arm falls as the scrap is generated, activating a switch to start the rewind spool. As the spool winds up the scrap, the dancer arm is caused to rise, deactivating the switch and thereby turning off the rewind spool. The logic program must sense one complete Rewind cycle for each product cycle or else the **REWIND FILM FAULT** will appear.

Setup

Set the rewind speed control to 60-70% (the speed pot is located in the upper left corner of the electrical control panel). Set the Accel/Decel pot on the rewind inverter INV5 to slightly CW from fully CCW. Adjust the dancer arm cam to activate the rewind motor when the dancer arm is horizontal. Add or subtract counterbalance weight from the dancer arm as needed for various types and gauges of film.

Troubleshooting

<p>The REWIND FILM fault appears and the scrap is not broken.</p>	<ul style="list-style-type: none"> ➤ Check that the film is threaded correctly. The film tail should go around the dancer roller and then up to the idler roller and then back down to the rewind spool. ➤ Check that the scrap tail is attached to the rewind spool. ➤ Check that the rear hub of the rewind spool is firmly attached to the rewind axle. ➤ Check that the rewind speed is fast enough to complete the rewind cycle and turn off before the next product cycle is started. Generally 70% is fast enough for all production speeds. ➤ Check that INV5 accel/decel pot is set slightly CW from fully CCW.
<p>The REWIND FILM fault appears and the scrap tail is broken.</p>	<ul style="list-style-type: none"> ➤ Check that film tail is threaded correctly. ➤ Check that film size is correct for the product. ➤ Check that scrap finger is not positioned too close to the stop position of the of the product, causing the film tail to jam or tear. ➤ Check that rewind speed is set at 60-70%. ➤ Check that dancer arm floats within its upper and lower limits.

Seal Head Speed Calibration

A unique feature of the sealing system is its stroke limiting seal head. This feature allows the fastest production speeds for all product heights. Because the stroke of the seal cylinder is limited its normal mechanical cushion, located at its rod end, is not used. Instead, a "Seal Head Cushion" valve is incorporated in the system to electronically energize during the downstroke of the seal head to provide a cushioned contact with the seal pad. The time at which the Seal Head Cushion valve is activated, is dependent on the height of the seal head. Therefore, after a seal head height adjustment or upon "power up," the machine will display the "Auto Calibration Sequence" screen as it performs a slow and deliberate seal cycle to "measure" the new seal bar height. This information is then used to calculate the proper time to activate the Seal Head Cushion valve during a normal seal cycle.

Setup

Note: The setup should be performed by a qualified technician only.

1. Simultaneously press and hold the Stop and Reset pushbuttons for approximately three (3) seconds until the "Factory Service Screen" is displayed.
2. Select "F4: Seal Head Calibration" from the main menu and follow screen instructions as detailed below.
3. Adjust the seal head height to twelve (12) on the height scale. (Six (6) if your scale doesn't go to 12)
4. So that the internal rod-end cushion on the seal head cylinder does not interfere with the electronic cushion valve, open the mechanical cushion at the rod-end of the seal head cylinder four (4) turns counter-clockwise from its closed position.
5. Open the Main Head Down speed flow restrictor fully counter-clockwise and lock with the jam nut.
6. Alternately press "F1: Head Down" and adjust the Seal Head Cushion valve flow restrictor as instructed. If "Too Fast" turn clockwise. If "Too Slow" turn counter-clockwise.
7. When "OK" is indicated, lock the adjustment with the jam nut and press "F5: Done."
8. Next, from the same seal head height, adjust the Head Up flow restrictor and cylinder cushion control (located at the base of the seal cylinder) for smooth stroke and cushion

Troubleshooting

Seal head goes Up too fast.	➤ Adjust the Main Seal Head Up flow restrictor for speed control and the mechanical cushion at the base of the air cylinder to cushion the seal head to a smooth stop.
Seal Head comes down too fast.	<ul style="list-style-type: none">➤ Check that the Seal Head Calibration procedure has been completed properly.➤ Ensure that the proximity switch located at the seal head height adjustment handle sends inputs to X26 as handle is rotated.➤ Ensure that the logic program has been configured for the correct machine Model. Check Factory Service Menu/System Configuration.➤ Ensure the proper program is loaded in the PLC and FX-25DUE Interface.
Seal Head comes down abruptly, generally first cycle of the day or after the machine has been idle.	➤ Seal head Up/Down valve is sticking or defective. Ensure air is clean and dry. Try disassembly and cleaning. Replace valve if necessary.

Preventative Maintenance

The Hanagata Z-Series Automatic L-Sealers are designed to require very little routine maintenance, but as is with any machinery, regular attention will promote long life as well as reduce unexpected downtime.

-Daily PM Routine-

Operational Check: Monitor the machine operation, and note any unusual noises or belt tracking problems. If noted, address the problem immediately so as to minimize possible further damage.

Seal Blades: At the end of an operating shift, apply a small amount of silicone grease to the seal blades before turning off the seal heaters. This aids in sealing and acts as a release agent on the seal blades to prevent any film residue/build-up.

The logic program is designed to prompt the operator to perform Preventative Maintenance (PM) every 40 operating hours. A red screen will appear once 40 hours have passed. The operator can remove the prompt from the screen and continue operation by pressing Reset, but the prompt will reappear everytime the power is turned on until the PM is performed and the PM hour meter is reset. Reset the PM hour meter by selecting F4: Special Functions from the Main Menu and the Maintenance Data.

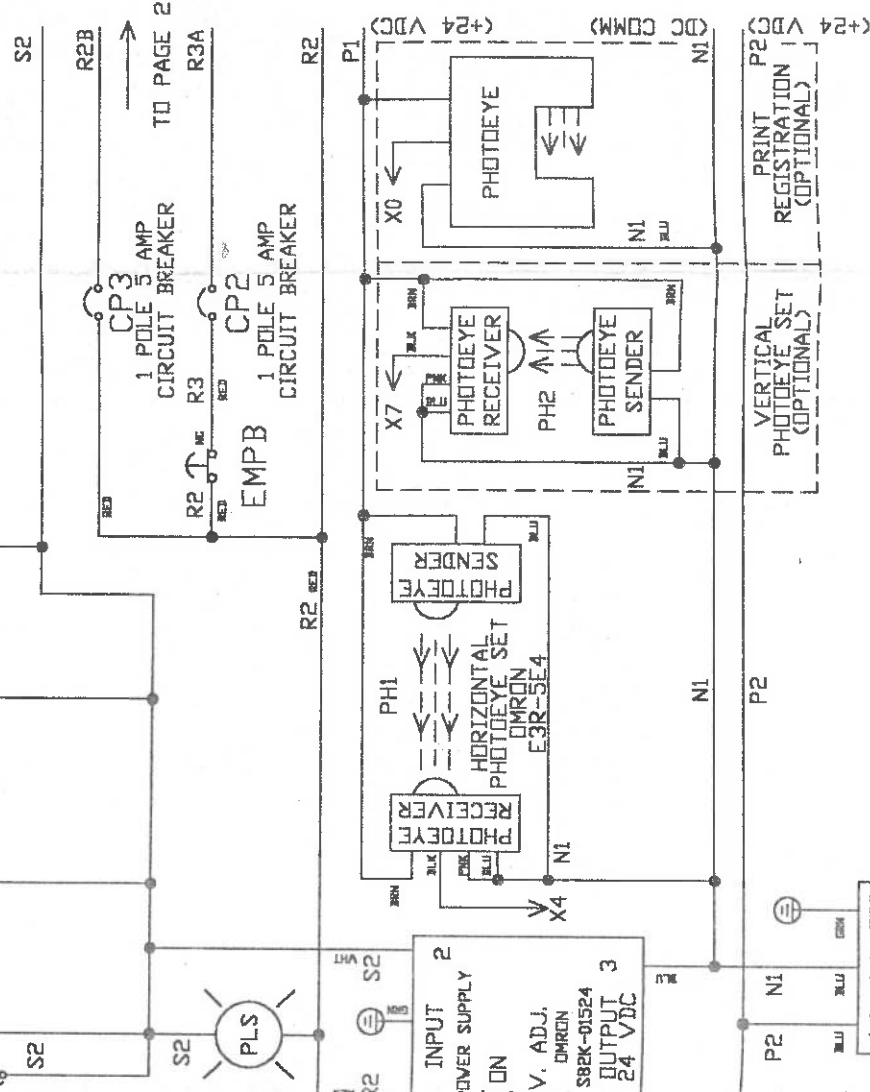
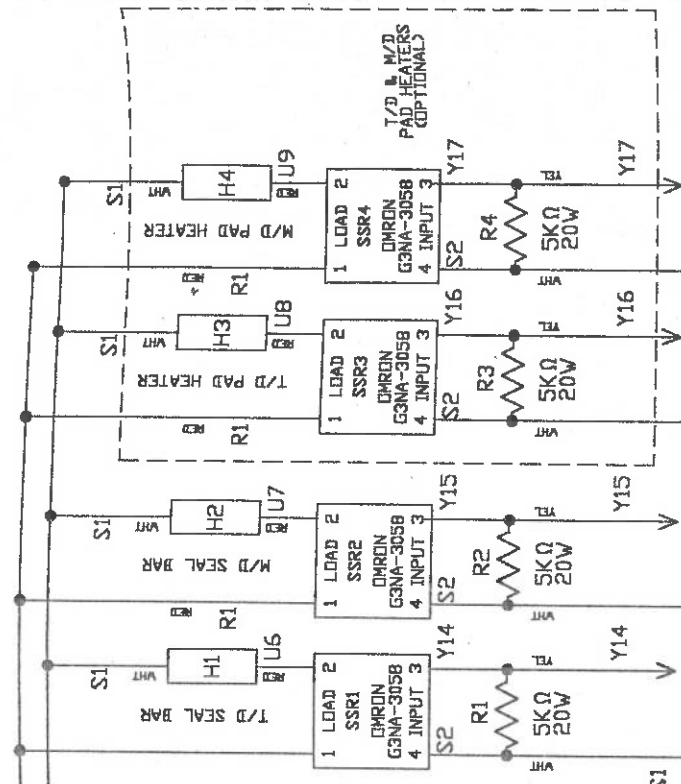
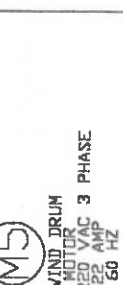
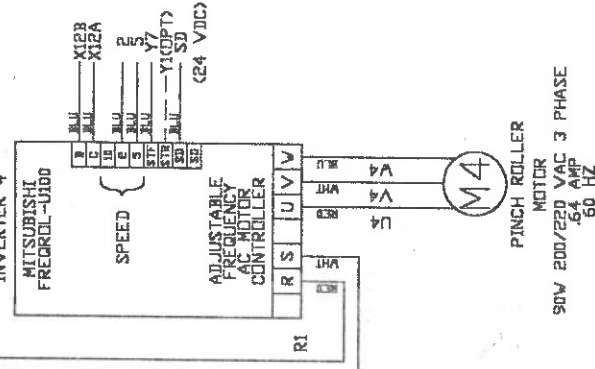
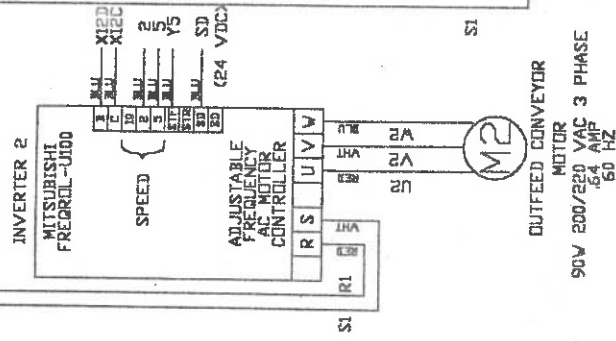
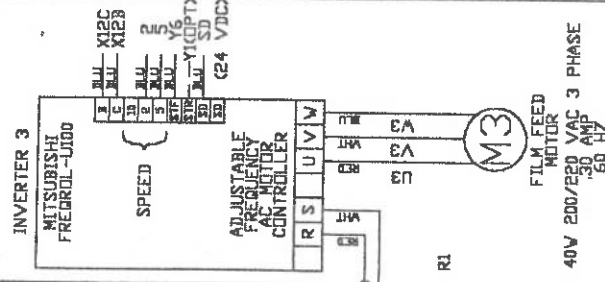
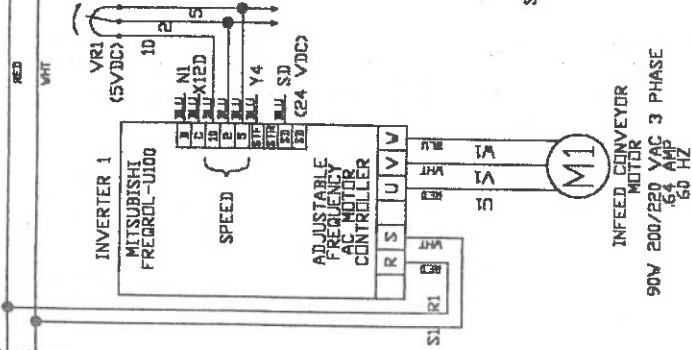
- 40 Hour PM Routine-

- Apply light oil (10wt. Air Tool Oil) to the seal head linear shafts to prevent surface corrosion. (Also, if the machine is equipped with the Optional Slide Belt Conveyor, apply light oil to its linear shafts.)
- Apply light chain oil to the seal head chains and the 5 Drive motor chains: Infeed, Outfeed, Film Feed, Scrap Takeaway and Scrap Rewind.
- Check and drain any water accumulated in the water trap. Press the button at the bottom of the trap and the water will be released.
- Check the condition of the Scrap Takeaway, Infeed and Outfeed belts. Wear on one side indicates a tracking adjustment is necessary.
- Clean Film Drive and Pinch Rollers with an ammonia based household glass cleaner.
- Clean Film Forming Plow with an ammonia based household glass cleaner.
- Clean the Photoeye lenses with an ammonia based household glass cleaner.
- Check the condition of the Seal Pad and Teflon Tape. Replace as necessary.

Model HP-10Z

Sn# 110031- 110305

Item Description	Part No.	Minimum	Standard	Complete
Seal Pad, ¼" x ¾" Soft	G9002208	6 ft.	6 ft.	6 ft.
2" Teflon Tape (3 mil)	G9000512	1 rl.	1 rl.	1 rl.
Silicone Grease	G9000025	1 tube	1 tube	1 tube
T/D Seal Blade	G2000260	1 ea.	1 ea.	1 ea.
M/D Seal Blade	G2000259	1 ea.	1 ea.	1 ea.
T/D Heater	G9000200		1 ea.	1 ea.
M/D Heater	G9000197		1 ea.	1 ea.
Solid State Relay (240VAC)	G9000443		1 ea.	1 ea.
Thermocouple	G9000198		1 ea.	1 ea.
Infeed Belt	G9000149			1 ea.
Outfeed Belt	G9000409			1 ea.
Upper Scrap Belt	G9000132			1 ea.
Lower Scrap Belt	G9000133			1 ea.
Seal Head Solenoid (240VAC)	G9000427			1 ea.



OPERATOR INTERFACE

(+) (-) GRD
MITSUBISHI
FX25-DU

TO FX2-16MR
PROGRAMMABLE CONTROLLER

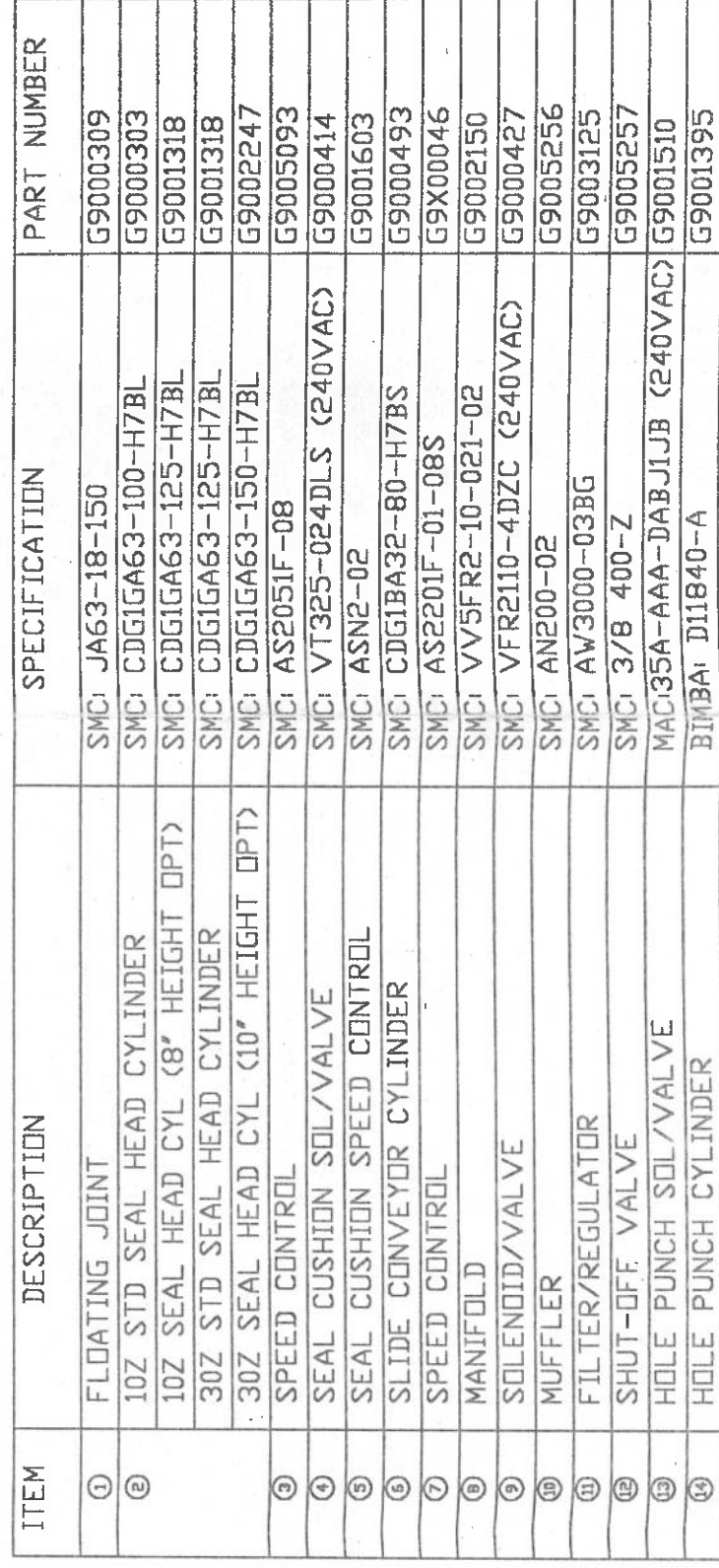
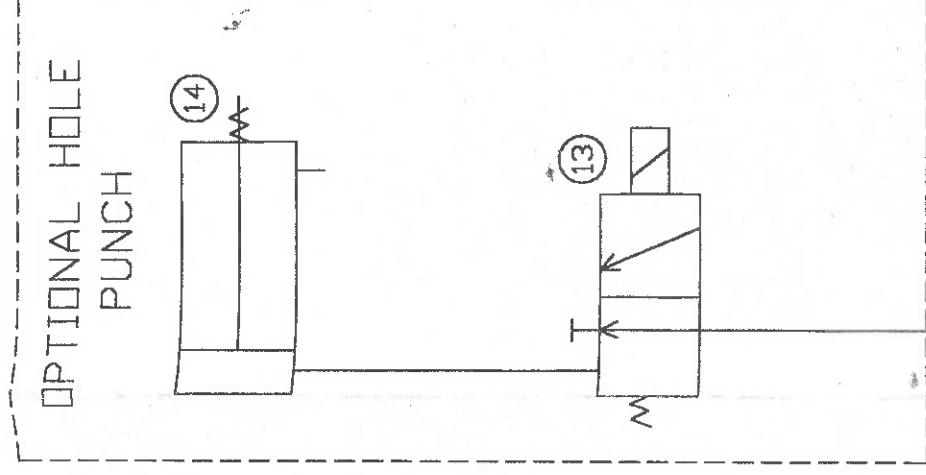
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Electrical Components Parts List

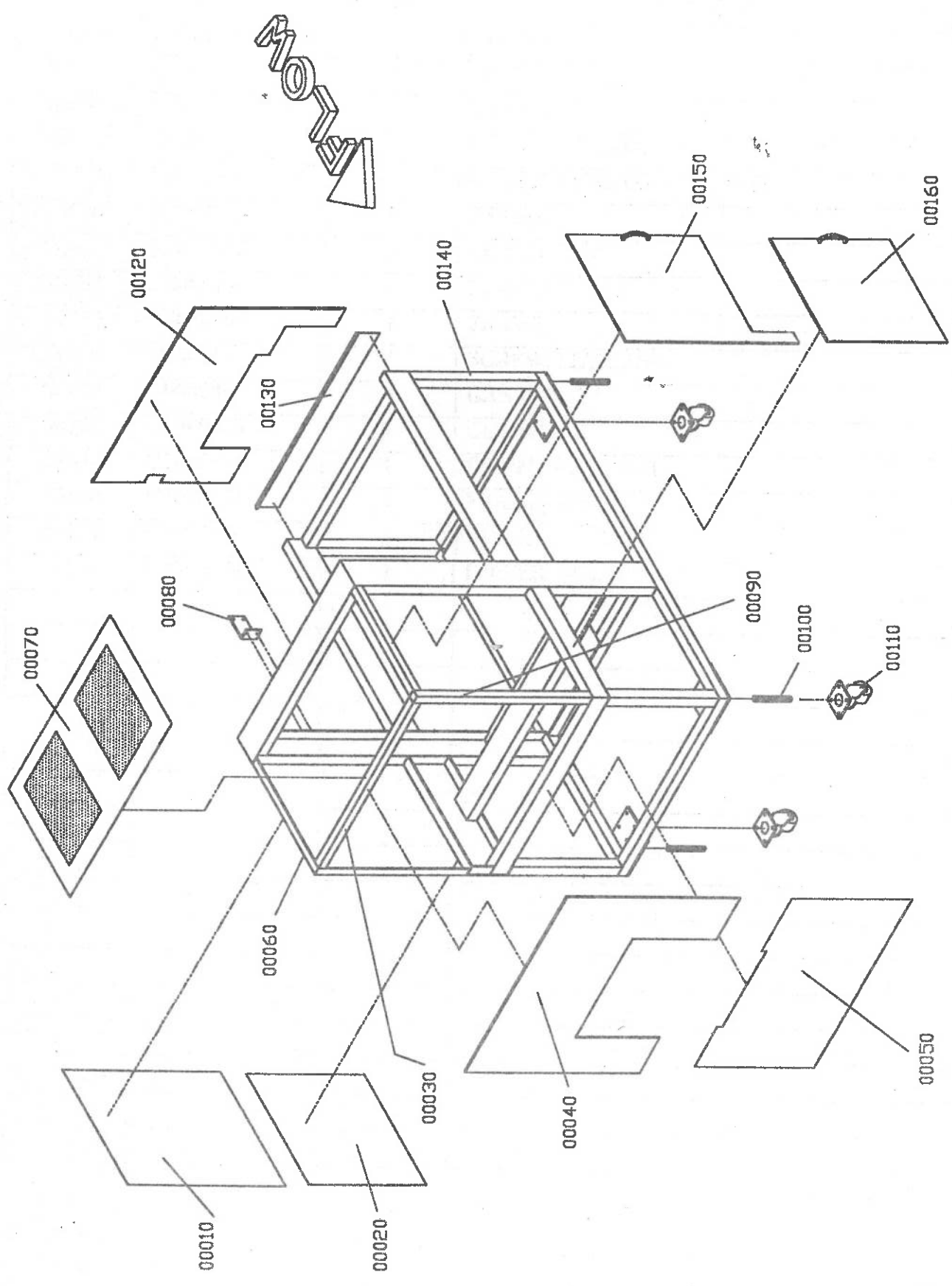
Model HP-10Z Serial Numbers 110031 - 110305

Refer to Electrical Schematic Drawings G2000129-1 and G2000130-1

Item	Part #	Description	Spec.	Qty	Mfr.
CP1	G9000441	Circuit Protector	CP30-BA2P1-M5A 2p,5A	1	Mitsu
CP2, 3	G9000442	Circuit Protector	CP30-BA1P1-M5A 1p,5A	2	Mitsu
EMPB	G9000438	Emergency Stop Button	AR22V2R-13R	1	Fuji
FX-16EX	G9000422	PLC Input Expansion	FX2C-16EX	1	Mitsu
FX-25DU	G9000425	Interface Unit	Fx-25DU	1	Mitsu
FX-4AD-TC	G9000424	PLC A/D Converter	FX2C-4AD-TC	1	Mitsu
FX-8EYS-H	G9000423	PLC Triac Output	FX2C-8EYS-H	1	Mitsu
H1	G9000200	Cartridge Heater	HP10K-20-14 200V/400W	1	
H2	G9000197	Cartridge Heater	HP10K-20-14 200V/450W	1	
H3,4		Cartridge Heater	200V/200W	2	
INV1-4	G9000439	AC Frequency Inverter	FR-U120S-0.1K	4	Mitsu
INV5	G9000451	AC Frequency Inverter	SC-A2100U	1	Mitsu
M1, 2, 4	G9000125	Gearmotor	GM-J90W 3ph, 200v, 60hz	3	Mitsu
M3	G9000416	Gearmotor	GM-J40W	1	Mitsu
M5	G9000244	Gearmotor	GM-J25W	1	Mitsu
Main Breaker	G9000431	Circuit Breaker	EA32/15A, 2p	1	Fuji
MS5, 6	G9000447	Roller Plunger Switch	Z-15GQ22-B	2	Omron
PB1	G9000435	Pushbutton Switch	AR22EOR-10G	1	Fuji
PB2	G9000436	Pushbutton Switch	AR22EOR-10R	1	Fuji
PB3	G9000420	Pushbutton Switch	AR22EOR-10Y	1	Fuji
PB4, 5	G9000437	Pushbutton Switch	AR22EOR-10B	2	Fuji
PH1, 2	G9000444	Photo Eye	E3R-5DE4	1Set	Omron
PL1	G9000433	Indicator Lamp (Working)	DR22F3M-M4G	1	Fuji
PLC	G9000421	PLC Base	FX2C-16MR	1	Mitsu
PLS	G9000432	Indicator Lamp (Source)	DR22F3M-M4W	1	Fuji
PROX1-4	G9000446	Proximity Switch	TL-W5MD2	4	Omron
PROX6	G9000450	Proximity Switch	E2E-X2D1-N	1	Omron
PS1	G9000445	Power Supply	S82K-01524	1	Omron
R1-4	G9000448	Resistor	FG020W5K J	2	Fuji
RE1	G9X00104	Rotary Encoder	E6A2-CS5C	1	Omron
RS1-3	G9000413	Reed Switch	D-H7BL	2	SMC
RS3, 4	G9000415	Magnetic Switch	GLS-1	2	Omron
RY1, 2	G9000449	Relay	MY4N-D2 w/PYF14A	1	Omron
SS1	G9000434	Selector Switch	AR22-R-210B	1	Fuji
SSR1-4	G9000443	Solid State Relay	G3NA-205B	2	Omron
SV1, 3	G9000427	Solenoid Valve	VFR2110-4DZC	1	SMC
SV2	G9000414	Solenoid Valve	VT325-024DLS	1	SMC
TC1-4	G9000198	Thermocouple	T-102 K-H0.32	2	
VR1, 2	G9000440	Variable Resistor	WA2WYA2SEBK 1K	2	Mitsu



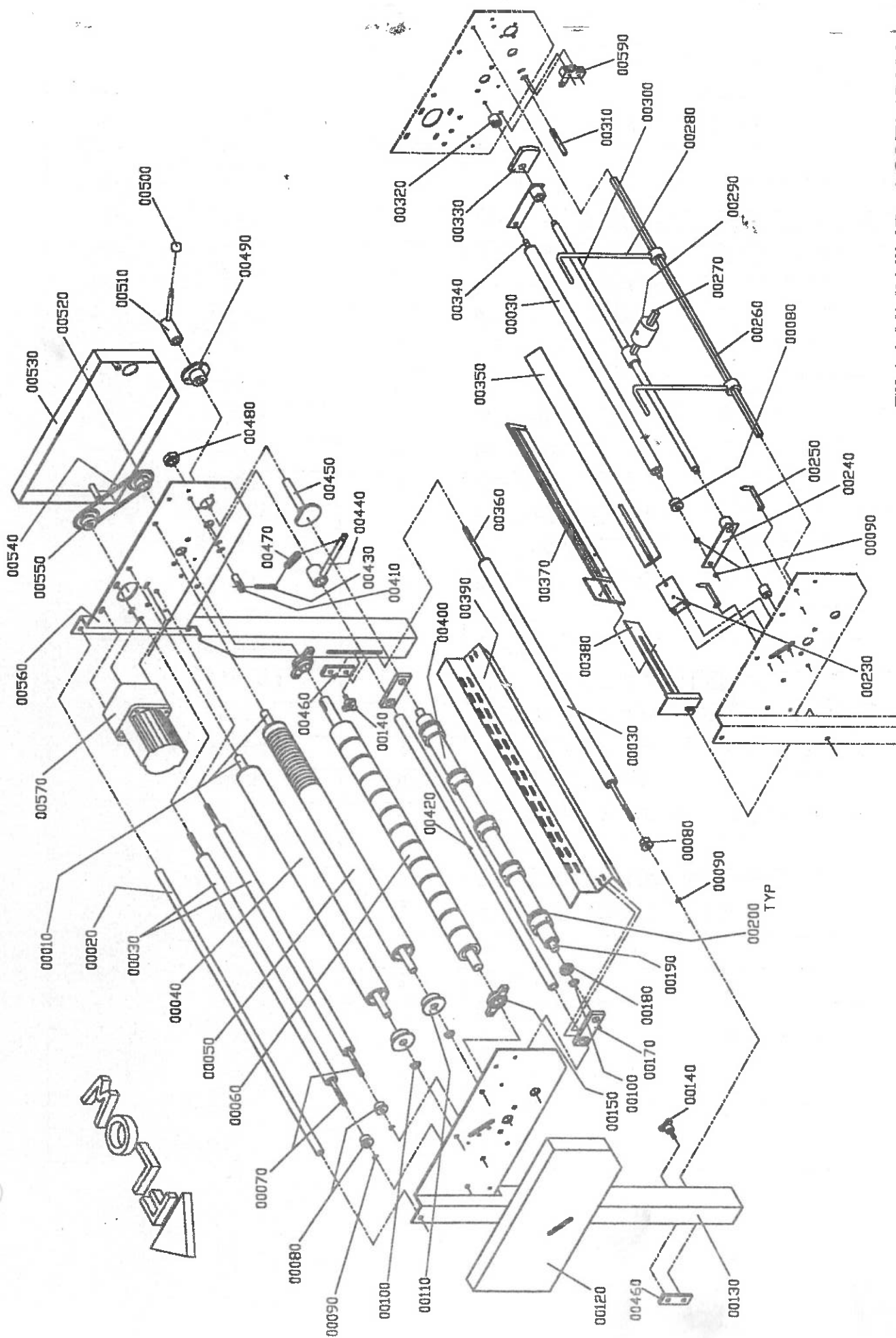
FRAME ASSEMBLY G4000330-1



Model HP-10z

Drawing G4000330-1 **FRAME ASSEMBLY**

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FILM UNWIND ASSEMBLY G4000348-1 (SN 41 & HIGHER)

Model HP-10z

Drawing G4000348-1 FILM FEED ASSEMBLY

Item No.	Part No.	Quantity	Description
00010	G1002917	2	SHAFT, FILM CRADLE ROLLER
00020	G1000055	1	ROD
00030	G1000072-1	4	ROLL, IDLER
00040	G2002914	1	ROLLER, FILM CRADLE, W/OUT GROOVES
00050	G2002913	1	ROLLER, FILM CRADLE, W/GROOVES
00060	G2000114-1	1	FILM DRIVE ROLLER
00070	G1000070-1	2	SHAFT, IDLER ROLL
00080	G1000073	8	BUSHING
00090	G9000071	10	SNAP RING
00100	G9000077	6	SNAP RING
00110	G1000078	4	BUSHING
00120	G4000081	1	COVER
00130	G4000064-1	1	SUPPORT BRACKET
00140	G9000121	2	HAND KNOB
00150	G9000126	2	BEARING, 2 HOLE FLANGE
00170	G1000059	2	BRACKET
00180	G9000067	2	BEARING
00190	G1000066-1	1	SHAFT, ROLLER, FILM PINCH
00200	G1000091-1	4	PERF. WHEEL, (USE W/SPONGE WHEEL)
	G1000091-2	4	PERF. WHEEL, SINGLE "O"-RING STYLE
00210	G1000092	20	PIN (P/O ITEM 00200)
00220	G1000118	4	SPONGE WHEEL(USE W/G1000091-1 ONLY)
00230	G1000061	1	BRACKET
00240	G2000089	2	BRACKET, DANCER COLLAR
00250	G1000079	2	STATIC DISCHARGE POINT
00260	G1000098-1	1	ROD
00270	G1000056	1	SHAFT
00280	G2000099	2	FILM GUIDE
00290	G1000054	1	WEIGHT
00300	G1000052	1	PIVOT, SHAFT DANCER
00310	G1000063	1	STUD
00320	G1000086	2	HOUSING

Model HP-10z

Drawing G4000348-1 FILM FEED ASSEMBLY(Cont.)

Item No.	Part No.	Quantity	Description
00330	G1000084-1	1	CAM
00340	G1000069-1	1	SHAFT, DANCER ROLL
00350	G1000062	1	FILM SEPARATOR
00360	G1000068	1	SHAFT, IDLER ROLL
00370	G4000094	1	STATIC ELIMINATOR BRUSH
00380	G3000085	1	BRACKET
00390	G4000080	1	GUARD
00400	G1000065-1	1	ROLLER, FILM PINCH
00410	G1000060	1	SPRING FIXTURE
00420	G1000058	1	PIVOT SHAFT
00430	G1000090	1	SPRING ADJUSTMENT BOLT
00440	G1000093	1	RELEASE LEVER
00450	G1000104	1	CAM
00460	G1X00107	2	NUT PLATE
00470	G9000116	1	SPRING
00480	G1000057	1	NUT WASHER
00490	G1000101	1	BEARING
00500	G9000103	1	KNØB
00510	G2000102	1	HANDLE
00520	G1000119	1	SPROCKET
00530	G4000083	1	COVER
00540	G9000117	1	CHAIN
00550	G1000120	1	SPROCKET
00560	G4000082-1	1	SUPPORT BRACKET
00570	G9000416	1	GEAR MOTOR
00590	G9000447	1	SWITCH, ROLLER PLUNGER

Model HP-10z

Drawing G4000334-1 SEAL HEAD ASSEMBLY

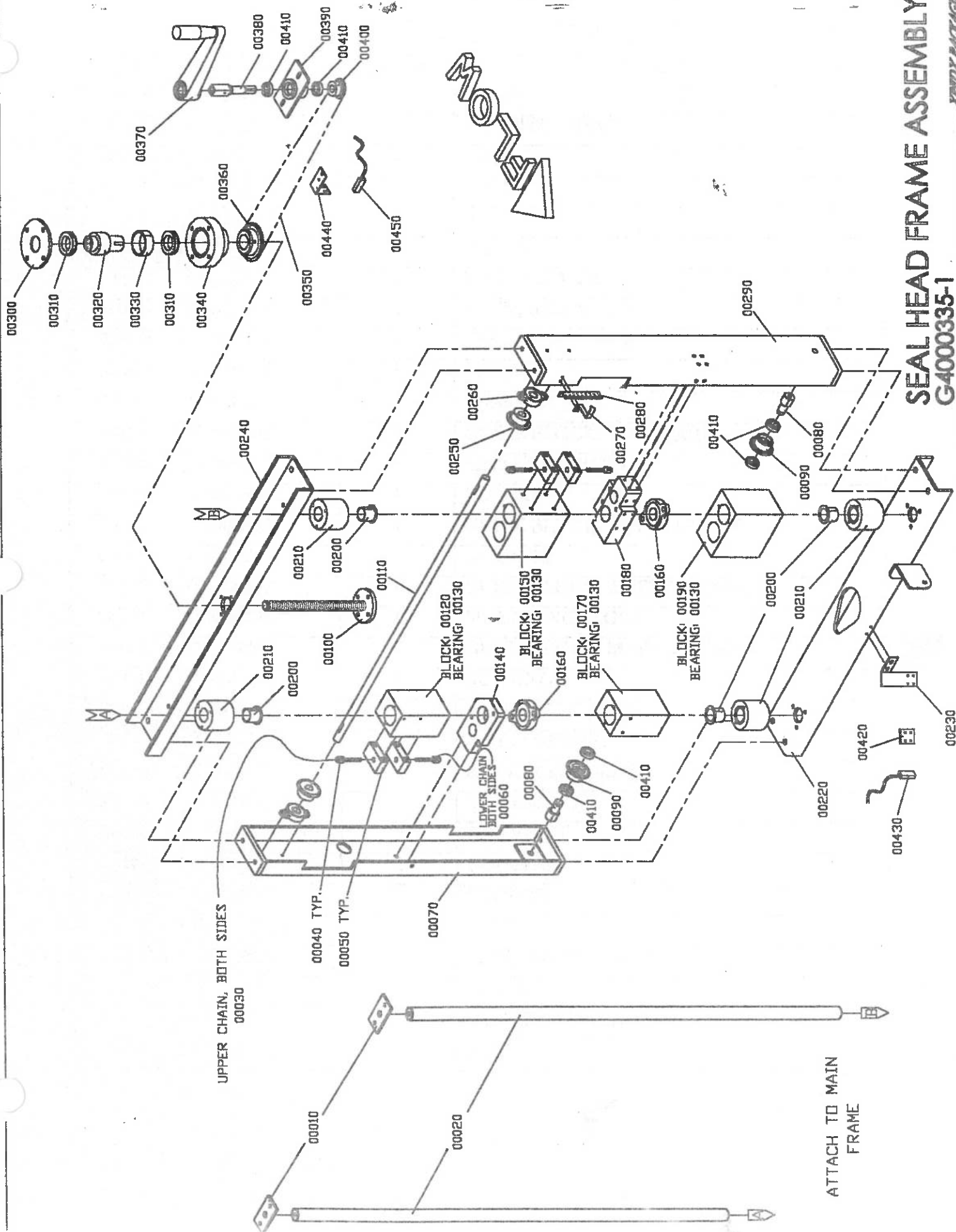
Item No.	Part No.	Quantity	Description
00010	G4000270	1	T/D SEAL BAR SUPPORT
00020	G3000269	1	T/D FILM CLAMP, INNER
00030	G9000198	2	THERMOCOUPLE
00040	G2000264	1	T/D BAR MOUNT ASSEMBLY
00050	G2000260	1	T/D SEAL BLADE INSERT
00060	G3000262	1	T/D SEALBAR BODY, SET
00070	G9000200	1	T/D HEATER CARTRIDGE
00080	G1000199	6	INSULATOR
00090	G3000268	1	T/D FILM CLAMP, OUTER
00100	G3000266	1	M/D FILM CLAMP, INNER
00110	G1000195	4	STUD
00120	G9000174	4	SPRING
00130	G1000179	4	BLOCK
00140	G1000173	4	SENSOR PLATE
00150	G9000196	4	SAFETY SWITCH
00160	G1000170	4	INSULATOR
00170	G1000185	4	MOUNTING PLATE
00180	G9000197	1	M/D HEATER CARTRIDGE
00190	G2000265	1	M/D BAR MOUNT ASSEMBLY
00200	G2000259	1	M/D SEAL BLADE INSERT
00210	G3000263	1	M/D SEAL BAR BODY, SET
00220	G3000267	1	M/D FILM CLAMP, OUTER
00230	G3000271	1	M/D SEAL HEAD SUPPORT
000240	G1000182	1	T/D SEAL PAD
00250	G2000181	1	T/D SEAL ANVIL
00260	G1000184	1	SIDE PLATE
00270	G4000261	1	T/D ANVIL SUPPORT BAR
00280	G2000290	1	BLOCK
00290	G9000309	1	FLOATING JOINT
00300	G1000193	2	SIDE PLATE
00310	G9000303	1	AIR CYLINDER
00320	G1000192	1	M/D SEAL PAD

Model HP-10z

Drawing G4000334-1

Drawing G4000334-1 **SEAL HEAD ASSEMBLY**(Cont.)

[illegible]



SEAL HEAD FRAME ASSEMBLY G4000335-1

Model HP-10z

Drawing G4000335-1 SEAL HEAD FRAME ASSEMBLY

Item No.	Part No.	Quantity	Description
00010	G1000277	2	PLATE
00020	G1000276	2	POLISHED SHAFT
00030	G1000307	2	CHAIN
00040	G1000279	4	STUD
00050	G1000278	4	BLOCK
00060	G1000306	2	CHAIN
00070	G4000301	1	SIDE FRAME, REAR
00080	G1000275	2	STUD, IDLER
00090	G1000274	2	SPROCKET, IDLER
00100	G2000289	1	SCREW
00110	G1000280	1	SHAFT
00120	G3000298	1	GUIDE BLOCK, TOP REAR
00130	G9000308	8	LINEAR BEARING
00140	G2000286	1	BLOCK
00150	G3000295	1	GUIDE BLOCK, TOP FRONT
00160	G1000283	2	BUSHING
00170	G3000297	1	GUIDE BLOCK, BOTTOM REAR
00180	G2000293	1	MOUNTING BLOCK
00190	G3000296	1	GUIDE BLOCK, BOTTOM FRONT
00200	G9000339	4	BUSHING
00210	G2000292	4	BUSHING HOUSING
00220	G4000300	1	BOTTOMFRAME
00230	G1000273	1	SENSOR BRACKET
00240	G3000299	1	TOP FRAME
00250	G1000281	2	SPROCKET
00260	G9000342	2	BEARING
00270	G1000282	1	POINTER
00280	G1000332	1	RULER
00290	G4000302	1	SIDE FRAME, FRONT
00300	G2000291	1	PLATE
00310	G9000338	2	THRUST BEARING
00320	G1000284	1	NUT

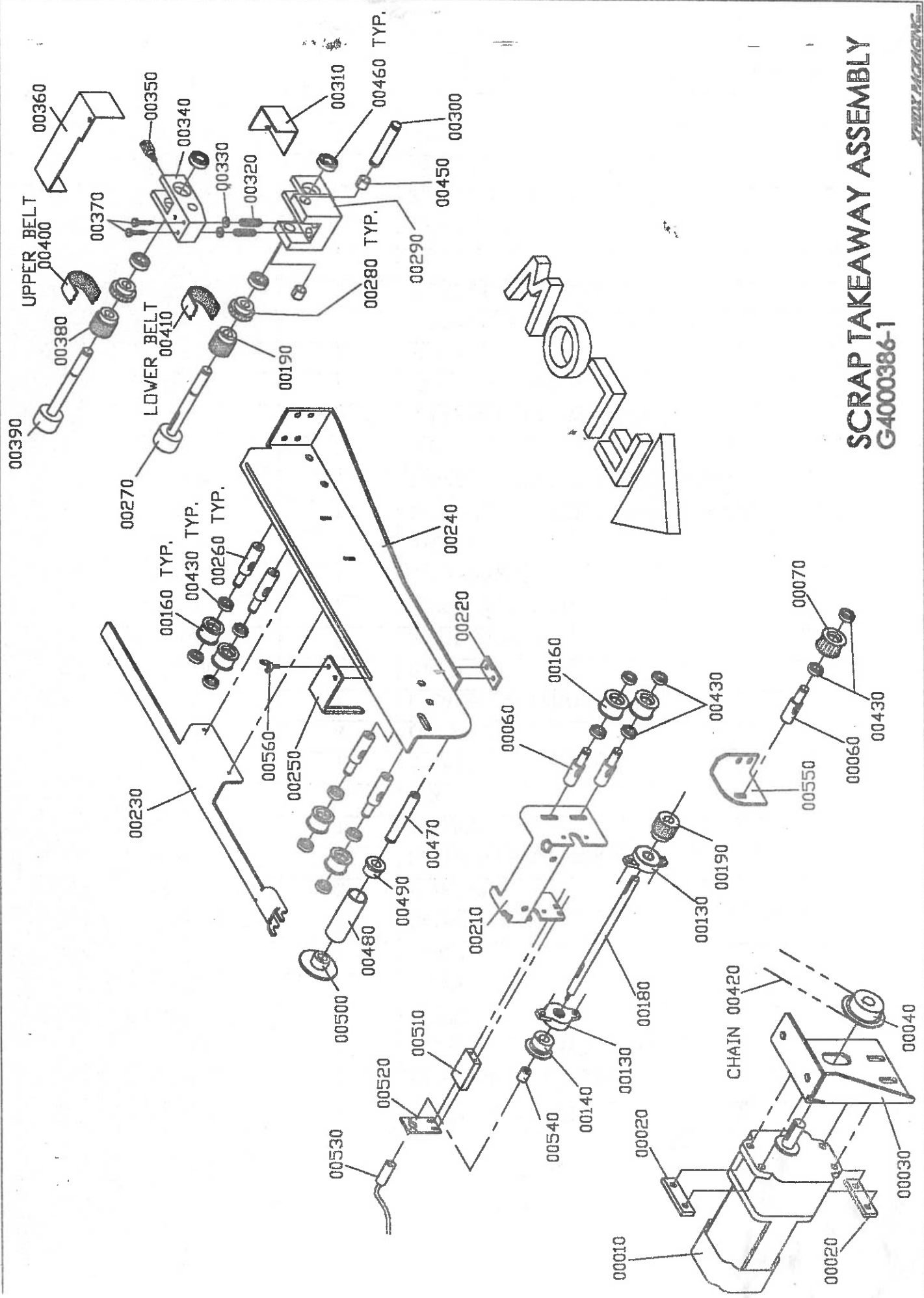
Model HP-10z

Drawing G4000335-1

SEAL HEAD FRAME ASSEMBLY(cont.)

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SCRAP TAKEAWAY ASSEMBLY G4000386-1



Model HP-10z

Drawing G4000386-1 SCRAP TAKEAWAY ASSEMBLY

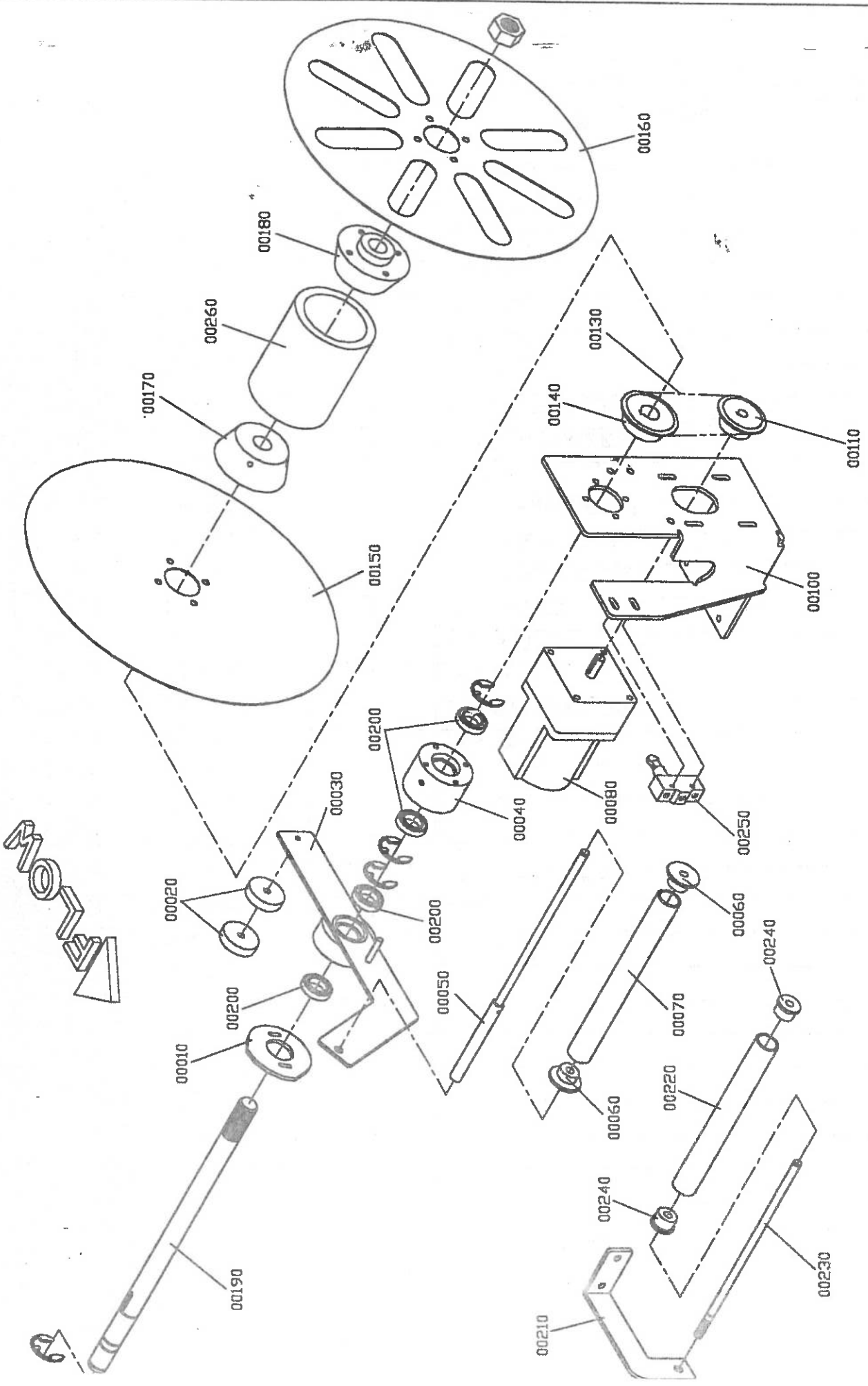
Item No.	Part No.	Quantity	Description
00010	G9000125	1	MOTOR
00020	G1000163	2	NUT PLATE
00030	G2000158-1	1	BRACKET, MOTOR MOUNT
00040	G1000202	1	SPROCKET
00060	G1001354	1	STUD
00070	G1000112	1	IDLER PULLEY, FLANGED
00130	G9000135	2	BEARING, ASAHI FLANGE
00140	G1000201	1	SPROCKET
00150	G1000219	1	BRACKET, PROX. MOUNT
00160	G1000115	6	IDLER PULLEY, SMOOTH
00180	G1000138-1	1	SHAFT
00190	G1000206	2	DRIVE PULLEY, HTD TIMING BELT
00210	G4X00103	1	BRACKET, DRIVE SHAFT MOUNTING
00220	G1000107	1	NUT PLATE
00230	G3000318-1	1	PRESSURE PLATE
00240	G3000387	1	TAKE-AWAY BRACKET
00250	G2000096	1	SCRAP FINGER
00260	G1000110	4	STUD
00270	G1000175	1	LOWER PINCH ROLLER
00280	G1000111	2	OPEN GEAR
00290	G2000258	1	BLOCK
00300	G1000105	1	PIN
00310	G1000322	1	GUARD
00320	G9000106	2	SPRING COMPRESSION
00330	G1000220	2	WASHER
00340	G1000257	1	BLOCK
00350	G1000212	1	KNOB
00360	G2000321	1	GUARD
00370	G1000218	2	SCREW
00380	G1000207	1	PULLEY, HTD TIMING BELT
00390	G1000131	1	UPPER PINCH ROLLER
00400	G9000132	1	UPPER BELT, 465J

Model HP-10z

Drawing G4000386-1

SCRAP TAKEAWAY ASSEMBLY(Cont.)

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SCRAP REWIND ASSEMBLY

G4000331-1

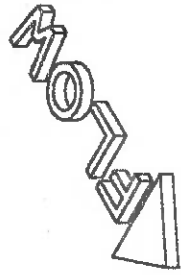
Model HP-10z

Drawing G4000331-1

SCRAP REWIND ASSEMBLY

Item No.	Part No.	Quantity	Description
00010	G1000238	1	CAM
00020	G1000234	2	COUNTER WEIGHT
00030	G3000255	1	DANCER ARM
00040	G2000252	1	BEARING HOUSING
00050	G2000253	1	DANCER ROD
00060	G1000242	2	ROLLER
00070	G1000243	1	ROLLER
00080	G9000244	1	MOTOR
00100	G3000254	1	MOTOR MOUNT
00110	G9000240	1	DRIVE SPROCKET
00130	G9000239	1	CHAIN
00140	G9000241	1	DRIVEN SPROCKET
00150	G2000248	1	SPOOL END, INNER
00160	G2000249	1	SPOOL END, OUTER
00170	G2000250	1	HUB, INNER
00180	G2000251	1	HUB, OUTER
00190	G2000245	1	SHAFT
00200	G9000472	4	BEARING, NSK 6804Z
00210	G2000482	1	BRACKET
00220	G1000480	1	ROLLER
00230	G1000481	1	AXLE
00240	G1000073	2	HUB
00250	G9000447	1	ROLLER PLUNGER
00260	G1X00028	1	CORE
00270	G9X00029	4	"E" CLIP

THEORY



Model HP-10z

Drawing G4000462-1

OUTFEED CONVEYOR ASSEMBLY

Item No.	Part No.	Quantity	Description
00010	G3000333	1	PLATE, W/TAPE
00020	G2000329	1	GUARD
00030	G1000214	2	BRACKET
00040	G1000337	1	SHAFT
00050	G1000336	2	ROLLER
00060	G1000233	2	COLLAR
00070	G1000209	1	SHAFT
00080	G9000461	4	BEARING, 6901Z
00090	G1000190	2	BLOCK
00100	G9000342	2	BEARING
00110	G9000304	2	SPROCKET
00120	G2000217	1	ROLL, RUBBER
00130	G1000325	6	ROLLER
00140	G1000326	6	SHAFT
00150	G1000328	12	BUSHING, ROLLER
00160	G2000215	1	BRACKET
00170	G2000272	1	BRACKET
00180	G1000216	2	SPACER
00190	G1000163	2	NUT PLATE
00200	G9000125	1	MOTOR
00210	G4000341	1	FRAME
00220	G2000208	1	BRACKET
00230	G1000171	1	ROLL BRACKET
00240	G1000189	2	STUD
00250	G1000186	1	SHAFT
00260	G1000188	1	BAR
00270	G1000187	1	BAR
00280	G1000210	1	ROLLER BRACKET
00290	G9000409	1	APRON
00300	G9000408	1	CHAIN

Model HP-10z

Drawing G4000191-1 INFEED CONVEYOR ASSEMBLY

Item No.	Part No.	Quantity	Description
00010	G9000149	1	CONVEYOR BELT
00020	G9000161	1	DRIVE CHAIN
00030	G2000610	1	SCREW BLOCK
00040	G1000205	1	SCREW ROD
00050	G9000412	1	PHOTOEYE, (SET)
00060	G1000313	2	NUT PLATE
00070	G1000314	2	PLATE
00080	G1000315	2	BRACKET
00090	G9000097	3	WING NUT
00100	G3000613	1	CONVEYOR BED PLATE
00110	G2000150	1	LOWER FILM FORMER
00120	G2000159	1	BAR
00130	G1000228	2	NUT PLATE
00140	G1000160	1	NUT PLATE
00150	G2000611-1	1	DRIVE ROLLER
00160	G2000612-1	1	GUARD
00170	G2000613-1	1	GUARD
00180	G0000614	1	MOTOR MOUNT
00220	G1000223	2	SLIDE ROD
00230	G9000125	1	MOTOR & REDUCER
00240	G1000167	4	NUT PLATE
00250	G9000410	4	PILLOW BLOCK BUSHING
00260	G1000162	2	BLOCK
00270	G9000620	2	BEARING
00280	G2000615	1	SCALE
00290	G2000141	1	MOUNTING BLOCK
00300	G2000224	1	GUIDE
00310	G1000317	1	POINTER
00320	G1000226	1	POINTER
00330	G3000616	1	UPPER FILM FORMER
00340	G9000147	1	HANDWHEEL
00350	G1000229	1	SCREW

Model HP-10z

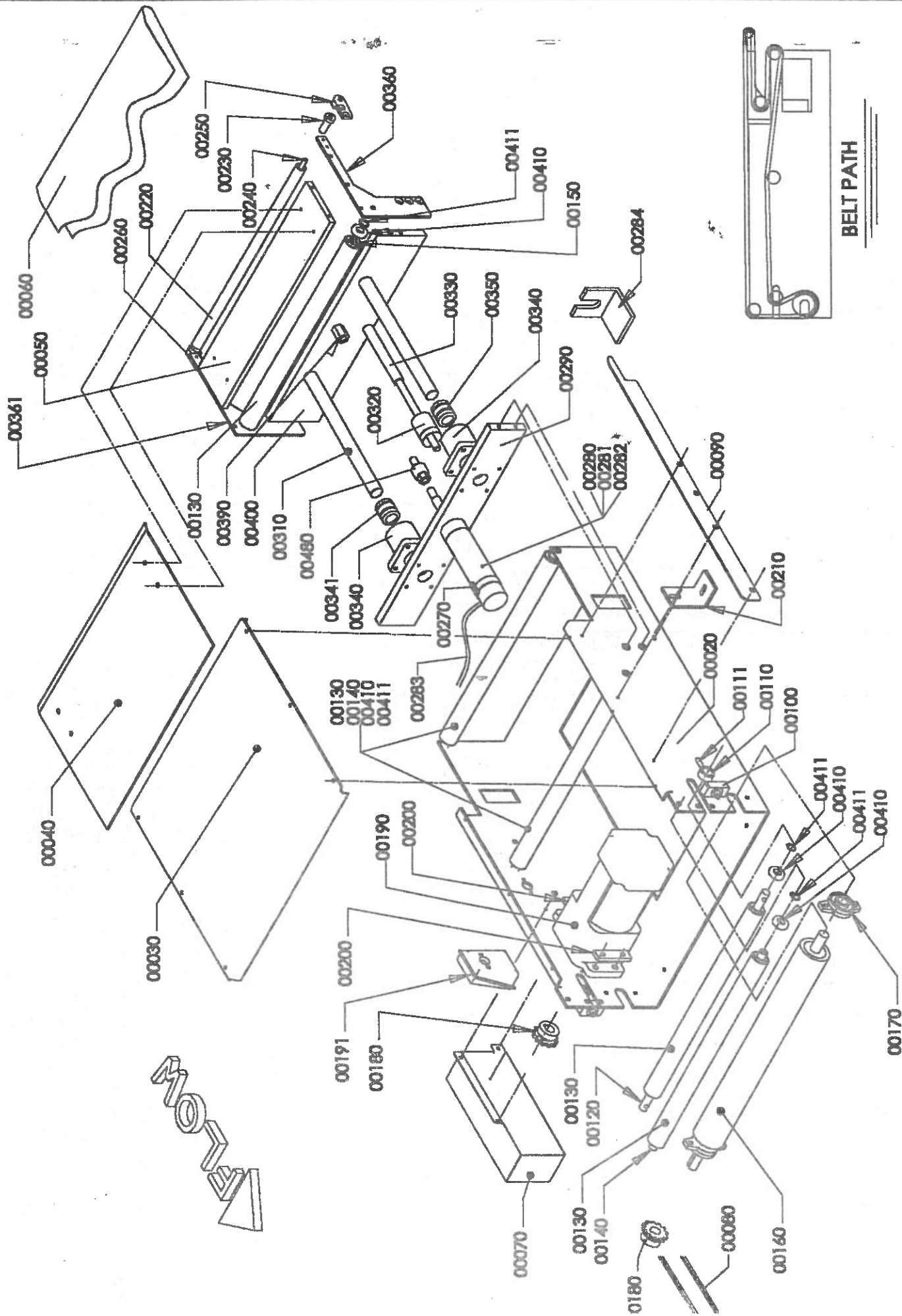
Drawing G4000191-1 INFEEED CONVEYOR ASSEMBLY(Cont.)

Item No.	Part No.	Quantity	Description
00360	G1000143	2	SLIDE ROD
00370	G9000135	3	2 HOLE BEARING
00380	G1000227	1	PLATE
00390	G9000621	2	GARLOCK BUSHING
00400	G1000388	1	ROLLER TUBE
00410	G1000389	1	ROLLER SHAFT
00420	G9000327	2	CIRCLIP
00430	G1000328	2	BUSHING
00441	G10001174	1	ROLLER BRACKET, FRONT
00442	G10001175	1	ROLLER BRACKET, REAR
00450	G3000391	1	BRACKET
00460	G1000324	1	PHOTOEYE BRACKET
00470	G2000617	1	PHOTOEYE BRACKET
00480	G1000148	1	BAR
00490	G1000316	1	UPPER FILM SUPPORT ROD
00500	G1000123	1	BLOCK
00510	G1000230	1	ROLLER TUBE
00520	G9000461	2	BEARING
00530	G9000077	2	SNAP RING
00540	G1000232	1	ROLLER SHAFT
00550	G1000233	2	COLLAR
00560	G1000225	1	BRACKET
00570	G3000618	1	GUARD
00580	G1000166	1	BRACKET
00590	G4000088-1	1	FRAME
00600	G3000619	1	PAN
00610	G9000304	2	SPROCKET, RS35B12
00620	G1003743		
00630	G1X00003	1	ROLLER TUBE, IDLER
00631	G1X00100-1	1	SHAFT, IDLER
00632	G9X00005	2	BUSHING
00640	G2X00021-1	1	IDLER ROLLER MOUNTING BRACKET

Model HP-10z

Drawing G4000191-1 **INFEED CONVEYOR ASSEMBLY(Cont.)**

Item No.	Part No.	Quantity	Description
00650	G1X00001	2	NOSE ROLLER SHAFT
00651	G1X00098	1	SHAFT
00652	G1X00099	4	BEARING
00653	G9X00102	4	FENDER WASHER
00654	G1000124-1	2	BUSHING HOUSING, CENTER/FRONT
00655	G1000140-1	1	BUSHING HOUSING, REAR



OPTIONAL OUTFEED SLIDE CONVEYOR G4000607-1

Model HP-10z**OPTIONAL****Drawing G4000607-1 OUTFEED SLIDE CONVEYOR**

Item No.	Part No.	Quantity	Description
00010			
00020	G4000494	1	FRAME
00030	G2000486	1	BED PLATE
00040	G3000485	1	SLIDE BED
00050	G2000487	1	CROSS MEMBER
00060	G9000483	1	CONVEYOR BELT
00070	G2000329	1	GUARD
00080	G9000408	1	CHAIN
00090	G2000484	1	GUIDE
00100	G1000190	2	BLOCK
00110	G1000233	2	COLLAR
00111	G9X00045	2	TENSION BOLT AND RETAINER
00120	G1000209	1	TENSION ROLLER SHAFT
00130	G1000336	5	ROLLER TUBE
00140	G1000337	3	ROLLER SHAFT
00150	G1000488	1	ROLLER SHAFT
00160	G2000217	1	DRIVE ROLLER
00170	G9000342	2	BEARING
00180	G9000304	2	SPROCKET
00190	G9000125	1	MOTOR
00191	G9X00044	1	JUNCTION BOX
00200	G1000163	2	NUT PLATE
00210	G1000214	2	MOUNTING FOOT
00220	G1000188	1	NOSE ROLLER TUBE
00230	G1000189	2	BUSHING
00240	G1000186	1	ROLLER SHAFT
00250	G1000489	1	BRACKET
00260	G1000490	1	BRACKET
00270	G9000413	1	MAGNETIC REED SWITCH

Model HP-10z

OPTIONAL

Drawing G4000607-1 **OUTFEED SLIDE CONVEYOR(Cont.)**

Item No.	Part No.	Quantity	Description
00280	G9000493	1	AIR CYLINDER
00281	G9000427	1	SOLENOID VALVE
00282		2	FLOW RESTRICTER
00283	G9000759	1	AIR TUBING
00290	G2000491	1	CROSS MEMBER
00300	G2000492	1	BRACKET CROSS MEMBER
00310	G1000496	2	LINEAR SHAFT
00320	G1000497	1	STROKER LIMITER
00330	G2000498	1	THREADED ROD
00340	G2000499	2	BUSHING HOUSING
00341	G9004682	1	BUSHING, FL-12
00350	G9004682C	1	BUSHIN, COMPENSATING FLC-12
00360	G2000602	1	CARRIAGE SIDE PLATE, FRONT
00361	G2001048	1	CARRAIGE SIDE PLATE, REAR
00390	G1004680	1	COUPLING, CYLINDER M/F
00400	G2004530	1	BRACKET CROSS MEMBER
00410	G9000461	10	BEARING
00411	G9002394	8	EXTERNAL SNAP RING
00480	G9004547	1	FLOATING JOINT COUPLING

Parameter List

PARAMETERS

Function	Parameter Number	Name	Setting Range	Minimum Setting Increments	Factory Setting	Data Code (Note 8)		Refer To:
						Read	Write	
Basic functions	0	Torque boost (Note 1)	0 to 30%	0.1%	6%	00	80	56
	1	Maximum frequency	0 to 120Hz	0.01Hz(Note 3)	120Hz	01	81	57
	2	Minimum frequency	0 to 120Hz	0.01Hz(Note 3)	0Hz	02	82	57
	3	Base frequency(Note 1)	0 to 400Hz	0.01Hz(Note 3)	60Hz	03	83	58
	4	Multi-speed setting (high speed)	0 to 400Hz	0.01Hz(Note 3)	60Hz	04	84	59
	5	Multi-speed setting (middle speed)	0 to 400Hz	0.01Hz(Note 3)	30Hz	05	85	59
	6	Multi-speed setting (low speed)	0 to 400Hz	0.01Hz(Note 3)	10Hz	06	86	59
	7	Acceleration time	0 to 3600 s/ 0 to 360 s	0.1 s/ 0.01 s	5 s/10s (Note 4)	07	87	60
	8	Deceleration time	0 to 3600 s/ 0 to 360 s	0.1 s/ 0.01 s	5 s/10s (Note 4)	08	88	60
Standard operation functions	9	Electronic thermal O/L relay	0 to 500A	0.01A	Rated output current (Note 5)	09	89	62
	10	DC injection brake operation frequency	0 to 120Hz	0.01Hz(Note 3)	3Hz	0A	8A	63
	11	DC injection brake operation time	0 to 10 s	0.1 s	0.5 s	0B	8B	63
	12	DC injection brake voltage	0 to 30%	0.1%	6%	0C	8C	63
	13	Starting frequency	0 to 60Hz	0.01Hz	0.5Hz	0D	8D	64
	14	Load pattern selection (Note 1)	0 to 3	1	0	0E	8E	64
	15	Jog frequency	0 to 400Hz	0.01Hz(Note 3)	5Hz	0F	8F	66
	16	Jog acceleration/deceleration time	0 to 3600 s/ 0 to 360 s	0.1 s/ 0.01 s	0.5 s	10	90	66
	18	High-speed maximum frequency	120 to 400Hz	0.1Hz	120Hz	12	92	57
	19	Base frequency voltage (Note 1)	0 to 1000V, 8888, 9999	0.1V	9999	13	93	58
	20	Acceleration/deceleration reference frequency	1 to 400Hz	0.01Hz(Note 3)	60Hz	14	94	60
	21	Acceleration/deceleration time increments	0.1	1	0	15	95	60
	22	Stall prevention operation level	0 to 200%	0.1%	150%	16	96	67
	23	Stall prevention operation level at double speed (Note 6)	0 to 200%, 9999	0.1%	9999	17	97	67
	24	Multi-speed setting (speed 4)	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	18	98	59
	25	Multi-speed setting (speed 5)	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	19	99	59
	26	Multi-speed setting (speed 6)	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	1A	9A	59
	27	Multi-speed setting (speed 7)	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	1B	9B	59
	29	Acceleration/deceleration pattern	0,1,2	1	0	1D	9D	69
	30	Regenerative function selection	0,1	1	0	1E	9E	70
	31	Frequency jump 1A	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	1F	9F	71
	32	Frequency jump 1B	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	20	A0	71
	33	Frequency jump 2A	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	21	A1	71
	34	Frequency jump 2B	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	22	A2	71
	35	Frequency jump 3A	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	23	A3	71
	36	Frequency jump 3B	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	24	A4	71
	37	Speed display	0, 0.01 to 9998	0.001 r/min	0	25	A5	72
	38	Frequency at 5V (10V) input	1 to 400Hz	0.01Hz(Note 3)	60Hz(Note 2)	26	A6	73
	39	Frequency at 20mA input	1 to 400Hz	0.01Hz(Note 3)	60Hz(Note 2)	27	A7	73
Output terminal functions	41	Up-to-frequency sensitivity	0 to 100%	0.1%	10%	29	A9	74
	42	Output frequency detection	0 to 400Hz	0.01Hz(Note 3)	6Hz	2A	AA	74
	43	Output frequency detection for reverse rotation	0 to 400Hz, 9999	0.01Hz(Note 3)	9999	2B	AB	74

PARAMETERS

Function	Parameter Number	Name	Setting Range	Minimum Setting Increments	Factory Setting	Data Code (Note 8)		Refer To:
						Read	Write	
Sond functions	44	Second acceleration/deceleration time	0 to 3600 s / 0 to 360 s	0.1 s / 0.01 s	5 s/10 s (Note 4)	2C	AC	60
	45	Second deceleration time	0 to 3600 s / 0 to 360 s, 9999	0.1 s / 0.01 s	9999	2D	AD	60
	46	Second torque boost (Note 1)	0 to 30%, 9999	0.1%	9999	2E	AE	56
	47	Second V/F (base frequency) (Note 1)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	2F	AF	58
	48	Second electronic overcurrent protection	0 to 500A, 9999	0.01A	9999	30	B0	62
Display functions	52	DI/PI main display data selection	0,2,3,100	1	0	34	B4	75
	54	PI terminal function selection	0,1,2	1	0	36	B6	75
	55	Frequency monitoring reference	0 to 400Hz	0.01Hz (Note 3)	60Hz	37	B7	77
	56	Current monitoring reference	0 to 500A	0.01A	Rated output current	38	B8	77
Automatic restart functions	57	Restart coasting time	0 to 5 s, 9999	0.1 s	9999	39	B9	78
	58	Restart cushion time	0 to 60 s	0.1 s	1.0 s	3A	BA	78
Additional function	59	Remote setting function selection	0,1,2	1	0	3B	BB	79
Operation selection functions	60	Shortest acceleration/deceleration mode	0,1,2,11,12	1	0	3C	BC	80
	61	Reference current	0 to 500A, 9999	1A	9999	3D	BD	81
	62	Reference current for acceleration	0 to 200%, 9999	1%	9999	3E	BE	81
	63	Reference current for deceleration	0 to 200%, 9999	1%	9999	3F	BF	81
	65	Retry selection	0,1,2,3	1	0	41	C1	82
	66	Stall prevention operation level reduction starting frequency (Note 6)	0 to 400Hz	0.01Hz (Note 3)	60Hz	42	C2	67
	67	Number of retries at alarm occurrence	0 to 10, 101 to 110	1	0	43	C3	82
	68	Retry waiting time	0.1 to 360 s	0.1 s	1 s	44	C4	82
	69	Retry count display erasure	0	1	0	45	C5	82
	70	Special regenerative brake duty	0 to 30%	0.1%	0%	46	C6	70
	71	Applied motor (Note 6)	0,1,3,5,6, 13,15,16, 23,100,101, 103,113, 123,105,115, 106,116	1	0	47	C7	84
	72	PWM frequency selection	0 to 15	1	1	48	C8	85
	73	0-5V/0-10V selection	0,1	1	0	49	C9	86
	74	Filter time constant	0 to 8	1	1	4A	CA	87
	75	Reset selection/disconnected PU detection/PU stop selection	0 to 3,14 to 17	1	14	4B	CB	87
	77	Parameter write disable selection	0,1,2	1	0	4D	CD	89
	78	Reverse rotation prevention selection	0,1,2	1	0	4E	CE	90
	79	Operation mode selection (Note 6)	0 to 4,6 to 8	1	1	4F	CF	91
Motor constants	80	Motor capacity	0.1 to 7.5kW, 9999	0.01kW	9999	50	D0	84
	82	Motor exciting current	0 to 500A, 9999	0.01A	9999 (Note 3)	52	D2	95
	83	Rated motor voltage	0 to 1000V	0.1V	200V	53	D3	95
	84	Rated motor frequency	50 to 120Hz	0.01Hz (Note 3)	60Hz	54	D4	95
	90	Motor constant (R1) (Note 6)	0 to 50Ω, 9999	0.001Ω	9999	5A	DA	95
	96	Auto-tuning setting/status (Note 6)	0, 1	1	0	60	E0	95

PARAMETERS

Function	Parameter Number	Name	Setting Range	Minimum Setting Increments	Factory Setting	Data Code (Note 8)		Refer To:
						Read	Write	
Communication functions	117	Station number	0 to 31	1	0	11	91	101
	118	Communication speed	48,96,192	1	48	12	92	101
	119	Stop bit length/data length	0,1 (data length 8) 10,11 (data length 7)	1	1	13	93	101
	120	Parity check presence/absence	0,1,2	1	2	14	94	101
	121	Number of communication retries	0 to 10,9999	1	1	15	95	101
	122	Communication check time interval	0 to 999.8 s, 9999	0.1 s	0	16	96	101
	123	Waiting time setting	0 to 150, 9999	1	9999	17	97	101
	124	CR, LF presence/absence selection	0,1,2	1	1	18	98	101
PID control	128	PID action selection	0,20,21	1	0	1C	9C	112
	129	PID proportional band	0.1 to 1000%, 9999	0.1%	100%	1D	9D	112
	130	PID integral time	0.1 to 3600 s, 9999	0.1 s	1 s	1E	9E	112
	131	Upper limit	0 to 100%, 9999	1%	9999	1F	9F	112
	132	Lower limit	0 to 100%, 9999	1%	9999	20	A0	112
	133	PID action set point for PU operation	0 to 100%	1%	0%	21	A1	112
	134	PID differential time	0.01 to 10.00 s, 9999	0.01 s	9999	22	A2	112
Additional function	146	frequency setting command selection	0, 1, 9999	1	0	2E	AE	120
Current detection	150	Output current detection level	0 to 200%	0.1%	150%	32	B2	121
	151	Output current detection period	0 to 10 s	0.1 s	0	33	B3	121
	152	Zero current detection level	0 to 200.0%	0.1%	5.0%	34	B4	122
	153	Zero current detection period	0.05 to 1 s	0.01 s	0.5 s	35	B5	122
Sub function	156	Stall prevention operation selection	0 to 31,100	1	0	38	B8	123
Additional function	160	User group read selection	0, 1, 10, 11	1	0	00	80	125
Initial monitor	171	Actual operation hour meter clear	0	—	0	0B	8B	127
User functions	173	User group 1 registration	0 to 999	1	0	0D	8D	125
	174	User group 1 deletion	0 to 999,9999	1	0	0E	8E	125
	175	User group 2 registration	0 to 999	1	0	0F	8F	125
	176	User group 2 deletion	0 to 999,9999	1	0	10	90	125
Terminal assignment functions	180	RL terminal function selection	0 to 18	1	0	14	94	127
	181	RM terminal function selection	0 to 18	1	1	15	95	127
	182	RH terminal function selection	0 to 18	1	2	16	96	127
	183	MRS terminal function selection	0 to 18	1	6	17	97	127
	190	RUN terminal function selection	0 to 99	1	0	1E	9E	129
	191	FU terminal function selection	0 to 99	1	4	1F	9F	129
	192	A, B, C terminal function selection	0 to 99	1	99	20	A0	129

PARAMETERS

Function	Parameter Number	Name	Setting Range	Minimum Setting Increments	Factory Setting	Data Code (Note 8)		Refer To:
						Read	Write	
Multi-speed operation	232	Multi-speed setting (speed 8)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	28	A8	59
	233	Multi-speed setting (speed 9)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	29	A9	59
	234	Multi-speed setting (speed 10)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	2A	AA	59
	235	Multi-speed setting (speed 11)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	2B	AB	59
	236	Multi-speed setting (speed 12)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	2C	AC	59
	237	Multi-speed setting (speed 13)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	2D	AD	59
	238	Multi-speed setting (speed 14)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	2E	AE	59
	239	Multi-speed setting (speed 15)	0 to 400Hz, 9999	0.01Hz (Note 3)	9999	2F	AF	59
Sub functions	240	Soft-PWM setting	0, 1	1	1	30	B0	85
	244	Cooling fan operation selection	0, 1	1	0	34	B4	130
	245	Rated motor slip	0 to 50%, 9999	0.01%	9999	35	B5	131
	246	Slip compensation response time	0.01 to 10 s	0.01 s	0.5 s	36	B6	131
	247	Constant-output region slip compensation selection	0, 9999	1	9999	37	B7	131
	249	Ground fault detection at start	0, 1	1	0	39	B9	132
Stop selection function	250	Stop selection	0 to 100 s, 1000 to 1100 s, 8888, 9999	1	9999	3A	BA	133
Calibration functions	900	FM terminal calibration	—	—	—	5C	DC	135
	902	Frequency setting voltage bias	0 to 10V, 0 to 60Hz	0.01Hz	0V, 0Hz	5E	DF	137
	903	Frequency setting voltage gain	0 to 10V, 1 to 400Hz	0.01Hz	5V, 60Hz	5F	DE	137
	904	Frequency setting current bias	0 to 20mA, 0 to 60Hz	0.01Hz	4mA, 0Hz	60	E0	137
	905	Frequency setting current gain	0 to 20mA, 1 to 400Hz	0.01Hz	20mA, 60Hz	61	E1	137
	922	Built-in frequency setting potentiometer bias	0 to 5V, 0 to 60Hz	0.01Hz	0V, 0Hz	16H	96H	137
	923	Built-in frequency setting potentiometer gain	0 to 5V, 1 to 400Hz	0.01Hz	5V, 60Hz	17H	97H	137